DIGITAL LASER MFP

SCX-4200 Series

SCX-4200/XEU

Basic Model : SCX-4200

SERVICE Manual

DIGITAL LASER MFP

SCX-4200 Series

The keynote of Product

[Key Features]

- 18ppm Print/Copy Speed

- 600dpi Print/Copy Resolution

- 600 x 2400dpi Scan Resolution

- Samsung Print Language

- 8MB System Momory

- 250sh Paper Input/50sh Paper Output

- Under 42sec Warm-up Time

- 16 x 2 Line LCD Display

- USB 2.0

- 3K Toner Yield: initial(1K), sales(3K)

- Special Copy: ID Copy, Clone, 2-up, Poster, Autofit

SAMSUNG

ELECTRONICS

Contents

Continued

5. Disassembly and Reassembly

6. Troubleshooting

Continued

7. Block diagram

8. Exploded Views & Parts List

9. Connection Diagram

10. Schematic Diagram

11. Reference Information

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 otherwise 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 recommend that this machine be disconnected from the power source when such weather conditions are expected. Do not touch the machine or the power cord if it is still connected to the wall socket in these weather conditions.

(10) Avoid damp or dusty areas, install the printer in a clean well ventilated location. Do not position the machine near a humidifier. Damp and dust build up inside the machine can lead to overheating and cause a fire.

(11) Do not position the printer in direct sunlight. This will cause the temperature inside the printer to rise possibly leading to the printer failing to work properly and in extreme conditions could lead to a fire.

(12) Do not insert any metal objects into the machine through the ventilator fan or other part of the casing, it could make contact with a high voltage conductor inside the machine and cause an electric shock.

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 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.

Samsung Electronics

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 12.1kg Gross Weight(With Package). Use safe lifting and handling techniques. Back injury could be caused if you do not lift carefully.
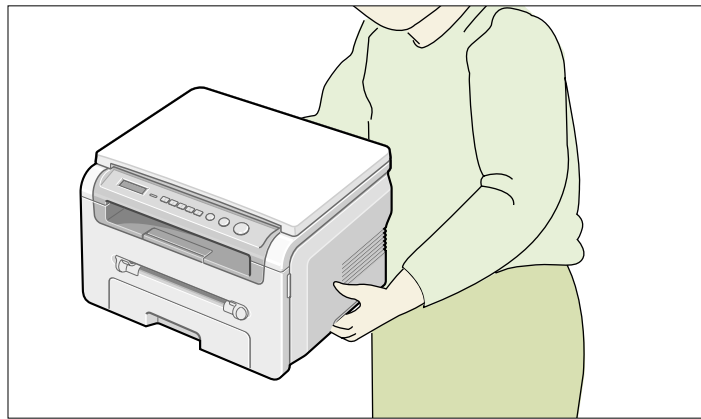
(4) Ensure the printer is installed safely.
The printer weighs 9.5Kg(Net Weight / inc. Toner Cartridge), ensure the printer is installed on a level surface, capable of supporting its weight. Failure to do so could cause the printer to tip or fall possibly causing personal injury or damaging the printer.

(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.

1.4 Super Capacitor or Lithium Battery Precautions

1. Exercise caution when replacing a super capacitor or Lithium battery. There could be a danger of explosion and subsequent operator injury and/or equipment damage if incorrectly installed.

2. Be sure to replace the battery with the same or equivalent type recommended by the manufacturer.

3. Super capacitor or Lithium batteries contain toxic substances and should not be opened, crushed, or burned for disposal.

4. Dispose of used batteries according to the manufacture's instructions.

2. Product Specification

2.1 Product Overview

Item	Descriptions	Remark
Basic Model	SCX-4200/SEE	
Series Model	SCX-4200	
Market of Sailes	Persnal user MFP(Low Price for small work Group.)	
Specification	· 18ppm(Ltr. 19ppm), Chorus2(CPU : Use 16/32 Bit RISC Processor)	
	· Flash Memory : 1 M Byte	
	· 1K(initial), 3K(sailes)	
	· USB 2.0	
	· 250pages feeding, 50pages Face Down	

2.2 Specifications

Specfications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2.2.1 General Specifications

Items			SCX-4200	Remarks
General	Major Features		Copier,Print,Scan	
	Size (W*D*H)		16.6"x15.8" x9.4" (409x362x232mm)	
	Net Weight(Inc. Toner Cartridge)		9.5 Kg	
	Net Weight(exc. Toner Cartridge)		8.7 Kg	
	Gross Weight(with package)		12.1 Kg	
	LCD		16*2 Char	No BackLight
	I/O Interface		USB 2.0	
Power Consumption	Printing Operation		350 Wh	
	Sleep Mode		Energy Star Compliant	
	Power Switch		Yes	
Noise	Operating		53 dBA	
	Standby		38 dBA	
Warm Up Time	from Cold Status		Less than 30 seconds	
Machine Life	Max. Monthly Volume	Print	4K pages	
	(Duty Cycle)	Scan	800 pages	
	Average Monthly Print Volume		500 Pages	
	Machine Life		5 years, 50,000 Pages Whichever comes first.	
Approval			Class B	
Device Memory			8MB	
Internal N/W Option			N/A	
Page Counter			Yes	
Print Configuration Sheet			Yes	
Maintenance	Pickup Roller		50,000 Pages	
	Separation Pad		50,000 Pages	
	Transfer Roller		50,000 Pages	
	Fuser Unit		50,000 Pages	

2.2.2 Print Specification

Items		SCX-4200	Remarks
PRINT	Print Speed	19ppm/Ltr, 18ppm/A4	
	Print Method	Laser	
	Print Language	SPL	
	Power Save	Yes(5/10/15/30/45min.)	
	Resolution — Normal	600 x 600 dpi	
	Resolution — RET	No	
	Toner Save	Yes	LCD Only (Toner Save On/Off Setting method is in the Menu).
	Memory	8MB	
	FPOT — From Stand by	Approx. 11 seconds	
	FPOT — From Cold Status	Less than 41 seconds	
	Duplex Print	N.A	
	Printable Area	208 x 273 mm (Letter)	
	Halftone(Gray Scale)	256 levels	

2.2.3 Scan Specification

Items		SCX-4200	Remarks
SCAN	Scan Method	Color CIS	
	Scan Speed through Platen — Lineart, Halftone	15 sec	
	Scan Speed through Platen — Gray	30 sec	
	Scan Speed through Platen — Color 75dpi/300dpi	75 sec	
	Resolution — Optical	600*2400dpi	
	Resolution — Enhanced	4800dpi*4800dpi (USB)	
	Halftone	256level	
	Scan Size — Max. Document Width	Max.216mm(8.5")	
	Scan Size — Effiective Scan Width	Max 208mm(8.2inch)	
	Scan-to	E-mail, Image, OCR, WEB Through PC	"through PC --> means "from SmarThru4 application".
	Scan Depth — Color	24 bit	
	Scan Depth — Mono	1bit for Lineart, Halftone, 8 Bit for Gray scale	

2.2.4 Copy Specification

Items			SCX-4200	Remarks
COPY	Copy Quality Selection or Original Image type selection Mode	Text	600x300dpi	
		Text/Photo	600x300dpi	
		Photo	600x600dpi for Platen	
	FCOT	Stand by	Approx. 11 seconds	
		From Cold Status	Less than 41 seconds	
	Copy Speed / Letter	SDMC at all mode	19cpm/Ltr. 18cpm/A4	SDMC: Single Document Multiple Copy
	Resolution	Scan:600*600dpi Print:600*600dpi		
	Zoom Range		50% to 200%	
	Multi Copy		1~99	
	Preset		Yes	
	Darkness Control		3 level	Light, Normal, Dark
	Copy Mode(=Original Type)		Text, Text/Photo, Photo	
	Collation Copy		N/A	
	Auto return to default mode		Yes(after 1 minute)	Time can be changeable; 15,30,60,180sec, Off
	Changeable Default mode		Darkness, Original Type, Reduce/Enlarge, No. of Copies,	
	Special Copy	2-up copy	Yes(Platen only)	
		Collation Copy	N/A	
		AutoFit Copy	Yes(Platen only)	
		2 Sides in 1 pg	Yes(Platen only)	* Copy 2-side printed original document into one page(ex. ID Card Copy)
		Clone	Yes(Platen only)	
		Poster	Yes(Platen only)	

2.2.5 Paper Handiling Specification

Items			SCX-4200	Remarks
Paper Handling	Capacity(20lbs)	Main Tray	250sheets	
		Bypass(MP Tray)	Single Sheet	
	Optional Cassette	No		
	Output Capacity		Face Down: 50Sheets/20lb Face Up: 1Sheet	
	Output Control		Face down/Face up	
	Paper Size	Main Tray	Legal,A4,Letter, Folio, Executive, B5, A5, A6	
		Bypass	Bypass:Envelope6 3/4, 7 3/4,#9, #10,DL,C5,B5	With main tray paper
	Paper Weight	Main Tray	16~24 lb.	
		Bypass	16~43 lb.	
	Paper Path	Standard output	Bottom to Top Front (FIFO)	
		Straight Through	Face up, Single Sheet	
	Paper Size	Max	216 x 356mm(8.5"x14")	
		Min	76 x 127mm(3"x5")	
	Compatibility	DOS	No	

2.2.6 Other Specification

| Items			SCX-4200	Remarks
Software	O.S	Win 2.x	No	*Dos(No)
		Win 95	No	
		Win 98&WinME	Yes	
		Win NT 4.0	No	
		Win 2000	Yes	
		Win XP	Yes	
		Mac	Yes	Print, Scan
		Linux	Yes	Print, Scan
	Driver	Printer	SPL	
		TWAIN	Yes	
		WIA	Yes	
	Application	RCP	No	Remote Control Panel, Only for upgrade FW
		PC-FAX	No	Only available through PC
Package and POP	POP		Yes	
	Quick Reference guide (include Setup Guide and Function Guide)	Yes		
Accessory	Owner's manual		Yes(Electronic)	
	S/W CD ROM		1 CD for User Manual, Smar Thru 4, Print Driver, Scan Driver, RCP	
	Toner Cartridge		1 EA	
	Power Cable		1 EA	L-shape power cable
	Telephone Jack		No	
	Printer Cable		No	China,Korea : USB
	Type		One Piece	
Consumables	How to install		Front door open and front loading	
	Toner		Life	Initial 1Kpages running 3Kpages
	Toner Count	Level Sensor	No	
		Software Count	Yes	

3. System Overview

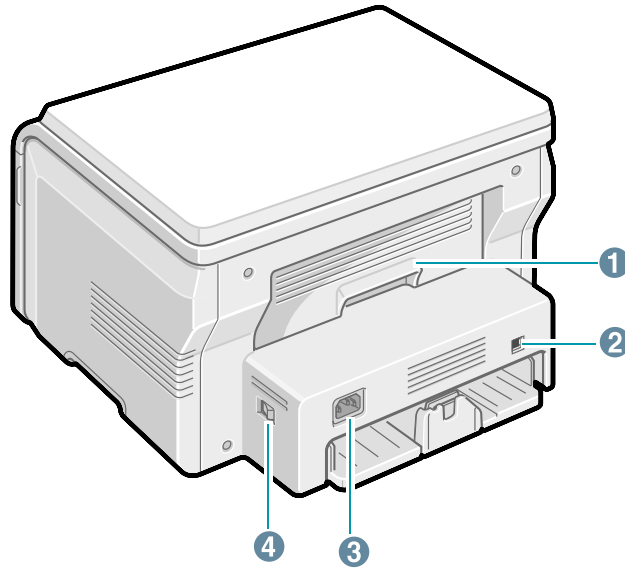This chapter describes the functions and operating principles of the main components.

3.1 System Outline

3.1.1 Front View
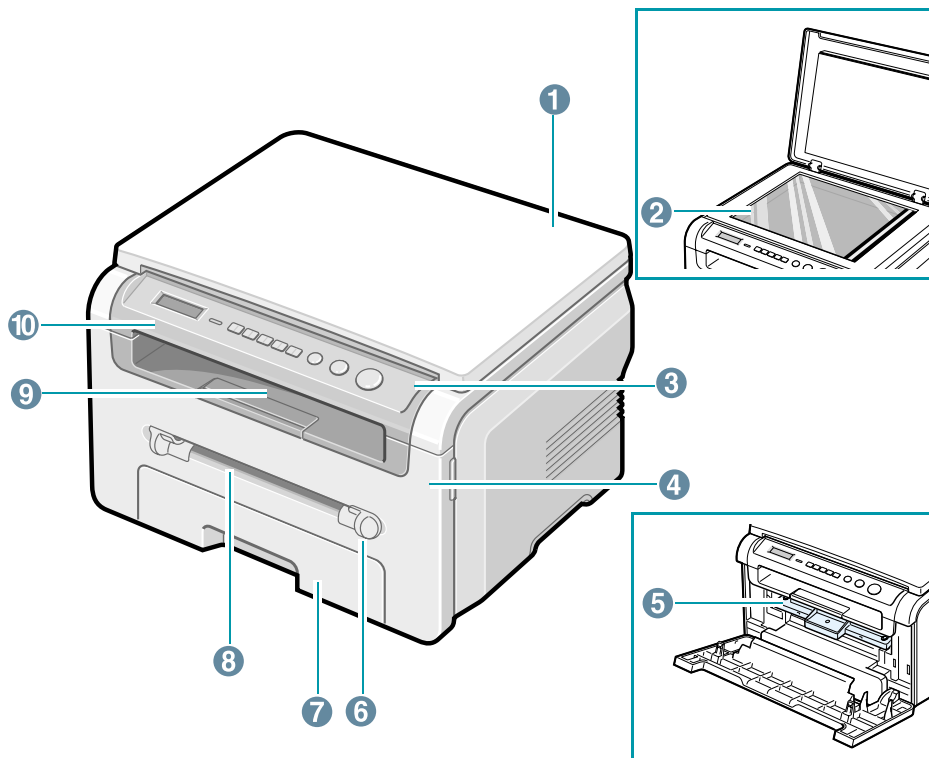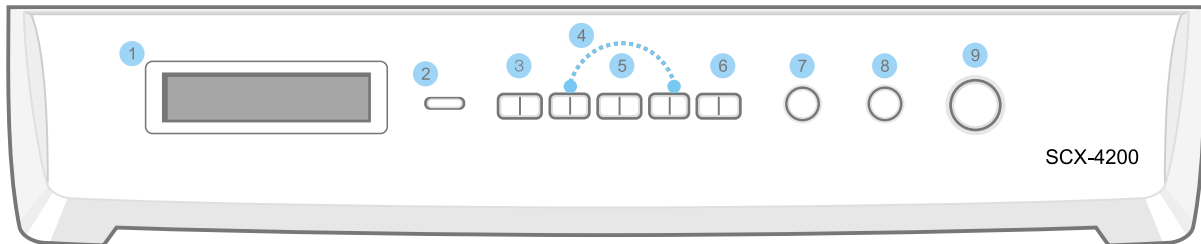

1	document cover	6	manual feeder guides
2	document glass	7	paper input tray
3	control panel	8	manual feeder
4	front cover	9	output tray
5	toner cartridge	10	scan unit

3.1.2 Sensor

1	rear cover	3	power respectable
2	USB port	4	power switch

3.1.3 Control Panel

SCX-4200

1	Displays the current status and prompts during an operation.
2	**Status**- Shows the status of your machine. See page 9.3.
3	**Menu**- Enters Menu mode and scrolls through the available menus.
4	Scroll through the options available in the selected menu.
5	**OK**- Confirms the selection on the display.
6	**Back**- Sends you back to the upper menu level.
7	**Copies**- Allows you to enter the number of copies.
8	**Stop/Clear**- Stops an operation at any time. In Standby mode, clears/cancels the copy options, such as the resolution, the document type setting, the copy size, and the number of copies.
9	**Start**- Starts a job.

3.1.4 System Layout

① Paper Input (Cassette)	⑤ Paper Empty Sensor (Manual)
② Paper Input (Manual Feeder)	⑥ Paper Empty Sensor (Cassette)
③ Paper Out (Face Down)	⑦ Paper Feeding Sensor
④ Paper Out (Face Up)	⑧ Paper Exit Sensor
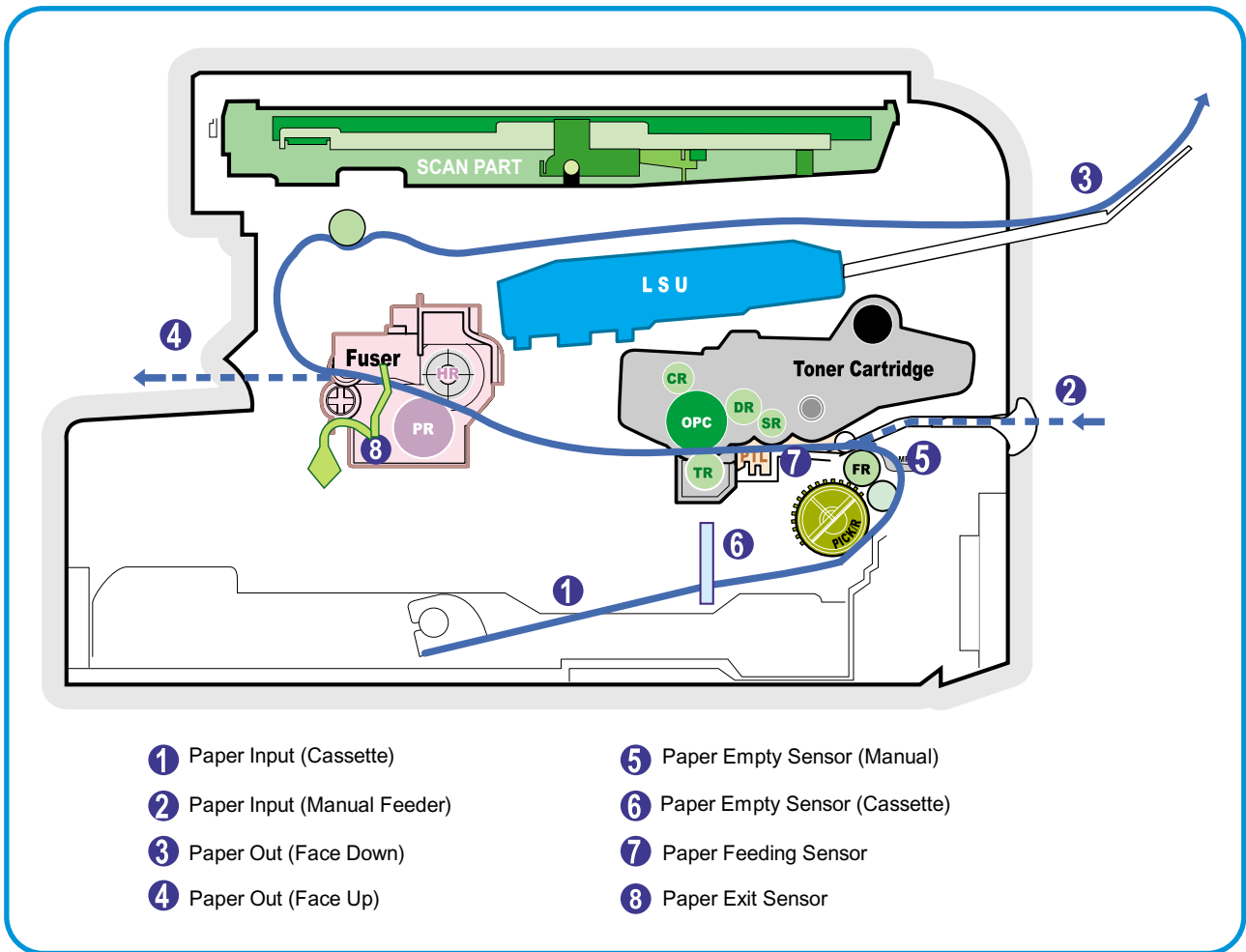
3.1.4.1 Paper Feed Mechanism

The printer has a universal cassette which automatically loads paper and a manual feed which supplies paper single sheet at a time. The cassette has a friction pad which separates paper to ensure single sheet feeding, and it has a sensor, which checks when the paper tray is empty.

- Feeding Method: Universal Cassette Type

- Feeding Standard: Center Loading

- Feeding Capacity: Cassette-250 sheets (75g/m2 , 20lb paper standard)
  Manual 1 sheet (Paper, OHP, Envelop, etc.)

- Paper detecting sensor: Photo sensor

- Paper size sensor: None

3.1.4.2 Transfer Ass'y

This consists of the PTL (pre-transfer lamp) and the Transfer Roller. The PTL shines a light onto the OPC drum. This lowers the charge on the drum's surface and improves transfer efficiency.

The transfer roller transfers toner from the OPC drum surface to the paper.

- Life expectancy: Over 50,000 sheets (at 15~30°C)

3.1.4.3 Drive Ass'y

A gear driven power unit. The motor supplies power to the paper feed unit, the fuser unit, and the toner cartridge.

3.1.4.4 Fixing Part(Fuser)

Heat Lamp type used on 220V Export models and all 110V models.

The Heat Lamp type fuser consists of the Heat Lamp, Heat Roller, Pressure Roller, Thermistor, and Thermostat. It fixes toner to the paper using pressure and heat to complete the printing job.

1)Heat Lamp power cut-off (Thermostat)

The thermostat is a temperature sensing device, which cuts off the power to the heat lamp to prevent overheating fire when the heat lamp or heat roller overheats.

2)Temperature Detecting Sensor (Thermistor)

The Thermistor detects the surface temperature of the heat roller, this information is sent to the main processor which uses this information to regulate the temperature of the heat roller.

3) Heat Roller

The surface of the Heat Roller is heated by the Heat Lamp. As the paper passes between the Heat and Pressure rollers the toner is melted and fixed permanently to the paper. The surface of the roller is coated with Teflon. This ensures that toner does not adhere to the roller surface.

4) Pressure roller

The Pressure Roller mounted under the heat roller, it is made of a silicon resin, and the surface of the roller is tubed with Teflon. This ensures that toner does not adhere to the roller surface.

5) Safety Relevant Facts

• To prevent overheating

      - 1st protection device: Hardware cuts off when overheated

      - 2nd protection device: Software cuts off when overheated

      - 3rd protection device: Thermostat cuts off mains power to the lamp.

• Safety device

      - Fuser power is cut off when the front cover is opened

      - LSU power is cut off when the front cover is opened

      - The temperature of the fuser cover's surface is maintained at less than 80ºC to protect the user and a caution label is attached where the customer can see it easily when the rear cover is opened.

3.1.4.5 Scanner Unit

• **Scan Image Controller**

      1.Scan Line Time : 1.63ms

      2.Scan Resolution : Color : Max 600DPI

      3.Scan Width : 216mm

      4.Function

        - White Shading Correction

        - Gamma Correction

        - CIS Interface

        - 256 Gray Scale

• **CIS Operating Part: CIS use +3.3V**

      - CIS Max Operating Frequency: 5MHz

3.1.4.6 LSU (Laser Scanner Unit)

This is the core of the laser printer. It converts the video data received from the computer into an electrostatic latent image on the surface of the OPC drum. This is achieved by controlling the laser beam and exposing the surface of the OPC drum to the laser light. A rotating polygon mirror reflects the laser light onto the OPC and each side of the mirror is one scan line. The OPC drum turns as the paper feeds to scan the image down the page.
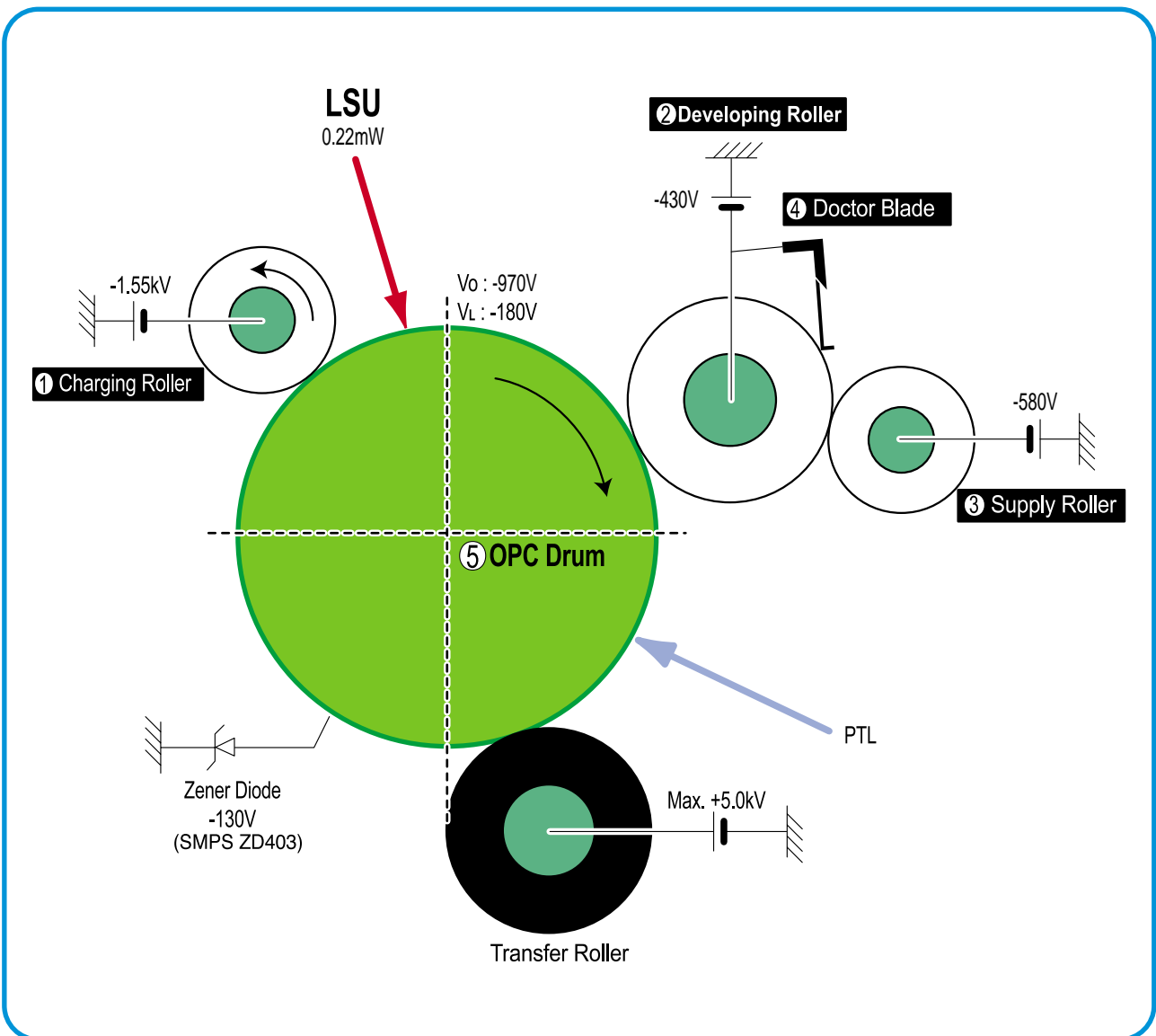
The /HSYNC signal is created when the laser beam from LSU reaches the end of the polygon mirror and this signal is sent to the controller. The controller detects the /HSYNC signal to adjust the vertical line of the image on paper. In other words after the /HSYNC signal is detected the image data is sent to the LSU to adjust the left margin on the paper.
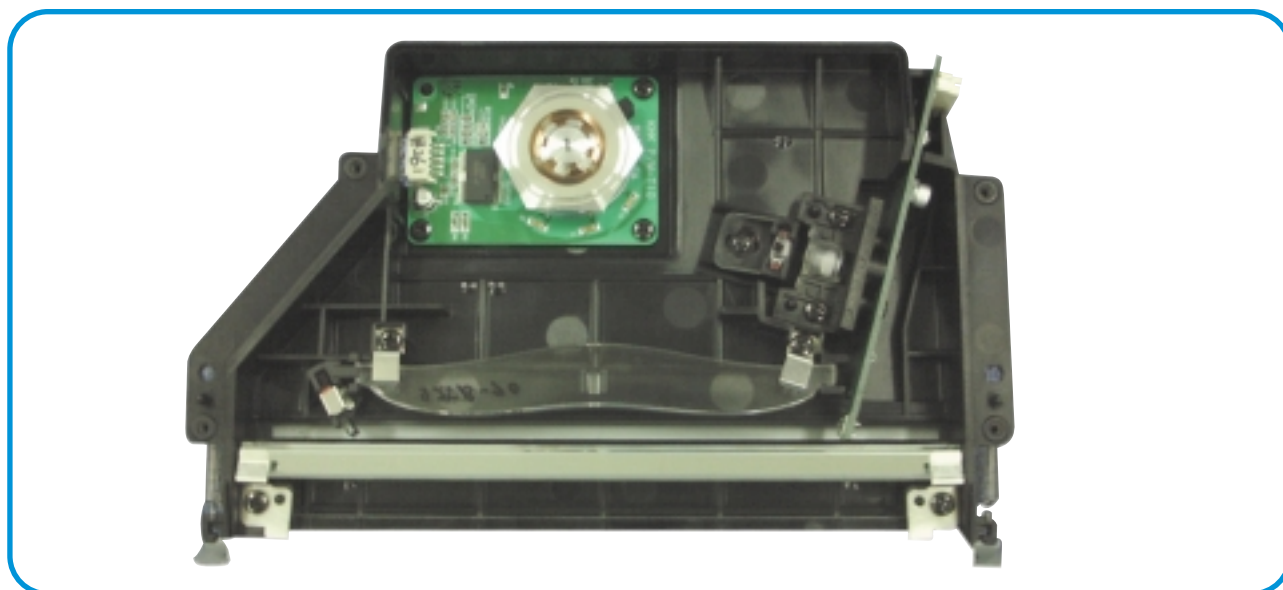
3.1.4.7 Toner Cartridge

The toner cartridge is an integral unit containing the OPC unit and toner unit. The OPC unit consists of the OPC drum and charging roller, and the toner cartridge unit consists of the toner, supply roller, developing roller, and blade (Doctor blade)

- Developing Method: Non magnetic 1 element contacting method
- Toner: Non magnetic 1 element shatter type toner
- The life span of toner: 3,000 sheets (ISO standard)
- Toner remaining amount detecting sensor: No
- OPC Cleaning: Electrostatic process
- Management of waste toner: Electro static process(Cleanerless Type)
- OPC Drum protecting Shutter: No
- Classifying device for toner cartridge: ID is classified by interruption of the frame channel

LSU
0.22mW

❷ **Developing Roller**

-430V

❹ Doctor Blade

-1.55kV

V_o : -970V
V_L : -180V

❶ Charging Roller

-580V

❸ Supply Roller

⑤ **OPC Drum**

PTL

Zener Diode
-130V
(SMPS ZD403)

Max. +5.0kV

Transfer Roller

3.2 H/W Structure and Descriptions

SCX-4200 is roughly made up Main Control part, Operation Panel part, Scanner part, PC interface part and Power part. Each Part is separated Module which focus on common and standard design of different kind products. The main control part is 1 CPU,1 board adopting Chorus 2 Chip which is exclusive MFP ASIC . Scanner part is composed Platen and is connected with Main Cantroller by Harness.

3.2.1 CPU Part

1) CPU : Use 16/32Bit RISC Processor, Chorus 2,which is exclusive controller to execute Printer and to execute operation block by flash memory within system program, and to control whole system.

- Main function block
- Completely Integrated System for Embedded Applications,
- 16/32 Bit Risc Architecture, Efficient and Powerful ARM7 Core.
- LSU Interface Module for Interfacing PVC with LSU
- 5 Channel General Purpose DMA Controllers for High Speed I/O
- Operation Frequency: System: 66MHz, Bus: 66MHz
- Operation Voltage   : 3.3V

2) Flash Memory : Record System Program, and download System Program by PC INTERFACE..

- Size: 1M Byte
- Access time: 70 nsec

3) SDRAM : is used as Page Buffer in Printing, Scan Buffer in Scanning and System Working Memory Area

- Size: 8Mbyte
- 3.5 MB: System Working Memory Area and Scan Buffer
- 4.5 MB: Printing System Working Memory Area
- Max Frequency: 133MHz
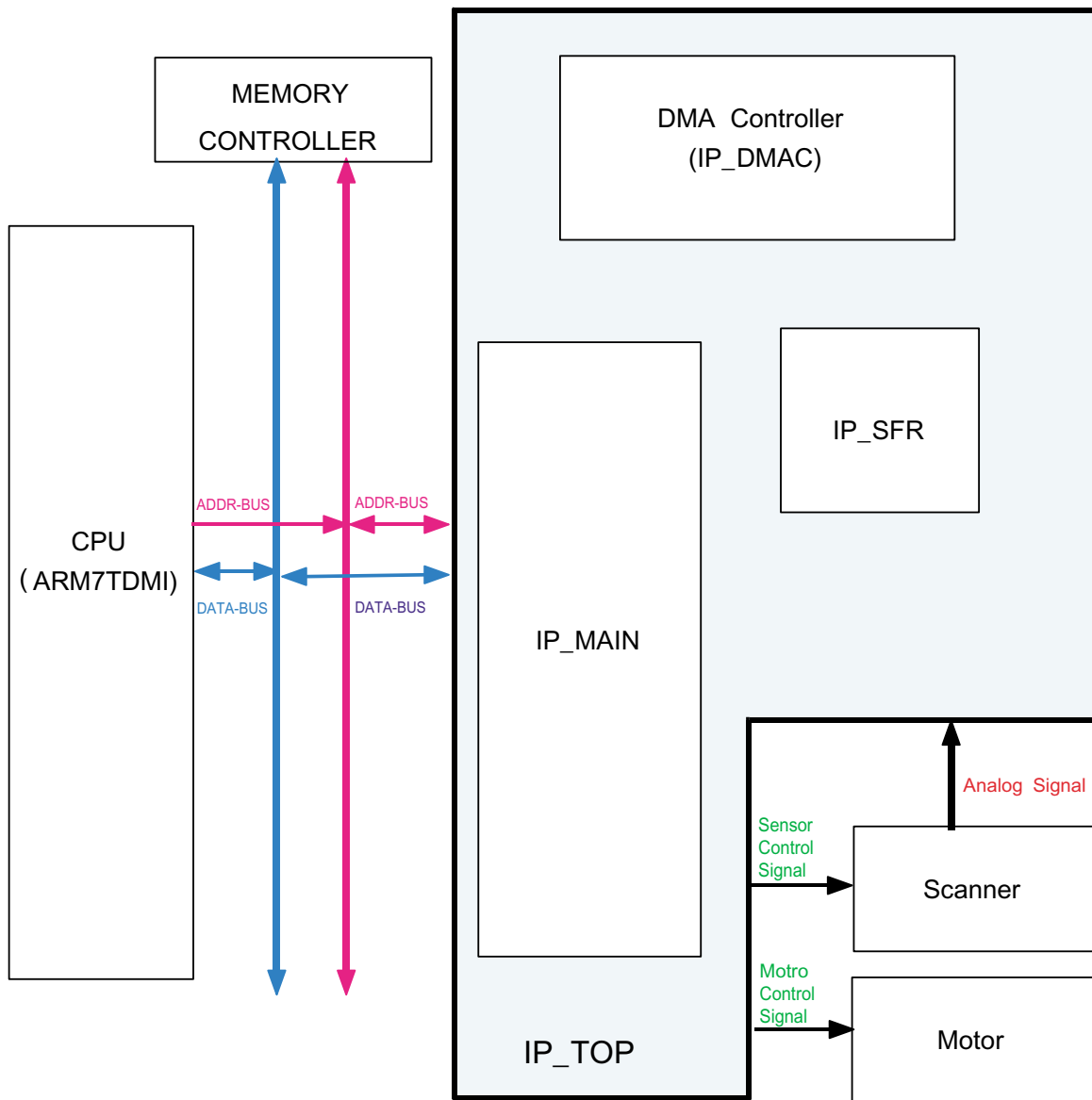
IP_TOP interface

3.2.2 Scan Part

1) Pictorial signal input part: output signal of CIS passes through Bypass Cap change to ADC at IP Main and defined signal between AFE and IP Main processes the Image signal. When AFE accept each pixel, CDS (Correlated Double Sampling) technique which samples arm-level twice is used on each pixel by using IP signal.

2) Pictorial image processing part: read CIS Pixel data in terms of 600dpi Line and process LAT algorithm on text mode, Error Diffusion Algorithm on Mixed mode, and store Data at Scan Buffer on PC Scan mode without algorithm. On every mode Shading Correction and Gamma Correction are executed ahead then processing is executed later.

   * Scan Image Control Specification
   ① Minimum Scan Line Time: 1.23ms
   ② Scan Resolution: Max. 600 x 2400 DPI (optical)
   ③ Scan Width: 216mm
   ④ main function
      - Internal 10bit ADC
      - White Shading Correction
      - Gamma Correction
      - CIS Interface
      - 256 Gray Scale

3) CIS Operating Part : CIS use +3.3V
      - CIS Maximum Operating Frequency : 5MHz
      - CIS Line time : 1.63ms
      - White Data output Voltage : 1.7V -(Mono Copy, 5ms/line)

3.2.3 Ope Pannel

1) Configuration
Operation Panel uses Main Control and separated Ope Chip Micom and work as inner program, systemic operation is serial system which exchange Data with SIO Port of Main Control. Ope Panel is approximately composed of Micom part, Matrix part and LCD.

2) Micom controller
Micom has ROM, RAM, I/O Port built-in and displays and lights LCD by CPU command of Main Control Part and report Key recognition Data to Main Control Board.

3.2.4 Printer Section

Printer is consisted of the Engine parts and F/W, and said engine parts is consisted of the mechanical parts comprising Frame, Feeding, Developing, Driving, Transferring, Fusing, Cabinet and H/W comprising the main control board, power board, operation panel, PC Interface.

The main controller is consisted of Asic(Chorus2) parts, Memory parts, Engine.

Interface parts and it functions as Bus Control, I/O Handling, drivers & PC Interface by CPU.

Memory Access supports 16bit Operation, and Program Memory 1MB and Working Memory as well.
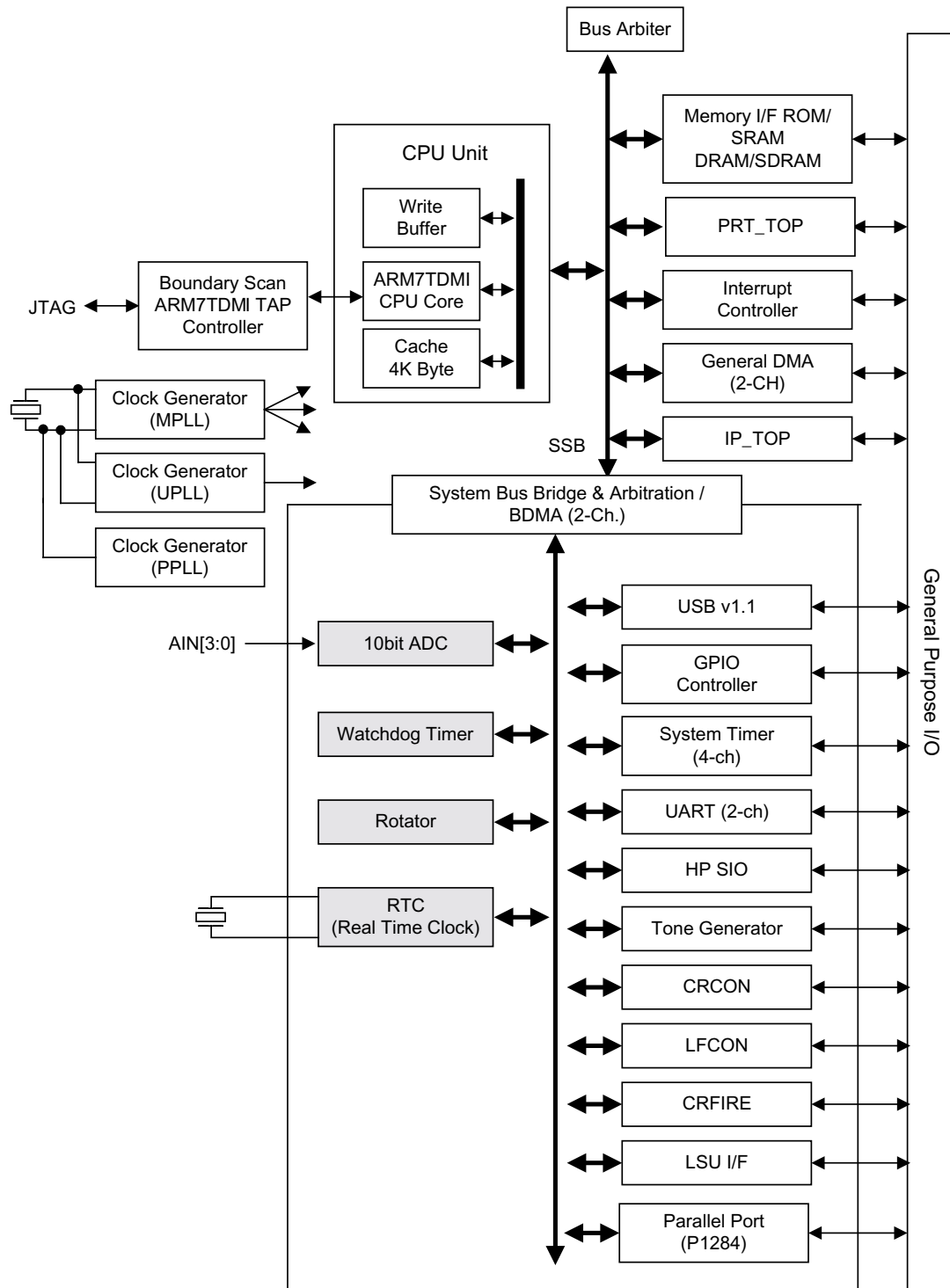
The Engine Board and the Controller Board are in one united board, and it is consisted of CPU part and print part in functional aspect. The CPU is functioned as the bus control, I/O handling, drivers, and PC interface. The main board sends the Current Image, Video data to the LSU and manages the conduct 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.

3.2.4.1 ASIC

■ Chorus 2
  - 16/32-bit RISC embedded processor core
  - 4KB instruction cache and 4KB data cache
  - No Tightly Coupled Memory
  - Memory Protection Unit & CP15 control program
■ Printer Video Controller for LBP engines
■ Graphic Execution Unit for banding support of Printer Languages
■ Printer Video Controller for LBP engines
  - PVC: Printer Video Controller without RET Algorithm
■ Engine Controller
  - Motor Control Unit
  - Motor Speed Lookup Table Memory (128 x 16 x 2)
  - Pulse Width Modulation Unit
  - 2 Channels are supported
  - ADC Interface Unit
  - 2 ADC Channels are available
  - ADC Core maximum clock frequency: 2.5 MHz
■ USB 2.0 Interface
■ Package : 208-LQFP-2828
■ Power : 1.8V(Core), 3.3V(IO) power operation
■ Speed : 66MHz core(ARM7TDMI) operation, 60MHz bus operation

■ **Chorus 2 Block Diagram**

3.2.5 Copier Part

1) Copy Mode:	Black and White
2) Scanner Type:	CIS with Flatbed/Platen
3) Maximum Size of Original:	⇒ Platen: 216 x 297 mm
(max. width = 216 mm, max length = 297 mm)	
4) Optical Resolution: 600 x 600 dpi	
5) Copy Quality - H x V:	⇒ Text : 600 x 300 dpi (default)
(User selectable via Content button)	⇒ Mixed : 600 x 300 dpi
	⇒ Photo : 600 x 600 dpi
6) Supported Media Types:	Plain, Label, Cardstock, Transparency
7) Copy Speed:	⇒ Platen, SDMP: 19cpm (Letter)
(SDMP = Single Document, Multiple Printout)	
8) Reduce/Enlarge:	⇒ Platen: 50% - 200% (1% increments)
9) Non-printable Area:	4 mm (Top, Bottom, and each Side)
10) Copy Count:	1 to 99
(Page count displayed on LCD during copy operation)	
11) Copy Modes:	Text, Text/Photo, Photo
12) Fixed R/E Setting:	100%, Auto-fit
13) Darkness Control:	3 levels
14) First Copy Output Time (FCOT):	⇒ Platen: 11 sec. (600 x 300 dpi)
15) Duplex Copy	⇒ Manual

3.2.6 SMPS & HVPS

The SMPS supplies DC Power to the System.

It takes 110V/220V and outputs the +5V, +24V to supply the power to the main board . The HVPS board creates the high voltage of THV/MHV/Supply/Dev and supplies it to the developer part for making best condition to display the image. The HVPS part takes the 24V and outputs the high voltage for THV/MHV/BIAS, and the outputted high voltage is supplied to the toner, OPC cartridge, and transfer roller.

3.2.6.1 HVPS (High Voltage Power Supply)

■ Transfer High Voltage (THV+)

- Input Voltage : 24 V DC $\pm$ 15%

- Output Voltage : MAX +5.0KV $\pm$ 5 %,(Duty Variable, no loading)

- Input contrast of the Voltage stability degree : under $\pm$ 3 % (fluctuating input 21.6V~26.4V)
  Loading contrast : $\pm$3 % or less

- Output Voltage Rising Time : 100 ms Max

- Output Voltage Falling Time : 100 ms Max

- Fluctuating transfer voltage with environmental various : +650 V~ 5 KV

- Environment Recognition Control Method : The THV-PWM ACTIVE is transfer active signal. It detects the esistance 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.

■ Charge Voltage (MHV)

- Input Voltage : 24 V DC $\pm$ 15%

- Output Voltage : -1.3KV ~ -1.8KV DC $\pm$ 3%

- 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.

- Input Voltage : 24 V DC $\pm$ 15%

- Output Voltage : -1KV $\pm$ 15%

- Output Voltage Rising Time : 100 ms Max

- Output Voltage Falling Time : 100 ms Max

■ Developing Voltage (DEV)

- Input Voltage : 24 V DC $\pm$ 15%

- Output Voltage: -200V ~ -600V DC $\pm$ 3%

- Output Voltage Fluctuation range: PWM Control

- Input contrast of the output stability degree : $\pm$ 3 % or less
  Loading contrast : $\pm$ 3 % 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 : -400 V ~ -800V DC ±5%(ZENER using, DEV)
   - Input contrast of the output stability degree : under ± 3 %
     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.

3.2.6.2 SMPS (Switching Mode Power Supply)

It is the power source of entire system. It is assembled by an independent module and completely common use with SCX-4200, so it is same characteristic with SCX-4200. It is mounted at the bottom of the set.

It is consisted of the SMPS 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 +5V and +24V.

■ AC Input
   - Input Rated Voltage: AC 220V ~ 240V   AC 110V ~ 127V
   - Input Voltage fluctuating Range: AC 198V ~ 264V   AC 99V ~ 135V
   - Rated Frequency: 50/60 Hz
   - Frequency Fluctuating Range: 47 ~ 63 Hz
   - Input Current: Under 5.0Arms / 2.5Arms (But, the status when lamp is off or rated voltage is inputted/outputted)

■ Rated Output Power

NO	ITEM	CH1	CH2	CH3	Remark
1	CHANNEL NAME	+5V	+24V	+24.0VS	
2	CONNECTOR PIN	CON2 5V PIN 3, 4, 24 GND PIN 5,6	CON 2 24V PIN:13 GND PIN:7, 9, 10	CON 2 24VS PIN:11, 12 GND PIN:7, 9, 10	
3	Rated Output	+5V ±5% (4.75~5.25V)	+24V-10/15% (21.6~27.6V)	+24VS-10/15% (21.6~27.46V)	
4	Max. Output current	1.0A	0.5 A	1.0 A	
5	Peak Loading voltage	1.5A	1.0 A	1.5 A	1ms
6	RIPPLE NOISE Voltage	Under 150m Vp-p	Under500mVp-p	Under 500mVp-p	
7	Maximum output	5.0W	12W	24W	

■ Consumption Power

NO	ITEM	CH1(+5V)	CH2(+24V)	CH3(+24VS)	System
1	Stand-By	0.2A	0.07A	0.07 A	AVG : 100 Wh
2	PRINTING	1.0A	0.5A	1.0 A	AVG 350 Wh
3	Sleep-Mode	0.2A	0.02A	0.03A	AVG : 10 Wh

■ Length of Power Cord : 1830 ±50mm

■ Power Switch: Use

■ Feature
  - Insulating Resistance: 100㏁ or more (at DC 500V)
  - Insulating revisiting pressure: Must be no problem within 1 min. (at 1,000V-LV / 1,500Vac-HV,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 : Bi-Wave 3kV(2Ω) - Normal, 6KV(12Ω) - Common

■ Environment Condition
  - Operating Temperature Range: 0℃ ~ 40℃
  - Maintaining Temperature Range: -25℃ ~ 85℃
  - Preserving Humidity Condition: 30% ~ 90% RH
  - Operating Atmospheric Pressure Range: 1atm

■ EMI Requirement: CISPR, FCC, CE, MIC

■ Safety Requirement: IEC950 UL1950, CSA950, C-UL, Semko, CB, CCC(CCIB),GOST, EPA, Power Save

3.2.7 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 Phototriac (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 PC102 (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 PC102 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 (PC102)
  - Turn On If Current : 15mA ~ 50mA(Design: 16mA)
  - High Repetive Peak Off State Voltage : Min 600V

3.3 S/W Structure and Descriptions

3.3.1 Architecture
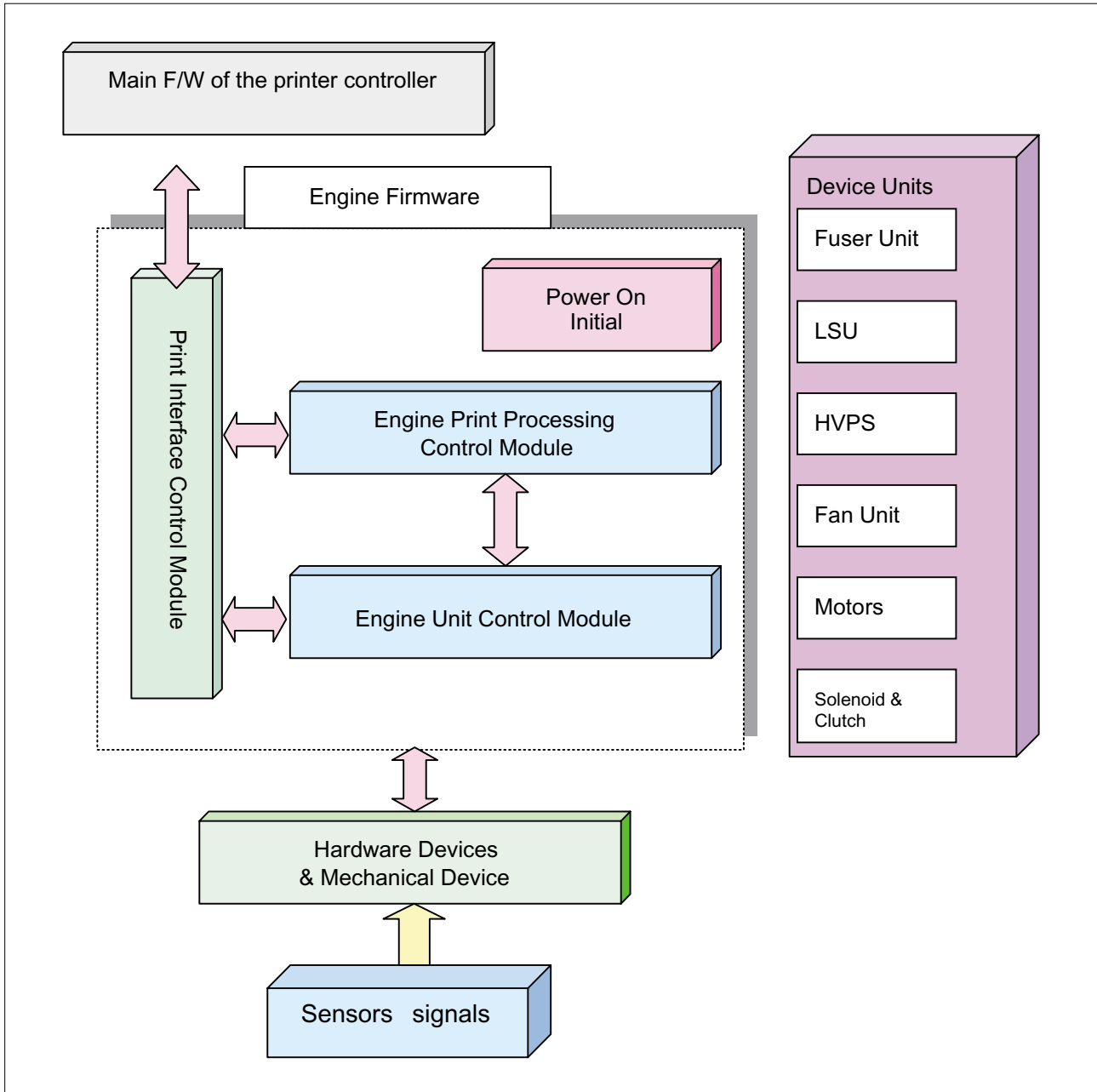
The following diagram shows the Engine Control System.

Fig 1. The architecture of the engine firmware

3.3.2 S/W Overview

Engine Control F/W is executed every 10msec by the timer interrupt of the main system.

And it consists of 4 control modules. Power on Initial, Engine Print Processing Control, Print Interface Control and Engine Unit Control Module. Major operations of the Printer Engine Control F/W are following.

- Control the Pick-Up, Feeding and Discharging of Paper
- Control the LSU
- Control the HVPS for the Developer Process
- Control the Temperature of Fuser unit
- Control the Motor

3.3.2.1 Power on Initial Module

If it turns on the power of the printer, the main f/w calls this module of the engine first. And so the printer engine control firmware executes the necessary initialization. After that, the other modules of the printer engine control firmware are called and executed. Specially, in this module H/W ports or variables related to critical action must be initialized.

3.3.2.2 Engine Print Processing Control Module

The main control module largely consists of 4 sub functions. First function is that processes virtual timer jobs, second function does a Time Processing for checking elapsed time and counter, the third function is that is doing jam processing and final function is that doing state processing for the each engine state.

- **Virtual timer function:** This is about the virtual timer used to control time process in the engine part. This consists of three parts. One is the action part to declare ID and Function, another is the execution part to run the timer and the function and the other is the stop part to stop the timer. This controls the process unit as time.
- **Time Processing function:** This is function that processes a timer for counter, elapsed time after on time.
- **Jam Processing function:** It checks the jam state under conditional status.
- **State processing function:** This is about the processing of the engine status. This controls the printer according to the state of the engine. These states consist of many states according to the engine mode.

3.3.2.3 Print Interface Module

Print Interface Control Module communicates with the main system for receiving the command from main system and transmitting the present status of engine for requested status. There are several sub functions. One is a function for receiving command from the main system. Second is a function that informs the main system of the current engine status for requested item. And there is function that calls sub-functions for specific operations that is requested by printer controller or printer engine firmware.

3.3.2.4 Engine Unit Control Module

Engine Unit Control Module consists of 4 sub-functions. The first function is a fixing unit control function. At this function, it controls the temperature of a fixing unit for regulating temperature of the unit within a fixed range that is set following paper type and number of printout. The second function is a fan control function that controls operation of fan unit. And the third function is a sensor status management function. It gets the present status of each sensor and sets the status of each sensor. Finally there is a Unit and Device control function. In this function, it controls the devices and units for example: Motor, Clutch, and so on.

3.3.2.5 Paper Size

Eiger does not have a paper size sensor. So the information of the paper size is basically received from the main system. But the engine measures the paper size with the counter value based on the time of the feed sensor on-off when the paper is fed. We obtain the interval distance between paper and paper in the information from the main system and the measured interval distance. Comparing two interval distances, we choose the paper size with which the paper has a larger interval distance. The default value of the paper size is a legal.

3.3.2.6 Paper Type

The information of paper type is sent by the main system. The engine considers following paper types.

Plain Paper	OHP
Envelope	Card Stock
Label	Thin
Bond	Thick
Colored Paper	Preprinted

It controls a fuser temperature and a pick-up time according to above paper type. Each control depends on its mechanism.

Normally, papers with hard thickness are controlled by maintained a high temperature. But a paper like OHP is controlled at the lower temperature.

3.3.3 Functional Requirements of Fixing Unit (Fuser) Handling

The fixing control depends on its fixing mechanism. And according to a paper type, a paper size, an elapsed printed time, or the number of accumulated Printing Pages, a fixing control is different. Moreover, it may be different according to hardware specs, which are a flicker, an inner temperature and so on.

3.3.3.1 Print Mode

There are warm-up, stand-by, printing, error and sleep mode in the print mode. Every mode is one of major elements to decide the fixing temperature.

At the warm-up mode, the engine makes the temperature of the fixing unit rise up to the warm-up target temperature, which is normally the same as the stand-by temperature.

At the stand-by mode, it maintains the specified temperature of the fixing unit in order to reduce the time to print the first page.

At the printing mode, it controls the temperature of the fixing unit according to the paper type, the paper size, the number of accumulated printing pages, the elapsed printing time and the environment index.

3.3.3.2 Paper Type

The paper type is also one of major elements to decide the temperature of the fixing unit. According to the paper type, the temperature is different. Generally, a thick paper has higher temperature and OHP has lower temperature than a plain paper does. The fixing unit has a different temperature according to the paper type mentioned in 3.1.2.2. Paper Type

3.3.3.3 Paper Size

If the paper width is narrow, the temperature of fuser roller does not uniformly at overall surface of the roller. So in this case, the engine controls the interval of pick up of the paper.

But because it does not have a sensor for a paper width, it judges whether a paper width is a narrow paper by a paper length. If it judges a current paper size is below B5, it regards as a narrow paper. Normally, if a paper size is a narrow, the interval of pick up is lengthened according to an elapsed printing time and the number of accumulated Printing Pages.

3.3.3.4 Accumulated Printing Pages

If more pieces of paper are printed than the specified number of the paper, the inner temperature of machine may be saturated. In this case, the engine keeps the temperature of the fixing unit with the specified temperature. The accumulated printing pages are cleared at the sleep mode.

3.3.3.5 Elapsed Printing Time

If the printing job is done over the fixed time, the inner temperature of machine may be saturated. In this case, the engine keeps the temperature of the fixing unit with the specified temperature. The elapsed printing time is cleared at the sleep mode.

3.3.3.6 Temperature in the Stand-By mode

At the stand-by mode, the engine controls the temperature of the fixing unit for maintaining a specified temperature for reducing printing time of the first page.

Moreover, the temperature depends on an environment condition. For example, normally the temperature in low temperature and low marshy place is maintained higher than that in normal temperature and normal marshy place.

3.3.3.7 Temperature in the Warm-Up mode

When the engine operates the warm-up processing, it controls the temperature of the fixing unit for raising the temperature to the stand-by temperature.

3.3.3.8 Environmental Index

The engine checks the present environment when it performs the printing job or the warm-up process and then with the checked result, the temperature of fixing unit is assigned with a different temperature for each mode.

It is very important to control the temperature of the fixing unit in the printing process and there are many requirements for it. Therefore, a Temperature Table is defined and given by the fixing unit team. See the attachment.

3.3.4 Functional Requirements for LSU Control

LSU receives the image data from PVC and make the latent image on OPC surface.

It uses the single beam .

The Eiger has many different registers for LSU. These registers are in manual book of CHORUS2, the CPU of the Eiger.

3.3.4.1 LSU Ready Check

The Eiger will pick up the paper when the LSU is ready. And when the paper picked up meets the feed sensor, it will check whether the LSU is ready or not and the Hsync is detected or not for appointed time.

3.3.4.2 Sequence of LSU module

The laser scanning unit control is executed when engine control module receives print command.

- Setting up the initial value

- With above results, it controls the polygon motor and laser diode when receives print command.

- With above results, it monitors register value related to LReady and Hsync, and if the error happens, it sets up the error flag

- If no error happens with above results, set up the values to mask the video data for horizontal and vertical region but if happens, it will be recovered according to the recovery sequence.

3.3.5 Functional Requirements of Environment Recognition

It is intended to gain the index to indicate the inner environment in a present machine. The engine is divided into several levels with the index.

It is used to control high-voltage values deciding the warm-up time, the fixing temperature and high voltage value to supply to the developer unit.

3.3.5.1 Transfer Roller

There are two cases to recognize the environment for taking the environmental index.

- Recognizing Environment without paper: It is operated when OPC is revolved without the paper.
- Recognizing Environment with paper: It is operated when the front edge of the paper is between the transfer roller and OPC

3.3.5.2 Air Temperature Sensor

N/A

3.3.5.3 Environment Recognition

There are several reference voltages to supply to the transfer roller in order to recognize the environment. At first, it supplies the lowest voltage to the transfer roller and then when a fixed time is elapsed, it reads the resistance value of the transfer roller by means of the ADC unit. It operates until the value is lower than a specified value. If the value is lower than a specified value, it decides an array index for the voltage and then searches an appropriate index in the table presented by the developer team

3.3.6 Functional Requirements of HVPS Control

The engine supplies the developer unit with high voltage through the HVPS unit in order to form the image on the paper fed through the paper pass. So the engine-control f/w supplies the high voltage to the developer unit at the specified time and position of the paper during the printing process.

The HVPS unit is controlled by PWM. The output voltage is determined by PWM duty. For reference, PWM cycle is about 14 KHz presented by the power team.

There are 3 kinds of high-voltages as follows:

3.3.6.1 MHV

 This high-voltage is supplied to the OPC drum through the charging roller while charging the skin of the OPC drum with a minus voltage.

3.3.6.2 THV

3.3.6.2.1 THV +

The (+) transfer high voltage is supplied to the transfer roller to transfer the toner on the OPC drum to the paper. It is determined by the environmental index.

3.3.6.2.2 THV -

The (-) transfer high voltage is supplied to the transfer roller for cleaning polluted transfer roller by moving the toner remained a transfer roller to the OPC drum. The value is fixed to about -1000V.

3.3.6.3 DEV

This high-voltage is supplied to the developer roller to move the toner to the skin of the OPC drum scanned by laser beam while printing the image.

The engine controls if a high voltage is supplied or not and its quantity.

The developer team presents the timing chart to control the high voltage.

3.3.7 Functional Requirements of Power Save Mode

The power save mode is controlled by the main system firmware. In order to switch the ready state to the power save mode after a specified time, the main system sends a sleep command to the engine. When the engine receives a sleep command, it stops the operation of the fixing unit and the fan unit in the engine and sets the engine state as a sleep state. Determination of run or stop operation is different according to the engine status.

A user can select one of pre-defined times as power save time from Driver UI. The setting value for power save time is OFF, 5min, 10min, 15min, 30min, 45min, and 60min. The default time is 5min. Although OFF is selected, power save time is operated 2 hours to protect fuser.

3.3.8 Functional Requirements of Toner Cartridge

3.3.8.1 Installation Toner Cartridge

The engine of the Eiger doesn't check it but the main f/w checks it. The method to check whether it is new or old is the crum. The crum stores the ID, the opc cycle, the toner consumption and so on.

3.3.8.2 Toner Save

This function is to save the toner consumption. The methods to save toner are three. One is to modulate the video data by lookup table in the main f/w; another is to modulate the DEV voltage in the engine f/w. Of course, the two methods can be used by compounded each other. And the last method is controlling the power of laser diode.

3.3.9 Functional Requirements of OPC Drum

3.3.9.1 Clean OPC Drum

To clean the contamination of the OPC drum, the remnants of toner should be removed.

- Manual: There is the function that the user can use anytime. When user selects this function, the engine receives the OPC cleaning command from the main system, and then performs the cleaning processing.
  There are two methods to clean the OPC. One is the minus clean mode, and the other is the plus clean mode.
- Minus clean mode: Supplying minus voltage to transfer roller for removing toner with negative pole.
- Plus clean mode: Supplying plus voltage to transfer roller for removing toner with plus pole.
  The developer team presents the cleaning process.

3.3.10 Functional Requirements of Fan Operation

The fan is always driven except a sleep mode and a special condition to cool the inner temperature of the machine or LSU. When the engine becomes the error mode, the engine stops the fan operation. However, when the engine enters the sleep mode, the engine stops the fan operation after 5minutes because of toner fixing. But it may make an exception in some status.

- The Fan activated at that time warmming_up and printing.

3.3.11 Door Open

When the cover is open, the engine detects the status and stops all functions. As a next step, it informs an error message of the main system and then the error message is displayed at LCD window. If the cover is closed, the engine operates the warm-up process.

3.3.12 No paper

- Operation: The recording paper has run out. Engine notify to the printer system. And then the error message is displayed at LCD window.
- To remove the error: When the error is happened, if the user loads the paper in the paper feeder, then the error is removed. The developer team presents the cleaning process.

3.3.13 Checking Paper jam

Paper Jam happens when a paper is not fed to required position by a mechanical obstacle.

· The paper jam is decided by checking the states of sensors while moving the paper. There are a feed sensor and an exit sensor in the paper-feeding path.

· The jam is classified to 3 types according to the position of the paper.

3.3.13.1 Paper Jam 0

This is the status that the paper doesn't arrive in the feed sensor. If the feed sensor is not activated within the specified time after re-picking up the paper, the engine decides that the paper is jammed or used up. So the engine informs the error status of the main system and the error message is displayed at LCD window informing the error status of the user. The specified time will be decided based on a mechanical design length. When Paper Jam0 happens, fuser and fan is off. The control of fuser and fan may be changed.

3.3.13.2 Paper Jam1

This is the status that the paper is jammed between the feed sensor and the exit sensor. If the feed sensor is active or the exit sensor is not active after the specified time from activating the feed sensor, the engine decides the paper is jammed. Also, if the status (the exit sensor and the feed sensor are active) is maintained, the engine decides the paper is jammed by the structure of the mechanism after the specified time. So the engine informs the error status of the main system and the error message is displayed at LCD window informing the error status of the user. The specified time or steps will be decided based on the mechanical design length and the paper size. When Paper Jam1 happens, fuser and fan is off.

3.3.13.3 Paper Jam2

This is the status that the paper is jammed after it passes the exit sensor. If the exit sensor is still active after the specified time from activating exit sensor, the engine decides the paper is jammed. So the engine informs the error status of the main system and then the error message is displayed at LCD window informing the error status of the user. The specified time or steps will be decided based on the mechanical design length and the paper size. . When Paper Jam2 happens, fuser and fan is off.

3.3.14 Out Bin Tray Full

N/A

3.3.15 Temperature

3.3.15.1 Open Heat Error

When the engine operates the warm-up process, if the temperature of the fixing unit is not higher than a specified temperature, the engine defines Open Heat Error. When this error is broken out, the engine stops all functions and keeps the error state. Also, the engine informs the error status of the main system. And then the error message is displayed at LCD window informing the error status of the user.

3.3.15.2 Low Heat Error

When the engine is at stand-by, printing or warm-up mode, if the temperature of the fixing unit is lower than the specified temperature at each state and the lower temperature state is maintained during the specified time, the engine defines Low Heat Error. When this error is broken out, the engine stops all functions and keeps it at the error state. Also the engine informs the error status of the main system. And then the error message is displayed at LCD window informing the error status of the user.

3.3.15.3 Over Heat Error

For overall engine state, if the temperature of the fixing unit is higher than the specified temperature and the temperature state is kept during the specified time, the engine defines Over Heat Error. When this error is broken out, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system. And then the error message is displayed at LCD window to inform the error status of the user.

· To recover the heat error: The heat error recovery is operated automatically when the error is only caused by Low Heat Error, not the Heat Errors in Warm-up state and the Over Heat Error. If an error happens, then the engine memorizes a present temperature. In case of Low Heat Error, the maximum heat is supplied to the fixing unit. When a specified time is elapsed, the engine detects the temperature again. If the present temperature is higher than the memorized temperature, the error is recovered. In case of Over Heat Error, no heat is supplied to the fixing unit. When a specified time is elapsed, the engine detects a present temperature again. If the present temperature is a specified degree lower than the memorized temperature, the error is recovered.

3.3.16 LSU Error

The errors related to LSU are as follows:

· By LReady: When the printing is started, the engine drives the polygon motor of LSU. After the specified time is elapsed, if the motor is not in a ready status, the engine detects the error that the polygon motor is not in a ready status. If this error happens, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system and the error message is displayed at LCD window to inform the error status of the user.

· By Hsync: When the polygon motor is ready, the LSU sends out the signal called Hsync and used to synchronize with each image line. So, if the engine does not detect consecutively the signal for a fixed time, it defines the Hsync Error. If this error happens, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system and then the error message is displayed at LCD window to inform the error status of the user.

4. Alignment and Adjustments

This chapter describes some of the main service procedures including:
Using the EDC mode; Clearing paper jam and test patterns.
Much of this chapter is also included in the user's guide.

4.1 Engine Test Mode/ Tech Mode

The Engine Tests Mode supplies useful functions to check the condition of the engine. It tests the condition of each device and displays the result of the test on the LCD. It is classified into 5 functions (0~4), and are shown below.

4.1.1 To enter the Engine Test Mode/ Tech Mode

To enter the Engine Test mode

EDC Mode : "Menu -> Copies -> ◄ -> ► -> Menu -> ◄ "in sequence, and the LCD briefly displays

Tech Mode : "Menu -> Copies -> ◄ -> ► -> Menu -> ► "In sequence, and the LCD briefly displays

'Engine Test [Diagnostic]', the machine has entered Engine Test Mode.

• To enter a lower menu (Sub menu) Press the Start/Enter key.

• To exit into an upper menu Press the Menu/Exit key.

• To return to the user menu Press the Menu/Exit key.

4.1.2 Diagnostic

Main Menu	Engine test	Remark
ENGINE TEST MTR FAN SOL ETC	Motor Test	1 : On, 2 : Off
	PickUp Test	1 : On, 2 : Off
	Fan Test	1 : On, 2 : Off
	Manual Clt Test	1 : On, 2 : Off
	PTL Test	1 : On, 2 : Off
ENGINE TEST LSU TEST	LSU Motor Test	1 : On, 2 : Off
	LSU Hsync Test	1 : On, 2 : Off
	LD Test	1 : On, 2 : Off
ENGINE TEST SENSOR TEST	Feed Sen Test	Check : Check Start
		Next : Next Sensor Check
	Exit Sen Test	Check : Check Start
		Next : Next Sensor Check
	Cover Sen Test	Check : Check Start
		Next : Next Sensor Check
	Empty Sen Test	Check : Check Start
		Next : Next Sensor Check
	Manual Sen Text	Check : Check Start
		Next : Next Sensor Check
ENGINE TEST HEAT TEST	Therm ADC 220~85	1 : On, 2 : Off (maintain the fusing temp. 65C~230C)
ENGINE TEST HVPS TEST	MHV Test	1 : On, 2 : Off (-1550V ± 50V)
	Dev Bias Test	1 : On, 2 : Off (-430V ± 20V)
	THV EN/NEG Test	1 : On, 2 : Off (-1000V +300V/-150V)
	THV ON (1300V)	1 : On, 2 : Off (+1300V ± 20V)
	THV ADC 1300V	1 : On, 2 : Off
	THV ADC 600V~3550V	1 : On, 2 : Off (Compare each ADC Value)

4.2 Paper Path

1	Paper Input (Cassette)	**5**	Paper Empty Sensor (Manual)
2	Paper Input (Manual Feeder)	**6**	Paper Empty Sensor (Cassette)
3	Paper Out (Face Down)	**7**	Paper Feeding Sensor
4	Paper Out (Face Up)	**8**	Paper Exit Sensor

<Jam0>   <Jam1>   <Jam2>
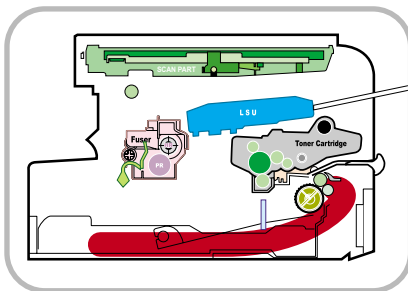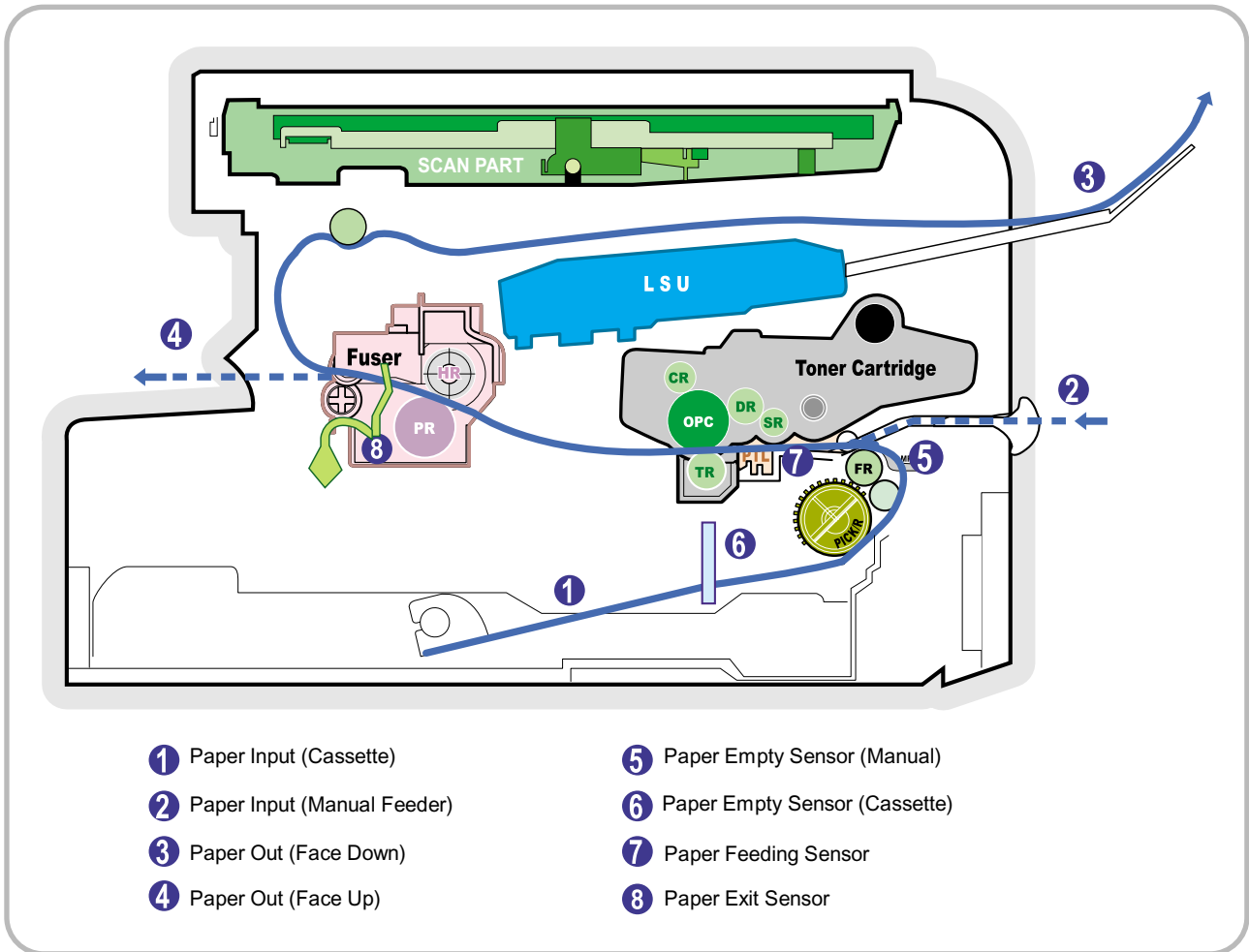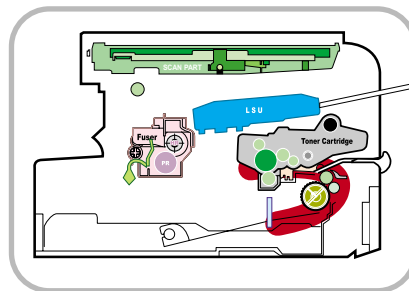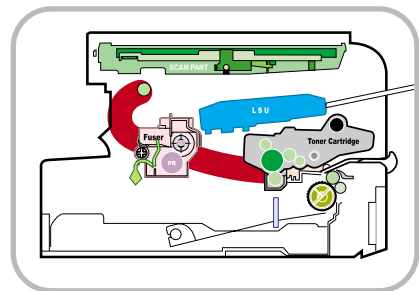
1) After receiving a print command, the printer feeds paper from the main cassette or manual feeder as required.

2) The paper being fed passes the paper feed sensor. (Jam 0 occurs if the sensor is not operated within a certain time)

3) Having passed the paper feed sensor the paper moves to the paper exit sensor via printing process. (Jam 1 occurs if the sensor is not operated within a certain time)

4) The paper then passes through the paper exit sensor and out of the set. (Jam 2 occurs if the trailing edge of the paper does not pass the exit sensor within a certain time of the paper leading edge activating the exit sensor)

4.3 Clearing Paper Jams

When a paper jam occurs, "Paper Jam" appears on the display. Refer to the table below to locate and clear the paper jam.

Message	Location of Jam
PAPER JAM 0 OPEN/CLOSE DOOR	In the paper tray
PAPER JAM 1 OPEN/CLOSE DOOR	In the paper exit area
PAPER JAM 2 CHECK INSIDE	In the fuser area or around the toner cartridge
BYPASS JAM	In the manual feeder

To avoid tearing the paper, pull the jammed paper out gently and slowly. Follow the steps on the next pages to clear the jam.

4.3.1 In the Paper Tray

1 Open and close the front cover. The jammed paper is automatically ejected from the machine. If the paper is not ejected continue to step 2.

2 Pull the paper tray open.
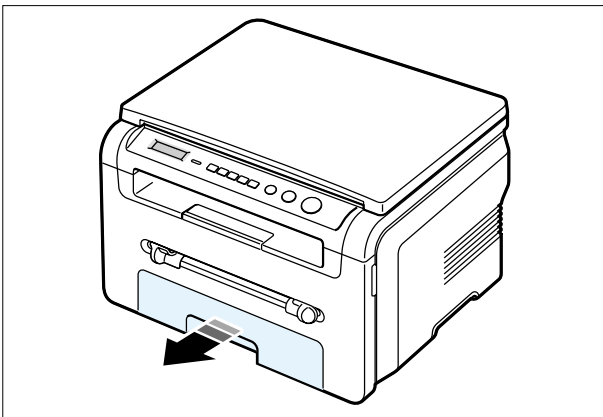
3 Remove the jammed paper by gently pulling it straight out.
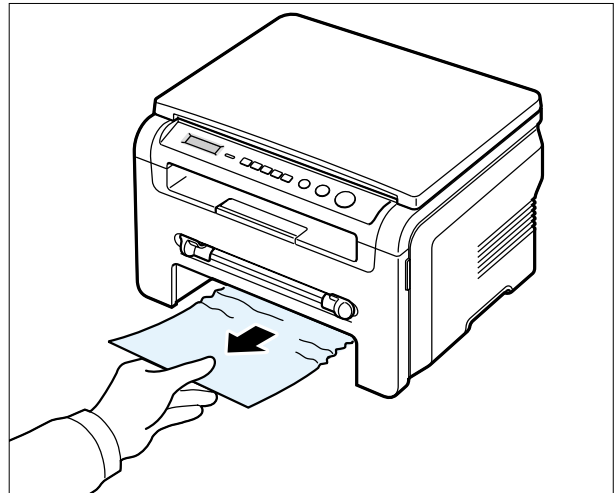
If there is any resistance and the paper does not move when you pull or if you cannot see the paper in this area, skip to the fuser area around the toner cartridge. See page 6-5

4 Insert the paper tray into the machine until it snaps into place.

5 Open and close the front cover to resume printing.

4.3.2 In the Paper Exit Area

1 Open and close the front cover. The jammed paper is automatically ejected from the machine. If the paper is not ejected continue to step 2.

2 Gently pull the paper out of the front output tray. Skip to step 9.
If you cannot see the jammed paper in the front output tray, continue to step 3.

3 Open the jam cover by lifting the front edge of the scanner unit. The support lever will automatically pop up.
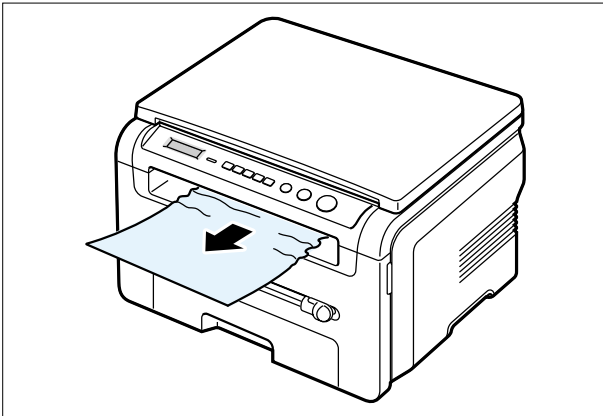
4 Pull the paper out gently.
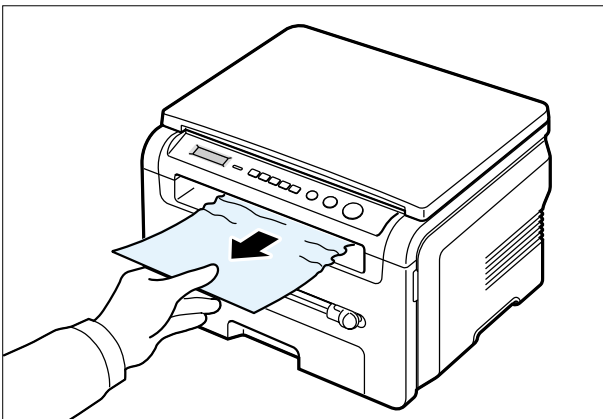
5 Close the jam cover by pushing the support tab to the left and hold it down whilst lowering the cover carefully until the cover fully down, this will hold down the tab.
If there is any resistance and the paper does not move when you pull or if you cannot see the paper in the jam cover, continue to step 6.

6 Open the rear cover.

7 Remove the jammed paper by gently pulling it straight out.
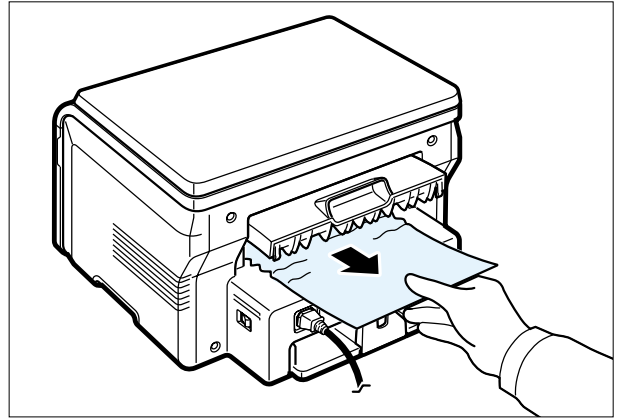
8 Close the rear cover.

9 Open and close the front cover to resume printing.

4.3.3 In the Fuser Area or Around the Toner Cartridge

NOTE: The fuser area is hot. Take care when removing paper from the machine.

1 Open the front cover and lightly push down on the cartridge then pull to take it out.
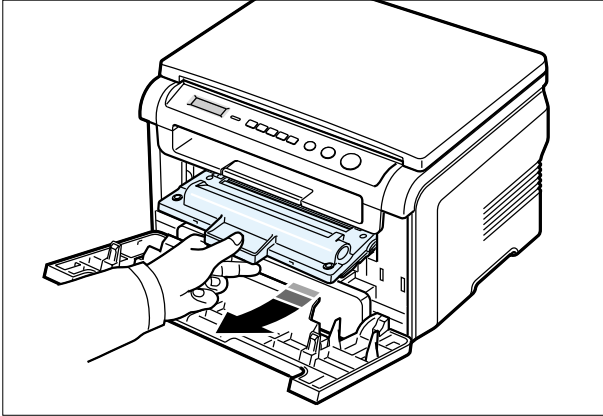
2 Remove the jammed paper by gently pulling it straight out.
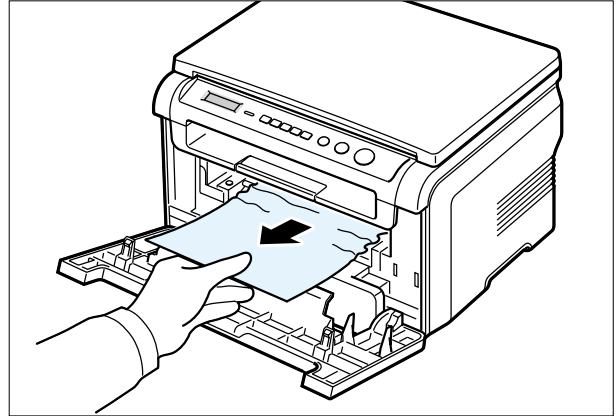
3 Replace the toner cartridge and close the front cover.
Printing automatically resumes.

4.3.4 In the Manual Feeder

"Bypass Jam" appears on the display when you try to print using the manual feeder and the machine does not detect paper, due to no paper or improper paper loading.

The error message may also occur when the paper is not properly fed into the machine through the manual feeder.
In that case, pull the paper out of the machine.
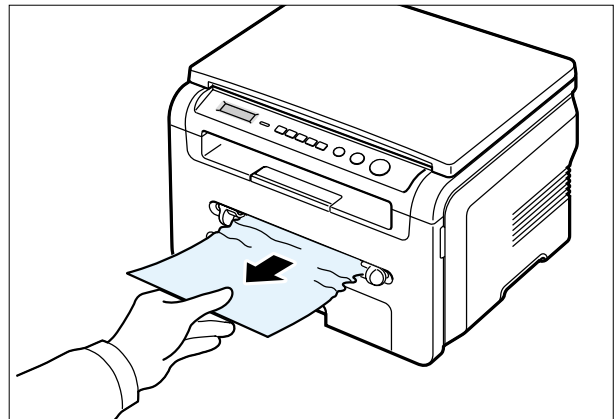
4.4 Printing the System Data List

Your machine can print the system data report which shows the status of the user-selectable options. You may print this list to confirm your changes after changing any settings.

To print the system data list:

1 Press **Menu** until "Report" appears on the top line of the display.
  "System Data" appears on the bottom line.

2 Press **Start**
  The system data list prints out.

4.5 Clearing the Memory

You can selectively clear information stored in your machine's memory.

1 Press **Menu** on the control panel until "Maintenance" appears on the top line of the display.

2 Press the scroll button (< or >) until you see "Clear Settings" on the bottom line and press **Start**
  The first available menu item, "Paper Setting" displays on the bottom line.

3 Press the scroll button (< or >) until you see the item you want to clear.
  • Paper Setting: Restores all of the Paper Setting options to the factory default.
  • Copy Setup: Restores all of the Copy Setup options to the factory default.
  • All Settings: Resets all of your settings to the factory default.
  • Machine Setup: Resets all of the system settings, such as the display language and save modes, to the factory default.

4 Press Start/Enter. The selected memory is cleared and the display asks you to continue clearing the next item.

5 To clear another item, press Start/Enter and repeat steps 3 and 4. Or, to return to Standby mode, press Stop/Clear.

4.6 Clearing the Drum

If there are streaks or spots on your print, the OPC drum of the cartridge may require cleaning.

1 Before carrying out the cleaning procedure, make sure that paper is loaded in the machine.

2 Press **Menu** on the control panel until "Maintenance" appears on the top line of the display.
  The first available menu item, "Clean Drum", displays on the bottom line.

3 Press **Start**

4 When the display asks you to confirm your selection, press **Start**
  The machine prints a cleaning page. Toner particles on the drum surface are affixed to the paper.

5 If the problem remains, repeat steps 1 through 4.

4.7 Consumables and Replacement Parts

The cycle period outlined below is a general guideline for maintenance.
The example list is for an average usage of 50 transmitted and received documents per day.
Environmental conditions and actual use will vary these factors.
The cycle period given below is for reference only.

COMPONENT	REPLACEMENT CYCLE	
Pick-up Roller	50,000 Pages	
Paepr Feeding Roller(Friction Pad)	50,000 Pages	
Transfer Roller	50,000 Pages	
Fuser	50,000 Pages	
Toner Cartridge	Original 1,000 Pages	Replacement 3,000 Pages

4.8 The LCD Status Display by Each Error

LCD	Meaning	Solutions
Door Open	The front or rear cover is not securely latched.	Close the cover until it locks into place.
[JAM 1] or [No Cartridge]	The toner cartrige is not installed.	Install the toner cartridge.
Low Heat Error Open Heat Error [Over Heat]	There is a problem in the fuser unit.	Unplug the power cord and plug it back in. (Tech Mode Reference)
[LSU Error]	A problem has occurred in the LSU (Laser Scanning Unit).	Unplug the power cord and plug it back in. (Tech Mode Reference)
No Paper [Add Paper]	The paper tray has run out of paper.	Load paper in the paper tray.
Paper Jam 0 Open/Close Door	Paper has jammed in the feeding area of the paper tray.	Clear the jam.
Paper Jam 1 Open/Close Door	• Paper has jammed in the fuser area. • A paper jam has occurred in the manual feeder or the machine detects non-feeding from the manual feeder.	• Clear the jam. • Clear the jam.
Paper Jam 2 Check Inside	Paper has jammed in the paper exit area.	Clear the jam.

4.9 Periodic Defective Image

If a mark or other printing defect occurs at regular intervals down the page it may be caused by a damaged or contaminated roller. Measure the repetition interval and refer to the table below to identify the roller concerned.

No	Roller	Defective image	Typical defect
1	OPC Drum	75.5mm	white spot on black image or black spot
2	Charge Roller	37.8mm	black spot
3	Supply Roller	44.9mm	light or dark horizontal image band
4	Developing Roller	35.2mm	horizontal image band
5	Transfer Roller	45.3mm	image ghost
6	Heat Roller	64.0mm	Black spot and image ghost
7	Pressure Roller	75.3mm	black spot on the backside

<Rollers Layout>
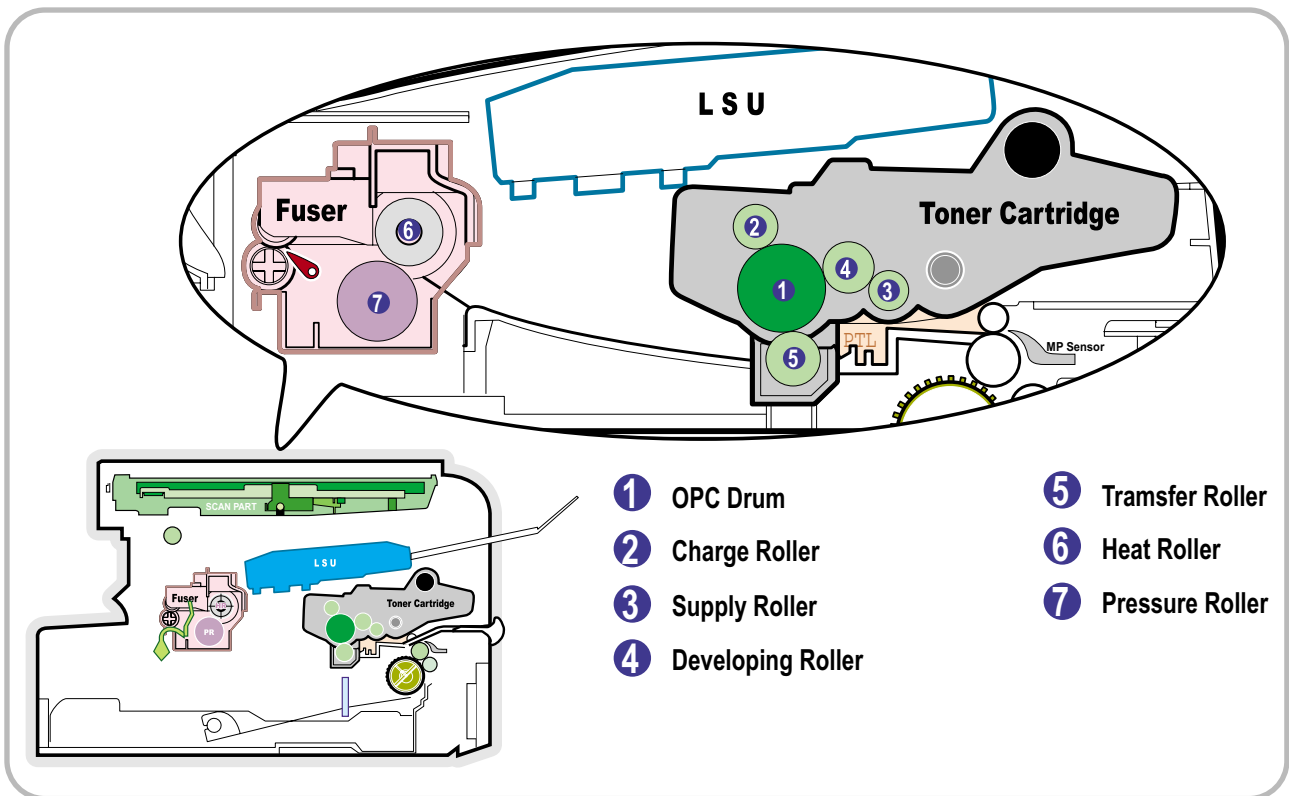
4.10 Error Message

Display	Meaning	Suggested solutions
Door Open	The front cover is not securely latched.	Close the cover until it locks into place.
Hsync Error	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.
[Invalid Cartridge]	There is invalid foner install.	Installed authorized toner cartridge.
Low Heat Error	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.
[LSU Error]	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.
[No Paper] Add Paperr	The paper in the paper input tray has run out.	Load paper in the paper input tray.
Open Heat Error	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.
[Over Heat]	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 Jam 0] Open/Close Door	Paper has jammed in the feeding area of the paper input tray.	Clear the jam.
[Paper Jam 1] Open/Close Door	Paper has jammed in the fuser area or in the manual feeder.	Clear the jam.
[Paper Jam 2] Check Inside	Paper has jammed in the paper exit area.	Clear the jam.
Power Failure	Power has turned off then on and the machine's memory has not been back up.	The job which you were trying to do before the power failure must be completely re-done.
Scanner Error	There is a problem in the scanner unit.	Unplug the power cord and plug it back in. If the problem persists, please call for service.

	1st level		2nd level	3rd level	4th level	Default Value	Descriptions
	Upper Level	--		Upper Level			
	Left/Right && Enter	--▶	16 Character	Left/Right Enter			
Menu	1.Reduce/Enlarge	1	Original(100%)			100%	
			A4→LTR(94%)				
			EXE→LTR(104%)				
			50%				
			150%				
			200%				
			Custom:50-200%				
	2.Darkness	1	Normal				
		2	Dark				
		3	Light				
	3.Original Type	1	Text			* Default	
		2	Text/Photo				
		3	Photo				
	4.Special Copy	1	Off			* Default	
		2	Clone				
		3	Auto Fit				
		4	2 Sides in 1 pg				ID Copy
		5	2 UP				
		6	Poster				
	5.Toner Save	1	On				
		2	Off			* Default	
	6.Paper Setting	1	Paper Size	Tray Paper	LTR,LGL, A4, EXE, Folio, A5, B5, A6	LTR(US) A4(EU/AP)	
				Manual Feed	LTR,LGL, A4, EXE, Folio, A5, B5, A6	LTR(US) A4(EU/AP)	
		2	Paper Type	Plain Paper, Bond, Transparency, Card Stock, Labels, Preprinted, Colored, Envelope,Thick, Thin			
	7.Copy Setup	1	Default-Change	Darkness	Light/Normal/Dark	Normal	
				Original Type	Text, Text/Photo,Photo	Text	
				Reduce/Enlarge	[Original(100%)]	100%	
					[A4→LTR(94%)]		
					[EXE→LTR(104%)]		
					50%		
					150%		
					200%		
					[Custom:50-200%]		
				Copies	[1-99]	1	
		2	Timeout	15,30,60,180 sec, Off		30 sec	
	8.Report	1	System Data				
	9.Machine Setup	1	Language	[English/French/Spanish/Portuguese/German/Italian/Dutch/Russian/Swedish]- 9 countries		English	Portuguese (European)
		2	Power Save	On Off	5, 10, 15, 30, 45	5 min	
		3	USB Mode	Fast, Slow		Fast	
	0.Maintenance	1	Clean Drum				
		2	Clear Settings	Paper Setting			
				Copy Setup			
				All Settings			
				Machine Setup			
	Tech Mode	1	Data Setup	Clear All Mem.			
				Clear Count	Total Page CNT		
					FLT Scan CNT		
				Flash Upgrade	Local		
					Remote		
		2	Machine Test	Switch Test			
				Dram Test			
				Rom Test			
				Pattern Test			
				Shading Test			
		3	Report	System Data			

DIRECT KEY

Copies	1-99 * Default : 1
Menu	This is to be used to enter the Menu.
Start	This key is used to activate the job.
Stop	This key is used to stop the job being done or to exit from the Menu. And clear value of 5 copy keys..
OK	This key is used to select the right item what customer wants from several items.
◀/▶	Left/Right Arrow Key

Machine IDLE dsiplay

```
READY
     100%        P.1
```

DIRECT KEY

1.COPY DIRECT KEY

notice

In each LCD display	```COPY 1/10```
If user press Start/Enter key	``` P.1```
,Machine starts copy	
In each LCD display	```Ready```
If user press Stop/Clear	``` 100% P.1```
,Machine stops copy	

LCD Display

| Copies | ```Copies``` | **3*4KEY** | ```Copies``` | **ENTER** | Idle Display | ```Ready``` |
| | ```[1~99]>_``` | | ```[1~99]>10_``` | | ⟶ | ```100%   P.10``` |
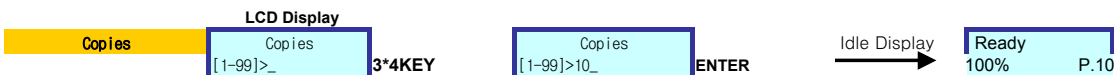
2.COMMON DIRECT KEY

| STOP | ```Ready``` | **STOP/CLEAR** |
| | ```100%   P.1``` | |

```
Please Wait…
Clear Key Value
```
Image / Contrast / No.Of Copies / (Reduce/Enlarge) / Special
Return default value of all 5 copy keys

notice

Menu	This is to be used to enter the Menu.
Start	This key is used to activate the job.
Stop	This key is used to stop the job being done or to exit from the Menu. And clear value of 5 copy keys..
OK	This key is used to select the right item what customer wants from several items.
◄/►	Left/Right Arrow Key

3.Status LED

LED Color	LED Status	Discription
Off	Off	Power Off / Sleep Mode
Green	On	Ready
	Blink	When the job is in progress.
		Blink Slowly :: Printer Data Comm. Blink Fast :: Printing Blink Normally :: Copy,Scan …
Red	On	ex)Toner Empty, Paper Jam, Paper Empty, Cover open
	Blink	In case of recoverable Error ex) Paper Mismatching In case of Warming up state. ex)Replace Toner

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.
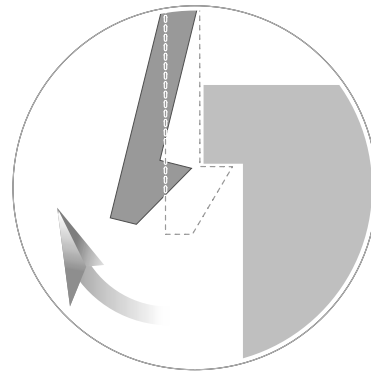
5.2 Front Cover

1. Take the Cassette out of the printer.

Cassette
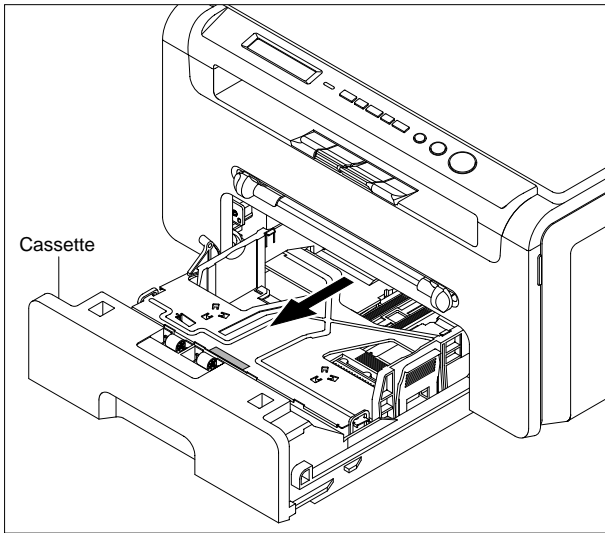
2. Open the Front Cover.
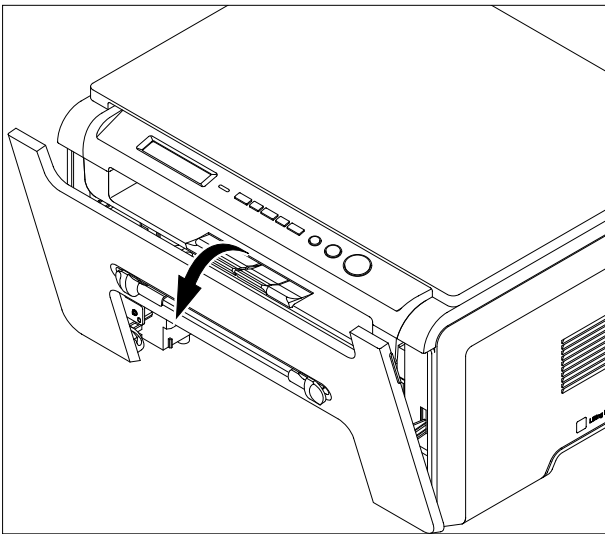
3. To remove the Front Cover, first pull the part below the right side of the Front Cover with a light pressure to the direction of arrow and then remove the Front Cover, as shown below.

Front Cover
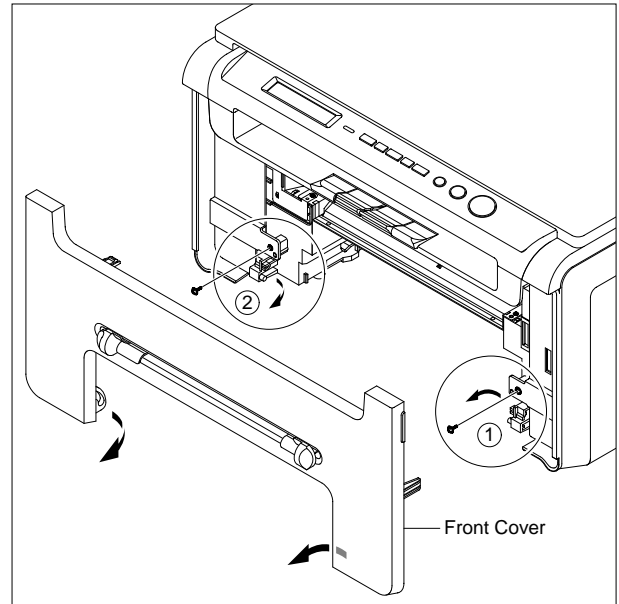
5.3 Rear Cove

1. Remove the four screws securing the Rear Cover, as shown below.
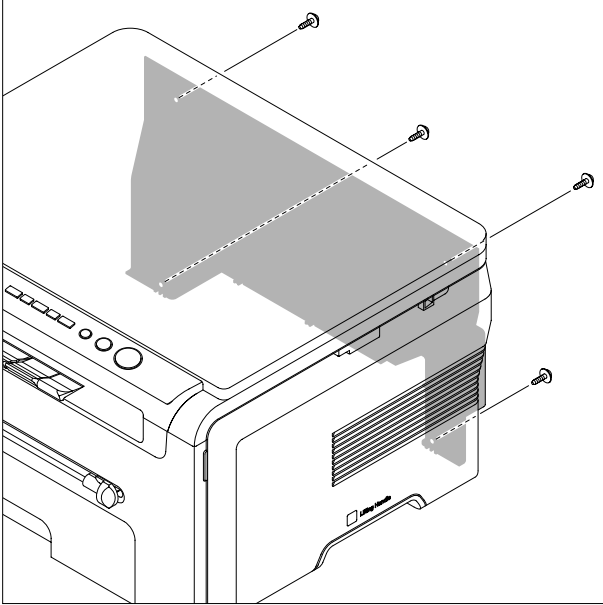
2. To remove the Rear Cover make sure the Power Switch doesn't get jammed to Rear Cover and then Unplug the one connector(DC Fan) from the Main PBA, as shown below.
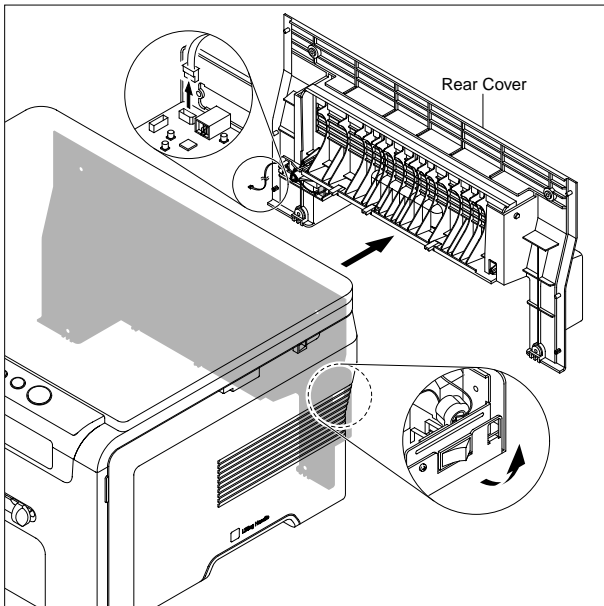
Rear Cover

3. If necessary, remove the Rear Door in the direction of arrow, as shown below.

Rear Door
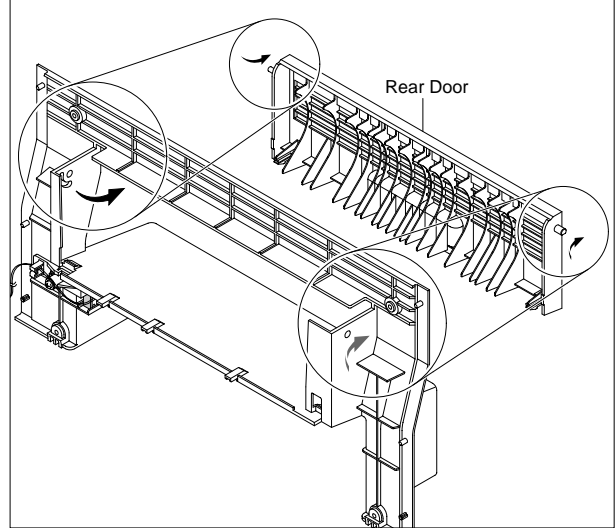
5.4 DC Fan

1. Before you remove the DC Fan, you should remove:
   - Rear Cover (Refer to 5.3)

2. First release the harness from the Harness Holder and then remove the one screw securing the Harness Holder and remove it, as shown below.

Harness Holder
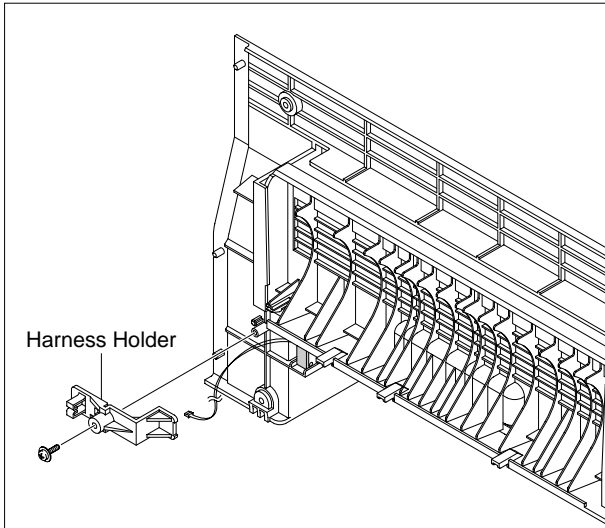
3. Pull the DC Fan out of the Rear Cover.

DC Fan
(24V, 80mA)
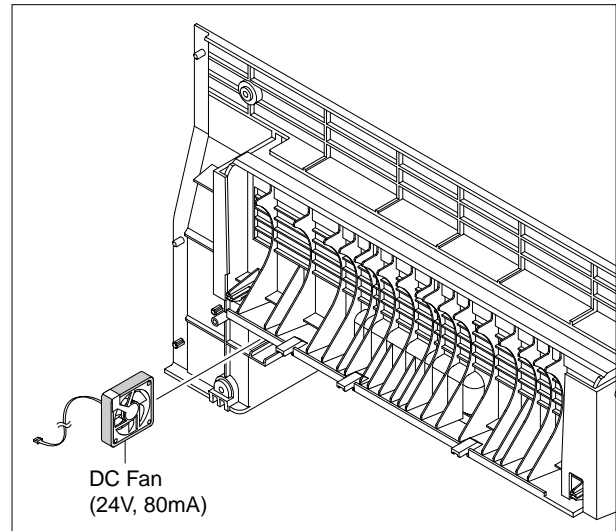
5.5 Right Side Cover

1. Before you remove the Right Side Cover, you should remove:
   - Front Cover (Refer to 5.2)
   - Rear Cover (Refer to 5.3)

2. Remove the one screw at the front of the unit.
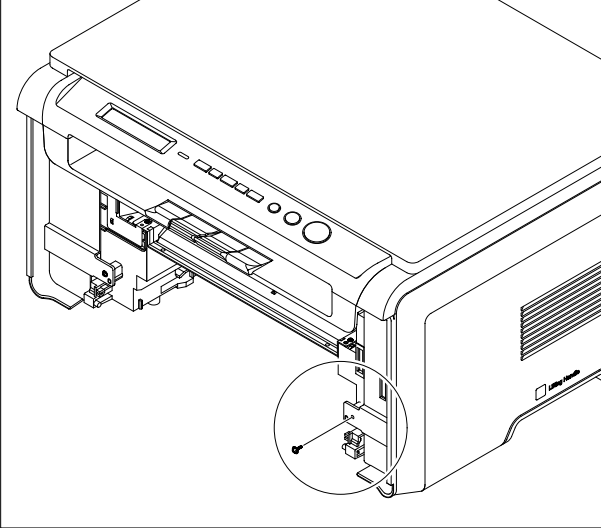
3. Apply light pressure to the back of the Right Side Cover and pull it to the right side in the direction of arrow, as shown below.
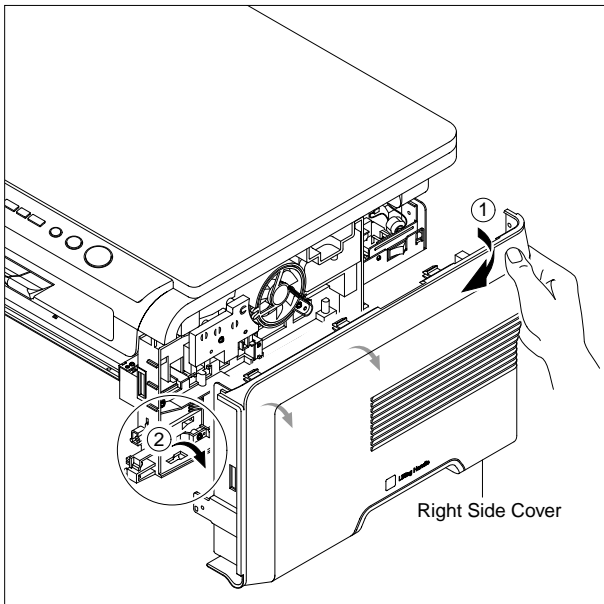
Right Side Cover

4. Unplug the connector(Micro Switch) from the SMPS, as shown below.
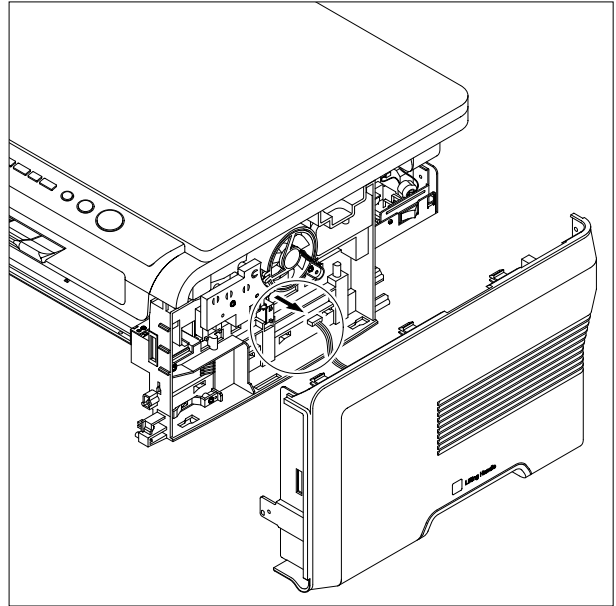
5. If necessary, remove the one screw securing the Micro Switch and remove it.

Right Side Cover

Micro Switch
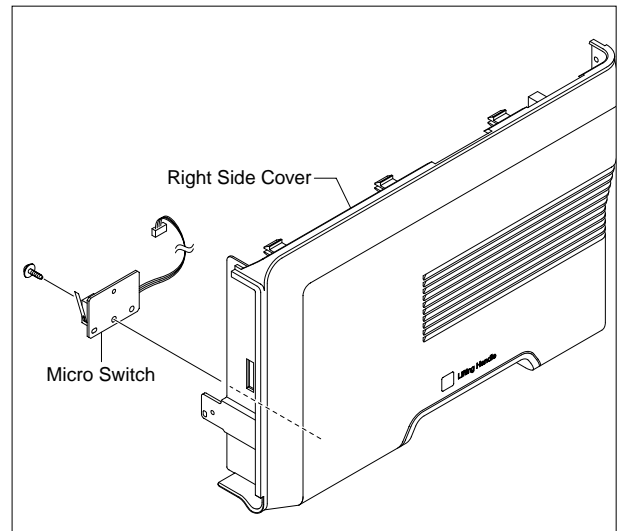
5.6 Left Side Cover

1. Before you remove the Left Side Cover, you should remove:
   - Front Cover (Refer to 5.2)
   - Rear Cover (Refer to 5.3)

2. Remove the one screw at the front of the unit.
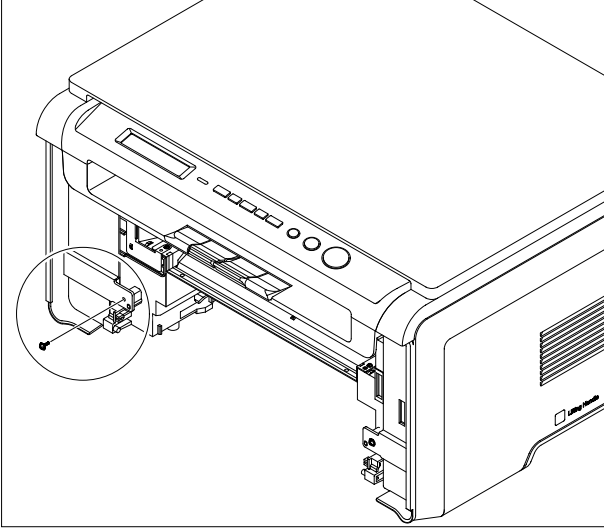
3. Apply light pressure to the back of the Left Side Cover and pull it to the left side in the direction of arrow, as shown below.
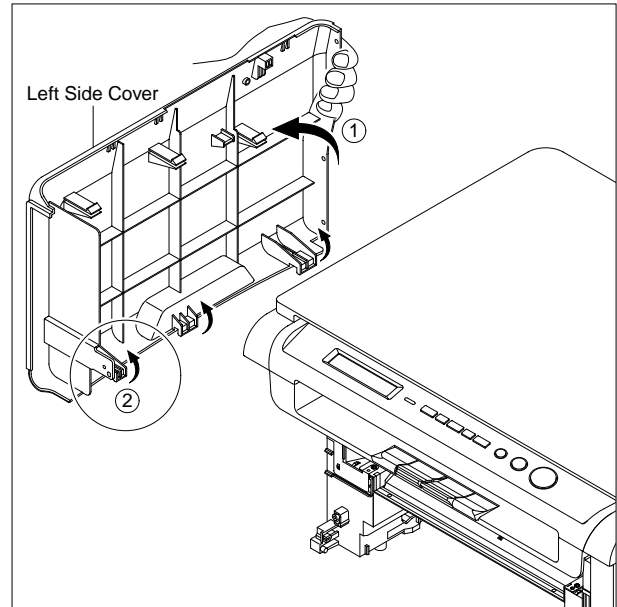
5.7 Scanner Unit

1. Before you remove the Scanner Unit, you should remove:
   - Front Cover (Refer to 5.2)
   - Rear Cover (Refer to 5.3)
   - Right Side Cover (Refer to 5.5)
   - Left Side Cover (Refer to 5.6)

2. Unplug the two connectors(Scan Motor, OPE Unit) and CIS FFC from the Main PBA, as shown below.
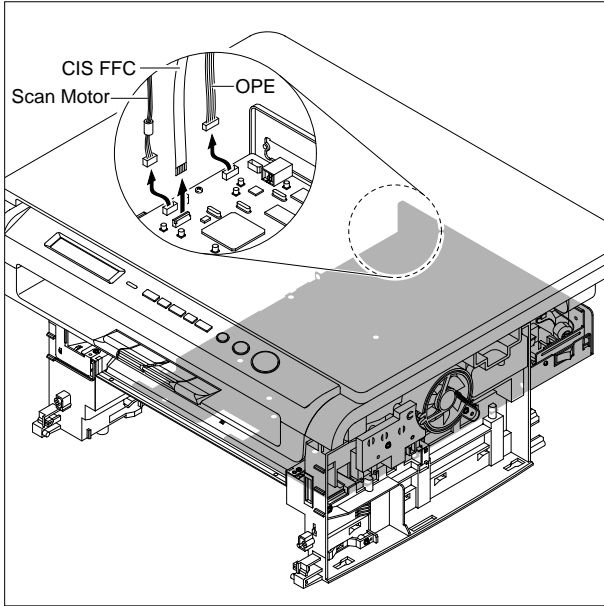
3. Carefully lift the Scanner Unit from the base taking care to thread the cables through the frame.
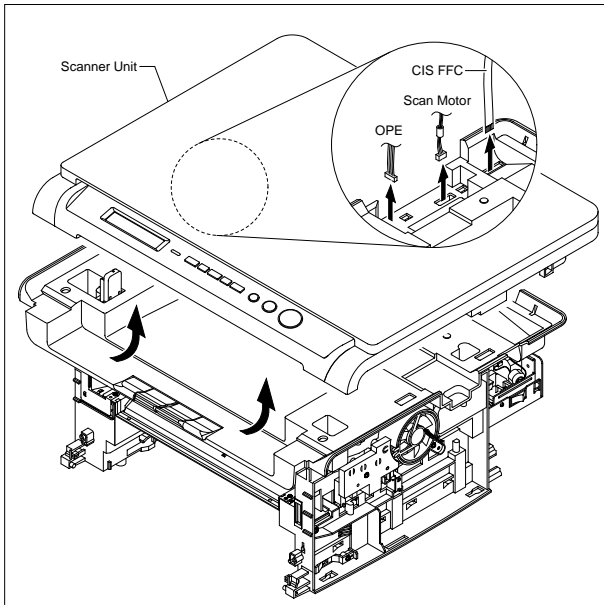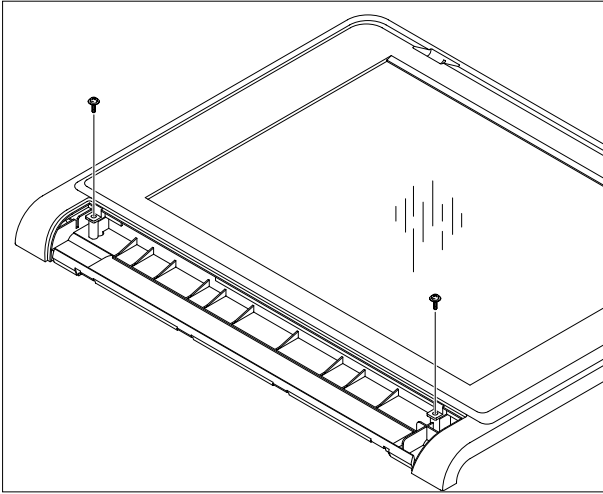

4. Lift the Platen Cover upward and remove it.
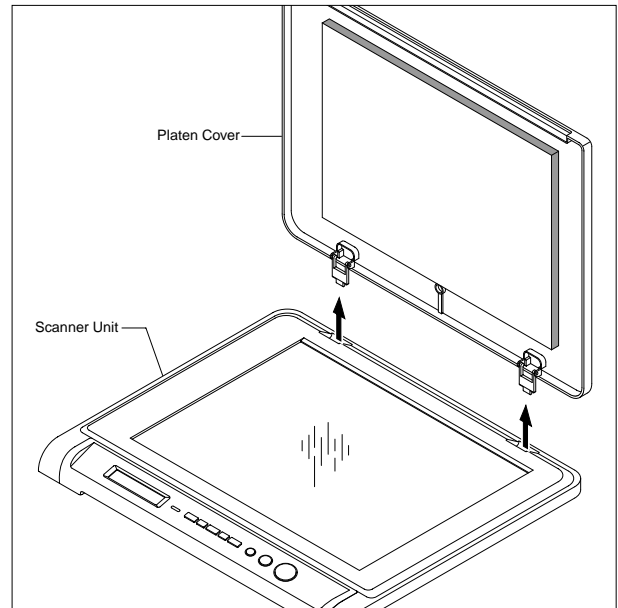
5. To remove OPE Unit, first pull the part below the front of the OPE Unit with a light pressure to the direction of arrow.
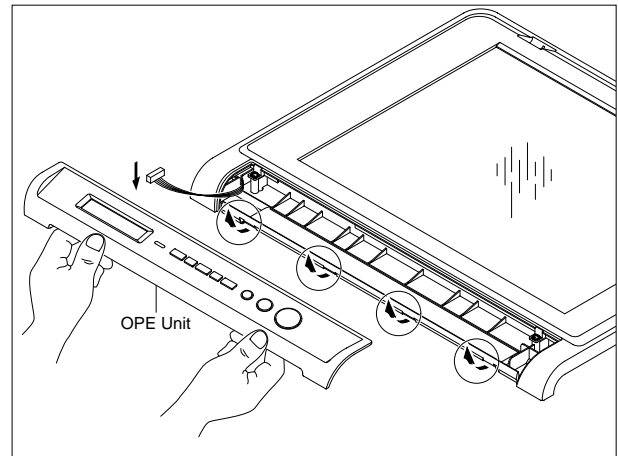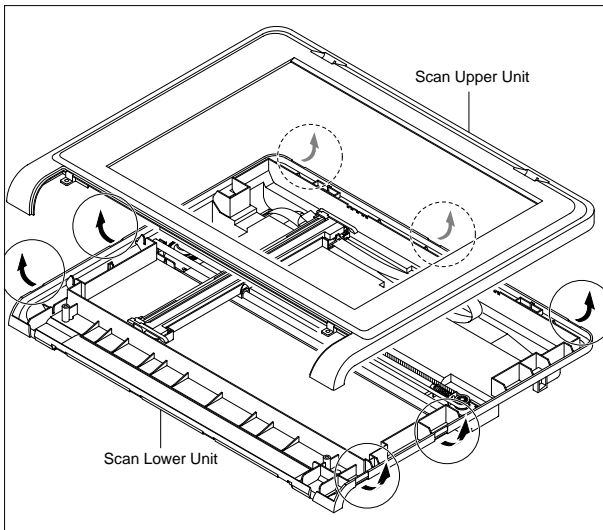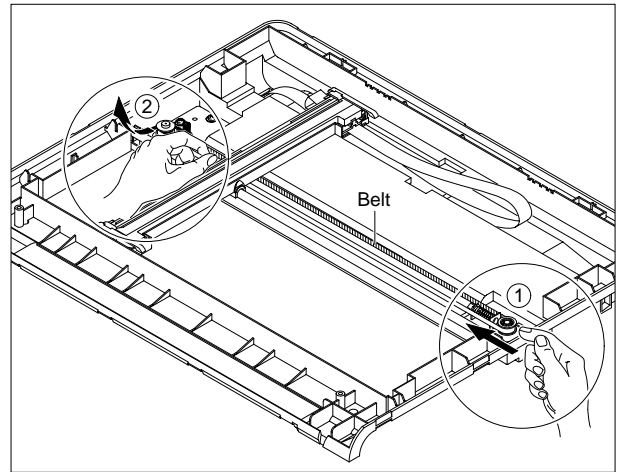
6. Remove the two screws securing the Scan Upper Unit.

7. Release the seven hooks securing the Scan Upper Unit to the Scan Lower Unit and remove it, as shown below.

Scan Upper Unit

Scan Lower Unit

8. Using the right hand to push the Idle Pulley from right to left, and the left hand to lift and remove the Belt.
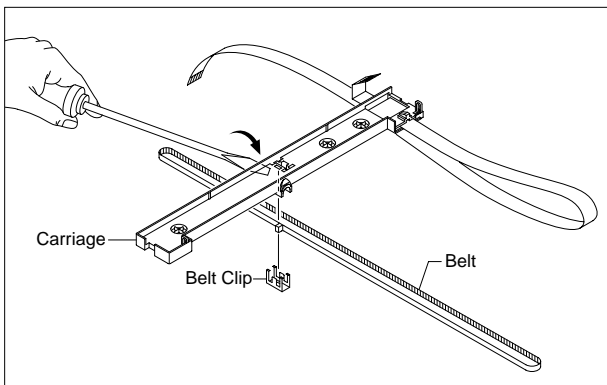

Belt

9. When removing CIS FFC, note that the cable is taped to the Scan Lower Unit. Then take the CIS(with Carriage, Belt, CIS FFC) out of OPE Lower Unit.
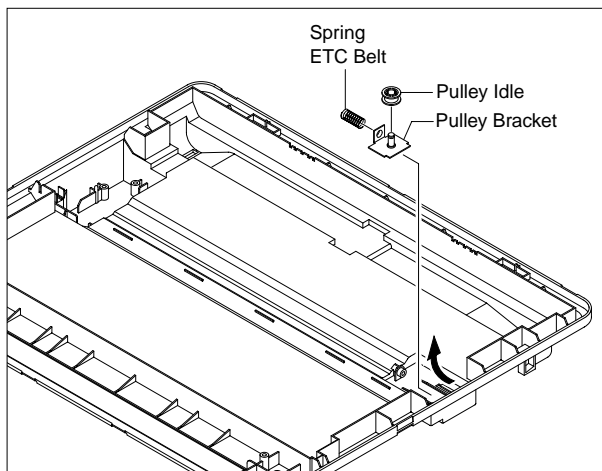

CIS

Belt

Carriage

CIS FFC

Scan Lower Unit
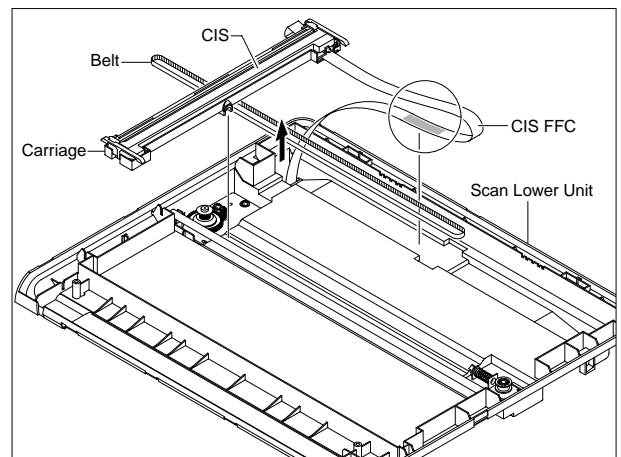
10. To remove the CIS from the Carriage, first unplug the CIS FFC from the CIS and remove two CIS Slider from each end of the CIS. Then Release the CIS in the direction of arrow, as shown below.
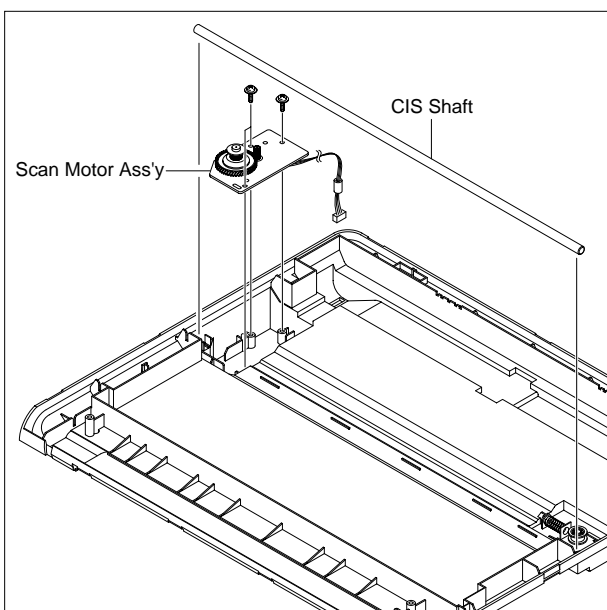

CIS Slider

CIS Slider

CIS

CIS FFC
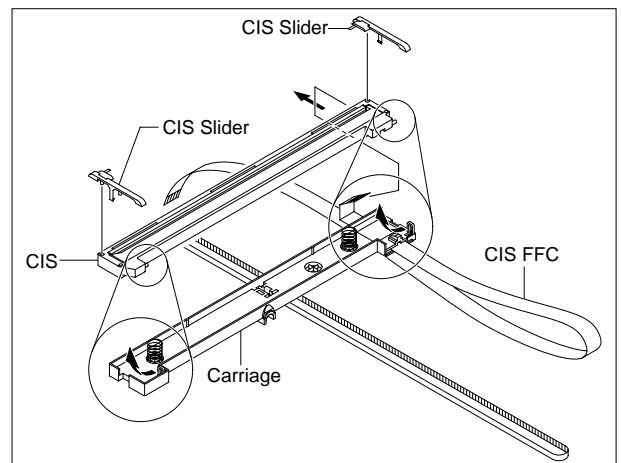
Carriage

11. To remove Belt using a screw driver, remove the Belt Clip at the center of the Carriage and remove the Belt, as shown below.

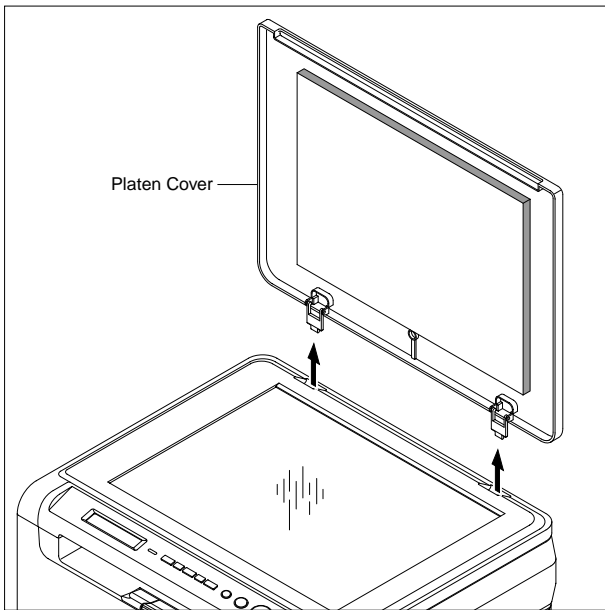12. Take the CIS Shaft out of OPE Lower Unit and then remove the three screws securing the Scan Motor Ass'y and remove it.

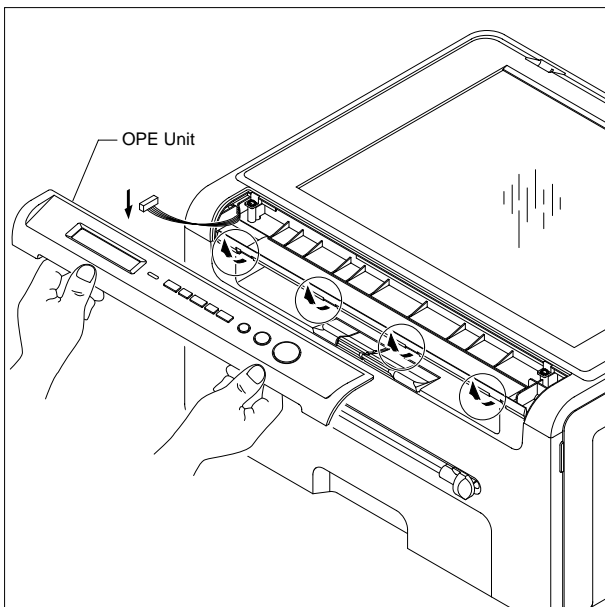13. Remove the Idle Pulley in the direction of arrow, as shown below.

5.8 OPE Unit

1. Lift the Platen Cover upward and remove it.

2. To remove OPE Unit, first pull the part below the front of the OPE Unit with a light pressure to the direction of arrow.

3. Remove the three scrrews securing the OPE PBA and remove it.
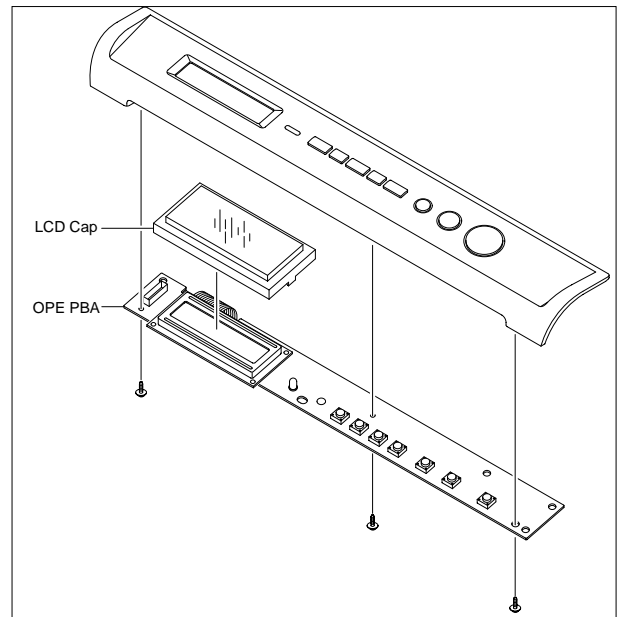
4. Release the Keys.
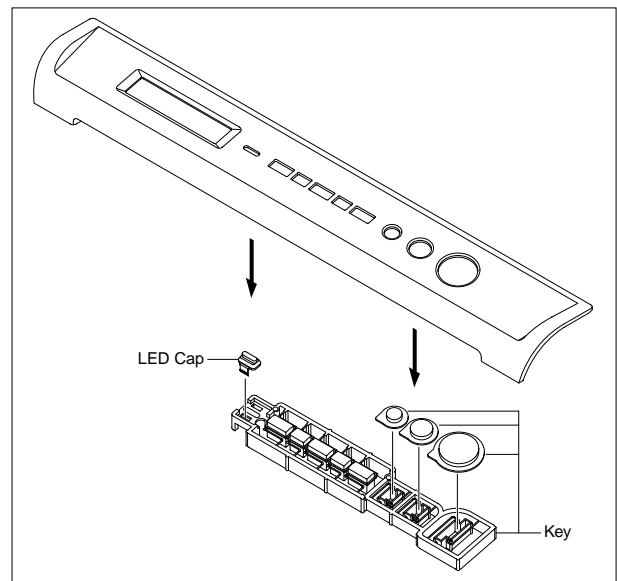
5.9 Middle Cover Unit

1. Before you remove the Middle Cover Unit, you should
   remove:
   - Scanner Unit (Refer to 5.7)

2. Remove the four screws securing the Middle Cover
   Unit and remove it, as shown below.

Middle Cover Unit

5.10 Fuser

1. Before you remove the Fuser, you should remove:
   - Rear Cover (Refer to 5.3)

2. Unplug the two connectors from the Main PBA and SMPS, as shown below.
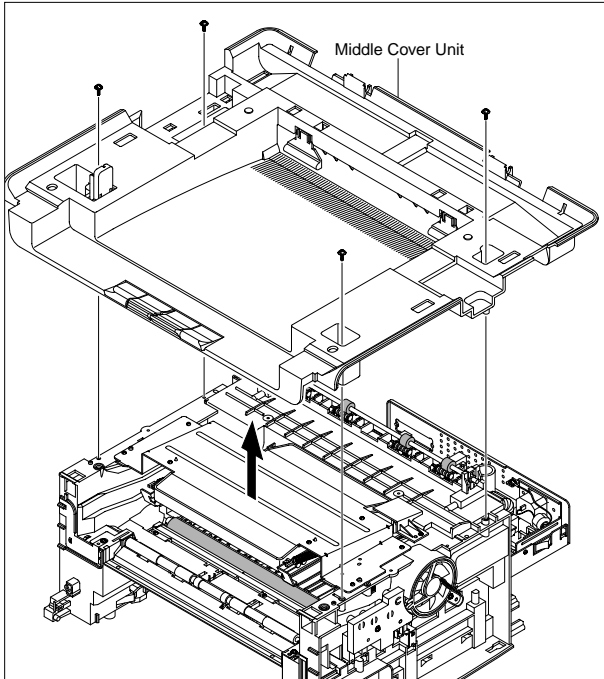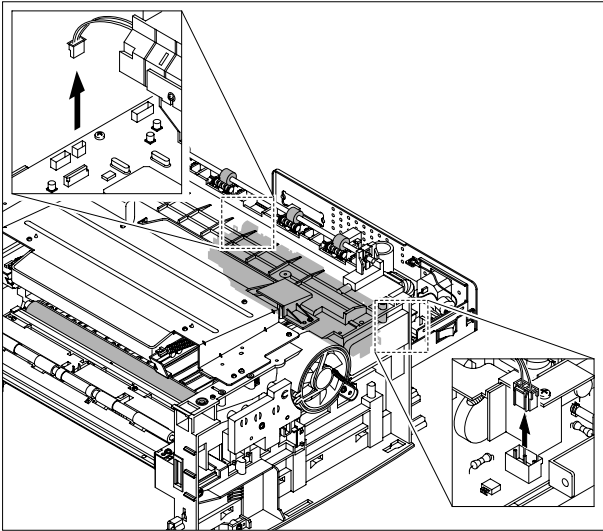

3. Remove the four screws securing the Fuser and remove it.
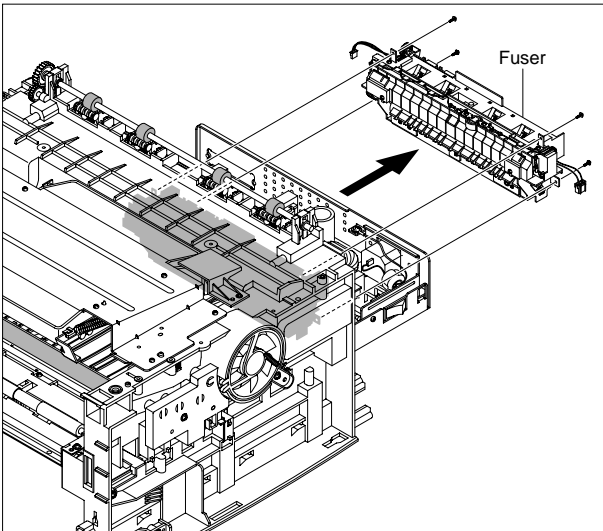
Notice: Remove the Fuser taking care not to damage the Exit Sensor.

4. Remove the two screws securing the Thermostat and then release the Fuser Harness and Fuser Joint Harness from both side of the Thermostat, as shown below. Then take the Thermostat out of the Fuser.
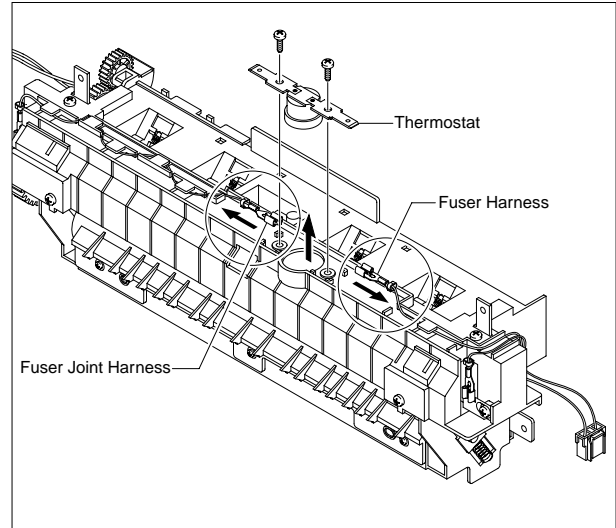
5. Remove the two screws securing the Halogen Lamp and then release the Fuser Harness and Fuser Joint Harness from both side of the Halogen Lamp, as shown below. Then take the Halogen Lamp out of the Heat Roller.
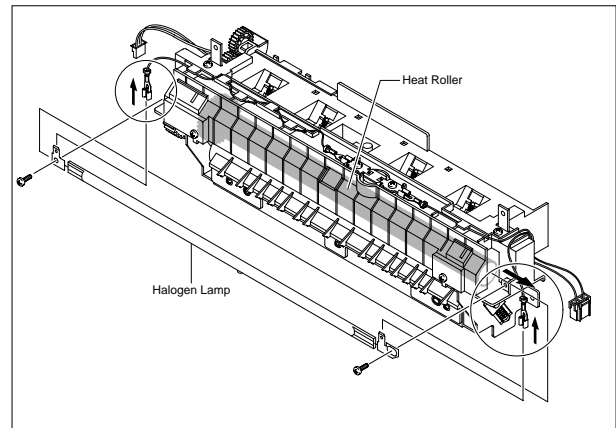
6. Remove the one screw securing the Gear
   RDCN(25/15) and remove it.

7. Remove the four screws and divide the Fuser into two
   parts.

8. Unwrap the Thermistor Harness, as shown below.
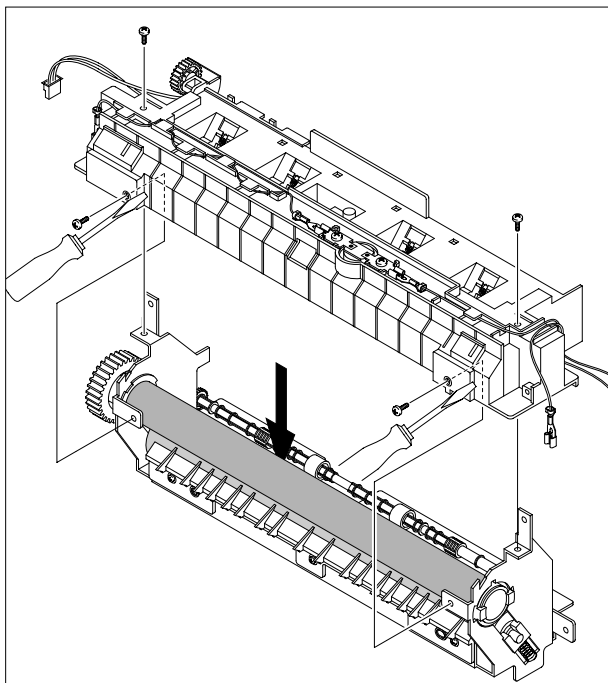
9. Remove the Thermistor from the Fuser Cover.
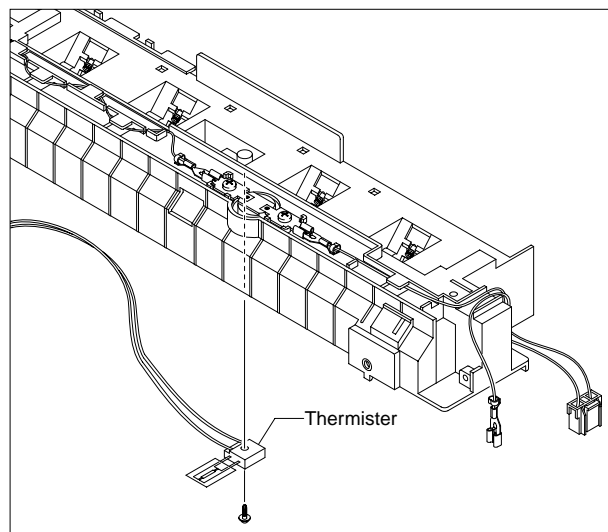
5.11 Exit Roller

1. Before you remove the Exit Roller, you should remove:
   - Scanner Unit (Refer to 5.7)
   - Middle Cover Unit (Refer to 5.9)

2. Remove the Exit Gear and Bearing using a screw driver at one end then remove the shaft and rollers, as shown below.
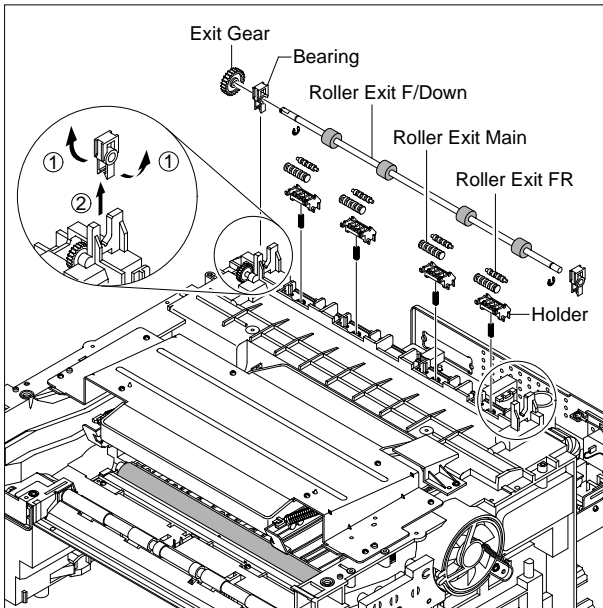
5.12 LSU

1. Before you remove the LSU, you should remove:
   - Scanner Unit (Refer to 5.7)
   - Middle Cover Unit (Refer to 5.9)

2. Remove the one screw securing the CAP LSU and remove it.

3. Unplug the two connectors from the LSU.
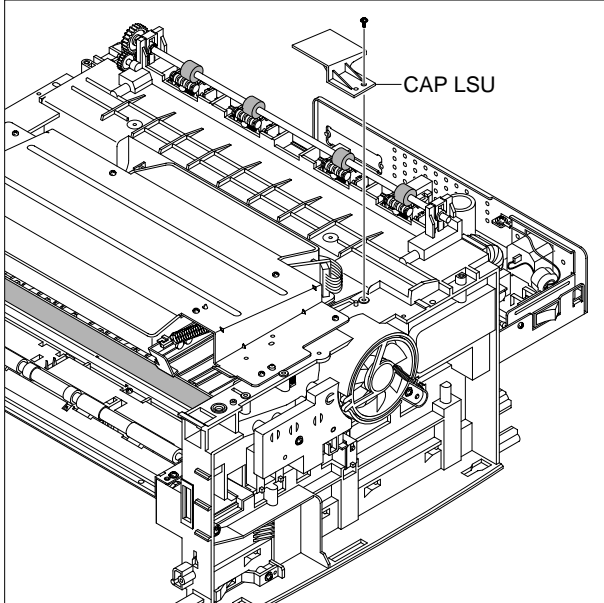
4. Unplug the four screws and take the LSU out.
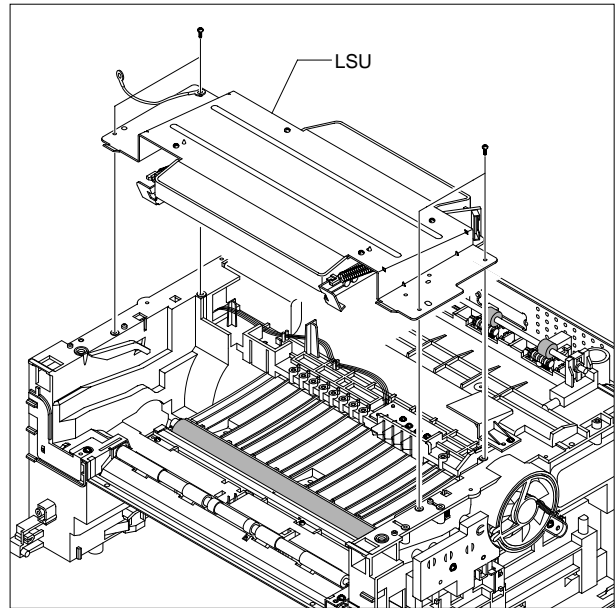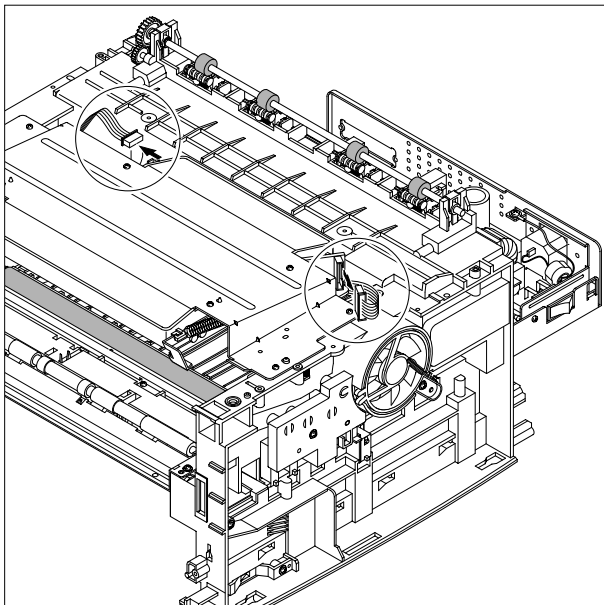
5.13 Fan

1. Before you remove the Fan, you should remove:
    - Front Cover (Refer to 5.2)
    - Rear Cover (Refer to 5.3)
    - Right Side Cover (Refer to 5.5)

2. Unplug the connector from the SMPS and remove the one screw. Then take out the Fan.

DC Fan
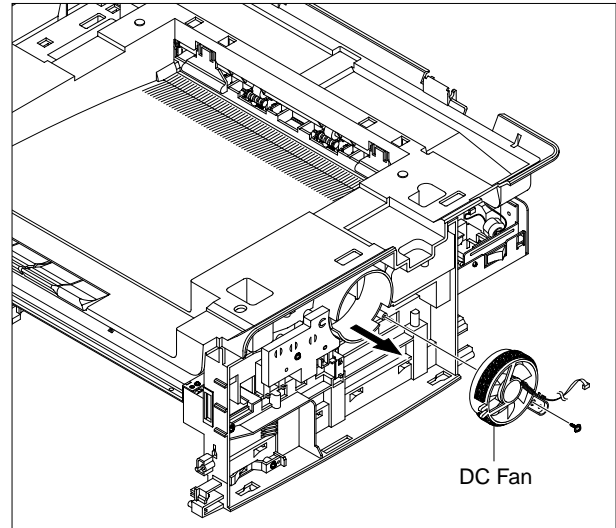
5.14 Drive Ass'y

1. Before you remove the Drive Ass'y, you should remove:
    . Front Cover (Refer to 5.2)
    . Rear Cover (Refer to 5.3)
    . Left Side Cover (Refer to 5.6)

2. Remove the six screws securing the Drive Ass'y.
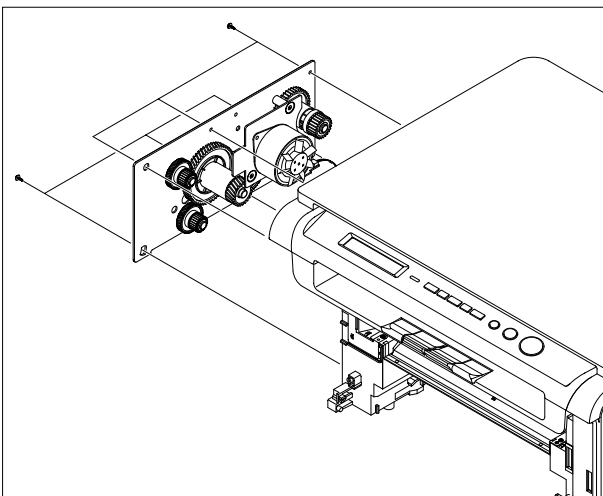
Notice: When refitting the Drive Ass'y tighten the screws in the order that they are numbered on the Drive Ass'y base plate.

3. Unplug the connector from the Drive Motor, as shown below.

Drive Ass'y
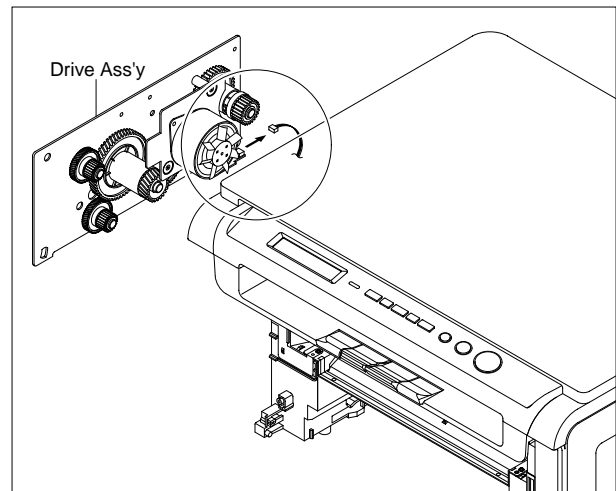
5.15 Engine Shield Ass'y

1. Before you remove the Engine Shield Ass'y, you should remove:
   - Scanner Unit (Refer to 5.7)
   - Fuser Connectors (Refer to 5.10.2)

2. Remove the eleven screws securing the Engine Shield Ass'y and unplug the all connectors. Then remove the Engine Shield Ass'y.
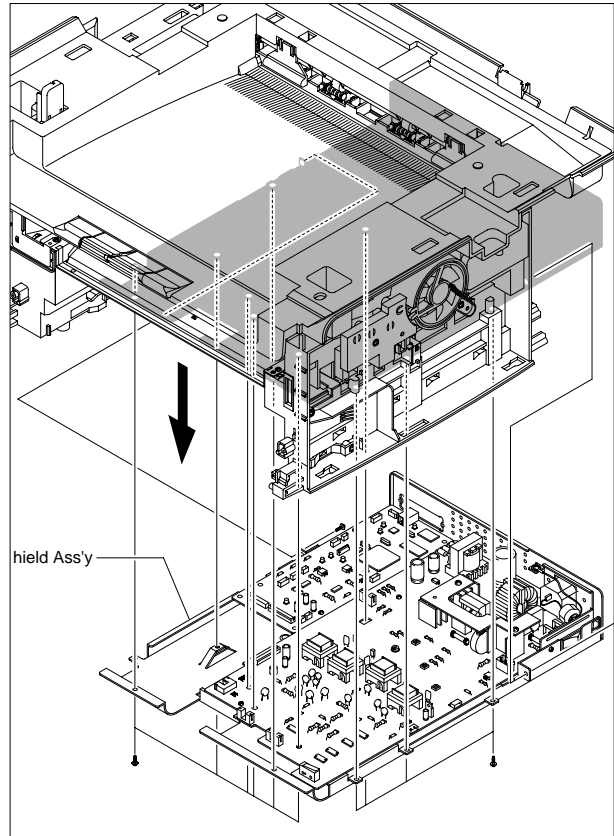
5.16 Main PBA

1. Before you remove the Main PBA, you should remove:
   - Engine Shield Ass'y (Refer to 5.15)

2. Unplug the Engine Harness and remove the two screws from the Main PBA. Then lift the Main PBA out, as shown below.
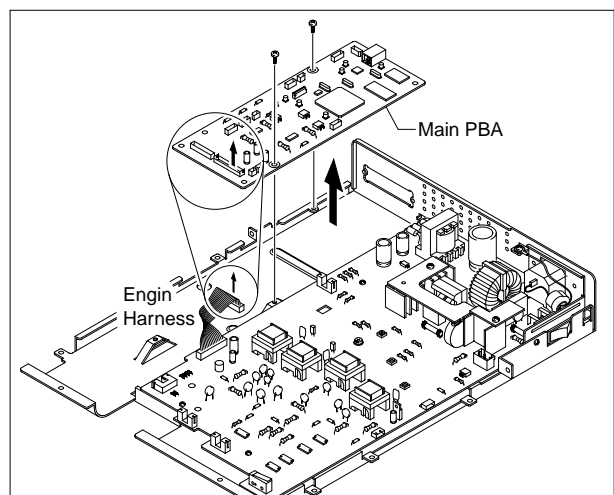
5.17 SMPS

1. Before you remove the SMPS, you should remove:
   - Engine Shield Ass'y (Refer to 5.15)

2. Remove the two screws then take the Inlet Bracket out, as shown below.
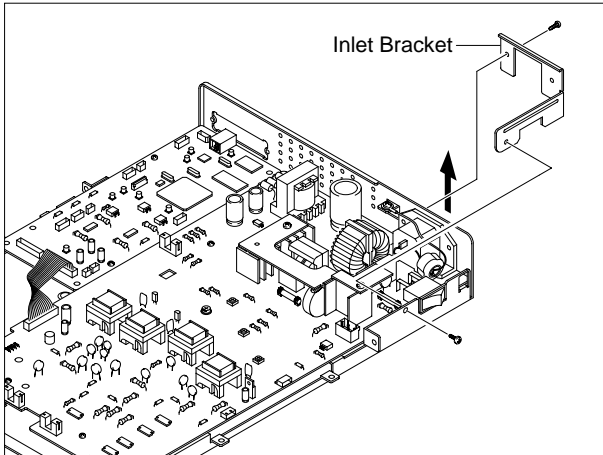
3. Unplug the Engine Harness from the SMPS and then remove the one screw securing the ground cable, as shown below.
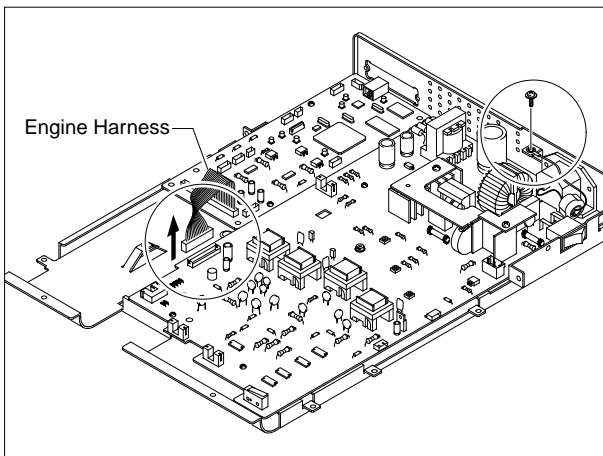
4. Remove the three screws and take the SMPS out.
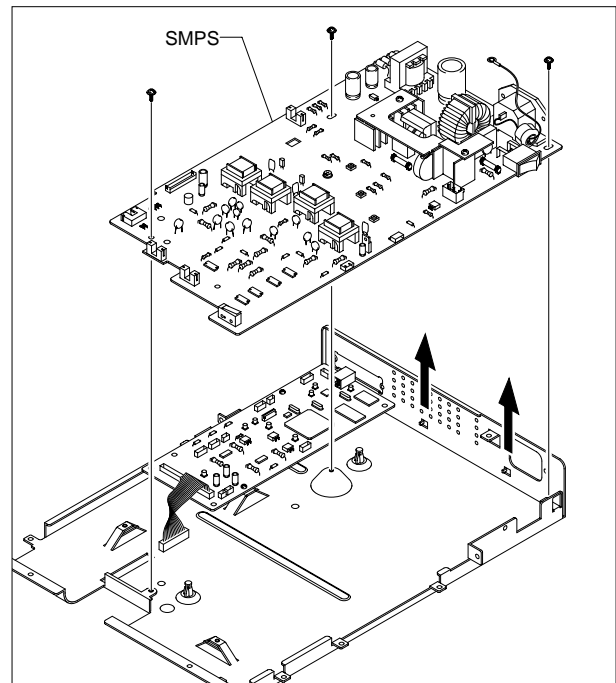
5.18 CRUM PCB

1. Before you remove the CRUM PCB, you should remove:
   - LSU (Refer to 5.12)
   - Engine Shield Ass'y (Refer to 5.15)

2. Remove the four screws securing the CRUM PCB and remove it, as shown below.


CRUM PCB
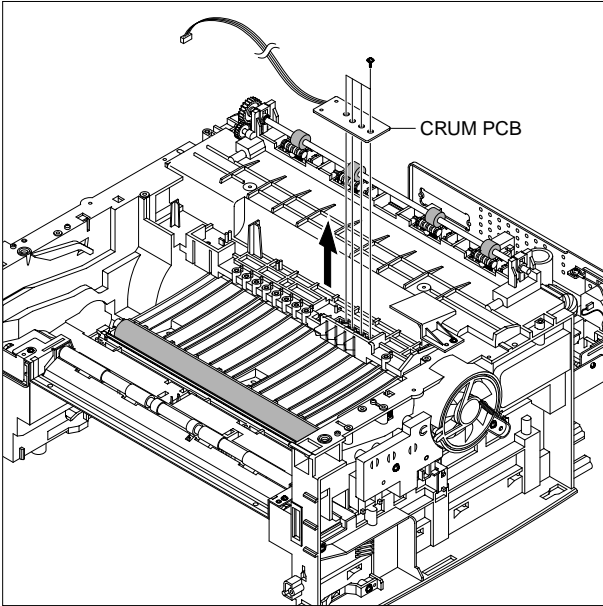
5.19 Transfer Roller

1. Before you remove the Transfer Roller, you should remove:
   - Scanner Unit (Refer to 5.7)
   - Middle Cover Unit (Refer to 5.9)
   - LSU (Refer to 5.12)

2. Remove the three screws and take the Transfer Earth out.
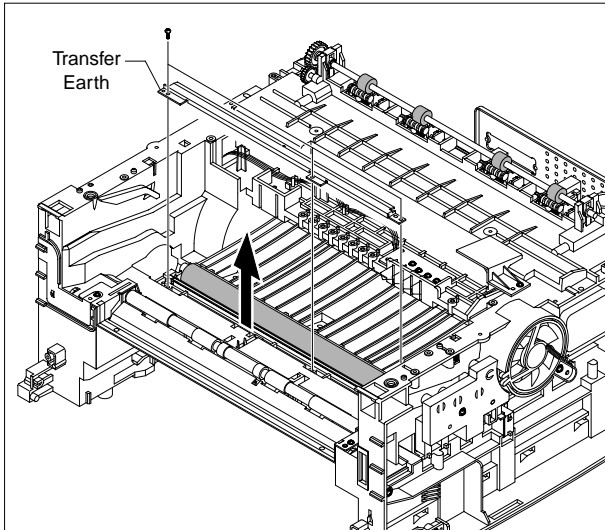
3. Unplug the PTL PBA Harness then remove the PTL Holder and PTL Lens, as shown below. Take care to note the orientation of the PTL Lens and ensure it is refitted correctly.
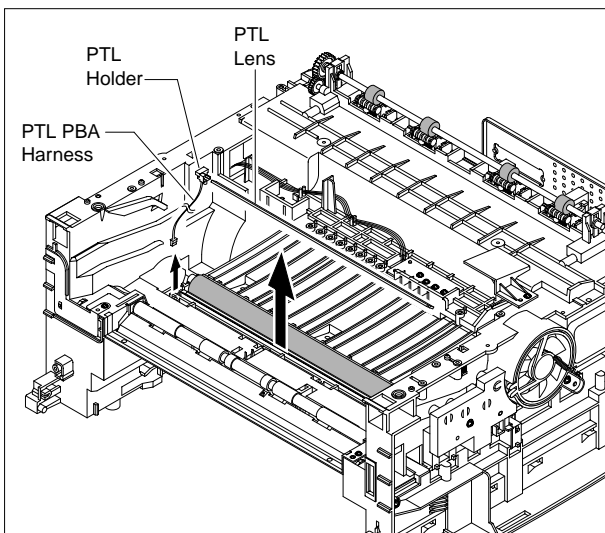
4. Unlatch the Bush and remove it. Then lift the Transfer Roller out, as shown below.
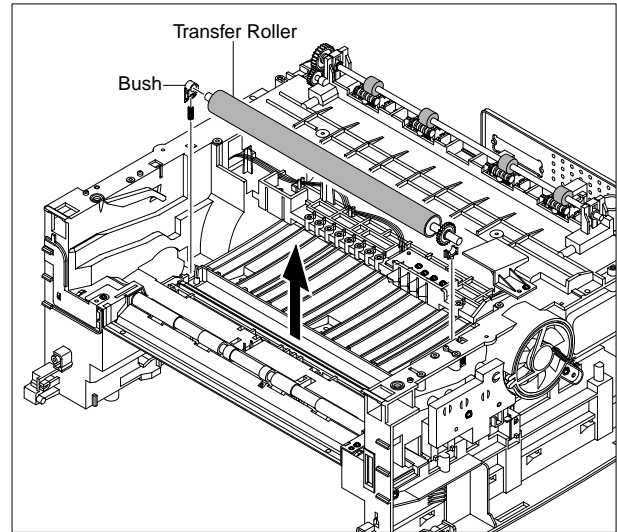
5.20 Feed Roller

1. Before you remove the Feed Roller, you should remove:
   - Middle Cover Unit (Refer to 5.9)
   - LSU (Refer to 5.12)
   - Drive Ass'y (Refer to 5.14)

2. Remove the two screws from the Guide Paper and take it out.
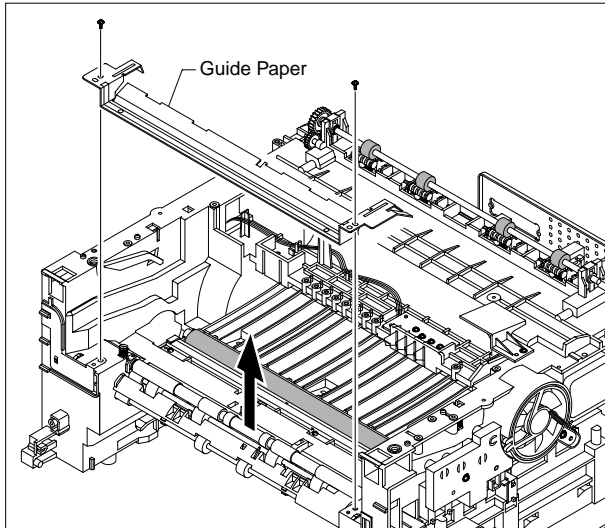
3. Pull up the Feed Idle Bush and Feed Idle Shaft, as shown below.
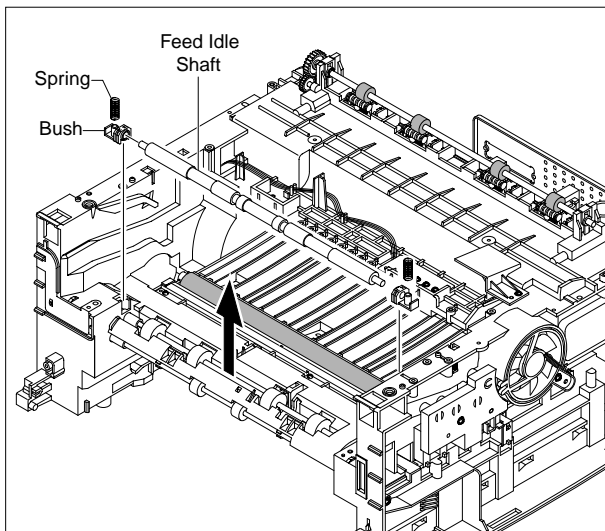
4. Remove the three screws from the Feed Bracket and take it out.
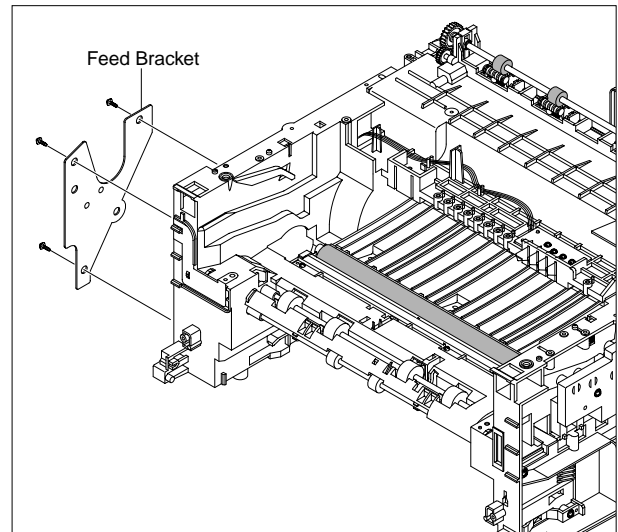
5. Remove the Idle Gear and Feed Gear2.
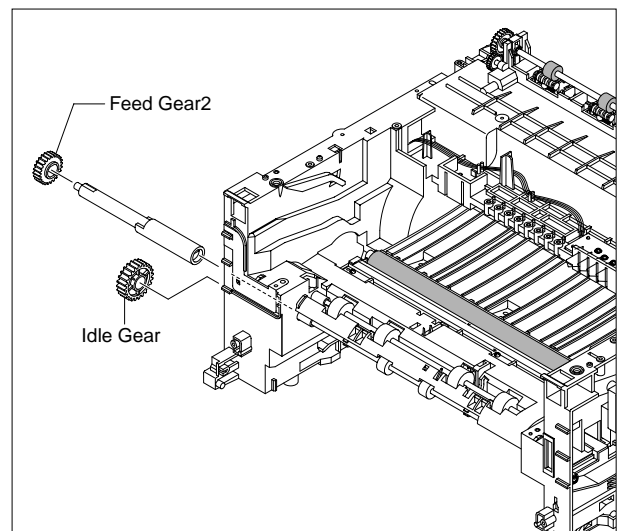
6. Remove the Feed Gear1 Ass'y, as shown below.

Feed Gear1
Ass'y
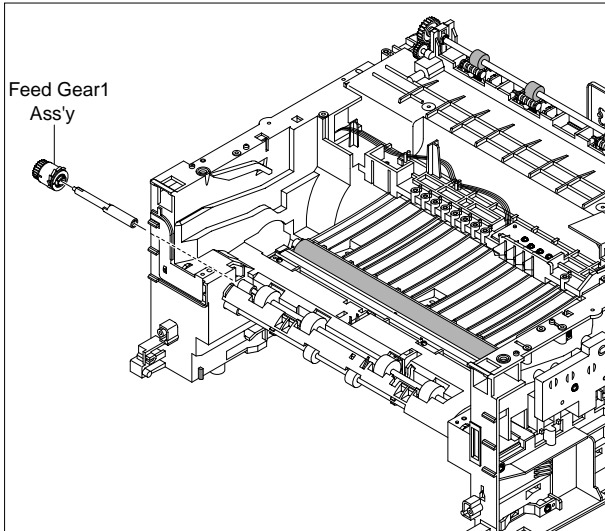
7. Pull the Feed Roller and Feed Roller1, as shown below.

Feed Roller

Feed Roller1
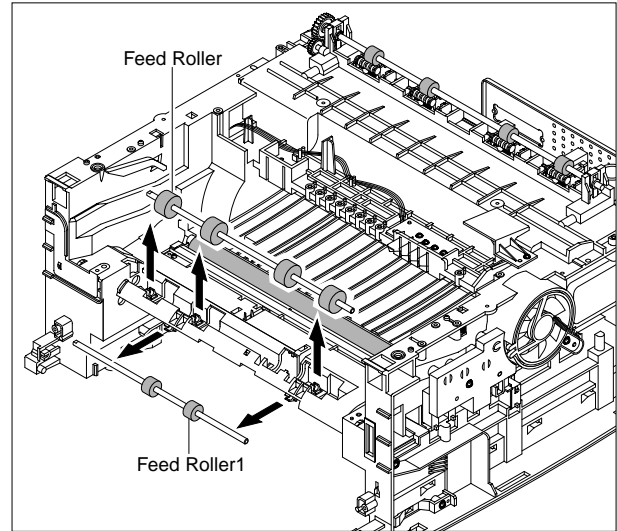
5.21 Pick Up Roller & Solenoid

1. Before you remove the Pick Up Roller & Solenoid, you should remove:
   - Middle Cover Unit (Refer to 5.9)
   - LSU (Refer to 5.12)
   - Drive Ass'y (Refer to 5.14)
   - Feed Bracket and Gear (Refer to 5.19 steps 4~6)

2. Remove the Pick Up Gear Ass'y, as shown below.

3. To remove the Pick Up Ass'y, first lift the notch attached to the Bush so that it's released from the shaft, then slide the Pick Up Ass'y from right to left and it will be released completely, as shown below.
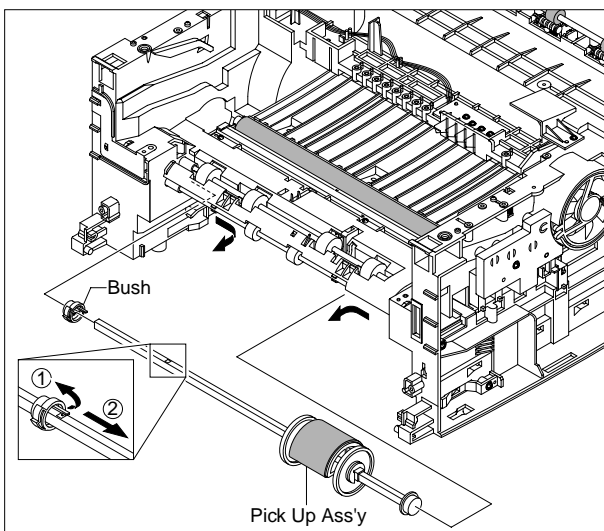
4. Remove the two screws and then remove the Regi Solenoid and Pick Up Solenoid.

Memo

6. Troubleshooting

6.1 Printing Problems – Causes and Solutions

6.1.1 Vertical Black Lines and Bands

• Description	1. Straight thin black vertical lines occur in the printing. 2. Dark black vertical bands occur in the printing.
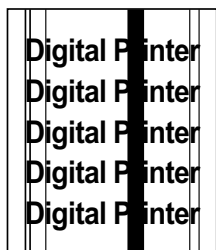
Check and Cause	Solution
1. Damaged developer roller, deformed Doctor-blade in the Toner cartridge.	1. Replace the toner cartridge and test again.
2. Scratched surface of the charge roller in the toner cartridge.	2. Replace the toner cartridge and test again.

6.1.2 Vertical White Line

• Description	White vertical voids in the image.
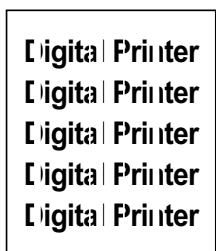
Check and Cause	Solution
1. 1. Contamination of the window or internal lenses of LSU mirror.	1. Clean the LSU window with recommended cleaner (IPA) Clean the window with a clean cotton swab. If dirt is inside the LSU – replace LSU.
2. Foreign object inside the toner cartridge or low toner.	2. Replace the toner cartridge.
3. Foreign object, contamination or burr on the edge of the toner cartridge window.	3. Clean the exposure window.
4. If the fuser is defective, voids occur periodically at the top of a black image.	4. Open the front cover and check the ribs that correspond to the position of the voids. Remove if found.
5. Contamination of the OPC drum.	5. If the problems are not solved, replace the toner cartridge.

6.1.3 Horizontal Black Bands

• Description	1. Dark or blurry horizontal stripes occur in the printing periodically. (These may occur at regular intervals down the page.)

Check and Cause	Solution
1. Bad contacts on the toner cartridge high voltage terminals.	1. Clean all HV terminals on the cartridge and on the set frame. Ensure all toner or paper dust particles are removed.
2. The rollers in the toner cartridge may be contaminated. Charge roller = 37.8 mm Supply roller = 44.9 mm Develop roller = 35.2 mm Transfer roller = 45.3 mm	2. Clean the right Gear that has relatively small tooth gap on the OPC.
	3. If the problem persists replace the toner cartridge.

6.1.4 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 Developer may be contaminated with foreign matte or paper particles. (Charge roller : 37.8 mm interval OPC drum : 75.5 mm interval)	1. Print several OPC cleaning Mode Prints and then run the Self-test 2 or 3 times.
2. If faded areas or voids occur in a black image at intervals of 75.5 mm, or black spots occur elsewhere, the OPC drum surface is damaged.	2. 75.5 mm repetition: Examine the surface of the OPC drum and carefully clean with a soft, lint free cloth. If unsuccessful replace the cartridge. 37.8mm repetition: Replace the toner cartridge
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 50,000 sheets printing. If the roller's life is expired, replace it. **Note**. Cleaning the inside of the set to remove excess toner particles or paper dust will reduce the occurrence of this problem..

6.1.5 Light Image

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

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. Toner Save mode enabled	1. Ensure the Toner Save mode is off. Check set and driver settings.
2. Develop roller is contaminated or the toner cartridge is almost empty.	2. Replace the toner cartridge and try to print out again.
3. Ambient temperature is below than 10°C.	3. Wait 30 minutes after printer is powered on before you start printing.
4. Bad contact caused by dirty terminals on the toner cartridge or set.	4. Clean the cartridge and set contacts. Generally clean dirt from inside the set.
5. Abnormal output from the HVPS. (Run EDC mode – see sections 6.1.2 and 6.1.3)	5. Replace the HVPS if the problems are not solved by the above four instructions.

6.1.6 Dark Image or a Black

• **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 fault due to bad contact between toner cartridge and set contacts.	2. Clean the high voltage charge terminals. **Note** if 1 and 2 do not resolve the problem and the problem persists replace the HVPS.
3. VD0 signal of the Main PBA is Low state.	3. Replace the LSU Unit or Main PBA.

6.1.7 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 holders are damaged.	1. Replace both the left and right bush and spring assemblies.
2. The life of the Toner cartridge has expired.	2. Replace the toner cartridge and try to print out
3. The toner level is not even on the toner cartridge roller due to the damaged blade or low toner.	3. Gently shake the toner cartridge and try printing again. If the problem persists replace the toner cartridge.

6.1.8 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. Printing large quantities of low coverage (2%) pages or the printer has not been used for a long time.	1. The toner cartridge is basically designed to print 3,000 sheets with 5% image. If it prints more than 3,600 sheets with 2% coverage, a background can occur.
2. Is a recycled toner cartridge be used?	2. The A/S is not guaranteed if using a recycled toner cartridge. **Note** try shaking the toner cartridge gently from side to side. If the problem persists replace the toner cartridge.
3. Has the life span of the toner cartridge ended?	3. Replace the toner cartridge when its life is expired.
4. Is the movement(Up and Down) of the transfer roller smooth?	4. Clean the transfer roller bushes.
5. Is the HVPS normal?	5. Clean the high voltage charge terminals. If this does not resolve the problem replace the HVPS.

6.1.9 Ghost (1)

• Description	Ghost occurs at 75.5 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 Toner cartridge.	1 and 2. Clean all HV contacts, If problem persists replace the HVPS.

If problem still persists replace the Main PBA |
2. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board.	
3. The life of toner cartridge is expired.	3. Replace the toner cartridge and try to print out.
4. Transfer roller life (50,000 sheets) has expired.	4. Check the transfer roller lifetime and replace it.
5. Low ambient temperature (below 10°C).	5. Wait about 30 minutes after power on before using printer.

6.1.10 Ghost (2)

• Description	Ghost occurs at 75.5mm 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, a higher transfer voltage is required.	Ensure that the correct paper type is selected in the printer driver or application software. Remember to set back to normal paper after use.

6.1.11 Ghost (3)

> • **Description**   Ghost occurs at 64 mm intervals.

Check and Cause	Solution
Fuser contamination.	1. Disassemble the fuser and remove any contamination on the rollers. Clean any contamination from between the Thermistor and the Heat roller. (Caution: Take care not to deform the rollers.)

6.3.12 Ghost (4)

> • **Description**   A White ghost occurs in a black image printing at 35.2mm intervals.

Check and Cause	Solution
1. The life of the developer may be expired.	1. Problem in the toner cartridge, replace the toner cartridge and try to print out again.
2. Abnormal output from the HVPS. (Run EDC mode – see sections 6.1.2)	2. Check the HVPS supply voltage. Clean all HV terminals on the cartridge and on the set. Replace the HVPS if the problem persists.

6.1.13 Stains on the Face of the Page

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

Check and Cause	Solution
1. Toner leakage due to improperly sealed toner cartridge.	1. Replace the toner cartridge.
	2. If the transfer roller is contaminated, run PC Cleaning Mode Print 2 or 3 times and then perform Self-Test 2 or 3 times to remove contamination.

6.1.14 Stains on Back of Page

• **Description**   The back of the page is stained at 45.3 or 75.3 mm intervals.
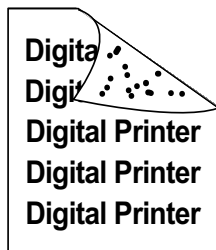
Check and Cause	Solution
1. 45.3mm : Transfer roller is contaminated.	1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination from the transfer roller. **Note.** Replace the transfer roller if ⚠ contaminated severely.
2. 75.3mm : Pressure roller is contaminated.	2. Disassemble the fuser and clean the H/R(Heat Roller) and P/R(Pressure roller). Check and clean the area between the H/R and the Thermistor. (Caution: Take care not to deform the rollers.)

6.1.15 Blank Page Print out (1)

• **Description**   Blank page is printed.
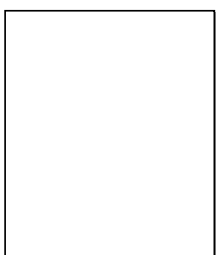
Check and Cause	Solution
Bad ground contacts in OPC and/or toner cartridge.	1. Check if the Ground-OPC or the OPC Ground Zener diode are defective or open circuit. (set inside left side). 2. Remove contamination of the terminals on the toner cartridge and the unit.

6.1.16 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.
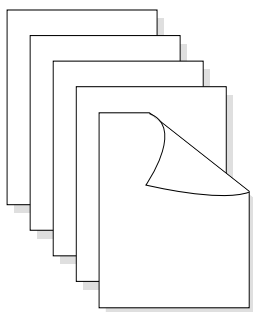
Check and Cause	Solution
1. Abnormal solenoid.	1. Perform the engine self test using TECH Mode to check if the Solenoid is normal. If the problem persists replace the main PBA

6.2 Copy Problems

6.2.1 White Copy

• **Description**   Blank page is printed out when copying.

Check and Cause	Solution
1. Check the Scanner Cover is properly closed.	1. Room light can pass through a thin original.
2. Check shading profile.	2. Redo shading profile in the tech mode.
3. Check white/black reference voltage on Main PBA. e.q • CIS_SI, CIS_CLK at CN8 • Or Check the FFC	3. Replace CN8 if it is defective. • CN8-Pin6(CIS-SI) • CN8-Pin7(CIS-CLK)

6.2.2 Black Copy

• **Description**   Black page is printed out when Copying.

Check and Cause	Solution
1. Check for CIS problem on the Main PBA.	1. Check the CIS harness is properly connected.
2. Check shading profile.	2. Redo shading profile in the tech mode.

6.2.3 Abnormal noise

• **Description**   There is noise from the Platen when copying.

Check and Cause	Solution
1. Check the Scan Motor and gesr. 2. Check the Motor Driver on Driver PBA.	1. Check for correct assembly of gear and motor. Ensure no parts are fouling and there are no foreign objects in the mechanism or scanner path. Replace any worn parts 2. Replace the main PBA.

6.2.4 Defective Image Quality

• **Description**   The copied image is excessively light or dark

Check and Cause	Solution
1. Check shading profile. 2. Check the gap between original and scanner glass. 3. Check printing quality.	1. Redo shading profile in the tech mode. 2. A gap of more than 0.5 mm can cause a blurred image. Ensure cover close correctly. Replace as necessary. 3. See "Print" troubleshooting.

6.3 Paper Feed problems – Causes and Solutions

6.3.1 Wrong Print Position

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

Check and Cause	Solution
Wrong sensor timing caused by defective feed sensor actuator.	Replace the defective actuator

6.3.2 JAM 0

> • **Description**   1. Paper does not exit from the cassette.
> 2. Jam-0 occurs when the paper feeds into the printer.
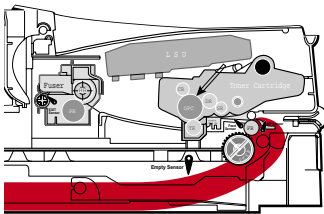
Check and Cause	Solution
1. Check the Solenoid by using Tech Mode.	1. Replace the solenoid.
2. Check cassette/MP knock-up plate and springs.	2. Repair / replace as required
3. Check paper separator pad	3 Clean with soft cloth dampened with IPA (Isopropyl Alcohol) or water. Replace if required.
4. Check the pick up roller for contamination and correct assembly.	4. Clean with soft cloth dampened with IPA (Isopropyl Alcohol) or water. Replace if required
5. If continuous clusters occur, check all rollers between pickup and registration sensor.	5. Ensure all rollers are clean and free to operate correctly.
6 If the paper feeds into the printer and Jam 0 occurs, perform Tech Mode to check feed sensor.	6. Check the SMPS PBA, Main PBA and all connections. Replace any faulty parts or the

6.3.3 JAM 1

• **Description**	1. Paper is jammed in front of or inside the fuser. 2. Paper is stuck in the exit 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. 2. If the recording paper is stuck in the exit roller and the fuser just after passing through the Actuator-Feed, Feed Actuator may be defective.	1. Replace the Exit-Sensor, SMPS or main PBA. 2. Reassemble the Actuator-Feed and Spring-Actuator if the movement is bad. Replace if necessary.

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: The Exit sensor may be defective. • After the paper is completely discharged the Exit sensor actuator should return to its original position to shut the photo-sensor. It may stick open or return only slowly due to contamination be paper debris or foreign objects. 2. If the paper is rolled in the Fuser Roller: • This occurs when a Guide claw is broken away, damaged or deformed. • It occurs when the Spring of a Guide claw is broken or damaged. • It occurs when the Heat-Roller or Pressure-Roller is seriously contaminated with toner.	1. Check if the exit sensor actuator is defective. • Check if the actuator exit is deformed (Check if the lever part is deformed). • Check whether burrs occur in the assembly part of the exit actuator and if the actuator operates smoothly. • Check if foreign objects or paper debris are preventing the correct operation of the actuator. 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. Check all ribs, claws and springs.

6.3.5 Multi-Feeding

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

Check and Cause	Solution
1. Check that the paper size guides are set correctly (cassette and MPF tray).	1. Adjust paper guides.
2. Solenoid malfunction (the solenoid does not work properly).	2. Replace the solenoids or PBA as appropriate.
3. Friction Pad is contaminated.	3. Clean the friction pad rubber with a soft cloth dampened with IPA (Isopropyl Alcohol) or water.
4. Paper has a rough surface texture.	4. Use paper with a smother surface finish.

6.3.6 Paper rolled in the fuser

• **Description**   Paper rolled around fuser rollers or 'Concertina' jam

Check and Cause	Solution
1. Contamination of the pressure roller or heat roller.	1. After disassembling the fuser, clean contamination from between the heat roller and the thermistor and also clean contamination from the pressure roller. Clean the surface of the rollers with IPA or water
2. Damaged or deformed ribs, claws or springs.	2. Check for damage or deformation of the print claws and the holder plate claws, and repair or replace as appropriate.

6.3.7 Paper rolled on the OPC Drum

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

Check and Cause	Solution
1. Paper is too thin.	1. Use paper that conforms to the printer specification.
2. The face of paper is curled.	2. Ensure paper is stored properly to prevent curl. **Note.** To remove paper rolled in the OPC. • Remove the toner cartridge from the set, taking care not to touch the green surface. Use the gearwheel at the side to rotate the OPC drum and pull the paper from the cassette. • Clean fingerprints on the OPC gently with soft tissue, taking care not to scratch the surface.

6.4 Printer Faults – Causes and Solutions

6.4.1 Fuser Error

• **Description**   A message "Open Heat Error/Over heat/Heating Error' is displayed in the LCD panel.

Check and Cause	Solution
1. Thermostat, fuser power cable or heat lamp is open circuit.	1. Replace the whole fuser assembly if the thermostat is open circuit.
2. Thermistor is open circuit.	2. Replace the whole fuser assembly if the thermistor sensor is faulty.
3. Heat lamp ON/OFF test	3. Replace the fuser.
4. Drive gear melted	

6.4.2 LSU Error

• **Description**   A message "LSU Error" is displayed in the LCD panel.

Check and Cause	Solution
1. LSU cable or connector faulty.	Use TECH mode to test the LSU - Replace the LSU - Replace a main board if the same error persists after replacing a LSU.
2. LSU motor is faulty.	
3. Check the HSYNC signal.	

6.4.3 Fuser gear melts due to overheating causing Paper Jam.

• Description	Constant Jam where paper is entering Fuser unit. Fuser rollers do not turn

Check and Cause	Solution
1. Check the Heat Lamp, thermostat and thermistor	1. Use EDC Mode to test the fuser. Replace Fuser unit Replace SMPS or Main PBA as appropriate.

6.4.4 Paper Empty

• Description	Paper Empty is displayed in the LCD panel even when paper is loaded in the cassette.

Check and Cause	Solution
1. Deformed paper sensor actuator or faulty sensor.	1. Replace the defective actuator or sensor.
2. SMPS PBA or Main PBA is defective	2. Replace the SMPS PBA or MAIN PBA as appropriate.
3. Faulty cables or connectors.	

6.4.5 Paper Empty without indication

• **Description**   The paper empty message does not appear in the LCD when the paper cassette is empty.

Check and Cause	Solution
1. Deformed paper sensor actuator or faulty sensor.	1. Replace the defective actuator.
2. SMPS PBA or Main PBA is defective .	2. Replace the SMPS PBA or MAIN PBA as appropriate

6.4.6 Cover Open

• **Description**   The Cover Open message appears on the LCD even when the print cover is closed.

Check and Cause	Solution
1. The 'Open Cover' microswitch may be stuck or faulty	1. Use TECH mode("cover sensor test") to check cover switch operation. Check and replace switch if necessary.
2. The tab on the front cover may be damaged or broken	2. Replace the front cover.
3. Check the connector and cables between Switch and main PBA.	3. Replace the Main Control board or Cover Open S/W as necessary.

6.4.7 No error message when the cover is open

• **Description**   The Cover Open message does not appears on the LCD even when the print cover is open.

Check and Cause	Solution
1. The 'Open Cover' microswitch may be stuck or faulty 2. Check the connector and cables between Switch and main PBA.	1. Use TECH mode("cover sensor test") to check cover switch operation. Check and replace switch if necessary. 2. Replace the Main Control board or Cover Open S/W as necessary.

6.4.8 Defective motor operation

• **Description**   Main motor is faulty and paper does not feed into the printer, resulting in Jam 0'

Check and Cause	Solution
1. The main motor harness or Motor PCB may be faulty.	1. Check the motor harnesses and connectors, replace if defective.. If the problem persists replace the main PBA.
	Note Check motor operation using EDC Mode.

6.4.9 No Power

• **Description**   When system power is turned on the LCD panel does not come on.

Check and Cause	Solution
1. Check if the power input and SMPS output are normal.	1. Replace the power supply cord or SMPS. Check power fuse and SMPS fuses replace if necessary.
2. LCD panel does not come on but normal start up sounds are heard.	2. Replace the OP panel.
3. After replacing SMPS display does not come on and no start up sounds are heard.	3. Replace the main PBA panel.

6.4.10 Printed Vertical Lines become curved

• **Description**   When printing, vertical lines are not straight.

Check and Cause	Solution
1. Check stability of 24V supply to LSU.	1. 24V stable - Replace LSU. 24V unstable replace SMPS, if the problem persists replace the main PBA.

6.5 Toner Cartridge Service

Only toner cartridges supplied by Samsung should be used. Printing defects or set damage caused by the use of non-approved toner cartridges or un-licensed toner refills are not covered by the guarantee.

6.5.1 Precautions on Safe-keeping of Toner Cartridge
Excessive exposure to direct light for more than a few minutes may cause damage to the cartridge.

6.5..2 Service for the Life of Toner Cartridge
If the printed image is light due to the toner supply becoming low you can temporarily improve the print quality by redistributing the toner (Shake the toner cartridge), however you should replace the toner cartridge to solve the problem permanently.

6.5.2.1 Redistributing Toner
When the toner cartridge is near the end of its life, white streaks or light print occurs. You can temporarily reestablish the print quality by redistributing the remaining toner in the cartridge.

1. Open the Front Cover.

2. Lightly pushing the used cartridge down, pull it out.

Note : Help the environment by recycling your used toner cartridge. Refer to the recycling brochure packed with the toner cartridge for details.

3. Unpack the new toner cartridge and gently shake it horizontally four or five times to distribute the toner evenly inside the cartridge.

4. Save the box and the cover for shipping. Slide the new toner cartridge in until it locks into place.

6.5.3 Standard of guarantee for consumable parts.
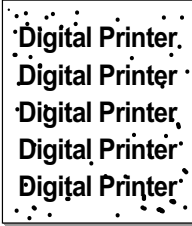
Please refer to User's Manual or Instructions on Printer Consumables SVC manual for the criteria for judging the quality of consumable parts the standard of guarantee on those parts.

• **Spotting a refilled cartridge by eye.**
One way security screws are used in the manufacture of the cartridge – check if these are damaged.

6.5.4 Signs and Measures of Poor toner cartridge

Fault	Signs	Cause & Check	Solution

Light image and partially blank image (Cartridge life is ended.)
 	
Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer
	• The printed image is light or dirty and untidy.
	
	• Parts of the image are not printed.
	
	• Periodically a "tick tick" noise occurs.
		1. If the image is light or dirty and untidy - Shake the toner cartridge and then recheck. OK: Lack of toner, so the life is nearly expired.
		
		2. Some part of image is not printed - Shake the toner cartridge and then recheck. (1)NG: clean the LSU window with a cotton swab, then recheck. (2)OK: Lack of toner, so the life is nearly closed.
		
		3. Periodically a noise like "tick tick" occurs - Measure the time between ticks.
		
		4. White vertical stripes on the whole or part of the page : Shake the toner cartridge and then recheck. OK: Lack of toner, so the life is nearly expired
			1. All of 1, 2, 3
			   If image quality improves by shaking, replace with a new toner cartridge. Perhaps up to 100 pages left before out of toner.
			
			2. For item 2-
			   If image quality improves after cleaning the LSU window then the toner cartridge is normal. (Contamination on the LSU window has caused image quality problems.)
			
			3. For item 3-
			   If the time between ticks is about 2 seconds, the toner inside the toner cartridge is almost exhausted. (Purchase and replace with a new toner cartridge. Perhaps up to 200 pages left before out of toner)
			
			4. For item 3-
			   This is a phenomenon caused by lack of toner, so replace the toner cartridge.

Toner Contamination	• Toner contamination of the printed page at regular intervals down the page. • Random Toner contamination over the whole or large parts of the paper surface.	1. Contamination at regular intervals. (a)Check the distance between contamination marks. (b)Check the appearance of both ends of the toner cartridge OPC drum. 2. Random page contamination. (a) Check that the terminals (contact points) of the toner cartridge and the set are clean. (b) Check that the terminals (contact points) of the toner cartridge and the set are not damaged.	1.(a) Refer to section 6.5 1.(b) If both ends of the OPC drum are contaminated with toner: Check no. of pages printed using this cartridge – perhaps waste toner collector is full. 2. Clean all HV contacts. If the problem persists replace the cartridge.

Fault	Signs	Cause & Check	Solution
White Black spot Digital Printer Digital Printer Digital Printer Digital Printer Digital Printer	• Light or dark black dots on the image occur periodically. • White spots occur in the image periodically.	1. If light or dark black dots occur at regular intervals this is because the toner cartridge rollers are contaminated with foreign substance or paper particles. (1)37.8mm interval : Charge roller (2)75.5mm interval : OPC cycle 2. If white spots occur in a black image at intervals of 75.5mm, or black spots occur elsewhere, the OPC drum is damaged or foreign substance is stuck to the surface. 3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has been expired or the transfer voltage is abnormal.	1. For item 1 - Run OPC Cleaning Mode Print 4-5 times repeatedly to remove excess toner. Especially check for foreign substances on the OPC surface Clean with a clean gauze moistened with IPA Isopropyl Alcohol) take care not to damage the OPC surface. ⚠ Never use other forms of alcohol. 2. For Item 2 - If running OPC Cleaning Mode Print 4-5 times does not resolve the problem : at intervals of 37.8mm - place the toner cartridge. : at intervals of 75.5mm – clean OPC drum. 3. For item 3 - Change the transfer roller because the life of the transfer roller has expired. (Check the transfer voltage and readjust if necessary.)
Recycled product	• Poor appearance of the toner cartridge. • Dirty or rough printouts. • Bad background in the image.	1. Poor appearance of the toner cartridge. (a)Check for damage to label and if different materials are used. (b)Check the appearance of parts of the toner cartridge, such as frame, hopper, screws 2. Unclean and rough printouts. (a)Check that the terminals (contact point) of the toner cartridge and the set are clean. (b)Check that the terminals (contact point) of the toner cartridge and the set are not damaged.	1. For Item 1 the cartridge is judged to be a recycled product - (a) If there is any evidence of disassembling the toner cartridge. (b) If materials other than normal parts of the toner cartridge are added or substituted. 2. Clean all HV contacts. If the problem persists replace the cartridge. **Note** If the cartridge is judged to be recycled then these types of problems can occur when the toner cartridge is recycled over 2 times. If 'nearly empty' cartridges are collected for re-use this is judged as recycling the toner cartridge.

Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	• The printed image is too light or dark, or partially contaminated black. • Totally contaminated black. (Black image printed out) • The density of printouts is too dark and ghost occurs.	1. The printed image is too light or dark, or partially contaminated black. (a) Check if foreign substance or toner are stuck to the terminals (point of contact) of the toner cartridge or set. (b) Check if the terminal assembly is normal. 2. Totally contaminated black. (Black image printed out) (a) Check if foreign substances are stuck to the terminal (point of contact) of the toner cartridge or set. (b) Check if the terminal assembly is normal. (Especially check the charge roller terminal.) 3. The printed image is dark and ghost occurs. (a) Check if foreign substances are stuck to the terminal (point of contact) of the toner cartridge or set. (b) Check if the terminal assembly is normal. (Especially check the developer roller terminal.)	1. All of Items 1, 2, 3 (a) Clean the contacts on the toner cartridge. (b) Clean the contact points on the set. (c) If the terminal assembly is damaged repair or replace the terminals in the set or replace the cartridge 2. In Item 2 This is particularly related to problems with the charge roller contact. Pay close attention to the charge roller contacts. 3. In Item 3 This is particularly related to problems with the developer bias voltage contact. Pay close attention to the charge roller contacts.

6.6 Software Problems – Causes and Solutions

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: using the menu buttons print the test page. (Menu, Enter, Enter).	1. If the test print works that means there are no problems in the printer itself. If the test printing does not work that means the printer is faulty and the problem is not due to computer software or driver settings.
2. Check that the PC and the printer are properly connected and that the toner cartridge installed correctly.	2. Replace the printer cable. If the problem is not solved even after the cable is replaced, check the amount of the remaining toner. (refer to Toner Cartridge Service 7-6, Page 7-25)
3. Check that the printer cable is directly connected to the printer.	3. If you have other devices that need to share the printer port try temporarily disconnecting these devices 9and perhaps even uninstalling their drivers) to ensure the printer works by itself. If you are using a USB hub try connecting directly to the back of the PC instead.

6.6.2 Abnormal Printing

• **Description**   Printing does not work – even after replacing the cable
Printer does not work at all or strange fonts are printed,

Check and Cause	Solution
1. Set up the parallel port using CMOS SETUP.	1. Ensure that ECP (best) or SPP is selected in the CMOS (BIOS) setup.
2. Printer Driver Error.	2. Ensure that the correct driver is loaded. Use the driver supplied on the CD or downloaded from the Samsung web site. DO NOT use the Microsoft driver supplied with the Windows operating system. If the printer is a GDI or SPL type printer ensure that ALL OTHER GDI or SPL drivers are uninstalled as Windows allows only 1 of this type of driver to be loaded.
3. Error message "insufficient memory". (The printing job sometimes stops due to insufficient virtual memory, this is caused by insufficient space on the hard disk.)	3. Delete any unnecessary files to secure enough space on the hard disk and start the print job again.

6.6.3 SPOOL Error

| | • Description | SPOOL (simultaneous peripheral operations online) is the process Windows uses to manage print jobs. Jobs are processed and then stored on the hard disk until the printer is ready to accept them |

Check and Cause	Solution
1. Insufficient space on the hard disk in the directory assigned for the basic spool.	1. Delete any unnecessary files to provide more space for spool storage.
2. If previous printing errors were not solved.	2. There may be files from previous failed print jobs on the hard disk with the name in the form '*.jnl'. Delete these files and Reboot Windows to restart the printer.
3. There may be conflict with other drivers or programs.	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 the OS are damaged or virus infected.	5 After rebooting the computer, check for viruses, restore the damaged files and reinstall the application program which is not working properly.
6. Memory is less than suggested.	6. Add up more 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 delete in the menu.

If the job you are deleting is the current job when you delete the job data that has already been transferred to the printer's memory will still be printed. If there is a problem with the printer (out of toner, offline, out of paper etc.) the job may take a long time to delete as it must wait for a time out.

7. Block Diagram

7.1 System Block Diagram
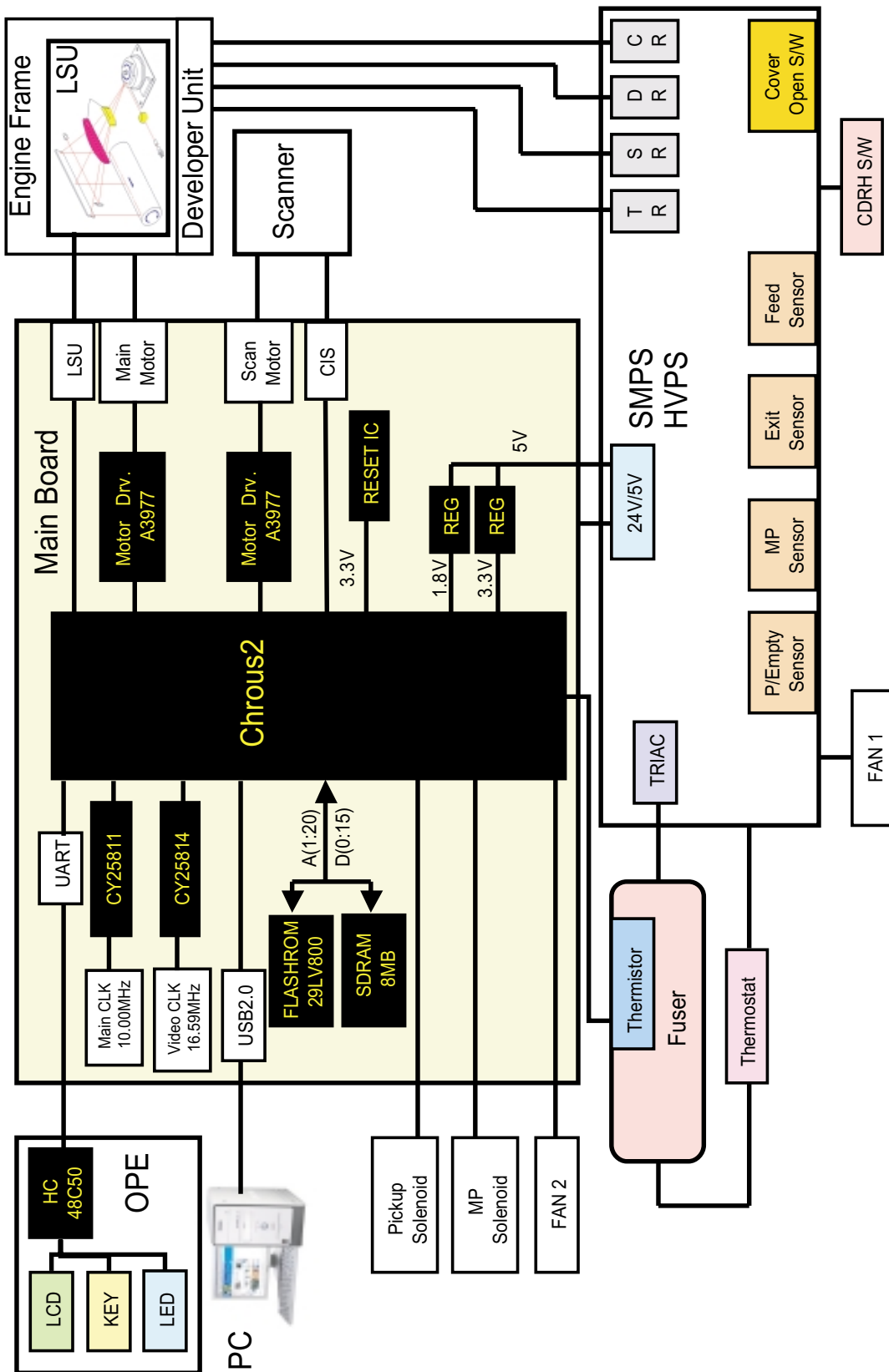
8. Exploded Views and Parts List (SCX-4200/XEU)

Contents

Part Number & Description format.

Part numbers and descriptions are defined according to a company standard. The information below will help you to understand the part number format and assist when ordering spare parts.

• There are two types of Part number format.

●●●● – ●●●●●●   ex) 2007-007961   R-CHIP

■■●● – ●●●●●■   ex) JB96-01268A   ELA UNIT-COVER TOP
        └─ It shows part specific

(● : number   ■ : letter)

Type   1 : This format is used throughout Samsung on all product ranges.
        Typically it is used for small components and electronic parts.

Type   2 : This format is controlled by individual Samsung Divisions and is used on specific
        products, typically for mechanical parts. Type 2 format part numbers fall into 2 categories:

• A/S privately used part : It is only used for A/S .

• Ass'y part : Assemblies consisting of 2 or more parts. Also used for Service manuals,
            user guides and diagrams.

• Ass'y parts and A/S privately used Parts can be distinguished by the part Code and Description.
  They are always Type 2 format. The 2 leading characters indicate private or assembly parts.

DIVISION	PART CODE	DESCRIPTION
A/S Private	**81-****** (JB81-00039A)	AS-********** (AS-USE)
ASS'Y Part	**75-****** (JB75-00068A)	MEC-******** (MEC-CHUTE)
ASS'Y Part	**92-****** (JB92-01131A)	PBA ********* (PBA MAIN-CONTROLLER)
ASS'Y Part	**97-****** (JB97-01089A)	MEA ********* (MEA UNIT-PULLEY IDLE)

8.1 Main Exploded View
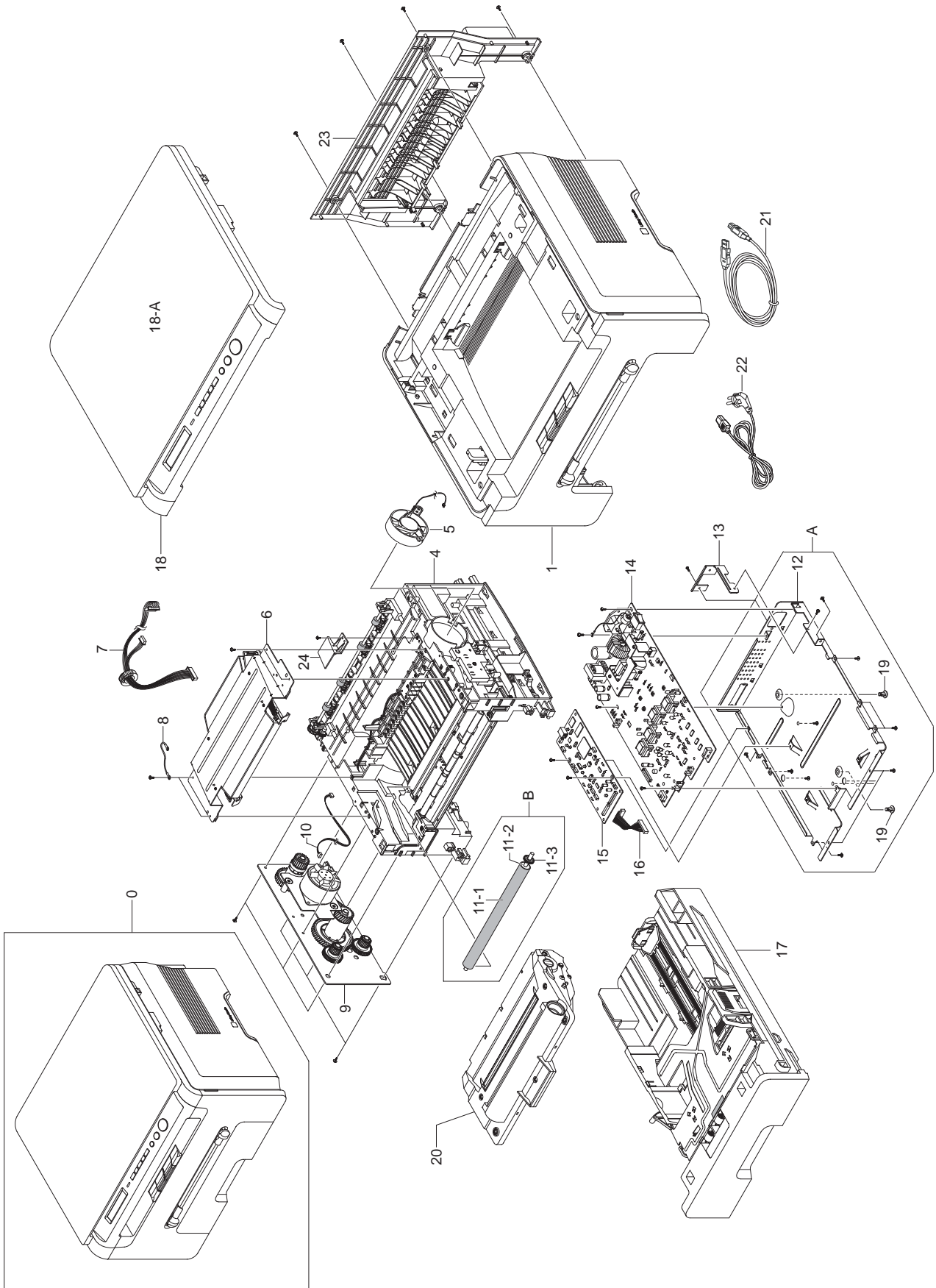
8.2. Housing Base Exploded View
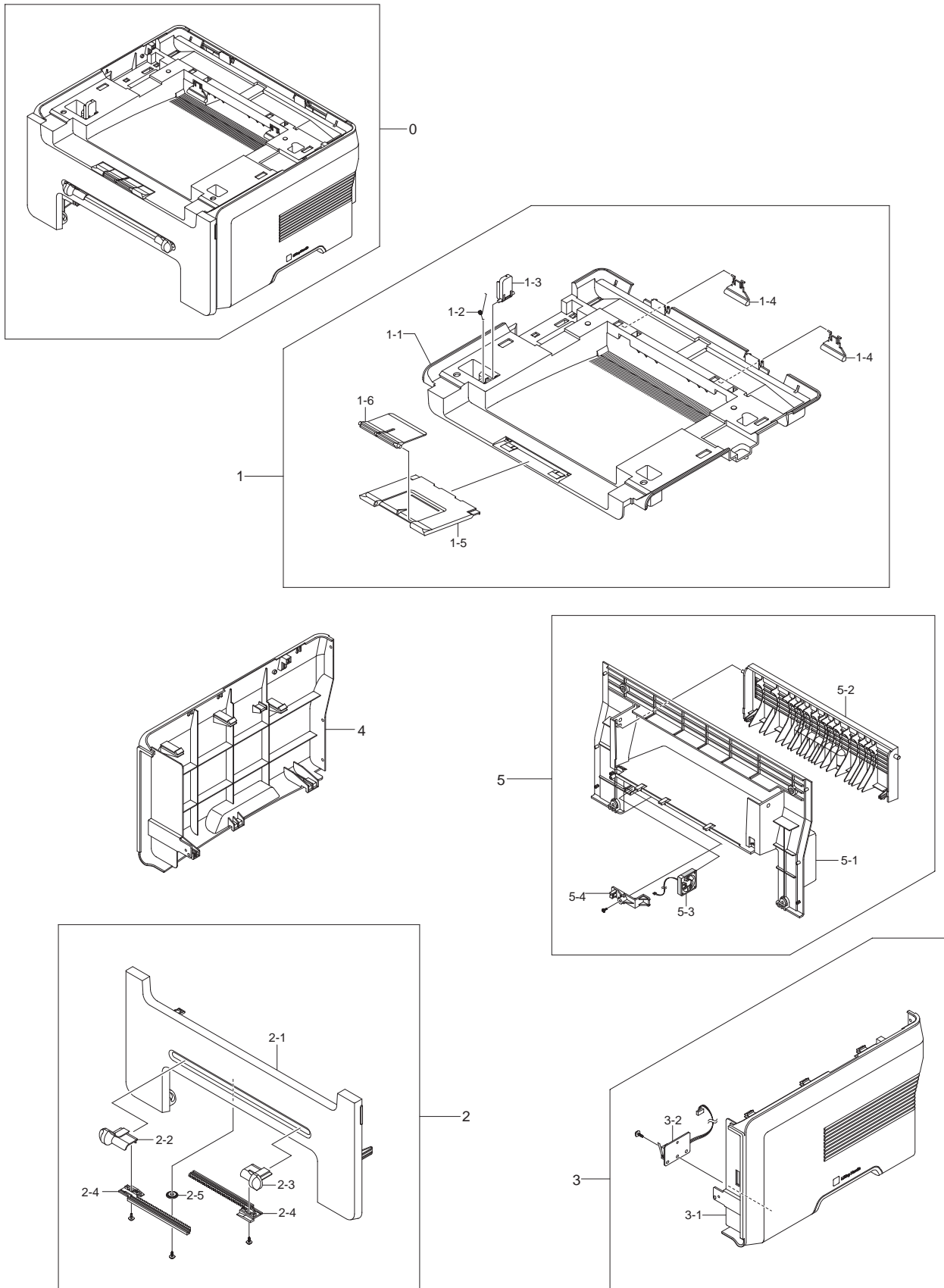
8.3. Frame Assembly Exploded View

Transfer Roller
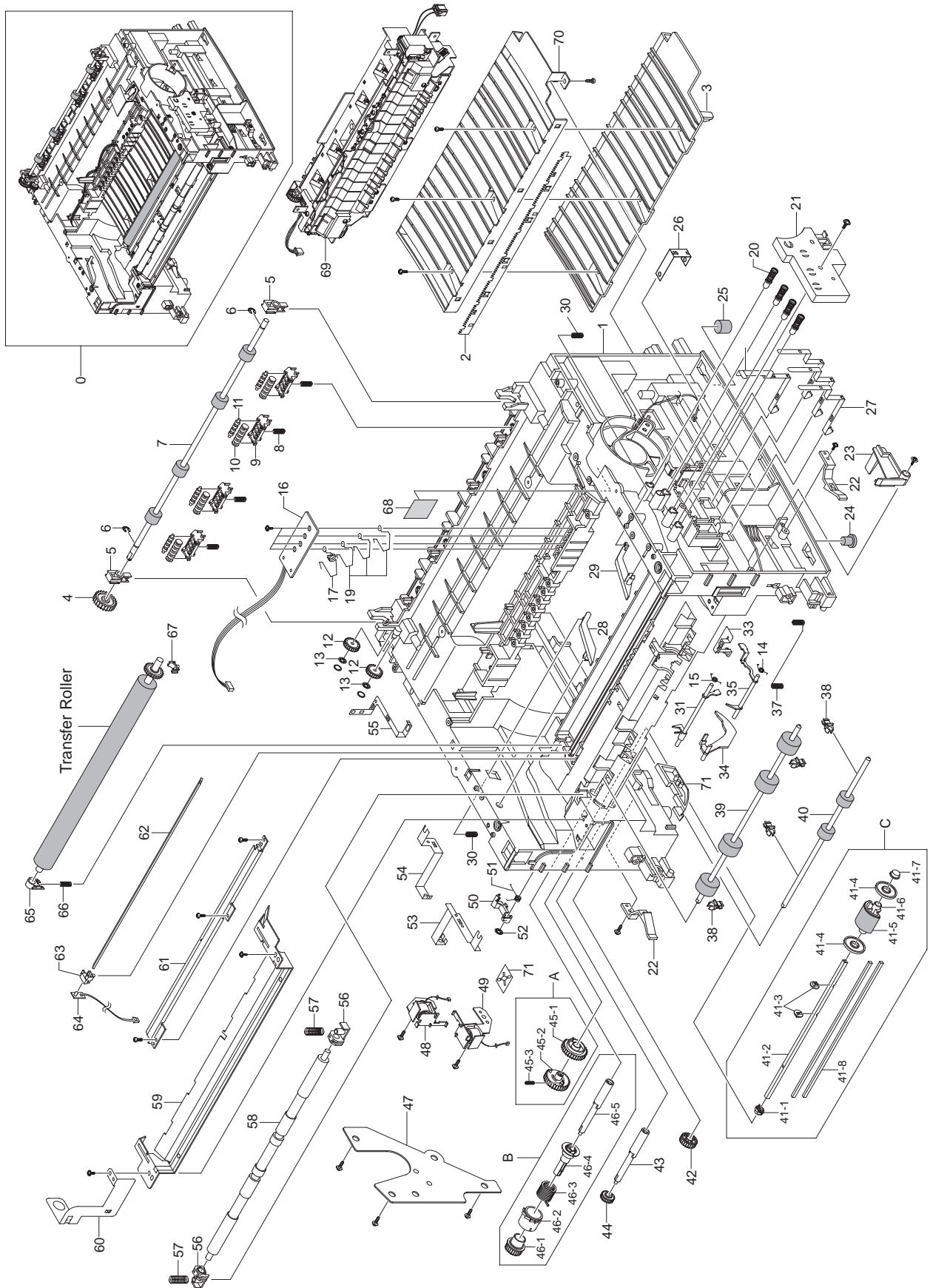
8.4. Fuser Unit Exploded View
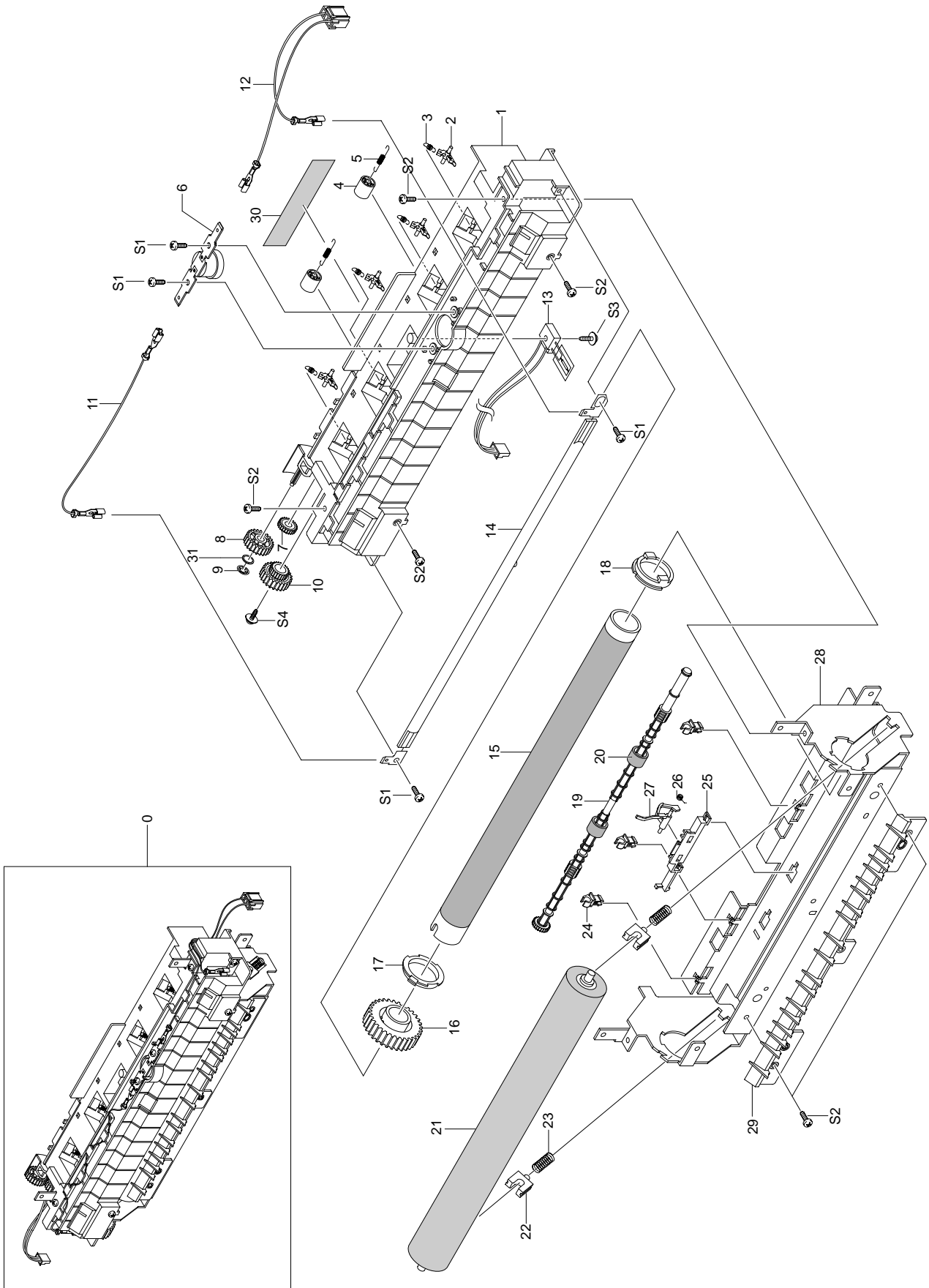
8.5. Drive Assembly Exploded View
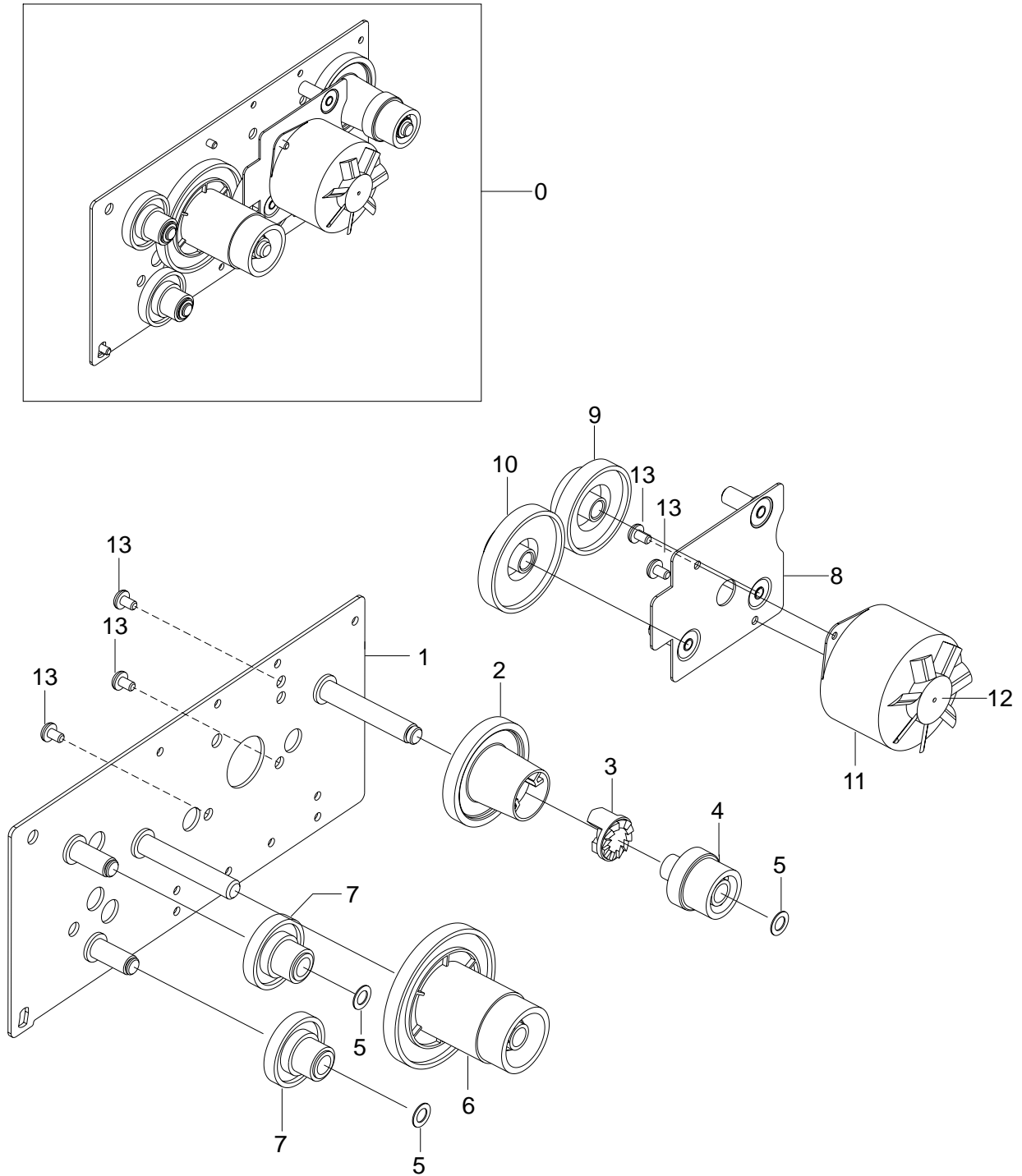
8.6. Scan Assembly Exploded View
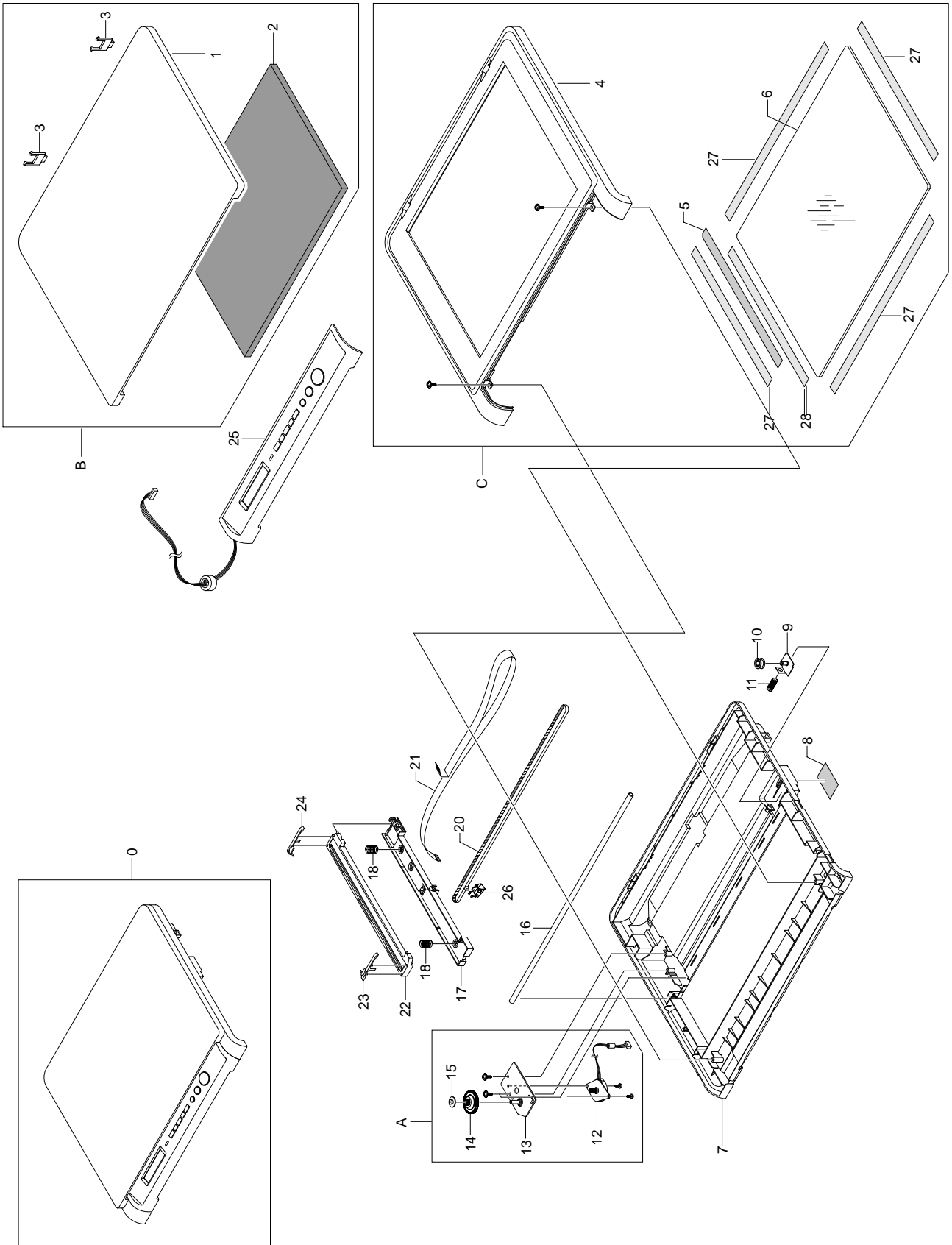
8.7. OPE Assembly Exploded View
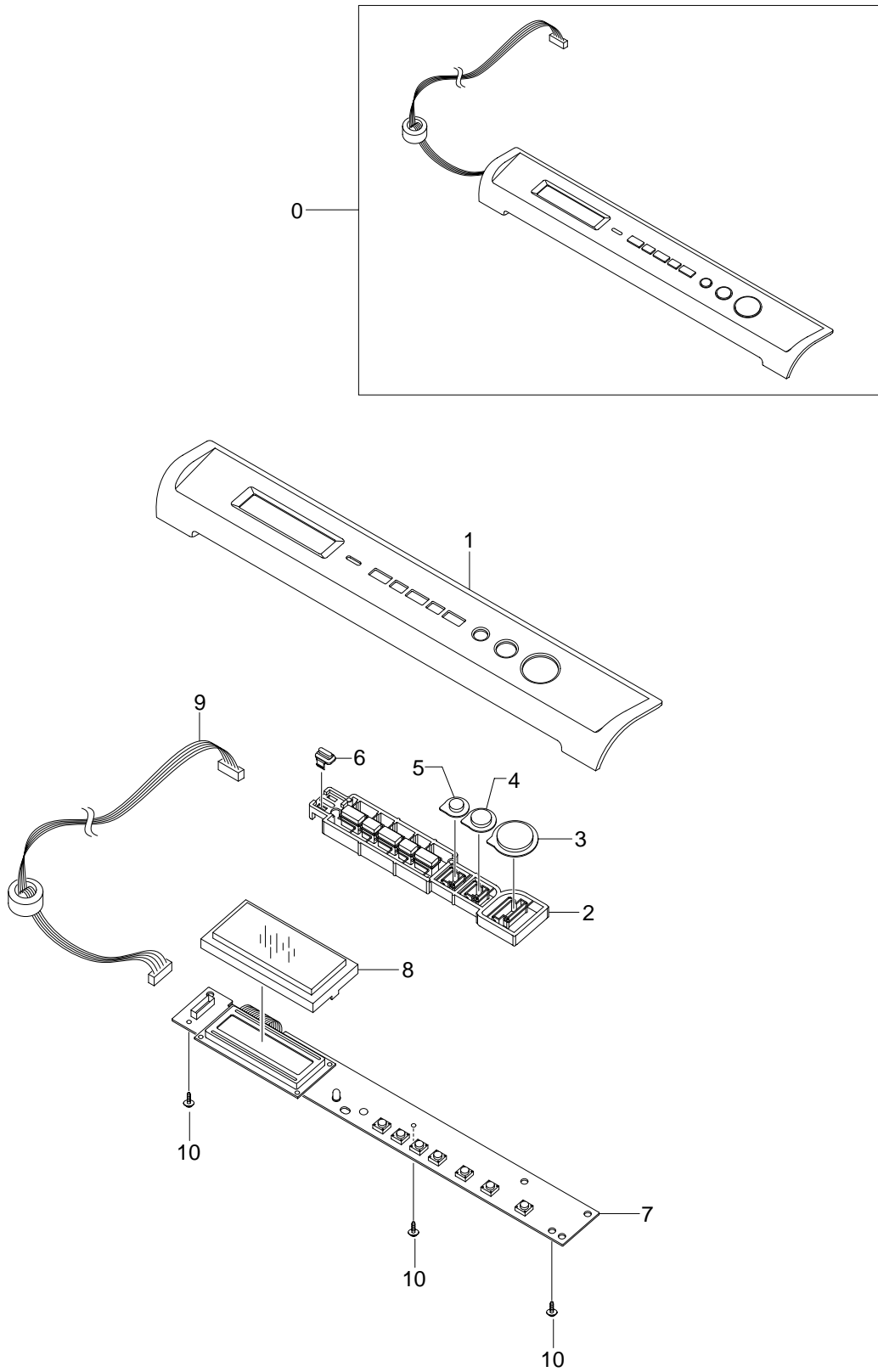
8.8. Cassette Assembly Exploded View
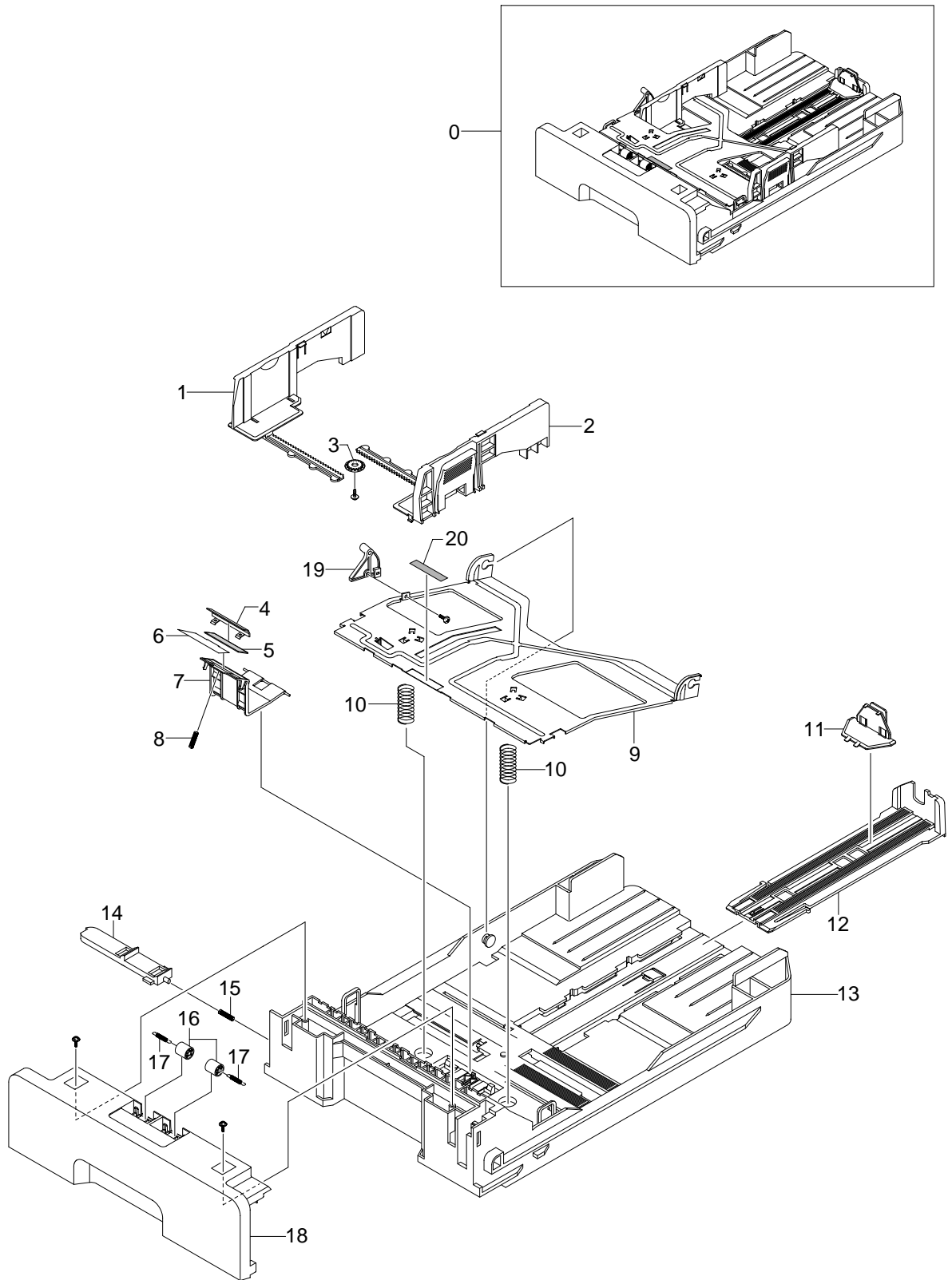
Model Parts List (SCX-4200/XEU)

Service BOM(SA : Service Available, **SNA** : Service not Available, DNA:DELIVERY   not   AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
8.1-1	JC96-03807A	ELA HOU BASE-HOUSING;SCX-4200,SEC,-,-,-,		SNA
8.1-2	3103-001085	FAN-DC;24V,80mA,4800rpm,-,0.131mmH20	Z4126	SA
8.1-3	JC61-01643A	HOLDER-M_HARNESS;SCX-4200,ABS, HB,2.0,15	Z4127	SA
8.1-4	JC96-03892A	ELA UNIT-FRAME LOWER;SCX-4200,SAMSUNG,-,	Z4128	SA
8.1-5	JC31-00004A	FAN-DC_HAWK;ML-6060,24.0V,2800rpm,15m^3/	F5018	SA
8.1-6	JC59-00018C	UNIT-HUMMING_VE LSU;SCX-4100,-,-,600 DPI	L7043	SA
8.1-7	JB39-40532A	CBF HARNESS-OPE;SF3000,CBF,UL1007,-,100,	E2002	SA
8.1-8	JC39-00242A	CBF HARNESS-LSU;ML-1710,#26,UL 1061,5/7/	L7002	SA
8.1-9	JC96-03823A	ELA UNIT-DRIVE;SCX-4200,SAMSUNG,-,110V/2	Z4129	SA
8.1-A	JC97-01792A	MEA UNIT-SHIELD ENGINE;ML-1710,SAMSUNG,-	E2098	SA
8.1-10	JC39-00241A	CBF HARNESS-MOTOR;ML-1710,CBF,UL 1061,4P	M2053	SA
8.1-11-1	JC66-01218A	ROLLER-TRANSFER;SCX-4200,NBR+ECO,15,219M	Z4130	SA
8.1-11-2	JC72-00851A	PPR-SPACER_TR;ML-1210,*,TEFLON,V0,-,NTR,		SNA
8.1-11-3	JC66-00395A	GEAR-TRANSFER;ML-1710,POM(M90-44),-,-,-,	G0448	SA
8.1-12	JC63-00107A	SHIELD-P-ENGINE;ML-1400,SECC,0.8,291.6,2	E2108	SNA
8.1-13	JC61-00601A	BRACKET-P-INLET;ML-1400,SECC,1,124.8,28.	B4027	SA
8.1-14	JC44-00073A	SMPS-V2;SCX-4100,-,AC/DC,45.7W,220-240VA	S7050	SA
8.1-15	JC92-01762A	PBA MAIN-CONTROLLER;SCX-4200,SEC,-,-,-,-	Z4131	SA
8.1-16	JC39-00240A	CBF HARNESS-ENGINE;ML-1710,CBF,UL1061,26	H1070	SA
8.1-17	JC97-02436A	MEA UNIT-CASSETTE;SCX-4200,SEC,-,-,110/2	Z4132	SA
8.1-18	JC96-03822A	ELA UNIT-SCANNER;SCX-4200,-,-,-,-,-,-	Z4133	SA
8.1-18-A	JC96-03805A	ELA UNIT-COVER PLATEN;SCX-4200,SEC,-,-,-	Z4134	SA
8.1-19	6103-001056	SUPPORTER;DASC-8N,L11,NATUAL,NYLON 6/6		SNA
8.1-20	JC96-03825A	ELA UNIT-DEVE;SCX-4200,SEC,-,1K,-,-,0.65		SNA
8.1-22	3903-000067	CBF-POWER CORD;DT,GB,GP3/YES(A),I(IEC C1	K2903	SA
8.1-23	JC97-02434A	MEA UNIT-COVER REAR;SCX-4200,SEC,-,-,-,-	Z4135	SA
8.1-24	JC67-00158A	CAP-M-LSU;SCX-4200,HIPS,1.5T,-,-,-,		SNA
8.2-1	JC97-02433A	MEA UNIT-COVER MIDDLE;SCX-4200,SEC,-,-,-	Z4136	SA
8.2-1-1	JC63-01008A	COVER-M-MIDDLE;SCX-4200,HIPS,T2.2,393.6,	Z4137	SA
8.2-1-2	JC61-00026A	SPRING ETC-TS-CHARGE APOLLO;SF-5100,SUS3		SNA
8.2-1-3	JC61-00949A	STOPPER-M-LEVER;SCX-4100,PC,T2.5,19.5,31	Z4138	SA
8.2-1-4	JC72-01343A	PMO-SUB_M_STACKER;ML-1520,PC,BLACK,39*25	Z4139	SA
8.2-1-5	JC61-01644A	STACKER-M-LARGE;SCX-4200,HIPS,1.8,100,55	Z4140	SA
8.2-1-6	JC61-01645A	STACKER-M-SMALL;SCX-4200,HIPS,1.7,50,33.	Z4141	SA
8.2-2	JC97-02435A	MEA UNIT-COVER FRONT;SCX-4200,SEC,-,-,-,	Z4142	SA
8.2-2-1	JC63-01009A	COVER-M-FRONT;SCX-4200,HIPS,T2.2,405.4,1	Z4143	SA
8.2-2-2	JC70-00476B	ADJUST-M_MANUAL_L;SCX-4200,HIPS HB(HR-13	Z4144	SA
8.2-2-3	JC70-00477B	ADJUST-M_MANUAL_R;SCX-4200,HIPS HB(HR-13	Z4145	SA
8.2-2-4	JC70-00304A	ADJUST RACK-M-MANUAL;ML-1710,POM(F20-03)	K2007	SA
8.2-2-5	JC66-00387A	GEAR-RACK_PINION;ML-1710,POM(M90-44),-,-	G0378	SA
8.2-3	JC97-02432A	MEA UNIT-COVER SIDE_R;SCX-4200,SEC,-,-,-	Z4146	SA
8.2-3-1	JC63-01017A	COVER-M-SIDE R;SCX-4200,HIPS,T2.2,301.52	Z4147	SA
8.2-3-2	JC92-01761A	PBA SUB-SWITCH;SCX-4200,SEC,-,-,-,-,33	Z4148	SA
8.2-4	JC63-01018A	COVER-M-SIDE L;SCX-4200,HIPS,T2.2,301.52	Z4149	SA
8.2-5-1	JC63-01011A	COVER-M-REAR;SCX-4200,HIPS,T2.2,367.4,19	Z4150	SA
8.2-5-2	JC63-01012A	COVER-M-REAR DOOR;SCX-4200,ABS,T2.2,270.	Z4151	SA
8.3-1	JC61-01651A	FRAME-M_BASE;SCX-4200,ABS(VE-0860P),-,-,	Z4152	SA
8.3-2	JC61-00604A	PLATE-P-SAW;ML-1400,SUS304-CSP,0.15,15.1	P5152	SA
8.3-3	JC61-00594A	GUIDE-M-TR RIB;ML-1710,PC+ABS,-,-,-,BLK,	G2079	SA
8.3-4	JC66-00038A	GEAR-EXIT F/DOWN;ML-4500,POM,WHT,-,-	E4039	SA
8.3-5	JC61-00829A	HOLDER-BEARING EXIT F/DOWN;SCX-4216F,POM	H4009	SA
8.3-6	6044-000159	RING-C;ID3,OD7,T0.6,PASS,STSC	Z4153	SA
8.3-7	JC66-01209A	ROLLER-EXIT F/DOWN;SCX-4200,SUM22+EPDM,1	Z4154	SA
8.3-8	6107-001163	SPRING-CS;SUS304-WPB,-,PI0.4,D3.9,L13,-,	D4086	SA
8.3-9	JC61-00582B	HOLDER-M_EXIT F/DOWN;SCX-4200,PC(LS-1250	Z4155	SA
8.3-10	JC72-41081B	PMO-M-ROLLER EXIT_MAIN 5;ML-1710,POM, 50		SNA
8.3-11	JC72-41082B	PMO-M-ROLLER EXIT_FR 500;ML-1710,POM, 50		SNA
8.3-12	JC72-00143A	PMO-GEAR_EXIT_DRV16;SF-5100,POM(DE8903),		SNA
8.3-13	6031-001051	WASHER-PLAIN;M4,ID4.1,OD7.0,T0.13,*,POLY	S2004	SNA
8.3-13	6031-000019	WASHER-PLAIN;-,ID6.1,OD8.5,T0.1,BLK,POLY		SNA
8.3-13	6031-000022	WASHER-PLAIN;-,ID5.9,OD10.0,T0.13,BLK,PO		SNA
8.3-14	6107-001164	SPRING-TS;SUS304-WPB,-,PI0.15,D3.95,L12,	Z4156	SA
8.3-14	6107-001238	SPRING-TS;SUS304-WPB,-,PI0.5,D2.4,L16.4,		SNA
8.3-15	6107-001165	SPRING-TS;SUS304-WPB,-,PI0.2,D4,-,-,-,ID		SNA
8.3-16	JC92-01786A	PBA SUB-CRUM;SCX-4200,SEC,KOREA,CRUM,-,-	Z4157	SA
8.3-17	JC63-00458A	GROUND-P-TERMINAL DEVE;SCX-4920N,STS304		SA
8.3-18	JC61-01652A	PLATE-P-TERMINAL CR;SCX-4200,SUS301-CSP	Z4158	SA
8.3-19	JC70-00340A	IPR-P-TERMINAL DEVE KEY;SCX-4216F,SUS304	T2116	SNA
8.3-20	JC75-00049A	MEC-TERMINAL;SF-5100,SAMSUNG,-,-,-,-,-,-	K3739	SA

Service BOM(SA : Service Available, SNA : Service not Available, DNA:DELIVERY   not   AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
8.3-21	JC61-00911A	HOUSING-M-TERMINAL R2;SCX-4920N,ABS(NH-1	H6040	SA
8.3-22	JC72-00983A	PMO-LOCKER CST;ML-1710,POM(DELIN 900P),W	L6030	SA
8.3-23	JC72-00974A	PMO-ACTUATOR CVR OPEN;ML-1710,PC V0(NH10	O1073	SA
8.3-24	JC61-00836A	FOOT-FRONT;ML-1750,NBR,D7,-,11.5,-,-	F1011	SA
8.3-25	JC61-00835A	FOOT-BACK;ML-1750,NBR,D13.6,-,10.5,-,-	F1010	SA
8.3-26	JC70-00311A	IPR-P-GROUND_TR;ML-1710,SUS304-CSP,-,0.2	F4104	SNA
8.3-27	JC70-00312A	IPR-P-TERMINAL CON;ML-1710,SUS304-CSP,-,	K3385	SA
8.3-28	JC72-00984A	PMO-PLATE GUIDE DEVE_L;ML-1710,POM(M90-4	G2285	SA
8.3-29	JC72-00985A	PMO-PLATE GUIDE DEVE_R;ML-1710,POM(M90-4	G2286	SA
8.3-30	JC61-70932A	SPRING ETC-GUIDE DEVE;ML-5000A,-,D4.3,-,	Z4159	SA
8.3-31	JC72-00976A	PMO-ACTUATOR FEED;ML-1710,PC NH-1023P,BL	F6156	SA
8.3-33	JC70-00309A	IPR-P-GROUND_EARTH TR;ML-1710,SUS304-CSP		SNA
8.3-34	JC72-00975A	PMO-ACTUATOR EMPTY;ML-1710,PC(NH-1023P),	K3816	SA
8.3-35	JC72-00977A	PMO-ACTUATOR MANUAL;ML-1710,PC NH-1023P,	K3817	SA
8.3-37	6107-001162	SPRING-ETC;SUS304-WPB,-,PI0.45,D4.45,L12	Z4160	SA
8.3-38	JC72-00382B	PMO-BUSHING FEED;ML-1710,POM(DERLIN 8903	P0034	SA
8.3-39	JC66-00526A	ROLLER-FEED ROLLER 1;ML-1510,SUM24L+NI+E	F6201	SA
8.3-40	JC66-00598A	ROLLER-FEED;ML-1710,SUM24L+NI+EPDN,5/12.	F6200	SA
8.3-40-1	JC61-00586A	BUSH-M-PICK_UP L;ML-1710,POM(DELIN 8903)	P2039	SA
8.3-41-2	JC66-00399A	SHAFT-P-PICK_UP;ML-1710,SECC,-,-,-,-,0.8	P2160	SA
8.3-41-3	JC61-00593A	STOPPER-PICK_UP;ML-1710,POM(DELIN 8903),		SNA
8.3-41-4	JC72-00982A	PMO-IDLE PICK_UP;ML-1710,POM(M90-44),NTR	P2131	SA
8.3-41-5	JC72-01231A	SPONGE-ROLLER PICK_UP;ML-1510,EPDM+IR,-,	P2164	SA
8.3-41-6	JC61-00587A	BUSH-M-PICK_UP R;ML-1710,POM(M90-44),-,-	P2067	SA
8.3-41-7	JC61-00591A	HOUSING-M-PICK_UP;ML-1710,PC+ABS,-,-,L43	P2040	SA
8.3-41-8	JC66-00720A	SHAFT-P-CORE;ML-1750,SECC 1.2T,203,-,-,-	P2158	SA
8.3-42	JC66-00396A	GEAR-IDLE 23;ML-1710,POM(M90-44),0.8,23,	G0256	SA
8.3-43	JC66-00398A	SHAFT-FEED;ML-1710,POM(M90-44),-,-,NTR,-	F6210	SA
8.3-44	JC66-00394A	GEAR-FEED 2;ML-1710,POM(M90-44),-,-,-,NT	F6072	SA
8.3-45-1	JC72-00980A	PMO-GEAR PICK_UP B;ML-1710,POM(M90-44),N	P2126	SA
8.3-45-2	JC72-00979A	PMO-GEAR PICK_UP A;ML-1710,POM(M90-44),N	P6221	SA
8.3-45-3	6107-001167	SPRING-CS;SUS304-WPB,-,PI0.25,D3.25,L9.6	D4089	SA
8.3-B	JC97-01788A	MEA UNIT-CLUTCH;ML-1710,SAMSUNG,-,-,-,-	C9040	SA
8.3-46-1	JC66-00393A	GEAR-FEED 1;ML-1710,POM(DELIN 8903),-,-,	F6071	SA
8.3-46-2	JC72-00978A	PMO-COLLAR_SPRING;ML-1710,POM(M90-44),NT	Z4125	SA
8.3-46-3	6107-001171	SPRING-TS;SWRS82A,-,0.75X0.5,D14.2,-,-,-	Z4161	SA
8.3-46-4	JC72-00981A	PMO-HUB CLUTCH;ML-1710,POM(M90-44),NTR,-		SNA
8.3-47	JC61-00602A	BRACKET-P-FEED;ML-1710,SECC,1,-,-,-,-	F6040	SA
8.3-48	JC33-00009A	SOLENOID-HB (PICK-UP);-,ML-1510,DC24V,-,	P2162	SA
8.3-49	JC33-00010A	SOLENOID-HB (MANUAL);-,ML-1510,DC24V,-,-	S8015	SA
8.3-50	JC66-00377A	CAM-M-PICK_UP;ML-1710,POM(DELIN 8903),-,	P2042	SA
8.3-51	6107-001170	SPRING-TS;SWP-B,-,PI0.9,D6.0,-,-,-,ID5.2	Z4162	SA
8.3-52	6044-000001	RING-CS;ID3,OD3,T0.25,BLACK,SUS304	D4088	SNA
8.3-53	JC70-00308A	IPR-P-GROUND_DRIVE;ML-1710,SUS304-CSP,-,	F4106	SNA
8.3-54	JC70-00335A	IPR-P_GROUND_DRIVE2;ML-1710,SUS304-CSP,-	D4060	SA
8.3-55	JC70-00310A	IPR-P-GROUND_FUSER;ML-1710,SUS304-CSP,-,	F4105	SNA
8.3-56	JC61-00585A	BUSH-M-FEED IDLE;ML-1710,POM(CF620-GF20%	F6043	SA
8.3-57	JC61-70958A	SPRING ETC-TR;ML-5000A,SUS304 WPB,PI0.55	Z4163	SA
8.3-58	JC66-00527A	SHAFT-FEED IDLE;ML-1510,SUM24L+NI,223,8,	F6209	SA
8.3-59	JC61-00718A	GUIDE-P-PAPER;ML-1710,SECC,0.8,19.5,261.	G2086	SA
8.3-60	JC70-00458A	IPR-P-GROUND_GUIDE PAPER;ML-1710,C5210P,	G2285	SNA
8.3-61	JC70-00307A	IPR-P-EARTH TRANSFER;ML-1710,SECC,-,1.0T	K3367	SA
8.3-62	JC67-00027A	LENS-PTL;ML-1710,PMMA,NTR,-,-,-,-	K3433	SA
8.3-63	JC61-00583A	HOLDER-PTL;ML-1710,PC,-,-,-,BLK,V0	H4041	SA
8.3-64	JC92-01620B	PBA SUB-PTL;SCX-4100,SEC,-,PTL,-,-,-,132	M0248	SA
8.3-65	JC61-00588A	BUSH-M-TR L;ML-1710,POM(M90-44),-,-,-,BL	K2886	SA
8.3-66	JC61-00047A	SPRING ETC-TR L HAWK;ML-6060A,SWP-B,-,-,	S0033	SA
8.3-67	JC72-00102A	PMO-BUSHING_TR(L);SF-5100,POM (CH-15),BL	K3856	SA
8.3-68	JC68-00407A	LABEL(R)-HV FUSER;ML-6060,PVC,-,220V,-,,	L0006	SNA
8.3-69	JC96-03891A	ELA HOU-FUSER;SCX-4200,SAMSUNG,-,220V,-,	Z4164	SA
8.3-70	JC61-00607A	GUIDE-P-TR;ML-1710,SECC,0.5,239.1,76.4,-	G2089	SA
8.3-71	JC61-00937A	GUIDE-M-KNOCK UP;ML-1750,POM,-,77.8,20.8	P5146	SA
8.4-1	JC63-01019A	COVER-M-FUSER;SCX-4200,PET+GF30%,T2.0,28	Z4165	SA
8.4-2	JC61-00584A	HOLDER-M-PLATE CLAW;ML-1710,PPS+GF40%,-,	H4031	SA
8.4-3	JC61-00064A	SPRING ETC-CLAW;ML-5200A,SUS 304 WPB,¥Õ0	B2031	SA
8.4-4	JC72-40361A	PMO-ROLLER_EXIT;SCF(XR),POM,NATURAL,-,M9	R0015	SNA
8.4-5	JC61-70976A	SPRING ETC-FUSER EXIT;ML-7000,SUS304-WPB	S0021	SNA
8.4-6	JC47-00013A	THERMOSTAT-_170;SCX-4200,-,125V/250V,15A	Z4166	SA
8.4-10	JC66-01204A	GEAR-RDCN 25/15;SCX-4200,PA6T,FR52G30LX,	Z4167	SA
8.4-11	JC39-00404A	CBF HARNESS-FUSER JOINT;ML-1610,WIRE HAR	H1089	SA
8.4-12	JC39-00559A	HARNESS-FUSER;SCX-4200,UL3122 #18,UL 312	Z4168	SA
8.4-13	1404-001298	THERMISTOR-NTC;7KOHM,-,3370K,0.3MW/C,-,-	W3071	SA
8.4-14	4713-001202	LAMP-HALOGEN;230V,-,600W,-,-,-,6X284MM	K2297	SA
8.4-15	JC66-00601A	ROLLER-HEAT;ML-1710,AL 5052+PFA,20.3,247	H2010	SA

Service BOM(SA : Service Available, **SNA** : Service not Available, DNA:DELIVERY   not   AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
8.4-16	JC66-00564A	GEAR-FUSER, Z37;ML-1710,PPS OFL4036,0.8,	F4094	SA
8.4-17	JC61-00589A	BUSH-M-HR L;ML-1710,PPS(RBA313N),-,-,-,-	K2879	SA
8.4-18	JC61-00590A	BUSH-M-HR R;ML-1710,PPS RBA313N,-,-,-,	K2880	SA
8.4-19	JC66-00380A	ROLLER-M-EXIT F/UP;ML-1710,PC(GE EXL-911	E0041	SA
8.4-20	JC73-00017A	RMO-RUBBER_EXIT;SF-5100,EPDM,14.4*9.8,50	K4215	SA
8.4-21	JC66-00600A	ROLLER-PRESSURE;ML-1710,SUM24L+LSR+PFA,2	P6014	SA
8.4-22	JC66-10901A	BEARING-PRESSURE/R;ML-165,PPS(RBA313N),-	P6004	SA
8.4-23	6107-001168	SPRING-CS;PW-2,-,PI0.95,D5.95,L16,-,-,ID	D4085	SA
8.4-24	JC72-00382A	PMO-BUSHING TX;ML-6060A,POM M9044,BLK,-,		SNA
8.4-25	JC61-00581A	HOLDER-ACTUATOR;ML-1710,PBT GP2150+GF 15		SNA
8.4-27	JC72-00987A	PMO-ACTUATOR_EXIT;ML-1710,PC+GF20%,BLK,-	E4093	SA
8.4-28	JC70-00317A	IPR-P-FRAME_FUSER;ML-1710,SECC,-,1.2,356		SNA
8.4-29	JC61-00595A	GUIDE-M-INPUT;ML-1710,PET+GF30%,-,-,-,BL	K3960	SNA
8.4-30	JC68-01581A	LABEL(P)-CAUTION HOT;COMMON,SAMSUNG,PET,	L0001	SNA
8.4-S1	6003-000261	SCREW-TAPTITE;BH,+,B,M3,L6,ZPC(YEL),SWRC		SNA
8.4-S1	6003-000264	SCREW-TAPTITE;PWH,+,-,B,M3,L6,ZPC(YEL),S		SNA
8.4-S1	6003-000282	SCREW-TAPTITE;BH,+,-,B,M3,L8,ZPC(BLK),SW	Z4169	SA
8.4-S1	6003-000301	SCREW-TAPTITE;BH,+,S,M4,L6,ZPC(YEL),SWRC		SNA
8.4-S1	6003-000269	SCREW-TAPTITE;BH,+,-,S,M3,L6,ZPC(YEL),SW	Z4170	SA
8.4-S4	6006-001078	SCREW-TAPTITE;WSP,PH,+,M3,L10,ZPC(YEL),S		SNA
8.5-1	JC61-00598B	BRACKET-P-GEAR 1400;SCX-4200,SECC+SUM24L	Z4171	SA
8.5-2	JC66-01203A	GEAR-DRV FUSER OUT;SCX-4200,POM,0.8,53,-	Z4173	SA
8.5-3	JC66-00340A	GEAR-HUB CLUTCH;SCX-5100,POM,M0.8,Z13,-,	C9033	SA
8.5-4	JC66-01202A	GEAR-DRV FUSER IN;SCX-4200,PA6T,0.8,26,-	Z4172	SA
8.5-5	6031-000023	WASHER-PLAIN;-,ID5.9,OD10.0,T0.5,BLK,POL	W0001	SNA
8.5-6	JC66-00391A	GEAR-RDCN 113/33;ML-1400,POM(DELIN 8903)	G0381	SA
8.5-7	JC66-00389A	GEAR-RDCN 57/18;ML-1710,POM(M90-44),-,57	G0394	SA
8.5-8	JC61-00599A	BRACKET-P-MOTOR 1400;ML-1710,SECC,1.2,61	B4025	SNA
8.5-9	JC66-00392A	GEAR-RDCN 90/31;ML-1710,POM(NW02),-,90/3	G0380	SA
8.5-10	JC66-00390A	GEAR-RDCN 103/41;ML-1710,POM(NW-02),-,10	G0396	SA
8.5-11	JC31-00028A	MOTOR STEP-HUMMINGBIRD;M49SP-2NK,ML-1710	M2159	SA
8.5-12	JC72-00825A	PMO-IMPELLER_DRV;ML-6200,NYLON66,BLK,-,-	K4023	SNA
8.5-13	6001-000130	SCREW-MACHINE;BH,+,M3,L6,ZPC(WHT),SWRCH1	-	SA
8.6-1	JC63-01013A	COVER-M-PLATEN;SCX-4200,HIPS,T2.2,405.29	Z4174	SA
8.6-2	JC63-00209A	SHEET-WHITE SPONGE;SCX-4216F,PC SHEET+SP	Z4175	SA
8.6-3	JC61-00929A	HINGE-M_PIVOT;SCX-4100,POM,3.0,-,-,-,-,-		SNA
8.6-4	JC63-01007A	COVER-M-SCAN UPPER;SCX-4200,HIPS,T2.2,40		SA
8.6-5	JB68-00644A	LABEL(P)-SHADING;COMMON,YOOPO PAPER ,T0.	Z4177	SA
8.6-6	JB01-00002A	GLASS-PLATEN;247*356,2.85,CLEAR	Z4178	SA
8.6-7	JC63-01014A	COVER-M-SCAN LOWER;SCX-4200,HIPS,T2.2,40		SA
8.6-8	JC63-00459A	SHEET-SCAN LOWER;SCX-4100,PET,T0.188,-,-		SNA
8.6-9	JC61-00931A	BRACKET-P-PULLEY;SCX-4100,SECC,0.8,-,-,-		SNA
8.6-A	JC96-03834A	ELA UNIT-SCAN DRIVE;SCX-4200,SAMSUNG,-,1	Z4180	SA
8.6-10	JC66-00713A	PULLEY-M_IDLE;SCX-4100,POM,-,WHT,-,-,-,-		SNA
8.6-11	6107-001194	SPRING-CS;SWP-B,BLK,PI0.9,D6.95,L20,-,-,	S0032	SNA
8.6-12	JC31-00049A	MOTOR STEP-SCAN;2T357278Q,SCX-4200,0.2A,	Z4181	SA
8.6-13	JC61-01640A	BRACKET MOTOR-P-SCAN;SCX-4200,SECC,T1.0,	Z4182	SA
8.6-14	JC66-01201A	GEAR-M_PULLEY;SCX-4200,POM,0.4,73,-,-,31	Z4183	SA
8.6-15	JC67-00069A	CAP-M-PULLEY;SCX-4100,POM,T1,¥Õ14,4.3,NTS		SNA
8.6-16	JC66-00718A	SHAFT-CIS;SCX-4100,SUM22,-,6,-,-,-		SNA
8.6-17	JC61-01646A	BRACKET-M-CIS;SCX-4200,PC/ABS,2.0,28.67,	Z4184	SA
8.6-18	6107-001137	SPRING-CS;SUS304 WPB,-,PI0.4,D9.4,L11.5,		SNA
8.6-20	6602-001261	BELT-TIMING GEAR;C9000-40031,RUB,T0.98,-		SNA
8.6-21	JC39-00358A	CBF SIGNAL-CIS FFC;SCX-4100,12PIN,FFC,68	Z4186	SA
8.6-22	0609-001237	CONTACT IMAGE SENSOR;216MM,5136DOT,1.5MS	Z4187	SA
8.6-23	JC66-00904A	SLIDER-M_CIS R;SCX-4521F,POM,3,13.5,37.4		SNA
8.6-24	JC66-00840A	SLIDER-M_CIS L;SCX-4521F,POM,3,13.5,37.4		SNA
8.6-25	JC96-03809A	ELA UNIT-OPE;SCX-4200,SEC,-,-,-,-,	Z4188	SA
8.6-26	JB61-00232A	CLIP-P-BELT;SF-457,SUS,0.2,NTR,HALF HARD	Z4185	SA
8.6-27	0203-001267	TAPE-DOUBLE FACE;3M9448HK,T0.16,W8,L280,		SNA
8.6-28	0203-001266	TAPE-DOUBLE FACE;3M9448HK,T0.16,W4,L280,		SNA
8.6-C	JC96-03833A	ELA UNIT-SCAN UPPER;SCX-4200,SEC,-,-,-,-	Z4176	SA
8.7-1	JC63-01010A	COVER-M-PANEL;SCX-4200,HIPS,T2.2,52.1,34	Z4189	SA
8.7-2	JC64-00257A	KEY-M-MENU;SCX-4200,ABS,-,HB,DARKMAGENT,	Z4190	SA
8.7-3	JC64-00255A	KEY-M-START;SCX-4200,HIPS,P.28,HB,SOFT B	Z4191	SA
8.7-4	JC64-00256A	KEY-M-STOP;SCX-4200,HIPS,P22,HB,SOFT ORA	Z4192	SA
8.7-5	JC64-00258A	KEY-M-COPIES;SCX-4200,HIPS,19,HB,DARKMAG	Z4193	SA
8.7-6	JC67-00156A	CAP-M-LED;SCX-4200,PMMA,T1.0,14.6,14.1,M	Z4194	SA
8.7-8	JC67-00155A	CAP-M-LCD;SCX-4200,PC,T2.0,41.0,86.2,CLE	Z4196	SA
8.7-9	JC39-00582A	HARNESS-OPE;SCX-4200,WIRE HARNESS,UL1061	Z4197	SA
8.7-10	6003-000196	SCREW-TAPTITE;PWH,+,B,M3,L10,NI PLT,SWRC	Z4198	SA
8.8-1	JC70-00300A	ADJUST-M-CASSETTE_L;ML-1400,ABS,-,-,-,VI	K2014	SA
8.8-2	JC70-00301A	ADJUST-M-CASSETTE_R;ML-1400,ABS,-,-,-,VI	K2015	SA
8.8-3	JG66-40003A	GEAR-PINION;SF4000,POM,WHT,M1,Z16	G0035	SA

Service BOM(SA : Service Available, **SNA** : Service not Available, DNA:DELIVERY   not   AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
8.8-4	JC70-00314A	IPR-PLATE PAD;ML-1710,SUS304-CSP,-,0.1,-	P0009	SA
8.8-5	JC73-00140A	RPR-FRICTION PAD;ML-1510,NBB,1T 8.9*47,5	P0034	SA
8.8-6	JC63-00290A	SHEET-HOLDER PAD;ML-1750,PC,0.125T,50,18	H4102	SA
8.8-7	JC61-00580A	HOLDER-M-PAD;ML-1710,PC+ABS(NH-1023P),-,	P0034	SA
8.8-8	JC61-70911A	SPRING ETC-EXIT ROLL FD;ML-165,SUS304 WP	S0021	SA
8.8-9	JC61-00603A	PLATE-P-KNOCK_UP;ML-1710,SECC,1,250.7,16		SNA
8.8-10	6107-001166	SPRING-CS;SUS304-WPB,-,PI0.65,D12.65,L59	Z4199	SA
8.8-11	JC72-00971A	PMO-EXTENSION SMALL;ML-1710,ABS(HF-0660I	E5014	SA
8.8-12	JC61-00918B	GUIDE-M-EXTENSION L2;ML-2250,HIPS,-,184.	E5013	SA
8.8-13	JC61-00876A	FRAME-M_CASSETTE;SF-755P,HIPS,HR-1360,HB		SNA
8.8-14	JC72-00972A	PMO-PLATE_LOCKER;ML-1710,POM(M90-44),WHT	L6051	SA
8.8-15	JG61-70531A	SPRING ETC-LOCKER,PLATE;SF6000,STS304WPB	S0025	SA
8.8-16	JC66-00529A	ROLLER-M-IDLE FEED;ML-1510,POM(DELRIN890	F6203	SA
8.8-17	6107-001047	SPRING-ES;PI0.45,D2.75,L24.2,-,SUS304		SA
8.8-18	JC61-01641A	GUIDE-M-HANDLE;SCX-4200,HIPS, HB,T2.2,28		SA
8.8-19	JC66-00719A	CAM-M-KNOCK UP;ML-1750,POM(KOLON K700),-		SNA
8.8-20	JC73-00141A	RPR-PAD CASSETTE;ML-1510,URETHANE SPONGE	R0020	SA
Replacement	JC69-00932B	BOX(P)-MAIN;SCX-4200/SEE,DW,OFFSET4,321,		SA
#N/A	6801-001014	CARD-REGISTRATION;XEU,SEUK,ENG,MOJO100,L		SNA
#N/A	JC68-01653A	MANUAL-QIG;SCX-4200,SAMSUNG,ENGLISH,U.S.		SNA
#N/A	JC96-02663C	ELA ETC-SHIELD PCB;SCX-4200,SAMSUNG,-,-,		SNA
#N/A	JC96-03206B	ELA HOU-SMPS;SCX-4100,SEE,-,-,-,-,-		SA
#N/A	JC96-03826A	ELA HOU-ENGINE;SCX-4200,SEC,-,-,-,-,-		SNA
#N/A	JC99-01937A	PAA-PACKING;SCX-4200/XAA,US,-,-,-,-		SNA
#N/A	JC99-01939F	PAA WOOD-LABEL;SCX-4200/XEU,SEUK,-,-,-,-		SNA
#N/A	JC99-01946B	INA-ACCESSORY;SCX-4200/XEU,SAMSUNG,-,EIG		SNA
#N/A	0201-001183	ADHESIVE-AA;ARON ALPHA #202F,NTR,100,20G		SNA
#N/A	0202-001240	SOLDER-WIRE;HSE-01,-,D3,SN/0.5CU/0.03NI/		SNA
#N/A	0202-001492	SOLDER-WIRE FLUX;HSE-02 LFM48 SR-34 S,-,		SNA
#N/A	0203-001100	TAPE-OPP MASKING;OPP/W75/CLR,T0.05,W75,L		SNA
#N/A	0203-001159	TAPE-FILAMENT;#8915,T0.15,W12,L55000,CLR		SNA
#N/A	0204-000469	THINNER;#4662,-,0.795,-		SNA
#N/A	0204-002978	FLUX;KSP-70L,-,84%,FLUX,SPRAY		SNA
#N/A	0205-001003	GREASE-BEARING;NYOGEL788,DAMPING GREASE,		SNA
#N/A	0205-001056	GREASE-GRAPHITE;CRS841,WHT,-		SNA
#N/A	0205-001067	GREASE-GRAPHITE;NYOGEL 756G,HYDRO CARBON		SNA
#N/A	0205-001080	GREASE-BEARING;NYOGEL 774H,NOISE DAMPING		SNA
#N/A	0402-000129	DIODE-RECTIFIER;1N4003,200V,1A,DO-41,TP		SA
#N/A	0403-001440	DIODE-ZENER;1N5956BRL/BZY97-C200,188-212		SNA
#N/A	1203-000242	IC-POSI.FIXED REG.;7812,TO-220,3P,-,PLAS		SA
#N/A	2001-000911	R-CARBON;62OHM,5%,1/4W,AA,TP,2.4X6.4MM		SA
#N/A	2005-000168	R-WIRE WOUND,NON;0.22ohm,5%,2W,AA,BK,4x1		SA
#N/A	2401-002300	C-AL;47uF,20%,50V,GP,TP,6.3x11,5		SA
#N/A	2801-001375	CRYSTAL-UNIT;10MHz,20ppm,28-AAA,16pF,45o		SNA
#N/A	2801-003267	CRYSTAL-UNIT;16.5912MHz,50ppm,28-AAA,20p		SNA
#N/A	2801-003886	CRYSTAL-UNIT;12MHz,50ppm,28-AAA,16pF,50o		SNA
#N/A	3301-001742	CORE-FERRITE;AD,32X35X7.75MM ,-,-		SNA
#N/A	3708-001408	CONNECTOR-FPC/FFC/PIC;12P,1MM,STRAIGHT,S		SA
#N/A	3711-002003	HEADER-BOARD TO CABLE;BOX,26P,2R,2mm,STR		SNA
#N/A	3711-002812	HEADER-BOARD TO CABLE;BOX,11P,1R,2mm,STR		SNA
#N/A	3711-003408	HEADER-BOARD TO CABLE;BOX,2P,1R,2mm,STRA		SNA
#N/A	3711-003409	HEADER-BOARD TO CABLE;BOX,3P,1R,2mm,STRA		SNA
#N/A	3711-003410	HEADER-BOARD TO CABLE;BOX,4P,1R,2mm,STRA		SNA
#N/A	3711-003968	HEADER-BOARD TO CABLE;BOX,3P,1R,2.5mm,ST		SA
#N/A	3711-003969	HEADER-BOARD TO CABLE;BOX,2P,1R,2.5mm,ST		SNA
#N/A	3722-002303	JACK-USB;4P/1C,AU30U,BLK,ANGLE,B TYPE		SA
#N/A	6501-001020	CABLE TIE;DA-B190,T1.3,W8.7,L195,NTR,NYL		SNA
#N/A	6902-000288	BAG PE;LDPE,T0.05,W250,L450,TRP,8,2-		SNA
#N/A	6902-000312	BAG PE;HDPE,T0.015,W1000,L900,TRP,8,4-		SNA
#N/A	JB68-00073A	LABEL(R)-BAR CODE;SF-3000,PY,38X6.5,T0.1		SNA
#N/A	JB68-00916A	LABEL RATING-BLANK;SF-340,SEC,TETRON,0.0		SNA
#N/A	JC02-00043A	TONER-GRINDED;ML-1610,TUFTONE YS-4,-,8.8		SNA
#N/A	JC46-00274A	S/W APPLICATION-CD;-,SCX-4200,DRV,1.0,20		SNA
#N/A	JC61-01649A	FRAME-M DEVE UPPER;SCX-4200,HIPS,-,HB,BL		SNA
#N/A	JC63-00551A	FELT-CHARGE ROLLER;ML-2250,POLYESTER+POL		SNA
#N/A	JC66-00671A	DAMPER-SOLENOID;ML-1750,NBR,-,3.2,20.3,2		SNA
#N/A	JC68-00317A	LABEL(R)-HOT CAUTION,KME;ML-7050,TETRON,		SNA
#N/A	JC68-00421A	MANUAL-SERVICE CARD;COMMON,SEUK,XEU,,,,,		SNA
#N/A	JC68-00573A	LABEL(R)-BARCODE;ML-4500,PET,T0.05,10mm,		SNA
#N/A	JC68-00690A	MANUAL-(CARD)WARRANTY CARD;ML-1210,XEU,E		SNA
#N/A	JC68-00886A	LABEL(P)-REORDER(UK);COMMON,SAMSUNG,PET,		SNA
#N/A	JC68-01584A	LABEL(P)-BLANK 90*25;CLP-510,SEE,ART 100		SA
#N/A	JC68-01666A	LABEL(R)-POP;SCX-4200/XAA,US,YUPO REMOVA		SNA
#N/A	JC68-10932B	LABEL(P)-BLANK(YELLOW);ML-1710,-,ART,100		SNA

4

Service BOM(SA : Service Available, SNA : Service not Available, DNA:DELIVERY not AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
#N/A	JC69-00933A	CUSHION-MAIN(R);SCX-4200/XAA,EPS,-,506,1		SNA
#N/A	JC69-00933B	CUSHION-MAIN(L);SCX-4200/XAA,EPS,-,506,1		SNA
#N/A	JC92-01477A	PBA MAIN-DEV;ML-2150,SEC,KOREA,DEV B'D,-		SNA
#N/A	JC94-01097A	PHANTOM AU JC92-01762A		SNA
#N/A	JC96-03806A	ELA UNIT-SCAN LOWER;SCX-4200,SEC,-,-,-,-	Z4179	SA
#N/A	JC97-02430A	MEA-DEVE KIT;SCX-4200,SEC,-,-,-,-		SNA
#N/A	0201-001162	ADHESIVE-CYA;LOCTITE403,NTR,1250,20G		SNA
#N/A	0202-001459	SOLDER-CREAM;S3X58-M405,-,D20~38§-,96.5SS		SNA
#N/A	0203-001189	TAPE-ACETATE;#810,T0.05,W12,L65000,TRP,-		SNA
#N/A	0205-000005	GREASE-BEARING;EP56,DIAMOND HYDRO FLUID,		SNA
#N/A	0205-001059	GREASE-BEARING;PETAMO GHV 133,BEIGE,15KG		SNA
#N/A	0205-001088	GREASE-BEARING;NICHIMOLY DM-1770X,PTFE,-		SNA
#N/A	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,DO-35,T		SA
#N/A	0401-000116	DIODE-SWITCHING;MMSD914T1,100V,200MA,SOD		SNA
#N/A	0401-001090	DIODE-SWITCHING;1SS355,80V,100MA,SOD-323		SA
#N/A	0404-000112	DIODE-SCHOTTKY;RB420D,40V,100MA,SOT-23,T		SA
#N/A	0407-000122	DIODE-ARRAY;KDS226,80V,300mA,C2-3,SOT-23		SA
#N/A	0501-000150	TR-SMALL SIGNAL;2SA1037,PNP,200mW,SOT-23		SA
#N/A	0501-000457	TR-SMALL SIGNAL;MMBT2222A,NPN,350MW,SOT-		SA
#N/A	0504-000111	TR-DIGITAL;DTC114YK,NPN,200MW,10K/47K,SO		SA
#N/A	0601-001908	LED;ROUND,RED,3MM,630NM,3.2X4.6MM		SNA
#N/A	0801-000794	IC-CMOS LOGIC;7S08,AND GATE,SOT-25,5,63M		SA
#N/A	0801-002446	IC-CMOS LOGIC;74LCX14,SCHMITT INVERTER,T		SNA
#N/A	0904-001989	IC-USC;ISP1582BS,-,HVQFN56,56P,8X8X0.85M		SA
#N/A	1003-001535	IC-MOTOR DRIVER;A3977SLP,TSSOP,28P,9.6X4		SA
#N/A	1105-001390	IC-DRAM;K4S641632,1MX16X4BIT,TSOP(II),54		SA
#N/A	1107-001302	IC-FLASH MEMORY;29LV800,1Mx8/512Kx16,TSO		SA
#N/A	1202-000164	IC-VOLTAGE COMP.;393,SOP,8P,150MIL,DUAL,		SA
#N/A	1203-001455	IC-POSI.FIXED REG.;1117,DPAK,3P,265MIL,P		SA
#N/A	1203-002233	IC-RESET;XC61F,SOT-23,3P,-,PLASTIC,0.7/1		SNA
#N/A	1203-002454	IC-POSI.FIXED REG.;FAN1117A,TO-252,3P,25		SA
#N/A	1205-002258	IC-CLOCK GENERATOR;CY25814SC,SOIC,8P,150		SNA
#N/A	1205-002339	IC-CLOCK GENERATOR;CY25811SC,SOIC,8P,150		SA
#N/A	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000071	R-CHIP;22ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000091	R-CHIP;12Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000096	R-CHIP;30Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000105	R-CHIP;200Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000107	R-CHIP;470Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000123	R-CHIP;1.5Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000134	R-CHIP;33Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000293	R-CHIP;100ohm,5%,1/4W,TP,3216		SA
#N/A	2007-000303	R-CHIP;10Kohm,5%,1/4W,TP,3216		SA
#N/A	2007-000475	R-CHIP;1Mohm,1%,1/10W,TP,1608		SA
#N/A	2007-000729	R-CHIP;300ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000730	R-CHIP;300ohm,5%,1/4W,TP,3216		SA
#N/A	2007-000965	R-CHIP;5.1Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-001002	R-CHIP;510ohm,5%,1/10W,TP,1608		SA
#N/A	2007-001045	R-CHIP;56ohm,5%,1/4W,TP,3216		SNA
#N/A	2007-001139	R-CHIP;7.5Kohm,1%,1/10W,TP,1608		SA
#N/A	2007-002901	R-CHIP;12.1Kohm,1%,1/10W,TP,1608		SA
#N/A	2007-007521	R-CHIP;14.7Kohm,1%,1/10W,TP,1608		SA
#N/A	2007-008567	R-CHIP;15.4Kohm,1%,1/10W,TP,1608		SNA
#N/A	2011-001011	R-NET;10Kohm,5%,1/16W,L,CHIP,8P,TP,3.2x1		SNA
#N/A	2203-000206	C-CER,CHIP;100nF,10%,50V,X7R,2012		SA
#N/A	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608		SA
#N/A	2203-000384	C-CER,CHIP;0.015nF,5%,50V,C0G,1608		SA
#N/A	2203-000426	C-CER,CHIP;0.018nF,5%,50V,C0G,1608		SA
#N/A	2203-000440	C-CER,CHIP;1nF,10%,50V,X7R,1608		SA
#N/A	2203-000783	C-CER,CHIP;0.33nF,5%,50V,C0G,1608		SA
#N/A	2203-001607	C-CER,CHIP;0.22nF,5%,50V,NP0,1608		SA
#N/A	2203-001683	C-CER,CHIP;0.068nF,5%,50V,NP0,1608		SA
#N/A	2203-002392	C-CER,CHIP;220nF,+80-20%,50V,Y5V,2012		SA
#N/A	2203-002398	C-CER,CHIP;22nF,10%,50V,X7R,1608		SA
#N/A	2203-005249	C-CER,CHIP;100nF,10%,50V,X7R,1608		SNA
#N/A	2401-000426	C-AL;10uF,20%,16V,GP,TP,3.5x5,5		SA
#N/A	2402-000008	C-AL,SMD;47uF,20%,16V,GP,TP,6.6x6.6x5.4		SA
#N/A	2402-001178	C-AL,SMD;10uF,20%,16V,WT,TP,4.3x4.3x5.8m		SA
#N/A	3301-000317	BEAD-SMD;120ohm,2012,TP,-,-		SNA
#N/A	3301-000325	BEAD-SMD;60ohm,3.2x2.5x1.3mm,400mA,TP,,,		SNA
#N/A	3301-001084	BEAD-SMD;600ohm,2012,300mA,TP,522ohm/70M		SNA

**Service BOM(SA : Service Available, SNA : Service not Available, DNA:DELIVERY not AVAILABLE)**

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
#N/A	JC13-00021A	IC ASIC-CHORUS2;S3C46Q0X,SF-531P,208P,+1		SA
#N/A	JC39-00243A	CBF HARNESS-PTL;ML-1710,CBF,UL 1061,2P,2	H1212	SA
#N/A	JC39-00576A	CBF HARNESS-CRUM2;SCX-4200,CBF,UL1061,5P		SA
#N/A	JC41-00179A	PCB-DEV B'D;ML-2150,FR-1,1LAYER,-,1.6T,5		SNA
#N/A	JC41-00246A	PCB-SUB (1LAYER);SCX-4920N,FR-1,1,-,1.6T		SNA
#N/A	JC41-00323A	PCB-MAIN;SCX-4200,FR4,2 L,-,1.6T,185MM *		SNA
#N/A	JC61-00025A	SPRING ETC-CS-CHARGE APOLLO;SF-5100,SUS	B2030	SNA
#N/A	JC61-00035A	SPRING ETC-HV APOLLO;SF-5100,SUS304WPB,0		SNA
#N/A	JC61-00063A	SUPPORT-SEAL;ML-7000,POLYURETHANE FOAM,T		SNA
#N/A	JC61-00605A	PLATE-P-CLAW;ML-1710,SUS304-CSP,0.1,-,-,	H4032	SNA
#N/A	JC61-00610B	PLATE-M_DEV_SD;ML-1710D3,PC ,2,-,-,BLACK		SNA
#N/A	JC61-01648A	FRAME-M DEVE LOWER;SCX-4200,ABS,-,HB,BLK		SNA
#N/A	JC61-01650A	PLATE-M_DEVE R;SCX-4200,ABS,2,96.7,41.8,		SNA
#N/A	JC62-00083A	SEAL-SUPPLY L;ML-1510,PORON,-,T5.0,47.2,		SNA
#N/A	JC62-00084A	SEAL-SUPPLY R;ML-1510,PORON,-,T5.0,47.2,		SNA
#N/A	JC62-00085A	SEAL-SIDE;ML-1510,URETHAN FORM ,-,T2.8,1		SNA
#N/A	JC62-00086A	SEAL-SIDE CAP;ML-1510,EPDM,-,-,-,HARDN		SNA
#N/A	JC62-00090A	SEAL-FRAME LOWER;ML-1710,URETHAN FORM ,-		SNA
#N/A	JC66-00381A	GEAR-AGITATOR;ML-1710,POM,0.6,22,-,-,-	G0164	SA
#N/A	JC66-00382A	GEAR-IDLE 26/13;ML-1710,POM,0.6,26/13,-,	G0260	SA
#N/A	JC66-00384A	GEAR-DEVE ROLLER;ML-1710,CARILON,0.8,-,-	G0561	SA
#N/A	JC66-00386A	GEAR-OPC L;ML-1710,PC(LS-1250),0.8,30,-,	G0355	SA
#N/A	JC66-00697A	GEAR-IDLE 17/20;SCX-4920N,POM,0.8/0.6,17		SNA
#N/A	JC66-00698A	GEAR-SUPPLY ROLLER;SCX-4920N,500CL,0.6,2		SNA
#N/A	JC66-00722B	ROLLER-SUPPLY;SCX-4200,SILICON FOAM,¥Õ11S		SNA
#N/A	JC66-00723A	DRUM-OPC;SCX-4100,ALUMINIUM,-,¥Õ24.01,23S		SNA
#N/A	JC66-01229A	ROLLER-DEVELOPER;SCX-4200,CONDUCTIVE NBR		SNA
#N/A	JC67-00028A	CAP-M-DEV L;ML-1710,ABS,2,-,-,-,19*24.7*		SNA
#N/A	JC67-00029A	CAP-M-DEV R;ML-1710,ABS,2,-,-,-,19*24.7*		SNA
#N/A	JC68-01040A	MANUAL-CARD PROTECTION;ML-1710,SEC,-,-,-		SNA
#N/A	JC68-01085K	LABEL(P)-EXTRACT;SCX-4200/XAA,SAMSUNG,AR		SNA
#N/A	JC68-10914D	LABEL(P)-SERIAL NO;ML-85,ART,70X15,G100,		SNA
#N/A	JC69-00078A	BAG PE;CONDUTIVE T0.1,T=0.1,-,190*410,-,		SNA
#N/A	JC70-00050A	IPR-TERMINAL;SF-5100,SWRCH1018,-,-,-,-,8		SNA
#N/A	JC70-00153A	IPR-ELECTRODE CHARGE;ML-4500,SUS301-,8.		SNA
#N/A	JC70-00483A	ELECTRODE-P_SR(M);SCX-4100,SUS301-CSP T0		SNA
#N/A	JC70-40910A	ICT-SHAFT GEAR;ML-5000,SUM24L,¡Ë4,-,-,-,S		SNA
#N/A	JC70-50901A	IPR-IPM BUSHING DEV R;ML-5000,BRONZE,-,D		SNA
#N/A	JC71-00033A	NPR-GND LUG;-,ML-1650,BS-SN,0.5T,-,-,-,		SNA
#N/A	JC72-00082A	PMO-BUSHING AGI R;SF-5100,POM,BLK,-,-,-,		SNA
#N/A	JC72-00083A	PMO-HOLDER CR;SF-5100,POM,BLK,-,-,-,-,		SNA
#N/A	JC72-00288A	PPR-SPACER DR;SF-5100,PET FILM, T0.1,-,-		SNA
#N/A	JC72-00288B	PPR-SPACER DR R;SF-5100,TEFRON,WHT,-,-,T		SNA
#N/A	JC72-00289B	PPR-FILM REAR;ML-1210,PET FILM,-,0.08T,-		SNA
#N/A	JC72-01234A	PMO-DEVE CAP TONER;CLP-500,PP,BLACK,-,H5		SNA
#N/A	JC72-40332A	PMO-BUSHING_CHARGE;ML-80,POM,BLK,HB,-		SNA
#N/A	JC72-41105A	PMO-BUSHING DEV;ML-5000,POM,NTR,-,-,-,-		SNA
#N/A	JC73-00021A	RPR-SEAL BLADE;SF-5100,URETHANE FOAM,230		SNA
#N/A	JC73-00055A	RPR-SEAL SPACE;SF-5100,URETHANE SPONGE ,		SNA
#N/A	JC73-10017A	RPR-SEAL_BLOCK;ML-80,POLYURETHANE FOAM,T		SNA
#N/A	JC73-10914A	RPR-SEAL FILM;ML-5000,URETHANE FOAM,11X1		SNA
#N/A	JC75-00043A	MEC-GEAR OPC R;SF-5100,SEC,-,-,BLK,-,-,-		SNA
#N/A	JC75-00044A	MEC-BUSHING AGI L;SF-5100,SEC,POM+SANTOP		SNA
#N/A	JC92-01760B	PBA SUB-PANEL;SCX-4200/XAA,SEC,AMERICA,-	Z4195	SA
#N/A	JC97-01782A	MEA-CHARGE ROLLER;ML-1710,SEC,12*254,0.5		SA
#N/A	JC97-01783A	MEA-SUS BLADE;ML-1710,SEC,242,SUS+BRACKE		SNA
#N/A	JC97-01900B	MEA UNIT-AGITATOR_B;ML-1610,SEC,SKYLARK,		SNA
#N/A	0407-000101	DIODE-ARRAY;DA204K,20V,100mA,C2-3,SOT-23		SA
#N/A	0601-000003	LED;ROUND,RED/GRN,3.1MM,650/563NM,3.8X5.		SA
#N/A	1103-001183	IC-EEPROM;24C04,512x8,SOP,8P,5x4mm,2.5/5		SA
#N/A	2203-000815	C-CER,CHIP;0.033nF,5%,50V,C0G,1608		SA
#N/A	3404-000165	SWITCH-TACT;12V,50mA,160gf,6x6mm,SPST		SA
#N/A	3405-001073	SWITCH-MICRO;125V,5A,40GF,SPDT		SNA
#N/A	3711-003411	HEADER-BOARD TO CABLE;BOX,5P,1R,2mm,STRA		SNA
#N/A	JC07-00003A	LCD-DISPLAY(XEV);VHX1620BHRC9,SCX-5312F/		SA
#N/A	JC39-00306A	CBF HARNESS-LCD;CLP-500,WIRE,UL2877,14-1		SA
#N/A	JC39-00560A	HARNESS-SWITCH;SCX-4200,CBF,UL 1061,4P,2		SA
#N/A	JC39-40511A	CBF HARNESS;ML-80,JUMPER,AWG22,52mm,SILV		SA
#N/A	JC41-00171C	PCB-PTL (1LAYER);SCX-4100,FR-1,1,-,1.6T,		SNA
#N/A	JC41-00324A	PCB-SWITCH;SCX-4200,FR-1,1,-,1.6T,33X25M		SNA
#N/A	JC61-00597A	BRACKET-P-BLADE;ML-1710,SPCC+NI,1.2,242,		SNA
#N/A	JC66-00012A	GEAR-OPC R;SF-5100,POM(M90-44),BLK,M0.6,		SA
#N/A	JC66-00018A	GEAR-CHARGE ROLLER;SF-5100,POM(F20-03),M		SNA
#N/A	JC66-00524A	ROLLER-CHARGE ROLLER;ML-1510,NBR+SBR,12,		SNA

Service BOM(SA : Service Available, SNA : Service not Available, DNA:DELIVERY   not   AVAILABLE)

Drawer# (Section-No)	Part Code	Description	Location	Status (SA/SNA)
#N/A	JC70-00452A	IPR-SUS BLADE;ML-1710,SUS301,-,0.08T,16,		SNA
#N/A	JC71-00002A	NPR-EARTH OPC APOLLO;SF-5100,C5210P-H,0.		SNA
#N/A	JC72-00081A	PMO-BUSHING AGI L;SF-5100,POM,BLK,-,-,-,		SNA
#N/A	JC72-01317A	PPR-FILM AGITATOR SUB;ML-2550,PET SHEET		SNA
#N/A	JC72-01329A	PMO-AGITATOR_DOUBLE;ML-6060,ABS+GF20%,BL		SNA
#N/A	JC72-10924A	PPR-FILM AGITATOR;ML-5000,PET T0.1,NTR,-		SA
#N/A	JC72-10925A	PPR-FILM SUPPORT AGI;ML-5000,PET T0.3,NT		SNA
#N/A	JC73-40906A	RMO-SEAL AGITATOR;ML-5000,SANTOPRENE,-,-		SNA
#N/A	0501-000279	TR-SMALL SIGNAL;KSA1182-Y,PNP,150mW,SOT-		SA
#N/A	0801-002469	IC-CMOS LOGIC;74HC14,SCHMITT INVERTER,TS		SA
#N/A	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216		SA
#N/A	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000076	R-CHIP;330ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000094	R-CHIP;22Kohm,5%,1/10W,TP,1608		SA
#N/A	2007-000120	R-CHIP;680ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000402	R-CHIP;150ohm,5%,1/10W,TP,1608		SA
#N/A	2007-000539	R-CHIP;200ohm,5%,1/10W,TP,1608		SA
#N/A	2203-000189	C-CER,CHIP;100nF,+80-20%,25V,Y5V,1608		SA
#N/A	2203-000236	C-CER,CHIP;0.1nF,5%,50V,C0G,1608		SA
#N/A	2203-000357	C-CER,CHIP;0.15nF,5%,50V,C0G,1608		SA
#N/A	2203-000626	C-CER,CHIP;0.022nF,5%,50V,C0G,1608		SA
#N/A	2203-000998	C-CER,CHIP;0.047nF,5%,50V,C0G,1608		SA
#N/A	2203-005819	C-CER,CHIP;1000nF,+80-20%,16V,Y5V,-,1608		SNA
#N/A	2404-001102	C-TA,CHIP;33uF,20%,16V,GP,TP,6032,-		SNA
#N/A	2802-001069	RESONATOR-CERAMIC;7.37MHz,0.5%,TP,4.7x4.		SNA
#N/A	JB13-00004A	IC ASIC-OPE;SF-3100,HT48C5,SSOP,48P,16.1		SA
#N/A	JC41-00325A	PCB-PANEL;SCX-4200,FR-1,1LAYER,-,1.6T,30		SNA

9. Connection Diagram

9.1 SCX-4200 Connection Diagram
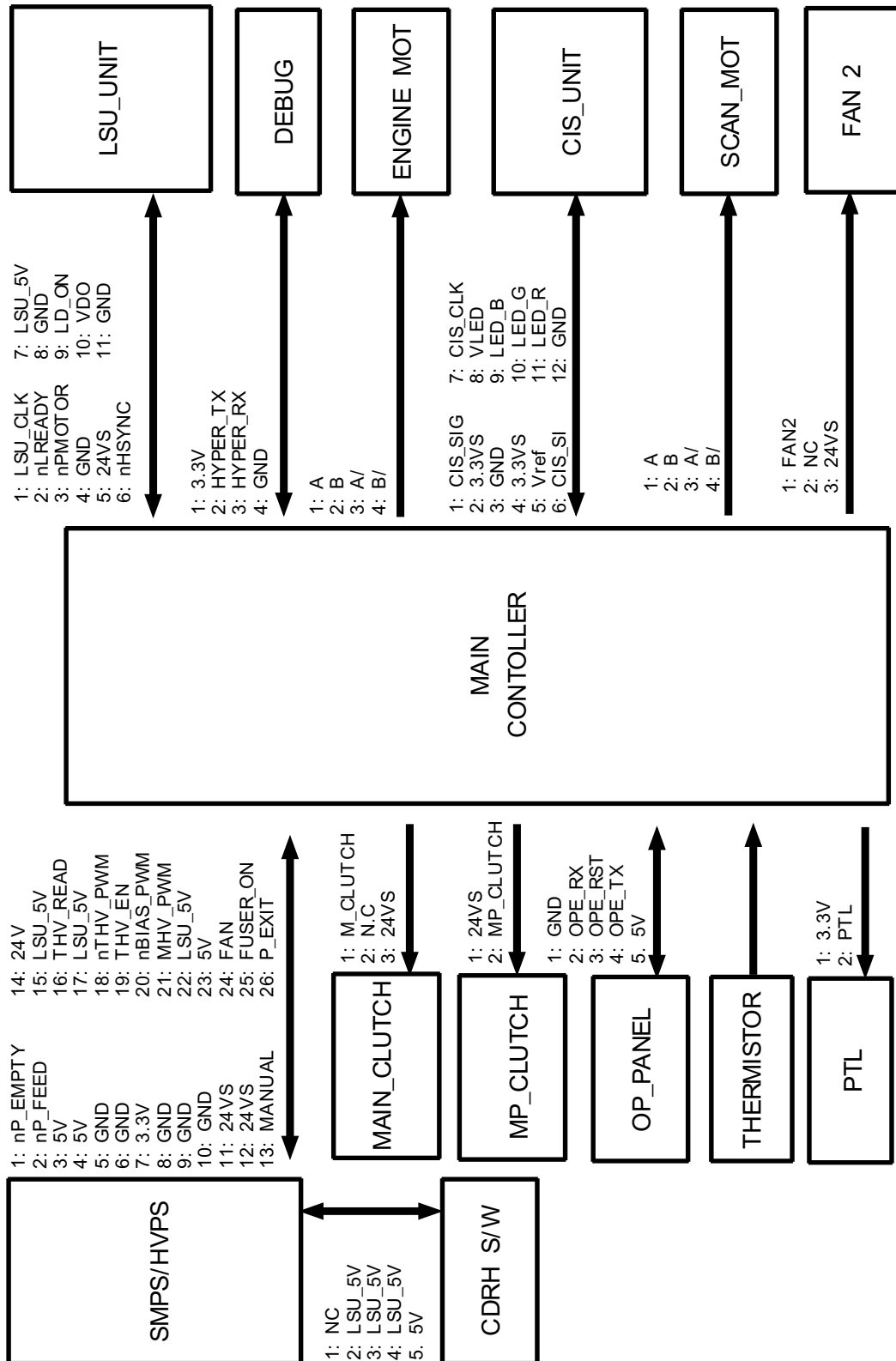
Agenda

Ⅰ. Introduction
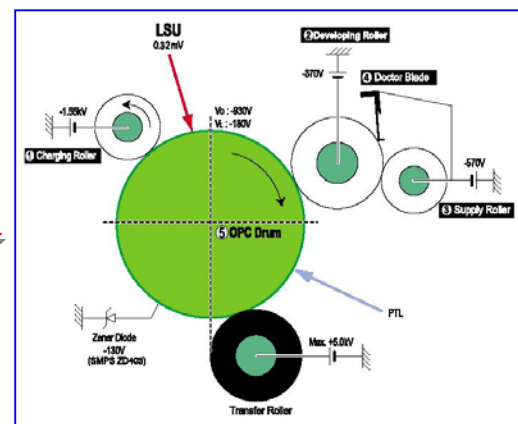
Ⅱ. Main PBA

Ⅲ. OPE PBA

Ⅳ. SMPS PBA

Objectives

I.   To make you aware of the

key specification points

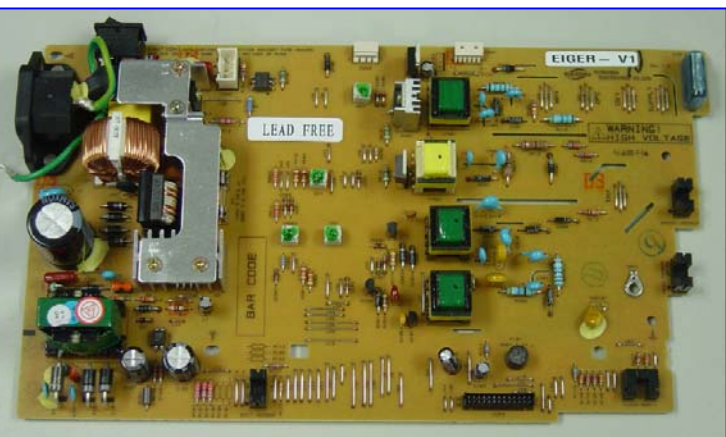II. To show you how SCX-4200

series are different

1-1. Overview

Panel Board

OPC

SMPS + HVPS

Main Board

1 . Introduction
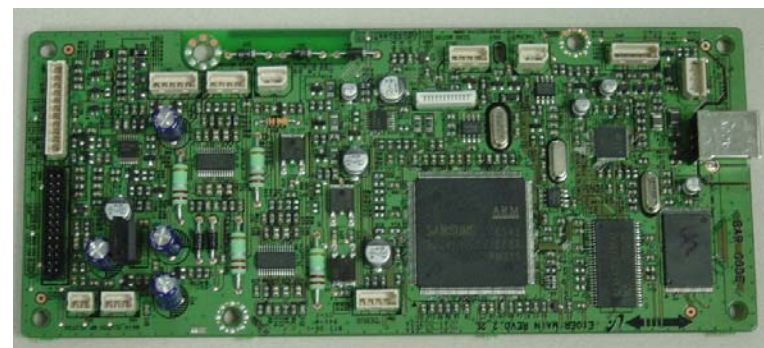
1-2. Block Diagram

1-3. Connection Diagram

SMPS/HVPS
```
1: nP_EMPTY      14: 24V
2: nP_FEED       15: LSU_5V
3: 5V            16: THV_READ
4: 5V            17: LSU_5V
5: GND           18: nTHV_PWM
6: GND           19: THV_EN
7: 3.3V          20: nBIAS_PWM
8: GND           21: MHV_PWM
9: GND           22: LSU_5V
10: GND          23: 5V
11: 24VS         24: FAN
12: 24VS         25: FUSER_ON
13: MANUAL       26: P_EXIT
```

```
1: FAN1
2: 24VS
3: LSU_5V
4: LSU_5V
5: LSU_5V
6: 5V
```

CDRH S/W
FAN 1

MAIN_CLUTCH
```
1: M_CLUTCH
2: N.C
3: 24VS
```

MP_CLUTCH
```
1: 24VS
2: MP_CLUTCH
```

OP_PANEL
```
1: GND
2: OPE_RX
3: OPE_RST
4: OPE_TX
5: 5V
```

CRUM

THERMISTOR
```
1: 3.3V
2: DATA
3: CLK
4: GND
```

PTL
```
1: 3.3V
2: PTL
```

MAIN CONTOLLER

LSU_UNIT
```
1: LSU_CLK     7: LSU_5V
2: nLREADY     8: GND
3: nPMOTOR     9: LD_ON
4: GND         10: VDO
5: 24VS        11: GND
6: nHSYNC
```

DEBUG
```
1: 3.3V
2: HYPER_TX
3: HYPER_RX
4: GND
```

ENGINE MOT
```
1: A
2: B
3: A/
4: B/
```

CIS_UNIT
```
1: CIS_SIG    7: CIS_CLK
2: 3.3VS      8: VLED
3: GND        9: LED_B
4: 3.3VS      10: LED_G
5: Vref       11: LED_R
6: CIS_SI     12: GND
```

SCAN_MOT
```
1: A
2: B
3: A/
4: B/
```

FAN 2
```
1: FAN2
2: NC
3: 24VS
```

1-4. General Spec.

General specifications

Item	Description
Model name	SCX-4200 (EG42MFC)
Paper input capacity	Tray with multi-pages: 250 multi-pages for plain paper (20 lb, 75 g/m^2 bond) Tray with single page and manual tray: 1 single page for plain paper, transparencies, labels, Post Card and envelopes (16 ~43 lb, 60 ~ 165 g/m^2 bond)
Paper output capacity	Face down: 50 sheets Face up: 1 sheet
Consumables	1-piece toner cartridge system
Power rating	110 - 127 VAC, 50/60 Hz, 4.5 A (USA, Canada) 220 - 240 VAC, 50/60 Hz, 2.5 A (Others)
Power consumption	Average: 350 W Power save mode: Less than 10 W
Noise level[a]	Standby mode: Less than 38 dBA Scanning / Printing mode: Less than 53 dBA Warn-up: Less than 50 dBA
Warm-up time	Less than 42 seconds
First print out time	Standby mode: less than 11 seconds Cold status: less than 53 seconds
Operating environment	Temperature: 50° F to 89° F (10° C to 32° C) Humidity: 20% to 80% RH
Display	16 characters x 2 lines
Toner cartridge life[b]	3,000 pages at ISO 19752 5% coverage (Ships with 1,000 pages toner cartridge)
Memory	8 MB (Non-extendable)
External dimension (W x D x H)	409 x 362 x 232 mm (16.1 x 14.3 x 9.1 inches)
Weight	9.3 Kg (including consumables)
Package weight	Paper: 1.8 Kg, Plastic: 0.4 Kg

Scanner and copier specifications

Item	Description
Compatibility	TWAIN standard/ WIA standard
Scanning method	Color CIS
Resolution	Optical: Max. 600 x 2400 dpi (Mono and color) Enhanced: 4,800 x 4,800 dpi
Effective scanning length	Max. 297 mm (11.7 inches)
Effective scanning width	Max. 216 mm (8.5 inches) Effective: 208 mm (8.2 inches)
Color bit depth	24 bit
Mono bit depth	1 bit for Black & White mode 8 bit for Gray mode
Copy speed[a]	Up to 18 ppm in A4 (19 ppm in Letter)
Copy resolution	Scan: up to 600 x 300 dpi (Text, Text/Photo) up to 600 x 600 dpi (Photo) Print: up to 600 x 600 dpi (Text, Text/Photo, Photo)
Zoom rate	50 ~ 200%
Multiple copies	1-99 pages
Gray scale	256 levels

1. Introduction

1-4. General Spec.

Printer specifications

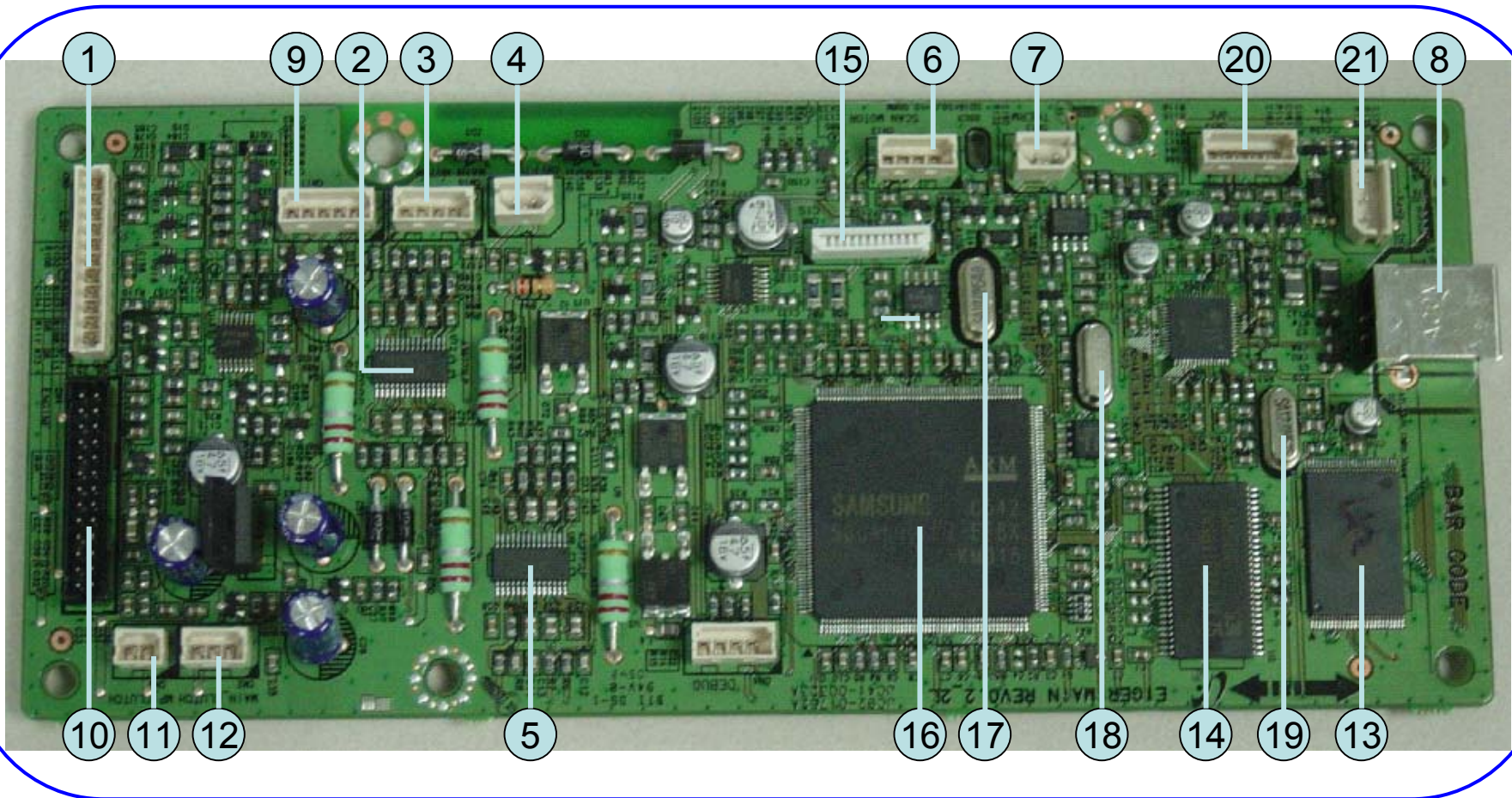| Item	Description
Printing method	Laser Beam Printing
Printing speed[a]	Up to 18 ppm in A4 (19 ppm in Letter)
First print out time	11 seconds (From Ready)
Print resolution	Up to 600 x 600 dpi
Printer language	SPL (Samsung Printer Language)
OS Compatibility[b]	Windows 98/Me/2000/XP, Various Linux OS (USB only), Macintosh 10.3/10.4
Inteface	USB 2.0

1-5. Comparison Between SCX-4100 and SCX-4200

Item		SCX-4100	SCX-4200	ETC
Main	CPU	Same (Chorus 2)		
	ROM	Same (1MB)		
	RAM	Same (8MB)		
	Video Clock	12.99MHz	16.59MHz	
	USB	USB 1.1	USB 2.0	
	Main-Motor	2K (Bi-Polar)	2NK (Bi-polar)	
	Motor-IC	AN44060	A3977	
	Heat-Lamp	Same (600W)		
	LSU	Same		
	Fan	Main(1)	Main(1) + Sub(1)	
Scan	CIS	Canon 600dpi	LITEON 600dpi	
	Scan-Motor	Uni-Polar(35Φ)	Bi-Polar(35Φ)	
	Motor-IC	STA403A(Uni-Polar)	A3977 (Bi-polar)	
Panel	LCD	2*16 , 7Keys	2*16 , 8Keys , 1LED	
	ASIC	9228(SEC)	48C05(Holtec)	
SMPS /HVPS	SMPS	Same		SMPS/HVPS on 1 Board ->Heat Sink Added
	HVPS	Same		

Objectives

I. To show you the structure

and key elements of Main

PBA in SCX-4200

2-1. General description

- Main PBA employs Chorus2 as an ASIC, which is developed for LBP Printer

2-1. General description

1	LSU CONNECTOR (CN5)	12	MAIN CLUTCH CONNECTOR3 (CN2)
2	MAIN MOTOR DRIVER IC –A3977(U12)	13	FLASH ROM-29LV800 (U4)
3	MAIN MOTOR CONNECOR (CN10)	14	SDRAM –K4S641623H-TL75 (U2)
4	PTL CONNECTOR (CN9)	15	CIS CONNECTOR (CN8)
5	SCAN MOTOR DRIVER IC –A3977 (U6)	16	GRAPHIC PROCESSOR ASIC-CHORUS2 (U5)
6	SCAN MOTOR CONNECTOR (CN13)	17	MAIN CLOCK CRYSTAL-10.00 MHz (OSC3)
7	THERMISTOR CONNECTOR (CN12)	18	VIDEO CLOCK CRYSTAL –16.59MHz (OSC2)
8	USB 2.0 (CN6)	19	USB CLOCK CRYSTAL – 12MHz (OSC1)
9	CRUM CONNECTOR (CN11)	20	OPE CONNECTOR (CN14)
10	ENGINE CONNECTOER (CN4)	21	FAN2 (CN7)
11	MP CLUTCH CONNECTOR (CN3)		

2-2. LBP CPU Serises

| CPU	Core	Clock	Bus	Package	features
Jupiter 4e	ARM 9	150MHz	16 bit	QFP	Internal Flash 0.5MB
SPGPm	ARM 9	166MHz	16 bit	BGA	RAM 32bit Control
SPGPv3	ARM 10	400MHz	32 bit	BGA	DDR Memory supporting
Chorus 2	ARM 7	66MHz	16 bit	QFP	Internal CIP
Chorus m	ARM 9	300MHz	32 bit	BGA	Internal CIP
PPC 266	PPC	266MHz	32 bit	QFP	CPU
RM7000Se	MIPS	460MHz~	64 bit	BGA	CPU

2-3. Chorus2

Samsung's S3C46Q0X 16/32-bit RISC micro controller is designed to provide a cost-effective, low power, small die size and high performance micro-controller solution for inkjet, laser beam printer and MFP.

The S3C46Q0X is developed using ARM7TDMI core, 0.18m CMOS standard cell, and memory cell.

The integrated on-chip functions are as follows:

- 1.8V internal, 3.3V external (I/O boundary) microprocessor with 4KByte Cache
- Image Processor
- On-chip clock generator with PLL
- Memory & External Bank Control
- DMA Control (5-channel)
- Interrupt Control
- 2-port USB Host /1- port USB Device (ver 2.0) Interface Control
- UART (2 Channel)
- Synchronous Serial Interface Control
- Timer (4 Channel)
- Watch Dog Timer
- Power control: Normal, Slow, Idle, Stop and SL_IDLE mode
- A/D Converter (10-bit, 2 Channel)
- General I/O Port Control
- Print Head Control
- Carrier Motor Control
- Paper Motor Control
- Tone Generator
- RTC with calendar function
- S/W Assistant function(Rotator)

2-3. CPU (Chorus2)

Block diagram
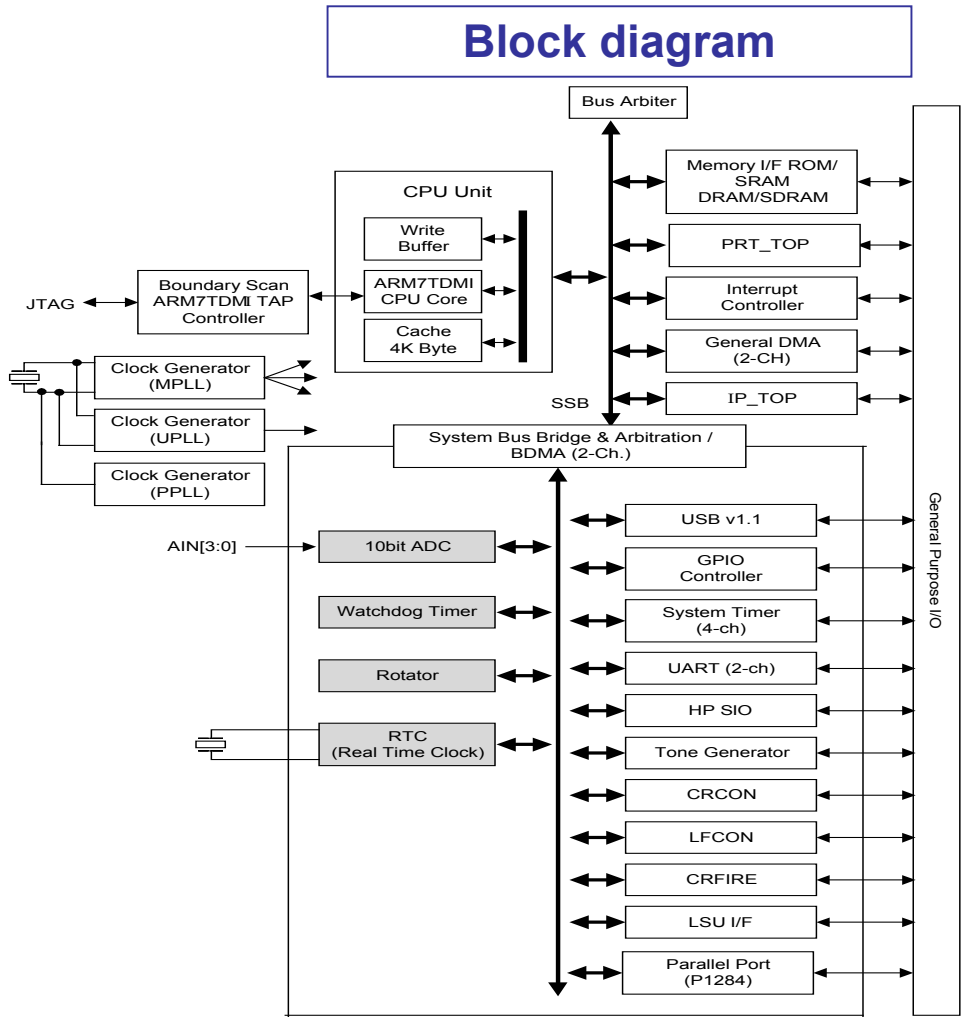
2-4 Flash Memory (as ROM) : AM29LV800

- Storing the systems program and downloading the system program through the PC interface.

 Capacity : 1 Mega Byte.

- AM29LV800

- Access Time : 70 nsec

PIN CONFIGURATION

A0–A18	=	19 addresses
DQ0–DQ14	=	15 data inputs/outputs
DQ15/A-1	=	DQ15 (data input/output, word mode), A-1 (LSB address input, byte mode)
BYTE#	=	Selects 8-bit or 16-bit mode
CE#	=	Chip enable
OE#	=	Output enable
WE#	=	Write enable
RESET#	=	Hardware reset pin, active low
RY/BY#	=	Ready/Busy# output
V_{CC}	=	3.0 volt-only single power supply (see Product Selector Guide for speed options and voltage supply tolerances)
V_{SS}	=	Device ground
NC	=	Pin not connected internally

Circuit Diagram of Flash Memory
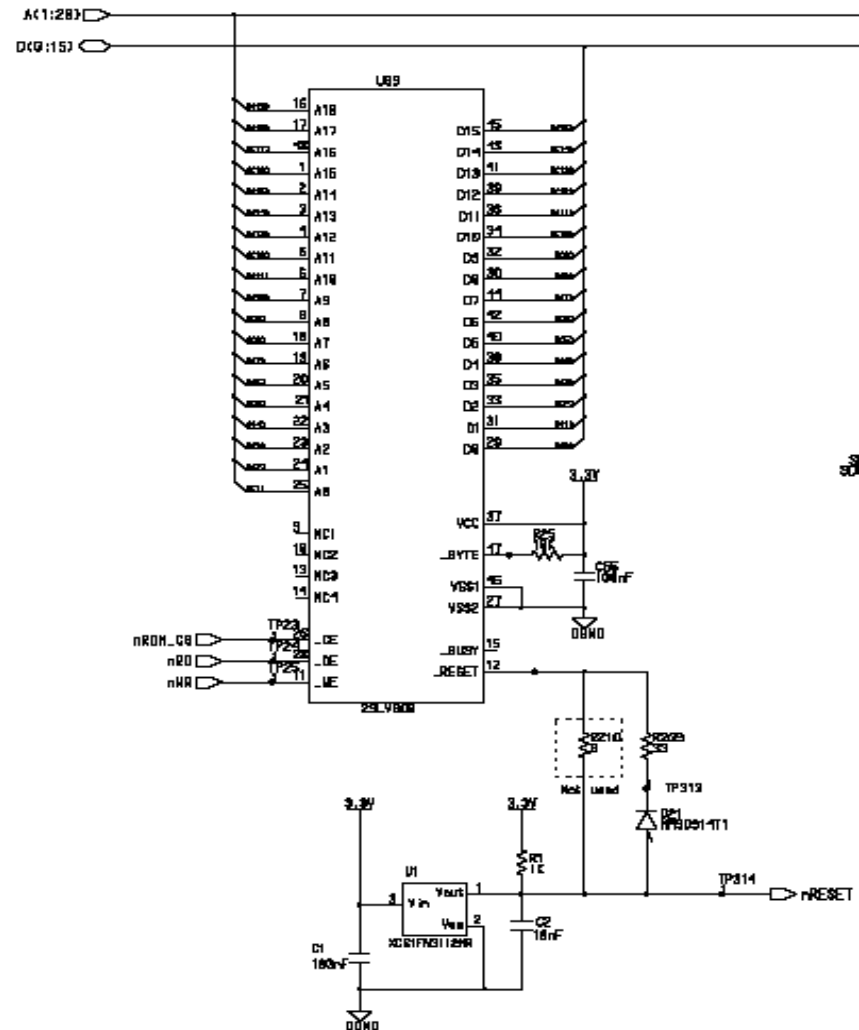
2-5. SDRAM

Used as a buffer, system working
memory area, etc, while printing

Capacity : 8 Mbyte
(K4S641632H-TL75)

Access Time : 133 MHz

PIN FUNCTION DESCRIPTION

| Pin	Name
CLK	System clock
CS	Chip select
CKE	Clock enable
A0 ~ A11	Address
BA0 ~ BA1	Bank select address
RAS	Row address strobe
CAS	Column address strobe
WE	Write enable
DQM	Data input/output mask
DQ0 ~ N	Data input/output
VDD/Vss	Power supply/ground
VDDQ/VSSQ	Data output power/ground

Circuit Diagram of SDRAM
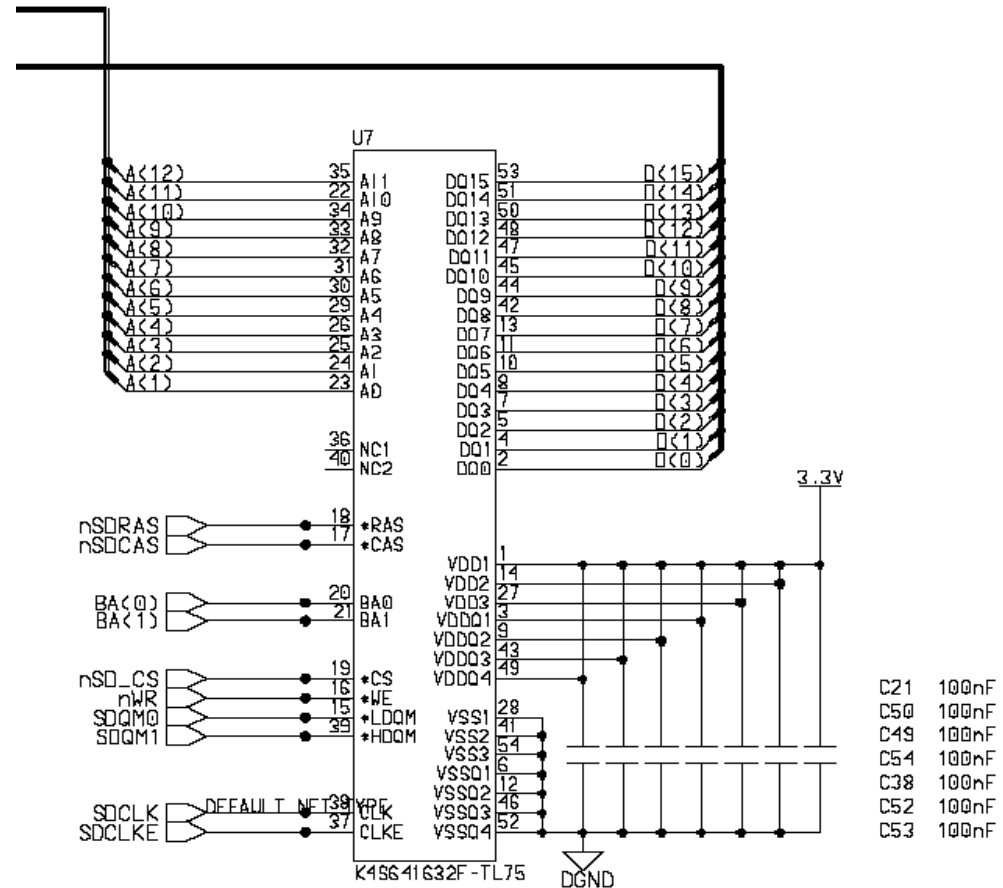
2-6. Main motor Driver

Using A3977 as Motor Drive

By gearing the main motor drives the rollers such as feeding roller, developing roller, fuser roller, and distributing roller. The step motor is controlled for the sections, acceleration section and fixed speed section. In the initial stage of the motor run, appoint the acceleration section to prevent the isolation of the motor. It is controlled by the AN44060 motor drive IC. The step signal and the enable signal are sent to make the phase for driving the motor in CPU.
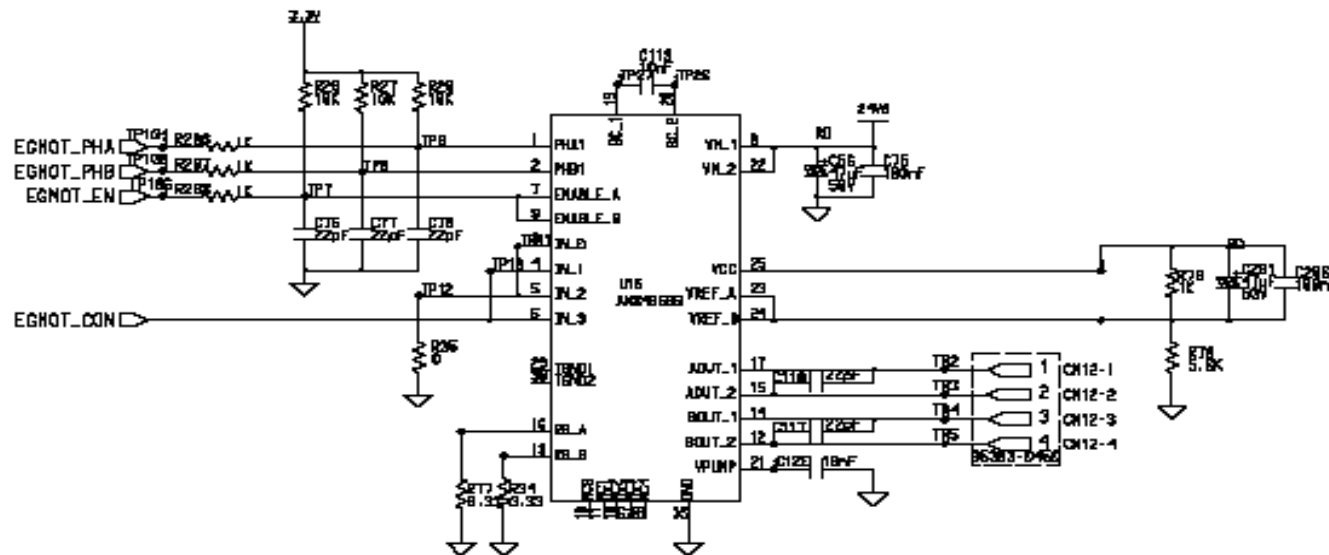
2-7. USB INTERFACE

Uses PHILIPS ISP1582BS IC

■ Complies fully with:
  - Universal Serial Bus Specification Rev. 2.0
  - Most Device Class specifications
  - ACP, OnNow and USB power management requirements.
■ Supports data transfer at high-speed (480 Mbit/s) and full-speed (12 Mbit/s)
■ High performance USB peripheral controller with integrated Serial Interface Engine (SIE),
  Parallel Interface Engine (PIE), FIFO memory and data transceiver
■ Automatic Hi-Speed USB mode detection and Original USB fall-back mode
■ Supports sharing mode
■ Supports I/O voltage range of 1.65 V to 3.6 V
■ Supports VBUS sensing
■ High-speed DMA interface
■ Fully autonomous and multi-configuration DMA operation
■ 7 IN endpoints, 7 OUT endpoints and a fixed control IN/OUT endpoint
■ Integrated physical 8 kbytes of multiconfiguration FIFO memory
■ Endpoints with double buffering to increase throughput and ease real-time data transfer
■ Bus-independent interface with most microcontrollers and microprocessors
■ 12 MHz crystal oscillator with integrated PLL for low EMI
■ Software-controlled connection to the USB bus (SoftConnect)
■ Low-power consumption in operation and power-down modes; suitable for use in bus-
  powered USB devices

2-8. CIS

CIS Module radiates the light by LED to the document, then according to LED,
the reflection signals are divided with R,G,B data. The RGB data (analog signal)
convert into digital signal through ADC ,then the digital signal is transmitted to
Chorus2 Image Processor Block.
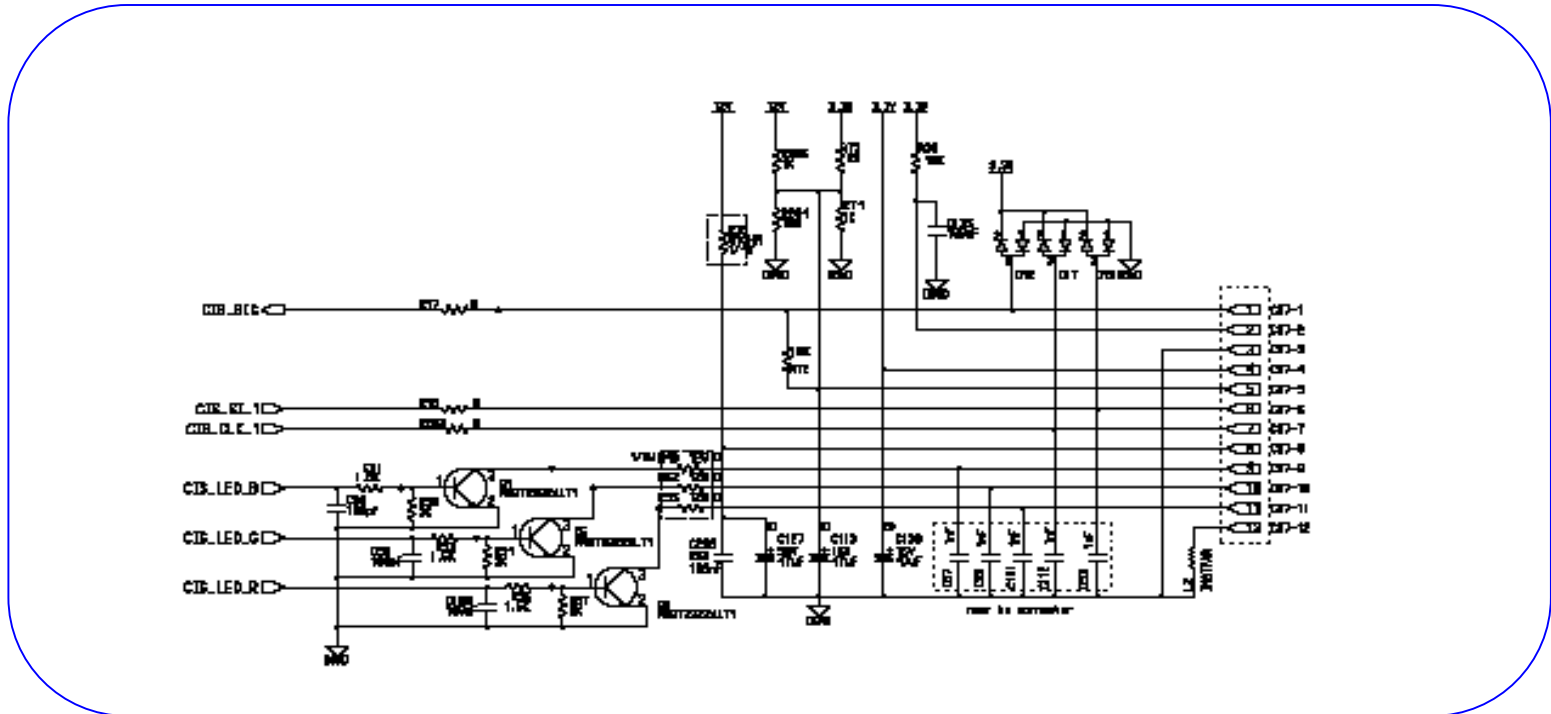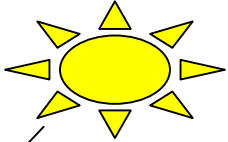
Image Scanning Process

Light Source

Image Sensing

Signal Receiving
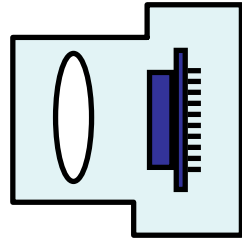
Transfer
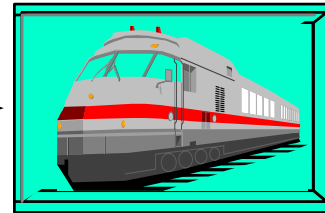
Object

Image Sensor

Processing…
Display
Printing

Structure of CIS

		LED Light Guide
Vled		
Gled		

Rod Lens Array

Vdd+

GND

Detector Array

1　2　3 ----- 1728

SI

CLK

Shift Register, Analog switches
and Video Signal Buffer

Vref

SIG
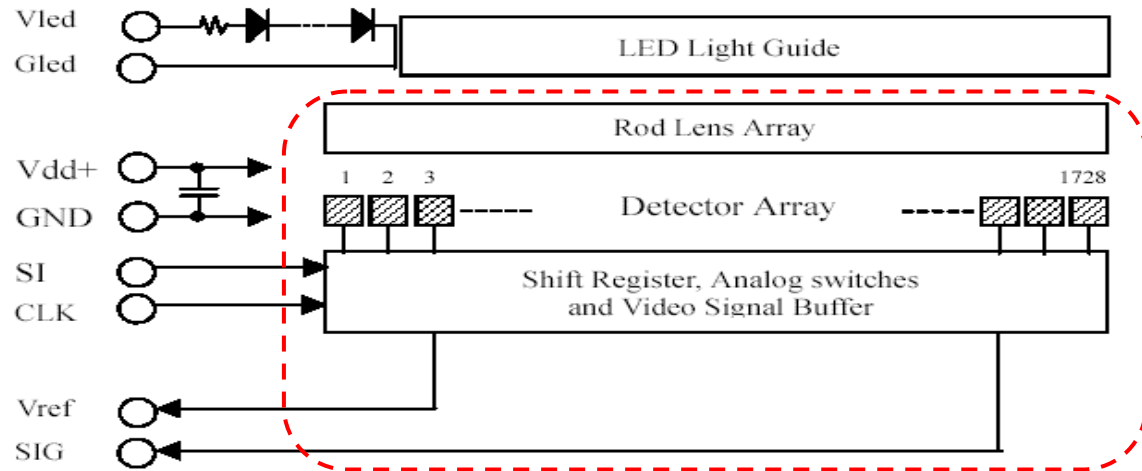
Circuits

Timing Diagram

600 DPI MODE

SEL = LOW

1.5 ms/color

300 DPI MODE

SEL = HIGH

0.75 ms/color
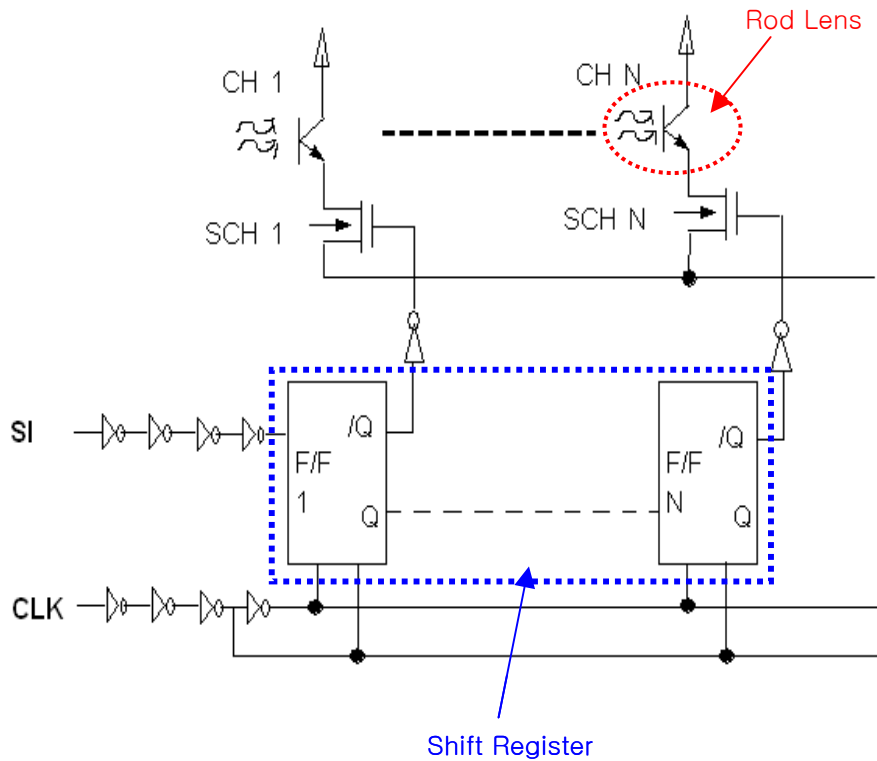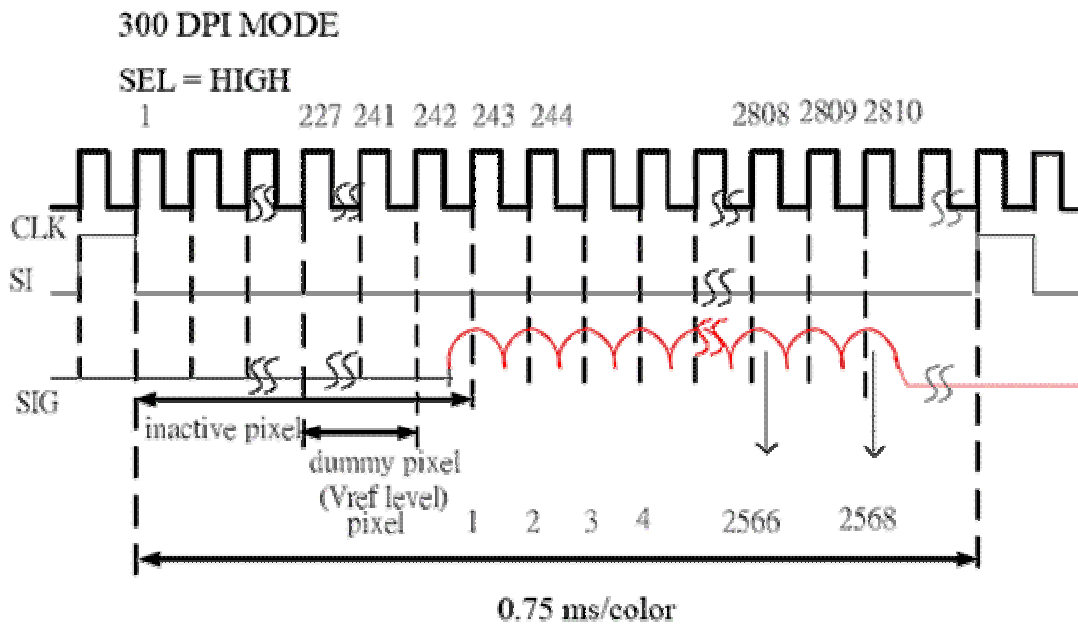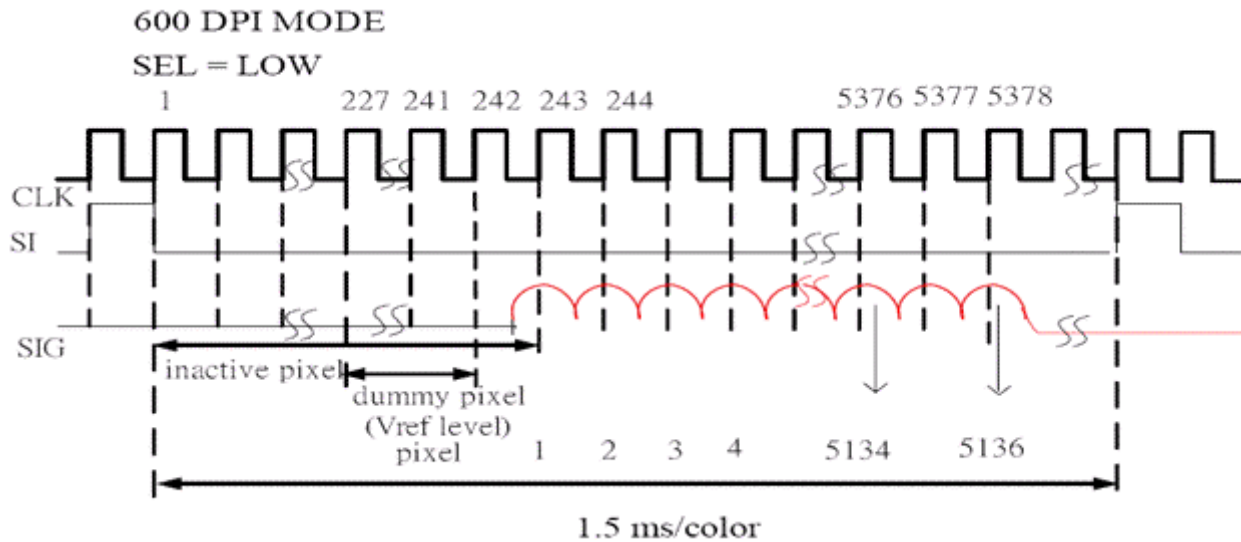
LED Timing for Color Reading
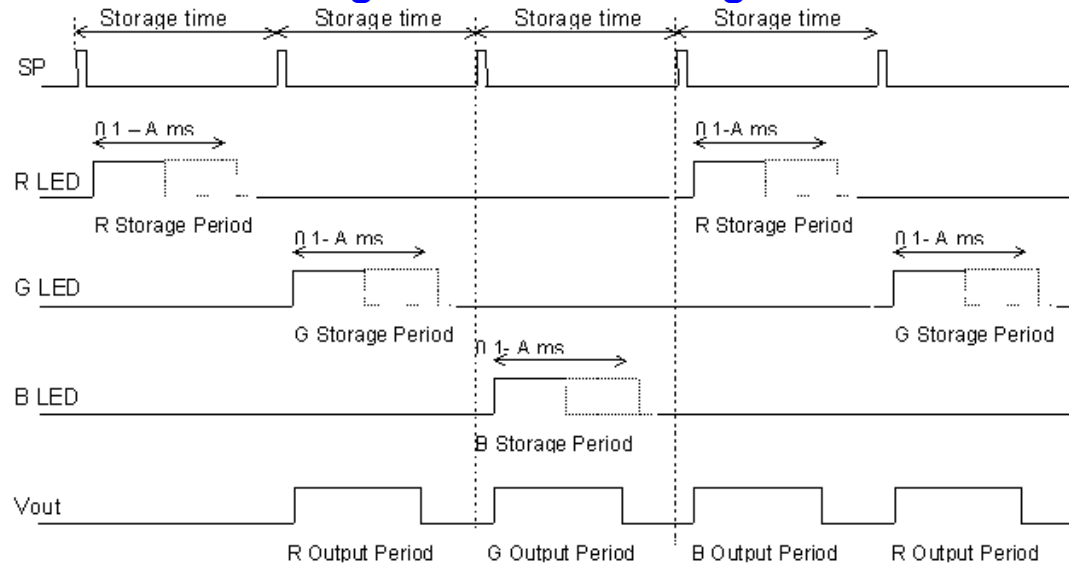
LED Timing for Mono Chrome Reading

1. Per 3 Color per Storage Time

2. Only Green LED ON

SAMSUNG Electronics
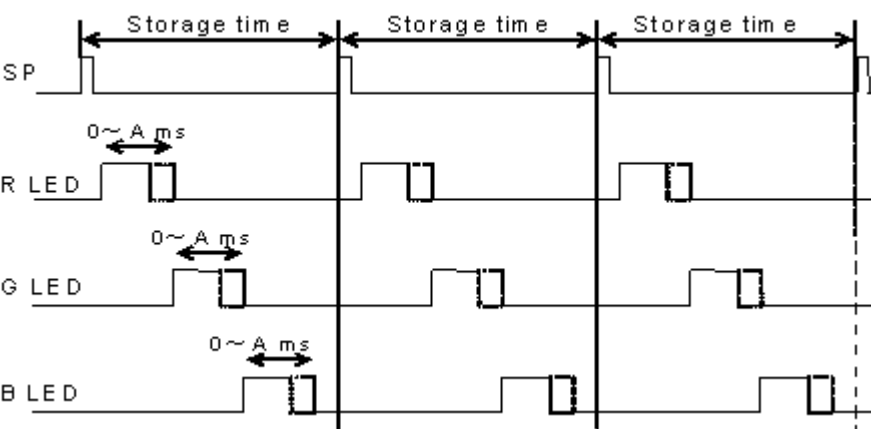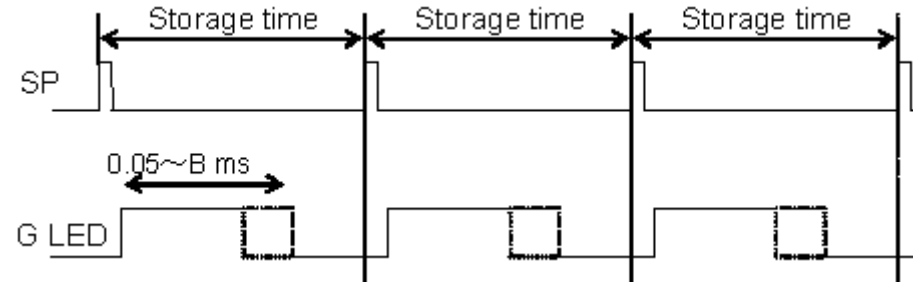
3-1. General description

OPE board is consisted of various function keys and LCD to display an operation of key.
OP micom(48C05) is 8-bit micro controller device designed for multiple I/O control.   It creates a panel
circuit with LCD and other devices. A communication method with a CPU of a main board is UART(TXD-
transmit, RXD-receive).

Menu ◄ OK ► Back Copies Stop Start
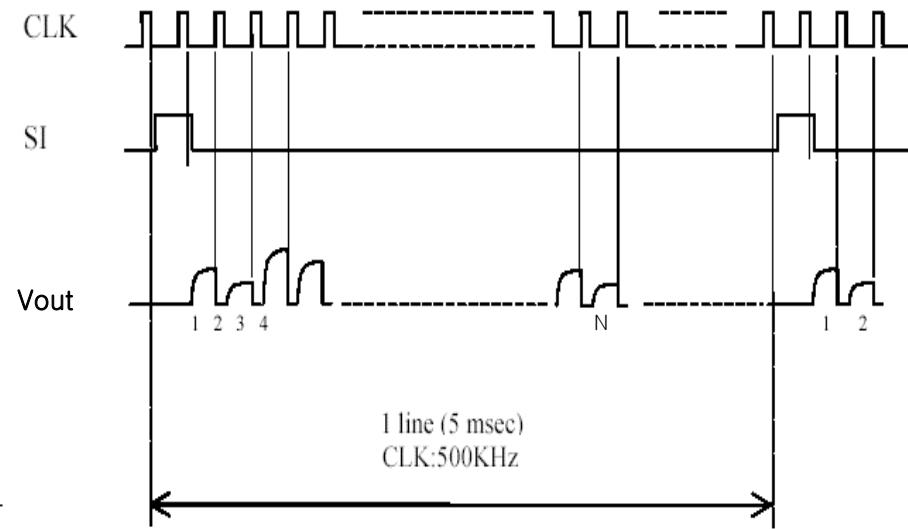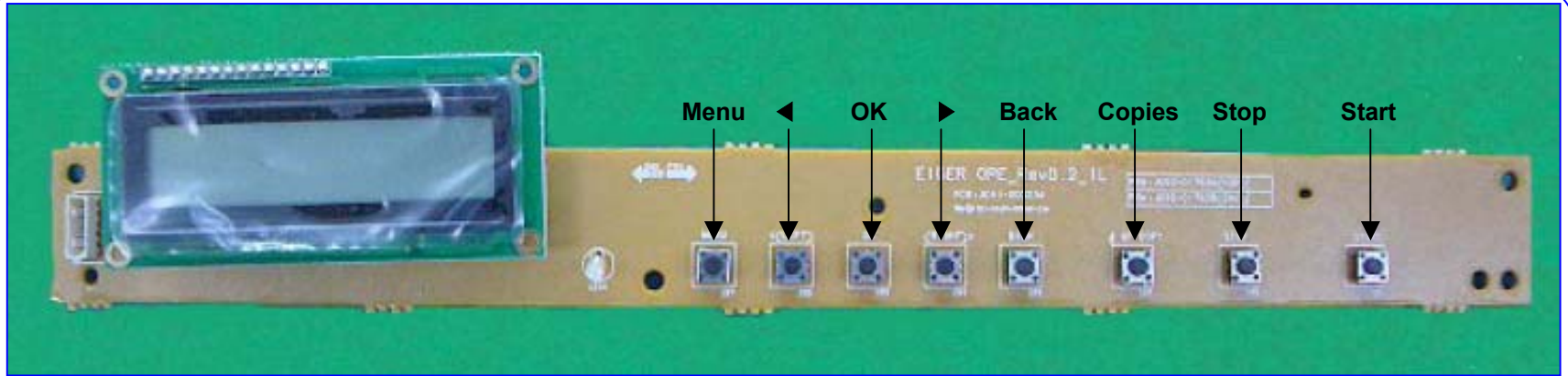
Menu	This is to be used to enter the Menu
Copies	1-99
OK	This key is used to select the right item what customer wants from several items.
Start	This key is used to activate the job
Stop	This key is used to stop the job being done or to exit from the Menu.
Back	This key is used to move previous menu – upper level
◄/►	Left/Right Arrow Key

3-2. UART

■ OPE and main board exchange information by UART.
The band rate is 9600bps, and uses 7.37 MHz resonator as oscillating element.
It engages in communication with 8 bit data without parity bit. UART has two
lines for Tx and Rx. The default level is in the 'high' state. For communication,
the start bit (low level) is transmitted before the data. When the data transmission
is completed, the high state is maintained as the stop bit is transmitted.

■ UART TX format :Codes for change of keys are transmitted in single code,
and OK or error message to check if communication is performed properly are
also transmitted in single code.

■ UART RX format: : Data being received will be arranged to be received as
according to the following specified format to know what data they are.

1. The Role of SMPS & HVPS

FUSER

Main Controller

Micro Processor

INTERFACE

LSU

HVPS

Supply
Cha. Dev.
OPC
Clean

SMPS (Switched Mode Power Supply)
To Supply Constant & Stable DC Power
To Supply DC Bias Voltage
To Control Total System Operation

AC to DC and then
DC to DC Conversion
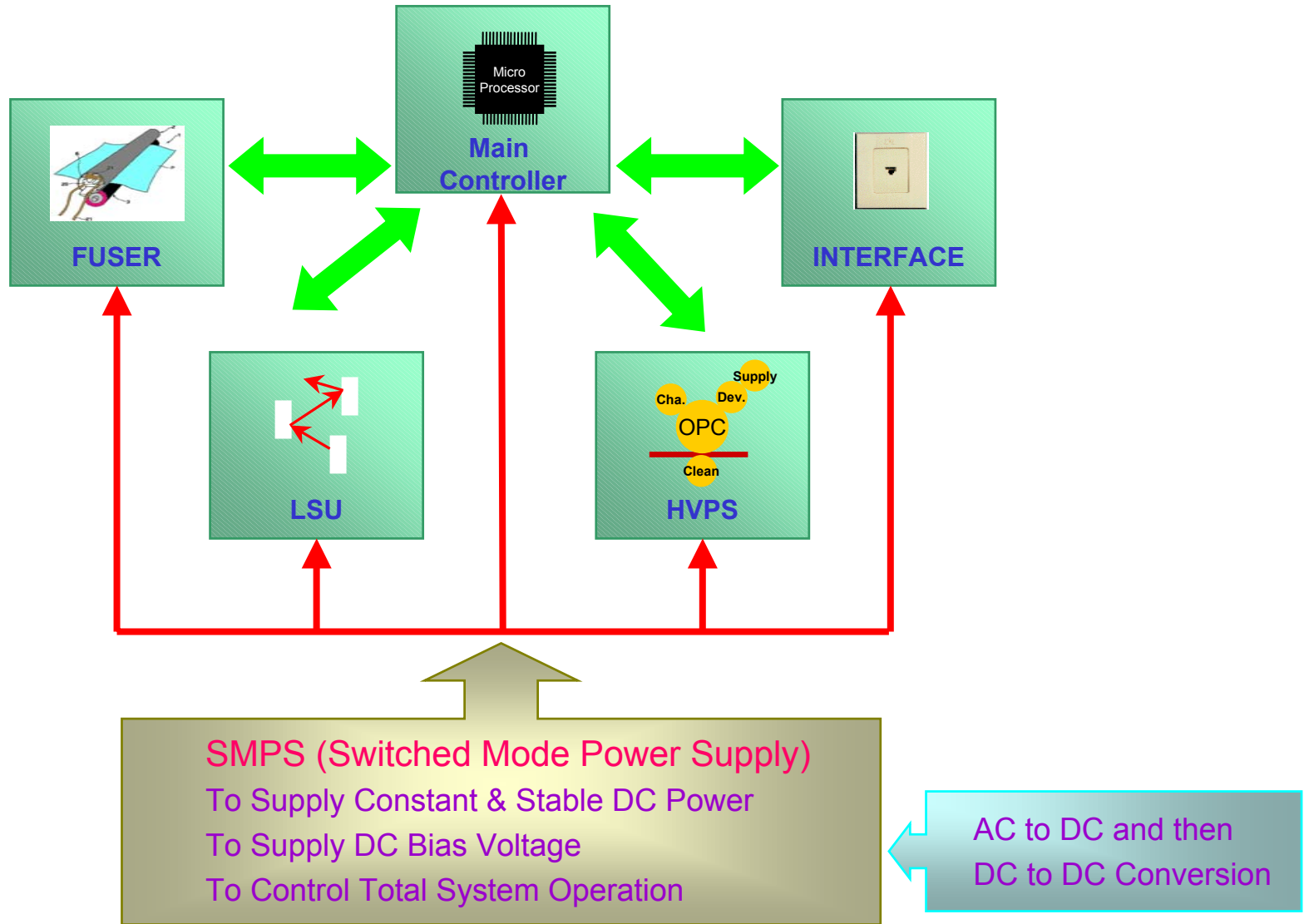
4-2. SMPS & HVPS Spec.

SMPS is the power source of entire system. It is assembled by an independent module and completely common use
with SCX-4200 and it is same characteristic with SCX-4100. It is mounted at the bottom of the set.
The SMPS supplies the DC power for driving the system, and the AC heater control part, which supplies the power to fuser.
it has two output channels. Which are +5V and +24V.

HVPS creates the high voltage of THV/MHV/Supply/Dev and supplies it to the developer part for making
best condition to display the image. The HVPS part takes the 24V and outputs the high voltage for THV/MHV/BIAS,
and the outputted high voltage is supplied to the toner, OPC cartridge, and transfer roller.

SMPS(Switching Mode Power Supply)   HVPS (High Voltage Power Supply)
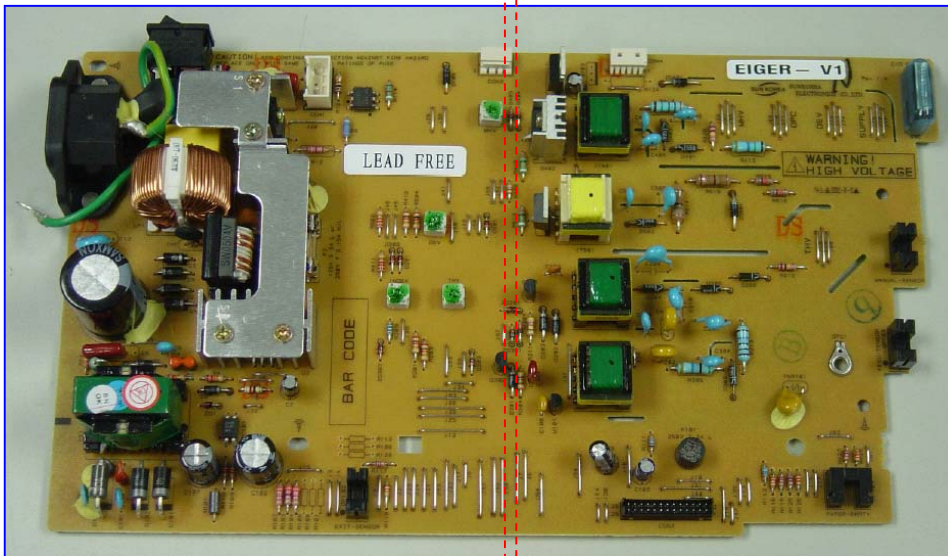
4-3. SMPS & HVPS Spec.

1) Transfer High Voltage(THV+)
- Input Voltage: 24 V DC ±15%
- Output Voltage: MAX +5.0KV ± 5%(Duty Variable, no loading)
    -1.0KV ± 15%(when clearing, 200Mohm)
- Output Voltage Trigger :6.5 μA
- Input contrast of the Voltage stability degree under ± 5%(fluctuating input 21.6V~26.4V)
    Loading contrast : ±5% or less
- Output Voltage Rise Time : 100ms Max
- Output Voltage Fall Time : 100ms Max
- Transfer voltage range as environment variable :+650V(Duty 90%) ~5KV(Duty 10%)
- Environment Recognition Control Method :The THV-PWM ACTIVE transfers 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 output and controlled by
    changing the Duty cycle of the THV PWM Signal. 90% Duty:+650V, 10% Duty:+5KV ± 5%

2) Charge Voltage(MHV)
- Input Voltage: 24 V DC ±15%
- Output Voltage: -1.3KV ~ -1.8KV DC ±50V
- Output Voltage Rise Time : 50ms Max

4-4. SMPS & HVPS Spec.

- Output Voltage Fall Time : 50ms Max
- Output Loading Range : 30M ohm ~1000M ohm
- Output Control Signal(MHV-PWM):CPU is HV output when PWM is LOW

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

4) 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 Rise Time : 50ms Max
- Output Voltage Fall Time : 50ms Max
- Output Loading range : 10M ohm ~1000M ohm
- Output Control Signal(BIAS-PWM): the CPU output is HV output when PWM is low.

5) Supply
- Output Voltage: -400V ~ 800V DC±50V(ZENER using, DEV)
- Input contrast of the output stability degree under ±5%

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 is also included.

11.1 Tool for Troubleshooting

The following tools are recommended for safe and smooth troubleshooting described in this service manual.

1 DVM(Digital Volt Meter)
Standard: Indicates more than 3 digits.
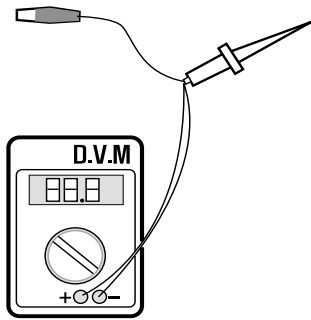
2 Driver
Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).
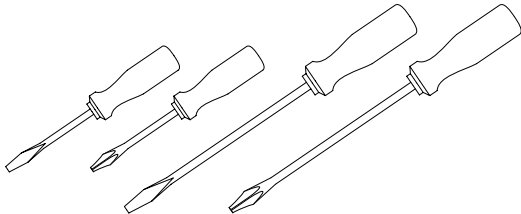
3 Tweezers
Standard : For general home use, small type.
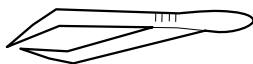
4 Cotton Swab
Standard : For general home use, for medical service.

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

6 Vacuum Cleaner

7 Spring Hook
Standard : For general use

8 Software(Driver) installation CD ROM
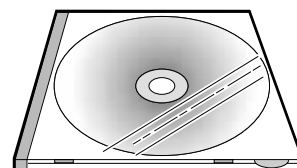
11.2 Acronyms and Abbreviations

The table in the below explains abbreviations used in this service manual.
The contents of this service manual are declared with abbreviations in many parts. Please refer to the table.

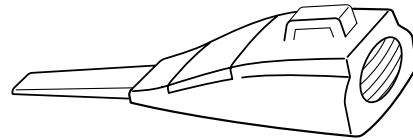|				
ADC	Analog-to-Digital-Conversion		FCOT	First Copy Out Time
AP	Access Point		FFC	FLexiable FLat Cable
AC	Alternating Current		LAN	local area network
ASIC	Application Specific Integrated Circuit		LBP	Laser Beam Printer
ASSY	Assembly		EPP	Enhanced Parallel Port
BIOS	Basic Input Output System		F/W	Firmware
BLDC Motor	Brushless DC Motor		FCF/FCT	First Cassette Feeder/First Cassette Tray
CIS	Contact Image Sensor		FISO	Front-In, Side-Out
CMOS	Complementary Metal Oxide Semiconductor		FPOT	First Print out Time
CN	Connector		GDI	Windows Graphic Device Interface
CON	Connector		GIF	Graphic Interchange Format
CPU	Central Processing Unit		GND	Ground
dB	Decibel		HBP	Host Based Printing
dBA	A-Weighted decibel		HDD	Hard Disk Drive
dBm	Decibel milliwatt		HTML	Hyper Text Transfer Protocol
DC	Direct Current		HV	High Voltage
DCU	Diagnostic Control Unit		HVPS	High Voltage Power Supply
DIMM	Dual In-line Memory Module		I/F	Interface
DPI	Dot Per Inch		I/O	Input and Output
DRAM	Dynamic Random Access Memory		lb	Pound(s)
DVM	Digital Voltmeter		IC	Integrated Circuit
ECP	Enhanced Capability Port		ICC	International Color Consortium
ECU	Engine Control Unit		IDE	Intelligent Drive Electronics or Integrated Drive Electronics
EEPROM	Electronically Erasable Programmable Read Only Memory		IEEE	Institute of Electrical and Electronics Engineers. Inc
EMI	Electro Magnetic Interference		IOT	Image Output Terminal (Color printer, Copier)
EP	Electro photographic			
EPP	Enhanced Parallel Port		IPA	Isopropy Alcohol

IPC	Inter Process Communication	RAM	Random Access Memory
IPM	Images Per Minute	ROM	Read Only Memory
LCD	Liquid Crystal Display	SCF/SCT	Second Cassette Feeder/Second Cassette Tray
LED	Light Emitting Diode	SMPS	Switching Mode Power Supply
LSU	Laser Scanning Unit	SPGP	Samsung Printer Graphic Processor
MB	Megabyte	SPL	Samsung Printer Language
MFP	Multi-Functional Product	Spool	Simultaneous Peripheral Operation Online
MHz	Megahertz		
MPBF	Mean Prints Between Failure	SURF	Surface Rapid Fusing
MPF/MPT	Multi Purpose Feeder/Multi Purpose Tray	SW	Switch
		sync	Synchronous or Synchronization
NIC	Network Interface Card	T1	ITB
NPC	Network Printer Card	T2	Transfer Roller
NVRAM	Nonvolatile Random Access Memory	TBD	To Be Determined
		TRC	Toner Reproduction Curve
OPC	Organic Photo Conductor	TTM	Time to Market
PBA	Printed Board Assembly	PnP	Universal Plug and Play
PCL	Printer Command Language , Printer Control Language	UMC	Unit Manufacturing Cost
		URL	Uniform Resource Locator
PCI	Peripheral Component Interconnect by Intel 1992/6/22, is a local bus standard developed by Intel and introduced in April, 1993 : A60, B60 Pins	USB	Universal Serial Bus
		VCCI	Voluntary Control Council for Interference Information Technology Equipment
PDF	Portable Document Format	WECA Alliance	Wireless Ethernet Compatibility
PDL	Page Description Language	Wi-Fi	Wireless Fidelity
Ping	Packet internet or Inter-Network Groper		
PPD	Postscript Printer Discription		
PPM	Page Per Minute		
PS	Post Script		
PTL	Pre-Transfer Lamp		
PWM	Pulse Width Moduration		
Q'ty	Quantity		
QCD	Quality, Cost, and Delivery		

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
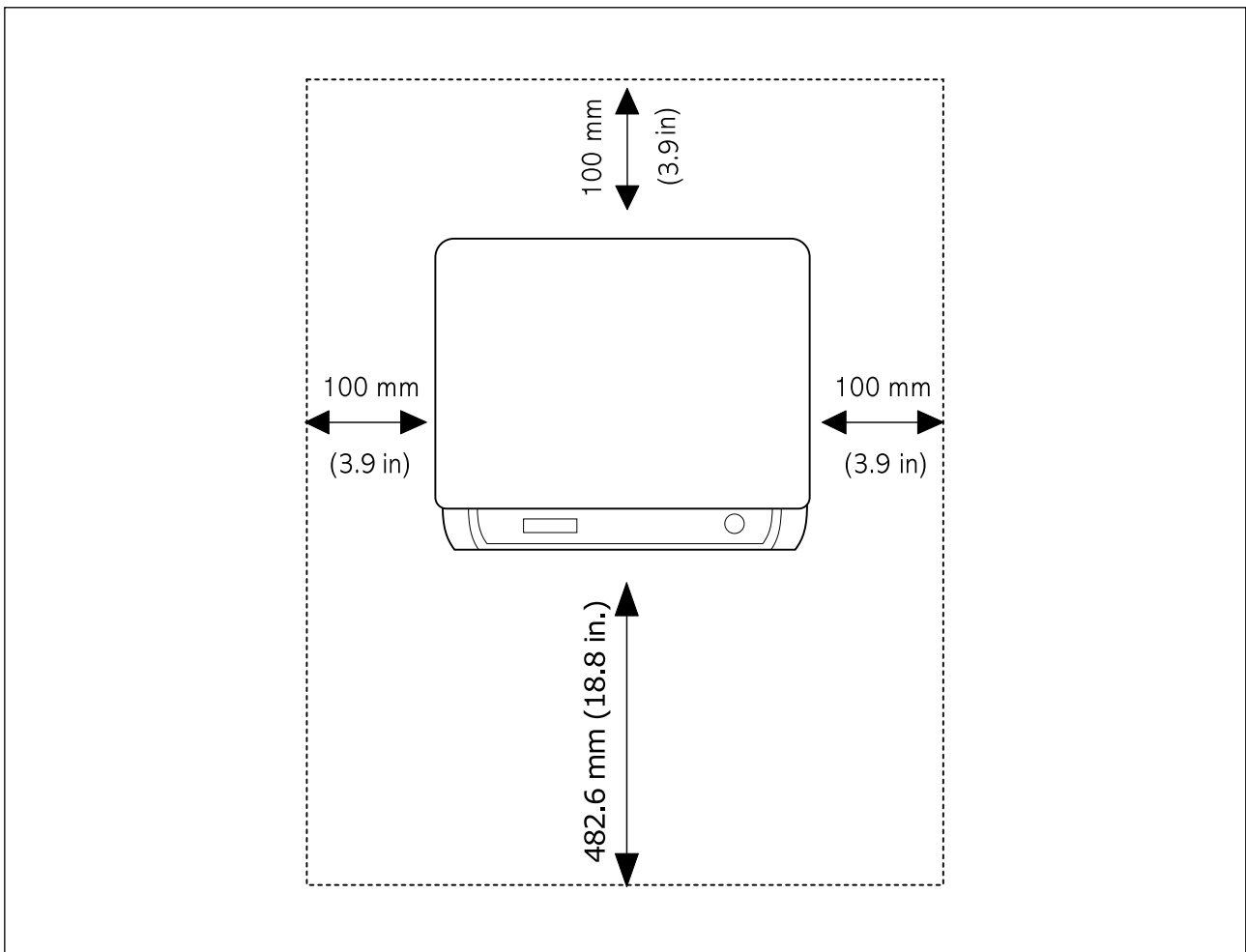
11.4 A4 ISO 19752 Standard Pattern

This test page is reproduced at 70% of the normal A4 size

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXY

Stephen J. Singel
Labanda Sinpat Abarress
Tendar, BSF
URANGLE

23 January 2004

Jonathan Q. Maderia

Inpert Mampem Abaress
2343 Stantin Dawer Lank
Benhibe, SDF

Mr.Maderia:

Nam liber tempor cum soluta nobis eleifend ption cogue nihil consequat, velillum.
Dolore eu zril feugiat nulla acilisis at vero eros accumsan et iusto odio dignis sim qui blandit
praesent lutatum ril lobortis nisl ut aliquip exea commodo consequat. Duis autem vel eum ireure
dolor in hendreritin vulputate velit esse molestie tincidunt ut laoreet dolore magna aliquam erat
volutpat. Ut wisi enim ad minim viniam, quis nostrud exerci tation ullam corpersus cipit lotis nisl
ut aliquip ex ea commodo consequat. Lorem ipsum dolor sit.

Amet, consectetuer adipiscing elit, sud diam nonummy nibh veniam,
recneps adipiscing elit, sed diam nonummy nibtil laoreet dolore magn
aliam erat volutpat. Ut wisi enim minim veniam, quisient nostrud. Soly
uta nobis eleifendoptn cogue nihil imerdiet domg id quod mzim plera
facer posim aum. Lorem ipsm dolor sit amet, consectuer. Duis autem
eum iriure dolor in hendreritin vulputate velit cesse ea commodo mol

Nam liber tempor cum soluta nobis eleifend option cogue nihil consequat,
velillum. Dolore eu zril feugiat nulla facilisis at vero eros accumsan et iusto odio dignissim qui blandit
praesent.

Singabet,

Stephen J. Singel
Demperta Aminerimum
Labanda Sinpat Abarress

SJS:dwg
FINAL

LSA
Funtres Solber Netener

Stnecrep Balrecneps

B   C   D   E

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXY