



**hp** color LaserJet 4600  
4600n, 4600dn, 4600dtn, 4600hdn



i n v e n t

**service  
manual**





hp color LaserJet 4600 series printer

**service manual** \_\_\_\_\_

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## Conventions

This manual uses the following conventions:

- **COLOR** is used to emphasize items that are important to the material under discussion.
- **Bold** is used for menu items to click and for emphasis, particularly in situations where *italic* type would be confusing.
- *Italic* type is used to indicate related documents or emphasis.
- `DISPLAY` type indicates text as seen on the printer control panel display.
- Commands you use on a computer keyboard or on the printer control panel are shown in **KEYCAP**. Two examples are `PAUSE/RESUME` and `CANCEL JOB`.
- `COURIER` type indicates text that you type on a computer keyboard exactly as shown.

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### Note

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Notes contain important information set off from the text.

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### CAUTION

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Caution messages alert you to the possibility of damage to equipment or loss of data.

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### WARNING!

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Warning messages alert you to the possibility of personal injury.



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# 1

# Printer description

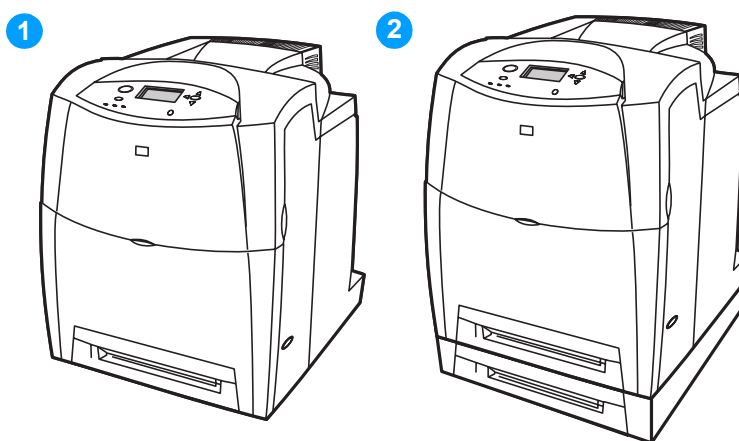
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## Printer features

The HP Color LaserJet 4600 series printer pictured in Figure 1-1 has five models.

- The HP Color LaserJet 4600 printer is the base model; it contains 96 MB of SDRAM.
- The HP Color LaserJet 4600n printer is the base model with an HP Jetdirect 610N print server (this model is available only in Europe)
- The HP Color LaserJet 4600dn printer is the base model with an HP Jetdirect 610N print server (network card) and automatic 2-sided printing.
- The HP Color LaserJet 4600dtn printer is the base model with an HP Jetdirect 610N print server (network card), automatic 2-sided printing, additional 500-sheet paper feeder, and 160 MB of SDRAM.
- The HP Color LaserJet 4600hdn printer is the base model with an HP Jetdirect 610N print server (network card), automatic 2-sided printing, additional 500-sheet paper feeder, a hard disk, and 160 MB of SDRAM.



**Figure 1-1** HP Color LaserJet 4600 series printers

- 1 HP Color LaserJet 4600, 4600n, and 4600dn printers
- 2 HP Color LaserJet 4600dtn and 4600hdn printers

This printer series combines the quality and reliability of Hewlett-Packard printers with the features listed in Table 1-1.

**Table 1-1 Printer features**

<b>Feature</b>	<b>Description</b>
Performance	<ul style="list-style-type: none"><li>● 17 pages per minute (ppm) on letter-sized paper, 16 ppm on A4-sized paper.</li><li>● Prints on transparencies and glossy paper.</li></ul>
Memory	<ul style="list-style-type: none"><li>● 96 megabytes (MB) of synchronous dynamic random access memory (SDRAM) (160 MB in the HP Color LaserJet 4600dtn and 4600hdn printers).</li><li>● Can be expanded to 512 MB.</li><li>● Optional hard disk drive (included with the HP Color LaserJet 4600hdn printer).</li></ul>
User interface	<ul style="list-style-type: none"><li>● Graphic display on control panel.</li><li>● Enhanced Help with animated graphics.</li><li>● Embedded Web server to access support and order supplies (network-connected printers).</li></ul>
Supported printer personalities	<ul style="list-style-type: none"><li>● HP PCL 6.</li><li>● HP PCL 5c.</li><li>● PostScript 3 emulation.</li><li>● Automatic language switching.</li></ul>
Storage features	<ul style="list-style-type: none"><li>● Job retention (for printers with hard disks).</li><li>● Fonts and forms.</li><li>● Personal identification number (PIN) printing (for printers with hard disks).</li></ul>
Environmental features	<ul style="list-style-type: none"><li>● PowerSave setting.</li><li>● High content of recyclable components and materials.</li><li>● Energy star compliant.</li><li>● Blue Angel compliant.</li></ul>
Fonts	<ul style="list-style-type: none"><li>● 80 internal fonts available for both PCL and PostScript emulation.</li><li>● 80 printer-matching screen fonts in TrueType™ format available with the software solution.</li><li>● Supports forms and fonts on the disk using HP Web Jetadmin.</li></ul>

**Table 1-1 Printer features**

Feature	Description
Paper handling	<ul style="list-style-type: none"><li>● Prints on media from 77 mm by 127 mm (3 inches by 5 inches) up to legal size.</li><li>● Prints on media with weights from 60 g/m<sup>2</sup> to 163 g/m<sup>2</sup> (16 lb bond to 43 lb bond).</li><li>● Prints on a wide range of media types including glossy, labels, overhead transparencies, and envelopes.</li><li>● Multiple gloss levels.</li><li>● A 500-sheet input tray (Tray 2) that supports letter-, legal-, executive-, JIS B5-, A4-, and A5-sized and custom media.</li><li>● Optional 500-sheet paper feeder (Tray 3) that supports letter-, legal-, executive-, JIS B5-, A4-, and A5-sized and custom media; standard on HP Color LaserJet 4600dtn and 4600hdn printers.</li><li>● 2-sided printing on HP Color LaserJet 4600dn, 4600dtn, and 4600hdn printers.</li><li>● 250-sheet face-down output bin.</li></ul>
Accessories	<ul style="list-style-type: none"><li>● Printer hard disk, which provides storage for fonts and macros as well as job storage; standard on HP Color LaserJet 4600hdn.</li><li>● Dual inline memory modules (DIMM).</li><li>● Printer stand.</li><li>● Optional 500-sheet paper feeder (Tray 3) that supports letter-, legal-, executive-, JIS B5-, A4-, and A5-sized media; standard on HP Color LaserJet 4600dtn and 4600hdn printers.</li><li>● Flash DIMM.</li><li>● Fast InfraRed (FIR) pod.</li></ul>
Connectivity	<ul style="list-style-type: none"><li>● Optional enhanced input/output (EIO) network card; standard on HP Color LaserJet 4600n, 4600dn, 4600dtn, and 4600hdn printers.</li><li>● FIR connection.</li><li>● HP Web Jetadmin software.</li><li>● Standard bidirectional parallel cable interface (IEEE-1284 compliant).</li></ul>
Supplies	<ul style="list-style-type: none"><li>● Supplies status page contains information on toner level, page count, and estimated pages remaining.</li><li>● No-shake cartridge design.</li><li>● Printer checks for authentic HP print cartridges at cartridge installation.</li><li>● Internet-enabled supply-ordering capabilities (using embedded Web server or printer Status and Alerts).</li></ul>

# Identification

## Model and serial numbers

The model number and serial numbers are listed on identification labels located on the rear of the printer. The model number is alphanumeric, such as C9660A for the HP Color LaserJet 4600. The serial number contains information about the country/region of origin, the printer version, production code, and the production number of the printer (see Figure 1-2).



**Figure 1-2** Model and serial number information

**Table 1-2** Model names and numbers

Model name	Model number
HP Color LaserJet 4600	C9660A
HP Color LaserJet 4600n	C9692A
HP Color LaserJet 4600dn	C9661A
HP Color LaserJet 4600dtn	C9662A
HP Color LaserJet 4600hdn	C9663A

## Power and regulatory information

The identification labels on the rear of the printer also contain power rating and regulatory information as shown in Figure 1-3.

### CAUTION

Converting the voltage on the printer can damage the printer. Do not use any voltage other than the operating voltage. Any attempt to convert operating voltages will void the product warranty (for example, attempting to change a 110V printer to a 220V printer).

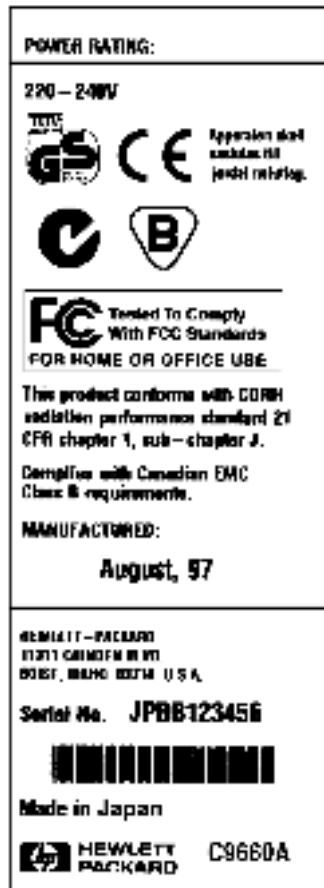


Figure 1-3 Sample label



## Site requirements

The printer must be kept in a proper location to maintain the performance level that has been set at the factory. In particular, be sure that the environment adheres to the specifications listed in this chapter.

Below are recommendations for the printer location and placement.

Make sure the printer has the following:

- a well-ventilated, dust-free area
- a hard, level surface (not more than a 2° angle):
  - for the HP Color LaserJet 4600, 4600n, and 4600dn, the surface must support 37 kg (81 lb)
  - for the HP Color LaserJet 4600dtn and 4600hdn, the surface must support 44 kg (97 lb)
- a level surface that supports all four corners of the 500-sheet paper feeder
- a constant temperature and humidity. (Do not install near water sources, humidifiers, air conditioners, refrigerators, or other major appliances)

Make sure to keep the printer away from the following:

- direct sunlight, dust, open flames, or water
- the direct flow of exhaust from air ventilation systems
- magnets and devices that emit a magnetic field
- areas subject to vibration
- walls or other objects. There must be enough space around the printer for proper access and ventilation. See Figure 1-4 on page 23.

## Space requirements

The printer must have the following amounts of space above and around it.

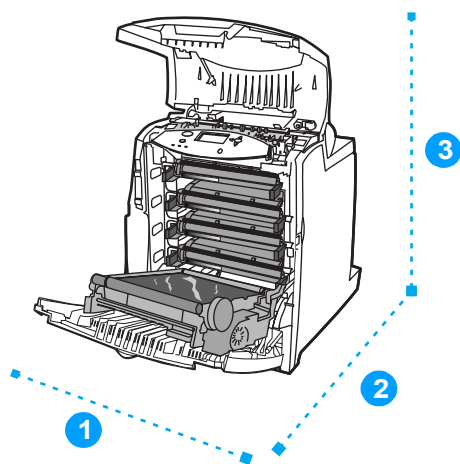


Figure 1-4

### Space requirements

- 1 530 mm (20.9 inches)
- 2 1294 mm (50 inches)
- 3 804 mm (31.7 inches)

## Electrical specifications

Table 1-3 lists the electrical specifications required to run the printer safely.

**Table 1-3 Electrical specifications**

Item	110-volt models	220-volt models
Power requirements	100-127 V (-10%, +6%) 50/60 Hz (+/- 2 Hz)	220-240 V (-10%, +6%) 50/60 Hz (+/- 2 Hz)
Power consumption (LaserJet 4600)		
During printing	426 W	430 W
During standby*	34 W	36 W
During PowerSave	30 W	32 W
Off	0 W	0 W
Minimum recommended circuit capacity for typical product	6 A	3 A

\* When the printer is in standby mode, it continues to consume a minimal amount of energy.

---

### Note

---

This information is preliminary and might not be current. Please see <http://www.hp.com/support/lj4600> for current information.

## Environmental specifications

Keep the printer within the environmental conditions shown in Table 1-4 for optimum performance.

**Table 1-4 Environmental specifications**

Item	Operating
Temperature	
Recommended	17° to 25° C (63° to 77° F)
Allowed	10° to 30° C (50° to 86° F)
Humidity	
Recommended	30% to 70% RH
Allowed	10% to 80% RH
Altitude	
Allowed	0 to 2600 m (0 to 8530 ft)

## Supply storage requirements

The life of supplies is greatly affected by their storage environment. Use Table 1-5 to determine the shelf life of stored supplies.

**Table 1-5 Supply storage requirements**

Item	Storage time	Storage condition
Temperature	Normal (maximum of 2.5 years)	0° to 35° C (32° to 95° F)
	Severe (maximum of 18 days)	High 35° to 40° C (95° to 104° F) Low 0° to -20° C (32° to -4° F)
Maximum temperature change rate	40° to 15° C (104° to 59° F) within 3 minutes -20° to 25° C (-4° to 77° F) within 3 minutes	
Humidity	Normal (maximum of 2.5 years)	35% to 85% RH
	Severe (maximum of 18 days)	High 85% to 95% RH Low 10% to 35% RH
Atmospheric pressure	460 to 760 mm Hg (18.1 to 29.9 in Hg)	
Storage time <sup>1</sup>	2.5 years	

<sup>1</sup> The average storage time includes use time. Use cartridges within 2.5 years of the date code on the cartridge.

## Printer specifications

Table 1-6 describes the dimensions of the printer.

**Table 1-6 Printer dimensions**

	HP Color LaserJet 4600, 4600n, 4600dn	HP Color LaserJet 4600dtn, 4600hdn
Height	566 mm (22.3 inches)	654 mm (25.8 inches)
Width	456 mm (20 inches)	456 mm (20 inches)
Depth	480 mm (18.9 inches)	480 mm (18.9 inches)
Weight	37 kg (81 lb)	44 kg (97 lb)

Table 1-7 lists the acoustic emissions of the printer when it is printing and when it is in standby mode.

**Table 1-7 Acoustic emissions**

	HP Color LaserJet 4600
Sound power Printing PowerSave	Per ISO 9296 $L_{WA} = 6.5$ bels(A) [65 dB (A)] $L_{WA} = 5.0$ bels(A) [50dB (A)]
Bystander (1m) Printing PowerSave	Per ISO 9296 $L_{PA} = 51$ dB(A) $L_{PA} = 34$ dB(A)

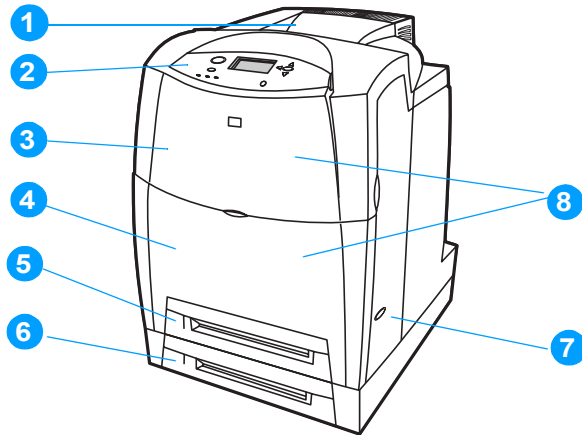
### Note

These values are subject to change. See <http://www.hp.com/support/lj4600> for current information.

Maximum duty cycle is 85,000 pages per month.

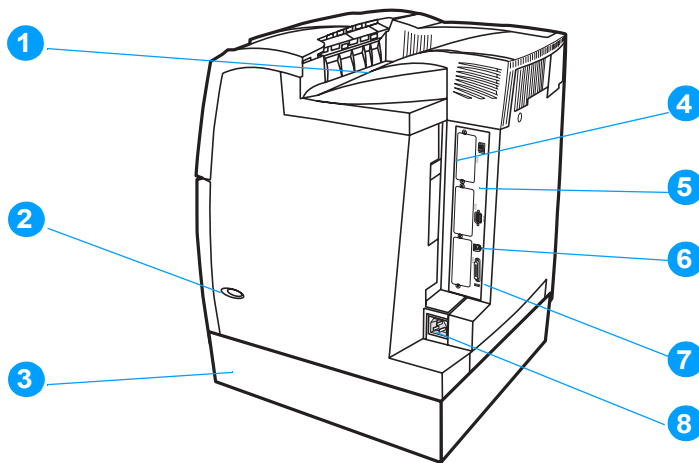
## Printer assemblies

Figures 1-5 and 1-6 show the location of each major assembly in the printer. These assemblies are described in Chapter 3.



**Figure 1-5** Front view, HP Color LaserJet 4600 series (shown with additional 500-sheet paper feeder)

- 1 output bin
- 2 printer control panel
- 3 top cover
- 4 front cover (contains Tray 1)
- 5 Tray 2 (500-sheet standard tray)
- 6 Tray 3 (500-sheet paper feeder; optional on 4600, 4600n, and 4600dn models)
- 7 on/off switch
- 8 access to print cartridges, transfer unit, and fuser



**Figure 1-6** Rear view, HP Color LaserJet 4600 series (shown with additional 500-sheet paper feeder)

- 1 output bin
- 2 on/off switch
- 3 Tray 3 (500-sheet paper feeder; optional on 4600, 4600n, and 4600dn models)
- 4 EIO connection (quantity 3)
- 5 memory access
- 6 FIR (Fast InfraRed) connection
- 7 parallel connection
- 8 power connection

# Media requirements

## Selecting print media

You can use many types of paper and other print media with this printer. This section provides guidelines and specifications for selecting and using different print media.

Before purchasing any media or specialized forms in quantity, verify that your paper supplier obtains and understands the print media requirements specified in the *HP LaserJet Family Print Media Guide*. The guide is available through Hewlett-Packard Customer Support (HPCS). See page 47 for ordering information.

It is possible that media could meet all of the guidelines in this chapter and still not print satisfactorily. This may be a result of abnormal characteristics of the printing environment or of other variables over which Hewlett-Packard has no control (for example, extremes in temperature and humidity).

Hewlett-Packard recommends testing any media before buying it in large quantities.

---

### CAUTION

Using media that does not conform to the specifications listed here and in the *HP LaserJet Family Print Media Guide* can cause problems that require service. This service is not covered by the Hewlett-Packard warranty or service agreements.

---

## Media specifications

For optimum results, use conventional 75 g/m<sup>2</sup> (20 lb) xerographic paper. Verify that the paper is of good quality and is free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges. Avoid fanning the print media before loading it into the paper trays.

## Supported media weights and sizes

Table 1-8 shows the media types and sizes supported by the printer and the printer accessories.

**Table 1-8 Supported media specifications**

Tray	Supported media	Media specifications	Capacity
Tray 1	Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 76 by 127 mm (3 by 5 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	60 to 163 g/m <sup>2</sup> (16 to 43 lb)	100 sheets of 75 g/m <sup>2</sup> (20 lb) paper  Do not load more than the maximum stack height of 10 mm (0.6 in)
	Transparencies A4/Letter	0.13 mm (5 mil)	maximum stack height of 10 mm (0.6 in)
	Glossy film A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 76 by 127 mm (3 by 5 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	0.13 mm (5 mil)	maximum stack height of 10 mm (0.6 in)
	Glossy Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 76 by 127 mm (3 by 5 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	75 g/m <sup>2</sup> to 120 g/m <sup>2</sup> (20 lb to 32 lb)	maximum stack height of 10 mm (0.6 in)
	Envelopes Com10 Monarch C5 DL B5	Maximum weight: 105 g/m <sup>2</sup> (28 lb bond)	Limit of 20
	Labels (Tray 1 only) A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 76 by 127 mm (3 by 5 in) Maximum size: 216 by 356 mm (8.5 by 14 in)		Do not load more than the maximum stack height of 10 mm (0.6 in)

**Table 1-8 Supported media specifications (continued)**

Tray	Supported media	Media specifications	Capacity
Tray 2 and optional Tray 3* **	Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 148 by 210 mm (5.8 by 8.2 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	60 to 105 g/m <sup>2</sup> (16 to 28 lb)	500 sheets of 75 g/m <sup>2</sup> (20 lb) paper  maximum stack height of 50 mm (2 inches)
	Transparencies A4/Letter	0.13 mm (5 mil)	Limit of 100 sheets
	Glossy film A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 148 by 210 mm (5.8 by 8.2 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	0.13 mm (5 mil)	Limit of 100 sheets
	Glossy Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum size: 148 by 210 mm (5.8 by 8.2 in) Maximum size: 216 by 356 mm (8.5 by 14 in)	75 g/m <sup>2</sup> to 120 g/m <sup>2</sup> (20 lb to 32 lb)	Limit of 200 sheets
Duplex printing	Paper, Glossy Paper A4/Letter Legal Executive JIS B5  Custom paper sizes are not supported for 2-sided printing.	75 g/m <sup>2</sup> to 105 g/m <sup>2</sup> (20 lb to 28 lb)	

\*Trays 2 and 3 do not support the range of custom sizes available in Tray 1.

\*\*Trays 2 and 3 use custom size, specifically for B5 ISO.

**Note**

Use only HP-supported transparencies (HP part number C2934A, Letter size; C2936A, A4 size).



## Media to avoid

This printer can handle many types of media. Using media outside the printer's specifications will cause a loss of print quality and increase the chance of paper jams occurring.

- Do not use paper that is too rough.
- Do not use paper with cutouts or perforations other than standard 3-hole punched paper.
- Do not use multipart forms.
- Do not use paper that has already been printed on or fed through a photocopier or printer.
- Do not use paper with a watermark if you are printing solid patterns.

## Media that may cause damage to the printer

In rare circumstances media can damage the printer. To prevent possible damage, do not use the following media:

- Do not use paper that is embossed or coated unless it is specifically recommended for use in this printer.
- Do not use paper with irregularities such as tabs or staples.
- Do not use letterhead paper with low temperature dyes or thermography. Preprinted forms or letterhead must use inks that can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Do not use any media that produces hazardous emissions, or that melts, offsets, or discolors when exposed to 190° C (374° F) for 0.1 second.
- Do not use transparencies designed for use with Inkjet printers or other low temperature printers. Use only transparencies that are specified for use with HP Color LaserJet printers.

## Printing on special media

Use these guidelines when printing on special types of media.

- For optimum results, use conventional 75 g/m<sup>2</sup> (20 lb) xerographic paper.
- Verify that the paper is of good quality and free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges.

## Transparencies

When printing on transparencies, use the following guidelines.

- Handle transparencies using the edges. Oils from your fingers can remain on the transparency and can cause print quality problems.
- Use only overhead transparencies recommended for use in this printer. Hewlett-Packard recommends using HP Color LaserJet Transparencies with this printer. HP products are designed to work together for optimum printing results. Table 1-9 describes the recommended specifications for transparencies.

---

### CAUTION

Transparencies not designed for LaserJet printing will melt in the printer, causing damage to the printer.

**Table 1-9 Printing on transparencies**

Description	Specifications
Electrical surface resistivity	2.0 to 15 by 10 ohms per square inch
Fusing compatibility	Materials must not discolor, melt, offset, or release hazardous emissions when heated to 190° C (374° F) for 0.1 second.
Caliper (thickness)	0.12 mm (0.0048 in) to 0.13 mm (0.0052 in)

## Glossy paper

- In either the software application or the driver, select **Glossy** as the media type for media lighter than 105 g/m<sup>2</sup> (28 lb bond), select **Heavy Glossy** for media heavier than 105 g/m<sup>2</sup> (28 lb bond), or print from a tray that is configured for glossy paper.
- You can also use the printer control panel to set the media type to **GLOSS** for the input tray you are using.
- Because this setting affects all print jobs, it is important to return the printer to its original settings once your job has printed. See the section in the online user guide on configuring input trays.

---

### Note

Hewlett-Packard recommends using HP Color LaserJet Soft Gloss paper with this printer. HP products are designed to work together for optimum printing results. If HP Color LaserJet Soft Gloss paper is not used with this printer, print quality may be compromised.

## Colored paper

- Colored paper should be of the same high quality as white xerographic paper.
- Pigments used must be able to withstand the printer's fusing temperature of 190° C (374° F) for 0.1 second without deterioration.
- Do not use paper with a colored coating that was added after the paper was produced.
- The printer creates colors by printing patterns of dots, overlaying and varying their spacing to produce various colors. Varying the shade or color of your paper will affect the shades of your printed colors.

## Heavy paper

- Use Tray 1 for paper that is heavier than 105 g/m<sup>2</sup> (28 lb bond up to 43 lb bond).
- For optimum results when printing on heavy paper, use the printer control panel to set the media type for the tray to **HEAVY**.
- In either the software application or the driver, select **Heavy** as the media type, or print from a tray that is configured for heavy paper.
- Because this setting affects all print jobs, it is important to return the printer to its original settings once your job has printed. See the section in the online user guide on configuring input trays.

---

### CAUTION

In general, do not use paper that is heavier than the recommended specification for this printer. Doing so can cause misfeeds, jams, inferior print quality, and excessive mechanical wear. However, some heavier media types, such as HP Cover Stock, can be safely used. See Table 1-8 for supported paper types and sizes.

## Envelopes

Envelopes can be printed only from Tray 1. Set the tray's media size to the specific envelope size. For information about loading envelopes, see the section in the online user guide about loading envelopes into Tray 1.

Adhering to the following guidelines will help ensure proper printing on envelopes and help prevent printer jams:

- Do not load more than 20 envelopes into Tray 1.
- The weight rating of envelopes should not exceed 105 g/m<sup>2</sup> (28 lb).
- Envelopes should be flat.
- Do not use envelopes with windows or clasps.
- Envelopes must not be wrinkled, nicked, or otherwise damaged.
- Envelopes with peel-off adhesive strips must use adhesives that can withstand the heat and pressures of the printer's fusing process.
- Envelopes should be loaded face-down and with the postage end feeding into the printer first.

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### CAUTION

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To prevent severe printer damage, do not use envelopes that have windows, clasps, snaps, or synthetic materials.

## Labels

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### Note

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To print labels, set the tray's media type to LABELS in the printer control panel.

When printing labels, use the following guidelines:

- Verify that the label's adhesive material can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Verify that adhesive material is not exposed between the labels. Exposed areas can cause labels to peel off during printing, which can cause printer jams. Exposed adhesive can also cause damage to printer components.
- Do not re-feed a sheet of labels.
- Verify that labels lie flat.
- Do not use labels that are wrinkled, bubbled, or otherwise damaged.

## Preprinted forms and letterhead

Observe the following guidelines for best results with preprinted forms and letterhead:

- Forms and letterhead must be printed with heat-resistant inks that will not melt, vaporize, or release hazardous emissions when subjected to the printer's fusing temperature of approximately 190° C (374° F) for 0.1 second.
- Inks must be non-flammable and should not adversely affect any printer rollers.
- Forms and letterhead should be sealed in a moisture-proof wrapping to prevent changes during storage.
- Before you load preprinted paper such as forms and letterhead, verify that the ink on the paper is dry. During the fusing process, wet ink can come off of preprinted paper.
- When duplex printing, load preprinted forms and letterhead into Tray 2 and Tray 3 with the front of the page facing down and the top edge of the page towards the back of the printer. Load preprinted forms and letterhead into Tray 1 with the front of the page facing up and the bottom edge feeding into the printer first.

## Recycled paper

This printer supports the use of recycled paper. Recycled paper must meet the same specifications as standard paper; refer to the *HP LaserJet Family Print Media Guide*, available through HP Direct. See the online user guide for ordering information. Hewlett-Packard recommends that recycled paper contain no more than 5 percent groundwood.

## Weight equivalence table

Table 1-10 shows equivalent weights for different grades of paper. A boldface type value indicates a commonly available standard weight for that grade.

### Note

Text and book grades marked with an asterisk (\*) actually calculate to 51, 61, 71, and 81 but are rounded to standard book or text weights of 50, 60, 70, and 80.

**Table 1-10 Weight equivalence table**

Bond weight (17 by 22 inches)	Text/ Book weight (25 by 38 inches)	Cover weight (20 by 26 inches)	Bristol weight (22.5 by 28.5 inches)	Index weight (25.5 by 30.5 inches)	Tag weight (24 by 36 inches)	Metric weight
16#	41#	22#	27#	33#	37#	<b>60 g/m<sup>2</sup></b>
17#	43#	24#	29#	35#	39#	<b>64 g/m<sup>2</sup></b>
20#	50# *	28#	34#	42#	46#	<b>75 g/m<sup>2</sup></b>
21#	54#	30#	36#	44#	49#	<b>80 g/m<sup>2</sup></b>
24#	<b>60# *</b>	33#	41#	50# *	55#	<b>90 g/m<sup>2</sup></b>
27#	68#	37#	45#	55#	61#	<b>100 g/m<sup>2</sup></b>
28#	<b>70# *</b>	39#	49#	58#	65#	105 g/m <sup>2</sup>
29#	74#	41#	50#	61#	68#	<b>110 g/m<sup>2</sup></b>
32#	<b>80# *</b>	44#	55#	67#	74#	<b>120 g/m<sup>2</sup></b>
36#	90#	<b>50#</b>	62#	75#	83#	<b>135 g/m<sup>2</sup></b>
39#	<b>100#</b>	55#	<b>67#</b>	82#	91#	148 g/m <sup>2</sup>
40#	101#	55#	68#	83#	92#	<b>150 g/m<sup>2</sup></b>
43#	110#	<b>60#</b>	74#	<b>90#</b>	<b>100#</b>	163 g/m <sup>2</sup>
45#	115#	63#	77#	94#	104#	<b>170 g/m<sup>2</sup></b>
47#	119#	<b>65#</b>	80#	97#	108#	176 g/m <sup>2</sup>
51#	128#	70#	86#	105#	117#	<b>190 g/m<sup>2</sup></b>
53#	134#	74#	90#	<b>110#</b>	122#	199 g/m <sup>2</sup>
54#	137#	75#	93#	113#	<b>125#</b>	203 g/m <sup>2</sup>
58#	146#	<b>80#</b>	98#	120#	133#	216 g/m <sup>2</sup>
65#	165#	<b>90#</b>	111#	135#	<b>150#</b>	244 g/m <sup>2</sup>
66#	169#	92#	114#	138#	154#	<b>250 g/m<sup>2</sup></b>
67#	171#	94#	115#	<b>140#</b>	155#	253 g/m <sup>2</sup>
70#	178#	98#	<b>120#</b>	146#	162#	264 g/m <sup>2</sup>
72#	183#	<b>100#</b>	123#	150#	166#	271 g/m <sup>2</sup>

# Environmental Product Stewardship Program

## Protecting the environment

Hewlett-Packard Company is committed to providing quality products in an environmentally sound manner. This product has been designed with several attributes to minimize impacts on the environment.

## Ozone production

This product generates no appreciable ozone gas (O<sub>3</sub>).

## Energy consumption

Energy usage drops significantly while in PowerSave mode, which saves natural resources and saves money without affecting the high performance of this printer. This product qualifies for ENERGY STAR<sup>®</sup>, which is a voluntary program to encourage the development of energy-efficient office products.



ENERGY STAR<sup>®</sup> is a U.S. registered service mark of the U.S. Environmental Protection Agency. As an ENERGY STAR<sup>®</sup> partner, Hewlett-Packard Company has determined that this product meets ENERGY STAR<sup>®</sup> Guidelines for energy efficiency. For more information, see <http://www.energystar.gov/>.

## Paper use

This product's optional automatic duplex feature (2-sided printing) can reduce paper usage and the resulting demands on natural resources.

## Plastics

Plastic parts over 25 grams have markings according to international standards that enhance the ability to identify plastics for recycling purposes at the end of the product's life.

## HP LaserJet Printing Supplies

In many countries/regions, this product's printing supplies (print cartridges, fuser, and transfer unit) can be returned to HP through the HP Printing Supplies Returns and Recycling Program. An easy to use and free takeback program is available in over 48 countries/regions. Multi-lingual program information and instructions are included in every new HP LaserJet print cartridge and supplies package.

## HP Printing Supplies Returns and Recycling Program information

Since 1990, the HP Printing Supplies Returns and Recycling Program has collected more than 47 million used LaserJet printer cartridges that otherwise might have been discarded in the world's landfills. The HP LaserJet printer cartridges and supplies are collected and bulk-shipped to our resource and recovery partners, who disassemble the cartridges. After a thorough quality inspection, selected parts are reclaimed for use in new cartridges. Remaining materials are separated and converted into raw materials for use by other industries to make a variety of useful products.

- **U.S. returns**—For a more environmentally responsible return of used cartridges and supplies, HP encourages the use of bulk returns. Simply bundle two or more cartridges together and use the single, pre-paid, and pre-addressed UPS label that is supplied in the package. For more information in the U.S., call 1-800-340-2445 or visit the HP LaserJet Supplies website at <http://www.hp.com/go/recycle>.
- **Non-U.S. recycling returns**—Non-U.S. customers should call the local HP Sales and Service Office or visit the <http://www.hp.com/go/recycle> website for further information regarding availability of the HP Supplies Returns and Recycling Program.

## Recycled paper

This product is capable of using recycled papers when the paper meets the guidelines outlined in the Print Media Guide. This product is suitable for the use of recycled paper according to DIN 19309.

## Material restrictions

This product does not contain batteries.

This product does not contain added mercury.

This product contains lead in solder.

For recycling information, contact <http://www.hp.com/go/recycle>, contact your local authorities, or go to the Electronics Industries Alliance website <http://www.eiae.org>.

## Extended warranty

HP SupportPack provides coverage for the HP hardware product and all HP-supplied internal components. The hardware maintenance covers a 1 to 5 year period from date of the HP product purchase. The customer must purchase HP SupportPack within 90 days of the HP product purchase. For more information, contact the HP Customer Care Service and Support group.

## Spare parts and supplies availability

Spare parts and supplies for this product will be available for at least five years after production has stopped.

## For more information

On HP's environmental programs, including:

- Product environmental profile sheet for this and many related HP products
- HP's commitment to the environment
- HP's environmental management system
- HP's end-of-life product return and recycling program
- Material Safety Data Sheets

See <http://www.hp.com/go/environment> or <http://www.hp.com/hpinfo/community/environment/>.

# Regulatory statements

## FCC Regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If this equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between equipment and receiver.
- Connect equipment to an outlet on a circuit different from that to which the receiver is located.
- Consult your dealer or an experienced radio/TV technician.

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### Note

Any changes or modifications to the printer that are not expressly approved by HP could void the user's authority to operate this equipment.

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Use of a shielded interface cable is required to comply with the Class B limits of Part 15 of FCC rules.



## Safety information

### Laser safety statement

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration has implemented regulations for laser products manufactured since 1 August 1976. Compliance is mandatory for products marketed in the United States. The printer is certified as a "Class 1" laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

#### WARNING!

Using controls, making adjustments, or performing procedures other than those specified in this guide may result in exposure to hazardous radiation.

### Material Safety Data Sheet

Material Safety Data Sheets (MSDS) can be obtained by contacting the HP LaserJet Supplies website at <http://www.hp.com/go/msds>.

### Toner safety

Hewlett-Packard encourages responsible disposal of HP LaserJet printer supply items through its Environmental Collection Program. For details on this program, see the recycling instruction guide enclosed with each supply item.

#### Note

In case of toner spills, skin and clothing are best cleaned by removing as much toner as possible with a dry tissue, then washing with cold water. Hot water causes toner to permanently set into clothing.

### Canadian DOC regulations

Complies with Canadian EMC Class B requirements.

«Conforme à la classe B des normes canadiennes de compatibilité électromagnétiques. «CEM».»»

### EMI statement (Korea)

사용자 안내문 (B 급 기기)

이 기기는 비업무용으로 전자파장해검정을 받은 기기로서, 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

Figure 1-7 EMI statement for Korea

## VCCI statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。  
取り扱い説明書に従って正しい取り扱いをして下さい。

Figure 1-8 VCCI statement for Japan

# Laser statement for Finland

## LASERTURVALLISUUS

### Luokan 1 laserlaite

#### Klass 1 Laser Apparat

HP Color LaserJet 4600, 4600n, 4600dn, 4600dtn, 4600hdn laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalisessa käytössä kirjoittimen suojakotelointi estää lasersäteiden pääsyn laitteen ulkopuolelle.

Laitteen turvallisuusluokka on määritetty standardin EN 60825-1 (1994) mukaisesti.

#### VAROITUS !

Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

#### VARNING !

Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

#### HUOLTO

HP Color LaserJet 4600, 4600n, 4600dn, 4600dtn, 4600hdn kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

#### VARO !

Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

#### VARNING !

Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsätts användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 775-795 nm

Teho 5 mW

Luokan 3B laser

# Declaration of Conformity

according to ISO/IEC Guide 22 and EN 45014

**Manufacturer's Name:** Hewlett-Packard Company  
**Manufacturer's Address:** 11311 Chinden Boulevard  
Boise, Idaho 83714-1021 USA

**declares that the product**

**Product Name:** HP Color LaserJet 4600/4600n/4600dn/4600dtn/4600hdn  
Printer  
**Model Number<sup>4</sup>:** Including 500-sheet paper feeder  
C9660A /C9692A /C9661A /C9662A /C9663A Printer  
C9664A 500-sheet paper feeder  
**Product Options:** ALL

## **conforms to the following Product Specifications:**

**Safety:** IEC 950:1991+A1+A2+A3+A4 / EN 60950:1992+A1+A2+A3+A4+A11  
IEC 825-1:1993 +A1 / EN 60825-1:1994 +A11 Class 1 Laser/LED Product  
**EMC:** CISPR 22:1997 / EN 55022:1998 Class B1  
EN 61000-3-2:1995  
EN 61000-3-3:1995  
EN 55024: 1998  
FCC Title 47 CFR, Part 15 Class B2  
/ ICES-002, Issue 2  
AS / NZS 3548:1995

## **Supplementary Information:**

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC, and carries the CE-Marking accordingly:

- <sup>1</sup> The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems.  
<sup>2</sup> This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two Conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  
<sup>3</sup> Product exhibits Class A operation when connected to Local Area Network (LAN) cables using print server accessories.  
<sup>4</sup> The model number may include an additional suffix letter "R".

**Hewlett-Packard Company**  
**Boise, Idaho USA**  
**April 1, 2002**

## **For regulatory topics only:**

Australia Contact: Product Regulations Manager, Hewlett-Packard Australia Ltd., 31-41 Joseph Street, Blackburn, Victoria 3130, Australia

European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Straße 110-140, D-71034 Böblingen (FAX: +49-7031-14-3143)

USA Contact: Product Regulations Manager, Hewlett-Packard Company, PO Box 15, Mail Stop 160, Boise, ID 83707-0015 (Phone: 208-396-6000)

# 2

# Service approach

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## Service approach

Printer repair normally begins by using the printer's internal diagnostics and the three-step process below.

- Step 1 Isolate the problem to the major system (for example, the host computer, the network or server, or the printer system).
- Step 2 Determine if the problem is located in the accessories or in the printer engine.
- Step 3 Troubleshoot the problem using the procedures in Chapter 7.

Once a faulty part is located, the printer can usually be repaired at the assembly level by replacing field replaceable units (FRUs). Some mechanical assemblies might need to be repaired at the subassembly level. Hewlett-Packard does not support replacement of components on the printer circuit assemblies.

## Parts and supplies

### Ordering parts

Field replaceable and accessory part numbers are found in Chapter 8 of this manual. Order replacement parts from Hewlett-Packard Customer Support-Americas (HPCS-A) or Hewlett-Packard Customer Support-Europe (HPCS-E).

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**Note**

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Use only accessories specifically designed for this printer. Accessories can be ordered from an authorized service or support provider. See “Ordering related documentation and software” on page 47 and “Ordering parts” on page 311 for additional ordering information.

#### By phone:

- Hewlett-Packard Customer Support-Americas (HPCS-A)  
(1)(800) 227-8164 (U.S. only)
- Hewlett-Packard Customer Support-Europe (HPCS-E)  
(49 7031) 14 2253

#### By mail:

Hewlett-Packard Company  
HPCS-A  
8050 Foothills Blvd.  
Roseville, CA 95678

Hewlett-Packard Company  
HPCS-E  
Wolf-Hirth Straße 33  
D-7030 Böblingen, Germany

### Ordering supplies

Order supplies directly from Hewlett-Packard. The phone numbers for ordering supplies are:

- U.S. (800) 538-8787
- Canada (800) 387-3154; Toronto (416) 671-8383
- United Kingdom 0734-441212
- Other local phone numbers may also be available

## Exchange program

HP offers remanufactured assemblies for some parts. These are identified in Chapter 8 and can be ordered from Hewlett-Packard Customer Support-Americas (HPCS-A) or Hewlett-Packard Customer Support-Europe (HPCS-E).

## Supplies

Paper and print cartridges can be ordered directly from Hewlett-Packard. See Chapter 8 for ordering information.

## World Wide Web

Printer drivers, updated HP printer software, and product and support information can be obtained from the following URL:

In the U.S.: <http://www.hp.com/support/lj4600>

Printer drivers may be obtained from the following sites:

In China: <ftp://www.hp.com.cn/support/lj4600>

In Japan: <ftp://www.jpn.hp.com/support/lj4600>

In Korea: <http://www.hp.co.kr/support/lj4600>

In Taiwan: <http://www.hp.com.tw/support/lj4600>

or the local driver website: <http://www.dds.com.tw>

## HP Service Parts Information Compact Disc

This powerful, CD-ROM-based parts information tool is designed to give users fast, easy access to parts information such as pricing and recommended stocking lists for a wide range of HP products. To subscribe to this quarterly service in the U.S. or Canada, call (800) 336-5987. In Asia Pacific, call (65) 740-4484. Parts identification and pricing information can also be checked via the World Wide Web at <http://www.hp.com/go/partsinfo>.

## HP Support Assistant Compact Disc

This support tool offers a comprehensive online information system designed to provide technical and product information about HP products. To subscribe to the quarterly service in the U.S. or Canada, call (800) 457-1762. In Hong Kong, Indonesia, Malaysia, or Singapore, call Mentor Media at (65) 740-4477.

## Customer care reseller sales and service support center

The Customer Care Reseller Sales and Support Center is available to assist resellers and service technicians. To reach this support center, call (1) (800) 544-9976.

## HP authorized resellers and support

To locate authorized HP resellers and support, call (1) (800) 243-9816 in the U.S. or (1) (800) 387-3867 in Canada.

## HP service agreements

Call (1) (800) 743-8305 in the U.S. or (1) (800) 268-1221 in Canada.

## Other areas

Outside of North America and Europe, contact the local HP sales office for assistance in obtaining technical support for resellers and service technicians.



## Ordering related documentation and software

Table 2-1 shows where to order related documentation and software. Telephone numbers for the various sources are:

- Hewlett-Packard Customer Support-Americas (HPCS-A)  
(1)(800) 227-8164 (U.S. only)
- Hewlett-Packard Customer Support-Europe (HPCS-E)  
(49 7031) 14 2253
- HP Distribution Center (HPD) (661) 257-5565.  
Fax: (805) 257-6995

**Table 2-1 Related documentation and software**

<b>Description</b>	<b>Part Number</b>
<i>HP LaserJet Family Print Media Guide</i>	5963-7863
<i>HP JetDirect Print Server Administrator's Guide</i>	5971-3257
<i>PCL/PJL Technical Reference Package</i>	5021-0330
<i>HP Color LaserJet 4600 Series Getting Started Guide</i>	C9660-90902
<i>HP Color LaserJet 4600 Series Service Manual</i>	C9660-90901
HP Color LaserJet 4600 Series Printer Service and Support CD-ROM	C9660-60107
HP Color LaserJet 4600 Series Printer Self-paced Training Kit	C9660-67905

# Warranty statement

## Hewlett-Packard warranty statement

HP Color LaserJet 4600, 4600n, 4600dn, 4600dtn, and 4600hdn printer 1 year limited warranty

- 1 HP warrants HP hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
- 2 HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.
- 3 HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.
- 4 HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.
- 5 The warranty period begins on the date of delivery or on the date of installation if installed by HP. If customer schedules or delays HP installation more than 30 days after delivery, warranty begins on the 31st day from delivery.
- 6 Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.
- 7 TO THE EXTENT ALLOWED BY LOCAL LAW, THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTY OR CONDITION, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED AND HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE.
- 8 HP will be liable for damage to tangible property per incident up to the greater of \$300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective HP product.
- 9 TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE.
- 10 FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

## Limited warranty for print cartridge life

This HP product is warranted to be free from defects in materials and workmanship during its useful life (end of life is indicated by a printer control panel low-life message).

This warranty does not cover products that have been modified, refurbished, remanufactured, misused, or tampered with in any way.

This limited warranty gives you specific legal rights. You may have other rights which vary from state to state, province to province, and country/region to country/region.

THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. THE HEWLETT-PACKARD COMPANY SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT ALLOWED BY APPLICABLE LAW, IN NO EVENT SHALL HEWLETT-PACKARD COMPANY BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT, PUNITIVE, OR EXEMPLARY DAMAGES OR LOST PROFITS FROM ANY BREACH OF THIS WARRANTY OR OTHERWISE.

In the event that your product proves to be defective, please return to place of purchase with a written description of the problem.

## Transfer unit and fuser warranty

This HP product is warranted to be free from defects in materials and workmanship for one year or until the printer control panel indicates a low-life message, whichever occurs first.

This warranty does not cover products that have been modified, refurbished, remanufactured, misused, or tampered with in any way.

This limited warranty gives you specific legal rights. You may have other rights which vary from state to state, province to province, and country/region to country/region.

THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. THE HEWLETT-PACKARD COMPANY SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT ALLOWED BY APPLICABLE LAW, IN NO EVENT SHALL HEWLETT-PACKARD COMPANY BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT, PUNITIVE, OR EXEMPLARY DAMAGES OR LOST PROFITS FROM ANY BREACH OF THIS WARRANTY OR OTHERWISE.

In the event that your product proves to be defective, please return to place of purchase with a written description of the problem.

# HP maintenance agreements

HP has several types of maintenance agreements that meet a wide range of support needs. Maintenance agreements are not part of the standard warranty. Support services may vary by area. Check with your local HP dealer to determine the services available to you.

## **On-site service agreements**

To provide you with the level of support best suited to your needs, HP has on-site service agreements with three response times.

### **Priority on-site service**

This agreement provides 4-hour service response to your site for calls made during normal HP business hours.

### **Next-day on-site service**

This agreement provides support by the next working day following a service request. Extended coverage hours and extended travel beyond HP's designated service zones are available on most on-site agreements (for additional charges).

### **Weekly (volume) on-site service**

This agreement provides scheduled weekly on-site visits for organizations with many HP products. This agreement is designated for sites using 25 or more workstation products, including printers, plotters, computers, and disk drives.

For more information on HP service agreements, call (800) 835-4747 (U.S.) or (800) 268-1221 (Canada).

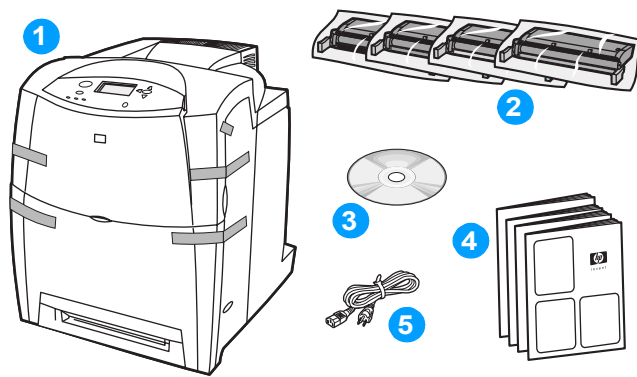
# 3

# Installation and configuration

## Chapter contents

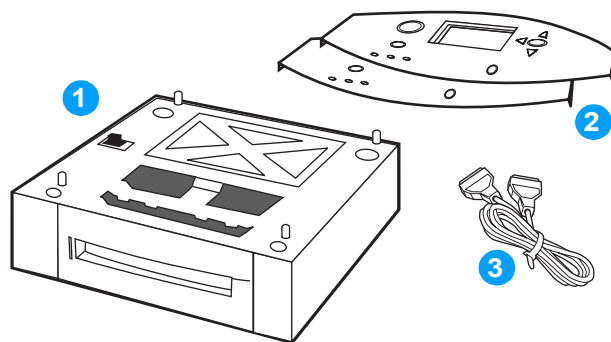
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# Unpack the printer



**Figure 3-1** Package contents

- 1 HP Color LaserJet 4600 series printer
- 2 print cartridges
- 3 software and electronic documentation
- 4 printed documentation
- 5 power cord



**Figure 3-2** Optional package contents

- 1 optional 500-sheet paper feeder (Tray 3)
- 2 control panel overlays
- 3 parallel cable

## Unpacking the printer

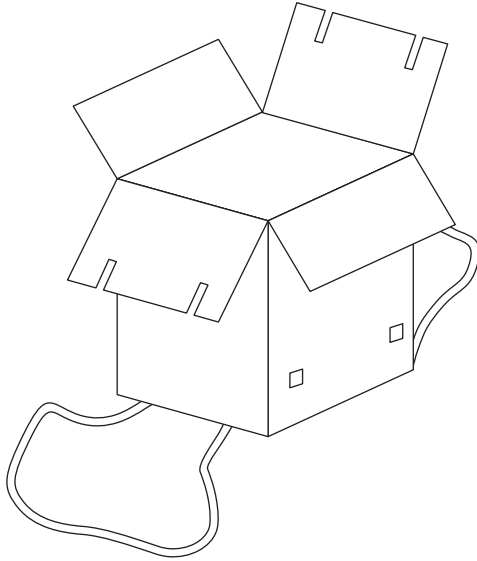
### Note

Save all the packing materials in case you need to repack and transport the printer at a later date.

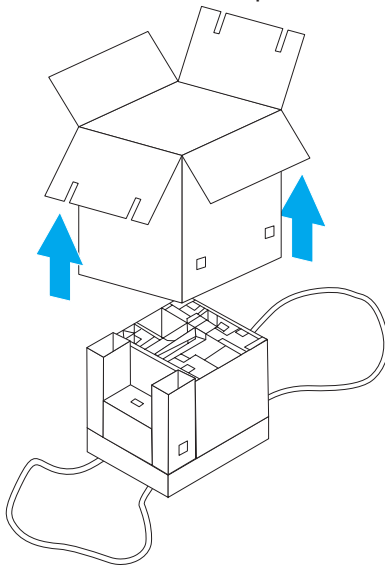
### WARNING!

The printer weighs approximately 36 kg (80 lb). HP recommends having two or more people lift or move the printer.

- 1 Do not cut the straps. Open the top flaps of the packing box. Detach the straps from the top flaps and lay them on the floor.

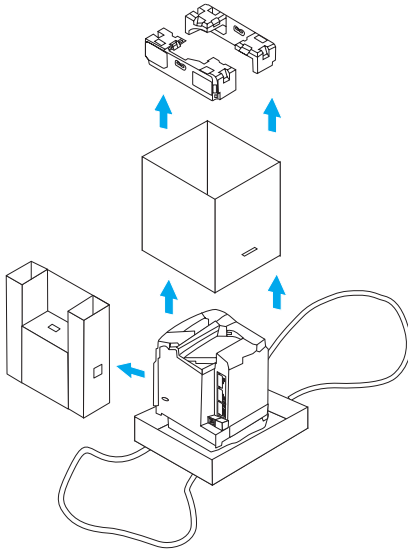


- 2 Lift the box frame up and off the printer.

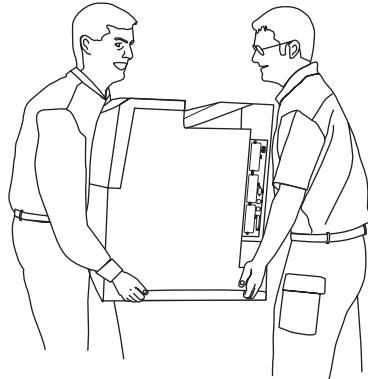


- 3 If the printer has an optional 500-sheet paper feeder, it is packaged on top of the printer. Lift the 500-sheet paper feeder from the package, and place it in the prepared location.

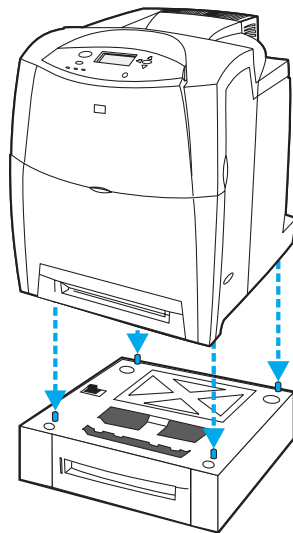
- 4 Remove the shipping blocks, accessory packs, and inner cardboard frame that surrounds the printer.



- 5 Lift the printer from the packing pallet and place it in the prepared location. Two people must lift and move the printer.

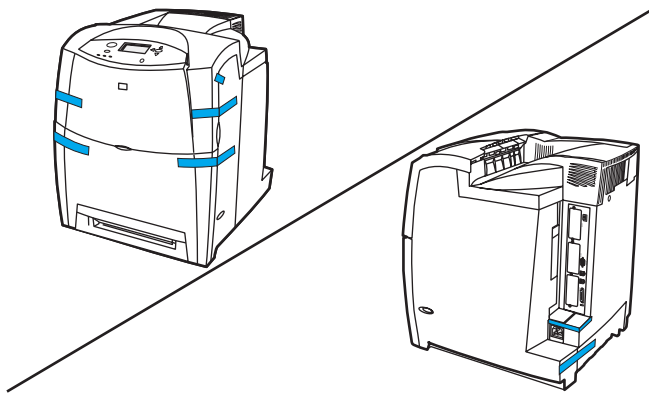


- 6 If you are using an optional 500-sheet paper feeder, align the printer with the guidepins on top of the 500-sheet paper feeder.

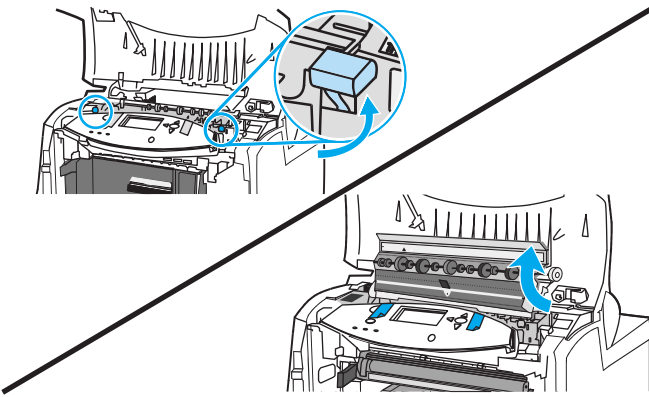




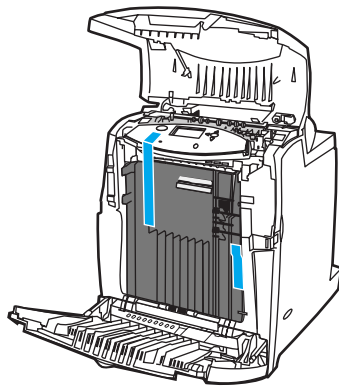
- 7 Remove the packing tape from the front and rear of the printer.



- 8 Using the side handles, open the top cover. Firmly lift the two green handles on either side of the fuser. Lift the fuser cover completely, and pull on either of the orange tabs to remove the fuser packing tape and plastic shipping locks. Close the fuser cover.



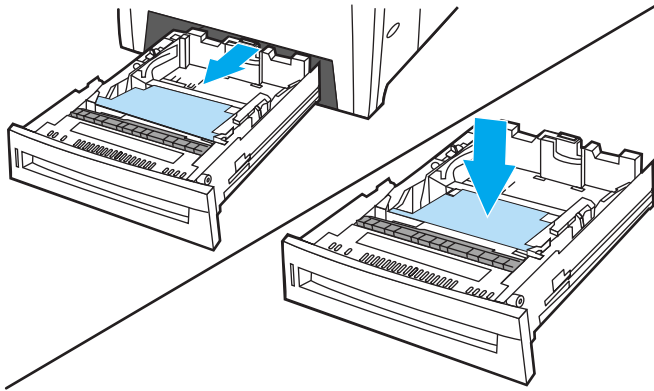
- 9 Open the front cover and remove the packing tape from the transfer unit. Close the front cover and the top cover.



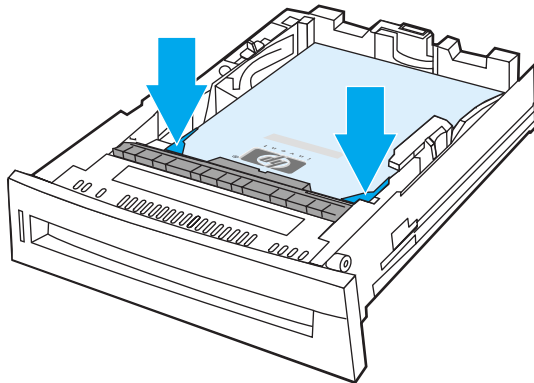
# Installation

## Installing the media tray

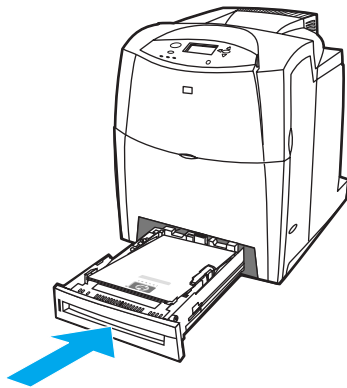
- 1 Remove the tray from the printer. Push the media lift plate down until it locks. Remove the cardboard from the tray.



- 2 Adjust the rear length guide by squeezing the guide adjustment latch and sliding the back of the tray to the length of the media being loaded. Slide the width guides to the desired size.
- 3 Load media face-up. Make sure that the front corners of the media fit under the front corner tabs.

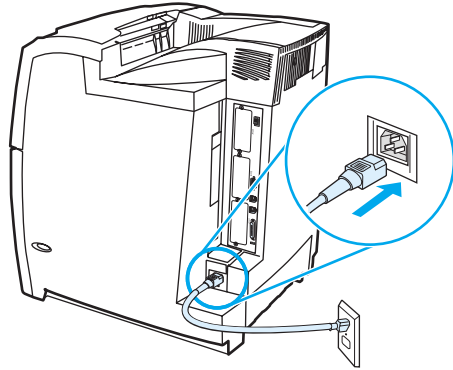


- 4 Slide the media input tray straight into the slot at the bottom of the printer.



## Connecting power

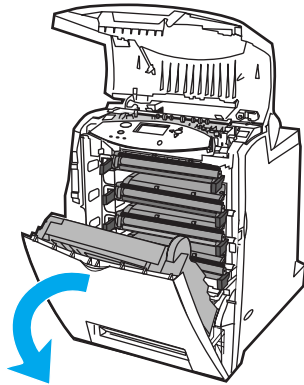
- 1 Plug the AC power cord into the printer and into the power outlet.



- 2 Turn the printer on.

## Installing the print cartridges

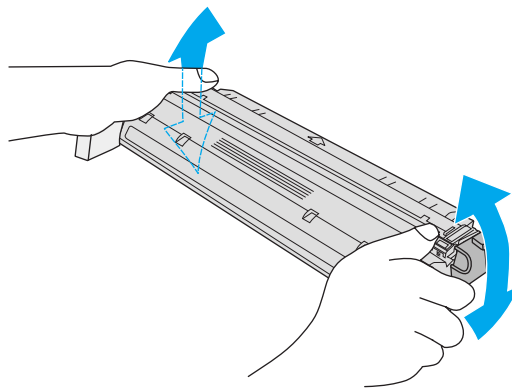
- 1 Open the top cover. Grasp the green handle on the transfer unit and pull down. The front cover will open as you pull down the transfer unit.



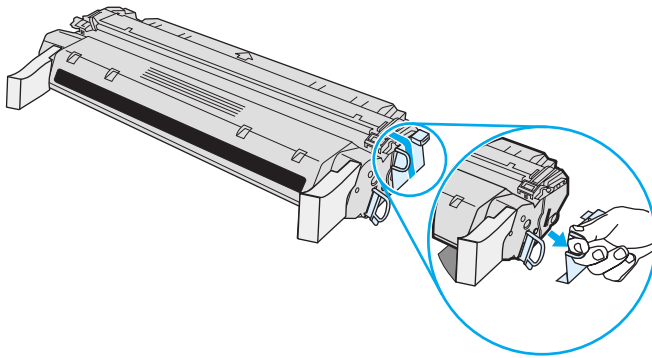
### CAUTION

Do not place anything on the transfer unit while it is open. If the transfer unit is punctured, print quality problems may result.

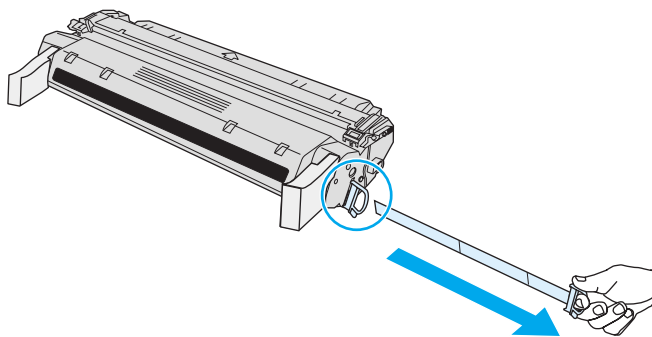
- 2 Grasp both sides of the cartridge and distribute the toner by gently rocking the cartridge from side to side.



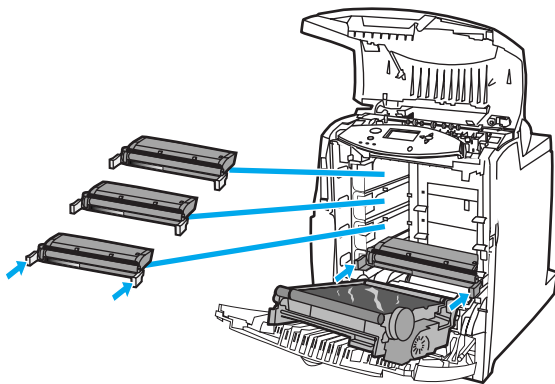
- 3 Remove the tape from the orange shipping lock. Remove and discard the orange shipping lock.



- 4 Remove the inside sealing tape by pulling the orange loop on the end and pulling the tape completely out. Discard the tape.




- 5 Grasp the blue handles on the sides of the print cartridge. Insert the print cartridges, starting with the bottom cartridge, in the position shown (C = cyan, Y = yellow, M = magenta, K = black).

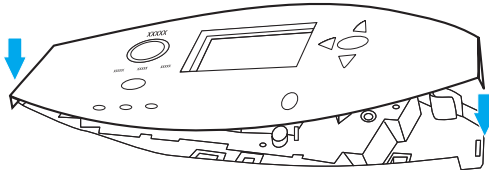




- 6 Close the transfer unit and front cover. Close the top cover. After a short while, the control panel should display **READY**.

## Installing a new overlay (optional)

Some printer models are shipped without the control panel overlay installed. Overlays are available for several languages. If you are setting up a printer for a language other than English, follow this procedure.






- 1 Position the new overlay over the top of the control panel. Insert the left tab of the overlay into the slot on the printer face. Line up the tab on the right side of the overlay with the slot on the right side of the control panel. Set the overlay in place by pushing down on the overlay near the blue  button.



- 2 The control panel displays LANGUAGE in English. Press  until the preferred language is highlighted. Press  to save the preferred language.

## Testing the printer operation

Print a configuration page to ensure the printer is working properly.

- 1 Press  to enter the MENUS.
- 2 Press  to highlight INFORMATION.
- 3 Press  to select INFORMATION.
- 4 Press  to highlight PRINT CONFIGURATION.
- 5 Press  to select PRINT CONFIGURATION.

## Using PowerSave

The adjustable PowerSave Time feature reduces power consumption when the printer has been inactive for an extended period. You can set the length of time before the printer goes into PowerSave mode to 1 MINUTE, 15 MINUTES, 30 MINUTES, or to 1 HOUR, 2 HOURS, or 4 HOURS. The default setting is 30 MINUTES.











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### Note











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The printer display dims when the printer is in PowerSave mode. PowerSave mode does not affect printer warm-up time.

### To set PowerSave Time

- 1 Press  to enter the MENU.
- 2 Press  to highlight CONFIGURE DEVICE.
- 3 Press  to select CONFIGURE DEVICE.
- 4 Press  to highlight SYSTEM SETUP.
- 5 Press  to select SYSTEM SETUP.
- 6 Press  to highlight POWERSAVE TIME.
- 7 Press  to select POWERSAVE TIME.
- 8 Press  or  to select the appropriate time period.
- 9 Press  to set the time period.
- 10 Press PAUSE/RESUME.

### To disable/enable PowerSave

- 1 Press  to enter the MENU.
- 2 Press  to highlight CONFIGURE DEVICE.
- 3 Press  to select CONFIGURE DEVICE.
- 4 Press  to highlight RESETS.
- 5 Press  to select RESETS.
- 6 Press  to highlight POWERSAVE.
- 7 Press  to select POWERSAVE.
- 8 Press  or  to select ON or OFF.
- 9 Press  to set the selection.
- 10 Press PAUSE/RESUME.

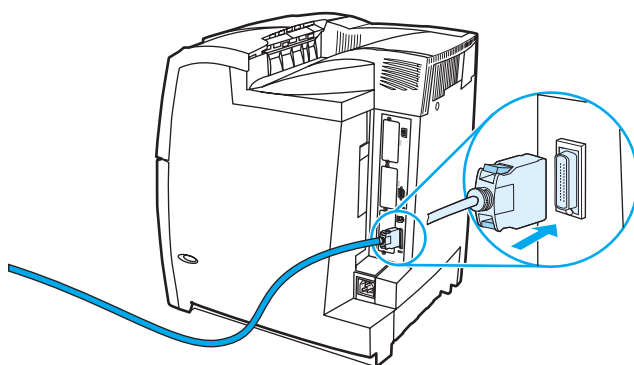
## Connecting to a computer

The HP Color LaserJet 4600 printer supports network and parallel connections at the same time.

### Parallel connections

A parallel connection is made by connecting the printer to the computer using a bidirectional parallel cable (IEEE-1284 compliant) with a c-connector plugged into the printer's parallel port. The cable can be a maximum of 10 meters (30 feet) long.

When used to describe a parallel interface, the term *bidirectional* indicates that the printer is able to both receive data from the computer and send data to the computer through the parallel port.



**Figure 3-3** Parallel port connection

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**Note** To use the enhanced capabilities of the bidirectional parallel interface, ensure that the most recent printer driver is installed. These enhanced capabilities include bidirectional communication between the computer and printer, faster transfer of data, and automatic configuration of printer drivers.

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**Note** Factory settings support automatic switching between the parallel port and one or more network connections on the printer.

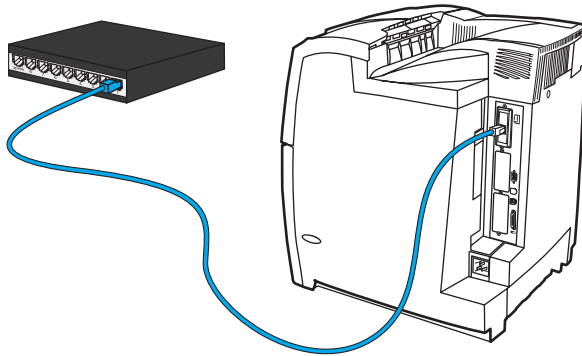
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## Network connections

You may connect the printer to a network in several ways.

### Direct to network

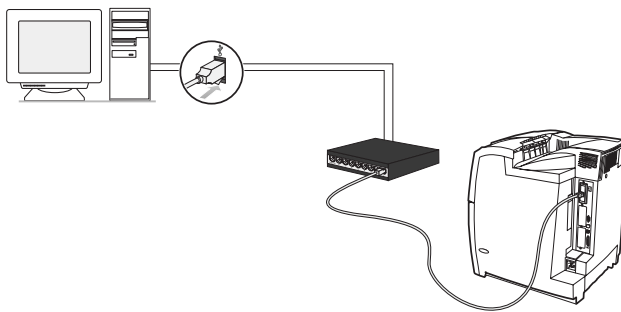
Connect one end of the network cable to the RJ-45 port on the Jetdirect print server card. Connect the other end to the network.



**Figure 3-4** Direct to network connection

### Network print server

Connect one end of a network cable into the server. Connect the other end to the network. Connect one end of a second network cable to the printer and the other end to the network.

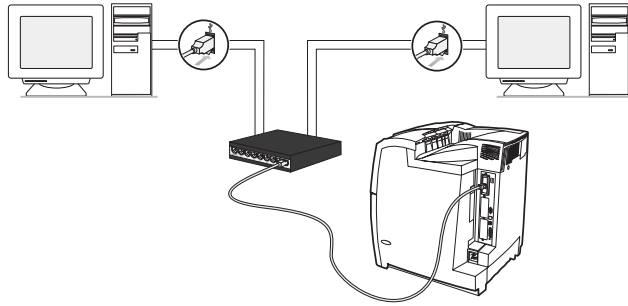


**Figure 3-5** Network print server connection



### Peer to peer (direct to network)

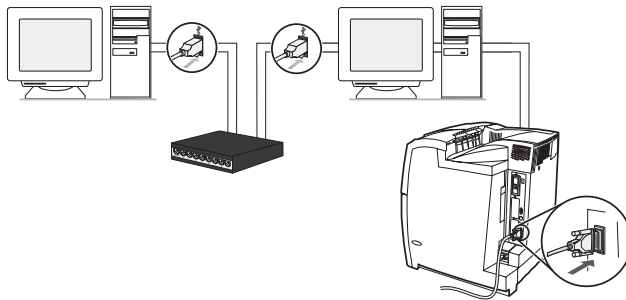
Connect one end of a network cable to the computer. Connect the other end to the network. Connect one end of a second parallel cable to the printer and the other end to the network.



**Figure 3-6** Peer to peer connection (direct to network)

### Peer to peer (parallel)

Connect two or more computers to the network hub using network cables. Connect one end of a parallel cable to the printer. Connect the other end to a computer.



**Figure 3-7** Peer to peer connection (parallel)

## Enhanced I/O (EIO) configuration

This printer comes equipped with three enhanced input/output (EIO) slots. The three EIO slots hold compatible external devices such as the HP Jetdirect print server network cards or other devices. Plugging EIO network cards into the slots increases the number of network interfaces available to the printer.

EIO network cards can maximize printer performance when you are printing from a network. In addition they provide the ability to place the printer anywhere on a network. This eliminates the need to attach the printer directly to a server or a workstation and enables you to place the printer closer to the network users.

If the printer is configured through an EIO network card, configure that card through the control panel Configure device menu.

### HP Jetdirect print servers

HP Jetdirect print servers (network cards) can be installed in one of the printer's EIO slots. These cards support multiple network protocols and operating systems. HP Jetdirect print servers facilitate network management by allowing you to connect a printer directly to your network at any location. HP Jetdirect print servers also support the Simple Network Management Protocol (SNMP), which provides network managers with remote printer management and troubleshooting through HP Web Jetadmin software.

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#### Note

Installation of these cards and network configuration should be performed by a network administrator. Configure the card either through the control panel or with HP Web Jetadmin software.

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#### Note

Refer to the HP Jetdirect print server documentation for information on which external devices or EIO network cards are supported.

### Available enhanced I/O interfaces

HP Jetdirect print servers (network cards) provide software solutions for:

- Novell NetWare
- Microsoft Windows and Windows NT networks
- Apple Mac OS (LocalTalk)
- UNIX (HP-UX and Solaris)
- Linux (Red Hat and SuSE)
- Internet printing

For a summary of available network software solutions, refer to the *HP Jetdirect Print Server Administrator's Guide*, or visit HP Customer Care online at [http://www.hp.com/support/net\\_printing](http://www.hp.com/support/net_printing).

### NetWare networks

When using Novell NetWare products with an HP Jetdirect print server, Queue Server mode provides improved printing performance over Remote Printer mode. The HP Jetdirect print server supports Novell Directory Services (NDS) as well as bindery modes. For more information, see the *HP Jetdirect Print Server Administrator's Guide*.

For Windows 95, 98, ME, NT 4.0, 2000, and XP systems, use the printer installation utility for printer setup on a NetWare network.

## Windows and Windows NT networks

For Windows 95, 98, ME, NT 4.0, 2000, and XP systems, use your printer installation utility for printer setup on a Microsoft Windows network. The utility supports printer setup for either peer-to-peer or client-server network operation.

## AppleTalk networks

Use the HP LaserJet Utility to set up the printer on an EtherTalk or LocalTalk network. For more information, refer to the *HP Jetdirect Print Server Administrator's Guide* included with printers equipped with the HP Jetdirect print server.

## LocalTalk configuration

The LocalTalk interface enables you to print directly from a stand-alone Apple Macintosh computer or from a Macintosh computer on a LocalTalk network. For specific information on configuring the computer and printer to print through a LocalTalk interface, refer to the printer's getting started guide and the *HP Jetdirect Print Server Administrator's Guide*.

---

**Note**

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For LocalTalk configuration, the DIN-8 printer cable must be connected to the printer port of the Macintosh computer.

## LocalTalk network configuration

To connect the printer to a Macintosh computer on a LocalTalk network, use the HP LocalTalk Cable Kit. You will need a kit for each printer and an additional kit for each Macintosh computer on the network.

## UNIX/Linux networks

Use the HP Jetdirect printer installer for UNIX utility to set up the printer on HP-UX or Sun Solaris networks.

For setup and management on UNIX or Linux networks, use HP Web Jetadmin.

To obtain HP software for UNIX/Linux networks, visit HP Customer Care online at [http://www.hp.com/support/net\\_printing](http://www.hp.com/support/net_printing). For other installation options supported by the HP Jetdirect print server, see the *HP Jetdirect Print Server Administrator's Guide* included with printers equipped with the HP Jetdirect print server.

# Printer drivers

The optimal way to control the printer is through settings in a software application or through the printer driver. Changing print settings via a software application affects only that particular print job. Most software applications allow you to choose print settings from menus within the application. Software application settings and printer driver settings override the settings on the printer control panel.

For best print quality, always select the paper or media type in the printer driver. Different media types use different printer settings. For example, selecting transparencies in the driver causes the printer to use a different color table, one designed for maximum print quality on transparencies. Additionally, transparencies cause the printer to adjust printer speed and fuser temperature.

Other media types affect the printer settings as well: Selecting heavy or glossy media, for example, causes the printer to change the engine speed.

The printer driver also gives you customized control of color text, graphics, and photos. Use the printer driver to set the following color control options:

- Print in Grayscale
- Halftone options
- Neutral Grays
- Edge Control
- RGB Color

See the printer driver's online Help for details on color settings and their effect on printed output.

## Available drivers

The following printer drivers are included with the printer.

**Table 3-1 Printer drivers**

Operating system <sup>1</sup>	PCL 5c	PCL 6	PS
Windows 95, 98, ME	X	X	X
Windows NT 4.0	X	X	X
Windows 2000	X	X	X
Windows XP	X	X	X
Macintosh OS			X

<sup>1</sup> Not all printer features are available from all drivers or operating systems. See the online Help in your driver for availability of features.

---

### Note

If your system did not automatically check the Internet for the latest drivers during software installation, download them from <http://www.hp.com/support/lj4600>. Once connected, select **Downloads and Drivers** to find the driver you wish to download.

## Additional drivers

The following drivers are not included on the CD-ROM, but are available from the Internet or from HP Customer Care.

- OS/2 PCL 5c/6 printer driver
- OS/2 PS printer driver
- Windows NT 3.51 PCL 5c, Windows NT 3.51 PS
- UNIX model scripts
- Linux drivers
- Windows 3.1x (HP LaserJet 4500 driver)

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**Note**

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The OS/2 drivers are available from IBM and are packaged with OS/2. They are not available for Traditional Chinese, Simplified Chinese, Korean, and Japanese.

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**Note**

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For more information about Windows 3.1x drivers, go to <http://www.hp.com/support/lj4600>.

## Network configuration

### Configuring the printer for the network

You can configure certain network parameters on the printer from the printer control panel or, for most networks, from the HP Web Jetadmin software (or the HP LaserJet Utility for Macintosh). The utilities are provided on the printing software CD-ROM that comes with the printer. You can also set these parameters from the HP Web Jetadmin software, which is available at <http://www.hp.com/go/webjetadmin>.

For a complete list of supported networks and for instructions on configuring network parameters from software such as HP Web Jetadmin, see the *HP Jetdirect Print Server Software Installation Guide*. The guide comes on the CD-ROM with printers in which an HP Jetdirect 610N print server is installed.

### Configuring Novell NetWare frame type parameters

The HP Jetdirect 610N print server automatically selects a NetWare frame type. Select a frame type manually only when the print server selects an incorrect frame type. To identify the frame type chosen by the HP Jetdirect 610N print server, print a configuration page.

## Setting network security on the printer

This printer features control panel locking, which allows network administrators to prevent users from changing certain printer control panel settings. When a menu is locked, unauthorized users trying to change settings in the printer control panel will receive the following message:

```
ACCESS DENIED
MENUS LOCKED
```

You can use HP Web Jetadmin software, the HP LaserJet Utility for Macintosh, or an ASCII escape sequence to perform this procedure. For instructions on locking the printer control panel using either the HP Web Jetadmin software or the HP LaserJet Utility for Macintosh, see the online Help for these utilities.

### Locking the control panel

You can prevent users from changing printer control panel settings by establishing a password and locking the printer control panel. You can choose from multiple levels of security. You can lock certain control panel menus, allowing users to change the rest of the menus, or you can lock all of the menus—and you can even lock the [CANCEL JOB](#) button.

### Levels of security

**Table 3-2 Printer security levels**

Lock setting	Control panel items locked
OFF	Service menu (locked with factory set PIN)
LOW	I/O submenu System setup submenu Resets submenu Service menu (locked with factory set PIN)
MEDIUM	Configure Device menu (including all submenus) Diagnostics menu Service menu (locked with factory set PIN)
HIGH	Information menu Paper Handling menu Configure Device menu (including all submenus) Diagnostics menu Service menu (locked with factory set PIN) <a href="#">CANCEL JOB</a> button

Use HP Web Jetadmin software, HP LaserJet Utility for Macintosh, or an ASCII escape sequence to set security. HP software, which comes on the software CD-ROM, is easier to use than an ASCII escape sequence. For instructions about locking the control panel by using either HP Web Jetadmin software or the HP LaserJet Utility for Macintosh, go to the online Help for that software.

## Using an ASCII PJI escape sequence to set network security

If you decide to use the ASCII escape sequence, you must use an MS-DOS® or Windows ASCII editor to create the commands. The commands must also be sent to the printer by using a DOS COPY command or an ASCII file download utility. The *PJI Technical Reference Manual* is located on CD-ROM, part number 5961-0976. Order a copy of this manual from the HP website: <http://www.hp.com>.

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### Note

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In the following examples, EC represents the escape character. For more information on using escape characters, see the *PJI Technical Reference Manual*.

- To lock or unlock the printer control panel if a password has not been set, send the following ASCII sequence to the printer:

```
EC%-12345X@PJI JOB
@PJI DEFAULT CPLOCK=NONE
      (or MINIMUM, MODERATE, or MAXIMUM)
@PJI EOJ
EC%-12345X
```

- To set the password, send the following ASCII sequence to the printer:

```
EC%-12345X@PJI JOB
@PJI DEFAULT PASSWORD=[numeric password (0 to 65535)]
@PJI EOJ
EC%-12345X
```

- To lock or unlock the control panel if the password has been set, send the following ASCII sequence to the printer:

```
EC%-12345X@PJI JOB PASSWORD=(numeric password)
@PJI DEFAULT CPLOCK=NONE
      (or MINIMUM, MODERATE, or MAXIMUM)
@PJI EOJ
EC%-12345X
```



# 4

# Printer maintenance

## Chapter contents

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# Cleaning the printer and accessories

Clean the outside surfaces with a water-dampened cloth. Observe the warning and caution below.

## WARNING!

Before you begin these steps, turn the printer off and unplug all power cords to avoid shock hazard.

Be careful when cleaning around the fuser area. It might be hot.

## CAUTION

To avoid permanent damage to the print cartridge, do not use ammonia-based cleaners on or around the printer.

If toner gets on your clothes, wipe it off with a dry cloth and wash your clothes in cold water. Hot water sets toner into fabric.

**Table 4-1 Cleaning the printer**

Component	Cleaning Method
Outside covers	Use an HP Toner Cleaning Cloth (part number 5090-3379) or a water-dampened cloth. Do not use solvents or ammonia-based cleaners.
Inside general	With a dry lint-free cloth, wipe any dust, spilled toner, and paper particles from the paper path area, the registration roller, and the print cartridge cavity.
ETB attaching roller	Clean with lint-free paper. If dirt cannot be removed, dampen the paper with alcohol.
Paper pickup rollers	Clean with lint-free paper. If dirt cannot be removed, dampen the paper with alcohol.
Color registration detection unit	Clean with lint-free paper. If dirt cannot be removed, dampen the paper with alcohol.

## Cleaning spilled toner

Defective print cartridges can develop leaks. Also, after a paper jam has occurred, some toner might remain on the rollers and guides inside the printer. The pages that print immediately after the jam can pick up this toner.

## CAUTION

When cleaning the printer, do not touch the ETB with the damp cloth or with your fingers.

## Vacuum specifications

Do not vacuum the printer or any spilled toner using a conventional vacuum. Toner particles used in this product might be too fine for effective vacuuming and could result in damage to conventional vacuums.

A vacuum specifically designed for cleaning toner can be used if it is capable of filtering fine particles (5 microns in diameter).

## Approximate replacement intervals for supply items

You can identify supply items by their labeling and their blue plastic handles. For instructions on installing supplies, see the installation guides supplied with each supply item.

The following table lists the approximate replacement intervals and part numbers for printer supply items and the control panel messages that prompt you when it is time to replace each item.

**Table 4-2** Approximate replacement intervals for supply items

Supply item	Printer message	Expected life	Approximate time period <sup>1</sup>	Part number
Black (K) print cartridge	REPLACE BLACK CARTRIDGE	9,000 pages <sup>2</sup>	2.7 months	6825A001CN (see Table 8-1)
Cyan (C) print cartridge	REPLACE CYAN CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	6824A0001CN (see Table 8-1)
Magenta (M) print cartridge	REPLACE MAGENTA CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	6823A001CN (see Table 8-1)
Yellow (Y) print cartridge	REPLACE YELLOW CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	6822A001CN (see Table 8-1)
Image Transfer kit (ETB)	REPLACE TRANSFER KIT	120,000 pages <sup>3</sup>	40 months	RG5-6484-000CN (see Table 8-1)
Image Fuser kit	REPLACE FUSER KIT	150,000 pages	50 months	RG5-6493-000CN (110V) RG5-6517-000CN (220V) (see Table 8-1)

1. Approximate lives are based on 3,000 pages per month.
2. The approximate average A4/Letter-size page count is based on 5 percent coverage of individual colors. Page counts are only estimations; usage conditions and print patterns cause results to vary.
3. Usage conditions and print patterns cause results to vary. See Figure 4-1 on page 74 for more information.

### CAUTION

Hewlett-Packard recommends the use of HP products in this printer. Use of non-HP products can cause problems that require service not covered by the Hewlett-Packard warranty or service agreements.

## ETB life under different circumstances

Depending on the printer workload, the customer will need to replace the ETB once or twice in the life of the printer. In order to help plan supplies purchases, the HP Color LaserJet 4600 printer calculates an estimated remaining number of pages that can be printed on the ETB and displays this on the Supplies Status page under Transfer Kit: HP Part Number: HP C9724A. You can view the Supplies Status page by printing it from the printer's control panel. If the printer is connected to the network, you can also view the page in your Web browser or through the HP Web Jetadmin software.

The number of pages an ETB can print is a function of two factors:

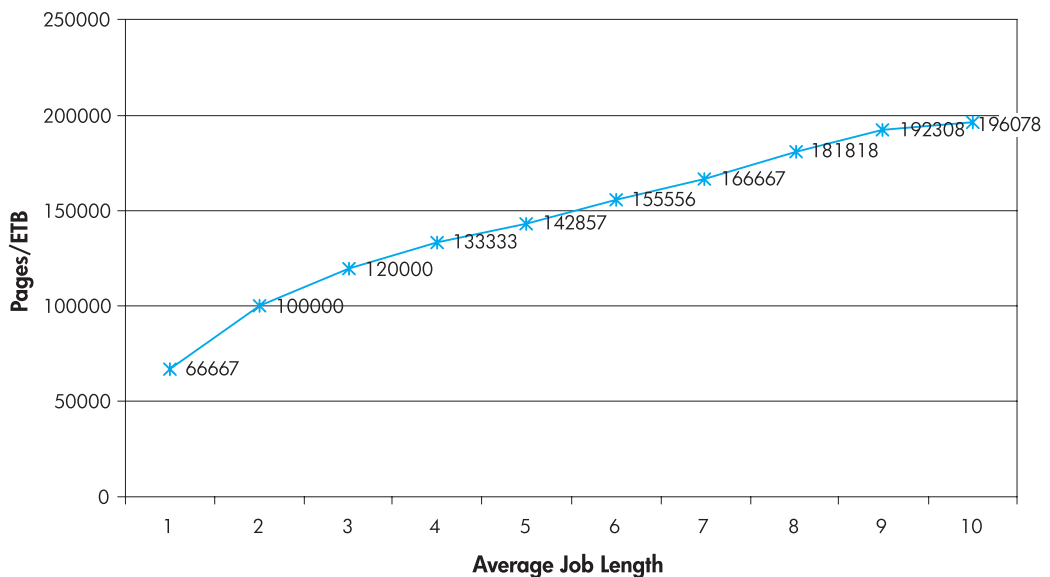
- the number of times the belt goes from a stationary to a rotating state (spins up)
- the number of pages printed on the belt

Unless print jobs are queued back to back, each print job will require the belt to spin up.

Think of the ETB as having a limited number of wear units. It has 200,000 wear units when it is new. Each time the belt spins up, it uses two wear units. Each time it prints a page, the belt uses one wear unit.

Since most print jobs are not queued, the average number of pages per job, or job length, is a factor in how fast the ETB will wear out. The shorter the average job, the faster the ETB will wear out.

Figure 4-1 shows how many pages an ETB will print, given various average job lengths.



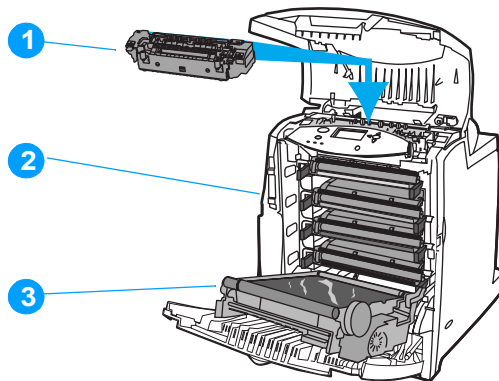
**Figure 4-1** ETB total page count according to average job length

The printer assumes an average print job length of three pages to estimate how many pages are remaining on the ETB. For an average job length of three pages, the ETB will print 120,000 pages.

If all print jobs are exactly three pages long, for each page printed the number of estimated pages remaining would decrease by one, beginning with the maximum 120,000 pages. If the job's length is less than three pages, the estimated pages remaining number decreases more quickly than the rate at which the number of pages actually printed increases. If the job's length is greater than three pages, the number of pages remaining decreases less quickly than the rate at which the actual number of pages printed increases.

## Locating supplies

Figure 4-2 illustrates the location of each supply item.



**Figure 4-2** Location of supplies

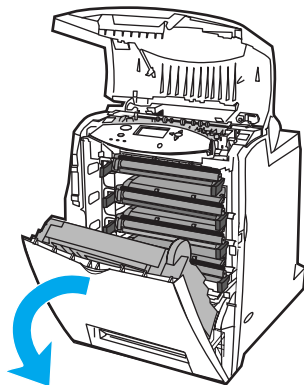
- 1 fuser
- 2 print cartridges
- 3 transfer unit (ETB)

# Replacing supply items

## Changing print cartridges

Replace a print cartridge when the printer control panel displays a REPLACE <COLOR> CARTRIDGE message. The control panel display will also indicate the color that should be replaced (unless a genuine HP cartridge is not currently installed).

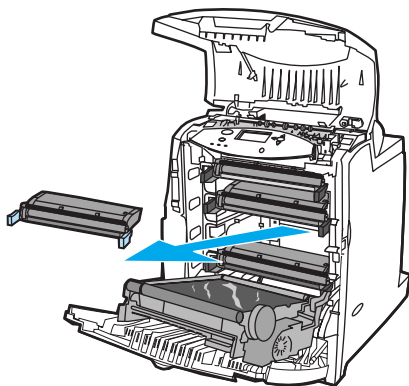
- 1 Open the top cover. Grasp the green handle on the transfer unit and pull down. The front cover will open as you pull down the transfer unit.



### CAUTION

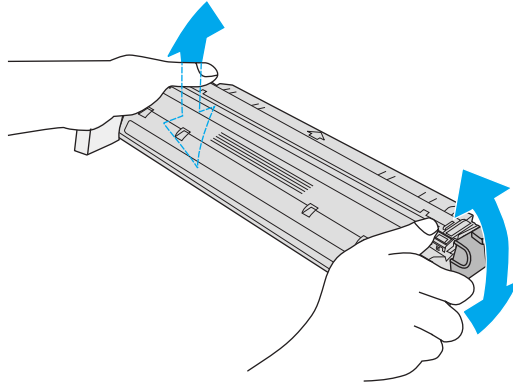
Do not place anything on the transfer unit while it is open. If the transfer unit is punctured, print quality problems may result.

- 2 Remove the used print cartridge from the printer.

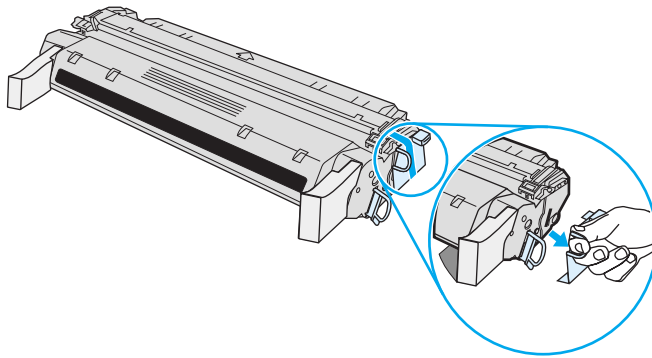


- 3 Remove the new print cartridge from the bag. Place the used print cartridge in the bag for recycling.

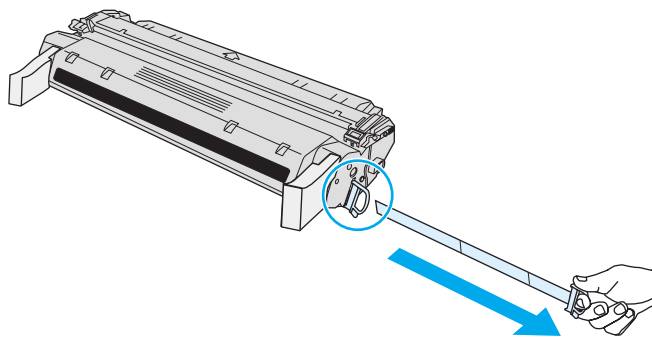
- 4 Grasp both sides of the cartridge and distribute the toner by gently rocking the cartridge from side to side.



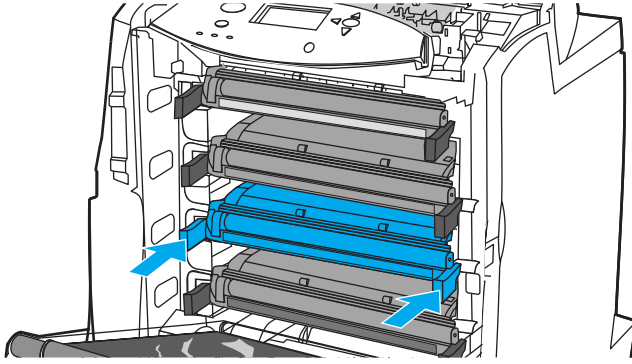
- 5 Remove the tape from the orange shipping lock. Remove and discard the orange shipping lock.



- 6 Remove the inside sealing tape by pulling the orange loop on the end and pulling the tape completely out. Discard the tape.



- 7 Grasp the blue handles on the sides of the print cartridge. Align the print cartridge with the tracks inside the printer and insert the cartridge until it is completely seated.



- 8 Installation is complete. Place the used print cartridge in the box in which the new cartridge arrived. See the enclosed recycling guide for recycling instructions.



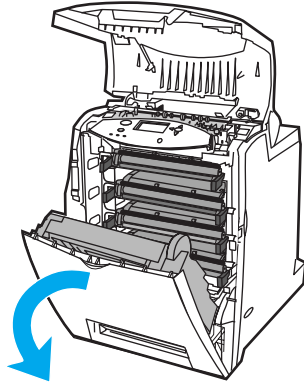
## Replacing the transfer unit

Replace the transfer unit when the printer control panel displays: REPLACE TRANSFER KIT.

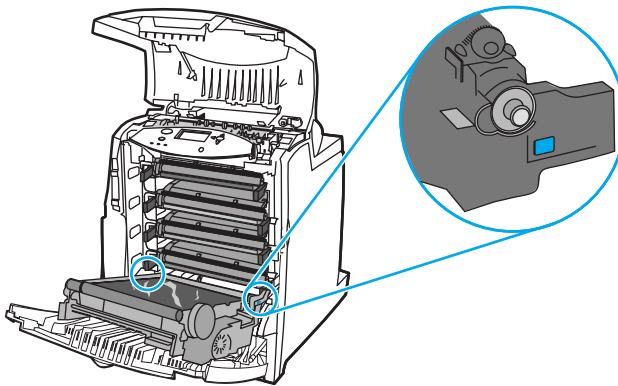
### Note

If you replace the transfer unit when it is not at the end of life, for instance if it is defective, you will need to calibrate the printer and reset the transfer unit count through the control panel. See page 81 for instructions.

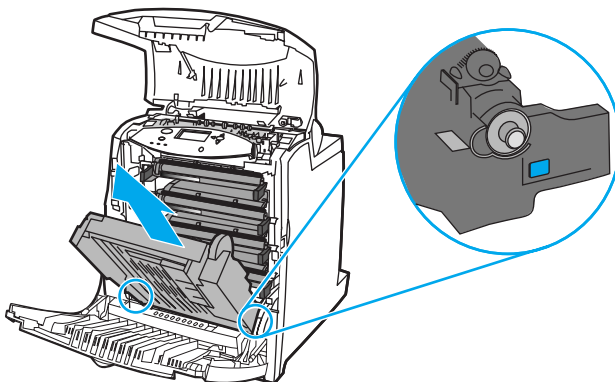
- 1 Turn the printer off.
- 2 Using the side handles, open the top cover.
- 3 Grasp the green handle on the transfer unit and pull down. The front cover will open as you pull down the transfer unit.



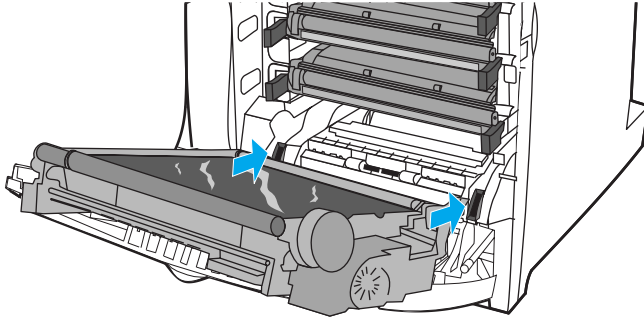
- 4 Locate the blue release buttons on either side of the transfer unit (near the bottom of the transfer unit).





- 5 Grasp the transfer unit with two hands. Simultaneously press in the blue buttons on either side of the transfer unit and slide the unit out of the printer.



- 6 Remove the new transfer unit from the bag. Place the used transfer unit in the bag for recycling. See the enclosed recycling guide for recycling instructions.
- 7 Hold the transfer unit on either side. Guide the feet into the cups and slide the transfer unit into the printer.










- 8 Close the transfer unit and front cover. Close the top cover and turn the printer on. After a short while, the control panel should display `NEW TRANSFER KIT=`.
- 9 Press  to highlight `YES`.
- 10 Press  to reset the transfer unit count.
- 11 Wait for the printer to calibrate.






## Replacing the transfer unit when it is not at end of life

If you replace the transfer unit when it is not at the end of life, for instance if it is defective, you will need to calibrate the printer and reset the transfer unit count through the control panel.

To calibrate the printer, do the following:

- 1 Press  to enter the MENUS.
- 2 Press  to highlight CONFIGURE DEVICE.
- 3 Press  to select CONFIGURE DEVICE.
- 4 Press  to highlight PRINT QUALITY.
- 5 Press  to select PRINT QUALITY.
- 6 Press  to highlight CALIBRATE NOW.
- 7 Press  to select CALIBRATE NOW.
- 8 Wait for the printer to calibrate.

To reset the transfer unit count, do the following:

- 1 Press  to enter the MENUS.
- 2 Press  to highlight CONFIGURE DEVICE.
- 3 Press  to select CONFIGURE DEVICE.
- 4 Press  to highlight RESETS.
- 5 Press  to select RESETS.
- 6 Press  to highlight RESET SUPPLIES.
- 7 Press  to select RESET SUPPLIES.
- 8 Press  to highlight NEW TRANSFER KIT.
- 9 Press  to select NEW TRANSFER KIT.
- 10 Press  to highlight YES.
- 11 Press  to reset the transfer unit count.

## Replacing the fuser

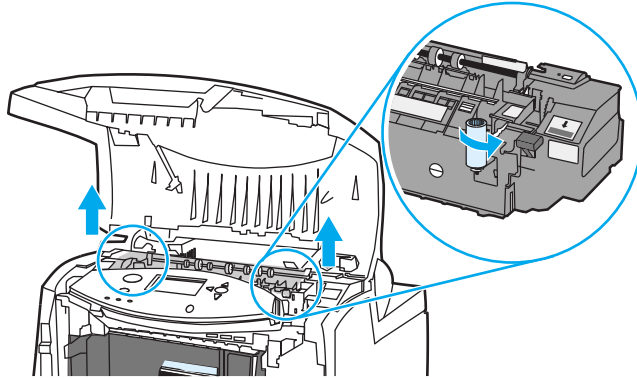
Replace the fuser when the printer control panel displays `REPLACE FUSER KIT`.

- 1 Turn the printer off.
- 2 Using the side handles, open the top cover.

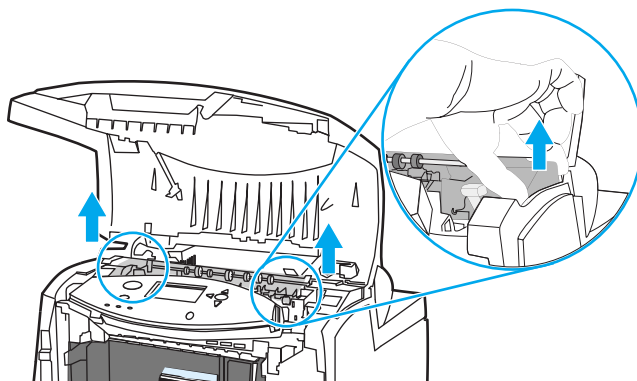
### **WARNING!**

The fuser might be hot. Wait 10 minutes before proceeding.

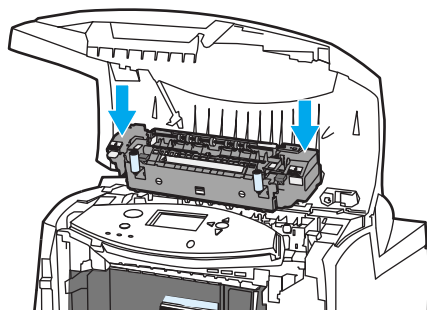
- 3 Completely loosen the blue thumb screws on either side of the fuser.



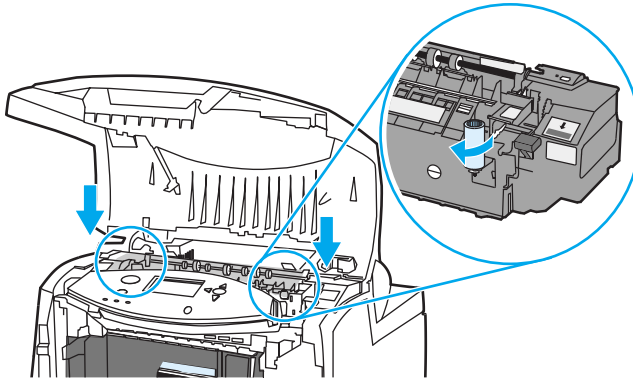
- 4 Grasp the ends and pull straight up to remove the fuser.





- 5 Remove the new fuser from the bag. Place the used fuser in the bag for recycling. See the enclosed recycling guide for recycling instructions.
- 6 Grasp the sides of the fuser and push down firmly into the printer.



- 7 Tighten the blue thumb screws.














- 8 Close the top cover, and turn the printer on. After a short while, the control panel should display `NEW FUSER KIT=`.
- 9 Press  to highlight `YES`.
- 10 Press  to reset the fuser count.

### Replacing the fuser when it is not at end of life

If you replace the fuser when it is not at the end of its life, for instance if it is defective, you will need to reset the fuser count through the control panel.

To reset the fuser count, do the following:

- 1 Press  to enter the `MENUS`.
- 2 Press  to highlight `CONFIGURE DEVICE`.
- 3 Press  to select `CONFIGURE DEVICE`.
- 4 Press  to highlight `RESETS`.
- 5 Press  to select `RESETS`.
- 6 Press  to highlight `RESET SUPPLIES`.
- 7 Press  to select `RESET SUPPLIES`.
- 8 Press  to highlight `NEW FUSER KIT`.
- 9 Press  to select `NEW FUSER KIT`.
- 10 Press  to highlight `YES`.
- 11 Press  to reset the fuser count.

## Printer memory

The printer has five dual in-line memory module (DIMM) slots.

---

### Note

For maximum flexibility in DIMM support, the formatter is designed with four 168-pin DIMM slots and a fifth 100-pin DIMM slot. Due to technical limitations, only four DIMMs can be loaded at a time, so the fifth DIMM slot (100-pin) is logically the same as the fourth DIMM slot (168-pin). The system can only have a DIMM installed on the fourth DIMM slot (168-pin) provided that no DIMM is installed in the fifth DIMM slot (100-pin) and vice versa.

Use these DIMM slots to upgrade the printer with:






- more printer memory - DIMMs are available in 64, 128, and 256 MB
- flash memory DIMMs - available in 4 MB; unlike standard printer memory, flash DIMMs can be used to permanently store downloaded items in the printer, even when the printer is off
- DIMM-based accessory fonts, macros, and patterns
- other DIMM-based printer languages and printer options

---

### Note

Single in-line memory modules (SIMMs) used on previous HP LaserJet printers are not compatible with the printer.

Before ordering additional memory, print a configuration page to see how much memory is currently installed.

- 1 Press  to enter the MENUS.
- 2 Press  to highlight INFORMATION.
- 3 Press  to select INFORMATION.
- 4 Press  to highlight PRINT CONFIGURATION.
- 5 Press  to select PRINT CONFIGURATION.

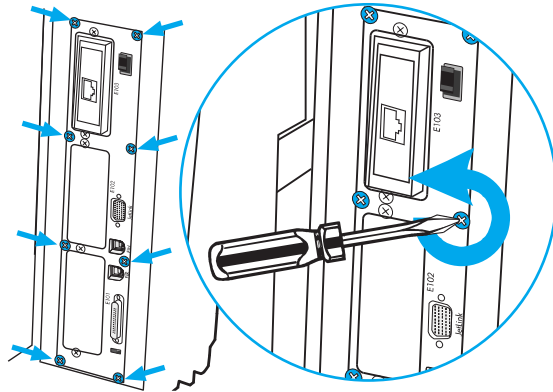
## Installing memory and font DIMMs

You can install more memory for the printer, and you can also install a font DIMM to allow the printer to print characters for languages such as Chinese or the Cyrillic alphabet.

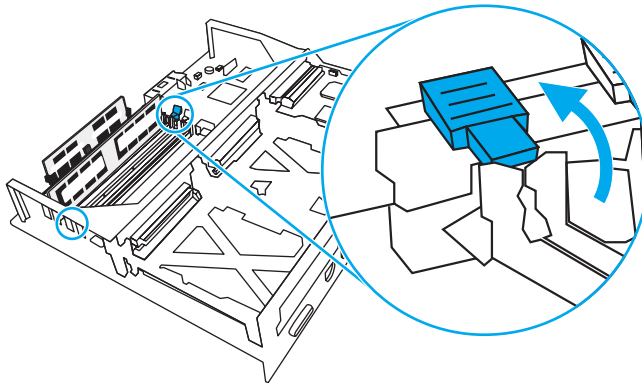
### CAUTION

Static electricity can damage DIMMs. When handling DIMMs, either wear an antistatic wrist strap, or frequently touch the surface of the DIMM antistatic package and then touch bare metal on the printer.

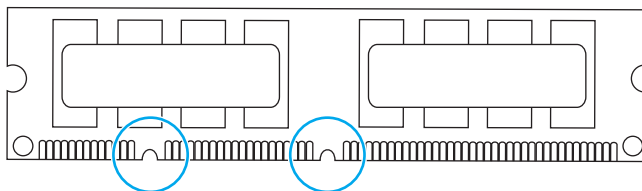
- 1 Turn the printer off, and disconnect all power and interface cables. Locate the formatter board in the rear of the printer.
- 2 Remove the eight screws holding the board in place, and set them aside.



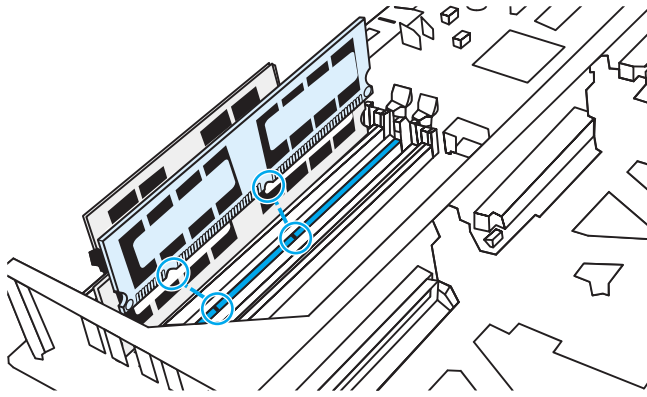
- 3 Slide out the formatter board and set it on a clean, flat, grounded surface.
- 4 Release the locks on each side of the DIMM slot.



- 5 Remove the DIMM from the antistatic package. Locate the alignment notches on the bottom edge of the DIMM.



- 6 Holding the DIMM by the edges, align the notches on the DIMM with the bars in the DIMM slot.

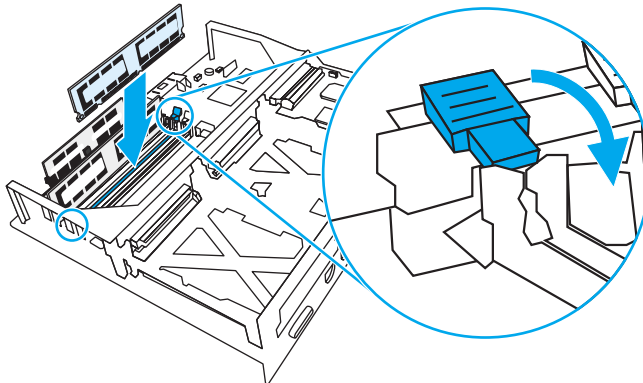


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**Note**

If you have difficulty inserting the DIMM or closing the latches, make sure the notches on the bottom of the DIMM are aligned with the bars in the slot. If the DIMM still does not go in, make sure you are using the correct type of DIMM.

- 7 Firmly press the DIMM straight into the slot. Close the locks on each side of the DIMM until they snap into place.



- 8 Align the formatter board in the tracks at the top and bottom of the slot, and slide the board back into the printer. Replace and tighten the eight screws removed in step 2.
- 9 Reconnect the power cable and interface cables, and turn the printer on.



## Enabling memory

If you installed a memory DIMM, set the printer driver to recognize the newly added memory.

- 1 On the **Start** menu, point to **Settings**, and click **Printers** or **Printers and Faxes**.
- 2 Select this printer and select **Properties**.
- 3 On the **Configure** tab, click **More**.
- 4 In the **Total Memory** field, type or select the total amount of memory that is now installed.
- 5 Click **OK**.

## Enabling the language font DIMM

If you installed a language font DIMM in the printer, you must select the Font DIMM option in the printer driver for the font DIMM to work properly. To enable fonts from the PCL 5c and PCL 6 printer drivers for Windows, follow this procedure:

- 1 On the **Start** menu, point to **Settings**, and click **Printers**.
- 2 Select this printer and select **Properties**.
- 3 On the **Configure** tab, click **More**.
- 4 Select the **Font DIMM** check box.
- 5 In the **Configure Font DIMMs** dialog box, click **Add** to add the font file.
- 6 In the **Add Font DIMM** dialog box, browse to the location of the font file, select the font file, and click **OK**.
- 7 In the **Configure Font DIMMs** dialog box, select the installed DIMM.
- 8 Click **OK**.

## Checking DIMM installation

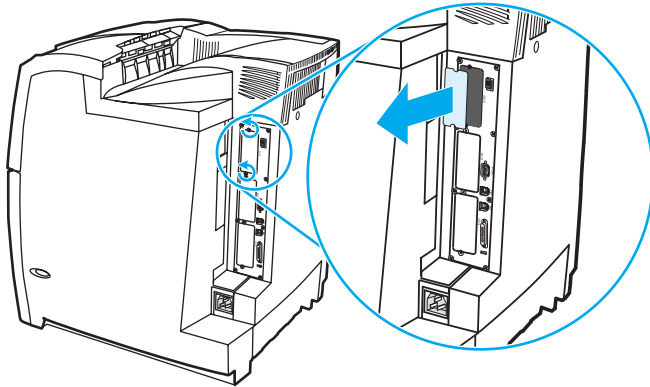
Check that the DIMMs are installed correctly and working.

- 1 Turn the printer on. Check that the Ready light is on after the printer has gone through the startup sequence. If an error message appears, a DIMM may have been incorrectly installed.
- 2 Print a configuration page.
- 3 Check the Installed Personalities and Options section on the configuration page and compare it with the configuration page printed before the DIMM installation.
- 4 If the amount of recognized memory has not increased:
  - The DIMM may not be installed correctly. Repeat the installation procedure.
  - The DIMM may be defective. Try a new DIMM.

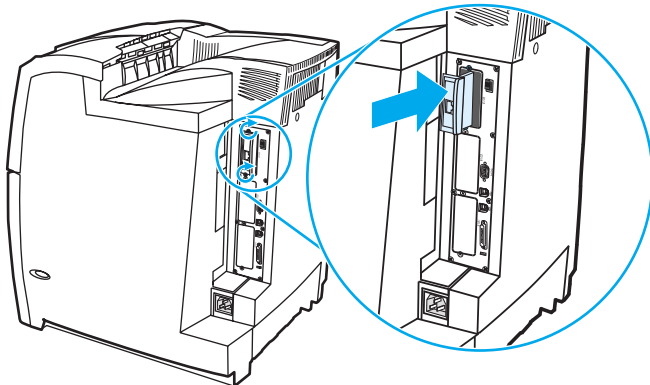
## Installing an HP Jetdirect print server card

You can install an HP Jetdirect print server card in the base model printer, which comes with an open EIO slot.

- 1 Turn the printer off, and disconnect all power and interface cables.
- 2 Locate an empty EIO slot. Loosen and remove the two retaining screws holding the cover for the EIO slot onto the printer, and then remove the cover. You will not need these screws and cover again.



- 3 Firmly insert the HP Jetdirect print server card into the EIO slot. Insert and tighten the retaining screws that came with the print server card.



- 4 Connect the network cable. Reconnect the power cable, and turn the printer on.
- 5 Print a configuration page. In addition to a printer configuration page, an HP Jetdirect configuration page that contains network configuration and status information should also print.

If it does not print, uninstall and reinstall the print server card to ensure that it is completely seated in the slot.

- 6 Perform one of these steps:
  - Choose the correct port. See the computer or operating system documentation for instructions.
  - Reinstall the software, choosing the *network* installation this time.

# 5

# Theory of operation

## Chapter contents

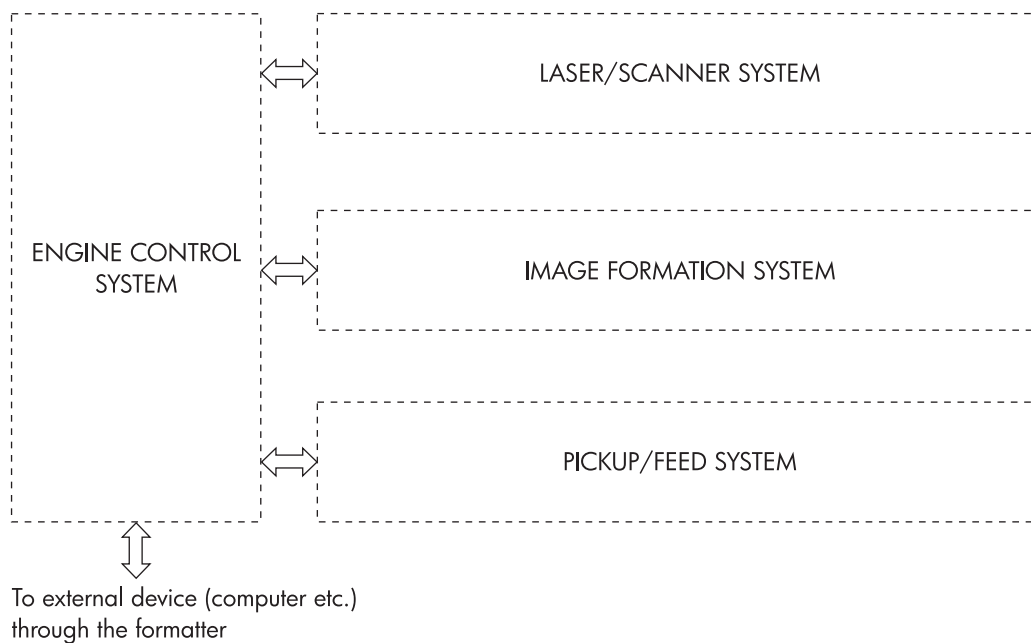
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## Basic operation

The HP Color LaserJet 4600 series printer's functions are divided into four systems:

- engine control system
- laser/scanner system
- image formation system
- pickup/feed system

This chapter describes each of these systems thoroughly.



**Figure 5-1** Basic system operation

## Operation sequence

A microcomputer in the engine control system controls the operation sequence for the printer. Table 5-1 describes the main operational periods from the point when the printer is turned on until a print operation is completed and each motor stops rotating.

### Note

In the table below, "ETB" stands for "electrostatic transfer/transport belt." This component is described later in this chapter, as are the other components mentioned in the table.

**Table 5-1 Basic operation sequence**

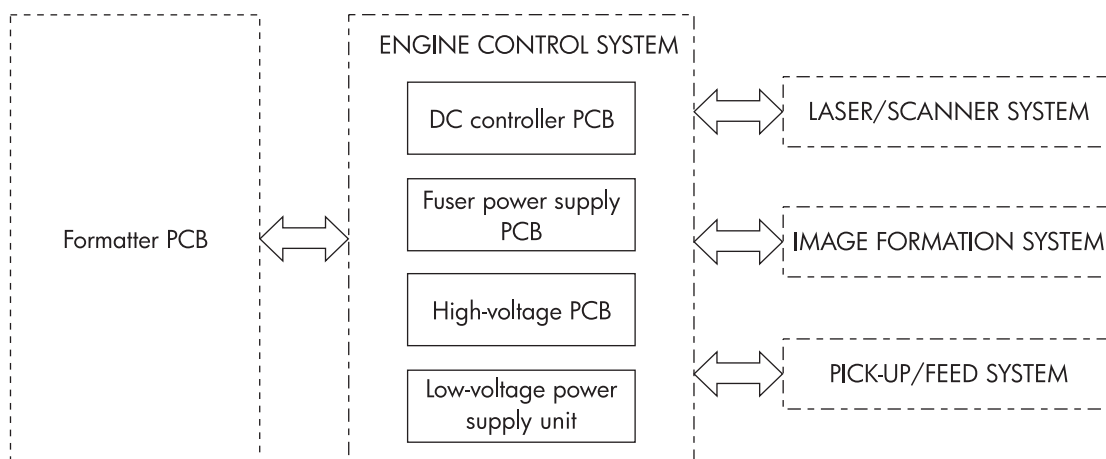
Period		Purpose	Remark
WAIT (wait period)	From the time the power switch is turned on until the ETB cleaning is completed.	To clear a potential on the drum surface and to clean the ETB.	During this period, the printer checks the toner level and detects whether the cartridges are present. The printer also executes the pulse width modulation adjustment, color registration adjustment, and image density calibration control as required.
STBY (standby period)	From the end of the WAIT or LSTR period or last rotation until the formatter inputs a print command or until the power is turned off.	To keep the printer ready to print.	When the formatter sends a sleep command, the printer enters PowerSave mode.
INTR (initial rotations period)	From immediately after the formatter inputs a print command until the /TOP signal is sent to the formatter.	To stabilize the photosensitive drum's sensitivity in preparation for a print operation.	
PRINT (print period)	From the end of the INTR period until the leading edge detection sensor detects paper and then turns off the transfer positive bias.	To form an image on the photosensitive drum according to the video signal input from the formatter and to transfer the toner image to the paper.	After the power is turned on, the cartridge is cleaned every 35 pages and the ETB is cleaned every 100 pages.
LSTR (last rotations period)	From the end of the PRINT period until the ETB motor stops.	To deliver the paper out of the printer and to clean the ETB.	The last rotations period lasts until the instant the formatter sends a print command. Then the initial rotations period starts again.

## Engine control system

The engine control system is the brain of the printer. It controls all the other systems according to commands from the formatter. The engine control system consists of the following:

- DC controller PCB
- fuser power supply PCB
- high-voltage PCB
- low-voltage power supply unit
- formatter

Each of these components is described in the following sections.



**Figure 5-2** Engine control system

---

### Note

In this manual, the abbreviation "PCB" stands for "printed circuit board assembly." Components described as a PCB may consist of a single circuit board or a circuit board plus other parts, such as cables and sensors.

---

## DC controller circuit

The DC controller is responsible for controlling the print operation sequence for the printer. The sequence of events is as follows:

- 1 Power is turned on.
- 2 The low-voltage power supply unit supplies DC power to the DC controller.
- 3 The CPU in the DC controller starts to control printer operations.
- 4 The printer enters the standby state.
- 5 Based on the print command and the image data input from the formatter, the CPU sends a signal to drive the laser diode, the motors, and the solenoids.

### Note

See the general circuit diagram on page 307 for detailed information on the printer circuitry.

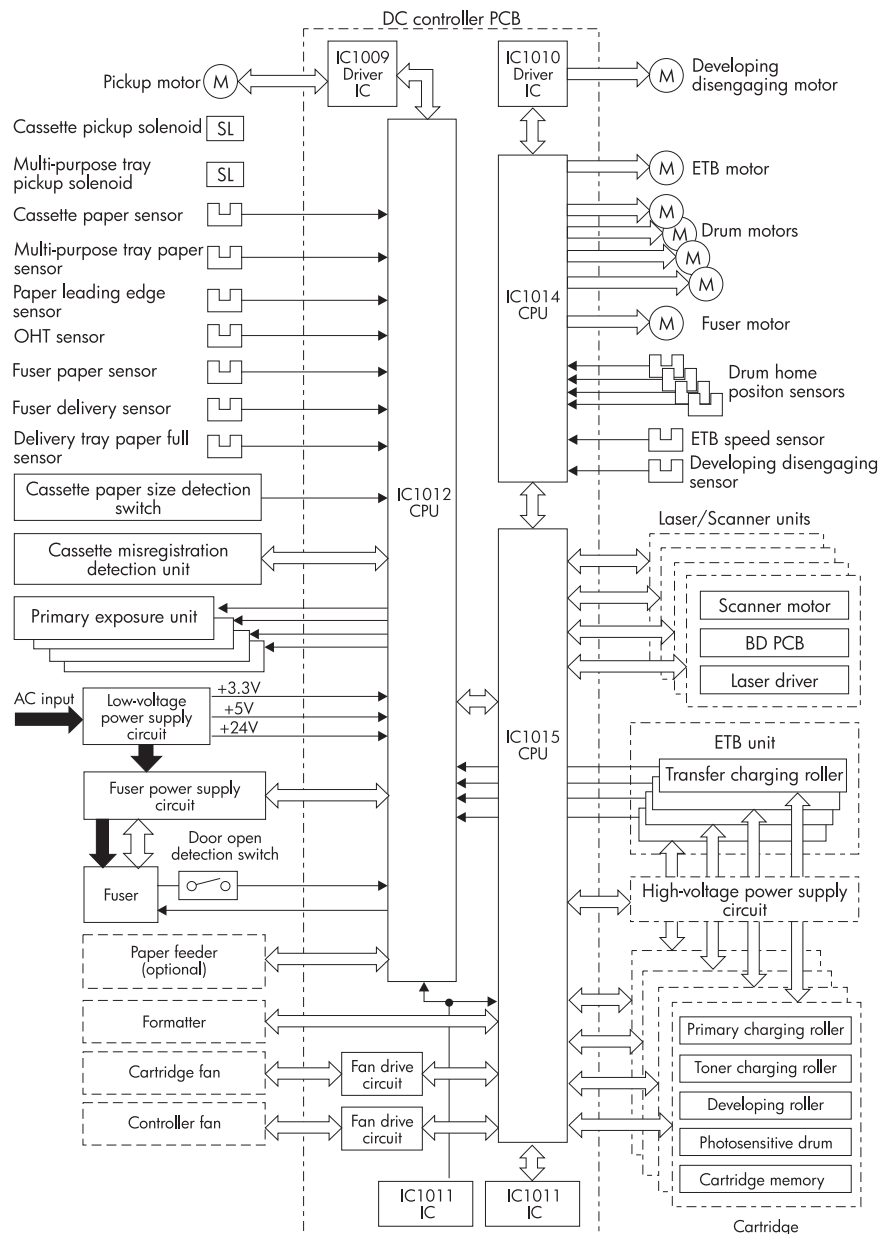


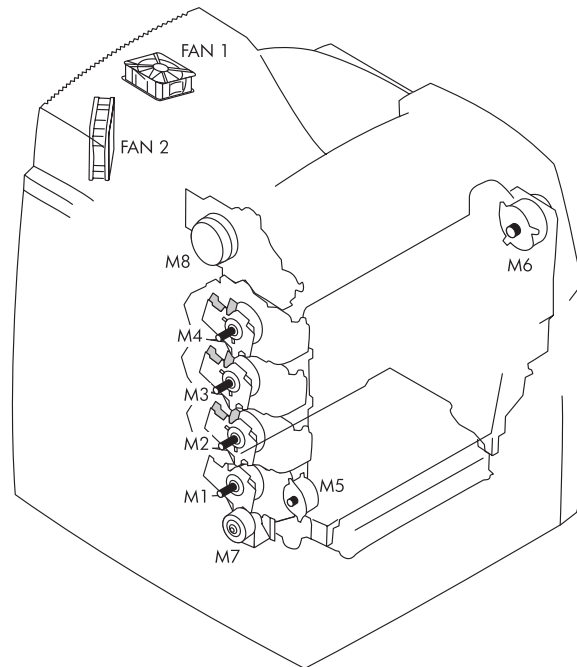
Figure 5-3 DC controller circuit

## Motors and fans

The printer has ten motors and two fans. Eight of the motors are DC motors; the other two are stepping motors. Figure 5-4 shows the locations of the motors and fans. Table 5-2 explains the function of each component.

One of the stepping motors and six of the eight DC motors are used for paper feeding and image formation. The remaining stepping motor is the developing disengaging motor. The remaining two DC motors are fan motors.

Since the printer transfers an image in four colors in line onto the paper, small changes in the rotational speed of the motor are likely to cause color misalignment. The DC motors used for image formation are precisely controlled to account for rotational speed fluctuation.



**Figure 5-4** Motors and fans

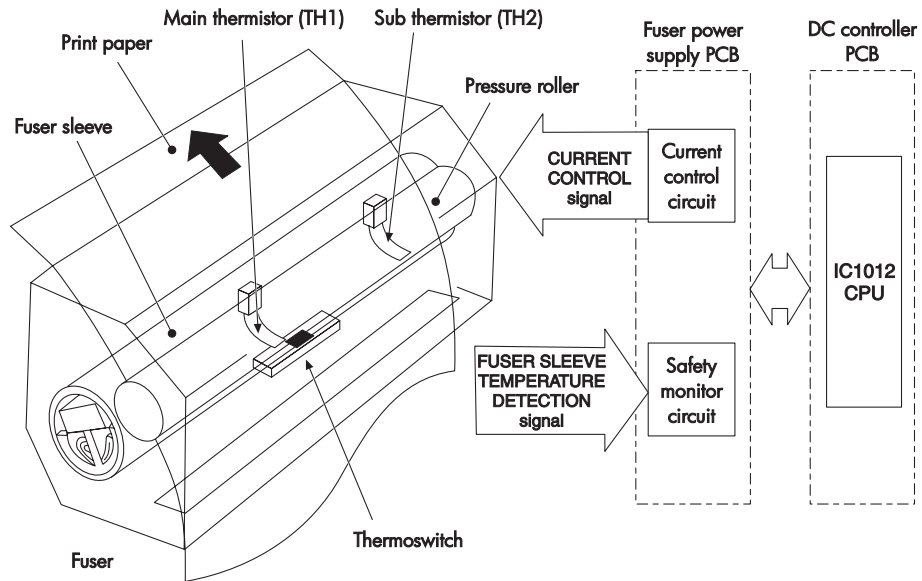


**Table 5-2 Function of motors and fans**

<b>Name</b>	<b>Function</b>	<b>Type</b>	<b>Speed switching</b>
<b>M1</b> Cyan cartridge motor	Drives the photosensitive drum	DC motor	4-speed (full, 1/2, 1/3, 1/4)
<b>M2</b> Yellow cartridge motor			
<b>M3</b> Magenta cartridge motor			
<b>M4</b> Black cartridge motor			
<b>M5</b> Pickup motor	Drives the pickup roller and feed roller	Stepping motor	4-speed (full, 1/2, 1/3, 1/4)
<b>M6</b> ETB motor	Drives the ETB	DC motor	4-speed (full, 1/2, 1/3, 1/4)
<b>M7</b> Developing disengaging motor	Separates the photosensitive drums and the developing cylinders	Stepping motor	No
<b>M8</b> Fuser motor	Drives the pressure roller and delivery roller	DC motor	4-speed (full, 1/2, 1/3, 1/4)
<b>FAN1</b> Formatter fan	Exhausts heat around the formatter and low-voltage power supply unit	DC motor	2-speed (full during printing, 1/2 during standby)
<b>FAN2</b> Cartridge fan	Exhausts heat around the fuser and cartridges	DC motor	No (full speed during printing only)

## Fuser power supply circuit

This printer uses an induction heating method to heat the fuser. Figure 5-5 shows the configuration of the fuser power supply.



**Figure 5-5** Fuser power supply circuit

The fuser power supply has three main components:

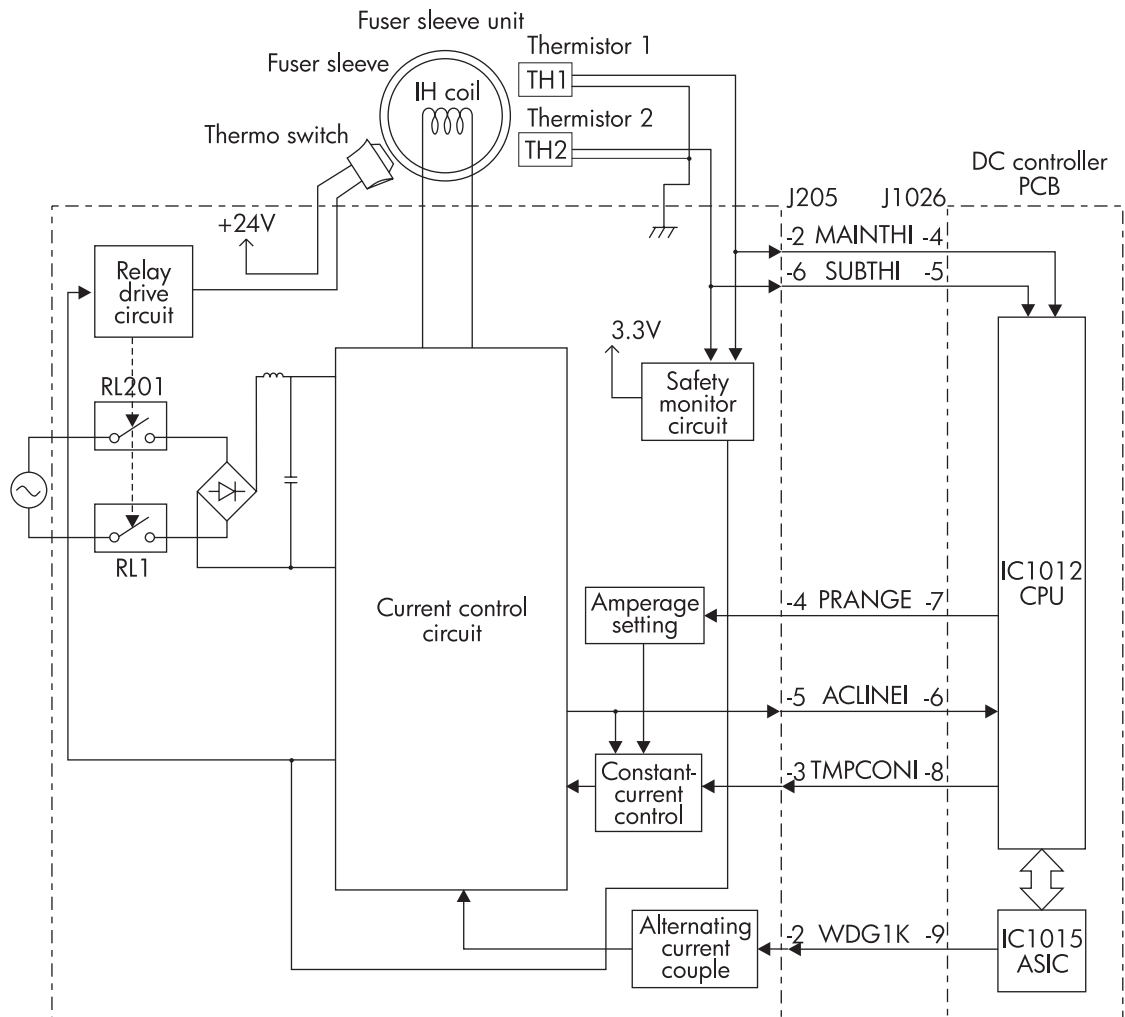
- **Fuser sleeve.** A high-frequency current flows through an induction heating coil in the fuser sleeve, causing the metal sleeve to heat.
- **Thermistors.** Two thermistors are in the fuser sleeve: one in the center, and the other at the end. Each thermistor monitors the temperature in the fuser sleeve.
- **Thermoswitch.** The thermoswitch is located at the bottom center of the fuser sleeve. When the fuser is overheating, the switch opens, and power to the induction heating coil is shut off.

**Table 5-3** Fuser temperatures

Media	Temperature	Engine speed
plain	~ 190° C (374° F)	full speed
overhead transparencies	~ 172° C (342° F) color ~ 185° C (365° F) monochrome	1/4 speed 1/2 speed
thick	~ 185° C (365° F)	1/2 speed
gloss	~ 167° C (333° F)	1/3 speed
envelopes	~ 190° C (374° F)	full speed

## Heater temperature control

The heater temperature control detects the surface temperature of the fuser sleeve and controls the current flowing to the induction heating coil. The heater temperature control circuit is shown in Figure 5-6.



**Figure 5-6** Heater temperature control circuit

The two thermistors that are attached to the fuser sleeve (TH1 and TH2) detect the surface temperature of the fuser sleeve. The main thermistor (TH1) controls the fuser temperature, and the sub thermistor (TH2) detects overheating at the end of the fuser sleeve. When the surface temperature of the fuser sleeve increases, resistance of the two thermistors is reduced, and the voltage of the main thermistor detection signal (MAINTH1) and the sub thermistor detection signal (SUBTH1) drops.

The CPU (IC1012) on the DC controller monitors the voltage of the MAINTH1 and SUBTH1 signals. The CPU sends the fuser temperature control signal (TMPCON) according to the voltage level.

The CPU sends the amperage control signal (PRANGE) to control the amperage of the fuser sleeve.

## High-voltage power supply

The high-voltage power supply circuit applies bias to the primary charging rollers, the toner charging rollers, the developing cylinders, the attaching roller, and the transfer charging rollers. Figure 5-7 shows the high-voltage power supply circuit.

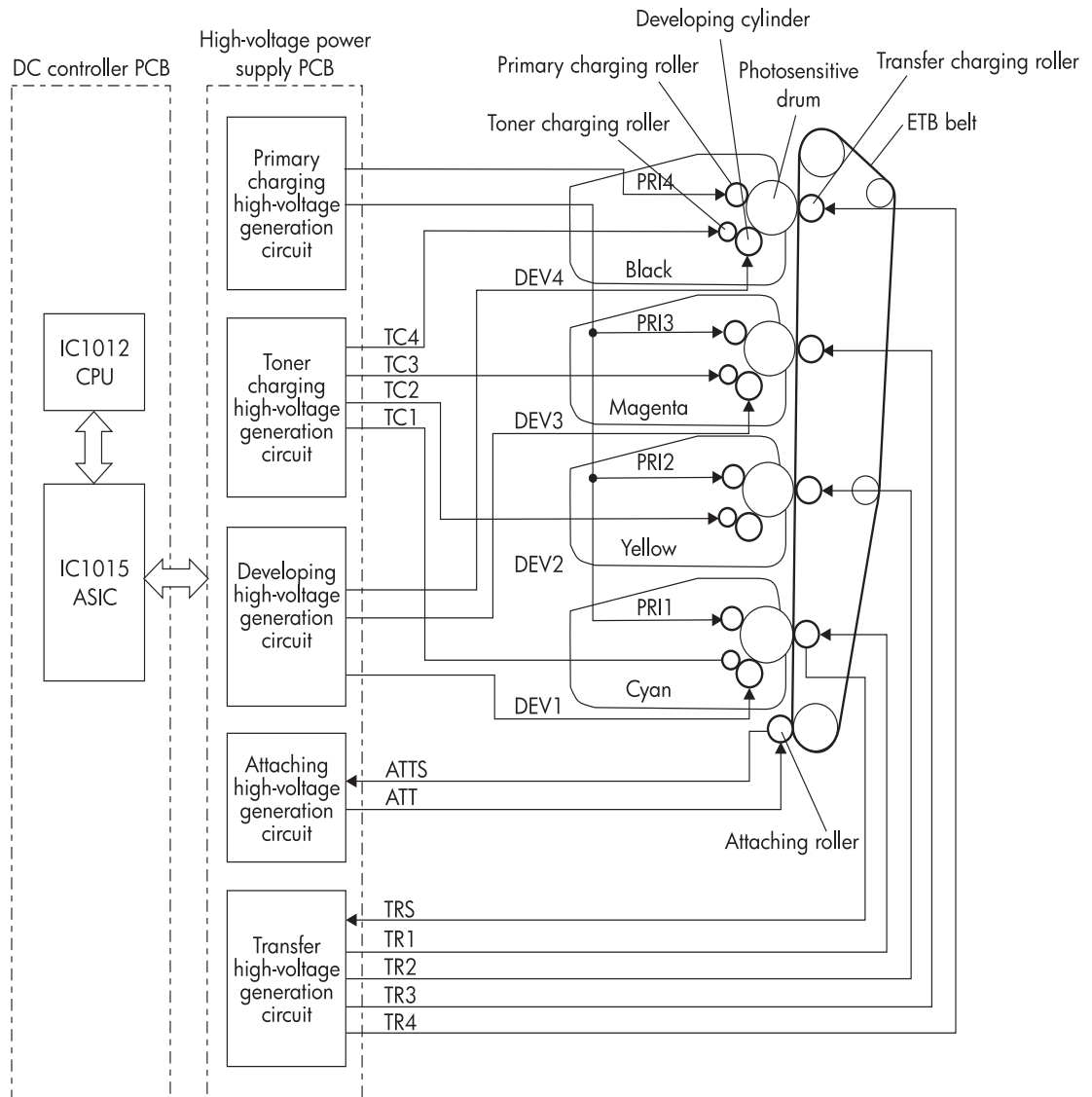


Figure 5-7 High-voltage power supply circuit

## Low-voltage power supply

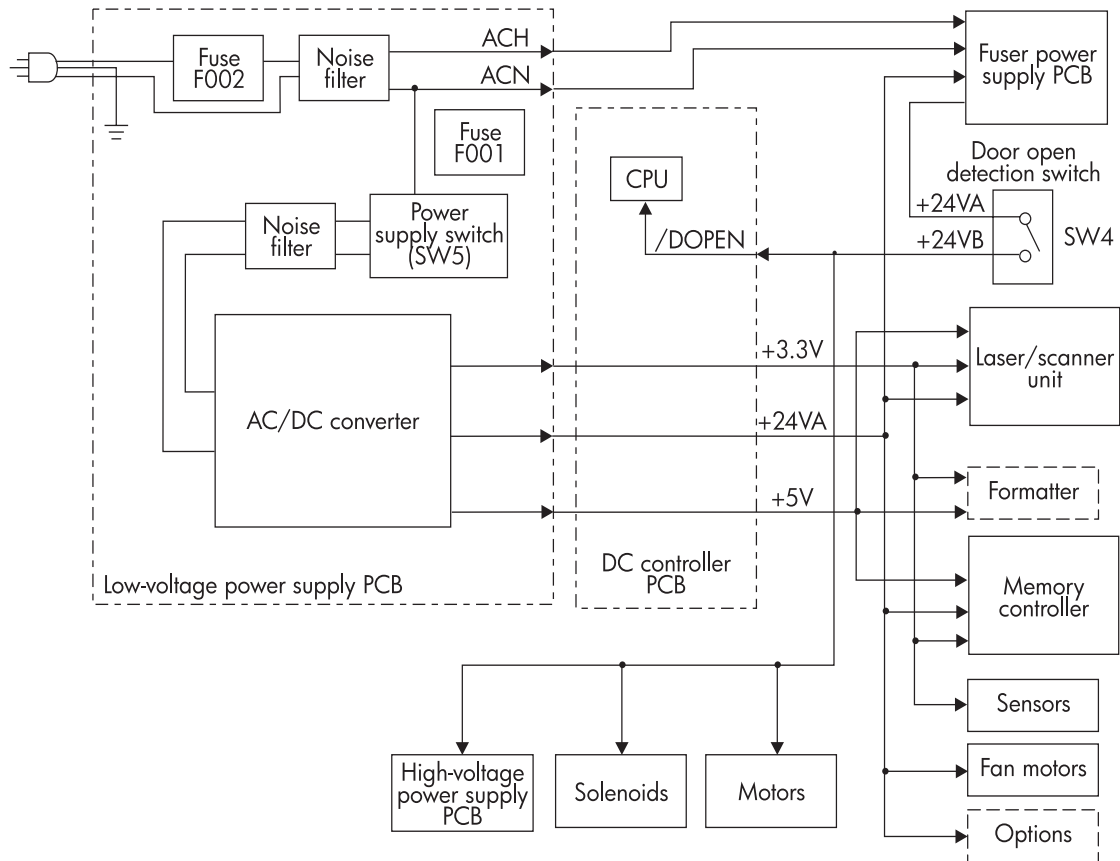
The low-voltage power supply circuit converts the AC voltage that is input from the electrical outlet to DC power and delivers it to each load in the printer. Figure 5-8 shows the low-voltage power supply circuit including the amount of voltage supplied to each component.

The AC power is supplied to the low-voltage power supply by turning on the power supply switch (SW5). The AC power is converted to the DC power that the printer requires:

- +24 V goes to the motors, solenoids, clutches, and the high-voltage power supply circuit.
- +5 V goes to the laser driver PCB, the beam detect PCB, and the formatter.
- +3.3 V goes to the formatter, the sensors, and the ICs in the DC controller PCB.

+24 V is divided into +24 VA, which is constantly sent from the low-voltage power supply circuit, and +24 VB, which stops power supply when the top cover or the front cover is opened. +24 VB goes to the fuser power supply circuit, high-voltage power supply circuit, and the motors and solenoids.

+24 VB also functions as the door open detection signal (/DOPEN). The CPU detects the door open with the signal.



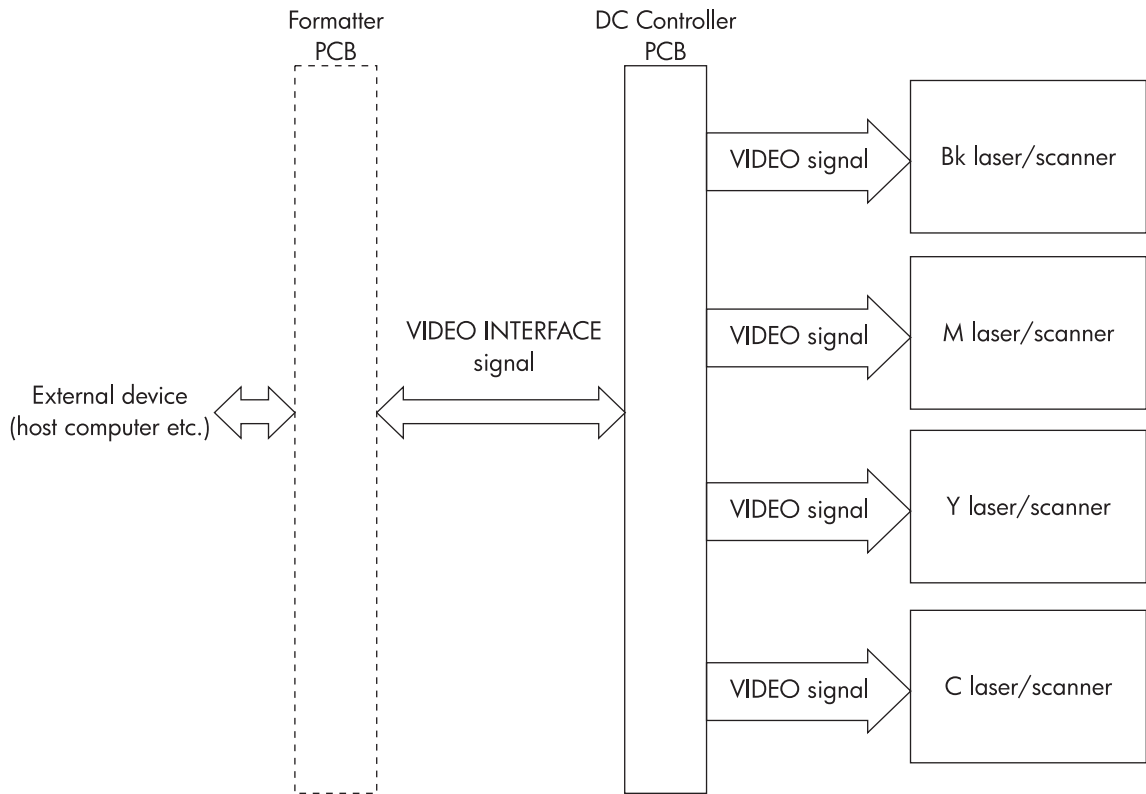
**Figure 5-8** Low-voltage power supply circuit

## Formatter system

The formatter PCB is responsible for the following:

- receiving and processing print data from the various printer interfaces
- monitoring control panel inputs and relaying printer status information (through the control panel and the bidirectional I/O)
- developing and coordinating data placement and timing with the print engine
- storing font information
- communicating with the host computer through the bidirectional interface
- controlling the PowerSave mode

The formatter monitors the printer continuously through the video interface. When the printer is ready to print, the formatter sends a signal to the DC controller, which turns the laser on or off based on the signal. Figure 5-9 shows the formatter system.



**Figure 5-9** Formatter system

## PowerSave

This feature conserves power after the printer has been idle for an adjustable length of time. Set the time length in the Configure Device menu, under System Setup. When the printer is in PowerSave mode, the control panel backlight is turned off, but the printer retains all printer settings, downloadable fonts, and macros. The default setting is POWERSAVE= ON, with a 30-minute idle time. You can turn PowerSave off in the Configure Device menu, under Resets.

The printer exits PowerSave mode and enters the warm-up cycle when any of the following occurs:

- A print job, valid data, or a PML or PJP command is received at the parallel port, serial port, FIR port, or EIO card.
- A control panel button is pressed.
- The top cover is opened.
- A paper tray is opened.
- The engine test button is pressed.

---

### Note

Printer error messages override the PowerSave message. The printer enters PowerSave mode at the appropriate time, but the error message continues to appear.

## Input/Output

### Parallel interface

The formatter receives incoming data through its bidirectional interface (IEEE-1284). The I/O provides high-speed and two-way communication between the printer and the host, allowing the user to change printer settings and monitor printer status from the host computer. The user can configure the HIGH SPEED item in the control panel menu. (This item is found in the CONFIGURE DEVICE menu, under I/O menu, and PARALLEL INPUT.) The default setting, YES, allows the I/O to run at the higher speeds supported by most newer computers. When set to NO, the parallel interface runs at the slower mode that is compatible with older computers. The user can also configure the ADVANCED FUNCTIONS item. The default setting, ON, allows for two-way parallel communications. The OFF mode disables the advanced functionality. The I/O is compatible with the bidirectional parallel interface standard.

### Expanded I/O

The optional HP Fast InfraRed receiver enables wireless printing from any iRDA-compliant portable device (such as a laptop computer) to the printer.

The printing connection is maintained by positioning the sending infrared port within operating range. The connection can be blocked by objects such as a hand or paper, or by direct sunlight or any bright light shining into either infrared port.

### Flash

Optional flash is available in 4 MB flash memory DIMMs for storing forms, fonts, and signatures.

### Hard-disk accessory



The optional hard-disk accessory can be mounted in one of the EIO slots on the rear of the formatter. The optional EIO-based hard disk is used for creating multiple original prints (mopies) and storing forms, fonts, and signatures.

### CPU

The HP LaserJet 4600 series printer formatter incorporates a 400 MHz RISC processor.

## Printer memory

If the printer encounters difficulty managing available memory, a clearable warning message will appear on the control panel.

Some printer messages are affected by the auto-continue and clearable warning settings from the Configure Device menu, under System Setup. If CLEARABLE WARNING = JOB is set on the control panel, warning messages appear on the control panel until the end of the job from which they were generated. If CLEARABLE WARNING = ON is set, warning messages appear on the control panel until  is pressed. If an error occurs that prevents printing and AUTO CONTINUE = OFF is set, the message appears until  is pressed.

## Read-only memory

Besides storing microprocessor control programs, the read-only memory (ROM) stores dot patterns of internal character sets (fonts).

## Random-access memory

The random-access memory (RAM) contains the page, I/O buffers, and the font storage area. It stores printing and font information received from the host system, and can also serve to temporarily store a full page of print-image data before the data is sent to the print engine. Memory capacity can be increased by adding DIMMs to the formatter. Note that adding memory (DIMMs) might also increase the print speed for complex graphics.

## DIMM slots

The DIMM slots can be used to add memory, fonts, or firmware upgrades.

## Firmware DIMM

To upgrade printer firmware, insert a new firmware DIMM in the slot marked J1. See page 85 for more information.

## Nonvolatile memory

The printer uses nonvolatile memory (NVRAM) to store I/O and information about the print environment's configuration. The contents of NVRAM are retained when the printer is turned off or disconnected.

## PJL overview

Printer job language (PJL) is an integral part of configuration, in addition to the standard printer command language (PCL). With standard cabling, PJL allows the printer to perform functions such as:

- Two-way communication with the host computer through a bidirectional parallel connection. The printer can tell the host about such things as the control panel settings, and it allows the control panel settings to be changed from the host.
- Dynamic I/O switching allows the printer to be configured with a host on each I/O. The printer can receive data from more than one I/O simultaneously, until the I/O buffer is full. This can occur even when the printer is offline.
- Context-sensitive switching allows the printer to automatically recognize the personality (PS or PCL) of each job and configure itself to serve that personality.
- Isolation of print environment settings from one print job to the next. For example, if a print job is sent to the printer in landscape mode, the subsequent print jobs print in landscape only if they are formatted for landscape printing.



## **PML**

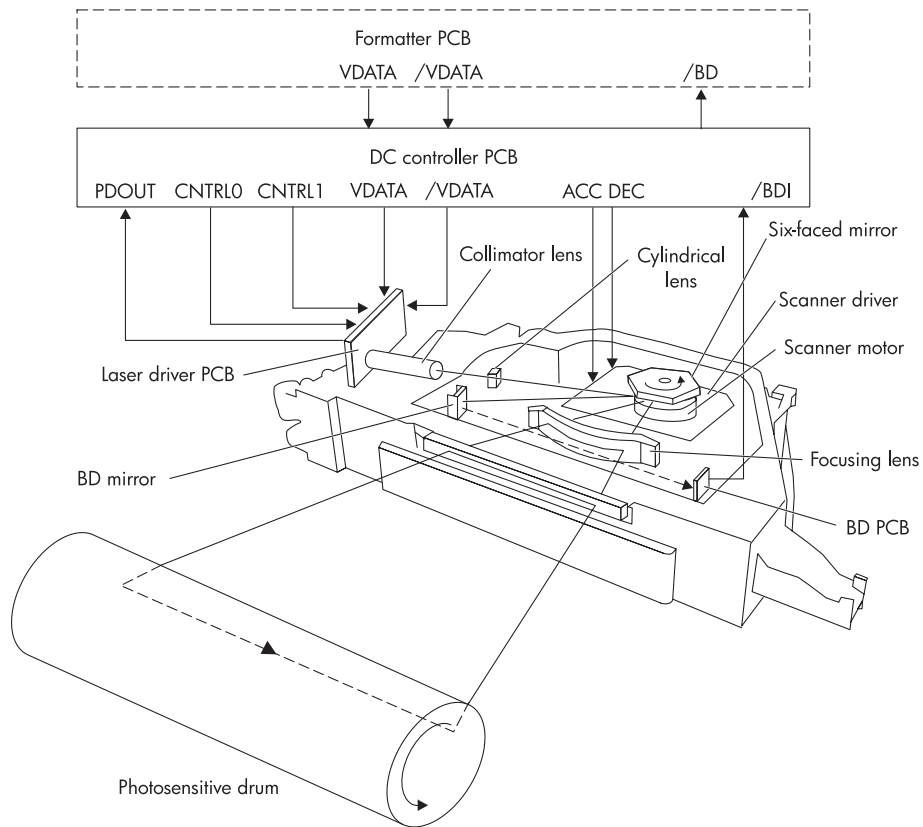
The printer management language (PML) allows remote configuration and status readback through the I/O ports.

## **Control panel**

The formatter sends and receives printer status and command data to and from a control panel board.

## Laser/scanner system

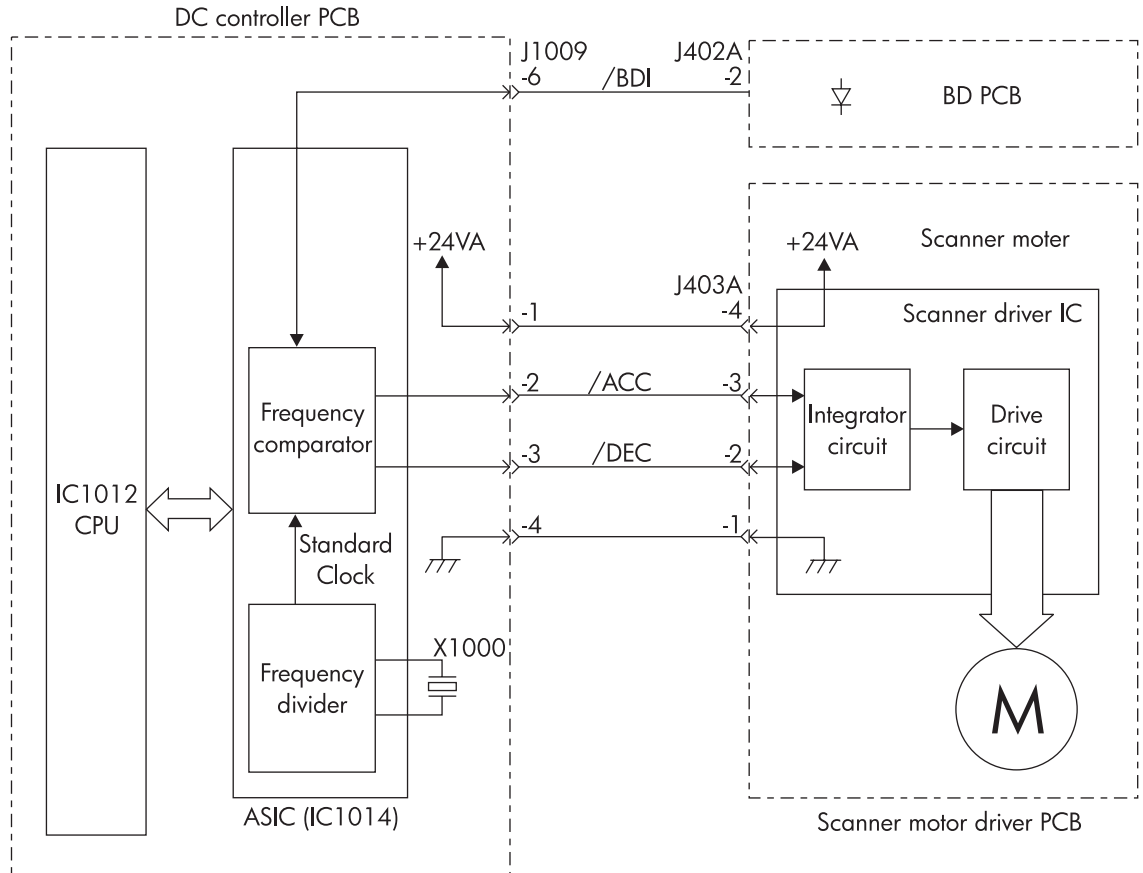
The laser/scanner system receives a signal from the formatter and forms a latent image on the photosensitive drum in the print cartridge. The printer has a separate laser/scanner unit for each color. Each of these has the same structure, which is shown in Figure 5-10.



**Figure 5-10** Laser/scanner system

## Scanner motor control

The scanner motor control rotates the scanner motor in order to place the laser beam at the proper position on the photosensitive drum. Figure 5-11 shows the circuit diagram for the scanner motor control.

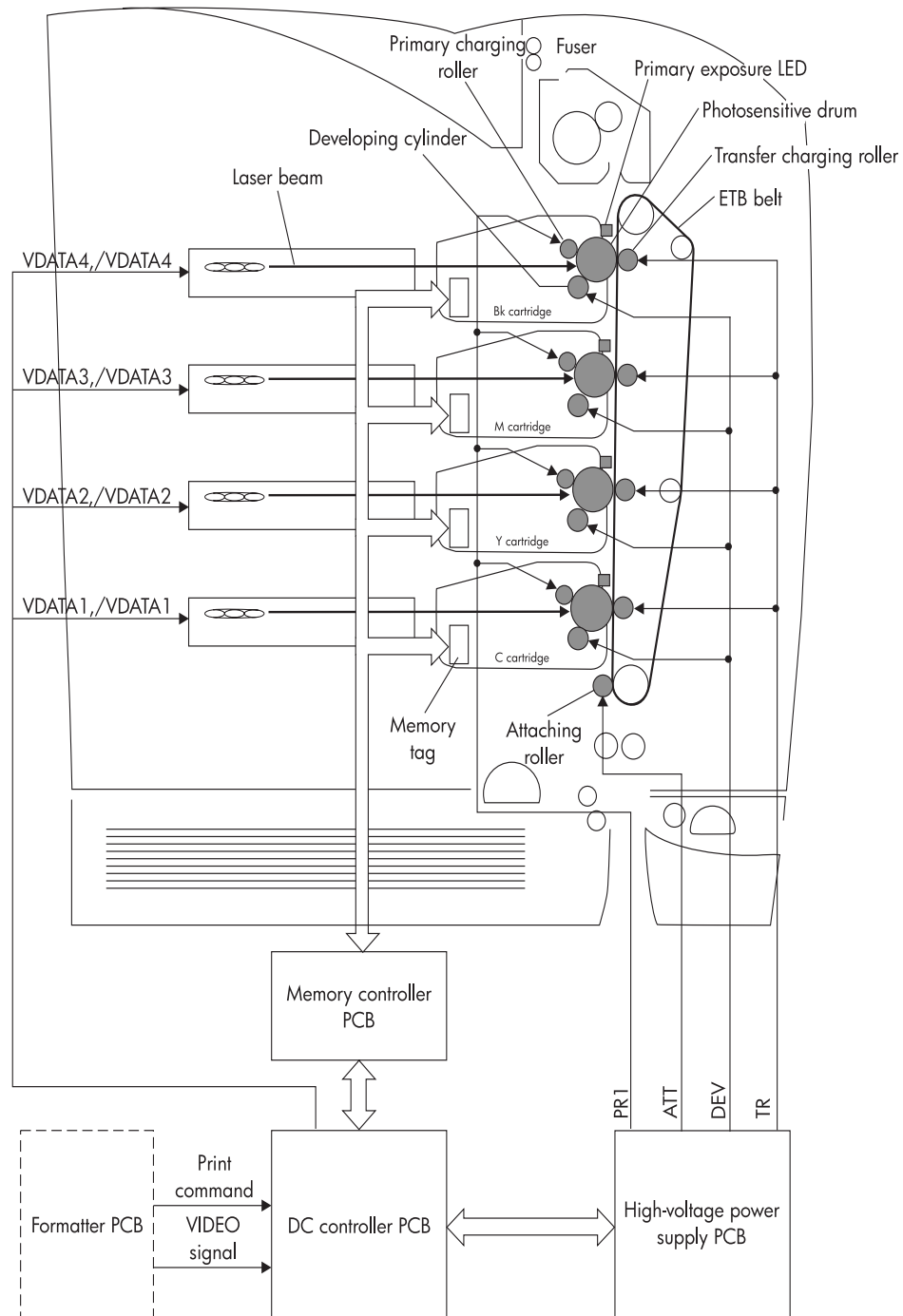


**Figure 5-11** Scanner motor control circuit

## Image formation system

The image formation system is the central hub of the printer. Figure 5-12 shows the image formation system. During image formation, an image of colored toner is formed and then fused onto the paper. The image formation system consists of the following physical components:

- four laser/scanners
- four print cartridges
- ETB
- fuser



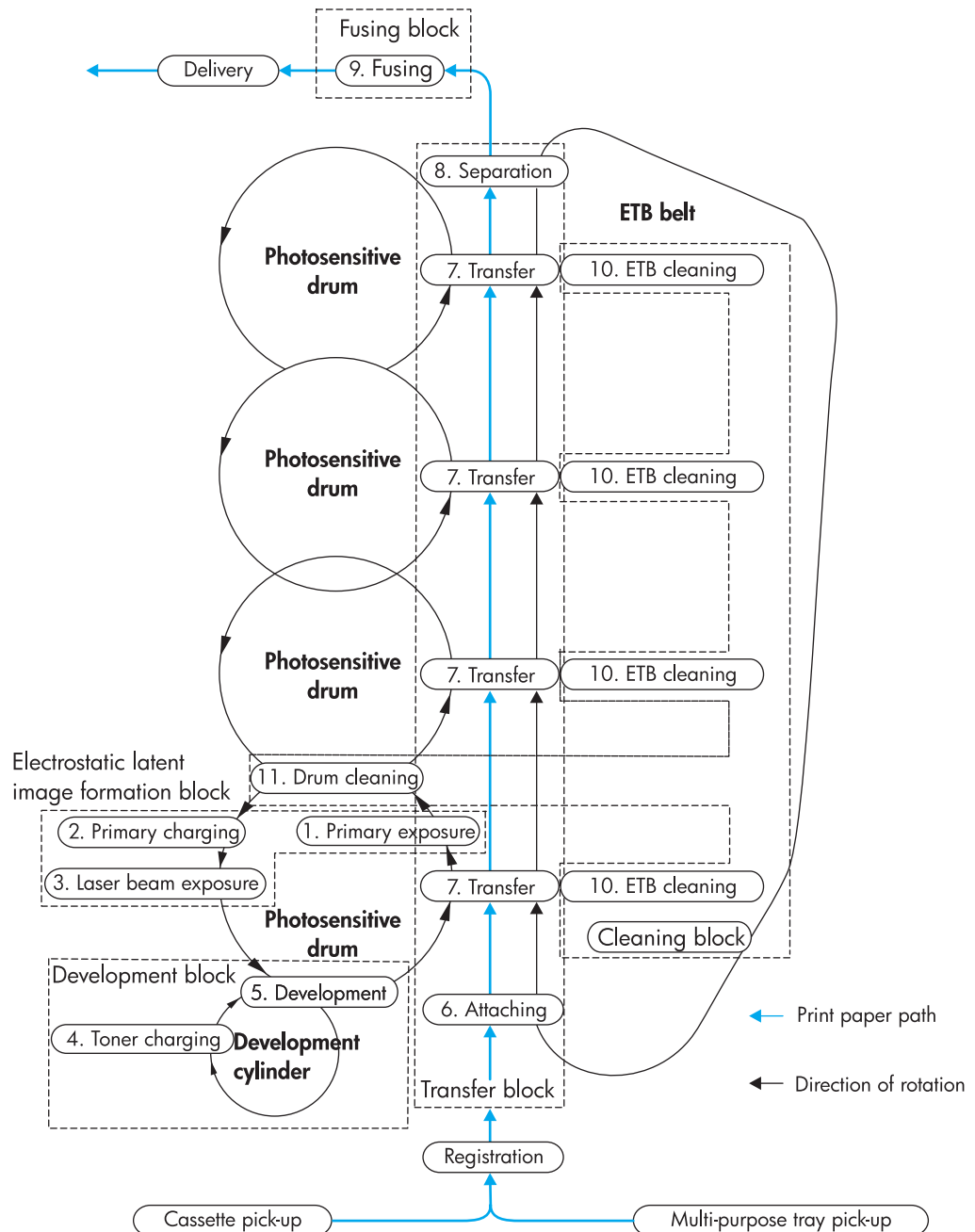
**Figure 5-12** Image formation system

## Image formation process

The image formation process consists of eleven steps divided among five functional blocks:

- electrostatic latent image formation block
- developing block
- transfer block
- fusing block
- cleaning block

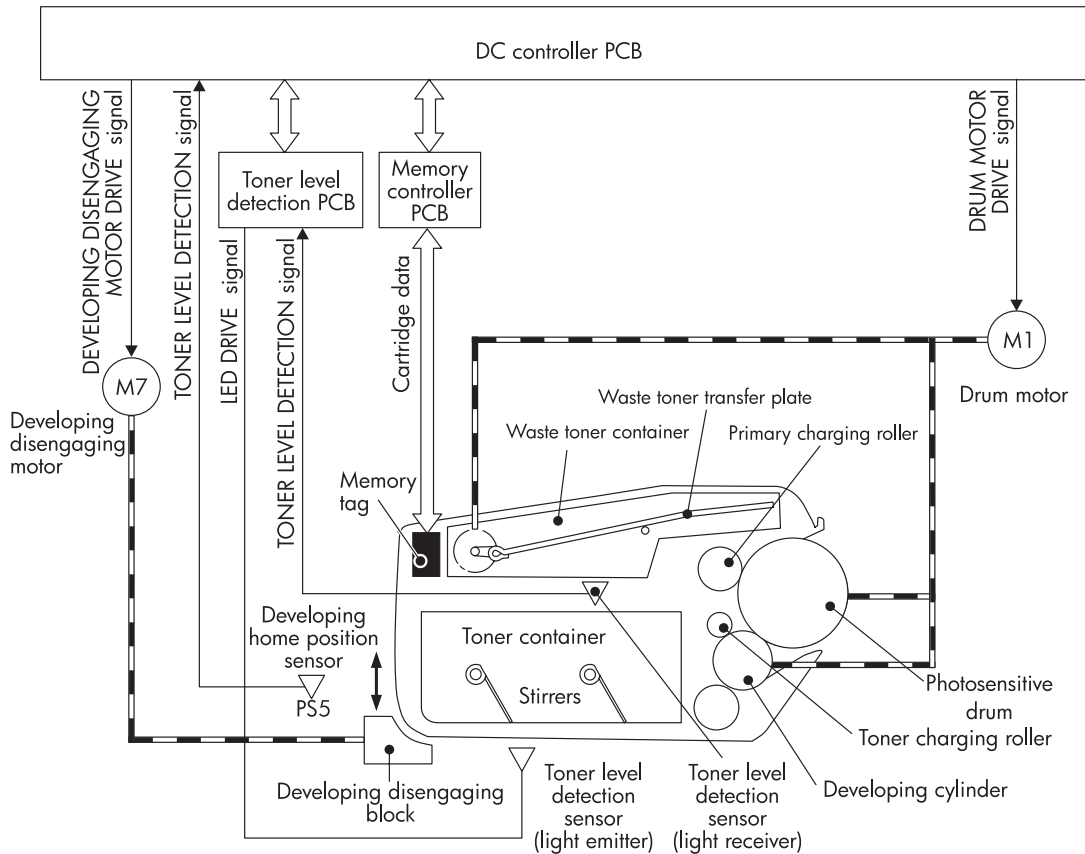
Figure 5-13 illustrates the process. The next sections describe the print cartridges and the ETB in detail, followed by a description of each functional block. The image formation steps are numbered consecutively through the blocks.



**Figure 5-13** Image formation process

## Print cartridges

The printer has four different print cartridges, one for each color. However, they share the same structure, shown in Figure 5-14.



**Figure 5-14** Print cartridge

The physical components inside the print cartridge are the following:

- photosensitive drum
- primary charging roller
- developing cylinder
- toner charging roller
- stirrers
- waste toner transfer plate

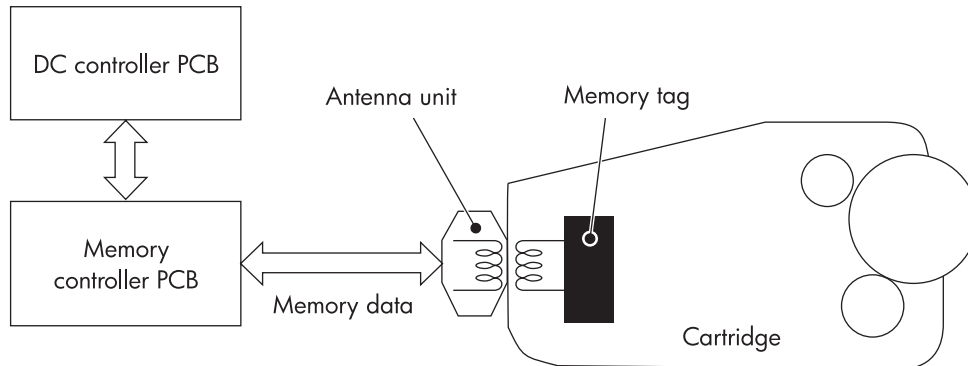
The photosensitive drum's rotation drives the primary charging roller. All other components are driven by the drum motor.

The developing disengaging motor drives the developing disengaging block, which causes the developing cylinder to engage with or disengage from the photosensitive drum.

The DC controller uses an LED and a photo diode to monitor the level of toner inside the cartridge. It stores this information on a memory tag built into each cartridge.

## Memory tag

The memory tag is an EEPROM built into the print cartridge. It stores information about the amount of toner in the cartridge and estimates the remaining life. Figure 5-15 describes how the memory tag operates.



**Figure 5-15** Memory tag

The DC controller reads information from the memory tag whenever the printer is turned on, whenever the top cover is closed, and whenever it receives a READ command from the formatter.

The DC controller writes information to the memory tag at specified times during a print operation and whenever it receives a WRITE command from the formatter.

If the DC controller is unable to either read to or write from the memory tag four times in a row, the DC controller alerts the formatter of a memory tag abnormality.

## Toner level detection

The printer monitors print cartridge life in several ways to ensure continued high print quality:

- The number of developer rotations measures the usefulness (charge) of the toner.
- The toner sensor monitors remaining toner, and informs the user of "low" or "out" conditions.
- The number of photosensitive drum rotations measures the life of the photosensitive drum, which degrades slightly with each rotation.

The cartridge life represented on the supplies status page and in the gauges on the control panel is a combination of all three of these components. The lowest remaining percent is the number reported to the customer. However, information about which of these components is low or out is not reported.

During the life of a print cartridge, the customer receives three different control panel messages:

- **OK.** The cartridge has between 15 and 100 percent life remaining.
- **Order cartridge.** The cartridge has 15 percent life remaining. In typical printing situations, this represents about 2 weeks of use.
- **Replace cartridge.** One of the three components listed above has reached its end of life. The printer stops, and printing cannot continue until the cartridge is replaced.

## Developer rotations

The developer rollers rotations are tracked on the print cartridge's memory tag (e-label). Tracking rotations enables the printer to signal that a print cartridge is low or out before the developer and/or toner is actually worn out, which would result in print quality defects.

Over time, the toner loses its required properties due to excessive stirring and re-charging. Although the cartridge will correctly signal LOW or OUT because of wear, some toner might remain in the fresh toner hopper.

In addition to toner wear, the developer roller experiences wear during its life, so developer life tracking is necessary. In situations where low-coverage documents are printed frequently, the developer rotations might cause a LOW message before the toner level reaches its low level.

## Toner sensor

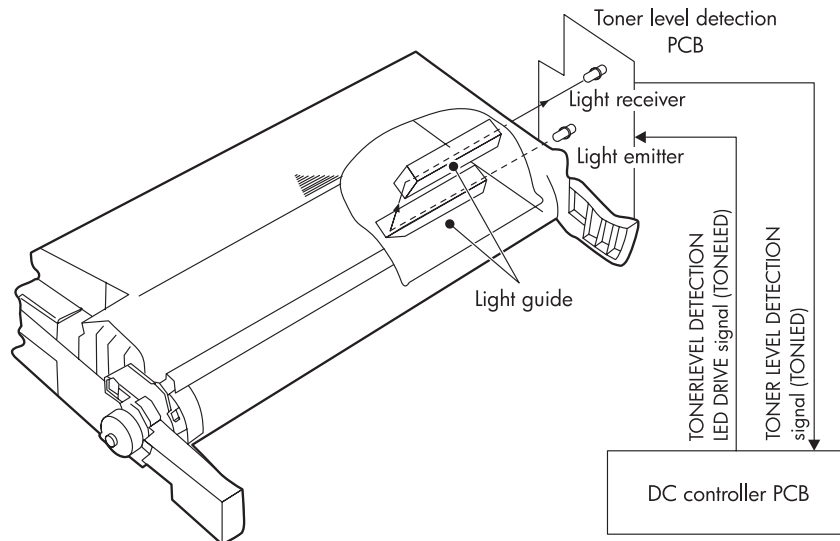
For the first 75 percent of the cartridge life, toner depletion within the cartridge is calculated by pixel counting. An optical toner level sensor then tracks the final 25 percent of toner. The toner is measured and then reported on the toner gas gauge on the control panel or on the supplies status page. The transition from pixel counting to optical toner-level sensing causes no fluctuations on the toner gas gauge. Some toner might remain in the fresh toner hopper due to other cartridge components reaching their end of life.

## Photosensitive drum rotations

Photosensitive drum rotations are also tracked on the cartridge's memory tag. Similar to the developer roller, tracking these rotations enables the printer to signal that a print cartridge is low or out before the photosensitive drum is actually worn out, when print quality defects would occur. The photosensitive drum might cause a low message when low-coverage documents are printed frequently. Tracking drum life is essential because of drum wear and the potential for overflow from the waste toner hopper if the photosensitive drum life is extended past its useful life.

Figure 5-16 illustrates the toner level detection system.

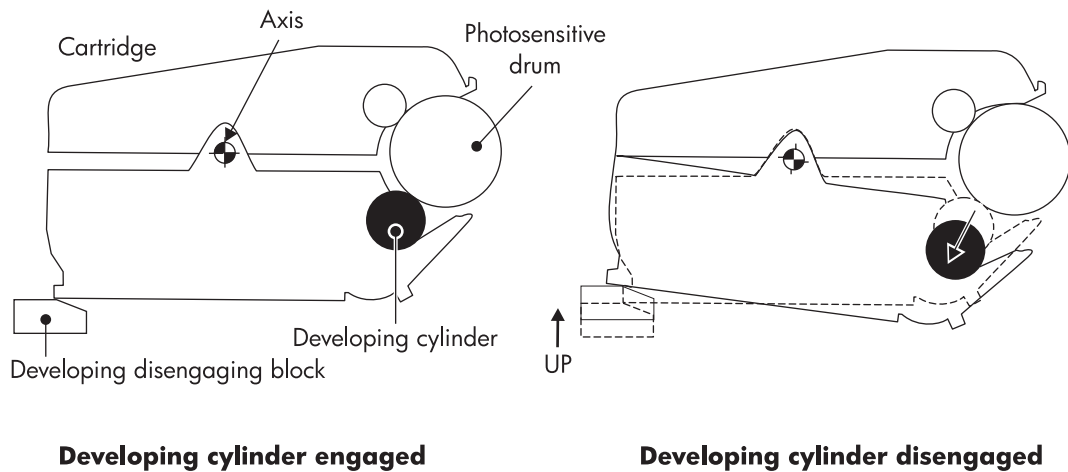




**Figure 5-16** Toner level detection

### Developing cylinder disengaging control

Whenever the developing cylinder is in contact with the photosensitive drum, toner is passed onto the drum. At certain times, such as during ETB cleaning or during monochrome printing, toner should not pass onto the drum, and the developing cylinder should not be in contact with the drum. The bottom half of the print cartridge can pivot up and down, causing the developing cylinder to either come in contact with or move away from the photosensitive drum. A small block inside the printer causes each cartridge to pivot. When the block is pushed up, the rear of the cartridge is pushed up, and the front of the cartridge swings down. The developing cylinder disengages from the drum. Figure 5-17 illustrates this process.

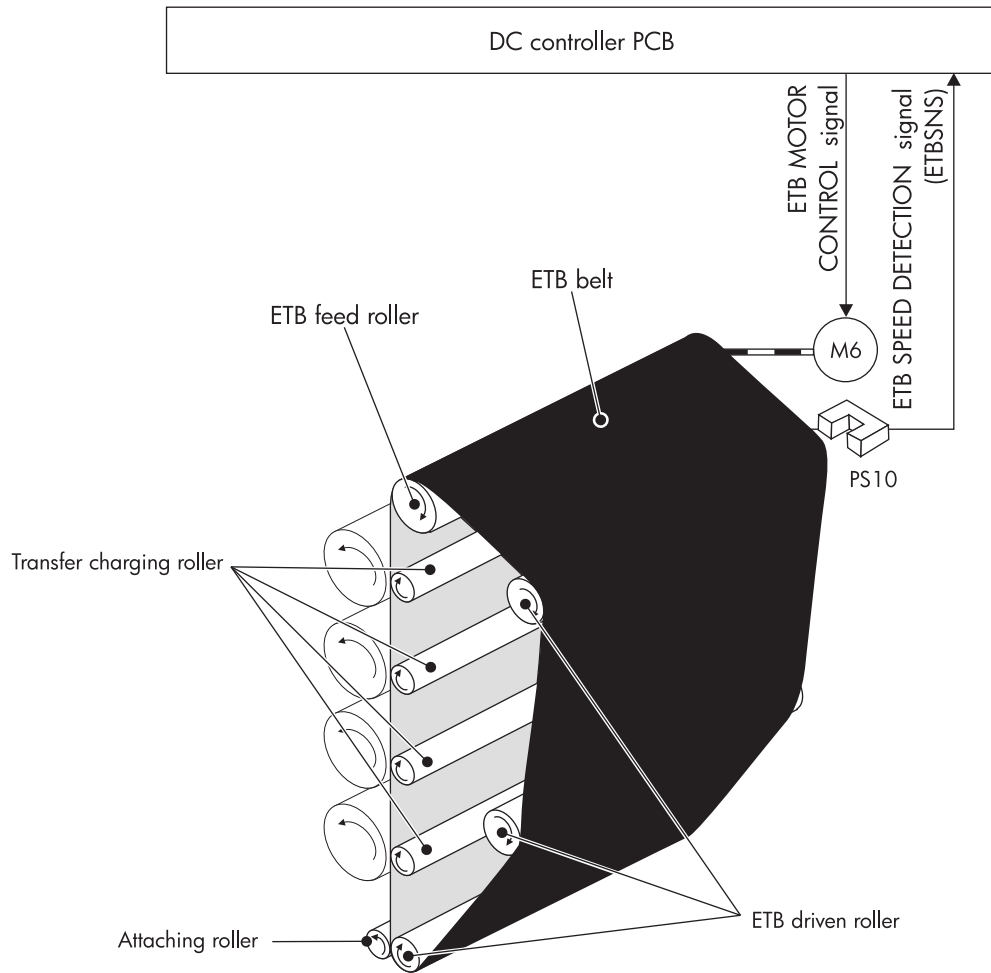


**Figure 5-17** Developing cylinder disengaging

The developing cylinders are disengaged only during monochrome printing or during ETB cleaning. During monochrome printing, the developing cylinder in all cartridges except black is disengaged. During ETB cleaning, the developing cylinders in all cartridges are disengaged.

## Electrostatic transfer/transport belt (ETB) unit

The ETB unit feeds the paper through the printer and helps transfer toner onto the paper. Figure 5-18 illustrates the ETB unit.



**Figure 5-18** ETB unit

The physical components of the ETB unit are the following:

- ETB belt
- ETB feed roller
- attaching roller
- transfer charging rollers (four)
- ETB-driven rollers (three)

The ETB motor drives the ETB feed roller, causing the belt to rotate. All other rollers are driven by the belt rotation.

A sensor at the top of the ETB unit detects the ETB's speed. The DC controller maintains a constant ETB feed speed to ensure good color registration.

## Electrostatic latent image formation block

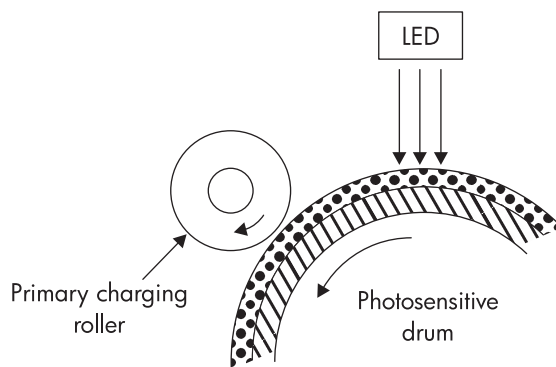
The image formation process begins with the electrostatic image formation block, in which an electrostatic latent image is formed on the photosensitive drum. This block consists of three steps:

- primary exposure
- primary charging
- laser beam exposure

After the last step is completed, areas of the drum surface that have not been exposed to the laser beam retain a negative charge. The areas exposed to the laser are neutralized. This neutralized image is called an electrostatic latent image because it is invisible to the eye.

### Step 1: Primary exposure

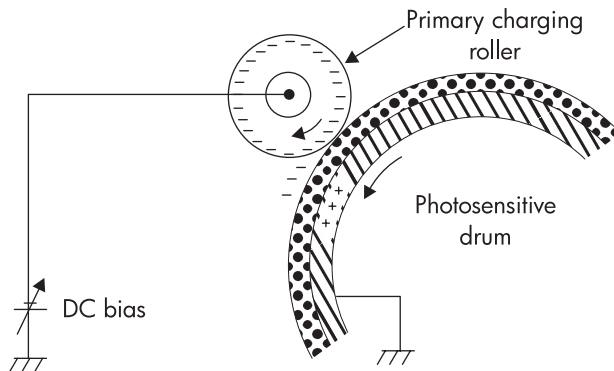
To prepare for primary charging, light from the primary exposure LED strikes the photosensitive drum surface. This eliminates any residual charge on the drum surface in order to avoid inconsistent charge density. Figure 5-19 illustrates this step.



**Figure 5-19** Primary exposure

### Step 2: Primary charging

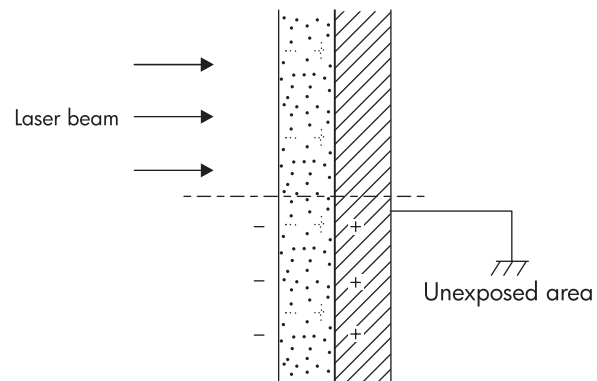
To prepare for latent image formation, a uniform negative potential is applied to the photosensitive drum surface. The primary charging roller is made of a conductive rubber. DC bias is applied to the primary charging roller to maintain uniform potential on the drum surface. Figure 5-20 illustrates this step.



**Figure 5-20** Primary charging

### Step 3: Laser beam exposure

As the laser beam scans the drum surface, it neutralizes the negative charge. This is the electrostatic latent image. The remaining areas, where the laser beam has not struck, retain a negative charge. Figure 5-21 illustrates this step.



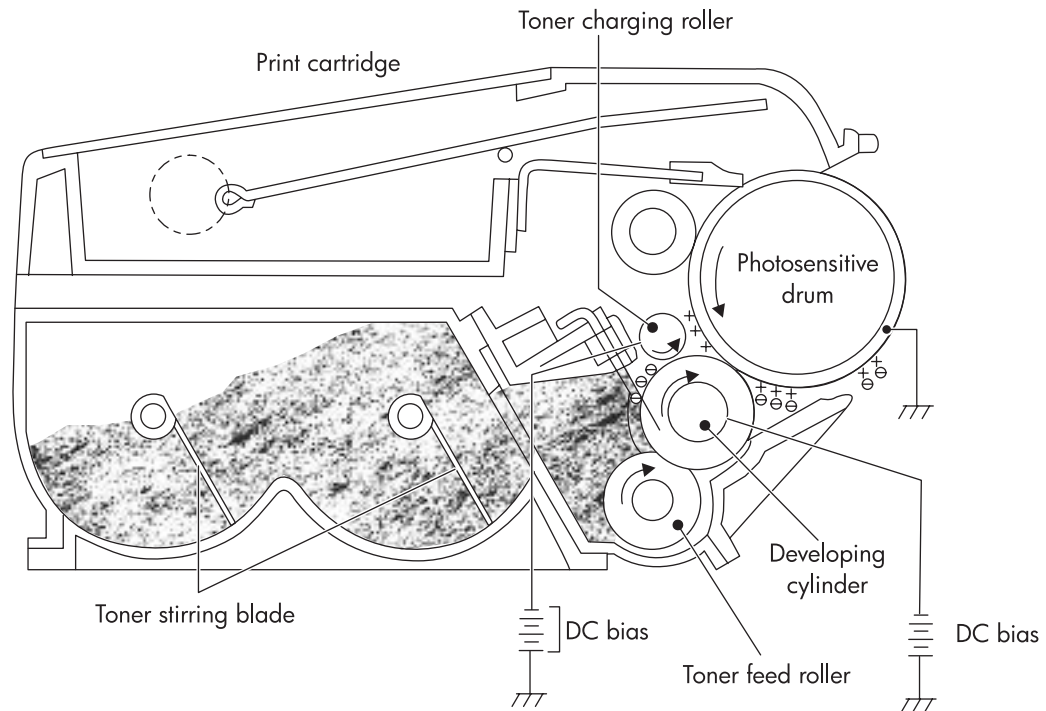
**Figure 5-21** Laser beam exposure

## Development block

The second part of the image formation process is the development block, in which toner is transferred onto the electrostatic latent image on the surface of the photosensitive drum, creating a visible image. This printer uses a contact development method that keeps the developing cylinder in contact with the drum, pushing the toner against the drum surface for development. The toner is non-magnetic and consists of resins. This block consists of two steps:

- toner charging
- development

Figure 5-22 shows a cross-section of a print cartridge and illustrates the development block.



**Figure 5-22** Development block

### Step 4: Toner charging

As the toner stirring blade turns inside the cartridge, the friction creates a negative potential on the toner. A negative voltage is applied to the toner charging roller and creates a uniform negative potential on the toner.

### Step 5: Development

The areas on the photosensitive drum that have been exposed to the laser beam have a higher potential (are less negatively charged) than the toner particles on the developing cylinder. As the photosensitive drum rotates, the toner adheres to the exposed areas on the photosensitive drum. At this point, the image is visible on the drum surface.

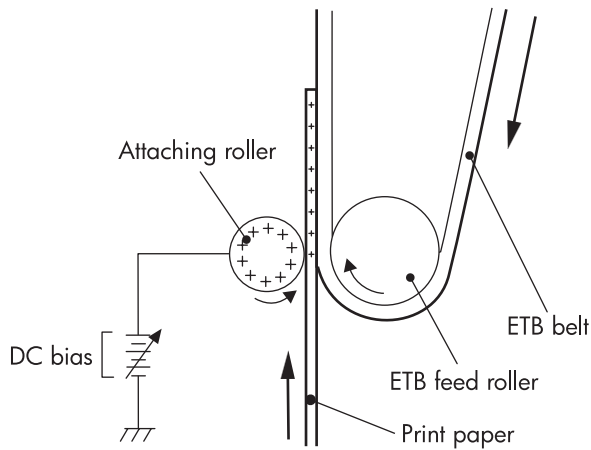
## Transfer block

The third part of the image formation process is the transfer block, in which the toner image is transferred from the photosensitive drum to the paper. This block consists of three steps:

- attaching
- transfer
- separation

### Step 6: Attaching

After the paper is picked up from the input tray, the attaching roller pushes it against the ETB. The attaching roller has a positive DC bias, and it creates a positive charge on the paper. Figure 5-23 illustrates this step.

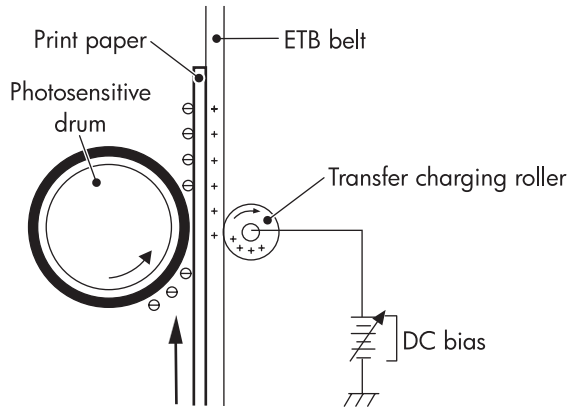


**Figure 5-23** Attaching the paper to the ETB

## Step 7: Transfer

A positive bias is applied to the transfer charging roller, which is directly opposite the photosensitive drum. As the ETB passes the transfer charging roller, it picks up a positive charge. The negatively charged toner on the photosensitive drum is transferred to the positively charged paper. Figure 5-24 illustrates this step. This process is repeated for each color as the ETB carries the paper from the bottom cartridge to the top (C, Y, M, K).

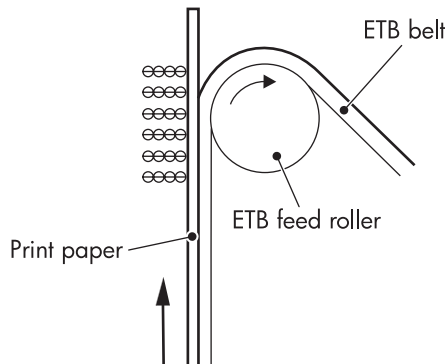
In four-color printing, as four colors of toner are piled up on the paper, the holding force of the toner weakens as the transfer process progresses. To counteract this effect, the DC controller increases the positive DC bias applied to the transfer charging roller for each successive color.



**Figure 5-24** Toner transfer

## Step 8: Separation

The paper's elasticity causes it to separate from the ETB as the ETB reaches the top of its path. Figure 5-25 illustrates this step.



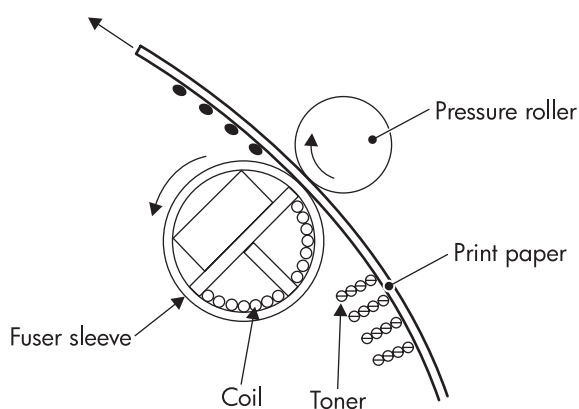
**Figure 5-25** Separation

## Fusing block

The fourth part of the image formation process is the fusing block, in which the toner image is fused to the paper, making a permanent image that cannot be smeared. This block consists of one step: fusing.

### Step 9: Fusing

This printer uses the induction heating method to fuse the toner to the paper. This method uses quick fuser heating, resulting in shortened wait time and reduced power consumption. Figure 5-26 illustrates this step.



**Figure 5-26** Fusing

## Cleaning block

The fifth and final part of the image formation process is the cleaning block, in which the ETB and the photosensitive drums are cleaned, preparing them for the next print. The next section provides more information about printer calibration and cleaning. This block consists of two steps:

- ETB cleaning
- photosensitive drum cleaning

### Step 10: ETB cleaning

See page 120 for a complete discussion of ETB cleaning.

### Step 11: Photosensitive drum cleaning

See page 121 for a complete discussion of photosensitive drum cleaning.



## Calibration and cleaning

The printer automatically calibrates and cleans itself at various times to maintain the highest level of print quality. You can also force the printer to calibrate by choosing **CALIBRATE NOW** from the Print Quality menu. See “Calibrate Now” on page 294.

While the printer is calibrating or cleaning, it will pause printing. For most calibrations and cleanings, the printer will not interrupt a print job, but will wait for the job to complete before calibrating or cleaning. Table 5-4 shows when the printer calibrates, the duration of the calibration, and the type of calibration that occurs. Table 5-5 shows when the printer cleans and the duration of the cleaning. The sections that follow discuss calibration and cleaning in more detail.

**Table 5-4 Calibration timing and duration**

Calibration occurrence	Duration	Type of calibration
When you turn the printer on.	75 seconds for calibration, but because of other initialization activities, the printer takes a total of 2 minutes to be ready for printing	DMAX, DHALF
When you install one or more print cartridges that have not previously been installed in the printer.	150 seconds (2 minutes, 30 seconds)	DMAX, DHALF, color plane registration (CPR)
After 50 pages have printed since installing a print cartridge. The printer will finish printing the current job before calibrating.	75 seconds	DMAX, DHALF
After 1000 pages have printed since the last calibration. The printer will finish printing the current job before calibrating.	75 seconds	DMAX, DHALF
After 8 hours since the last calibration, but not while the printer is in PowerSave mode. Typically, this calibration occurs on the first job or control panel interaction after an overnight idle period.	75 seconds	DMAX, DHALF
When you request calibration from the control panel (Calibrate Now).	280 seconds (4 minutes, 40 seconds)	DMAX, DHALF, CPR, drum phase

**Table 5-5 Cleaning timing and duration**

Cleaning occurrence	Duration	Type of cleaning
When the printer continuously prints (with no idle period or spin down) for 51 pages.	either 5 seconds or 21 seconds (5 seconds is the most common)	primary and toner charging rollers
At intervals of 90 and 140 pages. The printer will finish printing the current job before cleaning.	16 seconds	ETB

## ETB cleaning

During this step, all toner particles that remain on the ETB are returned to the photosensitive drums in each print cartridge. Figure 5-27 illustrates this step.

The ETB is automatically cleaned when the printer is turned on, when the covers are closed, and after printing a specified number of pages. The DC controller applies negative bias to the photosensitive drums and either a positive or negative bias to the transfer charging rollers. This creates a difference in potential between the photosensitive drums and the ETB. Both positive and negative residual toner returns to the photosensitive drums.

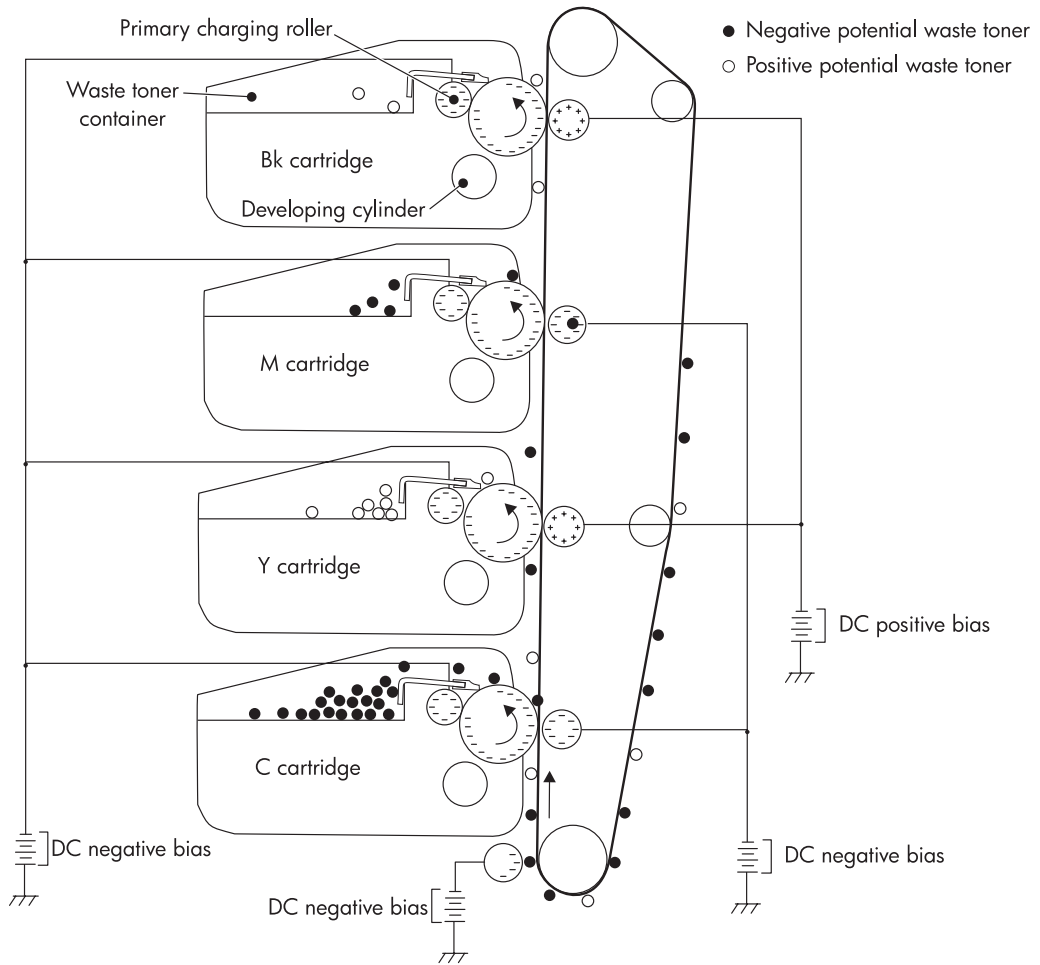
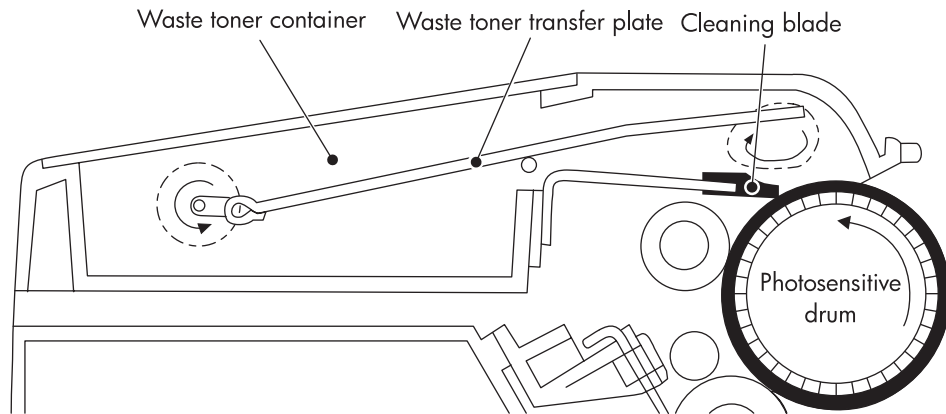


Figure 5-27 ETB cleaning

## Photosensitive drum cleaning

A cleaning blade inside the print cartridge clears the remaining toner on the photosensitive drum as the drum rotates past the blade. This waste toner is moved into the waste toner container in the top of the print cartridge. Figure 5-28 illustrates this step.

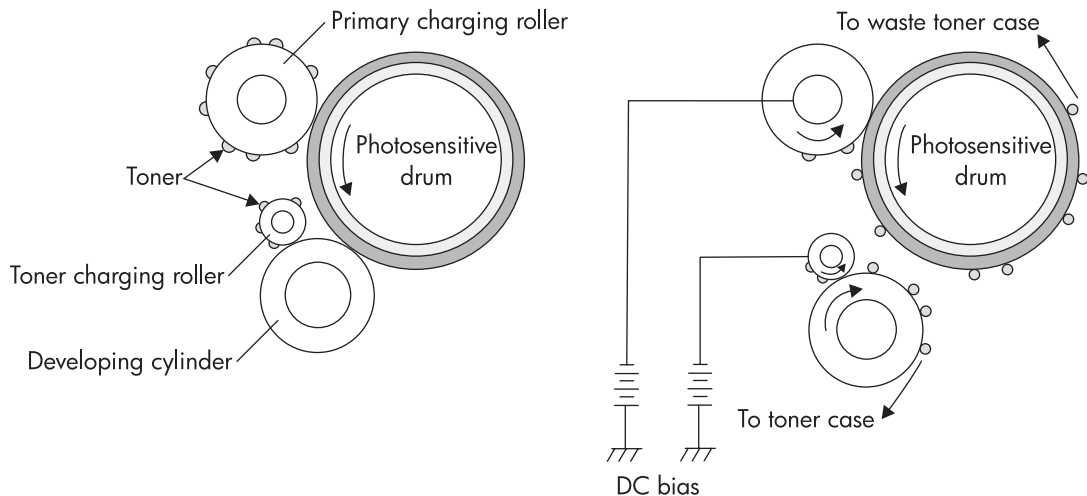


**Figure 5-28** Drum cleaning

During the printing process, toner adheres to the primary charging roller and the toner charging roller. To prevent print quality defects, this toner needs to be cleaned. The DC controller alternately applies negative bias in different values to the primary charging roller and the toner charging roller when one of the following occurs:

- The printer is turned on.
- The covers are closed.
- At the start of a print operation.
- After printing a specified number of pages.

Applying bias removes the toner from each roller. The toner on the primary charging roller is transferred to the photosensitive drum, and the toner on the toner charging roller is transferred to the developing cylinder. Then the cleaning blade scrapes the toner on the photosensitive drum into the waste toner container, as described above. The toner on the developing cylinder is returned to the toner case. Figure 5-29 illustrates this process.



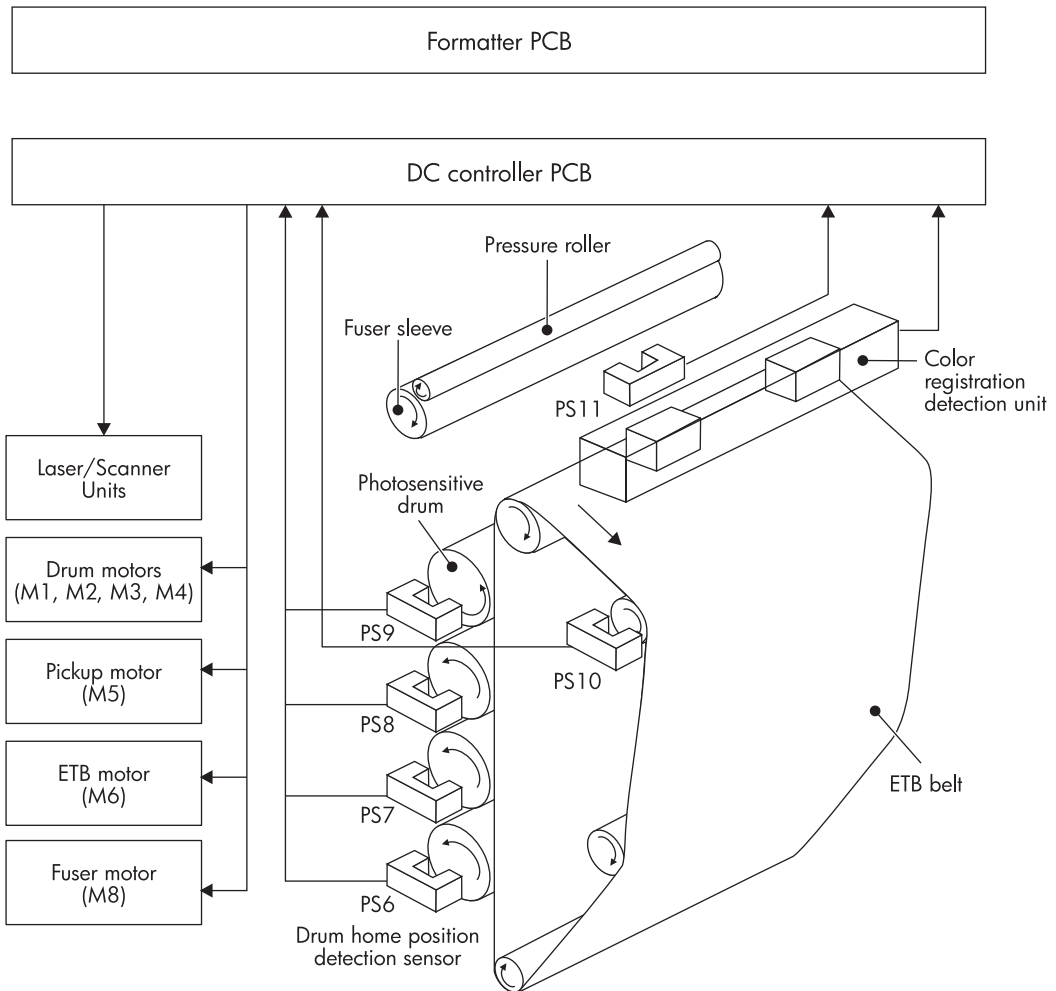
**Figure 5-29** Primary charging roller and toner charging roller cleaning

## Color plane registration calibration

The diameter of the rollers in individual print cartridges or ETB units varies from one to another. For this reason, whenever a new print cartridge or ETB unit is installed, the printer must adjust the rotational speed of the rollers in order to ensure good color plane registration. Color misregistration occurs when the individual colors do not print directly on top of one another, causing poor print quality. This adjustment consists of two steps:

- 1 **Direct calibration.** The DC controller uses the color registration detection unit to measure the color registration range directly and calibrate the color registration.
- 2 **Indirect calibration.** The DC controller monitors the rotational speed of each feed roller and controls the speed to prevent color misregistration.

Figure 5-30 illustrates this process.



**Figure 5-30** Color registration calibration

## Drum phase calibration

The drum phase calibration aligns all four cartridge motors and their drive gears.

## Image stabilization control

As the print cartridge ages, the toner and the photosensitive drum begin to deteriorate, which can cause fluctuations in image density. The printer accounts for this with image stabilization control. There are two kinds of image stabilization control:

- image density calibration control
- image halftone calibration control

Each control operates as necessary.

### Image density calibration control (DMAX)

This control stabilizes image density by calibrating the values of the developing bias whenever one of the following events occurs:

- when the printer is turned on
- when a print cartridge is replaced
- after a set number of pages have printed
- when the formatter sends an operation command

Image density calibration consists of three steps:

- 1 The DC controller forms density patterns for each color on the ETB using varying levels of developing bias.
- 2 The color registration detection unit measures the image density of the density patterns formed on the ETB.
- 3 The DC controller uses the density measurements to adjust the developing bias to obtain proper image density.

### Image halftone calibration control (DHALF)

This control measures halftone density output from the formatter and returns the measurements to the formatter so it can perform halftone calibration. Image density calibration must always be performed prior to image halftone calibration.

Image halftone calibration control consists of three steps:

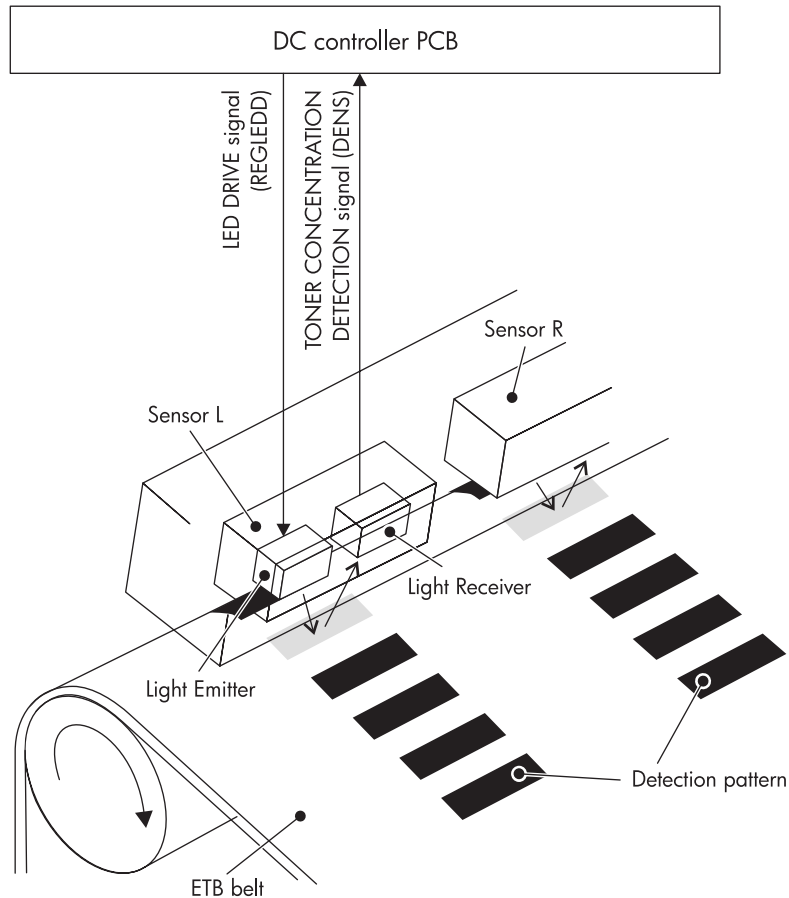
- 1 Using the optimum developing bias determined during image density calibration, the DC controller forms density patterns on the photosensitive drum in each color cartridge.
- 2 These density patterns are transferred to the ETB, and the color registration detection unit measures the image density of these patterns. Image data is returned to the formatter.
- 3 The formatter uses the image data to perform a halftone calibration in order to obtain an ideal halftone image.

## Image density detection

Each of the image stabilization controls described above uses the color registration unit at the top of the ETB unit to measure image density. To measure image density, the DC controller emits a light from sensors located above the density detection patterns on the ETB. The light reflected off the patterns is returned to the sensor, and the data is returned to the DC controller. Figure 5-31 illustrates this process.

When the values detected by the density sensor are outside the specified range, the DC controller resets the image density and issues an "image density sensor out of guaranteed range" warning to the formatter.

If the sensor receives no reflected light, the DC controller stops the printer and issues a "density sensor abnormality" warning to the formatter.



**Figure 5-31** Image density detection

## Pickup/feed system

The pickup/feed system picks paper from the input trays and carries it along the paper path. The printer has one multi-purpose tray (Tray 1) and one 500-sheet cassette (Tray 2). A second 500-sheet paper feeder (Tray 3) is available for the HP Color LaserJet 4600 and 4600n models; it is standard on the 4600dn, 4600dtn, and 4600hdn models. Sensors detect the presence of paper in each of these trays. Three switches detect the size of the paper. Three motors and two solenoids drive the various feed rollers.

Three photo sensors are able to detect the progress of paper along the paper path. If paper does not reach or pass one of these sensors within a specified time, the DC controller determines there is a paper jam and notifies the formatter. Figure 5-32 on the next page illustrates this system.

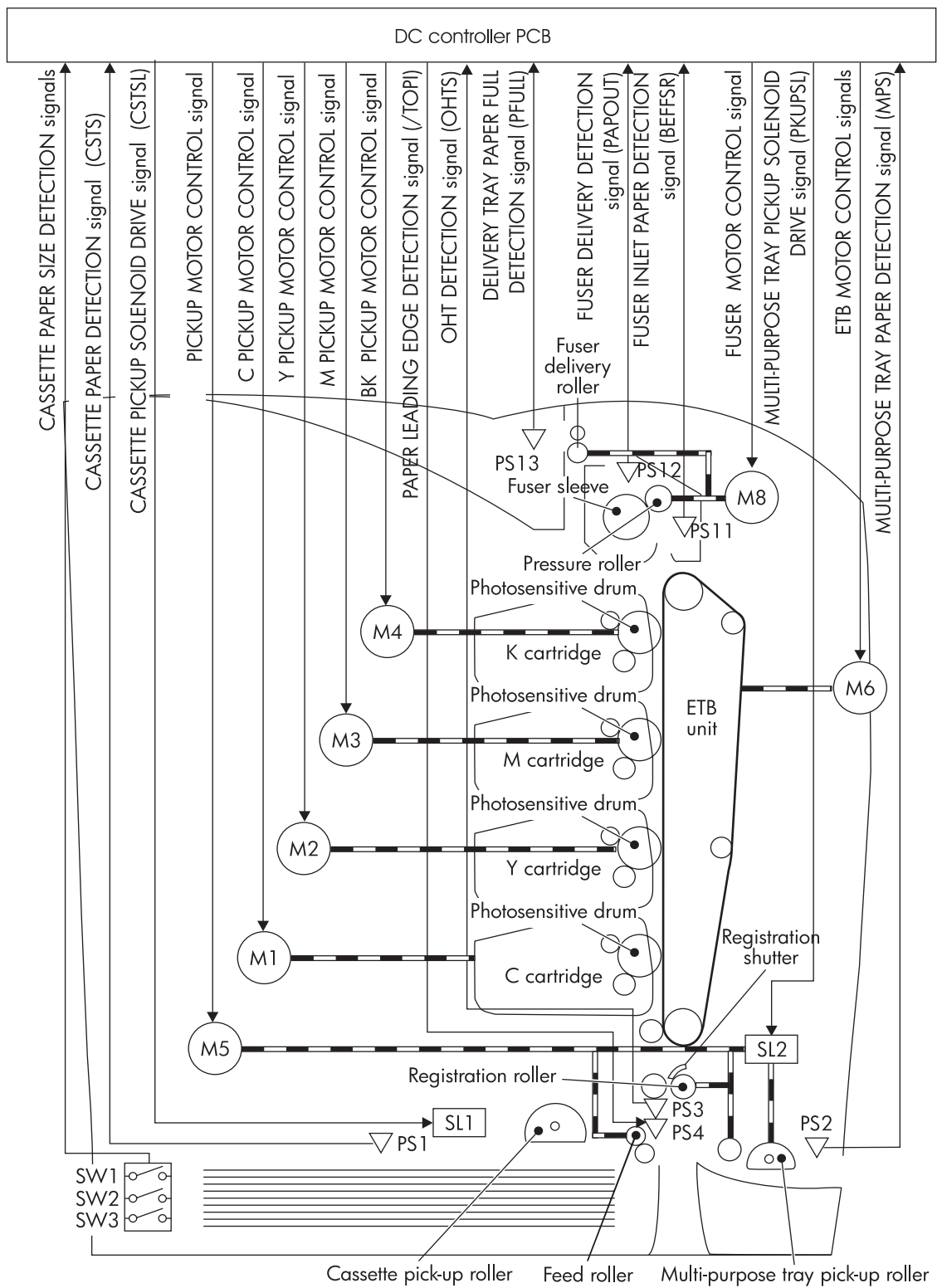


Figure 5-32 Pickup/feed system

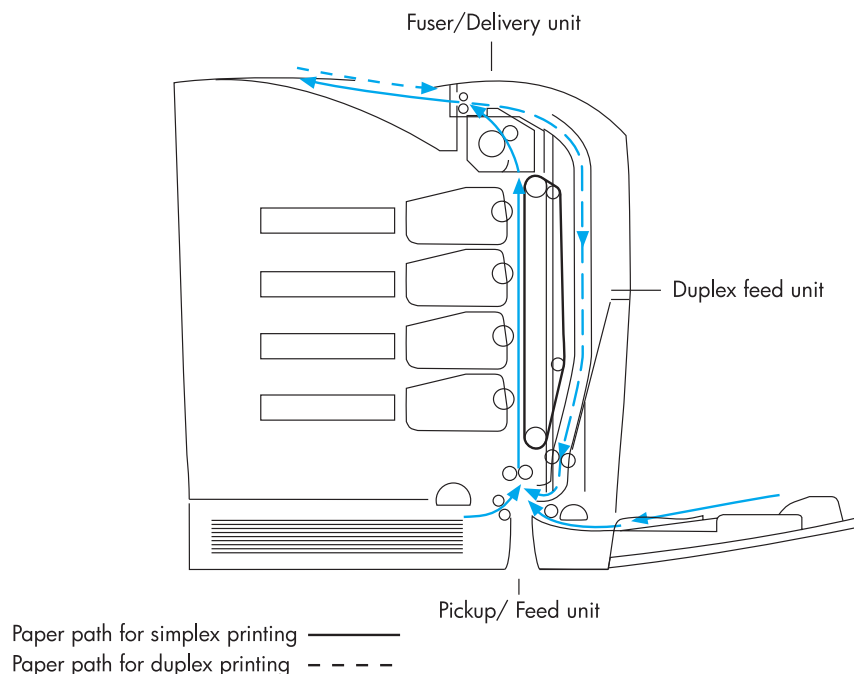


The pickup/feed system has the following physical components:

- PS1: cassette paper sensor
- PS2: multi-purpose tray paper sensor
- PS3: paper leading edge sensor (top of page)
- PS4: OHT sensor
- PS11: fuser inlet paper sensor
- PS12: fuser delivery sensor
- PS13: output bin full sensor
- SW1: cassette paper size detection switch
- SW2: cassette paper size detection switch
- SW3: cassette paper size detection switch
- M1: cyan drum motor
- M2: yellow drum motor
- M3: magenta drum motor
- M4: black drum motor
- M5: pickup motor
- M6: ETB motor
- M8: fuser motor
- SL1: cassette pickup solenoid
- SL2: multi-purpose tray pickup solenoid

Figure 5-33 illustrates the pickup/feed system, which can be divided into three units:

- **pickup/feed unit.** from the point the paper is picked from the tray until it reaches the fuser
- **fuser/delivery unit.** from the fuser to the output bin
- **duplex feed unit.** from the output bin to the registration shutter at the bottom of the ETB



**Figure 5-33** Pickup/feed system

## Pickup/feed unit

At the bottom of the paper path, the pickup unit picks individual pieces of paper from the trays. Then the ETB carries the paper to the top of the paper path. The sequence of events is as follows:

- 1 The formatter sends a print command to the DC controller, which rotates the pickup motor, the drum motors, the ETB motor, and the fuser motor.
- 2 The cassette feed roller and registration roller rotate as the pickup motor starts to rotate.
- 3 Paper is picked from the cassette or multi-purpose tray. A separation claw in the cassette prevents picking multiple sheets of paper. A separation pad in the multi-purpose tray prevents multiple sheets from feeding.
- 4 The registration shutter corrects any skew in the paper, and the paper is fed at a specified speed, according to the size and type of the paper.
- 5 As the ETB carries the paper past each print cartridge, toner is transferred onto the paper.

## Cassette detection and cassette paper size detection

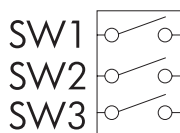
The printer can sense whether the cassette (Tray 2) is installed correctly, and it can sense the size of the paper in the cassette. Paper size detection switches at the back of the cassette send this information to the DC controller. The DC controller is able to determine which size is loaded by reading the state of the various switches according to the Table 5-6. Figure 5-34 shows how the switches are stacked.

**Table 5-6 Cassette paper size detection**

Paper size	Paper size detection switch		
	SW1	SW2	SW3
A4	on	off	off
B5	on	on	off
A5	on	off	on
Letter	off	on	on
Legal	off	off	on
Executive	off	on	off
Custom	on	on	on
No cassette	off	off	off

Although the cassette determines paper size by reading the switches, it is possible that the user can select a different size than what is loaded, creating an error in paper size detection.

The paper leading edge sensor detects when the leading edge and the trailing edge of a sheet of paper pass it. By measuring the time between the leading edge and trailing edge passing, the sensor can determine the actual size of the paper. If this measured size differs from the size specified by the formatter or the switch combination, the DC controller determines there is a mis-match. The current sheet of paper is ejected from the printer, and the printer stops.

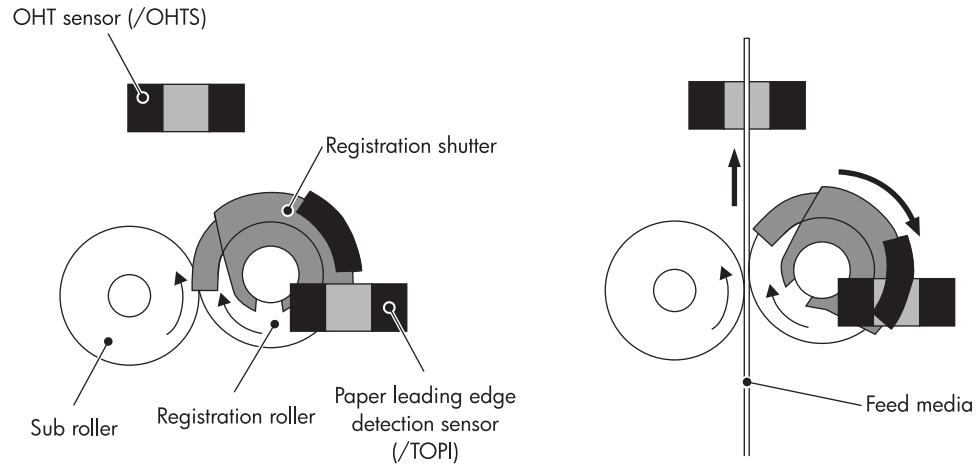


**Figure 5-34 Cassette paper size detection switches**

## Overhead transparency detection

In order to prevent print quality problems, the printer prints on overhead transparencies (OHT) at a slower speed than on plain paper. The printer has a sensor above the paper leading edge sensor that detects an OHT and signals the DC controller to slow the motors accordingly.

The OHT sensor uses a light transmitter and receiver to detect the presence of plain paper. When plain paper passes through the sensor, the light is blocked, and the OHT signal changes from low to high. Consequently, when the signal is not blocked, but paper is detected by the paper leading edge sensor, the DC controller determines the media to be an OHT. Figure 5-35 illustrates this process.

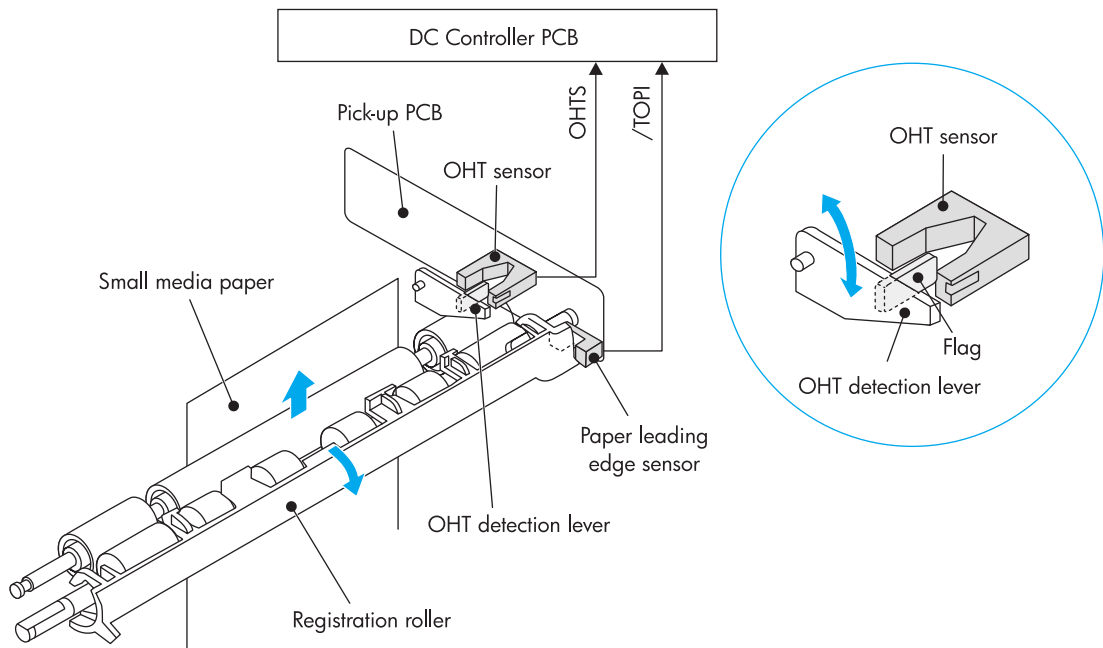


Signal \ Media	Normal	Plain paper	OHT
/TOPI signal	H	L	L
/OHTS signal	L	H	L

**Figure 5-35** Overhead transparency detection

## Small-size paper detection

Because the printer's overhead transparency detection sensor is installed at the end of the feed path, small-size paper that does not pass the edge of the feed path can be mistaken for an OHT. To avoid this problem, the printer has a lever in front of the OHT detection sensor to distinguish small-sized paper. Small-size paper is too narrow to trip the lever. When the lever is tripped, the flag attached to the lever momentarily blocks light from reaching the OHT detection sensor, indicating that the media is full width. The DC controller determines whether the media is an OHT or a sheet of paper based on whether the OHT sensor remains shaded from light as the media passes through. If the lever is not triggered, the DC controller determines the media to be small-size paper. Figure 5-36 illustrates this process.



**Figure 5-36** Small-size paper detection

## Feed speed control

The type of media in the paper path dictates the speed at which it is fed. The DC controller can change the feed speed according to type of media. Table 5-7 shows the relationship between media type and feed speed.

**Table 5-7 Feed speed according to media**

Feed mode	Media type	Print mode	Feed speed
Normal mode	● plain paper	full color	normal
		monochrome	
OHT mode	● overhead transparency	full color	1/4 speed
		monochrome	1/2 speed
Thick 1 mode	● thick paper	full color	1/2 speed
		monochrome	
Thick 2 mode	● thick paper	full color	1/2 speed
		monochrome	
Gloss 1 mode	● glossy paper	full color	1/3 speed
		monochrome	
Gloss 2 mode	● glossy paper	full color	1/3 speed
		monochrome	
Gloss film mode	● glossy film	full color	1/3 speed
		monochrome	
Envelope mode	● envelope	full color	normal
		monochrome	
Thick paper mode	● thick paper	full color	normal
		monochrome	
Label paper mode	● adhesive labels	full color	1/2 speed
		monochrome	
Auto mode	● plain paper	full color	automatically adjusts for media
	● OHT	monochrome	

The DC controller determines a media mismatch, ejects the media, and stops the printer in the following situations:

- when OHT is detected and the printer is set to either thick paper or gloss mode
- when plain paper is detected and the printer is set to OHT mode

However, if the printer is set to plain paper mode and OHT is detected, the DC controller will automatically switch the printer to OHT mode, and printing continues normally.

## Fuser/delivery unit

The fuser/delivery unit consists of the fuser, which melts the toner and presses it onto the paper, and the delivery unit, which feeds the paper into the output bin. The sequence of events is as follows:

- 1 The ETB carries a sheet of paper with transferred toner into the fuser.
- 2 The fuser motor adjusts its speed to maintain even tension on the paper as it enters the fuser.
- 3 The fuser melts the individual toner particles. The fuser sleeve and pressure roller mix the liquefied toner and press it onto the paper to create the desired color.
- 4 The paper passes from the fuser into the output bin.

A sensor in the output bin detects when the bin is full. The DC controller will stop the printer after the current print is completed.

## Duplex feed unit

During 2-sided (duplex) printing, the duplex feed unit retrieves the paper from the output bin and sends it back through the pickup/feed unit to print on the second side. The sequence of events is as follows:

- 1 The paper, with the front side printed, passes through the fuser.
- 2 The fuser motor (M8) rotates counterclockwise for a specified length of time after the paper reaches the fuser delivery sensor. The fuser delivery roller reverses direction and feeds the paper into the duplex feed unit. Figure 5-37 illustrates this "switch back" operation.
- 3 The oblique roller and feed roller allow the left edge of the paper to contact the left-side plate in order to align the paper on the left margin.
- 4 The paper then re-enters the pickup/feed unit and is printed on the second side.
- 5 The paper passes through the fuser a second time and comes to rest in the output bin.

### Note

During duplex printing, the printer prints the second side of the page first. For instance, if a 4-page print job is to be printed on two sheets of paper, pages 2 and 4 print first, then pages 1 and 3 print. For this reason, when duplex printing on pre-printed letterhead, be sure to load the letterhead face-down in Tray 2 or Tray 3, and load letterhead face-up in Tray 1.

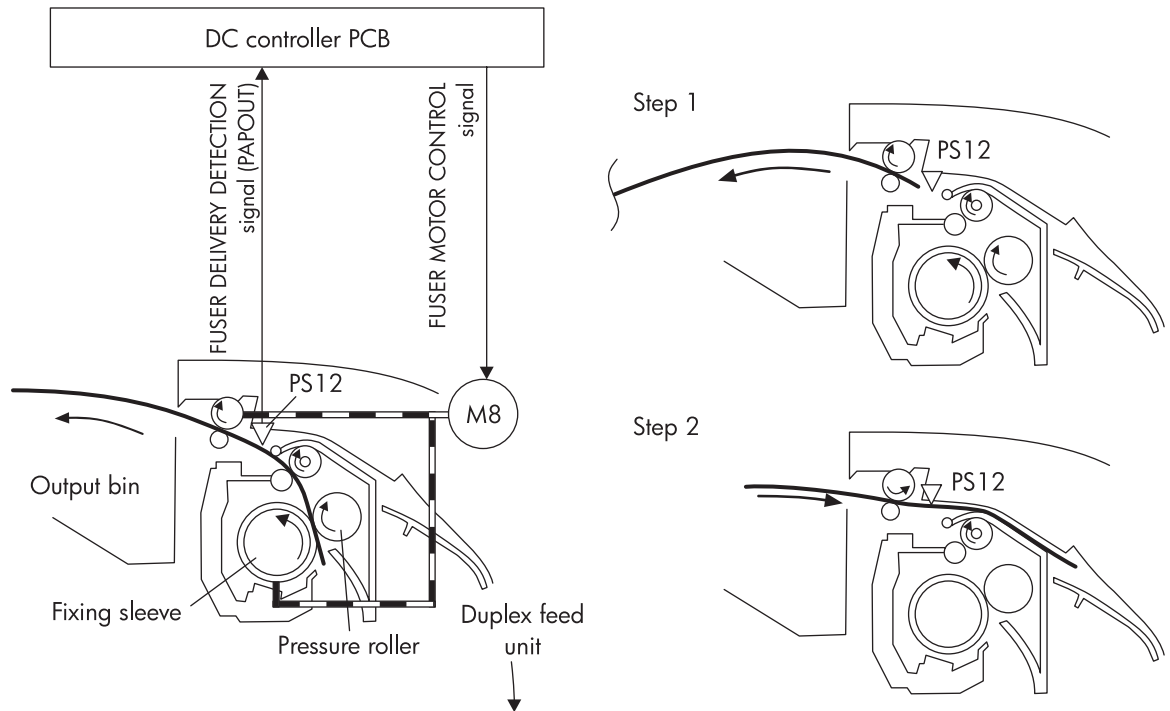
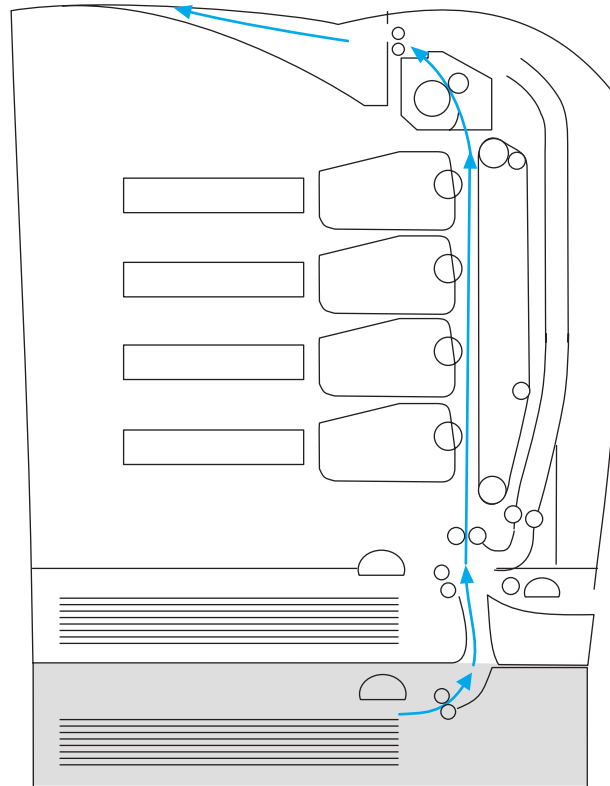


Figure 5-37 Duplex switch back

## 500-sheet paper feeder

The HP Color LaserJet 4600dtn and 4600hdn printer models come standard with an additional 500-sheet paper feeder. It is an option for all other models. This additional tray (Tray 3) is essentially the same as Tray 2. Figure 5-38 shows the paper path with the additional 500-sheet paper feeder installed.



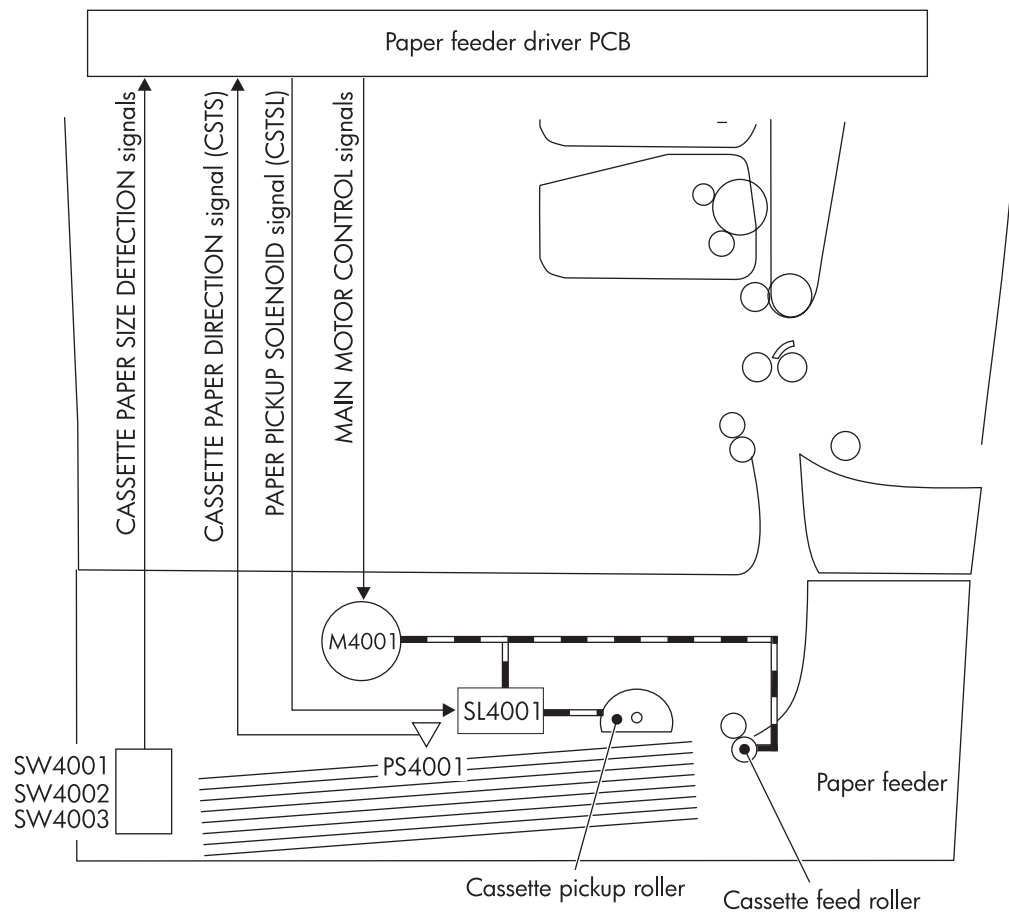
**Figure 5-38** Additional 500-sheet paper feeder



## Pickup and feed operations

The sequence of operations for the 500-sheet paper feeder follows. Figure 5-39 illustrates this sequence.

- 1 The DC controller receives a print command from the formatter and sends a pickup command to the paper feeder driver.
- 2 The paper feeder driver rotates the main motor (M4001) in the paper feeder, and the feed roller starts to rotate.
- 3 After the printer enters the SCANNER READY state, the DC controller instructs the paper feeder driver to pick a sheet of paper. The paper feeder pickup solenoid (SL4001) turns on. The pickup roller makes one rotation and picks up paper in the paper feeder.
- 4 Separation tabs eliminate any multiple-fed sheets, and a single piece of paper enters the feed path.



**Figure 5-39** 500-sheet paper feeder pickup and feed operation



# 6

# Removal and replacement

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## Introduction

### Removal and replacement strategy

This chapter explains how to remove and replace major printer components. (HP does not support repairing individual subassemblies or troubleshooting to the component level.)

Replacement is generally the reverse of removal. Occasionally, directions for difficult or critical replacement procedures are included.

---

**WARNING!**

The information in this section is intended for authorized service personnel only.

### Repair notices

---

**WARNING!**

Turn the printer off, wait five seconds, then unplug the power cord before servicing the printer. Failure to completely disconnect the printer could result in severe injury.

Never operate or service the printer with the protective cover removed from the laser/scanner assembly. The reflected beam, although invisible, can damage your eyes.

Never operate the printer with any parts removed.

The sheet-metal parts can have sharp edges. Be careful not to cut yourself when handling sheet-metal parts.

---

### Caution regarding electrostatic discharge (ESD)



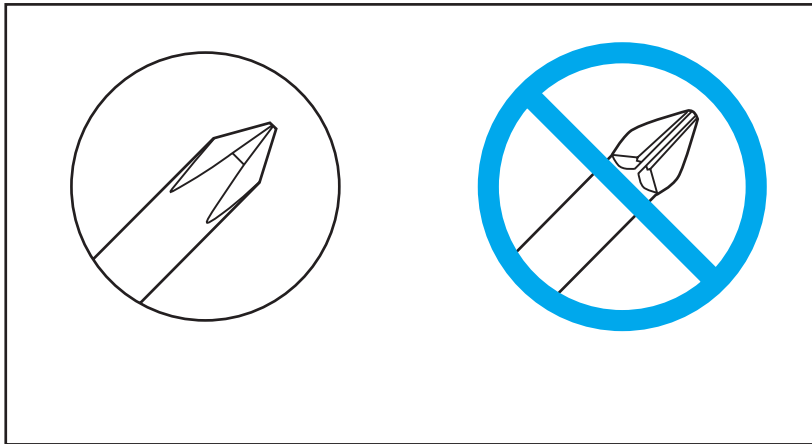
The printer contains parts that are sensitive to electrostatic discharge (ESD). Watch for the ESD reminder shown at the left when removing printer parts. Protect the parts that are sensitive to ESD with protective ESD pouches.

## Required tools

Before servicing the printer, gather the following tools:

- Phillips #2 magnetized screwdriver (152-mm [6-inch] shaft)
- Small flat-blade screwdriver
- Small needle-nose pliers
- ESD strap
- Penlight (optional)

All components in the HP Color LaserJet 4600 series printer use Phillips-head screws that require a #2 Phillips screwdriver. Ensure that you have a Phillips screwdriver and not a Posidriv screwdriver. Figure 6-1 (below) shows the difference between a Phillips and a Posidriv screwdriver. Note that the Phillips tip has more beveled surfaces.



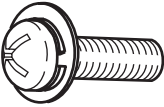

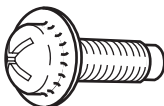

**Figure 6-1** Phillips and Posidriv screwdriver comparison

## Types of screws

Table 6-1 describes the screws used in the printer and provides guidelines to help determine where to use each type of screw. The screws can vary in length depending on the thickness of the material being fastened.

Always note where each type of screw is located and replace each one into its original location.

**Table 6-1** Types of screws

Illustration	Description	Uses
	Screw, machine with washer M3x8 part number XA9-1276-000CN	To hold plastic to metal. example: printer covers
	Screw, self tapping	To hold plastic to plastic.
	Screw, truss head M3x6 part number XA9-1275-000CN	To hold sheet metal to sheet metal. example: formatter cage
	Retaining ring (e-type)	To hold a bolt through a slot or a gear in place.

# Supplies

The customer replaces print cartridges, the fuser, and the ETB unit as they are depleted. Chapter 4 explains when to replace supplies and provides instructions on replacing them.

---

## Note

The printer tracks the amount of use on the customer-replaceable supplies by keeping a page count. Swapping supplies between printers might cause a misrepresentation of supply life values and is not recommended.

---

---

## Note

If you replace either the fuser or the ETB when servicing the printer, and these supplies have not yet reached the end of their estimated life, you must reset the page count for these supplies through the Configure device menu on control panel. See page 81 and page 83 for instructions on resetting the ETB and fuser counts.

---

**Table 6-2 Approximate replacement intervals for supply items**

Supply item	Printer message	Page counts	Approximate time period <sup>1</sup>	To install
Black (K) print cartridge	REPLACE BLACK CARTRIDGE	9,000 pages <sup>2</sup>	2.7 months	See page 76.
Cyan (C) print cartridge	REPLACE CYAN CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	See page 76.
Magenta (M) print cartridge	REPLACE MAGENTA CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	See page 76.
Yellow (Y) print cartridge	REPLACE YELLOW CARTRIDGE	8,000 pages <sup>2</sup>	2.7 months	See page 76.
Image transfer kit (ETB)	REPLACE TRANSFER KIT	120,000 pages <sup>3</sup>	40 months	See page 79.
Image fuser kit	REPLACE FUSER KIT	150,000 pages	50 months	See page 82.

1. Approximate lives are based on 3,000 pages per month.
2. The approximate average A4/Letter-size page count is based on 5% coverage of individual colors. Page counts are only estimations; usage conditions and print patterns cause results to vary.
3. Page counts are only estimations; usage conditions and print patterns cause results to vary. See page 74.

---

## CAUTION

Hewlett-Packard recommends the use of HP products in this printer. Use of non-HP products can cause problems that require service not covered by the Hewlett-Packard warranty or service agreements.

---



## Print cartridges and ETB

It is recommended that you remove the print cartridges and ETB when servicing internal printer components. Place the print cartridges and ETB in a safe place while they are out of the printer.

---

**CAUTION**

---

Grasp the print cartridges by the blue handles to avoid accidentally touching the photosensitive drum inside each cartridge.

---

**CAUTION**

---

Do not place any items on the ETB. If the belt is punctured or otherwise damaged, print quality problems will result.

For instructions on removing the print cartridges, see page 76.

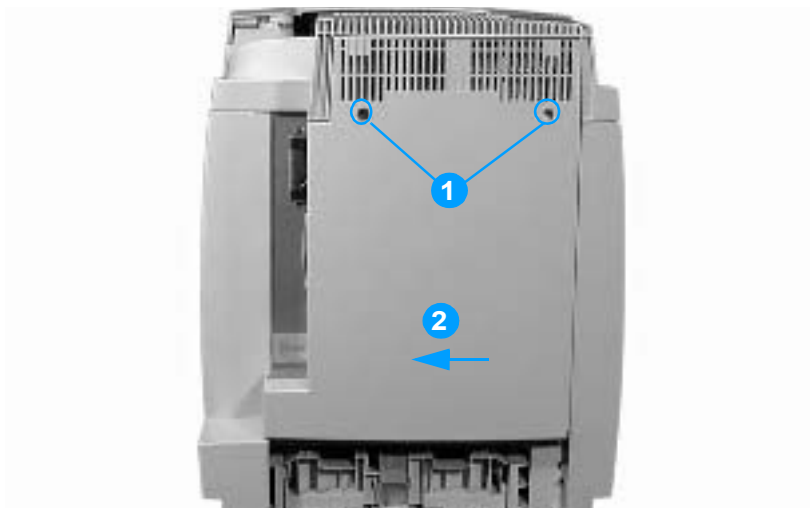
For instructions on removing the ETB, see page 79.

## Covers and external components

### Rear cover

#### To remove the rear cover

- 1 Remove the two screws shown in callout 1.
- 2 Pull out on the left side of the rear cover, and slide it to the left to remove it.



**Figure 6-2** Removing and replacing the rear cover

## Top cover

### To remove the top cover

- 1 Lift the top cover and remove the fuser. See “Replacing the fuser” on page 82 for instructions on removing the fuser.

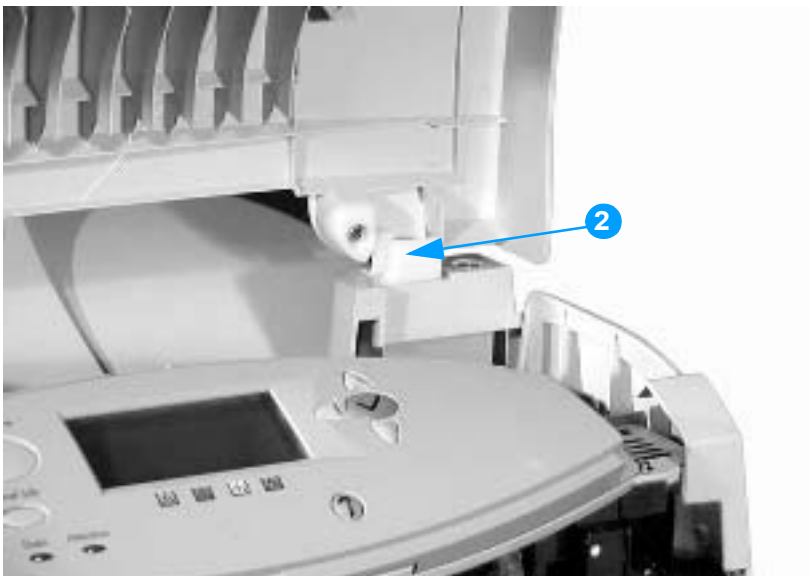
#### **WARNING!**

The fuser might be hot. Wait 10 minutes for it to cool down before removing it.

- 2 Using fingers or needle-nose pliers, pinch and release the white plastic clips (shown in callout 1) on the damper arm on the left side of the cover. It is easier to pinch these clips if you tip the top cover forward slightly.
- 3 Disengage the tab shown in callout 2 and remove the retaining block.
- 4 Push the cover to the left to release the hinge pin on the right side. Then pull the cover to the right to release the hinge pin on the left side.



**Figure 6-3** Removing and replacing the top cover (1 of 2)

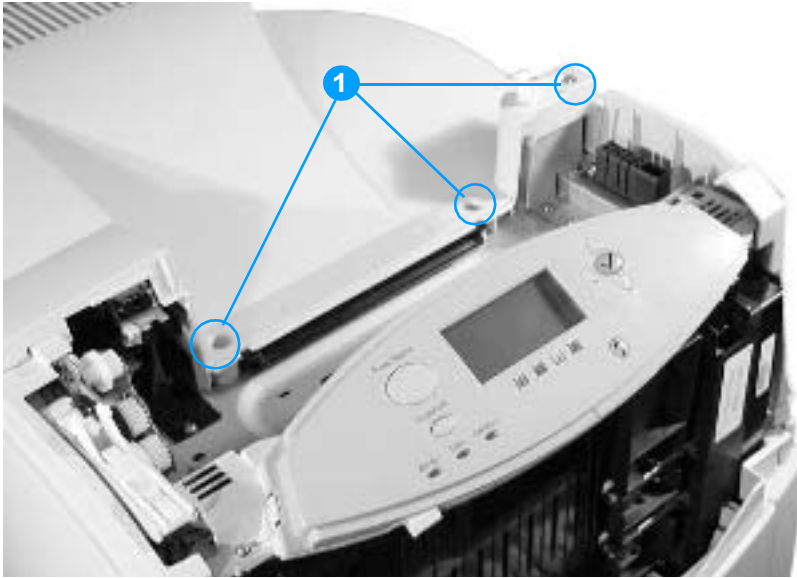


**Figure 6-4** Removing and replacing the top cover (2 of 2)

## Rear top cover

### To remove the rear top cover

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the three screws shown in callout 1.
- 4 Insert a flat-blade screwdriver between the top and side covers on the left and right sides of the printer. Lift slightly to disengage the tabs (shown in callout 2) on the left and right sides of the printer.
- 5 Remove the rear top cover.



**Figure 6-5** Removing and replacing the rear top cover, removing screws (1 of 3)



**Figure 6-6** Removing and replacing the rear top cover, releasing right-side tab (2 of 3)



**Figure 6-7** Removing and replacing the rear top cover, releasing left-side tab (3 of 3)

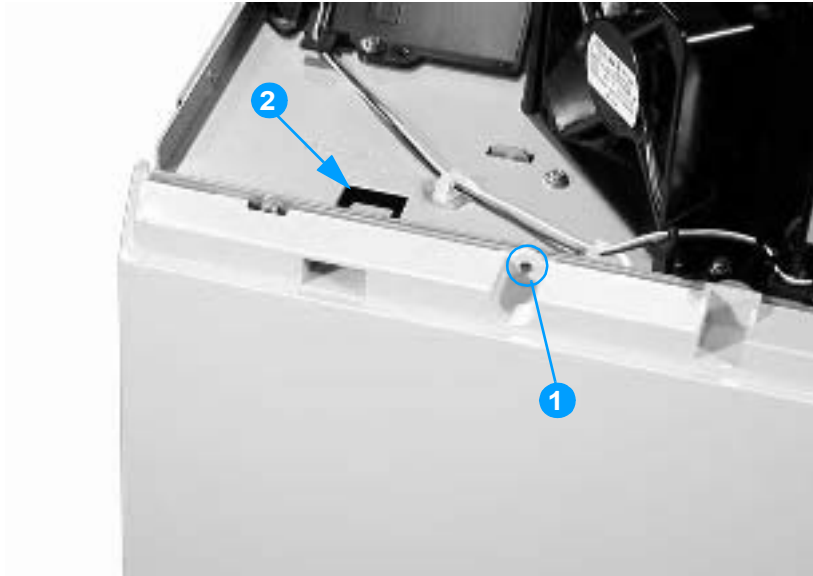
## Left cover

### To remove the left cover

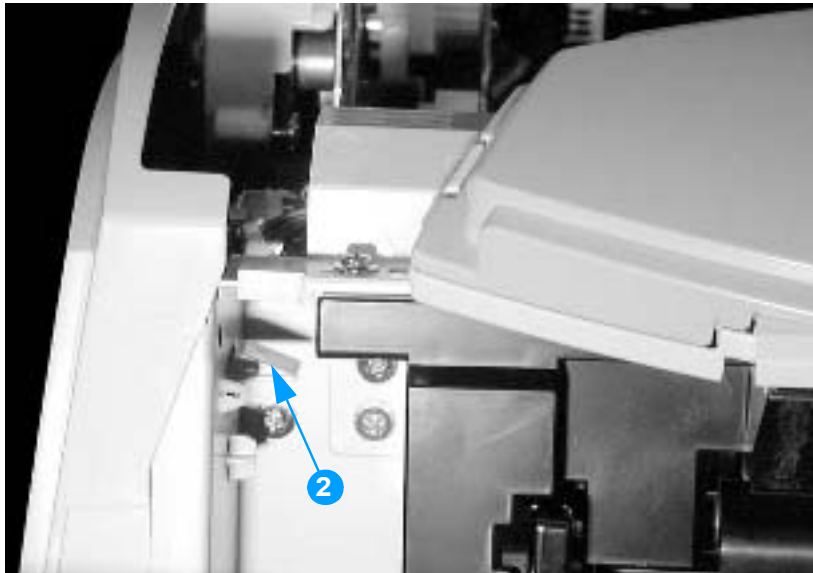
- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Open the front cover.
- 5 Remove the screw shown in callout 1.
- 6 Disengage the two tabs shown in callout 2.
- 7 Tilt the top of the left cover away from the printer, and remove it.

### Reinstallation tip

When reinstalling the left cover, be sure to insert the two hooks that are along the bottom edge of the cover into the holes in the printer frame.



**Figure 6-8** Removing and replacing the left cover (1 of 2)



**Figure 6-9** Removing and replacing the left cover (2 of 2)

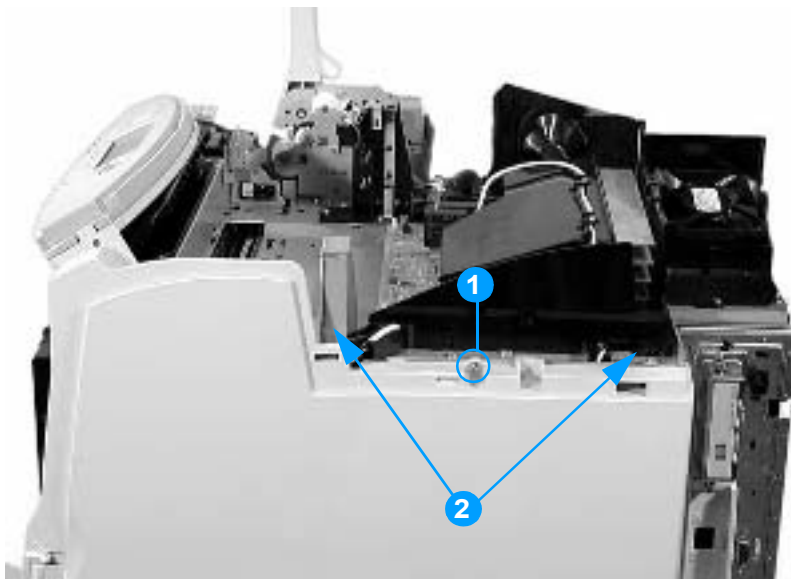
## Right cover

### To remove the right cover

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Open the front cover.
- 5 Remove the screw shown in callout 1.
- 6 Disengage the two tabs shown in callout 2.
- 7 Tilt the top of the right cover away from the printer and remove it.

### Reinstallation tip

When reinstalling the right cover, be sure to insert the two hooks that are along the bottom edge of the cover into the holes in the printer frame.



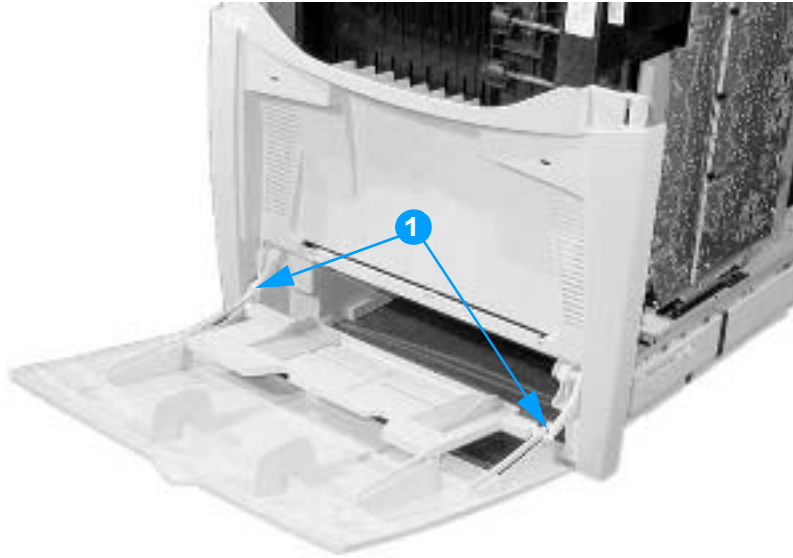
**Figure 6-10** Removing and replacing the right cover



## Multi-purpose tray (Tray 1)

### To remove the multi-purpose tray

- 1 Remove Tray 2 from the printer and set it aside.
- 2 Open the front cover.
- 3 Unhook the two link arms shown in callout 1.
- 4 Flex the cover inward near the two link arms, and remove the cover.



**Figure 6-11** Removing and replacing the multi-purpose tray

## Front cover

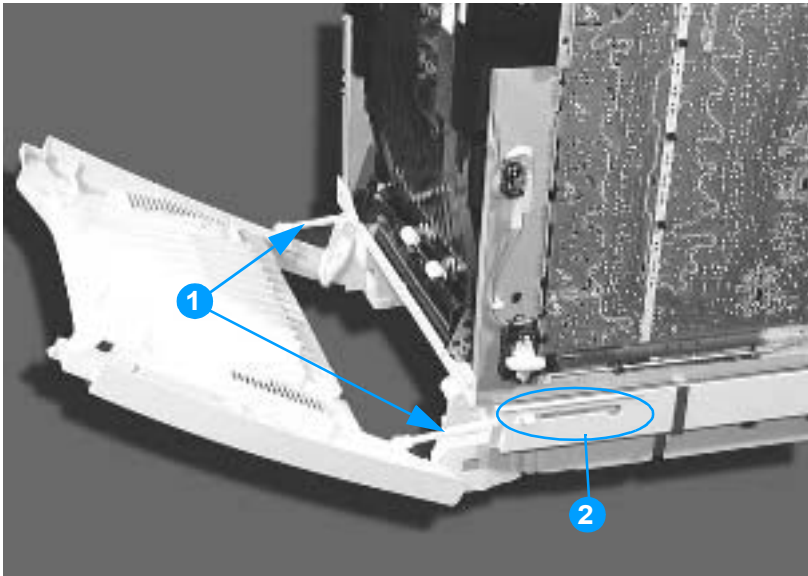
### To remove the front cover

- 1 Remove the multi-purpose tray. See page 152.
- 2 Unhook the two spring rods shown in callout 1.

#### CAUTION

The rods are under spring tension. Use caution when removing them. Tilt the tray up slightly to lessen the spring tension, making the rods easier to remove.

- 3 Press outward on the tray near the spring rods and remove the tray.



**Figure 6-12** Removing and replacing the multi-purpose tray

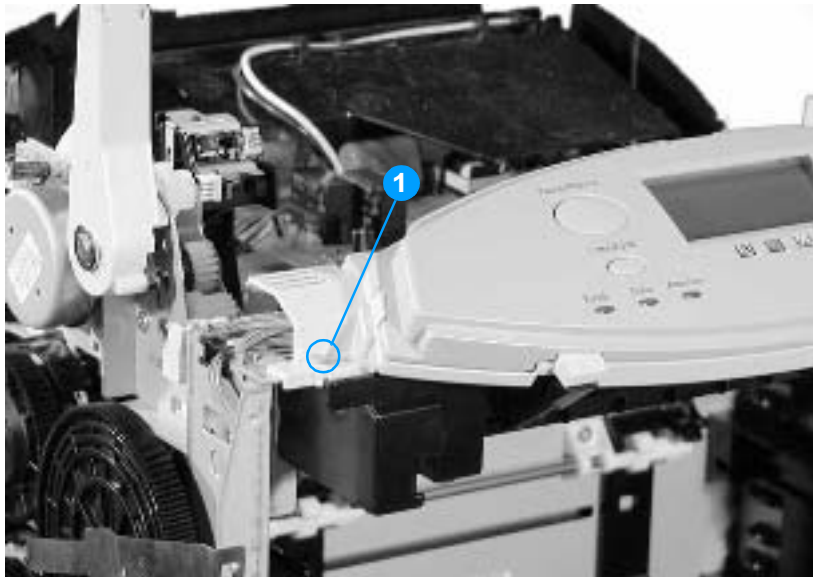
### Reinstallation tip

Make sure the rods are inserted through their guides in the printer frame (callout 2) when reinstalling the multi-purpose tray.

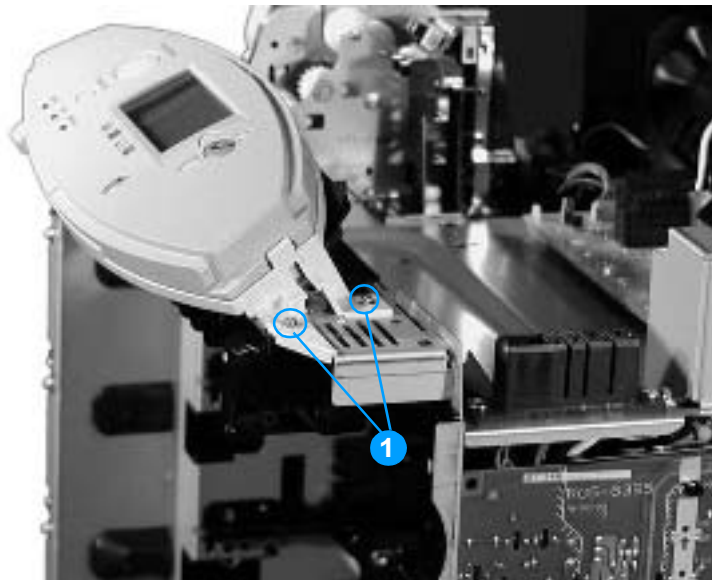
## Control panel

### To remove the control panel

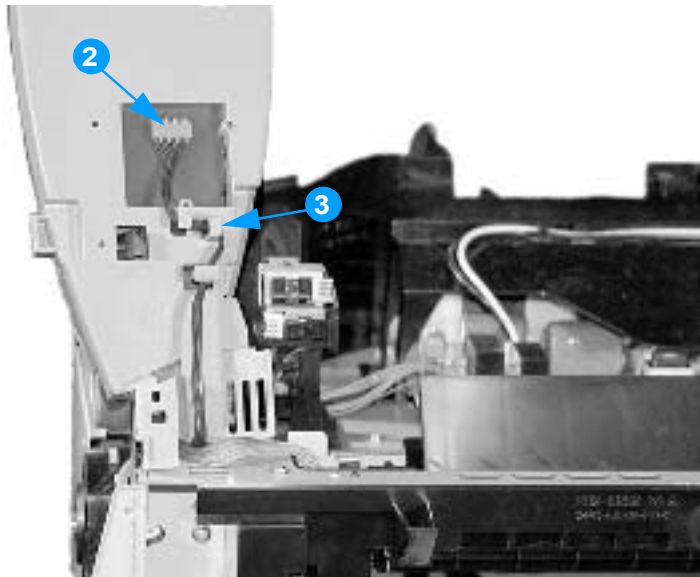
- 1 Open the top cover if you have not already removed it.
- 2 Remove the three screws shown in callout 1.
- 3 Lift the right side of the control panel to access the connector underneath the left side.
- 4 Disconnect the connector shown in callout 2, and unwind the wires from the stay (callout 3).
- 5 Remove the control panel.



**Figure 6-13** Removing and replacing the control panel (1 of 3)



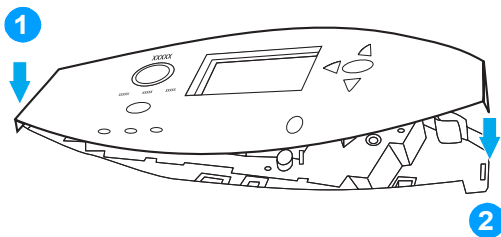
**Figure 6-14** Removing and replacing the control panel (2 of 3)



**Figure 6-15** Removing and replacing the control panel (3 of 3)

### To install a new control panel overlay

- 1 Position the new overlay over the top of the control panel.
- 2 Insert the left tab of the overlay into the slot on the printer face (callout 1). Line up the tab on the right side of the overlay with the slot on the right side of the control panel (callout 2). Set the overlay in place by pushing down on the overlay near the right side.



**Figure 6-16** Installing a new control panel overlay

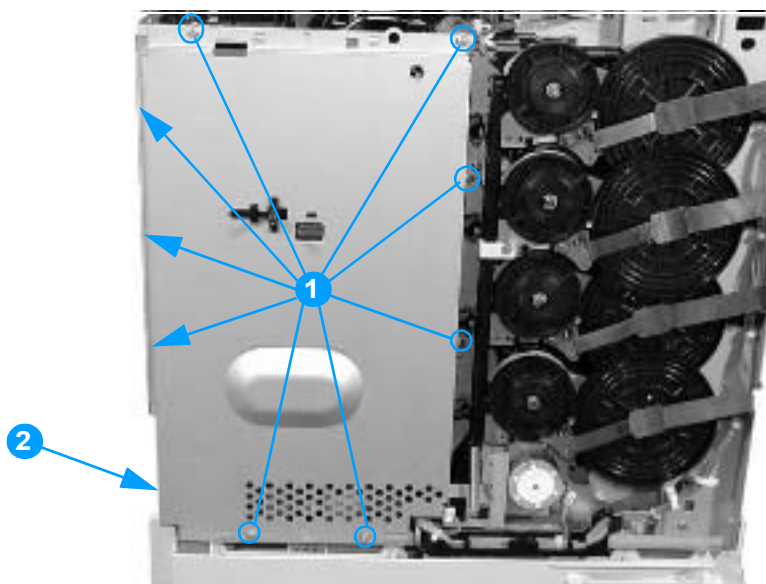
## Internal components

### DC controller shield

To access and service many of the internal components, you first need to remove the DC controller shield on the left side of the printer.

#### To remove the DC controller shield

- 1 Remove the print cartridges and the ETB.
- 2 Remove the rear cover. See page 144.
- 3 Remove the top cover. See page 145.
- 4 Remove the rear top cover. See page 146.
- 5 Remove the left cover. See page 148.
- 6 Remove the 9 screws shown in callout 1.
- 7 A possible tenth screw might be located on the rear of the printer at the bottom of the DC controller shield (callout 2). If a screw is present, remove it.
- 8 Remove the DC controller shield.

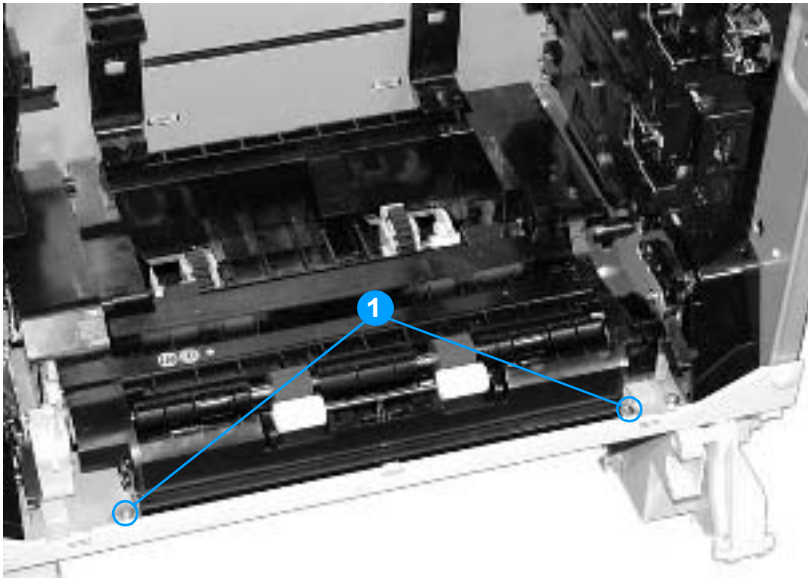


**Figure 6-17** Removing and replacing the DC controller shield

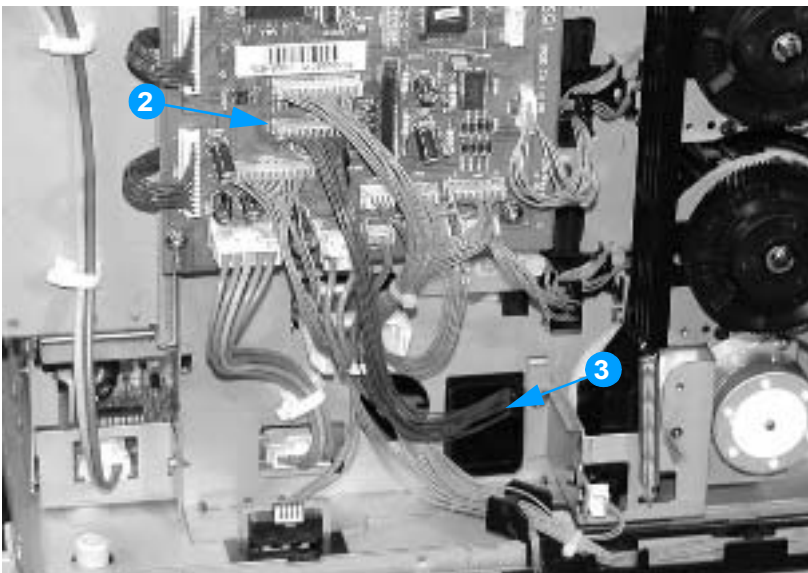
## Internal components (front)

### Paper pickup unit

- 1 Remove the DC controller shield. See page 155.
- 2 Move the ETB latch receptacles to the UP position. Use a screwdriver to rotate them because they are stiff.
- 3 Remove the two screws shown in callout 1.
- 4 Disconnect the connector (J1020, shown in callout 2) from the DC controller PCB.
- 5 Lift the paper pickup unit, and pull it forward. Guide the connector through the trough shown in callout 3.



**Figure 6-18** Removing and replacing the paper pickup unit (1 of 2)

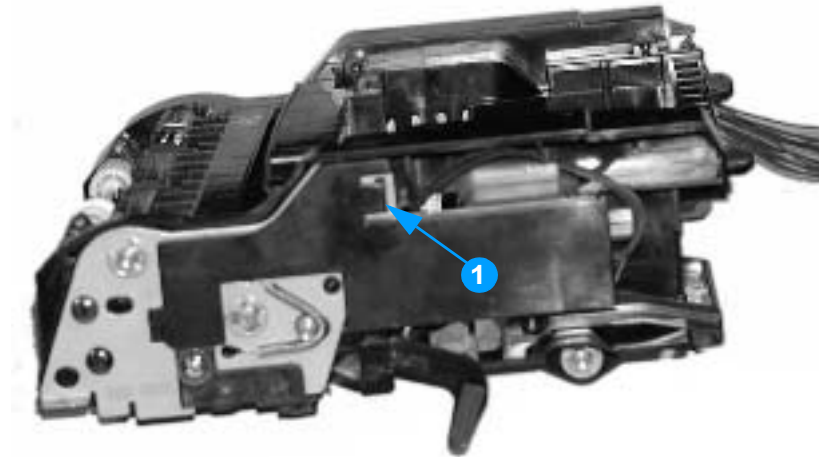


**Figure 6-19** Removing and replacing the paper pickup unit (2 of 2)

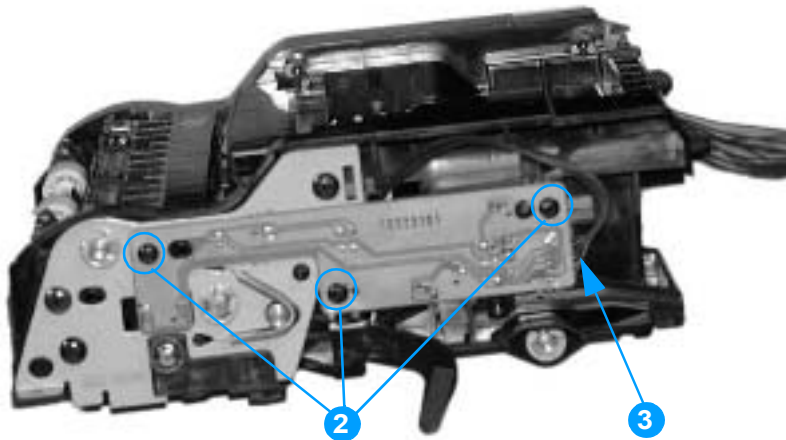
## Paper pickup sensor PCB

### To remove the paper pickup sensor PCB

- 1 Remove the paper pickup unit. See page 156.
- 2 Push in on the black tab, shown in callout 1, on the right side of the paper pickup unit.
- 3 Remove the sensor cover.
- 4 Remove the three screws shown in callout 2.
- 5 Disconnect the connector shown in callout 3, and remove the sensor PCB.



**Figure 6-20** Removing and replacing the paper pickup sensor PCB (1 of 2)

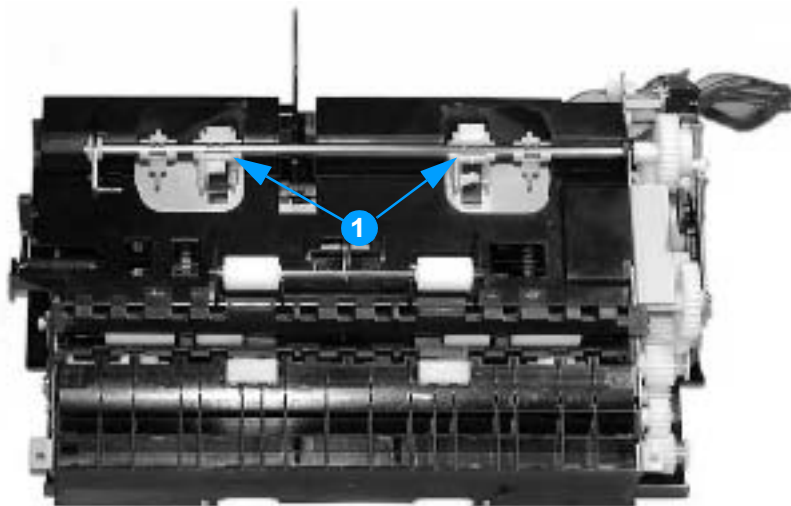


**Figure 6-21** Removing and replacing the paper pickup sensor PCB (2 of 2)

## Cassette (Tray 2) paper pickup rollers

### To remove the paper pickup rollers

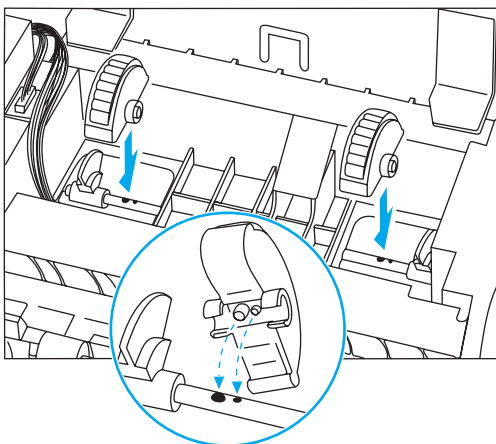
- 1 Remove the ETB and the print cartridges.
- 2 Remove the paper pickup unit. See page 156.
- 3 On the paper pickup unit, from the bottom, grasp the paper pickup rollers shown in callout 1, and firmly push down to remove them.



**Figure 6-22** Removing the cassette pickup rollers

### Reinstallation tip

When reinstalling the paper pickup rollers, be sure to fit the pins on the pickup roller into the holes on the pickup roller shaft.



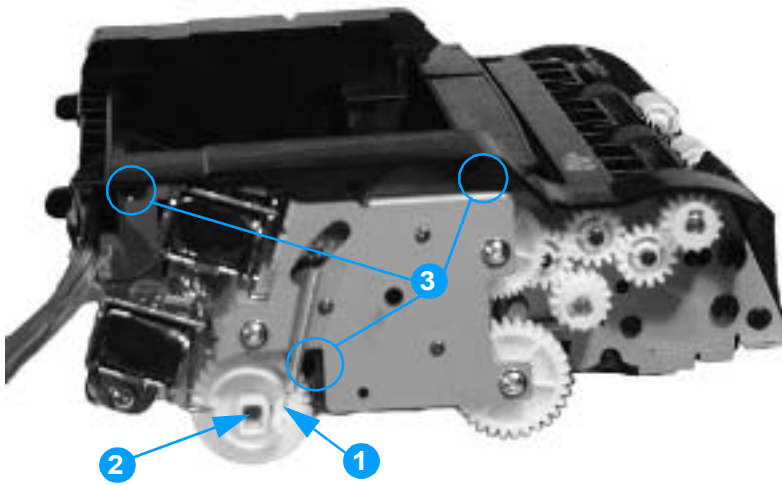
**Figure 6-23** Replacing the cassette pickup rollers



## Paper pickup drive unit

### To remove the paper pickup drive unit

- 1 Remove the paper pickup unit. See page 156.
- 2 On the bottom of the paper pickup unit, remove the screw holding the gear cover in place, and then remove the gear cover.
- 3 Unhook the spring from the gear, shown in callout 1.
- 4 Using a flat-bladed screwdriver, push down on the tab in the center of the gear to release it (callout 2), and then remove the gear.
- 5 Remove the three black screws shown in callout 3.
- 6 Disconnect the three connectors on the back of the paper pickup drive unit, and remove the unit.



**Figure 6-24** Removing and replacing the paper pickup drive unit

## Multi-purpose tray pickup roller and separation pad

### To remove the multi-purpose tray pickup roller and separation pad

- 1 Remove Tray 2 from the printer, and remove any paper in the tray.
- 2 Rotate the two lock pins outward, shown in callout 1, and tilt the cassette cover forward.
- 3 Push the blue roller snap shown in callout 2 towards the back of the tray, and remove it.
- 4 Pull up on the multi-purpose tray pickup roller shown in callout 3, and remove it.
- 5 Push outward on the two tabs that hold the separation pad in place (callout 4).
- 6 Pull the separation pad forward to remove it (callout 5).

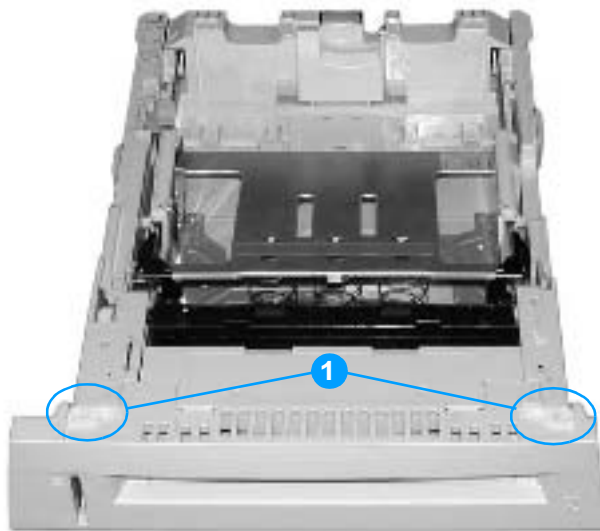


Figure 6-25 Removing and replacing the multi-purpose tray pickup roller and separation pad (1 of 2)

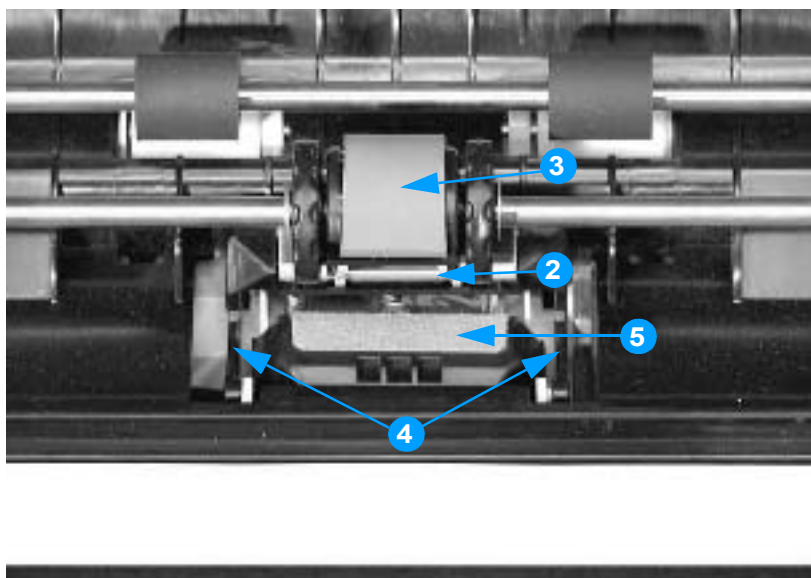


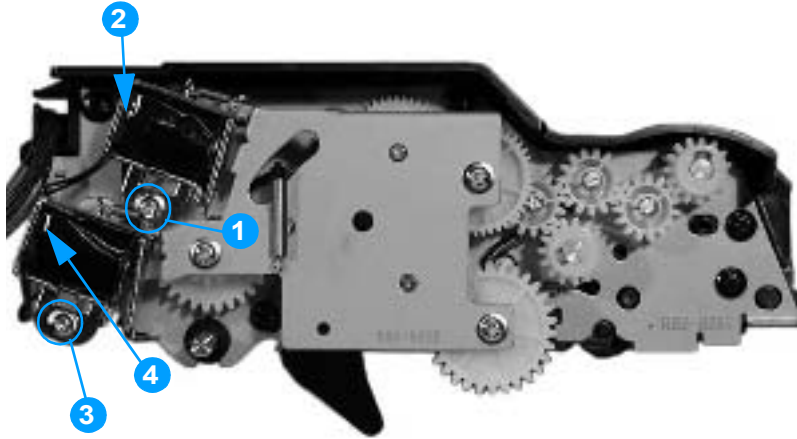
Figure 6-26 Removing and replacing the multi-purpose tray pickup roller and separation pad (2 of 2)

**Note** Always replace the separation pad when you replace the multi-purpose tray pickup roller.

## Solenoids

### To remove the cassette solenoid or the multi-purpose tray solenoid

- 1 Remove the paper pickup unit. See page 156.
- 2 To remove the multi-purpose tray solenoid, remove the screw shown in callout 1 and disconnect the connector shown in callout 2.
- 3 To remove the cassette solenoid, remove the screw shown in callout 3 and disconnect the connector shown in callout 4.



**Figure 6-27** Removing and replacing the solenoids

## Color registration detection unit

### To remove the color registration detection unit

- 1 Open the top cover and the front cover.
- 2 Remove the ETB.

---

#### Note

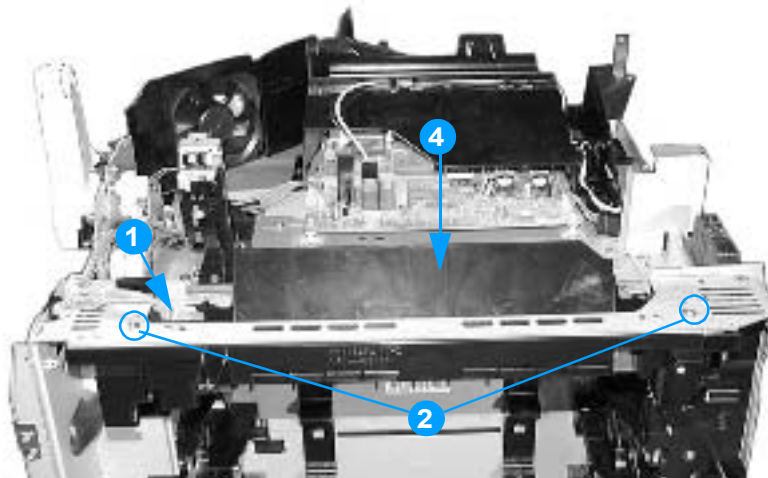
To protect the ETB from damage, always remove the ETB when removing the color registration detection unit.

- 3 Remove the control panel. See page 153.
- 4 Disconnect the connector shown in callout 1.
- 5 Remove the two screws shown in callout 2.
- 6 Remove the screw shown in callout 3 (this screw is located on the right side of the printer, underneath the plate where the screws in callout 2 are located).
- 7 Remove the control panel support assembly shown in callout 4, and then remove the color registration detection unit, which is located behind the stay.

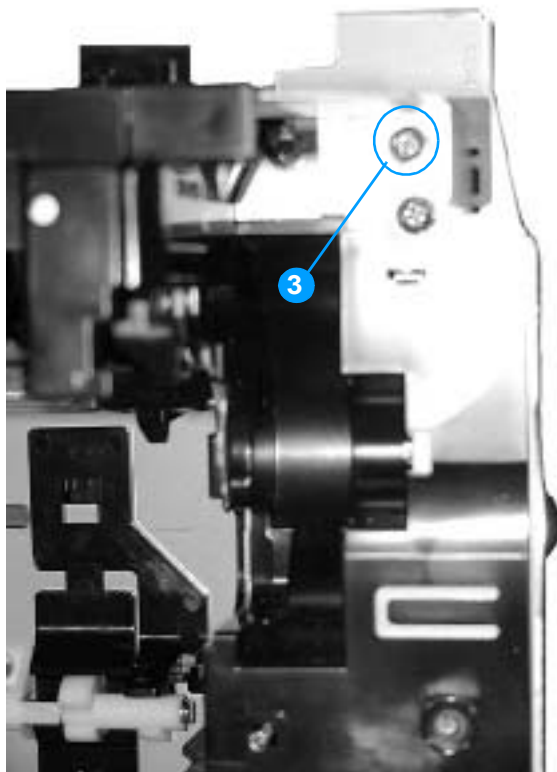
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#### CAUTION

Do not touch the lens for the color registration detection unit.



**Figure 6-28** Removing and replacing the color registration detection unit (1 of 2)



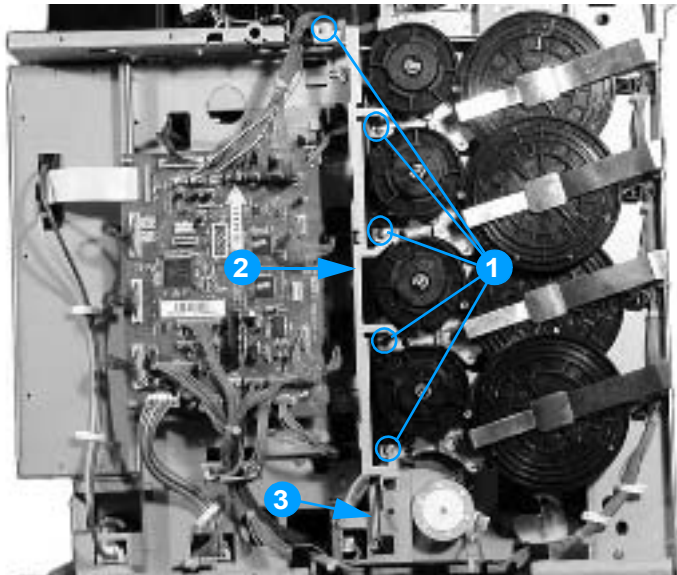
**Figure 6-29** Removing and replacing the color registration detection unit (2 of 2)

## Internal components (left side)

### Drum drive units

#### To remove the developing disengaging rod

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the five screws shown in callout 1, and remove the drum drive grounding plate (callout 2), which covers the developing disengaging rod.
- 7 Unhook the spring shown in callout 3, and slide the developing disengaging rod up and out.

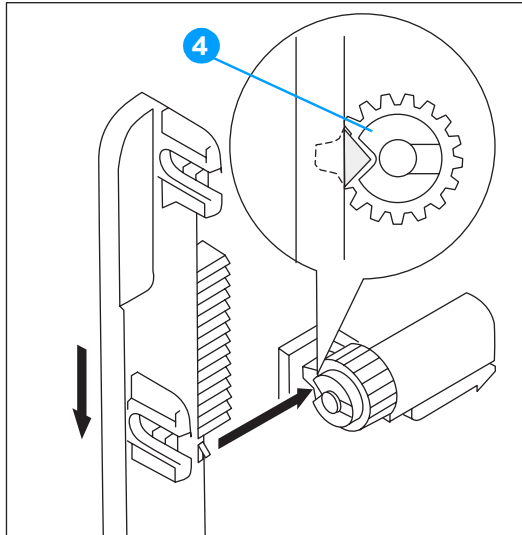


**Figure 6-30** Removing and replacing the developing disengaging rod

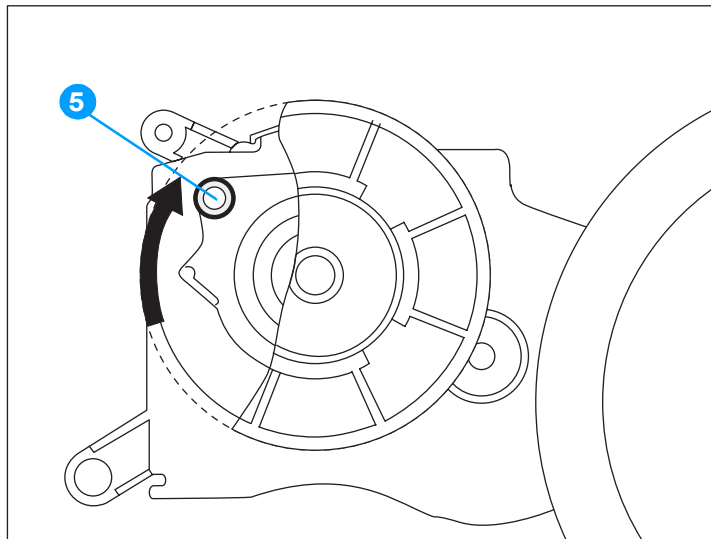
## Reinstallation tip

When reinstalling the developing disengaging rod, be sure to rotate the white gear (located between the black and magenta drum drive units) fully clockwise until it comes to a complete stop, as indicated in callout 4 below.

Also make sure the developing disengaging rod passes through the slots in the drive clutches (in the up position) in each of the four drum drive units, engaging each clutch. The clutch on the yellow drum drive unit is particularly difficult to see and engage properly.



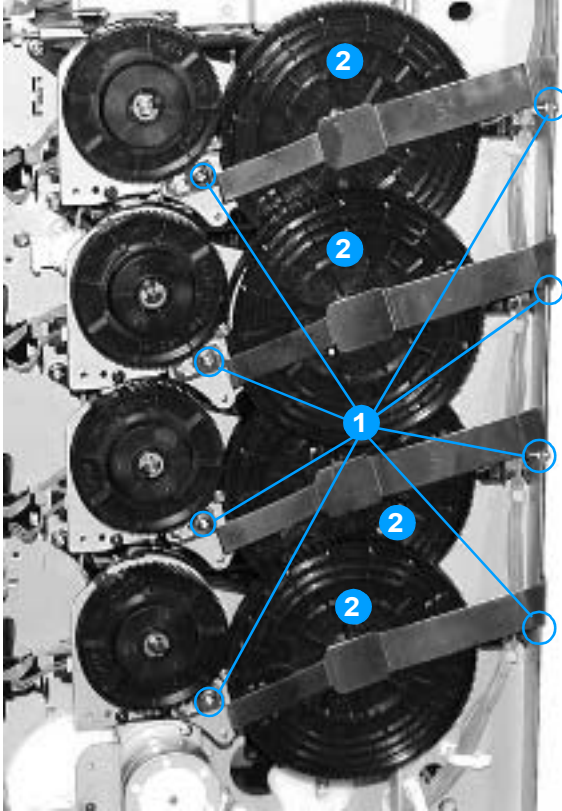
**Figure 6-31** Reinstalling the developing disengaging rod (1 of 2)



**Figure 6-32** Reinstalling the developing disengaging rod (2 of 2)

## To remove the drum drive gears

- 1 Remove the developing disengaging rod. See page 164.
- 2 Remove the eight screws shown in callout 1, and remove the four drum gear grounding plates. Note that the grounding plates and drive gears for the cyan and magenta drum drive units have longer shafts than for the yellow and black drum drive units.
- 3 Remove the four drum drive gears shown in callout 2.



**Figure 6-33** Removing and replacing the drum drive gears

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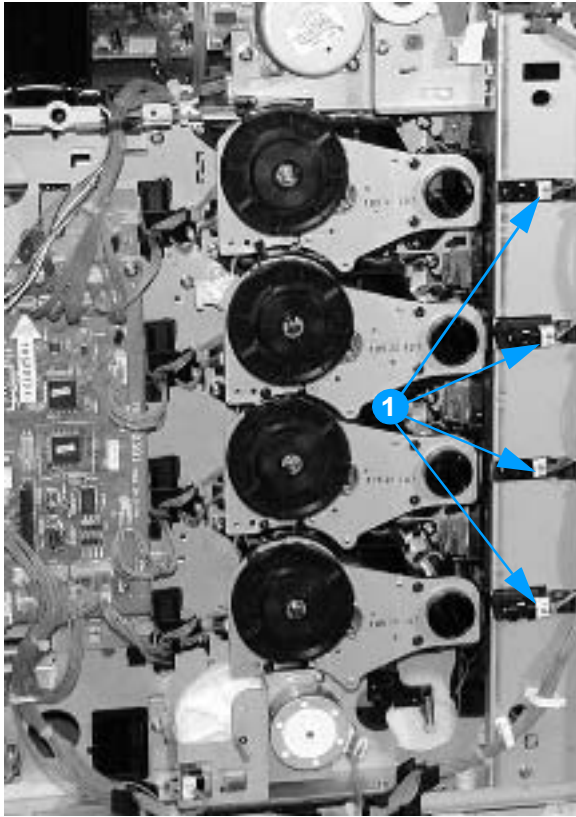
### Note

Calibrate the printer after removing and replacing any of the drum drive gears. See “Calibrate Now” on page 294.



## To remove the drum home position sensors

- 1 Remove the drum drive gears. See page 166.
- 2 Disconnect the four connectors shown in callout 1.
- 3 Push each drum home position sensor holder (behind the connectors shown in callout 1) toward the rear of the printer, and flex it to remove the projection. Remove the sensor.
- 4 Disengage the two tabs holding each drum home position sensor in its holder, and remove the sensors.



**Figure 6-34** Removing and replacing the drum home position sensors

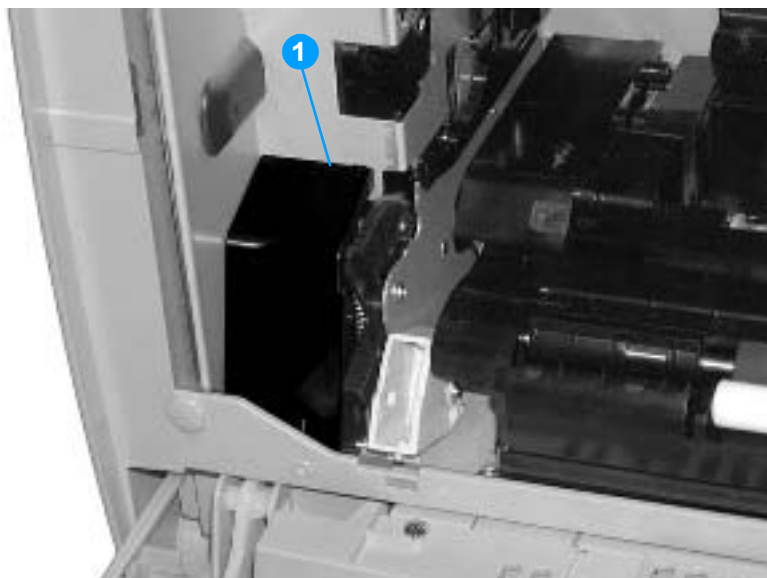
---

### Note

Calibrate the printer after reassembling the drum drive unit. See “Calibrate Now” on page 294.

## To remove the drum drive motors

- 1 Remove the drum drive gears. See page 166.
- 2 From the front of the printer, release the tab that holds the black interlock cover in place (callout 1), and then remove the interlock cover.
- 3 Remove the interlock arm from the interlock lever (callout 2).

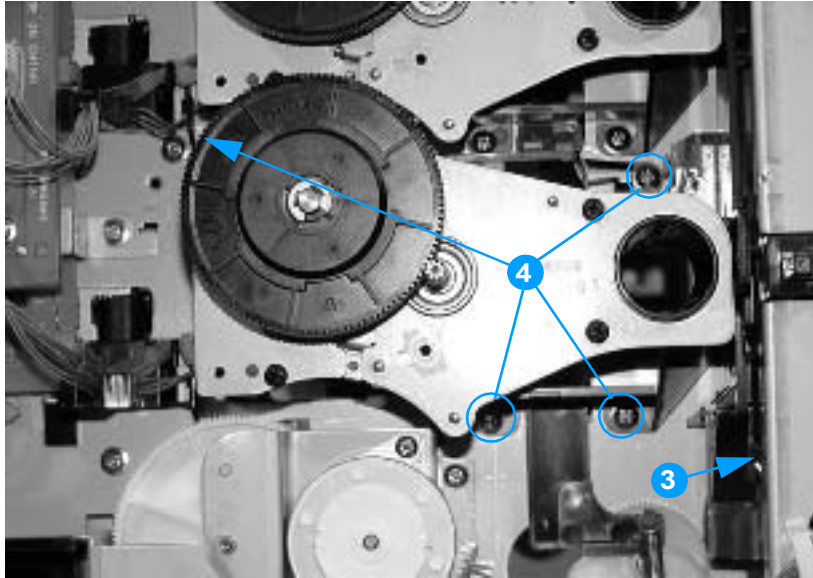


**Figure 6-35** Removing and replacing the interlock cover



**Figure 6-36** Removing and replacing the interlock arm

- 4 Lift the cartridge shutter bar, shown in callout 3, up and out of the printer.
- 5 Remove the four screws shown in callout 4. (In the picture below, the screw in the upper left corner is hidden by the gear.)
- 6 Disconnect the connector for each drum drive motor from the DC controller PCB.
- 7 Remove the drum drive motors.



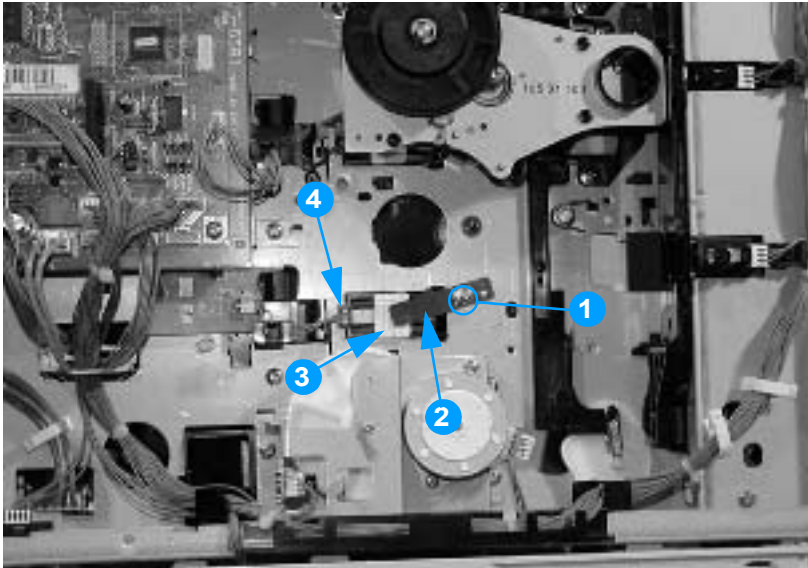
**Figure 6-37** Removing and replacing the drum drive motors (cyan motor shown)

**Note** Calibrate the printer after removing or replacing the drum drive motors. See page 294.

## Memory tag antenna PCBs

### To remove the memory tag antenna PCBs

- 1 Remove the drum drive unit. See page 164.
- 2 Remove the screw shown in callout 1, and remove the grounding plate shown in callout 2.
- 3 Remove the white retainer shown in callout 3.
- 4 Disconnect the connector, shown in callout 4, from the memory controller PCB.
- 5 Remove the memory tag antenna PCB, which is inside the slot.

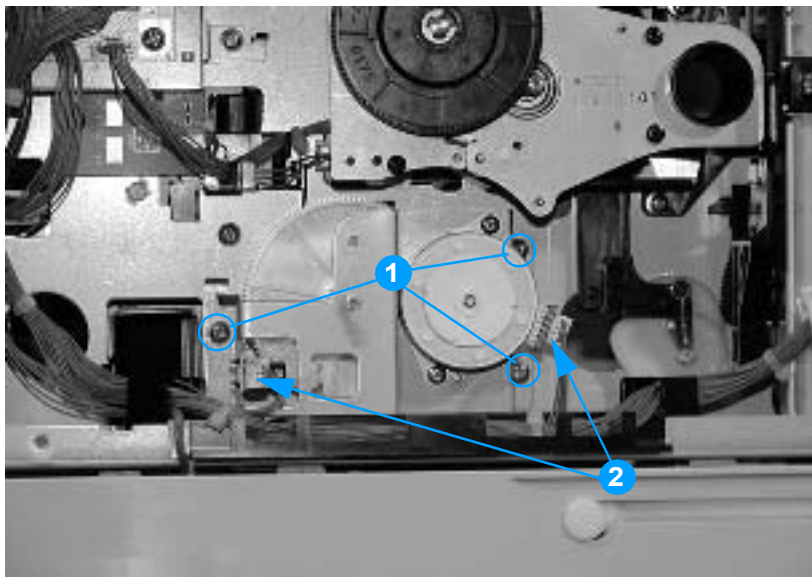


**Figure 6-38** Removing and replacing the memory tag antenna PCB (cyan is shown)

## Developing disengaging motor assembly

### To remove the developing disengaging motor assembly

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the developing disengaging rod. See page 164.
- 7 Remove the three screws shown in callout 1.
- 8 Disconnect the two connectors shown in callout 2.
- 9 Remove the developing disengaging motor assembly.



**Figure 6-39** Removing and replacing the developing disengaging motor assembly

## DC controller PCB

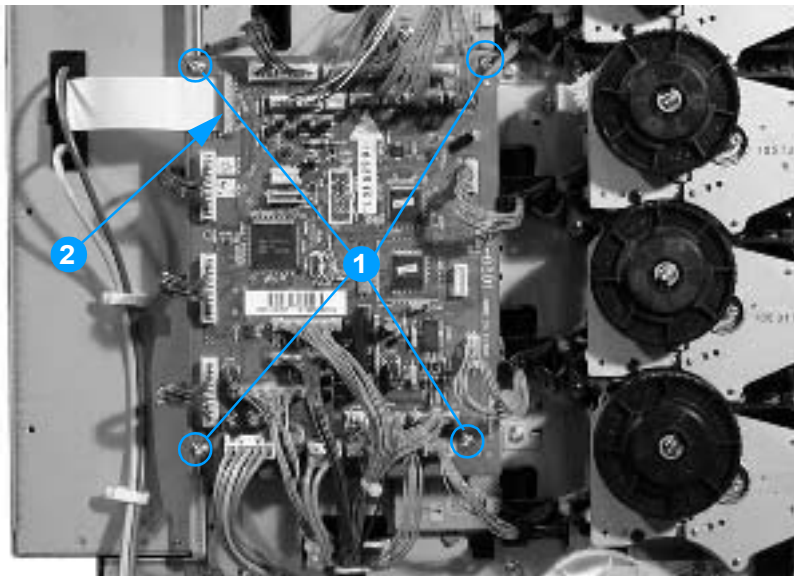
### To remove the DC controller PCB

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the four screws shown in callout 1.
- 7 Disconnect all the connectors on the DC controller PCB, including the formatter ribbon cable shown in callout 2.

#### CAUTION

When removing the formatter ribbon cable, be careful not to tear it or to damage the connector. Use a flat-blade screwdriver to release the brown tab over the connection. Do not pull on the ribbon cable without releasing this tab.

- 8 Remove the DC controller PCB.



**Figure 6-40** Removing and replacing the DC controller PCB

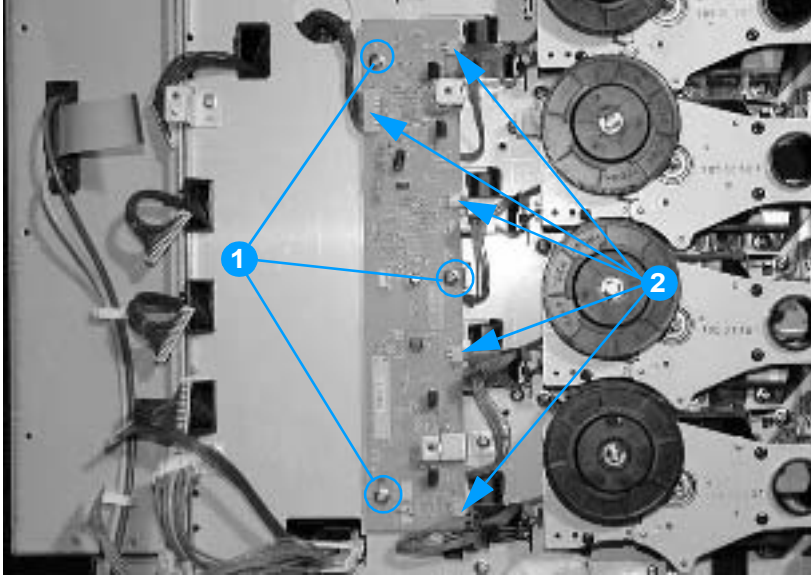
#### Note

Calibrate the printer after removing or replacing the DC controller. See “Calibrate Now” on page 294.

## Memory controller PCB

### To remove the memory controller PCB

- 1 Remove the DC controller PCB. See page 172.
- 2 Remove the three screws shown in callout 1.
- 3 Disconnect the five connectors shown in callout 2.
- 4 Remove the memory controller PCB.

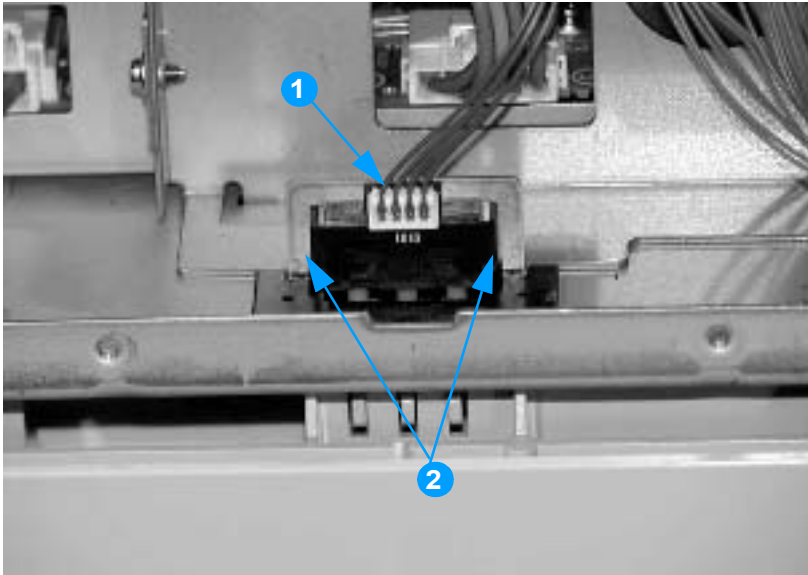


**Figure 6-41** Removing and replacing the memory controller PCB

## Cassette paper size detection switch

### To remove the cassette paper size detection switch

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Disconnect the connector shown in callout 1.
- 7 Squeeze the two tabs shown in callout 2, and remove the cassette paper size detection switch.



**Figure 6-42** Removing and replacing the cassette paper size detection switch

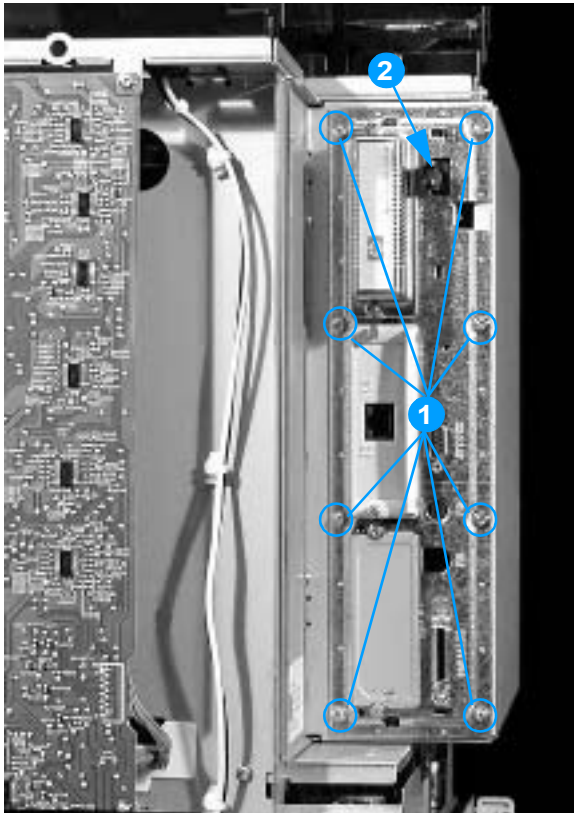


## Internal components (rear)

### Formatter

#### To remove the formatter

- 1 Remove the eight screws shown in callout 1.
- 2 Grasp the black disk drive lock shown in callout 2, and pull the formatter out of the printer.



**Figure 6-43** Removing and replacing the formatter

**Note** Calibrate the printer after replacing the formatter. See “Calibrate Now” on page 294 for instructions.

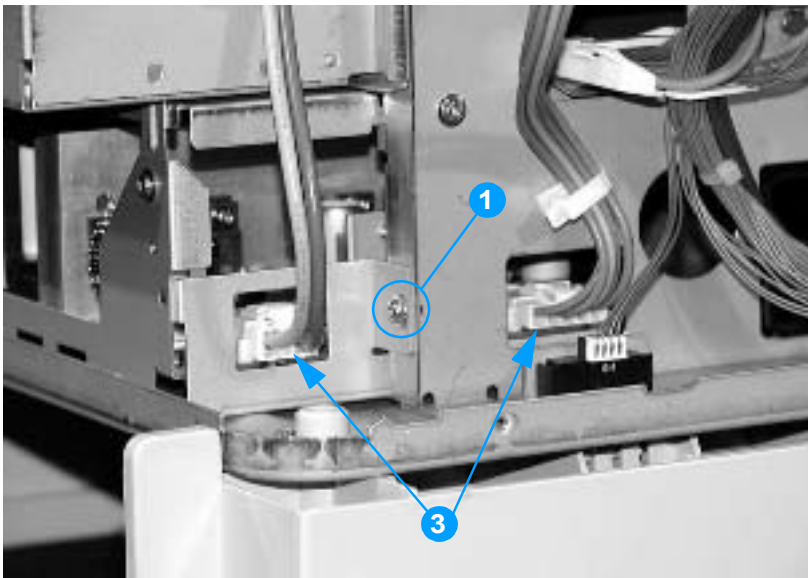
## Low-voltage power supply

### To remove the low-voltage power supply

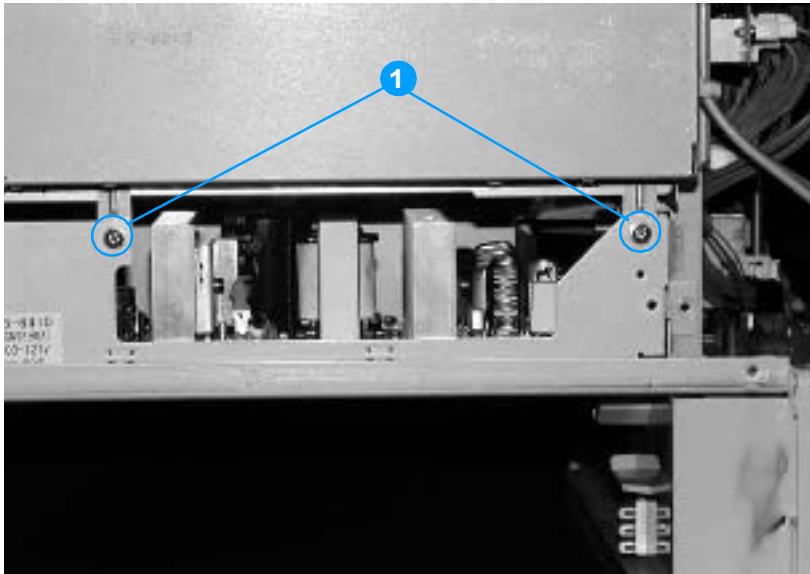
- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the right cover. See page 150.
- 7 Remove the five screws shown in callout 1. (See the figures on the next page for the locations of four of the screws.)
- 8 Disconnect the connecting rod shown in callout 2. (See the next page.)
- 9 Disconnect the three connectors shown in callout 3.
- 10 Remove the low-voltage power supply.

#### **CAUTION**

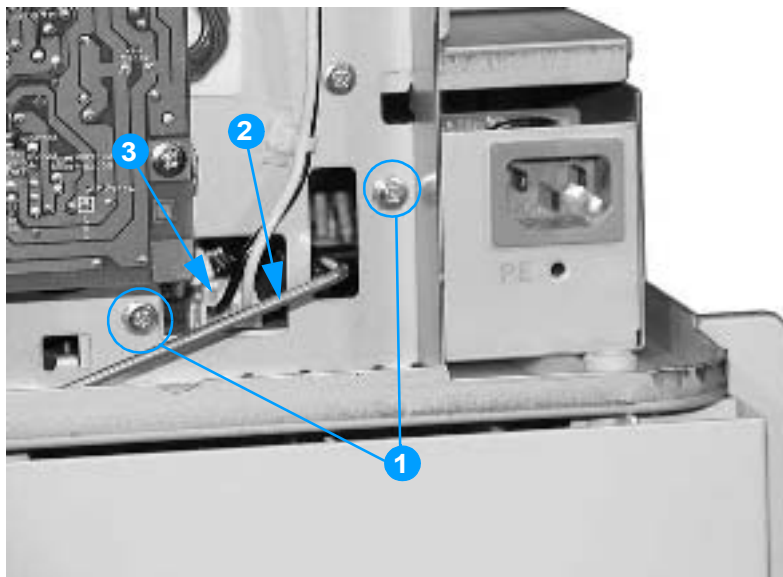
When removing the low-voltage power supply, be sure that elements do not touch sheet metal.



**Figure 6-44** Removing and replacing the low-voltage power supply, left side of printer (1 of 3)



**Figure 6-45** Removing and replacing the low-voltage power supply, rear of printer (2 of 3)



**Figure 6-46** Removing and replacing the low-voltage power supply (3 of 3)

## Formatter case

### To remove the formatter case

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the right cover. See page 150.
- 7 At the rear of the printer, remove the eight screws shown in callout 1.
- 8 On the DC controller PCB, release the brown tab covering the formatter ribbon cable, and disconnect the cable (callout 2).

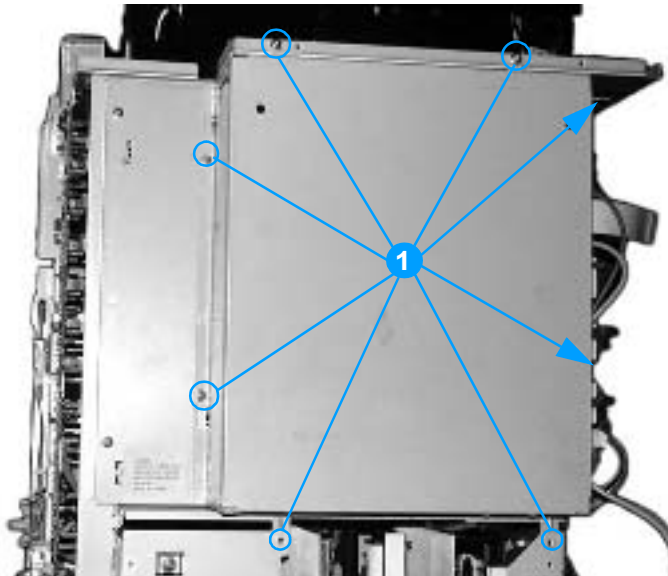
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**CAUTION**

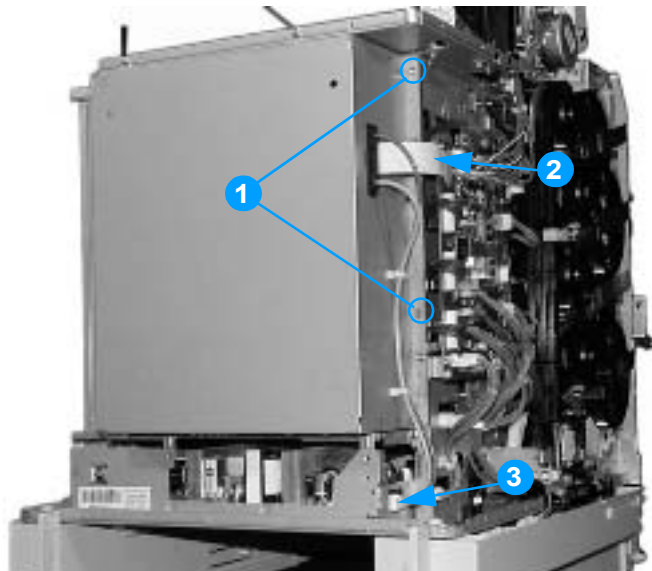
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When removing the formatter ribbon cable, be careful not to tear it. Use a flat-blade screwdriver to release the brown tab over the connection. Do not pull on the ribbon cable without releasing this tab.

- 9 Disconnect the connector shown in callout 3, and remove the formatter case.



**Figure 6-47** Removing and replacing the formatter case (1 of 2)



**Figure 6-48** Removing and replacing the formatter case (2 of 2)

## Laser/scanner units

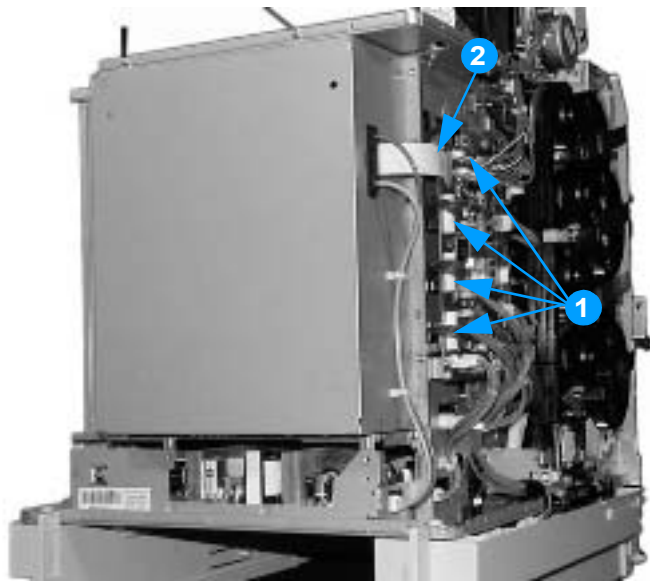
### To remove the laser/scanner cover plate

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the right cover. See page 150.
- 7 On the DC controller PCB, disconnect the four connectors shown in callout 1.
- 8 On the DC controller PCB, release the brown tab covering the formatter ribbon cable, and disconnect the cable (callout 2).

#### CAUTION

When removing the formatter ribbon cable, be careful not to tear it. Use a flat-blade screwdriver to release the brown tab over the connection. Do not pull on the ribbon cable without releasing this tab.

- 9 Remove the formatter case. See page 178.



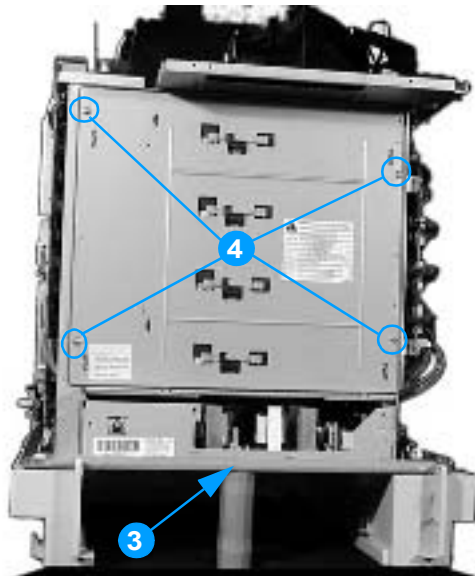
**Figure 6-49** Disconnecting the laser/scanner connectors and formatter ribbon cable

- 10 At the rear of the printer, place the cardboard spacer (included with the laser/scanner assembly) underneath the V mark on the bottom of the printer frame (callout 3 on the next page).

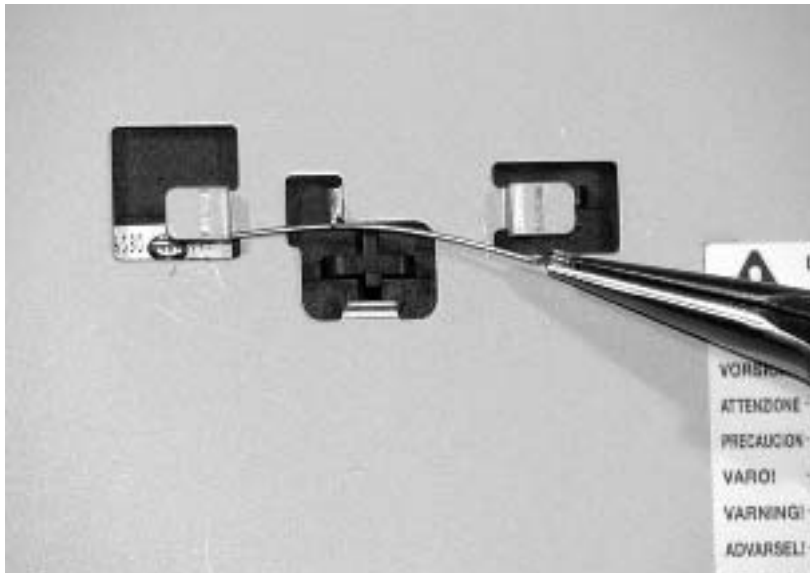
#### CAUTION

Always place the spacer under the printer frame. This spacer is important to support the printer and keep it from flexing when the plate that covers the laser/scanners is removed. If the printer frame flexes, the laser beams may become skewed, resulting in print quality problems.

- 11 Remove the four screws shown in callout 4.
- 12 Using needle-nose pliers, pull down on the right side of the wire clip, then release the left side of the clip from the bracket. Repeat this procedure for each of the four clips.
- 13 Remove the plate that covers the laser/scanner units.



**Figure 6-50** Removing and replacing the laser/scanner cover plate (1 of 2)



**Figure 6-51** Removing and replacing the laser/scanner cover plate (2 of 2)

### Reinstallation tip

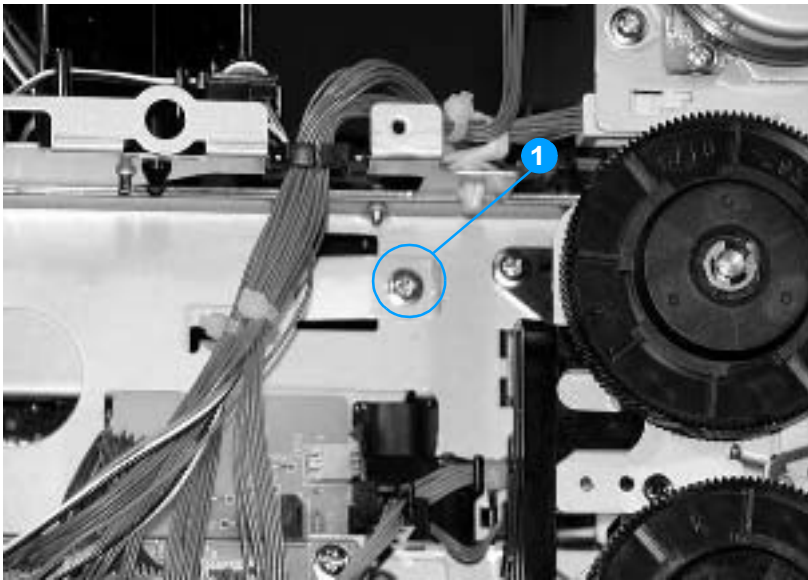
When reinserting the four wire clips, insert the left end of the clip first, thread the clip under the center notch, and then insert the right end of the clip.

## To remove the laser/scanner retaining bars

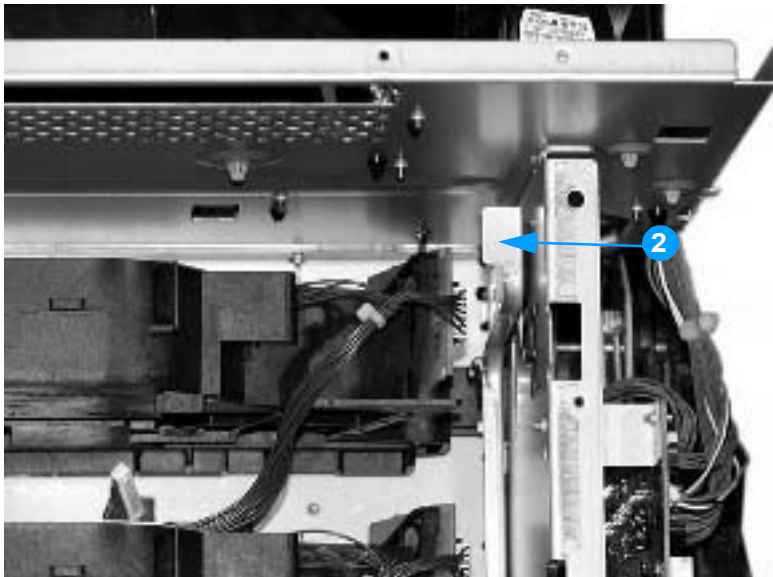
- 1 Remove the laser/scanner cover plate. See page 180.
- 2 Pull the cables for the four laser/scanner connectors free of the printer frame.
- 3 On the left side of the printer, remove the screw above the DC controller, shown in callout 1.
- 4 Push the top of the sheet-metal scanner retaining bar towards the laser/scanners (callout 2).
- 5 Rotate the bar down and carefully remove it from the printer.

### CAUTION

The scanner retaining bars are under spring tension. Remove them carefully.



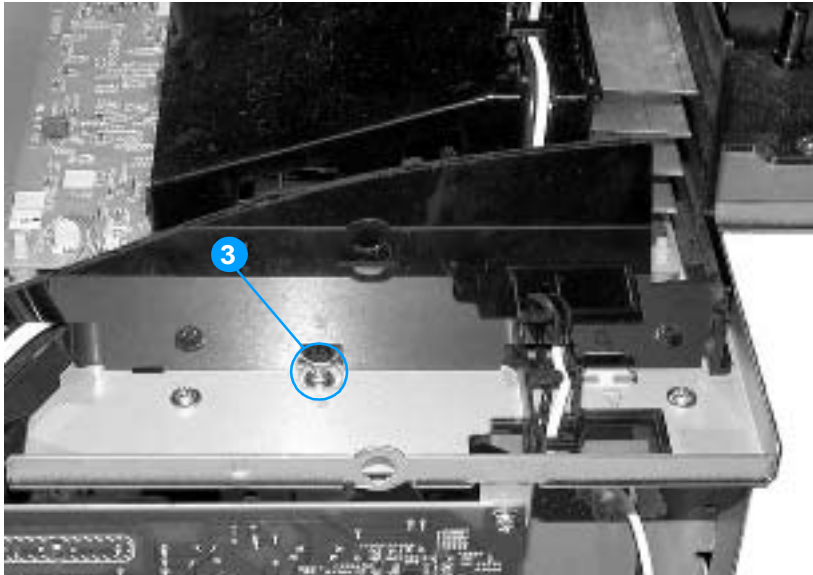
**Figure 6-52** Removing and replacing the left side laser/scanner retaining bar, left side of printer (1 of 2)



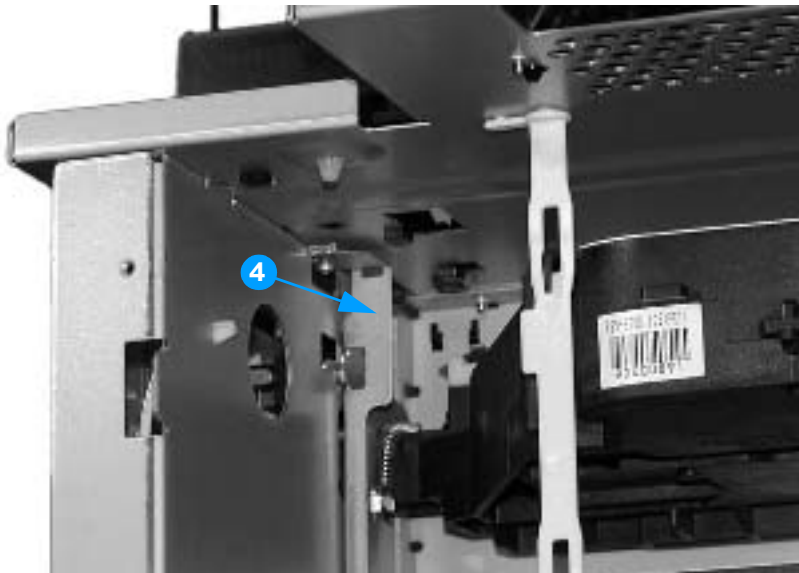
**Figure 6-53** Removing and replacing the left side laser/scanner retaining bar, rear of printer (2 of 2)



- 6 On the top surface of the right side of the printer, remove the screw shown in callout 3.
- 7 On the right side of the printer, push the top of the sheet-metal scanner retaining bar in towards the laser/scanners (callout 4).
- 8 Rotate the bar down and carefully remove it from the printer.



**Figure 6-54** Removing and replacing the right side laser/scanner retaining bar, right side of printer (1 of 2)



**Figure 6-55** Removing and replacing the right side laser/scanner retaining bar, rear of printer (2 of 2)

### Reinstallation tip

Reinstall the laser/scanner retaining bars in the same order you removed them: the left side and then the right side. Feed the connector cables through the frame and reconnect the connectors to the DC controller.

## To remove the laser/scanner units

- 1 Remove the laser/scanner retaining bars. See page 182.
- 2 For the cyan laser/scanner unit, slide it to the left and then pull it out of the printer.
- 3 For the yellow, magenta, and black laser/scanner units, first unhook each unit from the white strap shown in callout 1. Then pull the laser/scanner units out of the printer.

---

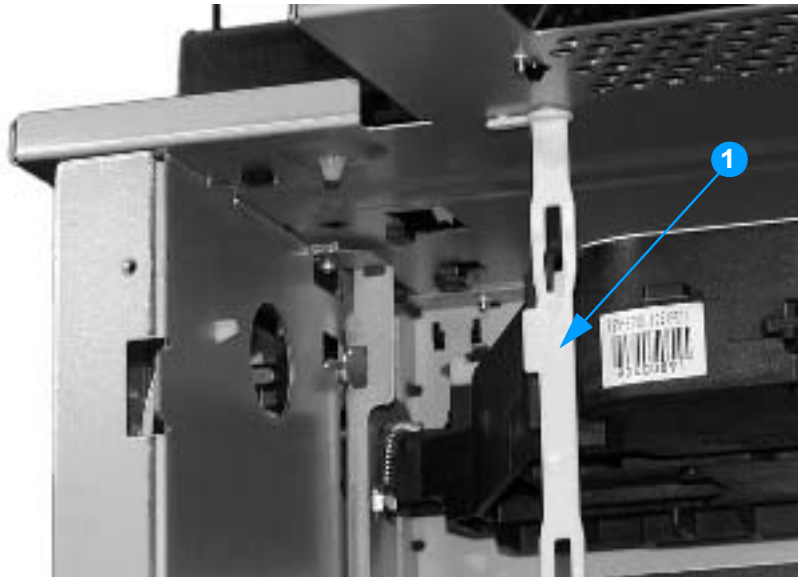
### CAUTION

When reinstalling the laser/scanner units, always reconnect the laser/scanner units to the strap. Failure to do so could cause the laser/scanners to become distorted, and the laser beam could become skewed, resulting in image defects.

---

### CAUTION

The laser/scanner unit is not adjustable in the field. Be sure not to disassemble it.



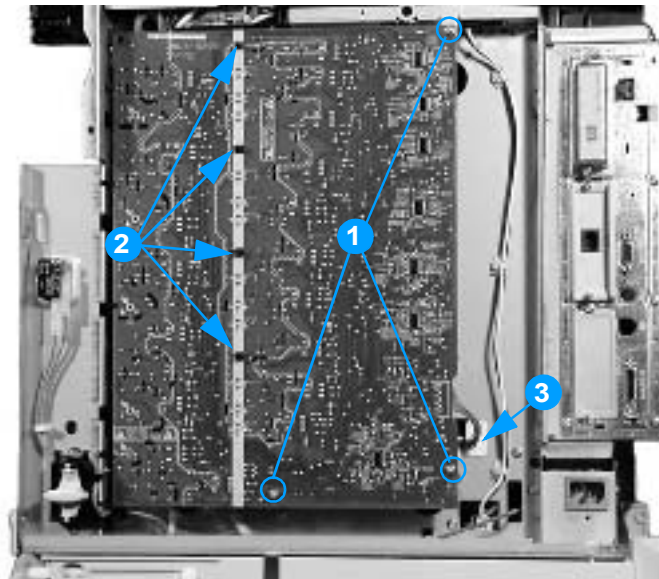
**Figure 6-56** Removing and replacing the laser/scanner units

## Internal components (right side)

### High-voltage power supply PCB

#### To remove the high-voltage power supply PCB

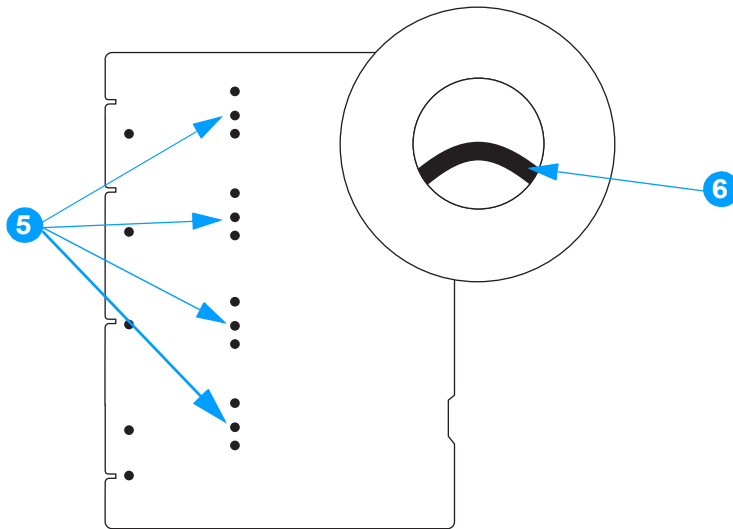
- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the right cover. See page 150.
- 5 Remove the three screws shown in callout 1.
- 6 Pinch the four clips shown in callout 2, and free the board.
- 7 Disconnect the connector shown in callout 3.
- 8 Remove the high-voltage power supply PCB.



**Figure 6-57** Removing and replacing the high-voltage power supply PCB

## Reinstallation tip

When reinstalling the high-voltage power supply PCB, be sure to align the white markings on the left side of the PCB with the hooks on the printer, then snap in the PCB. You can verify that the PCB is aligned correctly by observing the 12 holes shown in callout 5. When the PCB is aligned correctly, you will be able to see part of the contact springs, as shown in callout 6.

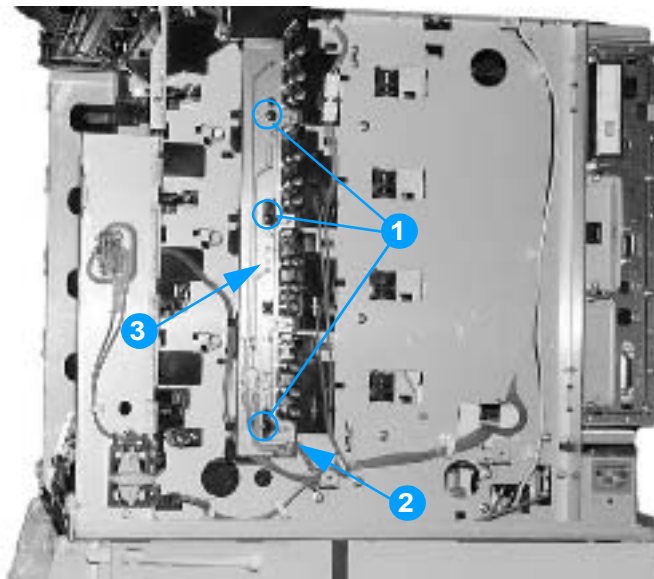


**Figure 6-58** Aligning the high-voltage power supply PCB

## Toner level detection PCB

### To remove the toner level detection PCB

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the right cover. See page 150.
- 5 Remove the high-voltage power supply PCB. See page 185.
- 6 Remove the three screws shown in callout 1.
- 7 Disconnect the connector shown in callout 2.
- 8 Remove the toner level detection PCB (callout 3).

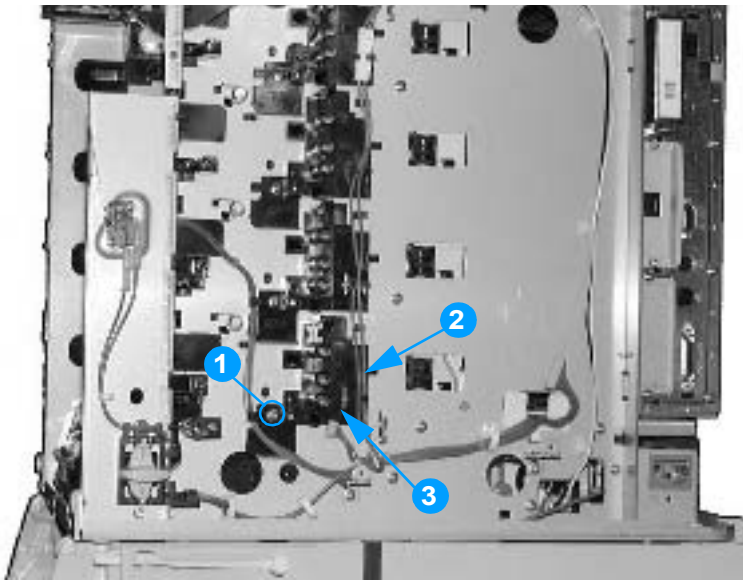


**Figure 6-59** Removing and replacing the toner level detection PCB

## High-voltage contact blocks

### To remove the high-voltage contact blocks

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the right cover. See page 150.
- 5 Remove the high-voltage power supply PCB. See page 185.
- 6 Remove the toner level detection PCB. See page 187.
- 7 Remove the screw shown in callout 1.
- 8 Unthread the wires from their guides, shown in callout 2.
- 9 Remove the high-voltage contact block, shown in callout 3.
- 10 Repeat for each of the four high-voltage contact blocks.

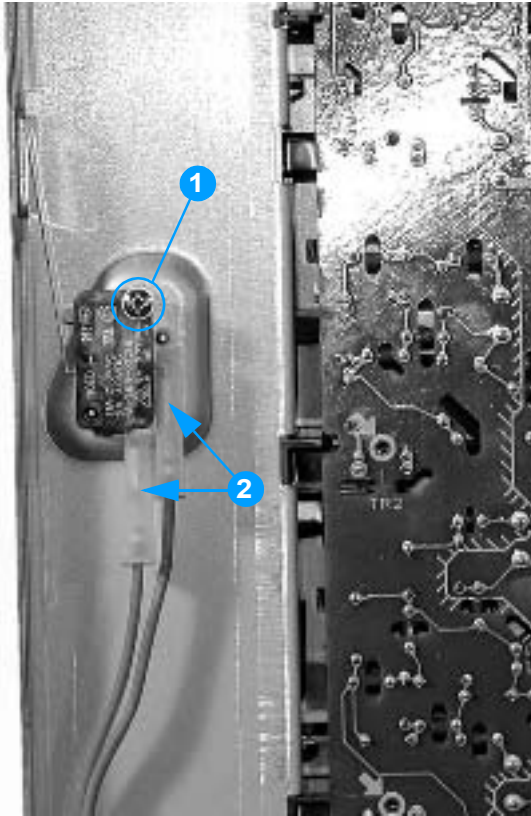


**Figure 6-60** Removing and replacing the high-voltage contact blocks (cyan indicated)

## Door switch

### To remove the door switch

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the right cover. See page 150.
- 5 Remove the screw shown in callout 1.
- 6 Disconnect the connector shown in callout 2.
- 7 Remove the door switch.



**Figure 6-61** Removing and replacing the door switch

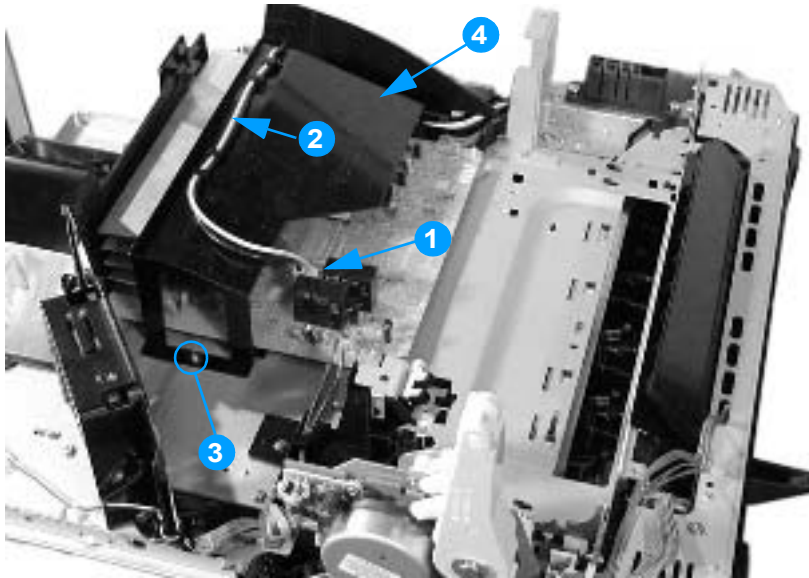
## Internal components (top)

### Fuser power supply PCB

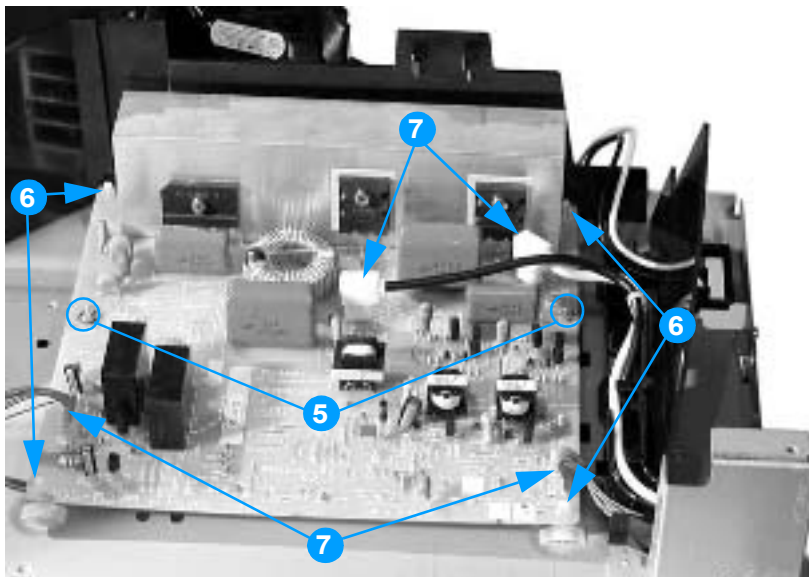
#### To remove and replace the fuser power supply PCB

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Disconnect the connector J203 shown in callout 1.
- 5 Unthread the cable shown in callout 2 from the fuser power supply cover.
- 6 Remove the screw shown in callout 3, and then remove the fuser power supply cover (callout 4).
- 7 Remove the two screws shown in callout 5, and using needle-nose pliers remove the four clips shown in callout 6.
- 8 Disconnect the four connectors shown in callout 7, and remove the fuser power supply PCB.





**Figure 6-62** Removing and replacing the fuser power supply PCB (1 of 2)



**Figure 6-63** Removing and replacing the fuser power supply PCB (2 of 2)

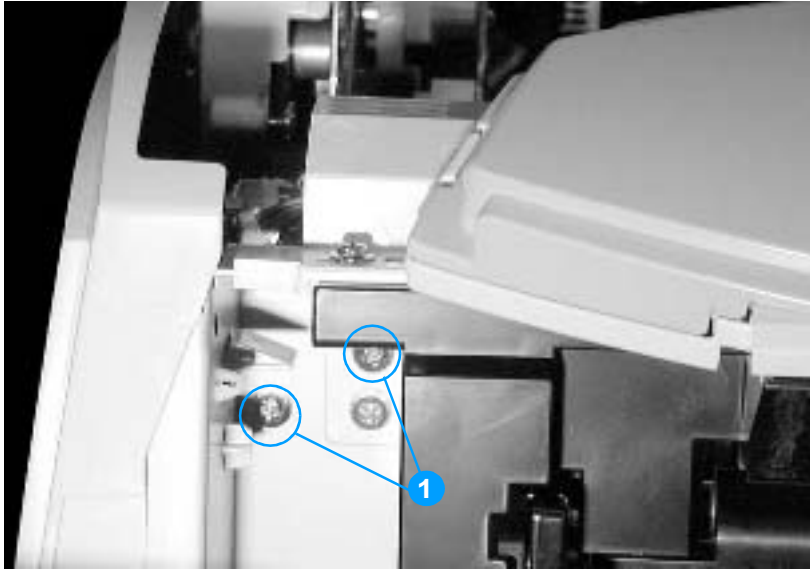
**Reinstallation tip**

When reinstalling the fuser power supply PCB, connect the J203 connector last.

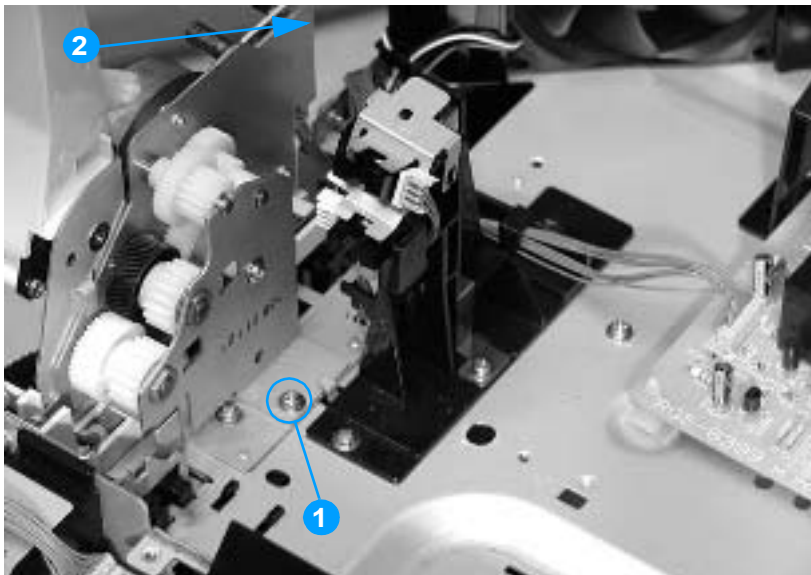
## Fuser drive unit

### To remove the fuser drive unit

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the control panel. See page 153.
- 6 From the left side of the printer, at the top and front of the printer frame, unhook the white tab that holds the hinge cover in place, and remove the hinge cover. (This tab is located above and to the right of the black drum drive unit.)
- 7 On the DC controller, disconnect the three connectors J1002, J1030, and J1034. See page 304.
- 8 Remove the three screws shown in callout 1.
- 9 Disconnect the connector shown in callout 2 (this connector is hidden in the picture; it is on the rear left side of the fuser drive unit).
- 10 Remove the fuser drive unit from the printer.
- 11 Remove the screw that attaches the hinge unit, and remove the hinge unit from the fuser drive.



**Figure 6-64** Removing and replacing the fuser drive unit (1 of 2)

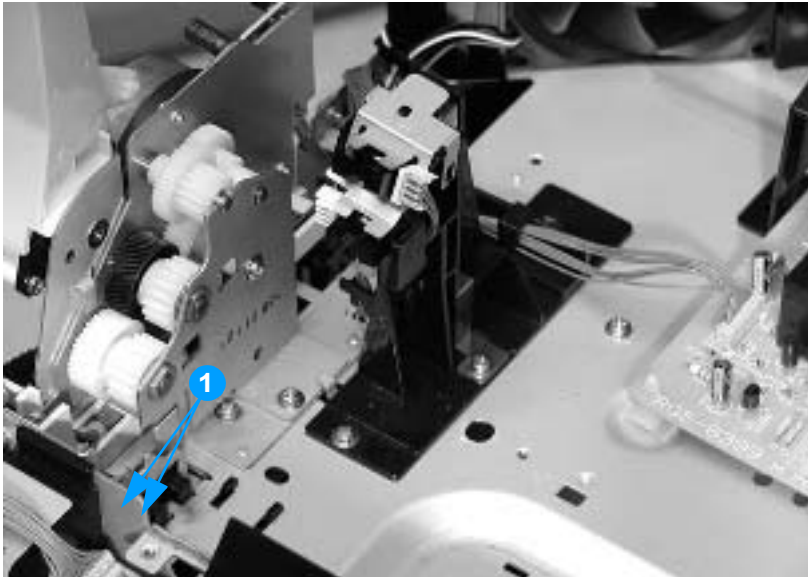


**Figure 6-65** Removing and replacing the fuser drive unit (2 of 2)

## Fuser inlet paper sensor

### To remove the fuser inlet paper sensor

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the fuser. See page 82.
- 5 Unhook the two tabs shown in callout 1 (they are on the front of the sensor).
- 6 Disconnect the connector directly in front of those tabs (this connector is hidden in the picture).
- 7 Remove the fuser paper sensor.

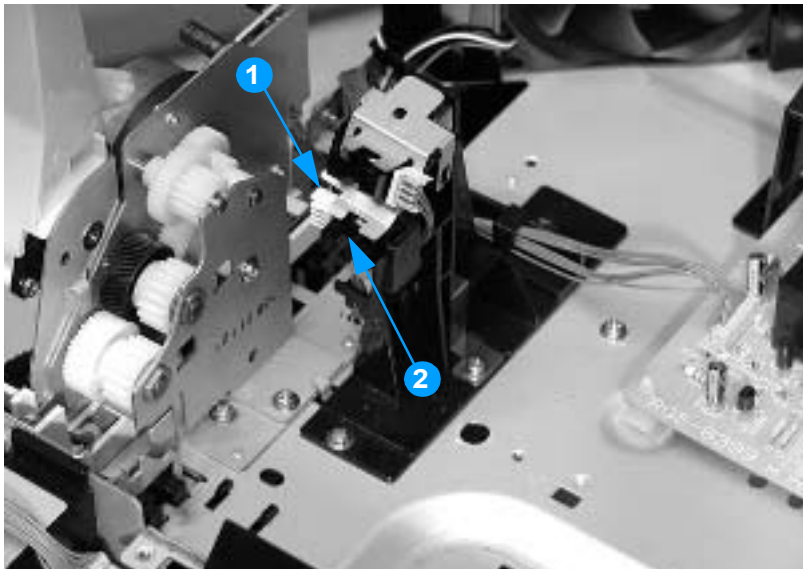


**Figure 6-66** Removing and replacing the fuser paper sensor

## Fuser delivery sensor

### To remove the fuser delivery sensor

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the fuser. See page 82.
- 5 Unhook the two tabs on the back of the sensor (on the connector side).
- 6 Disconnect the connector shown in callout 1.
- 7 Remove the fuser delivery sensor shown in callout 2.

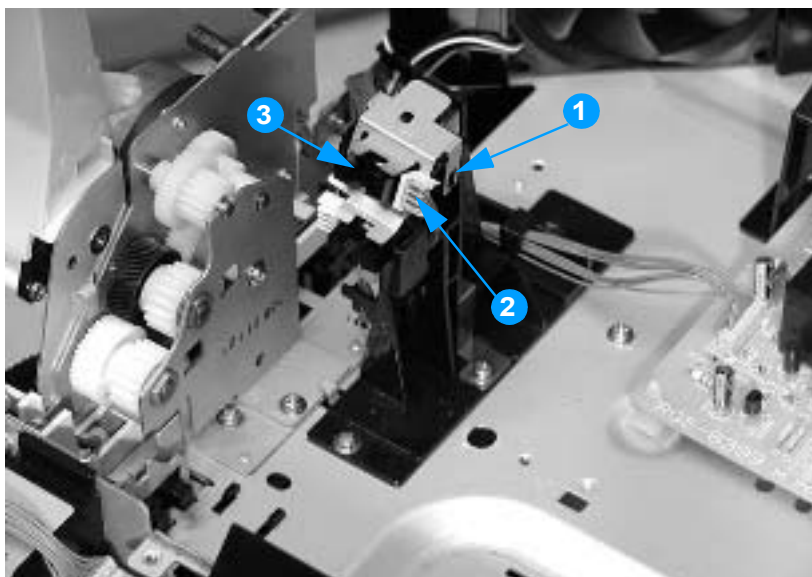


**Figure 6-67** Removing and replacing the fuser delivery sensor

## Output bin full sensor

### To remove the output bin full sensor

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the fuser. See page 82.
- 5 Unhook the two tabs shown in callout 1.
- 6 Disconnect the connector shown in callout 2.
- 7 Remove the output bin full sensor (callout 3).



**Figure 6-68** Removing and replacing the output bin full sensor

## Cartridge fan

### To remove the cartridge fan

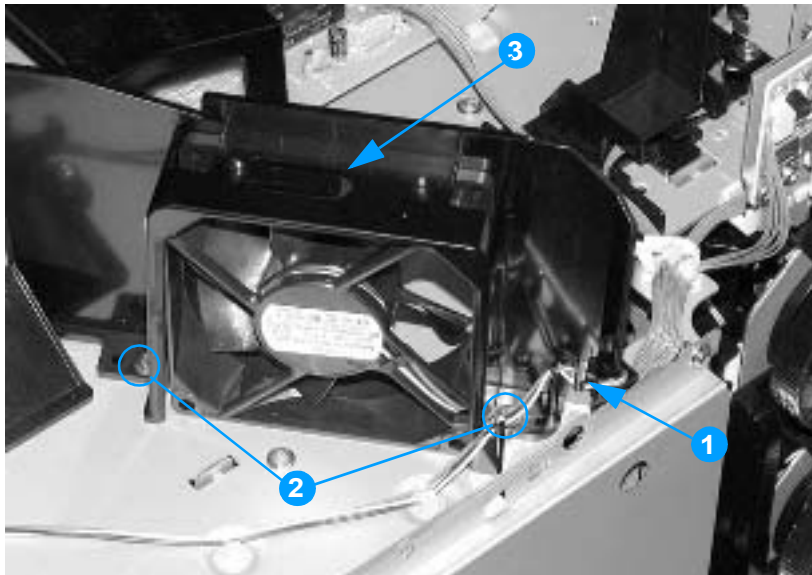
#### Note

The cartridge fan is the vertical, front-most fan.

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Disconnect the connector J1004 on the DC controller PCB. See page 304.
- 7 Unthread the cables from the guides shown in callout 1.
- 8 Remove the two screws shown in callout 2.
- 9 Remove the fan holder and fan from the printer (callout 3).
- 10 Remove the fan from the fan holder.

### Reinstallation tip

When reinstalling the cartridge fan, be sure that the arrow marked on the fan holder and the arrow marked on the fan are pointing in the same direction.



**Figure 6-69** Removing and replacing the cartridge fan

## Formatter fan

### To remove the formatter fan

---

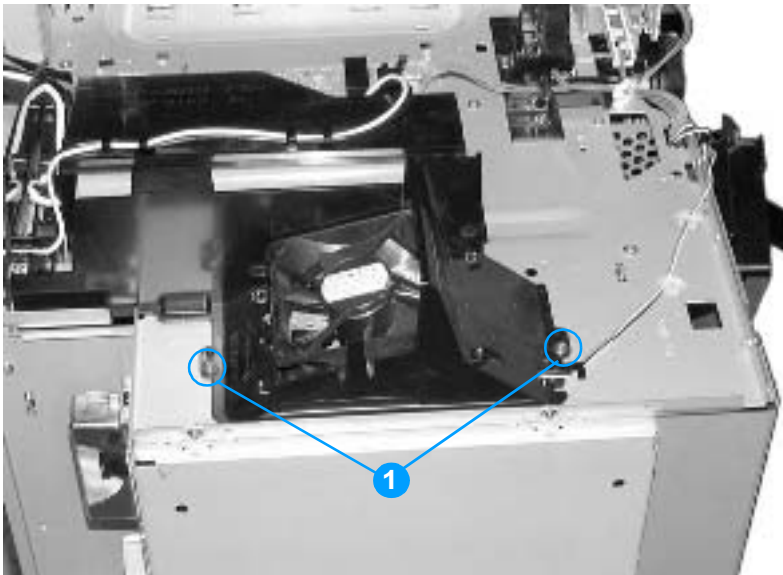
**Note**

The formatter fan is the horizontal, rear-most fan.

- 1 Remove the rear cover. See page 144.
- 2 Remove the top cover. See page 145.
- 3 Remove the rear top cover. See page 146.
- 4 Remove the left cover. See page 148.
- 5 Remove the DC controller shield. See page 155.
- 6 Remove the cartridge fan and holder. See page 197.
- 7 Disconnect the connector J1003 on the DC controller. See page 304.
- 8 Remove the two screws shown in callout 1.
- 9 Remove the fan holder and the fan from the printer.
- 10 Remove the fan from the fan holder.

### Reinstallation tip

When reinstalling the formatter fan, be sure that the arrow marked on the fan holder and the arrow marked on the fan are pointing in the same direction.



**Figure 6-70** Removing and replacing the formatter fan



## Optional 500-sheet paper feeder

### Paper feeder top cover plate

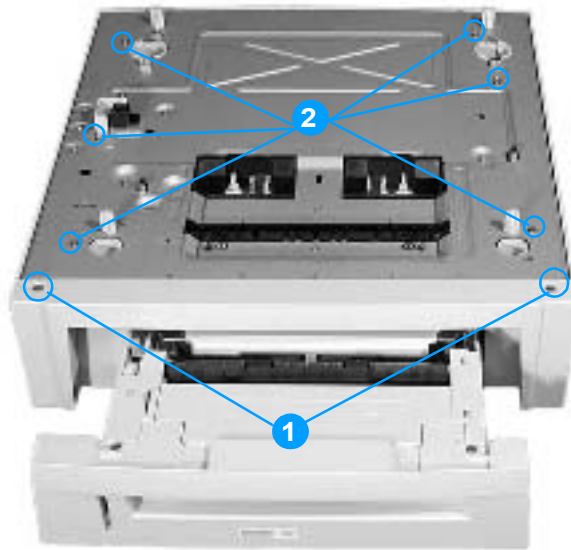
#### To remove the 500-sheet paper feeder top cover plate

- 1 Remove the two screws shown in callout 1, and remove the front cover from the 500-sheet paper feeder.
- 2 Remove the six screws shown in callout 2, and remove the top plate.

---

**Note**

The internal components of the 500-sheet paper feeder are mounted on the underside of the top plate.

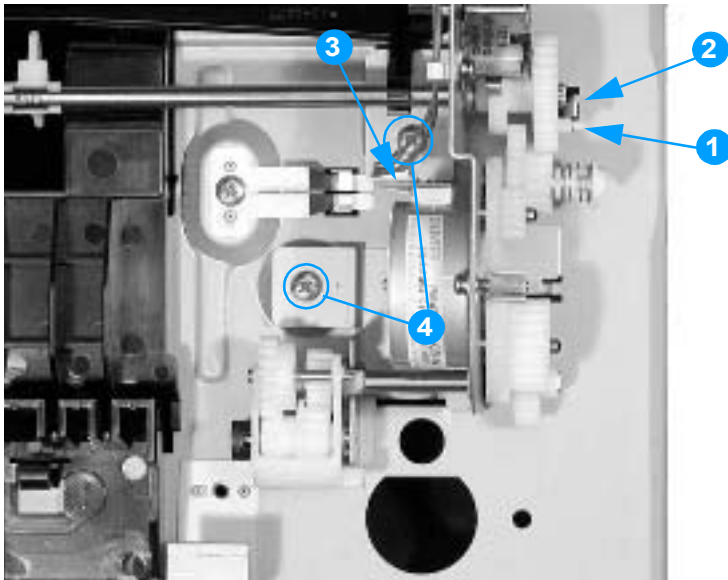


**Figure 6-71** Removing and replacing the 500-sheet paper feeder top plate

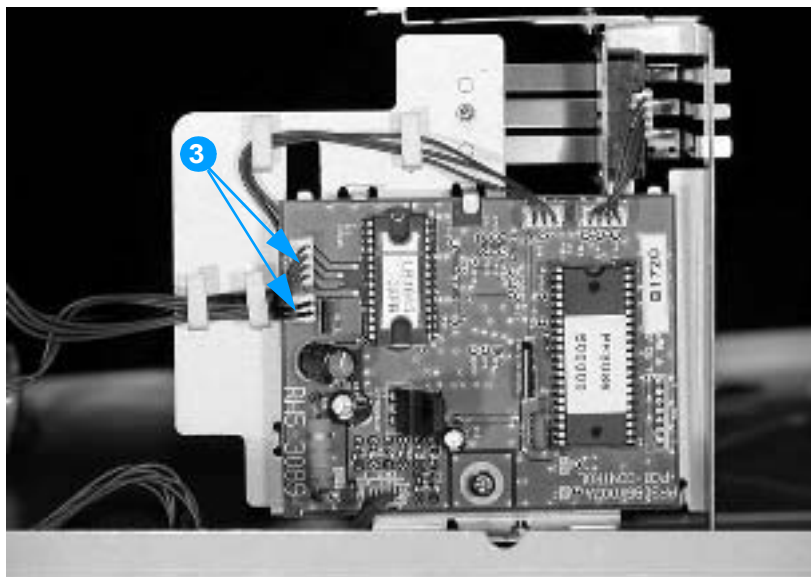
## Paper feeder drive unit

### To remove the 500-sheet paper feeder drive unit

- 1 Remove the top plate from the 500-sheet paper feeder (see page 199), and turn it upside-down.
- 2 Remove the spring and the E-ring indicated by callout 1.
- 3 Unhook the tab in the center of the gear indicated by callout 2, and remove the gear.
- 4 Disconnect the three connectors indicated by callout 3 (two of these connectors are on the paper feeder PCB).
- 5 Remove the cables from the cable clips.
- 6 Remove the two screws shown in callout 4, and slide the drive unit out.



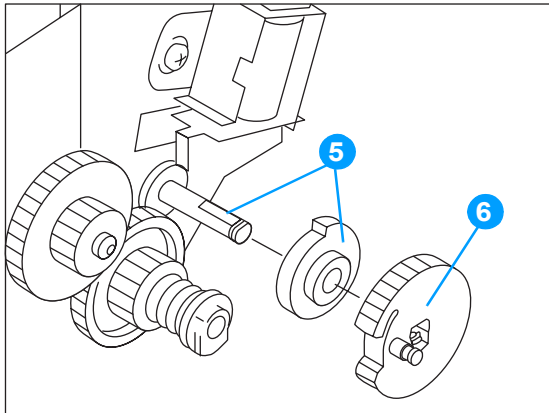
**Figure 6-72** Removing and replacing the paper feeder drive unit, top view (1 of 2)



**Figure 6-73** Removing and replacing the paper feeder drive unit, side view (2 of 2)

## Reinstallation tip

When reassembling the drive unit, the cam shown in callout 5 and the gear shown in callout 6, should be in the position shown.



**Figure 6-74** Cam and gear alignment

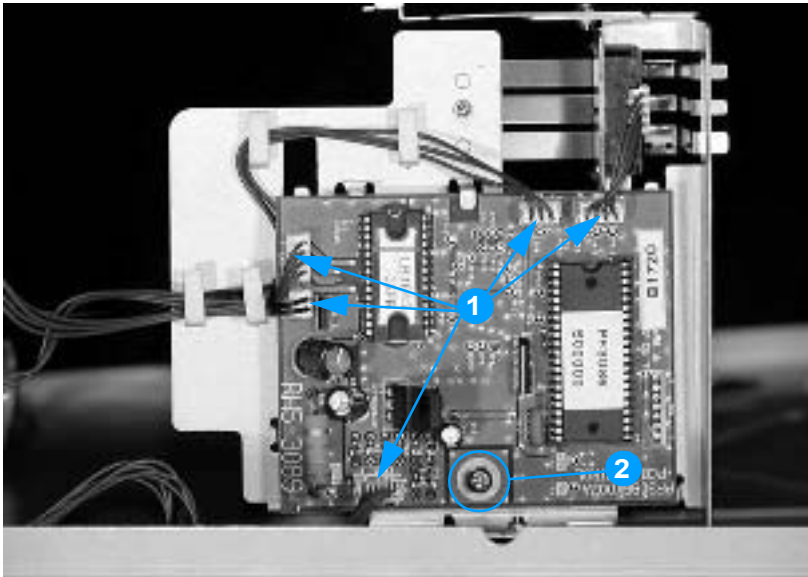
## Paper feeder pickup rollers

The procedure for removing the 500-sheet paper feeder pickup rollers is essentially the same as for the cassette (Tray 2) pickup rollers. See page 158 for instructions.

## Paper feeder PCB

### To remove the 500-sheet paper feeder PCB

- 1 Remove the top plate from the 500-sheet paper feeder (see page 199), and turn it upside-down.
- 2 Disconnect the five connectors shown in callout 1.
- 3 Remove the screw shown in callout 2.
- 4 Remove the paper feeder PCB.



**Figure 6-75** Removing and replacing the 500-sheet paper feeder PCB

# 7 Troubleshooting

## Chapter contents

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# Introduction

This troubleshooting chapter assumes the reader has a basic understanding of the color laser printing process. Explanations of each mechanical assembly, printer systems, and the basic theory of operation are found in Chapter 5. Do not perform any of these troubleshooting processes without fully understanding the function of each mechanism.

This chapter contains the following sections:

- **Troubleshooting process** includes a pre-troubleshooting checklist and a troubleshooting flowchart. These tools contain information about common printer errors that can inhibit proper operation or create print quality problems. These tools also include recommendations for solving the cause of the error.
- **Printer error troubleshooting** explains each control panel display message and suggests recommendations for clearing the cause of each message. When the printer message indicates a failure for which the root cause is not obvious, use the printer error troubleshooting section and the troubleshooting tools section found later in this chapter to solve the problem.
- **Paper path troubleshooting** provides techniques to solve feed problems. Explanations regarding print media checks, troubleshooting jams, and the differences between jams caused by media and those caused by the printer are discussed.
- **Image formation troubleshooting** suggests methods for solving print quality problems.
- **Interface troubleshooting** provides techniques for isolating communication problems to the printer hardware, printer configuration, network configuration, or software application.
- **Control panel troubleshooting** provides procedures for printing a menu map from the printer control panel. It also describes the control panel menus, the items within each menu, and the possible values for the menu items.
- **Troubleshooting tools** help isolate the cause of printer failures. This section includes explanations of the printer configuration page and the event log.
- **Diagnostics** provides instructions on how to access and use the diagnostic tools incorporated into the printer.
- **Service menu** provides procedures for entering the service menu and performing service-oriented tasks. These tasks include counts for entering the serial number, service ID, transfer unit maintenance, fuser maintenance, color page, total page, and clearing the event log.
- **Diagrams** provides graphical locations and tables for the printer's internal assemblies and sensors.

## Troubleshooting process

When the printer malfunctions or encounters an unexpected situation, the printer control panel alerts you of the situation. This section contains a pre-troubleshooting checklist to filter out many possible causes of the problem. A troubleshooting flowchart helps you diagnose the root cause of the problem. The remainder of this chapter provides steps for correcting problems.

- Use the pre-troubleshooting checklist to evaluate the source of the problem and to reduce the number of steps required to fix the problem.
- Use the troubleshooting flowchart to pinpoint the root cause of hardware malfunctions. The flowchart guides you to the appropriate section of this chapter that provides steps for correcting the malfunction.

Before beginning any troubleshooting procedure, check the following:

- Are supply items within their rated life?
- Does the configuration page reveal any configuration errors?

---

### Note

The customer is responsible for checking supplies and for using supplies that are in good condition.



## Pre-troubleshooting checklist

The list below describes basic questions to ask the customer to help quickly define the problem(s).

**Table 7-1 Pre-troubleshooting checklist**

<b>Environment</b>	<ul style="list-style-type: none"> <li>● Is the printer installed on a solid, level surface?</li> <li>● Is the power supply voltage within <math>\pm 10</math> volts of the specified power source?</li> <li>● Is the power supply plug inserted in the printer and the outlet?</li> <li>● Is the operating environment within the specified parameters, as listed in Chapter 1 of this manual?</li> <li>● Is the printer exposed to ammonia gas, such as that produced by diazo copiers or office cleaning materials?</li> <li>● Is the printer exposed to direct sunlight?</li> </ul>
<b>Media</b>	<ul style="list-style-type: none"> <li>● Does the customer use only supported media?</li> <li>● Is the media in good condition (no curls, folds, etc.)?</li> <li>● Is the media stored correctly and within environmental limits?</li> </ul>
<b>Input trays</b>	<ul style="list-style-type: none"> <li>● Is the amount of media in the tray within specifications?</li> <li>● Is the media set into the tray correctly?</li> <li>● Are the paper guides aligned with the paper?</li> <li>● Is the cassette properly installed in the printer?</li> </ul>
<b>Print cartridges</b>	<ul style="list-style-type: none"> <li>● Is each print cartridge properly installed?</li> </ul>
<b>ETB and fuser</b>	<ul style="list-style-type: none"> <li>● Are the ETB and fuser properly installed?</li> </ul>
<b>Covers</b>	<ul style="list-style-type: none"> <li>● Are the top cover and front cover closed?</li> </ul>
<b>Condensation</b>	<ul style="list-style-type: none"> <li>● Does condensation occur following a temperature change (particularly in winter following cold storage)? If so, wipe affected parts dry or leave the printer on for 10 to 20 minutes.</li> <li>● Was a print cartridge opened soon after being moved from a cold to a warm room? If so, allow the printer to sit at room temperature for one to two hours.</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>● Check for and remove any non-HP components (print cartridges, memory modules, and EIO cards) from the printer.</li> <li>● If hardware or software configuration has not changed, or the problem is not associated with any specific software, contact the Customer Care Center (see Chapter 1).</li> <li>● Remove the printer from the network, and ensure that the failure is associated with the printer before beginning troubleshooting.</li> <li>● For any print quality issues, calibrate the printer. See “Calibrate Now” on page 294 for instructions.</li> </ul>

# Troubleshooting flowchart

The flowchart on these two pages highlights the general processes to quickly isolate and solve printer hardware problems.

Each heading depicts a major troubleshooting step. A "yes" answer to the questions allows you to proceed to the next major step.

A "no" answer indicates that additional testing is needed. Proceed to the referenced section in this chapter, and follow the instructions. After completing this additional testing, proceed to the next major step in the troubleshooting flowchart.

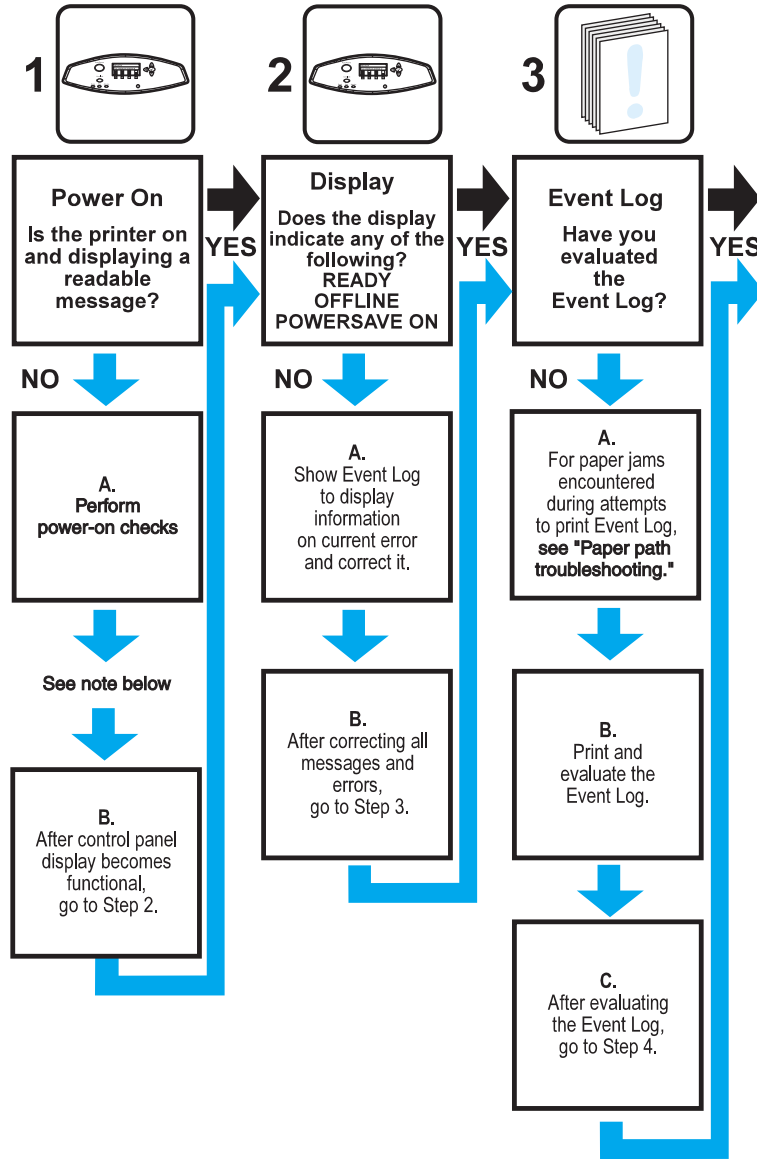
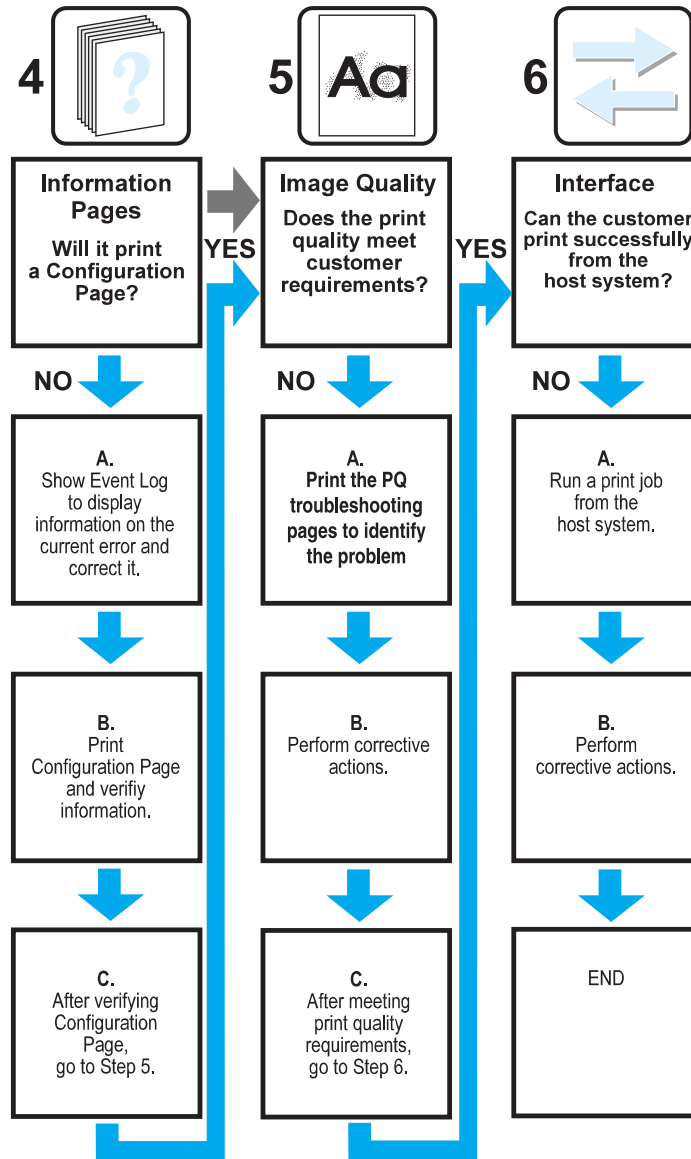


Figure 7-1 Troubleshooting flowchart

**Note**

If the printer's display is blank, but the power-on checks pass, try printing an engine test page to determine whether the problem is with the engine/display or with the formatter. See page 292 for instructions.

# Troubleshooting flowchart (continued)



## Troubleshooting power-on

When you turn on the printer, if it does not make any sound or if the control panel display is blank, check the following items:

- 1 Verify that the printer is plugged into an active electrical outlet with the correct voltage.
- 2 Verify that the on/off switch is in the ON position.
- 3 Make sure the rear fan is running, indicating the system is operational.
- 4 Verify that the firmware DIMM and the formatter are seated and operating properly.
- 5 Remove any HP Jetdirect or other EIO cards, then try to turn the printer on again.
- 6 Make sure the control panel display is connected.
- 7 Check the fuses in the power supply.
- 8 If necessary, replace the power supply.
- 9 If necessary, replace the DC controller.

# Printer error troubleshooting

The following tables explain messages that might appear on the printer control panel. Alphabetical printer messages and their meanings are listed in Table 7-2, and numerical printer messages are listed in Table 7-3.

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
## Note

Not all messages are described in the tables; those messages that are not listed are self-explanatory.

## Status messages

Status messages reflect the current state of the printer. They inform you of normal printer operation and require no interaction to clear them. They change as the state of the printer changes. Whenever the printer is ready, not busy, and has no pending warning messages, the status message `Ready` is displayed if the printer is online.

## Warning messages

Warning messages inform you of data and print errors. These messages typically alternate with `Ready` or with status messages and remain displayed until the  button is pressed. If `CLEARABLE WARNING` is set to `JOB` in the printer's configuration menu, these messages are cleared by the next print job.

## Error messages

Error messages communicate that some action must be performed, such as adding paper or clearing a paper jam.

Some error messages are auto-continuable; if `AUTO_CONTINUE=ON` the printer will continue normal operation after displaying an auto-continuable error message for 10 seconds.

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## Note

Any button pressed during the 10-second display of an auto-continuable error message will override the auto-continue feature, and the function of the button pressed will take precedence. For example, pressing the `CANCEL JOB` button will cancel the job.

## Critical error messages

Critical error messages inform you of a device failure. Some of these messages can be cleared by turning the printer off and then on. These messages are not affected by the auto continue setting. If a critical error persists, service is required.

## Alphabetical printer messages

### Note

Many of the procedures in this section instruct you to replace the DC controller PCB, the ETB, the formatter, the drum drive motors, the drum drive gears, or a laser/scanner unit. After replacing one of these items, you must access the Print Quality menu and select **CALIBRATE NOW** to ensure proper print quality after the repair. See “Calibrate Now” on page 294 for instructions on calibrating the printer. When the ETB or the fuser are replaced before their normal end of life, access the resets menu and reset the counter to zero. See page 81 and page 83 for instructions.


















**Table 7-2 Alphabetical printer messages**

Message	Description	Action
Access denied menus locked	An attempt has been made to modify a menu item while the control panel security mechanism is enabled by the printer administrator. The message will disappear shortly, and the printer will return to Ready state.	Contact the printer administrator to change settings.
CHOSEN PERSONALITY NOT AVAILABLE For help press <b>?</b>  alternates with  CHOSEN PERSONALITY NOT AVAILABLE To continue press <b>✓</b>	PJL encountered a request for a personality that did not exist in the printer. The job is aborted and no pages will be printed.	<ol style="list-style-type: none"> <li>1 Press <b>?</b> for detailed information.</li> <li>2 Press <b>▲</b> and <b>▼</b> to step through the instructions.</li> </ol>
CLOSE FRONT COVERS For help press <b>?</b>	The covers need to be closed.	<ol style="list-style-type: none"> <li>1 Press <b>?</b> for more information.</li> <li>2 Close front covers.</li> </ol> <p><b>Note:</b> This message might also appear if the fuser is missing or incorrectly installed. Ensure that the fuser is correctly installed.</p>
CPR SENSOR OUT OF RANGE	The CPR Sensor is not behaving properly.	<ol style="list-style-type: none"> <li>1 Force a calibration by selecting Calibrate Now from the Print Quality menu. See “Calibrate Now” on page 294.</li> <li>2 If the message persists, verify the cables are seated properly and the connector J1024 is making good contact with the DC controller.</li> <li>3 Replace the color registration detection unit.</li> <li>4 If the message still persists, replace the DC controller PCB. Calibrate the printer after replacing the DC controller.</li> </ol>
DATA RECEIVED To print last page press <b>✓</b>	The printer received data and is waiting for a form feed. When the printer receives another file, the message should disappear.	Press <b>✓</b> to continue.

**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>DETECTABLE SIZE IN TRAY XX For help press ?</p> <p>alternates with</p> <p>DETECTABLE SIZE IN TRAY XX Recommend move switch to STANDARD</p>	<p>A tray has been loaded with paper that is a standard size and the switch in the tray is set to custom.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information.</li> <li>2 Press ▲ and ▼ to step through instructions.</li> </ol>
<p>DISK DEVICE FAILURE</p> <p>alternates with</p> <p>Ready For menu press ✓</p>	<p>A device failure has occurred on the specified drive.</p>	<ol style="list-style-type: none"> <li>1 Printing may continue for jobs that do not require access to the disk drive.</li> <li>2 To clear the message, turn the printer off and then back on.</li> <li>3 If the message persists, remove and re-install the EIO disk drive.</li> <li>4 If the message persists, replace the EIO disk drive.</li> </ol>
<p>DISK FILE OPERATION FAILED</p> <p>alternates with</p> <p>Ready For menu press ✓</p>	<p>The printer received a PJL file system command that attempted to perform an illogical operation (for example, to download a file to a non-existent directory).</p>	<ol style="list-style-type: none"> <li>1 Printing may continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 If the message reappears, there may be a problem with the software application.</li> </ol>
<p>DISK FILE SYSTEM IS FULL</p> <p>alternates with</p> <p>Ready For menu press ✓</p>	<p>The printer received a PJL file system command that attempted to store something on the file system but was unsuccessful because the file system is full.</p>	<ol style="list-style-type: none"> <li>1 Use the HP Web Jetadmin software to delete files from the EIO disk drive and try again.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> </ol>
<p>DISK IS WRITE PROTECTED</p> <p>alternates with</p> <p>Ready For menu press ✓</p>	<p>The file system device is protected and no new files can be written to it.</p>	<ol style="list-style-type: none"> <li>1 To enable writing to the disk, turn off write protection, using HP Web Jetadmin.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> </ol>
<p>EIO DISK X NOT FUNCTIONAL For help press ?</p>	<p>The EIO disk in slot X is not working correctly.</p>	<p>Remove the EIO disk from the slot indicated and replace with a new EIO disk drive.</p>
<p>FLASH DEVICE FAILURE</p> <p>alternates with</p> <p>Ready For menu press ✓</p>	<p>A device failure has occurred on the specified drive.</p>	<ol style="list-style-type: none"> <li>1 Printing may continue for jobs that do not require the Flash DIMM.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> <li>3 If the message persists, remove and re-install the Flash DIMM.</li> <li>4 If the message persists, replace the Flash DIMM.</li> </ol>

**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>FLASH FILE OPERATION FAILED</p> <p>alternates with</p> <p>Ready</p> <p>For menu press </p>	<p>The printer received a PJL file system command that attempted to perform an illogical operation (for example, to download a file to a non-existent directory).</p>	<ol style="list-style-type: none"> <li>1 Printing may continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 If the message reappears, there may be a problem with the software application.</li> </ol>
<p>FLASH FILE SYSTEM IS FULL</p> <p>alternates with</p> <p>Ready</p> <p>For menu press </p>	<p>The printer received a PJL file system command that attempted to store something on the file system but was unsuccessful because the file system is full.</p>	<ol style="list-style-type: none"> <li>1 Use HP Web Jetadmin software to delete files from the flash memory and try again.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> </ol>
<p>FLASH IS WRITE PROTECTED</p> <p>alternates with</p> <p>Ready</p> <p>For menu press </p>	<p>The file system device is protected and no new files can be written to it.</p>	<ol style="list-style-type: none"> <li>1 To enable writing to the flash memory, turn off write protection, using HP Web Jetadmin.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> </ol>
<p>INCORRECT &lt;COLOR&gt; CARTRIDGE</p> <p>alternates with</p> <p>For status press </p>	<p>An incorrect cartridge is installed in a slot and the cover is closed.</p>	<ol style="list-style-type: none"> <li>1 Press  and then press  for help.</li> <li>2 Press  and  to step through the instructions.</li> </ol>
<p>Incorrect PIN</p>	<p>The wrong PIN was entered.</p>	<p>Re-enter PIN correctly. After three incorrect PIN entries, the printer will return to Ready.</p>
<p>INCORRECT SUPPLIES</p> <p>For status press </p>	<p>At least one supply item is incorrectly positioned in the printer and another supply item is missing, incorrectly placed, out, or low.</p>	<ol style="list-style-type: none"> <li>1 Press  and then press  for help.</li> <li>2 Follow the instructions on the display to locate and replace the incorrect supply.</li> <li>3 Press  and  to step through the instructions.</li> </ol>
<p>INSERT OR CLOSE TRAY XX</p> <p>For help press </p>	<p>Tray XX must be inserted or closed before the current job can be printed.</p>	<ol style="list-style-type: none"> <li>1 Press  for detailed information.</li> <li>2 Press  and  to step through instructions.</li> </ol>



**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>INSTALL &lt;COLOR&gt; CARTRIDGE</p> <p>alternates with</p> <p>For help press ?</p>	<p>The cartridge is either not installed or not correctly installed in the printer.</p>	<ol style="list-style-type: none"> <li>1 Insert the cartridge or make sure the cartridge is fully seated.</li> <li>2 Press ? for detailed information.</li> <li>3 Press ▲ and ▼ to step through the instructions.</li> <li>4 If the error persists, replace the cartridge.</li> <li>5 Verify that the connectors between the memory tag antenna, memory controller board, and the DC controller are seated properly.</li> <li>6 Replace the antenna PCB for the indicated color.</li> <li>7 Replace the memory controller PCB.</li> <li>8 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>INSTALL FUSER</p> <p>For help press ?</p>	<p>The fuser is either not installed or not correctly installed in the printer.</p>	<ol style="list-style-type: none"> <li>1 Insert the fuser or make sure the installed fuser is fully seated.</li> <li>2 Press ? for detailed information.</li> <li>3 Press ▲ and ▼ to step through the instructions.</li> <li>4 If the error persists, verify that fuser connector J4034 is good; replace it if necessary.</li> <li>5 Replace the fuser assembly.</li> <li>6 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>INSTALL SUPPLIES</p> <p>For status press ✓</p>	<p>At least one supply item is missing or is not correctly seated in the printer and another supply item is missing, incorrectly placed, out, or low. Insert the supply item or make sure the installed supply item is fully seated.</p>	<ol style="list-style-type: none"> <li>1 Press ✓ and then press ? for help.</li> <li>2 Follow the instructions on the display to locate and replace the missing or incorrect supply.</li> <li>3 Press ▲ and ▼ to step through the instructions.</li> </ol>
<p>INSTALL TRANSFER UNIT</p> <p>For help press ?</p>	<p>The transfer unit is either not installed or not correctly installed in the printer.</p>	<ol style="list-style-type: none"> <li>1 Insert the transfer unit or make sure the installed transfer unit is fully seated.</li> <li>2 Press ? for detailed information.</li> <li>3 Press ▲ and ▼ to step through the instructions.</li> <li>4 If the error persists, verify that the ETB connectors (J4017 on the ETB and J1014 on the DC controller PCB) are good. Replace connectors as necessary.</li> <li>5 Replace the ETB.</li> <li>6 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>













**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>LOAD TRAY XX: &lt;TYPE&gt; &lt;SIZE&gt; For help press ?</p> <p>alternates with</p> <p>LOAD TRAY XX: &lt;TYPE&gt; &lt;SIZE&gt; To use another tray press ✓</p>	<p>Tray XX is either empty or configured for a type and size other than specified in the job.</p>	<p>1 Press ? for detailed information.</p> <p>2 Press ▲ and ▼ to step through instructions.</p>
<p>LOAD TRAY XX: &lt;TYPE&gt; &lt;SIZE&gt; For help press ?</p>	<p>Tray XX is either empty or configured for a type and size other than specified in the job. No other tray is available.</p>	<p>1 Press ? for detailed information.</p> <p>2 Press ▲ and ▼ to step through instructions.</p>
<p>MANUALLY FEED &lt;TYPE&gt; &lt;SIZE&gt; For help press ?</p> <p>alternates with</p> <p>MANUALLY FEED &lt;TYPE&gt; &lt;SIZE&gt; To continue press ✓</p>	<p>A job sent requires a specific paper type and size that is not currently available.</p>	<p>1 Press ? for detailed information.</p> <p>2 Press ▲ and ▼ to step through instructions.</p>
<p>If no paper in tray: MANUALLY FEED &lt;TYPE&gt; &lt;SIZE&gt; For help press ?</p> <p>alternates with</p> <p>MANUALLY FEED &lt;TYPE&gt; &lt;SIZE&gt; To use another tray press ✓</p>	<p>A job sent requires a specific paper type and size that is not currently available.</p>	<p>1 Press ? for detailed information.</p> <p>2 Press ▲ and ▼ to step through instructions.</p>
<p>NON HP CARTRIDGE DETECTED</p>	<p>A new cartridge has been installed that is not made by HP. This message is displayed until an HP cartridge is installed or <b>CANCEL JOB</b> is pressed.</p>	<p>If you believe the cartridge is an HP cartridge, please call the HP fraud hotline.</p> <p>Any printer repair required as a result of using non-HP cartridges is not covered under HP warranty.</p> <p>To continue printing, press <b>CANCEL JOB</b>. The first pending job will be cancelled.</p>
<p>NON HP CARTRIDGE IN USE</p> <p>alternates with</p> <p>Ready For menus press ✓</p>	<p>The printer has detected that a non-HP print cartridge is currently installed.</p>	<p>If you believe the cartridge is an HP cartridge, please call the HP fraud hotline.</p> <p>Any printer repair required as a result of using non-HP cartridges is not covered under HP warranty.</p>















**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
ORDER <COLOR> CARTRIDGE  alternates with  To continue press	The identified print cartridge is nearing the end of its useful life and the SUPPLIES LOW setting in the SYSTEM SETUP submenu is set to STOP. Override by pressing .	<ol style="list-style-type: none"> <li>1 Order the identified print cartridge.</li> <li>2 Press  to continue.</li> <li>3 Press  for detailed information.</li> <li>4 Press  and  to step through instructions.</li> <li>5 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER <COLOR> CARTRIDGE  alternates with  XXXX PAGES LEFT	The identified print cartridge is near end of life. The printer is ready and will continue for the estimated number of pages indicated.	<ol style="list-style-type: none"> <li>1 Order the identified print cartridge.</li> <li>2 Estimated pages remaining is based upon historical page coverage of this printer.</li> <li>3 Printing will continue until REPLACE &lt;COLOR&gt; CARTRIDGE is shown.</li> <li>4 Press  for detailed information.</li> <li>5 Press  and  to step through instructions.</li> <li>6 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER FUSER KIT XXXX PAGES LEFT To continue press	The fuser is near end of life and the SUPPLIES LOW setting in the SYSTEM SETUP submenu is set to STOP.	<ol style="list-style-type: none"> <li>1 Order the image fuser kit.</li> <li>2 Press  to continue printing. Printing can continue until the fuser reaches end of life.</li> <li>3 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER FUSER KIT XXXX PAGES LEFT To enter menus press	The fuser is near end of life. The printer is ready and will continue for the estimated number of pages indicated.	<ol style="list-style-type: none"> <li>1 Order the image fuser kit.</li> <li>2 Printing can continue until the fuser reaches end of life.</li> <li>3 Press  for detailed information.</li> <li>4 Press  and  to step through instructions.</li> <li>5 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER SUPPLIES For menus press	More than one supply item is low.	<ol style="list-style-type: none"> <li>1 Press  to identify which supplies should be ordered.</li> <li>2 Order the identified supplies.</li> <li>3 Printing can continue until supplies reach end of life.</li> <li>4 Press  for detailed information.</li> <li>5 Press  and  to step through instructions.</li> <li>6 Supplies ordering information is also available from the embedded Web server.</li> </ol>












**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
ORDER SUPPLIES For status press 	More than one supply item is low and the SUPPLIES LOW setting is set to STOP.	<ol style="list-style-type: none"> <li>1 Press  to identify which supplies should be ordered.</li> <li>2 Order the identified supplies.</li> <li>3 Press  twice to continue printing. Printing can continue until supplies reach end of life.</li> <li>4 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER TRANSFER KIT XXXX PAGES LEFT To continue press 	The number of pages remaining for the transfer unit has reached the low threshold and the SUPPLIES LOW setting in the SYSTEM SETUP submenu is set to STOP.	<ol style="list-style-type: none"> <li>1 Order the transfer kit.</li> <li>2 Printing can continue until the transfer unit reaches end of life.</li> <li>3 Press  for detailed information.</li> <li>4 Press  and  to step through instructions.</li> <li>5 Supplies ordering information is also available from the embedded Web server.</li> </ol>
ORDER TRANSFER KIT XXXX PAGES LEFT To enter menus press 	The transfer unit is near end of life.	<ol style="list-style-type: none"> <li>1 Order an image transfer kit.</li> <li>2 Printing can continue until the transfer unit reaches end of life.</li> <li>3 Press  for detailed information.</li> <li>4 Press  and  to step through instructions.</li> <li>5 Supplies ordering information is also available from the embedded Web server.</li> </ol>
OUTPUT BIN FULL Remove all paper from bin	The output bin is full and must be emptied for printing to continue.	Remove media from the output bin.
Performing PAPER PATH TEST	The printer is performing a Paper Path test.	No action is necessary; however, the data is useful to help troubleshoot paper jams.
Printing... PQ TROUBLESHOOTING	The printer is generating the print quality troubleshooting pages. The printer will return to the Ready state when the pages are printed.	Follow the instructions on the printed pages.
Printing... REGISTRATION PAGE	The printer is generating the registration page. The printer will return to the SET REGISTRATION menu when the page is completed.	Follow the instructions on the printed pages.
Processing duplex job Do not grab paper until job completes	Paper temporarily comes into the output bin while printing a duplex job. Do not attempt to remove the pages until the job is complete.	Do not grab paper as it temporarily comes into the output bin. The message will disappear when the job is finished.
RAM DISK DEVICE FAILURE  alternates with  Ready For menus press 	A device failure has occurred on the specified drive.	Turn the printer off and then back on to remove this message from the display.

**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>RAM DISK FILE OPERATION FAILED</p> <p>alternates with</p> <p>Ready For menu press </p>	<p>The printer received a PJL file system command that attempted to perform an illogical operation (for example, to download a file to a non-existent directory).</p>	<ol style="list-style-type: none"> <li>1 Printing may continue.</li> <li>2 Turn the printer off and then back on to remove the message from the display.</li> <li>3 If the message reappears, there may be a problem with the software application.</li> </ol>
<p>RAM DISK FILE SYSTEM IS FULL</p> <p>alternates with</p> <p>Ready For menu press </p>	<p>The printer received a PJL file system command that attempted to store something on the file system but was unsuccessful because the file system is full.</p>	<p>Turn the printer off and then back on to remove the message from the display. This will also delete any files saved in RAM.</p>
<p>RAM DISK IS WRITE PROTECTED</p> <p>alternates with</p> <p>Ready For menu press </p>	<p>The file system device is protected and no new files can be written to it.</p>	<ol style="list-style-type: none"> <li>1 To enable writing to the RAM disk, turn off write protection using HP Web Jetadmin software.</li> <li>2 To remove this message from the display, turn the printer off and then back on.</li> </ol>
<p>Receiving upgrade</p>	<p>A firmware upgrade is in progress.</p>	<p>Do not turn the printer off until the printer returns to Ready.</p>
<p>REINSTALL &lt;COLOR&gt; CARTRIDGE</p> <p>alternates with</p> <p>For help press </p>	<p>The cartridge is not fully seated.</p>	<ol style="list-style-type: none"> <li>1 Press  for detailed information.</li> <li>2 Press  and  to step through instructions.</li> </ol>
<p>REMOVE ALL PRINT CARTRIDGES</p> <p>To exit press Cancel Job key</p>	<p>The printer is executing a Component test and the component selected is Belt only.</p>	<p>Remove all print cartridges.</p>
<p>REMOVE AT LEAST 1 PRINT CARTRIDGE</p> <p>To exit press Cancel Job key</p>	<p>The printer is executing a Disable cartridge check or Component test where the component selected is Cartridge Motor.</p>	<p>Remove one print cartridge.</p>
<p>REPLACE &lt;COLOR&gt; CARTRIDGE</p> <p>alternates with</p> <p>For help press </p>	<p>The identified print cartridge has reached the end of life. Printing will not continue until the cartridge is replaced.</p>	<ol style="list-style-type: none"> <li>1 Replace the identified print cartridge to continue printing.</li> <li>2 Press  for detailed information.</li> <li>3 Press  and  to step through instructions.</li> <li>4 Supplies ordering information is also available from the embedded Web server.</li> </ol>
<p>REPLACE FUSER KIT</p>	<p>The fuser kit is at end of life.</p>	<ol style="list-style-type: none"> <li>1 Replace the fuser to continue printing.</li> <li>2 Press  for detailed information.</li> <li>3 Press  and  to step through instructions.</li> <li>4 Supplies ordering information is also available from the embedded Web server.</li> </ol>














**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
REPLACE SUPPLIES For status press 	At least one supply item is out and needs to be replaced and another supply item is either out or low.	<ol style="list-style-type: none"> <li>1 Press  to identify which supplies should be replaced.</li> <li>2 Replace the identified supplies to continue printing.</li> <li>3 Press  for detailed information.</li> <li>4 Press  and  to step through instructions.</li> <li>5 Supplies ordering information is also available from the embedded Web server.</li> </ol>
REPLACE TRANSFER KIT For help press 	The transfer unit has reached end of life.	<ol style="list-style-type: none"> <li>1 Replace the transfer unit to continue printing.</li> <li>2 Press  for detailed information.</li> <li>3 Press  and  to step through instructions.</li> <li>4 Supplies ordering information is also available from the embedded Web server.</li> </ol>
Resend upgrade	The firmware upgrade was not completed successfully.	Attempt upgrade again.
Rotating. . . alienation motor To exit press CANCEL JOB	The printer is testing the developing disengaging motor. (This motor is called the "alienation motor" in firmware messages.)	Press <b>CANCEL JOB</b> when ready to stop this test.
Rotating. . . belt drive To exit press CANCEL JOB	The printer is executing a Component Test and the component selected is Belt Only.	Press <b>CANCEL JOB</b> when ready to stop this test.
Rotating <color> cartridge motor To exit press CANCEL JOB	A component test is in progress; the component selected is the <color> Cartridge motor.	Press <b>CANCEL JOB</b> when ready to stop this test.
Rotating. . . fuser motor To exit press CANCEL JOB	The printer is executing a Component test and the component selected is Fuser Motor.	Press <b>CANCEL JOB</b> when ready to stop this test.
Rotating <color> Laser Scanner To exit press CANCEL JOB	A Scanner test is in progress.	Press <b>CANCEL JOB</b> when ready to stop this test.
Rotating. . . transfer motors To exit press CANCEL JOB	The printer is executing a Component test and the component selected is Transfer Motors.	Press <b>CANCEL JOB</b> when ready to stop this test.
SIZE MISMATCH TRAY XX=<SIZE> For help press   alternates with  Ready For menus press 	The tray is loaded with media longer or shorter in the feed direction than the size configured for the tray.	<ol style="list-style-type: none"> <li>1 Adjust the side and rear media guides against the paper.</li> <li>2 If the media used is Letter, A4, Executive, B5 JIS, A5, or Legal sized, the tray switch should be set to STANDARD. Set the tray switch to CUSTOM for all other media sizes. The tray switch must be set before the size can be selected from the control panel.</li> <li>3 Reset the paper size in the paper handling menu.</li> </ol>

**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
TRAY XX CONTAINS UNKNOWN MEDIA	The media type in the specified tray cannot be determined.	<ol style="list-style-type: none"> <li>1 To change media type, press . Use  and  to highlight the type, then press  to select.</li> <li>2 To change the media size to Letter, A4, Executive, B5 JIS, A5, or Legal, leave the tray switch in the STANDARD position.</li> <li>3 To change the media size to other sizes, move the tray switch to CUSTOM, adjust the paper guides against the paper, and close the tray.</li> <li>4 Use  and  to highlight the media size, then press  to select.</li> </ol>
TRAY XX EMPTY <TYPE> <SIZE>  alternates with  Ready For menu press	The specified tray is empty and needs to be filled but the current job does not need this tray to print correctly.	Refill the tray at a convenient time.
TRAY XX OPEN For help press  alternates with  Ready For menu press	The specified tray is open or not closed completely.	Close the tray.
TRAY XX SIZE= <XXXX SIZE> For help press  alternates with  TRAY XX SIZE= <XXXX SIZE> To change, move switch in tray XX	<p>A non-detectable media size was selected from the menu and the tray switch is set to STANDARD.</p> <p>The size selected from the menu does not match the size detected by the tray. Size detection occurs when the tray switch is set in the STANDARD position.</p>	<ol style="list-style-type: none"> <li>1 Adjust the side and rear media guides against the paper.</li> <li>2 If the media used is Letter, A4, Executive, B5 JIS, A5, or Legal sized, the tray switch should be set to STANDARD. Set the tray switch to CUSTOM for all other media sizes. The tray switch must be set before the size can be selected from the control panel.</li> <li>3 Reset the paper size in the paper handling menu.</li> </ol>
TRAY XX <TYPE> <SIZE> Size detected by tray  alternates with  TRAY XX <TYPE> <SIZE> To change type press	The printer is reporting the current configuration of tray XX. The tray switch is in the STANDARD position.	<ol style="list-style-type: none"> <li>1 To change media type, press . Use  and  to highlight the type, then press  to select.</li> <li>2 To change the media size to Letter, A4, Executive, B5 JIS, A5, or Legal, leave the tray switch in the STANDARD position.</li> <li>3 To change the media size to other sizes, move the tray switch to CUSTOM, adjust the paper guides against the paper, and close the tray.</li> <li>4 Use  and  to highlight the media size, then press  to select.</li> </ol>

**Table 7-2 Alphabetical printer messages (continued)**

Message	Description	Action
<p>TRAY XX &lt;TYPE&gt; &lt;SIZE&gt; Size specified by user</p> <p>alternates with</p> <p>TRAY XX &lt;TYPE&gt; &lt;SIZE&gt; To change type press </p>	<p>The printer is reporting the current configuration of tray XX. The tray switch is in the CUSTOM position.</p>	<ol style="list-style-type: none"> <li>1 To change media type, press . Use  and  to highlight the type, then press  to select.</li> <li>2 To change the media size to Letter, A4, Executive, B5 JIS, A5, or Legal, set the tray switch to the STANDARD position and adjust the media guides to the correct positions.</li> <li>3 To change the media size to other sizes, leave the tray switch in the CUSTOM position, adjust the media guides against the media, and close the tray.</li> <li>4 Select the paper handling menu from the control panel. Configure the size for the tray.</li> </ol>
<p>TYPE MISMATCH TRAY XX= &lt;TYPE&gt;</p> <p>alternates with</p> <p>Ready To enter menus press </p>	<p>This warning appears after the printer has detected an overhead transparency in the paper path when the tray is configured for another type, resulting in a 41.5 Unexpected Type in Tray XX error. The user did not reconfigure the tray after the error message appeared, so the printer determines that the type of media is not what the tray is configured to hold.</p>	<p>To change media type, press . Use  and  to highlight the type, then press  to select.</p>
<p>Unable to store job &lt;JOBNAME&gt;</p>	<p>A job cannot be stored because of a memory, disk, or configuration problem.</p>	<p>Install additional memory in the printer, or install a disk drive into the printer.</p> <p>If a disk drive is installed, delete previously stored print jobs.</p>
<p>USE INSTEAD? TRAY 2: &lt;TYPE&gt; &lt;SIZE&gt; TRAY 3: &lt;TYPE&gt;</p>	<p>The printer is offering a selection of alternate media to use for the print job.</p>	<p>Highlight the media with  and . Press  to select a choice.</p>

**Note**

Not all messages are described in the tables; those messages that are not listed are self-explanatory.



## Numerical printer messages

### Note

Many of the procedures in this section instruct you to replace the DC controller PCB, the ETB, the formatter, the drum drive motors, the drum drive gears, or a laser/scanner unit. After replacing one of these items, you must access the Print Quality menu and select **CALIBRATE NOW** to ensure proper print quality after the repair. See “Calibrate Now” on page 294 for instructions on calibrating the printer. When the ETB or the fuser are replaced before their normal end of life, access the Resets menu and reset the counter to zero. See page 81 and page 83 for instructions.

**Table 7-3 Numerical printer messages**

Message	Description	Action
<p>10.XX.YY SUPPLIES ERROR For help press ?</p> <p><b>NOTE:</b> The printer cannot always determine whether the error lies with the cartridge or with the printer reader/writer.</p>	<p>The printer cannot read or write to at least one print cartridge memory tag or at least one memory tag is missing.</p> <p><b>XX Description</b> 00 memory error on supply item 10 memory tag missing</p> <p><b>YY Description</b> 00 black print cartridge 01 cyan print cartridge 02 magenta print cartridge 03 yellow print cartridge</p>	<ol style="list-style-type: none"> <li>1 Turn the printer off and then back on.</li> <li>2 Swap the cartridge for the color indicated with a cartridge in another slot to determine whether the error follows the cartridge or stays with the slot. If the error follows the cartridge, replace that cartridge. Otherwise, continue with step 3.</li> <li>3 Reseat the connectors between the memory PCB (J602-J605) and the antenna PCBs (J901A-D), the memory PCB, and the DC controller PCB (J1028).</li> <li>4 Replace the antenna PCB.</li> <li>5 Replace the memory PCB.</li> <li>6 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>13.XX.YY.DUPLEX JOB INTERRUPTED For help press ?</p> <p>alternates with</p> <p>13.XX.YY.DUPLEX JOB INTERRUPTED Discard top sheet and press ✓</p> <p>or</p> <p>13.XX.YY.DUPLEX JOB INTERRUPTED Discard top two sheets and press ✓</p>	<p>A duplex job was interrupted by interference as media passed through the output bin during duplexing.</p>	<ol style="list-style-type: none"> <li>1 Press ? for more information.</li> <li>2 Remove one or two pages from the output bin as directed by the display.</li> <li>3 Press ✓ to continue printing.</li> </ol> <p><b>NOTE:</b> If JAM RECOVERY = OFF some pages will not be reprinted. Re-send the missing pages.</p>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>13.XX.YY.JAM IN DUPLEX PATH For help press ?</p>	<p>There is a jam in the duplex path.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 Check if the ETB rollers or gears are worn or defective. Replace the ETB if they are.</li> <li>4 Check the duplex feed guide, which is part of the control panel crossmember assembly. If the guide is worn or damaged, replace the crossmember assembly.</li> </ol>
<p>13.XX.YY.JAM IN PAPER INPUT PATH For help press ?</p>	<p>There is a jam in the media input path.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 Check the registration shutter, and make sure it is in place. Replace the paper pickup assembly if the shutter is damaged.</li> <li>4 Check the paper pickup feed rollers, and replace them if they are worn or damaged.</li> <li>5 Check the connectors, gears, solenoids, motors, and PCB on the paper pickup assembly. Replace the paper pickup assembly if necessary.</li> </ol>
<p>13.XX.YY JAM IN PAPER PATH For help press ?</p>	<p>There is a jam in the media path.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 If paper is folding into an accordion shape, check whether the shutter on each print cartridge opens as you close the ETB and if each cartridge is turning properly. Replace defective print cartridges or drive motors.</li> <li>4 Clean the attaching roller at the bottom of the ETB and make sure the spring is holding it in place.</li> <li>5 If the attaching roller gears are defective, replace the ETB. Calibrate the printer after replacing the ETB. See “Calibrate Now” on page 294.</li> <li>6 Replace the paper pickup PCB.</li> <li>7 Replace the ETB if it is not moving paper properly. Calibrate the printer.</li> <li>8 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>13.XX.YY JAM IN TOP COVER AREA For help press ?</p>	<p>There is a jam in the top cover area.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> </ol> <p><b>WARNING!</b> The fuser might be hot.</p> <ol style="list-style-type: none"> <li>3 Check that the fuser paper sensor is in place. If it is defective, replace it.</li> <li>4 Replace the fuser.</li> <li>5 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>13.XX.YY.JAM IN TRAY 1 For help press ?</p>	<p>A page is jammed in the multi-purpose tray.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 Clean the pickup roller. If it is worn or damaged, replace it.</li> <li>4 Clean or replace the separation pad.</li> <li>5 Replace the Tray 1 pickup solenoid.</li> <li>6 Replace the pickup motor.</li> <li>7 Replace the paper pickup assembly.</li> <li>8 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>13.XX.YY.JAM IN TRAY 2 For help press ?</p>	<p>A page is jammed in Tray 2.</p>	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 Clean the pickup roller. If it is worn or damaged, replace it.</li> <li>4 Clean the feed roller. If it is worn or damaged, replace it.</li> <li>5 Replace the Tray 2 pickup solenoid.</li> <li>6 Replace the pickup motor.</li> <li>7 Replace the paper pickup assembly.</li> <li>8 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
13.XX.YY.JAM IN TRAY 3 For help press ?	A page is jammed in Tray 3.	<ol style="list-style-type: none"> <li>1 Press ? for detailed information about clearing the jam.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> <li>3 Clean the pickup roller. If it is worn or damaged, replace it.</li> <li>4 Clean the feed roller. If it is worn or damaged, replace it.</li> <li>5 Replace the Tray 3 pickup solenoid.</li> <li>6 Replace the Tray 3 pickup motor.</li> <li>7 Replace the Tray 3 paper feeder PCB.</li> <li>8 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
20 INSUFFICIENT MEMORY For help press ?  alternates with  20 INSUFFICIENT MEMORY To continue press ✓	The printer has received more data from the computer than fits in available memory.	<ol style="list-style-type: none"> <li>1 Press ✓ to resume printing. <b>Note:</b> A loss of data will occur.</li> <li>2 Reduce the complexity of the print job to avoid this error.</li> <li>3 Adding memory to the printer may allow printing of more complex pages.</li> </ol>
22 EIO X BUFFER OVERFLOW To continue press ✓	The printer's EIO card in slot X has overflowed its I/O buffer during a busy state.	<p>Press ✓ to resume printing.</p> <p><b>Note:</b> A loss of data will occur.</p>
22 PARALLEL I/O BUFFER OVERFLOW For help press ?  alternates with  22 PARALLEL I/O BUFFER OVERFLOW To continue press ✓	The printer's parallel buffer has overflowed during a busy state.	<p>Press ✓ to resume printing.</p> <p><b>Note:</b> A loss of data will occur.</p>
22 SERIAL I/O BUFFER OVERFLOW To continue press ✓	The printer's serial buffer has overflowed during a busy state.	<p>Press ✓ to resume printing.</p> <p><b>Note:</b> A loss of data will occur.</p>
40 BAD SERIAL TRANSMISSION To continue press ✓	A serial data error (parity, framing, or line overrun) has occurred while the printer was receiving data.	<p>Press ✓ to resume printing.</p> <p><b>Note:</b> A loss of data will occur.</p>
40 EIO X BAD TRANSMISSION To continue press ✓	A connection with the card in EIO slot X has been abnormally broken.	<ol style="list-style-type: none"> <li>1 Press ✓ to resume printing. <b>Note:</b> A loss of data will occur.</li> <li>2 Check that all cables are connected to the EIO ports and that the EIO board is seated properly.</li> <li>3 If possible, print to another network printer to verify the network is working properly.</li> </ol>




**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>41.3 UNEXPECTED SIZE IN TRAY XX For help press ?</p> <p>alternates with</p> <p>LOAD TRAY XX: [TYPE] [SIZE] For help press ?</p>	<p>Media is loaded which is longer or shorter in the feed direction than the size configured for the tray.</p>	<ol style="list-style-type: none"> <li>1 If the incorrect size was selected, cancel the job or press ? to access help.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> </ol>
<p>41.5 UNEXPECTED TYPE IN TRAY XX For help press ?</p> <p>alternates with</p> <p>LOAD TRAY XX: [TYPE] [SIZE] For help press ?</p>	<p>The printer senses a different media type in the media path than configured in the tray.</p>	<ol style="list-style-type: none"> <li>1 If the incorrect type was selected, cancel the job or press ? to access help.</li> <li>2 Press ▲ and ▼ to step through the instructions.</li> </ol>
<p>41.X PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>41.X PRINTER ERROR To continue press ⏪</p>	<p>A printer error has occurred.</p> <p><b>X Description</b></p> <ol style="list-style-type: none"> <li>1 unknown misprint error</li> <li>2 beam detect misprint error</li> <li>3 media feed error (size)</li> <li>4 no VSYNC error</li> <li>5 media feed error (type)</li> <li>6 ETB detection error</li> <li>7 feed delay error</li> <li>9 noise VSREQ</li> </ol>	<ol style="list-style-type: none"> <li>1 Press ⏪ to continue or press ? for more information.</li> <li>2 If the message persists, turn the printer off and then back on.</li> </ol>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>49.XXXX            PRINTER ERROR            To continue            turn off then on</p>	<p>A critical firmware error has occurred that caused the processor on the formatter to abort operation. This type of error can be caused by invalid print commands, corrupt data, or invalid operations. In some cases, electrical noise in the cable can corrupt data during transmission to the printer. Other causes include poor quality parallel cables, poor connections, or home-grown applications. On rare occasions, the formatter is at fault, which is usually indicated by a 79 Service Error.</p>	<ol style="list-style-type: none"> <li><b>1</b> Press <b>CANCEL JOB</b> to clear the print job from the printer memory.</li> <li><b>2</b> Turn the printer off and then back on.</li> <li><b>3</b> Try printing a job from a different software application. If the job prints, go back to the first application and try printing a different file. If the message appears only with a certain software application or print job, contact the software vendor for assistance.</li> <li><b>4</b> If the message persists with different software applications and print jobs, disconnect all cables to the printer that connect it to the network or PC.</li> <li><b>5</b> Turn the printer off.</li> <li><b>6</b> Remove all memory DIMMs or third-party DIMMs from the printer. (Do not remove the firmware DIMM in slot J1.)</li> <li><b>7</b> Remove all EIO devices from the printer.</li> <li><b>8</b> Turn the printer on.</li> <li><b>9</b> If the error no longer exists, install each DIMM and EIO device one at a time, making sure to turn the printer off and back on as you install each device.</li> <li><b>10</b> Replace a DIMM or EIO device if you determine that it causes the error.</li> <li><b>11</b> Remember to reconnect all cables that connect the printer to the network or computer.</li> <li><b>12</b> If the error persists, replace the firmware DIMM.</li> <li><b>13</b> Replace the formatter and calibrate the printer. See "Calibrate Now" on page 294.</li> </ol>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>50.X FUSER ERROR For help press ?</p>	<p>A fuser error has occurred.</p> <p><b>X Description</b></p> <ul style="list-style-type: none"> <li>1 low fuser temperature</li> <li>2 fuser warmup service</li> <li>3 high fuser temperature</li> <li>4 faulty fuser</li> <li>5 inconsistent fuser</li> <li>6 open fuser</li> </ul>	<ul style="list-style-type: none"> <li>1 Turn the printer off and allow it to cool down.</li> <li>2 Reinstall the fuser, and check the connector J4034 that connects the fuser and the printer. Replace the connector if it is damaged.</li> <li>3 Turn the printer off and remove the fuser. Measure the resistance between the connector pins on the fuser. If resistance does not meet the following guidelines, replace the fuser. J4034-5 to J4034-6: 300 - 500 KOhms J4034-1 to J4034-2: less than 1 KOhm</li> <li>4 Check for continuity between connector pins J4034-4 and J4034-2. If there is no continuity, replace the fuser.</li> <li>5 Replace the fuser power supply PCB.</li> <li>6 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul>
<p>51.XY PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>51.XY PRINTER ERROR To continue turn off then on</p>	<p>A printer error has occurred.</p> <p><b>X Description</b></p> <ul style="list-style-type: none"> <li>1 beam detect error</li> <li>2 laser error</li> </ul> <p><b>Y Description</b></p> <ul style="list-style-type: none"> <li>0 no color</li> <li>K black</li> <li>C cyan</li> <li>M magenta</li> <li>Y yellow</li> </ul>	<ul style="list-style-type: none"> <li>1 Press  to continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 Reseat the connectors between the laser/scanner and DC controller PCB (J1009 - J1012).</li> <li>4 Replace the defective laser/scanner assembly. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.</li> <li>5 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul>
<p>52.XY PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>52.XY PRINTER ERROR To continue turn off then on</p>	<p>A printer error has occurred.</p> <p><b>X Description</b></p> <ul style="list-style-type: none"> <li>1 scanner error</li> <li>2 scanner startup error</li> <li>3 scanner rotation error</li> </ul> <p><b>Y Description</b></p> <ul style="list-style-type: none"> <li>0 no color</li> <li>K black</li> <li>C cyan</li> <li>M magenta</li> <li>Y yellow</li> </ul>	<ul style="list-style-type: none"> <li>1 Press  to continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 Reseat the connectors between the laser/scanner and DC controller PCB (J1009 - J1012).</li> <li>4 Replace the defective laser/scanner assembly. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.</li> <li>5 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul>
<p>53.X0.ZZ PRINTER ERROR To continue turn off then on</p>	<p>An error has occurred in the onboard RAM.</p>	<ul style="list-style-type: none"> <li>1 Press  to continue.</li> <li>2 Turn the printer off and then back on.</li> </ul>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>53.XY.ZZ PRINTER ERROR To continue press CANCEL JOB</p>	<p>An error occurred on some memory of the printer.</p> <p><b>X DIMM Type</b> 1 RAM</p> <p><b>Y Device Location</b> 1 DIMM Slot 1 2 DIMM Slot 2 3 DIMM Slot 3 4 DIMM Slot 4</p> <p><b>ZZ Error Number</b> 0 unsupported memory 1 unrecognized memory 2 unsupported memory size 3 failed RAM test 4 exceeded maximum RAM size 5 invalid DIMM speed</p>	<p>Press <b>CANCEL JOB</b>.</p> <p>If the problem persists, replace the DIMM card in the slot indicated.</p>
<p>53.10.05 PRINTER ERROR To continue turn off then on</p>	<p>A DIMM is installed in both 168-pin DIMM Slot 4 and 100-pin DIMM Slot 5.</p>	<p>This is an invalid configuration. DIMMs can not be installed in both of these slots at the same time.</p> <p>Remove one of the DIMMs, or move one of the DIMMs to a different slot.</p>
<p>54.X PRINTER ERROR</p>	<p><b>X Description</b> 1 temperature 3 image density sensor 5 color plane registration sensor 6 image density sensor 7 yellow drum home position sensor 8 magenta drum home pos. sensor 9 cyan drum home position sensor 10 black drum home position sensor 11 black density sensor 12 cyan density sensor 13 magenta density sensor 14 yellow density sensor 19 ETB speed control sensor 20 color plane registration sensor 21-24 toner level sensors</p>	<p>Turn the printer off and then back on, then check items in the order listed.</p> <p><b>54.1 error</b> Check the fuser. See 50.X fuser error.</p> <p><b>54.3 error</b> Check the connections. Replace the color registration detection assembly.</p> <p><b>54.5 error</b> Check the connections. Replace the color registration detection assembly.</p> <p><b>54.6 error</b> Check the connections. Replace the color registration detection assembly.</p> <p><b>54.7, 54.8, 54.9, or 54.10 error</b> Check the connections. Replace the drum phase sensor for the indicated color.</p> <p><b>54.11, 54.12, 54.13, or 54.14 error</b> Check the connections. Check the cartridge and replace it if necessary. Replace the color registration detection assembly.</p> <p><b>54.19 error</b> Check the ETB connection. Replace the ETB. Replace the DC controller.</p> <p><b>54.20 error</b> Check the connection. Replace the color registration detection assembly.</p> <p><b>54.21, 54.22, 54.23, or 54.24 error</b> Check the connections. Replace the toner level sensing PCB. Replace the DC controller.</p>



**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>55.X PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>55.X PRINTER ERROR To continue press ✓</p>	<p>The DC controller is not communicating with the formatter. The problem could be caused by a timing error or an intermittent connection.</p>	<ol style="list-style-type: none"> <li>1 Press ✓ to continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 Reseat or replace the connectors between the DC controller and the formatter.</li> <li>4 If the problem persists, replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> <li>5 Replace the formatter. Initialize NVRAM. See “NVRAM initialization” on page 293.</li> </ol>
<p>57.X PRINTER ERROR To continue turn off then on</p>	<p>A printer fan error has occurred.</p> <p><b>X Description</b></p> <ol style="list-style-type: none"> <li>3 cartridge fan (vertical fan, F2)</li> <li>4 formatter fan (horizontal fan, F1)</li> </ol>	<p>Turn the printer off and then back on.</p> <p><b>57.3 Cartridge fan error (F2)</b></p> <ol style="list-style-type: none"> <li>1 Reconnect the connector J1004 on the DC controller PCB.</li> <li>2 Immediately after starting the print operation, measure the voltage between pins 1 and 3 on the J1004 connector. If the voltage changes from 0 V to 24 V, replace the cartridge fan.</li> <li>3 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol> <p><b>57.4 Formatter fan error (F1)</b></p> <ol style="list-style-type: none"> <li>1 Reconnect the connector J1003 on the DC controller PCB.</li> <li>2 Immediately after turning the printer on, measure the voltage between pins 1 and 3 on the J1004 connector. If the voltage changes from 0 V to 24 V, replace the formatter fan.</li> <li>3 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>
<p>58.X PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>58.X PRINTER ERROR To continue turn off then on</p>	<p>A memory tag error was detected.</p> <p><b>X Description</b></p> <ol style="list-style-type: none"> <li>3 CPU</li> <li>4 power supply</li> </ol>	<ol style="list-style-type: none"> <li>1 Turn the printer off and then back on.</li> <li>2 Replace the memory PCB.</li> <li>3 Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.</li> </ol>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>59.XY PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>59.X Y PRINTER ERROR To continue turn off then on</p>	<p>A printer motor error has occurred.</p> <p><b>X Description</b></p> <ul style="list-style-type: none"> <li>0 motor error</li> <li>1 motor startup error</li> <li>2 motor rotation error</li> <li>3 fuser motor startup error</li> <li>4 fuser motor rotation error</li> <li>5 print cartridge motor startup error</li> <li>6 print cartridge motor rotation error</li> <li>9 ETB motor startup error</li> <li>A ETB motor rotation error</li> <li>B developing disengaging motor startup error</li> <li>C developing disengaging motor rotation error</li> </ul> <p><b>Y Description</b></p> <ul style="list-style-type: none"> <li>0 no color</li> <li>K black</li> <li>C cyan</li> <li>M magenta</li> <li>Y yellow</li> </ul>	<ul style="list-style-type: none"> <li><b>1</b> Turn the printer off and then back on.</li> <li><b>2</b> This message might also appear if the transfer unit is missing or incorrectly installed. Ensure that the transfer unit is correctly installed.</li> </ul> <p><b>ETB motor error</b></p> <ul style="list-style-type: none"> <li><b>1</b> Clean the ETB unit intermediate connector, J4017. If the connector is damaged, replace it.</li> <li><b>2</b> Reconnect the connectors J4022 for the ETB motor, J4017 between the ETB and the printer, and J4014 on the DC controller PCB.</li> <li><b>3</b> Replace the ETB motor.</li> <li><b>4</b> Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul> <p><b>Fuser motor error</b></p> <ul style="list-style-type: none"> <li><b>1</b> Reconnect the connectors J4030 for the fuser motor and J1002 on the DC controller PCB. Replace any damaged parts.</li> <li><b>2</b> Replace the fuser drive assembly.</li> <li><b>3</b> Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul> <p><b>Print cartridge motor error</b></p> <ul style="list-style-type: none"> <li><b>1</b> Reconnect the print cartridge connector on the DC controller PCB (J1013 for cyan, J1031 for magenta, J1032 for yellow, and J1033 for black).</li> <li><b>2</b> Replace the drum drive assembly for the indicated print cartridge.</li> <li><b>3</b> Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul> <p><b>Developing disengaging motor error</b></p> <ul style="list-style-type: none"> <li><b>1</b> Reconnect the connectors J4024 and J1019 between the developing disengaging motor and the DC controller PCB.</li> <li><b>2</b> Replace the developing disengaging drive assembly.</li> <li><b>3</b> Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.</li> </ul>
<p>62 NO SYSTEM To continue turn off then on</p>	<p>No system was found.</p>	<ul style="list-style-type: none"> <li><b>1</b> Turn the printer off and then back on.</li> <li><b>2</b> Reseat the firmware DIMM, making sure it is in the 168-pin slot J1.</li> </ul>

**Table 7-3 Numerical printer messages (continued)**

Message	Description	Action
<p>64 PRINTER ERROR For help press ?</p> <p>alternates with</p> <p>64 PRINTER ERROR To continue turn off then on</p>	<p>Scan buffer error.</p>	<ol style="list-style-type: none"> <li>1 Turn the printer off and then back on.</li> <li>2 Perform a cold reset. See “Cold reset” on page 293 for instructions.</li> <li>3 If the message persists, replace the formatter or firmware DIMM.</li> </ol>
<p>68.X PERMANENT STORAGE ERROR For help press ?</p> <p>alternates with</p> <p>68.X PERMANENT STORAGE ERROR To continue press ✓</p>	<p>One or more printer settings saved in the non-volatile storage device is invalid and has been reset to its factory default. Pressing the ✓ button should clear the message. Printing can continue, but there may be unexpected behavior.</p> <p><b>X Description</b> 0 onboard NVRAM 1 removable disk (flash or hard)</p>	<ol style="list-style-type: none"> <li>1 Press ✓ to continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 Check the printer settings to determine which settings have been changed.</li> </ol>
<p>68.X PERMANENT STORAGE FULL For help press ?</p> <p>alternates with</p> <p>68.X PERMANENT STORAGE FULL To continue press ✓</p>	<p>A non-volatile storage device is full. Pressing the ✓ button should clear the message. Printing can continue, but there may be unexpected behavior.</p> <p><b>X Description</b> 0 onboard NVRAM 1 removable disk (flash or hard)</p>	<ol style="list-style-type: none"> <li>1 Press ✓ to continue.</li> <li>2 For <b>68.0</b> errors, turn the printer off and then back on.</li> <li>3 If a 68.0 error persists, execute an NVRAM initialization. See “NVRAM initialization” on page 293.</li> <li>4 For <b>68.1</b> errors, use the HP Web Jetadmin software to delete files from the disk drive.</li> <li>5 If a 68.1 errors persists, reinitialize the hard disk. See “Hard disk initialization” on page 294.</li> </ol>
<p>68.X PERMANENT STORAGE WRITE FAIL To continue press ✓</p>	<p>A non-volatile storage device is failing to write. Pressing the ✓ button should clear the message. Printing can continue, but there may be unexpected behavior.</p> <p><b>X Description</b> 0 onboard NVRAM 1 removable disk (flash or hard)</p>	<ol style="list-style-type: none"> <li>1 Press ✓ to continue.</li> <li>2 Turn the printer off and then back on.</li> <li>3 If the problem persists, initialize NVRAM. See “NVRAM initialization” on page 293.</li> <li>4 Reinitialize the hard disk. See “Hard disk initialization” on page 294.</li> </ol>
<p>79.XXXX PRINTER ERROR To continue turn off then on</p>	<p>A critical hardware error has occurred.</p>	<ol style="list-style-type: none"> <li>1 Turn the printer off and then back on.</li> <li>2 If the problem persists, reseal the firmware DIMM.</li> <li>3 Reseat the formatter.</li> <li>4 Replace the firmware DIMM.</li> <li>5 Replace the formatter. Calibrate the printer. See “Calibrate Now” on page 294.</li> </ol>
<p>8X.YYYY EIO ERROR</p>	<p>The EIO accessory card in slot X has encountered a critical error.</p>	<ol style="list-style-type: none"> <li>1 Turn the printer off and then back on.</li> <li>2 If the problem persists, reseal the EIO card.</li> <li>3 Replace the EIO card.</li> </ol>

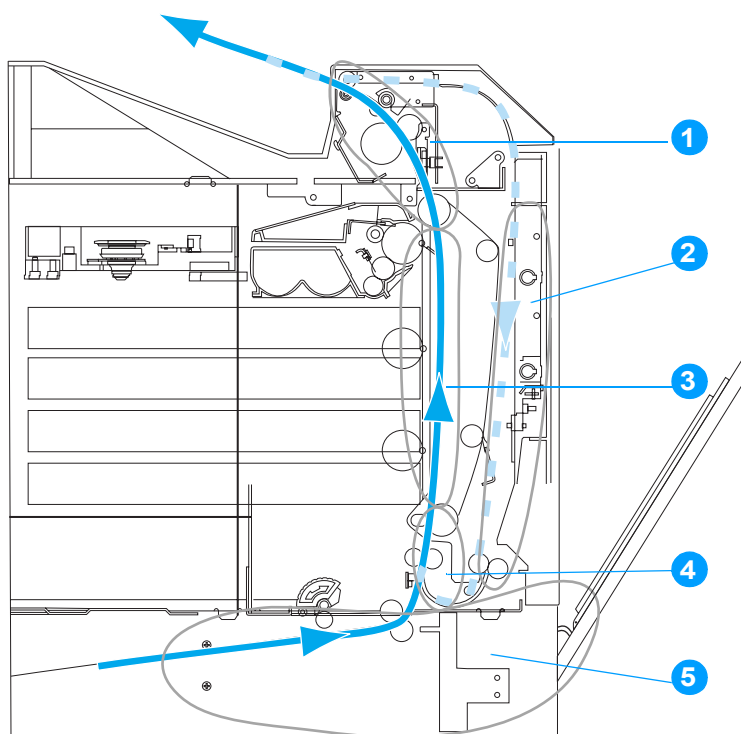
# Paper path troubleshooting

## Jams

Jam error messages occur if paper fails to arrive at or clear the paper path sensors in the allowed time. Dedicated paper sensors detect whether paper is present in the sensor and if paper is fed normally. When the DC controller detects a jam, it immediately stops the printing process and displays the appropriate jam message for the sensor that detects the jam. Figure 7-19 on page 299 shows the locations of all the sensors in the printer.

## Jam locations

Jams occur in the areas shown in Figure 7-2. Jam messages correlate with these areas. For instructions on clearing jams, see the sections later in this chapter.



**Figure 7-2** Jam locations

- 1 top cover area
- 2 duplex path
- 3 paper path
- 4 paper input path
- 5 trays

## Jam locations by error message

Use Table 7-4 to help pinpoint and clear specific paper jams. See Figure 7-2 for jam locations.

**Table 7-4 Error messages and associated jam locations**

Error message	Jam location	Action
13.01.00 JAM IN TRAY X	5	Media is delayed in the feed area of the specified tray. <ol style="list-style-type: none"> <li>1 Open the covers and the ETB.</li> <li>2 Pull media by both corners to remove it.</li> </ol>
13.02.00 JAM IN TRAY X	5	Media is stuck in the feed area of the specified tray. <ol style="list-style-type: none"> <li>1 Open the covers and the ETB.</li> <li>2 Pull media by both corners to remove it.</li> </ol>
13.05.00 JAM IN PAPER PATH	3	Media is delayed in the paper input path or has not reached the fuser paper sensor in the expected time. <ol style="list-style-type: none"> <li>1 Open the covers and the ETB.</li> <li>2 Pull media by both corners to remove it.</li> </ol>
13.09.00 JAM IN TOP COVER AREA	1	Media has crumpled into an accordion fold as it enters the fuser. <ol style="list-style-type: none"> <li>1 Open the top cover.</li> </ol> <p><b>WARNING!</b> The fuser is hot, wait 10 minutes for it to cool down.</p> <ol style="list-style-type: none"> <li>2 Firmly lift the two green handles on either side of the fuser to disengage the fuser rollers.</li> <li>3 Open the fuser cover, and remove the media.</li> <li>4 Firmly press down on the two green handles on either side of the fuser to re-engage the fuser rollers.</li> </ol>
13.0A.00 JAM IN TOP COVER AREA	1	During a duplex print job, media was delayed in the output bin before it entered the duplex path. <ol style="list-style-type: none"> <li>1 Open the top cover.</li> </ol> <p><b>WARNING!</b> The fuser is hot, wait 10 minutes for it to cool down.</p> <ol style="list-style-type: none"> <li>2 Firmly lift the two green handles on either side of the fuser to disengage the fuser rollers.</li> <li>3 Pull media by both corners to remove it.</li> <li>4 Firmly press down on the two green handles on either side of the fuser to re-engage the fuser rollers.</li> </ol>
13.12.00 JAM IN DUPLEX PATH	2	During a duplex print job, media was removed from the output bin before it entered the duplex path, or media has entered the duplex path, but it is stuck. <ol style="list-style-type: none"> <li>1 Open the top cover and the front cover. (Do not open the ETB.)</li> <li>2 Pull media by both corners to remove it.</li> </ol>
13.21.00 JAM IN PAPER PATH	3	One of the covers is not completely closed. Ensure both covers are closed before printing. <ol style="list-style-type: none"> <li>1 Open the covers and the ETB.</li> <li>2 Pull media by both corners to remove it.</li> </ol>

## Paper jam recovery

This printer automatically provides paper jam recovery, a feature that allows you to set whether the printer should attempt to automatically reprint jammed pages. The options are:










- **AUTO** Printer will attempt to reprint jammed pages.
- **OFF** Printer will not attempt to reprint jammed pages.

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### Note

During the recovery process, the printer may reprint several pages that were printed properly before the paper jam occurred. Be sure to remove any duplicated pages.

### To disable paper jam recovery

- 1 Press  to enter the **MENUS**.
- 2 Press  to highlight **CONFIGURE DEVICE**.
- 3 Press  to select **CONFIGURE DEVICE**.
- 4 Press  to highlight **SYSTEM SETUP**.
- 5 Press  to select **SYSTEM SETUP**.
- 6 Press  to highlight **JAM RECOVERY**.
- 7 Press  to select **JAM RECOVERY**.
- 8 Press  to highlight **OFF**.
- 9 Press  to select **OFF**.
- 10 Press the **PAUSE/RESUME** button to return to the **READY** state.

To improve print speed and increase memory resources, you may want to disable paper jam recovery. If paper jam recovery is disabled, the pages involved in a jam will not be reprinted.

## Avoiding paper jams

Table 7-5 lists common causes of paper jams and suggests solutions for resolving them.

**Table 7-5 Common causes of paper jams**

Cause	Solution
Print media does not meet HP-recommended media specifications.	Use only media that meets HP specifications. See Table 1-8, "Supported media specifications," on page 29.
A supply item is installed incorrectly, causing repeated jams.	Verify that all print cartridges, the ETB, and the fuser are correctly installed.
You are reloading paper that has already passed through a printer or copier.	Do not use media that has been previously printed on or copied.
An input tray is loaded incorrectly.	Remove any excess media from the input tray. Press media down in the input tray so it fits below the tabs and within the media width guides.
Print media is skewed.	Input tray guides are not adjusted correctly. Adjust input tray guides so they hold media firmly in place without bending it. If media heavier than 105 g/m <sup>2</sup> (28 lb) is loaded into Tray 2 or Tray 3, the media might skew.
Print media is binding or sticking together.	Remove media, flex it, rotate it 180 degrees, or flip it over. Reload media into the input tray. Do not fan media.
Print media is removed before it settles into the output bin.	Reset the printer. Wait until the page completely settles in the output bin before removing it.
When duplexing, the print media is removed before the second side of the document is printed.	Reset the printer and print the document again. Wait until the page completely settles in the output bin before removing it.
Print media is in poor condition.	Replace the print media.
Print media is not picked up by the internal rollers from Tray 2 or Tray 3.	Remove the top sheet of media. If the media is heavier than 105 g/m <sup>2</sup> (28 lb), it may not be picked from the tray.
Print media has rough or jagged edges.	Replace the media.
Print media is perforated or embossed.	This media does not separate easily. You might need to feed single sheets from Tray 1.
Printer supply items have reached the end of their useful life.	Check the printer control panel for messages prompting you to replace supplies, or print a supplies status page to verify the remaining life of the supplies.
Media was not stored correctly.	Replace the print media. Media should be stored in the original packaging in a controlled environment.

## Persistent jams

If jams occur repeatedly, use the information in this section to diagnose the root cause of the problem. The tables in this section list possible causes and recommended solutions for jams in each area of the paper path. Items are listed in the order you should investigate. In general, items at the beginning of the list are relatively minor repairs. Items at the end of the list are more significant repairs.

## Basic troubleshooting for paper jams

The basic troubleshooting process for paper jams consists of the following:

- 1 Gather data.
- 2 Identify the cause of the problem.
- 3 Fix the problem.

### Data collection

To troubleshoot paper jams, gather the following information:

- the exact paper jam error code displayed on the control panel
- the location of the leading edge of the paper in the paper path
- whether paper is in the paper path when the jam occurs, or if paper is stuck in the input tray
- whether the jam occurs at power-up or while paper is moving
- whether the paper is damaged, and if it is, where the damage occurs on the paper and where in the paper path the paper stops
- whether the jam occurs when feeding from one particular tray
- whether the jam occurs only when duplex printing
- whether a particular type of paper is jamming or not jamming
- whether any of the supplies are non-HP (non-HP supplies are known to cause paper jams)
- whether the customer is storing the paper correctly, overloading the trays, damaging the edge of the paper during loading, or using paper that has already been fed through the printer



## General paper path troubleshooting

Use the following suggestions to isolate the cause of the problem. Once you have identified the cause, use the tables that follow to find a recommended solution.

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### Note

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Use the paper path test in the Diagnostics menu to print pages while troubleshooting. See page 287 for information about the paper path test.

- View or print the event log and determine if a particular jam error occurs more often than others. Try to identify a pattern.
- From the event log, determine the frequency of a particular jam. If a jam occurs repeatedly around the same page count, consider this a single jam that the customer tried to clear.
- Try printing from all available input trays to identify whether the problem is isolated to one tray.
- Print the job in both simplex and duplex modes to identify if the problem occurs only in one mode or the other.
- Try printing on paper from an unopened ream that has been stored correctly. If the jam does not occur with this media, then the customer's media might be causing the problem.
- If the jam occurs from when the printer is turned on, check the paper path for small torn pieces of paper. Also check for broken sensors or flags, and check for loose or defective connections.
- If the paper is torn, folded, or wrinkled (typically along the leading edge), inspect the paper path for items that could be causing the damage.
- If the customer is using non-HP supplies, try replacing those supplies with genuine HP supplies to see if the problem goes away.
- If necessary, instruct the customer on proper media storage, correct loading technique, and printer operation. Make sure the customer knows not to grab paper in the output bin during duplex printing.

### Paper path checklist

- Verify that media is correctly loaded in the input trays and that all length and width guides are set correctly.
- Clean the printer. Toner and paper dust in the paper path can inhibit free movement of media through the printer and can block the sensors.
- Use the paper path test in the Diagnostic menu to vary the input selections of the printer to determine if the problem is associated with a particular area of the printer.
- Worn rollers or separation pads can cause multifeeds. Check the condition of the pickup rollers and separation pads. Bent separation tabs (on the front corners of the input trays) can cause misfeeds and multifeeds. Replace the tray if necessary.
- Defective paper tray switches can cause jams by communicating the wrong paper size to the formatter.
- Defective paper sensors along the paper path might signal a false jam.
- Scraps of media left in the paper path can cause intermittent jams. Always check that the paper path is clear when cleaning the printer and when clearing jams. Also, remove the fuser and carefully check it for jam debris.

## Jams in Tray 1

**Table 7-6 Causes for jams in Tray 1**

Cause	Solution
Pickup roller is dirty, worn, or damaged.	Clean the pickup roller. If it is still dirty after cleaning, or if it is worn or damaged, replace the pickup roller.
Separation pad is defective.	Clean the separation pad. If it is still dirty after cleaning, or if it is worn or damaged, replace the separation pad.
Drive gears are damaged.	Check the drive gears in the paper pickup unit. Replace the pickup drive assembly if the gears are damaged.
Multi-purpose tray pickup solenoid is defective.	<ol style="list-style-type: none"> <li>1 Disconnect the connector J1020 for the multi-purpose tray pickup solenoid from the DC controller PCB.</li> <li>2 Measure the resistance between the cable-side connectors J1020-11 and J1020-10.</li> <li>3 If the measured resistance is NOT about 160 ohms, replace the multi-purpose tray pickup solenoid.</li> </ol>
Pickup motor is defective.	Replace the paper pickup drive assembly.
Paper pickup assembly is defective.	Replace the paper pickup assembly.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Jams in Tray 2

**Table 7-7 Causes for jams in Tray 2**

Cause	Solution
Separation tabs in the paper cassette are deformed.	Straighten the tabs on the front corners of the tray, or replace the cassette.
Pickup roller is worn or damaged.	Replace the pickup roller.
Feed roller is dirty, worn, or damaged.	Clean the feed roller. If it is still dirty after cleaning, or if it is worn or damaged, replace the feed roller.
Drive gears are damaged.	Check the drive gears in the paper pickup unit. Replace the pickup drive assembly if the gears are damaged.
Cassette pickup solenoid is damaged.	<ol style="list-style-type: none"> <li>1 Disconnect the connector for the cassette pickup solenoid from the DC controller PCB.</li> <li>2 Measure the resistance between the cable-side connectors J1020-13 and J1020-12.</li> <li>3 If the measured resistance is NOT about 160 ohms, replace the cassette pickup solenoid.</li> </ol>
Pickup motor is defective.	Replace the paper pickup drive assembly.
Paper pickup assembly is defective.	Replace the paper pickup assembly.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Jams in Tray 3

**Table 7-8 Causes for jams in Tray 3**

Cause	Solution
Separation tabs in the paper cassette are deformed.	Straighten the tabs on the front corners of the tray, or replace the cassette.
Pickup roller is worn or damaged.	Replace the pickup roller.
Feed roller is dirty, worn, or damaged.	Clean the feed roller. If it is still dirty after cleaning, or if it is worn or damaged, replace the feed roller.
Drive gears are damaged.	Check the drive gears in the paper pickup unit. Replace the pickup drive assembly if the gears are damaged.
Connector to the printer has poor contact.	Reconnect all connectors to the printer. Replace any damaged connectors.
Paper feeder pickup solenoid is damaged.	<ol style="list-style-type: none"> <li><b>1</b> Disconnect the connector J4006 for the paper feeder solenoid from the paper feeder PCB.</li> <li><b>2</b> Measure the resistance between the cable-side connectors J4006-2 and J4006-1.</li> <li><b>3</b> If the measured resistance is NOT about 160 ohms, replace the paper feeder pickup solenoid.</li> </ol>
Pickup motor is defective.	Replace the paper pickup drive assembly.
Paper feeder PCB is defective.	Replace the paper feeder PCB.
Paper pickup assembly is defective.	Replace the paper pickup assembly.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See “Calibrate Now” on page 294.

## Jams in the paper path

**Table 7-9 Causes for jams in the paper path**

Cause	Solution
Registration shutter is defective. (This applies to jams that occur before the registration roller.)	Make sure the shutter is clean, moves smoothly, and that the spring is in place. If the shutter is damaged, replace the paper pickup assembly.
Drive gears are damaged. (This applies to jams that occur before the registration roller.)	Check the drive gears in the paper pickup unit. Replace the pickup drive assembly if the gears are damaged.
Registration roller and registration sub roller are dirty, worn, or damaged. (This applies to jams that occur before the registration roller.)	Clean the registration roller or registration sub roller if it is dirty. If it is still dirty after cleaning, or if it is worn or damaged, replace the paper pickup assembly.
Attaching roller is damaged. (This applies to jams in which paper is crumpled into an accordion as it enters the ETB.)	Check if the attaching roller is damaged. If it is damaged, replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
Cartridge shutter open/close mechanism is damaged. (This applies to jams in which paper is crumpled into an accordion fold somewhere on the ETB belt.)	The shutters in each print cartridge should open as you close the ETB. If a shutter does not open, replace that print cartridge. Also check for a damaged shutter mechanism in the printer.
Cartridge drive motor assembly is damaged.	Inspect the cartridge drive assembly in each print cartridge. If any are damaged, replace the assembly for that print cartridge.
Attaching roller is defective.	Make sure the attaching roller is clean and the spring is in place. If the roller is damaged, replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
Paper leading edge sensor is defective.	Replace the pickup PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Jams in the top cover

**Table 7-10 Causes for jams in the top cover**

<b>Cause</b>	<b>Solution</b>
Fuser paper sensor or sensor lever is defective.	Make sure the fuser paper sensor lever moves smoothly and is set in place. Replace the lever if it is damaged. Replace the sensor if it is defective.
Fuser sleeve or pressure roller does not rotate smoothly.	If the fuser drive gears are worn or damaged, replace the fuser.
Fuser inlet guide is dirty or has built-up toner.	Clean the fuser inlet guide.
Fuser sleeve or pressure roller is dirty, worn, or damaged.	Clean the fuser sleeve or pressure roller. If it is damaged, replace the fuser.
Fuser delivery sensor or sensor lever is defective.	Make sure the fuser delivery sensor lever moves smoothly and is set in place. Replace the lever if it is damaged. Replace the sensor if it is defective.
Fuser delivery roller is worn.	Replace the fuser.
Fuser delivery roller drive gears are worn or damaged.	Replace the fuser.
Face-down delivery roller is defective.	Replace the fuser.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Jams in the duplex path

**Table 7-11 Causes for jams in the duplex path**

<b>Cause</b>	<b>Solution</b>
Oblique rollers are worn or damaged.	Replace the oblique rollers.
Oblique roller drive gears are worn or damaged.	Replace the ETB unit. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
Duplex feed guide is damaged.	Replace the ETB unit. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.

## Paper transport troubleshooting

If media is feeding incorrectly, use the information in this section to identify and resolve the problem.

### Multiple pages are fed

**Table 7-12 Causes for multiple pages feeding**

Cause	Solution
Separation tabs in the cassette are damaged (Tray 2 or Tray 3).	Straighten the tabs on the front corners of the tray, or replace the cassette.
Multi-purpose tray separation pad is worn.	Replace the separation pad assembly.
Multi-purpose tray separation pad has a defective spring.	Make sure the spring is set in place. If the spring is damaged, replace the separation pad assembly.

### Paper is wrinkled or folded

To diagnose the cause of wrinkled or folded paper, use the Print/Stop test in the Diagnostics menu. Adjust the stop time so the paper stops before it enters the fuser. Open the ETB. If paper is wrinkled at this stage, use Table 7-14 to diagnose the problem. If paper is *not* wrinkled at this stage, use Table 7-13 to diagnose the problem. See page 291 for more information on the Print/Stop test.

**Table 7-13 Causes for wrinkled or folded paper (part one, paper path entrance)**

Cause	Solution
Registration shutter is defective.	Make sure the registration shutter is clean and moves smoothly. If the registration shutter is worn or damaged, replace the paper pickup assembly.
Feed roller or registration roller is dirty or defective.	Replace the paper pickup assembly.
Paper path has foreign substances or dirt.	Remove any foreign substances or dirt from the paper path. If the feed guide is damaged, replace the paper pickup assembly.
Cartridge shutter open/close mechanism is damaged. (This applies to jams in which paper is crumpled into an accordion fold somewhere on the ETB belt.)	The shutters in each print cartridge should open as you close the ETB. If a shutter does not open, replace that print cartridge. Also check for a damaged shutter mechanism in the printer.

**Table 7-14 Causes for wrinkled or folded paper (part two, paper path exit)**

Cause	Solution
Fuser inlet guide is dirty.	Clean the fuser inlet guide.
Fuser pressure roller is dirty or damaged.	Clean the pressure roller. If the pressure roller is damaged, replace the fuser.
Fuser sleeve is dirty or damaged.	Clean the fuser sleeve. If the fuser sleeve is damaged, replace the fuser.
Fuser delivery roller is dirty.	Clean the fuser delivery roller.

## Paper is skewed

**Table 7-15 Causes for skewed paper**

<b>Cause</b>	<b>Solution</b>
Paper dust or dirt has accumulated in the cassette feed roller or registration roller.	Clean the rollers.
Cassette feed roller and registration roller are worn irregularly.	Replace the paper pickup assembly.
Separation tabs in the cassette are damaged (Tray 2 or Tray 3).	Straighten the tabs on the front corners of the tray, or replace the cassette.
Registration shutter is defective.	Make sure the registration shutter moves smoothly, its spring is in place, and it is clean. If the registration shutter is damaged, replace the paper pickup assembly.

## Image formation troubleshooting

The image formation system is the central hub of the printer. During image formation, an image of colored toner is formed and then fused onto the paper. The image formation system consists of the following physical components:

- four laser/scanners
- four print cartridges
- ETB
- fuser

Before beginning image formation troubleshooting, check that the media meets the specifications listed in the *HP LaserJet Printer Family Print Media Guide*.

### Print quality problems associated with media

Some print quality problems arise from use of inappropriate media.

- Use paper that meets HP paper specifications. See “Supported media specifications” on page 29.
- The surface of the media is too smooth. Use media that meets HP paper specifications. See “Supported media specifications” on page 29.
- The driver/printer is set incorrectly. Change the paper type setting to **heavy** or **glossy**.
- The media you are using is too heavy for the printer, and the toner is not fusing to the media.
- The transparencies you are using are not designed for proper toner adhesion. Use only transparencies designed for HP Color LaserJet printers.
- The moisture content of the paper is uneven, too high, or too low. Use paper from a different source or from an unopened ream of paper.
- Some areas of the paper reject toner. Use paper from a different source or from an unopened ream of paper.
- The letterhead you are using is printed on rough paper. Use a smoother, xerographic paper. If this solves your problem, consult with the printer of your letterhead to verify that the paper used meets the specifications for this printer.
- The paper is excessively rough. Use a smoother, xerographic paper.



## Overhead transparency defects

Overhead transparencies may display any of the image quality problems that any other type of media will cause, as well as defects specific to printing on transparencies. In addition, because transparencies are pliable while in the print path, they are subject to being marked by the media-handling components.

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### Note

Allow transparencies to cool at least 30 seconds before handling them.

- In the printer driver's **Paper** tab, select **Transparency** as the media type. Also, make sure that the tray is correctly configured for transparencies.
- Check that the transparencies meet the specifications for this printer. See "Supported media specifications" on page 29. For more information, consult the *HP LaserJet Printer Family Print Media Guide*.
- Handle transparencies by the edges. Skin oil on the surface of transparencies can cause spots and smudges.
- Small, random dark areas on the trailing edge of solid fill pages may be caused by transparencies sticking together in the output bin. Try printing the job in smaller batches.
- The selected colors are undesirable when printed. Select different colors in the software application or printer driver.
- If you are using a reflective overhead projector, use a standard overhead projector instead.

## Print quality problems associated with the environment






- The printer is operating in excessively humid or dry conditions. Verify that the printing environment is within specifications. See "Environmental specifications" on page 24.

## Print quality problems associated with jams

- Make sure that all media is cleared from the paper path.
- The printer recently jammed. Print two to three pages to clean the printer.
- The media does not pass through the fuser causing image defects to appear on subsequent documents. Print two to three pages to clean the printer. However, if the problem persists see the next section.

## Print quality troubleshooting pages

Use the built-in print quality troubleshooting pages to help diagnose and solve print quality problems.

1. Press  to enter the **MENUS**.
2. Press  to highlight **DIAGNOSTICS**.
3. Press  to select **DIAGNOSTICS**.
4. Press  to highlight **PQ TROUBLESHOOTING**.
5. Press  to print the pages.

The printer returns to the **READY** state after printing the print quality troubleshooting pages.

## Understanding color variations

The printed output might not match the computer screen, and the colors printed on successive pages might not match. While color variations are inherent in this printing method, they can indicate changes in the printing environment, print media, or printer components.

### Common causes of color variation

The following list outlines the major causes of color variations between computers, applications, and output devices.

- Halftone patterns produced on monitors and the types of patterns used in the print jobs are different and might cause variations in the printed output.
- The printed output differs from the image on the monitor because the monitor and the print media have different reference values of black and white. The monitor screen has charcoal gray for the black level, and the white on the monitor screen is actually blue. Black on the print media is limited only by the fill capability of the printer, and most good quality paper has a very high white level. In addition, phosphor (used in color monitors) and toner have entirely different spectra characteristics and different color-rendering capabilities. Differences between output are common. Blues generally match better than reds.
- The color of the ambient light changes the perception of color. Fluorescent light lacks many colors present in incandescent light, and the color range of natural light is broader than any artificial light. When comparing color, choose a standard light source for reference and understand that the perceived color will change as the light changes.
- Long-term color variations occur as paper ages. Use high-quality paper and protect the paper from sunlight to help minimize discoloration.
- Environmental changes can cause color variation. The development process places a high potential across an air gap to attract toner to the imaging drum. Changes in relative humidity vary the point at which the toner travels to the imaging drum.
- All consumable components have a finite life span. As these components reach the end of their useful life, their ability to produce consistent print quality diminishes.
- Paper roughness can cause colors to look different. Use standard paper.

### Color selection process

The user selects the color in the application, but the operating system might convert or modify some characteristics of the color before sending the information to the printer driver. The printer driver might also modify color characteristics depending upon the selected output mode.

Any color characteristics not addressed by the printer driver or applications are set to the printer default. The default color might not match the color the user selected.

## Matching colors

### PANTONE®\* color matching

PANTONE®\* has multiple color matching systems. PANTONE®\* Matching System is very popular and uses solid inks to generate a wide range of color hues and tints. See <http://www.hp.com> for details on how to use PANTONE®\* Matching System with this printer.

### Swatch book color matching

The process for matching printer output to preprinted swatch books and standard color references is complex. In general, you can obtain a reasonably good match to a swatch book if the inks used to create the swatch book are cyan, magenta, yellow, and black. These are usually referred to as process color swatch books.

Some swatch books are created from spot colors. Spot colors are specially created colorants. Many of these spot colors are outside of the gamut of the printer. Most spot color swatch books have companion process swatch books that provide CMYK approximations to the spot color.

Most process swatch books will have a note on what process standards were used to print the swatch book. In most cases they will be SWOP, EURO, or DIC. To get optimal color matching to the process swatch book, select the corresponding ink emulation from the printer menu. If you cannot identify the process standard, use SWOP ink emulation.

## Using color

### HP ImageREt 2400

HP ImageREt 2400 is a technology that provides you with the best color print quality without having to change driver settings or make trade-offs between print quality, performance, and memory. ImageREt 2400 produces photorealistic images.

ImageREt 2400 provides 2400 dpi color laser-class quality through a multilevel printing process. This process precisely controls color by combining up to four colors within a single dot and by varying the amount of toner in a given area. As a result, ImageREt 2400, together with the 600-by-600 dpi engine resolution, creates millions of smooth colors.

### Paper selection

For the best color and image quality, select the appropriate media type from the printer menu or from the front panel.

### sRGB

Standard red-green-blue (sRGB) is a world-wide color standard originally developed by HP and Microsoft as a common color language for monitors, input devices (scanners, digital cameras), and output devices (printers, plotters). It is the default color space used for HP products, Microsoft operating systems, the World Wide Web, and most office software sold today. sRGB is representative of the typical Windows PC monitor today and the convergence standard for high-definition television.

The latest versions of Adobe PhotoShop, CorelDRAW™, Microsoft Office, and many other applications use sRGB to communicate color. Most importantly, as the default color space in Microsoft operating systems, sRGB has gained broad adoption as a means to exchange color information between applications and devices using a common definition that assures typical users will experience greatly improved color matching. sRGB improves your ability to match colors between the printer, the PC monitor and other input devices (scanner, digital camera) automatically, without the need to become a color expert.

## Color options

Color options enable optimal color output automatically for diverse types of documents.

Color options use object tagging, which allows optimal color and halftone settings to be used for different objects (text, graphics, and photos) on a page. The printer driver determines which objects are used on a page and uses halftone and color settings that provide the best print quality for each object. Object tagging, combined with optimized default settings, produces great color out of the box.

In the Windows environment, the **Automatic** and **Manual** color options are on the **Color** tab in the printer driver.

Setting color options to **Automatic** will typically produce the best possible print quality for color documents. However, there may be cases when you want to print a color document in grayscale (black and white) or wish to change one of the printer's color options.

- Using Windows, print in grayscale or change the color options using settings found on the **Color** tab in the printer driver.
- Using a Macintosh computer, print in grayscale or change the color options using the **Color Matching** pop-up menu in the **Print** dialog box.

### Print in Grayscale

Selecting the **Print in Grayscale** option from the printer driver prints a document in black and white. This option is useful for previewing preliminary copies of slides and hardcopy output, or for printing color documents that will be photocopied or faxed.

### Automatic or manual color adjustment

The **Automatic** color adjustment option optimizes the neutral gray color treatment, halftones, and edge enhancements used for each element in a document. For more information, see your printer driver online Help.

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#### Note

Automatic is the default setting and is recommended for printing all color documents.

The **Manual** color adjustment option allows you to adjust the neutral gray color treatment, halftones, and edge enhancements for text, graphics and photographs. To access the Manual color options, from the **Color** tab, select **Manual**, then **Settings**.

### Manual color options

Manual color adjustment allows you to adjust the Color (or Color Map) and Halftone options individually for text, graphics, and photographs.

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#### Note

Some applications convert text or graphics to raster images. In these cases, the **Photographs** settings will also control text and graphics.

### Halftone options

Halftone options affect the resolution and clarity of your color output. You can select halftone settings for text, graphics, and photographs independently. The two halftone options are **Smooth** and **Detail**.

- The **Smooth** option provides better results for large, solid-filled print areas. It also enhances photographs by smoothing out fine color gradations. Choose this option when uniform and smooth area fills are top priority.
- The **Detail** option is useful for text and graphics that require sharp distinctions among lines or colors, or images that contain a pattern or a high level of detail. Choose this option when sharp edges and details are top priority.

## Neutral Grays

The **Neutral Grays** setting determines the method used for creating gray colors used in text, graphics, and photographs.

Two values are available for the **Neutral Grays** setting:

- **Black Only** generates neutral colors (grays and black) using only black toner. This guarantees neutrals colors without a color cast.
- **4-Color** generates neutral colors (grays and black) by combining all four toner colors. This method produces smoother gradients and transitions to non-neutral colors, and it produces the darkest black.

## Edge Control

The **Edge Control** setting determines how edges are rendered. Edge control has two components: adaptive halftoning and trapping. Adaptive halftoning increases edge sharpness. Trapping reduces the effect of incorrect color plane registration by overlapping the edges of adjacent objects slightly.

Four levels of edge control are available:

- **Maximum** is the most aggressive trapping setting. Adaptive halftoning is on for this setting.
- **Normal** is the default trapping setting. Trapping is at a medium level and adaptive halftoning is on.
- **Light** sets trapping at a minimal level, and adaptive halftoning is on.
- **Off** turns off both trapping and adaptive halftoning.

## RGB Color

Two values are available for the **RGB Color** setting:

- **Default** instructs the printer to interpret RGB color as sRGB. sRGB is the accepted standard of Microsoft and the World Wide Web Organization (www).
- **Device** instructs the printer to print RGB data in raw device mode. To render photographs properly with this selection, you must manage image color in the application or operating system.














## Adjusting color balance

This printer features automatic color calibration to provide high-quality color output. In situations that require critical color control, you can manually adjust the density balance of the printer's four toner colors. The available range for each color is from -5 to +5. The default value is 0.

### CAUTION

This procedure should only be performed by your network administrator. Performing this procedure changes the color balance of the printer by altering halftones and affects *all* print jobs.

### To adjust color density

- 1 Press  to enter the MENUS.
- 2 Press  to highlight CONFIGURE DEVICE MENU.
- 3 Press  to select CONFIGURE DEVICE MENU.
- 4 Press  to highlight PRINT QUALITY.
- 5 Press  to select PRINT QUALITY.
- 6 Press  or  to highlight ADJUST COLOR.
- 7 Press  or  to highlight the desired color.
- 8 Press  or  to highlight the correct density setting.
- 9 Press  to select the density setting.
- 10 Press  to set the density for the next color.
- 11 After setting the density for each color, press [PAUSE/RESUME](#).

## Image defects

If specific defects occur repeatedly, print a Print Quality Troubleshooting page (see “Print quality troubleshooting pages” on page 247) and follow the instructions on the page. If you are unable to resolve the problem, use the information in this section to identify the root cause of the problem.

Image defects fall into the categories listed in Table 7-16. Possible causes and recommended solutions for each of these categories are listed in the tables that follow. In general, the items are listed in order from minor repairs to major repairs. Check the items in the order in which they appear.

**Table 7-16 Image defects**

<b>Image defect</b>	<b>Description</b>	<b>More information</b>
Light image	A very light image is printed.	See Table 7-17 on page 254.
Light color	One color is light in an image.	See Table 7-18 on page 254.
Dark image	A very dark image is printed.	See Table 7-19 on page 254.
Dark color	One color is dark in an image.	See Table 7-20 on page 255.
Completely blank	No image is printed.	See Table 7-21 on page 255.
All black/solid color	An all black or solid colored image is printed.	See Table 7-22 on page 255.
Dots in vertical lines	Vertical lines of white dots appear in the image.	See Table 7-23 on page 255.
Dirt on back of paper	The back (non-printed) side of the paper is dirty.	See Table 7-24 on page 256.
Dirt on front of paper	The front (printed) side of the paper is dirty.	See Table 7-25 on page 256.
Vertical lines	Vertical lines are printed.	See Table 7-26 on page 256.
White vertical lines	White vertical lines appear in the image.	See Table 7-27 on page 257.
Horizontal lines	Horizontal lines are printed.	See Table 7-28 on page 257.
White horizontal lines	White horizontal lines appear in the image.	See Table 7-29 on page 257.
Missing color	One of the four toner colors is not printed.	See Table 7-30 on page 257.
Blank spots	The image has blank spots.	See Table 7-31 on page 258.
Poor fusing	Toner is loose on the printed image.	See Table 7-32 on page 258.
Distortion or blurring	The image appears distorted, or colors seem out of alignment.	See Table 7-33 on page 258.
Smearing	The image is smeared or dirty.	See Table 7-34 on page 259.
Misplaced image	The image is placed incorrectly on the page.	See Table 7-35 on page 259.

## Light image

**Table 7-17 Causes for light images**

Cause	Solution
Image density is not adjusted correctly.	Increase the density for each color.
Poor contact in the attaching bias contacts between the ETB and the high-voltage PCB.	Clean the contacts. Replace them if they are still dirty or are damaged.
Attaching roller is worn or damaged.	Replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Light color

**Table 7-18 Causes for one color printing light**

Cause	Solution
Poor contact in the transfer bias contacts between the ETB and the printer.	Clean the contacts for the affected color. If the contacts are still dirty after cleaning or if they are damaged, replace the contacts or the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
Transfer charging roller is worn or damaged.	Replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
Photosensitive drum is worn.	Replace the print cartridge for the affected color.
High-voltage PCB is defective.	Replace the high-voltage PCB.
Laser/scanner unit is defective.	Replace the laser/scanner for the affected color. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Dark image

**Table 7-19 Causes for dark images**

Cause	Solution
Image density is not adjusted correctly.	Decrease the density for each color.
Color registration detection unit is dirty.	Clean the lens on the color registration detection unit.
Color registration detection unit is defective.	Replace the color registration detection unit.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.



## Dark color

**Table 7-20 Causes for one color printing dark**

Cause	Solution
Poor contact in the drum ground, primary charging bias, and developing bias contacts of the high-voltage PCB and the print cartridge.	Clean the contacts on the cartridge for the affected color. If they are still dirty after cleaning, or if they are damaged, replace the cartridge.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Completely blank image

**Table 7-21 Causes for a completely blank image**

Cause	Solution
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## All black or solid color

**Table 7-22 Causes for an all black or solid colored image**

Cause	Solution
Poor contact in the drum ground, primary charging bias, and developing bias contacts of the high-voltage PCB and the print cartridge.	Clean the contacts on the cartridge for the affected color. If they are still dirty after cleaning, or if they are damaged, replace the cartridge.
Primary charging roller is defective.	Replace the print cartridge for the affected color.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Dots in vertical lines

**Table 7-23 Causes for vertical lines of white dots**

Cause	Solution
Transfer charging roller is worn or damaged.	Replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Dirt on back of paper

**Table 7-24 Causes for dirt on the back of the paper**

Cause	Solution
Rollers are dirty.	See Table 7-36 on page 260 for information on identifying the roller(s) that might be dirty. Clean the indicated roller. If the roller is still dirty after cleaning, replace the appropriate roller, cartridge, or assembly.
Pickup roller is dirty.	Clean the roller. If the roller is still dirty after cleaning, replace the pickup roller assembly.
Poor contact in the attaching bias contacts between the ETB and the high-voltage PCB.	Clean the contacts. Replace them if they are still dirty or are damaged.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Dirt on front of paper

**Table 7-25 Causes for dirt on the front of the paper**

Cause	Solution
Rollers are dirty.	See Table 7-36 on page 260 for information on identifying the roller(s) that might be dirty. Clean the indicated roller. If the roller is still dirty after cleaning, replace the appropriate roller, cartridge, or assembly.
Pickup roller is dirty.	Clean the roller. If is still dirty after cleaning, replace the pickup roller assembly.
Poor contact in the attaching bias contacts between the ETB and the high-voltage PCB.	Clean the contacts. Replace them if they are still dirty or are damaged.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Vertical lines

**Table 7-26 Causes for vertical lines**

Cause	Solution
Photosensitive drum has grooves going around the circumference.	Replace the cartridge for the color of the vertical lines.
Fuser sleeve has grooves around the circumference.	Replace the fuser.

## White vertical lines

**Table 7-27 Causes for white vertical lines**

Cause	Solution
Developing cylinder has grooves going around the circumference.	Replace the print cartridge for the color in which the white lines appear.
Photosensitive drum has grooves going around the circumference.	Replace the print cartridge for the color in which the white lines appear.
Laser is blocked by a foreign substance.	Inspect the laser source for the affected color, and remove any debris that might be blocking it.
Mirror in the laser/scanner unit is dirty.	Replace the laser/scanner for the color in which the white lines appear. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.
The fuser sleeve has vertical scars. (All colors are affected.)	Replace the fuser.

## Horizontal lines

**Table 7-28 Causes for horizontal lines**

Cause	Solution
Photosensitive drum has scars running from end to end.	Replace the print cartridge for the affected color.
The fuser sleeve has scars running from end to end.	Replace the fuser.

## White horizontal lines

**Table 7-29 Causes for white horizontal lines**

Cause	Solution
Photosensitive drum has scars running from end to end.	Replace the print cartridge for the affected color.
ETB belt has horizontal scars.	Replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.

## Missing color

**Table 7-30 Causes for a missing color**

Cause	Solution
Poor contact in the developing bias contacts of the high-voltage PCB and the print cartridge.	Clean the contacts. If they are still dirty after cleaning, or if they are damaged, replace the print cartridge or the high-voltage contacts. Replace the high-voltage PCB.
Primary charging roller is defective.	Replace the print cartridge for the missing color.
Laser/scanner unit is defective.	Replace the laser/scanner for the missing color. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Blank spots

**Table 7-31 Causes for blank spots**

Cause	Solution
High-voltage PCB is defective.	Replace the high-voltage PCB.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Poor fusing

**Table 7-32 Causes for poor fusing**

Cause	Solution
Media is not within specifications. For example, media that is too thick causes poor fusing.	Use media that meets specifications. See "Supported media weights and sizes" on page 29.
Fuser is not within nip width specifications.	Replace the fuser.
Fuser sleeve is scarred or damaged.	Replace the fuser.
Pressure roller is scarred or damaged.	Replace the fuser.
Thermistor is deteriorated.	Replace the fuser.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Distortion or blurring

**Table 7-33 Causes for distortion or blurring**

Cause	Solution
Color plane registration is out of specification.	Calibrate the printer from the Print Quality menu. See "Calibrate Now" on page 294.
ETB is defective.	If the ETB belt does not rotate smoothly, replace the ETB. Calibrate the printer after replacing the ETB. See "Calibrate Now" on page 294.
ETB motor drive gear is worn or damaged.	Replace the ETB motor.
Drum motor drive gear is worn or damaged.	Replace the drum motor for the affected color.
Color registration detection unit is defective.	Replace the color registration detection unit.
Laser/scanner unit is defective.	Replace the laser/scanner for the affected color. Calibrate the printer after replacing the laser/scanner. See "Calibrate Now" on page 294.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Smearing

**Table 7-34 Causes for smearing**

<b>Cause</b>	<b>Solution</b>
Poor contact in the printer ground and cartridge ground contacts.	Clean each printer cartridge ground contact and the printer ground contact. If they are still dirty after cleaning, or if they are damaged, replace the cartridge, or replace the printer ground contact.
Fuser inlet guide is dirty or has debris.	Clean the fuser inlet guide.
Cartridge shutters are not opening.	Make sure the cartridge shutter bar is operating properly.

## Misplaced image

**Table 7-35 Causes for a misplaced image**

<b>Cause</b>	<b>Solution</b>
Paper is skewed.	See Table 7-15 on page 245 to resolve the reason for the skew.
Oblique rollers are worn. (Applies to duplex printing only.)	Replace the oblique rollers.
DC controller PCB is defective.	Replace the DC controller PCB. Calibrate the printer after replacing the DC controller. See "Calibrate Now" on page 294.

## Repetitive defects troubleshooting

Defects on printer rollers can cause image defects to appear at regular intervals on the page. Use the repetitive defects ruler on the next page (Figure 7-3) to measure the distance between defects that recur on a page. Use Table 7-36 to determine which roller is causing the defect. To resolve the problem, try cleaning the roller first. If the roller is still dirty after cleaning or if it is damaged, replace the indicated part.

### Note

Letter codes before the roller names in Table 7-36 correspond to the letters at the top of the repetitive defects ruler in Figure 7-3. Not all rollers are shown in the ruler.

### CAUTION

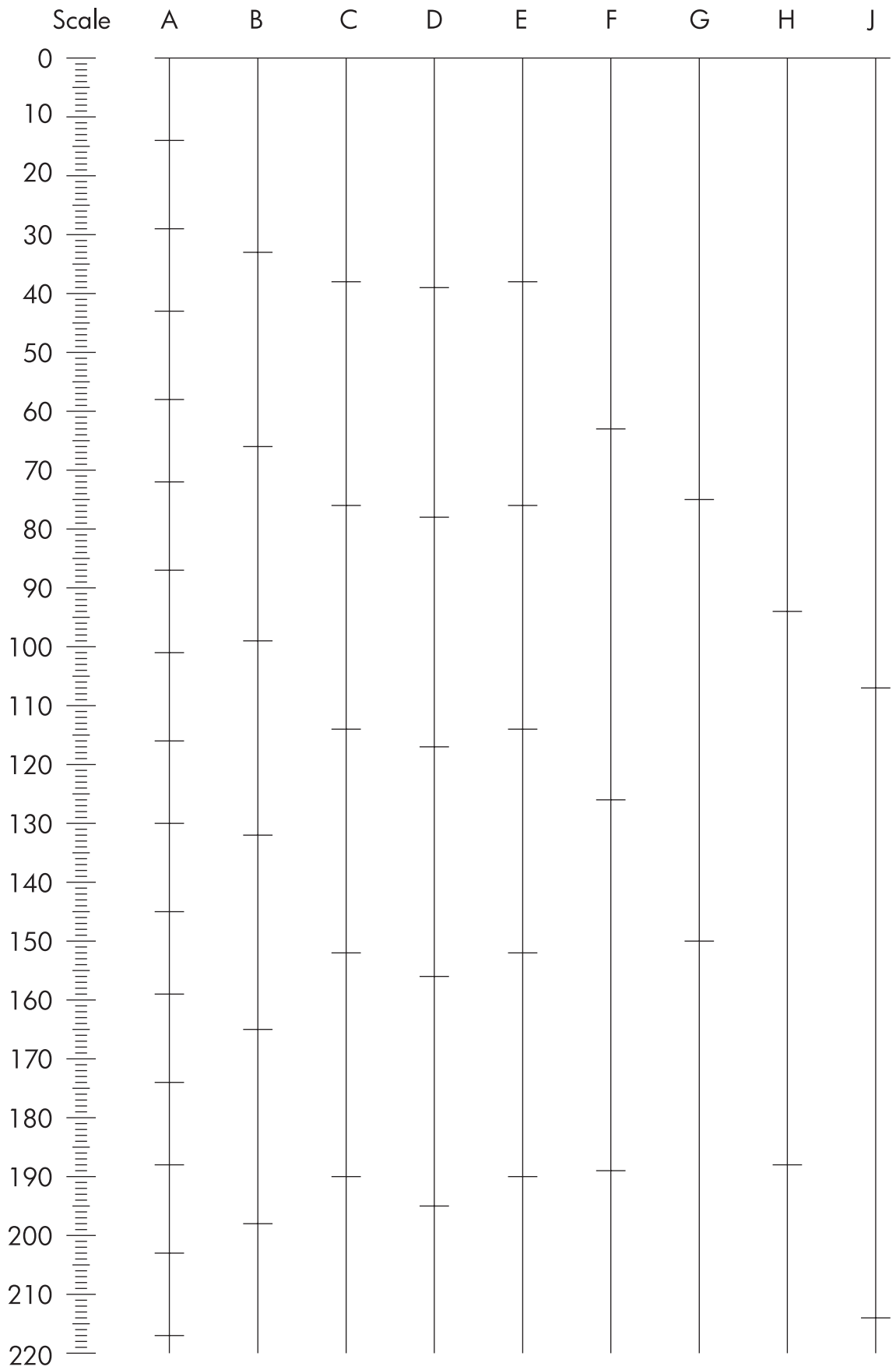
Do not use solvents or oils to clean rollers. Instead, rub the roller with lint-free paper. If dirt is difficult to remove, rub the roller with lint-free paper dampened with rubbing alcohol.

**Table 7-36 Repetitive defect spacing**

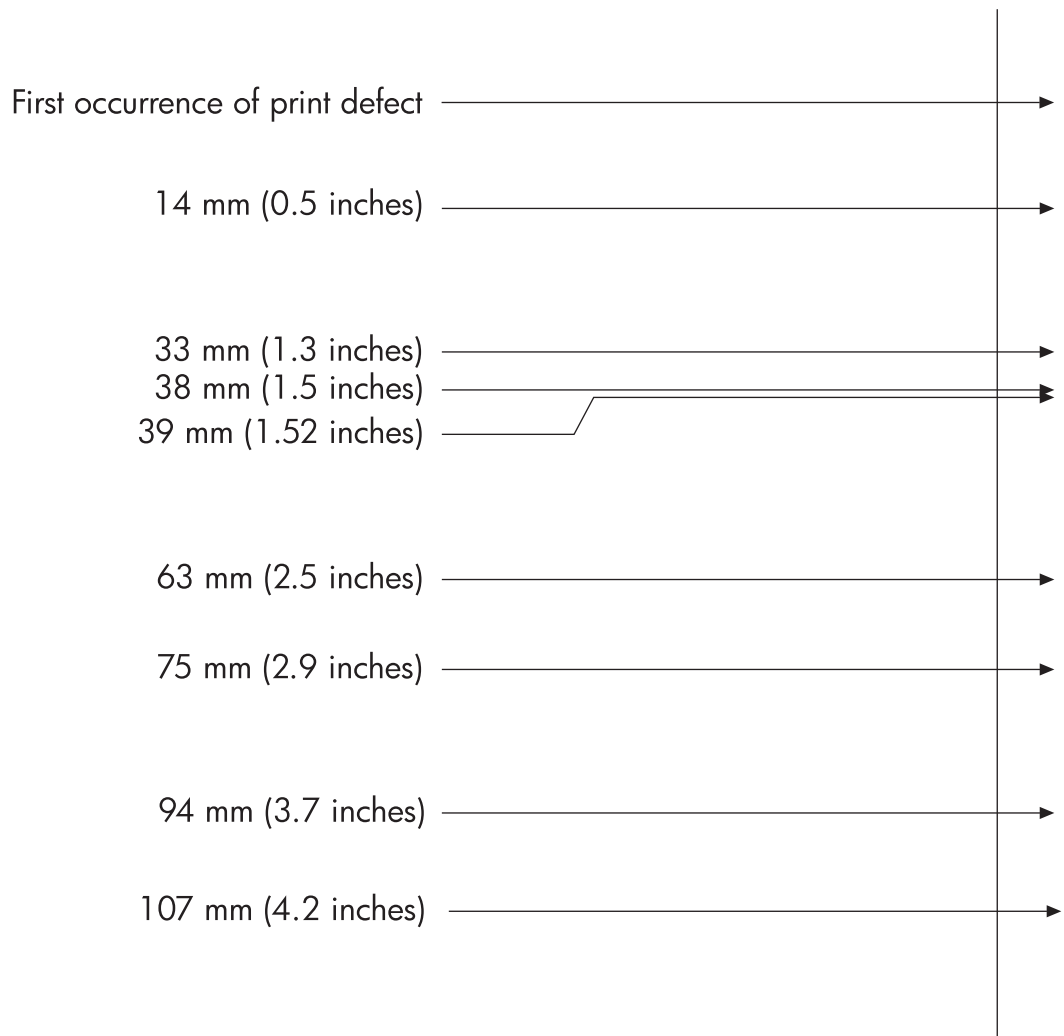
Roller	Distance	Type of defect	Replacement part
<b>A</b> toner charging roller	14 mm		print cartridge
<b>B</b> developing cylinder	33 mm	defect on front of paper	print cartridge
<b>C</b> primary charging roller	38 mm	blank spots	print cartridge
<b>D</b> toner feed roller	39 mm		print cartridge
<b>E</b> media attaching roller	38 mm	defect on front of paper	ETB
<b>F</b> fuser pressure roller	63 mm	poor fusing	fuser
<b>G</b> photosensitive drum or transfer rollers (center-to-center distance)	75 mm		Replace any print cartridges that have a damaged photosensitive drum. Replace the ETB.
<b>H</b> photosensitive drum	94 mm	defect on front of paper blank spots	print cartridge
<b>J</b> fuser sleeve	107 mm	poor fusing	fuser
cassette feed roller	54 mm	defect on front of paper	cassette
cassette feed sub roller	44 mm	defect on back of paper	cassette
registration roller	54 mm	defect on back of paper	paper pickup assembly
registration sub roller	57 mm	defect on front of paper	paper pickup assembly
fuser delivery roller	38 mm	defect on back of paper	fuser
face-down delivery roller	49 mm	defect on back of paper	fuser
cassette pickup roller	see note below	defect on front of paper	paper pickup rollers
multi-purpose tray pickup roller	see note below	defect on back of paper	MP tray pickup roller assembly

### Note

Defects on the cassette pickup roller or the multi-purpose tray pickup roller do not cause a repetitive defect. Defects on these rollers cause a defect to appear only on the leading edge of the image.



**Figure 7-3** Repetitive defects ruler (1 of 2)



**Figure 7-4** Repetitive defects ruler (2 of 2)



# Interface troubleshooting

## Communications checks

**Note**

Communication problems are normally the customer's responsibility. Time spent attempting to resolve these problems might not be covered by the product's Hewlett-Packard warranty.

Refer the customer to the network administrator for assistance in troubleshooting network problems.

If the printer is not connected to an MS-DOS-based host, proceed to Table 7-37, Communications check.

**Table 7-37 Communications check**

Check	Action
Is your computer configured to the parameters described in the configuration instructions?	These parameters are required to communicate with the printer. Verify that the configuration of the computer's communications port matches these parameters.  <b>Note:</b> If these parameters are not set properly, an error might display on the control panel.

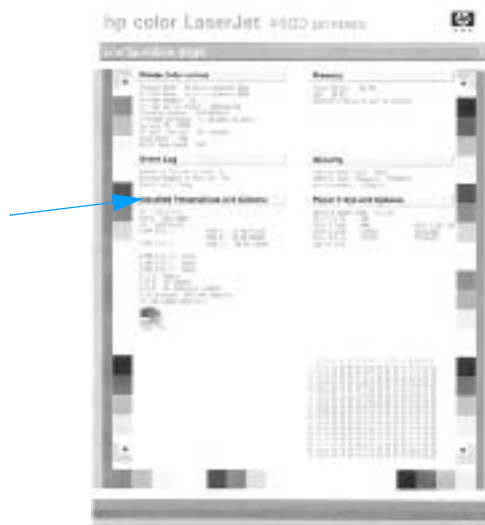
## EIO troubleshooting

If the printer contains an optional HP Jetdirect print server, and you cannot communicate with the printer over the network, verify the operation of the print server. Print a configuration page. If the Jetdirect card does not appear under "Installed personalities and options" on the configuration page (indicated by the arrow in Figure 7-5), see the troubleshooting section of the *HP Jetdirect Print Server Software Installation Guide*.

If the host system and printer are still not communicating, replace the formatter PCB and the EIO card and reconfigure the printer. If the problem persists, a protocol analyzer might be needed to find the source of the problem.

**CAUTION**

HP LaserJet printers are not designed to work with mechanical switch-box products without proper surge protection. These devices generate high transient voltages that cause permanent damage to the formatter PCB. This circumstance is not covered by the Hewlett-Packard warranty.



**Figure 7-5** HP Color LaserJet 4600 series printer configuration page

# AUTOEXEC.BAT standard configurations

## Parallel DOS commands

Ensure that the AUTOEXEC.BAT file contains the following statements for parallel interface communications:

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

For MS-DOS version 4.0 and above:

```
MODE LPT1: , ,B
```

---

### Note

---

This example assumes that you are using parallel printer port LPT1. If you are using LPT2 or LPT3, replace LPT1 in the example with the appropriate printer port.

## Printer Job Language (PJM) commands

See the *HP Printer Job Language Technical Reference Manual* for a complete description of PJL commands. This manual is available with the *HP PCL/PJL Reference Set* on CD-ROM, part number 5021-0337.

### @PJL [Enter]

This command enables the specified printer language. If the printer does not receive this command it enables the default language. This ensures the correct operation applications that do not support PJL. The command syntax is:

```
@PJL [Enter] LANGUAGE = {PCL/PostScript} [<CR>] <LF>
```

### UEL (universal exit language)

This command (also referred to as the universal exit language command) terminates the current printer language and returns control to PJL. It performs the following actions:

- Prints all data received before this command.
- Performs a reset: <esc>E in PCL, <cntrl>D in PostScript.
- Turns control over to PJL.

This command is also a valid HP-GL/2 terminator.

The UEL command must be immediately followed by the “@PJL” command prefix. Characters or control codes other than @PJL (such as <CR> or <LF>), enable the default language and process the print job in that language. All jobs must begin and end with the UEL command. Besides entering PJL, the UEL command has the same effect as the <esc>E command. However, the <esc>E command should always be included to ensure backward compatibility.

## **@PJL COMMENT**

This command designates the current line as a comment, which is ignored. The syntax is:

```
@PJL COMMENT <words> [
```

## **@PJL INFO CONFIG**

This command solicits a response to describe the installed options and allows the printer to configure the installed options automatically as the applications require.

## **@PJL INFO ID**

This command identifies the printer type to the host for reference when selecting printer drivers for automatic installation. The command syntax is:

```
@PJL INFO ID <CR> <LF>
```

## **@PJL INFO USTATUS**

This command queries the state of unsolicited JOB status. PAGE and TIMED status are not supported. The syntax is:

```
@PJL INFO USTATUS <CR> <LF>
```

## **@PJL INFO PAGECOUNT**

This command returns the number of pages printed by the engine.

## **@PJL JOB**

This command informs the printer of the start of a PJL job and synchronizes the job status information. The printer counts print jobs, including nested jobs, incrementing the job counter for the @PJL JOB command and decrementing it for @PJL EOJ.

The printer accepts the NAME= parameter and returns the name string in the unsolicited JOB start status message (if unsolicited job status is enabled). The printer transmits the unsolicited JOB status message to every I/O channel that has enabled this function. This message's format is:

```
@PJL USTATUS JOB <CR><LF>  
START<CR><LF>  
[NAME=<job name><CR><LF>]  
<FF>
```

The printer resets the nested job counter whenever it switches the source to a different I/O channel. This prevents a corrupt job on one channel from disrupting the activities on another channel.

## **@PJL EOJ**

This command identifies the end of a print job and is a hint for the I/O switching algorithm. The printer counts nested jobs and recognizes job boundaries when the counter decrements to zero. The printer ignores isolated EOJ commands. Each EOJ must be preceded by a JOB command.

## **@PJL ECHO**

This printer supports the ECHO command which transmits its parameters over the I/O channel to the host that issued the command.

## **@PJL USTATUS JOB=ON/OFF**

This command enables or disables the JOB status for the I/O channel that delivers the command.

## **@PJL USTATUSOFF**

This command disables the unsolicited JOB status for the I/O channel that delivered the command. For this printer, it duplicates the function of @PJL USTATUS JOB=OFF, AND @PJL USTATUS DEVICE=OFF.

---

### **Note**

All commands not supported by this printer's PJL command set are returned with the message @PJL XXXX<CR><LF>?<CR><LF>.



## Information menu

Use the Information menu to access and print specific printer information.

**Table 7-38 Information menu**

Menu item	Description
PRINT MENU MAP	Prints the control panel menu map, which shows the layout and current settings of the control panel menu items.
PRINT CONFIGURATION	Prints the printer configuration page.
PRINT SUPPLIES STATUS	Prints the estimated remaining life for the supplies; reports statistics on total number of pages and jobs processed, print cartridge manufacture date, serial number, page counts, and maintenance information.
SUPPLIES STATUS	Displays the supplies status in a scrollable list.
PRINT USAGE	Prints a count of all media sizes that have passed through the printer; lists whether they were simplex, duplex, monochrome, or color; and reports the page count.
PRINT DEMO	Prints a demonstration page.
PRINT FILE DIRECTORY	Prints the name and directory of files stored in the printer on an optional hard disk.
PRINT PCL FONT LIST	Prints the available PCL fonts.
PRINT PS FONT LIST	Prints the available PS (emulated PostScript) fonts.

## Paper handling menu

The Paper handling menu allows you to configure input trays by size and type. This menu can also be used to set default media size and type. It is important to configure the trays correctly with this menu before you print for the first time.

### Note

If you have used previous HP LaserJet printers, you might be accustomed to configuring Tray 1 to first mode or cassette mode. To mimic the settings for first mode, configure Tray 1 for size = ANY and type = ANY. To mimic the settings for cassette mode, set either the size or type for tray 1 to a setting other than ANY.

**Table 7-39 Paper handling menu**

Menu item	Value	Description
TRAY 1 SIZE	A list of available sizes appears.	Allows you to configure the media size for tray 1. The default value is ANY.
TRAY 1 TYPE	A list of available types appears.	Allows you to configure the media type for tray 1. The default value is ANY.
TRAY <N> SIZE (N = 2 or 3)	A list of available sizes appears.	Allows you to configure the media size for Tray 2 or Tray 3. The default setting is the size detected by the guides in the tray. To use a custom size, move the switch in the tray to custom.
TRAY <N> TYPE (N = 2 or 3)	A list of available types appears.	Allows you to configure the media type for Tray 2 or Tray 3. The default is PLAIN.

## Configure device menu

The Configure device menu has several submenus. These submenus allow you to change the printer's default printing settings, adjust the print quality, change the system's configuration and I/O options, and reset the printer to its default settings.

### Printing menu

The settings in the Printing menu affect only jobs without identified properties. Most jobs identify all of the properties and override the values from this menu.

**Table 7-40 Printing submenu**

Menu item	Values	Description
COPIES	1 - 32000	Allows you to set the default number of copies.
DEFAULT PAPER SIZE	A list of available sizes appears.	Allows you to set the default media size.
DEFAULT CUSTOM PAPER SIZE	UNIT OF MEASURE X DIMENSION Y DIMENSION	Allows you to set the default size for any job without dimensions.
DUPLEX	OFF ON	Allows you to enable or disable the duplex function on models with duplexing capability.
OVERRIDE A4/LETTER	NO YES	Allows you to set the printer to print an A4 job on letter-size paper when no A4 paper is loaded.
MANUAL FEED	ON OFF	Allows you to manually feed media.
COURIER FONT	REGULAR DARK	Allows you to select a version of the Courier font.
WIDE A4	NO YES	Allows you to change the printable area of A4 paper so that eighty 10-pitch characters may be printed on a single line.
PRINT PS ERRORS	OFF ON	Allows you to select to print PS error pages.
PCL	FORM LENGTH ORIENTATION FONT SOURCE FONT NUMBER FONT PITCH SYMBOL SET APPEND CR TO LF	Allows you to configure settings for the printer control language.

## Print quality menu

The Print quality menu allows you to adjust all aspects of print quality, including calibration, registration, and color halftone settings.

**Table 7-41 Print quality submenu**

Menu item	Values	Description
ADJUST COLOR	CYAN DENSITY MAGENTA DENSITY YELLOW DENSITY BLACK DENSITY RESTORE COLOR VALUES	Allows you to modify the halftone settings for each color.
SET REGISTRATION	PRINT TEST PAGE SOURCE ADJUST TRAY 1 ADJUST TRAY 2 ADJUST TRAY 3	Allows simplex and duplex image alignment.
PRINT MODES	A list of available modes appears.	Allows you to associate each media type with a specific print mode.
OPTIMIZE	REDUCE BACKGROUND TRANSFER RESTORE OPTIMIZE	Allows you to optimize certain parameters for all jobs rather than optimizing by media type.
CALIBRATE NOW		Executes all printer calibrations: DMAX, DHALF, color plane registration, and drum phase adjustment



## System setup menu

The System setup menu allows you to make changes to general printer configuration default settings such as PowerSave Time, printer personality (language), and jam recovery.

**Table 7-42 System setup submenu**

Menu item	Values	Description
JOB STORAGE LIMIT	1-100	Sets the limit for the maximum number of jobs stored on the hard disk at the printer.
JOB HELD TIMEOUT	OFF 1 HOUR 4 HOURS 1 DAY 1 WEEK	Sets the period of time that the system keeps files in job storage before deleting them from the queue.
COLOR/MONO MIX =	AUTO MOSTLY COLOR PAGES MOSTLY BLACK PAGES	AUTO will reset the printer to the factory default setting, which is MOSTLY COLOR. MOSTLY COLOR PAGES will exhibit the NEVER SWITCH behavior to maximize performance. MOSTLY BLACK PAGES will exhibit the LOOK AHEAD FIRST behavior to improve cost per page as much as possible while minimizing impact to performance.
TRAY BEHAVIOR	USE REQUESTED TRAY MANUALLY FEED PROMPT	Allows you to specify settings for the tray selection behavior. (This setting allows you to configure the trays to behave like trays in some previous HP printers.)
POWERSAVE TIME	1 MINUTE 5 MINUTES 30 MINUTES 1 HOUR 2 HOURS 4 HOURS	Reduces power consumption when the printer has been inactive for an extended period.
PERSONALITY	AUTO PCL PS	Sets the default personality to automatic switching, PCL, or PostScript emulation.
CLEARABLE WARNINGS	ON JOB	Sets whether a warning is cleared on the control panel or when another job is sent.
AUTO CONTINUE	ON OFF	Determines printer behavior when the system generates an auto continuable error.
SUPPLIES LOW	CONTINUE STOP	Sets low supplies reporting options.
JOB STORAGE LIMIT	1-100	Sets the limit for the maximum number of jobs stored on the hard disk at the printer.
JAM RECOVERY	AUTO ON OFF	Sets whether the printer will attempt to reprint pages after a jam.
LANGUAGE	A list of available languages appears.	Sets the default language.

## I/O menu

The I/O menu allows you to configure the printer's I/O options.

**Table 7-43 I/O submenu**

Menu item	Values	Description
I/O TIMEOUT	5 - 300	Allows you to select the I/O timeout in seconds.
PARALLEL INPUT	HIGH SPEED ADVANCED FUNCTIONS	Allows you to select the speed at which the parallel port communicates with the host, and to enable or disable the bi-directional parallel communication.
EIO X (Where X=1, 2, or 3.)	Possible values are: TCP/IP IPX/SPX APPLETALK DLC/LLC LINK SPEED NOVELL	Allows you to configure EIO devices installed in slot 1, 2, or 3.

## Resets menu

The Resets menu allows you to reset factory settings, disable and enable PowerSave, and update the printer after new supplies are installed.

**Table 7-44 Resets submenu**

Menu item	Values	Description
RESTORE FACTORY SETTINGS	None.	Allows you to clear the page buffer, remove all perishable personality data, reset the printing environment, and return all default settings to factory defaults.
POWERSAVE	ON OFF	Allows you to enable and disable PowerSave.
RESET SUPPLIES	NEW TRANSFER KIT NEW FUSER KIT	Allows you to inform the printer that a new transfer kit or new fuser kit has been installed.

## Diagnostics menu





The Diagnostics menu allows you to run tests that can help you identify and solve problems with the printer.

**Table 7-45** Diagnostics menu

Menu item	Description
PRINT EVENT LOG	Prints an event log that displays the last 50 entries in the printer's event log, starting with the most recent.
SHOW EVENT LOG	Displays the last 50 events on the control panel display, starting with the most recent.
PQ TROUBLESHOOTING	Prints a series of print quality assessment pages that help troubleshoot any print quality problems.
DISABLE CARTRIDGE CHECK	Allows you to remove a print cartridge to help determine which cartridge is the source of the problem.
PAPER PATH TEST	Used for testing the paper handling features of the printer, such as the configuration of the trays.
SENSOR TEST	Allows you to test the paper path sensors and switches for correct operation.
COMPONENT TEST	Activates individual parts independently to isolate noise, leaking, and other hardware issues.
PRINT/STOP TEST	Isolates print quality faults more accurately by stopping the printer in mid print cycle. Stopping the printer in mid cycle allows you to see where the image begins to degrade.

## Service menu

The Service menu is PIN protected for added security. Only authorized service people have access to the service menu. When you select **SERVICE** from the list of menus, you are prompted to enter your 8-digit PIN number. The PIN for this printer is 04460002.

- 1 Press  or  until the first digit of the PIN is displayed.
- 2 Press  to save the digit. The display will replace the digit with an asterisk.
- 3 Repeat steps 1 and 2 until all eight digits are entered.
- 4 Press  at any time to move to the previous digit.

Use the Service menu to reset counts, clear the event log, enter the serial number, enter the date the printer was first used, and reset the default paper size.

**Table 7-46 Service menu**

Menu item	Values	Description
CLEAR EVENT LOG		Allows you to clear the printer's internal event log
TOTAL PAGE COUNT	Range: 0 - 9999999	Allows you to reset the page count after replacing the formatter. The page count should reflect the number of pages printed on the print engine rather than the formatter.
TRANSFER KIT COUNT	Range: 0 - 9999999 (120,000 is the maximum number of pages the transfer unit can print)	Allows you to reset the page count of the current transfer unit if the value is lost. This item automatically resets to zero when the transfer unit is replaced and the user selects the choice to reset the transfer count.
FUSER KIT COUNT	Range: 0 - 9999999 (150,000 is the maximum number of pages the fuser can print)	Allows you to reset the page count of the current fuser if the value is lost. This item automatically resets to zero when the fuser is replaced and the user selects the choice to reset the fuser count.
SERIAL NUMBER	XXXXXXXXXX	Allows you to update the serial number if you replace the formatter.
SERVICE ID	YYDDD	If you replace the formatter, this item allows you to set the date to the date the printer was first used, rather than the date the new formatter was installed. See "Service ID" on page 296 for information on the date format.
COLD RESET PAPER	LETTER A4	If the customer uses default paper size of A4 (used in Europe), this item allows you to reset the default if you replace the formatter.

# Tools for troubleshooting

## Embedded Web server

When the printer is directly connected to a computer, the embedded Web server is supported for Windows 95 and later. In order to use the embedded Web server with a direct connection, you must choose the Custom installation option when you install the printer driver. Select the option to load Printer Status and Alerts. The proxy server is installed as part of the Printer Status and Alerts software.

When the printer is connected to the network, the embedded Web server is automatically available. You may access the embedded Web server from Windows 95 and later.

The embedded Web server allows you to view printer and network status and to manage printing functions from your computer instead of from the printer control panel. Below are examples of what you can do using the embedded Web server:

- view printer control status information
- set the type of paper loaded in each tray
- determine the remaining life on all supplies and order new ones
- view and change tray configurations
- view and change the printer control panel menu configuration
- view and print internal pages
- receive notification of printer and supplies events
- view and change network configuration

To use the embedded Web server, you must have Microsoft Internet Explorer 4 and later or Netscape Navigator 4 and later. The embedded Web server works when the printer is connected to an IP-based network. The embedded Web server does not support IPX-based printer connections. You do not have to have Internet access to open and use the embedded Web server.

## To access the embedded Web server

In a supported Web browser on your computer, type the IP address for the printer. (To find the IP address, print a configuration page.)

---

### Note

Once you open the URL, you can bookmark it so that you can return to it quickly in the future.

- 1 The embedded Web server has three tabs that contain settings and information about the printer: the **Information** tab, the **Settings** tab, and the **Network** tab. Click the tab that you want to view.
- 2 See the following sections for more information about each tab.

## Information tab

The Information pages group consists of the following pages:

- **Device Status.** Displays the printer status and shows the life remaining of HP supplies, with 0 percent representing that a supply is empty. The page also shows the type and size of print media set for each tray. To change the default settings, click **Change Settings**.
- **Configuration page.** Shows the information found on the printer Configuration page.
- **Supplies Status.** Shows the life remaining of HP supplies, with 0 percent representing that a supply is empty. This page also provides supplies part numbers. To order new supplies, click **Order Supplies** in the **Other Links** area on the left side of the window. To visit any website, you must have Internet access.
- **Event log.** Shows a list of all printer events and errors.
- **Usage page.** Shows a summary of the number of pages the printer has printed, grouped by size and type.
- **Device Information.** Shows the printer network name, address, and model information. To change these entries, click **Device Information** on the **Settings** tab.

## Settings tab

This tab allows you to configure the printer from your computer. The **Settings** tab can be password protected. If this printer is networked, always consult with the printer administrator before changing settings on this tab.

The **Settings** tab contains the following pages.

- **Configure Device.** Allows you to configure all printer settings from this page. This page contains the traditional menus found on printers using a control panel display. These menus include **Information**, **Paper Handling**, **Configure Device**, and **Diagnostics**.
- **Alerts.** Network only. Allows you to set up to receive e-mail alerts for various printer and supplies events.
- **E-mail.** Network only. Used in conjunction with the Alerts page to set up incoming and outgoing e-mail, as well as to set e-mail alerts.
- **Security.** Allows you to set a password that must be entered to gain access to the **Settings** and **Networking** tabs. Enable and disable certain features of the EWS.
- **Other Links.** Allows you to add or customize a link to another website. This link is displayed in the **Other Links** area on all embedded Web server pages. These permanent links always appear in the **Other Links** area: **HP Instant Support™**, **Order Supplies**, and **Product Support**.
- **Device Information.** Allows you to name the printer and assign an asset number to it. Enter the name and e-mail address for the primary contact who will receive information about the printer.
- **Language.** Allows you to determine the language in which to display the embedded Web server information.

## Networking tab

This tab allows the network administrator to control network-related settings for the printer when it is connected to an IP-based network. This tab will not appear if the printer is directly connected to a computer, or if the printer is connected to a network using anything other than an HP Jetdirect print server card.

## Other links

This section contains links that connect you to the Internet. You must have Internet access in order to use any of these links. If you use a dial-up connection and did not connect when you first opened the embedded Web server, you must connect before you can visit these websites. Connecting might require that you close the embedded Web server and reopen it.

- **HP Instant Support™** connects you to the HP website to help you find solutions. This service analyzes your printer error log and configuration information to provide diagnostic and support information specific to your printer.
- **Order Supplies** connects to the HP website and order genuine HP supplies, such as print cartridges and paper.
- **Product Support** connects to the support site for the HP Color LaserJet 4600 printer where you can search for help regarding general topics.

## Printer Status and Alerts software

Printer Status and Alerts is supported only for Windows 95 and later versions.

The Printer Status and Alerts software is available to users of both networked and directly connected printers. To use Printer Status and Alerts software with a directly connected computer, you must choose the Custom installation option when you install the printer driver. Select the option to install Printer Status and Alerts. For network connections, Printer Status and Alerts is installed automatically with the Typical software installation option.

This software allows you to view the embedded Web server information for a particular printer. It also generates messages on the computer regarding the status of the printer and print jobs. Depending on how the printer is connected, you can receive different messages.

- **Networked printers.** You can receive regular job status messages that appear every time a print job is sent to the printer or every time the print job finishes printing. You can also receive alert messages. These messages appear when you are printing to a particular printer if that printer experiences a problem. In some cases, the printer can continue to print (such as when a tray that is not being used is open, or a print cartridge is low). In other cases, a problem may prevent the printer from printing (such as when paper is out, or a print cartridge is empty).
- **Directly connected printers.** You can receive alert messages that appear when the printer experiences a problem but can continue printing or a problem that prevents it from printing. You can also receive messages indicating the print cartridge is low.

You can set alert options for a single printer that supports Printer Status and Alerts, or you can set alert options for all printers that support Printer Status and Alerts. For networked printers, these alerts only appear for your jobs.

Note that even if you are setting alert options for all printers, not all options you select will apply to all printers. For example, when selecting the option to notify you when the print cartridges are low, directly connected printers that support Printer Status and Alerts will generate a message when the print cartridges are low. However, none of the networked printers will generate this message, unless it affects a user-specific job.

### To choose which status messages appear

- 1 Open Printer Status and Alerts in one of these ways:
  - Double-click the **Printer Status and Alerts** tray icon, which is near the clock in the Tray Manager.
  - On the Start menu, point to **Programs**, point to **Printer Status and Alerts**, and click **Printer Status and Alerts**.
- 2 Click the **Options** icon in the left pane.
- 3 In the **For** field, select the printer driver for this printer, or select **All Printers**.
- 4 Clear the options for the messages you do not want to appear, and select the options for the messages you do want to appear.
- 5 Under **Status check rate**, select how frequently you want the software to update the printer status information that the software uses to generate the messages. Status Check Rate might not be available if the printer administrator has restricted the rights to this function.






### To view status messages and information

On the left side of the window, select the printer for which you want to see information. Information provided includes status messages, supplies status, and printer capabilities. You can also click the Job History (clock) icon at the top of the window to view a list of previous jobs sent to the printer from your computer.



## Printer configuration page

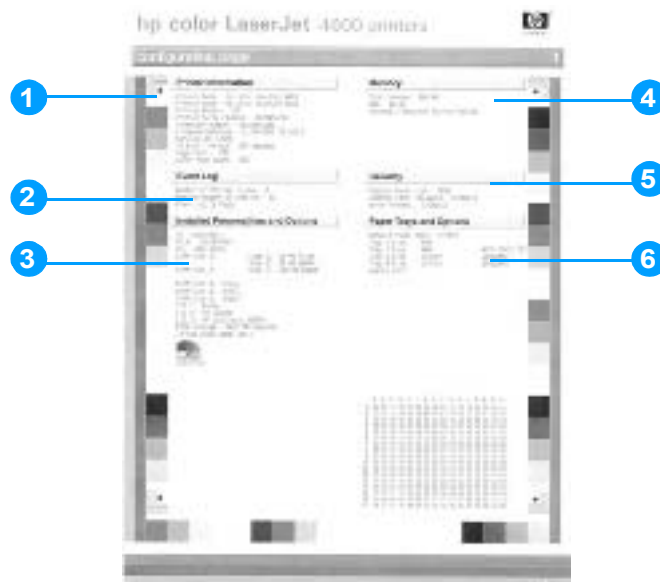
Use the configuration page to view current printer settings, to help troubleshoot printer problems, or to verify installation of optional accessories, such as memory (DIMMs), paper trays, and printer languages.

- 1 Press  to enter the MENU.
- 2 Press  to highlight INFORMATION.
- 3 Press  to select INFORMATION.
- 4 Press  to highlight PRINT CONFIGURATION.
- 5 Press  to select PRINT CONFIGURATION.

The message PRINTING... CONFIGURATION appears on the display until the printer finishes printing the configuration page. The printer returns to the READY state after printing the configuration page.

### Note

If the printer is configured with EIO cards (for example, an HP Jetdirect Print Server) or an optional hard disk drive, an additional configuration page will print that provides information about those devices.



**Figure 7-7** Printer configuration page






- 1 printer information
- 2 event log
- 3 installed personalities and options
- 4 memory
- 5 security
- 6 paper trays and options

## Supplies status page

The supplies status page illustrates the remaining life for the following printer supplies:

- print cartridges (all colors)
- transfer unit
- fuser

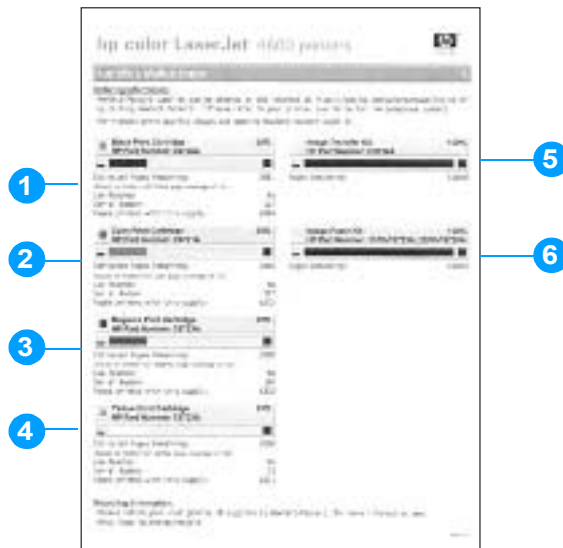
To print the supplies status page:

- 1 Press  to enter the **MENUS**.
- 2 Press  to highlight **INFORMATION**.
- 3 Press  to select **INFORMATION**.
- 4 Press  to highlight **PRINT SUPPLIES STATUS**.
- 5 Press  to select **PRINT SUPPLIES STATUS**.

The message **PRINTING... SUPPLIES STATUS** appears on the display until the printer finishes printing the supplies status page. The printer returns to the Ready state after printing the supplies status page.

### Note

If you are using non-HP supplies, the supplies status page will not show the remaining life for those supplies.






**Figure 7-8** Supplies status page

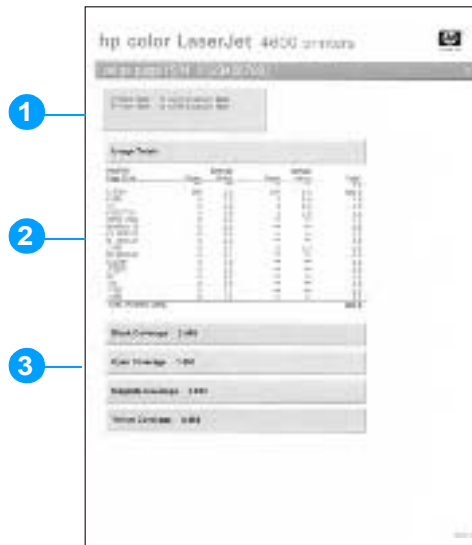
- 1 black print cartridge information
- 2 cyan print cartridge information
- 3 magenta print cartridge information
- 4 yellow print cartridge information
- 5 image transfer kit (ETB) information
- 6 image fuser kit information

## Usage page

The usage page lists a page count for each size of media that has passed through the printer. This page count includes the number of pages that were printed on one side, the number that were printed on two sides (duplexed), and totals of the two printing methods for each media size. It also lists the average percentage of page coverage for each color.

- 1 Press  to enter the MENUS.
- 2 Press  to highlight INFORMATION.
- 3 Press  to select INFORMATION.
- 4 Press  to highlight PRINT USAGE.
- 5 Press  to select PRINT USAGE.

The message PRINTING... USAGE appears on the display until the printer finishes printing the usage page. The printer returns to the Ready state after printing the usage page.








**Figure 7-9** Usage page

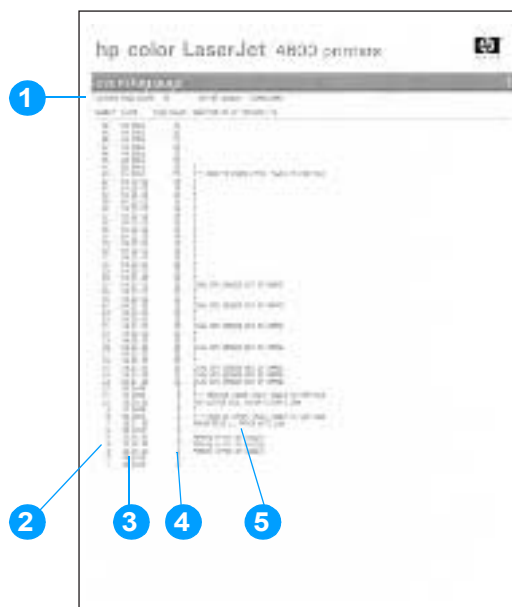
- 1 printer identification information
- 2 usage totals
- 3 percent of coverage broken down by color

## Event log

The event log lists the printer events, including printer jams, service errors, and other printer conditions.

- 1 Press  to enter the MENUS.
- 2 Press  to highlight DIAGNOSTICS.
- 3 Press  to select DIAGNOSTICS.
- 4 Press  to highlight PRINT EVENT LOG.
- 5 Press  to select PRINT EVENT LOG.

The message PRINTING... EVENT LOG appears on the display until the printer finishes printing the event log. The printer returns to the Ready state after printing the event log.



**Figure 7-10** Event log

- 1 current page count and printer serial number
- 2 event number (the most recent is at the top of the list)
- 3 error code
- 4 page count at which the event occurred
- 5 description of the event

## Diagnostics flowchart

Use this flowchart to help identify the cause of high-level printer problems. These problems are indicated by abnormalities in the printer's power-on sequence. The LED that the flowchart refers to is on the formatter. Figure 7-12 on the next page indicates where this LED is located. This is a "heartbeat" LED that blinks on and off when the formatter is operating properly.

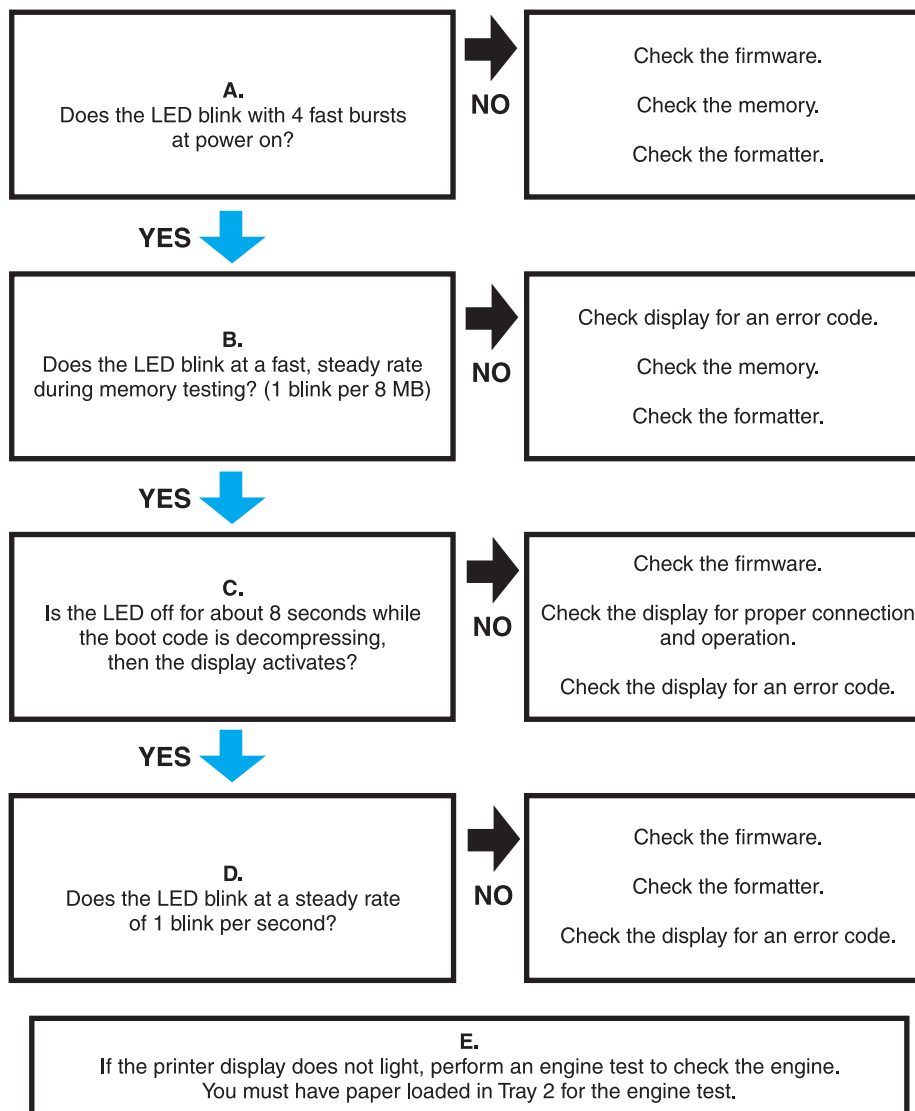
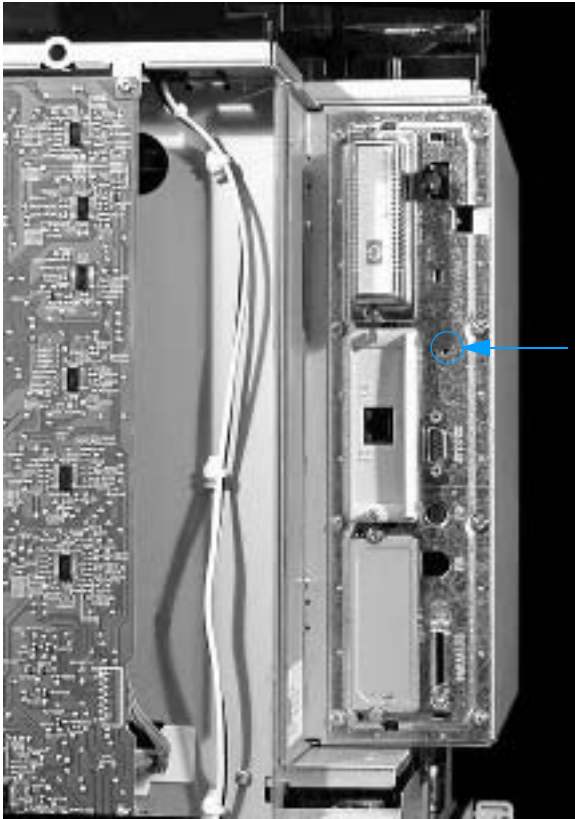


Figure 7-11 Diagnostics flowchart



**Figure 7-12** Formatter LED

## Engine diagnostics

This section provides an overview of the engine diagnostics incorporated into the HP Color LaserJet 4600 series printer. The printer contains extensive internal diagnostics that help in troubleshooting print quality issues, paper path issues, noise issues, component issues, and timing issues.

### Diagnostics mode

Some of the diagnostic tests automatically put the printer into a special diagnostics mode. The special diagnostics mode allows the printer to perform actions that it normally could not because the printer would enter an error state. Always follow the control panel directions in the Diagnostic menu to properly exit the special diagnostics mode and return the printer to a normal state.

### Diagnostics that put the engine into the special diagnostics mode

There are three diagnostic tests that put the engine into a special state:

- Disable cartridge check
- Sensor test
- Component test

While the printer is in the special diagnostics mode, the display should read:

```
Ready Diagnostics Mode
To exit press Cancel Job
```

When the printer is in the special diagnostics mode, the three tests listed above appear in the menu and are available to be run. To access other diagnostic tests or to leave the special state, press the **CANCEL JOB** button, and then select `Exit diagnostics`. The printer will reset itself, and then return to the normal state.

---

#### Note

A good understanding of how the printer operates is required to use the engine diagnostics successfully. Before proceeding with these diagnostic tests, be sure you understand the information in Chapter 5 of this manual.

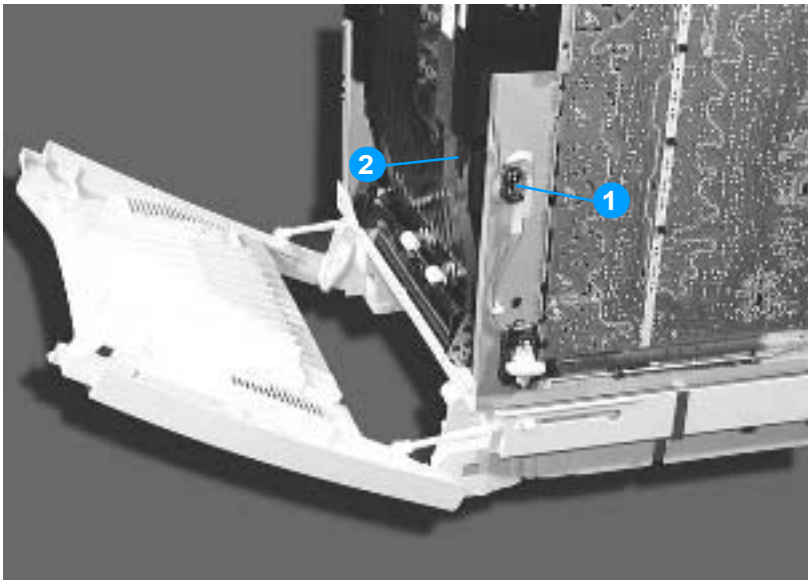
## Diagnostics tests

Different tests can be used to isolate different types of issues. For component or noise isolation, you can run the diagnostics with the covers removed. Removing the rear cover, top cover, rear top cover, and side covers provides a better view of the areas being tested. To operate the printer with the covers removed, defeat the door switch (SW4, callout 1) and depress the ETB connector (callout 2) after closing the ETB.

---

### WARNING!

Take caution when performing printer diagnostics to avoid risk of injury. Only trained service personnel should access and run the diagnostics with the covers removed. Never touch any of the power supplies with the printer turned on.



**Figure 7-13** Door switch and ETB connector

---

### Note

Any time a cartridge is installed or removed while the covers are removed, the door interlock must be cycled to simulate opening and closing the top cover in order for the engine to recognize the change. The ETB must be closed and its connector must be depressed before cycling the door switch, or the printer will generate a 59.90 Printer Error. With covers installed, the door switch and ETB connector are automatically operated. With covers removed, you must manually perform these steps.

---



## Individual diagnostic tests

The following sections explain in more detail how to operate the various diagnostics properly.

### Print event log

This item prints an event log that displays the last 50 entries in the printer's event log, starting with the most recent.

### Show event log

This item displays on the control panel the last 50 events on the control panel display, starting with the most recent.

### PQ troubleshooting

This item prints a series of print quality assessment pages that help troubleshoot print quality problems.


### Disable cartridge check (special mode test)

This diagnostic test allows you to print internal pages or send an external job to the printer with one or more print cartridges removed or swapped. Because the cartridges are not keyed, the diagnostic test can be run with one to four cartridges removed or swapped to another location. Consumable supply errors are ignored while in this mode. Once in this mode, you can navigate the menus and print internal pages or send an external print job to the printer. This diagnostic test can be used to isolate print quality problems related to individual cartridges and to isolate individual cartridge problems such as noise.

---

#### Note

Do not remove or swap cartridges before entering the disable cartridge check diagnostic. After entering the test, you can remove or swap cartridges.

While performing the disable cartridge check, you can navigate the menus and print internal pages as desired from the control panel. Use the  button to access the menus as you normally would. You can also send external print jobs to the printer.

To exit this diagnostic, press the **CANCEL JOB** button and then select `Exit diagnostics`.

### Paper path test

This diagnostic will generate one or more test pages that you can use to isolate the cause of paper jams.

To isolate a problem, you can specify which input tray to use, specify whether to use the duplex path, and specify the number of copies to print. Multiple copies can be printed to help isolate intermittent problems. The following options become available after you enter the diagnostic:

- **Print test page.** Run the paper path test from the default settings: Tray 2, no duplex, and one copy. To specify other settings, scroll down the menu and select the setting, then scroll back up and select `PRINT TEST PAGE` to execute the test.
- **Source.** Select Tray 1, Tray 2, or Tray 3 (if the optional 500-sheet paper feeder is installed).
- **Duplex.** Enable or disable 2-sided printing.
- **Copies.** Set the numbers of copies to be printed; the choices are 1, 10, 50, 100, or 500.

## Sensor Test (special mode test)

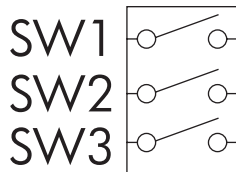
This diagnostic test allows you to test the printer's sensors and switches for proper operation. Each sensor is represented by a letter, as indicated in Table 7-47. A one below the letter indicates paper is present. For the paper size sensor, the range of values is from 0 to 7. Table 7-48 indicates the switch state and paper size associated with each of these values.

### Note

To eliminate the display flicker during this test, you can leave the door switch in the open state.

**Table 7-47 Sensor test letter codes**

Letter	Sensor	Sensor/switch number	Idle value (doors closed, paper in Trays 1 and 2)
A	top of page	PS 3	0
B	fuser inlet speed	PS11	1
C	fuser delivery	PS12	0
D	output bin full	PS13	0
E	MP tray paper presence	PS2	0
F	Tray 2 paper presence	PS1	0
G	Tray 2 paper size	SW1, SW2, SW3	0 - 7 (see Table 7-48)
H	Door	SW4	1




**Figure 7-14 Tray 2 paper size switch arrangement**

**Table 7-48 Tray 2 paper size codes**

Size code	Switch state			Paper size
	SW1	SW2	SW3	
0	on	on	on	Custom (see note below)
1	off	on	on	Letter
2	on	off	on	A5
3	off	off	on	Legal
4	on	on	off	B5 (JIS)
5	off	on	off	Executive
6	on	off	off	A4
7	off	off	off	tray not installed

### Note

Depressing all three switches of the Tray 2 paper size levers to cause the control panel to display the custom paper menu. Press the  button to return to the sensor diagnostic display.

To toggle a sensor, find and move the sensor flags in the following locations:

- **A.** Remove Tray 2. The flag is located in the center paper inlet path of the paper pickup unit, directly in front of right-side white roller. The flag is recessed above the registration shutter in the paper pickup unit.

---

**WARNING!**


The fuser might be hot; wait 10 minutes for it to cool down.

- **B.** Open the ETB and wait for the fuser to cool down. The fuser inlet flag is located at the front center of the fuser. Access the flag from above the black print cartridge.
- **C.** The fuser delivery flag is located at the upper center of fuser, behind the fuser Caution label. It is wrapped in a clear roller.
- **D.** The output bin full sensor is located on upper rear edge of the fuser.
- **E.** Remove Tray 2. The Tray 1 (MP tray) paper presence sensor flag is the black lever on the front right of the paper tray cavity.
- **F.** Remove Tray 2. The Tray 2 paper presence sensor flag is the black lever in the middle center of the paper tray cavity.
- **G.** Remove Tray 2. The Tray 2 paper size sensor switches are located on the left rear side of the paper tray cavity.
- **H.** The door switch is located on the right front of the printer frame (underneath the right cover).

### Component test (special mode test)

The component test allows you to exercise individual parts independently to isolate problems.

Each component test can be exercised once or repeatedly. If **CONTINUOUS** is selected as the repeat option, the test will cycle the component on and off. This process will repeat for 2 minutes, and then the test will terminate.

Menus cannot be accessed during component tests, so the  button serves the same function as the **CANCEL JOB** button.

---

**Note**

The door interlock switch must be defeated to run any of the component tests. If covers are removed, the door switch must be manually cycled during some tests for the engine to recognize a change.

The ETB assembly can be open, closed, or removed while some of these tests are executing.

Print cartridges can be installed or removed during certain tests. The display prompts for removal of some or all cartridges during certain tests in order to rotate and isolate certain components, as well as to protect the cartridges and ETB.

---

The following component tests can be executed:

- **Transfer motors.** This test turns the components involved in the image transfer process: the cartridge motors, the ETB motor and belt (if the ETB is closed and the connector is seated), and the print cartridges (if the ETB is closed). You can remove or install print cartridges during this test.
- **Belt only.** This test turns only the ETB motor and belt. The ETB must be closed and the connector seated. The display prompts you to remove the cartridges because the ETB belt contacts the photosensitive drums and cannot turn without them rotating also. Rotating the photosensitive drums could damage the belt or photosensitive drums. If covers are removed, you must manually cycle the door switch after removing the cartridges for the test to execute.
- **Cartridge motors.** This test rotates only the print cartridge drive motors. The display prompts you to remove at least one cartridge for the same reason as stated for the Belt only test. The engine rotates the cartridge motor(s) for only the cartridges that are removed. To rotate all motors sequentially, remove all cartridges; to isolate one motor, remove only that cartridge. If covers are removed, you must manually cycle the door switch after removing the cartridges for the test to execute. Always start this test with all cartridges installed, and cycle the door switch so the printer recognizes the configuration. Then proceed with the test, removing one or more cartridges.
- **Black, Magenta, Yellow, Cyan laser/scanners.** These four tests allow you to rotate each scanner motor individually.
- **Fuser motor.** This test rotates the fuser motor and drive gears.
- **Alienation motor** (also called the developing disengaging motor). This test moves the developing disengaging rod, clutches, and plates through their three positions:
  - Clean/Home: middle position; all cartridges disengaged; used during cleaning cycle
  - Color: top position; no cartridges disengaged; used during color printing
  - Black: lowest position; C, M, and Y cartridges disengaged, black engaged; used during black-only printing
- **Tray1/Tray 2 solenoids.** This test activates and releases the Tray 1 and Tray 2 solenoids. The Tray 1 solenoid is the lower solenoid. Tray 2 is the upper solenoid. You can remove the two securing screws and rotate the paper pickup unit to get a better view of the solenoids.

## Print/Stop test

This diagnostic test can be used to isolate the cause of problems, such as image formation defects and jams, within the engine. This test allows you to stop the paper anywhere along the printer's paper path. The test can be programmed to stop printing internal pages or an external print job when the paper reaches a certain position. The test can also be programmed to stop from 0 to 60,000 mS. If the timer is set to a value that is greater than it takes to print the job, there are two ways to recover the printer.

- After the print job completes, press **CANCEL JOB** to return to the diagnostic menu before the timer times out.
- After the timer times out, press **CANCEL JOB**. You will have to cycle the door switch to restart the engine and return it to a normal state.

When the timer trips, the display shows the message `Printing stopped, Press [OK]` to continue. Pressing [OK] will print the previously selected job. If you do not want the previous job to print, press **CANCEL JOB** first, and then press the [OK] button.

---

### Note

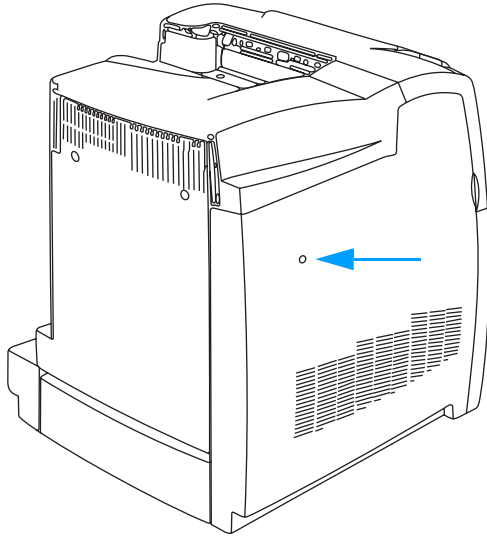
Do not attempt to execute a Print/Stop test while the printer is calibrating; a power cycle will be required. If you encounter a jam message during testing, cycle the door switch.

## Test pages

Printing test pages helps you determine whether the printer engine and the formatter are functioning.

### Engine test page






To verify that the printer engine is functioning, print an engine test page. Use a small pointed object to depress the test page switch located on the left side of the printer, as shown in Figure 7-15. The test page should have a series of horizontal lines. The test page can use only Tray 2 as the paper source, so ensure paper is loaded in Tray 2.



**Figure 7-15** Test page switch

### Formatter test page

To verify that the formatter is functioning, print a configuration page as follows:




- 1 Press  to enter the MENUS.
- 2 Press  to highlight INFORMATION.
- 3 Press  to select INFORMATION.
- 4 Press  to highlight PRINT CONFIGURATION.
- 5 Press  to select PRINT CONFIGURATION.

# Engine resets

## Cold reset

A cold reset unlocks menus that have been locked and resets variables in the control panel. However, it does not clear the values in the Service menu (such as the serial number and page counts).

### To perform a cold reset

- 1 Turn the printer on.
- 2 As the printer performs its power-on sequence, press and hold  until all three lights on the control panel are lit.
- 3 When `SELECT LANGUAGE` appears on the display, press  until `COLD RESET` appears on the display.
- 4 Press . The printer will perform a cold reset and then continue its power-on sequence.

## NVRAM initialization





### CAUTION

Initializing NVRAM will reset the serial number, the event log, the page counts, the calibration settings, and the EIO card. Use the Service menu to restore the serial number and page counts. You will also need to reconfigure any computers that print to this printer to recognize the printer. Initialize NVRAM only when absolutely necessary. In most situations, use a Cold reset to reset printer variables but still retain the needed values in the Service menu.

Before initializing NVRAM, print a configuration page and a supplies status page to gather the following information:

- total page count and color page count
- transfer kit count
- fuser kit count
- serial number



### To initialize NVRAM

- 1 Turn the printer on and watch the control panel display.
- 2 When the display begins showing the memory count, press and hold  until all three lights on the control panel are lit.
- 3 Press .
- 4 Press `PAUSE/RESUME`. The display should show `SKIP DISK LOAD`.
- 5 Press  until `NVRAM INIT` is highlighted.
- 6 Press . The printer will initialize NVRAM and then continue its power-on sequence.

## Hard disk initialization

A hard disk initialization will erase and reformat the printer's hard disk. Perform hard disk initialization only if an error code appears on the control panel indicating an EIO disk error. Always try initializing the hard disk before replacing it.





### To initialize the hard disk

- 1 Turn the printer on.
- 2 As the printer performs its power-on sequence, press and hold the **PAUSE/RESUME** button until all three lights on the control panel are lit.
- 3 Press . The display should show INITIALIZE DISK.
- 4 Press . The printer will initialize the hard disk and continue its power-on sequence.

## Calibration bypass








During certain diagnostic procedures, you will need to bypass the automatic calibration that is performed whenever the printer is turned on.

### To bypass calibration

- 1 Turn the printer on and watch the control panel display.
- 2 When the display begins showing the memory count, press and hold  until all three lights on the control panel are lit.
- 3 Press .
- 4 Press **PAUSE/RESUME**. The display should show SKIP DISK LOAD.
- 5 Press  until SKIP CALIBRATION is highlighted.
- 6 Press . The printer will skip calibration and then continue its power-on sequence.

## Calibrate Now





Use the following procedure to calibrate the printer whenever you replace the DC controller, the ETB, the drum drive motors, the drum drive gears, or a laser/scanner.

- 1 Press  to enter the MENUS.
- 2 Press  to highlight CONFIGURE DEVICE.
- 3 Press  to select CONFIGURE DEVICE.
- 4 Press  to highlight PRINT QUALITY.
- 5 Press  to select PRINT QUALITY.
- 6 Press  to highlight CALIBRATE NOW.
- 7 Press  to select CALIBRATE NOW.
- 8 Wait for the printer to calibrate.



## Accessing the Service menu

The Service menu is PIN protected for added security. Only authorized service people have access to the Service menu. When you select `SERVICE` from the list of menus, you are prompted to enter your 8-digit PIN number. The PIN for this printer is 04460002.

- 1 Press  or  until the first digit of the PIN is displayed.
- 2 Press  to save the digit. The display will replace the digit with an asterisk.
- 3 Repeat steps 1 and 2 until all eight digits are entered.
- 4 Press  at any time to move to the previous digit.

## Clear event log

This item allows you to clear the printer's internal event log.

## Total page count

The page count stored in NVRAM and printed on the configuration page represents the number of pages that the formatter has formatted (not including engine test prints). If you install a new formatter when repairing a printer, use this menu item to reset the page count to the previous value. In this way, the page count reflects the number of pages printed by the engine rather than starting over for the new formatter. The page count is broken into two categories: total mono pages and total color pages.

## Transfer kit count

This item allows you to reset the transfer unit count if the value is lost, such as when you replace the formatter. This value is initially set to zero at the factory. Enter a value up to 120,000. This value is automatically reset to zero when a customer installs a new transfer kit and sets `NEW TRANSFER KIT` to `YES` in the Resets menu.

## Fuser kit count

This item allows you to reset the fuser count if the value is lost, such as when you replace the formatter. This value is initially set to zero at the factory. Enter a value up to 150,000. This value is automatically reset to zero when a customer installs a new transfer kit and sets `NEW FUSER KIT` to `YES` in the Resets menu.

## Serial number

If you replace the formatter, use this item to reset the serial number of the printer.

## Service ID

This item allows the date that the printer was first used to be shown through the control panel, eliminating the need for customers to keep paper receipts for proof of warranty. Because the printer does not have an internal clock, the service ID date's availability is dependent on the printer being connected to a source that can provide the date, such as the installer, the driver, or the embedded Web server. In cases where the printer is not connected to a date source, the service ID will not be available, and the control panel will display 000000.

## Restoring the Service ID

If you replace the formatter, the date is lost. Use this menu item to reset the date to the original date the printer was first used. The date format is YYDDD. Calculate the date as follows:

- 1 To calculate YY, subtract 1990 from the calendar year. For instance, if the printer was first used in 2002, calculate YY as follows:  $2002 - 1990 = 12$ .  $YY = 12$ .
- 2 To calculate DDD, use the following formula:  
 $30(\text{calendar month} - 1) + \text{calendar day} = \text{DDD}$ . If the calendar day is 31, use 30 instead.  
For instance, if the printer was first used on October 17, calculate DDD as follows:
  - a. Subtract 1 from 10 (October is the tenth month of the year):  $10 - 1 = 9$ .
  - b. Multiply 9 by 30:  $9 \times 30 = 270$ .
  - c. Add 17 to 270:  $270 + 17 = 287$ . Thus,  $DDD = 287$ .

## Converting the Service ID to an actual date

You can use the printer's Service ID number to determine whether the printer is still under warranty. Convert the Service ID into the installation date as follows:

- 1 Add 1990 to YY to get the actual year that the printer was installed.
- 2 Divide DDD by 30. If there is a remainder, add 1 to the result. This is the month.
- 3 The remainder from the calculation in step 2 is the date.

Using the Service ID 12287 as an example, the date conversion is as follows:

- 1  $12 + 1990 = 2002$ , so the year is 2002.
- 2  $287 \text{ divided by } 30 = 9 \text{ with a remainder of } 17$ . Since there is a remainder, add 1 to 9 to get 10, which represents October.
- 3 The remainder in step 2 is 17, so that is the date.
- 4 The complete date is 17-October-2002.

---

### Note

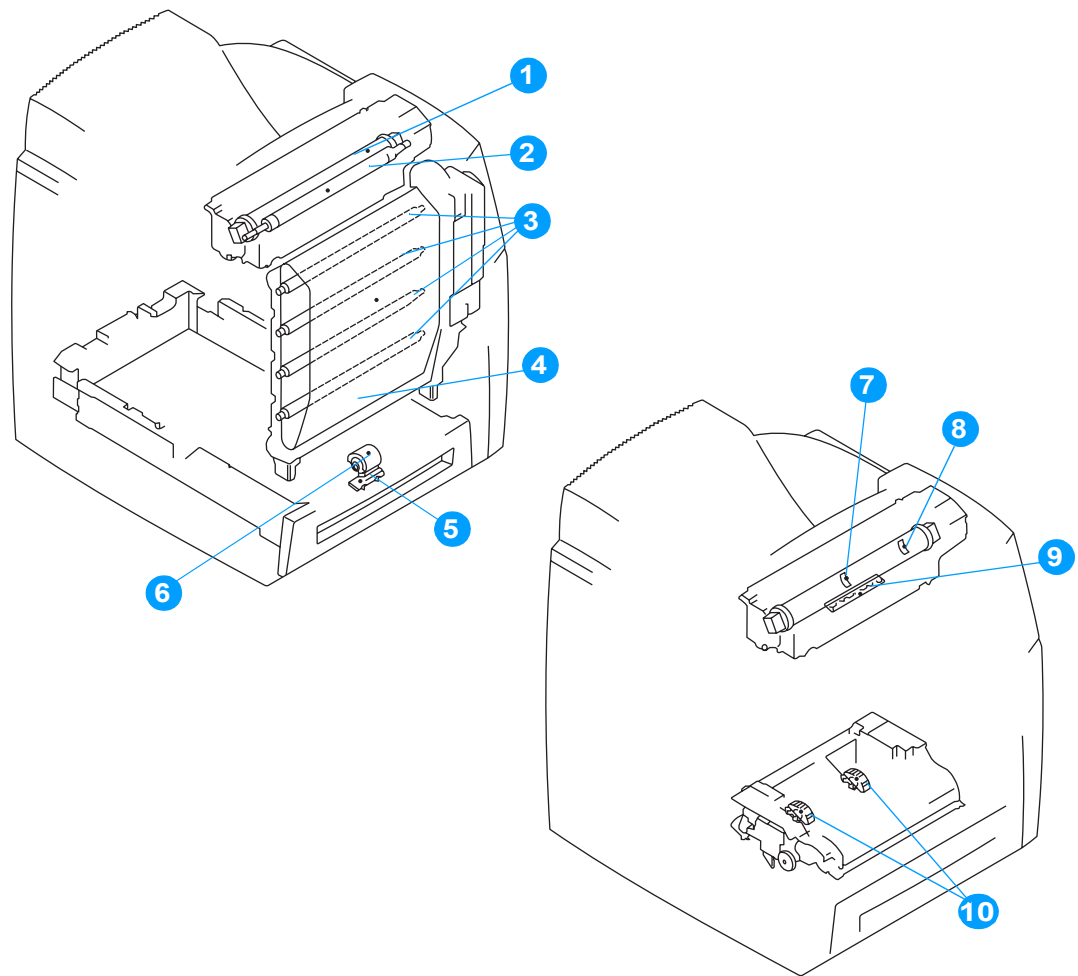
A 6-day grace period is built into the date system.

## Cold reset paper

When you perform a cold reset, the paper size stored in NVRAM is reset to the default factory setting. If you replace a formatter board in a country/region such as Europe that uses A4 as the standard paper size, use this menu to reset the default paper size to A4. LETTER and A4 are the only available values.

# Diagrams

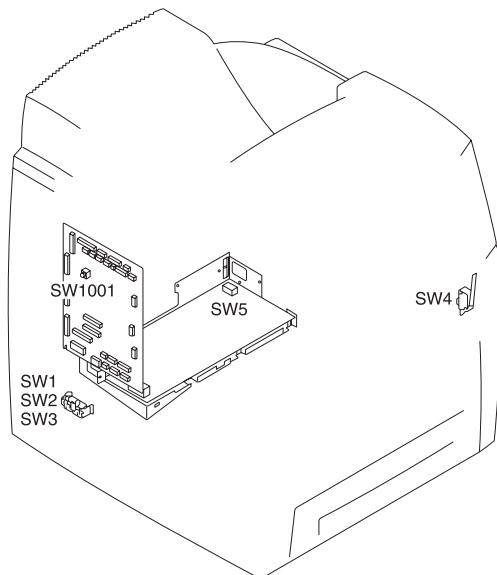
## Main parts



**Figure 7-16** Location of main parts

- 1 fuser sleeve
- 2 pressure roller
- 3 transfer charging rollers
- 4 ETB belt
- 5 separation pad
- 6 multi-purpose tray pickup roller
- 7 main thermistor
- 8 sub thermistor
- 9 thermoswitch
- 10 cassette pickup rollers

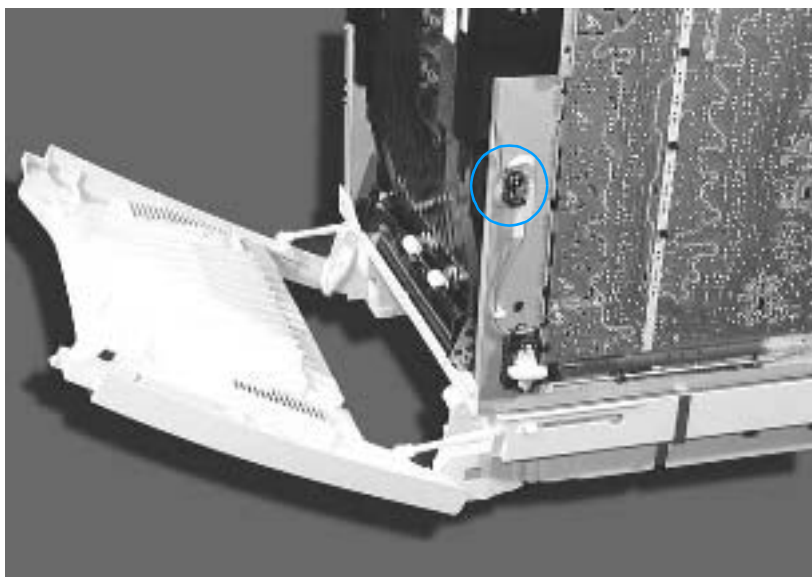
## Switches



**Figure 7-17** Location of switches

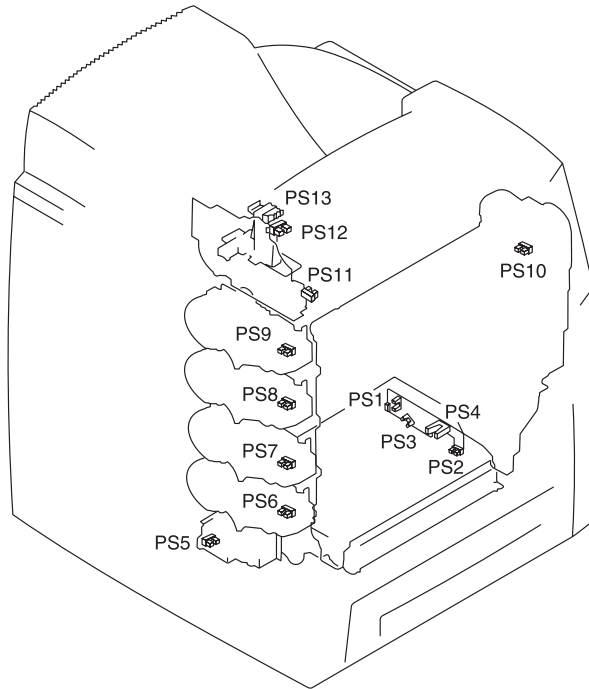
**Table 7-49** Switches

Name	Function
SW1	cassette paper size detection switch
SW2	cassette paper size detection switch
SW3	cassette paper size detection switch
SW4	door switch (shown in the photo below)
SW5	on/off switch
SW1001	test print switch

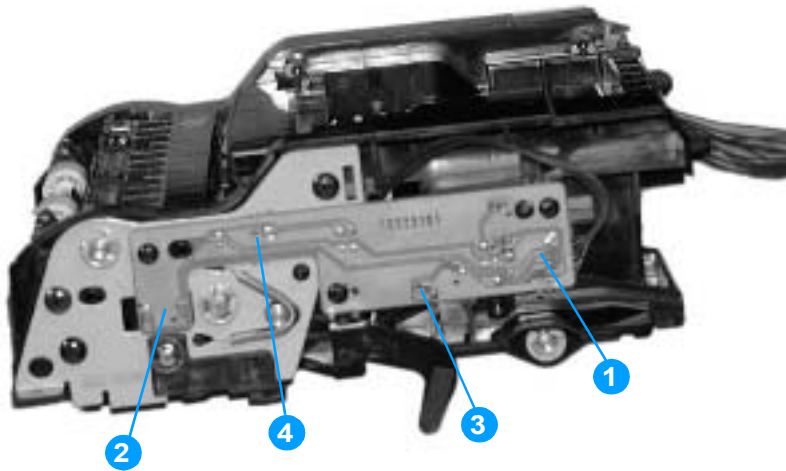


**Figure 7-18** Door switch

## Sensors

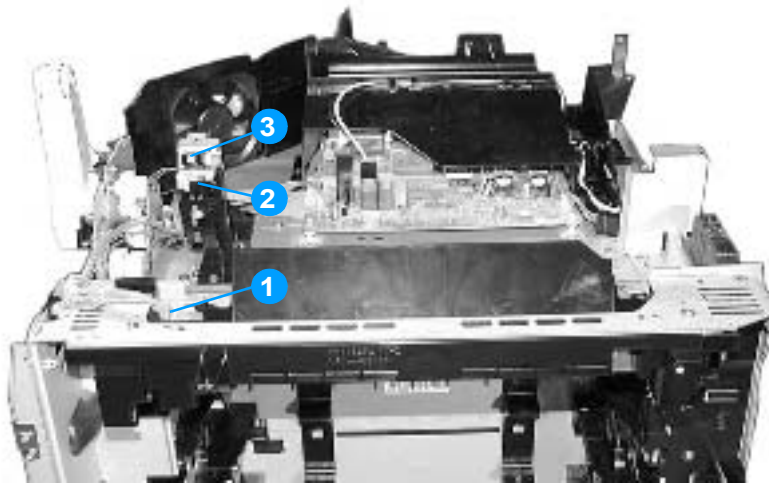


**Figure 7-19** Location of sensors



**Figure 7-20** Sensors on the paper pickup unit (sensors are on the back of the PCB)

- 1 cassette paper sensor
- 2 multi-purpose tray paper sensor
- 3 paper leading edge sensor
- 4 overhead transparency sensor



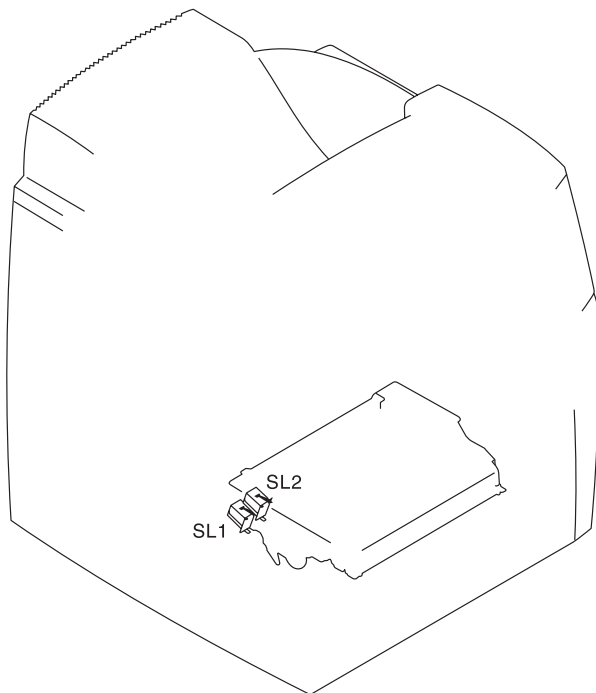
**Figure 7-21** Fuser sensors and output bin full sensor

- 1 fuser inlet paper sensor (PS11)
- 2 fuser delivery sensor (PS12)
- 3 output bin full sensor (PS13)

**Table 7-50** Sensors

Name	Function
PS1	cassette paper present sensor
PS2	multi-purpose tray paper present sensor
PS3	paper leading edge sensor
PS4	overhead transparency sensor
PS5	developing disengagement sensor
PS6	cyan drum home position sensor
PS7	yellow drum home position sensor
PS8	magenta drum home position sensor
PS9	black drum home position sensor
PS10	ETB speed sensor
PS11	fuser inlet paper sensor
PS12	fuser delivery sensor
PS13	output bin paper full sensor

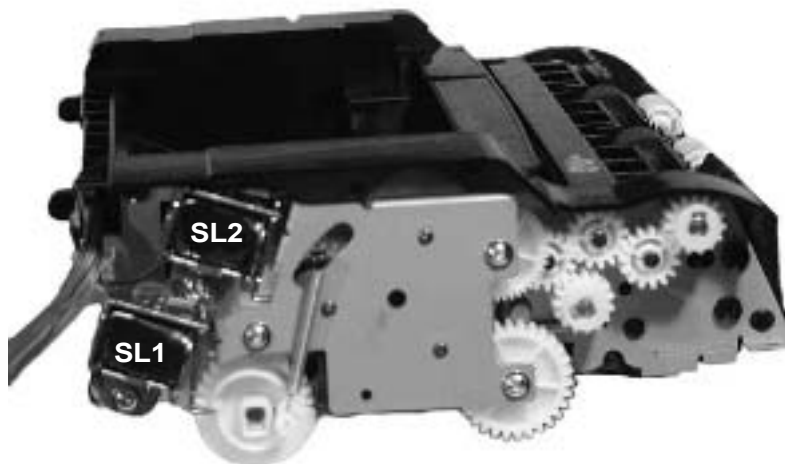
## Solenoids



**Figure 7-22** Location of solenoids

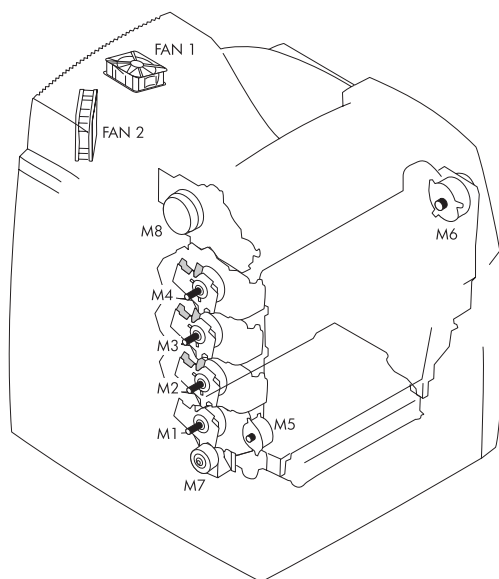
**Table 7-51** Solenoids

Name	Function
SL1	cassette pickup solenoid (paper pickup drive assembly)
SL2	multi-purpose tray pickup solenoid (paper pickup drive assembly)



**Figure 7-23** Solenoids on the paper pickup unit

## Motors and fans



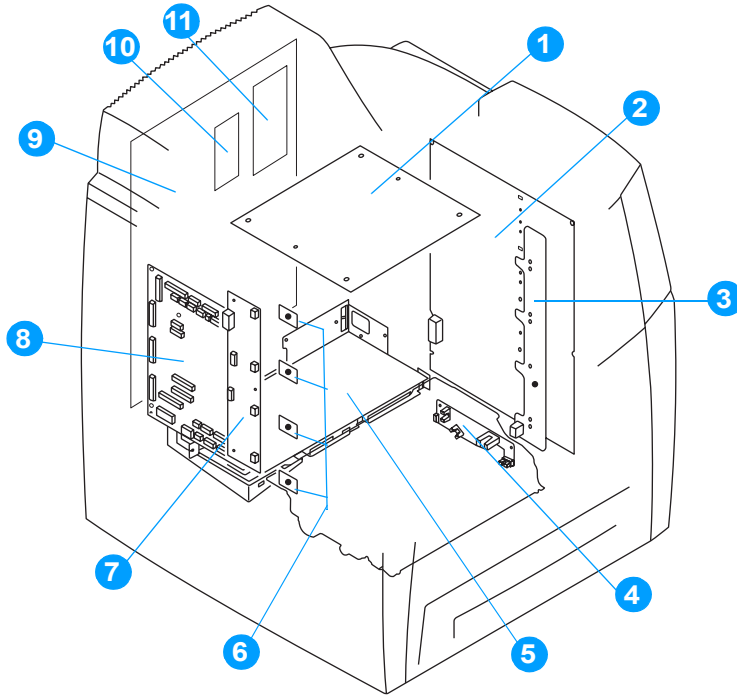
**Figure 7-24** Location of motors and fans

**Table 7-52** Motors and fans

Name	Function
M1	cyan drum motor
M2	yellow drum motor
M3	magenta drum motor
M4	black drum motor
M5	paper pickup motor
M6	ETB motor
M7	developing disengaging motor
M8	fuser motor
FAN1	formatter fan
FAN2	cartridge fan



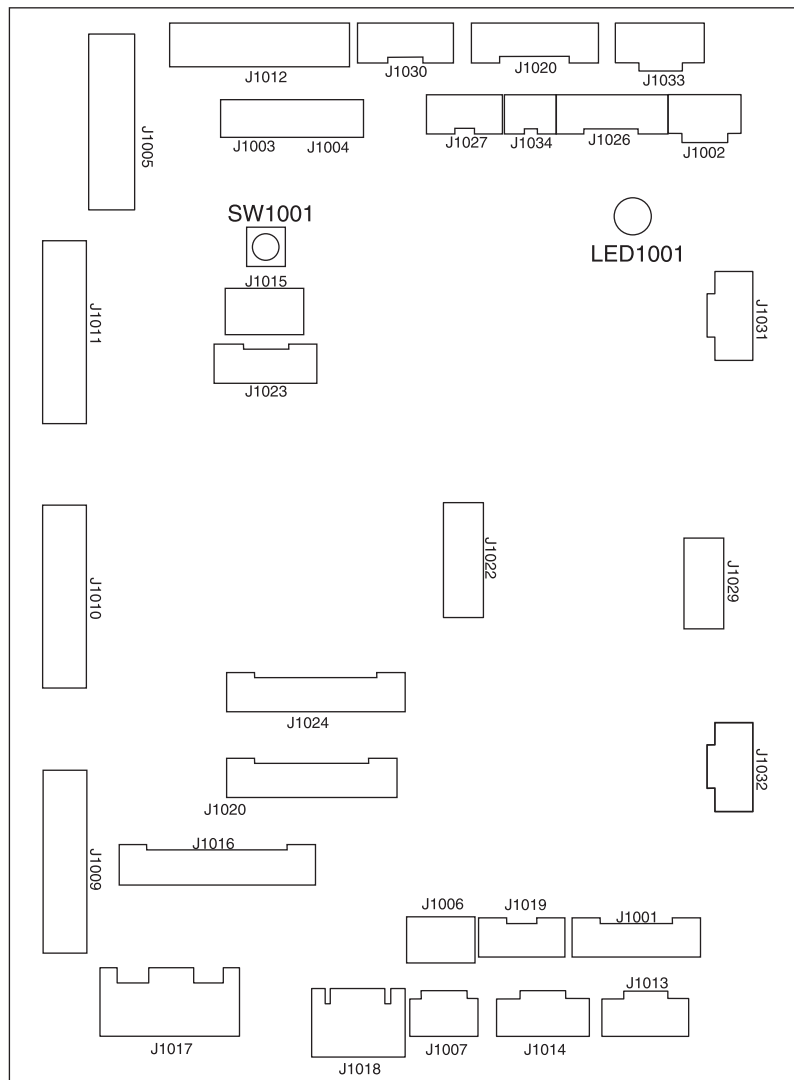
## PCBs



**Figure 7-25** PCB locations

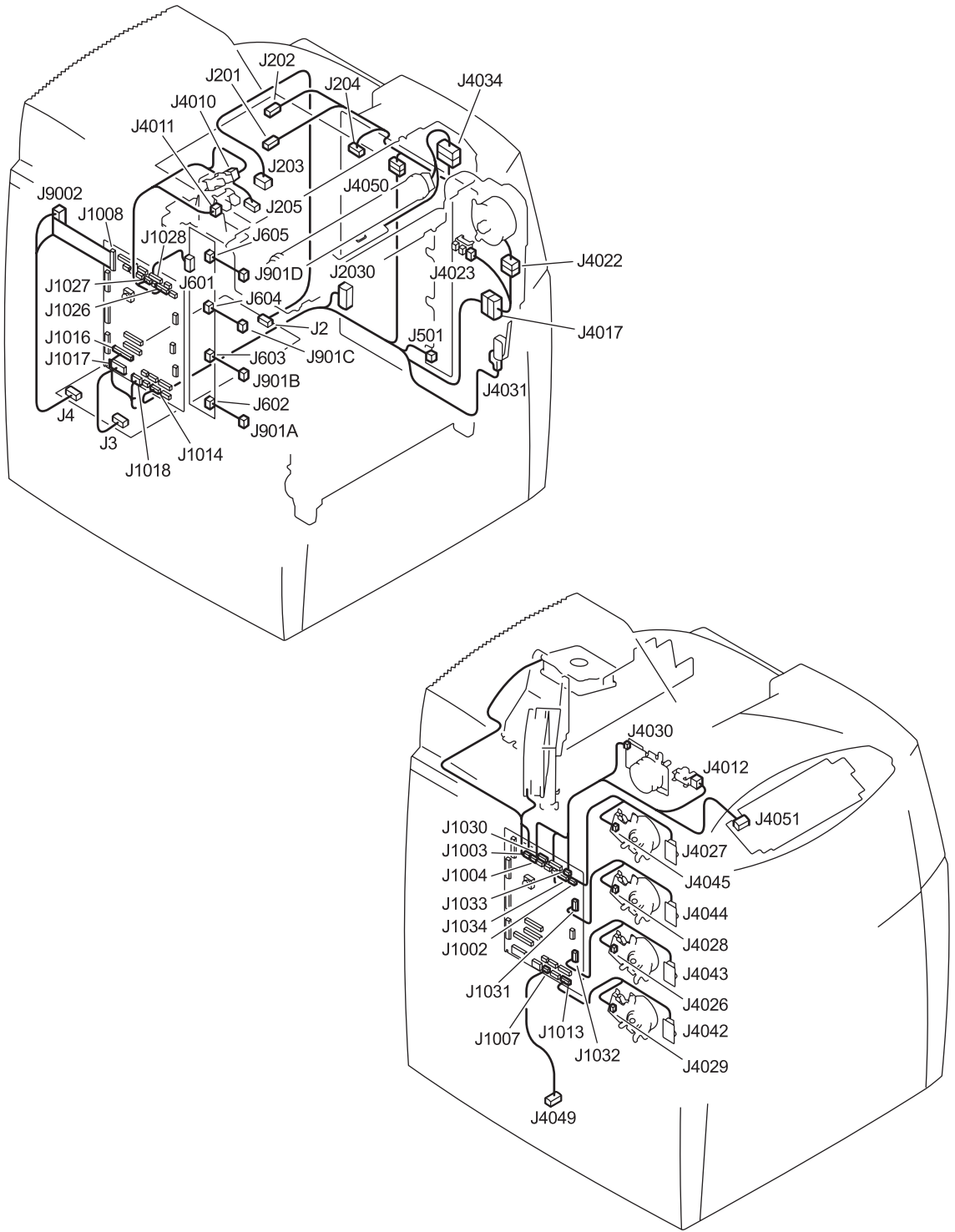
- 1 fuser power supply PCB
- 2 high-voltage power supply PCB
- 3 toner-level detection PCB
- 4 paper pickup sensor PCB
- 5 low-voltage power supply PCB
- 6 antenna PCBs
- 7 memory controller PCB
- 8 DC controller PCB
- 9 formatter PCB
- 10 firmware DIMM PCB
- 11 I/O daughter card PCB

## DC controller PCB



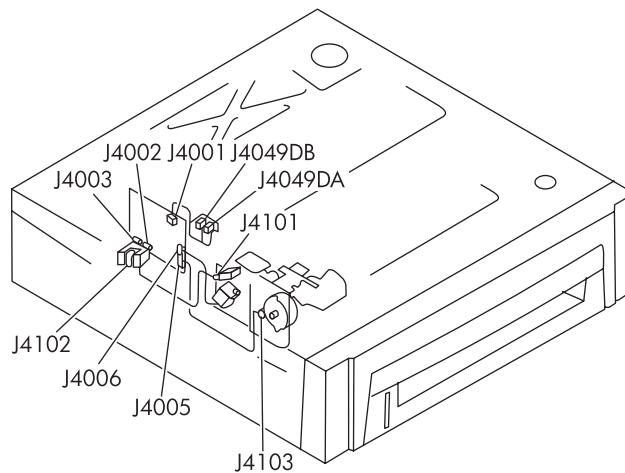
**Figure 7-26** Location of DC controller PCB components

# Connectors



**Figure 7-27** Location of connectors

## 500-sheet paper feeder connectors



**Figure 7-28** 500-sheet paper feeder connectors

# General circuit diagram

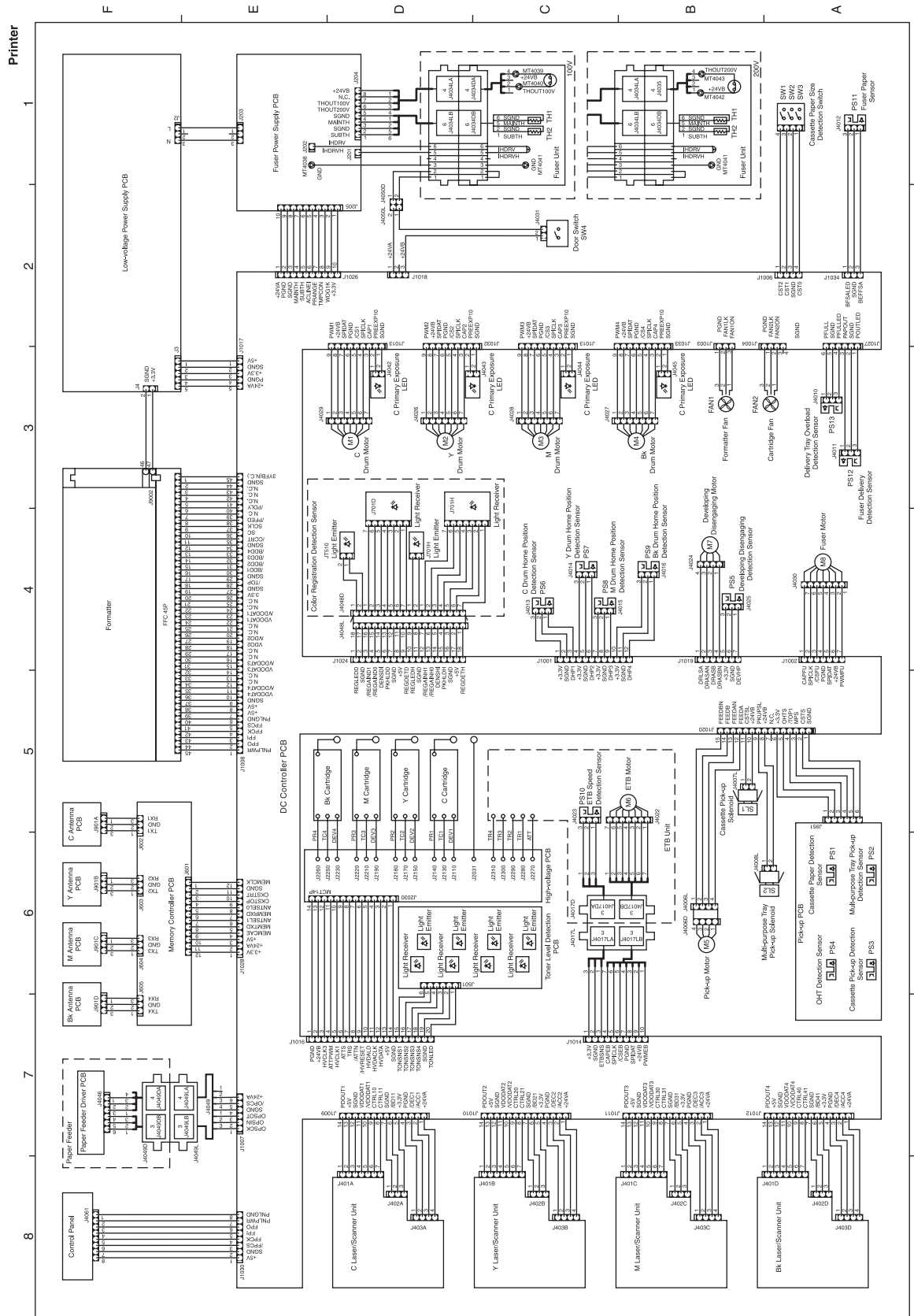


Figure 7-29 General circuit diagram

# 500-sheet paper feeder circuit diagram

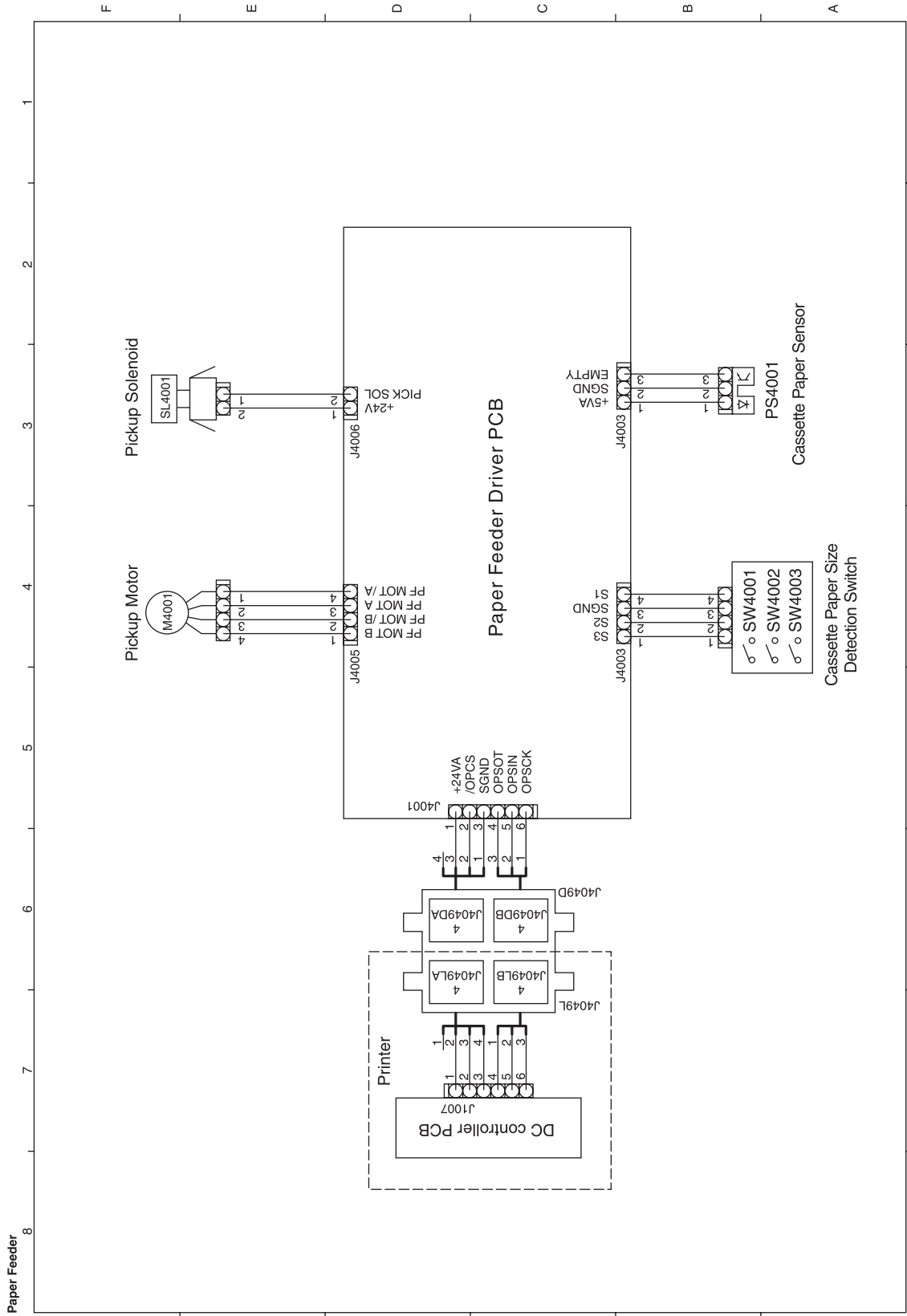


Figure 7-30 500-sheet paper feeder circuit diagram

# 8

# Parts and diagrams

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## Introduction

The figures in this chapter show the major subassemblies in the printer and their component parts. A table (materials list) follows each exploded assembly diagram. Each table lists the reference designator (item number), the associated part number, and the description of each part.

---

**Note**

---

When looking for a part number, pay careful attention to the voltage listed in the description column to ensure that the part number selected is for the correct printer model.

---

**Note**

---

In this manual, the abbreviation "PCB" stands for "printed circuit board assembly." Components described as a PCB may consist of a single circuit board or a circuit board plus other parts, such as cables and sensors.



## Ordering parts

All standard part numbers are stocked and can be ordered from Hewlett-Packard Customer Support-Americas (HPCS-A) or Hewlett-Packard Customer Support-Europe (HPCS-E). For information about contacting HPCS-A or HPCS-E, see page 45.

### Note

Parts that have no reference designator or part number are not field replaceable and cannot be ordered.

## Supplies and accessories

The items listed in Table 8-1 are available through your local authorized HP dealer. To find a dealer near you (or if your local dealer is temporarily out of stock), call the HP Customer Information Center at (800) 752-0900.

### Note

See page 47 for documentation part numbers.

Supplies and accessories are available directly from Hewlett-Packard at the following numbers:

- U.S.: (800) 538-8787
- Canada: (800) 387-3154, (Toronto) (416) 671-8383
- United Kingdom: 0734-441212

Contact your local HP Parts Coordinator for other local phone numbers.

**Table 8-1 Supplies and accessories**

Product number	Part number	Description
<b>Accessories</b>		
J6057A	J6057-69001	HP Jetdirect connectivity card
C4103A		FIR pod
C9667A		Printer cabinet/stand
C9664A	R96-5023-000CN	Optional 500-sheet paper feeder and Tray 3 assembly
<b>Cables</b>		
C2946A		IEEE-1284 compliant parallel cable, 3 m (approximately 10 feet) long, with 25-pin male/micro 36-pin male (c-type) connector
92215S		Macintosh DIN-8 printer cable
92215N		HP LocalTalk cable kit
<b>Media</b>		
C2934A		HP Color LaserJet Transparencies (letter) 50 sheets
C2936A		HP Color LaserJet Transparencies (A4) 50 sheets
C4179A		HP LaserJet Soft Gloss paper (letter) 200 sheets
C4179B		HP LaserJet Soft Gloss paper (A4) 200 sheets
Q1298A		HP LaserJet Tough paper (letter)
Q1298B		HP LaserJet Tough paper (A4)
HPU1132		HP Premium Choice LaserJet paper (letter)
CHP410		HP Premium Choice LaserJet paper (A4)

**Table 8-1 Supplies and accessories (continued)**

Product number	Part number	Description
HPJ1124		HP LaserJet paper (letter)
CHP310		HP LaserJet paper (A4)
<b>Memory</b>		
J6054B	J6054-61013	Printer hard disk
C9665A	C9665-67951	4 MB Flash DIMM
C7848A	C7848-67901	64 MB memory DIMM (SDRAM)
C7850A	C7850-67901	128 MB memory DIMM (SDRAM)
C9653A	C9653-67901	256 MB memory DIMM (SDRAM)
<b>Panel overlays</b>		
	C9660-40002	English overlay
	C9660-40003	French overlay
	C9660-40004	German overlay
	C9660-40005	Italian overlay
	C9660-40006	Spanish overlay
	C9660-40007	Danish overlay
	C9660-40008	Dutch overlay
	C9660-40009	Finnish overlay
	C9660-40010	Norwegian overlay
	C9660-40011	Portuguese overlay
	C9660-40012	Swedish overlay
	C9660-40013	Czech overlay
	C9660-40014	Hungarian overlay
	C9660-40015	Polish overlay
	C9660-40016	Russian overlay
	C9660-40017	Turkish overlay
	C9660-40018	Arabic overlay
	C9660-40019	Greek overlay
	C9660-40020	Hebrew overlay
	C9660-40021	Japanese overlay
	C9660-40022	Korean overlay
	C9660-40023	Thai overlay
	C9660-40024	Simplified Chinese overlay
	C9660-40025	Traditional Chinese overlay
<b>Reference materials</b>		
	5963-7863	<i>HP LaserJet Printer Family Paper Specifications Guide</i>
	5021-0330	PCL/PJL Technical Reference Package
<b>Supplies</b>		
C9720A	6825A001CN	Black print cartridge
	6825A002CN	Black print cartridge (Europe)

**Table 8-1 Supplies and accessories (continued)**

Product number	Part number	Description
C9721A	6824A001CN	Cyan print cartridge
	6824A002CN	Cyan print cartridge (Europe)
C9722A	6822A001CN	Yellow print cartridge
	6822A002CN	Yellow print cartridge (Europe)
C9723A	6823A001CN	Magenta print cartridge
	6823A002CN	Magenta print cartridge (Europe)
C9724A	C9660-69004 (exchange) C9660-67904 (new)	Image transfer kit
C9725A	C9660-69002 (exchange) C9660-67902 (new)	Image fuser kit (110 volt)
C9726A	C9660-69003 (exchange) C9660-67903 (new)	Image fuser kit (220 volt)

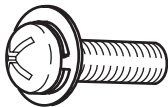

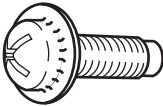

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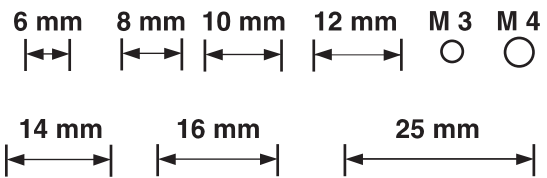
**Note**

The only difference between the print cartridges listed above is that the Europe-only print cartridges have different languages on the instruction sheet inside the box.

## Common fasteners

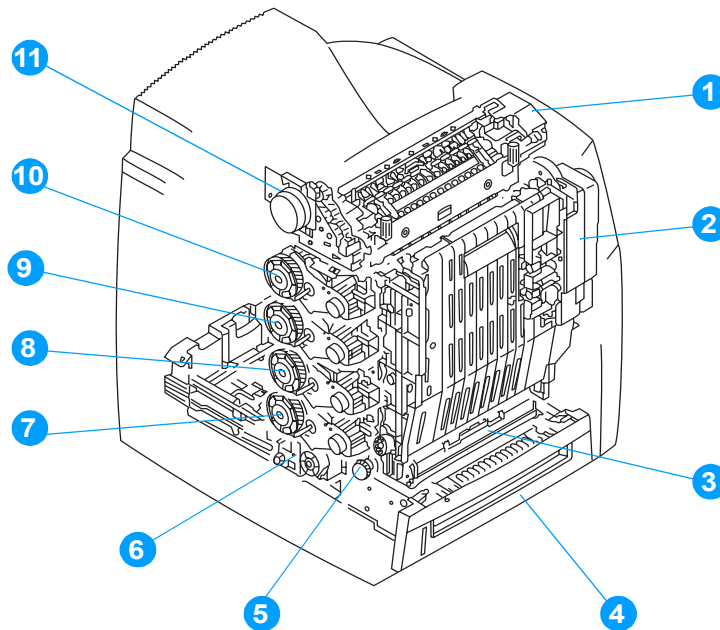
Table 8-2 Common fasteners

Illustration	Description	Size	Part number	Uses
	Screw, machine with washer	M3x8	XA9-1276-000CN	To hold plastic to metal, (example: the skins)
	Screw, self tapping			To hold plastic to plastic
	Screw, truss head	M3x6	XA9-1275-000CN	Sheet metal to sheet metal, (example: formatter pan)
	Retaining Ring (e-type)			To hold gears into place



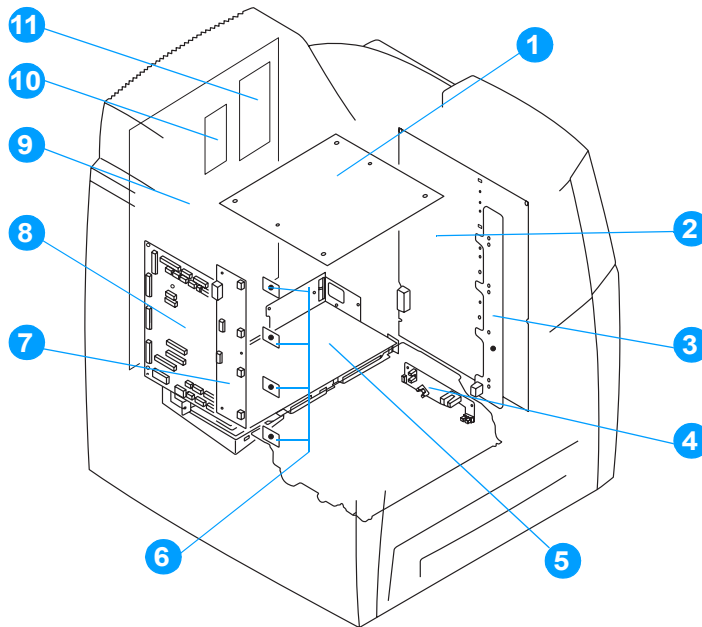
## Illustrations and parts lists

The following illustrations and parts tables list the field replaceable units (FRU) for this printer. At the end of this chapter are two tables listing all of the parts shown in this chapter: Table 8-22 on page 342 lists the parts in alphabetical order, and Table 8-23 on page 348 lists the parts in numerical order by part number. Both tables list the appropriate figure in this chapter where the part can be found.



**Figure 8-1** Assembly location diagram

- 1 Fuser assembly, see Figure 8-17 on page 336.
- 2 ETB assembly, see Figure 8-16 on page 335.
- 3 Paper pickup assembly, see Figure 8-15 on page 334.
- 4 Cassette, see Figure 8-13 on page 332.
- 5 Paper pickup drive assembly, see Figure 8-9 on page 328.
- 6 Disengaging drive assembly, see Figure 8-11 on page 330.
- 7 Drum drive assembly (cyan/magenta), see Figure 8-10 on page 329.
- 8 Drum drive assembly (yellow), see Figure 8-10 on page 329.
- 9 Drum drive assembly (cyan/magenta), see Figure 8-10 on page 329.
- 10 Drum drive assembly (black), see Figure 8-10 on page 329.
- 11 Fuser drive assembly, see Figure 8-12 on page 331.

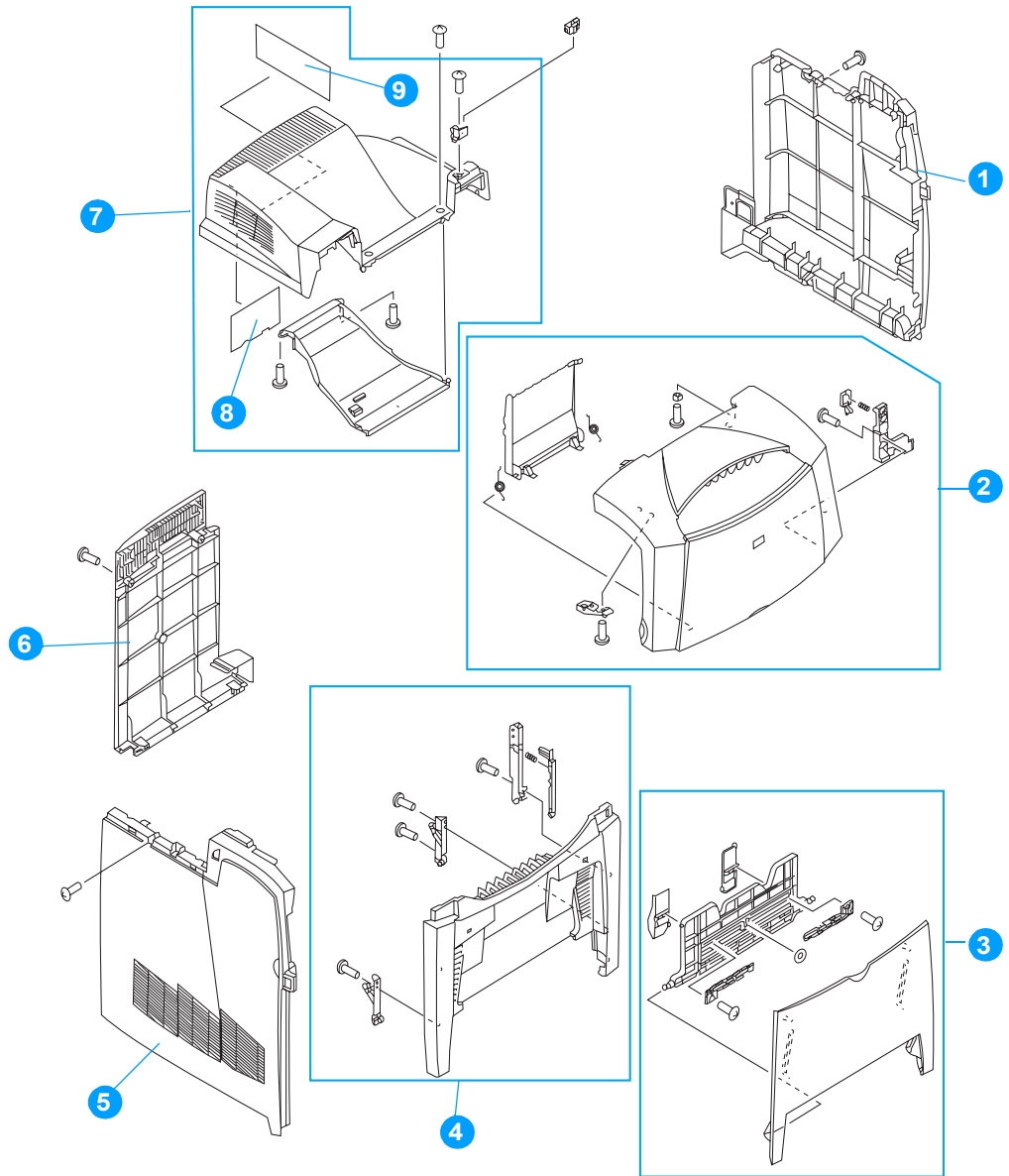


**Figure 8-2 PCB locations**

**Table 8-3 PCB locations**

Ref	Description	Quantity	Part number
1	Fuser power supply PCB	1	RG5-6399-000CN (100 - 127 volt) RG5-6400-000CN (220 - 240 volt)
2	High-voltage power supply PCB	1	RG5-6395-000CN
3	Toner sensor PCB	1	RG5-6393-000CN
4	Pickup PCB	1	RG5-6392-000CN
5	Low-voltage power supply PCB	1	RG5-6410-000CN (100 - 127 volt) RG5-6411-000CN (220 - 240 volt)
6	Memory tag antenna PCBs	4	RG5-5469-000CN
7	Memory controller PCB	1	RG5-6396-000CN
8	DC controller PCB	1	RG5-6391-000CN
9*	Formatter (simplex)	1	C9660-69001 (exchange) C9660-67901 (new)
	Formatter (duplex)	1	C9661-69001 (exchange) C9661-67901 (new)
10	Firmware DIMM	1	C9156-67901
11	I/O daughter card	1	C9144-60001

\* The formatter is available with either simplex or duplex capability. Be sure to use the correct formatter for the model of printer you are servicing. The HP Color LaserJet 4600 and 4600n printers do not have duplex capability.



**Figure 8-3** External covers and panels

**Table 8-4** External covers and panels

Ref	Description	Quantity	Part number
1	Right cover	1	RB2-8591-000CN
2	Top cover assembly	1	RG5-6465-000CN
3	Multi-purpose tray assembly	1	RG5-6467-000CN
4	Front cover assembly	1	RG5-6466-000CN
5	Left cover	1	RB2-8590-000CN
6	Rear cover	1	RB2-8592-000CN
7	Rear top cover assembly	1	RG5-6464-000CN
8	Filter, rear	1	RB2-8597-000CN
9	Filter, left side	1	RB2-8596-000CN

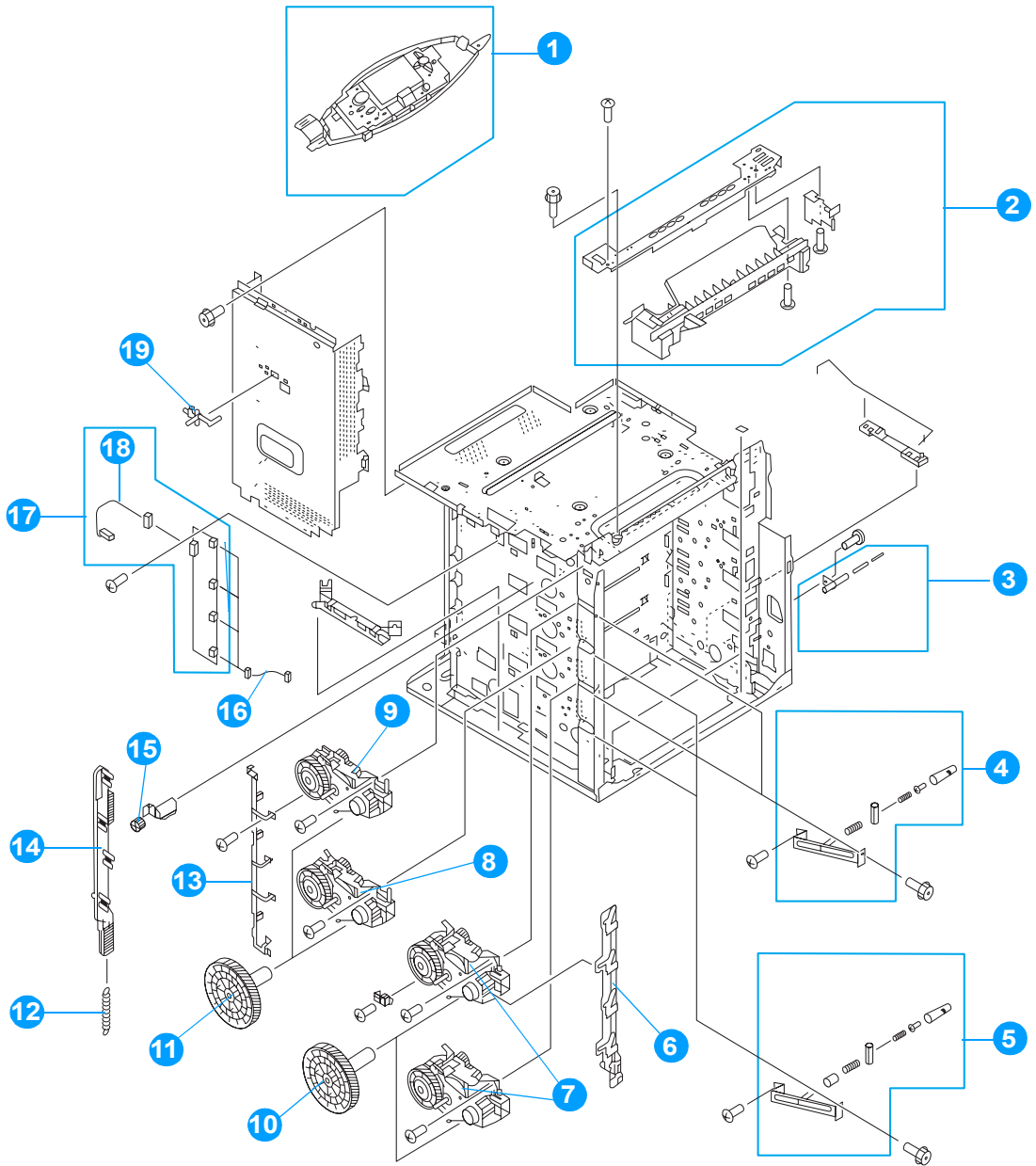
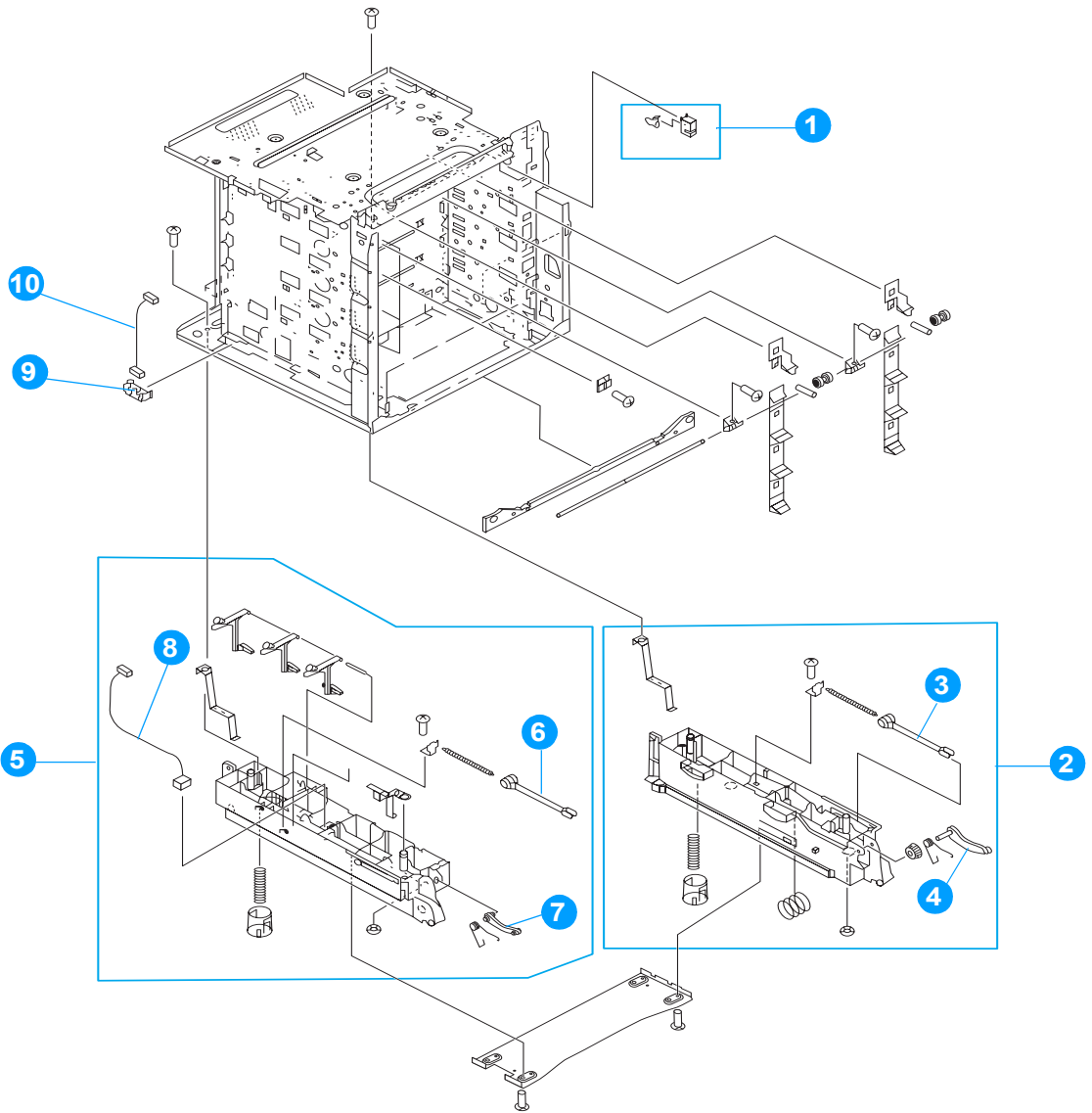


Figure 8-4 Internal components (1 of 5)



**Table 8-5 Internal components (1 of 5)**

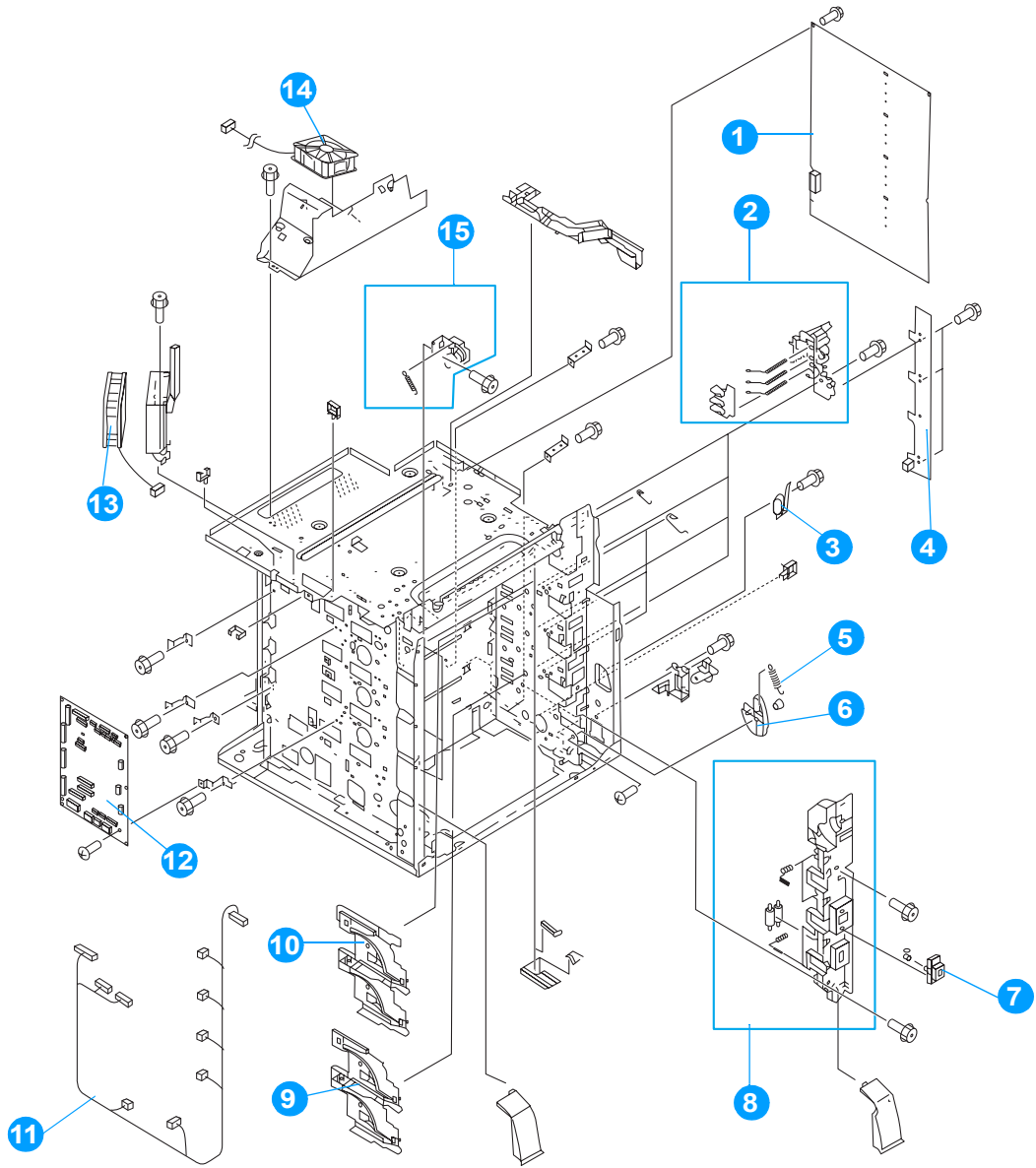
Ref	Description	Quantity	Part number
1	Control panel assembly	1	RG5-6432-000CN (100 - 127 volt) RG5-6433-000CN (220 - 240 volt)
2	Control panel crossmember assembly	1	RG5-6510-000CN
3	Contact pin assembly	1	RG5-6492-000CN
4	Drum grounding assembly (black and yellow)	2	RG5-6474-000CN
5	Drum grounding assembly (magenta and cyan)	2	RG5-6475-000CN
6	Plate, drive interlock	1	RB2-8225-000CN
7	Drum drive assembly (magenta and cyan)	2	RG5-6504-000CN
8	Drum drive assembly (yellow)	1	RG5-6506-000CN
9	Drum drive assembly (black)	1	RG5-6505-000CN
10	Gear, 200T (magenta and cyan)	2	RS7-0137-000CN
11	Gear, 200T (black and yellow)	2	RS7-0138-000CN
12	Spring, tension	1	RS6-2537-000CN
13	Plate, drive grounding	1	RB2-8255-000CN
14	Plate, developer disengagement	1	RB2-8239-000CN
15	Gear, 17T	1	RS7-0139-000CN
16	Cable, antenna	4	RG5-6418-000CN
17	Antenna memory PCB assembly	1	RG5-6396-000CN
18	Cable, memory	1	RG5-6420-000CN
19	Arm, test print	1	RB2-8250-000CN



**Figure 8-5** Internal components (2 of 5)

**Table 8-6 Internal components (2 of 5)**

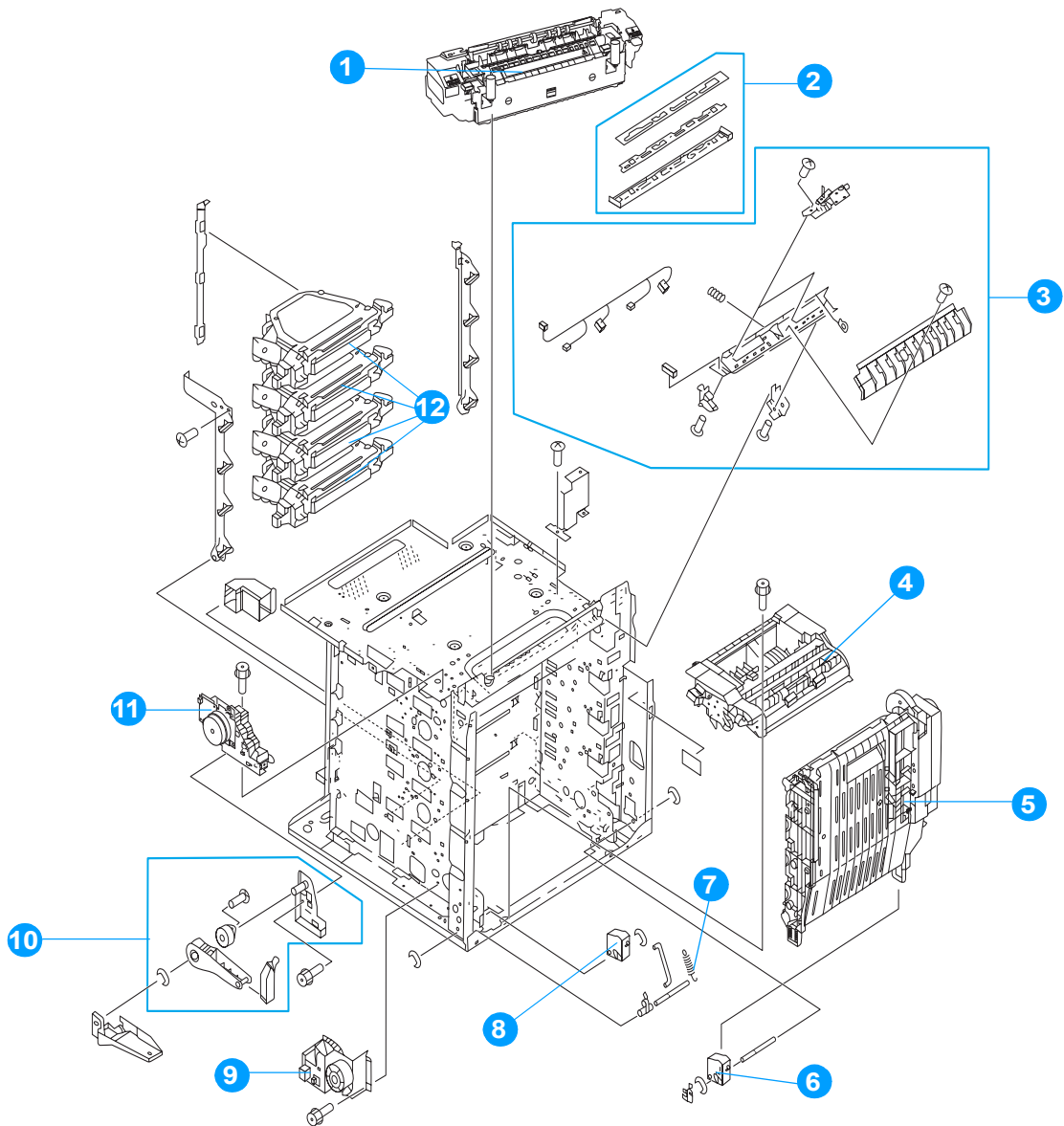
<b>Ref</b>	<b>Description</b>	<b>Quantity</b>	<b>Part number</b>
1	Lever, cart pressure	4	RF5-3725-000CN
2	Cassette frame right assembly	1	RG5-6460-000CN
3	Rod, spring	1	RB2-8213-000CN
4	Arm link (right)	1	RB2-8212-000CN
5	Cassette frame left assembly	1	RG5-6459-000CN
6	Rod, spring	1	RB2-8213-000CN
7	Arm link (left)	1	RB2-8207-000CN
8	Cable/connector, optional feeder	1	RG5-6430-000CN
9	Switch, cassette paper size	1	WC2-5452-000CN
10	Cable, cassette size	1	RG5-6430-000CN



**Figure 8-6** Internal components (3 of 5)

**Table 8-7 Internal components (3 of 5)**

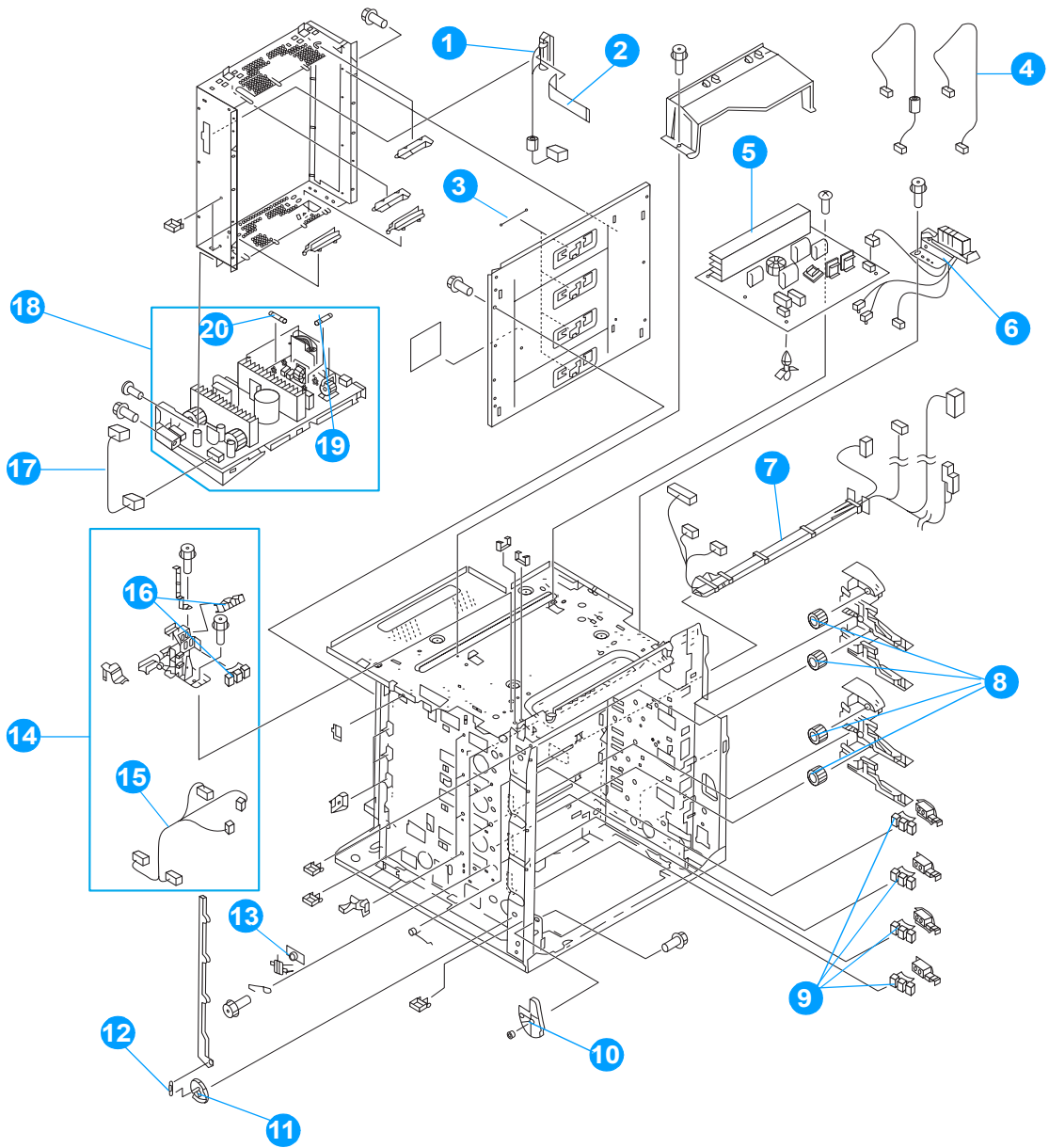
Ref	Description	Quantity	Part number
1	High-voltage power PCB assembly	1	RG5-6395-000CN
2	HVT terminal assembly	4	RG5-6449-000CN
3	Microswitch, front cover	1	WC4-5169-000CN
4	Toner sensor PCB assembly	1	RG5-6393-000CN
5	Spring, tension	1	RS6-2511-000CN
6	Arm, pressure	1	RB2-8151-000CN
7	Connector, drawer	1	WS3-5746-000CN
8	Cartridge inlet assembly	1	RG5-6450-000CN
9	Guide, cartridge, right lower	1	RB2-8146-000CN
10	Guide, cartridge, right upper	1	RB2-8147-000CN
11	Cable, left plate	1	RG5-6413-000CN
12	DC controller PCB assembly	1	RG5-6391-000CN
13	Fan, cartridge	1	RH7-1490-000CN
14	Fan, formatter	1	RH7-1491-000CN
15	ETB latch assembly	2	RG5-6456-000CN



**Figure 8-7** Internal components (4 of 5)

**Table 8-8 Internal components (4 of 5)**

Ref	Description	Quantity	Part number
1	Fuser	1	C9660-69002 (110 volt) C9660-69003 (220 volt)
2	Static eliminator	1	RF5-3773-000CN
3	Color registration detection assembly	1	RG5-6454-000CN
4	Paper pickup assembly	1	RG5-6468-000CN
5	ETB assembly	1	C9660-69004
6	Cap, right	1	RB2-8124-000CN
7	Spring, tension	1	RS6-2511-000CN
8	Cap, left	1	RB2-8121-000CN
9	Developing disengaging drive assembly	1	RG5-6507-000CN
10	Damper assembly	1	RG5-6446-000CN
11	Fuser drive assembly	1	RG5-6512-000CN
12	Laser/scanner assembly	4	RG5-6380-000CN

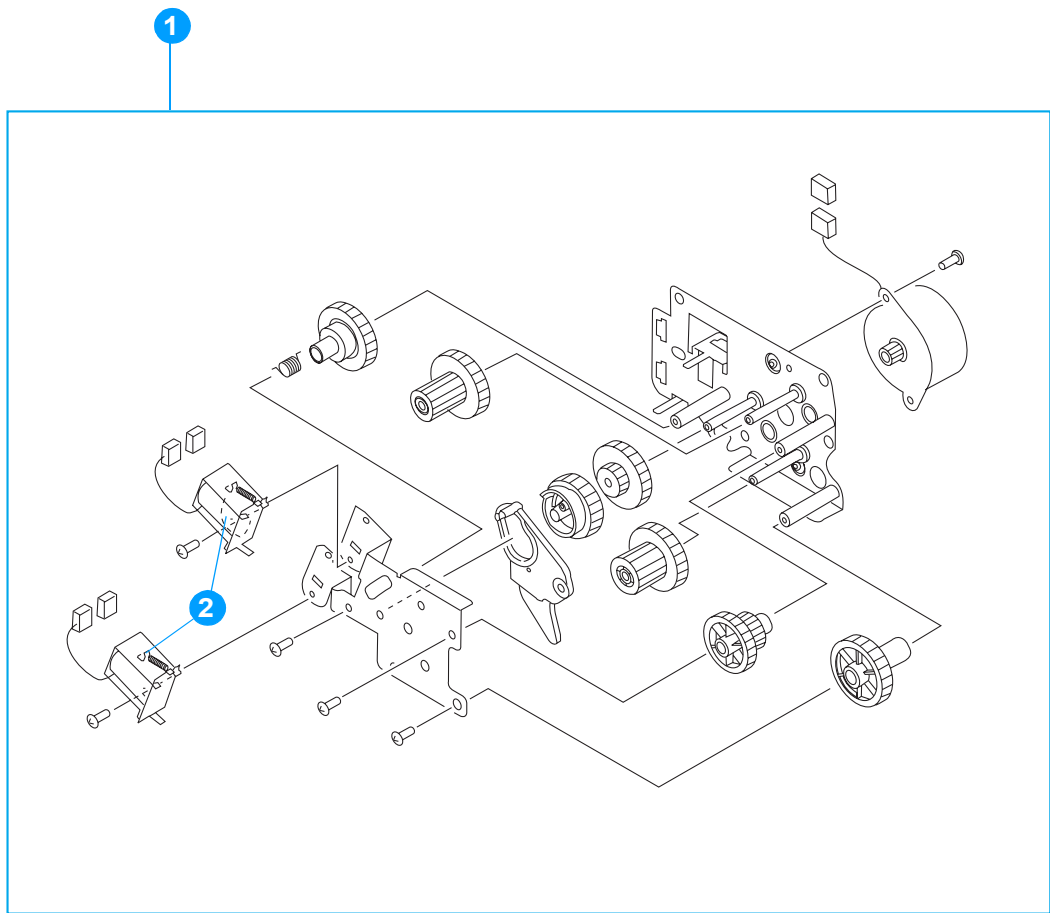


**Figure 8-8** Internal components (5 of 5)



**Table 8-9 Internal components (5 of 5)**

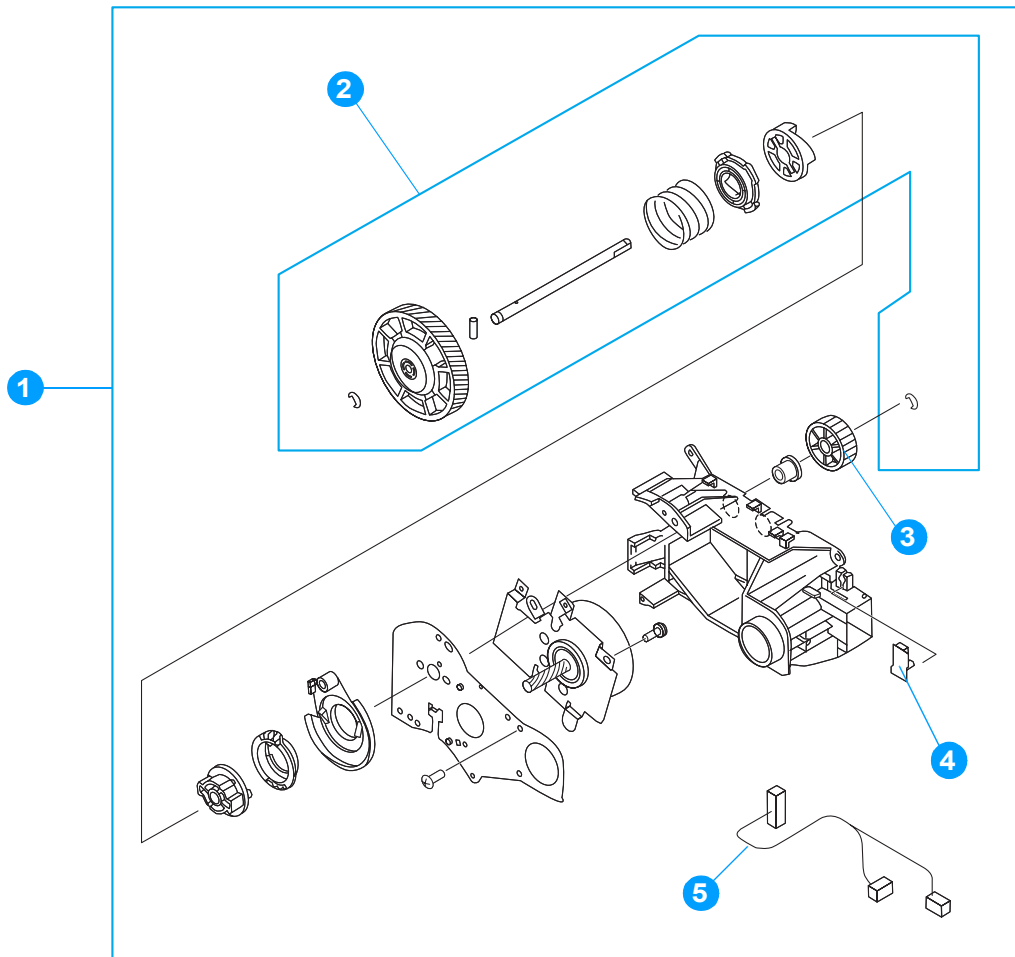
Ref	Description	Quantity	Part number
1	Cable, interface	1	RG5-6422-000CN
2	Cable, flat	1	RH2-5471-000CN
3	Spring, scanner support	4	RB2-8246-000CN
4	Cable, AC	1	RG5-6427-000CN (110 volt) RG5-6434-000CN (220 volt)
5	Fuser power supply PCB assembly	1	RG5-6399-000CN (110 volt) RG5-6400-000CN (220 volt)
6	Cable/connector, fuser	1	RG5-6425-000CN
7	Cable, relay	1	RG5-6414-000CN
8	Gear, 29T	4	RS7-0136-000CN
9	Photo interrupter, TLP1241	4	WG8-5362-000CN
10	Gear, pressure	1	RB2-8122-000CN
11	Cam/gear, 66T	1	RS7-0135-000CN
12	Spring, tension	1	RS6-2510-000CN
13	Memory tag antenna PCB assembly	4	RG5-5469-000CN
14	Sensor/bracket assembly	1	RG5-6522-000CN
15	Cable, sensor	1	RG5-6423-000CN
16	Photo interrupter, TLP1241	2	WG8-5362-000CN
17	Cable, DC power supply	1	RG5-6415-000CN
18	Low-voltage power supply assembly	1	RG5-6410-000CN (110 volt) RG5-6411-000CN (220 volt)
19	Fuse, 125 volt, 6.3 amp Fuse, 250 volt, 4 amp	1	VD7-0216-301CN (110 volt) VD7-0644-001CN (220 volt)
20	Fuse, 250 volt, 20 amp Fuse, 250 volt, 8 amp	1	VD7-1731-502CN (110 volt) VD7-1838-001CN (220 volt)



**Figure 8-9** Paper pickup drive assembly

**Table 8-10** Paper pickup drive assembly

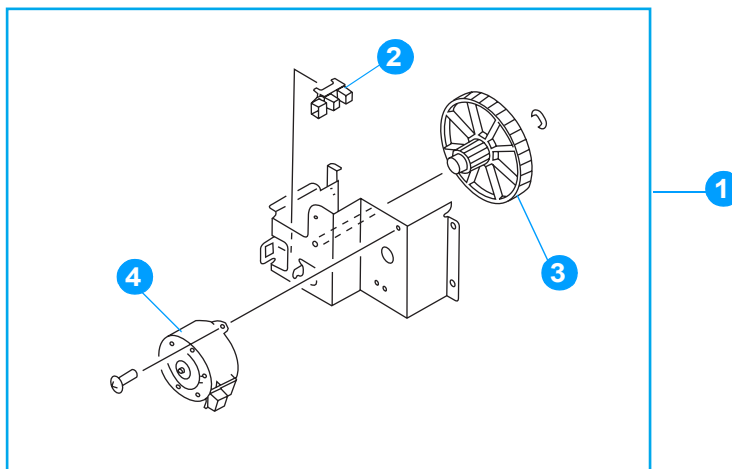
Ref	Description	Quantity	Part number
1	Paper pickup drive assembly	1	RG5-6469-000CN
2	Solenoid	2	RH7-5319-000CN



**Figure 8-10** Drum drive assembly

**Table 8-11** Drum drive assembly

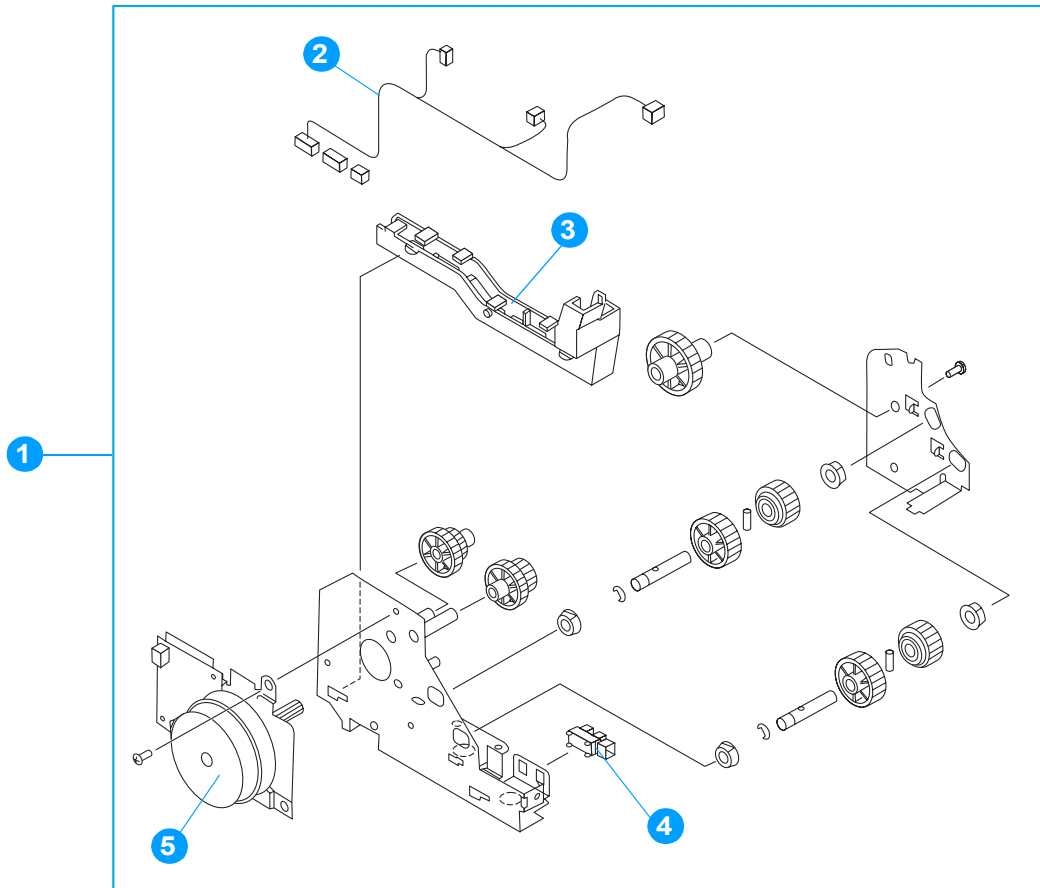
Ref	Description	Quantity	Part number
1	Drum drive assembly (cyan/magenta) Drum drive assembly (black) Drum drive assembly (yellow)	2 1 1	RG5-6504-000CN RG5-6505-000CN RG5-6506-000CN
2	Developing drive assembly (cyan/magenta) Developing drive assembly (black/yellow)	2 2	RG5-6508-000CN RG5-6509-000CN
3	Gear, 30T	1	RS7-0176-000CN
4	LED PCB assembly	1	RG5-6394-000CN
5	Cable, main drive	1	RG5-6416-000CN



**Figure 8-11** Disengaging drive assembly

**Table 8-12** Disengaging drive assembly

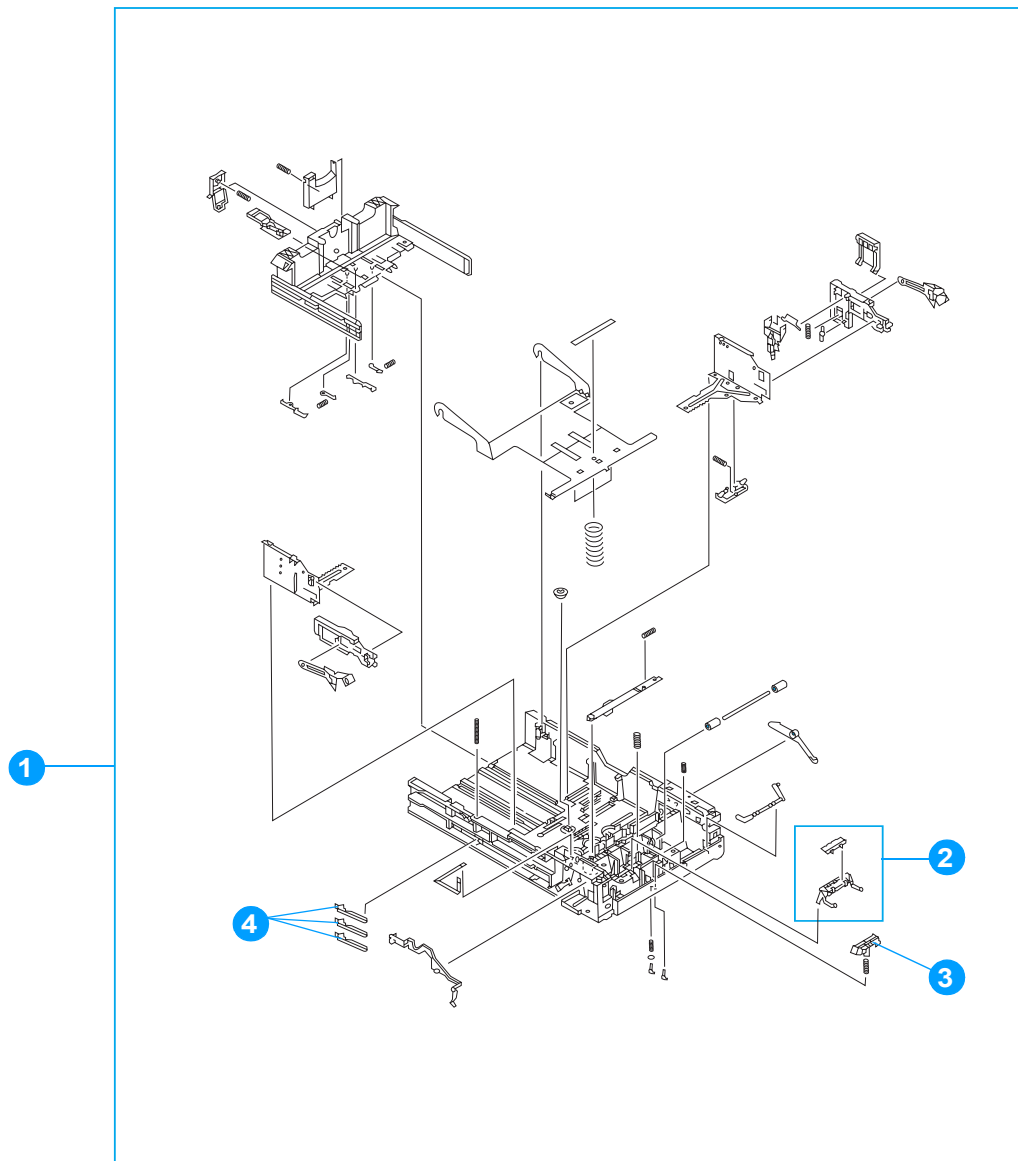
Ref	Description	Quantity	Part number
1	Disengaging drive assembly	1	RG5-6507-000CN
2	Photo interrupter, TLP1241	1	WG8-5362-000CN
3	Gear, 16T, 128T	1	RS7-0179-000CN
4	Motor, M7, developing disengaging, stepping	1	RH7-1494-000CN



**Figure 8-12 Fuser drive assembly**

**Table 8-13 Fuser drive assembly**

Ref	Description	Quantity	Part number
1	Fuser drive assembly	1	RG5-6512-000CN
2	Cable, upper crossmember	1	RG5-6421-000CN
3	Guide, cable	1	RB2-8532-000CN
4	Photo interrupter, TLP1241	1	WG8-5362-000CN
5	Motor, M8, fuser, DC, brushless, 24 volt	1	RH7-1495-000CN



**Figure 8-13** Cassette (1 of 2)

**Table 8-14** Cassette

Ref	Description	Quantity	Part number
1	Cassette (Tray 2)	1	RG5-6476-000CN
2	Separation pad assembly	1	RG5-6471-000CN
3	Plate, separation	1	RF5-3749-000CN
4	Arm, paper size	3	RB2-8349-000CN
5	Multi-purpose tray pickup roller assembly	1	RG9-1529-000CN

**Note**

Table 8-14 lists parts shown in Figure 8-13 and Figure 8-14. If you order a replacement cassette (item 1), you will receive all parts shown in both figures.

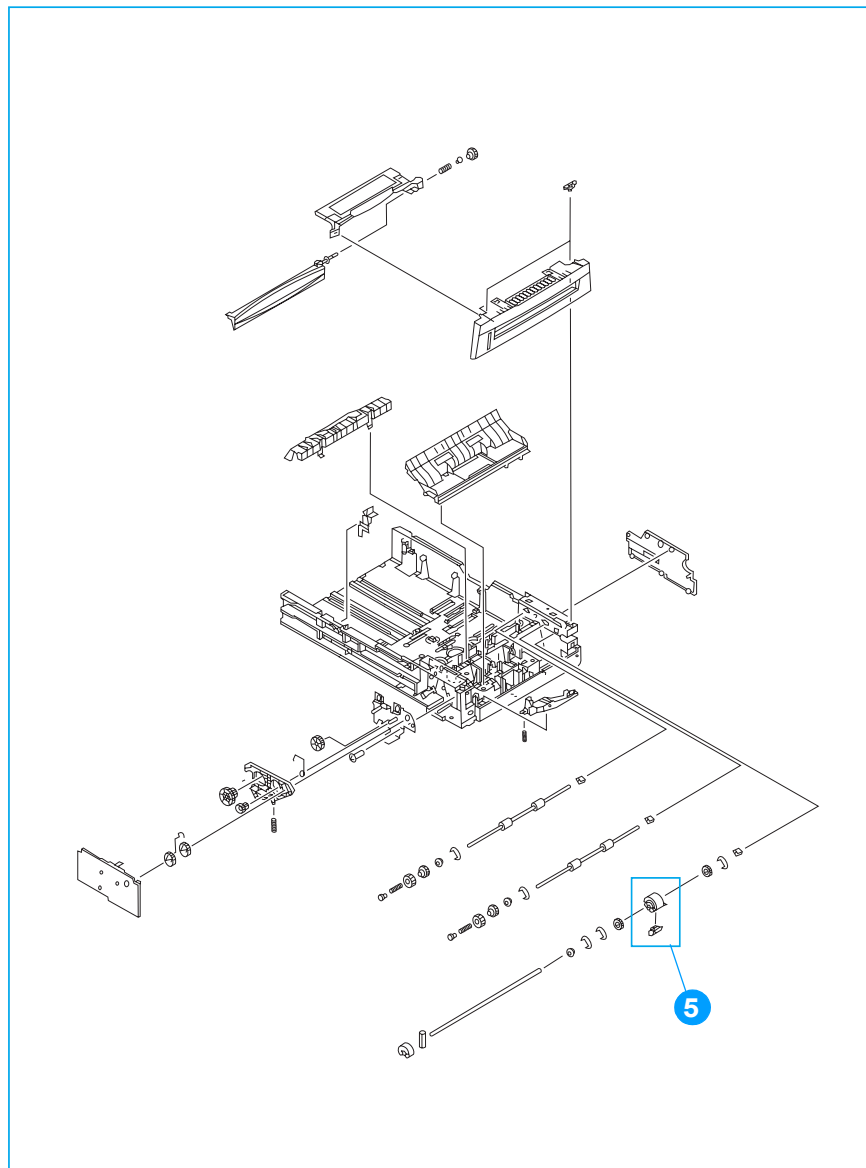
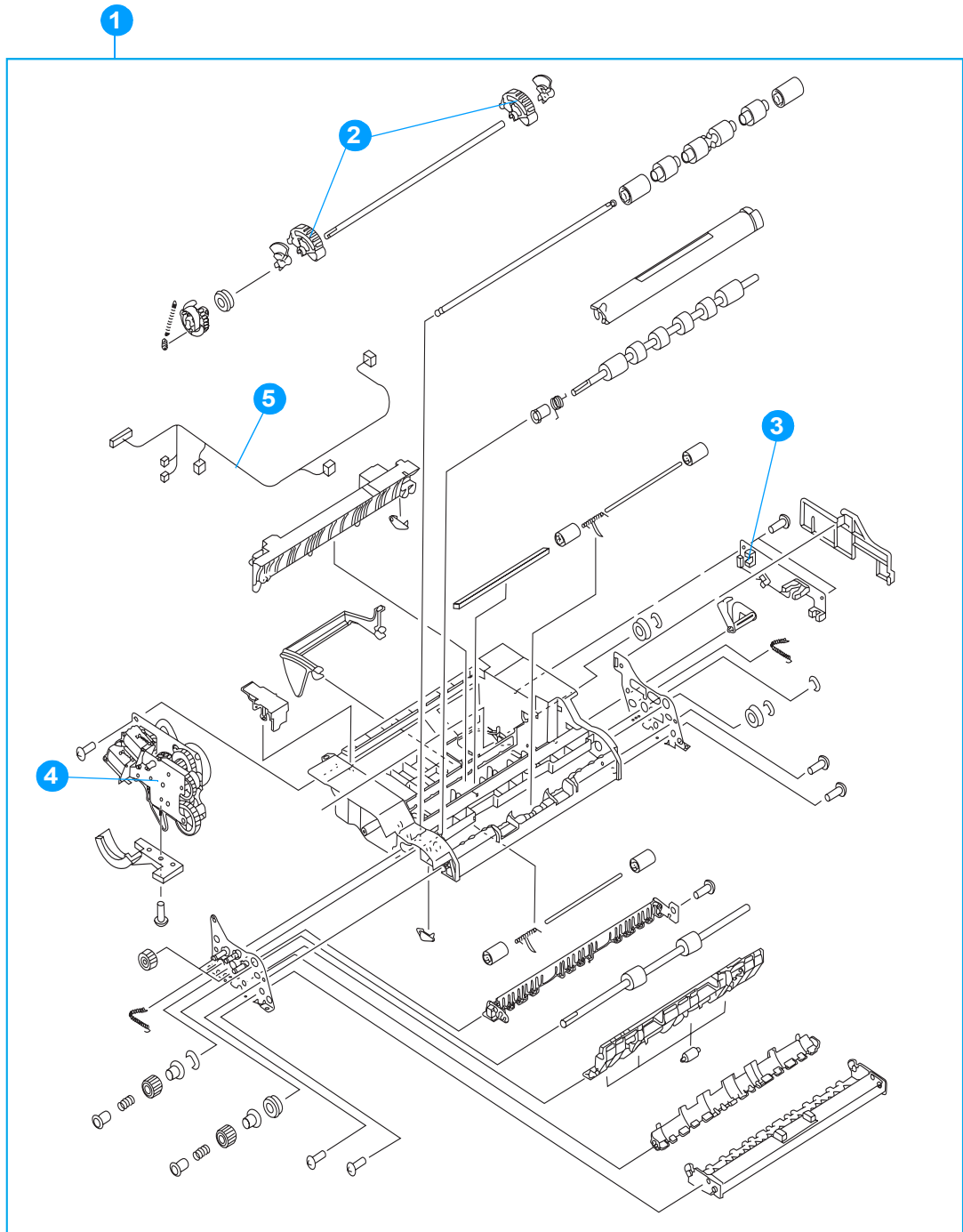


Figure 8-14 Cassette (2 of 2)

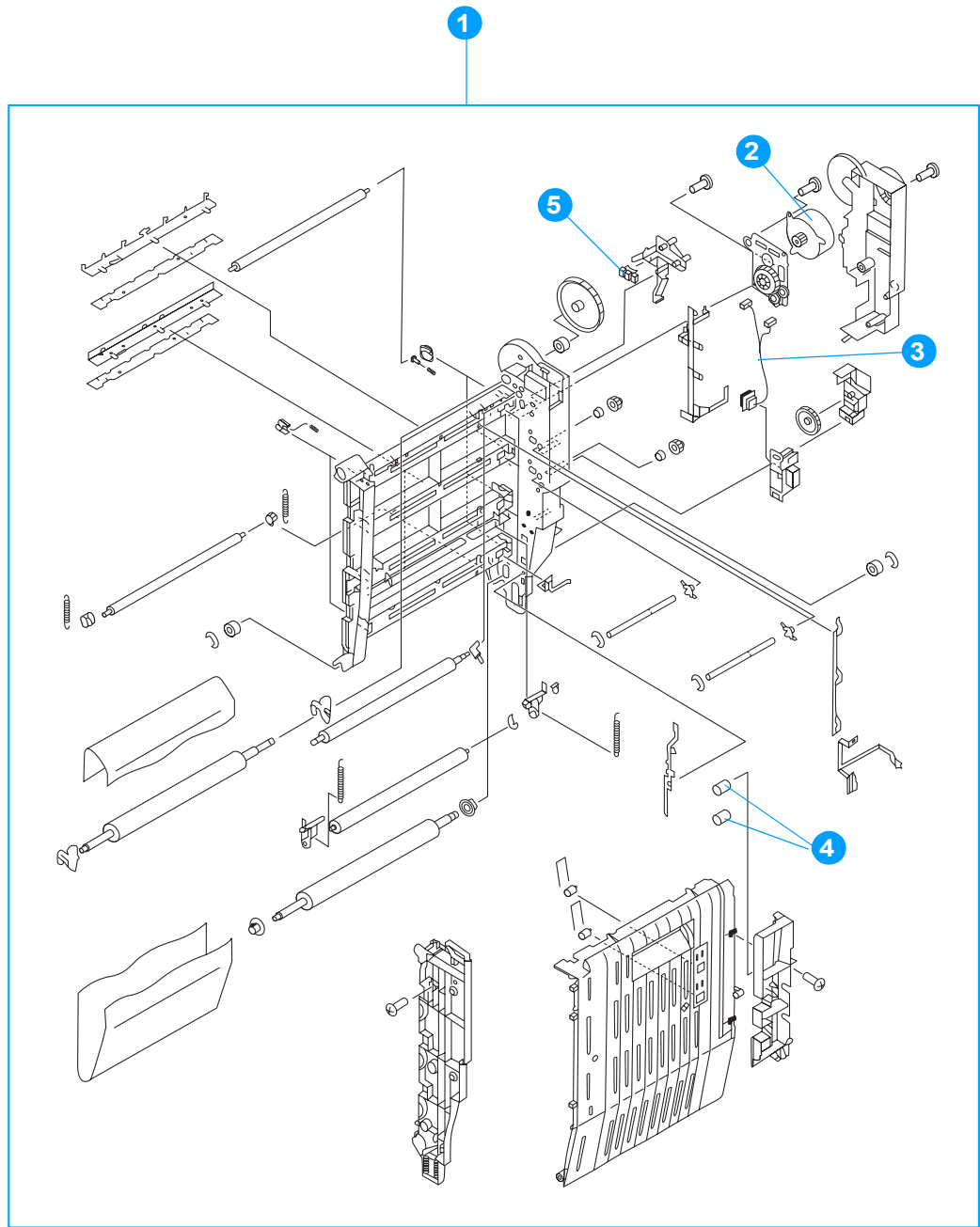


**Figure 8-15** Paper pickup assembly

**Table 8-15** Paper pickup assembly

Ref	Description	Quantity	Part number
1	Paper pickup assembly	1	RG5-6468-000CN
2	Roller, paper pickup	2	RF5-3739-000CN
3	Paper sensor PCB assembly	1	RG5-6392-000CN
4	Paper pickup drive assembly	1	RG5-6469-000CN
5	Cable, paper feed	1	RG5-6419-000CN

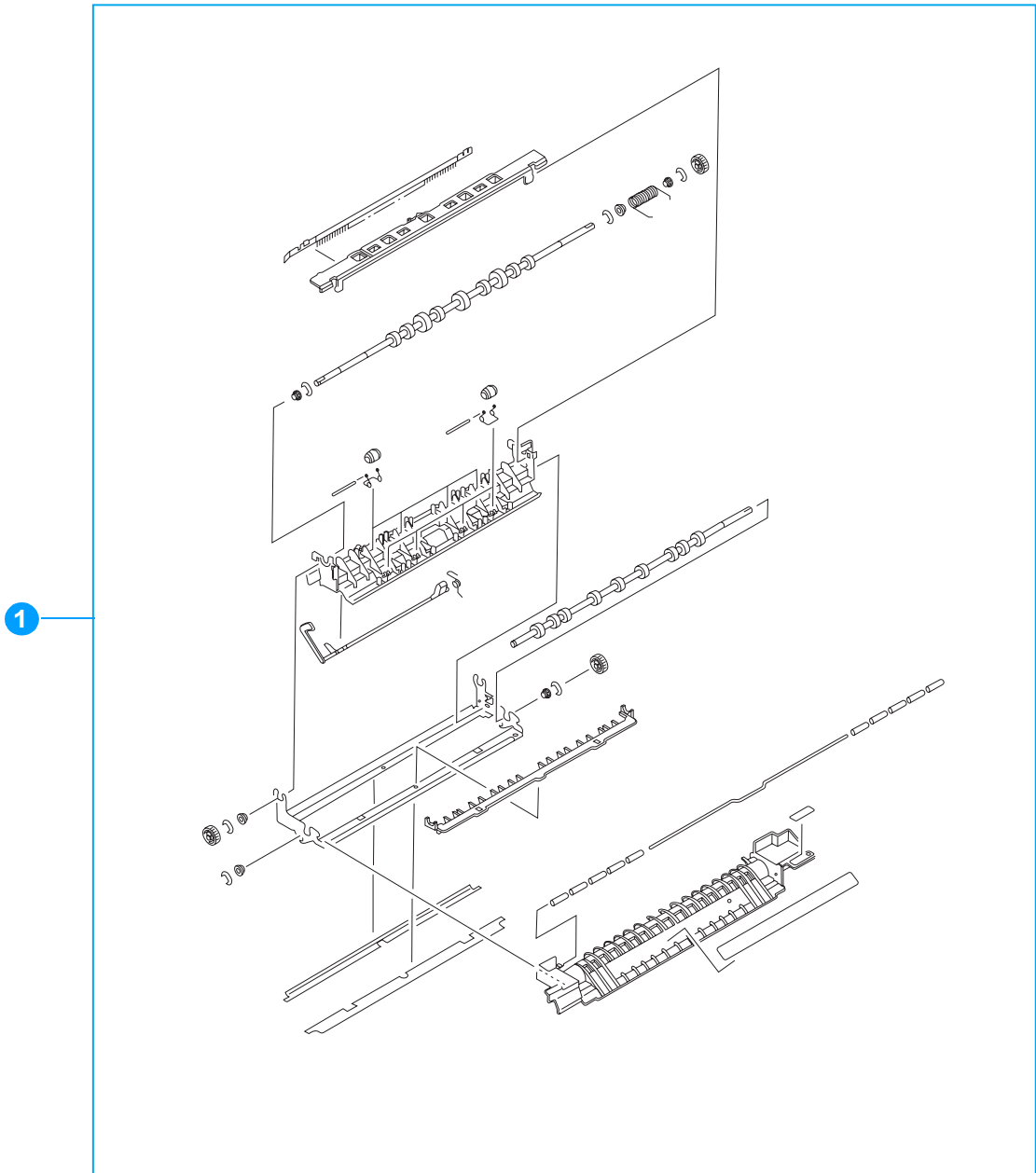




**Figure 8-16** ETB assembly

**Table 8-16** ETB assembly

Ref	Description	Quantity	Part number
1	ETB assembly	1	C9660-69004
2	Motor, M6, ETB, DC, 24 volt, brushless	1	RH7-1495-000CN
3	Cable, ETB	1	RG5-6417-000CN
4	Roller, oblique	2	RB1-2155-000CN
5	Photo interrupter, TLP1241	1	WG8-5362-000CN



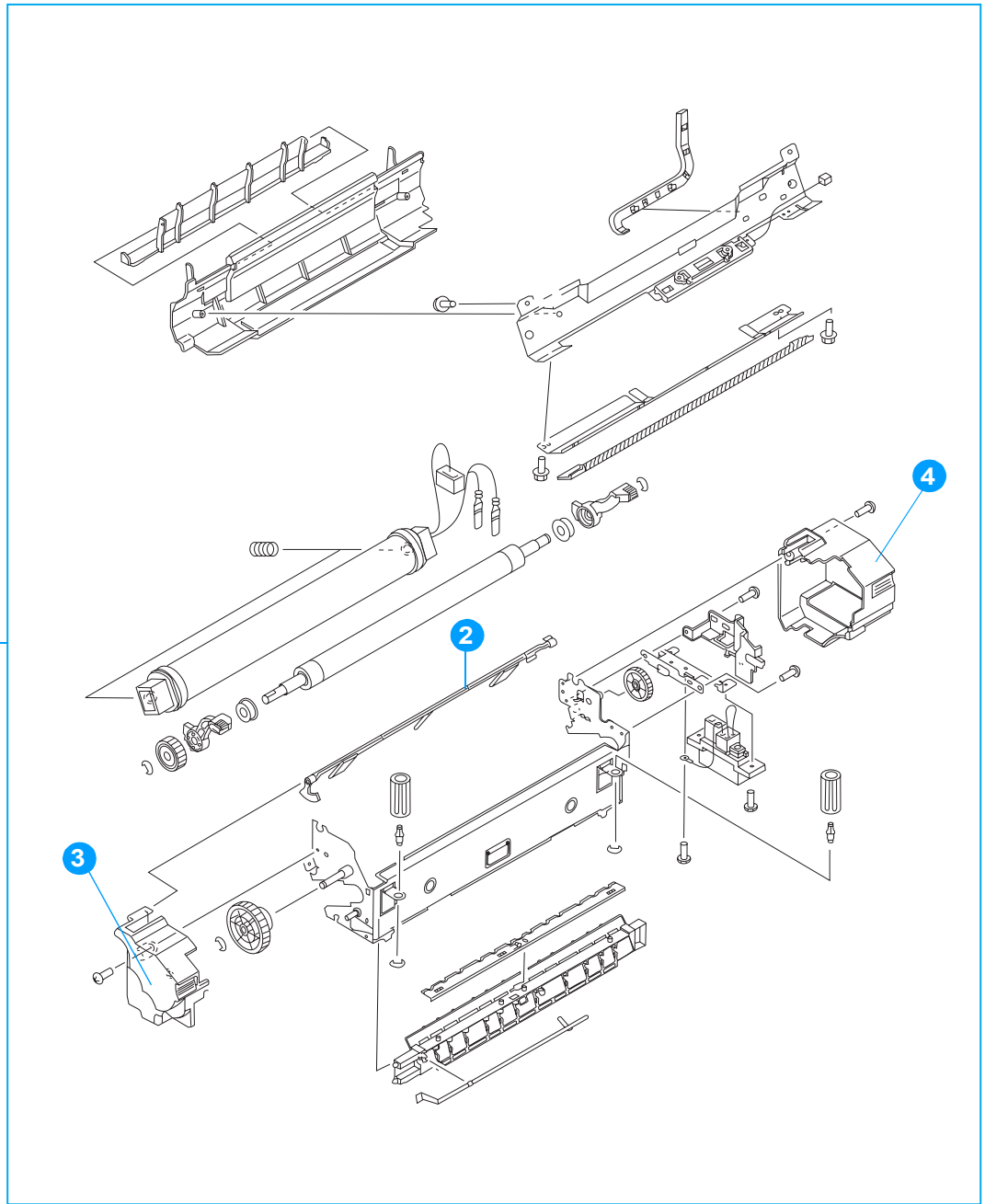
**Figure 8-17** Fuser assembly (1 of 2)

**Table 8-17** Fuser assembly

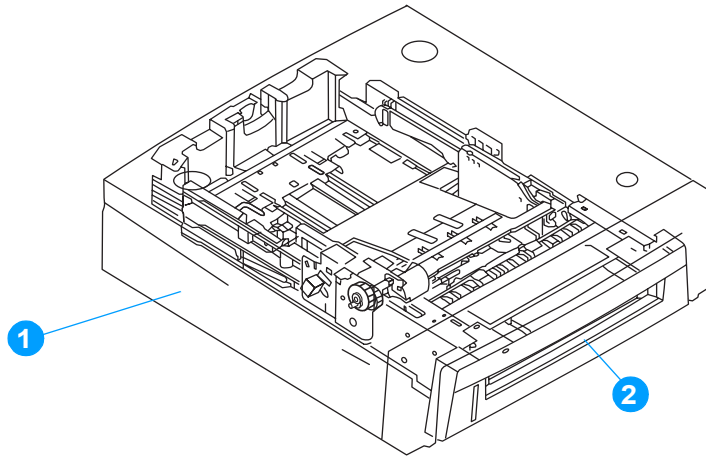
Ref	Description	Quantity	Part number
1	Fuser assembly	1	C9660-69002 (110 volt) C9660-69003 (220 volt)
2	Sensor flag	1	RB2-8498-000CN
3	Fuser cover, left	1	RF5-3774-000CN
4	Fuser cover, right	1	RF5-3775-000CN

**Note**

Table 8-17 lists parts shown in Figure 8-17 and Figure 8-18. If you order a replacement fuser, you will receive all the parts shown in both figures.



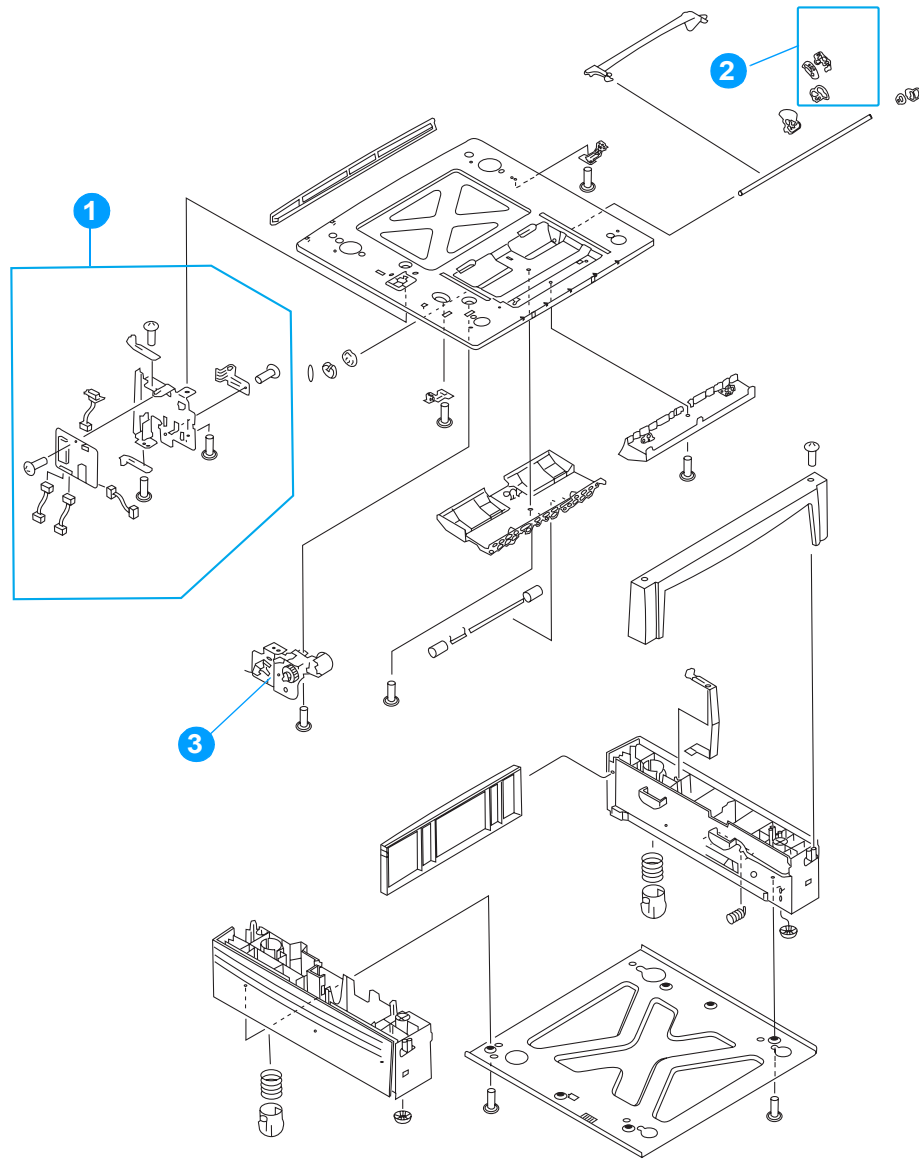
**Figure 8-18** Fuser assembly (2 of 2)



**Figure 8-19** 500-sheet paper feeder assembly location diagram

**Table 8-18** 500-sheet paper feeder assemblies

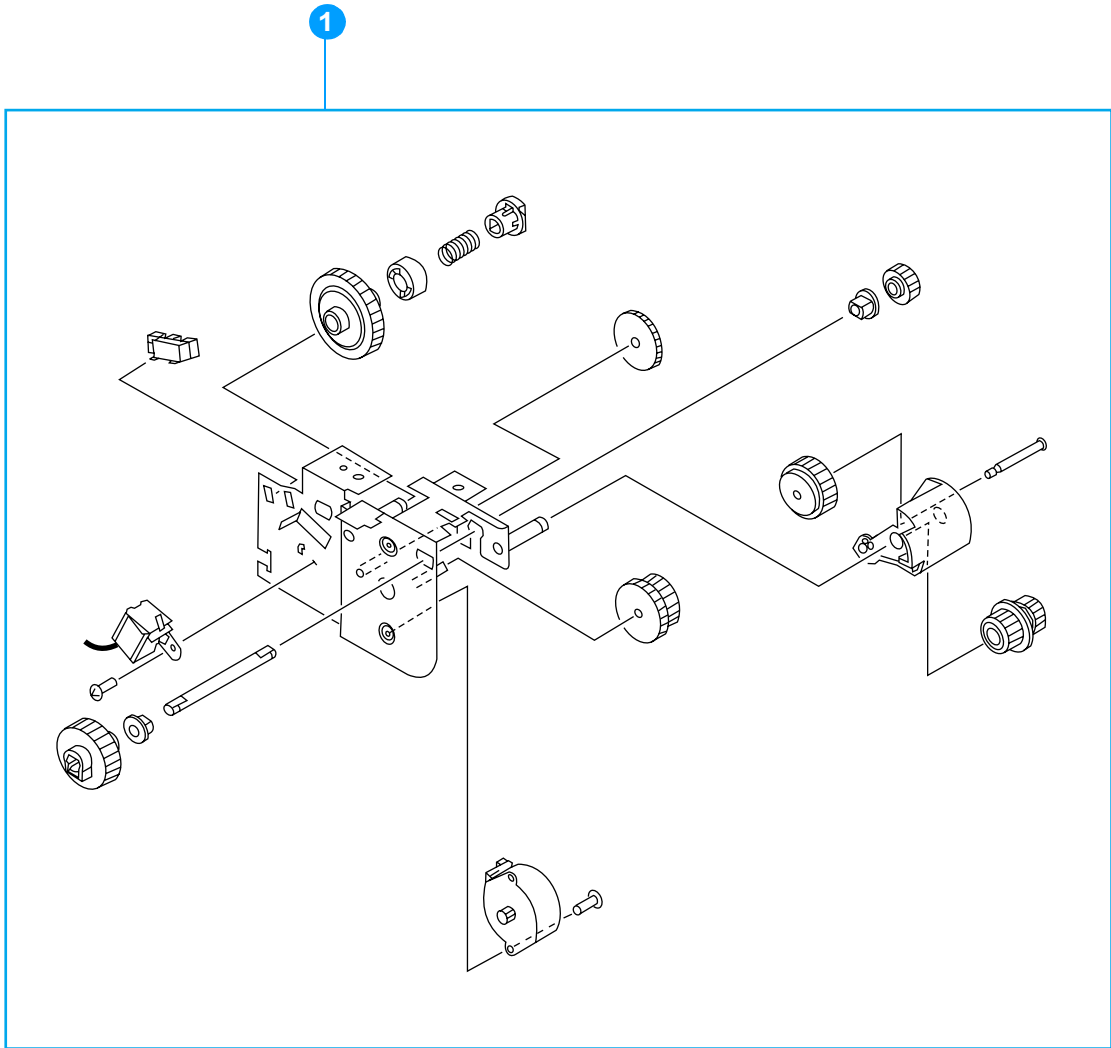
Ref	Description	Quantity	Part number
1	Optional 500-sheet paper feeder and Tray 3 assembly	1	5781A001AA
2	Cassette, 500-sheet paper feeder	1	RG1-4140-000CN



**Figure 8-20** 500-sheet paper feeder internal components

**Table 8-19** 500-sheet paper feeder internal components

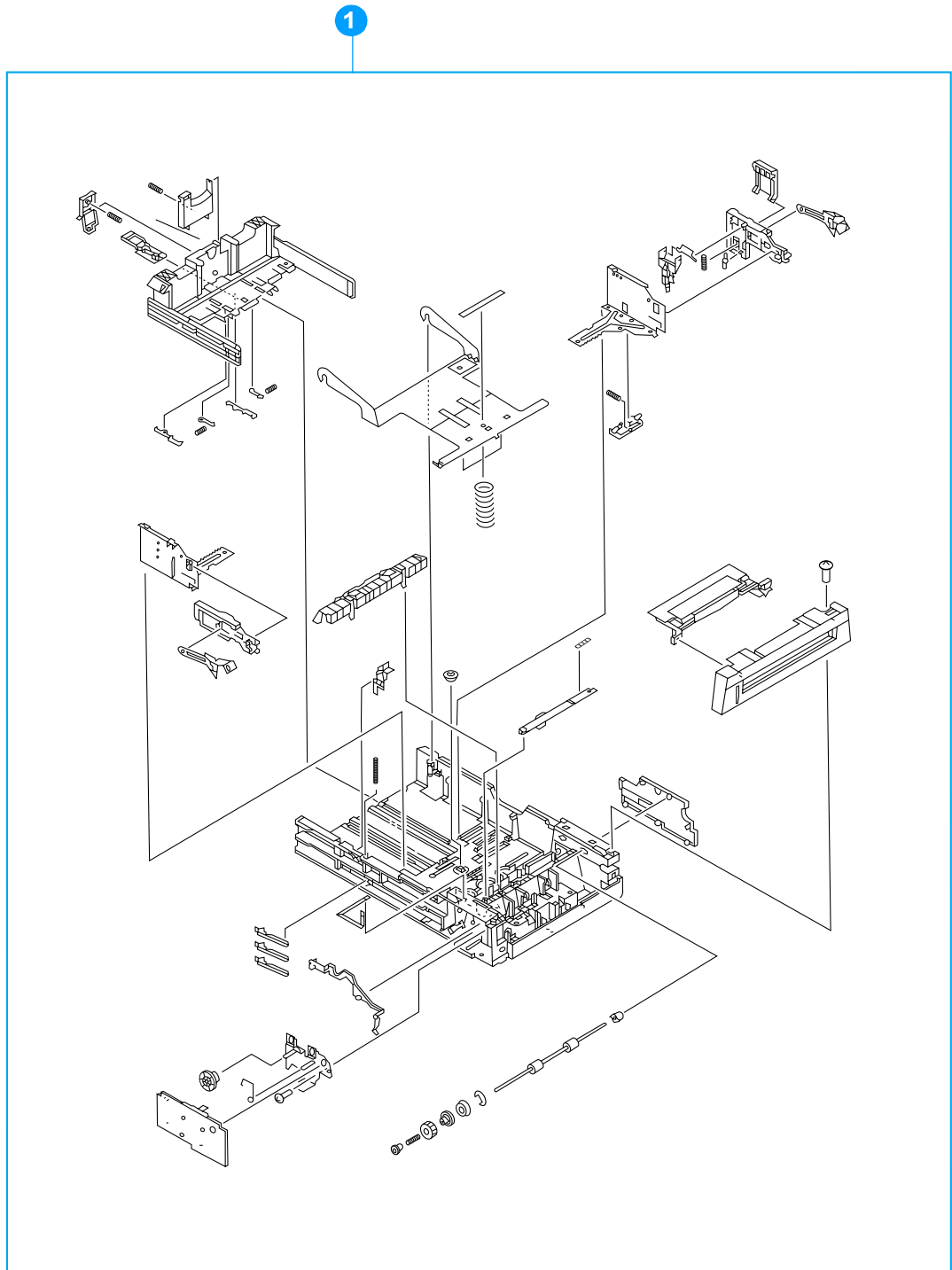
Ref	Description	Quantity	Part number
1	Paper feeder PCB assembly	1	RG1-4139-000CN
2	Roller, paper pickup	2	RF5-3739-000CN
3	Paper feeder drive assembly	1	RG1-4138-000CN



**Figure 8-21** 500-sheet paper feeder drive assembly

**Table 8-20** 500-sheet paper feeder drive assembly

Ref	Description	Quantity	Part number
1	Paper feeder drive assembly	1	RG1-4138-000CN



**Figure 8-22** 500-sheet paper feeder cassette

**Table 8-21** 500-sheet paper feeder cassette

Ref	Description	Quantity	Part number
1	Cassette, 500-sheet paper feeder	1	RG1-4140-000CN

## Alphabetical parts list

**Table 8-22 Alphabetical parts list**

Description	Part number	Figure	Reference
128 MB memory DIMM (SDRAM)	C7850-67901		
256 MB memory DIMM (SDRAM)	C9653-67901		
4 MB Flash DIMM	C9665-67951		
64 MB memory DIMM (SDRAM)	C7848-67901		
Antenna memory PCB assembly	RG5-6396-000CN	Figure 8-4	17
Arabic overlay	C9660-40018		
Arm link (left)	RB2-8207-000CN	Figure 8-5	7
Arm link (right)	RB2-8212-000CN	Figure 8-5	4
Arm, paper size	RB2-8349-000CN	Figure 8-13	4
Arm, pressure	RB2-8151-000CN	Figure 8-6	6
Arm, test print	RB2-8250-000CN	Figure 8-4	19
Black print cartridge	6825A001CN		
Black print cartridge (Europe)	6825A002CN		
Cable, AC	RG5-6427-000CN (110 volt) RG5-6434-000CN (220 volt)	Figure 8-8	4
Cable, antenna	RG5-6418-000CN	Figure 8-4	16
Cable, cassette size	RG5-6430-000CN	Figure 8-5	10
Cable, DC power supply	RG5-6415-000CN	Figure 8-8	17
Cable, ETB	RG5-6417-000CN	Figure 8-16	3
Cable, flat	RH2-5471-000CN	Figure 8-8	2
Cable, interface	RG5-6422-000CN	Figure 8-8	1
Cable, left plate	RG5-6413-000CN	Figure 8-6	11
Cable, main drive	RG5-6416-000CN	Figure 8-10	5
Cable, memory	RG5-6420-000CN	Figure 8-4	18
Cable, paper feed	RG5-6419-000CN	Figure 8-15	5
Cable, relay	RG5-6414-000CN	Figure 8-8	7
Cable, sensor	RG5-6423-000CN	Figure 8-8	15
Cable, upper crossmember	RG5-6421-000CN	Figure 8-12	2
Cable/connector, fuser	RG5-6425-000CN	Figure 8-8	6
Cable/connector, optional feeder	RG5-6430-000CN	Figure 8-5	8
Cam/gear, 66T	RS7-0135-000CN	Figure 8-8	11
Cap, left	RB2-8121-000CN	Figure 8-7	8
Cap, right	RB2-8124-000CN	Figure 8-7	6
Cartridge inlet assembly	RG5-6450-000CN	Figure 8-6	8
Cassette (Tray 2)	RG5-6476-000CN	Figure 8-13 Figure 8-14	1
Cassette frame left assembly	RG5-6459-000CN	Figure 8-5	5



**Table 8-22 Alphabetical parts list (continued)**

<b>Description</b>	<b>Part number</b>	<b>Figure</b>	<b>Reference</b>
Cassette frame right assembly	RG5-6460-000CN	Figure 8-5	2
Cassette, 500-sheet paper feeder	RG1-4140-000CN	Figure 8-19	2
Cassette, 500-sheet paper feeder	RG1-4140-000CN	Figure 8-22	1
Color registration detection assembly	RG5-6454-000CN	Figure 8-7	3
Connector, drawer	WS3-5746-000CN	Figure 8-6	7
Contact pin assembly	RG5-6492-000CN	Figure 8-4	3
Control panel assembly	RG5-6432-000CN (100 - 127 volt) RG5-6433-000CN (220 - 240 volt)	Figure 8-4	1
Control panel crossmember assembly	RG5-6510-000CN	Figure 8-4	2
Cyan print cartridge	6824A001CN		
Cyan print cartridge (Europe)	6824A002CN		
Czech overlay	C9660-40013		
Damper assembly	RG5-6446-000CN	Figure 8-7	10
Danish overlay	C9660-40007		
DC controller PCB	RG5-6391-000CN	Figure 8-2	8
DC controller PCB assembly	RG5-6391-000CN	Figure 8-6	12
Developing disengaging drive assembly	RG5-6507-000CN	Figure 8-7	9
Developing drive assembly (cyan/magenta)	RG5-6508-000CN	Figure 8-10	2
Developing drive assembly (black/yellow)	RG5-6509-000CN		
Disengaging drive assembly	RG5-6507-000CN	Figure 8-11	1
Drum drive assembly (black)	RG5-6505-000CN	Figure 8-4	9
Drum drive assembly (cyan/magenta)	RG5-6504-000CN	Figure 8-10	1
Drum drive assembly (black)	RG5-6505-000CN		
Drum drive assembly (yellow)	RG5-6506-000CN		
Drum drive assembly (magenta and cyan)	RG5-6504-000CN	Figure 8-4	7
Drum drive assembly (yellow)	RG5-6506-000CN	Figure 8-4	8
Drum grounding assembly (black and yellow)	RG5-6474-000CN	Figure 8-4	4
Drum grounding assembly (magenta and cyan)	RG5-6475-000CN	Figure 8-4	5
Dutch overlay	C9660-40008		
English overlay	C9660-40002		
ETB assembly	C9660-69004	Figure 8-7	5
ETB assembly	C9660-69004	Figure 8-16	1
ETB latch assembly	RG5-6456-000CN	Figure 8-6	15
Fan, cartridge	RH7-1490-000CN	Figure 8-6	13
Fan, formatter	RH7-1491-000CN	Figure 8-6	14
Filter, left side	RB2-8596-000CN	Figure 8-3	9
Filter, rear	RB2-8597-000CN	Figure 8-3	8
Finnish overlay	C9660-40009		

**Table 8-22 Alphabetical parts list (continued)**

<b>Description</b>	<b>Part number</b>	<b>Figure</b>	<b>Reference</b>
Firmware DIMM	C9156-67901	Figure 8-2	10
Formatter (duplex)	C9661-69001 (exchange) C9661-67901 (new)	Figure 8-2	9
Formatter (simplex)	C9660-69001 (exchange) C9660-67901 (new)	Figure 8-2	9
French overlay	C9660-40003		
Front cover assembly	RG5-6466-000CN	Figure 8-3	4
Fuse, 125 volt, 6.3 amp Fuse, 250 volt, 4 amp	VD7-0216-301CN (110 volt) VD7-0644-001CN (220 volt)	Figure 8-8	19
Fuse, 250 volt, 20 amp Fuse, 250 volt, 8 amp	VD7-1731-502CN (110 volt) VD7-1838-001CN (220 volt)	Figure 8-8	20
Fuser	C9660-69002 (110 volt) C9660-69003 (220 volt)	Figure 8-7	1
Fuser assembly	C9660-69002 (110 volt) C9660-69003 (220 volt)	Figure 8-17	1
Fuser cover, left	RF5-3774-000CN	Figure 8-18	3
Fuser cover, right	RF5-3775-000CN	Figure 8-18	4
Fuser drive assembly	RG5-6512-000CN	Figure 8-7	11
Fuser drive assembly	RG5-6512-000CN	Figure 8-12	1
Fuser power supply PCB	RG5-6399-000CN (100 - 127 volt) RG5-6400-000CN (220 - 240 volt)	Figure 8-2	1
Fuser power supply PCB assembly	RG5-6399-000CN (110 volt) RG5-6400-000CN (220 volt)	Figure 8-8	5
Gear, 16T, 128T	RS7-0179-000CN	Figure 8-11	3
Gear, 17T	RS7-0139-000CN	Figure 8-4	15
Gear, 200T (black and yellow)	RS7-0138-000CN	Figure 8-4	11
Gear, 200T (magenta and cyan)	RS7-0137-000CN	Figure 8-4	10
Gear, 29T	RS7-0136-000CN	Figure 8-8	8
Gear, 30T	RS7-0176-000CN	Figure 8-10	3
Gear, pressure	RB2-8122-000CN	Figure 8-8	10
German overlay	C9660-40004		
Greek overlay	C9660-40019		
Guide, cable	RB2-8532-000CN	Figure 8-12	3
Guide, cartridge, right lower	RB2-8146-000CN	Figure 8-6	9
Guide, cartridge, right upper	RB2-8147-000CN	Figure 8-6	10
Hebrew overlay	C9660-40020		
High-voltage power PCB assembly	RG5-6395-000CN	Figure 8-6	1
High-voltage power supply PCB	RG5-6395-000CN	Figure 8-2	2
HP Jetdirect connectivity card	J6057-69001		
Hungarian overlay	C9660-40014		
HVT terminal assembly	RG5-6449-000CN	Figure 8-6	2
I/O daughter card	C9144-60001	Figure 8-2	11

**Table 8-22 Alphabetical parts list (continued)**

<b>Description</b>	<b>Part number</b>	<b>Figure</b>	<b>Reference</b>
Image fuser kit (110 volt)	C9660-69002 (exchange) C9660-67902 (new)		
Image fuser kit (220 volt)	C9660-69003 (exchange) C9660-67903 (new)		
Image transfer kit	C9660-69004 (exchange) C9660-67904 (new)		
Italian overlay	C9660-40005		
Japanese overlay	C9660-40021		
Korean overlay	C9660-40022		
Laser/scanner assembly	RG5-6380-000CN	Figure 8-7	12
LED PCB assembly	RG5-6394-000CN	Figure 8-10	4
Left cover	RB2-8590-000CN	Figure 8-3	5
Lever, cart pressure	RF5-3725-000CN	Figure 8-5	1
Low-voltage power supply assembly	RG5-6410-000CN (110 volt) RG5-6411-000CN (220 volt)	Figure 8-8	18
Low-voltage power supply PCB	RG5-6410-000CN (100 - 127 volt) RG5-6411-000CN (220 - 240 volt)	Figure 8-2	5
Magenta print cartridge	6823A001CN		
Magenta print cartridge (Europe)	6823A002CN		
Memory controller PCB	RG5-6396-000CN	Figure 8-2	7
Memory tag antenna PCB assembly	RG5-5469-000CN	Figure 8-8	13
Memory tag antenna PCBs	RG5-5469-000CN	Figure 8-2	6
Microswitch, front cover	WC4-5169-000CN	Figure 8-6	3
Motor, M6, ETB, DC, 24 volt, brushless	RH7-1495-000CN	Figure 8-16	2
Motor, M7, developing disengaging, stepping	RH7-1494-000CN	Figure 8-11	4
Motor, M8, fuser, DC, brushless, 24 volt	RH7-1495-000CN	Figure 8-12	5
Multi-purpose tray assembly	RG5-6467-000CN	Figure 8-3	3
Multi-purpose tray pickup roller assembly	RG9-1529-000CN	Figure 8-14	5
Norwegian overlay	C9660-40010		
Optional 500-sheet paper feeder and Tray 3 assembly	5781A001AA	Figure 8-19	1
Paper feeder drive assembly	RG1-4138-000CN	Figure 8-20	3
Paper feeder drive assembly	RG1-4138-000CN	Figure 8-21	1
Paper feeder PCB assembly	RG1-4139-000CN	Figure 8-20	1
Paper pickup assembly	RG5-6468-000CN	Figure 8-7	4
Paper pickup assembly	RG5-6468-000CN	Figure 8-15	1
Paper pickup drive assembly	RG5-6469-000CN	Figure 8-9	1
Paper pickup drive assembly	RG5-6469-000CN	Figure 8-15	4
Paper sensor PCB assembly	RG5-6392-000CN	Figure 8-15	3
Photo interrupter, TLP1241	WG8-5362-000CN	Figure 8-8	9

**Table 8-22 Alphabetical parts list (continued)**

<b>Description</b>	<b>Part number</b>	<b>Figure</b>	<b>Reference</b>
Photo interrupter, TLP1241	WG8-5362-000CN	Figure 8-8	16
Photo interrupter, TLP1241	WG8-5362-000CN	Figure 8-11	2
Photo interrupter, TLP1241	WG8-5362-000CN	Figure 8-12	4
Photo interrupter, TLP1241	WG8-5362-000CN	Figure 8-16	5
Pickup PCB	RG5-6392-000CN	Figure 8-2	4
Plate, developer disengagement	RB2-8239-000CN	Figure 8-4	14
Plate, drive grounding	RB2-8255-000CN	Figure 8-4	13
Plate, drive interlock	RB2-8225-000CN	Figure 8-4	6
Plate, separation	RF5-3749-000CN	Figure 8-13	3
Polish overlay	C9660-40015		
Portuguese overlay	C9660-40011		
Printer hard disk	J6054-61013		
Rear cover	RB2-8592-000CN	Figure 8-3	6
Rear top cover assembly	RG5-6464-000CN	Figure 8-3	7
Right cover	RB2-8591-000CN	Figure 8-3	1
Rod, spring	RB2-8213-000CN	Figure 8-5	3
Rod, spring	RB2-8213-000CN	Figure 8-5	6
Roller, oblique	RB1-2155-000CN	Figure 8-16	4
Roller, paper pickup	RF5-3739-000CN	Figure 8-15	2
Roller, paper pickup	RF5-3739-000CN	Figure 8-20	2
Russian overlay	C9660-40016		
Screw, machine with washer, M3x8	XA9-1276-000CN		
Screw, truss head, M3x6	XA9-1275-000CN		
Sensor flag	RB2-8498-000CN	Figure 8-18	2
Sensor/bracket assembly	RG5-6522-000CN	Figure 8-8	14
Separation pad assembly	RG5-6471-000CN	Figure 8-13	2
Simplified Chinese overlay	C9660-40024		
Solenoid	RH7-5319-000CN	Figure 8-9	2
Spanish overlay	C9660-40006		
Spring, scanner support	RB2-8246-000CN	Figure 8-8	3
Spring, tension	RS6-2510-000CN	Figure 8-8	12
Spring, tension	RS6-2511-000CN	Figure 8-6	5
Spring, tension	RS6-2511-000CN	Figure 8-7	7
Spring, tension	RS6-2537-000CN	Figure 8-4	12
Static eliminator	RF5-3773-000CN	Figure 8-7	2
Swedish overlay	C9660-40012		
Switch, cassette paper size	WC2-5452-000CN	Figure 8-5	9
Thai overlay	C9660-40023		
Toner sensor PCB	RG5-6393-000CN	Figure 8-2	3
Toner sensor PCB assembly	RG5-6393-000CN	Figure 8-6	4

**Table 8-22 Alphabetical parts list (continued)**

<b>Description</b>	<b>Part number</b>	<b>Figure</b>	<b>Reference</b>
Top cover assembly	RG5-6465-000CN	Figure 8-3	2
Traditional Chinese overlay	C9660-40025		
Turkish overlay	C9660-40017		
Yellow print cartridge	6822A001CN		
Yellow print cartridge (Europe)	6822A002CN		

## Numerical parts list

**Table 8-23 Numerical parts list**

Part number	Description	Figure	Reference
5781A001AA	Optional 500-sheet paper feeder and Tray 3 assembly	Figure 8-19	1
6822A001CN	Yellow print cartridge		
6822A002CN	Yellow print cartridge (Europe)		
6823A001CN	Magenta print cartridge		
6823A002CN	Magenta print cartridge (Europe)		
6824A001CN	Cyan print cartridge		
6824A002CN	Cyan print cartridge (Europe)		
6825A001CN	Black print cartridge		
6825A002CN	Black print cartridge (Europe)		
C7848-67901	64 MB memory DIMM (SDRAM)		
C7850-67901	128 MB memory DIMM (SDRAM)		
C9144-60001	I/O daughter card	Figure 8-2	11
C9156-67901	Firmware DIMM	Figure 8-2	10
C9653-67901	256 MB memory DIMM (SDRAM)		
C9660-40002	English overlay		
C9660-40003	French overlay		
C9660-40004	German overlay		
C9660-40005	Italian overlay		
C9660-40006	Spanish overlay		
C9660-40007	Danish overlay		
C9660-40008	Dutch overlay		
C9660-40009	Finnish overlay		
C9660-40010	Norwegian overlay		
C9660-40011	Portuguese overlay		
C9660-40012	Swedish overlay		
C9660-40013	Czech overlay		
C9660-40014	Hungarian overlay		
C9660-40015	Polish overlay		
C9660-40016	Russian overlay		
C9660-40017	Turkish overlay		
C9660-40018	Arabic overlay		
C9660-40019	Greek overlay		
C9660-40020	Hebrew overlay		
C9660-40021	Japanese overlay		
C9660-40022	Korean overlay		

**Table 8-23 Numerical parts list (continued)**

Part number	Description	Figure	Reference
C9660-40023	Thai overlay		
C9660-40024	Simplified Chinese overlay		
C9660-40025	Traditional Chinese overlay		
C9660-69001 (exchange) C9660-67901 (new)	Formatter (simplex)	Figure 8-2	9
C9660-69002 (110 volt) C9660-69003 (220 volt)	Fuser	Figure 8-7	1
C9660-69002 (110 volt) C9660-69003 (220 volt)	Fuser assembly	Figure 8-17	1
C9660-69002 (exchange) C9660-67902 (new)	Image fuser kit (110 volt)		
C9660-69003 (exchange) C9660-67903 (new)	Image fuser kit (220 volt)		
C9660-69004	ETB assembly	Figure 8-7	5
C9660-69004	ETB assembly	Figure 8-16	1
C9660-69004 (exchange) C9660-67904 (new)	Image transfer kit		
C9661-69001 (exchange) C9661-67901 (new)	Formatter (duplex)	Figure 8-2	9
C9665-67951	4 MB Flash DIMM		
J6054-61013	Printer hard disk		
J6057-69001	HP Jetdirect connectivity card		
RB1-2155-000CN	Roller, oblique	Figure 8-16	4
RB2-8121-000CN	Cap, left	Figure 8-7	8
RB2-8122-000CN	Gear, pressure	Figure 8-8	10
RB2-8124-000CN	Cap, right	Figure 8-7	6
RB2-8146-000CN	Guide, cartridge, right lower	Figure 8-6	9
RB2-8147-000CN	Guide, cartridge, right upper	Figure 8-6	10
RB2-8151-000CN	Arm, pressure	Figure 8-6	6
RB2-8207-000CN	Arm link (left)	Figure 8-5	7
RB2-8212-000CN	Arm link (right)	Figure 8-5	4
RB2-8213-000CN	Rod, spring	Figure 8-5	3
RB2-8213-000CN	Rod, spring	Figure 8-5	6
RB2-8225-000CN	Plate, drive interlock	Figure 8-4	6
RB2-8239-000CN	Plate, developer disengagement	Figure 8-4	14
RB2-8246-000CN	Spring, scanner support	Figure 8-8	3
RB2-8250-000CN	Arm, test print	Figure 8-4	19
RB2-8255-000CN	Plate, drive grounding	Figure 8-4	13
RB2-8349-000CN	Arm, paper size	Figure 8-13	4
RB2-8498-000CN	Sensor flag	Figure 8-18	2
RB2-8532-000CN	Guide, cable	Figure 8-12	3
RB2-8590-000CN	Left cover	Figure 8-3	5

**Table 8-23 Numerical parts list (continued)**

<b>Part number</b>	<b>Description</b>	<b>Figure</b>	<b>Reference</b>
RB2-8591-000CN	Right cover	Figure 8-3	1
RB2-8592-000CN	Rear cover	Figure 8-3	6
RB2-8596-000CN	Filter, left side	Figure 8-3	9
RB2-8597-000CN	Filter, rear	Figure 8-3	8
RF5-3725-000CN	Lever, cart pressure	Figure 8-5	1
RF5-3739-000CN	Roller, paper pickup	Figure 8-15	2
RF5-3739-000CN	Roller, paper pickup	Figure 8-20	2
RF5-3749-000CN	Plate, separation	Figure 8-13	3
RF5-3773-000CN	Static eliminator	Figure 8-7	2
RF5-3774-000CN	Fuser cover, left	Figure 8-18	3
RF5-3775-000CN	Fuser cover, right	Figure 8-18	4
RG1-4138-000CN	Paper feeder drive assembly	Figure 8-20	3
RG1-4138-000CN	Paper feeder drive assembly	Figure 8-21	1
RG1-4139-000CN	Paper feeder PCB assembly	Figure 8-20	1
RG1-4140-000CN	Cassette, 500-sheet paper feeder	Figure 8-19	2
RG1-4140-000CN	Cassette, 500-sheet paper feeder	Figure 8-22	1
RG5-5469-000CN	Memory tag antenna PCB assembly	Figure 8-8	13
RG5-5469-000CN	Memory tag antenna PCBs	Figure 8-2	6
RG5-6380-000CN	Laser/scanner assembly	Figure 8-7	12
RG5-6391-000CN	DC controller PCB	Figure 8-2	8
RG5-6391-000CN	DC controller PCB assembly	Figure 8-6	12
RG5-6392-000CN	Paper sensor PCB assembly	Figure 8-15	3
RG5-6392-000CN	Pickup PCB	Figure 8-2	4
RG5-6393-000CN	Toner sensor PCB	Figure 8-2	3
RG5-6393-000CN	Toner sensor PCB assembly	Figure 8-6	4
RG5-6394-000CN	LED PCB assembly	Figure 8-10	4
RG5-6395-000CN	High-voltage power PCB assembly	Figure 8-6	1
RG5-6395-000CN	High-voltage power supply PCB	Figure 8-2	2
RG5-6396-000CN	Antenna memory PCB assembly	Figure 8-4	17
RG5-6396-000CN	Memory controller PCB	Figure 8-2	7
RG5-6399-000CN (100 - 127 volt) RG5-6400-000CN (220 - 240 volt)	Fuser power supply PCB	Figure 8-2	1
RG5-6399-000CN (110 volt) RG5-6400-000CN (220 volt)	Fuser power supply PCB assembly	Figure 8-8	5
RG5-6410-000CN (100 - 127 volt) RG5-6411-000CN (220 - 240 volt)	Low-voltage power supply PCB	Figure 8-2	5
RG5-6410-000CN (110 volt) RG5-6411-000CN (220 volt)	Low-voltage power supply assembly	Figure 8-8	18
RG5-6413-000CN	Cable, left plate	Figure 8-6	11
RG5-6414-000CN	Cable, relay	Figure 8-8	7
RG5-6415-000CN	Cable, DC power supply	Figure 8-8	17



**Table 8-23 Numerical parts list (continued)**

Part number	Description	Figure	Reference
RG5-6416-000CN	Cable, main drive	Figure 8-10	5
RG5-6417-000CN	Cable, ETB	Figure 8-16	3
RG5-6418-000CN	Cable, antenna	Figure 8-4	16
RG5-6419-000CN	Cable, paper feed	Figure 8-15	5
RG5-6420-000CN	Cable, memory	Figure 8-4	18
RG5-6421-000CN	Cable, upper crossmember	Figure 8-12	2
RG5-6422-000CN	Cable, interface	Figure 8-8	1
RG5-6423-000CN	Cable, sensor	Figure 8-8	15
RG5-6425-000CN	Cable/connector, fuser	Figure 8-8	6
RG5-6427-000CN (110 volt) RG5-6434-000CN (220 volt)	Cable, AC	Figure 8-8	4
RG5-6430-000CN	Cable, cassette size	Figure 8-5	10
RG5-6430-000CN	Cable/connector, optional feeder	Figure 8-5	8
RG5-6432-000CN (100 - 127 volt) RG5-6433-000CN (220 - 240 volt)	Control panel assembly	Figure 8-4	1
RG5-6446-000CN	Damper assembly	Figure 8-7	10
RG5-6449-000CN	HVT terminal assembly	Figure 8-6	2
RG5-6450-000CN	Cartridge inlet assembly	Figure 8-6	8
RG5-6454-000CN	Color registration detection assembly	Figure 8-7	3
RG5-6456-000CN	ETB latch assembly	Figure 8-6	15
RG5-6459-000CN	Cassette frame left assembly	Figure 8-5	5
RG5-6460-000CN	Cassette frame right assembly	Figure 8-5	2
RG5-6464-000CN	Rear top cover assembly	Figure 8-3	7
RG5-6465-000CN	Top cover assembly	Figure 8-3	2
RG5-6466-000CN	Front cover assembly	Figure 8-3	4
RG5-6467-000CN	Multi-purpose tray assembly	Figure 8-3	3
RG5-6468-000CN	Paper pickup assembly	Figure 8-7	4
RG5-6468-000CN	Paper pickup assembly	Figure 8-15	1
RG5-6469-000CN	Paper pickup drive assembly	Figure 8-9	1
RG5-6469-000CN	Paper pickup drive assembly	Figure 8-15	4
RG5-6471-000CN	Separation pad assembly	Figure 8-13	2
RG5-6474-000CN	Drum grounding assembly (black and yellow)	Figure 8-4	4
RG5-6475-000CN	Drum grounding assembly (magenta and cyan)	Figure 8-4	5
RG5-6476-000CN	Cassette (Tray 2)	Figure 8-13 Figure 8-14	1
RG5-6492-000CN	Contact pin assembly	Figure 8-4	3
RG5-6504-000CN	Drum drive assembly (magenta and cyan)	Figure 8-4	7

**Table 8-23 Numerical parts list (continued)**

Part number	Description	Figure	Reference
RG5-6504-000CN RG5-6505-000CN RG5-6506-000CN	Drum drive assembly (cyan/magenta) Drum drive assembly (black) Drum drive assembly (yellow)	Figure 8-10	1
RG5-6505-000CN	Drum drive assembly (black)	Figure 8-4	9
RG5-6506-000CN	Drum drive assembly (yellow)	Figure 8-4	8
RG5-6507-000CN	Developing disengaging drive assembly	Figure 8-7	9
RG5-6507-000CN	Disengaging drive assembly	Figure 8-11	1
RG5-6508-000CN RG5-6509-000CN	Developing drive assembly (cyan/magenta) Developing drive assembly (black/yellow)	Figure 8-10	2
RG5-6510-000CN	Control panel crossmember assembly	Figure 8-4	2
RG5-6512-000CN	Fuser drive assembly	Figure 8-7	11
RG5-6512-000CN	Fuser drive assembly	Figure 8-12	1
RG5-6522-000CN	Sensor/bracket assembly	Figure 8-8	14
RG9-1529-000CN	Multi-purpose tray pickup roller assembly	Figure 8-14	5
RH2-5471-000CN	Cable, flat	Figure 8-8	2
RH7-1490-000CN	Fan, cartridge	Figure 8-6	13
RH7-1491-000CN	Fan, formatter	Figure 8-6	14
RH7-1494-000CN	Motor, M7, developing disengaging, stepping	Figure 8-11	4
RH7-1495-000CN	Motor, M6, ETB, DC, 24 volt, brushless	Figure 8-16	2
RH7-1495-000CN	Motor, M8, fuser, DC, brushless, 24 volt	Figure 8-12	5
RH7-5319-000CN	Solenoid	Figure 8-9	2
RS6-2510-000CN	Spring, tension	Figure 8-8	12
RS6-2511-000CN	Spring, tension	Figure 8-6	5
RS6-2511-000CN	Spring, tension	Figure 8-7	7
RS6-2537-000CN	Spring, tension	Figure 8-4	12
RS7-0135-000CN	Cam/gear, 66T	Figure 8-8	11
RS7-0136-000CN	Gear, 29T	Figure 8-8	8
RS7-0137-000CN	Gear, 200T (magenta and cyan)	Figure 8-4	10
RS7-0138-000CN	Gear, 200T (black and yellow)	Figure 8-4	11
RS7-0139-000CN	Gear, 17T	Figure 8-4	15
RS7-0176-000CN	Gear, 30T	Figure 8-10	3
RS7-0179-000CN	Gear, 16T, 128T	Figure 8-11	3
VD7-0216-301CN (110 volt) VD7-0644-001CN (220 volt)	Fuse, 125 volt, 6.3 amp Fuse, 250 volt, 4 amp	Figure 8-8	19
VD7-1731-502CN (110 volt) VD7-1838-001CN (220 volt)	Fuse, 250 volt, 20 amp Fuse, 250 volt, 8 amp	Figure 8-8	20
WC2-5452-000CN	Switch, cassette paper size	Figure 8-5	9
WC4-5169-000CN	Microswitch, front cover	Figure 8-6	3
WG8-5362-000CN	Photo interrupter, TLP1241	Figure 8-8	9

**Table 8-23 Numerical parts list (continued)**

<b>Part number</b>	<b>Description</b>	<b>Figure</b>	<b>Reference</b>
WG8-5362-000CN	Photo interrupter, TLP1241	Figure 8-8	16
WG8-5362-000CN	Photo interrupter, TLP1241	Figure 8-11	2
WG8-5362-000CN	Photo interrupter, TLP1241	Figure 8-12	4
WG8-5362-000CN	Photo interrupter, TLP1241	Figure 8-16	5
WS3-5746-000CN	Connector, drawer	Figure 8-6	7
XA9-1275-000CN	Screw, truss head, M3x6		
XA9-1276-000CN	Screw, machine with washer, M3x8		



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