Model CV-P1a/CV-P1b
Machine Code: M009/M000

SERVICE MANUAL

February 2008
Subject to change

Precautions

In order to prevent accidents and to prevent damage to the equipment, please read the precautions listed below carefully before servicing the printer and follow them closely.

Safety Warning

1. Only to be serviced by appropriately qualified service engineers.
    - High voltages and lasers inside this product are dangerous. This printer should only be serviced by a suitably trained and qualified service engineer.
2. Use only genuine replacement parts
    - There are no user serviceable parts inside the printer. Do not make any unauthorized changes or additions to the printer, these could cause the printer to malfunction and create electric shock or fire hazards.
3. Laser Safety Statement
    - The Printer is certified in the U.S. to conform to the requirements of DHHS 21 CFR, chapter 1 Subchapter J for Class 1(1) laser products, and elsewhere, it is certified as a Class I laser product conforming to the requirements of IEC 825. Class I laser products are not considered to be hazardous. The laser system and printer are designed so there is never any human access to laser radiation above a Class I level during normal operation, user maintenance, or prescribed service condition.

⚠WARNING

- Never operate or service the printer with the protective cover removed from Laser/Scanner assembly. The reflected beam, although invisible, can damage your eyes. When using this product, these basic safety pre-cautions should always be followed to reduce risk of fire, electric shock, and injury to persons.

m009_001

Caution for safety

Toxic material

This product contains toxic materials that could cause illness if ingested.

1. If the LCD control panel is damaged, it is possible for the liquid inside to leak. This liquid is toxic. Contact with the skin should be avoided, wash any splashes from eyes or skin immediately and contact your doctor. If the liquid gets into the mouth or is swallowed, see a doctor immediately.
2. Please keep toner cartridges away from children. The toner powder contained in the toner cartridge may be harmful and if swallowed, you should contact a doctor.

Electric Shock and Fire Safety Precautions

Failure to follow the following instructions could cause electric shock or potentially cause a fire.

1. Use only the correct voltage, failure to do so could damage the printer and potentially cause a fire or electric shock.
2. Use only the power cable supplied with the printer. Use of an incorrectly specified cable could cause the cable to overheat and potentially cause a fire.
3. Do not overload the power socket, this could lead to overheating of the cables inside the wall and could lead to a fire.
4. Do not allow water or other liquids to spill into the printer, this can cause electric shock. Do not allow paper clips, pins or other foreign objects to fall into the printer these could cause a short circuit leading to an electric shock or fire hazard..
5. Never touch the plugs on either end of the power cable with wet hands, this can cause electric shock. When servicing the printer remove the power plug from the wall socket.
6. Use caution when inserting or removing the power connector. The power connector must be inserted completely otherwise a poor contact could cause overheating possibly leading to a fire. When removing the power connector grip it firmly and pull.
7. Take care of the power cable. Do not allow it to become twisted, bent sharply round corners or other wise damaged. Do not place objects on top of the power cable. If the power cable is damaged it could overheat and cause a fire or exposed cables could cause an electric shock. Replace a damaged power cable immediately, do not reuse or repair the damaged cable. Some chemicals can attack the coating on the power cable, weakening the cover or exposing cables causing fire and shock risks.
8. Ensure that the power sockets and plugs are not cracked or broken in any way. Any such defects should be repaired immediately. Take care not to cut or damage the power cable or plugs when moving the machine.
9. Use caution during thunder or lightening storms. We recommend that this machine be disconnected from the power source when such weather conditions are expected. Do not touch the machine or the power cord if it is still connected to the wall socket in these weather conditions.
10. Avoid damp or dusty areas, install the printer in a clean well ventilated location. Do not position the machine near a humidifier. Damp and dust build up inside the machine can lead to overheating and cause a fire.
11. Do not position the printer in direct sunlight. This will cause the temperature inside the printer to rise possibly leading to the printer failing to work properly and in extreme conditions could lead to a fire.
12. Do not insert any metal objects into the machine through the ventilator fan or other part of the casing, it could make contact with a high voltage conductor inside the machine and cause an electric shock.

Handling Precautions

The following instructions are for your own personal safety, to avoid injury and so as not to damage the printer

1. Ensure the printer is installed on a level surface, capable of supporting its weight. Failure to do so could cause the printer to tip or fall.
2. The printer contains many rollers, gears and fans. Take great care to ensure that you do not catch your fingers, hair or clothing in any of these rotating devices.
3. Do not place any small metal objects, containers of water, chemicals or other liquids close to the printer which if spilled could get into the machine and cause damage or a shock or fire hazard.
4. Do not install the machine in areas with high dust or moisture levels, beside on open window or close to a humidifier or heater. Damage could be caused to the printer in such areas.
5. Do not place candles, burning cigarettes, etc on the printer. These could cause a fire.

Assembly/ Disassembly Precautions

Replace parts carefully, always use genuine parts. Take care to note the exact location of parts and also cable routing before dismantling any part of the machine. Ensure all parts and cables are replaced correctly.

Please carry out the following procedures before dismantling the printer or replacing any parts.

1. Check the contents of the machine memory and make a note of any user settings. These will be erased if the main board or network card is replaced.
2. Ensure that power is disconnected before servicing or replacing any electrical parts.
3. Disconnect printer interface cables and power cables.
4. Only use approved spare parts. Ensure that part number, product name, any voltage, current or temperature rating are correct.
5. When removing or re-fitting any parts do not use excessive force, especially when fitting screws into plastic.
6. Take care not to drop any small parts into the machine.
7. Handling of the OPC Drum:
    - The OPC Drum can be irreparably damaged if it is exposed to light. Take care not to expose the OPC Drum either to direct sunlight or to fluorescent or incandescent room lighting. Exposure for as little as five minutes can damage the surface's photoconductive properties and will result in print quality degradation. Take extra care when servicing the printer. Remove the OPC Drum and store it in a black bag or other lightproof container. Take care when working with the covers (especially the top cover) open as light is admitted to the OPC area and can damage the OPC Drum.
    - Take care not to scratch the green surface of OPC Drum Unit. If the green surface of the Drum Cartridge is scratched or touched the print quality will be compromised.

Disregarding this warning may cause bodily injury

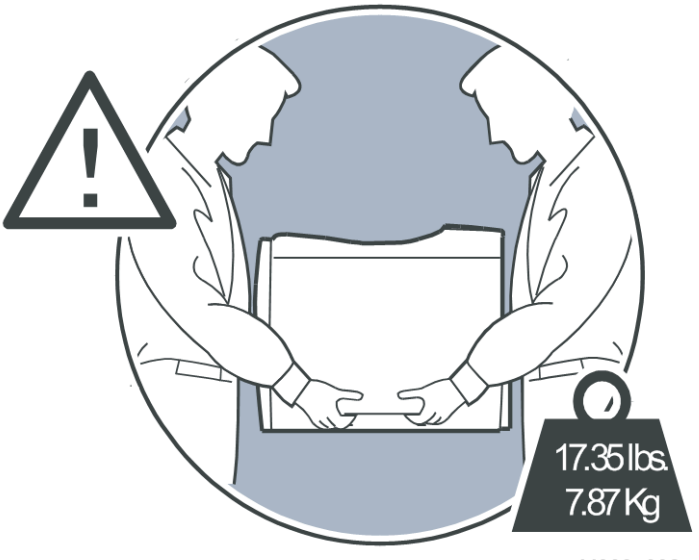
1. **Be careful with the high temperature part.**

   The fuser unit works at a high temperature. Use caution when working on the printer. Wait for the fuser to cool down before disassembly.

2. **Do not put fingers or hair into the rotating parts.**

   When operating a printer, do not put hand or hair into the rotating parts (Paper feeding entrance, motor, fan, etc.). If do so, you may get harm.

3. **When you move the printer.**



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   This printer weighs 7.87kg. Use safe lifting and handling techniques. Use the lifting handles located on each side of the machine. Back injury could be caused if you do not lift carefully.

4. **Ensure the printer is installed safely.**

   Ensure the printer is installed on a level surface, capable of supporting its weight. Failure to do so could cause the printer to tip or fall, possibly causing personal injury or damaging the printer.

5. **Do not install the printer on a sloping or unstable surface.**

   After installation, double check that the printer is stable.

ESD Precautions

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called "Electrostatically Sensitive (ES) Devices", or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor "chip" components.

The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

⚠CAUTION

- Be sure that no power is applied to the chassis or circuit, and observe all other safety precautions.

1. Immediately before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, employ a commercially available wrist strap device, which should be removed for personal safety prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESDs, place the assembly on a conductive surface, such as aluminum or copper foil, or conductive foam, to prevent electrostatic charge buildup in the vicinity of the assembly.
3. Use only a grounded tip soldering iron to solder or desolder ESDs.
4. Use only an "anti-static" solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.
7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.
9. Minimize bodily motions when handling unpackaged replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one's foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

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1. Installation

Installation Requirements

For details refer to the User's Guide.

2. Preventive Maintenance

PM Intervals

There are no PM parts in this machine.

Note

- Other than the three Yield Parts listed below, there is essentially no PM required on this product.
- These three items will need to be replaced in cases where their yield is near.

Description	Expected Yield	Q'ty/unit
Pick-up Roller	50K pages	1
Transfer Roller	50K pages	1
Fuser	50K pages	1

3. Replacement and Adjustment

General Precautions on Disassembly

When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

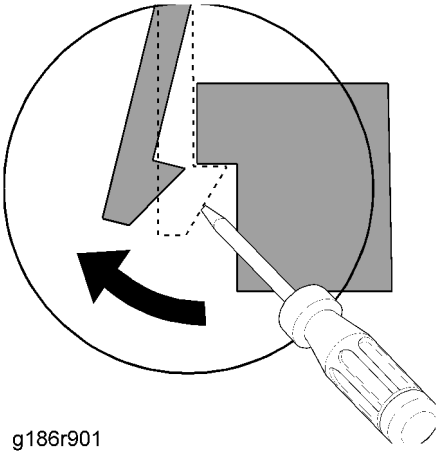
Check Points for Servicing

Whenever servicing the machine, you must perform as follows:

1. Check to verify that documents are not stored in memory.
2. Be sure to remove the print cartridge before you disassemble parts.
3. Unplug the power cord.
4. Use a flat and clean surface.
5. Replace only with authorized components.
6. Do not force plastic-material components.
7. Make sure all components are in their proper position.

Releasing Plastic Latches

Many of the parts are held in place with plastic latches. The latches break easily; release them carefully. To remove such parts, press the hook end of the latch away from the part to which it is latched.



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Cover Unit

Cassette and Front Cover

m009r301

1. Pull the cassette [A] out of the printer.

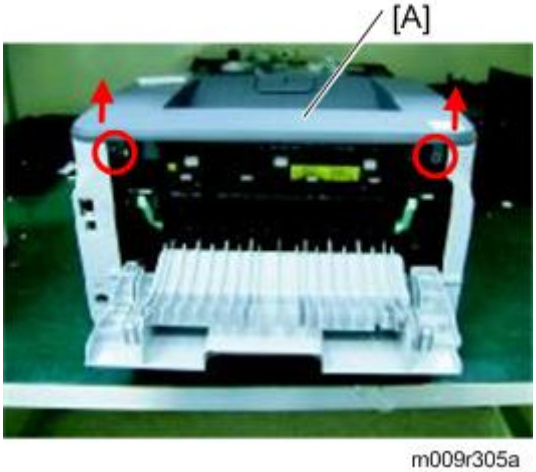
m009r302

2. Remove carefully the front cover [A], using caution with the hooks.
3. Remove the print cartridge [B].

Duplex Unit and Rear Cover

m009r304

1. Remove duplex unit [A].



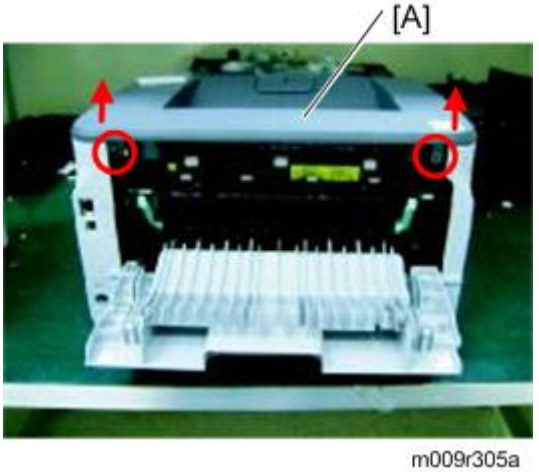
m009r305a

2. Remove the rear cover [A].

Top Cover

m009r302a

1. Open the front cover.
2. Remover the two screws.
3. Turn the machine around.



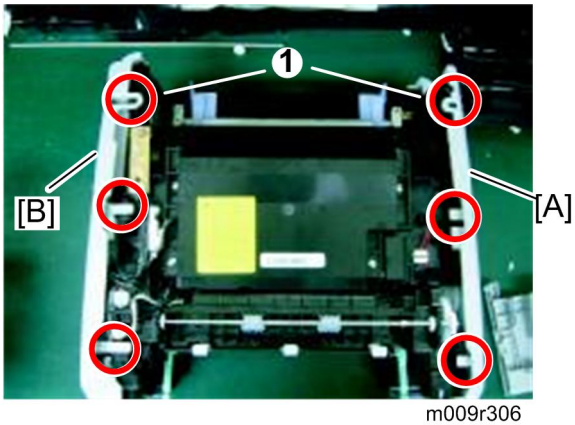
m009r305a

4. Open the rear cover.
5. Remove the two screws.
6. Remove the top cover [A].

Left and Right Cover

1. Before removing left/right cover, first remove:
    - Cassette and front cover (☛ Cassette and Front cover).

- Duplex unit and rear cover (☛ Duplex Unit and Rear Cover).
- Top cover (☛ Top Cover).

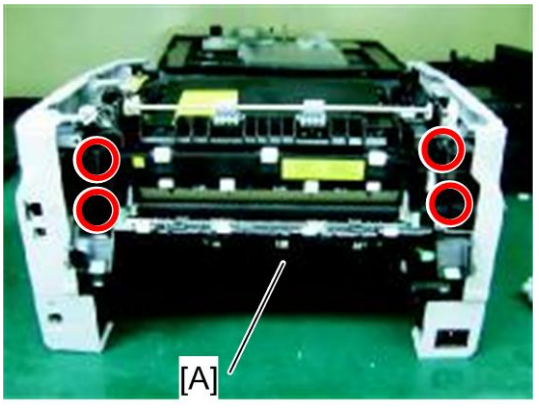


m009r306

2. Remove the first hooks ① from frame base and remove the other four hooks.
3. Remove left cover [A].
4. Remove right cover [B].

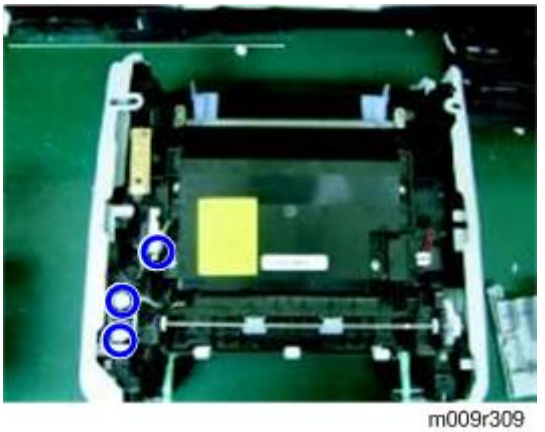
Fuser

1. Before removing fuser, first remove:
    - Duplex unit and rear cover (☛ Duplex unit and rear cover).
    - Top cover (☛ Top Cover).



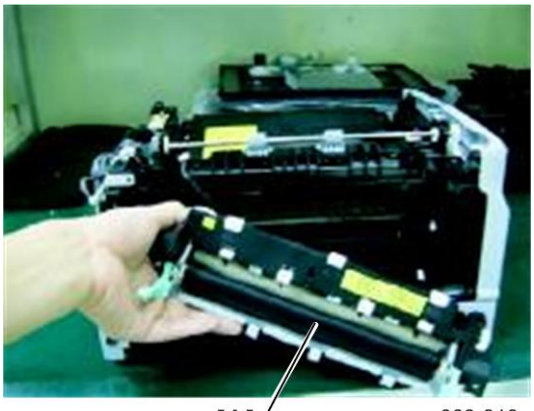
m009r308

2. Remove the rear guide [A].
3. Remove four screws.



m009r309

4. Disconnect three harnesses.



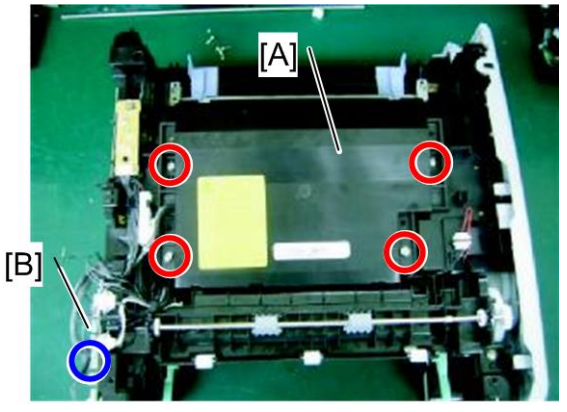
5. Remove the fuser [A].

Note

- Remove carefully to avoid damaging the harnesses.

LSU (Laser Scanning Unit)

1. Before removing the LSU, you should remove:
    - Top cover (☛ Top Cover).
    - Right cover (☛ Left and Right Cover)

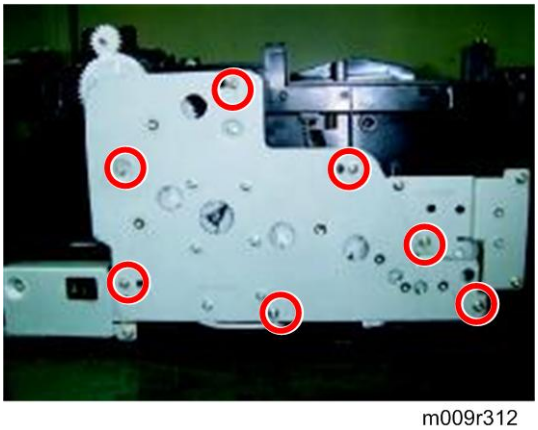


m009r311

2. Remove four screws (M4 x 10).
3. Disconnect the harness (one) from the main board [B].
4. Remove the LSU [A].

Drive

1. Before removing the drive, you should remove:
    - Top cover (☛Top Cover)
    - Left cover (☛ Left and Right Cover)



m009r312

2. Remove the seven screws indicated above.

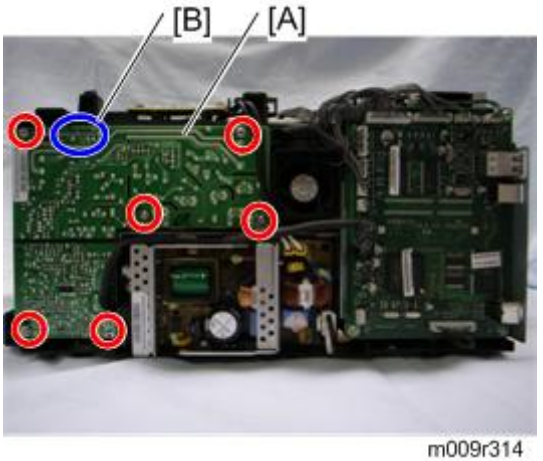
m009r313

3. Disconnect the harness of the drive assembly.
4. Drive [A]

HVPS/SMPS/Main Board

HVPS (High Voltage Power Supply)

1. Before removing the HVPS, you should remove:
    - Top cover (☛ Top cover).
    - Right cover (☛ Left and Right cover).



m009r314

2. Remove the six screws indicated above.
3. Disconnect the harness [B] at the back side of the HVPS [A].
4. Remove HVPS.

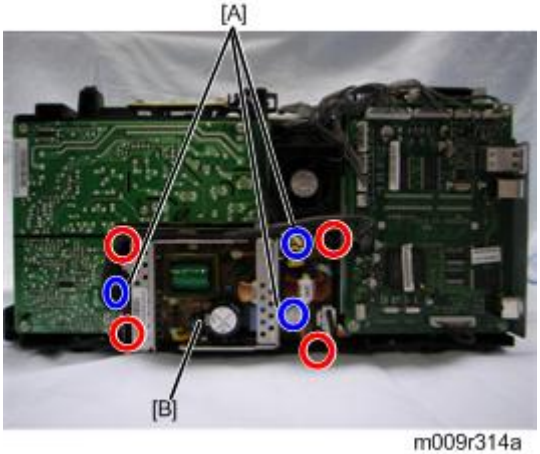
Note

- The Serial Number will be erased after replacing the main board.

5. Input the Serial Number (☛ Serial Number Input).

SMPS (Switching Mode Power Supply)

1. Before removing the SMPS, you should remove:
    - Top cover (☛ Top cover).
    - Right cover (☛ Left and Right cover).

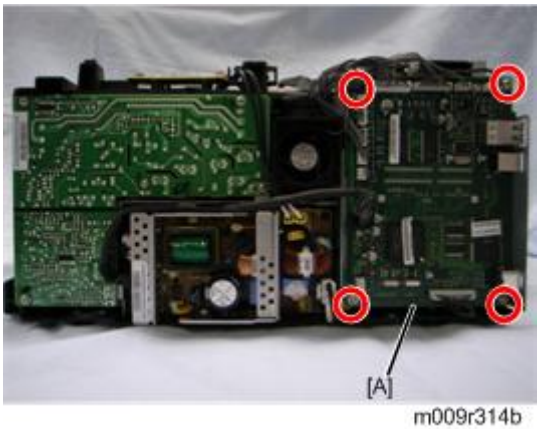


m009r314a

2. Disconnect the three harnesses [A] from the SMPS [B].
3. Remove the four screws.
4. Remove the SMPS [B].

Main Board

1. Before removing the main board, you should remove:
   - Top cover (☛ Top cover).
   - Right cover (☛ Right Cover).



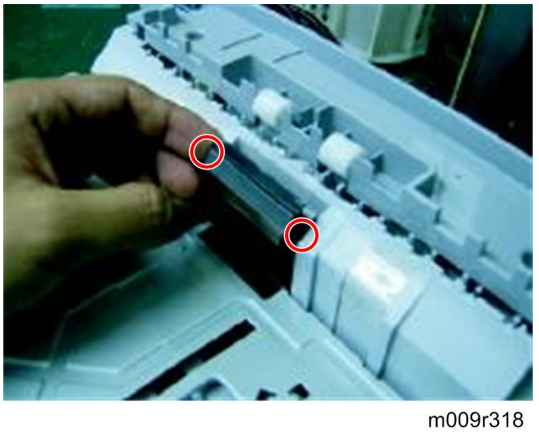
m009r314b

2. Disconnect all harnesses from the main board [A].
3. Remove the four screws.
4. Remove the main board.

Pad-Holder

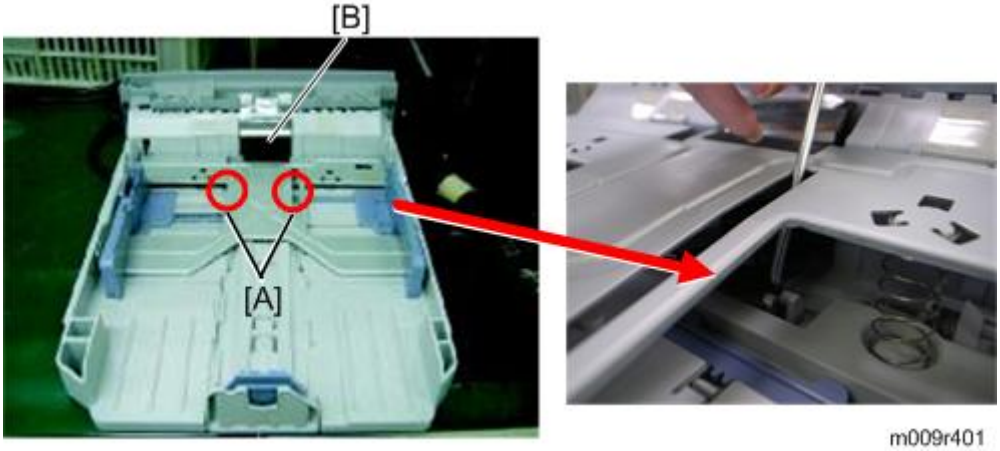
m009r301

1. Remove the cassette [A] from the printer.



m009r318

2. Release two hooks.

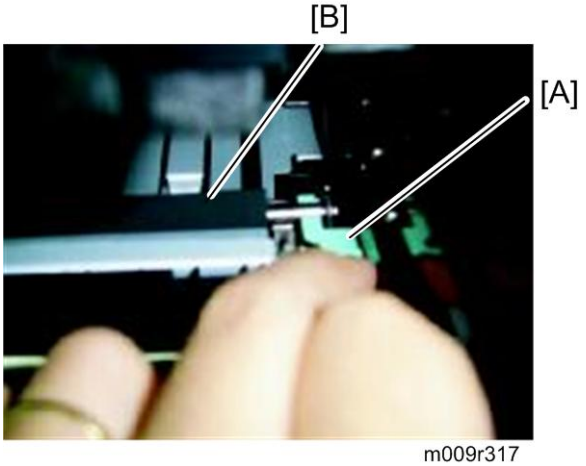


m009r401

3. Release both of pivots [A] as shown above.
4. Remove the pad-holder [B].

Transfer Roller

1. Open the front cover.
2. Remove the print cartridge.



m009r317

3. Push the transfer holder [A], which holds the transfer roller [B].


m009r317a

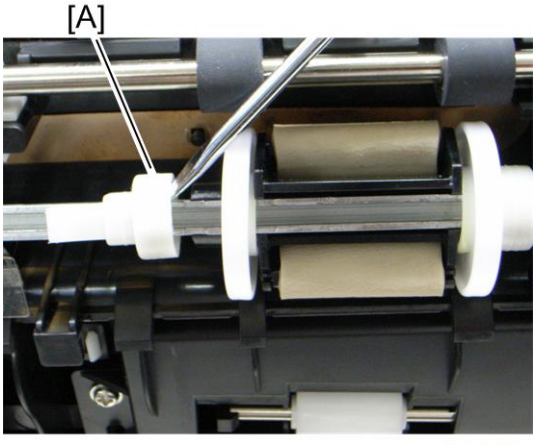
4. Remove the transfer roller from the printer.

Note

- Do not directly touch the transfer roller when replacing it.

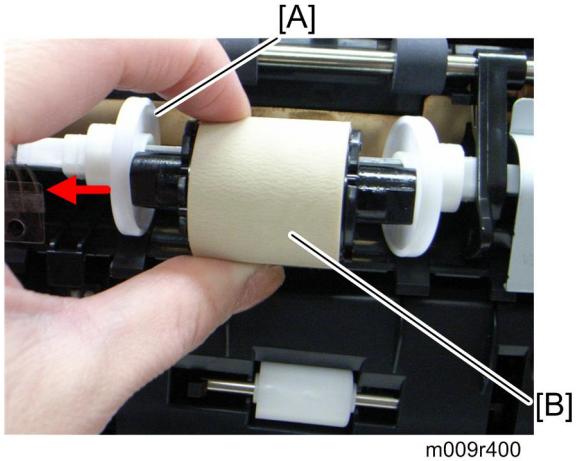
Pick-up Roller

1. Before removing the pick-up roller, you should:
   - Remove the print cartridge.
   - Remove the LSU (☛ LSU).
2. Put the printer on the flat surface.



m009r319

3. Slide the cam [A] to the left on the pick up roller shaft.



m009r400

4. Slide the roller positioners [A] toward the left end of the shaft, and rotate the pick-up roller [B] in order to take off it.

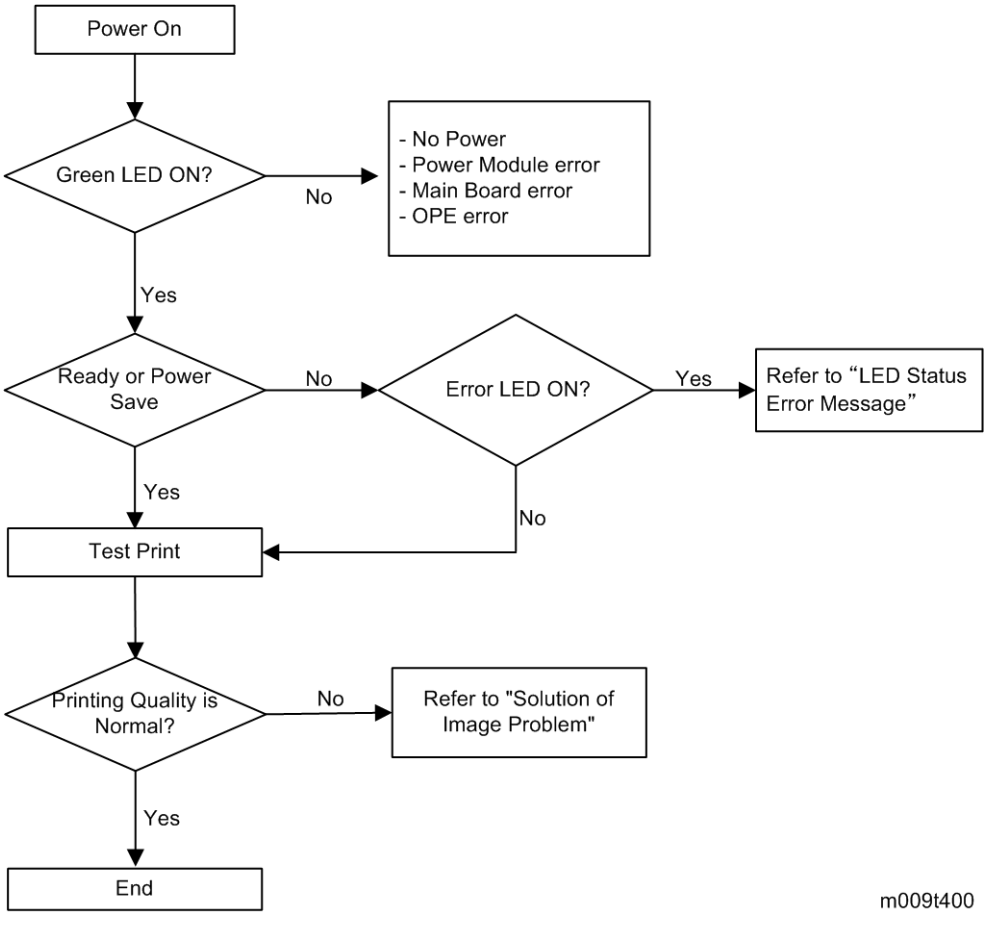
Note

- Confirm the correct direction of the pick-up roller when replacing it.

4. Troubleshooting

Procedure of Checking Symptoms

Before attempting to repair the printer, first obtain a detailed description from the customer of the problem.



m009t400

Symptoms, Causes, and Solutions of Bad Images

Vertical Black Line and Band

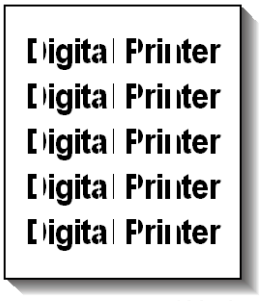
g186t534

Description:

1. Straight thin black vertical lines occur in the printing.
2. Dark black vertical band occurs in the printing.

Symptom and Cause	Solution
1. Deformed Doctor-blade or cleaning-blade, in print cartridge 2. Scratched surface of the charge roller in the print cartridge. 3. Partial depression or deformation on the surface of the transfer roller.	1. If causes one or two occur in the print cartridge, replace the print cartridge and try to print. 2. Replace the transfer roller if this occurs as No. three.

Vertical White Line



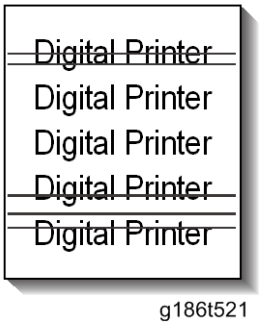
g186t535

Description:

White vertical voids in the image.

Symptom and Cause	Solution
1. Foreign matter stuck onto the window of internal lenses of LSU mirror. 2. Foreign matter or toner particles between the print cartridge roller and blade. (In case the life of the print cartridge has expired, white lines or light image may occur in front of the image.) 3. Burr and foreign substances are on the window of the print cartridge frame. 4. If the fuser is defective, voids occur periodically at the top of a black image. 5. Foreign substances are on the OPC Drum. 6. Partly depressed or deformed surface of the transfer roller	1. Foreign matter stuck onto the window: Clean the LSU window with recommended cleaner (IPA) Clean the window with a clean cotton swab. 2. Replace the print cartridge. 3. No 3: Remove the foreign matter and burr of the exposure window. (print cartridge) 4. No. 4: Open the front cover and check ribs that correspond to the position of the voids. Remove if found. 5. If the problems are not solved, replace the print cartridge. 6. Replace the transfer roller if occurred as No. 6

Horizontal Black Band



g186t521

4

Description:
Dark or blurry horizontal stripes occur in the printing periodically. (They may not occur periodically.)

Symptom and Cause	Solution
1. Bad contacts of voltage terminals to print cartridge. 2. The rollers of the print cartridge may be stained. Charge roller = 26.7mm Supply roller = 47.1mm Develop roller = 35.2mm Transfer roller = 47mm	1. Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (Remove the toner particles and paper particles.) 2. Clean the right Gear that has relatively small gap of the teeth in the OPC. 3. If the malfunction persists, replace the print cartridge.

Black/White Spot

g186t522

Description:

1. Dark or blurry black spots occur periodically in the printing.
2. White spots occur periodically in the printing.

Symptom and Cause	Solution
1. If dark or blurry black spots occur periodically, the rollers in the print cartridge may be contaminated with foreign matter or paper particles. (Charge roller: 26.7 mm interval OPC drum: 75.5 mm interval) 2. If faded areas or voids occur in a black image at intervals of 75.5 mm, or black spots occur elsewhere, the OPC drum surface is probably damaged. 3. If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired.	1. Run OPC cleaning Mode Print and run the Self-test 2 or 3 times. 2. In case of 75.5 mm interval irremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster. 3. The transfer roller guarantees 50.000 sheets printing in a normal environment. If the roller's life is expired, replace it. 4. In case of 75.5 mm interval irremovable in 1, take measures as to replace the print cartridge and try to print out. 5. Clean the inside of the set against the paper particles and foreign matter in order not to cause the problem.

Light Image

g186t523

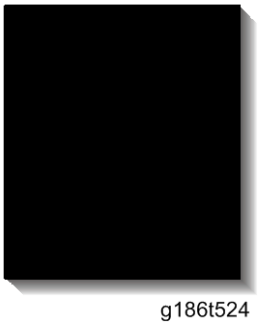
Description:

The printed image is light, with no ghost.

Symptom and Cause	Solution
1. Develop roller is stained when the print cartridge toner is almost consumed. 2. Ambient temperature is below 10°C.	1. Check if the Toner Save mode is off. Check if the density light is lit.

3. Bad contact caused by toner stains between high voltage terminal in the HVPS and the one in the set. 4. Abnormal output from HVPS. (Run self-test and check 1 to 4) 5. Check warranty out.	2. No 1: Replace the print cartridge and try to print out. 3. No 2: Wait 30 minutes after printer is powered on before you start printing. 4. No3: Clean up the area contaminated with toner. 5. Replace the HVPS if the problems are not solved by the above four instructions.

Dark Image or Black Page



g186t524

Description: The printed image is dark.	
Symptom and Cause	**Solution**
1. No charge voltage in the main board. 2. Charge voltage is not turned on due to bad contacts between power supply in the side of the print cartridge and charge terminal of HVPS. 3. VD0 signal of the main board is Low state.	1. Check the condition of the connector which connects the main board and HVPS. 2. Clean the high voltage charge terminal. 3. Replace the HVPS if not solved by step1 and 2 above. 4. Replace the LSU Unit or Main Board.

Uneven Density

g186t525

Description:

Print density is uneven between left and right.

Symptom and Cause	Solution
1. The pressure force on the left and right springs of the transfer roller is not even; the springs are damaged; the transfer roller is improperly installed; or the transfer roller bushing or holder is damaged. 2. The life of the print cartridge has expired. 3. The toner level is not even on the print cartridge roller due to a bad blade.	1. Replace both the left and right Spring Holder. 2. Gently shake the print cartridge. 3. Replace the print cartridge and run print test.

Background

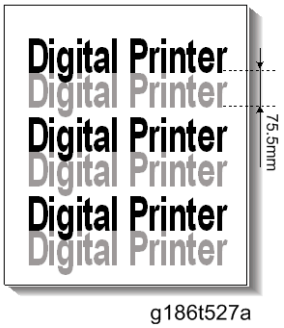
g186t526

Description:

Light dark background appears across entire printed page.

Symptom and Cause	Solution
1. Is the text less than 2% coverage per a page, and has the machine been out of operation for a long time? 2. Is a recycled print cartridge being used? 3. Has the life span of the print cartridge expired? 4. Is the movement (Up and Down) of the transfer roller smooth? 5. Is the HVPS normal?	1. The print cartridge is basically designed to print 7,000 pages with 5% coverage. If it prints more than 8,000 pages with 2% coverage, a background can occur. 2. The A/S is not guaranteed if using a recycled print cartridge. 3. Replace the print cartridge when the life span of it has expired. 4. Clean the bushing part of the transfer roller. 5. If the problem is still not solved, replace the print cartridge.

Ghost (1)



g186t527a

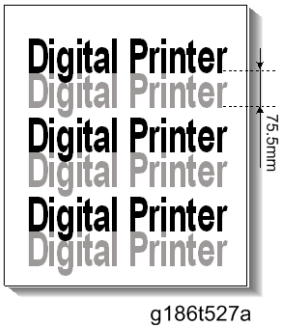
Description:

Ghost occurs at 75.5 mm intervals of the OPC drum across entire printed page.

Symptom and Cause	Solution
1. Bad contacts caused by contamination from toner particles between the high voltage terminal in the main body and the electrode of the print cartridge. 2. Bad contacts caused by contamination from toner particles between high voltage terminal of the main body and the one in the HVPS board. 3. The life of print cartridge has expired.	1. Clean the terminals when contaminated by toner particles. 2. For the print cartridge, replace the print cartridge and try to print out. 3. Replace the main board if not solved by steps 1 and 2 above. 4. If not solved by the step 3, check the transfer roller lifetime and replace it.

4. Transfer roller lifetime (50,000 sheets) has been exceeded. 5. Abnormal, low temperature (below 10°C). 6. Damaged cleaning blade in the print cartridge.	5. Wait about 1 hour after power on before using printer. 6. For the print cartridge, replace the print cartridge and try to print out.

Ghost (2)



g186t527a

Description:	
Ghost occurs at 75.5 mm intervals of the OPC drum on all pages of print jobs. (When printing on card stock or transparencies using manual feeder)	
Symptom and Cause	**Solution**
When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required.	Select Card stock or OHP Film on paper type menu from the software application setting. After using, it is recommended that the mode should be returned to the original setting.

Ghost (3): Fuser

g186t527b

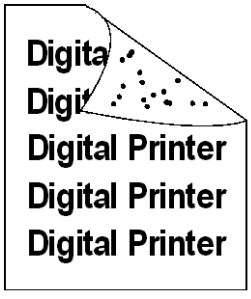
Description: Ghost occurs at 62.8 mm or 77.6mm intervals.	
Symptom and Cause	**Solution**
The temperature of the fuser is maintained at a high temperature.	Disassemble the fuser and remove the contaminated toner particles on the roller, and clean out the foreign matter between the thermistor and heat roller. (Caution: can be deformed)

Stains on the Face of Page

g186t529

Description: The background on the face of the printed page is stained.	
Symptom and Cause	**Solution**
1. Toner leakage due to improperly sealed print cartridge. 2. If the transfer roller is contaminated, stains on the face of a page may occur.	1. Replace the print cartridge. 2. If the transfer roller is contaminated, run OPC Cleaning Mode Print 2 or 3 times. And perform Self-Test 2 or 3 times to remove contamination.

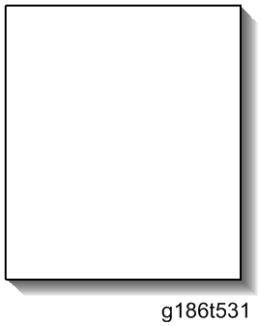
Stains on the Back of Page



g186t530

Description: The back of the page is stained at 47 or 62.8 mm intervals.	
Symptom and Cause	**Solution**
1. 47mm: Transfer roller is contaminated. 2. 62.8mm: Pressure roller is contaminated.	1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run self-test to remove the contamination of the transfer roller. 2. Replace the transfer roller if contaminated severely. 3. Disassemble the fuser and clean the H/R (Heat Roller) and P/R (Pressure Roller). Also check the area between H/R and Thermistor. If contaminated, clean the area, taking caution not to cause deformation of roller.

Blank Page Print out (1)

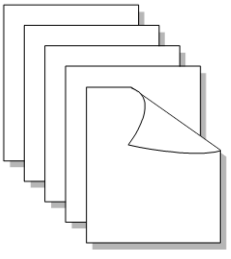


g186t531

Description:

Blank page is printed.	
Symptom and Cause	**Solution**
Bad ground contacts in OPC and/or print cartridge.	1. Check if the Ground-OPC is defective (set inside left side). 2. Remove contamination from the terminals of the print cartridge and the unit.

Blank Page Print out (2)



g186t532

Description:

1. Blank page is printed.
2. One or several blank pages are printed.
3. When the printer turns on, several blank pages print.

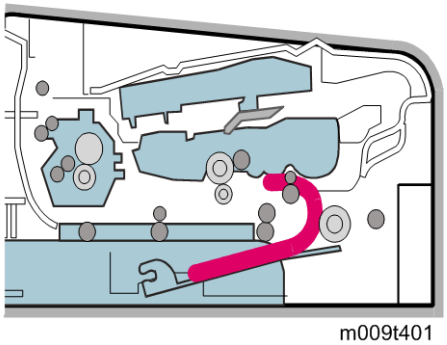
Symptom and Cause	**Solution**
1. Bad ground contacts in OPC and/or print cartridge. 2. Abnormal solenoid.	1. Remove contamination of the terminals of the print cartridge. 2. Perform the engine self test using EDC Mode to check if the Solenoid is normal. 3. If not solved by steps 1 and 2 above, replace the engine board. 4. Turn the power off, delete print data from PC and try printing again.

Discharge Symptoms, Causes, and Solutions

Wrong Print Position

Description: Printing begins at the wrong position on the paper.	
Symptom and Cause	**Solution**
Wrong sensing time caused by defective feed sensor actuator.	Replace the defective feed sensor actuator.

JAM 0

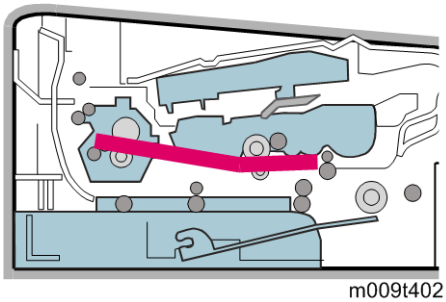


m009t401

Description: 1. Paper does not exit the cassette. 2. Jam-0 occurs if the paper feeds into the printer.	
Symptom and Cause	**Solution**
1. Check the solenoid by using EDC Mode. 2. Check if the pad is loose due to bad sealing of the side-pad. 3. Check the surface of the roller-pickup for foreign matter. 4. If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup opens or is broken away.	1. Replace the solenoid. 2. Replace the side-pad Assembly L or R, if necessary. 3. Clean with soft cloth dampened with IPA (Isopropyl Alcohol) or water. 4. Replace the main board and/or Sensor.

5. If the paper feeds into the printer and Jam 0 occurs, perform EDC Mode to check the feed-sensor of the main board.	

JAM 1



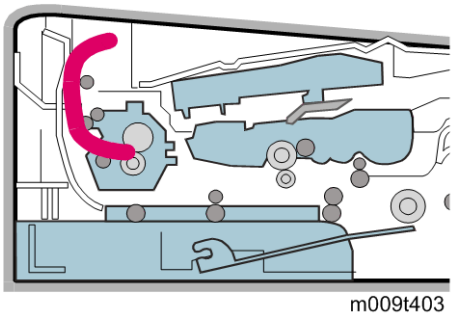
m009t402

Description:

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.

Symptom and Cause	Solution
1. If paper is jammed in front of or inside the fuser. 2. If the recording paper is stuck in the discharge roller and the fuser just after passing through the Actuator-Feed, Feed Actuator may be defective.	1. Replace the SMPS or Exit-Sensor. 2. Replace the main board. 3. Reassemble the Actuator-Feed and Spring-Actuator if the movement is bad.

JAM 2



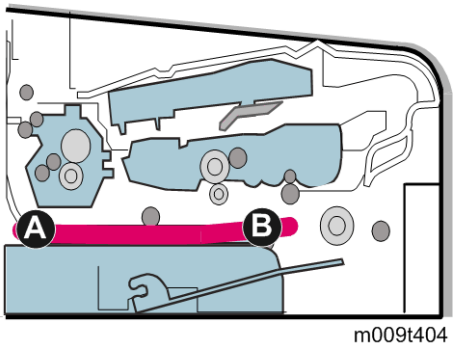
m009t403

Description:

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.

Symptom and Cause	Solution
1. If the paper is completely fed out of the printer, but Jam 2 occurs: Exit sensor is defective. • After the paper is completely discharged, actuator Exit should return to the original position to shut the photo-sensor. Sometimes it takes longer than it should and does not return. 2. If the paper is rolled in the Fuser Roller: • This occurs when a Guide claw is broken away or transformed. • It occurs when the Spring of a Guide claw is broken away or transformed. • It occurs when the Heat-Roller or Pressure-Roller is seriously contaminated with the toner. 3. Paper is accordion in the fuser.	1. Check if the exit sensor actuator is defective. • Check if the actuator exit is deformed (Check if the lever part is deformed). • Check whether burrs occur in the assembly part of the actuator exit or not and if the actuator is smoothly operated. • Check if foreign matter and wire get caught in the actuator exit's operation. 2. If the paper is stuck in the fuser: disassemble the fuser and remove the jammed paper, and clean the surface of the pressure roller with dry gauze. 3. Remove the jammed paper after disassembling the fuser: Clean the surface of the pressure roller with dry gauze. • Remove the toner particles stained on the rib. • Check the assemblage and performance of the exit.

Duplex Jam



m009t404

Description: Recording paper is Jammed in front or inside the duplex	
Symptom and Cause	**Solution**
1. When paper cannot trigger the duplex sensor. 2. When paper cannot reach the duplex sensor due to a paper jam on a duplex path.	1. Replace the SMPS or main PBA 2. When a paper jam occurs on (A) after it is reversed: replace the 2nd exit roller after checking its operation. 3. When a paper jam occurs on (B) after it is reversed: replace the duplex roller after checking its operation

Multi-Feeding

Description: Multiple sheets of paper are fed at once.	
Symptom and Cause	**Solution**
1. Check the Guide side L/R or Guide Rear in the Cassette, if the position is correct. 2. Solenoid malfunction (the solenoid does not work properly): Perform EDC Mode. 3. Pad-Friction is contaminated with foreign matter. (oil...) 4. The face of the paper is bent.	1. Replace the solenoid if necessary. 2. Replace the main board. 3. Clean the pad friction with soft cloth dampened with IPA (Isopropyl Alcohol). 4. Use smooth paper.

Paper Rolled in the Fuser

Description: If contaminated at intervals of 77.6mm on the back of the paper.	
Symptom and Cause	**Solution**
1. Contamination of the pressure roller or heat roller (Background, Hot off set). 2. Check the claws of the fuser for deformities.	1. After disassembling the fuser, clean contamination between the heat roller and the thermistor and remove the contamination of the pressure roller.

	2. If there is a heavy background, repair it with the background troubleshooting method. 3. Clean the surface of the heat roller with IPA or water 4. Check the warp or separation of the print claw and the holder plate claw, and then manage it.

Paper Rolled on the OPC Drum

Description: Paper is rolled up in the OPC.	
Symptom and Cause	**Solution**
1. Paper is too thin. 2. The paper is curled.	1. Use of normal paper is recommended. 2. How to remove rolled paper from the OPC. • Remove the paper while turning the OPC against the ongoing direction. • Clean fingerprints on the OPC gently with damp soft cloth.

Malfunction Causes and Solutions

Fuser Error

Description: All LEDs are blinking	
Check...	**Solutions**
1. Check whether thermostat, AC wire, and heat lamp are open or not. 2. Check whether thermistor is open or not. 3. Heat lamp ON/OFF test 4. Operation is impossible due to a gear of a fuser being melted.	1. Replace the fuser if the thermostat is open. 2. Replace the fuser if a thermistor sensor is located deep inside of a sponge. 3. Check whether the overheat mode circuit is operating normally or not. 4. Replace the fuser.

LSU (Laser Scanning Unit) Error

Description: "PMOTOR ERROR/HSYNC ERROR"	
Check...	**Solutions**
1. Check whether the LSU (Laser Scanning Unit) connector is disconnected or not. 2. Check whether the LSU motor is rotating or not. 3. Check the HSYNC signal.	1. Replace the LSU. 2. Replace the main board if the same error occurs again after replacing the LSU.

Malfunction of the Gear of the Fuser due to Melting

Description: The motor breaks away from its place due to gear melting away.	
Check...	**Solutions**
Check the Heat lamp.	1. Replace the Fuser.

	2. Replace the main board. 3. Replace the SMPS.

Paper Empty

Description: The status LED on the operation panel is on even when paper is loaded in the cassette.	
Check...	**Solutions**
1. Bending or deformation of the actuator of the paper sensor. 2. The main board is defective 3. Check the connector.	1. Replace the defective actuator. 2. Replace the empty sensor main board.

Paper Empty without Indication

Description: The paper lamp on the operation panel does not come on when the paper cassette is empty.	
Check...	**Solutions**
1. Bending or deformation of the actuator of the paper sensor. 2. The main board is defective.	1. Replace the defective actuator. 2. Replace the defective board.

Cover Open

Description: The ERROR lamp is on even when the print cover is closed.	
Check...	**Solutions**
1. The hook lever in the top cover may be defective. 2. Check connectors and the cover switch department in the main board.	1. Replace the hook lever, if defective. 2. Check the insertion of the cover-open S/W connector. 3. Replace the main board or cover open S/W.

No Error Message when the Cover Is Open

Description:
An ERROR message does not come on even when the printer cover is open

Check...	Solutions
1. Check the cover-open circuit on the main board. 2. Check the cover-open board.	1. Check the insertion of the cover-open S/W connector. 2. Replace the main control board or cover-open board.

Defective Motor Operation

Description:
Main motor is not driving when printing, and paper does not feed into the printer, resulting 'Jam 0'.

Check...	Solutions
1. Contamination of the pressure roller or heat roller (Background, Hot off set) 2. Check whether the claw of the fuser is deformed.	1. After disassembling the fuser, clean contamination between the heat roller and the thermistor and remove any contamination on the pressure roller. 2. If there is heavy background, repair it by the background troubleshooting method. 3. Clean the surface of the heat roller with IPA or water. 4. Check the warp or the holder plate claw and the holder plate clew, and then manage it.

No Power

Description:
When system power is turned on, all lamps on the operation panel do not come on.

Check...	Solutions
1. Check if the power input and SMPS output are normal.	1. Replace the operation panel. 2. Replace the control board.

2. Check for functionality of the LED-Panel or LCD window on the front-cover if the operation panel does not show anything after warming-up.	

Curved Vertical Line

Description: When printing, vertical lines become curved.	
Check...	**Solutions**
1. If the supply of +24v is unstable in the main control board linking with LSU, check drive by EDC mode: LSU check. 2. Check the DEVE main board in the print cartridge.	1. Replace LSU. 2. Replace the Toner Joint main board. 3. Replace the main board.

Software (Errors, Symptoms, Causes and Solutions)

Printer Not Working (1)

Description:

When main power is turned on, the printer is not working in printing mode.

Symptom and Cause	Solution
1. Run Self-Test Mode: Turn the power on while pressing the test printing button for 2 or 3 seconds - printing should begin. 2. Check if the PC and the printer are properly connected and the print cartridge installed. 3. Printing not working on the computer side. 4. Check if the printer cable is directly connected to peripheral devices.	1. Check that the printer has power, and perform the Self-Test. Successful test printing indicates that there are no problems in the printer itself. Unsuccessful test printing indicates that the problem is with the printer, and is not due to a software issue. 2. Replace the printer cable. If the problem is not solved even after the cable is replaced, check the amount of remaining toner. 3. Check if the connection between the PC and printer port is proper. If you use MS-Windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check which application is attempting to print. The best way to run a quick check, is to try printing a few lines of text from Memo-Pad in order to check printer functionality. If printing is not working for a certain application, adjust the printing settings for that application. Sometimes a simple adjustment will produce a normal printout, but may still fail to work with a particular software application. In such cases, install the newest driver again. If not working in basic programs, then check if the CMOS port is on ECP. Also check the address of IRQ 7 and 378. 4. If a scanner needs to be connected to the printer, first remove the scanner from the PC to see if the printer is properly working alone.

Printer Not Working (2)

Description:

After receiving a printing order, response is slow or nonexistent due to wrong setup rather than a malfunction of the printer itself.

Symptom and Cause	Solution
1. More hard disk space necessary. 2. Printing error occurs even if there is enough space on the hard disk. 3. Check parallel-port-related items in the CMOS Setup. 4. Reboot the system to print.	1. Not working with the message 'insufficient printer memory' indicates an HDD space problem rather than a RAM problem. In this case, provide more space on the hard disk. Secure more space using disk utilities, etc. 2. The connection of the cable and printer port is not proper. Check if the connection is properly done and if the parallel port in CMOS is properly set up. 3. As a printer port, Select ECP or SPP out of SPP (Normal), ECP, and EPP modes. SPP normal mode supports 8-bit data transfer, while ECP Mode transfers 12-bit data. 4. If regular fonts are not printing, the cable or the printer driver may be defective. 5. Turn the PC and printer off, and reboot the system to print again. If this doesn't solve the problem, double-click the printer icon in My Computer If regular fonts are not printed taking this step, then the cable may be defective, so try replacing the cable with new one.

Abnormal Printing

Description:

The printer is not working properly even when the cable has been verified to be good (after replacing the cable, etc.).

If the printer won't work at all or the strange fonts are repeated, the printer driver may be defective or wrongly set up in the CMOS Setup.

Symptom and Cause	Solution
1. Set up the parallel port in the CMOS SETUP. 2. Printer Driver Error. 3. Error message from insufficient memory. 4. (The printing job sometimes stops due to insufficient virtual memory, but it actually comes from insufficient space on the hard disk.)	1. Select SPP (Normal) or ECP LPT Port (among ECP, EPP or SPP) in the CMOS Setup. 2. Check the printer in My Computer. (To see if the printer driver is compatible with the present driver. Delete old driver, if defective, and reinstall new one.) 3. Delete unnecessary files to open up enough space of the hard disk and start printing job again.

Spool Error

Description:

To spool: (SPOOL - Simultaneous Peripheral Operations OnLine" a computer document or task list (or "job") is to read it and store it, usually on a hard disk or larger storage medium so that it can be printed or otherwise processed at a more convenient time (for example, when a printer is finished printing its current document).

Symptom and Cause	Solution
1. Insufficient space on the hard disk in the directory assigned for the basic spool. 2. If the previous printing error remains. 3. When expected to interfere with other program. 4. When an application program or the printer driver is damaged. 5. When some files related to OS are damaged or virus infected. 6. Actual memory is less than suggested.	1. Delete unnecessary files to provide more space to start printing job. 2. If there are some files with the extension name of ****.jnl, delete them and reboot Windows to restart the printing job. 3. Shut down all other programs except the current one, if possible. 4. Delete the printer driver completely and reinstall it. 5. After rebooting the computer, check for viruses, restore the damaged files and reinstall the application that will be running the printing job. 6. Install additional memory in the PC.

Note

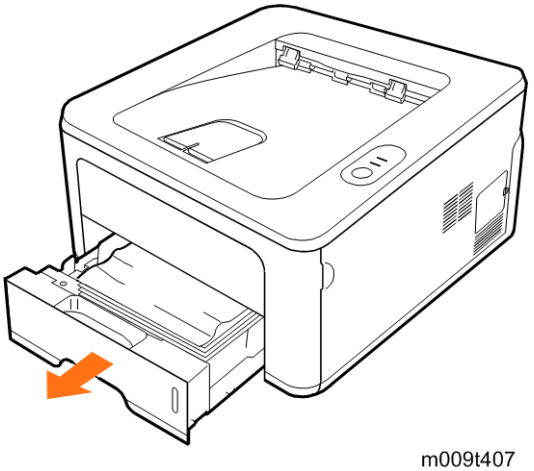
- In the spool manager, the installed drivers and the list of the documents waiting to be printed are shown. Select the document to be deleted and check the delete menu.
- If you intend to delete the current document being printed, the data being transferred to the printer will be stopped and then the document removed. Before choosing the document, the menu is still inactive.
- Or remove the document from the list and repeat the routine as outlined above or else finish the spool manager.

Clearing Paper Jams

Paper Feed Area

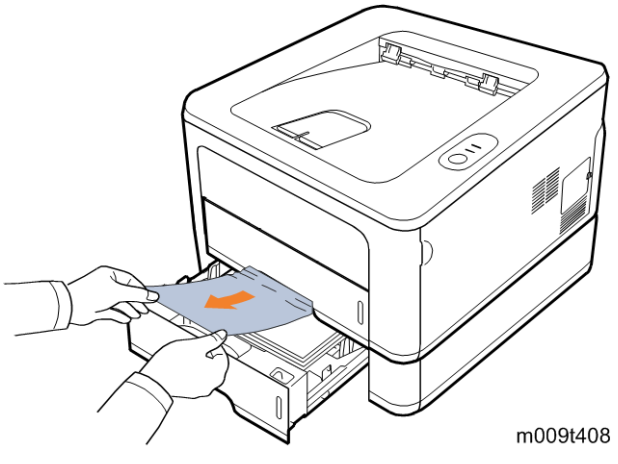
Tray 1

Do the following procedure to solve this type of paper jam.



m009t407

1. Pull the tray 1.



m009t408

2. Carefully pull the jammed paper straight out. Make sue that all of the paper is properly aligned in the tray 1.

Note

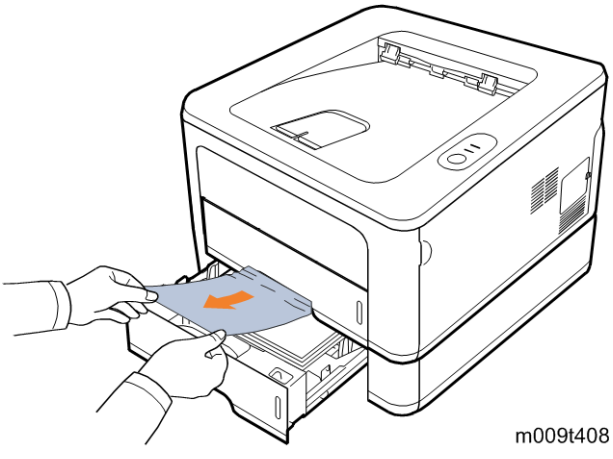
- If the paper does not move when you pull, or if you do not see paper in this area, check the fuser area around the print cartridge.

3. Insert tray 1 into the printer until it snaps into place. Printing should resume.

Optional tray 2

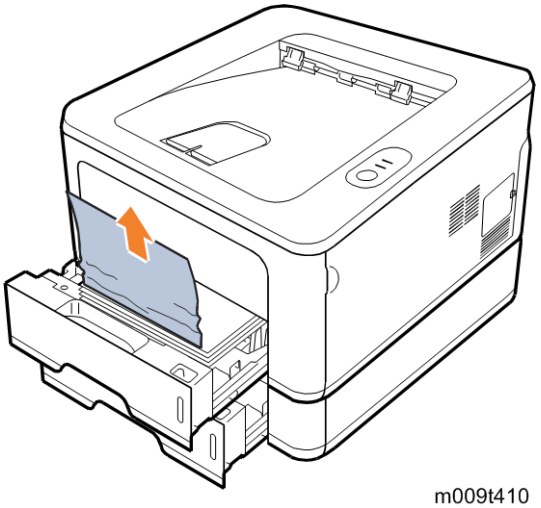
Do the following procedure to solve this type of paper jam.

1. Pull open the optional paper tray 2.



m009t408

1. Remove the jammed paper from the printer. Do not continue if the paper does not move or if you do not see the paper in this area. In this case, go to the next step.



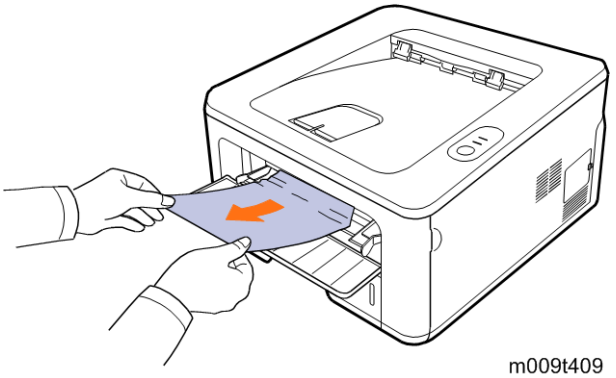
m009t410

2. Pull the tray 1 halfway out.
3. Pull the paper straight up and out.

4. Insert tray 1 and tray 2 back into the printer. Printing should resume.

In the manual tray

Do the following procedure to solve this type of paper jam.



m009t409

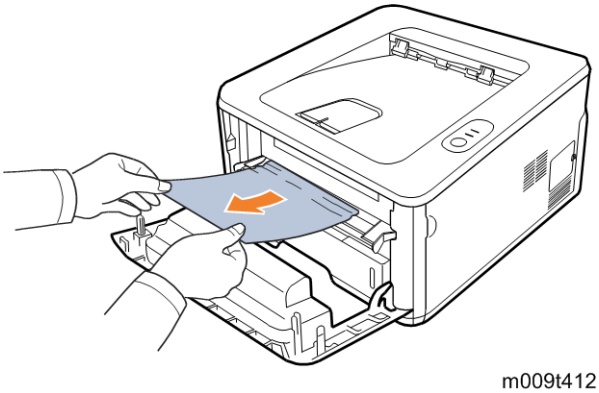
1. Remove the jammed paper from the printer.
2. Open and close the front cover.
3. Load a sheet of paper into the manual feeder. Printing should resume.

Print Cartridge Area

Do the following procedure to solve this type of paper jam.

m009t411

1. Open the front cover and remove the print cartridge.



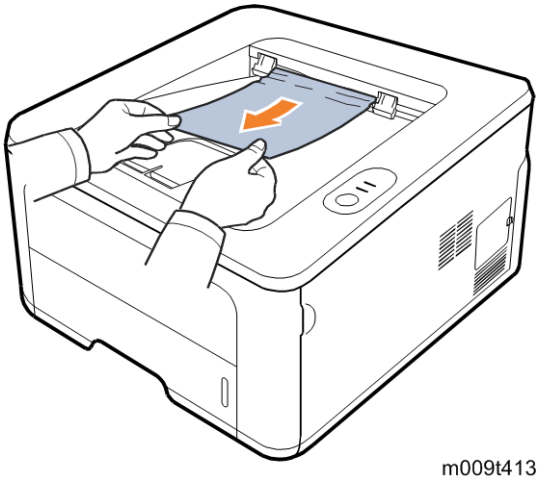
m009t412

2. Carefully pull the jammed paper straight out.
3. Replace the print cartridge and close the front cover. Printing should resume.

Paper Exit Area

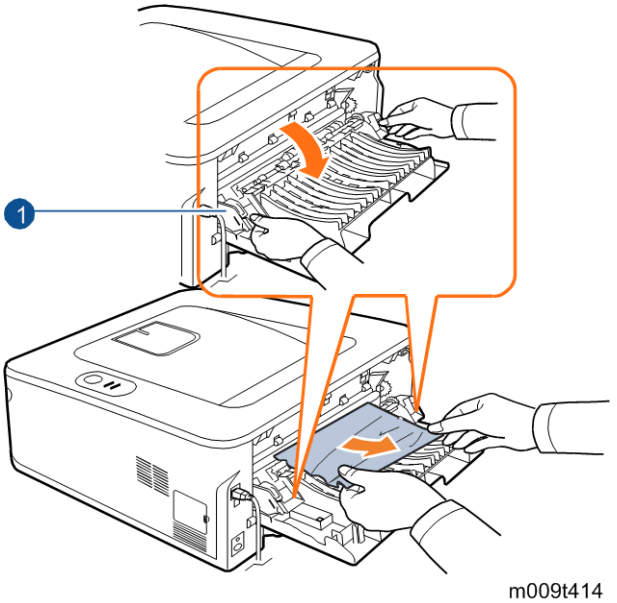
Do the following procedure to solve this type of paper jam.

1. Open and close the front cover. The jammed paper should be automatically ejected from the printer.



m009t413

2. Carefully pull the paper out of the output tray. Do not continue if there is any resistance or if you do not see the paper. In this condition, go to the next step.



m009t414

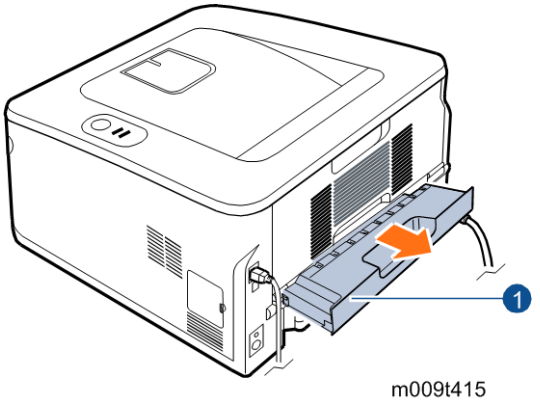
3. Pull the rear guide ① on each side down, and remove the paper.
4. Return the rear guide to its original position.
5. Close the rear cover. Printing should resume.

Duplex Unit Area

If the duplex unit is not inserted correctly, a paper jam may occur. Make sure that the duplex unit is inserted correctly.

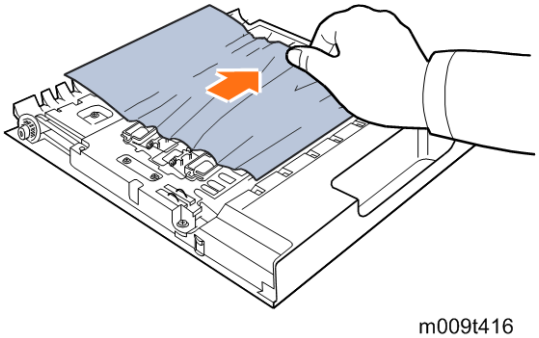
Duplex Jam 0

Do the following procedure to solve this type of paper jam.



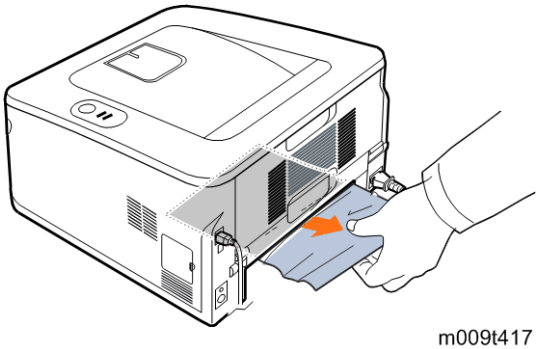
m009t415

1. Pull the duplex unit ① out of the printer.



m009t416

2. Remove the paper from the duplex unit.



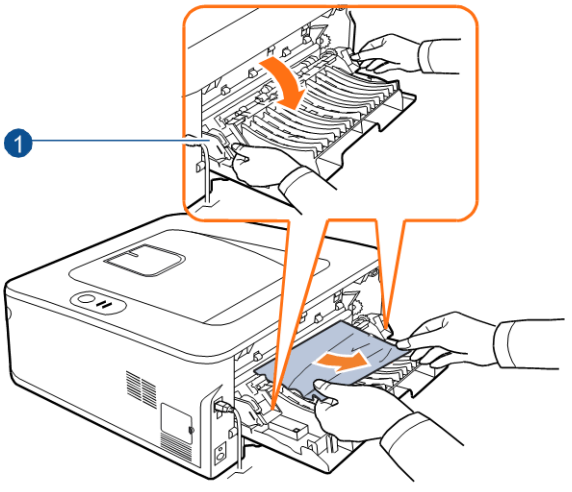
m009t417

3. Remove the paper from the bottom of the printer if the paper does not come out with the duplex unit.

Duplex Jam 1

Do the following procedure to solve this type of paper jam.

1. Open the rear cover.



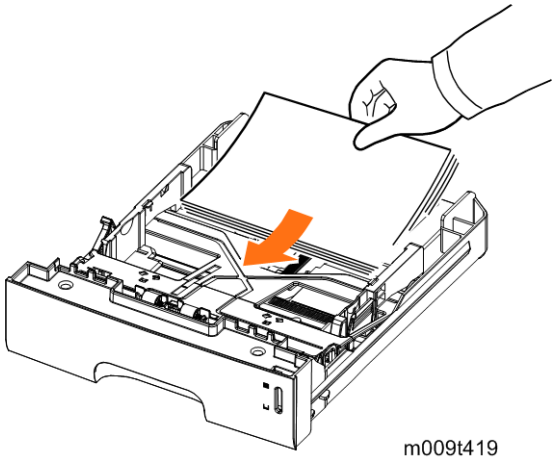
m009t418

2. Pull the rear guide ① on each side down and remove the paper.
3. Return the rear guide to its original position.
4. Close the rear cover. Printing should resume.

Tips to Avoid Paper Jams

Do the following procedure to reduce paper jam occurrences.

- Make sure that the adjustable guides are positioned correctly.
- Ensure that the paper is below the paper capacity mark on the right inside of the tray.
- Do not remove the paper from the tray at the time the machine prints.
- Flex, fan and straighten the paper before you load it into the paper feed unit.
- Do not use creased, dropped or highly curled paper.
- Do not mix paper types.
- Use only recommended print media.
- Ensure that the recommended print side of print media is facing down when you load paper to the input tray, or facing up in the bypass tray.
- If paper jams occur frequently when you print on A5-sized paper, then load the paper into the tray with the long edge facing the front of the tray as shown below.

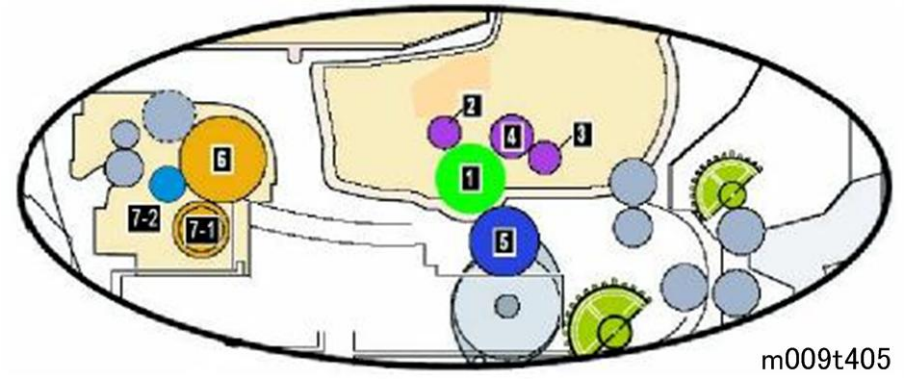

m009t419

Periodic Defective Image

If defective images regularly occur in print-outs, it may be due to a defective or damaged roller.

Refer to the table below and check the condition of the roller.

No	Roller	Defective image	Typical defect
1	OPC Drum	75.5 mm	White spots, black spots
2	Charge Roller	26.7 mm	Black spots and periodic bands
3	Supply Roller	47.1 mm	Periodic bands with slight differences in density
4	Developing Roller	35.2 mm	White spots, horizontal black bands
5	Transfer Roller	47 mm	Ghosting, damaged image due to abnormal transfer
6	Heat Roller	77.6 mm	Black spots or vertical black bands
7	Pressure Roller_1st	62.8 mm	Black background
8	Pressure Roller_2st	37.7 mm	Black background



5. Service Tables

Firmware Download

Download Procedure

There are two ways to upgrade the machine firmware.

1. Command Prompt
2. WIM (Web Image Monitor)

Connect the machine to a PC with the USB “Command Prompt” or through the network for “WIM” before you do the firmware upgrade procedure.

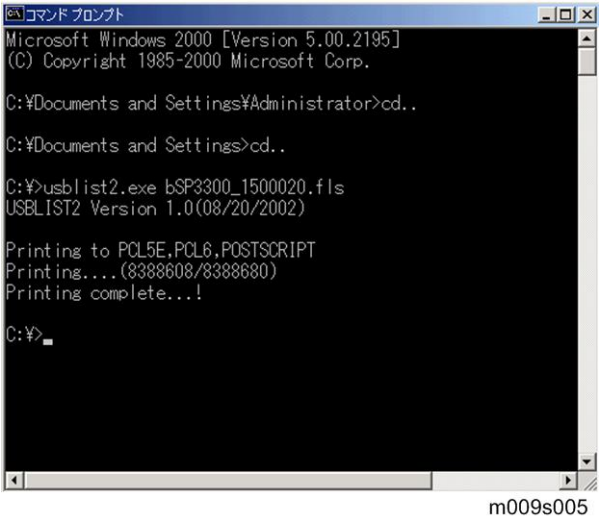
It is very rare to lose data and settings after the program has downloaded. However you should print out the Configuration page list before you start the download procedure.

DOS Command Mode

Program (firmware) for this machine can be upgraded by connecting to a PC via a USB cable. A Command to upgrade the program must be entered.

You must save the correct firmware file to the PC.

1. Print out the Configuration page for back up the data and setting.
2. Download the "usblist2.exe" file and “firmware file” to the PC.
3. Connect the PC and the machine with a USB cable.
4. Turn on the main power of the machine.
5. Open the DOS command window.
6. Enter the directly where you have already downloaded the firmware.



m009s005

7. Run the "usblist2.exe" and “firmware file”.
    - In Command prompt, type " usblist2.exe XXX" and press enter key. XXX indicates the firmware name as shown above.

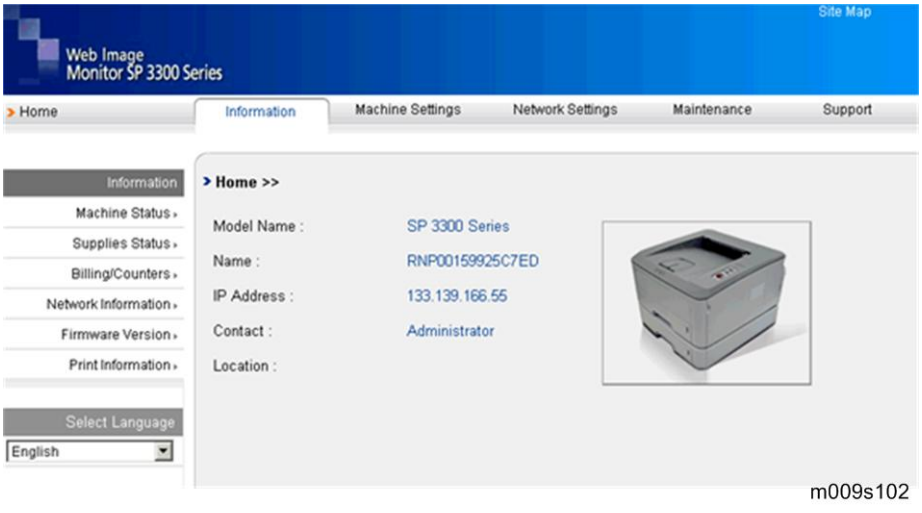
Note

- Do not turn off the machine during the firmware upgrading.

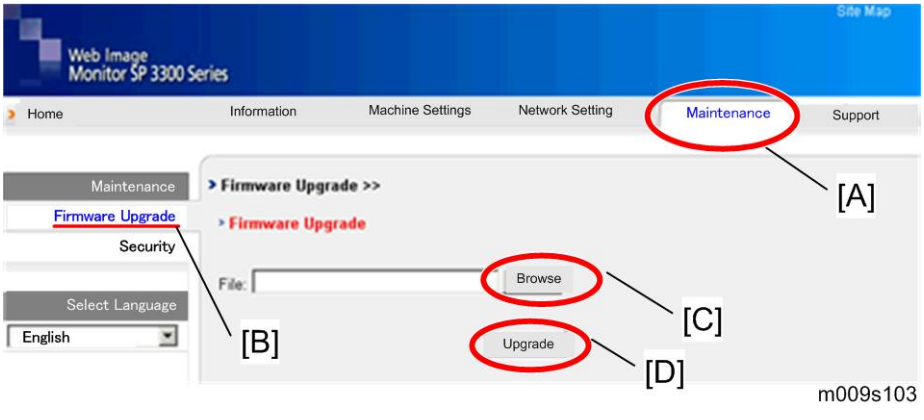
WIM (Web Image Monitor) mode

Program (firmware) for this machine can be upgraded by connecting to a PC through Network.You must save the correct firmware file to the PC.

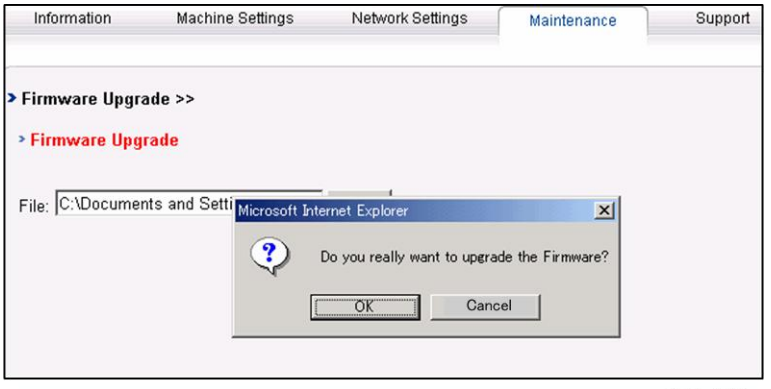
1. Print out the Configuration page for back up the data and setting.
2. Download the Firmware on the PC.



3. Access the “WIM” with the correct IP address.

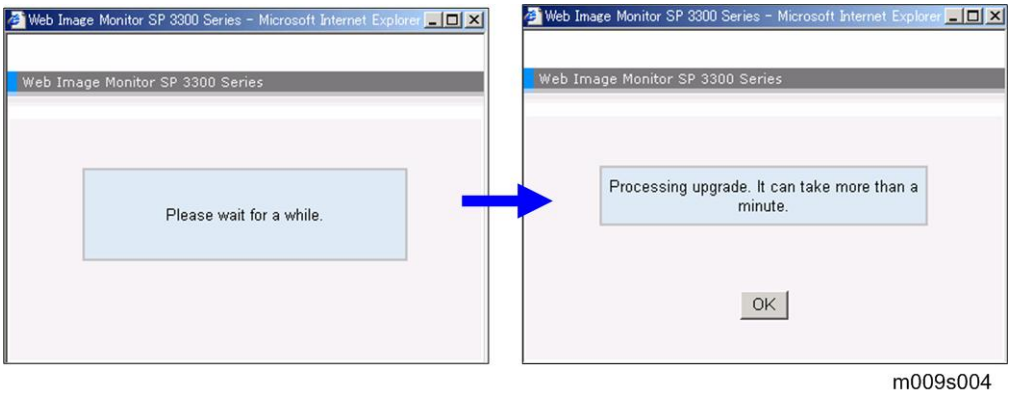


4. Select "Maintenance" [A] as shown above.
5. Make sure that "Firmware Upgrade" [B] is selected as shown above. If not, select it.
6. Click the "Browse" button [C] and select the Printer Firmware file you have saved in the PC.
7. Click the "Upgrade" button [D].



m009s003

8. Press "OK" button.



m009s004

9. Press "OK" button to start processing upgrade.
10. Make sure that the firmware has been completely updated.

Note

- Do not turn off the power while updating the Firmware.

Firmware Recovery Procedure

The machine will not operate if the upgrade procedure did not work correctly. At this time, do the following steps.

1. Turn the power off and then on.
2. Do the steps in the above download procedure.

The machine will start the upgrade again.

Serial Number Input

You must specify a Serial Number after you replace the main board.

Preparation

1. Print out the "Configuration page" for back up the data and the setting.
2. Download the "Write USB Serial" file in the PC.
3. Reboot the PC.

Procedure

1. Click the "Write USB Serial".
2. Input the Serial Number.

m009s001

3. Click the "Write".

m009s002

4. Confirm the message "Writing Good!" is shown.
5. Click the "OK", and then close the window.
6. Print out the "Configuration page" and confirm the Serial Number is input.

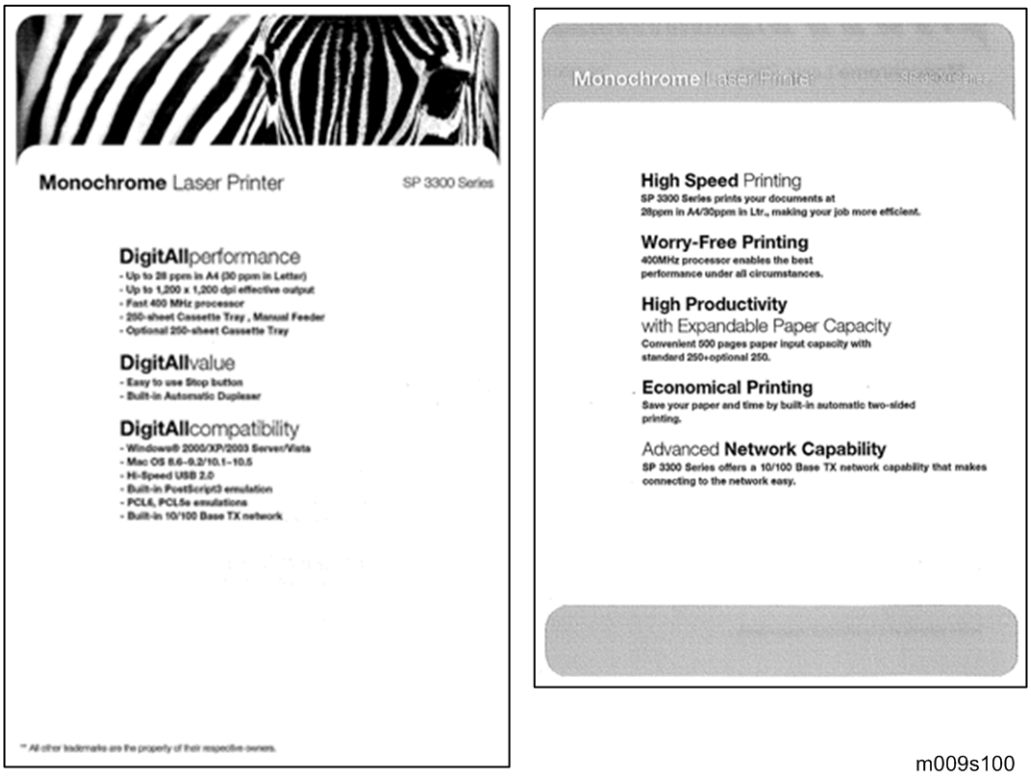
Sample Pattern

This product has several sample patterns for maintenance. With the sample patterns, check the existence of any abnormalities. The patterns help to regularly maintain the product.

Demo page

After setting up the printer, print a demo page to make sure that the printer is operating correctly.

1. Press the "Cancel" button for two seconds.
2. A demo page is printed out.



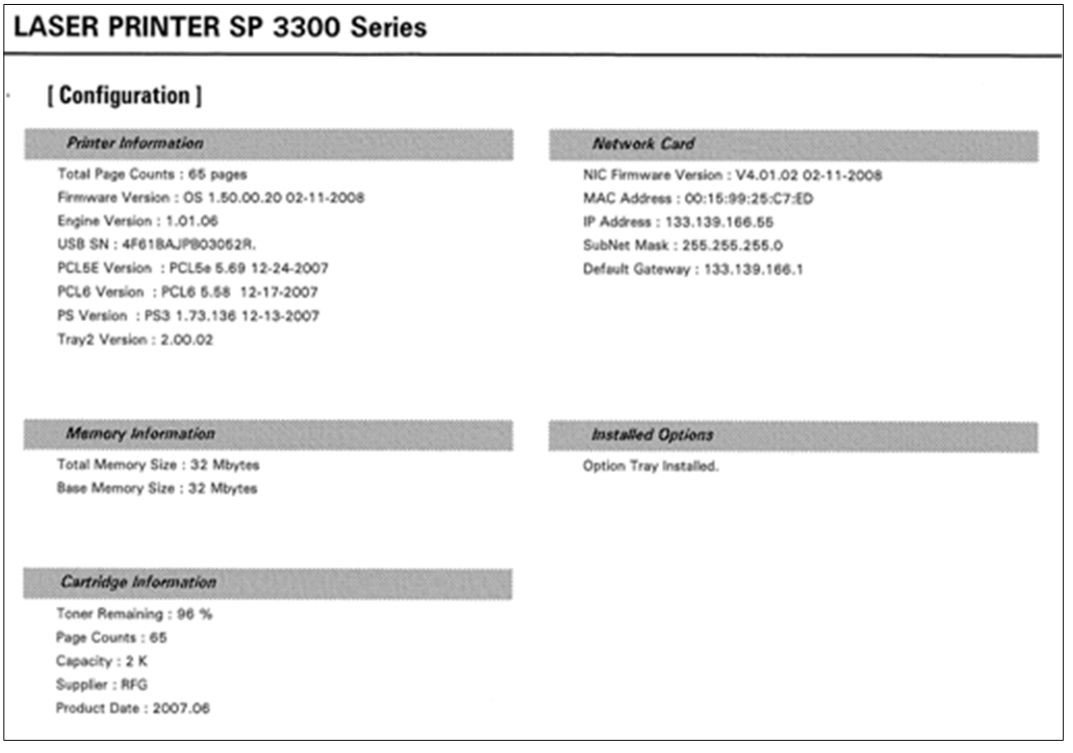
m009s100

Configuration Page

1. Press the "Cancel" button for four seconds.
2. A configuration page is printed out.

Note

- The "Menu Map" page is printed out with a configuration page.



LASER PRINTER SP 3300 Series

[Configuration]

Printer Information

Total Page Counts : 65 pages
Firmware Version : OS 1.50.00.20 02-11-2008
Engine Version : 1.01.06
USB SN : 4F61BAJPB03062R.
PCL5E Version : PCL5e 5.69 12-24-2007
PCL6 Version : PCL6 5.58 12-17-2007
PS Version : PS3 1.73.136 12-13-2007
Tray2 Version : 2.00.02

Network Card

NIC Firmware Version : V4.01.02 02-11-2008
MAC Address : 00:15:99:25:C7:ED
IP Address : 133.139.166.55
SubNet Mask : 255.255.255.0
Default Gateway : 133.139.166.1

Memory Information

Total Memory Size : 32 Mbytes
Base Memory Size : 32 Mbytes

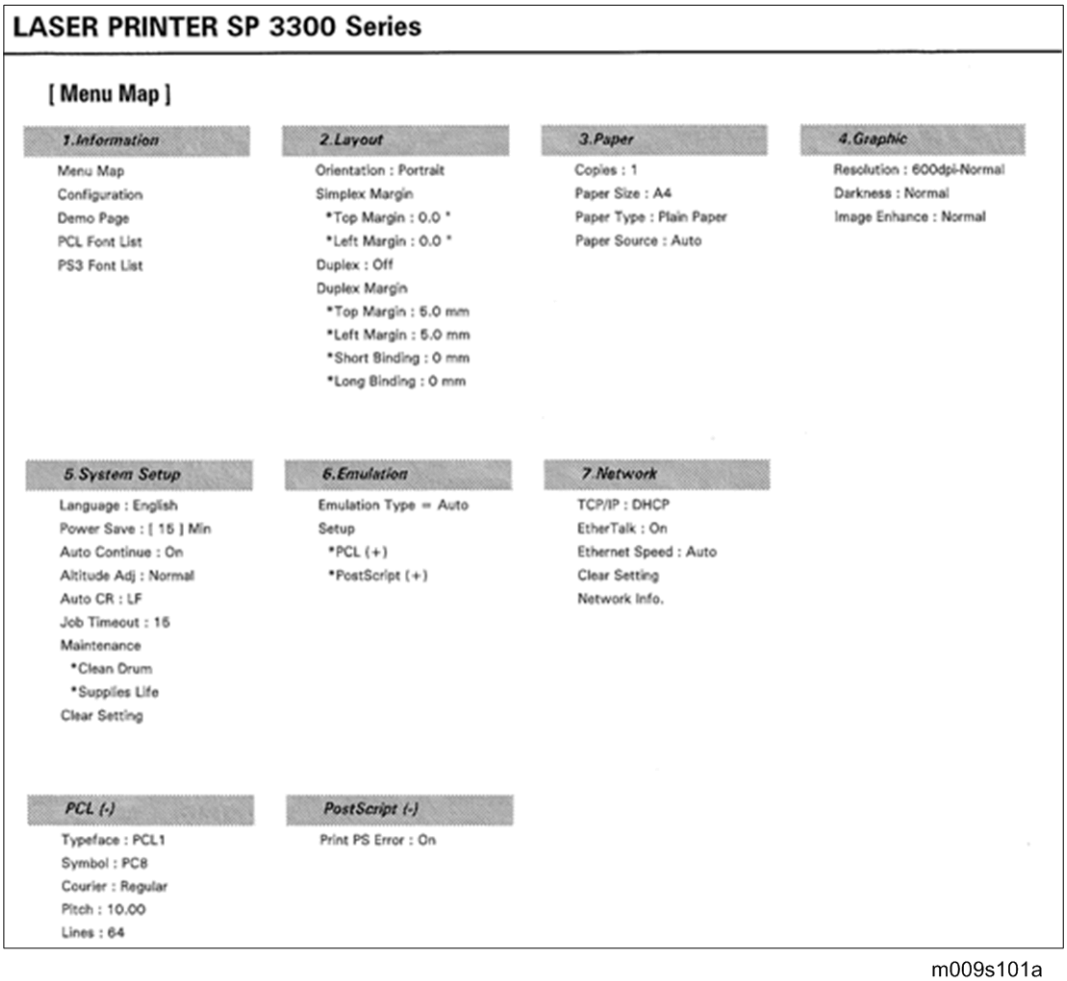
Installed Options

Option Tray Installed.

Cartridge Information

Toner Remaining : 96 %
Page Counts : 65
Capacity : 2 K
Supplier : RFG
Product Date : 2007.06

m009s101



LASER PRINTER SP 3300 Series

[Menu Map]

1.Information
- Menu Map
- Configuration
- Demo Page
- PCL Font List
- PS3 Font List

2.Layout
- Orientation : Portrait
- Simplex Margin
  - *Top Margin : 0.0 "
  - *Left Margin : 0.0 "
- Duplex : Off
- Duplex Margin
  - *Top Margin : 5.0 mm
  - *Left Margin : 5.0 mm
  - *Short Binding : 0 mm
  - *Long Binding : 0 mm

3.Paper
- Copies : 1
- Paper Size : A4
- Paper Type : Plain Paper
- Paper Source : Auto

4.Graphic
- Resolution : 600dpi-Normal
- Darkness : Normal
- Image Enhance : Normal

5.System Setup
- Language : English
- Power Save : [15] Min
- Auto Continue : On
- Altitude Adj : Normal
- Auto CR : LF
- Job Timeout : 15
- Maintenance
  - *Clean Drum
  - *Supplies Life
- Clear Setting

6.Emulation
- Emulation Type = Auto
- Setup
  - *PCL (+)
  - *PostScript (+)

7.Network
- TCP/IP : DHCP
- EtherTalk : On
- Ethernet Speed : Auto
- Clear Setting
- Network Info.

PCL (-)
- Typeface : PCL1
- Symbol : PC8
- Courier : Regular
- Pitch : 10.00
- Lines : 64

PostScript (-)
- Print PS Error : On

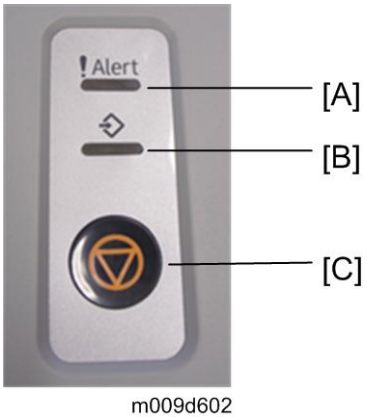
m009s101a

6. Detailed Section Descriptions

Overview

This chapter describes the main functions for service, such as the product maintenance method, the test output related to maintenance and repair, Jam removing method, etc.

Key Operation



m009d602

[A]	Error: Indicates the status of the printer.
[B]	Online: Indicates whether the printer is online.
[C]	Cancel: • Prints a demo page or configuration page (press and hold for three seconds). • Cancels the print job. • Causes the printer to feed.

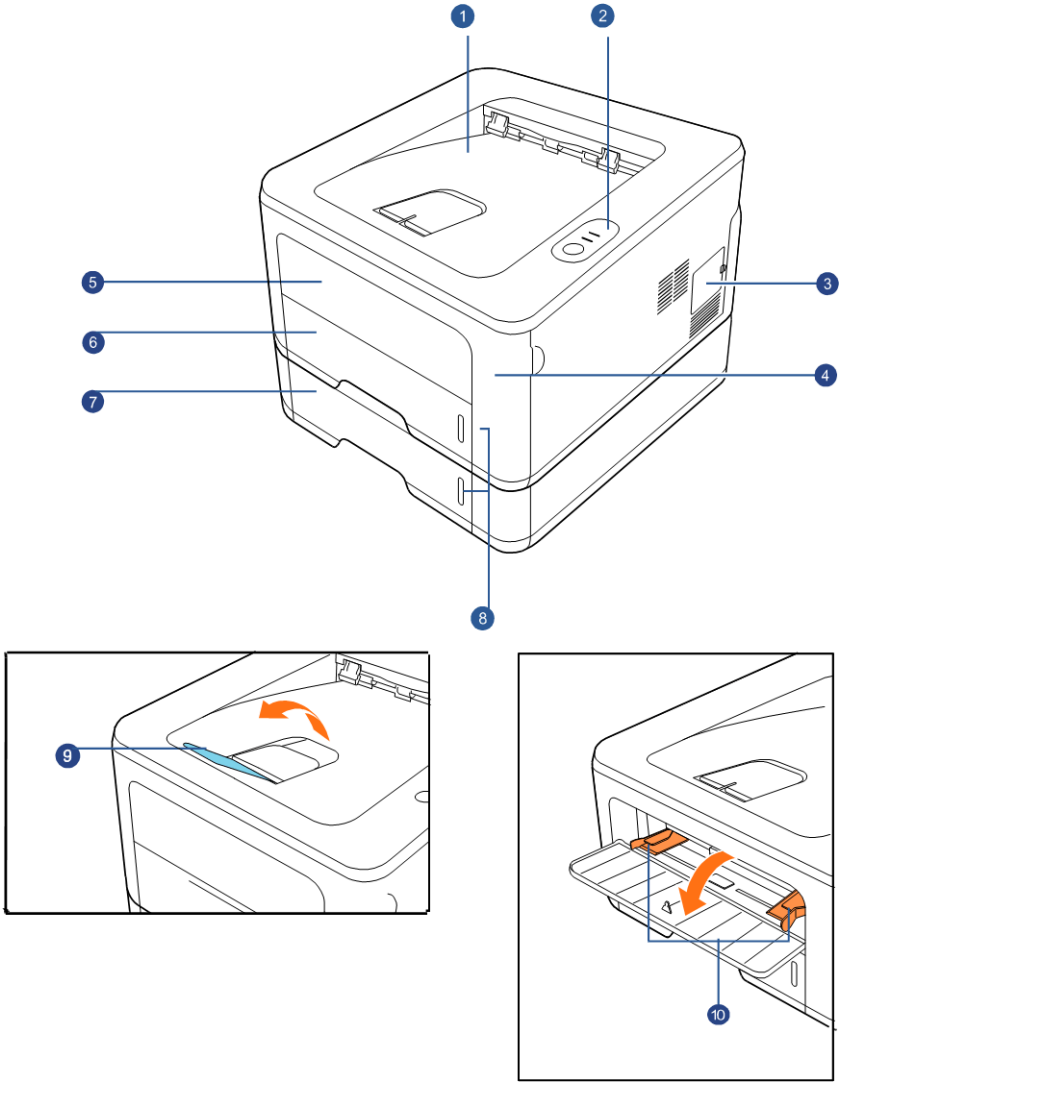
LED Status Error Message

Error	Red	On	1. The cover is open. • Close the cover. 2. No paper in the tray • Load paper in the tray. 3. The printer has stopped printing due to a major error.

			4. The print cartridge is not installed. • Install the print cartridge. 5. The life of the print cartridge. • Replace the print cartridge.
		Blinking	1. A minor error is occurring and the printer is waiting for the error to be cleared. • When the problem is cleared, the printer resumes printing. 2. The print cartridge is near end. • Replace a new print cartridge.
	Orange	On	1. A paper jam has occurred.
Online	Green	On	1. The printer is in the power save mode. 2. The printer is on-line and can receive data from the computer.
		Blinking	1. Blinks slowly indicates that the printer is receiving data from the computer. 2. Blinks quickly indicates that the printer is printing data.

Printer Components

Front View

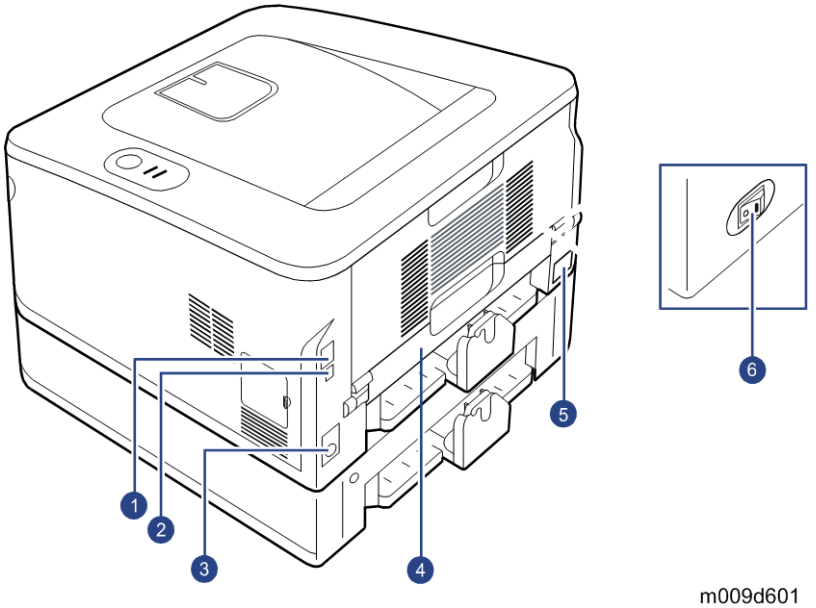


m009d600

1. Output tray	6. Tray 1
2. Control panel	7. Optional tray 2
3. Control board cover	8. Paper level indicator
4. Front cover	9. Out put support

5. By-Pass tray	10.By-pass tray paper width guides

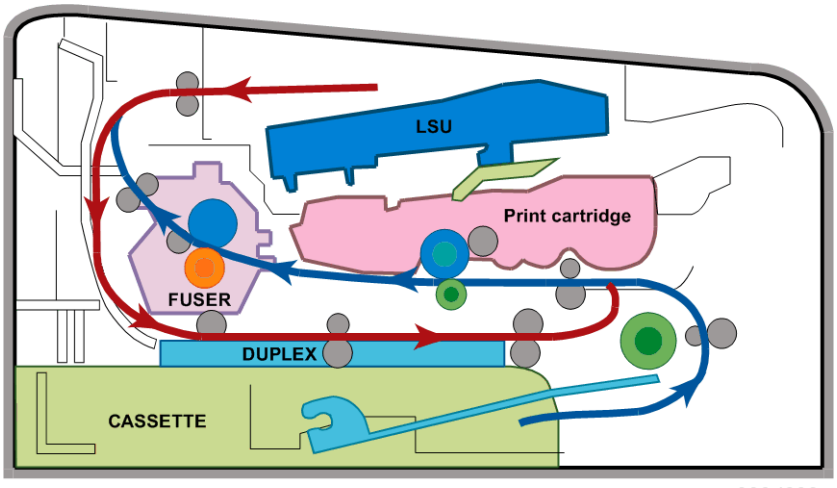
Rear View



m009d601

1. Network port (Only for M009)	4. Duplex unit
2. USB port	5. Power receptacle
3. Optional tray 2 cable connector	6. Power switch

System Layout



m009d603

Feeding

Paper feeding consists of a basic cassette, an MP (Multi-Purpose) tray for supplying different types of media (envelopes, labels, and special paper), duplex unit, and various paper transfer parts.

Separation method

Separation is achieved by a friction pad mounted in the center of the cassette.

Basic cassette

Center loading method utilized with friction pad separation. Paper size detection based upon first sheet size detected by printer controller. Both the side guide and the rear guide can be adjusted for various types of paper from A5 to legal size paper. Paper sensing; (capacity: 250 sheets of general paper); paper arranging; Paper Feed Unit paper path; and remaining paper display functions. Remaining paper indicator located on front of machine on right side of paper drawer.

Pick-up roller

Paper pickup; driving control, paper feeding; and electronic static removal.

Registration roller

Paper arranging; paper transferring; paper detecting; jam removal, and other functions.

By-pass tray

Paper arranging; paper transferring; jam removal; and other functions. Rubbing pad method enabling feed of one sheet of general paper or one envelop.

Duplex unit

Paper transferring; paper guide; jam removing; paper sensing; and main board supporting functions. Basic attachment ready; duplex feeding utilizes side feeding method. Usable paper sizes are A4, letter, and legal size paper.

For jam clearing at front of machine, design facilitates accessibility. Jam clearing at back of machine via rear cover.

Paper Feed Unit

Common driving mechanism for both Paper Feed Unit and main cassette (which has a capacity of 250 sheets).

Transfer

A transfer roller transfers toner on an OPC (Organic Photoconductor) drum to the paper.

Life span: Over 50,000 printed sheets (16 to 27°C)

Drive

The drive system consists of the main motor for feeding fuser and duplex reverse turn, and the development motor for the toner cartridge.

- Main Motor: DC 24V, 2170 rpm

Fuser

The fuser consists of the heat lamp, heat roller, pressure roller, thermistor and thermostat. It bonds the toner to the paper with heat and pressure to complete the printing job.

- E-coil Heater: 750 W ± 5%

Thermostat

When heat lamp overheats, thermostat cuts off the main power to prevent overheating.

- Non-Contact type Thermostat

Heat roller

The heat roller transfers heat from the e-coil to apply heat on the paper. The surface of the heat roller is coated with Teflon, so toner does not stick to the surface.

Pressure roller

The pressure roller mounted under the heat roller is made of silicon resin, and the surface is also coated with Teflon. When a sheet of paper passes between the heat roller and pressure roller, toner adheres to the surface of the paper permanently.

Items for safety

Protecting devices from overheating

- 1st protection device: Hardware cuts off when overheated
- 2nd protection device: Software cuts off when overheated
- 3rd protection device: Thermostat cuts off main power.

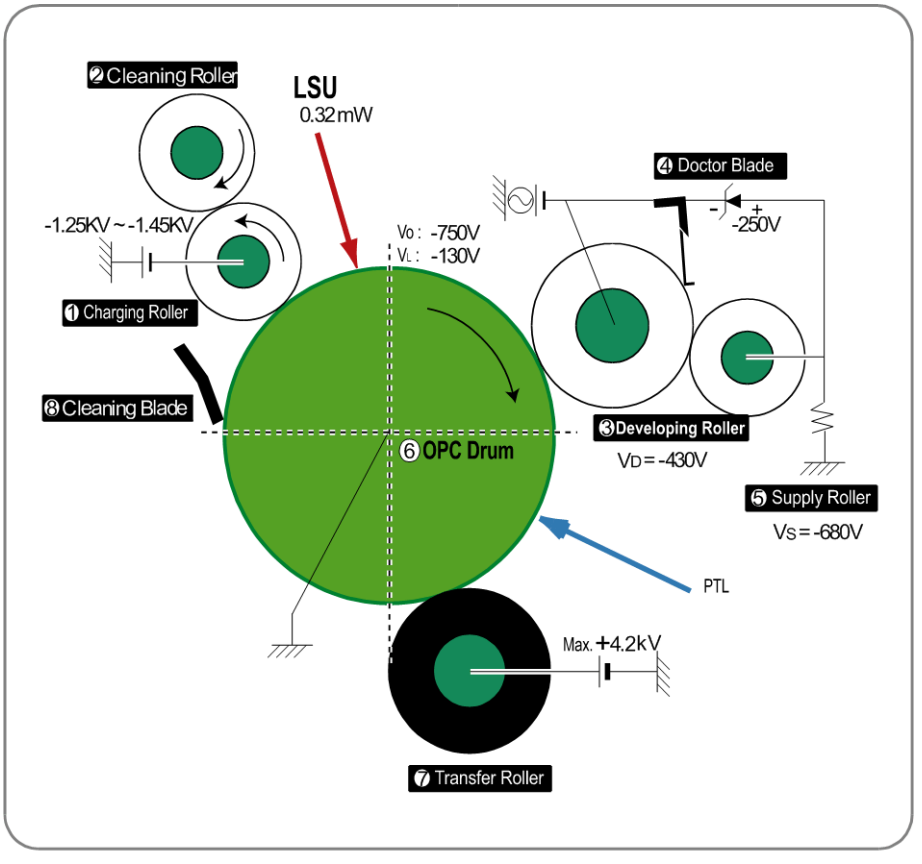
Safety device

- Fuser power is cut when the front cover is opened
- Exercise caution when servicing parts near the fusing unit - allow fuser cover surface to cool to under 80°C to avoid burns.

LSU (Laser Scanner Unit)

The LSU is the core part of this laser beam printer which switches from the video data received, to the controller, to the electrostatic latent image on the OPC drum, by controlling the laser beam, exposing the OPC drum, and the turning principle of the polygon mirror. The OPC drum is turned at the same speed as the paper feed speed. The /HSYNC (Horizontal Synch) signal is created when the laser beam from LSU (Laser Scanning Unit) reaches the end of the polygon mirror, and the signal is sent to the controller. The controller detects the /HSYNC signal to adjust the vertical line of the image on paper. In other words, after the /HSYNC signal is detected, the image data is sent to the LSU to adjust the left margin on the paper. One side of the polygon mirror is one line for scanning.

Print Cartridge



m009d604

The electronic photo process creates a visual image. In the print cartridge, the OPC unit and the toner cartridge unit are in a unit. The OPC unit consists of the OPC drum and charging roller, and the print cartridge unit consists of the toner, supply roller, developing roller, and blade.

- Developing Method: Non-contact method
- Toner: Non magnetic, one component pulverized type toner
- Toner life span: 2 or 5K (LSA Pattern/A4 standard)
- Remaining Toner Sensor: No
- OPC Cleaning: Cleaning blade type
- Management of waste toner: Toner collection by Cleaning Blade
- OPC Drum protecting Shutter: No
- Classifying device for toner cartridge: ID is classified by CRUM (CRU Monitor).

Engine Hardware Specifications

Engine Firmware

Driver

By gearing, the main motor drives the rollers such as the feed roller, developing roller, fuser roller, and exit roller. The BLDC motor is controlled for such acceleration section and steady section. The BLDC main motor is operated by the BLDC clock and the enable signal.

Transfer

The charging voltage, developing voltage and the transfer voltage are controlled by PWM (Pulse Width Modulation). Each output voltage is changeable due to the PWM duty. The transfer voltage set when the paper has passed the transfer roller is decided by the conditions of the environment in which the machine is operating. The resistance value of the transfer roller changes in accordance with the surrounding environment, and the voltage value, which changes in accordance with the operating environment, is controlled with the AD converter. The voltage value for impressing to the transfer roller is decided by the changed value.

Fusing

The temperature change of the heat roller's surface changes according to the resistance value through the thermistor. By converting the voltage value, which is impressed to the resistance, to the digital value through the AD converter, the temperature is decided. The AC power is controlled by comparing the target temperature to the value from the thermistor. If the value from the thermistor is out of controlling range while controlling the fusing, the error stated in the below table occurs.

Error	Description
OPEN HEAT ERROR	• When warming up, it has been lower than 90°C over 20 seconds.
LOW HEAT ERROR	• Standby - It has been lower than the Standby Reference Temperature -20°C over 10 seconds. • Printing has been lower than the Printing Reference Temperature -20°C over 10 seconds. • When Warm-Up End Process, it has been lower than the Warm-Up Reference Temperature -10°C over 10 seconds.
OVER HEAT ERROR	• It has been higher than 220°C over 20 seconds.

Error	Description
	• It has been higher than 230°C over 3 seconds. • It has been higher than Standby Reference Temperature +10°C over 180 seconds.

Note

- This can be changed in the future.

LSU

The LSU consists of the LD (Laser Diode) and the polygon motor control. When the printing signal occurs, it turns on the LD and drives the polygon motor. When the detector detects the beam, Hsync occurs. Error messages are as follows:

Error	Description
Polygon Motor Error	• When the polygon motor speed does not become steady.
LOW HEAT ERROR	• The polygon motor speed is steady but Hsync is not generated.

7. Specifications

General Specifications

Printer

Configuration	Desktop	
Paper size	A4/LT	
Print Resolution	Maximum	1200 x 1200 dpi
	Default	600 x 600 dpi
Print Speed	A4: 28 ppm	
	Letter: 30 ppm	
Duplex Print Speed	A4: 14 ipm	
	Letter: 14.5 ipm	
First Print Speed	Ready: Less than 8.5 seconds	
	Idle mode: Less than 25 seconds	
Copy Paper Weight	Paper Tray	60 - 105 g/m² (16 - 28 lb)
	By-pass tray	60 - 163 g/m² (16 - 43 lb)
	Optional paper tray	60 - 105 g/m² (16 - 28 lb)
	Duplex	75 - 90 g/m² (20 - 24 lb)
Warm-up Time	25 seconds	
Power Rating	110 - 127 VAC 50/60 HZ, 220 - 240 VAC 50/60 HZ	
Power Consumption	Average: Less than 500 W Power save mode: Less than 11 W/Less than 0.4W	
Noise Level	Stand by: 26dBA or less Printing: 50dBA or less	

Paper Input Size	Standard tray	A4, A5, LT, Legal, Executive, Folio, Oficio, ISO B5, JIS B5
	By-pass tray	A4, A5, A6, LT, Legal, Folio, Oficio, Executive, ISO B5, JIS B5, 3" x 5", Monarch, No.10, DL, C5, C6
	Optional paper tray	A4, LT, Legal, Folio, Oficio, A5, Executive, ISO, B5, JIS B5
Paper Input Capacity	Standard	250 sheets each (80 g/m², 21.3lb bond)
	By-pass tray	Plain paper: 1 sheets (80 g/m², 21.3lb bond) Envelope: 1 sheets (75 g/m²) Transparency, Labels, Post card, Card stock: 1 sheet 16 - 43lb (60 - 163g/ m²)
	Optional paper tray (Paper feed unit)	250 sheets x 1 (Max 501 sheets)
Output Capacity	Standard tray (Face down)	150 sheets (75 g/m², 20lb bond)
Environmental Standard	US: CDRH	
	EU/ASIA: IEC60825-1	
Power Saver Mode	Selectable 5/10/**15**/20/30/45/60/120 minutes	
Supply	5 K AIO toner supply cartridge	
	2 K AIO starter toner supply cartridge	
Dimension (W x D x H)	396 x 369 x 209.6 mm (14.33" x 14.523" x 8.25")	
Weight	8.81Kg (19.38lbs) include A10 toner	

Option

Item	
Optional Tray	250 sheets Cassette Tray

Controller

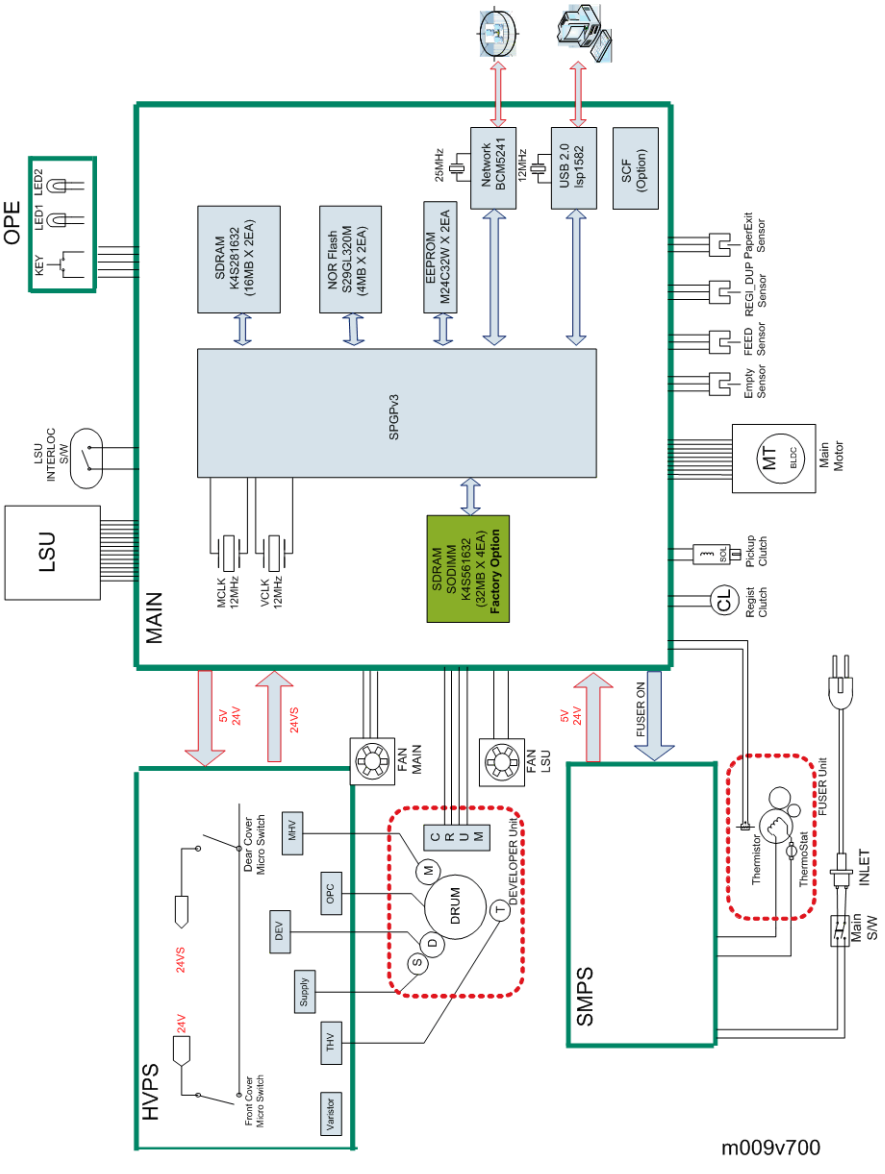
CPU	ARM1020E (400MHZ)	
Memory	Standard/Max	32 MB/160 MB
	Type	SDRAM
Printer Languages	Standard	PostScript3 emulation, PCL6,
Font	45 scalable, 1 bitmap, 136 PostScript 3 fonts	
	Driver	PCL6, PS3
	Supporting OS	Windows 2000/XP(32/64bits)/Vista(32/64bits)/2003 Server (32/64bits)
		Mac OS 10.1 to 10.5
	WHQL	Windows 2000, XP, 2003 Server (32/64bits), Vista (32/64bits)
	Compatibility	PCL6: Win 2000/XP(32/64bits)/2003 server (32/64bits)/Vista (32/64bits) PS3: Win 2000/XP(32/64bits)/Vista(32/64bits)/2003 PPD (32/64bits), Mac PPD
Wired Network	Protocol	TCP/IP, SNMP, HTTP 1.1 (M009 only)
	Supporting OS	Windows NT4.0/2000/XP(32/64bits)/2003 Server (32/64bits) Mac OS, 10.1 to 10.5
Interface	USB 2.0, 10/100 Base TX	

Handling Paper

Tray		
Standard Cassette Tray	Capacity	250 sheets (80 g/m^2 21.3lb)
	Media sizes	A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5
	Media types	Plain Paper
	Media weight	60 - 105 g/m^2 16 - 28 lb (For simplex) 75 - 90 g/m^2 20 - 24 lb (For duplex)
	Sensing	Paper empty sensor
By-pass Tray	Capacity	1 sheet (80 g/m^2 21.3lb)
	Media sizes	A4, A5, A6, Letter, Legal, Oficio, Folio, Executive, ISO B5, JIS B5, 3"x5", Monarch, No.10, DL, C5, C6
	Media types	Plain paper, Transparency, Label, Envelope, Card stock
	Media weight	60 - 163 g/m^2 (60 - 43lb)
	Sensing	N/A
Optional Cassette Tray	Capacity	250 sheets (80 g/m^2 21.3lb)
	Media sizes	A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5
	Media types	Plain Paper
	Media weight	60 - 105 g/m^2 16 - 28 lb (For simplex) 75 - 90 g/m^2 20 - 24 lb (For duplex)
	Sensing	Paper empty sensor

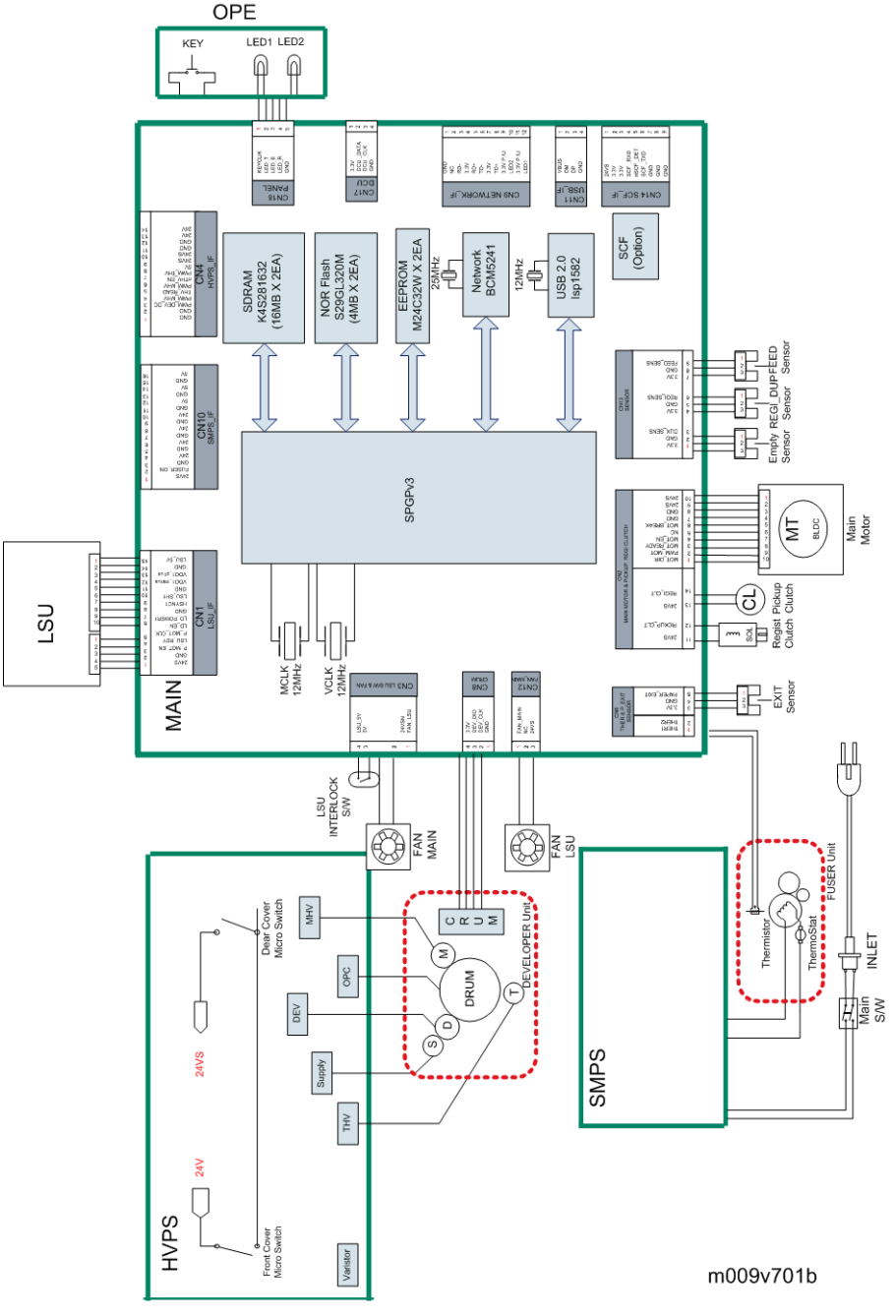
8. Appendix

Block Diagrams



m009v700

Connection Diagram



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