SAMSUNG

Service Manual

Color Laser Printer
CLP-770ND

SAMSUNG

ELECTRONICS

Service Manual

Service Manual

GSPN (Global Service Partner Network)

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1. Precautions

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

1.1 Safety Warning

(1) Only to be serviced by appropriately qualified service engineers.
High voltages and lasers inside this product are dangerous. This printer should only be serviced by a suitably trained and qualified service engineer.

(2) Use only Samsung replacement parts
There are no user serviceable parts inside the printer. Do not make any unauthorized changes or additions to the printer, these could cause the printer to malfunction and create electric shock or fire hazards.

(3) Laser Safety Statement
The Printer is certified in the U.S. to conform to the requirements of DHHS 21 CFR, chapter 1 Subchapter J for Class 1(1) laser products, and elsewhere, it is certified as a Class I laser product con-forming 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 DÔOUVERTURE. EXPOSITION DANGEREUSE AU FAISCEAU.

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

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

ADVARSEL. - USYNLIG LASERSTRLNING VED BNING, NR SIKKERHEDSBRYDERE ER UDE AF FUNKTION. UNDG UDSAETTELSE FOR STRLNING.

ADVARSEL. - USYNLIG LASERSTRLNING NR DEKSEL PNES. STIRR IKKE INN I STRLEN. UNNG EKSPONERING FOR STRLEN.

VARNING - OSYNLIG LASERSTRLNING NR DENNA DEL R ...PPNAD OCH SPRREN R URKOPPLAD. BETRAKTA EJ STRLEN. STRLEN R FARLIG.

VARO! - AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NKYMTT...MLLE LASER-STEILYLLE L KATSO STEESEEN.

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 Drum cartridge and Toner Cartridge away from children. The toner powder contained in the Drum cartridge and Toner Cartridge may be harmful and if swallowed you should contact a doctor.

1.2.2 Electric Shock and Fire Safety Precautions

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

(1) Use only the correct voltage, failure to do so could damage the printer and potentially cause a fire or electric shock.
(2) Use only the power cable supplied with the printer. Use of an incorrectly specified cable could cause the cable to overheat and potentially cause a fire.
(3) Do not overload the power socket, this could lead to overheating of the cables inside the wall and could lead to a fire.
(4) Do not allow water or other liquids to spill into the printer, this can cause electric shock. Do not allow paper clips, pins or other foreign objects to fall into the printer these could cause a short circuit leading to an electric shock or fire hazard.
(5) Never touch the plugs on either end of the power cable with wet hands, this can cause electric shock. When servicing the printer remove the power plug from the wall socket.
(6) Use caution when inserting or removing the power connector. The power connector must be inserted completely otherwise a poor contact could cause overheating possibly leading to a fire. When removing the power connector grip it firmly and pull.
(7) Take care of the power cable. Do not allow it to become twisted, bent sharply round corners or other wise damaged. Do not place objects on top of the power cable. If the power cable is damaged it could overheat and cause a fire or exposed cables could cause an electric shock. Replace a damaged power cable immediately, do not reuse or repair the damaged cable. Some chemicals can attack the coating on the power cable, weakening the cover or exposing cables causing fire and shock risks.
(8) Ensure that the power sockets and plugs are not cracked or broken in any way. Any such defects should be repaired immediately. Take care not to cut or damage the power cable or plugs when moving the machine.
(9) Use caution during thunder or lightening storms. Samsung 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 or network card is replaced.
(2) Ensure that power is disconnected before servicing or replacing any electrical parts.
(3) Disconnect printer interface cables and power cables.
(4) Only use approved spare parts. Ensure that part number, product name, any voltage, current or temperature rating are correct.
(5) When removing or re-fitting any parts do not use excessive force, especially when fitting screws into plastic.
(6) Take care not to drop any small parts into the machine.
(7) Handling of the OPC Drum
  - The OPC Drum can be irreparably damaged if it exposed to light.
    Take care not to expose the OPC Drum either to direct sunlight or to fluorescent or incandescent room lighting. Exposure for as little as 5 mins can damage the surface? photoconductive properties and will result in print quality degradation. Take extra care when servicing the printer. Remove the OPC Drum and store it in a black bag or other lightproof container. Take care when working with the covers(especially the top cover) open as light is admitted to the OPC area and can damage the OPC Drum.
  - Take care not to scratch the green surface of OPC Drum Unit.
    If the green surface of the Drum Cartridge is scratched or touched the print quality will be compromised.

1.2.5 Disregarding this warning may cause bodily injury

(1) Be careful with the high temperature part.
  The fuser unit works at a high temperature. Use caution when working on the printer. Wait for the fuser to cool down before disassembly.
(2) Do not put finger or hair into the rotating parts.
  When operating a printer, do not put hand or hair into the rotating parts (Paper feeding entrance, motor, fan, etc.). If do, you can get harm.
(3) When you move the printer
  - The equipment weighs approximately 30 Kg (including consumables), therefore pay attention when handling it.
  - Be sure not to hold the movable parts or units (e.g. the control panel, DADF) when transporting the equipment.
  - Be sure to use a dedicated outlet with 110V/220Vpower input.
  - The equipment must be grounded for safety.
  - Select a suitable place for installation. Avoid excessive heat, high humidity, dust, vibration and direct sunlight.
  - Provide proper ventilation since the equipment emits a slight amount of ozone.
  - The equipment shall be installed near the socket outlet and shall be accessible.
  - Be sure to fix and plug in the power cable securely after the installation so that no one trips over it.

1.3 ESD Precautions

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called "Electrostatically Sensitive (ES) Devices" or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor "chip" components.
The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

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

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

2. Product spec and feature

2.1 Product Summary

High performance CLBP at a Low Cost of Printing
Large Workgroup (SMB/Corp) & Tender Biz

- Speed : 32 / 32 ppm (A4)
- Resolution : up to 9600 X 600 dpi effective output.
- 7K/7K Black/Color toner (Initial : 3.5K/3.5K)
- Machine Life : 300K or 5 Years
- Paper handling
   : Maximum 1,600 Sheets Paper Capacity
   : 500sh cassette, 500sh SCF x 2 EA
   : 100 MP
- 80 GB HDD (Option)
- Memory : 256 MB (Max. 768 MB)
- Duplex printing
- N/W, USB 2.0, EDI, Wireless option
- 4 Line LCD

2.2 Sepcifications

2.2.1 General Print Engine

Item		Description
Engine Speed	Simplex	B&W : Up to 32 ppm in A4
		Color : Up to 32 ppm in A4
	Duplex	B&W : Up to 16 ipm in A4
		Color : Up to 16 ipm in A4
Warmup time		Less than 25 sec
FPOT (B&W)	From Ready	Less than 10 sec
	From Idle	Less than 28 sec
FPOT (Color)	From Ready	Less than 11 sec
	From Idle	Less than 30 sec
Resolution	Optical	600 x 600 dpi

	Support	■ PCL 6
		  Best : up to 9,600 x 600 effective output
		  Normal : up to 2,400 x 600 dpi
		  Draft : up to 600 x 600 dpi
		■ PostScript 3
		  Best : up to 9,600 x 600 effective output
		  Normal : up to 1,200 x 600 dpi
		  Draft : up to 600x600 dpi

2.2.2 Controller & S/W

Item		Description
MPU		800 MHz
Memory	Std.	256 MB
	Max.	768 MB
Memory Expansion		1 Slot
Printer Languages		PostScript 3, PCL5c, PCL6
Fonts		93 scalable and 1 bitmap PCL and 136 PS
Driver	Supporting OS	Windows 2000/XP/2003/Vista/Server 2003/Window Server 2008
		Various Linux including Red Hat 8.0~9.0, Mandrake 9.2~10.1, SuSE 8.2~9.2 and Fedora Core 1~4
		Mac OS 10.1 ~10.5 and Universal Mac
	Default Driver	- PCL6 - including Mono Only Driver
	WHQL	Windows 2000/XP/2003/Vista
Application	Printer Setting Utility	USB
	Smart Panel	Yes (USB / Network, Install Default)
	Network Management	Set IP, SyncThru Web Admin Service 4.0 (SWAS 4.0) (Windows: IExplorer 5.5 or higher, Linux/Mac: not supported)
	SmarThru4	N/A
Interface	Parallel	N/A
	USB	USB 2.0
	Network	Ethernet 10/100 Base TX
	Wireless LAN	Option
	EDI	Yes
Network Interface	Protocol	TCP/IPv4/v6, SNMPv2/v3, HTTP(S), DHCP/BOOTP, DNS, WINS, mDNS, SLP, UPnP, Standard TCP/IP Printing/IPP(S)/ SMTP/ LDAP
	Network OS	Windows 2000/XP(32/64bit)/2003/Server(32/64bit)/Vista NetWare 5.x, 6.x Mac OS 10.3~10.5 - TCP/IP Only Various Linux OS including Red Hat 8.0~9.0, Fedora Core 1~4, Mandrake 9.2~10.1, and SuSE 8.2~9.2 HP-UX, Solaris, SunOS, SCO UNIX
User Interface	LCD & Button	4 Line LCD
	LED	1 LED for status (Green/Red)

2.2.3 Paper Handling

Item		Description
Standard Capa.		500-sheet Cassette Tray, 100 MP
Max. Capa.		1600 sheets @ 80g/㎡ (500-sheet CST, 500-sheet SCFx2, 100MP)
Printing	Max. Size	216 x 356mm (8.5" x 14")
	Min. Size	76 x 127 mm (3" x 5")
	Margin(T/B/L/R)	4 mm, 4 mm, 4 mm, 4 mm
Multi-purpose tray	Capacity	100 sheets @ 75g/㎡
	Media sizes	A4 148.5x210 ~ Legal 216x356 (8.5"x14")
	Media type	Printer Default, Plain Paper, Thick, Thin, Cotton, Archive Paper, Bond, Card Stock, Labels, Preprinted, Color Paper, Envelope, Recycled
	Media weight	16~58lb (60 to 220g/㎡)
	Sensing	Empty sensing No size sensor
Standard Cassette Tray	Capacity	500 sheets @ 80g/㎡
	Media sizes	76 x 127 mm (3" x 5") ~ 216 x 356mm (8.5" x 14")
	Media types	Plain paper
	Media weight	16~28lb (60 to 105g/㎡)
	Size sensor	Paper size sensor
	User Interface	Indicator
	Sensing	Paper empty sensor
Optional Cassette Tray	Capacity	500 sheets @ 75g/㎡
	Media sizes	A5 148.5 x210mm ~ Legal 216 x 356mm (8.5" x 14")
	Media types	Plain paper
	Media weight	16~28lb (60 to 105g/㎡)
	Size sensor	Paper size sensor
	User Interface	Indicator
	Sensing	Empty sensing
Output Stacking	Capacity	250 sheets @ 80g/㎡
	Output Full sensing	Yes
Duplex	Supporting	Std.
	Throughput	N/A
	Media sizes	A4, Letter, Legal, Oficio, Folio
	Media types	Palin paper only
	Media weight	16~32lb (60 to 120g/㎡)

2.2.4 Reliability & Service

Item		Description
Printing Volume(AMPV)		1433 page (B&W : 573 page, Color : 860 pages)
Max Monthly Duty		120,000 pages
MPBF		100,000 pages
MTTR		<30 min.
SET Life Cycle		300,000 image or 5 years whitchever comes first
System-record		Total page count (color/mono) Fuser life Transfer belt life Toner Life(CMYK) Tray pickup-Roller life First operation date
Test Print		Configuration Sheet Menu Map Sheet Demo Sheet
RDC	Comm. Mode	USB & NW
	Operation	TBD(Status report F/W reset/writing NV-RAM operation Record tracking Administration alert)
Temperature	Operating	15~32.5 ℃ (50~90.5℉)
	Storage	-20~40℃ (-4~104℉)
Humidity	Operating	10~80%RH
	Storage	0~90%RH

2.2.5 Environment

Item		Description
Acoustic Noise Level(Sound / Pressure)	Printing	Less than 54 dBA
	Standby	Less than 35 dBA
	Sleep	Background noise level
Input Voltages		110-127 VAC, 50/60Hz
		220-240 VAC,50/60Hz
		Power Switch
Power Consumption	Ready	Less than 100W
	AVG.	Less than 750W
	Max/Peak	Less than 1900W
	Sleep	Less than 17W
Dimension (W x D x H)	Set	472 x 478 x 543 mm (18.4" x 18.5" x 25.4")
Weight	Set (with consumables)	30 kg (66.14 lbs)

2.2.6 Packing & Accessory

In-Box	Machine
	Initial Toner cartridge (CMYK : 3.5K)
	Power cord
	USB cable (China, Korea, CIS, India, XSS)
	Set-up CD
	QIG(Quick installation Guide sheet)
	Warranty book
	Manual Book: Domestic/Turkey Only

2.2.7 Consumables

■ CRU

Item		Description
Toner Cartridge	Yield	Initial : 3,500 standard pages Sales : 7,000 standard parge
	Part Name	CLT-C609S(Cyan) CLT-M609S(Magenta) CLT-Y609S(Yellow) CLT-K609S(Black) **Region: CLT-C6092S (Cyan) CLT-M6092S (Magenta) CLT-Y6092S (Yellow) CLT-K6092S (Black)
	Key	Unique, Electronic key(s-Chip V2.0)
	Life detect	Life detect Sensor (None), Traced via software 90% exhausted: Low message 100% exhausted: Empty message
Paper Transfer Belt	Yield	50K
	Part Name	CLT-T609
	Key	Unique, Electronic key(s-Chip V1.1)
	Sensor	None, that would be traced via software

* Declared yield value in accordance with ISO/IEC 19798

** Albania, Austria, Belgium, Bosnia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK.

■ FRU

Item	Part_Code	Life
Fuser	JC96-05454A(110V) JC96-05455A (220V)	100K
Pick-up Roller	JC90-00932A	100K
Friction Pad(CST)	JC97-03467A	100K

2.2.8 Option

Item	Part Name	Description
Memory	ML-MEM160 ML-MEM170	256 MB 512 MB
Optional Tray 2/3	CLP-S770A	500- sheet Cassette
Jscribe Enabler Kit	SCX-KIT10J	
Wireless LAN*	ML-NWA30L	
Hard Disk	ML-HDK420	80GB
Stand	ML-DSK20S	

* Depending on your country, wireless LAN cards may not be available. Contact your local Samsung dealer or the retailer where you bought your printer.

2.3 Model Comparison Table

■ Samsung Model

	Dali (CLP- 660ND)	Cezanne (CLP- 770ND)
Image		
Speed (A4)	24/24 ppm (A4)	32/32 ppm (A4)
Resolution	2,400 x 600 dpi	up to 9600 X 600 dpi effective output.
Emulation	PDL	PDL
Warm-up	30 sec	25 sec
FPOT (Sleep)	44 sec (Color/Mono)	30sec (Color) / 28sec (Mono)
Memory	128 MB (Max.640 MB)	256 MB (Max.768 MB)
Interface	N/W, USB 2.0	N/W, USB 2.0, EDI Wireless Opt.
Duplex	Standard	Standard
Paper Capacity	250 CST, 100 MP 500 SCF x 1 (Max. 850 sh)	500 CST, 100 MP 500 SCF x 2 (Max. 1,600 sh)
Toner	5.5K/5K	3.5K / 7K
Max.Duty	85,000	120,000
Set life	200,000	300,000
HDD	N/A	HDD option

■ Competitor Model

	CLP- 770ND	OKI C6100N	Xerox P8560DN	Lexmark C780N
Image				
Speed(A4)	32/32 ppm	32/26 ppm	30/30 ppm	33/29 ppm -
Resolution	Up to 9600 x 600 effective output	1,200 x 600 dpi	Up to 4,800 dpi	Up to 4,800 dpi
Emulation	PDL	PDL	PDL	PDL
FPOT	11/10sec	11/9 sec	5/5 sec	11/13 sec
Memory	256 MB (Max.768 MB)	256 MB (Max.768 MB)	600 MB (Max.1GB)	256 MB (Max.768 MB)
Interface	N/W, USB 2.0, EDI Wireless Opt.	N/W, USB 2.0 Wireless Opt.	N/W, USB 2.0	N/W, USB 2.0, Direct USB Wireless Opt.
Duplex	Standard	Standard	Standard	Standard
Paper Capacity	500CST, 100 MP 500 SCF x 2 (Max. 1,600 sh)	300 CST, 100 MP 530 SCF (Max. 930 sh)	525 CST, 100 MP 525 SCF x 2 (Max. 2,200 sh)	500 CST, 100 MP 500 SCF (Max. 1,150 sh)
Toner	3.5K/ 7K	6K/5K	6.8K/3.4K	6K/6K 10K/10K
Max. Duty	120,000	60,000	85,000	120,000
HDD	HDD option	HDD option	HDD option	HDD option

2.4 Product Configuration

■ **Front View**
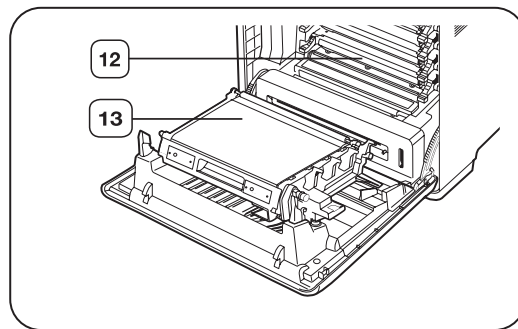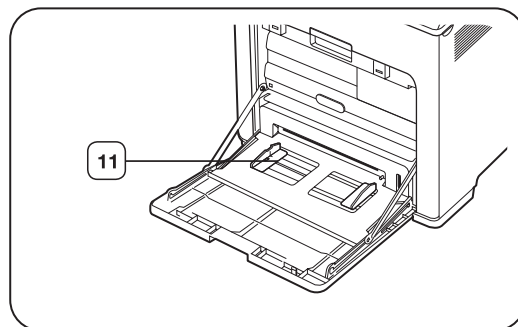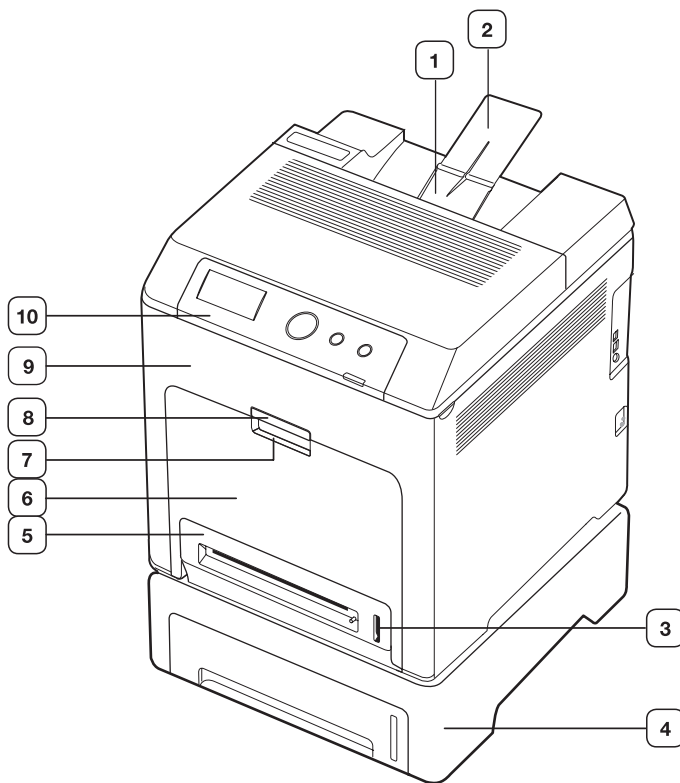
1	Output tray
2	Output support
3	Paper level indicator
4	Optional tray[a]
5	Tray 1
6	Multi-purpose tray
7	Multi-purpose tray handle

8	Front cover handle
9	Front cover
10	Control panel
11	Multi-purpose tray paper width guides
12	Toner cartridge
13	Paper transfer belt

a.The symbol a is a mark for the optional device.

■ Front View
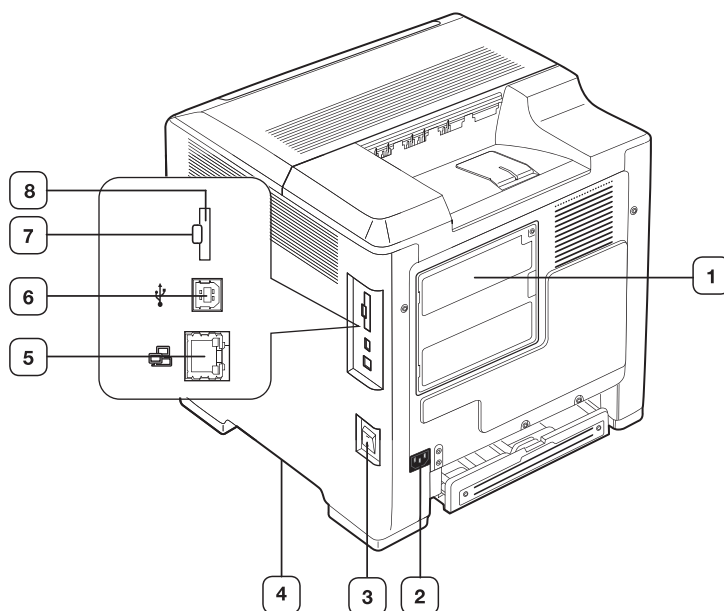
1	Control board cover		6	USB port
2	Power receptacle		7	External device interface (EDI)[a]
3	Power-switch		8	IEEE 802.11 b/g Wireless LAN[b]
4	Handle			
5	Network port			

a. External device interface for Samsung and third party solutions.
b. The symbol a is a mark for the optional device.

■ System Layout
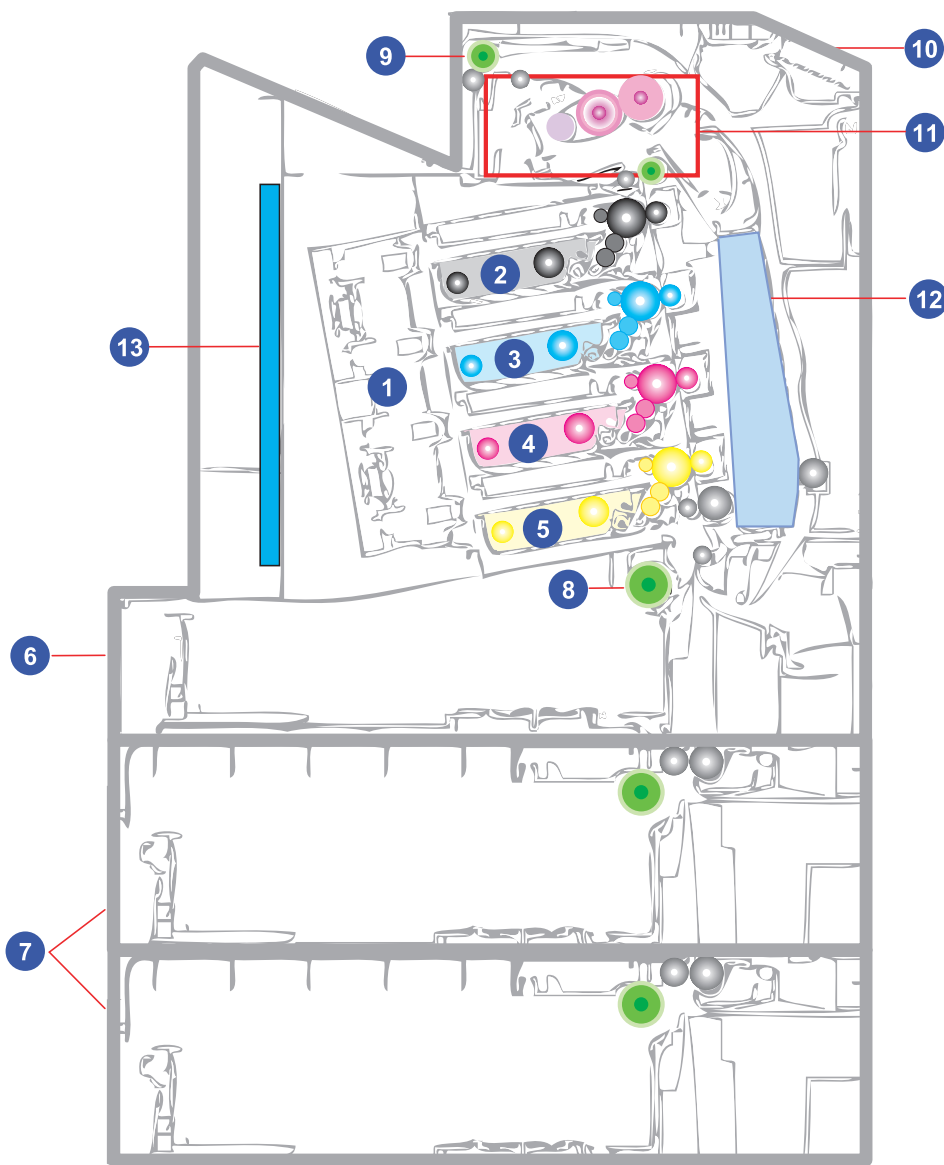
No.	Item	No.	Item
1	LSU Unit	9	Exit Roller
2	Toner (K)	10	OPE Unit
3	Toner (C)	11	Fuser Unit
4	Toner (M)	12	PTB Unit
5	Toner (Y)	13	Main PBA
6	CASSETTE Unit		SMPS PBA
7	SCF Unit (Optional Tray)		FDB (Fuser Drive Board) PBA
8	Pick up Roller		

■ **Paper Path**

Exit Pass

Duplex Pass

Simplex Pass

Cassette Feed

MP Feed

SCF1 Feed

SCF2 Feed
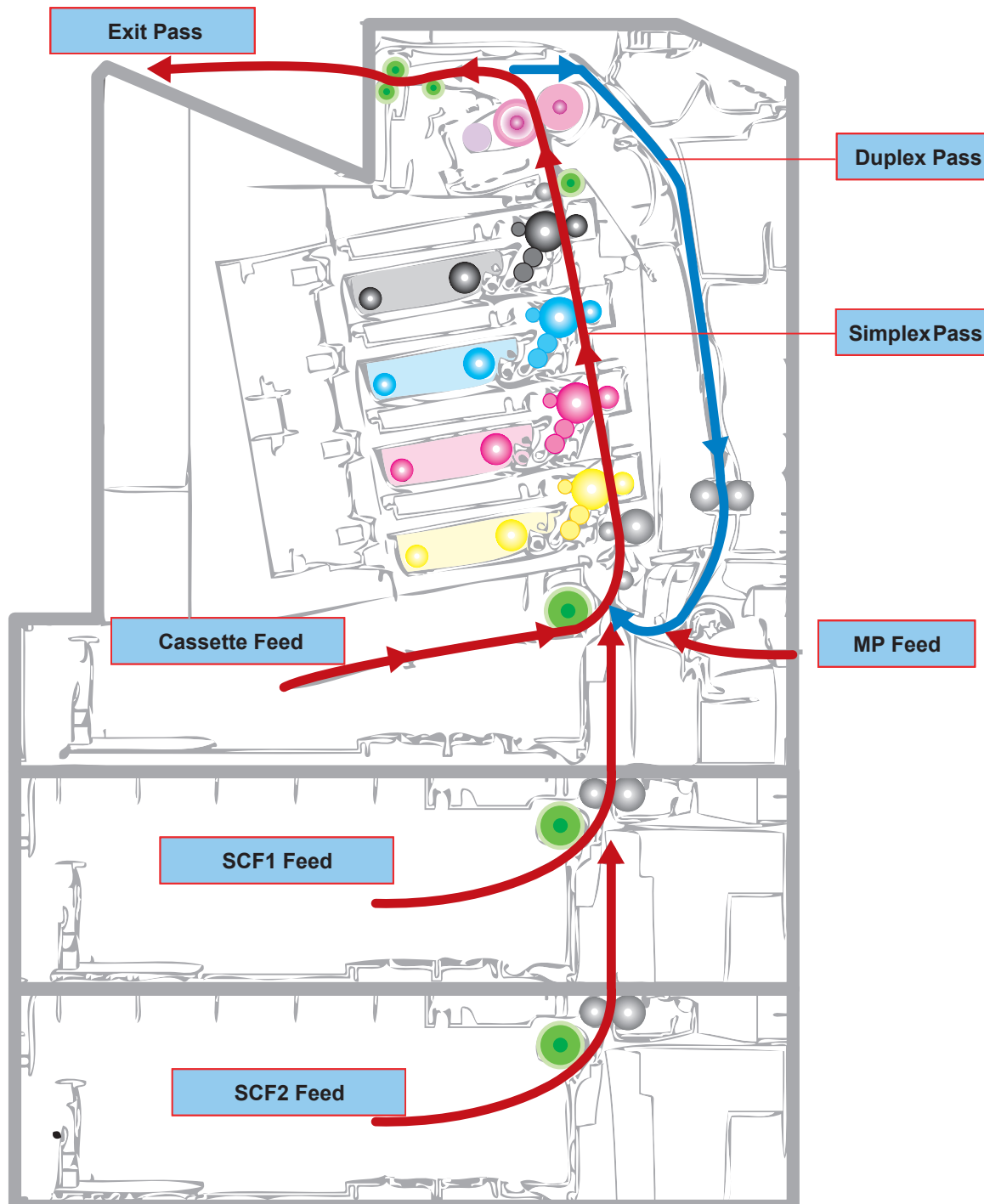
2.4.1 Main PBA

The CLP-770ND system controller consists of a main controller and an engine controller in one-board. The main controller uses a ARMS core chip as main processors, which are dedicated for printing several internal operating blocks through system programs stored in Flash Memory. The engine controller has an engine control SoC, which includes motor drivers, PWM drivers, LSU drivers, sensors, high-voltage drivers, and other driving units for mechanical parts.
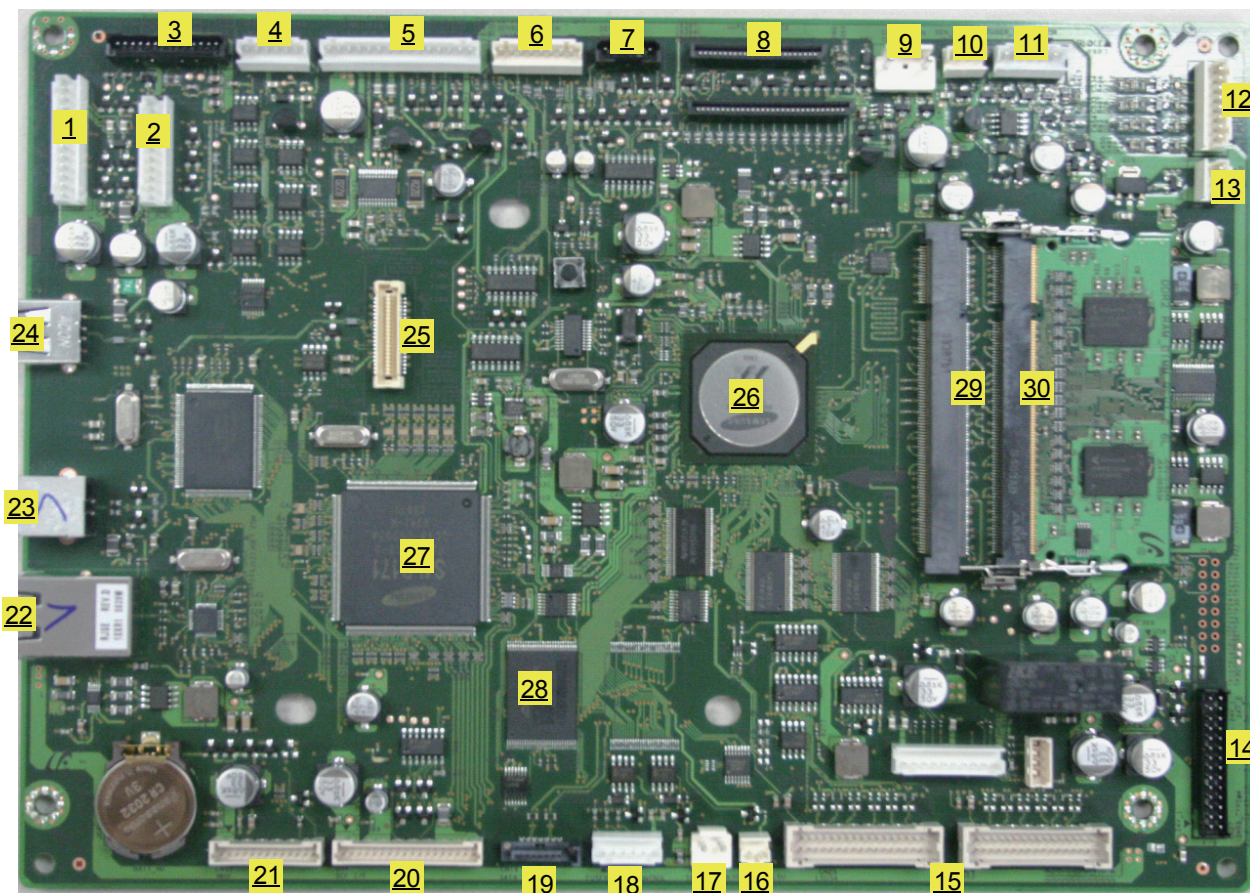

NO.	Connector	NO.	Connector	NO.	Connector
1	BLDC DEVE, 12pin	11	FUSER TEERMISTOR, 6pin	21	SCF_HVPS I/F, 13pin
2	BLDC OPC, 10pin	12	PTL, 8pin	22	ETHERNET JACK,3722-002376
3	PTB, 14pin	13	REAR FAN, 3pin	23	USB DEVICE JACK, 3722-002303
4	STEP FEED + REGI CLUTCH, 6pin	14	SMPS TYPE5, 28pin	24	USB HOST JACK, 3722-001051
5	BLDC FUSER, 15pin	15	DUAL BEAM LSU,	25	USB WLAN
6	SENSER TEMP, 8pin	16	LSU TEMP, 2pin	26	SPGPV4
7	DEVE CRUM, 7pin	17	SATA POWER CON., 2pin	27	LPEC3
8	HVPS	18	FUSER HEAT CONTROL, 6pin	28	Flash ROM (32MB)
9	COVER ON/OFF, 2pin	19	SATA I/F	29	DDR2 SOCKET(EXTEND)
10	OUT BIN SENSER, 3pin	20	SCF I/F, 18pin	30	DDR2 SOCKET(BASE)

1) Main PBA (SPGPV4) Block Diagram
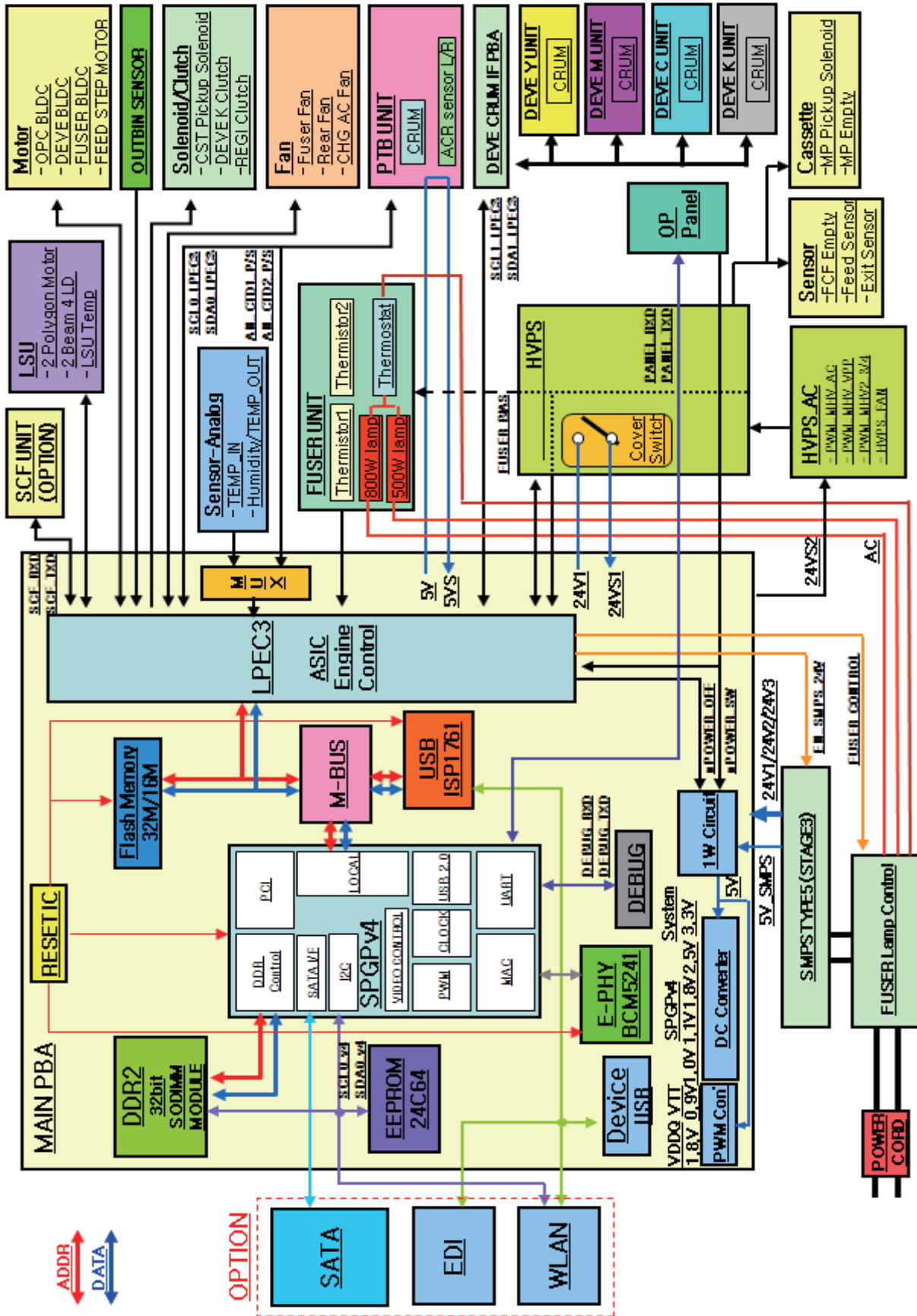
2) Main PBA Specification

- **CPU**
  - ARM v5TE compliant core 800MHz (I-Cache : 32KB, D-Cache : 32KB)

- **Memory Interface**
  - > ROM
    - Nor Flash used (32MB)
    - Interface With SPGPXV4 ROM Controller
  - > SDRAM
    - Size : CLP-770ND(DDR2) : Default 256MB (Option 256MB/512MB)
  - > EEPROM
    - Size : 512kb
    - Interface With SPGPV4 I2C Controller
  - > CRUM
    - Size : 256Byte
    - Interface With LPEC3I2C Controller via Deve Crum IF B'D

- **I/O Interface**
  - > USB
    - DEVICE : High Speed USB 2.0 (High speed 480Mbps)
    - Host : J-SCRIBE Enabler Kit (Full speed 12Mbps)
  - > N/W Embedded
    - SPGPV4 With MII Interface
    - Active LED(Yellow) / Link LED(Green)
  - > PWM
    - High Voltage Control With Duty
    - Main Motor Clock
  - > I2C Interface
    - NVRAM (system information + network information)
    - CRUM

3) Power Flow

Main PBA
- Supply From SMPS +5V
- Power Supply with Regulator (3.3V & 1.8V & 1.1V & 1.0V & 0.9V : Switching Regulator)
- 3.3V : I/O Operating (Digital & Analog)
- 1.8V : DRAM & Video I/F Voltage
- 1.1V : SPGPV4 CPU Voltage
- 1.0V : SPGPV4 Core Voltage

HVPS
- High Voltage Source for EP Condition
- Supply From SMPS +24V
- Controlled By PWM Pulse & I/O

SMPS
- Type 5 (stage 3 type)
- +24V : For use Mechanical Part (Motor & Actuator (Solenoid, Clutch))
- +5V   : Logic, Analog, Sensor,
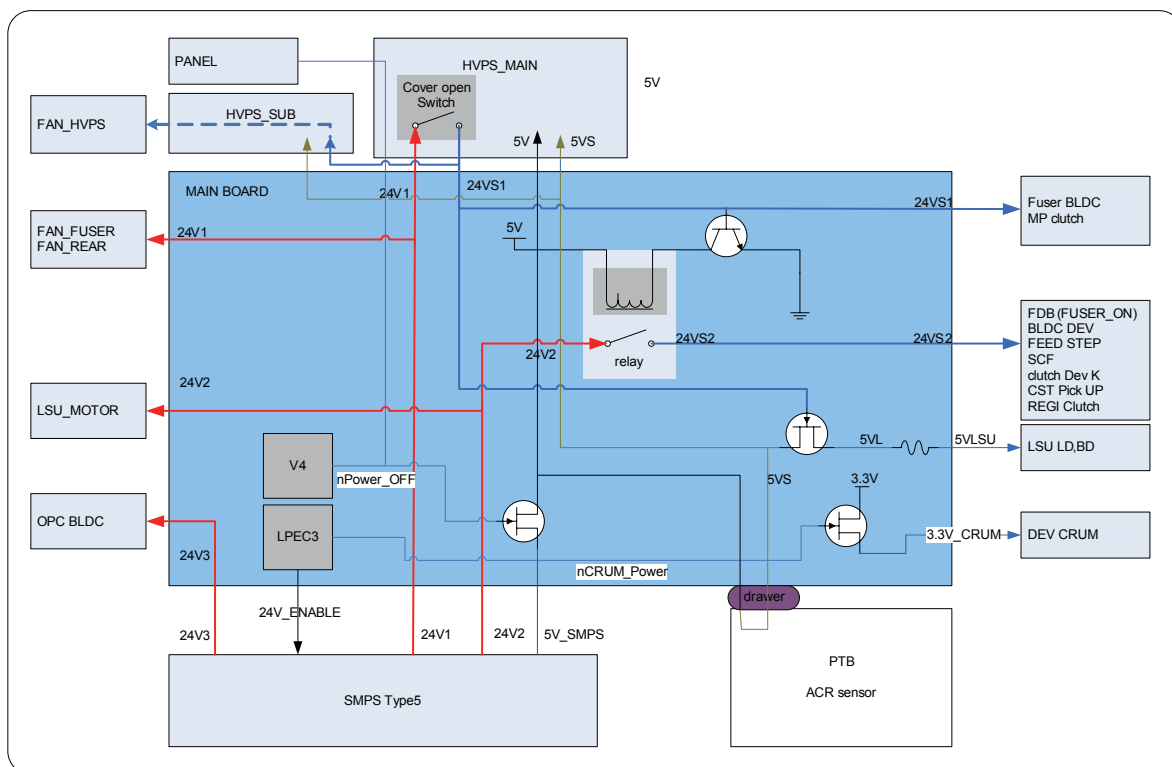
2.4.2 SMPS Board

SMPS(Switching Mode Power Supply) Board supplies electric power to a Main Board and other boards through a Main Controller by +5V,+24V from 110V/220V power input. It has safety protection modes for over current and load.
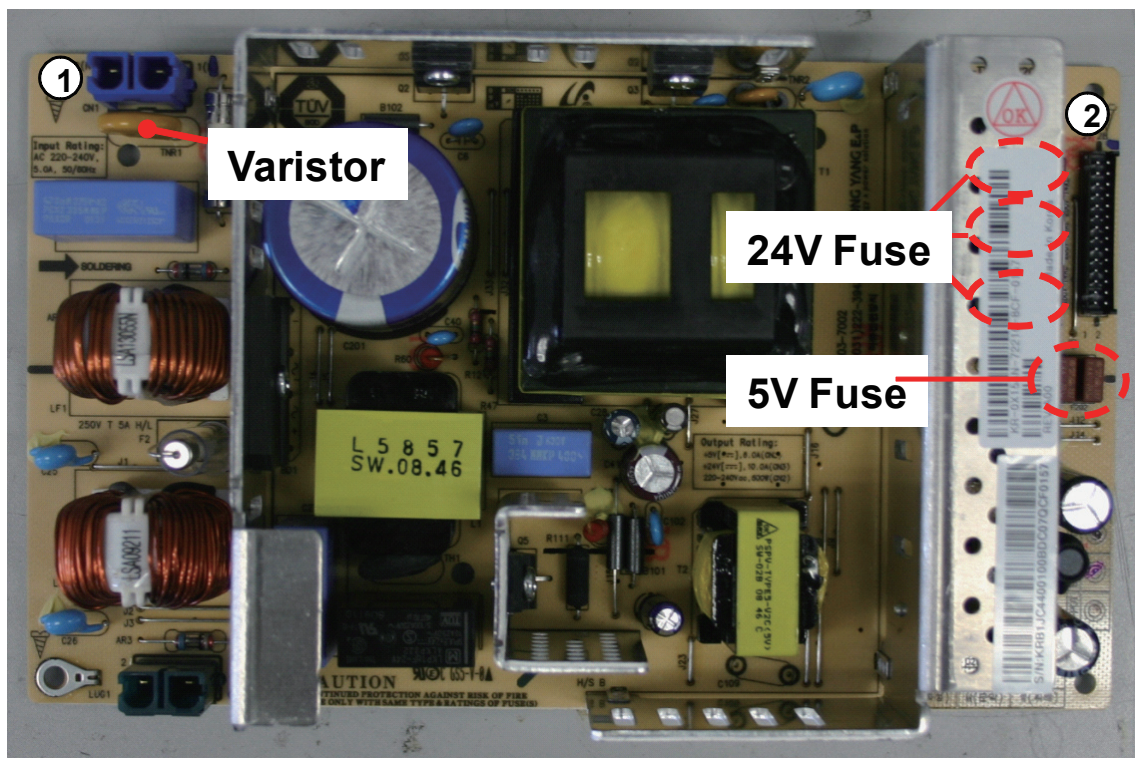
■ **Connection**

1	INPUT_AC (from Fuser Drive Board)
2	OUTPUT_5V , 24V (to Main PBA)
	INPUT_24V_Control (from Main PBA)

SPECIFICATION

General Input/Output Voltage
1) AC 110V (90V ~ 135V)
2) AC 220V (180V ~ 270V)
3) Output Power: 192W / Max. 270W
DC   5V: 24W ~ 30W
DC 24V: 168W ~ 240W

◆ **Input / Output connector**

AC Input Connector(CN1)		
PIN ASSIGN	PIN NO	Description
1	AC_L	AC Input
2	AC_N	

AC Input Connector(CN1)					
Description	PIN NO	PIN ASSIGN		PIN NO	Description
Power	+24V1	1	2	GND	24V Ground
Power	+24V1	3	4	+24V1	Power
24V Ground	GND	5	6	GND	24V Ground
Power	+24V2	7	8	GND	24V Ground
Power	+24V2	9	10	+24V2	Power
24V Ground	GND	11	12	GND	24V Ground
Power	+24V3	13	14	GND	24V Ground
Power	+24V3	15	16	GND	24V Ground
5V Ground	GND	17	18	GND	5V Ground
Power	+5V1	19	20	GND	5V Ground
Power	+5V1	21	22	+5V1	Power
5V Ground	GND	23	24	GND	5V Ground
Power	+5V2	25	26	+5V2	Power
Signal	Standby	27	28	reserved	Signal (reserved)

2.4.3 HVPS Board

HVPS (High Voltage Power Supply) Unit generates 16 high-voltage channels which includes T1(4), Charger(1), Deve AC(4), Supply DC(4), Fuser Bias(1), ATTR(2)

HVPS has Cover Open switch and some connectors (from Ope PBA, feed,,exit, regi, cst_empty, paper_size, cst_detect, MP_empty sensor, MP clutch) and Erase Lamp 4EA.
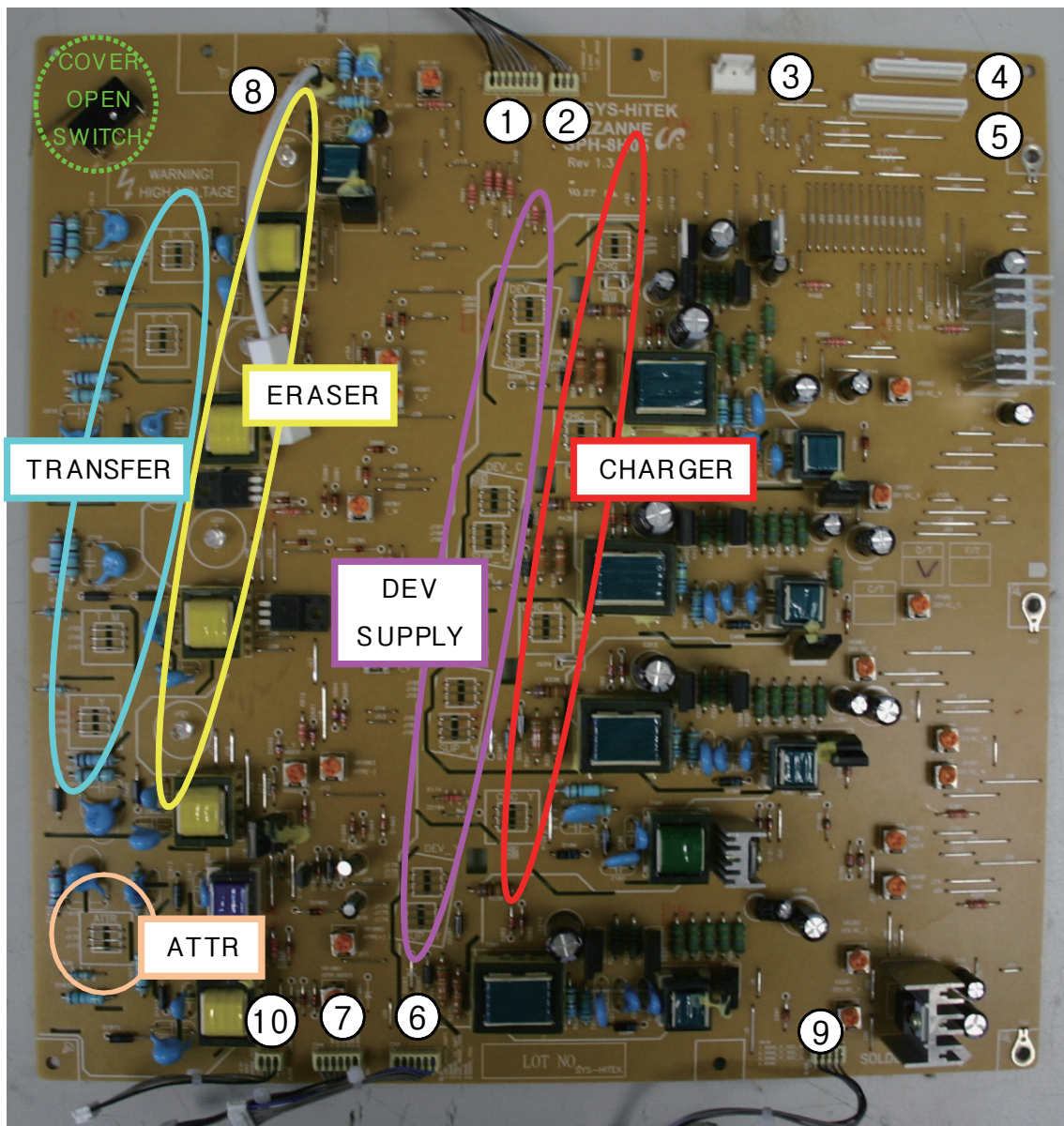
■ Connection

1	PANEL	6	Feed, CST empty sensor
2	EXIT SENSOR	7	MP solenoid, MP empty, CST detect
3	24V SWITCH	8	Fuser bias
4	HVPS1(from mainboard)	9	Paper size
5	HVPS2(from mainboard)	10	Regi sensor

■ **Specification**

Output	Input Duty (EDC mode display)	Output Voltage/ Current	Load	Read voltage (ADC)	Tolerance
CHARGER Y,M,C,K	0~255	-1170V	200M	0.7V(54)	3%
SUP DC Y,M,C,K		-295V	68pF	-	3%
DEVE AC Y,M,C,K		174.0V (about 1740V) [AC JIG]	68pF	-	1.50%
Transfer_Y,M,C,K		14uA	90M	1.84V (142)	3%
ATTR		1418V	100M	0.85V (66)	3%
ATTR[-]		-800V	25M	-	15%
Fuser Bias		418V	100M	-	3%
Eraser Y,M,C,K		on/off (18mA ±3mA)	-	-	

- Constant current outputs in T1 channels.
- Individual T1 channels for each color.
- AC + DC deve high voltage.
- 1Chanel charger output to each 4 color's port.
- All output channels can be adjusted by using volume control components.

2.4.4 HVPS_Sub Board
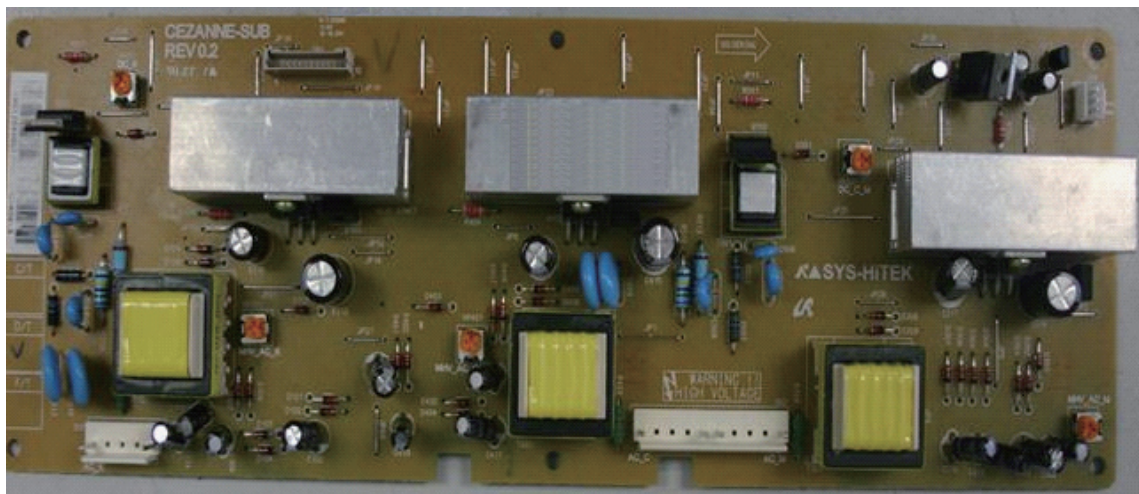
■ Connection

1	AC Control
2	Charger-K
3	Charger-M,C
4	Fan

■ Specification

1) MHV AC_M,C,K

Item	Specification		Condition
Rated output voltage	Temp. Humid.	DC 134.6V±3%	Rated input , 250pF load
	Environment	DC 134.6V±3%	Read AC value by using a AC_DC converting Jig.
Output voltage SETTING	134.6V		Rated input, 250pF load

2) MHV DC_M,C,K

Item	Specification	Condition
Rated output voltage	-1300V±3%	Rated input , 30㏁ Input
Output RIPPLE & NOISE	Less than 50Vp-p	Rated input , 30㏁ Input
Output voltage SETTING	-1300V	Rated input , 30㏁ Input

2.4.5 Fuser Drive Board

The FDB (Fuser Drive Board) controls 2 halogen lamps in the fuser unit using control signals which are provided from the ENGINE PBA and supplies AC power to the SMPS. Both V1/V2 FDBs provide max. 1500W output power.
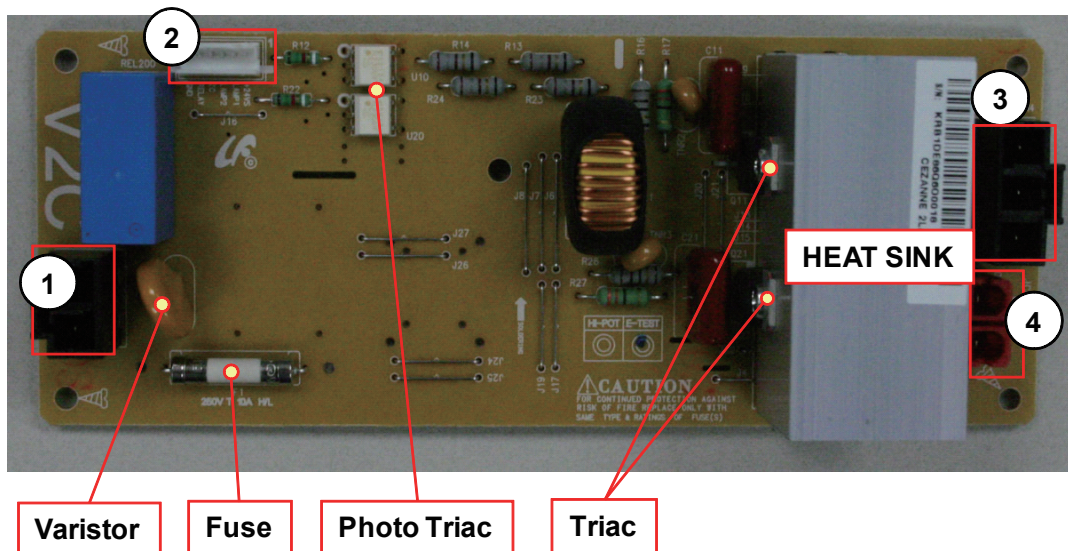
■ Connection

1	INLET AC
2	FUSER CONTROL (from Main board)
3	FUSER AC (to Fuser lamp)
4	SMPS AC (to SMPS)

■ Specification

	V1	V2
Input Voltage (Range)	AC 110V (90 ~ 135V)	AC 220V (180 ~ 270V)
Input Current	20A	10A
Output Power	Max. 1500W	Max. 1500W
Phase Detect	Not support	
Protection	Relay Control Signal	

2.4.6 OPE Board

The OP PBA controls the 4 Line Graphic LCD(128 x 64 Dots) unit, and communicates with Main PBA through UART. The OP PBA includes an 8-Bit CMOS Micom(S3F828B) and a Power Key. With the OPE Power Key, user can turn on & off the set(CLP-770ND).
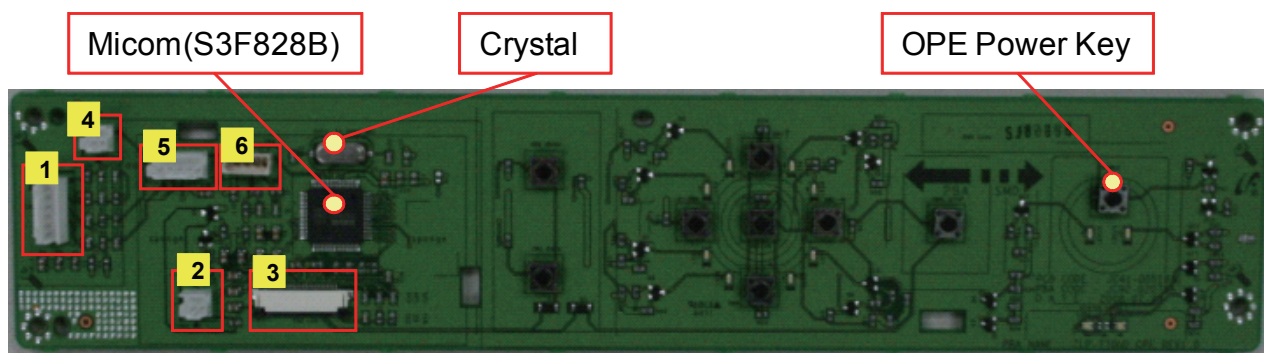
■ **Connection**

1	Main IF
2	LCD Back Light IF
3	LCD IF
4	For Download
5	For Download
6	For Debug

2.4.7 Feeding Section

1) Cassette (1st tray)

It stores and automatically feeds print paper.
Pick-up Roller picks up paper, controls drive, feeds paper, removes static electricity, and so on.

- Feeding Method : Cassette Type
- Feeding Standard : Center Loading
- Feeding Capacity : Cassette 500 Sheets (80g/㎡, 20lb Paper Standard) - Paper Detecting Sensor : Photo
                Sensor (Empty, Registration, Exit)
- Paper Size Sensor
- Media size : Letter, Legal, Oficio, Folio, A4, ISO B5, JIS B5, Executive, A5

2) SCF (Second Cassette Feeder, 2nd / 3rd tray)

This is the option unit of CLP-770ND. This additionally stores and automatically feeds printing paper. Its function is the same as the Cassette (1st tray). This SCF can be installed until Max. 2 ea.

- Feeding Method : Cassette Type
- Feeding Capacity : Cassette 500 Sheets (80g/㎡, 20lb Paper Standard) - Media size : Letter, Legal, Oficio,
                Folio, A4, ISO B5, JIS B5, Executive, A5

3) MP tray (Multi-Purpose tray)

MP tray allows you to print a varity of media type.

- Feeding Capacity : 100 sheets
- Media size : Letter, Legal, Oficio, Folio, A4, ISO B5, JIS B5, Statement, Executive, A5, A6,
                Envelope Monarch, Envelope COM-10, No-10, Envelope DL, Envelope C5,
                Envelope C6, Envelope No 9, Envelope 6 3/4

2.4.8 LSU (Laser scanning unit)

LSU consists of LD(Laser Diode) and polygon motor control. For realizing Color Image, it is controled by 4 LD. When the controller generate the printing signal, LD will turn on and Polygon motor starts.If the receiving part in LSU detect the beam , Hsync is generated. When the rotation of polygon motor is steady, it is time of LSU ready status for printing. If either of two condition is not satisfied, LSU error is expected.
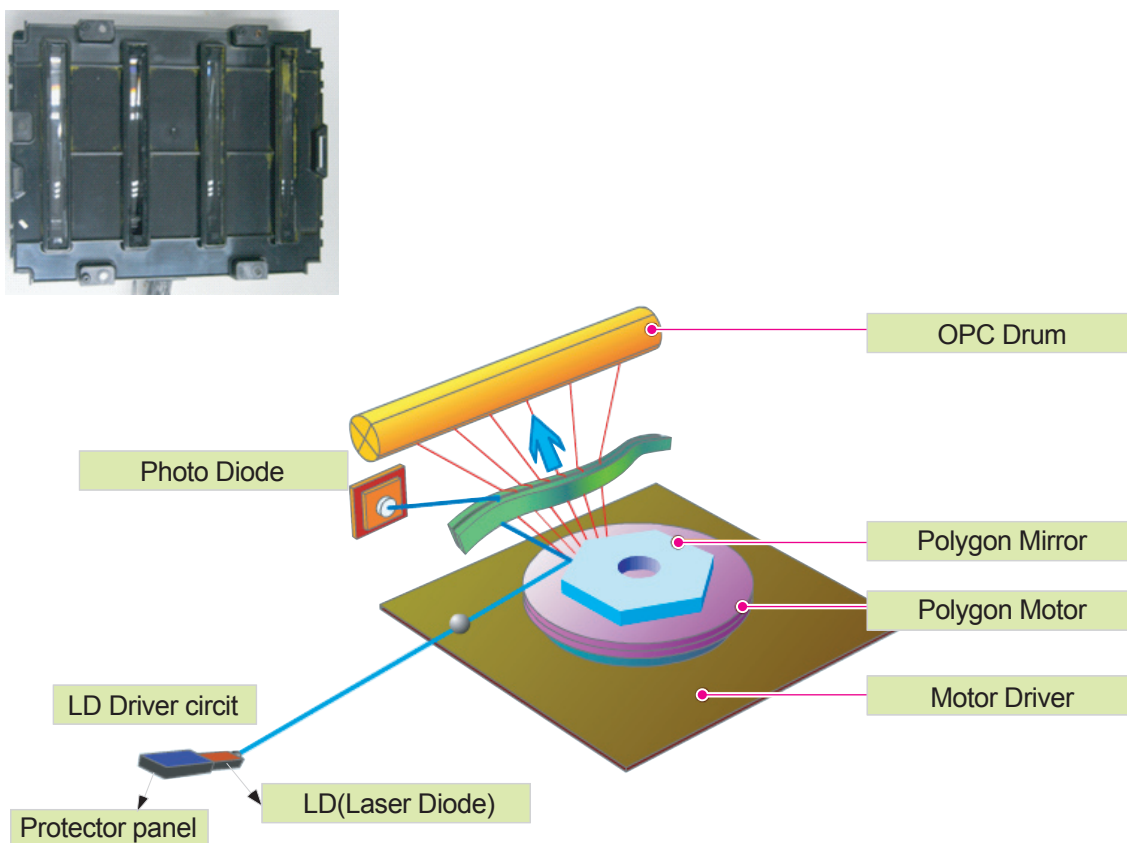
Trouble	Failure Analysis
Polygon Motor Error	The Rotation of Polygon Motor can not reach stable
Hsync Error	Though the rotation of Polygon Motor reach stable, the signal of Hsync is not occurred

2.4.9 Fuser Unit

This unit consists of Heat Roller, a Thermostat, and Thermistors, etc. It melts and fuses the toner, transferred by the transfer roller onto the paper, by applying pressure and high temperature to complete printing job.

- Fusing Type : [Dual Lamp Heating, 800W/500W]
- Heat Roller : Pipe Type (Lamp Inside)
- Pressure Roller
- Thermistor – Temperature Detecting Sensor
                contact thermistor 2EA
- Thermostat – Overheat Protection Device

1. Thermostat

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

2. Fuser Belt

The fuser belt transfers the heat from the lamp to apply a heat on the paper.
The surface of the fuser belt is coated with Teflon, so toner does not stick to the surface.

3. Pressure roller

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

2.4.10 PTB(Paper Transfer Belt) Unit

This unit consists of a transfer belt, transfer roller, duplex unit. waste toner tank, etc. The transfer belt carries the printing medium (paper) through OPC drums of each colors. As the paper and transfer belt pass between the transfer roller and the OPC drum, the negatively charged toner images formed on OPC drum are transferred to the printing medium (paper) by positive bias applied to the transfer roller. The toner images transferred to the medium is melted down ad fixed on the medium by fusing system.
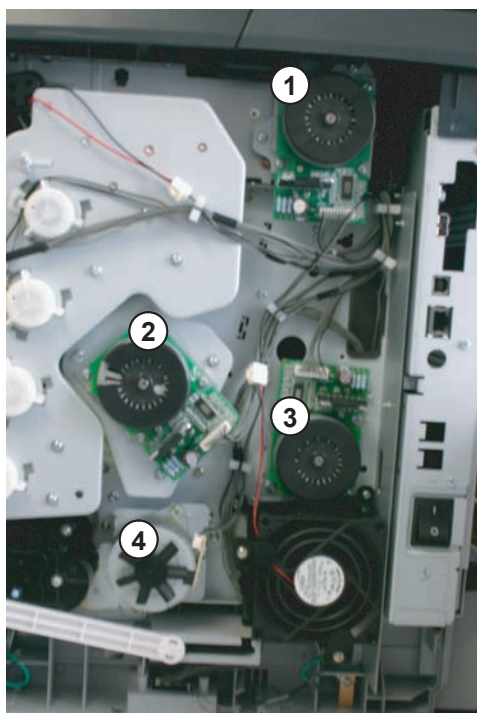
- Life Span : 50,000 images (Declared yield value in accordance with ISO/IEC 24712)

2.4.11 Motors
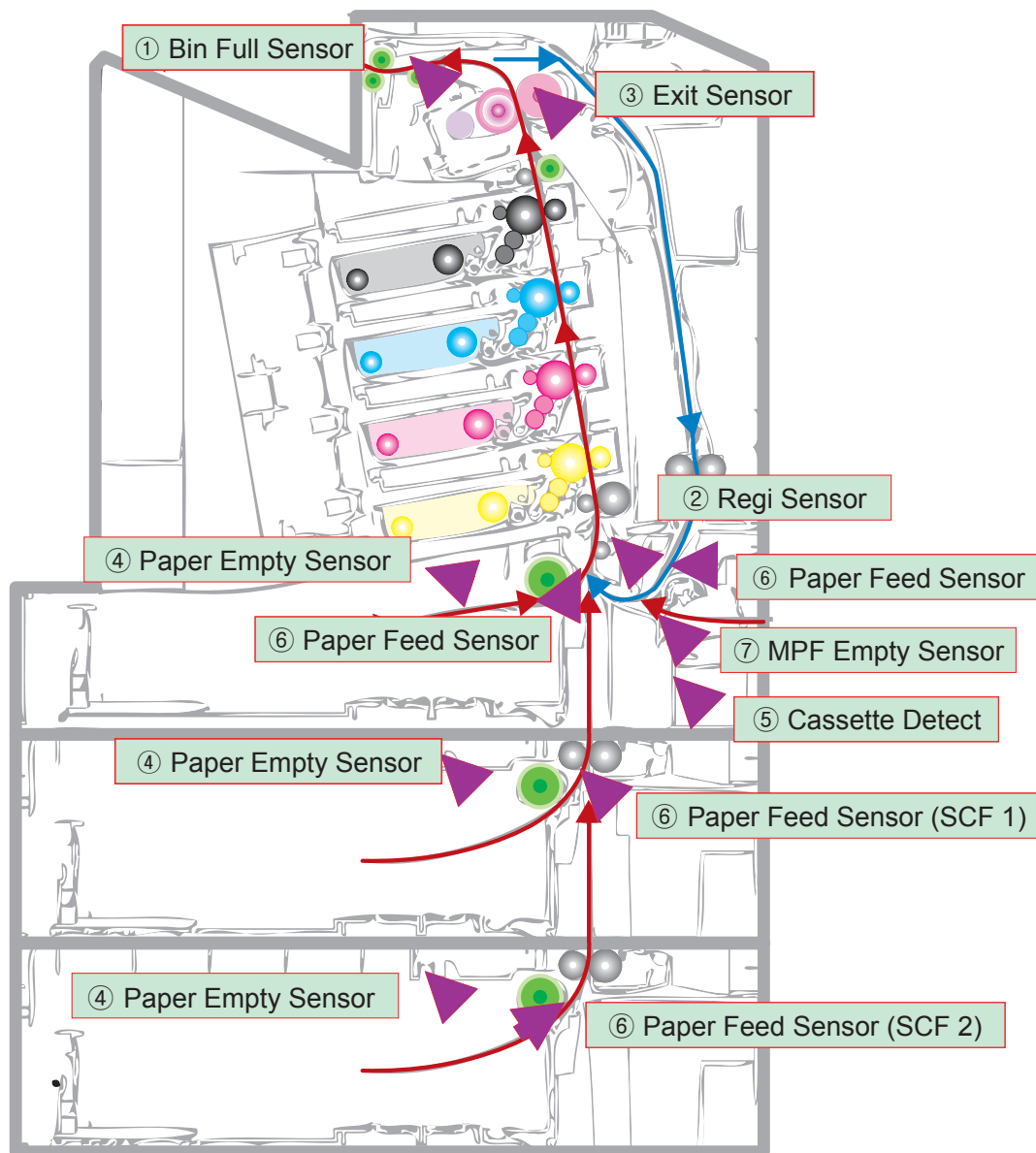
This product have many motors.
These motors drive the PTB unit, fuser unit, feeder unit, exit unit, etc.

1	BLDC Motor	For fuser unit
2	BLDC Motor	For OPC Drive unit
3	BLDC Motor	For DEVE Drive unit
4	Step Motor	For feed drive unit

2.4.12 Sensors

The picture below shows the location of sensors in the machine.

① Bin Full Sensor

③ Exit Sensor

② Regi Sensor

④ Paper Empty Sensor

⑥ Paper Feed Sensor

⑥ Paper Feed Sensor

⑦ MPF Empty Sensor

⑤ Cassette Detect

④ Paper Empty Sensor

⑥ Paper Feed Sensor (SCF 1)

④ Paper Empty Sensor

⑥ Paper Feed Sensor (SCF 2)

■ DESCRIPTION

① Bin Full Sensor :Check overflowing of Paper on Stacker
② Regi Sensor :Two Regi Sensor for checking precise paper position
③ Exit Sensor :Check paper position on Fuser
④ Paper Empty Sensor :Check Paper empty on a cassette
⑤ Cassette Detect :Check cassette insertion
⑥ Paper Feed Sensor : Check paper position
⑦ MPF Empty Sensor :Check paper empty on MPF

Sensor (Expansion)

1	CASSETTE_DETECT
2	PAPER_EMPTY
3	SENS_FEED
4	SENS_REGI
5	SENS_PAPER_EXIT
6	OUTBIN_FULL
7	MP_EMPTY
8	CLUTCH_FEED
9	SOL__PICKUP

10	SENS_ACR
11	THERMOSTAT
12	CRUM_DEVE_Y(M/C/K)
13	CRUM_PTB
14	PAPER_SIZE1(2/3)
15	INNER_TEMP
16	SENS_HUMIDITY OUT_TEMP

3. Disassembly and Reassembly

3.1 Precautions when replacing parts

3.1.1 Precautions when assembling and disassembling

* Use only approved Samsung spare parts. Ensure that part number, product name, any voltage, current or temperature rating are correct. Failure to do so could result in damage to the machine, circuit overload, fire or electric shock.
* 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.
* Take care when dismantling the unit to note where each screw goes. There are 19 different screws. Use of the wrong screw could lead to system failure, short circuit or electric shock.
* Do not disassemble the LSU unit. Once it is disassembled dust is admitted to the mirror chamber and will seriously degrade print quality. There are no serviceable parts inside.
* Regularly check the condition of the power cord, plug and socket. Bad contacts could lead to overheating and firfe. Damaged cables could lead to electric shock or unit malfunction.

3.1.2 Preautions when handling PBA

Static electricity can damage a PBA, always used approved anti-static precautions when handling or storing a PBA.

>> Precautions when moving and storing PBA
1. Please keep PBA in a conductive case, anti-static bag, or wrapped in aluminum foil.
2. Do not store a PBA where it is exposed to direct sunlight.

>> Precautions when replacing PBA
1. Disconnect power connectors first, before disconnecting other cables
2. Do not touch any soldered connections, connector terminals or other electronic parts when handling insulated parts.

>> Precautions when checking PBA
1. Before touching a PBA, please touch other grounded areas of the chassis to discharge any static electrical charge on the body.
2. Take care not to touch the PBA with your bare hands or metal objects as you could create a short circuit or get an electric shock. Take extra care when handling PBAs with moving parts fitted such as sensors, motors or lamps as they may get hot.
3. Take care when fitting, or removing, screws. Look out for hidden screws. Always ensure that the correct screw is used and always ensure that when toothed washers are removed they are refitted in their original positions.

3.1.3 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.
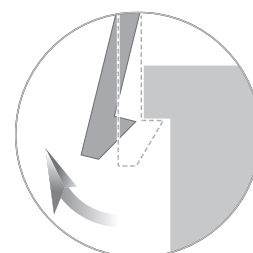
3.2 Replacing a Maintenance Parts

To avoid print quality and paper feed problems resulting from worn parts and to maintain your machine in top working condition, the following parts will need to be replaced after printing the specified number of pages or when the life span of each item has expired.

3.2.1 Fuser Unit

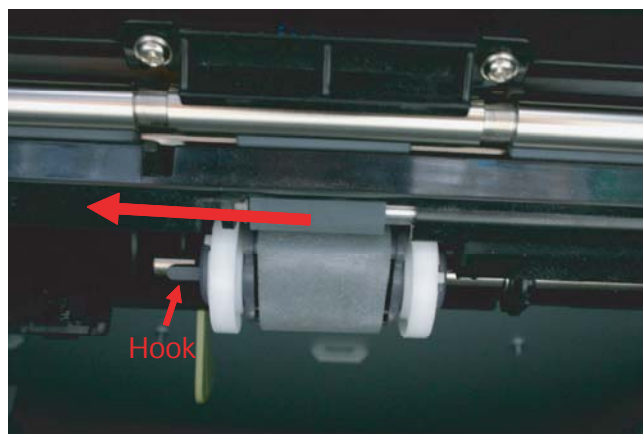Open the Top cover. Lift the Fuser up unit after push the lever.
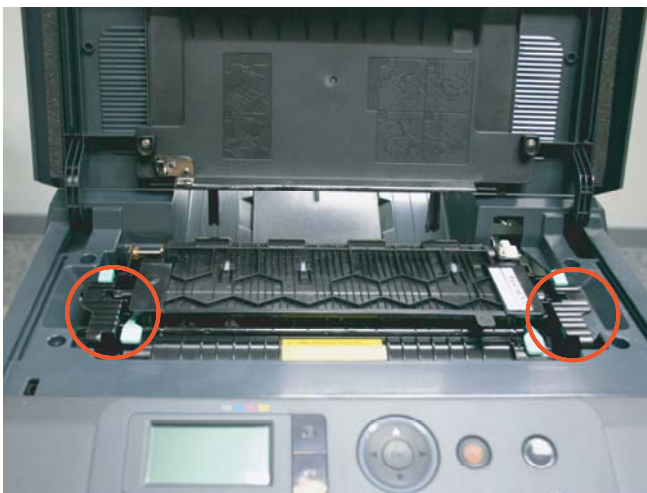
Caution

The fuser is very hot. So turn the printer off and wait until the printer to cool before replacing it.

3.2.2 Pick up roller

1. Remove the Cassette Unit.

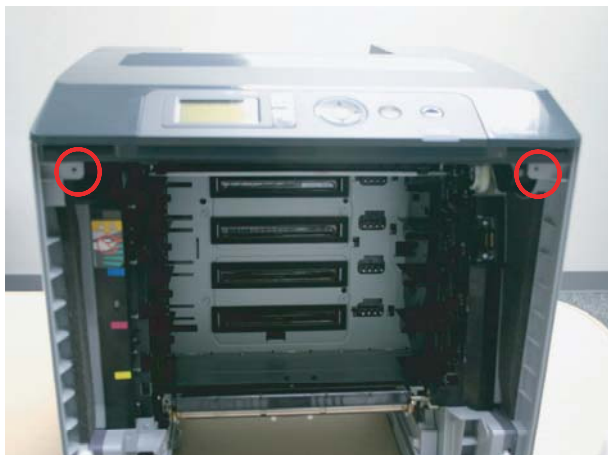2. Pull the pick up roller to the direction of arrow.

Hook

3.3 General Disassembly

3.3.1 Cover Unit

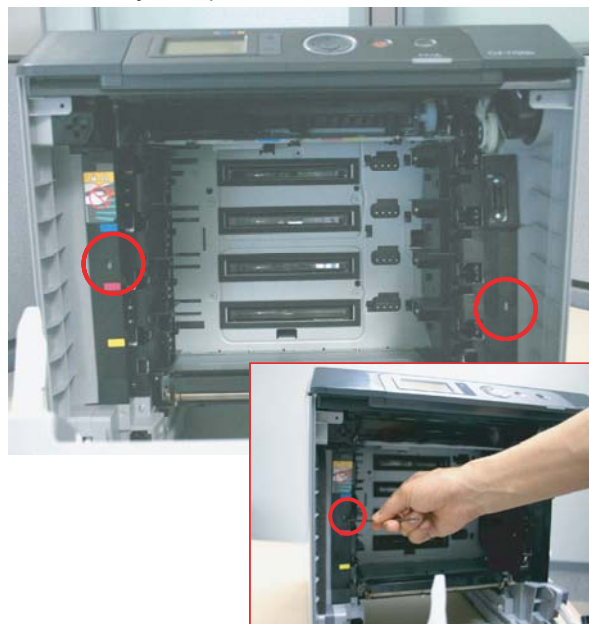-Before disassembling the cover unit, remove all toner cartridges.

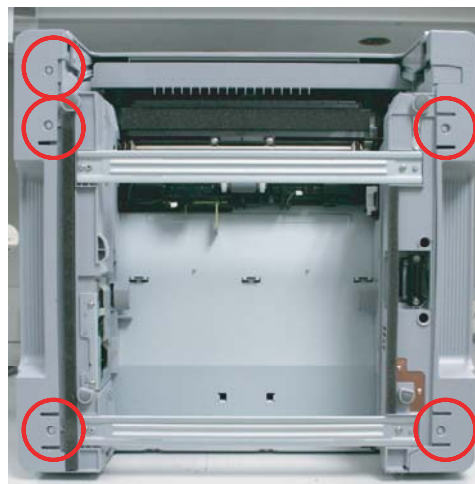1. Remove 2 screws and MEA COVER-NOISE.

MEA COVER-NOISE

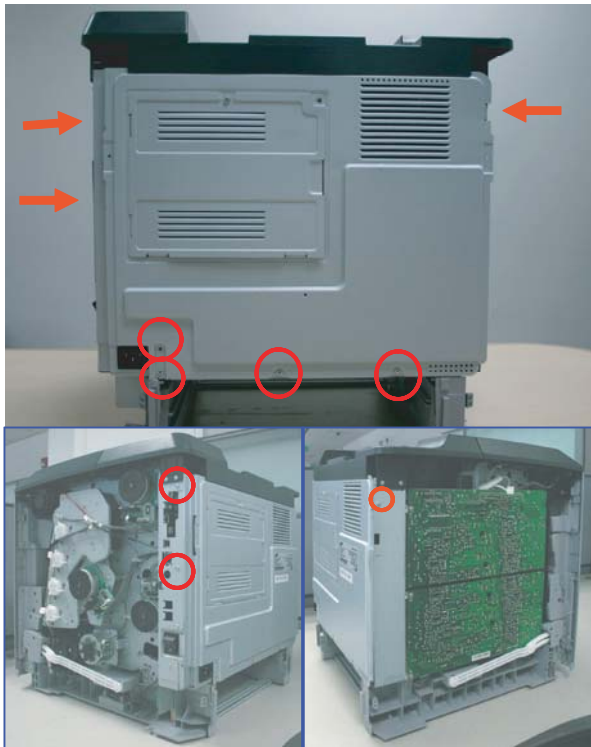2. Open the front cover. And remove 2 screws.

3. Remove the left/right cover by pushing the hooks with any sharp tool.

4. Unlatch the 5 hooks from the bottom before remove the side cover. And remove the right/left cover.

5. Release the rear cover after remove 7 screws.

6. Remove 4 screws from both side.

7. Remove 6 screws.
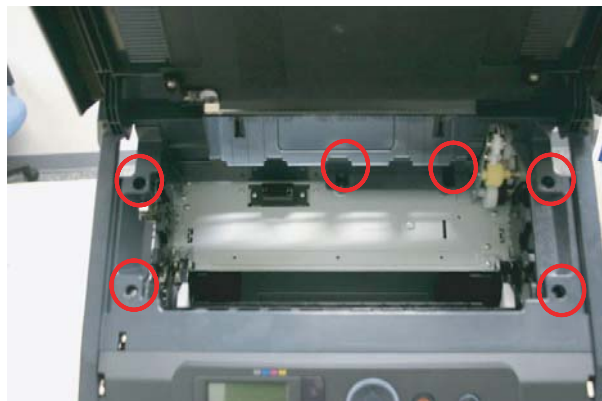
8. Lift the top cover up. Unplug 2 connectors.
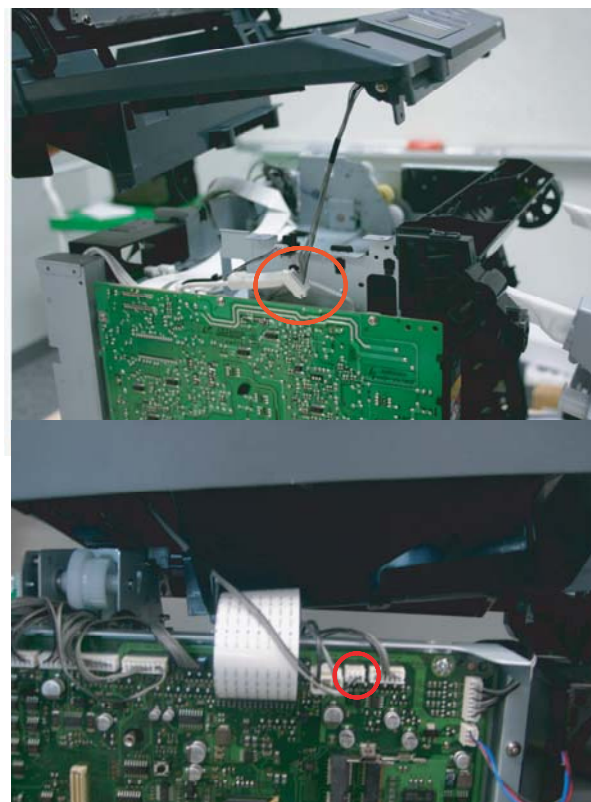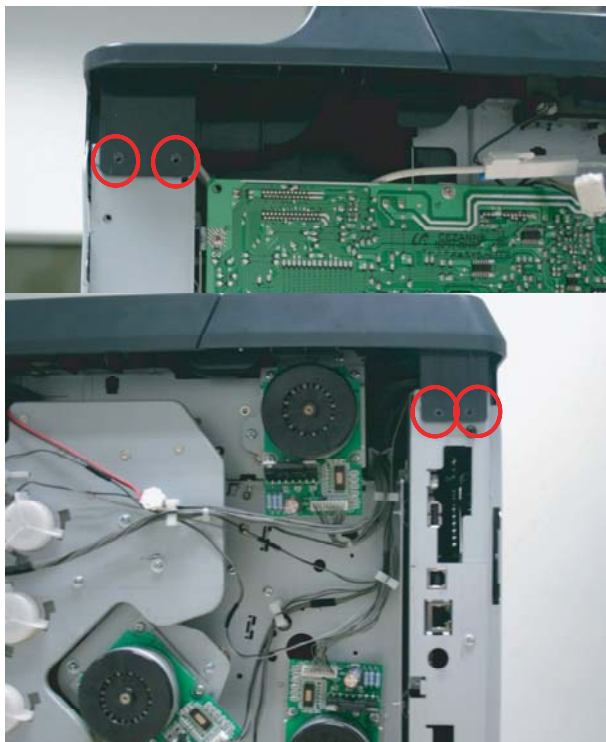
9. Remove the left/right link.
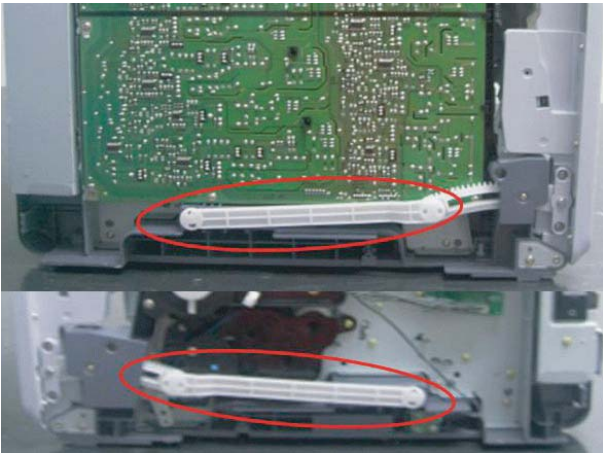
10. Remove 4 screws from both side.
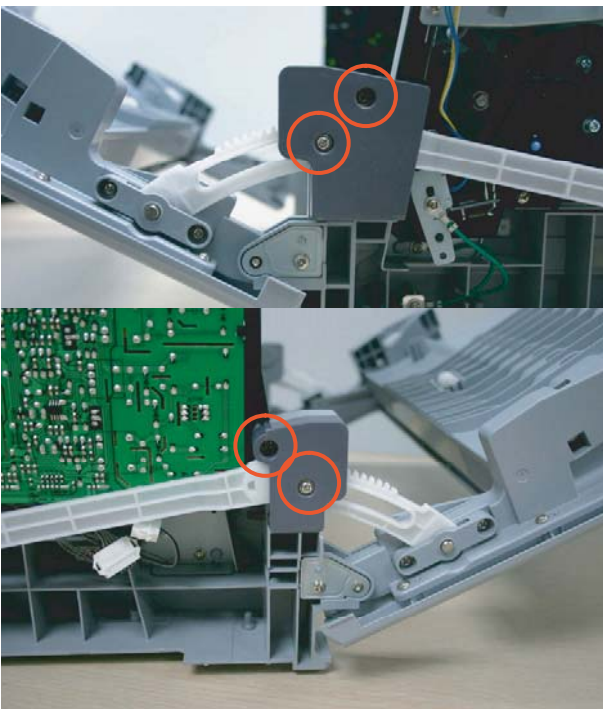
11. Remove the Bracket hinge with any tool after remove one screw.
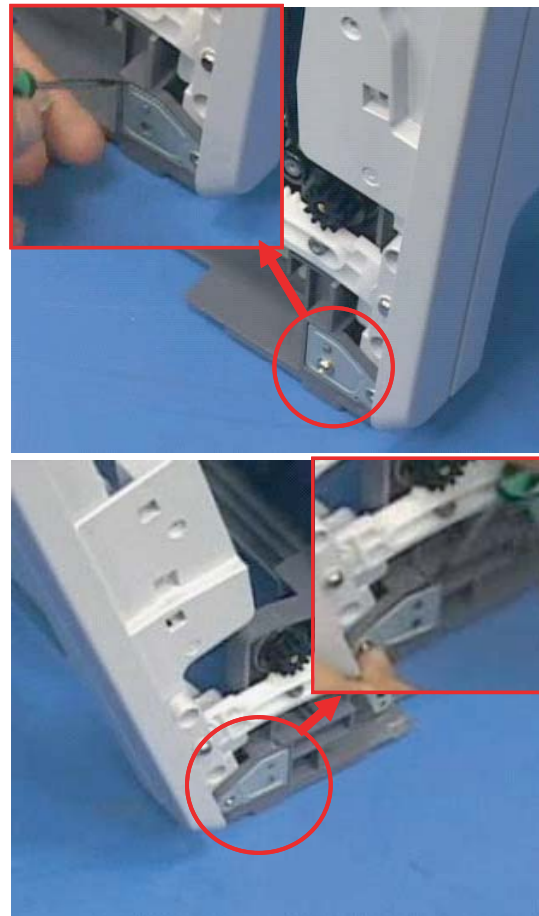
12. Remove the Damper hinge. (2 EA)
    And release the front cover.

3.3.2 Front Cover Unit

The following method describes how to disassemble the front cover without removeing both side cover.

1. Open the Front Cover. Remove 2 screws. And remove the shaft.
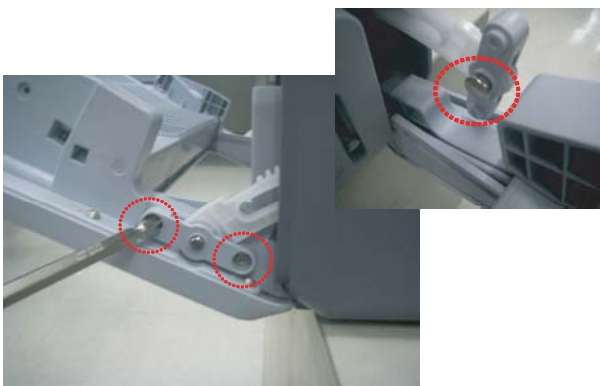
Caution : When reassembling, be careful the shaft head direction.

2. For the opposite side, remove 2 screws and the shaft.
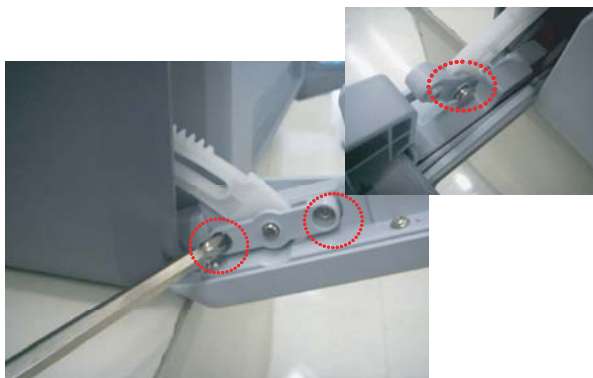
Caution : When reassembling, be careful the shaft head direction.

3. Remove 6 screws from both side.
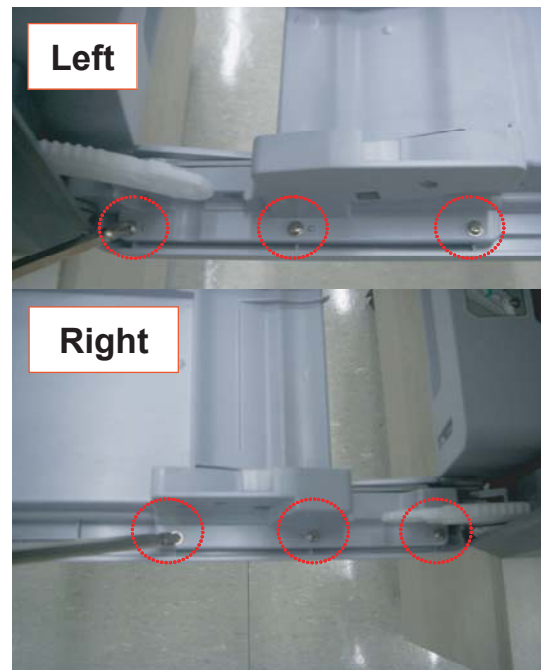
4. Release the Front cover unit.
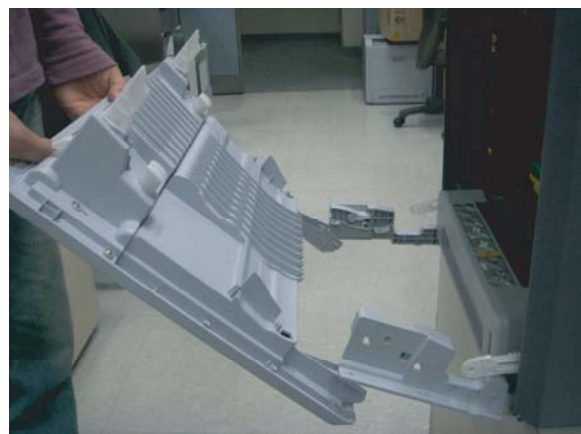
3.3.3 OPE Unit

-Before disassembling the OPE unit, remove the Top cover.

1. Remove 2 screws from both side.
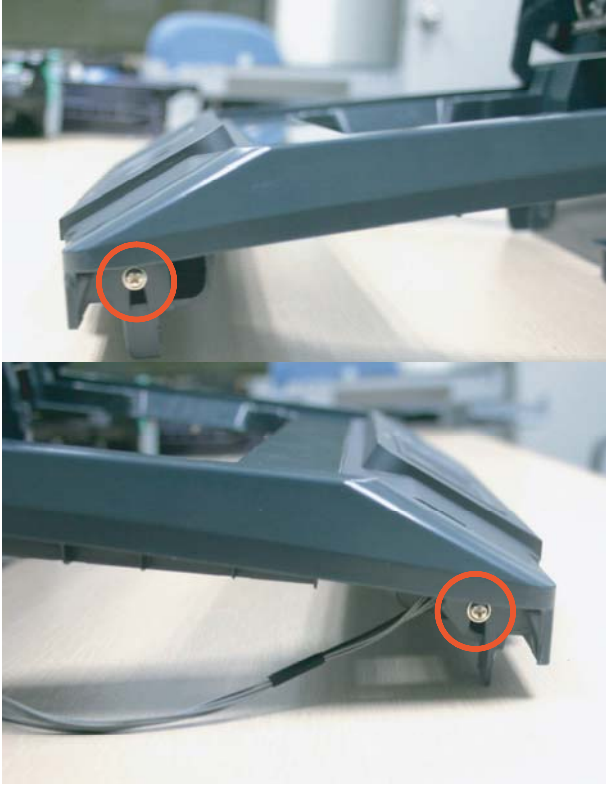
2. Remove 2 screws.
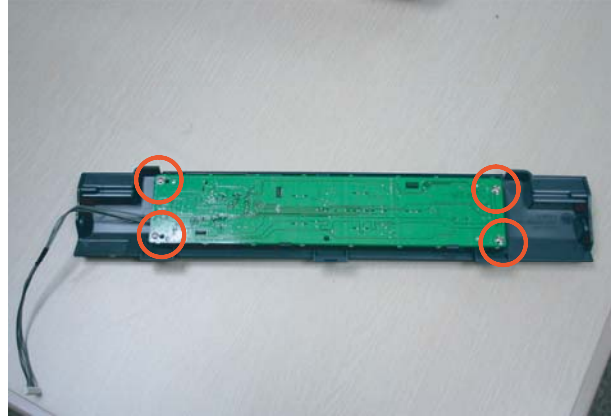
3.3.4 HVPS Board

- Before disassembling the HVPS board, remove the cover unit.

1. Unplug 9 connectors from the tup/bottom of the HVPS board.
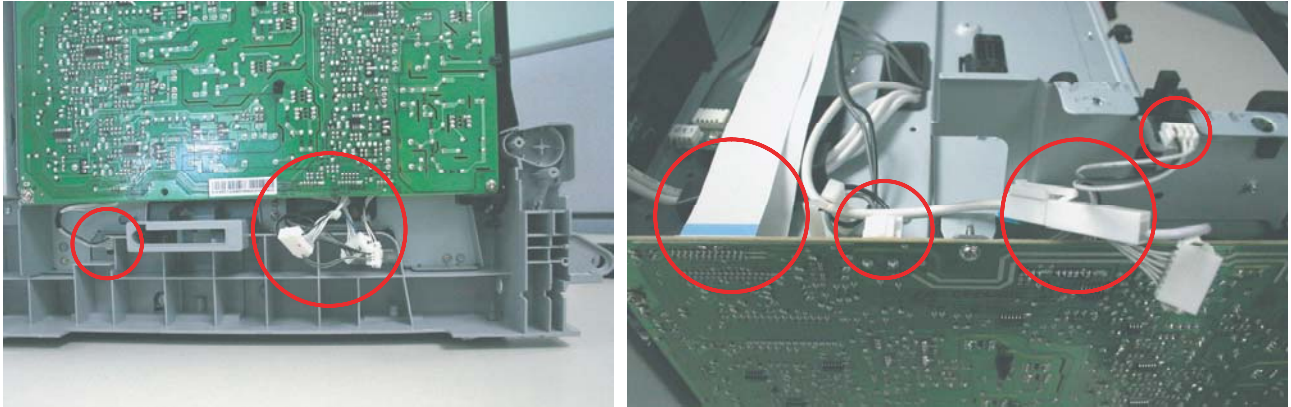
2. Remove 8 screws and unlatch 4 hooks after remove left side cover
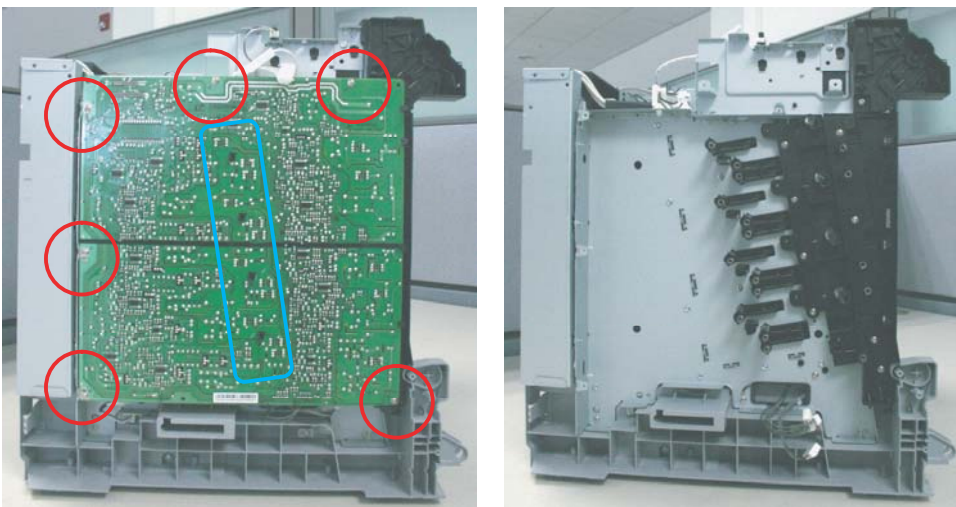
Caution : Be careful when you take out the HVPS so that the 16 high voltage
terminals behind HVPS are not damaged

3.3.5 Main PBA

- Before disassembling the Main PBA, remove the cover unit.

1. Unplug all harness from Main PBA.
2. Remove 4 screws and release the Main PBA.
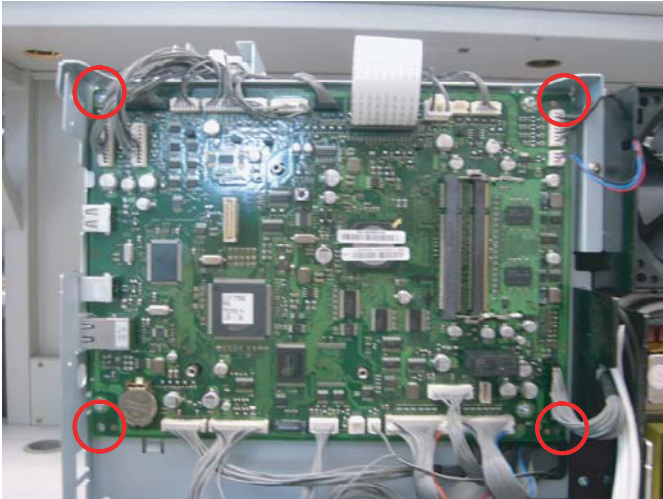
3.3.6 SMPS Board

- Before disassembling the SMPS board, remove the cover unit.

1. Unplug the harness from the SMPS board.
2. Remove 4 screws and release the SMPS board.
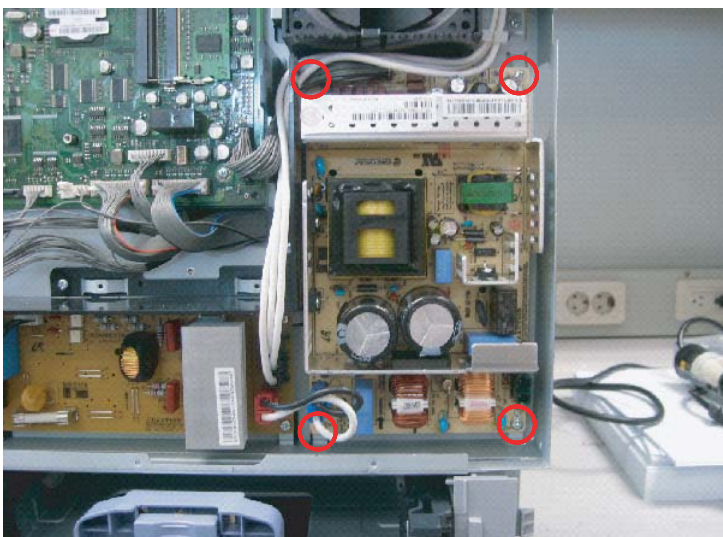
3.3.7 Fuser Control Board

- Before disassembling the Fuser control board, remove the cover unit.

1. Unplug the harness from the Fuser control board.
2. Remove 4 screws and release the Fuser control board.
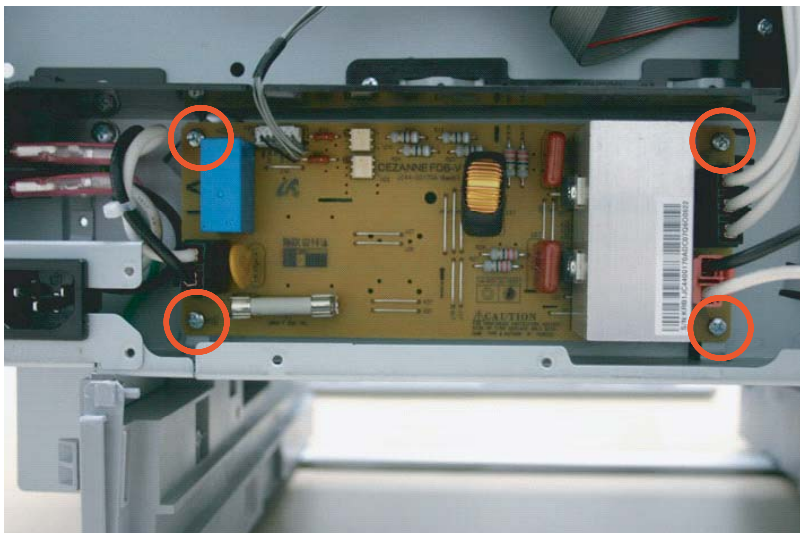
3.3.8 HVPS sub board(AC Board)

- Before disassembling the AC board, remove the Main PBA. (refer to 3.3.5 Main PBA.)

1. Remove the 4 screws.
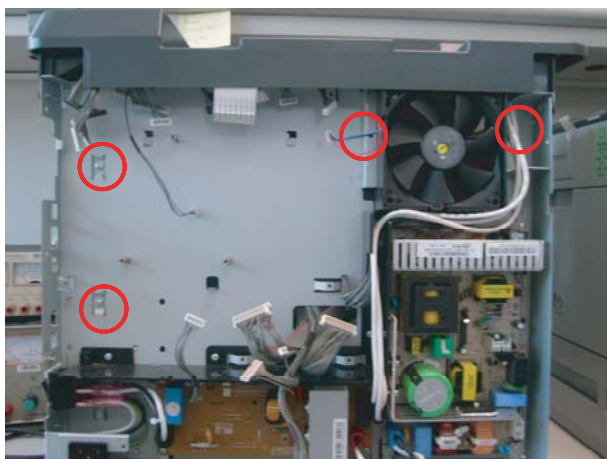
2. Remove the SMPS board after removing the 4 screws.

3. Remove the 3 screws. And then remove the Main bracket.
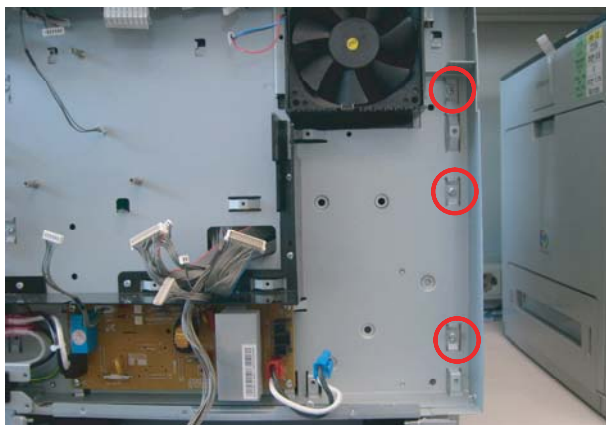
4. Remove 6 screws and release the AC Board and Insulation sheet.
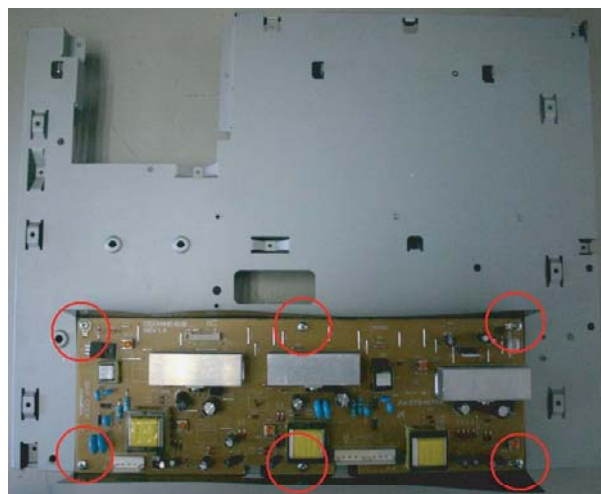
3.3.9 LSU Unit

- Before disassembling the LSU Unit, remove the main bracket (refer to 3.3.8)

1. Remove Rear-fan.

2. Remove the LSU after remove 4 screws.
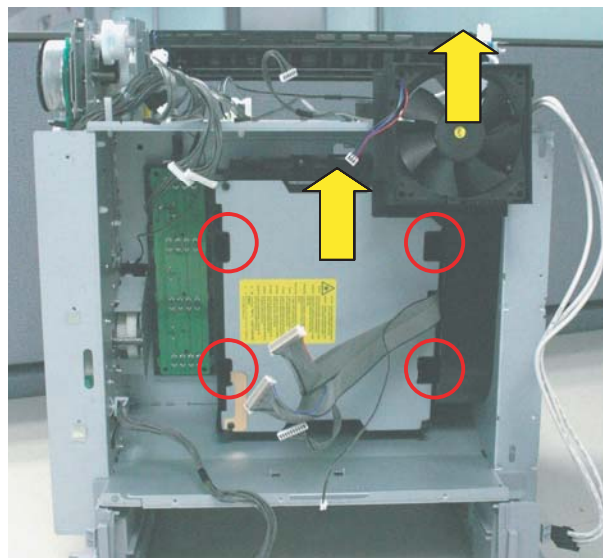
3.3.10 SOLENOID and CLUTCH-FEED

1. Remove 3 screws and release the CAP-PICK UP GEAR.

CAP–PICK UP GEAR

2. Remove the MEA-GEAR PICK UP.

MEA-GEAR PICK UP

3. Release the CLUTCH-FEED and SOLENOID-PICK_UP.

CLUTCH - FEED

SOLENOID-PICK_UP
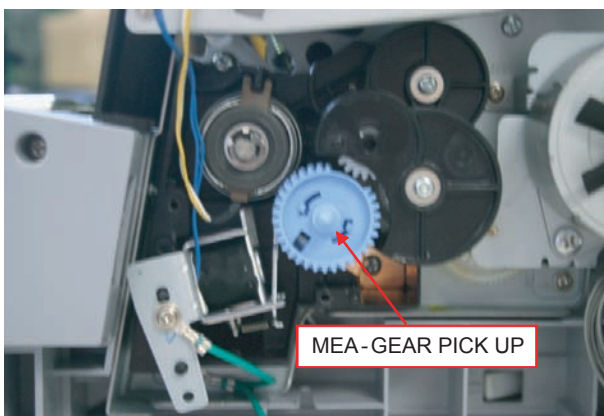
4. Alignment & Troubleshooting

4.1 Alignment and Adjustments

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

4.1.1 Control Panel
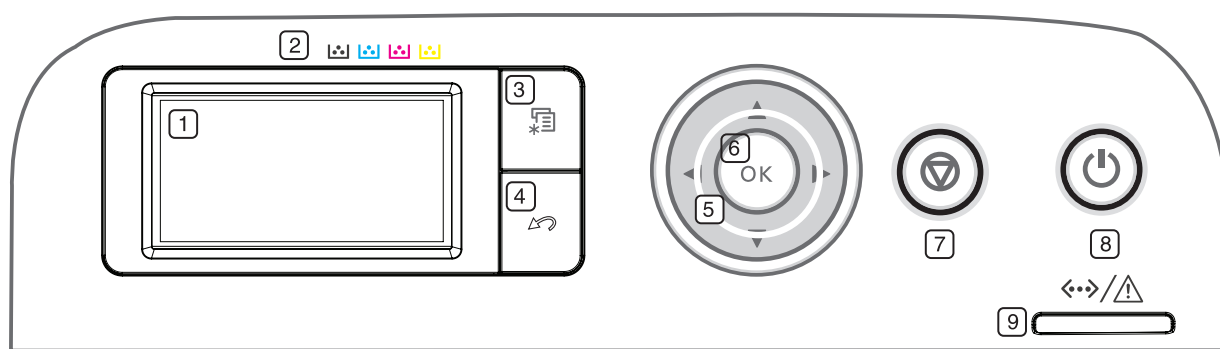
1	Display	Shows the current status and prompts during an operation.
2	Toner colors	Show the status of each toner cartridge.
3	▤ (menu)	Enters menu mode and scrolls through the available menus.
4	↰ (Back)	Sends you back to the upper menu level.
5	Arrow	Scroll through the options available in the selected menu, and increase or decrease values.
6	**OK**	Confirms the selection on the screen.
7	◎ (Stop)	Stops an operation at any time. The pop-up window appears on the screen showing the current job that the user can stop or resume.
8	⏻ (Power)	Sends the machine into power saver mode. You can also turn the power on and off with this button.
9	Status LED	Shows the status of your machine.

4.1.2 Understanding The Status LED

The color of the Status LED indicates the machine's current status.

Status		Description
Off		• The machine is off-line. • The machine is in power saver mode. When data is received, or any button is pressed, it switches to on-line automatically.
Green	On	• The machine is powered on and can be used.
	Blinking	• When the LED blinks slowly, the machine is receiving data from the computer. • When the LED blinks rapidly, the machine is printing data.
Red	On	• The toner cartridge is totally empty. Remove the old toner cartridge and install a new one. • A paper jam has occurred. • The cover is opened. Close the cover. • There is no paper in the tray. Load paper in the tray. • The machine has stopped due to a major error. Check the display message.
	Blinking	• A minor error has occurred and the machine is waiting for the error to be cleared. Check the display message. When the problem is cleared, the machine resumes. • The toner cartridge is near the end of its life. Order a new toner cartridge. You can temporarily improve print quality by redistributing the toner.

4.1.3 Menu Overview

This chapter explains the menu item. If you want to know more information about the menu item, refer to the User Guide.

■ ACCESSING OPERATOR PANEL MENU

1. Press Menu on the control panel.
2. Press Scroll (▲ to ▼) to highlight the desired setting and press OK.
3. If the setting item has sub menus, repeat step 2.
4. Press Scroll (▲ to ▼) to access the required value.
5. Press OK to save the selection.
6. If you want to move to the upper level menus, press Back .
7. Press Stop to return to ready mode.

■ Menu Description

- Information : This menu contains information pages that you can print to give details about the printer and its configuration
- Layout : This menu allows you to adjust the paper layout setting.
- Paper : This menu allows you to select the default paper size, default paper type, the tray for printing, etc.
- Graphic : This menu can select the default resolution. If the resolution is high, the clarity of the printouts is shaper, but the print time may take longer. (Draft, Normal, Best)
- System Setup : This menu allows you to setup the machine.
- Emulation : This menu allow you to select the machine language and to set up the emulation configuration.
- Color : This menu allow you to adjust the color setting.
- Network : This menu allow you to configure the network interface.
- Job Management : This menu shows the status for printing jobs.

■ **Menu Map**

Information

Menu Map
Configuration
Supplies Info.
Demo Page
PCL Font List
PS Font List
Stored Job List*
Completed Job List*
Usage Page*
Accounting Report
Counter Info.

Layout

Orientation
   Portrait
   Landscape
Simplex Margin
   Top Margin
   Left Margin
Duplex
   Off
   Long Edge
   Short Edge
Duplex Margin
   Top Margin
   Left Margin
   Short Binding
   Long Binding

Paper

Copies
MP Tray / [Tray<x>]
   Paper Size
   Paper Type
Paper Source
   Tray 1
   Tray 2
   Tray 3
   MP Tray
   Manual Feeder
   Auto
Tray Confirm

Emulation

Emulation Type
   Auto
   PCL
   PostScript
Setup
   PCL
      Typeface
      Symbol
      Point Size
      Courier
      Pitch
      Lines
   PostScript

System Setup

Date & Time
Clock Mode
Form Menu*
Select Form*
Language
Power Save
Auto Continue
Altitude Adj.
Auto CR
Job Timeout
Maintenance
   Clean Fuser
   CLR Empty Msg.***
   Supplies Info.
      Toner Low Alert
Clear Settings
HDD spooling*

Graphic

Resolution
   Draft
   Normal
   Best
Fine Edge
Darken text
Screen

Color

Custom Color
   Defaul
   Manual Adjust
Auto Color Reg.
Density Calibration
Density Control

Network

Ethernet Speed
TCP/IP (IPv4)
TCP/IP (IPv6)
Wireless**
Clear Settings
Network Info.

Job Management*

Active Job
Store Job
File Policy
Image Overwrite
   Immediate
   On Demand

* This Menu appears only when
  HDD is installed
** This Menu appears only when
  Wireless-LAN card is installed.
*** This Menu appears only when
  Toner worn occurs.

■ **Network Menu Map**

Depth 1	Depth 2	Depth 3	Depth 4	Depth 5
Ethernet Speed	Auto *			
	10M Half			
	10M Full			
	100M Half			
	100M Full			
TCP/IP (IPv4)	View Host Name	View Only		
	Set IP Address	Manual	IP Address	[0~255]:192.0.0.192 *
			Subnet Mask	[0~255]:255.255.255.0 *
			Gateway	[0~255]:192.0.0.192 *
		DHCP *		
		BOOTP		
	Show IP Address			
TCP/IP (IPv6)	IPv6 Activate	On *		
		Off		
	DHCPv6 Config	Router *		
		DHCPv6 addresses		
		DHCPv6 Off		
Wireless(for only wireless model)	WLAN Setting	Wizard *	Search List TestSSID List	WLAN Security
				Authentication
				WPA Key
				Error
		Custom	Edit SSID	Operation Mode
	WLAN Default	Restore		
	WLAN Signal	Excellent		
Clear Settings	Yes No			
Network Info.	Printing…			

■ Useful Menu Item for service

Printing a machine report

You can print the machine's information.
Configuration : You can print a report on the machine's overall configuration.
Demo Page : You can print the demo page whether your machine is printing properly or not.

1. Press 🗐 on the control panel.

2. Press up/down arrow to highlight Information and press OK.
3. Press up/down arrow to highlight Configuration and press OK.
4. The display shows Print?, then press OK to print the configuration report.

Monitoring the supplies life

To view the supply life indicators, follow the steps below:1.Press on the control panel.

1. Press 🗐 on the control panel.

2. Press up/down arrow to highlight System Setup and press OK.
3. Press up/down arrow to highlight Maintenance and press OK.
4. Press up/down arrow to highlight Supplies Info. and press OK.
5. The display shows two options as you press up/down arrow.
   • Printed Pages: Displays the total number of pages printed.
   • Remains Info.: Displays how much toner remains in the cartridge.

Cleaning a fuser belt

If you are experiencing blurred, faded, or smeared printouts, you can clear the problem by printing a cleaning sheet, provided by your printer.You can Print:1.Press on the control panel.

1. Press 🗐 on the control panel.

2. Press up/down arrow to highlight System Setup and press OK.
3. Press up/down arrow to highlight Maintenance and press OK.
4. Press up/down arrow to highlight Clean Fuser and press OK.
   Your machine automatically picks up a sheet of paper from the tray and prints out a cleaning sheet with dust or toner particles on it.

Conducting the Auto Color Registration

You can adjust the position of color texts or graphics to match the position of the printed colors to those on your screen. When you have moved the machine or replaced some parts, it is strongly recommended to operate this menu manually.

1. Press 🗐 on the control panel.

2. Press up/down arrow to highlight Color and press OK.
3. Press up/down arrow to highlight Auto Color Reg. and press OK.
4. The display shows Run Now? ◄Yes►/ ◄No► , then select yes or no. And press the OK to conduct the Auto Color Registration.
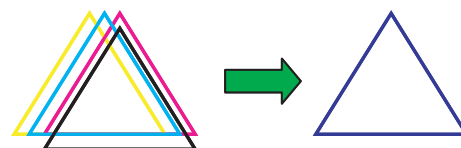
4.1.4 Tech Mode

In service (tech) mode, the technician can check the machine and perform various test to isolate the cause of a malfunction. While in Tech mode, the machine still performs all normal operations.

To enter the Tech Mode

To enter the Tech Mode, press **" Menu + Up + Left + OK + Right + Stop + Menu"** in sequence, and the LCD briefly displays 'Tech Mode', the machine has entered service tech mode.
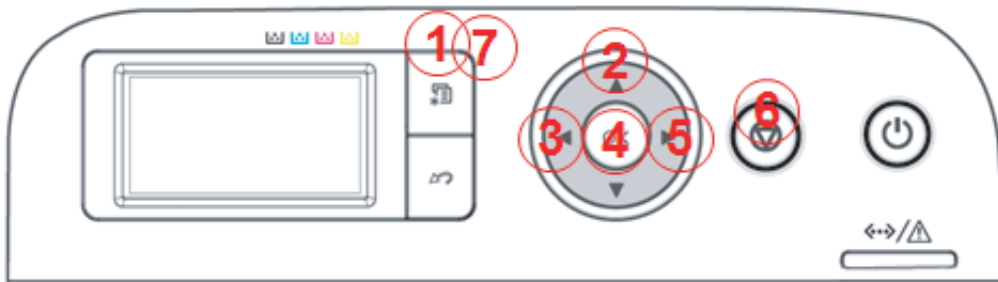
After entering the tech mode, select the item you want by using a button on control panel.
Below picutre shows to select the motor color opc item in Test Routine.
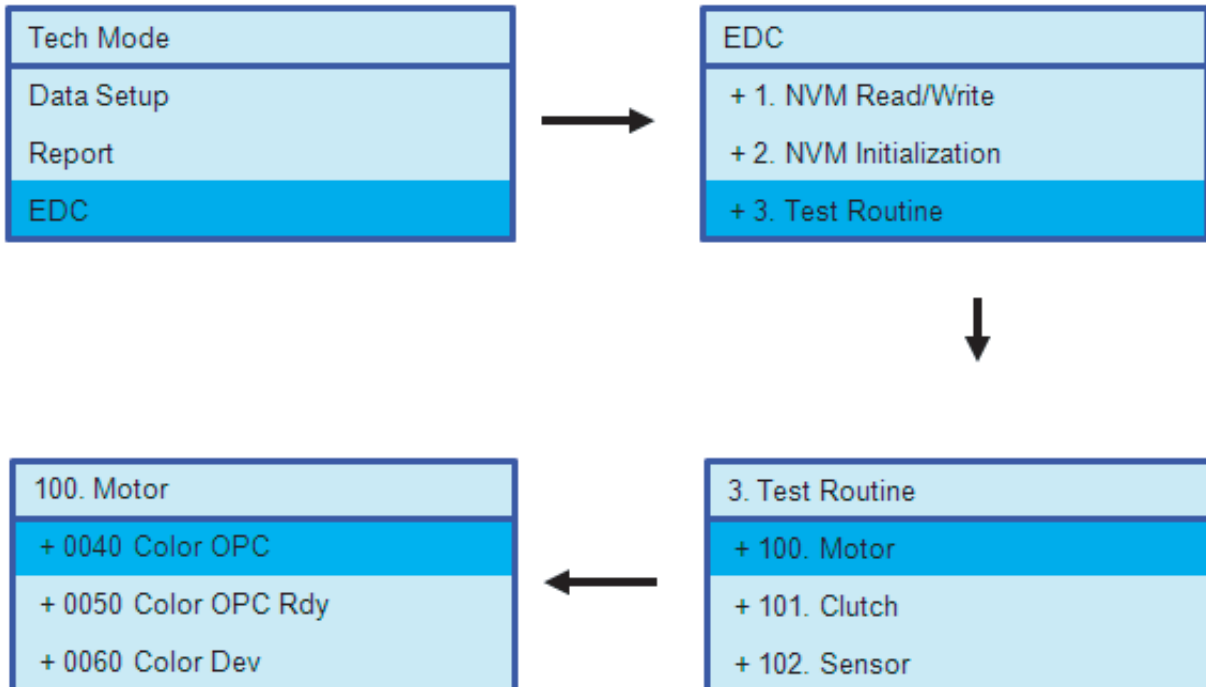
Tech Mode Structrue

Depth 1	Depth 2	Depth 3	Depth 4
Data Setup	HDD Setup	Disk Format	Formatting…
		Max File No.	64*
			128
			196
			256
	Counter Reset	Fuser	
		Pickup Roller	Tray 1
			Tray 2
			Tray 3
			MP Tray
	Adjust Margin	Top Margin	[-10~10]:
		Left Margin	[-10~10]:
	B2B Mode	[0-99] 0*	
	Toner Low Level	[1~30]: 10 %*	
	Paper Substitution	Off *	
		On	
Report	Menu Map	Printing…	
	Suppilies Info	Printing…	
	Event Log	Printing…	
	ACR Report	Printing…	
	Job Duty Report	Printing…	
	Density Report	Printing…	
EDC Mode	NVM Read/ Write		
	NVM Initialization	Initialize Now?	
	Test Routine		
	Manual settings	X Offset Left Y	[-5~5] 0*
		X Offset Left M	[-5~5] 0*
		X Offset Left C	[-5~5] 0*
		X Offset Center Y	[-5~5] 0*
		X Offset Center M	[-5~5] 0*
		X Offset Center C	[-5~5] 0*
		X Offset Right Y	[-5~5] 0*
		X Offset Right M	[-5~5] 0*
		X Offset Right C	[-5~5] 0*
	Regi Pattern	Printing…	

Tech Mode Item description

Item	Description
HDD Setup	This menu can format the hard disk or set up the maximum number of files that you can store. You can see this menu when the HDD is installed in the machine.
Counter Reset	This menu can reset the counts for the Fuser or Pick up roller. When replacing the fuser or pick up roller, you must do this menu.
Adjust Margin	This menu can adjust the paper margin.
Toner Low Level	When the toner remains less than setting up level, the machine notify user of toner low.
B2B Mode	You can set B2B mode
Suppilies Info	You can print the supplies information page.
Event Log	You can print the Event Log that is occurred for specific period.
ACR Report	You can print the ACR Report.
NVM Read/ Write	Engine parameter read/write
NVM Initialization	This menu can initialize all NVM values.
Test Routine	You can check status of the machine coponents.
Manual Settings	You can set up the offset manually.
Regi Pattern	This menu can print the regi pattern.

NVM Read/ Write Table

Depth 1	Depth 2	Depth 3	Meaning	Remark
100-Motor			Not Available	
102-Registration			Not Available	
103-Time			Not Available	
104-Counter			Not Available	
105-Duty	0030-MHV DC K	[-15~15] 0*	Set up the Charger(MHV)'s DC control duty	Adjustment of Charge voltage (for Background)
106-Deve	0000-Deve DC Y	[-25~25] 0*	Set up the Yellow Dev DC control duty	Adjustment of Y/M/C/K density (for Text low density)
	0010-Deve DC M	[-25~25] 0*	Set up the Magenta Dev DC control duty	
	0020-Deve DC C	[-25~25] 0*	Set up the Cyan Dev DC control duty	
	0030-Deve DC K	[-25~25] 0*	Set up the Black Dev DC control duty	
	0040-Deve VPP Y	[-25~25] 0*	Set up the Yellow Dev PP control duty	Adjustment of image resolution
	0050-Deve VPP M	[-25~25] 0*	Set up the Magenta Dev PP control duty	
	0060-Deve VPP C	[-25~25] 0*	Set up the Cyan Dev PP control duty	
	0070-Deve VPP K	[-25~25] 0*	Set up the Black Dev PP control duty	

Depth 1	Depth 2	Depth 3	Meaning	Remark
106-Deve	0080-Dev AC Y	[-25~25] 0*	Set up the Yellow Dev AC control duty	Adjustment of Y/M/C/K developing density
	0090-Dev AC M	[-25~25] 0*	Set up the Magenta Dev AC control duty	
	0100-Dev AC C	[-25~25] 0*	Set up the Cyan Dev AC control duty	
	0110-Dev AC K	[-25~25] 0*	Set up the Black Dev AC control duty	
	0120-Deve AC Freq	[-500~500] 0*	Set up the Dev AC frequncy	
107-Transfer	0000-THV Y	[-25~25] 0*	Set up the yellow transfer DC normal voltage control duty	Transfer current optimization for special paper pluck -> THV downward omission -> THV upward
	0010-THV M	[-25~25] 0*	Set up the magenta transfer DC normal voltage control duty	
	0020-THV C	[-25~25] 0*	Set up the cyan transfer DC normal voltage control duty	
	0030-THV K	[-25~25] 0*	Set up the black transfer DC normal voltage control duty	
	0040-THV Low Y	[-10~10] 0*	Set up the yellow transfer DC low voltage control duty	Density level adjustment by transfer
	0050-THV Low M	[-10~10] 0*	Set up the magenta transfer DC low voltage control duty	
	0060-THV Low C	[-10~10] 0*	Set up the cyan transfer DC low voltage control duty	
	0070-THV Low K	[-10~10] 0*	Set up the black transfer DC low voltage control duty	
	0130-ATTR+ Bias	[-10~10] 0*	Set up the ATTR plus bias voltage on at normal drive level	
109-Temp Offset	0000-Ready Temp	[-10~10] 0*	Target Temperature value setting during standby state.	
	0010-Print Temp	[-10~10] 0*	Target Temperature value setting during print state.	
	0020-Low Power Temp	[-10~10] 0*	Target Temperature value setting during power save state.	
	0070-Bond Temp	[-10~10] 0*	Bond type paper fixing temperature offset	Fusing temparature optimazation for special paper. Not fusing -> Temp. upward Over fusing -> Temp. downward
	0080-Trans Temp	[-10~10] 0*	Transparency(OHP) type paper temperature offset	
	0100-Envelopes Temp	[-10~10] 0*	Envelopes type paper temperature offset	
	0110-Labels Temp	[-10~10] 0*	Labels type paper temperature offset	
	0120-Fuser Bias Duty	[-10~10] 0*	Set up the fuser roll voltage control duty	
	0130-Thick Temp	[-10~10] 0*	Thick type paper temperature offset	
110-LD Power	0040-LD Power Y	[-10~10] 0*	Yellow LD Power at Normal Speed	Adjustment of gray scale density
	0050-LD Power M	[-10~10] 0*	Magenta LD Power at Normal Speed	
	0060-LD Power C	[-10~10] 0*	Cyan LD Power at Normal Speed	
	0070-LD Power K	[-10~10] 0*	Black LD Power at Normal Speed	
111-Toner			Not Available	
112-ACR Offset	0000-ACR Condition	[0~1] 1*	All Condition of ACR On/Off (On 1, Off 0)	
	0010-ACR Inner Temp	[0~1] 1*	The Condition for Inner Temperature of ACR On/Off (On 1, Off 0)	
	0020-ACR LSU Temp	[0~1] 1*	The Condition for LSU Temperature of ACR On/Off (On 1, Off 0)	
	0030-ACR New CRU	[0~1] 1*	The Condition for New Crum of ACR On/Off (On 1, Off 0)	
	0040-ACR Page Cnt	[0~1] 1*	The Condition for Page Count of ACR On/Off (On 1, Off 0)	
	0050-Fuser Motor Speed	[-10~10] 0*	The Fuser Motor Speed Offset for Regi.	

Test Routines Menu Item (Engine Diagnostic Test)

Depth1	Depth2	Meaning
100-Motor	0040-Color OPC	Color OPC BLDC Motor is On/Off
	0050-Color OPC Rdy	Detect if Color DEV BLDC Motor runs at normal speed
	0060-Color Dev	Color DEV BLDC Motor is On/Off
	0070-Color Dev Rdy	Detect if Color DEV BLDC Motor runs at normal speed
	0191-System Fan Run	Start/Stop System Fan run
	0192-System Fan Rdy	Detects if System Fan runs at normal speed.
	0193-HVPS Fan	Start/Stop HVPS Fan run
	0194-HVPS Fan Rdy	Detects if HVPS Fan runs at normal speed.
101-Clutch	0000-MP Feed Clutch	Engages drive to pick up a paper from bypass Tray(MP Tray).
	0010-Tray1 Pickup	Engages drive to pick up a paper from tray1.
	0020-Tray2 Pickup	Engages drive to pick up a paper from tray2. (Optional)
	0030-Tray3 Pickup	Engages drive to pick up a paper from tray3. (Optional)
	0050-Registration	Engages drive to registartion rolls.
	0120-Tray1 Feed Mot	T1 Feed Motor On/Off
	0130-Tray2 Feed Mot	T2 Feed Motor On/Off
	0140-Tray3 Feed Mot	T3 Feed Motor On/Off
	0190-OutBin Full	Detect a paper full in Outbin
102-Sensor	0000-Tray1 Home Pos	Detect when tray1 is closed.
	0010-Tray1 Empty	Detect when paper is in Tray1.
	0020-Tray1 Size1	Detects whether auto size1 sensor of tray1 is high or low.
	0030-Tray1 Size2	Detects whether auto size2 sensor of tray1 is high or low.
	0040-Tray1 Size3	Detects whether auto size3 sensor of tray1 is high or low.
	0070-Tray2 Home Pos	Detect when tray2 is closed.
	0080-Tray2 Empty	Detect when paper is in tray2.
	0090-Tray2 Size1	Detects whether auto size1 sensor of tray2 is high or low.
	0100-Tray2 Size2	Detects whether auto size2 sensor of tray2 is high or low.
	0110-Tray2 Size3	Detects whether auto size3 sensor of tray2 is high or low.
	0140-Tray3 Home Pos	Detect when tray3 is closed.
	0150-Tray3 Empty	Detect when paper is in tray3.
	0160-Tray3 Size1	Detects whether auto size1 sensor of tray3 is high or low.
	0170-Tray3 Size2	Detects whether auto size2 sensor of tray3 is high or low.
	0180-Tray3 Size3	Detects whether auto size3 sensor of tray3 is high or low.
	0280-MP Empty	Detects when paper is in Bypass Tray(MP Tray).
	0290-Feed Sensor	Detect when a paper is at Feed sensor.
	0360-Regi Sens	Detect when a paper is at Regi. sensor.
	0370-Exit Sens	Detect when a paper is at Exit. sensor.

Depth1	Depth2	Meaning
105-MHV Bias	0000-Y MHV Bias	Yellow MHV bias voltage on at normal drive level
	0010-M MHV Bias	Magenta, Cyan MHV bias voltage on at normal drive level
	0030-K MHV Bias	Black MHV bias voltage on at normal drive level
	0100-M MHV AC	Magenta, Cyan MHV AC bias voltage on at normal drive level
	0120-K MHV AC	Black MHV AC bias voltage on at normal drive level
106-Dev Bias	0000-Y Dev Bias	Yellow Dev bias voltage on at normal drive level
	0010-M Dev Bias	Magenta Dev bias voltage on at normal drive level
	0020-C Dev Bias	Cyan Dev bias voltage on at normal drive level
	0030-K Dev Bias	Black Dev bias voltage on at normal drive level
	0031-K Dev AC	Black Dev bias AC voltage on at normal drive level
	0032-C Dev AC	Cyan Dev bias AC voltage on at normal drive level
	0033-M Dev AC	Magenta Dev bias AC voltage on at normal drive level
	0034-Y Dev AC	Yelllow Dev bias AC voltage on at normal drive level
107-Transfer Bias	0000-Y THV Bias	Yellow THV bias voltage on at normal drive level
	0010-M THV Bias	Magenta THV bias voltage on at normal drive level
	0020-C THV Bias	Cyan THV bias voltage on at normal drive level
	0030-K THV Bias	Black THV bias voltage on at normal drive level
	0040-Y THV Bias R	Detect what the THV value is on the THV Roller
	0120-ATTR+ Bias	ATTR plus bias voltage on at normal drive level
	0140-ATTR- Bias	ATTR Minus bias voltage on at normal drive level
	0160-Erase Lamp	Make a OPC surface voltage equal
109-Fuser Heater	0000-Temp A	Detects what the temperature center is on fuser.
	0010-Temp B	Detects what the temperature side is on fuser.
	0030-Fuser Mot Fwd	Fuser Motor Forward On/Off
	0031-Fuser Mot Bwd	Fuser Motor Backward On/Off
	0040-Fuser Fan Run	Fuser Fan Motor On/Off
	0050-Fuser Bias	Fuser bias voltage on at normal drive level
	0090-Fuser Power On	It controls temperature of fuser as 180 degrees.
	0110-Fuser Fuse 1 R	Detect if the life of fuser1 is exhausted.
110-LSU	0000-LSU Motor 1 Rdy	Detects if LSU motor1 runs at normal speed.
	0010-LSU Motor 2 Rdy	Detects if LSU motor2 runs at normal speed.
	0060-LSU Motor 1 Run	LSU Motor1 On/Off
	0070-LSU Motor 2 Run	LSU Motor2 On/Off
	0080-LD Power 1	LSU LD1 enable On/Off (yellow)
	0090-LD Power 2	LSU LD2 enable On/Off (magenta)
	0100-LD Power 3	LSU LD3 enable On/Off (cyan)
	0110-LD Power 4	LSU LD4 enable On/Off (black)
112-ACR	0010-Manu Regi Clear	Clear Manual Offset Value of Color Regi.

4.1.5 Firmware Upgrade

• USB and Network port are used to F/W upgrade.
• Network applications (SWAS, SWS) can be used for network port upgrade.

4.1.5.1 Using the common method

- Via USB connection (when Ready state)

CLP-770 Rom has file name like 'CLP770_VA.BB.CC.DD.hd'.

1) Delete all processing job.
2) Confirm USB connection
3) Download ROM file form PC to MACHINE via usblist2.exe
   -> Drag the F/W file and Drop down on the usblist2.exe file.

- Via USB connection (when Power OFF)

1) Confirm USB connection
2) Power button press
3) Within 1sec of Step2, press STOP key , make "Wait Image" status.
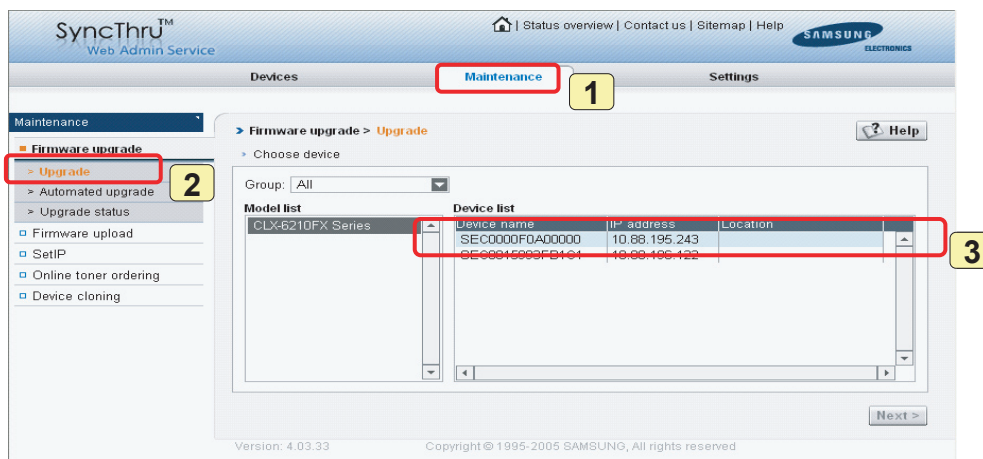4) Download ROM file form PC to MACHINE via usblist2.exe
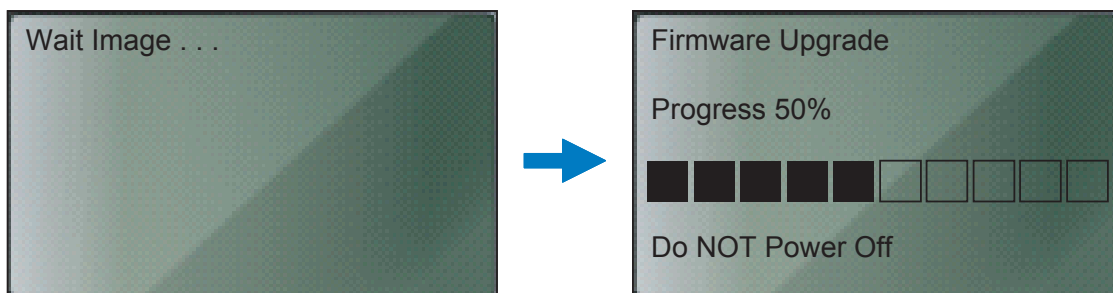
4.1.5.2 F/W upgrade using SWAS (SyncThru Web Admin Service)

To use below method, SWAS program is installed in PC.
Start the SWAS program.
(Windows Start menu > Programs > Samsung Netowork Printer Utilities > SyncThru Web Admin Service)

1. Firmware Upgrade → Upgrade (check device using IP address)

2. Maintenance → Firmware upload (register firmware)
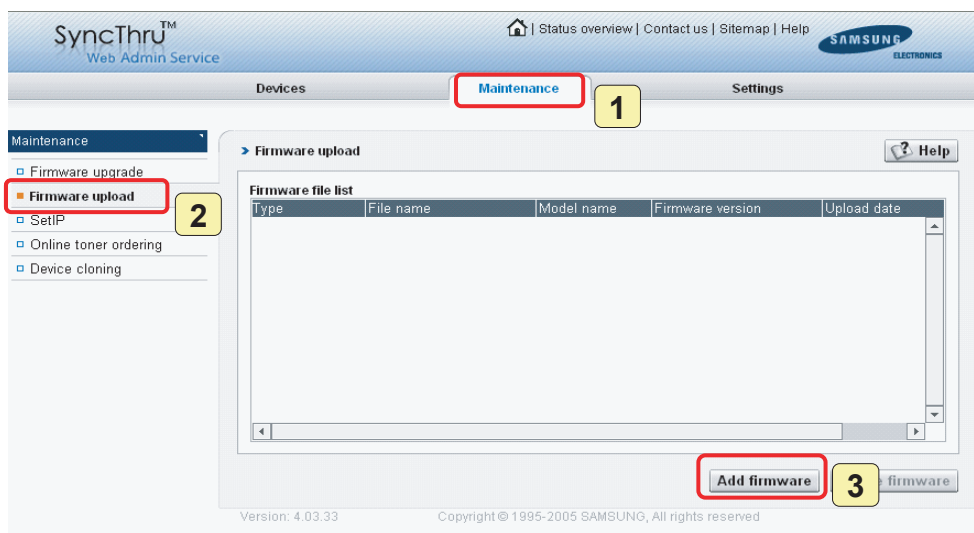
3. Maintenance → Firmware Upload (upload firmware)
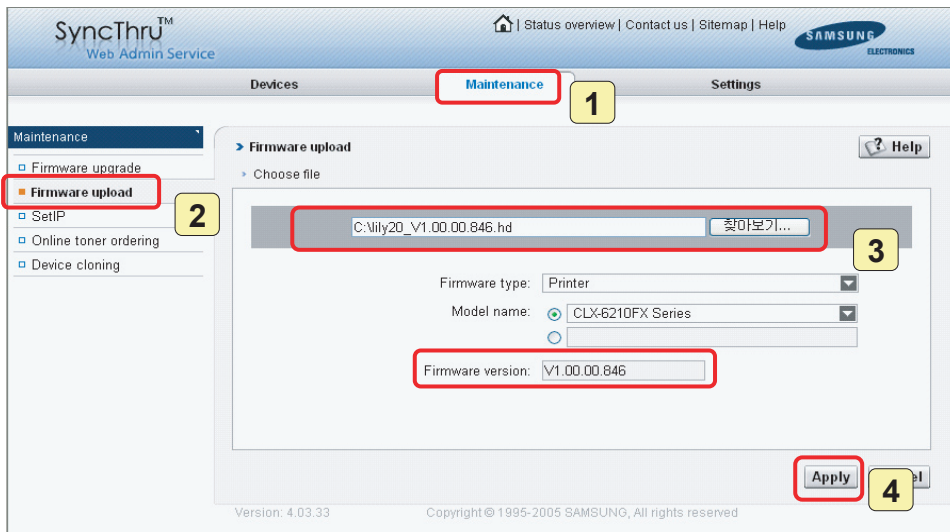
4. Maintenance → Firmware Upload (confirm uploaded firmware)
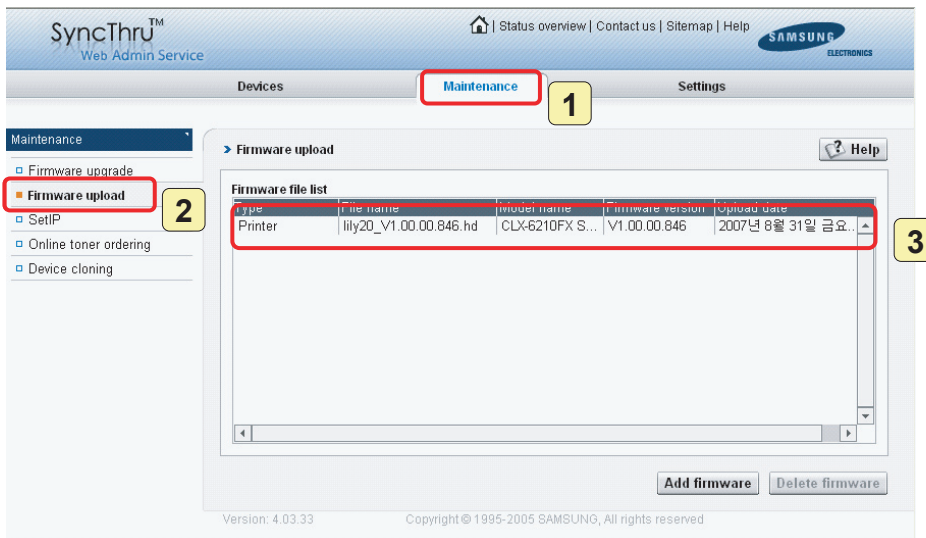
5. Maintenance → Firmware Upgrade → Upgrade (choose firmware)
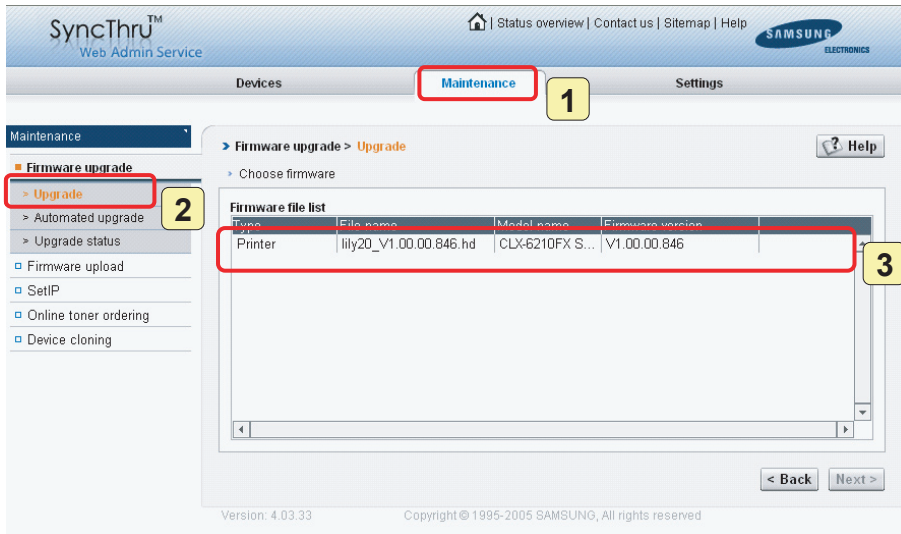
6. Maintenance → Firmware Upgrade → Upgrade (choose firmware)
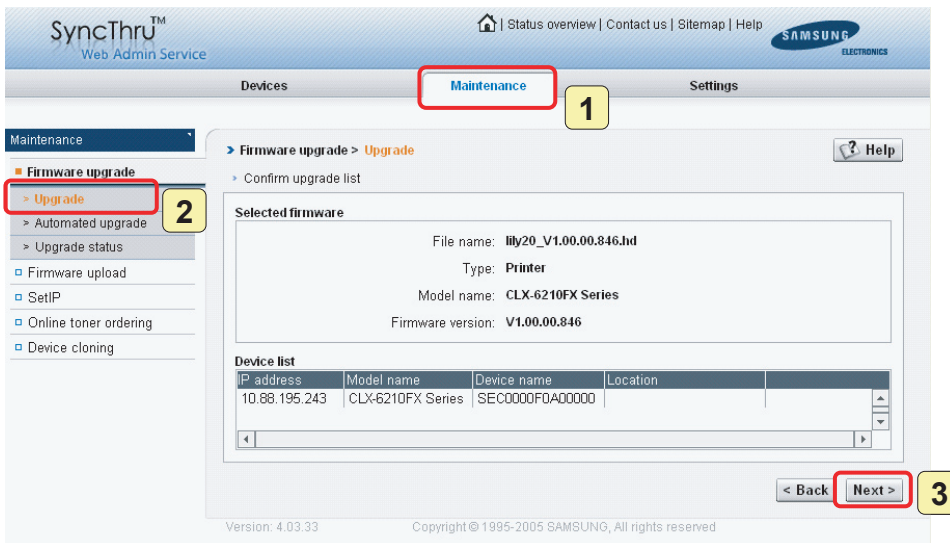
7. Maintenance → Firmware Upgrade → Upgrade

8. Maintenance → Firmware Upgrade → Upgrade (Done)
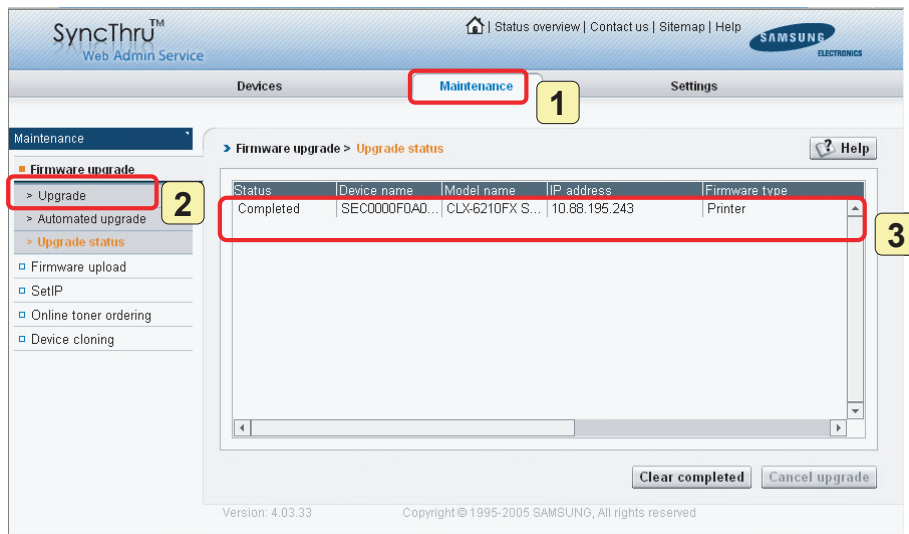
4.1.5.3 F/W upgrade using SWS (SyncThru Web Service)

To use below method,

1. Start a web browser such as Internet Explorer, Safari or Firefox and enter your machine's new IP address in the browser window.

For example,

2. When the SyncThru™ Web Service window opens, click Maintenance, Then, click "Find" and selet a firmware file.
3. Click "Upgrade"

4-18

4.2 Troubleshooting

4.2.1 Procedure of Checking the Symptoms

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

```
                    Power On
                       │
                       ▼
                  ┌─────────┐        - No Power
                  │ OP Panel │   No   - Power Module error
                  │  ON?    │─────▶  - Main PBA error
                  └─────────┘        - LCD Panel error
                       │
                      Yes
                       │
                       ▼
              ┌───────────┐   No   ┌──────────────┐  Yes   ┌─────────────┐
              │ Ready or  │───────▶│  Indicate    │───────▶│  Refer to   │
              │ Power save│        │ Error Massage│        │ Error Massage│
              └───────────┘        └──────────────┘        │< Chapter 4.2.2 >│
                       │                   │               └─────────────┘
                      Yes                  No
                       │                   │
                       ▼                   ▼
                 Test Print  ◀─────────────┘
                       │
                       ▼
              ┌───────────┐
              │  printing │   No   ┌──────────────────┐
              │ Quality is│───────▶│ Refer to "Solution│
              │  Nomal?   │        │ of 4.2.4 Print Quality"│
              └───────────┘        └──────────────────┘
                       │
                      Yes
                       │
                       ▼
                     END
```
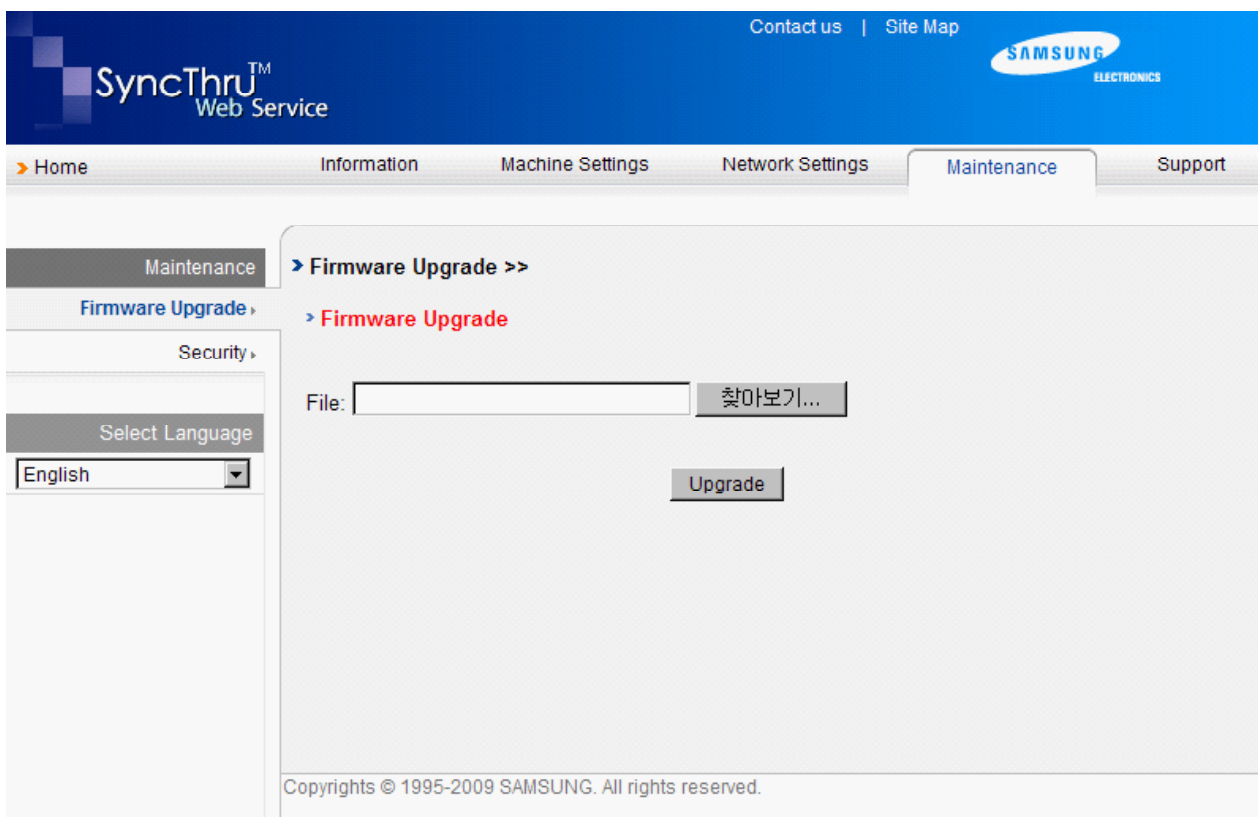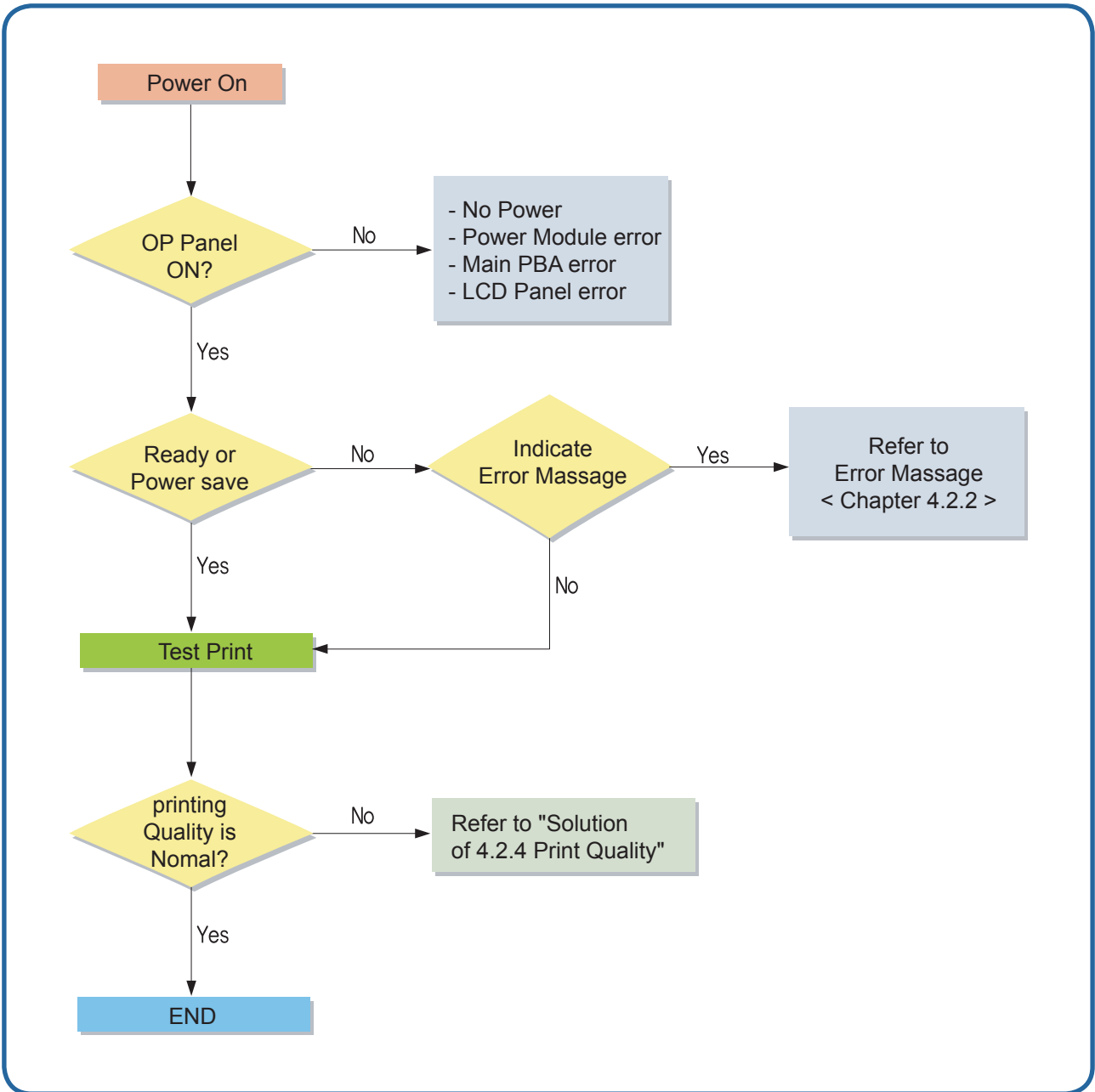
4.2.2 Display Meassage Troubleshooting

Messages appear on the Smart Panel program window or on the control panel display to indicate machine status or errors. Refer to the tables below to understand the meanings of the messages, diagnose, and solve the problems

* [O] indicates the toner cartridge color (C/M/Y/K)
* [OO] indicates the toner cartridge color (Cyan/Mazenta/Yellow/Black)
* When S: meassage is displayed and press OK button, T: message will be displayed.

Message	Description	Suggested Solution
Door is open or Check Transfer belt	The front cover or the top cover is not securely latched or the transfer belt is not installed.	1. Close the Cover-Front or Cover-Exit 2. If the PTB is not installed, install it. 3. Check the 24V1_S. 4. If the voltage is not occurred, check the 24V switch, CN3, CN3 harness on HVPS. 5. Check the PTB drawer connector and related harness connection.
Paper Jam in MP tray	Paper misfed from multi-purpose tray.	1. Remove the jammed paper in MP tray. 2. Check the MP empty sensor of the Cassette. If it is defective, replace it. 3. Check the Regi. sensor and feed sensor by using EDC mode after feed a paper from Cassette. If it is defective, replace it. * Actuator-Feed (JC66-02052A) * Actuator-Regi (JC66-02053A) * Photo-Interrupter (0604-001095) 4. Reconnect connector of CN4,5,9 on HVPS. 5. Reconnect connector of CN1,2 on HVPS and check the flat cable.
Paper Jam in tray1	Paper has jammed in the feeding area of the tray.	1. Take out the cassette and remove the jammed paper. 2. Check the separator pad of the cassette. If it become loose or life has expired, replace it. * MEA Holder Pad (JC97-03467A) 3. If the pick up roller does not rotate, check the Gear Pick up(JC97-02895A). If it is defective, replace it. 4. If the pick up roller rotates but the paper is not feeding, replace the Clutch-Feed(JC47-00023A). 5. Reconnect connector of CN4,5,9 on HVPS. 6. Reconnect connector of CN1,2 on HVPS and check the flat cable.

Message	Description	Suggested Solution
Paper Jam in tray2	Paper has jammed in the feeding area of the tray.	1. Take out the 2nd cassette and remove the jammed paper. 2. If the pick up roller does not rotate, check the Gear Pick up(JC97-02895A). If it is defective, replace it. 3. If the pick up roller rotates but the paper is not feeding, replace the Clutch-Feed(JC47-00023A). 4. Reconnect the CN9 connector on Main PBA 5. Check the sensor and connector in SCF.
Paper Jam in tray3	Paper has jammed in the feeding area of the tray.	1. Take out the 3rd cassette and remove the jammed paper. 2. If the pick up roller does not rotate, check the Gear Pick up. If it is defective, replace it. 3. If the pick up roller rotates but the paper is not feeding, replace the Clutch-Feed. 4. Reconnect the CN9 connector on Main PBA 5. Check the sensor and connector in SCF.
Jam inside machine	Paper jammed in the feeding area of the tray.	1. Check the Spring tension of the Regi. roller and Regi shaft. If the spring is defective, replace it. 2. Replace the actuator fuser and exit sensor. 3. Reconnect the CN4,5,6,9 connector on HVPS. 4. Reconnect connector of CN1,2 on HVPS and check the flat cable.
Jam in exit area	Paper jammed in the exit area.	1. If the actuator fuser sensing part has some problems, replace the actuator fuser and exit sensor. 2. Reconnect the CN6 connector on HVPS. 3. Reconnect connector of CN1,2 on HVPS and check the flat cable.
Jam of duplex	Paper jammed in the duplex area.	1. Open the Front Cover and separate the PTB unit. Remove the Jammed paper. 2. If the paper is not reached to the duplex path after the exit sensor sensing, check the Clutch-BK deve. If it is defective, replace it.
S: Output bin Full T: Output bin Full. Remove printed paper	The paper is full on exit tray.	1. Clear the paper on exit tray. 2. Reconnect the CN3 connector on Main-PBA. 3. Replace the Actuator-Stacker and Actuator-OutFull. * Actuator-Stacker (JC66-02065A) * Actuator-Outfull (JC66-02064A) * Photo-Interrupter (0604-001095)
S: System error T: Error: #02-000 Turn off then on	1. At warm up, the temperature is less than reference temperature for 20 sec 2. Abnormal ADC has occurred. 3. Abnormal Thermistor value has occured. (by FSA regulation / thermistor open/ thermistor short)	1. Turn off the power. And turn on the power. 2. Reconnect the CN2 connector on Main-PBA. 3. If the problem persists, replace the Main-PBA. 4. Check the thermistor Tension of the Fuser.

Message	Description	Suggested Solution
S: Low Heat error T: Error: #02-001 Turn off then on	1. At warm up, the temperature keep up the lower temperature for regular time. 2. In case that the temperature has not reached warm up temperature after warm-up time. 3. At ready, Less than120℃ and for more than 15 sec. 4. At printing, Less than printing Ref. temp and for more than 15 sec.	1. Turn off the power. And turn on the power. 2. Check the connection of the Fuser unit. And the CN2,5 connector on Main-PBA. 3. Remove the resistance value of the thermostat. If the value is infinity, replace the thermostat. 4. Check the thermistor. If it is defective, replace it. 5. If the problem persists, replace the Fuser unit. 6. Replace the SMPS board or FDB(Fuser drive board).
S: Over Heat error T: Error: #02-002 Turn off then on	The temperature keep up the higher than 240℃	1. Turn off the power. And turn on the power. 2. Replace the Fuser unit. 3. Replace the FDB. 4. Replace the Main-PBA.
S: Motor error T: Error: #03-006 Turn off then on	After Black OPC BLDC motor is operated, the ready signal is not occurred within 2.5 sec.	1. Check the 24V power. 2. If 24V power is not occurred, replace the SMPS. 3. Check the motor connector and Main-PBA connector. 4. Replace the BLDC motor. 5. Replace the Main-PBA.
S: Motor error T: Error: #03-007 Turn off then on	After Dev BLDC motor is operated, the ready signal is not occured within 2.5 sec.	1. Check the 24V power. 2. If 24V power is not occurred, replace the SMPS. 3. Check the motor connector and Main-PBA connector. 4. Replace the BLDC motor. 5. Replace the Main-PBA.
S: Motor error T: Error: #03-008 Turn off then on	After Fuser OPC BLDC motor is operated, the ready signal is not occurred within 1 sec.	1. Check the 24V power. 2. If 24V power is not occurred, replace the SMPS. 3. Check the motor connector and Main-PBA connector. 4. Replace the BLDC motor. 5. Replace the Main-PBA.
S: Fan error T: Error: #03-015 Turn off then on	Fan does not operate.	1. Check the CN7 connector on Main-PBA. 2. If the Fan operates and the error message is displayed, replace the Main-PBA.
S: LSU error T: Error: #04-001,4,7,10 Turn off then on	After LD on, the Laser beam detect signal is not occurred or irregular.	1. Replace the Main board. 2. If the problem persists after replacing the Main board, replace the LSU unit.

Message	Description	Suggested Solution
S: LSU error T: Error: #04-002 Turn off then on	LSU motor does not operate or the drive signal is abnormal.	1. Check No.4,9 pin of the CN21 on Main-PBA by the osiloscope. If the motor rotation starts and the signal change low for regular time, the LSU unit is normal. 2. Check the 24V power. If the voltage is not occurred, replace the SMPS. 3. Check the Motor connector, Main-PBA connector.
S: [O] toner is Low T: [O] toner is low. Order new one	The toner cartridge is almost empty	Prepare the new toner cartridge.
S: [O] toner is empty T: [OO] toner is empty. Replace with new one	The lifespan of the toner cartridge which the arrow indicates is reached	Replace the new toner cartridge.
S: [O] toner Not Installed T: [OO] toner cartridge is not installed. Install it	The toner cartridge is not installed or the CRUM (Consumer Replaceable Unit Monitor) in the cartridge is not properly connected	1. Take out the toner cartridge and re-install it. 2. If the problem persists, check the CN24 connector on Main-PBA. 3. Check the connector, harness of the DEVE CRUM IF PBA.
S: [O] Not Compatible T: [OO] toner cartridge is not compatible. Check guide	The toner cartridge you have installed is not for your machine.	1. Check the samsung-genuine toner cartridge is installed or not. 2. Check the CN24 connector on Main-PBA. 3. Check the connector, harness of the DEVE CRUM IF PBA.
S: [O] toner is worn T: [OO] toner is worn. Replace with new one	The color toner cartridge has run out. The machine stops printing.	You can select the option among Stop, Continue or Black Only.If you select Stop, the machine stops printing. If you select Continue, the machine keeps printing, but the quality cannot be guaranteed. If you select Black Only, the machine prints the data in black. If you do not select any, the machine will work as Stop is selected.Replace the toner cartridge with a Samsung-genuine toner cartridge.
S: [O] toner cart. error T: Error: #06-006 Open/close door	The toner cartridge is wrong installed	Take out the toner cartridge and re-install it.
S: Replace [O] toner T: Replace with New [OO] Toner	The toner cartridge has reached the end of its lifespan.	Replace the new toner cartridge.

Message	Description	Suggested Solution
S: [O] Toner Not Install T: [O] Toner is not install. Remove seal tape & reinstall	The machine cannot detect a toner cartridge.	Take out the toner cartridge and re-install it.
S: System error T: Error: #10-004 Turn off then on	The communication error occurred.	1. Check the OPE PBA connection. If the harness is properly not connected to OPE PBA, re-connect it. 2. If the problem persists, replace the OPE PBA. 3. Replace the Main PBA.
S: Tray2 has a problem T: Communication problem occurred with Tray2	The machine cannot communicate the optional trays.	1. Check the tray2 connection. 2. If there is no problem, replace the tray2 unit. 3. If the error message is still displayed, replace the Main-PBA.
S: Tray3 has a problem T: Communication problem occurred with Tray3	The machine cannot communicate the optional trays.	1. Check the tray3 connection. 2. If there is no problem, replace the tray3 unit. 3. If the error message is still displayed, replace the Main-PBA.
S: Sensor Failure T: Temperature sensor has Problem #10-012. Turn off then on	There is a problem in the sensor signal.	1. Check the CN19 connector on Main-PBA. 2. Replace the Main-PBA.
S: Sensor Failure T: Outer temperature sensor Failure #10-013 Turn off then on	There are some effective Outer Temperature sensor value range(Min~Max) on product. - Outer Temp.Short error occurs when Outer Temperature sensor value is under the minimum. - Outer Temp.Open error occurs when Outer Temperature sensor value is over the maximum.	1. Check the CN19 connector on Main-PBA.

Message	Description	Suggested Solution
S: Sensor Failure T: Outer temperature sensor Failure #10-014 Turn off then on	There are some effective Outer Temperature sensor value range(Min~Max) on product. - Outer Temp.Short error occurs when Outer Temperature sensor value is under the minimum. - Outer Temp.Open error occurs when Outer Temperature sensor value is over the maximum.	1. Check the CN19 connector on Main-PBA.
S: Sensor Failure T: Humidity sensor has problem #10-015 Turn off then on	There are some effective humidity range(Min~Max) on product. - Humidity Out error occurs when Humidity value is under the minimum. - Humidity Open error occurs when Humidity value is over the maximum.	1. Check the CN19 connector on Main-PBA.
S: Sensor Failure T: Humidity sensor has problem #10-016 Turn off then on	There are some effective humidity range(Min~Max) on product. - Humidity Out error occurs when Humidity value is under the minimum. - Humidity Open error occurs when Humidity value is over the maximum.	1. Check the CN19 connector on Main-PBA.
S: Sensor Failure T: Inner temperature sensor Failure #10-017 Turn off then on	inner temperature circuit is open. please reboot the machine.	1. Check the CN19 connector on Main-PBA.
S: Sensor Failure T: Inner temperature sensor Failure #10-018~019 Turn off then on	inner temperature circuit is short. please reboot the machine.	1. Check the CN19 connector on Main-PBA.
S: Paper mismatch Tray1 M: Load [A4] [Plain] Continue ⊙ Cancel X	There is no corresponding paper in the tray1.	1. Check the CN10 connector on HVPS. 2. Check the shape of the paper size switch in cassette.
S: Paper mismatch Tray2 M: Load [A4] [Plain] Continue ⊙ Cancel X	There is no corresponding paper in the tray2.	1. Check the CN10 connector on HVPS. 2. Check the shape of the paper size switch in cassette.

Message	Description	Suggested Solution
S: Paper mismatch Tray3 M: Load [A4] [Plain] Continue ⊙ Cancel X	There is no corresponding paper in the tray3.	1. Check the CN10 connector on HVPS. 2. Check the shape of the paper size switch in cassette.
S: Paper mismatch MP M: Load [A4] [Plain] Continue ⊙ Cancel X	There is no corresponding paper in the MP tray.	Load the paper in MP tray.
S: Paper Empty in tray1 T: Paper is empty in tray1. Load paper	Paper is empty in tray1.	1. Check the CN5 connector on HVPS. 2. Reconnect the CN1,2 connector. And check the flat cable. 3. Replace the paper empty sensor or actuator.
S: Tray1 cassette Out T: Tray1 cassette is pulled out. Insert it properly	The tray1 cassette is not installed properly.	1. Check the CN4 connector on HVPS. 2. Reconnect the CN1,2 connector. And check the flat cable.
S: Paper Empty in MP T: Paper is empty in MP tray. Load paper	Paper is empty in MP tray.	Load the paper in MP tray.
S: Tray2 Not Installed T: Tray2 is not installed	The tray2 is not installed properly.	Reinstall the Tray2 unit.
S: Paper Empty in tray2 T: Paper is empty in tray2. Load paper	Paper is empty in tray2.	Load the paper in Tray2
S: Tray2 cassette Out T: Tray2 cassette is pulled out. Insert it properly	The tray2 cassette is not installed properly.	Reinstall the Tray2 cassette.

| Message	Description	Suggested Solution
S: Tray3 Not Installed T: Tray3 is not installed	The tray3 is not installed properly.	Check the Tray3 connector.
S: Paper Empty in tray3 T: Paper is empty in tray3. Load paper	Paper is empty in tray3.	Load the paper in Tray3
S: Tray3 cassette Out T: Tray3 cassette is pulled out. Insert it properly	The tray3 cassette is not installed properly.	Reinstall the Tray3 cassette.
S: Transfer belt is low T: Transfer belt unit will be worn. Order new one	The life of the transfer belt will expired soon.	Order the PTB unit with a new one.
S: Transfer belt is worn T: Transfer belt unit is worn. Replace with new one	The life of the transfer belt has expired.	Replace the new PTB unit.
S: TR belt Not Installed T: Transfer belt unit is not installed. Install it	The transfer belt unit is not installed.	Check the Drawer connector of the PTB unit.
S: TR. belt Not compatible T: Transfer belt unit is not compatible. Check guide	The transfer belt of the machine is not for your machine	Check the samsung-genuine PTB is installed. If or not, replace the new PTB unit.
S: Fuser unit is worn T: Fuser unit is worn. Replace with new one	The life of the fuser unit will expired soon.	Check the fuser unit life. If the life is expired, replace it.

Message	Description	Suggested Solution
S: Fuser unit is low T: Fuser unit will be worn. Replace with new one	The life of the fuser unit has expired.	Check the fuser unit life. If the life is expired, replace it.
S: Fuser unit Not Installed T: Fuser unit is not instelled. Install it	The fuser unit is not installed.	Open the top cover. Remove and reinstall the Fuser unit.
S: Pickup roller is worn T: MP/Tray/Tray2/Tray3 pickup roller is worn. Replace with new one	The life of the corresponding pick up roller has expired.	Check the pick up roller life. If the life is expired, replace it.

4.2.3 Feeding Problems and solutions

4.2.3.1 Clearing paper JAMS

If a paper jam occurs an error message appears in the LCD display. Find and remove the jammed paper. If you don't see the paper, open the covers. Do not use a tweezers, pincers or other metal tools when clearing a paper jam. This could damage the internal mechanism causing print quality problems or possibly electrical shock.
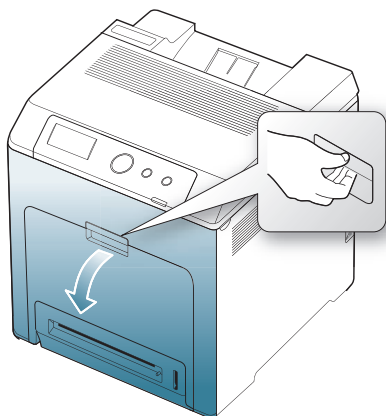
JAM type
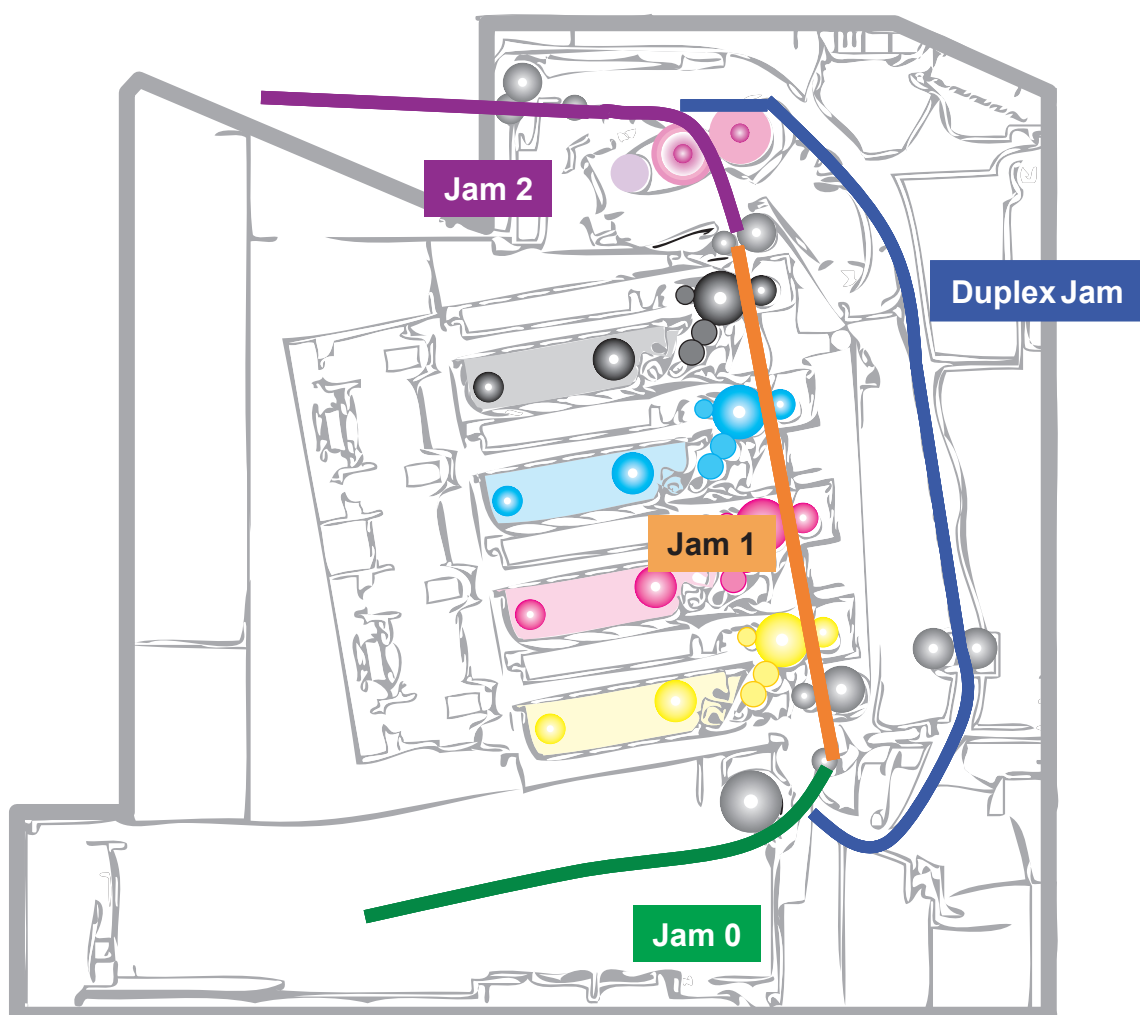
| Jam type	Displayed error message
JAM0	Paper Jam in tray1
JAM1	Jam inside machine
JAM2	Jam in exit area
Duplex JAM	Jam bottom of duplex Jam top of duplex

In tray 1

If paper is jammed in the paper feed area, follow the next steps to release the jammed paper.

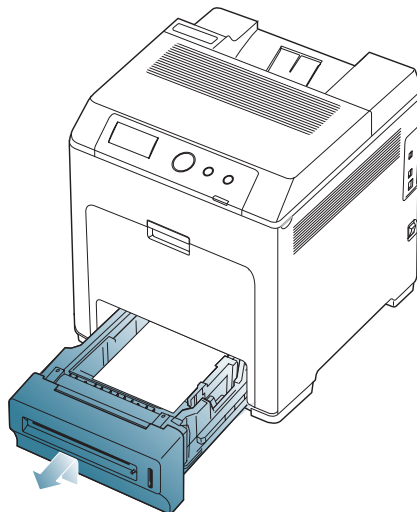1. Using the handle, completely open the front cover.

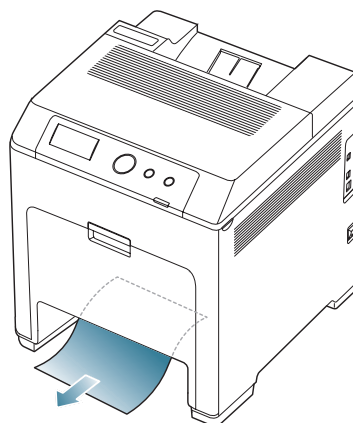2. Carefully remove the paper by pulling in the direction as shown below.
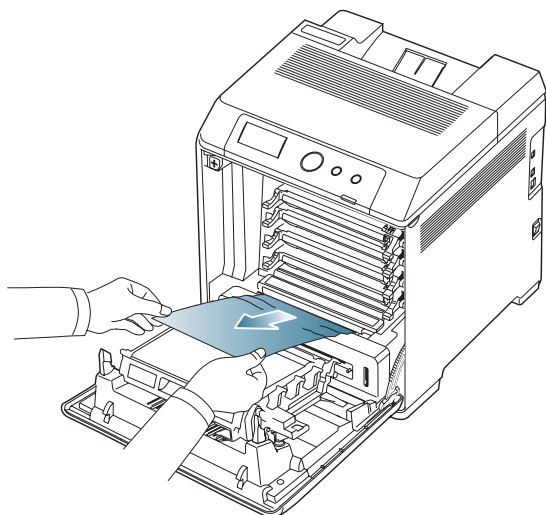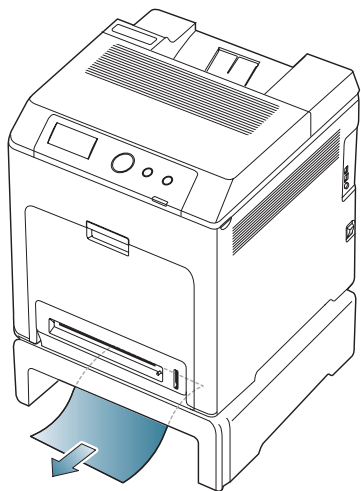
3. Close the front cover.

4. Pull out tray 1.

5. Remove the jammed paper by gently pulling it straight out as shown below.

6. Insert tray 1 back into the machine until it snaps into place. Printing automatically resumes.
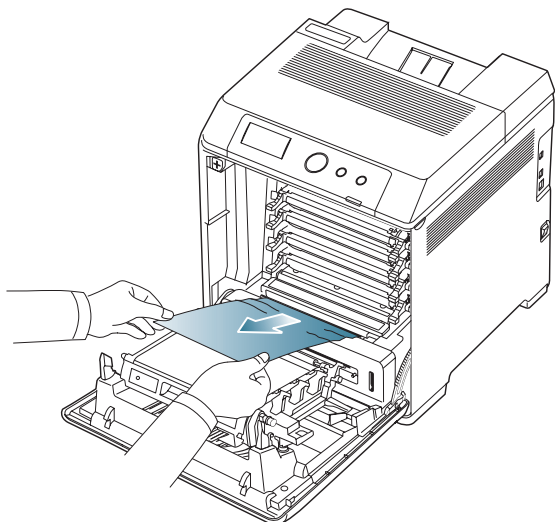
In optional trays

1. Pull out optional tray 2 open.

2. Remove the jammed paper from the machine.

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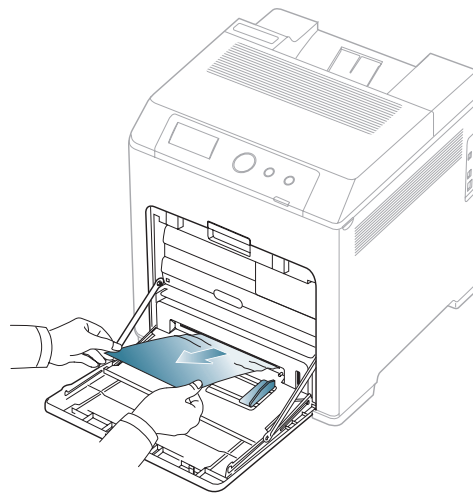
3. Open the front cover.

4. Pull the jammed paper out in the direction shown. To avoid tearing the paper, pull it out gently and slowly.

5. Close the front cover and insert the trays back into the machine. Printing automatically resumes.

In the multi-purpose tray

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

   If you do not see the jammed paper or if there is any resistance when you pull, stop and go to step 3.
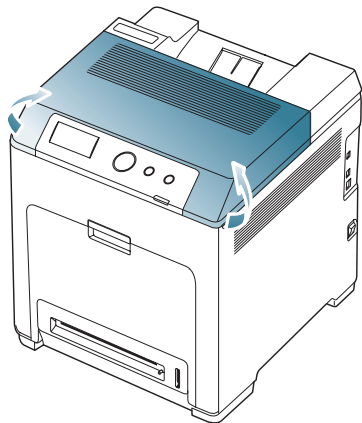
2. Open and close the front cover to resume printing.

3. Using the handle, completely open the front cover.

4. Remove the jammed paper by pulling in the direction shown. To avoid tearing the paper, pull it out gently and slowly.
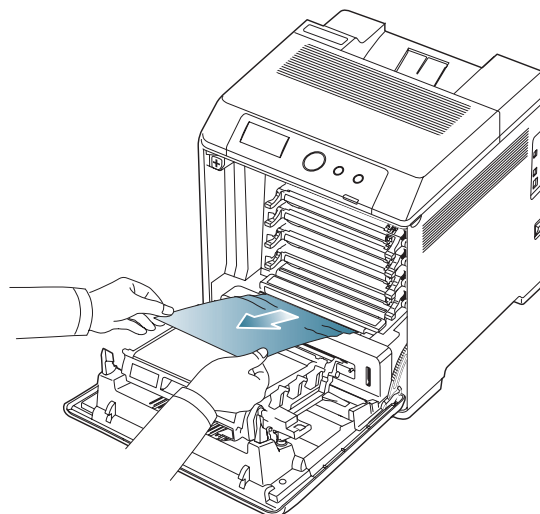
5. Close the front cover to resume printing.

In the fuser unit area

1. Open the top cover.

2. Open the inner cover using the handle on it.
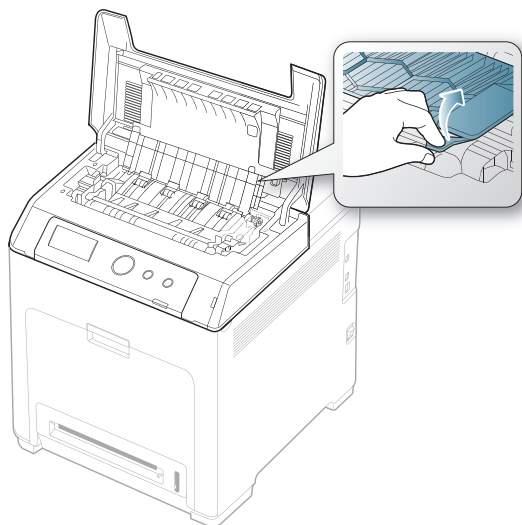
3. Pull up the paper jam lever to loose the fusing part of the fuser unit and carefully take the jammed paper out of the machine.
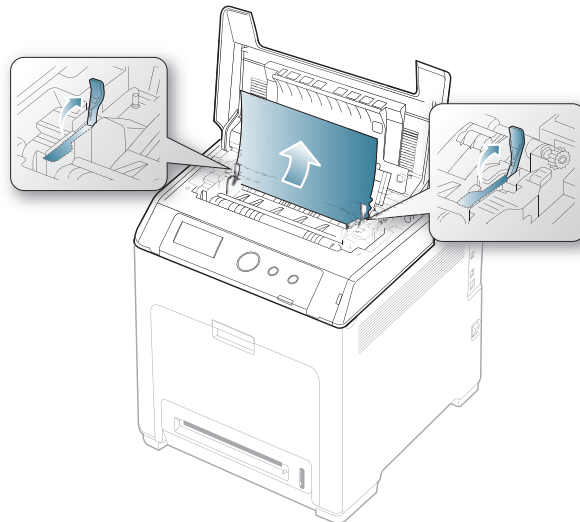
4. Press down the paper jam lever to fasten the fusing part.

5. Close the inner cover.

6. After removing the jammed paper, check for paper which may be jammed in other parts of the machine.

7. Close the top cover. Ensure that the cover is securely closed.

In exit area

1. Open and close the front cover. The jammed paper is automatically ejected from the machine.

2. Gently pull the paper out of the output tray.
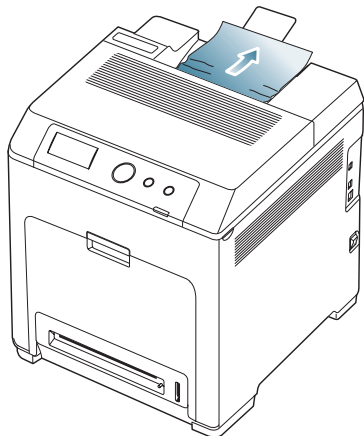
   If you do not see the jammed paper or if there is any resistance when you pull, stop and see "In the fuser unit area" on page 78.

3. Open and close the front cover to resume printing.

In the duplex unit area

1. Using the handle, completely open the front cover.
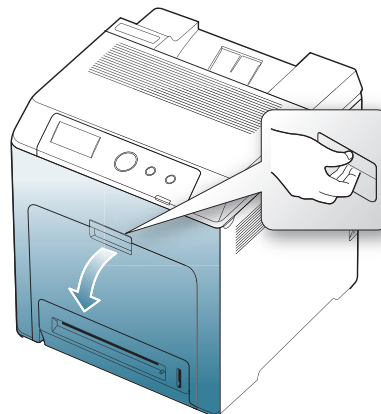
2. Press the green release handle to release the paper transfer belt. Holding the handle on the paper transfer belt, lift it out of the machine.
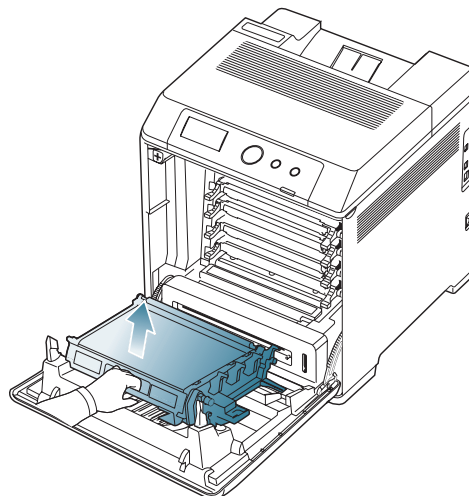
3. Remove the jammed paper by pulling in the direction shown. To avoid tearing the paper, pull it out gently and slowly.


4. Holding the handle on the paper transfer belt, align it with the slots on the inside of the front cover.

5. Lower the paper transfer belt until it is parallel with the front cover and firmly seated.
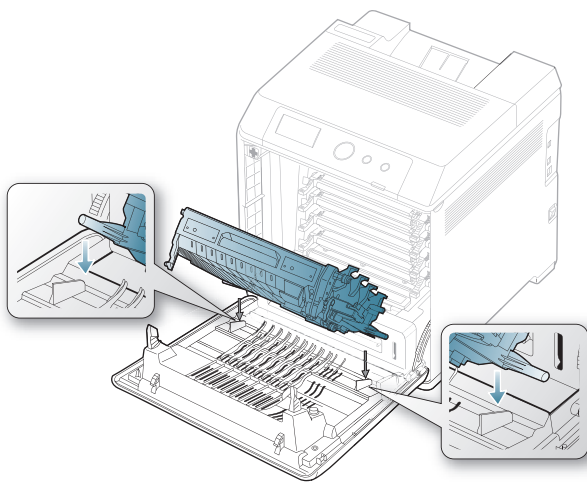
6. Close the front cover to resume printing.

Multi-Feeding

Description	When the paper is feeding, multiple pages are fed.

Step	Cause and Check Point	Yes	No
1	Check that the power code is plugged into electrical outlet. Is it plugged?	Go to step2	Plug the power code.
2	Is the on/off switch in the ON position?	Go to step3	Turn the switch on.
3	Check if the power input and SMPS output are normal. Is it normal?	Go to step4	Replace the SMPS.
4	Check the LCD panel. Is it normal?	Replace the OPE PBA or the Main PBA.	Replace the LCD panel.

Skew paper

Description	Paper is skewed.

Step	Cause and Check Point	Yes	No
1	Check the paper is loaded properly.	Go to step 2.	Adjust the paper guide in paper size.
2	Check the rollers on paper path is dirty. Is it dirty?	Clean the rollers.	Go to step 3.
3	Pick up roller, feed roller is defective.	Replace the pick up roller, feed roller together.	Replace the SMPS.

4.2.4 Image Quality Problems and solutions

If a mark or other printing defects occur at regular intervals down on the page, they may be caused by damaged or contaminated rollers. Use the table below to find which roller causes the defect from the periods of the rollers.
If the roller is dirty, try to clean it. If the problem still remains after cleaning, replace the part including the defective roller.

NO	Roller	Period (mm)	Yes	No
1	Fuser Belt	125.7	Waving, Offset, Spot, Line Burst	Fuser Unit
2	Pressure roller	91	Offset, Spot, Line Burst	Fuser Unit
3	OPC Drum	75.39	White and Black Spot, Periodic Banding, Ghost, Color Registration	CMYK toner cartridge
4	Deve Roller	36.1 (CMY)	White Spot, Horizontal Band	CMY toner cartridge
		32.6 (K)	Offset, Spot, Line Burst	K toner cartridge
5	Supply Roller	48.2 (CMY)	Periodic Band (by little difference of density)	CMY toner cartridge
		43.4 (K)		K toner cartridge
6	Transfer Roller	44	White and Black Spot, Periodic Banding	PTB Unit
7	PTB Charge roller	31.4		PTB Unit

Repetitive defect Image check page

Print this page. Align the start line on this page with the printed defect image, and measure to the next occurrence of the defect to determine which roller, drum, or belt causes the defect.

Start line ————————————————————————————

PTB Charge roller
Deve Roller (K) ————————————————————————
Deve Roller (CMY) ——————————————————————
Supply Roller (K)
Transfer Roller
Supply Roller (CMY)

OPC Drum ————————————————————————————

Pressure roller ————————————————————————

Fuser belt ————————————————————————————

Examples of Defective page

Poor fusing
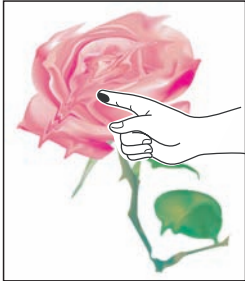
Blank Page

Vertical White Line
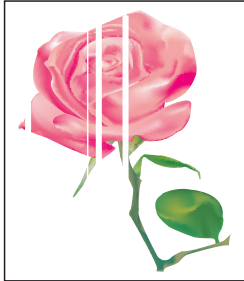
Dark image or Black

Vertical Black Line and Band

Contamination on back of page

Horizontal Bands
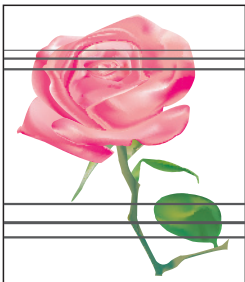
Uneven Density

Vertical Black Line and Band

Description	1. Straight thin vertical black lines occur in the printed image 2. Dark black vertical bands occurs in the printed image

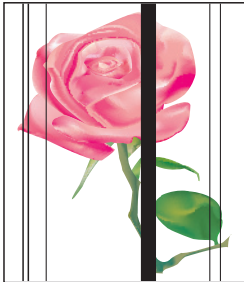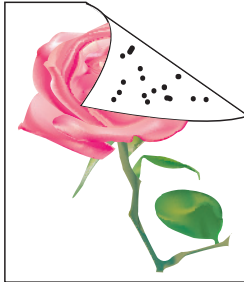| Cause and Check Point	Solution
Check if the surface of the charge roller is scratched or contaminated.	Replace the toner cartridge and test again
Check if there are grooves on the circumference of the OPC drum.	Replace the toner cartridge and test again
Check if the cleaning blade is damaged	Replace the toner cartridge and test again
Is the charge roller of PTB unit damaged?	Clean the charge roller of PTB unit, or replace the PTB unit.
Check if paper transfer belt is damaged or contaminated.	Replace the PTB unit and test again.

Vertical White Line

Description	White vertical voids in the image.

Cause and Check Point	Solution
Check if the LSU window or internal lenses of LSU is contaminated.	Clean the LSU window with recommended cleaner(IPA). Clean the window with a clean cotton swab. If dirt is inside the LSU, replace the LSU.
Check if there are scratches on the circumference of the OPC drum.	Replace the toner cartridge.
Check if there are scratches on the circumference of the developing roller.	Replace the toner cartridge.
Foreign objects inside the toner cartridge.	Replace the toner cartridge.
Check if there are vertical scratches on the transfer unit.	Replace the PTB unit.

Contamination on back of page

Description	The back of the page is contaminated.

Cause and Check Point	Solution
Dirty registration roller, pressure roller, feed roller, etc. Any dirty rollers through the path of the paper.	Identify the roller which may cause the problem by comparing the period of the contamination on images with the size of rollers. Clean any dirt from the roller or replace the dirty roller.
Dirty PTB belt or damaged PTB belt.	Clean PTB or replace the PTB unit.
Dirty feed guide, or any paper delivery guide.	Clean the part which cause the contamination.

Dark or Black image

Description	The back of the page is contaminated.

Cause and Check Point	Solution
No charging voltage in the HVPS	Check the connecting state between the Main PBA and HVPS. Reconnect the harness.
Poor contact between toner cartridge and set contacts.	Clean the contacts as necessary. Replace any deformed or damaged contacts.
HVPS is defective.	Replace the HVPS.

Blank Page

Description	Blank page is printed.

Cause and Check Point	Solution
Bad contacts from OPC drum and/or toner cartridge to ground.	Check the terminal of Ground-OPC.
Not working the LSU	Check the connecter of LSU
Not working the developing bias voltage on HVPS	Check the HVPS B'd and replace it.

Uneven Density

Description	Print Density is uneven between left and right.

Cause and Check Point	Solution
The pressure force in the left and right springs of the transfer roller is not even, the springs are damaged, the transfer roller is improperly installed	Replace the PTB Unit
The toner layer is not even in the developing roller due to the damaged blade or low toner level.	Replace the toner cartridge
Poor the pressure spring force of the toner cartridge.	Replace the toner cartridge
The life of the Toner Cartridge has expired.	Replace the toner cartridge

Horizontal Bands

Description	Dark or white horizontal stripes appear in the page. (These may occur at regular intervals down the page.)

Cause and Check Point	Solution
The developing roller, OPC drum or other rollers in the toner cartridge may be contaminated or deformed.	Replace the toner cartridge.
Contamination of the Gap-Ring - regular intervals 38.9mm	Clean the gap ring, or replace it. Or replace the toner cartridge
Bad contacts of HV terminals of the toner cartridge with high voltage terminals from printer set.	Clean all HV terminals in the cartridge and on the set frame. Ensure all toner or paper dust, particles are removed.

Contamination on the front of the page

Description	The front page of the printed page is stained.

Cause and Check Point	Solution
Toner leakage due to improperly sealed toner cartridge.	Replace the toner cartridge.
Poor OPC cleaning.	Replace the toner cartridge.
Rollers and drum are dirty or defective.	Identify the roller which may cause the problem by comparing the period of the contamination on images with the size of rollers. Clean any dirt from the roller or replace the dirty roller or part.

Poor fusing

Description	Toner is not properly fixed on paper.

Cause and Check Point	Solution
The media doesn't meet specification	Use the proper media in specifications.
Fuser is defective	Replace the fuser unit.
FDB (Fuser drive board) is defective.	Replace the FDB.

4.2.5 Common Problems and solutions

No Power

Description	When system power is turned on, the printer does not warm up or LCD panel is blank.

Step	Cause and Check Point	Yes	No
1	Check that the power code is plugged into electrical outlet. Is it plugged?	Go to step2	Plug the power code.
2	Is the on/off switch in the ON position?	Go to step3	Turn the switch on.
3	Check if the power input and SMPS output are normal. Is it normal?	Go to step4	Replace the SMPS.
4	Check the LCD panel. Is it normal?	Replace the OPE PBA or the Main PBA.	Replace the LCD panel.

4.2.6 Network problems and soltutions

Before Troubleshooting, check below check point.

Check Point	Action
LAN cable check	A. Connected or Not connected B. Wrong cable (defected cable, crossover cable) C. Connection connector (Link partner check)
Network LED check	A. Link LED check (Link LED On when connected) B. Activity LED check (No packet Regularly blinking, packet random blinking depend on Printer Model)

Print Network test page	A. Printed correctly. If not, NIC is in lock up state or NIC can not communicate with printer
	B. Network address value check : IP address, Subnet Mask, Gateway, MAC address
	C. NIC F/W version (Correct or not)
	  1) V1.0x.xx : NPC3
	  2)V2.0x.xx : NPC3H
	  3)V3.0x.xx : PHY Board
	  4)V4.0x.xx : On Board
	D. Protocol Enable / Disable
	E. WLAN module / Status check if WLAN available.

Printer SET status check	A. Toner Empty, Paper Empty and so on : Hard Stop cases (Job can be finished completely)

Network Printer Configuration check

1. Address Conflict check
    A. IP address Conflict : Same IP address in a network
      • Unplug network cable and PING test
    B. MAC address Conflict : Same MAC address in a physical network
      • Default MAC address or same MAC address (PING and ARP –a)

2. IP get method check (Panel or SWS)
    A.DHCP/BOOTP : IP can be changed after rebooting
    B. Auto IP address : Xerox Model default on

3. Protocol Enable / Disable, Port Number (In SWS)

4. IP filtering On/Off

5. SNMP community name check (When SNMP no response)

Host PC Configuration check

1. Address Conflict check
     A. IP address Conflict : Same IP address in a network
          • Unplug network cable and PING test at other PC
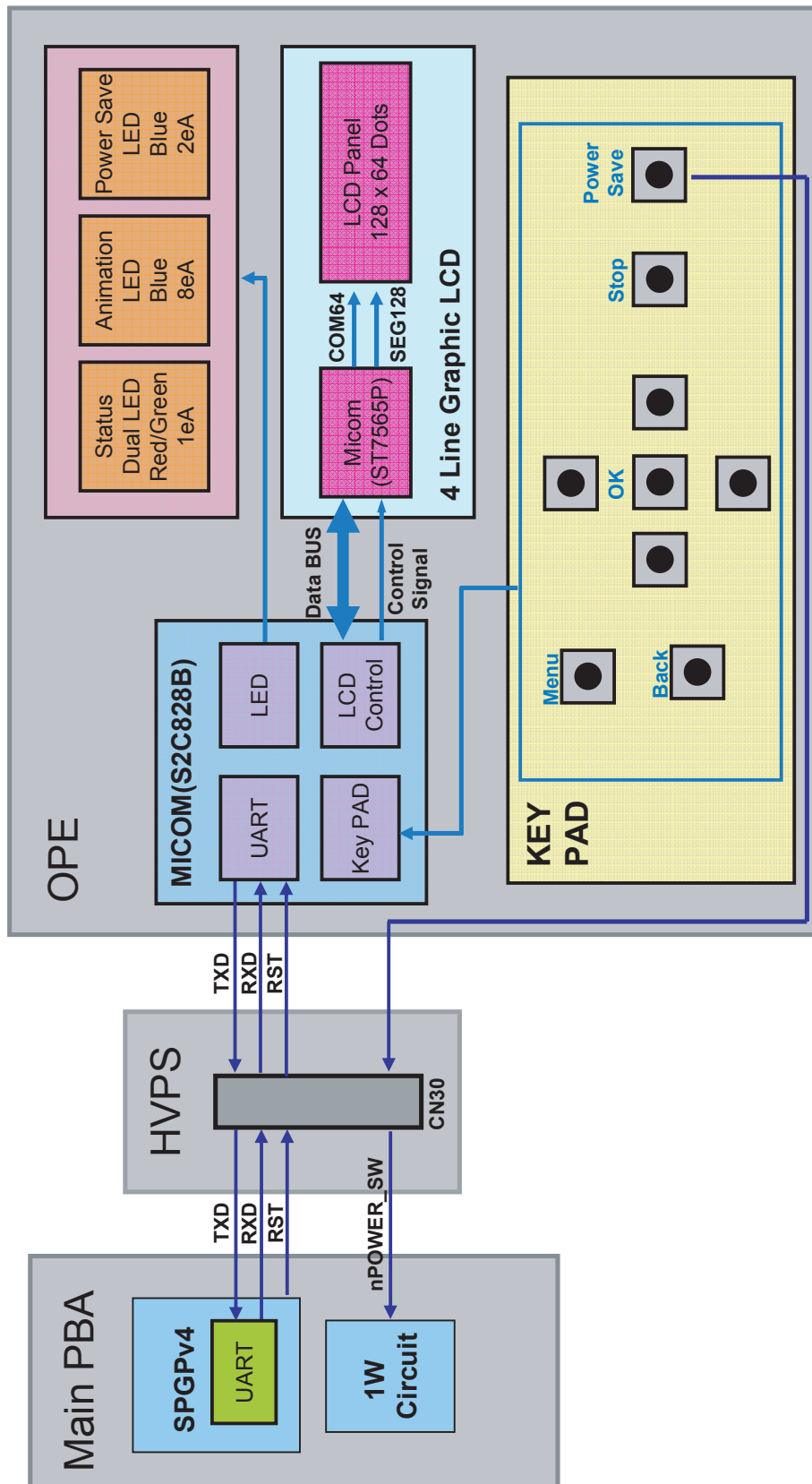2. Protocol Enable / Disable, Port Number in printer driver

Factory Default

1. Network Value changed to default value
     A. Some of Network value will not be changed immediately.
     B. Factory default operation will be done after Power Off / Power On

5. System Diagram
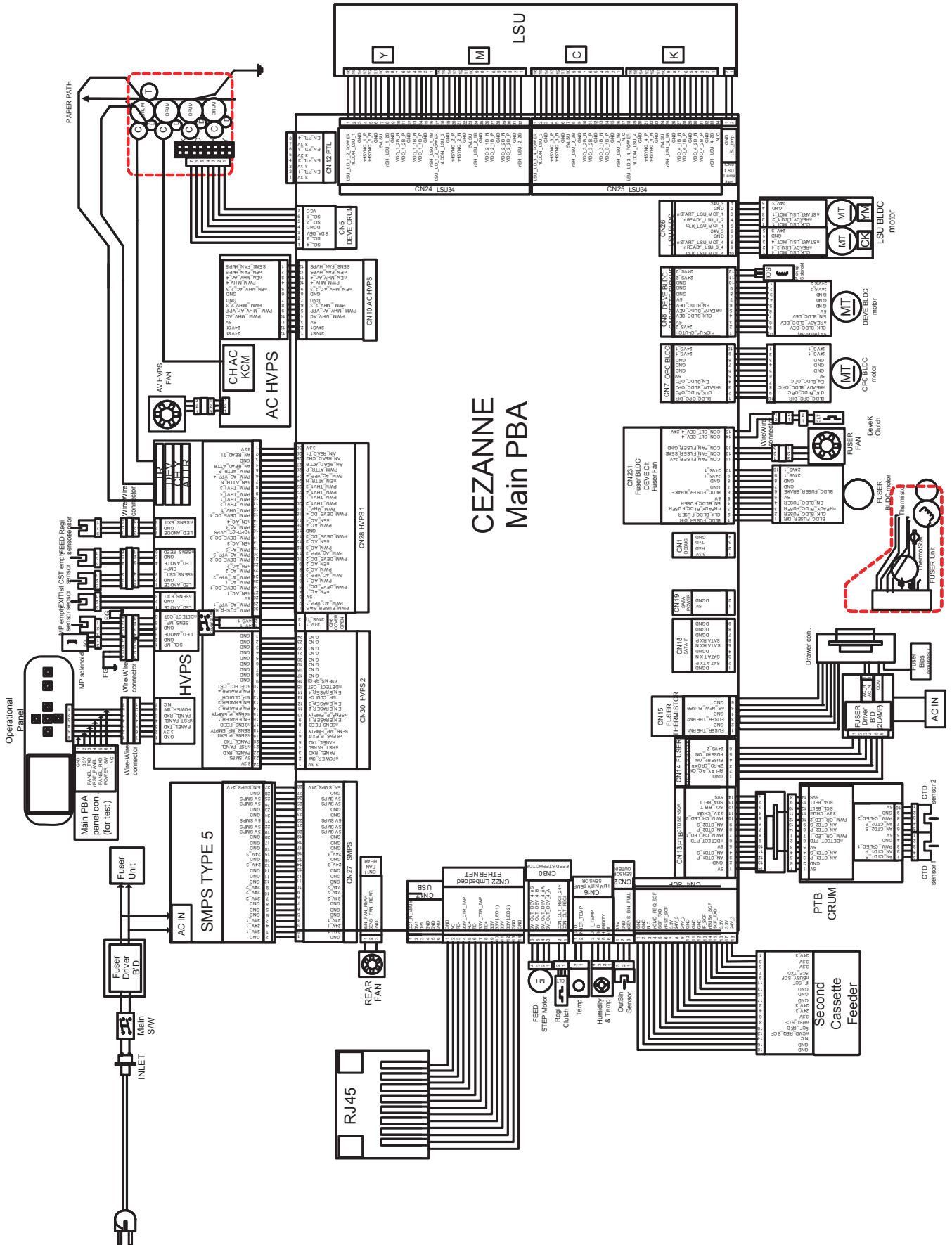
5.1 Main PBA Block Diagram
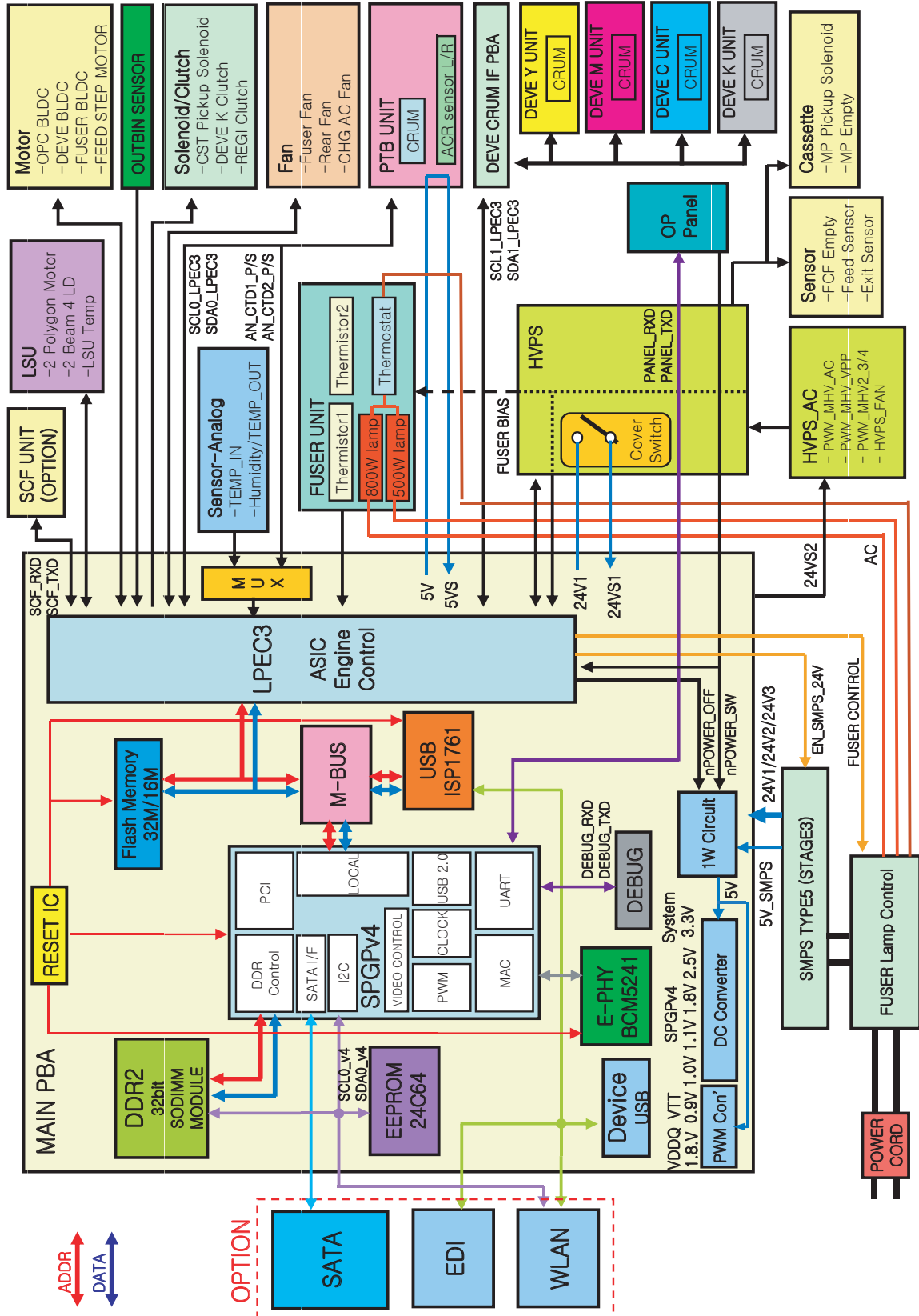
5.2 OPE PANEL Block Diagram

5.3 Connection Diagram

6. Reference Information

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

6.1 Tools for Troubleshooting

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

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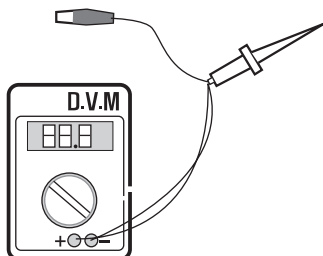
- **Driver**
  Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).
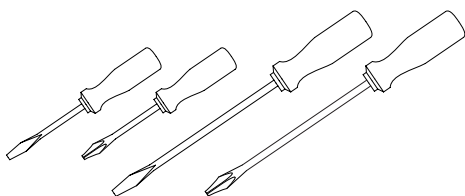
- **Tweezers**
  Standard : For general home use, small type.
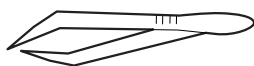
- **Cotton Swab**
  Standard : For general home use, for medical service.

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

- **Vacuum Cleaneraner**

- **Brush**

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

  Install Driver CD
  Network S/W CD

6.2 Acronyms and Abbreviations

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

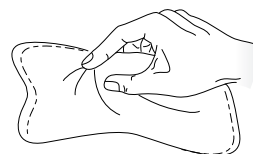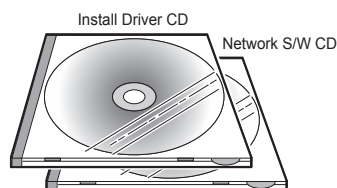|			
ADC	Analog-to-Digital-Conversion	HBP	Host Based Printing
AP	Access Point	HDD	Hard Disk Drive
AC	Alternating Current	HTML	Hyper Text Transfer Protocol
ASIC	Application Specific Integrated Circuit	HV	High Voltage
ASSY	Assembly	HVPS	High Voltage Power Supply
BIOS	Basic Input Output System	I/F	Interface
BLDC Motor	Brushless DC Motor	I/O	Input and Output
CLBP	Color Laser Beam Printer	lb	Pound(s)
CMOS	Complementary Metal Oxide Semiconductor	IC	Integrated Circuit
		ICC	International Color Consortium
CMYK	Cyan, Magenta, Yellow, Black	IDE	Intelligent Drive Electronics or ntegrated Drive Electronics
CN	Connector		
CON	Connector	IEEE	Institute of Electrical and Electronics Engineers. Inc
CPU	Central Processing Unit		
CTD Sensor	Color Toner Density Sensor	IOT	Image Output Terminal (Color printer, Copier)
dB	Decibel		
dBA	A-Weighted decibel	IPA	Isopropy Alcohol
dBm	Decibel milliwatt	IPC	Inter Process CommunicationEPP Enhanced parallel Port
DC	Direct Current		
DCU	Diagnostic Control Unit	IPM	Images Per Minute
DIMM	Dual In-line Memory Module	ITB	Image Transfer Belt
DPI	Dot Per Inch	LAN	local area network
DRAM	Dynamic Random Access Memory	LBP	Laser Beam Printer
DVM	Digital Voltmeter	LCD	Liquid Crystal Display
ECP	Enhanced Capability Port	LED	Light Emitting Diode
ECU	Engine Control Unit	LSU	Laser Scanning Unit
EEPROM	Electronically Erasable Programmable Read Only Memory	MB	Megabyte
		MHz	Megahertz
EMI	Electro Magnetic Interference	MPBF	Mean Prints Between Failure
EP	Electro photographic	MPF/MPT	Multi Purpose Feeder/Multi Purpose Tray
EPP	Enhanced Parallel Port		
F/W	Firmware	NIC	Network Interface Card
FCF/FCT	First Cassette Feeder/First Cassette Tray	NPC	Network Printer Card
		NVRAM	Nonvolatile Random Access Memory
FISO	Front-In, Side-Out	OPC	Organic Photo Conductor
FPOT	First Print out Time	PBA	Printed Board Assembly
GDI	Windows Graphic Device Interface	PCL	Printer Command Language , Printer Control Language
GIF	Graphic Interchange Format		
GND	Ground		

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	SMPS	Switching Mode Power Supply
		SPGP	Samsung Printer Graphic Processor
		SPL	Samsung Printer Language
		SPL-C	Samsung Printer Language-Color
		Spool	Simultaneous Peripheral Operation Online
PCL5Ce	Printer Command Language 5Ce-Color	SRS	Software Requirment Specification
PCL6	Printer Command Language 6	SURF	Surface Rapid Fusing
PDF	Portable Document Format	SW	Switch
PDL	Page Description Language	sync	Synchronous or Synchronization
Ping	Packet internet or Inter-Network Groper	T1	ITB
		T2	Transfer Roller
PPD	Postscript Printer Discription	TRC	Toner Reproduction Curve
PPM	Page Per Minute	PnP	Universal Plug and Play
PS	Post Script	U.I.	User Interface
PS3	Post Script Level3	URL	Uniform Resource Locator
PTL	Pre-Transfer Lamp	USB	Universal Serial Bus
PTB	Paper-Transfer Belt	VCCI	Voluntary Control Council for Interference Information Technology Equipment
PWM	Pulse Width Moduration		
Q?y	Quantity		
RAM	Random Access Memory	WECA	Wireless Ethernet Compatibility Alliance
RCP	Remote Control Panel		
ROM	Read Only Memory	Wi-Fi	Wireless Fidelity
SCF/SCT	Second Cassette Feeder/Second Cassette Tray		

6.3 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

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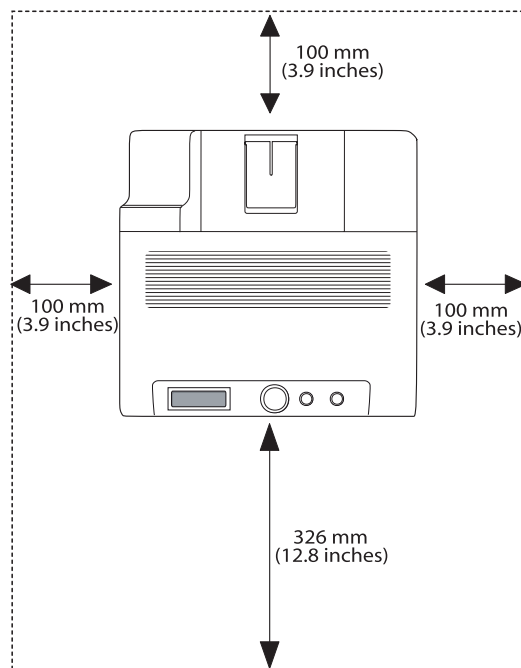
6.4 A4 ISO 19798 Standard Pattern

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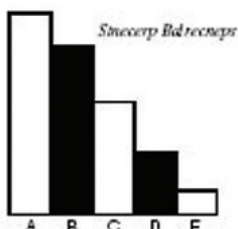
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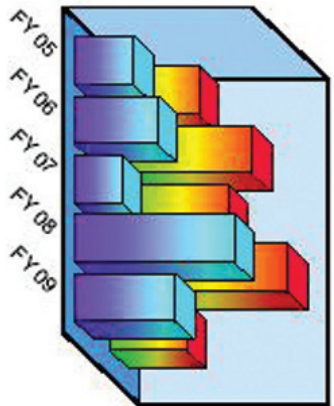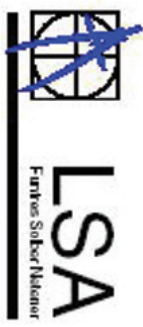
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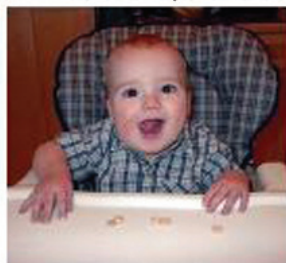
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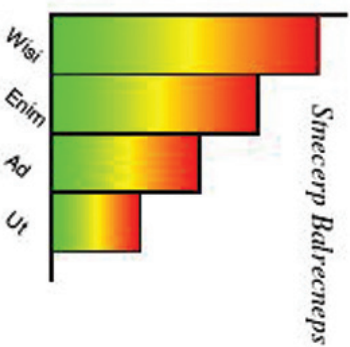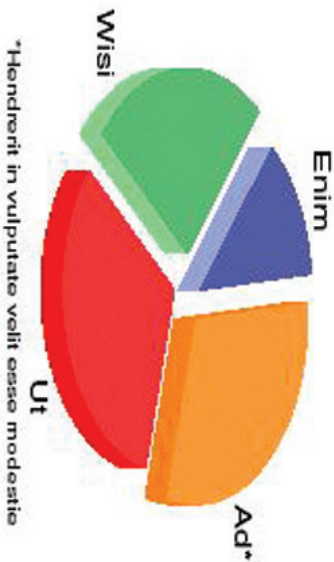
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