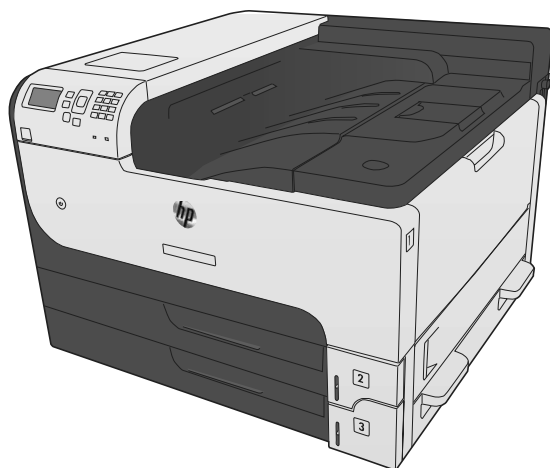




LASERJET ENTERPRISE 700

Troubleshooting Manual



M712



HP LaserJet Enterprise 700 M712

Troubleshooting Manual

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Conventions used in this guide

 **TIP:** Tips provide helpful hints or shortcuts.

 **NOTE:** Notes provide important information to explain a concept or to complete a task.

 **CAUTION:** Cautions indicate procedures that you should follow to avoid losing data or damaging the product.

 **WARNING!** Warnings alert you to specific procedures that you should follow to avoid personal injury, catastrophic loss of data, or extensive damage to the product.

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1 Theory of operation

- Basic operation
- Engine control system
- Laser scanner system
- Image-formation system
- Pickup, feed, and delivery system
- 500-sheet paper feeder (Tray 4)
- 1x500 and 3x500 paper feeder and stand
- 3,500-sheet high-capacity input (HCI) feeder
- Duplexer

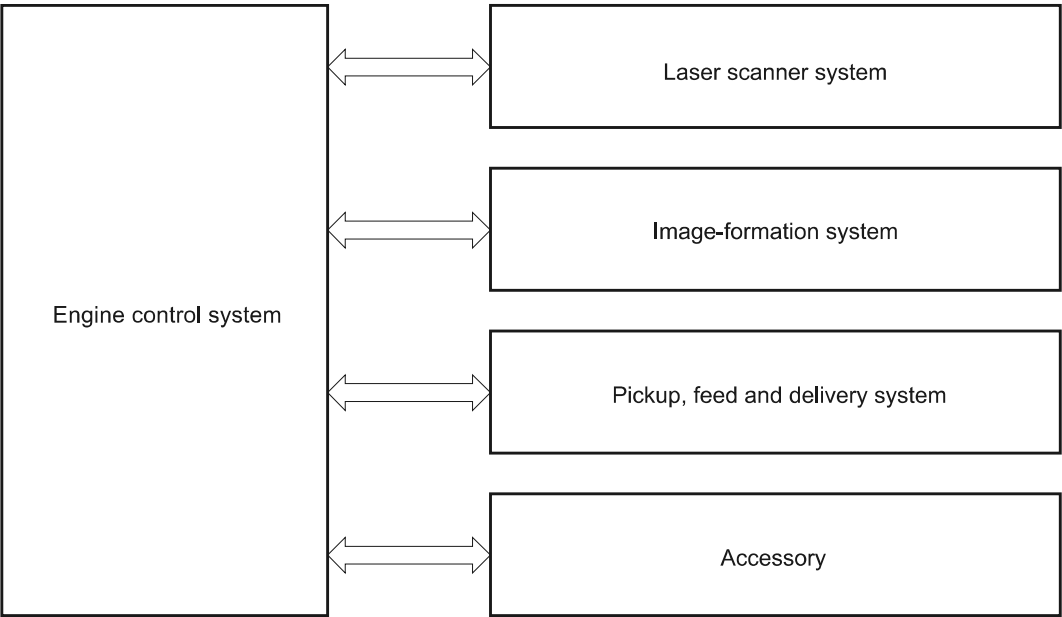
Basic operation

Function structure

The product contains the following systems:

- Engine control system
- Laser scanner system
- Image-formation system
- Pickup, feed and delivery system
- Accessory

Figure 1-1 Function structure



Operation sequence

The DC controller in the engine-control system controls the operational sequences. The following table describes durations and operations for each period of a print operation from when the product is turned on until the motors stop rotating.

Table 1-1 Operation sequence

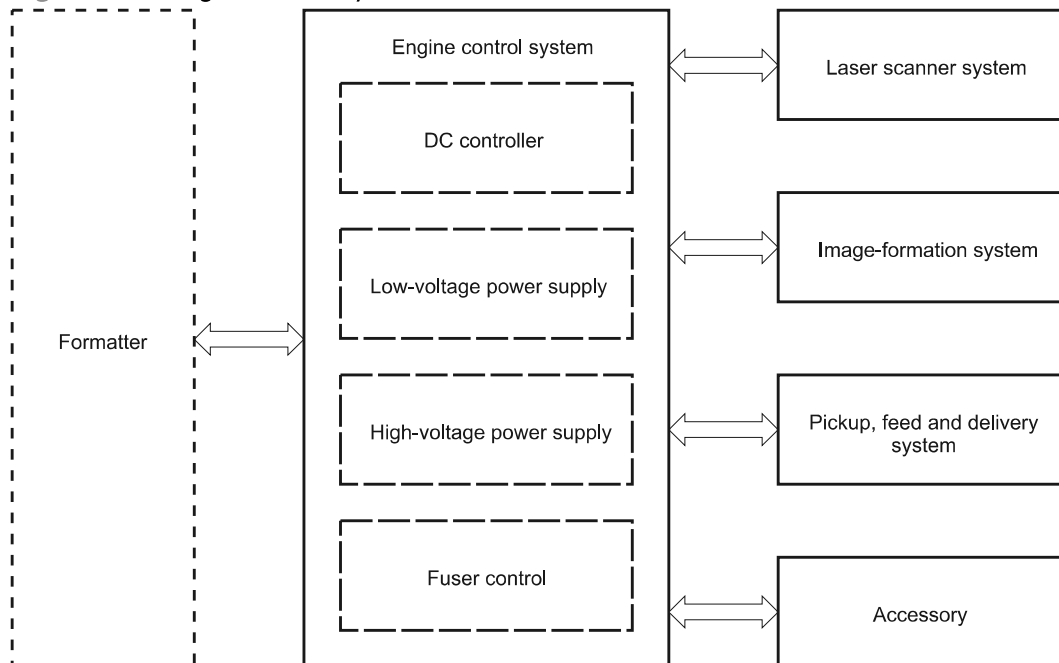
| Period | Duration | Purpose |
|-------------------------|---|--|
| WAIT period | From the time the power switch is turned on, the door is closed or product exits Sleep mode until the product is ready for a print operation. | <p>Brings the product to the Ready state.</p> <ul style="list-style-type: none"> • Detects the failure of the low-voltage power supply • Detects the connection with the accessories • Detects the presence of cartridge • Rotates and then stops each motor and fan • Checks the fuser temperature • Heats the fuser film • Detects any residual paper and clears it automatically • Initializes the high-voltage bias • Cleans the photosensitive drum • Detects the toner level |
| STBY (Standby period) | From the end of WAIT or LSTR period until either a print command is sent or the power switch is turned off. | <p>Maintains the product in printable condition.</p> <ul style="list-style-type: none"> • Enters Sleep mode if the sleep command is received • Rotates and then stops each fan |
| INTR (Initial rotation) | From the time the print command is received until the product picks up the paper. | <p>Prepares the product for a print job.</p> <ul style="list-style-type: none"> • Rotate the motors • Rotate the fans • Outputs the high-voltage bias • Starts up the laser scanner assembly • Warms up the fuser heater |
| PRINT | From the end of the INTR period until the last sheet is delivered. | <p>Processes the print job.</p> <ul style="list-style-type: none"> • Forms the image on the photosensitive drum • Transfers toner to the paper • Fuses the toner image onto the paper |
| LSTR (Last rotation) | From the end of the PRINT period until the motor stops rotating. | <p>Stops each load.</p> <ul style="list-style-type: none"> • Stops the motors and fans • Stops the high-voltage bias • Stops the laser scanner assembly • Stops the fuser heater <p>The product enters the INTR period as the LSTR period is complete if the formatter sends another print command.</p> |

Engine control system

The engine-control system coordinates all the other systems, according to commands from the formatter. The engine-control system contains the following components:

- DC controller PCA
- Low-voltage power supply unit
- High-voltage power supply PCA
- Fuser control

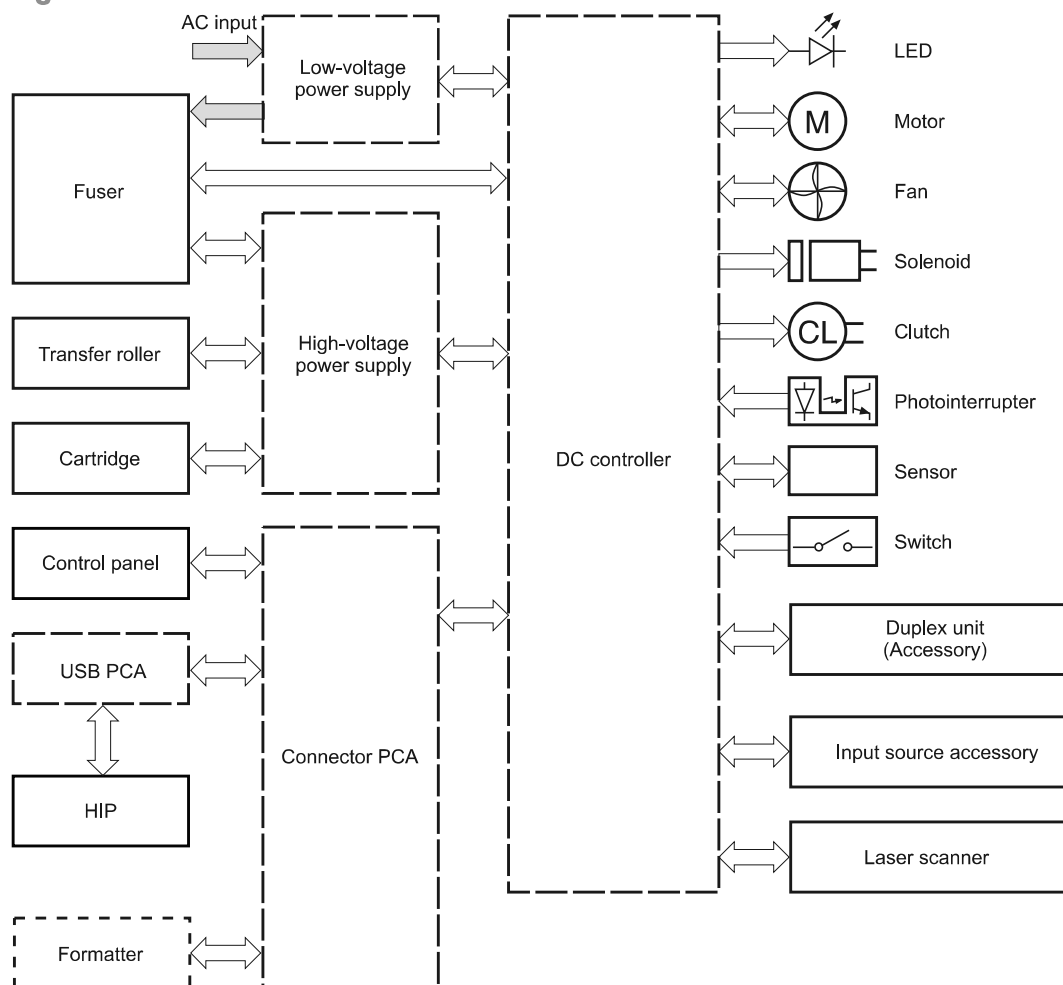
Figure 1-2 Engine control system



DC controller PCA

The DC controller PCA controls the product operation sequence.

Figure 1-3 DC controller PCA



The following table lists the product electrical components.

| Component type | Component abbreviation | Component name |
|----------------|------------------------|--------------------------------------|
| Switch | SW1 | Left door interlock switch |
| | SW2 | Cartridge door interlock switch |
| | SW3 | Cartridge door open detection switch |
| | SW4 | Upper cassette media width switch |
| | SW5 | Lower cassette media width switch |
| | SW6 | Upper cassette media end switch |
| | SW7 | Lower cassette media end switch |
| | — | Power switch |

| Component type | Component abbreviation | Component name |
|------------------|------------------------|----------------------------------|
| Solenoid | SL1 | Tray 1 (MP tray) pickup solenoid |
| Clutch | CL1 | Upper cassette pickup clutch |
| | CL2 | Lower cassette pickup clutch |
| Fan | FM1 | Rear fan |
| | FM2 | Front fan |
| | FM3 | Fuser fan |
| Photointerrupter | SR1 | Cartridge presence sensor |
| | SR2 | MP tray media out sensor |
| | SR3 | Output sensor |
| | SR4 | Output bin media full sensor |
| | SR5 | Lower cassette media out sensor |
| | SR6 | Loop sensor |
| | SR7 | Upper cassette media out sensor |
| | SR8 | Right door sensor |
| | SR9 | TOP sensor |
| | SR10 | Upper cassette lift-up sensor |
| | SR11 | Lower cassette lift-up sensor |
| | SR12 | Fuser output sensor |
| Sensor | — | Environment sensor |
| Motor | M1 | Drum motor |
| | M2 | Scanner motor |
| | M3 | Fuser motor |
| | M4 | Upper cassette lifter motor |
| | M5 | Lower cassette lifter motor |

Motor control

The product has five motors for the paper-feed and image-formation.

Motor locations

The following figure shows the product motor locations.

Figure 1-4 Motor locations

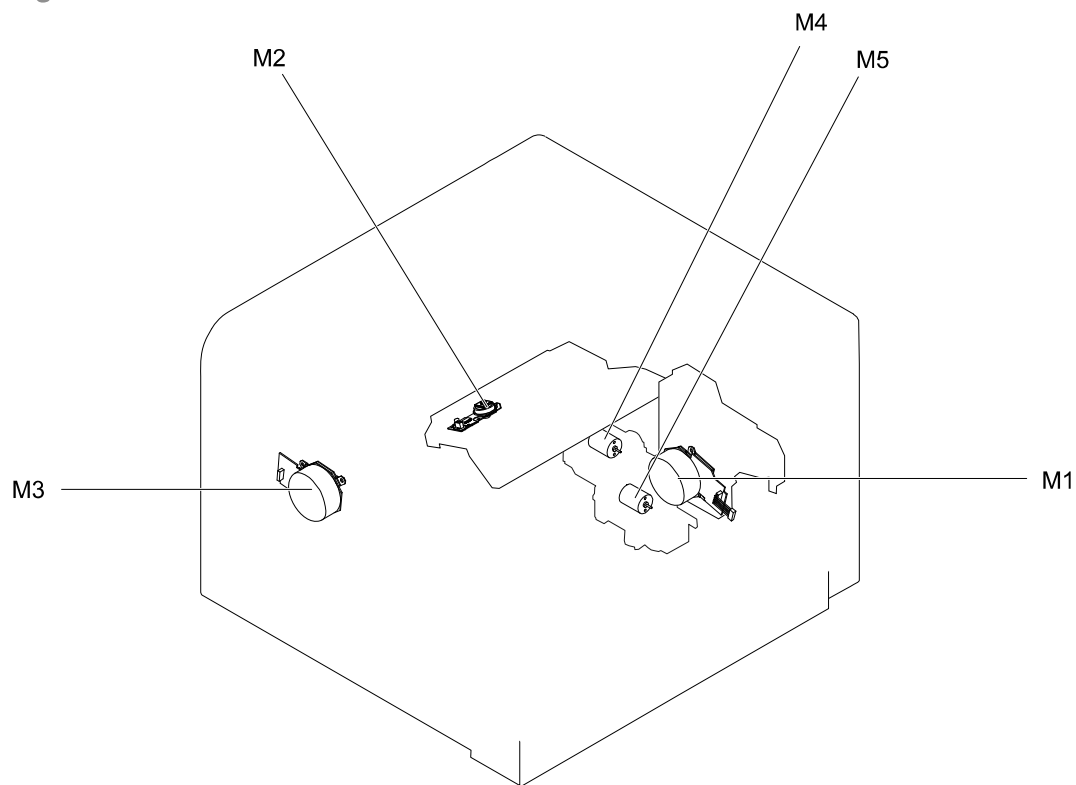


Table 1-2 Motor locations

| Motor | | Components driven by motor |
|-------|-----------------------------|---|
| M1 | Drum motor | Photosensitive drum, transfer roller, registration roller, MP tray pickup roller, cassette pickup roller, and feed roller |
| M2 | Scanner motor | Laser scanner mirror |
| M3 | Fuser motor | Pressure roller, fuser output roller, intermediate output roller and paper delivery roller |
| M4 | Upper cassette lifter motor | Lifter for the upper cassette |
| M5 | Lower cassette lifter motor | Lifter for the lower cassette |

Failure detection

The DC controller monitors the following motors to determine a motor failure:

- Drum motor
- Scanner motor
- Fuser motor

The DC controller determines if the motor has failed and notifies the formatter when the motor encounters the following conditions:

- Startup failure — The motor does not reach a specified rotational count within a specified time from when the motor starts.
- Rotational failure — The rotational speed of the motor is not in the specified range for a specified time after the motor reaches a specified speed.

The DC controller notifies the formatter of a BD (beam detect) failure when it detects a rotational failure of the scanner motor.

The DC controller monitors the related part condition of the following motors to determine a motor failure:

- Upper cassette lifter motor
- Lower cassette lifter motor

Fan control

The product has three fans for preventing the temperature from rising in the product and cooling down the delivered paper.

Fan locations

The following figure shows the product fan locations.

Figure 1-5 Fan locations

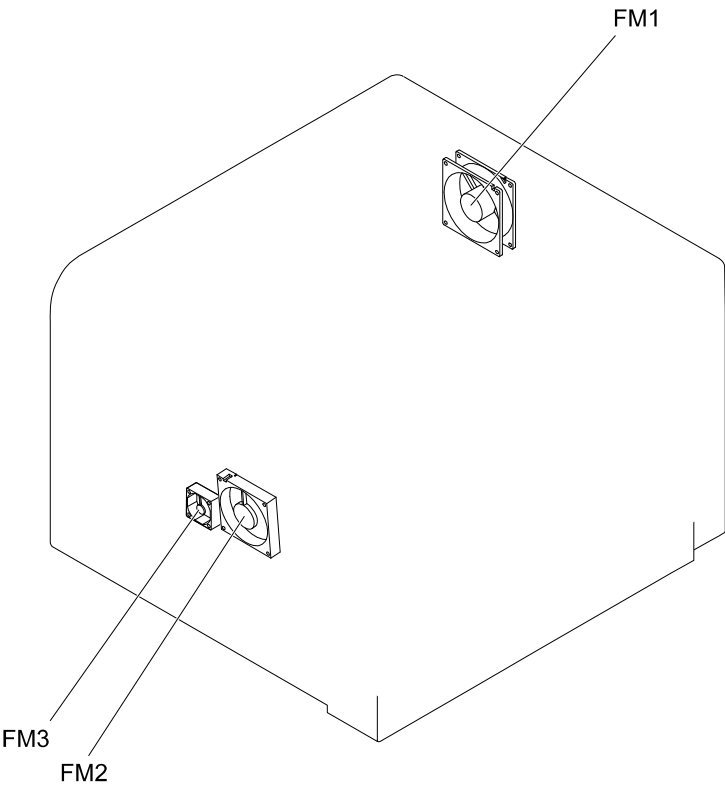


Table 1-3 Fan locations

| Fan | | Cooling area | Type | Speed |
|-----|-----------|--|---------|--------------|
| FM1 | Rear fan | Product inside and low-voltage power supply area | Exhaust | Full/Mid/Low |
| FM2 | Front fan | Product inside | Intake | Full |
| FM3 | Fuser fan | Fuser area | Intake | Full |

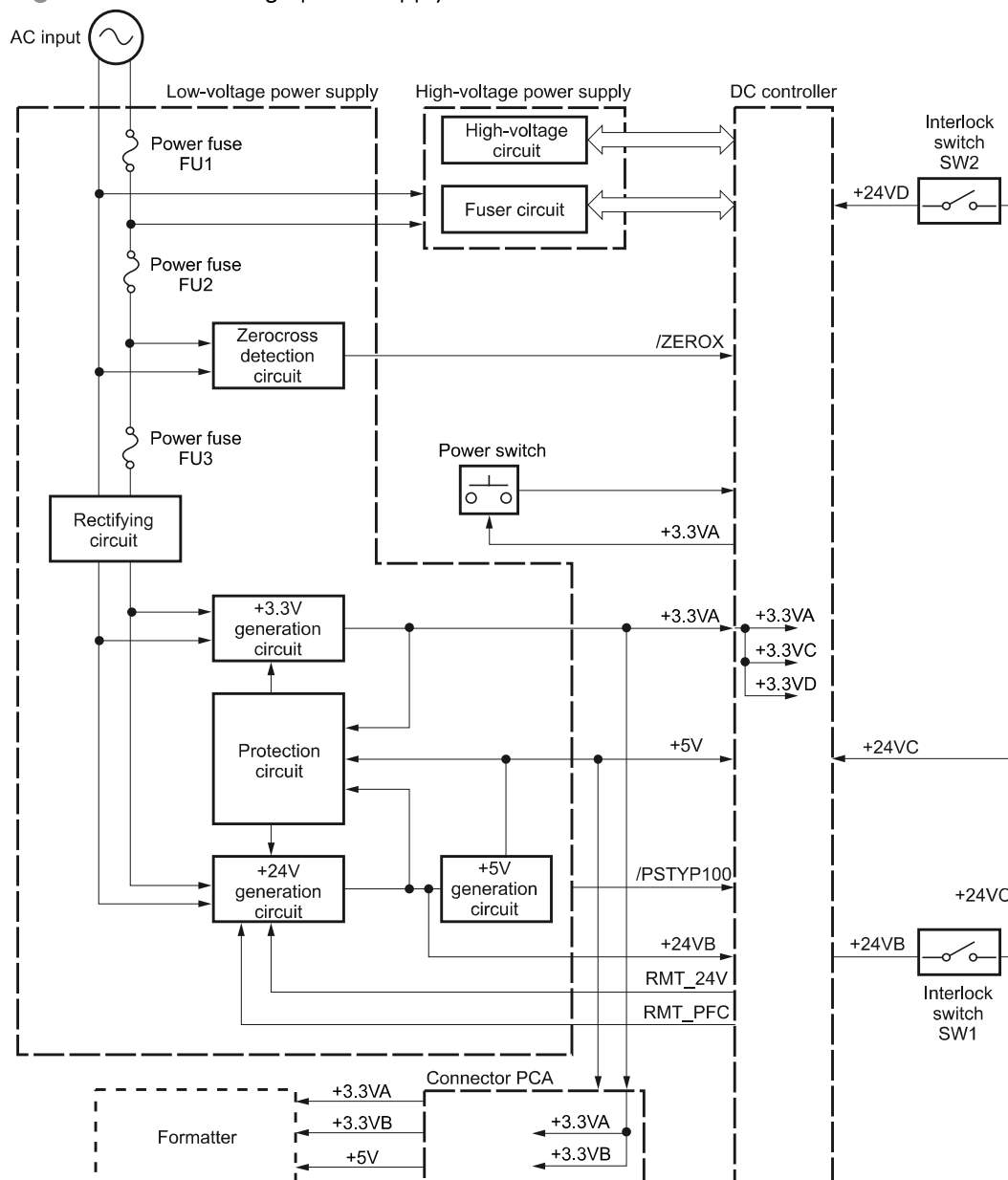
Failure detection

The DC controller determines if the fan has failed and notifies the formatter when the fan stops rotating for a specified time during start-up.

Low-voltage power-supply PCA

The low-voltage power supply converts AC power into the DC voltage that product components use.

Figure 1-6 Low-voltage power-supply PCA



The following table shows the specifications for the DC power supply.

Table 1-4 Low voltage power supply DC power specifications

| DC voltage | | Behavior |
|------------|-------|---|
| +24V | +24VB | Off during Sleep mode (sleep level1, active off and inactive off) |
| | +24VC | Off during Sleep mode (sleep level1, active off and inactive off) Interrupted when the left door open |
| | +24VD | Off during Sleep mode (sleep level1, active off and inactive off) Interrupted when the left door or the cartridge door open |

Table 1-4 Low voltage power supply DC power specifications (continued)

| DC voltage | | Behavior |
|------------|--------|---|
| +5V | +5V | Off during Sleep mode (sleep level1, active off and inactive off) |
| +3.3V | +3.3VA | Constantly supplied |
| | +3.3VB | Off during Sleep mode (inactive off) |
| | +3.3VC | Off during Sleep mode (active off and inactive off) |
| | +3.3VD | Off during Sleep mode (sleep level1, active off and inactive off) |

Over-current/over-voltage/overload protection

The over-current/overvoltage protection automatically stops the DC voltage to the product components whenever an excessive current or abnormal voltage is detected. The overload protection automatically stops the DC voltage to the product components whenever the temperature of the low-voltage power supply PCA rises to specified degrees.

The low-voltage power supply has a protective circuit against over-current, over-voltage and overload to prevent failures in the power supply circuit. If DC voltage is not being supplied from the low-voltage power supply, the protective function might be running. In this case, turn the power off and unplug the power cord. Do not turn the product switch on until the root cause is found and corrected.

The DC controller determines a low-voltage power supply failure and notifies the formatter when the protective function runs.

In addition, the low-voltage power supply has three fuses to protect against over-current. If over-current flows into the AC line, the fuse blows to stop AC power.

Safety interruption

For user and service technician's safety, the product interrupts the power supply of +24V by turning off the interlock switch. The DC power to the following components is interrupted:

- High-voltage power supply
- Fuser motor

The remote switch control circuit turns on or off the product so that the AC power flows even the power switch is turned off. Be sure to unplug the power cord before disassembling the product.

Power supply voltage detection

The power supply voltage detection controls the fuser properly according to the voltage. The DC controller detects whether the low-voltage power supply voltage is 100V or 220V according to the POWER SUPPLY VOLTAGE signal (/PSTYP100).

Sleep mode

The Sleep mode reduces the power consumption of the product. There are three types of sleep mode:

- Sleep level 1

The DC controller stops the power supply of +24V according to the +24V CONTROL signal (RMT_24V) and POWER FACTOR CORRECTION ACTIVATE signal (RMT_PFC) after a specified period of time from when a sleep command signal is sent from the formatter. The DC controller supplies +24V and the product exits sleep level 1 when a recover signal is sent from the formatter.

- Active off

The DC controller stops the power supplies except for +3.3VA and +3.3VB to the formatter when an active off command signal is sent from the formatter during sleep level 1 or STBY period. The DC controller supplies all power supplies and the product exits active off when a recover signal is sent from the formatter or the power switch is depressed for shorter than three seconds.

- Inactive off

The DC controller stops the power supplies except for +3.3VA to the formatter when an inactive off command signal is sent from the formatter during sleep level 1 or STBY period. The product enters inactive off when the power switch is depressed for longer than three seconds. The DC controller supplies all power supplies and the product exits inactive off when a recover signal is sent from the formatter or the power switch is depressed for shorter than three seconds.

Power supply illumination control

The DC controller changes the light of the LED (power supply illumination) for the power switch according to the power supply condition as follows:

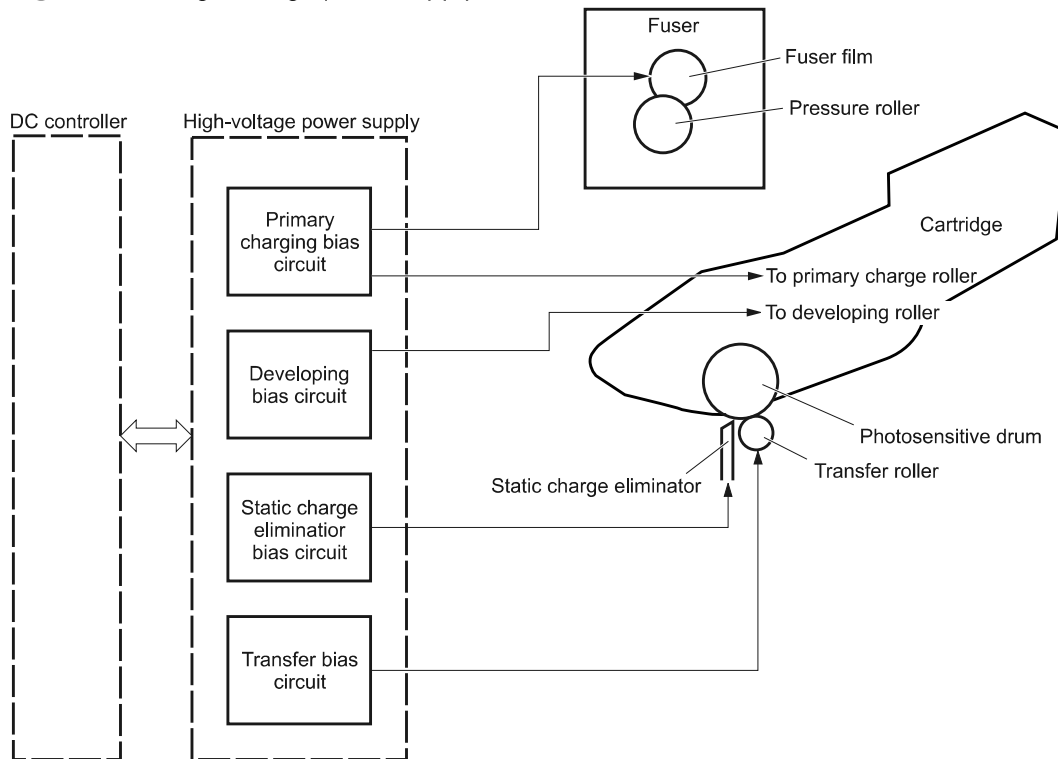
- Lighting-up: STBY period or sleep level 1
- Blinking: Active off
- Lighting-out: Inactive off

High-voltage power-supply PCA

The high-voltage power supply applies positive or negative voltage biases to the following components:

- Primary charging roller
- Developing roller
- Transfer roller
- Static charge eliminator
- Fuser film

Figure 1-7 High-voltage power-supply PCA



The DC controller controls the high-voltage power supply to generate the following biases.

- Primary charging bias

The primary charging bias is used to charge the surface of the photosensitive drum evenly to prepare for image formation. The primary charging bias circuit generates the bias.

- Developing bias

The developing bias is used to adhere toner to an electrostatic latent image formed on the photosensitive drum. The developing bias circuit generates the bias.

- Transfer bias

The transfer bias is used to transfer the toner from the photosensitive drum onto the paper. The transfer bias circuit generates the bias. The transfer bias circuit also generates the reverse bias to clean the transfer roller.

- Static charge eliminator bias

The static charge eliminator bias is used to improve the paper-feed performance and image-quality. The static charge eliminator bias circuit generates the bias.

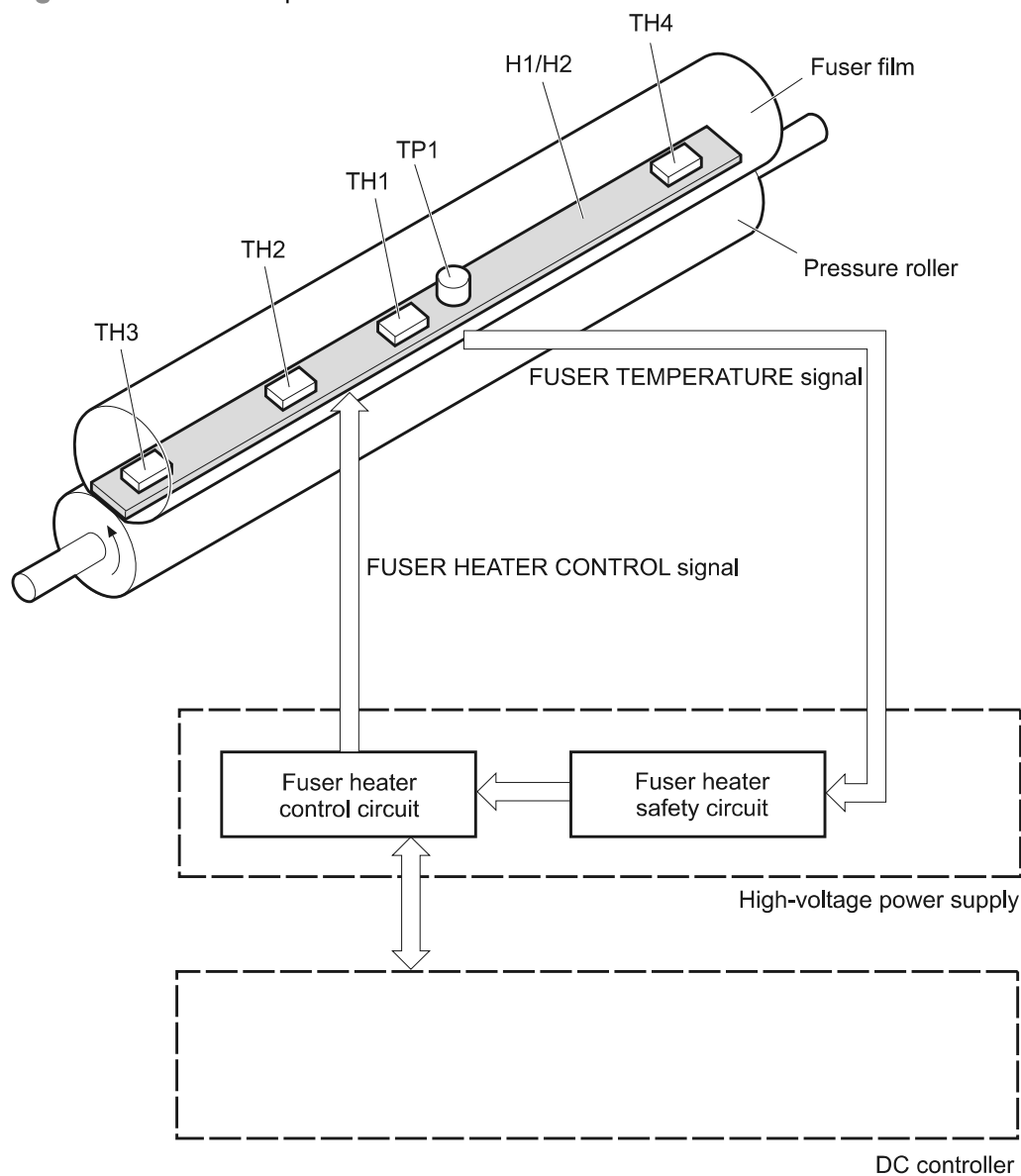
- Fusing bias

The fusing bias is used to improve the image-quality. The primary charging bias circuit generates the bias.

Fuser control

The fuser heater control circuit and the fuser heater safety circuit control the fuser temperature according to commands from the DC controller. The product uses an on-demand fusing method.

Figure 1-8 Fuser components

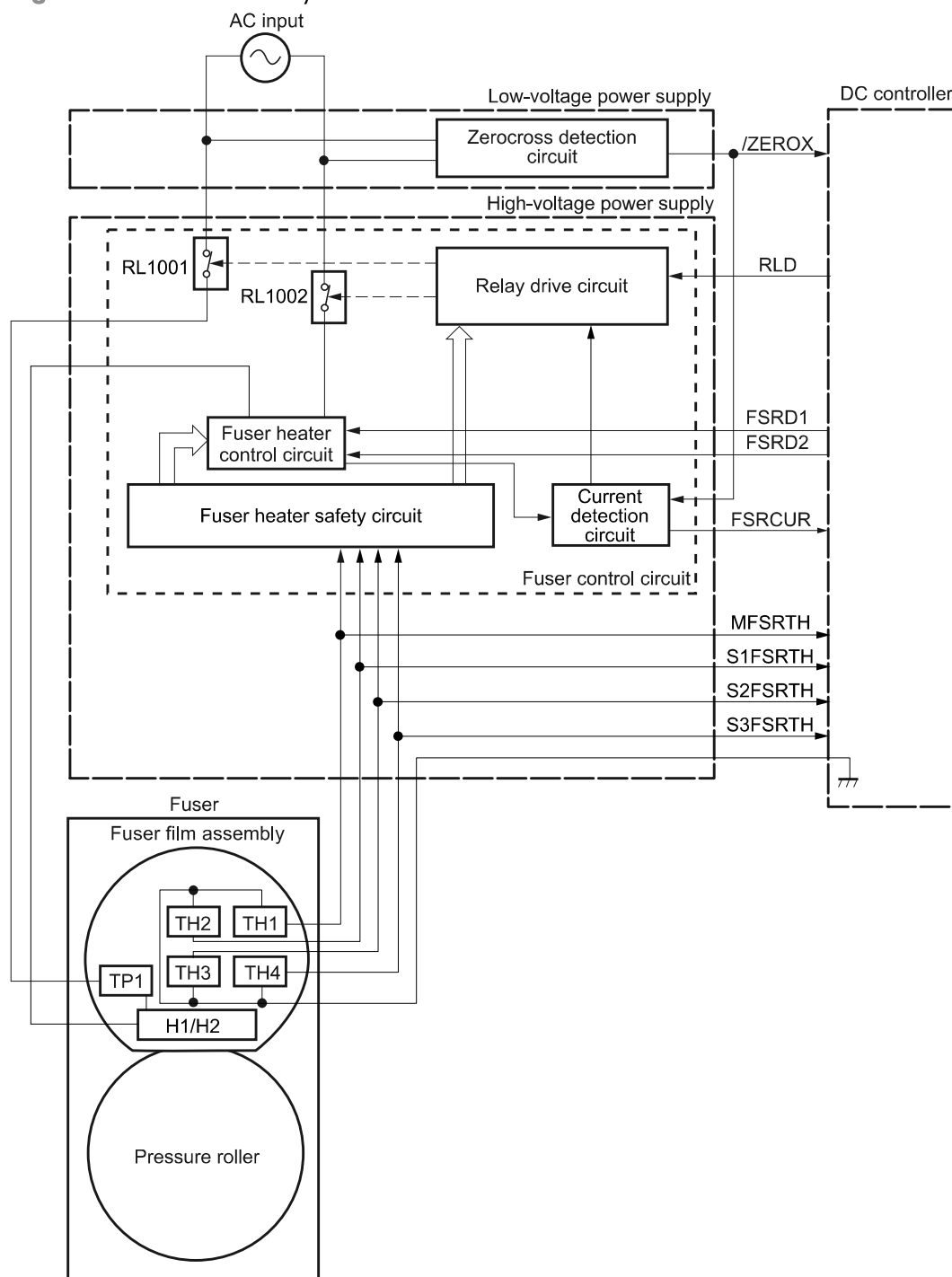


The following table shows the function of each fuser component.

| Component | | Function |
|-----------|-------------------|--|
| H1 | Fuser main heater | Heats center area of the fuser film |
| H2 | Fuser sub heater | Heats both ends of the fuser film |
| TP1 | Thermoswitch | Prevents an abnormal temperature rise of the fuser heater (contact type) |
| TH1 | Main thermistor | Detects the temperature at center of the fuser heater (contact type) |

| Component | | Function |
|-----------|------------------|--|
| TH2 | Sub thermistor 1 | Detects the temperature at ends of the fuser heater (contact type) |
| TH3 | Sub thermistor 2 | |
| TH4 | Sub thermistor 3 | |

Figure 1-9 Fuser control system



Fuser temperature control

The fuser temperature control maintains the temperature of the fuser heater at its targeted temperature.

The DC controller monitors the FUSER TEMPERATURE signals (MFSRTH, S1FSRTH, S2FSRTH and S3FSRTH) and sends the FUSER HEATER CONTROL signals (FSRD1 and FSRD2). The fuser heater control circuit controls the fuser heater depending on the signals so that the fuser heater remains at the targeted temperature.

Fuser heater protective function

The fuser heater protective function detects an abnormal temperature rise of the fuser and interrupts power supply to the fuser heater. The following protective components prevent an abnormal temperature rise of the fuser heater:

- DC controller

The DC controller monitors the detected temperature of the thermistor. The DC controller releases the relay (RL1001) to interrupt power supply to the fuser heater when it detects an abnormal temperature.

- Fuser heater safety circuit

The fuser heater safety circuit monitors the detected temperature of the thermistor. The fuser heater safety circuit releases the relays (RL1001 and RL1002) or deactivates the fuser heater control circuit to interrupt power supply to the fuser heater when it detects an abnormal temperature.

- Thermoswitch

The contact of the thermoswitch is broken to interrupt power supply to the fuser heater when the temperature of the fuser heater is abnormally high.

- Current detection circuit

The current detection circuit monitors the current value flowing in the fuser heater control circuit, and it releases the relay to interrupt power supply to the fuser heater when it detects an abnormal current flow.

The DC controller deactivates the FUSER HEATER CONTROL signal and releases the relays (RL1001 and RL1002) to interrupt power supply to the fuser heater when it detects out of a specified current value of the CURRENT DETECTION signal (FSRCUR).

Fuser failure detection

The DC controller determines if the fuser functions properly. The DC controller determines a fuser failure, interrupts power supply to the fuser heater and notifies the formatter of a failure state when it encounters the following conditions:

- Abnormally high temperature 1
The main thermistor detects 240°C (464°F) or higher for a specified period.
- Abnormally high temperature 2
The sub thermistor 1 detects 230°C (446°F) or higher for a specified period during WAIT period.
The sub thermistor 1 detects 230°C (446°F) or higher for a specified period before INTR starts.
The sub thermistor 1 detects 300°C (572°F) or higher for a specified period.
- Abnormally high temperature 3
Either one of the sub thermistor 2 or sub thermistor 3 detects 230°C (446°F) or higher for a specified period during WAIT period.

Either one of the sub thermistor 2 or sub thermistor 3 detects 230°C (446°F) or higher for a specified period before INTR starts.

Either one of the sub thermistor 2 or sub thermistor 3 detects 300°C (572°F) or higher for a specified period.
- Abnormally low temperature 1
The main thermistor detects 60°C (140°F) or lower for a specified period during WAIT period.

The main thermistor detects 70°C (158°F) or lower for a specified period during heater temperature control of INTR period.

The main thermistor detects the targeted temperature minus 40°C (104°F) or lower for a specified period during heater temperature control or pressure roller cleaning of PRINT period.

The main thermistor detects 80°C (176°F) or lower for a specified period during heater temperature control or pressure roller cleaning of PRINT period.
- Abnormally low temperature 2
The sub thermistor 1 detects 60°C (140°F) or lower for a specified period during WAIT period.
- Abnormally low temperature 3
Either one of the sub thermistor 2 or sub thermistor 3 detects 60°C (140°F) or lower for a specified period during WAIT period.
- Abnormal temperature rise
The main thermistor detects the targeted temperature minus 10°C (50°F) or lower for a specified period during heater temperature control of INTR period.
- Drive circuit failure

The frequency of the ZEROCROSS signal is not detected in a specified value within a specified period after power-on.

The frequency of the ZEROCROSS signal is not detected in a specified value for a specified period after power-on and once the signal is detected.

- Heater failure

A specified current value or lower is detected during the heater drive period of the WAIT period or when more than a specified electrical power is input.

Pressure roller cleaning

The pressure roller cleaning clears toner on the pressure roller surface by adhering to the paper according to a command from the formatter. This is executed only when the paper size is A4-R (rotated) or Letter-R (rotated). The operational sequence of the pressure roller cleaning is as follows:

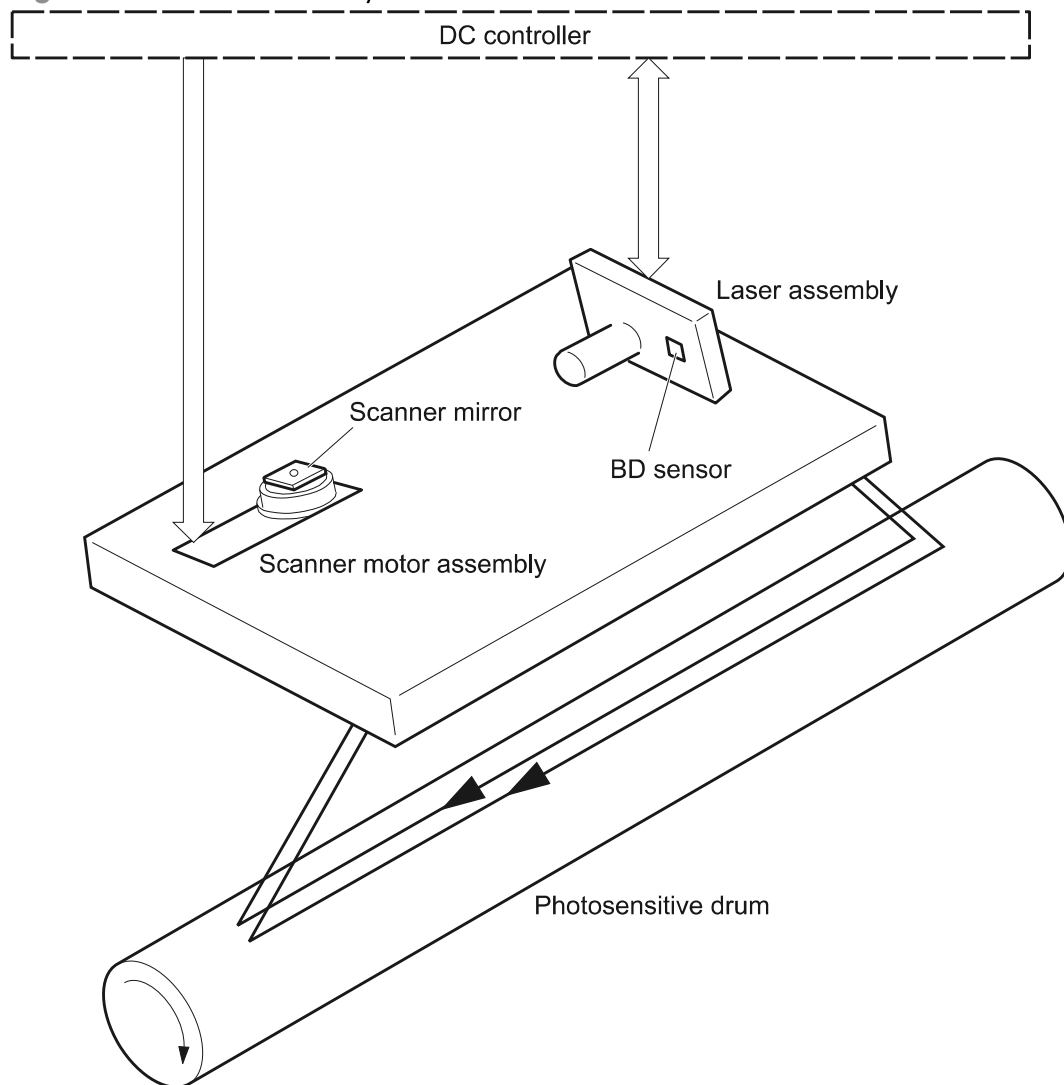
1. The DC controller picks up the paper from the designated input source when a cleaning command is sent from the formatter.
2. When the trailing edge of paper passes through the transfer roller, the fuser motor repeats to rotate-and-stop at regular intervals and the fuser heater turns on-and-off at the same time.
3. The toner on the pressure roller fuses onto the paper and the roller clears.
4. The paper with fused toner is delivered out of the product.

Laser scanner system

The DC controller controls the laser scanner system according to commands from the formatter. The DC controller controls the internal components in the laser scanner system to form latent electrostatic image on the photosensitive drum according to the VIDEO signals. The following are the main components of the laser scanner system:

- Laser assembly
- Scanner motor assembly
- BD (beam detect) sensor
- Scanner mirror

Figure 1-10 Laser scanner system



Laser scanner failure detection

The DC controller determines a laser scanner failure and notifies the formatter of the error state when any of the following conditions occurs:

- BD failure
A specified BD interval is not detected within a specified period during the scanner motor drive.
- Scanner motor start-up failure
The scanner motor does not reach a specified rotation within a specified period from when the laser scanner starts driving.
- Laser failure
A specified laser intensity is not detected.

Laser scanner safety function

The laser scanner has a mechanical shutter. For user and service technician safety, the laser shutter interrupts optical path of the laser scanner when the cartridge door is open.

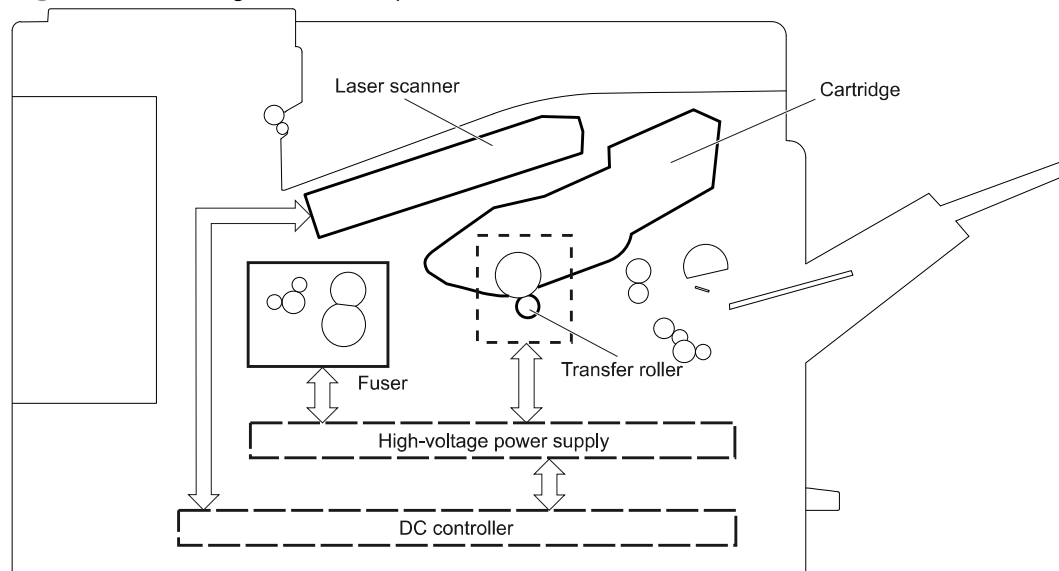
Image-formation system

The DC controller controls the image-formation system according to commands from the formatter. The DC controller controls the internal components of the image-formation system to form the toner image on the photosensitive drum surface. The toner image is transferred to the paper and fused.

The following are the main components of the image-formation system:

- Cartridge
- Transfer roller
- Fuser
- Laser scanner
- High-voltage power supply

Figure 1-11 Image-formation system



The DC controller rotates the drum motor to drive the following components:

- Photosensitive drum
- Developing roller (follows the photosensitive drum)
- Primary charging roller (follows the photosensitive drum)
- Transfer roller

The DC controller rotates the fuser motor to drive the following components:

- Pressure roller
- Fuser film (follows the pressure roller)

Figure 1-12 Image-formation components

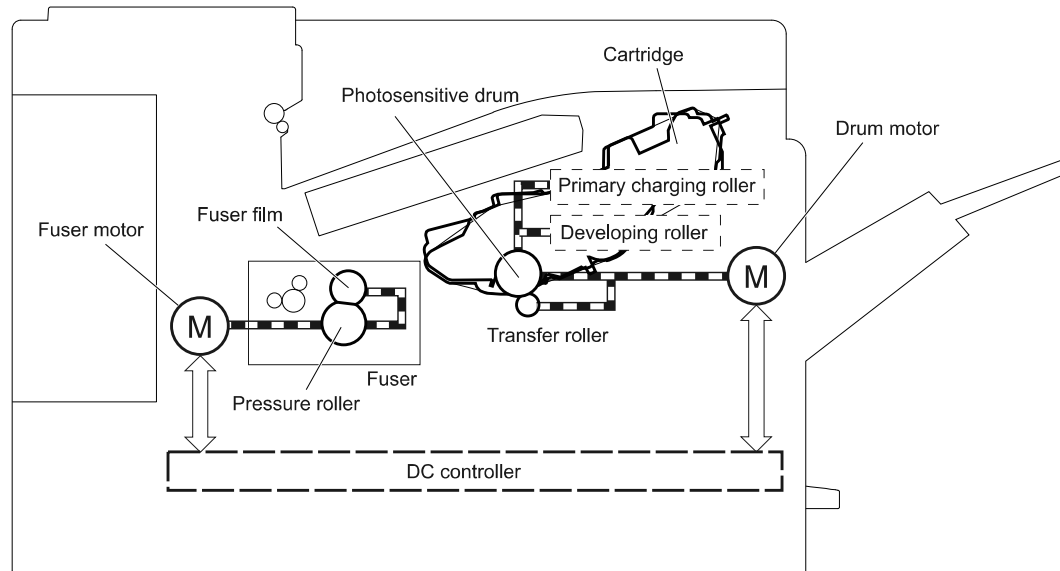


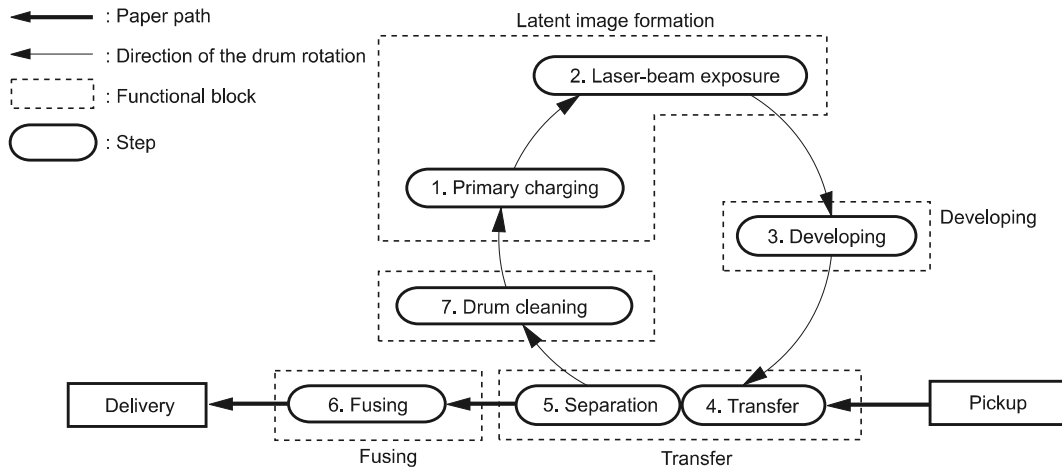
Image-formation process

The image-formation process consists of seven steps divided into five functional blocks:

- Latent-image-formation system
 - Step 1: Primary charging
 - Step 2: Laser-beam exposure
- Developing system
 - Step 3: Developing
- Transfer system
 - Step 4: Transfer
 - Step 5: Separation

- Fuser system
 - Step 6: Fusing
- Drum cleaning
 - Step 7: Drum cleaning

Figure 1-13 Image-formation process



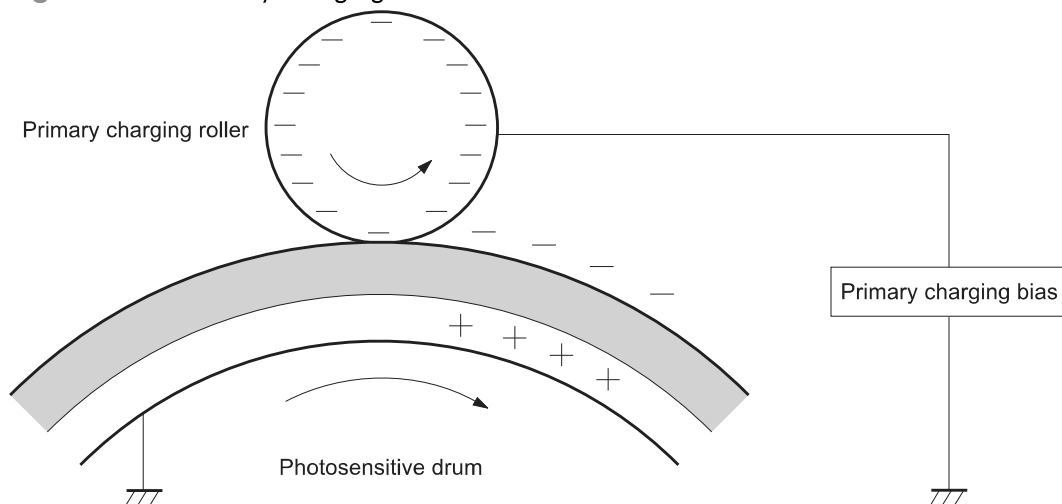
Latent-image formation block

During the two steps that comprise this block, an invisible latent image is formed on the photosensitive drum.

Step 1: primary charging

To prepare for latent image formation, the surface of the photosensitive drum is charged with a uniform negative potential. The primary charging roller charges the photosensitive drum directly. The primary charging bias is applied to the primary charging roller to keep a negative potential on the drum surface.

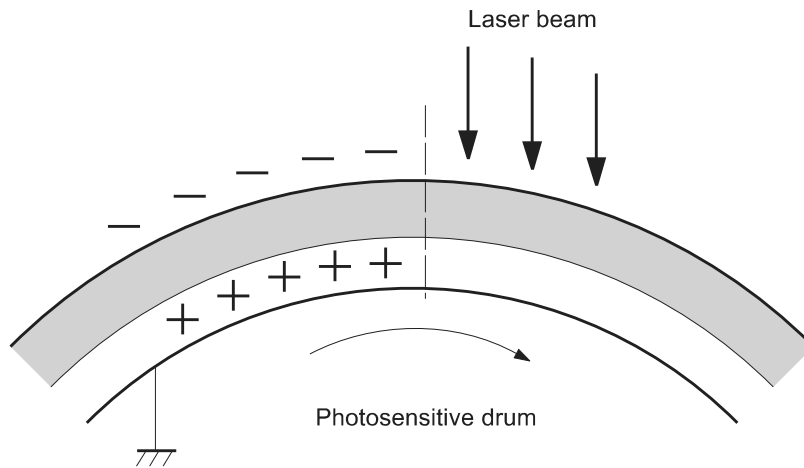
Figure 1-14 Primary charging



Step 2: laser-beam exposure

The laser-beam strikes the surface of the photosensitive drum to neutralize the negative charge. An electrostatic latent image forms where the negative charge was neutralized.

Figure 1-15 Laser-beam exposure



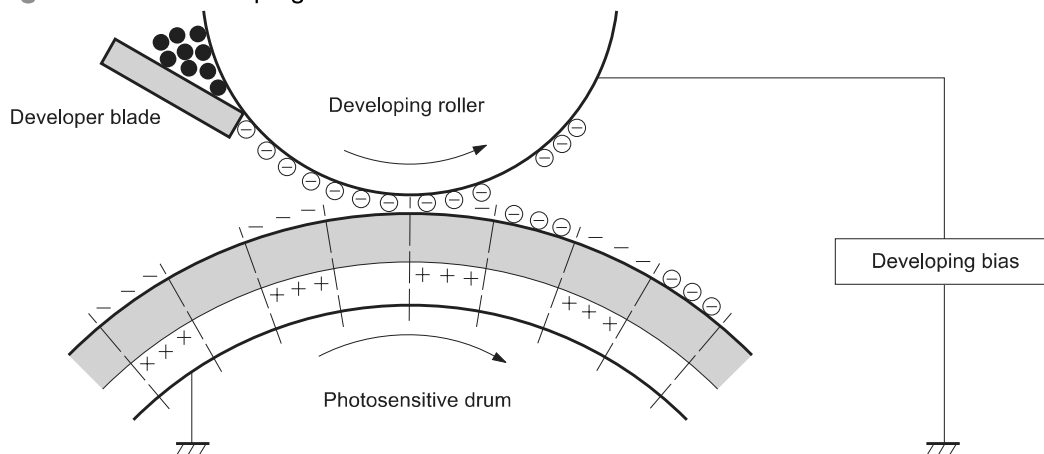
Development block

Toner adheres to the electrostatic latent image on the photosensitive drum, which becomes visible.

Step 3: developing

Toner acquires a negative charge from the friction that occurs when the developing roller rotates against the developer blade. The developing bias is applied to the developing roller to make difference in the electric potential of the drum. The negatively charged toner is attracted to the latent image on the photosensitive drum because the drum surface has a higher potential. The latent image becomes visible on the drum.

Figure 1-16 Developing



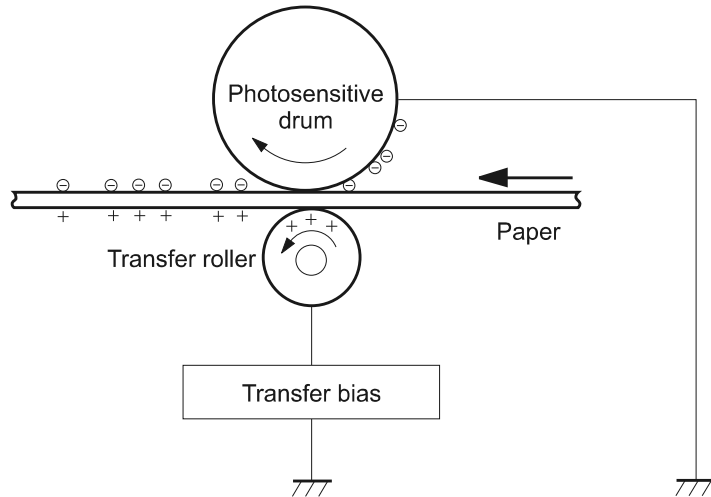
Transfer block

During the two steps that comprise this block, a toner image on the photosensitive drum transfers to the paper.

Step 4: image transfer

The toner on the photosensitive drum is transferred to the paper. The transfer bias is applied to the transfer roller to charge the paper positive. The negatively charged toner on the drum surface transfers onto the paper.

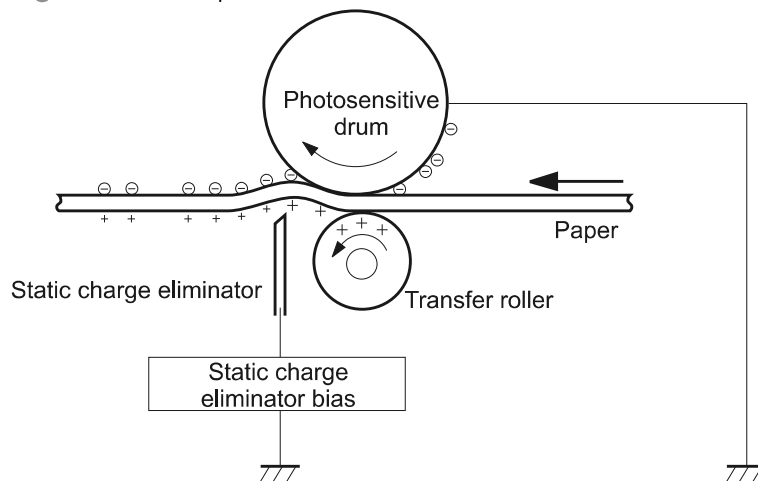
Figure 1-17 Image transfer



Step 5: separation from the drum

The elasticity of the paper and the curvature of the photosensitive drum cause the paper to separate from the photosensitive drum. The static charge eliminator bias is applied to the static charge eliminator. The static charge eliminator reduces back side static discharge of the paper after the transfer process for stable paper-feed and print-quality.

Figure 1-18 Separation from the drum



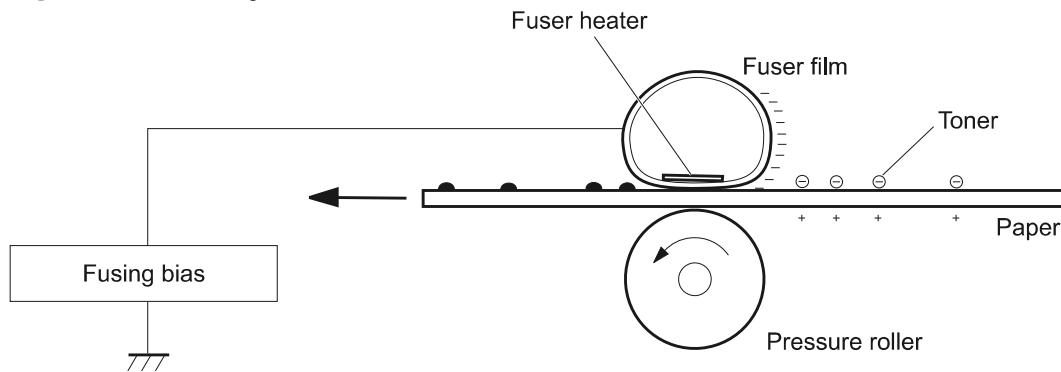
Fuser block

Until the fusing stage is complete, the image is not permanently affixed to the paper. The toner can be easily smudged until the heat and pressure of the fusing process fix the image to the sheet.

Step 6: fusing

The toner melts by the heat and pressure as the paper passes through the rollers. The toner image is permanently fused to the paper. The fusing bias is applied to the fuser film to improve print-quality.

Figure 1-19 Fusing



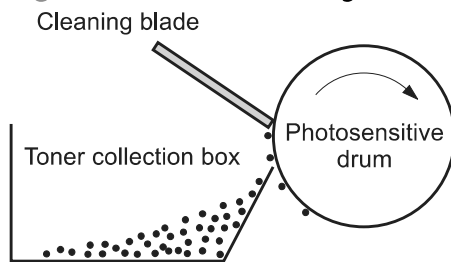
Drum-cleaning block

The residual toner is removed from the photosensitive drum surface

Step 7: drum cleaning

The cleaning blade scrapes the residual toner off the surface of the photosensitive drum and toner is deposited in the toner collection box.

Figure 1-20 Drum cleaning



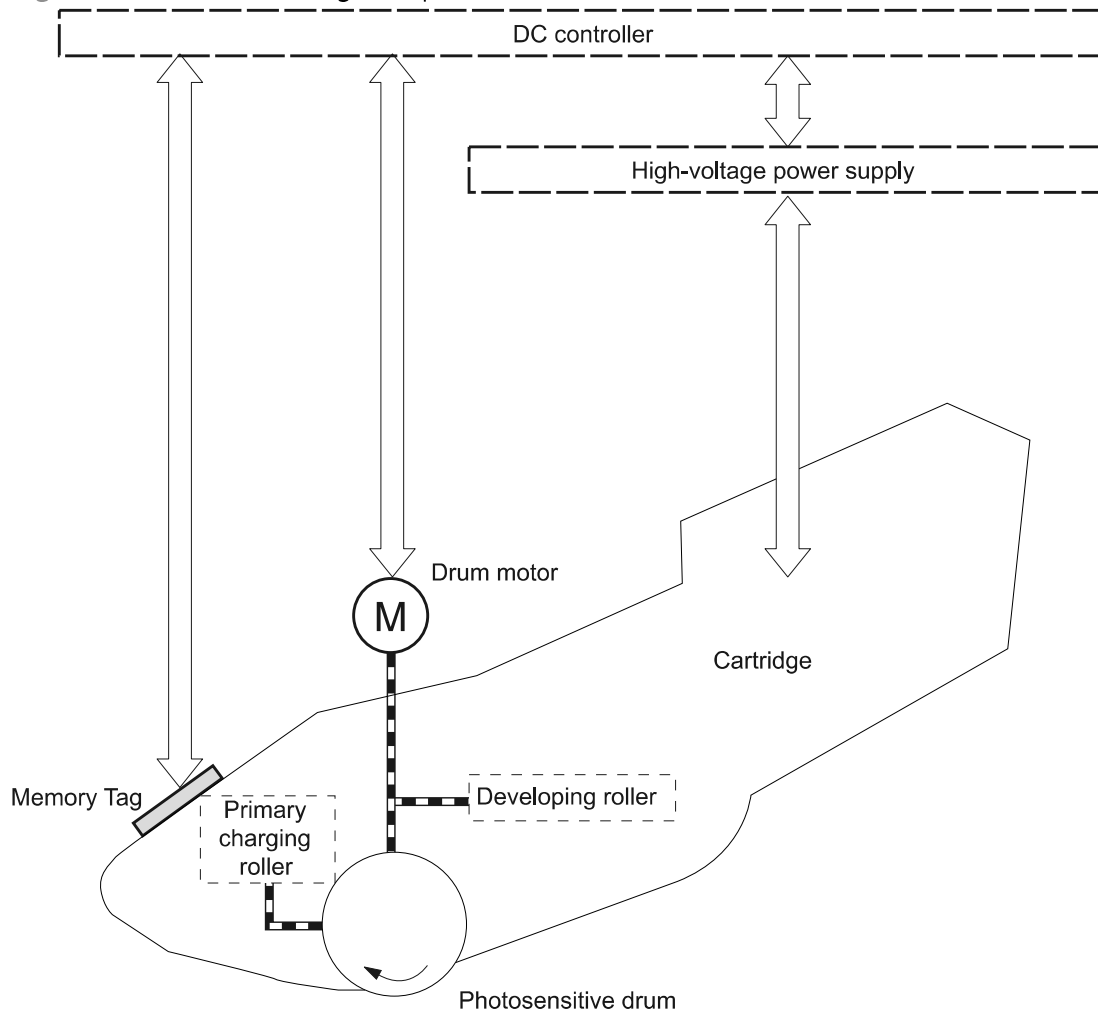
Toner cartridge

The cartridge is filled with toner and consists of the following components:

- Photosensitive drum
- Developing roller

- Primary charging roller
- Memory tag

Figure 1-21 Toner cartridge components



The cartridge serves a role in the following functions:

- Memory tag

The memory tag is a non-volatile memory in the cartridge and the DC controller controls it. The memory tag stores information about usage for the cartridge and the DC controller reads and writes the data in the memory tag. The DC controller determines a memory tag error and notifies the formatter when it fails to either read from or write to the memory tag.

- Cartridge-presence detection

The DC controller detects whether the cartridge is installed in the product by monitoring the cartridge presence sensor. The DC controller notifies the formatter when it determines a cartridge absence.

- Toner-level detection

The DC controller detects the remaining toner level in a cartridge according to the TONER LEVEL signal. The DC controller determines a cartridge low warning or cartridge end of life when the toner level drops below a specified level and notifies the formatter.

- Cartridge-life detection

The DC controller detects the cartridge life of components that wear out. The DC controller determines a cartridge end of life and notifies the formatter.

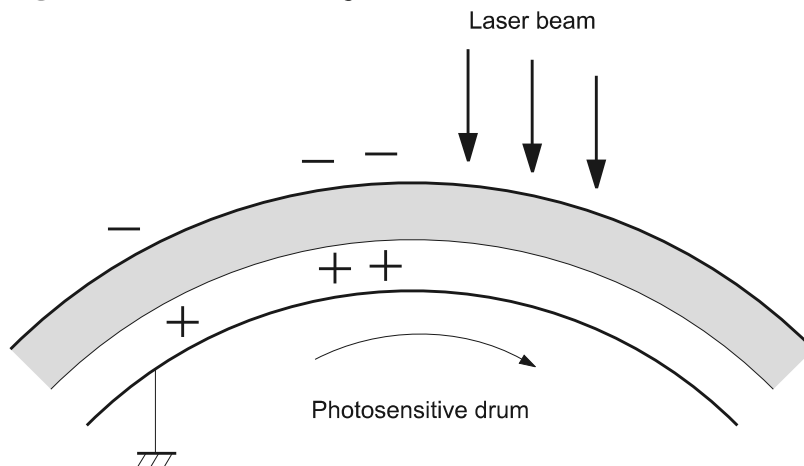
Other image-formation functions

Drum discharge

The drum discharge is a feature to remove residual charge on the photosensitive drum surface for preventing the uneven image density. The laser-beam strikes the surface of the photosensitive drum to remove the residual charge.

The drum discharge is performed during LSTR period.

Figure 1-22 Drum discharge



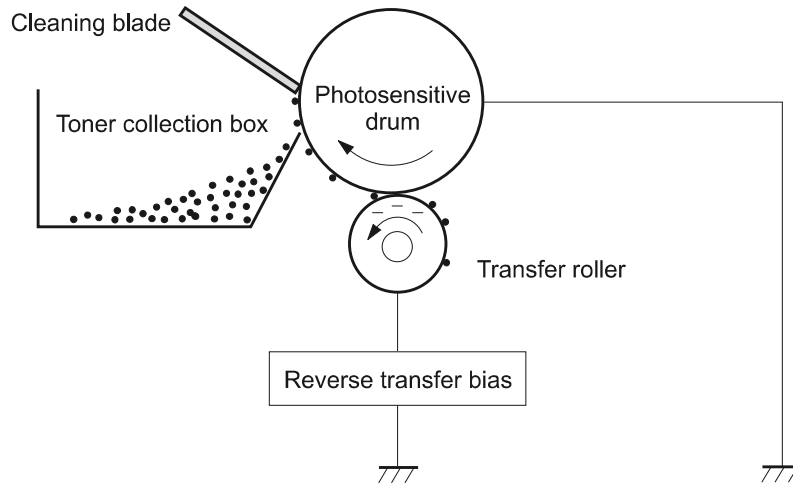
Transfer roller cleaning

The transfer roller cleaning is a feature to remove residual toner on the transfer roller surface for preventing the back side toner stain of the paper.

The residual toner reverse transfers to the photosensitive drum by applying the reverse transfer bias to the transfer roller. The residual toner is deposited in the toner collection box.

The transfer roller cleaning is performed during WAIT period, INTR period, LSTR period and after forming the image for the front side of page when duplex printing.

Figure 1-23 Transfer roller cleaning



Environment change control

The environment change control calibrates each high-voltage bias to obtain an appropriate image according to the environment changes.

The DC controller determines the environment, where the product is installed, based on the surrounding temperature and humidity data from the environment sensor. It adjusts the high-voltage biases to accommodate environmental changes.

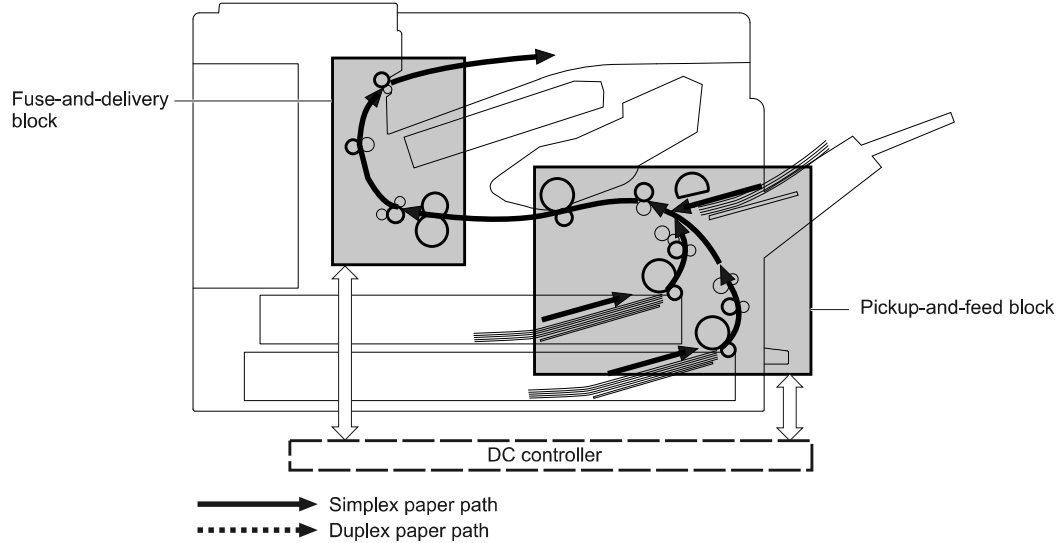
The DC controller determines an environment sensor abnormality and notifies the formatter when it detects out of specified range data from the environment sensor.

Pickup, feed, and delivery system

The DC controller controls the pickup, feed and delivery system according to commands from the formatter. The DC controller controls each block to pickup, feed and deliver the paper. The pickup, feed and delivery system consists of following three functional blocks:

- Pickup-and-feed block
- Fuse-and-delivery block
- Duplex block

Figure 1-24 Pickup, feed, and delivery system



The figure below shows the sensors and switches for the pickup, feed and delivery system.

Figure 1-25 Pickup, feed, and delivery system sensors and switches

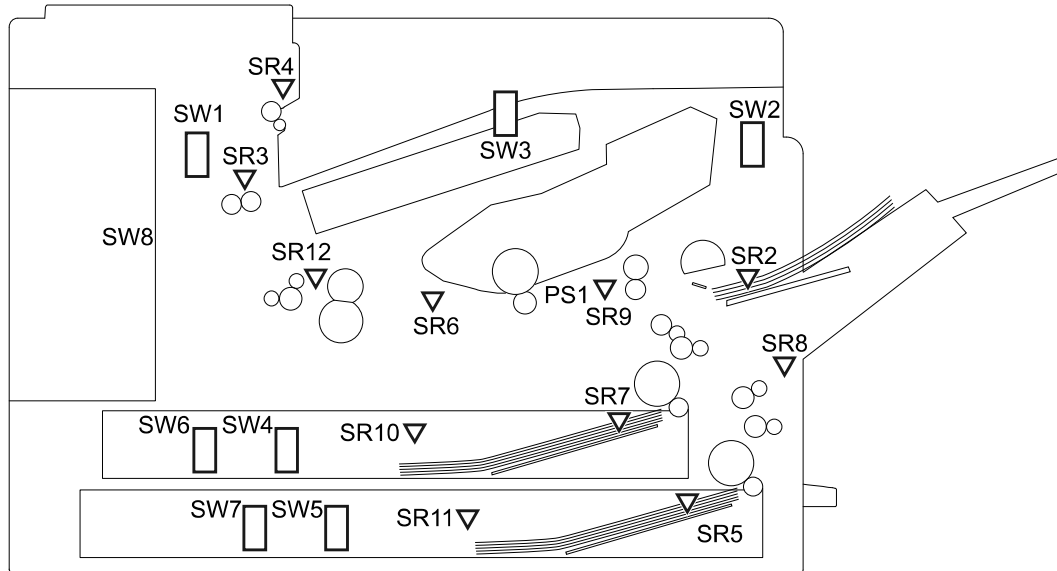


Table 1-5 Pickup, feed, and delivery system sensors and switches

| Component | | Signal |
|-----------|--------------------------------------|--------------------------------------|
| SW1 | Left door interlock switch | LEFT DOOR OPEN DETECTION signal |
| SW2 | Cartridge door interlock switch | CARTRIDGE DOOR OPEN DETECTION signal |
| SW3 | Cartridge door open detection switch | CARTRIDGE DOOR OPEN DETECTION signal |
| SW4 | Upper cassette media width switch | UPPER CASSETTE MEDIA WIDTH signal |
| SW5 | Lower cassette media width switch | LOWER CASSETTE MEDIA WIDTH signal |
| SW6 | Upper cassette media end switch | UPPER CASSETTE MEDIA END signal |
| SW7 | Lower cassette media end switch | LOWER CASSETTE MEDIA END signal |
| SR2 | MP tray media out sensor | MP TRAY MEDIA OUT signal |
| SR3 | Output sensor | OUTPUT signal |
| SR4 | Output bin media full sensor | OUTPUT BIN MEDIA FULL signal |
| SR5 | Lower cassette media out sensor | LOWER CASSETTE MEDIA OUT signal |
| SR6 | Loop sensor | LOOP LEVEL signal |
| SR7 | Upper cassette media out sensor | UPPER CASSETTE MEDIA OUT signal |
| SR8 | Right door sensor | RIGHT DOOR OPEN DETECTION signal |
| SR9 | TOP sensor | TOP signal |
| SR10 | Upper cassette lift-up sensor | UPPER CASSETTE LIFT-UP signal |
| SR11 | Lower cassette lift-up sensor | LOWER CASSETTE LIFT-UP signal |
| SR12 | Fuser output sensor | FUSER OUTPUT signal |

The figure below shows the solenoid and motors for the pickup, feed and delivery system.

Figure 1-26 Pickup, feed, and delivery-system solenoid and motors

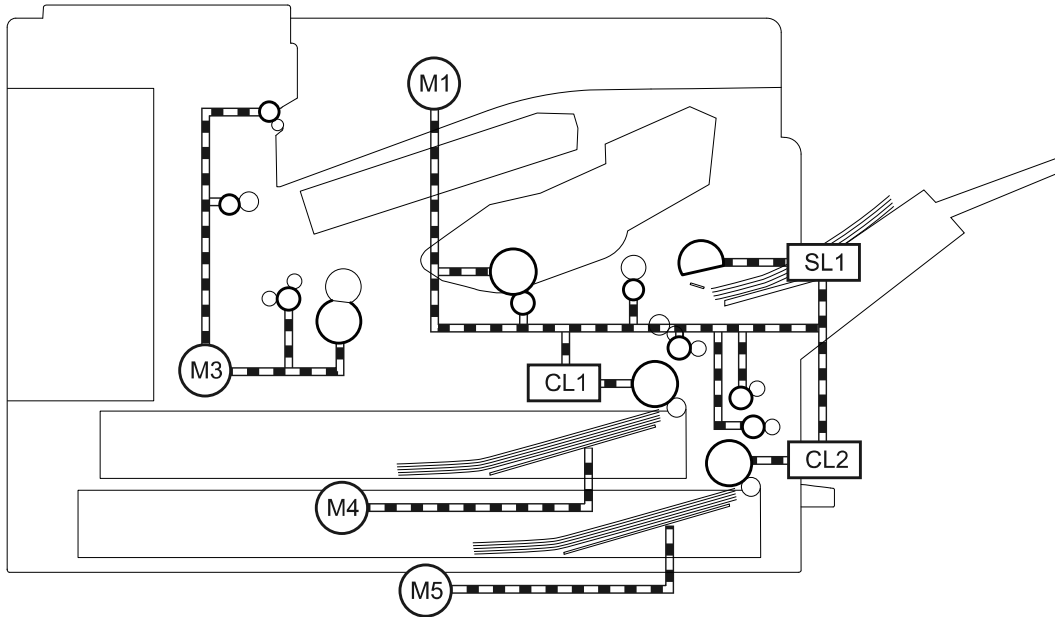


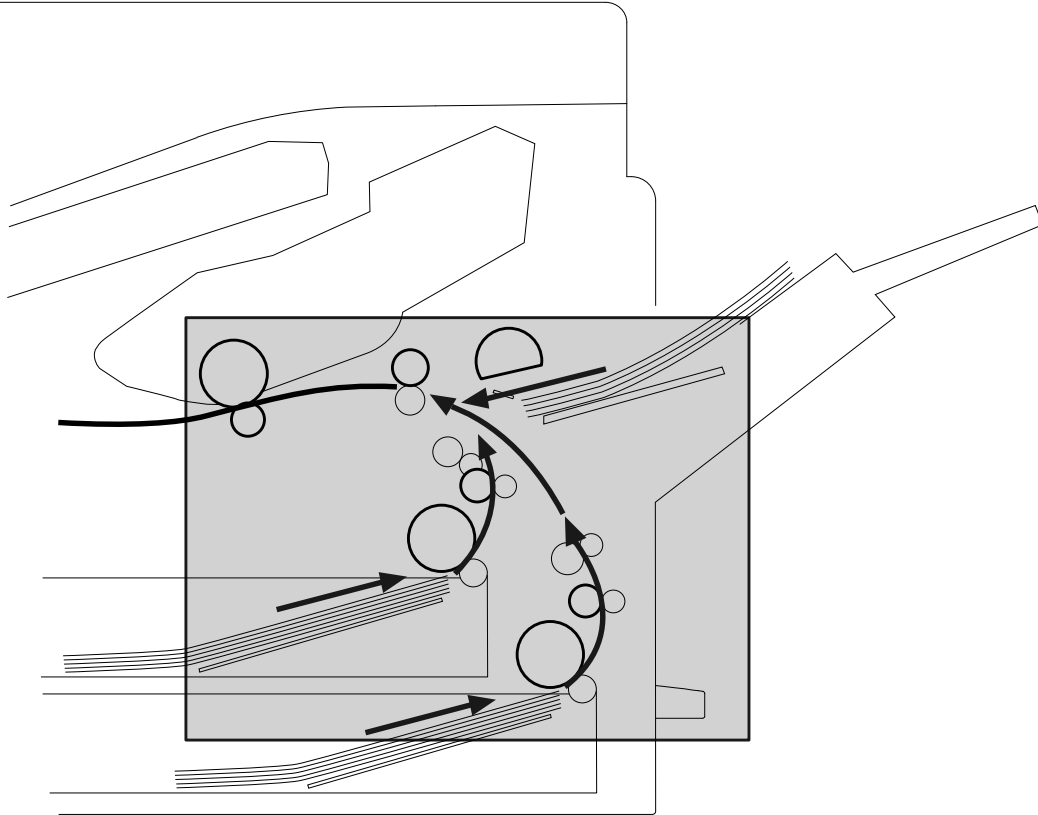
Table 1-6 Pickup, feed, and delivery system solenoid and motors

| Component | | Signal |
|-----------|------------------------------|--|
| SL1 | MP tray pickup solenoid | MP TRAY PICKUP SOLENOID signal |
| CL1 | Upper cassette pickup clutch | UPPER CASSETTE PICKUP CLUTCH signal |
| CL2 | Lower cassette pickup clutch | LOWER CASSETTE PICKUP CLUTCH signal |
| M1 | Drum motor | DRUM MOTOR CONTROL signal |
| M3 | Fuser motor | FUSER MOTOR CONTROL signal |
| M4 | Upper cassette lifter motor | UPPER CASSETTE LIFTER MOTOR CONTROL signal |
| M5 | Lower cassette lifter motor | LOWER CASSETTE LIFTER MOTOR CONTROL signal |

Pickup and feed block

The pickup-and-feed block picks one sheet of paper from the cassette or the MP tray and feeds it into the fuser.

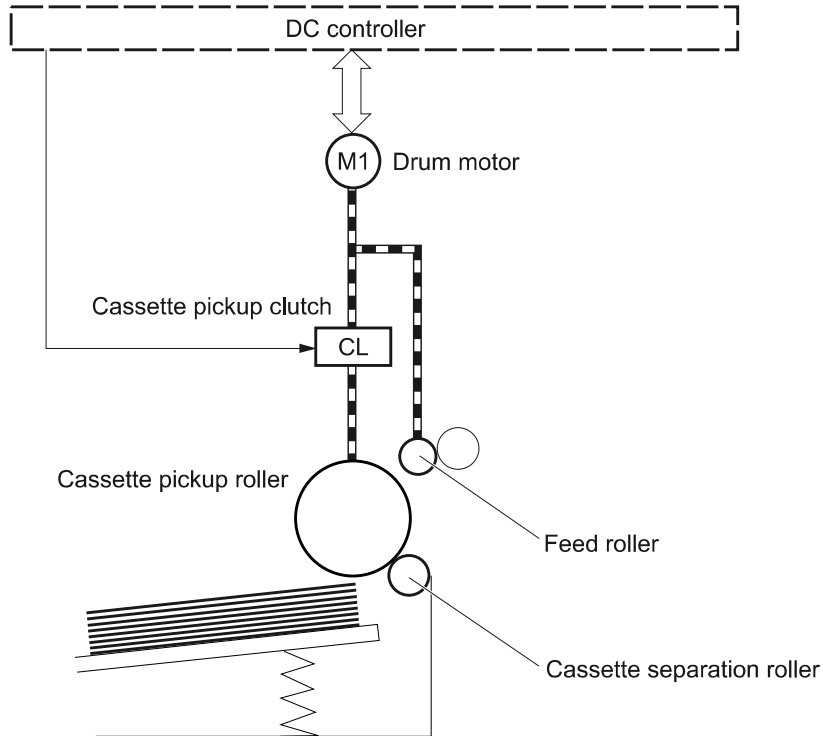
Figure 1-27 Pickup and feed block



Cassette pickup

The product picks up one sheet of paper from the cassette. The following figure shows the cassette pickup mechanism. Both trays have the same mechanism.

Figure 1-28 Cassette pickup mechanism



The operational sequence of the cassette pickup is as follows:

1. The DC controller rotates the drum motor when it receives a print command from the formatter.
2. The feed roller rotates.
3. The cassette pickup solenoid is driven at a specified timing.
4. The cassette pickup roller rotates and picks up the top paper
5. The cassette separation roller removes any multiple-fed sheets.
6. One sheet of paper is fed into the product.

Cassette media-size detection and cassette-presence detection

The DC controller determines the size of the paper loaded in the cassette and also whether the cassette is installed to the product by monitoring the cassette media width switch and the cassette media end switch.

The cassette media width switch and the cassette media end switch contain three sub-switches each. The DC controller detects the size of paper and the presence of cassette according to the combination of the switches and notifies the formatter.

The cassette media-size detection and the cassette-presence detection are not performed during Sleep mode. The following table lists the combination of the switches.

Table 1-7 Media switch combinations

| Paper size | Cassette media width switch | | | Cassette media end switch | | |
|------------------|-----------------------------|--------|--------|---------------------------|--------|--------|
| | Top | Center | Bottom | Top | Center | Bottom |
| Cassette absence | OFF | OFF | OFF | — | OFF | OFF |
| A5-R | OFF | OFF | OFF | — | ON | ON |
| B5-R | ON | ON | OFF | — | ON | ON |
| Executive-R | OFF | ON | OFF | — | ON | ON |
| Letter-R | OFF | ON | ON | — | ON | ON |
| A4-R | ON | ON | ON | — | ON | ON |
| 8.5 x 13 in | OFF | OFF | OFF | — | ON | OFF |
| Legal | OFF | OFF | OFF | — | OFF | ON |
| B4 | ON | ON | OFF | — | OFF | ON |
| Ledger | OFF | ON | ON | — | OFF | ON |
| A3 | ON | ON | ON | — | OFF | ON |

Cassette lift operation

There are two types of cassette lift operation: cassette lift-up and cassette lift-down. The paper stack surface is lifted up to the pickup position. The lifting plate is lifted down when the pickup operation is not performed. The lift-up and lift-down operations are described in the following. Both upper and lower cassettes perform the same operation.

Lift-up operation

The DC controller rotates the cassette lifter motor until the cassette lift-up sensor detects the lifter rack. Accordingly the lifter moves up and the lifting plate moves up to the pickup position. The lift-up operation is performed when the product is turned on or when the cassette is installed.

The DC controller determines a cassette lifter motor failure and notifies the formatter when the cassette lift-up sensor does not detect the lifter rack within a specified period from when the lift-up operation starts.

Lift-down operation

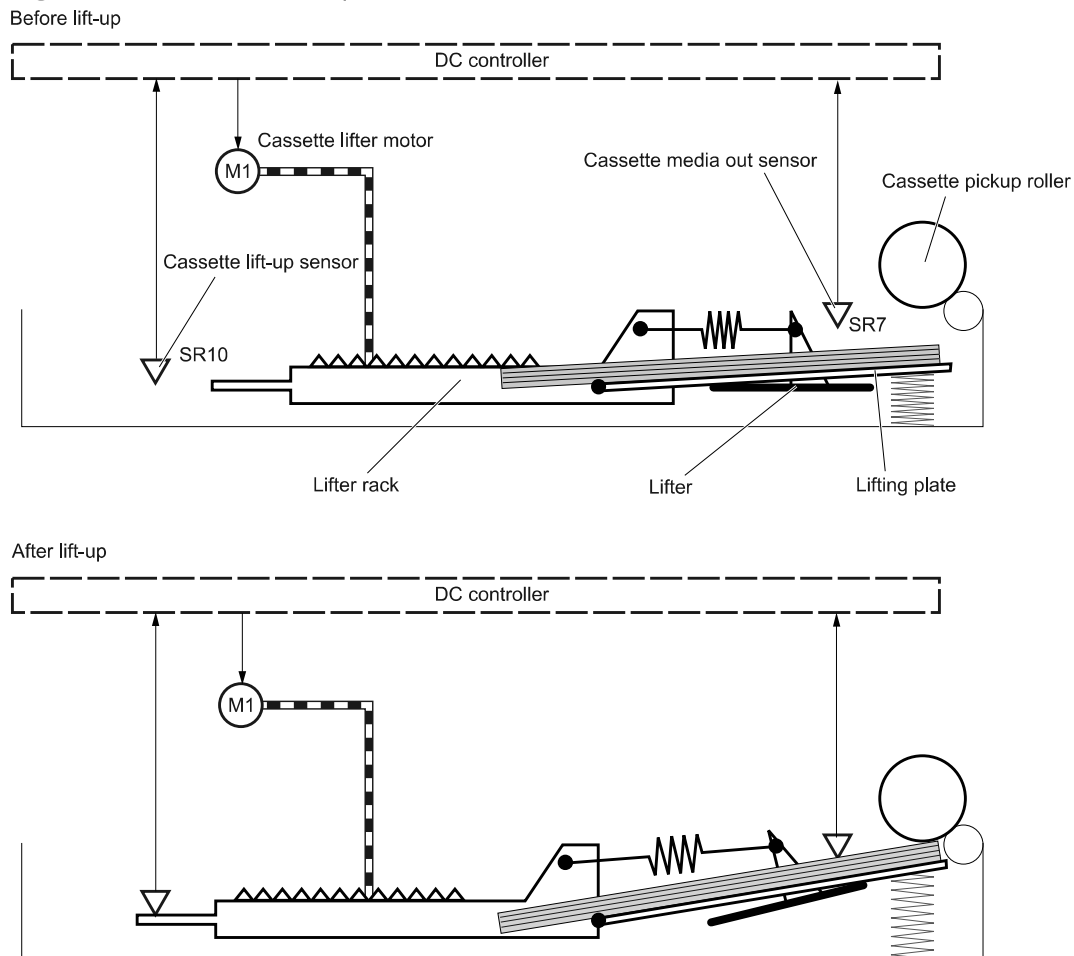
The paper loaded in the cassette presses against the cassette pickup roller when the lifting plate is in the pickup position. If this condition is kept for a long time, the paper deformed and a pickup failure may occur. Therefore, the lifting plate is moved down to release the paper from the pickup roller when a print operation is not performed.

The DC controller reverses the cassette lifter motor until the cassette lift-up sensor stops sensing the lifter rack when a print job is not sent for a specified period.

The DC controller determines a cassette lifter motor failure and notifies the formatter when the cassette lift-up sensor keeps sensing the lifter rack for a specified period from when the lift-down operation starts.

The following figure shows the mechanism of the cassette lift operation for the upper cassette. Both upper and lower cassettes have the same mechanism.

Figure 1-29 Cassette lift operation



Cassette media-presence detection

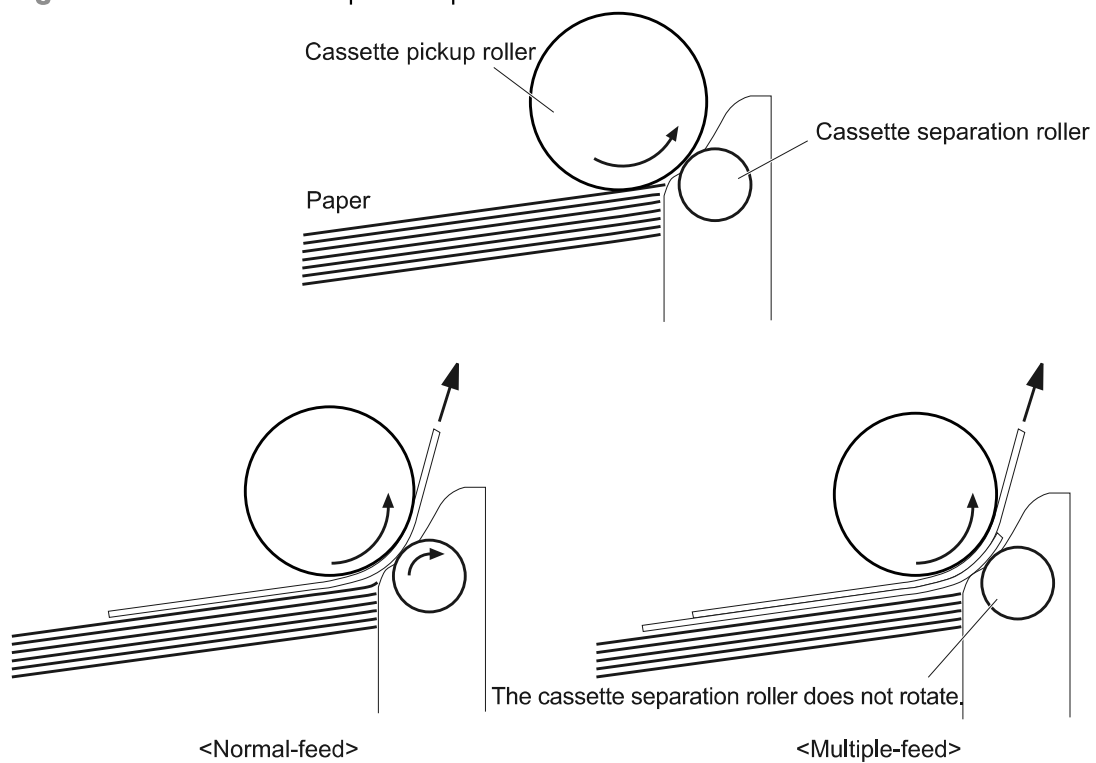
The DC controller detects whether the paper is loaded in the cassette by monitoring the cassette media out sensor. The cassette media-presence detection is not performed during Sleep mode. The DC controller determines a media-absence and notifies the formatter when the cassette media out sensor does not detect the paper.

Cassette multiple-feed prevention

The product uses a cassette separation roller to prevent the multiple sheets of paper from entering to the product. The cassette separation roller follows the rotation of the cassette pickup roller. When multiple

sheets are picked up, the cassette separation roller does not rotate and only one sheet is fed into the product.

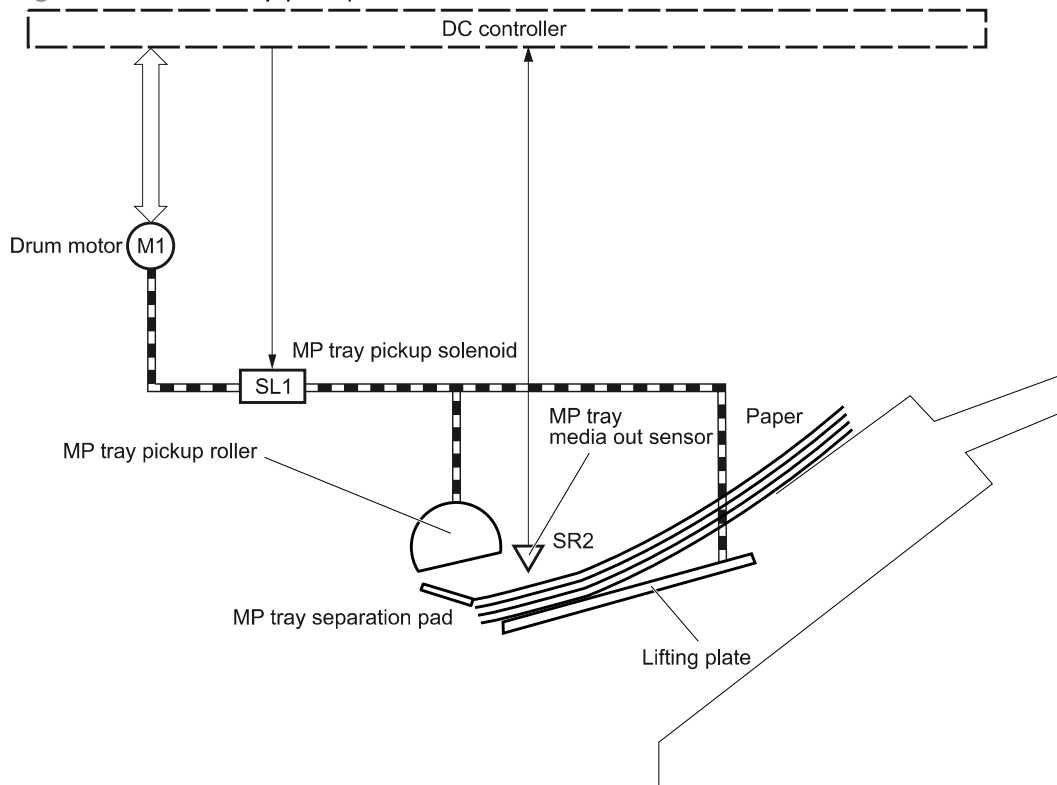
Figure 1-30 Cassette multiple feed prevention



MP tray pickup

The product picks up one sheet of paper from the MP tray.

Figure 1-31 MP tray pickup



The operational sequence of the MP tray pickup is as follows:

1. The DC controller rotates the drum motor when it receives a print command from the formatter.
2. The MP tray pickup solenoid is driven at a specified timing.
3. The MP tray pickup roller rotates.
4. The lifting plate moves up.
5. The MP tray pickup roller picks up the top paper.
6. The MP tray separation pad removes any multiple-fed sheets.
7. One sheet of paper is fed into the product.

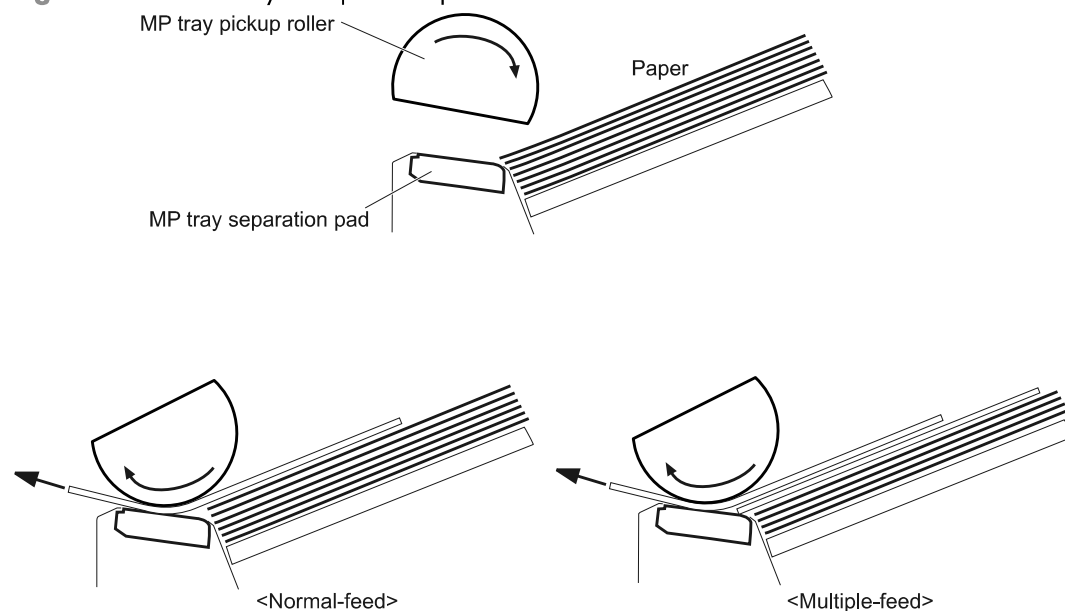
MP tray media-presence detection

The DC controller detects whether the paper is loaded in the MP tray by monitoring the MP tray media out sensor. The MP tray media-presence detection is not performed during Sleep mode. The DC controller determines a media-absence and notifies the formatter when the MP tray media out sensor does not detect the paper.

MP tray multiple-feed prevention

The product uses a MP tray separation pad to prevent the multiple sheets of paper from entering to the product. When multiple sheets are picked up, multiple sheets stop due to the friction against the MP tray separation pad.

Figure 1-32 MP tray multiple-feed prevention



Feed-speed control

The feed-speed control adjusts the paper feeding speed to improve the print-quality depending on the paper types. The DC controller feeds the paper at a specified speed according to the print mode designated by the formatter.

The following table shows the print mode and corresponding feed-speed.

| Print mode | Feed-speed |
|----------------|-----------------------|
| Auto | — |
| Normal | 1/1, 1/2 ¹ |
| Heavy media 1 | 1/1 |
| Heavy media 2 | 1/2 |
| Heavy media 3 | — |
| Light media 1 | 1/1 |
| Light media 2 | 1/1 |
| Light media 3 | — |
| Glossy media 1 | — |
| Glossy media 2 | — |

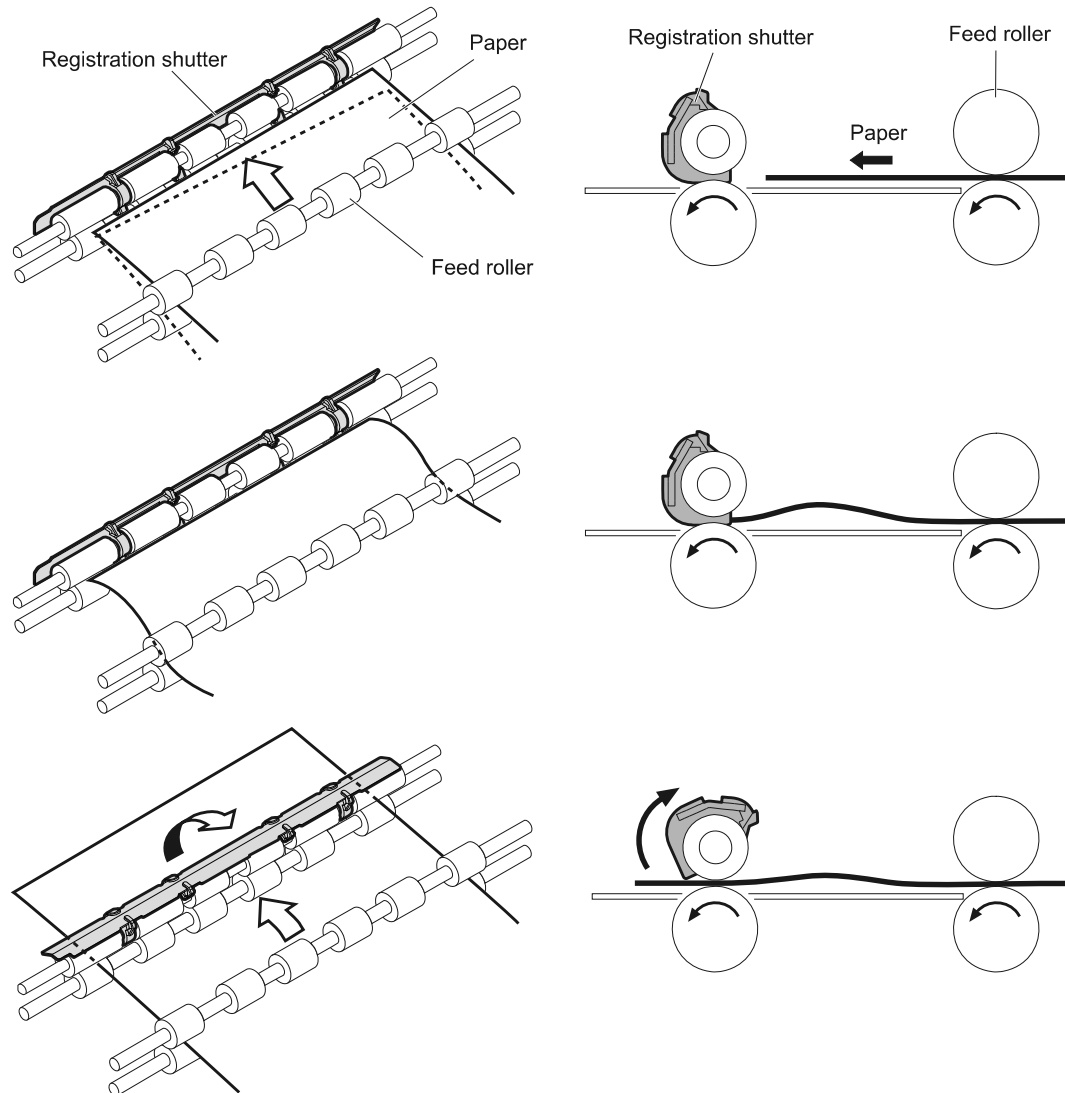
| Print mode | Feed-speed |
|--------------------|-------------------|
| Glossy media 3 | — |
| Glossy film | — |
| Photo media 1 | — |
| Photo media 2 | — |
| Photo media 3 | — |
| Envelope 1 | 1/1 |
| Envelope 2 | 1/2 |
| Envelope 3 | — |
| OHT | 1/2 |
| Label | — |
| Designated media 1 | — |
| Designated media 2 | — |
| Designated media 3 | — |

¹ The product will run at half speed in normal mode when the specific Print Quality, Optimize mode for reducing toner explosions is selected.

Skew-feed prevention

The product uses a registration shutter to correct the skew feed without decreasing the feeding speed.

Figure 1-33 Skew-feed prevention



The operational sequence of the skew-feed prevention is as follows:

1. The leading edge of paper strikes the registration shutter as the paper is fed.
2. The leading edge of paper is aligned with the shutter.
3. As the feed roller keeps pushing the paper, the paper warps.
4. The stiffness of paper pushes up the registration shutter.
5. The paper passes through the registration shutter and straightens.

Media-length detection

The DC controller detects the length of paper to prevent the toner stain on the transfer roller and also to minimize jam occurrences in the duplexer. The DC controller measures the length of paper by monitoring the time from when the leading edge of paper reaches at the TOP sensor until when the trailing edge passes through and determines the paper size.

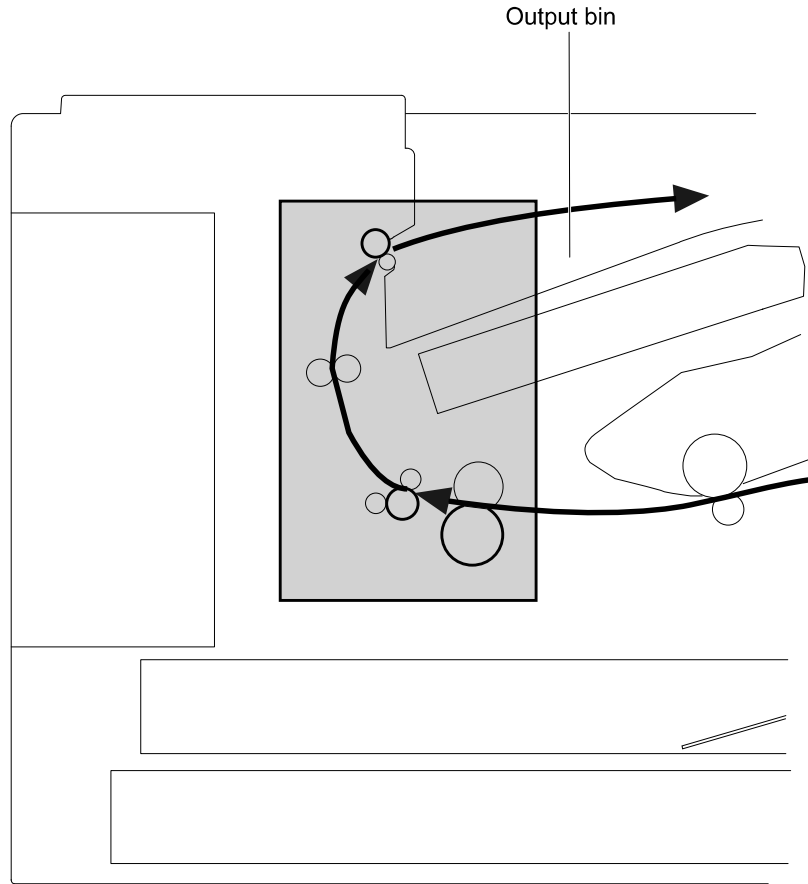
The DC controller determines a media-size mismatch and notifies the formatter when the detected paper size is under the following conditions:

- The detected paper size is different from the size designated by the formatter.
- The detected paper size is different from the size detected by the cassette media size switch.

Fuse and delivery block

The fuse and delivery block fuses the toner image onto the paper and delivers the printed page to the face-down output bin.

Figure 1-34 Fuse and delivery block



Loop control

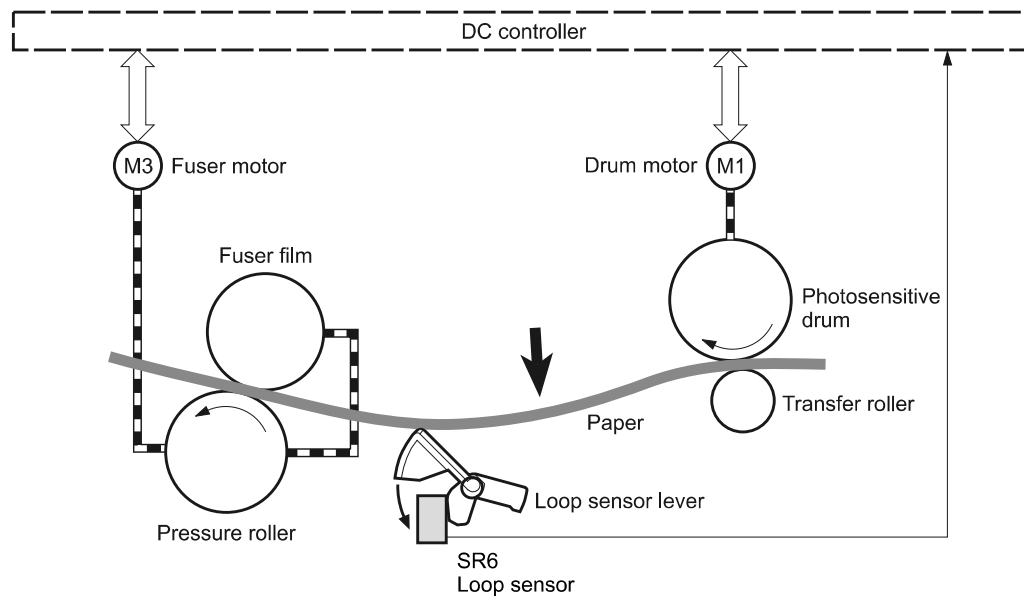
The product controls the loop of paper to prevent the defects of print-quality and paper-feed.

- If the fuser film/pressure roller rotates slower than the photosensitive drum/transfer roller, the paper loop increases.
- If the fuser film/pressure roller rotates faster than the photosensitive drum/transfer roller, the paper loop decreases.

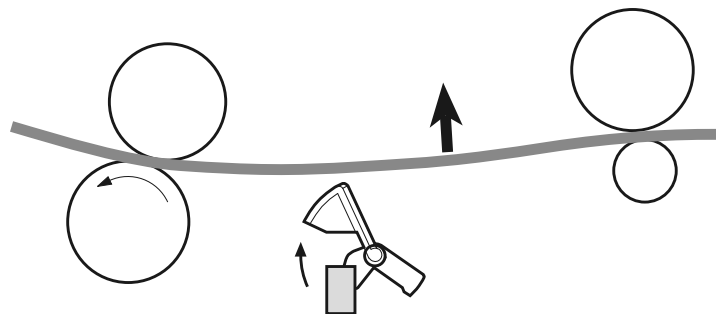
The DC controller detects the loop amount by monitoring the loop sensor and controls the rotational speed of the fuser motor.

Figure 1-35 Loop control

Fuser film/Pressure roller rotates slower than photosensitive drum/transfer roller.



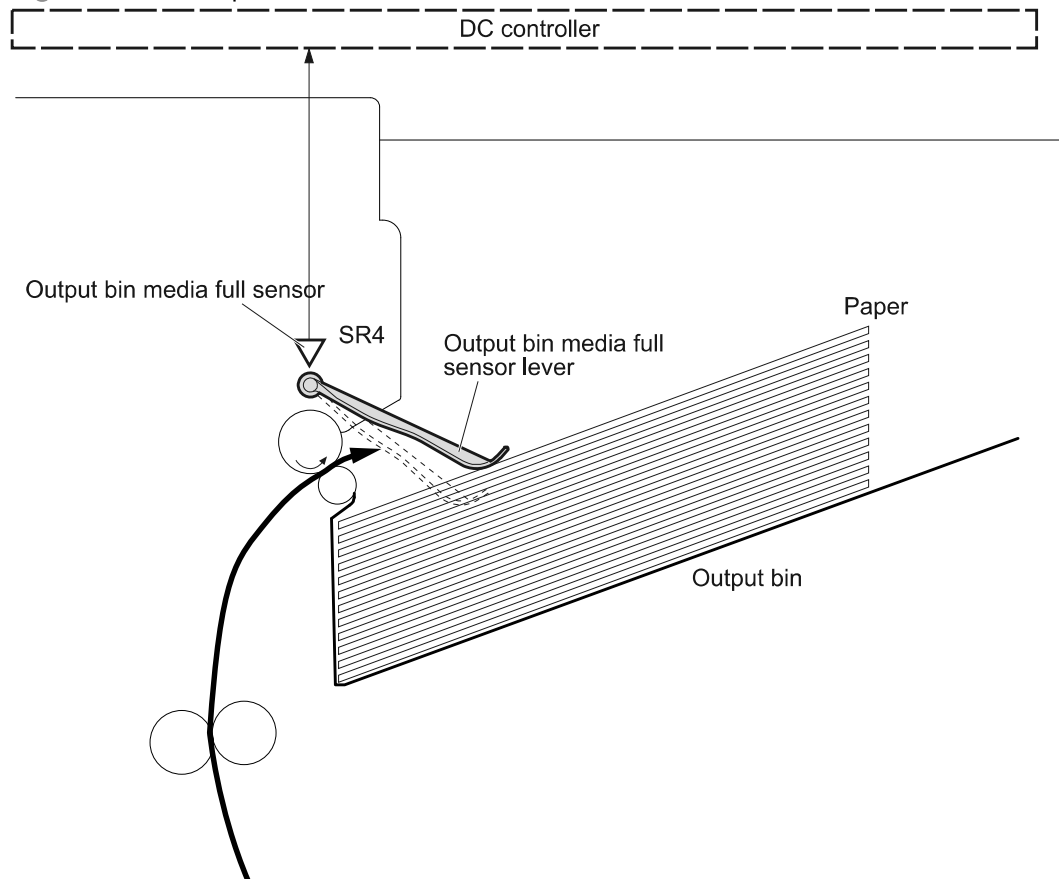
Fuser film/Pressure roller rotates faster than photosensitive drum/transfer roller.



Output bin media-full detection

The DC controller detects whether the output bin is full by monitoring the output bin media full sensor.

Figure 1-36 Output bin media-full detection



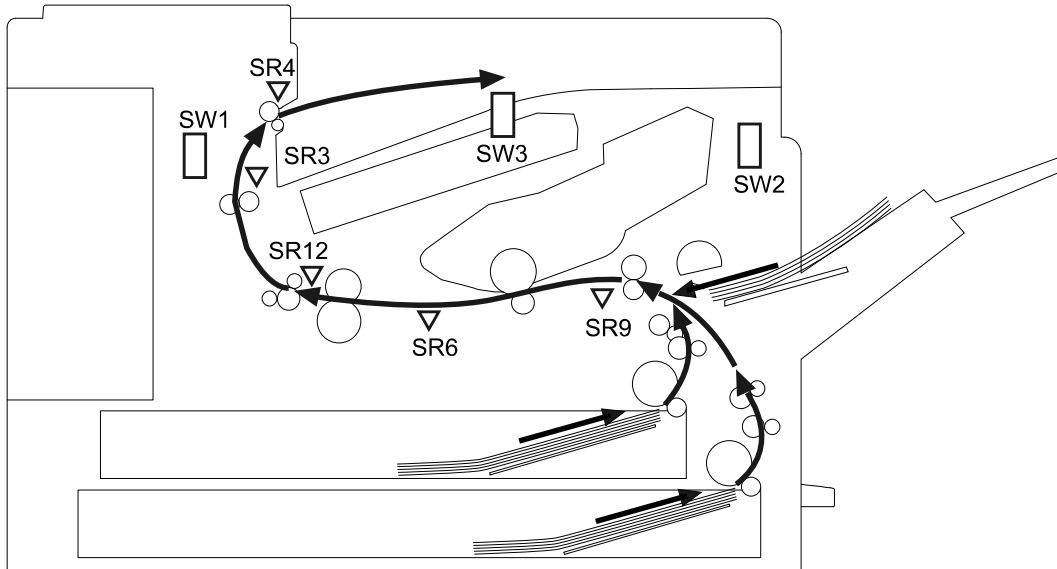
The DC controller determines an output bin media full and notifies the formatter when the output bin media full sensor detects the paper for a specified period during a print operation.

Jam detection

The product uses the following sensors and switches to detect the presence of paper and to check whether the paper is being fed correctly or has jammed:

- Left door interlock switch (SW1)
- Cartridge door interlock switch (SW2)
- Cartridge door open detection switch (SW3))
- TOP sensor (SR9)
- Loop sensor (SR6)
- Fuser output sensor (SR12)
- Output sensor (SR3)
- Output bin media full sensor (SR4)
- Right door sensor (SR8)

Figure 1-37 Product engine jam detection sensors and switches



No pick jam 1

- MP tray

The TOP sensor does not detect the leading edge of paper within a specified period (including two retries) from when the MP tray pickup solenoid is turned on.

- Standard cassette

The TOP sensor does not detect the leading edge of paper within a specified period (including two retries) from when the cassette pickup clutch is driven.

- Duplexer

The TOP sensor does not detect the leading edge of paper within a specified period from when the paper passes through the duplex waiting position.

- **Input accessory**

The TOP sensor does not detect the leading edge of paper within a specified period from when the following sensor of the input accessory installed on the top detects the leading edge.

- 500-sheet paper feeder: PF cassette media feed sensor
- 1x500-sheet paper deck: PD cassette 1 media feed sensor
- 3x500-sheet paper deck: PD cassette 1 media feed sensor
- 3,500-sheet paper deck: HCI cassette media feed sensor

Feed stay jam 1

The TOP sensor does not detect the trailing edge of paper within a specified period from when it detects the leading edge.

Fuser output delay jam 1

The fuser output sensor does not detect the leading edge of paper within a specified period from when the TOP sensor detects the leading edge.

Fuser output stay jam 1

The fuser output sensor does not detect the trailing edge of paper within a specified period from when the TOP sensor detects the trailing edge.

Output delay jam 1

The output sensor does not detect the leading edge of paper within a specified period from when the TOP sensor detects the leading edge.

Output delay jam 2

The output bin media full sensor does not detect the leading edge of paper within a specified period from when the TOP sensor detects the leading edge.

Output stay jam 1

The output sensor does not detect the trailing edge of paper within a specified period from when the fuser TOP sensor detects the trailing edge.

Residual paper jam 1

Either one of the following sensors detects a paper-presence when the product is turned on or when the door is closed:

- TOP sensor
- Loop sensor
- Fuser output sensor

Either one of the following sensors detects a paper-presence when the automatic delivery is complete:

- TOP sensor
- Loop sensor
- Fuser output sensor
- Output sensor

Fuser wrap jam 1

The fuser output sensor detects a paper-absence within a specified period from when it detects the leading edge of paper.

Door open jam 1

Either one of the following switches or sensor detects a door open during a paper feed operation:

- Left door interlock switch
- Cartridge door interlock switch
- Cartridge door open detection switch
- Right door sensor

Multiple-feed jam 1

The sub thermistor 1 detects 300°C (572°F) or higher for a specified period from when the multiple fed sheets passes through the TOP sensor.

Automatic delivery

The product automatically clears the paper if the output sensor detects the residual paper when the product is turned on or when the door is closed.

500-sheet paper feeder (Tray 4)

The paper feeder is optionally installed at bottom of the product. It picks up the paper and feeds it to the product. The paper feeder controller controls the operational sequence of the paper feeder.

Figure 1-38 500-sheet paper feeder paper path

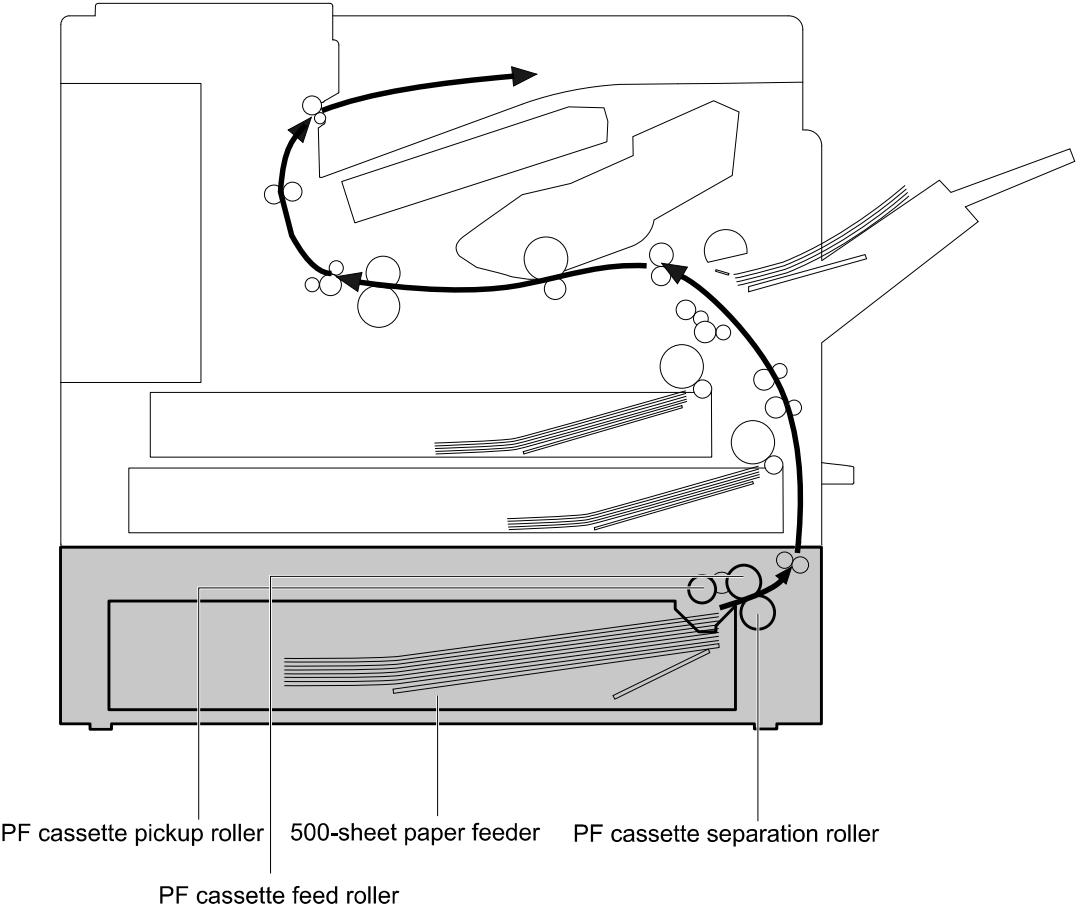


Figure 1-39 500-sheet paper feeder signal flow

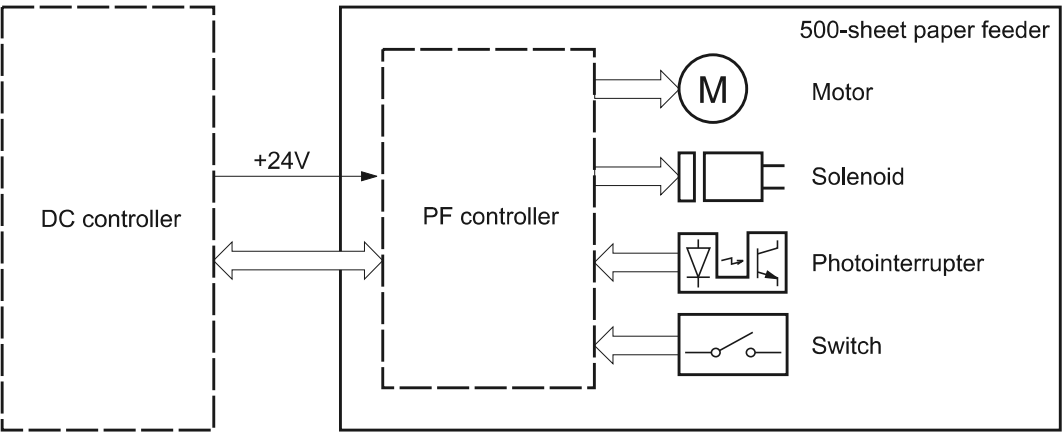
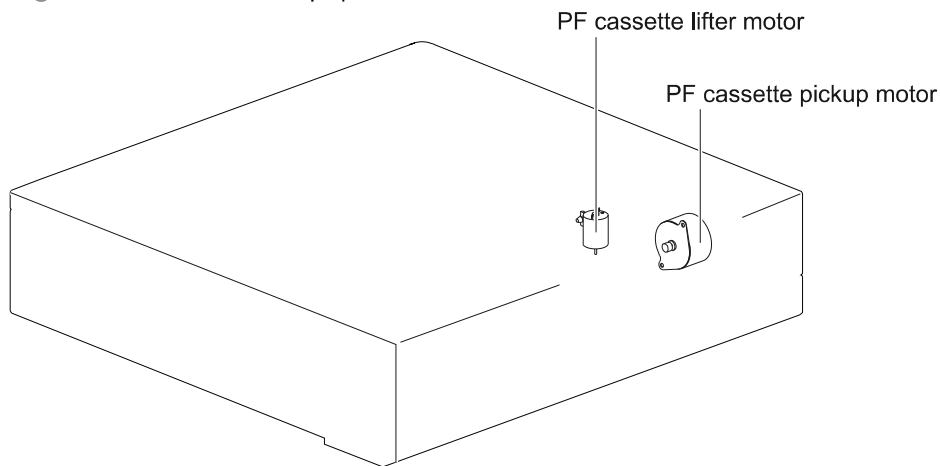


Table 1-8 500-sheet paper feeder electrical components

| Component | Abbreviation | Component name |
|------------------|--------------|--|
| Motor | M1 | PF cassette pickup motor |
| | M2 | PF cassette lifter motor |
| Solenoid | SL1 | PF cassette pickup solenoid |
| Photointerrupter | SR1 | PF cassette media feed sensor |
| | SR2 | PF cassette media stack surface sensor |
| | SR3 | PF cassette media out sensor |
| Switch | SW1 | PF right door open detection switch |
| | SW2 | PF cassette media width switch |
| | SW3 | PF cassette media end switch |

500-sheet paper feeder motor control

The paper feeder has two motors for the paper-feed and cassette lift-up.

Figure 1-40 500-sheet paper feeder motor locations**Table 1-9 500-sheet paper feeder motors**

| Motor | Components driven | |
|-------|--------------------------|--|
| M1 | PF cassette pickup motor | Pickup roller, separation roller and feed roller for the PF cassette |
| M2 | PF cassette lifter motor | Lifter for the PF cassette |

500-sheet paper feeder failure detection

The paper feeder controller determines a cassette lifter motor failure according to the condition of the related part. The paper feeder controller does not determine if the cassette pickup motor has failed; therefore, a jam occurs when the motor fails.

500-sheet paper feeder pickup and feed operation

The pickup-and-feed operation picks up one sheet of paper in the paper feeder cassette and feeds it to the product.

Figure 1-41 500-sheet paper feeder pickup and feed components

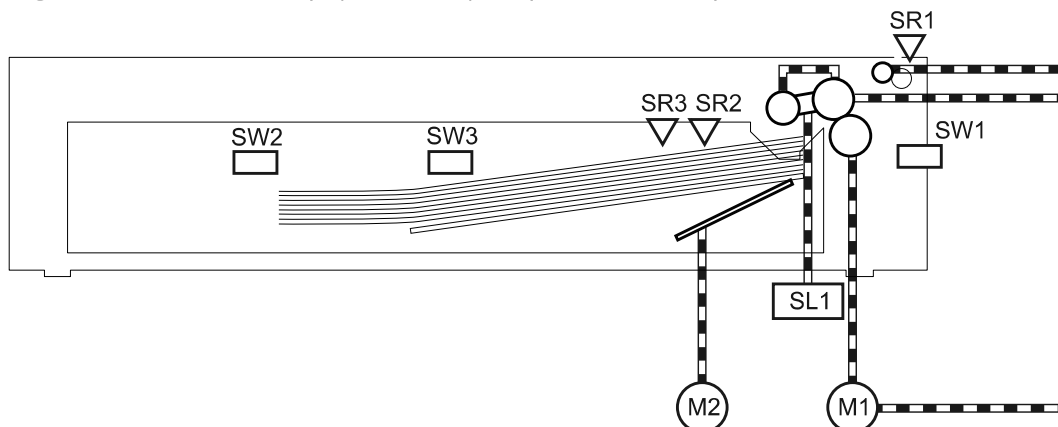


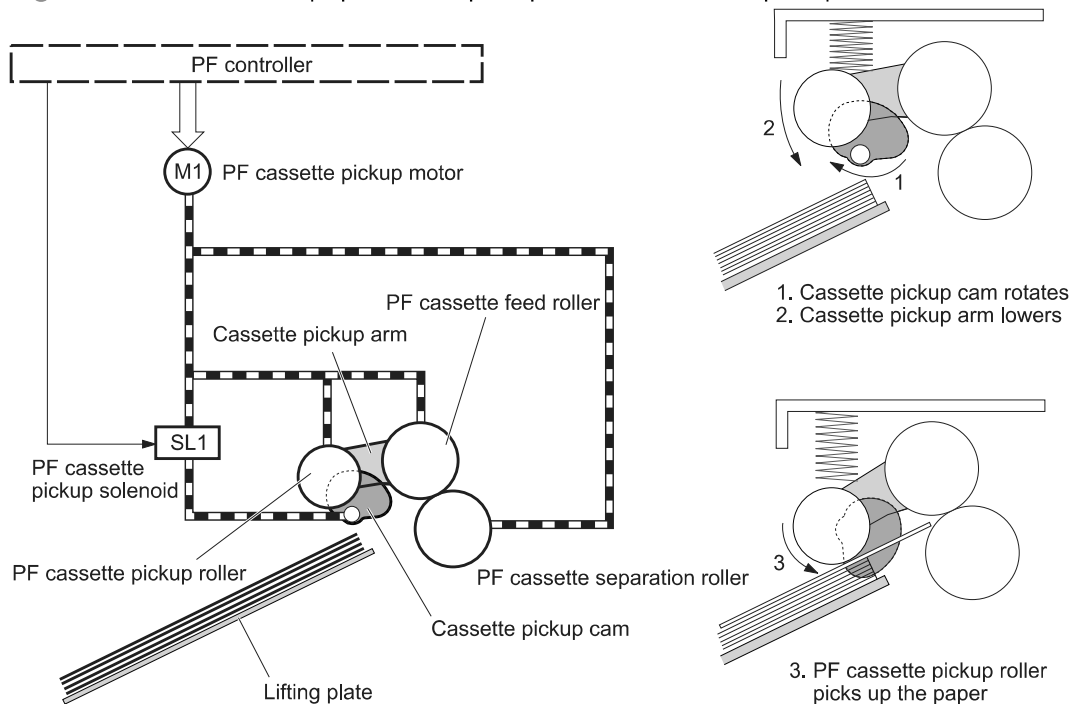
Table 1-10 500-sheet paper feeder pickup and feed components

| Component | | Signal |
|-----------|--|---|
| M1 | PF cassette pickup motor | PF CASSETTE PICKUP MOTOR CONTROL signal |
| M2 | PF cassette lifter motor | PF CASSETTE LIFTER MOTOR CONTROL signal |
| SL1 | PF cassette pickup solenoid | PF CASSETTE PICKUP SOLENOID signal |
| SR1 | PF cassette media feed sensor | PF CASSETTE MEDIA FEED signal |
| SR2 | PF cassette media stack surface sensor | PF CASSETTE MEDIA STACK SURFACE signal |
| SR3 | PF cassette media out sensor | PF CASSETTE MEDIA OUT signal |
| SW1 | PF right door open detection switch | PF RIGHT DOOR OPEN DETECTION signal |
| SW2 | PF cassette media width switch | PF CASSETTE MEDIA WIDTH signal |
| SW3 | PF cassette media end switch | PF CASSETTE MEDIA END signal |

500-sheet paper feeder cassette pickup

The paper feeder picks up one sheet of paper from the cassette.

Figure 1-42 500-sheet paper feeder pickup and feed cassette pickup



The operational sequence of the cassette pickup is as follows:

1. The paper feeder controller rotates the PF cassette pickup motor when it receives a print command from the formatter.
2. The PF cassette pickup roller, PF cassette feed roller and PF cassette separation roller rotate.
3. The PF cassette pickup solenoid is driven at a specified timing.
4. The cassette pickup cam rotates.
5. The cassette pickup arm lowers and the PF cassette pickup roller picks up the top paper.
6. The PF cassette separation roller removes any multiple-fed sheets.
7. One sheet of paper is fed into the product.

500-sheet paper feeder cassette media-size detection and cassette-presence detection

The paper feeder controller determines the size of paper loaded in the cassette and also whether the cassette is installed to the paper feeder by monitoring the PF cassette media width switch and the PF cassette media end switch.

The PF cassette media width switch and the PF cassette media end switch contain three sub-switches each. The paper feeder controller detects the size of paper and the presence of cassette according to the combination of the sub-switches and notifies the formatter.

The cassette media-size detection and the cassette-presence detection are not performed during Sleep mode.

Table 1-11 500-sheet paper feeder media switch combinations

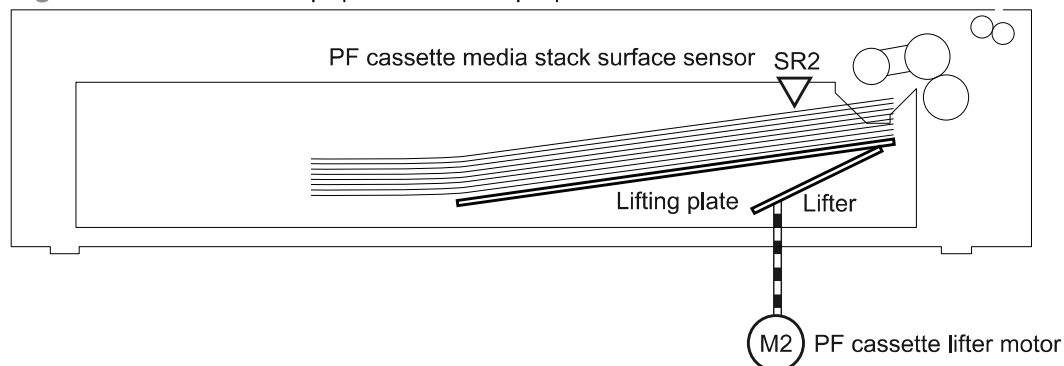
| Paper size | Cassette media width switch | | | Cassette media end switch | | |
|------------------|-----------------------------|--------|--------|---------------------------|--------|--------|
| | Top | Center | Bottom | Top | Center | Bottom |
| Cassette absence | OFF | OFF | OFF | OFF | OFF | OFF |
| A5-R | ON | ON | OFF | ON | ON | ON |
| B5-R | OFF | ON | OFF | ON | ON | ON |
| Executive-R | OFF | ON | ON | ON | ON | ON |
| Letter-R | OFF | OFF | ON | ON | ON | ON |
| A4-R | OFF | OFF | OFF | ON | ON | ON |
| 8.5 x 13 in | ON | ON | OFF | OFF | ON | ON |
| Legal | ON | ON | OFF | OFF | OFF | ON |
| B4 | OFF | ON | OFF | OFF | OFF | ON |
| Ledger | OFF | OFF | ON | OFF | OFF | ON |
| A3 | OFF | OFF | OFF | OFF | OFF | ON |

500-sheet paper feeder lift-up operation

The paper feeder performs the lift-up operation to keep the surface of paper at the pickup position whenever the following occurs:

- The product is turned on
- The cassette is installed
- The paper stack surface lowers by pickup operation

Figure 1-43 500-sheet paper feeder lift-up operation



The operational sequence of the lift-up is as follows:

1. The lifter motor rotates to raise the lifter.
2. The lifter motor stops when the PF cassette media stack surface sensor detects the paper surface.
3. The lifter motor rotates again when the PF cassette media stack surface sensor detects that the stack surface lowers during a print operation.

The paper feeder controller determines a PF cassette lifter motor failure and notifies the formatter through the DC controller when the PF cassette media stack surface sensor does not detect the paper surface within a specified period from when the PF cassette lifter motor starts rotating.

500-sheet paper feeder cassette media-presence detection

The paper feeder controller detects whether the paper is loaded in the cassette by monitoring the PF cassette media out sensor.

The cassette media-presence detection is not performed during Sleep mode.

The paper feeder controller determines a media-absence and notifies the formatter through the DC controller when the PF cassette media out sensor does not detect the paper.

500-sheet paper feeder cassette multiple-feed prevention

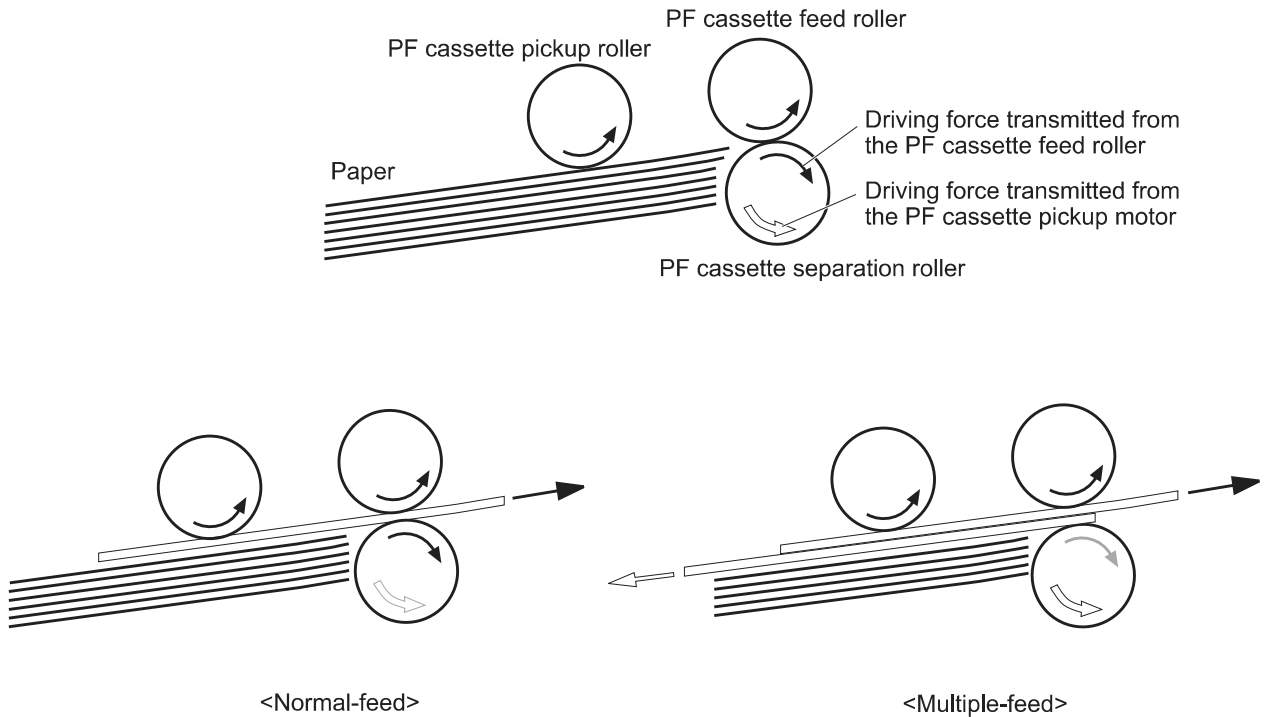
The paper feeder uses a PF cassette separation roller to prevent the multiple sheets of paper from entering to the product.

The PF cassette separation roller transmits its driving force so that the roller rotates in the same direction with the PF cassette feed roller.

- When one sheet of paper is picked up, driving force from the PF cassette feed roller transmits through the single sheet of paper because the torque limiter functions and the PF cassette separation roller follows the PF cassette feed roller. Therefore, single sheet is fed into the product.
- When multiple sheets of paper are picked up, driving force from the PF cassette feed roller becomes weak due to a low friction between the sheets. The PF cassette separation roller rotates

by its own driving force and the multiple-fed paper are pushed back to the cassette. Therefore, single sheet is fed into the product.

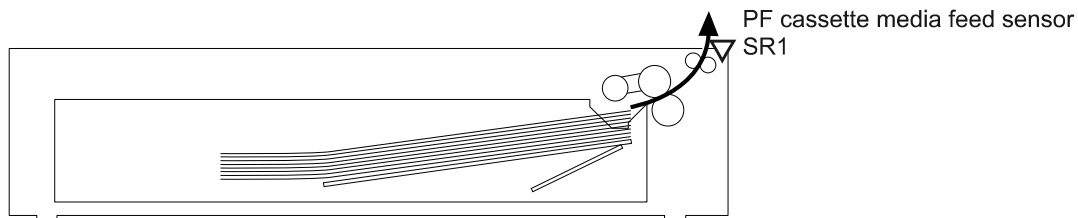
Figure 1-44 500-sheet paper feeder multiple-feed prevention



500-sheet paper feeder jam detection

The paper feeder uses the PF cassette media feed sensor (SR1) to detect the presence of paper and to check whether paper is being fed correctly or has jammed.

Figure 1-45 500-sheet paper feeder cassette jam detection sensor



No pick jam 2

The PF cassette media feed sensor does not detect the leading edge of paper within a specified period (including 2 retries) from when the PF cassette pickup solenoid is turned on.

Residual paper jam 1

The PF cassette media feed sensor detects a paper-presence when the automatic delivery is complete.

Door open jam 1

A PF right door open is detected during a paper feed operation.

500-sheet paper feeder automatic delivery

The paper feeder automatically clears the paper if the PF cassette media feed sensor detects the residual paper when the product is turned on or when the door is closed.

1x500 and 3x500 paper feeder and stand

The 1x500-sheet paper feeder is optionally installed at the bottom of the product or 500-sheet paper feeder. The 3x500-sheet paper feeder is optionally installed at bottom of the product only. Each of the paper feeders pick up the paper and feed it to the product. The paper feeder controller controls the operational sequence of the paper feeder.

Figure 1-46 Paper deck paper path

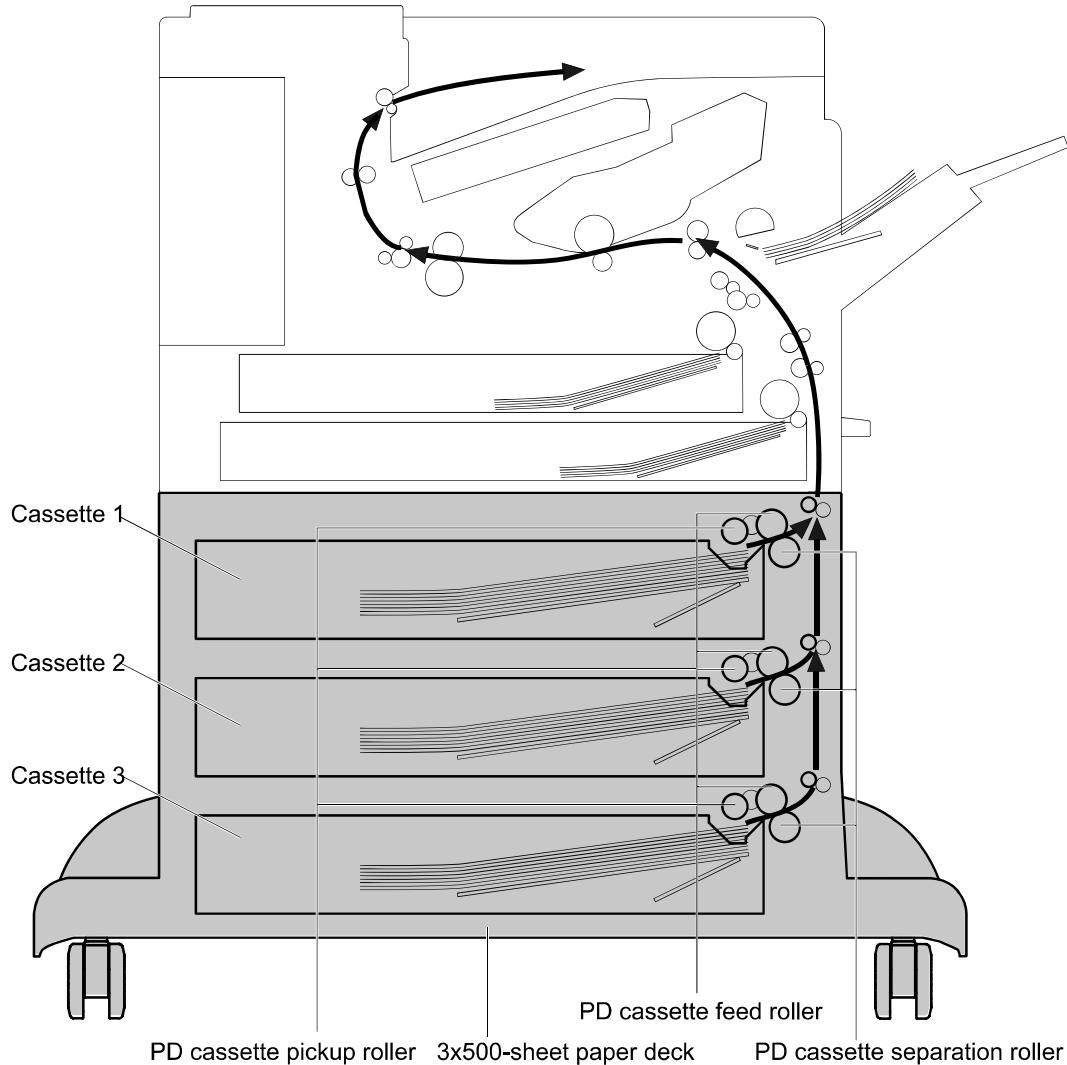


Figure 1-47 Paper deck signal flow

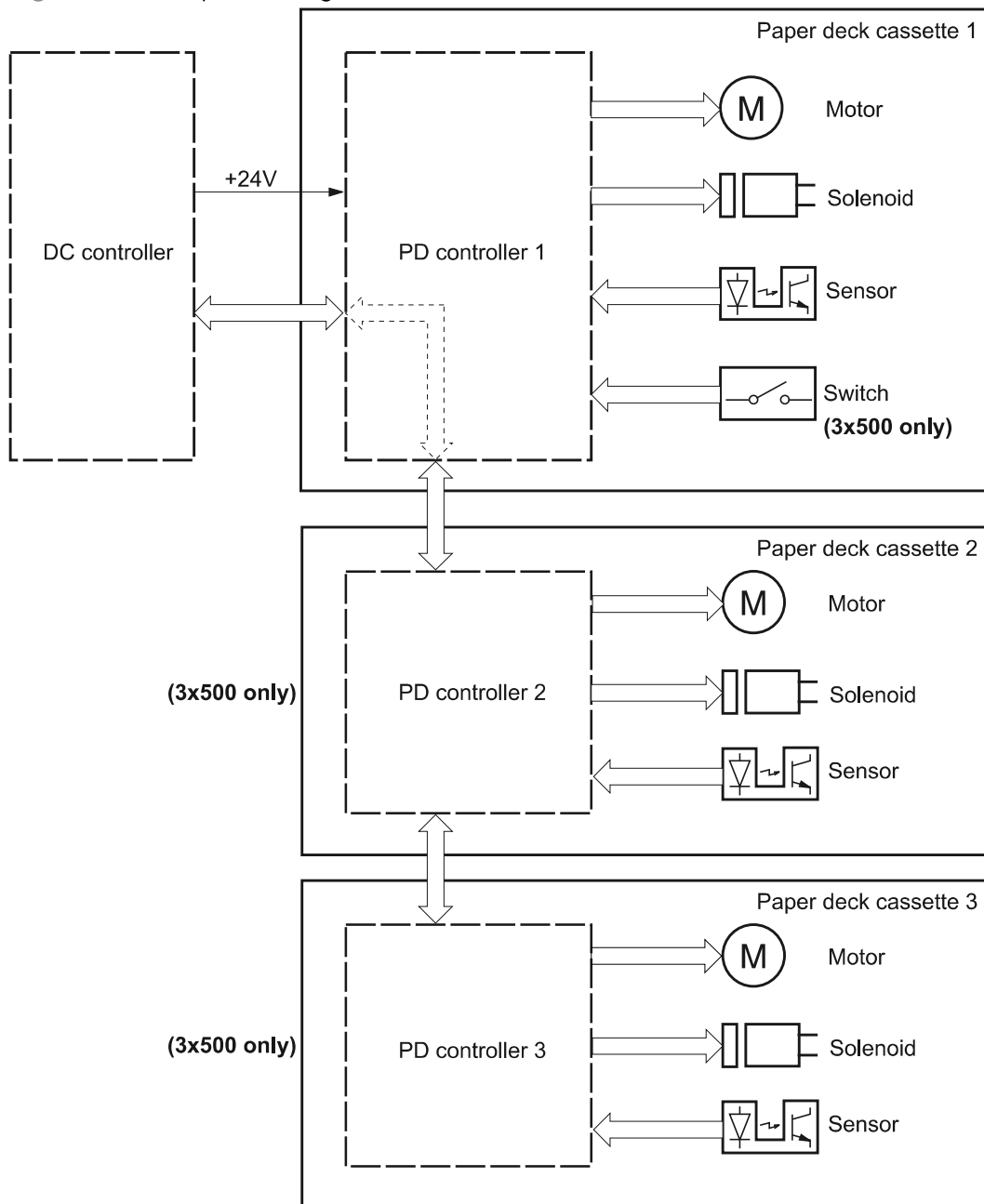


Table 1-12 Paper deck electrical components

| Component | Abbreviation | Component name |
|-----------|--------------|---|
| Motor | M1 | PD cassette 1 pickup motor |
| | M2 | PD cassette 1 lifter motor |
| | M81 | PD cassette 2 pickup motor ¹ |
| | M82 | PD cassette 2 lifter motor ¹ |
| | M91 | PD cassette 3 pickup motor ¹ |
| | M92 | PD cassette 3 lifter motor ¹ |

Table 1-12 Paper deck electrical components (continued)

| Component | Abbreviation | Component name |
|------------------|--------------|---|
| Solenoid | SL1 | PD cassette 1 pickup solenoid |
| | SL82 | PD cassette 2 pickup solenoid ¹ |
| | SL92 | PD cassette 3 pickup solenoid ¹ |
| Photointerrupter | SR1 | PD cassette 1 media feed sensor |
| | SR1 | PD cassette 1 media feed sensor |
| | SR3 | PD cassette 1 media out sensor |
| | SR81 | PD cassette 2 media feed sensor ¹ |
| | SR82 | PD cassette 2 media stack surface sensor ¹ |
| | SR83 | PD cassette 2 media out sensor ¹ |
| | SR91 | PD cassette 3 media feed sensor ¹ |
| | SR92 | PD cassette 3 media stack surface sensor ¹ |
| | SR93 | PD cassette 3 media out sensor ¹ |
| Switch | SW1 | PD right door open detection switch ¹ |
| | SW2 | PD cassette 1 media width switch |
| | SW3 | PD cassette 1 media end switch |
| | SW82 | PD cassette 2 media width switch ¹ |
| | SW83 | PD cassette 2 media end switch ¹ |
| | SW92 | PD cassette 3 media width switch ¹ |
| | SW93 | PD cassette 3 media end switch ¹ |

¹ Applies to the 3x500 paper deck only.

Paper deck motor control

The paper deck has two motors in each cassette for the paper-feed and cassette lift-up.

Figure 1-48 Paper deck motors

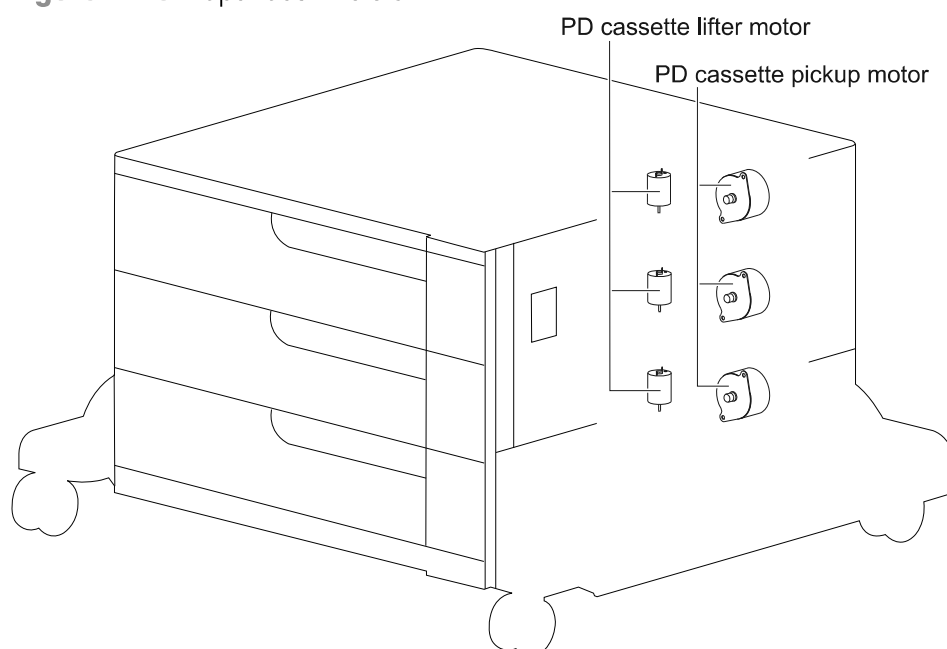


Table 1-13 Paper deck motors

| Motor | | Components driven |
|-------|----------------------------|--|
| M1 | PD cassette 1 pickup motor | Pickup roller, separation roller and feed roller for the PD cassette 1 |
| M2 | PD cassette 1 lifter motor | Lifter for the PD cassette 1 |
| M81 | PD cassette 2 pickup motor | Pickup roller, separation roller and feed roller for the PD cassette 2 |
| M82 | PD cassette 2 lifter motor | Lifter for the PD cassette 2 |
| M91 | PD cassette 3 pickup motor | Pickup roller, separation roller and feed roller for the PD cassette 3 |
| M92 | PD cassette 3 lifter motor | Lifter for the PD cassette 3 |

Paper deck failure detection

The paper deck controller determines a PD cassette lifter motor failure according to the condition of the related part.

The paper deck controller does not determine if the PD cassette pickup motor has failed; therefore, a jam occurs when the motor fails.

Paper deck pickup-and-feed operation

The pickup-and-feed operation picks up one sheet of paper in the paper deck cassette and feeds it to the product.

NOTE: The following figure illustrates the mechanism for paper deck cassette 3, but each paper deck cassette has the same mechanism.

Figure 1-49 Paper deck pickup and feed components

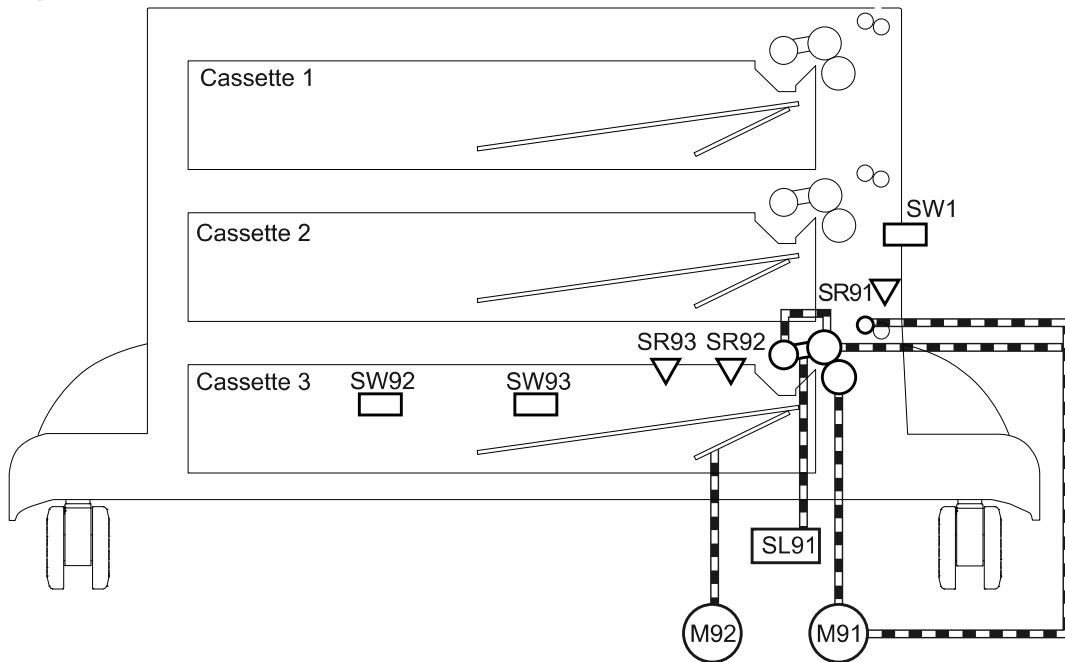


Table 1-14 Paper deck pickup-and-feed operation components

| Abbreviation | Component | Signal |
|--------------|--|---|
| M1 | PD cassette 1 pickup motor | PD CASSETTE 1 PICKUP MOTOR CONTROL signal |
| M2 | PD cassette 1 lifter motor | PD CASSETTE 1 LIFTER MOTOR CONTROL signal |
| SL1 | PD cassette 1 pickup solenoid | PD CASSETTE 1 PICKUP SOLENOID signal |
| SR1 | PD cassette 1 media feed sensor | PD CASSETTE 1 MEDIA FEED signal |
| SR2 | PD cassette 1 media stack surface sensor | PD CASSETTE 1 MEDIA STACK SURFACE signal |
| SR3 | PD cassette 1 media out sensor | PD CASSETTE 1 MEDIA OUT signal |
| SW1 | PD right door open detection switch | PD RIGHT DOOR OPEN DETECTION signal |
| SW2 | PD cassette 1 media width switch | PD CASSETTE 1 MEDIA WIDTH signal |
| SW3 | PD cassette 1 media end switch | PD CASSETTE 1 MEDIA END signal |
| M81 | PD cassette 2 pickup motor | PD CASSETTE 2 PICKUP MOTOR CONTROL signal |
| M82 | PD cassette 2 lifter motor | PD CASSETTE 2 LIFTER MOTOR CONTROL signal |
| SL81 | PD cassette 2 pickup solenoid | PD CASSETTE 2 PICKUP SOLENOID signal |
| SR81 | PD cassette 2 media feed sensor | PD CASSETTE 2 MEDIA FEED signal |
| SR82 | PD cassette 2 media stack surface sensor | PD CASSETTE 2 MEDIA STACK SURFACE signal |
| SR83 | PD cassette 2 media out sensor | PD CASSETTE 2 MEDIA OUT signal |
| SW82 | PD cassette 2 media width switch | PD CASSETTE 2 MEDIA WIDTH signal |

Table 1-14 Paper deck pickup-and-feed operation components (continued)

| Abbreviation | Component | Signal |
|--------------|--|---|
| SW83 | PD cassette 2 media end switch | PD CASSETTE 2 MEDIA END signal |
| M91 | PD cassette 3 pickup motor | PD CASSETTE 3 PICKUP MOTOR CONTROL signal |
| M92 | PD cassette 3 lifter motor | PD CASSETTE 3 LIFTER MOTOR CONTROL signal |
| SL91 | PD cassette 3 pickup solenoid | PD CASSETTE 3 PICKUP SOLENOID signal |
| SR91 | PD cassette 3 media feed sensor | PD CASSETTE 3 MEDIA FEED signal |
| SR92 | PD cassette 3 media stack surface sensor | PD CASSETTE 3 MEDIA STACK SURFACE signal |
| SR93 | PD cassette 3 media out sensor | PD CASSETTE 3 MEDIA OUT signal |
| SW92 | PD cassette 3 media width switch | PD CASSETTE 3 MEDIA WIDTH signal |
| SW93 | PD cassette 3 media end switch | PD CASSETTE 3 MEDIA END signal |

Paper deck cassette media-size detection and cassette-presence detection

The paper deck controller detects the size of paper loaded in the cassette and also whether the cassette is installed to the paper deck by monitoring the PD cassette media width switch and the PD cassette media end switch.

The PD cassette media width switch and the PD cassette media end switch contain three subswitches each. The paper deck controller detects the size of paper and the presence of cassette according to the combination of the sub-switches and notifies the formatter.

The cassette media-size detection and the cassette-presence detection are not performed during Sleep mode.

Table 1-15 Paper deck media switch combinations

| Paper size | Cassette media width switch | | | Cassette media end switch | | |
|------------------|-----------------------------|--------|--------|---------------------------|--------|--------|
| | Top | Center | Bottom | Top | Center | Bottom |
| Cassette absence | OFF | OFF | OFF | OFF | OFF | OFF |
| A5-R | ON | ON | OFF | ON | ON | ON |
| B5-R | OFF | ON | OFF | ON | ON | ON |
| Executive-R | OFF | ON | ON | ON | ON | ON |
| Letter-R | OFF | OFF | ON | ON | ON | ON |
| A4-R | OFF | OFF | OFF | ON | ON | ON |
| 8.5 x 13 in | ON | ON | OFF | OFF | ON | ON |
| Legal | ON | ON | OFF | OFF | OFF | ON |
| B4 | OFF | ON | OFF | OFF | OFF | ON |

Table 1-15 Paper deck media switch combinations (continued)

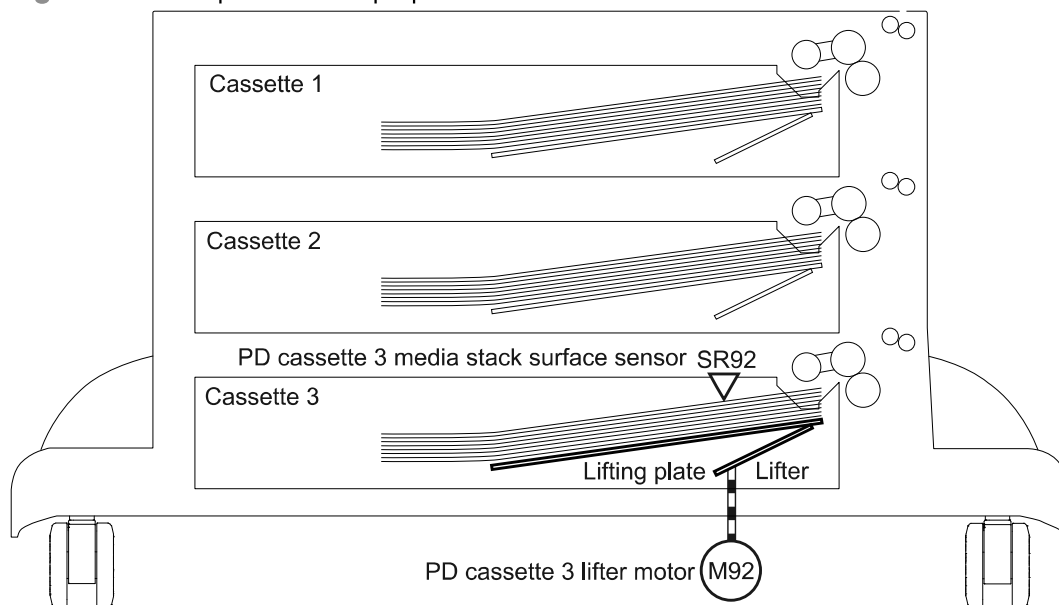
| Paper size | Cassette media width switch | | | Cassette media end switch | | |
|------------|-----------------------------|--------|--------|---------------------------|--------|--------|
| | Top | Center | Bottom | Top | Center | Bottom |
| Ledger | OFF | OFF | ON | OFF | OFF | ON |
| A3 | OFF | OFF | OFF | OFF | OFF | ON |

Paper deck lift-up operation

The paper deck lifts up the tray to keep the surface of paper at the pickup position whenever the following occurs:

- The product is turned on
- The cassette is installed
- The paper stack surface lowers by pickup operation

NOTE: The following figure illustrates the mechanism for paper deck cassette 3, but each paper deck cassette has the same mechanism.

Figure 1-50 Paper deck lift-up operation

The operational sequence of the lift-up is as follows:

1. The PD cassette 3 lifter motor rotates to raise the lifter.
2. The PD cassette 3 lifter motor stops when the PD cassette 3 media stack surface sensor detects the paper surface.
3. The PD cassette 3 lifter motor rotates again when the PD cassette 3 media stack surface sensor detects that the stack surface lowers during a print operation.

The paper deck controller 3 determines a PD cassette 3 lifter motor failure and notifies the formatter through the DC controller when the PD cassette 3 media stack surface sensor does not detect the paper surface within a specified period from when the PD cassette 3 lifter motor starts rotating.

Paper deck cassette media-presence detection

The paper deck controller detects whether the paper is loaded in the cassette by monitoring the PD cassette media out sensor.

The cassette media-presence detection is not performed during Sleep mode.

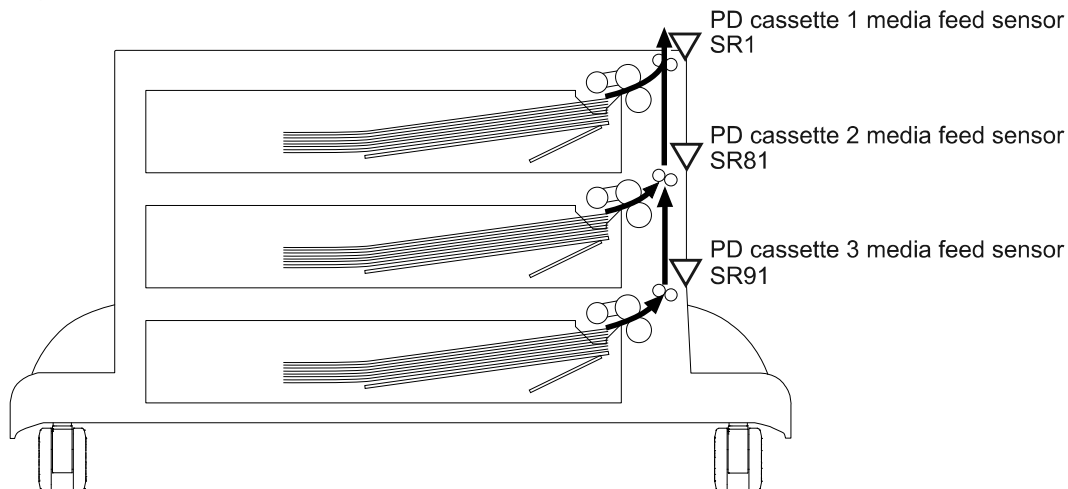
The paper deck controller determines a media-absence and notifies the formatter through the DC controller when the PD cassette media out sensor does not detect the paper.

Paper deck jam detection

The paper deck uses the following sensors to detect the presence of paper and to check whether paper is being fed correctly or has jammed:

- PD cassette 1 media feed sensor (SR1)
- PD cassette 2 media feed sensor (SR81) (3x500-sheet paper deck only)
- PD cassette 3 media feed sensor (SR91) (3x500-sheet paper deck only)

Figure 1-51 Paper deck jam detection sensors



No pick jam 2

The PD cassette 1 media feed sensor does not detect the leading edge of paper within a specified period (including 2 retries) from when the PD cassette 1 pickup solenoid is turned on.

The PD cassette 1 media feed sensor does not detect the leading edge of paper within a specified period from when the PD cassette 2 media feed sensor detects the leading edge. (3x500-sheet paper deck only)

The PD cassette 1 media feed sensor does not detect the leading edge of paper within a specified period from when the PD cassette 3 media feed sensor detects the leading edge. (3x500-sheet paper deck only)

No pick jam 3 (3x500-sheet paper deck only)

The PD cassette 2 media feed sensor does not detect the leading edge of paper within a specified period (including two retries) from when the PD cassette 2 pickup solenoid is turned on.

The PD cassette 3 media feed sensor does not detect the leading edge of paper within a specified period (including two retries) from when the PD cassette 3 pickup solenoid is turned on.

Residual paper jam 1

The following sensor detects a paper-presence when the automatic delivery is complete.

- PD cassette 1 media feed sensor
- PD cassette 2 media feed sensor (3x500-sheet paper deck only)
- PD cassette 3 media feed sensor (3x500-sheet paper deck only)

Door open jam 1

A PD right door open is detected during a paper feed operation.

Paper deck automatic delivery

The paper deck automatically clears the paper if either one of the following sensor detects the residual paper when the product is turned on or when the door is closed:

- PD cassette 1 media feed sensor
- PD cassette 2 media feed sensor (3x500-sheet paper deck only)
- PD cassette 3 media feed sensor (3x500-sheet paper deck only)

3,500-sheet high-capacity input (HCI) feeder

The 3,500-sheet paper deck is optionally installed at bottom of the product or the 500-sheet paper feeder. It picks up the paper and feeds it to the product. The HCI controller controls the operational sequence of the 3,500-sheet paper deck.

Figure 1-52 HCI paper path

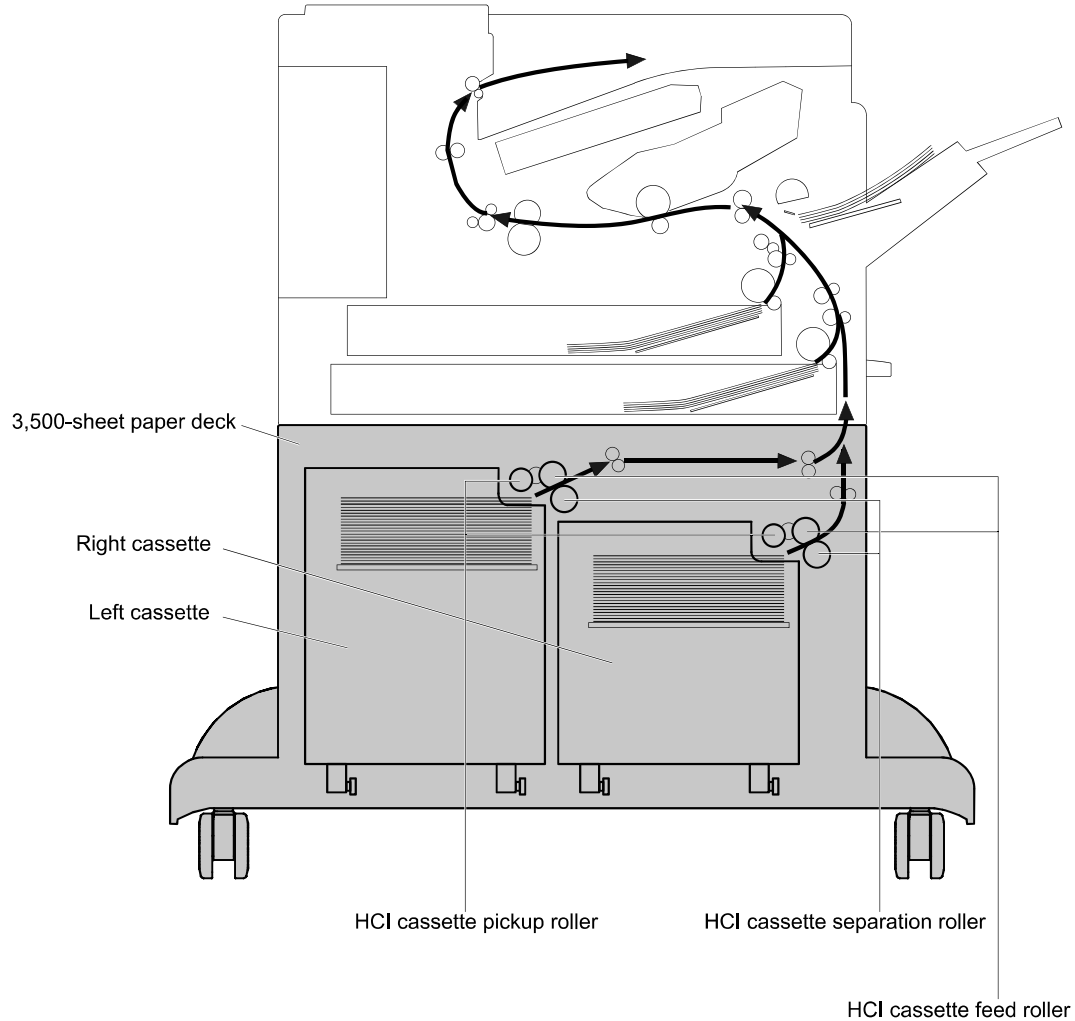


Figure 1-53 HCI signal flow

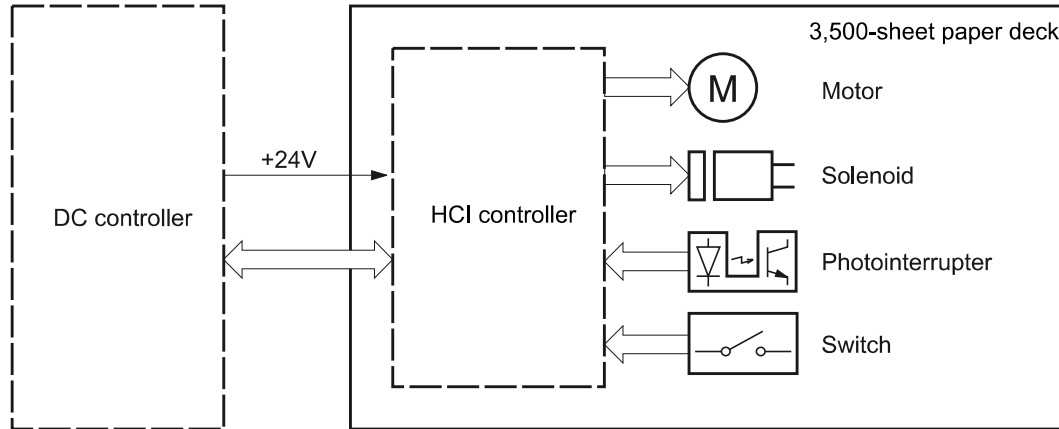


Table 1-16 HCI electrical components

| Component | Abbreviation | Component name |
|------------------|--------------|---|
| Motor | M3301 | HCI right cassette pickup motor |
| | M3302 | HCI right cassette lifter motor |
| | M3303 | HCI left cassette lifter motor |
| | M3304 | HCI left cassette pickup motor |
| Solenoid | SL3301 | HCI right cassette pickup solenoid |
| | SL3302 | HCI left cassette pickup solenoid |
| Photointerrupter | PS3101 | HCI right cassette media stack surface 2 sensor |
| | PS3102 | HCI right cassette media stack surface 1 sensor |
| | PS3103 | HCI right cassette media out sensor |
| | PS3201 | HCI left cassette media stack surface 2 sensor |
| | PS3202 | HCI left cassette media stack surface 1 sensor |
| | PS3203 | HCI left cassette media out sensor |
| | PS3301 | HCI media feed sensor |
| | PS3302 | HCI right cassette media feed sensor |
| | PS3303 | HCI right cassette media size sensor |
| | PS3304 | HCI left cassette media size sensor |
| | PS3305 | HCI left cassette media feed sensor |
| | PS3306 | HCI long edge feed guide open detection sensor |
| Switch | SW3301 | HCI right door open detection switch |
| | SW3302 | HCI right cassette open detection switch |
| | SW3303 | HCI left cassette open detection switch |

HCI motor control

The HCI has two motors in each cassette for the paper-feed and cassette lift-up.

Figure 1-54 HCI motors

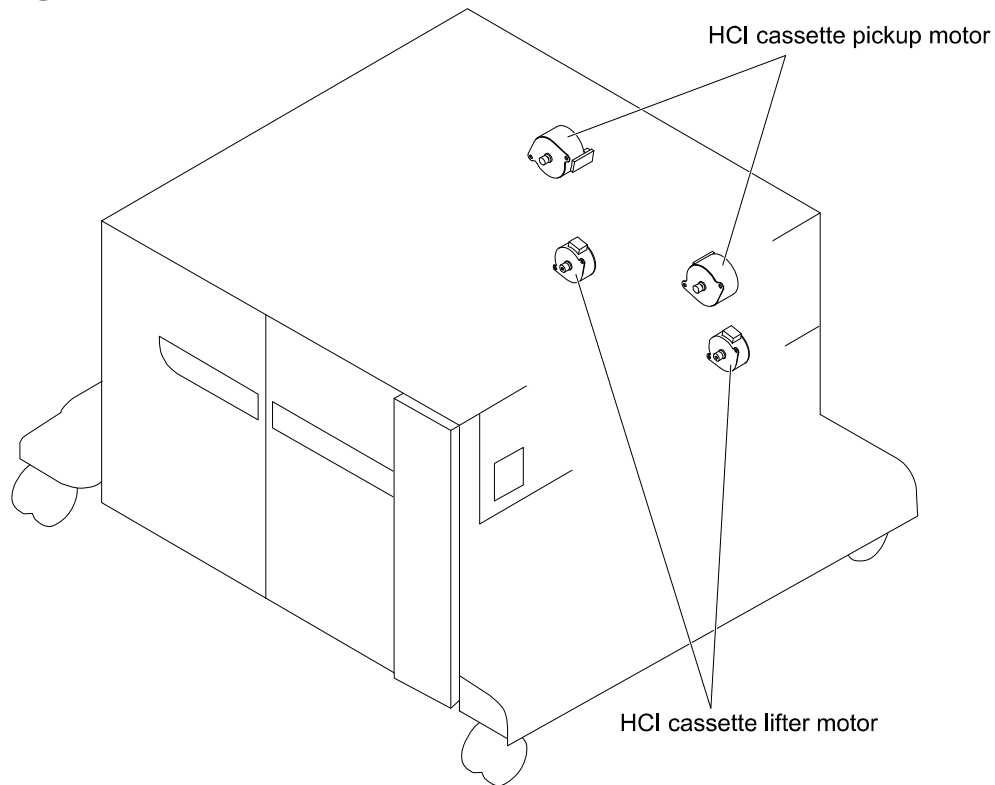


Table 1-17 HCI motors

| Motor | | Components driven |
|-------|---------------------------------|---|
| M3301 | HCI right cassette pickup motor | Pickup roller, separation roller and feed roller for the HCI right cassette |
| M3302 | HCI right cassette lifter motor | Lifter for the HCI right cassette |
| M3303 | HCI left cassette lifter motor | Lifter for the HCI left cassette |
| M3304 | HCI left cassette pickup motor | Pickup roller, separation roller and feed roller for the HCI left cassette |

HCI failure detection

The HCI controller determines a lifter motor failure according to the condition of the related part.

The HCI controller does not determine if the HCI cassette pickup motor has failed; therefore, a jam occurs when the motor fails.

HCI pickup-and-feed operation

The pickup-and-feed operation picks up one sheet of paper in the 3,500-sheet paper deck cassette and feeds it to the product.

Figure 1-55 HCI pickup-and-feed operation

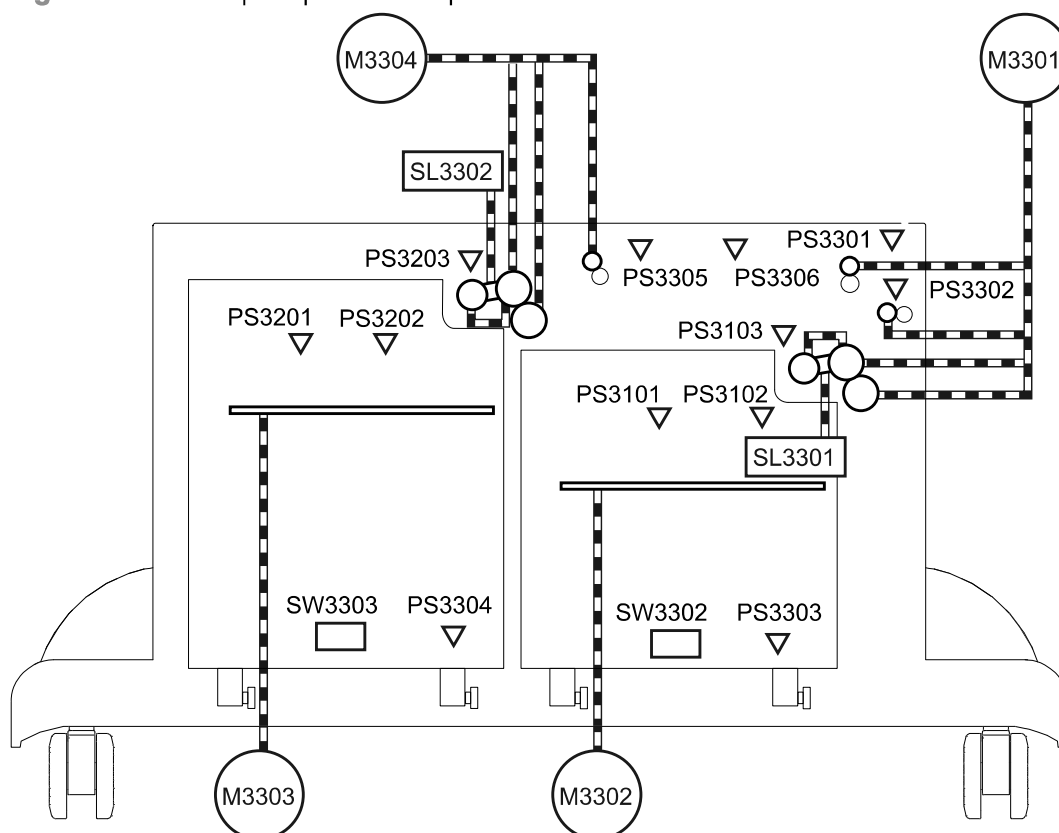


Table 1-18 HCI pickup-and-feed operation components

| Abbreviation | Component | Signal |
|--------------|---|---|
| M3301 | HCI right cassette pickup motor | HCI RIGHT CASSETTE PICKUP MOTOR CONTROL signal |
| M3302 | HCI right cassette lifter motor | HCI RIGHT CASSETTE LIFTER MOTOR CONTROL signal |
| M3303 | HCI left cassette lifter motor | HCI LEFT CASSETTE LIFTER MOTOR CONTROL signal |
| M3304 | HCI left cassette pickup motor | HCI LEFT CASSETTE PICKUP MOTOR CONTROL signal |
| SL3301 | HCI right cassette pickup solenoid | HCI RIGHT CASSETTE PICKUP SOLENOID signal |
| SL3302 | HCI left cassette pickup solenoid | HCI LEFT CASSETTE PICKUP SOLENOID signal |
| PS3101 | HCI right cassette media stack surface 2 sensor | HCI RIGHT CASSETTE MEDIA STACK SURFACE 2 signal |
| PS3102 | HCI right cassette media stack surface 1 sensor | HCI RIGHT CASSETTE MEDIA STACK SURFACE 1 signal |

Table 1-18 HCI pickup-and-feed operation components (continued)

| Abbreviation | Component | Signal |
|---------------------|--|--|
| PS3103 | HCI right cassette media out sensor | HCI RIGHT CASSETTE MEDIA OUT signal |
| PS3201 | HCI left cassette media stack surface 2 sensor | HCI LEFT CASSETTE MEDIA STACK SURFACE 2 signal |
| PS3202 | HCI left cassette media stack surface 1 sensor | HCI LEFT CASSETTE MEDIA STACK SURFACE 1 signal |
| PS3203 | HCI left cassette media out sensor | HCI LEFT CASSETTE MEDIA OUT signal |
| PS3301 | HCI media feed sensor | HCI MEDIA FEED signal |
| PS3302 | HCI right cassette media feed sensor | HCI RIGHT CASSETTE MEDIA FEED signal |
| PS3303 | HCI right cassette media size sensor | HCI RIGHT CASSETTE MEDIA SIZE signal |
| PS3304 | HCI left cassette media size sensor | HCI LEFT CASSETTE MEDIA SIZE signal |
| PS3305 | HCI left cassette media feed sensor | HCI LEFT CASSETTE MEDIA FEED signal |
| PS3306 | HCI long edge feed guide open detection sensor | HCI LONG EDGE FEED GUIDE OPEN DETECTION signal |
| SW3301 | HCI right door open detection switch | HCI RIGHT DOOR OPEN DETECTION signal |
| SW3302 | HCI right cassette open detection switch | HCI RIGHT CASSETTE OPEN DETECTION signal |
| SW3303 | HCI left cassette open detection switch | HCI LEFT CASSETTE OPEN DETECTION signal |

HCI cassette media-size detection and cassette-presence detection

The HCI controller detects the size of paper loaded in the cassette by monitoring the HCI cassette media size sensors. It determines whether A4-R or Letter-R is loaded and notifies the formatter through the DC controller. It also detects whether the cassette is installed to the 3,500-sheet paper deck by monitoring the HCI cassette open detection switches and notifies the formatter through the DC controller.

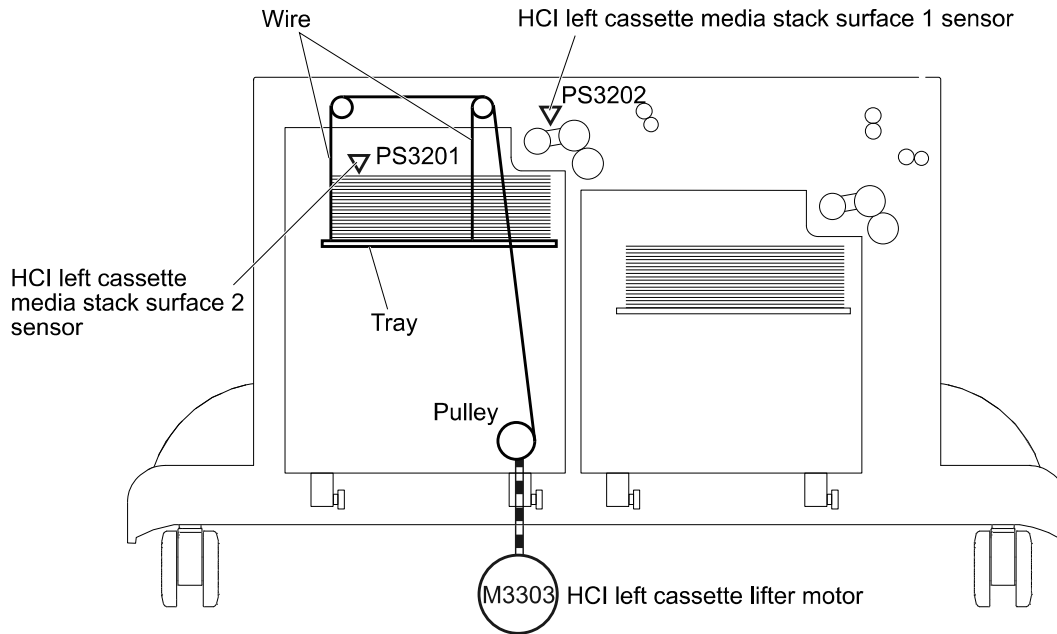
The cassette media-size detection and the cassette-presence detection are not performed during Sleep mode.

HCI lift-up operation

The HCI lifts up the tray to keep the surface of the paper at the pickup position whenever the following occurs:

- The product is turned on
- The cassette is installed
- The paper stack surface lowers by pickup operation

Figure 1-56 HCI lift-up operation



The figure above illustrates the mechanism for the left cassette, but each HCI cassette has the same mechanism.

The operational sequence of the lift-up is as follows:

1. The HCI cassette lifter motor rotates the pulley to reel the wire. Accordingly the tray moves up.
2. The HCI cassette lifter motor stops when the HCI cassette media stack surface 2 sensor detects the paper surface.
3. The HCI cassette lifter motor rotates again when the HCI cassette media stack surface 1 sensor detects that the stack surface lowers during a print operation.

The HCI controller determines an HCI cassette lifter motor failure and notifies the formatter through the DC controller when the HCI cassette media stack surface 2 sensor does not detect the paper surface within a specified period from when the HCI cassette lifter motor starts rotating.

HCI cassette media-presence detection

The HCI controller detects whether the paper is loaded in the cassette by monitoring the HCI cassette media out sensor.

The cassette media-presence detection is not performed during Sleep mode.

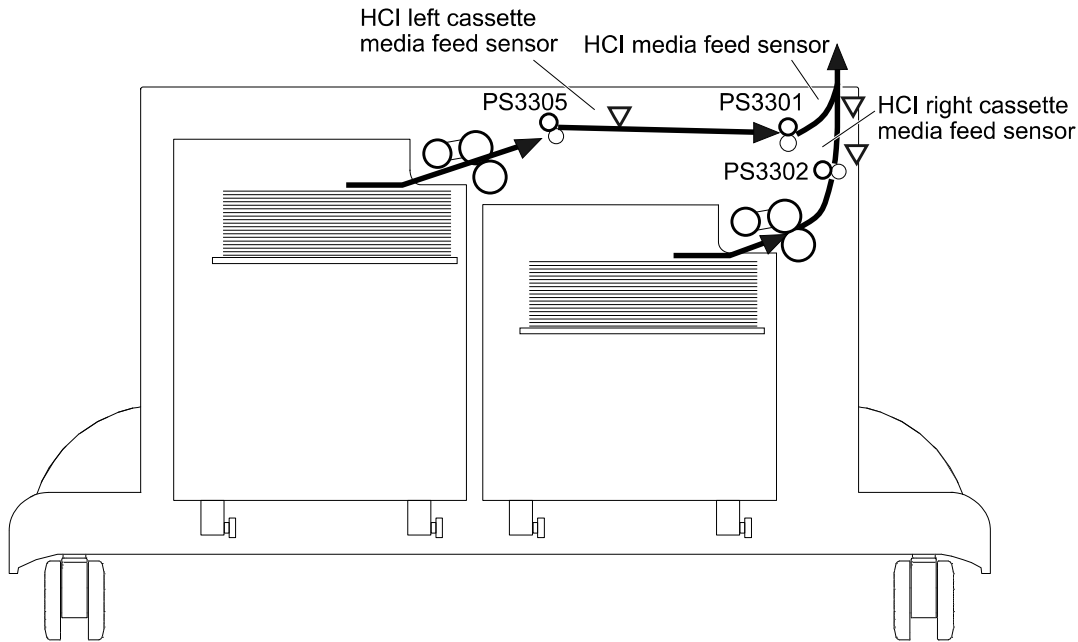
The HCI controller determines a media-absence and notifies the formatter through the DC controller when the HCI cassette media out sensor does not detect the paper.

HCI jam detection

The HCI uses the following sensors to detect the presence of paper and to check whether paper is being fed correctly or has jammed:

- HCI media feed sensor (PS3301)
- HCI right cassette media feed sensor (PS3302)
- HCI left cassette media feed sensor (PS3305)

Figure 1-57 HCI jam detection sensors



No pick jam 2

The HCI media feed sensor does not detect the leading edge of paper within a specified period from when the HCI right cassette media feed sensor detects the leading edge.

The HCI media feed sensor does not detect the leading edge of paper within a specified period from when the HCI left cassette media feed sensor detects the leading edge.

No pick jam 3

The HCI right cassette media feed sensor does not detect the leading edge of paper within a specified period, including two times retry, from when the HCI right cassette pickup solenoid is turned on.

The HCI left cassette media feed sensor does not detect the leading edge of paper within a specified period, including two times retry, from when the HCI left cassette pickup solenoid is turned on.

Residual paper jam 1

Either one of the following sensors detects a paper-presence when the automatic delivery is complete:

- HCI media feed sensor
- HCI right cassette media feed sensor
- HCI left cassette media feed sensor

Door open jam 1

An HCI right door open or an HCI long edge feed guide open is detected during a paper-feed operation.

HCI automatic delivery

The HCI automatically clears the paper if either one of the following sensors detects the residual paper when the product is turned on or when the door is closed:

- HCI media feed sensor
- HCI right cassette media feed sensor
- HCI left cassette media feed sensor

Duplex

The optional duplexer is installed in the left side of the product. The duplexer reverses the output roller and intermediate output roller in the product engine, reverses and feeds the paper passed through the fuser. Then it detects side misregistration to adjust the starting position of the scanning direction for the second side of paper according to the command from the formatter and feeds it to the product engine.

Figure 1-58 Duplexer paper path

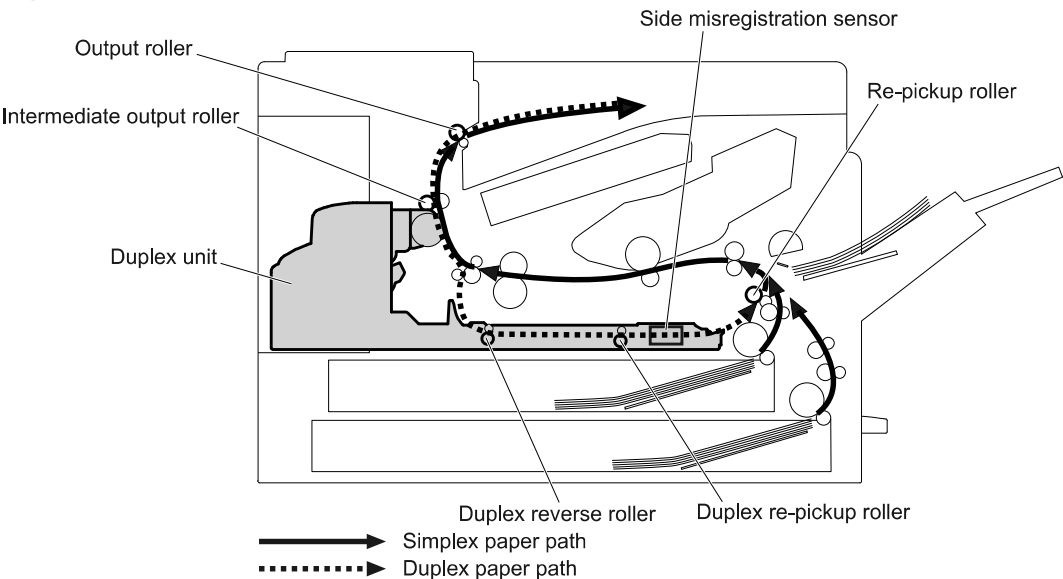


Figure 1-59 Duplexer signal flow

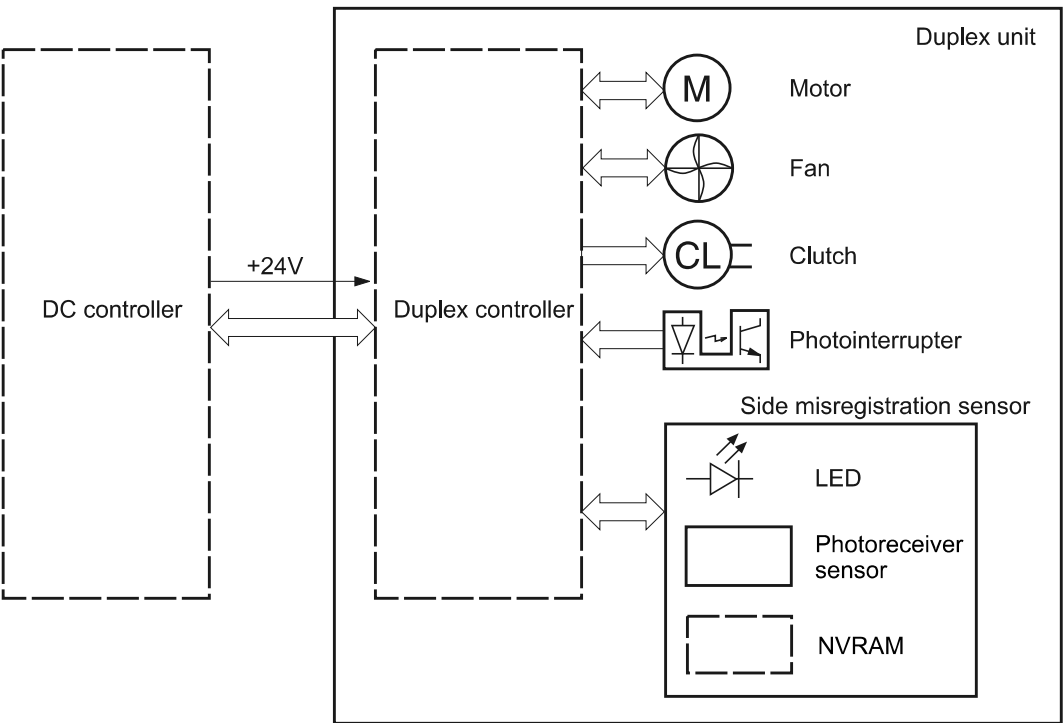
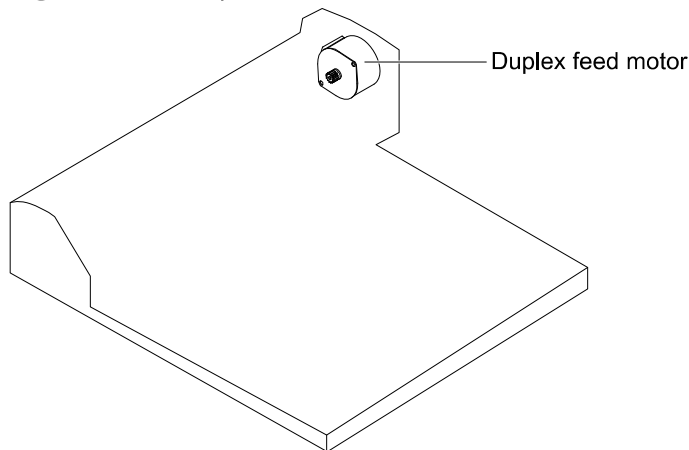


Table 1-19 Duplexer electrical components

| Component | Abbreviation | Component name |
|------------------|--------------|-------------------------|
| Motor | M1 | Duplex feed motor |
| Fan | FM1 | Duplex fan |
| Clutch | CL1 | Duplex feed clutch |
| Photointerrupter | SR1 | Duplex reverse sensor |
| | SR2 | Duplex re-pickup sensor |

Duplexer motor control

The duplexer has one motor. The duplex feed motor reverses the output roller and the intermediate output roller. Also it drives the duplex reverse roller and the duplex re-pickup roller to feed the paper and to drive the side misregistration sensor and the re-pickup roller.

Figure 1-60 Duplexer motor**Table 1-20 Duplexer motor**

| Motor | | Components driven |
|-------|-------------------|--|
| M1 | Duplex feed motor | Duplex reverse roller, duplex re-pickup roller, re-pickup roller, output roller and intermediate output roller |

Duplexer motor failure detection

The duplex controller does not determine if the duplex feed motor has failed; therefore, a jam occurs when the motor fails.

Duplexer fan control

The duplex unit has one fan for preventing the temperature from rising in the duplex unit. The duplex controller determines if the duplex fan has failed and notifies the formatter through the DC controller when the fan fails to operate for a specified time during start-up.

Figure 1-61 Duplexer fan

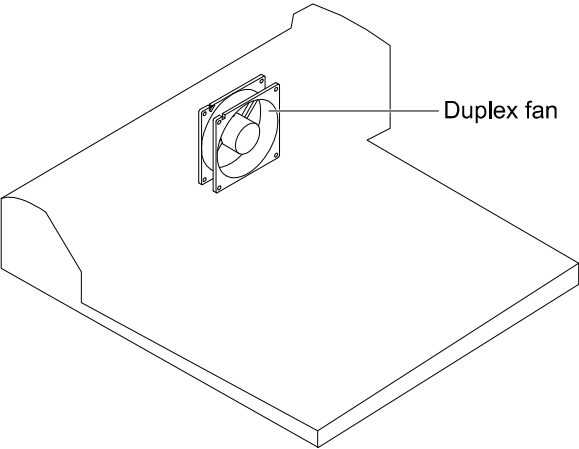


Table 1-21 Duplexer fan

| Fan | | Cooling area | Type | Speed |
|-----|------------|-----------------|---------|-------|
| FM1 | Duplex fan | Duplexer inside | Exhaust | Full |

Duplexer fan failure detection

The duplex controller determines if the duplex fan has failed and notifies the formatter when the fan locks for a specified time during start-up.

Duplexer reverse and feed operation

The duplexer reverses the feed and delivery rollers in the product to print on both sides. The paper that passed through the fuser unit reverses its feeding direction and is fed to the duplexer. The duplexer

feeds the paper and performs horizontal registration to align the starting position of the main scan for the second-side print. Then, the paper is fed into the product engine unit again.

Figure 1-62 Duplexer reverse and feed operation

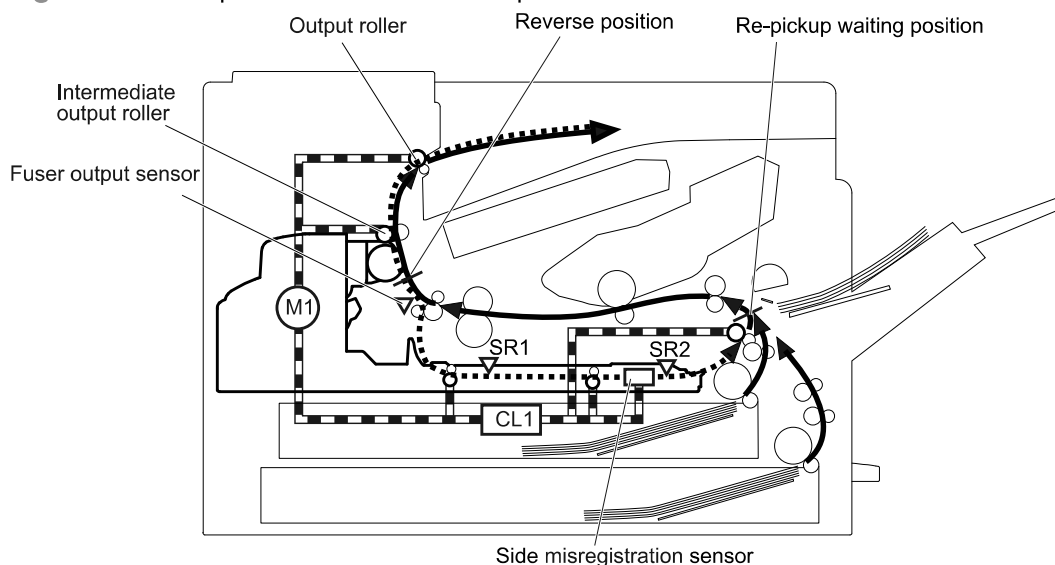


Table 1-22 Duplexer reverse and feed components

| Component | | Signal |
|-----------|-------------------------|----------------------------------|
| M1 | Duplex feed motor | DUPLEX FEED MOTOR CONTROL signal |
| CL1 | Duplex feed clutch | DUPLEX FEED CLUTCH signal |
| SR1 | Duplex reverse sensor | DUPLEX FEED signal |
| SR2 | Duplex re-pickup sensor | DUPLEX RE-PICKUP signal |

Duplexer reverse and feed operation sequence

The operational sequence of the reverse-and-feed operation is as follows:

1. The paper printed on the first side passes through the fuser.
2. The DC controller feeds the paper until the trailing edge of paper reaches the reverse position after the fuser output sensor detects the trailing edge.
3. The duplex controller reverses the output roller and the intermediate output roller to feed the paper to the duplexer from the reverse position.
4. The duplex controller detects the image starting position according to the side misregistration sensor and feeds the paper to the re-pickup waiting position.
5. The duplex controller stops the paper temporarily at the re-pickup waiting position when the paper is standard size but shorter than Letter-R. It feeds the paper to the product engine again if a print

command is sent from the formatter. If a print command is sent before the paper reaches the repickup waiting position, the duplex controller does not stop the paper.

If the paper is other than standard size or standard size but longer than Letter-R and a print command is sent before the paper reaches the re-pickup waiting position, the duplex controller does not stop the paper. If a print command is not sent before the paper reaches the re-pickup waiting position, the duplex controller notifies the formatter of duplex re-pickup jam 3 through the DC controller.

Side misregistration detection

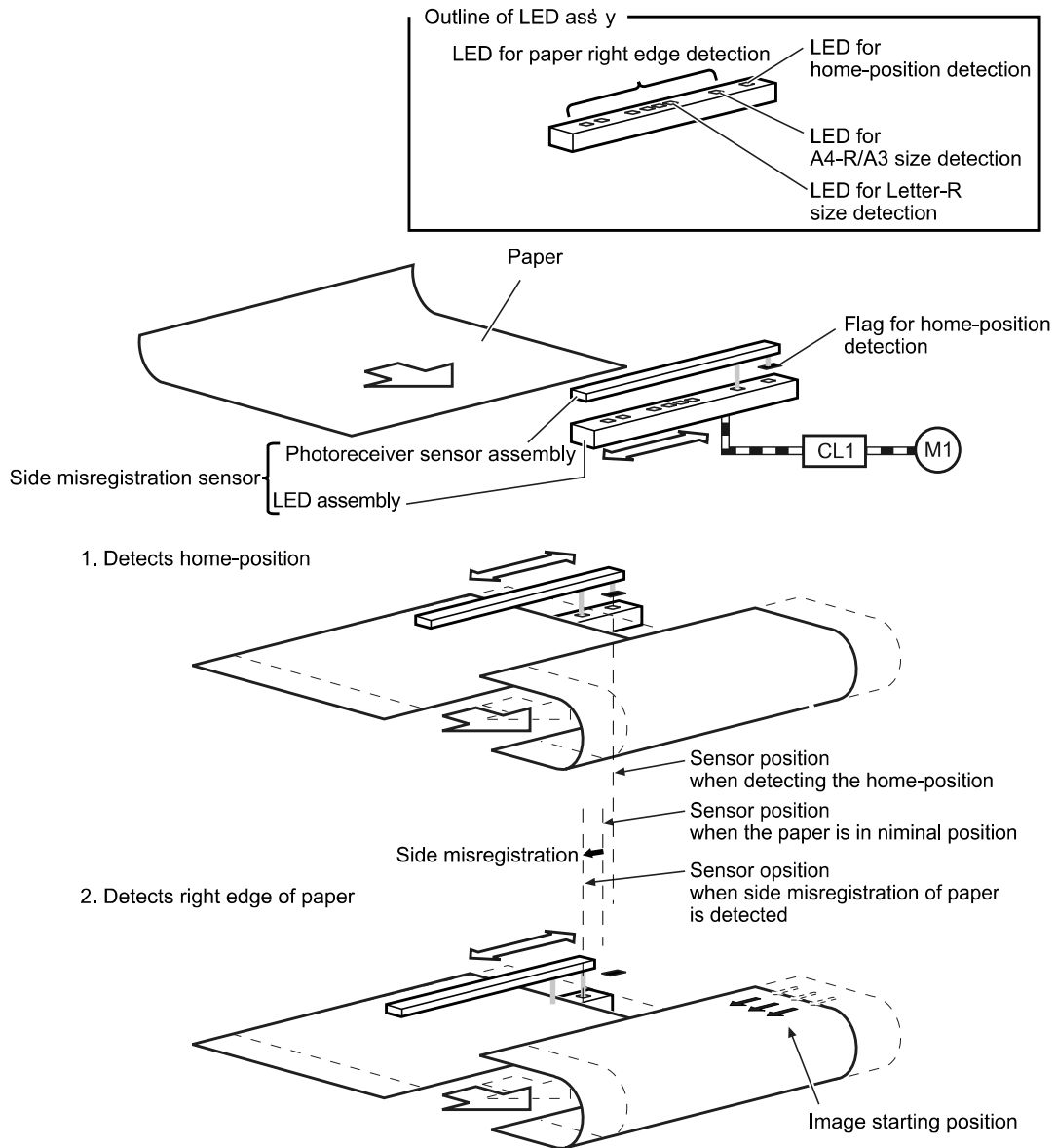
The side misregistration detection is a feature to determine the starting position in scanning direction for the second side printing of the paper fed to the duplexer.

The LED and photoreceiver sensor of the side misregistration sensor are located paired at the position of right edge of each standard size paper. The side misregistration sensor reciprocates while lighting the LED which is corresponding to the paper size. The paper passes through in between the LED and photoreceiver sensor.

The side misregistration detection is performed when the duplex re-pickup sensor detects the leading edge of paper. The moving distance of the sensor is measured according to the home-position of the side misregistration sensor and the position where the right edge of paper interrupts LED light. Then the side misregistration amount is calculated by subtracting the distance of nominal position (without side

misregistration) for each paper size. The side misregistration amount is notified to the formatter through the DC controller as a correction value of scanning start position for the second side printing.

Figure 1-63 Duplexer side misregistration detection



Side misregistration failure detection

The duplex controller determines a side misregistration sensor failure and notifies the formatter when it encounters any one of the following condition:

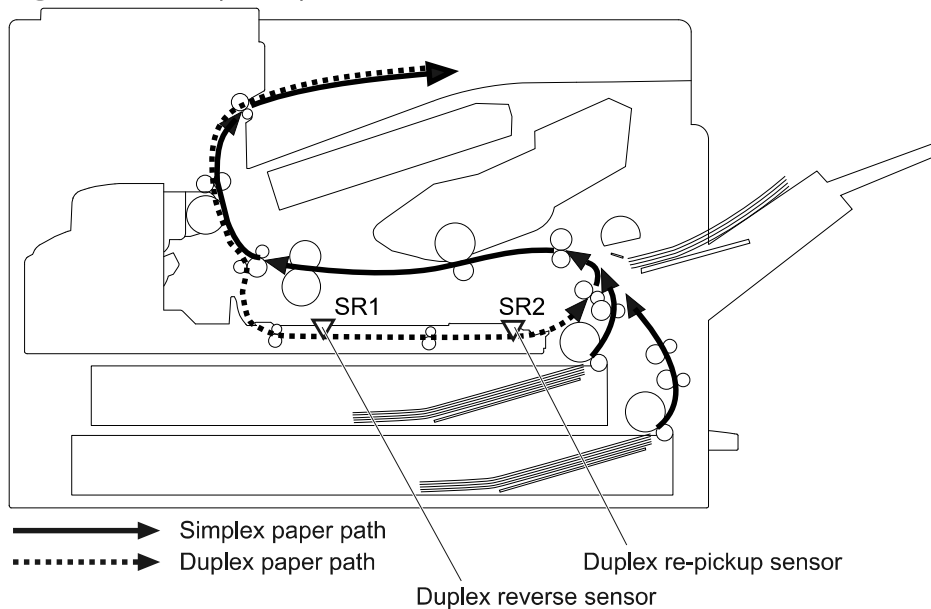
- The photoreceiver sensor does not output as prescribed when the product is turned on, when the duplexer is installed to the product or when the light intensity is adjusted before the paper is fed to the duplexer.
- The side registration sensor does not detect the home-position.
- An NVRAM data abnormality or communication error occurs when the product is turned on, when the duplexer is installed to the product or when the light intensity is adjusted and write/read the NVRAM data during duplex printing.

Duplexer jam detection

The duplexer uses the following sensors to detect the presence of paper and to check whether the paper is being fed correctly or has jammed:

- Duplex reverse sensor (SR1)
- Duplex re-pickup sensor (SR2)

Figure 1-64 Duplexer jam detection sensors



Fuser output stay jam 2

The fuser output sensor does not detect the trailing edge of paper within a specified period from when it detects the leading edge.

Reverse jam 1

The duplex reverse sensor does not detect the leading edge of paper within a specified period from when a reverse operation starts.

Duplex re-pickup jam 1

The duplex re-pickup sensor does not detect the leading edge of paper within a specified period from when the duplex reverse sensor detects the leading edge.

Duplex re-pickup jam 2

The duplexer is removed or the communication with the duplexer is failed during a period from when the reverse operation starts until the paper reaches the re-pickup waiting position.

Duplex re-pickup jam 3

A print command is not sent from the formatter before the paper reaches the re-pickup waiting position if the paper is other than standard size or standard size but longer than Letter-R.

Residual paper jam 1

Either one of the following sensors detects a paper-presence when the automatic delivery is complete:

- Duplex reverse sensor
- Duplex re-pickup sensor

Duplexer automatic delivery

The product automatically clears the paper if any one of the following sensors detects the residual paper when the product is turned on or when the door is closed:


- Duplex reverse sensor (SR1)
- Duplex re-pickup sensor (SR2)

2 Solve problems

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- [Current settings pages](#)
- [Troubleshooting process](#)
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- [Clear jams](#)
- [Solve paper-handling problems](#)
- [Use manual print modes](#)
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Solve problems checklist

Follow these steps when trying to solve a problem with the product.

1. If the control panel is blank or black, complete these steps:
 - a. Check the power cable.
 - b. Check that the power is turned on.
 - c. Make sure that the line voltage is correct for the product power configuration. (See the label that is on the back of the product for voltage requirements.) If you are using a power strip and its voltage is not within specifications, connect the product directly into the electrical outlet. If it is already connected into the outlet, try a different outlet.
2. The control panel should indicate a **Ready** status. If an error message displays, resolve the error.
3. Check the cabling.
 - 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.
4. Ensure that the selected paper size and type meet specifications. Also open the **Trays** menu on the product control panel and verify that the tray is configured correctly for the paper type and size.
5. Print a configuration page. If the product is connected to a network, an HP Jetdirect page also prints.
 - a. At the product control panel, press the Home  button.
 - b. Open the following menus:
 - **Administration**
 - **Reports**
 - **Configuration/Status Pages**
 - c. Select the **Configuration Page** option, and then press the **OK** button.
 - d. Scroll to the **Print** option, and then press the **OK** button to print the page.

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

If the page jams in the product, follow the instructions on the control panel to clear the jam.


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

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

- 6.** Verify that you have installed the print driver for this product. Check the program to make sure that you are using the print driver for this product. The print driver is on the CD that came with the product. You can also download the print driver from this Web site: www.hp.com/go/lj700M712_software.
- 7.** Print a short document from a different program that has worked in the past. If this solution works, then the problem is with the program. 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, selecting the new connection type that you are using.


Menu map

You can print a report of the complete product menus so you can more easily navigate to the individual settings you need.

1. At the product control panel, press the Home  button.
2. Open the following menus:
 - **Administration**
 - **Reports**
 - **Configuration/Status Pages**
3. Select the **Administration Menu Map** option, and then press the OK button.
4. Scroll to the **Print** option, and then press the OK button to print the report.


Preboot menu options

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

 **CAUTION:** The **2 Format Disk** option performs a disk initialization for the entire disk. The operating system, firmware files, and third-party files (among other files) will be completely lost. HP does not recommend this action without contacting support first.

Open the Preboot menu


1. Turn the product on.
2. Wait for both the **Ready** and **Attention** LEDs to illuminate and then dim out. The HP logo will appear on the control panel display.
3. When the LEDs illuminate again, press the **Stop** ⊗ button on the control panel.

 **NOTE:** The period of time for opening the Preboot menu, while the **Ready** and **Attention** LEDs are illuminated, is around one second. You might need to press the **Stop** ⊗ button repeatedly while the product is starting up to make you sure you gain access to the Preboot menu.


4. Use the **Down** arrow button to navigate the Preboot menu options.
5. Press the **OK** button to select a menu item.

Cold reset using the Preboot menu

1. Open the Preboot menu.
 - a. Turn the product on.
 - b. Wait for both the **Ready** and **Attention** LEDs at the bottom right side of the control panel to illuminate and then dim out. The HP logo will appear on the control panel display.
 - c. When the **Ready** and **Attention** LEDs illuminate again, press the **Stop** ⊗ button on the control panel.

 **NOTE:** The period of time for accessing the preboot menu, while the **Ready** and **Attention** LEDs are illuminated, is around one second. You may need to press the **Stop** ⊗ button repeatedly while the product is starting up to make you sure you gain access to the Preboot menu.

- d. Use the **Down** arrow button to navigate the preboot menu options.
 - e. Press the **OK** button to select a menu item.
2. Select the **3 Administrator** item, and then press the **OK** button.
3. Select the **8 Startup Options** item, and then press the **OK** button.

4. Select the **2 Cold Reset** item, and then press the **OK** button.
5. Press the Home  button to highlight the **1 Continue** item, and then press the **OK** button.



NOTE: The product will initialize.

Table 2-1 Preboot menu options (1 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------|-------------|--------------|-------------|--|
| 1 Continue | | | | <p>Selecting the 1 Continue item exits the Preboot menu and continues the normal boot process.</p> <p>If a selection is not made in the initial menu within 30 seconds, the product returns to a normal boot (the same as selecting 1 Continue).</p> <p>If the user navigates to another menu, the timeout does not apply.</p> |
| 2 Sign In | | | | <p>Enter the administrator PIN or service PIN if one is required to open the Preboot menu.</p> |

Table 2-1 Preboot menu options (1 of 6) (continued)

| Menu option | First level | Second level | Third level | Description |
|------------------------|--------------------------|---|-------------|--|
| 3 Administrator | | | | <p>This item navigates to the 3 Administrator sub menus.</p> <p>If authentication is required (and the user is not already signed in) the 2 Sign In displays. The user is required to sign in.</p> |
| | 1 Download | 1 Network 2 USB 3 USB Thumbdrive | | <p>This item initiates a preboot firmware download process. A USB device interface or a Network connection can be used to download firmware.</p> |
| | 2 Format Disk | | | <p>This item reinitializes the disk and cleans all disk partitions.</p> <p>CAUTION: Selecting the 2 Format Disk item removes all data.</p> <p>A delete confirmation prompt is not provided.</p> <p>The system is not bootable after this action—a firmware download must be performed to return the system to a bootable state.</p> |
| | 3 Partial Clean | | | <p>This item reinitializes the disk (removing all data except the firmware repository where the master firmware bundle is downloaded and saved).</p> <p>CAUTION: Selecting the 3 Partial Clean item removes all data except the firmware repository.</p> <p>A delete confirmation prompt is not provided.</p> <p>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).</p> |
| | 4 Change Password | | | <p>Select this item to set or change the administrator password.</p> |
| | 5 Clear Password | | | <p>Select the 5 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.</p> <p>When the confirmation prompt displays, press the OK button to clear the password.</p> |

Table 2-2 Preboot menu options (2 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|----------------------|--------------------------|-------------|---|
| 3 Administrator continued | 6 Manage Disk | 1 Clear disk | | Select the 1 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. |
| | | 2 Lock Disk | | <p>Select the 2 Lock Disk item to lock (mate) a new secure disk to this product.</p> <p>The secure disk already locked to this product will remain accessible to this product. Use this function to have more than one encrypted disk accessible by the product when using them interchangeably.</p> <p>The data stored on the secure disk locked to this product always remains accessible to this product.</p> |
| | | 3 Leave Unlocked | | <p>Select the 3 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.</p> <p>The secure disk that is already locked to this product remains accessible to this product.</p> |
| | | 4 Clear Disk Pwd | | <p>Select the 4 Clear Disk Pwd item to continue using the non-secure disk and clear the password associated with the yet to be installed secure disk.</p> <p>CAUTION: Data on the missing secure disk will be permanently inaccessible.</p> |
| | | 5 Retain Password | | Select the 5 Retain Password item to use the non-secure disk for this session only, and then search for the missing secure disk in future sessions. |
| | 6 Boot Device | 1 Secure Erase | | <p>Select the 1 Secure Erase item to erase all of the data on the disk and unlock it if required.</p> <p>This might take a long time.</p> <p>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.</p> |
| | | 2 Erase/Unlock | | <p>Select the 2 Erase/Unlock item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product.</p> <p>NOTE: The system will be unusable until the system files are reinstalled. Erases the crypto key. The disk becomes a non-encrypted disk.</p> |
| | | 3 Get Status | | This item provides disk status information if any is available. |

Table 2-3 Preboot menu options (3 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|-----------------------------------|--------------------------|-----------------------|--|
| 3 Administrator continued | 6 Manage Disk continued | 7 Internal Device | | Select the 7 Internal Device item to erase the internal device or get status about the internal device. |
| | | | 1 Secure Erase | <p>Select the 1 Secure Erase item to erase all of the data on the disk and unlock it if required.</p> <p>This might take a long time.</p> <p>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.</p> |
| | | | 2 Erase/Unlock | <p>Select the 2 Erase/Unlock item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product.</p> <p>NOTE: The system will be unusable until the system files are reinstalled. Erases the HP High Performance Secure Hard Disk. The disk becomes a non-encrypted disk.</p> |
| | | | 3 Get Status | This item provides disk status information if any is available. |
| | | 8 External Device | | Select the 8 External Device item to erase the internal device or get status about the internal device. |
| | | | 1 Secure Erase | <p>Select the 1 Secure Erase item to erase all of the data on the disk and unlock it if required.</p> <p>This might take a long time.</p> <p>NOTE: The system will be unusable until the system files are reinstalled.</p> <p>The ATA secure-erase command erases the entire disk, including firmware. The disk remains an encrypted disk.</p> |
| | | | 2 Erase/Unlock | <p>Select the 2 Erase/Unlock item to cryptographically erase all data on disk and unlock the disk to allow access to it from any product.</p> <p>NOTE: The system will be unusable until the system files are reinstalled. Erases the crypto key. The disk becomes a non-encrypted disk.</p> |
| | | | 3 Get Status | This item provides disk status information if any is available. |

Table 2-4 Preboot menu options (4 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|------------------------|-------------------------|------------------------|---|
| 3 Administrator continued | 7 Configure LAN | | | Select the 7 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. |
| | | IP Mode [DHCP] | | Use this item for automatic IP address acquisition from the DHCP server. |
| | | IP Mode [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 | Select the Save item to save the manual settings. |

Table 2-5 Preboot menu options (5 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|--------------------------|-------------------------|-------------|---|
| 3 Administrator continued | 8 Startup Options | | | Select the 8 Startup Options item to specify options that can be set for the next time the product is turned on and initializes to the Ready state. |
| | | 1 Show Revision | | Not currently functional: Check the 1 Show Revision item to allow the product to initialize and show the firmware version when the product reaches the Ready state. Once the product power is turned on the next time, the 1 Show Revision item is unchecked so that the firmware revision is not shown. |
| | | 2 Cold Reset | | Check the 2 Cold Reset item to clear the IP address and all customer settings (this item also returns all settings to factory defaults). NOTE: Items in the Service menu are not reset. |
| | | 3 Skip Disk Load | | |
| | | 4 Skip Cal | | Select the 4 Skip Cal item to initialize the product the next time the power is turned on without calibrating. |
| | | 5 Lock Service | | CAUTION: Select the 5 Lock Service item to lock the Service menu access (both in the preboot menu and the Device Maintenance menu). Service personnel must have the administrator remove the 5 Lock Service setting before they can open the Service menu. |
| | | | | |

Table 2-5 Preboot menu options (5 of 6) (continued)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|---------------------------------------|---------------------------------|-------------|---|
| | | 6 Skip FSK | | Select the 6 Skip FSK item to disable Chkdisk/ScanVolume during startup. |
| 3 Administrator continued | 8 Startup Options continued | 7 First Power | | <p>Not currently functional: This item allows the product to initialize as if it is the first time it has been turned on.</p> <p>For example, the user is prompted to configure first-time settings like date/time, language, and other settings.</p> <p>Check this item so that it is enabled for the next time the product power is turned on.</p> <p>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.</p> |
| | | 8 Embedded JetDirect Off | | <p>Check the 8 Embedded JetDirect Off item to disable the embedded Jetdirect.</p> <p>By default this item is unchecked so that Jetdirect is always enabled.</p> |

Table 2-6 Preboot menu options (6 of 6)

| Menu option | First level | Second level | Third level | Description |
|-------------------------------------|-----------------------|------------------------------------|---------------------|---|
| 3 Administrator continued | 9 Diagnostics | 1 Memory | a Do Not Run | |
| | | | b Short | |
| | | | c Long | |
| | | 2 Disk | a Do Not Run | |
| | | | b Short | |
| | | | c Long | |
| | | | d Optimized | |
| | | | e Raw | |
| | | | f Smart | |
| | | 3 ICB | | |
| | | 4 CPB | | |
| | | 5 Interconnect Run Selected | | |
| | A Remote Admin | 1 Start Telnet | | The A Remote Admin item allows a service technician to access the product remotely to troubleshoot issues. |

Table 2-6 Preboot menu options (6 of 6) (continued)

| Menu option | First level | Second level | Third level | Description |
|------------------------------|-----------------------------|--------------------------|-------------|---|
| | | 2 Stop Telnet | | |
| | | 3 Refresh IP | | |
| | B System Triage | 1 Copy Logs | | |
| 4 Service Tools | | | | This item requires the service access code. If the product does not reach the Ready state, you can use this item to print the error logs. The logs can be copied to a USB storage accessory when the product is initialized, and then these encrypted files can be sent to HP to help determine what is causing the problem. |
| | 3 Reset Password | | | Use this item to reset the administrator password. |
| | 2 Subsystems | | | For manufacturing use only. Do not change these values. |
| 5 Developer Tools | 1 Netexec | | | |