

**SAMSUNG**

# Color Laser Printer

## CLP-31x Series

CLP-310/315/310N/315W

Basic Model : CLP-310,CLP-315

# *SERVICE* Manual

### Samsung Color Laser Printer



### The keynote of Product

**The smallest / The lowest noise  
High Quality Multi-path CLBP**

- Model series : CLP-310/315  
CLP-310N (Network model)  
CLP-315W (Wireless model)
- Speed(Color/Mono) : 4/16 ppm(A4). 4/17ppm(Let)
- Printing resolution : Max. 2,400 x 600 dpi
- Emulation : SPL-C
- Memory : 32 MB (Network model : 32MB)  
64 MB (Wireless model : 64MB)
- Processor : Jupiter 360MHz (CLP-310/315/310N)  
Chorus 360MHz (CLP-315W)
- Interface : IEEE 802.3, Ethernet(10/100Mbps)  
Wireless: IEEE 802.11b/g(Only wireless model)
- Toner Cartridge
  - Initial : 1K Toner(K), 0.7K Toner(C,M,Y, each)
  - Sales : 1.5K Toner(K), 1K toner(C, M, Y each)
- Printer Life : 100,000 pages  
Monthly Max. Duty : 20,000 pages/month



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# 1. Precautions

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

## 1.1 Safety Warning

(1) Only to be serviced by appropriately qualified service engineers.

High voltages and lasers inside this product are dangerous. This printer should only be serviced by a suitably trained and qualified service engineer.

(2) Use only Samsung replacement parts

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

(3) Laser Safety Statement

The Printer is certified in the U.S. to conform to the requirements of DHHS 21 CFR, chapter 1 Subchapter J for Class 1(1) laser products, and elsewhere, it is certified as a Class I laser product conforming to the requirements of IEC 825. Class I laser products are not considered to be hazardous. The laser system and printer are designed so there is never any human access to laser radiation above a Class I level during normal operation, user maintenance, or prescribed service condition.

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



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

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

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

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

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

ADVARSEL - USYNLIG LASERSTRLNING VED BNING, NR  
SIKKERHEDSBRYDERE ER UDE AF FUNKTION.  
UNNG 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 ALTIINA NKYMTT...MLLE LASER-  
STEILYLLE L KATSO STEESEEN.

**注 意** - 严禁揭开此盖, 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 otherwise damaged. Do not place objects on top of the power cable. If the power cable is damaged it could overheat and cause a fire or exposed cables could cause an electric shock. Replace a damaged power cable immediately, do not reuse or repair the damaged cable. Some chemicals can attack the coating on the power cable, weakening the cover or exposing cables causing fire and shock risks.
- (8) Ensure that the power sockets and plugs are not cracked or broken in any way. Any such defects should be repaired immediately. Take care not to cut or damage the power cable or plugs when moving the machine.
- (9) Use caution during thunder or lightening storms. Samsung recommend that this machine be disconnected from the power source when such weather conditions are expected. Do not touch the machine or the power cord if it is still connected to the wall socket in these weather conditions.
- (10) Avoid damp or dusty areas, install the printer in a clean well ventilated location. Do not position the machine near a humidifier. Damp and dust build up inside the machine can lead to overheating and cause a fire.
- (11) Do not position the printer in direct sunlight. This will cause the temperature inside the printer to rise possibly leading to the printer failing to work properly and in extreme conditions could lead to a fire.
- (12) Do not insert any metal objects into the machine through the ventilator fan or other part of the casing, it could make contact with a high voltage conductor inside the machine and cause an electric shock.



## 1.2.3 Handling Precautions

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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 an 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

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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 is exposed to light. Take care not to expose the OPC Drum either to direct sunlight or to fluorescent or incandescent room lighting. Exposure for as little as 5 mins can damage the surface's photoconductive properties and will result in print quality degradation. Take extra care when servicing the printer. Remove the OPC Drum and store it in a black bag or other lightproof container. Take care when working with the covers (especially the top cover) open as light is admitted to the OPC area and can damage the OPC Drum.
  - Take care not to scratch the green surface of the 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 11 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/220V power 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 Specifications

#### 2.1.1 Product Overview

Item	Descriptions
Basic Model	CLP-310/315
Series Model	CLP-310N : Network Model CLP-315W : Wireless Model
Main Specification	<ol style="list-style-type: none"> <li>1. Speed <ul style="list-style-type: none"> <li>• Up to 16 ppm in A4 (17 ppm in Letter)</li> <li>• Up to 4 ppm in A4 (4 ppm in Letter)</li> </ul> </li> <li>2. Printing Resolution <ul style="list-style-type: none"> <li>• Max. 2400x600 dpi effective output</li> </ul> </li> <li>3. Processor <ul style="list-style-type: none"> <li>• Chorus3 (360Mhz, CLP-315W), Jupiter (360Mhz, CLP-310/315/310N)</li> </ul> </li> <li>4. Printer Language Emulations <ul style="list-style-type: none"> <li>• SPL-Color</li> </ul> </li> <li>5. Memory <ul style="list-style-type: none"> <li>• FLASH ROM    2MB : CLP-310/315                       4MB : CLP-310N                       8MB : CLP-315W</li> <li>• DDR2 SDRAM 32MB : CLP-310/315/310N                       64MB : CLP-315W</li> </ul> </li> <li>6. Interfaces <ul style="list-style-type: none"> <li>• One USB port</li> <li>• One 10/100 BaseT network connector</li> <li>• One IEEE 802.11 b/g wireless LAN</li> </ul> </li> <li>7. Control Panel <ul style="list-style-type: none"> <li>• No LCD, 1 keys and 6 LEDs</li> </ul> </li> <li>8. Toner cartridge <ul style="list-style-type: none"> <li>• Black : 1K (initial) / 1.5K (sales)</li> <li>• Color : 0.7K (initial) / 1K (sales)</li> </ul> </li> <li>9. Color <ul style="list-style-type: none"> <li>• There are two kinds of colors. (Gray and Black)</li> </ul> </li> </ol> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>

## 2.1.2 Product Specification

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

### 2.1.2.1 General Print Engine

Item		CLP-310/315	CLP-310N/CLP-315W
Print Speed	Simplex	B&W : 17ppm@Letter	B&W : 17ppm@Letter
		16ppm@A4	16ppm@A4
		Color : 4ppm@A4,.Letter	Color : 4ppm@A4,.Letter
	Duplex	NA	NA
Print Emulation		SPL-C	SPL-C
Auto Emulation Sensing		NA	NA
Font	Type	NA	NA
	Number	NA	NA
Power Save		Yes (5/10/15/30/60/120min.)	Yes (5/10/15/30/60/120min.)
Resolution	Normal	Up to 2400X600dpi Class (Default 1200x600 dpi)	Up to 2400X600dpi Class (Default 1200x600 dpi)
		Optical: 600x600 Dpi	Optical: 600x600 Dpi
	RET	NA	NA
Toner Save		NA	NA
FPOT	From Ready	Less than 26 sec ( Color )	Less than 26 sec ( Color )
		Less than 14 sec ( B&W )	Less than 14 sec ( B&W )
	From Idle	Less than 57 sec ( Color )	Less than 57 sec ( Color )
		Less than 45 sec (B&W)	Less than 45 sec (B&W)
	From Cold Boot	Less than 57 sec ( Color )	Less than 57 sec ( Color )
		Less than 45 sec (B&W)	Less than 45 sec (B&W)
Duplex Print		NA	NA
Printable Area	210 x 297 mm (A4)		210 x 297 mm (A4)
	216 x 279 mm (Letter)		216 x 279 mm (Letter)
	216 x 355.6 mm (Legal)		216 x 355.6 mm (Legal)
Print Margin	Side Margin: 4.23±2mm		Side Margin: 4.23±2mm
	Top Margin: 4.23±3mm		Top Margin: 4.23±3mm

## 2.1.2.2 Controller &amp; S/W

Item		CLP-310/315	CLP-310N/CLP-315W
MPU		Jupiter (360Mhz)	310N : Jupiter (360Mhz) 315W : Chorus3 (360Mhz)
Memory	Standard / Max.	32MB / 32MB	32MB / 32MB
	Type	DDR2 SDRAM	DDR2 SDRAM
	Expand Memory Slot & Type	NA	NA
	Compression Technology	YES	YES
Supporting OS		Microsoft Windows: 2000/2003/XP(Include 64bit),Vista Linux(Printer only)OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2	Microsoft Windows: 2000/2003/XP(Include 64bit),Vista MacOS:10.3,10.4 MacOS:10.3,10.4 Linux(Printer only)OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2
Default Driver		SPL-C	SPL-C
Driver feature		Microsoft Windows: -Watermark -N-up printing -Poster printing -Manual Dulpex -Quality(Best,Normal,Draft) -Color mode(Color, Gray scale) -Device Color Support -Color Management Support [Mac] -N-up printing -Quality(Best,Normal,Draft) -Color mode(Color, Gray scale) [Linux] - N-up printing -Quality(Best,Normal,Draft) [Common] -N/W Install during driver install	Microsoft Windows: -Watermark -N-up printing -Poster printing -Manual Dulpex -Quality(Best,Normal,Draft) -Color mode(Color, Gray scale) -Device Color Support -Color Management Support [Mac] -N-up printing -Quality(Best,Normal,Draft) -Color mode(Color, Gray scale) [Linux] - N-up printing -Quality(Best,Normal,Draft) [Common] -N/W Install during driver install
WHQL		Windows 2000 including vista	Windows 2000 including vista

Item	CLP-310/315	CLP-310N/CLP-315W
Language Localization	[Windows] - Korean,English,French,German,Italian,Spanish,Russian,Dutch,E.Portuguese,B.Portuguese,Finnish,Swedish,Norwegian,Danish,S.Chinese,T.Chinese,Polish,Hungarian,Greek,Czech,Turkish [Mac] - Korean,English,French,German,Italian,Spanish [Linux] - English Only	[Windows] - Korean,English,French,German,Italian,Spanish,Russian,Dutch,E.Portuguese,B.Portuguese,Finnish,Swedish,Norwegian,Danish,S.Chinese,T.Chinese,Polish,Hungarian,Greek,Czech,Turkish [Mac] - Korean,English,French,German,Italian,Spanish [Linux] - English Only
Smart Panel	USB	310N : USB/Network 315W : USB/Network/Wireless Network
	Default Install	Default Install
Network Management	NA	Set IP.SWAS &SWS (Linux, Mac not support, SWAS&SWS need Internet explorer 5.0 or Higher) NA Management
Smart Thru	NA	Smart Thru 4

## 2.1.2.3 Interface




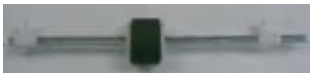



Item		CLP-310/315	CLP-310N/CLP-315W
Interface	Parallel	NA	NA
	USB	USB 2.0	USB 2.0
	Network	NA	Ethernet 10/100 base Tx
	Wireless	NA	802.11 b/g (only 315W)
Network Interface	Protocol	NA	TCP/IP,IPP,SNMPv2
	Network OS	NA	<ul style="list-style-type: none"> <li>- Microsoft Windows: 98/ME/2000/XP(32/64Bit) 2003 Server(32/64Bit)/ Vista</li> <li>- Mac OS: 10.3,10.4(Printing OnTCP/IP)</li> <li>- Linux OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 &amp; Suse 8.2~9.2</li> <li>- Unix HP-UX, Solaris,SunOS SCO UNIX</li> </ul>
User Interface	LCD	NA	NA
	OP UI	Key 1 EA, LED 6EA	Key 1 EA, LED 6EA
	Sound UI	NA	NA



## 2.1.2.4 Paper Handling

Item		CLP-310/315	CLP-310N/CLP-315W
Capacity	Cassette	150sheets@75g/m <sup>2</sup> (Max) Envelop ; 5 Sheets Transparency ; 1 Sheets Label , thick paper ; 10 Sheets	150sheets@75g/m <sup>2</sup> (Max) Envelop ; 5 Sheets Transparency ; 1 Sheets Label , thick paper ; 10 Sheets
	MP Tray	NA	NA
	Option Cassette	NA	NA
Output Capacity		Face Down: 100Sheets/20lb Envelop ; 5 Sheets Transparency ; 1 Sheets Label , thick paper ; 10 Sheets	Face Down: 100Sheets/20lb Envelop ; 5 Sheets Transparency ; 1 Sheets Label , thick paper ; 10 Sheets
Output Full Sensing		No	No
Duplex		NA	NA
Paper Type	Cassette	A4, A5,A6, Letter, Legal, Executive, Folio, ISO B5, JIS B5 Transparency;(Mono Print Only)	A4, A5,A6, Letter, Legal, Executive, Folio, ISO B5, JIS B5 Transparency;(Mono Print Only)
	MP Tray	NA	NA
	Option Tray	NA	NA
Paper Weight	Cassette	16~43 lb. (60 to 163g/m <sup>2</sup> )	16~43 lb. (60 to 163g/m <sup>2</sup> )
Paper Path	Standard output	Bottom to Top Front (FIFO)	Bottom to Top Front (FIFO)
	Straight Through	NA	NA
Paper Size	Max	216 x 355.6mm(8.5"x14")	216 x 355.6mm(8.5"x14")
	Min	76 x 160mm(3"x6.3")	76 x 160mm(3"x6.3")
Jam Rate	Cassette	1/3,000	1/3,000
Multi-Feed Rate	Cassette	1/1,500	1/1,500
Printing Skew	Top	1.5/201.4mm (Cassette)	1.5/201.4mm (Cassette)
	Side	2.0/270.4mm (Cassette)	2.0/270.4mm (Cassette)

### 2.1.2.5 Consumables

Item	Image	Pages Printed	Part number	Remark
Black Toner cartridge		Approx. Initial : 1,000 Pages* Sales : 1,500 Pages*	CLT-K409S(Black)	CRU
Color Toner cartridge		Approx. Initial : 700 Pages* Sales : 1,000 Pages*	CLT-C409S(Cyan) CLT-M409S(Magenta) CLT-Y409S(Yellow)	
Imagine unit		Approx. 24000 images*	CLT-R409	
Waste Toner		Mono: Approx. 2500 images Color: Approx. 2500 images	CLT-W409	
Pick-up roller		Approx. 50,000 pages	JC97-03028A	FRU
Fuser unit		Approx. 100,000 black pages or 50,000 color bages	JC96-05492B(110V)	
			JC96-05491B (220V)	
T2 roller		Approx. 10,000 pages	JC97-03046A	
ITB		Approx. 100,000 black pages or 50,000 color bages	JC96-04840A	

\* Average A4-/letter-sized page count based on Std. ISO 19798 of individual colors on each page. Usage conditions and print patterns may cause results to vary.

## 2.1.2.6 Reliability &amp; Service

Item	CLP-310/315	CLP-310N/CLP-315W
Max Monthly Duty	20,000 image (Color: 16,000/ Mono: 4,000)	20,000 image (Color: 16,000/ Mono: 4,000)
SET Life Cycle	100,000image or 5 years whichever comes first	100,000image or 5 years whichever comes first
MTBF	40,000 images (color 32,000 images and black 8,000 images : total 40,000 image)	40,000 images (color 32,000 images and black 8,000 images : total 40,000 image)
MTTR	<30 min.	<30 min.
Real-time Clock	No	No
System record	Total image count Total page count (color/mono) Imaging unit Information Transfer roller life Transfer belt life Toner information Tray roller life	Total image count Total page count (color/mono) Imaging unit Information Transfer roller life Transfer belt life Toner information Tray roller life
Minimum System Requirement	Pentium- II 400MHZ, 64MB RAM, 300MB HDD, Internet Explorer 5.0	Pentium- II 400MHZ, 64MB RAM, 300MB HDD, Internet Explorer 5.0





## 2.1.2.7 Environment

Item		CLP-310/315	CLP-310N/CLP-315W
Power Consumption	Ready	Less than 160W	Less than 160W
	Average	Less than 350W (Currency:5A(110V)/3A(220V))	Less than 350W (Currency:5A(110V)/3A(220V))
	Max/Peak	700W/1KW	700W/1KW
	Sleep/Power off	Less than 8.4W	Less than 8.4W
Power Supply	Input Voltage	Low Voltage : 110 ~ 127VAC High Voltage : 220 ~ 240VAC	Low Voltage : 110 ~ 127VAC High Voltage : 220 ~ 240VAC
	Input Frequency	50 / 60Hz(+/- 3Hz)	50 / 60Hz(+/- 3Hz)
Noise	Printing	Mono : 46dBA Color : 48dBA	Mono : 46dBA Color : 48dBA
	Standby	Background noise level	Background noise level
	Sleep	Background noise level	Background noise level
Warm Up Time	From Cold Status (At rated volt)	Less than 35 seconds	Less than 35 seconds
Temperature	Operating	10~32.5℃	10~32.5℃
	Storage (Un-Packed)	5~35℃	5~35℃
	Storage (Packed)	-20~50℃	-20~50℃
Humidity	Operating	20 ~ 80% RH	20 ~ 80% RH
	Storage (Un-Packed)	20 ~ 80% RH	20 ~ 80% RH
	Storage (Packed)	10~90% RH	10~90% RH
Altitude		Normal: 0~3000ft (0~1000m)	Normal: 0~3000ft (0~1000m)
		High: 3001~6600ft( ~2000m)	High: 3001~6600ft( ~2000m)
		Higher: 6601~9900ft( ~3000m)	Higher: 6601~9900ft( ~3000m)
		Highest;9901~13000ft( ~4000m)	Highest;9901~13000ft( ~4000m)

## 2.1.2.8 Accessory

Item		CLP-310/315	CLP-310N/CLP-315W
Quick setup guide		Yes	Yes
Owner's manual		Yes	Yes
S/W CD ROM		1 : for Driver	1 : for Driver 2 : for Network
S/W	1 CD for Driver, SmarThru 4	1 CD for Driver, SmartThru 4, EUG	1 CD for Driver, SmartThru 4, EUG
Toner Cartridge		4 EA (0.7K/0.5K yield ISO 19752 5% Coverage)	4 EA (0.7K/0.5K yield ISO 19752 5% Coverage)
Power Cable		1 EA	1 EA
Printer Cable		1 EA	1 EA

### 2.1.3 Model Comparison Table

	Samsung CLP-310	Samsung CLP-300	HP CLJ 1600	HP LJ 1022
Image				
Speed	16/4 ppm	16/4 ppm	8/8 ppm -> 12/10 ppm (E)	18 ppm
processor	360 MHz	300 MHz	264 MHz	266 MHz
Memory	32 MB	32 MB	16 MB	8 MB
Print Language	SPL-C	SPL-C	GDI	PCL5e
Input	150 sheets CST	150 sheets CST	250 sheets CST, 1 Manual	150 sheets MP, 10 Manual
Duplex	Manual	Manual	Manual	Manual
Interface	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Size (mm)	388 x 314 x 237	350x315x250	407 x 453 x 370	370 x 245 x 241
Weight	11 kg	13 kg	18.4 kg	5.5 kg
Noise	45 dBA	49 dBA	47 dBA	-
Toner (Black/Color)	1.5 K/1K	2K/1K	2.5 K/2K	2K

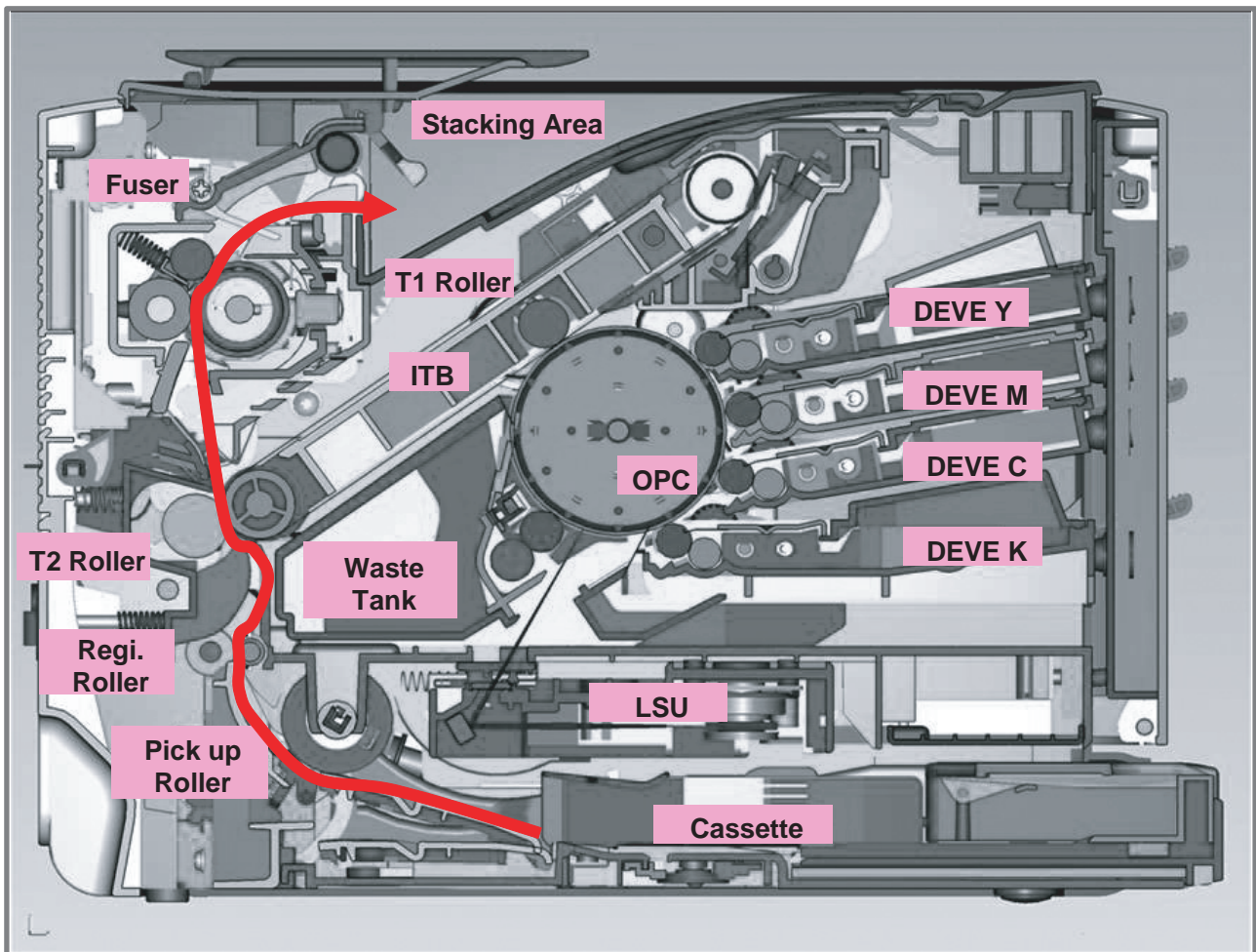
## 2.2 System Overview

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

### 2.2.1 System Structure

The Printer function consists of the Engine part and the Main Controller part, and the Engine part consists of the Mechanical part comprising a Frame, Feeding, Developing, Driving, Transferring, Fusing, and Cabinet and the Electrical part comprising a SMPS, a HVPS, a LSU, and some facilities in the Main Controller to control the Engine part for printing.

#### 2.2.1.1 Main Parts of System





① **Cassette**

- Feeding Method : Cassette Type
- Feeding Standard : Center Loading
- Feeding Capacity : Cassette 150 Sheets(75g/m<sup>2</sup>, 20lb Pa per Standard)
- No Manual Feeder
- Paper Detecting Sensor : Photo Sensor (Empty, Registration, Exit)
- Paper Size Sensor : None

② **LSU(Laser Scan Unit)**

The LSU unit is controlled by video controller. It scans the video data received from video controller with laser beam by using the rotation principle of the polygon mirror to create the latent image on the OPC drum. It is the core part of LBP.

The OPC drum rotates as the same speed as the paper feeding speed. It creates the /HSYNC signal and sends it to the engine when the laser beam of the LSU reaches the end of the polygon mirror, and the engine detects the /HSYNC signal to arrange the vertical line of the image on the paper. After detecting the /HSYNC signal, the image data is sent to the LSU to arrange the its margin on the paper.

- Consisted of LD(Laser Diode) and Polygon Motor Control.

Error	Phenomenon
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



③ **2nd Transfer Ass'y**

- The life span: Print over 100,000 sheets (in 15~30 )
- Specification: Similar to CLP-300 Series

④ **Fuser Ass'y**

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

- \* Heat Lamp : Kunckle Type
- \* Fusing system : 3-Roll Fusing type
  - Heat roller : Pipe type (Lamp inside)
  - Pressure roller
  - Pressure roller Shaft
- \* Thermistor - Temperature-Measuring Device
- \* Thermostat - Critical Temperature-Detecting Device
- \* The life span – 100k(black)/color(25k)

**Thermostat**

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

**Heat roller**

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

**Pressure roller**

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





⑤ & ⑥ **ITB(Intermediate Transfer Belt) & 1st Transfer Roller**

- The life span: Print over 100,000 Images
- The ITB unit includes 1st Transfer Roller

⑦ & ⑧ **OPC(Organic Photo-Conductor) & Developer**

- The life span: Print over 50,000 Images (Both)
- Image Unit consists of 4 kinds of Developer , OPC, and Deve. Main Frame



⑨ **Toner Kits**

- The life span: Color -> 1000 images (Std. ISO 19798 Print-Out)
- Black -> 1500 images (Std. ISO 19798 Print-Out)

⑩ **Driver Ass'y**

- It is a power delivery unit by gearing
- By driving the motor, it supplies the power to the feeding unit, the fusing unit, and the distributing unit.
- The Main Motor is similar to CLP-300 Series Main Motor.

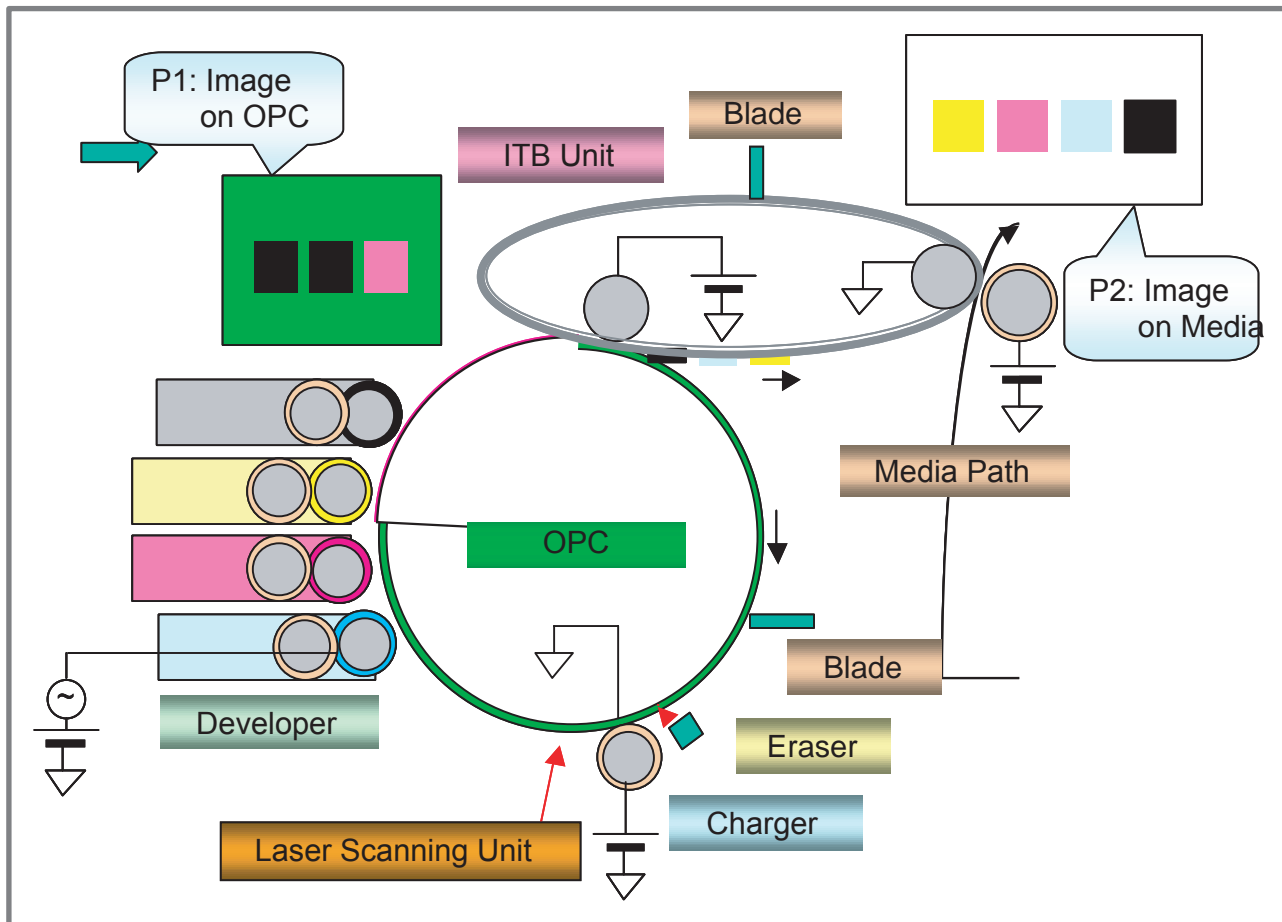
⑪ **Wireless PBA (Only CLP-315W)**

- CLP-315W model has a Wireless PBA to use wireless network.



### 2.2.1.2 EP Process

- Structure of EP Process



① **Charging**

- Conductive Roller charging
- Applied voltage : -1.1kV
- Charge acceptance : -520V
- OPC coating thickness : 21um
- OPC diameter :  $\Phi$ 60mm
- Eraser system

1. Organic Photoconductor is charged to uniform voltage by conductive roll charging method
2. No ozone is produced because corona is not used
3. Charger roll is cleaned with cleaning roll
4. Toner remained on OPC after T1 process is cleaned by cleaning blade and retrieved into waste toner box by auger and belt driving mechanism

② **Exposing**

- One polygon motor ( 6 facet )
- Single beam LD (1ea)
- LD wavelength : 785nm
- Polygon motor rpm : 29685
- LSU energy : 0.25uJ/cm<sup>2</sup>
- OPC exposed potential : -50V

1. Exposing is implemented by laser striking on to OPC with uniform potential
2. Laser beam is modulated according to image to be printed that is from PC
3. Latent Image is formed on OPC, which is developed with toner

③ **Developing**

- Non-magnetic, mono component
- Non-contact development
- Developing bias : DC + AC
- AC peak to peak : 1.5 ~ 2.0kV
- Roller diameter :  $\Phi$ 10mm
- Process speed ratio : 1.2 (OPC=1.0)
- Color order : Y -> M -> C -> K

1. Only latent image formed by exposing process is developed with toner
2. AC + DC Voltage is being used to develop toner into latent image on OPC because non-contact developing method is adopted
3. Y, M, C, and K Images are sequentially developed onto OPC and transferred onto Intermediate Transfer Belt (hereafter ITB) to form a color image on ITB
4. Toner Bottles are used to supply toner into developer compartment
5. Toner level is being sensed to control toner supply from toner bottle to developer

④ **Transfer 1**

- Multi-pass transfer
- Indirect transfer
- Transfer voltage : 0.5 ~ 2.0kV (controllable)
- Roller diameter :  $\Phi$ 14mm
- Transfer unit life : 100K images

1. Developed Image on OPC is transferred onto ITB by T1 Process
2. T1 Voltage is positive which attract toner to ITB
3. 4 times of T1 process is required to make a color image on ITB, which means multi-pass process
4. ITB has a hole as a fiducial mark for timing. Engine control for color image is synchronous with it, ITB Home Sensing Signal

⑤ **Transfer 2**

- Indirect transfer
- Transfer voltage : 1 ~ 4.0kV (controllable)
- Roller diameter :  $\Phi$ 18.6mm
- Transfer unit life : 100 K images

1. Color image formed on ITB is transferred onto media by T2 process
2. T2 voltage is also positive to get color image moved onto media
3. Toner remained on ITB after T2 process is cleaning by ITB cleaning blade and collected and
4. Transported and retrieved into waste toner box by auger and belt driving system
5. T2 Roll is engaged when color image is being transferred onto media. Otherwise it is disengaged. Clutch is used for driving T2 Roll engagement and disengagement

⑥ **Fusing**

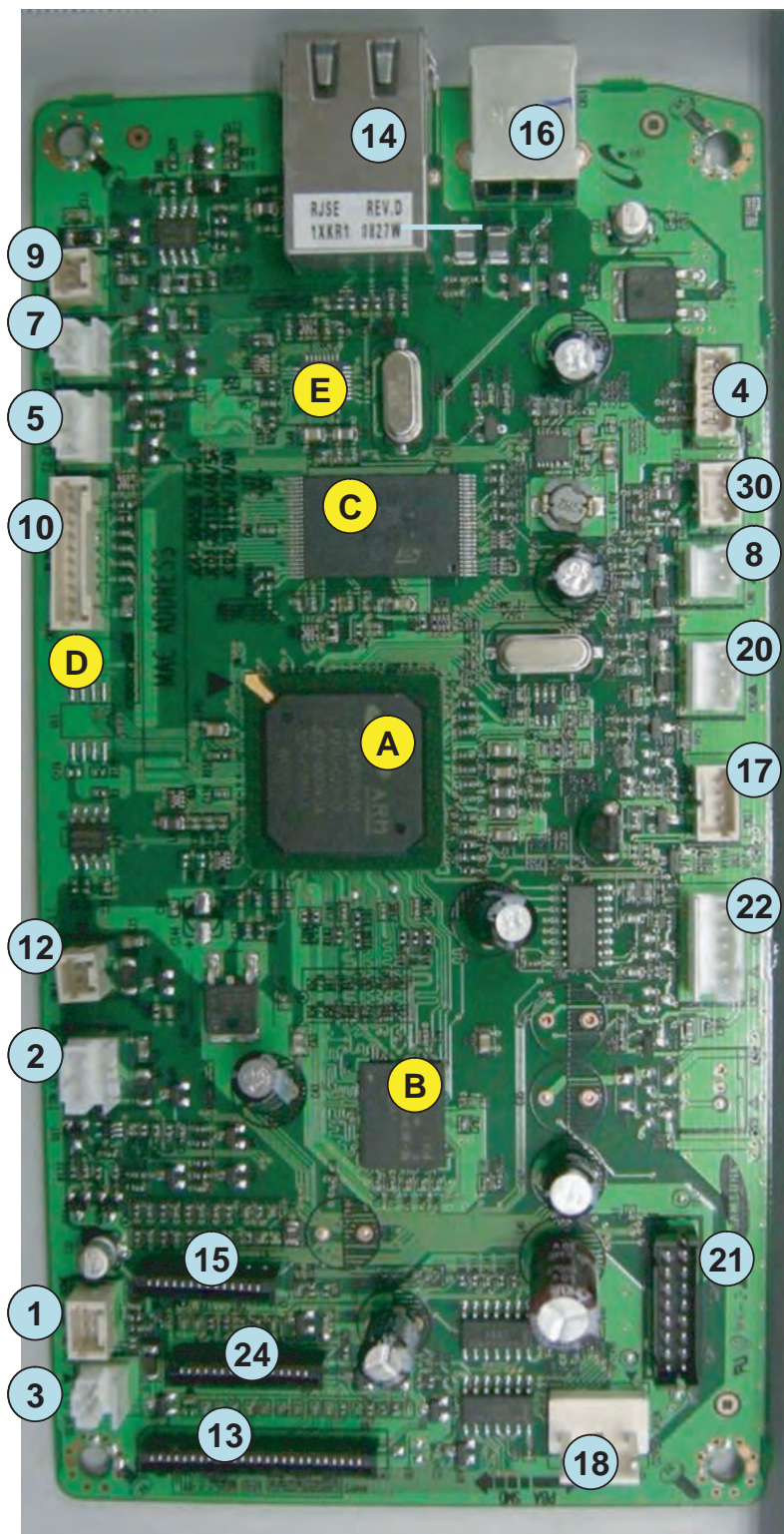
- 3 Roll system
  - > short warm-up time (35sec)
- Post Pressure Roll

1. Color Image on media is melted down and fixed into media by fusing process

## 2.2.2 Main PBA Description

### 2.2.2.1 Main Controller PBA

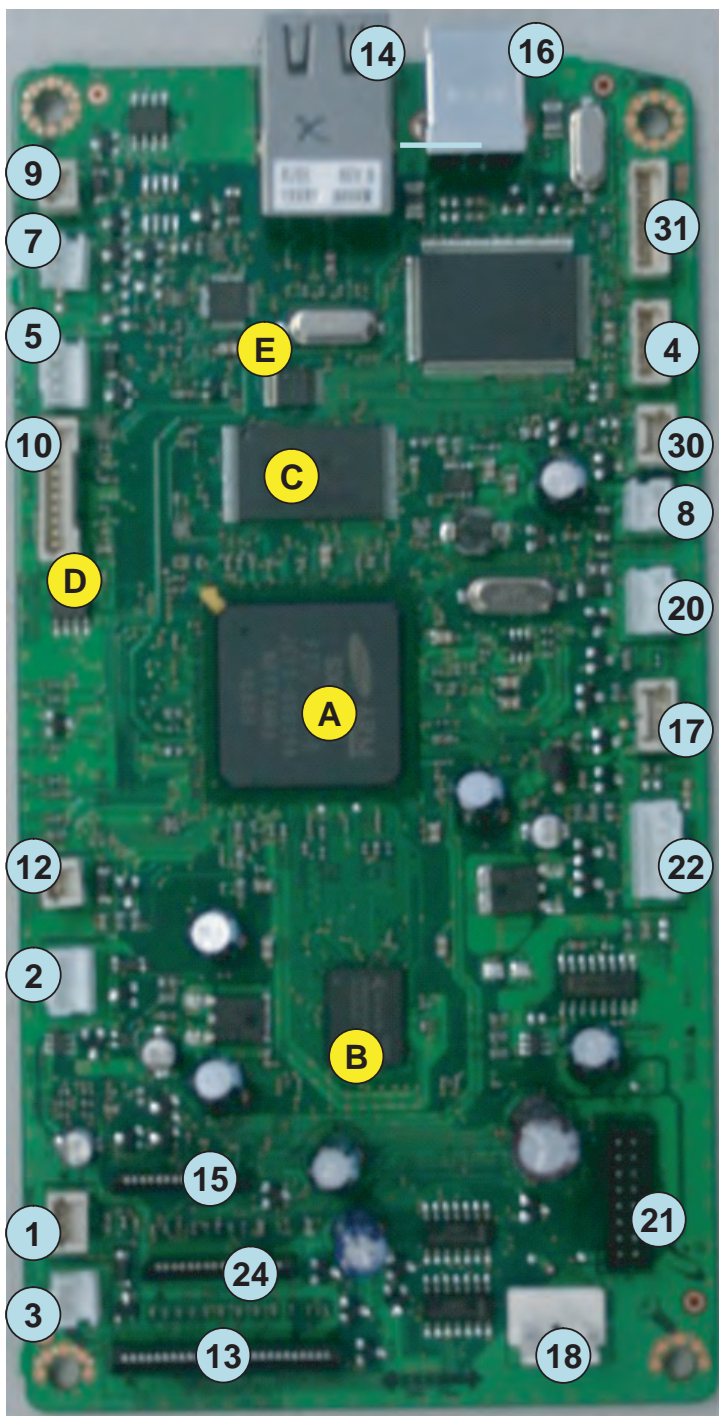
- CLP-310N ( VE model )



NO.	NAME
1	Deve home CON.(3P)
2	ITB CLT(3P)
3	Deve CLT(2P)
4	Debug(4P)
5	T2 CLT(2P)
7	Fuser(2P)
8	Regi CLT.(2P)
9	Fuser CLT.(2P)
10	BLDC Motor(10P)
12	ITB Tension(3P)
13	HVPS(26P)
14	Wired N/W Con. (14P)
15	OPE & ITB (15P)
16	USB Con. (6P)
17	Key PTL(10P)
18	Cover OPEN (2P)
19	Pickup CLT (2P)
20	Pickup CLT. (3P)
21	SMPS (16P)
22	CRUM Con. (5P)
24	LSU Con.(16P)
30	Empty. (3P)
NO.	NAME
A	CPU(Jupiter5)
B	DDR2 (32MB)
C	NOR FLASH(2MB or 4MB)
D	EEPROM
E	PHY Chip

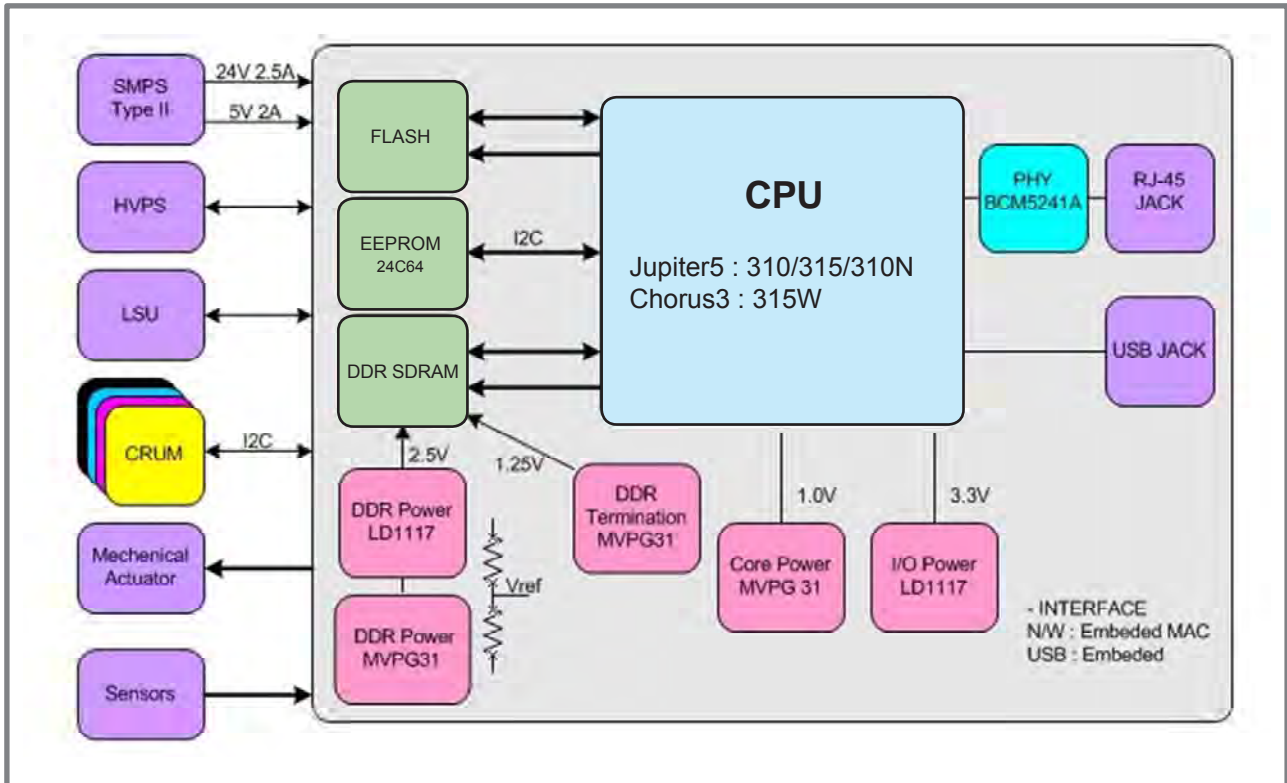


- CLP-315W



NO.	NAME
1	Deve home CON.(3P)
2	ITB CLT(3P)
3	Deve CLT(2P)
4	Debug(4P)
5	T2 CLT(2P)
7	Fuser(2P)
8	Regi CLT.(2P)
9	Fuser CLT.(2P)
10	BLDC Motor(10P)
12	ITB Tension(3P)
13	HVPS(26P)
14	Wired N/W Con. (14P)
15	OPE & ITB (15P)
16	USB Con. (6P)
17	Key PTL(10P)
18	Cover OPEN (2P)
19	Pickup CLT (2P)
20	Pickup CLT. (3P)
21	SMPS (16P)
22	CRUM Con. (5P)
24	LSU Con.(16P)
30	Empty. (3P)
31	W-LAN PBA
NO.	NAME
A	CPU(Chorus3)
B	DDR2 (64MB)
C	NOR FLASH(8MB)
D	EEPROM
E	PHY Chip

### 2.2.2.3 Main PBA Description



#### Jupiter5(or Chorus3)

A Proprietary SoC, CHORUS3, executes and controls all jobs and functions to be required for printing. To do these all jobs, the CHORUS3 incorporates all H/W blocks as follows.

- CPU Core ARM 926ESJ, I/D-Cache 16/16KB , Up to 400MHz
- System Bus Internally 32-bit width, Up to 120MHz
- MEM Controller DDR1/2, 16-bit width, 166MHz, 4-Bank, 128MB Space/bank
- ROM Controller 16-bit width, 4-bank, 16MB Space/bank
- CODEC Controller JBIG 4-ch Decoder and 2-ch Encoder, 1-ch JPEG
- Image Processor Processing Scan Image
- MAC Controller 10/100Mbps Full IEEE 802.3 Compatibility
- USB Controller USB2.0, Device or Host
- UART Controller
- I2C Controller
- Interrupt Controller
- Misc. Controller ADC, DAC, PWM, Step Motor Control and so on
- Voltage Core 1.0V, I/O 3.3V
- Package 416PBGA

#### Flash Memory

Used to store System Programs including the Operating System.

- Type NOR Flash
- Bus 16-bit width
- Size : 2MB (CLP-310/315)
  - 4MB (CLP-310N)
  - 8MB (CLP-315W)

**System Memory**

Used as a Printing buffer for printing, a Scan buffer for scanning, a ECM Buffer for System Working Area.

- Type DDR1 SDRAM
- Bus 16-bit 166MHz
- Size 32MB (310/315/310N) / 64MB(315W)

**CRU Control**

Used to store the printing and operating information into a Security EEPROM in 4 CRUs, Y,M,C and K Imaging Cartridge, respectively by the CHORUS3.

- Access I2C Bus Ch.2 400KHz
- Security Size 2K-bit

**System Information Control**

Used to store the system operating information needed at printing into a EEPROM in the Main Controller by the CHORUS3.

- Access I2C Bus Ch.1 400KHz
- EEPROM Size 64Kbit

**OPE Interface**

Used to control the OPE by the CHORUS3. Through CHORUS3's GPIO pins, all LEDs and Keys in the OPE are controlled.

**I/O Port**

Used to receive or transmit some data from/to the Host.

- USB Device USB2.0 High speed 480Mbps
- Network Ethernet 10/100-Base Tx

(note) The Network only equipped at CLP-310N/315N, not CLP-310/315.

**Engine Control**

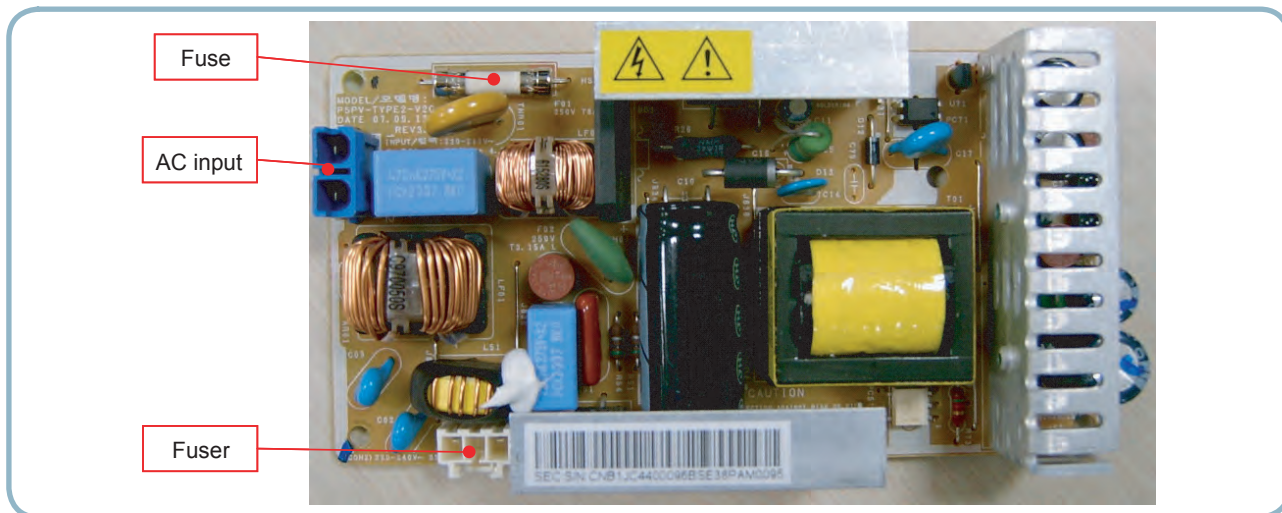
Used to control all parts to be required at printing by the CHORUS 3.

- Sensors
  - Paper Empty
  - Paper Registration
  - Waste Toner Bottle
  - Paper Exit
  - Temperature sensors
  - Etc.
- Clutches(Solenoid)
  - Paper Pick Up
  - Paper Registration
  - Etc.
- Motor 1 BLDC
- LSU
- Fuser Control the Fuser's temperature
- HVPS Control the high voltage outputs
- ADC Reading the Fuser's temperature and the high voltage outputs' feedback
- Cover Open Sensing



### 2.2.2.4 SMPS(Switching Mode Power Supply) PBA

SMPS is the power source of the entire system. It is assembled by an independent module, so it is possible to use for common use. It is mounted at the side of the set. It is consisted of the SMPS part which supplies the DC Power for driving the system and the AC Heater control part which supplies the AC Power to the Fuser. The SMPS has two DC output channels, +5V and +24V.



#### AC Input

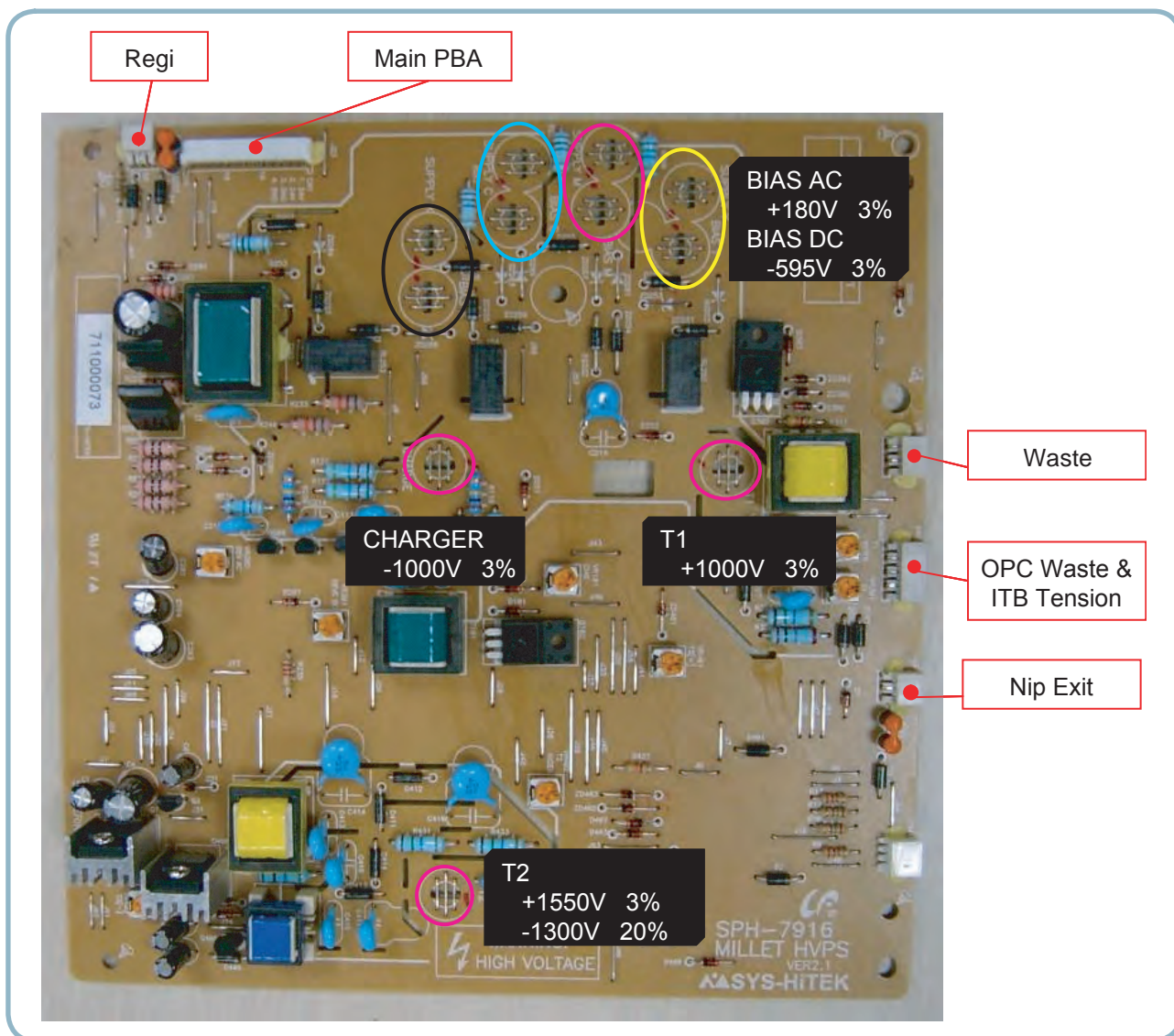
Input Rated Voltage	AC 110V~127V, AC 220V~240V AC 120V/AC 220V(EXP version)
Input fluctuating range	AC 99V~135V, AC 198V~264V
Rated Frequency	50/60 Hz
Frequency Fluctuating	47~63 Hz
Input Current	< 4.0Arms, 2.0Arms

#### Rated Output Power

No	Item	CH1	CH2	Remark
1	Channel Name	+5V	+24.0V	
2	Connector Pin	CON 3 5V Pin: 11,13,15 GND Pin: 12,14,16	CON 3 24V Pin:3,5,7,9 GND Pin:4,6,8,10	
3	Rated Output	+5V $\pm$ 5% (4.75~5.25V)	+24V $\pm$ 10% (21.6~26.4V)	
4	Max. Output Current	2 A	2.4 A	
5	Peak Loading Current	2.2 A	2.7 A	1ms
6	Ripple Noise	<100mVp-p	<500mVp-p	
7	Maximum Output	10.2W	60W	
8	Peak Output	11W	64.8W	1ms
9	Protection for loading shortage and overflowing current	Shut down or Fuse Protection	Shut down or Output Voltage Drop	

### 2.2.2.5 HVPS(High Voltage Power Supply) PBA

The HVPS creates the high voltages for T1(+), T2(+,-), Charger(-), DEV, and SUPPLY and then, supplies these voltages to the Developer part for making best condition to print. The HVPS part takes the 24V and outputs the high voltages and then, the high voltages are supplied to the Toner, OPC Cartridge, and Transfer Belt and Roller.



**1) Charger Voltage : Charger**

- Function: voltage that charges OPC surface up to -500V~ -800V.
- Output voltage: -1.0KV ~ -2.0KV DC 3%
- Error type: if the voltage fails to be output to Charger Roll, OPC surface will not be charged, and the toner on the developer roller will be transferred to OPC Drum, printing black paper.

**2) 1st Transfer High Voltage : T1(+)**

- Function: voltage necessary for transferring toner developed on OPC Drum surface onto ITB.
- Output voltage: Max +2.0KV 3%(Duty variable, no load)
- ERROR type: if T1(+) output fails, the toner on OPC drum will not be transferred to ITB normally and the image will be blurred.

**3) 2nd Transfer High Voltage : T2(+)**

- Function: voltage used to transfer the toner primarily transferred on ITB again onto paper.
- Output voltage: Max +5.0KV 3%(Duty variable, no load)
- ERROR type: if T2(+) output fails, the toner on ITB will not be transferred to paper normally and the image will be blurred.

**4) T2 Cleaning Voltage : Clean : T2(-)**

- Function: prevent reverse side of paper from being dirtied, by recovering the negatively charged toner remaining at Transfer Roller and sending it onto ITB.
- Output voltage: with no feedback control, output fixed voltage(-1300V 15%)
- ERROR type: reverse side of paper will be dirtied.

**5) Supplying Voltage : Supply AC+DC(-)**

- Function: voltage that makes toner to develop on the area exposed by LSU by means of potential difference, output will be the voltage of AC+DC overlapped form.
- Output voltage: AC 600V ~ 2000V p-p 1.5%  
DC -50V ~ -600V DC 3%
- ERROR type: 1. if supply is GND, density will be extremely low.  
2. if supply is floating (for insecure terminal contact), density will be down so slightly that it is impossible to make out with naked eyes.

**6) Developing Voltage : Deve AC+DC(-)**

- Function: voltage that supplies toner to Developing Roller
- Output voltage: AC 250V ~ 1650Vp-p 1.5% (supply voltage is connected to ZENER Diode 350V)  
DC -50V ~ -600V DC 3%
- ERROR type: 1. if Deve is GND, density will be extremely down.  
2. if Deve is floating (for insecure terminal contact), density will be extremely down.

## 2.2.3 CRUM

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The CLP-310N engine will be equipped with electronics that can read and write data into NVRAMs otherwise known as CRUMs that reside within 1) C, M, Y, K Toner cartridges.

The CRUM has a company ID, and electronics logo.

The toner CRUM also identifies the type of toner cartridge (Standard or High Capacity). The CRUMs contain fixed data such as the low warning point, specified life point, and hard stop point (on toner) and also store the current life count (pages count, pixels count, images count) and % of usage (gas gauge) data.

### ■ In the case of Refill Toner Install

1) Perception of Refill Cartridge (when power is on or the cover is closed)

End of Life / life span data initialization -> judge to be Refill Cartridge

End of Life / life exhausted (simple refill) -> stop printing caused by life exhaustion

2) Operating

It is impossible to control appropriate development parameters, for there s no toner specification data.

It runs with the setting of default development parameter. (Image quality will be degraded, for the lack of appropriate respond to the change of time and environment.)

### ■ Process after CRU life expiration

1) Record the information of End of Life.

2) Clear some information of Operation Area.

-> Supplier/Model Name/MFC date/Serial Number (Manufacture Information)

-> Let cartridge refiller initialize manufacture information and life span information.

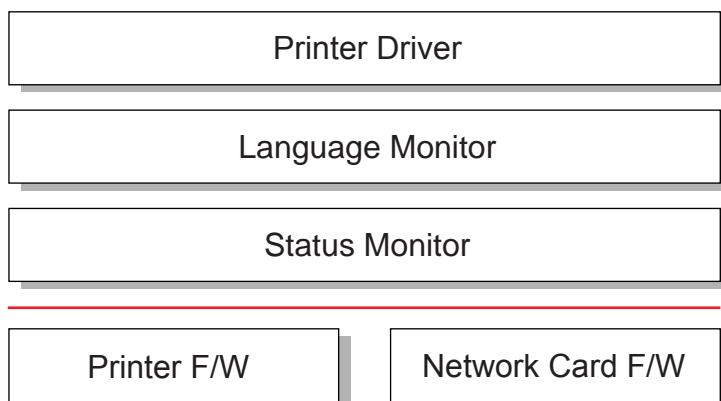
## 2.3 S/W Structure and Descriptions

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### 2.3.1 Architecture

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The belt CRUM interface board is a transmission belt CRUM interface board of the photoelectric Dry Color Laser Printer, mounted on the printer body, making it possible to physically combine the body and the belt CRUM board.



### 2.3.2 Language Monitor

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Language Monitor is a part of the Printer Driver and the Windows Spool System. The main roll of the Language Monitor is that sends a job start message to the Status Monitor. Therefore the Status Monitor can start polling to get the printer status.

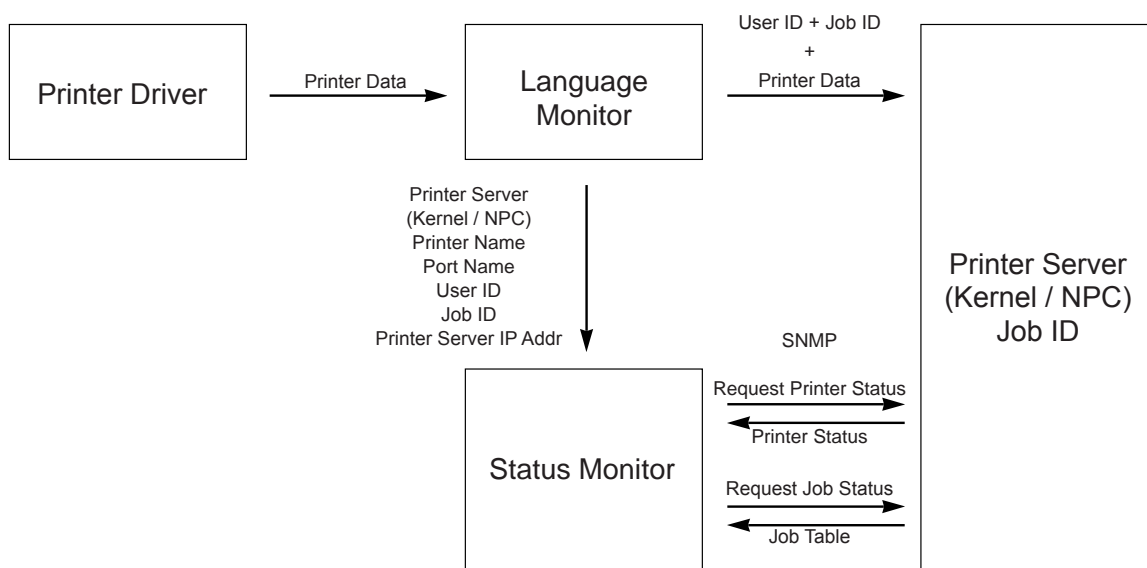
The second roll is that sends the job information such as User ID and Job ID to the Status Monitor and the Printer F/W. Hence the Status Monitor can stop polling because the Printer F/W informs the Status Monitor that printing job is complete.

### 2.3.3 Status Monitor

---

Status Monitor has no user interface. It shows only HTML help when any error occurs during printing jobs.

### 2.3.4 Network Interface



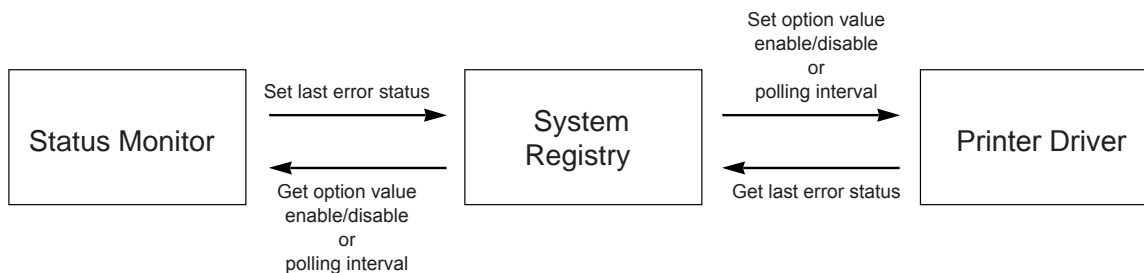
Status Monitor Data Flow

After polling is started, Status Monitor has to know when it stops the polling. For this reason, the Network Printer Server should inform of completing job when the printing job is finished. When Status Monitor requests a job status, the Printer Server returns the job table that contains user id, job id, and job status (printing or complete or canceled).

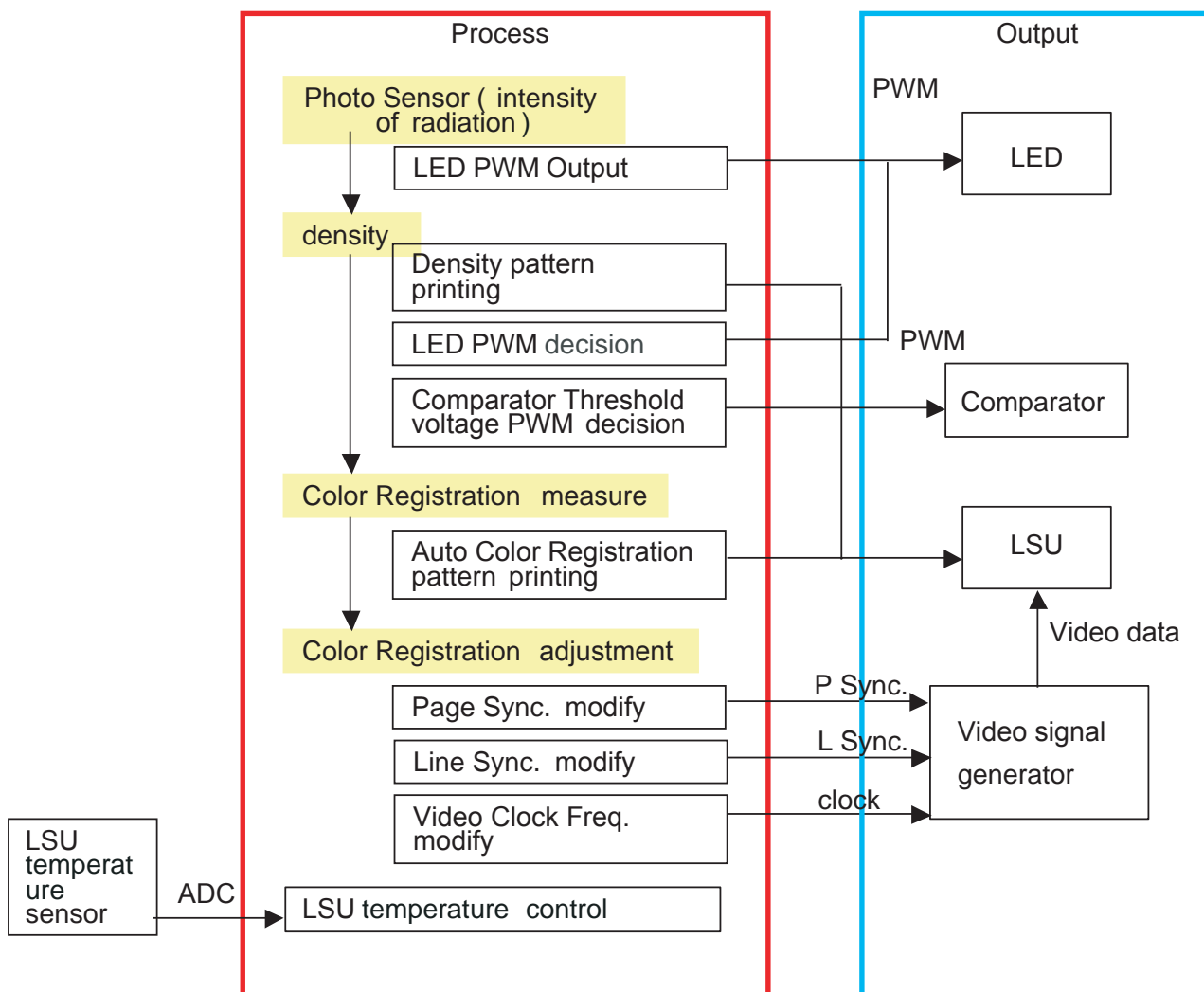
### 2.3.5 Printer Driver <-> Status Monitor

The Printer Driver and the Status Monitor can set/get some data to the system registry to share the Status Monitor information such as the polling interval.

When the user wants to set the option of the Status Monitor manually, he or she can set it using the Printer Driver User Interface. So, if the user set option that the Status Monitor is disabled, the Status Monitor can't show HTML Help to the user although the error has occurred while printing.



### 2.3.6 System F/W Flow



## 2.3.7 Alarm Shortage

	90 ~ 100 %	100 ~ 110 %	110 %~
Toner (C,M,Y,K)	Ready Yellow Toner Low	Replace Yellow Toner	Yellow Toner Exhausted
Transfer Belt	Replace Transfer Belt Soon	Replace Transfer Belt	
Fuser	Replace Fuser Soon	Replace Fuser	
Pickup Rollers (MP/Tray1/Tray2)		Replace MP Pick-Roller	

## 2.3.8 Error status

1. Missing/Invalid Consumables
  - Install Cyan (Magenta, Yellow, Black) Toner
  - Install Transfer Belt
  - Invalid Cyan (Magenta, Yellow, Black) Toner
  - Invalid Transfer Belt
2. Paper JAM
  - Jam 0 In MP(Tray1, Tray2)
  - Jam Inside Printer
  - Jam In Exit Area
3. Cover
  - Cover Open : Message toggles between  
“Cover Open” and “Install Transfer Belt”
  - SCF Cove Open
4. Service Call : Unrecoverable Error
  - Engine LSU Error
  - Main Motor Error
  - Engine Fuser Over(Low) Heat Error + Open Heat Error
  - Transfer Belt Error
5. Others
  - Ready IP Conflict



## 2.3.9 CRUM Overview

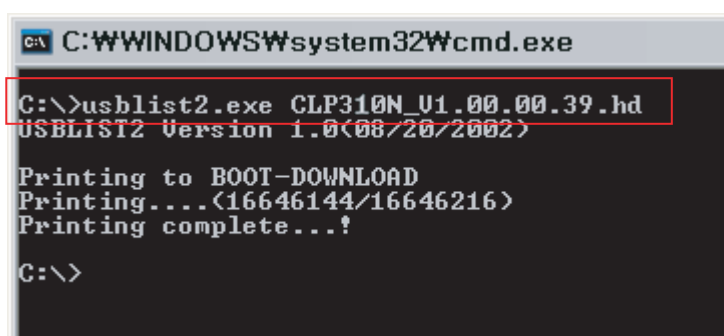
- Stands for “Customer Replaceable Unit Monitor”
- EEPROM, SAMSUNG CRUM is used for CRUM Memory.
- CRUM stores various information on consumables (including consumables’ life).
- In CLP-31x Series, total four CRUM’s are used (four on toner cartridges)

### CRUM stores the following information

- Model Name
- Supplier ID
- Serial Number
- Company ID
- MFG Date
- Capacity
- Page Count
  - Toner Cartridge and Transfer Belt
  - Indicates how many pages are printed by using the consumable
- Dot Count
  - Toner Cartridge Only
  - Indicates how many dots are printed by using the toner cartridge
- Image Count
- Model ID

## 2.3.10 FW Upgrade

- Via USB or Network (SWS/SWAS)
- You can upgrade F/W via USB or Network whenever the printer is “Ready”
- Make sure connecting Printer to the computer with a USB cable
- Via Using F/W Download Mode :
  - Step 1) Power on while pressing the STOP Key
  - Step 2) Press STOP Key more time and the status LED is on as Green.
  - Step 3) Download F/W via USB

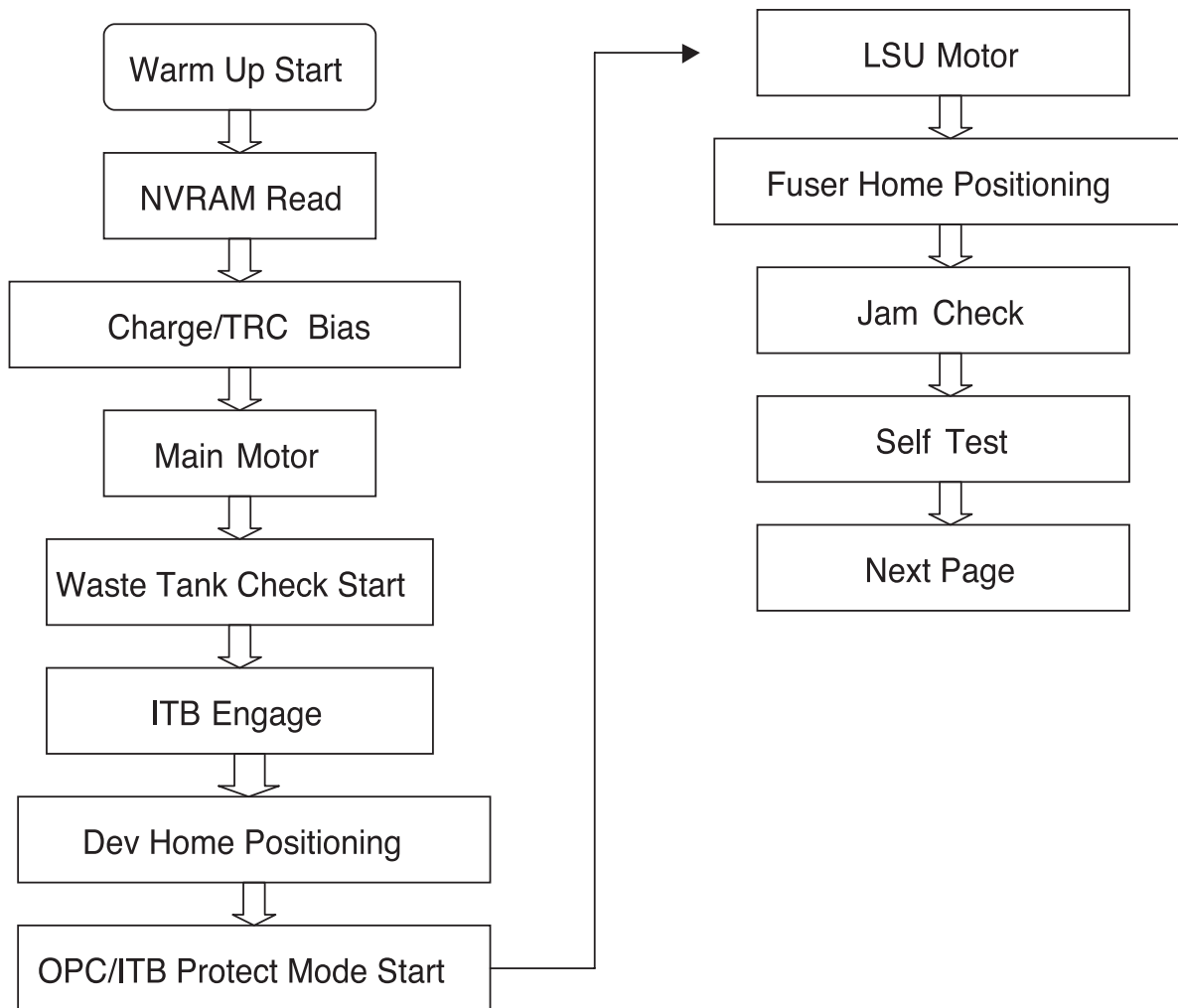


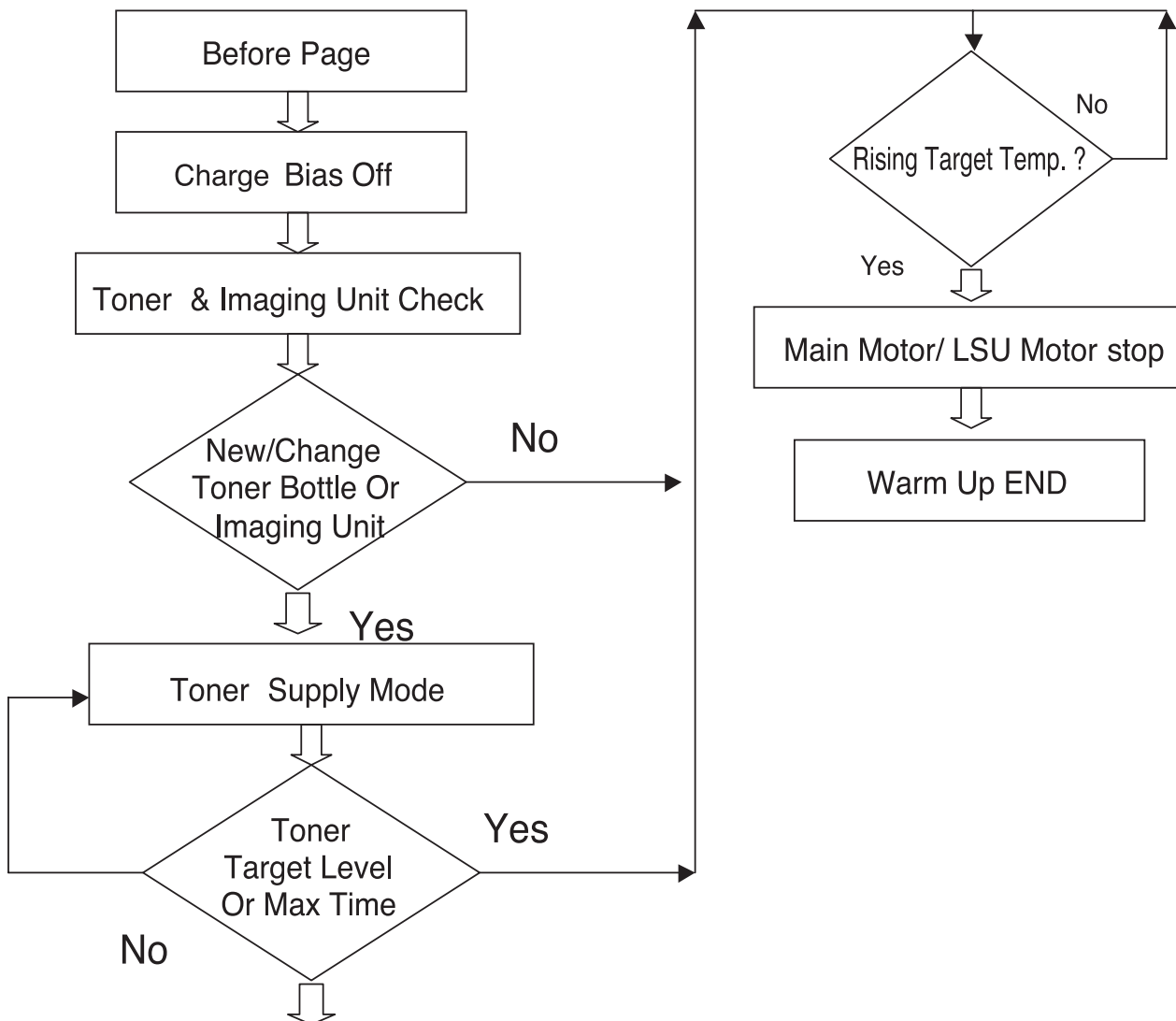
```
C:\WINDOWS\system32\cmd.exe
C:\>usblast2.exe CLP310N_U1.00.00.39.hd
USBLIST2 Version 1.0(08/20/2002)

Printing to BOOT-DOWNLOAD
Printing....<16646144/16646216>
Printing complete...!

C:\>
```

### 2.3.11 Initailize Flow





## 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 fire. Damaged cables could lead to electric shock or unit malfunction.

#### 3.1.2 Precautions when handling PBA

Static electricity can damage a PBA, always use 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.

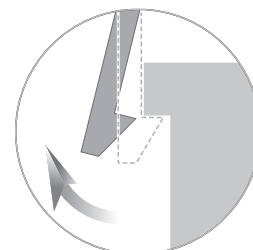
##### >> Precautions when checking PBA

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 Parts for Maintenance and Repair

### 3.2.1 Replacement interval for parts with a limited life

Some of the parts in this printer have a limited life, shorter than that of the whole machine. These parts must be replaced periodically.

The table below shows the interval at which these parts should be replaced.

The table shows the life of each part, and is measured when using A4 paper. When servicing a machine always check the status of these parts using the control panel and ensure that parts are replaced at the appropriate times otherwise a general degradation in print quality will occur.

Item	Pages Printed	Part number	Remark
Black Toner cartridge	Approx. Initial : 1,000 Pages* Sales : 1,500 Pages*	CLT-K409S(Black)	CRU
Color Toner cartridge	Approx. Initial : 700 Pages* Sales : 1,000 Pages*	CLT-C409S(Cyan) CLT-M409S(Magenta) CLT-Y409S(Yellow)	
Imagine unit	Approx. 24000 images*	CLT-R409	
Waste Toner	Approx. 2500 images	CLT-W409	
Pick-up roller	Approx. 50,000 pages	JC97-03028A	FRU
Fuser unit	Approx. 100,000 black pages or 25,000 color bages	JC96-04781A (110V)	
		JC96-04780A (220V)	
T2 roller	Approx. 10,000 pages	JC97-03046A	
ITB	Approx. 100,000 black pages or 25,000 color bages	JC96-04840A	

\* Average A4-/letter-sized page count based on Std. 19752 of individual colors on each page. Usage conditions and print patterns may cause results to vary.

\*\* Image counts based on one color on each page. If you print documents in full color (Cyan, Magenta, Yellow, Black), the life of this item will be reduced by 25%.

### 3.2.2 Printer Cleaning

---

A printer should be regularly cleaned, especially if it is used in a dusty environment. This will ensure that print quality remains high and failure due to contamination of printing services is less likely to occur.

- \* Clean the printer with a soft, lint free, cloth dipped in a "Recommended cleaner" "Recommended cleaner" can be purchased from our service center. (where available)
- \* Do not touch the transfer roller when cleaning the inside of the printer. Grease and oils from the skin will contaminate the surface and reduce print quality.
- \* Do not touch transfer roller when cleaning inside of machine. If transfer roller gets dirty, printing quality could be low.
- \* Please refer to the User Manual for cleaning instructions.

## 3.3 Information Related to Disassembly and Assembly.

### 3.3.1 Special service parts

Never disassemble or adjust the items mentioned, a stock of these items should be maintained.

#### 1) Disassembly of the LSU unit

There are no serviceable parts inside the LSU. Alignment of the mirrors is critical. Opening the LSU will allow dust into the laser and significantly reduce print quality. It is very dangerous to operate or service a machine with the LSU open or system interlocks disabled. Exposure to laser radiation can cause blindness.

#### 2) Disassembly of the ITB unit

Do not disassemble the ITB. The alignment of the home sensor is critical and is set up in the factory on a special jig. Incorrect re-assembly will cause print quality degradation.

#### 3) Care of the Toner cartridge

Toner cartridges contain an extremely fine powder. Please keep toner cartridges away from children. The toner powder contained in the toner cartridge may be harmful and if swallowed you should contact a doctor. Take care not to spill toner - spillages should be cleaned with a vacume cleaner and washed in cold water (hot water sets the toner). Do not touch the developer roller surface as contamination will reduce print quality. Take care not to damage the roller's surface when installing or removing a toner cartridge.

#### 4) Disassembly of DEVE drive ass'y and the main drive ass'y

The alignment of the drive mechanism is critical and it has been set up in factory using a jig and a driving gear. It is adjusted for the best gearing alignment. If the motor is disassembled alignment would not be maintained and this could cause operational noise and image problems: image alignment and toner distribution may be affected.

#### 5) Disassembly of terminal parts

Do not adjust the variable resistors on the PBA. They have been already adjusted in the factory.

#### 6) Disassembly of the fuser unit

- The fuser melts toner onto the paper at a high temperature: therefore, you need to take special care not to get burned by a hot fuser. When removing the fuser from a set that has recently been operating you need to take extra care.
- Do not touch an AC line (Copper contact) on a main frame even after removing the fuser.



### 3.3.2 Screws used in the printer

The screws listed in the table below are used in this printer. Please ensure that, when you disassemble the printer, you keep a note of which screw is used for which part and that, when reassembling the printer, the correct screws are used in the appropriate places.

Sec_Code	Location	Description	Qty
6001-000130	Main Drive	SCREW-MACHINE;BH,+ ,M3,L6,ZPC(WHT),SWRCH18A,-,-	1
6002-000440		SCREW-TAPPING;PWH,+ ,-,2,M3,L8,ZPC(BLK),SWRCH18A,-	21
6003-000301		SCREW-TAPTITE;BH,+ ,-,S,M4,L6,ZPC(WHT),SWRCH18A,-	1
6003-000196	Main Line	SCREW-TAPTITE;PWH,+ ,B,M3,L10,NI PLT,SWRCH18A	29
6003-000269		SCREW-TAPTITE;BH,+ ,-,S,M3,L6,ZPC(WHT),SWRCH18A,-	8
6003-000301		SCREW-TAPTITE;BH,+ ,-,S,M4,L6,ZPC(WHT),SWRCH18A,-	1
6001-000485	Toner Y	SCREW-MACHINE;PH,+ ,-,M2.6,L4,ZPC(WHT),SWRCH18A,FP,-	1
6002-000308		SCREW-TAPTITE;PH,+ ,-,B,M2.6,L6,ZPC(WHT),SWRCH18A,-	7
6001-000485	Toner M	SCREW-MACHINE;PH,+ ,-,M2.6,L4,ZPC(WHT),SWRCH18A,FP,-	1
6002-000308		SCREW-TAPTITE;PH,+ ,-,B,M2.6,L6,ZPC(WHT),SWRCH18A,-	7
6001-000485	Toner C	SCREW-MACHINE;PH,+ ,-,M2.6,L4,ZPC(WHT),SWRCH18A,FP,-	1
6002-000308		SCREW-TAPTITE;PH,+ ,-,B,M2.6,L6,ZPC(WHT),SWRCH18A,-	7
6001-000485	Toner K	SCREW-MACHINE;PH,+ ,-,M2.6,L4,ZPC(WHT),SWRCH18A,FP,-	1
6002-000308		SCREW-TAPTITE;PH,+ ,-,B,M2.6,L6,ZPC(WHT),SWRCH18A,-	7
6003-000196	Front Cover	SCREW-TAPTITE;PWH,+ ,B,M3,L10,NI PLT,SWRCH18A	4
6003-000196	Fuser	SCREW-TAPTITE;PWH,+ ,B,M3,L10,NI PLT,SWRCH18A	7
6003-000282		SCREW-TAPTITE;BH,+ ,-,B,M3,L6,ZPC(WHT),SWRCH18A,-	2
6003-000282	LSU	SCREW-TAPTITE;BH,+ ,-,B,M3,L8,ZPC(BLK),SWRCH18A,-	8
6003-000282	LSU LD	SCREW-TAPTITE;BH,+ ,-,B,M3,L8,ZPC(BLK),SWRCH18A,-	2
6003-000282	Drum	SCREW-TAPTITE;BH,+ ,-,B,M3,L8,ZPC(BLK),SWRCH18A,-	10
6003-000282	Cartridge-Transfer	SCREW-TAPTITE;BH,+ ,-,B,M3,L8,ZPC(BLK),SWRCH18A,-	12
6003-000152	Frame	SCREW-TAPTITE;PH,+ ,-,B,M2,L10,ZPC(WHT),SWRCH18A,-	2
6003-000196		SCREW-TAPTITE;PWH,+ ,B,M3,L10,NI PLT,SWRCH18A	25
6006-001078		SCREW-TAPTITE;PH,+ ,WSP,B,M3,L10,ZPC(WHT),SWRCH18A,-	1
6002-000440	Rear Cover	SCREW-TAPPING;PWH,+ ,-,2,M3,L8,ZPC(BLK),SWRCH18A,-	2
6003-000261	Top Cover	SCREW-TAPTITE;BH,+ ,-,B,M3,L6,ZPC(WHT),SWRCH18A,-	1

## ■ Harness Connection table

No	CONNECTION		PIN	SEC Code
1	Main B'd	LSU	16-(10+5)	JC39-00867A
2	Main	HVPS	26-26	JC39-00866A
3	Main	OPE PANEL	4-4	JC39-00868A
4	SMPS	INLET S/W	2-2	JC39-00908A
5	Main B'd	SMPS	16-16	JC39-00894A
6	Main B'd	Sensor(Deve Home)	3-3	JC39-00895A
7	Main B'd	Sensor(Empty)	3-3	JC39-00896A
8	Main B'd	BLDC	10-10	JC39-00899A
9	Main B'd	Cover S/W	2-2	JC39-00900A
10	Main B'd	Eraser Lamp	4-(2+2)	JC39-00901A
		OPC KEY		
11	Main B'd	ITB Home Sen I/F	7-5	JC39-00902A
12	ITB Home Sen I/F	ITB Home Sensor	5-(3+2)	JC39-00903A
		TEMP(Inner)		
13	Main	Temp(out)	2-2	JC39-00905A
14	SMPS	FUSER	2	JC39-00907A
15	FUSER	FUSER	1-1	JC39-00500A
16	Main B'd Bracket	Fuser Ass'y GND	1-1	JC39-00496A
17	HVPS	GND WIRE	1-2	JC39-00904A
18	Main	CRUM-JOINT	4-4	JC39-00906A
19	HVPS	EXIT	3-3	
20	HVPS	Sensor(Regi)	3-3	JC39-00897A
21	HVPS	Waste Toner Sensor	4-4	JC39-00898A
22	HVPS B'd	Sensor	7-(4+3)	
		(ITB Tension /OPC Waste)		
23	Main B'd	Wireless LAN PBA	6(5)	JC39-00970A

## 3.4 Disassembly Procedure

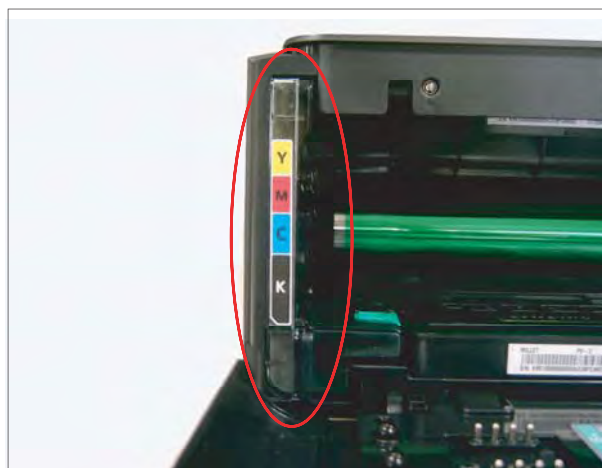
The description of disassembly and reassembly in this manual is listed according to the disassembly procedures. If you find the certain unit or Assy, please consult the name of unit under the picture.

### 3.4.1 Cover

1. Take out the Cassette.



3. Remove the Toner waste tank.



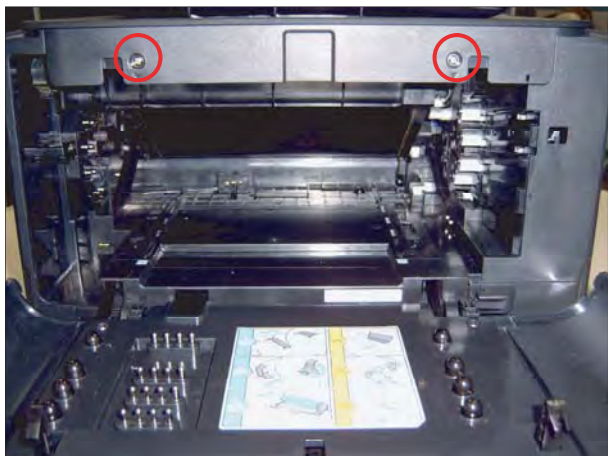
2. Open the Front cover and take out the CMYK Toner.



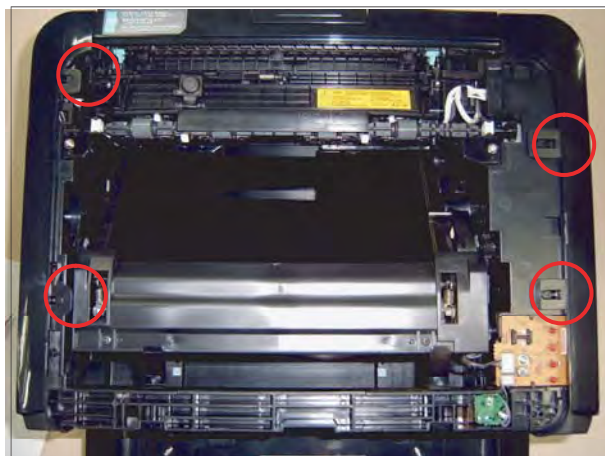
4. Remove the Drum Unit.



5. Remove the 2 screws securing the TOP Cover.  
And lift the Top cover up.



7. Remove the Hook from the top/bottom of the  
Left/Right cover and release it.



6. Remove the one screw from the rear of SET.



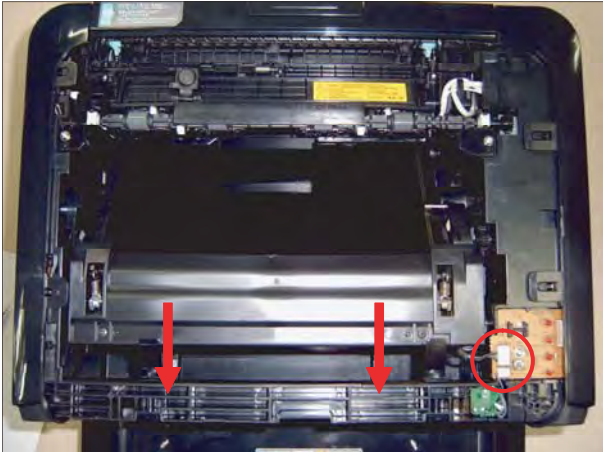
8. Remove the connector from front cover.  
And remove the front cover.





### 3.4.2 ITB

1. Unplug the one connector from OPE PBA and pull out the ITB unit in the direction of bottom.



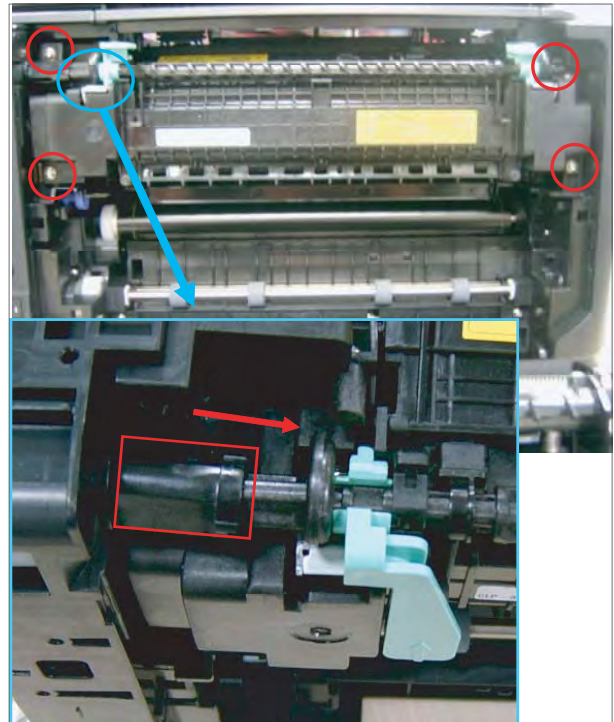
### 3.4.3 Fuser

1. Remove the Right cover. And remove the 2 connector as shown below.



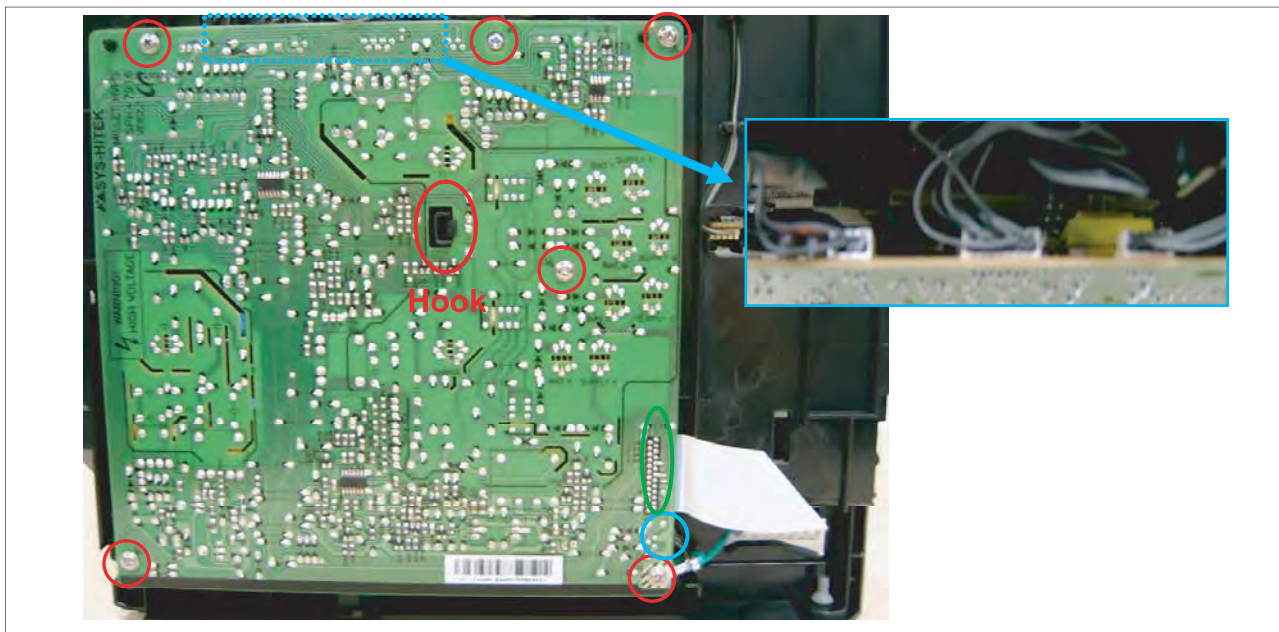
**Caution** - The fuser is very hot. So turn the printer off and wait until the printer to cool before replacing it.

2. Remove the 4 screw, and move the shaft as shown below. And remove the Fuser unit.



### 3.4.4 HVPS board

1. Remove the 6 screws and unplug the 4 connectors, 1 flat cable. And remove the one hook of the center.

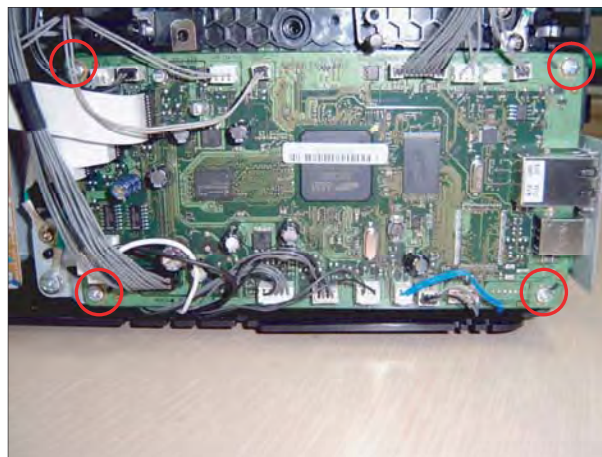


### 3.4.5 Main PBA

1. Remove the harness cover after remove the one screw.



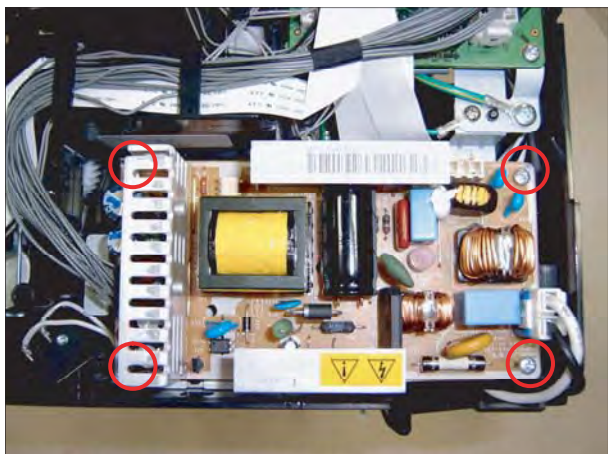
2. Remove the all harness and 4 screws. And release the Main PBA.





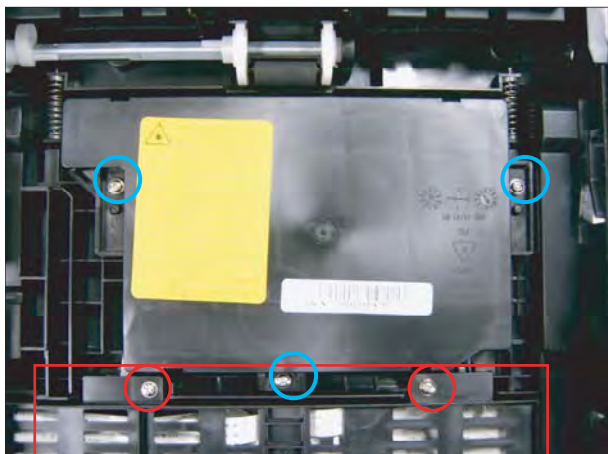
### 3.4.6 SMPS board

1. Remove the all harness and 4 screws. And remove the SMPS board.

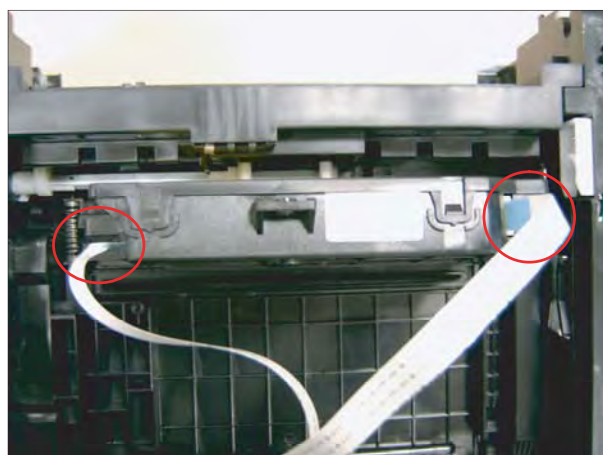


### 3.4.7 LSU Unit

1. To remove the LSU from the bottom of the SET, first remove the harness cover after remove the 2 screws. And remove the 3 screws.



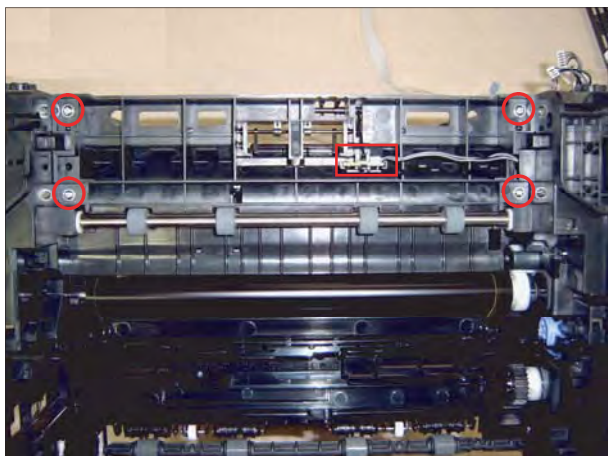
2. Release the LSU unit after remove the 2 Flat cable.



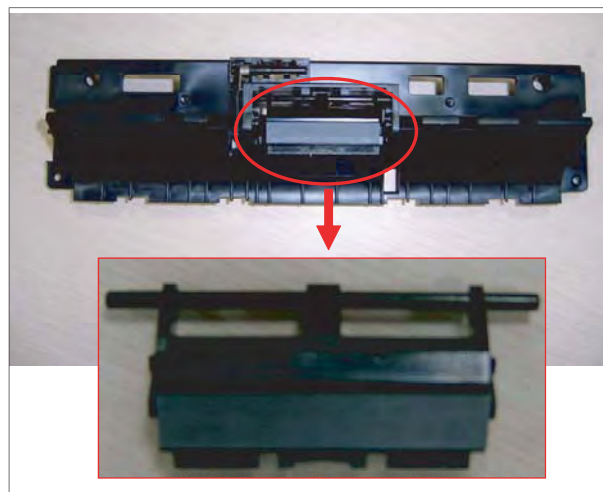


### 3.4.8 Holder Pad

1. Remove the sub PBA. And release the Guide Pick up unit after remove the 4 screws.

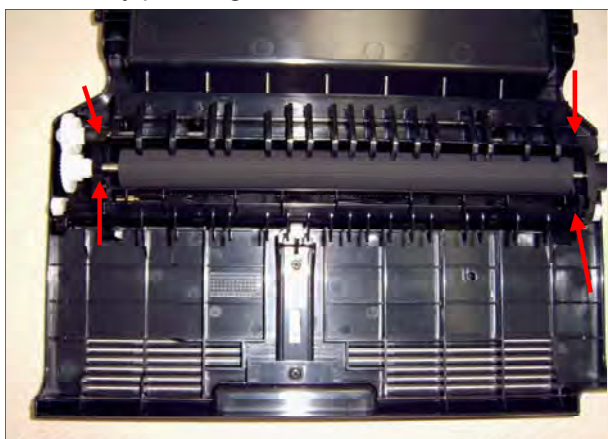


2. Release the holder pad after remove the hook of both side.



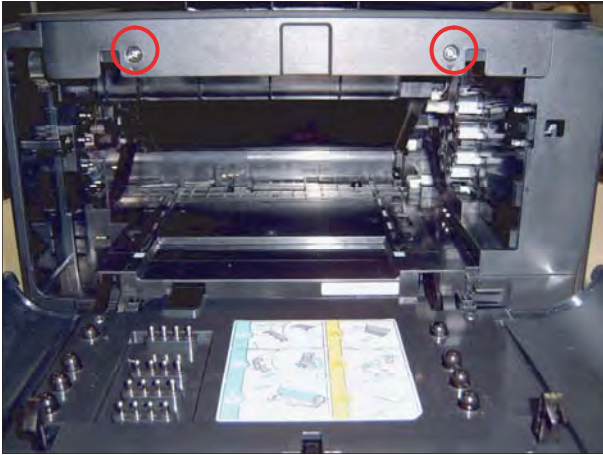
### 3.4.9 Transfer roller

1. Remove the Transfer roller assy from the rear cover by pressing the hook.

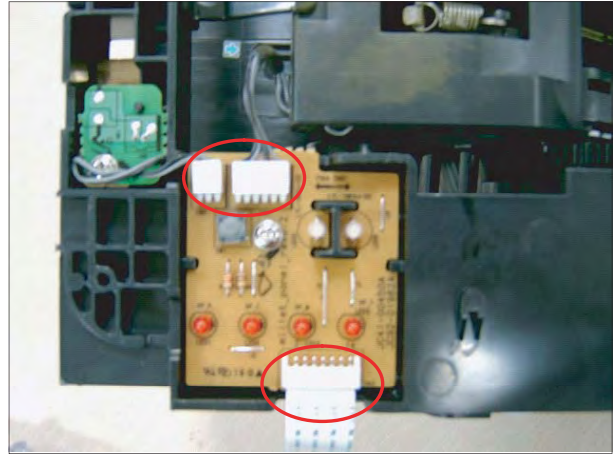


### 3.4.10 OPE PBA

1. Remove the 2 screws securing the TOP Cover.  
And lift the Top cover up



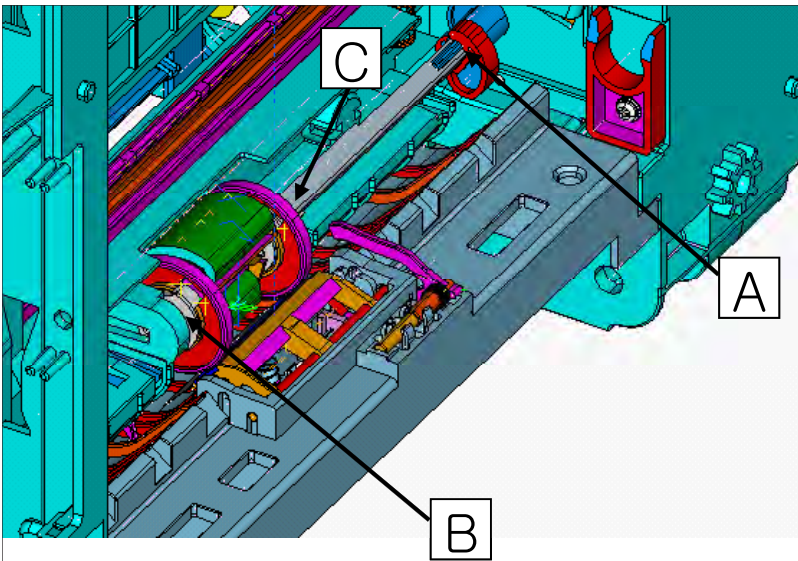
2. Lift OPE PBA up after unplug the 2 connectors  
and 1 flat cable..



### 3.4.11 Pick up roller

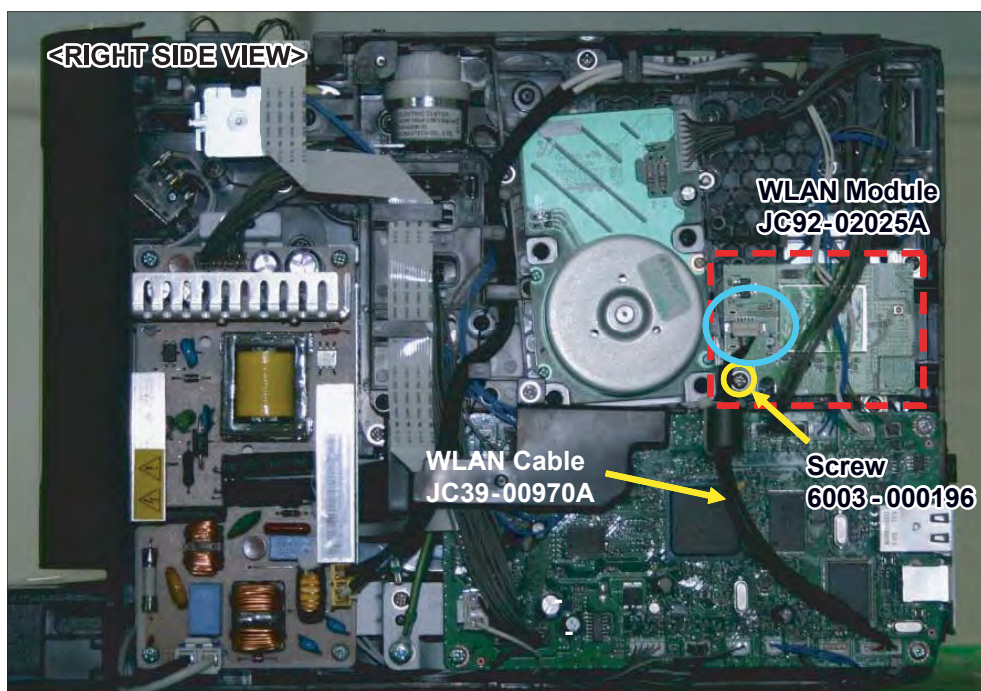
Before disassembling, remove the Guide Pick up unit.( refer to 3.4.8)

1. Remove the hook from the position A and push to the left side.
2. Separate the Pick up roller Assy after release the position B.
3. Remove the hook of the part C,B in sequence.
4. Separate the Pick up rubber.



### 3.4.12 Wireless PBA (only CLP-315W)

1. Remove the right cover.
2. Remove 1 screw and connector. Remove the wireless PBA(WLAN module)



## 4. Alignment & Troubleshooting

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### 4.1 Alignment and Adjustments

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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

---

##### 4.1.1.1 Overview

- The CLP-31x series printers do not have LCD panel which is used in other color model printers. On the contrary to other models of color printers, they show the status of the printer only with their LEDs.
- The CLP-31x series printers have 1 keys and 6 LEDs. The 'User Interface' module handles the processing of the 'Key Press' and 'LED control' at different states of the machine.

##### 4.1.1.2 Architecture

KEY (1 key): Stop key

LED (6 LEDs):

4 LED for CMYK toners : toner-low(cyan, magenta, yellow, black) LEDs

2 LED for status : ready (green) or error(red) status LED (two color LED)

1 LED for JAM display (WiFi status display at wireless model)

##### 4.1.1.3 Data and Control Flow

User interface (panel) is made up of

- KEY input detection & process
- LED control

The initial process to use the panel checks register's values of key and LED.

If user input key value, the operation to be defined by key value is processed and the LED operation to be defined by printer status is controlled.

## 4.1.2 Function

### 4.1.2.1 KEY Function

There are one keys present. The one is Stop key.

If users input key value, the key input is transferred via GIP (General Input Port) and the operation to be defined by key value is processed.

#### 4.1.2.1.1 Functions

Stop key function is made up of

- Demo page/Configuration sheet printing function
- Job cancels function
- Start manual feeding function
- Firmware downloads mode function

#### 4.1.2.1.2 Detail Description

KEY input detection & process order

1) User KEY input

2) KEY input detection

: If the key input is detected when the key input check per timer tick 10ms, The 10ms interrupt service routine sends the key detection event to panel task.

3) KEY input process

##### - Stop key input process

: After the panel task is received the Stop key detection event, it checks the engine error status two times and process the operation to be defined by key value.

##### - Demo page/Configuration sheet function

This button will have multiple functions when the printer is in idle state.

Demo page printing

Press and hold this button for about 2 seconds until the control panel lights blink slowly to print a demo page.

Configuration sheet printing

Press and hold this button for about 5 seconds until the control panel lights blink rapidly to print a configuration sheet.

##### - Job cancels function

When the printer is printing an active printing job, press and holds this button until the control panel lights blink to cancel a job the printer is currently except the manual job.

##### - Start manual feeding function

When you select manual feed for paper source, press this button each time you feed a sheet of paper manually.

The application of manual feeding function in CLP-310 series will be determined

##### - Firmware downloads mode function

Turn on the printer at the same time that the button is pressed.

If all LEDs scroll, release the button and download the firmware ROM file via USB port



### 4.1.2.2 LED Function

There are five LEDs present. Status led indicate the error/online status of the printer in idle mode. In error mode, the status LED glows by red color and in ready mode, it glows by green color. The other four LEDs indicate the toner status. If the black toner needs to change, the toner-low (black) LED glows and if the color (yellow, magenta, cyan) toners need to change, the toner-low (yellow, magenta, cyan) LED glows.

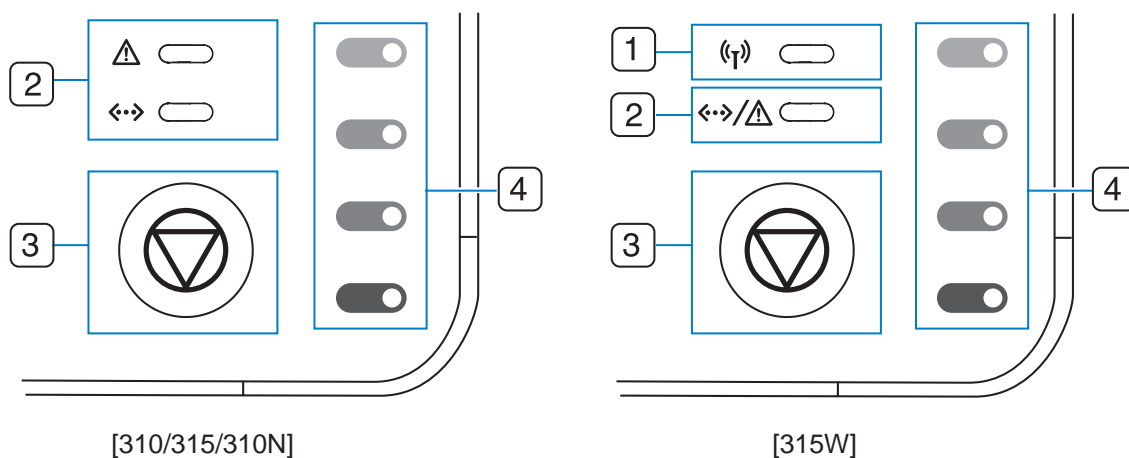
#### 4.1.2.2.1 Functions

- LED function is made up of
- Ready/Printing status display
  - Error status display
  - Toner low status display

#### 4.1.2.2.2 Detail Description

LED control order

- 1) Control LED according to current printer state  
: After the panel task is received each event, the LED operation is controlled by current printer status.
- 2) Write LED value to GOP (General Output Port)



1	Wireless LED	Shows the status of wireless network. When the LED on, the machine is ready. (Wireless models only)
2	Status LED	Shows the status of your machine.
3	Stop	Stops an operation at any time and there are more functions.
4	Toner colors	Show the status of each toner cartridge.

LED behavior

STATUS LED	TONER COLORS LED	DESCRIPTION
lights green	all LEDs off	The machine is ready to print.
slowly blinks green	all LEDs off	The machine is receiving data from the computer.
fast blinks green	all LEDs off	The machine is printing data.
lights red	all LEDs off	<ul style="list-style-type: none"> <li>The machine is experiencing an error, such as jammed paper, open cover, empty paper, installed waste toner container, or full waste toner container.</li> <li>The machine is experiencing a service required error, such as LSU error, fuser error, or Contact your sales or service representative.</li> </ul>
lights orange	all LEDs off	The machine is experiencing an error such as jammed paper.
lights green	each LED blinks red	Each toner cartridge is near the end of its life.
blinks red	each LED lights red	Each toner cartridge is almost empty. You can print, but the quality is not reliable.
lights red	each LED lights red	<ul style="list-style-type: none"> <li>Each toner cartridge is totally exhausted. You can not print.</li> <li>Each toner cartridge is wrong.</li> </ul>
lights green	each LED blinks red in a repeated order	The machine is warming up.

All printing errors will be appear in the Smart Panel program window.

Assert Error LED Operation	
The panel LED operation display the line number of assert error occurrence.	
Line number	LED operation
start & end	All LEDs(Toner low LEDs, Status(Red) LED) turn ON for approximately 2 seconds and then All LEDs turn OFF for approximately 3 seconds.
1	After Status (Red) LED blinks one time, Toner low LEDs blink one time.
2	After Status (Red) LED blinks two times, Toner low LEDs blink one time.
3	After Status (Red) LED blinks three times, Toner low LEDs blink one time.
4	After Status (Red) LED blinks four times, Toner low LEDs blink one time.
5	After Status (Red) LED blinks five times, Toner low LEDs blink one time.
6	After Status (Red) LED blinks six times, Toner low LEDs blink one time.
7	After Status (Red) LED blinks seven times, Toner low LEDs blink one time.
8	After Status (Red) LED blinks eight times, Toner low LEDs blink one time.
9	After Status (Red) LED blinks nine times, Toner low LEDs blink one time.

## 4.1.3 Jam Removal

### TIPS FOR AVOIDING PAPER JAMS

By selecting the correct media types, most paper jams can be avoided. When a paper jam occurs.

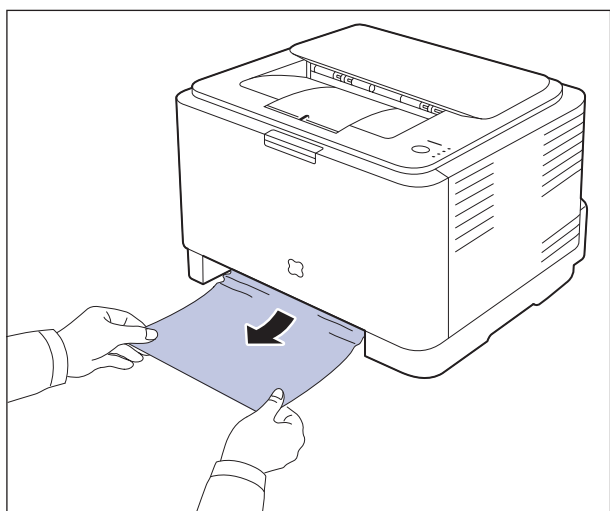
- Follow the procedures on page 30. Ensure that the adjustable guides are positioned correctly.
- Do not overload the tray. Ensure that the paper level is below the paper capacity mark on the inside of the tray.
- Do not remove paper from the tray while your machine is printing.
- Flex, fan, and straighten paper before loading.
- Do not use creased, damp, or highly curled paper.
- Do not mix paper types in a tray.
- Use only recommended print media.
- Ensure that the recommended side of the print media is facing up in the tray.

### 4.1.3.1 Clearing Paper Jams

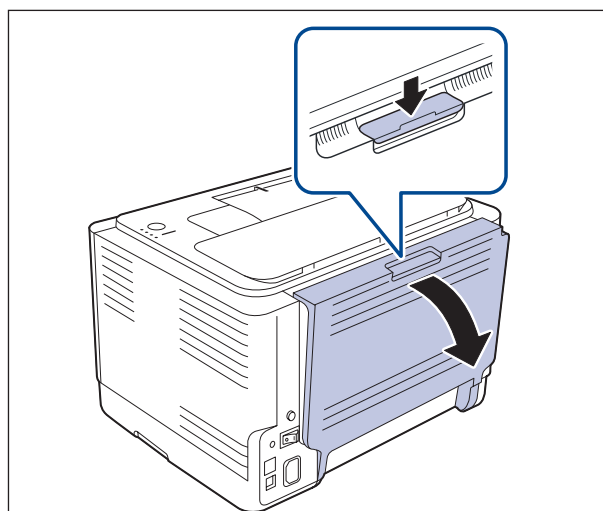
**NOTE:** When removing paper that is jammed in the printer, if possible always pull the paper in the direction that it normally moves so as not to damage internal components. Always pull firmly and evenly; do not jerk the paper. If the paper tears, ensure that all fragments of paper are removed; otherwise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

If a paper jam occurs, the Status LED on the control panel lights red. Find and remove the jammed paper. To resume printing after clearing paper jams, you must open and close the front cover or rear cover.

1. Pull the tray out of the printer and remove the jammed paper.



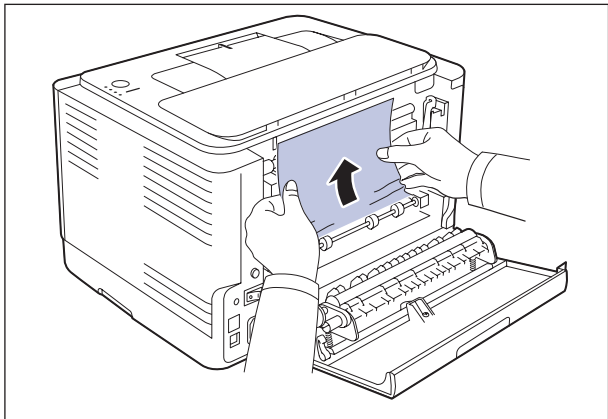
2. To remove the jammed paper, open the rear cover.



If you can not find the jammed the paper,Go to the next step.

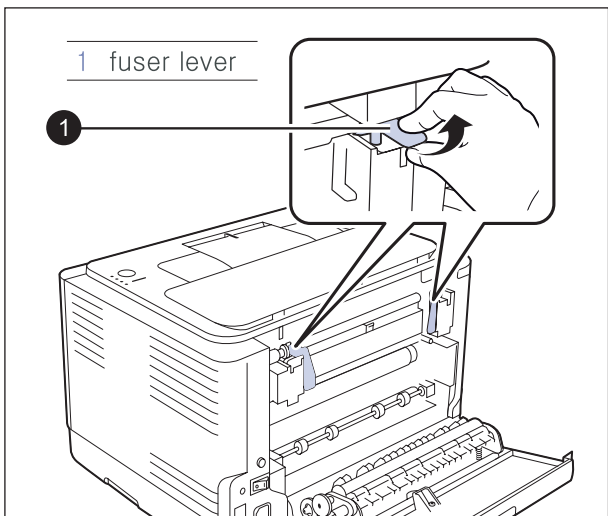


3. Carefully remove the paper by pulling in the direction as shown below. Most of the jammed paper can be removed in this step.

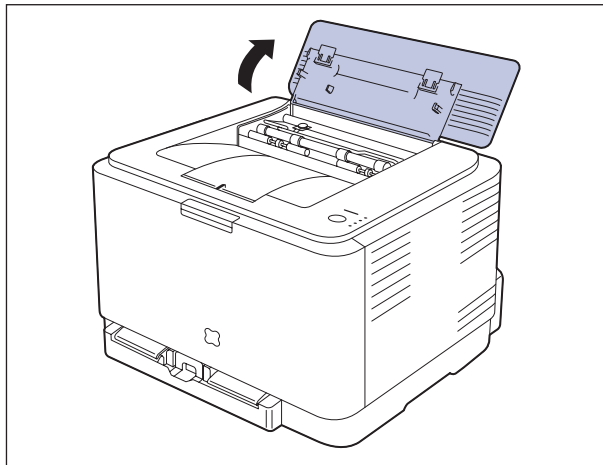


If you cannot find the jammed paper, or if there is any resistance removing the paper, stop pulling and go to the next step.

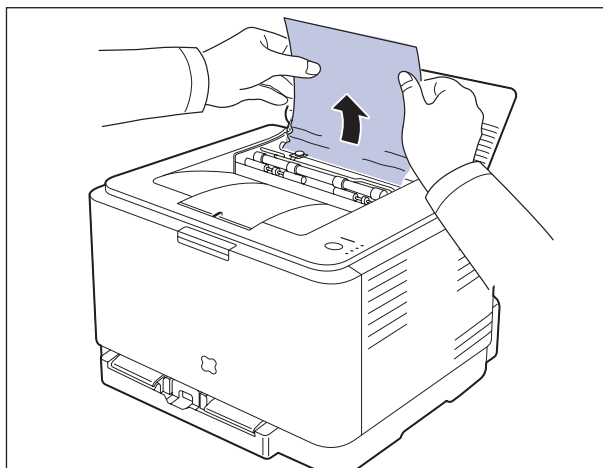
4. Push the fuser levers upwards.



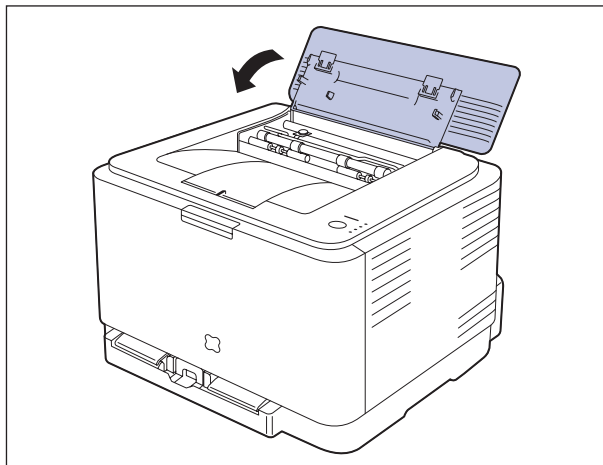
5. Open the top cover and inner cover.



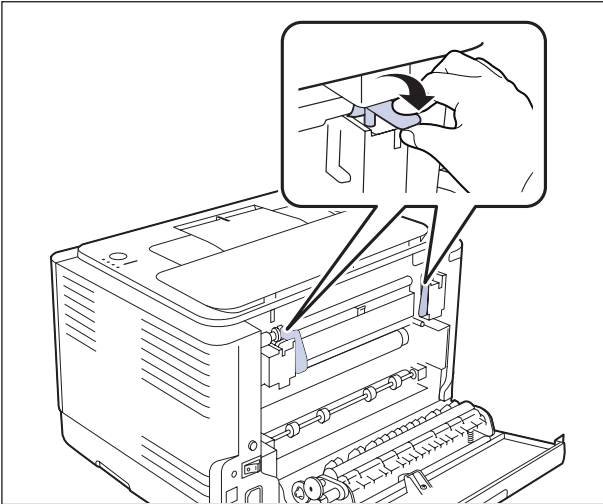
6. Holding the inner cover open, carefully take the jammed paper out of the printer. The inner cover will then close automatically.



7. Close the top cover. Make sure that it is securely closed.



8. Push the fuser levers downwards.



9. Open and then close the rear cover or front cover to resume printing.

## 4.1.4 Sample Pattern

This product provides several printable test patterns for maintenance purposes. These patterns can be used to aid the diagnosis of print quality problems.

### 4.1.4.1 Printing a Demo Page

Print a demo page to make sure that the printer is operating correctly.

To print a demo page: In ready mode, press and hold the Stop button for 2 seconds.

A demo page showing the printer's features and capabilities is printed.



#### 4.1.4.2 Printing a Configuration Page

You can print a configuration page from the printer's control panel. Use the configuration page to view the current settings, to help troubleshoot problems.

To print a configuration page: In ready mode, press and hold the Stop button on the control panel for 5 seconds.

A configuration page prints out.

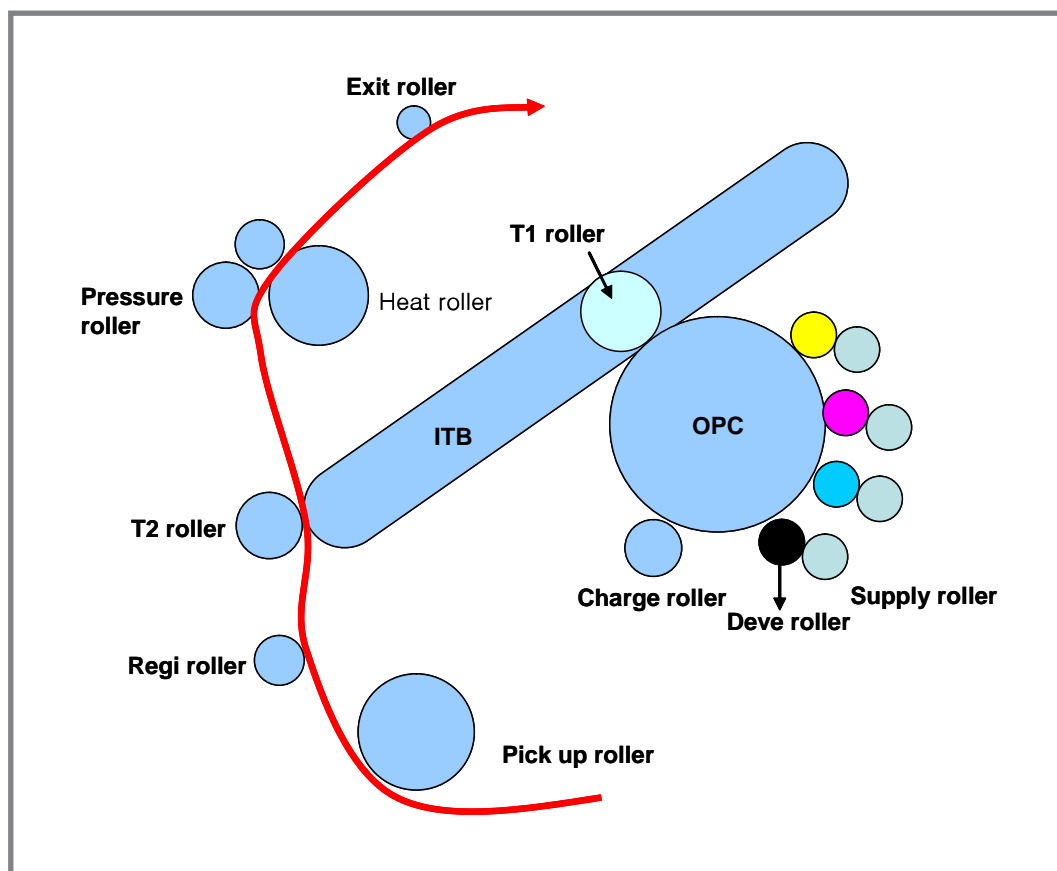
Configuration Report				
Model Name	: CLP-310 Series			
[ General Information ]				
OS Version	: V1.01.00.89.01.N Jan-14-2008			
SPL-C Version	: SPL-C 5.35 11-20-2007			
Engine Version	: 0.62.98.T			
Installed Date	: 2008. 1. 17			
USB Serial Number	: 4M21B1BPC00072R			
Total Page Count	: 159/55 Page(s) (color/mono)			
Total Image Count	: 694 Image(s)			
[ Options ]				
RAM Size	: 32 Mbytes			
USB	: Connected (HIGH)			
NPC	: Installed			
[ Consumables Life ]				
Fuser Life	: 426 Page(s)			
Transfer Roller Life	: 213 Page(s)			
Tray Roller Life	: 214 Page(s)			
Transfer Belt Life	: 118 Image(s)			
[ Setup Menu ]				
Power Save	: 5 Min			
Auto Continue	: On			
Altitude Adj.	: Normal			
Custom Color	: Manual Adjust ( YMCK : 0,0,0,0 )			
[ Toner Information ]				
	Yellow	Magenta	Cyan	Black
Toner Remaining	: 60%	64%	33%	75%
Page Count	: 159 Page(s)	159 Page(s)	159 Page(s)	207 Page(s)
Serial-No	: CRUM-000000000000	CRUM-000000000000	CRUM-000000000000	CRUM-000000000000
Supplier	: INI( INI)	INI( INI)	INI( INI)	INI( INI)
Product Date	: INI	INI	INI	INI
Last Used Date	: 2008.01.18	2008.01.18	2008.01.18	2008.01.18
First Installed Date	: 2007.09.17	2007.09.17	2007.09.17	2007.09.17
[ Imaging-Unit Information ]				
Maker	: Mitsu			
Remaining	: 98%			
Image Count	: 694 Image(s)			
Last Used Date	: 2008.01.29			
First Installed Date	: 2007.09.17			

- 1. General Information** : shows OS/SPL-C/Engine version , Installed Date, Total page/image count.
- 2. Options** : shows options set up in the printer. ( Memory size, USB, NPC)
- 3. Consumables life** : shows the life of Fuser, T2 roller, Tray roller, Transfer belt. ( Count : Pages)
- 4. Setup Menu** : shows the menu items set up in the printer. (power save, auto continue etc.)
- 5. Toner Information** : shows toner remaining (%), page count ( pages ) , serial number, last used date, first installed date.
- 6. Imaging-unit Information** : shows image count, last used date, first installed date.
- 7. Network configuration report** : shows network information set up in the printer. (Mac address, NIC F/W version, TCP/IP, IPP etc. )

### 4.1.5 Periodic Defective Image

If an image defects appears at regular intervals on the printed-paper, it is due to a faulty or damaged roller. Refer to the table below and check the condition of the appropriate roller.

No	Roller	Period	Phenomenon
1	OPC Drum	188.5mm	White and Black Spots
2	Charge Roller	37.7mm	Black Spot and line and Periodic Band
3	Supply Roller	47.5mm	Periodic Band by little difference of density
4	Developing Roller	26.0mm	White Spot, Horizontal black band
5	1 <sup>st</sup> Transfer Roller	43.8mm	Ghost, Damaged Image by abnormal tranfer
6	2 <sup>nd</sup> Transfer Roller	54.64mm	Ghost, Damaged Image by abnormal tranfer
7	Pressure Roller	50.3mm	Background
8	Heat Roller	86.4mm	Black Spots or Vertical Black Band



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

EDC Mode is feature that allows the engineer to check the condition of the print engine. It can check the operating condition of the motors, sensors, solenoids and clutches, measure the High Voltage from the HVPS and check the operation of the fuser and LSU.

### 4.1.6.1 Enterecence

When trying to check the CLP-310N EDC Mode, additional EDC execution program needed.

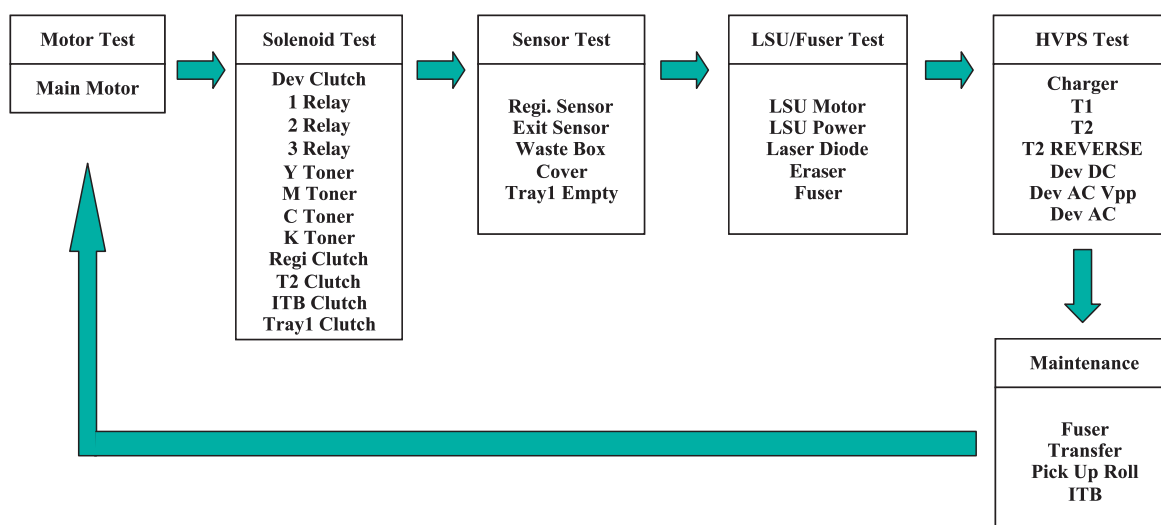
#### [ Procedure of EDC Mode operation ]

- a) First, turn on the Power of Printer, wait until Ready state
- b) In this state, Run the EDC program on the computer
- c) After that, click the menu of screen
- d) Then <Motor Test> appears on the initial screen
- e) Should you get out of this program, press Exit of screen

### 4.1.6.2 Keys

Key	Discription
Exit	Close program
Update LCD	Update value (ex : sensor value)
Menu	Move to the top menu
Left/Right arrow	Move test item
Enter	Start testing or select Sub-item
Upper level	Stop testing or the upper menu

### 4.1.6.3 EDC Map



#### 4.1.6.3(a) Motor Test

Item	Discription
Main Motor	If motor lock signal is normal, "Succesed" message will be displayed. When motor lock signal is abnormal, "failed" message will be displayed. When "Upper Level" is pushed, "off" message will be displayed.

#### 4.1.6.3(b) Solenoid Test

Item	Discription
Dev Clutch	When "select" key is pushed, "Dev Clutch ON" message will be displayed. "Upper Level" is pushed, "Dev Clutch Off" message will be displayed.
Relay 1	When "select" key is pushed, "1 Relay ON" message will be displayed. "Upper Level" is pushed, "1 Relay Off" message will be displayed on.
Relay 2	When "select" key is pushed, "2 Relay ON" message will be displayed. "Upper Level" is pushed, "2 Relay Off" message will be displayed.
Relay 3	When "select" key is pushed, "3 Relay ON" message will be displayed. "Upper Level" is pushed, "3 Relay Off" message will be displayed.
Y Toner	When "select" key is pushed, "Y Toner ON" message will be displayed. "Upper Level" is pushed, "Y Toner Off" message will be displayed.
M Toner	When "select" key is pushed, "M Toner ON" message will be displayed. "Upper Level" is pushed, "M Toner Off" message will be displayed.
C Toner	When "select" key is pushed, "C Toner ON" message will be displayed. "Upper Level" is pushed, "C Toner Off" message will be displayed.
K Toner	When "select" key is pushed, "K Toner ON" message will be displayed. "Upper Level" is pushed, "K Toner Off" message will be displayed.
Regi Clutch	When "select" key is pushed, "REGI Clutch ON" message will be displayed. "Upper Level" is pushed, "REGI Clutch Off" message will be displayed.
T2 Clutch	When "select" key is pushed, "T2 Clutch ON" message will be displayed. "Upper Level" is pushed, "T2 Clutch Off" message will be displayed.
ITB Clutch	When "select" key is pushed, "ITB Clutch ON" message will be displayed. "Upper Level" is pushed, "ITB Clutch Off" message will be displayed.
Tray1 Clutch	When "select" key is pushed, "Tray1 Clutch ON" message will be displayed. "Upper Level" is pushed, "Tray1 Clutch Off" message will be displayed.
Tray2 Clutch	When "select" key is pushed, "Tray1 Clutch ON" message will be displayed. "Upper Level" is pushed, "Tray1 Clutch Off" message will be displayed.
Regi. Sensor	If actuator is checked by sensor, "Without Paper" message will be displayed. if not, "With Paper" message will be.
Exit Sensor	If actuator is checked by sensor, "Without Paper" message will be displayed. if not, "With Paper" message will be.
Waste Box	If waste Box exists , "Installed" message will be displayed. If not, "Not Installed" message will be.

Item	Discription
Cover	If cover is opened, " Opened" message will be displayed. If not, "Closed" message will be.
Tray1 Empty	If paper exists in the tray, "With Paper" will be displayed. If not, "Without Paper" message will be.
Tray2 Empty	If paper exists in the tray, "With Paper" will be displayed. If not, "Without Paper" message will be.

#### 4.1.6.3(b) Solenoid Test

Item	Discription
LSU Motor	If LSU motor lock signal is normal, "Succesed" message will be displayed. When LSU motor lock signal is abnormal , "failed" message will be displayed. When "Upper Level" is pushed, "off" message will be displayed.
LSU Power	When "select" key is pushed, "LSU Power On" message will be displayed. If not, "LSU Power Off" message will be.
Laser Diode	When select key is pushed, Laser Diode On message will be displayed. If not, Laser Diode Off message will be.
Eraser	When select key is pushed, Eraser On message will be displayed . If not, Eraser Off message will be.
Fuser	When select key is pushed, Fuser On message will be displayed. If not, Fuser Off message will be.



### 4.1.6.3(d) HVPS Test

Item	Discription
Charger	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
T1	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
T2	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
T2 REVERSE	When "select" key is pushed, "T2 REVERSE On" message will be displayed. If not, "T2 REVERSE Off" will be.
Dev DC	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
Dev AC Vpp	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
Dev AC	When "select" key is pushed, "DUTY : x%*" message will be displayed. And then Left/Right arrow is selected, x% is increased or decreased. And "DUTY : x%" message will be displayed. * is disappeared. And then "select" key is pushed, x%*" message will be displayed. When "Upper Level" is pushed, * is disappeared.
Charger	Duty : 50% -> "-789V", Range : -81V ~ -1689V
T1	Duty : 50% -> "1159V", Range : 122V ~ 2188V
T2	Duty : 50% -> "2552V", Range : 264V ~ 4730V
Supply DC	Duty : 50% -> "-269V", Range : -1V ~ -591V
AC, Vpp	Duty : 50%-> "1210V" , Range : 800V ~ 2160V

#### 4.1.6.3(e) Maintenance

Item	Description
Fuser	When "select" key is pushed, "Initialized" message will be displayed. When "Upper Level" is pushed, "Off" message is disappeared.
Transfer	When "select" key is pushed, "Initialized" message will be displayed. When "Upper Level" is pushed, "Off" message is disappeared.
FCF Pick Up Roll	When "select" key is pushed, "Initialized" message will be displayed. When "Upper Level" is pushed, "Off" message is disappeared.
SCF Pick Up Roll	When "select" key is pushed, "Initialized" message will be displayed. When "Upper Level" is pushed, "Off" message is disappeared.
ITB	When "select" key is pushed, "Initialized" message will be displayed. When "Upper Level" is pushed, "Off" message is disappeared.

#### 4.1.6.3(e) Maintenance

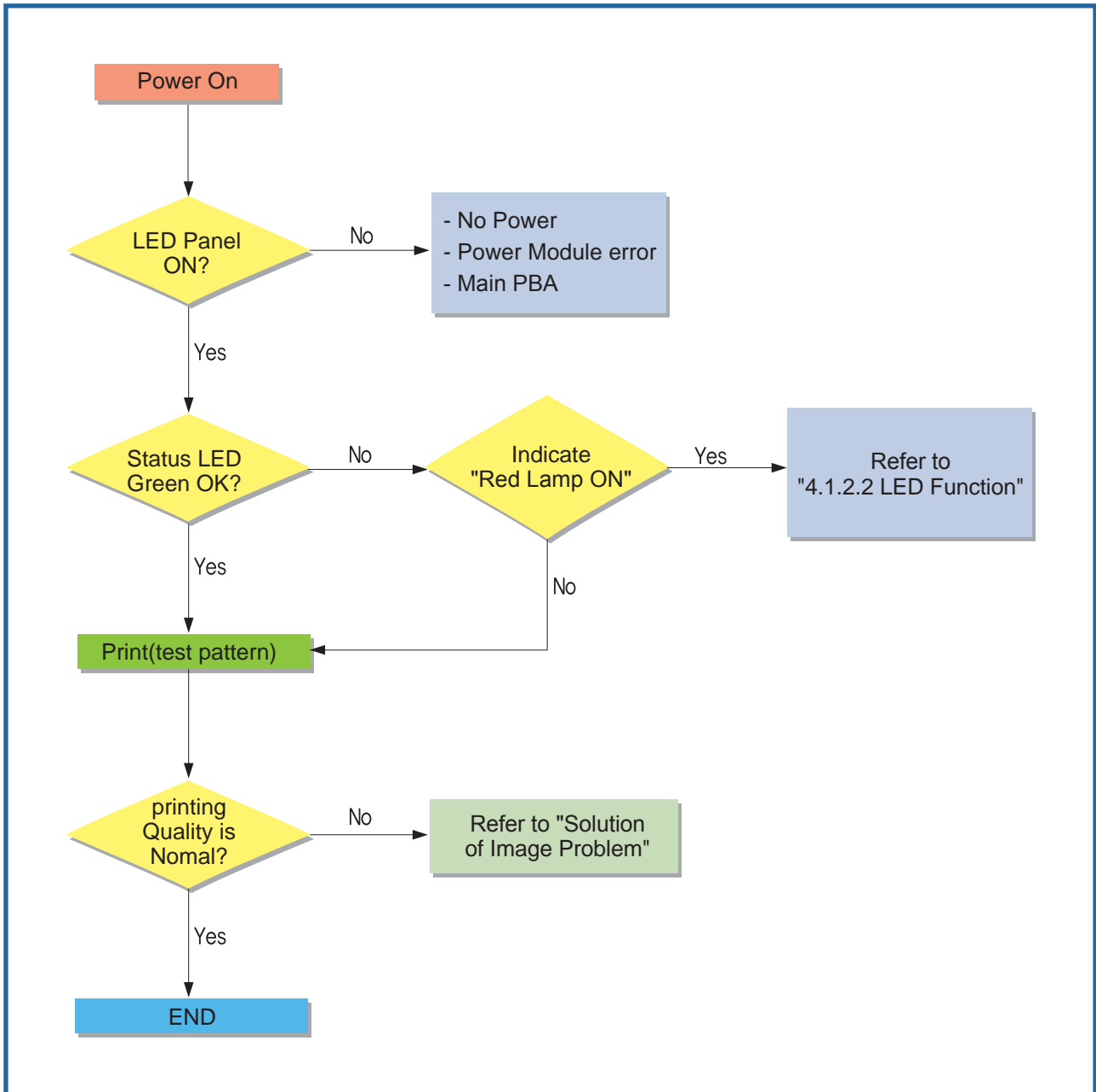
- ▶ Paper Empty / Paper Mismatch
  - Load specified paper in the tray 1
    - Paper does not exist in the tray1
    - Load Paper, When you still want to continue printing
  - Paper mismatch in the tray 1
    - Paper is mismatched
    - Press stop key for a while, When you still want to continue printing
- ▶ Cover Open
  - Cover Open
    - Cover is opened
    - Close the door, When you still want to continue printing
- ▶ Waster Tank Full or not installed
  - Waste Tank Full
    - Toner of Waste toner box is full
    - Empty or Insert the waste toner box
- ▶ Paper Jam
  - Paper Jam at the tray1
    - Paper is not picked up
    - Cover Open /Close, When you still want to continue printing
  - Paper Jam inside printer
    - There is a paper inside printer
    - After cover Open , Paper must be removed, and then close the cover

- Paper Jam at the paper exit area
  - There is a paper at exit area
  - After cover Open , Paper must be removed, and then close the cover
- Motor Lock Error
  - Motor does not run or runs abnormal speed
  - Motor or Main board must be checked
- LSU Motor Lock Error
  - LSU motor does not run or runs abnormal speed
  - Hsync is not detected
  - LSU or Main board must be checked
- Transfer Belt Error
  - ITB home sensor is not checked for a normal time
  - ITB must be checked
- Fuser Over Heat error
  - Temperature of fuser is high
  - Fuser or Main board must be checked
- Fuser Low Heat error
  - Temperature of fuser is low
  - Fuser or Main board must be checked
- Fuser Open Heat error
  - Temperature of fuser is less than 50 in warmup state.
  - Fuser or Main board must be checked
- Dev. Home error
  - Home of Development is not checked or checked at the abnormal time
  - Clutch of Development or Main board must be checked
- ADC not Confirm Error
  - Signal of confirmation for ADC is not detected
  - Main board must be checked

## 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.



## 4.2.2 Troubleshooting Checklist

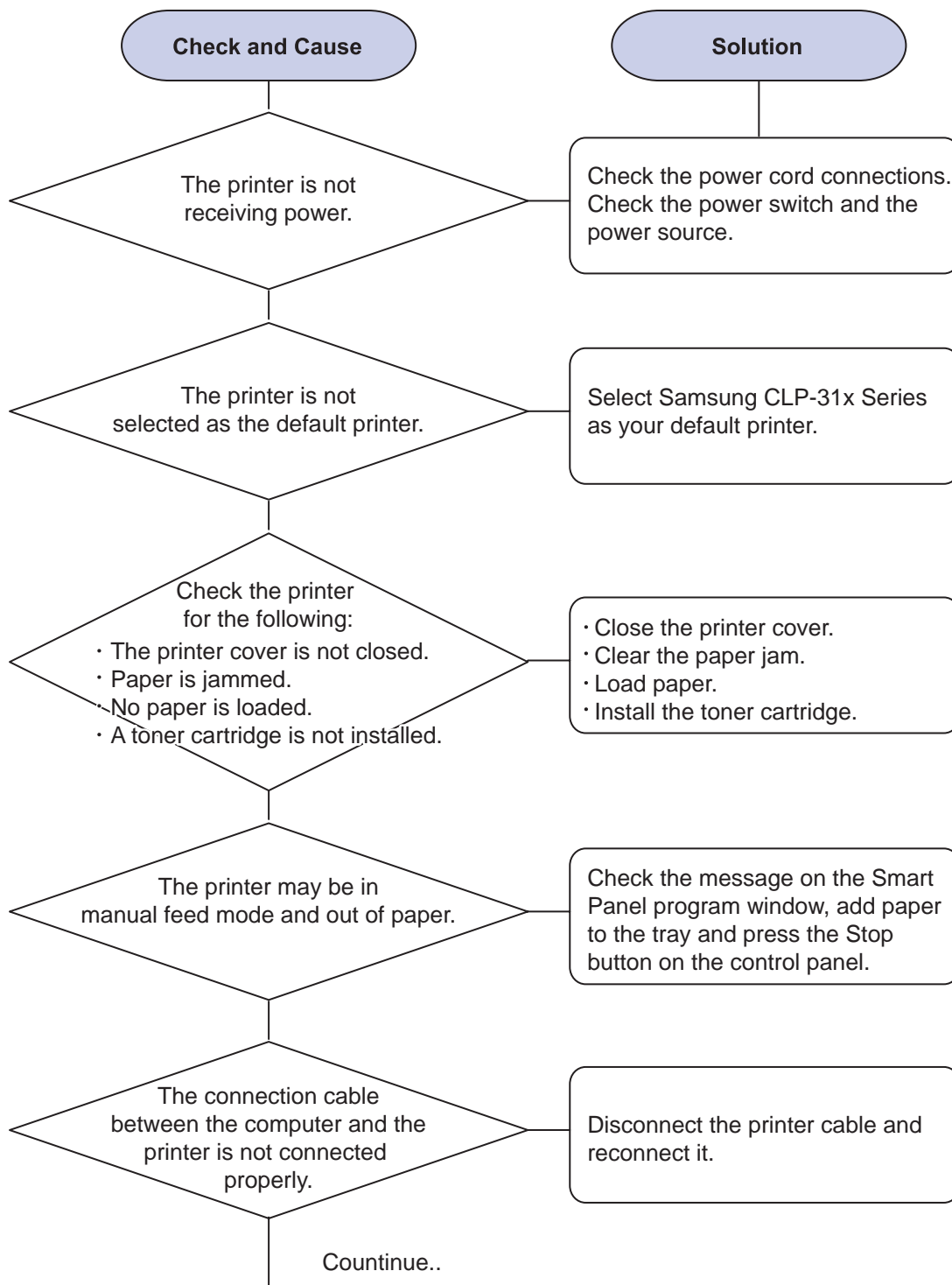
If the printer is not working properly, consult the following checklist. If the printer does not pass a step, follow the corresponding troubleshooting suggestions.

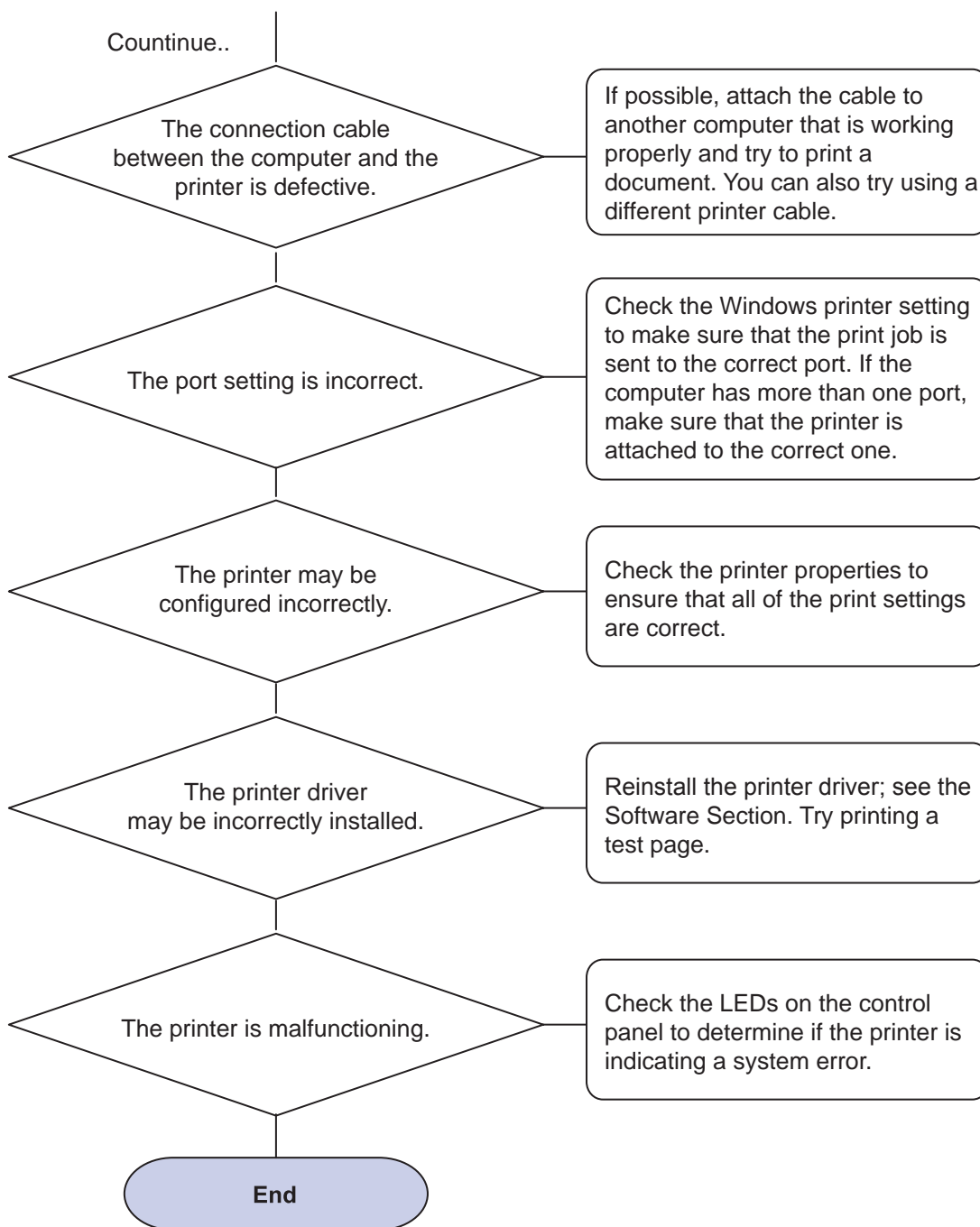
Status	Response
Make sure that the Status LED on the control panel green and "Ready" is shown on the Smart Panel program window.	<ul style="list-style-type: none"> <li>• If the Status LED is off, check the power cord connection. Check the power switch. Check the power source by plugging the power cord into another outlet.</li> <li>• If the Status LED blinks or lights red, solve the problems.</li> </ul>
Print a demo page to verify that the printer is feeding paper correctly.	<ul style="list-style-type: none"> <li>• If a demo page does not print, check the paper supply in the paper tray.</li> <li>• If the paper jams in the printer, go to "Clearing Paper Jams"</li> </ul>
Check the demo page to see if it is printed correctly.	If there is a print quality problem, go to "Solving Print Quality Problems"
Print a short document from a software application to verify that the computer and printer are connected and communicating correctly.	<ul style="list-style-type: none"> <li>• If the page does not print, check the cable connection between the printer and the computer.</li> <li>• Check the print queue or print spooler to see if the printer has been paused.</li> <li>• Check the software application to ensure that you are using the proper printer driver and communication port. If the page is interrupted during printing, go to "Solving General Printing Problems"</li> </ul>
If completing the checklist does not resolve the printer problem, check the following troubleshooting sections.	<ul style="list-style-type: none"> <li>• See "Solving General Printing Problems"</li> <li>• See "Solving Print Quality Problems"</li> <li>• See "Common Windows Problems"</li> <li>• See "Common Macintosh Problems"</li> <li>• See "Common Linux Problems"</li> </ul>

### 4.2.3 Solving General Printing Problems

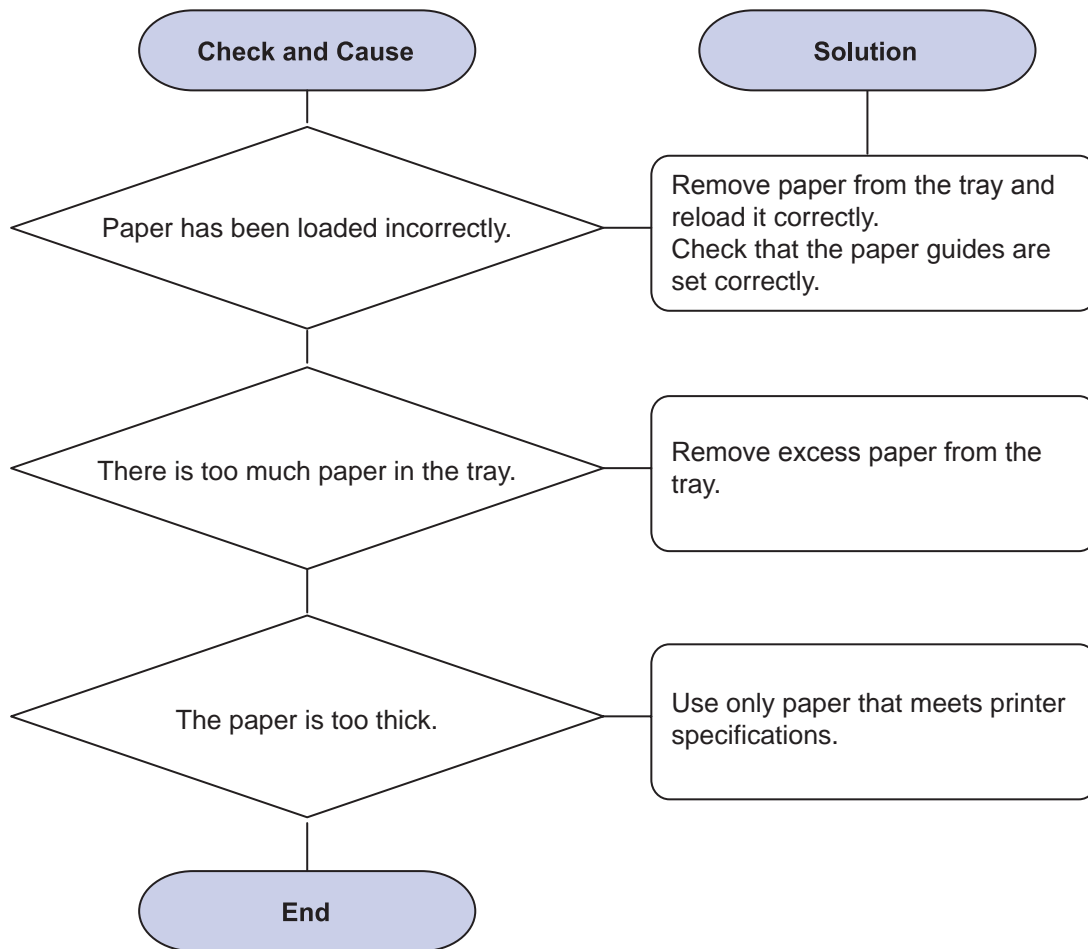
For problems with the operation of your printer, refer to the table for suggested solutions..

<b>Description</b>	The printer does not print.
--------------------	-----------------------------



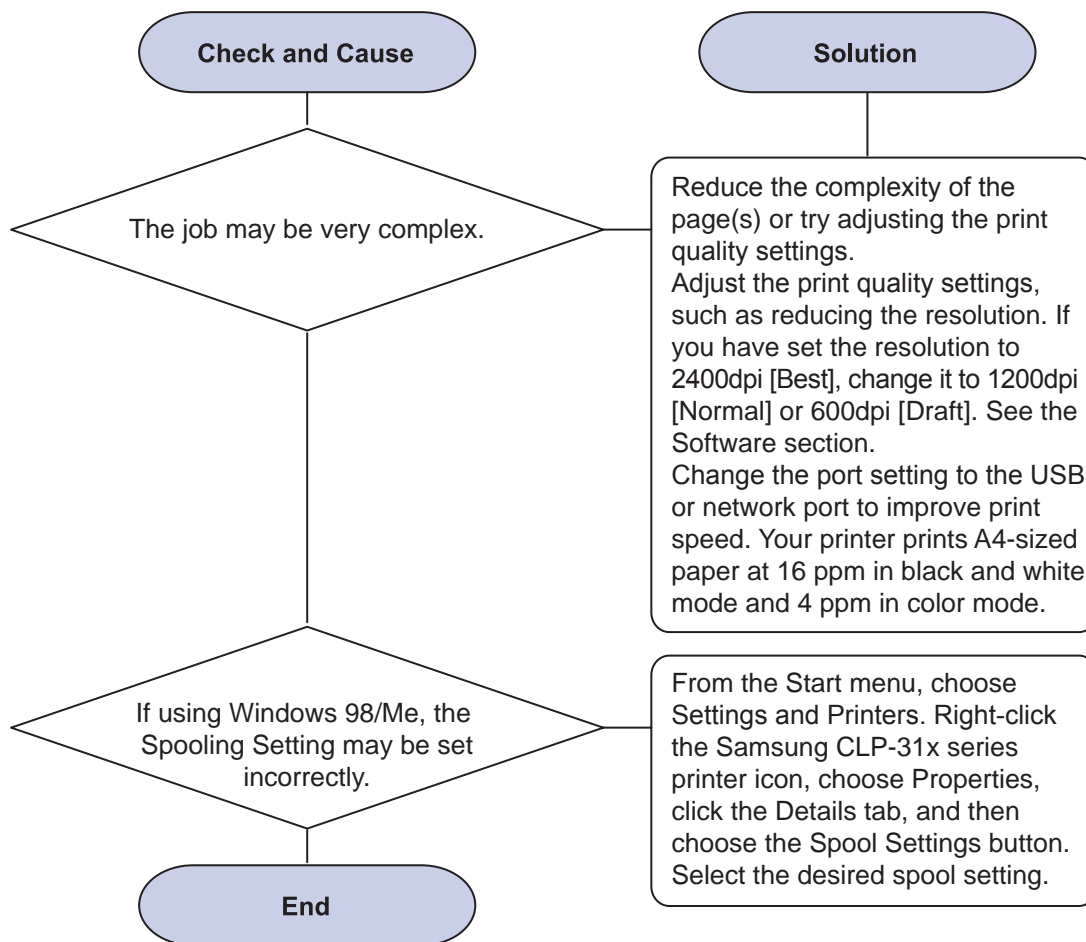


**Description** Paper does not feed into the printer..

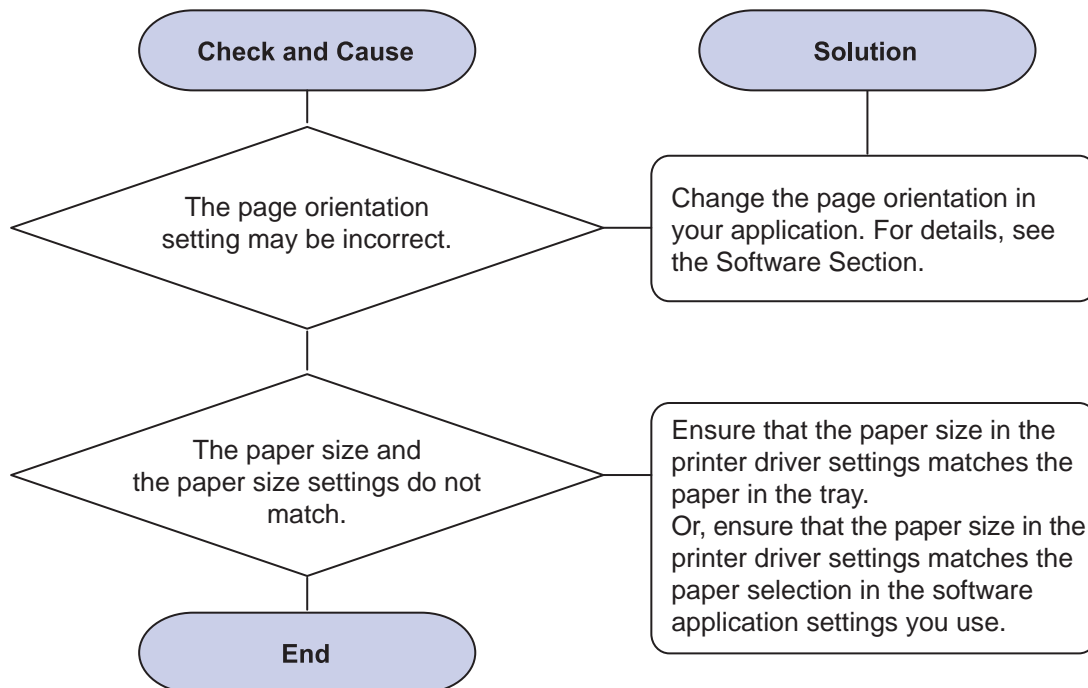




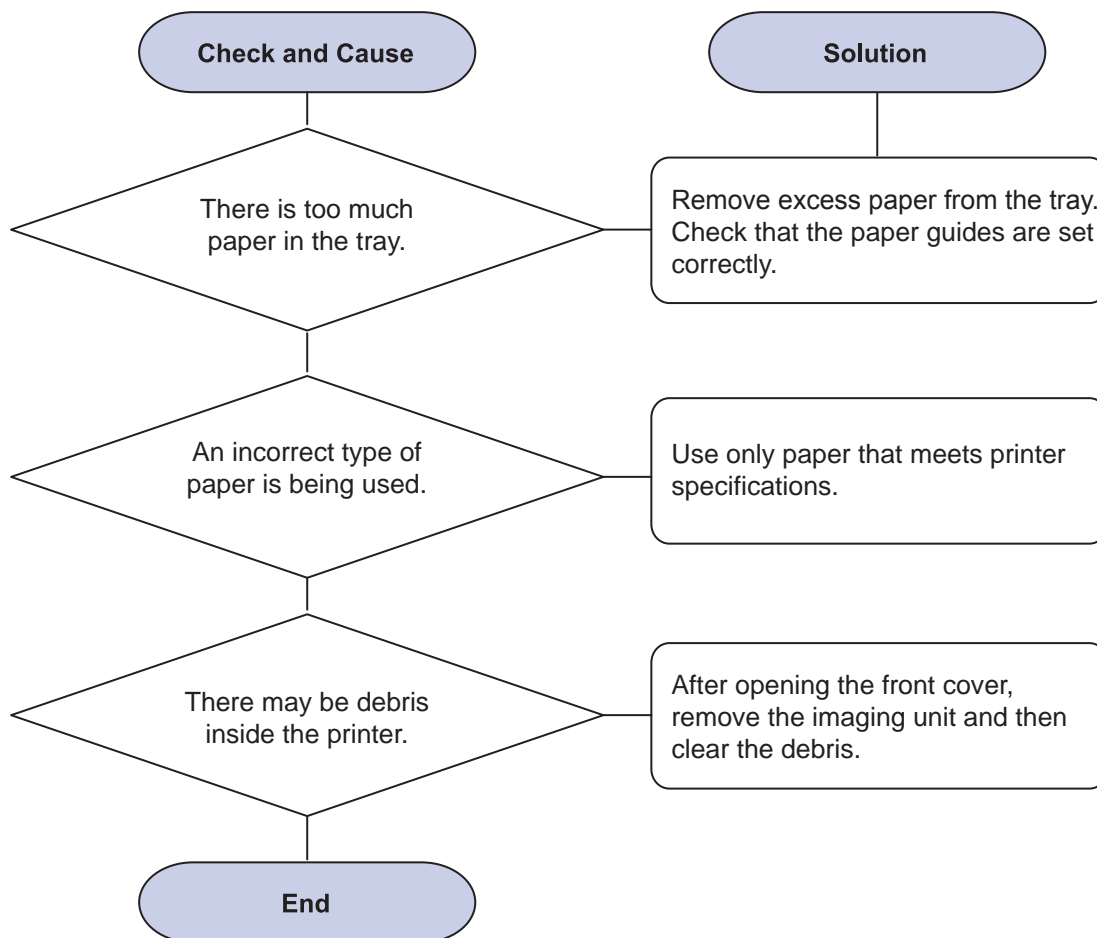
**Description** A print job is extremely slow.



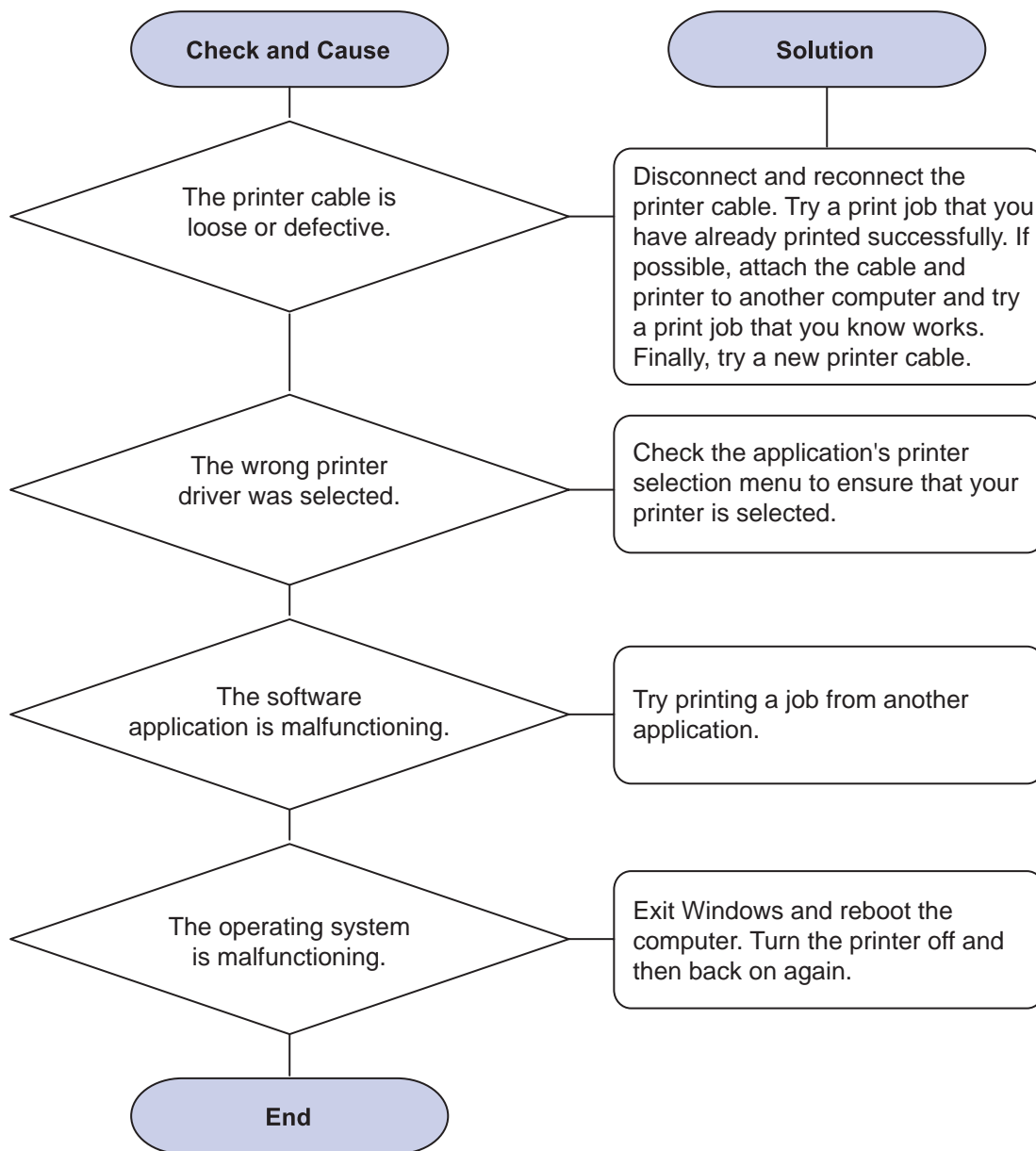
**Description** Half the page is blank.



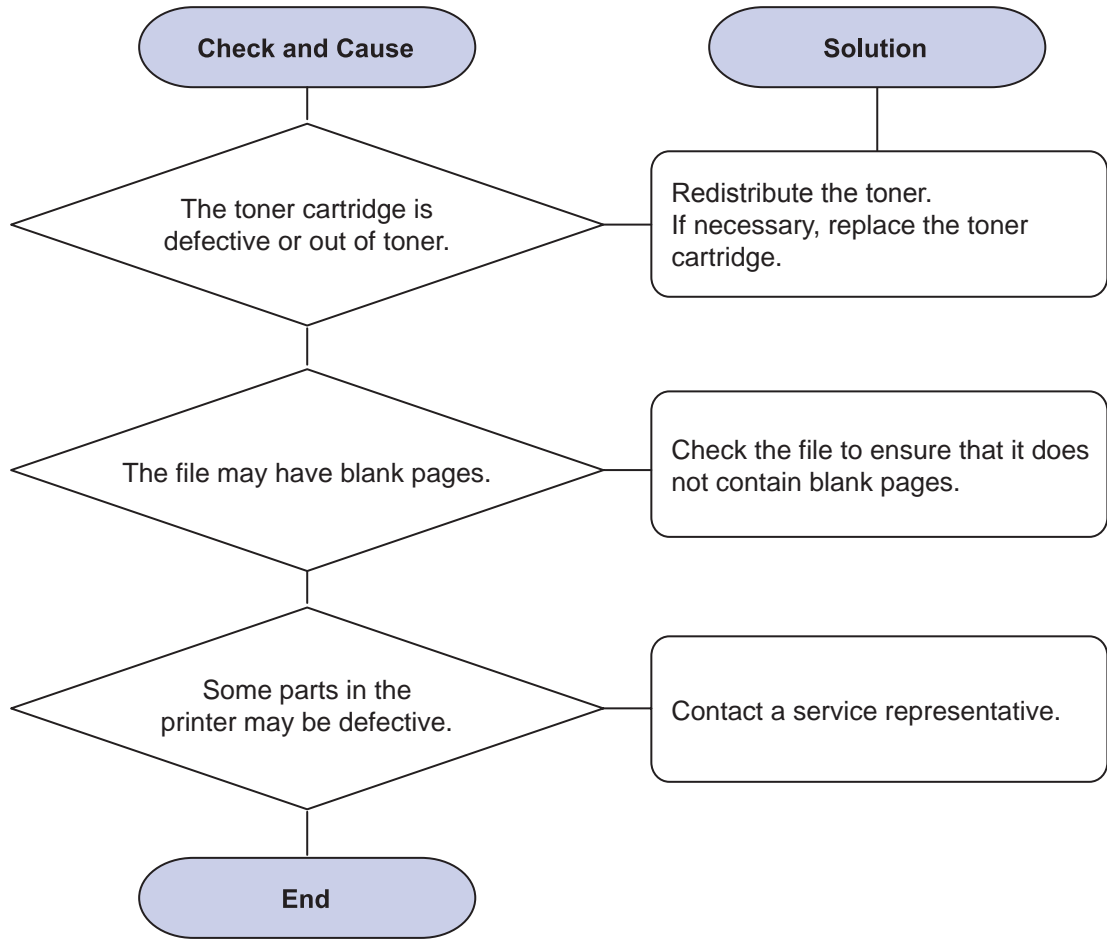
**Description** The paper keeps jamming.



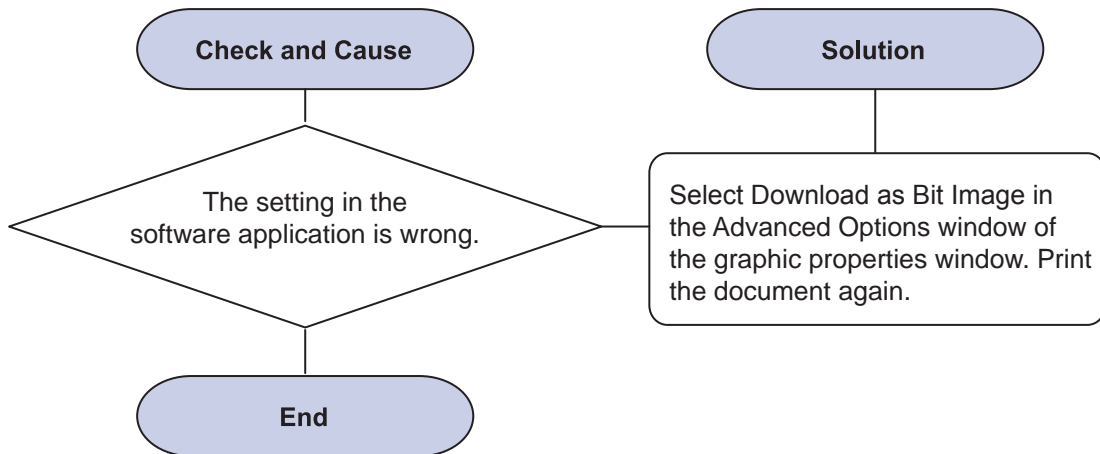
**Description** The printer prints, but the text is wrong, garbled, or incomplete.



<b>Description</b>	Pages print, but are blank.
--------------------	-----------------------------

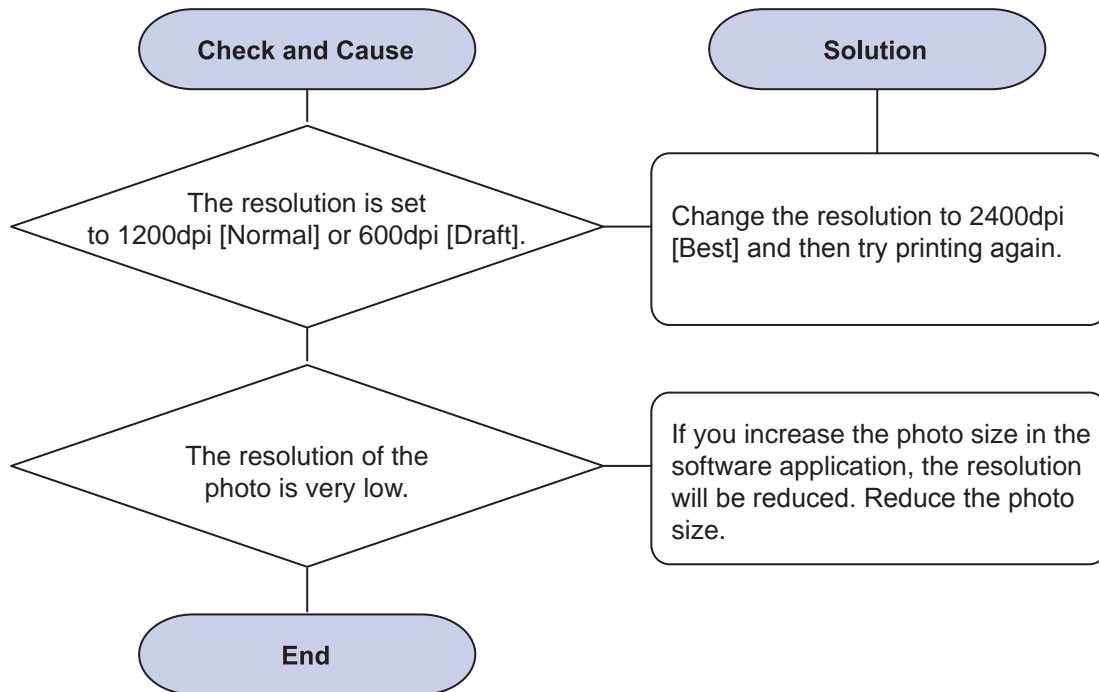


**Description** When you are using Windows 98, the illustrations print incorrectly from Adobe Illustrator.



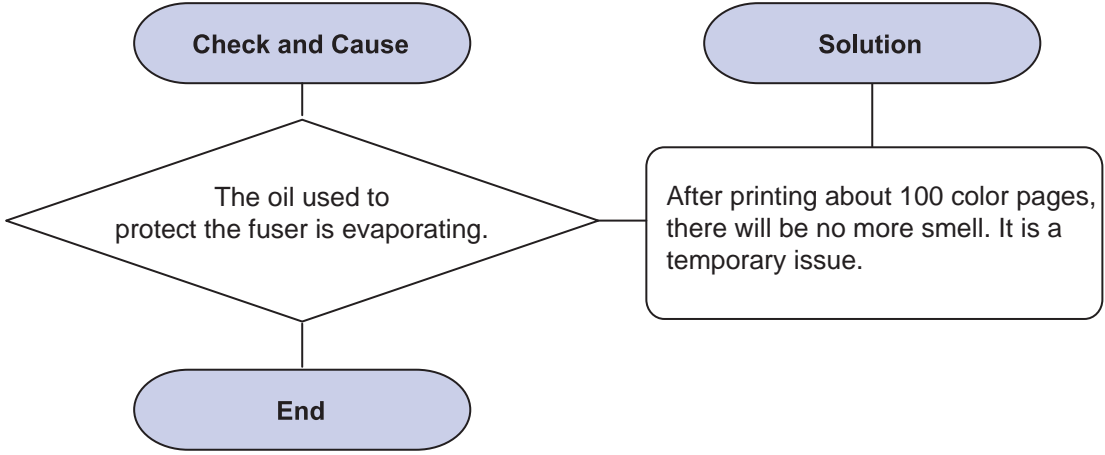
**Description**

The print quality of photos is not good.  
Images are not clear.





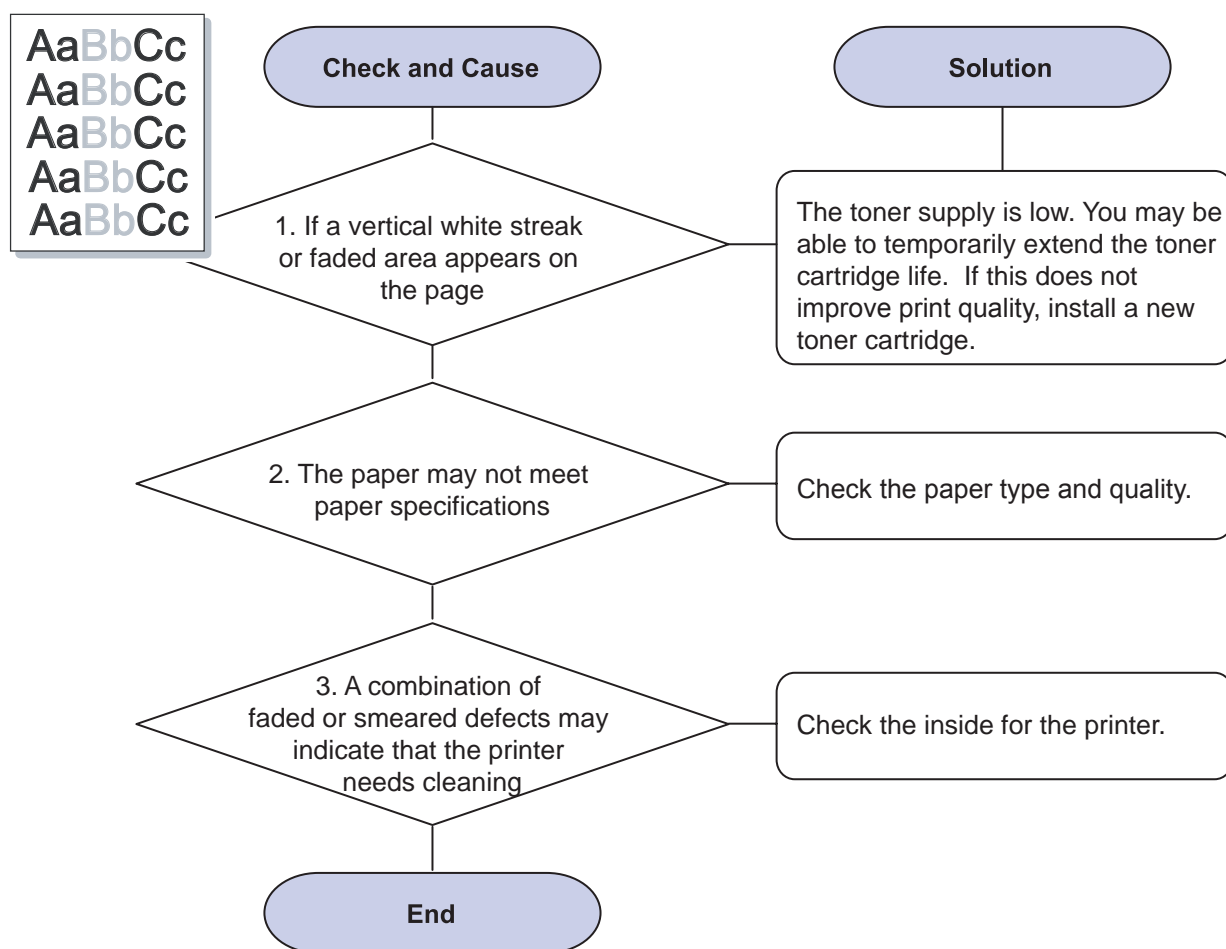
**Description** Your printer has an odd smell during initial use.



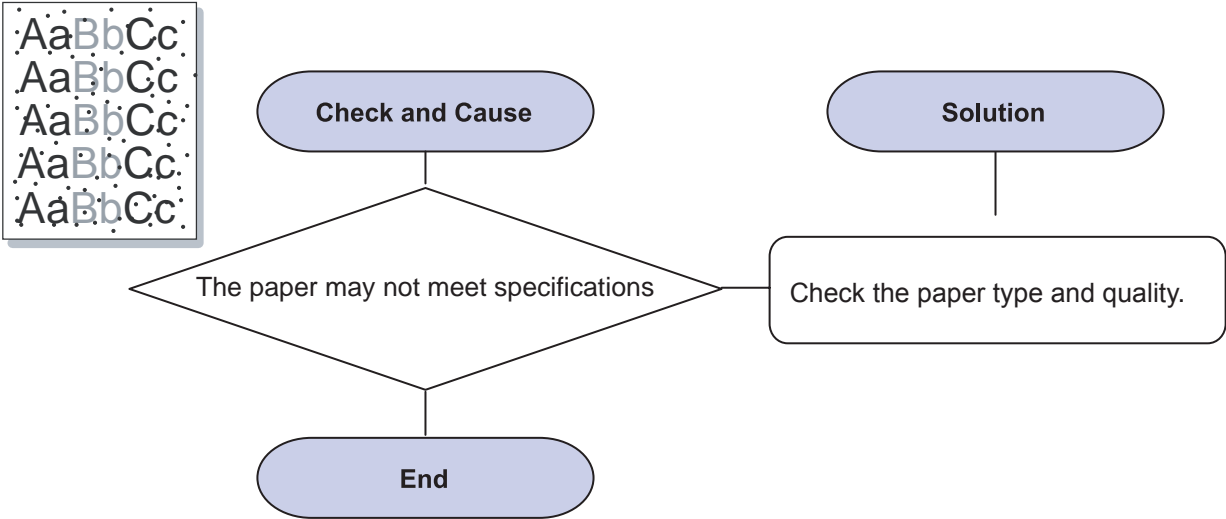
## 4.2.4 Solving Print Quality Problems

Dirt inside of the printer or improper paper loading may reduce print quality. See the table below to troubleshoot problems.

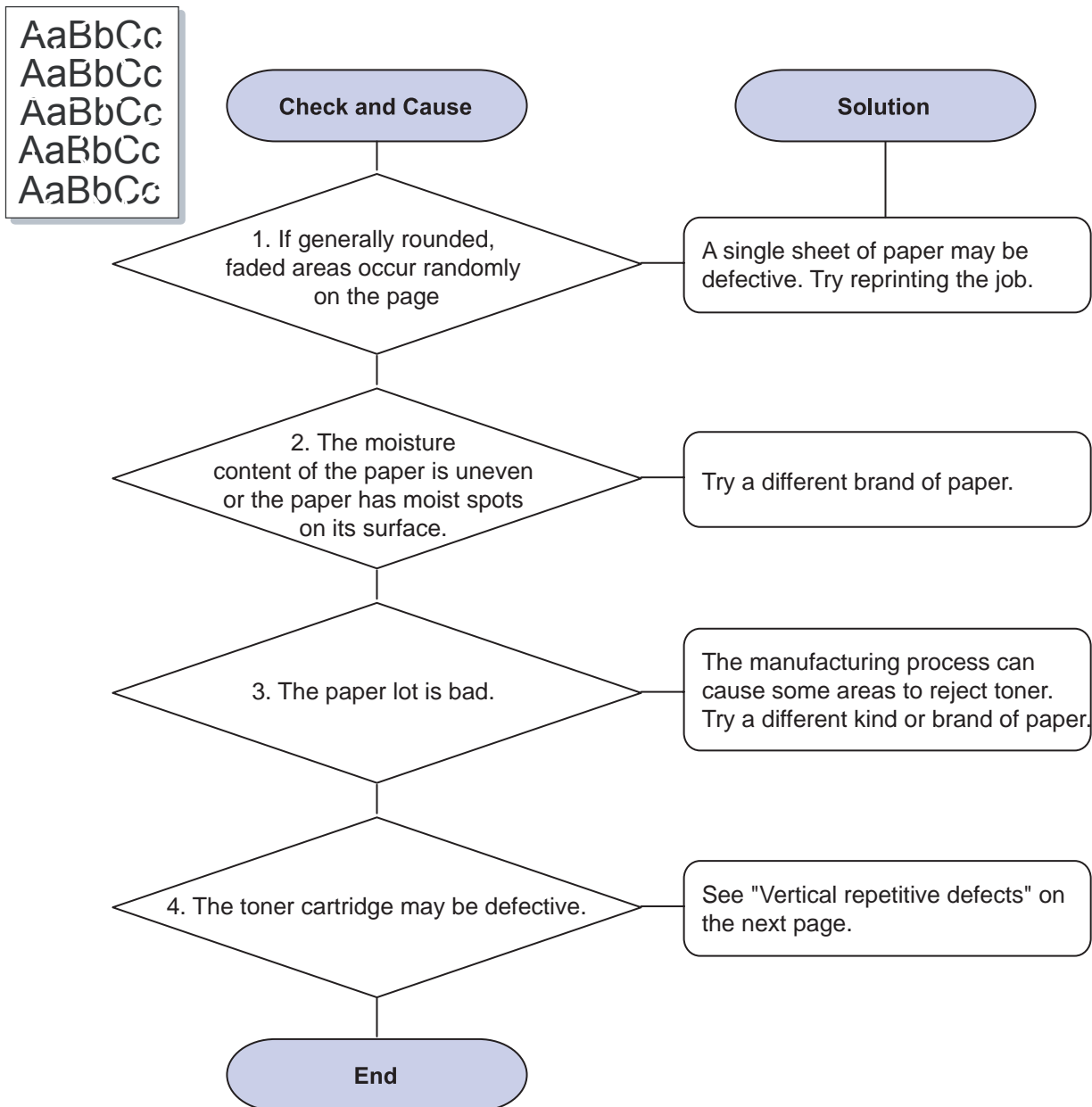
### 1) Light or faded print



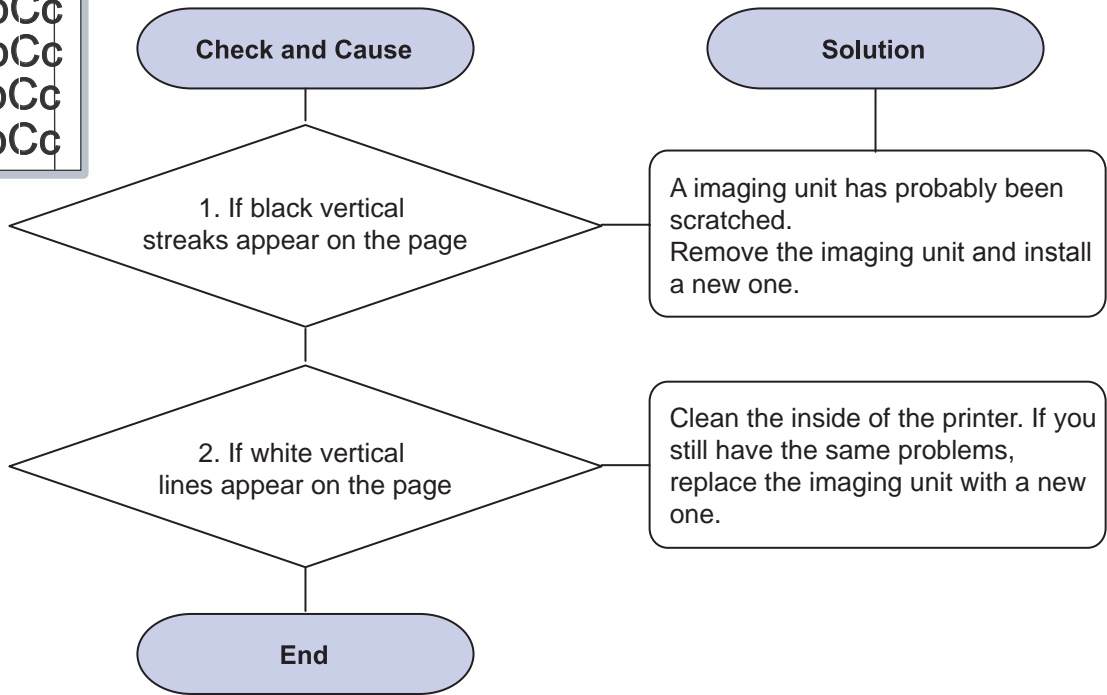
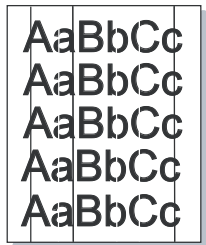
2) Toner specks



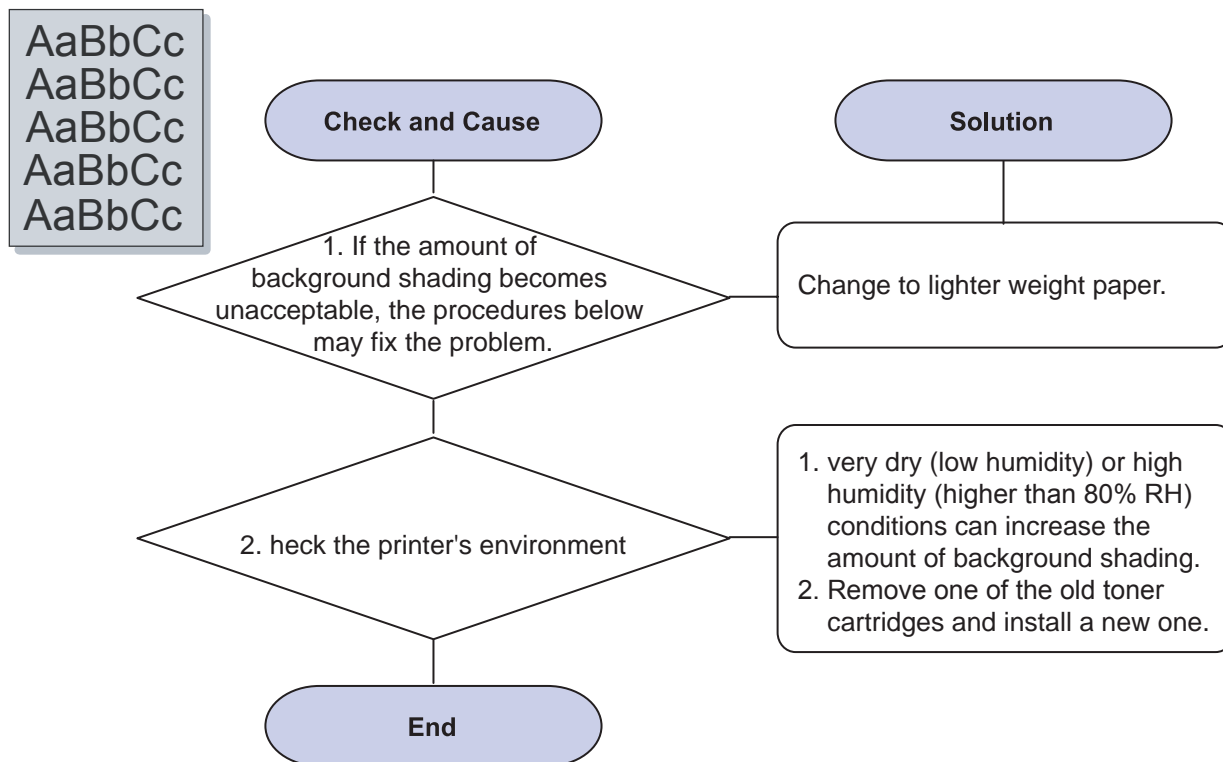
### 3) Dropouts



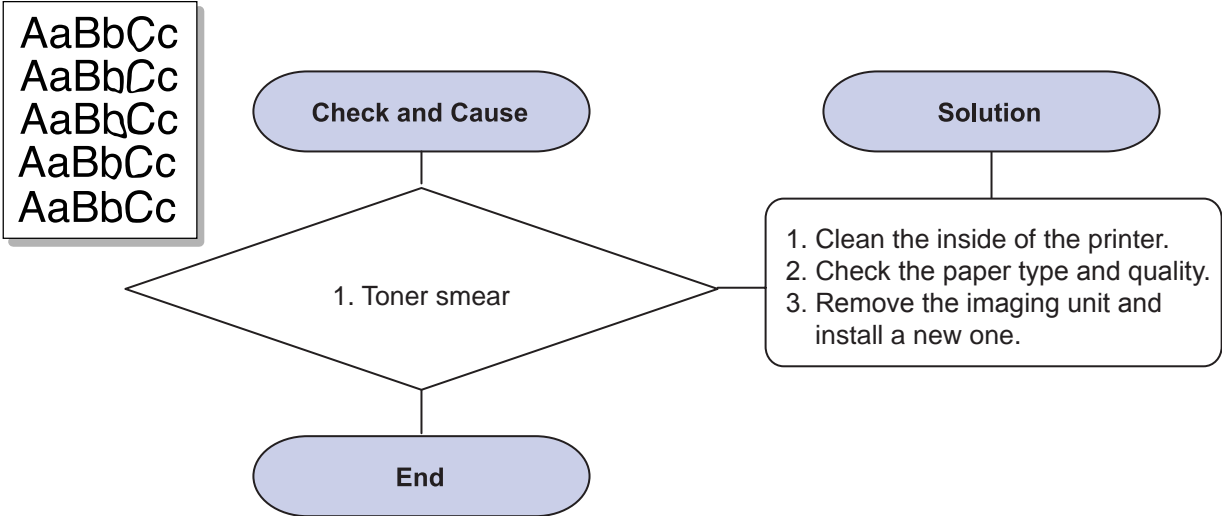
#### 4) Vertical lines



### 5) Color or Black background

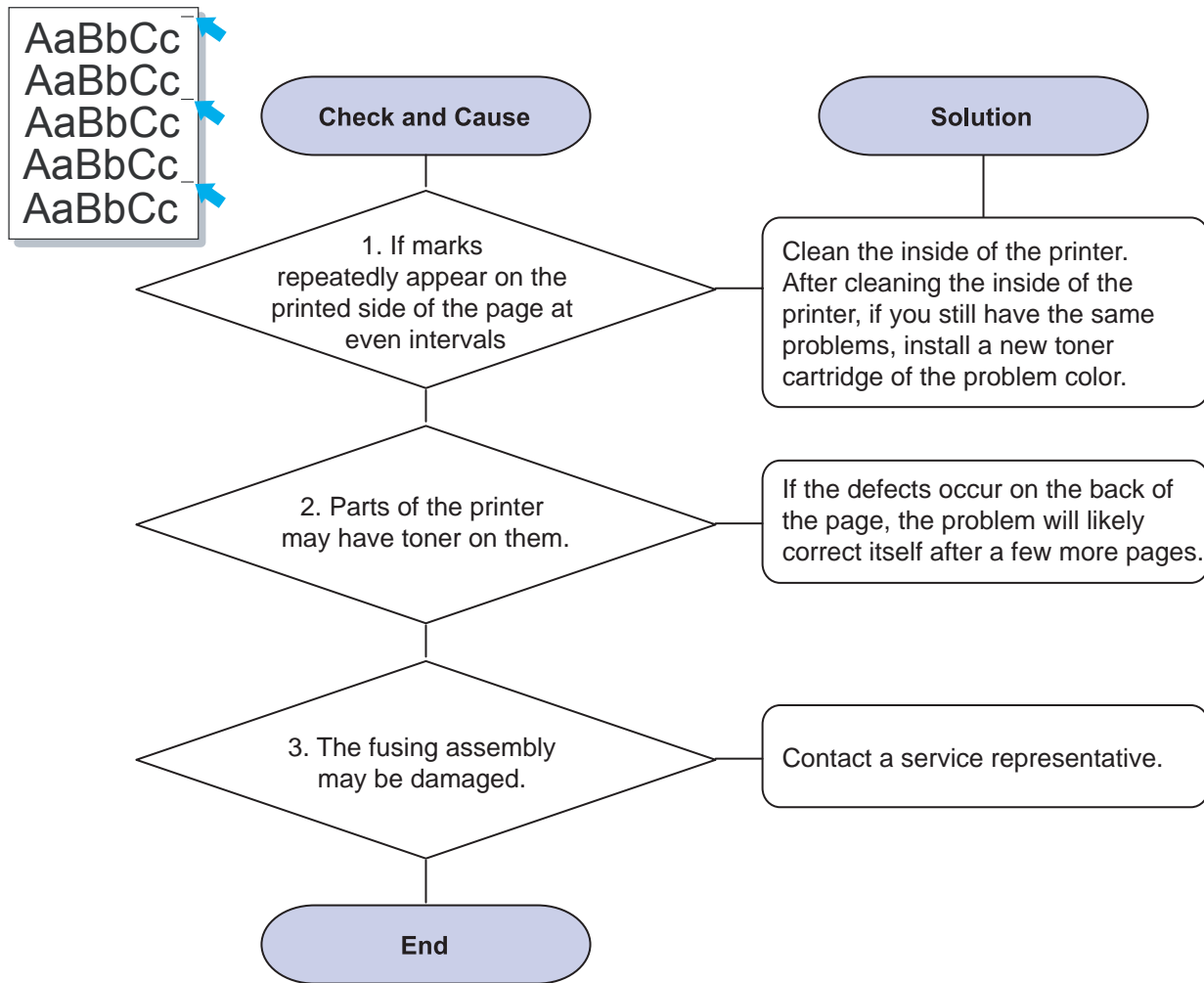


6) Toner smear

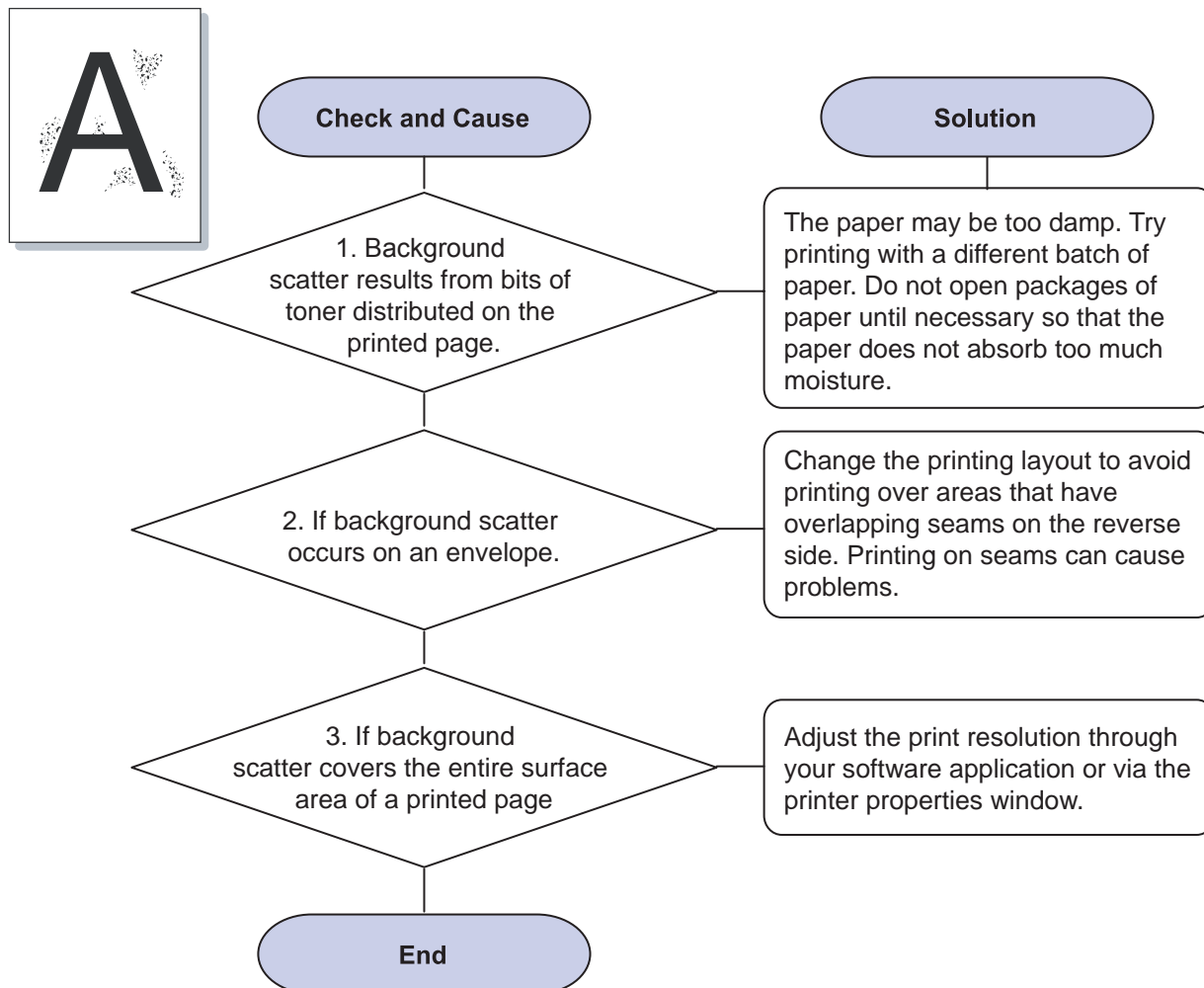




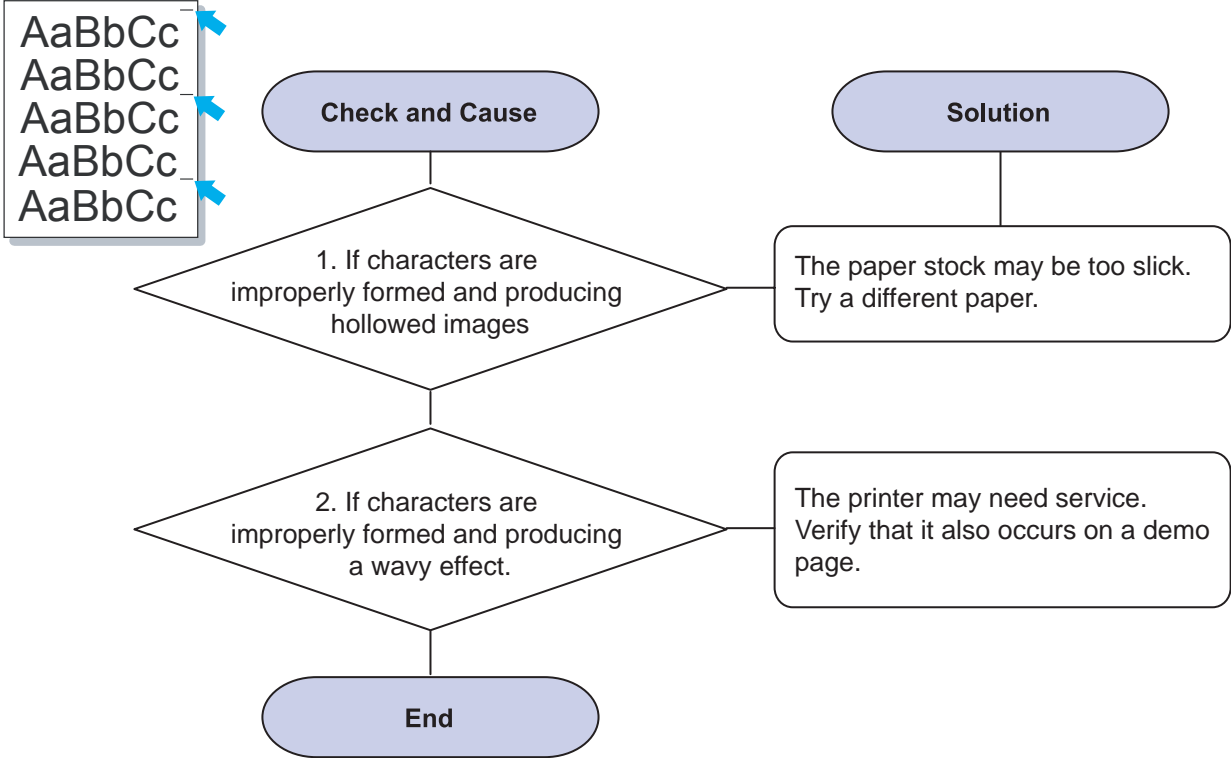
7) Vertical repetitive defects



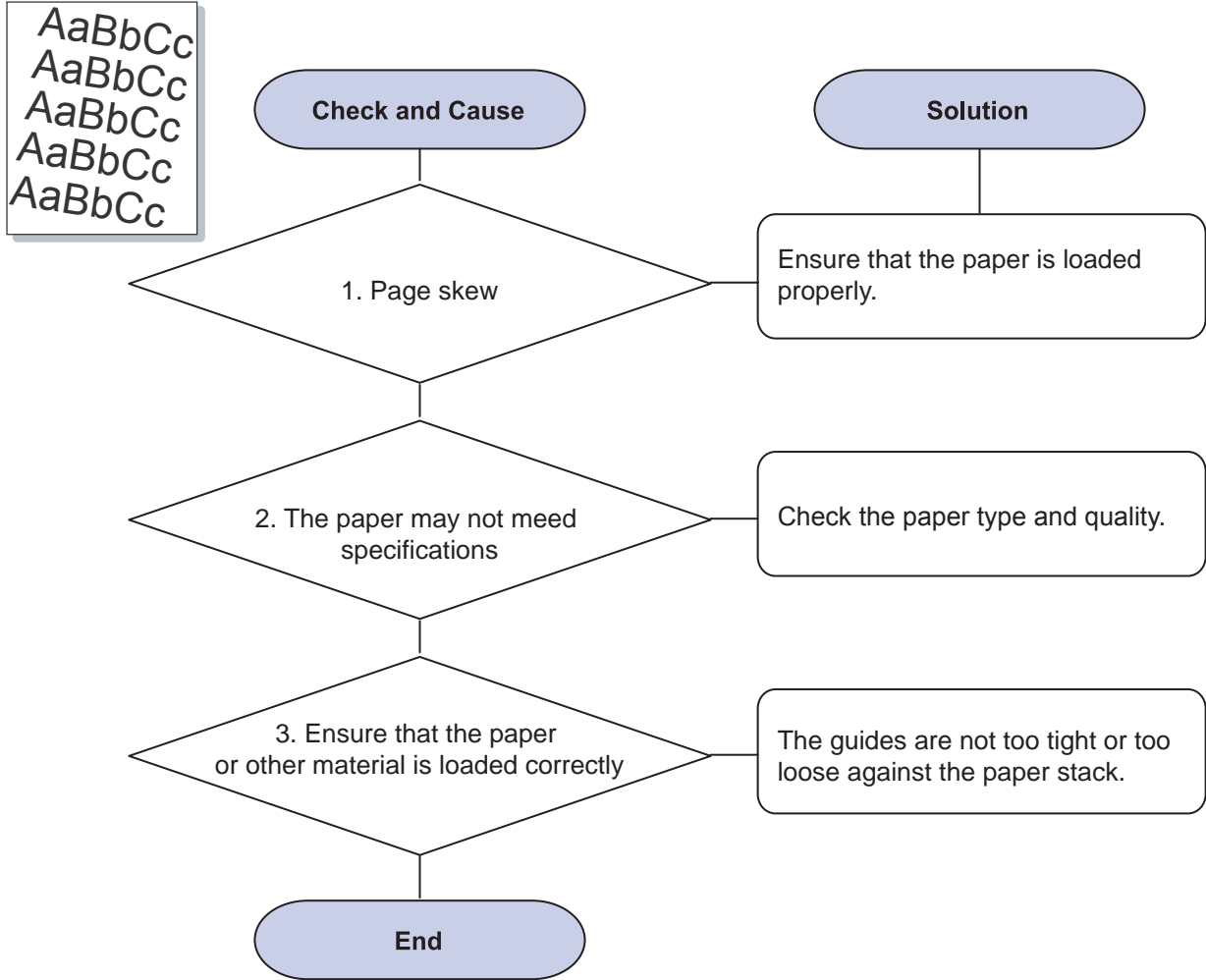
## 8) Background scatter



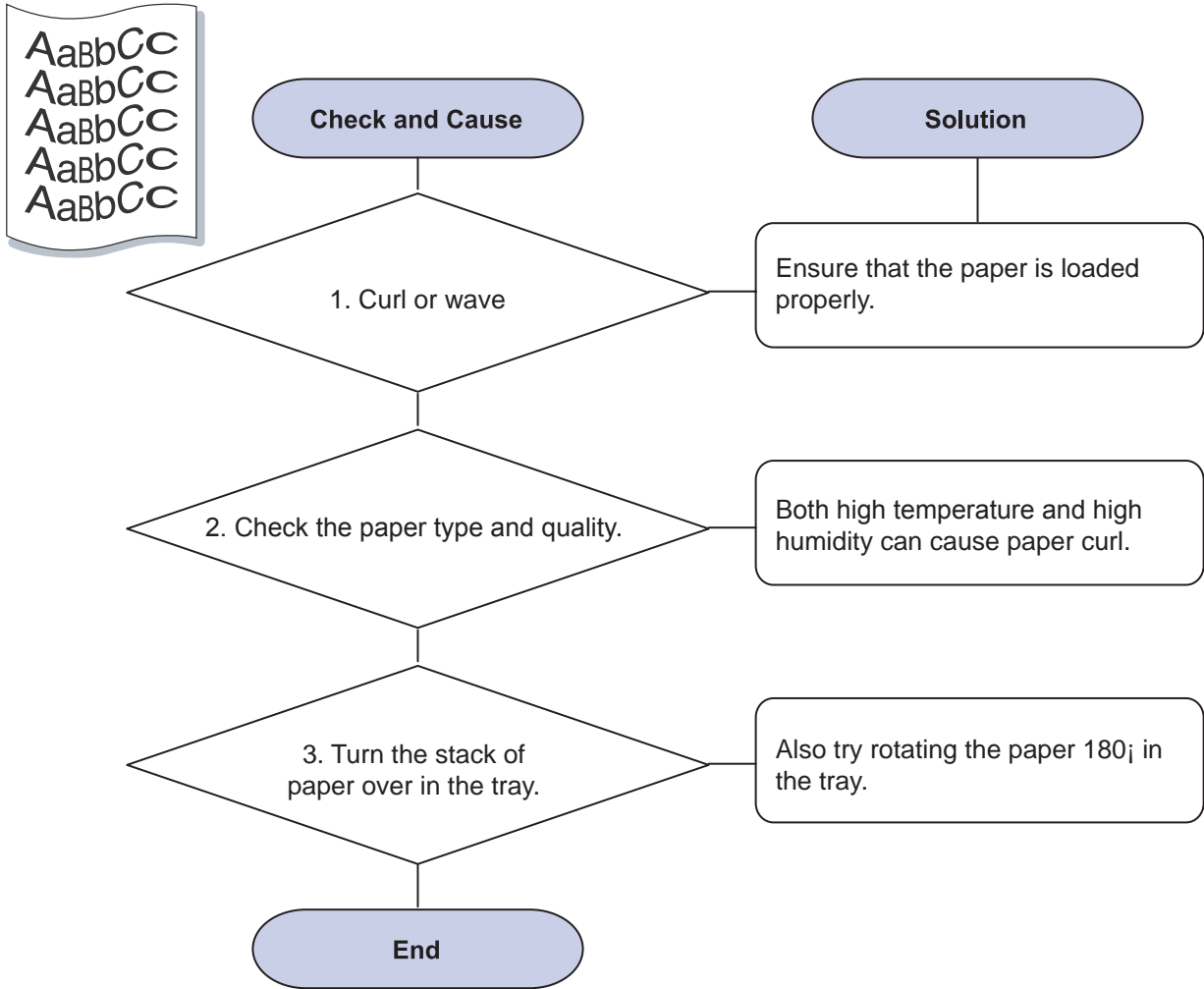
9) Misformed characters



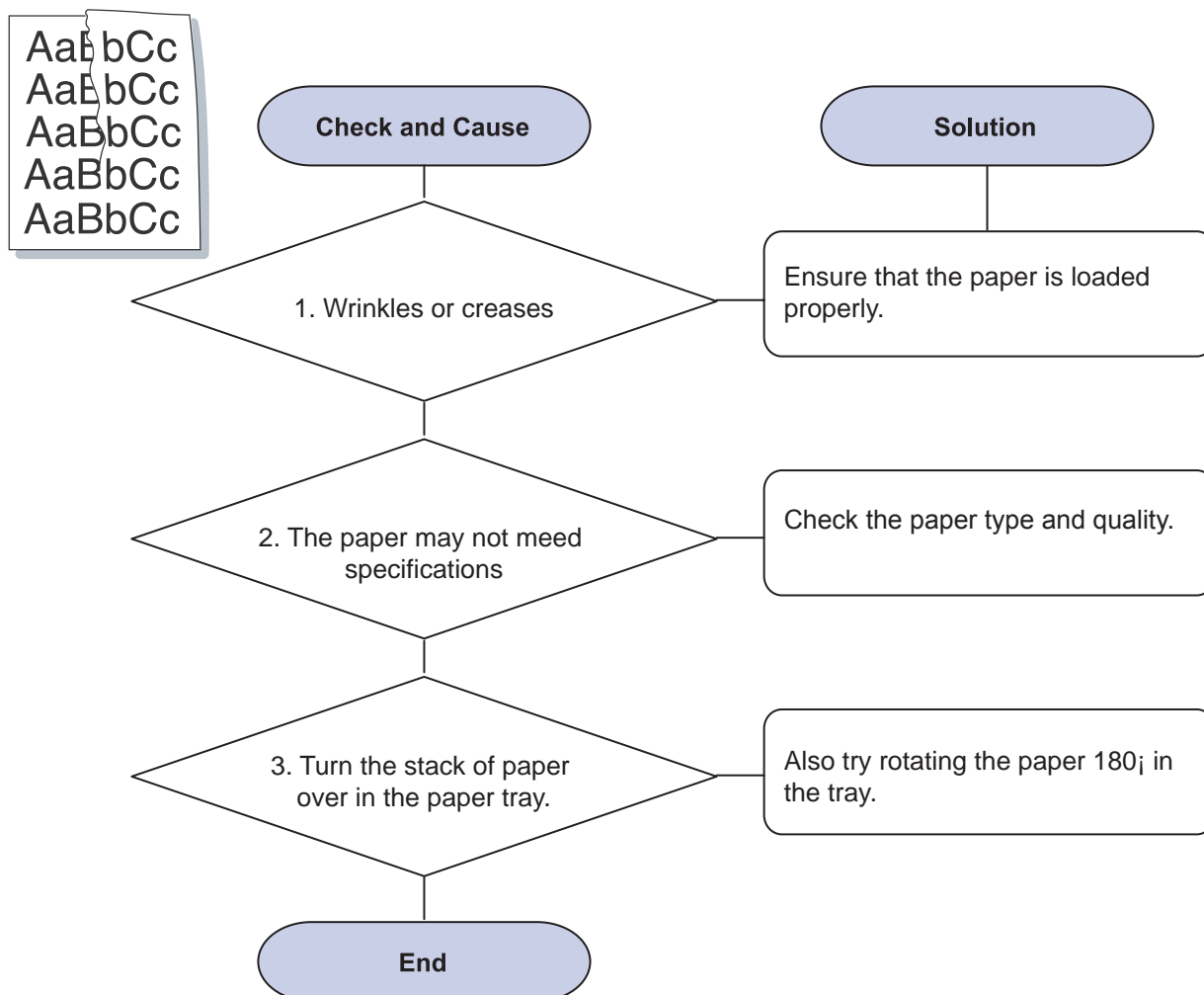
### 10) Page skew



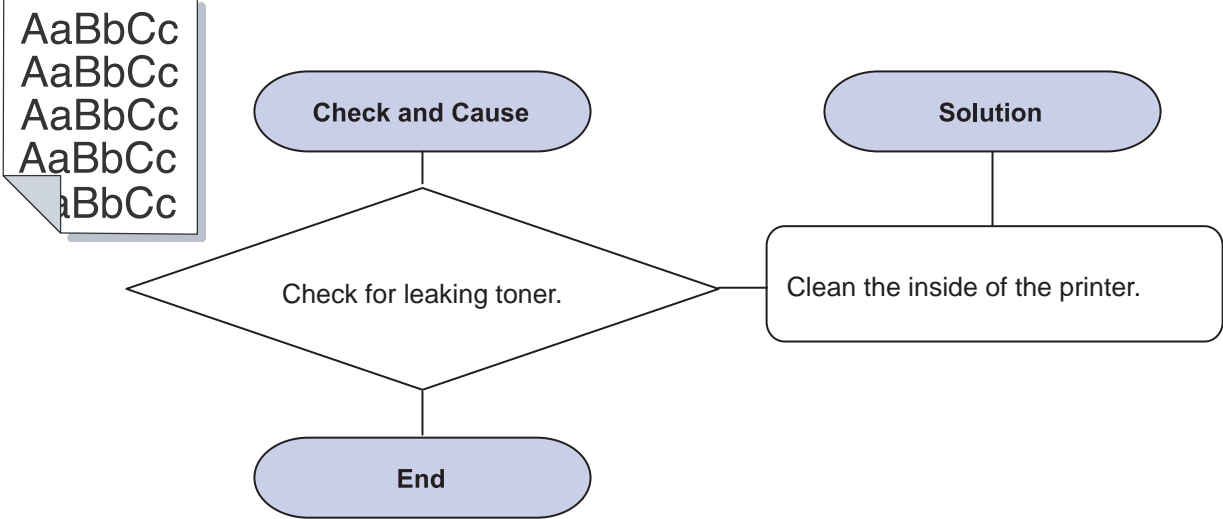
### 11) Curl or wave



### 12) Wrinkles or creases

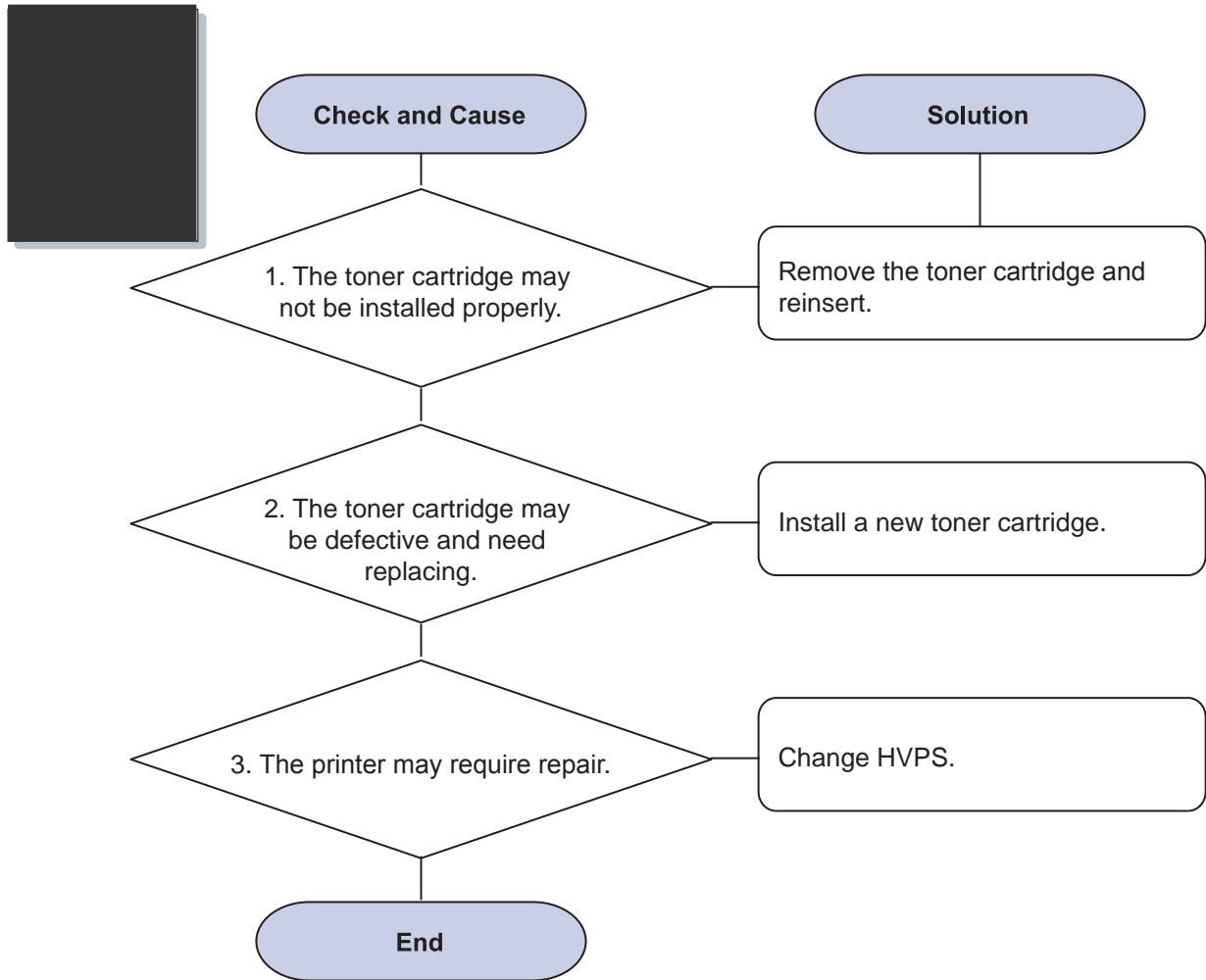


13) Back of printouts are dirty

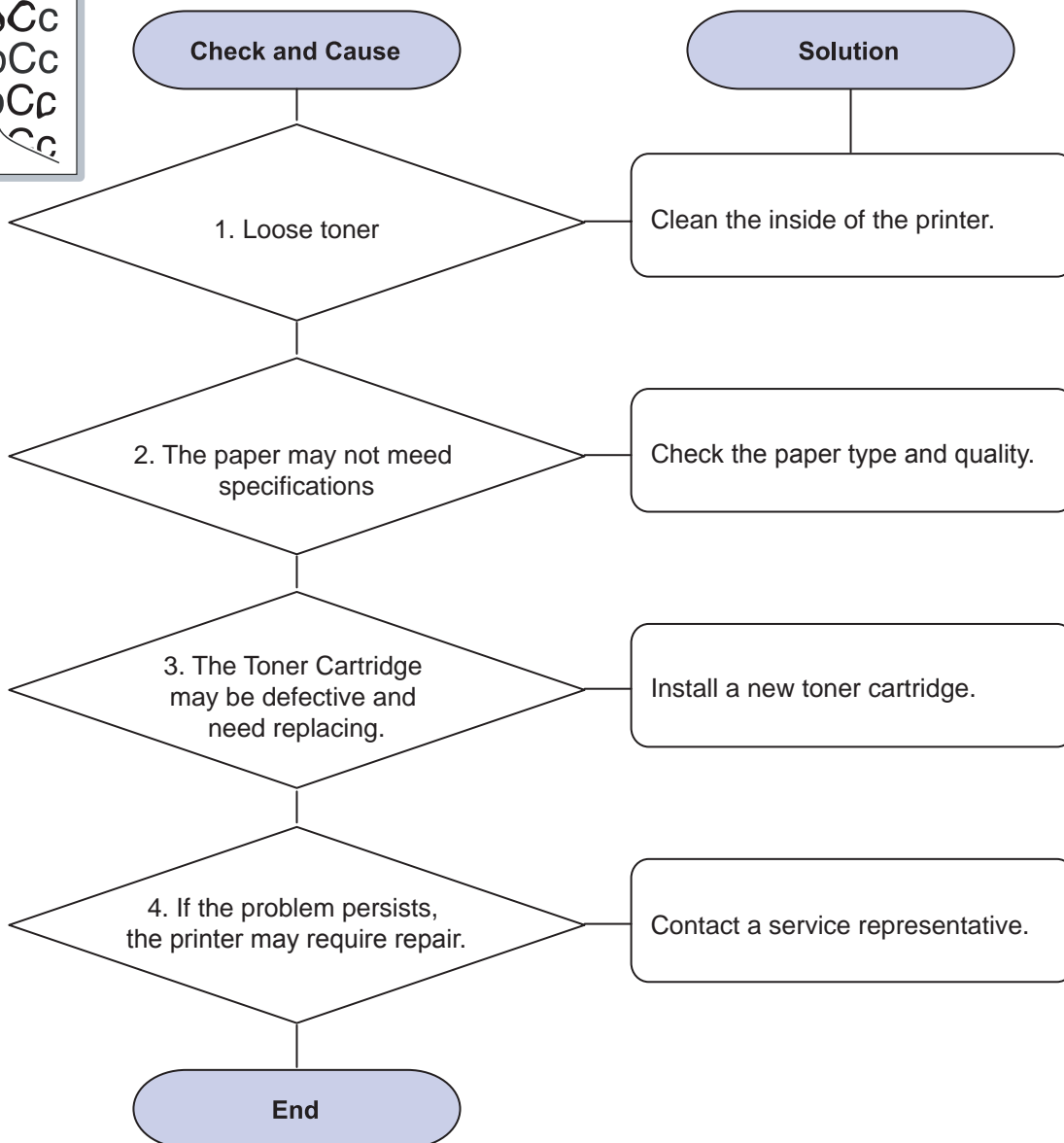
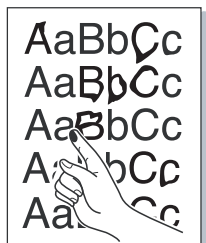




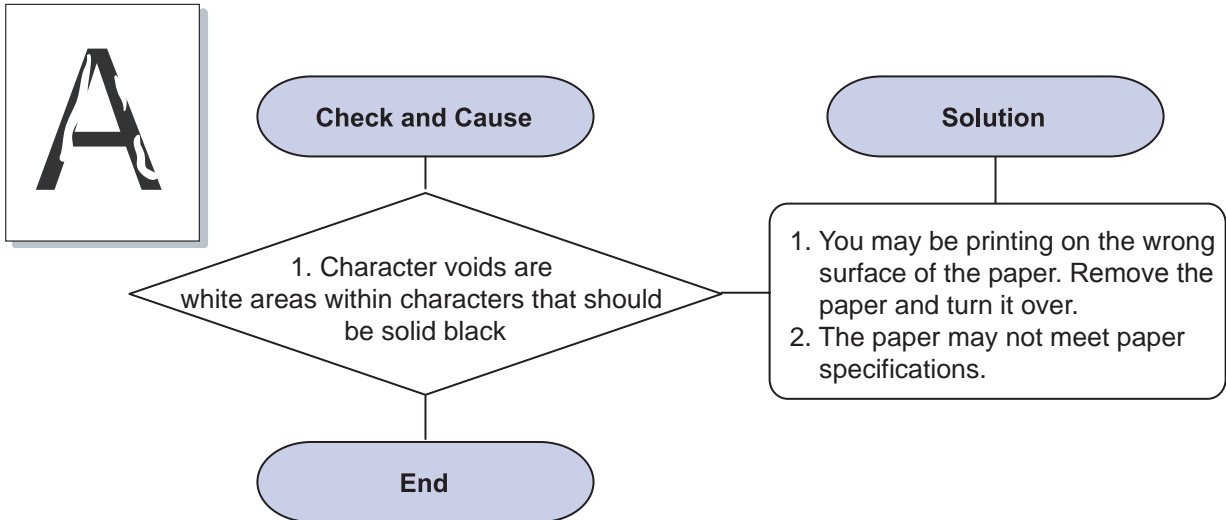
### 14) Solid Color or Black pages



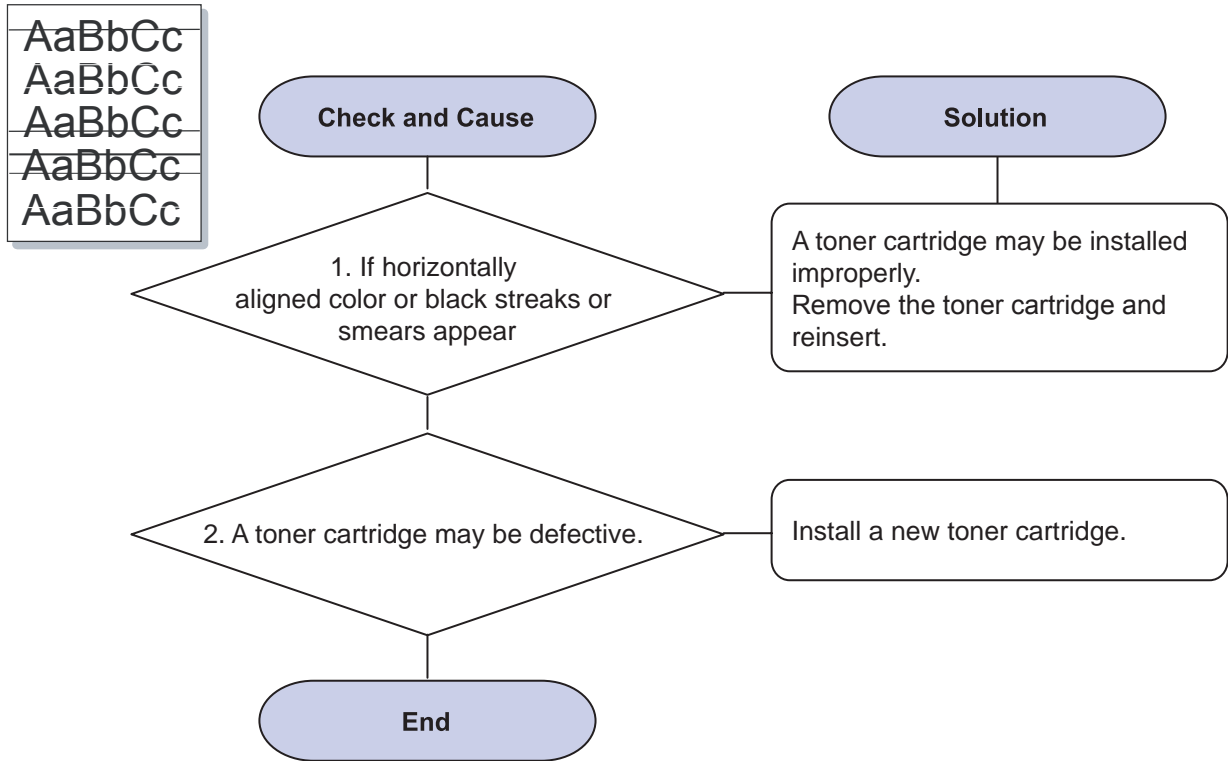
15) Loose toner



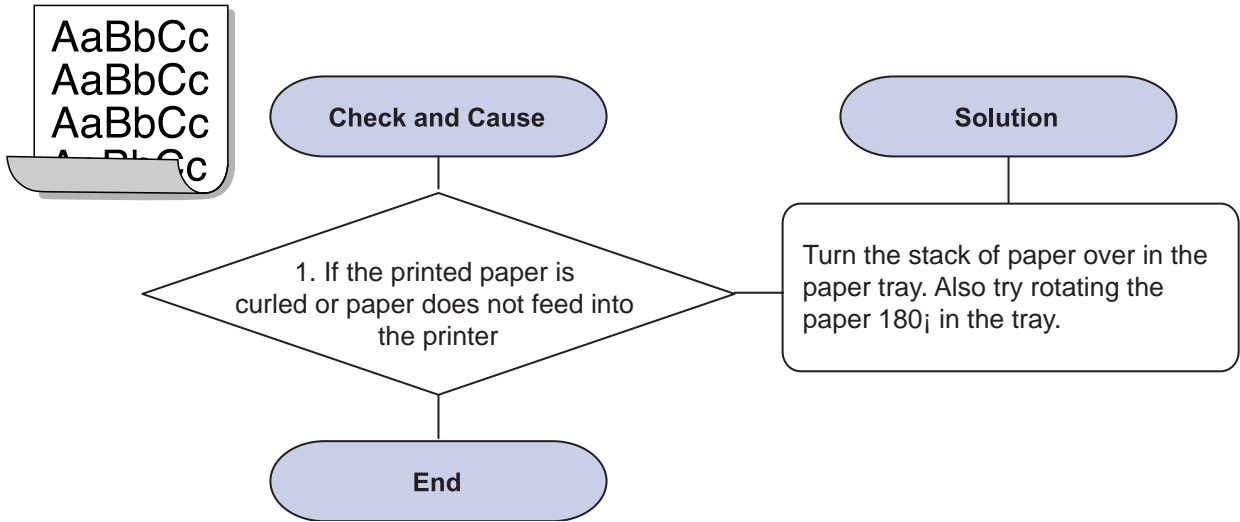
## 16) Character Voids



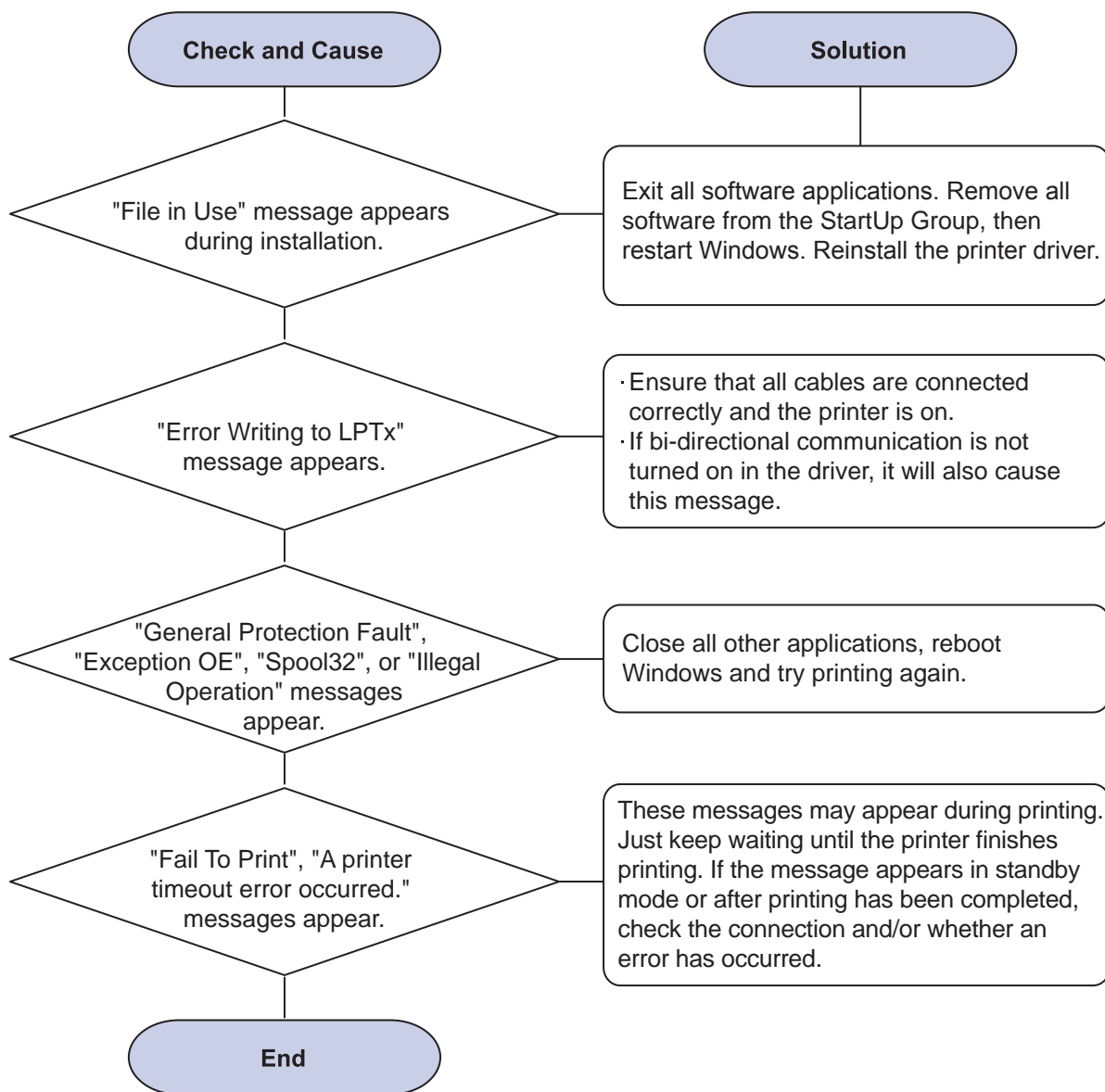
### 17) Horizontal stripes



### 18) Curl

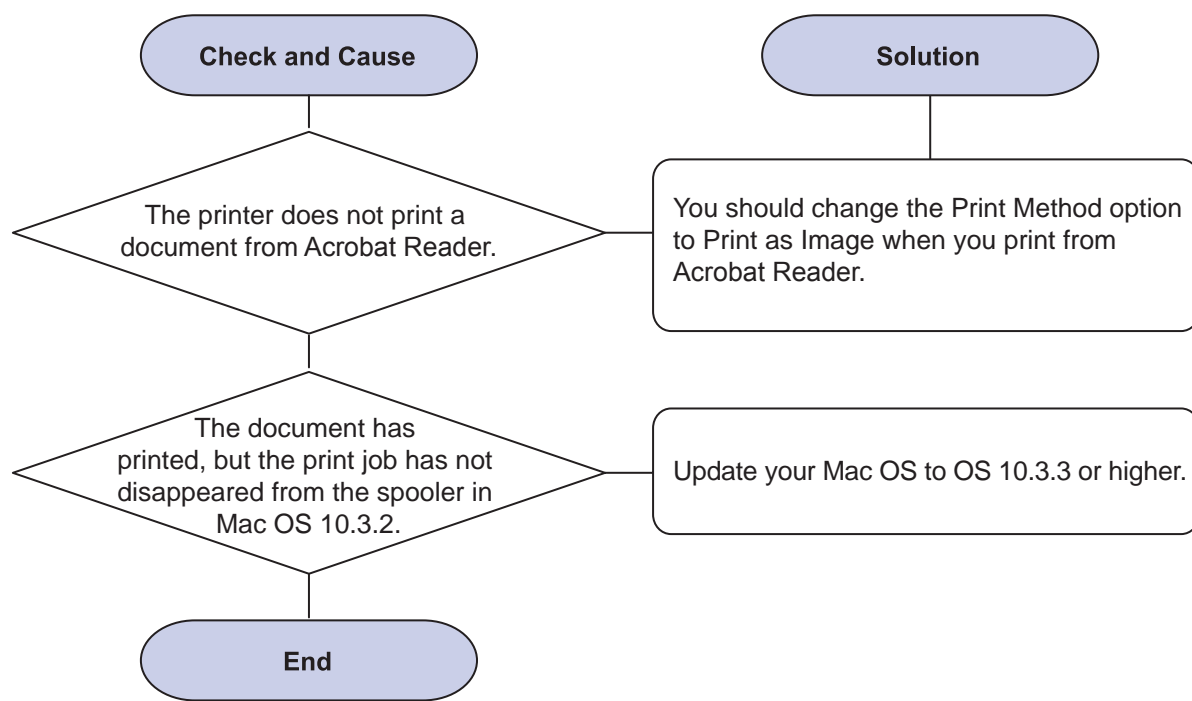


### 4.2.5 Common Windows Problems



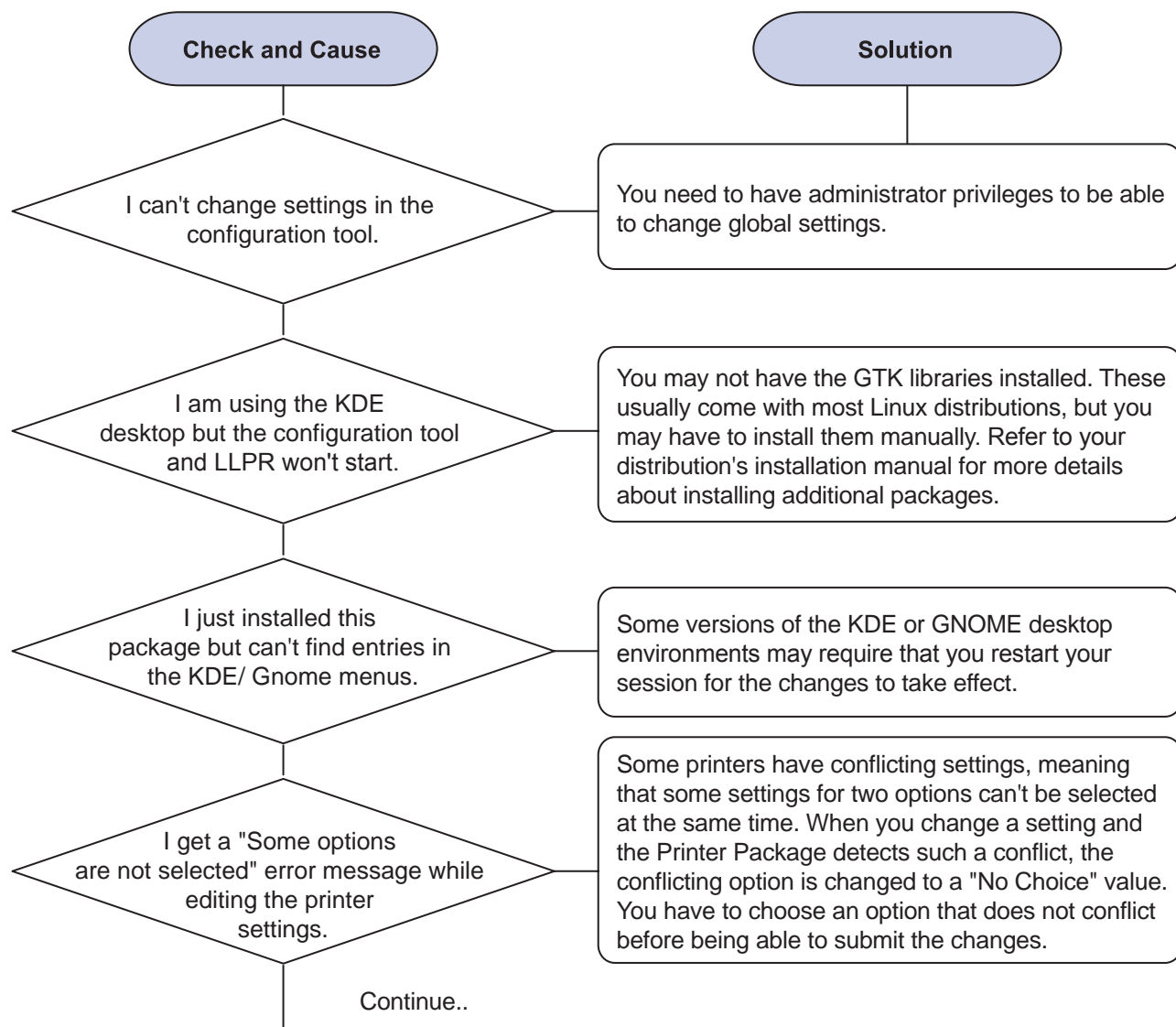
**NOTE:** Refer to the Microsoft Windows 98/Me/NT 4.0/2000/2003/XP User's Guide that came with your PC for further information on Windows error messages.

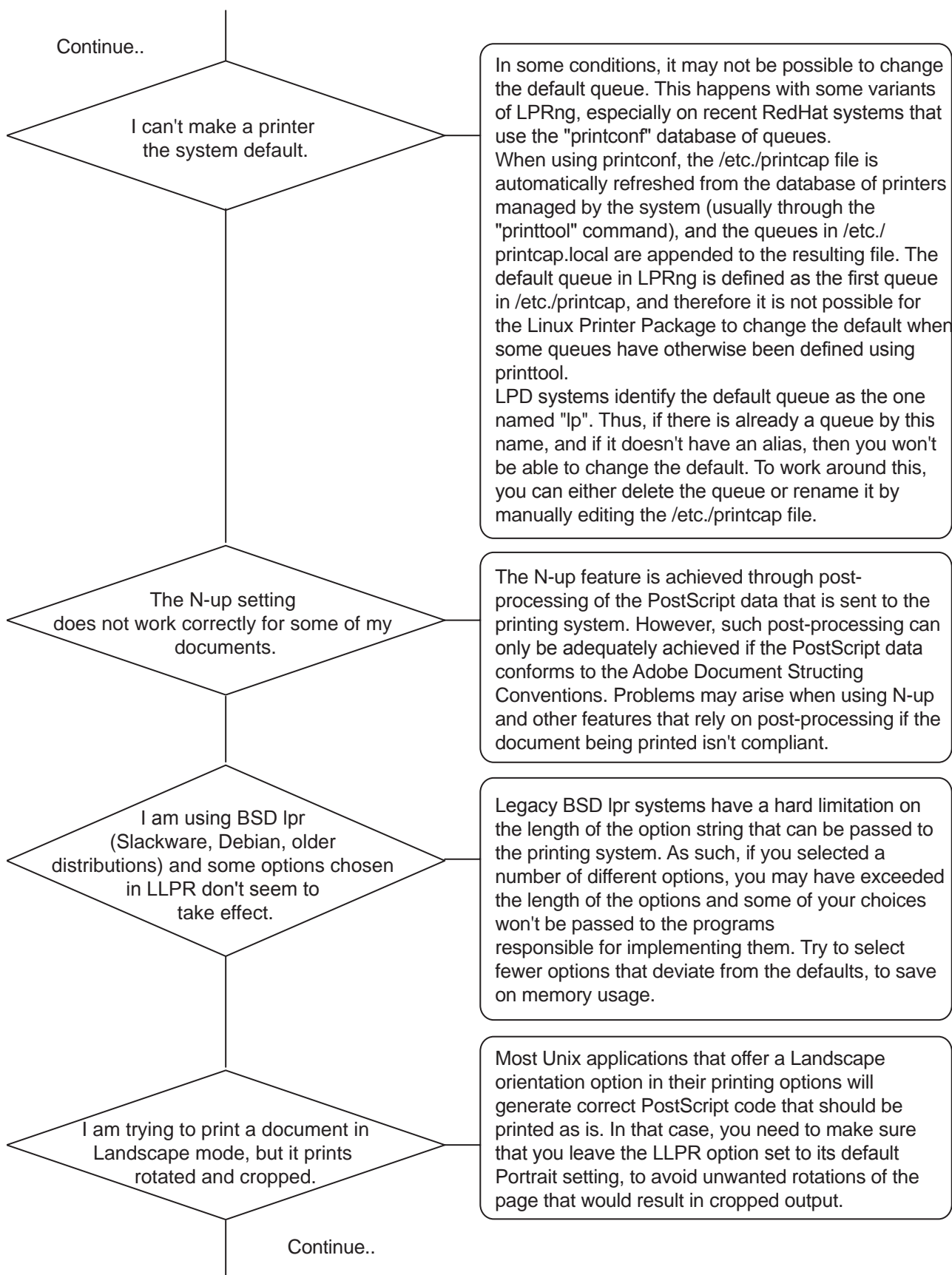
## 4.2.6 Common Macintosh Problems

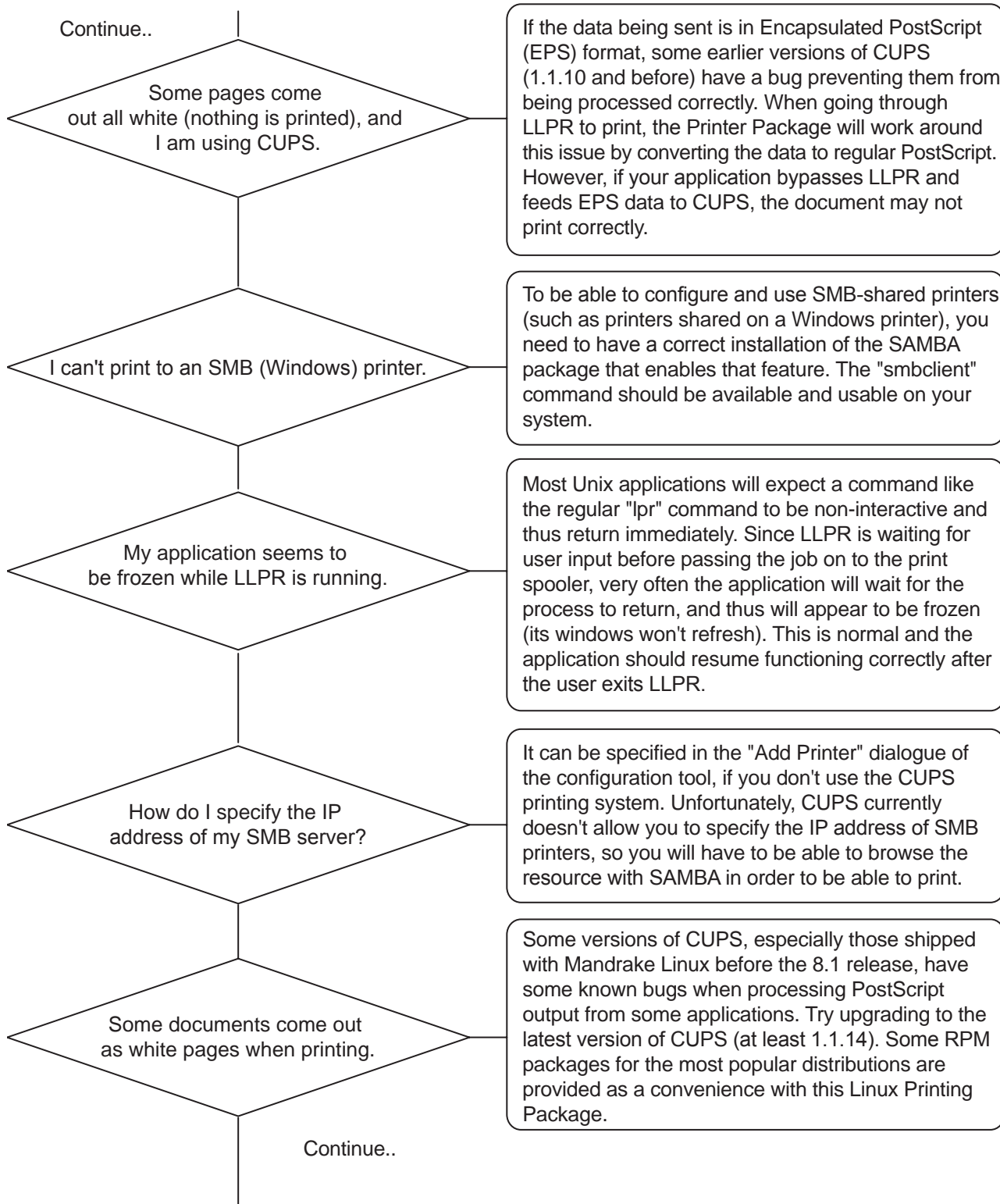


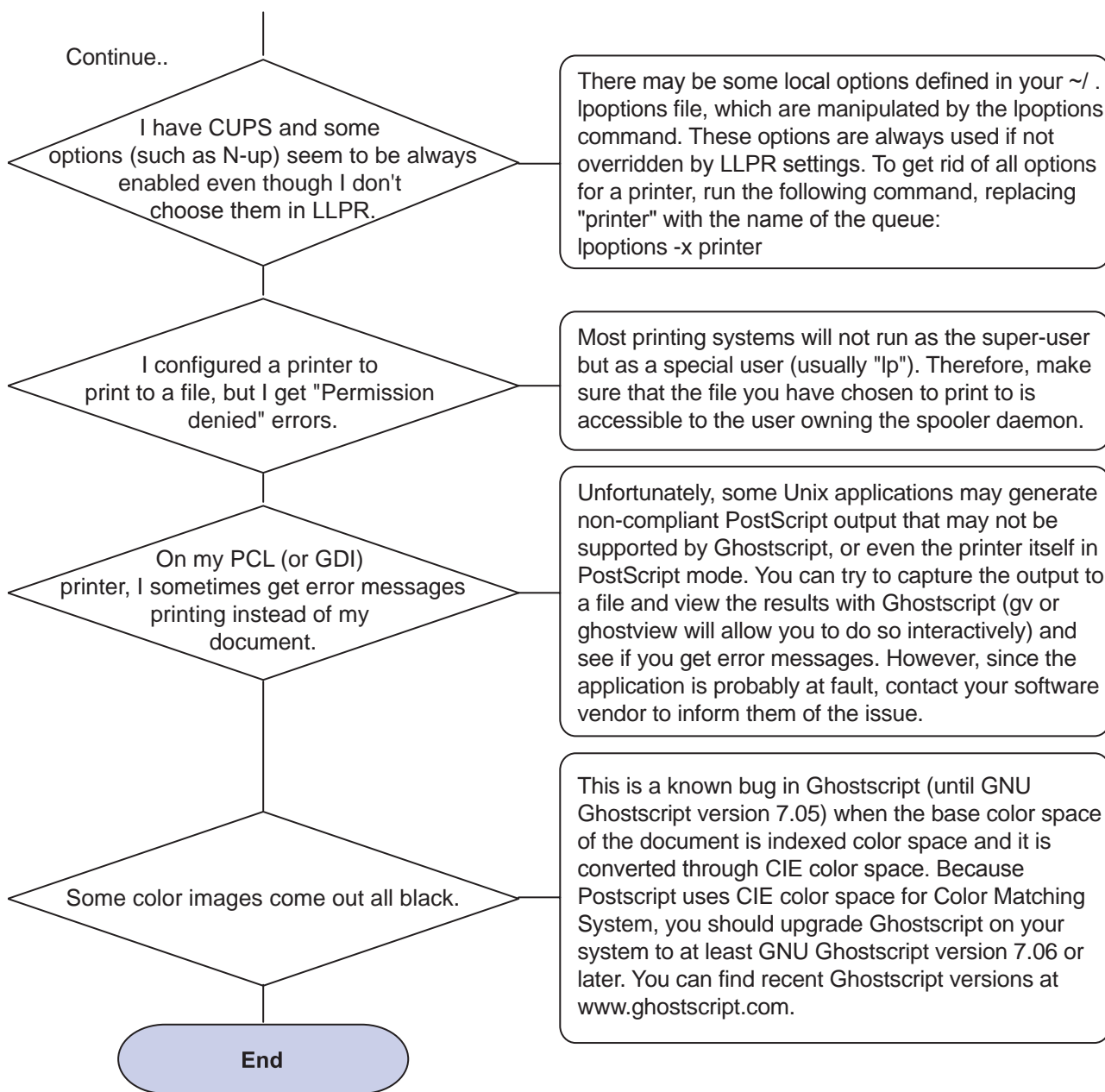


## 4.2.7 Common Linux Problems







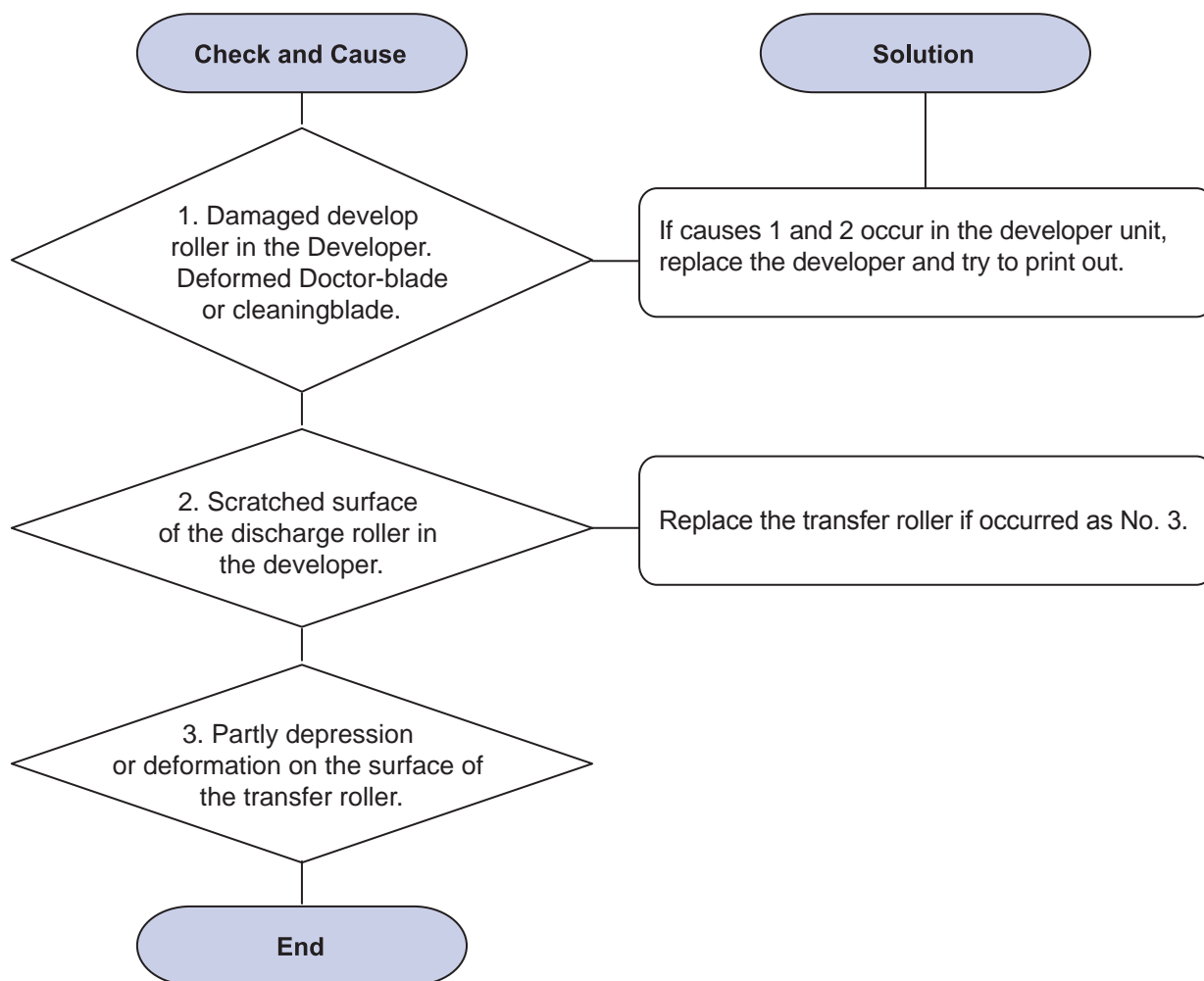


## 4.2.8 Major Problems Trouble shooting

### 1) Vertical Line and Band

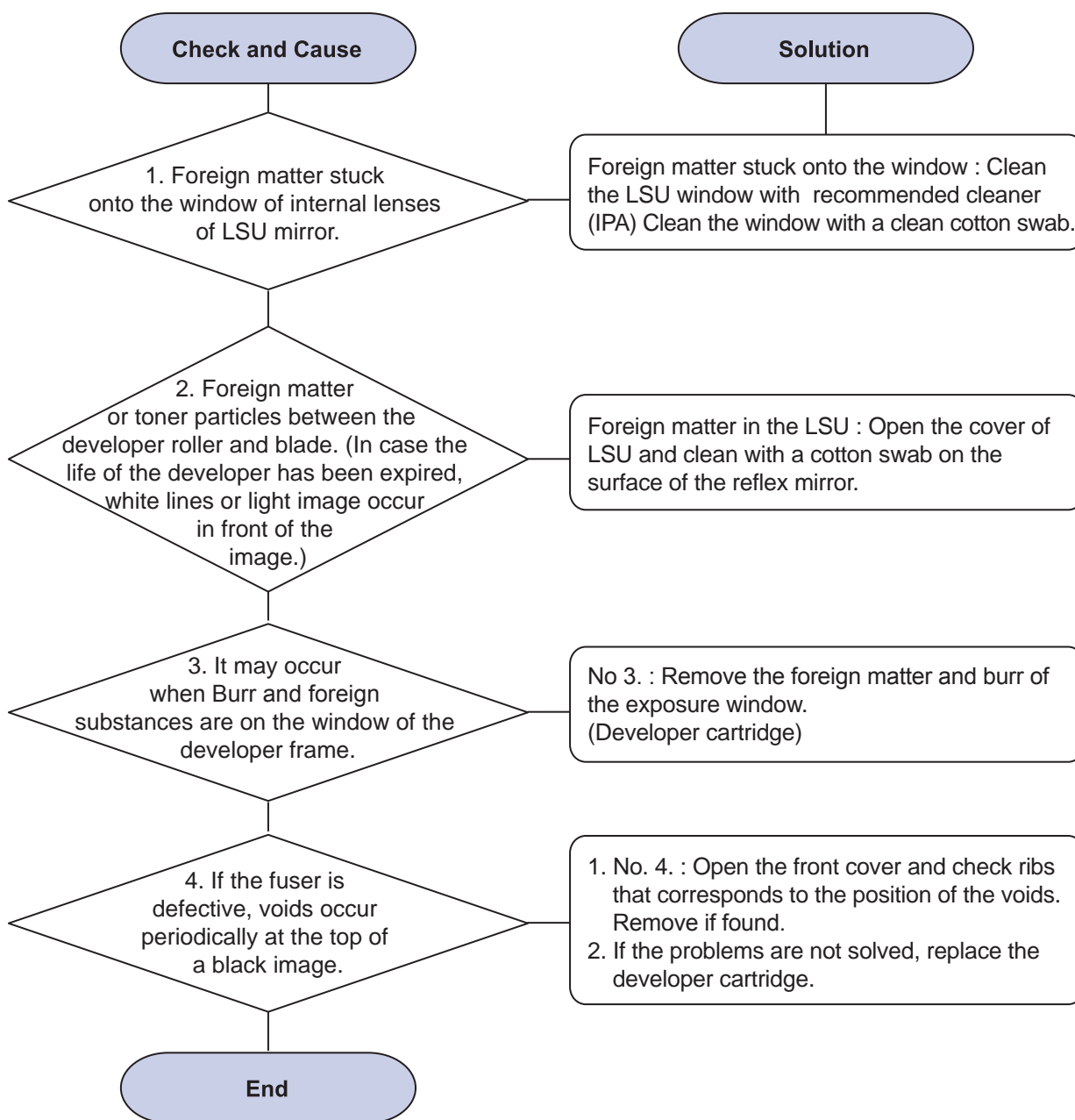
**Description**

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



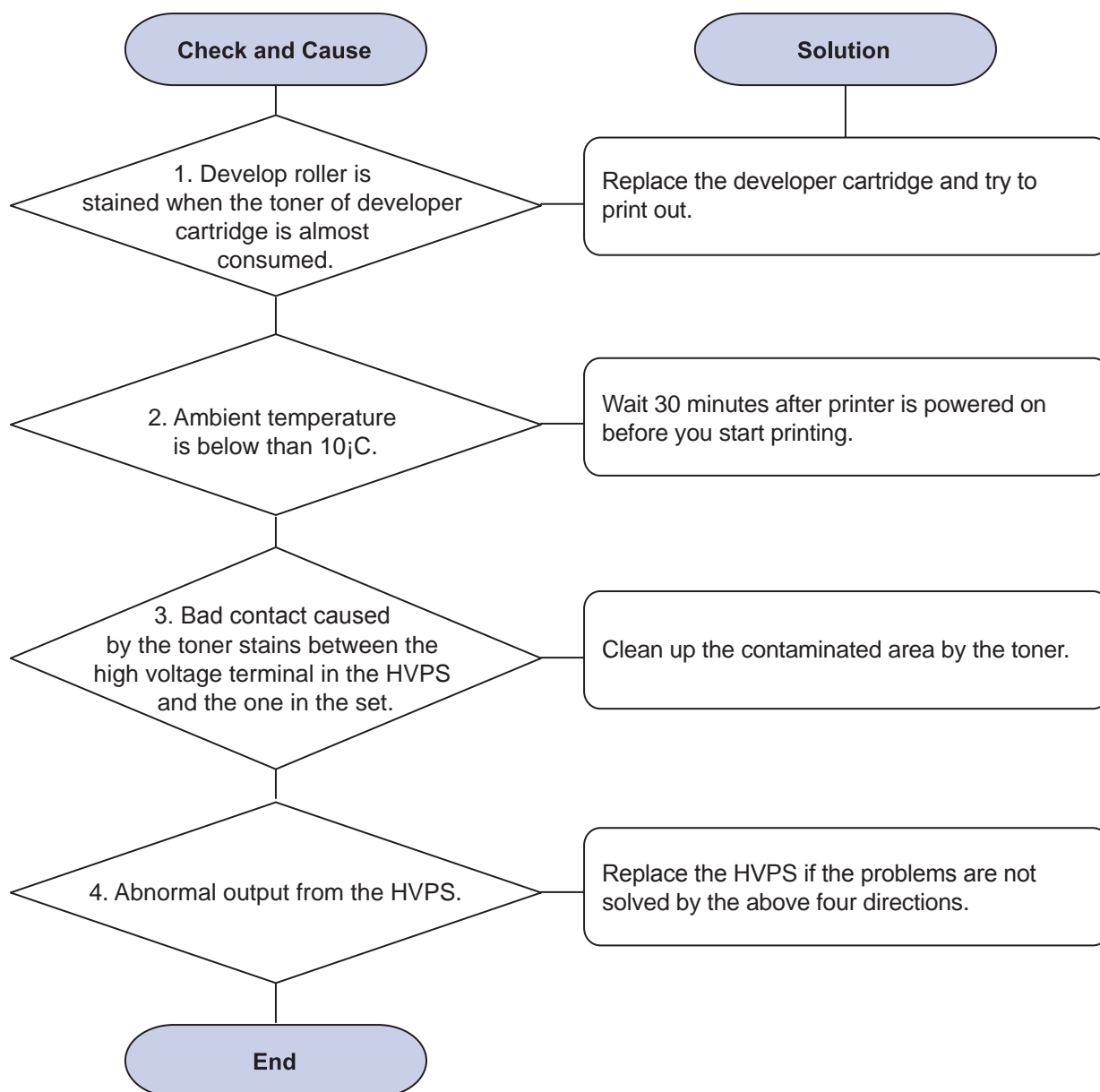
## 2) Vertical White Line

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



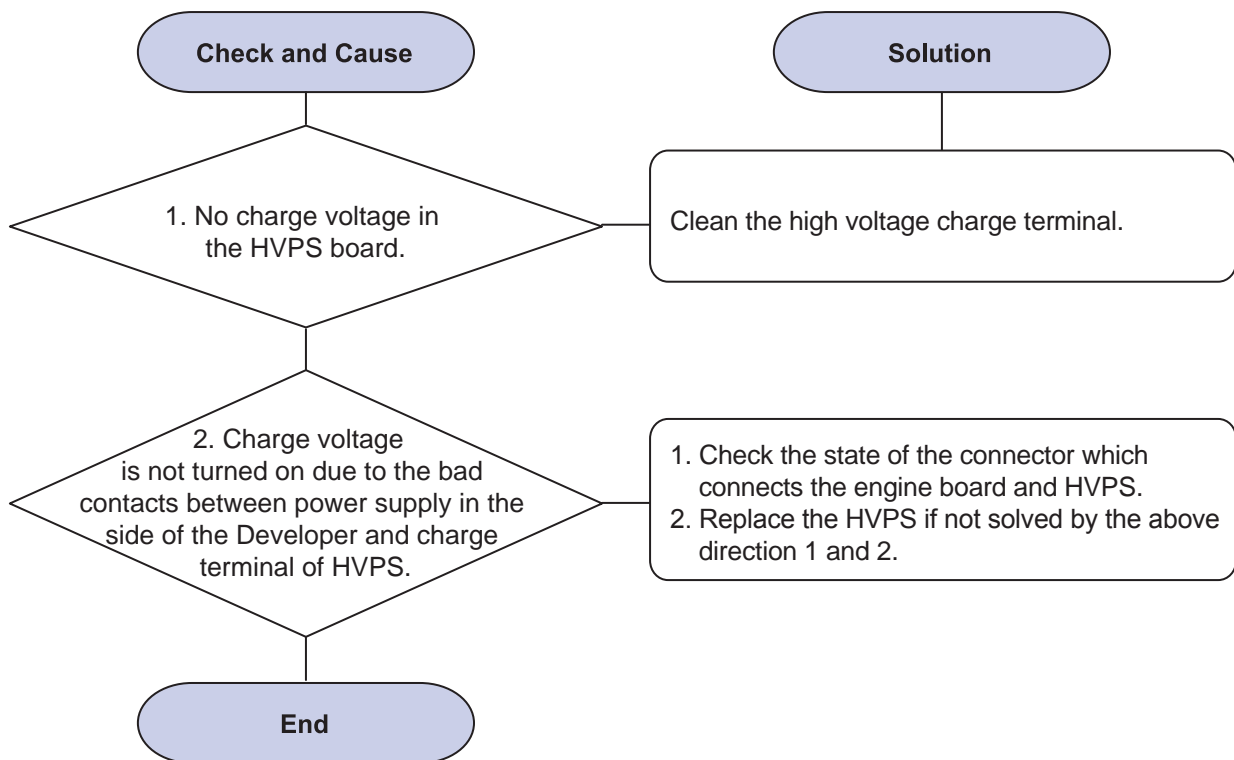
### 3) Light Image

<b>Description</b>	The printed image is light, with no ghost.
--------------------	--



#### 4) Dark Image or black

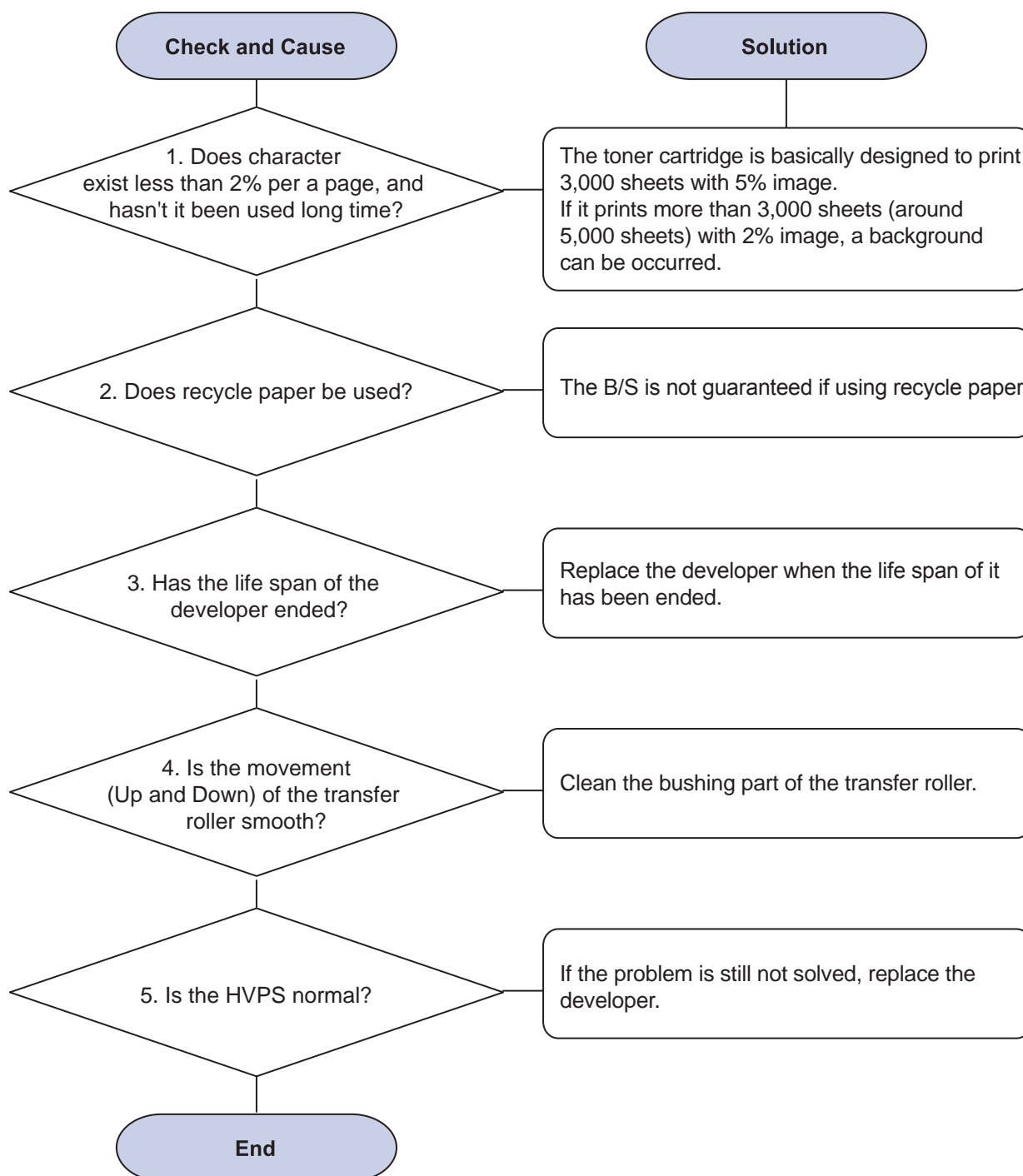
**Description** The printed image is dark.





### 5) Background

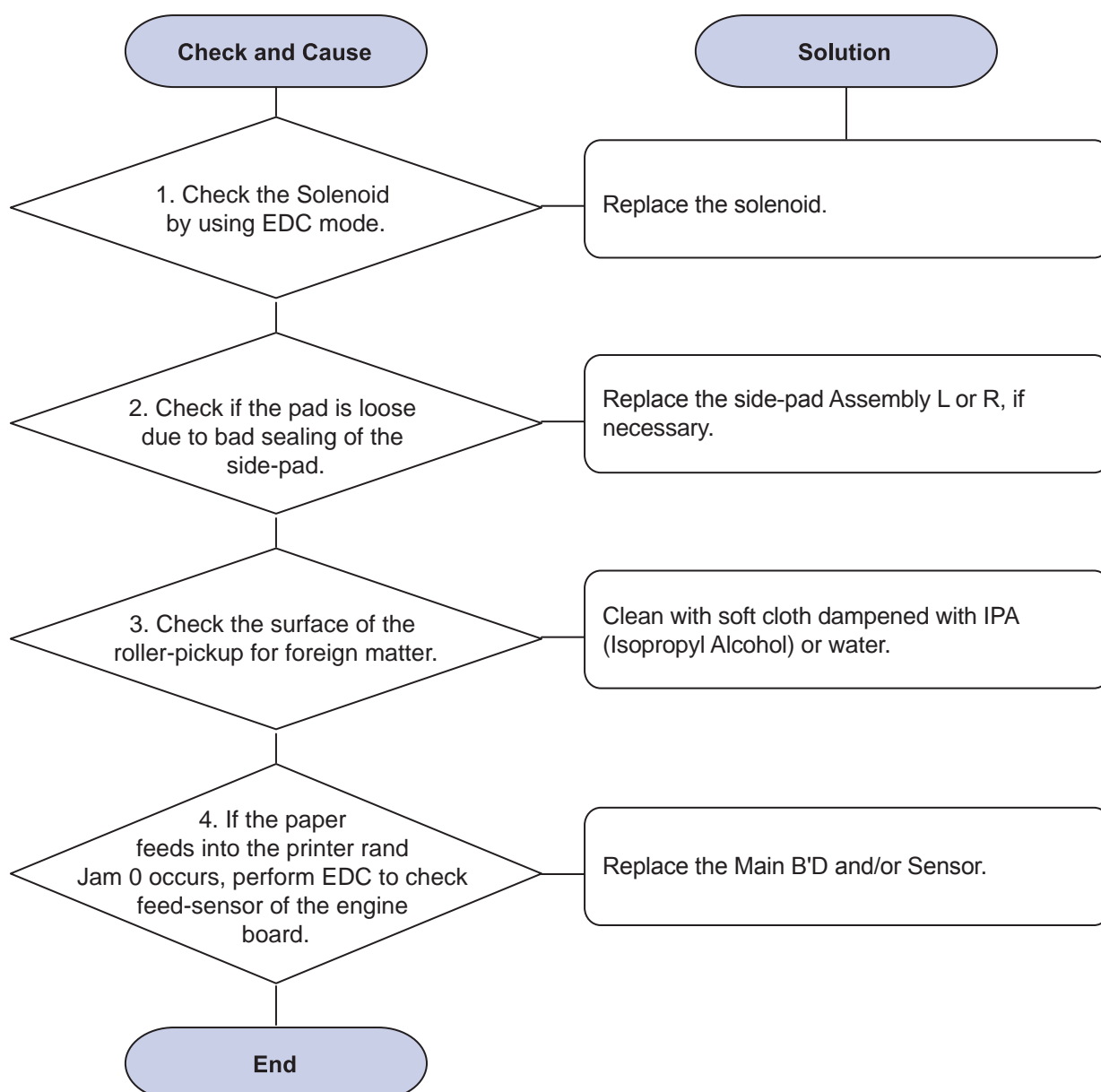
**Description** Light dark background appears in whole area of the printing.



## 6) JAM 0

### Description

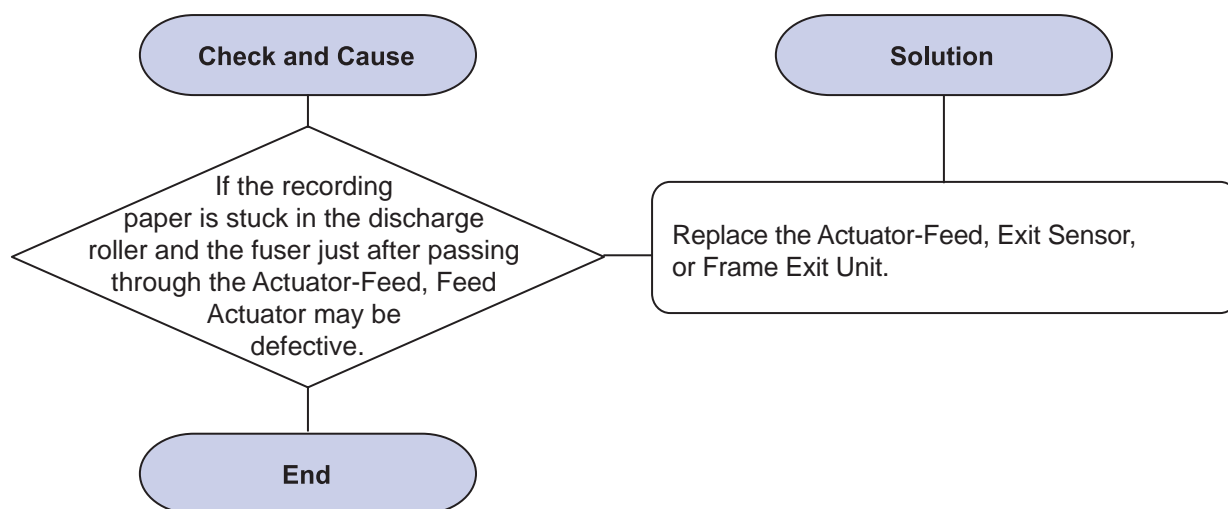
1. Paper is not exited from the cassette.
2. Jam-0 occurs if the paper feeds into the printer.



7 JAM 1

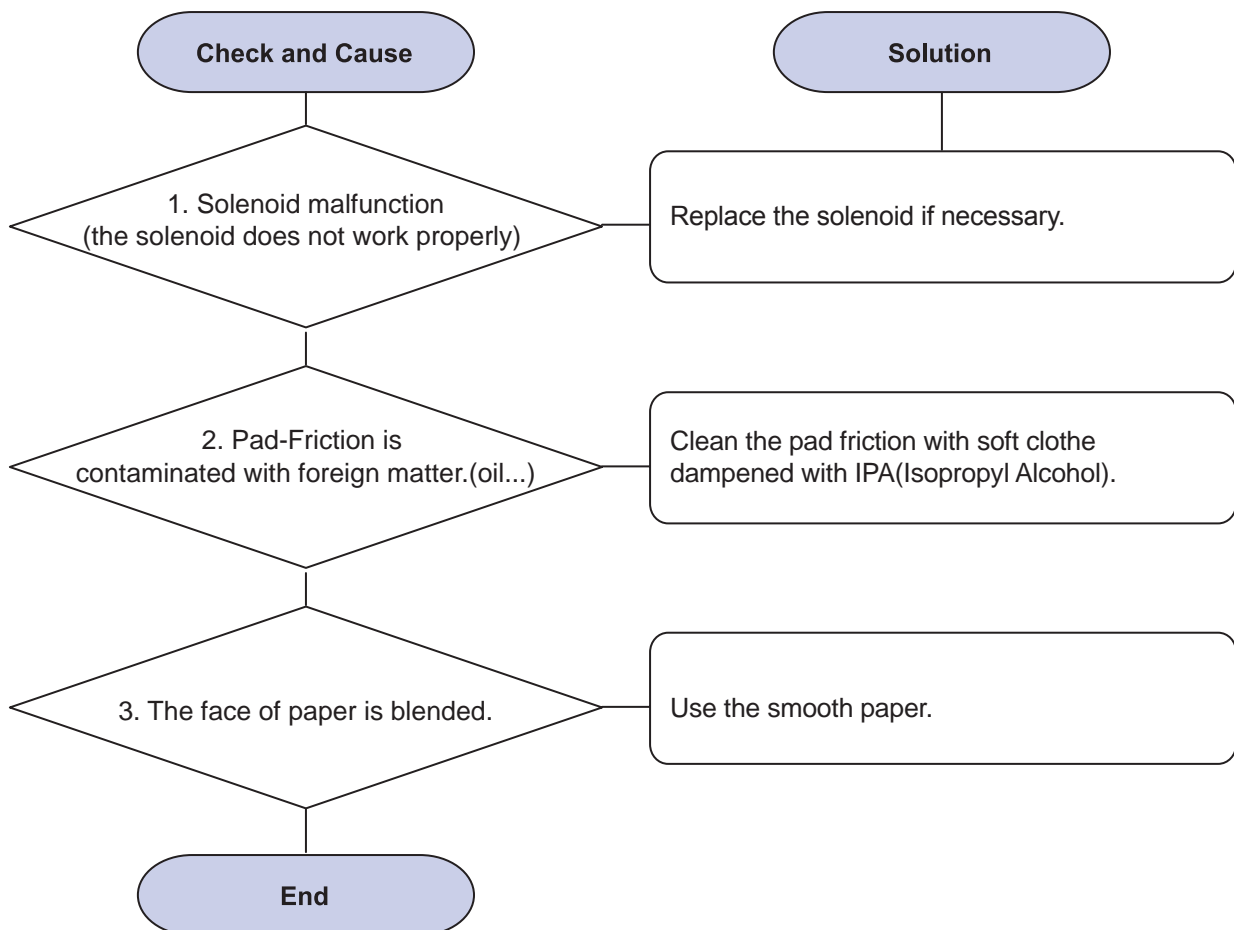
**Description**

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



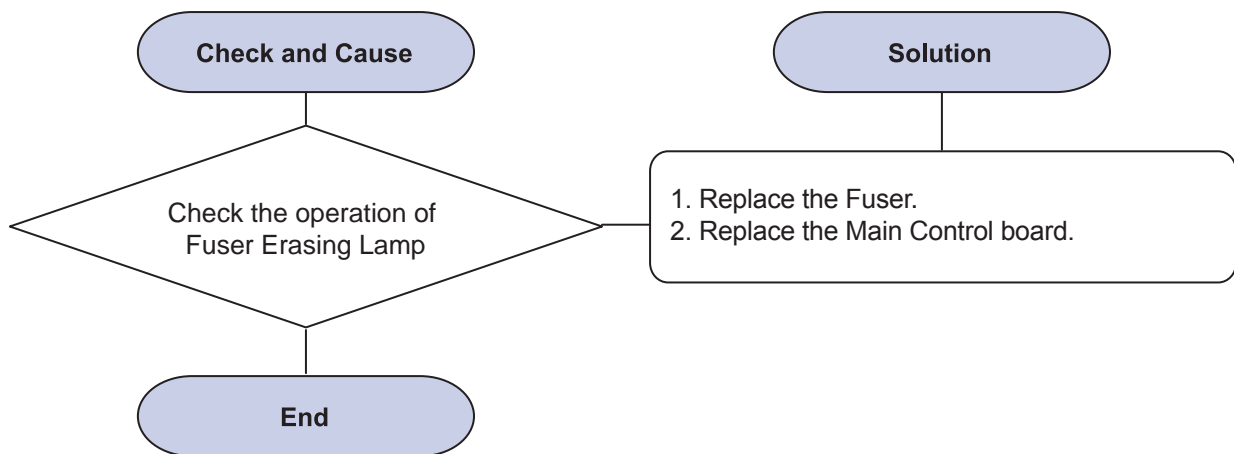
## 8) Multi-Feeding

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



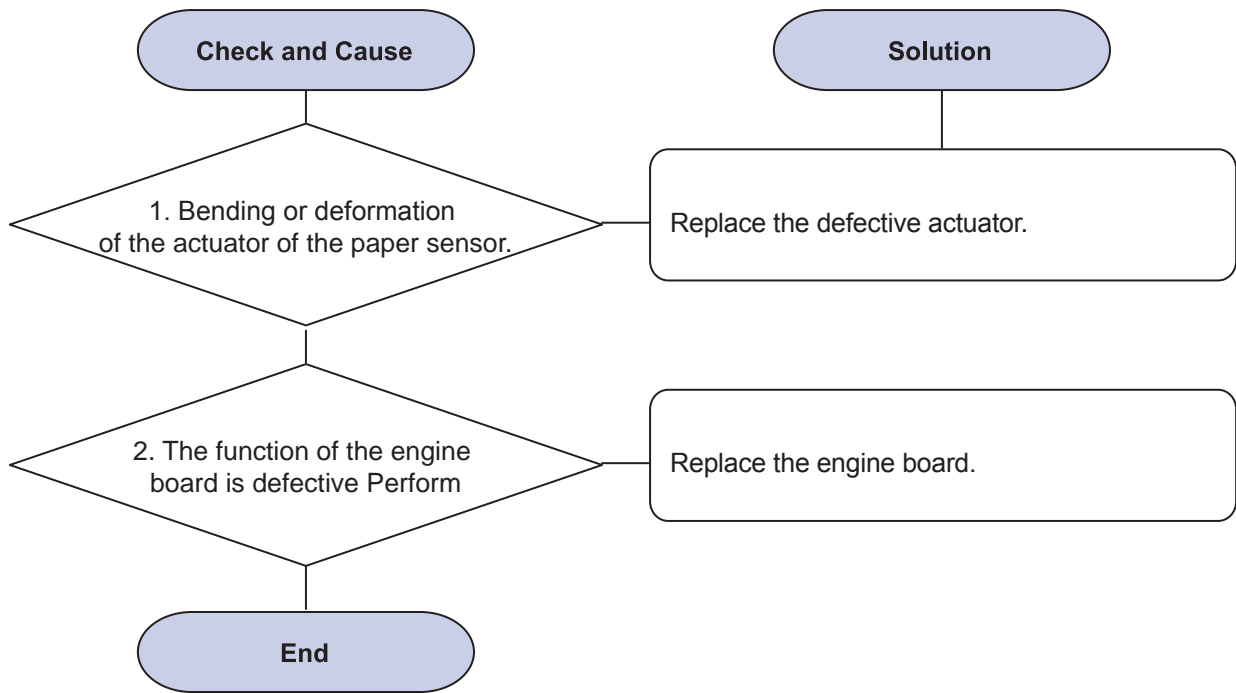
### 9) Not function of the gear of the fuser due to melting away

**Description** The motor breaks away from it's place due to gear melting away.



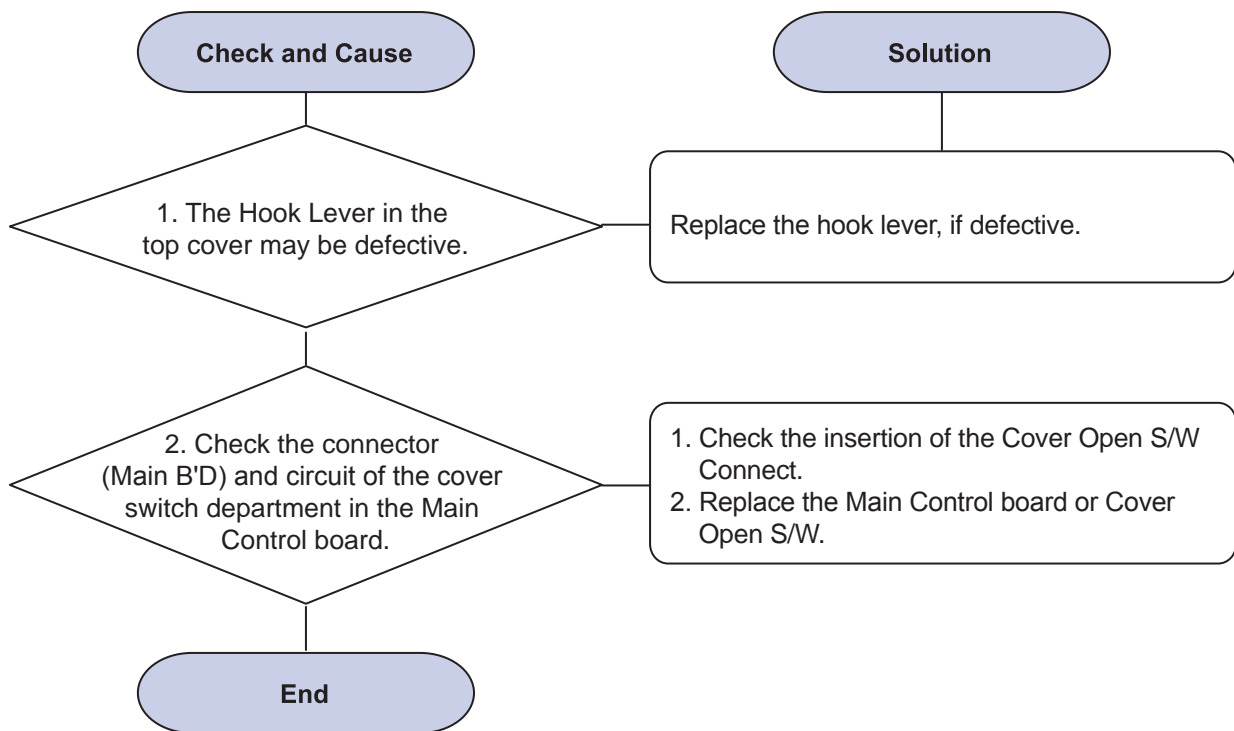
### 10) Paper Empty

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



## 11) Cover Open

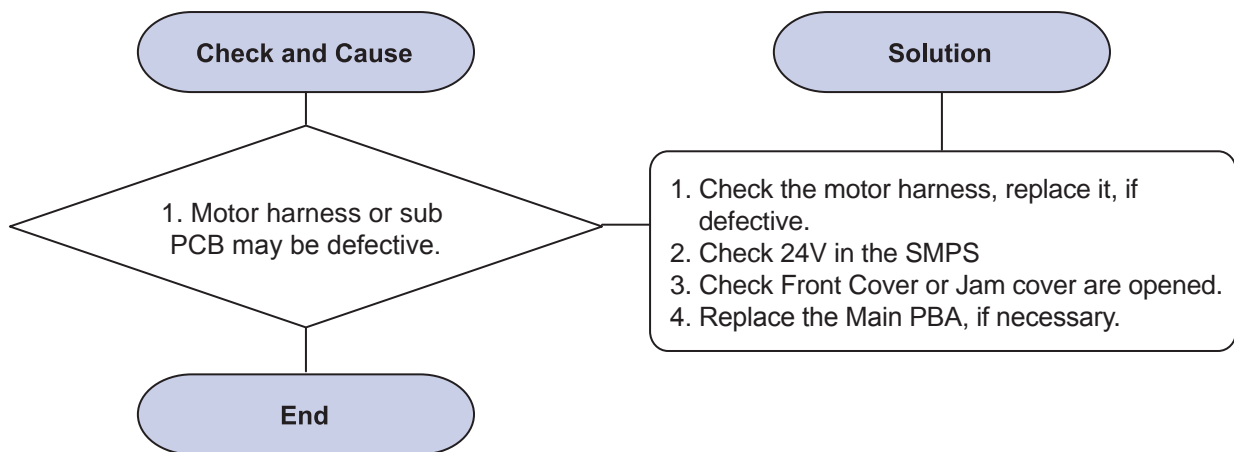
**Description** The ERROR lamp is on even when the print cover is closed.



## 12) Defective motor operation

**Description**

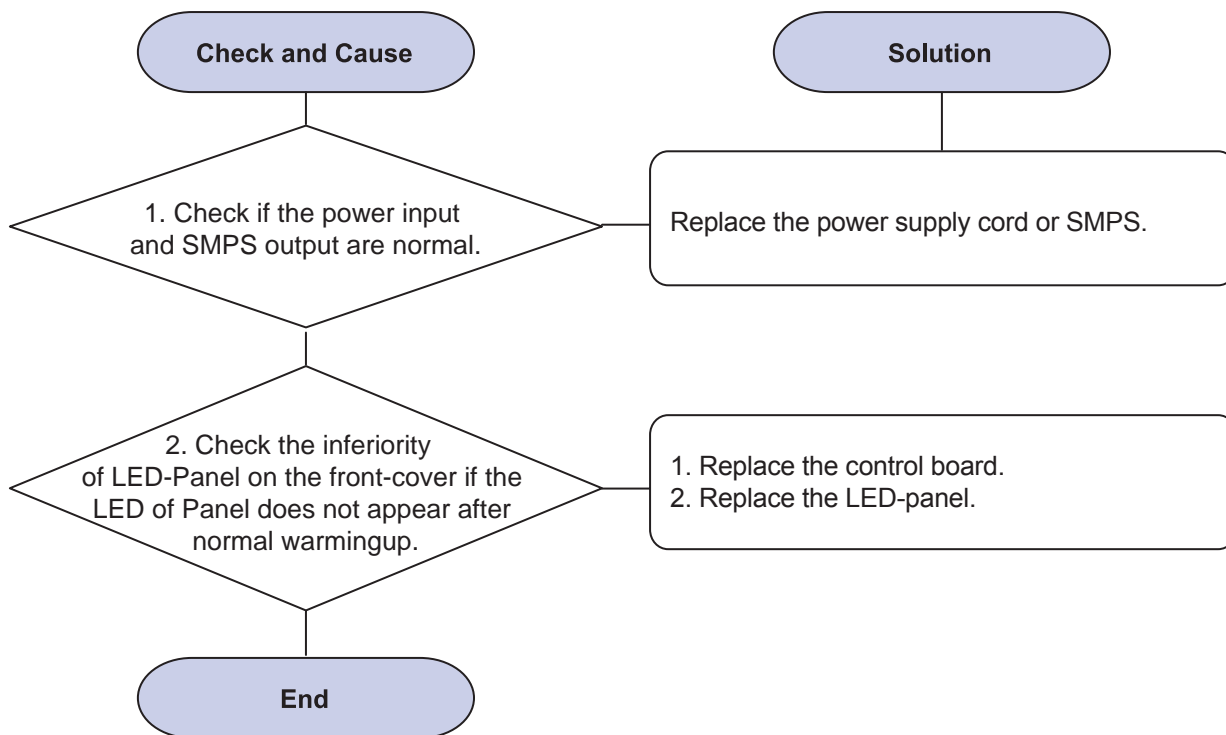
Main motor is not driving when printing, and paper does not feed into the printer, resulting 'Jam 0'.





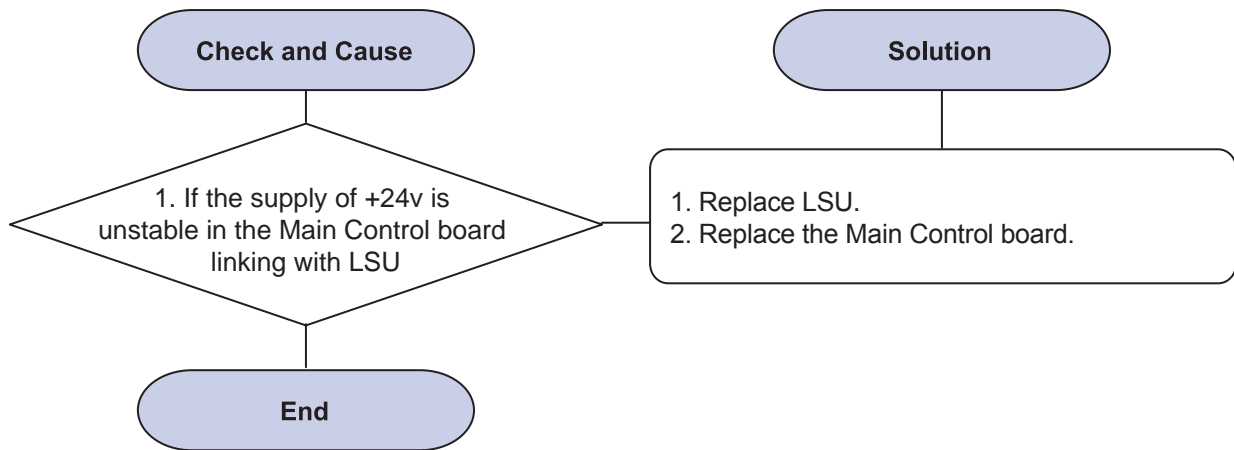
### 13) No Power

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



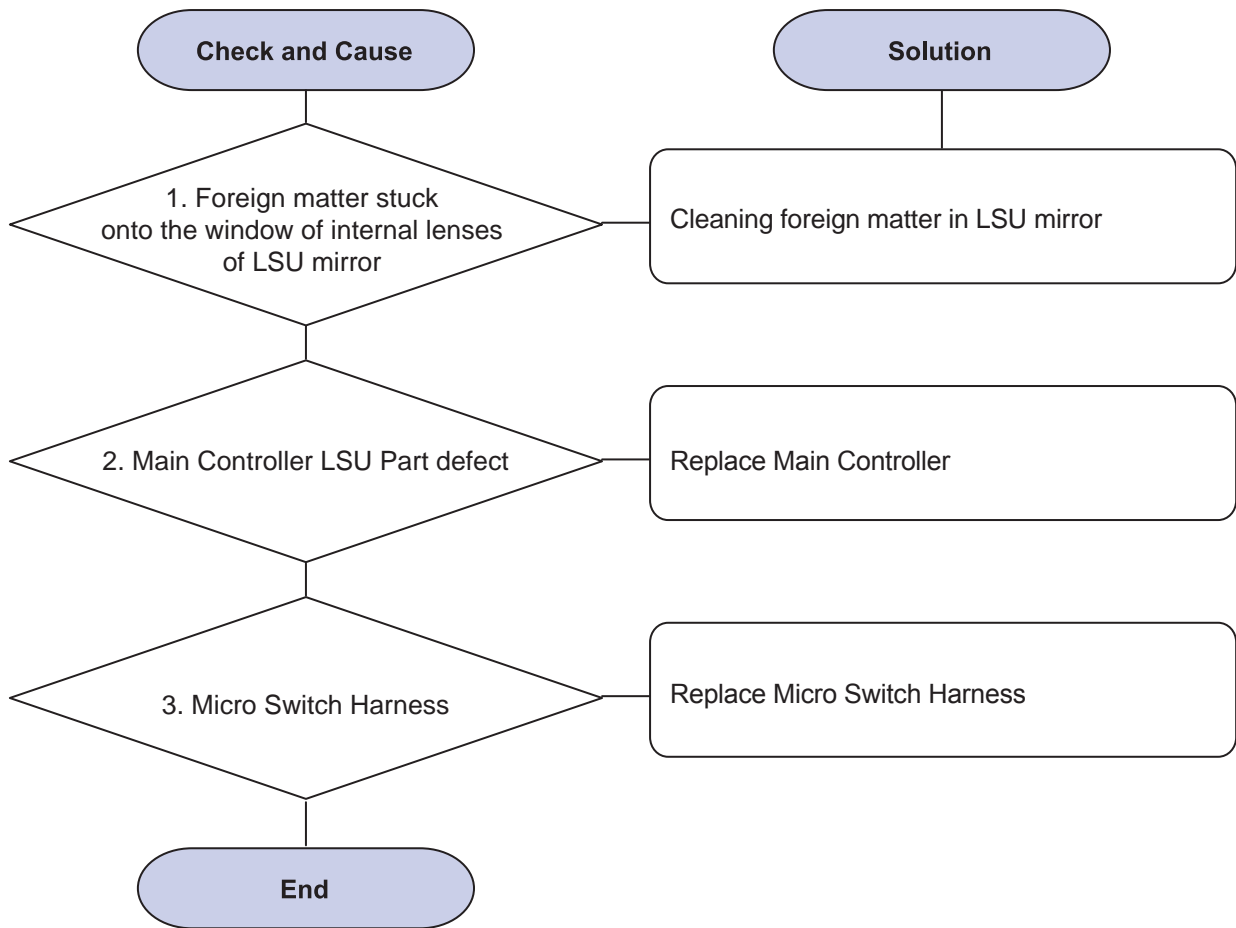
### 14) Vertical Line Getting Curved

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



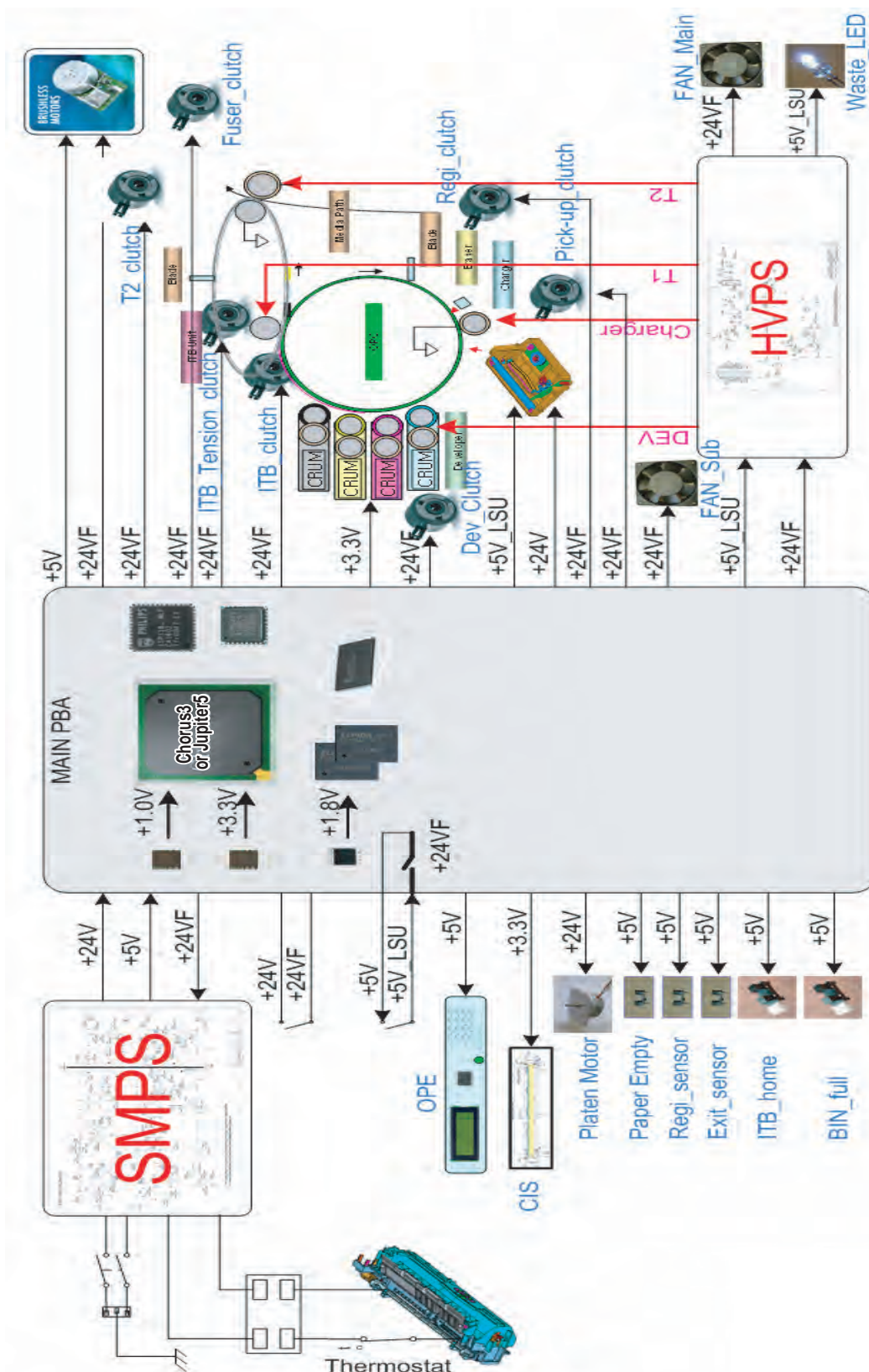
### 15) LSU Error

**Description** The printing is stop in the fad status, With LSU Error SM Message.

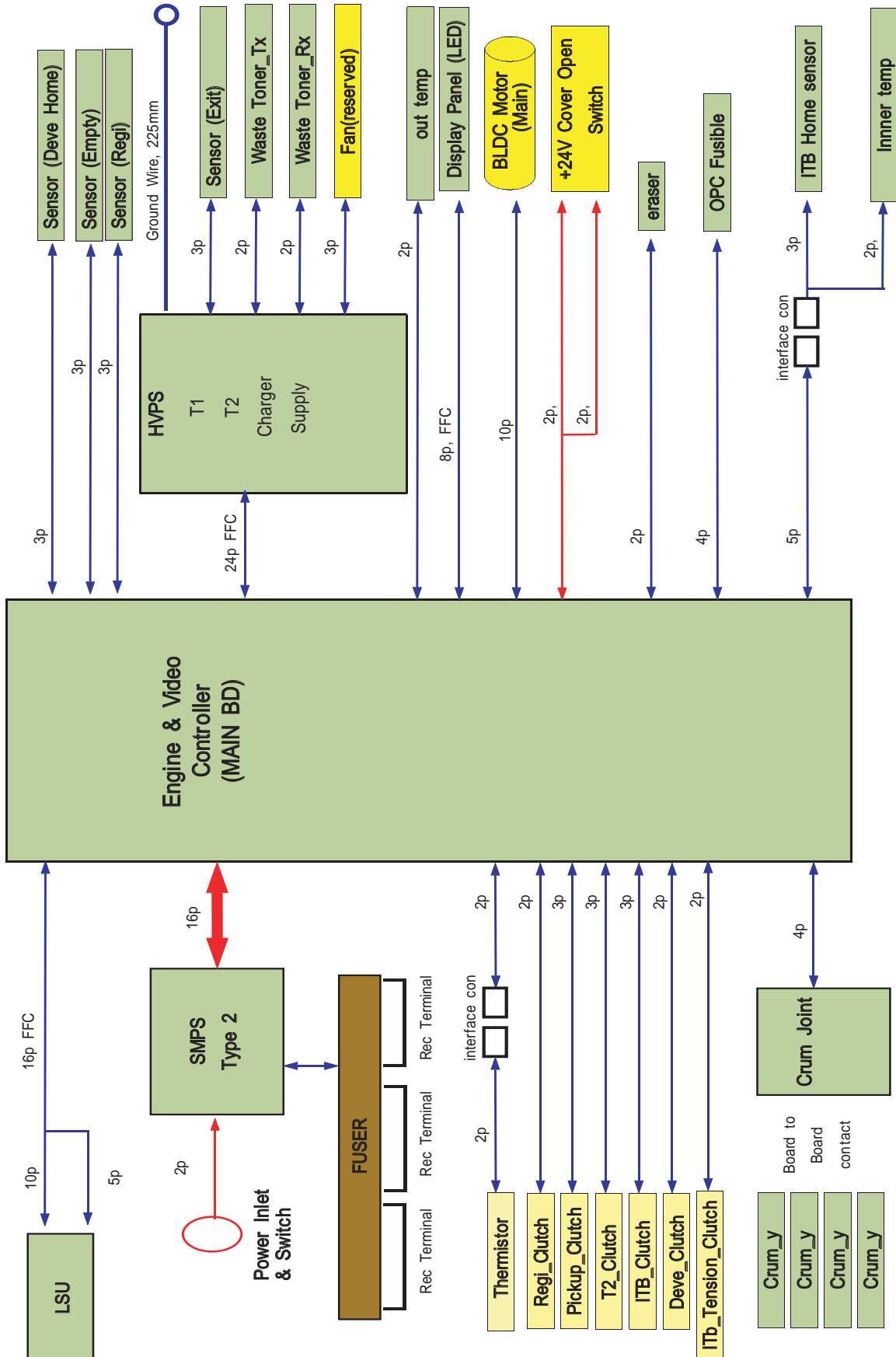


# 5. System Diagram

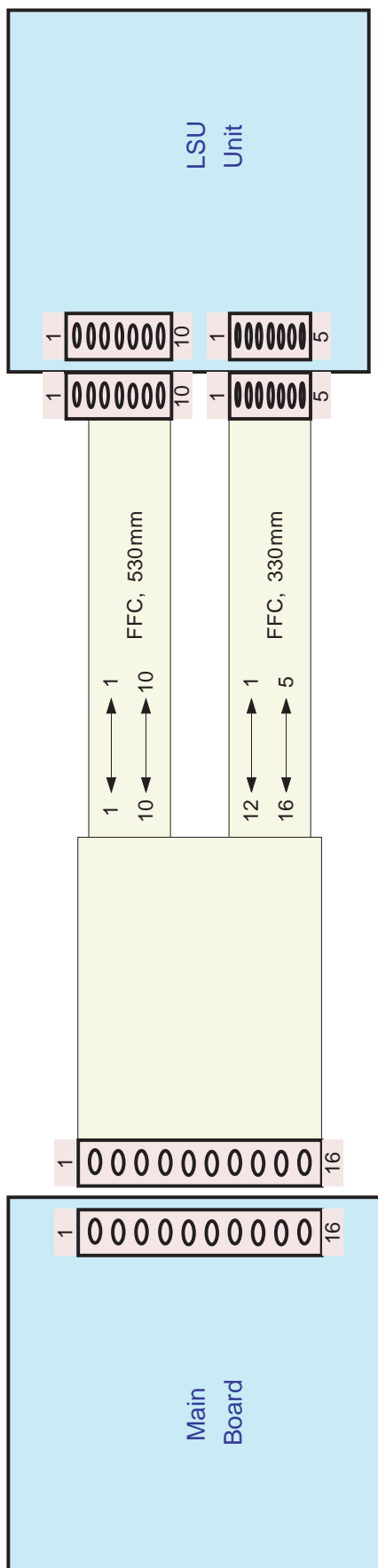
## 5.1 Block Diagram



## 5.2 Connection Diagram



1. Main Board ↔ LSU Unit

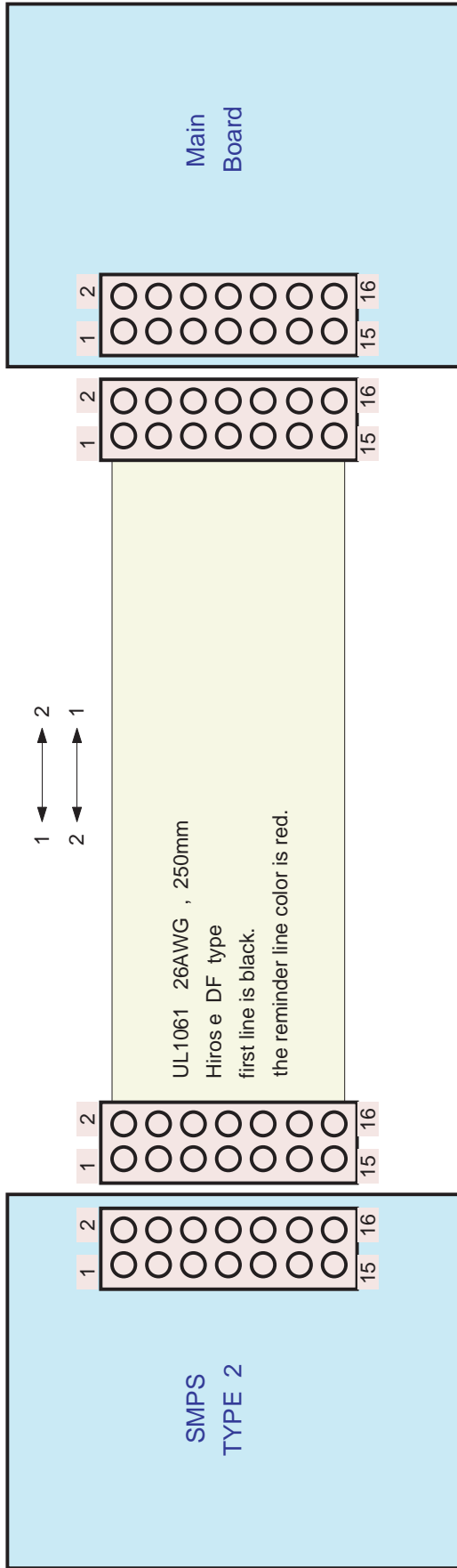


1	+5V_LSU
2	DGND
3	VDO1_plus
4	VDO1_minus
5	DGND
6	LSU_SH1
7	nHSYNC1
8	DGND
9	LD_POWER
10	nLE_EN
11	-
12	LSU_MOT_CLK
13	nLSU_READY
14	nLSU_MOT_EN
15	DGND
16	+24V

1	+5V_LSU
2	DGND
3	VDO1_plus
4	VDO1_minus
5	DGND
6	LSU_SH1
7	nHSYNC1
8	DGND
9	LD_POWER
10	nLE_EN

1	LSU_MOT_CLK
2	nLSU_READY
3	nLSU_MOT_EN
4	DGND
5	+24V

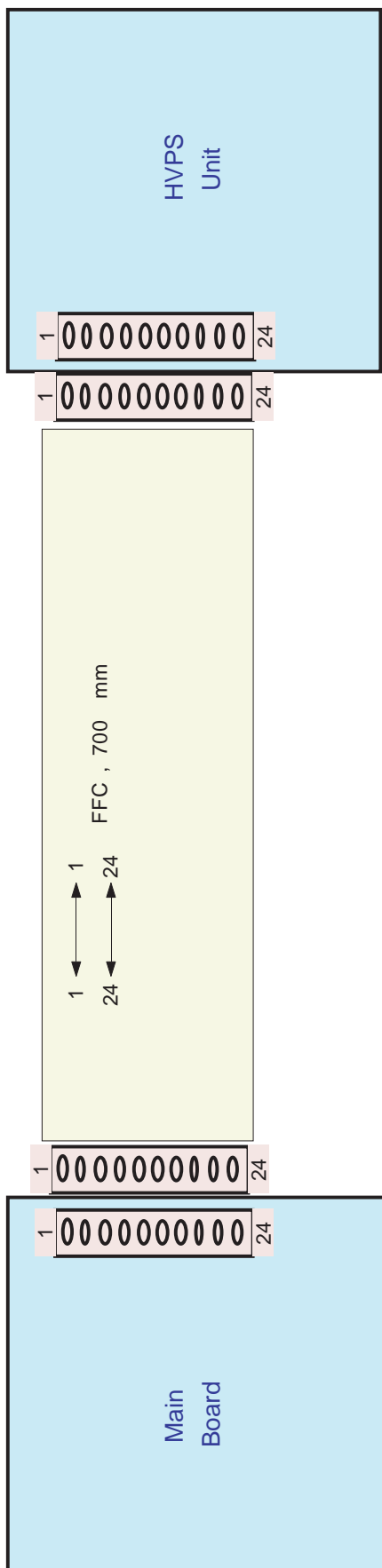
2. SMPS ↔ Main board



+24VF	1	2	FUSER_ON
DGND	3	4	+24VA
DGND	5	6	+24VA
DGND	7	8	+24VA
DGND	9	10	+ 24V
DGND	11	12	+ 5V
DGND	13	14	+ 5V
DGND	15	16	+ 5V

FUSER_ON	1	2	+24 VF
+ 24VA	3	4	DGND
+ 24VA	5	6	DGND
+ 24VA	7	8	DGND
+24V	9	10	DGND
+5V	11	12	DGND
+5V	13	14	DGND
+5V	15	16	DGND

3. Main Board ↔ HVPS

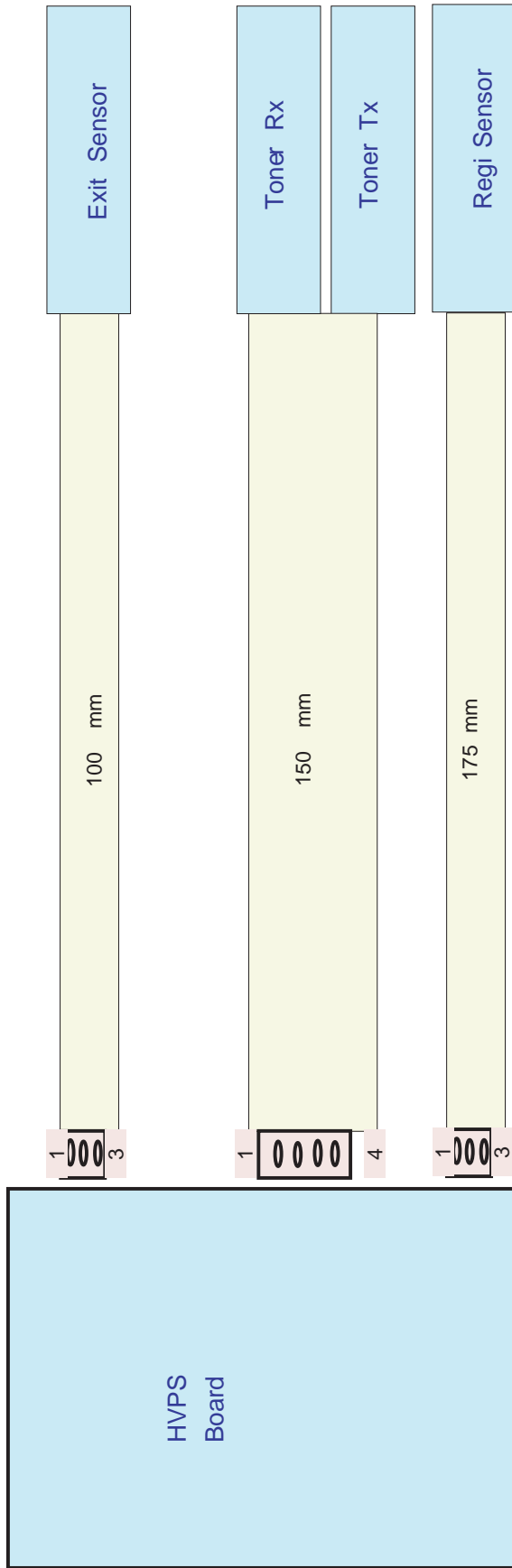


1	+ 24VF
2	+ 24VF
3	DGND
4	DGND
5	nDEV_EN
6	PWM_DEV_VPP
7	PWM_DEV_AC
8	PWM_DEV_DC
9	PWM_I THV
10	PWM_THV
11	PWM_MHV
12	nTHV_EN
13	ITHV_READ
14	THV_READ
15	-
16	nP_EXIT
17	DEV_SOL2
18	DEV_SOL1
19	nREGI
20	DEV_SOL3
21	WASTE_LED_TX
22	WASTE_LED_RX
23	FAN_MAIN
24	+ 5V_LSU

1	+ 24VF
2	+ 24VF
3	DGND
4	DGND
5	nDEV_EN
6	PWM_DEV_VPP
7	PWM_DEV_AC
8	PWM_DEV_DC
9	PWM_I THV
10	PWM_THV
11	PWM_MHV
12	nTHV_EN
13	ITHV_READ
14	THV_READ
15	-
16	nP_EXIT
17	DEV_SOL2
18	DEV_SOL1
19	nREGI
20	DEV_SOL3
21	WASTE_LED_TX
22	WASTE_LED_RX
23	FAN_MAIN
24	+ 5V_LSU



4. HVPS ↔ Sensor



1	+5V
2	nEXIT
3	DGND

1	+5V
2	Waste_Lamp
3	Waste_Level
4	DGND

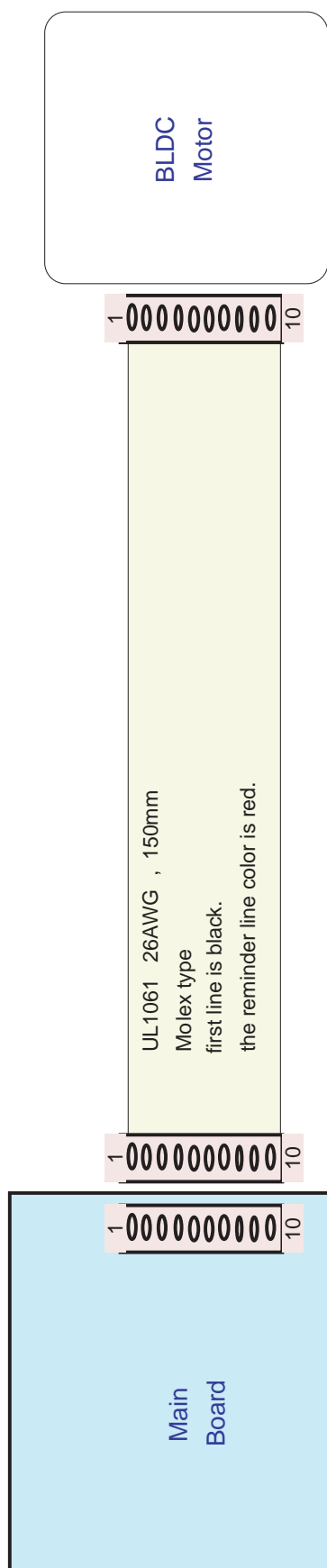
1	+5V
2	nREGI
3	DGND

1	+5V
2	nEXIT
3	DGND

1	+5V
2	Waste_Lamp
3	Waste_Level
4	DGND

1	+5V
2	nREGI
3	DGND

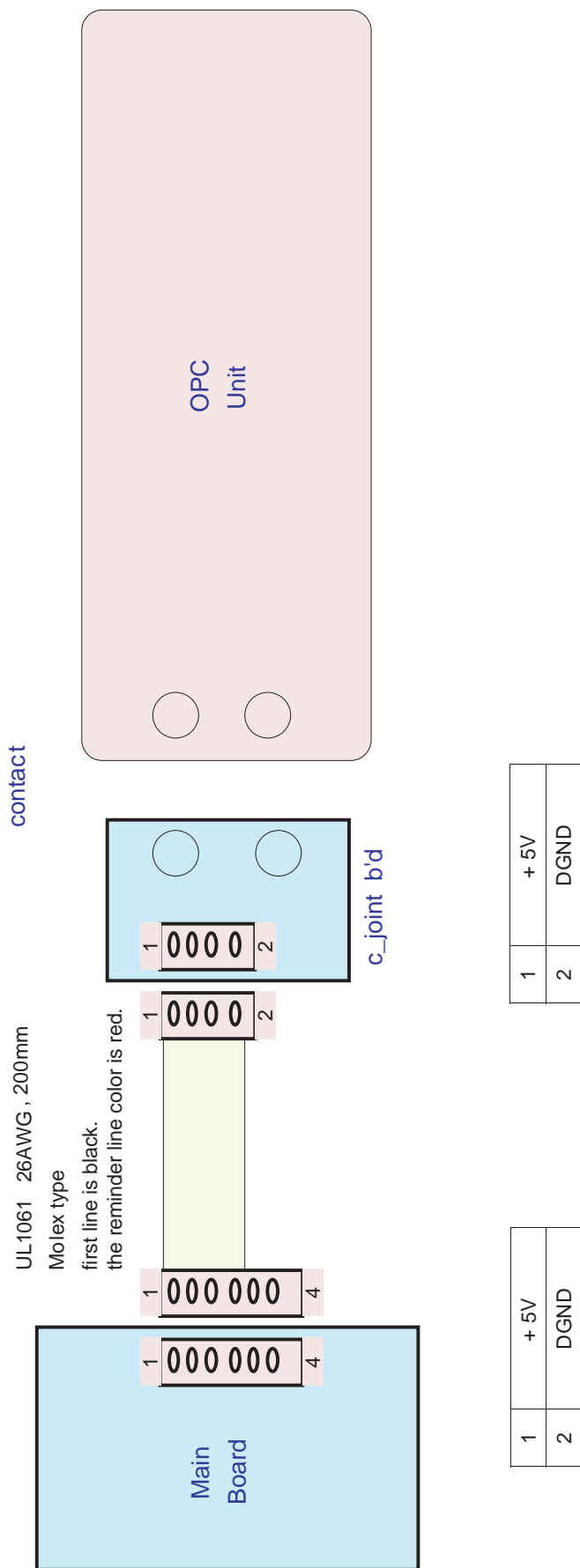
### 5. Main Board ↔ BLDC



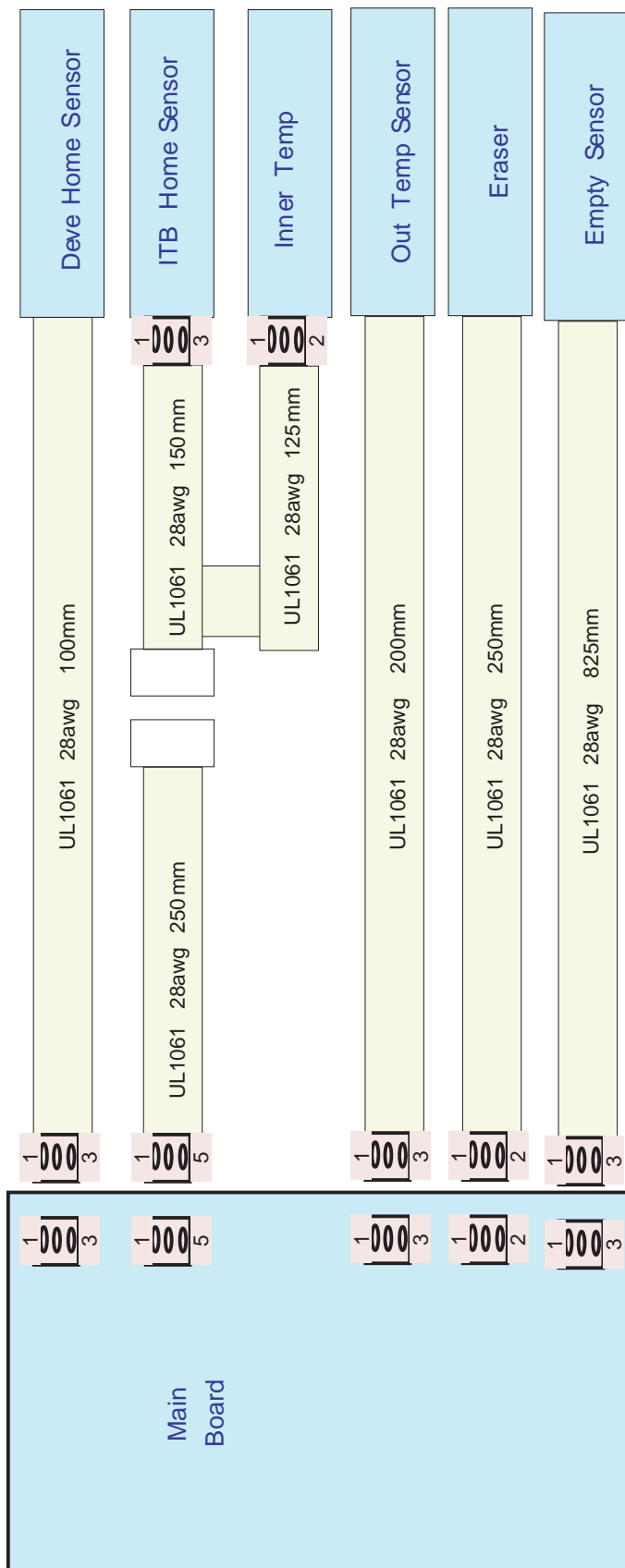
1	+ 24VF
2	+ 24VF
3	DGND
4	DGND
5	DGND
6	+ 5V
7	nBLDC_MOTOR_EN
8	BLDC_MOTOR_READY
9	PWM_MOT
10	GAIN

1	+ 24VF
2	+ 24VF
3	DGND
4	DGND
5	DGND
6	+ 5V
7	nBLDC_MOTOR_EN
8	BLDC_MOTOR_READY
9	PWM_MOT
10	GAIN

### 6. Main Board ↔ OPC Fusible



7. Main board ↔ Sensor



1	OUT_TEMP
2	DGND

1	+5V
2	nDEV_HOME
3	DGND

1	+5V
2	nITB_HOME
3	DGND
4	INNER TEMP
5	DGND

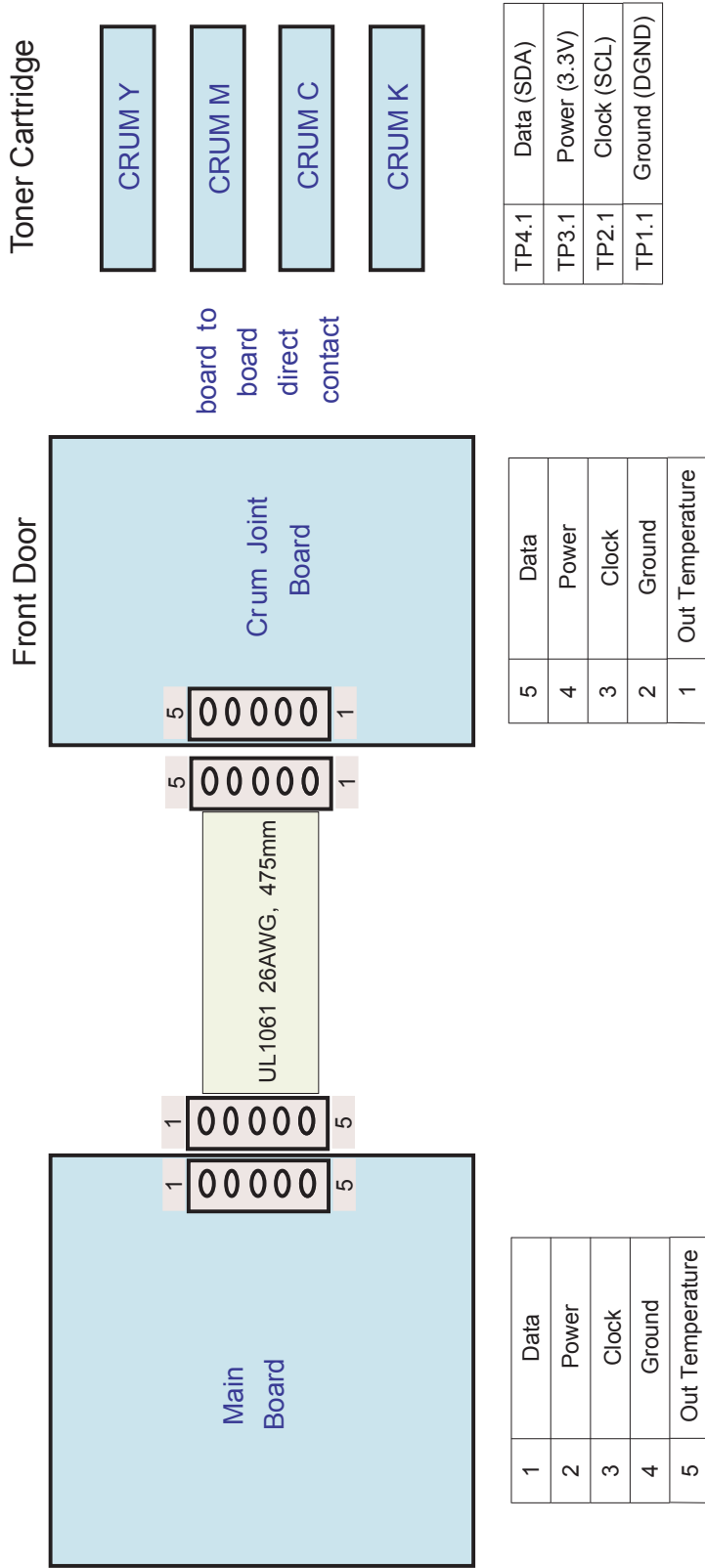
1	+5V
2	ERASER_LAMP

1	OUT_TEMP
2	DGND

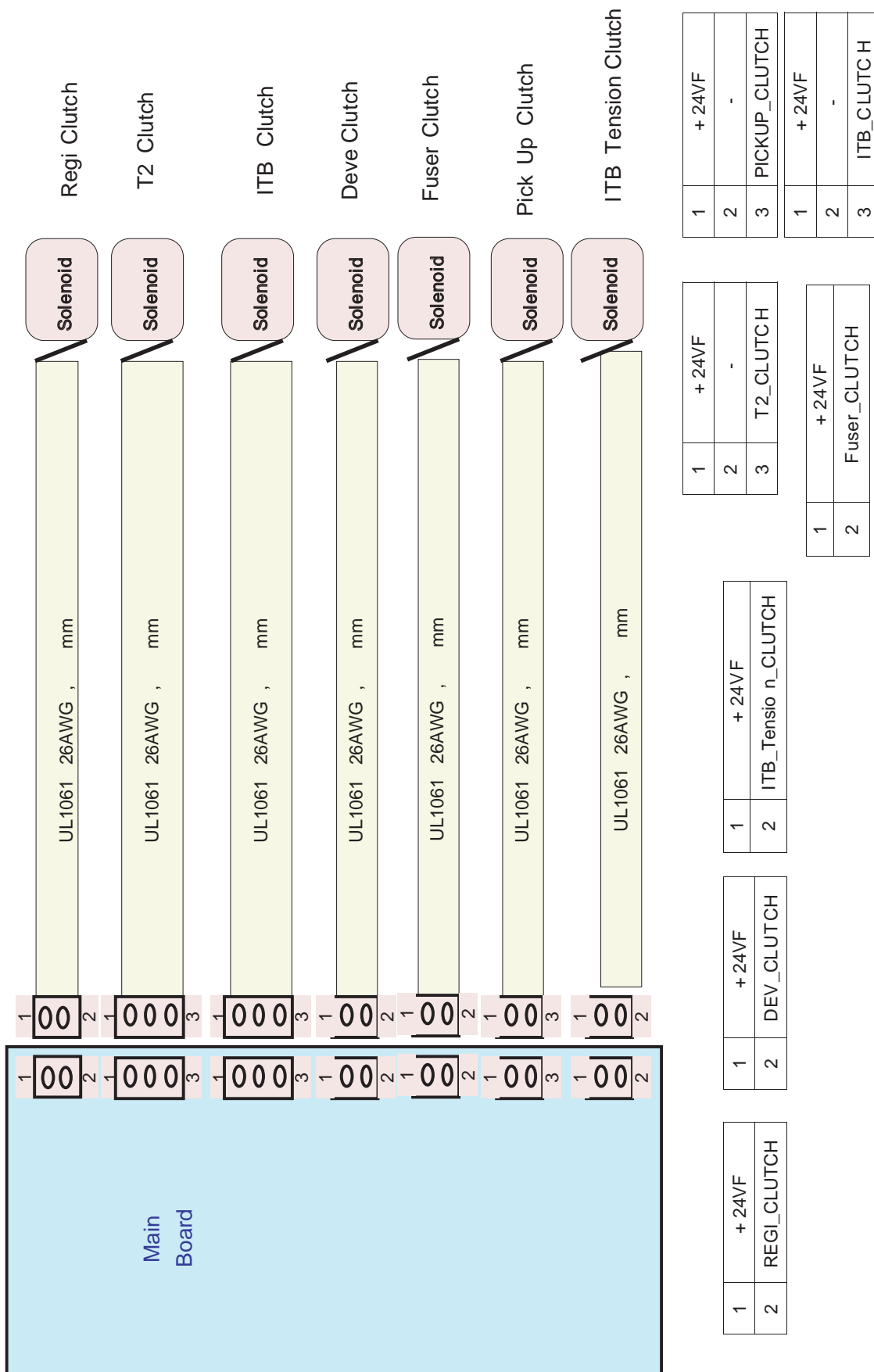
1	+5V
2	nDEV_HOME
3	DGND

1	+5V
2	ERASER_LAMP

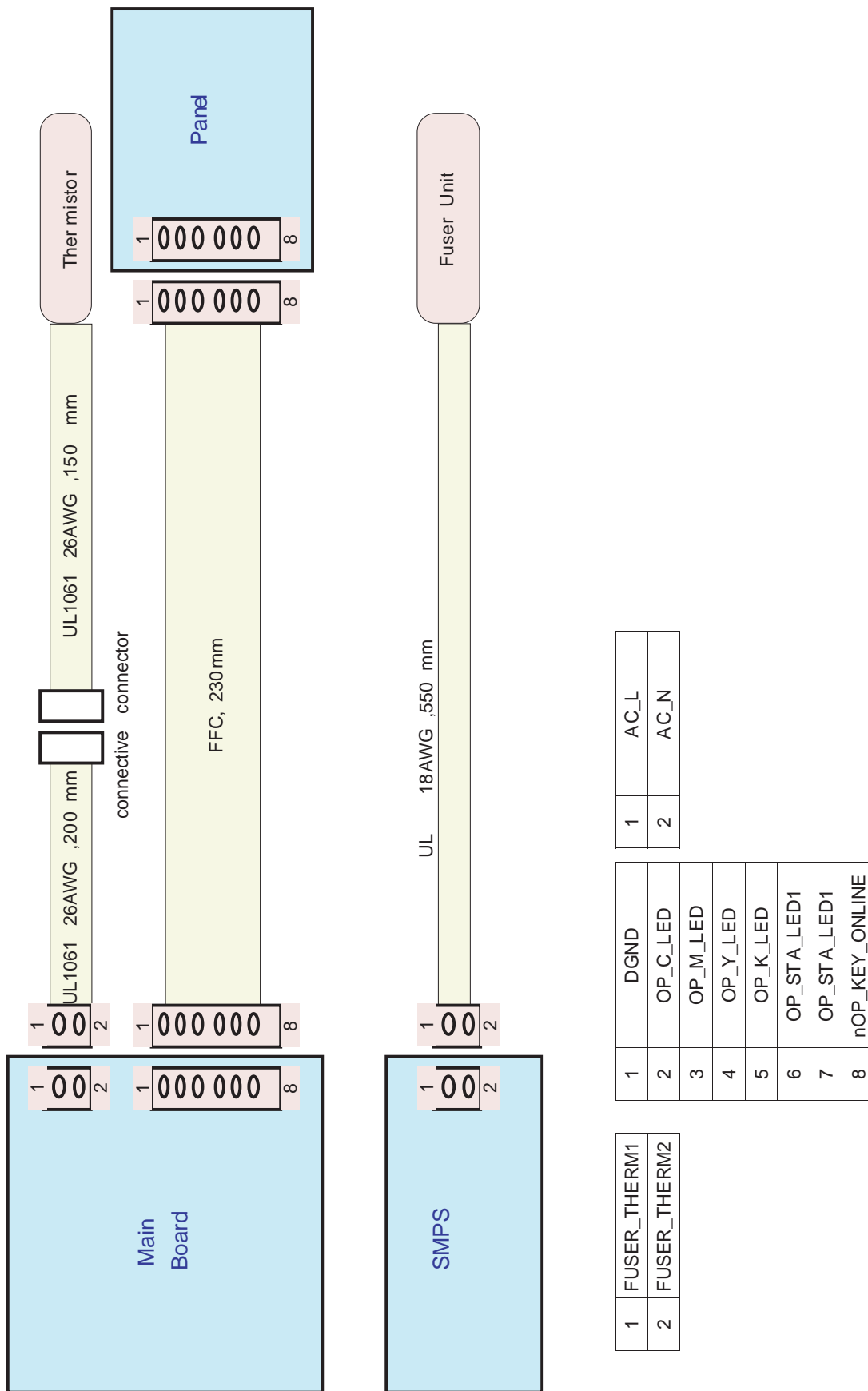
### 8. Main Board ↔ CRUM



9. Main Board ↔ Actuator



### 10. Main Board ↔ Heater Unit



## 6. Reference Information

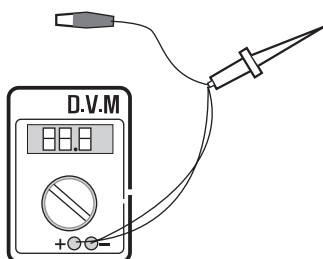
This chapter contains the tools list, list of abbreviations used in this manual, and a guide to the location space required when installing the printer. A definition of tests pages and Wireless Network information definition is also included.

### 6.1 Tools for Troubleshooting

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

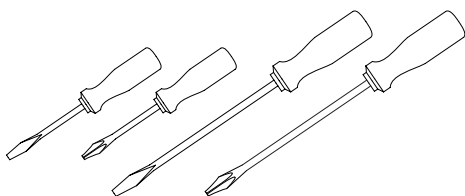
- **DVM(Digital Volt Meter)**

Standard : Indicates more than 3 digits.



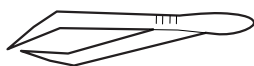
- **Driver**

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



- **Tweezers**

Standard : For general home use, small type.



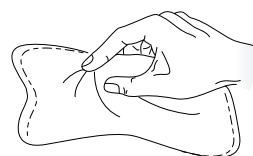
- **Cotton Swab**

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.



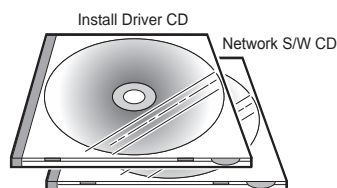
- **Vacuum Cleaner**



- **Brush**



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





## 6.2 Acronyms and Abbreviations

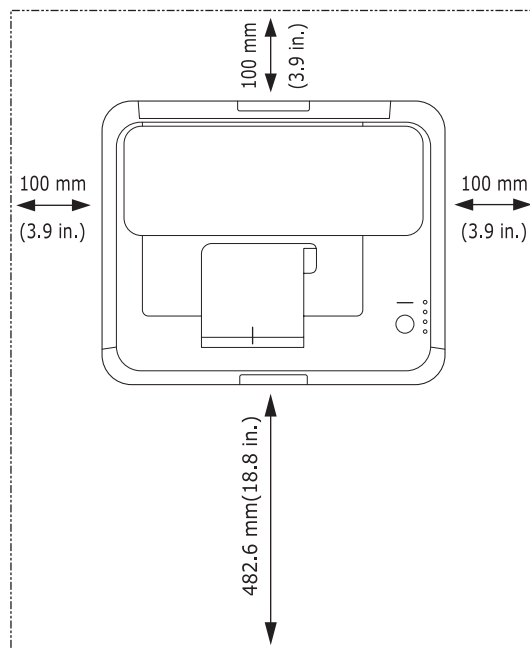
The table below explains the abbreviations and acronyms used in this service manual. Where abbreviations or acronyms are used in the text please refer to this table.

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
CMYK	Cyan, Magenta, Yellow, Black	ICC	International Color Consortium
CN	Connector	IDE	Intelligent Drive Electronics or Integrated Drive Electronics
CON	Connector	IEEE	Institute of Electrical and Electronics Engineers. Inc
CPU	Central Processing Unit	IOT	Image Output Terminal (Color printer, Copier)
CTD Sensor	Color Toner Density Sensor	IPA	Isopropyl Alcohol
dB	Decibel	IPC	Inter Process Communication Enhanced parallel Port
dBA	A-Weighted decibel	IPM	Images Per Minute
dBm	Decibel milliwatt	ITB	Image Transfer Belt
DC	Direct Current	LAN	local area network
DCU	Diagnostic Control Unit	LBP	Laser Beam Printer
DIMM	Dual In-line Memory Module	LCD	Liquid Crystal Display
DPI	Dot Per Inch	LED	Light Emitting Diode
DRAM	Dynamic Random Access Memory	LSU	Laser Scanning Unit
DVM	Digital Voltmeter	MB	Megabyte
ECP	Enhanced Capability Port	MHz	Megahertz
ECU	Engine Control Unit	MPBF	Mean Prints Between Failure
EEPROM	Electronically Erasable Programmable Read Only Memory	MPF/MPT	Multi Purpose Feeder/Multi Purpose Tray
EMI	Electro Magnetic Interference	NIC	Network Interface Card
EP	Electro photographic	NPC	Network Printer Card
EPP	Enhanced Parallel Port	NVRAM	Nonvolatile Random Access Memory
F/W	Firmware	OPC	Organic Photo Conductor
FCF/FCT	First Cassette Feeder/First Cassette Tray	PBA	Printed Board Assembly
FISO	Front-In, Side-Out	PCL	Printer Command Language , Printer Control Language
FPOT	First Print out Time		
GDI	Windows Graphic Device Interface		
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
PCL5Ce	Printer Command Language 5Ce-Color	SPGP	Samsung Printer Graphic Processor
PCL6	Printer Command Language 6	SPL	Samsung Printer Language
PDF	Portable Document Format	SPL-C	Samsung Printer Language-Color
PDL	Page Description Language	Spool	Simultaneous Peripheral Operation Online
Ping	Packet internet or Inter-Network Groper	SRS	Software Requirement Specification
PPD	Postscript Printer Discription	SURF	Surface Rapid Fusing
PPM	Page Per Minute	SW	Switch
PS	Post Script	sync	Synchronous or Synchronization
PS3	Post Script Level3	T1	ITB
PTL	Pre-Transfer Lamp	T2	Transfer Roller
PTB	Paper-Transfer Belt	TRC	Toner Reproduction Curve
PWM	Pulse Width Moduration	PnP	Universal Plug and Play
Q?y	Quantity	U.I.	User Interface
RAM	Random Access Memory	URL	Uniform Resource Locator
RCP	Remote Control Panel	USB	Universal Serial Bus
ROM	Read Only Memory	VCCI	Voluntary Control Council for Interference Information Technology Equipment
SCF/SCT	Second Cassette Feeder/Second Cassette Tray	WECA	Wireless Ethernet Compatibility Alliance
		Wi-Fi	Wireless Fidelity

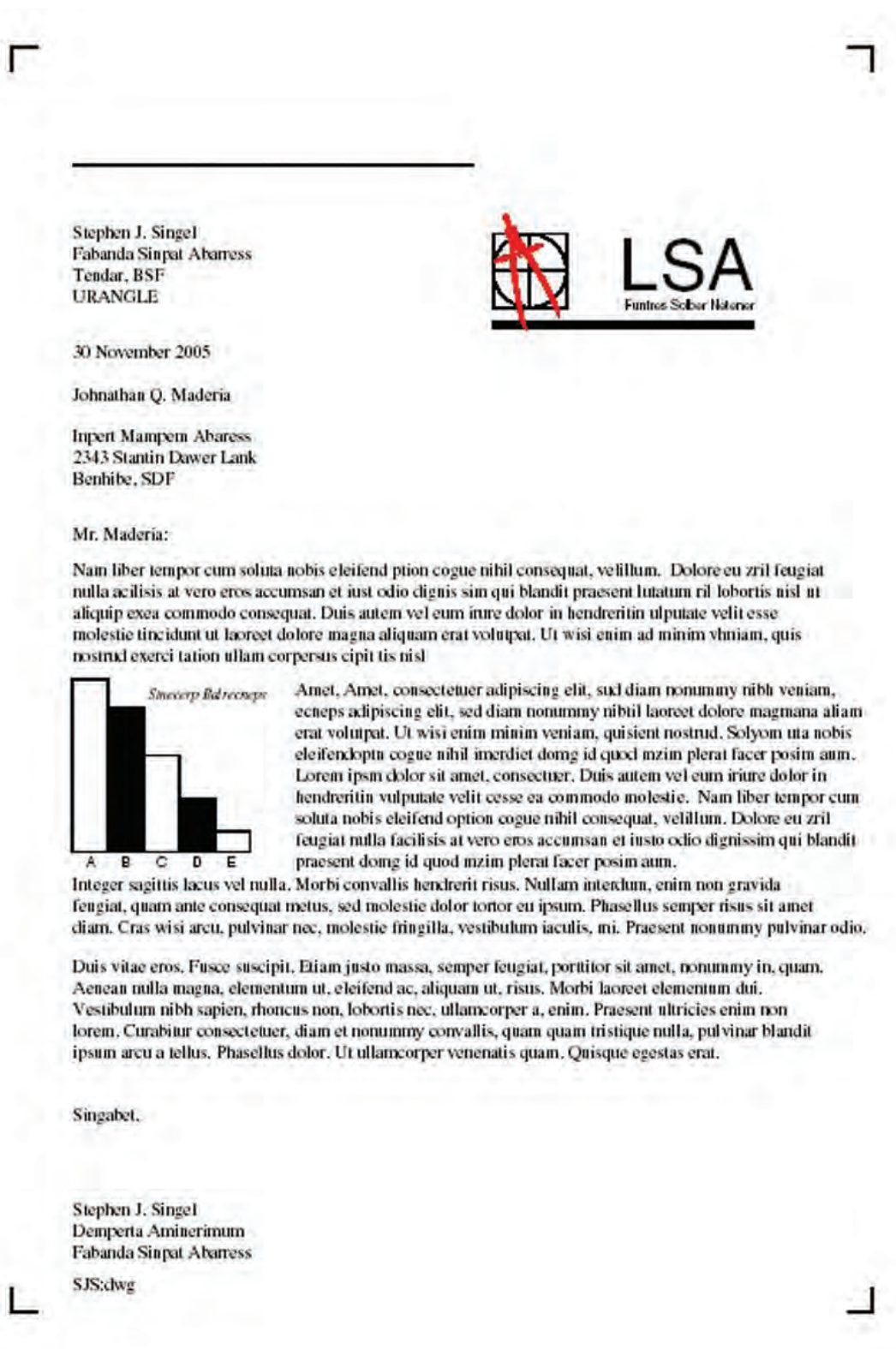
## 6.3 Select a location for the printer

- 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



## 6.4 A4 ISO 19798 Standard Pattern

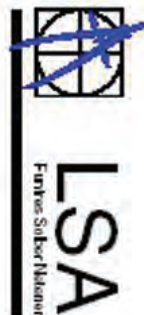
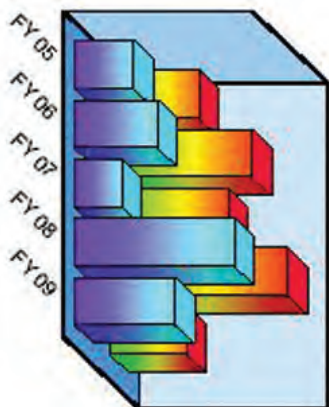
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# Sempter Fdud Aploriorius

Uppu vira darpipollentiaqis em latus sempter 2005  
Præfatus darpipollentiaqis em latus sempter 2005

	FY05	FY06	FY07	FY08	FY09
<b>Nuc Facilis:</b>					
Termbot Facilis	\$ 14,609	\$ 11,592	\$ 9,402	\$ 7,569	\$ 6,484
Inrebout Facilis	17,901	13,650	11,310	9,192	8,192
<b>Troper Facilis</b>	32,510	25,360	20,772	16,761	14,494
<b>Bet Reparides:</b>					
Elamber	27,125	27,380	17,122	13,256	11,880
<b>Sempter</b>	4,394	3,611	3,195	3,154	2,614
<b>Troper Yet Reparides</b>	<b>31,515</b>	<b>24,991</b>	<b>20,317</b>	<b>16,410</b>	<b>14,494</b>
<b>Reparides ent Facilis:</b>					
Facilis zu Pontone Eber	17,069	13,021	10,021	8,018	7,834
Facilis be Reptor	2,946	2,478	2,102	1,910	1,760
Renlers ent Dictiument	2,302	2,027	1,761	1,436	1,289
Solig, Galenre ent Almed	5,365	4,925	4,554	3,642	2,401
<b>Troper Reparides ent Facilis</b>					
<b>Eberer zontæ Orlemer:</b>					
Impress Otleber ent Obent, Num	270	29	25	23	20
Impress Reparides	206	155	121	93	87
Reparids Belome Tanxer	3,632	2,423	1,783	1,334	1,143
Popliense lur Taxer	1,199	824	605	863	496
<b>Net Epantais</b>	<b>2,433</b>	<b>1,589</b>	<b>1,177</b>	<b>471</b>	<b>647</b>
<b>Ipen epantais doctiem:</b>					
Pen Epantais	4.63	3.07	2.33	0.94	1.30
Gelpe Diwedenum	0.70	0.55	0.45	0.36	0.32
<b>Et Hare Sili:</b>					
<b>Toper Grandum</b>	<b>\$ 24,427</b>	<b>\$ 19,567</b>	<b>\$ 16,736</b>	<b>\$ 13,700</b>	<b>\$ 11,973</b>
<b>Delpereeds</b>	<b>102,300</b>	<b>98,400</b>	<b>69,200</b>	<b>92,600</b>	<b>89,000</b>
<b>Reparides pen Delpereeds</b>	<b>\$ 308,104</b>	<b>\$ 253,974</b>	<b>\$ 211,195</b>	<b>\$ 177,214</b>	<b>\$ 162,854</b>





# Ve Emerirre Et Tum Ober

14 December 2004

MCLLXVII

## Lorem

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Aliquam et lacus eget magna scelerisque blandit. Nullam sapien neque, vulputate non, porttitor nec, faucibus et, est. Ut fringilla turpis ut magna porttitor tempor. Praesent erat. Donec sed erat consequat ligula pulvinar dapibus. Etiam sapien. Donec a risus ut augue tincidunt euismod. Fusce laoreet, risus nec euismod suscipit, orci ligula tempor massa, et ultricies nulla quam ut.

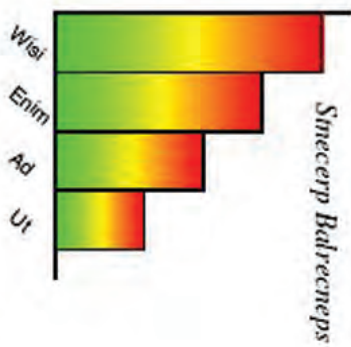
## Ve Emerirre Et Tum Ober

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Akisia Solyom	Co-Ediops
Sangrui Mehor	Accondant
Donglo Truta	Poporter
Tinkal Tempals	Pamperator
Soglish Traumar	Leagelo
Banken	Wool

Suscript Lobortis



Adipiscing



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