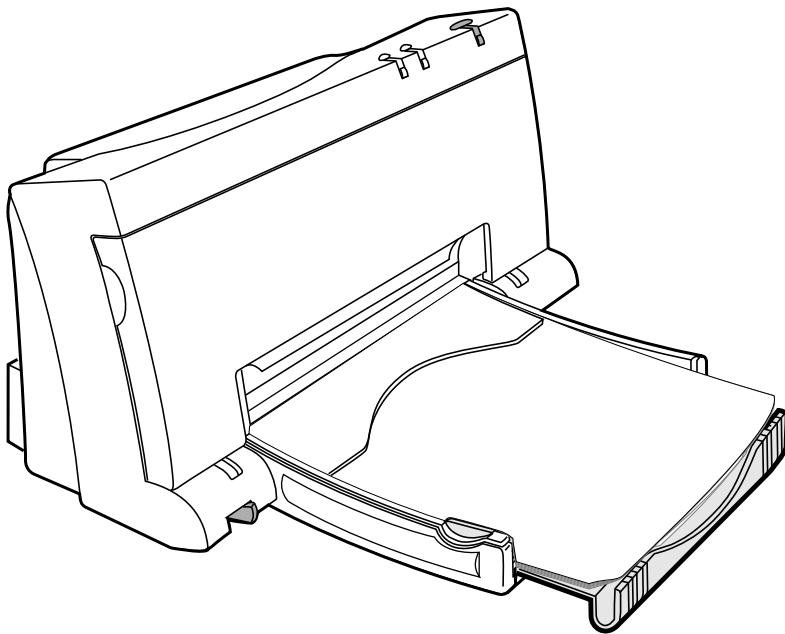


HP DeskJet 400 Printer Technical Support Solutions Guide



HP DeskJet 400 Printer Technical Support Solutions Guide



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Italic type is used for the titles of publications and for emphasis in a paragraph.

Warning

Warning text is used where danger to an individual can develop.

Caution

Caution text is used where a risk of damage to equipment can develop.

Note

Note text is used for special instructions.

About This Guide

This guide is designed as a reference for people who provide post-sale technical support to end-users of the HP DeskJet 400 printer. It represents a collection of information gathered from Hewlett-Packard's dealer and end-user support organizations. The purpose of this guide is to provide answers to frequently asked questions and solutions to common problems.

While the contents of this guide is quite comprehensive, it is not all inclusive. It is not a substitute for other types of product documentation, such as the *User's Guide* and *Quick Start*.

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Product Information

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Model Numbers and Product Positioning

Table 1-1. The HP DeskJet 400 Printer Model Numbers and Product Positioning

Printer	Model Number	Model Status	Product Positioning
<i>HP DeskJet 400 Printer</i>	C2642A C2642B	Available	Professional quality black printing and easy-to-add color printing option for the home and small office users.

Support Tools

Hewlett-Packard recommends the following tools for supporting HP DeskJet 400 printer.

- Dial caliper or accurate linear scale
- Tissue paper
- Cotton swabs
- Clean lint-free soft cloth
- Brush or small computer vacuum cleaner

Features and Benefits

Table 1-2. HP DeskJet 400 Printer Features and Benefits

Feature	Benefit
<i>Black output resolution:</i> <ul style="list-style-type: none">• 600 by 300 dots per inch	Letter-quality output at an affordable price.
<i>Prints on plain paper</i>	No special paper required.
<i>Drop-on-demand thermal inkjet printing</i>	Proven reliable, letter-quality, and quiet printing solution.
<i>Paper tray that is foldable</i>	Flexible media handling. The paper tray can load paper and transparencies automatically.
<i>2 to 3 pages per minute printing</i>	Fast generation of hard-copy output.
<i>Support for major MS DOS and Windows 3.1 and above applications</i>	Confidence in software compatibility.
<i>Supports color graphics output with major MS DOS applications</i>	Good coverage of the top-tier graphics packages in the DOS environment.
<i>Supports all Windows applications in color using the HP printer driver, included with the printer</i>	Confidence in software compatibility for color printing.
<i>The HP DeskJet 400 printer comes with the enhanced HP ColorSmart printer driver</i>	Produces vibrant colors at the touch of a button.
<i>High-quality color graphics capability</i>	Create high-quality color documents.
<i>Internal landscape fonts (for DOS)</i>	Useful for DOS spreadsheet applications.

Table 1-2. HP DeskJet 400 Printer Features and Benefits (Continued)

Feature	Benefit
<i>TrueType scalable fonts support in Windows using the HP printer driver included with the printer The HP DeskJet 400 also supports TrueType scalable fonts</i>	Create any size text needed in Windows 3.1.
<i>Grayscale output in Windows using the HP printer driver</i>	256 levels of grayscale with enhanced dithering using the current HP DeskJet 400 printer driver.
<i>Transparency support (black and color)</i>	Create effective high-quality presentations in black or color.
<i>Presentation quality color output capability using HP Premium Paper</i>	Print vibrant color documents.
<i>HP Premium Glossy Paper support (black and color)</i>	Create high-quality pages in black or color.
<i>Customer replaceable black print cartridge with water resistant ink</i>	Easy to replace. Smudge-resistant permanent ink.
<i>Compatible with the tri-chamber color print cartridge, part number 51625A (cyan, magenta, and yellow inks)</i>	Same convenient, clean, and easy to use solution as black, only for color printing.
<i>Print cartridge storage container available with the Color Kit</i>	Maintain a long life of letter-quality output from black and color print cartridges.

Views

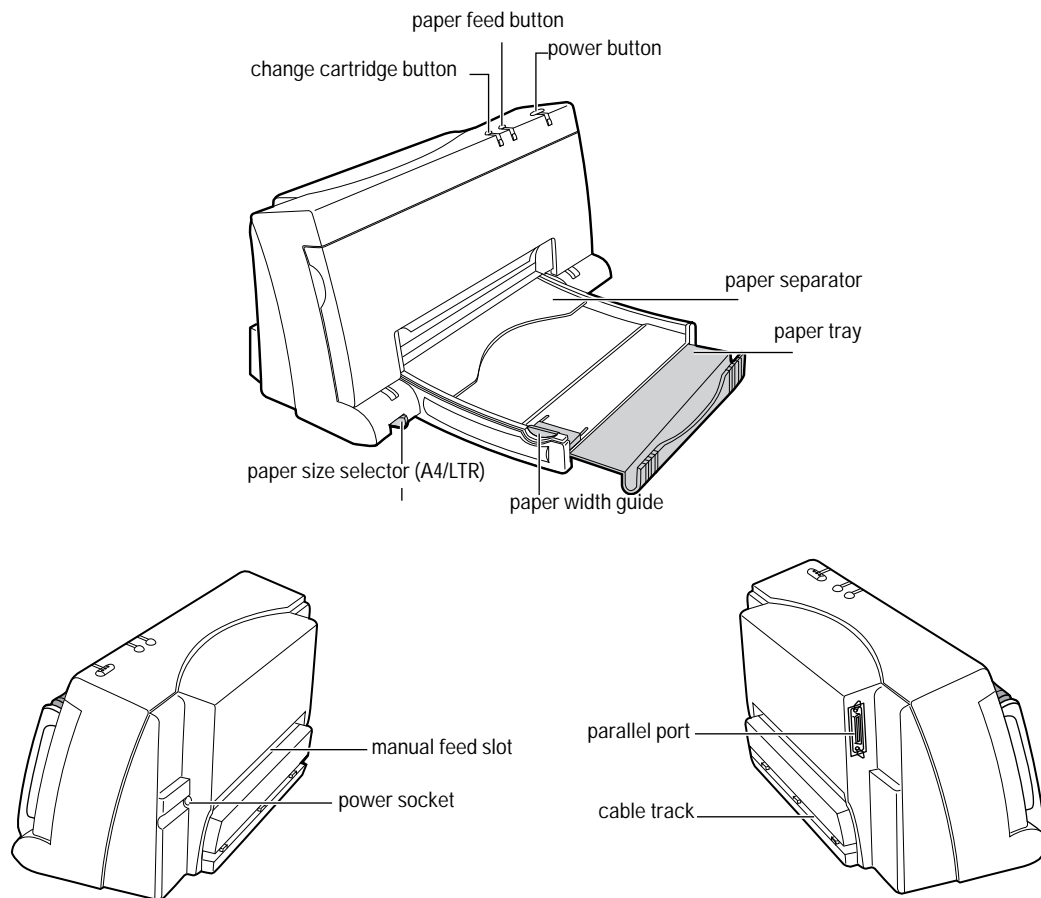


Figure 1-1. The HP DeskJet 400 Printer

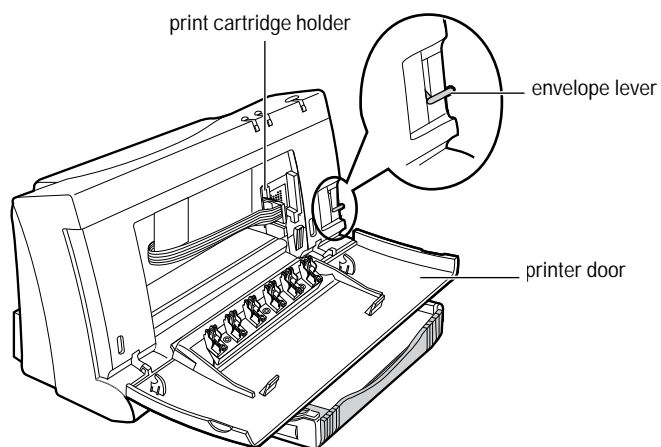


Figure 1-2. The HP DeskJet 400 Printer (Internal View)

Note

- For physical dimensions, see “Physical Specifications” later in this chapter.

Printer Options

The HP DeskJet 400 printer uses a power adapter. When replacing the power adapter, quote the power Adapter number listed below.

Table 1-3. HP DeskJet 400 Printer Options

Region or Country	HP DeskJet 400 Printer Option Number	Power Adapter Included	Language of User Documentation
Argentina	C2642A #AC8	9100-5129	US English/French/L.Spanish/B.Portuguese
Australia	C2642A #ABG	9100-5127	UK English
Canada/Brazil/Mexico	C2642A #ABM	8120-6732	US English/French/L.Spanish/B.Portuguese
Chile	C2642A #AKV	9100-5346	US English/French/L.Spanish/B.Portuguese
China	C2642A #AB2	9100-5129	Simplified Chinese
Central Europe	C2642A #ACT	8120-6731	German/French/Dutch/UK English
ECE	C2642 #AKG	8120-6731	Polish/Czech/Hungarian/Hebrew
Hong Kong	C2642A #AB5	9100-5348	UK English
Intercon	C2642A #ABK	8120-6731	UK English
India	C2642 #ACJ	9100-5128	UK English
Nordics	C2642A #ABN	8120-6731	Norwegian/Swedish/Danish/Finnish
Russia/Mediterranean	C2642A #ACB	8120-6731	Russian/Greek/Turkish/Arabic
Spain/Italy	C2642A #ABE	8120-6731	Spanish /Italian/Portuguese/UK English
South Africa	C2642A #ACQ	9100-5128	German/French/Dutch/UK English
Taiwan	C2642A #AB0	8120-6732	Traditional Chinese
United Kingdom	C2642A #ABU	9100-5131	German/French/Dutch/UK English
United Kingdom	C2642B #ABU	9100-5131	UK English
U.S.	C2642A #ABA	8120-6732	US English

Power Adapter Part Numbers

Table 1-4. Power Adapters

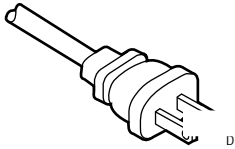
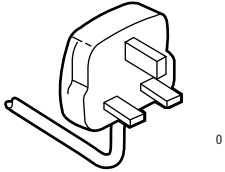
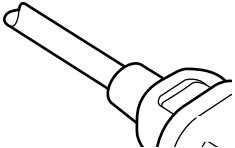
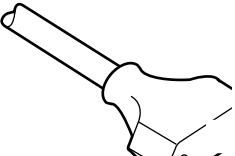
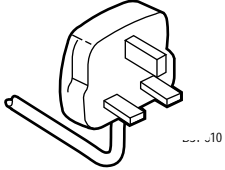
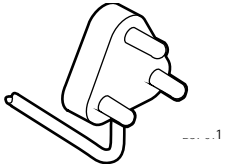
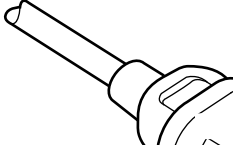
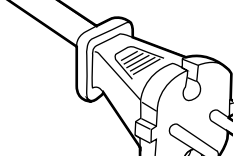
Plug Type	Country or Region	Power Adapter Part Number	Region's AC Voltage
	U.S. Canada Mexico Brazil	8120-6732	120 Vac
	Hong Kong	9100-5348	220 Vac
	Australia	9100-5127	240 Vac
	Europe	8120-6731	230 Vac
	UK	9100-5131	240 Vac
	South Africa	9100-5128	220 Vac

Table 1-4. Power Adapters (Continued)

Plug Type	Country or Region	Power Adapter Part Number	Region's AC Voltage
	China Argentina	9100-5129	220 Vac
	Chile Latin America	9100-5346	220 V AC

Supplies and Accessories

Table 1-5. HP DeskJet 400 Printer Supplies and Accessories

Part Number	Supply/Accessory Description
51626A	Black print cartridge
51625A	Color print cartridge
C3280A C3281A C3282A	Color Kit, including the color print cartridge (cyan, magenta, and yellow inks) and cartridge storage container U.S.A. Europe Latin America and Asia-Pacific
C2950A C2951A	HP parallel cables
C3834A C3828A C3835A C3832A C3836A C3833A C3837A C3831A 51634Y 51634Z	Media Premium Transparency (US Letter, 50 sheets): 8 ¹ / ₂ x 11 in. Premium Transparency (US Letter, 20 sheets): 8 ¹ / ₂ x 11 in. Premium Transparency (A4, 50 sheets): Premium Transparency (A4, 20 sheets): Premium Glossy Paper (US Letter, 50 sheets): 8 ¹ / ₂ x 11 in. Premium Glossy Paper (US Letter, 10 sheets): 8 ¹ / ₂ x 11 in. Premium Glossy Paper (A4, 50 sheets) Premium Glossy Paper (A4, 10 sheets) Premium InkJet Paper (US Letter, 200 sheets): 8 ¹ / ₂ x 11 in. Premium InkJet Paper (A4, 200 sheets):
92296A 92296B 92296C 92296D 92296E 92296F 92296G 92296H 92296J 92296K	HP Labels: Addressing (1 x 2 ⁵ / ₈ in.) Addressing (1 ¹ / ₃ x 4 in.) Addressing (1 x 4 in.) Addressing (2 x 4 in.) Shipping (3 ¹ / ₃ x 4 in.) Return Address (1 ¹ / ₂ x 1 ³ / ₄ in.) File Folder (2 ² / ₃ x 3 ⁷ / ₁₆ in.) 3 ¹ / ₂ -in. disk (2 ³ / ₄ x 2 ³ / ₄ in.) 5 ¹ / ₄ -in. disk (1 ¹ / ₂ x 4 in.) Full sheet (11 x 8 ¹ / ₂ in.)

User Documentation

Table 1-6. Available HP DeskJet 400 Printer's User Documentation Kits

Language	User Documentation Kit Part Number
	HP DeskJet 400
Chinese (Traditional)	C2642-90108
Chinese (Simplified)	C2642-90109
English (USA, Canada, Latin America)	C2642-90100
English-International (Europe and other areas)	C2642-90107
German/French/Dutch/UK	C2642-90102
Norwegian/Swedish/Dannish/Finnish	C2642-90104
Polish/Czech/Hebrew/Hungarian	C2642-90105
Russian/Greek/Turkish/Arabic	C2642-90106
Spanish/Italian/Portuguese/UK	C2642-90103
US/French/L.Spanish/B.Portuguese	C2642-90101

Internal Fonts

Note Windows 3.1 does not support these internal fonts. The HP DeskJet 400 printer driver uses TrueType fonts when printing from Windows 3.1 (see "Selecting a Printer Driver" in chapter 4).

Table 1-7. Internal Portrait Fonts

Portrait Fonts	Comments
Courier Upright (6 and 12 point) 5 cpi 10 cpi 16.67 cpi 20 cpi	The HP DeskJet 400 printer can print all available portrait fonts in the following modes and enhancements: Modes – Draft – Letter-Quality Enhancements – Normal – Bold
<i>Courier Italic</i> (6 and 12 point) 5 cpi 10 cpi 20 cpi	
Letter Gothic (6 and 12 point) 6 cpi 12 cpi 24 cpi	
<i>Letter Gothic Italic</i> (6 and 12 point) 6 cpi 12 cpi 24 cpi	
CG Times (6 and 12 point) Proportional spacing	
<i>CG Times Italic</i> (6 and 12 point) Proportional spacing	

Table 1-8. Internal Landscape Fonts

Landscape Font	Comments
Courier Upright (6, 12 and 24 point) 10 cpi 16.67 cpi 20 cpi	The HP DeskJet 400 printer can print all available landscape fonts in the following modes and enhancements: Modes – Draft – Letter-Quality Enhancements – Normal – Bold

Specifications

Table 1-9. Performance Specifications

Category	Specification
Print modes	Draft and Letter-Quality (LQ)
Print speed Draft Letter-Quality	3 pages per minute (ppm) 2 ppm
Mechanism speed (burst at 10 cpi) Draft Letter-Quality	330 characters per second (cps) 167 cps
Programming command set	HP PCL Level 3, with extensions (see appendix A)
<i>Print resolution (horizontal × vertical)</i> Draft Letter-Quality	150 × 300 dots per inch 600 × 300 dots per inch (black), 300 × 300 dots per inch (color)
Internal fonts (built-in)	See tables 1-7 and 1-8.
Character sets	HP Roman8, PC-8 (D/N), ISO 7 bit languages (German, French, Italian, Norwegian, Portuguese, Swedish, Spanish, UK), PC-850, ASCII, ECMA-94 Latin 1, and HP Legal
Paper feed	Manual single sheet feeding Paper tray can hold up to 50 sheets of 16 lb. (60 g/m ²) paper
Printable area	See figures 1-5 and 1-6, and table 1-18.
Printer lights and buttons	See table 3-1.

Table 1-10. Reliability Specifications

Category	Specification
Printer usage	5,000 pages per year
Mean time between failures (MTBF)	20,000 hours
Mechanism life	25,000 pages

Table 1-11. Graphics Resolution

Horizontal Resolution	Vertical Resolution	Number of Dots Per Pixel
75 pixels per inch (ppi)	75 ppi	16
100 ppi	100 ppi	9
150 ppi	150 ppi	4
300 ppi	300 ppi	1

Table 1-12. Interface Specifications

Category	Specification
Interface	Centronics parallel
Receive buffer size	16K or 48K (using DJPMenu)

Table 1-13. Physical Specifications

Item	Figure 1-7 Reference	Approximate Dimensions	Approximate Weight
Printer with the paper tray closed			
Width	A	13.7 in. (348.5 mm)	6.6 lb (3 kg)
Height	B	6.96 in. (176.9 mm)	
Depth	C	6.43 in. (163.3 mm)	
Printer with the paper tray extended			
Width	A	13.7 in. (348.5 mm)	
Height	D	6.96 in. (176.9 mm)	
Depth	E	11.1 in. (281.9 mm)	

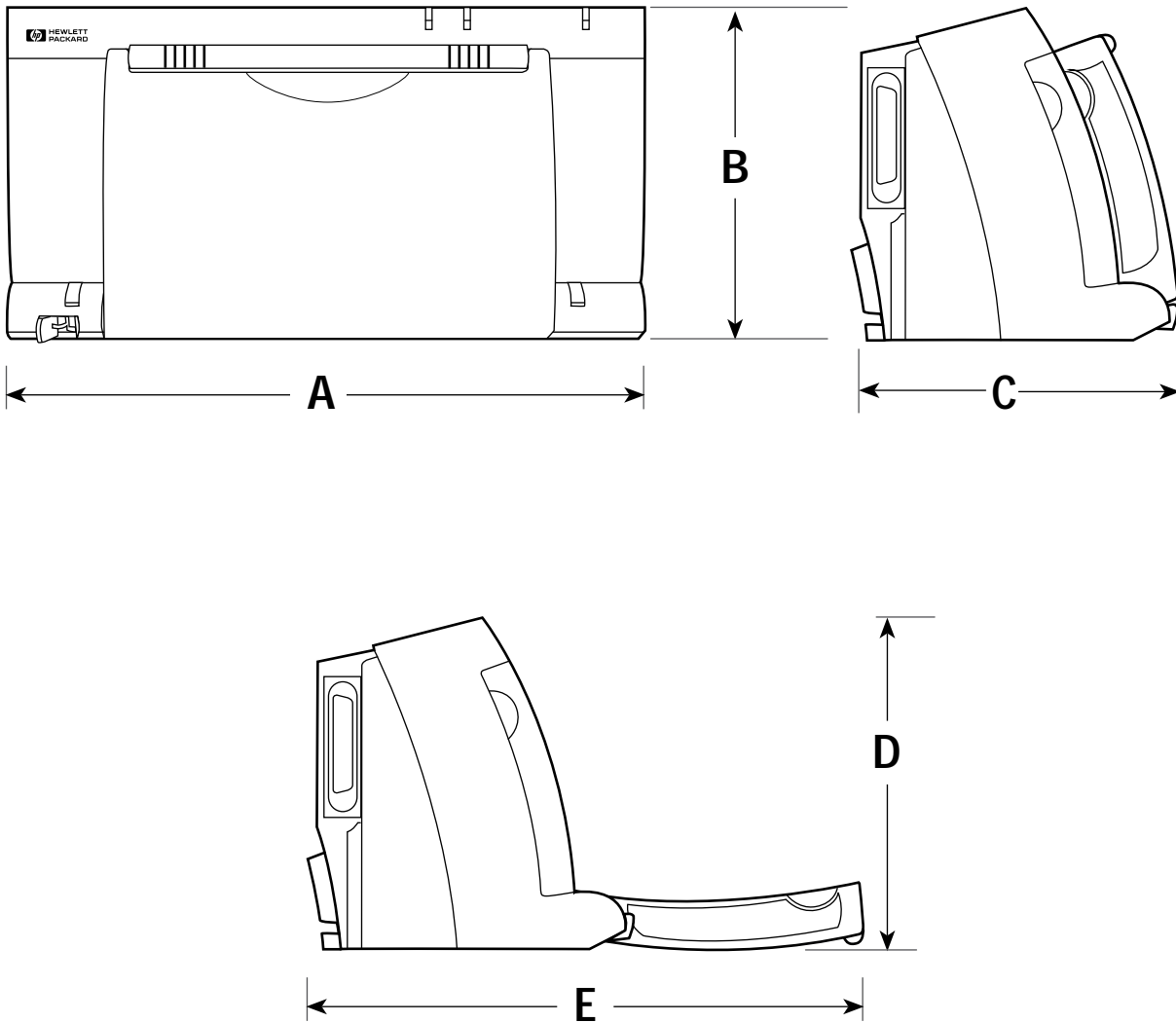


Figure 1-3. Physical Specifications

Table 1-14. Packaging Dimensions Specifications

Packaging Dimensions Specifications	Figure 1-8 Reference	Dimensions of Package
Length	A	17.7 in. (450 mm)
Width	B	9.1 in. (230 mm)
Height	C	11.2 in. (285 mm)

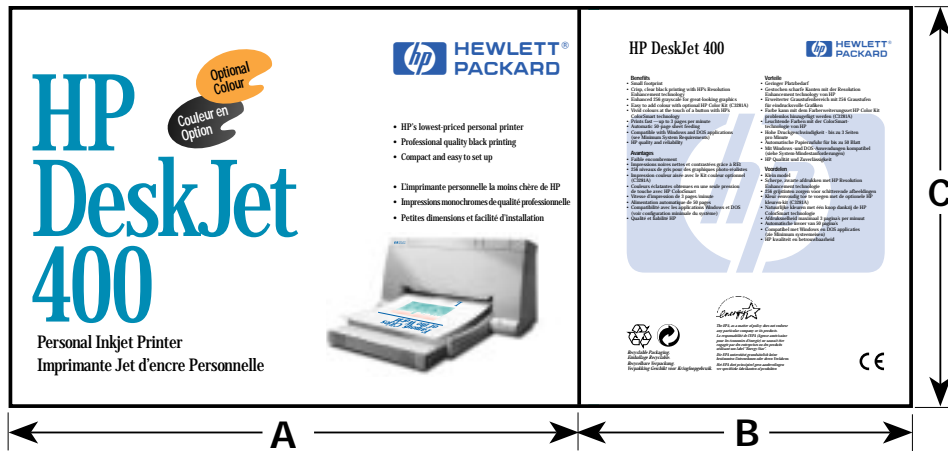


Figure 1-4. Packaging Dimensions Specifications

Table 1-15. Environmental Specifications

Category	Specification
Temperature Operating Non-operating Recommended operating	5° to 40° C (41° to 104°F) -40° to 60° C (-40° to 140° F) 15° to 35° C (59° to 95° F)
Relative humidity Operating with paper Operating with transparencies Non-operating	20% to 80% RH at 30°C 30% to 80% RH at 30°C 95% RH at 65°C
Altitude Printer Operating Non-operating Print cartridge Operating Non-operating	0 to 4600 meters (15,000 feet) 0 to 15,300 meters (50,000 feet) 0 to 4600 meters (15,000 feet) 0 to 7300 meters (24,000 feet)
Mechanical vibration Frequency range Operating Random Non-operating Random Swept sine	5 to 500 Hz Approximately 0.21 G rms Approximately 2.09 G rms 0.5 G (0 to peak)
Noise levels per ISO 9296 Sound pressure (at 1 meter bystander position) Sound power	46 dB(A) 6.4 B(A)
Electrostatic discharge No soft failures 2.5% or fewer soft failures No hard failures	0 to 5000 V <15,000 V <25,000 V

Table 1-16. Product Safety Specifications

Item	Safety Certification
Power Adapter	UL CSA TÜV SEMKO NEMKO KEMA FIMKO LCIE SECV DEMKO SEV MITI NOM1
Printer with Power Adapter	UL CSA TÜV NOM1
Item	EMI Certification
Printer with power adapter	FCC Class B when used with a Class B computing device (U.S.A.) EMC Directive 89/336/EEC (European Community) VCCI (Japan) SABS (South Africa)

Table 1-17. Paper Handling Specifications

Category	Specification
Printable weights Paper Auto feed Paper Manual feed Envelopes Cards	16 to 24 lb (60 to 90 g/m ²) 16 to 36 lb (60 to 135 g/m ²) 20 to 24 lb (75 to 90 g/m ²) 110 lb Index max: 8.5 pt max thickness (110 to 200 g/m ²)
Media size U.S. Letter A4 U.S. Legal U.S. Executive B5-JIS US No. 10 envelope DL envelope	8.5 in. × 11 in. 210 mm × 297 mm 8.5 in. × 14 in. 7.25 in. × 10.5 in. 182 mm × 257 mm 4.12 in. × 9.5 in. 220 mm × 110 mm

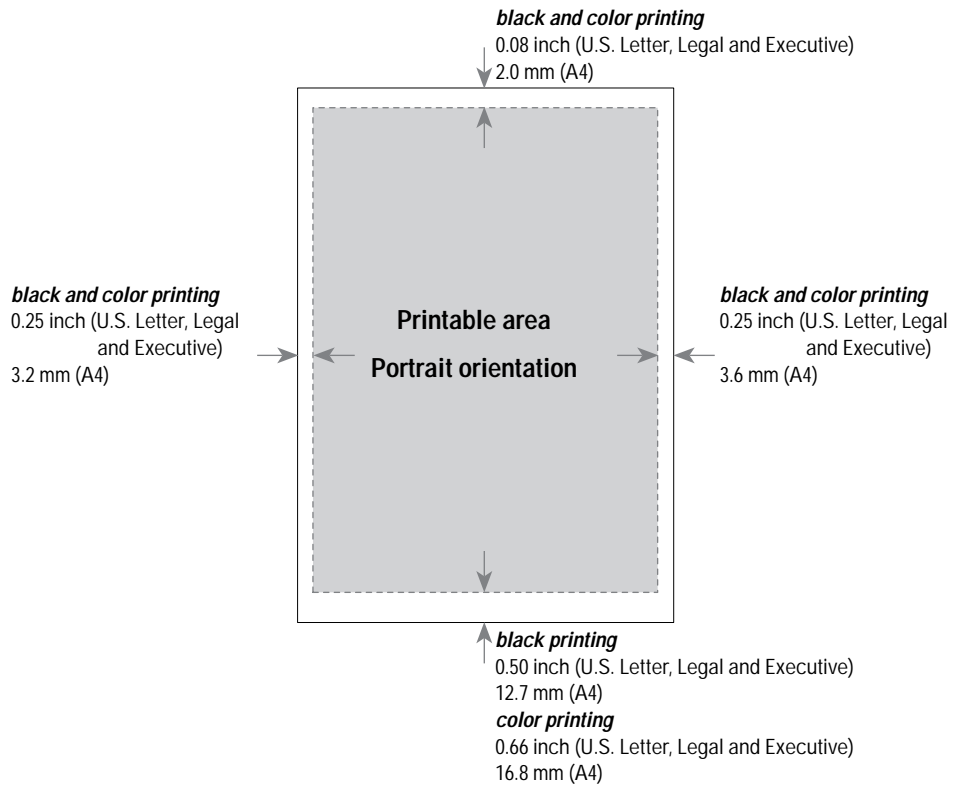


Figure 1-5. Printable Area (Portrait Orientation)

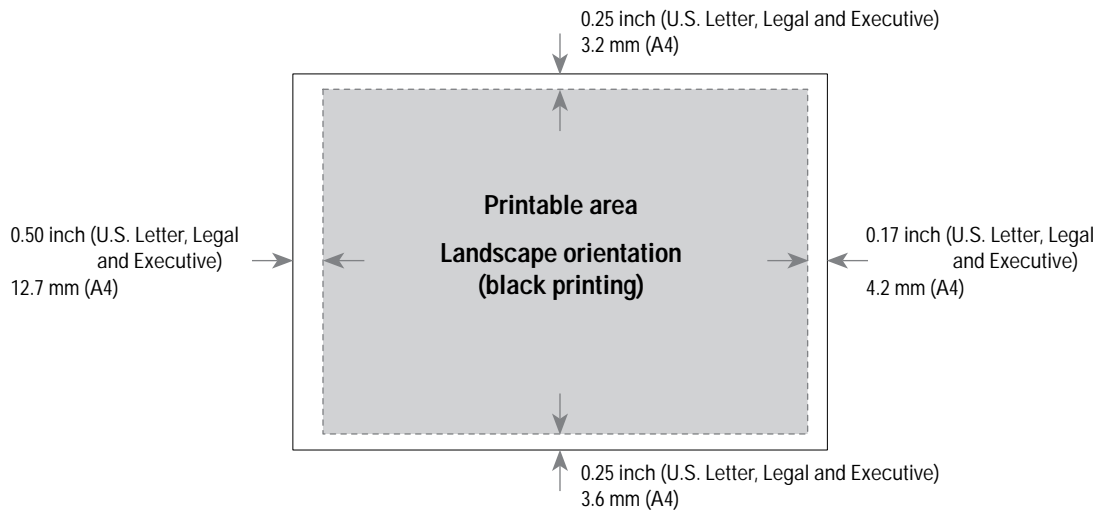


Figure 1-6. Printable Area (Landscape Orientation)

Table 1-18. Printable Area^{1,2}

Portrait Mode					
Page Size	Printable Area ³	Top Margin	Bottom Margin	Left Margin	Right Margin
U.S. Letter 8.5 × 11 in. (215.9 × 279.4 mm)	black printing: 8.0 × 10.5 in. (203.2 × 266.7 mm) color printing: 8.0 × 10.34 in. (203.2 × 262.6 mm)	0.08 in. (2.0 mm)	black printing: 0.5 in. (12.7 mm) color printing: 0.66 in. (16.8 mm)	0.25 in. (6.4 mm)	0.25 in. (6.4 mm)
U.S. Legal 8.5 × 14 in. (215.9 × 355.6 mm)	black printing: 8.0 × 13.5 in. (203.2 × 342.9 mm) color printing: 8.0 × 13.34 in. (203.2 × 338.8 mm)				
Executive Paper 7.25 × 10.5 in. (184.2 × 266.7 mm)	black printing: 6.75 × 10.0 in. (171.5 × 254.0 mm) color printing: 6.75 × 9.84 in. (171.5 × 249.9 mm)				
A4 210 × 297 mm	black printing: 203.2 × 284.2 mm color printing: 203.2 × 280.2 mm			3.2 mm	3.6 mm
Landscape Mode					
Page Size	Printable Area	Top Margin	Bottom Margin	Left Margin	Right Margin
U.S. Letter 11 × 8.5 in. (279.4 × 215.9 mm)	10.33 × 8.0 in. (262.4 × 203.2 mm)	0.25 in. (6.4 mm)	0.25 in. (6.4 mm)	0.5 in. (12.7 mm)	0.17 in. (4.2 mm)
U.S. Legal 14 × 8.5 in. (355.6 × 215.9 mm)	13.33 × 8.0 in. (338.6 × 203.2 mm)				
Executive Paper 10.5 × 7.25 in. (266.7 × 184.2 mm)	9.83 × 6.75 in. (249.8 × 171.5 mm)				
A4 297 × 210 mm	280.1 × 203.2 mm	3.2 mm	3.6 mm		

1. The specifications in this table are based on text scale mode off (63 lines/page on U.S. letter size paper) and perforation skip mode off. The top margin (portrait mode) increases to 0.5 inches with perforation skip on. (The factory default setting for perforation skip mode is on.)
2. Printable area for non-Windows applications. Other applications may have additional restrictions. See the documentation included with the software application or contact the software vendor.
3. Based on perforation skip mode off. Perforation skip mode on reduces the printable area by increasing the top margin to 0.5 inches.

Table 1-19. Hewlett-Packard Print Cartridge Specifications

Category	Specification
Type	Plain paper drop-on-demand thermal inkjet printing
Cartridge life 51626A black cartridge 1000 characters per page coverage 1500 characters per page coverage 51625A color cartridge	500 to 1000 pages 333 to 666 pages 250 pages ¹
Interconnect specifications Print cartridge Printer	24 inserts/withdraws per month 122 inserts/withdraws over the life of the cartridge 1440 inserts/withdraws over the life of the printer
Number of nozzles 51626A (black) 51625A (color)	48 Nozzles 48 Nozzles
Vertical resolution	300 dpi
Dot size	130 µm on 25% cotton bond paper

1. The 51625A print cartridge life specification is based on using Normal print mode with an average 8% area fill.

Caution

The ink in the print cartridges has been carefully formulated by Hewlett-Packard to ensure superior print quality and compatibility with the printer. Damage to the printer resulting from modifying the print cartridge is not the responsibility of Hewlett-Packard.

Hewlett-Packard does not support refilling the print cartridges. HP cannot guarantee the print quality from refilled print cartridges. Printer damage caused by refilling is not covered by the Hewlett-Packard warranty or customer service agreements.

Installation and Configuration

Chapter Contents

Section Title	Page
Items Included	2-2
Connecting Power to the Printer	2-3
Connecting the Printer to a Power Adapter	2-3
Centronics Parallel Pinout Information	2-4
Connecting the Interface Cable and Establishing Communication	2-5
Installing Windows Printer Drivers	2-7
Configuring the Printer	2-8
Configuration Options with the DJPMenu Configuration Utility	2-8
Running the DJPMenu Configuration Utility.	2-8
Changing Default Graphics Resolutions	2-8
Changing the Input Buffer Size	2-8
Localizing Factory Defaults	2-9

Items Included

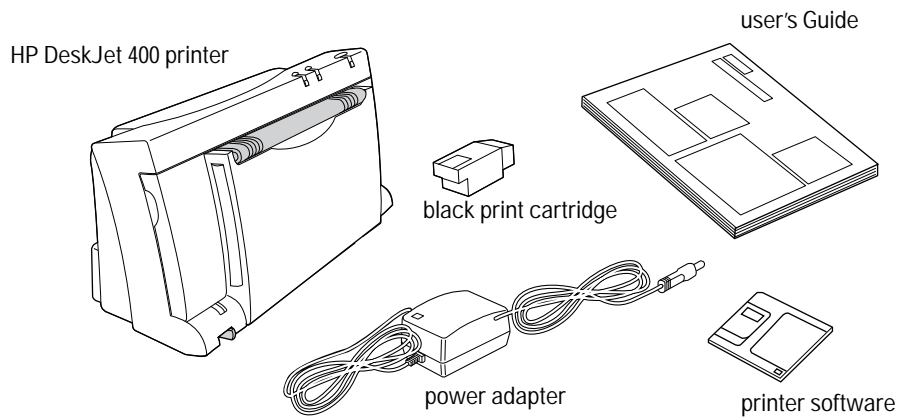


Figure 2-1. Items Included

Note

Items *not included* with the HP DeskJet 400 printer are listed below:

- Centronics Parallel Interface Cable
- Color Kit

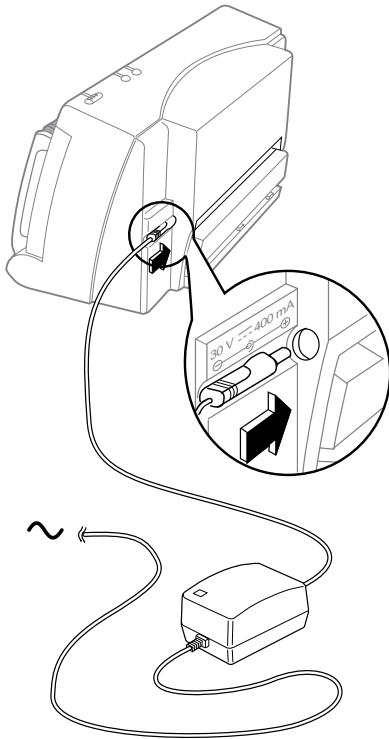
See tables 1-5 through 1-9 for the part numbers of these HP DeskJet 400 printer accessories.

Connecting Power to the Printer

Connecting the Printer to a Power Adapter

Caution Power adapters emit some magnetic interference. Place the adapter on the floor, or at least one inch (approximately 3 cm) away from the computer, disk drive, or hard disk.

1. Plug the power adapter firmly into the printer's power socket. Plug the other end of the power adapter cable into a grounded electrical outlet.



2. If the electrical outlet is on the same side as the parallel port on the printer, fit the power cable into the cable track so that the power cable is neatly housed in place.

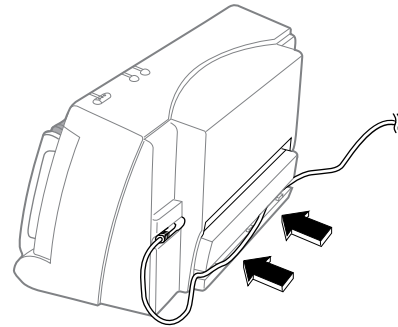


Table 2-1. Power Adapter Information

Topic	Information
Power adapter	A power adapter is used to power the DeskJet 400 printer.
Country specific power adapter	See table 1-4 for power adapters part numbers.
Further information	See "Powering the Printer" in chapter 3.

Centronics Parallel Pinout Information

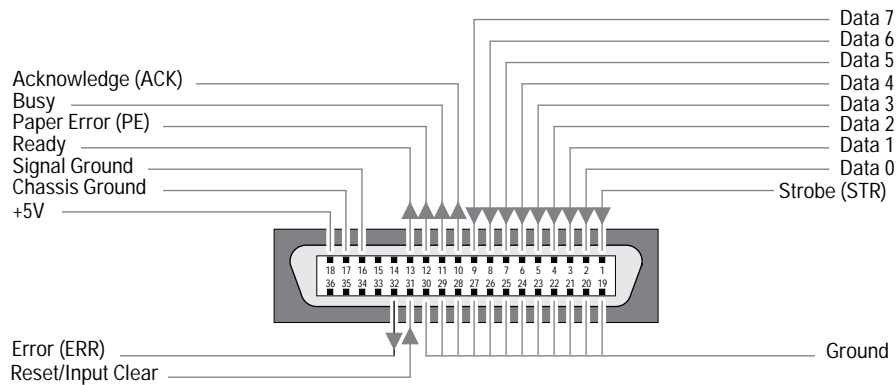


Figure 2-2. Centronics Parallel Interface Connector

Table 2-2. Centronics Parallel Interface Pinout Information

Pin Number	Pin ID	Description
1	Strobe ¹	A low pulse causes the printer to read one byte of data.
2 - 9	Data 0 - Data 7	These pins are the data lines. Data 0 is the least significant bit (LSB).
10	Acknowledge ¹	The printer sends a low pulse to indicate that it has accepted a byte of data and is ready for more data.
11	Busy	The printer sends a high logic level to indicate to the computer that it cannot receive data due to data entry, a full buffer, or error status.
12	Paper Error	The printer sends a high logic level to indicate to the computer that it is out of paper.
13	Ready	The printer sends a high logic level to indicate to the computer that it is in an online condition. The printer sends a low logic level to indicate that it is offline or that the input buffer is full.
16	Signal Ground	Signal interface ground.
17	Chassis Ground	Chassis ground.
18	+5 V	The printer outputs a +5 volt high logic level through a 2.2K ohm resistor.
19 - 30	Ground	These pins are tied to signal ground.
31	Reset/Input Clear ¹	A low pulse sent by the computer resets the printer and clears the print buffer. The reset occurs on the trailing edge of the pulse.
32	Error ¹	The printer sends a low logic level to the computer to indicate that it is in an error state.

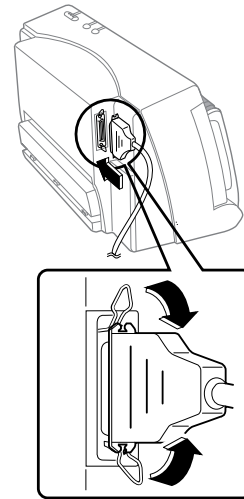
1. Active low.

Connecting the Interface Cable and Establishing Communication

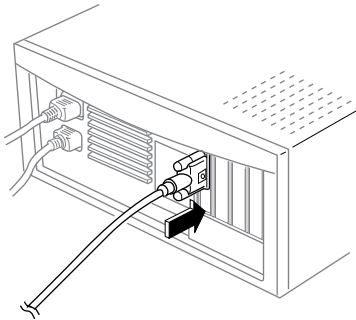
- Use a Centronics parallel interface cable to connect HP DeskJet 400 printer to the computer.

1. Turn off the computer and the printer.

2. Connect the printer end of the interface cable to the parallel interface port on the printer. Snap both clips into the notches of the connector to secure the cable to the computer.



3. Connect the computer end of the parallel cable firmly into the parallel port on your computer and tighten the screws on the connector.



4. Turn on the computer and the printer. The printer Power light should come on.

5. Establish communication between the computer and the printer by sending the following DOS command:

```
MODE LPT1:,,P
```

For DOS 5.0 and DOS 6, send

```
MODE LPT1: RETRY=R
```

This command causes infinite retries when sending data so that the computer does not timeout while waiting for the printer to print. All data is directed to parallel port 1. If the printer is connected to a different interface port on the computer (such as parallel port 2), modify the Mode command.

Note: This DOS command can be added to the AUTOEXEC.BAT file so that it will not be necessary to type the command whenever the computer is turned on. Refer to your DOS manual for instructions on adding this command to the AUTOEXEC.BAT file.

Installing Windows Printer Drivers

This section outlines the procedures for installing Microsoft's and Hewlett-Packard's printer drivers for Windows 3.1. For more information on available printer drivers, see "Windows Printer Driver Information" in chapter 4.

Installing the Printer Driver for Microsoft Windows Users

Ensure you have the minimum system requirements:

- 80386 processor and above
- Microsoft Windows 3.1 and above
- DOS 3.3 and above
- 2 MB RAM minimum for monochrome imaging
- 4 MB RAM minimum for color imaging
- 10 MB free hard disk space

1. Start Windows and make sure that no Windows applications are running.
2. Insert the HP Installation Disk into the computer's disk drive.
3. Click **File** in the **Program Manager** window menu.
4. Click **Run** in the File menu.
5. Type the computer's disk drive (for example **A:**), followed by **SETUP**, in the Command Line box. Then click **OK**.

Follow the instructions on the screen to complete the installation of the printer driver.

Configuring the Printer

Go to the printer setup to configure the printer. Follow the instructions on the screen to set the configuration. Alternatively, you could configure the printer by using the DJPMenu Configuration Utility for DOS environment.

Setting up the Printer

Go to the printer setup and select HP DeskJet 400. Click on the Setup button to choose the following:

- Automatic/Manual
- Print Quality
- Paper Type
- Paper Size
- Paper Source
- Orientation
- Number of Copies to Print
- Reverse Order Printing

Click on the OK button when you have selected your configuration and you can start to print.

Configuration Options with the DJPMenu Configuration Utility

DJPMenu is a program that remotely changes settings on HP DeskJet 400 printer for the DOS environment. It requires MS-DOS version 3.3 or later with 80 columns by 25 lines of text display (color or monochrome). In addition, DJPMenu requires a direct connection to the printer via the parallel port of your computer. It will not work through the serial port, any network or if any print spooler (such as DOS PRINT) is installed.

Users can run the DJPMenu configuration utility on their host computer. They can specify all the printer settings using the DJPMenu and verify the current settings.

Running the DJPMenu Configuration Utility

To run DJPMenu, first install the DJPMENU.EXE file to the computer's hard drive using INSTALL.BAT from the printer software Installation Disk, then type: **c:\deskjet\djpmenu**.

Note

To use the DJPMenu configuration utility, the computer and printer must be connected directly. The utility will not work with print spoolers and some switch boxes.

Changing Default Graphics Density

You can change default graphics resolution from the factory default of 300 dpi to 75, 100, or 150 dpi, and back to 300. You can set this new default Graphics Density from within the DJPMenu configuration utility.

Changing the Input Buffer Size

You can change the input buffer size from the default value of 16K to 48K.

If you are using Windows, the default of 16K is recommended. If you are using a DOS application that prints mainly text, you may find that switching to 48K will shorten the time that your application is tied up printing to the DeskJet 400.

Localizing Factory Defaults

You can also use the DJPMenu configuration utility to change the *factory* default settings to those appropriate to a particular *country*. Then when you reset the printer to the factory defaults, you will be setting them to the “country defaults” that you changed with the DJPMenu configuration utility.

Changing a country default will cause the printer — after you have reset it — to use the default character set and media size setting appropriate for that country. See table 2-3.

In order for the country default settings, that you have changed with DJPMenu, to actually take effect, you must reset the printer.

Caution

Once you have localized the factory default settings, you cannot restore the printer to the original factory default settings. If you wish to restore the original factory default settings, use DJPMenu to select “US” from the list of countries in the Country Default group box.

Table 2-3. Country Defaults Available in DJPMenu

Country Default	Media Size	Character Set
<i>US</i>	Letter	PC-8 USA
<i>UK</i>	A4	UK
<i>Germany</i>	A4	Germany
<i>France</i>	A4	France
<i>Italy</i>	A4	Italy
<i>Norway</i>	A4	Norway
<i>Sweden</i>	A4	Sweden Names
<i>Spain</i>	A4	Spain
<i>Portugal</i>	A4	Portugal

Note

Hewlett-Packard recommends that you do *not* change the factory default settings unless you have a specific need for localized country default settings. Note that, even without changing the factory default settings, you can make changes to the printer settings in Menu mode that will be retained even after the printer is turned off and on any number of times.

Operation and Usage




Chapter Contents

Section Title	Page
Printer Buttons and Lights	3-2
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Manual Single Load	3-4
Installing/Replacing a Print Cartridge	3-6
Maintenance	3-9
Maintaining Print Cartridges	3-9
Print Cartridge Safety	3-9
Cleaning the Print Cartridge	3-9
Material Safety Data Sheet.	3-9
Print Cartridge Tips	3-10
Maintaining the Printer	3-10

Printer Buttons and Lights

Note For patterns of lights on the printer that indicate problems, see “Printer Light Indications” in chapter 5.

Table 3-1. Description of Printer Buttons and Lights

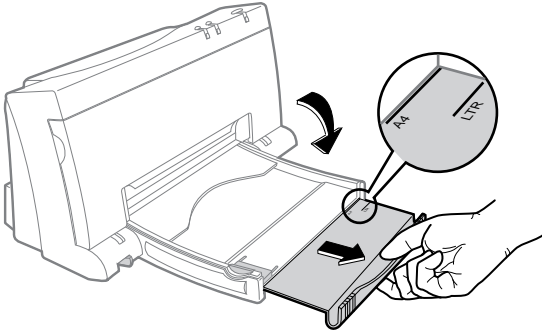
Icon	Button or Light	Description
	Power light	Lights when the printer is on; blinks when the printer is receiving information from the computer or when printing.
	Power button	Press this button to turn the printer on or off.
	Paper Feed light	Blinks when the printer is out of paper. Load paper in the paper tray and press the Paper Feed button to continue.
	Paper Feed button	Press to feed paper into the printer. Press and hold to eject paper
	Change Cartridge light	Blinks when the printer is waiting for you to change the print cartridge.
	Change Cartridge button	Press to move the print cartridge cradle to the middle of the printer where you can change the print cartridge. Press again to return the cradle to the right side of the printer.

Loading Media

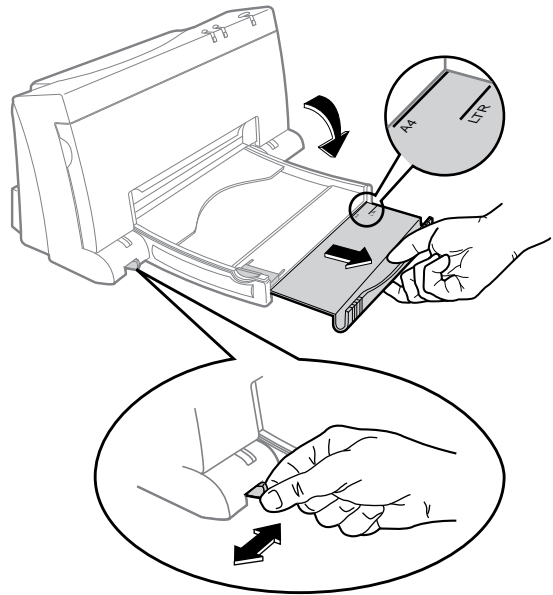
Notes The HP DeskJet 400 printer is designed to work with *cut-sheet paper and media only*. If continuous Z-fold paper is loaded into the printer — whether you are using the paper tray or loading the paper feed slot by hand — the printer will detect a paper jam error and will not operate properly. See Table 1.5 for the types of paper.

Normal Printing from the Paper Tray

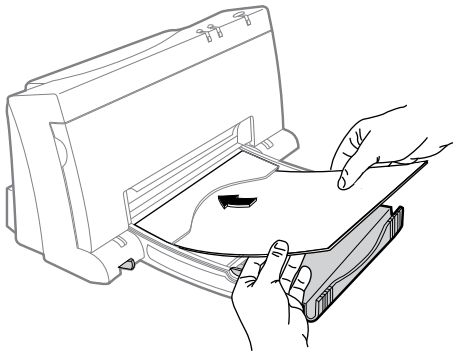
1. Open the paper tray and extend it to either the A4 or the LTR (US Letter)¹ mark.



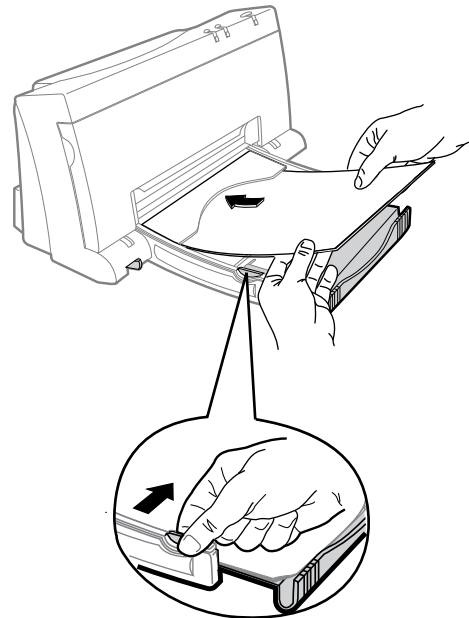
2. Switch the media size selector (A4/LTR) according to the size of the paper that you are loading in: either A4 or US letter.



3. Insert a stack of paper into the paper tray with the print side down. If you are loading letterheads or HP transparencies, insert them print side down, with the top of the page going into the printer.



4. Move the paper width guide so that it presses lightly against the paper stack.

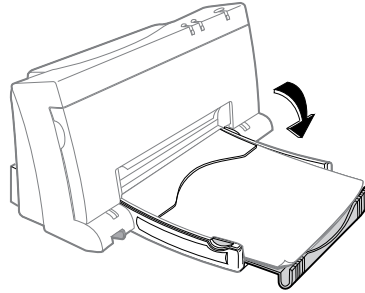


¹ If you are using legal, executive, B5 size paper, envelopes, labels and thick paper, you will have to feed these into the printer manually, one by one. See the section on "Manual Single Load".

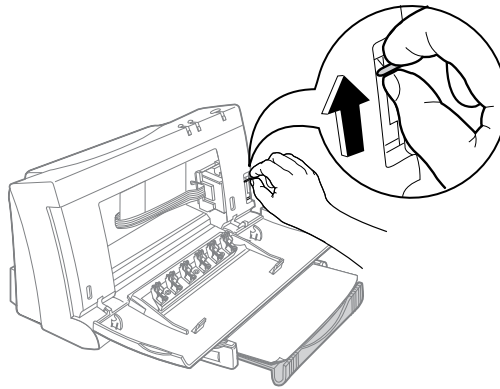
Manual Single Load

1. Select Manual Feed in the Printer Setup dialog box.

2. Open the paper tray.

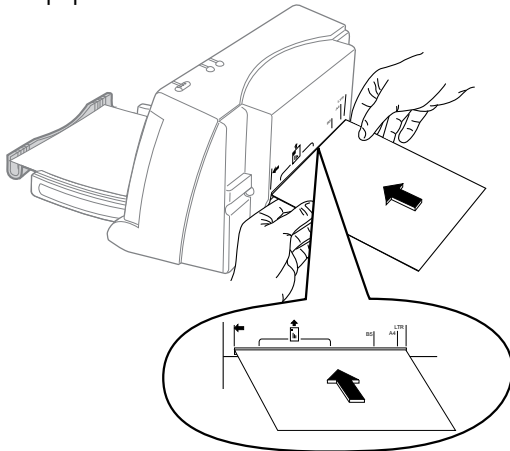


3. Open the printer door and switch the envelope lever to envelope if you are using envelope, labels or thick paper. Switch the lever to paper if you are using paper or transparencies. Then close the printer door.

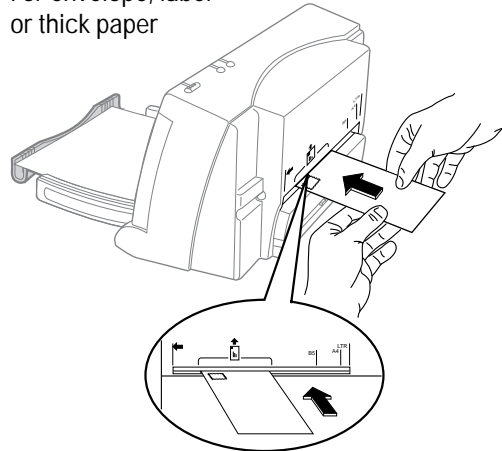


4. Align the media against the molded line of the manual feed slot (on the back of the printer). Insert the paper until the printer pulls the paper out.

For paper



For envelope, label
or thick paper



5. Invoke the print command from your computer

Notes

- If you are loading letterheads or HP transparencies, insert them print side up, with the top of the page going into the printer.
- Remember to switch the envelope lever to paper after you have finished printing envelopes, labels, or thick paper. For optimal print quality, ensure that the envelope lever is adjusted according to what you want to print.

Table 3-2. Media Loading Information

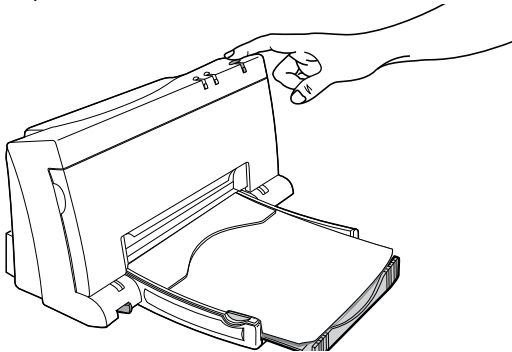
Topic	Information
<i>Transparencies</i>	Transparencies can either be fed by hand or loaded into the paper tray. Do not use transparencies other than HP Premium and do not load more than 20 transparencies into the paper tray.
<i>Printing on letterhead</i>	To print on the letterhead side of a page, place the letterhead face <i>down</i> in the IN tray. Position the paper with the top of the letterhead toward the printer, so that the letterhead end feeds into the printer first. If you are using manual feed, insert them print side <i>up</i> , with the top of the letterhead going into the printer.
<i>Printing on envelopes, labels or thick paper</i>	Envelopes, labels and thick paper must be fed into the printer manually, one by one and print side up, from the back of the printer.
<i>Media loading tips</i>	<ul style="list-style-type: none">• Make sure that the paper meets the specifications listed in chapter 1.• Do not mix media types in the IN tray.• Always load a stack of paper into an empty IN tray. Don't place new paper on top of paper <i>already</i> in the IN tray.
<i>Media to avoid</i>	Do <i>not</i> use the following kinds of media in the printer: <ul style="list-style-type: none">• Weight greater than 24 lb. (90 g/m²) or less than 16 lbs. (60 g/m²)• Media that is torn or wrinkled or that has curled edges• Media with cutouts or perforations, like 2- and 3-hole-punch paper• Multiple part forms• Media that is heavily textured or embossed• Transparencies other than HP Premium• Labels other than HP 92296 Series or other high-quality labels for laser printers• Paper sizes other than U.S. letter, A4, U.S. legal, and U.S. executive; transparencies or label sheets other than U.S. letter or A4 size.

Installing/Replacing a Print Cartridge

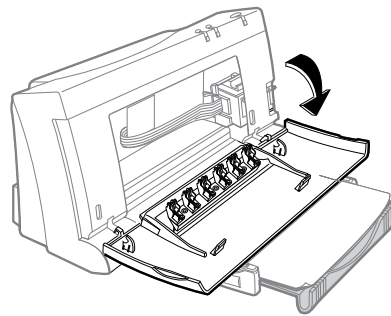
Caution

- Do not let the print cartridge contacts and nozzles touch any surface or object, including your fingers. Oil and dust can cause missing dots and other print quality problems.
 - The star wheels on the printer door have sharp edges. make sure your hand does not get in contact with the star wheels.
-

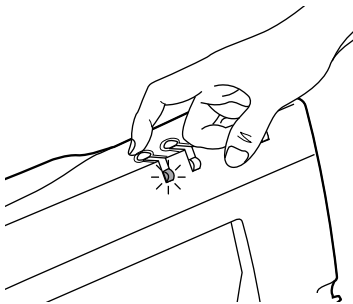
1. If the printer is off, turn it on.



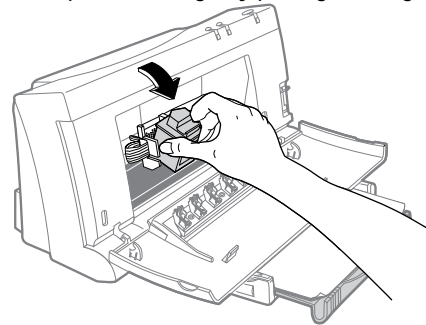
2. Open the printer door



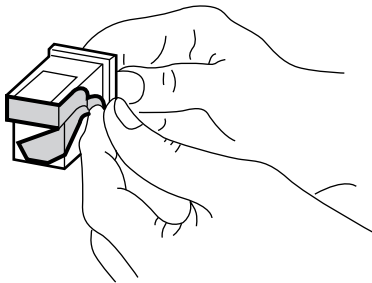
3. Press the Change Cartridge button to move the print cartridge holder to the middle position.



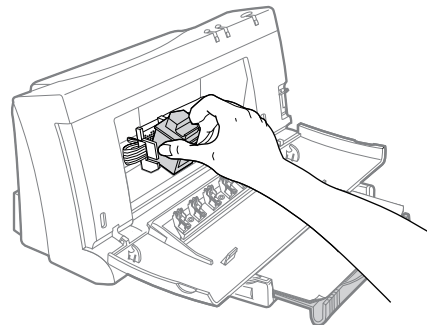
4. Remove the print cartridge by pulling at the green top.



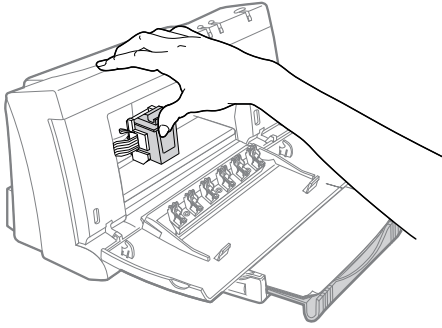
5. Gently remove the tape(s) covering the ink nozzles. Be careful not to touch the ink nozzles or the copper contacts.



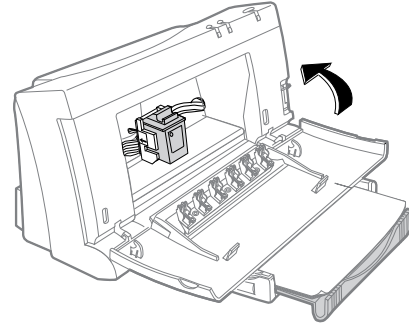
6. Insert the print cartridge into the holder at an angle such that the green top is tilted toward you. The arrow on the print cartridge should be pointing toward the inside of the printer.



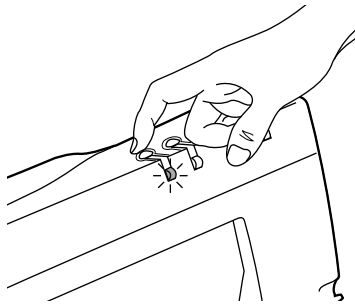
7. Push the green top in until the print cartridge snaps into place.



8. Close the printer door.



9. Press the Change Cartridge button again to bring the carriage back home position so that it is ready to print.



Note

Use only a recommended print cartridge. See table 1-5 for the part numbers. If you did not install a recommended print cartridge, the print cartridge holder will move back to the loading position, and the Change Cartridge light will continue to blink.

Table 3-3. Common Problems with Print Cartridges

Problem	Possible Causes	Solution
<i>Nothing prints</i>	<ul style="list-style-type: none"> • Tape may be covering the print cartridge nozzles. • The print cartridge is out of or nearly out of ink. • The print cartridge is faulty. • The printer is faulty. 	See "Troubleshooting Print Cartridges" and "Solving Print Quality Problems" in chapter 5.
<i>Print fades, rows of dots are missing, or print quality is otherwise unsatisfactory</i>	<ul style="list-style-type: none"> • The print cartridge may be faulty. • The media may be causing unsatisfactory print quality. • The user may not be operating the printer for optimum print quality. • The printer may be faulty. 	See "Troubleshooting Print Cartridges" and "Solving Print Quality Problems" in chapter 5.
<i>Change Cartridge light is blinking</i>	The printer is waiting for the user to install a print cartridge.	Install the print cartridge.
<i>Print is faint or fuzzy</i>	<ul style="list-style-type: none"> • A problem with either the print cartridge or the media can cause this problem. • The print cartridge may need cleaning. 	See "Troubleshooting Print Quality" and "Using the Print Cartridge Cleaning Routine" in chapter 5.
<i>Printouts are missing rows of dots</i>	<ul style="list-style-type: none"> • The print cartridge, printer, or the connection between the print cartridge and printer may be faulty. • The print cartridge may need cleaning. 	See "Printouts Missing Rows of Dots" and "Using the Print Cartridge Cleaning Routine" in chapter 5.
<i>Print cartridge will not return to the home position (right side of the mechanism)</i>	<ul style="list-style-type: none"> • The print cartridge, printer, or the connection between the print cartridge and printer may be faulty. • The print cartridge may need cleaning. • Wrong cartridge has been installed. 	<p>See "Printout Missing Rows of Dots" and "Using the Print Cartridge Cleaning Routine" in chapter 5.</p> <p>Make sure that the correct print cartridge is installed. Refer to Table 1-5 for the part numbers</p>

Maintenance

The HP DeskJet 400 printer does not require any scheduled maintenance. Periodic cleaning, however, not only enhances the look of the printer, but also maintains it in optimum condition. Cleaning may also make it easier to diagnose a problem visually.

Maintaining Print Cartridges

In order to maintain optimum print quality, the printer automatically performs the operations of “spitting”, wiping, and capping the print cartridge nozzles. These operations are not visible to the user and require no user intervention.

Although print cartridges require no routine maintenance, proper use and handling of them will help ensure optimum print quality and print cartridge life. Read “Print Cartridge Tips” in this section for tips on using and handling the print cartridges.

Note	See “Troubleshooting Print Cartridges” and “Solving Print Quality Problems” in chapter 5 for more print cartridge troubleshooting information.
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Warning	The print cartridge ink contains diethylene glycol which may be harmful if swallowed. Keep new and used cartridges out of the reach of children. If ink is accidentally ingested, contact the HP Health Line (800) 457-4209 in North America. From all other international locations the HP Health Line can be reached by calling (503) 494-7199. For health related issues, this line is staffed 24 hours per day.
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Print Cartridge Safety

Ink used in the print cartridge does not pose a health hazard to customers. During the development of ink formulas, all the ingredients are screened and researched for known potential health related issues. Only those chemicals that meet or exceed worldwide safety and regulatory requirements are used in HP inks.

Cleaning the Print Cartridge

HP DeskJet 400 printer automatically carry out “spits and wipes” to help maintain the print cartridge. This printer also has a print cartridge cleaning routine to restore print cartridges to optimum functioning. See “Using the Print Cartridge Cleaning Routine” in chapter 5.

Material Safety Data Sheet

A Material Safety Data Sheet (MSDS) is available for the print cartridges. The MSDS includes product identification information, characteristics of the ink, and precautions for handling and use. To request an MSDS, write to the following address:

Hewlett-Packard
Customer Information Center
Department MSDS
P.O. Box 58059
Santa Clara, CA 95052-8059
Mailstop 51LSD

Alternatively, if you are in the U.S. or Canada, you can telephone (800) 752-0900 and ask for Department MSDS (6:00 AM to 5:00 PM Pacific Time).

Print Cartridge Tips

- Do not use print cartridges after the expiration date. See “Identifying the Print Cartridge Expiration Date” in chapter 5.
- Keep the print cartridges sealed in the packaging container until ready for use. The print cartridges have a longer life sealed in this container than in the printer.
- Keep opened print cartridges in the printer or in the print cartridge storage container.
- Turn off the printer by pressing the Power button rather than unplugging the power adapter. Turning the printer off with the Power button caps the print cartridge, extending the life of the print cartridge.
- Do not allow the print cartridge contacts and nozzles to touch any surface or object, including your fingers. Oil and dust can cause print quality problems.
- If printouts are missing dots, read “Printout Missing Rows of Dots” in chapter 5.
- Print cartridges left out of the printer may experience a crusting of dried ink on the print cartridge nozzles. *Clean the dried ink off of the nozzles before installing the print cartridge in the printer.* See “Removing Crusted Ink from the Print Cartridge Nozzles” in chapter 5.
- Store print cartridges at room temperature.

Caution

The ink in the print cartridges has been carefully formulated by Hewlett-Packard to ensure superior print quality and compatibility with the printer. Damage to the printer resulting from modifying the print cartridge is not the responsibility of Hewlett-Packard.

Hewlett-Packard does not support refilling print cartridges. Hewlett-Packard cannot guarantee the print quality from refilled print cartridges. Printer damage caused by refilling print cartridges is not covered by the Hewlett-Packard warranty or customer service agreements.

Maintaining the Printer

The interior and exterior of the printer should be examined for smudges, dust, etc. Clean the exterior with a soft cloth moistened with mild detergent and water. Open the access door and examine the interior areas of the printer. Any accumulation of paper or lint should be carefully removed by brushing the loose material onto a cloth, or by using a small computer vacuum cleaner.

Caution

Clean the printer with water only. Platen cleaners or alcohol may damage the printer.

Thermal Inkjet II Technology

The HP DeskJet 400 printer uses Thermal InkJet II (TIJ II) technology. This technology is based on a disposable print cartridge which propels ink out of 48 nozzles. The basic principle of TIJ II is to apply heat to a tiny measure of ink until it expands and is propelled through a nozzle.

The first step in the process is to fill a small reservoir, known as the firing chamber, with ink. The next step is to heat the ink with a thin-film resistor layered above the firing chamber. As the ink heats up, it expands to form a bubble. The bubble continues to expand and finally bursts. At the climactic instant when the bubble bursts, the ink is forced through the nozzle located below the firing chamber and out onto the paper.

This process is repeated up to 5,000 times per second and creates residual heat in the resistor. A layer of silicon is placed above the resistor to cool it by transferring the residual heat away.

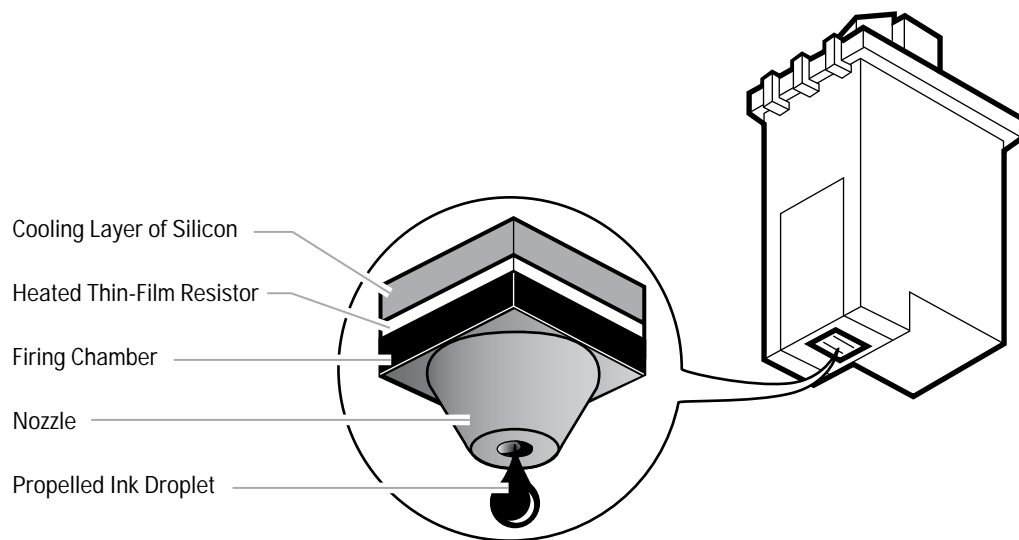


Figure 2-3. Thermal Inkjet II Technology

Printer Drivers

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Hewlett-Packard's Printer Drivers for Windows	4-2
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Windows Printer Drivers

Hewlett-Packard and Microsoft provide several HP DeskJet 400 printer driver solutions for Windows 3.1. This chapter identifies available printer drivers and which driver to choose for optimum performance.

Some users may choose to use the Microsoft printer driver, although the driver has limited capabilities. Microsoft's and Hewlett-Packard's printer drivers can be installed in Windows at the same time and assigned to the same port. Windows, however, allows only one default or active printer driver per port at a time. Selecting a printer as the default or active device automatically switches any other printer drivers assigned to the port to an inactive state.

The next two sections describe Microsoft's printer drivers, included with Windows software, and Hewlett-Packard's printer drivers, included with DeskJet 400 printer.

Microsoft's Printer Drivers for Windows

The Microsoft printer drivers are printer drivers available from Microsoft or included in versions of Microsoft Windows.

Limited Microsoft Printer Driver Features

- Limited grayscale imaging; scanned images in particular will not print as well
- Supports printer internal fonts in portrait mode only
- Small size; occupies only about 150K of disk space
- Monochrome (black) text and graphics
- No detailed online help information on the specific printer

Hewlett-Packard's Printer Drivers for Windows

The Hewlett-Packard printer drivers are printer drivers available from Hewlett-Packard or bundled with HP DeskJet 400 printer.

Note

Hewlett-Packard recommends that Windows 3.1 users update to the HP DeskJet 400 Printer Driver. For information on obtaining printer drivers, see the "Service and Support Resources" section in chapter 6.

Printer Driver Features and Capabilities

HP DeskJet 400 Printer Driver (v6.0) for Windows

The HP DeskJet 400 Printer Driver for Windows (v 6.0) provides the following features and capabilities:

- Windows 3.1x compatibility only
- Included with HP DeskJet 400 printers and offered separately through order fulfillment (for escalation only) by third party suppliers
- Supports HP's ColorSmart Technology for automatic selection of the best halftoning, intensity, and color control settings to provide the best quality printout
- Black text and grayscale printing
- Color printing
- HP Premium Transparency and Glossy Paper Support
- Includes the HP setup program (SETUP)
- WYSIWIG print regions for black and color printing
- Does NOT support Intellifont scalable fonts
- Does NOT support font cartridges or internal fonts
- Graphical User Interface
- Supports new Windows Print Manager
- The DJPMenu configuration utility can be used to change all printer configuration settings; this is a DOS program included in the printer driver diskette
- Quick Tour; this is a 2-minute animated multimedia program included in the printer driver diskette to educate users on the various benefits of the DeskJet 400 printer

Minimum Configuration for Hewlett-Packard's Printer Drivers

Hewlett-Packard's printer drivers require the following minimum system configuration:

CPU	80386 processor or greater
Memory	2 MB of RAM for monochrome printing 4 MB of RAM for color imaging
Free Disk Space	10 MB free of disk space (for installation of printer driver)
Software Compatibility	Microsoft Windows version 3.1 and above DOS 3.3 and above

Note	Although the HP DeskJet 400 printer can print with the above minimum configuration, the printing performance may be unsatisfactory to users. Increasing the computer's processing power or RAM may improve printing performance to a satisfactory level.
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Common Windows Printer Driver Problems

Table 4-1. Common Windows Problems

Problem	Solution
Difficulty installing the printer driver.	<ol style="list-style-type: none">1. Close all other applications and memory resident programs.2. Reinstall the printer driver using the HP Printer Setup program (SETUP). Do not install through the Control Panel.
Printer won't print from Windows	<ol style="list-style-type: none">1. Make sure the printer is on, the Power light is on, and the printer is properly connected to the computer with the appropriate cable.2. Verify the correct printer model and port are selected in the Control Panel or Printer Setup menu.3. Verify the printer is the "Default" device in the Control Panel, is selected as the active printer in the application, and the correct port is selected.4. Are any of the printer lights flashing? If so, the printer detects an error (for example out-of-paper or a paper jam) and the printer is offline. See "Printer Light Indications" in chapter 5 for more information on light error patterns.
Illegible output when printing.	<ol style="list-style-type: none">1. Verify the proper printer model is selected in the Printer Setup menu.2. Verify the interface cable between the host and the printer is ok. (Print a directory from DOS. Type: <code>c:\dir>LPT1</code>)
No transparency option available.	<ol style="list-style-type: none">1. Verify that the HP DeskJet 400 Printer Driver is selected rather than the Microsoft printer driver included with Windows.2. Verify the correct printer is selected in the Printer Setup menu. Otherwise, the transparency mode may not be selectable.

Composite Black Ink

The printer driver produces composite black by mixing the colors of the color print cartridge to produce "black" ink. The printer driver uses composite black instead of true black ink because:

- The HP DeskJet 400 printer holds one color print cartridge *or* one black print cartridge. Therefore, any black on a color page must be printed using composite black.
- In most DOS applications, all of the black in any color graphic is printed with composite black. The printer driver does not separate the black from the color in a color graphic. Contact the DOS application vendor for color driver information.

Composite black is slower to print, depletes the color print cartridge more quickly, and the output may appear slightly greenish.

Increasing the Printing Speed

Table 4-2. Increasing the Printing Speed

Printing Speed Factor	Solution
<i>Computer and printer configuration</i>	<ol style="list-style-type: none">1. Use a more powerful computer. For example, a computer with a pentium processor rather than an 80386 processor.2. Use the paper tray rather than feeding sheets manually into the printer. Paper handling is quicker with the paper tray.3. When possible, use econofast mode. The printer prints faster in econofast mode.4. Read the documentation included with the software application for tips on enhancing the output performance.
Windows 3.1 configuration	<ol style="list-style-type: none">1. In Printer Setup, select the correct printer model.2. Install more memory (RAM) in the computer.<ul style="list-style-type: none">– 2 MB minimum for black printing.– 4 MB minimum for color or grayscale printing.3. Close all other applications running in Windows (screen savers and memory resident programs).4. Delete unnecessary large Windows screen fonts.5. When printing a draft of a color document to the printer, print the document in grayscale with the black print cartridge rather than in color.6. When printing drafts, select Draft or Normal Print Quality rather than Best Print Quality. (Note: Draft mode of TrueType fonts may not be supported in all applications. In this case, use Normal mode.)
<i>Complexity of the document</i>	<p>If possible, reduce the complexity of the document.</p> <p>Print copies in econofast mode. This not only improves the printing performance for draft copies but also increases the life of the print cartridge.</p>

Selecting a Printer Driver

If you use Microsoft Windows 3.1, install the HP DeskJet 400 printer driver provided with the printer. The accompanying printer software guide provides installation instructions, or see *Installing Windows Printer Drivers* in chapter 2.

For DOS applications, install an HP DeskJet 500C printer driver for the application you are using whenever one is available. Contact the software vendor for the printer driver for the software application. For other options, see “Obtaining Printer Drivers” in chapter 6.

Problem Resolution

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Troubleshooting Tools

The following tools are recommended for troubleshooting the HP DeskJet 400 printer:

- Dial caliper or accurate linear scale
- Tissue paper
- Cotton swabs
- Rigid card stock
- Clean soft cloth
- Voltmeter (used to check the voltage out of the power adapter)

Overall Troubleshooting

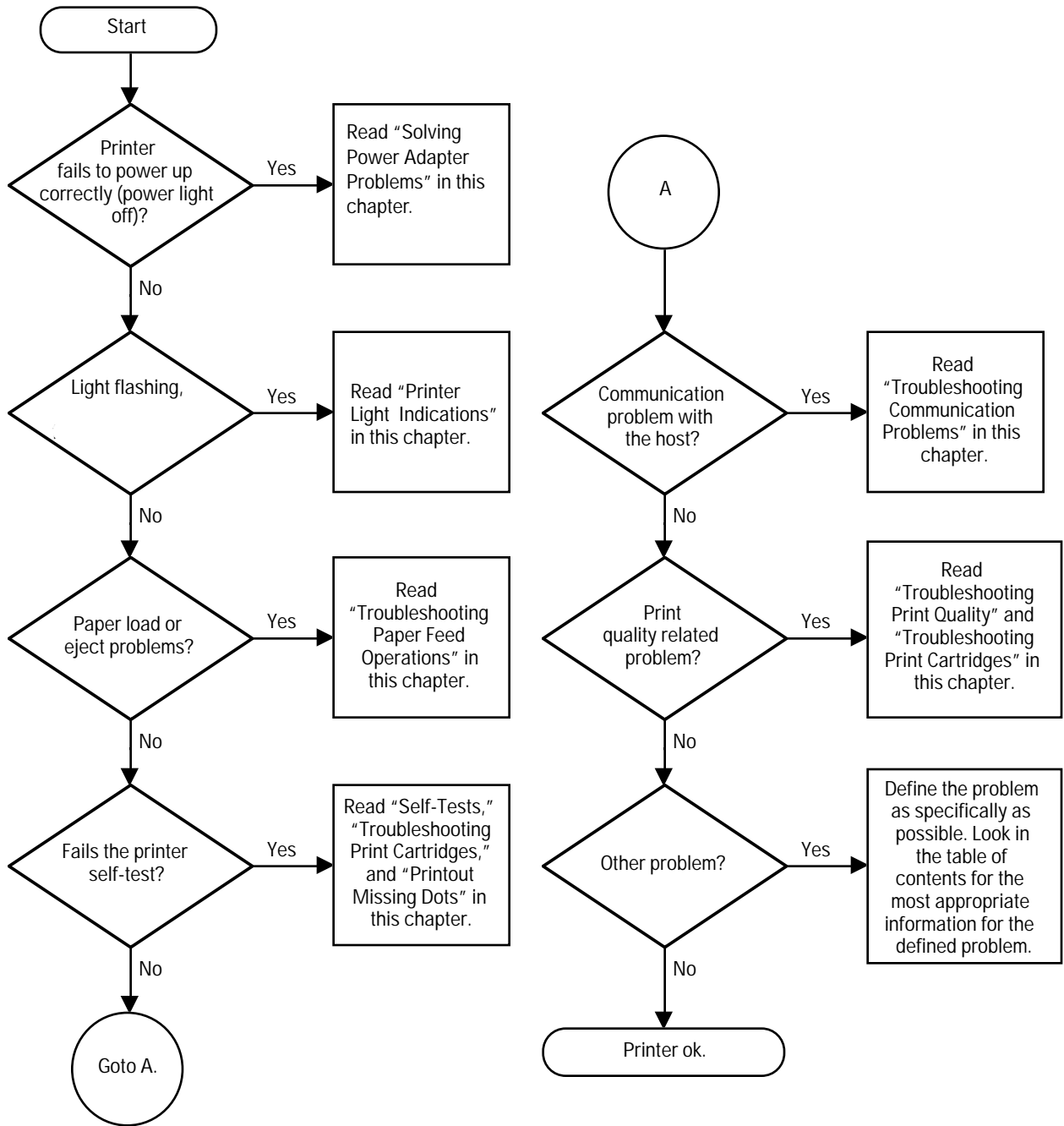


Figure 5-1. Overall Troubleshooting

Solving Power Adapter Problems

Table 5-1. Solving Power Adapter Problems

Problem	Solution
<i>Printer will not operate</i>	<ol style="list-style-type: none">1. Verify that the correct power adapter has been used.2. Verify that the power adapter connector is fully seated in the printer's power socket.3. The user may not be pressing the Power button long enough. Press the Power button until the light turns on.4. Check the voltage out of the power adapter. Replace the power adapter if it is faulty.5. The printer may be faulty. Return the printer for repair.

Troubleshooting the Printer

Self-Tests

Power On Self-Test

HP DeskJet 400 printer performs a power-on self-test when the printer is turned on to test printer operation. There is no printout associated with the power-on self-test.

There are two possible outcomes to the power-on self-test:

- If the printer *passes* the power-on self-test, the printer will power up with its current default settings and the Power light will be lit.
- If the printer *fails* the power-on self-test, the printer lights will blink simultaneously. For more information on printer light error patterns, see “Printer Light Indications” in this chapter.

Printer Demo Page

The printer demo page pattern printed with a black print cartridge installed shows the following:

- A nozzle test pattern that identifies any ink nozzles that are not printing. If the diagonal line has a gap, one or more nozzles may be clogged and you may need to clean the print cartridge
- An alphabetic character, following the letters "ID," identifying the type of print cartridge installed
- The printer firmware version and date
- The page count
- The current printer settings
- The default printer settings; the factory defaults are:

MEDIA SOURCE = Sheet Feeder

MEDIA SIZE = US Letter

CR DEFINITION = CR=CR

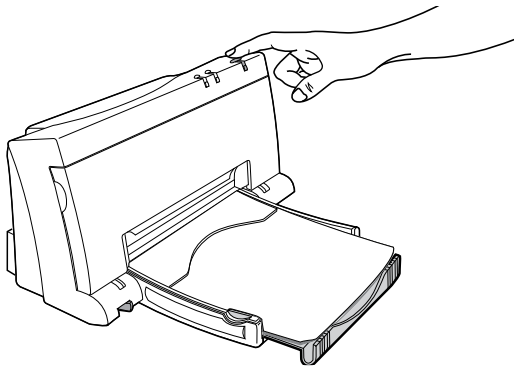
PERF. SKIP = On

TEXT SCALE = Off

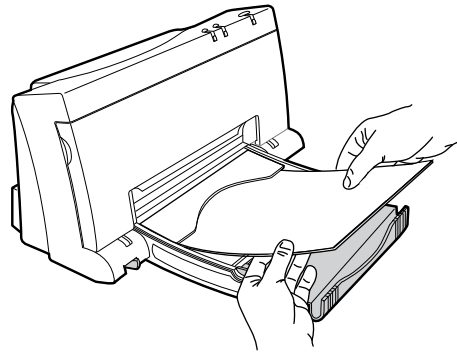
CHARACTER SET= PC-8 USA

To print the demo page, carry out the steps described below. If a black print cartridge is installed, the printout should resemble figure 5-2. With a color cartridge, the printout will be different.

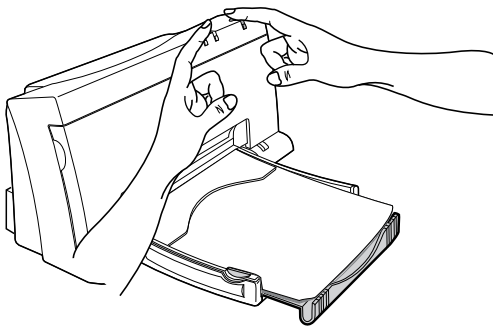
1. Turn the printer *off* by pressing the Power button.



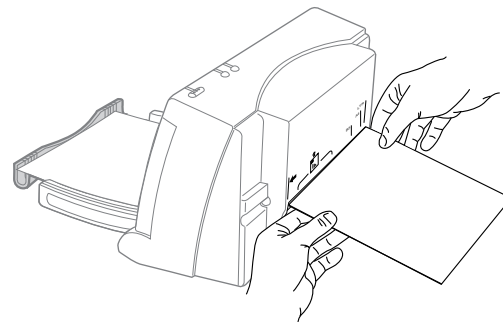
2. If using the paper tray, load paper. See "Loading Media" in chapter 3 for instructions on loading paper .



3. While pressing the Paper Feed button, press and release the Power button.



4. If using the printer manually, load a sheet when the Paper Feed light starts blinking. See "Loading Media" in chapter 3 for instructions on manually loading paper.



The Paper Feed light will blink when the printer is ready for another sheet of paper.

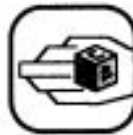


HP DeskJet 400

HEWLETT-PACKARD'S LOWEST-PRICED PERSONAL INKJET PRINTER



Professional Black Printing



Compact And Easy To Set Up



Optional Color Kit

PROFESSIONAL BLACK PRINTING

- ▲ The HP Print Quality Advantage
 - Crisp, clear printing with HP's Resolution Enhancement Technology
 - Better contrast of graphics with enhanced 256 levels of grayscaling
- ▲ Fast print speed of up to 3 pages per minute

COMPACT AND EASY TO SET UP

- ▲ Small footprint
- ▲ Automatic 50-page sheet feeder
- ▲ Compatible with a wide range of software applications

EASY TO ADD OPTIONAL COLOR

- ▲ Touch of a button for vivid color printing with HP's ColorSmart technology
- ▲ Up to 16.7 million brilliant colors

PRINTED ON THE HP DESKJET 400 INKJET PRINTER



• 10 E • 5.86 • 95/05/22 • PC = 83 • MEDIA SOURCE = Sheet Feeder • MEDIA SIZE = US Letter •
• CR DEFINITION = CR=CR • PERP. SKIP = ON • TEST SCALE = OFF • CHARACTER SET = PC-B USR •

Figure 5-2. Printer Demo Page with a Black Print Cartridge Installed

Printing Problems

Table 5-2. HP DeskJet 400 Printing Problems

Problem	Probable Cause	Solution
<i>Printing is skewed or slanted</i>	<p>Sheets are not feeding into the printer correctly.</p> <p>The print on your pre-printed forms is slanted.</p>	<p>See "Avoiding Print Skew" in this chapter.</p> <p>Re-print the forms.</p>
<i>The printer appears to be printing, but nothing is printed</i>	<p>The tape(s) that cover the ink nozzles of a new print cartridge have not been removed.</p> <p>The print cartridge wasn't snapped into place.</p> <p>The print cartridge is empty.</p>	<p>First remove the print cartridge from the printer. Then remove the tape(s) covering the ink nozzles and re-install the cartridge.</p> <p>Remove and re-install the print cartridge, making sure that you push the top of the cartridge forward until it snaps into place.</p> <p>Replace the print cartridge.</p> <p>For more information, see "Installing/Replacing a Print Cartridge" in chapter 3.</p>
<i>The printout is not correct</i>	<p>The appropriate printer driver has not been selected in the software.</p>	<p>Check the printer driver selected in the software application. See "Selecting a Printer Driver" in chapter 4.</p>
<i>The font specified in the document is not the font on the printout</i>	<p>The font specified in the document has not been installed in the software.</p> <p>The font was not correctly specified in the software.</p>	<p>Check the printer driver selected in the software application. See "Selecting a Printer Driver" in chapter 4.</p> <p>Check the software manual for instructions on specifying fonts.</p>
<i>Printed fonts, line length and/or character spacing do not match what you see on the screen</i>	<p>Screen fonts are either not available or not correctly installed.</p>	<p>Refer to the software application manual.</p>
<i>Printing is slow, or you receive messages like "Not enough memory to print"</i>	<p>There are problems with computer system memory.</p>	<p>If you are using Windows:</p> <ul style="list-style-type: none"> • Exit all applications and Windows. • Re-start Windows and re-start only the application you need. <p>Delete the screen fonts that correspond to printer fonts that you use rarely.</p> <p>Purchase more RAM for the computer.</p>

Printer Light Indications

The HP DeskJet 400 printer lights blink on and off to give you information about what the printer is doing.

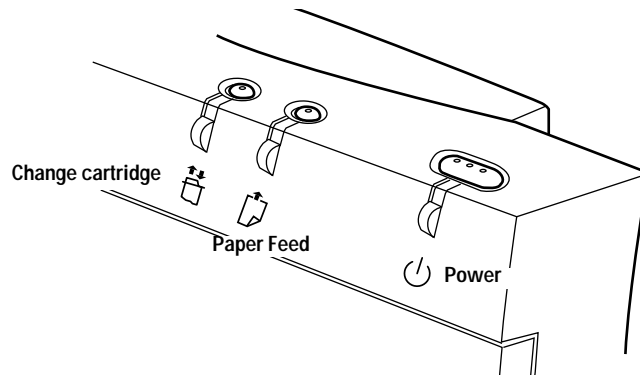


Figure 5-3. Printer Buttons and Lights

Note One or more blinking lights suggests that user intervention is needed.

Table 5-3. Printer Light Indications

Printer Light Indication	Probable Cause	Solution
<i>The Paper Feed light is blinking</i>	The printer is out of paper. The paper is not properly loaded.	Load paper into the paper tray. Push the paper release lever down and reposition paper. Push the paper release lever up and press the Paper Feed button to continue printing.
<i>The Change Cartridge light is blinking</i>	<ul style="list-style-type: none"> The printer is waiting for you to change the print cartridge. The print cartridge is improperly installed. You may be printing a colour document with a black print cartridge. 	<ul style="list-style-type: none"> Install a print cartridge. See "Installing a Print Cartridge" in chapter 3. Remove the print cartridge and then reload the print cartridge. Change the print cartridge accordingly.
<i>All printer lights are blinking at the same time.</i>	The printer has encountered some problems.	Turn off the printer and turn it on again. If the problem still exists, press and hold down the Paper Feed button. The blinking lights will change to a steady error pattern. Refer to table 5-4 for the error light patterns.

Table 5-4. Error Light Patterns

Error Light Indication	Probable Cause	Solution
None of the lights lit up	Internal ROM is defective	Return printer for replacement of main PCA
Change Cartridge light lits up	Print cartridge carriage cannot move	Check the carriage path for physical obstruction Return printer for repair
Paper light lits up	Paper is jammed OOPS is defective	Remove paper or other obstruction from the paper path. Ensure the OOPS flag is aligned correctly; return the printer for replacement of the OOPS flag
Power and Paper Feed lights lit up	Internal RAM is defective	Replace printer for replacement of main PCA
Power and Change Carriage lights lit up	Internal EEPROM is defective	Return printer for replacement of main PCA
Paper feed and Change Cartridge lights lit up	Service station stall	Check the service station base for movement obstructions. Return printer for repair
All 3 lights lit up	Firmware logic error or hardware error	Return the printer for replacement of main PCA

Solving Carriage Stall Conditions

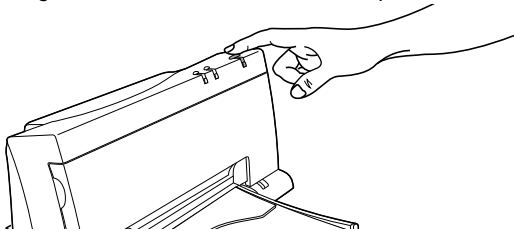
A carriage stall error condition occurs if the printer detects a problem with the movement of the print cartridge cradle along the printer carriage. In order to exit from a carriage stall, you have to turn the printer off.

The *Change Cartridge light is on* when an HP DeskJet 400 printer detects a *service station motor stall*. The service station is the part of the mechanism below the print cartridge when the print cartridge is at the right end of the mechanism (the “home” position). It serves to cap the print cartridge so that the nozzles will not dry out. In order to exit from a service station motor stall, you have to turn the printer off.

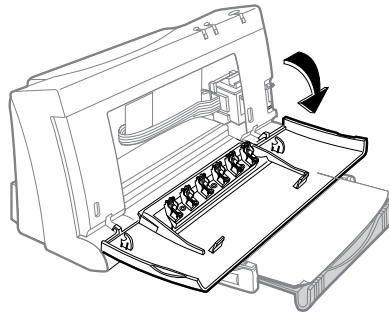
Caution

Do not attempt to manually move the print cartridge or print cartridge cradle from the home position (right end of the mechanism). The mechanism locks the print cartridge cradle in the home position, and attempting to slide the cradle or print cartridge in the locked position may damage the printer.

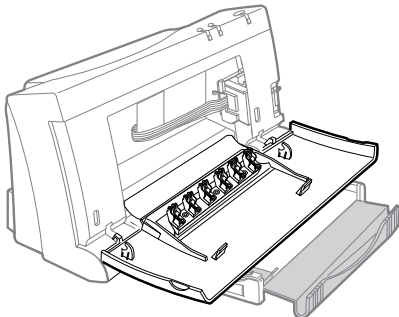
1. Turn the printer off and then back on.
 - If the stall condition does not reappear, no further troubleshooting is necessary. Monitor the printer for a period of time to make sure that the stall condition does not reappear.
 - If a carriage or service station motor stall occurs again, continue on to the next step.



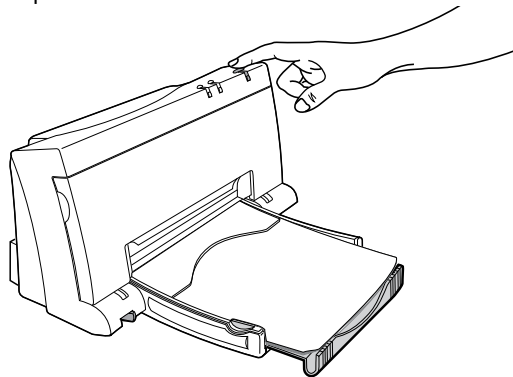
2. Open the access door.



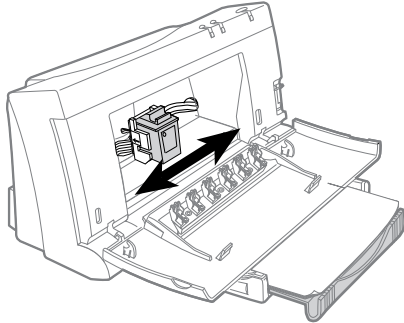
3. Look inside the printer and determine if the print cartridge and print cartridge cradle are in the home position (right end of the mechanism).
 - If the print cartridge and cradle are stuck in the home position, return the printer for repair.
 - If the print cartridge and cradle are *not* in the home position, continue on to the next step.



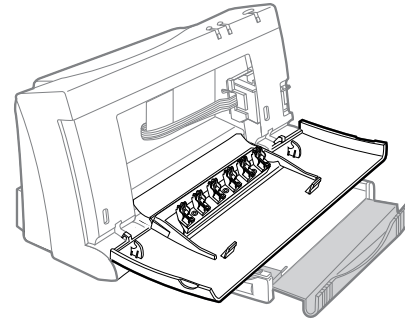
4. Turn the printer off. Because of the stall condition, the printer should turn off with the print cartridge out of the home position.



5. If the printer has a carriage stall error condition, look for obstructions or binding along the printer carriage path. Slide the print cartridge cradle back and forth across the printer mechanism. If the problem cannot be resolved, return the printer for repair.

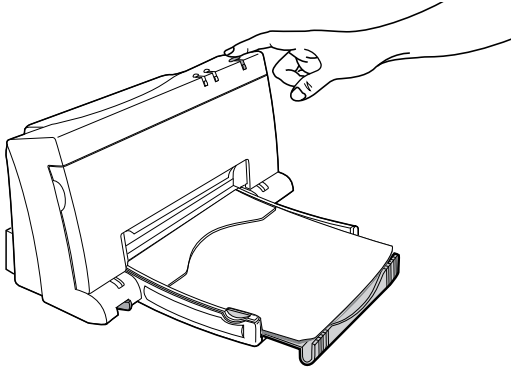


6. If the printer has a service station motor stall error condition, look for any visible obstructions around the service station (right end of the mechanism) that may be hindering the service station operation. If the problem cannot be resolved, return the printer for repair.



7. Turn on the printer. The carriage should move along the carriage path and return to the home position.

- If the stall problem recurs, look again for anything that may be causing it. If there are no visible causes, return the printer for repair.
- If the printer operates without a stall, monitor the printer during printing operations. If the stall problem continues to occur, return the printer for repair.



Troubleshooting Paper Feed Operations

Table 5-5. Media Related Problems

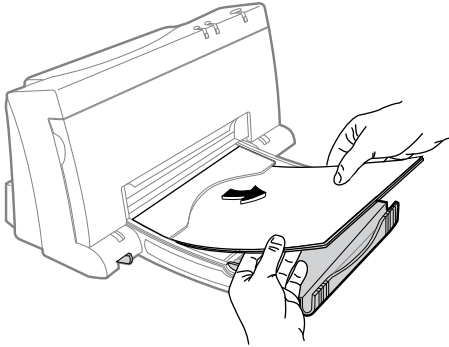
Problem or Indication	Possible Causes and Solutions
If you are using manual feed	
<i>Print is skewed or slanted</i>	See "Avoiding Print Skew" in this chapter.
<i>Printer does not pick up sheets fed by hand</i>	<ol style="list-style-type: none">1. Wait for the printer paper feed rollers to stop turning. Then insert the media in the paper feed slot again.2. Make sure that the sheet you are feeding is aligned with the molded line in the paper feed slot. Hold the sheet squarely in position until the printer pulls it in.3. Make sure that you have selected the manual feed option in your software. If the software does not allow you to specify the media source, use Menu mode or the DJPMenu configuration utility to select the Manual Feed printer setting. See "Changing the Printer Settings" in chapter 2.4. Make sure that the media you are feeding is not torn or dusty and that its edges are not curled.5. Open the printer door and switch the envelope lever to Envelope if you are printing envelopes, labels or thick paper. Remember to switch the Envelope lever back to paper.
<i>Sheets do not eject from the printer</i>	<ol style="list-style-type: none">1. Press and <i>hold</i> the Paper Feed button to eject the pages.2. If the computer was turned off during printing, turn it on again. The page will then be ejected.
<i>Paper Feed light is blinking</i>	The printer is out of paper. Feed a sheet into the paper feed slot and press the Paper Feed button to continue printing.

Table 5-5. Media Related Problems (Continued)

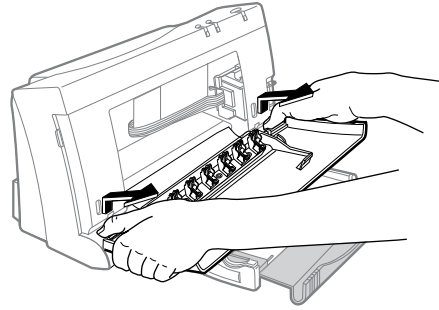
Problem or Indication	Possible Causes and Solutions
If you are using the paper tray	
<i>Media loading from the paper tray is skewed or slanted</i>	<ol style="list-style-type: none"> 1. Media of different types or weights may be loaded together in the IN tray. If so, remove all the media and replace with a single type. 2. Reload the media. Make sure that: <ul style="list-style-type: none"> • The stack of media is pushed against the right side of the IN tray. • The paper width adjustment selector is pushed against the left edge of the media. (Refer to page 3-3.) 3. If more than a 0.2 inch (5 mm) stack of media is loaded in the IN tray, remove some of it.
<i>Printer loads multiple sheets from the paper tray</i>	<ol style="list-style-type: none"> 1. Media of different types or weights may be loaded together in the IN tray. If so, remove all the media and replace with a single type. 2. Make sure that there is no more than 0.2 inch (5 mm) of media in the IN tray. If you are printing transparencies, make sure than you have loaded no more than 20 sheets into the IN tray. 3. Do not load paper on top of paper already in the IN tray. Load the paper into an empty IN tray as a single stack. 4. If media are stuck together, remove the stack, separate the sheets and reload into the IN tray.
<i>Transparencies do not load into the printer from the paper tray</i>	Under very humid conditions, transparencies can stick together. If this is the case, feed them by hand, one at a time.
<i>Transparencies jam in the printer</i>	The edges of the transparencies may be curled. Use only transparencies with edges that are <i>not</i> curled.
<i>Printer does not pick up paper from the paper tray</i>	<ol style="list-style-type: none"> 1. Verify that the paper meets the specifications listed in chapter 1. 2. The paper may not be properly loaded in the paper tray. Reload the paper, making sure that: <ul style="list-style-type: none"> • The paper is pushed against the right side of the IN tray. • The paper width adjustment selector is pushed against the left edge of the paper. (Refer to page 3-3) 3. Make sure that you have selected the automatic sheet feeding option in your software. If the software does not allow you to specify the media source, use the DJPMenu configuration utility to select the printer setting. If Manual Feed is currently selected, the printer paper feed rollers will not remain turned on long enough for the printer to load a sheet from the sheet feeder. See “Changing the Printer Settings” in chapter 2.

Clearing Paper Jams

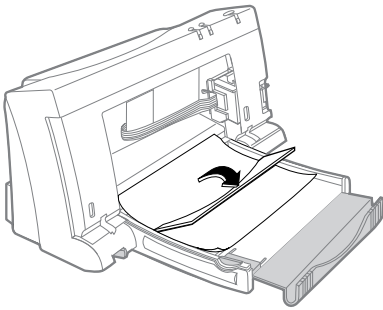
1. Turn off the printer and remove the paper from the paper tray.



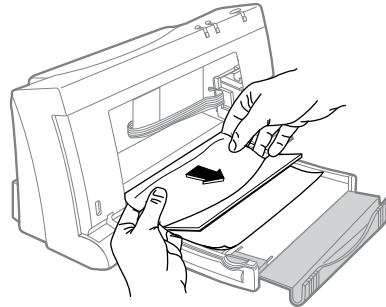
2. Open the printer door and remove it by grasping its sides and pulling it up.



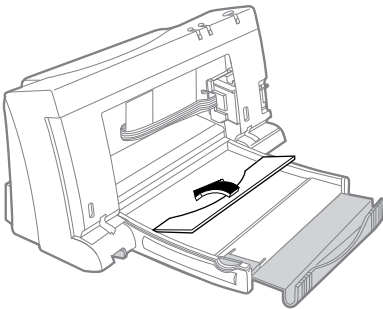
3. Open the paper separator (the flap that separates the printed pages from the blank sheets) by pulling it toward you.



4. Grip the jammed paper firmly by its sides and pull it out slowly.



5. Close the paper separator and re-attached by placing the door flat on the paper tray. Then align the hinges on the printer door with the pins on the printer. Press the printer door down until the printer door clicks into place.



6. Close the printer door. Load paper and turn on the printer.

Table 5-6. Possible Causes for Paper Jams

Possible Cause	Solution
<i>Paper is out-of-specification</i>	Use paper that meets the specifications listed in chapter 1.
<i>IN tray is too full</i>	Make sure that the stack of paper in the IN tray is no more than 0.2 inch (5 mm) high.
<i>Paper is too long</i>	<ul style="list-style-type: none">• Use only media sizes recommended in chapter 1.• Do not use continuous Z-fold paper in the printer.
<i>Paper is not loaded correctly</i>	Make sure the paper is not buckled. For more information, see "Loading Media" in chapter 3.
<i>Obstructions block the paper path</i>	Look for obstructions in the paper path, both within the paper tray and within the printer itself. Open the access door and verify that the paper path within the printer is clear of any obstructions. Then lift the printer out of the paper tray and look for obstructions.
<i>The printer may be faulty</i>	<ul style="list-style-type: none">• Try reloading paper in the paper tray. If it continues to have problems feeding paper into the printer, return the printer for repair.• If paper does not properly feed through the printer manually, the printer may be faulty.

Avoiding Print Skew

Print skew results when the movement of paper in the mechanism is not square to the carriage movement. The result is inconsistent print margins along the paper's edge.

- Print skew is determined by three elements:
 - The printer itself may skew paper that is otherwise within specification and loaded correctly.
 - The paper may not be square.
 - The paper may not be properly loaded.
- The squareness of the paper can be measured (see below). Any *paper* skew will be added to or subtracted from the print skew attributable to the printer itself, resulting in a “total print skew.”
- Total print skew can be measured by the procedure described on the next page. From the total print skew you can subtract the paper skew to determine whether the print skew attributable to the printer itself is within acceptable tolerances.
- It is possible to reduce total print skew by proper loading and handling of the paper. Review the instructions included with the user documentation to ensure that the paper was properly loaded.

Note

When using the paper tray, always load a stack of paper into an empty IN tray rather than placing paper on top of paper *already* in the IN tray.

Printer Skew Specification

The print skew specification for HP DeskJet 400 printer is no more than 0.006 inches per inch on 95% of all pages printed. The squareness of the paper and how paper is loaded can also add to total print skew. Pre-printed forms with their own printing *already skewed* can increase the *apparent* print skew if the form is skewed in the direction opposite from the printer's skew. Any skew on the printed form must be taken into account when measuring print skew.

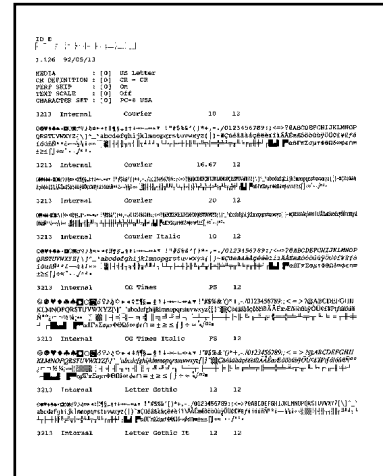
Measuring Paper Squareness

Total print skew may be affected by the squareness of the paper. The industry standard for paper squareness is no more than 0.003 inches per inch. This tolerance must be added to the printer's own print skew specification to obtain a true total print skew specification. Test the paper squareness by printing on one side of the paper, flipping the paper over, then printing on the other side. If the print slopes down on one side and up on the other side, the squareness of the paper may be affecting the total print skew. In this case, you may be able to reduce the total print skew by trying a different kind or brand of paper.

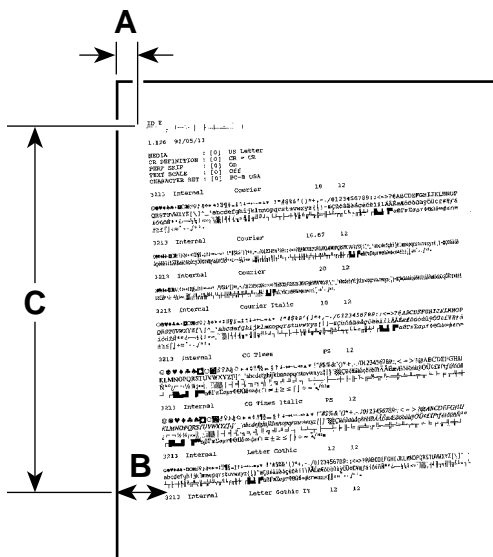
Measuring Print Skew

1. Load a stack of paper in the IN tray. Use paper with squareness that is within tolerance.

2. Print a page of information that should display a consistent left margin down the page.

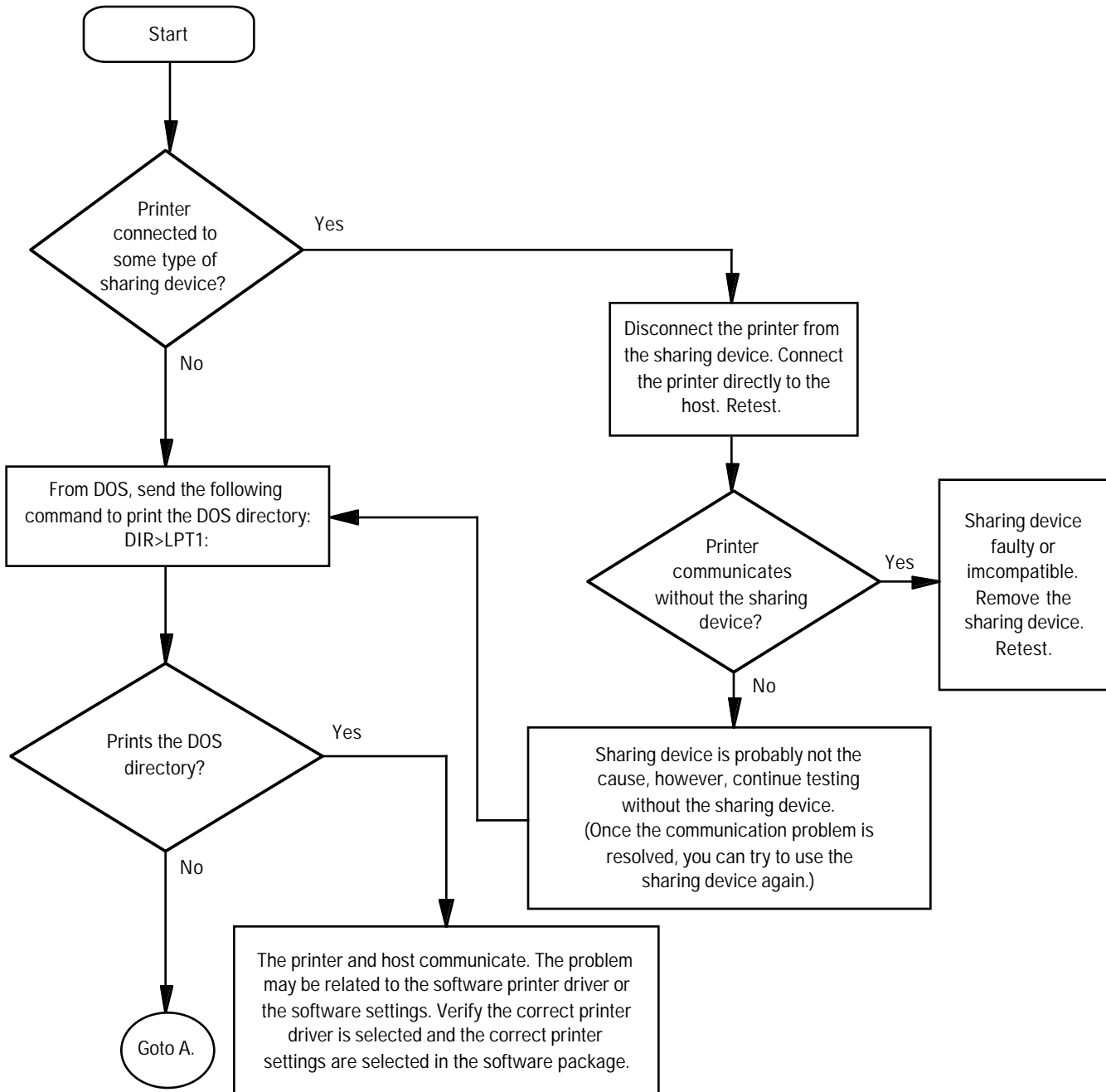


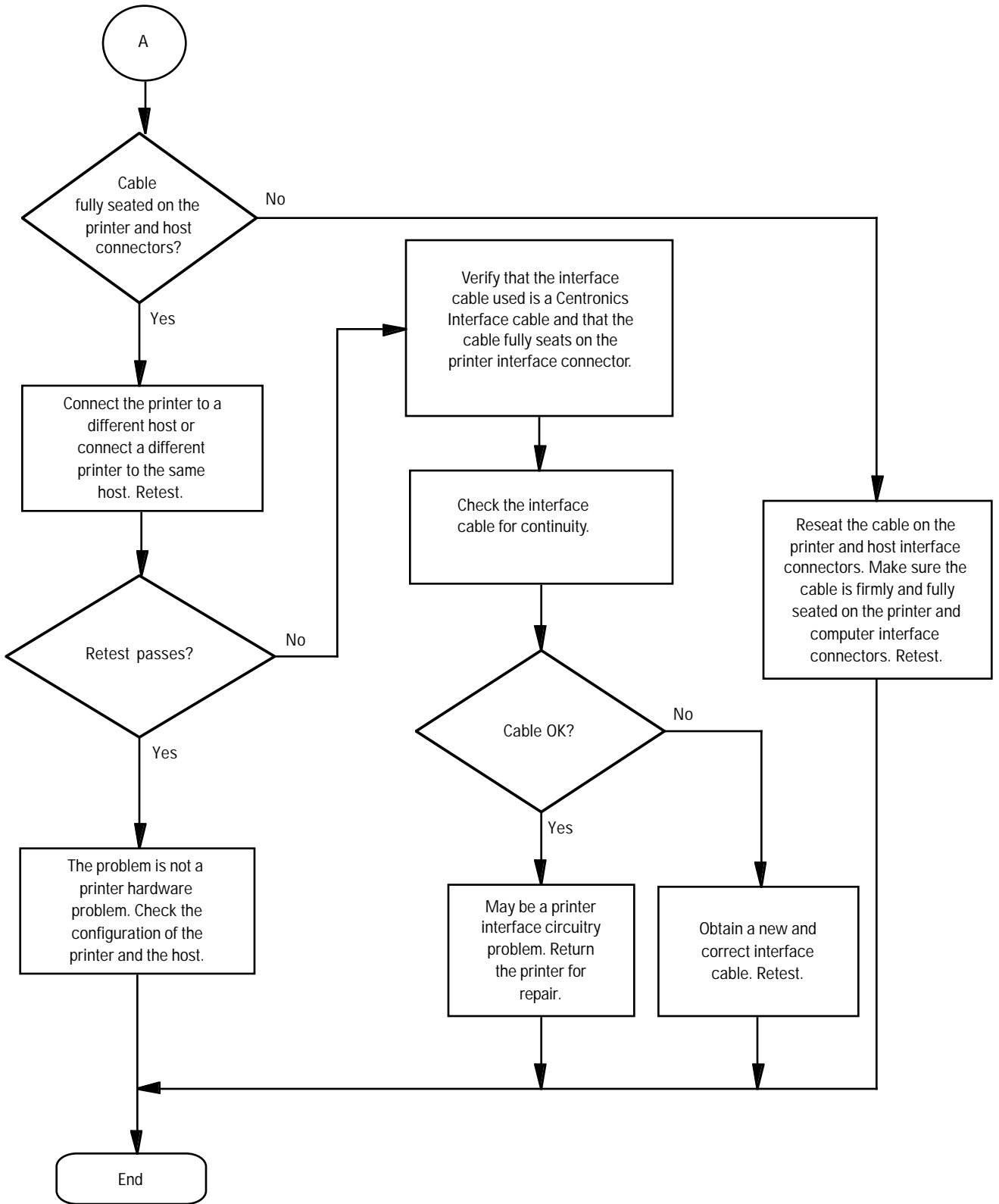
3. Take measurements to determine the print skew on the page.
 - A. Measure the distance from the left edge of the paper to the upper left corner of the printout. This is distance "A" in the figure below.
 - B. Measure the distance from the left edge of the paper to the lower left corner of the pattern. This is distance "B" in the figure below.
 - C. Measure the vertical distance between "A" and "B." This is distance "C" in the figure below.



4. Use one of the following equations to determine the total print skew on the page:
 - If $A > B$, use the equation $(A - B) / C$
 - If $B > A$, use the equation $(B - A) / C$
5. Repeat steps 2, 3, and 4 on at least 20 pages. The measurement should be within the print skew specification on 19 out of 20 pages.
6. Try the process again with a different type of paper.
7. If the print skew is consistently out of tolerance, return the printer for repair.

Troubleshooting Communication Problems





Troubleshooting Print Cartridges

Short Print Cartridge Life

There are several causes for a short print cartridge life. The information below describes the average print cartridge life for the two recommended print cartridges and possible causes for a reduction to this expected print cartridge life.

Table 5-7. Print Cartridge Life Specifications — Ink Used

Print Cartridge		Print Cartridge Life Based on Ink Used		
		1000 Characters Per Page Coverage	1500 Characters Per Page Coverage	Normal Print Mode (8% Area Fill)
Black Print Cartridge ¹	51626A	500 to 1000 Pages	333 to 666 Pages	
Color Print Cartridge ²	51625A			250 Pages

1. The **51626A** black print cartridge life specifications are based on printing Courier 10. The lower numbers in the specifications are based on using letter-quality print mode and the higher numbers in the specifications are based on using draft print mode.
2. The **51625A** color print cartridge life specification is based on using Normal print mode in Windows with an average 8% area fill.

Table 5-8. Possible Causes for Short Print Cartridge Life — Black or Color

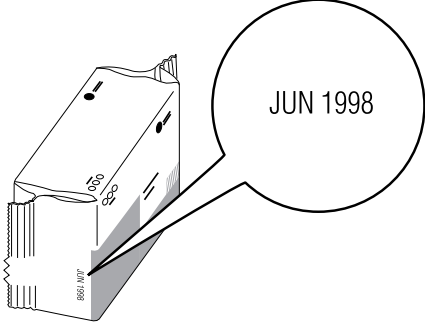
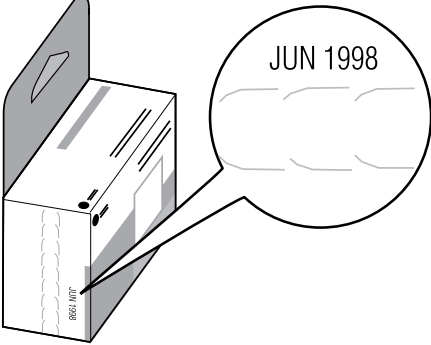
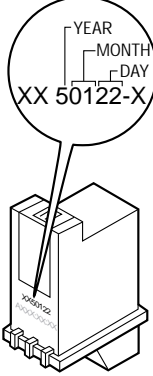
Possible Cause	Explanation
<i>Pages used a higher rate of ink coverage than that used for the cartridge life specification</i>	The rate of coverage on the page has a significant impact on the number of pages per print cartridge. Heavy concentrations of ink and higher print quality significantly reduce the number of pages per print cartridge.
<i>Pages contained graphics</i>	Generally, graphics use ink at a much higher rate than the Courier 10 font at the 1500 characters per page specification. If possible, print drafts of documents without the graphics.
<i>The selected print mode uses ink at a higher rate</i>	Higher quality print modes use more ink than draft print mode. To maximize print cartridge life, print drafts of documents in draft mode, then print the final copies in letter-quality mode.
<i>The print cartridge is past the expiration date</i>	Replace the print cartridge. Use a First In-First Out (“FIFO”) inventory process to avoid a stock of expired print cartridges.
<i>The printer was turned off with the print cartridge away from home position</i>	A service station is located at the right end of the mechanism. This service station caps the print cartridge nozzles to minimize ink drying in the nozzles. Always allow the print cartridge to return to the home position so that the service station can cap the print cartridge nozzles when the printer is not in use.
<i>The print cartridge was open outside the printer</i>	Opened print cartridges must be stored in the printer or in the print cartridge storage container supplied with the optional Color Kit.
<i>The print cartridge was refilled</i>	Hewlett-Packard does not recommend or guarantee the print quality or cartridge life of refilled print cartridges. Replace the print cartridge with a new print cartridge.

Table 5-8. Possible Causes for Short Print Cartridge Life — Black or Color (Continued)

Possible Cause	Explanation
<i>The print cartridge packaging seal was broken too soon</i>	The print cartridge has a longer life sealed in its packaging rather than in the printer. Keep print cartridges sealed in their packaging until needed. Then, install the print cartridge in the printer promptly. If you use both a black and a color print cartridge, keep one print cartridge in the printer and the other in the storage container provided with the optional Color Kit.
<i>The estimate of the number of pages actually printed was inaccurate</i>	Underestimating the number of pages actually printed is hard to avoid. When counting pages per cartridge, be sure to count drafts that have been thrown away.
<i>The print cartridge was faulty</i>	If a print cartridge proves to be faulty, replace it. If a pattern of faulty print cartridges develops, it is possible that a problem in the printer itself may be causing the print cartridges to fail. In this case, return the printer with the failed print cartridges for evaluation and repair.
<i>There may be a printer hardware problem</i>	The service station may be faulty, or the printer may be damaging the print cartridges. Return the printer with the failed print cartridges for repair.
<i>The print cartridge cleaning routine was used excessively</i>	The cleaning routine clears the ink nozzles and — if used in the appropriate circumstances — can have the effect of restoring a print cartridge. However, using this routine too frequently consumes significant quantities of ink. Avoid overusing the cleaning routine.

Identifying the Print Cartridge Expiration Date

Print quality problems may be caused by print cartridges that have passed their expiration date. There are two methods for determining whether a print cartridge is past its expiration date:

1. If the print cartridge is in the original packaging, read the "Use Before" date printed on the box. The date can also be read from the plastic packaging used to wrap the cartridge. If the print cartridge is not in the original packaging, continue on to the next step.
2. Determine the earliest and latest possible expiration dates from the code printed on the print cartridge.
 - A. Determine the manufacturing date from the code printed on the print cartridge. In the example below, the print cartridge was produced on January 22, 1995.
 - B. Determine the earliest and latest possible expiration dates from the code printed on the print cartridge.
 - Earliest Possible Expiration Date = Manufacturing Date + Open Life Specification
 - Latest Possible Expiration Date = Manufacturing Date + Shelf Life (Sealed in its Container)
 - C. If you believe, based on these calculations, that the print cartridge has passed its shelf life expiration date — or, if open, its open life expiration date — replace the print cartridge. See table 5-10.

Notes

- Ink can evaporate through the nozzles, reducing the print cartridge life. Therefore, keep print cartridges sealed as long as you can. Then, once you have broken the seal, keep the cartridge either *in the printer* — so that it is capped by the service station at the right end of the mechanism — or in the storage container supplied with the optional Color Kit.
- For more tips on extending the print cartridge life, read "Maintaining Print Cartridges" in chapter 3.

Table 5-9. Print Cartridge Life Specifications — Age

Print Cartridge		Print Cartridge Life	
Part Number	Description	Sealed in its Container (Shelf Life)	Open in the Printer or in the Storage Container ¹
51626A	Black Print Cartridge	18 Months	90 Days
51625A	Color Print Cartridge	18 Months	180 Days

1. At office, with ambient printing at least once a month.

Table 5-10. Print Cartridge Expired?

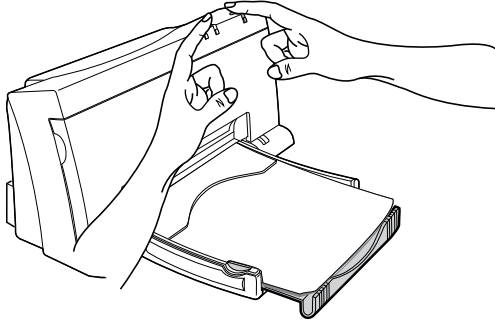
Period of Time After the Manufacturing Date	Print Cartridge Expired?	Explanation
From the manufacturing date to 90 days after the manufacturing date	No	The print cartridge has yet to exceed the open life specification.
90 days to 18 months from the manufacturing date	Maybe	Expired if the print cartridge has been out of its packaging longer than the open life specification.
Longer than 18 months after the manufacturing date	Yes	The print cartridge has exceeded its 18 month shelf life.

Note Use a First In, First Out (FIFO) inventory control process to avoid keeping print cartridges longer than their shelf life.

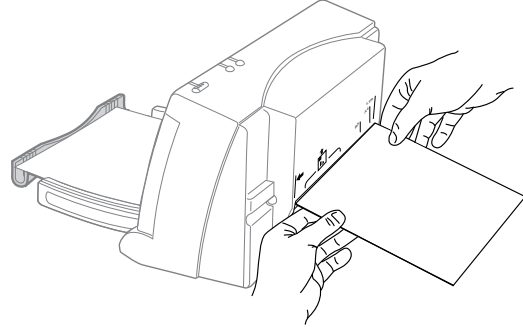
Using the Print Cartridge Cleaning Routine

When dots or lines are missing from printouts, use the following routine to clear the print cartridge ink nozzles. The HP DeskJet 400 printer can clean either a black or a color print cartridge.

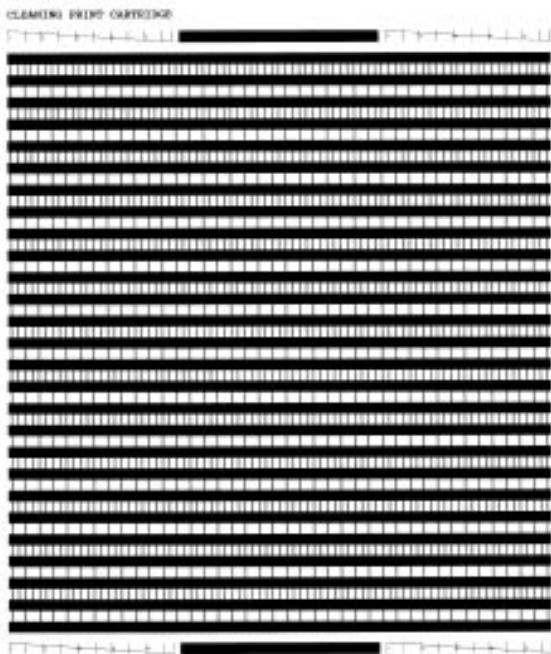
1. Hold the change cartridge button while pressing the power button.



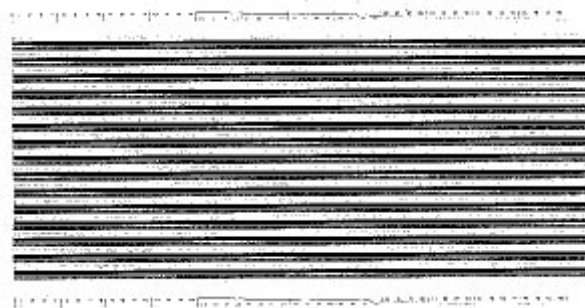
2. If you are using manual feed, insert a sheet of Letter- or A4-size paper in the paper feed slot.



3. The printer will perform a series of "spits and wipes" on the print cartridge nozzles. If you are using a *black* print cartridge, the printer will then print a page like the one shown:



4. If you are using a *color* print cartridge, the printer will then print a different page, like the one shown below:



If there are streaks in the horizontal bars or gaps in the diagonal test pattern at the **bottom** of the page, some of the ink nozzles may still be clogged. If necessary, repeat the cleaning process. If the cleaning routine *still* does not restore the print cartridge, try doing the procedure "Cleaning the Electrical Contacts" later in this chapter.

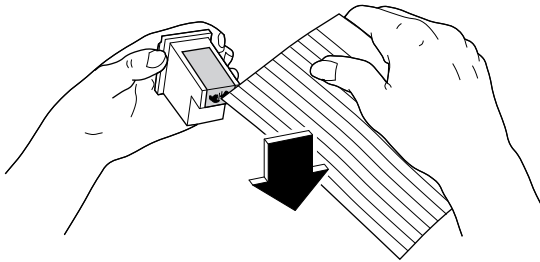
Removing Crusted Ink from the Print Cartridge Nozzles

Print cartridges left out of the printer may have crusted ink on the print cartridge nozzles. *Do not install a print cartridge with crusted ink into the printer.* Use the following procedure to remove the crusted ink from the nose of a black print cartridge.

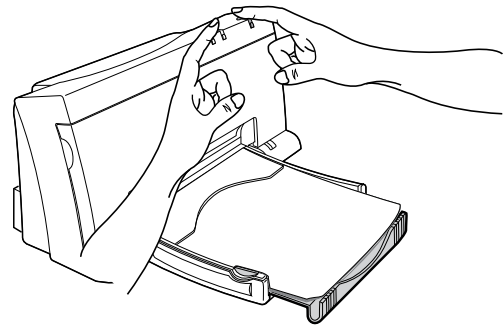
Caution

Use care during this process to avoid staining your hands or clothes with ink from the print cartridge.

1. Grasp the print cartridge by the green top portion of the print cartridge. Use the edge of an index card or other rigid paper stock to scrape the dried ink off the print cartridge nozzles into a trash container.



2. Perform the print cartridge cleaning routine. This routine executes several "spits and wipes" on the print cartridge nozzles, and prints a page of horizontal bars. See "Using the Print Cartridge Cleaning Routine" on the previous page.



3. Perform the printer self-test. If the printout is not missing dots toward the end of the self-test printout, the print cartridge is restored to operating condition.



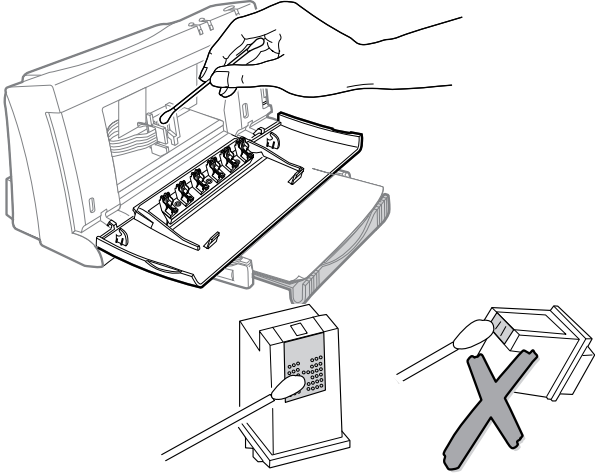
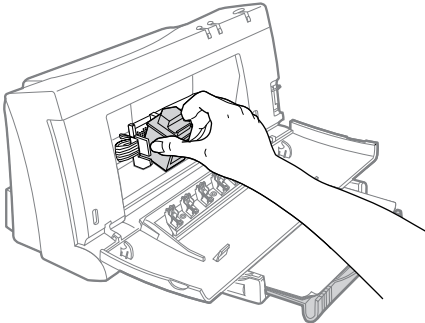
4. If the printout is still missing dots toward the end of the self-test printout, the print cartridge may have dirty electrical contacts or clogged nozzles. Follow the steps in the next section, "Cleaning the Electrical Contacts".

Cleaning the Electrical Contacts

You may need to clean the electrical contacts on the print cartridge if:

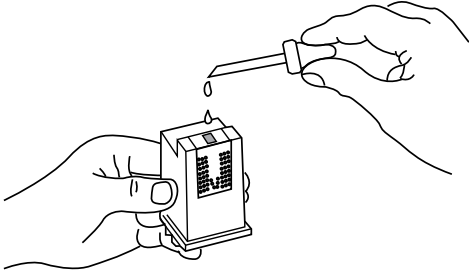
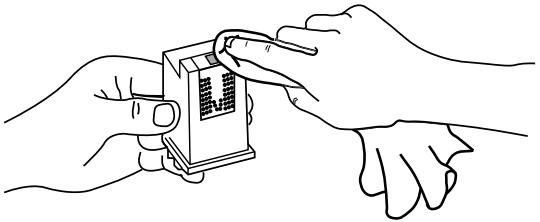
- the print cartridge cradle does not return to the home position when you press the Setup button.
- the characters printed are incomplete, or if dots or lines are missing from the printouts.

To clean the contacts, use the procedure described below:

<p>1. Remove the print cartridge from the printer and clean the print cartridge and print cartridge cradle contacts. Use a cotton swab lightly moistened with water. <i>Do not wipe the ink nozzles on the print cartridge.</i></p> 	<p>2. Once the print cartridge and print cartridge cradle contacts are dry, reinstall the print cartridge.</p> 
<p>3. Do the self-test. If the self-test is missing dots or lines, you can try clearing the print cartridge nozzles, as described below.</p>	

Clearing Clogged Print Cartridge Nozzles

If printouts are missing dots or lines, first try cleaning the electrical contacts by following the steps above. If dots are still missing, then follow the steps below:

<p>1. Hold the print cartridge so that the gold rectangle, in the middle of the raised end, points up. Place two drops of clean water on the gold rectangle.</p> 	<p>2. After 60 seconds, gently remove the water with a lint-free damp cloth.</p> 
<p>3. Reinstall the print cartridge and do the self-test.</p> <ul style="list-style-type: none">• If the self-test is not missing dots or lines, the print cartridge is restored.• If the self-test is missing dots or lines, repeat the self-test. If the dots are still missing, replace the print cartridge.	

Troubleshooting Print Quality

Solving Black Print Quality Problems

Table 5-11. Solving Black Print Quality Problems

Black Print Quality Issue	Possible Cause and Solution
<i>Print is faint or fuzzy</i>	<ol style="list-style-type: none">1. Was the print cartridge new when installed in the printer or was it a refilled print cartridge? If it was refilled, replace it with a new print cartridge. Hewlett-Packard does not recommend refilling print cartridges and cannot guarantee the quality from a refilled print cartridge. Also, refilled cartridges may be using ink formulations that can damage the service station.2. Verify that the print cartridge has not expired. See “Identifying the Print Cartridge Expiration Date” in this chapter.3. Run the print cartridge cleaning routine to clear the nozzles. See “Using the Print Cartridge Cleaning Routine” in this chapter.4. If you determine that the print cartridge is running out of ink, replace the print cartridge.5. The print cartridge may be faulty. Try printing with another print cartridge.6. Make sure that the media meets the specifications in chapter 1.7. Verify that the paper is not inkjet, ThinkJet, or special coated paper, unless it is recommended for HP DeskJet 400 printer.8. Turn the paper over and try printing on the other side. See the paper packaging for an arrow or other identification of the print side of the paper.9. Some paper that meets specifications in chapter 1 will not produce satisfactory results. Try a different brand of paper.10. If printing transparencies, verify that you are using HP Premium media.11. Verify that the printer is set to Letter Quality rather than Draft mode printing.12. Adjust the intensity setting in your software to make sure that the correct amount of ink is thrown onto the page. See your software manual.
<i>Print density is inconsistent</i>	<ol style="list-style-type: none">1. The print cartridge nozzles may be clogged. Run the print cartridge cleaning routine to clear the nozzles. See “Using the Print Cartridge Cleaning Routine” in this chapter.2. Make sure that you insert media <i>print side up</i> in the printer. Check the packaging for an indication of the print side. If you are using plain paper, try turning the paper over and printing on the other side.3. Make sure that the media meets the specifications in chapter 1.4. If printing transparencies, verify that the media is HP Premium.5. Some paper that meets specifications in chapter 1 will not produce satisfactory results. Try a different brand of paper.
<i>Ink is smearing</i>	<ol style="list-style-type: none">1. Adjust the intensity setting in your software to reduce the amount of ink thrown onto the page. See your software manual.2. Verify that there is no crusting of ink on the print cartridge nozzles.3. Verify that the paper is not inkjet, ThinkJet, or special coated paper unless it is recommended for use with HP DeskJet 400 printer.4. Try printing in the vertical print position.5. Some kinds of paper that meet specifications in chapter 1 will not produce satisfactory results. Try a different brand of paper.6. If printing transparencies, verify that the media is HP Premium.7. Allow the ink to set before stacking paper or placing transparencies in sleeves.
<i>Output appears jagged</i>	<ol style="list-style-type: none">1. Verify that Letter Quality mode is selected rather than Draft mode.2. In Windows, check that Presentation mode rather than Normal or Draft mode is selected.

Table 5-11. Solving Black Print Quality Problems (Continued)

Black Print Quality Issue	Possible Cause and Solution
<i>Black printing is fading</i>	<ol style="list-style-type: none"> 1. Run the print cartridge cleaning routine to clear the nozzles. See “Using the Print Cartridge Cleaning Routine” in this chapter. 2. If the print quality does not improve, replace the print cartridge.
<i>Characters, dots or lines are incomplete or missing from printouts; or dark horizontal lines appear in gray areas</i>	<p>Missing dots may be caused by problems with any of the following:</p> <ul style="list-style-type: none"> • print cartridge • printer hardware • connection between the printer and the print cartridge. <p>See “Printouts Missing Rows of Dots” in this chapter for solutions.</p> <p>If you are printing from a Windows application:</p> <ul style="list-style-type: none"> • Select Presentation mode in the Printer Setup dialog box. • Print the page again using manual feed.
<i>Black output appears greenish</i>	<p>The HP DeskJet 400 printer, when using a color print cartridge, produce composite black from the color print cartridge by mixing colors. If this composite black appears greenish or otherwise unsatisfactory, try to arrange the document so that each page is either <i>only color</i> or <i>only black</i>; you can then change to a black cartridge before printing a black only page.</p>

Solving Color Print Quality Problems

Table 5-12. Solving Color Print Quality Problems

Color Print Quality Issue	Possible Cause
<i>Printout is faint. Colors appear washed out.</i>	<ol style="list-style-type: none"> 1. Make sure that Letter Quality mode is selected (the Draft light should be <i>off</i>). 2. Adjust the intensity setting in your software to increase the amount of ink thrown onto the page. See your software manual.
<i>Ink is smearing</i>	<p>See the <i>Ink is smearing</i> solutions in table 5-11, Solving Black Print Quality Problems.</p>
<i>Colors are missing or hues change on printouts</i>	<ol style="list-style-type: none"> 1. Run the print cartridge cleaning routine to clear the nozzles. See “Using the Print Cartridge Cleaning Routine” in this chapter. 2. If the print quality does not improve, the print cartridge may be running out of one color of ink. Replace the print cartridge.
<i>Print density is inconsistent</i>	<ol style="list-style-type: none"> 1. The print cartridge nozzles may be clogged. Run the print cartridge cleaning routine to clear the nozzles. See “Using the Print Cartridge Cleaning Routine” in this chapter. 2. Make sure that you insert media <i>print side up</i> in the printer. Check the packaging for an indication of the print side. If you are using plain paper, try turning the paper over and printing on the other side. 3. Make sure that the media meets the specifications in chapter 1. 4. If printing transparencies, verify that the media is HP Premium. 5. Some paper that meets specifications in chapter 1 will not produce satisfactory results. Try a different brand of paper.

Table 5-12. Solving Color Print Quality Problems (Continued)

Color Print Quality Issue	Possible Cause
<p><i>Printouts contain inconsistent color fill patterns with horizontal bands or thin lines running completely across the sheet</i></p>	<p>If bands or thin lines run all the way across the printout, the inconsistent color fill pattern can result from either of two problems: waitbanding or overlapping lines. These problems require different solutions.</p> <ul style="list-style-type: none"> • If you see horizontal <i>bands</i> of color, the printer may be experiencing waitbanding (“color banding”). See “Inconsistent Color Fill Patterns” at the end of this chapter for solutions. One approach is to print the document to a file; then you can print the file as a binary file from DOS (copy filename LPT1:/b). • If you see thin horizontal <i>lines</i> of color, the problem is likely to be overlapping lines. <ul style="list-style-type: none"> – Try printing the sheet again using manual feed. – If you are printing from a Windows application, select the “Best” setting under Print Quality in the Printer Setup dialog box.
<p><i>Printed colors do not match screen color</i></p>	<p>If you are using Windows, try the following:</p> <ol style="list-style-type: none"> 1. Verify that the “Match Screen” option is selected under Color Control in the Options dialog box of the Printer Setup menu. 2. The print cartridge may be running out of one color of ink. 3. Try a different dithering method. <p>In DOS applications, a solution is dependent on the printer driver for that DOS software package. Refer to the software documentation or contact the software vendor for possible solutions.</p>
<p><i>Color smudges on transparencies</i></p>	<p>If you are using Windows:</p> <ol style="list-style-type: none"> 1. In the Printer Setup dialog box, make sure that you have selected “Transparency Film” or “Transparency Film (Extra Dry Time)” in the “Media Type” field. <ul style="list-style-type: none"> • If you have selected “Transparency Film,” the printer will add several extra minutes of drying time before dropping another sheet on top of the transparency that was last printed. The Busy light flashes during the drying interval. • If you have selected “Transparency Film (Extra Dry Time),” the printer will print each transparency and stop before printing the next. You will see the message, “Remove Printed Page.” Remove the transparency and click the OK button in the dialog box. Place the removed transparency in a drying area, out of the sun. 2. Make sure that you load the transparency into the paper tray or directly into the paper feed slot with the <i>rough</i> side of the transparency up. 3. Wait several minutes before placing transparencies in sleeves or avoid placing transparencies in sleeves.
<p><i>Color smudges on glossy paper</i></p>	<p>If you are using Windows:</p> <ol style="list-style-type: none"> 1. In the Printer Setup dialog box, make sure that you have selected “Glossy Paper” or “Glossy Paper (Extra Dry Time)” in the “Media Type” field. <ul style="list-style-type: none"> • If you have selected “Glossy Paper,” the printer will add several extra minutes of drying time before dropping another sheet on top of the sheet that was last printed. • If you have selected “Glossy Paper (Extra Dry Time),” the printer will print each sheet and stop before printing the next. You will see the message, “Remove Printed Page.” Remove the sheet and click the OK button in the dialog box. Place the removed sheet in a drying area, out of the sun. 2. Make sure that you load the sheet into the paper tray or directly into the paper feed slot with the <i>glossy</i> side up. 3. Be sure to give the ink several minutes to dry.

Table 5-12. Solving Color Print Quality Problems (Continued)

Color Print Quality Issue	Possible Cause
<i>Color fades on transparencies</i>	It is possible that the transparencies are being exposed to ultraviolet light, typically from the sun. Check other instruments and machinery near the printer to see that they do not create ultraviolet light. Be sure to protect transparencies from direct or reflected rays of the sun or other sources of ultraviolet. After the transparency is dry, you can cover it with a sheet of paper.
<i>Printouts have black output where you expected color</i>	<ol style="list-style-type: none"> 1. Verify that the black print cartridge is <i>not</i> installed. If it is, replace it with the color print cartridge and print the page. 2. If using Windows, verify that you have not selected Black Text or Grayscale print modes in the Printer Setup dialog box. If you have selected Automatic, be sure you have not selected "Print in Grayscale", located immediately below the Manual button, in the Printer Setup dialog box.
<i>Characters, dots or lines are incomplete or missing from printouts</i>	<p>Missing dots when printing color can be caused by the same problems that cause missing dots when printing black. These problems may be with any of the following:</p> <ul style="list-style-type: none"> • print cartridge • printer hardware • connection between the printer and the print cartridge. <p>See "Printouts Missing Rows of Dots" in this chapter for solutions.</p> <p>If you are printing color from a Windows application:</p> <ul style="list-style-type: none"> • Select Presentation mode in the Printer Setup dialog box. • Print the page again using manual feed.

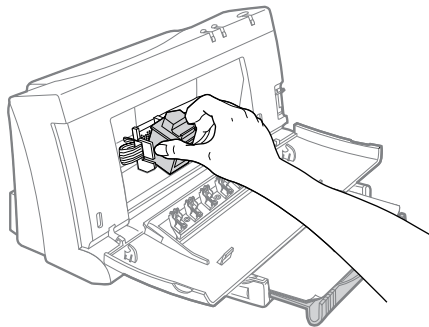
Printouts Missing Rows of Dots

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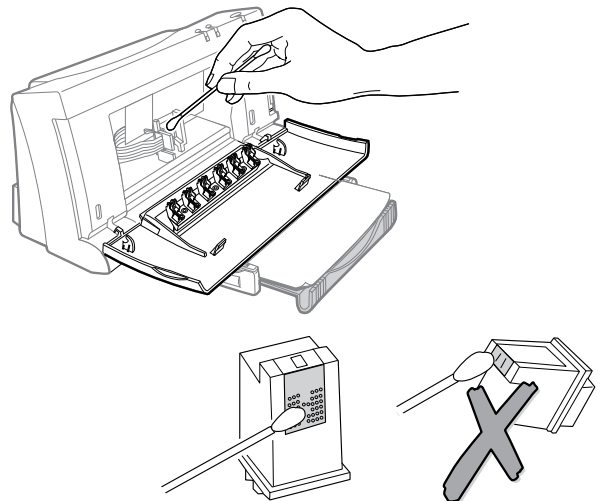
Figure 5-4. Printouts Missing Dots

Horizontal rows of dots missing on printouts may be the result of a connection problem between the print cartridge cradle contacts and the print cartridge contacts. This is known as an “interconnect problem.” You may be able to solve this problem using the following procedure:

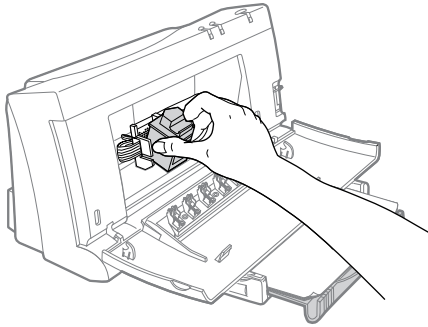
1. Remove and reinstall the print cartridge. Make sure the print cartridge snaps into place in the print cartridge cradle. Retest by printing the printer self-test.
 - If all of the rows of dots are printing, no further troubleshooting is necessary.
 - If rows of dots are still missing in the self-test printout, continue on to the next step.



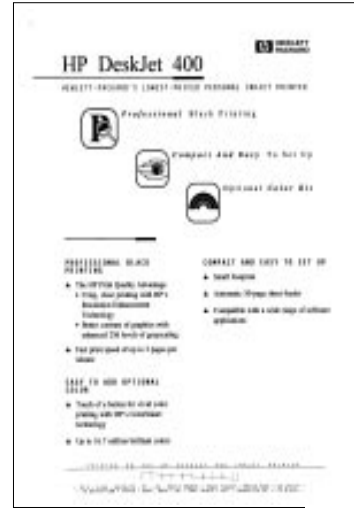
2. Remove the print cartridge from the printer and clean the print cartridge and print cartridge cradle contacts. Use a cotton swab lightly moistened with water. *Do not wipe the ink nozzles on the print cartridge.*



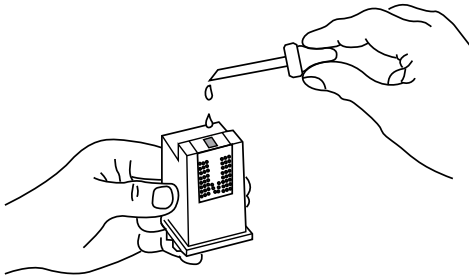
3. Once the print cartridge and print cartridge cradle contacts are dry, reinstall the print cartridge. Retest by printing the printer self-test.
- If all of the rows of dots are printing, no further troubleshooting is necessary.
 - If rows of dots are still missing in the self-test printout, continue on to the next step.



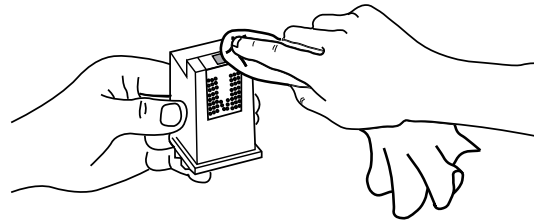
4. The print cartridge may be faulty. Replace the print cartridge and retest by printing the printer self-test.
- If all of the rows of dots are printing, no further troubleshooting is necessary.
 - If rows of dots are still missing in the self-test printout, the print cartridge nozzles may be clogged, continue on to the next step.



5. Hold the print cartridge so that the gold rectangle, in the middle of the raised end, points up. Place two drops of clean water on the gold rectangle (shaded below).



6. After 60 seconds, gently remove the water with a lint-free damp cloth.



7. Repeat the above steps of installing the print cartridge, cleaning the print cartridge contacts, cleaning the print cartridge cradle contacts, and clearing the nozzles several times. If the problem consistently appears in the printer self-test with the same rows of dots missing on different print cartridges, return the printer for repair.

Inconsistent Color Fill Patterns

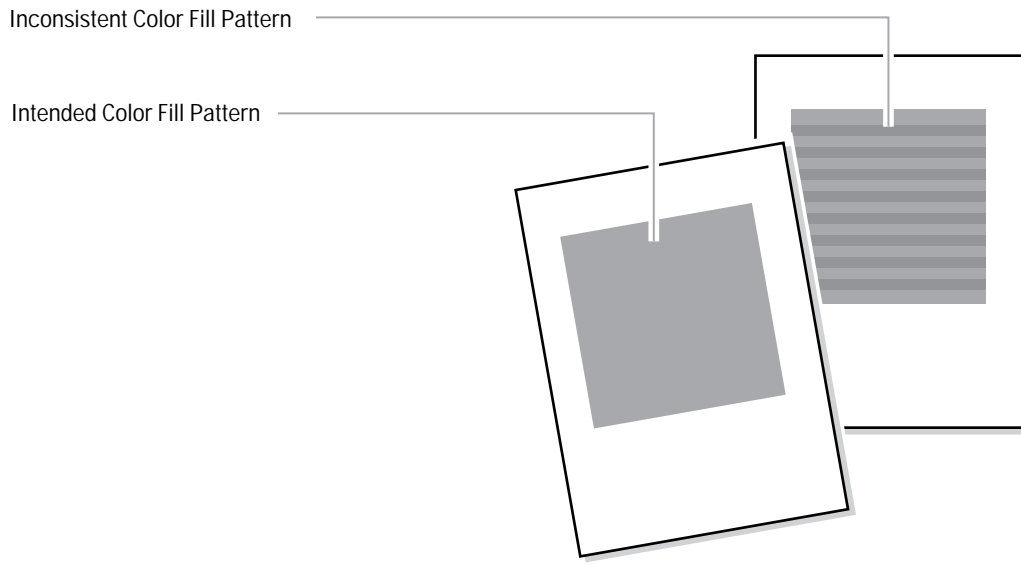


Figure 5-5. Inconsistent Color Fill Pattern

The print quality in color fill patterns is best if the computer sends data at the same rate as the printer prints it. If the computer sends the data slower than the printer prints it, the printer stops and waits for the computer to send more data, resulting in a color banding effect as shown above. This phenomenon is called “waitbanding.” If waitbanding occurs, try to speed up the computer by the methods listed below; also, see “Increasing the Printing Speed” in chapter 4.

Table 5-13. Avoiding Waitbanding

Solution	Implementation
Speed up the host computer for printing	<p>General Solutions</p> <ul style="list-style-type: none"> • Install more memory (RAM) into the computer. • If possible, make the document less complex. • Use a more powerful computer. • Print the document to a file. Then print the file. • Read the software application's documentation for tips on improving the printing performance.
Optimize the Windows settings	<p>Windows Specific Solutions</p> <ul style="list-style-type: none"> • Close any other open applications running in Windows. • In Printer Setup, select Draft or Normal Mode rather than Presentation Mode. • Disable any active screen saver.

Service and Support Information

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Warranty Information

Hewlett-Packard maintains facilities throughout the world that can service HP DeskJet 400 printer. The warranty for HP DeskJet 400 printer varies, depending on the date of purchase, and the country of purchase.

For products returned under warranty, Hewlett-Packard may use one of the following options:

- Repair the product.
- Replace the product with a remanufactured unit.
- Replace the product with a product of equal or greater functionality.
- Refund the purchase price.

See the user documentation included with the product or contact an HP Customer Service Center, or HP Sales and Support Office, for specific warranty information, including exclusions and limitations to the product warranty.

U.S. Service Support Contracts

HP Express Exchange Service

Hewlett-Packard offers an express exchange service to minimize product downtime. With HP Express Exchange Service, a replacement unit is available by 10:30 the next working day.

HP Express Exchange provides next day exchange service (same as HP SupportPack) but is based on a per incident of repair rather than throughout the warranty period. This service does not need to be purchased within 30 days of the printer purchase date.

To order the HP Express Exchange Service, call toll-free at (916) 785-1200 from Monday to Friday, 6 am to 5 pm Pacific Standard Time.

HP Support Pack

HP SupportPack enhances the service offering by upgrading warranty repair service to a next day express exchange service and extends the warranty period from one year to three years. This service enhancement provides customers with a cost-effective and timely way to achieve quality support. HP SupportPack is sold exclusively through resellers (ordered like any other HP product) and is not available directly from Hewlett-Packard. Customers must purchase this service enhancement within 30 days of purchasing the printer. Additional information on HP SupportPack and the prices for the service upgrade are available through HPNN and the In-Touch newsletter.

HP Customer Return Repair Service

If down time is less critical, the HP Customer Return Repair Service provides maintenance service at the HP Customer Service Center located in Corvallis, Oregon. HP will repair the product within two working days from receipt and return via surface transportation. Service Authorized Resellers can call (916) 785-1200. Sales Authorized Resellers can call (800) 544-9976.

To order the HP Customer Return Repair Service for customers with non-critical applications, call toll-free (208) 323-2551.

Non-U.S. Service Support Contracts

HP Support Pack

HP Support Pack enhances the service offering during the warranty period by upgrading warranty repair service to a next day exchange service. This service enhancement provides customers with a cost-effective and timely way to achieve quality support. HP Support Pack is sold exclusively through resellers (ordered like any other HP product) and is not available directly from Hewlett-Packard. Additional information on HP Support Pack and the prices for the service upgrade is available through HPNN.

For other service and support contracts, contact the HP Sales and Support Office for that country.

Returning a Printer for Service

In the U.S.

If a printer requires service, the customer can contact a service authorized reseller. The reseller should verify that the printer is in need of repair and contact the HP Corvallis Service Center. Sales authorized resellers should call (800) 544-9976 to arrange for repair. Service authorized resellers should call (503) 750-2035.

Customers can contact Hewlett-Packard directly by calling HP Customer Support Center at (208) 323-2551. They will verify that the printer is in need of repair and transfer the customer to the HP Corvallis Repair Center. If packaging materials are needed, call the HP Resellers Response Line at (800) 544-9976.

Printer Return Instructions for the U.S.

If the printer needs to be shipped, be sure it is packed in a protective carton. Hewlett-Packard recommends that the original shipping container be saved for this purpose. In-transit damage is not covered by the warranty. It is suggested that shipments are always insured.

When either a customer or reseller calls HP to arrange for service, the HP Corvallis Service Center will dispatch a premium carrier to pick up the product at the reseller or customer location. The printer will be delivered to HP, at HP's expense, using second day delivery. The customer or reseller must still package the printer for shipment.

Once the printer is repaired, HP will ship it to the customer or reseller location using second day delivery.

You can help assure effective servicing of your customer's printer by following these guidelines:

1. Follow the troubleshooting instructions in this manual to be certain that the malfunction is in the printer and not the result of an interface error or a malfunction in the computer or software. If possible, identify the defective area or function.
2. If you determine that repair is required, please provide the following with the printer when returning the printer for service:
 - a. Make a copy of the HP DeskJet 400 Printer Repair Sheet (located at the end of this chapter).
 - b. Determine the appropriate error code from table 6-3 in the "Printer Repair Feedback Information" section in this chapter.
 - c. Fill out the repair sheet. Include specific information, such as the configuration at the time of the malfunction, the type of interface cable, a description of the computer or host, and a description of the software application in use.
 - d. If purchased through a Hewlett-Packard reseller, include a copy of the sales slip or other proof of purchase to establish the warranty coverage period.

In the UK, France, Germany, Switzerland, Austria, Belgium, Norway, Sweden, Denmark, Finland, and the Netherlands

If a printer fails during the warranty period, the customer should do the following:

1. Follow the troubleshooting procedures in this document or consult the HP FIRST facsimile assistance services.
2. If the customer is still unable to determine the cause of the failure, the customer should contact their local reseller or the European Customer Support Center.

Customer support representatives can answer questions about the setup, configuration, installation, and operation of the printer. They can also troubleshoot and diagnose printer problems and, if necessary, can give instructions for getting the printer serviced and repaired.

If available for your country and language, phone numbers for HP FIRST and the European Customer Support Center are given in a separate document shipped with the printer. If additional information is needed, customers can call the reseller or the nearest HP Sales and Support Office.

If a printer fails after the warranty period:

1. Follow the troubleshooting procedures in this document or the printer user's guide.
2. If the customer is unable to determine the cause of the failure, the customer should contact their local reseller or the nearest HP Sales and Support Office for instructions on returning the printer for service and repair.

Elsewhere in the World

If a printer fails during or after the warranty period:

1. Follow the Troubleshooting procedures in this document or the printer user's guide.
2. If the customer is unable to determine the cause of the failure, the customer should contact their local reseller or the nearest HP Sales and Support Office for instructions on returning the printer for service and repair.

Notes

- Include the power adapter when returning the printer for repair.
 - Include the print cartridge when returning the printer for repair *except* in the following situation:
 - when a printer is to be exchanged for another unit. You do this only if the faulty printer does *not* exhibit a print cartridge-related problem.When the print cartridge is *not* returned with the printer, remove the print cartridge and store it in the storage container provided with the optional Color Kit, or in a sealed plastic bag. If you have both a black and a color print cartridge, store one in the storage container and the other in a sealed plastic bag. When the exchange unit is received, promptly install one of your cartridges in the printer.
 - Do *not* include with the printer any operating accessories (for example, the sheet feeder, documentation, and software) unless the problem involves a particular accessory. In that case, include the one relevant accessory.
-

Service and Support Resources

Obtaining Printer Drivers

For the latest available versions of printer drivers, contact the appropriate software vendors directly.

Hewlett-Packard offers printer drivers through the HP Forum on CompuServe. As updated and new printer drivers become available, they are uploaded to the HP Forum for instant access by CompuServe members. To become a CompuServe member and gain access to the printer drivers through HP Forum, call (800) 848-8990 from within the U.S. From outside the U.S., call 1 (614) 457-8650.

In the U.S., printer driver updates are also available through the HP Customer Support Center at (208) 323-2551. Hours are Monday, Tuesday, Thursday and Friday 6 a.m.–5 p.m. and Wednesday 6 a.m.–3 p.m. Pacific Time.

In the U.S. and Canada, printer driver updates are also available through the HP Distribution Center at (303) 339-7009, 24 hours a day, except Sundays.

Authorized Resellers can obtain printer drivers through HPNN, an electronic bulletin board service, at your local international number, or at 1 (408) 553-7303.

Obtaining Support Information

For the latest information on a particular software application, contact the software vendor.

Hewlett-Packard offers a fax information system called HP FIRST (Hewlett-Packard Fax Information Retrieval Support Technology) distributes information on software and HP products to anyone with a touch-tone Group 3 fax machine.

To use HP FIRST, dial (800) 333-1917 from your fax machine in the U.S. or Canada. From outside the U.S. and Canada, choose a number from the list on the next page. A voice response system helps you select the information you need. HP FIRST then sends this information to your fax machine.

The table below summarizes the available resources for different types of information. For specific information on an available resource, see “Additional Resource Information” on the next page.

Table 6-1. Obtaining Drivers and Information

To Obtain:	Check the Following Resources:
Printer Drivers	<ol style="list-style-type: none">1. Software Vendor2. HP BBS3. CompuServe and Internet4. HP Distribution Center (Users Only)5. HPNN (HP Authorized Resellers Only)6. HP Customer Support Center (Users Only)
HP SupportPack Information	<ol style="list-style-type: none">1. HPNN (HP Authorized Resellers Only)2. In-Touch Newsletter
Software Information	<ol style="list-style-type: none">1. Software Application Documentation2. Software Vendor3. HP FIRST or HP BBS4. CompuServe and Internet5. HPNN (HP Authorized Resellers Only)

Table 6-1. Obtaining Drivers and Information (Continued)

To Obtain:	Check the Following Resources:
Presales Information	<ol style="list-style-type: none"> 1. HP FIRST 2. HP Customer Information Center 3. HP Reseller Response Line (HP Authorized Resellers Only) 4. HP BBS 5. CompuServe and Internet 6. HPNN (HP Authorized Resellers Only)
Postsales Information	<ol style="list-style-type: none"> 1. HP FIRST 2. HP Audio Tips 3. HP Customer Support Center (End-User Customers Only) 4. HP Reseller Response Line (Authorized Resellers Only) 5. HP BBS 6. CompuServe and Internet 7. HPNN (HP Authorized Resellers Only)

Additional Resource Information

Table 6-2. Resource Information

Service/ Support Resource	Items Available	Phone Number	Hours (Pacific Time)																																			
CompuServe¹ (HP Peripherals Forum)	<ul style="list-style-type: none"> • Presales information • Printer drivers • Software notes • Post/Reply to questions 	To join CompuServe call: (800) 524-3388 (U.S. and Canada) ask for representative 51 1 (614) 457-8650 (Outside U.S. and Canada) or call your local number On CompuServe use: GO HPPER	24 hours/day																																			
HP FIRST²	<ul style="list-style-type: none"> • Presales Information • Postsales Information • Software Notes 	<table border="0"> <thead> <tr> <th>Language</th> <th>Country</th> <th>Phone Number</th> </tr> </thead> <tbody> <tr> <td rowspan="5">• English</td> <td>• U.S. and Canada</td> <td>• (800) 333-1917</td> </tr> <tr> <td>• UK</td> <td>• 0800 96 02 71</td> </tr> <tr> <td>• Any European Country</td> <td>• (31) 20 681 5792</td> </tr> <tr> <td>• Singapore</td> <td>• (65) 291 7951</td> </tr> <tr> <td>• other countries</td> <td>• 1 (208) 344-4809</td> </tr> <tr> <td rowspan="2">• Dutch</td> <td>• Netherlands</td> <td>• 06 022 2420</td> </tr> <tr> <td>• Belgium</td> <td>• 0800 11 906</td> </tr> <tr> <td rowspan="4">• French</td> <td>• France</td> <td>• 05 90 59 00</td> </tr> <tr> <td>• Belgium</td> <td>• 0800 17 043</td> </tr> <tr> <td>• Switzerland</td> <td>• 155 15 26</td> </tr> <tr> <td>• Germany</td> <td>• 01 308 100 61</td> </tr> <tr> <td rowspan="3">• German</td> <td>• Austria</td> <td>• 06 60 81 28</td> </tr> <tr> <td>• Switzerland</td> <td>• 155 15 27</td> </tr> <tr> <td colspan="2">(or call your local number)</td> </tr> </tbody> </table>	Language	Country	Phone Number	• English	• U.S. and Canada	• (800) 333-1917	• UK	• 0800 96 02 71	• Any European Country	• (31) 20 681 5792	• Singapore	• (65) 291 7951	• other countries	• 1 (208) 344-4809	• Dutch	• Netherlands	• 06 022 2420	• Belgium	• 0800 11 906	• French	• France	• 05 90 59 00	• Belgium	• 0800 17 043	• Switzerland	• 155 15 26	• Germany	• 01 308 100 61	• German	• Austria	• 06 60 81 28	• Switzerland	• 155 15 27	(or call your local number)		24 hours/day
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	(or call your local number)																																					

1. CompuServe is an electronic bulletin board. Printer drivers and information can be downloaded from the HP Forum by CompuServe members.
2. HP FIRST (Hewlett-Packard Fax Information Retrieval Support Technology) is an automated support access program that sends printed product information to a facsimile machine. Call HP FIRST from a touch tone telephone/fax machine. Select the product information you want by navigating through the pre-recorded messages using the buttons on the telephone. HP FIRST sends selected product information to any Group 3 fax machine.

Table 6-2. Resource Information (Continued)

Service/ Support Resource	Items Available	Phone Number	Hours (Pacific Time)
HP Audio Tips¹	<ul style="list-style-type: none"> • Presales information • Postsales information 	1 (800) 333-1917 (U.S. and Canada) 1 (208) 344-4809 (other countries)	24 hours/day
HP Distribution Center	<ul style="list-style-type: none"> • Printer Drivers 	(303) 339-7009 (U.S. and Canada only)	24 hours/day Except Sundays
HPNN²	<ul style="list-style-type: none"> • Presales information • Printer drivers • HP SupportPack information • Software notes 	1 (408) 553-7303 or call your local number	24 hours/day
HP Customer Information Center³	<ul style="list-style-type: none"> • Presales Information 	(800) 752-0900 (U.S. and Canada) or call your local number	Monday - Friday 6:00 am – 5:00 pm
HP Reseller Response Line	<ul style="list-style-type: none"> • Presales and postsales technical support for HP authorized resellers 	(800) 544-9976 (U.S. and Canada) or call your local number	Monday - Friday 8:00 am – 4:00 pm
HP Partner Support Group	<ul style="list-style-type: none"> • Presales and Postsales Technical Support for HP Support Providers 	Call your local number	
HP Customer Support Center	<ul style="list-style-type: none"> • Postsales technical support for all users and for dealers outside the U.S. and Canada 	1 (208) 323-2551 or call the local number provided with your printer	Monday, Tuesday, Thursday, Friday 6:00 am – 5:00 pm Wednesday 6:00 am – 3:00 pm
HP BBS⁴	<ul style="list-style-type: none"> • Presales information • Printer drivers • Software notes • Troubleshooting hints 	1 (208) 344-1691 Set your communications software to: N, 8, 1	24 hours/day
Internet	<ul style="list-style-type: none"> • Printer drivers • Product and Support Information 	FTP access at: 192.6.71.2 or ftp-boi.external.hp.com World-Wide Web access at: URL http://www.hp.com/home.html	24 hours/day

1. HP Audio Tips is a set of pre-recorded messages to answer common product questions. Navigate through the pre-recorded messages by pressing the buttons on a touch tone telephone.
2. HPNN (Hewlett-Packard News Network) is an electronic bulletin board service available only to HP authorized resellers.
3. The HP Customer Information Center is available to both resellers and users.
4. HP's computer bulletin-board system.

Printer Repair Feedback Information

1. Make a copy of the HP DeskJet 400 Printer Repair Sheet in this section.
2. Observe the problem with the printer. Verify the problem is repeatable.
3. Determine the applicable error code in table 6-3.
4. Fill out the repair sheet and return the repair sheet with the printer.

Table 6-3. HP DeskJet 400 Printer Error Code Table

Keyword	Description	Code
Startup Problems		
Power Up failed	No lights on, no noise, no movement/intermittent power failure	EX00
Self-test failed	Self-test printout does not print out, is incomplete or wrong	EZ05
Defective power cord/ module	Power cord/module is defective or damaged (<30 days)	EX05
General start-up	Customer cannot describe problem	EZ20
Control Panel/Light Problems		
Lights on steady	LEDs on front panel ON steady	EK00
Lights flashing in unison	LEDs on front panel ON and flashing	EK05
General lights	Customer cannot describe problem	EZ35
Media Advance/Eject Problems		
No media pick up	Paper/transparency not loading properly	FF00
Multiple pick	Several sheets/envelopes are picked together	FF05
Incomplete feed	Sheet/envelope loads, then stops	FF10
Media jam	Sheet/envelope/labels stuck inside the printer	FF15
Skewed/slanted page	Sheet/envelope loads unevenly	FF20
Media eject problem	Sheet/envelope fails to eject	FF25
Continuous media feed	Continuously picks and feeds media	FF35
General media handling	Customer cannot describe problem	FF55
Print Quality Problems		
Missing dots	White line or streak through text or graphics	PP00
Fuzzy print	Overspray of dots	PP05
Vertical misalignment	Table columns of text/vertical lines are not well aligned (bi-directional shift)	PP10
Solid black page	Sheet is solid black	PP15
Underlines or streaks in printing	Prints extra lines across media when printing self-test	PP20
Wavy print	Print appears wavy on self-test	PP25
Incomplete print	Parts of printed characters are missing on self-test	PP30
General print quality	Customer cannot describe problem	PP35
Missing color	Color is partially missing from printout	-
Smear	Smear on printout	-
Starwheel track marks	Starwheel track marks on print media	-

Table 6-3. HP DeskJet 400 Printer Error Code Table (Continued)

Keyword	Description	Code
Carriage Problems		
Carriage stall	No carriage movement	MH00
Left side collision	Carriage slams to left side and stays there	MH05
Right side collision	Carriage slams to the right side and stays there	MH10
Carriage belt defective	Carriage belt frayed or broken	MH15
General carriage problem	Customer cannot describe problem	MH20
Noise Problems		
Squeaky noise	Unusual, persistent squeaking noise	MN00
Grinding noise	Unusual, persistent grinding noise	MN05
Knocking noise	Frequent shock or clicking noise	MN10
General noise	Customer cannot describe problem	MN15
Cosmetic Problems		
Scratched	External part is scratched	ZC00
General cosmetic defect	Customer cannot describe problem	ZC05
Access door defective	Access door bent or broken	-
Starwheel	Starwheel missing or broken	-
Communication Problems		
I/O printer port failure	Input/Output from PC fails to print – not cable or PC problem	KR00
General communication problem	Customer cannot describe problem	KR40
Print Cartridge Problems		
Short pen life	Cartridge life not to specifications	SD00
Leaking cartridge	Print cartridge has leaked in printer and damaged printer	SD05
Rejects cartridge – black	Printer rejects black cartridge	SD10
Rejects cartridge – color	Printer rejects Cyan/Magenta/Yellow cartridge	SD15
Service station, pen-cap problems	Service station upgrade, wider assembly, flex assembly, leaky pen	MW20
General print cartridge failure	(Not something we would service)	SD20
Deprimed Cartridge	Ink cartridge has deprimed/cartridge dries out/crust on nozzles	SD25
Accessory Problems		
Missing manual	Manual is missing from shipment container	AM00
Missing power cord/module	Power cord/module is missing from shipment container	AM05
Missing driver	Driver disk is missing from shipment container	AM10
Missing print cartridges	Print cartridge is missing from shipment container	AM20

Table 6-3. HP DeskJet 400 Printer Error Code Table (Continued)

Keyword	Description	Code
Performance Problems		
Intermittent operation	Powers OFF and ON intermittently	EZ40
Print mechanism locks up	Printer locks up while printing	EZ45
Stops printing	Prints part of page then stops	EZ50
Burning smell	During operations, printer emits a burning smell	EZ55
Smoking smell	During operations, printer emits a cigarette smell	EZ60
Undefined Code and Miscellaneous		
Undefined code	None of the above codes apply	ZZ00

HP DeskJet 400 Printer Repair Sheet

Company Information

Company _____

Address _____

Phone _____

Your Name _____

Printer Information

Serial number _____

Date of purchase _____

Date that you are sending the printer _____

Printer error code (see table 6-3) _____

Failure is _____ intermittent, occasional intermittent, frequent continuous

Brand and model of your computer _____

Version of software you are using _____

The driver you are using _____

Other Information About the Problem

Actions Taken to Resolve the Problem and the Results

Included Information

Check any of the following boxes for additional troubleshooting information.

- Sample printout included
- Printer self-test included
- Unable to print the printer self-test

1/08/95

HP PCL Printer Commands and Control Codes

HP PCL Printer Command Summary

Table A-1. HP PCL Printer Command Summary

Command Topic	Printer Feature	Printer Command	Decimal Equivalent	Hex Equivalent
Printer Control Commands				
Reset and Self-Test Control	Reset	E _c E	027 069	1B 45
	Self-test	E _c Z	027 122	1B 7A
Paper Input Control (Media Source)	Eject page	E _c &−0H	027 038 108 048 072	1B 26 6C 30 48
	Feed from tray	E _c &−1H	027 038 108 049 072	1B 26 6C 31 48
	Manual feed	E _c &−2H	027 038 108 050 072	1B 26 6C 32 48
Print Mode	Unidirectional left to right	E _c &k0W	027 038 107 048 087	1B 26 6B 30 57
	Bidirectional	E _c &k1W	027 038 107 049 087	1B 26 6B 31 57
	Unidirectional right to left	E _c &k2W	027 038 107 050 087	1B 26 6B 32 57
Dry Time	Dry time in seconds	E _c &b#T	027 038 098 # 084	1B 26 62 # 54
Underline	Single fixed	E _c &d1D	027 038 100 049 068	1B 26 64 31 44
	Double fixed	E _c &d2D	027 038 100 050 068	1B 26 64 32 44
	Single float	E _c &d3D	027 038 100 051 068	1B 26 64 33 44
	Double float	E _c &d4D	027 038 100 052 068	1B 26 64 34 44
	Turn off	E _c &d@	027 038 100 064	1B 26 64 40
Line Termination	CR=CR, LF=LF, FF=FF	E _c &k0G	027 038 107 048 071	1B 26 6B 30 47
	CR=CR+LF, LF=LF, FF=FF	E _c &k1G	027 038 107 049 071	1B 26 6B 31 47
	CR=CR, LF=CR+LF, FF=CR+FF	E _c &k2G	027 038 107 050 071	1B 26 6B 32 47
	CR=CR+LF, LF=CR+LF, FF=CR+FF	E _c &k3G	027 038 107 051 071	1B 26 6B 33 47
End-of-Line Wrap	Turn on	E _c &s0C	027 038 115 048 067	1B 26 73 30 43
	Turn off	E _c &s1C	027 038 115 049 067	1B 26 73 31 43
Transparent Print Data	No. of bytes	E _c &p#X[data]	027 038 112 #...# 088	1B 26 70 #...# 58
Enhancement Control³	Line-by-line on	E _c &k0E	027 038 107 048 069	1B 26 6B 30 45
	Line-by-line off	E _c &k1E	027 038 107 049 069	1B 26 6B 31 45
Display Functions	Turn on	E _c Y	027 089	1B 59
	Turn off	E _c Z	027 090	1B 5A
SI/SO Control¹	Line-by-line on	E _c &k0F	027 038 107 048 070	1B 26 6B 30 46
	Line-by-line off	E _c &k1F	027 038 107 049 070	1B 26 6B 31 46

Indicates the numeric value field.

1. This is an obsolete command. Hewlett-Packard suggests that it not be used in code developed for HP DeskJet printers.

Table A-1. HP PCL Printer Command Summary (Continued)

Command Topic	Printer Feature	Printer Command	Decimal Equivalent	Hex Equivalent
Page Control Commands				
Paper Size †	Default paper size	E _c &-0A	027 038 108 048 065	1B 26 6C 30 41
	US executive	E _c &-1A	027 038 108 049 065	1B 26 6C 31 41
	US letter	E _c &-2A	027 038 108 050 065	1B 26 6C 32 41
	US legal	E _c &-3A	027 038 108 051 065	1B 26 6C 33 41
	A4	E _c &-26A	027 038 108 050 054 065	1B 26 6C 32 36 41
Line Spacing	Number of lines per inch	E _c &-#D	027 038 108 #...# 068	1B 26 6C #...# 44
Page Orientation †	Landscape	E _c &-1O	027 038 108 049 079	1B 26 6C 31 4F
	Portrait	E _c &-0O	027 038 108 048 079	1B 26 6C 30 4F
Page Length †	Number of lines per page	E _c &-#P	027 038 108 #...# 080	1B 26 6C #...# 50
Perforation Skip Mode †	On	E _c &-1L	027 038 108 049 076	1B 26 6C 31 4C
	Off	E _c &-0L	027 038 108 048 076	1B 26 6C 30 4C
Top Margin †	Number of lines	E _c &-#E	027 038 108 #...# 069	1B 26 6C #...# 45
Text Length †	Number of lines	E _c &-#F	027 038 108 #...# 070	1B 26 6C #...# 46
Side Margins †	Clear	E _c 9	027 057	1B 39
	Left (column no.)	E _c &a#L	027 038 097 #...# 076	1B 26 61 #...# 4C
	Right (column no.)	E _c &a#M	027 038 097 #...# 077	1B 26 61 #...# 4D
Text Scale Mode	Off	E _c &k5W	027 038 107 053 087	1B 26 6B 35 57
	On	E _c &k6W	027 038 107 054 087	1B 26 6B 36 57
Cursor Positioning	Move to row no.	E _c &a#R	027 038 097 #...# 082	1B 26 61 #...# 52
	Move to column no.	E _c &a#C	027 038 097 #...# 067	1B 26 61 #...# 43
	Horizontal no. (decipoints)	E _c &a#H	027 038 097 #...# 072	1B 26 61 #...# 48
	Vertical no. (decipoints)	E _c &a#V	027 038 097 #...# 086	1B 26 61 #...# 56
	Horizontal no. (dots)	E _c *p#X	027 042 112 #...# 088	1B 2A 70 #...# 58
	Vertical no. (dots)	E _c *p#Y	027 042 112 #...# 089	1B 2A 70 #...# 59
	Horizontal motion index (no. of 1/120th inch moves)	E _c &k#H	027 038 107 #...# 072	1B 26 6B #...# 48
	Vertical motion index (no. of 1/48th inch moves)	E _c &-#C	027 038 108 #...# 067	1B 26 6C #...# 43

† These printer commands are listed in the order in which they must be sent.

Indicates the numeric value field.

Table A-1. HP PCL Printer Command Summary (Continued)

Command Topic	Printer Feature	Printer Command	Decimal Equivalent	Hex Equivalent
Font Selection Commands				
Character Set †	PC-8	E _c (10U)	027 040 049 048 085	1B 28 31 30 55
	HP Roman8	E _c (8U)	027 040 056 085	1B 28 38 55
	PC-8 Danish/Norwegian	E _c (11U)	027 040 049 049 085	1B 28 31 31 55
	PC-850	E _c (12U)	027 040 049 050 085	1B 28 31 32 55
	ECMA-94 Latin 1	E _c (0N)	027 040 048 078	1B 28 30 4E
	German (ISO 21)	E _c (1G)	027 040 049 071	1B 28 31 47
	French (ISO 69)	E _c (1F)	027 040 049 070	1B 28 31 46
	Italian (ISO 15)	E _c (0I)	027 040 048 073	1B 28 30 49
	Spanish (ISO 17)	E _c (2S)	027 040 050 083	1B 28 32 53
	Swedish Names (ISO 11)	E _c (0S)	027 040 048 083	1B 28 30 53
	Swedish (ISO 10)	E _c (3S)	027 040 051 083	1B 28 33 53
	Norwegian1 (ISO 60)	E _c (0D)	027 040 048 068	1B 28 30 44
	Norwegian2 (ISO 61)	E _c (1D)	027 040 049 068	1B 28 31 44
	Portuguese (ISO 16)	E _c (4S)	027 040 052 083	1B 28 34 53
	United Kingdom (ISO 4)	E _c (1E)	027 040 049 069	1B 28 31 45
	ANSI ASCII (ISO 6)	E _c (0U)	027 040 048 085	1B 28 30 55
	JIS ASCII	E _c (0K)	027 040 048 075	1B 28 30 4B
	HP Legal	E _c (1U)	027 040 049 085	1B 28 31 55
	ISO IRV	E _c (2U)	027 040 051 085	1B 28 32 55
	Spacing †	Proportional	E _c (s1P)	027 040 115 049 080
Fixed		E _c (s0P)	027 040 115 048 080	1B 28 73 30 50
Print Pitch †	Number of characters per inch	E _c (s#H)	027 040 115 #...# 072	1B 28 73 #...# 48
Point Size (Character Height) †	Number of 1/72nds inch	E _c (s#V)	027 040 115 #...# 086	1B 28 73 #...# 56
Style †	Upright	E _c (s0S)	027 040 115 048 083	1B 28 73 30 53
	Italic	E _c (s1S)	027 040 115 049 083	1B 28 73 31 53
Stroke Weight †	Normal	E _c (s0B)	027 040 115 048 066	1B 28 73 30 42
	Bold	E _c (s3B)	027 040 115 051 066	1B 28 73 33 42
	Extra Bold (optional)	E _c (s7B)	027 040 115 055 066	1B 28 73 37 42
Typeface †	Courier	E _c (s3T)	027 040 115 051 084	1B 28 73 33 54
	CG Times	E _c (s4101T)	027 040 115 052 049 048 049 084	1B 28 73 34 31 30 31 54
	Letter Gothic	E _c (s6T)	027 040 115 054 084	U1B 28 73 36 54
	Univers	E _c (s52T)	027 040 115 053 050 084	1B 28 73 35 32 54
Print Quality	Letter	E _c (s2Q)	027 040 115 050 081	1B 28 73 32 51
	Draft	E _c (s1Q)	027 040 115 049 081	1B 28 73 31 51
Placement	Superscript	E _c (s+1U)	027 040 115 043 049 085	1B 28 73 2B 31 55
	Normal	E _c (s0U)	027 040 115 048 085	1B 28 73 30 55
	Subscript	E _c (s-1U)	027 040 115 045 049 085	1B 28 73 2D 31 55
Primary Font Designators	Default character set	E _c (0@)	027 040 048 064	1B 28 30 40
	Current primary character set	E _c (2@)	027 040 050 064	1B 28 32 40
	Default font	E _c (3@)	027 040 051 064	1B 29 #...# 58

† These printer commands are listed in the order in which they must be sent.
Indicates the numeric value field.

1. This is an obsolete command. Hewlett-Packard suggests that it not be used in code developed for HP DeskJet 300 Series printers.
2. This is a testing command; it is not recommended for use.

Table A-1. HP PCL Printer Command Summary (Continued)

Command Topic	Printer Feature	Printer Command	Decimal Equivalent	Hex Equivalent
Secondary Font¹ Designators	Default character set	E _c 0@	027 041 048 064	1B 29 30 40
	Default primary chr. set	E _c 1@	027 041 049 064	1B 29 31 40
	Current primary chr. set	E _c 2@	027 041 050 064	1B 29 32 40
	Default secondary font	E _c 3@	027 041 051 064	1B 29 33 40
Raster Graphics Commands				
Set Graphics Print Mode	Graphics default	E _c *p0N	027 042 112 048 078	1B 2A 70 30 4E
	Print graphics bidirectionally	E _c *p1N	027 042 112 049 078	1B 2A 70 31 4E
	Print graphics left to right	E _c *p2N	027 042 112 050 078	1B 2A 70 32 4E
	Print graphics right to left	E _c *p3N	027 042 112 051 078	1B 2A 70 33 4E
	Conditionally print graphics bidirectionally	E _c *p4N	027 042 112 052 078	1B 2A 70 34 4E
Start Raster Graphics	At leftmost position	E _c *r0A	027 042 114 048 065	1B 2A 72 30 41
	Current cursor position	E _c *r1A	027 042 114 049 065	1B 2A 72 31 41
End Raster Graphics	End graphics	E _c *rbC	027 042 114 098 067	1B 2A 72 62 43
Set Raster Graphics Resolution	75 dots per inch	E _c *t75R	027 042 116 055 053 082	1B 2A 74 37 35 52
	100 dots per inch	E _c *t100R	027 042 116 049 048 048 082	1B 2A 74 31 30 30 52
	150 dots per inch	E _c *t150R	027 042 116 049 053 048 082	1B 2A 74 31 35 30 52
	300 dots per inch	E _c *t300R	027 042 116 051 048 048 082	1B 2A 74 33 30 30 52
Set Raster Graphics Width	Number of pixels	E _c *r#S	027 042 114 #...# 083	1B 2A 72 #...# 53
Temporary X offset²	Horizontal offset for raster row	E _c *b#X	027 042 098 #...# 088	1B 2A 62 #...# 58
Set Raster Graphics Compression Method	Compression off	E _c *b0M	027 042 098 048 077	1B 2A 62 30 4D
	Method 1	E _c *b1M	027 042 098 049 077	1B 2A 62 31 4D
	Method 2	E _c *b2M	027 042 098 050 077	1B 2A 62 32 4D
	Method 3	E _c *b3M	027 042 098 051 077	1B 2A 62 33 4D
	Method 9	E _c *b9M	027 042 098 057 077	1B 2A 62 39 4D
	Seed row source	E _c *b#S	027 042 098 #...# 083	1B 2A 62 #...# 53
Transfer Raster Graphics	Transfer graphics data by row	E _c *b#W[data]	027 042 098 #...# 087 data	1B 2A 62 #...# 57 data
	Transfer graphics data by plane ²	E _c *b#V[data]	027 042 098 #...# 086 data	1B 2A 62 #...# 56 data
Relative Vertical Pixel Movement	Number of dots	E _c *b#Y	027 042 098 #...# 089	1B 2A 62 #...# 59
Set Graphics Quality	Draft	E _c *r1Q	027 042 114 049 081	1B 2A 72 31 51
	Letter quality	E _c *r2Q	027 042 114 050 081	1B 2A 72 32 51
Set Number of Raster Planes Per Row¹	3 planes, CMY palette	E _c *r-3U	027 042 114 045 051 085	1B 2A 72 2D 33 37
	Single plane palette	E _c *r1U	027 042 114 049 085	1B 2A 72 31 37
	3 planes, RGB palette	E _c *r3U	027 042 114 051 085	1B 2A 72 33 37
Misc. Raster Graphics Commands	Raster graphics shingling	E _c *o#Q	027 042 111 #...# 081	1B 2A 6F #...# 51
	Raster graphics depletion ²	E _c *o#D	027 042 111 #...# 068	1B 2A 6F #...# 44

Indicates the numeric value field.

1. This is a testing command; it is not recommended for use.
2. This is an obsolete command. Hewlett-Packard suggests that it not be used in code developed for HP DeskJet printers.

Control Codes

Table A-2. HP PCL Printer Control Codes

Code Name	Symbol	Description	Value (Dec)	Value (Hex)	Keystroke
Backspace	<B _S >	Causes the printer to move the current print position one character position to the left.	08	08	CTRL H
Horizontal Tab	<H _T >	Causes the printer to move to the next predefined tab position. (Tabs are located every eighth character position, beginning at the left margin.)	09	09	CTRL I
Line Feed	<L _F >	Causes the printer to advance the paper one line at the current line spacing.	10	0A	CTRL J
Form Feed	<F _F >	Causes the printer to advance the paper to the next top-of-form. Top-of-form is the first line of printing on the next page.	12	0C	CTRL L
Carriage Return	<C _R >	Causes the printer to move the current print position to the left margin. Does not cause a paper advance.	13	0D	CTRL M
Shift Out	<S _O >	Causes the printer to select the currently designated secondary font for use.	14	0E	CTRL N
Shift In	<S _I >	Causes the printer to select the currently designated primary font for use.	15	0F	CTRL O
Escape	<E _C >	Indicates to the printer that the characters immediately following are part of a printer command.	27	1B	CTRL [
Space	<S _P >	Causes the printer to move the current print position one character to the right.	32	20	

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