SAMSUNG

# DIGITAL LASER PRINT
# ML-4550 Series

## ML-4550 / ML-4551N / ML-4551ND

## ML-4551NR / ML-4551NDR

**Basic Model : ML-4550**

# SERVICE *Manual*

**DIGITAL LASER PRINT**

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**[The keynote of Product]**

- Series Model: ML-4550 / 4551N / 4551ND
- High speed Laser Printer:
  Up to 43 ppm in A4 (45 ppm in Letter),
  Duplex: 29 ipm (A4); 30 ipm (Letter)
- Resolution: Up to 1200 x 1200 dpi
- Marvell 500Mhz
- Memory: 128 MB (Max. 512 MB)
  128, or 256 MB optional memory available.
  Use only the Samsung-approved DIMM.
  128 MB: ML-MEM150, 256 MB: ML-MEM160
- Option:
  ML-4550:500-sheet trays, ethernet 10/100 Base TX wired LAN, ethernet 10/100 Base hard disk, duplex unit, DIMM
- Toner cartridge:
  · Starter: 10K or 20K pages
  · Consumable: 10K or 20K pages
- Duty cycle: Monthly Up to 150,000 pages

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## 1. Precautions



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## 5. Disassembly and Reassembly

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# 1. 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.

## 1.1 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 Samsung 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.*

CAUTION - INVISIBLE LASER RADIATION WHEN THIS COVER OPEN. DO NOT OPEN THIS COVER.

VORSICHT - UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GE FFNET. NICHT DEM STRAHL AUSSETZEN.

ATTENTION - RAYONNEMENT LASER INVISIBLE EN CAS D OUVERTURE. EXPOSITION DANGEREUSE AU FAISCEAU.

ATTENZIONE - RADIAZIONE LASER INVISIBILE IN CASO DI APERTURA. EVITARE L ESPOSIZIONE AL FASCIO.

PRECAUCION - RADIACION LASER IVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO.

ADVARSEL. - USYNLIG LASERSTR LNING VED BNING, N R SIKKERHEDSBRYDERE ER UDE AF FUNKTION. UNDG UDSAETTELSE FOR STR LNING.

ADVARSEL. - USYNLIG LASERSTR LNING N R DEKSEL PNES. STIRR IKKE INN I STR LEN. UNNG EKSPONERING FOR STR LEN.

VARNING - OSYNLIG LASERSTR LNING N R DENNA DEL R PPNAD OCH SP RREN R URKOPPLAD. BETRAKTA EJ STR LEN. STR LEN R FARLIG.

VARO! - AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA N KYM TT M LLE LASER-S TEILYLLE L KATSO S TEESEEN.

注 意 - 严禁渴开此盖, 以免激光泄露灼伤

주 의 - 이 덮개를 열면 레이저광에 노출될 수 있으므로 주의하십시오.

# 1.2 Caution for safety

## 1.2.1 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.

## 1.2.2 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. Samsung recommends 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.

## 1.2.3 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.

## 1.2.4 Assembly / Disassembly Precautions

Replace parts carefully, always use Samsung 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.

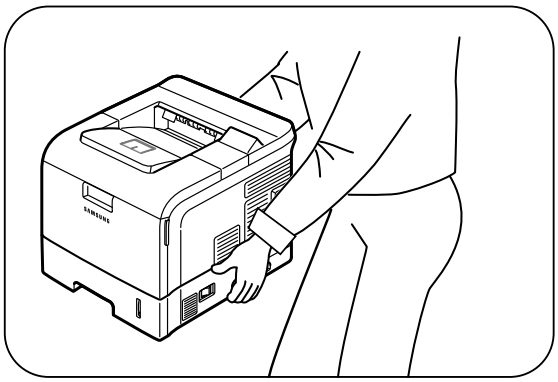
(1) Check the contents of the machine memory and make a note of any user settings. These will be erased if the mainboard or network card is replaced.
(2) Ensure that power is disconnected before servicing or replacing any electrical parts.
(3) Disconnect printer interface cables and power cables.
(4) 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 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 5 mins 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.

## 1.2.5 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 finger 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, you can get harm.

**(3) When you move the printer.**
This printer weighs 22kg including toner cartridge and cassette. 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.**
The printer weighs 22Kg, 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.

# 1.3 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 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 your personal safety reasons 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.

# 2. Product Specifications

## 2.1 Product Overview

| Item | Descriptions | Remark |
|---|---|---|
| Basic Model | ML-4550 | |
| Series Model | ML-4550, ML-4551N, ML-4551ND, ML-4551NDG(Kor.) | |
| Maket of Sailes | Office user Laser printer. (Network for work Group) | |
| Specification | · 43ppm(Ltr. 45ppm), 500MHz Processor, 128MB Memory<br>· 10K(initial), 20K(sailes)<br>· USB(Hight Speed USB 2.0), Network Option, ML-4551N, ML-4551ND(Network base)<br>· Face Down(250 sheets), Face Up(100 sheets) | |

## 2.2 Specifications

· Product Specifications are subject to without notice. See below for product specifications.

### 2.2.1 General Specifications

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Engine Speed | Simplex | Up to 43 ppm in A4 (45 ppm in Letter) | | |
| | Duplex | Option : 29 ipm in A4 (30 ipm in Letter) | | |
| Warmup time | - | Less than 45 sec : Power-on boot | | |
| FPOT | From Ready | Less than 8.5 sec | | |
| | From Idle | Less than 43.5 sec | | |
| | From Coldboot | Less than 53.5 sec | | |
| Resolution | - | Up to 1200 x 1200 dpi effective output | | |

## 2.2.2. Controller & S/W

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Processor | | Marvell 500Mhz | | |
| Memory | Std. | 128 MB | | |
| | Max. | 512MB(256+256) | | |
| Printer Languages | - | PostScript3, PCL6, IBM ProPrinter, EPSON, PDF Direct(only HDD installed) | | |
| Fonts | - | 45 scalable, 1 bitmap, 136 PostScript 3 fonts, OCR Fonts | | |
| Driver | Default Driver | PCL6 : Win 95/98/NT4.0/2000/Me/XP(32/64bits)/2003 Server(32/64bits)<br>PS : Linux & Mac | | |
| | Supporting OS | Windows 95/98/NT4.0/2000/Me/XP(32/62bits)/2003 Server(32/62bits) | | |
| | | Various Linux OS including Red Hat 8~9, Fedora Core 1~3, Mandrake 9.2~10.1 and SuSE 8.2~9.2 | | |
| | | Mac OS 8.6~9.2/10.1~10.4 | | |
| | WHQL | Windows 2000, XP, 2003 Server | | |
| Wired Network | Protocol | N/A | SPX/IPX, TCP/IP, SNMP, HTTP 1.1, AppleTalk | |
| | Supporting OS | N/A | Windows 98/ME/NT4.0/2000/XP(32/64bits)/2003 Server(32/64bits)<br>Netware 4.x, 5.x, 6.x<br>Mac OS 8.6~9.2, 10.1~10.4<br>Various Linux OS including Red Hat 8.0~9.2, Fedora Core 1~3, Mandrake 9.2~10.1<br>and SuSE 8.2~9.2 | |
| Wireless Network | Protocol | N/A | | |
| | Supporting OS | N/A | | |
| Application | RCP | N/A | | |
| | Status Monitor | N/A | | |
| | Smart Panel | YES (Include RCP and SM) | | |
| | Network Management | N/A | | |
| Interface | | | | |
| Parallel | - | IEEE 1284 | | |
| USB | - | High Speed USB 2.0 | | |
| Wired Network | - | Optional | 10/100 Base TX | |
| Wireless Network | - | N/A | | |
| User Interface | | | | |
| LCD | - | 16 x 12 Character LCD | | |
| LED | - | 2LED(Status LED, Save Button LED) | | |
| Key | - | 8 Key: Menu , ◀ , OK (*) , ▶ , Back Toner Save , Demo , Stop | | |

## 2.2.3. Paper Handling

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Standard Capacity | - | 500-sheet Cassette Tray, 100-sheet Multi Purpose Tray @75g/㎡ | | |
| Max. Capacity | - | 2,100 sheets @75g/㎡ | | |
| Printing | Max. Size | 216 x 356 mm (8.5" x 14") | | |
| | Min. Size | 76 x 127 mm (3.0" x 5.0")(>105g) | | |
| Multi-purpose tray | | | | |
| Capacity | - | 100 sheets @75g/㎡ | | |
| Media sizes | - | A4, A5, A6, Letter, Legal, Oficio, Folio, Executive,ISO B5, JIS B5, 3"x5", Monarch, No.10, DL, C5, C6 | | |
| Media type | - | Transparencies, Envelopes, Labels, Card stock | | |
| Media weight | - | 16~43 lb (60 to176g/㎡) | | |
| Sensing | - | Paper empty sensor | | |
| Standard Cassette Tray | | | | |
| Capacity | - | 500 sheets @ 75g/㎡ | | |
| Media sizes | - | A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5 | | |
| Media types | - | Plain Paper | | |
| Media weight | - | 16~28lb (60 to 105g/㎡) | | |
| Sensing | - | Paper empty sensor, Paper Size Sensor | | |
| Second Cassette Tray | Optional | | | |
| Capacity | - | 500 sheets @ 75g/㎡ | | |
| Media sizes | - | A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5 | | |
| Media types | - | Plain Paper | | |
| Media weight | - | 16~28lb (60 to 105g/㎡) | | |
| Sensing | - | Paper empty sensor, Paper Size Sensor | | |
| Third Cassette Tray | Optional | | | |
| Capacity | - | 500 sheets @ 75g/㎡ | | |
| Media sizes | - | A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5 | | |
| Media types | - | Plain Paper | | |
| Media weight | - | 16~28lb (60 to 105g/㎡) | | |
| Sensing | - | Paper empty sensor, Paper Size Sensor | | |
| Output Stacking | | | | |
| Capacity | Face-Down | 250 sheets @ 75g/㎡ | | |
| | Face-Up | 100 sheets @ 75g/㎡ | | |
| Output Full sensing | - | Paper full Sensor | | |
| Optional Stacker | | | | |
| Capacity | Face-Down | N/A | | |
| Duplex Supporting | - | Optional | | Built-in |
| Media sizes | - | A4, Letter, Legal, Folio, Oficio | | |
| Media types | - | Plain Paper | | |
| Media weight | - | 20~24lb (75~90g/㎡) | | |

## 2.2.4. Consumables

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Toner | Black | Standard 10K pages @ ISO 19752 standard Coverage<br>High Yield 20K pages @ ISO 19752 standard Coverage | | |
| | Key | Electronic key(CRUM) | | |
| | Life detect | Toner remaining volume would be traced via software | | |
| Drum | Yield | Same as consumables | | |

## 2.2.5. Reliability & Service

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Printing Volume (SET AMPV) | - | 5,000 sheets / month | | |
| Max. Monthly Duty | - | 150,000 sheets | | |
| MPBF | - | 150,000 sheets | | |
| MTTR | - | 20 min. | | |
| SET Life Cycle | - | 500,000 sheets or 5 years (whichever comes first) | | |

## 2.2.6. Environment

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Acoustic Noise Level(Sound Power/Pressure) | Printing | Less than 57.0 dBA | | |
| | Standby | Less than 35.0 dBA | | |
| | Sleep | Back Ground Level | | |
| Power Consumption | AVG. | Less than 650W | | |
| | Sleep/Power Off | Less than 13W | | |
| Dimension (W x D x H) | SET | 396 x 453 x 353 mm (15.6" x 17.8" x 13.9") | | 396 x 501 x 353 mm (15.6" x 19.7" x 13.9") |
| | SET Packing | 518 x 566 x 568 mm (External) | | |
| | CRU | 314 x 242 x 138 mm | | |
| | Toner Packing | 370 x 286 x 180 mm (External) | | |
| Weight | SET | 17.8kg(39.2 lb) | | 19.1kg |
| | Toner(10K) | 10K : 1.85kg(4.08 lbs), 20K : 2.06kg(4.54 lbs) | | |
| | Gross | 21.6kg(47.62 lbs) | | 23.5kg(51.81 lbs) |

## 2.2.7. Options

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Memory | - | 128MB/512MB (256MB+256MB) | | |
| Second Cassette | - | 500 sheet Cassette Tray | | |
| Third Cassette | - | 500 sheet Cassette Tray | | |
| Stacker | - | N/A | | |
| Stapler | | N/A | | |
| PostScript | - | Default | | |
| Wired Network | - | Ethernet 10/100 Base TX (Internal) | Default | Default |
| Hard Disk | - | 40GB | | |
| Duplex Unit | - | Optional | | Default |

## 2.2.8. Others

| ITEM | | ML-4550 SERIES | | |
|---|---|---|---|---|
| | | ML-4550 | ML-4551N | ML-4551ND |
| Performance Requirement | Jam Rate | Base Line Paper : 1/12K | | |
| | | Standard Paper : 1/10K | | |
| | | Stress Paper : 1/1500 | | |

# 2.3 Model Comparison Table

| Project | SEC | HP | Lexmark | Brother | Dell |
|---|---|---|---|---|---|
| **Model Name** | **ML-4550** | **LJ-4250** | **T642** | **HL-8050N** | **W5200N** |
| |  |  |  |  |  |
| **Engine** | | | | | |
| FPOT | 8.5 sec | 8 sec | 8.5 sec | 9 sec | 8.5 sec |
| Speed(ppm) | 43ppm (Ltr. 45ppm) | 43ppm (Ltr. 45ppm) | 43ppm (Ltr. 45ppm) | 34ppm (Ltr. 35ppm) | 43ppm (Ltr. 45ppm) |
| Resolution | 1200 dpi | 1200 dpi | 1200 dpi x 1200 dpi | 1200dpi x 1200 dpi | 1200 dpi x 1200 dpi |
| Noise(dB) | 57dB(Printing), 35dB(Idle) | not_inform | 55dB(Printing), 30dB(Idle) | 54dB(Printing), 27dB(Idle) | 55dB(Printing), 34dB(Idle) |
| Weight | 17.83kg | 20.2kg (45 lbs) | 23.1Kg (51lbs) | 20.6Kg (45.2 lbs) | 45lbs |
| Demension(W*D*H) | 15.6" x 17.8" x 13.9"<br>396 x 453 x 353 mm | 16.5"x17.8"x14.8"<br>418x451x377mm | 436x523x406mm<br>(17.2"x20.6"x16") | 16.6" x 18.3" x 15.9" | (17.2"x20.2"x16") |
| **Control** | | | | | |
| Processor | 500MHz | 460MHz | 457 MHz RISC | 300MHz | 500 MHz RISC |
| Ram(Std.) | 128MB | 48MB | 64MB | 64MB | 80MB |
| Ram(Max.) | 512MB | 512MB | 576MB | 576MB | 336MB |
| Emulation | PCL6, PS3 | PCL6, PS3 | PCL6, PS3 | PCL6, PS3,<br>10/100 Base TX | PCL6, PS3,<br>10/100 Base TX |
| Interface | IEEE1284, USB 2.0 | IEEE1284, USB 2.0 | IEEE1284, USB 1.1 | IEEE1284, USB<br>2.010/100 Base TX | IEEE1284, USB<br>2.010/100 Base TX |
| Optional Interface | 10/100 Base TX | 10/100 Base TX | 10/100 Base TX | N/A | N/A |
| **Paper Handling** | | | | | |
| Paper Input(Capa./Type) | 500 Sheets<br>Cassette100 MP Tray | 500 Sheets<br>Cassette100 MP Tray | 500 Sheets<br>Cassette100 MP Tray | 550 Sheets Cassette<br>150 Sheets Cassette | 500 Sheets<br>Cassette100 MP Tray |
| Paper Output | 250 Sheets Face down<br>100 Sheets Face up | 250 Sheets Face down | 500 Sheets Face Down | 500 Sheet Face down<br>70 Sheet Face up | 250 Sheets Face Down |
| **Others** | | | | | |
| Max.Monthly Duty | 150,000 sheets | 200,000 sheets | 225,000 sheets | - | 225,000 sheets |
| Consumable Yeild | Standard 10K<br>High Yield 20K | Standard 10K<br>High Yield 20K | Standard 6K<br>High Yield 21K | 17K | Standard 18K<br>High Yield 27K |
| Power Consumption | Printing : Less than 650 W<br>Sleep : under 13 W | Printing : 680 W<br>Sleep : under 20 W | not_inform | Printing: < 593W<br>Sleep:< 12W | not_inform |
| Duplex | Option | Option | Option | Option | NO |
| Options | - Memory (128MB/256MB)<br>- 3x500 sheet SCF<br>- Duplex<br>- 40GB HD | - Memory<br>- 500 sheet SCF<br>- Duplex<br>- HP Jetdirect<br>- 20GB HD<br>- Stacker & Stapler | - 250 sh duplexer<br>- 3x250 sh drawer<br>- 2000 sh drawer(Max.3850)<br>- 85 sh envelope feeder<br>- 650 sh output expander<br>- 1850 sh High capacity output stacker<br>- 40 sheet staple<br>- 5 bin mailbox (5x120 sh ) | - SCF<br>- Memory<br>- Stand<br>- Sorter/Mail box | - duplexer<br>- 85 envelope feeder<br>- 500 sheet cassette<br>- 250 sheet cassette |

## 2.4 ACCESSORY

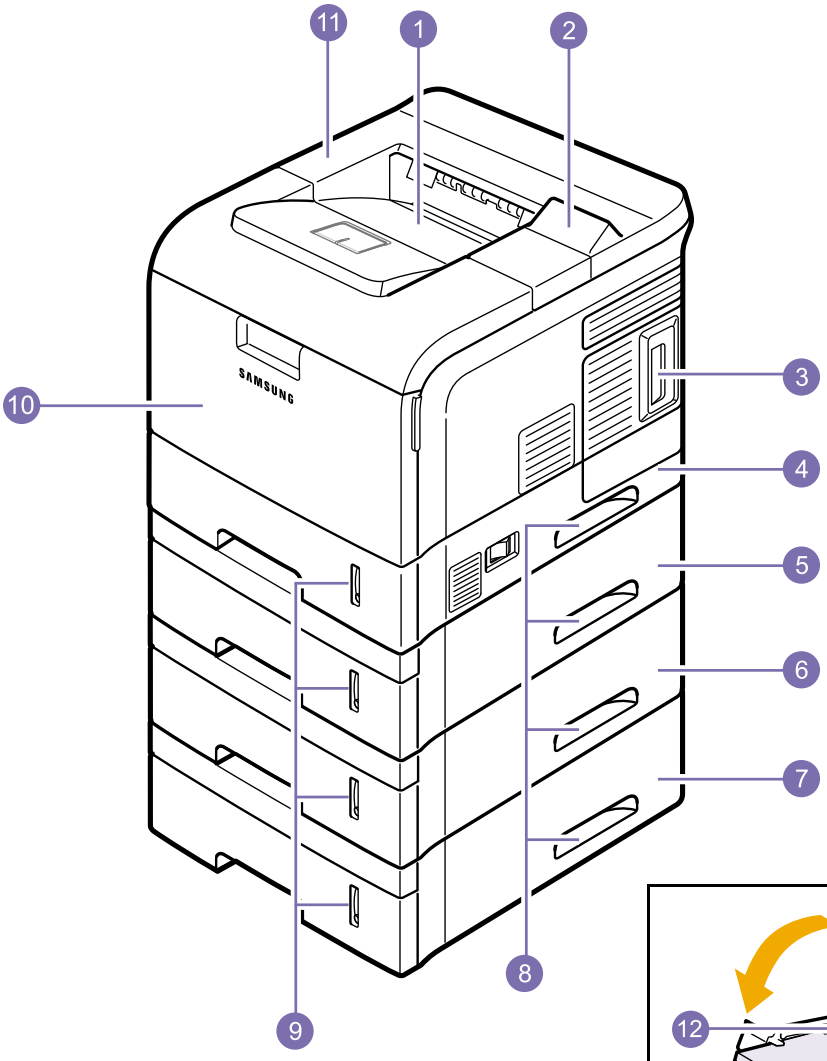
| Item | Code | Quantity |
|---|---|---|
| INA-ACCESSORY | JC99-01974E | 1 |
| CBF-POWER CORD | 3903-000042 | 1 |
| BAG PE | 6902-000288 | 1 |
| S/W APPLICATION-CD | JC46-00280A | 1 |
| S/W APPLICATION-CD | JC46-00293A | 1 |
| MANUAL-(CARD)WARRANTY CARD | JC68-00690A | 1 |
| MANUAL-NETWORK GUIDE | JC68-01579A | 1 |
| LABEL(P)-BLANK 90*25 | JC68-01584A | 1 |

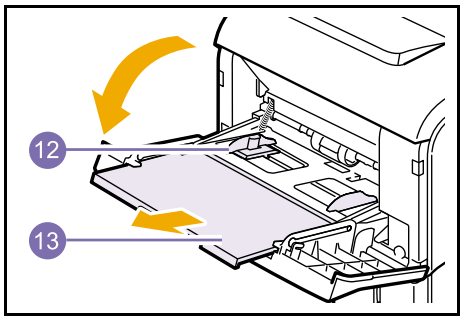
# 3. Summary of Product

This chapter describes the functions and operating principal of the main component.

## 3.1 Printer Components

### 3.1.1 Front View

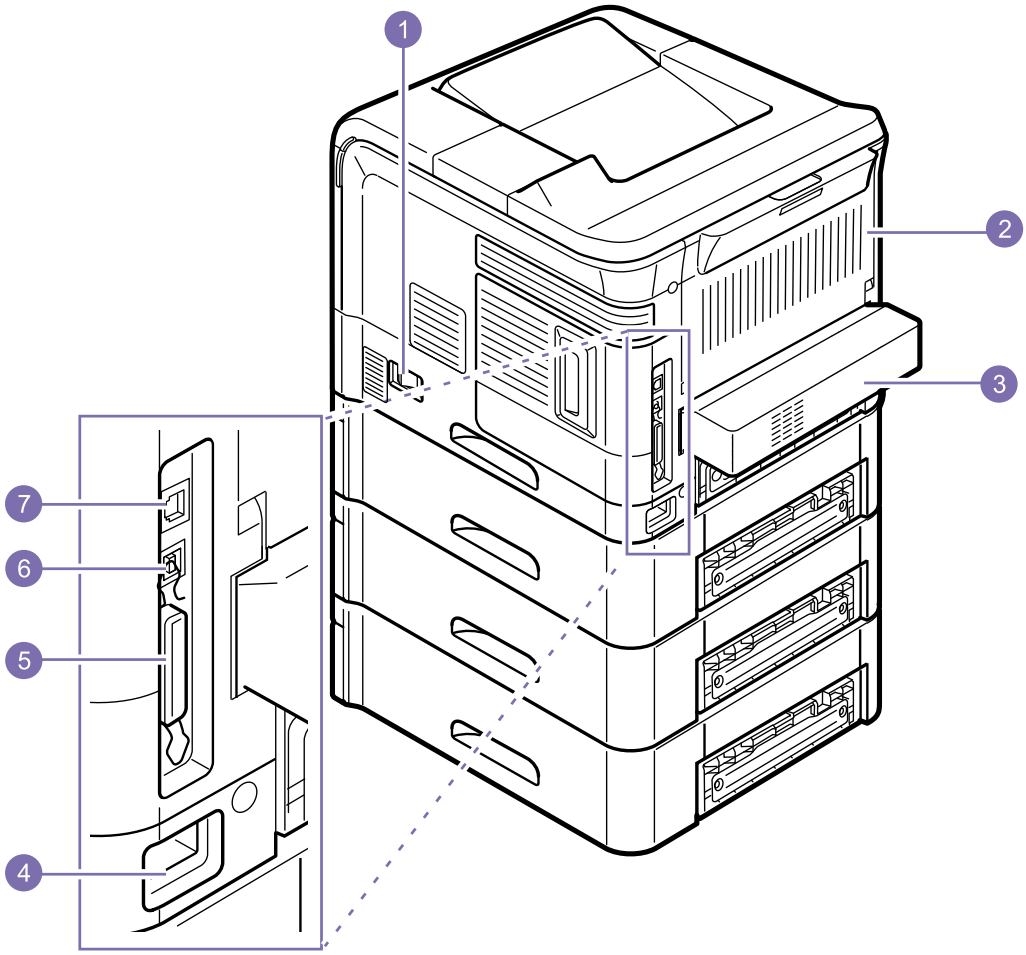



The figure above shows an ML-4551ND with all available options.

| | | | |
|---|---|---|---|
| 1 | output tray | 8 | handle |
| 2 | control panel | 9 | paper level indicator |
| 3 | control board cover | 10 | multi-purpose tray |
| 4 | tray 1 | 11 | top cover |
| 5 | optional tray 2 | 12 | multi-purpose tray paper width guides |
| 6 | optional tray 3 | 13 | multi-purpose tray extension |
| 7 | optional tray 4 | | |

## 3.1.2 Rear View

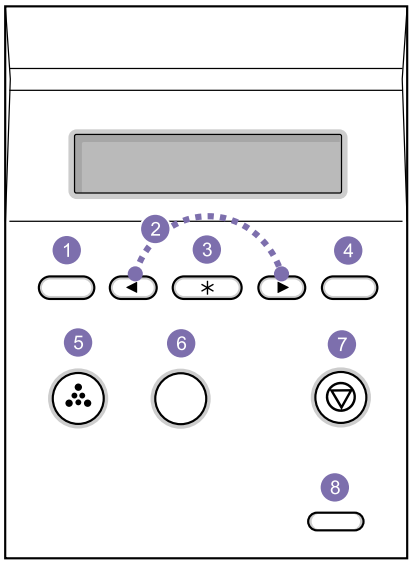



* The figure above shows an ML-4551ND with all available options.

| | | | |
|---|---|---|---|
| 1 | power switch | 5 | parallel port |
| 2 | rear cover | 6 | USB port |
| 3 | duplex unit | 7 | network port |
| 4 | power receptacle | | |

## 3.1.3 Control Panel

The control panel on the top right side of your printer has the display and the nine buttons.

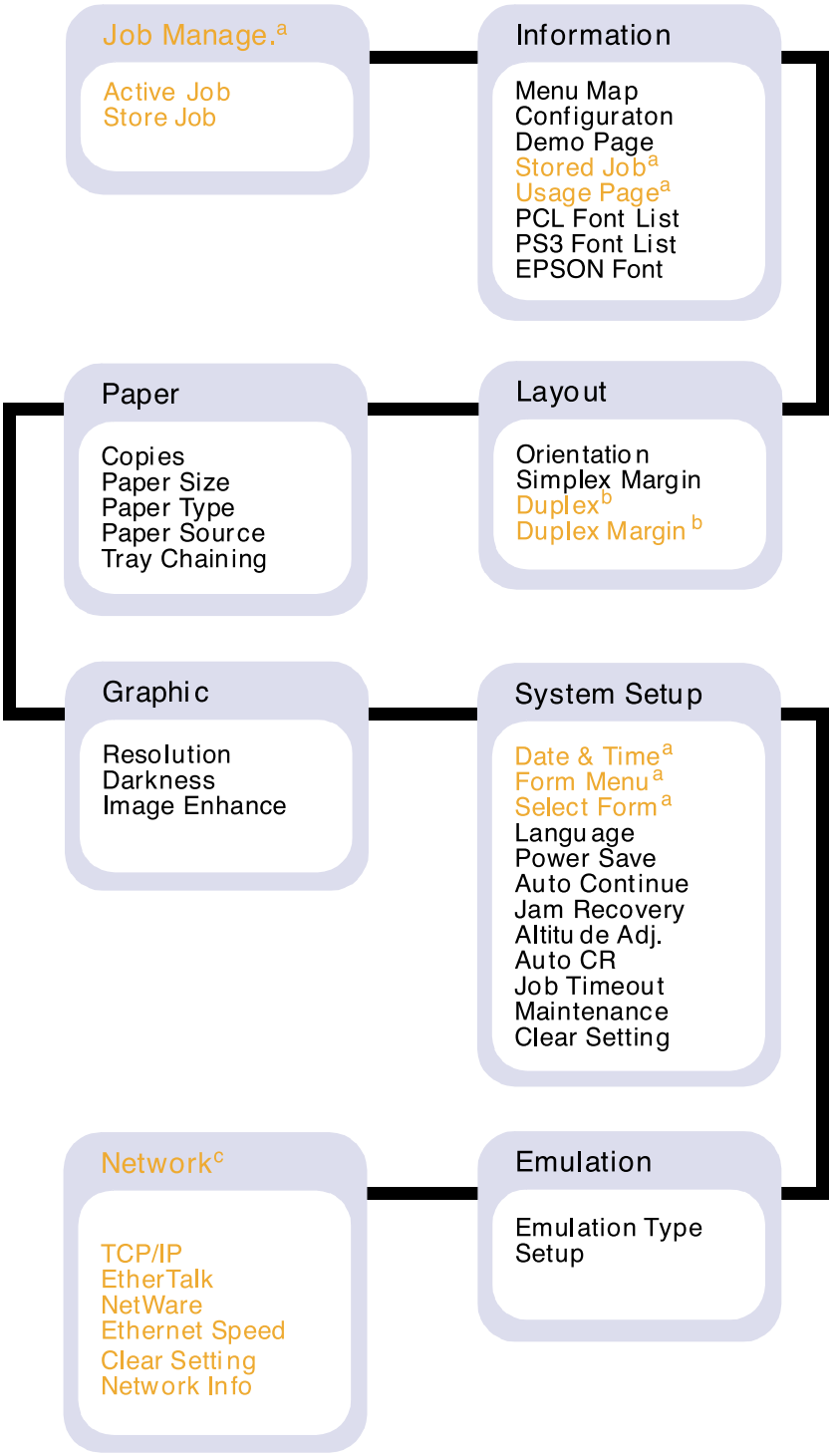



### 3.1.3.1 Display

| | |
|---|---|
| 1 | Menu: Enters Menu mode and scrolls through the available menus. |
| 2 | Scroll buttons: Scroll through the options available in the selected menu, and increase or decrease values. |
| 3 | OK: Confirms the selection on the display. |
| 4 | Back: Sends you back to the upper menu level. |
| 5 | Toner Save: Allows you to save on toner by using less toner in printing. |
| 6 | Demo: Prints a demo page. |
| 7 | Stop: Stops an operation at any time. |
| 8 | Status: Indicates the status of your printer. |

### 3.1.3.2 Overview of Control Panel Menus

The control panel menus are used to configure the printer for your environment.
The control panel provides access to the following menus.




a. Available with an optional hard disk.
b. Available with an optional duplex unit in the ML-4550 or ML-4551N.
c. Available with an optional network interface card for the ML-4550.

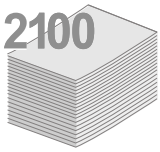
### 3.1.3.3 Special Features

Your new printer is equipped with special features that improve the print quality,giving you a competitive edge.
You can:

**Print with excellent quality and high speed**

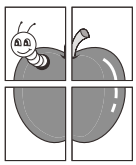

- You can print up to 1200 x 1200 dpi effective output. See the Software Section.
- Your printer prints A4-sized paper at up to 43 ppm a and letter-sized paper at up to 45 ppm. For duplex printing, your printer prints A4-sized paper at up to 29 ipm b and letter-sized paper at up to 30 ipm.

**Handle paper flexibly**




- The multi-purpose tray supports letterheads, envelopes, labels, transparencies, custom-sized materials, postcards, and heavy paper. The multi-purpose tray holds up to 100 sheets of plain paper.
- The 500-sheet standard tray 1 supports plain paper in various sizes.
- The 500-sheet optional tray support plain paper in various sizes. You can install up to 3 additional trays.
- Two output tray; select either the output tray (face-down) or the rear cover (face-up) for the most convenient access.
- Straight-through paper path capability from the multi-purpose tray to the rear cover.

**Create professional documents**

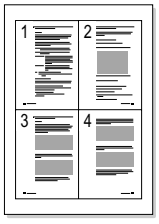


- Print Watermarks. You can customize your documents with words, such as “Confidential.” See the Software Section.
- Print Posters. The text and pictures of each page of your document are magnified and printed across the sheet of paper and can then be taped together to form a poster. See the Software Section.

a. pages per minute

b. images per minute

**Save your time and money**




- This printer allows you to use toner save mode to save toner.
- You can print on both sides of the paper to save paper (double-sided printing) if you use the ML-4551ND or install the optional duplex unit in the ML-4550 and ML-4551N.
- You can print multiple pages on a single sheet of paper to save paper (N-Up printing). See the Software Section.
- You can use preprinted forms and letterhead with plain paper. See the Software Section.
- This printer automatically conserves electricity by substantially reducing power consumption when not in use.

### Expand the printer capacity


- Your printer has 128 MB of memory which can be expanded to 512 MB.
- A Network interface enables network printing. You can add an optional network interface card to the ML-4550. The ML-4551N and ML-4551ND come with a built-in network interface, 10/100 Base TX.
- You can add 500-sheet optional trays to your printer. These trays let you add paper to the printer less often.
- A PostScript 3 Emulation* (PS) enables PS printing.

### Use the optional hard disk

You can install an optional hard disk in your printer.

- The 40 GB hard disk can store the data from your computer in the print queue. This decreases the workload of the computer.
- You can use various print features, such as storing a job in the hard disk, proofing a job, and printing private documents.
- You can manage the print jobs in the print queue of the printer hard disk. For details.

### Print in various environments

- You can print in Windows 98/Me/NT 4.0/2000/XP/2003.
- Your printer is compatible with Linux and Macintosh.
- Your printer comes with both Parallel and USB interfaces.
- You can also use a network interface. The ML-4551N and ML-4551ND come with a built-in network interface, 10/100 Base TX. However, you need to install the optional wired network interface card to the ML-4550.

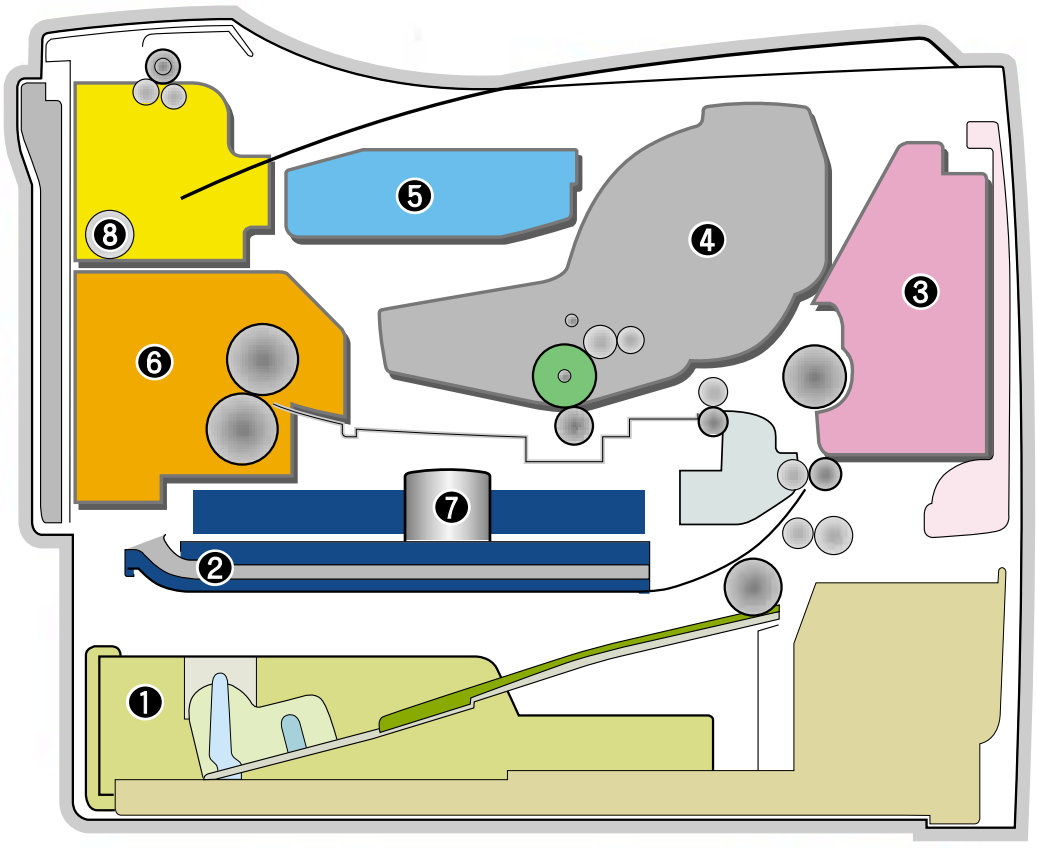
### Printer Features

The table below lists a general overview of features supported by your printer.

(I: Installed, O: Option)

| Features | ML-4550 | ML-4551N | ML-4551ND |
|---|---|---|---|
| IEEE 1284 Parallel | I | I | I |
| USB 2.0 | I | I | I |
| Network Interface (Ethernet 10/100 Base TX) | O | I | I |
| Hard Disk | O | O | O |
| PostScript* Emulation | I | I | I |
| Duplex Unit | O | O | I |
| Optional Tray 2 | O | O | O |
| Optional Tray 3 | O | O | O |
| Optional Tray 4 | O | O | O |

## 3.2 System Layout



## 3.2.1 Feeding

It is consists of a basic cassette, an MP tray for supplying different types of media : envelope, label special paper, duplex unit, and parts related to paper transferring.

### 1) Separation method

Separate it from the friction pad mounted to the center of the cassette and apply retard roller that uses a spring clutch. A feed roller uses an electronic clutch to control driving power.

### 2) Basic cassette

It takes a center loading method and applies 'friction pad separating method.' It means that there is a paper sensor, but a paper size is detected after detecting the first paper by software.
Both the side guide and the rear guide can be adjusted for for various types of papers from A5 to legal size paper.
It has a paper existence sensing function (Capacity: 500 sheets of general paper), paper arranging function, various size papers accepting function, SCF paper path function, and displaying function of paper remaining amount.
In the front side, there is a paper level indicator.

### 3) Pick-up roller

It has functions such as a paper pickup function, driving control function, paper feeding function, and removing electronic static function.

### 4) Retard roller

It takes an arrangement method which uses a stopper roller and a weight without electric actuator.
It has paper separating function, driving control function, and multi feeding prevention function.

### 6) Registration roller

It has a paper arranging function, paper transferring function, paper detecting function, jam removing function, and so on.

### 7) MP tray

It has a paper arranging function, paper transferring function, jam removing function, and so on.
It uses rubbing pad method to feed 100 sheets of general papers and 10 envelops.
It is possible to extend to 300mm for accepting a legal size paper.

### 8) Duplex unit

It has paper transferring function, paper guide function, jam removing function, paper sensing function, and main board supporting function.
It is designed for basic attachment, and the duplex feeding takes a side feeding method. Usable papers are A4, letter, and legal size paper.
For removing a jam occurred in a front part, it is designed to open a cassette and a guide.
It is designed to open a rear cover to remove a jam in a rear part.
If a face up tray is open, the duplex option cannot be used.

### 9) SCF (Second Cassette Feeder)

It is the same method with the main cassette, and the capacity is 500 sheets.
It has a separate driving mechanism. It is designed for a common use with a main cassette.

## 3.2.2 Transfer

It consists of a PTL (Pre-transfer Lamp) and a transfer roller. A PTL sheds light on an OPC drum, lowers an electric potential of an OPC drum's surface, and improves the efficiency of the transfer.
A transfer roller transfers toner on an OPC drum to the paper.
Life span: Print over 150,000 sheets (In 16~27℃)

## 3.2.3 Driver Ass'y

By driving the motor, the system takes power. It consists of a main motor for feeding fuser and duplex reverse turn, and a deve-motor for a toner cartridge.

- Main Motor : DC 24V, Rated RPM : 1604rpm
- Deve Motor : DC 24V, Rated RPM : 1424 rpm

## 3.2.4 Fuser

It is consisted of a heat lamp, heat roller, pressure roller, thermistor and thermostat. It sticks the toner on a paper by heat and pressure to complete the printing job.

- E-coil Heator : 1,300 Watt ±50W

### 1) Thermostat

When a heat lamp is overheated, a Thermostat cuts off the main power to prevent over-heating.

- Non-Cotact type Thermostat

### 3) Heat roller

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

### 4) Pressure roller

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

### 5) Items for safety

Protecting device for 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

- A fuser power is cut off when a front cover is opened
- Maintain a temperature of fuser cover's surface under 80(C for user, and attach a caution label at where customer can see easily when customer open a rear cover.

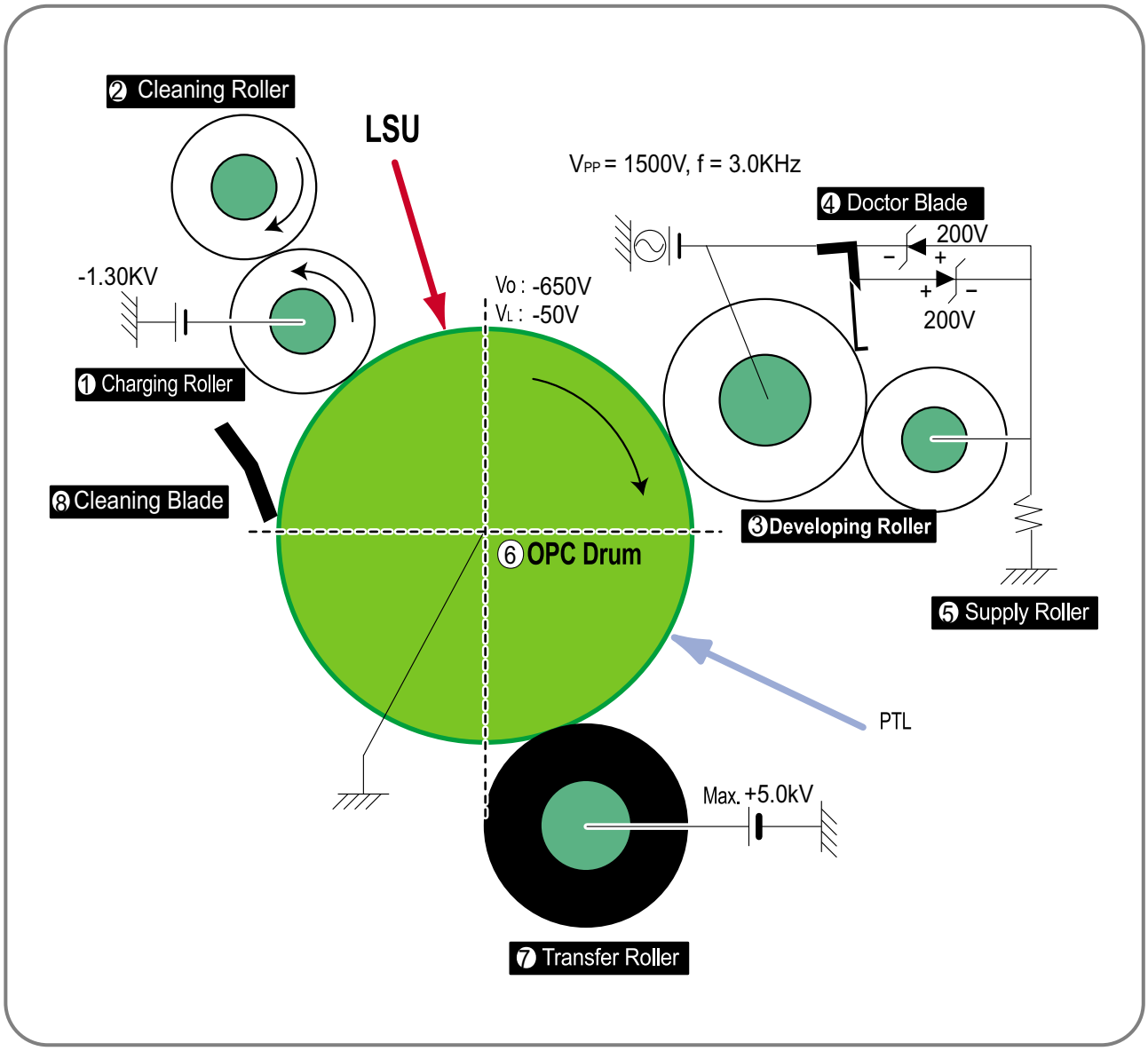
## 3.2.5 LSU (Laser Scanner Unit)

It is the core part of the LBP which switches from the video data received to the controller to the electro-static latent image on the OPC drum by controlling laser beam, exposing OPC drum, and turning principle of polygon mirror. The OPC drum is turned with the paper feeding speed. The /HSYNC signal is created when the laser beam from LSU 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 paper. The one side of the polygon mirror is one line for scanning.

## 3.2.6 Print Cartridge

By using the electronic photo process, it creates a visual image. In the print cartridge, the OPC unit and the toner cartridge unit are in a body. The OPC unit has OPC drum and charging roller, and the toner cartridge unit has toner, supply roller, developing roller, and blade (Doctor blade)

- Developing Method: Non-contacting method
- Toner : Non magnetic 1 component pulverized type toner
- The life span of toner : 10,000 or 20,000 pages (LSA Pattern/A4 standard)
- Toner remaining amount detecting sensor : Yes
- OPC Cleaning : Cleaning blade type
- Management of disusable toner : Collect the toner by using Cleaning Blade
- OPC Drum protecting Shutter : Yes
- Classifying device for toner cartridge : ID is classified by CRUM.




<Toner Cartridge Layout>

# 3.3 Engine H/W Specifications

## 3.3.1 ML-4550 (PCL) Main Board

The Engine Board and the Controller Board are in one united board, and it is consisted of CPU part and print part in functional aspect. The CPU is functioned as the bus control, O/O handling, drivers, and PC interface. The main board sends the Current Image by Video data to the LSU and manages the conduct of Electrophotography for printing. It is consisted of the circuits of the motor (paper feed, pass) driving, clutch driving, pre-transfer lamp driving, current driving, and fan driving. The signals from the paper feed jam sensor and paper empty sensor are directly inputted to the main board.

### 3.3.1.1 Asic (ORION 2)

- **Marvell Feroceon 2850 ARM Compatoble (I-Cache: 32KB, D-Cache-32KB)**
- **64-bit RISC embedded processor core**
- **Dual bus architecture for bus traffic distribution**
  - AMBA High performance Bus (AHB)
  - System Bus with SDRAM
  - 64-bit Mbus Crossbar extension Interface with Flash and Device port

- **SDRAMC**
  - 32 Bits Dual mode DDR-II, 200MHz
  - 4 Banks (Up to 256MB per Bank)

- **Device Controller**
  - Boot Flash 1 Bank (Up to 128MB)
  - Device/NOR Flash 3 Banks (Up to 128MB per Bank)

- **No Graphic Execution Unit and Image processor**
- **No Codec (Encoding / Decoding)**
- **Printer Video Controller Interface for LBP engines**
  - Hyper-C : Printer Video Controller with RET algorithm
    (Line Memory & Lookup Table Memory : 512 x 8 , 4096 x 16)
    Dual / Single Beam, LVDS Pad (VDO, HSYNC)

- **PCI Controller**
  - 32Bits, 66MHz (PCI) / 133MHz (PCI-X)
  - PCI Local Bus Specification rev. 2.2 compliant
  - PCI Express Specification beta 1.0a compliant
  - Host /Agent Mode (Support 3+4 Express Devices in Host Mode)

- **Engine Controller (LPEC1)**
  - LSU Interface unit
  - Step Motor: 2 Channels
  - PWM: 8 Channels
  - ADC: 6 Channels

- **USB 2.0 Interface with Embedded USB 2.0 PHY**
- **Gigabit Ethernet Controller**
  - IEEE 802.3 compliant with 10/100/1000 Mbps full-duplex GbE port
  - Support GMII,MII and RGMII interface with external PHY/SERDES device

- **Package :** 496pins PBGA
- **Power :** 1.2V(Core), 3.3V(IO) power operation
- **Speed :** 600MHz core(ARM9 Compatible) operation, 200MHz bus operation

### 3.3.1.2 Memory

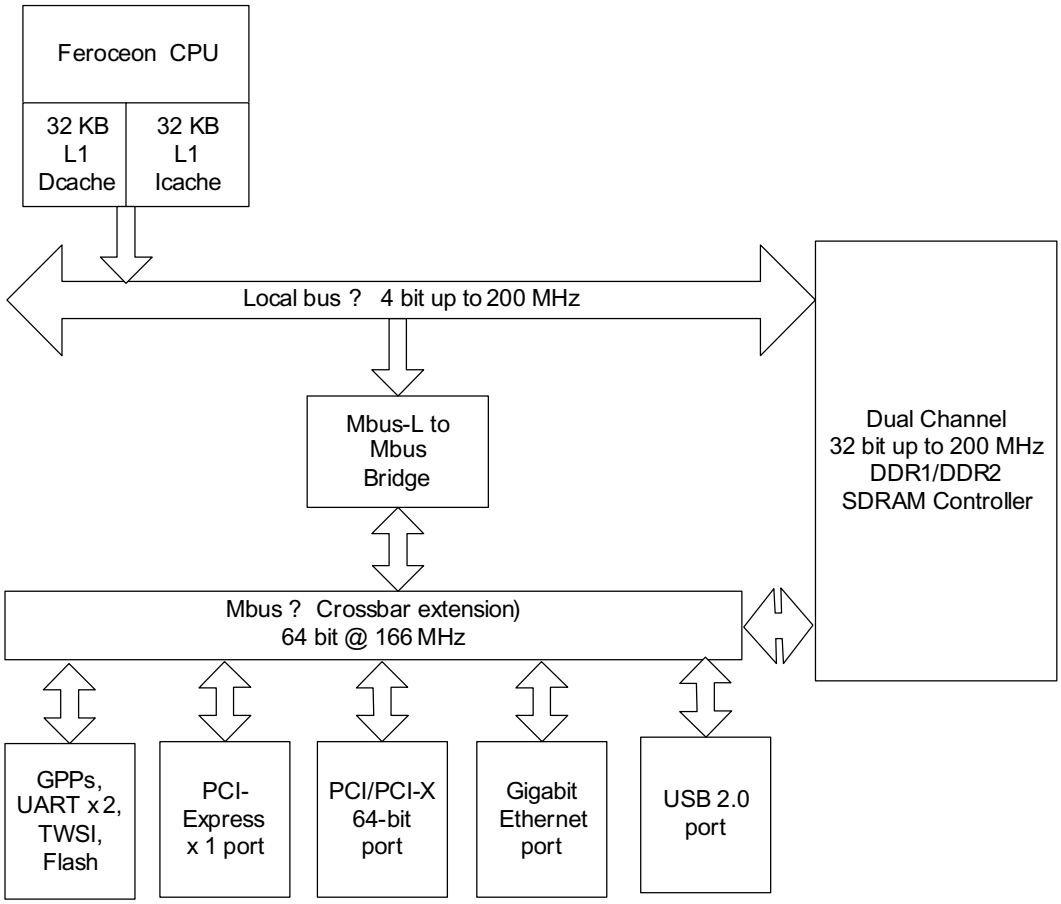
- **NOR Flash Memory :** It stores System Program and downloads the System Program through PC Interface, and in case of model for export it compresses the PCL font, then stores it.
  - Capacity : 128M Byte
  - Access Time : 70 nsec

- **DDR SDRAM :** It is used as Swath Buffer, System Working Memory Area, etc. when printing.
  It stores Font List, compressed into Flash memory, on DRAM and uses it as PCL font in case of model for export.
  - Capacity : 128 Byte(Basic), up to 512Mbyte (User Option)
  - Type : DDR-II SDRAM 200MHz , 32bit

### 3.3.1.3 Others

The Option PBA can be mounted for supporting the serial communication.

### 3.3.1.4. 88F5281 Internal Block Diagram



## 3.3.1.5 Sensor Input Circuit

### 3.3.1.5.1 Paper Empty Sensing

The Paper empty sensor (Photo Interruptor) on the engine board informs the state of paper to CPU whether it is empty or not with operation of the actuator.

When cassette is empty, it detects the fact by reading the D0 Bit of CPU, and then informs the fact by selecting the second LED(yellow) among the panel LEDs.

### 3.3.1.5.2 MP Sensing

By operation of Actuator on the frame, MP Sensor (Photo interruptor) on the engine board informs the state of paper to CPU whether it is empty or not. It reads the D0 Bit of CPU for recognizing paper in MP, and paper is fed from MP if there is.

### 3.3.1.5.3 Paper Feeding/Width Toner Cartridge Sensing

When paper passes the actuator (feed sensor part), it detects the signal of Photo interrupter, informs the paper feeding state to CPU, and then sprays the image data after certain time.

If it doesn't detect the feed sensor within 1sec. after paper is fed, paper Jam0 (CPU #_ ) is occurred (Red and Yellow will be turned on among the OP panel LEDs), and the fact whether the developer is inserted or not is detected with the same principle. After the developer is mounted, the actuator is operated. The signal from the photo interrupter is detected when it is passing the actuator of the sensor part. That is the developer ID sensing.

### 3.3.1.5.4 Paper Exit Sensing

It detects paper state whether paper gets out from the set with operation of exit sensor on the engine board and actuator on the frame. Paper detects the on/off time of exit sensor by reading D2 Bit of CPU, and the normal operation or jam information is informed to the CPU.

The paper JAM2 is informed. (Red, Yellow LED will be turned on among the OP panel LEDs)

### 3.3.1.5.5 Cover Open Sensing

The Cover open sensor is located on the front cover. After the front cover is opened, +24V (DC fan, Solenoid, Main Motor, Polygon motor part of LSU and HVPS), which is supplied to the each unit, is cut off. The cover-open sensing is operated by the D0 bit of CPU, and the developer ID sensing is operated by D7 bit of CPU.

In case, the red LED among OP pnael LEDs will be ON for informing the facts to user.

### 3.3.1.5.6 DC FAN / SOLENOID Driving

It is driven by transistor and controlled by D6 bit of CPU.

When it is high, the fan is driving by turning on the TR, and it is off when the sleep mode is selected. There are two solenoids, and they are driven by paper pick-up and MP signal. It is turned on or off by D4 bit of CPU, and its driving time is 300ms. The diode protects the driving TR from the noise pulse, which is flown when the solenoid id de-energizing.

FAN Driving Circuit is driven by Transistor, and controlled by D6 Bit of

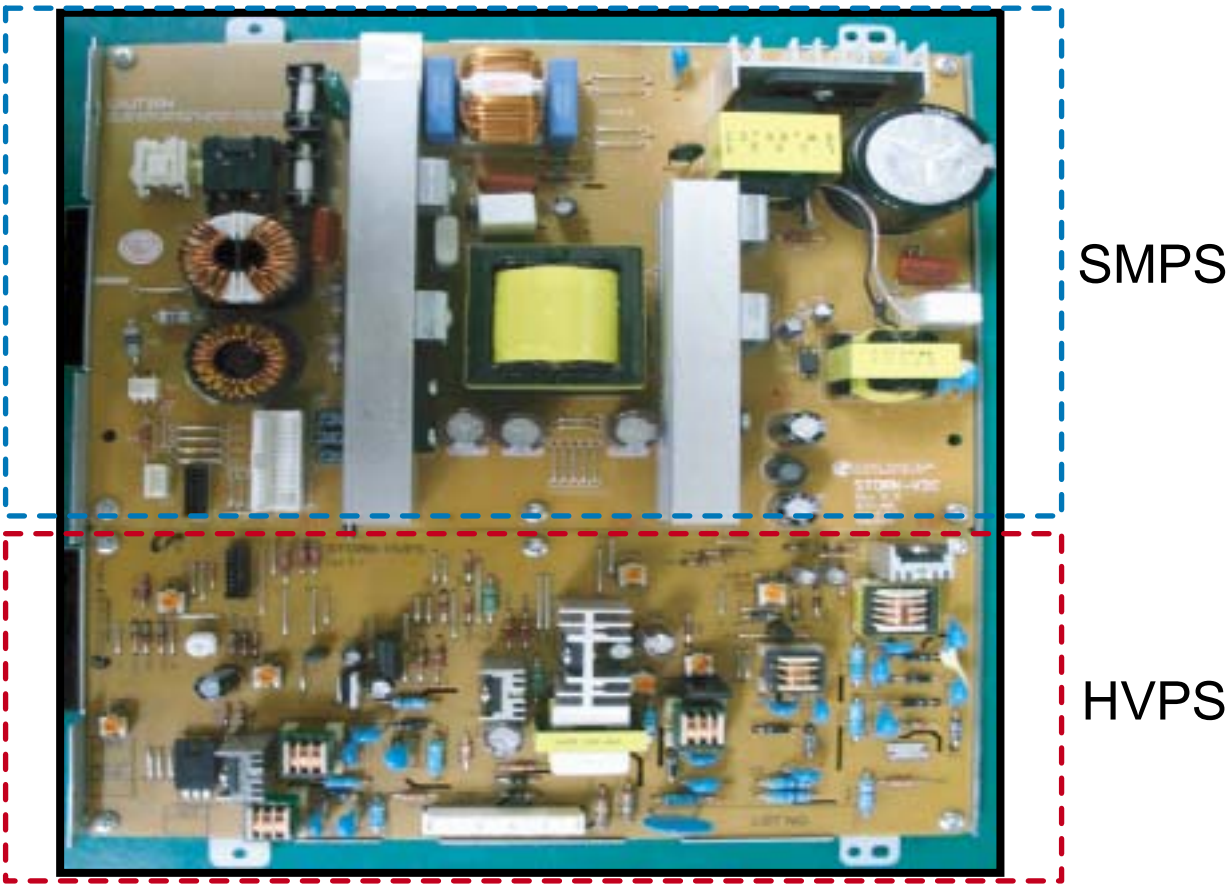
### 3.3.1.5.7 Motor Driving

The motor driving circuit is formed when the Driver IC is selected in the first place. The A3977 Motor Driver IC is used in this case. But resistance Rs value of sensing and voltage value of the V reference can be changed by motor driving voltage value. The motor driving voltage is calculated with the following formula.

I = Vref / Rs, wherein Vref is (R1x 5V) / (R1+R2).

### 3.3.2 SMPS & HVPS board

Outputs 5V, 24V to supply the power to the main board and Optional Board(SCF, Duplex) (Not ADF Board)



### 3.3.2.1 HVPS (High Voltage Power Supply)

**• Transfer High Voltage (THV+)**

- Input Voltage : 24 V DC ±15%
- Output Voltage : MAX +5.0KV ±5 %,(Duty Variable, no loading )
  -1.2KV ±15% (when cleaning, 200㏁)
- Output Voltage Trigger : 6.5 ㎂
- Input contrast of the Voltage stability degree :under ± 5 % (fluctuating input 21.6V ~ 26.4V)
  Loading contrast : ± 5 % or less
- Output Voltage Rising Time : 100 ms Max
- Output Voltage Falling Time : 100 ms Max
- Fluctuating transfer voltage with environmental various : +650 V(Duty 10%) ~ 5 KV (Duty 90%)
- Environment Recognition Control Method : The THV-PWM ACTIVE is transfer active signal. It detects the resistance by recognizing the voltage value, F/B, while permits the environmental recognition voltage.
- Output Voltage Control Method : Transfer Output Voltage is outputted and controlled by changing Duty of THVPWM Signal. 10% Duty : +650V, 90%
  Duty : +5KV ±5%

**· Fuser Voltage**

- Input Voltage : 24 V DC ±15%
- Output Voltage : 30V~1000V DC ±30V
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 30 MΩ ~ 1000 MΩ
- Output Control Signal(MHV-PWM) : CPU is HV output when PWM is Low

**· Cleaning Voltage (THV-)**

- The (+) Transfer Voltage is not outputted because the THV PWM is controlled with high.
- The (-) Transfer Voltage is outputted because the THV-Enable Signal is controlled with low
- The output fluctuation range is big because there is no Feedback control.

**· Developing Voltage (DEV)**

- Input Voltage : 24 V DC ± 15%
- Output Voltage: -200V ~ -600V DC ± 20V
- Output Voltage Fluctuation range: PWM Control
- Input contrast of the output stability degree : ± 5 % or less
  Loading contrast : ± 5 % or less
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 10MΩ ~ 1000 MΩ
- Output Control Signal (BIAS-PWM) : the CPU output is HV output when PWM is low.

**· Supply**

- Output Voltage : -400V~ -800V DC ± 50V(ZENER using, DEV )
- Input contrast of the output stability degree : under ± 5 %
  Loading contrast : ± 5 % or less
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 10 MΩ ~ 1000 MΩ
- Output Control Signal (BIAS-PWM) : the CPU is HV output when PWM is low.

### 3.3.2.2 SMPS (Switching Mode Power Supply)

It is the power source of entire system. It is assembled by an independent module, so it is possible to use for common use. It is mounted at the bottom of the set.
It is consisted of the AMPS part, which supplies the DC power for driving the system, and the AC heater control part, which supplies the power to fuser. SMPS has two output channels. Which are 3.3V and +24V.

**• AC Input**

- Input Rated Voltage : AC 220V ~ 240V  AC 120V / AC 220V(EXP version)
- Input Voltage fluctuating range : AC 198V ~ 264V  AC 90V ~ 135V / AC 198V ~ 264V (EXP version)
- Rated Frequency : 50/60 Hz
- Frequency Fluctuating range : 47 ~ 63 Hz
- Input Current : Under 4.0Arms / 2.0Arms (But, the status when lamp is off or rated voltage is inputted/outputted )

**• Rated Output Power**

| NO | ITEM | CH1 | CH2 | CH3 |
|---|---|---|---|---|
| 1 | CHANNEL NAME | +5V | +24V1 + +24V2 | |
| 2 | CONNECTOR PIN | CON 21<br>5V PIN: 12, 14, 16, 18<br>GND PIN: 20, 22, 24 | CON 21<br>24V PIN : 2, 4, 6, 8<br>GND PIN : 26, 27, 28 | |
| 3 | Rated Output | +5.0V ± 5%<br>(+4.75V ~ +5.25V) | +24.0V ± 5%<br>(+21.6V ± 26.4V) | |
| 4 | Max.Output Current | 4.0A | 7.5A | |
| 5 | Peak Loading Current | 4.4A | 8.0 A | |
| 6 | RIPPLE NOISE Voltage | Under 100mVp-p | Under 100mVp-p | |
| 7 | Maximum output | 16.0W | 127.2W | |
| 8 | Peak output | 20.0W | 180.0W | |
| 9 | Protection for loading shortage and overflowing current | - | - | |

**• Power Consumption**

| NO | ITEM | CH1(+3.3V) | CH2(+5V) | CH3(24V) | System |
|---|---|---|---|---|---|
| 1 | Stand-By | 1.0 A | 0.07A | 0.4 A | AVG : 55 Wh |
| 2 | PRINTING | 1.0 A | 0.14A | 2.0 A | AVG : 280 Wh |
| 3 | Sleep-Mode | 0.8A | 0.01A | 0.4A | AVG : 10 Wh |

**• Length of Power Cord : 1830 ±50mm**
**• Power Switch : Use**

**• Feature**

- Insulating Resistance : 50㏁ or more (at DC 500V)
- Insulating revisiting pressure : Must be no problem within 1 min. (at 1500Vac,10mA)
- Leaking Current : under 3.5mA
- Running Current : under 40A PEAK (AT 25℃, COLD START)
  under 60A PEAK (In other conditions)
- Rising Time : within 2Sec
- Falling Time : over 20ms
- Surge : Ring Wave 6KV-500A (Normal, Common)

**• Environment Condition**

- Operating temperature range : 0℃ ~ 40℃
- Maintaining temperature range : -25℃ ~ 85℃
- Preserving Humidity Condition : 30% ~ 90% RH
- Operating atmospheric pressure range :

### 3.3.2.3 FUSER AC POWER CONTROL

Fuser(HEAT LAMP) gets heat from AC power. The AV power controls the switch with the Triac, a semiconductor switch. The ON/OFF control is operated when the gate of the Triac is turned on/off by Photo triac (insulting part).
In other words, the AC control part is passive circuit, so it turns the heater on/off with taking signal from engine control part.
When the HEATER ON signal is turned on at engine, the LED of PC1 (Photo Triac) takes the voltage and flashes. From the flashing light, the Triac part (light receiving part) takes the voltage, and the voltage is supplied to the gate of Triac and flows into the Triac. As a result, the AC current flows in the heat lamp, and heat is occurred.
On the other hand, when the signal is off, the PC1 is off, the voltage is cut off at the gate of Triac, the Triac becomes off, and then the heat lamp is turned off.

· Triac (THY1) feature :12A, 600V SWITCHING
· Phototriac Coupler (PC3)
  - Turn On If Current : 15mA~50mA(Design :16mA)
  - High Repetive Peak Off State Voltage : Min 600V

## 3.3.3 Engine F/W

### 3.3.3.1.Control Algorithm

**• Feeding**

If feeding from a cassette, the drive of the pickup roller is controlled by controlling the solenoid. The on/off of the solenoid is controlled by controlling the general output port or the external output port. If feeding from a manual feeder, decide to insert the paper according to the operation of the manual sensor, and by driving the main motor, insert the paper in front of the feed sensor. While paper moves, occurrence of Jam is judged as below.

| ITEM | Description |
|---|---|
| JAM 0 | - After picking up, paper cannot be entered due to paper is not fed.<br>- After picking up, paper entered but it cannot reach to the feed sensor in certain time due to slip, etc.<br>- After picking up, if the feed sensor is not on, re-pick up. After re-picking up, if the feed sensor is not on after certain time, it is JAM 0.<br>** It is a status that the leading edge of the paper doesn't pass the feed sensor.*<br>- Even though the paper reaches to the feed sensor, the feed sensor doesn't be ON.<br>** It is a status that the leading edge of the paper already passes the feed sensor.* |
| JAM 1 | - After the leading edge of the paper passes the feed sensor, the trailing edge of the paper cannot pass the feed sensor after a certain time. (The feed sensor cannot be OFF)<br>- After the leading edge of the paper passes the feed sensor, the paper cannot reach the exit sensor after certain time. (The exit sensor cannot be ON)<br>** The paper exists between the feed sensor and the exit sensor.* |
| JAM 2 | - After the trailing edge of the paper passes the feed sensor, the paper cannot pass the exit sensor after certain time. |
| DUPLEX JAM 1 | - After the trailing edge of the paper passes the exit sensor, the leading edge of the paper cannot reach the duplex sensor after certain time. |
| DUPLEX JAM 0 | - After the leading edge of the paper passes the duplex sensor, the leading edge of the paper cannot reach the feed sensor after certain time. |

### 3.3.3.1.2 Driver

By gearing, the main motor drives the rollers such as feeding roller, developing roller, fuser roller, and exiting roller. The step motor is controlled for the such acceleration section and steady section. In the initial stage of the motor run, appoint the acceleration section to prevent the step-out of the motor. It is controlled by the A 3977 motor driver IC. The step signal and the enable signal are sent to make the phase for driving the motor in CPU.

### 3.3.3.1.3 Transfer

The charging voltage, developing voltage and the transfer voltage are controlled by PWM (Pulse Width Modulation). The each output voltage is changeable due to the PWM duty. The transfer voltage admitted when the paper passes the transfer roller is decided by environment recognition. The resistance value of the transfer roller is changed due to the surrounding environment or the environment of the set, and the voltage value, which changes due to the environments, is changed through AD converter. The voltage value for impressing to the transfer roller is decided by the changed value. Each voltage value is controlled according to 3.3.4.2 Timing Chart.

### 3.3.3.1.4 Fusing

The temperature change of the heat roller°Øs surface is changed to the resistance value through the thermistor. By converting the voltage value, which impressed to the resistance, to the digital value through the AD converter, the temperature is decided. The AC power is controller 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.

- **Lamp Method**

| Error | Description | LCD Display |
|---|---|---|
| OPEN HEAT ERROR | - When warming up, it has been lower than 60℃ over 35 seconds | "ENGINE FUSER ERROR" |
| LOW HEAT ERROR | - StandbyIt has been lower than 130℃ over 10 seconds<br>- Printing<br>Up to 2 consecutive pages :<br>It has been lower than 155℃ over 7 seconds.<br>From 3 consecutive pages :<br>It has been 25℃ lower than the fixed fusing temperature over 7 seconds. | "ENGINE LOW HEAT ERROR" |
| OVER HEAT ERROR | It has been higher than 230℃ over 10 seconds | "ENGINE OVERHEAT ERROR" |

=>This can be changed in the future.

### 3.3.3.1.5 LSU

The LSU is consisted 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. When the polygon motor speed becomes strady, Lready occurs. If two conditions are satisfied, the status are not satisfied, the error shown in below occurs.

| Error Type | Description | LCD Display |
|---|---|---|
| Polygon Motor Error | Whenthe polygon motor speed doesn t'become steady | "LSU NOT READY" |
| Hsync Error | The polygon motor speed is steady but the Hsync is not generated | "HSYNC ERROR" |

# 4. Alignment and Adjustments

This chapter describes the main functions for service, such as the product maintenance method, the test output related to maintenance and repair, DCU using method, Jam removing method, and so on. It includes the contents of manual.

## 4.1 How to use EDC (Engine Diagnostic Control) Mode

### 4.1.1 EDC Setup

EDC(Engine Diagnostic Control, EDC will be used below) is considered to test and check whether each functions of machinery and h/w module are normal or not. All of the test function are able to be controlled by the keys and LCD window on the panel without any other kits. It's developed for related engineers, not for users.

### 4.1.2 Entrance method for EDC

In order to enter the "EDC" mode, the entering method should be special because this mode is developed for engineers related, not for end users.

- Entering the mode, the message, "COMPONENT TEST/Press Menu Key" is displayed.
- In this mode, an engineer should press the "Menu Key" to search each function he would like to test.

• **Usage**

1. Check printer is powered on.
2. Wait until the printer becomes a ready mode.
3. Press "Menu -> Stop -> Left -> Back -> Ok -> Right" in order.
4. Confirm the message "COMPONENT TEST/Press Menu Key" is displayed.
5. Press "Menu" key.
6. Follow a usage for a function you would like to use.

* The procedure and content above can be changed according to the situation.

## 4.1.3 Cover Status

This function is to check all cover sand all doors status.

• **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 1.Cover Status" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function (Refer to the table below).
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Back key" for return.

• **Function**

| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| Top Cover | If the cover is opened, "Open" message will be displayed and if not, "Closed" displayed. | Top Cover [Closed]/[Open] | |
| Tray1 Cassette | If the Tray is opened, "Open" message will be displayed and if not, "Closed" displayed. | Tray1 Cassette [Closed]/[Open] | |
| Tray2 Cassette | If the Tray is opened, "Open" message will be displayed and if not, "Closed" displayed. | Tray2 Cassette [Closed]/[Open] | |
| Tray3 Cassette | If the Tray is opened, "Open" message will be displayed and if not, "Closed" displayed. | Tray3 Cassette [Closed]/[Open] | |
| Tray4 Cassette | If the Tray is opened, "Open" message will be displayed and if not, "Closed" displayed. | Tray4 Cassette [Closed]/[Open] | |
| Fuser Door | If the Door is opened, "Open" message will be displayed and if not, "Closed" displayed. | Fuser Door [Closed]/[Open] | |

• The procedure and content above can be changed according to the situation.

## 4.1.4 Sensor Status

These Functions are to check a current state (normal or not) of each Sensor.

• **Usage**

- The other sensors

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 2.Sensor Status" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
3. Touch a sensor you would like to test.
4. Check the message on the LCD window for the state of it.

• **Function**

| Sensor | Description | Display (LCD) | | Remarks |
|---|---|---|---|---|
| | | Before touching | After touching | |
| RegiSensor | See the message after touching the sensor. | Regi. Sensor [Without Paper] | Regi. Sensor [With Paper] | |
| T1 FeedSensor | See the message after touching the sensor. | T1 Feed Sensor [Without Paper] | T1 Feed Sensor [With Paper] | |
| T2 FeedSensor | See the message after touching the sensor. | T2 Feed Sensor [Without Paper] | T2 Feed Sensor [With Paper] | |
| T3 FeedSensor | See the message after touching the sensor. | T3 Feed Sensor [Without Paper] | T3 Feed Sensor [With Paper] | |
| T4 FeedSensor | See the message after touching the sensor. | T4 Feed Sensor [Without Paper] | T4 Feed Sensor [With Paper] | |
| ExitSensor | See the message after touching the sensor. | Exit Sensor [Without Paper] | Exit Sensor [With Paper] | |
| DJam1Sensor | See the message after touching the sensor. | DJam1 Sensor [Without Paper] | Djam1 Sensor [With Paper] | |
| Out Bin Sensor | See the message after touching the sensor. | OutBin. Sensor [Normal] | OutBin Sensor [Full] | |
| Bypass Empty | See the message after touching the sensor. | Bypass Empty [Empty] | Bypass Empty [Present] | |
| T1 Paper Empty | See the message after touching the sensor. | T1 Paper Empty [Empty] | T1 Paper Empty [Present] | |
| T2 Paper Empty | See the message after touching the sensor. | T2 Paper Empty [Empty] | T2 Paper Empty [Present] | |
| T3 Paper Empty | See the message after touching the sensor. | T3 Paper Empty [Empty] | T3 Paper Empty [Present] | |

| Sensor | Description | Display (LCD) | | Remarks |
|---|---|---|---|---|
| | | Before touching | After touching | |
| T4 Paper Empty | See the message after touching the sensor. | T4 Paper Empty [Empty] | T4 Paper Empty [Present] | |
| T1 PSize0 Sen. | See the message after touching the sensor. | T1 Psize0 Sen. [Low] | T1 Psize0 Sen. [High] | |
| T1 PSize1 Sen. | See the message after touching the sensor. | T1 Psize1 Sen. [Low] | T1 Psize1 Sen. [High] | |
| T1 PSize2 Sen. | See the message after touching the sensor. | T1 Psize2 Sen. [Low] | T1 Psize2 Sen. [High] | |
| T2 PSize0 Sen. | See the message after touching the sensor. | T2 Psize0 Sen. [Low] | T2 Psize0 Sen. [High] | |
| T2 PSize1 Sen. | See the message after touching the sensor. | T2 Psize1 Sen. [Low] | T2 Psize1 Sen. [High] | |
| T2 PSize2 Sen. | See the message after touching the sensor. | T2 Psize2 Sen. [Low] | T2 Psize2 Sen. [High] | |
| T3 PSize0 Sen. | See the message after touching the sensor. | T3 Psize0 Sen. [Low] | T3 Psize0 Sen. [High] | |
| T3 PSize1 Sen. | See the message after touching the sensor. | T3 Psize1 Sen. [Low] | T3 Psize1 Sen. [High] | |
| T3 PSize2 Sen. | See the message after touching the sensor. | T3 Psize2 Sen. [Low] | T3 Psize2 Sen. [High] | |
| T4 PSize0 Sen. | See the message after touching the sensor. | T4 Psize0 Sen. [Low] | T4 Psize0 Sen. [High] | |
| T4 PSize1 Sen. | See the message after touching the sensor. | T4 Psize1 Sen. [Low] | T4 Psize1 Sen. [High] | |
| T4 PSize2 Sen. | See the message after touching the sensor. | T4 Psize2 Sen. [Low] | T4 Psize2 Sen. [High] | |
| TOP Margin Sen | See the message after touching the sensor. | TOP Margin Sen. [Without Paper] | TOP Margin Sen. [With Paper] | |
| DPX Detect Sen | See the message after touching the sensor. | DPX Detect Sen [Low] | DPX Detect Sen [High] | |

* The procedure and content above can be changed according to the situation.

## 4.1.5 Motor Test

These functions are to check a current state (normal or not) of all motors.

- **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 3.Motor Test" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function (Refer to the table below).
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Back key" for return.

- **Function**

| Function Name | Description | Display(LCD) |
|---|---|---|
| Main Mtr Fwd. | The motor will run on the forward direction or stop. | Main Mtr Fwd. [ON] / [OFF] |
| Main Mtr Bwd. | The motor will run on the backward direction or stop. | Main Mtr Bwd. [ON] / [OFF] |
| Main Mtr Slow. | The motor will run on the forwarding direction by half speed. | Main Mtr Slow. [ON] / [OFF] |
| Dev Mtr Nor. | The motor will run on the forwarding direction by normal speed. | Dev Mtr Slow. [ON] / [OFF] |
| Dev Mtr Slow. | The motor will run on the forwarding direction by half speed. | Dev Mtr Slow. [ON] / [OFF] |
| Duplex Mtr Fwd. | The motor will run on the forwarding direction. | Duplex Mtr Fwd. [ON] / [OFF] |
| T2 Feed Motor | The motor will run on the forward direction or stop. | T2 Feed Motor [ON] / [OFF] |
| T3 Feed Motor | The motor will run on the forward direction or stop. | T3 Feed Motor [ON] / [OFF] |
| T4 Feed Motor | The tray2 motor will run on the forward direction or stop. | T Feed Motor [ON] / [OFF] |

* The procedure and content above can be changed according to the situation.

## 4.1.6 Fan Test

These functions are to check a current state (normal or not) of all fans.

- **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 4.Fan Test" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function (Refer to the table below).
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Back key" for return.

• **Function**

| Function Name | Description | Display(LCD) |
|---|---|---|
| Fuser Fan | The fan will run or stop. | Fuser Fan [ON] / [OFF] |
| Fuser Fan Rdy | Check whether the fan is in locked state. | Fuser Fan Rdy.<br>[Ready] / [Not Ready] |
| SMPS Fan | The fan will run or stop. | SMPS Fan [ON] / [OFF] |
| SMPS Fan Rdy | Check whether the fan is in locked state. | SMPS Fan Rdy.<br>[Ready] / [Not Ready] |
| Duplex Fan | The fan will run or stop. | Duplex Fan [ON] / [OFF] |

* The procedure and content above can be changed according to the situation.

## 4.1.7 Clutch / Sol

These functions are to check a current state (normal or not) of the solenoids and clutches.

• **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 5.Clutch/Sol Test" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Back key" for retun.

• **Function**

| Function Name | Description | Display(LCD) |
|---|---|---|
| T1 P-up Clutch | The clutch will run or stop. | T1 P-up Clutch [ON] / [OFF] |
| T2 P-up Clutch | The clutch will run or stop. | T2 P-up Clutch [ON] / [OFF] |
| T3 P-up Clutch | The clutch will run or stop. | T3 P-up Clutch [ON] / [OFF] |
| T4 P-up Clutch | The clutch will run or stop. | T4 P-up Clutch [ON] / [OFF] |
| Bypass Clutch | The clutch will run or stop. | Bypass Clutch [ON] / [OFF] |
| Duplex Sol. | The solenoid will run or stop. | Duplex Sol. [ON] / [OFF] |

* The procedure and content above can be changed according to the situation.

## 4.1.8 Fuser Ctrl

This function is to check a current state (normal or not) of the fuser unit.

• **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 6.Fuser Ctrl" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "Arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Back key" for retun.

• **Function**

| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| Fuser Bias | The bias will have the saved value previously | Fuser Bias [ON] / [OFF] | |
| Temp Control | The fuser unit will control the power for fixing and display the current temperature on the panel. The target temperature is 160℃. | Temp Control [OFF] / [ON] [xxx] | [xxx] is a current temperature. |
| Fuser Temp | The ADC will be displayed on the panel. | Fuser Temp [xxx] | [xxx] is it's ADC. |
| Inner Temp | The ADC will be displayed on the panel. | Inner Temp [xxx] | [xxx] is it's ADC. |

* The procedure and content above can be changed according to the situation

## 4.1.9 LSU

These functions are to check a current state (normal or not) of the Laser Scanning Unit.

• **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 7.LSU Control" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Cancel key" for stop.

• **Function**

| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| LD Power 1&2 | The LD will have the saved value previously | LD Power 1&2<br>[ON] / [OFF] | |
| Laser Motor | The motor will run or stop. | Laser Motor<br>[ON] / [OFF] | |
| Laser Ready | When Laser Scanning Unit is ready to print (Laser diode on, Stable polygon motor speed) the message, "Normal" is displayed. On the other case "Fault" | Laser Ready<br>[Normal] | |

* The procedure and content above can be changed according to the situation.

## 4.1.10 Deve Control

These functions are to check whether the control for HVPS is normal or not.

• **Usage**

1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 8.Deve Control" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Cancel key" for stop.

• **Function**

| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| THV Plus Bias | The bias will have the previously saved value. | THV Plus Bias<br>[ON] / [OFF] | |
| THV Minus Bias | The bias will have the previously saved value. | THV Minus Bias<br>[ON] / [OFF] | |
| DEV Bias | The bias will have the previously saved value. | DEV Bias [ON] / [OFF] | |
| DEV AC Bias | The bias will have the previously saved value. | DEV AC Bias<br>[ON] / [OFF] | |
| DEV Vpp Bias | The bias will have the previously saved value. | DEV Vpp Bias<br>[ON] / [OFF] | |
| MHV Bias | The bias will have the previously saved value. | MHV Bias [ON] / [OFF] | |
| PTL | The lamp will be lighted or not. | PTL [ON] / [OFF] | |

| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| Erase Lamp | The lamp will be lighted or not. | Erase Lamp [ON] / [OFF] | |
| THV Read | The Adc will be displayed on the panel. | THV Read [xxx] | [xxx] is it's ADC |
| MHV Read | The Adc will be displayed on the panel. | MHV Read [xxx] | xxx] is it's ADC |

* The procedure and content above can be changed according to the situation.

## 4.1.11 Print Test and Option version

These functions are to check a total print process state and the option s'version.

• **Usage**

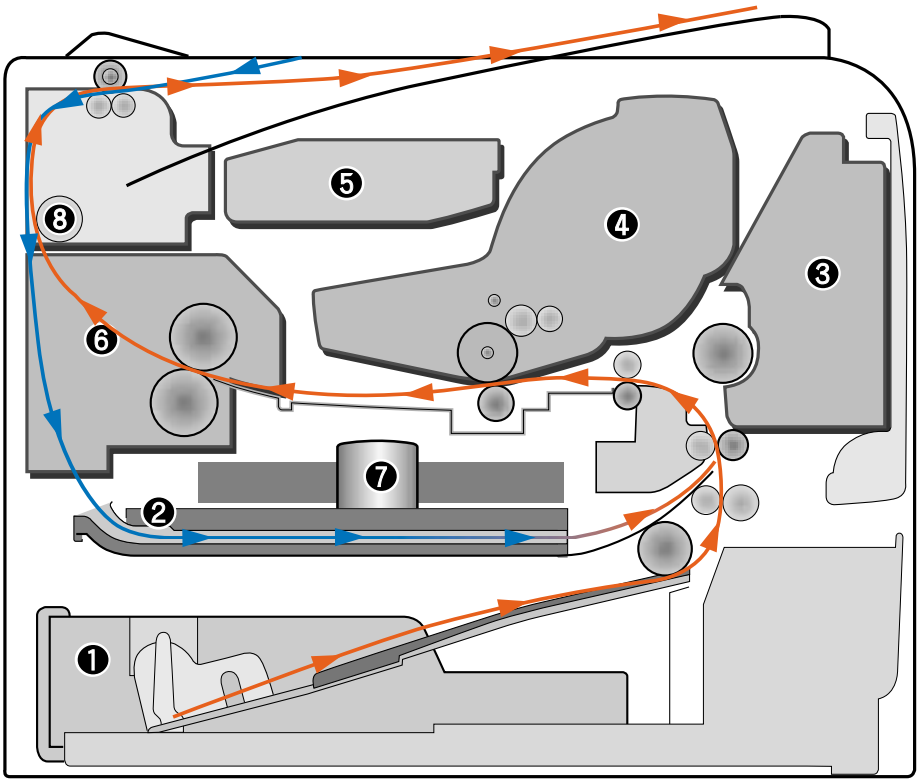
1. Press the "Arrow Keys (◀/▶)" until finding "Component Test / 10.Print Test" message on the panel.
2. Press the "OK Key", when it is found.
3. Press the "arrow keys" until finding a suitable function. (Refer to the table below)
4. Press the "OK Key", when it is found.
5. Press the "OK Key" for execution or the "Cancel key" for stop.

• **Function**

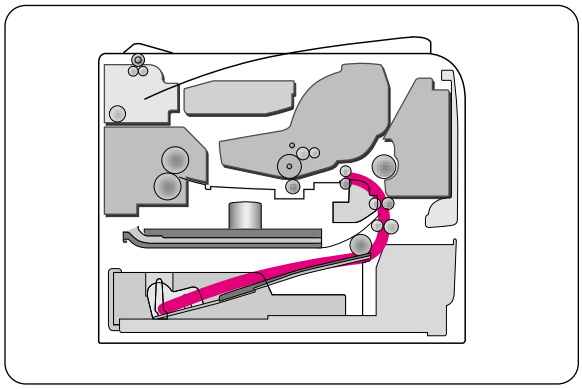
| Function Name | Description | Display(LCD) | Remarks |
|---|---|---|---|
| Pattern Print | The printer can print the previously saved mode (Simplex or Duplex / Copy/ pattern kind) | Pattern Print [ON] | |
| T2 Version | This is the version for Tray2 | T2 Version [x.xx] | x.xx is version. |
| T3 Version | This is the version for Tray3 | T3 Version [x.xx] | x.xx is version. |
| T4 Version | This is the version for Tray4 | T4 Version [x.xx] | x.xx is version. |
| Duplex Version | This is the version for Duplex | Duplex Version [x.xx] | x.xx is version. |

* The procedure and content above can be changed according to the situation.

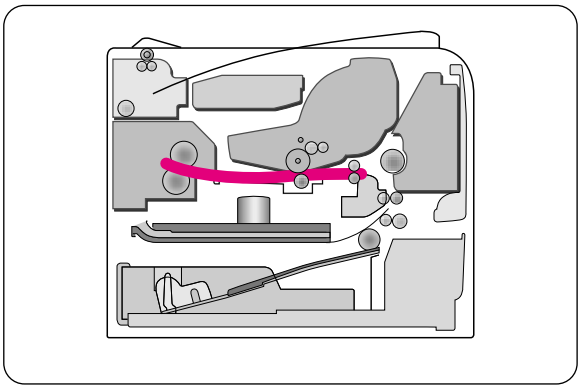
## 4.2 Paper Path



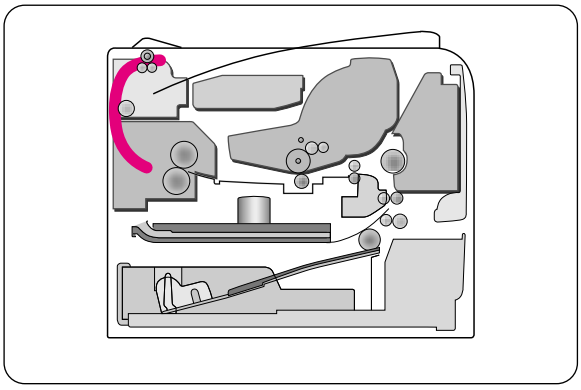

❶ Cassette
❷ Duplex
❸ MPF
❹ Print Cartridge
❺ LSU
❻ Fuser
❼ SMPS & HVPS Board
❽ Duplex Solenoid



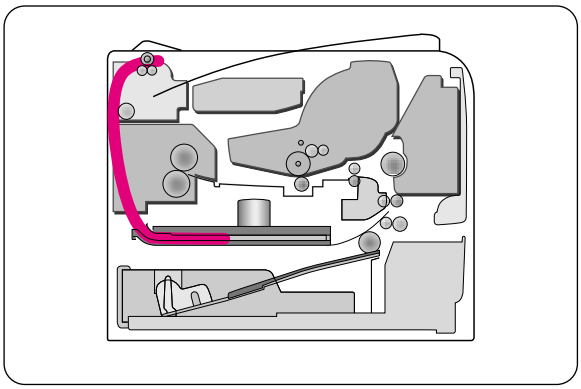
<Jam 0>



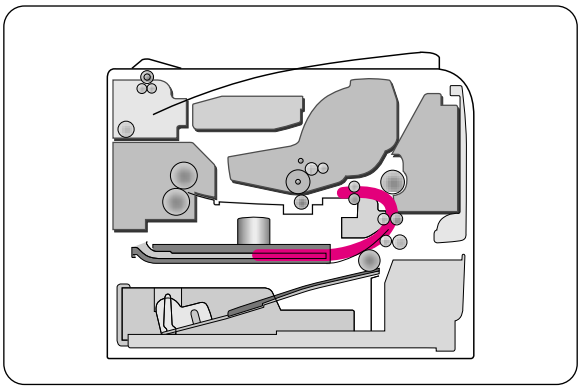
<Jam 1>



<Jam 2>



<Jam Duplex 1>



<Jam Duplex 0>

**• Simplex**

1) A paper is fed from a cassette or MPF by a printing order.
2) The fed paper passes a paper feeding sensor.
   - If the sensor does not operate after feeding the paper, the Jam0 occurs.
3) The paper passes a paper exit sensor, and it comes out from a machine.
   - If the tailing edge of the paper does not come out from a machine after the leading edge of the paper passes the sensor, then certain time later, a Jam2 occurs.

**• Duplex**

1) A paper is fad from a cassette or MPF by a printing order.
2) The fed paper passes a paper feeding sensor.
   - If the sensor does not operate after feeding the paper, a Jam0 occurs.
3) The paper that passes a paper exit sensor takes several printing processes, and moves to a paper exit sensor.
   - If the sensor does not operate after certain time, a Jam 1 occurs.
4) If the paper does not discharge until the paper passes an exit roller and a Roller-Exit-F/Down, a Jam 2 occurs.
5) The printing paper starts to be printed for duplex only by reversing rotation by an exit motor. The printing paper enters to a machine through an exit roller, and reaches to duplex sensor.
   - If the printing paper cannot reach to the duplex sensor after certain time, a duplex Jam 1 occurs.
6) The printing paper that passes the duplex sensor reaches to a feed sensor again and a printing operation is tried over again.
   - If the printing paper cannot reach to a feed sensor after certain time later, a duplex Jam 2 occurs.

## 4.2.1 Clearing Paper Jams

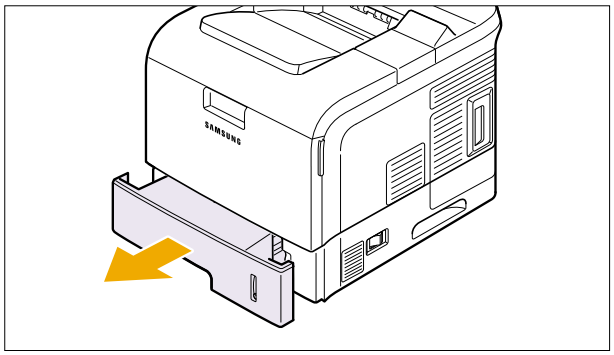
**Note :** When removing paper that is jammed in the printer, if possible always pull the paper in the direction that it normally moves so as not to damage internal components. Always pull firmly and evenly; do not jerk the paper. If the paper tears, ensure that all fragments of paper are removed; otherwise a jam will occur again.

When a paper jam occurs, the Status LED lights red. Open and close the top cover. The jammed paper automatically exits the printer. If the paper does not exit, check the display on the control panel. The message indicating the corresponding location of the paper jam appears. Refer to the table below to locate the paper jam and to clear it:

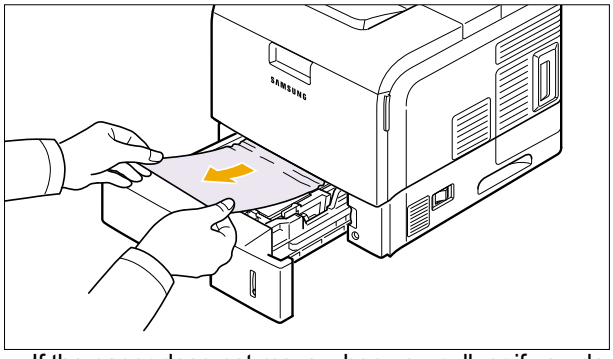
### 4.2.1.1 In the paper feed area

#### • In the Tray1

1. Pull the tray 1 open.



2. Remove the jammed paper by gently pulling it straight out. Make sure that all of the paper is properly aligned in the tray 1.



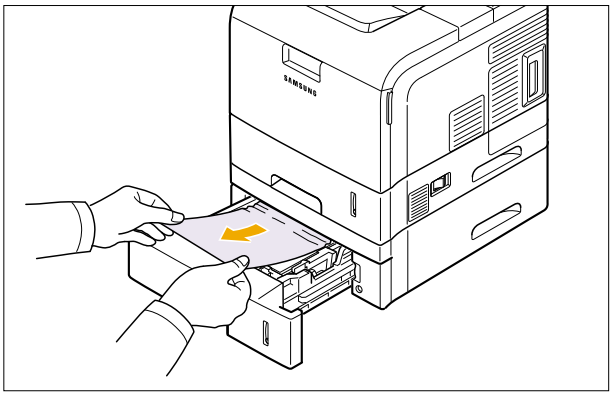
If the paper does not move when you pull, or if you do not see the paper in this area, check the fuser area around the toner cartridge.

3. Insert the tray 1 into the printer until it snaps into place. Printing automatically resumes.

## • In the optional tray

1. Pull the optional tray open.

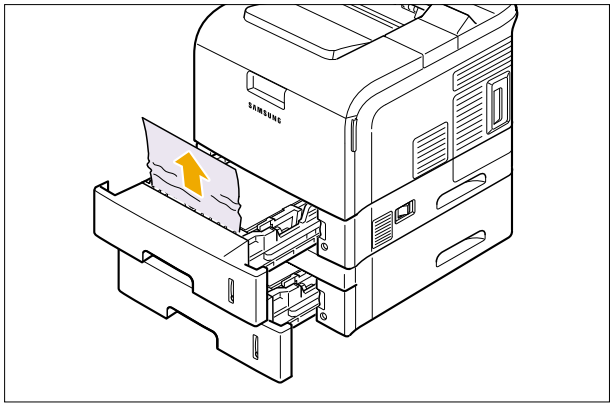
2. Remove the jammed paper from the printer.



If the paper does not move when you pull, or if you do not see the paper in this area, stop and go to step 3.

3. Pull the upper tray half way out.

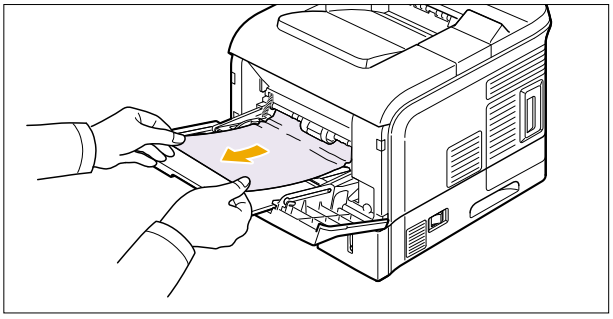
4. Pull the jammed paper straight up and out.



5. Fully insert the trays back into the printer. Printing automatically resumes.

## • In the multi-purpose tray

1. If the paper is not feeding properly, pull the paper out of the printer.



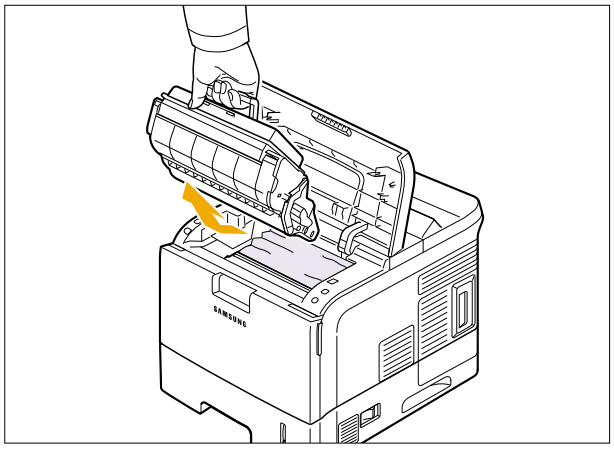
2. Open and close the top cover to resume printing.

3. Open and close the top cover.Printing can be resumed.

### 4.2.1.2 Around the printer cartridge

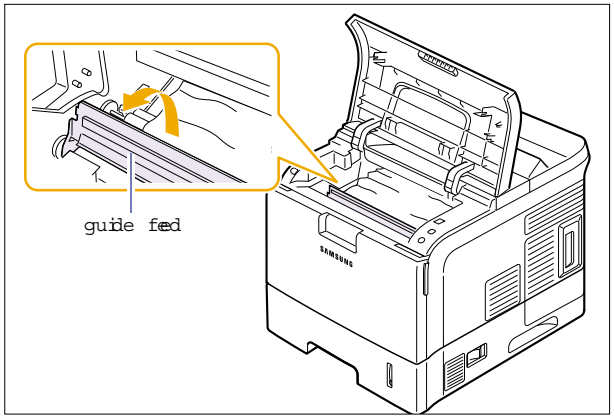
**Note :** The fuser area is hot. Take care when removing paper from the printer.

1. Open the top cover and pull the printer cartridge out.

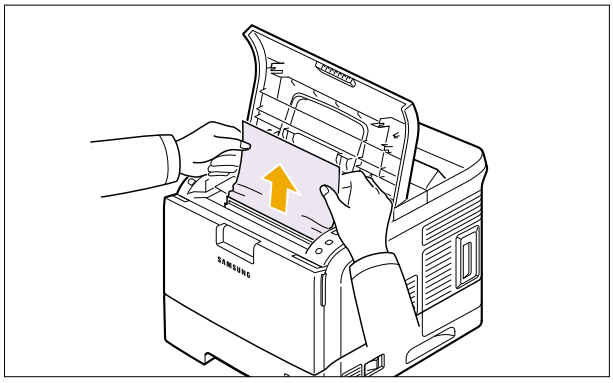


**Caution :** • To prevent damage to the printer cartridge, do not expose it to light for more than a few minutes. Cover it with a piece of paper, if necessary.
• Do not touch the green surface underside of the printer cartridge. Use the handle on the cartridge to avoid touching this area.

2. Carefully lift up the guide feed.

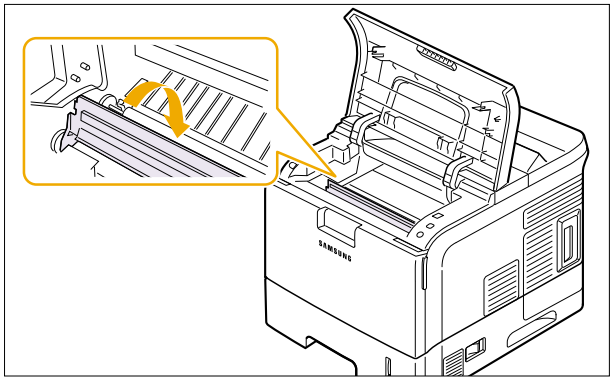



3. Remove the jammed paper by gently pulling it straight out.



If you do not see the jammed paper or if there is any resistance removing the paper, stop pulling and go to the paper exit area.

4. Flip down the guide feed.



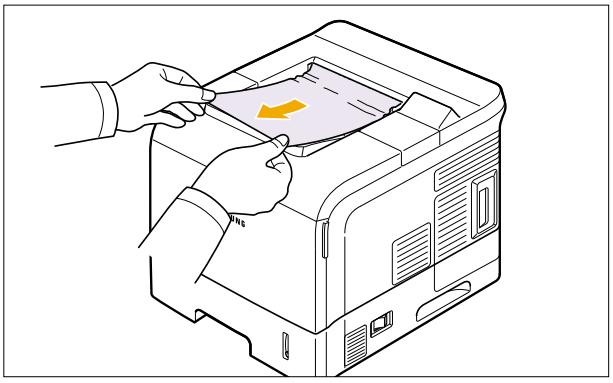
5. Replace the printer cartridge and close the top cover. Printing automatically resumes.

**Note :** If it is difficult to reinstall the printer cartridge, make sure that the guide feed has been flipped back down into position.

### 4.2.1.3 In the paper exit area

1. Open and close the top cover. The jammed paper is automatically ejected from the printer.

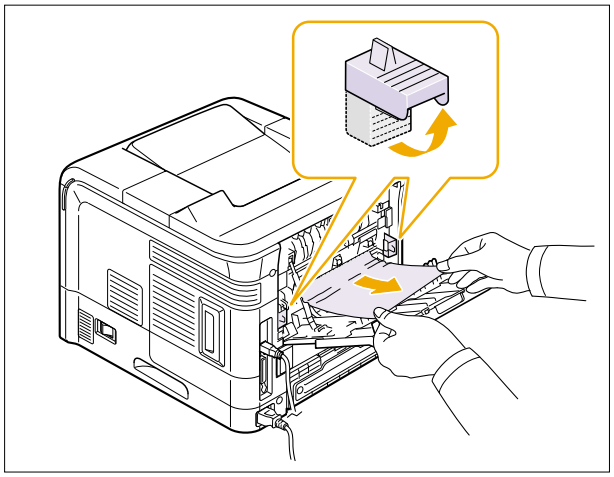
2. Gently pull the paper out of the output tray.



If you do not see the jammed paper or if there is any resistance when you pull, stop and go to the next step.

3. Open the rear cover.

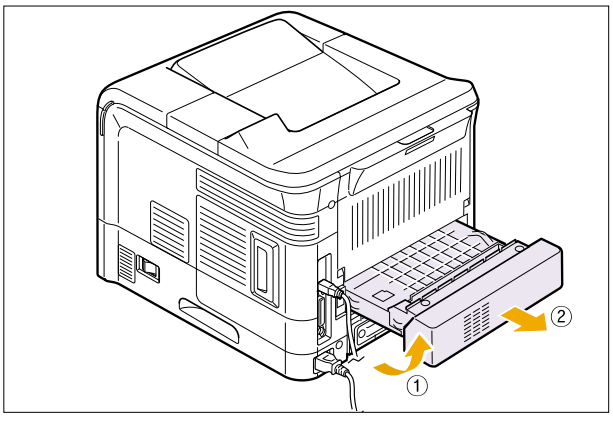
4. By pusing the fuser levers upwards, loosen the jammed paper. Then gently pull the paper straight out.



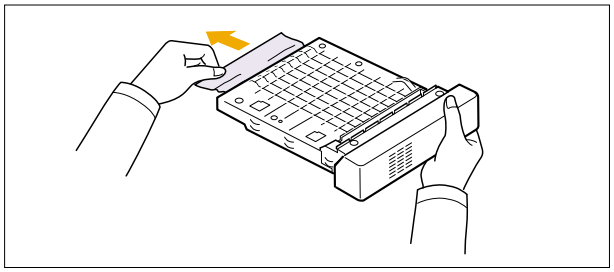
### 4.2.1.4 In the duplex unit area

#### • Duplex jam 0

1. Pull the duplex unit out of the printer.




2. Locate the jammed paper and remove it.

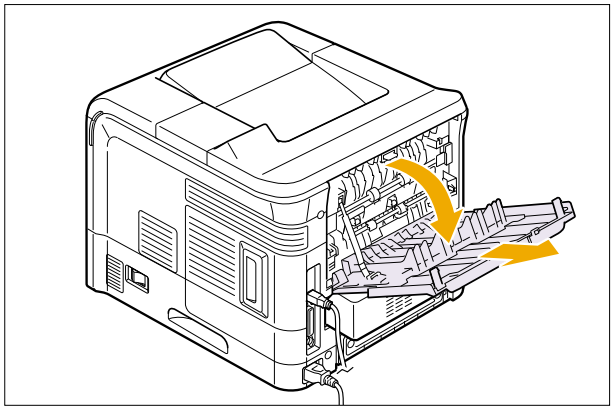


3. Insert the duplex unit into the slot.

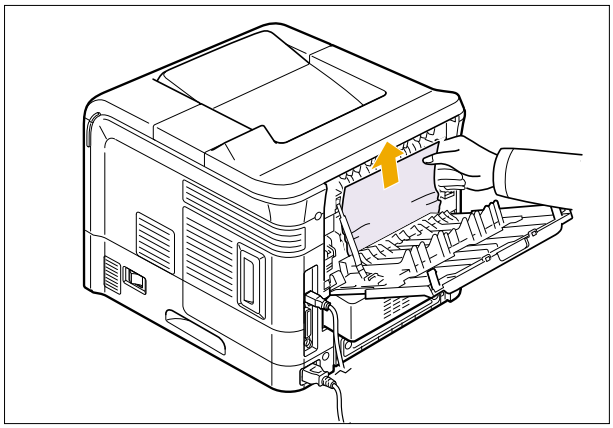
4. Open and close the top cover. The printer will resume printing.

## • Duplex jam 1

1. Open the rear cover.



2. Gently pull the jammed paper straight up.



3. Close the rear cover.

4. Open and close the top cover. The printer will resume printing.

# 4.3 Sample Pattern

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

## 4.3.1 Information Pages

Your printer comes with a set of information pages that helps you solve printing problems and obtain the best results from your printer. You can access these pages from the printer's front panel.

To print information pages:

1. On the printer's front panel, press the Menu button, then press the Enter button to select Information.
2. Select Info Pages, then press the Enter button.
   ① Slect key( ◀/▶), tind to intormation menu.
   ② Press Enter key, sutch to intormation page.
   ③ Press Enter key, the printing.

* 3. Select the appropriate information page, then press the Enter button to print.

* If installed The HDD, select press(1~3 times), then display intormation menu.

***Note :*** *Print the "Menu Map" to see other information pages available for printing.*

## 4.3.2 Demo Pages

Your printer comes with a set of sample pages which demonstrate different functions.

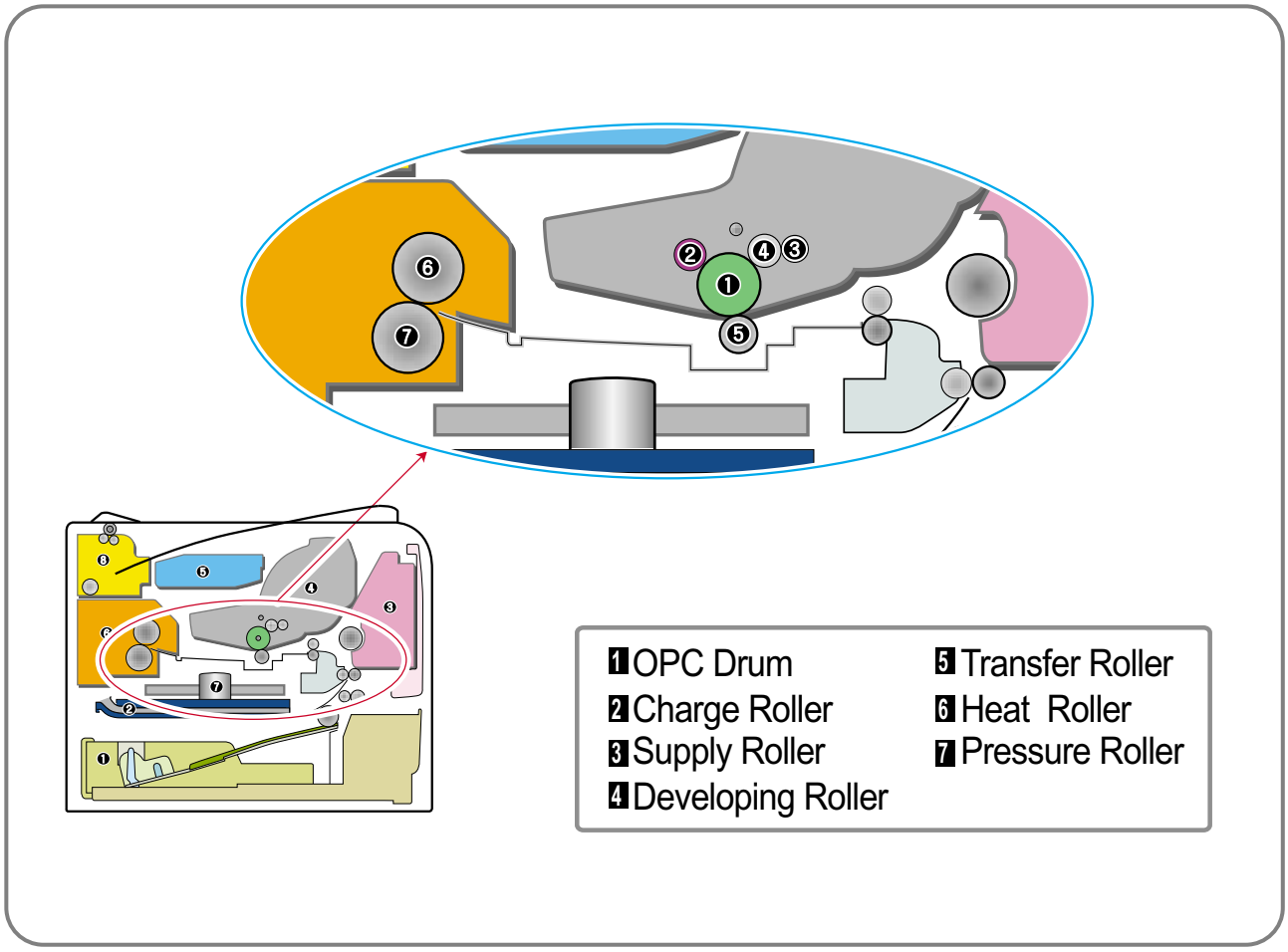
To print sample pages:

1. On the printer's front panel, press the Menu button, then press the OK button to select Information.
2. Select Demo Pages, then press the OK button.
3. Select the desired sample page, then press the OK button to print.

## 4.4 Periodic Defective Image

If the delinquent image regularly occurs in the printed-paper, it is due to delinquent or damaged roller.
Refer to the table in below and check the condition of the roller.

| No | Roller | Defective image | Typical defect |
|---|---|---|---|
| 1 | OPC Drum | 95 mm | white spot on black image or black spot, image ghost |
| 2 | Charge Roller | 38 mm | black spot |
| 3 | Supply Roller | 45 mm | light or dark horizontal image band |
| 4 | Developing Roller | 43 mm | horizontal image band, image ghost |
| 5 | Transfer Roller | 55 mm | image ghost |
| 6 | Heat Roller | 126 mm | Black spot and image ghost |
| 7 | Pressure Roller | 126 mm | black spot on the backside |




<Rollers Layout>

## 4.5 Error Messages

Messages appear on the Smart Panel program window or the control panel display to indicate the printer's status or errors. Refer to the tables below to understand the messages' meaning and correct the problem if necessary. Messages and their meanings are listed in alphabetical order.

| Message | Meaning | Suggested solutions |
|---|---|---|
| ADC Not Confirm Error | There is a problem in your printer system. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| Door Open | The top cover or rear cover is not securely latched. | Close the cover until it locks into place. |
| Duplex Jam 0<br>Check Inside | Paper has jammed during duplex printing. | Clear the jam. |
| Duplex Jam 1<br>Open/Close Door | Paper has jammed during duplex printing. | Clear the jam. |
| Fuser Door Open | The fuser door is not securely latched. | Open the rear cover and close the fuser door until it locks into place. |
| Fuser is Cleaning | Your printer is printing a leaning sheet now. | Please wait a few minutes. |
| Inner Temp. Open<br>Cycle Power | There is a problem in your printer system. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| Inner Temp. Short<br>Cycle Power | There is a problem in your printer system. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| Install Toner | ① A toner cartridge is not installed.<br>② View of when the inner terminal of the set and the DEVE is not connected properly. | ① Install a toner cartridge.<br>② Check if there is any deformity at the inner terminal of the set, of check the CRUM at the DEVE for any polluted areas. |
| Invalid Toner | The toner cartridge you have installed is not for your printer. | Install a Samsung-genuine toner cartridge, designed for your printer. |
| Load [Size] In [Tray] | The paper size specified in the printer properties does not match the paper you are loading. | Load the correct paper in the tray. |
| Load Manual<br>Press Cont Key | The multi-purpose tray is empty in manual feed mode. | Load a sheet of print media and press OK. You need to press OK each page to be printed. |
| Low Heat Error<br>Cycle Power | There is a problem in the fuser unit. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |

| Message | Meaning | Suggested solutions |
|---|---|---|
| LSU Motor Error<br>Cycle Power | A problem has occurred in the LSU (Laser Scanning Unit). | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| MP Tray<br>Paper Empty | There is no paper in the multi-purpose tray. | Load paper in the multi-purpose tray. |
| OPC is Cleaning | Your printer is printing a cleaning sheet now. | Please wait a few minutes. |
| Open Heat Error<br>Cycle Power | There is a problem in the fuser unit. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| Out-Bin Full | The output tray is full. | It can hold up to 250 sheets of plain paper. Once the paper is removed from the output tray, the printer resumes printing. |
| Over Heat Error<br>Cycle Power | There is a problem in the fuser unit. | Unplug the power cord and plug it back in. If the problem persists, please call for service. |
| Paper Exit Jam 1<br>Open/Close Door | Paper has jammed before reaching to the exit sensor. | Clear the jam. |
| Paper Jam 0<br>Open/Close Door | Paper has jammed in the feeding area of the tray. | Clear the jam. |
| Paper Jam 1<br>Open/Close Door | Paper has jammed in the fuser area. | Clear the jam. |
| Paper Jam 2<br>Check Inside | Paper has jammed in the paper exit area. | Clear the jam. |
| Paper [Tray] Jam<br>Open [Tray] | Paper has jammed in the displayed optional tray. | Clear the jam. |
| Printing... | The printer is printing jobs. | Complete your printing. |
| Ready | The printer is on-line and ready to print. | Use your printer. |
| Replace Toner | This message appears between the Toner Empty status. | Replace the toner cartridge with a new one. |
| Self Diagnostic<br>LSU | The LSU (Laser Scanning Unit) in your printer is checking some problems detected. | Please wait a few minutes. |
| Self Diagnostic<br>Temperature | The engine in your printer is checking some problems detected. | Please wait a few minutes. |
| Sleeping... | The printer is in power save mode. | When data is received, it switches to on-line automatically. |

| Message | Meaning | Suggested solutions |
|---|---|---|
| Toner Emhaust | The life of the toner cartridge in end. | Replace the toner cartridge with a new one |
| Toner Low | The displayed toner cartridge is almost empty. | Take out the toner cartridge and thoroughly shake it. By doing this, you can temporarily reestablish printing operations. |
| [Tray]<br>Cassette Out | The displayed tray is open. | Close the tray until it locks into place. |
| [Tray]<br>Paper Empty | There is no paper in the tray. | Load paper in the tray. |
| Warming Up<br>Please Wait... | Your printer is warming up now. | Please wait a few minutes. |

# 5. Disassembly and Reassembly

## 5.1 General Precautions on Disassembly

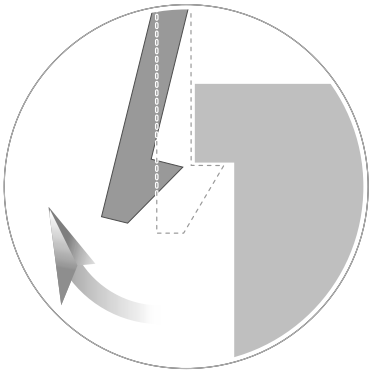
When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must.
If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing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

### 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.

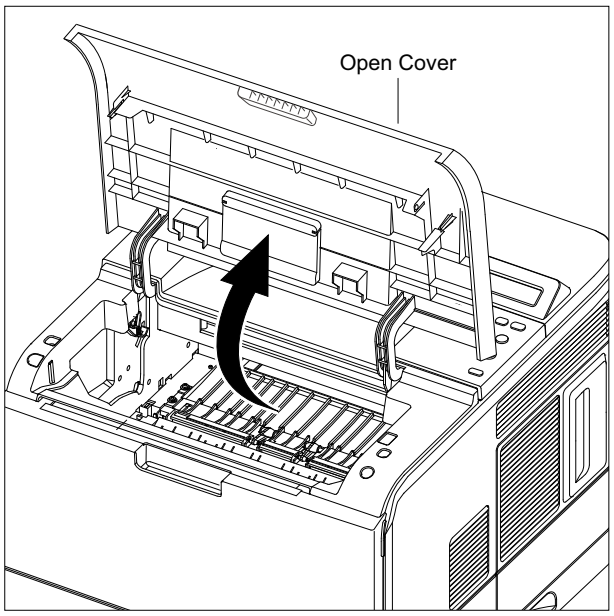
### Releasing Plastic Latches

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.

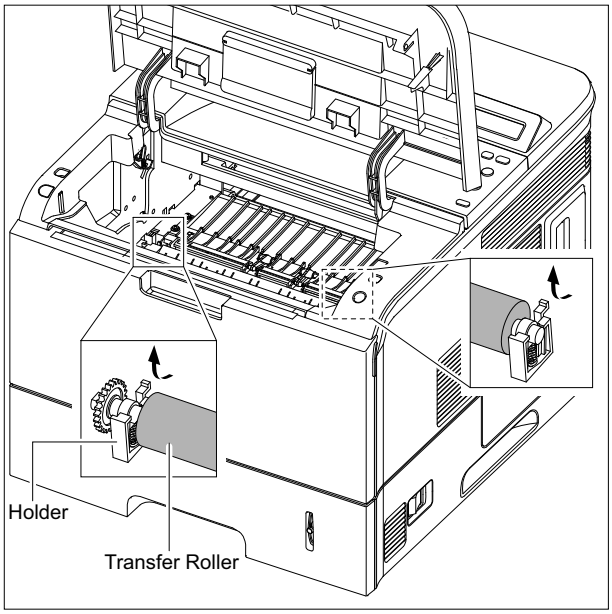


## 5.2 Transfer Roller

1. Open the Open Cover.

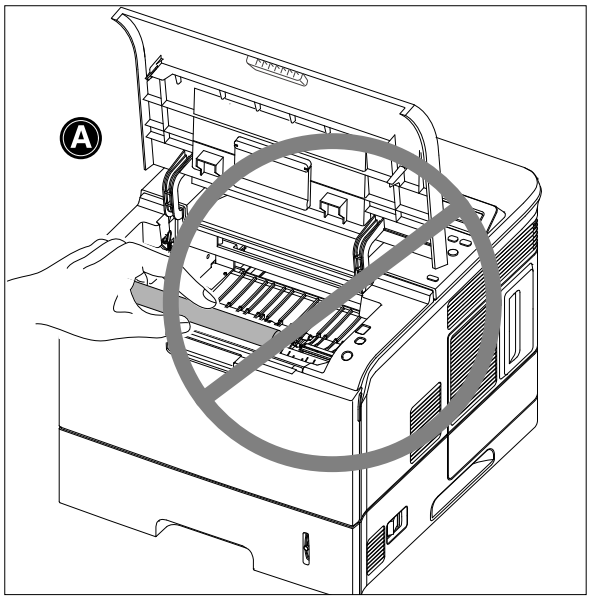



2. Hold the lever at both ends of the roller, then remove the roller.

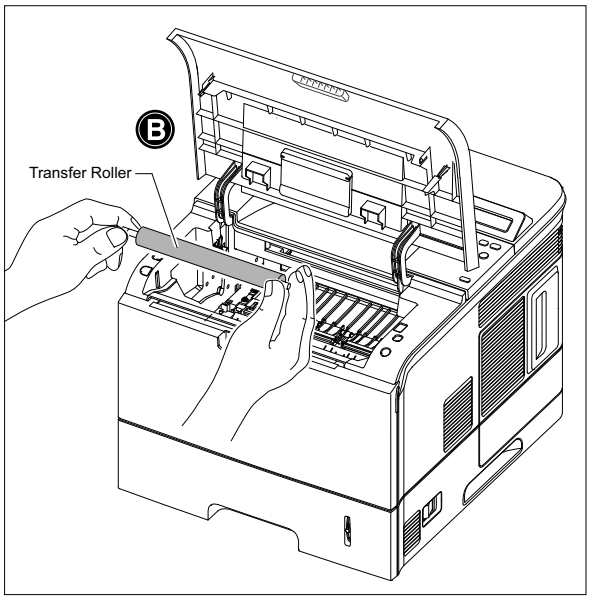



**<Cautions When Replacing a Transfer Roller>**

* Do not grab the Transfer Roller shown in picture (A).
  It may cause a malfunction due to a foreign object.
* Hold the both side of the Transfer Roller shown in picture (B) when replacing it.



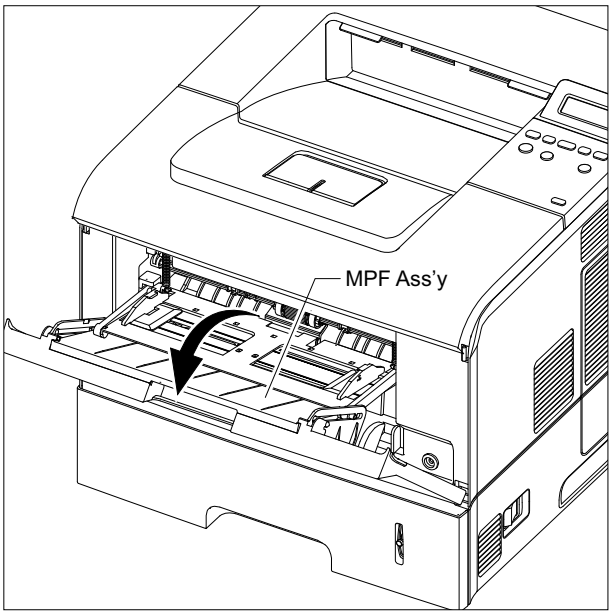

(A)



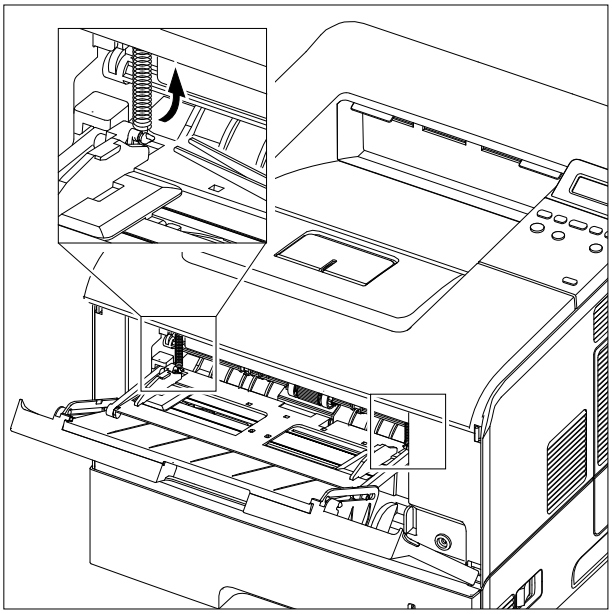

(B)

# 5.3 MPF Ass'y

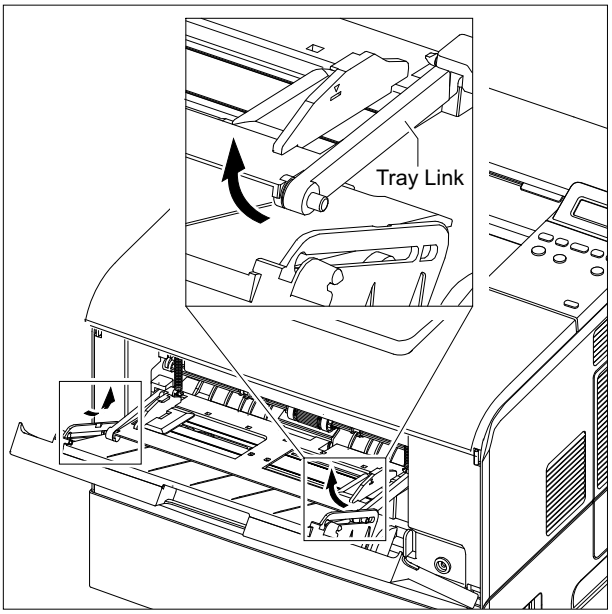
1. Open the MPF Ass'y.



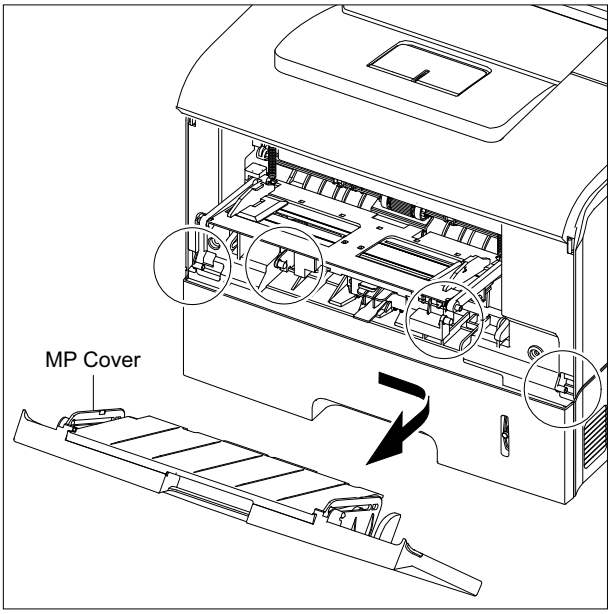

2. Remove two springs from the Knock Up Plate Ass'y.



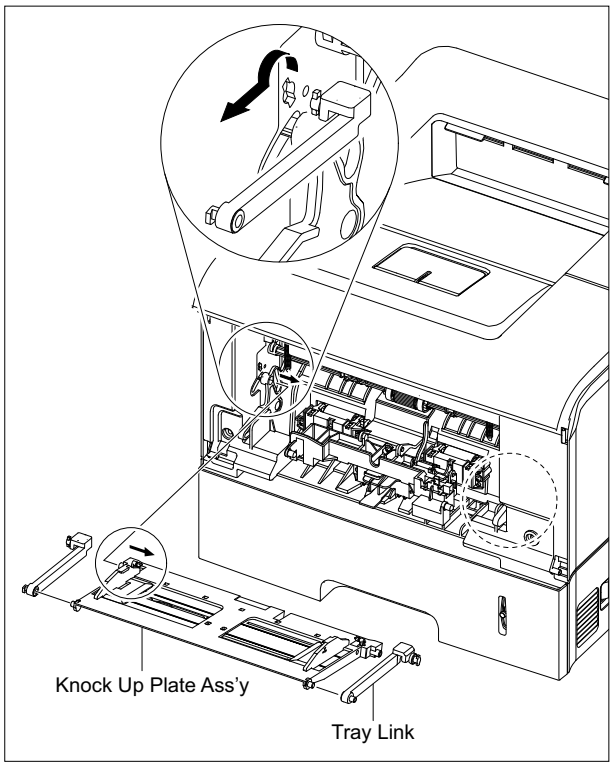
3. Remove the Tray Link from the MP Cover.



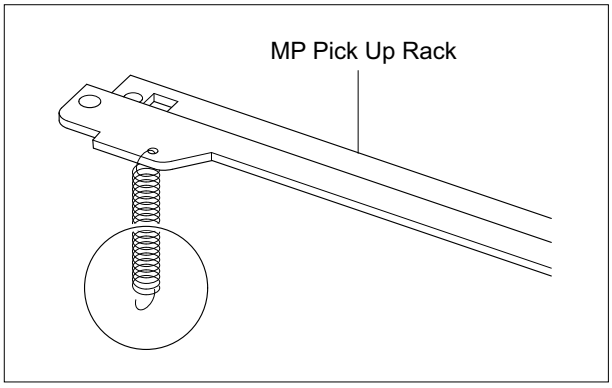

4. Push the MP Cover and remove it, as shown below.



5. Remove MP Cover in the direction of arrow, as shown below.



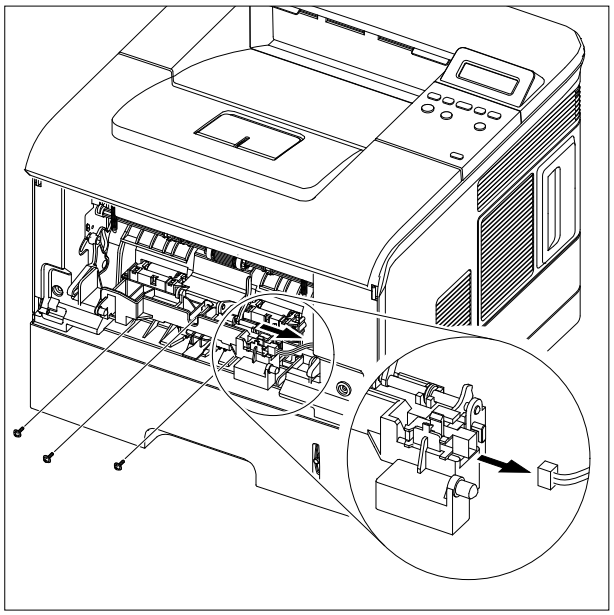

*** NOTICE :** *Do not separate the spring from the MP Pick Up Rack for convenience of assembling. Locate the hook section of the spring that is connected to the Knock Up Plate Ass'y as shown in the outside for convenience of assembling.*



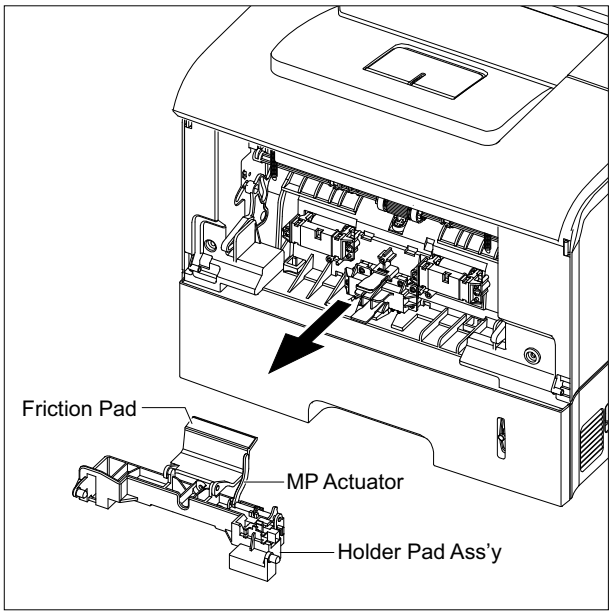

## 5.4 Holder Pad Ass'y

1. Before you remove the Holder Pad Ass'y, you should remove : -MPFAss'y (Refer to the5.3)

2. Unplug the connector and remove the three screws, as shown below.

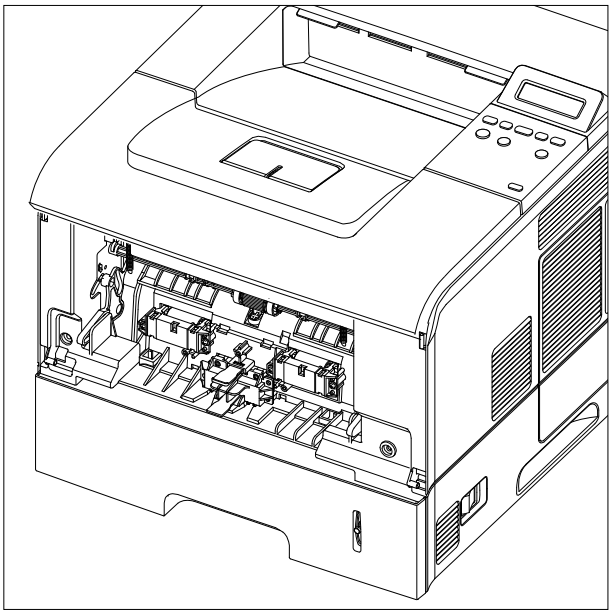


3. Remove the Photo Interrupter and the MP Actuator, as shown below.

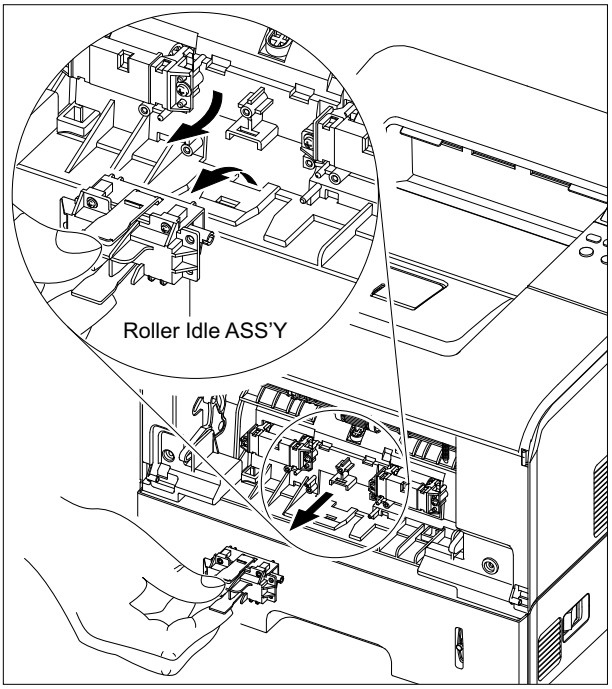


# 5.5 Roller Idle ASS'Y

1. Remove the Roller Ass'y, as shown below.



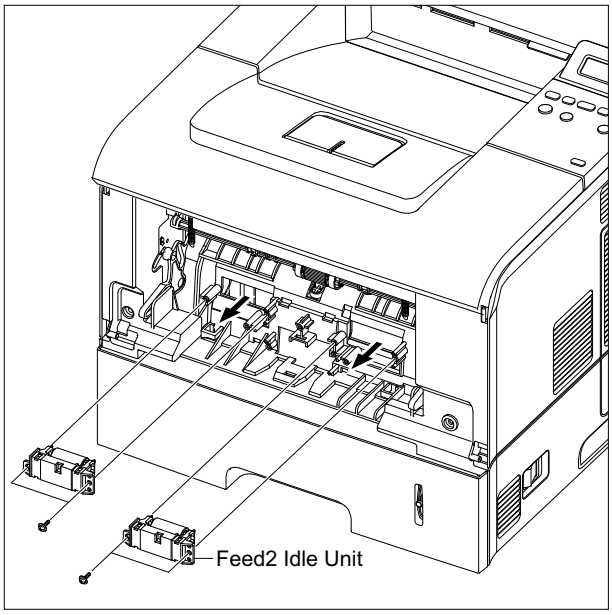
2. Releasse the lock as shown below and take out the retard Ass'y.



# 5.6 Feed2 Idle Unit

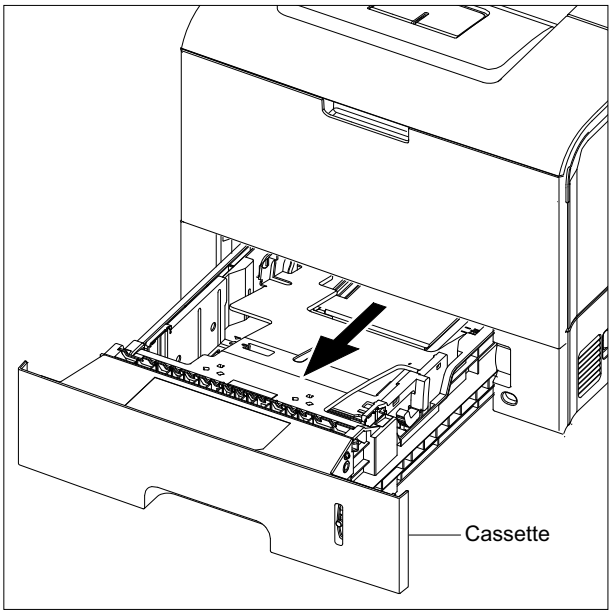
1. Before you remove the Feed2 Idle Unit, you should remove :
   - Holder Pad Ass'y (Refer to the 5.4)

2. Remove four screws. Then lift the Idle Unit, as shown below.

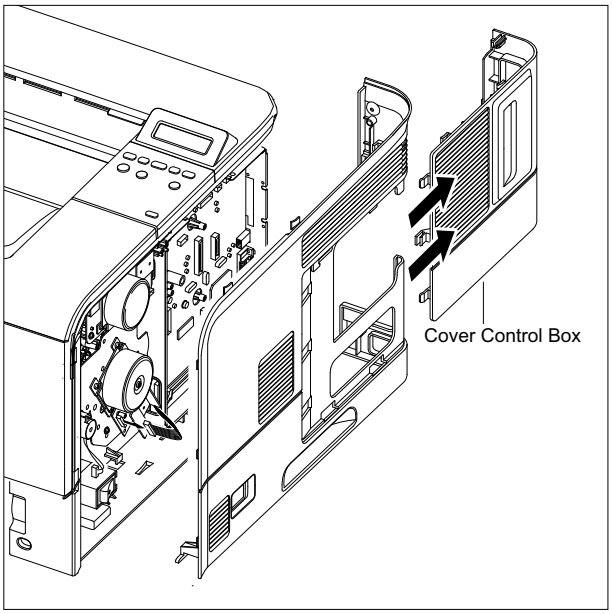


# 5.7 Cover Right

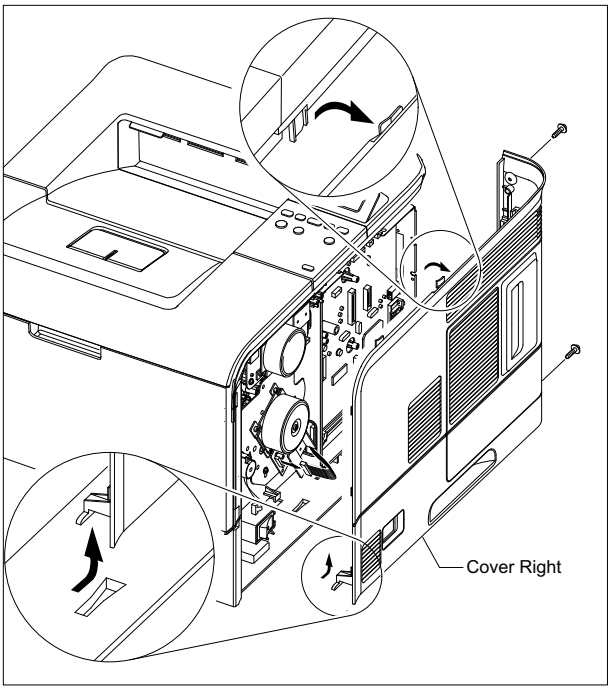
1. Pull the Cassette out of the printer.




2. Remove the Cover Dummy and Cover Control Box.



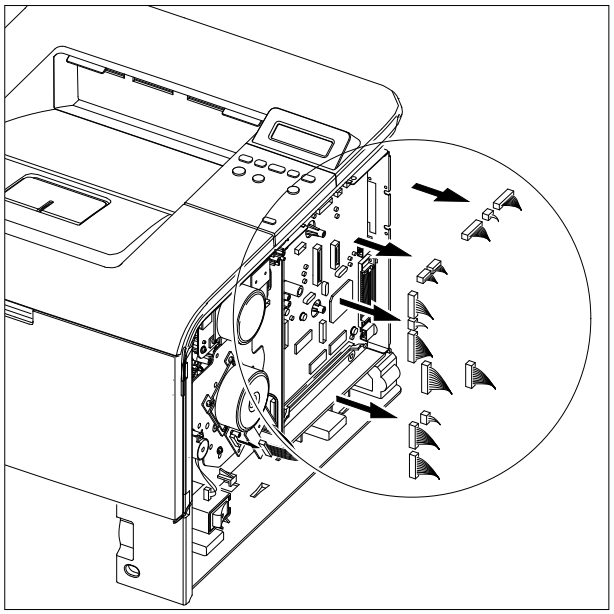

3. Remove two screws and take out the right side, as shown below.



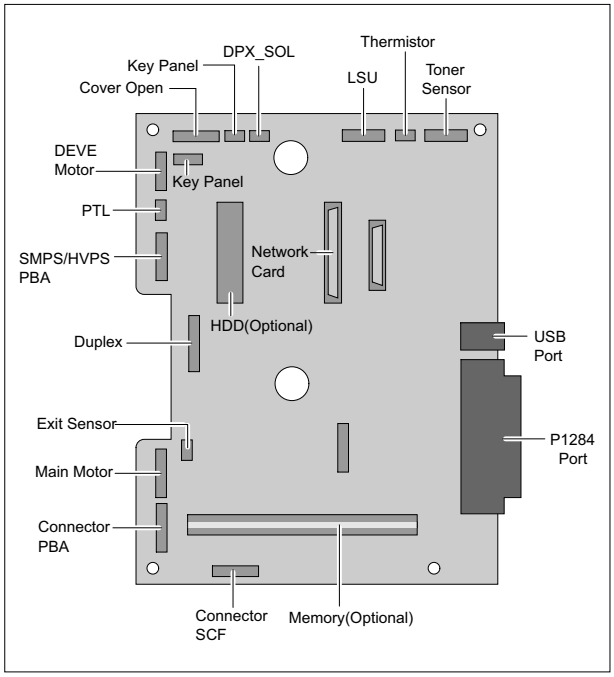
# 5.8 Main PBA

1. Before you remove the Main PBA, you should remove: - Cover Right (Refer to the 5.7)

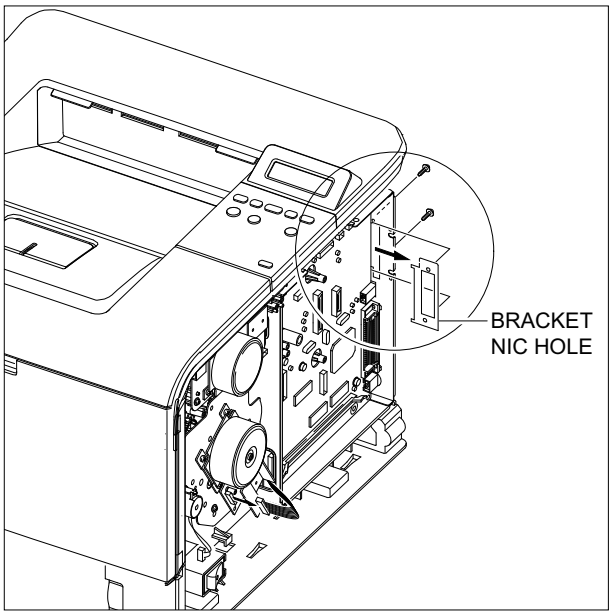
2. Unplug the all Connectors, as shown below.



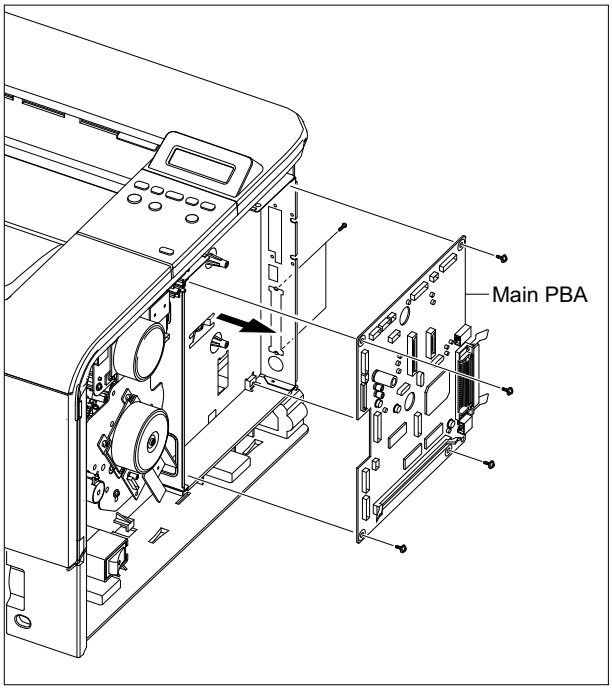
3. The Connectors are located, as shown below.




4. Remove two screws and take out the Dummy Bracket.



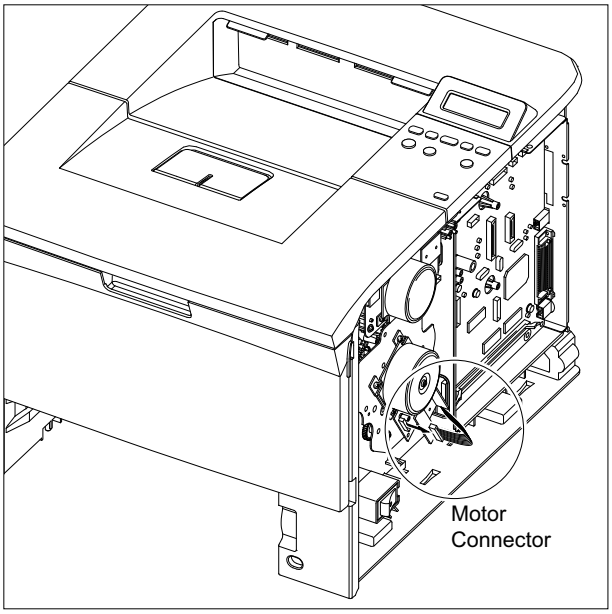

5. Remove six screws and take out the Main PBA.



# 5.9 Main Drive Ass'y

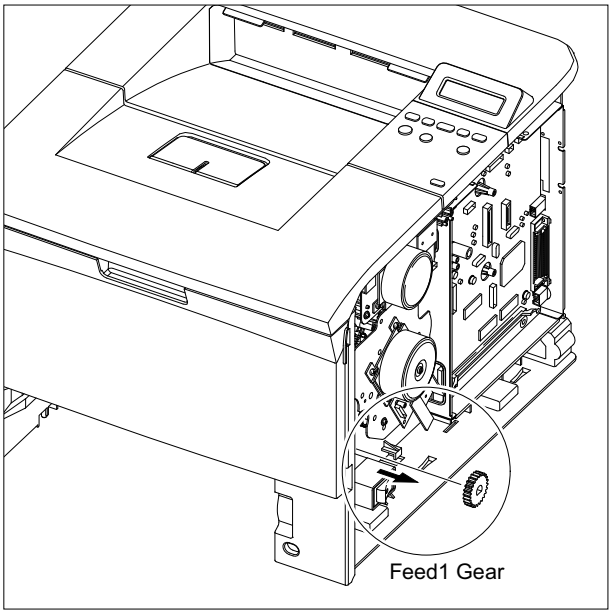
1. Before you remove the Main Drive Ass'y, you should remove :
   - Cover Right (Refer to the 5.7)

2. Unplug the Connector from the Main Motor Ass'y, as shown below.

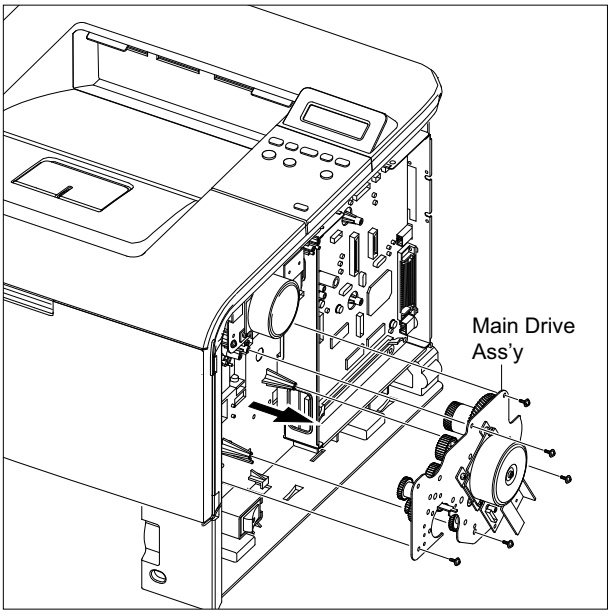



***Notice :*** Make sure the Power Switch is turned off before disassembling the Motor Connector.

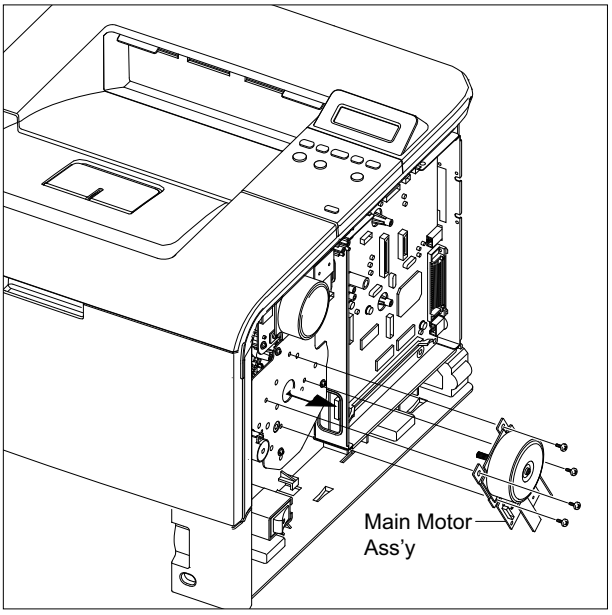
3. Remove the Feed1 Gear, as shown below.




4. Remove five screws and take out the Main Drive Ass'y.



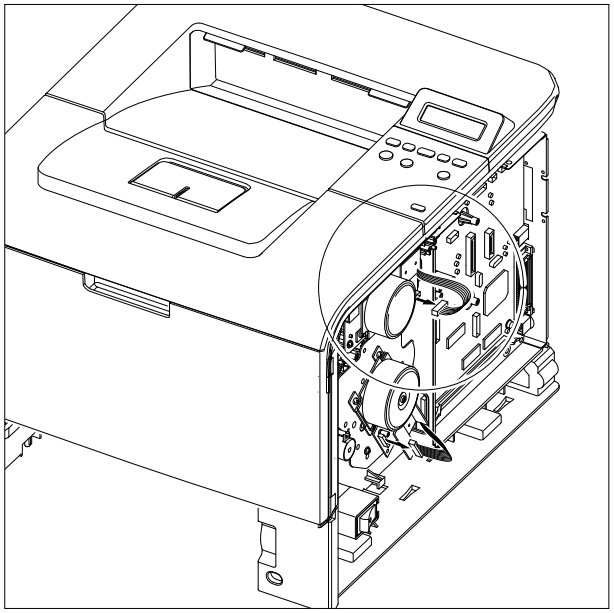

5. When separating the Main Motor Ass'y, disconnect the Connector from the Main Motor Ass'y, remove four screws, and then remove the Main Motor Ass'y.



# 5.10 DEVE Drive Ass'y

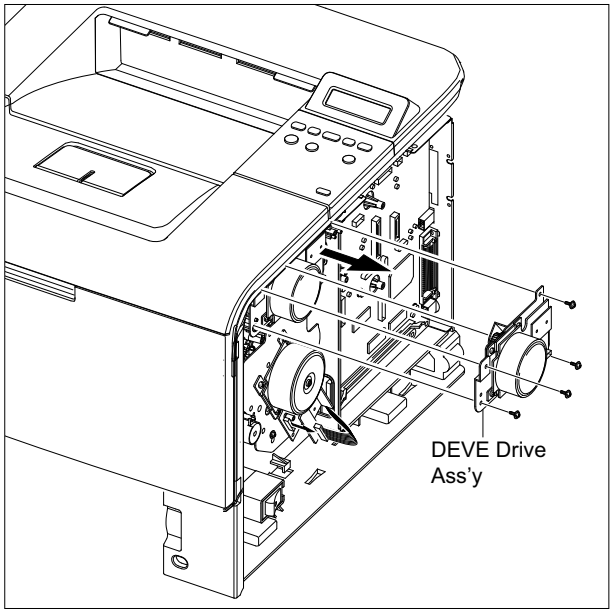
1. Before you remove the DEVE Drive Ass'y, you should remove : - Cover Right (Refer to the 5.7)

2. Unplug the Connector from the DEVE Motor Ass'y, as shown below.

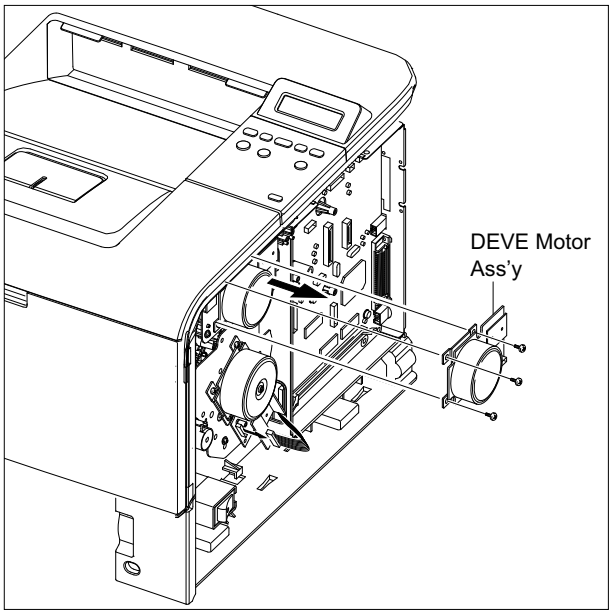


***Notice :*** Make sure the Power Switch is turned off before disassembling the Motor Connector.

3. Remove four screws and take out the DEVE Drive Ass'y.



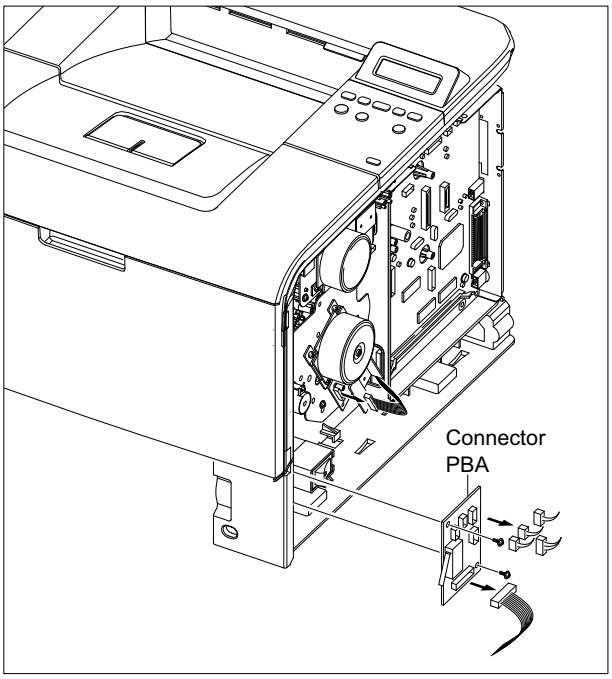

4. When separating the DEVE Motor Ass'y, disconnect the Connector from the DEVE Motor Ass'y, remove three screws, and then remove the DEVE Motor Ass'y.



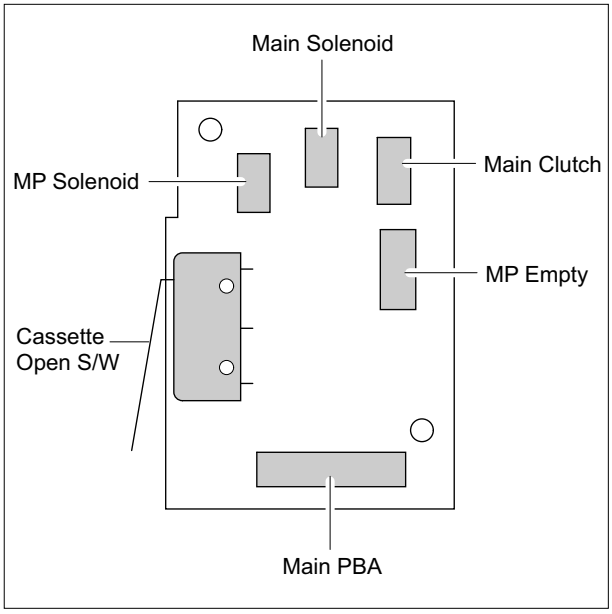
# 5.11 Connector PBA

1. Before you remove the Connector PBA, you should remove : - Cover Right (Refer to the 5.7)

2. Unplug the all Connectors from the Connector PBA and take it out.



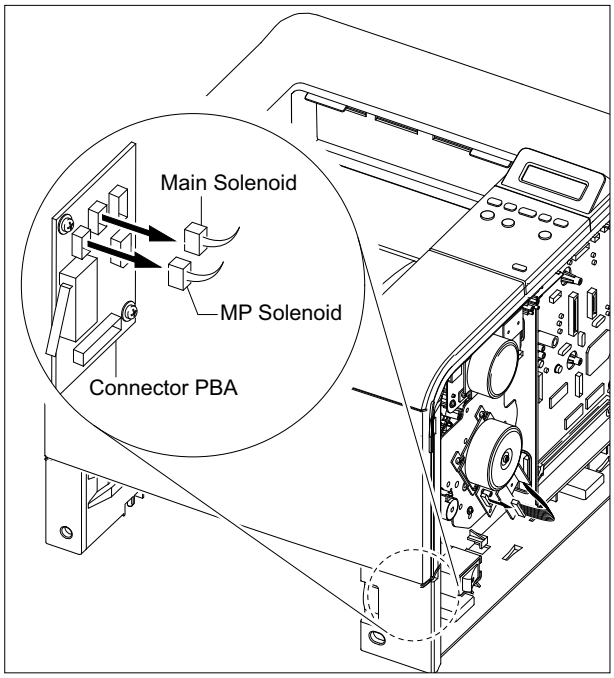

3. The Connectors are located, as shown below.



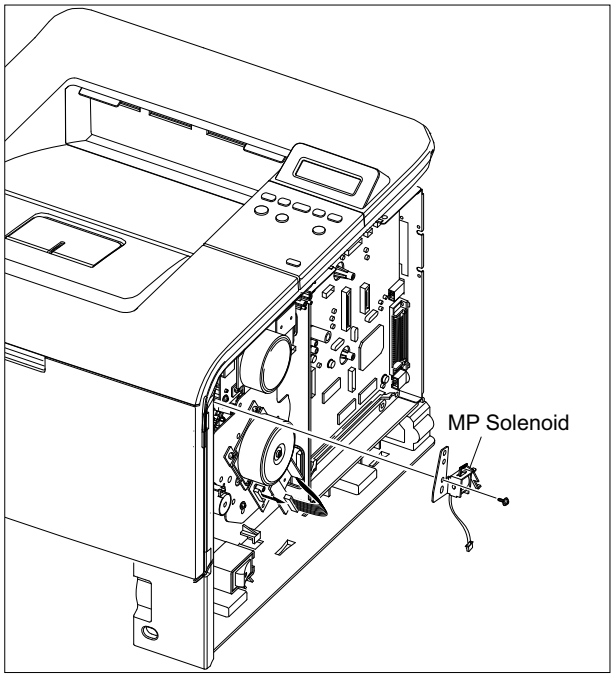
# 5.12 Solenoid

1. Before you remove the Solenoid, you should remove:
   - Cover Right (Refer to the 5.7)
   - Main Drive Ass'y (Refer to the 5.9)

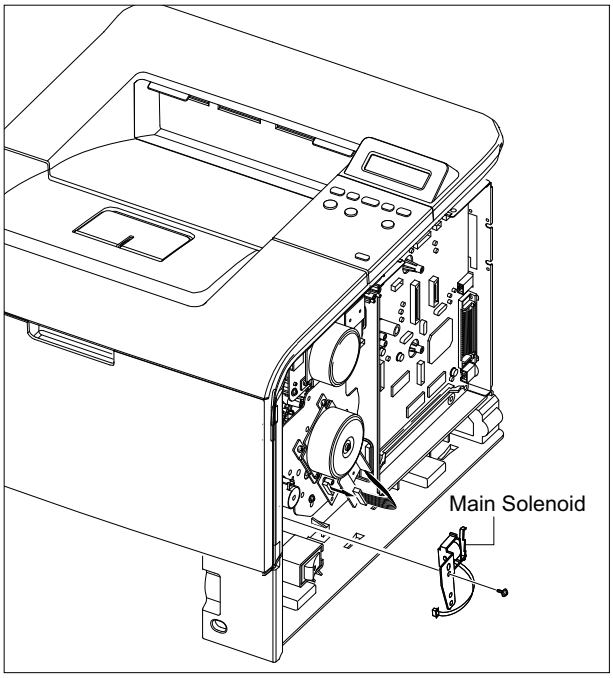
2. Unplug the MP Solenoid Harness and the Main Solenoid Harness from the Connector PBA.




3. Remove one screws and take out the MP Solenoid.



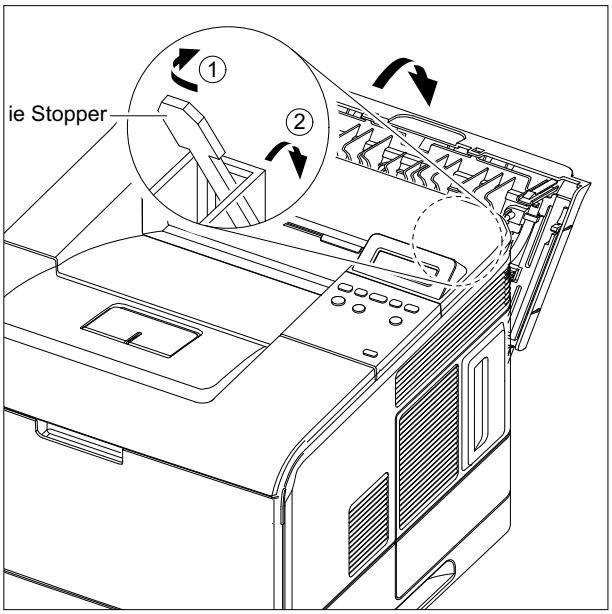

4. Remove one screws and take out the Main Solenoid.



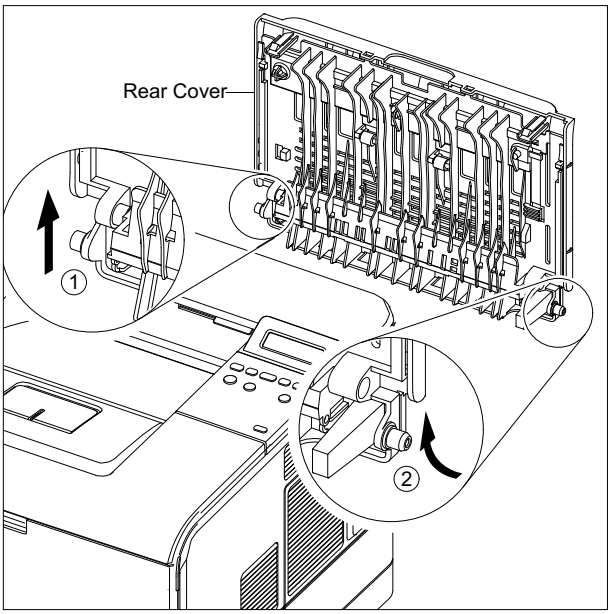

***NOTICE :** It is not necessary to disassemble the Main Drive Ass'y to remove the MP Solenoid.*

## 5.13 Rear Cover

1. Open the Rear Cover, and then take out the Stopper.

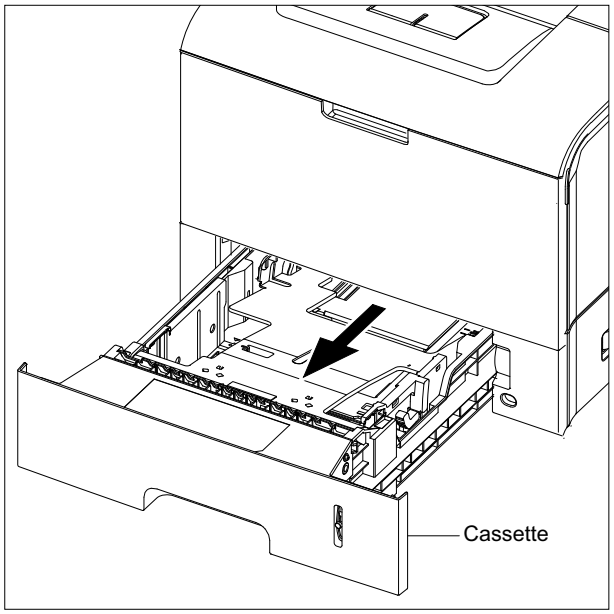



2. Remove the Rear Cover in the direction of arrow

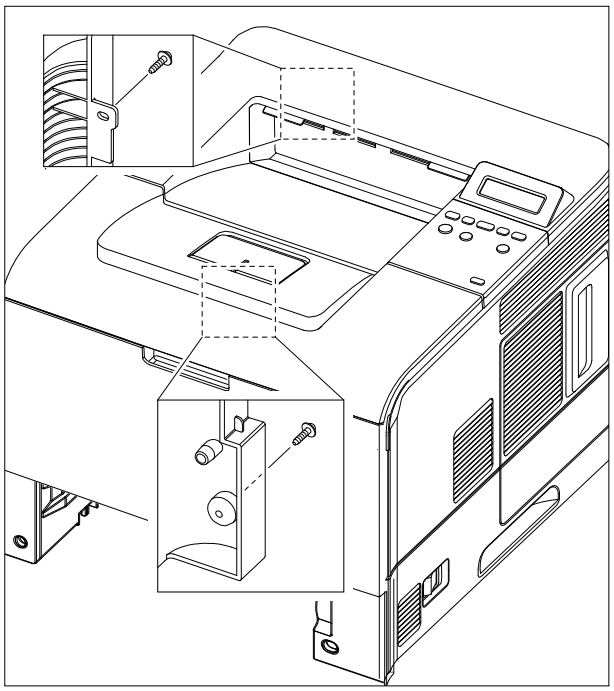


# 5.14 Cover Left

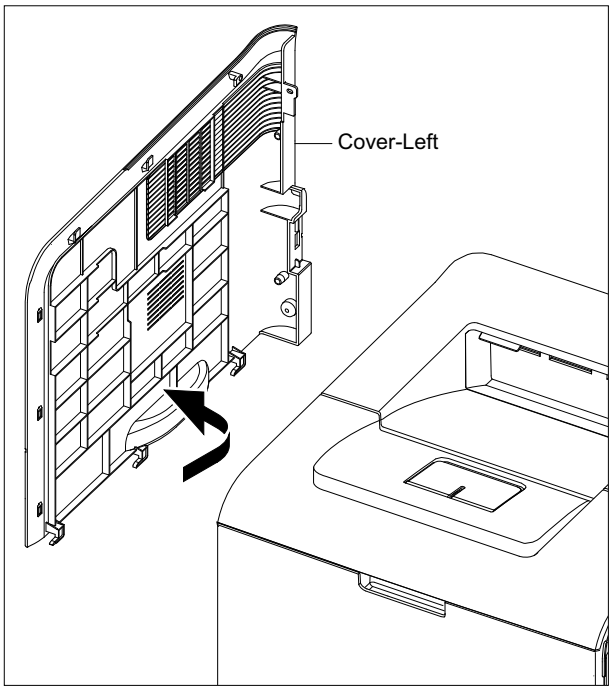
1. Pull the Cassette out of the printer.




2. Remove two screws and take out the left side.



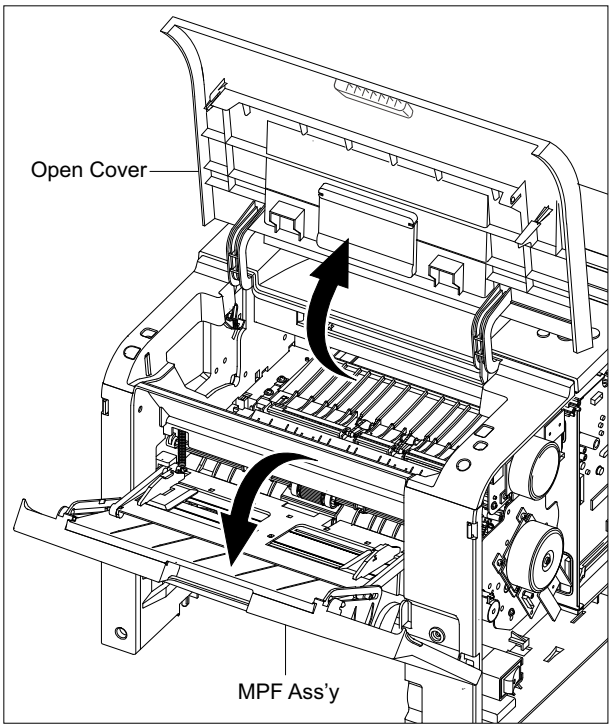
3. Take out the Cover Left.



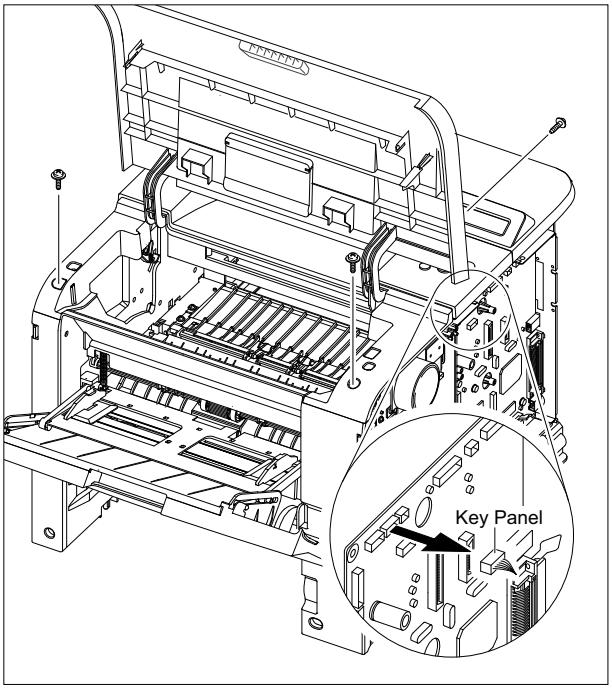
# 5.15 Top Cover

1. Before you remove the Top Cover, you should remove:
   - Rear Cover (Refer to the 5.14)
   - Cover Right (Refer to the 5.7)
   - Cover Left (Refer to the 5.13)

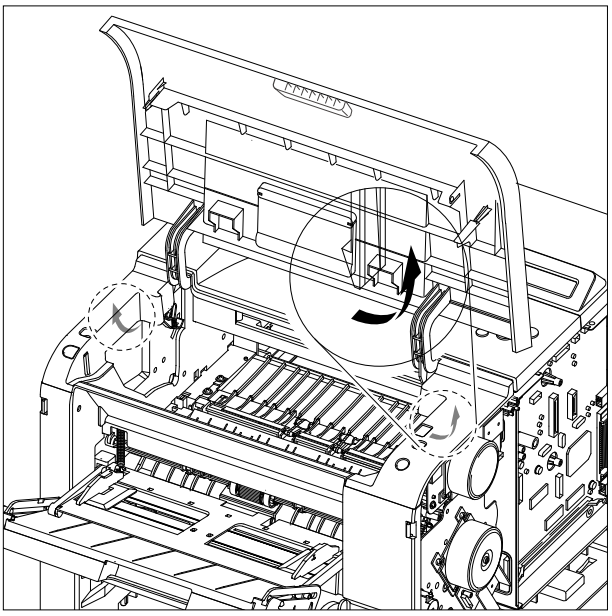
2. Open the MPF Ass'y, the Rear Cover, the Open Cover.



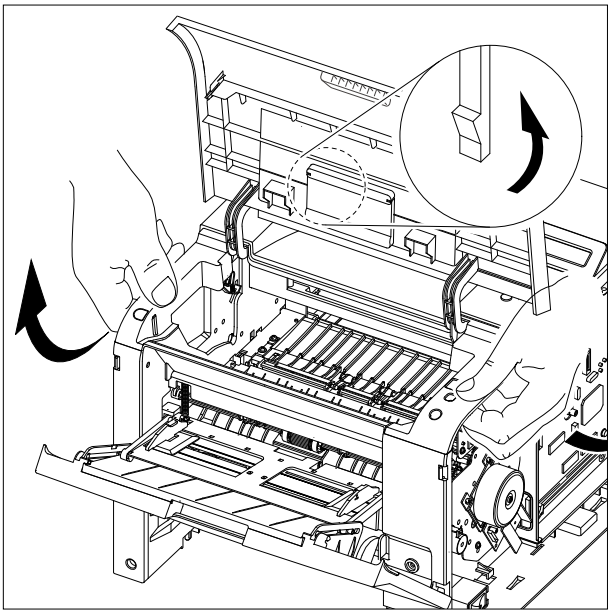

3. Unplug the two Connectors after you remove the three screws from the Main PBA.



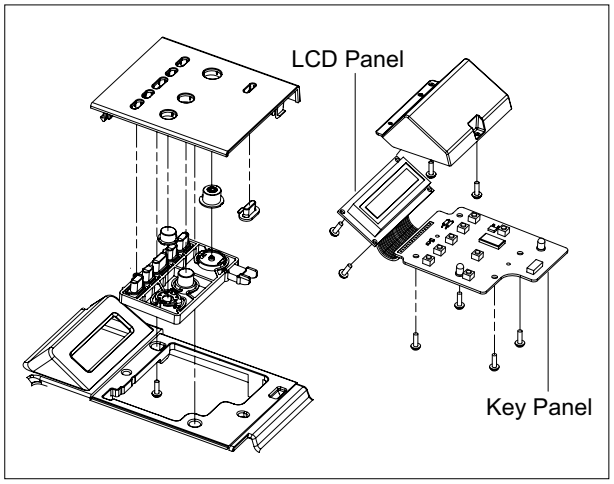

4. Unlatch both ends of the Top Cover.



5. Unlatch the hook and take out the Top Cover.



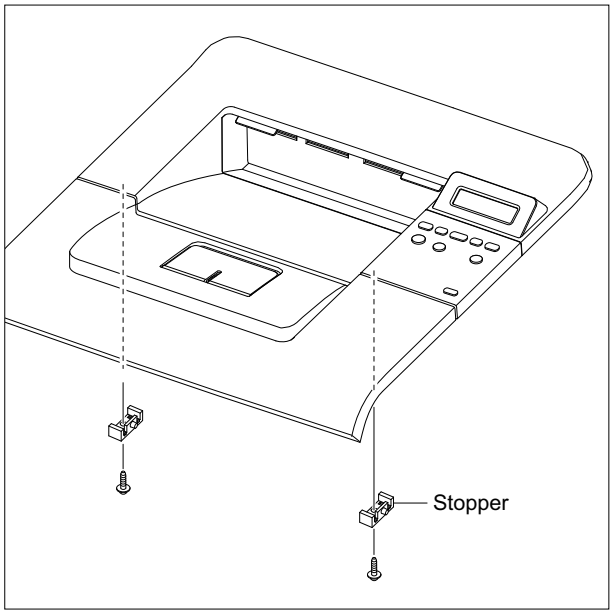
6. Remove seven screws and then take out the LCD Panel and the Key Panel.



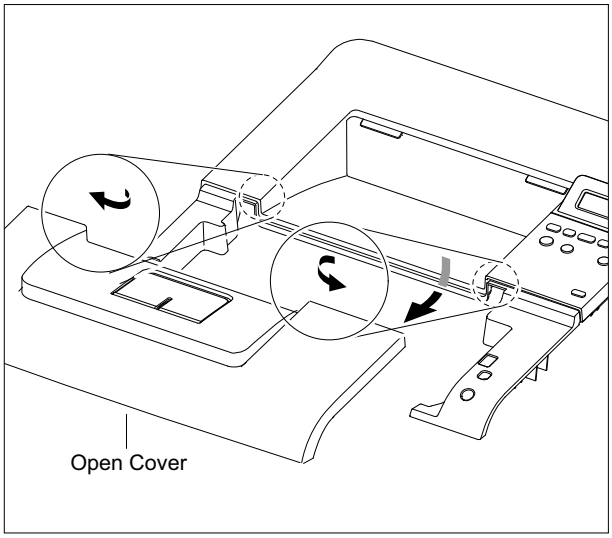

## 5.16 Open Cover

1. Before you remove the Open Cover, you should remove:
   - Top Cover (Refer to the 5.15)

2. Remove two screws and take out the Stopper.



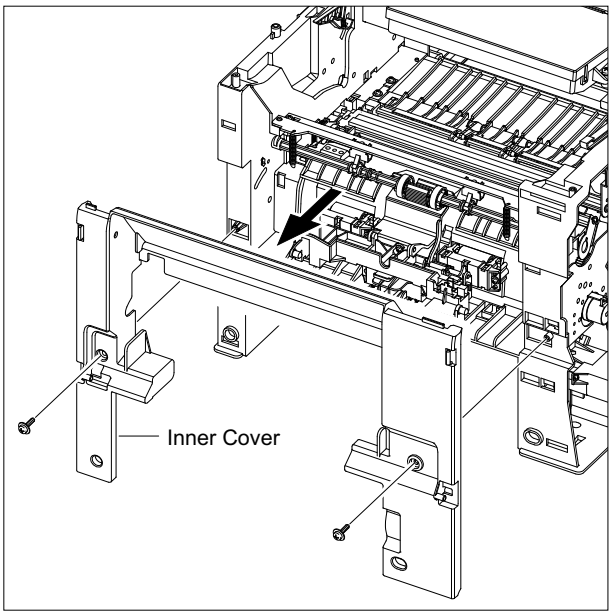

3. Take out the Open Cover, as shown below.



# 5.17 Inner Cover

1. Before you remove the Inner Cover, you should remove:
   -MPFAss'y (Refer to the5.3)
   - Top Cover (Refer to the 5.15)

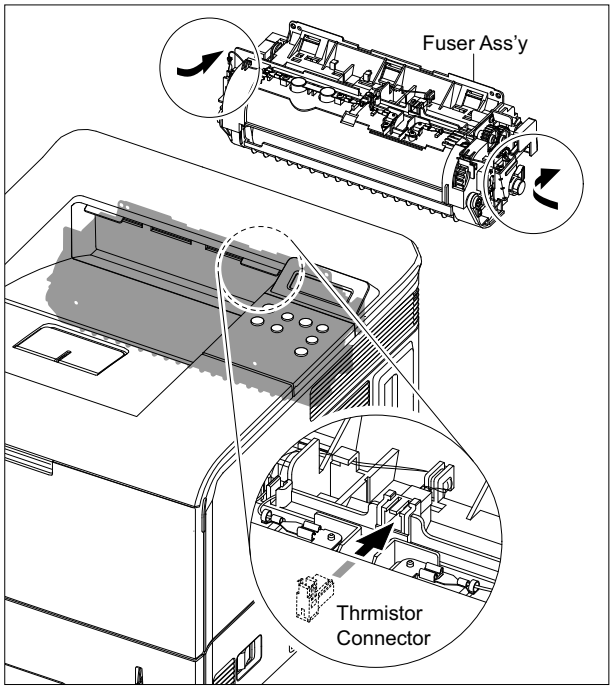
2. Remove two screws and take out the Inner Cover.



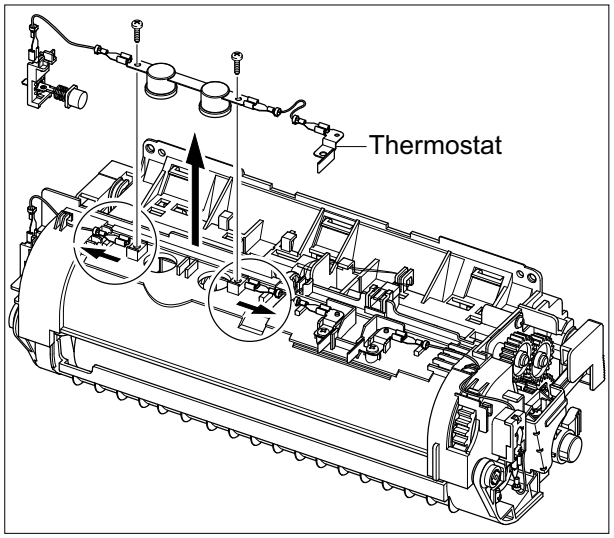
# 5.18 Fuser Ass'y

1. Before you remove the Fuser Ass'y, you should remove:
   - Rear Cover (Refer to the 5.14)

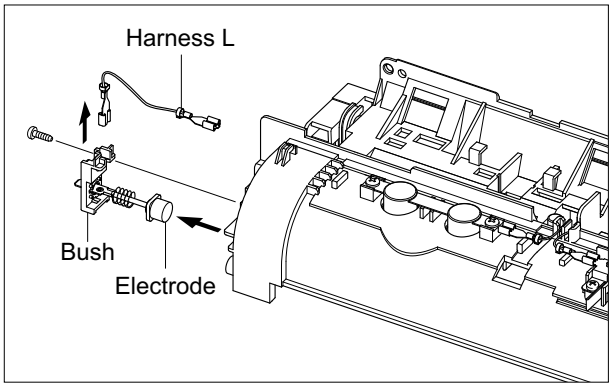
2. Pull the Locking Lever. Then take out the Fuser Ass'y, as shown below.

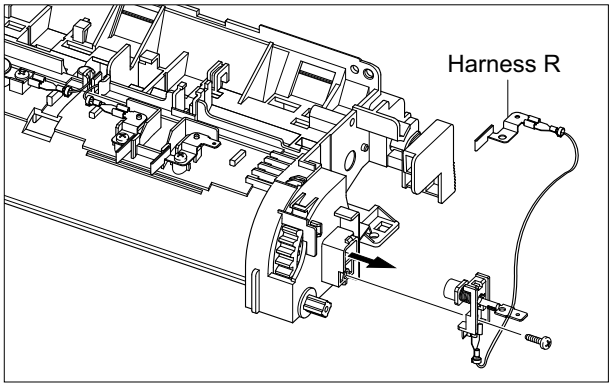



3. Remove two screws and take the Thermostat out of the Fuser Ass'y.

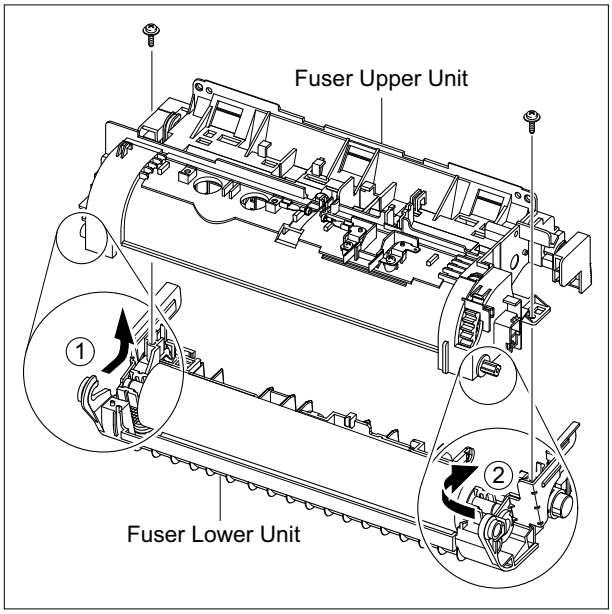



4. Remove two screws securing the Electrode L, R and remove it, as shown below.

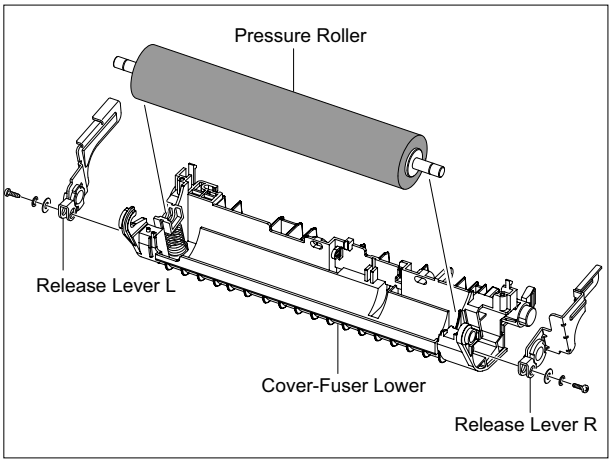


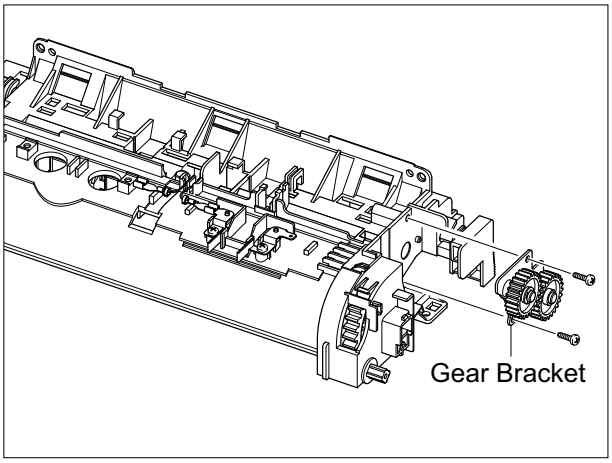

5. Remove two screws securing the Fuser Upper Unit and remove it, as shown below.



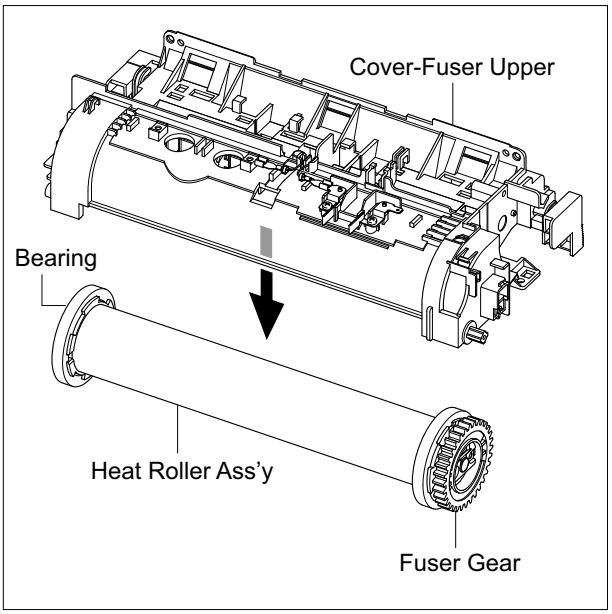
6. Remove two screws securing the Release Lever L,R and remove it, as shown below.



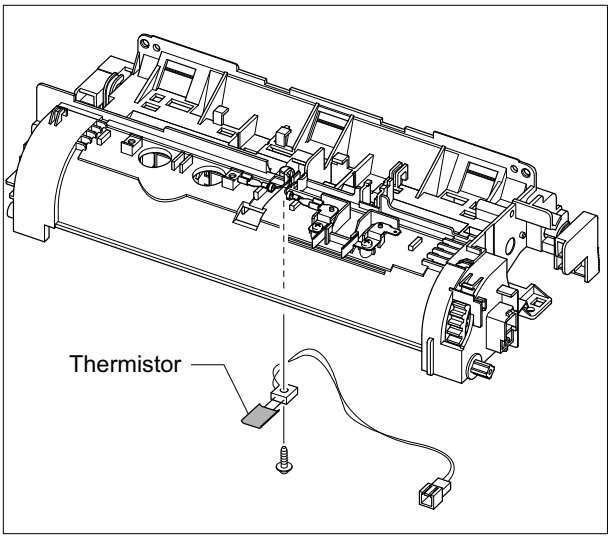

7. Remove two screws and take out the Gear Bracket.




8. Take out the Heat Roller Ass'y, as shown below.



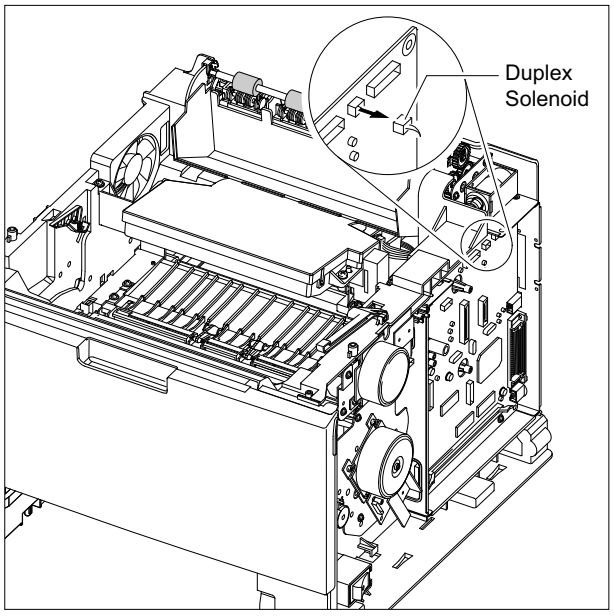

9. Remove the screw securing the Thermistor and remove it, as shown below.



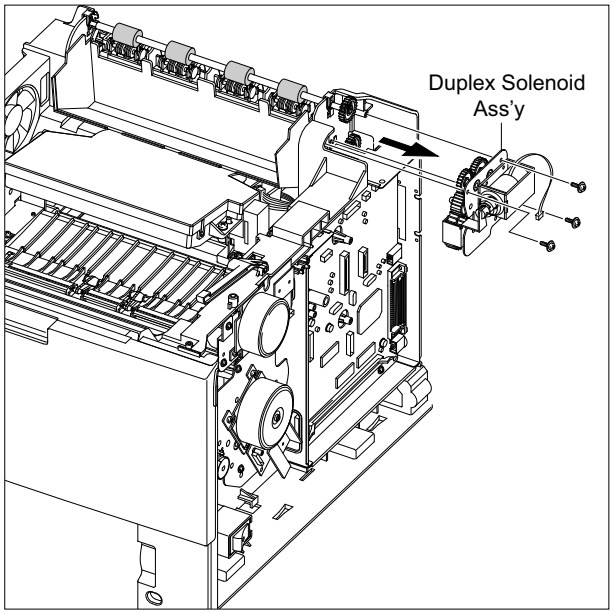
# 5.19 Duplex Solenoid Ass'y

1. Before you remove the Exit Solenoid Ass'y, you should remove:
   - Top Cover (Refer to the 5.15)

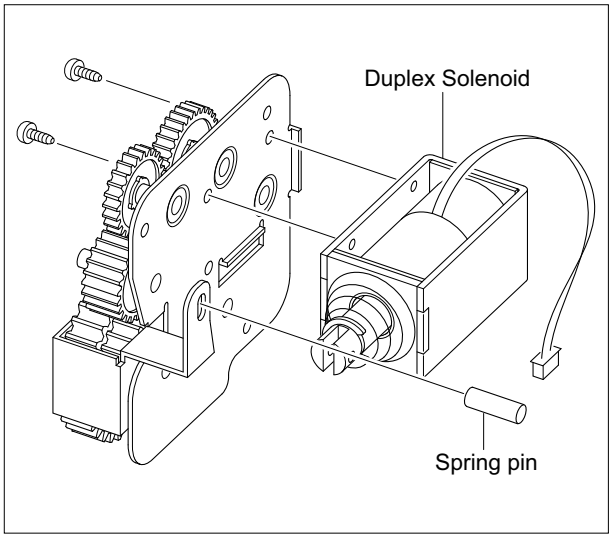
2. Unplug the Duplex Solenoid Harness from the Main PBA.




3. Remove three screws and take out the Exit Solenoid Ass'y.



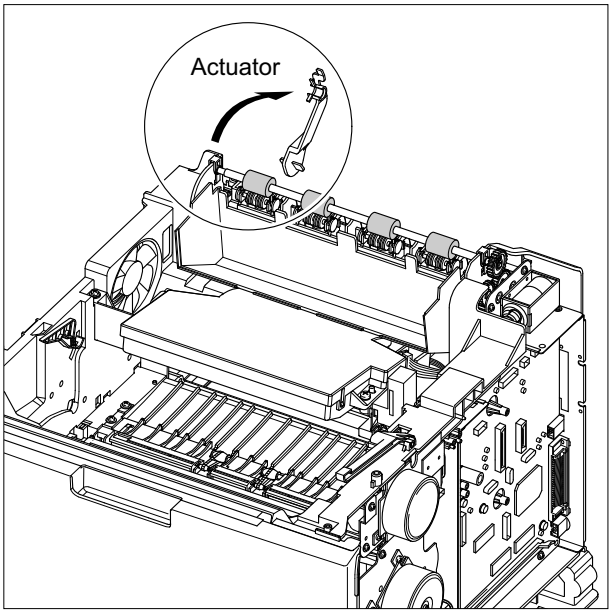

4. Remove spring pin and remove two screws and take out the Exit Solenoid.



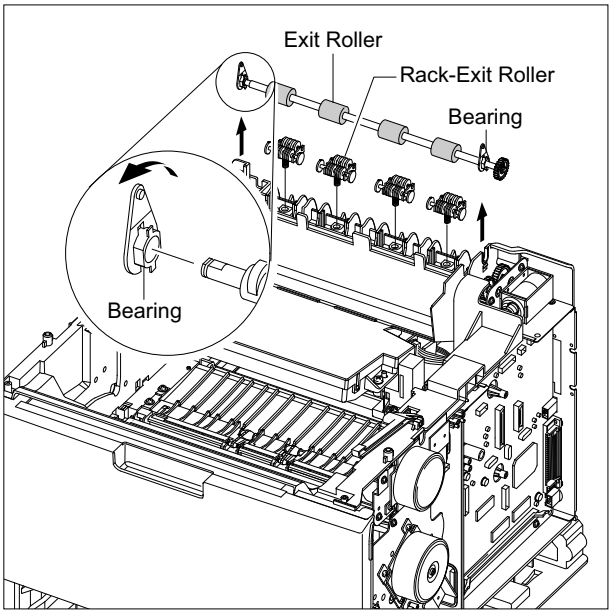
# 5.20 Exit Roller

1. Before you remove the Exit Roller, you should remove:
   - Top Cover (Refer to the 5.15)

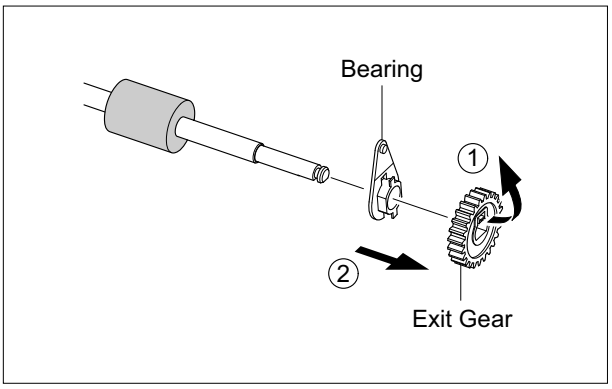
2. Take out the Actuator.



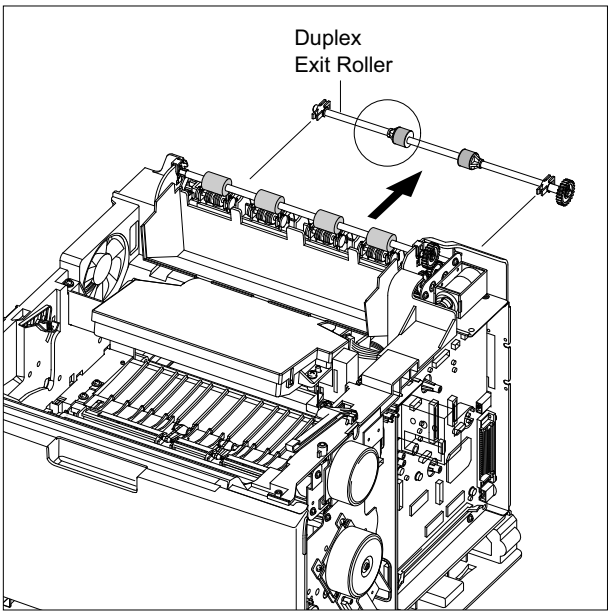

3. Remove the Exit Roller and Bearing, as shown below.



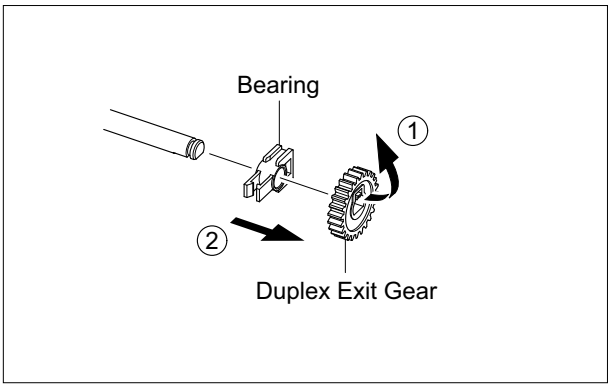

4. Release the Exit Gear, as shown below.




5. Remove the Duplex Exit Roller as same method.



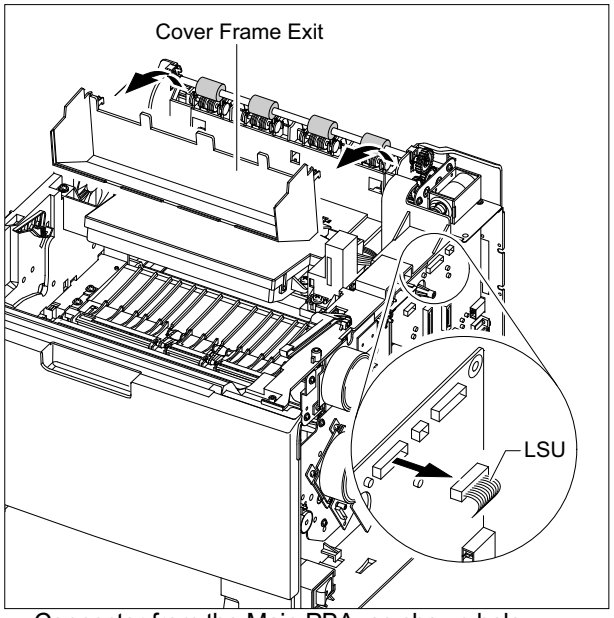

6. Release the Duplex Exit Gear, as shown below.



# 5.21 LSU

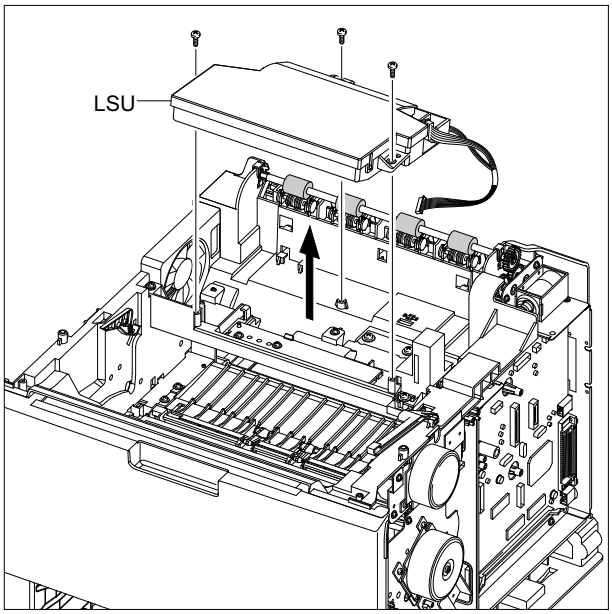
1. Before you remove the LSU, you should remove:
   - Rear Cover (Refer to the 5.14)
   - Cover Right (Refer to the 5.7)
   - Cover Left (Refer to the 5.13)
   - Top Cover (Refer to the 5.15)

2. Remove the Cover-Frame Exit and unplug the




Connector from the Main PBA, as shown below.

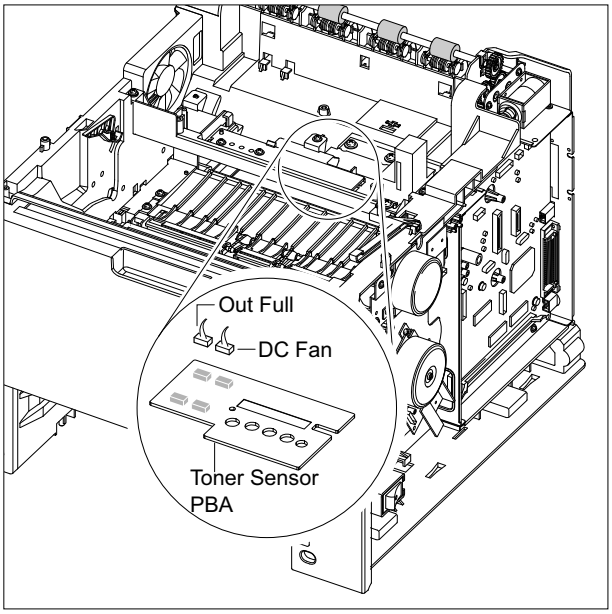
3. Remove three screws and take out the LSU.



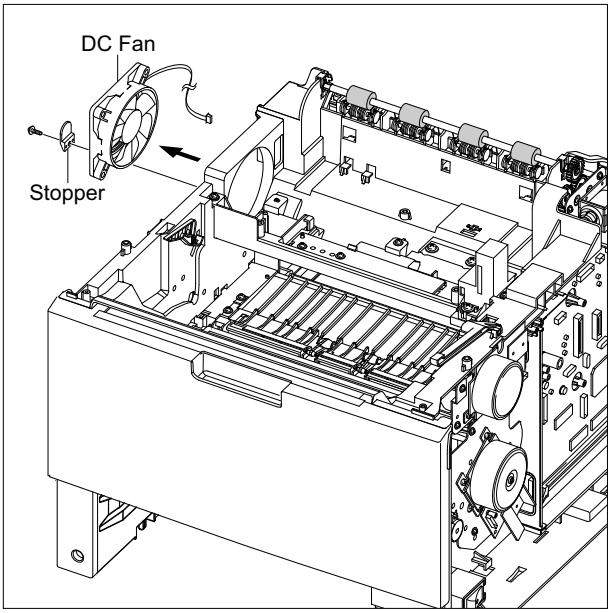
# 5.22 DC Fan

1. Before you remove the DC Fan, you should remove:
   - Cover Right (Refer to the 5.7)
   - Cover Left (Refer to the 5.13)
   - Cover Rear (Refer to the 5.14)

2. Unplug the two Connectors from the Toner Sensor PBA.



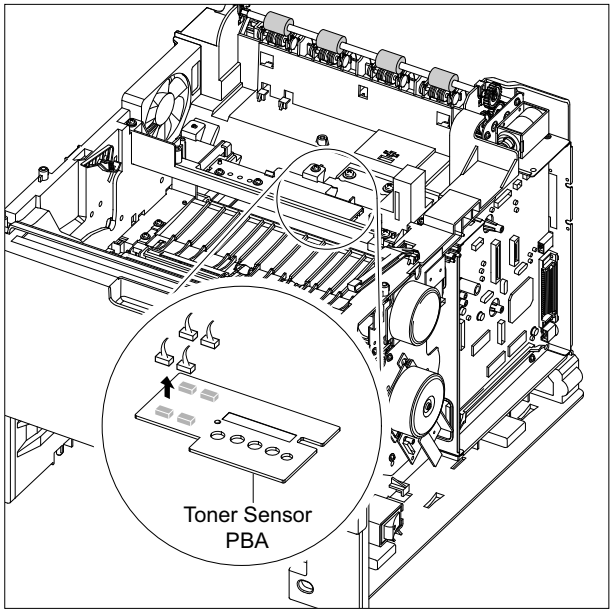

3. Remove the screw for taking out the Stopper, and then take out the DC Fan.



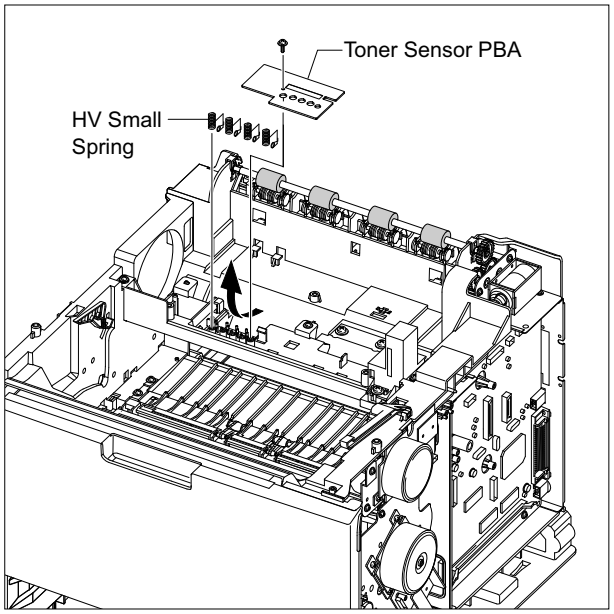
# 5.23 Toner Sensor PBA

1. Before you remove the LSU, you should remove:
   - Top Cover (Refer to the 5.15)
   - LSU (Refer to the 5.21)

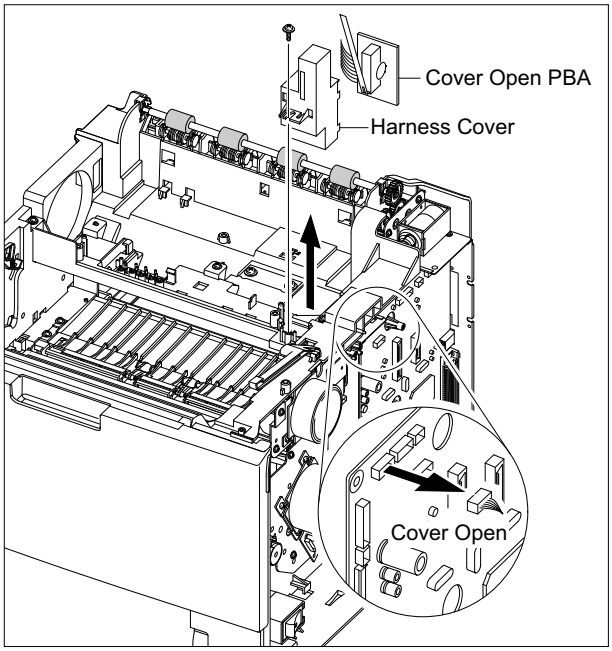
2. Unplug the all Connectors from the Toner Sensor PBA.



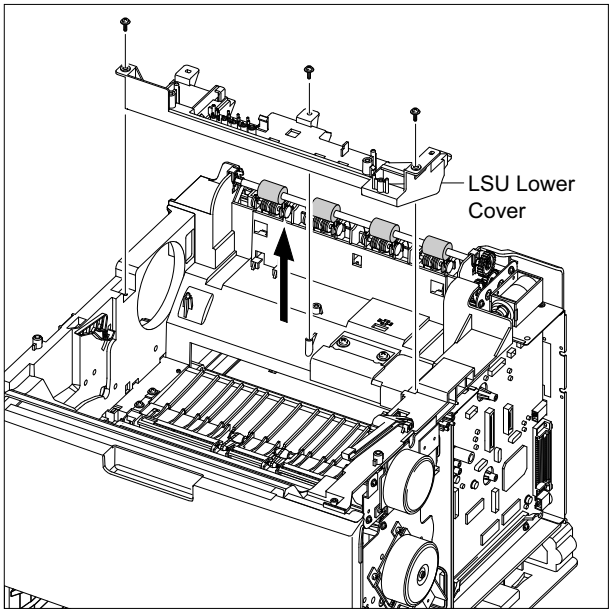

3. Remove two screws and take out the Toner Sensor PBA.




4. Remove the screw securing the Cover Open PBA and remove it. Then unplug the Connector from the Main PBA, as shown below.



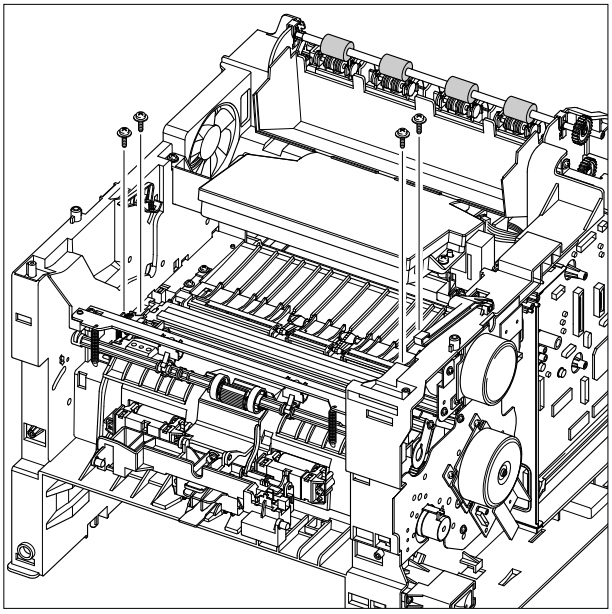

5. Remove three screws and take out the LSU Lower Cover.



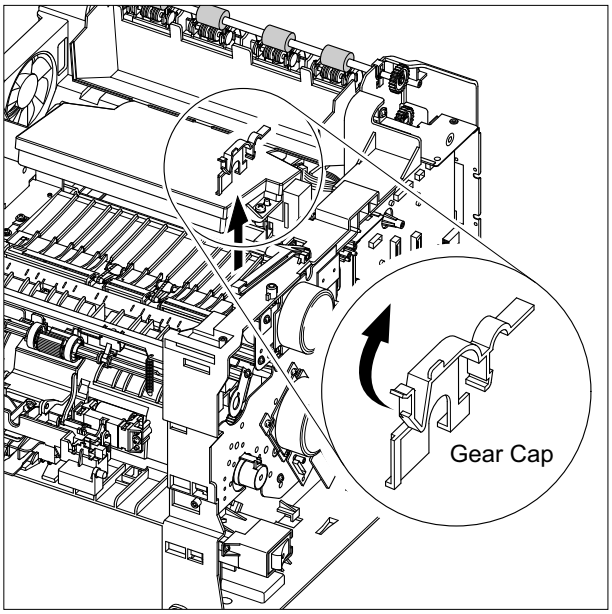
# 5.24 REGI Ass'y

1. Before you remove the REGI Ass'y, you should remove:
   - Top Cover (Refer to the 5.15)

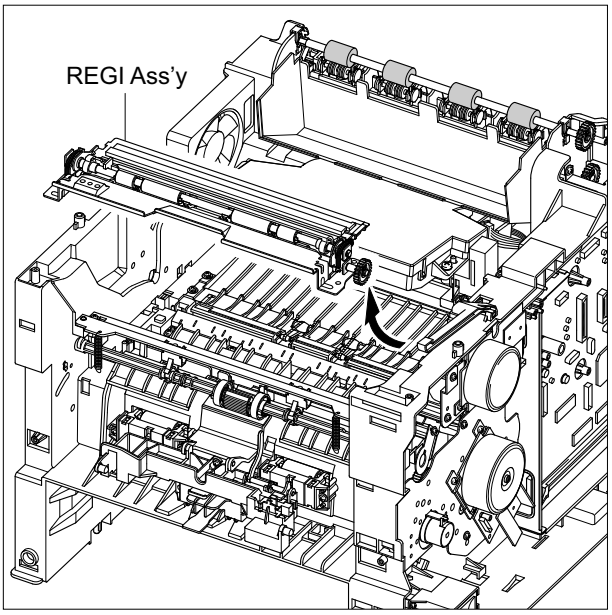
2. Unplug the Harness and remove four screws, as shown below.



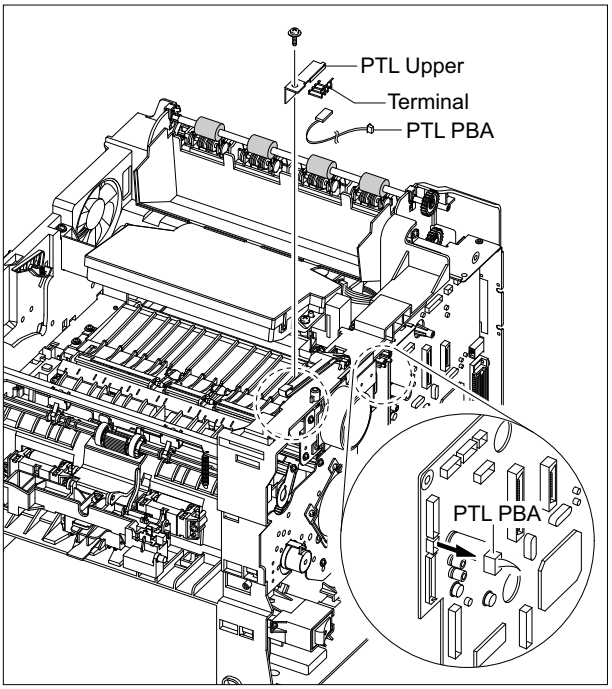
3. Release the lock as shown below and lift up the Gear Cap.




4. Take out the REGI Ass'y, as shown below.



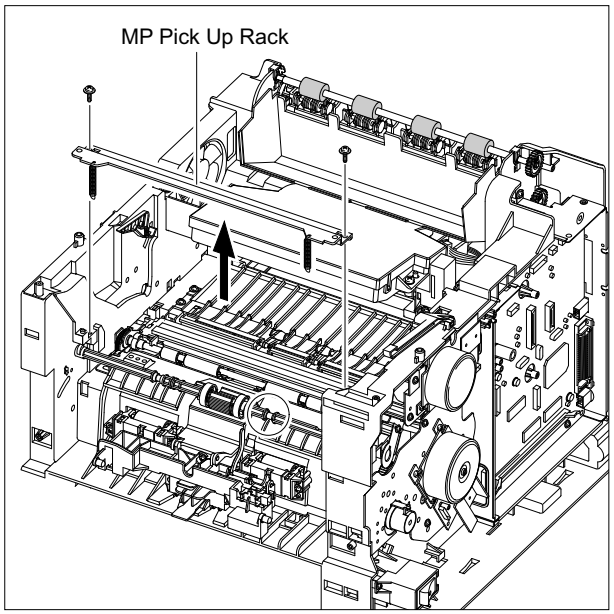

5. Unplug the Harness, remove the screw and take out the PTL PBA.



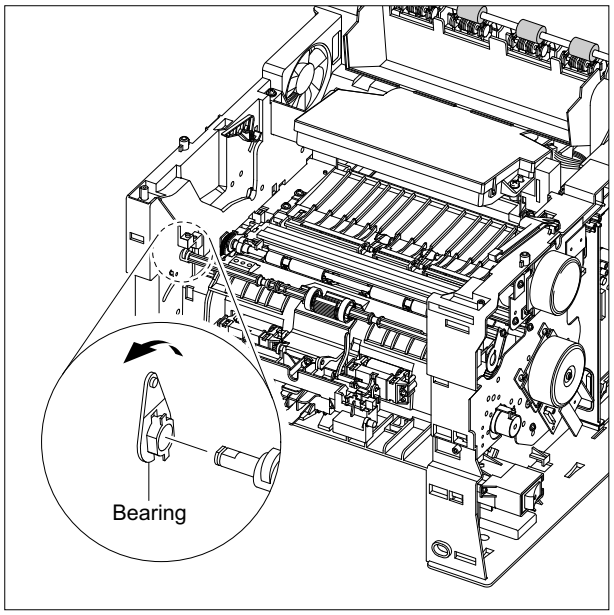
# 5.25 MP Pick Up Ass'y

1. Before you remove the MP Pick Up Ass'y, you should remove:
   - MPFAss'y (Refer to the5.3)
   - Main Drive Ass'y (Refer to the 5.9)
   - Top Cover (Refer to the 5.15)
   - Inner Cover (Refer to the 5.17)

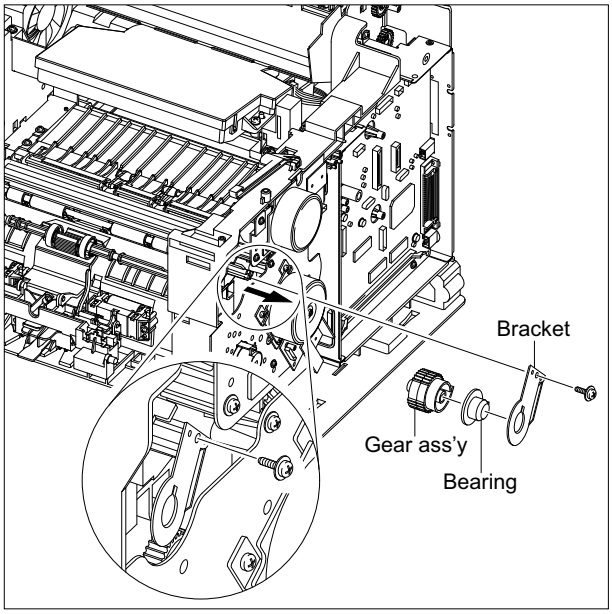
2. First of all remove two screws. Lift up the MP Pick Up Shaft for taking out the MP Pick Up Rack.



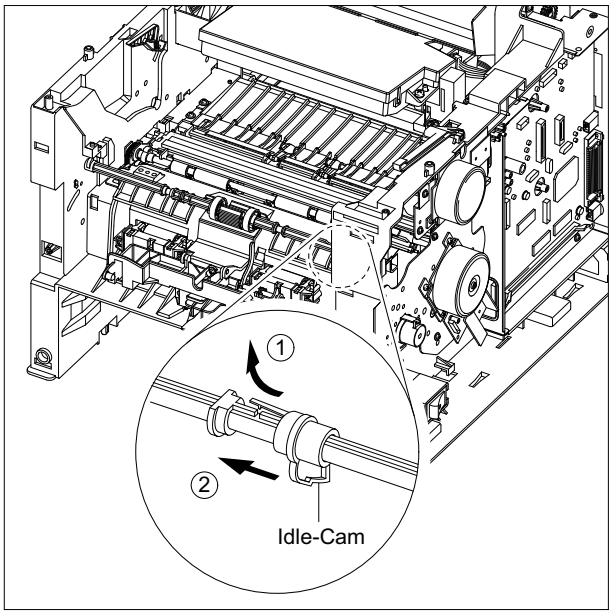

3. Remove the locking equipment rotate the Bearing in the direction of arrow.



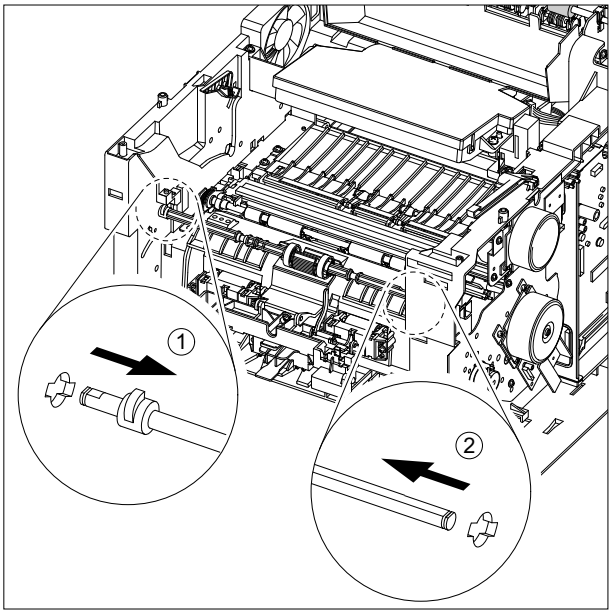

4. Remove the screw securing the Bracket and remove the Gear Ass'y, as shown below.



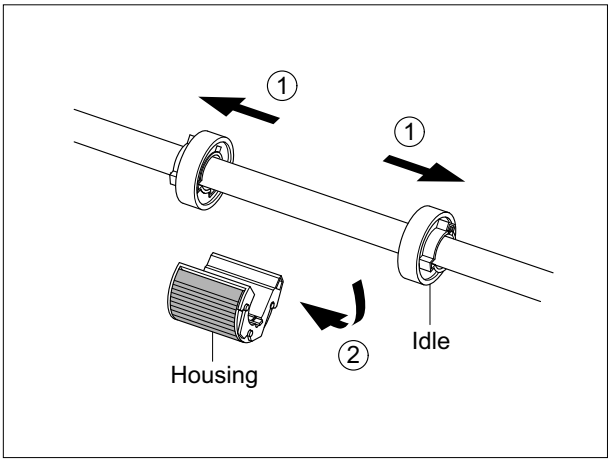

5. Slide the Cam to the right by pulling on the MP Pick Up Shaft, as shown below.



6. First lift the left side of the Shaft and then remove the Shaft.



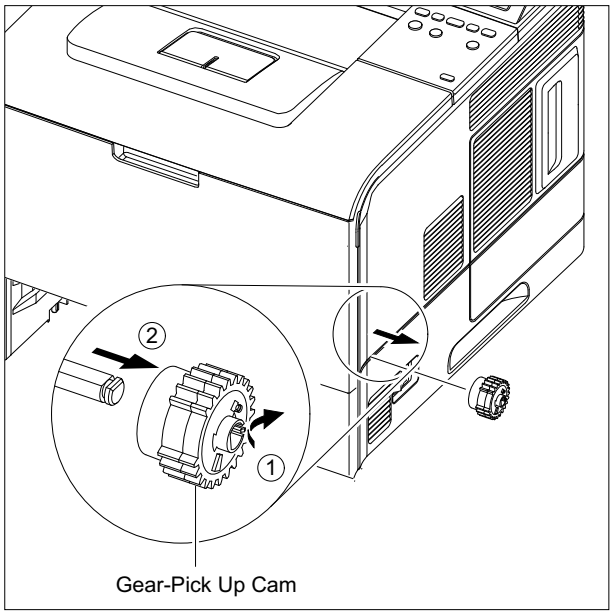

7. Push the Idle toward the ends of Shaft then take out the Housing, as shown below.



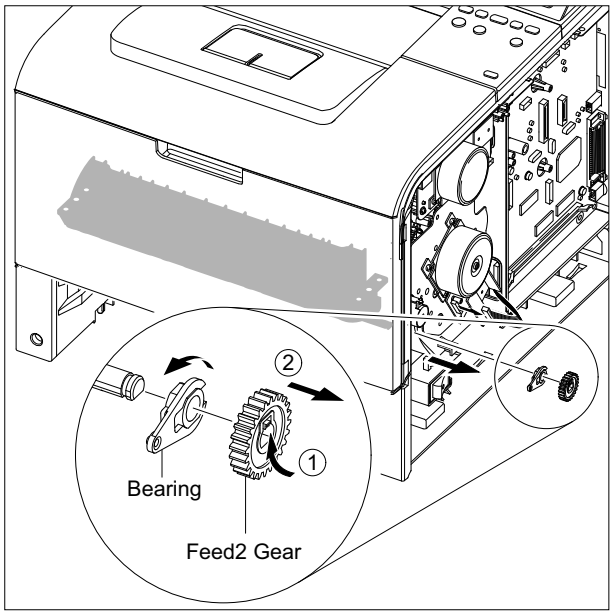
# 5.26 Pick Up & Feed2 Ass'y

1. Before you remove the Pick Up Ass'y, you should remove:
   - Main Drive Ass'y (Refer to the 5.9)
   - Right Cover (Refer to the 5.7)

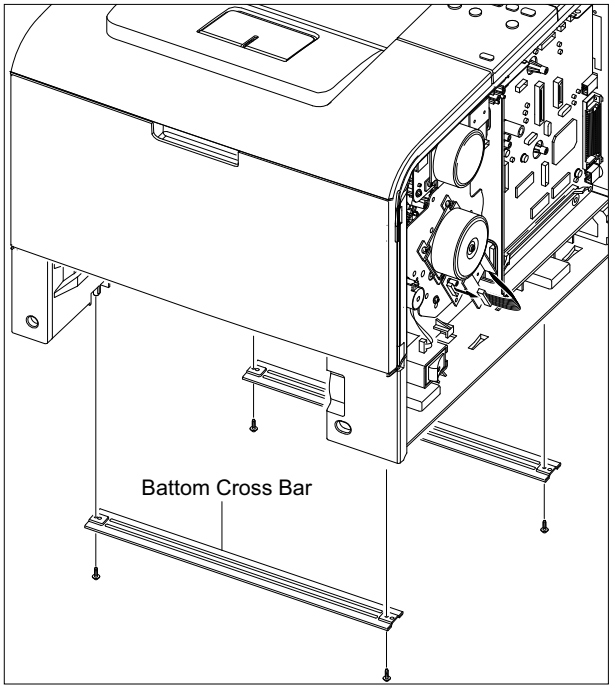
2. Remove the Gear-Pick Up Cam, as shown below.



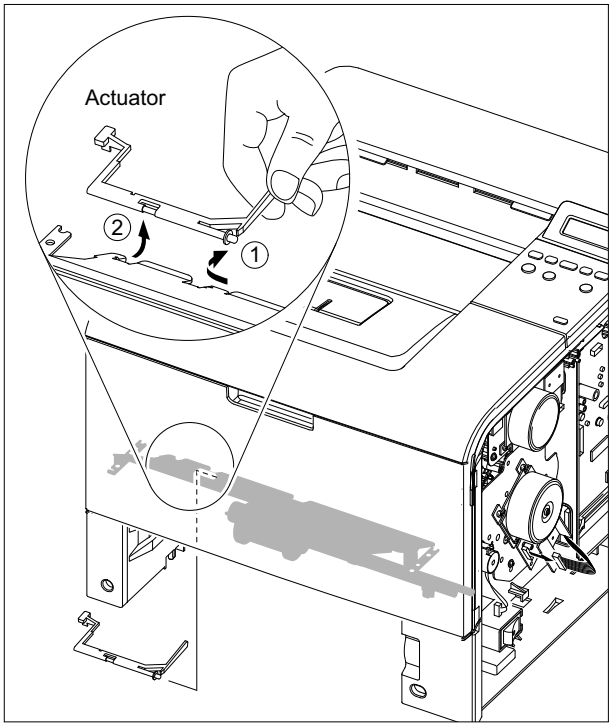

3. Release the Pick Up Gear and remove the locking equipment rotate the Bearing in the direction of arrow, as shown below.



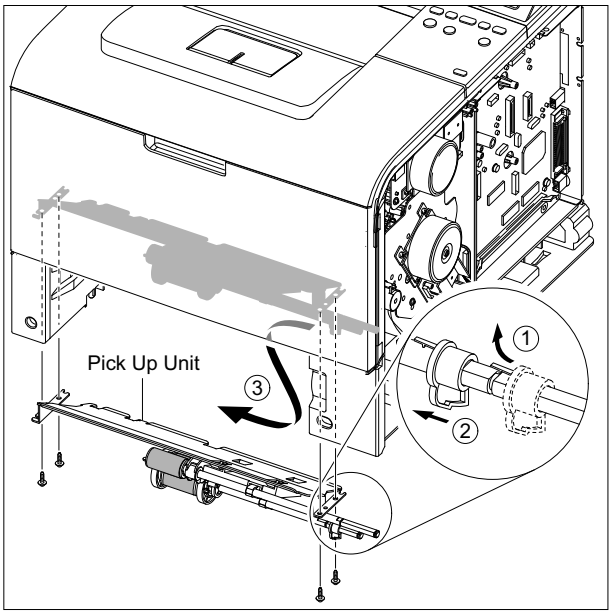

4. Remove four screws securing the Bottom Cross Bar and remove it.



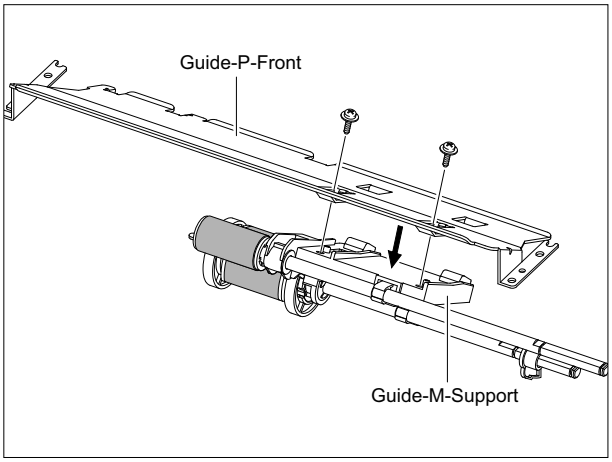

5. Remove the Actuator as shown below.



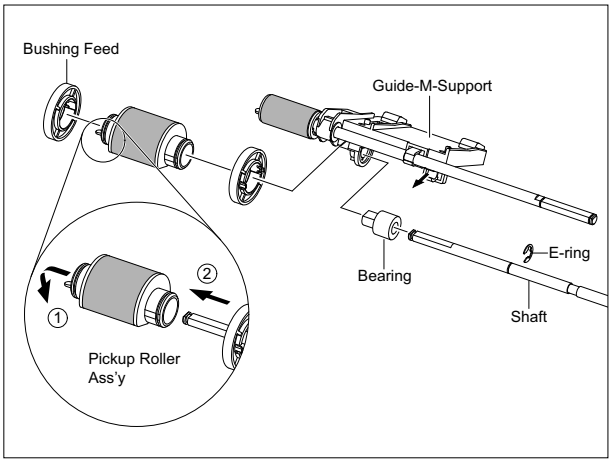
6. Remove four screws securing the Guide-P-Front. Then take out the Pick Up Unit, as shown below.



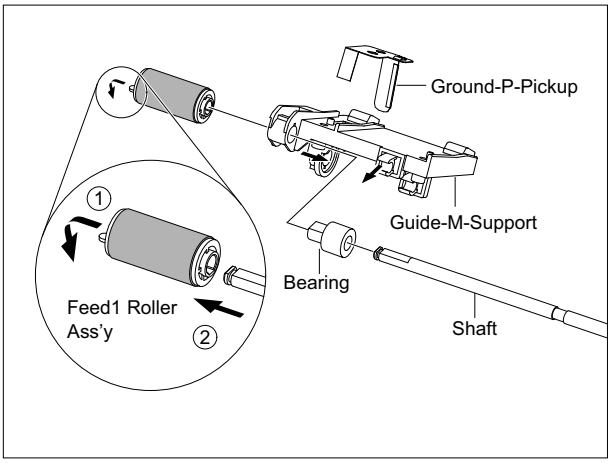

7. Remove two screws securing the Guide-M-Support and remove it.



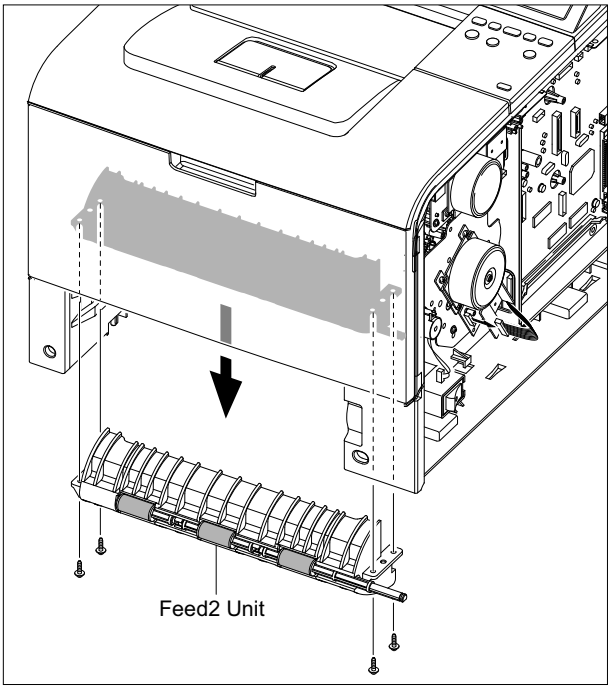

8. Remove the Feed1 Ass'y, as shown below.



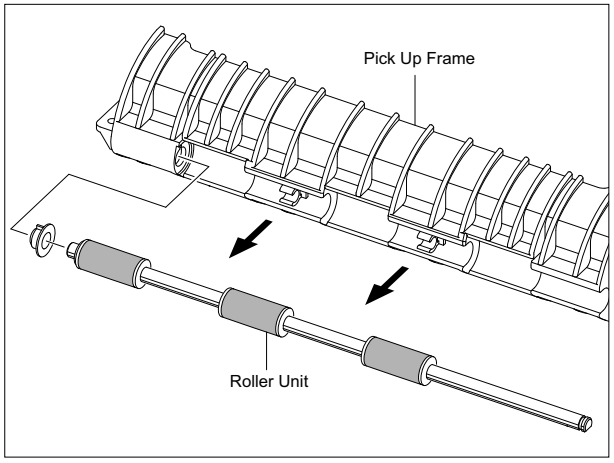

9. Remove the Feed2 Ass'y, as shown below.




10. Remove four screws securing the Feed2 Unit and remove it, as shown below.



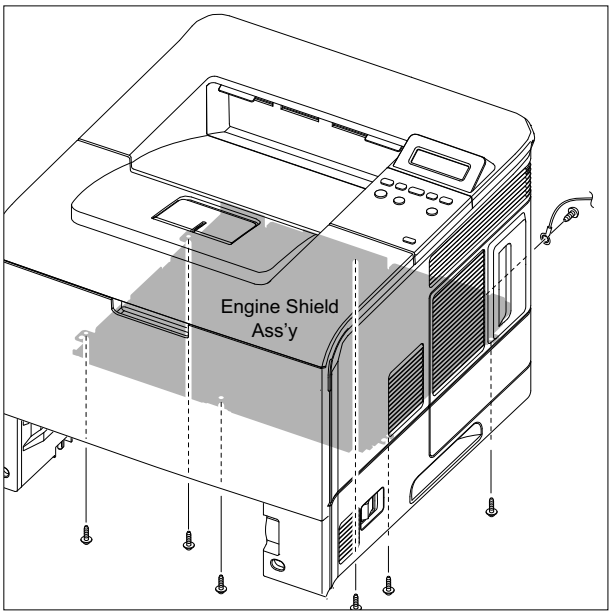
11. Remove the Roller Unit, as shown below.



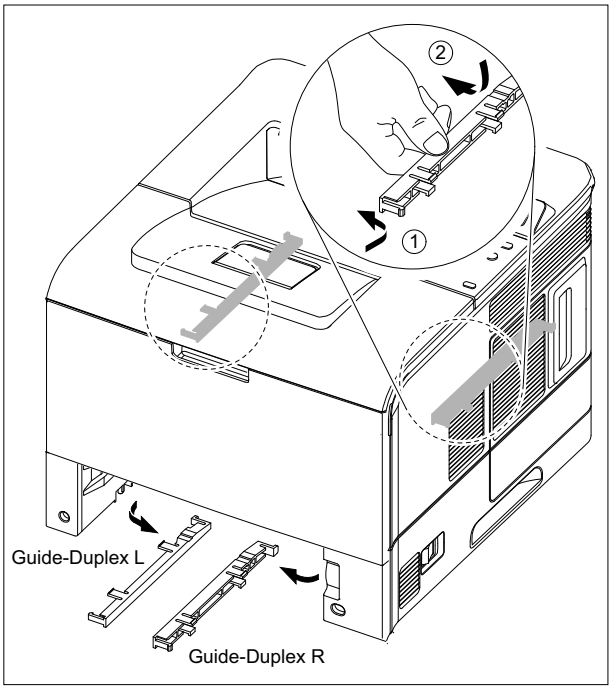
# 5.27 Engine Shield

1. Remove the Guide-P-Front.(Refer to the 5.16.7)

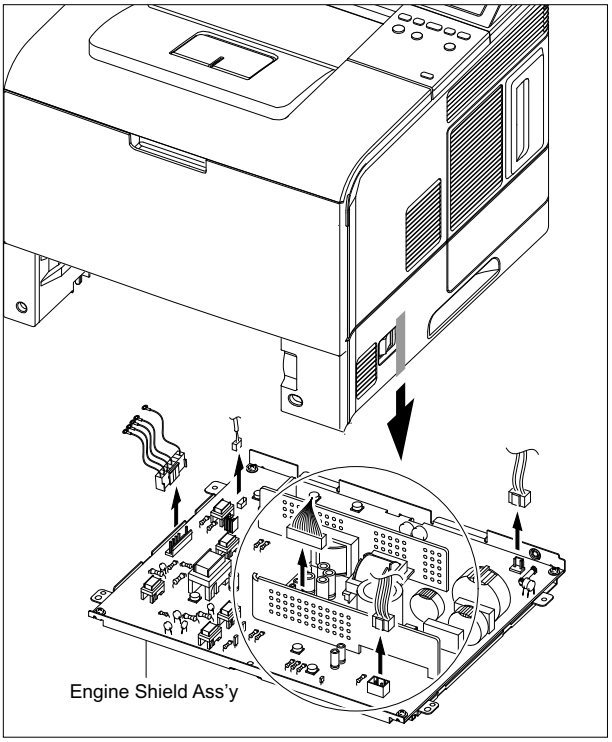
2. Remove six screws and slightly lift the Engine Shield, as shown below.



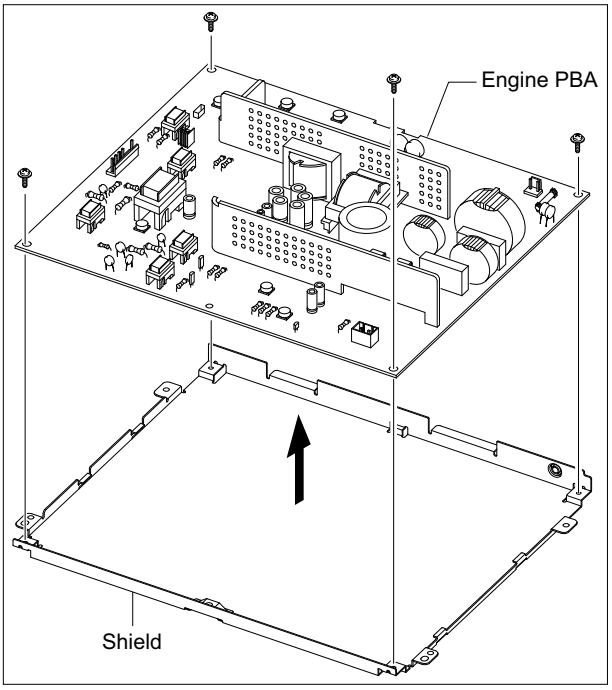

3. Remove the Duplex Guide L, R, as shown below.




4. Unplug the all Connectors from the Engine PBA. Then take out the Engine Shield Ass'y.



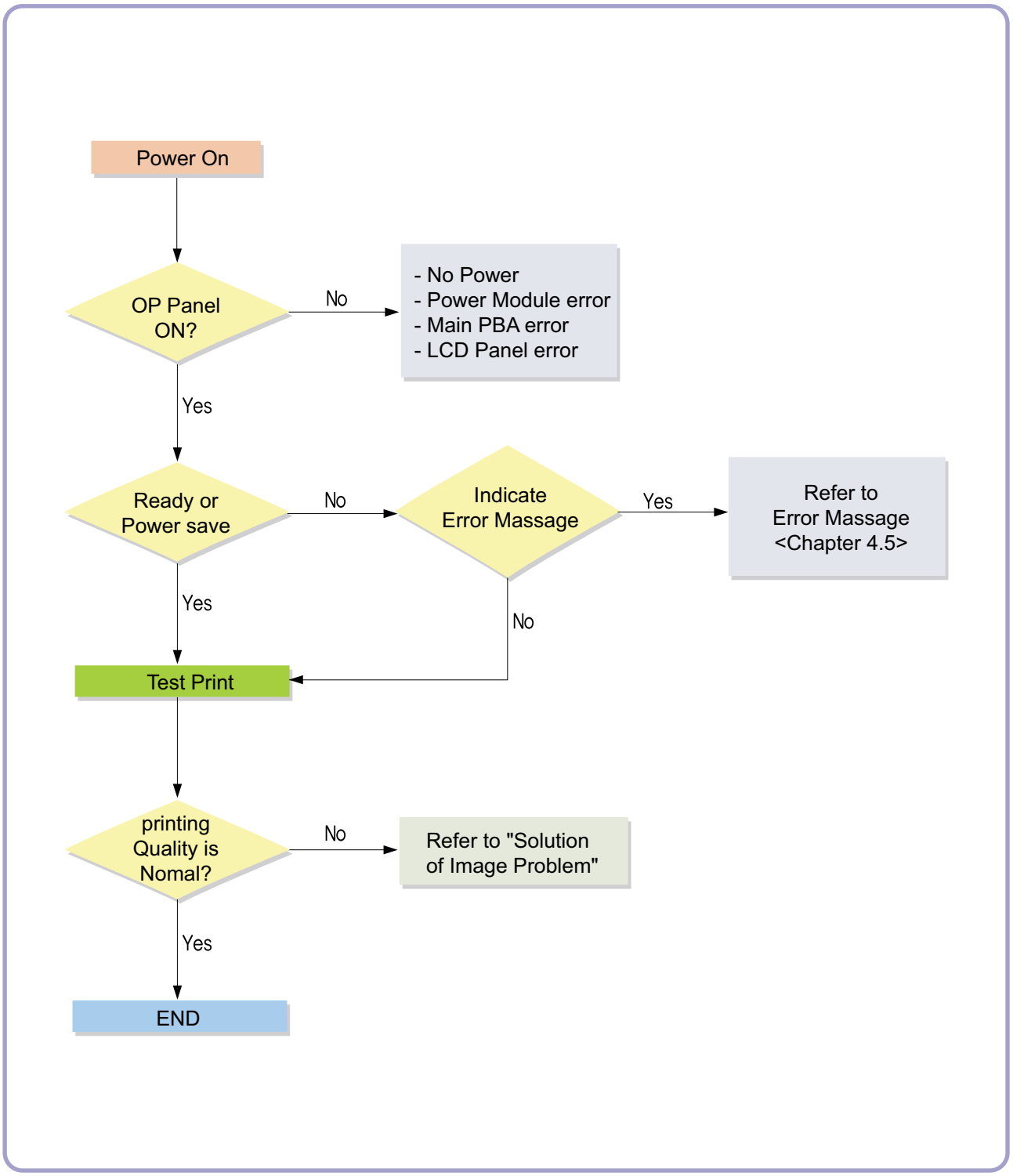

5. Remove four screws and take out the Engine PBA out of the Shield.



# 6. Troubleshooting

## 6.1 Procedure of Checking the Symptoms

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



# 6.2 The cause and solution of Bad image

## 6.2.1 Vertical Black Line and Band

• **Description** 1. Straight thin black vertical line occurs in the printing.
2. Dark black vertical band occur in the printing.


| Check and Cause | Solution |
|---|---|
| 1. Deformed Doctor-blade or cleaning-blade, in print cartridge | 1. If causes 1 and 2 occur in the print cartridge, replace the print cartridge and try to print out. |
| 2. Scratched surface of the charge roller in the print cartridge. | 2. Replace the transfer roller if occurred as No. 3. |
| 3. Partly depression or deformation on the surface of the transfer roller. | |

## 6.2.2 Vertical White Line

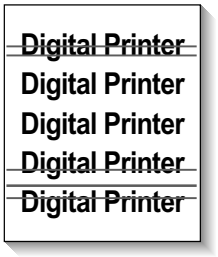
• **Description** White vertical voids in the image.


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

### 6.2.3 Horizontal Black Band

**• Description**

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

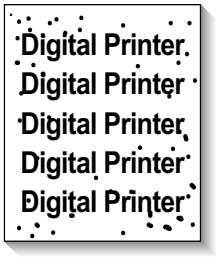



| Check and Cause | Solution |
|---|---|
| 1. Bad contacts of the voltage terminals to print cartridge. | 1. Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (remove the toner particles and paper particles) |
| 2. The rollers of print cartridge may be stained.<br>Charge roller = 38mm<br>Develop roller = 45mm<br>Transfer roller = 55mm<br>OPC Drum = 95mm | 2. Clean the right Gear that has relatively small gap of the teeth in the OPC.<br>3. If the malfunction persists, replace the print cartridge. |

### 6.2.4 Black/White Spot

**• Description**

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




| Check and Cause | Solution |
|---|---|
| 1. If dark or blurry black spots occur periodically, the rollers in the print cartridge may be contaminated with foreign matte or paper particles.<br>( Charge roller : 38 mm interval<br>OPC drum : 95 mm interval) | 1. Run OPC cleaning Mode Print and run the Self-test 2 or 3 times. |
| 2. If faded areas or voids occur in a black image at intervals of 95 mm, or black spots occur elsewhere, the OPC drum surface is damaged. | 2. In case of 95 mm interval unremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster. |
| 3. If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired. | 3. The transfer roller guarantees 150,000 sheets printing in normal environment. If the roller's life is expired, replace it.<br>4. In case of 38 mm interval unremovable in 1, take measures as to replace the print cartridge and try to print out.<br>5. Clean the inside of the set against the paper particles and foreign matter in order not to cause the trouble. |

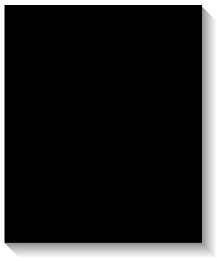
### 6.2.5 Light Image

• **Description** The printed image is light, with no ghost.


| Check and Cause | Solution |
|---|---|
| 1. Develop roller is stained when the toner of print cartridge is almost consumed. | 1. Check if the Toner Save mode is off. Check if the density is light. |
| 2. Ambient temperature is below than 10°C. | 2. No 1 : Replace the print cartridge and try to print out. |
| 3. Bad contact caused by the toner stains between the high voltage terminal in the HVPS and the one in the set. | 3. No 2 : Wait 30 minutes after printer is powered on before you start printing. |
| 4. Abnormal output from the HVPS. (Run self-test and check 1~4) | 4. No3 : Clean up the contaminated area by the toner. |
| 5. Check warranty out. | 5. Replace the HVPS if the problems are not solved by the above four instructions. |
| | 6. Replace print cartridge. |

### 6.2.6 Dark Image or a Black Page

• **Description** The printed image is dark.



| Check and Cause | Solution |
|---|---|
| 1. No charge voltage in the engine board. | 1. Check the state of the connector which connects the engine board and HVPS. |
| 2. Charge voltage is not turned on due to the bad contacts between power supply in the side of the print cartridge and charge terminal of HVPS. | 2. Clean the high voltage charge terminal.<br>3. Replace the HVPS if not solved by the above direction 1 and 2. |
| 3. VD0 signal of the Main PBA is Low state. | 4. Replace the LSU Unit or Main PBA. |
| 4. Case back side the cleaning blade of print cartridge. | 5. Replace print cartridge. |

### 6.2.7 Uneven Density

• **Description** Print density is uneven between left and right.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

| Check 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. | 1. Replace both the left and right Spring Holder. |
| 2. The life of the print cartridge has expired. | 2. Occur in the print cartridge gently shake the print cartridge. |
| 3. The toner level is not even on the print cartridge roller due to the bad blade. | 3.Replace the print cartridge and try to print out. |

### 6.2.8 Background

• **Description** Light dark background appears in whole area of the printing.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

| Check and Cause | Solution |
|---|---|
| 1. Does character exist less than 2% coverage per a page, and hasn't it been used long time? (see the configuration sheet) | 1. The print cartridge is basically designed to print 20,000 pages with 5% coverage. If it prints more than 23,000 pages with 2% coverage, a background can occur. |
| 2. Is a recycled print cartridge be used? | 2. The A/S is not guaranteed if using a recyled the print cartridger. |
| 3. Has the life span of the print cartridge ended? | 3. Replace the print cartridge when the life span of it has been ended. |
| 4. Is the movement(Up and Down) of the transfer roller smooth? | 4. Clean the bushing part of the transfer roller. |
| 5. Is the HVPS normal? | 5. If the problem is still not solved, replace the print cartridge. |

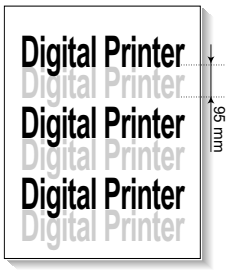
### 6.2.9 Ghost (1)

• **Description** Ghost occurs at 95 mm intervals of the OPC drum in the whole printing.


| Check and Cause | Solution |
|---|---|
| 1. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the electrode of the print cartridge. | 1. Clean the terminals when contaminated by toner particles. |
| 2. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board. | 2. Occur in the print cartridge, replace the print cartridge and try to print out. |
| 3. The life of print cartridge is expired. | 3. Replace the engine board if not solved by the above directions 1-2. |
| 4. Transfer roller lifetime(150,000 sheets) has expired. | 4. If not solved by the direction 3, check the transfer roller lifetime and replace it. |
| 5. Abnormal low temperature(below 10°C). | 5. Wait about 1 hour after power on before using printer. |
| 6. Damaged cleaning blade in the print cartridge. | 6. Occur in the print cartridge, replace the print cartridge and try to print out. |

### 6.2.10 Ghost (2)

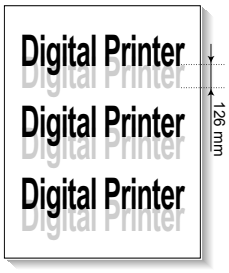
• **Description** Ghost occurs at 95 mm intervals of the OPC drum in the whole printing.
(When printing on card stock or transparencies using manual feeder)




| Check and Cause | Solution |
|---|---|
| When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required. | Select Card stoc or OHP Film on paper type menu from the software application and after using returning to the original mode is recommended. |

### 6.2.11 Ghost (3) : Fuser

• **Description** Ghost occurs at 126 mm intervals.




| Check and Cause | Solution |
|---|---|
| The temperature of the fuser is maintained high. | 1. Disassemble the fuser and remove the contaminated toner particles on the roller and clean the foreign matter between Thermistor and Heat roller. (Caution: can be deformed) |

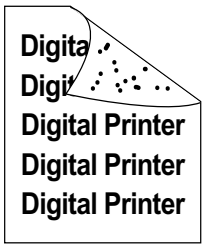
### 6.2.12 Stains on the Face of Page

• **Description** The background on the face of the printed page is stained.


| Check and Cause | Solution |
|---|---|
| 1. Toner leakage due to improperly sealed print cartridge. | 1. Replace the print cartridge, and clean to the toner powder of machine. |
| 2. If the transfer roller is contaminated, stains on the face of page will occur. | 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. |

### 6.2.13 Stains on the Back of Page

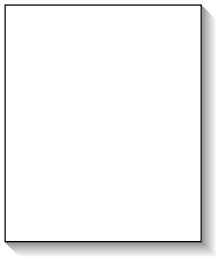
• **Description** The back of the page is stained at 55 or 126 mm intervals.




| Check and Cause | Solution |
|---|---|
| 1. 55mm : Transfer roller is contaminated. | 1.1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination of the transfer roller.<br>1.2. Replace the transfer roller if contaminated severely. |
| 2. 126mm : Pressure roller is contaminated. | 2.1. Perform the fuser cleaning mode print 2 or 3 tiones.<br>2.2. Disassemble the fuser and clean the H/R(Heat Roller) and P/R(Pressure roller). And check the area between H/R and Thermistor. If contaminated, clean the area not to be deformed. |

### 6.2.14 Blank Page Print out (1)

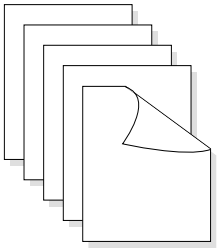
• **Description** Blank page is printed.



| Check and Cause | Solution |
|---|---|
| Bad ground contacts in OPC and/or print cartridge. | 1. Check if the Ground-OPC is defective(set inside left side).<br>2. Remove contamination of the terminals of the print cartridge and the unit. |

### 6.2.15 Blank Page Print out (2)

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



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

# 6.3 The cause and solution of the bad discharge

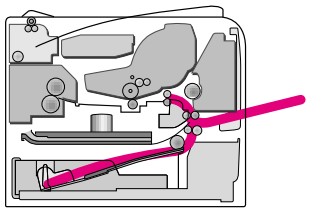
## 6.3.1 Wrong Print Position

• **Description** Printing begins at wrong position on the paper.

| Check and Cause | Solution |
|---|---|
| Wrong sense time caused by defective feed sensor actuator. | Replace the defective actuator |

## 6.3.2 JAM 0

• **Description**
1. Paper is not exited from the cassette.
2. Jam-0 occurs if the paper feeds into the printer.

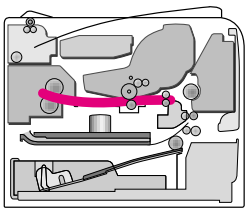


| Check and Cause | Solution |
|---|---|
| 1. Check the Main clutch by using EDC Mode. | 1. Replace the Main clutch. |
| 2. Check if the pad is loose due to bad sealing of the side-pad. | 2. Replace the side-pad Assembly L or R, if necessary. |
| 3. Check the surface of the roller-pick-up for foreign matter. | 3. Clean with soft cloth dampened with IPA(Isopropyl Alcohol) or water. |
| 4. If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup opens or is broken away. | 4. Replace the Main PBA and/or Sensor. |
| 5. If the paper feeds into the printer and Jam 0 occurs, perform EDC Mode to check feed-sensor of the engine board. | |

### 6.3.3 JAM 1

**• 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.

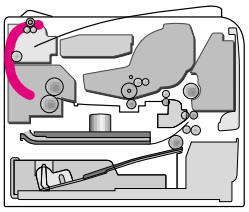


| Check and Cause | Solution |
|---|---|
| 1. If the recording paper is jammed in front of or inside the fuser. | 1. Replace the SMPS or Exit-Sensor.<br>2. Replace the Main PBA. |
| 2. If the recording paper is stuck in the discharge roller and the fuser just after passing through the Actuator-Feed,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

### 6.3.4 JAM 2

**• Description**

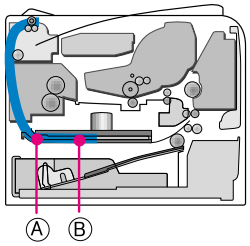
1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.



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

### 6.3.5 Duplex Jam 1

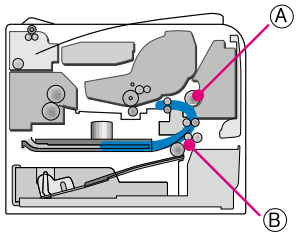
• **Description** A message 'Duplex Jam 1' is displayed in a LCD window.




| Check and Cause | Solution |
|---|---|
| 1. It is a case when a paper cannot operate a duplex sensor.<br>2. It is a case when a paper cannot reach to a duplex sensor due to a paper jam on a duplex path. | 1. Replace a SMPS or main PBA<br>2. A case that a paper jam occurs on (A) after it is reversed: replace a 2nd exit roller after checking its operation.<br>3. A case that a paper jam occurs on (B) after it is reversed: replace a duplex roller after checking its operation |

### 6.3.6 Duplex Jam 0

• **Description** A message 'Duplex Jam 2' is displayed in a LCD window.




| Check and Cause | Solution |
|---|---|
| 1. It is a case that a paper cannot pass a duplex sensor.<br>2. It is a case that a paper cannot reach to a registration sensor after it is passed a duplex sensor. | 1. Replace a SMPS or main PBA.<br>2. A case that a leading edge of a paper is jammed on (A) check an operation of a guide front. If it is worn or defective, replace it.<br>3. Check an operation of a feed roller and a registration roller. If they are worn or defective replace them. |

### 6.3.7 Multi-Feeding

• **Description** Multiple sheets of paper are fed at once.

| Check and Cause | Solution |
|---|---|
| 1. Check the Guide side L/R or Guide Rear in the Cassette, if the position is correct. | 1. Replace the solenoid if necessary. |
| 2. Solenoid malfunction(the solenoid does not work properly): Perform EDC Mode. | 2. Replace the Main PBA. |
| 3. Pad-Friction is contaminated with foreign matter.(oil...) | 3. Clean the pad friction with soft cloth dampened with IPA(Isopropyl Alcohol). |
| 4. The face of paper is blended. | 4. Use the smooth paper. |

### 6.3.8 Paper rolled in the fuser

• **Description** If contaminated at intervals of 57mm on the back of a paper.

| Check and Cause | Solution |
|---|---|
| 1. Contamination of the pressure roller or heat roller (Background, Hot off set). | 1. After disassembling the fuser, clean contamination between the heat roller and the thermostor and remove the contamination of the pressure roller. |
| 2. Check the claw of the fuser whether it is deformed. | 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 separation of the print claw and the holder plate claw, and then manage it. |

### 6.3.9 Paper rolled on the OPC Drum

• **Description** Paper is rolled up in the OPC.

| Check and Cause | Solution |
|---|---|
| 1. Paper is too much thin.<br><br>2. The face of paper is curled. | 1. Recommend to use normal paper.<br><br>2. How to remove the rolled paper in the OPC.<br>• Remove the paper while turning the OPC against the ongoing direction.<br>• Clean fingerprints on the OPC softly with soft cloth dampened with tissue. |

# 6.4 The cause and solution of the malfunction

## 6.4.1 Fuser Error

• **Description** A message “Engine Fuser Low Heat Error/Engine Fuser Over Heat Error” is displayed in a LCD panel.

| Check and Cause | Solution |
|---|---|
| 1. Check whether a thermostat, open or not. | 1. Replace the fuser if a thermostat is open. |
| 2. Check whether a thermistor is open or not. | 2. Replace the fuser if a thermistor sensor is located deep inside of a sponge. |
| 3. Heat lamp ON/OFF test | 3. Check whether the overheat mode circuit operates normally or not. |
| 4. It could not operate due to a gear of a fuser is melted. | 4. Replace the fuser. |

## 6.4.2 LSU Error

• **Description** A message “Engine Hsyne Error” is displayed in a LCD panel.

| Check and Cause | Solution |
|---|---|
| 1. Check whether the LSU connector is disconnected or not. | 1. Connect the LSU harness properly. |
| 2. Check whether the LSU motor is rotating or not. | 2. Replace a LSU. |
| 3. Check the HSYNC signal. | 3. Replace a main board if the same error occurs again after replacing a LSU. |

### 6.4.3 Not function of the gear of the fuser due to melting away

• **Description** The motor breaks away from its place due to gear melting away.

| Check and Cause | Solution |
|---|---|
| 1. Check the Fuser Unit. | 1. Replace the Fuser.<br>2. Replace the Main PBA.<br>2. Replace the SMPS. |

### 6.4.4 Paper Empty

• **Description** The paper lamp on the operator panel is on even when paper is loaded in the cassette.

| Check and Cause | Solution |
|---|---|
| 1. Bending or deformation of the actuator of the paper sensor. | 1. Replace the defective actuator. |
| 2. The function of the engine board is defective | 2. Replace the empty sensor PBA. |
| 3. Check the connector and harness. | |

### 6.4.5 Paper Empty without indication

| | |
|---|---|
| • **Description** | A message “Paper Empty” is displayed in a LCD panel.<br>The paper lamp on the operator panel does not come on when the paper cassette is empty. |

| Check and Cause | Solution |
|---|---|
| 1. Bending or deformation of the actuator of the paper sensor. | 1. Replace the defective actuator. |
| 2. Check the Main board. | 2. Replace the board which has a trouble. |
| 3. Check the empty sensor board. | |
| 4. Check the toner sensor board. | |

### 6.4.6 Cover Open

| | |
|---|---|
| • **Description** | A message “Colse Top Cover” is displayed in a LCD panel.<br>The ERROR lamp is on even when the print cover is closed. |

| Check and Cause | Solution |
|---|---|
| 1. The hook lever in the top cover may be defective. | 1. Replace the hook lever, if defective. |
| 2. Check the main board | 2. Check the insertion of the cover open S/W connect. |
| 3. Check the cover open board. | 3. Replace the main board or cover open board. |
| 4. Check the harness and connection. | |

### 6.4.7 No error message when the cover is open

• **Description** The ERROR message does not come on even when the printer cover is open

| Check and Cause | Solution |
|---|---|
| 1. Check the cover open circuit on the main board.<br><br>2. Check the cover open board. | 1. Check the insertion of the cover open S/W connect.<br><br>2. Replace the main control board or cover open board. |

### 6.4.8 Defective motor operation

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

| Check and Cause | Solution |
|---|---|
| 1. The motor harness or motor PCB may be defective. | 1. Replace the motor unit. |
| 2. Check the motor operation in the EDC mode. | 2. Replace the main PBA. |

### 6.4.9 No Power

• **Description** When system power is turned on, all lamps on the operator panel do not come on.

| Check and Cause | Solution |
|---|---|
| 1. Check if the power input and SMPS output are normal. | 1. Replace the SMPS. |
| 2. Check the inferiority of LED-Panel or LDC window on the front-cover if the OP panel does not appear after normal warming-up. | 2. Replace the control board. |

### 6.4.10 Vertical Line Getting Curved

• **Description** When printing, vertical line gets curved.

| Check and Cause | Solution |
|---|---|
| 1. If the supply of +24v is unstable in the main control board linking with LSU, check drive by EDC mode: LSU check. | 1. Replace LSU. |
| 2. Chect the deve PBA in the print cartridge. | 2. Replace the toner sensor PBA.<br>2. Replace the main PBA. |

# 6.5 Maintaining the toner cartridge

### Toner cartridge storage

To get the most from the toner cartridge, keep the following guidelines in mind:

- Do not remove the toner cartridge from its package until ready for use.
- Do not refill the toner cartridge. The printer warranty does not cover damage caused by using a refilled cartridge.
- Store toner cartridge in the same environment as the printer.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minute.

### Expected cartridge life

The life of the toner cartridge depends on the amount of toner that print jobs require. When printing text at ISO 19752 5% coverage, a new toner cartridge lasts an average of either 20,000 or 10,000 pages. (The original toner cartridge supplied with the printer lasts an average of 10,000 pages.) The actual number may also be different depending on the print density of the pages you print on, and the number of pages may be affected by operating environment, printing interval, media type, and media size. If you print a lot of graphics, you may need to change the cartridge more often.

### Saving toner

To save toner, press Toner Save on the control panel. The button backlight turns on.
Using this feature extends the life of the toner cartridge and reduce your cost per page, but it also reduces print quality.

## 6.5.1 Checking the remaining toner

You can check the level of toner left in the cartridge.
If you are having print quality problems, this can help you determine if the problem is caused by low toner.

Following the key formation at the panel, note the toner remaining level on the cartridge information after taking out the configuration sheet. In other way to check, follow the TECH mode and out put the cartridge information.

The display shows the percentage of the remaining toner.

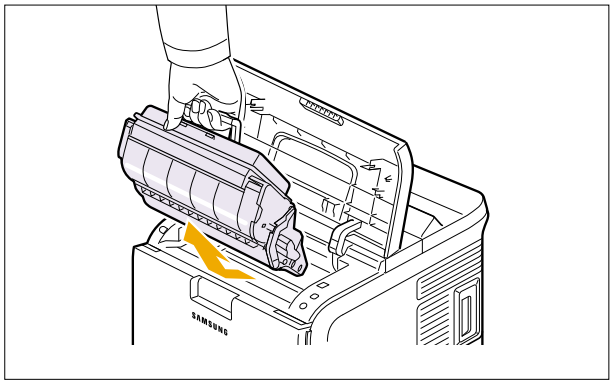
## 6.5.2 Redistributing toner cartridge

When the toner cartridge is near the end of its life:

- White streaks and light printing occur.
- Toner Low appears on the display.
- The Smart Panel program window appears on the computer telling you that the toner level is low.
- The Status LED blinks red. If this happens, you can temporarily reestablish print quality by redistributing the remaining toner in the cartridge. In some cases, white streaks or light printing will still occur even after you have redistributed the toner.

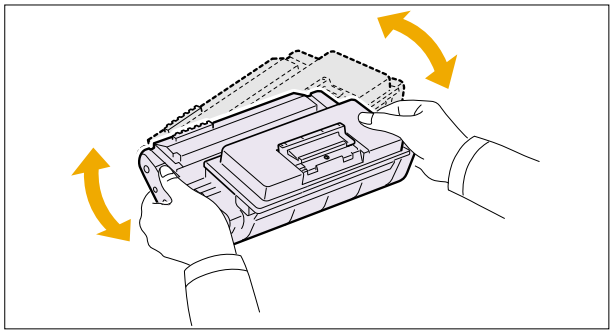
1. Open the top cover.

2. Pull the toner cartridge out.



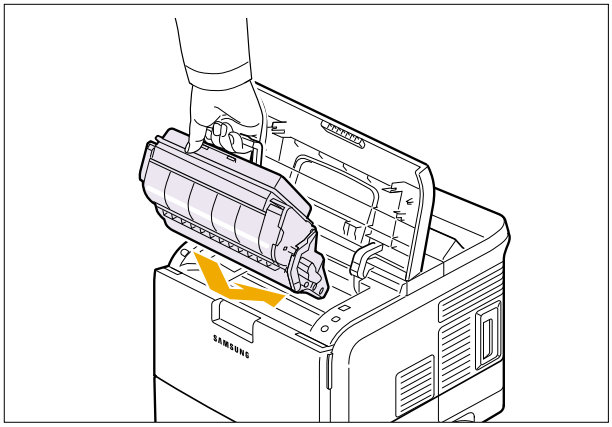
**Caution :**
- Avoid reaching too far into the printer. The fusing area may be hot.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minutes. Cover it with a piece of paper, if necessary.
- Do not touch the green surface underside of the toner cartridge. Use the handle on the cartridge to avoid touching this area.

3. Thoroughly shake the cartridge 5 or 6 times to distribute the toner evenly inside the cartridge.



**Note :** If toner gets on your clothing, wipe it off with a dry cloth and wash clothing in cold water. Hot water sets toner into fabric.

4. Hold the toner cartridge by the handle and slowly insert the cartridge into the opening in the printer. Tabs on the sides of the cartridge and corresponding grooves within the printer will guide the cartridge into the correct position until it locks into place completely.



5. Close the top cover. Make sure that the cover is securely closed.

### 6.5.3 Replacing the toner cartridge

When the toner cartridge is completely empty:

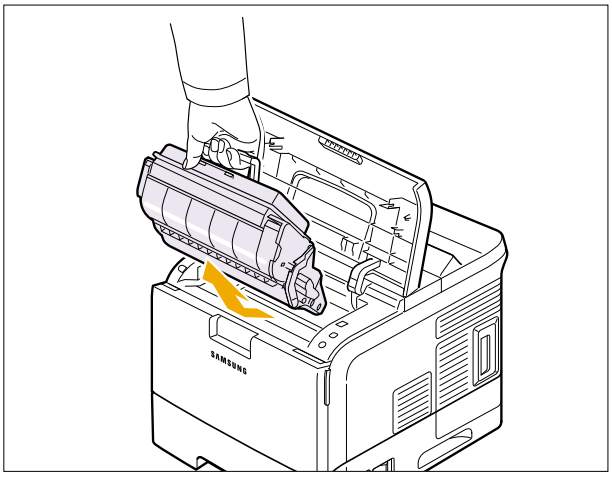
- Replace Toner appears on the display.
- The Smart Panel program window appears on the computer telling you that the toner cartridge is empty.
- The Status LED lights red.

At this stage, the toner cartridge needs to be replaced. For order information for toner cartridges,

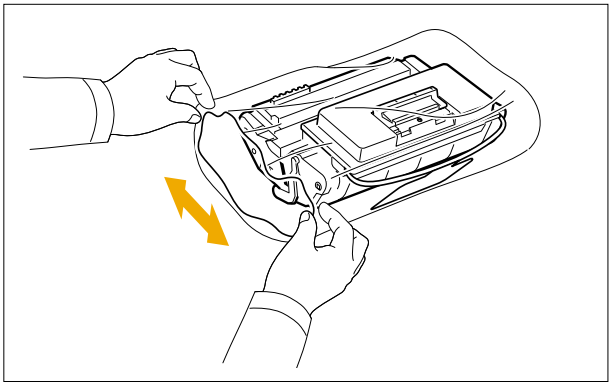
**Note :** This feature does not work for the Toner Empty message.

1. Open the top cover.

2. Pull the toner cartridge out.

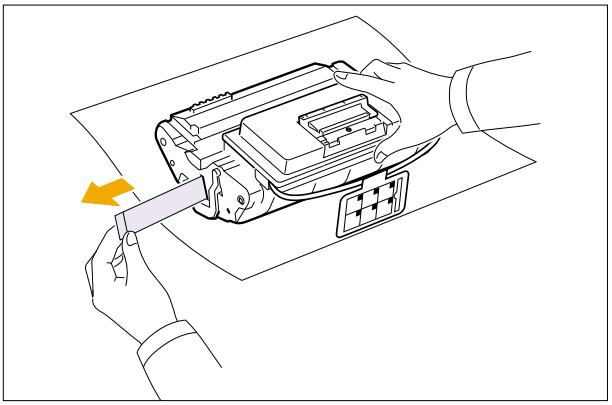



3. Remove the new toner cartridge from its bag.



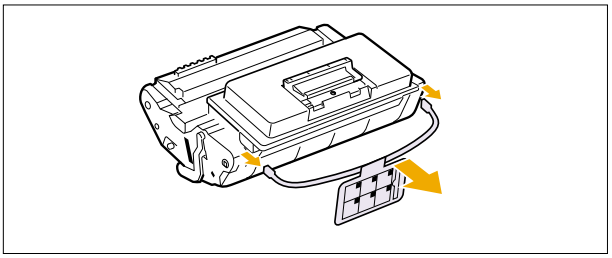
**Caution :** Do not use sharp objects, such as a knife or scissors, to open the toner cartridge package. They might scratch the drum of the cartridge.

4. Locate the sealing tape at the end of the toner cartridge. Carefully pull the tape completely out of the cartridge and discard it.

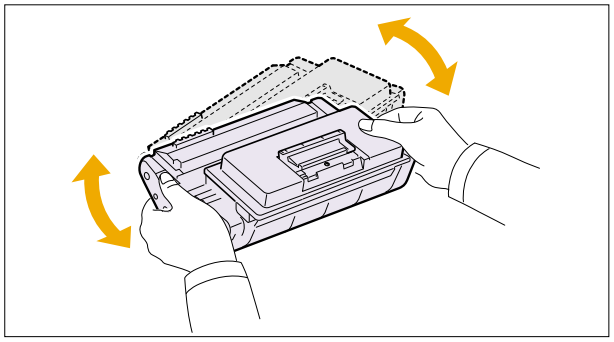


**Note :**
- The sealing tape should be longer than 60 cm when correctly removed.
- Holding the toner cartridge, pull the sealing tape straight to remove it form the cartridge. Be careful not to cut the tape. If this happens, you cannot use the toner cartridge.
- Refer to the helpful pictures on the cartridge wrapping paper.

5. Remove the flexible plastic holder out of the toner cartridge.



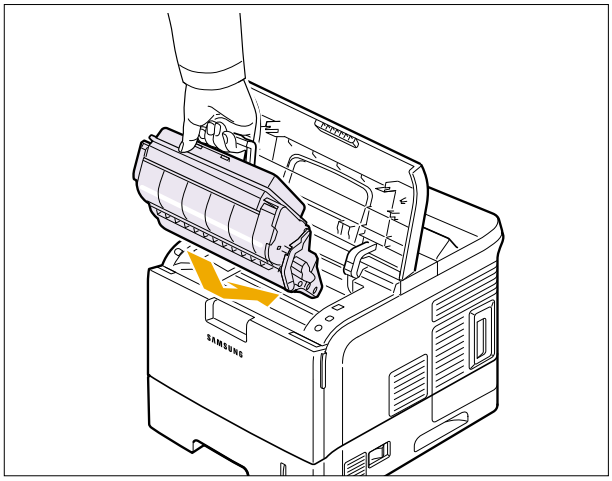
6. Thoroughly shake the cartridge 5 or 6 times to distribute the toner evenly inside the cartridge.



Thoroughly roll the cartridge to assure maximum copies per cartridge. Save the box and the plastic bag for shipping.

**Caution :**
- If toner gets on your clothing, wipe it off with a dry cloth and wash clothing in cold water. Hot water sets toner into fabric.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minutes. Cover it with a piece of paper, if necessary.
- Do not touch the green surface underside of the toner cartridge. Use the handle on the cartridge to avoid touching this area.

7. Hold the toner cartridge by the handle and slowly insert the cartridge into the opening in the printer. Tabs on the sides of the cartridge and corresponding grooves within the printer will guide the cartridge into the correct position until it locks into place completely.




8. Close the top cover. Make sure that the cover is securely closed.

## 6.5.4 Toner Cartridge-related messages

| Message | Meaning | Suggested solutions |
|---|---|---|
| Install Toner | A toner cartridge is not installed. | Install a toner cartridge. |
| Invalid Toner | The toner cartridge you have installed is not for your printer. | Install a Samsung -genuine toner cartridge ,designed for your printer. |
| Toner Low | The toner cartridge is almost empty. | Take out the toner cartridge and thoroughly shake it.By doing this,you can temporarily reestablish printing operations. |
| NonGenuine Toner<br>◀ Stop ▶ | The toner cartridge installed is not a genuine cartridge. | You can select either Stop or Continue.If you do not select any,the printer will work as Stop is selected.<br>If you select Stop, you cannot print until the genuine cartridge is installed.However, you can still print any kind of reports.<br>If you select Continue, you can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>If you want to change the selection, turn the printer off and on to have this message appear again, and then re-select Stop or Continue. |
| NonGenuine Toner<br>Replace Toner1 | The toner cartridge installed is not a genuine cartridge. | This message appears when you selected Stop at the NonGenuine Toner prompt.<br>Install the genuine toner cartridge. |
| NonGenuine Toner<br>Replace Toner | The toner cartridge installed is not a genuine cartridge. | This message appears when you selected Continue at the NonGenuine Toner prompt.<br>Install the genuine toner cartridge. |
| Toner Low<br>Replace Toner | The toner in the cartridge has run out. | Install a new genuine toner cartridge.<br>You can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>You can configure not to see the Toner Low Replace Toner message. |
| Replace Toner | The toner cartridge installed is not a genuine cartridge. | This message appears when you turned off the Toner Low Replace Toner message.<br>Install a new genuine toner cartridge.<br>You can keep printing but the quality cannot be guaranteed, and the product support is no longer provided. |
| Toner Exhausted<br>◀ Stop ▶ | The lifespan of the toner cartridge is reached. | You can select either Stop or Continue. If you do not select any, the printer will work as Stop is selected.<br>If you select Stop, you cannot print until the genuine cartridge is installed.<br>If you select Continue, you can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>If you want to change the selection, turn the printer off and on to have this message appear again, and then re-select Stop or Continue. |
| Toner Exhausted<br>Replace Toner1 | The lifespan of the toner cartridge is reached. | This message appears when you selected Stop at the Toner Exhausted prompt.<br>Install the genuine toner cartridge. |
| Toner Exhausted<br>Replace Toner | The lifespan of the toner cartridge is reached. | This message appears when you selected Continue at the Toner Exhausted prompt.<br>Install the genuine toner cartridge. |

## 6.6 The cause and solutions of bad environment of the software

### 6.6.1 The printer is not working (1)

• **Description** While Power turned on, the printer is not working in the printing mode.

| Check and Cause | Solution |
|---|---|
| 1. Run Self-Test Mode: Turn the power on while pressing the test printing button for 2 or 3 seconds before printing works. | 1.Check the power of the printer and perform the Self-Test. If the test printing works, that means no problems in the printer itself. If the test printing does not work, that means bad functioning of the printer(not because of software). |
| 2. Check if the PC and the printer is properly connected and the print cartridge installed. | 2. Replace the printer cable. If the problems not solved even after the cable replaced, check the amount of the remaining tone. (refer to print cartridge Service 4-5) |
| 3. Printing is nor working in the Windows. | 3. Check if the connection between PC and printer port is proper. If you use windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check in which program the printing is not working. The best way to find out is to open the memo pad to check the function of printing. If it is not working in a certain program, adjust the setup the program requires. Sometimes, the printout is normal within the Windows basic programs, but it's not working in a particular program. In such case, install the new driver again. If not working in the Windows basic program, Check the setup of the port of CMOS is on ECP. And check the address of IRQ 7 and 378 |
| 4. Check if the printer cable is directly connected to peripheral devices | 4. If the scanner needs to be connected to the printer, first the remove the scanner from the PC to see if the printer is properly working alone. |

### 6.6.2 The printer is not working (2)

**• Description** After receiving the printing order, no response at all or the low speed of printing occurs due to wrong setup of the environment rather than malfunction of the printer itself.

| Check and Cause | Solution |
|---|---|
| 1. Secure more space of the hard disk. | 1. Not working with the message 'insufficient printer memory' means hard disk space problem rather than the RAM problem. In this case, provide more space for the hard disk. Secure more space using the disk utilities program. |
| 2. Printing error occurs even if there is enough space in the hard disk. | 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 rightly set up. |
| 3. Check the parallel-port-related items in the CMOS Setup. | 3. As a printer port, Select ECP or SPP among SPP(Normal), ECP, and EPP modes(increase printing speed) SPP normal mode support 8-bit data transfer, while ECP Mode transfer the 12-bit data. |
| 4. Reboot the system to print. | 4. If the regular font is not printing, the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one. |

### 6.6.3 Abnormal Printing

| | |
|---|---|
| • **Description** | The printing is not working properly even when the cable has no problem.<br>(even after the cable is replaced)<br>If the printer won't work at all or the strange fonts are repeated, the printer driver may be defective or wrong setup in the CMOS Setup. |

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

### 6.6.4 SPOOL Error

| | |
|---|---|
| • Description | To spool which stands for "simultaneous peripheral operations online" a computer document or task list (or "job") is to read it in 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). |

| Check and Cause | Solution |
|---|---|
| 1. Insufficient space of the hard disk in the directory assigned for the basic spool. | 1. Delete the unnecessary files to provide more space to start printing job. |
| 2. If the previous printing error not solved. | 2. If there are some files with the extension name of ****.jnl, Delete them and Reboot the Windows to restart printing job. |
| 3. When expected to collide with other program. | 3. Shut down all other programs except the current one, if possible. |
| 4. When an application program or the printer driver is damaged. | 4. Delete the printer driver completely and reinstall it. |
| 5. When some files related to OS are damaged or virus infected. | 5 After rebooting the computer, check for viruses, restore the damaged files and reinstall the program to do the printing job. |
| 6. Memory is less than suggested one. | 6. Add up enough memory to the PC. |

**How to delete the data in the spool manager.**

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.

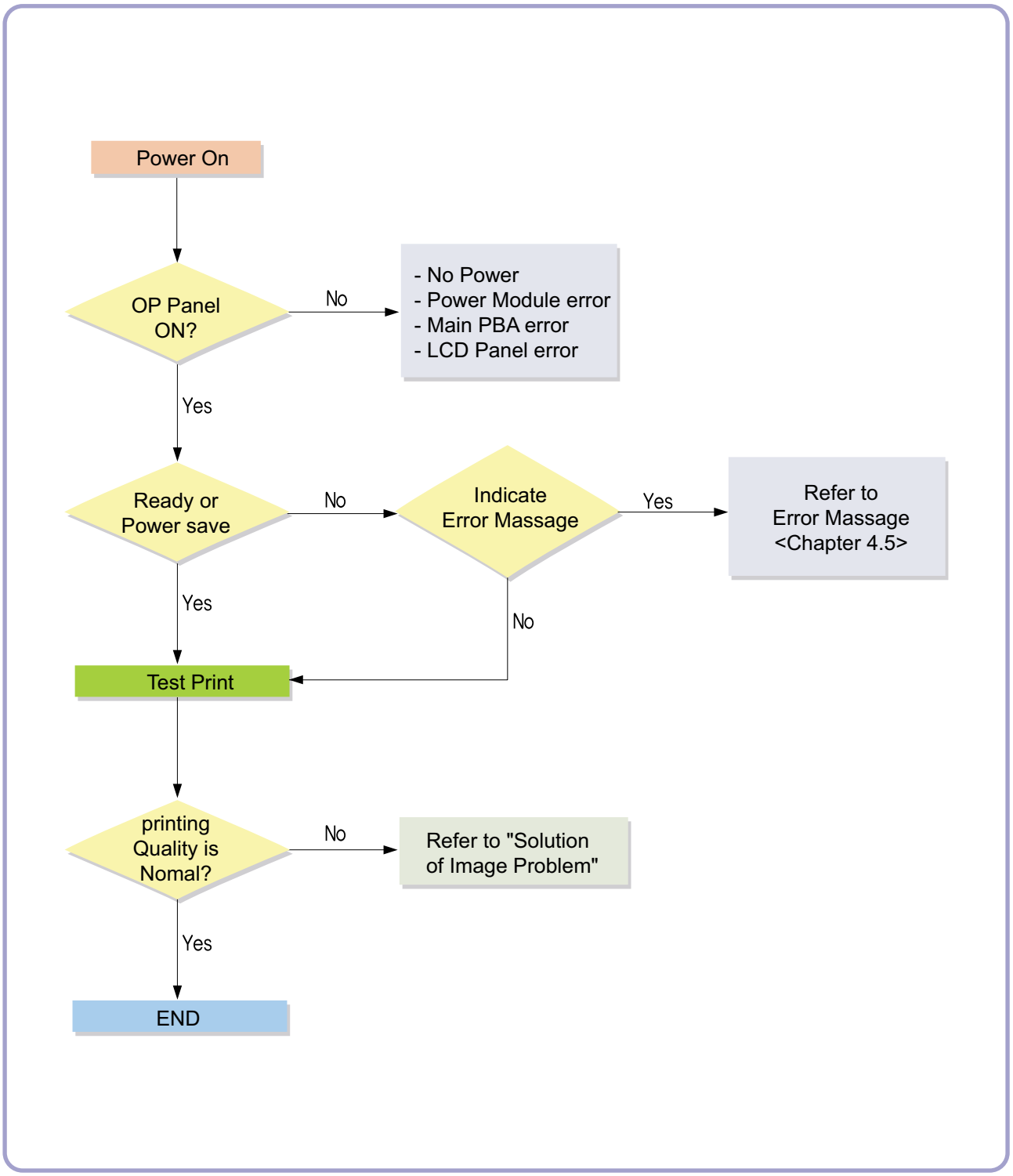
If you intend to delete the current document being printed, the data being transferred to the printer will be put out and then the document is removed. Before choosing the document, the menu is still inactive.

Or put the document out of the list and repeat the routine as in the above or finish the spool manager.

# 6. Troubleshooting

## 6.1 Procedure of Checking the Symptoms

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



# 6.2 The cause and solution of Bad image

## 6.2.1 Vertical Black Line and Band

• **Description** 1. Straight thin black vertical line occurs in the printing.
2. Dark black vertical band occur in the printing.


| Check and Cause | Solution |
|---|---|
| 1. Deformed Doctor-blade or cleaning-blade, in print cartridge | 1. If causes 1 and 2 occur in the print cartridge, replace the print cartridge and try to print out. |
| 2. Scratched surface of the charge roller in the print cartridge. | 2. Replace the transfer roller if occurred as No. 3. |
| 3. Partly depression or deformation on the surface of the transfer roller. | |

## 6.2.2 Vertical White Line

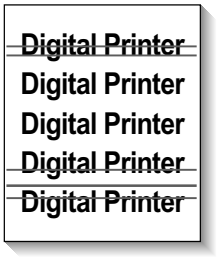
• **Description** White vertical voids in the image.


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

### 6.2.3 Horizontal Black Band

**• Description**

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

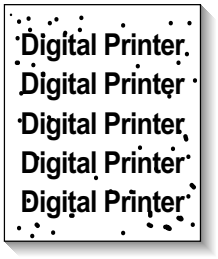



| Check and Cause | Solution |
|---|---|
| 1. Bad contacts of the voltage terminals to print cartridge. | 1. Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (remove the toner particles and paper particles) |
| 2. The rollers of print cartridge may be stained.<br>Charge roller = 38mm<br>Develop roller = 45mm<br>Transfer roller = 55mm<br>OPC Drum = 95mm | 2. Clean the right Gear that has relatively small gap of the teeth in the OPC.<br>3. If the malfunction persists, replace the print cartridge. |

### 6.2.4 Black/White Spot

**• Description**

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




| Check and Cause | Solution |
|---|---|
| 1. If dark or blurry black spots occur periodically, the rollers in the print cartridge may be contaminated with foreign matte or paper particles.<br>( Charge roller : 38 mm interval<br>OPC drum : 95 mm interval) | 1. Run OPC cleaning Mode Print and run the Self-test 2 or 3 times. |
| 2. If faded areas or voids occur in a black image at intervals of 95 mm, or black spots occur elsewhere, the OPC drum surface is damaged. | 2. In case of 95 mm interval unremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster. |
| 3. If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired. | 3. The transfer roller guarantees 150,000 sheets printing in normal environment. If the roller's life is expired, replace it.<br>4. In case of 38 mm interval unremovable in 1, take measures as to replace the print cartridge and try to print out.<br>5. Clean the inside of the set against the paper particles and foreign matter in order not to cause the trouble. |

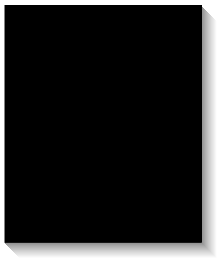
### 6.2.5 Light Image

• **Description** The printed image is light, with no ghost.


| Check and Cause | Solution |
|---|---|
| 1. Develop roller is stained when the toner of print cartridge is almost consumed. | 1. Check if the Toner Save mode is off. Check if the density is light. |
| 2. Ambient temperature is below than 10°C. | 2. No 1 : Replace the print cartridge and try to print out. |
| 3. Bad contact caused by the toner stains between the high voltage terminal in the HVPS and the one in the set. | 3. No 2 : Wait 30 minutes after printer is powered on before you start printing. |
| 4. Abnormal output from the HVPS. (Run self-test and check 1~4) | 4. No3 : Clean up the contaminated area by the toner. |
| 5. Check warranty out. | 5. Replace the HVPS if the problems are not solved by the above four instructions. |
| | 6. Replace print cartridge. |

### 6.2.6 Dark Image or a Black Page

• **Description** The printed image is dark.



| Check and Cause | Solution |
|---|---|
| 1. No charge voltage in the engine board. | 1. Check the state of the connector which connects the engine board and HVPS. |
| 2. Charge voltage is not turned on due to the bad contacts between power supply in the side of the print cartridge and charge terminal of HVPS. | 2. Clean the high voltage charge terminal.<br>3. Replace the HVPS if not solved by the above direction 1 and 2. |
| 3. VD0 signal of the Main PBA is Low state. | 4. Replace the LSU Unit or Main PBA. |
| 4. Case back side the cleaning blade of print cartridge. | 5. Replace print cartridge. |

### 6.2.7 Uneven Density

• **Description** Print density is uneven between left and right.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

| Check 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. | 1. Replace both the left and right Spring Holder. |
| 2. The life of the print cartridge has expired. | 2. Occur in the print cartridge gently shake the print cartridge. |
| 3. The toner level is not even on the print cartridge roller due to the bad blade. | 3.Replace the print cartridge and try to print out. |

### 6.2.8 Background

• **Description** Light dark background appears in whole area of the printing.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

| Check and Cause | Solution |
|---|---|
| 1. Does character exist less than 2% coverage per a page, and hasn't it been used long time? (see the configuration sheet) | 1. The print cartridge is basically designed to print 20,000 pages with 5% coverage. If it prints more than 23,000 pages with 2% coverage, a background can occur. |
| 2. Is a recycled print cartridge be used? | 2. The A/S is not guaranteed if using a recyled the print cartridger. |
| 3. Has the life span of the print cartridge ended? | 3. Replace the print cartridge when the life span of it has been ended. |
| 4. Is the movement(Up and Down) of the transfer roller smooth? | 4. Clean the bushing part of the transfer roller. |
| 5. Is the HVPS normal? | 5. If the problem is still not solved, replace the print cartridge. |

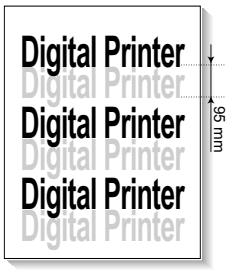
### 6.2.9 Ghost (1)

• **Description** Ghost occurs at 95 mm intervals of the OPC drum in the whole printing.


| Check and Cause | Solution |
|---|---|
| 1. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the electrode of the print cartridge. | 1. Clean the terminals when contaminated by toner particles. |
| 2. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board. | 2. Occur in the print cartridge, replace the print cartridge and try to print out. |
| 3. The life of print cartridge is expired. | 3. Replace the engine board if not solved by the above directions 1-2. |
| 4. Transfer roller lifetime(150,000 sheets) has expired. | 4. If not solved by the direction 3, check the transfer roller lifetime and replace it. |
| 5. Abnormal low temperature(below 10°C). | 5. Wait about 1 hour after power on before using printer. |
| 6. Damaged cleaning blade in the print cartridge. | 6. Occur in the print cartridge, replace the print cartridge and try to print out. |

### 6.2.10 Ghost (2)

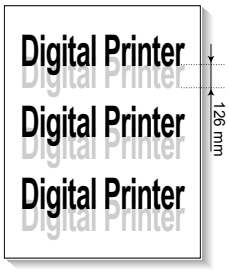
• **Description** Ghost occurs at 95 mm intervals of the OPC drum in the whole printing.
(When printing on card stock or transparencies using manual feeder)




| Check and Cause | Solution |
|---|---|
| When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required. | Select Card stoc or OHP Film on paper type menu from the software application and after using returning to the original mode is recommended. |

### 6.2.11 Ghost (3) : Fuser

• **Description** Ghost occurs at 126 mm intervals.




| Check and Cause | Solution |
|---|---|
| The temperature of the fuser is maintained high. | 1. Disassemble the fuser and remove the contaminated toner particles on the roller and clean the foreign matter between Thermistor and Heat roller. (Caution: can be deformed) |

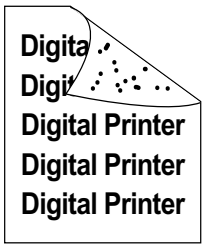
### 6.2.12 Stains on the Face of Page

• **Description** The background on the face of the printed page is stained.


| Check and Cause | Solution |
|---|---|
| 1. Toner leakage due to improperly sealed print cartridge. | 1. Replace the print cartridge, and clean to the toner powder of machine. |
| 2. If the transfer roller is contaminated, stains on the face of page will occur. | 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. |

### 6.2.13 Stains on the Back of Page

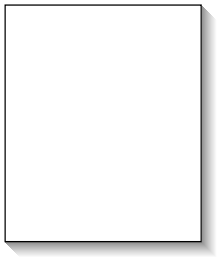
• **Description** The back of the page is stained at 55 or 126 mm intervals.




| Check and Cause | Solution |
|---|---|
| 1. 55mm : Transfer roller is contaminated. | 1.1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination of the transfer roller.<br>1.2. Replace the transfer roller if contaminated severely. |
| 2. 126mm : Pressure roller is contaminated. | 2.1. Perform the fuser cleaning mode print 2 or 3 tiones.<br>2.2. Disassemble the fuser and clean the H/R(Heat Roller) and P/R(Pressure roller). And check the area between H/R and Thermistor. If contaminated, clean the area not to be deformed. |

### 6.2.14 Blank Page Print out (1)

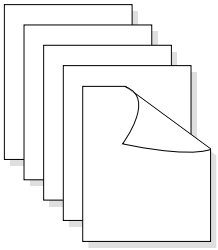
• **Description** Blank page is printed.



| Check and Cause | Solution |
|---|---|
| Bad ground contacts in OPC and/or print cartridge. | 1. Check if the Ground-OPC is defective(set inside left side).<br>2. Remove contamination of the terminals of the print cartridge and the unit. |

### 6.2.15 Blank Page Print out (2)

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



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

# 6.3 The cause and solution of the bad discharge

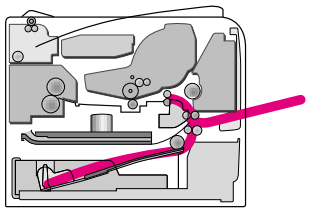
## 6.3.1 Wrong Print Position

• **Description** Printing begins at wrong position on the paper.

| Check and Cause | Solution |
|---|---|
| Wrong sense time caused by defective feed sensor actuator. | Replace the defective actuator |

## 6.3.2 JAM 0

• **Description**
1. Paper is not exited from the cassette.
2. Jam-0 occurs if the paper feeds into the printer.

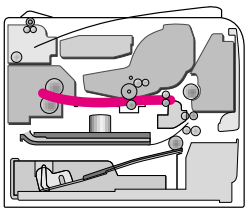


| Check and Cause | Solution |
|---|---|
| 1. Check the Main clutch by using EDC Mode. | 1. Replace the Main clutch. |
| 2. Check if the pad is loose due to bad sealing of the side-pad. | 2. Replace the side-pad Assembly L or R, if necessary. |
| 3. Check the surface of the roller-pick-up for foreign matter. | 3. Clean with soft cloth dampened with IPA(Isopropyl Alcohol) or water. |
| 4. If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup opens or is broken away. | 4. Replace the Main PBA and/or Sensor. |
| 5. If the paper feeds into the printer and Jam 0 occurs, perform EDC Mode to check feed-sensor of the engine board. | |

### 6.3.3 JAM 1

**• 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.

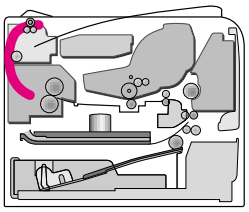


| Check and Cause | Solution |
|---|---|
| 1. If the recording paper is jammed in front of or inside the fuser. | 1. Replace the SMPS or Exit-Sensor.<br>2. Replace the Main PBA. |
| 2. If the recording paper is stuck in the discharge roller and the fuser just after passing through the Actuator-Feed,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

### 6.3.4 JAM 2

**• Description**

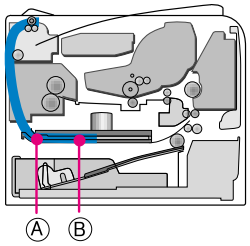
1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.



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

### 6.3.5 Duplex Jam 1

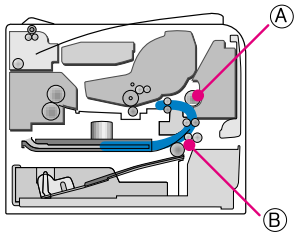
• **Description** A message 'Duplex Jam 1' is displayed in a LCD window.




| Check and Cause | Solution |
|---|---|
| 1. It is a case when a paper cannot operate a duplex sensor.<br>2. It is a case when a paper cannot reach to a duplex sensor due to a paper jam on a duplex path. | 1. Replace a SMPS or main PBA<br>2. A case that a paper jam occurs on (A) after it is reversed: replace a 2nd exit roller after checking its operation.<br>3. A case that a paper jam occurs on (B) after it is reversed: replace a duplex roller after checking its operation |

### 6.3.6 Duplex Jam 0

• **Description** A message 'Duplex Jam 2' is displayed in a LCD window.




| Check and Cause | Solution |
|---|---|
| 1. It is a case that a paper cannot pass a duplex sensor.<br>2. It is a case that a paper cannot reach to a registration sensor after it is passed a duplex sensor. | 1. Replace a SMPS or main PBA.<br>2. A case that a leading edge of a paper is jammed on (A) check an operation of a guide front. If it is worn or defective, replace it.<br>3. Check an operation of a feed roller and a registration roller. If they are worn or defective replace them. |

### 6.3.7 Multi-Feeding

• **Description** Multiple sheets of paper are fed at once.

| Check and Cause | Solution |
|---|---|
| 1. Check the Guide side L/R or Guide Rear in the Cassette, if the position is correct. | 1. Replace the solenoid if necessary. |
| 2. Solenoid malfunction(the solenoid does not work properly): Perform EDC Mode. | 2. Replace the Main PBA. |
| 3. Pad-Friction is contaminated with foreign matter.(oil...) | 3. Clean the pad friction with soft cloth dampened with IPA(Isopropyl Alcohol). |
| 4. The face of paper is blended. | 4. Use the smooth paper. |

### 6.3.8 Paper rolled in the fuser

• **Description** If contaminated at intervals of 57mm on the back of a paper.

| Check and Cause | Solution |
|---|---|
| 1. Contamination of the pressure roller or heat roller (Background, Hot off set). | 1. After disassembling the fuser, clean contamination between the heat roller and the thermostor and remove the contamination of the pressure roller. |
| 2. Check the claw of the fuser whether it is deformed. | 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 separation of the print claw and the holder plate claw, and then manage it. |

### 6.3.9 Paper rolled on the OPC Drum

• **Description** Paper is rolled up in the OPC.

| Check and Cause | Solution |
|---|---|
| 1. Paper is too much thin.<br><br>2. The face of paper is curled. | 1. Recommend to use normal paper.<br><br>2. How to remove the rolled paper in the OPC.<br>• Remove the paper while turning the OPC against the ongoing direction.<br>• Clean fingerprints on the OPC softly with soft cloth dampened with tissue. |

# 6.4 The cause and solution of the malfunction

## 6.4.1 Fuser Error

• **Description** A message “Engine Fuser Low Heat Error/Engine Fuser Over Heat Error” is displayed in a LCD panel.

| Check and Cause | Solution |
|---|---|
| 1. Check whether a thermostat, open or not. | 1. Replace the fuser if a thermostat is open. |
| 2. Check whether a thermistor is open or not. | 2. Replace the fuser if a thermistor sensor is located deep inside of a sponge. |
| 3. Heat lamp ON/OFF test | 3. Check whether the overheat mode circuit operates normally or not. |
| 4. It could not operate due to a gear of a fuser is melted. | 4. Replace the fuser. |

## 6.4.2 LSU Error

• **Description** A message “Engine Hsyne Error” is displayed in a LCD panel.

| Check and Cause | Solution |
|---|---|
| 1. Check whether the LSU connector is disconnected or not. | 1. Connect the LSU harness properly. |
| 2. Check whether the LSU motor is rotating or not. | 2. Replace a LSU. |
| 3. Check the HSYNC signal. | 3. Replace a main board if the same error occurs again after replacing a LSU. |

### 6.4.3 Not function of the gear of the fuser due to melting away

• **Description** The motor breaks away from its place due to gear melting away.

| Check and Cause | Solution |
|---|---|
| 1. Check the Fuser Unit. | 1. Replace the Fuser.<br>2. Replace the Main PBA.<br>2. Replace the SMPS. |

### 6.4.4 Paper Empty

• **Description** The paper lamp on the operator panel is on even when paper is loaded in the cassette.

| Check and Cause | Solution |
|---|---|
| 1. Bending or deformation of the actuator of the paper sensor. | 1. Replace the defective actuator. |
| 2. The function of the engine board is defective | 2. Replace the empty sensor PBA. |
| 3. Check the connector and harness. | |

### 6.4.5 Paper Empty without indication

| | |
|---|---|
| • **Description** | A message “Paper Empty” is displayed in a LCD panel.<br>The paper lamp on the operator panel does not come on when the paper cassette is empty. |

| Check and Cause | Solution |
|---|---|
| 1. Bending or deformation of the actuator of the paper sensor. | 1. Replace the defective actuator. |
| 2. Check the Main board. | 2. Replace the board which has a trouble. |
| 3. Check the empty sensor board. | |
| 4. Check the toner sensor board. | |

### 6.4.6 Cover Open

| | |
|---|---|
| • **Description** | A message “Colse Top Cover” is displayed in a LCD panel.<br>The ERROR lamp is on even when the print cover is closed. |

| Check and Cause | Solution |
|---|---|
| 1. The hook lever in the top cover may be defective. | 1. Replace the hook lever, if defective. |
| 2. Check the main board | 2. Check the insertion of the cover open S/W connect. |
| 3. Check the cover open board. | 3. Replace the main board or cover open board. |
| 4. Check the harness and connection. | |

### 6.4.7 No error message when the cover is open

• **Description** The ERROR message does not come on even when the printer cover is open

| Check and Cause | Solution |
|---|---|
| 1. Check the cover open circuit on the main board.<br><br>2. Check the cover open board. | 1. Check the insertion of the cover open S/W connect.<br><br>2. Replace the main control board or cover open board. |

### 6.4.8 Defective motor operation

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

| Check and Cause | Solution |
|---|---|
| 1. The motor harness or motor PCB may be defective. | 1. Replace the motor unit. |
| 2. Check the motor operation in the EDC mode. | 2. Replace the main PBA. |

### 6.4.9 No Power

• **Description** When system power is turned on, all lamps on the operator panel do not come on.

| Check and Cause | Solution |
|---|---|
| 1. Check if the power input and SMPS output are normal. | 1. Replace the SMPS. |
| 2. Check the inferiority of LED-Panel or LDC window on the front-cover if the OP panel does not appear after normal warming-up. | 2. Replace the control board. |

### 6.4.10 Vertical Line Getting Curved

• **Description** When printing, vertical line gets curved.

| Check and Cause | Solution |
|---|---|
| 1. If the supply of +24v is unstable in the main control board linking with LSU, check drive by EDC mode: LSU check. | 1. Replace LSU. |
| 2. Chect the deve PBA in the print cartridge. | 2. Replace the toner sensor PBA.<br>2. Replace the main PBA. |

# 6.5 Maintaining the toner cartridge

### Toner cartridge storage

To get the most from the toner cartridge, keep the following guidelines in mind:

- Do not remove the toner cartridge from its package until ready for use.
- Do not refill the toner cartridge. The printer warranty does not cover damage caused by using a refilled cartridge.
- Store toner cartridge in the same environment as the printer.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minute.

### Expected cartridge life

The life of the toner cartridge depends on the amount of toner that print jobs require. When printing text at ISO 19752 5% coverage, a new toner cartridge lasts an average of either 20,000 or 10,000 pages. (The original toner cartridge supplied with the printer lasts an average of 10,000 pages.) The actual number may also be different depending on the print density of the pages you print on, and the number of pages may be affected by operating environment, printing interval, media type, and media size. If you print a lot of graphics, you may need to change the cartridge more often.

### Saving toner

To save toner, press Toner Save on the control panel. The button backlight turns on.
Using this feature extends the life of the toner cartridge and reduce your cost per page, but it also reduces print quality.

## 6.5.1 Checking the remaining toner

You can check the level of toner left in the cartridge.
If you are having print quality problems, this can help you determine if the problem is caused by low toner.

Following the key formation at the panel, note the toner remaining level on the cartridge information after taking out the configuration sheet. In other way to check, follow the TECH mode and out put the cartridge information.

The display shows the percentage of the remaining toner.

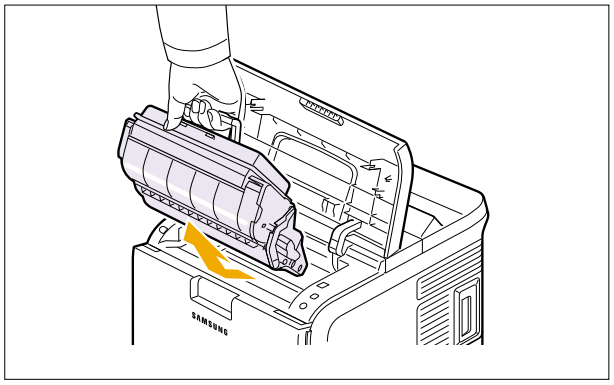
## 6.5.2 Redistributing toner cartridge

When the toner cartridge is near the end of its life:

- White streaks and light printing occur.
- Toner Low appears on the display.
- The Smart Panel program window appears on the computer telling you that the toner level is low.
- The Status LED blinks red. If this happens, you can temporarily reestablish print quality by redistributing the remaining toner in the cartridge. In some cases, white streaks or light printing will still occur even after you have redistributed the toner.

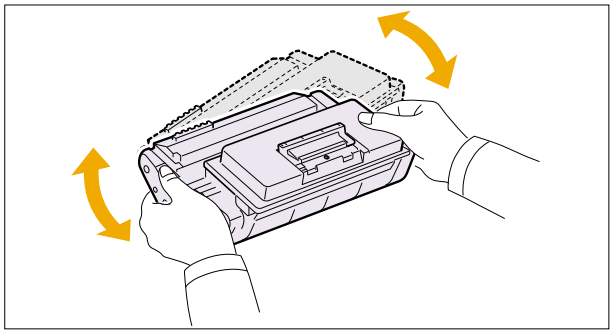
1. Open the top cover.

2. Pull the toner cartridge out.



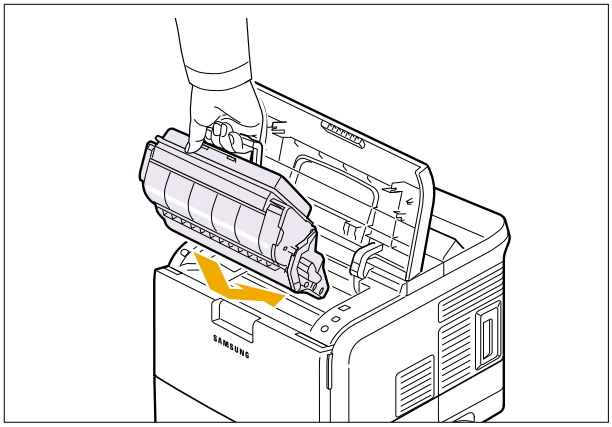
**Caution :**
- Avoid reaching too far into the printer. The fusing area may be hot.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minutes. Cover it with a piece of paper, if necessary.
- Do not touch the green surface underside of the toner cartridge. Use the handle on the cartridge to avoid touching this area.

3. Thoroughly shake the cartridge 5 or 6 times to distribute the toner evenly inside the cartridge.



**Note :** If toner gets on your clothing, wipe it off with a dry cloth and wash clothing in cold water. Hot water sets toner into fabric.

4. Hold the toner cartridge by the handle and slowly insert the cartridge into the opening in the printer. Tabs on the sides of the cartridge and corresponding grooves within the printer will guide the cartridge into the correct position until it locks into place completely.



5. Close the top cover. Make sure that the cover is securely closed.

### 6.5.3 Replacing the toner cartridge

When the toner cartridge is completely empty:

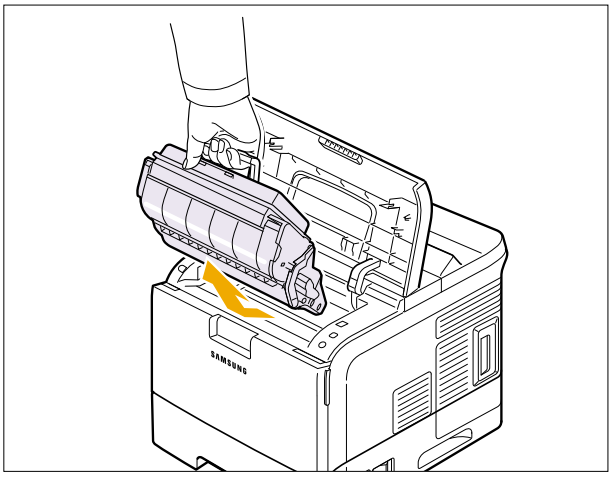
- Replace Toner appears on the display.
- The Smart Panel program window appears on the computer telling you that the toner cartridge is empty.
- The Status LED lights red.

At this stage, the toner cartridge needs to be replaced. For order information for toner cartridges,

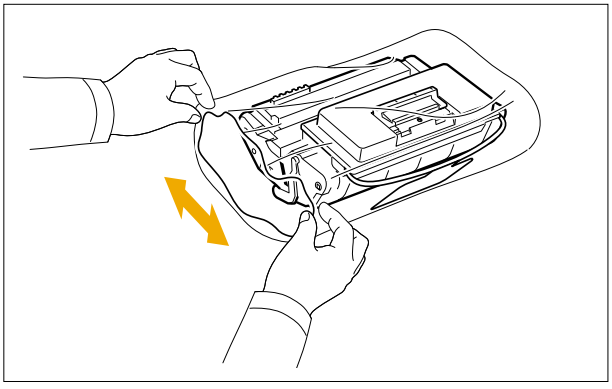
**Note :** This feature does not work for the Toner Empty message.

1. Open the top cover.

2. Pull the toner cartridge out.

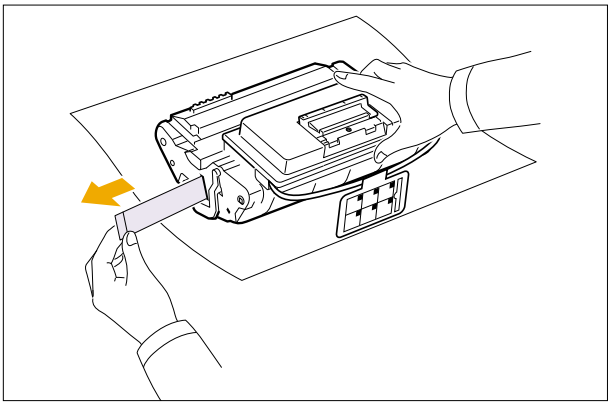



3. Remove the new toner cartridge from its bag.



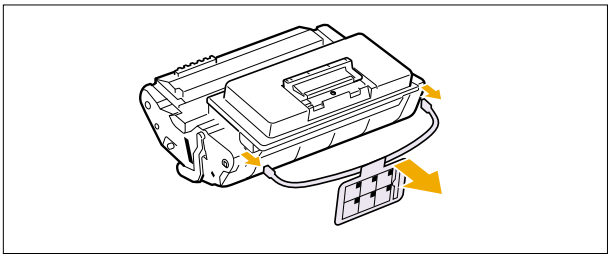
**Caution :** Do not use sharp objects, such as a knife or scissors, to open the toner cartridge package. They might scratch the drum of the cartridge.

4. Locate the sealing tape at the end of the toner cartridge. Carefully pull the tape completely out of the cartridge and discard it.

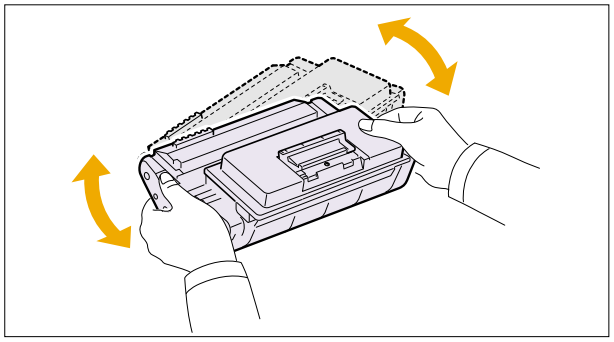


**Note :**
- The sealing tape should be longer than 60 cm when correctly removed.
- Holding the toner cartridge, pull the sealing tape straight to remove it form the cartridge. Be careful not to cut the tape. If this happens, you cannot use the toner cartridge.
- Refer to the helpful pictures on the cartridge wrapping paper.

5. Remove the flexible plastic holder out of the toner cartridge.



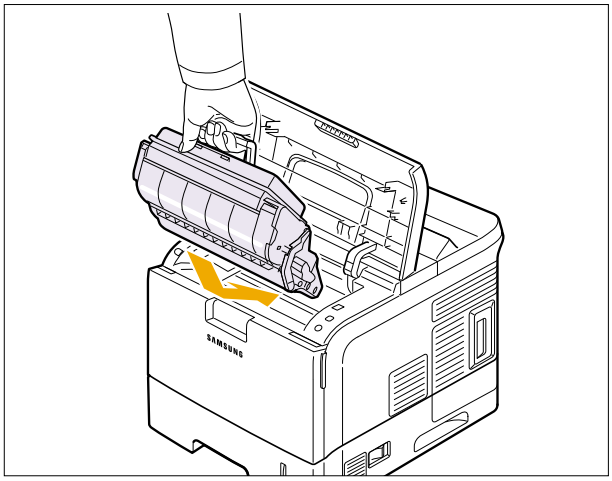
6. Thoroughly shake the cartridge 5 or 6 times to distribute the toner evenly inside the cartridge.



Thoroughly roll the cartridge to assure maximum copies per cartridge. Save the box and the plastic bag for shipping.

**Caution :**
- If toner gets on your clothing, wipe it off with a dry cloth and wash clothing in cold water. Hot water sets toner into fabric.
- To prevent damage to the toner cartridge, do not expose it to light for more than a few minutes. Cover it with a piece of paper, if necessary.
- Do not touch the green surface underside of the toner cartridge. Use the handle on the cartridge to avoid touching this area.

7. Hold the toner cartridge by the handle and slowly insert the cartridge into the opening in the printer. Tabs on the sides of the cartridge and corresponding grooves within the printer will guide the cartridge into the correct position until it locks into place completely.




8. Close the top cover. Make sure that the cover is securely closed.

## 6.5.4 Toner Cartridge-related messages

| Message | Meaning | Suggested solutions |
|---|---|---|
| Install Toner | A toner cartridge is not installed. | Install a toner cartridge. |
| Invalid Toner | The toner cartridge you have installed is not for your printer. | Install a Samsung -genuine toner cartridge ,designed for your printer. |
| Toner Low | The toner cartridge is almost empty. | Take out the toner cartridge and thoroughly shake it.By doing this,you can temporarily reestablish printing operations. |
| NonGenuine Toner<br>◀ Stop ▶ | The toner cartridge installed is not a genuine cartridge. | You can select either Stop or Continue.If you do not select any,the printer will work as Stop is selected.<br>If you select Stop, you cannot print until the genuine cartridge is installed.However, you can still print any kind of reports.<br>If you select Continue, you can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>If you want to change the selection, turn the printer off and on to have this message appear again, and then re-select Stop or Continue. |
| NonGenuine Toner<br>Replace Toner1 | The toner cartridge installed is not a genuine cartridge. | This message appears when you selected Stop at the NonGenuine Toner prompt.<br>Install the genuine toner cartridge. |
| NonGenuine Toner<br>Replace Toner | The toner cartridge installed is not a genuine cartridge. | This message appears when you selected Continue at the NonGenuine Toner prompt.<br>Install the genuine toner cartridge. |
| Toner Low<br>Replace Toner | The toner in the cartridge has run out. | Install a new genuine toner cartridge.<br>You can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>You can configure not to see the Toner Low Replace Toner message. |
| Replace Toner | The toner cartridge installed is not a genuine cartridge. | This message appears when you turned off the Toner Low Replace Toner message.<br>Install a new genuine toner cartridge.<br>You can keep printing but the quality cannot be guaranteed, and the product support is no longer provided. |
| Toner Exhausted<br>◀ Stop ▶ | The lifespan of the toner cartridge is reached. | You can select either Stop or Continue. If you do not select any, the printer will work as Stop is selected.<br>If you select Stop, you cannot print until the genuine cartridge is installed.<br>If you select Continue, you can keep printing but the quality cannot be guaranteed, and the product support is no longer provided.<br>If you want to change the selection, turn the printer off and on to have this message appear again, and then re-select Stop or Continue. |
| Toner Exhausted<br>Replace Toner1 | The lifespan of the toner cartridge is reached. | This message appears when you selected Stop at the Toner Exhausted prompt.<br>Install the genuine toner cartridge. |
| Toner Exhausted<br>Replace Toner | The lifespan of the toner cartridge is reached. | This message appears when you selected Continue at the Toner Exhausted prompt.<br>Install the genuine toner cartridge. |

## 6.6 The cause and solutions of bad environment of the software

### 6.6.1 The printer is not working (1)

• **Description** While Power turned on, the printer is not working in the printing mode.

| Check and Cause | Solution |
|---|---|
| 1. Run Self-Test Mode: Turn the power on while pressing the test printing button for 2 or 3 seconds before printing works. | 1.Check the power of the printer and perform the Self-Test. If the test printing works, that means no problems in the printer itself. If the test printing does not work, that means bad functioning of the printer(not because of software). |
| 2. Check if the PC and the printer is properly connected and the print cartridge installed. | 2. Replace the printer cable. If the problems not solved even after the cable replaced, check the amount of the remaining tone. (refer to print cartridge Service 4-5) |
| 3. Printing is nor working in the Windows. | 3. Check if the connection between PC and printer port is proper. If you use windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check in which program the printing is not working. The best way to find out is to open the memo pad to check the function of printing. If it is not working in a certain program, adjust the setup the program requires. Sometimes, the printout is normal within the Windows basic programs, but it's not working in a particular program. In such case, install the new driver again. If not working in the Windows basic program, Check the setup of the port of CMOS is on ECP. And check the address of IRQ 7 and 378 |
| 4. Check if the printer cable is directly connected to peripheral devices | 4. If the scanner needs to be connected to the printer, first the remove the scanner from the PC to see if the printer is properly working alone. |

### 6.6.2 The printer is not working (2)

**• Description** After receiving the printing order, no response at all or the low speed of printing occurs due to wrong setup of the environment rather than malfunction of the printer itself.

| Check and Cause | Solution |
|---|---|
| 1. Secure more space of the hard disk. | 1. Not working with the message 'insufficient printer memory' means hard disk space problem rather than the RAM problem. In this case, provide more space for the hard disk. Secure more space using the disk utilities program. |
| 2. Printing error occurs even if there is enough space in the hard disk. | 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 rightly set up. |
| 3. Check the parallel-port-related items in the CMOS Setup. | 3. As a printer port, Select ECP or SPP among SPP(Normal), ECP, and EPP modes(increase printing speed) SPP normal mode support 8-bit data transfer, while ECP Mode transfer the 12-bit data. |
| 4. Reboot the system to print. | 4. If the regular font is not printing, the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one. |

### 6.6.3 Abnormal Printing

| | |
|---|---|
| • **Description** | The printing is not working properly even when the cable has no problem.<br>(even after the cable is replaced)<br>If the printer won't work at all or the strange fonts are repeated, the printer driver may be defective or wrong setup in the CMOS Setup. |

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

### 6.6.4 SPOOL Error

| | |
|---|---|
| • Description | To spool which stands for "simultaneous peripheral operations online" a computer document or task list (or "job") is to read it in 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). |

| Check and Cause | Solution |
|---|---|
| 1. Insufficient space of the hard disk in the directory assigned for the basic spool. | 1. Delete the unnecessary files to provide more space to start printing job. |
| 2. If the previous printing error not solved. | 2. If there are some files with the extension name of ****.jnl, Delete them and Reboot the Windows to restart printing job. |
| 3. When expected to collide with other program. | 3. Shut down all other programs except the current one, if possible. |
| 4. When an application program or the printer driver is damaged. | 4. Delete the printer driver completely and reinstall it. |
| 5. When some files related to OS are damaged or virus infected. | 5 After rebooting the computer, check for viruses, restore the damaged files and reinstall the program to do the printing job. |
| 6. Memory is less than suggested one. | 6. Add up enough memory to the PC. |

**How to delete the data in the spool manager.**

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 put out and then the document is removed. Before choosing the document, the menu is still inactive.

Or put the document out of the list and repeat the routine as in the above or finish the spool manager.

# 7. Exploded Views and Parts List (ML-4550 Series)

## Contents



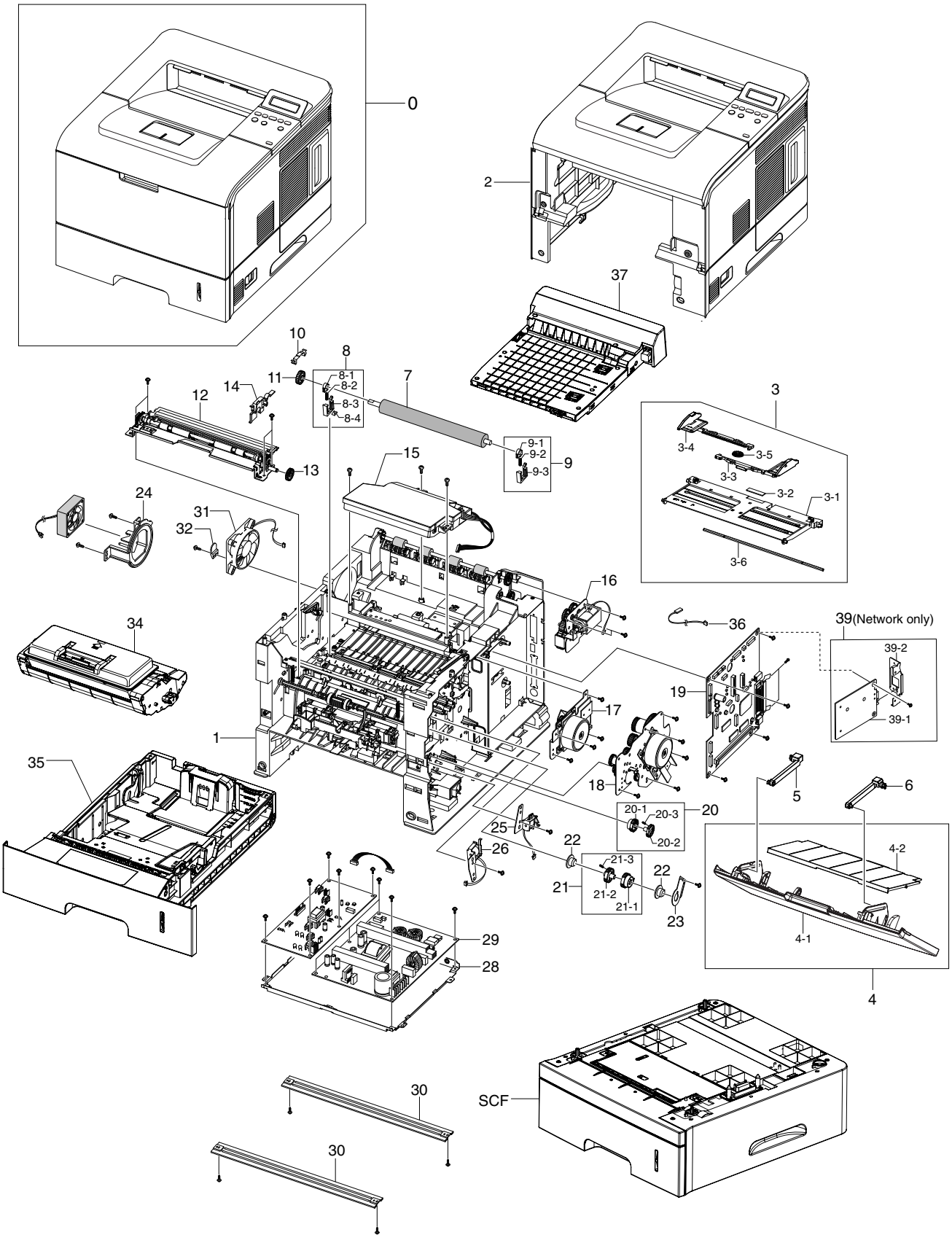
## DIGITAL LASER PRINT

## CONTENTS

**[The keynote of Product]**

- Series Model: ML-4550 / 4551N / 4551ND
- High speed Laser Printer:
  Up to 43 ppm in A4 (45 ppm in Letter),
  Duplex: 29 ipm (A4); 30 ipm (Letter)
- Resolution: Up to 1200 x 1200 dpi
- Marvell 500Mhz
- Memory: 128 MB (Max. 512 MB)
  128, or 256 MB optional memory available.
  Use only the Samsung-approved DIMM.
  128 MB: ML-MEM150, 256 MB: ML-MEM160
- Option:
  ML-4550:500-sheet trays, ethernet 10/100 Base TX wired LAN, ethernet 10/100 Base hard disk, duplex unit, DIMM
- Toner cartridge:
  · Starter: 10K or 20K pages
  · Consumable: 10K or 20K pages
- Duty cycle: Monthly Up to 150,000 pages

# 7.1 Main Assembly



# Service Parts List(ML-4551N/ND/NDR)

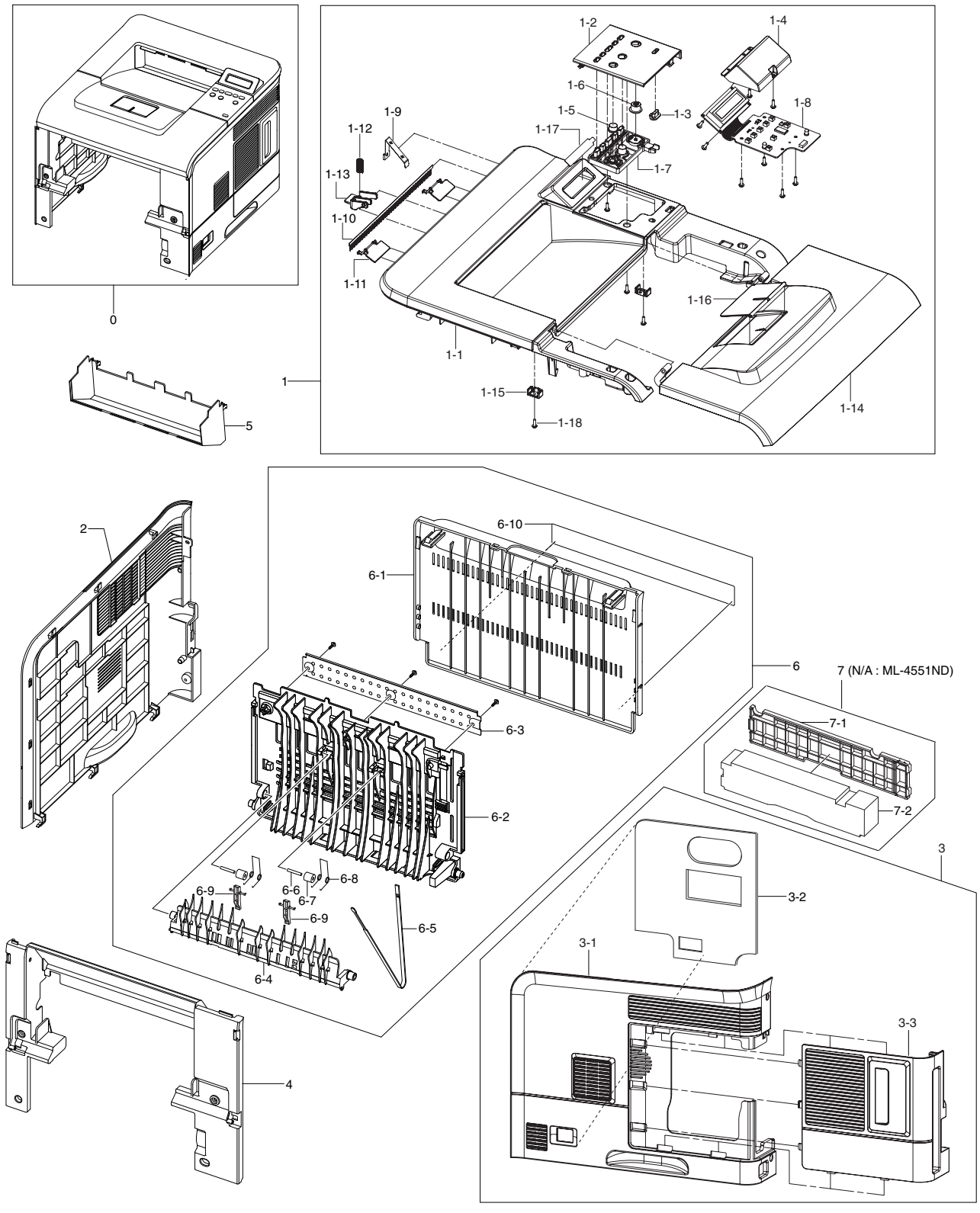
Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.1-0 | ML-4550 | MONO LASER,43PPM/A4 | | 1 | - | |
| 7.1-0 | ML-4551N | MONO LASER,43PPM/A4,NETWORK | | 1 | - | |
| 7.1-0 | ML-4551ND | MONO LASER,43PPM/A4,NETWORK,DUPLEX | | 1 | - | |
| 7.1-1 | JC96-04004A | ELA UNIT-FRAME BASE | | 1 | SA | 110V |
| 7.1-1 | JC96-04004B | ELA UNIT-FRAME BASE | Z4398 | 1 | SA | 220V |
| 7.1-2 | JC96-04064A | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4551N |
| 7.1-2 | JC96-04064B | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4551ND |
| 7.1-2 | JC96-04064E | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4551NDR |
| 7.1-2 | JC96-04064C | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4550R,4551NR |
| 7.1-3 | JC97-02230B | MEA UNIT-KNOCK_UP MP | G0470 | 1 | SA | |
| 7.1-3 | JC97-02230D | MEA UNIT-KNOCK_UP MP | G0470 | 1 | SA | ML-4551NDR |
| 7.1-3-1 | JC61-01251B | PLATE-M_KNOCK UP MP | W3027 | 1 | SA | |
| 7.1-3-1 | JC61-01251C | PLATE-M_KNOCKUP MP | W3027 | 1 | SA | ML-4551NDR |
| 7.1-3-2 | JC74-00011A | MPR-PAD KNOCK UP MP | O1109 | 1 | SA | |
| 7.1-3-3 | JC72-01006B | PMO-SIDE GUIDE MP(R) | G2301 | 1 | SA | |
| 7.1-3-4 | JC72-01005B | PMO-SIDE GUIDE MP(L) | G2299 | 1 | SA | |
| 7.1-3-5 | JG66-40003A | GEAR-PINION | O1127 | 1 | SA | |
| 7.1-3-6 | JC66-00895A | SHAFT-REINFORCEMENT | Z4400 | 1 | SNA | |
| 7.1-4 | JC97-02231A | MEA UNIT-COVER MP_SEC | E4062 | 1 | SA | |
| 7.1-4 | JC97-02231D | MEA UNIT-COVER MP | E4062 | 1 | SA | ML-4551NDR |
| 7.1-4-1 | JC63-00695A | COVER-M-MP_SEC | Z4401 | 1 | SNA | |
| 7.1-4-1 | JC63-00695D | COVER-M_MP | Z4401 | 1 | SNA | ML-4551NDR |
| 7.1-4-2 | JC63-00691B | TRAY-M_EXTEND_MP | K4281 | 1 | SA | |
| 7.1-4-2 | JC63-00691C | TRAY-M_EXTEND_MP | K4281 | 1 | SA | ML-4551NDR |
| 7.1-5 | JC63-00694B | TRAY-M_LINK MP(L) | K4282 | 1 | SA | |
| 7.1-6 | JC63-00689B | TRAY-M_LINK MP(R) | K4283 | 1 | SA | |
| 7.1-5 | JC63-00694C | TRAY-M_LINK MP(L) | K4282 | 1 | SA | ML-4551NDR |
| 7.1-6 | JC63-00689C | TRAY-M_LINK MP(R) | K4283 | 1 | SA | ML-4551NDR |
| 7.1-7 | JC66-00540B | ROLLER-TRANSFER | Z4402 | 1 | SA | |
| 7.1-8 | JC96-01729A | ELA UNIT-HOLDER TR R | K3139 | 1 | SA | |
| 7.1-8-1 | JC72-41142A | PMO-BUSHING TR | Z4403 | 1 | SNA | |
| 7.1-8-2 | JC61-00046A | SPRING ETC-TR R HAWK | Z4404 | 1 | SNA | |
| 7.1-8-3 | JC72-41145C | PMO-TRANSFER HOLDER R | Z4405 | 1 | SNA | |
| 7.1-8-4 | JC70-11053A | IPR-PLATE TR | Z4406 | 1 | SNA | |
| 7.1-9 | JC96-01730B | ELA UNIT-HOLDER_TR_L | Z6106 | 1 | SA | |
| 7.1-9-1 | JC72-41142A | PMO-BUSHING TR | Z4403 | 1 | SNA | |
| 7.1-9-2 | JC61-00046A | SPRING ETC-TR R HAWK | Z4404 | 1 | SNA | |
| 7.1-9-3 | JC72-41145F | PMO-TRANSFER HOLDER L | Z4407 | 1 | SA | |
| 7.1-10 | JC72-41292B | PMO-CAP TR | Z0015 | 1 | SA | |
| 7.1-11 | JC66-00039A | GEAR-TR29 | G0439 | 1 | SA | |
| 7.1-12 | JC96-03959A | ELA UNIT-REGI | Z4408 | 1 | SA | |
| 7.1-13 | JC66-00420A | GEAR-REGI Z25 | G0415 | 1 | SA | |
| 7.1-14 | JC67-00039A | CAP-M-GEAR | C1013 | 1 | SA | |
| 7.1-15 | JC96-04066A | ELA UNIT-LSU | Z4409 | 1 | SA | |
| 7.1-16 | JC96-03426A | ELA UNIT-EXIT SOL | K3059 | 1 | SA | |
| 7.1-17 | JC96-03408A | ELA UNIT-DEVE MOTOR | K3057 | 1 | SA | |
| 7.1-18 | JC96-04063A | ELA UNIT-MAIN | Z4410 | 1 | SA | |
| 7.1-19 | JC96-04109A | ELA HOU-MAIN | Z4411 | 1 | SNA | |
| 7.1-19-1 | JC92-01823A | PBA MAIN-CONTROLLER | Z4412 | 1 | SA | |
| 7.1-19-2 | JC92-01824A | PBA MAIN-DIMM | Z4413 | 1 | SA | |
| 7.1-20 | JC97-02226A | MEA UNIT-GEAR PICK UP | G0468 | 1 | SA | |
| 7.1-20-1 | JC66-00870A | GEAR-M-PICK UP CAM | Z4414 | 1 | SNA | |
| 7.1-20-2 | JC66-00876A | GEAR-M-PICK UP | Z4415 | 1 | SNA | |
| 7.1-20-3 | JC61-00003A | SPRING ETC--CAM MP | S0020 | 1 | SA | |
| 7.1-21 | JC97-01738A | MEA UNIT-GEAR P/UP MP CARDINA | G0467 | 1 | SA | |
| 7.1-21-1 | JC66-00424A | GEAR-MP HOLDER_CAM | H4008 | 1 | SA | |
| 7.1-21-2 | JC66-00423A | GEAR-MP PICK_UP | P2055 | 1 | SA | |
| 7.1-21-3 | JC61-00003A | SPRING ETC--CAM MP | S0020 | 1 | SA | |
| 7.1-22 | JC66-10202A | BEARING-PICK UP | B0003 | 1 | SA | |
| 7.1-23 | JC61-00755A | BRACKET-P-SHAFT MP | S4013 | 1 | SA | |
| 7.1-24 | JC61-01735A | HOLDER-FAN | Z4416 | 1 | SA | |
| 7.1-25 | JC33-00012A | SOLENOID-MAIN | S8015 | 1 | SA | |
| 7.1-26 | JC33-00016A | SOLENOID-MP | S8016 | 1 | SA | |
| 7.1-27 | JC96-04121A | ELA UNIT-DEVE_ERASER | Z4417 | 1 | SA | |
| 7.1-28 | JC63-01133A | SHIELD-SMPS | Z4418 | 1 | SNA | |
| 7.1-29 | JC96-04003B | ELA HOU-SMPS_HVPS_V2 | Z4419 | 1 | SA | 220V |

Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.1-29 | JC96-04003A | ELA HOU-SMPS_HVPS_V1 | Z4419 | 1 | SA | 110V |
| 7.1-30 | JC71-00042A | BAR-P_CROSS BOTTOM | K2861 | 2 | SA | |
| 7.1-31 | JC31-00050A | FAN | Z4425 | 1 | SA | |
| 7.1-32 | JC61-00667A | STOPPER-M-FAN80 | F5029 | 1 | SA | |
| 7.1-33 | JC61-01760A | HOLDER-ERASER | Z4421 | 1 | SA | |
| 7.1-34 | JC96-03963A | ELA UNIT-DEVE | Z4422 | 1 | SNA | |
| 7.1-35 | JC96-04015A | ELA UNIT-CASSETTE | Z4423 | 1 | SA | |
| 7.1-35 | JC96-04015B | ELA UNIT-CASSETTE | Z4423 | 1 | SA | ML-4551NDR |
| 7.1-36 | JC92-01839A | PBA-ERASE_LAMP | Z4424 | 1 | SA | |
| 7.1-37 | JC96-03412C | ELA UNIT-DUPLEX | Z6089 | 1 | SA | |
| 7.1-37 | JC96-03412E | ELA UNIT-DUPLEX | Z6089 | 1 | SA | ML-4551NDR |
| 7.1-38 | JC31-00050A | FAN | Z4425 | 1 | SA | |
| 7.1-39 | JC96-03586A | ELA HOU-EMBEDDED_MAC | Z4426 | 1 | SNA | |
| 7.1-39-1 | JC92-01700B | PBA SUB-NPC_PRT | Z4427 | 1 | SA | |
| 7.1-39-2 | JC61-00809A | BRACKET-_M_NPC | B0005 | 1 | SNA | |
| Replacement | - | CBF-POWER CORD | | | SA | |
| Replacement | - | BOX-MAIN | | | SA | |

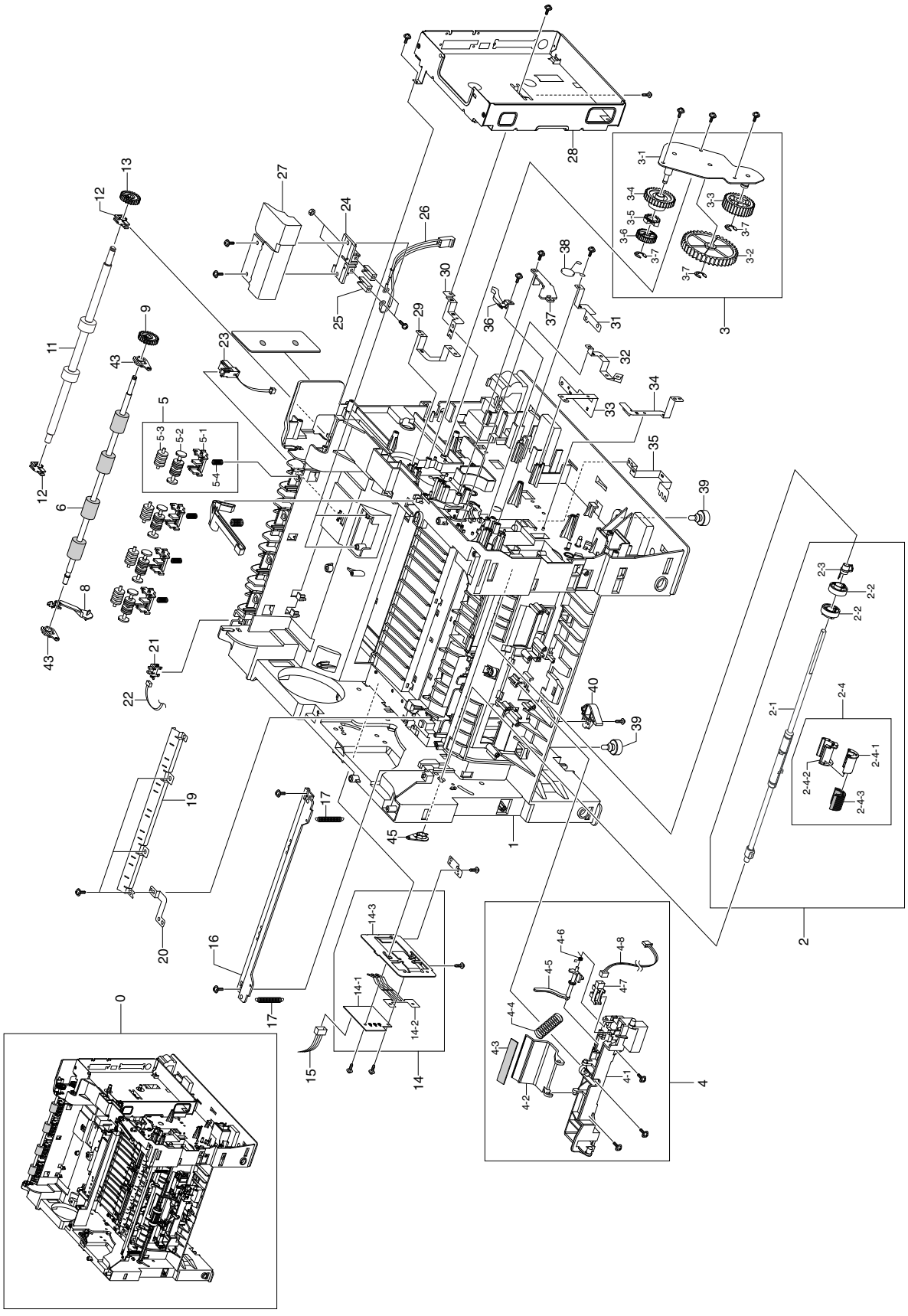
# 7.2 Cover Assembly



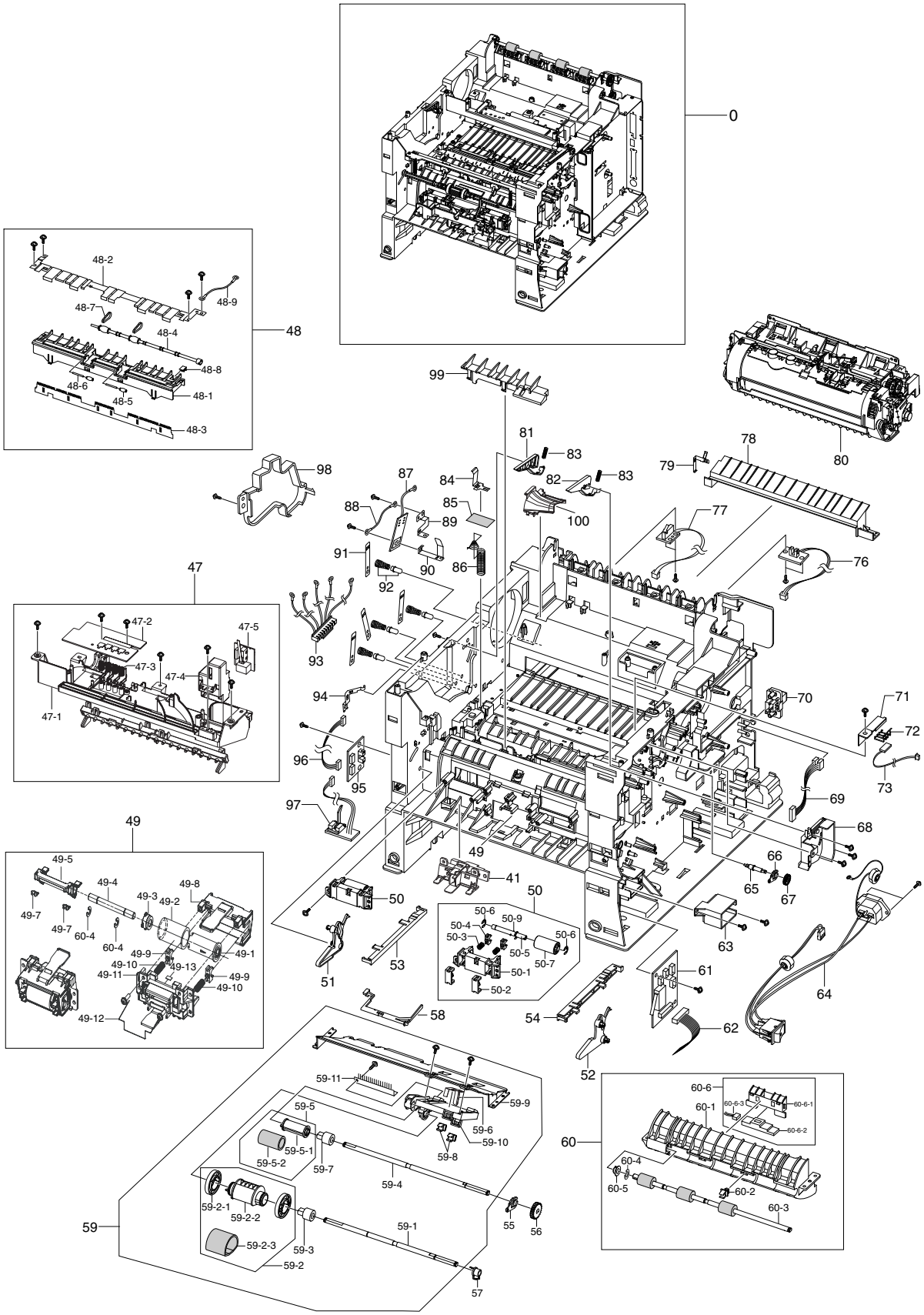
Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.2-0 | JC96-04064A | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4550 |
| 7.2-0 | JC96-04064B | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4551ND |
| 7.2-0 | JC96-04064E | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4551NDR |
| 7.2-0 | JC96-04064C | ELA HOU BASE-HOUSING | Z4399 | 1 | SNA | ML-4550R,4551NR |
| 7.2-1 | JC96-03978A | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4550 |
| 7.2-1 | JC96-03978B | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4550 |
| 7.2-1 | JC96-03978C | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4551ND |
| 7.2-1 | JC96-03978W | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4551NDR |
| 7.2-1 | JC96-03978U | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4551NR |
| 7.2-1 | JC96-03978Q | ELA UNIT-COVER TOP | Z6090 | 1 | SA | ML-4550R |
| 7.2-1-1 | JC63-00699B | COVER-M_TOP | Z4429 | 1 | SNA | |
| 7.2-1-1 | JC63-00699B | COVER-M_TOP | Z4429 | 1 | SNA | |
| 7.2-1-1 | JC63-00699C | COVER-TOP | Z4429 | 1 | SNA | ML-4551NDR |
| 7.2-1-2 | JC63-01101A | COVER-M_OPEN | Z4430 | 1 | SA | |
| 7.2-1-2 | JC63-01101B | COVER-M_OPEN | Z4430 | 1 | SA | ML-4551NDR |
| 7.2-1-3 | JC72-01367B | PMO-STACKER_RX | L6055 | 1 | SA | |
| 7.2-1-3 | JC72-01367C | PMO-STACKER_RX | L6055 | 1 | SA | ML-4551NDR |
| 7.2-1-4 | JC66-00902B | LEVER-M_STACKING 38 | L3019 | 2 | SA | |
| 7.2-1-4 | JC66-00902C | LEVER-STACKING | L3019 | 2 | SA | ML-4551NDR |
| 7.2-1-5 | JC61-00656A | STOPPER-M-HINGE OPEN | H3073 | 2 | SA | |
| 7.2-1-6 | JC63-01100C | COVER-OP PANEL | Z6100 | 1 | SA | |
| 7.2-1-6 | JC63-01445C | COVER-OP PANEL | Z6100 | 1 | SA | ML-4551NDR |
| 7.2-1-6 | JC63-01445A | COVER-OP PANEL | Z6100 | 1 | SA | ML-4551NR |
| 7.2-1-6 | JC63-01100W | COVER-OP PANEL | Z6100 | 1 | SA | ML-4550R |
| 7.2-1-7 | JC67-00147A | LENS LED-M_STATUS | Z4432 | 1 | SNA | |
| 7.2-1-8 | JC75-00095A | MEC-BRUSH ANTISTATIC | M0022 | 1 | SA | |
| 7.2-1-9 | JC92-01825B | PBA SUB-PANEL | Z4433 | 1 | SA | |
| 7.2-1-10 | JC64-00265A | KEY-M_BUTTON | Z4434 | 1 | SA | |
| 7.2-1-10 | JC64-00265B | KEY-M_BUTTON | Z4434 | 1 | SA | ML-4551NDR |
| 7.2-1-11 | JC64-00236A | KEY-M_STOP | Z4435 | 1 | SNA | |
| 7.2-1-12 | JC64-00047A | KEY-M-SAVE MODE | K0049 | 1 | SA | |
| 7.2-1-13 | JC64-00194A | WINDOW-M-LCD | K4285 | 1 | SA | |
| 7.2-1-14 | JC63-00836A | GROUND-P-TOP_COVER | G0440 | 1 | SA | |
| 7.2-2 | JC63-00684B | COVER-M_LEFT | H1292 | 1 | SA | |
| 7.2-2 | JC63-00684C | COVER-M_LEFT | H1292 | 1 | SA | ML-4551NDR |
| 7.2-3 | JC63-00701B | COVER-M_RIGHT | H1294 | 1 | SA | |
| 7.2-3 | JC63-00701C | COVER-M_RIGHT | H1294 | 1 | SA | ML-4551NDR |
| 7.2-4 | JC63-00702B | COVER-M_CONTROL BOX | H1288 | 1 | SA | |
| 7.2-4 | JC63-00702C | COVER-M_CONTROL BOX | H1288 | 1 | SA | ML-4551NDR |
| 7.2-5 | JC63-00685B | COVER-M_FRONT INNER | H1291 | 1 | SA | |
| 7.2-5 | JC63-00685C | COVER-M_FRONT INNER | H1291 | 1 | SA | ML-4551NDR |
| 7.2-6 | JC97-02232B | MEA UNIT-COVER REAR | E4063 | 1 | SA | |
| 7.2-6 | JC97-02232C | MEA UNIT-COVER REAR | E4063 | 1 | SA | ML-4551NDR |
| 7.2-6-1 | JC63-00703B | COVER-M_REAR | H1293 | 1 | SA | |
| 7.2-6-1 | JC63-00703C | COVER-M_REAR | H1293 | 1 | SA | ML-4551NDR |
| 7.2-6-2 | JC72-01357A | PMO-STACKER REAR | L6054 | 1 | SA | |
| 7.2-6-2 | JC72-01357B | PMO-STACKER REAR | L6054 | 1 | SA | ML-4551NDR |
| 7.2-6-3 | JC70-00007A | ICT-BRKT REAR COVER | Z4436 | 1 | SNA | |
| 7.2-6-4 | JC61-01217A | GUIDE-M_EXIT | G0441 | 1 | SA | |
| 7.2-6-5 | JC72-01359A | PMO-STRIPE | L6056 | 1 | SA | |
| 7.2-6-6 | JC70-20901A | IEX-SHAFT IDLE,F/UP | D2149 | 2 | SA | |
| 7.2-6-7 | JC72-20902A | PEX-ROLLER F/UP(2) | O1106 | 2 | SA | |
| 7.2-6-8 | JC61-01774A | SPRING ETC-SEPERATION | Z6115 | 5 | SA | |
| 7.2-6-9 | JC68-01526A | LABEL(P)-JAM REMOVAL | Z4438 | 1 | SNA | |
| 7.2-7 | JC97-02389B | MEA UNIT-COVER DUMMY | Z4420 | 1 | SA | ML-4550 |
| 7.2-7 | JC97-02389C | MEA UNIT-COVER DUMMY | Z4420 | 1 | SA | ML-4550R |
| 7.2-7-1 | JC72-01374A | SPONGE-COVER DUMMY | Z4421 | 1 | SNA | ML-4550 |
| 7.2-7-2 | JC63-00697B | COVER-M_DUMMY DUP | Z4422 | 1 | SA | ML-4550 |
| 7.2-7 | JC97-02389C | MEA UNIT-COVER DUMMY | Z4420 | 1 | SA | ML-4551NR |
| 7.2-7-2 | JC63-00697C | COVER-M_DUMMY DUP | Z4422 | 1 | SA | ML-4550R,4551NR |
| 7.2-8 | JC63-00696B | COVER-M_FRAME EXIT | H1290 | 1 | SA | |
| 7.2-8 | JC63-00696C | COVER-M_FRAME EXIT | H1290 | 1 | SA | ML-4551NDR |

# 7.3 Frame Assembly(1/2)



# Frame Assembly(2/2)



Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.3-0 | JC96-04004A | ELA UNIT-FRAME BASE | Z4398 | 1 | SA | 110V |
| 7.3-0 | JC96-04004B | ELA UNIT-FRAME BASE | Z4398 | 1 | SA | 220V |
| 7.3-1 | JC61-01206A | FRAME-M_BASE | Z4440 | 1 | SNA | |
| 7.3-2 | JC97-02649A | MEA UNIT-PICK UP MP | Z4441 | 1 | SA | |
| 7.3-2-1 | JC66-01265A | SHAFT-PICK UP MP | Z4442 | 1 | SA | |
| 7.3-2-2 | JC72-01003A | PMO-IDLE PICK UP MP | P0042 | 2 | SA | |
| 7.3-2-3 | JC66-00893A | CAM-M-SHAFT | P2043 | 1 | SA | |
| 7.3-2-4 | JC96-02686B | ELA UNIT-ROLLER P/UP MP | K3144 | 1 | SA | |
| 7.3-2-4-1 | JC61-00705A | HOLDER-M-PICKUP MP | P2062 | 1 | SA | |
| 7.3-2-4-2 | JC61-00685A | HOUSING-M-PICK UP MP | H0025 | 1 | SA | |
| 7.3-2-4-3 | JC73-00224A | RUBBER-PICK UP MP | C4024 | 1 | SA | |
| 7.3-3 | JC97-02238A | MEA UNIT-GEAR IDLE | E4065 | 1 | SA | |
| 7.3-3-1 | JC61-01200A | BRACKET-P-GEAR IDLE | Z4443 | 1 | SNA | |
| 7.3-3-2 | JC66-00872A | GEAR-FUSER IDLE 3 | Z4444 | 1 | SNA | |
| 7.3-3-3 | JC66-00859A | GEAR-M-FUSER IDLE 2 | Z4445 | 1 | SNA | |
| 7.3-3-4 | JC66-00858A | GEAR-M-FUSER DRV IN | | 1 | SNA | |
| 7.3-3-5 | JC66-00868A | CLUTCH-M-HUB | Z4446 | 1 | SNA | |
| 7.3-3-6 | JC66-01155A | GEAR-FUSER RDCN OUT V | Z4536 | 1 | SNA | |
| 7.3-3-7 | 6044-000231 | RING-E | R0006 | 2 | SA | |
| 7.3-4 | JC96-03403A | ELA HOU BASE-HOLDER | H1297 | 1 | SA | |
| 7.3-4-1 | JC61-01248A | FRAME-M-HOLDER PAD | Z4448 | 1 | SNA | |
| 7.3-4-2 | JC61-00684A | HOLDER-M-PAD | H4029 | 1 | SA | |
| 7.3-4-3 | JC73-00132A | RPR-FRICTION PAD MP | R0019 | 1 | SA | |
| 7.3-4-4 | JC61-00387A | SPRING ETC-PAD | S0028 | 1 | SA | |
| 7.3-4-5 | JC72-01365A | PMO-ACTUATOR EMPTY MP | W3028 | 1 | SA | |
| 7.3-4-6 | JC61-70965A | SPRING ETC-EMPTY | O1099 | 1 | SA | |
| 7.3-4-7 | 0604-001095 | PHOTO-INTERRUPTER | P0013 | 1 | SA | |
| 7.3-4-8 | JC39-00451A | CBF HARNESS-MP_EMPTY | H1253 | 1 | SA | |
| 7.3-5 | JC97-01034A | MEA RACK-EXIT ROLLER | E4060 | 4 | SA | |
| 7.3-5-1 | JC72-41006A | PMO-HOLDER EXIT ROLL | E4126 | 1 | SA | |
| 7.3-5-2 | JC72-41007A | PMO-ROLLER FD F | P0048 | 1 | SA | |
| 7.3-5-3 | JC72-41008A | PMO-ROLLER FD R | P0049 | 1 | SA | |
| 7.3-5-4 | JC61-70911A | SPRING ETC-EXIT ROLL FD | O1053 | 1 | SA | |
| 7.3-6 | JC66-00883A | ROLLER-EXIT_F/DOWN | D4089 | 1 | SA | |
| 7.3-8 | JC72-01310A | PMO-ACTUATOR OUTFULL | K3819 | 1 | SA | |
| 7.3-9 | JC66-00674A | GEAR-M-EXIT Z17 | G0331 | 1 | SA | |
| 7.3-12 | JC61-01262A | BUSH-M_EXIT D7 | S4014 | 2 | SA | |
| 7.3-13 | JC66-00854A | GEAR-M-EXIT DUP Z21 | G0200 | 1 | SA | |
| 7.3-14 | JC96-02127A | ELA HOU-CST SENSOR HAWK16 | Z2263 | 1 | SA | |
| 7.3-14-1 | JC92-01336A | PBA SUB-CASSETTE | Z4451 | 1 | SA | |
| 7.3-14-2 | JC70-00192A | IPR-PLATE SENSOR | S3058 | 1 | SA | |
| 7.3-14-3 | JC70-00195A | IPR-BRACKET SENSOR | S3055 | 1 | SA | |
| 7.3-15 | JC39-00261A | CBF HARNESS-SENSOR | H1242 | 1 | SA | |
| 7.3-16 | JC61-00675A | GUIDE-P_REGI UPPER | G2082 | 1 | SA | |
| 7.3-17 | JC61-70918A | SPRING ETC-LEVER | L4097 | 2 | SA | |
| 7.3-19 | JC61-00691A | GUIDE-PLATE PAPER | G2091 | 1 | SA | |
| 7.3-20 | JC70-00339A | IPR-P_GROUND PLATE PAPER | P5064 | 1 | SA | |
| 7.3-21 | 0604-001095 | PHOTO-INTERRUPTER | P0013 | 1 | SA | |
| 7.3-23 | JC39-00458A | CBF HARNESS-THERM | H1256 | 1 | SA | |
| 7.3-24 | JC61-01581A | HOUSING-M_TERMINAL | Z4452 | 1 | SNA | |
| 7.3-25 | JC65-00013A | TERMINAL-P-FUSER | K4277 | 1 | SA | |
| 7.3-26 | JC39-00456A | CBF HARNESS-FUSER | H1249 | 1 | SA | |
| 7.3-27 | JC67-00099A | CAP-M-HOUS_TERM | Z4453 | 1 | SNA | |
| 7.3-28 | JC63-01132A | SHIELD-CTRL | Z4454 | 1 | SA | |
| 7.3-29 | JC63-00677A | GROUND-P-MOTOR_DEVE | Z4455 | 1 | SNA | |
| 7.3-30 | JC63-00669A | GROUND-P_GUIDE TR | Z4456 | 1 | SNA | |
| 7.3-31 | JC63-00672A | GROUND-P-REGI_ROLLER | Z4457 | 1 | SNA | |
| 7.3-32 | JC63-00678A | GROUND-P-PICK_UP_MP | Z4458 | 1 | SNA | |
| 7.3-33 | JC63-00673A | GROUND-P-SCF_MAIN | Z4459 | 1 | SNA | |
| 7.3-34 | JC63-00671A | GROUND-P-MOTOR_MAIN | Z4460 | 1 | SNA | |
| 7.3-35 | JC63-00680A | GROUND-P-GUIDE_DUP | Z4461 | 1 | SNA | |
| 7.3-36 | JC67-00093A | CAP-M-GUIDE_HARNESS | Z4462 | 1 | SNA | |
| 7.3-37 | JC72-01356A | PMO-DUMMY_DEVE | Z0016 | 1 | SA | |
| 7.3-38 | JC96-01772A | ELA HOU-VARISTOR | K3053 | 1 | SA | |
| 7.3-39 | JC61-40001A | FOOT-ML80 | F0003 | 2 | SA | |
| 7.3-40 | JC72-01355A | PMO-REMOVE_LOCK_CST | L6040 | 1 | SA | |
| 7.3-43 | JC72-41191B | PMO-BEARING SHAFT | P0032 | 6 | SA | |
| 7.3-47 | JC96-03960A | ELA HOU-FRAME_LSU_LO | Z4463 | 1 | SA | |
| 7.3-47-1 | JC61-01732A | FRAME-PART_UPPER | Z4464 | 1 | SNA | |
| 7.3-47-2 | JC92-01807A | PBA SUB-TONER_SENSOR | Z4465 | 1 | SA | |
| 7.3-47-3 | JC65-00004A | TERMINAL-P_DEVE | T2175 | 4 | SA | |
| 7.3-47-4 | JC92-01730A | PBA SUB-COVER OEPN | M0443 | 1 | SA | |

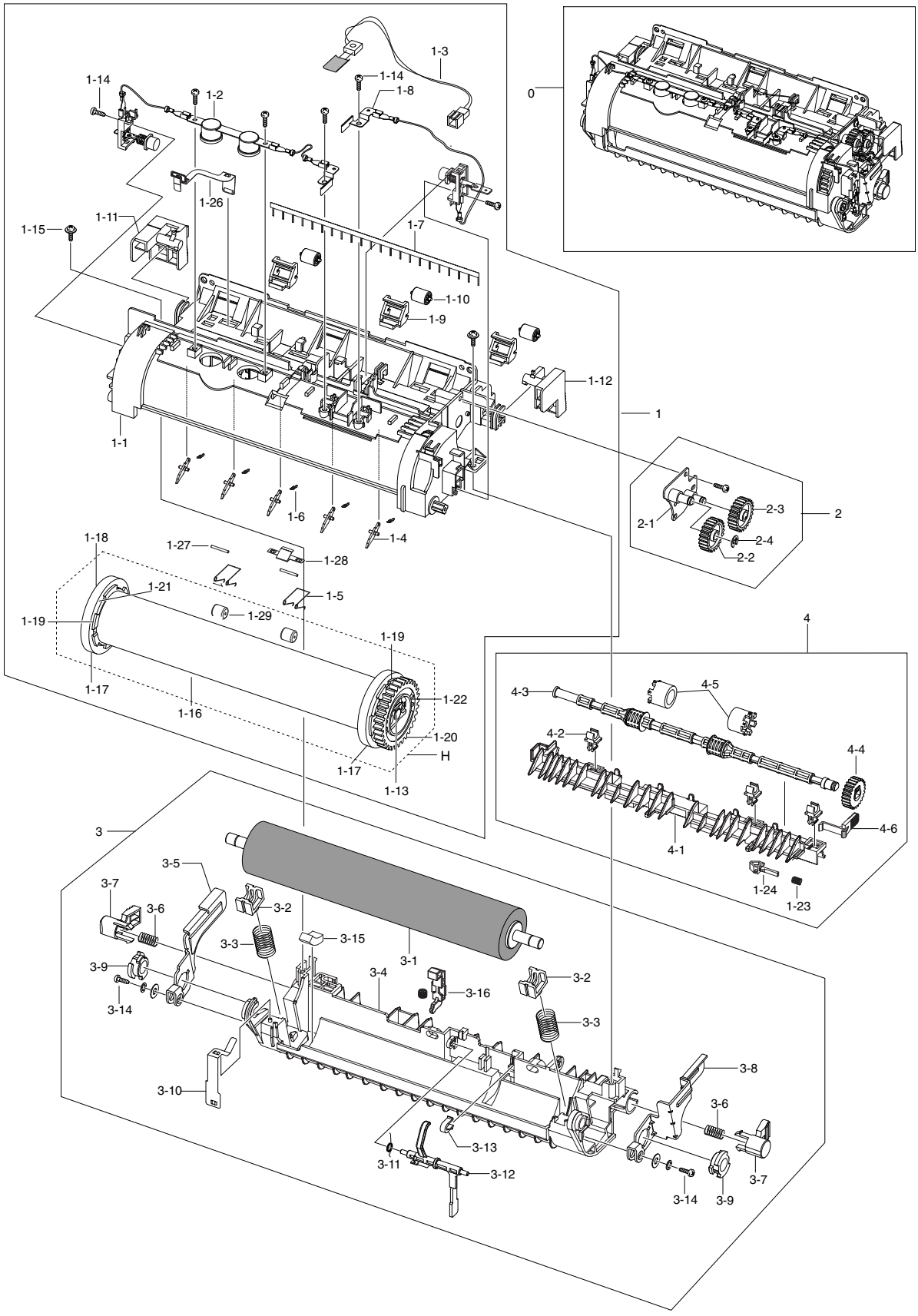
Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.3-47-5 | JC67-00095A | CAP-M_COVER_OPEN | Z4466 | 1 | SNA | |
| 7.3-48 | JC96-03425A | ELA UNIT-FEED3X5 | K3062 | 1 | SA | |
| 7.3-48-1 | JC61-01240A | HOLDER-M-SAW | Z4467 | 1 | SNA | |
| 7.3-48-2 | JC61-01235A | GUIDE-P-TRANSFER_FRONT | Z4468 | 1 | SNA | |
| 7.3-48-3 | JC61-01236A | PLATE-P-SAW | Z4469 | 1 | SNA | |
| 7.3-48-4 | JC66-00889A | SHAFT-M ROLLER_BELT | Z4470 | 1 | SNA | |
| 7.3-48-5 | JC66-00887A | ROLLER-M IDLE_BELT | Z4471 | 2 | SNA | |
| 7.3-48-6 | JC70-20901A | IEX-SHAFT IDLE F/UP | D2149 | 2 | SA | |
| 7.3-48-7 | JC73-00206A | RUBBER-BELT_FEED | C4020 | 2 | SA | |
| 7.3-48-8 | JC61-01239A | GUIDE-M SHAFT_BELT | Z4472 | 1 | SNA | |
| 7.3-49 | JC96-04016A | ELA UNIT-ROLLER_IDLE | Z4473 | 1 | SA | |
| 7.3-49-2 | JC61-00635A | HOUSING-M-RETARD | H6035 | 1 | SA | |
| 7.3-49-3 | JC73-00207A | RUBBER-RETARD | C4026 | 1 | SA | |
| 7.3-49-4 | JC72-00993A | PMO-HUB OUT RETARD | K4021 | 1 | SA | |
| 7.3-49-5 | JC66-01273A | SHAFT-IDLE FEED | Z4474 | 1 | SA | |
| 7.3-49-6 | JC64-00271A | SHUTTER-PATH_FEED | Z4475 | 1 | SA | |
| 7.3-49-7 | JC61-01550A | STOPPER-SPACE | Z4476 | 2 | SNA | |
| 7.3-49-8 | JC64-00272A | SHUTTER-CLAW | | 2 | SNA | |
| 7.3-49-9 | JC61-01741A | HOLD-IDLE FRONT | Z4477 | 1 | SA | |
| 7.3-49-10 | JC61-00652A | BUSH-M-RETARD | K2883 | 2 | SA | |
| 7.3-49-11 | JC61-00387A | SPRING ETC-PAD | S0028 | 2 | SA | |
| 7.3-49-12 | JC61-01739A | HOLD-IDLE REAR | Z4479 | 1 | SA | |
| 7.3-49-14 | JC64-00270A | SHUTTER-TENSION | Z4480 | 2 | SA | |
| 7.3-50 | JC96-03421A | ELA UNIT-FEED2 IDLE | K3060 | 2 | SA | |
| 7.3-50-1 | JC61-01242A | HOLDER-IDLE_FEED2 | Z4481 | 1 | SNA | |
| 7.3-50-2 | JC67-00105A | CAP-M IDLE_FEED2 | Z4482 | 2 | SNA | |
| 7.3-50-3 | JC61-00387A | SPRING ETC-PAD | S0028 | 2 | SA | |
| 7.3-50-4 | JC61-00652A | BUSH-M-RETARD | K2883 | 2 | SA | |
| 7.3-50-5 | JC66-00912A | SHAFT-IDLE_FEED2 | S4108 | 1 | SA | |
| 7.3-50-6 | 6044-000231 | RING-E | R0006 | 2 | SA | |
| 7.3-50-7 | JC66-00892A | ROLLER-M IDLE_FEED2 | Z4483 | 1 | SNA | |
| 7.3-51 | JC61-01250A | STOPPER-M-KNOCK UP MP_L | H3074 | 1 | SA | |
| 7.3-52 | JC61-01249A | STOPPER-M-KNOCK UP MP_R | H3075 | 1 | SA | |
| 7.3-53 | JC61-01252A | RAIL-M-LEFT_DUP | L6057 | 1 | SA | |
| 7.3-54 | JC61-01253A | RAIL-M-RIGHT_DUP | L6058 | 1 | SA | |
| 7.3-55 | JC72-41191B | PMO-BEARING SHAFT | P0032 | 1 | SA | |
| 7.3-56 | JC66-01262A | GEAR-FEED | Z4484 | 1 | SNA | |
| 7.3-57 | JC72-01362A | PMO- M CAM_PICK_UP | Z4485 | 1 | SNA | |
| 7.3-58 | JC72-00991A | PMO-ACTUATOR EMPTY | K3816 | 1 | SA | |
| 7.3-59 | JC96-03422A | ELA UNIT-PICK UP | K3141 | 1 | SA | |
| 7.3-59-1 | JC66-00910A | SHAFT-PICK UP | S4118 | 1 | SA | |
| 7.3-59-2 | JC97-02233A | MEA UNIT-P/UP_HOUSING | G0471 | 1 | SA | |
| 7.3-59-2-1 | JC72-01361A | PMO-M IDLE-PICK UP | L6039 | 2 | SA | |
| 7.3-59-2-2 | JC61-01238A | HOUSING-M-PICK UP | Z4486 | 1 | SNA | |
| 7.3-59-2-3 | JC73-00223A | RUBBER-PICK_UP | C4025 | 1 | SA | |
| 7.3-59-3 | JC61-01579A | HOLDER-P-REGI | Z4487 | 1 | SNA | |
| 7.3-59-4 | JC66-00911A | SHAFT-FEED1 | C4028 | 1 | SA | |
| 7.3-59-5 | JC81-03458A | AS-UNIT_FEED1 | K2860 | 1 | SA | |
| 7.3-59-5-1 | JC61-01237A | HOUSING-M-FEED1 | Z4488 | 1 | SNA | |
| 7.3-59-5-2 | JC73-00208A | RUBBER-FEED1 | C4022 | 1 | SA | |
| 7.3-59-6 | JC63-00674A | GROUND-P-PICK_UP_MAIN | Z4489 | 1 | SNA | |
| 7.3-59-7 | JC61-01579A | HOLDER-P-REGI | Z4487 | 1 | SNA | |
| 7.3-59-8 | JC72-00382B | PMO-BUSHING FEED | O1102 | 2 | SA | |
| 7.3-59-9 | JC61-01234A | GUIDE-P-FRONT-DUP-PICKUP | Z4490 | 1 | SNA | |
| 7.3-59-10 | JC61-01233A | GUIDE-M SUPPORT-PICKUP | Z4491 | 1 | SNA | |
| 7.3-60 | JC96-04119A | ELA UNIT-FEED | Z4492 | 1 | SA | |
| 7.3-61 | JC92-01704A | PBA SUB-JOINT | M0448 | 1 | SA | |
| 7.3-62 | JC39-00441A | CBF HARNESS-TRAY OUT | H1257 | 1 | SA | |
| 7.3-63 | JC67-00094A | CAP-M_POWER | Z4493 | 1 | SNA | |
| 7.3-64 | JC39-00624A | HARNESS-INLET | Z4494 | 1 | SA | |
| 7.3-65 | JC66-00888A | SHAFT-M BELT_GEAR | Z4495 | 1 | SNA | |
| 7.3-66 | JC72-41191B | PMO-BEARING SHAFT | P0032 | 1 | SA | |
| 7.3-67 | JC66-00674A | GEAR-M-EXIT Z17 | G0331 | 1 | SA | |
| 7.3-68 | JC67-00092A | CAP-M-DEVE_MOTOR | Z4496 | 1 | SNA | |
| 7.3-69 | JC39-00449A | CBF HARNESS-DUPLEX | Z4497 | 1 | SNA | |
| 7.3-71 | JC67-00036A | CAP-M-WIRE PTL LOWER | C1015 | 1 | SA | |
| 7.3-72 | JC65-00001A | TERMINAL-P_PTL | K4276 | 2 | SA | |
| 7.3-73 | JC92-01516A | PBA SUB-PTL2 | M0411 | 1 | SA | |
| 7.3-76 | JC92-01512B | PBA SUB-EXIT SENSOR | M0445 | 1 | SA | |
| 7.3-77 | JC92-01261C | PBA SUB-FUSER SW | M0447 | 1 | SA | |
| 7.3-78 | JC61-01218A | GUIDE-M-FRONT | G0442 | 1 | SA | |
| 7.3-79 | JC65-00010B | TERMINAL-GUIDE_FRONT | | 1 | SNA | |

Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.3-81 | JC72-00317A | PMO-GUIDE DEVE L | T2158 | 1 | SA | |
| 7.3-82 | JC72-00318A | PMO-GUIDE DEVE R | T2159 | 1 | SA | |
| 7.3-83 | JC61-70932A | SPRING ETC-GUIDE DEVE | Z4159 | 2 | SA | |
| 7.3-84 | JC65-00008A | TERMINAL-P-TR_KESTREL | K4278 | 1 | SA | |
| 7.3-86 | JC65-00009A | TERMINAL-SPRING_TR | K4279 | 1 | SA | |
| 7.3-89 | JC63-00679A | GROUND-P-ZENER | Z4498 | 1 | SNA | |
| 7.3-90 | JC63-00676A | GROUND-P-FUSER | Z4499 | 1 | SNA | |
| 7.3-91 | JC65-00006A | TERMINAL-P_HV CARDINAL | K4272 | 4 | SA | |
| 7.3-92 | JC97-01401A | MEA UNIT-TERMINAL:TR | Z4500 | 4 | SA | |
| 7.3-93 | JC39-00625A | HARNESS-HVPS | Z4501 | 1 | SA | |
| 7.3-94 | JC70-00332A | IPR-P_GROUND OPC | O0020 | 1 | SA | |
| 7.3-95 | JC92-01831A | PBA SUB-EMPTY | Z4502 | 1 | SA | |
| 7.3-96 | JC39-00620A | HARNESS-SENSOR | Z4503 | 1 | SA | |
| 7.3-97 | JC92-01262C | PBA SUB-FEED SENSOR | M0446 | 1 | SA | |
| 7.3-98 | JC67-00098A | CAP-M_HV | Z4504 | 1 | SNA | |
| 7.3-99 | JC67-00097A | CAP-M_SENSOR_FEED | Z4505 | 1 | SNA | |

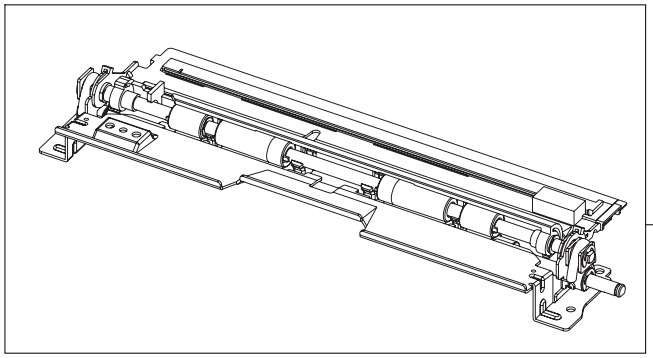
# 7.4 Fuser Unit

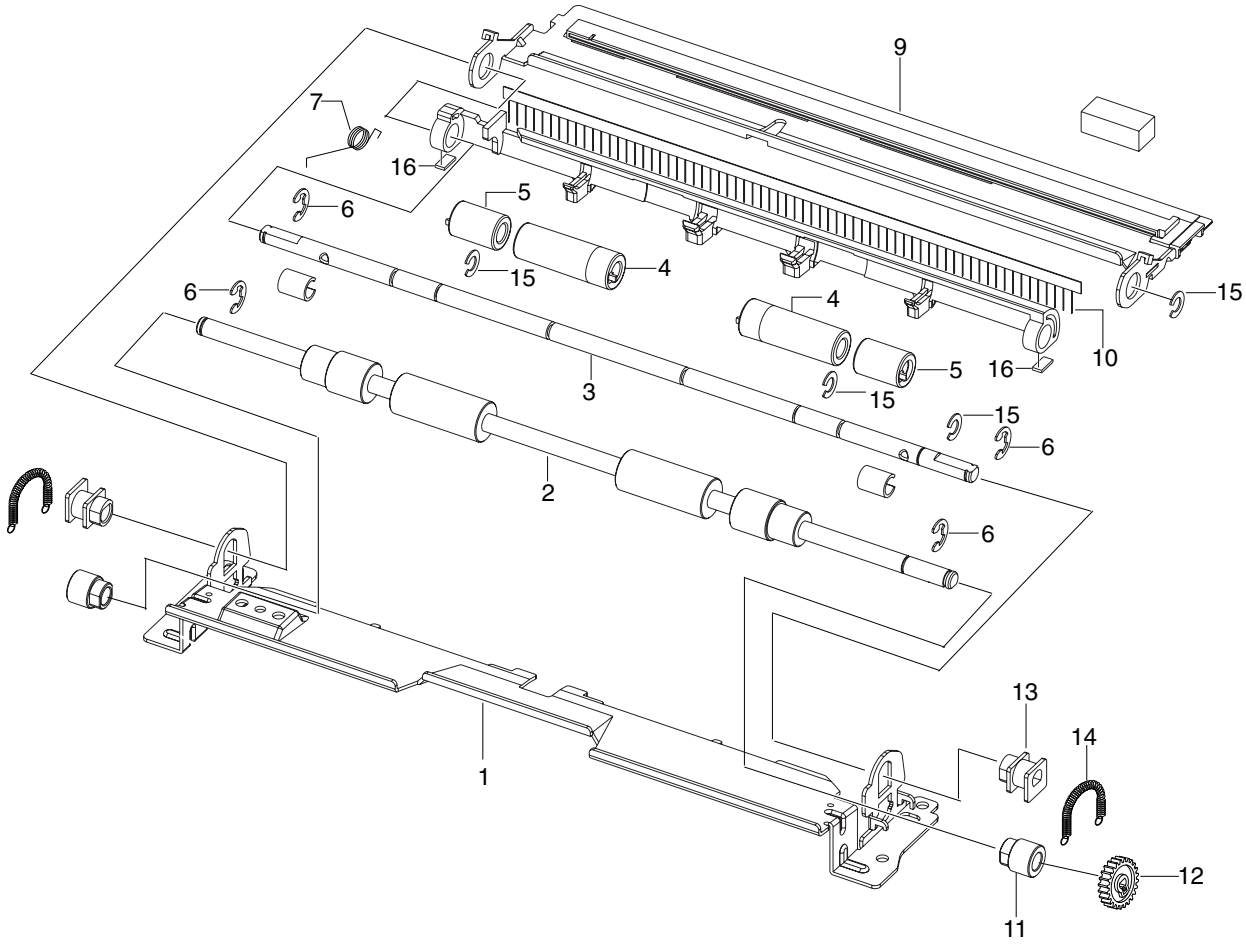


Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.4-0 | JC96-03957B | ELA UNIT-FUSER_220V | Z4506 | 1 | SA | 220V |
| 7.4-0 | JC96-03957A | ELA UNIT-FUSER_110V | Z4506 | 1 | SA | 110V |
| 7.4-1 | JC96-03958A | ELA UNIT-FUSER_UPPER | Z4507 | 1 | SNA | 110V |
| 7.4-1 | JC96-03958B | ELA UNIT-FUSER_UPPER | Z4507 | 1 | SNA | 220V |
| 7.4-1-2 | JC71-00056A | ELECTRODE-P-FU_L_08 | Z4508 | 1 | SNA | |
| 7.4-1-4 | JC72-41012C | PMO-GUIDE CLAW GREEN | Z0018 | 5 | SA | |
| 7.4-1-5 | 6107-001165 | SPRING-TS | | 2 | SA | |
| 7.4-1-8 | JC61-01215A | HOLDER-M-LEVER_L | Z4509 | 1 | SNA | |
| 7.4-1-9 | JC61-00785A | HOLDER-M-IDLE ROLLER | H4027 | 3 | SA | |
| 7.4-1-10 | JC72-40981A | PMO-ROLLER UPPER DP | K4068 | 3 | SA | |
| 7.4-1-12 | JC61-01216A | HOLDER-M-LEVER_R | Z4510 | 1 | SNA | |
| 7.4-1-13 | JC71-00052A | ELECTRODE-P-SUPPORT | Z4511 | 2 | SNA | |
| 7.4-1-15 | 6003-000196 | SCREW-TAPTITE | Z4397 | 31 | SA | |
| 7.4-1-KIT | JC96-04058A | ELA UNIT-HEAT | Z6118 | 1 | SNA | 110V |
| 7.4-1-KIT | JC96-04058B | ELA UNIT-HEAT | Z6118 | 1 | SNA | 220V |
| 7.4-1-16 | JC66-01268A | ROLLER-HEAT | Z4518 | 1 | SNA | 110V |
| 7.4-1-16 | JC66-01268B | ROLLER-HEAT | Z4518 | 1 | SNA | 220V |
| 7.4-1-17 | 6601-001384 | BEARING-BALL | Z4519 | 2 | SNA | |
| 7.4-1-19 | JC61-01260A | BUSH-M_HR | S4015 | 2 | SA | |
| 7.4-1-21 | JC61-01550A | STOPPER-SPACER | Z4476 | 4 | SNA | |
| 7.4-1-22 | JC71-00051A | ELECTRODE-FU | Z4521 | 2 | SNA | |
| 7.4-1-24 | JC67-00111A | CAP-M_ACTUATOR_UP | Z4522 | 1 | SNA | |
| 7.4-1-25 | JC63-00726A | COVER-M-REAR GUIDE UP | Z4523 | 1 | SNA | |
| 7.4-1-26 | JC71-00055A | ELECTRODE-P-SU CARBON | Z4524 | 1 | SNA | |
| 7.4-1-28 | JC61-01284A | HOLDER-P-SL CONNECTOR | Z4525 | 1 | SNA | |
| 7.4-2-1 | JC61-01213A | BRACKET-P-FUSER | Z4526 | 1 | SNA | |
| 7.4-2-3 | JC66-00869A | GEAR-M-IDLE 25 | Z4527 | 2 | SNA | |
| 7.4-3 | JC97-02630A | MEA UNIT-FUSER_LOWER | Z4528 | 1 | SNA | |
| 7.4-3-1 | JC66-00931A | ROLLER-PRESSURE | K4222 | 1 | SA | |
| 7.4-3-3 | 6107-001304 | SPRING-CS | Z4530 | 1 | SA | |
| 7.4-3-5 | JC66-00880A | LEVER-P-RELEASE_L | Z4532 | 1 | SNA | |
| 7.4-3-6 | 6107-001304 | SPRING-CS | Z4530 | 1 | SA | |
| 7.4-3-7 | JC67-00102A | CAP-M-FUSER LOCK | Z4533 | 2 | SNA | |
| 7.4-3-8 | JC66-00881A | LEVER-P-RELEASE_R | Z4534 | 1 | SNA | |
| 7.4-3-10 | JC63-00683A | GROUND-P-HR | Z4535 | 1 | SNA | |
| 7.4-3-11 | JC61-70903A | SPRING ETC-ACTUATOR | Z4132 | 1 | SA | |
| 7.4-3-12 | JC72-01358A | PMO-ACTUATOR EXIT | Z4536 | 1 | SNA | |
| 7.4-3-13 | JC67-00103A | CAP-M-ACTUATOR | Z4537 | 1 | SNA | |
| 7.4-3-14 | 6003-000196 | SCREW-TAPTITE | Z4397 | 2 | SA | |
| 7.4-4 | JC97-02631A | MEA UNIT-FUSER_GU_R | Z4539 | 1 | SNA | |
| 7.4-4-1 | JC61-01226B | GUIDE-M_REAR | Z4540 | 1 | SNA | |
| 7.4-4-2 | JC72-00382A | PMO-BUSHING TX | Z4606 | 2 | SNA | |
| 7.4-4-6 | JC61-01549A | HOLDER-M REAR_LEVER | Z4542 | 1 | SNA | |

## 7.5 REGI Assembly

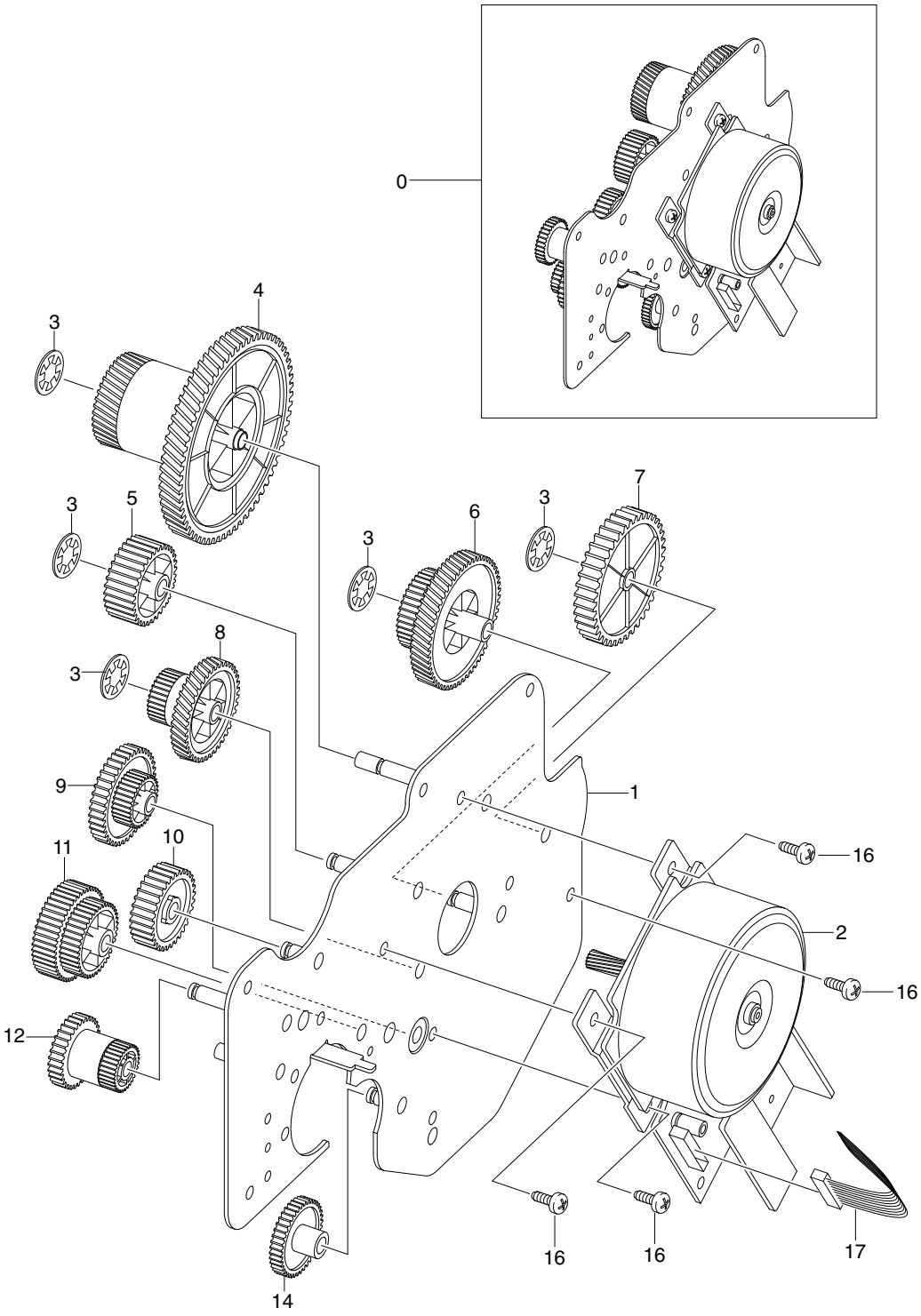


Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.5-0 | JC96-03959A | ELA UNIT-REGI | Z4408 | 1 | SA | |
| 7.5-1 | JC61-00674A | GUIDE-P_REGI LOWER | G2080 | 1 | SA | |
| 7.5-2 | JC66-00450A | ROLLER-REGI LOWER L | Z4543 | 1 | SNA | |
| 7.5-3 | JC66-00446A | SHAFT-REGI UPPER | S0010 | 1 | SA | |
| 7.5-4 | JC66-00647A | ROLLER-M_REGI IDLE L25 | R0014 | 2 | SA | |
| 7.5-5 | JC66-00648A | ROLLER-M_REGI IDLE S25 | R0015 | 2 | SA | |
| 7.5-6 | 6044-000231 | RING-E | R0006 | 4 | SA | |
| 7.5-7 | 6107-001165 | SPRING-TS | | 1 | SA | |
| 7.5-8 | JC72-00998A | PMO-ACTUATOR REGISHUTTER | P0030 | 1 | SA | |
| 7.5-9 | JC61-00670A | GUIDE-P_REGI PLATE | G2081 | 1 | SA | |
| 7.5-10 | JC75-00095A | MEC-BRUSH ANTISTATIC | M0022 | 1 | SA | |
| 7.5-11 | JC61-00669A | BUSH-M-ROLLER REGI U | B0029 | 2 | SA | |
| 7.5-12 | JC66-00420A | GEAR-REGI Z25 | G0415 | 1 | SA | |
| 7.5-13 | JC61-00669A | BUSH-M-ROLLER REGI U | B0029 | 2 | SA | |
| 7.5-14 | 6107-001155 | SPRING-ES | Z4544 | 2 | SA | |

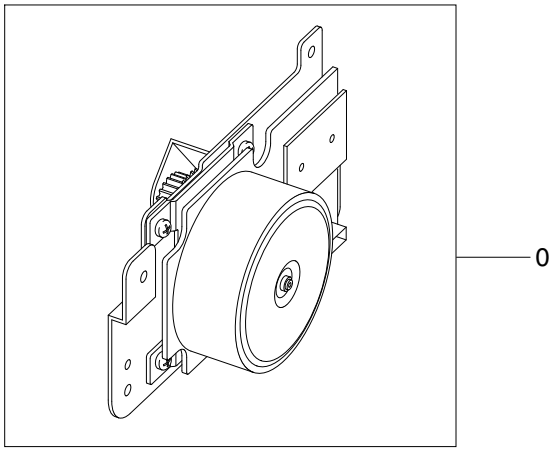
# 7.6 Main Motor Assembly

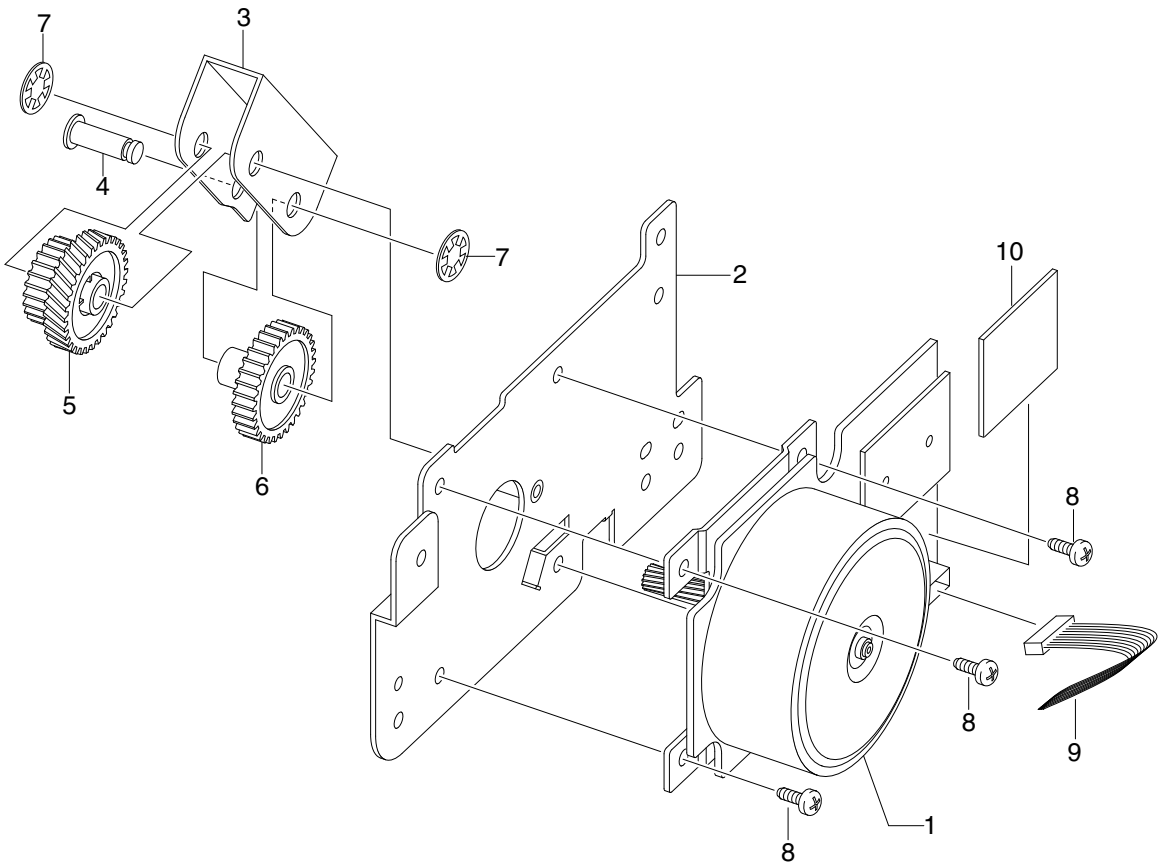


Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.6-0 | JC96-04063A | ELA UNIT-MAIN | Z4410 | 1 | SA | |
| 7.6-1 | JC61-01204A | BRACKET-P-MAIN | Z4545 | 1 | SNA | |
| 7.6-2 | JC31-00040A | MOTOR DC-BLDC MAIN | B5013 | 1 | SA | |
| 7.6-3 | 6031-001255 | WASHER-PLAIN | W0004 | 2 | SA | |
| 7.6-4 | JC66-00867A | GEAR-M-OPC DRV | Z4546 | 1 | SNA | |
| 7.6-5 | JC66-00864A | GEAR-M-REGI DRV | Z4547 | 1 | SNA | |
| 7.6-6 | JC66-00860A | GEAR-M-RDCN FUSER | Z4548 | 1 | SNA | |
| 7.6-7 | JC66-00875A | GEAR-M-FUSER IDLE 1 | Z4549 | 1 | SNA | |
| 7.6-8 | JC66-00865A | GEAR-M-RDCN REGI | Z4550 | 1 | SNA | |
| 7.6-9 | JC66-00866A | GEAR-M-RDCN PICK UP | Z4551 | 1 | SNA | |
| 7.6-10 | JC66-00861A | GEAR-M-MP DRV | Z4552 | 1 | SNA | |
| 7.6-11 | JC66-00862A | GEAR-M-FEED DRV | Z4553 | 1 | SNA | |
| 7.6-12 | JC66-00873A | GEAR-M-RDCN MP | Z4554 | 1 | SNA | |
| 7.6-14 | JC66-00863A | GEAR-M-PICK UP DRV | Z4555 | 1 | SNA | |

# 7.7 Deve Motor Assembly

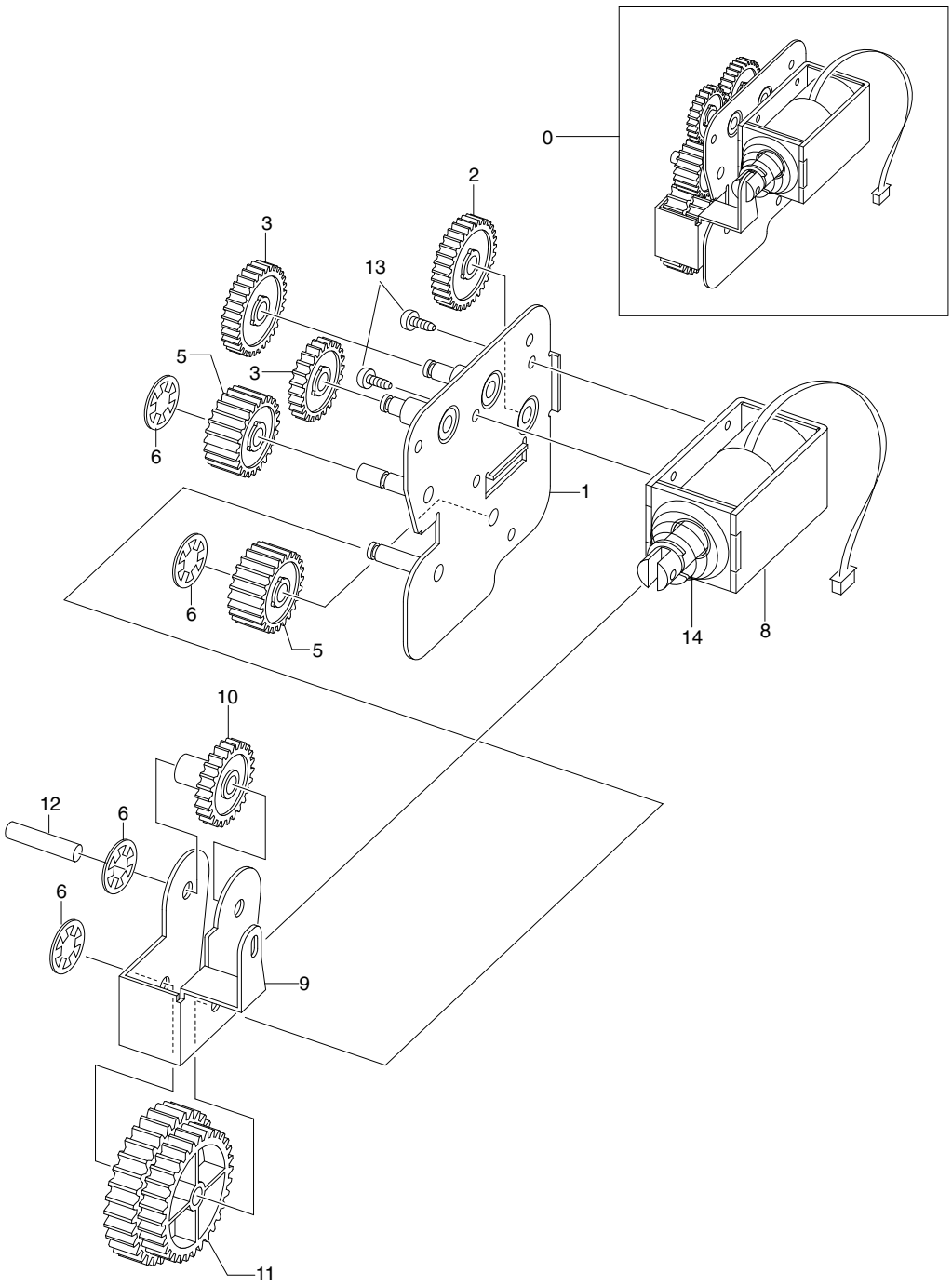


Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.7-0 | JC96-03408A | ELA UNIT-DEVE MOTOR | K3057 | 1 | SA | |
| 7.7-1 | JC31-00039A | MOTOR DC-BLDC DEVE | B5012 | 1 | SA | |
| 7.7-2 | JC61-01201A | BRACKET-P-DEVE | Z4556 | 1 | SNA | |
| 7.7-3 | JC61-01203A | BRACKET-P-SWING | Z4557 | 1 | SNA | |
| 7.7-4 | JC66-00915A | SHAFT-SWING DEVE | Z4558 | 1 | SNA | |
| 7.7-5 | JC66-00871A | GEAR-M-RDCN DEVE | Z4559 | 1 | SNA | |
| 7.7-6 | JC66-00857A | GEAR-M-SWING | Z4560 | 1 | SNA | |

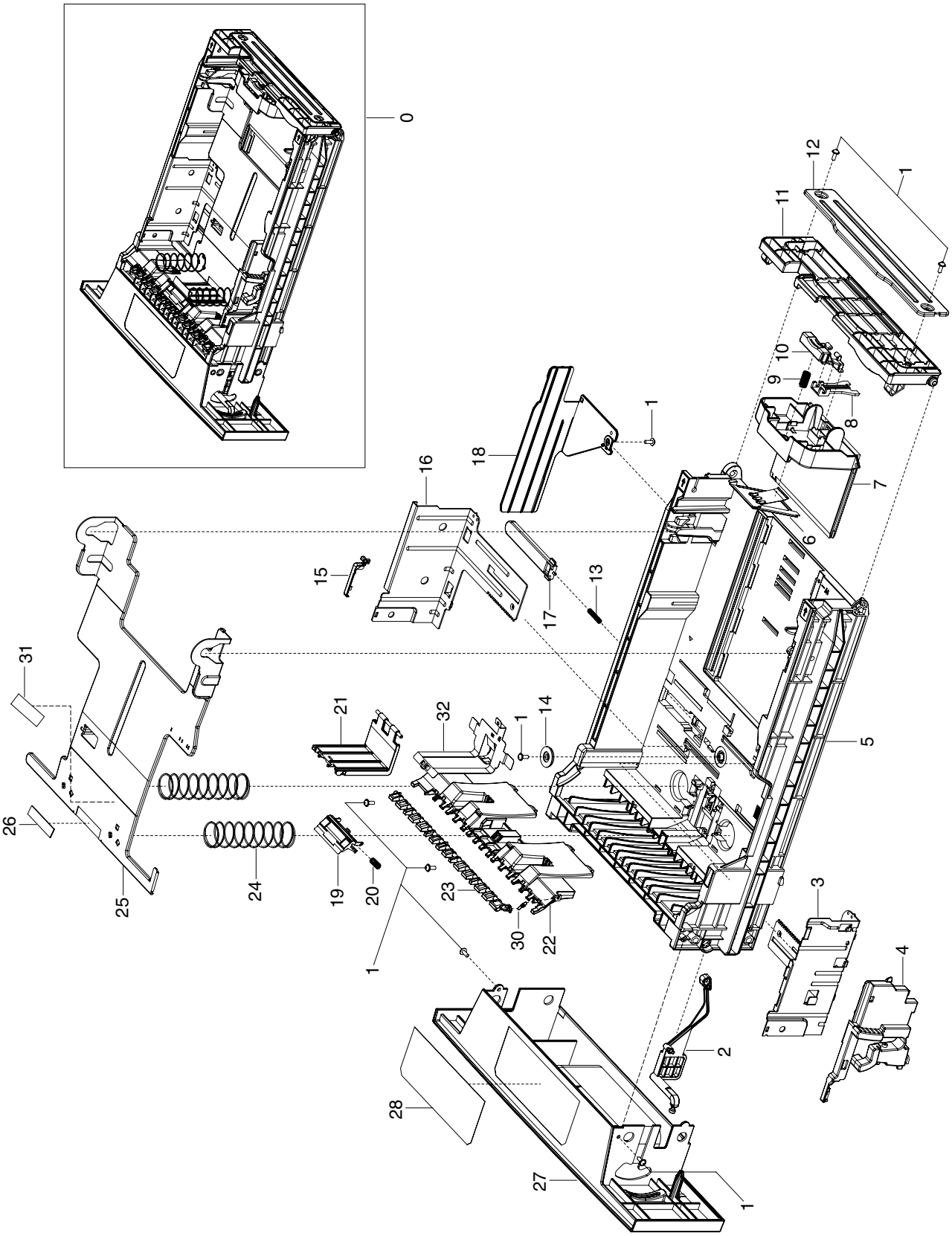
# 7.8 Duplex Sorenoid Assembly



Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.8-0 | JC96-03426A | ELA UNIT-EXIT SOL | K3059 | 1 | SA | |
| 7.8-1 | JC61-01205A | BRACKET-P-EXIT | Z4561 | 1 | SNA | |
| 7.8-2 | JC66-00869A | GEAR-M-IDLE 25 | Z4527 | 1 | SNA | |
| 7.8-3 | JC66-00869A | GEAR-M-IDLE 25 | Z4527 | 1 | SNA | |
| 7.8-4 | JC66-40911A | GEAR-DP,IDLE | G0198 | 1 | SA | |
| 7.8-5 | JC66-00100A | GEAR-6 | Z4562 | 3 | SNA | |
| 7.8-6 | 6031-001255 | WASHER-PLAIN | W0004 | 4 | SA | |
| 7.8-8 | JC33-00008A | SOLENOID-DUPLEX | S8014 | 1 | SA | |
| 7.8-9 | JC61-01202A | BRACKET-P-LINK SWING | Z4563 | 1 | SNA | |
| 7.8-10 | JC66-00855A | GEAR-M-SWING DUPLEX | Z4564 | 1 | SNA | |
| 7.8-11 | JC66-00856A | GEAR-M-RDCN EXIT | Z4565 | 1 | SNA | |
| 7.8-12 | JC66-00916A | SHAFT-SWING DUPLEX | Z4566 | 1 | SNA | |

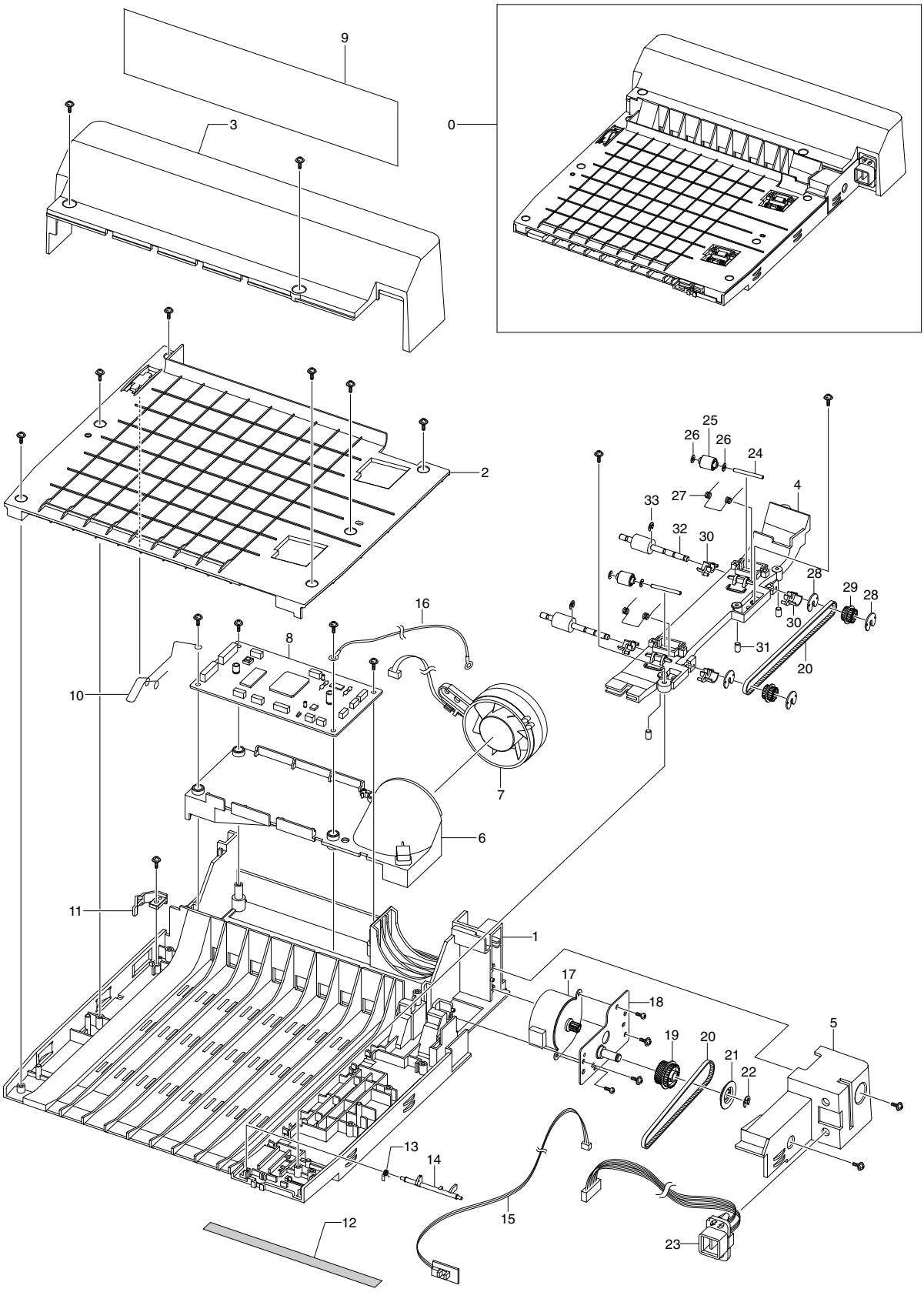
# 7.9 Cassette Assembly



Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.9-0 | JC96-04015A | ELA UNIT-CASSETTE | Z4423 | 1 | SA | |
| 7.9-0 | JC96-04015B | ELA UNIT-CASSETTE | Z4423 | 1 | SA | ML-4551NDR |
| 7.9-1 | 6002-000440 | SCREW-TAPPING | Z4418 | 8 | SA | |
| 7.9-2 | JC64-00189B | INDICATOR-M_EMPTY | Z4569 | 1 | SNA | |
| 7.9-3 | JC61-01244A | GUIDE-P-SIDE_R | Z4573 | 1 | SNA | |
| 7.9-4 | JC61-01225B | GUIDE-M_SIDE LOCK | Z4572 | 1 | SNA | |
| 7.9-5 | JC61-01220B | FRAME-M_CASSETTE | Z4567 | 1 | SNA | |
| 7.9-5 | JC61-01220C | FRAME-M_CASSETTE | Z4567 | 1 | SNA | ML-4551NDR |
| 7.9-6 | JC61-00751A | GUIDE-P-REAR PAPER CST | G2088 | 1 | SA | |
| 7.9-7 | JC61-01226B | GUIDE-M_REAR | Z4540 | 1 | SNA | |
| 7.9-8 | JC61-00267B | GUIDE-M-LOCK A | G2068 | 1 | SA | |
| 7.9-9 | JC61-00414A | SPRING ETC-GUIDE PAPER | Z4247 | 1 | SA | |
| 7.9-10 | JC64-00190B | KNOB-M_REAR | | 1 | SNA | |
| 7.9-11 | JC61-01224B | GUIDE-M_EXTENSION CST | Z4574 | 1 | SNA | |
| 7.9-11 | JC61-01224C | GUIDE-M_EXTENSION CST | Z4574 | 1 | SNA | ML-4551NDR |
| 7.9-12 | JC61-01223A | BRACKET-P-EXTENTION | Z4575 | 1 | SNA | |
| 7.9-13 | JG61-70531A | SPRING ETC-LOCKER,PLATE | S0025 | 1 | SA | |
| 7.9-14 | JG66-40003A | GEAR-PINION | O1127 | 1 | SA | |
| 7.9-15 | JC67-00037A | CAP-M-GUIDE SIDE,L | C1014 | 1 | SA | |
| 7.9-16 | JC61-01222A | GUIDE-P-SIDE_L | Z4571 | 1 | SNA | |
| 7.9-17 | JC72-41210A | PMO-LOCKER PLATE | L6038 | 1 | SA | |
| 7.9-18 | JC61-01227A | GUIDE-M-PAPER SIZE | Z4579 | 1 | SNA | |
| 7.9-19 | JC97-02234A | MEA UNIT-HOLDER PAD | G0469 | 1 | SA | |
| 7.9-20 | JC61-70911A | SPRING ETC-EXIT ROLL FD | O1053 | 1 | SA | |
| 7.9-21 | JC61-01228A | HOLDER-M-PAD_HOUSING | Z4576 | 1 | SNA | |
| 7.9-22 | JC61-01724A | GUIDE-PAPER | | 1 | SNA | |
| 7.9-23 | JC64-00268A | SHUTTER-PATH | | 1 | SNA | |
| 7.9-24 | JC61-00455A | SPRING ETC-PLATE K/UP | Z4228 | 2 | SA | |
| 7.9-25 | JC61-01245A | PLATE-P-KNOCK UP | Z4570 | 1 | SNA | |
| 7.9-26 | JC73-00141A | RPR-PAD CASSETTE | R0020 | 1 | SA | |
| 7.9-27 | JC61-01221B | GUIDE-M_HANDLE | Z4568 | 1 | SNA | |
| 7.9-27 | JC61-01221C | GUIDE-M_HANDLE | Z4568 | 1 | SNA | ML-4551NDR |
| 7.9-28 | JC68-01552A | LABEL(R)-CASSETTE | | 1 | SNA | |

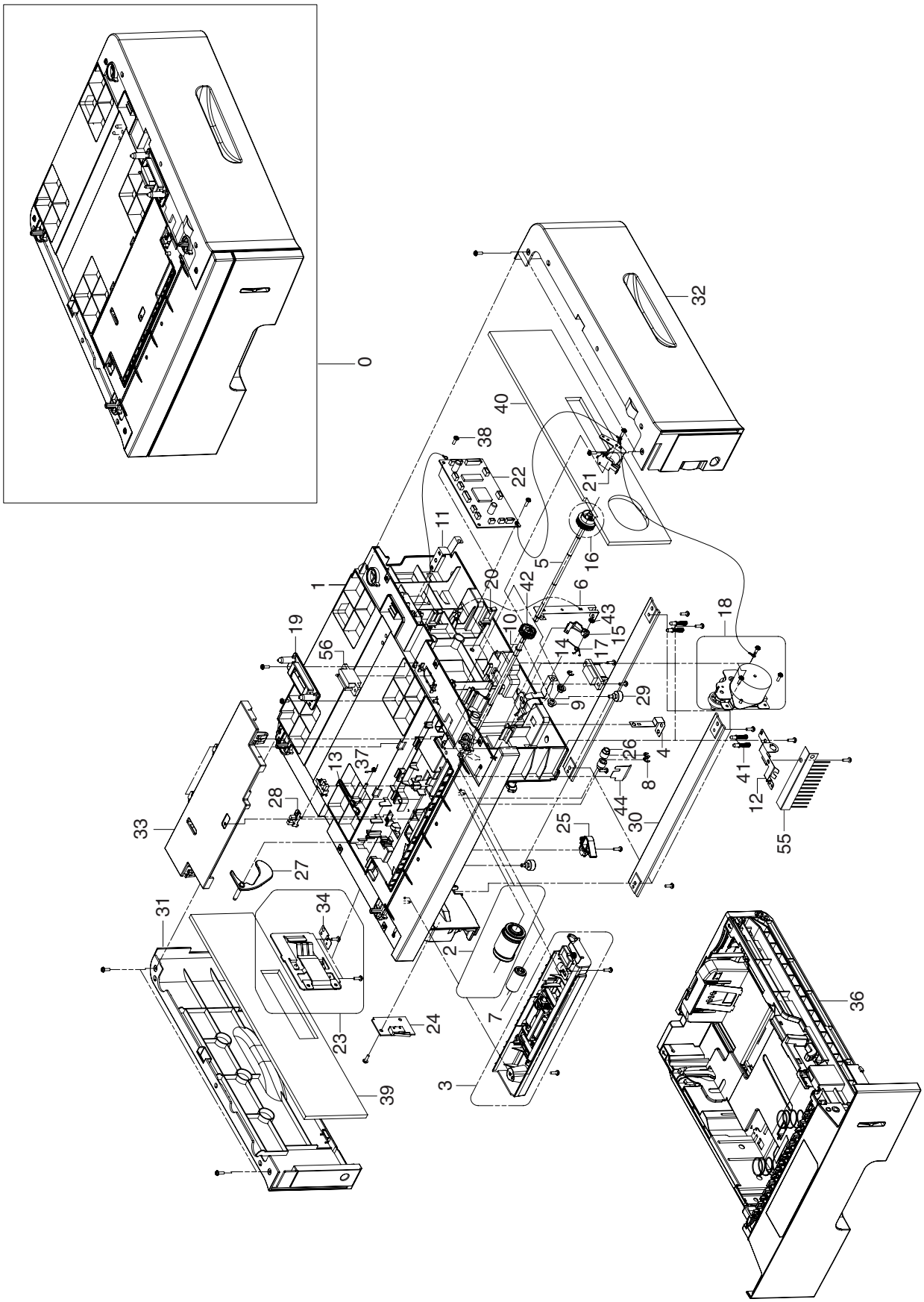
# 7.10 Duplex Unit



Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.10-0 | JC96-03412C | ELA UNIT-DUPLEX | Z6089 | 1 | SA | |
| 7.10-0 | JC96-03412E | ELA UNIT-DUPLEX | Z6089 | 1 | SA | ML-4551NDR |
| 7.10-1 | JC61-01254A | FRAME-M-DUPLEX | Z6096 | 1 | SA | |
| 7.10-2 | JC61-01255A | GUIDE-M-UPPER_DUP | Z6097 | 1 | SA | |
| 7.10-3 | JC63-00693B | COVER-M_REAR_DUP | Z6099 | 1 | SA | |
| 7.10-3 | JC63-00693C | COVER-M_REAR_DUP | Z6099 | 1 | SA | ML-4551NDR |
| 7.10-4 | JC61-01697A | GUIDE-M_ALIGN_DPX | | 1 | SNA | |
| 7.10-5 | JC67-00107A | CAP-M-CONNECTOR_DUP | Z4412 | 1 | SA | |
| 7.10-6 | JC67-00106A | DUCT-M-FAN_DUP | Z4413 | 1 | SA | |
| 7.10-7 | JC31-00004A | FAN-DC_HAWK | F5018 | 1 | SA | |
| 7.10-8 | JC92-01679A | PBA SUB-DUPLEX | Z6105 | 1 | SA | |
| 7.10-8 | JC92-01883A | PBA-DPX | Z6105 | 1 | SA | ML-4551NDR |
| 7.10-10 | JC70-00512A | IPR-TERMINAL GND_DUP | Z6104 | 1 | SA | |
| 7.10-11 | JC64-00191A | LOCKER-M-DUP | Z6102 | 1 | SA | |
| 7.10-12 | JC63-00706A | SHEET-FRAME_DUP | Z4619 | 1 | SA | |
| 7.10-13 | 6107-001165 | SPRING-TS | | 1 | SA | |
| 7.10-14 | JC72-01366A | PMO-ACTUATOR FEED DUP | Z4483 | 1 | SA | |
| 7.10-15 | JC92-01362A | PBA SUB-MP SEN | M0395 | 1 | SA | |
| 7.10-16 | JB39-00103A | CBF HARNESS-LIU GND | L5004 | 1 | SA | |
| 7.10-17 | JC31-00009A | MOTOR STEP | M2150 | 1 | SA | |
| 7.10-18 | JC61-01257A | BRACKET-P-MOTOR_DUP | Z4547 | 1 | SA | |
| 7.10-19 | JC66-00897A | PULLEY-M-30_DUP | Z6103 | 1 | SA | |
| 7.10-20 | 6602-001084 | BELT-TIMING GEAR | Z6091 | 2 | SA | |
| 7.10-21 | JC66-00898A | PULLEY-M-30-DUMMY_DUP | Z4419 | 1 | SA | |
| 7.10-22 | 6044-000231 | RING-E | R0006 | 1 | SA | |
| 7.10-23 | JC39-00450A | CBF HARNESS-D_JOINT | Z6093 | 1 | SA | |
| 7.10-24 | JC66-00444A | SHAFT-IDLE ROLL, DUP | S4108 | 2 | SA | |
| 7.10-25 | JC66-00896A | ROLLER-M-IDLE_ DUP | D2117 | 2 | SA | |
| 7.10-26 | JK72-00058A | PCT-SILP WASHER | | 4 | SNA | |
| 7.10-27 | JC61-01277A | SPRING ETC-DUP | Z4553 | 2 | SA | |
| 7.10-28 | JC66-00900A | PULLEY-M-18-DUMMY_DUP | D2119 | 4 | SA | |
| 7.10-29 | JC66-00899A | PULLEY-18_DUP | D2118 | 2 | SA | |
| 7.10-30 | JC61-00665A | BUSH-M-FEED, DUP | F6042 | 4 | SA | |
| 7.10-32 | JC66-00901A | ROLLER-FEED_DUP | D2145 | 1 | SA | |
| 7.10-33 | 6044-000107 | RING-C | Z4396 | 1 | SA | |
| 7.10-34 | JC70-00457A | ICT-STUD PAPER GUIDE, DP | G2098 | 3 | SA | |

# 7.11 SCF Unit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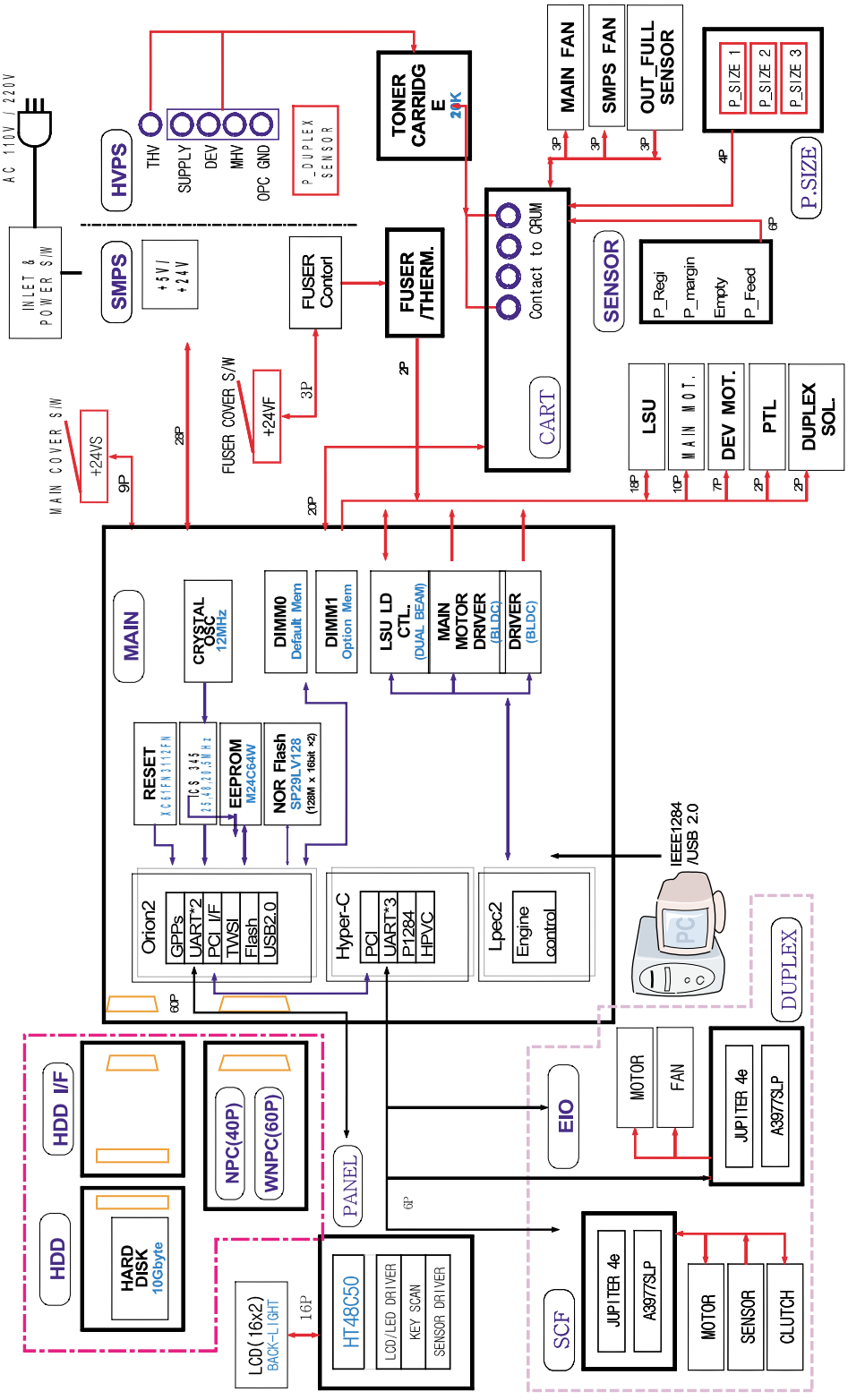
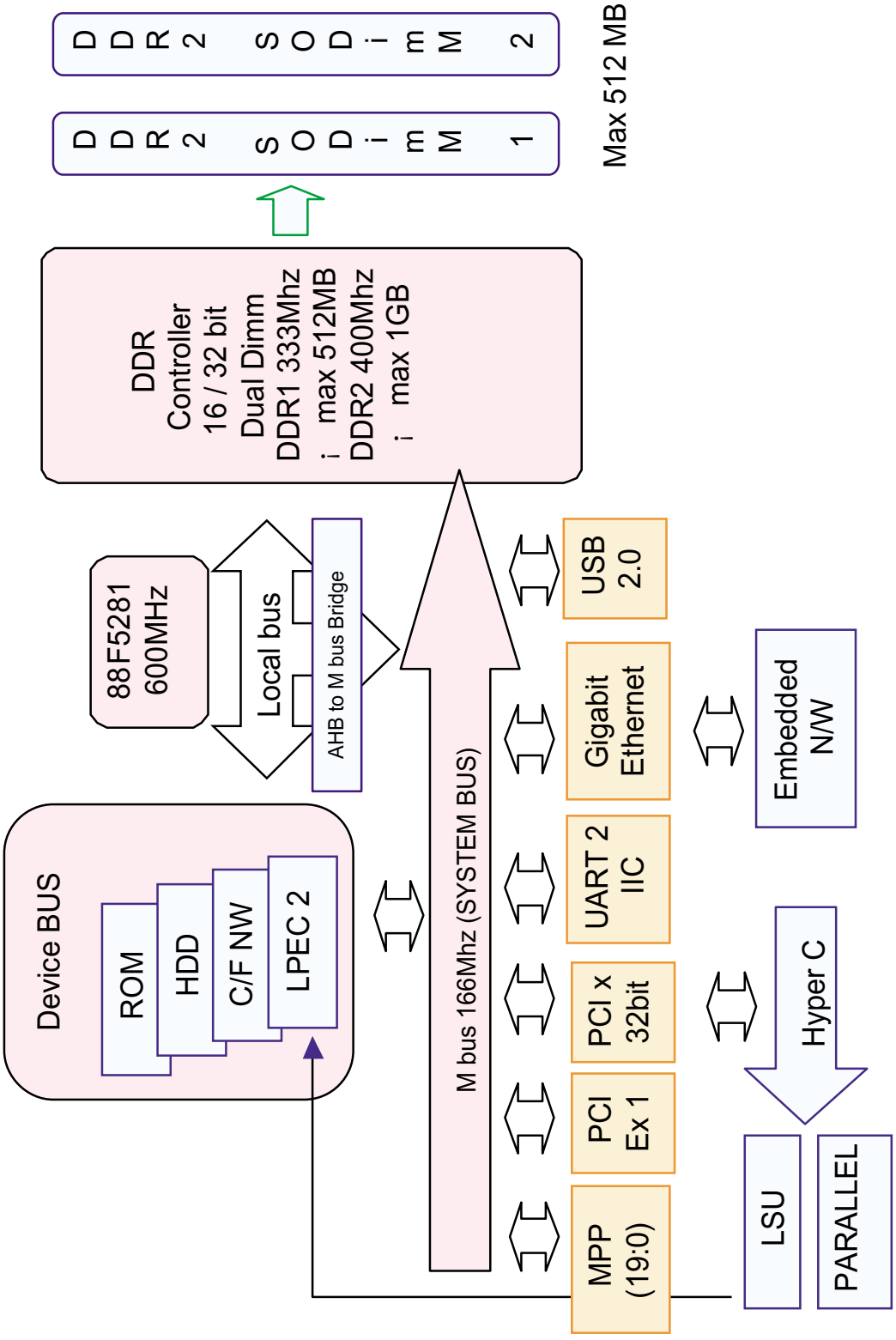
Service(SA:service available, SNA:service not available)

| Drawer# | SEC_Code | Description | Location | QT'Y | Service | Remark |
|---|---|---|---|---|---|---|
| 7.11-0 | JC96-04015D | ELA UNIT-CASSETTE | Z4423 | 1 | SA | |
| 7.11-0 | JC96-04015E | ELA UNIT-CASSETTE | Z4423 | 1 | SA | ML-4551NDR |
| 7.11-1 | 6002-000440 | SCREW-TAPPING | Z4418 | 8 | SA | |
| 7.11-2 | JC64-00189B | INDICATOR-M_EMPTY | Z4569 | 1 | SNA | |
| 7.11-3 | JC61-01244A | GUIDE-P-SIDE_R | Z4573 | 1 | SNA | |
| 7.11-4 | JC61-01225C | GUIDE-M_SIDE LOCK | | 1 | SNA | |
| 7.11-5 | JC61-01220B | FRAME-M_CASSETTE | Z4567 | 1 | SNA | |
| 7.11-5 | JC61-01220C | FRAME-M_CASSETTE | Z4567 | 1 | SNA | ML-4551NDR |
| 7.11-6 | JC61-00751A | GUIDE-P-REAR PAPER CST | G2088 | 1 | SA | |
| 7.11-7 | JC61-01226C | GUIDE-M_REAR | | 1 | SNA | |
| 7.11-8 | JC61-00267D | GUIDE-M_LOCK A | | 1 | SNA | |
| 7.11-9 | JC61-00414A | SPRING ETC-GUIDE PAPER | Z4247 | 1 | SA | |
| 7.11-10 | JC64-00190C | KNOB-M_REAR | | 1 | SNA | |
| 7.11-11 | JC61-01224B | GUIDE-M_EXTENSION CST | Z4574 | 1 | SNA | |
| 7.11-11 | JC61-01224C | GUIDE-M_EXTENSION CST | Z4574 | 1 | SNA | ML-4551NDR |
| 7.11-12 | JC61-01223A | BRACKET-P-EXTENTION | Z4575 | 1 | SNA | |
| 7.11-13 | JG61-70531A | SPRING ETC-LOCKER,PLATE | S0025 | 1 | SA | |
| 7.11-14 | JG66-40003A | GEAR-PINION | O1127 | 1 | SA | |
| 7.11-15 | JC67-00037A | CAP-M-GUIDE SIDE,L | C1014 | 1 | SA | |
| 7.11-16 | JC61-01222A | GUIDE-P-SIDE_L | Z4571 | 1 | SNA | |
| 7.11-17 | JC72-41210A | PMO-LOCKER PLATE | L6038 | 1 | SA | |
| 7.11-18 | JC61-01227A | GUIDE-M-PAPER SIZE | Z4579 | 1 | SNA | |
| 7.11-19 | JC97-02844A | MEA-UNIT_HOLDER PAD | Z4424 | 1 | SA | |
| 7.11-20 | JC61-70911A | SPRING ETC-EXIT ROLL FD | O1053 | 1 | SA | |
| 7.11-21 | JC61-01228A | HOLDER-M-PAD_HOUSING | Z4576 | 1 | SNA | |
| 7.11-22 | JC61-01724A | GUIDE-PAPER | | 1 | SNA | |
| 7.11-23 | JC64-00268A | SHUTTER-PATH | | 1 | SNA | |
| 7.11-24 | JC61-00455A | SPRING ETC-PLATE K/UP | Z4228 | 2 | SA | |
| 7.11-25 | JC61-01245A | PLATE-P-KNOCK UP | Z4570 | 1 | SNA | |
| 7.11-26 | JC73-00141A | RPR-PAD CASSETTE | R0020 | 1 | SA | |
| 7.11-27 | JC61-01221B | GUIDE-M_HANDLE | Z4568 | 1 | SNA | |
| 7.11-27 | JC61-01221C | GUIDE-M_HANDLE | Z4568 | 1 | SNA | ML-4551NDR |
| 7.11-28 | JC68-01552A | LABEL(R)-CASSETTE | | 1 | SNA | |
| 7.11-30 | JC61-00064A | SPRING ETC-CLAW | O1032 | 1 | SA | |
| 7.11-32 | JC63-01206A | GROUND-CASSETTE | Z6101 | 1 | SA | |

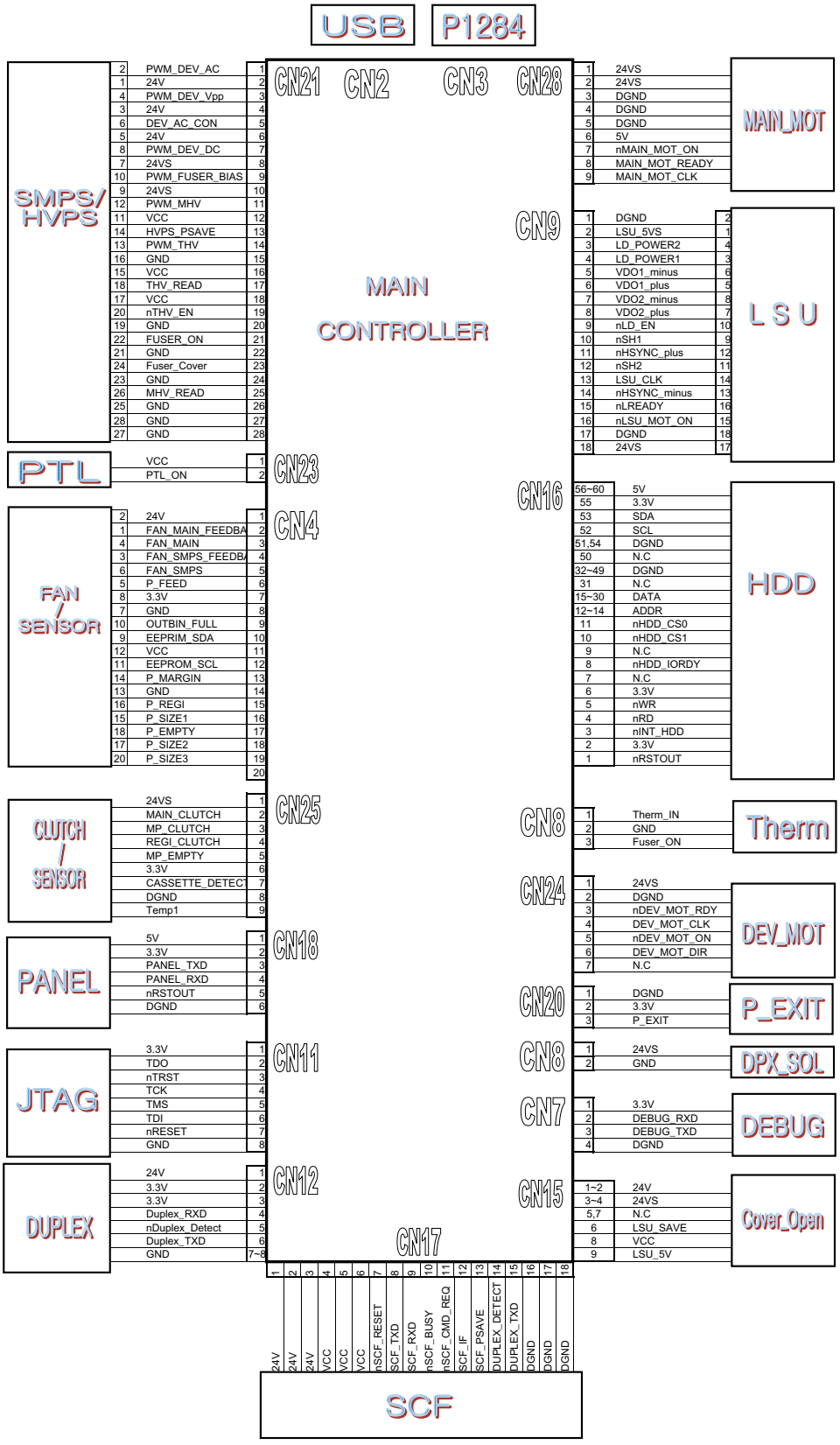
# 8. Block Diagram

## 8.1 System Block Diagram




DDR2 SODIMM 2
DDR2 SODIMM 1
Max 512 MB
DDR Controller 16 / 32 bit Dual Dimm DDR1 333Mhz ¡ max 512MB DDR2 400Mhz ¡ max 1GB
88F5281 600MHz
Local bus
AHB to M bus Bridge
M bus 166Mhz (SYSTEM BUS)
USB 2.0
Gigabit Ethernet
UART 2 IIC
PCI x 32bit
PCI Ex 1
MPP (19:0)
Embedded N/W
Hyper C
LSU
PARALLEL
Device BUS
ROM
HDD
C/F NW
LPEC 2

# 9. Connection Diagram



## [Sinal Description Table]

**CN 18** **(POWER)** Main ↔ SMPS/HVPS

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | DEVE_AC-PWM | 2 | ← |
| 2 | 24V | 1 | ← |
| 3 | DEVE_AC_Vpp | 4 | ← |
| 4 | 24V | 3 | ← |
| 5 | DEVE_AC_CON | 6 | ← |
| 6 | 24V | 5 | ← |
| 7 | DEVE_VDC-PWM | 8 | ← |
| 8 | 24VS | 7 | ← |
| 9 | FUSER_BAIS_PWM | 10 | ← |
| 10 | 3.3V | 9 | ← |
| 11 | MHV_PWM | 12 | ← |
| 12 | 3.3V | 11 | ← |
| 13 | FAN_SMPS | 14 | ← |
| 14 | 3.3V | 13 | ← |
| 15 | THV_PWM | 16 | ← |
| 16 | VCC | 15 | ← |
| 17 | THV_READ | 18 | ← |
| 18 | VCC | 17 | ← |
| 19 | nTHV_EN | 20 | ← |
| 20 | FAN_FEEDBACK | 19 | ← |
| 21 | FUSER COVER | 22 | ← |
| 22 | GND | 21 | ← |
| 23 | GND | 24 | ← |
| 24 | GND | 23 | ← |
| 25 | FUSER_ON | 26 | ← |
| 26 | GND | 25 | ← |
| 27 | GND | 28 | ← |
| 28 | GND | 27 | GND |

**CN 16** **(DUPLEX)** MAIN ↔ DUPLEX B'D

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24VS | 1 | ← |
| 2 | 3.3V | 2 | ← |
| 3 | 3.3V | 3 | ← |
| 4 | DUPLEX_RXD | 4 | ← |
| 5 | DUPLEX_DETECT | 5 | GND(DETECT) |
| 6 | DUPLEX_TXD | 6 | ← |
| 7 | GND | 7 | ← |
| 8 | GND | 8 | ← |
| 9 | GND | | ← |

**CN 17** **(EXIT SENSOR)** MAIN ↔ EXITSENSOR

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | GND | 2 | ← |
| 2 | 3.3V | 1 | ← |
| 3 | P_EIXT | 4 | ← |

**CN 21** **(DC_MOT)** MAIN ↔ MAIN MOTOR

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24VS | 1 | ← |
| 2 | 24VS | 2 | ← |
| 3 | GND | 3 | ← |
| 4 | GND | 4 | ← |
| 5 | GND | 5 | ← |
| 6 | VCC | 6 | ← |
| 7 | nMAIN_MOT_ON | 7 | ← |
| 8 | MAIN_MOT_READY | 8 | ← |
| 9 | MAIN_MOT_CLK | 9 | ← |
| 10 | NC | | |

**CN 22** **(JOINT)** MAIN ↔ JOINT B'D

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24VS | 1 | ← |
| 2 | MAIN CLUTCH | 2 | ← |
| 3 | MP_CLUTCH | 3 | ← |
| 4 | REGI_CLUTCH | 4 | ← |
| 5 | MP_EMPTY | 5 | ← |
| 6 | 3.3V | 6 | ← |
| 7 | CASSESTTE_DETECT | 7 | ← |
| 8 | GND | 8 | ← |
| 9 | TMEP1 | 9 | ← |

**CN 19** **(DEV_MOT)** MAIN ↔ DEVE MOTOR

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24VS | 1 | ← |
| 2 | GND | 2 | ← |
| 3 | nDEV_MOT_READY | 3 | ← |
| 4 | nDEV_MOT_CLK | 4 | ← |
| 5 | nDEV_MOT_ON | 5 | ← |
| 6 | nDEV_MOT_DIR | 6 | ← |
| 7 | NC | | |

**CN 20** **(PTL)** MAIN↔PTL

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | VCC | 1 | ← |
| 2 | PTL_ON | 2 | ← |

**CN 13** **(PANEL)** MAIN ↔ PANEL

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | VCC | 1 | ← |
| 2 | 3.3V | 2 | ← |
| 3 | PANEL_TXD | 3 | ← |
| 4 | PANEL_RXD | 4 | ← |
| 5 | nRSTOUT | 5 | ← |
| 6 | GND | 6 | ← |

**CN 15** **(COVER_OPEN)** MAIN ↔ COVEROPEN

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24V | 1 | ← |
| 2 | 24V | 2 | ← |
| 3 | 24VS | 3 | ← |
| 4 | 24VS | 4 | ← |
| 5 | NC | 5 | ← |
| 6 | COVER_OPEN | 6 | ← |
| 7 | NC | 7 | ← |
| 8 | VCC | 8 | ← |
| 9 | LSU_5V | 9 | ← |

**CN 5** **(DPX_SOL)** MAIN↔DUPLEX SOLENOIDt

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | DUPLEX_SOL | 1 | ← |
| 2 | 24VS | 2 | ← |

**CN 6** **(LSU)** MAIN ↔ LSU

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | GND | 2 | ← (LD DRIVER) |
| 2 | LSU_5V | 1 | ← |
| 3 | LD_POWER2 | 4 | ← |
| 4 | LD_POWER1 | 3 | ← |
| 5 | VDO1_minus | 6 | ← |
| 6 | VDO1_plus | 5 | ← |
| 7 | VDO2_minus | 8 | ← |
| 8 | VDO1_plus | 7 | ← |
| 9 | nLD_EN | 10 | ← |
| 10 | nSH1 | 9 | ← |
| 11 | nHSTNC_plus | 12 | ← |
| 12 | nSH2 | 11 | ← |
| 13 | nHSTNC_minus | 13 | ← |
| 14 | LSU_CLK | 1 | ← (P-MOTOR) |
| 15 | nREADY | 2 | ← |
| 16 | LSU_MOT_ON | 3 | ← |
| 17 | GND | 4 | ← |
| 18 | GND | 5 | ← |

**CN 4** **(CART)** MAIN ↔ TONER SENSOR

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24V | 2 | ← |
| 2 | P_SIZE3 | 1 | ← |
| 3 | FAN_SMPS | 4 | ← |
| 4 | P_SIZE2 | 3 | ← |
| 5 | FAN_MAIN | 6 | ← |
| 6 | P_SIZE1 | 5 | ← |
| 7 | GND | 8 | ← |
| 8 | 3.3V | 7 | ← |
| 9 | OUTBIN_FULL | 10 | ← |
| 10 | CART_CLK | 9 | ← |
| 11 | P_REGI | 12 | ← |
| 12 | CART_DOUT/CART_DIN | 11 | ← |
| 13 | P_EMPTY | 14 | ← |
| 14 | GND | 13 | ← |

**CN 2** **(SCF)** MAIN ↔ SCF B'D

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | 24V | 1 | ← |
| 2 | 3.3V | 2 | ← |
| 3 | SCF_EMPTY | 3 | 3.3V |
| 4 | SCF_RXD | 4 | ← |
| 5 | SCF_DETECT | 5 | ← |
| 6 | SCF_TXD | 6 | ← |
| 7 | GND | 7 | ← |
| 8 | GND | 8 | ← |
| 9 | GND | 9 | ← |
| 10 | GND | 10 | ← |
| 11 | GND | | |

**CN 23** **(THERM)** MAIN↔FUSER

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | THERM_IN | 1 | ← |
| 2 | FUSER_ON | 2 | GND |
| 3 | FUSER_EN | 3 | FUSER_ON |

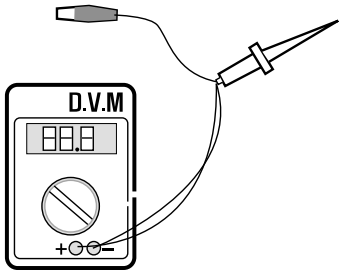
# 11. Reference Information

This chapter contains the tools list, list of abbreviations used in this manual, and a guide to the location space required when installing the printer. A definition of tests pages and Wireless Network information definition is also included.

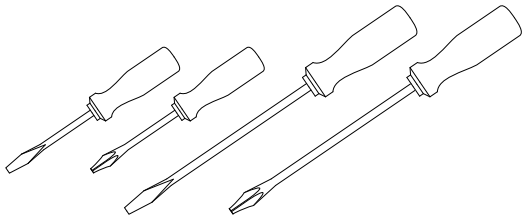
## 11.1 Tool for Troubleshooting

The following tools are recommended safe and easy troubleshooting as described in this service manual.

- **DVM (Digital Volt Meter)**
  Standard : Indicates more than 3 digits.



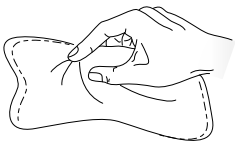

- **Driver**
  Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).



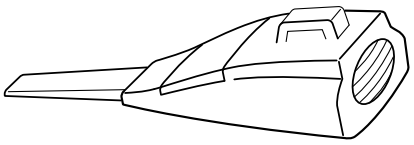
- **Tweezers**
  Standard : For general home use, small type.

- **Cotton Swab**
  Standard : For general home use, for medical service.

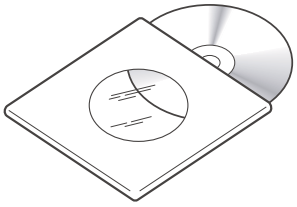
- **Cleaning Equipments**
  Standard : An IPA(Isopropyl Alcohol)dry wipe tissue or a gentle neutral detergent and lint-free cloth.



- **Vacuum Cleaner**



- **Software (Driver) installation CD ROM**



# 11.2 Acronyms and Abbreviations(1)

The table below explains the abbreviations and acronyms used in this service manual. Where abbreviations or acronyms are used in the text please refer to this table.

| Abbreviations | Explanation |
|---|---|
| AP | Access Point |
| AC | Alternating Current |
| APC | Auto Power Control |
| ASIC | Application Specific Integrated Circuit |
| ASSY | assembly |
| BIOS | Basic Input Output System |
| BLDC | Brush-less Direct Current |
| CMOS | Complementary Metal Oxide Semiconductor |
| CN | connector |
| CON | connector |
| CPU | Central Processing Unit |
| dB | decibel |
| dBA | decibel A |
| dBM | decibel milliwatt |
| DC | direct current |
| DCU | Diagnostic Control Unit |
| DPI | Dot Per Inch |
| DRAM | Dynamic Random Access Memory |
| DVM | Digital Voltmeter |
| ECP | Enhanced Capability Port |
| EDC | Embedded Diagnostic control |
| EEPROM | Electronically Erasable Programmable Read Only Memory |
| EMI | Electro Magnetic Interference |
| EP | electrophotographic |
| EPP | Enhanced Parallel Port |
| FPOT | First Printout Time |
| F/W | firmware |
| GDI | graphics device interface |
| GND | ground |
| HBP | Host Based Printing |
| HDD | Hard Disk Drive |
| H/H | High temperature and high marshy place |
| HV | high voltage |
| HVPS | High Voltage Power Supply |
| I/F | interface |
| I/O | Input and Output |
| IC | integrated circuit |
| IDE | Intelligent Drive electronics or Imbedded Drive Electronics |

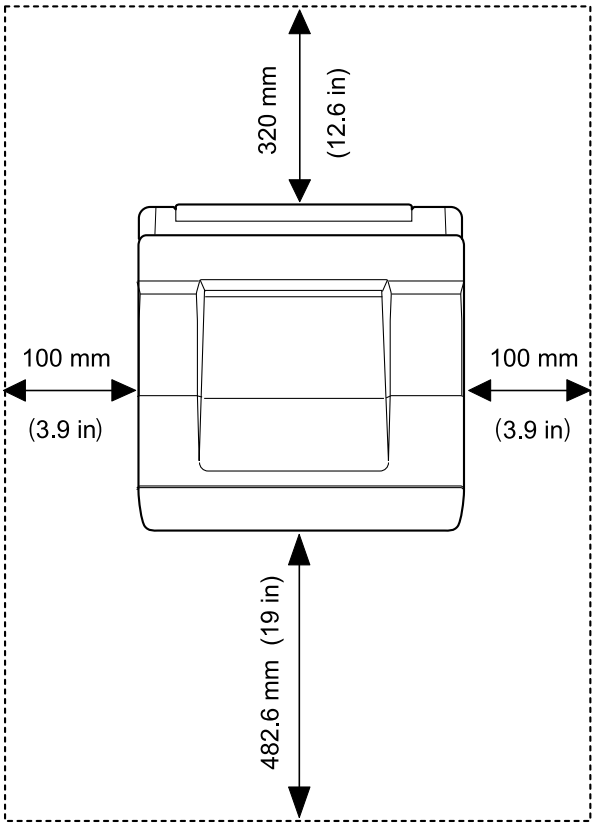
# Acronyms and Abbreviations(2)

| Abbreviations | Explanation |
|---|---|
| IEEE | Institute of Electrical and Electronics Engineers. Inc |
| IPA | Isopropy Alcohol |
| IPM | Images Per Minute |
| LAN | local area network |
| lb | pound(s) |
| LBP | Laser Beam Printer |
| LCD | Liquid Crystal Display |
| LED | Light Emitting Diode |
| L/L | Low temperature and low marshy place |
| LSU | Laser Scanning Unit |
| MB | megabyte |
| MHz | megahertz |
| MPF | Multi Purpose Feeder |
| NIC | Network Interface Card |
| N/N | Normal temperature and normal marshy place |
| NVRAM | nonvolatile random access memory |
| OPC | Organic Photo Conductor |
| OP | Operation Panel Equipment |
| PBA | Printed Board Assembly |
| PCL | Printer Command Language , Printer Control Language |
| PDL | Page Discription Language |
| PPM | Page Per Minute |
| PPS | Pulse Per Second |
| PS | Post Script |
| PTL | Pre-Transfer Lamp |
| PWM | Pulse Width Modulation |
| Q-PID | Quick Printer Initiating Device |
| Q ty | quantity |
| RAM | Random Access Memory |
| ROM | Read Only Memory |
| SCF | Second Cassette Feeder |
| SMPS | Switching Mode Power Supply |
| SPGP | Samsung Printer Graphic Processor |
| SPL | Samsung Printer Language |
| Spool | Simultaneous Peripheral Operation Online |
| SW | switch |
| sync | synchronous or synchronization |
| USB | Universal Serial Bus |
| WECA | Wireless Ethernet Compatibility Alliance |

## 11.3 Select a location for the printer

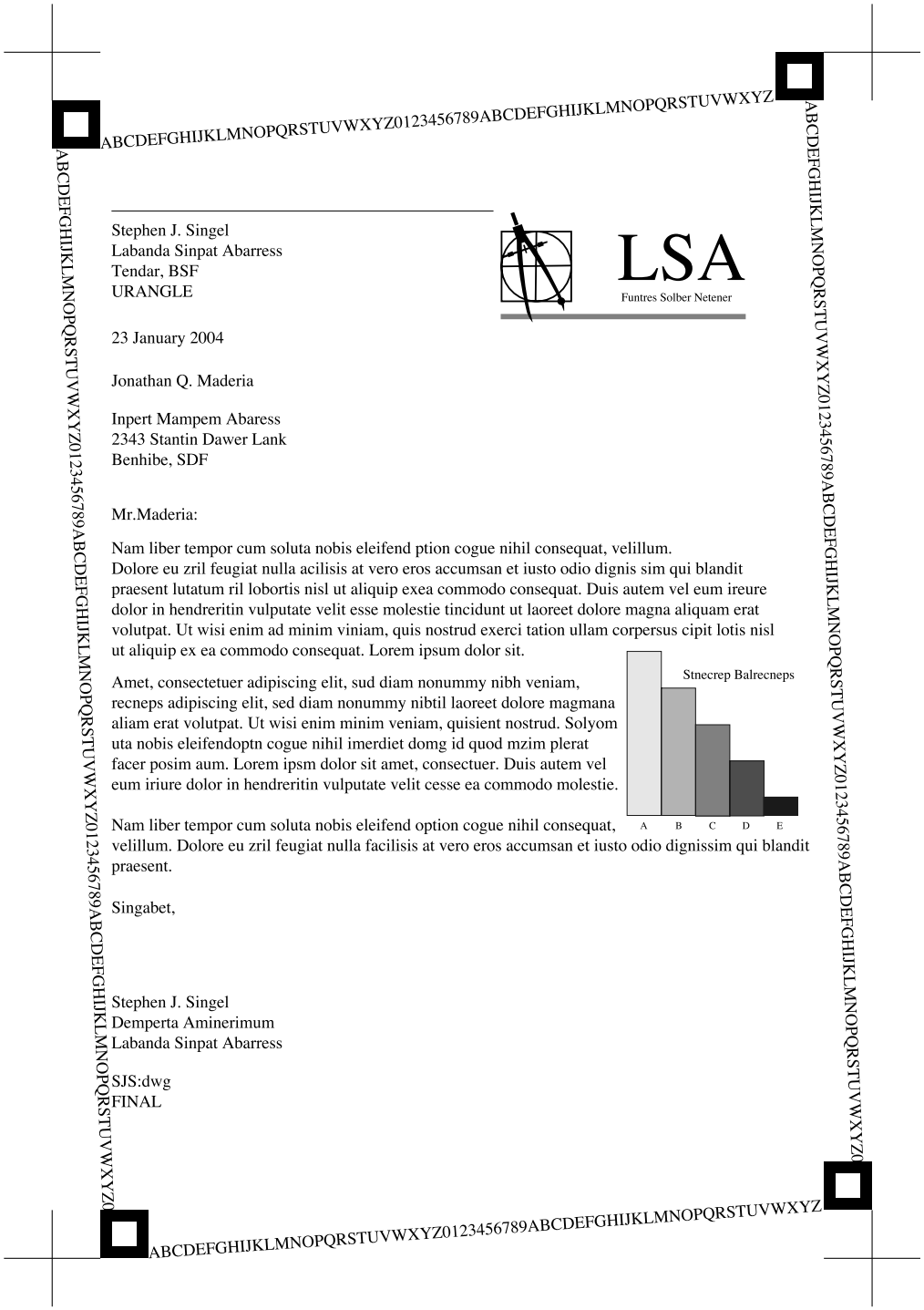
- Leave enough room to open the printer trays, covers, and allow for proper ventilation. (see diagram below)

• Provide the proper environment :
  - A firm, level surface
  - Away from the direct airflow of air conditioners, heaters, or ventilators
  - Free of extreme fluctuations of temperature, sunlight, or humidity
  - Clean, dry, and free of dust



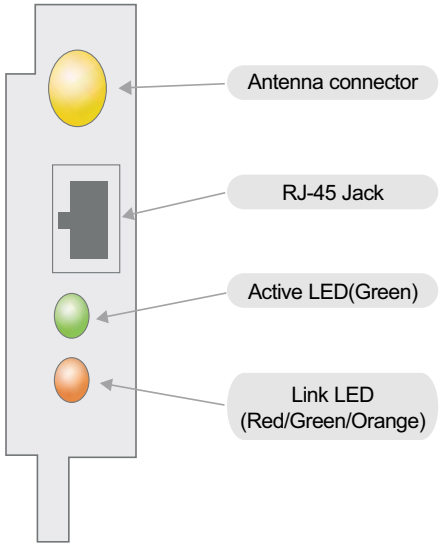
# 11.4 Sample Tests Patterns

The sample patterns shown below are the standard test patterns used in the factory.
The life of the toner cartridge, developer cartridge and printing speed are measured with the pattern shown below. The A4 ISO 19752 standard pattern samples are reproduced reduced to 70% of the actual A4 size.



# 11.5 LAN (Optional Function)

- **This product can be used with a wired LAN (Option)**
- **LED Condition and Status**




**[LED STATUS]**

| LED Condition | Status |
|---|---|
| Active LED random blink | Normal NPC &Normal packet receive |
| Active LED regular blink | Normal NPC &No Packet |
| Active LED Off/On maintenance | NPC Initial inferiority |
| Link LED On | The link LED On OPC,Normally linked (Red:Wireless,Green:Wire,Orange:Wire) |
| Link LED Off | Link LED off NPC,Link Inferiority |


ELECTRONICS




**VERSION NO**. : 1.00 **CODE** : JC-0168R