2. Release one tab (callout 2), and then remove the fan.
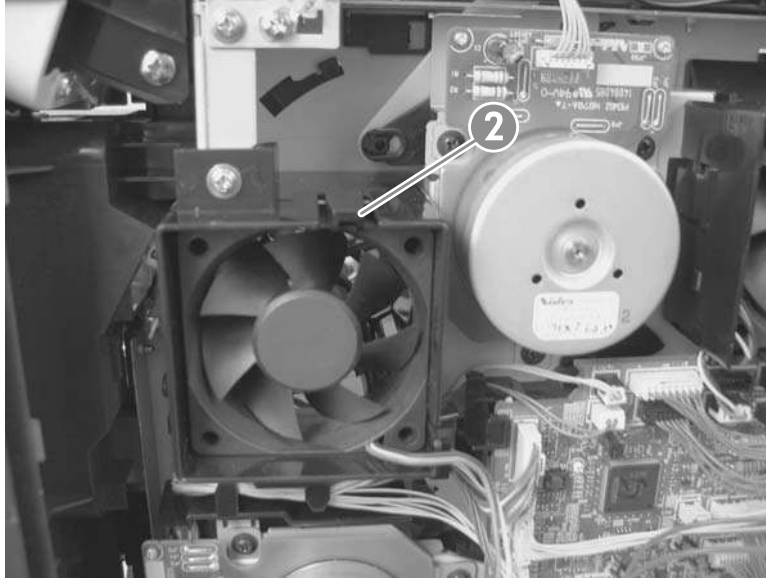
> ☼ **TIP:** When you reinstall the fan, the air must flow into the product. Verify that the airflow arrows that are embossed on the fan body point *into* the product.

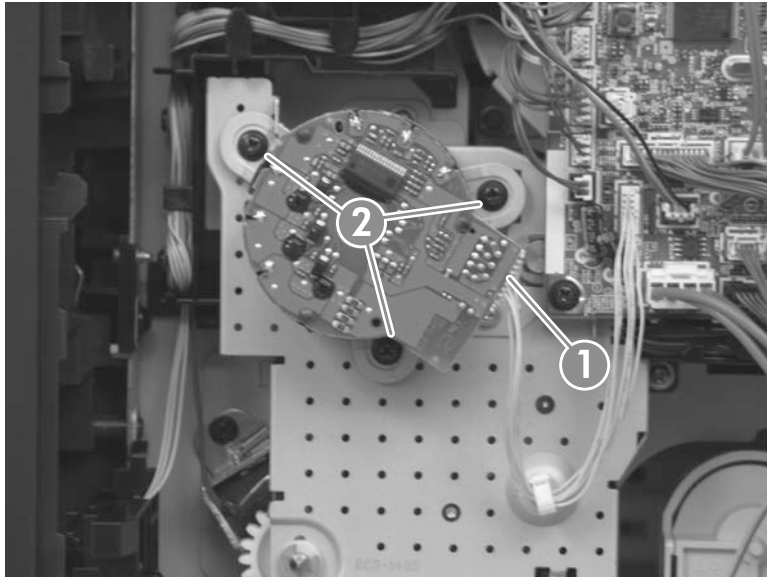**Figure 2-78** Remove fan FN103 (2 of 2)

Pickup-motor assembly (M101)

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.
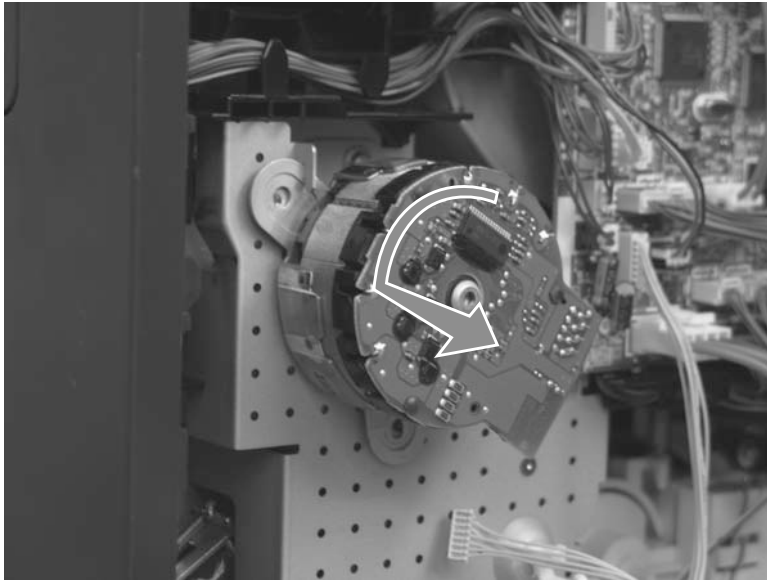
Remove the pickup-motor assembly

1. Disconnect one wire-harness connector (callout 1), and then remove three screws (callout 2).

Figure 2-79 Remove the pickup motor (1 of 2)

2. Roteat the motor assembly towards the front of the product to release it, and then remove it.

Figure 2-80 Remove the pickup motor (2 of 2)

💡 **Reinstallation tip**   Position the motor assembly on the product chassis, and then rotate it toward the back of the product to engage the tabs on the chassis with the assembly mounting bracket.

Drum-motor assembly (M102)

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

Remove the drum motor

1. Disconnect one wire-harness connector (callout 1), and the remove three screws (callout 2).

   Figure 2-81 Remove the drum motor (1 of 2)
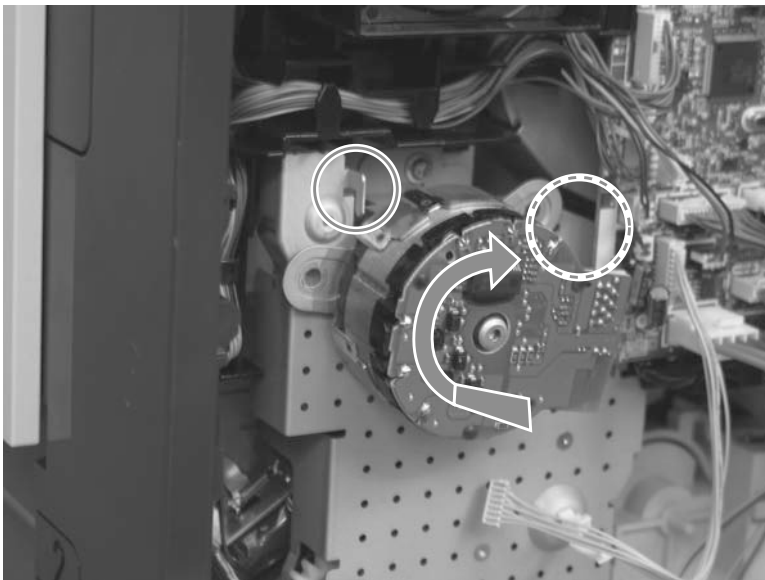
2. Rotate the motor assembly toward the front of the product to release it, and then remove it.

Figure 2-82 Remove the drum motor (2 of 2)

💡 **Reinstallation tip**   Position the motor assembly on the product chassis, and then rotate it toward the back of the product to engage the tabs on the chassis with the assembly mounting bracket.
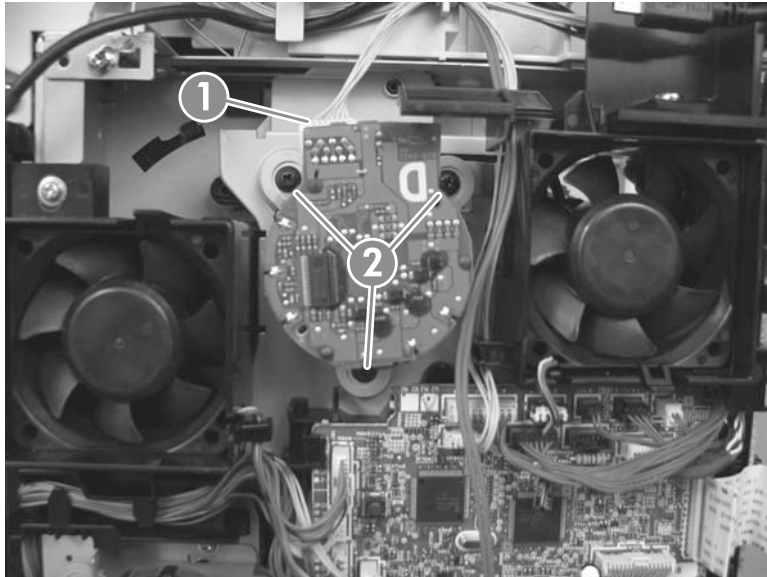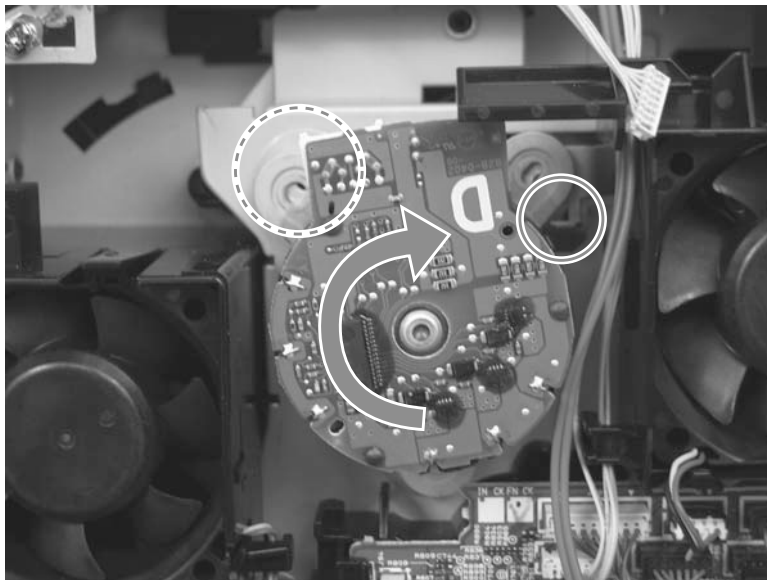
Lifter-motor assembly (M103)

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

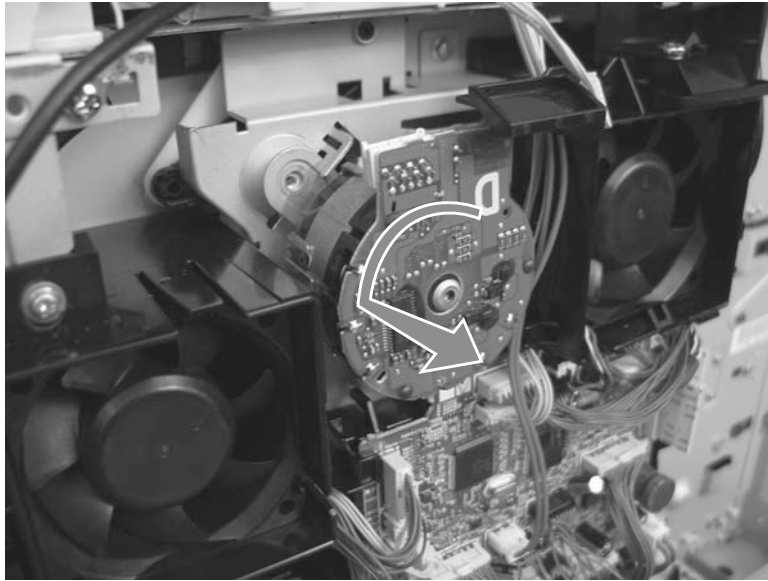- Right-side cover. See Right-side cover on page 95.

Remove the lifter motor

1. Disconnect one connector one wire-harness connector (callout 1), and then release the wire harness from two retainers (callout 2).

Figure 2-83 Remove the lifter motor (1 of 4)

2. Release one spring (callout 2).

NOTE: The spring is not captive. Do not lose the spring.

Figure 2-84 Remove the lifter motor (2 of 4)
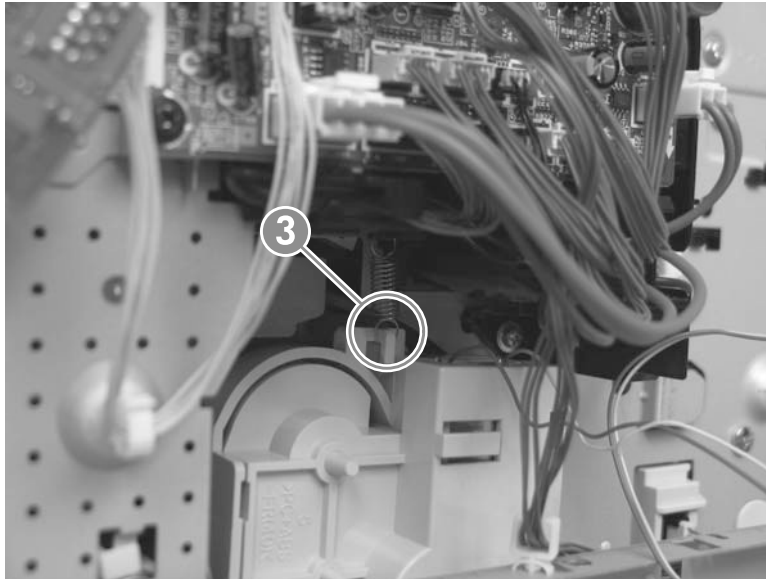
3. Release the wire-harness retainer (callout 4), move the wire harness (callout 5) out of the way, and then remove one screw (callout 6).

Figure 2-85 Remove the lifter motor (3 of 4)
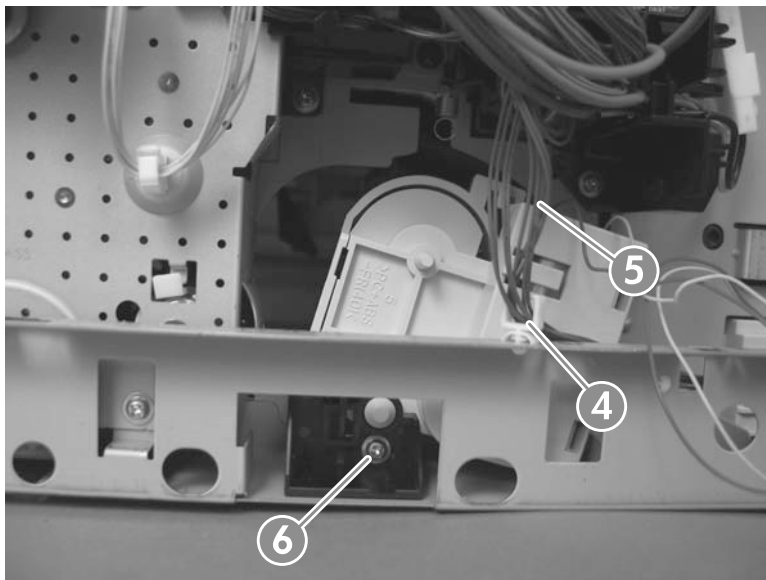
4. Remove the lifter-motor assembly.

Figure 2-86 Remove the lifter motor (4 of 4)

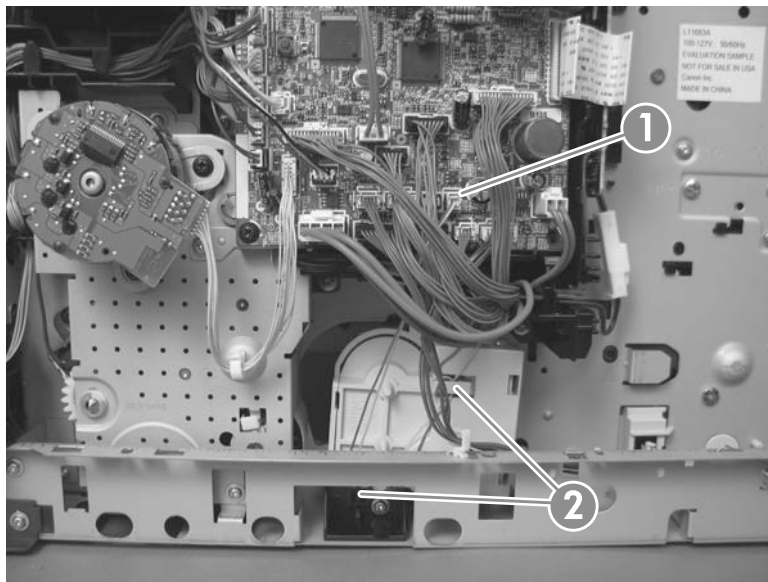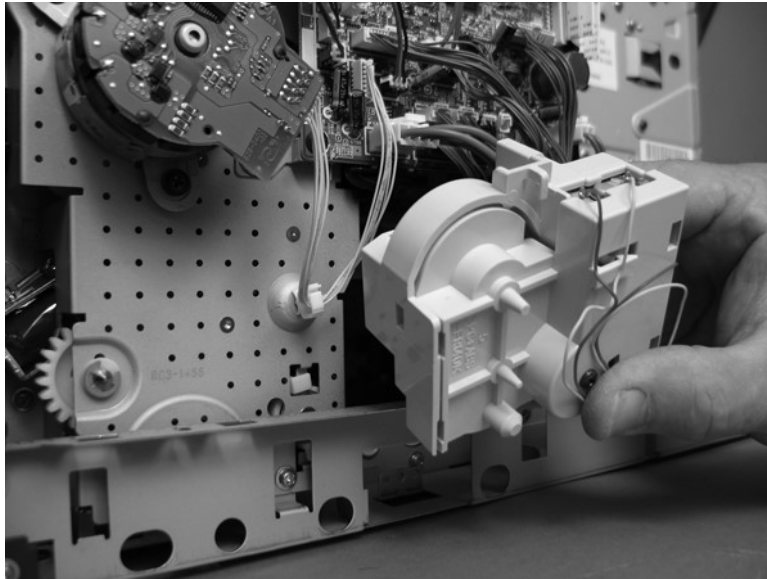# DC controller PCA

⚠ **CAUTION:** 🔲 ESD sensitive component.

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

Remove the DC controller PCA

1. Unplug all of the wire and cable connectors from the DC controller PCA.

💡 **TIP:** The DC controller shown below is only representational of the component found in this family of products. The component found in your specific product might look different than the one shown below.

Figure 2-87 Remove the DC controller PCA (1 of 4)

2. Remove two screws (callout 1),release one tab (callout 2), and then carefully remove the DC controller PCA.

⚠ **CAUTION:** Correct reinstallation of the DC controller is critical to correct operation of the product. If you are installing a *new* DC controller, follow the instructions in the reinstallation tips. If you are installing a *new formatter and a new DC controller*, see the special section that follows this DC controller section—Installing a new formatter and a new DC controller on page 129 .

Figure 2-88 Remove the DC controller PCA (4 of 4)
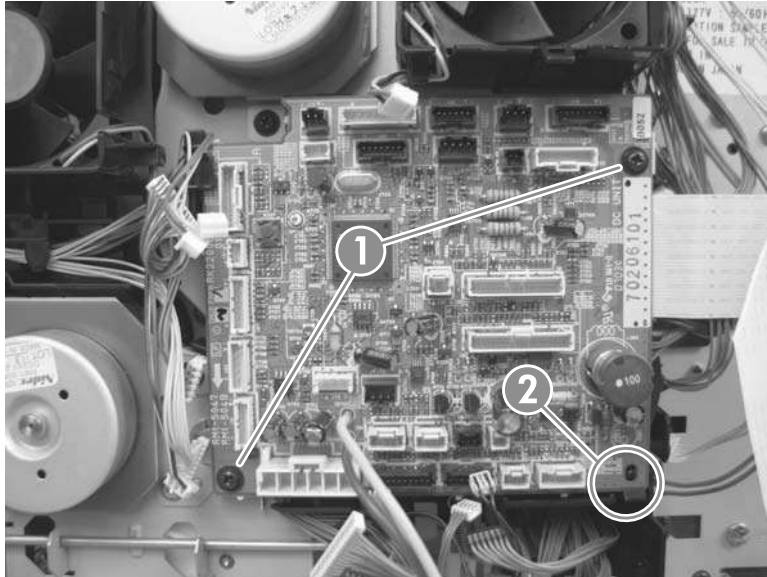
Reinstallation tip

📝 **NOTE:** DC controller PCA connector location J80 is not used. There will not be a connector for this location when the DC controller PCA is reinstalled.

1. After installing a *new* DC controller, turn the product on and wait for five minutes after the product reaches the **Ready** state.

📝 **NOTE:** Five minutes is required to allow for NVRAM settings to be written.

2. Turn the product off.

3. Turn the product on again, and then wait five minutes after the product reaches the Ready state.

4. Print a configuration page to verify against original settings.

Installing a new formatter and a new DC controller

⚠ **CAUTION:** Do not replace the DC controller and the formatter at the same time.

1. Turn the product off.

2. Remove the formatter (see Formatter cover and formatter cage on page 71) and replace it with the new formatter.

3. Turn the product on and then wait for five minutes after the product reaches the **Ready** state.

📝 **NOTE:** Five minutes is required to allow for NVRAM settings to be written. The same five-minute wait is required several times during this procedure.

4. Turn the product off.

5. Turn the product on again, and then wait five minutes after the product reaches the Ready state.

6. Turn the product off.

7. Remove the DC controller (see DC controller PCA on page 128) and replace it with the new DC controller.

8. Turn the product on and wait for five minutes after the product reaches the **Ready** state.

9. Turn the product off.

10. Turn the product on again, and then wait five minutes after the product reaches the Ready state.

11. Print a configuration page to verify against original settings.

Pickup-drive assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

- Pickup-motor assembly. See Pickup-motor assembly (M101) on page 121.

- DC controller PCA. See DC controller PCA on page 128.

> **☼ TIP:** The pickup-motor wire harness is disconnected from the motor assembly. Leave the wire harness connected to the DC controller PCA so it is not lost when the PCA is removed.

Remove the pickup-drive assembly

1. Release the wire harnesses from the retainer (callout 1) located on the lifter-motor side of the pickup-drive assembly.

   Figure 2-89 Remove the pickup-drive assembly (1 of 8)
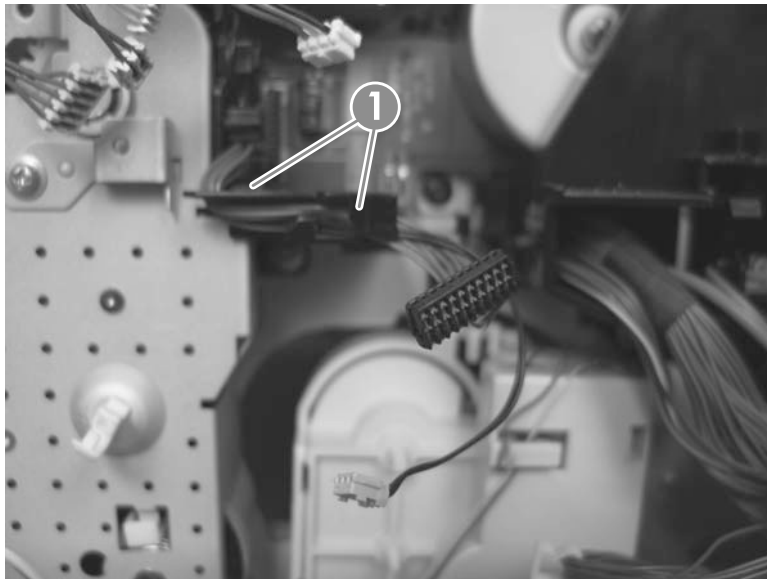
2. Release the solenoid wire harness (callout 2) from the retainer (callout 3).

💡 **TIP:** Do not damage the wire harness when removing it from the retainer. It might be easier to remove all or the wire harnesses together to release the solenoid wire harness.

Figure 2-90 Remove the pickup-drive assembly (2 of 8)
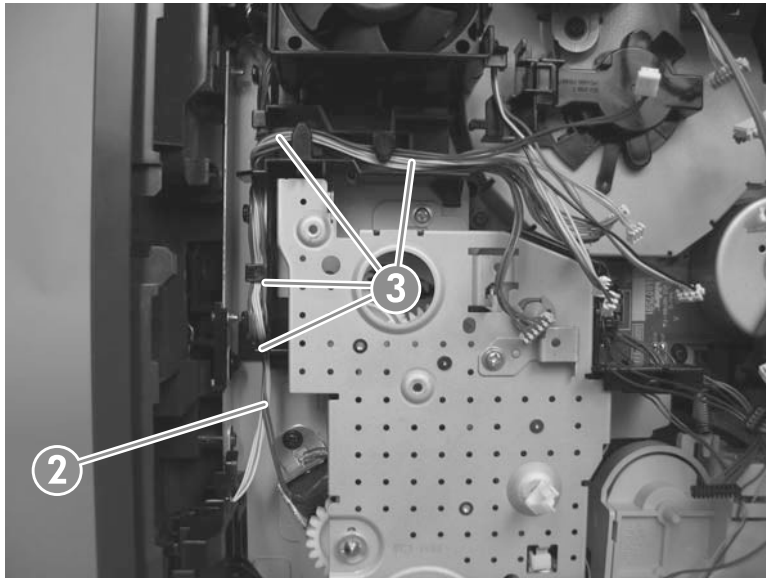
3. Remove five screws (callout 4).

Figure 2-91 Remove the pickup-drive assembly (3 of 8)
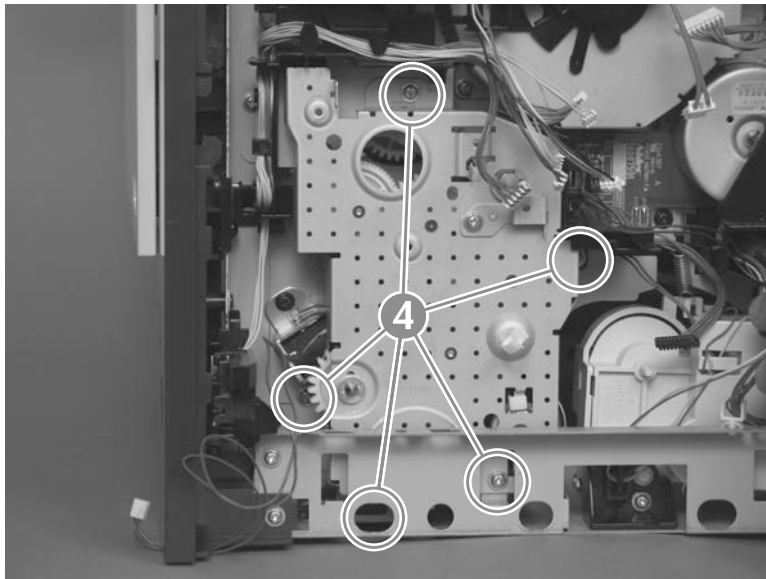
4. Remove one e-clip (callout 5).

Figure 2-92 Remove the pickup-drive assembly (4 of 8)
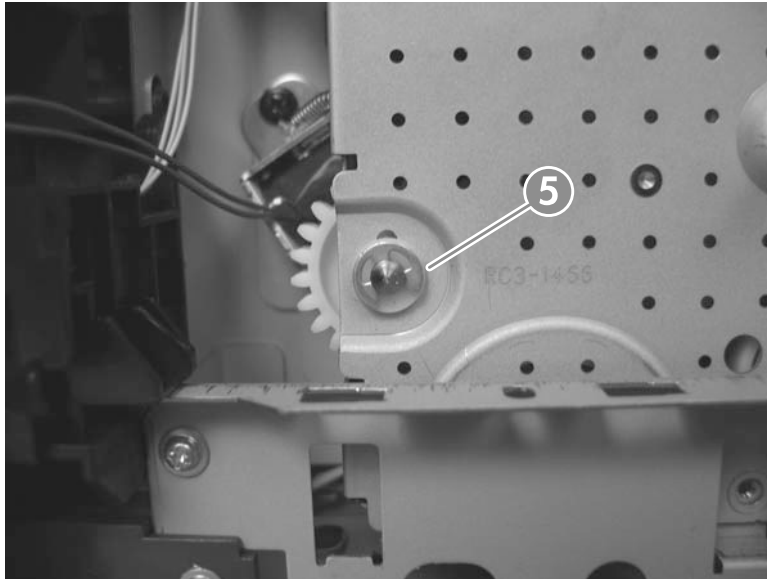
5. Remove one shaft collar (callout 6).

Figure 2-93 Remove the pickup-drive assembly (5 of 8)
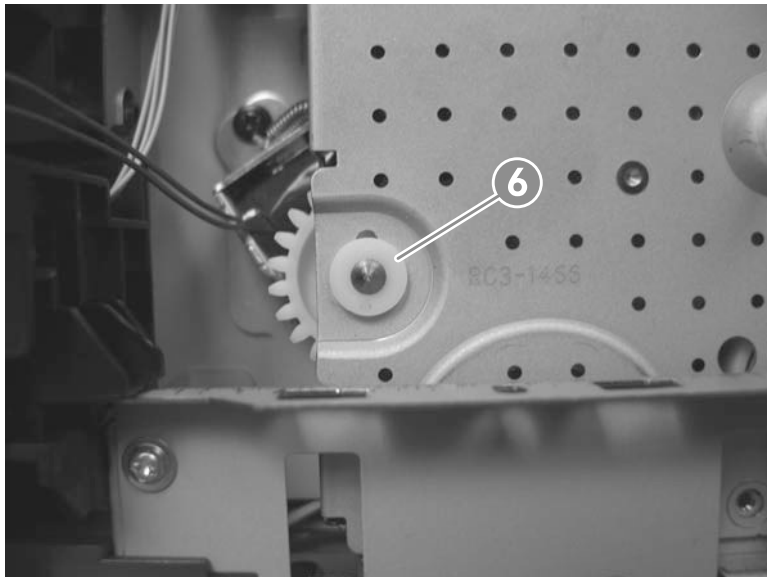
6. Push the tray drive-gear/shaft (located where the e-clip and shaft collar were removed in the previous steps) into the Tray 2 cavity.

Figure 2-94 Remove the pickup-drive assembly (6 of 8)
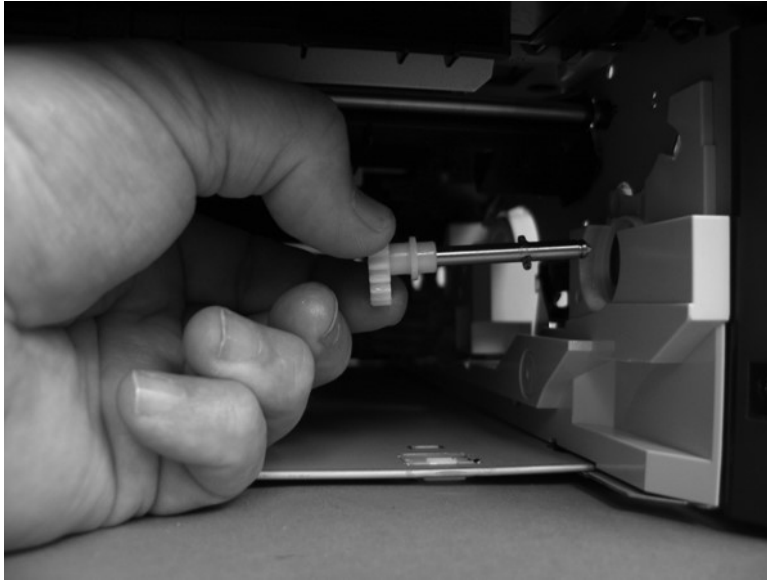
7. Two gears located inside the assembly are not captive when the assembly is removed. Do not lose these gears when handling the assembly. If the gears are dislodged during removal, use the figure below to correctly reinstall them.

☼ **TIP:** The gears in the assembly have a special grease applied to them at the factory. Try not to remove this grease when handling the assembly.

Figure 2-95 Remove the pickup-drive assembly (7 of 8)
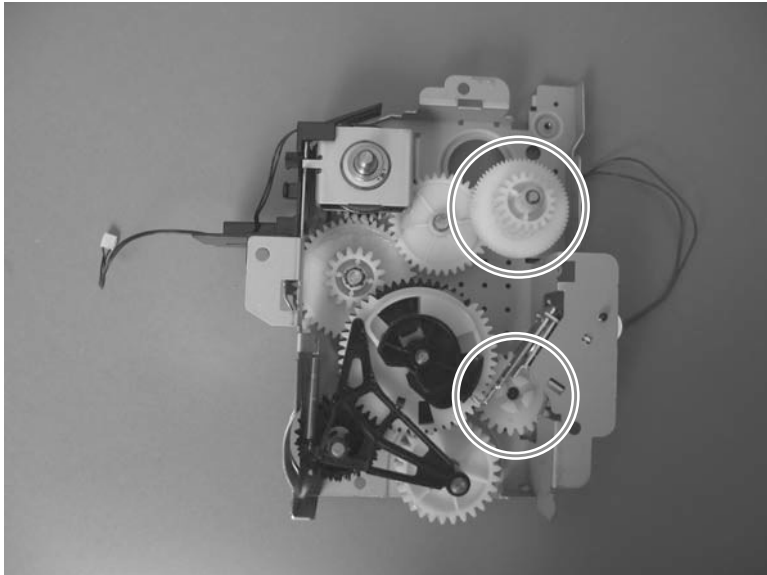
8. Reach inside the product and push the rear Tray 2 feed roller up into its raised position (this disengages the roller-lifting arm from the clutch gear), and then remove the pickup-drive assembly.
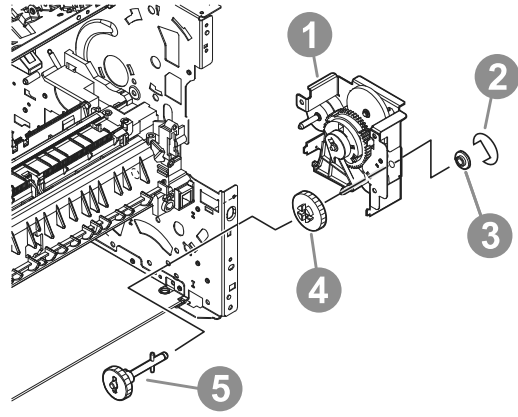
Figure 2-96 Remove the pickup-drive assembly (8 of 8)
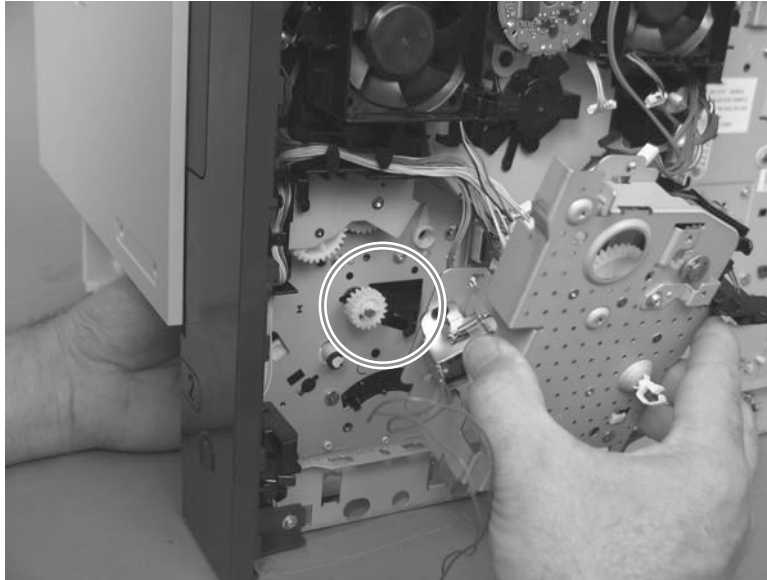
Reinstall the pickup-drive assembly

When you reinstall the paper-delivery drive assembly gears and shaft, verify that the gears are seated on the shaft-locking bars and that the shaft collars are correctly positioned in the paper-pickup drive-gear assembly mounting bracket and product chassis.

Table 2-2 Pickup-drive assembly

1	Pickup drive unit
2	E-clip
3	Bushing
4	23T gear
5	Retard roller drive shaft

Fuser-motor assembly (M299)

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

- Inner connecting PCA. See Inner connecting PCA on page 114.

  NOTE: Do not completely remove the inner connecting PCA. Remove the mounting screws, and then move the PCA out of the way.

- DC controller. See DC controller PCA on page 128.

Remove the fuser-motor assembly

1. Release one spring (callout 1).

   CAUTION: The spring is not captive. Do not lose the spring.

   Figure 2-97 Remove the fuser-motor assembly (1 of 3)
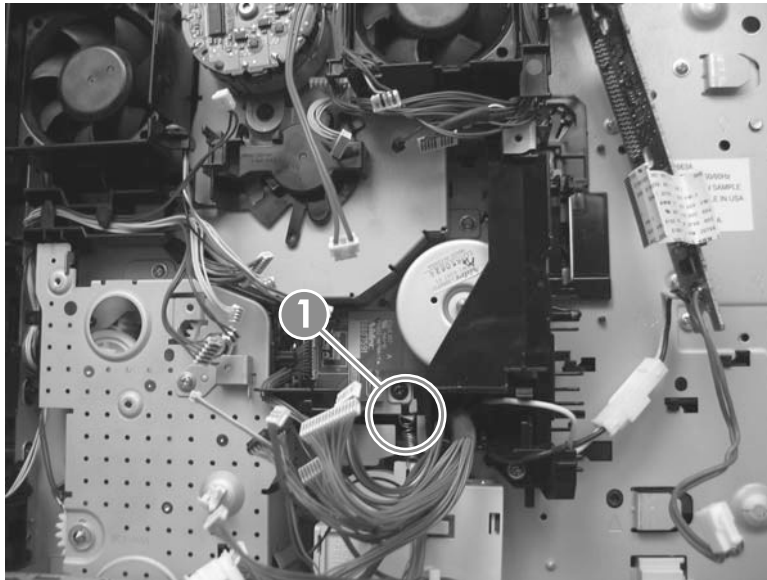
2. Remove two screws (callout 2) and then remove the guide (callout 3).

Figure 2-98 Remove the fuser-motor assembly (2 of 3)
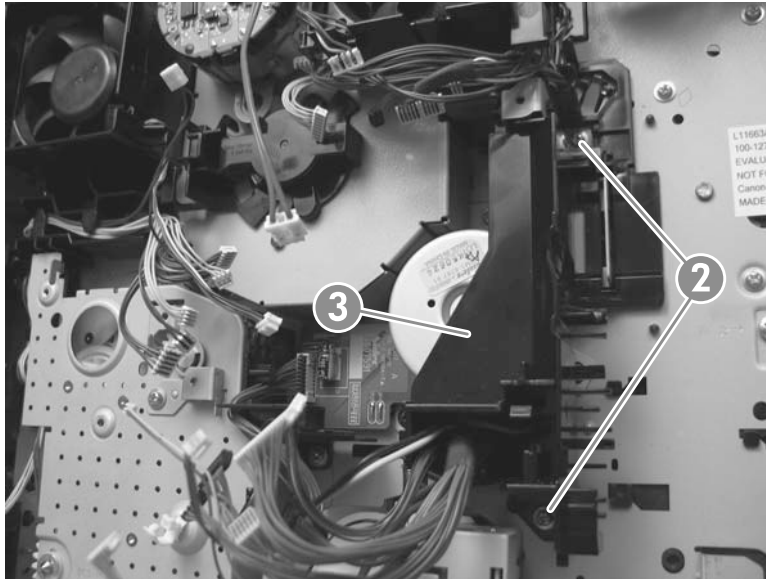
3. Disconnect one wire-harness connector (callout 4), and then remove three screws (callout 5). Remove the fuser-motor assembly.

> ☼ **Reinstallation tip**   Install the fuser-motor wire harness on the replacement fuser-motor assembly.

Figure 2-99 Remove the fuser-motor assembly (3 of 3)
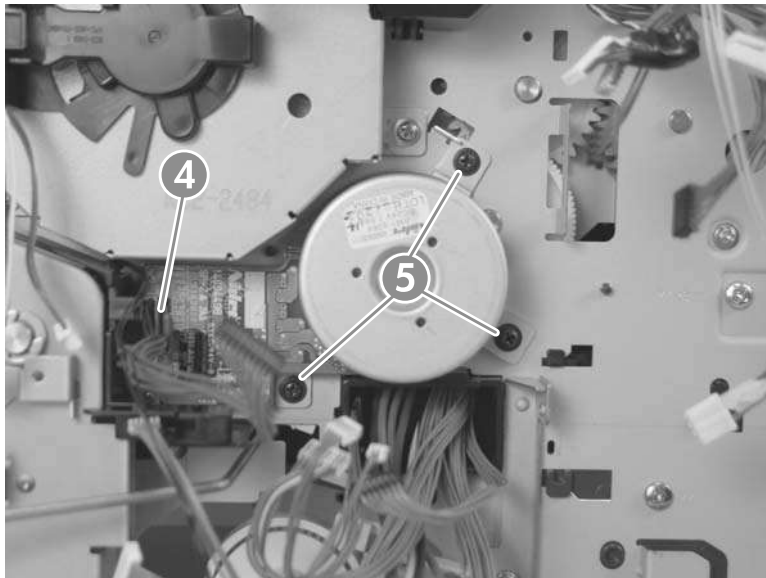
Drum-drive assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

- Fan FN102. See Fan FN102 on page 117.

- Fan FN103. See Fan FN103 on page 119.

- Drum-motor assembly. See Drum-motor assembly (M102) on page 123.

- DC controller PCA. See DC controller PCA on page 128.

Remove the drum-drive assembly

1. Remove one screw (callout 1) and the fan FN103 duct.

   Figure 2-100 Remove the drum-drive assembly (1 of 4)
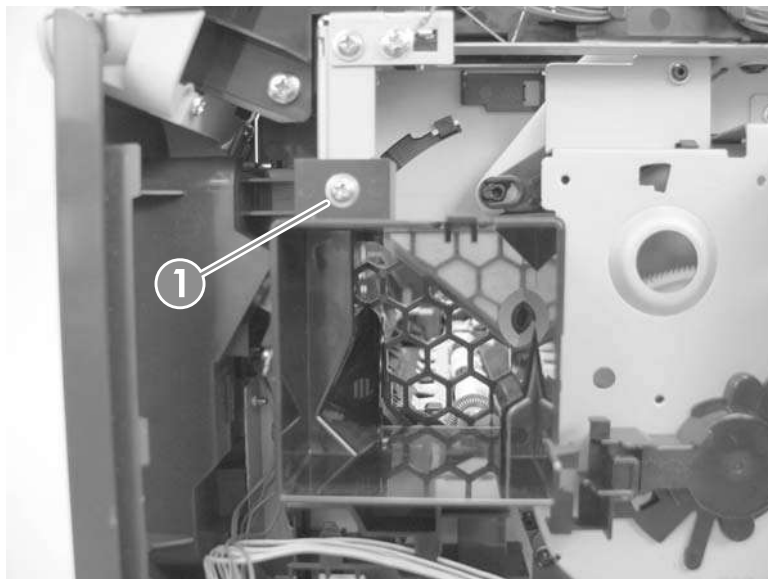
2. Release the wire-harnesses from the retainer on the fan FN102 duct (callout 2) .

Figure 2-101 Remove the drum-drive assembly (2 of 4)
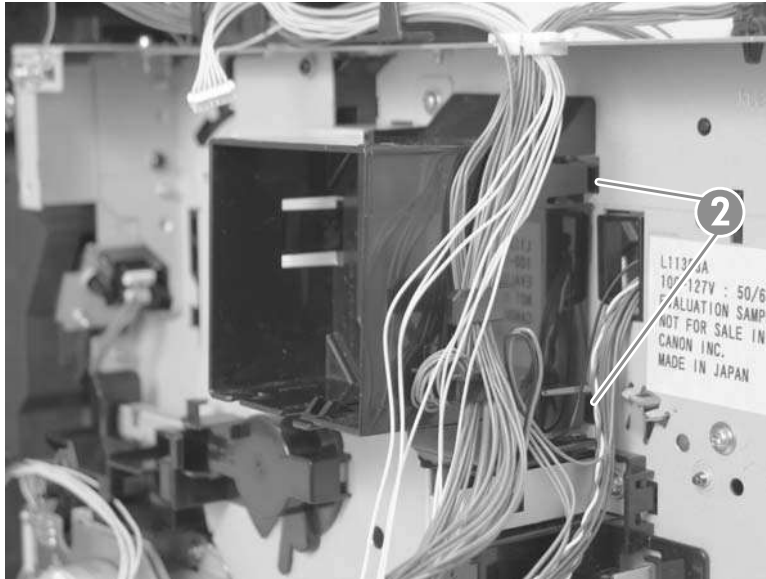
3. Remove three screws (callout 3).

Figure 2-102 Remove the drum-drive assembly (3 of 4)
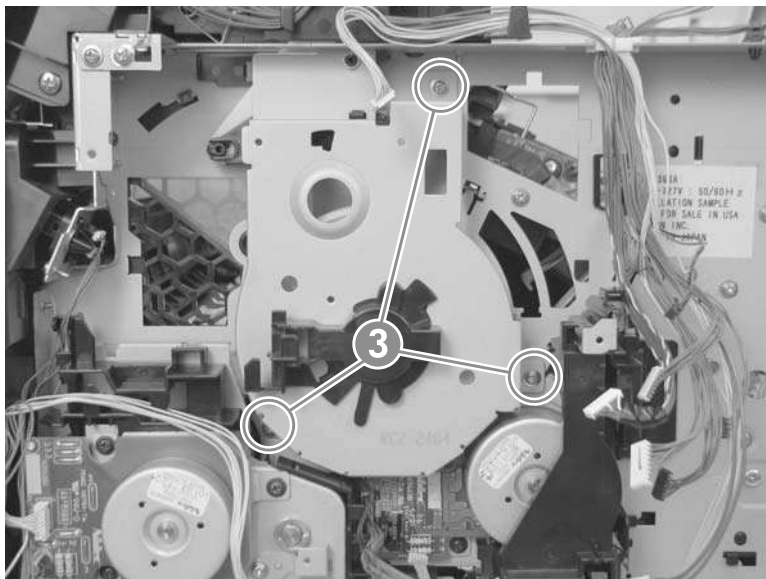
4. Carefully remove the drum-drive assembly.

Figure 2-103 Remove the drum-drive assembly (4 of 4)
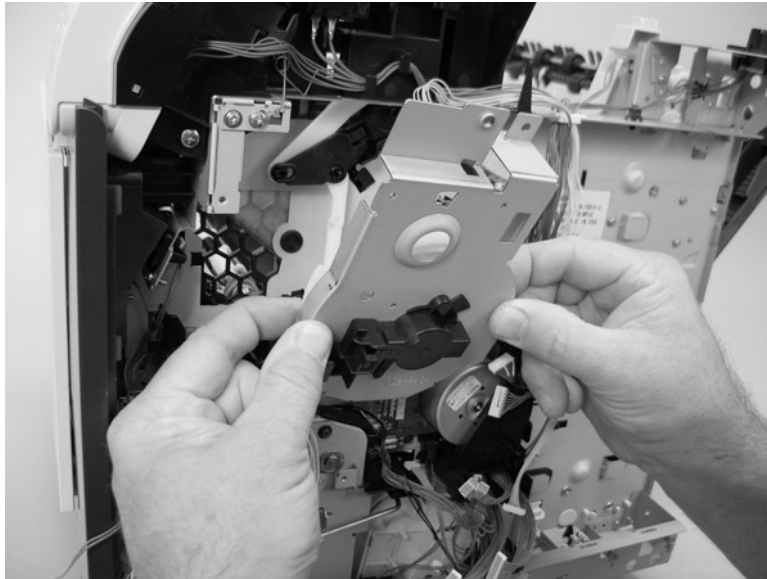
Reinstall the drum-drive assembly

When the drum-drive assembly is reinstalled, make sure that the spring is correctly positioned in the assembly.

Figure 2-104 Reinstall the drum-drive assembly
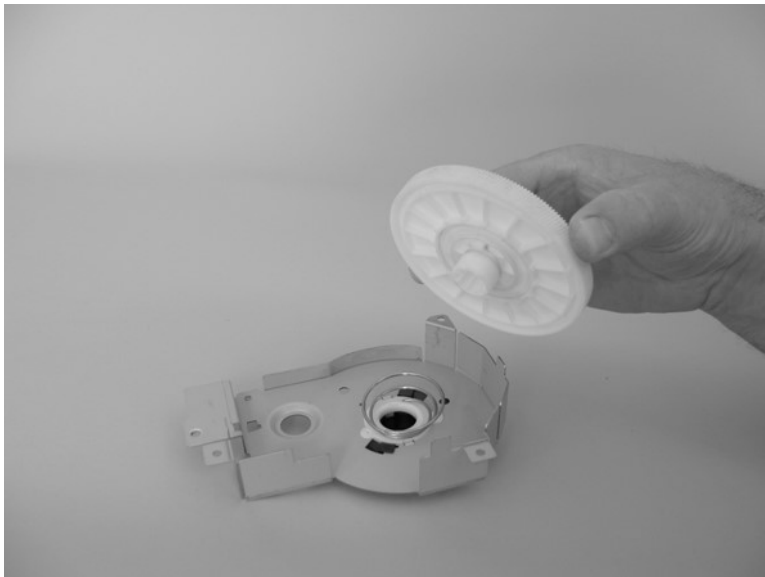
Fan FN101

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Top cover. See Top cover on page 92.

- Left-side cover. See Left-side cover on page 98.

Remove fan FN101

1. Remove two screws (callout 1), and then remove the sheet-metal plate (callout 2).

   Figure 2-105 Remove fan FN101 (1 of 3)
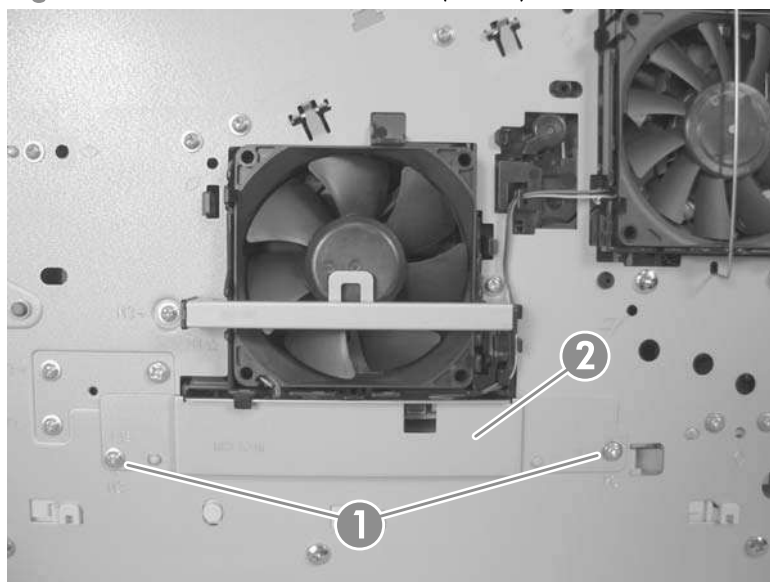
2. Disconnect two connectors (callout 3), and then remove one screw (callout 4). Slide the thermistor sensor bar (callout 5) to the right to release it, and then lift the thermistor sensor bar away from the product.

Figure 2-106 Remove fan FN101 (2 of 3)
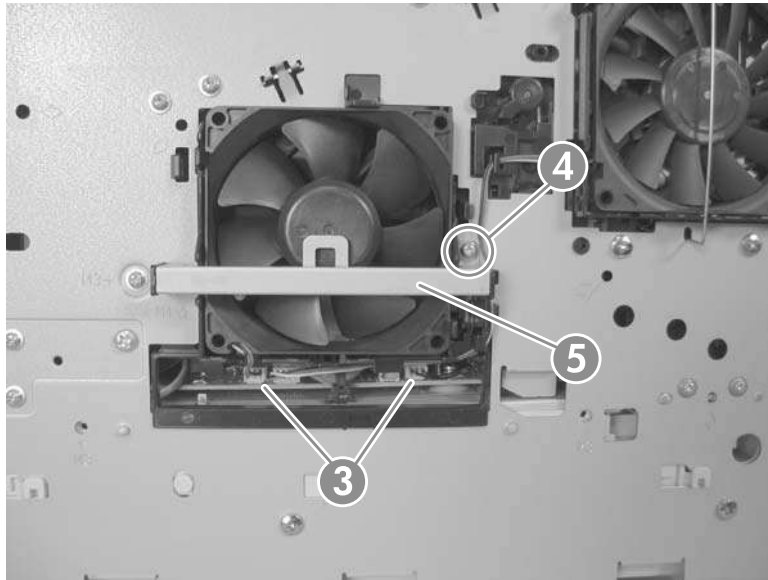
3. Release the two fan-locking tabs (callout 6), and then remove the fan.

⚠ **CAUTION:** When you reinstall the fan, do not apply too much pressure to the wire-harness connectors when they are connected to the power supply. Applying too much pressure might snap off the soldered connectors on the power supply.

☀ **Reinstallation tip** When you reinstall the fan, the air must flow into the product. Verify that the airflow arrows that are embossed on the fan body point *into* the product.

Figure 2-107 Remove fan FN101 (3 of 3)
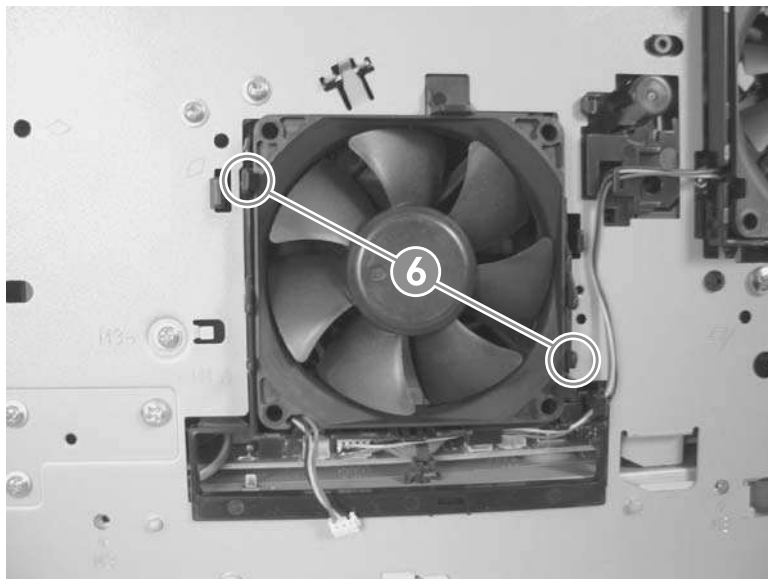
Fan FN301

before proceeding, remove the following components:

- Top accessory cover. See .

- Top cover. See .

- Left-side cover. See .

Remove fan FN301

1. Remove two screws (callout 1), and then remove the fan-cover plate (callout 2).

Figure 2-108 Remove fan FN301 (1 of 3)
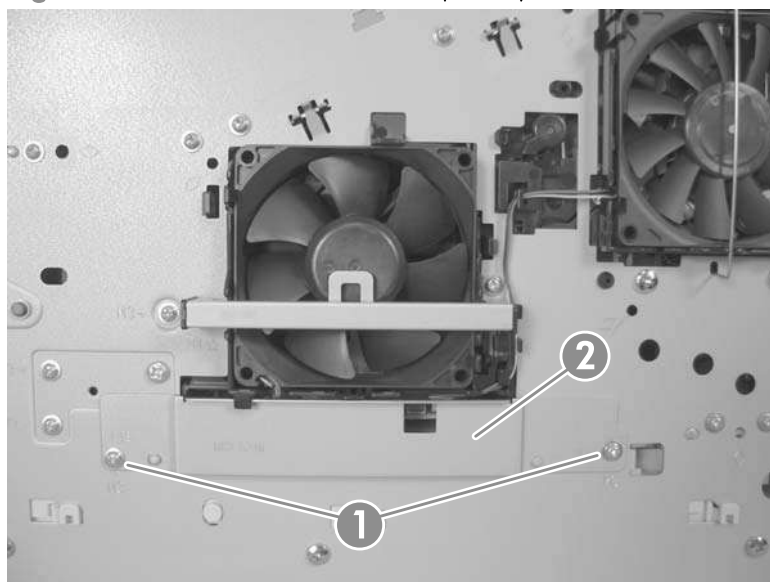
2. Disconnect one connector (callout 3), and then release the wire harness from the retainer (callout 4). Unhook and remove the fan clip (callout 5).

Figure 2-109 Remove fan FN301 (2 of 3)
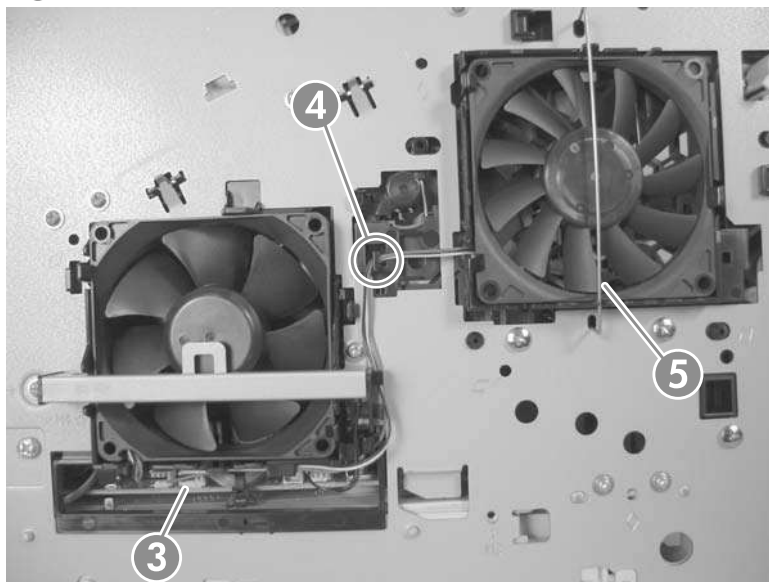
3. Release two tabs (callout 6), and then remove the fan.

💡 **TIP:** When you reinstall the fan, the air must flow into the product. Verify that the airflow arrows that are embossed on the fan body point *into* the product.

Figure 2-110 Remove fan FN301 (3 of 3)

Environmental sensor (TH3)

Before proceeding, remove the following components:

- Duplex accessory or cover. See Duplex accessory or cover on page 90.

- Top accessory cover. See Top-accessory cover on page 88.

- Tray 2 extension door. See Tray 2 extension door on page 91.

- Top cover. See Top cover on page 92.

- Left-side cover. See Left-side cover on page 98.

Remove the environmental sensor (TH3)

1. Remove two screws (callout 1), and then remove the fan-cover plate (callout 2).

    Figure 2-111 Remove the environmental sensor (TH3) (1 of 2)
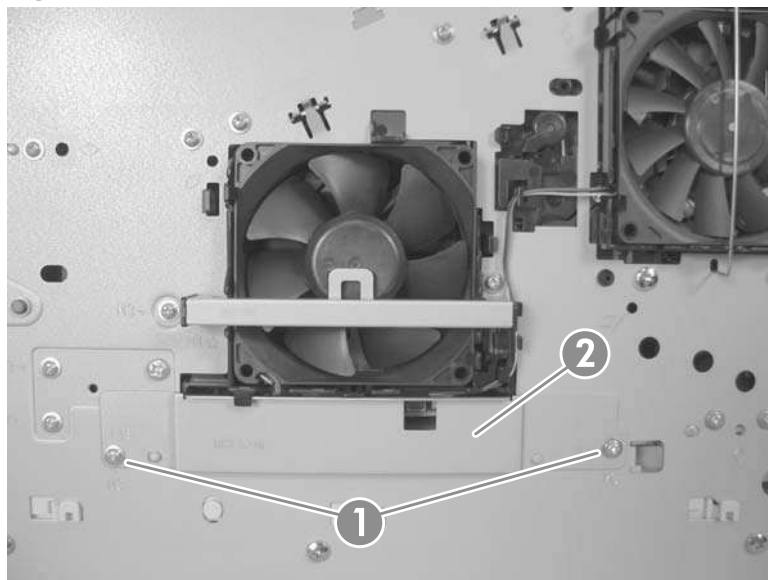
2. Disconnect one connector (callout 3), and then remove one screw (callout 4). Slide the thermistor sensor bar (callout 5) to the right to release it, and then lift the thermistor sensor bar away from the product.

Figure 2-112 Remove the environmental sensor (TH3) (2 of 2)
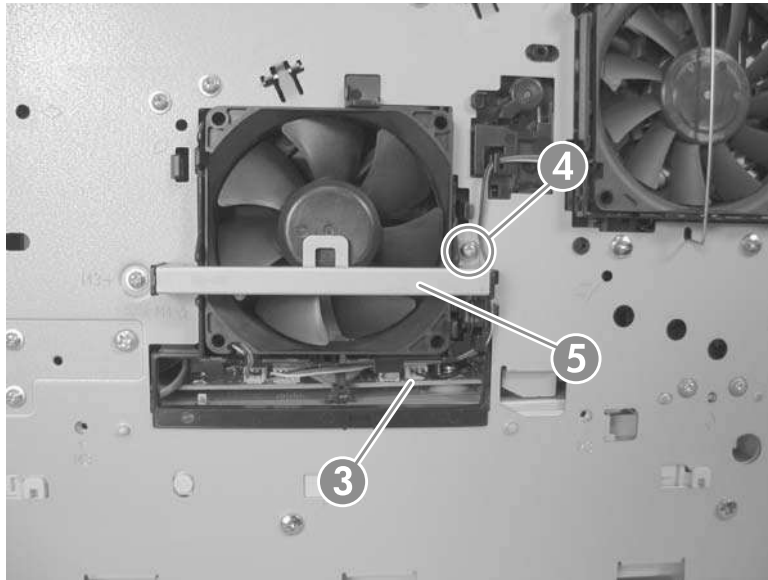
High voltage power supply

> ⚠ **CAUTION:** 🔷ESD ESD sensitive component.

- Top accessory cover. See Top-accessory cover on page 88.

- Duplex accessory or cover. See Duplex accessory or cover on page 90.

- Tray 2 extension door. See Tray 2 extension door on page 91.

- Rear output bin. See Rear output bin on page 87.

- Fuser. See Fuser on page 70.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92 .

- Right-side cover. See Right-side cover on page 95.

- Left-side cover. See Left-side cover on page 98.

Remove the high-voltage power-supply assembly

1. Remove one screw (callout 1), release one tab (callout 2), and then slide the power-supply PCA guide towards the rear of the product to remove it.

   Figure 2-113 Remove the high-voltage power-supply assembly (1 of 7)
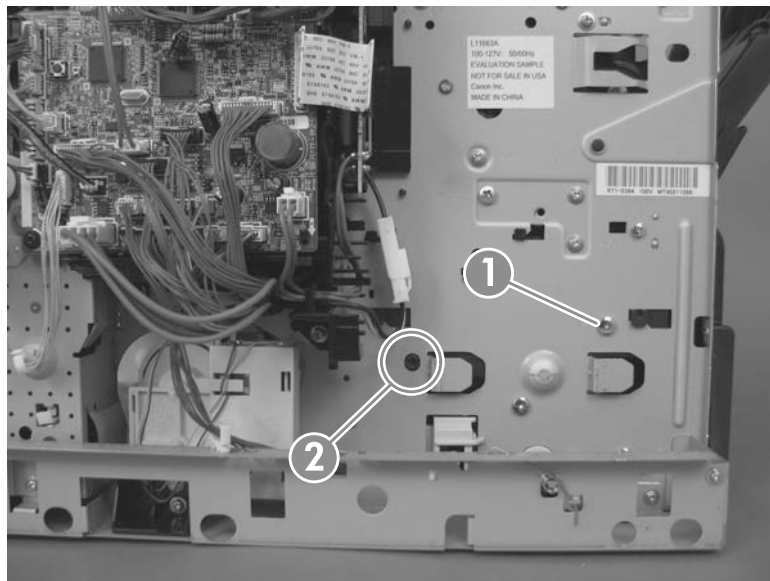
2. Remove four screws (callout 3) and one grounding screw (callout 4).

⚠ **WARNING!** When reinstalling the power supply, you must use a grounding screw to secure the AC outlet to the product chassis.

Figure 2-114 Remove the high-voltage power-supply assembly (2 of 7)
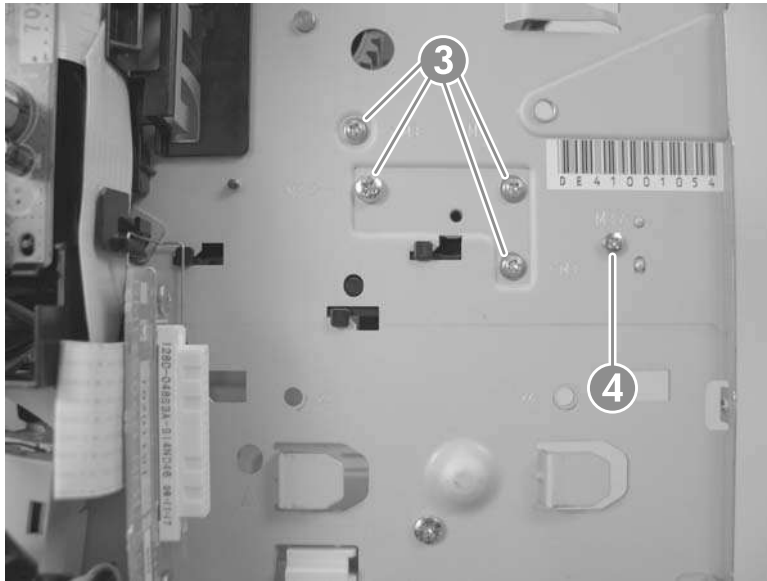
3. Disconnect five wire-harness connectors (callout 6; J82, J84, J85, J95, and J96).

Figure 2-115 Remove the high-voltage power-supply assembly (3 of 7)
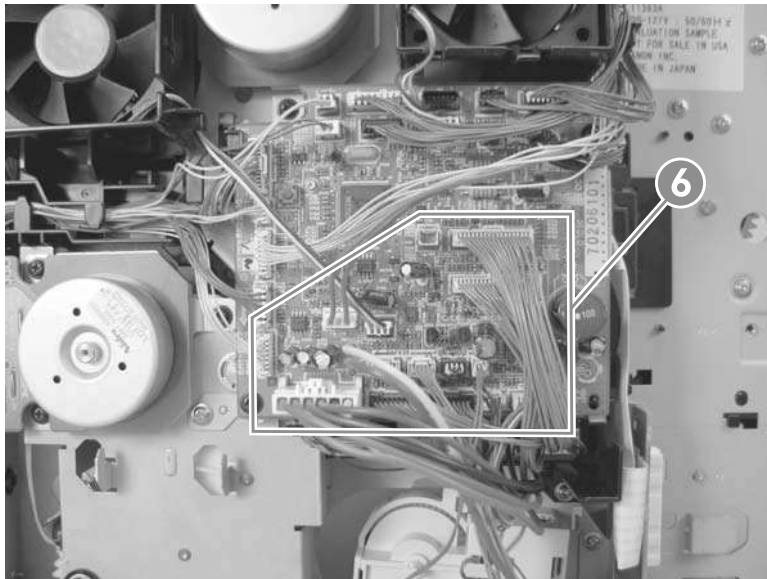
4. Remove two screws (product left side; callout 7) and then remove the fan-cover plate (callout 8).

Figure 2-116 Remove the high-voltage power-supply assembly (4 of 7)
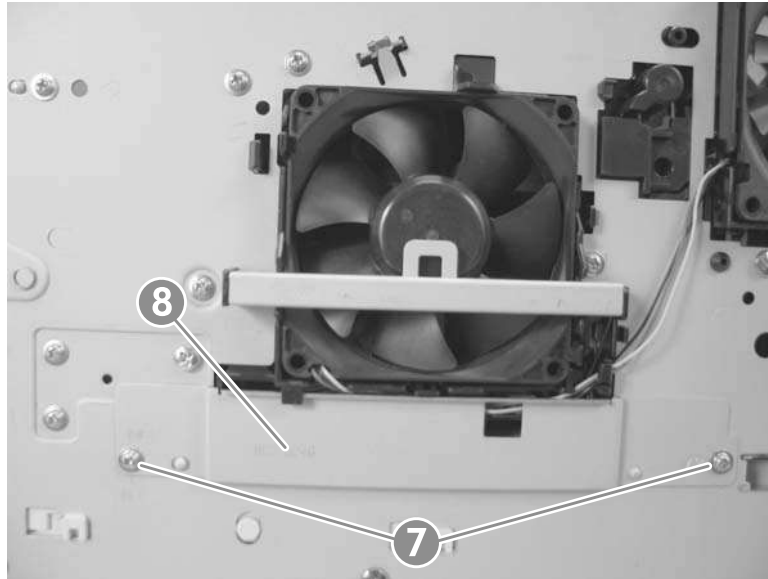
5. Disconnect three wire-harness connectors (product left side; callout 9) and then remove four screws (callout 10).

Figure 2-117 Remove the high-voltage power-supply assembly (5 of 7)
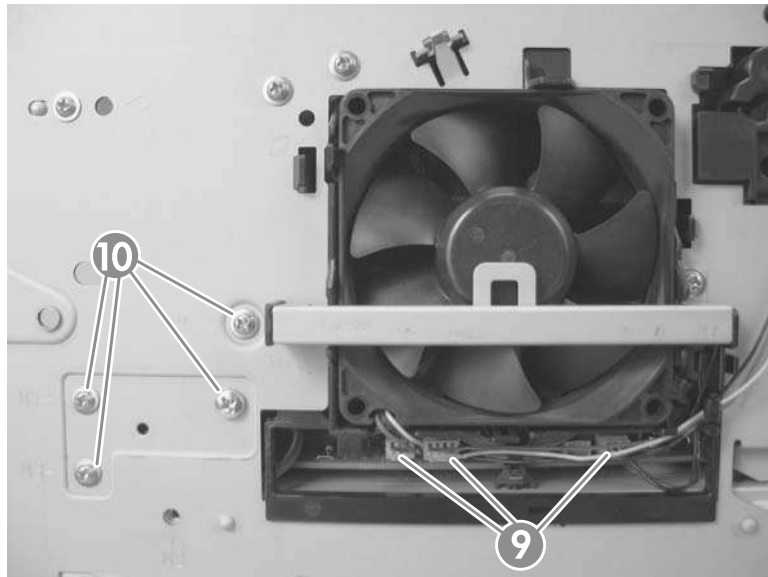
6. Feed the cables that were disconnected earlier through the hole in the right side of the chassis under the power-supply assembly.

⚠ **CAUTION:** Make sure that the four rubber belts and plastic rollers on the feed-guide assembly (mounted to the top of the power supply) remain in place. These belts and rollers can easily become dislodged and you might lose them.

Figure 2-118 Remove the high-voltage power-supply assembly (6 of 7)
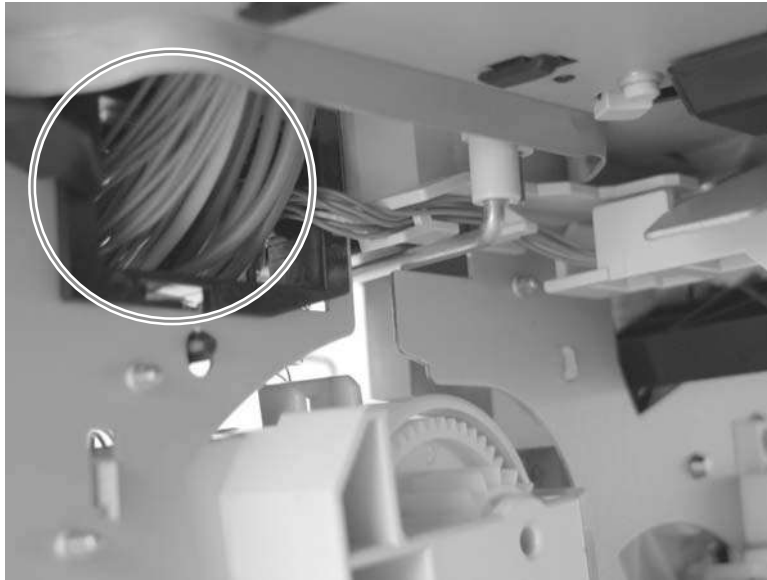
7. Grasp the power-supply assembly and lift it up slightly. Pull it straight out of the chassis.

**Figure 2-119** Remove the high-voltage power-supply assembly (7 of 7)
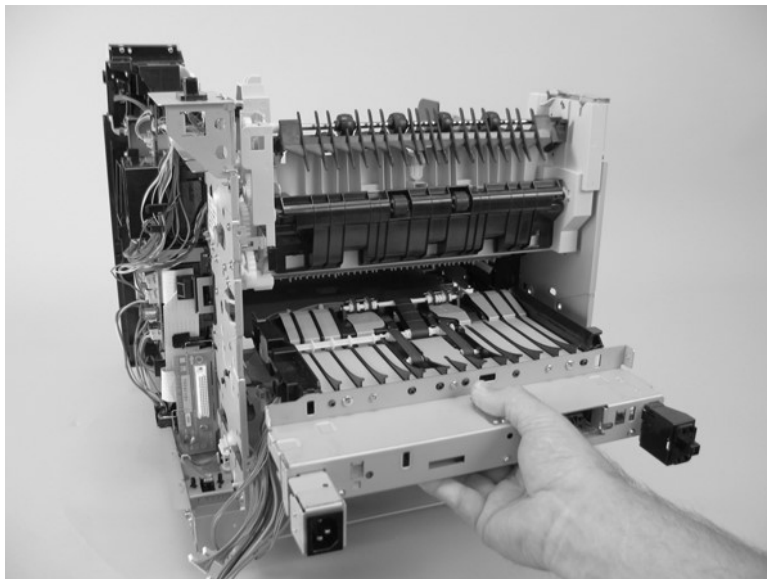
Feed-guide assembly

Before proceeding, remove th following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Duplex accessory or cover. See Duplex accessory or cover on page 90.

- Tray 2 extension door. See Tray 2 extension door on page 91.

- Fuser. See Fuser on page 70.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92 .

- Right-side cover. See Right-side cover on page 95.

- Left-side cover. See Left-side cover on page 98.

- High-voltage power supply. See High voltage power supply on page 148.

Remove the feed-guide assembly

1. Remove five screws (callout 1).

   Figure 2-120 Remove the feed-guide assembly (1 of 3)
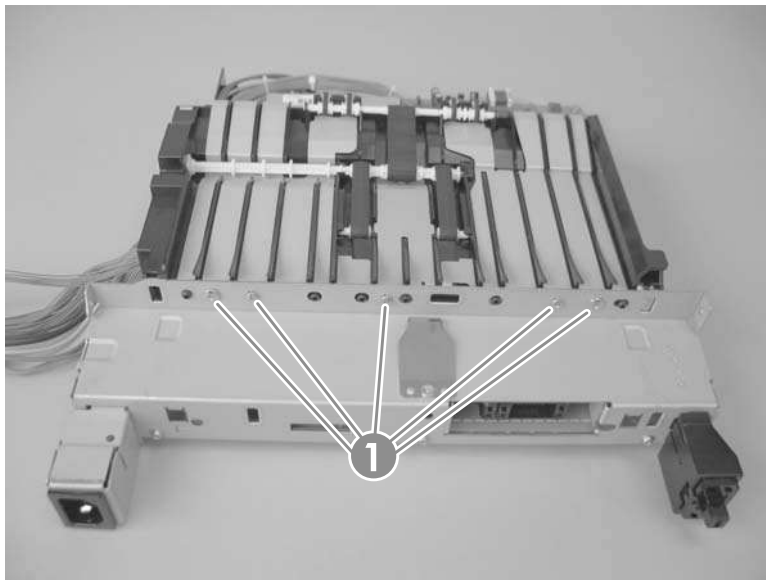
2. Remove one screw (callout 2).

Figure 2-121 Remove the feed-guide assembly (2 of 3)
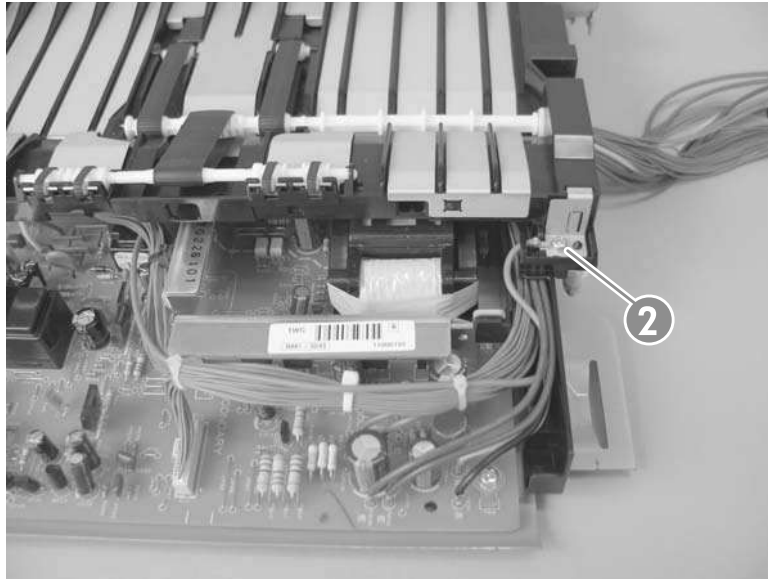
3. Remove the feed-guide assembly.

Figure 2-122 Remove the feed-guide assembly (3 of 3)
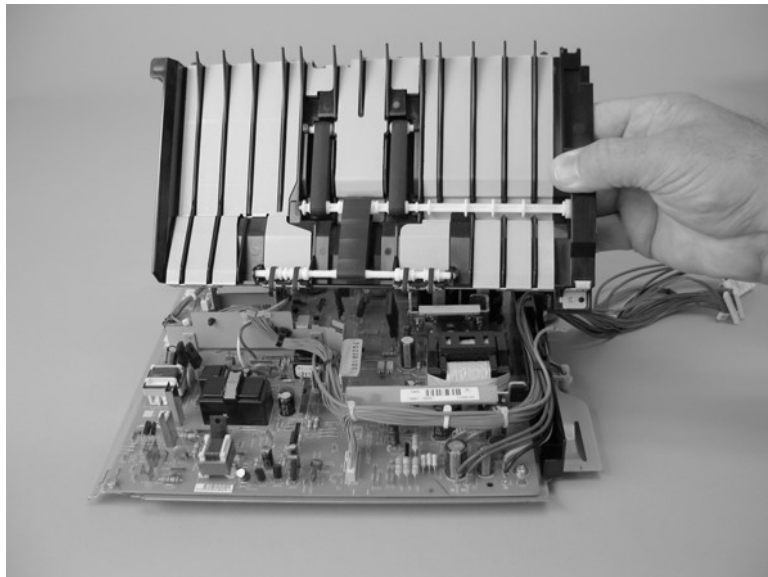
Reinstall the feed-guide assembly

When you reinstall the feed-guide assembly, make sure that the support foot is correctly positioned on the power supply.

⚠ **CAUTION:**   Make sure that the four rubber belts and plastic rollers on the feed-guide assembly (mounted to the top of the power supply) remain in place. These belts and rollers can easily become dislodged and you might lose them.

**Figure 2-123** Reinstall the feed-guide assembly

Tray 1 paper-pickup assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.
- Duplex accessory or cover. See Duplex accessory or cover on page 90.
- Tray 2 extension door. See Tray 2 extension door on page 91.
- Formatter cover and cage. See Formatter cover and formatter cage on page 71.
- Top cover. See Top cover on page 92.
- Right-side cover. See Right-side cover on page 95.
- Left-side cover. See Left-side cover on page 98.
- Right front cover. See Right-front cover on page 100.
- Front cover. See Front cover on page 105.

Remove the Tray 1 pickup assembly

1. Disconnect two wire-harness connectors (callout 1; J71, and J81), and then release the wire harnesses from the guide (callout 2).

   Figure 2-124 Remove the Tray 1 paper-pickup assembly (1 of 3)
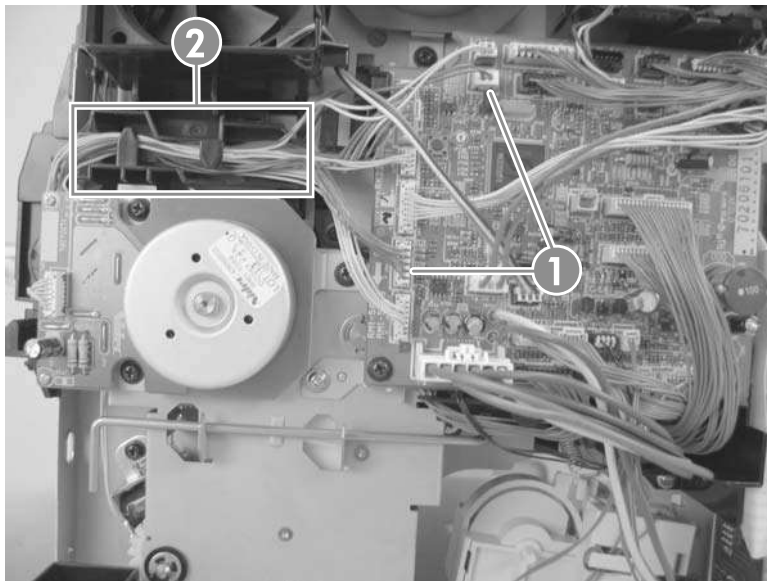
2. Remove eight screws (callout 3).

📝 **NOTE:** The four outside screws on the assembly are a different type than the others. Make sure that you replace the screws in the same position that they are removed from.

Figure 2-125 Remove the Tray 1 paper-pickup assembly (2 of 3)
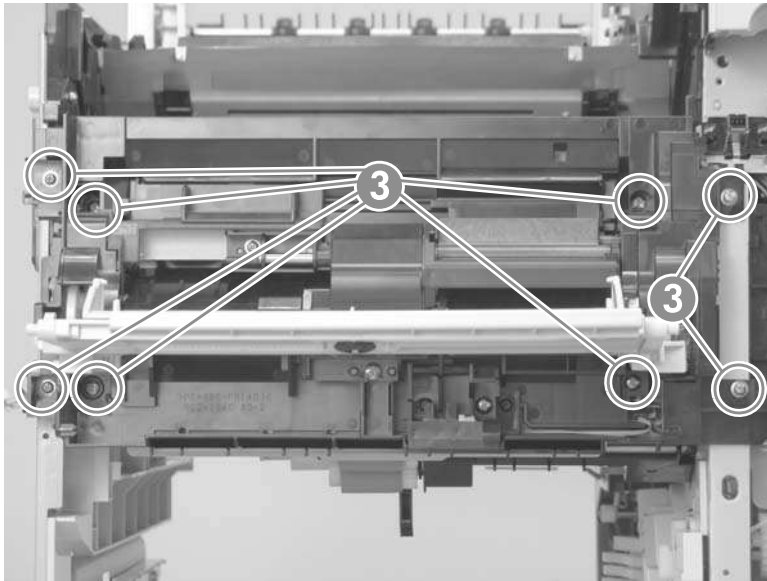
3. Rotate the left side of the assembly away from the chassis, and then slide the assembly to the left to remove it.

Figure 2-126 Remove the Tray 1 pickup assembly (3 of 3)
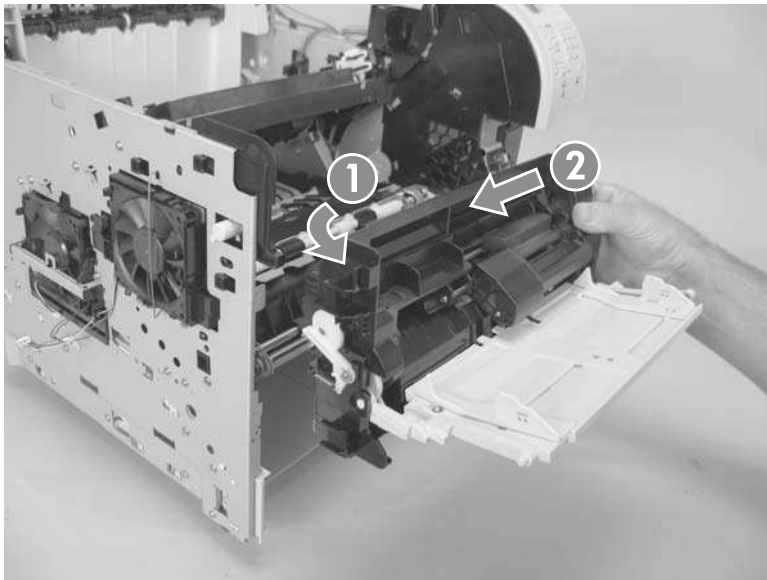
Feed-roller assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Duplex accessory or cover. See Duplex accessory or cover on page 90.

- Tray 2 extension door. See Tray 2 extension door on page 91.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

- Left-side cover. See Left-side cover on page 98.

- Right front cover. See Right-front cover on page 100.

- Front cover. See Front cover on page 105.

- Tray 1 paper-pickup assembly. See Tray 1 paper-pickup assembly on page 155.

Remove the feed-roller assembly

▲ Remove two screws (callout 1), and then remove the feed-roller assembly (callout 2).

Figure 2-127 Remove the feed-roller assembly
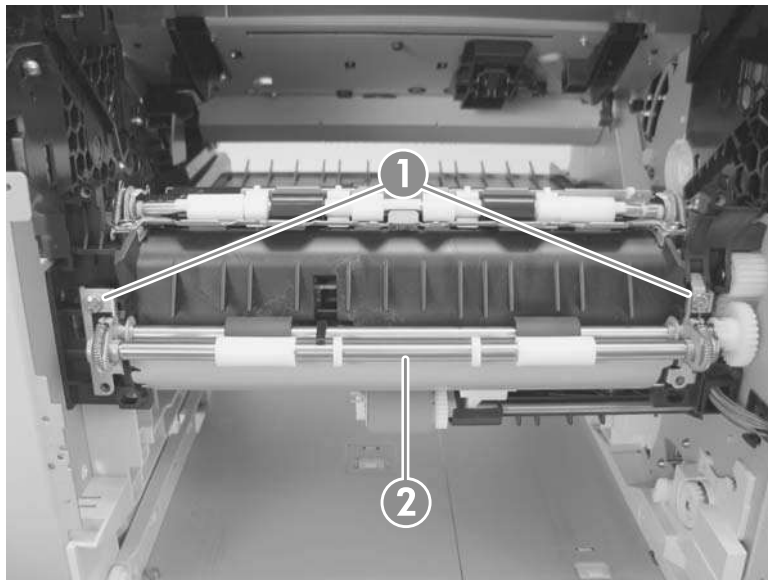
Laser/scanner assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Duplex accessory or cover. See Duplex accessory or cover on page 90.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

Remove the laser/scanner assembly

1. Unplug the laser/scanner wire-harness connector from the DC controller PCA (callout 1; J86).

   Figure 2-128 Remove the laser/scanner assembly (1 of 4)
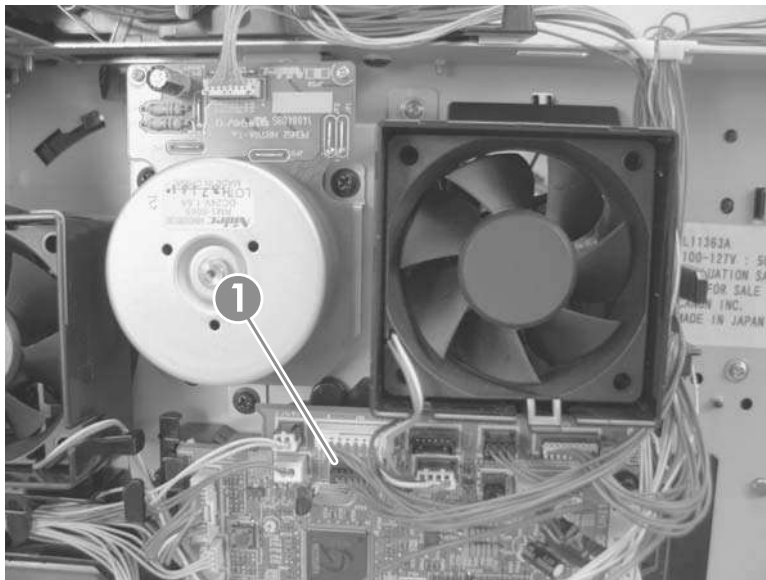
2. Remove the laser/scanner wire-harness from the wire guide (callout 2).

Figure 2-129 Remove the laser/scanner assembly (2 of 4)
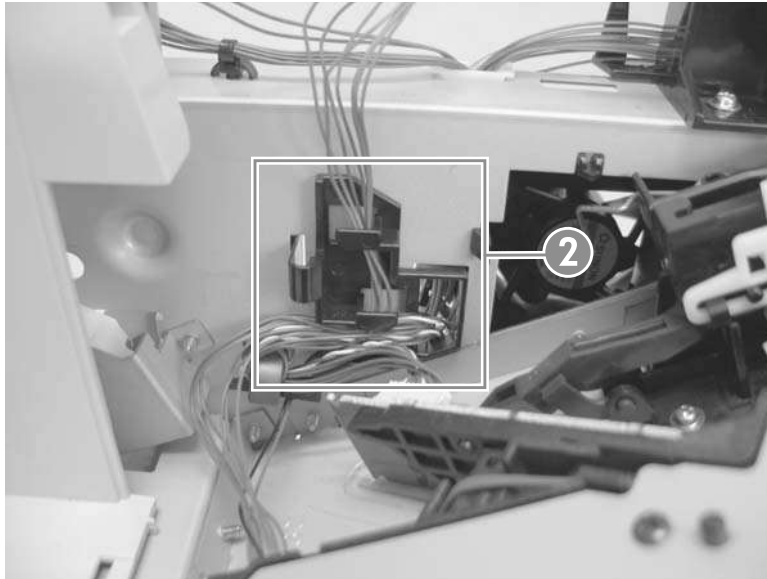
3. Remove four screws (callout 3) and the grounding clips.

Figure 2-130 Remove the laser/scanner assembly (3 of 4)
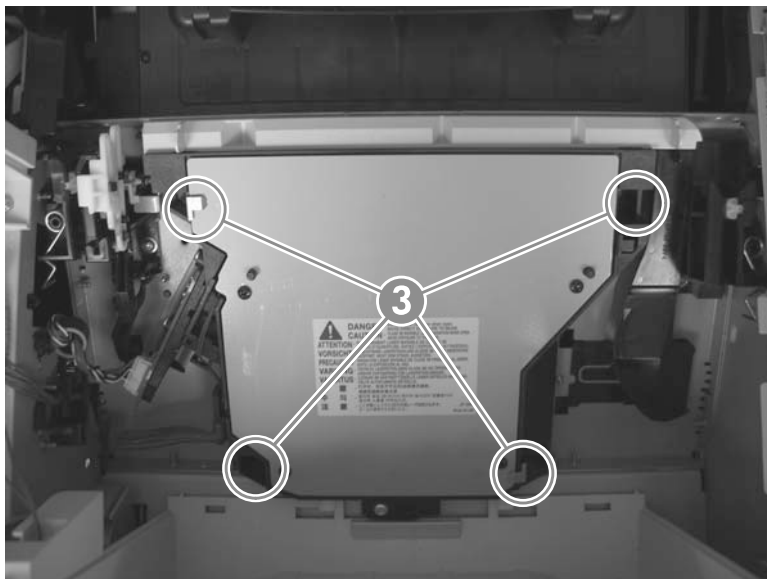
4. Disconnect the laser/scanner wire-harness (callout 4) from the laser/scanner PCA.

Figure 2-131 Remove the laser/scanner assembly (4 of 4)

5. Carefully lift the laser/scanner up and out of the product. Make sure that the laser/scanner assembly does not catch or snag the wires along the bottom of the assembly when you remove the assembly.

⚠ **CAUTION:** When you reinstall the laser/scanner assembly, make sure that the wire-harnesses are correctly routed through the cable guides. If the wire-harnesses are not correctly routed, they can be damaged when the top cover is installed.

📝 **NOTE:** Make sure that the air duct is correctly positioned and that the laser/scanner shutter properly functions.

Paper-delivery assembly

Before proceeding, remove the following components:

- Top accessory cover. See Top-accessory cover on page 88.

- Rear output bin. See Rear output bin on page 87.

- Formatter cover and cage. See Formatter cover and formatter cage on page 71.

- Top cover. See Top cover on page 92.

- Right-side cover. See Right-side cover on page 95.

- Rear upper cover. See Rear-upper cover on page 103.

Remove the paper-delivery assembly

1. Remove one screw (callout 1), and then release two tabs (callout 2).

Figure 2-132 Remove the paper-delivery assembly (1 of 4)
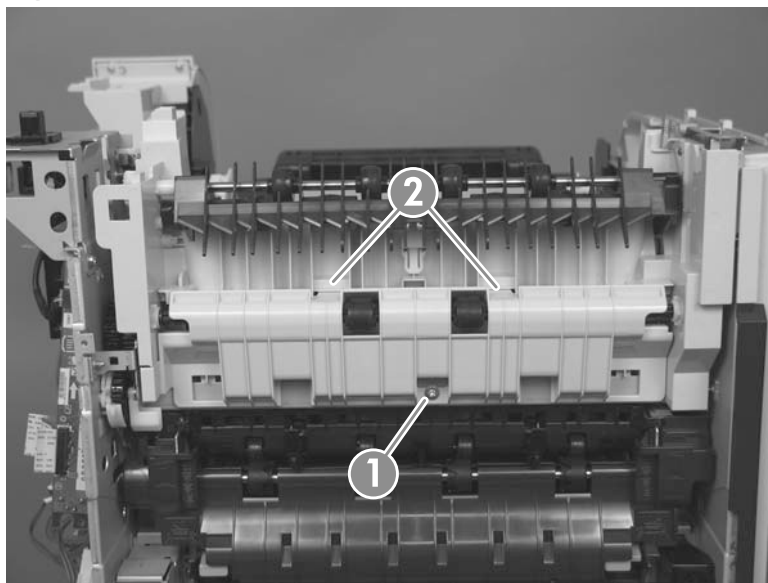
2. Rotate the top of the guide away form the product, push up on the guide to release it, and then remove the guide.

Figure 2-133 Remove the paper-delivery assembly (2 of 4)
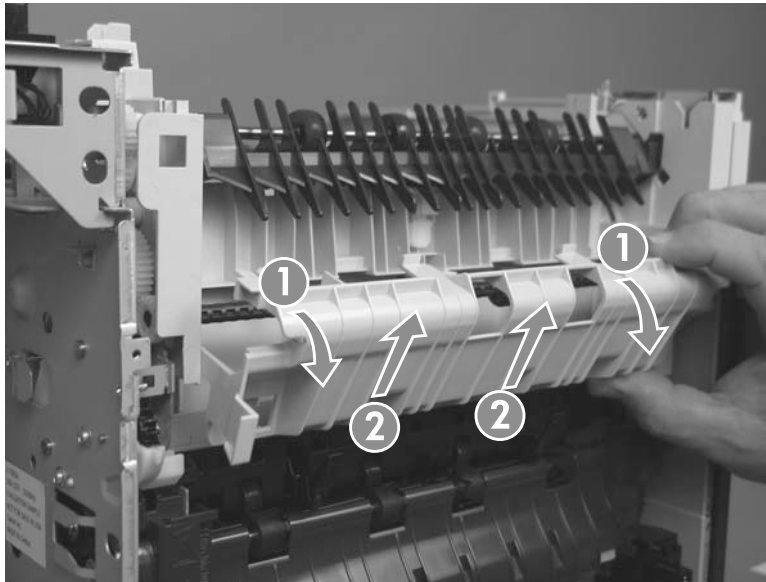
3. Use a small flatblade screwdriver to release the locking pin on the shaft lock, and then rotate the lock counter clockwise until the inner retaining tab (gear side) aligns with the hole in the paper-delivery assembly frame.

Slide the shaft lock to the right and remove it to release the gear shaft from the paper-delivery assembly.

⚠ **CAUTION:** Do not break the shaft lock. A replacement is not provided with a new paper-delivery assembly.

☀ **TIP:** Snap the shaft lock back into place on the assembly so that you will not lose it. Remove the shaft lock when you reinstall the output-delivery assembly. When the paper-delivery assembly is installed, verify that the locking pin on the shaft lock is fully seated in the hole on the paper-delivery assembly.

Figure 2-134 Remove the paper-delivery assembly (3 of 4)
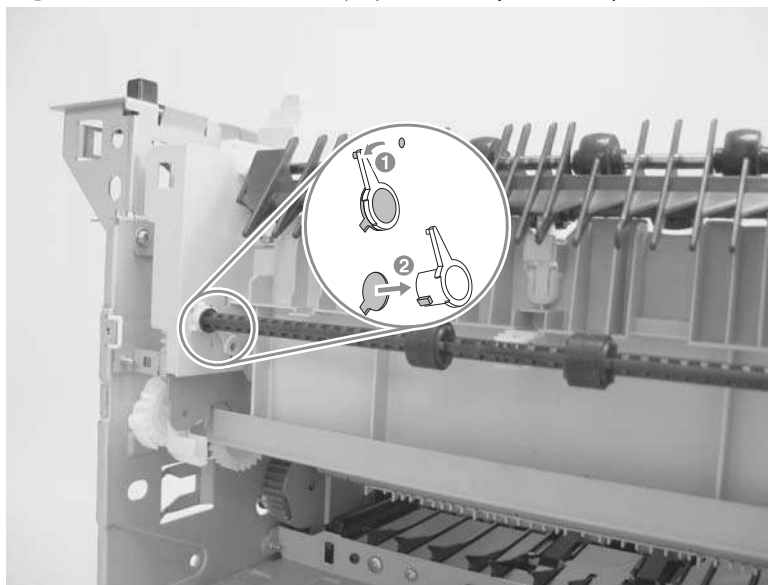
4. Lift up the gear end of the output-delivery assembly slightly and slide the assembly toward the formatter assembly to remove it.

⚠ **CAUTION:** The rear face-down output-bin-sensor cable is routed through a notch on the paper-delivery assembly at the gear end of the assembly. When you remove the assembly, carefully remove the cable from the notch to avoid damage to the cable. See Figure 2-136 Reinstall the paper-delivery assembly on page 164.

Figure 2-135 Remove the paper-delivery assembly (4 of 4)
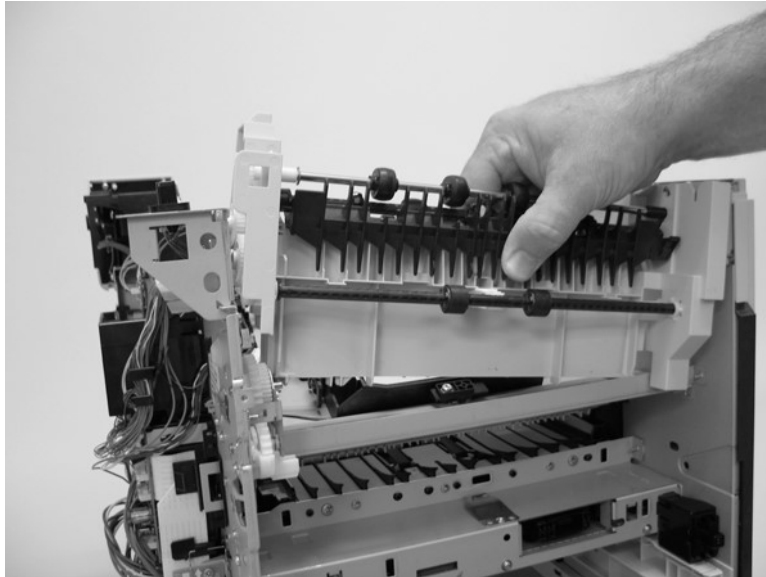
Reinstall the paper-delivery assembly

Make sure that the output-bin sensor is not dislodged when the paper-deliver assembly is reinstalled.

Figure 2-136 Reinstall the paper-delivery assembly
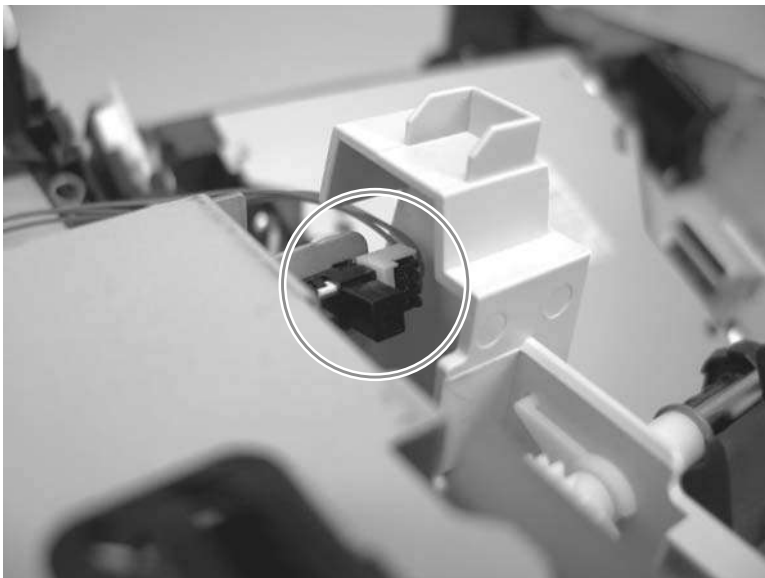
1,500-sheet paper deck (PD)

NOTE: The removal steps for the pickup and feed rollers in the 1,500-sheet paper deck are the same as the removing the Tray 2 rollers. See and in .

Separation roller (PD)

1. Open the 1,500-sheet paper deck door, and then open the separation-roller cover.

   Figure 2-137 Remove the separation roller (PD; 1 of 2)
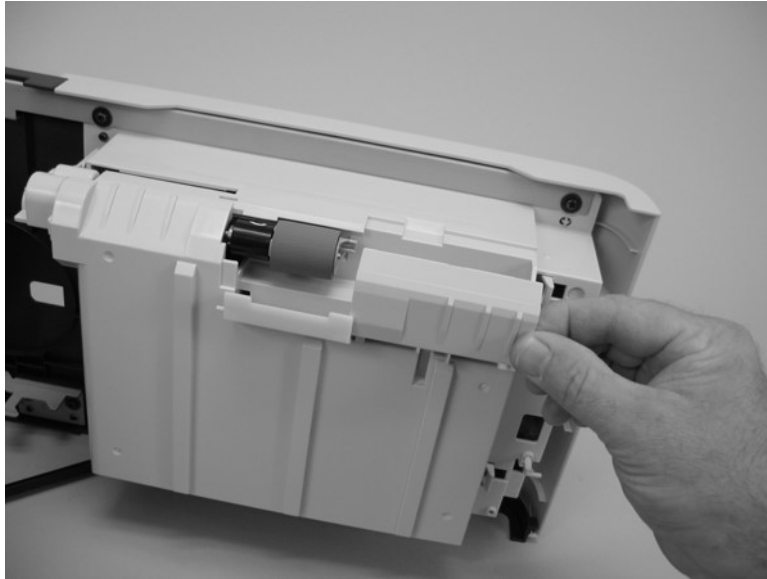
2. Pinch the blue latch that is on the side of the feed roller and slide the roller off of the shaft.

Reinstallation tip   When this roller is reinstalled, it must lock into place. Verify that the roller is seated on the locking bars that are located on the round black spacer and that the spacer is seated on the shaft-locking pin (callout 1 and callout 2).

Figure 2-138 Remove separation roller (PD; 2 of 2)
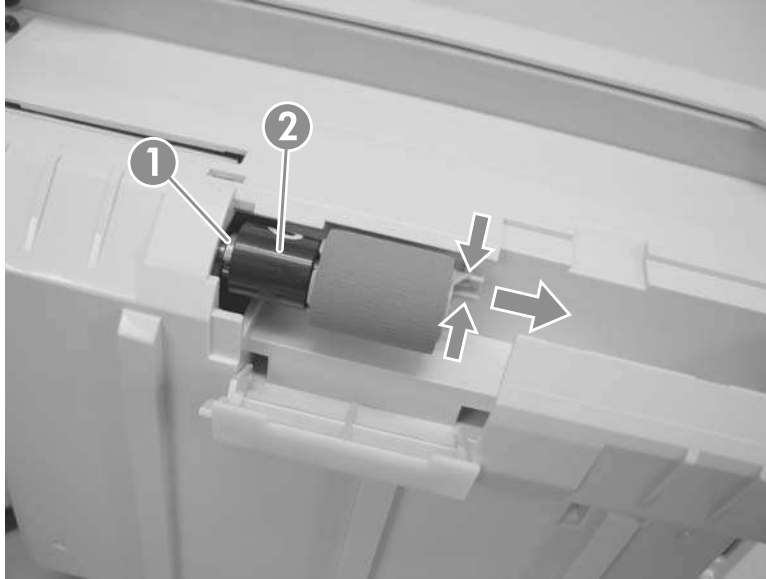
Rear cover (PD)

1. Release two tabs (callout 1).

   Figure 2-139 Remove the rear cover (PD; 1 of 2)

2. Rotate the top of the cover away from the feeder, and then lift up on the cover to release it. Remove the cover.

   Figure 2-140 Remove the rear cover (PD; 2 of 2)
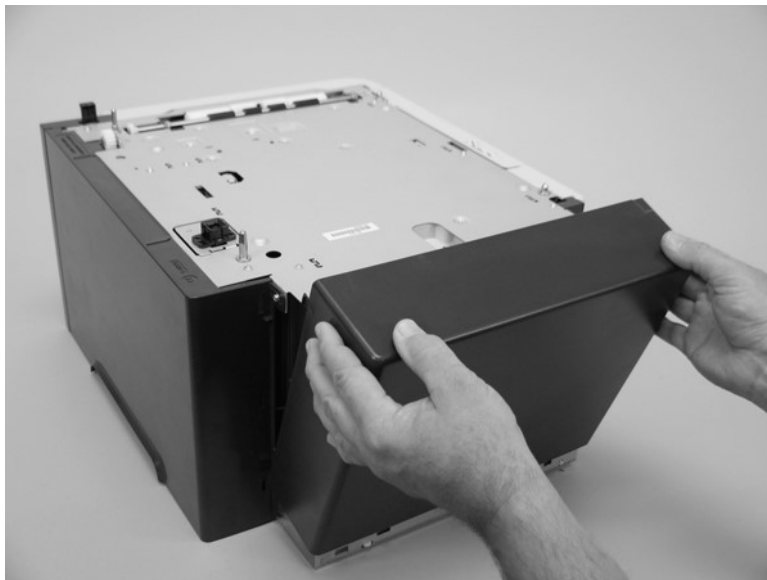
Right-side cover (PD)

1. Remove the 1,500-sheet paper deck rear cover. See .

2. Remove one screw (callout 1).

   Figure 2-141 Remove the right-side cover (PD; 1 of 2)
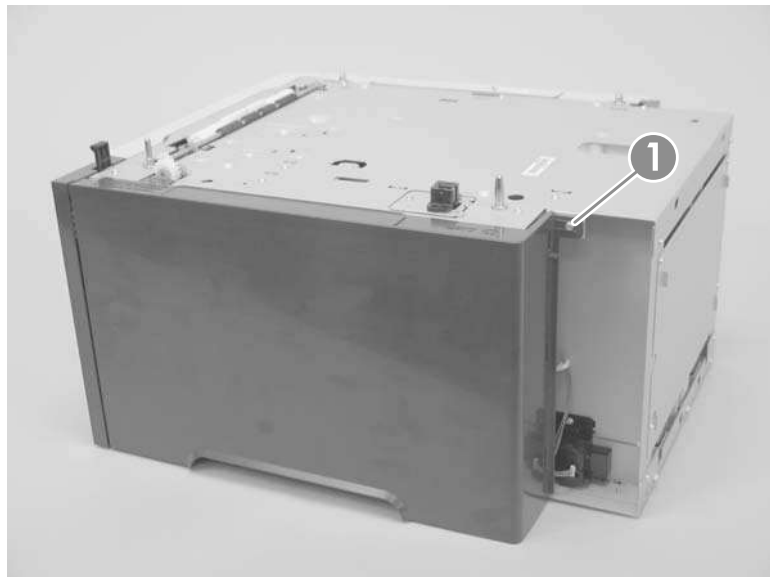
3. Rotate the top of the cover away from the chassis and then lift it up and remove it.

   Figure 2-142 Remove the right-side cover (PD; 2 of 2)
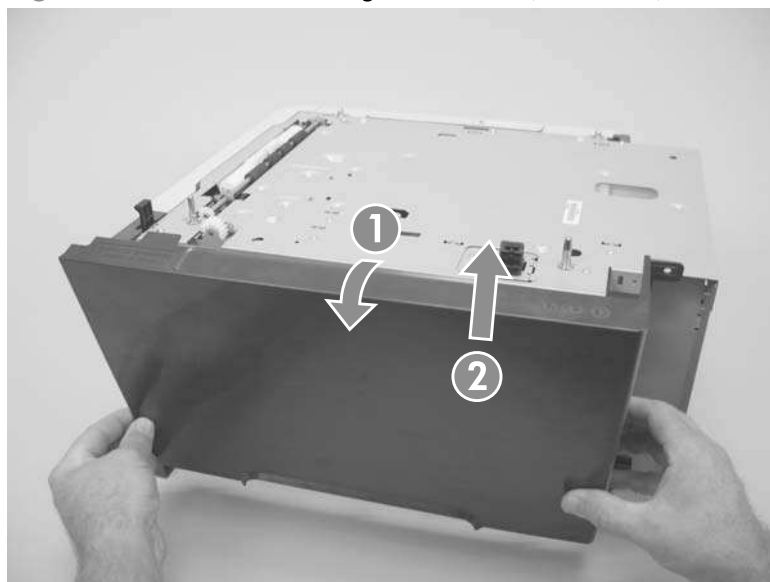
1,500-sheet paper deck left-side cover

Before proceeding, remove the following components;

- 1,500-sheet paper deck rear cover. See Rear cover (PD) on page 167.

Remove the left-side cover

1. Before removing the lock-mechanism cover, take note of the location of the retainer tabs (callout 1). The retaining tabs on this cover can be easily broken.

Figure 2-143 Remove the left-side cover (PD; 1 of 5)
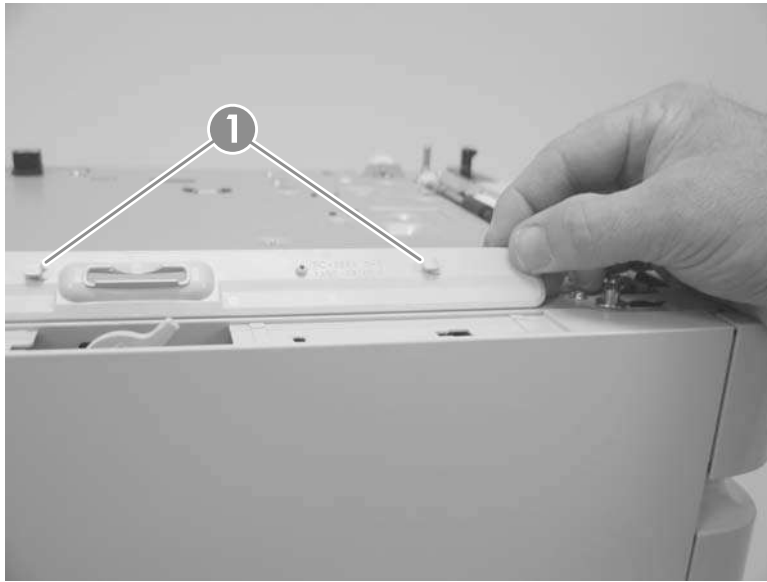
2. *Slightly* pry up on the lock-mechanism cover, and then slide it toward the front of the paper deck to release it. Remove the cover.

> **⚠ CAUTION:** Do not pry this cover up more than is necessary for clearance when sliding it forward. The retaining tabs on this cover can be easily broken.

Figure 2-144 Remove the left-side cover (PD; 2 of 5)
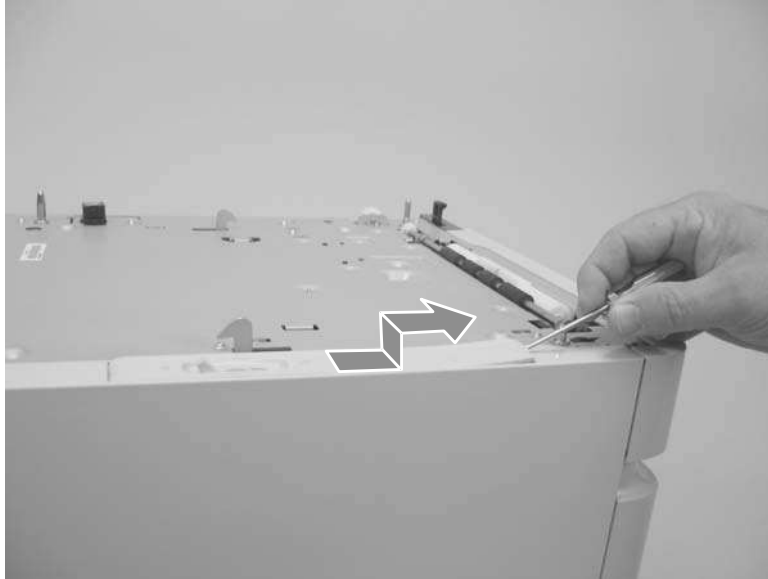
3. Open the 1,500-sheet paper deck door, and then remove two screws (callout 2).

Figure 2-145 Remove the left-side cover (PD; 3 of 5)
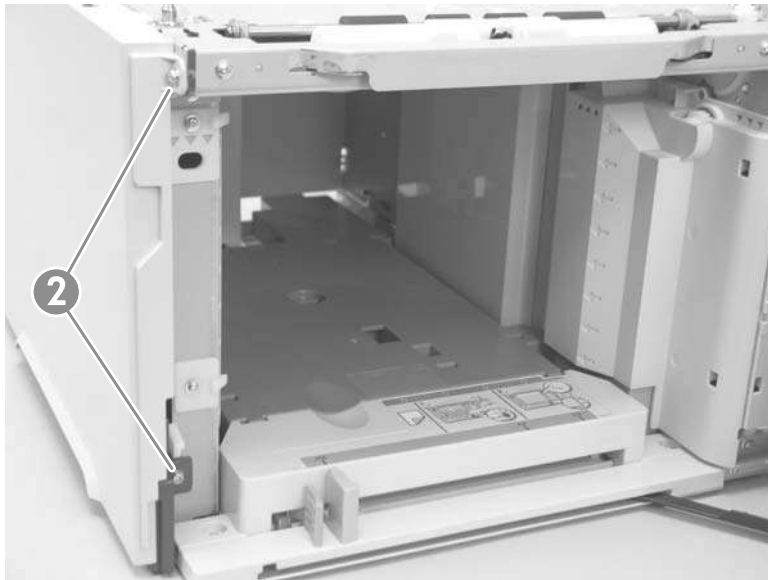
4. Remove one screw (callout 3).

Figure 2-146 Remove the left-side cover (PD; 4 of 5)
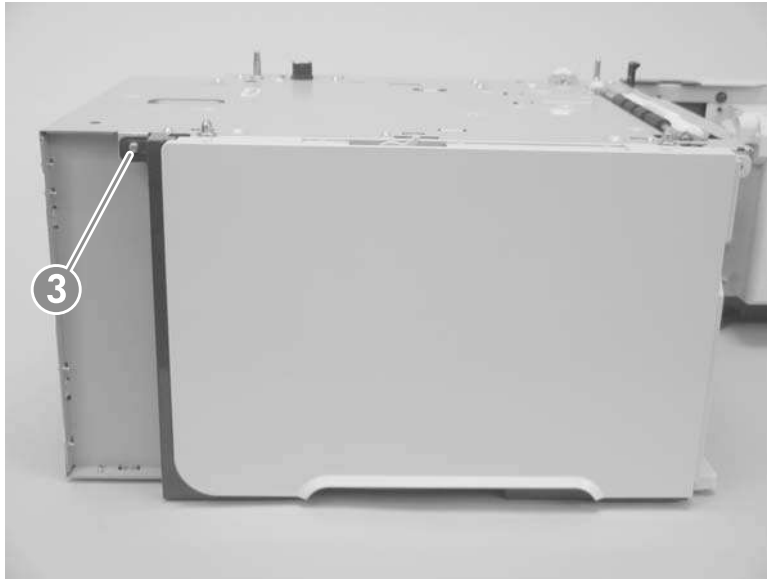
5. Rotate the top of the cover away from the chassis and then lift it up and remove it.

Figure 2-147 Remove the left-side cover (PD; 5 of 5)
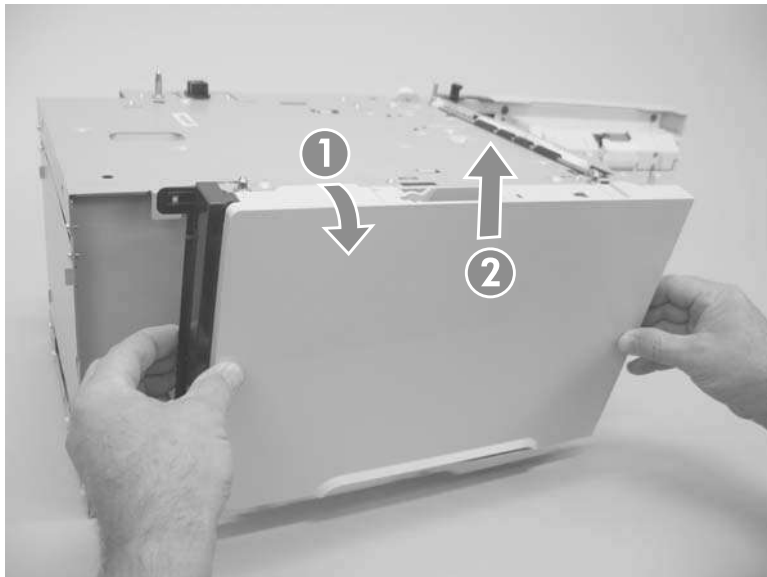
Door (PD)

1. Open the 1,500-sheet paper deck door.

2. Release one tab (callout 1), and then remove the door-stop plate (callout 2).

   Figure 2-148 Remove the door (PD; 1 of 3)

3. With the door open about halfway, gently pry open the door slide-bar slot and disengage the door slide-bar from the feeder.

   Figure 2-149 Remove the door (PD; 2 of 3)
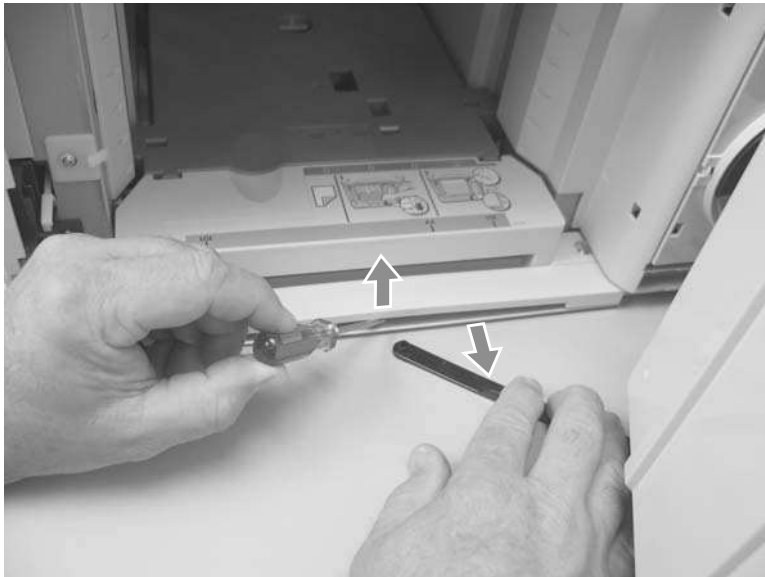
4. Lift the door straight up and off of the door hinge pins to remove it.

⚠ **CAUTION:** The door hinge pins are not captive. If the feeder must be turned on its side or placed upside down, remove the hinge pins and the door spring (on the lower hinge pin). Place the pins and the spring where you will not lose them.

Figure 2-150 Remove the door (PD; 3 of 3)
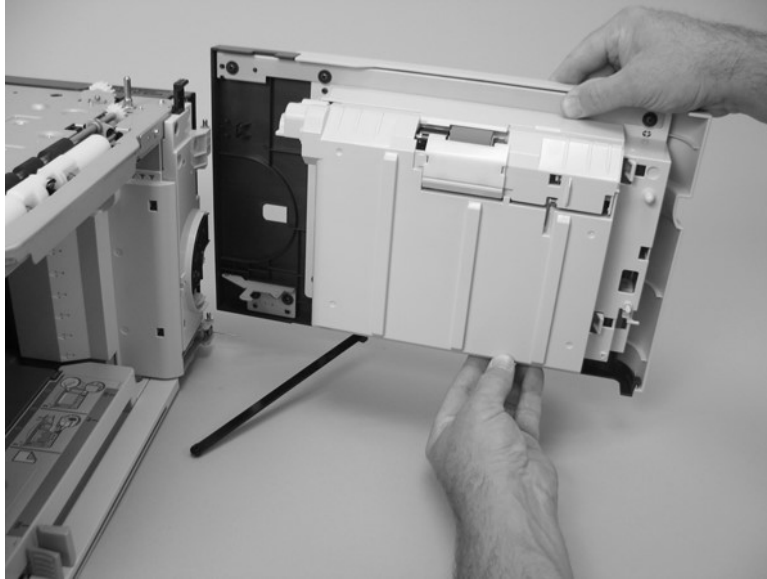
Motor (PD)

Before proceeding, remove the following components:

- 1,500-sheet feeder rear cover. See Rear cover (PD) on page 167.

- 1,500-sheet feeder right-side cover. See Right-side cover (PD) on page 168.

Remove the Motor (PD)

1. Disconnect one wire-harness connector (callout 1; J1703), and then release the wire harness from two retainers (callout 2).

    Figure 2-151 Remove the motor (PD; 1 of 2)
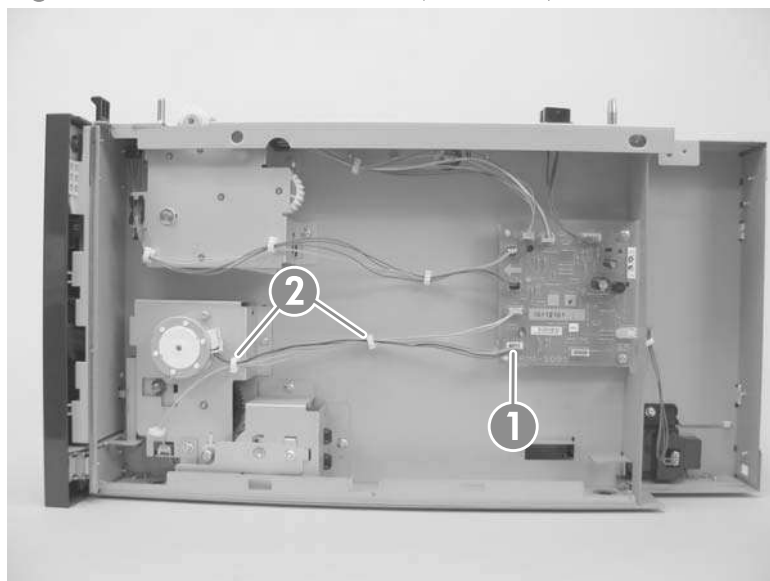
2. Remove two screws (callout 3). Slightly separate the motor from the feeder chassis, and then slide the motor toward the back of the paper deck to remove the motor.

Figure 2-152 Remove the motor (PD; 2 of 2)
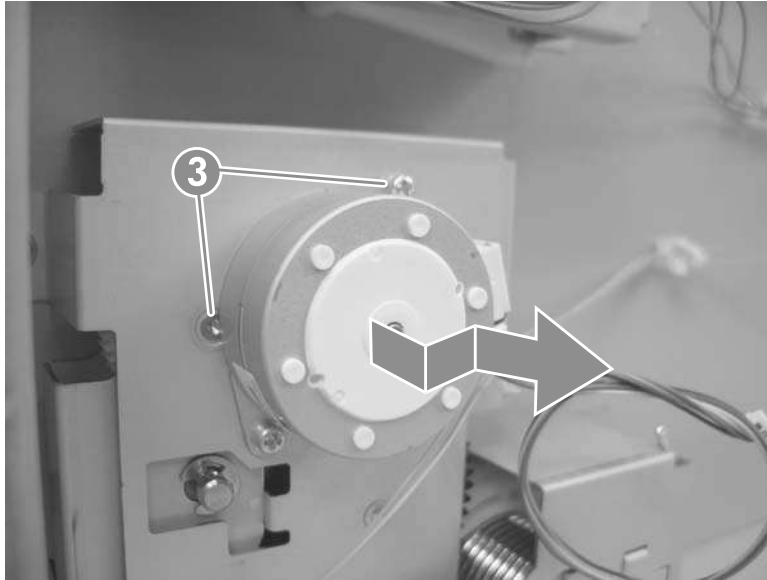
Driver PCA (PD)

Before proceeding, remove the following components:

- 1,500-sheet feeder rear cover. See .

- 1,500-sheet feeder right-side cover. See .

Remove the Driver PCA (PD)

1. Disconnect eight wire-harness connectors (callout 1).

Figure 2-153 Remove the driver PCA (PD; 1 of 2)

2. Remove two screws (callout 2). Use needle-nose pliers to squeeze the top of one of the nylon PCA standoff (callout 3). Gently pop the PCA off of the tab. Repeat the procedure on the remaining standoff. Remove the PCA.
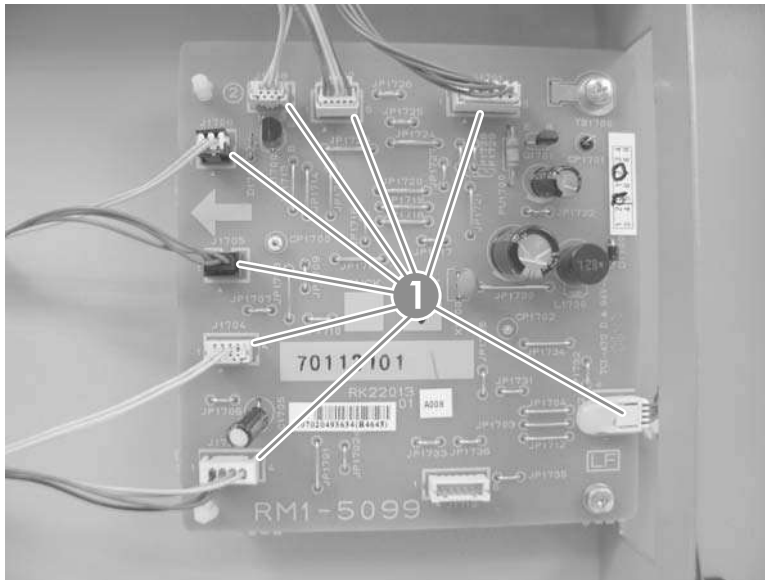
Figure 2-154 Remove the driver PCA (PD; 2 of 2)

Lift-drive assembly (PD)

Before proceeding, remove the following components:

- 1,500-sheet feeder rear cover. See Rear cover (PD) on page 167.

- 1,500-sheet feeder right-side cover. See Right-side cover (PD) on page 168.

- 1,500-sheet feeder motor. See Motor (PD) on page 174.

Remove the Lift-drive assembly (PD)

1. Disconnect one wire-harness connector (callout 1), and then release the wire harnesses from two retainers (callout 2).

   Figure 2-155 Remove the lift-drive assembly (PD; 1 of 3)
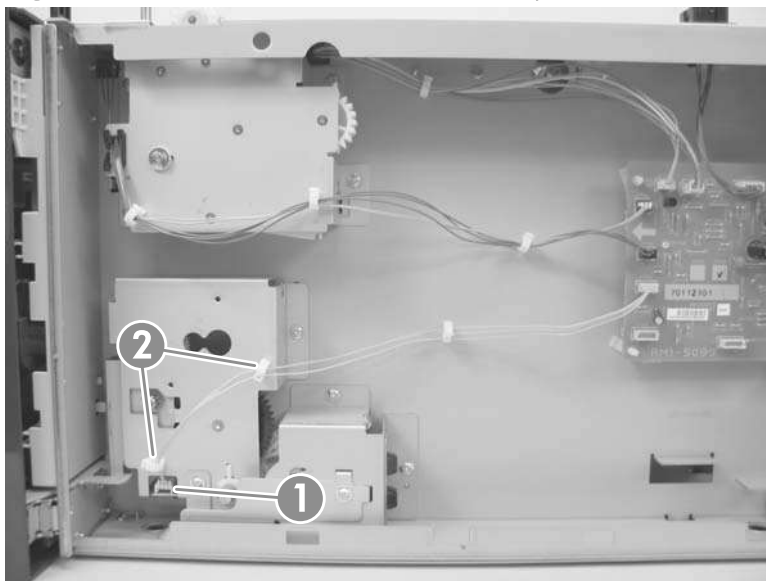
2. Remove two screws (callout 3) and the remove the sheet-metal plate (callout 4).

Figure 2-156 Remove the lift-drive assembly (PD; 2 of 3)
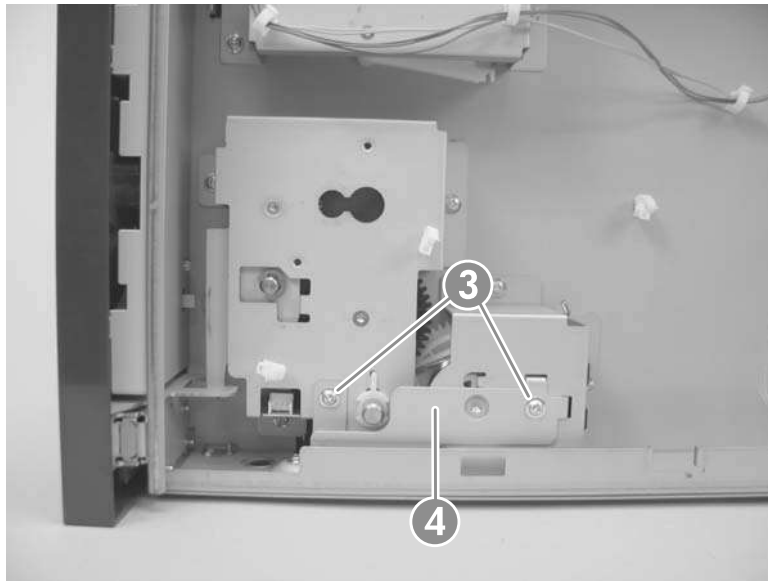
3. Remove three screws (callout 5), and then carefully remove the lift-drive assembly.

Figure 2-157 Remove the lift-drive assembly (PD; 3 of 3)
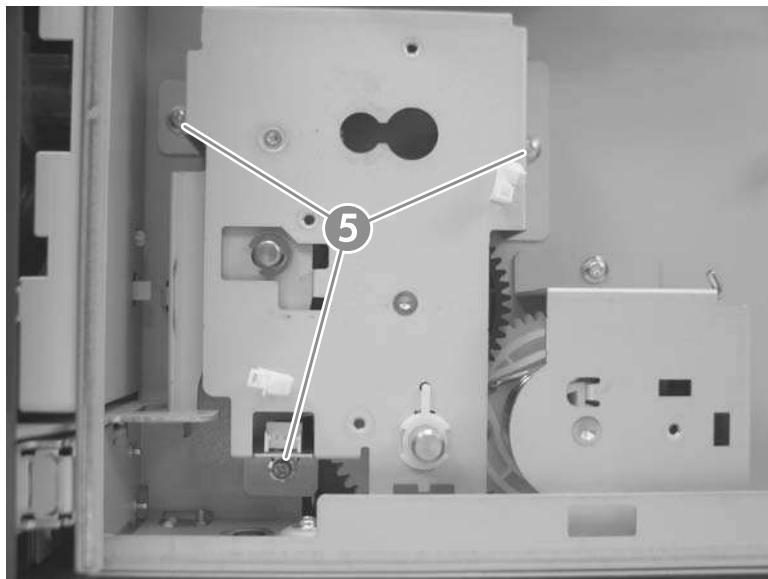
3 Solve problems

To use the information in this chapter, you should have a basic understanding of the HP LaserJet printing process. Explanations of each mechanical assembly, the printer systems, and the basic theory of operation are contained in the English-language service manual. Do not perform any of these troubleshooting processes unless you understand the function of each product component.

- Solve problems checklist
- Menu map
- Preboot menu options
- Current settings pages
- Troubleshooting process
- Tools for troubleshooting
- Clear jams
- Paper does not feed automatically
- Use manual print modes
- Solve image-quality problems
- Clean the product
- Solve performance problems
- Solve connectivity problems
- Service mode functions
- Product updates

Solve problems checklist

If the product is not responding correctly, complete the steps in the following checklist, in order. If the product does not pass a step, follow the corresponding troubleshooting suggestions. If a step resolves the problem, you can stop without performing the other steps on the checklist.

1. Make sure that the control-panel display shows one of the following messages: **Ready**, **Paused...** , or **Sleep Mode**. If no lights are illuminated or the display does not say **Ready**, **Paused...** , or **Sleep Mode**, use the Power-on checks section in the product service manual to troubleshoot the problem.

2. Check the cables.

    a. Check the cable connection between the product and the computer or network port. Make sure that the connection is secure.

    b. Make sure that the cable itself is not faulty by using a different cable, if possible.

    c. Check the network connection.

3. Ensure that the print media that you are using meets specifications.

4. Print a configuration page. If the product is connected to a network, an HP Jetdirect page also prints.

    a. If the pages do not print, check that at least one tray contains print media.

    b. If the page jams in the product, see the jams section.

5. If the configuration page prints, check the following items.

    a. If the page prints correctly, the product hardware is working. The problem is with the computer you are using, with the printer driver, or with the program.

    b. If the page does not print correctly, the problem is with the product hardware.

6. Does the image quality meet the user's requirements? If yes, see step 7. If no, check the following items:

    ● Print the fuser test page.

    ● Solve the print-quality problems, and then see step 7.

7. At the computer, check to see if the print queue is stopped, paused, or set to print offline.

    Windows: Click **Start**, click **Settings**, and then click **Printers** or **Printers and Faxes**. Double-click the **HP LaserJet Enterprise 600 M601**, **HP LaserJet Enterprise 600 M602**, or **HP LaserJet Enterprise 600 M603** item depending on the product model installed.

    -or-

    Mac OS X: Open **Printer Setup Utility**, and then double-click the line for the **HP LaserJet Enterprise 600 M601**, **HP LaserJet Enterprise 600 M602**, or **HP LaserJet Enterprise 600 M603** item depending on the product model installed.

8. Verify that you have installed the HP LaserJet Enterprise 600 M601, M602, and M603 Series Printer printer driver. Check the program to make sure that you are using the HP LaserJet Enterprise 600 M601, M602, and M603 Series Printer printer driver.

9. Print a short document from a different program that has worked in the past. If this solution works, the problem is with the program that you are using. If this solution does not work (the document does not print) complete these steps:

   a. Try printing the job from another computer that has the product software installed.

   b. If you connected the product to the network, connect the product directly to a computer with a USB cable. Redirect the product to the correct port, or reinstall the software, and select the new connection type that you are using.

Menu map

Print the menu maps

1. At the control panel, press the Home ⌂ button.

2. Open the following menus:

   - **Administration**

   - **Reports**

   - **Configuration/Status Pages**

3. Scroll to the **Administration Menu Map** item, and then press the OK button..

4. Scroll up to the **Print** option, and then press the OK button.

Preboot menu options

If an error occurs while the product is booting, an error message appears on the control-panel display. The user can access the Preboot menus. The Error menu item will not be seen if an error did not occur.

Access the Preboot menu

1. Turn the product on.

2. Press the **Stop** ⊗ button when the Ready, Data, and Attention LEDs are illuminated solid.

3. Use the **Down** arrow ▼ button to navigate the **Preboot** menu options.

4. Press the OK button to select a menu item.

Cold reset using the Preboot menu

1. Turn the product on.

2. Press the **Stop** ⊗ button when the Ready, Data, and Attention LEDs are illuminated solid.

3. Use the **Down** arrow ▼ button to highlight **Administrator**, and then press the OK button.

4. Scroll to the **Startup Options** item, and then press the OK button.

5. Scroll to the **Cold Reset** item, and then press the OK button.

6. Press the Back button twice to highlight **Continue**, and then press the OK button.

> **NOTE:** The product will initialize.

Table 3-1 Preboot menu options (1 of 5)

Menu option	First level	Second level	Third level	Description
Continue				Selecting the **Continue** item exits the Preboot menu and continues the normal boot process.
				If a selection is not made in the initial menu within 30 seconds, the product returns to a normal boot (the same as selecting **Continue**.
				If the user navigates to another menu, the timeout does not apply.
Sign In				Enter the Administrator PIN or Service PIN if one is required to access the **Preboot** menu.

Table 3-1 Preboot menu options (1 of 5) (continued)

Menu option	First level	Second level	Third level	Description
Administrator				This item navigates to the **Administrator** sub menus.
				If authentication is required (and the user is not already signed in) the **Sign In** displays. The user is required to sign in.
	Download			This item initiates a preboot firmware download process. A USB device interface or a Network connection can be used to download firmware.
		Network		See Product updates on page 397.
		USB		See Product updates on page 397.
	Clean Disk			This item reinitializes the disk and cleans all disk partitions.
				CAUTION: Selecting the **Clean Disk** item removes **all** data.
				A delete confirmation prompt is **not** provided.
				The system is **not** bootable after this action—a firmware download must be performed to return the system to a bootable state.
	Partial Clean			This item reinitializes the disk (removing all data except the firmware repository where the master firmware bundle is downloaded and saved).
				CAUTION: Selecting the **Partial Clean** item removes **all** data except the firmware repository.
				A delete confirmation prompt is **not** provided.
				This allows user to reformat the disk by removing the firmware image from the active directory without having to download new firmware code (product remains bootable).
	Change Password			Select this item to set or change the administrator password.
	Clear Password			Select the **Clear Password** item to remove a password from the Administrator menu. Before the password is actually cleared, a message will be shown asking to confirm that the password should be cleared. Press the OK button to confirm the action.
				When the confirmation prompt appears, press the OK button to clear the password.

Table 3-2 Preboot menu options (2 of 5)

Menu option	First level	Second level	Third level	Description
Administrat or continued	**Manage Disk**	**Clear Disk**		Select the **Clear Disk** item to enable an external device for job storage. Job storage is normally enabled only for the Boot device. This will be grayed out unless the 99.09.68 error is displayed.
		Lock Disk		Select the **Lock Disk** item to lock (mate) a new secure disk to this product. The secure disk already locked to this product will remain accessible to this product. Use this function to have more then one encrypted disk accessible by the product when using them interchangeably. The data stored on the secure disk locked to this product always remains accessible to this product.
		Leave Unlocked		Select the **Leave Unlocked** item to use a new secure disk in an unlocked mode for single service event. The secure disk that is already locked to this product will remain accessible to this product and uses the old disk's encryption password with the new disk. The secure disk that is already locked to this product remains accessible to this product.
		Clear Password		Select the **Clear Password** item to continue using the non-secure disk and clear the password associated with the yet to be installed secure disk. CAUTION: Data on the missing secure disk will be permanently inaccessible.
		Retain Password		Select the **Retain Password** item to use the non-secure disk for this session only, and then search for the missing secure disk in future sessions.
		Boot Device	**Secure Erase**	Select the **Secure Erase** item to erase all of the data on the disk and unlock it if required (this might take a long time). NOTE: The system will be unusable until the system files are reinstalled. ATA secure-erase command one pass over write. Erases entire disk including firmware. The disk remains an encrypted disk.
			Erase and Unlock	Select the **Erase and Unlock** item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product. NOTE: The system will be unusable until the system files are reinstalled. Erases the crypto key. The disk becomes a non-encrypted disk.
			Get Status	This item provides disk status information if any is available.

Table 3-3 Preboot menu options (3 of 5)

Menu option	First level	Second level	Third level	Description
Administrator continued	**Manage Disk** continued	**Internal Device**		Select the **Internal Device** item to erase the internal device or get status about the internal device.
			Secure Erase	Select the **Secure Erase** item to erase all of the data on the disk and unlock it if required (this might take a long time).
				NOTE: The system will be unusable until the system files are reinstalled. ATA secure-erase command one pass over write. Erases the entire disk, including firmware. The disk remains an encrypted disk.
			Erase and Unlock	Select the **Erase and Unlock** item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product.
				NOTE: The system will be unusable until the system files are reinstalled. Erases the crypto key. The disk becomes a non-encrypted disk.
			Get Status	This item provides disk status information if any is available.
		External Device		Select the **External Device** item to erase the internal device or get status about the internal device.
			Secure Erase	Select the **Secure Erase** item to erase all of the data on the disk and unlock it if required (this might take a long time).
				NOTE: The system will be unusable until the system files are reinstalled. ATA secure-erase command one pass over write. Erases the entire disk, including firmware. The disk remains an encrypted disk.
			Erase and Unlock	Select the **Erase and Unlock** item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product.
				NOTE: The system will be unusable until the system files are reinstalled. Erases the crypto key. The disk becomes a non-encrypted disk.
			Get Status	This item provides disk status information if any is available.

Table 3-4 **Preboot menu options (4 of 5)**

Menu option	First level	Second level	Third level	Description
Administrator continued	**Configure LAN**			Select the **Configure LAN** item to setup the network settings for the PreBoot menu firmware upgrade. The network can be configured obtain the network settings from a DHCP server or as static.
		DHCP		Use this item for automatic IP address acquisition from the DHCP server.
		Static		Use this item to manually assign the network addresses.
			IP Address	Use this item to manually enter the IP addresses.
			Subnet Mask	Use this item to manually enter the subnet mask.
			Default Gateway	Use this item to manually enter the default gateway.
			Save and Exit	Select the **Save and Exit** item to save the manual settings.

Table 3-5 Preboot menu options (5 of 5)

Menu option	First level	Second level	Third level	Description
Administrator continued	**Startup Options**			Select the **Startup Options** item to specify options that can be set for the next time the product is turned on and initializes to the to **Ready** state.
		Cold Reset		Check the **Cold Reset** item to clear the IP address and all customer settings (this item also returns all settings to factory defaults). Items in the **Service** menu are not reset.
		First Power		Not currently functional: This item allows the product initialize as if it is the first time it has been turned on.
				For example, the user is prompted to configure first time settings like Select Date/Time, Select Language, and other settings).
				Check this item so that it is enabled for the next time the product power is turned on.
				When the product power is turned on the next time, this item is unchecked so that the pre-configured settings are used during configuration and the first time setting prompt is not used.
		Skip Plug-ins		This item allows the device to be started without loading the third party applications.
				This means that files including Accessible Architecture on the disk will not be available at bootup. This is useful for troubleshooting problems with the hard disk without having to remove the hard disk. It also applies to flash file system disks on DIMMs.
				In this case, this function will cause the printer to configure the HP firmware first, followed by the third-party applications. The files on the disk will be available after the printer enters the **Ready** state.
		Skip Cal		Select the **Skip Cal** item to initialize the product the next time the power is turned on without calibrating.
		Show Revision		Not currently functional: Check the **Show Revision** item to allow the product to initialize and show the firmware version when the device reaches the **Ready** state.
				Once the product power is turned on the next time, the **Show Revision** item is unchecked so the firmware revision is not shown.
		Lock Service		**CAUTION:** Select the **Lock Service** item to lock the Service menu access (both PreBoot and Device Maintenance application).
				Service personnel must have the Administrator remove the **Lock Service** setting before they can enter the **Service** menu.

Table 3-6 Preboot menu options (5 of 5)

Menu option	First level	Second level	Third level	Description
Administrator continued	**Startup Options**	**Skip Disk Scan**		Check the **Skip Disk Scan** item to allow the product to initialize without scanning the disk.
				If the product is crashing on Step 4/8, checking this item may allow the problem to be isolated.
				Once the device is turned on the next time, the **Skip Disk Scan** item is unchecked and the disk scan is not skipped.
		Embedded Jetdirect Off		Check the **Embedded Jetdirect Off** item to disable the embedded Jetdirect.
				By default this item is unchecked so that Jetdirect is always enabled.
Service Tools				This item requires the Service access code.
	Reset Password			Use this item to clear the Administrator password.
	Subsystems			For manufacturing use only. Do not change these values.

Current settings pages

Printing the current settings pages provides a map of the user configurable settings that might be helpful in the troubleshooting process.

Print the current settings pages

1. At the control panel, press the Home ⌂ button.

2. Open the following menus:

    ●   **Administration**

    ●   **Reports**

    ●   **Configuration/Status Pages**

3. Scroll to the **Current Settings Page** item, and then press the OK button.

4. Scroll up to the **Print** option, and then press the OK button.

Troubleshooting process

When the product malfunctions or encounters an unexpected situation, the product control panel alerts you to the situation. This chapter contains information to help diagnose and solve problems.

- Use the pretroubleshooting checklist to evaluate the source of the problem and to reduce the number of steps that are required to fix the problem.

- Use the troubleshooting flowchart to pinpoint the root cause of hardware malfunctions. The flowchart guides you to the section of this chapter that contains steps for correcting the malfunction.

Before beginning any troubleshooting procedure, check the following issues:

- 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.

Determine the problem source

When the product malfunctions or encounters an unexpected situation, the product control panel alerts you to 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.

Pre-troubleshooting checklist

The following table includes basic questions to ask the customer to quickly help define the problem.

General topic	Questions
Environment	• Is the product installed on a solid, level surface (+/- 1°)?
	• Is the power-supply voltage within ± 10 volts of the specified power source?
	• Is the power-supply plug inserted in the product and the outlet (not a power strip)?
	• Is the operating environment within the specified parameters?
	• Is the product exposed to ammonia gas, such as that produced by diazo copiers or office cleaning materials?
	NOTE: Diazo copiers produce ammonia gas as part of the coping processes. Ammonia gas (from cleaning supplies or a diazo copier) can have an adverse affect on some product components (for example, the print-cartridge OPC).
	• Is the product exposed to direct sunlight?

General topic	Questions
Media	• Does the customer use only supported media?
	• Is the media in good condition (no curls, folds, or distortion)?
	• Is the media stored correctly and within environmental limits?
Input trays	• Is the amount of media in the tray within specifications?
	• Is the media correctly placed in the tray?
	• Are the paper guides aligned with the stack?
	• Is the cassette correctly installed in the product?
Print cartridges	• Is each print cartridge installed correctly?
	• Are original HP print cartridges installed?
	• Are the cartridges damaged?
Fuser	• Is the fuser correctly installed?
	• Is the fuser damaged?
Covers and trays	• Are the trays correctly installed?
	• Is the top cover closed?
Condensation	• Does condensation occur following a temperature change (particularly in winter following cold storage)? If so, wipe affected parts dry or leave the product on for 10 to 20 minutes.
	• Was a print cartridge opened soon after being moved from a cold to a warm room? If so, allow the print cartridge to sit at room temperature for 1 to 2 hours.
Miscellaneous	• Check for and remove any non-HP components (for example, print cartridges or memory modules) from the product.
	• Check to see whether the hardware or software configuration has changed or the problem is not associated with any specific software.
	• Remove the product from the network and ensure that the failure is associated with the product before beginning troubleshooting.
	• For any print-quality issues, clean the paper path.

Troubleshooting flowchart

This flowchart highlights the general processes that you can follow to quickly isolate and solve product hardware problems.

Each row depicts a major troubleshooting step. A "yes" answer to a question allows you to proceed to the next major step. A "no" answer indicates that more testing is needed. Go to the appropriate section in this chapter, and follow the instructions there. After completing the instructions, go to the next major step in this troubleshooting flowchart.

Table 3-7 Troubleshooting flowchart

1 **Power on**	Is the product on and does a readable message display?		Follow the power-on troubleshooting checks. See <u>Power subsystem on page 196</u>. After the control panel display is functional, see step 2.
	Yes ↓	No →	
2 **Control panel messages**	Does the message **Ready** display on the control panel?		If an error message displays, see <u>Interpret control-panel messages, status-alert messages, and event code errors on page 266</u>. After the errors have been corrected, go to step 3.
	Yes ↓	No →	
3 **Event log**	Open the **Troubleshooting** menu and print an event log to see the history of errors with this product. Does the event log print?		If the event log does not print, see <u>Print an event log on page 351</u>. If paper jams inside the product, see <u>Clear jams on page 353</u>. If error messages display on the control panel when you try to print an event log, see <u>Print an event log on page 351</u>. After successfully printing and evaluating the event log, see step 4.
	Yes ↓	No →	
4 **Configuration/ Status Pages**	Open the **Reports** menu and print the configuration pages to verify that all the accessories are installed. **NOTE: To display**: At the product control panel, press the Home 🏠 button, select the **Administration** menu, and then select the **Reports** menu. Are all the accessories installed?		If accessories that are installed are not listed on the configuration page, remove the accessory and reinstall it. After evaluating the configuration pages, see step 5.
	Yes ↓	No →	
5 **Image quality**	Does the print quality meet the customer's requirements?		Compare the images with the sample defects in the image defect tables. See <u>Print-quality examples on page 380</u>. After the print quality is acceptable, see step 6.
	Yes ↓	No →	
6 **Interface**	Can the customer print successfully from the host computer?		Verify that all I/O cables are connected correctly and that a valid IP address is listed on the Jetdirect configuration page.
	Yes. This is the end of the troubleshooting process.	No →	If error messages display on the control panel, see <u>Print an event log on page 351</u>. When the customer can print from the host computer, this is the end of the troubleshooting process.

Power subsystem

Power-on checks

The basic product functions should start up as soon as the product is plugged into an electrical receptacle and the power button is pushed to the *on* position.

Overview

Turn on the product power. If the control-panel display remains blank, random patterns appear, or asterisks remain on the display, perform power-on checks to locate the cause of the problem.

NOTE: It might take the control panel 10 to 20 seconds to illuminate when the product power is turned on.

During normal product operation, the left rear cooling fan begins to spin briefly after the product power is turned on. Place your hand over the holes in the left-side cover. If the fan is operating, you will feel a slight vibration and feel air passing into the product. You can also lean close to the product and hear the fan operating. When this fan is operational, the dc side of the power supply is functioning correctly.

After the fan is operating, the main motor turns on (unless the top cover is open, a jam condition is sensed, or the paper path sensor is blocked). You should be able to visually and audibly determine if the main motor is turned on.

If the fan and main motor are operating correctly, the next troubleshooting step is to separate print engine, formatter, and control-panel problems. Perform an engine test (see Engine test button on page 204). If the formatter is damaged, it might interfere with the engine test. If the engine test page does not print, try removing the formatter and then performing the engine test again. If the engine test is then successful, the problem is almost certainly with the formatter, the control panel, or the cable that connects them.

If the control panel is blank when you turn on the product, check the following items.

1. Make sure that the product is plugged into an active electrical outlet receptacle that delivers the correct voltage.

2. Make sure that the on/off button is in the *on* position.

3. Make sure that the fan runs briefly, which indicates that the power supply is operational.

4. Make sure that the control-panel display wire-harness is connected to connector J70 of the DC controller PCA.

5. Make sure that the formatter is seated and operating correctly.

NOTE: If the control-panel display is blank, but the main cooling fan runs briefly after the product power is turned on, try printing an engine test page to determine whether the problem is with the control-panel display, formatter, or other components. See Engine test button on page 204.

If the main cooling fan is not operating, replace the power-supply assembly. See High voltage power supply on page 148.

NOTE: It is important to have the control panel functional as soon as possible in the troubleshooting process so that the control-panel display can be used to help locate errors.

If problems with the power-on check persist, refer to table .

Table 3-8 Power-on defect or blank display

Problem	Action
The power cord is not plugged into the wall receptacle and connected to the product.	Make sure that the power cord is firmly plugged into the wall receptacle and connected to the product.
The correct voltage (power) is not available.	Measure the voltage at the outlet. If necessary, plug the power cord into another circuit outlet.
The power button is off.	Set the button to the *on* position. **NOTE:** The power button is illuminated when the button is in the on position and the product is correctly operating.
The overcurrent/overvoltage detection circuit is activated.	Wait for more than two minutes before turning the product back on.
A fuse is blown.	1. Check the fuses (FU1 and FU2) on the power supply. 2. Replace the power-supply assembly if necessary.

Table 3-8 **Power-on defect or blank display (continued)**

Problem	Action
The main cooling fan (located on the left side near the rear of the product) does not turn on when the product is started.	An operational fan indicates the following conditions: • The AC power is present in the product. • The DC power supply is functional (24 V, 5 V, and 3.3 V are being generated). • The DC controller microprocessor is functional. **If the fan is not working**: 1. Turn the product off and remove the formatter. Disconnect the optional accessories. 2. Turn the product on and check the fan again. **If the fan is still not working**: 1. Verify that the fan is connected to the power supply (connector J64). 2. Replace the fan. See Fan FN101 on page 142. 3. If the error persists, replace the power-supply assembly. See High voltage power supply on page 148. 4. If the error persists, replace the DC controller. See DC controller PCA on page 128. **Note:** The fan only operates during the initial startup and while printing, and when the temperature inside the product is too high. If the temperature is too high, the fan turns on to cool the inside of the product.
The fan works, but the control-panel display is blank.	1. Print an engine test. See Engine test button on page 204. 2. If the engine test is successful, perform the following steps, in order. ◦ Reseat the control panel and formatter connector. See Control-panel assembly on page 109 and Formatter cover and formatter cage on page 71. ◦ Replace the control-panel cable. See Control-panel assembly on page 109. ◦ If the error persists, replace the control-panel assembly. See Control-panel assembly on page 109. ◦ If the error persists, replace the formatter. See Formatter cover and formatter cage on page 71. 3. If the engine test is not successful, remove the formatter and attempt to perform the engine test again. If the engine test is successful with the formatter removed, replace the formatter. See Formatter cover and formatter cage on page 71. If the test is not successful with the formatter removed, replace the DC controller PCA. See DC controller PCA on page 128.

Tools for troubleshooting

Component diagnostics

LED diagnostics

LED, engine, and individual diagnostics can identify and troubleshoot product problems.

Understand lights on the formatter

Three LEDs on the formatter indicate that the product is functioning correctly.
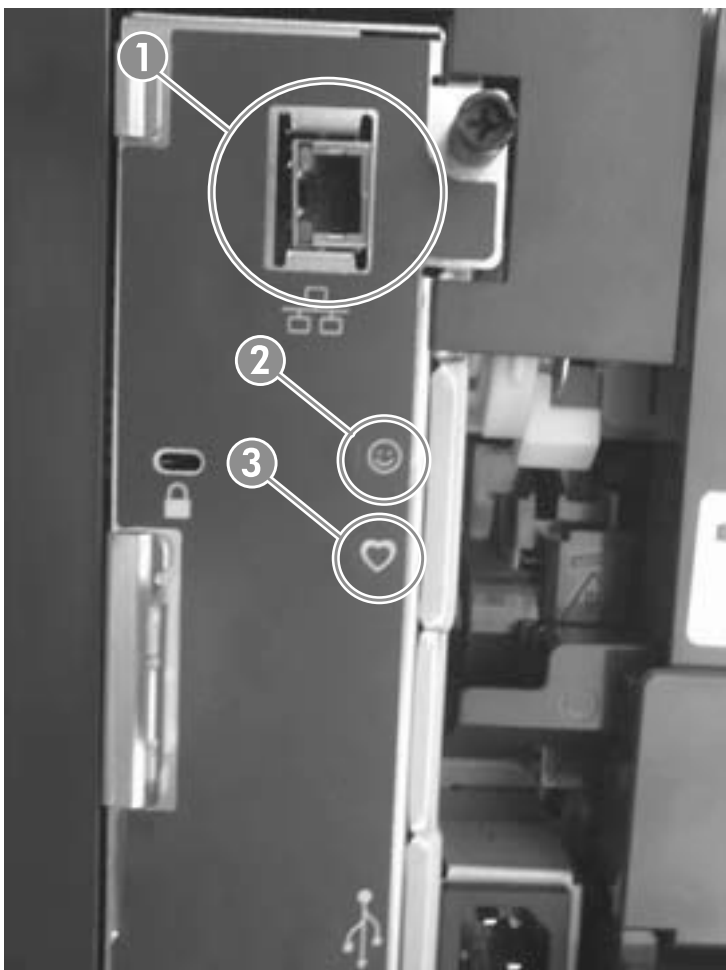
1	HP Jetdirect LEDs
2	Connectivity LED
3	Heartbeat LED

HP Jetdirect LEDs

The embedded HP Jetdirect print server has two LEDs. The yellow LED indicates network activity, and the green LED indicates the link status. A blinking yellow LED indicates network traffic. If the green LED is off, a link has failed.

For link failures, check all the network cable connections. In addition, you can try to manually configure the link settings on the embedded print server by using the product control-panel menus.

1. At the control panel, press the Home 🏠 button.

2. Open the following menus:

    ●   **Administration**

    ●   **Network Settings**

    ●   **Jetdirect Menu**

3. Scroll to and select the **Link Speed** item, and then press the OK button.

4. Select the appropriate link speed, and then press the OK button.

Heartbeat LED

The heartbeat LED indicates that the formatter is functioning correctly. While the product is initializing after you turn it on, the LED blinks rapidly and then turns off. When the product has finished the initialization sequence, the heartbeat LED pulses on and off.

If the heartbeat LED is off, turn the product power off, make sure that the formatter is fully seated, and then turn the product on. If the problem persists, the formatter might have a problem. Replace the formatter.

Connectivity LED

The connectivity LED provides information about product operation. If a product error occurs, the formatter displays a message on the control-panel display. However, error situations can occur causing the formatter to control panel communication to be interrupted.

> **NOTE:**   HP recommends fully troubleshooting the formatter and control panel before replacing either component. Use the connectivity LED to troubleshoot formatter and control panel errors to avoid unnecessarily replacing these components.

Formatter to control panel communication interruptions

●   The firmware does not fully initialize and configure the control panel interface.

●   The control panel is not functioning (either a failed component or power problem).

●   Interface cabling between the formatter and control panel is damaged or disconnected.

> **TIP:**   If the connectivity LED is illuminated—by an error condition or normal operation—the formatter is fully seated and the power is on. The pins for the LED circuit in the formatter connector are recessed so that this LED will not illuminate unless the formatter is fully seated.

The connectivity LED operates according to the product state. When the product is initializing, see . When the product is in **Ready** mode, see .

Connectivity LED, product initialization

The following table describes the connectivity operation while the product is executing the firmware boot process.

NOTE: When the initialization process completes the connectivity LED should be illuminated solid green—the LED is off if the product is in **Sleep Mode**

If after initialization the connectivity LED is not solid green, see .

Table 3-9 Connectivity LED, product initialization

Product initializing state	Connectivity LED, normal state	Connectivity LED, error state
No power (power cord unplugged or power button off)	Off	Not applicable
Power on (immediately after the power button pressed)	Red, solid ● Duration should be 1 second or less	Red, solid ● Firmware error; problem finding hardware and booting the serial peripheral interface flash memory ○ Boot process halted Replace the formatter.
Serial peripheral interface (SPI) flash memory boot	Green, solid	Red, solid ● Firmware error; problem corrupt or missing SPI flash memory ○ Boot process halted Replace the formatter.
HW checks on board DRAM	Green, solid	Red, solid ● Power on self check failure ○ Boot process halted Replace the formatter.
Control panel connection initializes	Green, solid NOTE: Control panel communication successful. If an error occurs, a message should appear on the control-panel display.	Yellow, fast flash ● Formatter to control panel connection failed ○ Boot process continues Check the cables between the formatter and control panel for damage. Make sure that the cables are fully seated.

Table 3-9 Connectivity LED, product initialization (continued)

Product initializing state	Connectivity LED, normal state	Connectivity LED, error state
Preboot menu available (including diagnostics)	Green, solid	Red, solid ● Diagnostic failure ○ Follow diagnostic instructions Turn the power off, and then on again to restart the initialization process.
Accessing disk for firmware image	Green, solid **NOTE:** If applicable, disk error messages appear on the control-panel display.	Yellow, fast flash ● Control panel not connected
Firmware boot	Green, solid **NOTE:** If applicable, error messages appear on the control-panel display.	Yellow, fast flash ● Control panel not connected
Product operational	Green, heartbeat blink **NOTE:** If applicable, error messages appear on the control-panel display.	Yellow, fast flash ● Control panel not connected
49.XX.YY error or initialization freezes	Not applicable	LED off **NOTE:** An error message (for example, **49.XX.YY**) might appear on the control-panel display. Eventually a formatter connection missing message will appear. Turn the power off, and then on again to restart the initialization process. If the error persists, perform a firmware upgrade.
Control panel connection interrupted after the product is operational	Not applicable	Yellow, fast flash ● Control panel not connected
Sleep Mode	Green, slow blink	Not applicable
Approaching **Sleep Mode**	Green, slow blink	Not applicable
Wake up from **Sleep Mode**	Follows initialization progression above.	Follows initialization progression above.
Approaching wake up from **Sleep Mode**	Follows initialization progression above.	Follows initialization progression above.

The following table describes the connectivity operation when the product completes the firmware boot process and is in the **Ready** state.

Table 3-10 Connectivity LED, product operational

LED color	Description
Green	- Normal operation - Formatter is operating normally - Firmware is operating normally - Control panel is connected
Yellow	- Formatter cannot connect to the control panel - Check control panel connections - Verify control panel functionality
Red	- Formatter error or failure - Serial peripheral interface (SPI) flash memory boot error - Power on self test (formatter) failed - Diagnostic (formatter) failed
Off	**TIP:** The connectivity LED is off if the power cord is unplugged, the product power button is in the off position, or the product is in **Sleep Mode**. - Firmware or system freeze - Check the control panel for an error message - Control panel failure **NOTE:** This condition is not usually caused by a formatter failure. Turn the power off, and then on again. If the error persists, perform a firmware upgrade.

Engine diagnostics

This section provides an overview of the engine diagnostics that are available in the HP LaserJet Enterprise 600 M601, M602, and M603 Series Printer product. The product contains extensive internal diagnostics that help in troubleshooting print quality, paper path, noise, component, and timing issues.

Engine test button

To verify that the product engine (all product components *except* the formatter, formatter DIMM, and the stacker or stapler/stacker) is functioning, print an engine-test page. Use a small, non-metallic, pointed object to depress the test-page buton, which is accessible through a slot in the right-side cover.

Figure 3-1 Engine-test-page button

The test page should have a series of horizontal lines. The test page prints from the last tray that you printed from. However, if the product has been turned off and then on again since the most recent print job, the page will print from Tray 2.

> **NOTE:** A damaged formatter might interfere with the engine test. If the engine-test page does not print, try removing the formatter and performing the engine test again. If the engine test is then successful, the problem is almost certainly with the formatter, the control panel, or the cable that connects them.

Formatter test

To check that the formatter is working, print a configuration page.

1. Press the Home 🏠 button.

2. Open the following menus:

    ●   **Administration**

    ●   **Reports**

    ●   **Configuration/Status Pages**

3. Scroll to the **Configuration Page** item, and then press the OK button.

4. Scroll to the **Print** item, and then press the OK button.

Print/Stop test

Perform a **Print/Stop Test** to determine which image-formation component might be malfunctioning.

1. Press the Home 🏠 button.

2. Open the following menus:

    *   **Administration**

    *   **Troubleshooting**

    *   **Diagnostic Tests**

3. Select the **Print/Stop Test** item, and then select from a range of 0 to 60,000 milli-seconds.

    NOTE: Select a range value that allows the page to progress through the paper path just past the component that you suspect is causing the print-quality problem.

4. Press the OK button to start the test.

Drum rotation test

The photosensitive drum, which is located in the print cartridge, must rotate in order for the print process to work. The photosensitive drum receives its drive from the main gear assembly. Use this procedure to determine whether the drum is rotating.

1. Open the top cover.

2. Remove the print cartridge.

3. Mark the cartridge drive gear with a felt-tipped marker. Note the position of the mark.

4. Install the print cartridge, and then close the top cover. The start-up sequence should rotate the drum enough to move the mark on the gear.

5. Open the product and inspect the mark on the cartridge drive gear. Verify that the mark moved. If there was no movement, inspect the main gear assembly to make sure that it connects with the print-cartridge gears. If the drive gears function but the drum does not move, replace the print cartridge.

    NOTE: This test is especially important if refilled print cartridges are in use.

If a dark and distinct toner image is present on the drum surface, assume that the cleaning, conditioning, writing, and developing functions of the electrophotographic process are functioning correctly. Troubleshoot the failure as a transfer or fusing problem. If no image is present on the drum, perform the drum-rotation test.

Paper-path test (and automatic sensor test)

This diagnostic test generates one or more test pages that you can use to isolate the cause of jams.

To isolate a problem, 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 start the diagnostic feature:

● **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, and then scroll back up and select **Print Test Page** to start the test.

● **Source**. Select Tray 1, Tray 2, or the optional tray.

● **Duplex**. Enable or disable two-sided printing.

> **NOTE:** Duplex models only.

● **Copies**. Set the numbers of copies to be printed; the choices are 1,10, 50, 100, or 500.

1. Press the Home 🏠 button.

2. Open the following menus:

    ● **Administration**

    ● **Troubleshooting**

    ● **Diagnostic Tests**

3. Scroll to **Paper Path Test**, and then press the OK button.

4. Select the paper-path test options for the test you want to run.

Paper path sensors test (automatic)

> **NOTE:** To view the function of each sensor and how to toggle them manually, see <u>Manual sensor test on page 208</u>.

This test displays the status of each paper path sensor and allows viewing of sensor status while printing internal pages.

1. Press the Home 🏠 button.

2. Open the following menus:

    ● **Administration**

    ● **Troubleshooting**

    ● **Diagnostic Tests**

3. Scroll to **Paper Path Sensors**, and then press the OK button.

4. Select the paper path sensor to test.

5. Press OK to start the test, and then watch the control-panel display for the switch or sensor state to change from green to clear or clear to green. It might take a few seconds to change.

Figure 3-2 Paper sensors
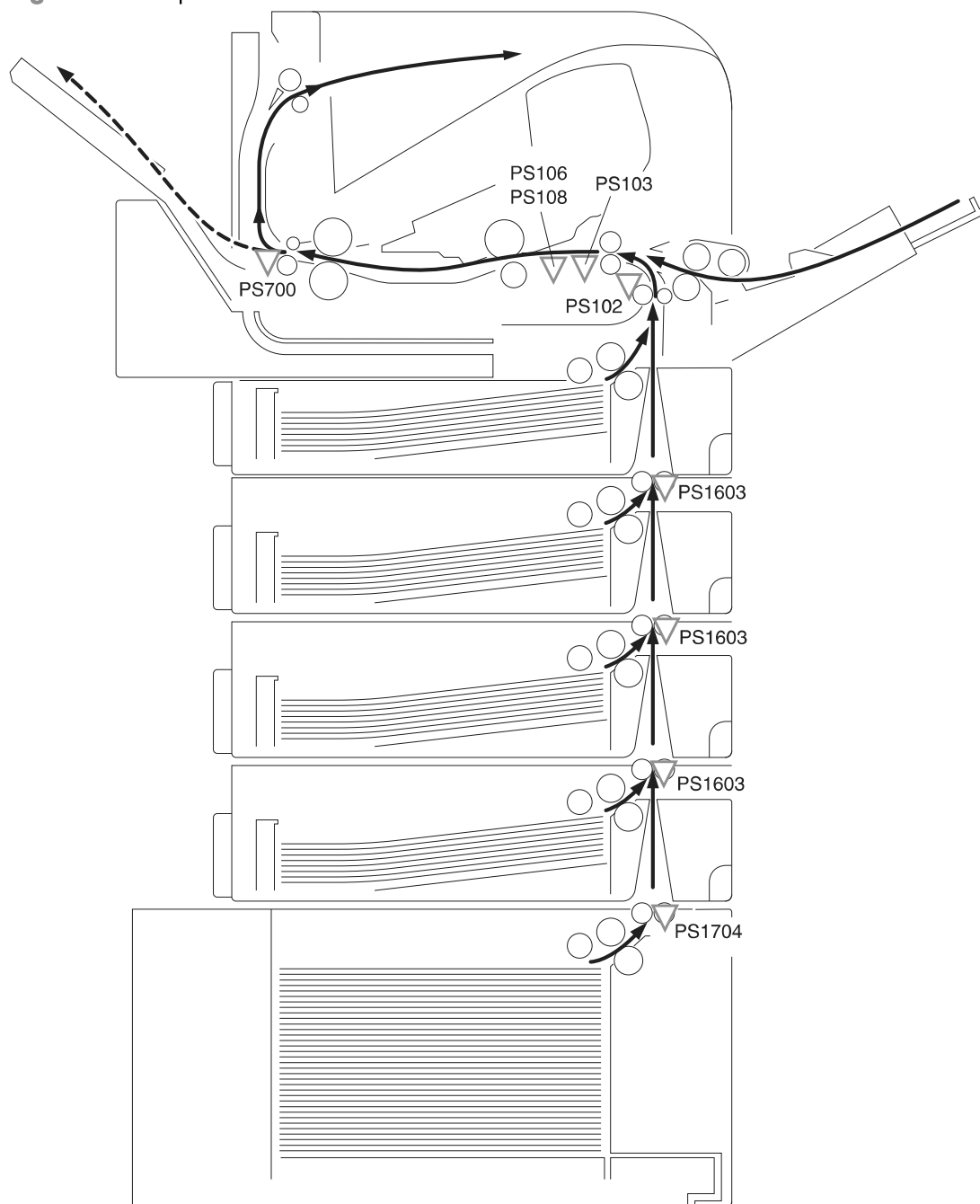
Table 3-11 **Paper sensor test designators**

Designator	Sensor
PS103	Top of page sensor
PS102	Pre-feed sensor

Table 3-11 Paper sensor test designators (continued)

Designator	Sensor
PS700	Fuser delivery sensor
PS1502	Duplex sensor
PS106	Left-side paper width sensor
PS108	Right-side paper width sensor
PS1603	Tray 3 media path sensor[1]
PS1603	Tray 4 media path sensor[1]
PS1603	Tray 5 media path sensor [1]
PS1704	Tray 6 media path sensor [1]

[1] This sensor is present only if the accessory is installed.

Manual sensor test

Use this diagnostic test to manually test the product sensors and switches. Each sensor is represented by a letter and number on the control panel display.

1. Press the Home ⌂ button.

2. Open the following menus:

    ● **Administration**

    ● **Troubleshooting**

    ● **Diagnostic Tests**

3. Scroll to the **Manual Sensor Test** item, and then press the OK button.

4. Activate a switch or sensor, and then watch the control-panel display for the switch or sensor state to change from green to clear or clear to green. It might take a few seconds to change.

Menus cannot be opened during this test, so the OK button serves the same function as the **Stop** button ⊗.

Table 3-12 **Manual sensor diagnostic tests**

Manual sensor test designator	Sensor or switch	Replacement component
PS103	Top of page sensor, see Top of page sensor (PS103) on page 210	Replace the product
PS102	Pre-feed sensor, see Pre-feed sensor (PS102) on page 211 **NOTE:** See this procedure for the Tray 3, 4, 5, or 6 media path sensors (PS1603/1603/1603/1704).	Replace the product
PS1502	Duplex sensor, see Duplex sensor (PS1502) on page 213	Replace the duplexer
PS700	Fuser delivery sensor, see Fuser delivery sensor (PS700) on page 212	Replace the fuser

Table 3-12 Manual sensor diagnostic tests (continued)

Manual sensor test designator	Sensor or switch	Replacement component
PS106/108	Left-side and right-side paper width sensors, see Media width sensors 1/2 (PS106/108) on page 214	Replace the product
PS1603/1704	PF/PD media path sensors, see Pre-feed sensor (PS102) on page 211	Replace the product
PS104	Output bin full sensor, see Output bin full sensor (PS104) on page 215	Replace the product
PS101	Tray 2 paper present sensor, see Tray 2 paper present sensor (PS101) on page 217	Replace the product
PS107	Tray 2 top of stack sensor, see Tray 2 top of stack sensor (PS107) on page 218	Replace the cassette pickup assembly
SW102	Tray 2 paper size switches, see Tray 2 paper size switches (SW102) on page 219 **NOTE:** See this procedure for the Tray 3, 4, 5, or 6 sensors and switches.	Replace the cassette pickup assembly

Top of page sensor (PS103)

1. Open the top cover and then remove the print cartridge.

2. Activate the top of page sensor (PS103) flag.

   NOTE: You might need to lift the flap—use the green handles—to expose the sensor flag.

   Figure 3-3 Test the top of page sensor
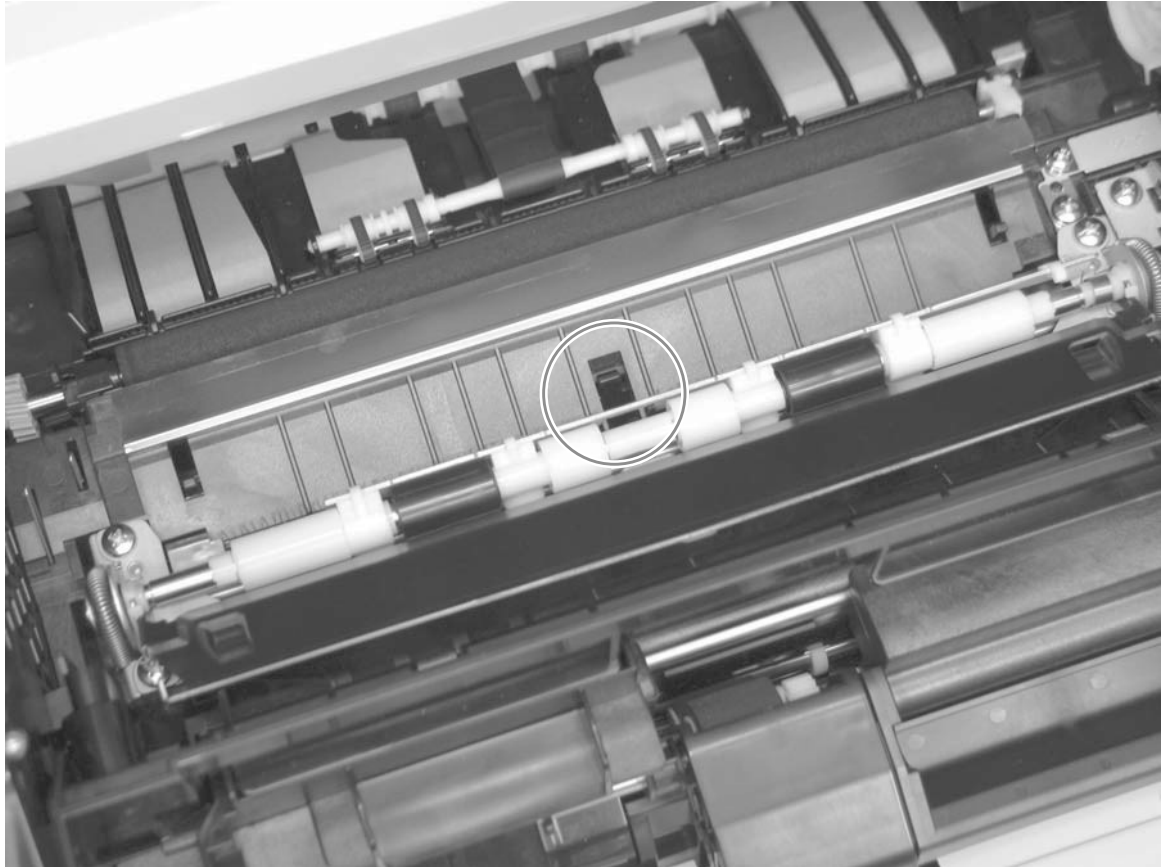
3. Check the control-panel display for sensor response (the dot on the display will turn green).

Pre-feed sensor (PS102)

NOTE: Use this procedure to test the paper feeder (PS1603) and paper deck (PS1704) media path sensors

1. Remove the Tray 2 cassette.

2. Insert a piece of paper to override the Tray 2 pre-feed sensor (PS102).

NOTE: The paper must be thick enough to depress and hold in place the sensor actuator arm.

Figure 3-4 Test the Tray 2 pre-feed sensor (PS102)
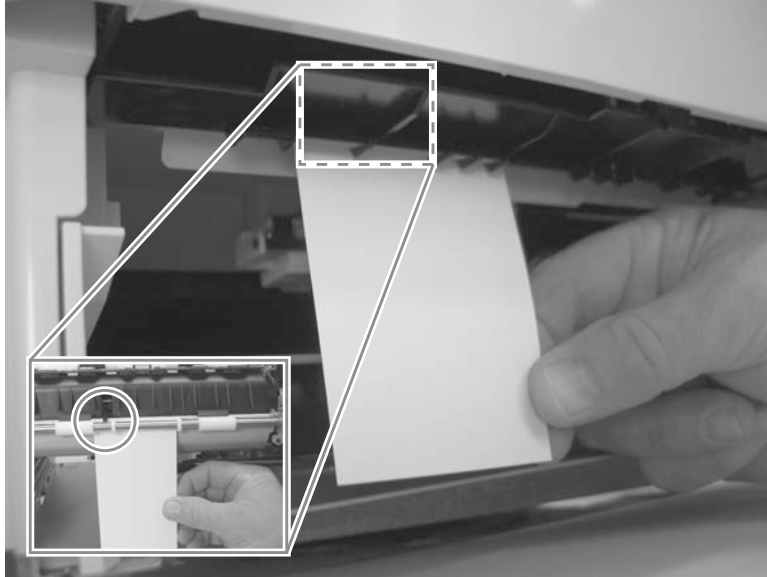
Figure 3-5 paper feeder and paper deck media path sensors
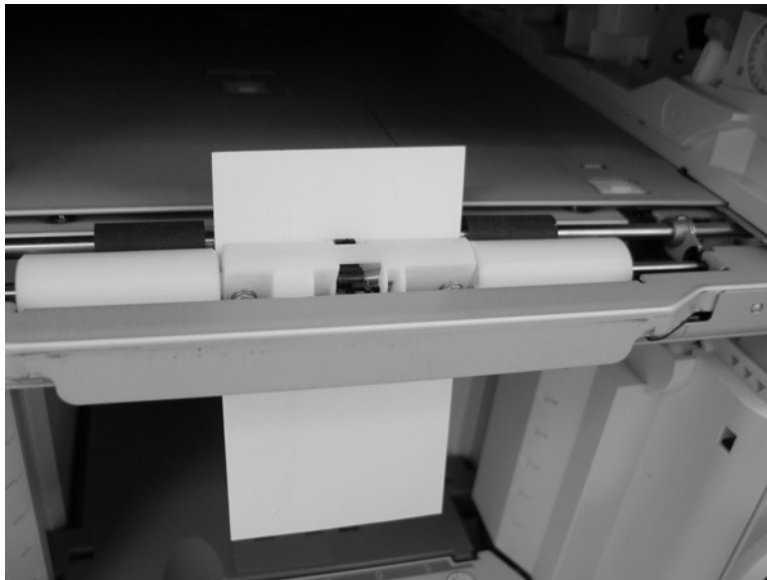
Fuser delivery sensor (PS700)

1. Open the rear output bin.

2. Activate the fuser delivery sensor (PS700) flag.

   Figure 3-6 Test the fuser delivery sensor (PS700)

3. Check the control-panel display for sensor response (the dot on the display will turn green).

Duplex sensor (PS1502)

1. Remove the duplexer.

2. Verify that the duplexer sensor (PS1502) flag moves freely.

3. If the flag does not move freely, replace the duplexer.

Figure 3-7 Test the fuser duplex sensor

1. Open the top cover and then remove the print cartridge.

2. Activate the left- or right-side paper width sensors (PS106/108).

Figure 3-8 Test the fuser pressure-release sensor
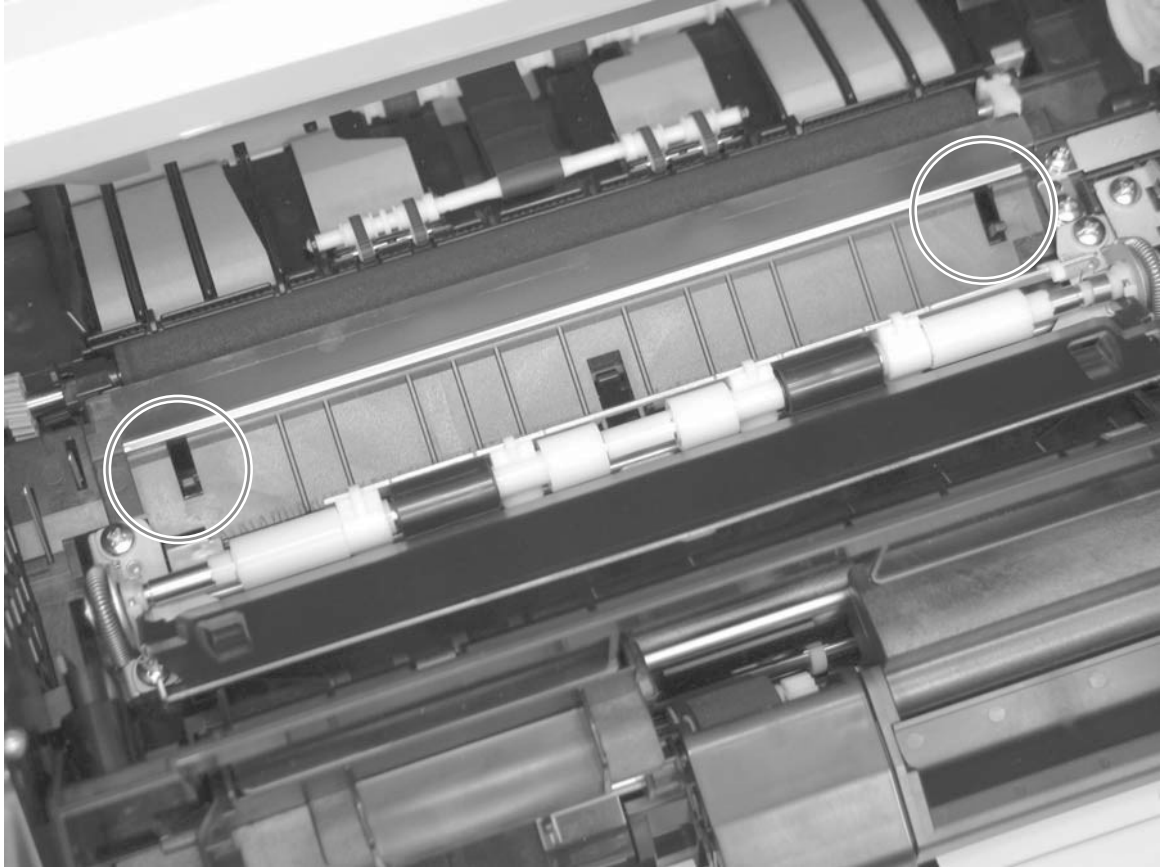
3. Check the control-panel display for sensor response (the dot on the display will turn green).

4. If the sensor does not respond, check the connectors at the DC controller.

Output bin full sensor (PS104)

This sensor flag is located in the output bin area.

Activate the sensor flag, and then check the control-panel display for sensor response.

Figure 3-9 Test the output bin full sensor (PS104)

Tray 1 paper present sensor (PS105)

1. Open Tray 1, and then activate the Tray 1 paper present sensor (PS105) flag.

Figure 3-10 Test the Tray 1 paper present sensor (PS105)

2. Check the control-panel display for sensor response (the dot on the display will turn green).

Tray 2 paper present sensor (PS101)

1. Remove the Tray 2 cassette.

2. Activate the Tray 2 paper present sensor (PS101) senor flag

   Figure 3-11 Test the Tray 2 paper present sensor (PS101)
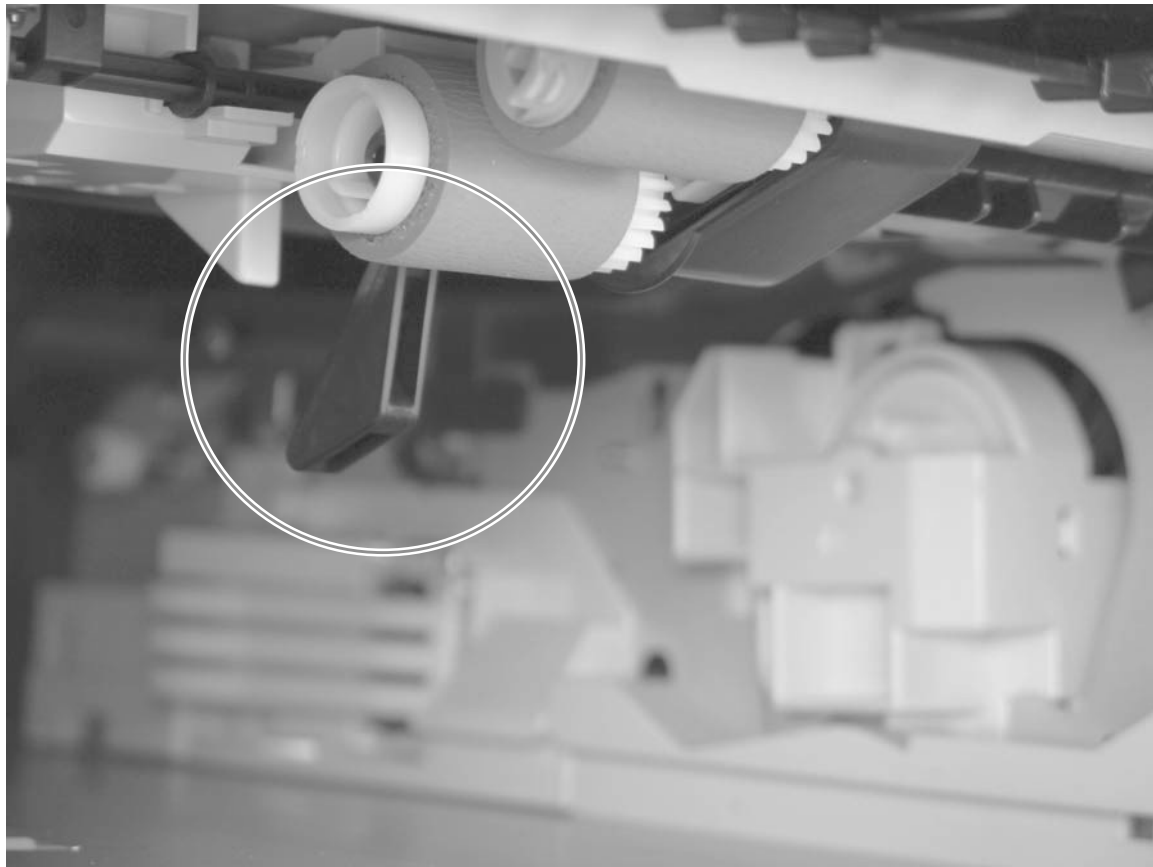
3. Check the control-panel display for sensor response (the dot on the display will turn green).

Tray 2 top of stack sensor (PS107)

1. Remove the Tray 2 cassette.

2. Activate the Tray 2 top of stack sensor (PS107) senor flag.

   Figure 3-12 Test the Tray 2 top of stack sensor (PS107)

3. Check the control-panel display for sensor response (the dot on the display will turn green).

Tray 2 paper size switches (SW102)

NOTE: Use this procedure for the Tray 3, 4, 5, or 6 sensors and switches.

1. Remove the Tray 2 cassette.

2. Activate the Tray 2 paper size switches (SW102).

    Figure 3-13 Test the Tray 2 paper size switches (SW102)
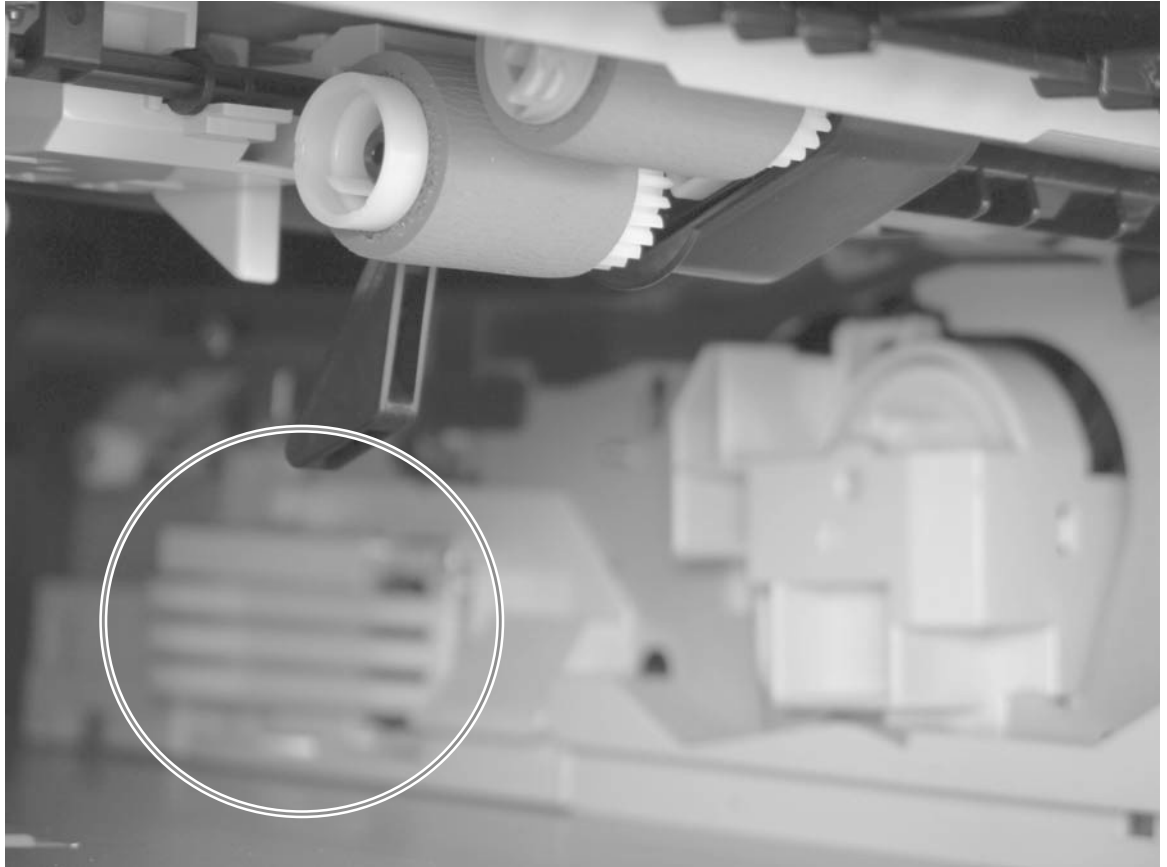
3. Check the control-panel display for sensor response (the dot on the display will turn green).

Tray/Bin manual sensor test

Use this test to test the tray and bin sensors and switches manually. The following illustrations and table show the locations of these sensors.

1. Press the Home 🏠 button.

2. Open the following menus:

   - **Administration**

   - **Troubleshooting**

   - **Diagnostic Tests**

3. Scroll to the **Manual Tray/Bin Sensor Test** item, and then press the OK button.

4. Activate a switch or sensor, and then watch the control-panel display for the switch or sensor state to change from green to clear or clear to green. It might take a few seconds to change.

Table 3-13 Manual sensor test 2 diagnostic tests

Manual sensor test 2 designator	Sensor or switch	
PS1603	Paper feeder sensor	**NOTE:** The locations of these switches and sensors are the same as those in Pre-feed sensor (PS102) on page 211 with respect to the optional paper input accessories.
PS1704	Paper deck sensor	

Print/stop test

Use this diagnostic test to isolate the cause of problems such as image formation defects and jams within the engine. The test can be programmed to stop from 0 to 60,000 ms.

1. Press the Home 🏠 button.

2. Open the following menus:

   - **Administration**

   - **Troubleshooting**

   - **Diagnostic Tests**

3. Scroll to the **Print/Stop Test** item, and then press the OK button.

4. Use the arrow buttons to set a stop time, when the print job should be interrupted, and then press the OK button.

Table 3-14 Print/Stop settings

Duration	Description
0 msecs	The leading edge of the paper stops approximately 28 mm beyond the "black" paper guide of the registration assembly.
100 msecs	The leading edge of the paper stops approximately 63 mm beyond the "black" paper guide of the registration assembly.
500 msecs	The leading edge of the paper stops just prior to the paper entering the "nip" of the fuser assembly; the nip is the gap between the pressure roller and the hot fusing roller.
600 msecs	The leading edge of the paper stops approximately 5 mm prior to the paper encountering the fuser assembly delivery photo sensor flag.
1,200 msecs	(Simplex print operation) The leading edge of the paper stops 35 mm past the face-down delivery stacker rollers. The trailing edge of the paper is approximately 30 mm from the "nip" of the fusing rollers.
2,250 msecs	(Duplex print operation) The leading edge of the paper has passed through the fuser assembly and into the output stacker rollers. The paper has now reversed direction and entered the duplex accessory. The leading edge of the paper stops approximately 15 mm before encountering the duplex assembly re-pick photosensor (PS1502).

If the timer is set to a value that is greater than the job-print time, you can recover the product in one of two ways.

● After the print job is completed press the **Stop** button to return to the **Diagnostics** menu before the timer times out.

● After the timer times out, press the **Stop** button. Activate the door switch to restart the engine and return it to a normal state.

When the timer trips, the control panel display shows the message **Printing stopped To continue, touch "OK"**. Pressing the OK button will print the previously selected job. If you do not want the previous job to print, press the **Stop** button first, and then press the OK button.

Component tests

These tests activate the selected component.

1. Press the Home 🏠 button.

2. Open the following menus:

   ● **Administration**

   ● **Troubleshooting**

   ● **Diagnostic Tests**

3. Scroll to the **Print/Stop Test** item, and then press the OK button.

4. Use the arrow buttons to select the particular component test that you want to perform, and then press the OK button.

The following table describes the component tests.

Component test	Description
DRUM MOTOR	This test activates the drum motor.
LASER SCANNER MOTOR	This test activates the laser scanner motor.
FUSER MOTOR	This test activates the fuser motor and drive gears.
TRAY PICKUP MOTOR	This test activates the tray pickup motor.
FEED ROLLER CLUTCH	This test activates the paper feed roller clutch.
MP TRAY SOLENOID **TRAY 2 PICKUP SOLENOID** **TRAY 3 PICKUP SOLENOID** **TRAY 4 PICKUP SOLENOID** **TRAY 5 PICKUP SOLENOID** **TRAY 6 PICKUP SOLENOID**	These tests activate the pickup solenoid for the selected input tray.
DUPLEXER SWITCHBACK MOTOR	This test activates the duplexing reverse motor.
DUPLEX REFEED MOTOR	This test activates the duplexing feed motor.

Diagrams

Block diagrams

Main assemblies

Figure 3-14 Main assemblies
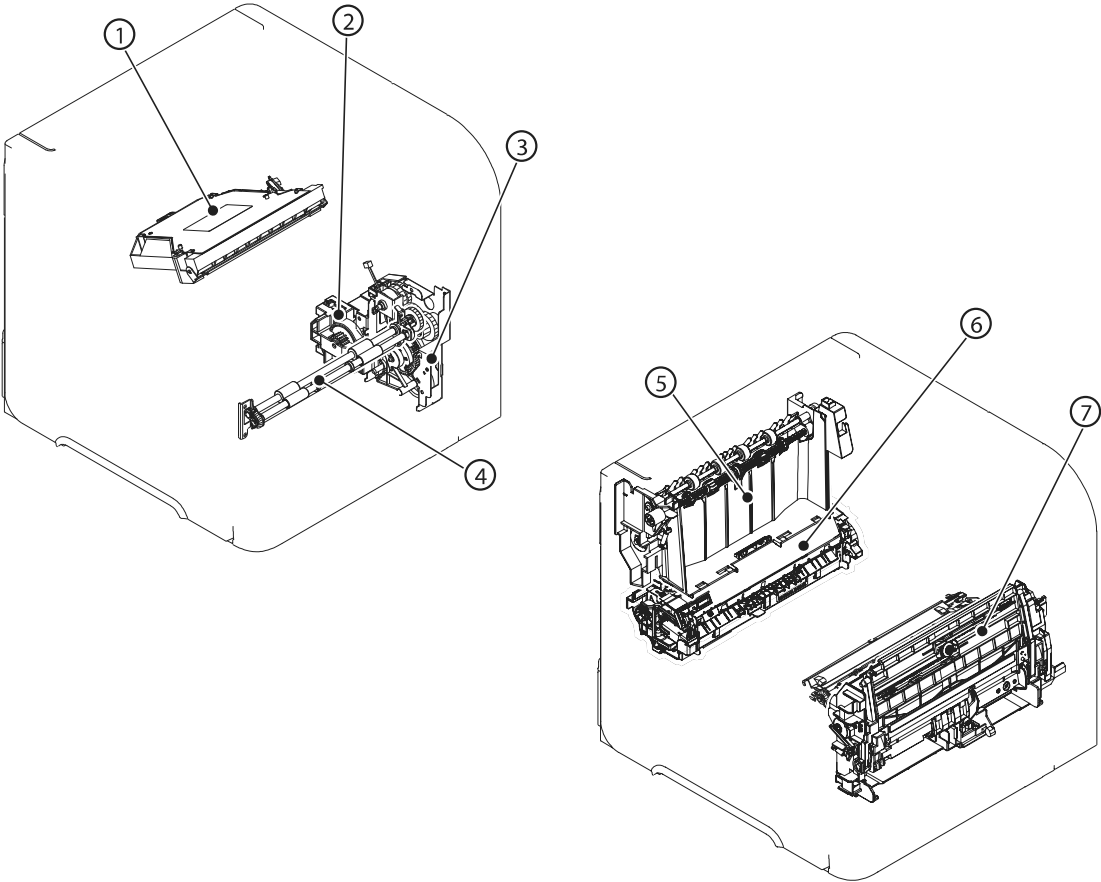
1	Laser/scanner unit
2	Lifter drive unit
3	Tray 2 pickup drive unit
4	Feed roller unit
5	Delivery unit
6	Fuser
7	Multipurpose tray pickup unit

Main parts

Figure 3-15 Main parts
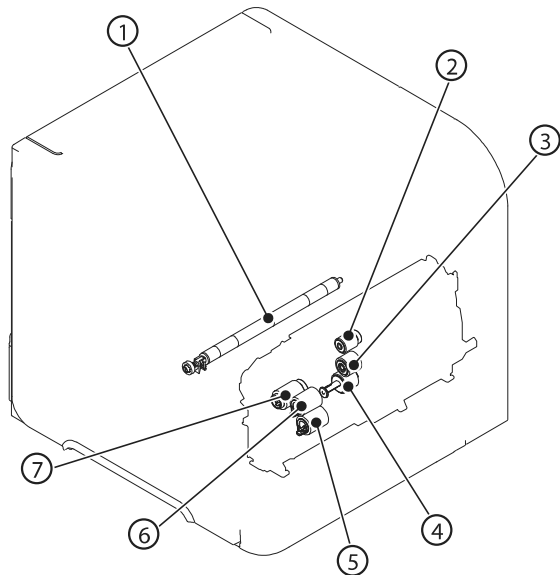
1	Transfer roller
2	Multipurpose tray pickup roller
3	Multipurpose tray feed roller
4	Multipurpose tray separation roller
5	Input tray separation roller (resides in input tray)
6	Input tray feed roller
7	Input tray pickup roller

Motors and fans

Figure 3-16 Motors and fans
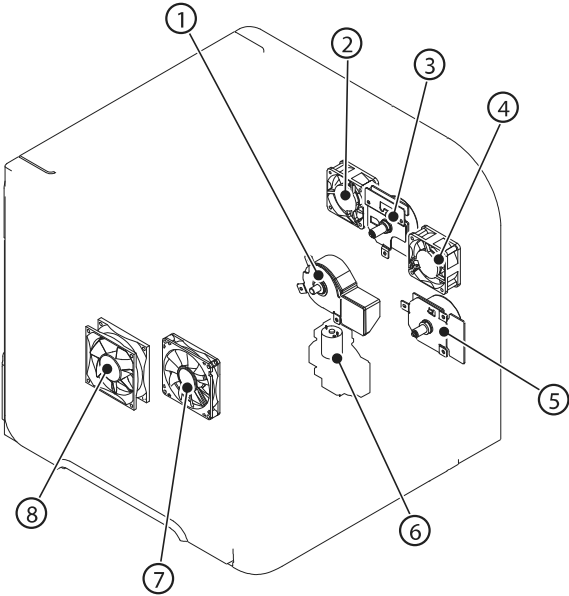
1	Fuser motor (M299)
2	Fan (FN102)
3	Drum motor (M102)
4	Fan (FN103)
5	Feed motor (M101)
6	Lifter motor (M103)
7	Fan (FN301)
8	Fan (FN101)

Figure 3-17 PCAs
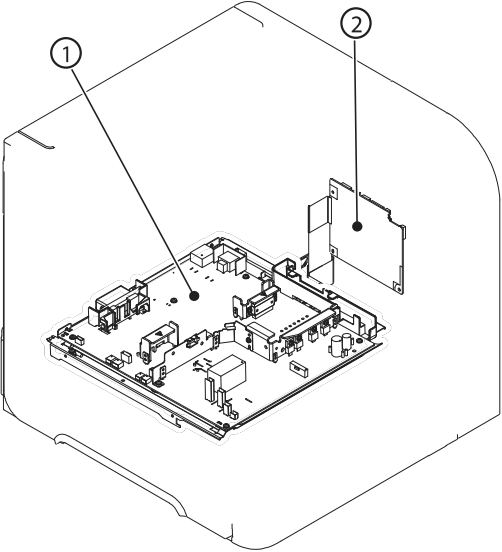
1	Power supply PCA
2	DC controller PCA

500-sheet feeder

Figure 3-18 500-sheet feeder main parts
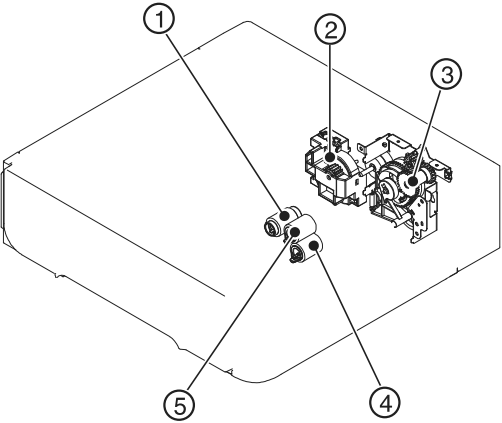
1	Paper feeder pickup roller
2	Paper feeder lifter driver unit
3	Paper feeder pickup drive unit
4	Paper feeder separation roller
5	Paper feed roller

Figure 3-19 500-sheet feeder solenoid and PCA
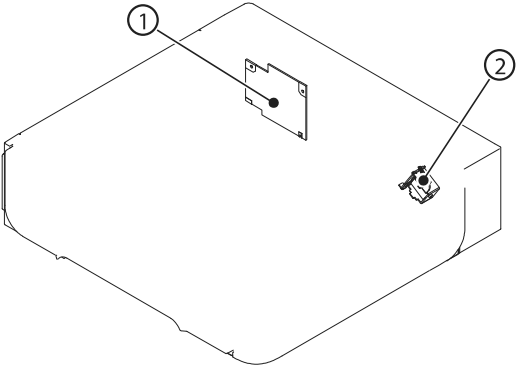
1	Driver PCA
2	Pickup solenoid

1,500-sheet feeder

Figure 3-20 1,500-sheet feeder main units
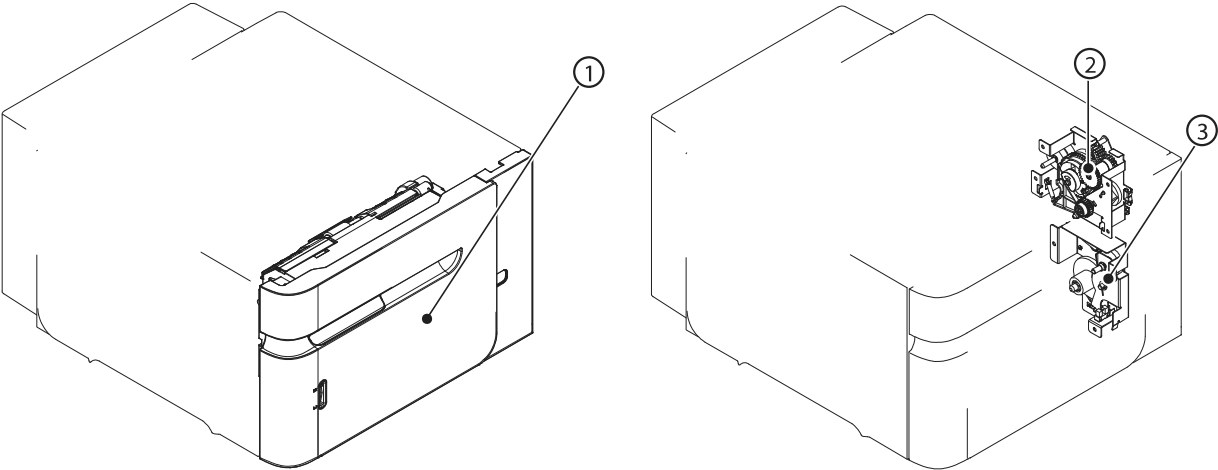
1	Front door unit
2	Pickup drive unit
3	Lifter drive unit

Figure 3-21 1,500-sheet feeder main parts
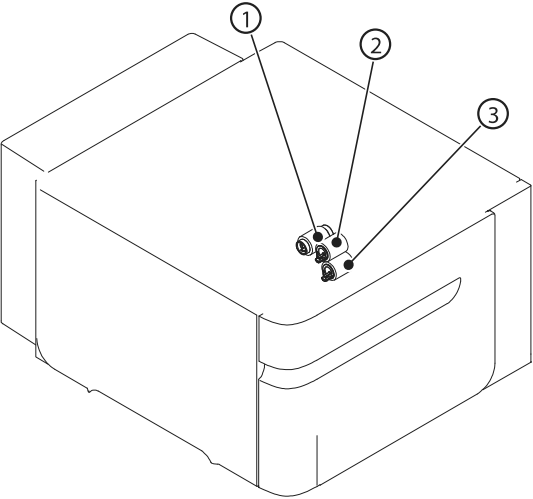
1	Pickup roller
2	Feed roller
3	Separation roller

Figure 3-22 1,500-sheet feeder motor and PCA
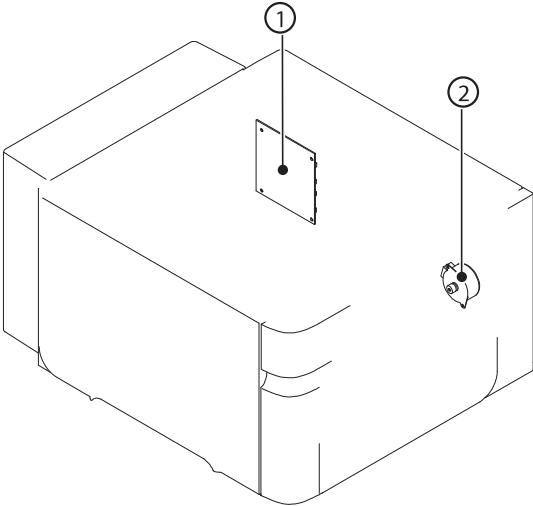
1	Driver PCA
2	Lifter motor

Connectors

DC controller PCA connectors

Figure 3-23 DC controller PCA connectors
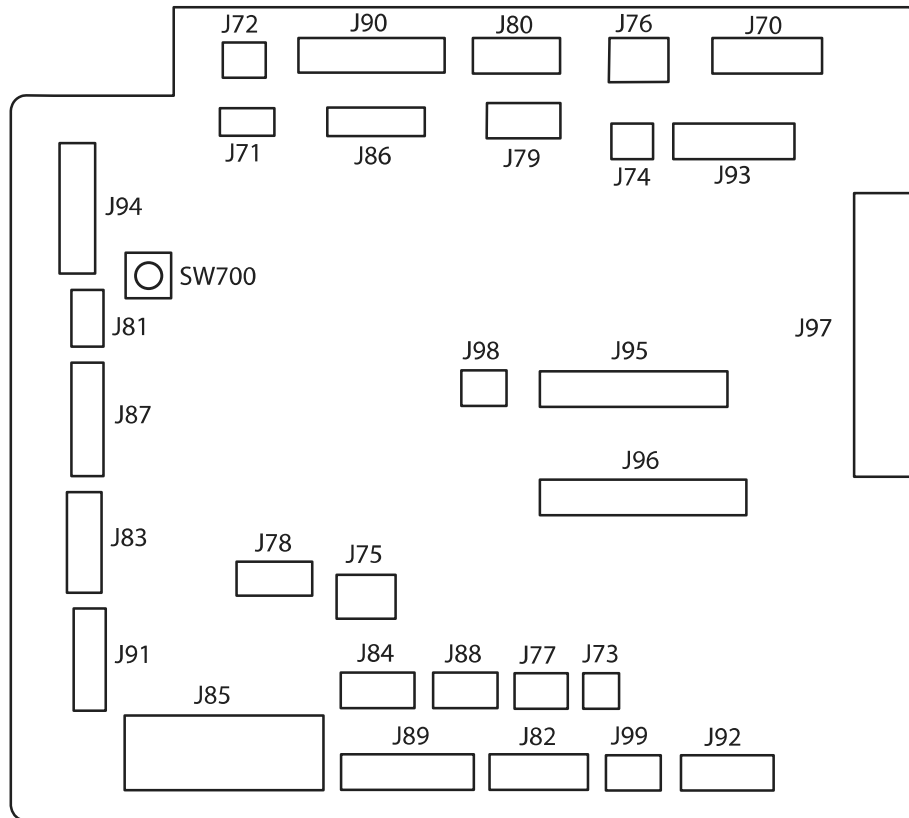
Table 3-15 DC controller connectors

Connector	Functionality	Pin configuration
J70	Control panel connector	8-pin
J71	**SL102** Tray 1 pickup solenoid	2-pin
J72	**SL101** Tray 2 pickup solenoid	2-pin
J73	**M103** Tray 2 lift motor	2-pin
J74	**TG101** memory tag I/O	2-pin
J75	**FN102** cooling fan	3-wire
J76	**PS104** face-down output full sensor	3-pin
J77	**CL101** feed clutch	3-pin (2-wire)
J78	**SW101** door open switch	3-pin
J79	**FN103** cooling fan	4-pin (3-wire)
J80	Not used	6-pin
J81	**PS105** Tray 1 media present sensor	3-pin

Table 3-15 DC controller connectors (continued)

Connector	Functionality	Pin configuration
J82	Fusing assembly	7-wire
J83	Envelope feeder accessory	5-pin
J84	Duplex accessory	6-pin
J85	Power supply PCA (+24Vdc/3.3Vdc)	6-wire
J86	Scanner motor/beam detect	7-pin
J87	**M102** drum motor	8-pin (7-wire)
J88	Paper deck accessory	5-pin
J89	**M299** fusing motor	10-pin
J90	Stacker/stacker-stapler/mailbox	8-pin
J91	**M101** feed motor	7-pin
J92	**PS101** Tray 2 media present sensor **PS107** Tray 2 media stack sensor 1 **PS907** Tray 2 media stack sensor 2	8-pin
J93	Laser/driver PCA	11-pin
J94	**PS102** pre-feed sensor **PS108** media width sensor 2 **PS103** top of page sensor **PS106** media width sensor 1	12-pin
J95	Power supply PCA	18-pin
J96	Power supply PCA	20-pin
J97	Intermediate PCA to formatter PCA	32-pin ribbon
J98	Not used	
J99	**SW102** Tray 2 media size switches	4-pin
TB700	3.3 volts DC	
TB701	GRN	

Product base connectors

Figure 3-24 Product base connectors
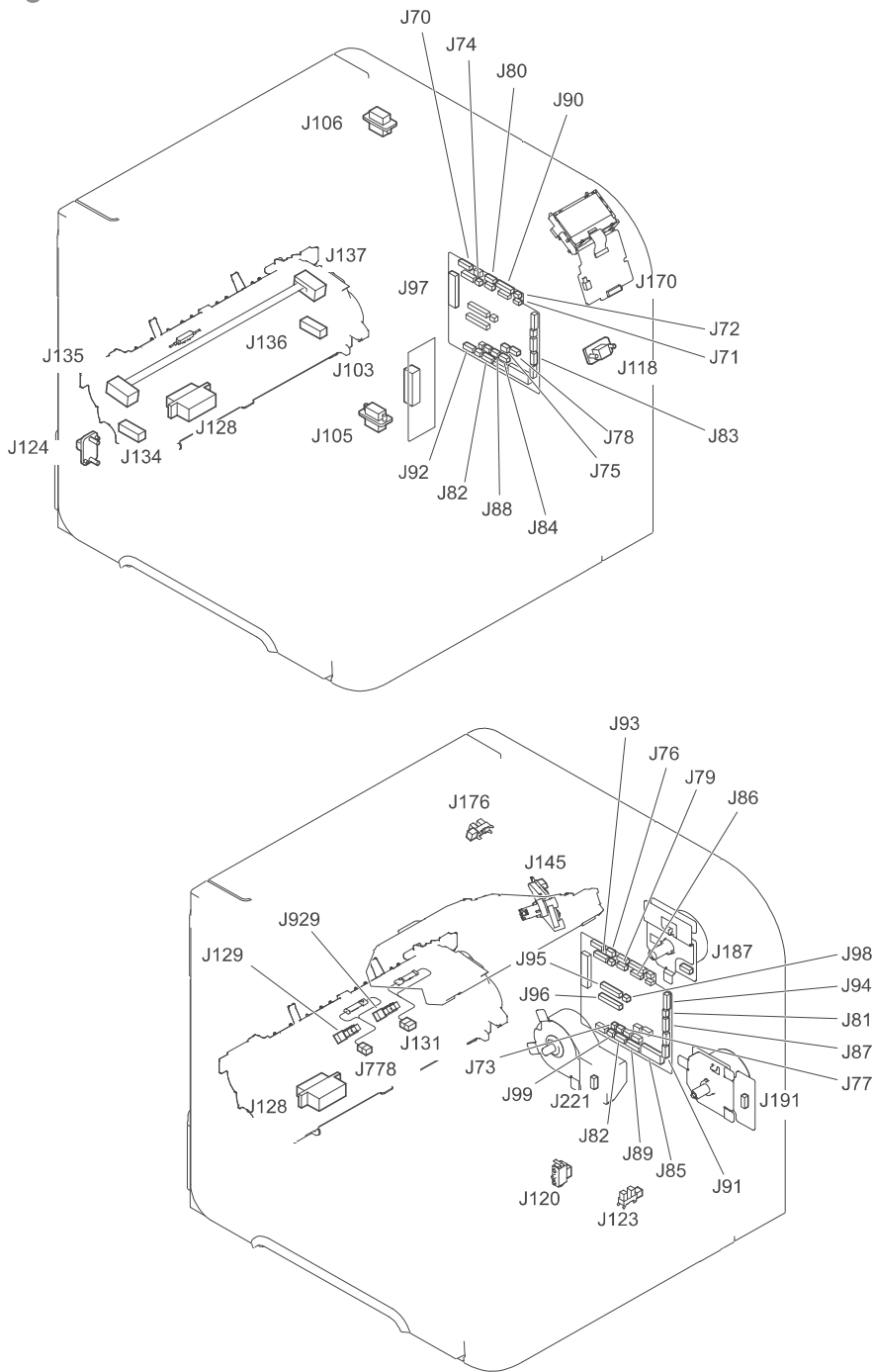
500-sheet paper tray connectors

Figure 3-25 500-sheet paper tray connectors
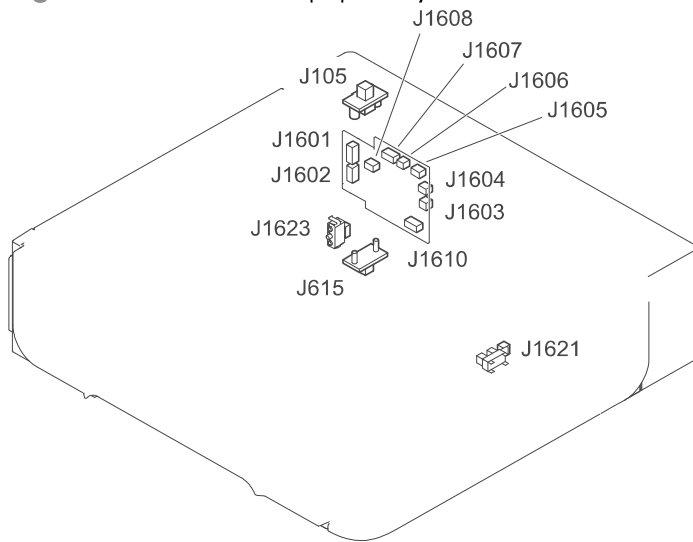
1,500-sheet paper tray connectors

Figure 3-26 1,500-sheet paper tray connectors
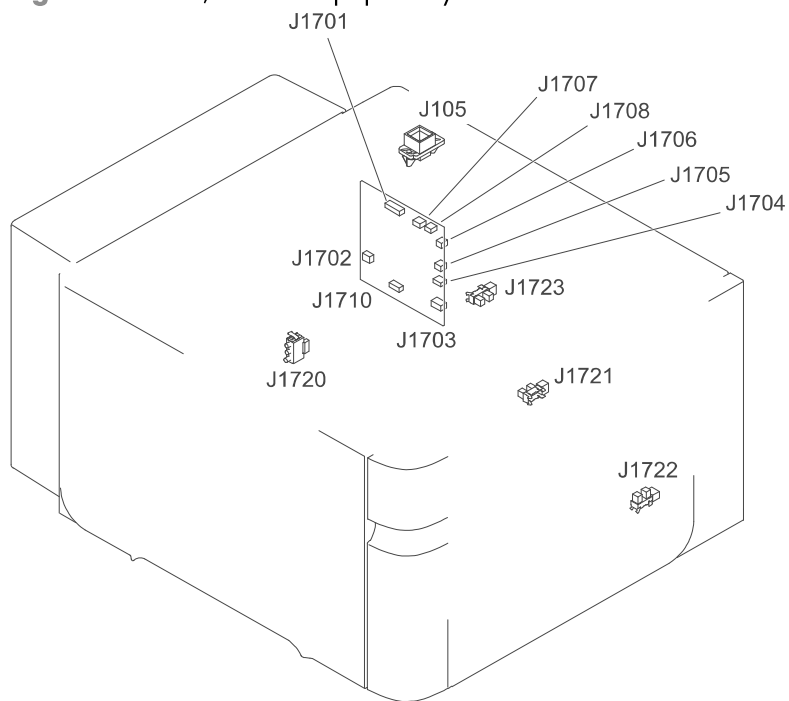
Duplexer connectors

Figure 3-27 Duplexer connectors

J1505
J1504
J1520
J1503
J1502
J1501
J1506
J1500
J1522
J1523
J1521
J124
J1524
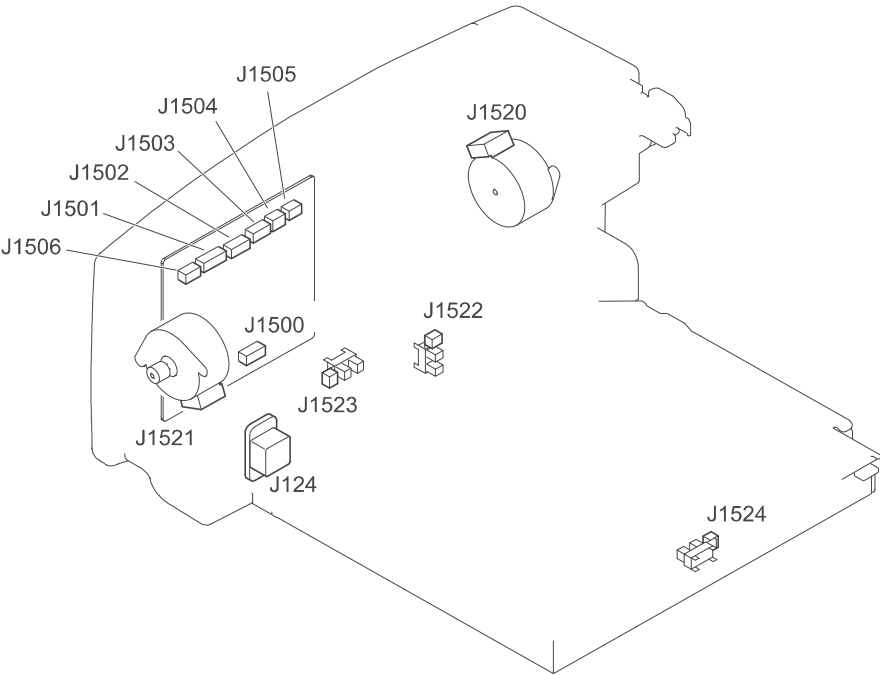
Envelope feeder connectors

Figure 3-28 Envelope feeder connectors

J1804
J1854
J1800
J1855
J1803
J1856
J1802
J1850
J1801
J1852
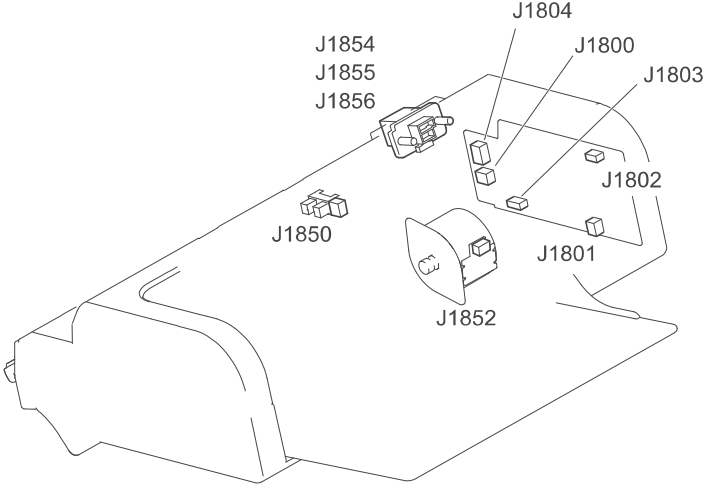
General timing chart

Figure 3-29 General timing chart

Timing chart for continuous 2 sheets printing in letter size

(Unit: seconds)

	Signal	WAIT	STBY	INTR	PRINT	LSTR	STBY
1	Initialize control command (EEC52)						
2	Print reservation command (EEC50)						
3	Print start command (EEC12)						
4	Top of page (/TOP)						
5	Video (/VDO1,/VDO1,VDO2,/VDO2)						
6	Scanner motor						
7	Laser						
8	Fixing heater (H1)						
9	Fixing motor (M299)						
10	Drum motor (M102)						
11	Feed motor (M101)						
12	Feed clutch (CL101)						
13	Cassette pickup solenoid (SL101)						
14	Top of page sensor (PS103)						
15	Fixing delivery sensor (PS700)						
16	Face-down tray media full sensor (PS104)						
17	Primary charging bias (AC)						
18	Primary charging bias (DC)						
19	Developing bias						
20	Transfer bias						
21	Fixing sleeve bias/ pressure roller bias						
22	Cooling fan 1 (FN101)						
23	Cooling fan 2, 3, 4 (FN102/FN103/FN301)						
24							
25							

Power switch ON

Approx. 7.4 · Approx. 4.9 · Approx. 1.0 · Approx. 0.8 · Approx. 0.7 · Approx. 0.5 · Approx. 0.1 · Approx. 7.4 · Approx. 0.6 · Approx. 0.6

Full speed · Negative bias · Between-sheet bias · Print bias

Approx. 360 · Approx. 840 · Stanby control · Approx. 360 · Approx. 840 · Stanby control

0.5

Circuit diagrams

Figure 3-30 General circuit diagram (1 of 2)

Figure 3-31 General circuit diagram (2 of 2)

Figure 3-31 General circuit diagram (2 of 2)

Figure 3-32 500-sheet paper tray circuit diagram
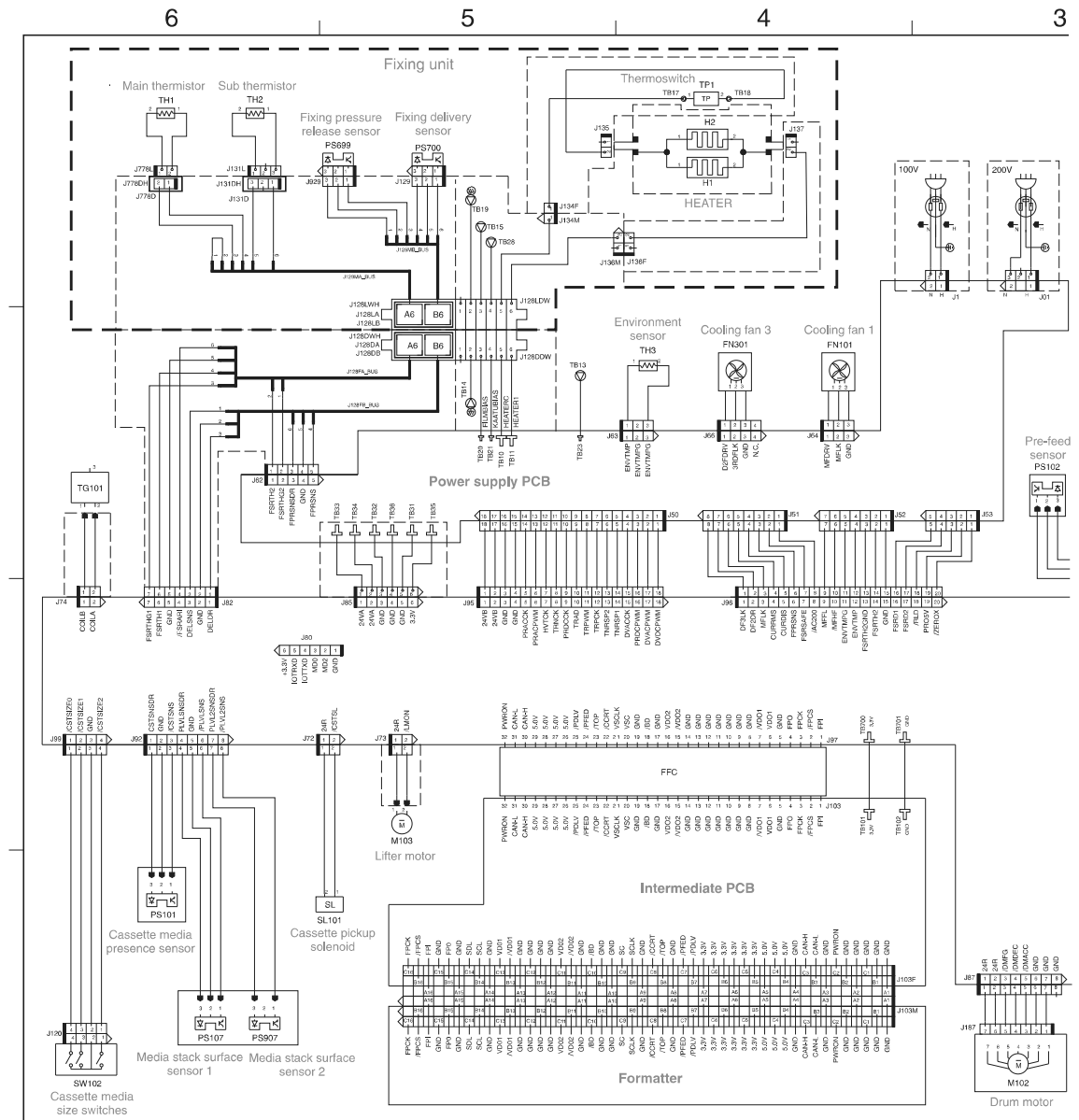
Figure 3-33 1,500-sheet paper tray circuit diagram
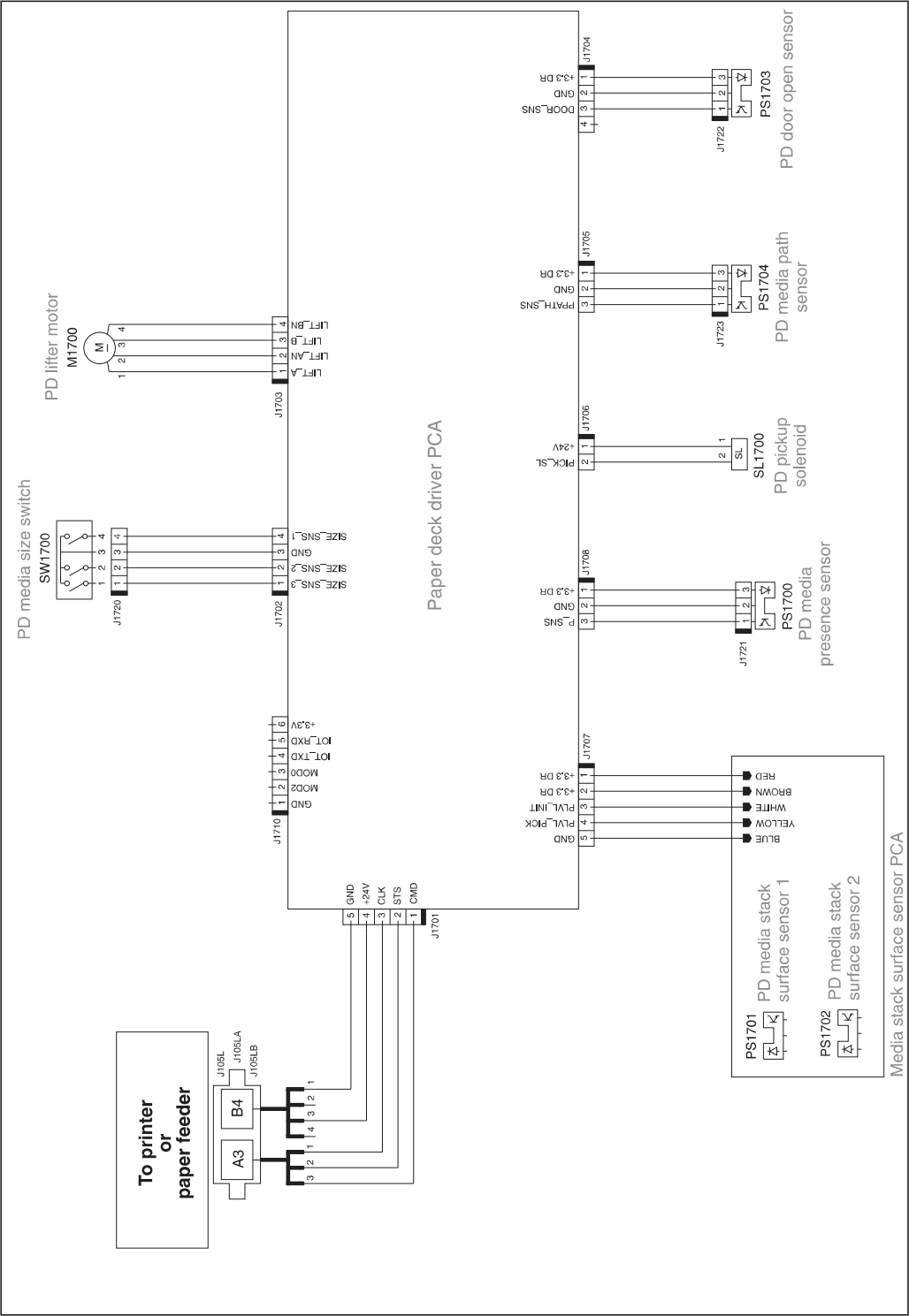
Figure 3-34 Envelope feeder circuit diagram

Figure 3-35 Duplexer circuit diagram
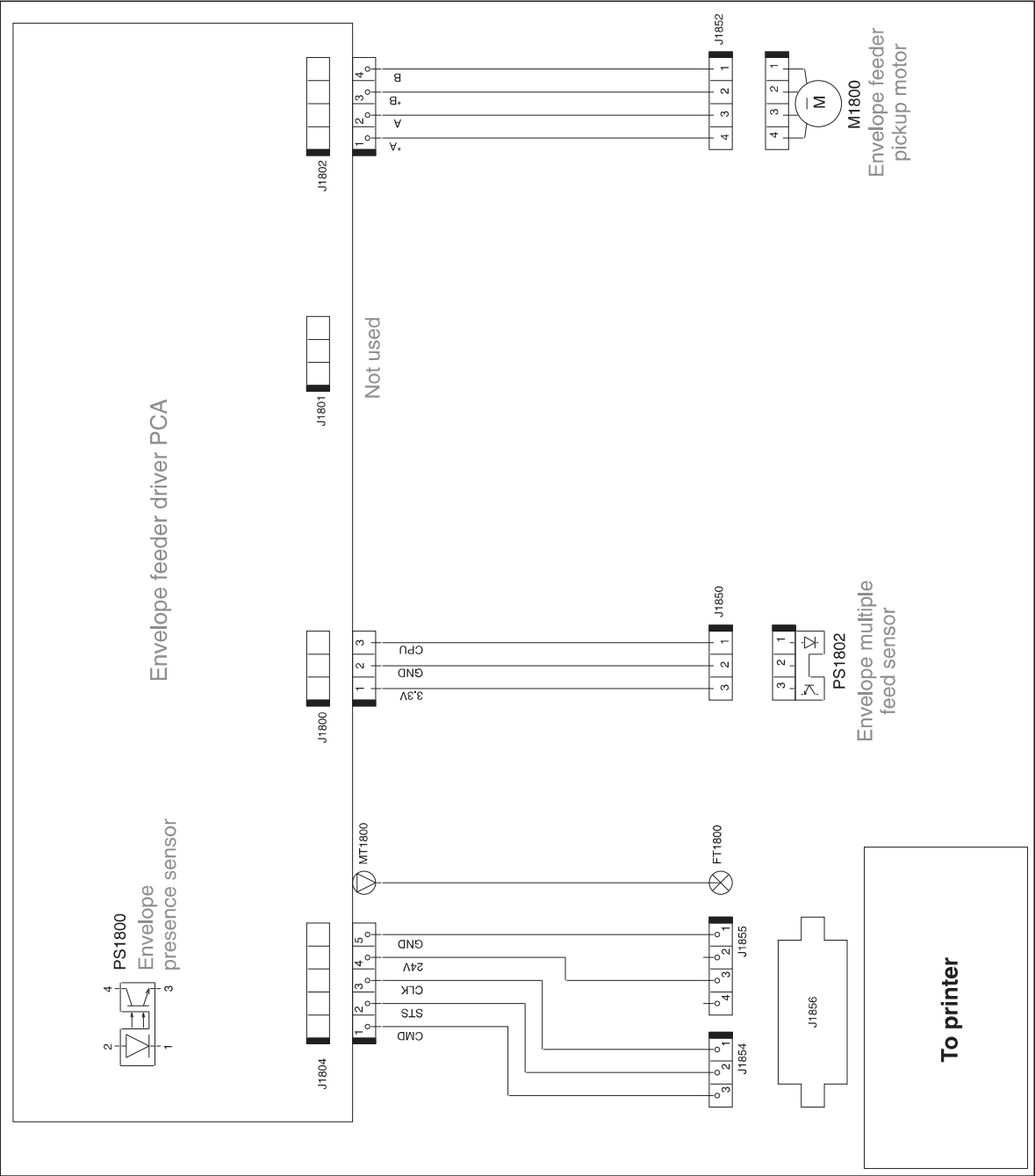
Internal print-quality test pages

Print-quality-troubleshooting pages

Use the built-in print-quality-troubleshooting pages to help diagnose and solve print-quality problems.

1. Press the Home ⌂ button.

2. Open the following menus:

   - **Administration**

   - **Troubleshooting**

   - **Print Quality Pages**

3. Scroll to the **Print Fuser Test Page** item, and then press the OK button.

Clean the paper path

Process a cleaning page

1. Press the Home 🏠 button.

2. Open the following menus:

   - **Device Maintenance**

   - **Calibrate/Cleaning**

3. Scroll to the **Print Cleaning Page** item, and then press the OK button.

4. The product prints a cleaning page, and then returns to the main menu. Discard the printed page.

Set up an auto cleaning page

Use the procedure in this section to set up an automatic cleaning page.

1. Press the Home 🏠.

2. Open the following menus:

   - **Device Maintenance**

   - **Calibrate/Cleaning**

   - **Cleaning Settings**

3. Use the arrow keys and the OK button to select and set the following settings:

   - **Auto Cleaning**

     ○ Set to **On**

   - **Cleaning Interval**

     ○ Select the number of pages at which to automatically clean the paper path

     > 💡 **TIP:** HP recommends processing a cleaning page after every 5000 printed pages.

   - **Cleaning Size**

     ○ Select **Letter** or **A4**

Print configuration page

Depending on the model, up to three pages print when you print a configuration page. In addition to the main configuration page, the embedded Jetdirect configuration pages print.

Configuration page

Use the configuration page to view current product settings, to help troubleshoot product problems, or to verify installation of optional accessories, such as memory (DIMMs), paper trays, and printer languages.

1. Press the Home ⌂ button.

2. Open the following menus:

    ● **Administration**

    ● **Reports**

    ● **Configuration/Status Pages**

3. Scroll to the **Configuration Page** item, and then press the OK button.

4. Scroll to the **Print** item, and then press the OK button.

Figure 3-36 Configuration page

Table 3-16 Configuration page elements

Item	Description	Item	Description
1	General Information	5	Event Log
2	Installed Personalities and Options	6	Security
3	HP Web Services	7	Paper Trays and options
4	Memory		

HP embedded Jetdirect page

The second configuration page is the HP embedded Jetdirect page, which contains the following information:

Figure 3-37 HP embedded Jetdirect page

1	**HP Jetdirect Configuration** indicates the product status, model number, hardware firmware version, port select, port configuration, auto negotiation, manufacturing identification, and manufactured date.
2	**Security Settings** information
3	**Network Statistics** indicates the total packets received, unicast packets received, bad packets received, framing errors received, total packets transmitted, unsendable packets, transmit collisions, and transmit late collisions.
4	**TCP/IP** information, including the IP address
5	**IPv4** information
6	**IPv6** information

Always make sure the status line under the HP Jetdirect configuration lines indicates "I/O Card Ready".

Print quality troubleshooting tools

Repetitive image defect ruler

Defects on product rollers can cause image defects to appear at regular intervals on the page, corresponding to the circumference of the roller that is causing the defect. Measure the distance between defects that recur on a page. Use the following table or the repetitive-defect ruler to determine which roller is causing the defect. To resolve the problem, try cleaning the roller before replacing it.

⚠ **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 that has been dampened with water.

📝 **NOTE:**   The following table replaces the graphical repetitive defect ruler. You can make your own ruler by using these measurements. For the most accurate results, use a metric ruler.

Table 3-17 Repetitive defects

Component	Distance between defects
Primary charging roller	37.7 mm (1.5 inches)
Transfer roller	47 mm (1.85 inches)
Developer roller	63 mm (2.5 inches)
Tray 1 pickup roller	63 mm (2.5 inches)
Tray 1 feed roller	79 mm (3.1 inches)
Tray 1 separation roller	
Tray 2 feed roller	79 mm (3.1 inches)
Tray 2 pickup roller	
Tray 2 separation roller	
Fuser sleeve unit or pressure roller	94 mm (3.75 inches)
Photosensitive drum	94 mm (3.75 inches)

📝 **NOTE:**   Defects on the tray pickup rollers or the Tray 1 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.

To use all of the capabilities of this product, a firmware upgrade might be required. HP recommends that you periodically go to www.hp.com/go/lj600Series_software to see if a new version of firmware is available.

Control-panel menus

Retrieve Job from USB menu

NOTE: You must enable this feature by using the control-panel menus or the HP Embedded Web Server before it can be used.

To enable this feature by using the control-panel menus, open the **Administration** menu, open the **Retrieve From USB Settings** sub menu, and then select the **Enable** option. To enable this feature by using the HP Embedded Web Server, click the **Print** tab.

To display: At the product control panel, press the Home 🏠 button, and then select the **Retrieve Job from USB** menu.

First level	Second level	Values
Select a file or folder	<Job name>	**Copies**

Retrieve Job from Device Memory menu

To display: At the product control panel, press the Home 🏠 button, and then select the **Retrieve Job from Device Memory** menu.

First level	Second level	Values
All Jobs (With PIN)	**Print**	**Copies**
	Print and Delete	**Copies**
	Delete	
All Jobs (No PIN)	**Print**	**Copies**
	Print and Delete	**Copies**
	Delete	**Yes**
		No
<Job name with PIN>	**Print**	**Copies**
	Print and Delete	**Copies**
	Delete	
<Job name without PIN>	**Print**	**Copies**
	Print and Delete	**Copies**
	Delete	**Yes**
		No

Supplies menu

To display: At the product control panel, press the Home ⌂ button, and then select the **Supplies** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-18 Supplies menu

First level	Second level	Third level	Fourth level	Values
Manage Supplies	**Print Supplies Status**			
	Supply Settings	**Black Cartridge**	**Very Low Settings**	**Stop**
				Prompt to continue
				Continue*
			Low Threshold Settings	1-100%
				Default values for the CE390A cartridge:
				● M601 = 8%
				● M602 = 11%
				● M603 = 20%
				Default values for the CE390X cartridge:
				● M602 = 5%
				● M603 = 9%
		Maintenance Kit	**Very Low Settings**	**Stop**
				Prompt to continue
				Continue*
			Low Threshold Settings	1-100%
				Default = 10%
	Supply Messages	**Low Message**		**On***
				Off
		Level Gauge		**On***
				Off
	Reset Supplies	**New Maintenance Kit**		**No**
				Yes
Black Cartridge				The status is displayed.
Maintenance Kit				The status is displayed.

Trays menu

To display: At the product control panel, press the Home ⌂ button, and then select the **Trays** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-19 Trays menu

First level	Second level	Values
Manage Trays	**Use Requested Tray**	**Exclusively***
		First
	Manually Feed Prompt	**Always***
		Unless Loaded
	Size/Type Prompt	**Display***
		Do Not Display
	Use Another Tray	**Enabled***
		Disabled
	Alternative Letterhead Mode	**Disabled***
		Enabled
	Duplex Blank Pages	**Auto ***
		Yes
	Tray 2 Model	**Standard Tray***
		Custom Tray
	Image Rotation	**Standard***
		Alternate
	Override A4/Letter	**Yes***
		No
Envelope Feeder Size		Select a size from the list.
Envelope Feeder Type		Select a type from the list.
Tray <X> Size		Select a size from the list.
Tray <X> Type		Select a type from the list.

Administration menu

Reports menu

To display: At the product control panel, press the Home 🏠 button, select the **Administration** menu, and then select the **Reports** menu.

Table 3-20 Reports menu

First level	Second level
Configuration/Status Pages	Administration Menu Map
	Configuration Page
	Supplies Status Page
	Usage Page
	File Directory Page
	Current Settings Page
Other Pages	PCL Font List
	PS Font List

General Settings menu

To display: At the product control panel, press the Home 🏠 button, select the **Administration** menu, and then select the **General Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-21 General Settings menu

First level	Second level	Third level	Fourth level	Values
Date/Time Settings	Date/Time Format	Date Format		DD/MMM/YYYY
				MMM/DD/YYYY
				YYYY/MMM/DD
		Time Format		12 hour (AM/PM)
				24 hours
	Date/Time	Date	Month	Select values from the lists.
			Day	
			Year	
		Time	Hour	Select values from the lists.
			Minute	
			AM/PM	

Table 3-21 General Settings menu (continued)

First level	Second level	Third level	Fourth level	Values
		Time Zone		Select the time zone from the list.
		Adjust for Daylight Savings		**On*** **Off**
Energy Settings	**Sleep Timer Settings**	**Sleep/Auto Off Timer**		**Enabled*** **Disabled**
		Sleep/Auto Off After		If you enabled the sleep/auto off timer, enter a value between 0 and 120 minutes. Default value: 30 minutes
		Wake/Auto On Events		**All Events*** **Network port** **Power button only**
Print Quality	**Image Registration**	**Adjust Tray <X>**	**Print Test Page**	
			X1 Shift	-5.00 mm to 5.00 mm
			Y1 Shift	
			X2 Shift	
			Y2 Shift	
	Adjust Paper Types	Select from a list of paper types that the product supports. The available options are the same for each paper type.	**Print Mode**	Select from a list of print modes.
			Resistance Mode	**Normal** **Up** **Down**
			Humidity Mode	**Normal** **High**
		Restore Modes		
	Optimize	**Line Detail**		**Normal*** **Alternate 1** **Alternate 2** **Alternate 3** **Off**

Table 3-21 General Settings menu (continued)

First level	Second level	Third level	Fourth level	Values
		Restore Optimize		
	Resolution			300 x 300 dpi
				600 x 600 dpi
				FastRes 1200*
				ProRes 1200
	Economode			Off*
				On
	Toner Density			Range: 1 - 5
				Default = 3
Quiet Mode				Off*
				On
Jam Recovery				Auto*
				Off
				On
Manage Stored Jobs	Quick Copy Job Storage Limit			1-100
				Default = 32
	Quick Copy Job Held Timeout			Off*
				1 Hour
				4 Hours
				1 Day
				1 Week
	Default Folder Name			
	Sort Stored Jobs By			Job Name*
				Date
Restore Factory Settings				

Retrieve From USB Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Retrieve From USB Settings** menu.

Table 3-22 Retrieve From USB Settings menu

First level	Values
Enable Retrieve from USB	**Enabled**
	Disabled*

General Print Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **General Print Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-23 Print Settings menu

First level	Second level	Values
Manual Feed		**Enabled**
		Disabled*
Courier Font		**Regular***
		Dark
Wide A4		**Enabled**
		Disabled*
Print PS Errors		**Enabled**
		Disabled*
Print PDF Errors		**Enabled**
		Disabled*
Personality		**Auto***
		PCL
		PS
		PDF
PCL	**Form Length**	Range: 5 – 128
		Default = 60
	Orientation	**Portrait***
		Landscape

Table 3-23 Print Settings menu (continued)

First level	Second level	Values
	Font Source	Internal*
		USB
	Font Number	Range: 0 – 110
		Default = 0
	Font Pitch	Range: 0.44 – 99.99
		Default = 10.00
	Font Point Size	Range: 4.00 – 999.75
		Default = 12.00
	Symbol Set	Select from a list of symbol sets.
	Append CR to LF	No*
		Yes
	Suppress Blank Pages	No*
		Yes
	Media Source Mapping	Standard*
		Classic

Default Print Options menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Default Print Options** menu.

In the following table, asterisks (*) indicate the factory default setting.

First level	Second level	Values
Number of Copies		
Default Paper Size		Select from a list of sizes that the product supports.
Default Custom Paper Size	**Unit of Measure**	**Inches**
		mm
	X Dimension	
	Y Dimension	
Output Bin		Select from a list of available output bins.
Sides		**1-sided***
		2-sided
2-Sided Format		**Book-style***
		Flip-style
Edge-To-Edge		**Enabled**
		Disabled*

Display Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Display Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-24 Display Settings menu

First level	Second level	Values
Display Brightness		Range -10 to 10
Language		Select from a list of languages that the product supports.
Show IP Address		**Display**
		Hide
Inactivity Timeout		Range: 10 – 300 seconds
		Default = 60 seconds

Table 3-24 Display Settings menu (continued)

First level	Second level	Values
Clearable Warnings		On
		Job*
Continuable Events		Auto continue (10 seconds)*
		Press OK to continue

Manage Supplies menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Manage Supplies** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-25 Manage Supplies menu

First level	Second level	Third level	Values
Print Supplies Status			
Supply Settings	Black Cartridge	Very Low Settings	Stop
			Prompt to continue
			Continue*
		Low Threshold Settings	1-100%
			Default values for the CE390A cartridge:
			• M601 = 8%
			• M602 = 11%
			• M603 = 20%
			Default values for the CE390X cartridge:
			• M602 = 5%
			• M603 = 9%
	Maintenance Kit	Very Low Settings	Stop
			Prompt to continue
			Continue*
		Low Threshold Settings	1-100%
			Default = 10%
Supply Messages	Low Message		On*
			Off

Table 3-25 Manage Supplies menu (continued)

First level	Second level	Third level	Values
	Level Gauge		On*
			Off
Reset Supplies	New Maintenance Kit		No
			Yes

Manage Trays menu

To display: At the product control panel, press the Home 🏠 button, select the **Administration** menu, and then select the **Manage Trays** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-26 **Manage Trays menu**

First level	Values
Use Requested Tray	Exclusively*
	First
Manually Feed Prompt	Always*
	Unless Loaded
Size/Type Prompt	Display*
	Do Not Display
Use Another Tray	Enabled*
	Disabled
Alternative Letterhead Mode	Disabled*
	Enabled
Duplex Blank Pages	Auto *
	Yes
Tray 2 Model	Standard Tray
	Custom Tray
Image Rotation	Standard
	Alternate
Override A4/Letter	Yes*
	No

Stapler/Stacker Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Stapler/Stacker Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-27 Stapler/Stacker Settings menu

First level	Values
Stapling	None*
	Top left or right
	Top left
	Top right
Staples Very Low	Continue*
	Stop

Multi-Bin Mailbox Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Multi-Bin Mailbox Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-28 Multi-Bin Mailbox Settings menu

First level	Values
Operation Mode	Mailbox*
	Stacker
	Job Separator
	Collator

Network Settings menu

To display: At the product control panel, press the Home ⌂ button, select the **Administration** menu, and then select the **Network Settings** menu.

In the following table, asterisks (*) indicate the factory default setting.

Table 3-29 Network Settings menu

First level	Values
I/O Timeout	Range: 5 – 300 sec
	Default = 15
Jetdirect Menu	See the table that follows for details.

Table 3-30 Jetdirect Menu

First level	Second level	Third level	Fourth level	Values
Information	**Print Sec Page**			**Yes**
				No*
TCP/IP	**Enable**			**On***
				Off
	Host Name			
	IPV4 Settings	**Config Method**		**Bootp**
				DHCP*
				Auto IP
				Manual
		Manual Settings **NOTE:** This menu is available only if you select the **Manual** option under the **Config Method** menu.	**IP Address**	Enter the address.
			Subnet Mask	Enter the address.
			Default Gateway	Enter the address.
		Default IP		**Auto IP***
				Legacy
		DHCP Release		**No***
				Yes
		DHCP Renew		**No***
				Yes

Table 3-30 Jetdirect Menu (continued)

First level	Second level	Third level	Fourth level	Values
		Primary DNS		
		Secondary DNS		
	IPV6 Settings	Enable		Off
				On*
		Address	Manual Settings	Enable
				Address
		DHCPV6 Policy		Router Specified
				Router Unavailable*
				Always
		Primary DNS		
		Secondary DNS		
	Proxy Server			
	Proxy Port			
	Idle Timeout			
Security	Secure Web			HTTPS Required*
				HTTPS Optional
	IPSEC			Keep
				Disable*
	802.1X			Reset
				Keep*
	Reset Security			Yes
				No*
Diagnostics	Embedded Tests	LAN HW Test		Yes
				No*
		HTTP Test		Yes
				No*
		SNMP Test		Yes
				No*
		Data Path Test		Yes
				No*

Table 3-30 Jetdirect Menu (continued)

First level	Second level	Third level	Fourth level	Values
		Select All Tests		Yes
				No*
		Execution Time [H]		Range: 1 – 60 hours
				Default = 1 hour
		Execute		No*
				Yes
	Ping Test	Dest Type		IPV4
				IPV6
		Dest IPv4		
		Dest IPv6		
		Packet Size		
		Timeout		
		Count		
		Print Results	Yes	
			No	
		Execute	Yes	
			No	
	Ping Results	Packets Sent		
		Packets Received		
		Percent Lost		
		RTT Min		
		RTT Max		
		RTT Average		
		Ping in Progress	Yes	
			No	

Table 3-30 Jetdirect Menu (continued)

First level	Second level	Third level	Fourth level	Values
		Refresh	Yes	
			No	
Link Speed				**Auto***
				10T Half
				10T Full
				100TX Half
				100TX Full
				1000T Full