3 Maintenance

Chapter contents

Life expectancies of supplies

Inspect supplies when you service the printer. Replace supplies as needed, based on failure or wear, rather than on usage.

The following table lists approximate schedules for replacing supplies.

Table 3-1. Life expectancies of supplies

Description	Part number	Estimated life (in number of pages at 5 percent coverage[1])	Remarks
Print cartridge, black (user replaceable)	Q3960-67901 Q3960-67902 (EMEA)	5,000	
Print cartridge, cyan (user replaceable)	Q3971-67901 Q3971-67902 (EMEA)	2,000	
Print cartridge, cyan (user replaceable)	Q3961-67901 Q3961-67902 (EMEA)	4,000	Extended-life cartridge
Print cartridge, yellow (user replaceable)	Q3972-67901 Q3972-67902 (EMEA)	2,000	
Print cartridge, yellow (user replaceable)	Q3962-67901 Q3962-67902 (EMEA)	4,000	Extended-life cartridge
Print cartridge, magenta (user replaceable)	Q3973-67901 Q3973-67902 (EMEA)	2,000	
Print cartridge, magenta (user replaceable)	Q3963-67901 Q3963-67902 (EMEA)	4,000	Extended-life cartridge
Imaging drum	Q3964-67901	20,000 (black only) 5,000 (color)	The average life is 6,000 to 8,000 pages.
Transfer roller	RF5-4067-000CN		Can affect print quality and paper movement.
Printer pickup roller	RB3-0160-000CN		Look for glazing and/or cracks.
Printer separation pad	RF5-4012-000CN		Can affect document movement.
Fuser assembly, 110-127 V)	RG5-7572-000CN		Can affect print quality and document movement.
Fuser assembly, 220-240 V)	RG5-7573-000CN		Can affect print quality and document movement.
Separation pad, optional trays 2 and 3	RB2-9960-000CN		Can affect document movement.

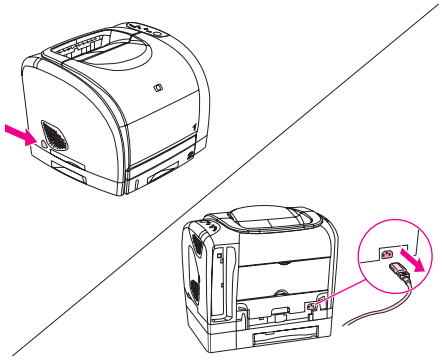
[1]The estimated print cartridge life is based on letter- or A4-sized paper with an average of 5% toner coverage and a medium density setting. Print cartridge life can be extended further by conserving toner by using draft-mode settings.

User-replaceable parts

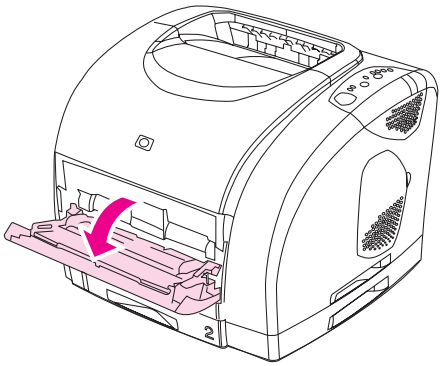
Pickup rollers and separation pads are user-replaceable parts.

Replacing the tray 1 pickup roller and separation pad

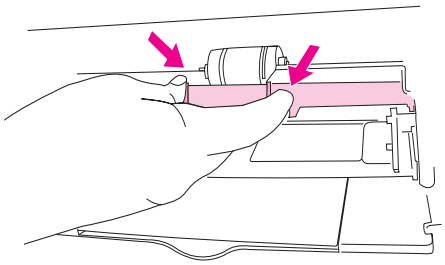
1. Turn the printer off and disconnect the power cable from the back of the printer.



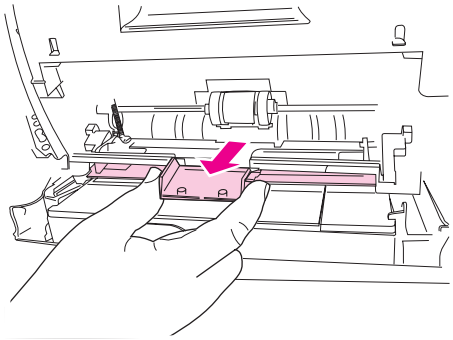
2. Open tray 1.



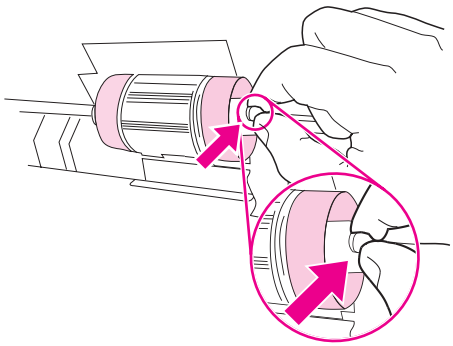
3. Find the faceplate cover that is located beneath the pickup roller in tray 1.



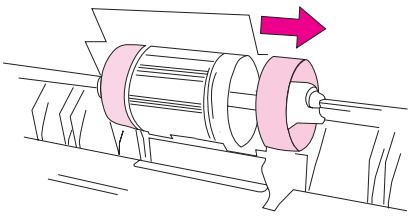
4. Grasp both sides of the center tab and pull the cover out of the printer.



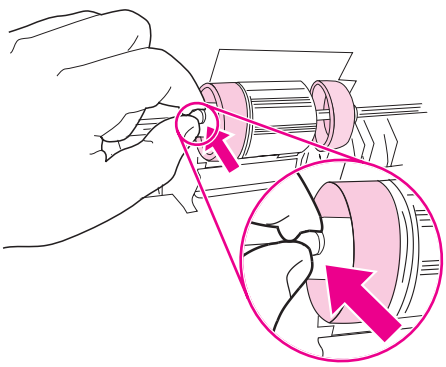
5. Squeeze the tab on the idler roller that is located on the right side of the pickup roller. If the tab is not visible, rotate the idler roller so that the tab is toward the front of the printer.



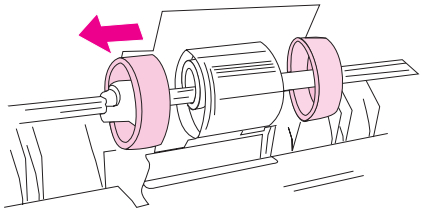
6. Slide the idler roller to the right to separate it from the pickup roller.



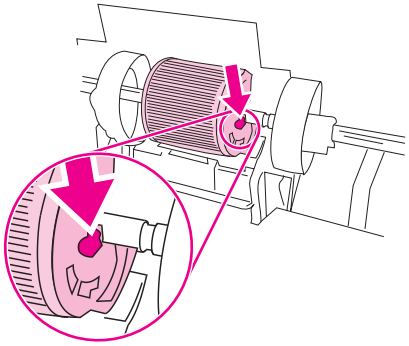
7. Squeeze the tab on the idler roller that is located on the left side of the pickup roller. If the tab is not visible, rotate the idler roller so that the tab is toward the front of the printer.



8. Slide the idler roller to the left to separate it from the pickup roller.

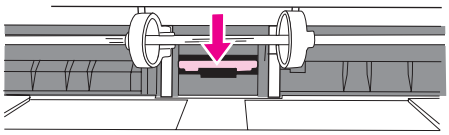


9. Press and hold the button that is located on the right side of the pickup roller. Slide the pickup roller slightly to the right, and then pull it off of the shaft.

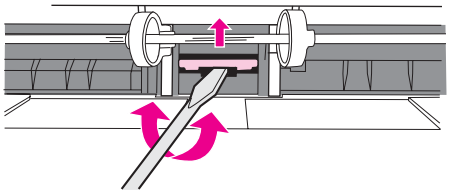


CAUTION To prevent the shaft retaining pin from falling out, do not move the remaining hub that is located to the left of the pickup roller.

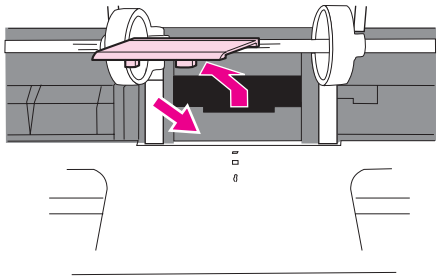
10. Locate the separation pad beneath the area of the shaft from which the pickup roller was removed.



11. Insert a flatblade screwdriver into the slot under the separation pad. Pry the pad up from the spring-loaded base by twisting the screwdriver until the tabs are separated from the printer.

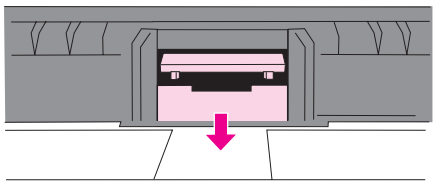


12. Use one hand to push the spring-loaded base down and then use the other hand to pull the separation pad up and out of the printer.



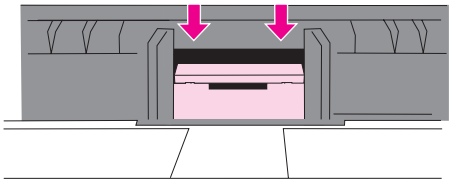
Note If you feel resistance when you try to remove the pad, make sure that the tabs are completely separated from the printer.

13. Push the spring-loaded base down and position the new separation pad in the empty slot.



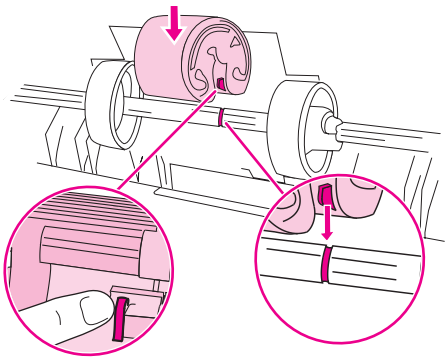
Note Make sure that the two tabs on the edge of the pad are toward the front of the printer.

14. Snap both sides of the separation pad firmly into place until they click.

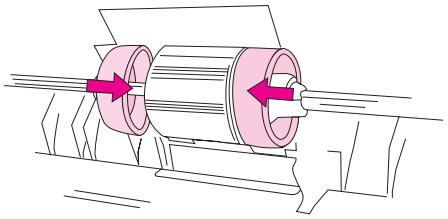


CAUTION If the pad is not straight, or if space exists between the pad and the base, make sure that the tabs on the pad are toward the front of the printer.

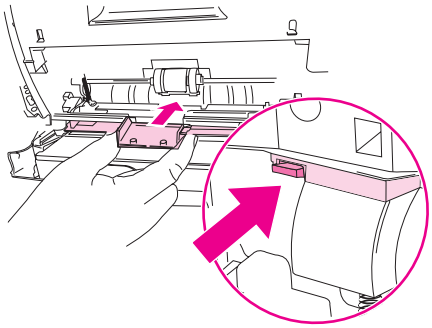
15. Hold down the new separation pad. Position the new pickup roller so that the button is on the right side, and the open side of the roller faces down. Make sure that the small ridge on the open side of the roller aligns with the groove in the shaft.



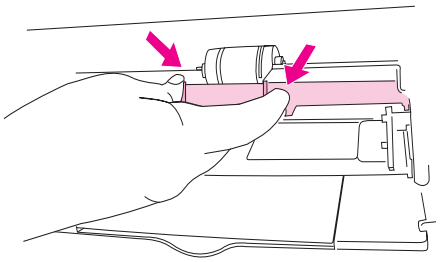
16. Slide the left and right idler rollers inward, against the pickup roller, until the idler rollers click into place.



17. Hold the faceplate cover as shown in the illustration, and align the cover with the rails on the inside of the printer.

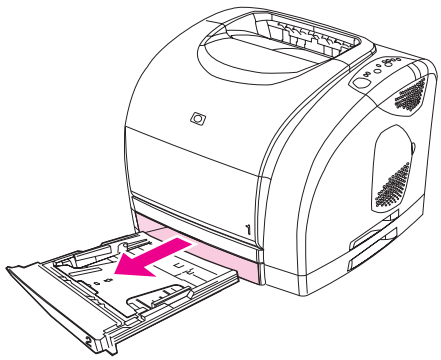


18. Grasp both sides of the center tab and insert the cover into the printer until the cover clicks into place. Close tray 1.

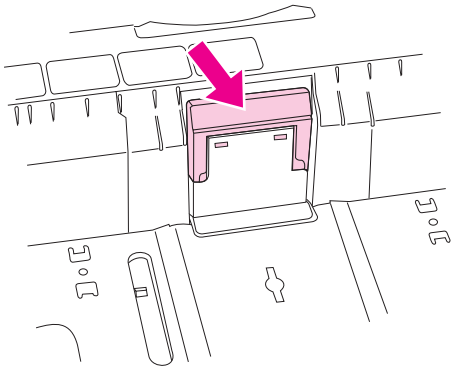


Replacing the separation pad in optional tray 2 or in optional tray 3

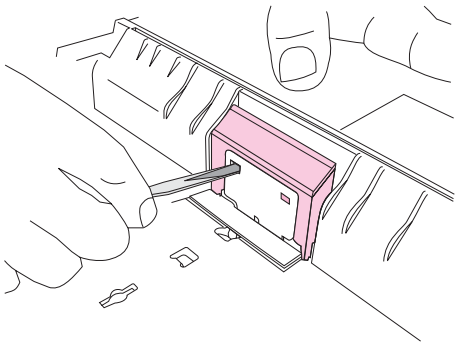
1. Remove the tray from the printer and place it on a flat surface. Remove any paper from the tray.



2. Locate the separation pad in the base at the inside-front edge of the tray.

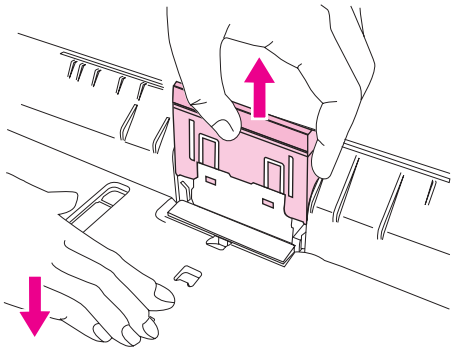


3. Press the large metal plate at the bottom of the tray down. Insert a flatblade screwdriver in the slots on each side of the base and push the tabs out of the slots.

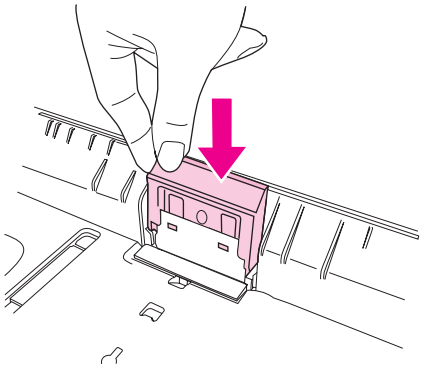


Note In a 250-sheet tray, the plate locks down; in a 500-sheet tray, hold the plate down manually.

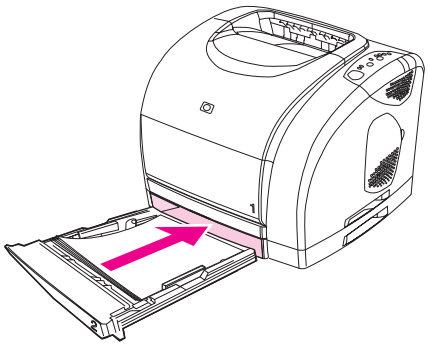
4. Pull the separation pad up and out of the tray.



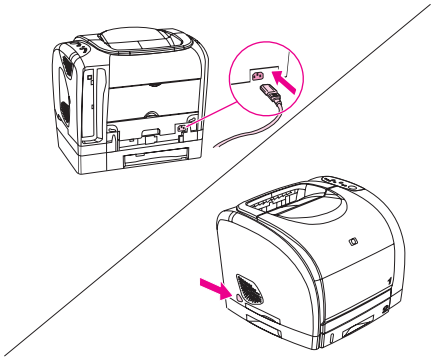
5. Use one hand to position the new separation pad above the empty base. Align the grooves on the sides of the pad with the sides of the base, and then slide the pad down until the tabs snap into the slots on the base.



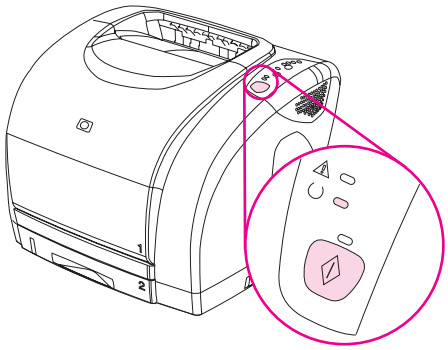
6. Reload any print media, and then slide the tray into the printer.



7. Reconnect the power cable. Turn the printer on.



8. When the green Ready light is on, press **Go** to print a Demo page, which verifies that the printer works and that installation is complete.



9. If the page does not print, or to find additional help, go to www.hp.com/support/clj2550.

Note If the page does not print, reconnect the power cable. Make sure that the Ready light is on and that no other lights are on or blinking. Make sure that print media is loaded and that all parts are installed correctly.

Cleaning the printer

During the printing process, paper, toner, and dust particles can accumulate inside the printer. Over time, this buildup can cause print-quality problems such as toner specks or smearing.

Cleaning the printer

Use a cleaning page to correct and prevent print-quality problems such as toner specks or smearing.

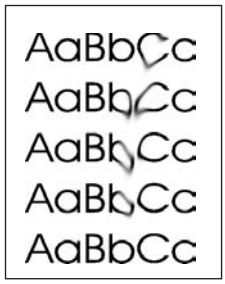


Figure 3-1. **Smearing**

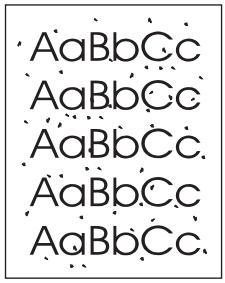


Figure 3-2. **Toner specks**

To use a cleaning page

Note

The following procedure must be performed from the HP LaserJet Toolbox. To clean the printer when the computer is running an operating system that does not support the HP LaserJet Toolbox, see the Late-Breaking Readme on the CD-ROM, or visit www.hp.com/support/clj2550.

1. Make sure that the printer is turned on and in the Ready state.
2. Open the HP LaserJet Toolbox.
3. On the **Troubleshooting** tab, click **Maintenance**, click **Cleaning Page**, and then click **Print**. A page with a pattern prints from the printer.
4. At the printer, remove any print media that might be in tray 1.

5. Remove the page that printed and load it face-down into tray 1 (see Figure 3-3. Loading the cleaning page in tray 1).

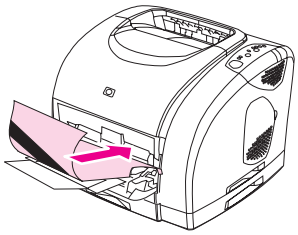


Figure 3-3. **Loading the cleaning page in tray 1**

6. At the computer, click **Clean**.

Calibrating the printer

The printer automatically calibrates at various times. You can adjust the calibration settings by using the HP LaserJet Toolbox.

Environmental differences, aging print cartridges, aging toner, and an aging imaging drum might cause fluctuations in image density. The printer accounts for this with image stabilization control. The printer automatically calibrates at various times to maintain the highest level of print quality. You can also request a calibration by using the HP LaserJet Toolbox.

The printer does not interrupt a print job to calibrate. It waits until the job is complete before calibrating or cleaning. While the printer is calibrating, it pauses printing for the time that is required to complete the calibration.

To calibrate the printer at the printer

Press  (Go) and  (Rotate Carousel) simultaneously to start a calibration.

To calibrate the printer from the HP LaserJet Toolbox

Note

This procedure applies to Windows operating systems only. Macintosh users should calibrate the printer manually by using the previous procedure.

1. Open the HP LaserJet Toolbox in one of these ways:
   - On the desktop, double-click the **HP LaserJet Toolbox** icon.
   - On the **Start** menu, point to **Programs**, point to **HP Color LaserJet 2550**, and then click **HP LaserJet Toolbox**.
2. On the **Troubleshooting** tab, click **Print Quality** (on the left side of the screen).
3. Click **Calibrate Now**.

Managing supplies

For warranty information about these supplies, see Limited warranty for the print cartridges and imaging drum.

Supplies life

The life of the imaging drum depends on the number of black-only or color pages that print jobs require. An HP color LaserJet 2550 series printer imaging drum could last an average of 20,000 pages when printing black-only pages and 5,000 pages when printing color pages. Actual life lies somewhere between these two numbers, depending on the number of black-only pages you print versus color. The average life is between 6,000 and 8,000 pages.

Imaging-drum life is also affected each time the printer calibrates because calibrating causes the imaging drum to rotate. Imaging-drum life is measured in terms of number of rotations rather than number of pages printed.

The type and length of print jobs also affects drum life. A series of short print jobs uses more drum life than an equivalent number of pages printed in a single large job. To extend drum life, print multiple copies of a print job at one time rather than sending the same job to the printer multiple times.

The life of a print cartridge depends on the amount of toner that print jobs require. When printing text at 5% coverage, black print cartridges last an average of 5,000 pages and cyan, magenta, and yellow print cartridges last an average of 2,000 pages. Extended-life cyan, magenta, and yellow print cartridges last an average of 4,000 pages. (A typical business letter has 5% coverage.)

NoteNote The imaging drum and print cartridges for this printer are not compatible with older, similar printer models such as the HP color LaserJet 1500 series printer or the HP color LaserJet 2500 series printer.

For longer supplies life, you can order extended-life replacement cyan, magenta, or yellow print cartridges for the HP color LaserJet 2550L printer that last an average of 4,000 pages at 5% coverage.

Checking and ordering supplies

You can check the supplies status by using the printer control panel, printing a Supplies Status page, viewing the HP LaserJet Toolbox, or viewing HP Web Jetadmin. Hewlett-Packard recommends that you place an order for a replacement print cartridge when you first receive the Low message for a print cartridge. The Low message indicates that approximately two weeks of life remain. When you use a new, authentic HP print cartridge or imaging drum, you can obtain the following types of supplies information:

- amount of cartridge or drum life remaining
- estimated number of pages that can be printed
- number of pages printed
- other supplies information

Note If the printer is connected to the network, you can set the HP LaserJet Toolbox to notify you by e-mail when a print cartridge is low or the imaging drum is near the end of its useful life. If the printer is directly connected to a computer, you can set the HP LaserJet Toolbox to notify you when supplies are low.

To check status and order supplies using the control panel

Do one of the following:

- Check the supplies status lights on the printer control panel. These lights indicate when a print cartridge or the imaging drum is low or empty. The lights also indicate when a non-HP print cartridge is first installed. See Supplies Status lights to interpret the light patterns.
- Press  (**Go**) and  (**Cancel Job**) simultaneously. A Supplies Status page (and the Configuration page and, possibly, the HP Jetdirect page) prints. Check the supplies levels on the Supplies Status page.

If the supplies levels are low, you can order supplies through your local HP dealer, by telephone, or online. See Parts and diagrams for part numbers. See www.hp.com/go/ljsupplies to order online.

To check status and order supplies using the HP LaserJet Toolbox

You can configure the HP LaserJet Toolbox to notify you when the supplies are low. You can choose to receive alerts by e-mail or as a pop-up message or taskbar icon. To order supplies by using the HP LaserJet Toolbox, in the **Other Links** area, click **Order supplies**.

For more information, see Other links.

To check status and order supplies using HP Web Jetadmin

In HP Web Jetadmin, select the printer device. The device status page shows supplies information. To order, use the HP LaserJet Toolbox. Or, see Parts and diagrams.

Storing supplies

Follow these guidelines for storing print cartridges and the imaging drum:

- Do not remove the print cartridge or imaging drum from its package until you are ready to use it.

CAUTION To prevent damage, do not expose the print cartridge or imaging drum to light for more than a few minutes.

- See Table 1-5. Environmental specifications for operating- and storage-temperature ranges.
- Store the supply in a horizontal position.
- Store the supply in a dark, dry location away from heat and magnetic sources.

Replacing and recycling supplies

To install a new HP print cartridge or imaging drum, follow the instructions included in the box that contains the new supply, or see the *HP Color LaserJet 2550 Series Getting Started Guide*.

To recycle supplies, place the used supply in the box in which the new supply arrived. Use the enclosed return label to send the used supply to HP for recycling. For complete information, see the recycling guide that is included with each new HP supply item. See HP Printing Supplies Returns and Recycling Program information for more information about HP's recycling program.

HP policy for non-HP supplies

Hewlett-Packard Company cannot recommend the use of non-HP supplies, either new or remanufactured. Because they are not HP products, HP cannot influence their design or control their quality. Service or repairs that are required as a result of using a non-HP supply will *not* be covered under the printer warranty.

When you insert a supply into the printer, the printer informs you if the supply is not a genuine HP supply. If you insert a genuine HP supply that has reached the low state from another HP printer, the printer identifies the supply as non-HP. Simply return the supply to the original printer to reactivate HP features and functionality.

Resetting the printer for non-HP supplies

When you install a non-HP print cartridge or imaging drum, the light next to the print cartridge or imaging drum you replaced blinks and the Attention light is on. In order to print with this supply, you must press (**Cancel Job**) the first time you install this non-HP supply. The status lights will not indicate when this type of supply is low or empty.

CAUTION The printer will not stop printing when a non-HP supply is empty. Printer damage can occur if the printer attempts to print with an empty print cartridge or imaging drum. See Uninstalling the printing software.

HP fraud hotline

Call the HP fraud hotline if the supplies status lights indicate that the print cartridge or imaging drum is not an HP product and you think that it is genuine. Hewlett-Packard will help determine if the product is genuine and take steps to resolve the problem.

Your print cartridge or imaging drum might not be a genuine HP product if you notice the following issues:

- You are experiencing a large number of problems with the print cartridge or imaging drum.
- The print cartridge or imaging drum does not look like an HP product usually does (for example, the pull tab or the box is different).

In the United States, call toll-free: 877-219-3183.

Outside the United States, you can call collect. Dial the operator and ask to place a collect call to this telephone number: 770-263-4745. If you do not speak English, a representative at the HP fraud hotline who speaks your language will assist you. Or, if someone who speaks your language is not available, a language line interpreter will connect approximately one minute after the beginning of the call. The language line interpreter is a service that translates between you and the representative for the HP fraud hotline.

4 Theory of operation

Chapter contents

Introduction

This chapter presents an overview of the relationships between major components in the printer, and includes a detailed discussion of the image-formation system. The following systems are discussed:

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

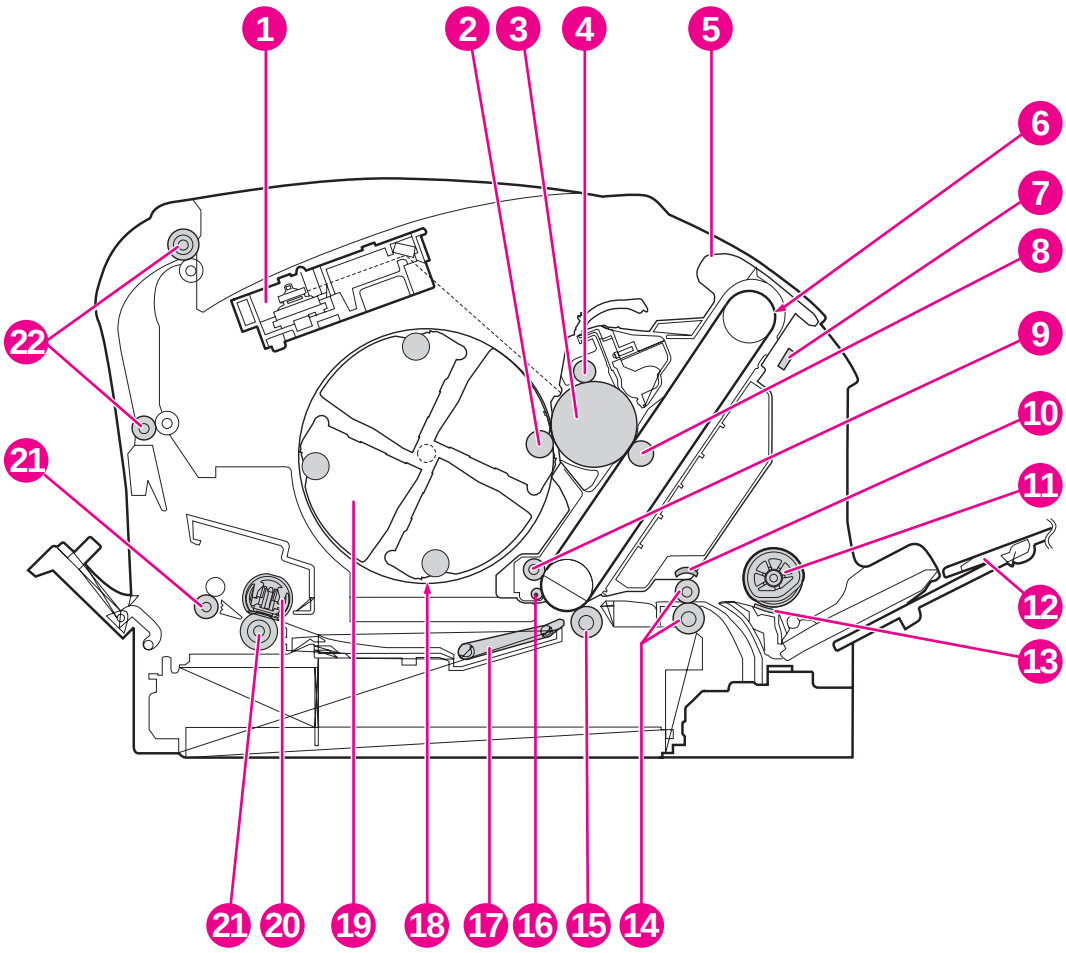


Figure 4-1. **Cross-section of the printer**

Ref	Description	Part number	Qty
1	Laser/scanner	RG5-6880-000CN	
2	Developing cylinder	(contained in print cartridge)	
3	Photosensitive drum	(contained in imaging drum)	
4	Primary charging roller	(contained in imaging drum)	
5	Imaging drum	Q3964A	

Ref	Description	Part number	Qty
6	Transfer belt	(contained in imaging drum)	
7	Density sensor	RH7-7146-000CN	
8	Primary transfer roller	(contained in imaging drum)	
9	Transfer-belt cleaning roller	(contained in imaging drum)	
10	Registration shutter	(contained in imaging drum)	
11	Pickup roller	RG5-6592-000CN	
12	Tray 1	RG5-7585-000CN	
13	Separation pad	RF5-4012-000CN	
14	Registration roller	RG5-6939-000CN	
15	Secondary transfer roller	RF5-4067-000CN	
16	Auxiliary transfer-belt cleaning roller	(contained in imaging drum)	
17	Feed belt (8)	RB3-0063-000CN	
18	Carousel	RG5-7592-000CN	
19	Print cartridge	(several; see Table 7-2. Accessories for part numbers)	
20	Fusing film	(contained in fuser)	
21	Pressure roller	(contained in fuser)	
22	Fuser delivery roller	(contained in fuser)	
23	Top output bin delivery roller	RG5-7595-000CN (lower) and RG5-6897-000CN (upper)	

Engine control system

The engine control system coordinates all printer functions. It drives the laser/scanner system, the image formation system, and the pickup and feed system.

The engine control system contains the following components:

- Dc controller
- High-voltage power-supply PCB
- Low-voltage power unit:
  - Fuser-control circuit
  - Low-voltage power-supply PCB

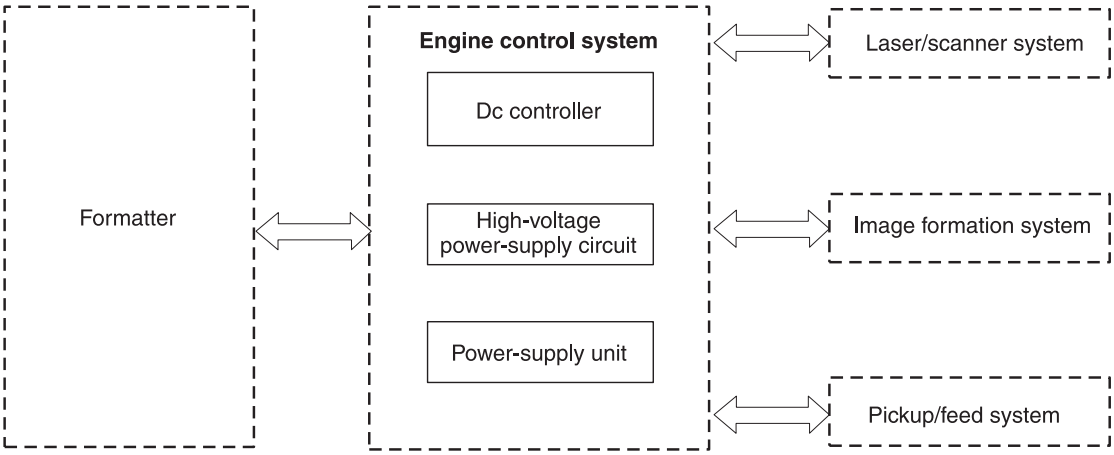


Figure 4-2. **Engine control system (includes the basic configuration of the printer)**

Basic sequence of operation

Operation sequences are controlled by the CPU in the dc controller in the engine control system. Table 4-1. Basic sequence of operation describes engine operations for each period of a print operation.

Table 4-1. Basic sequence of operation

Period	Duration	Purpose	Remarks
WAIT (wait)	From the time the power switch is turned on until transfer-belt cleaning is complete.	Clears potential from the drum surface and cleans the transfer belt.	See Figure 4-3. Power-on sequence for a complete description of the WAIT (power-on) period. Also see the General timing charts for detailed information about timing.
STBY (standby)	From the end of the WAIT or LSTR period until either a print command is sent from the formatter or the power is turned off.	Prepares the printer to receive print commands.	

Table 4-1. Basic sequence of operation (continued)

Period	Duration	Purpose	Remarks
INTR (initial rotation)	From the time of the print command until detection of the HP1 (transfer-belt home-position detection) signal for the first color.	Prepares the photosensitive drum for printing.	
PRINT (print)	From the end of the INTR period until detection of the transfer-belt home-position signal for the secondary transfer.	Forms the image on the photosensitive drum and transfers the toner image to the transfer belt.	
LSTR (last rotation)	From the end of the PRINT period until the main motor stops rotating.	Transfers the toner image on the transfer belt to the media and delivers the printed media.	After LSTR, the printer returns to STBY.

Power-on sequence

The power-on sequence is represented by the flowchart in Figure 4-3. Power-on sequence.

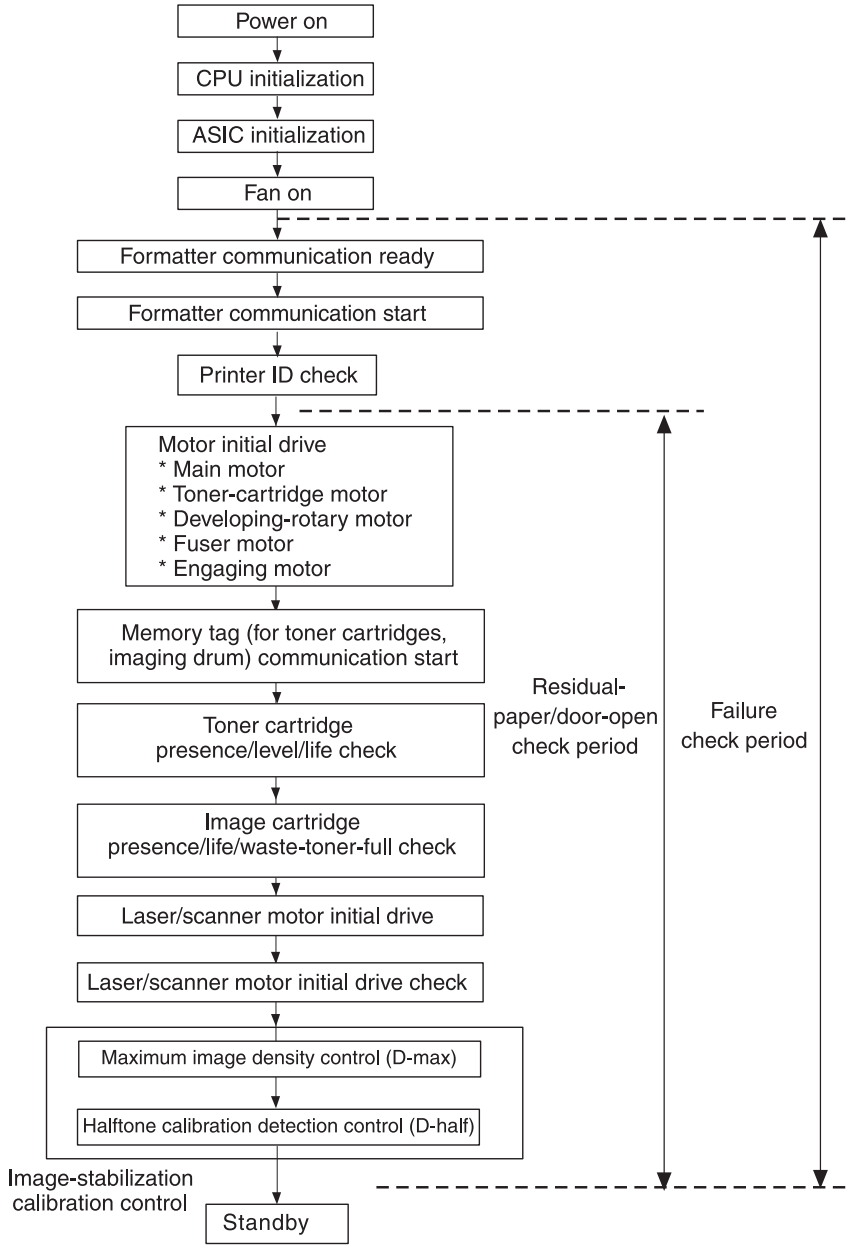


Figure 4-3. Power-on sequence

Motors and fans

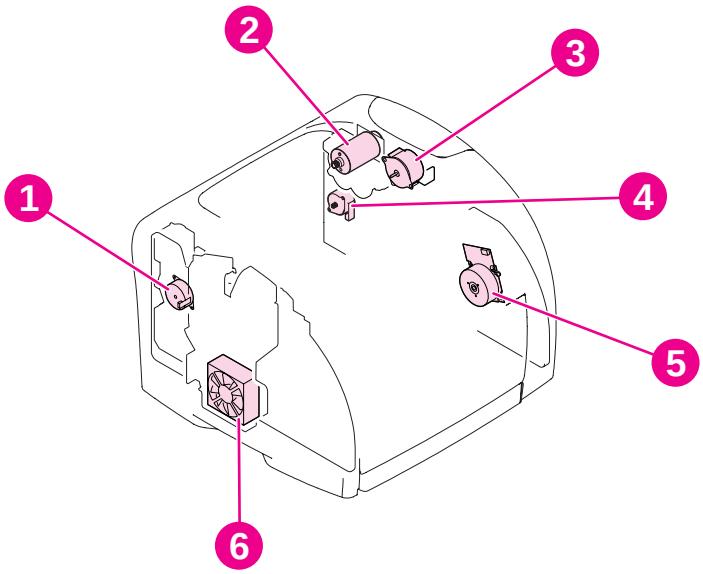


Figure 4-4. **Motors and fans**

Table 4-2. Motors and fans

Reference	Description
1	Engaging motor
2	Developing-rotary motor
3	Toner-cartridge motor
4	Fuser motor
5	Main motor
6	Cooling fan

Laser/scanner system

The laser/scanner system receives video signals from the dc controller, and then it converts the signals into latent images on the photosensitive drum. The dc controller controls the laser/scanner.

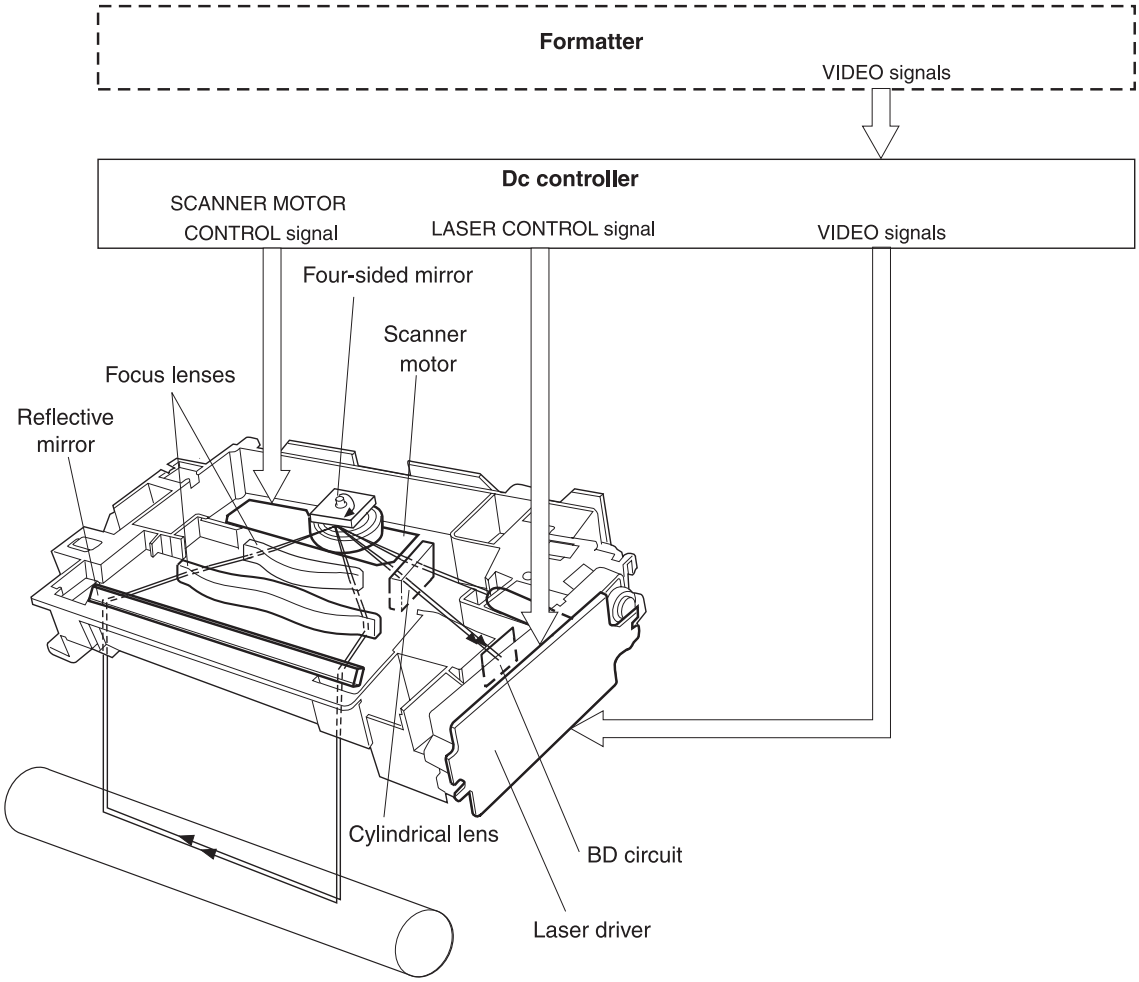


Figure 4-5. **Laser/scanner system**

Pickup and feed system

The pickup and feed system consists of several types of feed rollers and sensors. The dc controller drives the paper and feed system by controlling two motors, two clutches, and the solenoid.

Two photo-interrupters (PS1 and PS711) detect media as it passes. If media does not reach or pass each sensor within the specified time period, the dc controller determines that a jam has occurred and alerts the video controller circuit.

The following components are identified in Figure 4-6. Pickup and feed system:

- **PS1** fusing-delivery paper sensor
- **PS711** registration paper sensor
- **PS718** tray 1 (multipurpose tray) paper sensor
- **PS720** fuser wrap-jam sensor
- **DCM701** main motor
- **PM702** fuser motor
- **SL92** tray 1 pickup solenoid

- **CL1** registration clutch
- **CL2** roller-engaging clutch

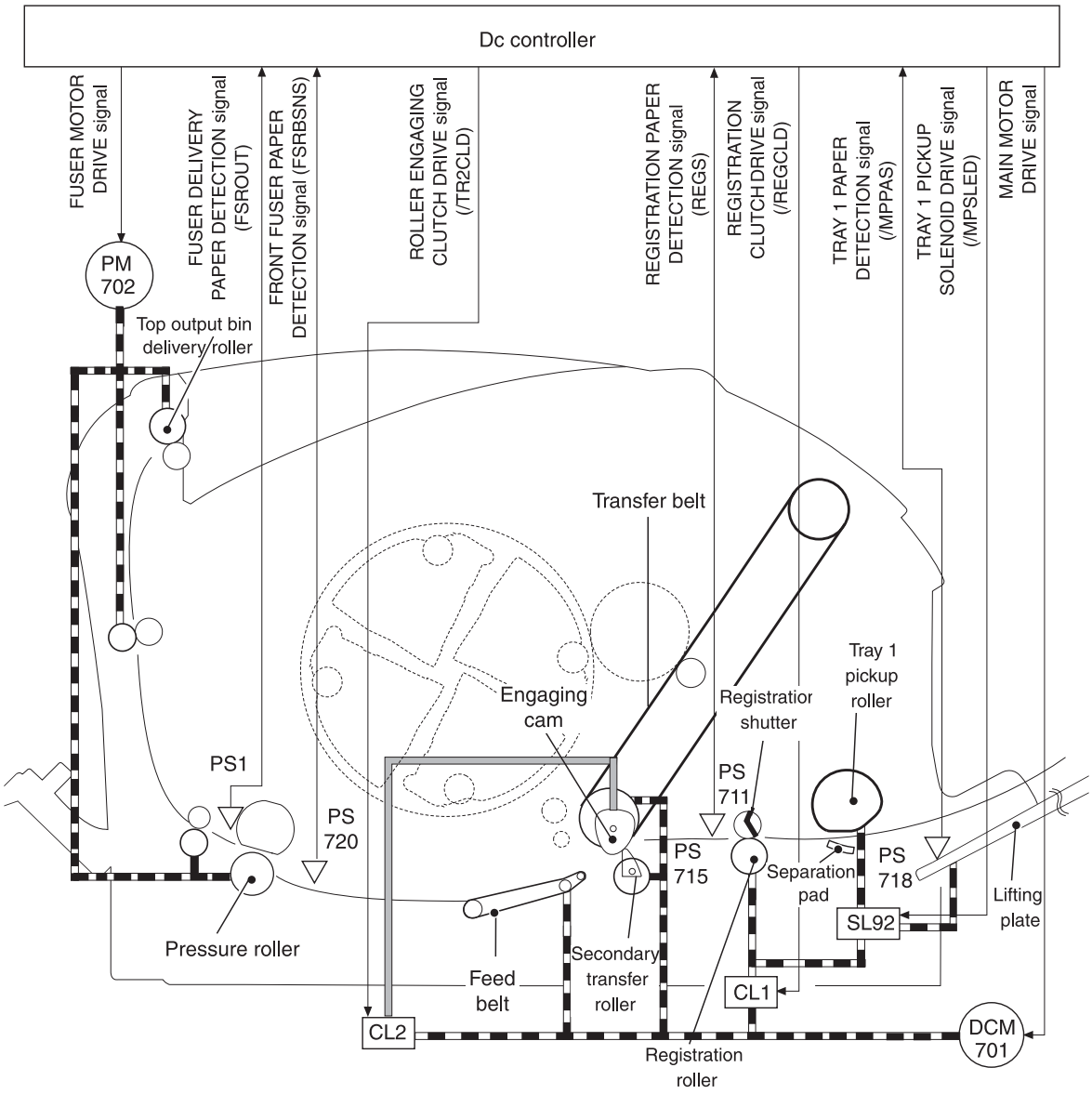


Figure 4-6. **Pickup and feed system**

Paper trays

The dc controller drives the operation sequence of the paper trays. It signals the driver PCB in optional tray 2 (250-sheet paper tray) and in optional tray 3 (500-sheet paper tray). In optional tray 2, the printer main motor drives the tray solenoids. In optional tray 3, each driver PCB controls the motors and solenoids in its paper tray.

The following components are identified in Figure 4-7. Optional tray 2 (250-sheet paper tray):

- **DCM701** gear-train motor (printer)
- **SL9** pickup solenoid (optional tray 2)

- **PS716** paper sensor (optional tray 2)
- **PS717** paper-feed sensor

Note Only optional tray 2 is shown; optional tray 3 is similar.

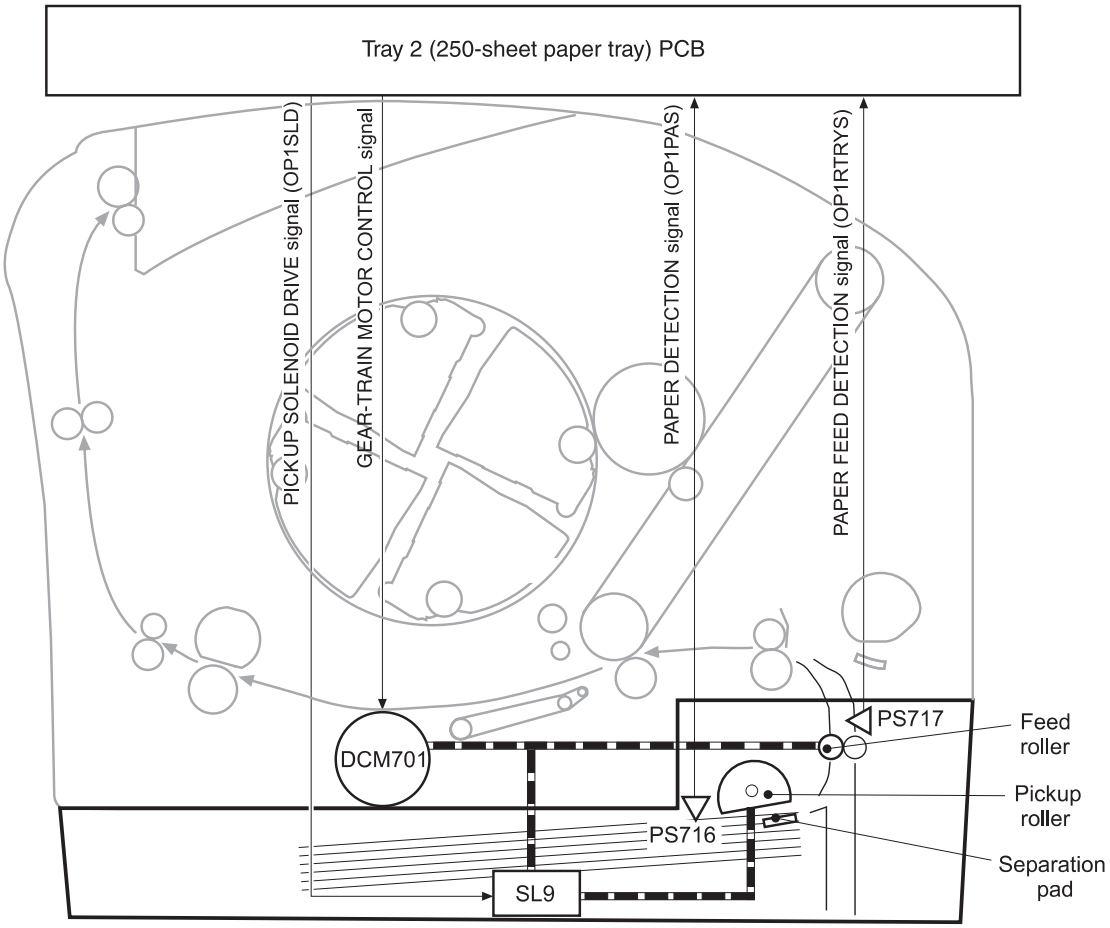


Figure 4-7. **Optional tray 2 (250-sheet paper tray)**

Jam detection

The registration sensor (PS711) and the fuser sensor (PS1) detect media that is moving through the printer. If a jam is detected, the dc controller immediately stops the printing process and sends a message to the video controller circuit.

A jam can be detected under any of the following conditions:

- Pickup delay jam. The leading edge of the print media does not reach the registration sensor (PS711) within 1.1 seconds (tray 1), 1.7 seconds (optional tray 2), or 2.8 seconds (optional tray 3).
- Pickup stationary jam. The registration clutch is on, and the registration sensor (PS711) does not detect the trailing edge of the media within 3.4 seconds after the start of a re-pickup operation.
- Fuser wrap-jam. The main CPU detects media inside the fuser front sensor (PS720) when the power is turned on or after the top cover is closed.

- Delivery delay jam. The registration clutch is on, and the fuser-delivery sensor (PS1) does not detect the leading edge of the media within 2.3 seconds after the start of a re-pickup operation.
- Delivery stationary jam. The leading edge of media does not pass the fuser-delivery sensor (PS1) within 2.4 seconds after it has passed the registration sensor (PS711).
- Door-open jam. The main CPU detects that the top cover is open during a print operation.
- Residual jam. The main CPU detects one or more of the following conditions:
  - Power is turned on.
  - The printer door is closed after a jam occurrence.
  - The registration sensor (PS711) and fusing-delivery sensor (PS1) detect media.
- Paper pickup failure. The sensor (PS717) near the feed roller does not detect media moving through the printer.

Photosensors and switches

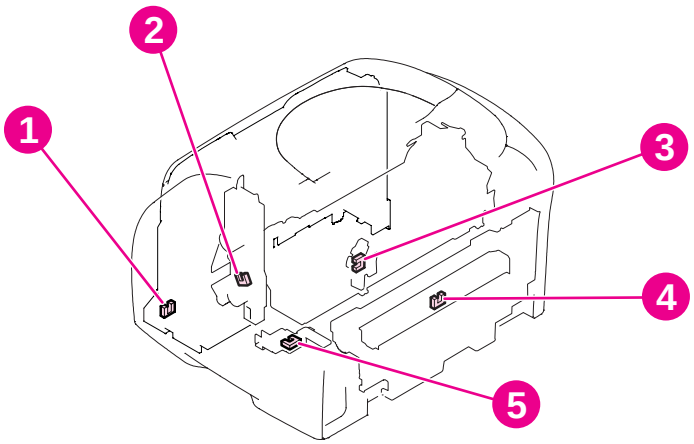


Figure 4-8. **Photosensors and switches (1 of 2)**

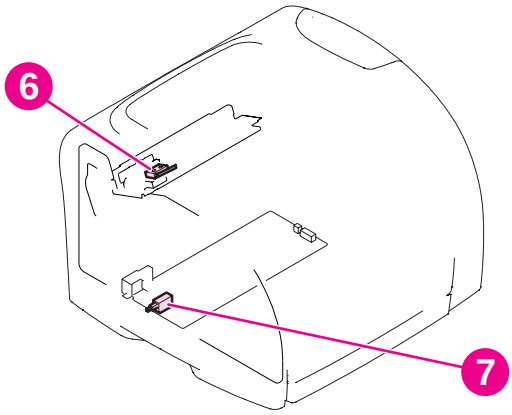


Figure 4-9. **Photosensors and switches (2 of 2)**

Table 4-3. Photosensors and switches

Reference	Description
1	Tray 1 sensor
2	Roller-engaging sensor
3	Developing-rotary-engaging sensor
4	Fuser-delivery sensor
5	Front fuser-detection sensor
6	Door-open detection switch
7	Power switch

Solenoid and clutches

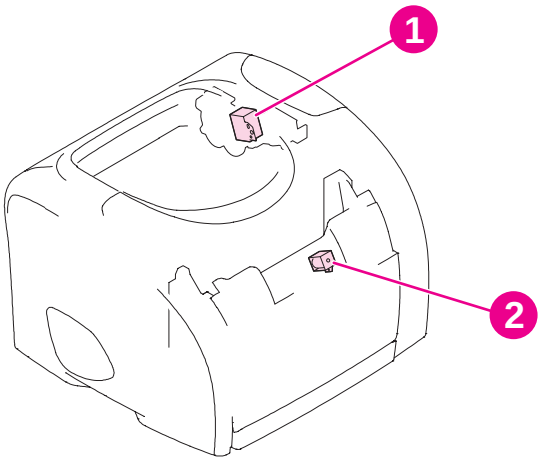


Figure 4-10. **Solenoid**

Table 4-4. Solenoid

Reference	Description
1	Developing-rotary-stopper solenoid
2	Tray 1 pickup solenoid

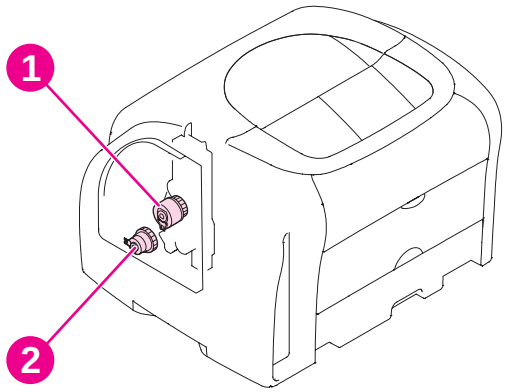


Figure 4-11. **Clutches**

Table 4-5. Clutches

Reference	Description
1	Roller-engaging clutch
2	Registration clutch

Printed circuit assemblies

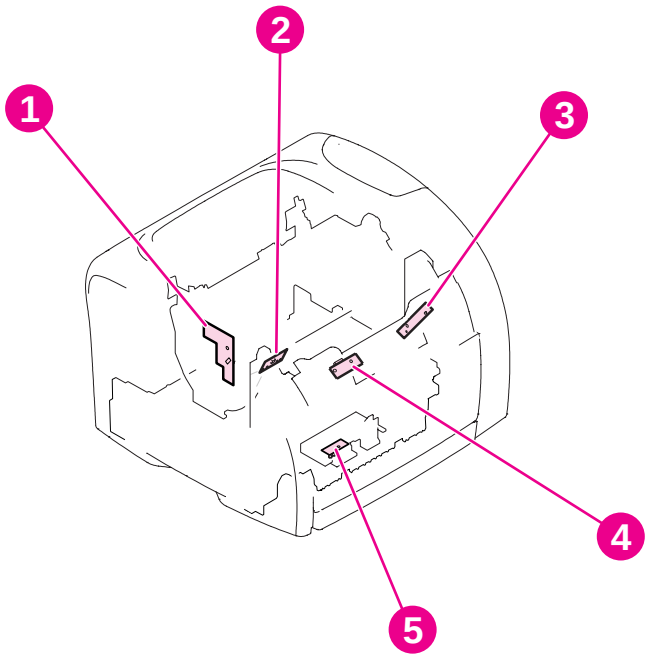


Figure 4-12. **Printed circuit assemblies (1 of 2)**

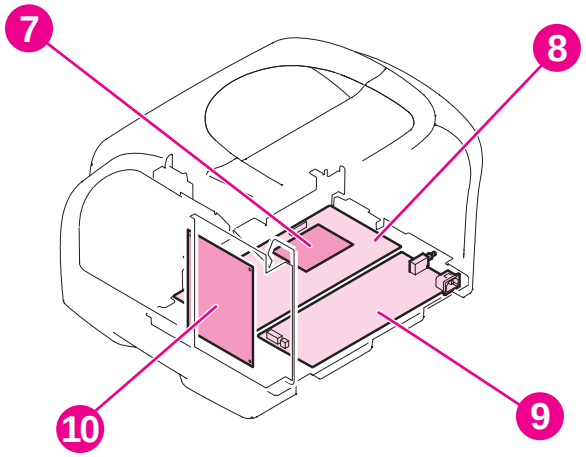


Figure 4-13. **Printed circuit assemblies (2 of 2)**

Table 4-6. Printed circuit assemblies

Reference	Description
1	Developing-rotary/toner-level detection PCA
2	Transfer-belt home-position detection PCA
3	Waste-toner-detection PCA
4	Density-detection PCA
5	Registration-detection PCA
6	Dc controller
7	Sub high-voltage power-supply PCA
8	High-voltage power-supply PCA
9	Power supply

Image-formation system

The image-formation system, which forms a toner image on media, consists of several interdependent systems:

- Electrostatic latent-image-formation system
- Developing system
- Transfer block
- Fuser
- Transfer belt cleaning block
- Imaging drum (with ITB)
- Photosensitive drum

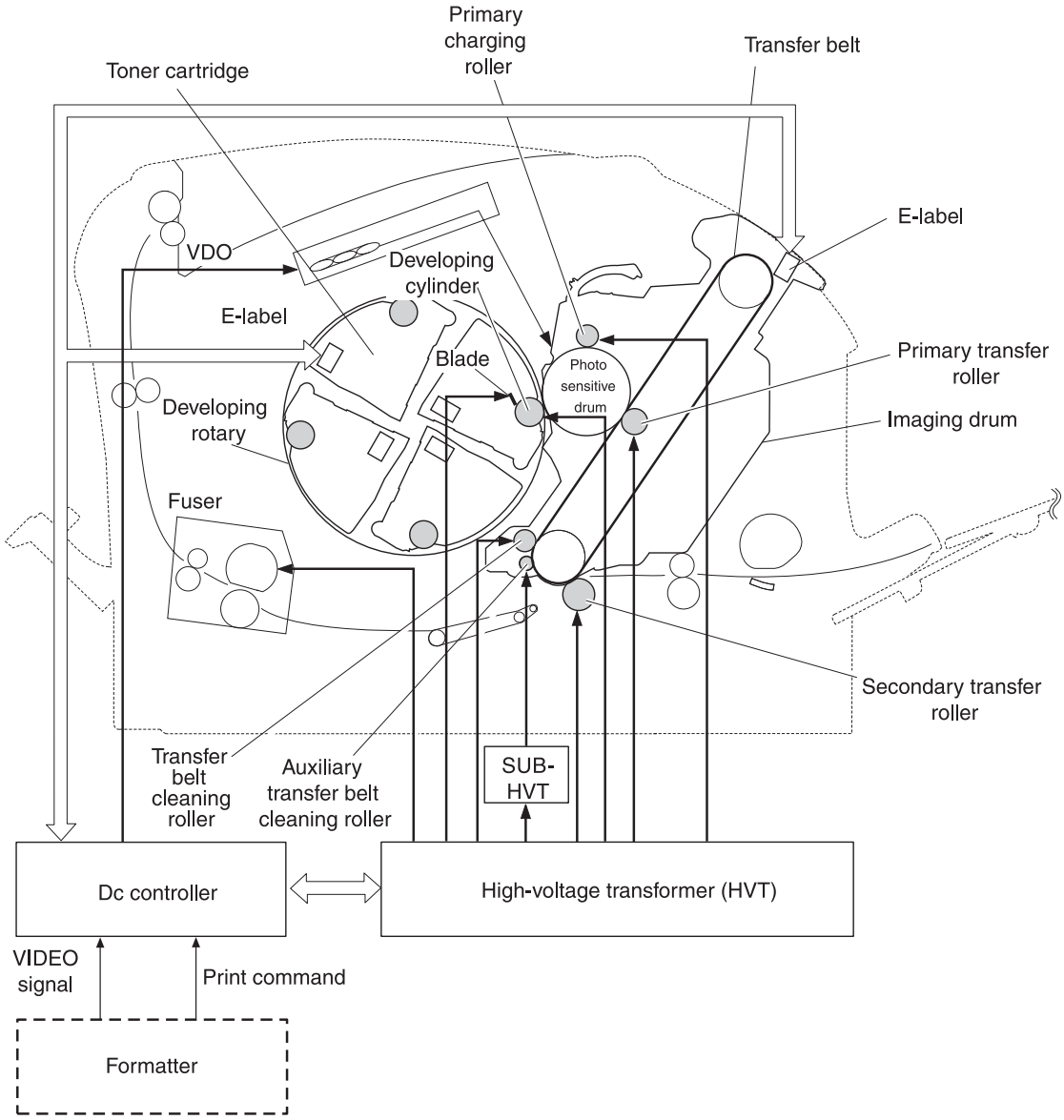


Figure 4-14. **Image-formation system**

Image-formation process

Laser printing requires the interaction of several different technologies including electronics, optics, and electrophotographics to produce a printed page. Each process functions independently and must be coordinated with the other printer processes. Image formation consists of the following five processes:

1. Latent-image formation
2. Developing
3. Image transfer
4. Fusing
5. Transfer-belt cleaning

The five processes are divided into twelve steps, which are shown in the Image-formation process graphic and are described in the following sections.

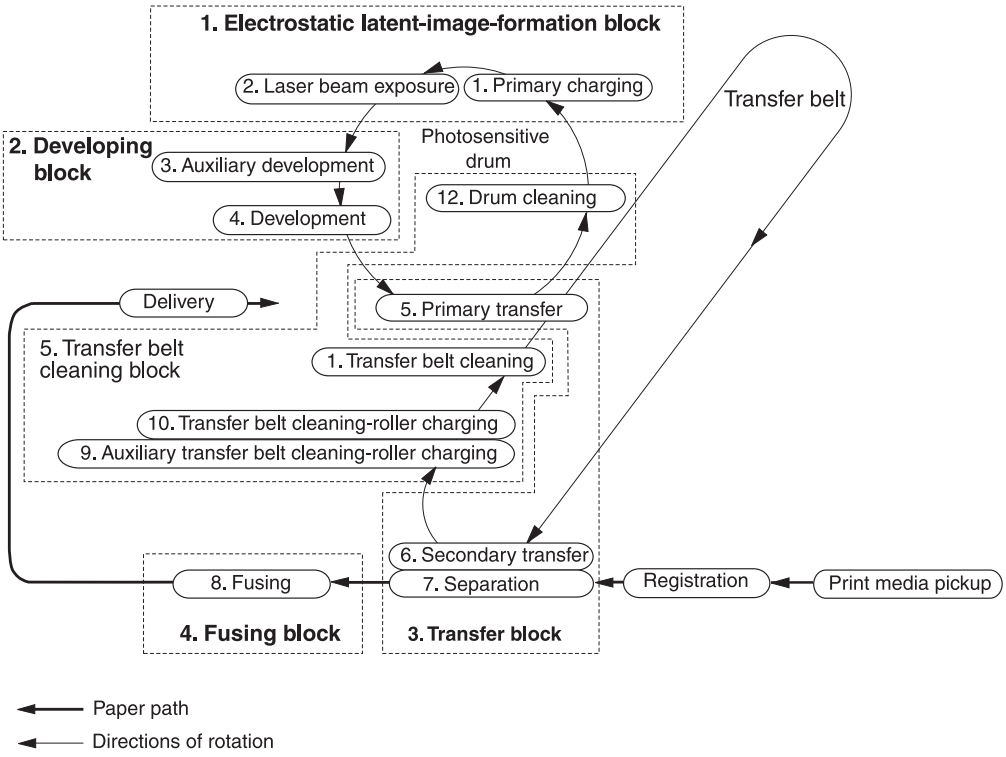


Figure 4-15. **Image-formation process**

Latent-image-formation stage

Step 1: primary charging

A dc bias is applied to the primary charging roller, which transfers a uniform negative potential to the photosensitive drum.

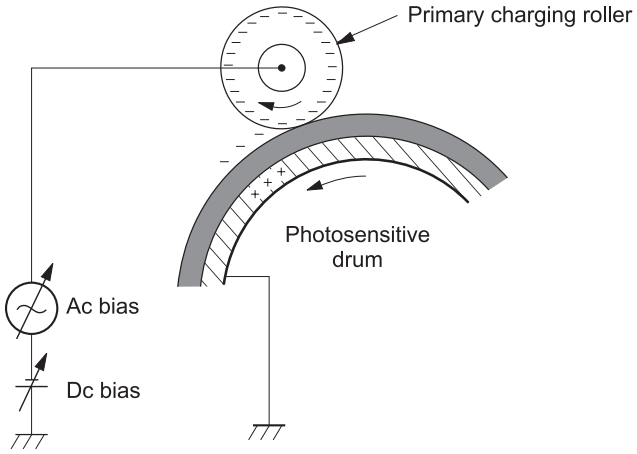


Figure 4-16. **Step 1: primary charging**

Step 2: laser-beam exposure

The laser beam scans the photosensitive drum to neutralize negative charges on parts of the drum. An electrostatic latent image is formed on the drum where negative charges were neutralized.

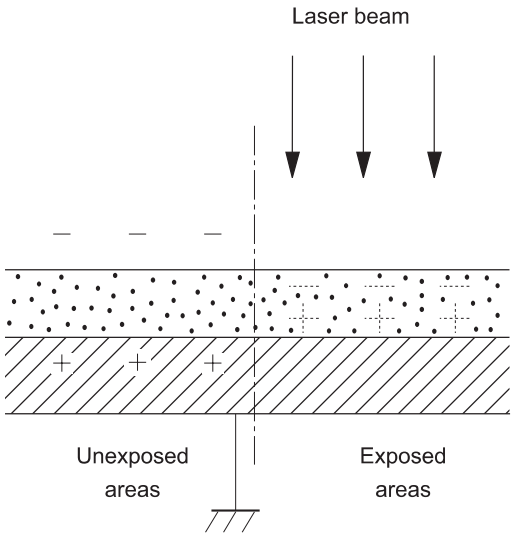


Figure 4-17. **Step 2: laser-beam exposure**

Developing stage

The developing cylinder comes in contact with the photosensitive drum to deposit toner onto the electrostatic latent image.

Note

The charges on the exposed area on the drum are shown as positive in Figure 4-18. Developing block. The charges are actually negative, but they are more positive than the charges on the developing cylinder.

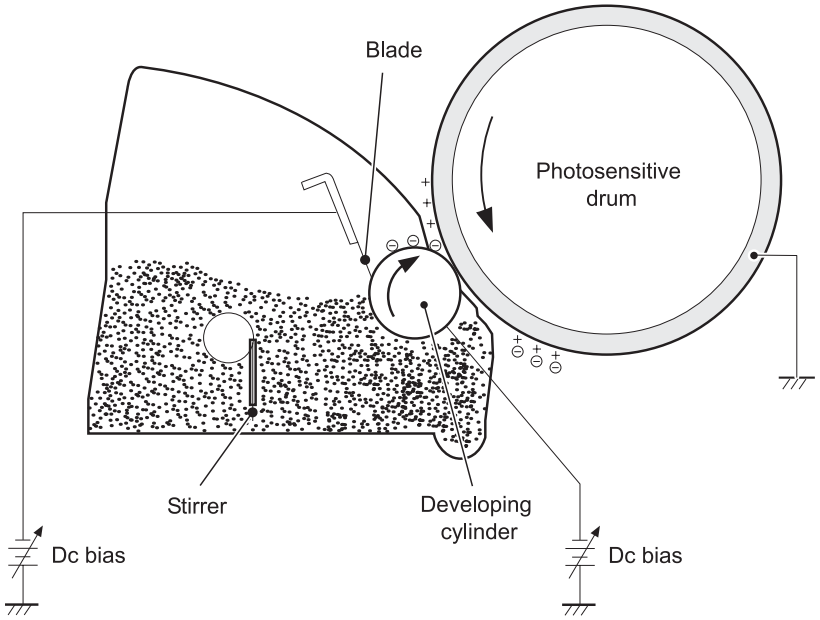


Figure 4-18. **Developing block**

Step 3: auxiliary developing

The dc bias applied to the blade imports a uniform negative potential to the toner.

Step 4: developing

Toner acquires a negative charge through friction from the developing cylinder and the blade. When the negatively charged toner comes in contact with the drum, the toner adheres to the electrostatic latent image. The image on the drum becomes visible because of the toner.

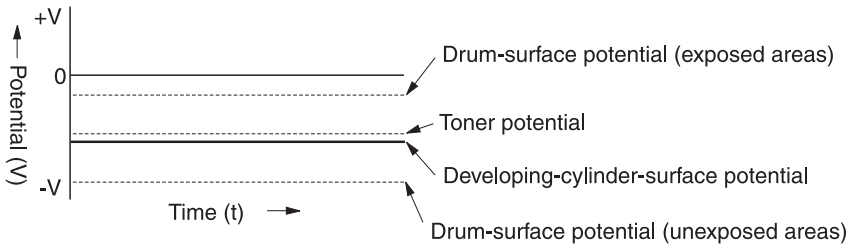


Figure 4-19. **Step 3: developing**

Transfer stage

Step 5: primary transfer

The primary transfer roller, to which a dc positive bias is applied, imparts a positive charge on the transfer belt. The negatively charged toner on the drum is transferred to the positively charged transfer belt. This procedure is repeated for each color (yellow, magenta, cyan, and black).

The dc positive bias is increased for each successive color to make sure that all of the colors adhere to the transfer belt.

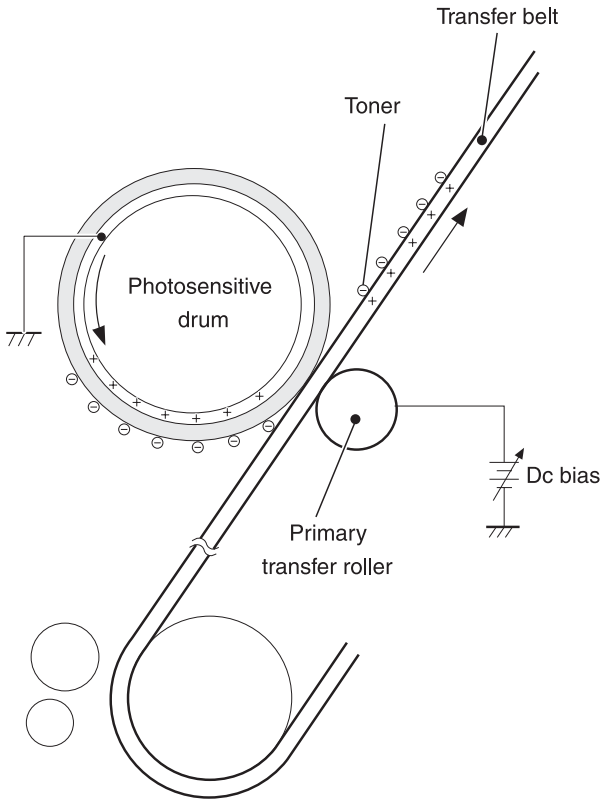


Figure 4-20. **Step 4: primary transfer**

Step 6: secondary transfer

The secondary transfer roller, to which a dc positive bias is applied, imparts a positive charge to the print media. When the print media comes in contact with the transfer belt, the toner is transferred to the print media.

Note When secondary transfer is complete, a dc negative bias is applied to the secondary transfer roller to prevent toner on the transfer belt from adhering to the secondary transfer roller.

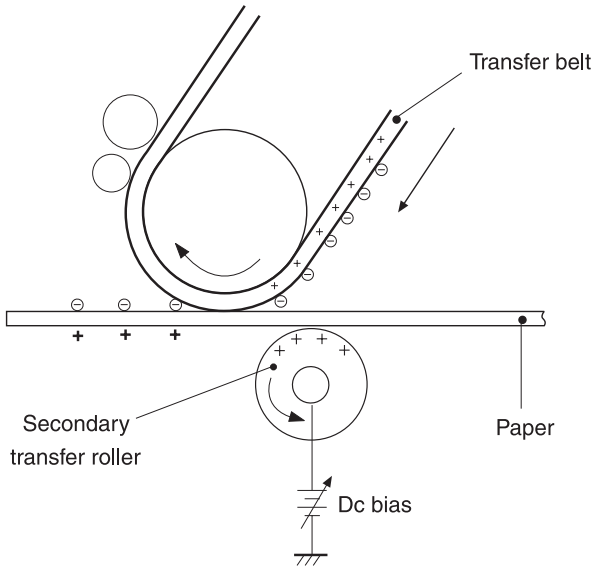


Figure 4-21. **Step 5: secondary transfer**

Step 7: separation

The elasticity of the print media causes it to separate from the transfer belt. A static charge eliminator aids separation by weakening any electrostatic adhesion.

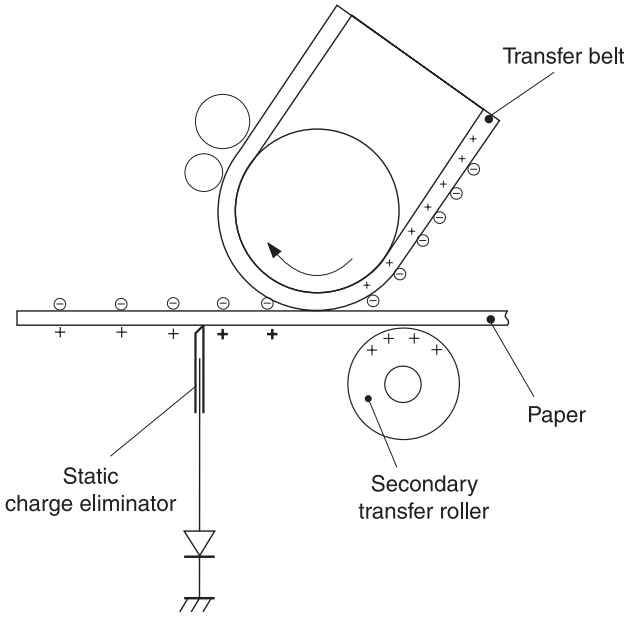


Figure 4-22. **Step 6: separation**

Fusing stage

The heat of the fuser bonds the toner to the media.

Step 8: fusing

The dc negative bias applied to the fusing film strengthens the holding force of the toner on the print media and prevents the toner from scattering.

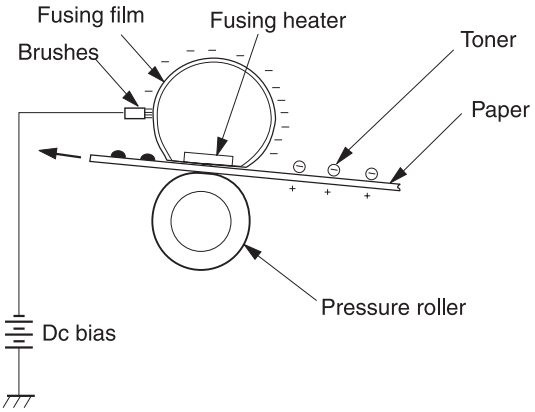


Figure 4-23. **Step 7: fusing**

Step 9: roller charging (auxiliary transfer belt cleaning roller)

During secondary transfer, not all of the toner on the transfer belt is transferred to the print media. Toner that remains on the belt is called "residual toner."

The auxiliary transfer belt cleaning roller, to which a dc positive bias is applied, imparts a positive charge to the residual toner, strengthening its hold on the transfer belt. This prevents toner from falling off of the transfer belt and scattering in the printer.

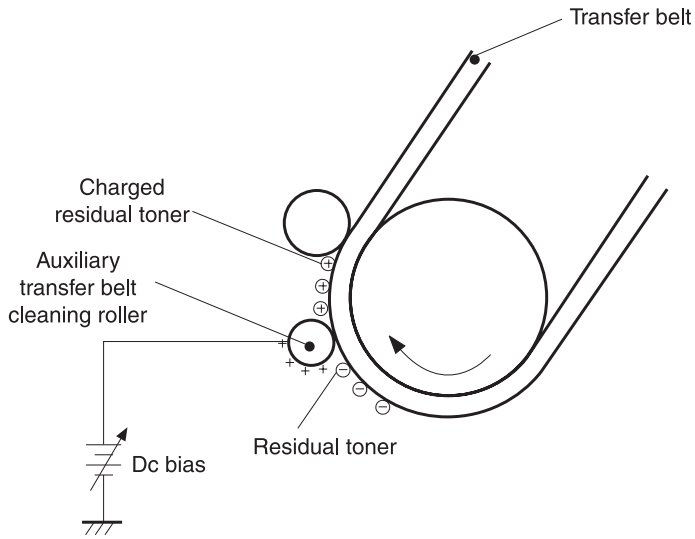


Figure 4-24. **Step 8: roller charging (auxiliary transfer belt cleaning roller)**

Step 10: roller charging (transfer-belt cleaning roller)

The transfer-belt cleaning roller, to which a dc positive bias is applied, imparts a positive charge to the residual toner on the transfer belt. This positive charge is stronger than the positive charge applied in step 8, so the earlier charge now behaves like a negative charge.

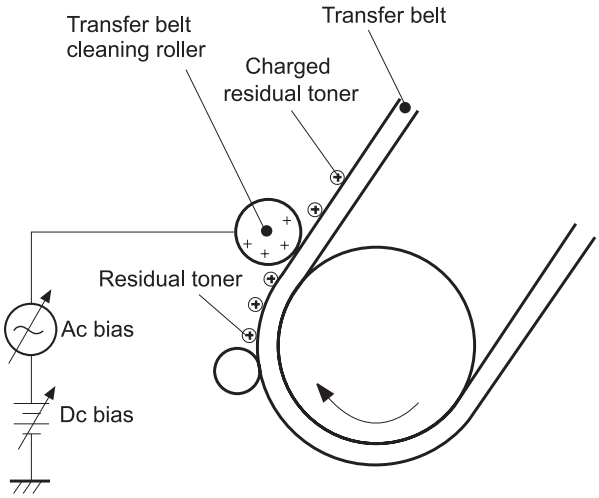


Figure 4-25. **Step 9: roller charging (transfer belt cleaning roller)**

Step 11: transfer belt cleaning

A dc positive bias is applied to the transfer belt to produce a difference in potential between the belt and the photosensitive drum. This causes residual toner to transfer to the drum.

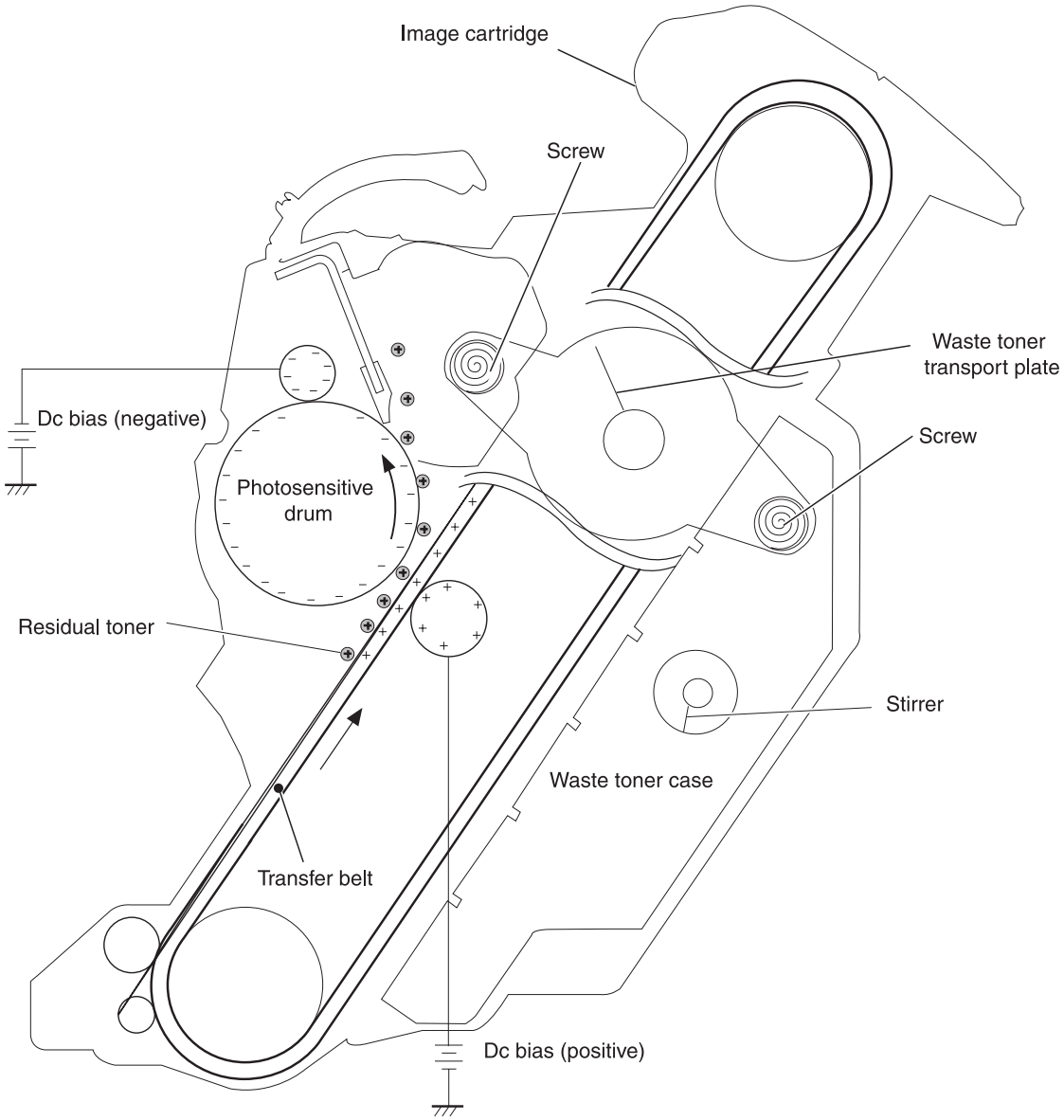


Figure 4-26. **Step 10: transfer belt cleaning**

Step 12: drum cleaning

The cleaning blade scrapes the residual toner off of the photosensitive drum, where the waste toner screws collect the toner and deposit it into the waste toner case.

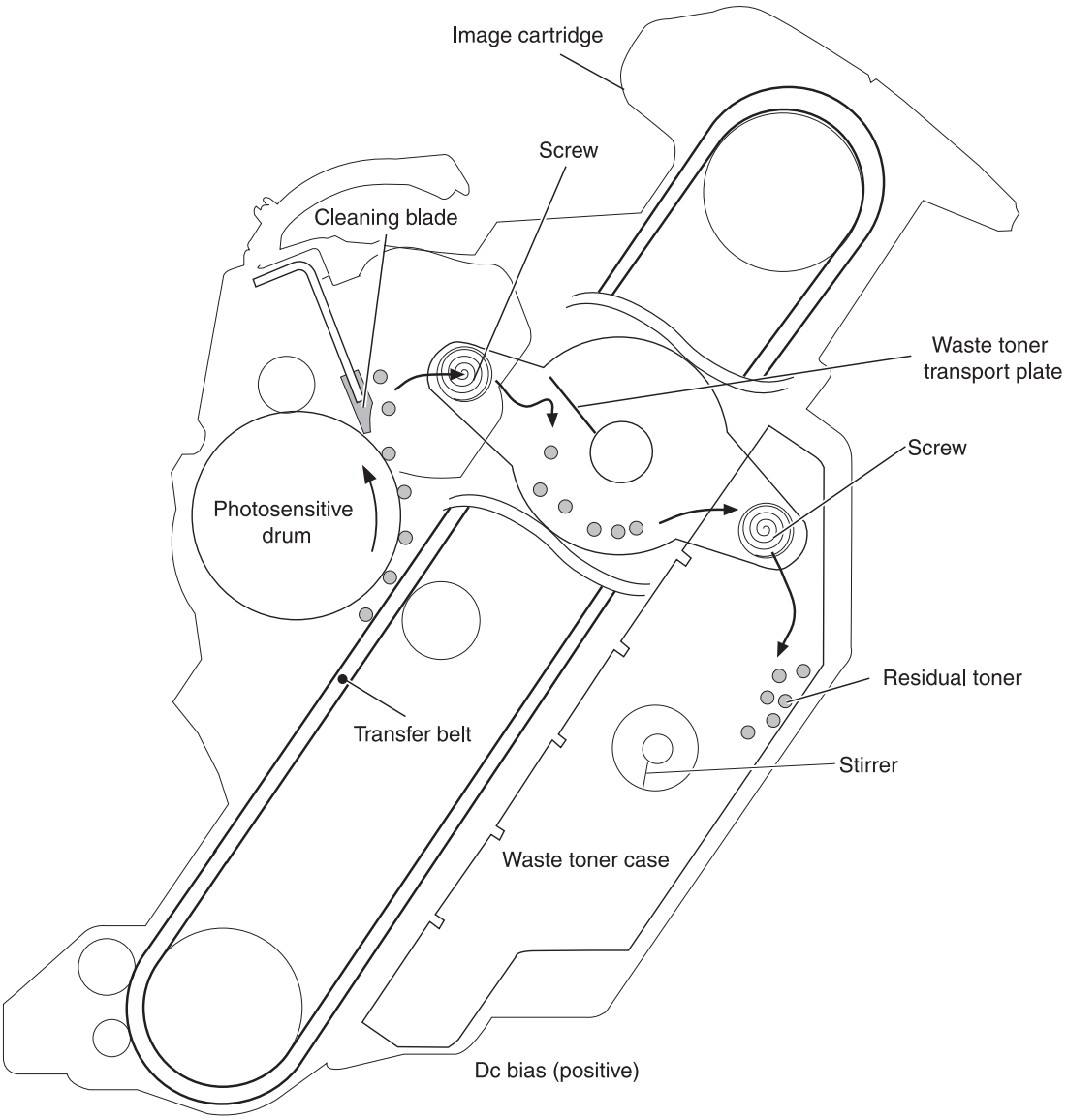


Figure 4-27. **Step 11: drum cleaning**

Print cartridge

The printer has four print cartridges: yellow, magenta, cyan, and black. Each print cartridge contains a developing cylinder, toner-feed roller, and stirrer. The developer motor rotates these parts so that each print cartridge can use toner to form a visible image on the drum.

The carousel motor rotates the E-label reader, which communicates E-label information to the dc controller.

The developing rotary/toner level detection PCB uses an LED (light emitter) and a photodiode (light receiver) to determine the toner level in each print cartridge.

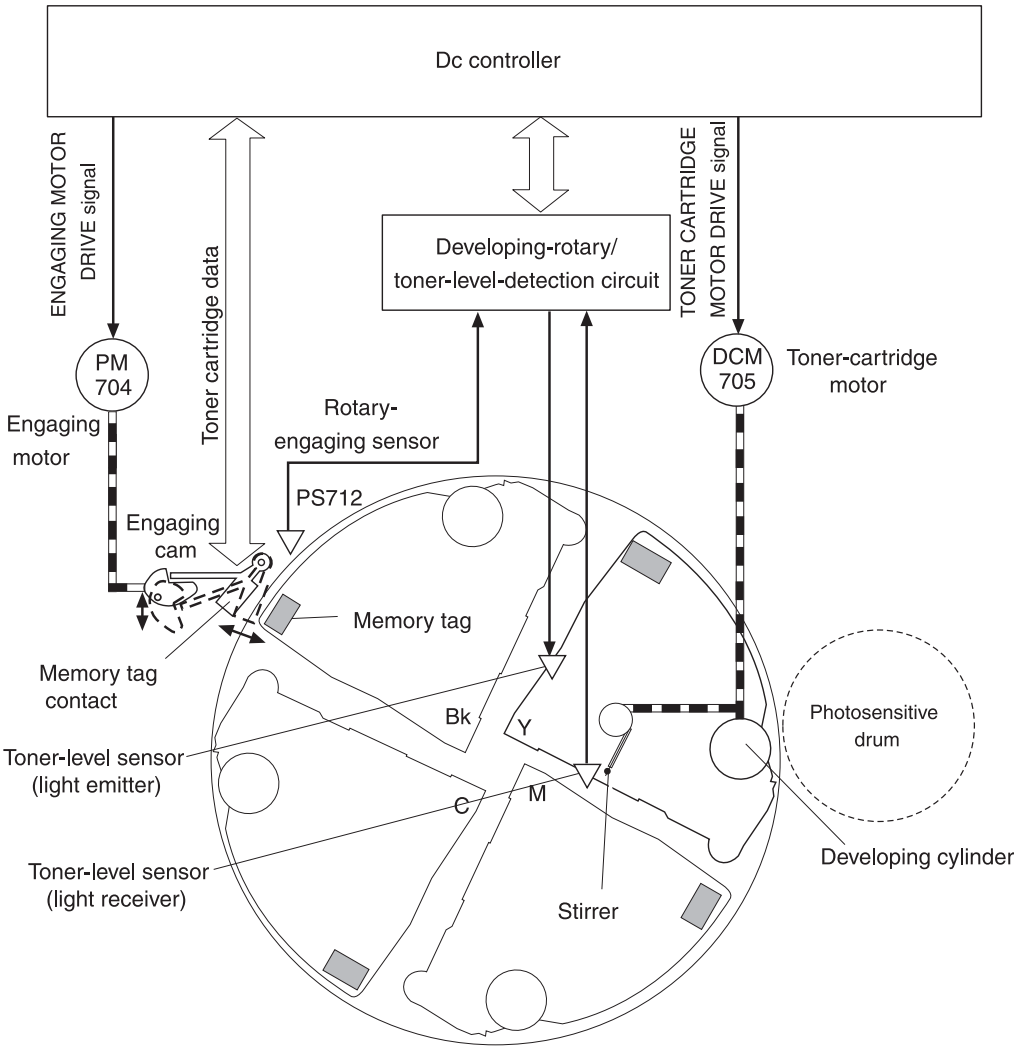


Figure 4-28. **Print cartridge**

Imaging-drum E-label

The E-label is nonvolatile memory, which is built into the imaging drum and stores usage information. When the imaging drum is installed in the printer, the E-label makes constant contact with the E-label reader. The E-label reader sends memory information to the dc controller, which updates the information and sends it back to the E-label.

The dc controller instructs the E-label to read information when:

- The printer is turned on.
- The top cover is closed.
- A command is sent from the video controller.

The dc controller instructs the E-label to write information when:

- A specified period occurs during printing.
- A command is sent from the video controller.

If the E-label reader fails to read or write information four times in a row, the dc controller notifies the video controller that an abnormality exists in the imaging drum.

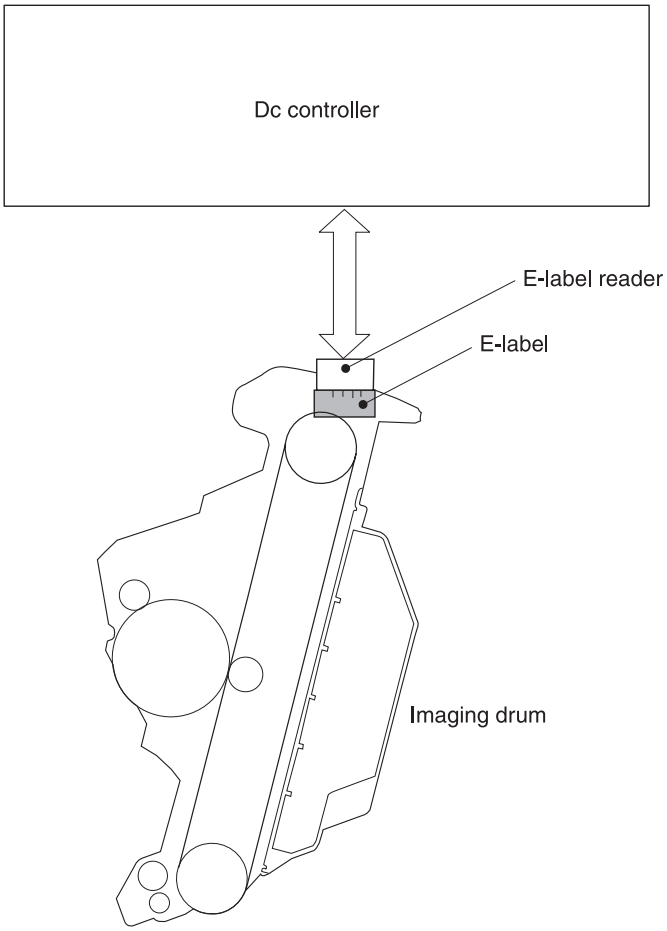


Figure 4-29. **Print-cartridge E-label**