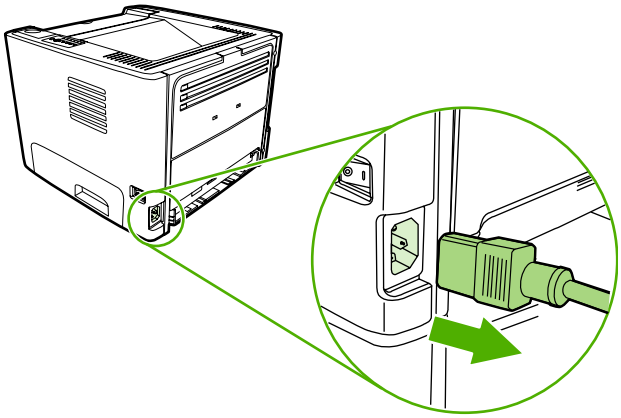
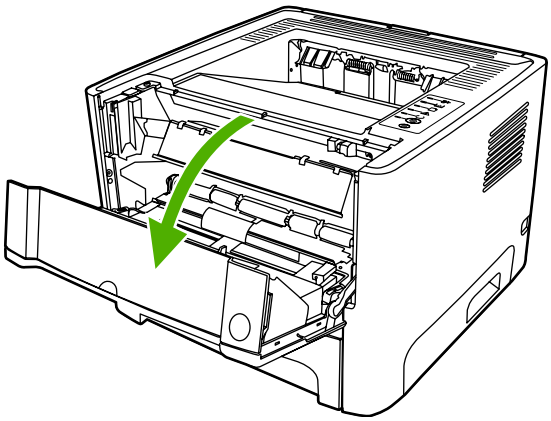
Replace the pickup roller (tray 1)

1. Unplug the power cord from the printer, and allow the printer to cool.



2. Press the print-cartridge-door button to open the print-cartridge door.

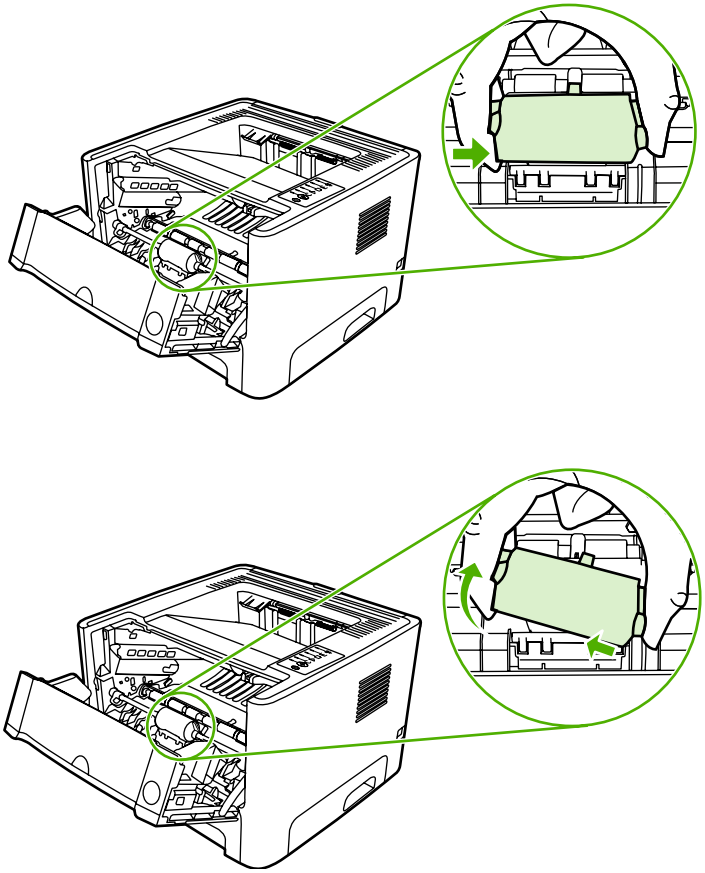


3. Remove the print cartridge.

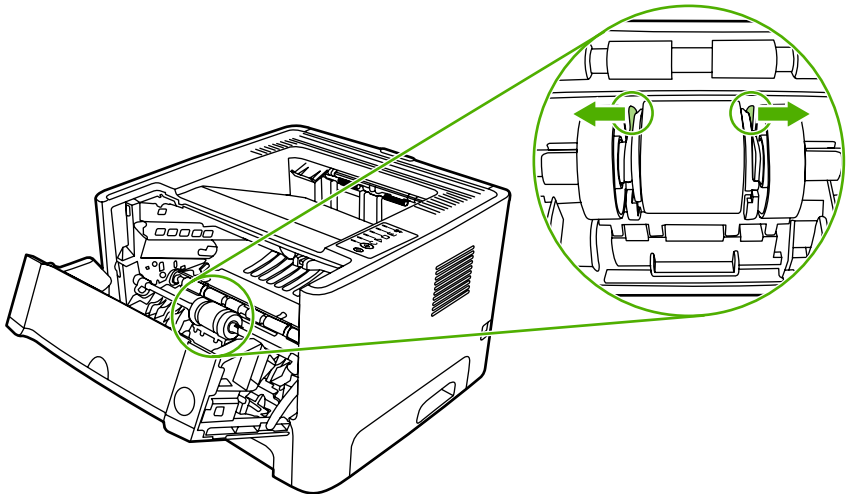
> **CAUTION** After removing the print cartridge, only handle it on the ends.

4. Grasping the pickup-roller cover with thumb and forefinger, squeeze the left side of the pickup-roller cover to release the left retaining tab, and then slide the cover to the left and up.

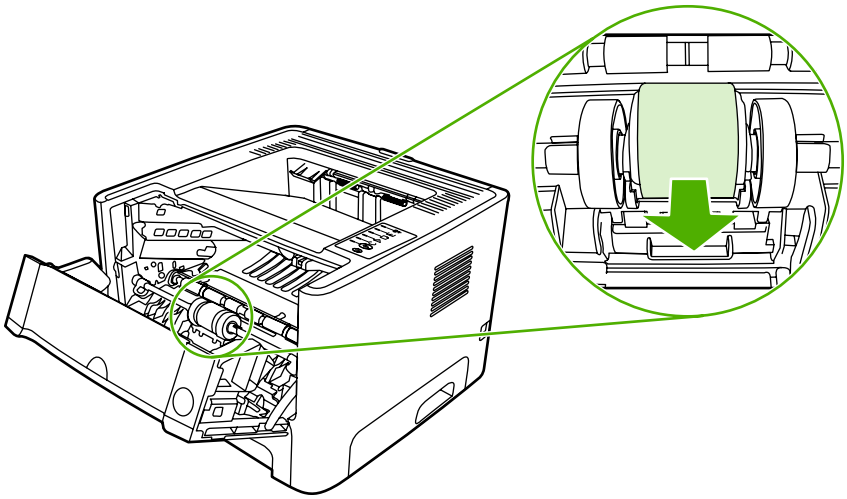
> **CAUTION** Failure to slide the cover to the left when removing it can cause the right retaining tab to break.



5. Press the two black retaining tabs outward until the pickup roller is released from its seat.

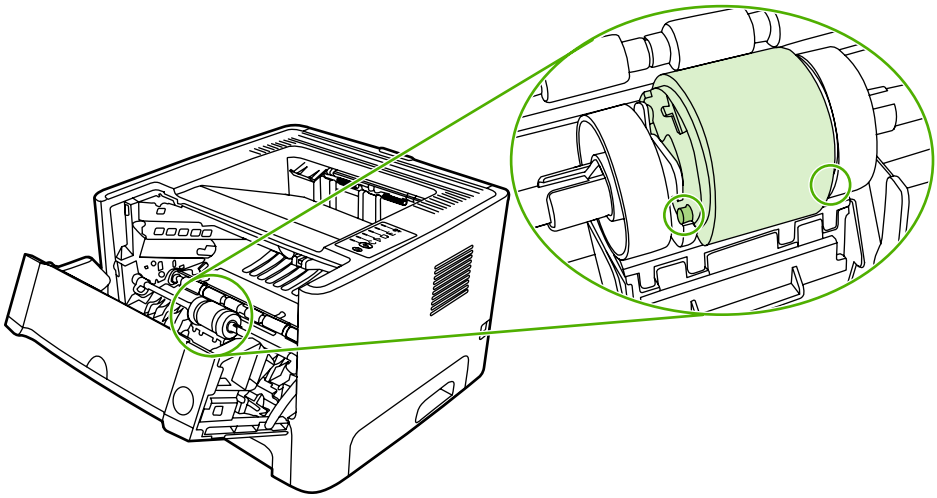


6. Remove the old pickup roller from the printer.

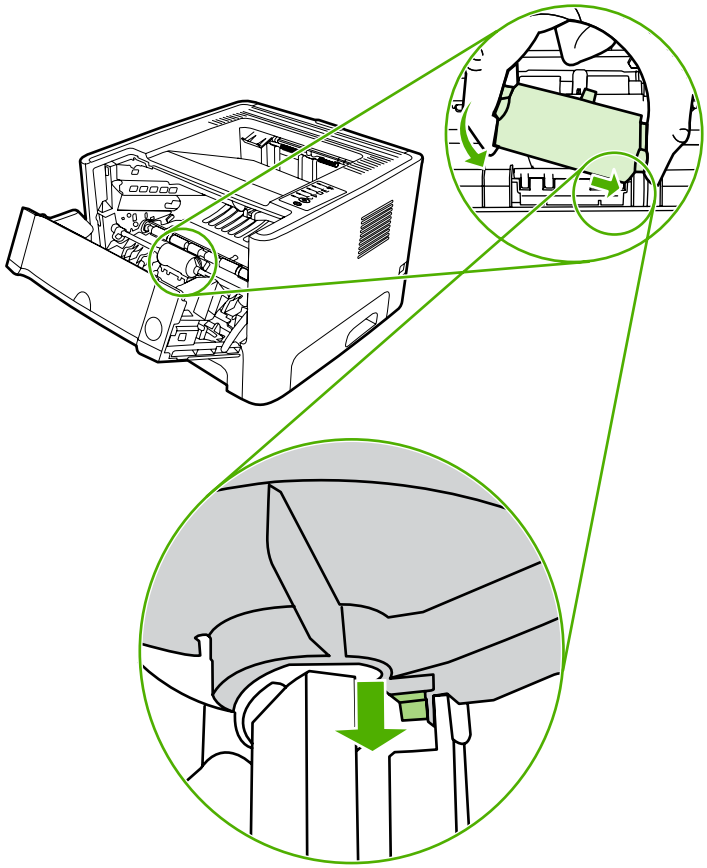


7. Line up the black retaining tabs in the printer with the grooves in the new pickup roller, and then press the pickup roller into the pickup-roller seat until the retaining tabs click.

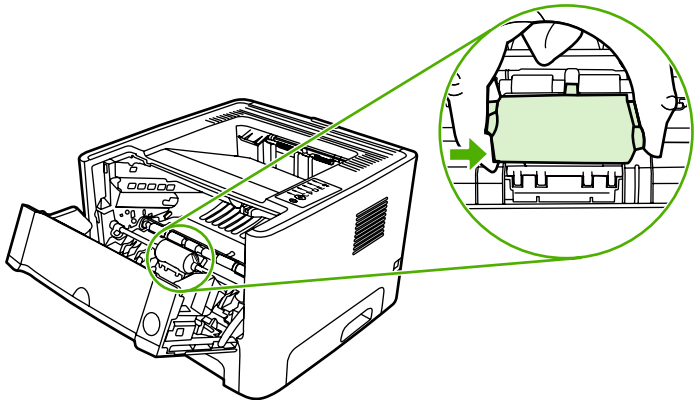
CAUTION Do not touch the pickup-roller pad.



8. Grasping the pickup-roller cover with thumb and forefinger, insert the pickup-roller cover's right retaining tab into the retaining slot.



9. Squeeze the left side of the pickup-roller cover and insert the left retaining tab in the retaining slot.

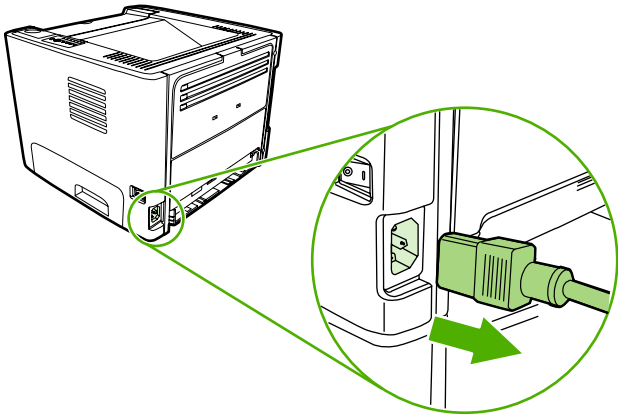


10. Close the print-cartridge door.

11. Plug the printer in.

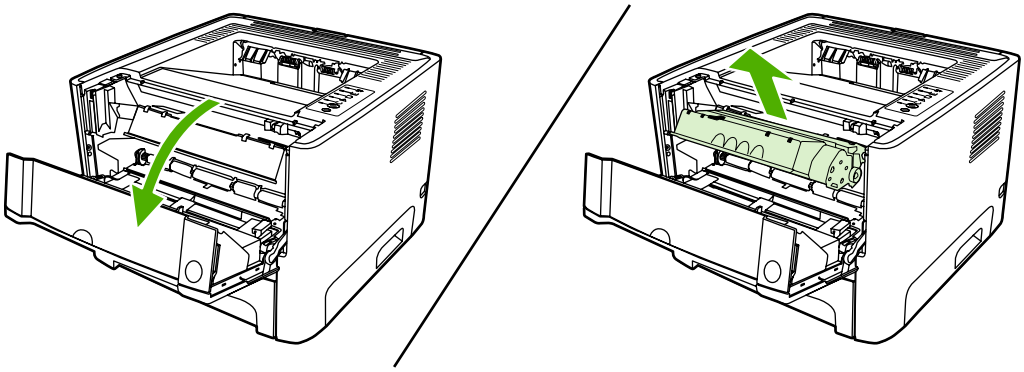
Clean the pickup roller (tray 2)

1. Unplug the power cord from the printer, and allow the printer to cool.

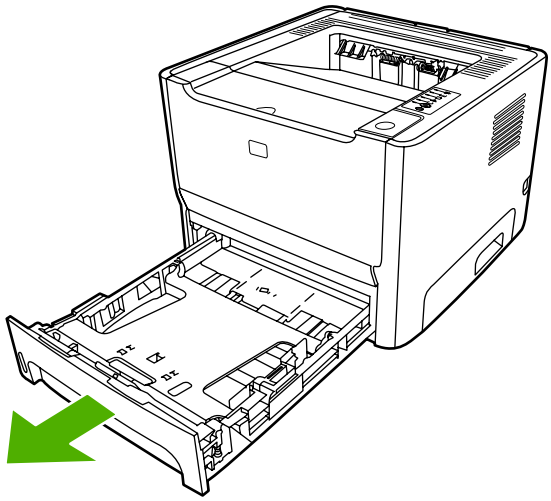


2. Press the print-cartridge-door button, and then remove the print cartridge from the printer.

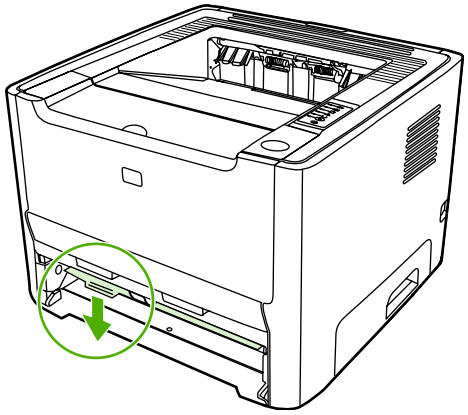
> **CAUTION** After removing the print cartridge, only handle it on the ends.



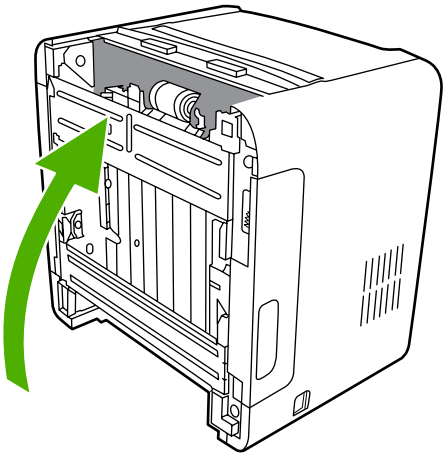
3. Remove tray 2.



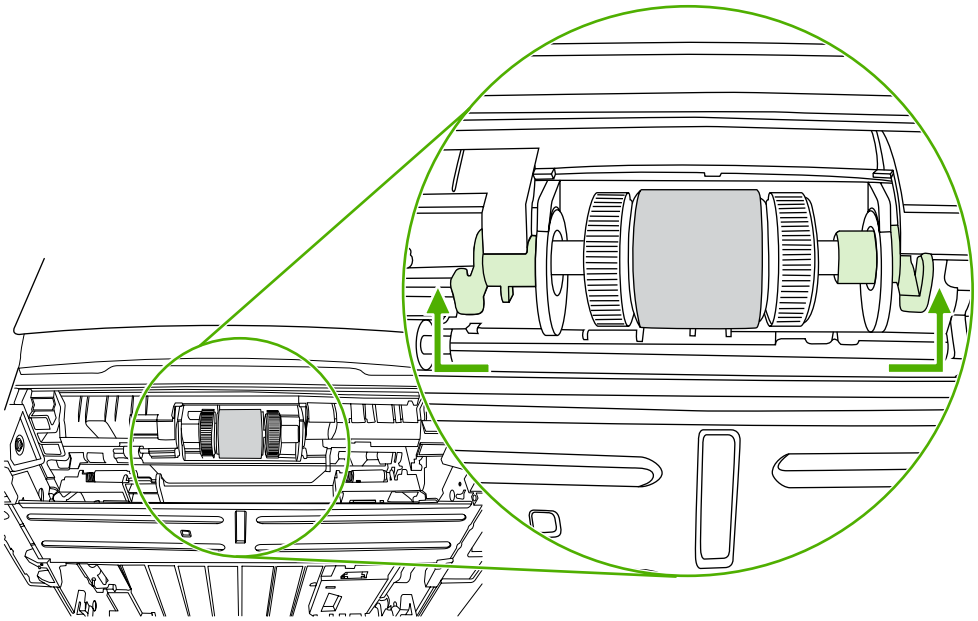
4. Open the automatic two-sided path door on the front of the printer (HP LaserJet P2015d, HP LaserJet P2015dn, and HP LaserJet P2015x printers only).



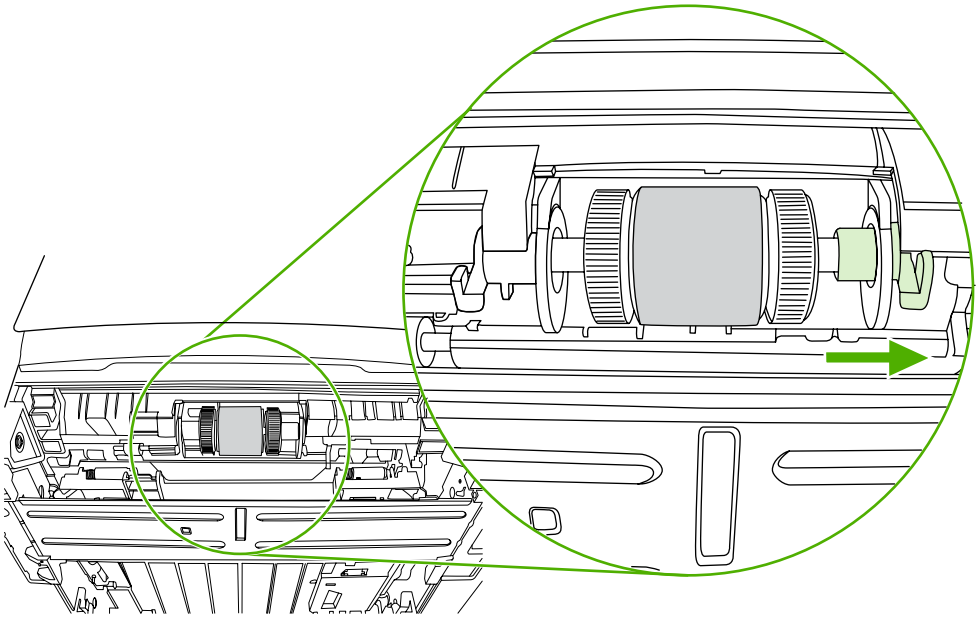
5. Place the printer on the work surface with the front of the printer facing up.



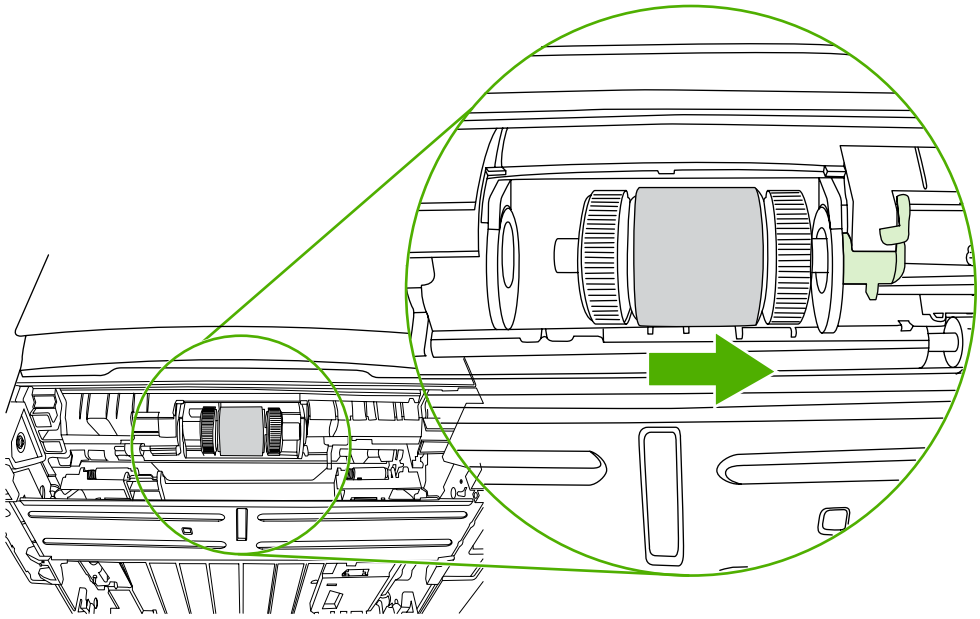
6. Pull the white tabs outward, and rotate the tabs up.



7. Slide the right tab to the right, and leave the tab in this position throughout the procedure.

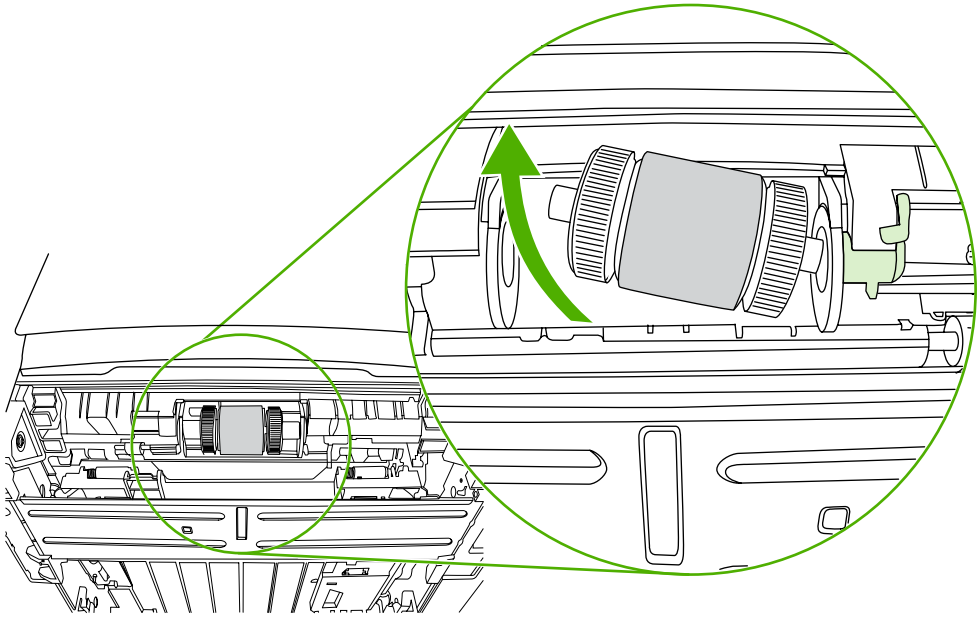


8. Slide the pickup roller assembly to the right, and remove the left end cap.

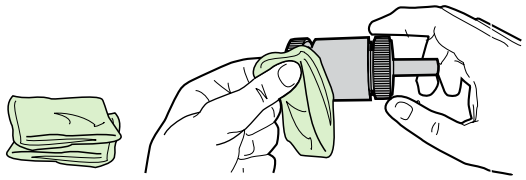


9. Remove the pickup roller.

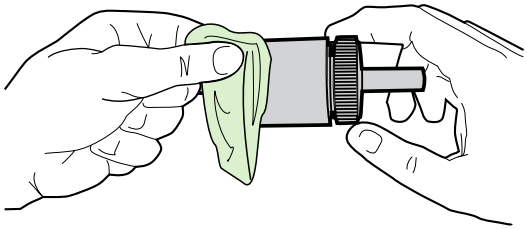
CAUTION Do not touch the pickup-roller pad.



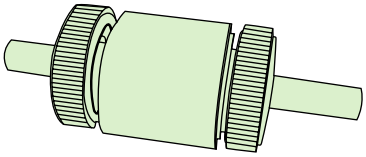
10. Dab a lint-free cloth in water, and scrub the roller.



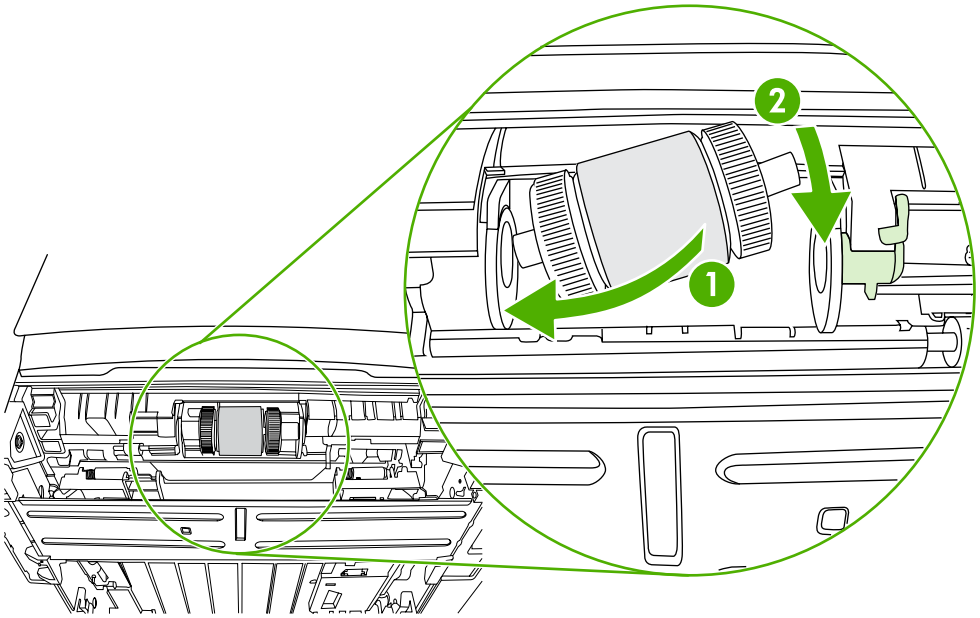
11. Using a dry, lint-free cloth, wipe the pickup roller to remove loosened dirt.



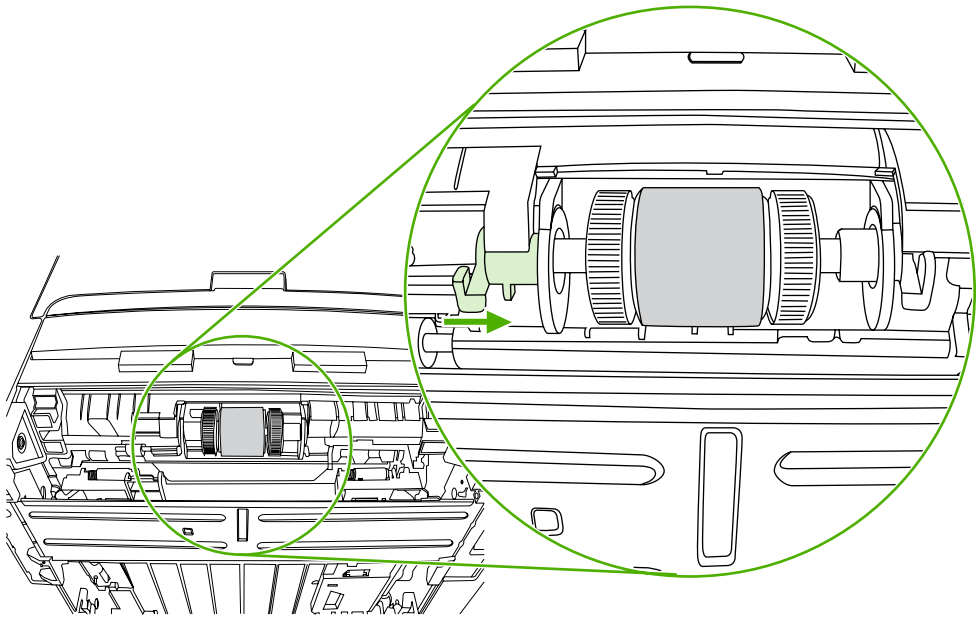
12. Allow the pickup roller to dry completely.



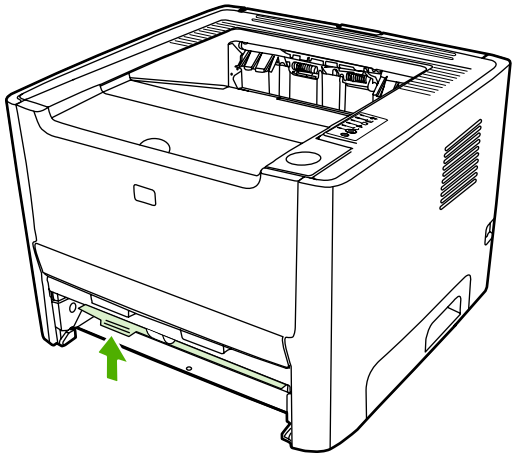
13. Insert the left side of the pickup roller into the left slot (1), and insert the right side (the side that has the notches in the shaft) into the right slot (2).



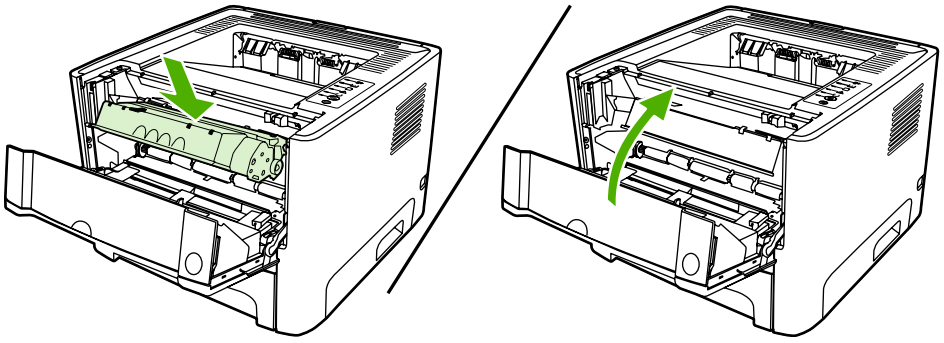
14. Place the end cap over the shaft on the left side, push the end cap to the right, and rotate the tab downward into position.



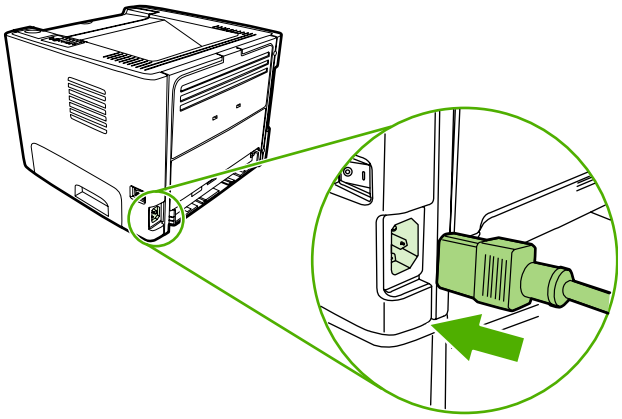
15. Rotate the shaft until the notches engage and the shaft clicks into place.
16. Push the right tab to the left, and rotate the tab downward into position.
17. Place the printer on the work surface with the top of the printer facing up.
18. Close the automatic two-sided path door.



19. Reinstall the print cartridge, and close the print-cartridge door.

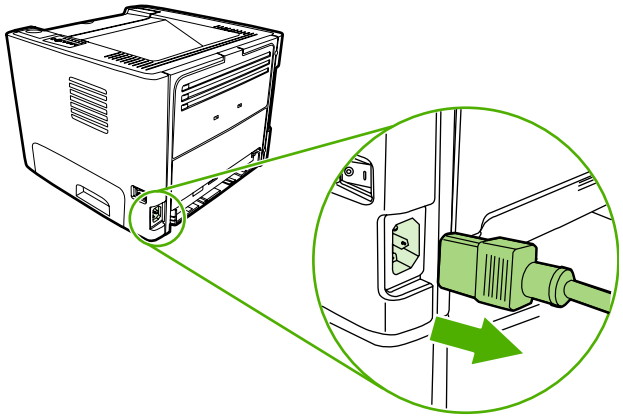


20. Plug the printer in.



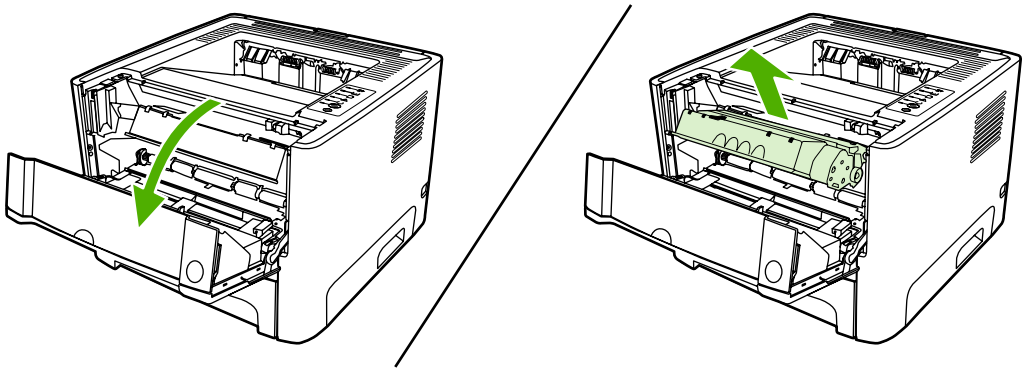
Replace the pickup roller (tray 2)

1. Unplug the power cord from the printer, and allow the printer to cool.

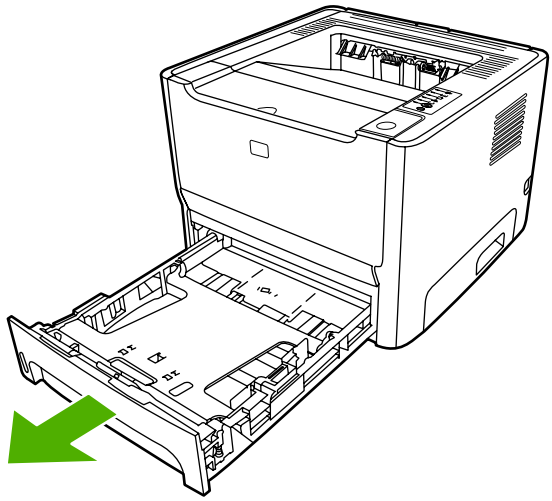


2. Press the print-cartridge-door button, and then remove the print cartridge from the printer.

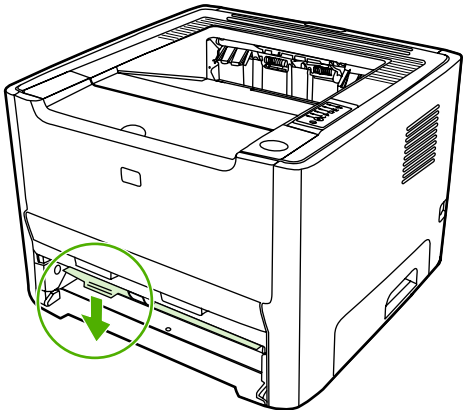
CAUTION After removing the print cartridge, only handle it on the ends.



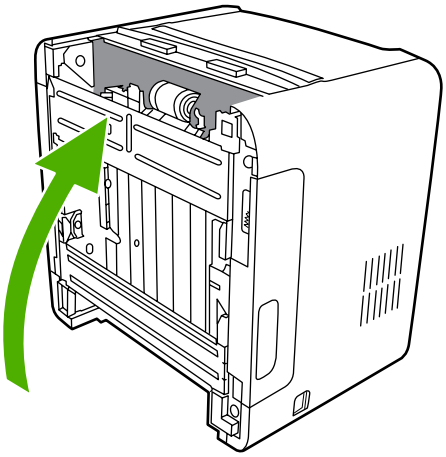
3. Remove tray 2.



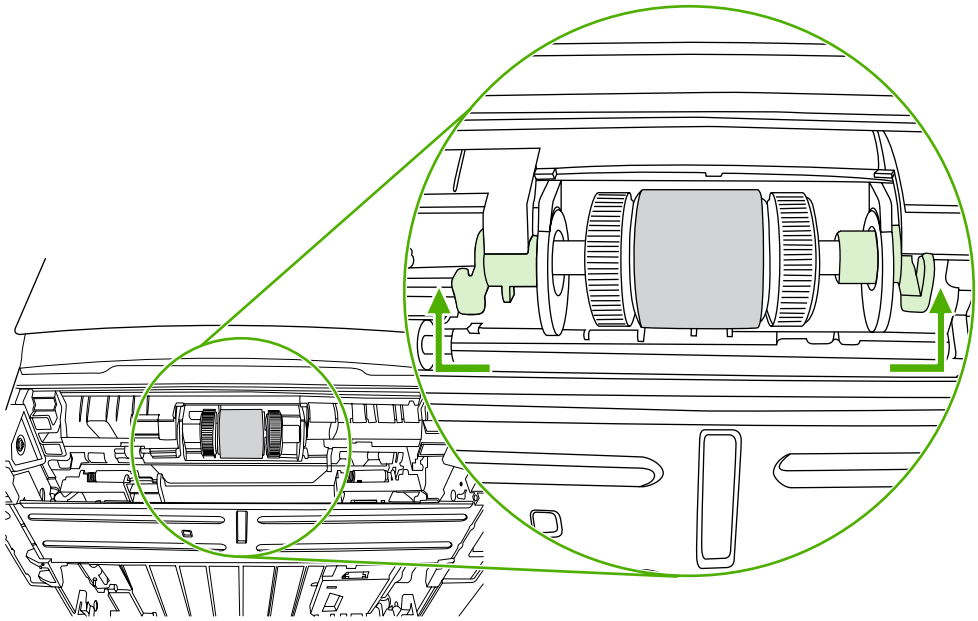
4. Open the automatic two-sided path door on the front of the printer (HP LaserJet P2015d, HP LaserJet P2015dn, and HP LaserJet P2015x printers only).



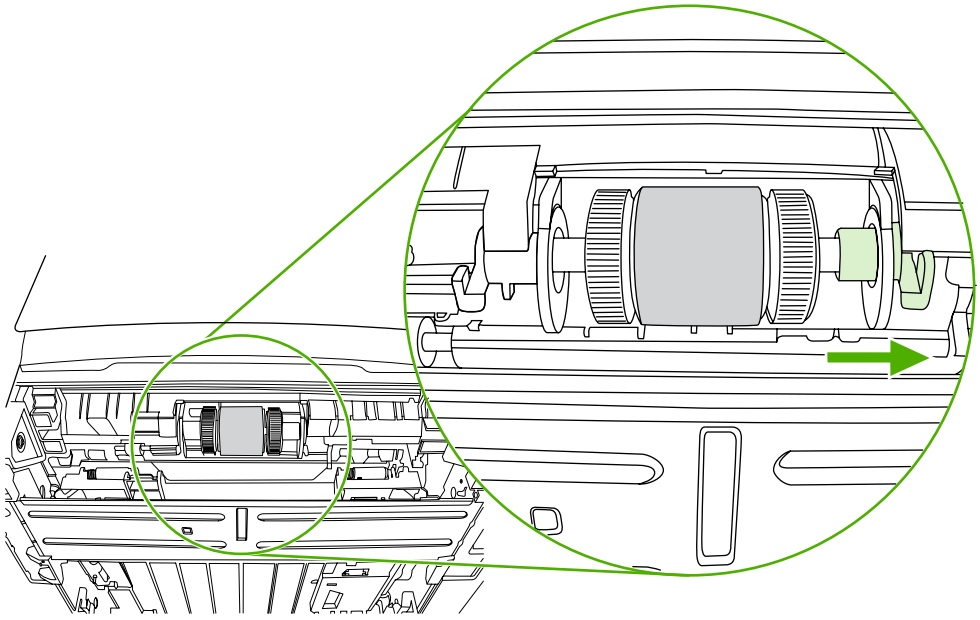
5. Place the printer on the work surface with the front of the printer facing up.



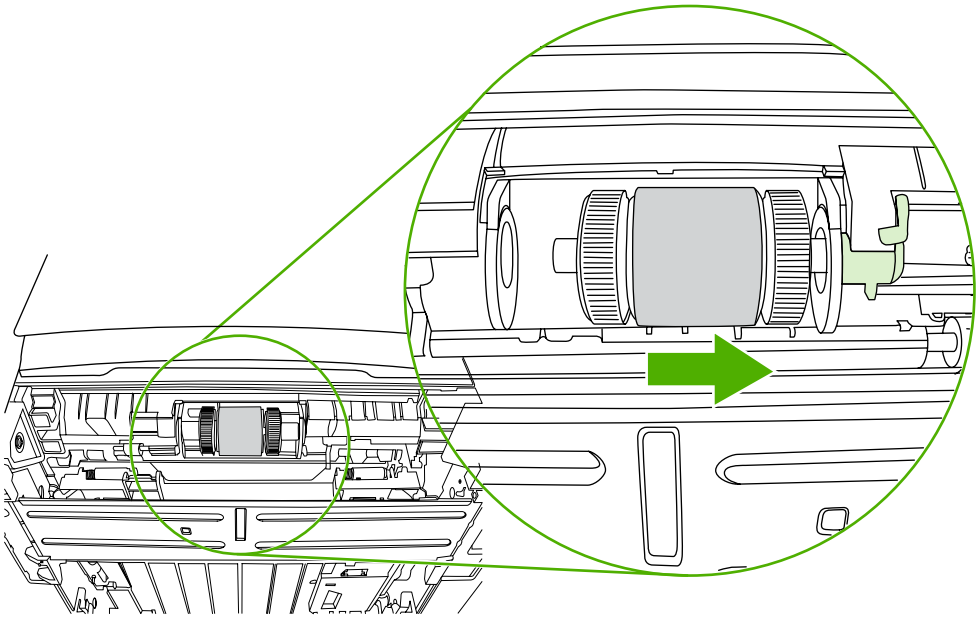
6. Pull the white tabs outward, and rotate the tabs up.



7. Slide the right tab to the right, and leave the tab in this position throughout the procedure.

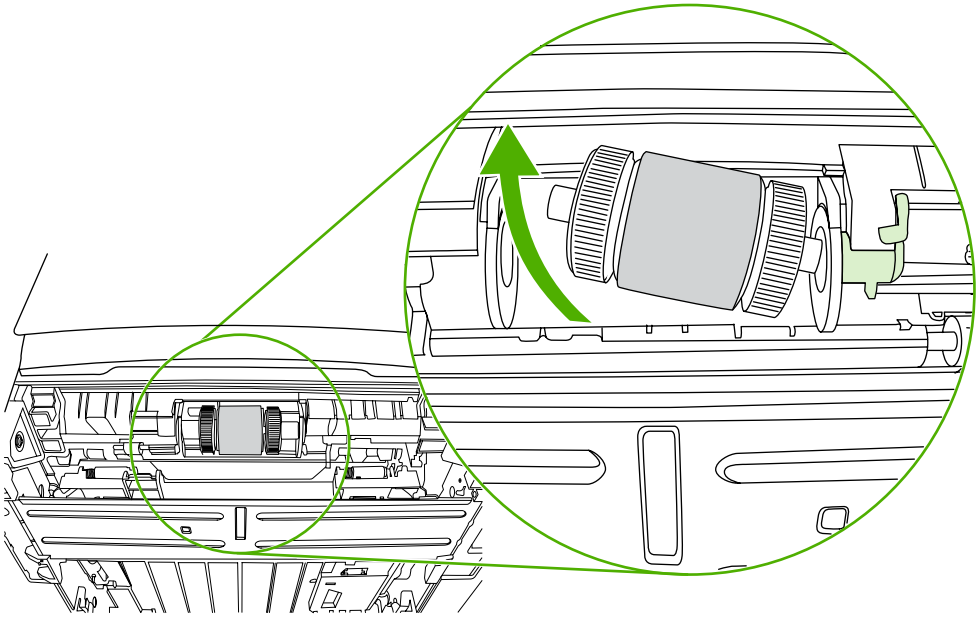


8. Slide the pickup roller assembly to the right, and remove the left end cap.

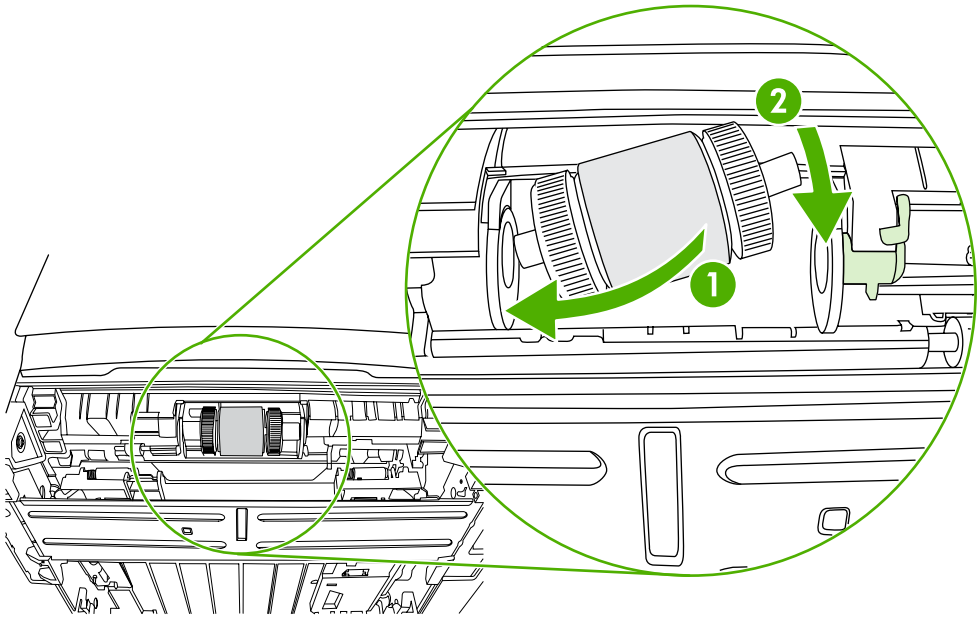


9. Remove the old pickup roller.

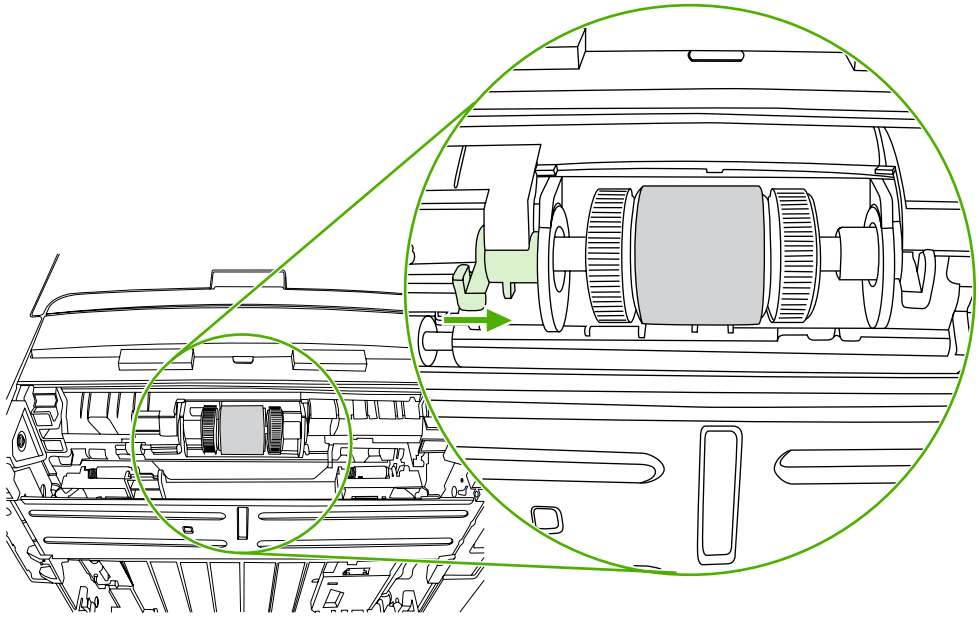
CAUTION Do not touch the pickup-roller pad.



10. Insert the left side of the new pickup roller into the left slot (1), and insert the right side (the side that has the notches in the shaft) into the right slot (2).

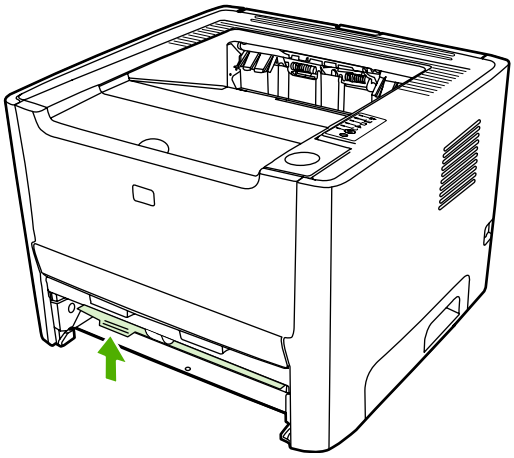


11. Place the end cap over the shaft on the left side, push the end cap to the right, and rotate the tab downward into position.

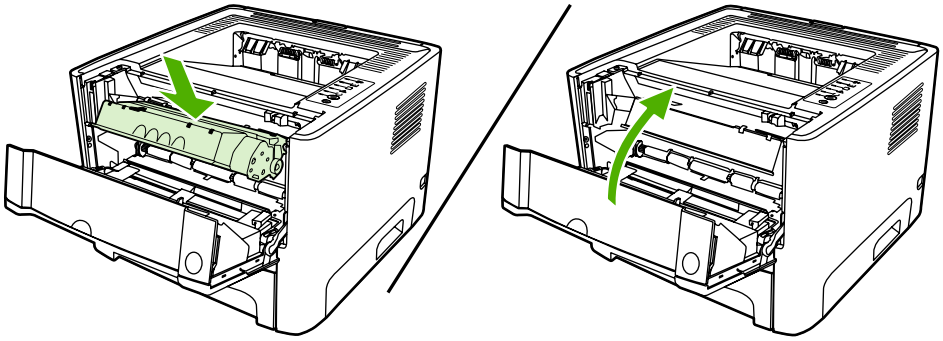


12. Rotate the shaft until the notches engage and the shaft clicks into place.
13. Push the right tab to the left, and rotate the tab downward into position.
14. Place the printer on the work surface with the top of the printer facing up.

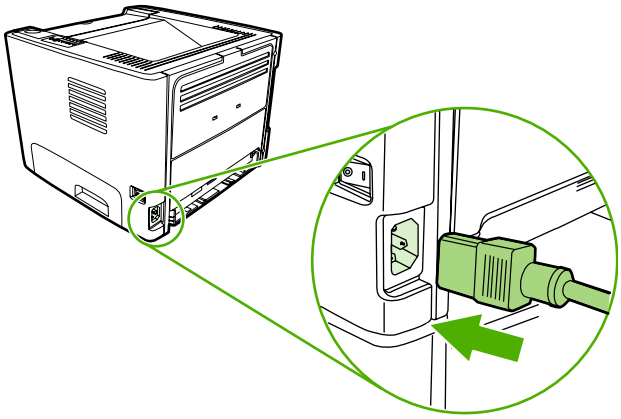
15. Close the automatic two-sided path door.



16. Reinstall the print cartridge, and close the print-cartridge door.



17. Plug the printer in to turn it back on.



5 Theory of operation

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/feed/delivery system
- Image-formation system

Figure 5-1 Block diagram on page 70 illustrates the relationships among the four systems.

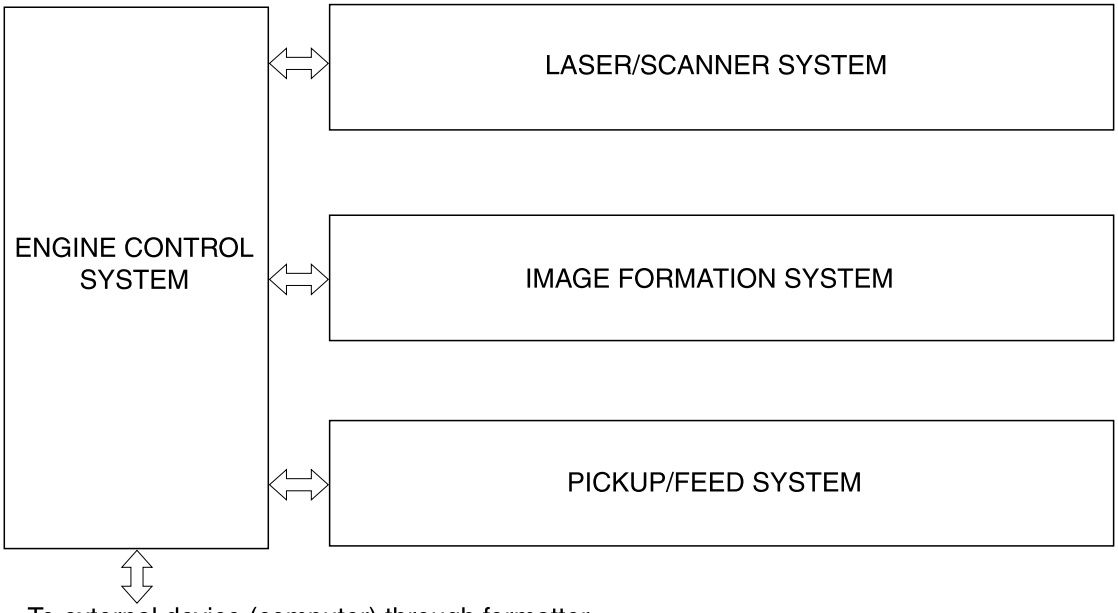


Figure 5-1 Block diagram

Internal components

Figure 5-2 Cross-section of printer on page 71 highlights the major internal components.

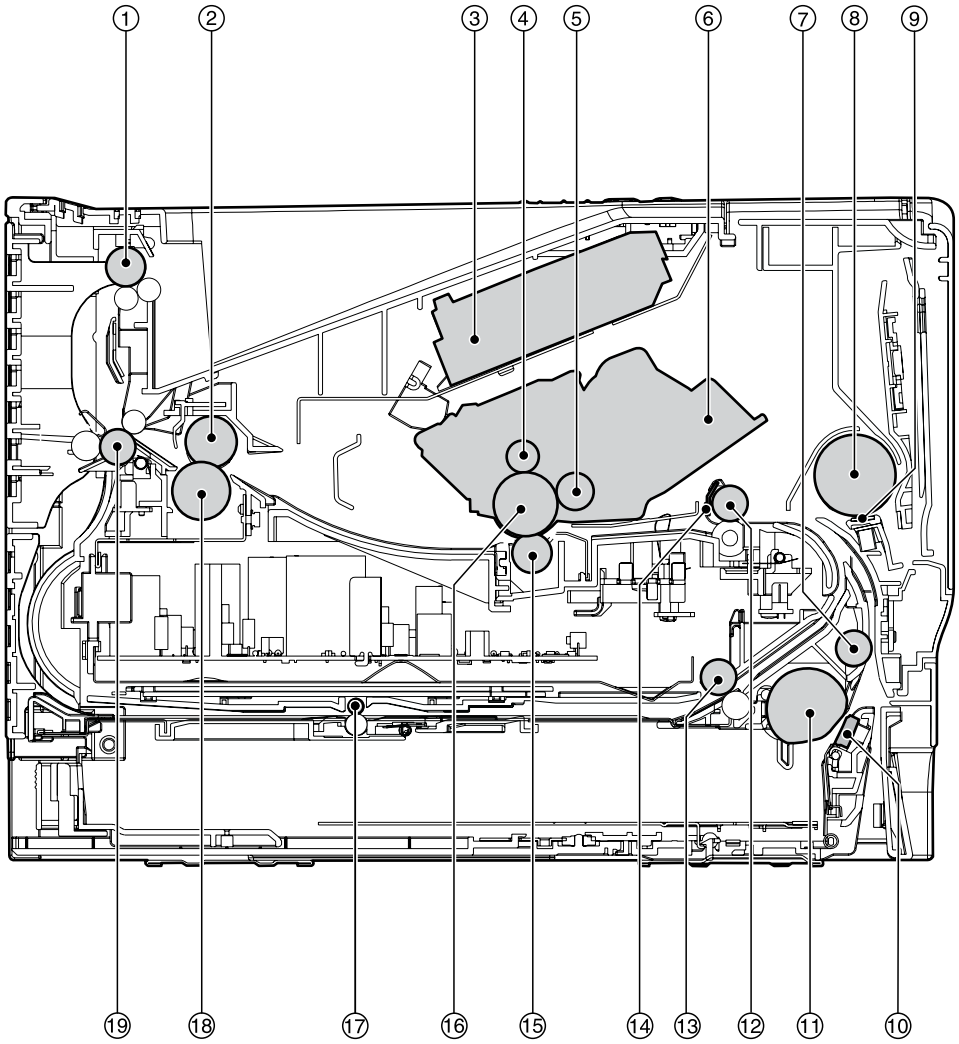


Figure 5-2 Cross-section of printer

1	Top output bin delivery roller
2	Fuser film
3	Laser/scanner
4	Primary charging roller
5	Developer roller
6	Print cartridge
7	Feed roller
8	Multipurpose pickup roller
9	Multipurpose separation pad
10	Separation pad

11	Pickup roller
12	Registration roller
13	Duplexer pickup roller
14	Registration shutter
15	Transfer roller
16	Photosensitive drum
17	Duplexer feed roller
18	Pressure roller
19	Rear output bin delivery roller

Timing

Sequence of operation

Operation sequences are controlled by the microprocessor on the DC controller. Table 5-1 Sequence of operation on page 73 describes engine operations for each period of a print operation.

Table 5-1 Sequence of operation

Name	Timing	Purpose
WAIT	From power-on until the end of the main motor initial drive	Detects presence of a print cartridge. Clears potential from the drum surface and cleans the transfer roller.
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
INTR (initial rotation)	From the time of the print command until the pickup solenoid is turned on.	Prepares the photosensitive drum for printing.
PRINT	From the end of the INTR period until the primary high-voltage is turned off.	Forms the image on the photosensitive drum and transfers the toner image to the media.
LSTR (last rotation)	From the end of the PRINT period (when high-voltage is turned off) until the main motor stops rotating.	Delivers the last page of a print job. After LSTR, the printer either returns to STBY or, if another print command was sent from the formatter, enters INTR.

Power-on sequence

Table 5-2 Power-on sequence

Step	Action
1	Power-on
2	CPU initialization
3	Video interface communication start
4	Check sensors for residual media
5	Main motor initial drive
6	Fuser heater initial drive. The fuser heater reaches a surface temperature of 100°C.
7	Laser/scanner motor initial drive
8	High-voltage control Detect presence of a print cartridge Clean the transfer roller after the primary charging ac bias is turned on
9	Failure/abnormality check: detect laser/scanner failure, fuser failure, and open covers
10	Communication with the memory tag

Engine control system

The engine control system coordinates all printer functions, according to commands sent from the formatter. It drives the laser/scanner system, the image-formation system, and the pickup/feed/delivery system.

The engine control system contains the following components:

- DC controller
- High-voltage PCA

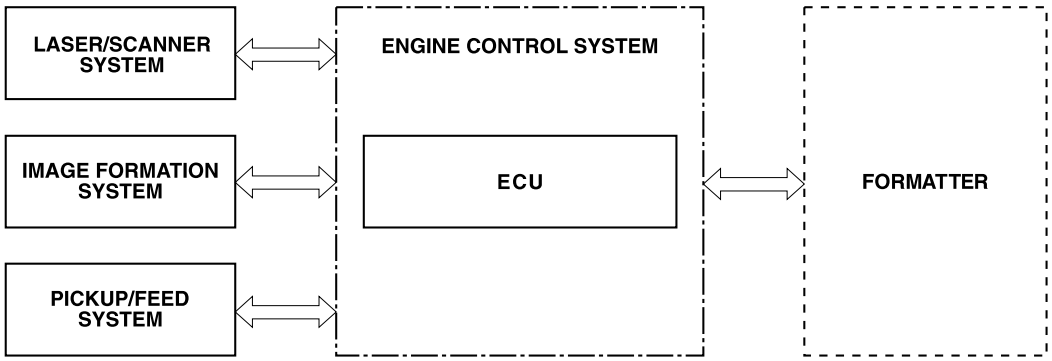


Figure 5-3 Engine control system

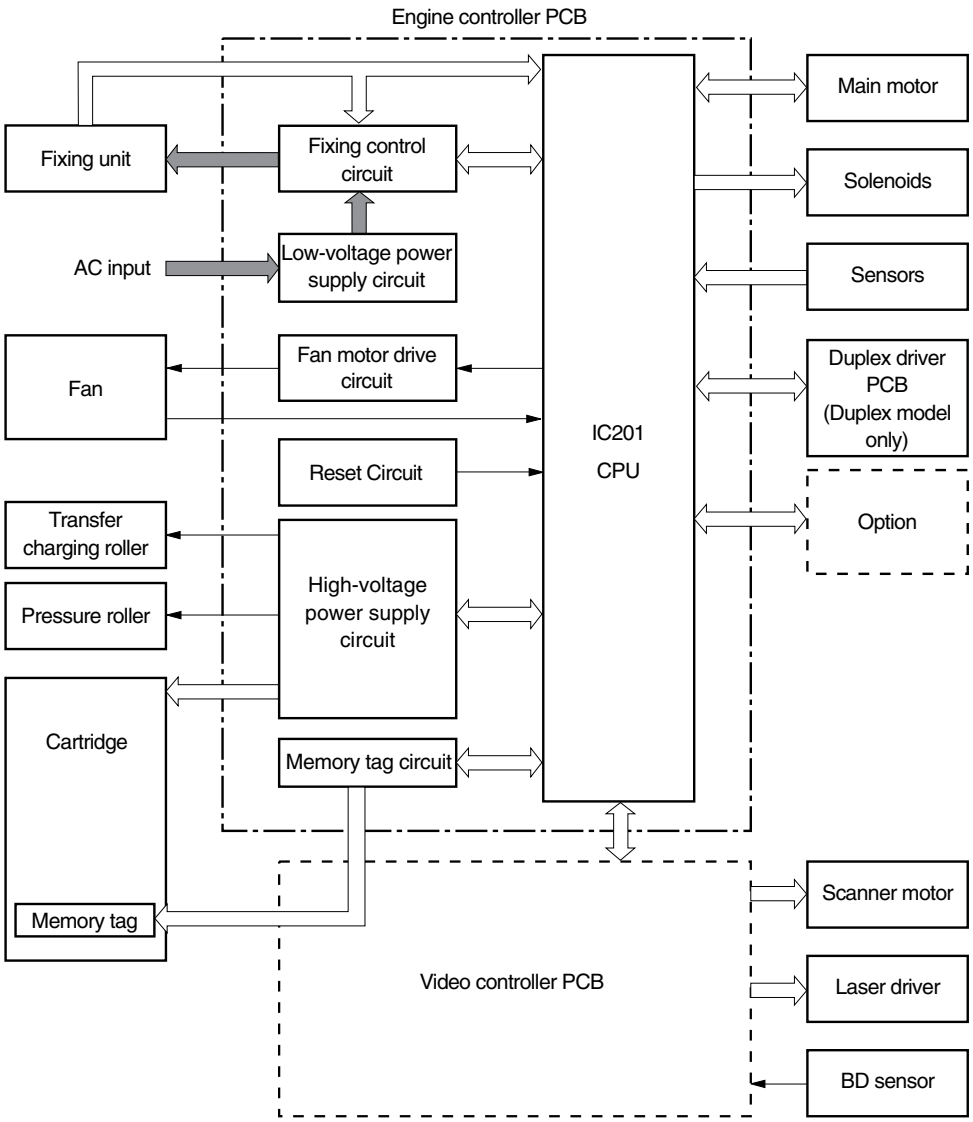


Figure 5-4 Engine control system circuit diagram

Laser/scanner system

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

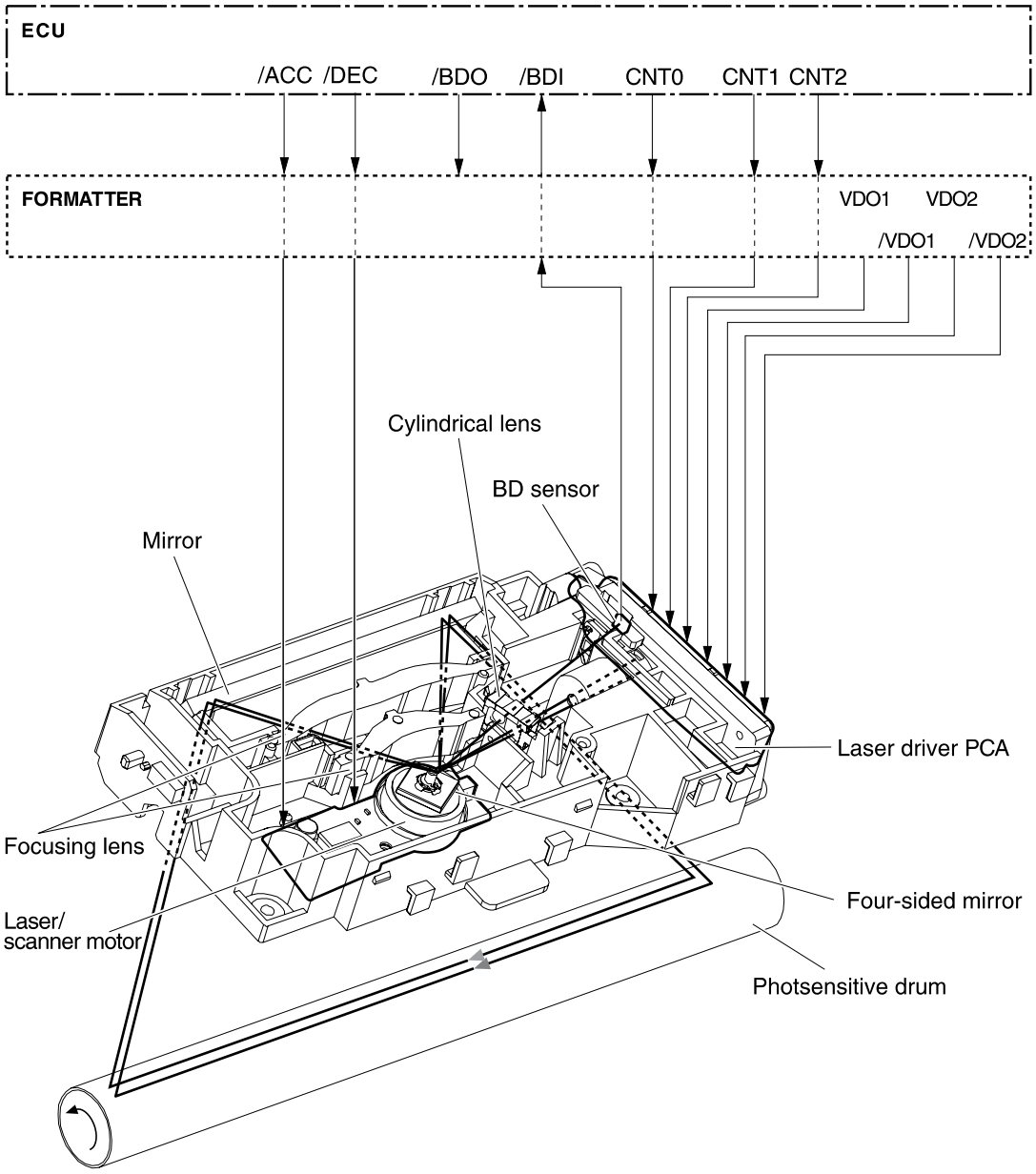


Figure 5-5 Laser/scanner system

Pickup/feed/delivery system

The pickup/feed/delivery system consists of several types of feed rollers and sensors. The dc controller uses two motors and two solenoids to drive the rollers. Three media-detection sensors detect media as it passes through the printer. If media does not reach or pass each sensor within a specified time period, the dc controller determines that a jam has occurred and alerts the formatter.

The following components are identified in Figure 5-6 Pickup/feed/delivery system on page 78:

- M1, main motor
- SL1, tray 2 pickup solenoid
- SL2, tray 1 pickup solenoid
- SL3, duplex solenoid (HP LJ P2015d, P2015dn, and P2015x only)
- PS911, width-detection sensor
- PS912, top-of-page sensor
- PS913, width-detection sensor
- PS914, tray 2 media sensor
- PS915, fuser delivery sensor
- PS915, duplex sensor (HP LJ P2015d, P2015dn, and P2015x only)

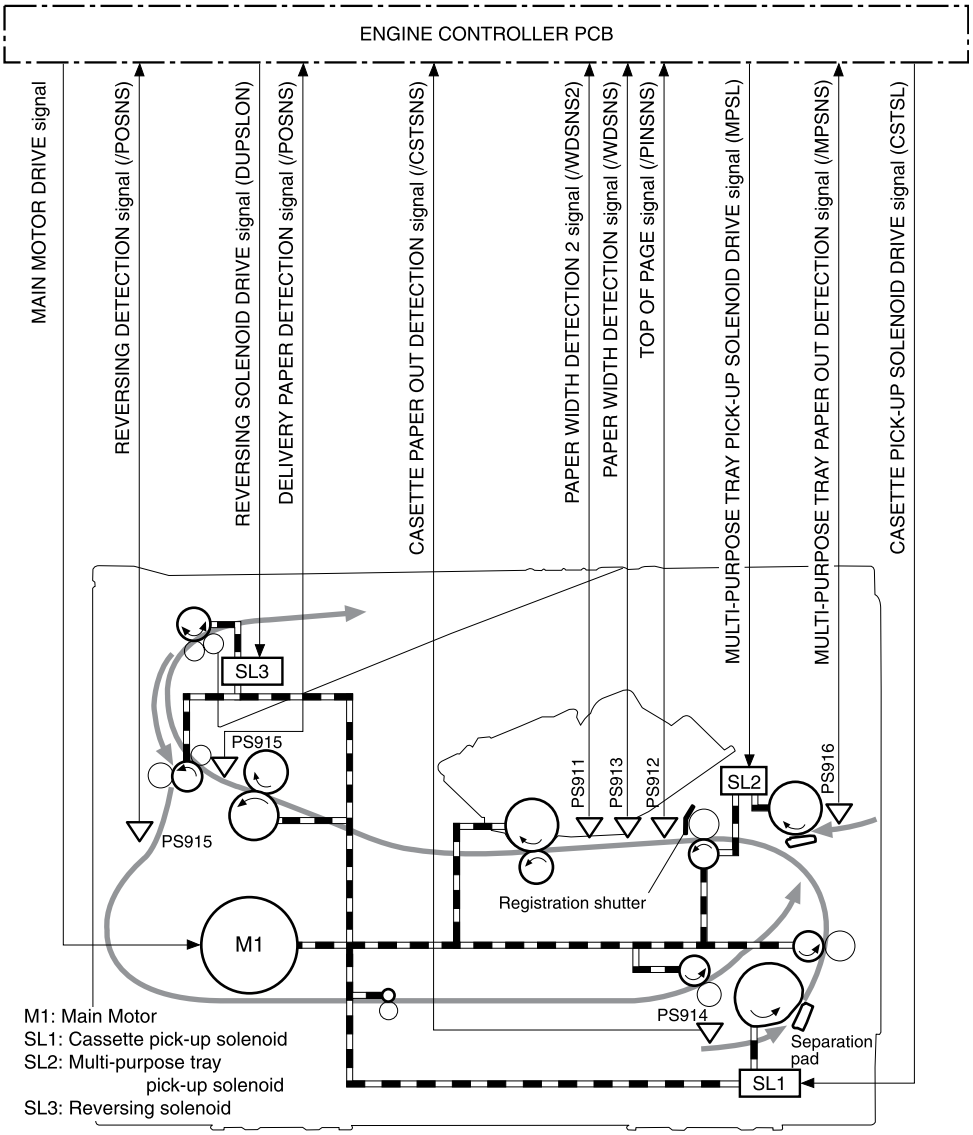


Figure 5-6 Pickup/feed/delivery system

Image-formation system

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

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

The five processes contain eight steps.

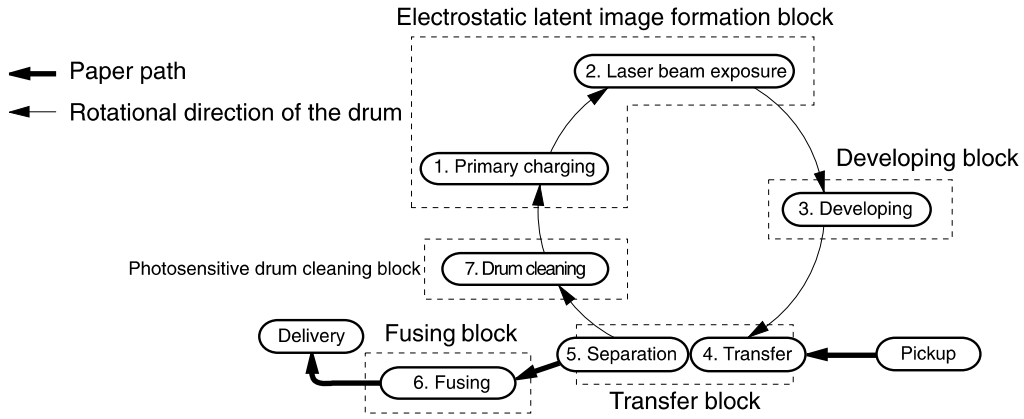


Figure 5-7 Image-formation system

Step 1: Primary charging

DC and AC biases are applied to the primary charging roller, which transfers a uniform negative potential to the photosensitive drum.

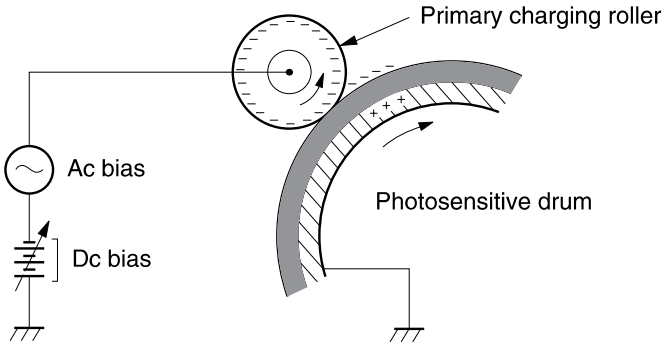


Figure 5-8 Primary charging

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.

Step 3: Developing

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 of the drum are shown as positive in Figure 5-9 Developing on page 80. The charges are actually negative, but they are more positive than the charges on the developing cylinder.

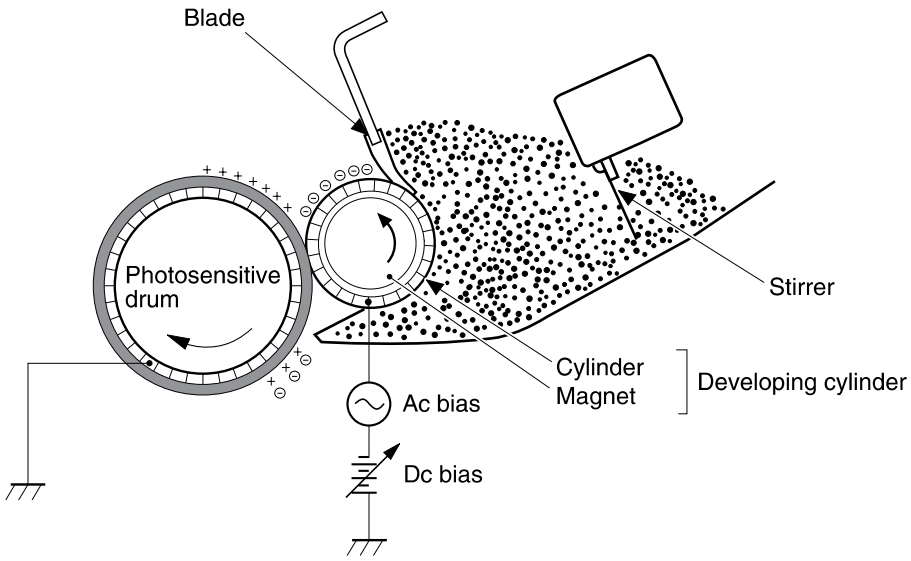


Figure 5-9 Developing

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.

Step 4: Transfer

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

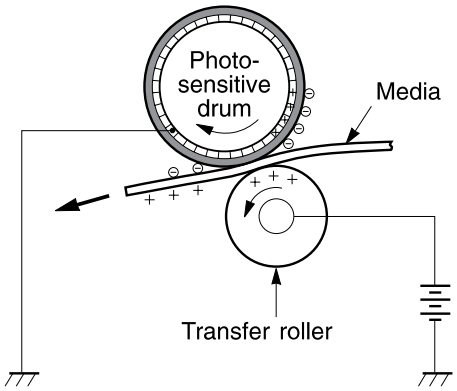


Figure 5-10 Transfer

Step 5: Separation

The elasticity of the print media causes its separation from the photosensitive drum. A static charge eliminator aids separation by weakening any electrostatic adhesion.

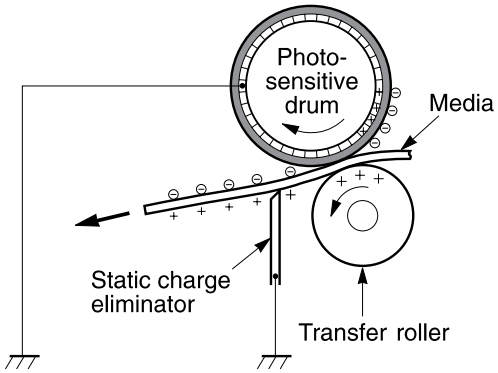


Figure 5-11 Separation

Step 6: 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.

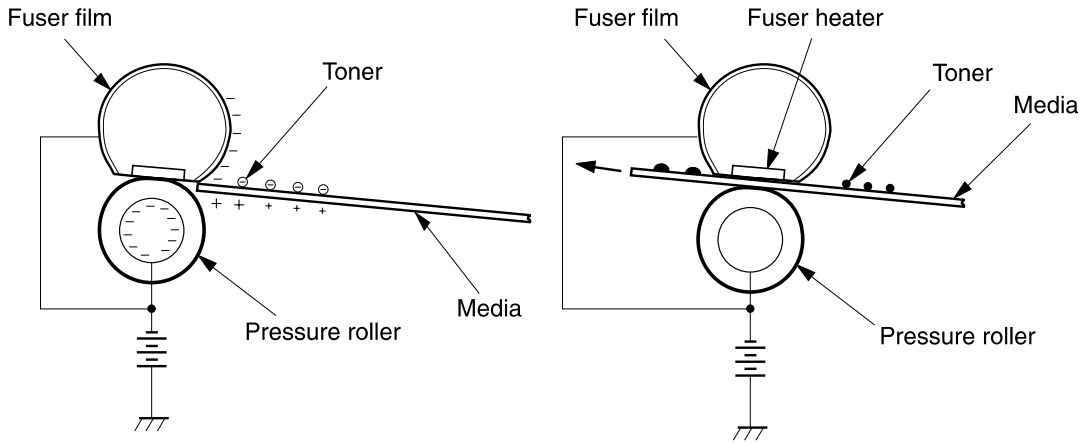


Figure 5-12 Fusing

Step 7: Drum cleaning

The cleaning blade scrapes the residual toner off the photosensitive drum and deposits it into the waste toner case.

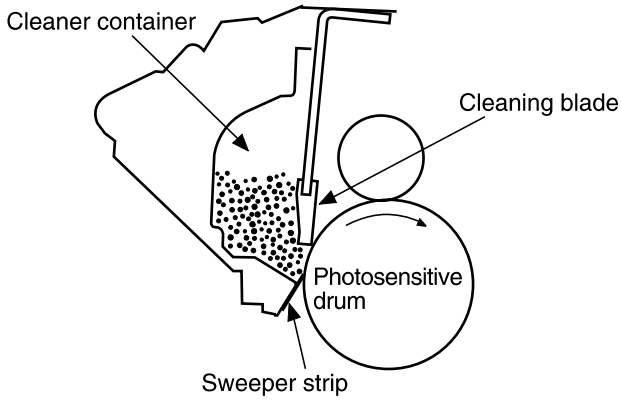


Figure 5-13 Drum cleaning

6 Removal and replacement

Introduction

This chapter documents removal and replacement of field replaceable units (FRUs) only.

Removal and replacement strategy

Replace parts in the reverse order of their removal. Directions for difficult or critical replacement procedures are included.

WARNING! The sheet-metal edges of the product can be sharp. Use caution when working on the product.

NOTE Note the length, diameter, color, type, and location of each screw. Be sure to return each screw to its original location during reassembly.

Incorrectly routed or loose wire harnesses can interfere with other internal components and can become damaged or broken. Frayed or pinched harness wires can be difficult to locate. When replacing wire harnesses, always use the provided wire loops, lance points, or wire-harness guides.

Electrostatic discharge

CAUTION The product contains parts that are sensitive to electrostatic discharge (ESD). Always service the product at an ESD-protected workstation, or use an ESD mat.

Watch for the ESD symbol to identify the parts that are sensitive to ESD. Protect these parts by using an ESD wrist strap and by placing ESD-sensitive parts into protective ESD pouches.

Required tools

The following tools are needed to service this product:

- #2 Phillips screwdriver with magnetic tip
- Small flat-blade screwdriver
- Small needle-nose pliers
- ESD mat
- Penlight

CAUTION A pozidrive screwdriver can damage the screw heads on the product. Use a #2 Phillips screwdriver.

If you use a multispeed screwdriver, use a torque limiter.

Before performing service

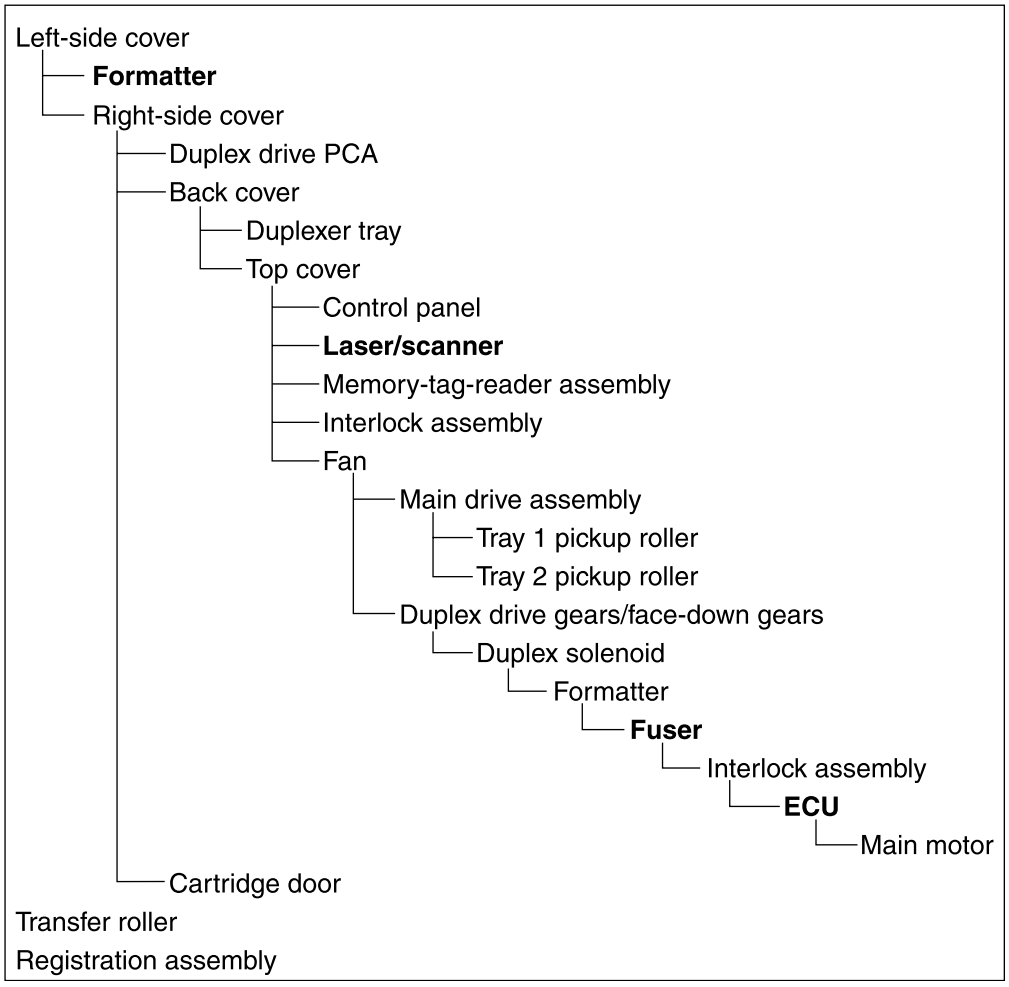
Follow the pre-service procedures before you perform service.

Pre-service procedures

1. Remove all media from the product.
2. Place the product on an ESD mat. If an ESD mat or an ESD-protected workstation is not available, discharge body static and ground the product chassis before servicing the product.
3. Remove the print cartridge.
4. Unplug the power cord and the interface cable.
5. Lift the printer off optional tray 3 (if tray 3 is installed).

Parts removal order

Use the following diagram to determine which parts must be removed before removing other parts.



Covers

Left-side cover

1. Open the print-cartridge door.
2. At the back of the printer, use a flat-blade screwdriver to release two tabs (1).

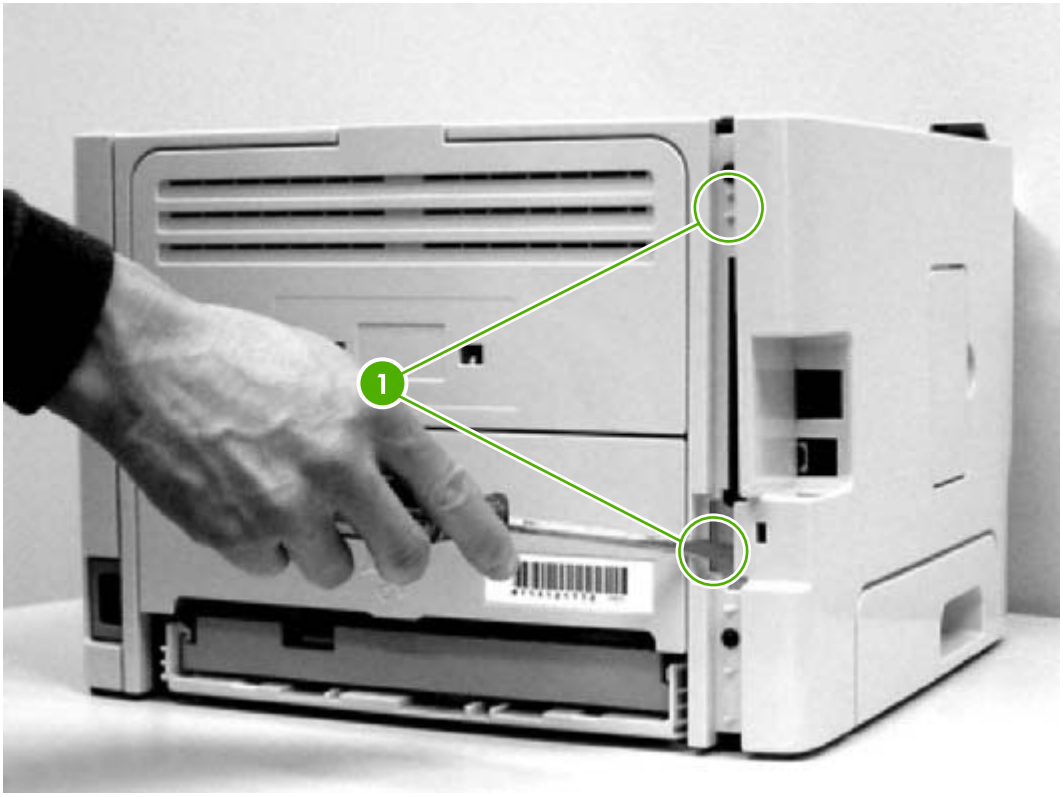


Figure 6-1 Removing the left-side cover (1 of 2)

3. Lift the cover away from the printer.

Right-side cover

1. Open the print-cartridge door.
2. Remove tray 2.

3. At the front of the printer, pop the front edge of the right-side cover over the two retaining tabs.

Figure 6-2 Removing the right-side cover

4. Lift the cover away from the printer.

Back cover

1. Remove tray 2.
2. Remove the left-side cover and the right-side cover.

3. Remove four screws (1).

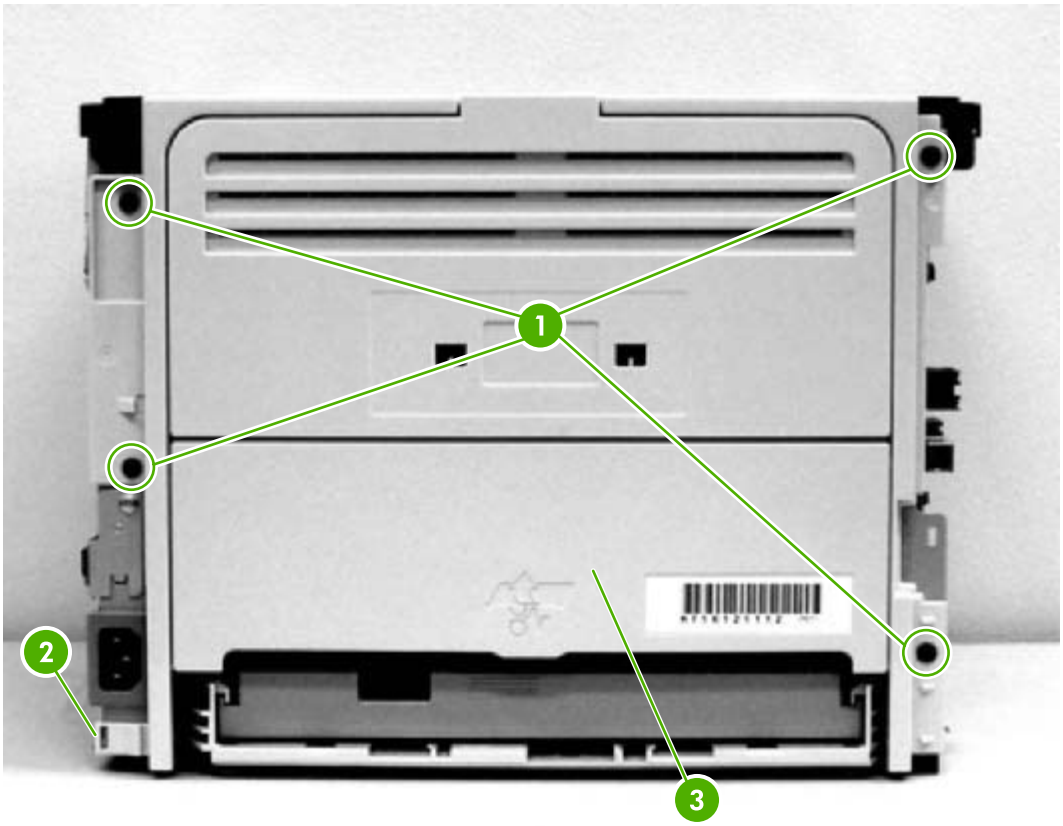


Figure 6-3 Removing the back cover (1 of 2)

4. Tip the printer so that it rests on its front.
5. Release the tab (2) at the back of the printer on the right side.
6. Open the duplex access door (3).

7. Slide the cover toward the right side of the printer to clear the tab (1) on the duplexer tray (duplex models only).

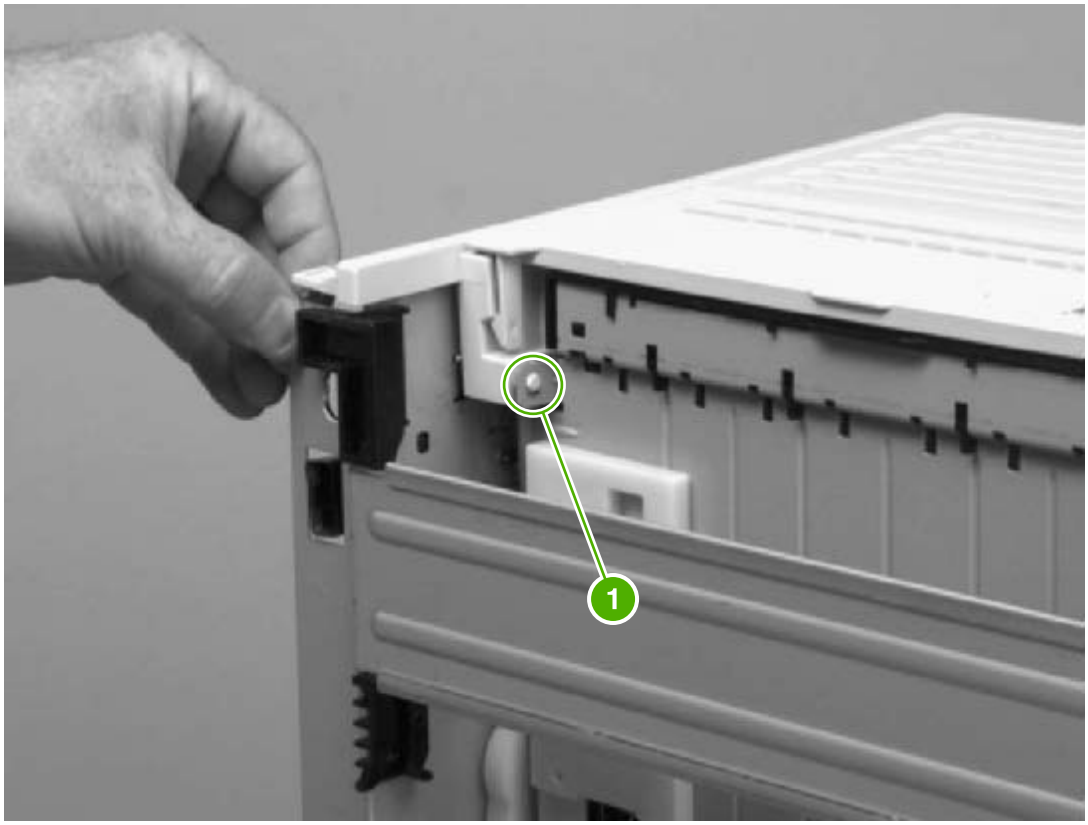


Figure 6-4 Removing the back cover (2 of 2)

8. Lift the cover straight up and away from the printer.

Duplexer tray (HP LaserJet P2015d, P2015dn, and P2015x printers only)

1. Remove the left-side cover, the right-side cover, and the back cover.

2. Pull the duplexer tray release-tab (1) to release the duplexer tray magnets.

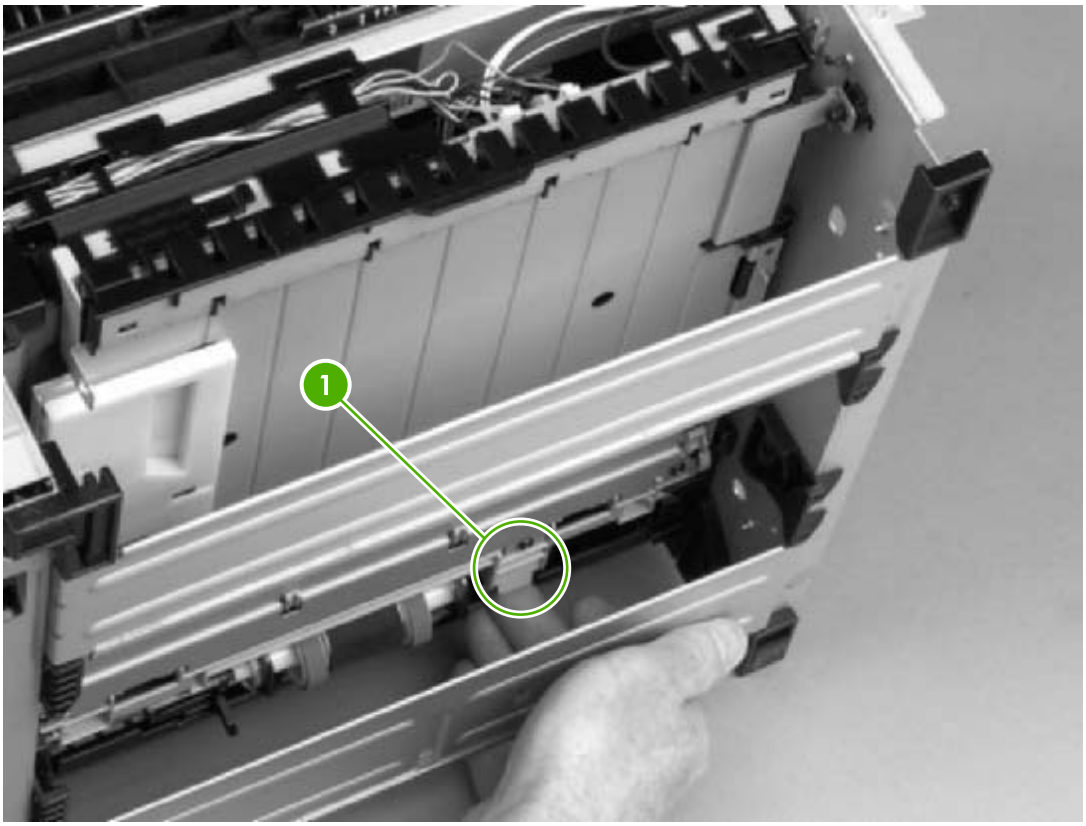


Figure 6-5 Removing the duplexer tray

3. Pull out the duplexer tray.

Top cover

1. Remove the left-side cover, the right-side cover, the back cover, and the duplexer tray.

2. Remove two screws (1) at the back of the printer.

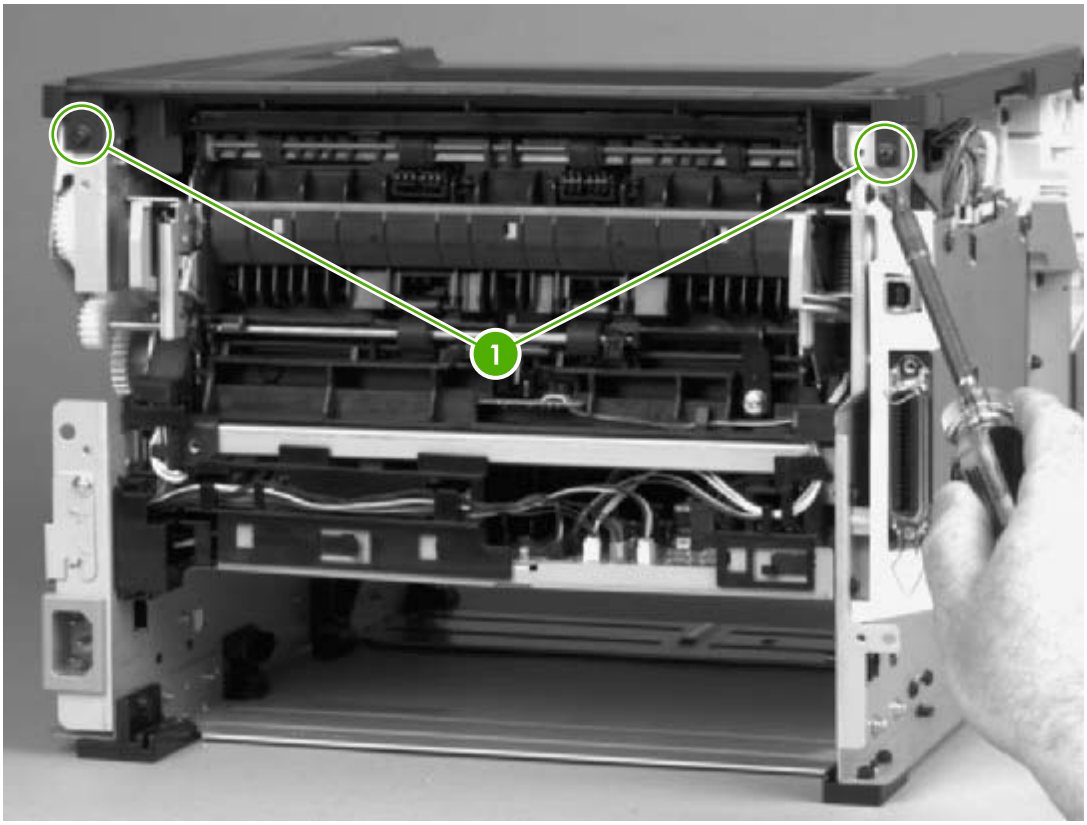


Figure 6-6 Removing the top cover (1 of 4)

3. Remove one screw (1) on the left side of the printer, and remove one screw (2) on the right side of the printer.

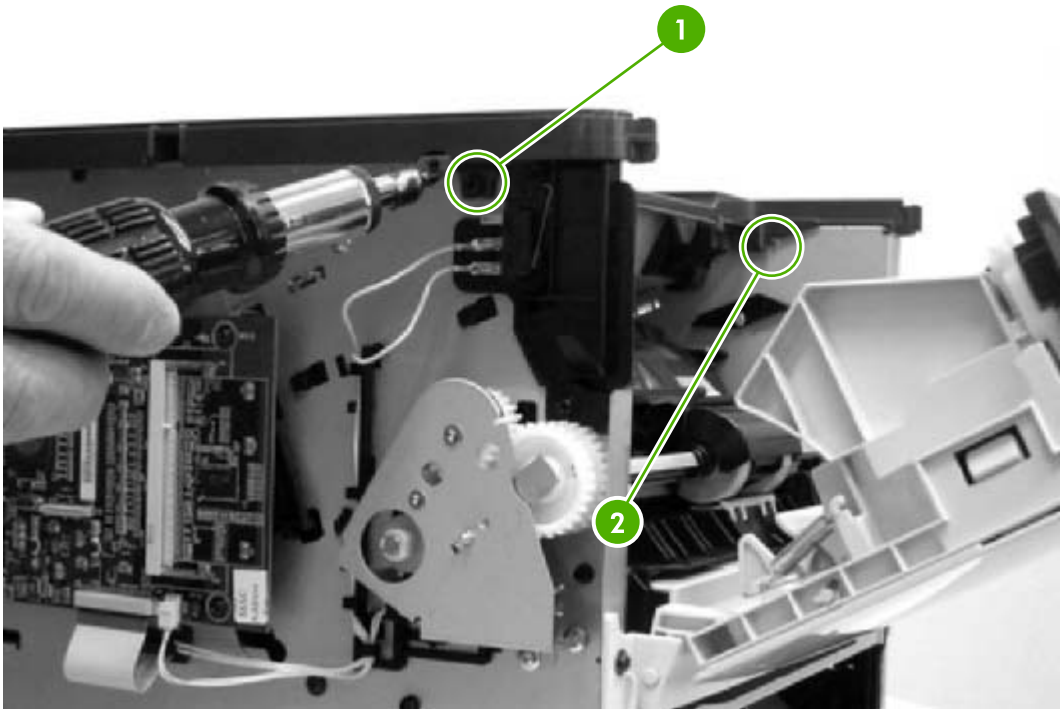


Figure 6-7 Removing the top cover (2 of 4)

4. Release the control-panel cable (1) on the left side of the printer.

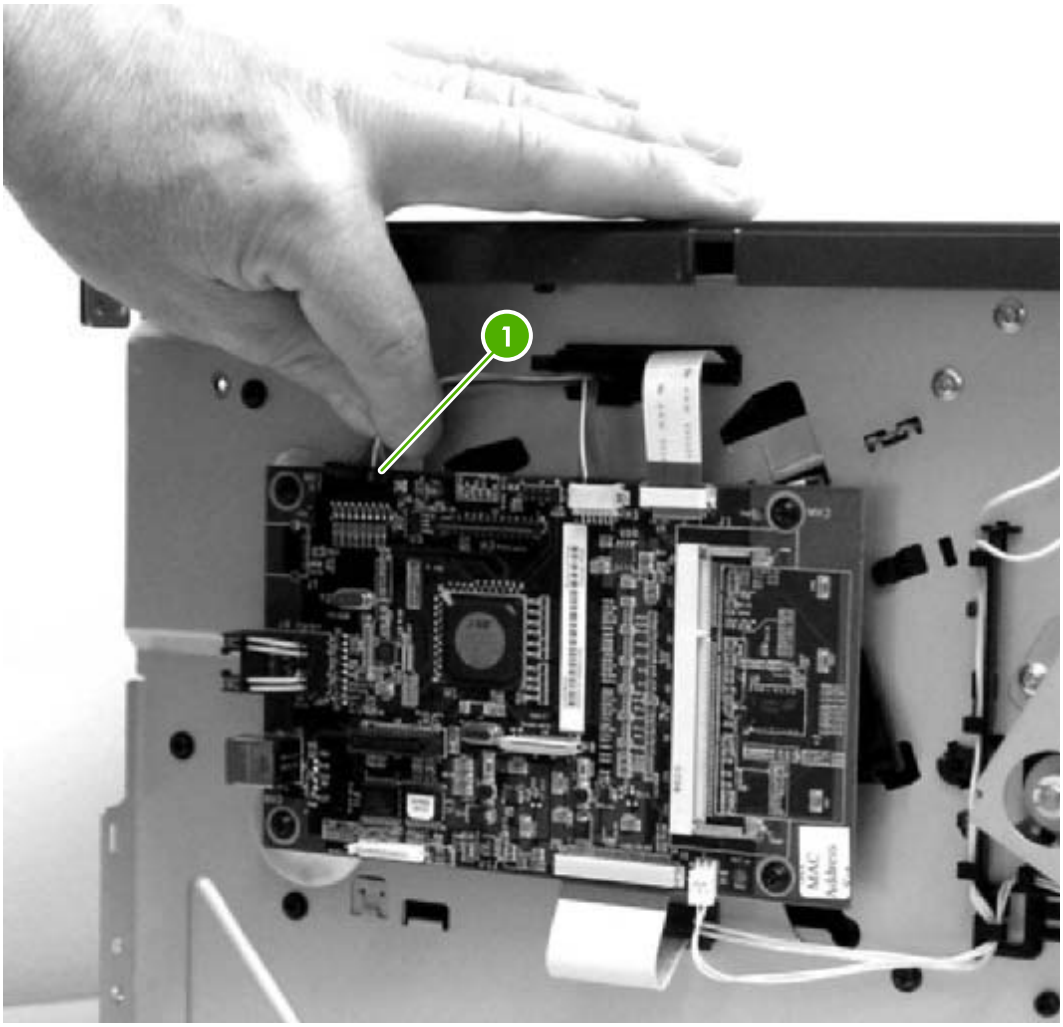


Figure 6-8 Removing the top cover (3 of 4)

5. Lift the top cover off the printer.

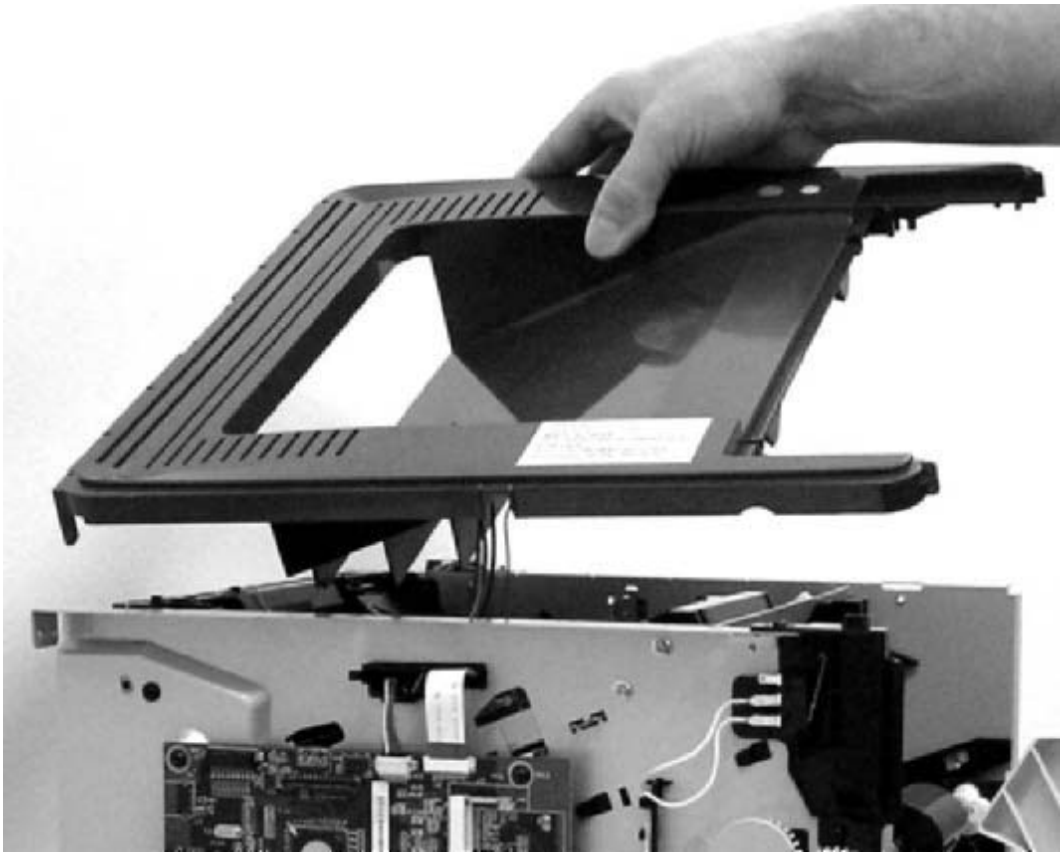


Figure 6-9 Removing the top cover (4 of 4)

Control panel

1. Remove all covers.
2. On the bottom of the top cover, remove two screws (1).

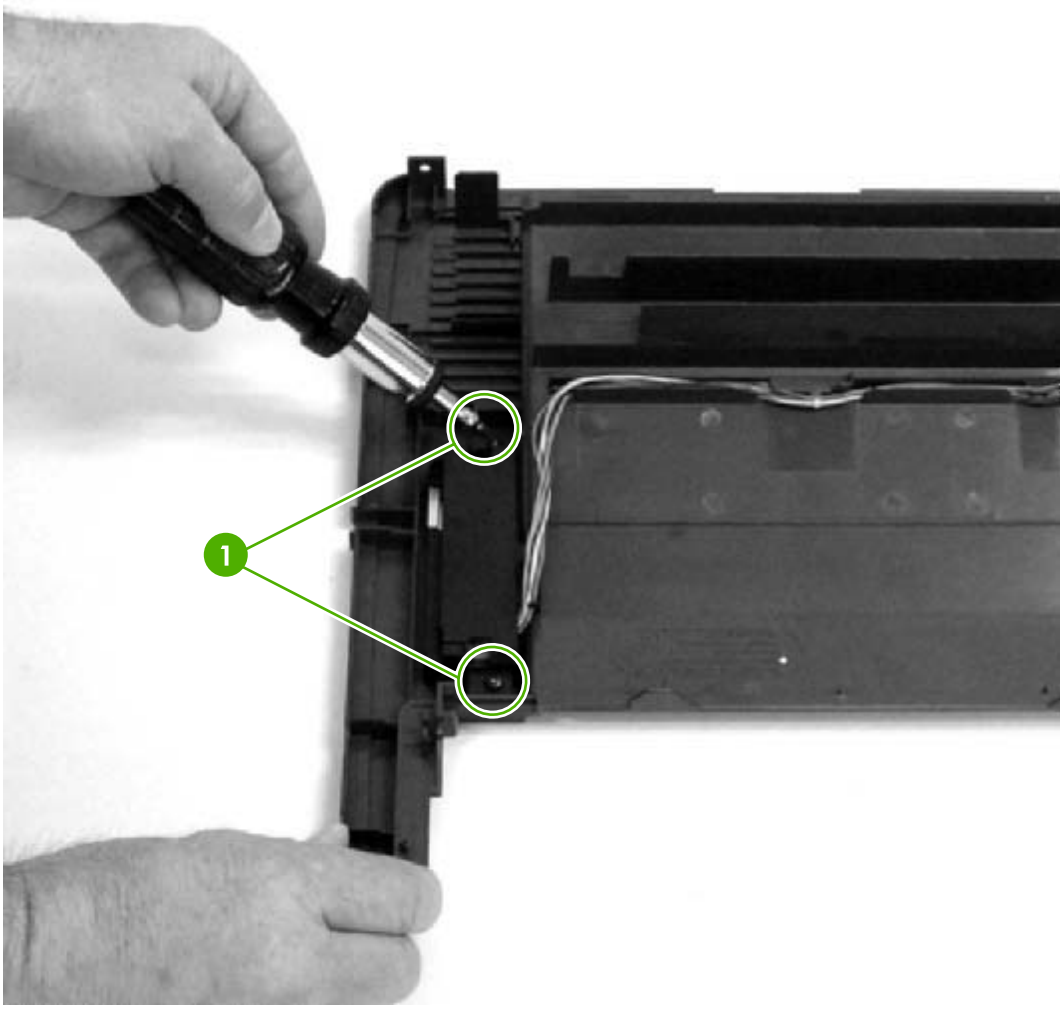


Figure 6-10 Removing the control panel (1 of 2)

3. Remove the control-panel wires from the wire guides.

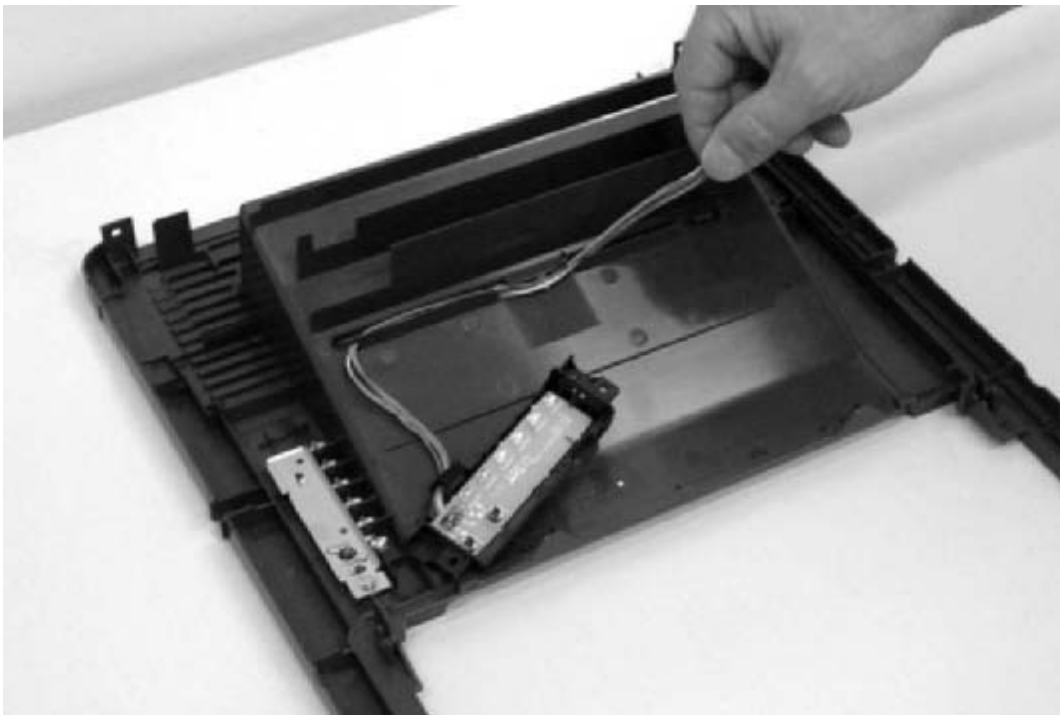


Figure 6-11 Removing the control panel (2 of 2)

Formatter

1. Remove the left-side cover.
2. Disconnect one cable (1) at the top of the formatter.
3. Disconnect one flat, flexible cable (2) at the top of the formatter.

> **CAUTION** Do not fold flat, flexible cables. Also, do not straighten pre-folds in flat, flexible cables.

4. Disconnect one flat, flexible cable (3) at the bottom of the formatter.
5. Disconnect one cable (4) at the bottom of the formatter.
6. Remove four screws (5).

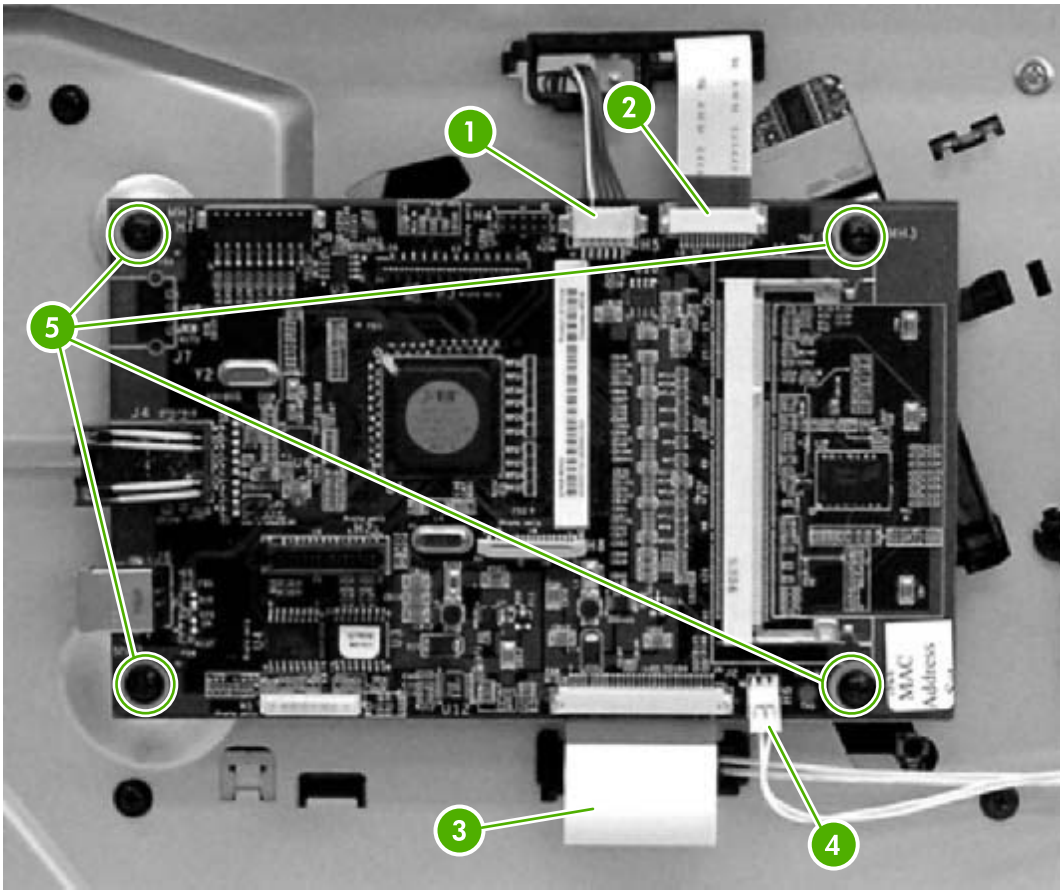


Figure 6-12 Removing the formatter

7. Remove the formatter.

Laser/scanner

1. Remove all covers.
2. Disconnect one flat, flexible cable (1) from the laser/scanner PCA.
3. Disconnect one cable (2) from the top of the laser/scanner.
4. Unthread all cables (3) from the laser/scanner cable guides.

NOTE Examine the cable routing as you unthread the cables.

5. Remove four screws (4).

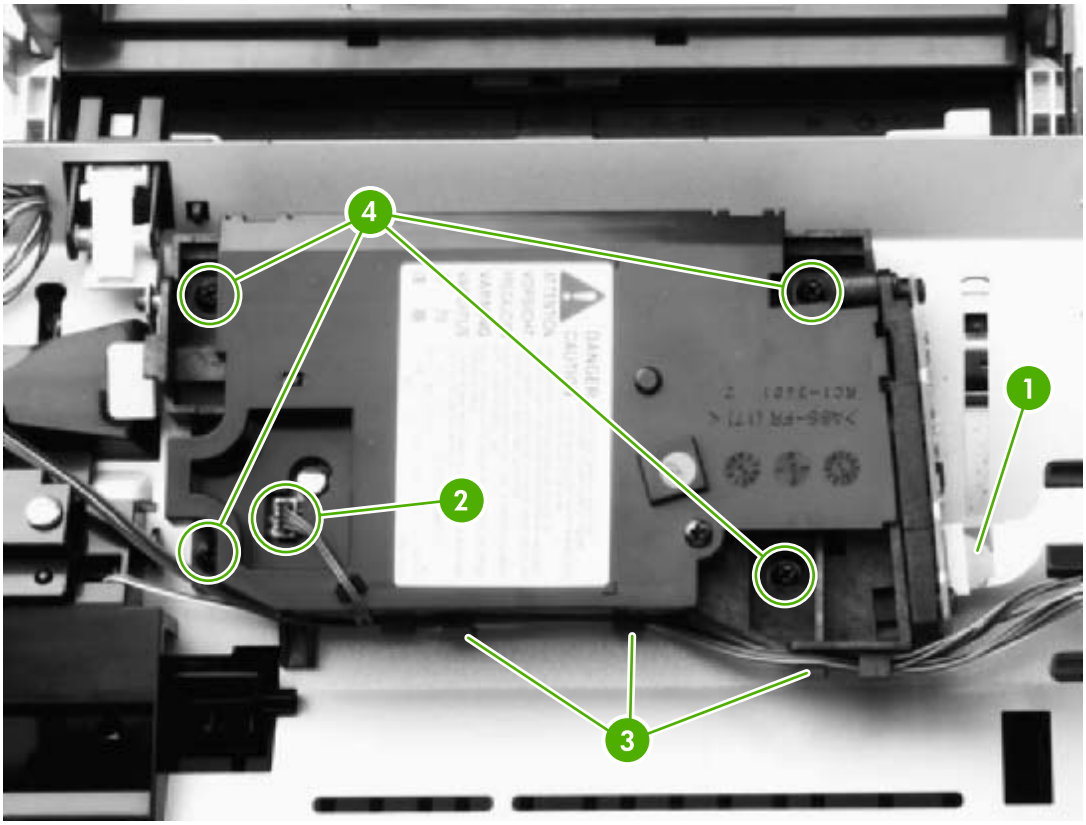


Figure 6-13 Removing the laser/scanner

6. Lift the laser/scanner out of the printer.

NOTE Examine the shutter switch as you lift the laser/scanner out of the printer.

Memory-tag-reader assembly

1. Remove all covers.
2. Remove the fan from the printer chassis.
3. Remove one cable (1) from the top of the memory-tag-reader cover.
4. Disconnect one cable (2) from the formatter.

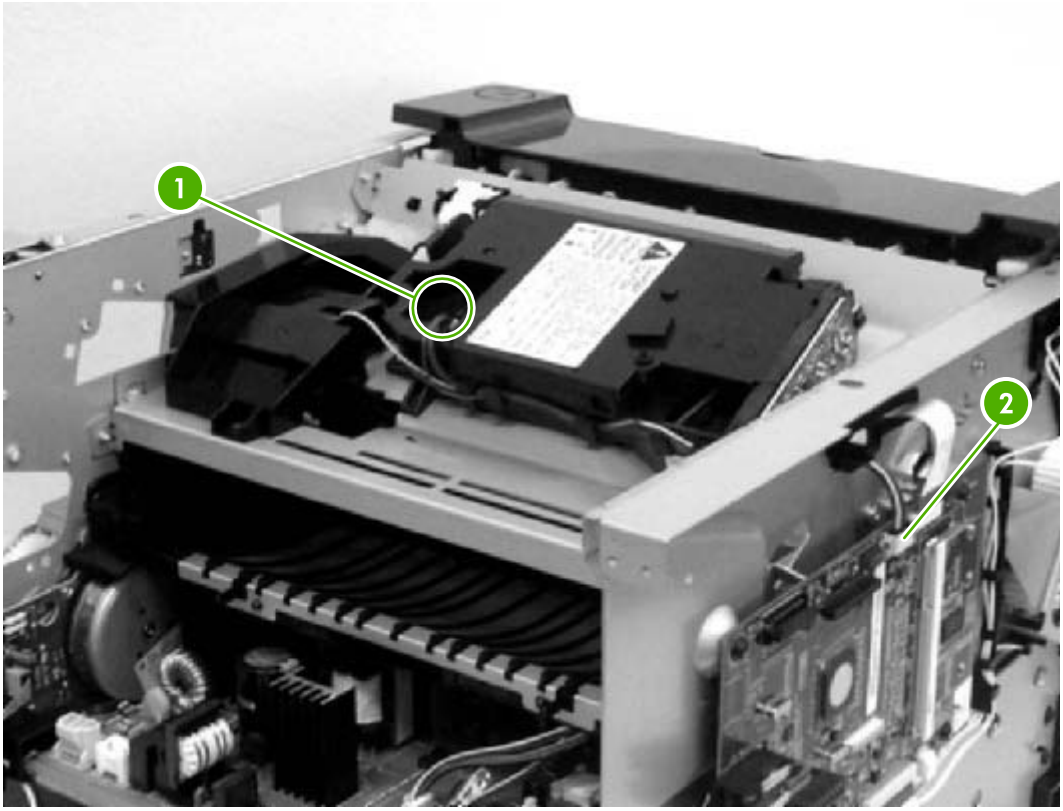


Figure 6-14 Removing the memory-tag-reader assembly (1 of 2)

5. Remove one screw (1).

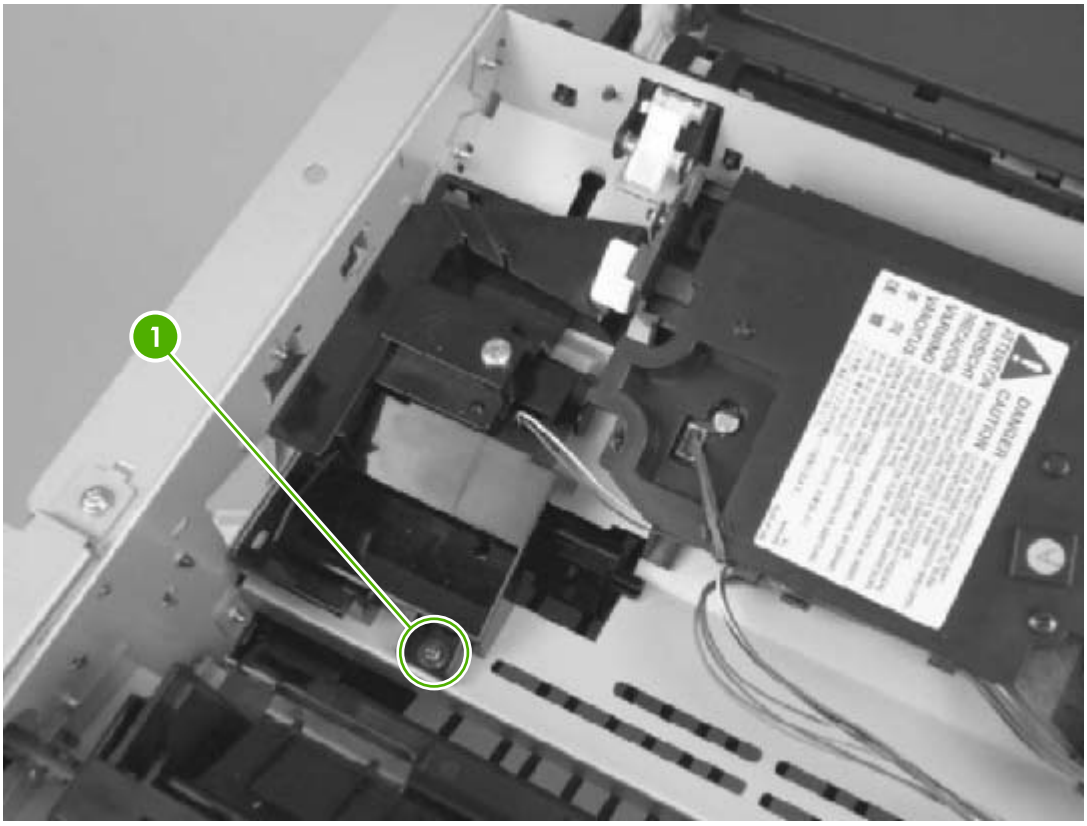


Figure 6-15 Removing the memory-tag-reader assembly (2 of 2)

6. Lift the back of the memory-tag-reader assembly slightly, and then slide the assembly toward the back of the printer to release it from the laser/scanner plate.

Duplex-drive PCA (HP LaserJet P2015d, P2015dn, and P2015x printers only)

1. Remove all covers.
2. Disconnect the duplex-drive cable (1) at the ECU, and then route the cable through the hole in the chassis.

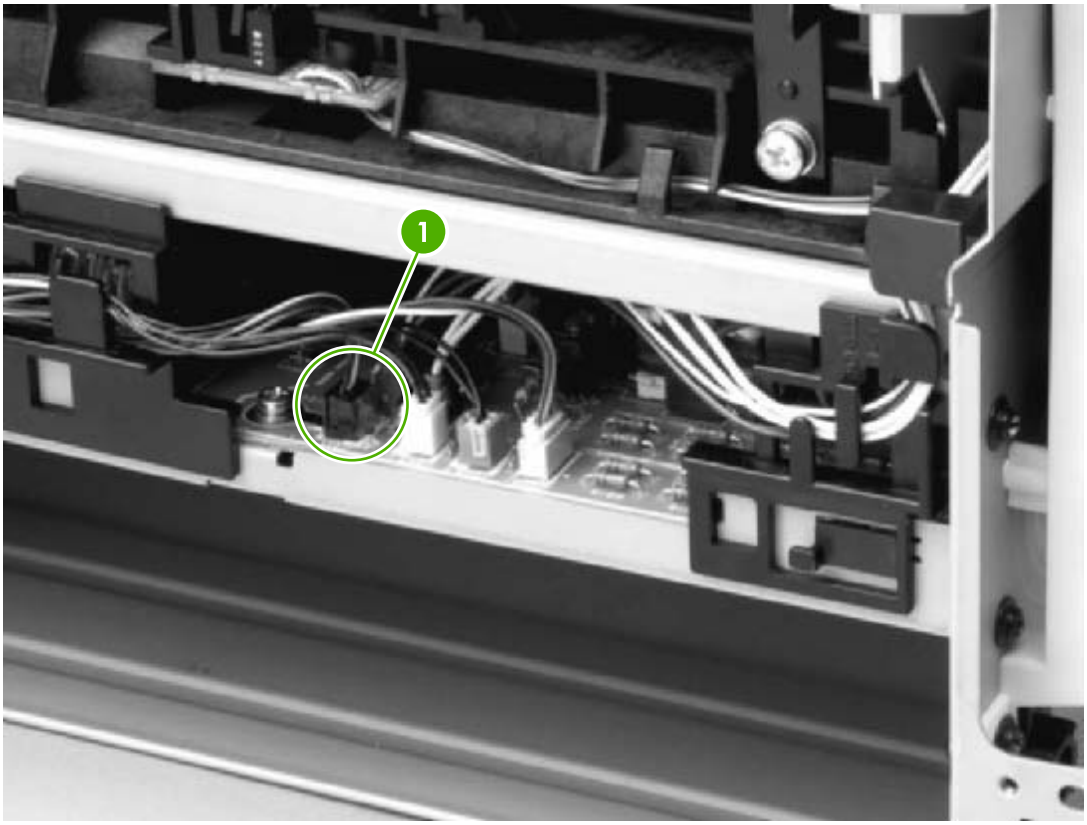


Figure 6-16 Removing the duplex-drive PCA (1 of 2)

3. Disconnect one cable (1) from the duplex-drive PCA.

4. Remove one screw (2), and then lift the duplex-drive PCA off the printer.

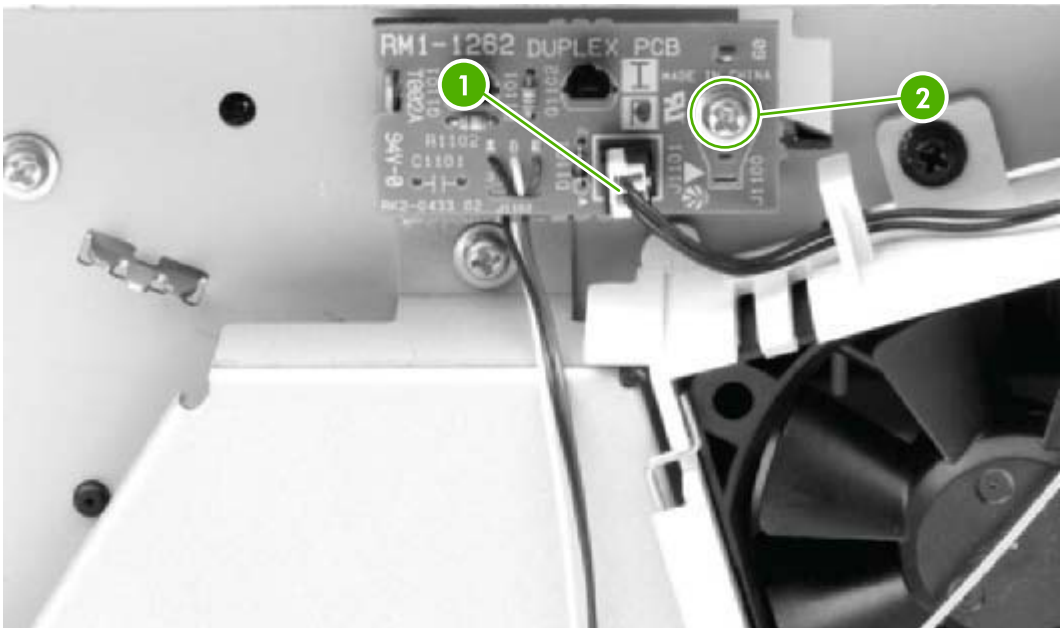


Figure 6-17 Removing the duplex-drive PCA (2 of 2)

Fuser

Several parts must be removed before you can remove the fuser. The following parts are included in this section about removing the fuser:

- Fan
- Duplex-drive gears/face-down gears
- Duplex solenoid
- Fuser

Fan

1. Remove all covers.
2. Disconnect the fan cable (1) at the ECU.

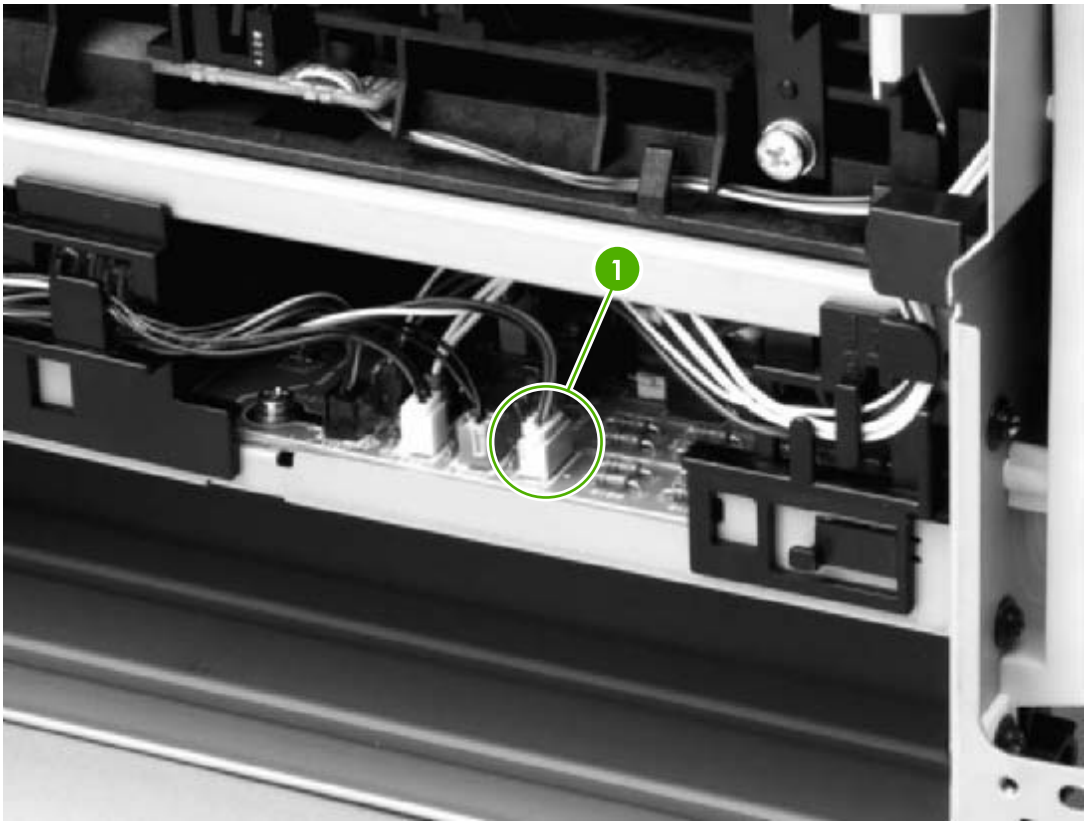


Figure 6-18 Removing the fan (1 of 2)

3. Unthread the fan wires from the retaining clips.
4. Remove two screws (1).

5. Unhook the fan clip (2) and then lift the fan off the printer.

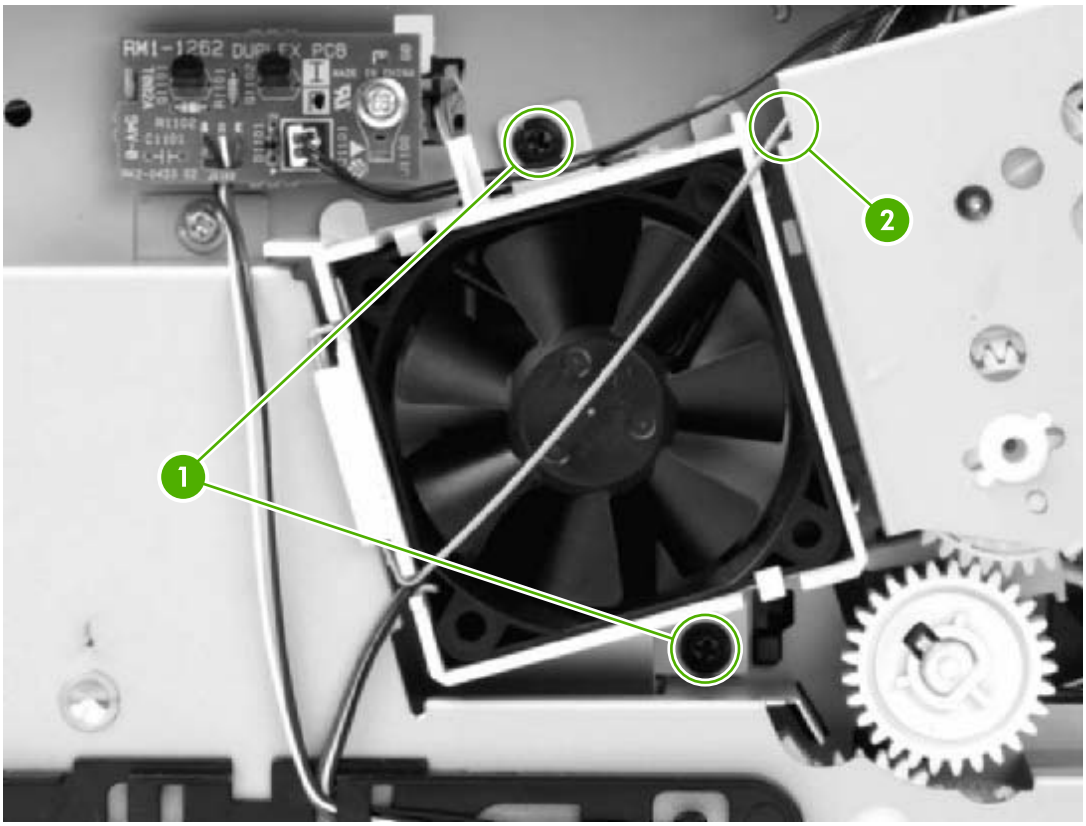


Figure 6-19 Removing the fan (2 of 2)

Duplex-drive gears (HP LaserJet P2015d, P2015dn, and P2015x printers only)

1. Remove all covers.
2. Remove the fan.

3. Remove three screws (1).

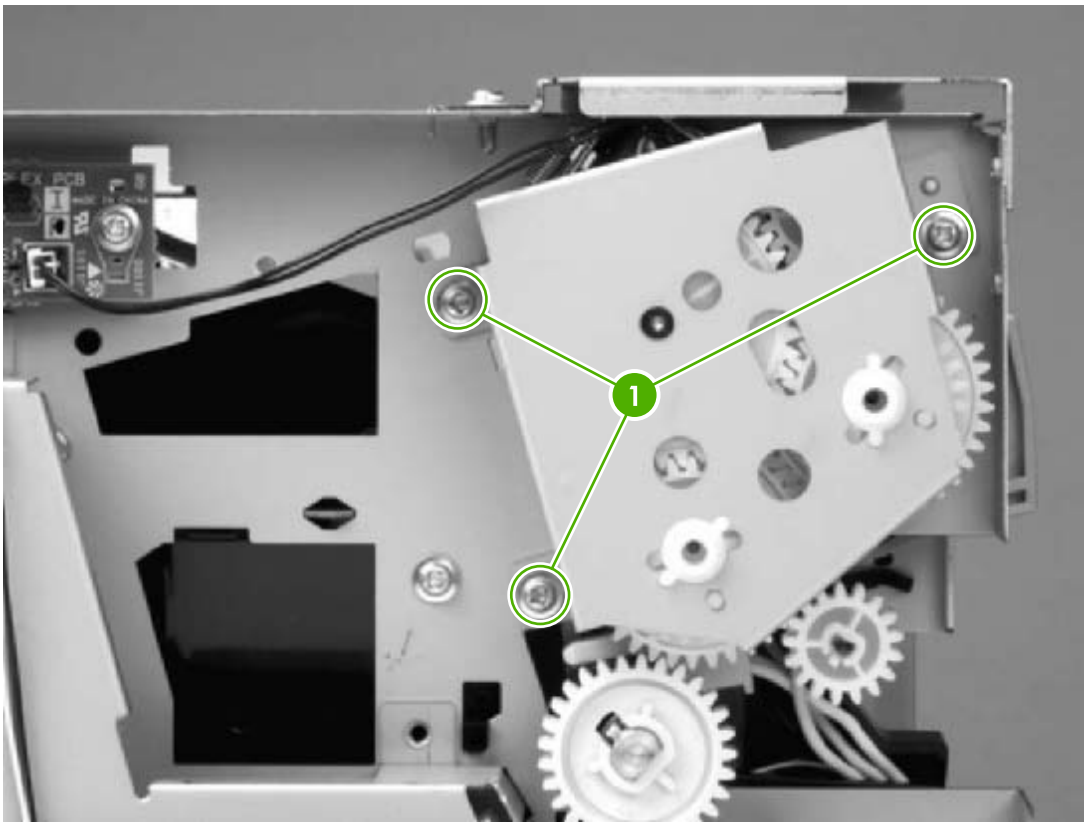


Figure 6-20 Removing the duplex-drive gears (1 of 2)

4. Lift the assembly away from the printer.

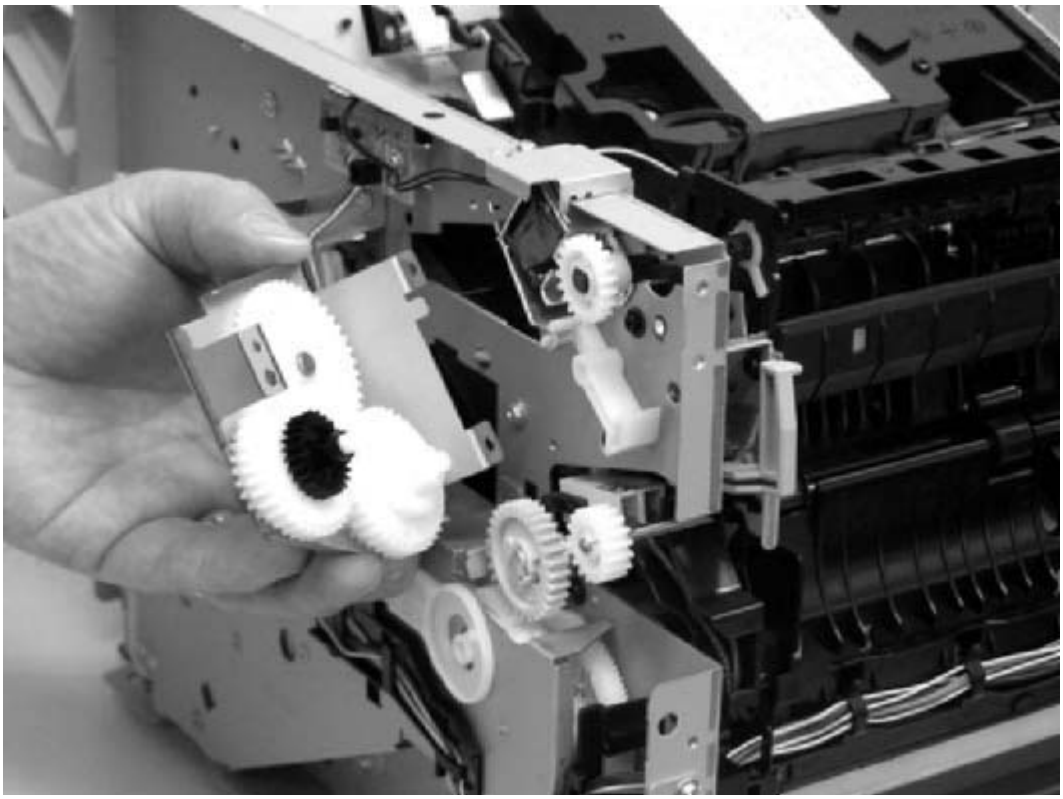


Figure 6-21 Removing the duplex-drive gears (2 of 2)

NOTE The gears are not attached to the gear plate. Carefully remove the gear plate and the gears together to prevent them from falling out of the assembly.

Duplex solenoid (HP LaserJet P2015d, P2015dn, and P2015x printers only)

1. Remove all covers.
2. Remove the fan.
3. Remove the duplex-drive gears.
4. Disconnect one cable (1) at the duplex-drive PCA.

5. Remove one screw (2), and then lift the solenoid off the printer chassis.

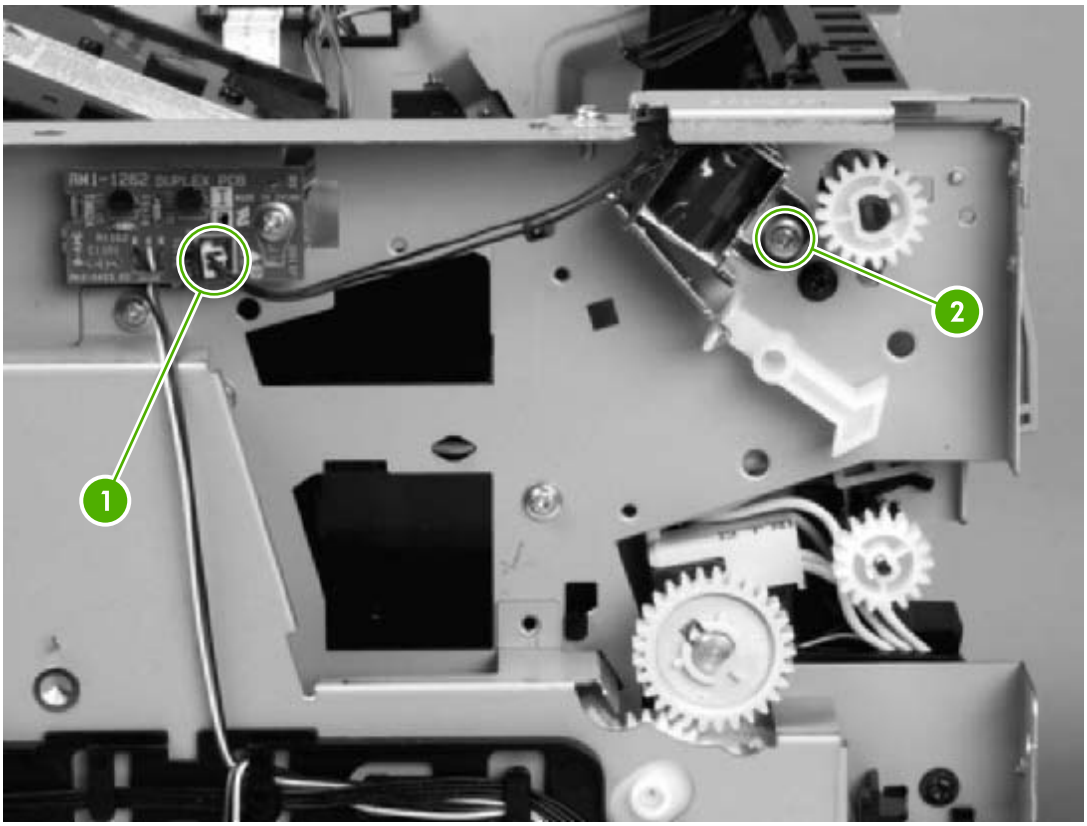


Figure 6-22 Removing the duplex solenoid

Fuser

1. Remove all covers.
2. Remove the fan.
3. Remove the duplex-drive gears or face-down gears.
4. Remove the formatter.
5. On the right side of the printer, press the tabs on two gears (1) to release the gears, and then slide the gears off the shafts.

6. Disconnect one cable (2) on the right side of the printer.

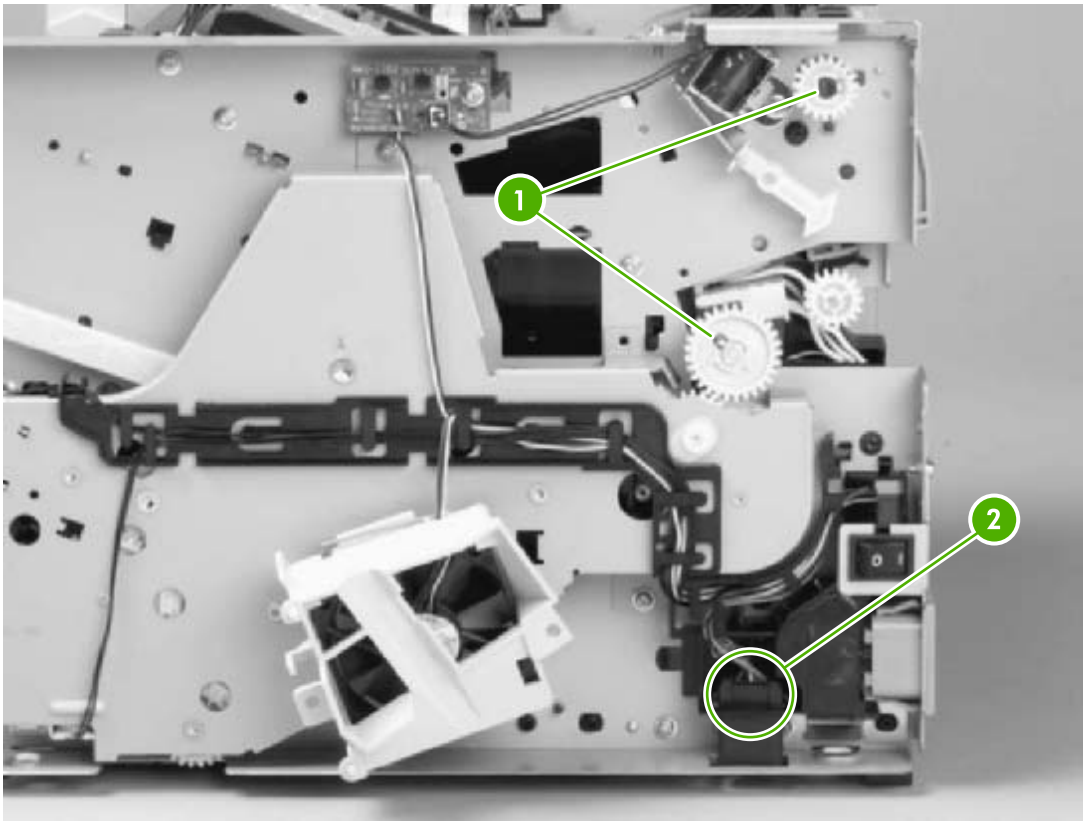


Figure 6-23 Removing the fuser (1 of 10)

7. Disconnect four cables (1) from the ECU, and then disconnect two more cables (2) that were behind the first set.

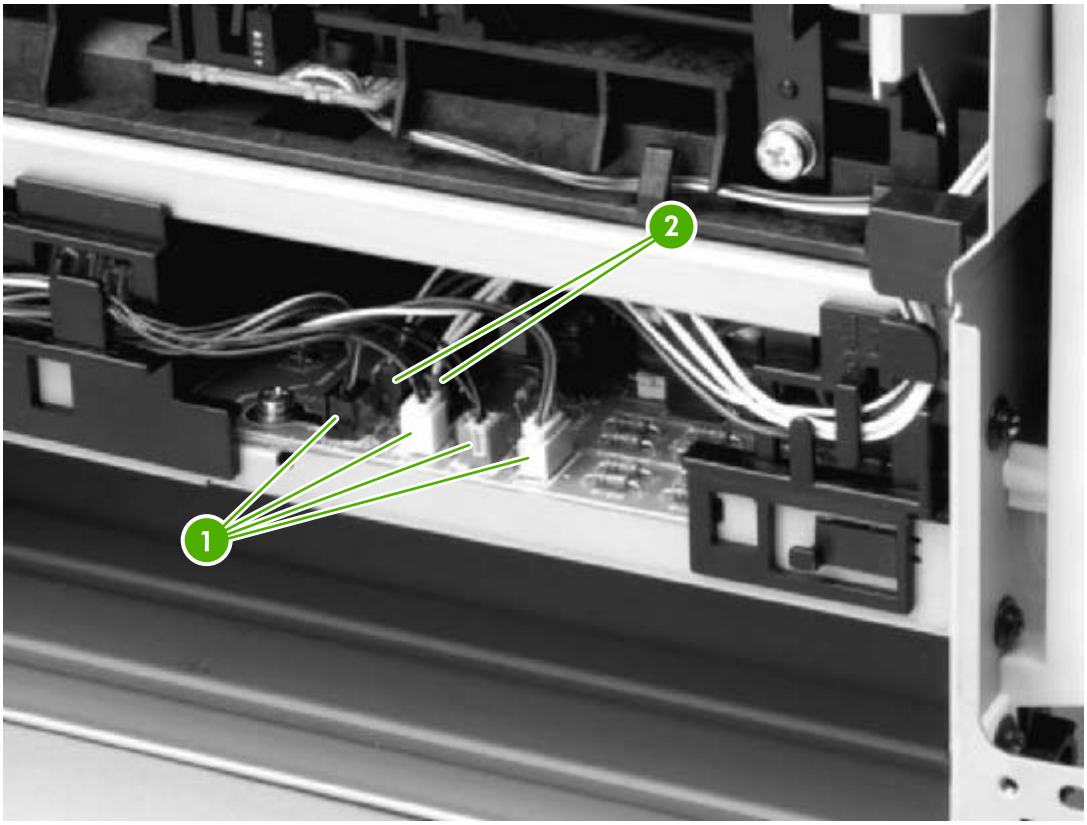


Figure 6-24 Removing the fuser (2 of 10)

8. Pull the tab on the cable holder (1) at the left side of the printer and slide it toward the center to release it from the frame, and then unroute the cables.

9. Pull the tab on the cable holder (2) and slide it toward the center to release it from the frame, and then unroute the cables.

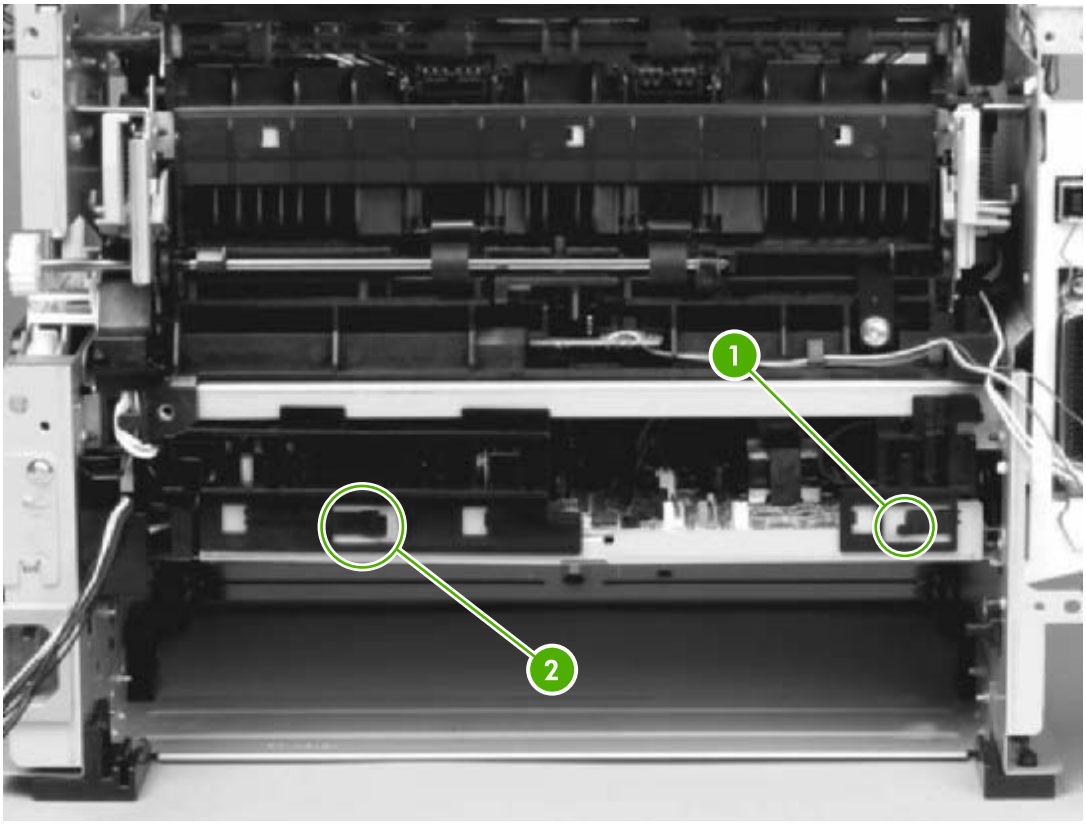


Figure 6-25 Removing the fuser (3 of 10)