

Brother Laser Printer SERVICE MANUAL

MODEL: HL-8050N



Read this manual thoroughly before maintenance work. Keep this manual in a convenient place for quick and easy reference at all times.

Sep. 2003 SM-PRN043 (4)

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PREFACE

This service manual contains basic information required for after-sales service of the laser printer (hereinafter referred to as "this machine" or "the printer"). This information is vital to the service technician to maintain the high printing quality and performance of the printer.

This service manual covers the HL-8050N printers.

This manual consists of the following chapters:

CHAPTER 1: GENERAL

Features, specifications, etc.

- CHAPTER 2: INSTALLATION AND BASIC OPERATION Installation conditions, Installation procedures, basic operation of the printer etc.
- **CHAPTER 3: THEORY OF OPERATION** Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.
- CHAPTER 4: DISASSEMBLY AND RE-ASSEMBLY Procedures for disassembling and re-assembling the mechanical system.
- CHAPTER 5: MAINTENANCE Periodical replacements parts, consumable parts, etc.
- CHAPTER 6: TROUBLESHOOTING Reference values and adjustments, troubleshooting image defects, troubleshooting malfunctions, etc.
- CHAPTER 7: SERVICE MODE Professional Menu mode and Service Menu mode, etc.
- **APPENDIX:** Serial No. descriptions, page counter, Diameter / circumference of rollers, Connection diagrams, PCB circuit diagrams, etc.

Information in this manual is subject to change due to improvement or redesign of the product. All relevant information in such cases will be supplied in service information bulletins (Technical Information).

A thorough understanding of this printer, based on information in this service manual and service information bulletins, is required for maintaining its print quality performance and for improving the practical ability to find the cause of problems.

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REGULATION

LASER SAFETY (110 - 120V MODEL ONLY)

This printer is certified as a Class I laser product under the US Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within the protective housing and external covers. The laser beam cannot escape form the machine during any phase of user operation.

FDA REGULATIONS (110 - 120V MODEL ONLY)

The US Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for Japanese manufactured products

MANUFACTURED: BROTHER INDUSTRIES, LTD.	K
15-1, Naeshiro-cho, Mizuho-ku, Nagoya 467-8561, Japan. This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	9

The label for Chinese manufactured products

MANUFACTURED: BROTHER Corporation (Asia) Ltd. Shenzen Buji Nan Ling Factory	С
Gold Garden Ind., Nan Ling Village, Buji, Rong Gang, Shenzen, CHINA This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	

Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

IEC 825 (220-240V MODEL ONLY)

This printer is a Class I laser product as defined in IEC 825 specifications. The label shown below is attached in countries where required.



This printer has a laser diode which emits invisible laser radiation in the Laser Unit. The Laser Unit should not be opened without disconnecting the two connectors connected with the AC power supply and laser unit. Since the variable resistor in the laser unit is adjusted in accordance with the standards, never touch it.

Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

For Finland and Sweden LUOKAN 1 LASERLAITE KLASS 1 LASER APPARAT

Varoitus! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Varning – Om apparaten används på annat sätt än i denna Bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

SAFETY INFORMATION

CAUTION FOR LASER PRODUCT (WARNHINWEIS FUR LASER DRUCKER)

- CAUTION: When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.
- CAUTION: In case of any trouble with the laser unit, replace the laser unit itself. To prevent direct exposure to the laser beam, do not try to open the enclosure of the laser unit.
- ACHTUNG: Im Falle von Störungen der Lasereinheit muß diese ersetzt werden. Das Gehäuse der Lasereinheit darf nicht geöffnet werden, da sonst Laserstrahlen austreten können.

LITHIUM BATTERIES

- CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
- VORSICHT: EXPLOSIONSGEFAHR BEI UNSACHGEMÄßEM AUSTAUSCH DER BATTERIE. ERSATZ NUR DURCH DENSELBEN ODER EINEN VOM HERSTELLER EMPFOHLENEN ÄHNLICHEN TYP. ENTSORGUNG GEBRAUCHTER BATTERIEN NACH ANGABEN DES HERSTELLERS.

ADDITIONAL INFORMATION

When servicing the optical system of the printer, be careful not to place a screwdriver or other reflective object in the path of the laser beam. Be sure to take off any personal accessories such as watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage the eyes.

Since the beam is invisible, the following caution label is attached on the laser unit.



DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following conventions are used in this service manual:



Indicates warnings that must be observed to prevent possible personal injury.

CAUTION:

Indicates cautions that must be observed to service the printer properly or prevent damage to the printer.

NOTE:

Indicates notes and useful tips to remember when servicing the printer.

**Listed below are the various kinds of "WARNING" messages included in this manual.







If malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is you analyze OFF because it is a single pole switch.

CHAPTER 1 GENERAL

1. FEATURES

This printer has the following features;

High Resolution and Fast Print Speed

True 1200 X 1200 dots per inch (dpi), 600 x 600 dots per inch (dpi) and true 300 x 300 dots per inch (dpi) for graphics with microfine toner and up to 34 pages per minutes (ppm) print speed (A4) and 35 pages per minutes (ppm) print speed (Letter paper).

Versatile Paper Handling

The printer loads paper automatically from the paper tray. The paper tray can hold A4, letter, B5 (ISO), B5 (JIS), A5, B6 (ISO), A6, Executive and Legal size paper.

Front Operation

Basic operation of the printer can be controlled from the front panel.

Enhanced Printing Performance and User-Friendly Operation for Windows®

The dedicated printer driver for Microsoft[®] Windows[®] 95/98/Me and Windows[®] NT 4.0/2000/XP are available on the CD-ROM supplied with your printer. You can easily install them into your Windows[®] system using our installer program. The driver allows you to choose various printer settings including toner save mode, custom paper size, sleep mode, gray scale adjustment, resolution, watermark and many other layout functions. You can easily setup these print options through the Printer Setup Menu.

Printer Status Monitor

The printer status monitor program can show the current status of your printer. When printing, the animated dialog box appears on your computer screen to show the current printing process. If an error occurs, a dialog box will appear to let you know what to correct. If you have turned on the interactive Help, you can get visual guidance on your PC screen on the actions to take in the event of certain printer errors.

Quick Print Setup

The Quick Print Setup is a convenient utility to allow you to make changes to frequently used driver settings easily without having to open the printer properties selection box every time. It is launched automatically when this printer driver is selected. You can change the settings by clicking on the icon with the right mouse button.

Enhanced Memory Management

The printer provides its own data compression technology in its printer hardware and the supplied printer driver software, which can automatically compress graphic data and font data efficiently into the printer's memory. You can avoid memory errors and print most full-page 1200 dpi graphic and text data, including large fonts, with the standard printer memory.

USB Interface (for Windows[®] 98/2000/XP, iMac and Power Macintosh with USB installed)

The printer can be connected using the Universal Serial Bus (USB) interface to a PC or Macintosh, which has the USB interface. Drivers that allow you to use the USB port are provided on the CD-ROM supplied with the printer.

Popular Printer Emulation Support

The printer supports the following printer emulation modes; HP LaserJet (PCL6), Epson FX-850, IBM Proprinter XL, HP-GL and PostScript[®] Level 3 language emulation (Brother BR-Script Level 3).

When you use DOS application software or Windows® version 3.0 or earlier, you can use any of these emulations to operate the printer. The printer also supports auto-emulation switching between HP, Brother BR-Script 3, HP-GL and Epson or HP, BR-Script 3, HP-GL and IBM. If you want to set the printer emulation, you can do it by operating the front panel.

High Resolution Control & Advanced Photoscale Technology

High Resolution Control (HRC) technology provides clear and crisp printouts. Use this function to get smooth text print quality.

Advanced Photoscale Technology (APT) enables the printer to print graphics in 256 grayscales, producing nearly photographic quality. Use this function when you want to print photographic images.

Environment-Friendly

<Economy Printing Mode>

This feature will cut your printing cost by saving toner. It is useful for obtaining draft copies for proof-reading.

<Sleep Mode (Power Save Mode)>

Sleep mode automatically reduces power consumption when the printer is not in use for a certain period of time. The printer consumes less than 16W when in sleep mode.

Bar Code Print

The printer can print the following 11 types of bar codes;

• Code 39	 US-PostNet 	• EAN-8
• Code 128	ISBN	• EAN-13
 Interleaved 2 of 5 	• UPC-A	• EAN-128
Codabar	• UPC-E	

Network Feature

The Brother network printer has a built in multi protocol network capability as standard. This allows multiple host computers to share the printer on a 10/100Mbit Ethernet network. Any users can print their jobs as if the printer was directly connected to their computer. Users on Windows[®] 95/98/Me, Windows[®] NT/2000/XP, UNIX, Novell, Apple Macintosh, LAN server and OS/2 Warp server computer simultaneously can access this printer. For further information, see the Network User's Guide supplied with the printer.

2. OVERVIEW

<Front View>



Fig. 1-1

<Rear View>



Fig. 1-2

3. SPECIFICATIONS

3.1 Printing

Print method	Electrophotography (single-component dry toner)
Laser	Semiconductor laser Wave length: 785±5 nm Output: 5mW max
Resolution	 1200dpi (for Windows[®] 95/98/Me, WindowsNT[®] 4.0, Windows[®] 2000 Windows[®] XP and Mac OS) 600 dpi (for Windows[®] 95/98/Me, WindowsNT[®] 4.0, Windows[®] 2000, Windows[®] XP, DOS and Mac OS) 300 dpi (for Windows[®] 95/98/Me, WindowsNT[®] 4.0, Windows[®] 2000, Windows[®] XP and Mac OS)
Print quality	Normal printing mode Economy printing mode (up to 20% toner saving)
Print speed	Up to 34 ppm* (When loading A4) Up to 35 ppm* (When loading Letter-size paper.)
Warm-up	Max. 17 seconds at 22°C (68°F)
First print	10 seconds or less (When loading A4 or Letter-size paper using face down print delivery from the paper tray.)
Consumables	Toner cartridge Life expectancy: 17,000 single-sided pages/cartridge or drum revolution up to 190,000 (When printing A4 or Letter-size paper with the print density set at level 0 with about 5% print coverage) NOTE : See Appendix 3 for the important information about toner cartridge

Continuous Print Speed

Paper size	Simplex (ppm)	Simplex OHP Mode (ppm)	Simplex Thick Stock Mode1 (ppm)	Simplex Thick Stock Mode2 (ppm)
Letter (SEF)	35.7	17.6	25.4	10.8
A4 (SEF)	34.0	17.6	25.3	10.8
Legal 14" (SEF)	29.2	-	25.2	10.7
Legal 13" (SEF)	31.1	-	25.3	10.7
Executive	35.7	-	25.4	10.8
B5(JIS) (SEF)	35.8	-	25.4	10.8
Envelopes	-	-	15.7	10.8

Reference: "ppm" is an abbreviation of "Prints Per Minute."

Reference: "SEF" is an abbreviation of "Short Edge Feed", and means the case where feeding is done from the shorter side of the paper.

3.2	Functions	
	CPU	Toshiba TMPR4955 300MHz
	Emulation	Brother Printing Solution for Windows [®] Automatic emulation selection among HP LaserJet 5(PCL 6), Brother BR-Script 3, HP-GL, EPSON FX-850 or IBM Proprinter XL
	Printer driver	<pcl driver=""> Windows[®] 95/98/Me, Windows[®] NT 4.0/2000/XP driver, supporting Brother Native Compression mode <ps driver=""> PPD file driver for Windows[®] 95/98/Me, Windows NT[®] 4.0/2000/XP driver and Macintosh driver</ps></pcl>
	Interface	 Bi-directional parallel Universal Serial Bus (USB) Network
	Memory	HL-8050N: 64.0 Mbytes ^{*1} Expandable up to 576 Mbytes by installing an industry standard DIMM ^{*2}
	Control Panel	 Display LCD: 2 lines by 16-column liquid crystal display LED: 2 LED Buttons: 9 buttons
	Diagnostics	Self-diagnostic program

¹NOTE:

The standard memory installed varies depending on the country.

*²NOTE:

The DIMM (Dual in Line Memory Module) must have the following specifications: -Type:100 pinAccess time:60 nsec - 80 nsecCapacity:16, 32, 64, 128, 256 MbytesHeight:35.0 mm (1.38 inches) or lessOutput:32 bit or 36 bit (independent of parity)

3.3 Options

Paper handling	 Lower tray unit (LT-8000); Maximum 550 sheets x 2 trays Duplex unit for duplex printing (DX-8000) Mailbox unit for output source (CT-8000)
Offset Catch Tray	
Storage Device	CompactFlash Card (Not provided by Brother)

3.4 Electrical and Mechanical

U.S.A. and Canada: Europe and Australia:		AC 110 to AC 220 to	120V, 50 Hz/60 Hz 240V, 50 Hz/60 Hz
Printing (Maximum):		120V: 985 230V: 985	W W
Standing by:		120V: 105 230V: 83W	W /
Sleep* ¹ :		120V: 12W 230V: 14W	l V
Sound Pressure	e:	Printing: Le Standby: L	ess than 53.6 dB (A) .ess than 27.0 dB (A)
Sound Power:	Printing	g: Less than Standby: L	6.7 B less than 4.0 B
Operating: Storage:	10 to 32 0 to 35	2.5°C (50 to °C (38 to 95	90.5°F) 5°F)
Operating: Storage:	15 to 8 10 to 8	5% (non co 0% (non co	ndensing) ndensing)
Printer: 421.8 x (16.6 x 18.3 x 1	465.4 x 5.9 inch	: 404.3 mm les)	(W x D x H)
Carton: 575 x 6 (22.6 x 26.2 x 2	65 x 570 2.4 inch	0 mm (W x ies)	D x H)
Printer: Approx	. 20.5 kg	g (45.4 lb.)	(Excluded Toner and Drum)
Carton: Approx Carton)	. 26.8 k	g (59.4 lb.)	(Included Toner, Drum and
	U.S.A. and Car Europe and Au Printing (Maxim Standing by: Sleep*1: Sound Pressure Sound Power: Operating: Storage: Operating: Storage: Printer: 421.8 x (16.6 x 18.3 x 1 Carton: 575 x 6 (22.6 x 26.2 x 2 Printer: Approx Carton: Approx Carton: Approx	U.S.A. and Canada: Europe and Australia: Printing (Maximum): Standing by: Sleep* ¹ : Sound Pressure: Sound Power: Printing Operating: 10 to 33 Storage: 0 to 35 Operating: 15 to 88 Storage: 10 to 35 Operating: 15 to 88 Storage: 10 to 80 Printer: 421.8 x 465.4 x (16.6 x 18.3 x 15.9 inch Carton: 575 x 665 x 570 (22.6 x 26.2 x 22.4 inch Printer: Approx. 20.5 kg Carton: Approx. 26.8 kg Carton)	U.S.A. and Canada: AC 110 to Europe and Australia: AC 220 to Printing (Maximum): 120V: 985 230V: 985 Standing by: 120V: 105 230V: 83W Sleep* ¹ : 120V: 12W 230V: 14W Sound Pressure: Printing: Less than Standby: L Sound Power: Printing: Less than Standby: L Operating: 10 to 32.5° C (50 to Storage: 0 to 35° C (50 to Storage: 0 to 35° C (38 to 95) Operating: 15 to 85% (non co Storage: 10 to 80% (non co Storage: 10 to 80% (non co Storage: 10 to 80% (non co Printer: 421.8 x 465.4 x 404.3 mm (16.6 x 18.3 x 15.9 inches) Carton: 575 x 665 x 570 mm (W x (22.6 x 26.2 x 22.4 inches) Printer: Approx. 20.5 kg (45.4 lb.) Carton: Approx. 26.8 kg (59.4 lb.) Carton)

*¹NOTE:

The power consumption figure quoted for sleep mode is when the fan has stopped.

3.5 Network

Type / Speed	On Board Ethernet 10BaseT/100BaseTX Auto speed detection
Protocols	TCP/IP (DHCP, BOOTP, RARP, APIPA, NetBIOS over IP LPR/LPD, Port9100, Custom Port, POP3/SMTP, SMB Print TELNET, SNMP, HTTP, TFTP, FTP, IPP, SSDP), EtherTalk, IPX/SPX, NetBEUI, DLC/LLC
Management	 Web Based Management BRAdmin Professional Windows[®] based management utility Web BRAdmin Server Software
Firmware update	8MB flash ROM (with Main Program). Use BRAdmin Professional when upgrading print server software or FTP, TFTP PUT/GET or IPX for Netware.
Supplied software	 BRAdmin Professional management utility (for Windows[®] 95/98/NT 4.0/2000/XP) Port driver for Windows[®] 95/98/Me/NT 4.0/2000/XP LPR port driver (for Windows[®] 95/98/Me/NT4.0 only) NetBIOS port driver, SMTP port driver Web BRAdmin Server Software

3.6 Paper

3.6.1 Feedable paper

We recommend the following paper types and sizes for each paper tray or print method.

(1) Paper type

Paper type	Tray 1	Tray 2	Tray 3/4	DX	СТ	Select the media type from the printer driver
Plain paper 60- 110 g/m ² (16 - 29 lbs.)	~	~	~	~	~	Plain paper
Thick paper 111- 159 g/m ² (30 - 42 lbs.)	~	~	~	~	~	Thick paper
Thicker paper 160- 216 g/m ² (43 - 57 lbs.)	\checkmark	~	~	\checkmark	~	Thicker paper
Transparencies	✓	\checkmark	\checkmark	-	~	Transparency
Labels	1	~	~	_	-	Plain paper
Labels	v			-		Thick paper
Envelopes	~	~	~		-	Thick paper
LINGIOPES	÷			-		Thicker paper

(2) Paper size

	Tray 1	Tray 2/3/4	DX	СТ
Paper size	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5, A6, B6, Com10, Monarch, C5, DL Width: 76.2 to 215.9 mm Height: 127.0 to 355.6 mm	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5 A6, B6, Com10, Monarch, C5, DL Width: 98.4 to 215.9 mm Height: 148.0 to 355.6 mm	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5 A6, B6, Com10, Monarch, C5, DL Width: 89.9 to 215.9 mm Height: 139.7 to 355.6 mm	A4, Letter, B5(JIS), B5(ISO), Executive, Legal, A5, A6, B6, Com10, Monarch, C5, DL Width: 89.9 to 215.9 mm Height: 139.7 to 355.6 mm
Capacity	150 sheets	550 sheets		500 sheets

(3) Other paper specifications

Paper Tray

	Cut sheet
Basis weight	60 to 105 g/m ² (16 to 28 lb.)
Caliper	0.08 to 0.13 mm (0.003 to 0.005 in.)
Moisture content	4% to 6% by weight

(4) Recommended paper

	Europe	USA
Plain paper *	Xerox Premier 80 g/m ²	Xerox 4200DP 20 lb.
Transparency	3M CG3300	3M CG3300
Label	Avery laser label L7163	Avery laser label #5160

* Recommended paper should have the following technical specifications:

Basis Wait 75-90 (g/m^2) Thickness 80-110 (micrometer) Roughness Higher than 20 (sec.) Stiffness 90-150 (cm³/100) Grain Direction Long Grain Volume Resistivity $10e^9 - 10 e^{11}$ (ohm) Surface Resistivity $10e^{10} - 10 e^{12}$ (ohm-cm) Filler CaCO3 (Neutral) Ash Content below 23 (wt%) Brightness higher than 80 (%) Opacity higher than 85 (%)

As a general guidance, paper that is suitable for a photocopier is generally suitable.

When you are choosing print media, be sure to follow the information given below to prevent any paper jams, print quality problems or printer damage;

- It is recommended to use long-grained paper for the best print quality. If short-grained paper is being used, it might be the cause of paper jams.
- Use neutral paper. Do not use acid paper to avoid any damage to the drum unit.
- Avoid using coated paper such as vinyl coated paper.
- Avoid using preprinted or highly textured paper.
- It is recommended to use labels or transparencies, which are designed for use in laser printers.
- Avoid feeding labels with the carrier sheet exposed, or the printer will be damaged.
- Before loading paper with holes such as organizer sheets, be sure to fan the stack well.
- Do not use organizer sheets that are stuck together. The glue that is used might cause damage to the printer.
- When printing on the back of pre-printed paper, if the paper is curled, be sure to straighten the paper as much as possible.
- Different types of paper should not be loaded at the same time in the paper tray to avoid any paper jams or misfeeds.

3.6.2 Print delivery

Face down ou	itput tray
Capacity:	Maximum 500 sheets (80 g/m ²)
	Face down only
Face up output	ut tray
Capacity:	Up to 70 sheets Face up only
TE:	
e down: e up:	Delivery with the printed face of the paper downwards. Delivery with the printed face of the paper upwards.
	Face down ou Capacity: Face up outpu Capacity: <i>TE:</i> e down: e up:

3.7 Printable Area

When using PCL emulation, the edges of the paper that cannot be printed on are shown below.



<Portrait>

	A4	Letter	Legal	B5 (JIS)	B5 (ISO)	Executive	A5
1	4.2 mm						
	(0.17 in)						
2	6.01 mm	6.35 mm	6.35 mm	5.84 mm	6.01 mm	6.35 mm	6.01 mm
	(0.24 in)	(0.25 in)	(0.25 in)	(0.23 in)	(0.24 in)	(0.25 in)	(0.24 in)
3	4.2 mm						
	(0.17 in)						
4	6.01 mm	6.35 mm	6.35 mm	5.84 mm	6.01 mm	6.35 mm	6.01 mm
	(0.24 in)	(0.25 in)	(0.25 in)	(0.23 in)	(0.24 in)	(0.25 in)	(0.24 in)

	A6	B6	COM-10	Monarch	C5	DL
1	4.2 mm					
	(0.17 in)					
2	6.01 mm	6.01 mm	6.35 mm	6.35 mm	6.01 mm	6.01 mm
	(0.24 in)	(0.24 in)	(0.25 in)	(0.25 in)	(0.24 in)	(0.24 in)
3	4.2 mm					
	(0.17 in)					
4	6.01 mm	6.01 mm	6.35 mm	6.35 mm	6.01 mm	6.01 mm
	(0.24 in)	(0.24 in)	(0.25 in)	(0.25 in)	(0.24 in)	(0.24 in)

<Landscape>

	A4	Letter	Legal	B5 (JIS)	B5 (ISO)	Executive	A5
1	4.2 mm						
	(0.17 in)						
2	5.0 mm	5.08 mm	5.08 mm	5.08 mm	5.0 mm	5.08 mm	5.0 mm
	(0.19 in)	(0.2 in)	(0.2 in)	(0.2 in)	(0.19 in)	(0.2 in)	(0.19 in)
3	4.2 mm						
	(0.17 in)						
4	5.0 mm	5.08 mm	5.08 mm	5.08 mm	5.0 mm	5.08 mm	5.0 mm
	(0.19 in)	(0.2 in)	(0.2 in)	(0.2 in)	(0.19 in)	(0.2 in)	(0.19 in)

	A6	B6	COM-10	Monarch	C5	DL
1	4.2 mm					
	(0.17 in)					
2	5.0 mm	5.0 mm	5.08 mm	5.08 mm	5.0 mm	5.0 mm
	(0.19 in)	(0.19 in)	(0.2 in)	(0.2 in)	(0.19 in)	(0.19 in)
3	4.2 mm					
	(0.17 in)					
4	5.0 mm	5.0 mm	5.08 mm	5.08 mm	5.0 mm	5.0 mm
	(0.19 in)	(0.19 in)	(0.2 in)	(0.2 in)	(0.19 in)	(0.19 in)

3.8 Serial No. Descriptions

The descriptions below show how to understand the meanings of the numbers printed on the labels or bag of the printer and printer parts

< ID for	production mon	th >					
A:	January	B:	February	C:	March	D:	April
E:	May	F:	June	G:	July	H:	August
J:	September	K:	October	L:	November	M:	December
< ID for 3:	year > 2003	4:	2004	5:	2005		
< ID for	factory >						
W:	W: Shenzhen Factory No.1			Y:	Shenzher	Facto	ry No.2

(1) Printer: Printed on the label attached on the rear of the main body



(2) Toner cartridge :



(3) Laser unit: On the laser unit



CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. TO USE THE PRINTER SAFELY

1.1 Installing and Relocating your Printer

Prohibited:

- Do not place the printer in a hot, humid, dusty, or poorly ventilated environment. Prolonged exposure to such adverse conditions can cause fire or electric shocks.
- Do not place the printer near heaters, volatile, flammable, or combustible materials, such as curtains.

HINT:

- Place the printer on a level, sturdy surface that can withstand the printer's weight. Failure to do so could cause the printer to fall, resulting in injuries.
- To prevent injuries, this printer should be lifted by at least two people.
- To lift the printer, one person is to face the front and the other person is to face the back of the printer, then grip the recessed areas at the bottom left and right with both hands. Never try to lift the printer by gripping any other areas. Lifting the printer by gripping other areas can cause the printer to fall, resulting in injuries.



Fig. 2-1

HINT:

- When lifting the printer, get a firm footing and bend your knees to avoid possible injuries to your back.
- Do not move the printer by lifting it by the front and back edges (positions shown in the following diagram) when the paper tray is extended (loaded with Legal 14 paper). The printer may fall and result in injuries or the paper tray may be damaged.



Fig. 2-2

HINT:

The printer has ventilation grills on the side and at the back of the machine. Ensure that the printer is installed no less than 300 mm (11.7 in.) from the wall on the right, 200 mm (7.8 in.) from the wall on the left, and 255 mm (9.9 in.) from the wall at the back. A poorly ventilated printer can cause excessive internal heat to build up and result in fire.

The diagram below shows the minimum clearances required for normal operation, consumables replacement, and maintenance, ensuring that your printer operates at peak performance.



Remove the plug:

When moving the printer, be sure to unplug the power cord from the AC power outlet/socket. Moving the printer with the power cord connected can damage the power cord, which could result in a fire or an electric shock.

Prohibited:

- When moving the printer, do not tilt it more than the angles shown in the diagram below.
- If tilted excessively, the printer may fall, resulting in injuries.



<Operating Environment>

Use the printer in a place that meets the following requirements:

Ambient temperature range of 10 to 32 °C (50.0 to 89.6 °F), relative humidity of 15 to 85% (no condensation)

When using the printer at an ambient temperature of 32 °C (89.6 °F), the relative humidity should not exceed 65%. When the relative humidity reaches 85%, the ambient temperature should not exceed 28 °C (82.4 °F).

Prohibited:

- Do not place the printer in a room where there are sudden fluctuations in temperature and do not move the printer from a cold place to a warm humid place. If you do, condensation may occur inside the printer and deteriorate print quality.
- Do not place the printer in direct sunlight, as this may damage the printer.
- When moving the printer, remove the toner cartridge, otherwise loose toner can spill inside the printer and deteriorate print quality.
- Do not place the printer directly next to an air conditioner or heater, as this affects the temperature inside the printer and can cause damage.
- Do not use the printer when it is tilted at an angle of more than 5 degrees, as this may result in damage.

1.2 Precautions for Power and Grounded/Earthed Connections

WARNING:

HINT:

- Use the printer within the specified power range.

AC power: 100-127 V AC ± 10% (90 V-140 V) or 220-240 V AC ± 10% (198 V-264 V) Frequency: 50 ± 3Hz/60 ± 3Hz

- Ensure that the AC power cord connector and AC power outlet/socket are free of dust. In a damp environment, a contaminated connector can, over time, draw non-negligible amounts of current that can generate heat and eventually cause fire.

Prohibited:

- Do not attempt to modify, pull, bend, chafe, or otherwise damage the AC power cord. Do not place objects on the AC power cord. A damaged AC power cord can cause fire or electric shock.
- Never touch an AC power cord with wet hands. This constitutes an electric shock hazard.

Remove the plug:

In the following situations, stop using the printer immediately, turn it off, and disconnect the AC power cord from the AC power outlet/socket. After that, call your dealer or Brother Customer Service immediately.

Continued use of the printer in such situations could result in fire:

- There is smoke emanating from the printer or the outside of the printer is excessively hot.
- Unusual noises are coming from the printer.
- There is water inside the printer.

Ground/Earth:

To prevent fire or electric shocks, connect the AC power cord to a grounded/earthed AC power outlet/socket. For your safety, if in any doubt about the effective grounding/earthing of the power, call a qualified electrician.

HINT:

If the power cord is broken or insulated wires are exposed, stop using the printer immediately, turn it off, and disconnect the AC power cord from the AC power outlet/socket. After that, call your dealer or Brother Customer Service. Using a damaged cord can cause fire or an electric shock.



Prohibited:

Do not plug or unplug the printer when it is on. Unplugging a live connector can deform the plug and cause fire.

HINT:

When unplugging the printer, grasp the plug instead of the AC power cord. Forcibly pulling the AC power cord can damage it and cause a fire or an electric shock.

Remove the plug:

Be sure to turn off and unplug the printer before accessing the interior of the printer for cleaning, maintenance, or troubleshooting. Accessing the interior of a live printer can result in electric shock.

HINT:

Once a month, turn off the printer and check the AC power cord for the following:

- The AC power cord is plugged firmly into the AC power outlet.
- The plug is not excessively heated, rusted, or bent.
- The plug and outlet are dust free.
- The cord is not cracked or frayed.
- If you notice any unusual conditions, call your dealer or Brother Customer Service for assistance.

Remove the plug:

When the printer is not used over an extended period of time, it is advisable to unplug the printer.

HINT:

Switch off the printer before connecting the interface cable or options. Connecting the interface cable or options to a live printer can cause electric shock.

<Radio Interference>

This printer may interfere with radio or television reception, causing flickering or distortion. This can be determined by turning the printer off and on. To correct interference, perform one or a combination of the following procedures:

- Move the printer away from the TV and/or radio.
- Reposition the printer, TV and/or radio.
- If the printer, TV and/or radio are plugged in to the same AC power outlet/socket, unplug them, then plug them into different AC power outlets/sockets.
- Reposition the TV and/or radio antennas and cables until the interference stops. For external antennas, consult your local electrician.
- Use coaxial cables with radio and television antennas.

1.3 **Operating Precautions**

WARNING:

Prohibited:

- Do not place any liquid containers such as vases or coffee cups on the printer. Liquids spilt on the printer can cause a fire or electric shock.
- Do not place any metal parts such as staples or clips on the printer. If metal or flammable materials get into the printer, they can short circuit internal components and cause a fire or electric shocks.

Remove the plug:

If debris (metal or liquid) gets into the printer, turn off and unplug the printer. After that, call your dealer or Brother Customer Service immediately. Operating a debris-contaminated printer can cause a fire or electric shock.

Do not dismantle:

- Never open or remove printer covers that are secured with screws unless specifically instructed to do so in this guide. High-voltage components can cause electric shocks.
- Do not try to alter the printer's structure or modify any parts. Unauthorized modifications can cause fire.
- This printer complies with the IEC60825 (Class 1) international laser standard. This means that the printer does not present any risk of injury to individuals from laser radiation. Various covers confine the laser radiation to the inside of the printer; hence, users cannot incur injury from the laser under normal operating conditions. Removing covers, unless instructed to do so in this guide, can cause injury from laser radiation.

Do not touch:

Never touch an area indicated by a high-temperature warning label (on or near the fuser unit). Touching these areas may result in burns.

If a sheet of paper is wrapped around the fuser or rollers, do not use excessive force to remove it so as to avoid injuries or burns. Turn off the printer immediately and call your dealer or Brother Customer Service.

Prohibited:

- Do not place any heavy objects on the printer. An off-balance printer can fall over or the heavy object can fall, resulting in injuries.
- Do not use highly flammable sprays or solvents in or around the printer, as this can result in fire.

HINT:

When removing paper jams, make sure that no pieces of paper are left inside the printer, as this can cause fire.

If the paper is wrapped around the fuser or roller, or you cannot see the jam that you are trying to clear, do not attempt to remove the paper by yourself, as this may result in injuries or burns. Turn off the printer immediately and call your dealer or Brother Customer Service.

Prohibited:

Do not place magnetic objects near the safety switch of the printer. Magnets can activate the printer accidentally, resulting in injuries.

1.4 Notes on Handling Consumables

WARNING:

Prohibited:

- Never put a toner cartridge into an open flame. It can explode, resulting in injuries.
- Never put a transfer roller into an open flame. It can explode, resulting in injuries.
- Never heat the drum in a cartridge, or scratch its surface. A heated or scratched drum can be hazardous to your health.
- Do not use a vacuum cleaner for cleaning toner spilled on the floor. Use a cloth soaked with soapy water to wipe it out. Vacuumed toner may cause a fire in the cleaner due to electrical sparks.



Do not open consumables until you are ready to use them. Do not store consumables in the following conditions:

- Hot or humid areas
- Near an open/naked flame
- Exposed to direct sunlight
- Dusty areas
- Before using consumables, read the instructions and precautions provided with the consumables.

Administer emergency first aid as follows:

- Eye Contact: Flush eyes with plenty of water for a minimum of 15 minutes, and seek medical advice.
- Skin contact: Wash material off skin with plenty of soap and water.
- Inhalation: Remove person to fresh air, and seek medical attention.
- Ingestion: If toner is swallowed, get immediate medical attention or advice.

Do not tilt or shake the toner cartridge when removing it temporarily. Loose toner can spill inside the printer and deteriorate print quality.

2. CARTON COMPONENTS



Fig. 2-5

Carton components may differ from one country to another.

The power cord may be slightly different to the one in the diagram above, depending upon which country you bought the printer in.

Save all packing materials and the printer carton. They should be used when shipping the printer.

NOTE:

- The interface cable is not a standard accessory. Buy the appropriate interface cable for the interface you intend to use (USB, Parallel or Network).
- It's recommended that you use a Parallel or USB interface cable that is no longer than 6 feet (2.0 meters).
- For the Parallel interface cable use a shielded interface cable that is IEEE 1284-compliant.

3. CONTROL PANEL



Fig. 2-6

3.1 Data LED Indications

LED	Printer status
Ready (Crean)	Lights when the printer is ready to print.
Ready (Green)	Blinks when the printer is receiving data.
Alarm (Red)	Lights when the printer has a problem that the user can rectify. NOTE: To clear the error, see the User's Guide Chapter 5.

The LED indicators are lights that show the printer's status.

<Alarm LED - Red>

This LED lights to indicate that the printer has detected some type of problem (operator call, error, service error).

LED status	Meaning
On	Alarm state (error)
Off	Normal state (no error)

<Ready LED - Green>

LED status	Meaning
Off	Printer is turned off. Printer is off-line. - Menu selection being performed - Number of reprint copies being set - PAUSE state - Alarm state
Blinking	Printer is receiving data from a computer or processing data.
On	Printer is on-line and ready for printing. - READY/WARMING UP state - SLEEP state - PRINTING state (including reprint) - JOB CANCEL state Incomplete data* is present. In this case, Data exists is displayed in the top line of the LCD. * Data that is in the process of being created exists, and no data is being received.

NOTE:

If the printer goes off-line while data is being received or processed (such as when the menu is displayed or an error occurs), data display is still given priority.

3.2 Liquid Crystal Display (LCD)

The display shows the current printer status. When you use the control panel buttons, the display will change.

If there are any problems, the display shows the appropriate error message or call service message so you will know that you need to take action.

<LCD Message>

Printer status messages

The following table shows the printer status messages that are displayed during normal operation:

Messages	Meaning
READY	Ready to print.
PRINTING	Printing.
RESOLUTION ADAPT	Printing with reduced resolution.
PROCESSING	Busy processing data.
JOB CANCELLING	Cancelling the job.
PAUSE	The printer has suspended its functions. Pressing the Go button starts the printer again.
WARMING UP	The printer is warming up.
SLEEP	In Sleep state
PRESS SET TO PRINT	Press the Set button to start printing.

Messages	Meaning	
RESET TO FACTORY SETTING	The printer setting returns to the factory settings.	
SELF TEST	Performing self-diagnostics.	
RAM SIZE=XX MB	This printer has XX MB memory.	
NOW INITIALIZING	The printer is setting up.	
PROGRAMING-WAIT	Accessing CompactFlash card.	
IGNORE DATA	PS data is being read and disregarded.	
Data exists (*)	Incomplete data exists.	

* Data that is being created exists, and no data is being received. Pressing the **Go** button performs FORM FEED and changes the display message to PRINTING.

3.3 Panel Buttons Functions

Key	Function
Job Cancel	Stop and cancel the printing job in progress.
Go	Exit from the control panel menu, reprint settings and error messages. Pause and continue printing.
Secure Print	Reprint the secure data.
+	Move forward through menus. Move forward through the options you can choose.
-	Move backward through menus. Move backward through the options you can choose.
Set	Select the control panel menu. Set the selected menus and settings.
Back	Go back one level in the menu.
Reprint	Reprint the last job or receiving job.
Menu	Go to the top menu (INFORMATION mode).

<Menu Button>

Pressing the **Menu** button while in a non-menu setting mode takes the printer off-line and displays the Top Menu. The **Menu** button is provided only for the purpose of displaying the Top Menu. It does not perform any other operation. The printer automatically exits the menu if no operation is performed for 30 seconds.

4. SETTING UP YOUR PRINTER

4.1 Install the Toner Cartridge

Prohibited:

Do NOT connect the interface cable. Connecting the interface cable is done when installing the driver.





(1) Remove all the packing tape.



Fig. 2-8

(2) Open the top cover.*Prohibited:Do not touch any parts inside the printer.*





(3) Take the toner cartridge out of the box and rock it 7 to 8 times.



Fig. 2-10
(4) Place the toner cartridge on a flat surface and pull the seal out horizontally.





NOTE:

- When pulling out the seal, pull it out horizontally. The tape might break if it is pulled out diagonally.
- After the seal has been pulled out, do not shake or bump the toner cartridge.
- (5) Hold the toner cartridge by the grip and insert it into the slot inside the printer.



Fig. 2-12

NOTE:

Make sure that the toner cartridge is firmly set.

(6) Close the top cover securely.



Fig. 2-13

4.2 Load Paper in the Paper Tray

(1) Pull the paper tray out of the printer.



Fig. 2-14

NOTE:

The paper tray must be pulled out completely. If the paper tray is pulled out halfway and pushed in again, the paper may be damaged.

(2) Place the paper tray on a flat surface.





(3) Remove the lid of the tray.



Fig. 2-16

(4) If the base plate of the paper tray is raised, push it down.



Fig. 2-17

(5) Squeeze the length guide and slide it to fit the paper size.





(6) Squeeze the right width guide and slide it to fit the paper size.





(7) Load the paper with the side to be printed facing up and with all 4 corners aligned. *Prohibited:*

Do not load paper exceeding the maximum fill line or the maximum capacity allowed.



Fig. 2-20

NOTE:

Align the right width guide with the paper width correctly. If the right width guide is not in place, the paper will not be properly fed and may cause a paper jam.

(8) Replace the lid of the paper tray.



NOTE:

Fig. 2-21

The lid of the tray must be firmly seated. If not, the paper might be misaligned.

(9) Put the paper tray back into the printer.



Fig. 2-22

NOTE: Load paper in the lower paper tray in the same way.

4.3 Installing the Face-up Output Tray

NOTE:

The installation of the tray is optional and is only necessary if you want to do face up printing. *Prohibited:*

Be sure to switch off the power and unplug the power cord from the outlet before carrying out the following steps.

(1) Insert the right and left tabs of the face-up output tray into the holes at the back of the printer.





If you want to print to the face-up output tray, push up lever (1) and pull out the extension tray (2).



Fig. 2-24

4.4 **Printing a Test Page**

Connect the AC power cord to the printer, and then plug it into the AC power (1) outlet/socket.



Turn the printer power switch on. (2)





(3) After the printer warms up, the **READY** message will appear.



Fig. 2-27



The printer will now print the test page.

4.5 Setting Your Language on the Control Panel



CHAPTER 3 THEORY OF OPERATION

1. ELECTRONICS

1.1 General Block Diagram

Fig. 3-1 shows a general block diagram of the HL-8050N printer.



Fig. 3-1

1.2 Main PCB (Video Controller PCB)

For the entire circuit diagram of the main PCB, see APPENDIX 2 to 10 'MAIN PCB CIRCUIT DIAGRAM, HL-8050N'

1.2.1 Outline

The Main PCB consists of the circuits which perform the following functions;

- Receive the printing data from the computer.
- Convert the received data to the bitmap data such as characters or graphics.
- Control the engine and send the generated bitmap data as a video signal.

The control panel is controlled by communicating with the main PCB to display LCD messages, light the LED's, display the button status, and so on.

The power for the Main PCB is supplied from the low-voltage power supply.

<Main PCB Block Diagram>



Fig. 3-2

1.2.2 Circuit

- (1) CPU block
 - Model name: TXPR4955-300, MIPS 64bit RISC CPU manufactured by Toshiba
 - Clock speed: 66.7 MHz (external) / 300 MHz (internal)
 - Cache memory: 32KB (Command cache) / 32KB (Data cache)
 - Bus width: 32 bit (external) / 64 bit (internal) Internal Floating Point Unit (FPU)
 - Appearance: 160-pin QFP
- (2) ASIC block
 - Model name: MF87F4562 manufactured by Fujitsu
 - Appearance: 420 pin BGA
 - Functions:

```
Controls CPU
Controls memory
Controls interrupts
Timer
External interfaces (iEEE1284 *<sup>1</sup>, USB *<sup>2</sup>, Ethernet *<sup>3</sup>, CompactFlash
Engine interface (Video signal control)
Supports Software
```

- *1 Stores the data received from the PC into DRAM as controlled by the DMA controller. It is applicable to both normal receiving and bi-directional communication (nibble mode, byte mode, ECP mode).
- *2 Stores the data received from the PC into DRAM as controlled by the DMA controller. The transmission speed is 12 Mbps.
- (3) Gate Array block
 - Model name: S1L50992F21A200 manufactured by Epson
 - Appearance: 160 pin QFP
 - Functions: Engine control (Clock synchronous serial transmission)
- (4) ROM block

The ROM stores the CPU control program and font data. ROMs used are 8Mbytes masked ROM, and 8Mbytes flash ROM which can be rewritten on the board.

<Masked ROM

- Access time: Less than 90 nsec.
- Appearance: 48 pin TSOP

<Flash ROM>

- Model name: TC58FVB321AFT-70 by Toshiba (or equivalent)
- Access time: Less than 90 nsec.
- Appearance: 48 pin TSOP

(5) DRAM block

DRAMs are used for the receiving buffer and the working area of the CPU. The DRAM block contains eight 128Mbit SDRAM, thus having 32MB memory capacity in total.

- Model name: K4S561632D-TC75 manufactured by SAMSUNG (or equivalent)
- Type: 256Mbit SDRAM
- Access time: CL2, PC66 or higher
- Appearance: 54 pin TSOP
- (6) DIMM block

DIMM (Dual-inline-memory-module) allows memory extension by up to 256MB.

2 DIMM sockets are available.

The following type of DIMM can be installed into each slot.

- Appearance: 100 pin
- Memory type: SDRAM
- Access time: CL2, PC66
- Parity: Either parity or non-parity can be used
- Memory capacity: 16MB, 32MB, 64MB, 128MB, 256MB

<Recommended DIMM type>

16MB: Techworks 12456-0001 32MB: Techworks 12457-0001 64MB: Techworks 12458-0001 128MB: Techworks 12459-0001 256MB: Techworks 12530-0001

Any combination of DIMM size can be installed into any slot in any order but it is recommended that the larger DIMM is installed in Slot 1.

(7) EEPROM

M24128-WMN6 type of two-wire method with a 16K x 8 bits configuration

(8) Reset circuit

The reset IC is a 3112N281A. The reset voltage is 2.8V (typ.) and the LOW period of reset if 100ms (typ.).

- (9) External interface block
 - IEEE1284 interface
 - USB interface
 - CompactFlash interface
 - Ethernet 10 Base T/100 Base TX

2. MECHANICS

2.1 Summary of Print Process

Electrophotography is used in HL-8050N printer to print an image on paper using a video signal sent from the PWBA ESS to the MCU of the HVPS/MCU. The electrophotography is composed of the following 7 steps:

(1) Charging

Negative charges are uniformly distributed over the surface of the drum by Bias Charge Roll.

(2) Exposure

The laser scanner scans the surface of the drum with a quite thin laser beam modulated according to the signal from the PWBA ESS (controller), to create an invisible electrostatic latent image on the drum surface.

(3) Development

During development, toner particles are attracted to the electrostatic latent image on the drum surface. Thus, a visible toner image is created.

(4) Transfer

The toner image is transferred from the drum surface to the paper.

(5) Peeling

Electric charges on the paper are partially neutralized. As a result, the paper is peeled off the drum surface.

(6) Fixing

The toner image is permanently fixed to the paper by heat and pressure.

(7) Cleaning

The remaining toner is removed from the drum surface.

<Summary of print process>



By rotating the drum, the surface undergoes various steps including charging, exposure, development, transfer, peeling, and cleaning. A toner image is created on the surface of the drum and transferred to the paper. The paper is subjected to some steps including transfer, peeling, and fixing by the paper transport mechanism. When the paper is placed in position relative to the image, the toner image is transferred to the paper from the drum surface, and then fixed.

Main components directly associated with the print process and transport of the paper are shown in the following figure.

<Components associated with print process>



<Components associated with transport of paper>



In the exposure step; the surface of the drum, negatively charged by the previous charging step, is scanned by a thin laser beam. The light radiated from the laser diode of the ROS (Raster Output Scanner) scans the drum from one end to the other. The light passes via a rotating polygon mirror (12 faces) and also via a lens.

The radiation of the laser beam is adjusted according to a video signal from the PWBA ESS.

The laser beam shot at the drum excites electrons directed to the photoconductor. As a result, electron-hole pairs are induced in the photoconductive layer. Since electrons are moved toward the body inside the drum by the electric field, the electron-hole pairs move to the surface of the photoconductive layer. Negative charges in this portion decrease, thus creating an invisible electrostatic latent image there.

Toner particles are adsorbed onto this electrostatic latent image in the next step. Thus, the image is developed. The toner particles adsorbed to the drum are attracted to positive charges supplied by the BTR, and are transferred to the paper. The drum is sent for peeling and cleaning steps.



<Electrostatic latent image formed on drum>

In the cleaning step, the remaining toner is removed from the drum surface. The drum surface is prepared for the next cycle.

The toner is scraped off the drum surface by a cleaning blade.

NOTE:

The toner scraped off in the cleaning step is collected in a recovery toner compartment partitioned from unused toner. The transfer rate is normally more than 90%, but varies according to the image coverage range and environmental conditions such as temperature and humidity. The used toner cannot be reused.

When the printing step is started, the whole drum surface is scanned with a laser beam. If charges generated in the previous step remain on the drum surface, they are completely removed. When the continuous printing step is started and finished, a negative high voltage is applied to the BTR. If toner particles adhere to the BTR in the previous printing step, the toner particles are returned to the drum surface. In this way, the surface of the BTR is cleaned.

2.2 Flow of Print Data

The On Board Network of the printer connected with a network receives a packet signal in a bit stream from a client or server of the network, and decomposes the packet signal received next into a data format adapted for a layer from which the data is sent to the Controller. The Controller processes the data from the On Board Network by the same method as for data received from the host computer via a parallel port. (These two types of data are referred to as host data.)

PWBA ESS acts to buffer the rasterized bit-image host data or converts host data in PDL (Page Description Language) into rasterized bit-image data. The PWBA ESS sends each line of the rasterized bit-image data to the MCU of the HVPS/MCU whenever the laser beam makes a scan.

This signal carrying image data (/VDO signal) is converted into LVDS signal by the MCU of the HVPS/ MCU, and is sent as XP.DATA+ and XP.DATA- signals to the ROS ASSY, where the signal is converted into a laser beam. The beam is emitted with a quite small diameter. The beam is turned ON and OFF according to the video signal. The laser beam is reflected off the surface of a rotating polygon mirror, so that the beam is concentrated to the surface of the drum of the EP Cartridge by a series of lenses. As a result, an electrostatic latent image is created on the drum surface.

Print data (electrical signal) from the printer controller is converted into a print image through the following flow.



Fig. 3-7

2.3 Driving Force Transmission Path

2.3.1 Main Motor

The rotating force of the Main Motor is transmitted via gears in the Gear ASSY Housing and via the Gear ASSY Plate to components that need mechanical driving force as shown in the following flow.



Fig. 3-8

The driving force transmitted to the EP Cartridge drives the Drum, and is transmitted to the BTR ASSY through the Drum Gear.

The driving force transmitted to the 550 Feeder ASSY drives the Roll ASSY Nudger and Roll ASSY Feed.

The driving force transmitted to the 150 Feeder ASSY drives the Roll Regi Metal and Roll Regi Rubber, as well as the Roll ASSY Nudger and Roll ASSY Feed.

The driving force transmitted to the Fuser ASSY drives the Heat Roll.

2.3.2 Motor ASSY Exit

The rotating force of the Motor ASSY Exit is transmitted via various gears to components that need mechanical driving force as shown in the following flow.



Fig. 3-9

2.3.3 Gear Layout

<Drive path in EP Cartridge>









Fig. 3-11

<Drive path in Clutch Regi>





<Drive path in Fuser ASSY>



Fig. 3-13



<Drive path in 500 Paper Exit & Option Face Up Tray>

Fig. 3-14

2.4 Paper Transport

2.4.1 Paper Transport Path

The paper is supplied from the Tray1 and Tray 2 or the optional Tray3 and Tray 4, and is transported into the printer along the paper path shown below.



Fig. 3-15

2.4.2 Layout of Paper Transport Path

The following is a cross section of the HL-8050N printer. Main components directly associated with the paper path and transport are shown here.

<Main components associated with transport of paper (only engine)>



Fig. 3-16

<Main components associated with transport of paper>

(when Option Duplex, Option 550 Feeder, Option OCT and 500 Paper Exit & Option Face Up Tray are installed)



Fig. 3-17

2.5 Actions of Main Functional Components

The functions of the main components of the HL-8050N printer are described in the following sections:

- 5.1 Paper Cassette
- 5.2 Paper Feeder
- 5.3 Xero
- 5.4 Fuser
- 5.5 500 Paper Exit & Option Face Up Tray
- 5.6 Drive
- 5.7 Electrical

2.5.1 Paper Cassette

Paper cassette models available include the 150 Paper Cassette and the 550 Paper Cassette. They are functionally equivalent, therefore only the 150 Paper Cassette is described here. Since a Low Indicator does not exist on the 150 model, explanation for this indicator applies to the 550 Paper Cassette only.

If the paper is smaller than A4, adjust the Guide ASSY End 150 and Guide ASSY SD on the Paper Cassette to match the size. If the paper is larger than A4, disengage the Extension that locks the Housing Base 150 and Housing Extension 150, and pull out the extension. Then adjust the Guide ASSY End 150 and Guide ASSY SD to match the size. When the extension is returned its original position, the Lock Extension locks automatically.



Fig. 3-18

<Guide ASSY L150 and Guide ASSY SD R150>

The Guide ASSY SD R150 can be adjusted to different paper sizes by moving it to the left or right. The guides come into contact with the left and right edges of the paper and hold it in position. The Guide ASSY SD L150 moves simultaneously with the Guide ASSY SD R150.

<Lock Extension>

The 150 Paper Cassette is so constructed that it can cope with the length of the paper in the direction of travel by moving the position of the Housing Extension 150 forward and backward. The Lock Extension is adopted as a mechanism for holding the Housing Extension 150 in position.

<Guide ASSY End150>

This can be adjusted to different paper sizes by making a forward or backward adjustment. This makes contact with the back of the paper, and holds it in position in the forward and backward directions.

The paper size to which the tray is set, is transmitted to the Link SW Size 1/2/3 via the Gear Selector and Rack Size by the Guide ASSY End150. The three Link SW Size units turns ON or OFF respectively according to the transmitted paper size. The paper size is detected by transmitting the ON/OFF information to the Size Switch in the Guide Tray Left. The types of paper that can be automatically detected are as follows:

Туре	Size (mm × mm)
Letter SEF	215.9 × 279.4
Legal 14" SEF	215.9 × 355.6
Legal 13" SEF	215.9 × 330.2
Executive SEF	184.2 × 266.7
A4 SEF	210.0 × 297.0
B5 (JIS) SEF	182.0 × 257.0
A5 SEF	148.5 × 210.0

<Lever BTM Lock and Stopper Gear>

These are at the back of the tray (i.e. the exit path of the paper). When the tray is inserted into the printer, the protrusions on the Feeder trigger the mechanism that depresses the Lever BTM Lock, slides the Rack BTM Lock 150, and then simultaneously unlocks the Gear Pinion and Gear PB R of the Stopper Gear.

<Plate ASSY BTM>

The force pushing up the Plate ASSY BTM is supplied via the Spring BTM Up150 by unlocking the Lever BTM Lock and Stopper Gear. When the Plate ASSY BTM is pushed up, the supplied paper and Roll ASSY Nudger touch each other.

<Low Indicator>

The Low Indicator is installed only on the 550 Paper Cassette. The amount of paper remaining in the cassette is indicated by the Low IND Front. As the amount of paper reduces, the Plate ASSY BTM rises and the Low IND Front goes down in the Guide Indicator.

<150 Paper Cassette>



Fig. 3-19



Fig. 3-20

2.5.2 Paper Feeder

Since Tray 1 and Tray 2 are functionally equivalent in terms of the Size Switch, Actuator No Paper, and Sensor No Paper, only the components of one tray are described here.

Since the Actuator and Sensor Low Paper are not installed in the Tray1, the description of these components applies to the Tray2 only.

<150 Feeder ASSY (Tray 1) / 550 Feeder ASSY (Tray 2)>

This is a mechanism for supplying paper from the Paper tray into the printer. The driving force from the Main Motor is transmitted via the Clutch ASSY PH to the Roll ASSY Feed and Roll ASSY Nudger that are components of Feeder ASSY. Thus, the paper is transported.

When the Roll ASSY Nudger picks up some sheets of paper and the paper gets low, the position of the Roll ASSY Nudger drops accordingly. The lowered Roll ASSY Nudger pushes down the lock lever of the Plate ASSY BTM, releasing it. The Plate ASSY BTM is pushed up by a spring, and thus the paper is raised. The raised paper then raises the Support Nudger. The Support Nudger disengages from the lock lever of the Plate ASSY BTM. The Plate ASSY BTM stops moving upward.

<Size Switch>

A switch for setting the size of paper supplied from each Paper tray is mounted. A signal indicating the set size is transmitted as a voltage to the HVPS/MCU.

<Actuator No Paper>

If paper runs out in the Paper tray, the Actuator No Paper drops and the flag of the Actuator No Paper that shielded the detection portion of the Sensor No Paper moves off the detection portion. Thus, the light is transmitted.

<Sensor No Paper>

The presence or absence of paper in the Paper tray is detected by the position of the Actuator No Paper. This is converted into an electrical signal. If the detection portion is shielded (i.e., there is paper), /No-Paper 1/2 SNR ON signal is turned OFF.

<Sensor Regi>

The paper transported from the Paper tray pushes up the Actuator B. The flag of the Actuator A optically unshields the detection portion of the Sensor Regi. Thus, the passage of paper is detected.

<Clutch Regi>

This electromagnetic clutch turns ON and OFF the driving force to the Roll Regi Rubber and Roll Regi Metal, to place the paper in position.

<Actuator>

When paper is low in Tray 2, the arm of the Actuator is pushed up by the Plate ASSY BTM. The flag of the Actuator that shielded the detection portion of the Sensor Low Paper moves off the detection portion. Thus, the light is transmitted.

<Sensor Low Paper>

When paper is low in Tray 2, this is detected by the position of the Actuator and converted into an electrical signal. When the detection portion is shielded (i.e. paper is high), /Low Paper SNR ON signal is turned OFF.



Fig. 3-21

2.5.3 Engine

<EP Cartridge>

The EP Cartridge is also known as CRU (Customer Replaceable Unit), and is made up of the following five components.

- Drum

This is a cylinder of aluminum and coated with a photoconductive material. Because of this photoconductive coating layer, electric charges are retained on the surface in the dark, and electrical conduction occurs when exposed to light.

- BCR (Bias Charge Roll)

This uniformly distributes electric charges over the drum surface, and erases a chargereduced pattern remaining from the previous cycle.

- Magnet Roll

This holds toner as a thin layer on the surface of this roll, and acts to transport the toner into the gap between the drum and Magnet Roll. The toner is supplied to the Magnet Roll by the Agitator in the Toner Compartment.

- CM Blade (Charging and Metering Blade)

This spreads the toner into a thin layer over the Magnet Roll, and applies negative charges to the toner triboelectrically.

- Cleaning Blade

This scrapes toner remaining after the transfer step off the drum surface.

<BTR ASSY>

The BTR of the BTR ASSY is in contact with the drum of the EP Cartridge, and is driven by the Drum Gear. When the paper moves between the BTR and Drum, the BTR applies positive charges to the back of the paper. The negatively charged toner image is attracted by positive charges on the back of the paper. Thus, the image is transferred from the surface of the drum to the surface of the paper.



Fig. 3-22

<ROS ASSY>

The ROS (Raster Output Scanner) scans the surface of the drum with a laser beam. The ROS ASSY consists of the following three components, i.e., LD (Laser Diode) ASSY, Scanner ASSY, and SOS PWB.

- LD ASSY

The LD Assembly produces a laser beam. This beam is turned ON and OFF according to a print data signal.

The maximum nominal output of the semiconductor laser diode used as the laser light source, is listed below.

600dpi Mode: 10mW

1200dpi Mode: 10mW

- Scanner ASSY

The Scanner Assembly consists of a Polygon Mirror (12 facets) and a Scanner Motor. The Polygon Mirror is mounted to the shaft of the Scanner Motor. The Scanner Motor rotates the Polygon Mirror at a specified speed. The rotating Polygon Mirror reflects the beam to the drum surface through lenses and mirrors, to scan the beam from one end to the other of the drum. One scan is made with one facet of the mirror.

The Scanner Motor is driven by three-phase, full-wave current linear drive. The current through the winding of each phase is switched by a Hall amplifier matrix. The signal from the phase detection terminal of the Motor is used.

- SOS PWB

When the laser beam hits the SOS Sensor of the SOS PWB, the beam is converted into an electrical signal (SOS signal), and the initial position where a scan is started on each line is detected.

When the laser beam is scanned across the drum surface from one end to the other while turning ON and OFF the beam, one line of latent image is created. If the scanning by the laser beam is repeated while rotating the drum, a two-dimensional image is created. The resolution in the scanning direction (from right to left) is determined by the rotational speed of the Scanner Motor and by the speed at which the laser is adjusted. The resolution in the process direction (from top to bottom) is determined by the rotational speed of the Scanner Motor. (If the scanning speed is increased, the next row to be scanned can be started earlier accordingly.)

<Conceptual diagram of image creation by scanning>







Fig. 3-24

2.5.4 Fuser

<Heat Roll>

This is a hollow metal tube having a coated surface. This tube is heated from the inside by 2 Halogen heaters (Heater Rod).

Heat is applied to the paper passing between this roll and the Pressure Roll. This heat fuses and fixes the toner on the paper.

<Pressure Roll>

This is a metal shaft coated with sponge rubber. Pressure is applied to the paper between this roll and the Heat Roll. This pressure presses the melted toner against the paper.

<Heater ASSY>

The Heater ASSY consists of a Heater Rod located in a Heat Roll and a harness connecting the Heater Rod to a terminal. The Heater Rod consists of heater coil inside a quartz glass and heats up the Heat Roll.

<Temperature Sensor>

This is a resistor (thermister) having a known value of resistance that sensitively varies with temperature. This sensor is mounted in contact with the surface of the Heat Roll, and monitors the temperature of the surface. The power supply of the Heater Rod is turned ON and OFF using the signal from this sensor, so that the surface temperature of the Heat Roll can be maintained within a specified range. This signal is also used to provide a first stage of overheat protection.

<Thermostat Sensor (STS)>

Two STS are installed. The STS's are connected to the Heat Roll. This provides a second stage of overheat protection. If the first stage does not prevent the Fuser from overheating, the Thermostat cuts off the power-supply circuit for the Heater Rod. The STS operates as follows.

- (1) If the paper is set incorrectly, the Pressure Roll may melt and adhere. As a countermeasure against this, the power-supply circuit is cut off to cool down the roll, if the detected temperature gets higher than a preset temperature.
- (2) If the temperatures increase at both sides of the Heat Roll, both ends of the paper may curl. As a countermeasure against this, the mode is switched to Short lamp lighting to control the temperature rise, if the detected temperature exceeds the preset temperature.

<Heat Roll Fingers>

These fingers peel off the leading edge of the paper from the Heat Roll to prevent the paper from getting wound around the Heat Roll.

<Heat Roll Diode>

The negative charge accumulated on the Heat Roll may deteriorate the toner image on the paper during fixing. The Heat Roll Diode discharges the charge to the frame ground.

< Exit Sensor >

This sensor detects the arrival of the paper at a detection point in the exit area positioned behind the Fuser. This sensor also detects the discharge of the paper from this point. When the sensor receives light (i.e., paper is present), /Exit goes Low.



Fig. 3-25

2.5.5 500 Paper Exit & Option Face Up Tray

500 Paper Exit are components for discharging the printed paper out of the printer. 500 Paper Exit enables Face-Up output to the Option Face Up Tray (mounted on the back of the machine), and output to Option OCT as well as Face-Down output.

<Motor ASSY Exit>

This motor drives the Roll Exit that conveys paper to each output tray. If the optional Duplex is installed, this motor has also a function of reversing and inserting paper into the Duplex.

<Roll Exit>

This roll transports the printed paper sent out from the Fuser, to the Face-Down output tray.

<Roll FU>

This roll discharges the printed paper sent out from the Fuser, to the Face-Up output tray.

<Sensor Face Up Open>

This sensor detects that the Face-Up print has been selected. If the Lever Gate FU is raised, a signal is detected by the Actuator attached to the interlocking Gate FU, and the Face-Up print mode is set.

<Sensor Full Stack>

This sensor detects that the 500 Exit Face-Down output tray is full, using the Actuator Full Stack.

<Gate FU>

This gate switches the paper transport path interlocking with the Lever Gate FU. When the Lever Gate FU is raised, the Gate FU blocks the normal paper output path and switches the output direction to the Face-Up output tray.

<Gate CT Exit>

This gate switches the paper transport path interlocking with the Link Gate CT. When the Solenoid ASSY Gate installed in the optional OCT operates, the Link Gate CT pushed down by the spindle of the Solenoid ASSY Gate blocks the normal paper output path and switches the output direction to the OCT output tray.



Fig. 3-26

2.5.6 Drive

<Gear ASSY Housing>

This housing is composed of gears for transmitting power from the Main Motor that drives the printer body to various portions of the printer.

<Gear ASSY Plate>

This transmits power from the Main Motor to the EP Cartridge.

<Lever Link>

This connects and disconnects the power from the Main Motor to the Fuser ASSY. When the Cover Open is opened, the Lever Link pushes up the Gear 8 in the Gear ASSY Housing, and disconnects the Gear 9. Thus, the power path to the Fuser ASSY is disconnected. As the Lever Link moves up and down, the Gear 4 in the Gear ASSY Plate moves right and left via the Link Gear 3, and power to the Drum of the EP Cartridge is connected or disconnected.



Fig. 3-27

2.5.7 Electrical

<Interlock S/W 24V>

This safety switch cuts off a 24 VDC power supply from the LVPS to the HVPS/MCU and Main Motor when the Cover Open is open.

<Interlock S/W 5V>

This safety switch cuts off a 5 VDC power supply from the LVPS to the LD ASSY of the ROS ASSY when the Cover Open is open.

<Interlock S/W Back>

This safety switch interrupts a 24 VDC power supply from the LVPS to the HVPS/MCU and Main Motor when the Back Cover is open.

<Fan Main>

This vents air from inside the printer to prevent an excessive rise of the inside temperature.

<Fan SUB>

This fan takes outside air into the printer to prevent an excessive rise of the inside temperature. This is mounted on the ROS ASSY in the center on the front side.

<LVPS>

This generates low DC voltages (5 V and 3 V for Logical Circuit, 5 V for Laser Diode, and 24 V for Motor and Clutch) from the AC power.

<HVPS/MCU>

The functions of the HVPS and MCU are incorporated in this substrate. The HVPS generates high AC and DC voltages and supplies them to the BCR (charging), Magnet Roll (development), BTR (transfer), and Detack Saw (peeling). The MCU controls the printing operation according to the information obtained through communications with the Print Controller and from sensors and switches.

<PWBA ESS>

This receives data from the Host Computer, performs printing, and controls the whole printer.

<PWBA Exit Motor>

This controls the Motor ASSY Exit according to a signal from the HVPS/MCU.

<Switch I/L ASSY>

This ASSY consists of the following two safety switches.

- Interlock S/W 5VR

This safety switch cuts off a 5VDC power supply from the LVPS to the LD ASSY of the ROS ASSY when the Cover Open is open.

- Interlock S/W Front R

This safety switch cuts off the Interlock BEF (the signal indicating that the front cover is open) from the LVPS to the HVPS/MCU when the Cover Open is open.



Fig. 3-28
2.6 Control

2.6.1 Control of Paper Size

<Cassette Feeding (Paper Cassette)>

The following table gives the states (ON (1) or OFF (0)) of the switches in the Size Switch, corresponding to the paper sizes of the Paper Cassette.

NOTE:

The switches in the Size Switch are denoted by "SW1", "SW2", "SW3", and "SW4", respectively, from the front side.

Paper size	Size Switch			
	SW1	SW2	SW3	SW4
No cassette	0	0	0	0
Executive SEF	0	0	0	1
B5 (JIS) SEF	0	0	1	1
A5 SEF	0	1	0	1
Legal14"SEF	0	1	1	1
Letter SEF	1	0	0	1
A4 SEF	1	1	0	1
Legal13"SEF	1	1	1	1

2.6.2 ROS Control

<Rotation of Scanner Motor>

The control (ON/OFF) of the rotation of the Scanner Motor is performed as shown below according to the mode of operation.

Mode of operation	ON/OFF of rotation of Scanner Motor
Standby state	Kept OFF.
Printing state	Turned on by receiving signal from the Controller, and turned off after 10 s since end of printing.
Power-saving state	Kept OFF.

The following table gives the resolution that differs according to the specifications of the machine, and the corresponding rotational speeds of the Scanner Motor.

Process Speed	Resolution	RPM of Scanner	CLK signal frequency
204mm/s -	600dpi	24,094.49rpm	2,049.449Hz
	1200dpi	24,094.49rpm	2,049.449Hz

dpi (dot per inch)

rpm (revolutions per minute)

Reference:

Reference Each facet of the Polygon Mirror (12 facets) is scanned with a laser beam.

<Warm-up of ROS>

The Scanner Motor rotates simultaneously with the warm-up of the ROS. The SOS signal is sampled at intervals of 100 ms. If the obtained value is shorter than the Ready reference value three consecutive times, the warm-up of the ROS is ended (The Scanner Motor is rotating at a constant speed).

<ROS Reference Value>

ROS reference value	Description
Ready reference value	SOS signal interval corresponding to less than 98% of the specified rotational speed of the Scanner Motor
Fail reference value	SOS signal interval corresponding to less than 90% of the specified rotational speed of the Scanner Motor

Reference:

If the speed of the Scanner Motor increases by more than 1%, the laser beam does not enter the SOS Sensor, and "U2" is detected in terms of Fail reference value.

2.6.3 Fuser Control

<Fuser Control>

The Halogen Lamp is controllably turned ON and OFF, based on the Fuser control temperature.

At the start of warm-up and when the Main Motor is at rest, the standby temperature is taken as the Fuser control temperature. When the Main Motor is operating except at warm-up, the running temperature is taken as the Fuser control temperature.

<ON/OFF Control of Halogen Lamp>

The Halogen Lamp is controllably turned ON and OFF to maintain the Fuser control temperature.

<Warm-up of Fuser>

The Halogen Lamp is lit up (turned ON) simultaneously with the start of warm-up of the Fuser. When the temperature of the Heat Roll surface (detected temperature of Thermister) reaches the Fuser control temperature (standby temperature), the warm-up of the Fuser is ended.

During warm-up of the Fuser, the Main Motor is in operation.

<Fuser Temperature in Ready State>

180 to 185 °C in Ready (standby) state (During operation, it is higher than 185 °C.)

<Fuser Temperature when Abnormal Temperature (higher or lower) is Detected>

Higher temperature: 250 °C Lower temperature: 130 °C



2.7 Schematic Diagram of Safety System

CHAPTER 4 DISASSEMBLY AND RE-ASSEMBLY

1. SAFETY PRECAUTIONS

To avoid creating secondary problems by mishandling, follow the warnings and precautions below during maintenance work.

- (1) Be careful not to lose screws, washers, or other parts removed.
- (2) Be sure to apply grease to the gears and applicable positions specified in this chapter.
- (3) When using soldering irons or other heat-generating tools, take care not to accidentally damage parts such as wires, PCBs and covers.
- (4) Static electricity charged in your body may damage electronic parts. When transporting PCBs, be sure to wrap them in conductive sheets.
- (5) When replacing the PCB and all the other related parts, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables or on the wire harness.
- (6) Be sure to replace self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values.
- (7) After disconnecting flat cables, check that each cable is not damaged at its end or short-circuited.
- (8) When connecting flat cables, do not insert them at an angle. After insertion, check that the cables are not at an angle.
- (9) When connecting or disconnecting cable connectors, hold the connector body, not the cables. If the connector has a lock, release the connector lock first to release it.
- (10) After a repair, check not only the repaired portion but also all connectors. Also check that other related portions are functioning properly before operational checks.

2. DISASSEMBLY FLOW



3. DISASSEMBLY PROCEDURE

3.1 Drum Unit

(1) Open the cover open, and remove the drum unit.





3.2 Paper Cassette 150

(1) Take the paper tray completely out of the printer and remove the cover CST (cassette).



- (2) Remove the holder ASSY retard.
- (3) Remove the roll ASSY retard.
- (4) Remove the spring retard.

When removing, do not hold the rubber rollers of the roll ASSY retard.

NOTE:

- When installing, do not hold the rubber rollers of the roll ASSY retard.
- Be sure to install the hook of the roll ASSY retard in the groove of the shaft retard
- After installing, make sure the holder retard comes back to the former position with the spring force of the spring retard, when pushing down the holder retard and then release the finger from it.



Fig. 4-3

(5) From the bottom of the tray remove the two screws, and remove the handle extension 150.





- (9) Release the hook, and remove the gear PB R.
- (10) Lever the gear PB L from the grove in the left side of the tray, slide the Shaft PB to the left.
- (11) Remove plate ASSY BTM from the paper cassette 150.
- (12) Remove the gear PB L from the shaft PB.

- In the following steps, gear PB L, gear BTM DMP one-way and gear BTM lock oneway will be detached. Be careful not to lose these gears.
- It is hard to remove gear PB R. When removing it, be careful not to break it NOTE:
- When installing plate ASSY BTM, be sure to put the 2 springs BTM UP 150s into the bosses on the back of plate ASSY BTM.
- Be sure to put the 2 claws that are on the top of the plate ASSY BTM under the hooks on the housing top 150.
- Be sure to install the hook of gear PB R into the groove of shaft PB.
- When installing gear PB R, be sure to lift up plate ASSY BTM. If plate ASSY BTM is inclined, a paper skew or jam may occur. Check after the installation is completed.
- After installing, make sure that the 3 claws of guide ASSY SD R150 and guide ASSY SD L150 sit correctly in the grooves of the housing top 150.
- When installing the gear pinion, make sure the guide ASSY SD R150 and guide ASSY SD L150 are completely open. If not, the side register may be misaligned.



Fig. 4-6

(13) Remove the ten screws, and remove the housing base 150.

(14) Remove the housing extension 150 from the housing top 150.

(15) Remove the four screws, and remove the cover extension.

- When installing, make sure that the cover extension is inserted under the 3 claws of the housing extension 150
- Use 6mm size fixed screw. If 8mm size screw is used, the housing extension 150 will not operate smoothly and the lock extension 150 doesn't operate correctly.



Fig. 4-7

(16) Remove the rack size.

NOTE:

- When installing the rack size, be sure to draw out the guide ASSY end 150 as far as it will go.
- After tightening the screws, move the guide ASSY end 150 back and forth, and make sure that the link SW sizes operate smoothly.



4-8

(17) Remove the screw, and remove the gear sector.



Fig. 4-9

(18) Release the four hooks, and remove the guide end 150.



Fig. 4-10

3.3 Paper Cassette 550

- (1) Remove the cover CST.
- (2) Remove the holder ASSY retard.
- (3) Remove the roll ASSY retard.
- (4) Remove the spring retard.

NOTE:

When removing, do not hold the rubber rollers of the roll ASSY retard. NOTE:

- When installing, do not hold the rubber rollers of the roll ASSY retard.
- Be sure to install the hook of the roll ASSY retard in the groove of the shaft retard
- After installing, make sure the holder retard comes back to the former position with the spring force of the spring retard, when pushing down the holder retard and then release the finger from it.



Fig. 4-11

(5) Remove the two screws, and remove the handle extension 550.



Fig. 4-12

- (6) Release the two hooks, and remove the gear pinion.
- (7) Remove the guide ASSY SD L 550.
- (8) Remove the guide ASSY SD R 550.

- Be sure to put 2 claws that on the top of the plate ASSY BTM under the hooks on the housing top 550.
- After installing, make sure that the 3 claws of the guide ASSY SD R550 and guide ASSY SD L550 sit correctly in the grooves of the housing top 550.
- When installing the gear pinion, make sure the guide ASSY SD R550 and guide ASSY SD L550 are completely open. If not, the side register may be misaligned.



Fig. 4-13

- (9) Release the hook, and remove the gear PB R.
- (10) Remove the plate ASSY BTM from the paper cassette 550.
- (11) Release the hook, and remove the gear PB L from the shaft PB.

- In the following steps, the gear PB L, gear BTM DMP oneway and gear BTM lock oneway will be detached. Be careful not to lose these gears.
- It is hard to remove gear PB R. When removing it, be careful not to break it •

NOTE:

- When installing the plate ASSY BTM, be sure to put 2 spring BTM UP 550s into the • bosses on the back of the plate ASSY BTM.
- Be sure to put 2 claws that on the top of the plate ASSY BTM under the hooks on the housing top 550.
- Be sure to install the hook of the gear PB R into the groove of the shaft PB.
- When installing the gear PB R, be sure to lift up the plate ASSY BTM. If the plate ASSY BTM is inclined, a paper skew or jam may occur. Check after the installation is completed.
- After installing, make sure that the 3 claws of the guide ASSY SD R550 and the guide ASSY SD L550 sit correctly in the grooves of the housing top 550.
- When installing the gear pinion, make sure the guide ASSY SD R550 and guide ASSY SD L550 are completely open. If not, the side register may be misaligned.



- (12) Remove the ten screws, and remove the housing base 550.
- (13) Remove the housing extension 550 from the housing top 550.
- (14) Remove the four screws, and remove the cover extension.

- Use 6mm size of fixed screw. If 8mm size of screw is used, housing extension 550 doesn't operate smoothly and lock extension 550 doesn't operate.
- When installing, make sure the cover extension is inserted under 3 claws of the housing extension 550.



Fig. 4-15

(15) Remove the rack size.

- When installing the rack size, be sure to draw out the guide ASSY end 550 as far as it will go.
- After tightening the screws, move the guide ASSY end 550 back and forth, and make sure that the link SW sizes operate smoothly.





Fig. 4-16

(16) Remove the screw, and remove the gear sector.



Fig. 4-17

(17) Remove the four hooks, and remove the guide end 550.



Fig. 4-18

3.4 Face-up Output Tray ASSY

(1) Remove the face-up output tray ASSY.



Fig. 4-19

3.5 Stopper FSR / Cover Rear 500

- (1) Remove the stopper FSR.
- (2) Release the hook, and remove the cover rear 500.



Fig. 4-20

3.6 Cover Rear 500

- (1) Release the two hooks, and remove the cover DUP.
- (2) Remove the five screws, and remove the chute low FU.
- (3) Remove the eliminator exit FU.





- (4) Remove the lever gate holder from the chute low FU.
- (5) Release the hook, and remove the spring lever gate.
- (6) Remove the left-right bosses, and remove the lever gate FU.

- Lever gate holder, spring lever gate, and lever gate FU are removed at the same time.
- Spring lever gate remains on the side of lever gate holder.



Fig. 4-22

- (7) Release the hook, and remove gear21.
- (8) Release the hook, and remove the bearing exit and roll FU.
- (9) Remove the bearing exit from the roll FU.
- (10) Release the hook, and remove the bearing exit from the chute low FU.

• Be careful handling the hook of the bearing exit. It is fragile and could break if given excessive force.

NOTE:

• Be sure to install the hook of the gear 21 into the groove of the roll FU.



(14) Remove the two screws, and remove the chute up FU.



Fig. 4-25

- (15) Remove the roll pinch FU.
- (16) Remove the spring pinch FU.



Fig. 4-26

(17) Remove the gate FU.

NOTE:

Be careful handling the gate FU. It is fragile and could break if given excessive force.





3.7 Cover Rear

(1) Remove the three screws, and remove the cover rear.

NOTE:

There are 2 kinds of screws, make sure they are put in the right place. When tightening the screws be careful not to pinch the harness between the board and frame.



Fig. 4-28

3.8 Cover Right

- (1) Loosen the screw.
- (2) Release the three hooks, and remove cover right.



3.9 Cover Left

(1) Release the three hooks, and remove the cover left.



Fig. 4-30

3.10 Cover Exit 500

(1) Loosen the two screws, lift up and remove cover exit 500.





(5) Remove the KIT chute up 550.



Fig. 4-34

- (6) Remove the two screws, and remove the chute up exit.
- (7) Remove the link gate CT.

- After installing, make sure that the link gate CT is placed at the back of the gate. (Note1)
- After installing, make sure that the tip of the link gate CT is placed under the hook of the chute low exit. (Note2)
- After installing, make sure that the gate moves when link gate CT is pushed in the direction of the arrow. (Note2)



(8) Remove the actuator full stack.



Fig. 4-36

- (9) Release the hook, and remove the gear21.
- (10) Release the hook, and remove the bearing exit and roll exit.

NOTE:

- Be careful handling the hook of the bearing exit. It is fragile and could break if given excessive force.
- When removing, do not hold the rubber rollers of the roll exit.

NOTE:

When installing, do not hold the rubber rollers of the roll exit.



Fig. 4-37

(11) Remove the two screws, and remove the motor ASSY exit.



Fig. 4-38

(12) Remove the spring gate CT.

(13) Release the hook, and remove the gate CT exit.



Fig. 4-39

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Ill stack.

3.12 Cover Top / Operation Panel

- (1) Remove the two screws from the cover top.
- (2) Disconnect the switch I/L harness connectors.
- (3) Release the panel harness (gray) from connector 5 of the ESS.
- (4) Release the two hooks, release the boss of the cover open from the lever link, and remove the cover top.

NOTE:

- When removing the lever link from the boss of the cover open, the cover open is opened, and the lever link is extended.
- In the following steps, do not separate the cover top and the printer too far from the printer, since the operation panel attached to the cover top is connected to the printer.

- When putting the boss of the cover open into the hole of the lever link, the cover open should be opened, and the lever link should be extended.
- When installing, put the harnesses of the motor ASSY exit and harness ASSY exit SNR1 into the square hole of the frame.



Fig. 4-42

(5) Remove the two screws from the cover top, and remove the switch I/L ASSY.





- (6) Release the two hooks, and remove the operation panel.
- (7) Remove the cover stopper.
- (8) Remove the two stopper open.
- (9) Remove the cover open.

Operation panel



Fig. 4-44

3.13 Cover Front

(1) Release the two hooks, and remove the

NOTE:

When installing, put the harnesses of the n the square hole of the frame.





3.14 Fan Main

(1) Release the lock of the lever fuser LH and lever fuser RH, and remove the fuser ASSY.



(2) Release the hook, and remove the chute transfer.





3.16 Lever Fuser LH / Lever Fuser RH

- (1) Remove the lever fuser LH.
- (2) Remove the lever fuser RH.


3.17 **150 Feeder ASSY**

- (1) Disconnect the two connectors.
- (2) Remove the five screws, and remove the 150 feeder ASSY.

NOTE:

Lift up the 150 feeder ASSY will click into midway position, lift it up a little bit further. NOTE:

- One of the screws that secure the 150 feeder ASSY is tightened together with the earth • plate base.
- Do not tighten the screw to the left side hole of the chute transfer
- There are 2 kinds of screws, make sure they are put in the right place.



(3) Disconnect the connector, and remove the sensor toner ASSY.



Fig. 4-52

- (4) Remove the roll ASSY nudger.
- (5) Remove the roll ASSY feed.

When removing, do not hold the rubber rollers of the roll ASSY nudger and gear nudger. NOTE:

- When installing, do not hold the rubber rollers of the roll ASSY nudger and gear nudger.
- Be sure to install the hook of the roll ASSY nudger into the groove of the shaft nudger.



- (6) Release the boss, and remove the holder left and actuator no paper.
- (7) Remove the actuator no paper.

NOTE:

- Be sure to install the hook of the gear nudger into the groove of the shaft nudger.
- Be sure to install the shafts on both ends of the actuator no paper into the holder left and support nudger.
- Assemble the hook of the actuator no paper to the holder left as shown in the figure.
- After installing, move the actuator no paper with a finger, and make sure that the actuator no paper operates smoothly.



(8) Remove gear nudger.



Fig. 4-55

- (9) Remove clutch one-way feed.
- (10) Remove the E-ring.
- (11) Remove clutch one-way nudger.
- (12) Remove gear idler nudger.



- (13) Disconnect the connector. (Clutch ASSY PH)
- (14) Remove the E-ring, and remove clutch ASSY PH.

- The part names differ with the clutch ASSY PH and clutch regi, but they are the same parts.
- The harness of the clutch ASY PH should be wrapped once around the portion of the clutch regi as shown in the figure.
- (15) Disconnect the connector. (Clutch regi)
- (16) Remove the E-ring, and remove clutch regi.

NOTE:

When installing, make sure that the notch of the clutch regi is combined with the boss of the clutch regi.





- (17) Remove the E-ring.
- (18) Remove the shaft feed.
- (19) Remove the two bearing nudger.



(24) Release the harness ASSY toner1.

(25) Remove the two spring regi.

(26) Remove the E-ring and bearing regi left.

- (27) Remove the bearing regi right.
- (28) Remove the roll regi rubber.
- (29) Remove the chute BTM.

(30) Remove the chute top ASSY.

NOTE:

When removing, do not hold the rubber rollers of the roll regi rubber.

NOTE:

- When installing, do not hold the rubber rollers of the roll regi rubber.
- Install the roll regi rubber so that its D-cut is positioned at the bearing regi right side.
- The shapes of the flange and the positions of the hook are different on the bearing regiright (white) and bearing regi left (black).
- When hanging the spring regis, make sure that the spring regi's are hung to the boss of the chute regi, and to the inside of the hooks of the bearing regi left and bearing regi right. After hanging the spring regi's, make sure the spring regi's have not pinched the harness ASSY toner 2.



- (31) Release the five hooks, and remove the cover actuator-A4.
- (32) Remove the two screws.
- (33) Remove the actuator cover.
- (34) Remove the actuator A, spring regi SNR A, actuator B and spring regi SNR B from the chute BTM.



Fig. 4-62

- (35) Release the two hooks, and remove the cover sensor.
- (36) Disconnect the connector.
- (37) Release the three hooks, and remove the sensor regi.



Fig. 4-63

3.18 550 Feeder ASSY

- (1) Disconnect the connector.
- (2) Remove the six screw, and remove the 550 feeder ASSY.

NOTE:

- One of the screws that secure the 550 feeder ASSY to the frame is tightened together • with the spring earth.
- When installing, put the harness ASSY tray 2 into the notch on the plate tie, and arrange it • as shown in the figure.









- (3) Remove the roll ASSY nudger.
- (4) Remove the roll ASSY feed.

• When removing, do not hold the rubber rollers of the roll ASSY nudger and roll ASSY feed.

- Be sure to install the hook of the roll ASSY feed into the groove of the shaft feed.
- When installing, do not hold the rubber rollers of the roll ASSY nudger and roll ASSY feed
- Be sure to install the hook of the roll ASSY nudger into the groove of the shaft nudger.



Fig. 4-66

- (5) Release the boss, and remove the holder left and actuator no paper.
- (6) Remove the actuator no paper.
- (7) Remove the gear nudger.

- Be sure to install the shafts on both ends of the actuator no paper into the holder left and support nudger.
- Assemble the hook of the actuator no paper to the holder left as shown in the figure.
- After installing, move the actuator no paper with a finger, and make sure that the actuator no paper operates smoothly.



Fig. 4-67

- (8) Remove the clutch one-way feed.
- (9) Remove the E-ring.
- (10) Remove the clutch one-way nudger.
- (11) Remove the gear idler nudger.



Fig. 4-68

- (12) Remove the six screws, and remove the plate TIE.
- (13) Disconnect the connector.
- (14) Remove the E-ring, and remove clutch ASSY PH.

- When installing, make sure that the notch of the clutch ASSY PH is combined with the boss of the chute out.
- Be careful when arranging the harness of the clutch ASSY PH.



Fig. 4-69

- (15) Remove the screw, and remove the holder no paper sensor.
- (16) Disconnect the connector, and remove the sensor no paper.



3.19 Sensor Low Paper/Actuator/Plate CST Lock/Stopper Tray R/Stopper Tray L

- (1) Disconnect the connector.
- (2) Remove the sensor low paper.
- (3) Remove the actuator.
- (4) Remove the two screws, and remove the two plate CST lock.
- (5) Remove the screw, and remove the stopper tray R.
- (6) Remove the screw, and remove the stopper tray L.



Fig. 4-71

3.20 Guide Tray Right

(1) Remove the screw, and remove the guide tray right.

NOTE:

When installing the guide tray right, make sure the installing position of the plate CST lock is in the position shown in the figure, note.



Fig. 4-72

3.21 Guide Tray Left

- (1) Disconnect the connector.
- (2) Remove the five screws, and remove the guide tray left.



Fig. 4-73



3.23 ROS ASSY

NOTE:

When performing the ROS ASSY removal and/or installation, be sure to perform the operation on a level and smooth work surface desk or the like. If the operation is performed on a rough and/or inclined worktop, the ROS ASSY will be out of alignment.

- (1) Remove the three screws, and remove the duct high.
- (2) Remove the eight screws, and remove the plate TIE front.
- (3) Disconnect the five connectors from the PCB of the ROS ASSY.
- (4) Remove the four screws, and remove the ROS ASSY.

- The printed circuit board on the ROS ASSY is fragile, therefore, be sure to hold it with hand when disconnecting the connectors.
- Never give any impact to the ROS ASSY with a screwdriver or other tools. NOTE:
- Never give any impact to the ROS ASSY with a screwdriver or other tools.
- The printed circuit board on the ROS ASSY is fragile, then, be sure to hold it with hand when connecting the connectors.

3.24 Shield Plate ROS

(1) Remove the two screws, and remove the shield plate ROS.



Fig. 4-77

3.25 Main Motor

(1) Remove the screw, and remove the motor cover.



Fig. 4-78

- (2) Remove the five screws, and remove the shield plate LVPS.
- (3) Disconnect the connector from the LVPS.
- (4) Remove the three screws, and remove the main motor.



Fig. 4-79



3.26 Guide CRU Left

- (1) Disconnect the three connectors from the LVPS.
- (2) Disconnect the screw from the harness connector. (for the fuser unit)
- (3) Remove the three screws, remove the fuser unit connector and remove the guide CRU left.

NOTE:

When removing guide CRU left, pressing link gear 3 in the direction of the arrow helps to remove guide CRU left easily.

NOTE:

- When installing, make sure that the lever link is attached to the guide CRU left.
- After installing the guide CRU left, touch the link gear 3 with your finger. Make sure that your finger can feel the link gear 3 move inward, when the lever link is pulled up.



- (4) Release the three hooks, and remove the cover guide CRU.
- (5) Release the harness from the cover guide CRU.

Be careful handling the hooks of the guide CRU left. They are fragile and could break if widen them to much.





- (6) Remove the lever link and link gear 3.
- (7) Remove the link gear 3 from the lever link.



Fig. 4-83





3.30 Gear ASSY Housing

- (1) Release the harnesses from the hooks.
- (2) Remove the six screws, and release the two hooks.
- (3) Remove the gear ASSY housing.

NOTE:

When removing the gear ASSY housing, two of the gears that are installed to the gear ASSY housing are not fixed and they may come off. Be careful not to drop them. NOTE:

- When installing, two of the gears that are installed to the gear ASSY housing are not fixed and they may come off. Be careful not to drop them.
- When installing, engage the gears of the gear ASSY housing, main motor, and gear ASSY plate. After assembling, check the engagement of the gears. The gears will engage easily when they are assembled, by rotating the main motor by hand.



Fig. 4-87



Fig. 4-88

3.31 Gear ASSY Plate / Gear 9

- (1) Remove the four screws, and remove the gear ASSY plate.
- (2) Remove the gear 9.

NOTE:

- When removing the gear ASSY plate, one of the gears that are installed to the gear ASSY
 plate is not fixed and it may come off. Be careful not to drop it.
- There is a spring inside of the gear that is not fixed to the gear ASSY plate. Be careful not to drop this spring.

- When installing gear 9, be sure to install the narrow end of the gear inside.
- When installing, if the gear or the spring that are not fixed to the gear ASSY plate come off, re-install them in the direction shown in the figure.
- When installing, two of the gears that are installed to the gear ASSY housing are not fixed and they may come off. Be careful not to drop them.
- When installing, engage the gears of the gear ASSY housing, main motor, and gear ASSY plate. After assembling, check the engagement of the gears. The gears will engage easily when they are assembled, by rotating the main motor with hand.

3.32 PWBA Exit Motor

- (1) Disconnect the two connectors.
- (2) Remove the two screws, and remove the PWBA exit motor.



Fig. 4-90

3.33 LVPS

- (1) Disconnect all the connectors.
- (2) Remove the five screws, and remove the LVPS.



Fig. 4-91

3.34 HVPS / MCU, FFC ASSY ESS

- (1) Remove the screw, and remove the bracket handle R.
- (2) Disconnect all the connectors and remove the FFC ASSY ESS.
- (3) Remove the three screws, and remove the bracket shield HVPS.
- (4) Remove the four screws, and remove the HVPS/MCU.

- When installing the HVPS/MCU, install the board under the hook of the frame. (Note 1)
- When tightening the screws, be careful not to pinch the harness between the board and the frame. (Note 2)
- After disconnecting the flat cable(s), check that each cable is not damaged at its end or short-circuited.
- When connecting the flat cable(s), do not insert it at an angle. After insertion, check that the cable is not at an angle.



Fig. 4-92

4. PACKING



5. GUIDELINES FOR LEAD FREE SOLDER

Information on Manually Repairing PCB Soldered with Lead-Free Solder This document provides information on how to correctly make manual repairs to a printed circuit board (PCB) soldered with lead-free solder.

1. Characteristics of lead-free solder

Melting point higher than that of conventional tin-lead solder

(Lead-free solder: approx. 220'C, Conventional tin-lead solder: approx. 180'C) Relatively poor solder wettability and spread (difficult to wet and spread), and hard Appearance (dull and grainy surface) different from that of conventional solder

Relatively poor wettability, rough surface (bumps are likely to be formed), and solder dragging

Poor solder elevation

Poor thermal conductivity and heat resistant (difficult to melt)

2. Metal composition & wire solder

The metal composition of lead-free solder allowed for use on PCBs for Brother's products is following.

LF Indication		Compositon	Manufacturer	Origin	Name
1		Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303
Н	only Component- side	Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303

We use wire solder which is indicated by digit after LF indication on PCB. Wire solder made in the countries except Japan are under investigation, and will be evaluated.

3. Appearance quality criteria

The appearance of the surface of portions soldered with lead-free solder is basically the same as that for those soldered with conventional lead-tin solder, except for the following points.

- 1) The surface of a portion soldered with lead-free solder is dull and not smooth.
- Shrinkage cracks can be observed on the surface of a portion soldered with lead-free solder. (They can be observed using a magnifying glass with approx. 10x magnification.)



Figure 1 Shrinkage Cracks

- 4. Identification of lead-free solder on PCBs
- For PCBs that use lead-free solder, "LF" is indicated by silk-screen printing or attaching a label. "LF" stands for lead free and indicates that the PCBs bearing such an indication have been soldered with lead-free solder. A digit is given in a box following "LF" if produced by silk-screen printing or follows "LF" without a box on an attached label, the digit indicating the metal composition and wire solder.
- 5. Precautions for hand soldering operations

- 1) Soldering operations using lead-free solder are basically the same as those using tinlead solder, however, due to the lead-free solder's characteristics of being difficult to melt, wet, and spread, as well as being hard, a soldering iron needs to be applied for a longer period of time than when soldering with conventional tin-lead solder. While soldering is being performed, it must be confirmed that the lead-free solder is spreading. When solder needs to be added when repairing PCBs, the solder must only be added after sufficiently melting the previously soldered area. When poor soldering is repaired, the solder of the poorly soldered area must be sufficiently removed and lead-free solder newly supplied.
- 2) Before starting soldering operations, it must be determined whether or not the PCB has an "LF" indication. If the PCB has an "LF" indication, lead-free solder corresponding to the digit following "LF" must be used. Conventional solder including lead (tin-lead solder) must not be used on a PCB that has an "LF" indication. (Use of tin-lead solder on a PCB having an "LF" indication is prohibited.)
- A soldering iron for exclusive use with lead-free solder must only be used; a soldering iron used for soldering with tin-lead solder must not be used with lead-free solder. The use of soldering irons designed for lead-free solder is desirable (see "7. Soldering iron" below).
- 4) The requirement for the temperature of the soldering iron's tip is the same as that for soldering using conventional solder; the temperature of the soldering iron's tip must not be raised even though the melting point of the lead-free solder is higher. The temperature of the soldering iron's tip is restricted to the temperature that the component to be soldered can resist. It should be noted that the temperature that the components to be soldered with lead-free solder can resist has not increased even though the melting point of the solder has.
- 5) A soldering iron must be correctly applied. Even though the melting point of the solder has increased, soldering operations must be performed with the soldering iron's tip at the same temperature as prescribed before. Therefore, heat needs to be effectively applied from the tip of the soldering iron to the base metal. For effective heat application, the shape of the soldering iron's tip and application of the soldering iron (position and angle relative to the base metal) need to be more strictly controlled than before.
- 6) The soldered point must be left as it is after the soldering iron is removed for a period of time longer than that required when soldering is performed with conventional solder.

The amount of heat applied to the base metal increases due to the higher melting point of the lead-free solder, and the base metal is heated to higher temperatures. Consequently, it takes time for the melted solder to cool and to solidify and, therefore, the soldered area must be left as it is after the soldering iron is removed for a longer period of time.

- 7) A localized ventilation system and gloves are required for soldering operations. Lead-free solder does not contain the toxic substance lead, however, inhalation of the fumes may adversely affect the health of workers. The silver contained in leadfree solder is also a toxic substance, though it is not as toxic as lead, and, therefore, a localized ventilation system and gloves are required for lead-free solder soldering operations, as required for those with conventional solder.
- 6. Soldering irons

When soldering is performed manually using lead-free solder, a soldering iron that has little reduction in its temperature needs to be used. This refers to a soldering iron that has a smaller degree of decrease in the temperature at the soldering iron's tip, such as when the soldering iron is applied to the base metal or solder is supplied, and the temperature is soon returned to the specified temperature.

With soldering operations using lead-free solder, the requirement for the temperature of the soldering iron's tip is the same as that for conventional solder, however, the melting point of lead-free solder is higher than that of conventional solder so productivity will decrease with conventional soldering irons.

Some tool manufacturers sell soldering irons designed for lead-free solder and that can maintain the productivity of the soldering operations.

The soldering irons used at BIL are model no. 941 manufactured by HAKKO and M6-SIC-40 manufactured by BONKOTE. The prices of these soldering irons for use with lead-free solder are three to four times higher than those for conventional soldering irons with a temperature controller built in.

7. No mixing of different solders

When repairs are made on a PCB with an "LF" indication on it, lead-free solder with the same metal composition, which is expressed by the digit following "LF", must be used on a single PCB. For a PCB with an "LF" indication on it, neither tin-lead solder nor lead-free solder with a different metal composition must be used.

Compatible solder for each countries are listed below. Solders are freely available from each
manufacturer. Visit the web site below for more detail.

Countries	Manufacturer	Origin	Name	Web site
For Japan, UK,	ALMIT	JAPAN	KR-19 SH RMA	http://www.almit.com
Finland,			LFM-48	
Germany,				
France,				
Sweden				
For World wide	KESTER	U.S.A.	KESTER245	http://www.kester.com
except			KESTER285	
Australia, New				
Zealand				
For Worldwide	AIM	CANADA	CASTIN RMA2	http://www.aimsolder.com

6. HARNESS ROUTING














CHAPTER 5 PERIODIC MAINTENANCE

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. Refer to APPENDIX 4 " PERIODICAL REPLACEMENT PARTS" in detail.

1. REPALACING THE TONER CARTRIDGE (TN-1700)

The toner cartridge is a consumable. A new replacement toner cartridge contains enough toner to print up to 17,000 A4 or Letter-size single-sided pages at about 5 % coverage, or rotates the drum up to 190,000 times.

1.1 Toner Cartridge Handling Precautions



Never throw a toner cartridge into an open flame. It can cause an explosion and you can get burnt.

<Handling Precautions>

- Do not subject it to direct sunlight or strong light.
- When installing the toner cartridge, select a location not subject to strong light and try to finish the installation within 5 minutes.
- Do not touch the surface of the photosensitive drum. Do not let the toner cartridge stand or place it upside down. The drum might get damaged.
- A drum shutter protects the photosensitive drum from light. Do not open the drum shutter.
- Although the toner is not harmful to the body, wash it off immediately if your hands or clothes are stained with it.
- We recommend that you use up the toner cartridge within 1 year after opening it.
- Toner consumption varies according to the image coverage on the page and the print density setting.
- The greater the image coverage, the greater the toner consumption.
- If you change the print density setting for lighter or darker printing, toner consumption varies accordingly.
- Wait to unpack the toner cartridge until immediately before you install it in the printer.
- Brother strongly recommends that you do not refill the toner cartridge provided with your printer. We also strongly recommend that you continue to use only Genuine Brother Brand replacement toner cartridges. Using or attempting to use potentially incompatible toner and/or toner cartridges in your printer may cause damage to the printer itself and/or it may result in unsatisfactory print quality. Our warranty coverage does not apply to any problem that was caused by the use of unauthorized third party toner and toner cartridges. To protect your investment and guarantee your print quality please continue to replace consumed toner cartridges with only Genuine Brother Branded Supplies.
- Printing with a third-party toner or third-party toner cartridge may reduce not only the print quality but also the quality and life of the printer itself. It may also cause serious damage to the performance. Warranty coverage does not apply to problems caused by the use of third-party toner or third-party toner cartridges.

1.2 **Replacing the Toner Cartridge**

(1) Turn off the printer power switch.





(2) Remove any paper from the center output tray.







CAUTION:

(3) Open the top cover.

Do not touch any parts inside the printer.

(4) Hold the toner cartridge by the grip and pull it out slowly.

NOTE:

To prevent the toner from dirtying the surface, lay a piece of paper on the surface first before putting the toner cartridge down.



Fig. 5-4

- (5) Take the new toner cartridge out of the box and shake it 7 to 8 times in the manner shown.
 - If the toner is not evenly spread out, the print quality may drop. Also, if you do not shake the toner cartridge well, there may be operating noise or the interior of the toner cartridge may be damaged during operation.
 - Do not touch the surface of the photosensitive drum.
- (6) Place the toner cartridge on a flat surface and pull the seal on the right hand side out horizontally.



Fig. 5-5





CAUTION:

- When pulling out the seal, pull it out horizontally. The tape might break if it is pulled out diagonally.
- After the seal has been pulled out, do not shake or bump the toner cartridge.
- (7) Hold the toner cartridge by the grip and insert it into the slot inside the printer.



Fig. 5-7

- Ensure that the toner cartridge is firmly set.

(8) Close the top cover securely. Turn the printer switch back on.



NOTE: See Appendix 3 for the important information about toner cartridge

Fig. 5-8

2. REPALACING THE FUSER UNIT & TRANSFER ROLL CARTRIDGE (FP-8000)

The fuser unit and transfer roll cartridge are consumables.

2.1 Fuser Unit & Transfer Roll Cartridge Handling Precautions



<Handling Precautions>

- Do not replace the fuser unit immediately after using the printer. You may get burnt.
- Do not remove and reinsert the transfer roll cartridge in use.
- When the message to replace the transfer roll cartridge appears, replace the transfer roll cartridge immediately. Otherwise, the printer will stop printing.

2.2 Replacing the Fuser Unit & Transfer Roll Cartridge

(1) Turn off the printer power switch and leave it for 30 minutes until the fuser unit cools down.





(2) Remove any paper from the center output tray.



Fig. 5-10

(3) Open the back cover by lifting the lower gray lever at the top left corner at the back of the printer.



Fig. 5-12

CAUTION:

Do not touch any parts inside the printer.

(4) Push down the 2 beige levers at the bottom of the used fuser unit.



(5) Remove the used fuser unit slowly.

Fig. 5-13



Fig. 5-14



(10) Hold the toner cartridge by the grip and pull it out slowly.

NOTE:

To prevent the toner from dirtying the surface, lay a piece of paper on the surface first before putting the toner cartridge down.

(11) Pull the 2 levers on the upper part of the transfer roll cartridge, then squeeze the 2 beige levers on the bottom of the used transfer roll cartridge and pull it out slowly towards you.



Fig. 5-19



Fig. 5-20



Fig. 5-21

(12) Pick up the new transfer roll cartridge by the levers at both ends and slowly push it into the slot.



Fig. 5-22

(13) Hold the toner cartridge by the grip and insert it into the slot inside the printer.





CAUTION:

Ensure that the toner cartridge is firmly set.

- (14) Close the top cover securely. Turn the printer switch back on.



Fig. 5-24

3. REPALACING THE FEED ROLLER

To purchase the replacement Feed Roller, call your dealer or Brother Customer Service.



<Handling Precautions>

- There are feed rollers inside the interior of the printer (2 in 2 locations, 4 in total), lower tray unit (1 location) and paper tray (1 location).
- Those rollers are periodic replacement parts. We recommend that you call your dealer or Brother Customer Service if you need assistance replacing the Feed Roller.

Inside the printer (2 locations)



Lower tray unit (1 location)



Fig. 5-25

Paper tray (1 location)



3.1 Replacing the Feed Roller

NOTE:

The following procedure explains how to replace the feed roller of the paper tray. Follow this procedure for replacing the feed roller of the optional lower tray unit as well.

<Paper tray feed roller>

(1) Pull the paper tray out of the printer.

NOTE:

If replacing the feed roller of tray 2, pull out both tray 1 and tray 2.





(2) While pushing down on the shaft of the feed roller as shown in the illustration (1), widen the tab of the feed roller to loosen it (2) and then slowly remove the feed roller from the shaft of the paper tray (3).



Fig. 5-27

(3) Hold the new feed roller with the tab as shown in the illustration and slowly push it on to the shaft of the paper tray.





(4) Align the small tab on the feed roller with the slot of the shaft, and then push the feed roller completely in so that the tab fits into the slot.



Fig. 5-29

(5) Push the paper tray completely into the printer.



Fig. 5-30

<Feed roller inside the printers>

(1) Remove any paper from the center output tray.



Fig. 5-31



Fig. 5-32

Fig. 5-33

(3) Hold the toner cartridge by the grip and pull it out slowly.

NOTE:

(2) Open the top cover.

To prevent the toner from dirtying the surface, lay a piece of paper on the surface first before putting the toner cartridge down. (4) While pushing down on the shaft of the feed roller as shown in the illustration, widen the tab of the feed roller to loosen it (1) and then slowly remove the feed roller from the shaft.

(5) Hold the new feed roller with the tab as shown in the illustration and slowly push it on to the shaft.







(6) Align the small tab on the feed roller with the slot of the shaft, and then push the feed roller completely in so that the tab fits into the slot.



Fig. 5-36

(7) Hold the toner cartridge by the grip and insert it into the slot inside the printer.

NOTE:

Make sure that the toner cartridge is firmly set.



Fig. 5-37

Fig. 5-38

(8) Close the top cover securely.

4. CLEANING THE PRINTER

We recommend that you clean the printer at least once a month to keep it in good working condition and to maintain print quality.



Turn the printer off and disconnect the power cord from the AC outlet/socket before cleaning the printer. Failure to turn the printer off and disconnect the power cord may result in an electric shock.

<Cleaning Precautions>

- Never spray anything directly onto the printer. Droplets can enter the printer and cause malfunctions. Never use detergents other than neutral detergents.
- Never lubricate the printer with oil. The printer does not require lubrication.
- Never use a vacuum cleaner to clean the printer.

4.1 Cleaning the Outside of the Printer

(1) Press the power switch to the **O** position to turn the power off.



Fig. 5-39

- Use a soft, damp cloth to clean the outside of the printer.
 If some stains prove difficult to remove, use a cloth lightly moistened with neutral detergent.
- (3) Wipe any remaining water with a soft, dry cloth.



4.2 Cleaning the Interior

(1) Press the power switch to the **O** position to turn the power off.

NOTE:

Remove any remaining pieces of paper.





- (2) Use a soft, damp cloth to clean the interior.If some stains prove difficult to remove, use a cloth lightly moistened with neutral detergent.
- (3) Wipe any remaining water with a soft, dry cloth.



Fig. 5-42

4.3 Cleaning the Feeder Roller

(1) Pull out the paper tray from the printer.



Fig. 5-43



Fig. 5-44

(2) Wipe the rubber parts with a damp, soft cloth.

(3) Push the paper tray completely into the printer.



Fig. 5-45

4.4 If the Printer Will Not Be Used for a Long Time

Carry out the following procedure if you are not going to use the printer for a long period of time.

(1) Press the power switch to the **O** position to turn the power off.







(2) Remove all connection cords, such as the power cord and interface cables.



- Never touch a power cord with wet hands. Danger of electric shock exists.
- When unplugging the machine, grasp the plug instead of the cord. Forcibly pulling on a cord can damage it and cause fire or electric shock.
- (3) Remove the paper from the paper tray and store it in a location free of humidity and dust.

CHAPTER 6 TROUBLESHOOTING

1. PROGRESSING WITH THE TROUBLESHOOTING

After making sure of the actual condition/trouble, proceed with the troubleshooting process efficiently making use of the Fault Isolation Procedure (FIP), Diagrams (Appendix), and Theory of Operation (Chapter 3).

1.1 Flow of Troubleshooting

Flow of the troubleshooting is as follows:



1.2 Preparatory Requirements

Be sure to check the following items before starting the troubleshooting procedures:

- 1) Voltage of the power supply is within the specifications (measure the voltage at the electric outlet).
- Power cord is free from breakage, short-circuit, disconnected wire, or incorrect connection in the power cord.
- 3) The laser printer is properly grounded.
- 4) The laser printer is not installed at a place subjected to too high temperature, too high humidity, toolow temperature, too low humidity or rapid change of temperature.
- 5) The laser printer is not installed close to water service, humidifier, heat generating unit, or fire, in very dusty place, or a place exposed to air flow from the air conditioning system.
- 6) The laser printer is not installed in a place where volatile gas or inflammable gas is generated.
- 7) The laser printer is not installed under direct sunbeams.
- 8) The laser printer is installed in a well-ventilated place.
- 9) Paper used meets specifications (standard paper is recommendable).
- 10) The laser printer is handled properly.
- 11) Parts which should be periodically replaced are replaced each time when specified number of sheets have been printed.

1.3 Cautions for Service Operations

1) Be sure to remove the power cord except when it is specifically required.



If the printer is kept ON, never touch the conductive parts while it is not specifically required.

The power switch and inlet of LVPS is live even while the power supply is cut off. Never touch the live parts.

 When checking some parts with covers removed and with the interlock and safety and powerswitches ON, remove the connector (P/J140) on the ROS ASSY except when it is specifically required.



When checking some parts with covers removed and with the interlock and safety and power switches ON, laser beams may be irradiated from the ROS ASSY. Since it is dangerous, be sure to remove the connector (P/J140) while it is not required.

3) When checking some parts with the left cover removed and power ON, be sure to remove the connector (P/J31) on the HVPS/MCU while it is not required.



When checking some parts with the left cover removed and power ON, high voltage may be applied by the HVPS. Be sure to remove the connector (P/J31) on the HVPS/MCU.

When connecting the connector (P/J31) on the HVPS/MCU according to the instructions of the FIP, never touch the HVPS and parts of high voltage.

- 4) When touching hot parts, be careful not to get burnt.
- 5) Workers should wear an antistatic wrist band or the like to remove static electricity from their body, grounding their body while working.

1.4 Cautions for FIP Use

- It is assumed in the FIP that the printer controller (PWBA ESS) is normally functioning. If any trouble cannot be corrected by troubleshooting, replace the printer controller with a normal one and check for proper operation again.
 If the trouble is still not corrected, replace the major parts and then related parts in succession and confirm according to the procedure of the "Check".
- 2) When troubleshooting according to the FIP, normal HVPS/MCU, LVPS, Fuser ASSY, BTR ASSY and so on, may be necessary for isolation of failed parts. Prepare them in advance.
- 3) In the initial check according to the FIP, check only items which can be simply checked.
- 4) In the initial check according to the FIP, check the constitutive parts of the major check parts and related parts, as well as major check parts.
- 5) When working with the printer, be sure to remove the power cord except when required specifically. Never touch live parts if not required, while the power cord is connected.
- 6) Connector condition is denoted as follows:

[P/J12]	>	Connector (P/J12) is connected.
[P12]	>	Plug side with the connector (P/J12) removed (except when attached directly to the board).
[J12]	>	Jack side with the connector (P/J12) removed (except when attached directly to the board).

- [P/J1-2PIN <=> P/J3-4PIN] in the FIP means measurement with the plus side of the measuring instrument connected to [2PIN] of [P/J1] and the minus side to [4PIN] of [P/J3].
- 8) [P/J1<=> P/J2] in the FIP means measurement for all terminals corresponding between [P/J1] and [P/J2] referring to "Wiring Diagrams".
- 9) In [P/J1-2PIN <=> P/J3-4PIN] in the FIP where voltage is measured, [P/J3-4PIN] on the rear minus side is always at the AG (analog ground), SG (signal ground), or RTN (return). Therefore, after checking of proper continuty between AGs, SGs, or RTNs respectively, the rear minus side can be connected to the PIN of AG, SG or RTN instead of [P/J3-4PIN].

However, care should be taken not to mistake since [AG], [SG], and [RTN] are not on the same level.

- 10) Measure the voltage of small connectors with the special tool. Handle the tool with care, as the leading edge of the tool is pointed.
- 11) When measuring the voltage, set the EP cartridge, BRT ASSY and paper tray, close the Cover Top ASSY, Fuser ASSY, and Cover Rear and power ON if not required specifically.
- 12) Numerical values in the FIP are only for standard. If numerical values are approximate, they should be considered permissible.
- 13) Parts which are always removed to check as indicated in the FIP and procedures for that purpose are not specifically referred to here. They should be handled carefully.
- 14) "Replacement" in the FIP indicates replacement of parts which are considered to be the source of trouble to be checked after replacing those parts, assemblies containing them (HIGH ASSY).
- 15) The FIP describes the first tray on the lower part of the devie as "Tray 1," and the second tray as "Tray 2", and the first tray of Option 550 Paper Feeder as "Tray 3", and the second tray as "Tray 4".
- 16) In the FIP, procedures are differentiated depending on specifications. Correct troubles according to the instructions in the FIP.
- 17) For optional parts, some troubleshooting procedure may follow the manual for those options, of which you should take note. Keep those manuals for the optional parts when required.

2. LEVEL 1 FIP

2.1 Level 1 FIP

The level 1 FIP is the first step for trouble diagnosis. The level 1 FIP isolates the presence of various troubles including error codes, and the level 2 FIP provides a guide for proceeding of the troubleshooting.

2.2 Flow of Level 1 FIP



Fig. 6-2

2.3 Error/Status Code List

NOTE:

For information about the following FIP items described in "FIP to be referred" column in the following table, refer to the manual of each Option unit.

22 through 25: Option 550 Paper Feeder

26 through 32: Option Duplex

37 through 43: Option CT

LCD Message	Error Contents	Error Description	FIP to be referred
ILLEGAL TONER Use only Brother genuine toner cartridges	Xero Fail	 EP cartridge is not installed, or incorrectly installed. EP cartridge out of specifications is installed. 	11
ERROR E59 SERVICE CALL	NVM Abnormality	 Failure of the NVRAM occurred at powering on. Write error to the NVRAM occurred. 	1
ERROR E60 SERVICE CALL	Fan Motor Abnormality	 Abnormal rotation or other failure of the Fan Main or Fan SUB occurred. 	4
ERROR E54 SERVICE CALL	Main Motor Abnormality	 Rotation of Main Motor does not reach the specified speed. 	5
ERROR E51 SERVICE CALL	ROS Motor Abnormality	 Interval of /BD signal after ROS Motor starts is delayed than the specified value. Interval of /BD signal became delayed than the specified value after it reached the specified value. Laser beam output is not the specified level. 	2
ERROR E50 SERVICE CALL	Fuser Abnormality	 Fuser does not reach the specified temperature after the specified time elapsed. Fuser Lamp lights for ten seconds or more in standby. Fuser temperature became 125 °C or lower during printing. Fuser temperature became 220 °C or higher. The thermistor (thermal sensor) have break. 	3
JAM C Remove the toner cartridge, first, and then remove the jammed paper. See	Exit Jam 1	Paper Jam/Exit - When the paper was not fed to Exit Sensor within the specified time. - When Exit Sensor turned ON in warming up.	8
the alphanumerical diagram to check on the location.	Exit Jam 2	Paper Jam/Exit - When paper was not fed to Exit Sensor within the specified time after Sensor Regi OFF.	8
	Exit Jam 3	Paper Jam/Exit - When the paper was fed out from Exit Sensor earlier than the specified time.	8

LCD Message	Error Contents	Error Description	FIP to be referred
JAM A1/A2/A3/A4 Remove the toner cartridge, first, and then remove the jammed paper. See the alphanumerical diagram to check on the location.	Feed Jam 1 (Early Feed Jam)	 Paper Jam/Tray to Regi When the paper was fed to Regi Sensor earlier than the specified time. Paper interval became narrow than the specified time because of the two or more papers are fed at a time. Paper size error. The paper longer than Legal 14" is used. 	9
JAM B Remove the toner cartridge, first, and	Feed Jam 2 (Misfeed Jam)	Paper Jam/Misfeed - When the paper did not reach Regi position within the specified time.	10
then remove the jammed paper. See the alphanumerical diagram to check on the location	Reg. Jam 1	Paper Jam/Regi to Fuser - When the paper did not reach Fuser from Regi position within the specified time.	7
	Reg. Jam 2	Paper Jam/Regi to Fuser - When Regi Sensor turned ON in warming up.	7
JAM D Remove the toner cartridge, first, and then remove the	Duplex Jam 1	Paper Jam/Dup to Regi - When the paper reached Regi position from Duplex Sensor earlier than the specified time.	29
jammed paper. See the alphanumerical diagram to check	Duplex Jam 2	Paper Jam/Exit to Dup - When the paper did not reach Duplex Sensor within the specified time.	28
	Duplex Jam 3	 Paper Jam/Dup to Regi When the paper was not fed to Duplex Sensor within the specified time. When Duplex Sensor turned ON in warming up. 	29
	Duplex Jam 4 (Misfeed Jam)	Paper Jam/Misfeed - When the paper did not reach Regi position from Duplex Sensor within the specified time.	30
JAM E Remove the toner cartridge, first, and then remove the	CT Jam 1	Paper Jam/Exit to CT - When the paper did not reach to CT Sensor from Exit Sensor within the specified time.	39
jammed paper. See the alphanumerical diagram to check on the location.	CT Jam 2	Paper Jam/CT - When the paper was not fed to CT Sensor within the specified time. - When CT Sensor turned ON in warming up.	40
SIZE MISMATCH Put <size> Paper into Tray <1/2/3/4>. Paper mismatch between the Printer and the Printer Driver setting.</size>	Paper Size Mismatch	 Paper size detected by the Paper Size Switch or set in the NVRAM does not match the paper length obtained from ON time of Regi Sensor at feeding. 	12
TONER LOW	Xero Warning	- Remaining toner in EP cartridge became low.	16

LCD Message	Error Contents	Error Description	FIP to be referred
REPLACE FUSER	Fuser Life Warning	 Fuser printed more than 200,000 sheets of paper. 	17
BACK LEVER ERROR Lower the Back lever.	Face Up Tray Fail	- Face Up Tray is not correctly installed in Duplex or CT mode.	44
LT-8000 FAIL Turn off the printer, then turn it on again.	Option Tray Unit Fail	- Option Tray is not installed when Option Tray is selected.	25
STACKER FULL Remove the paper from specified output tray.	Full Stack (500 Paper Exit)	- 500 Paper Exit became Full Stack.	45
STACKER FULL CT Remove the paper from specified output tray.	Full Stack (CT)	- Option CT became Full Stack.	42
COVER OPEN Close the Top Cover.	Top/Rear Cover Open	- Cover Open or Cover Rear 500/Cover Rear 250 is open.	6
COVER OPEN Close the CT Cover.	CT Cover Open	- Cover of Option CT is open.	37
COVER OPEN Ensure that the Cover of the Duplex Unit is closed.	Duplex Cover Open	- Cover of Option Duplex is open.	26
CT-8000 FAIL Turn off the printer, then turn it on again.	CT Unit Fail	 Option CT is not installed when CT mode is selected. 	38, 43
DX-8000 FAIL Turn off the printer, then turn it on again.	Duplex Unit Fail	 Option Duplex removed after powering on. 	27, 32
NO PAPER T4	NO Paper in Tray 4	- No paper in Tray 4.	23
NO PAPER T3	NO Paper in Tray 3	- No paper in Tray 3.	23
NO PAPER T2	NO Paper in Tray 2	- No paper in Tray 2.	14
NO PAPER T1	NO Paper in Tray 1	- No paper in Tray 1.	14

LCD Message	Meaning	Action
ERROR S01	FATAL ERROR EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S02	ADRL ERROR EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S03	ADRS ERROR EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S04	BUS ERROR EX (INSTRUCT)	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S05	BUS ERROR EX (DATA L/S)	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S06	SYSCALL EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S07	BREAKPOINT EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S08	RESERVED INSTRUCT EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S09	COPROCESSOR UNUSAB EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S10	ARITHMETIC OVERFLOW EX	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S11	UNDEFINED INTERRUPT	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S12	SOFTWARE 1 INTERRUPT	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR S13	SOFTWARE 2 INTERRUPT	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR E41	ENGINE COMMUNICATION ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB. If the same error occurs, then replace the engine PCB.
ERROR E46	ENGINE CPU RESET ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the engine PCB.
ERROR E49	FUSER UNIT MALFUNCTION	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the fuser unit.

LCD Message	Meaning	Action
ERROR E50	FUSER UNIT MALFUNCTION	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the fuser unit.
ERROR E51	LASER BEAM DETECTION ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the laser unit. If the same error occurs, replace the main PCB.
ERROR E52	SCANNER MOTOR MALFUNCTION	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the laser unit. If the same error occurs, replace the main PCB.
ERROR E54	MAIN MOTOR LOCK ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main motor. If the same error occurs, replace the main PCB.
ERROR E55	HIGH-VOLTAGE POWER SUPPLY MALFUNCTION	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the high-voltage power supply PCB ASSY. If the same error occurs, replace the PS PCB unit.
ERROR E59	NVM ERROR	Refer to FIP1.1 NVM Error
ERROR E60	FAN MOTOR ERROR	Refer to FIP1.4 Fan Error
ERROR H60	BUS ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H61	ROM CHECKSUM ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H63	DRAM ACCESS ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H66	NVRAM WRITE ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H67	NVRAM READ ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H68	NNVRAM BUS ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H73	FLASH READ ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H74	FLASH WRITE ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.
ERROR H38	PCI BUS CONNECTION ERROR	Turn off the printer. Wait a few seconds, then turn it on again. If the same error occurs, replace the main PCB.

3. LEVEL 2 FIP

3.1 Level 2 FIP

The Level 2 FIP is the trouble diagnostic procedure to be sorted based on the symptoms of various troubles. In the troubleshooting, executing the steps given in the FIP or checking procedure allows you to find out a cause of trouble in a short time.

4. ERROR CODE FIP

4.1 Level 1 FIP

<FIP1.1 NVM Error>

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU		
1	Does error occur when the power is turned ON?	Go to step 4.	Go to step 2.
2	Does error still occur when the power is turned OFF and ON again?	Go to step 4.	Go to step 3.
3	Does error still occur after several ON/OFF procedures of the power?	Go to step 4.	End of work *1
4	Checking HVPS/MCU non-volatile memory setup mode Is non-volatile memory setup mode accessible?	Go to step 5.	Replace HVPS/MCU.
5	Checking NVRAN for data setup Are all NVRAM data set appropriately?	Go to step 7.	Go to step 6.
6	Checking error after changing HVPS/MCU data setup Change NV RAM data to the correct setup value, and then turn the power ON again. Does error still occur?	Replace HVPS/MCU, then go to step 7.	End of work
7	Checking after replacing HVPS/MCU Does error occur?	Go to FIP2.19 Electrical Noise.	End of work

*1: Though some kind of foreign noise would be possible cause, go to [FIP2.19 Electrical Noise] and check, to make sure.

<FIP1.2 ROS Error>

Step	Check	Yes	No
	Possible causative parts: ROS ASSY HVPS/MCU EP cartridge Harness ASSY ROS LVPS		
1	Checking NVRAM for data setup value Are the value of NV03 (resolution) and the value of NV04 (Laser Diode output) set at the initial setup value in the factory?	Go to FIP2.3 ROS ASSY.	Set NV03 and NV04 to factory setup, and then check again. If error still occurs, go to FIP2.3 ROS ASSY.

<FIP1.3 Fuser Error>

Step	Check	Yes	No
	Possible causative parts: Fuser ASSY HVPS/MCU LVPS Harness ASSY Fuser Harness ASSY LVPS		
1	Checking the thermistor for operation Does error occur soon after the power is turned ON? Error occurs as soon as the power is turned ON, or just after the time when a short warm up period elapsed.	Replace Fuser ASSY.	Go to FIP2.4 Fuser ASSY.

<FIP1.4 Fan Error>

Step	Check	Yes	No
	Possible causative parts: Fan Main Fan SUB LVPS HVPS/MCU		
1	Checking Fan Main for rotation (1) Does Fan Main rotate, when the power is turned ON?	Go to step 2.	Go to step 5.
2	Checking Fan SUB for rotation (1) Does Fan SUB rotate, when the power is turned ON?	Go to step 3.	Go to step 9.
3	Checking Fan Main for rotation (2) Does Fan Main rotate in high-speed?	Go to step 4.	Go to step 5.
4	Checking Fan SUB for rotation (2) Does Fan SUB rotate in high-speed?	Replace HVPS/MCU, and watch Fan SUB for a while.	Go to step 9.
5	Checking the power to Fan Main Is Fan Main connected correctly, and is the voltage across P/J24-18 <=> P/J24-17, 24 VDC? (12 VDC, when half-speed)	Go to step 6.	Go to step 7.
6	Checking the Fan Alarm signal (1) Is the voltage across P/J24-17 <=> P/J24-16, 0.82 VDC or more?	Replace Fan Main.	Replace HVPS/MCU.
7	Checking after replacing Fan Main Replace the Fan Main. Does Fan error occur when the power is turned ON?	Go to step 8.	End of work
8	Checking after replacing LVPS Replace the LVPS. Does Fan Error occur when the power is turned ON?	Replace HVPS/MCU.	End of work

Step	Check	Yes	No
9	Checking the power to Fan SUB Is Fan SUB connected correctly, and is the voltage across P/J27-19 <=> P/J27-18, 24 VDC? (12 VDC, when half- speed)	Go to step 10.	Go to step 11.
10	Checking the Fan Alarm signal Is the voltage across P/J27-18 <=> P/J27-17, 0.82 VDC or more?	Replace Fan SUB.	Replace HVPS/MCU.
11	Checking after replacing Fan SUB Replace the Fan SUB. Does Fan Error occur when the power is turned ON?	Go to step 12.	End of work
12	Checking after replacing LVPS Replace the LVPS. Does Fan Error occur when the power is turned ON?	Replace HVPS/MCU.	End of work

<FIP1.5 Main Motor Error>

Step	Check	Yes	No
	Possible causative parts: Main Motor Gear ASSY Housing Gear ASSY Plate LVPS HVPS/MCU		
1	Checking Main Motor installation Are Main Motor, Gear ASSY Housing and Gear ASSY Plate installed correctly?	With tool go to step 2. Without tool go to step 3.	Reinstall obstructive parts.
2	Checking Main Motor for operation Does the Main Motor rotate, and each gear rotate normally?	Replace HVPS/MCU.	Go to step 3.
3	Checking Gear ASSY Housing and Gear ASSY Plate for operation Does each gear rotate normally? Rotate and check each gear of Gear ASSY Housing and Gear ASSY Plate.	Go to FIP2.2 Main Motor.	Replace the obstructive parts.

<FIP1.6 Cover Error>

Step	Check	Yes	No
	Possible causative parts: Interlock S/W 24V Interlock S/W 5V Interlock S/W Rear Switch I/L ASSY Cover Open HVPS/MCU LVPS		

Step	Check	Yes	No
1	Checking Cover Open and Cover Rear Are the tabs to push down Interlock S/W 24V, 5V, and Rear, and Switch I/L ASSY damaged? Open Cover Open and Cover Rear to check.	Replace Cover Open or Cover Rear.	With tool go to step 2. Without tool go to FIP2.9, 10, 11, and 12 Interlock S/W.
2	Checking Interlock S/W 24V and 5V on function Does the number on Sensor/Switch Check increase by one, every time Interlock S/W is pushed while pressing down the Switch I/L ASSY with a finger?	Go to step 3.	Go to FIP2.9 and 10 Interlock S/W.
3	Checking Interlock Rear on function Does the number on Sensor/Switch Check increase by one, every time Interlock S/W Rear is pushed while pressing down the Interlock S/W 24V with a finger?	Go to step 4.	Go to FIP2.11 Interlock S/W.
4	Checking Switch I/L ASSY on function Does the number on Sensor/Switch Check increase by one, every time Switch I/L ASSY is pushed while pressing down both Interlock S/W 24V and 5V with the finger?	Replace HVPS/MCU.	Go to FIP2.10 and 12 Interlock S/W.

<FIP1.7 Paper Jam/Regi to Fuser>

Step	Check	Yes	No
	Possible causative parts: Fuser ASSY HVPS/MCU Clutch Regi BTR ASSY EP cartridge Harness ASSY Fuser LVPS 150 Feeder ASSY Guide ASSY CRU R		
1	Checking the paper condition Is the paper in the tray crumpled or damaged?	Replace the paper with a new and dry one.	Go to step 2.
2	Checking paper size setup Does the paper size in use match the size setup by Guide ASSY End or by the Driver on the PC?	Go to step 3.	Replace the paper, or change the paper size set.
3	Checking paper position (1) Does the front end of paper touch with Actuator Exit in Fuser ASSY? Open Cover Open to check.	Go to step 7.	Go to step 4.
4	Checking paper position (2) Does the front end of paper go through the Heat Roll/Pressure Roll in Fuser ASSY? Remove EP cartridge to check.	Replace HVPS/MCU.	Go to step 5.

Step	Check	Yes	No
5	Checking paper position (3) Does the front end of paper go through BTR ASSY?	Go to step 15.	Go to step 6.
6	Checking paper position (4) Does the front end of paper go between Roll Regi Metal and Roll Regi Rubber?	Go to step 14.	Go to step 19.
7	Checking Actuator Exit for operation Does Actuator Exit move smoothly, when touching Actuator Exit with a finger inserted from the exit of Fuser ASSY, and moving it up and down? Remove EP cartridge to check.	With tool go to step 8. Without tool go to step 9.	Replace Fuser ASSY.
8	Checking Exit Sensor for operation (1) Does the number of Sensor/Switch Check increase, every time Actuator Exit is pushed and released?	Replace HVPS/MCU.	Go to step 10.
9	Checking Exit Sensor for operation (2) Is the voltage across P/J46-5 <=> P/J46-4 on LVPS, 0VDC when Actuator Exit is pushed, and 3.3VDC when released? Remove EP cartridge to check.	Replace LVPS.	Go to step 10.
10	Checking Harness ASSY Fuser for continuity Warning; Start the operation after the Fuser ASSY have cooled down. Disconnect P/J46 from LVPS. Remove Fuser ASSY. Is P/J46 <=> P/J4647 continuous normally?	Go to step 11.	Replace Harness ASSY Fuser.
11	Checking the power to Exit Sensor Is the voltage across P/J46-3 <=> P/J46-4, 3.3 VDC?	Go to step 13.	Go to step 12.
12	Checking LVPS for continuity Is P/J41-1 <=> P/J46-3 continuous normally?	Go to FIP2.1 LVPS.	Replace LVPS.
13	Checking Fuser ASSY roll for operation Warning; Start the operation after the Fuser ASSY have cooled down. Remove Fuser ASSY. Do the gear and the roll of Fuser ASSY rotate smoothly? Turn the gear of the heater roller of Fuser ASSY with a finger to check.	Replace LVPS.	Replace Fuser ASSY.
14	Checking BTR ASSY for shape Remove BTR ASSY. Are there any abnormalities in BTR ASSY? Check the shape, shaft and Bearing BTR of BTR ASSY.	Go to step 15.	Replace BTR ASSY.
15	Checking Guide ASSY CRU R Is Guide ASSY CRU R damaged or stained?	Clean or replace Guide ASSY CRU R.	Go to step 16.
16	Checking Guide ASSY CRU R for continuity Remove Guide ASSY CRU R. Is each harness continuous?	Go to step 17.	Replace Guide ASSY CRU R.
17	Checking after replacing HVPS/MCU Replace HVPS/MCU. Carry out a test printing. Does the same trouble occur?	Go to step 18.	End of work

Step	Check	Yes	No
18	Checking after replacing EP cartridge Replace EP cartridge. Does the similar trouble occur, when the test printing is done?	Go to step 19.	End of work
19	Checking Roll Regi Metal and Roll Regi Rubber for operation Do Roll Regi Metal and Roll Regi Rubber rotate smoothly? Turn Roll Regi Metal and Roll Regi Rubber with a finger to check.	Go to step 20.	Replace 150 Feeder ASSY.
20	Checking Clutch Regi for function Does Clutch Regi function appropriately?	Go to step 21.	Go to FIP2.15 Clutch Regi.
21	Checking Gear ASSY Housing operation (1) Remove EP cartridge. Install Cover ASSY and close it. Does each gear rotate normally?	Replace HVPS/MCU.	Go to step 22.
22	Checking Gear ASSY Housing operation (2) Does each gear rotate smoothly? Remove Gear ASSY Housing to check.	Replace Gear ASSY Housing.	Replace the trouble gear.

<FIP1.8 Paper Jam/Exit>

Step	Check	Yes	No
	Possible causative parts: Fuser ASSY HVPS/MCU Harness ASSY Fuser Motor ASSY Exit LVPS Roll Pinch Exit 500 Exit ASSY 150 Paper Cassette 550 Paper Cassette		
1	Checking the paper condition Is the paper crumpled, damaged or damp?	Replace the paper with a new and dry one.	Go to step 2.
2	Checking the paper size setup Does the paper size in use match the size setup by Guide ASSY End or by the driver on the PC?	Go to step 3.	Replace the paper, or set up the paper size correctly.
3	Does error occur when the power is turned ON?	Go to step 4.	Go to step 6.
4	Checking the paper in Actuator Exit Is there any remaining paper in Actuator Exit?	Remove the paper, and go to step 5.	Go to step 8.
5	Does error occur when the power is turned ON?	Go to step 8.	Go to step 6.
6	Carrying out a test printing Does error occur?	Go to step 7.	End of work

Step	Check	Yes	No
7	Checking Roll Pinch Exit Remove Cover Top ASSY. Is Roll Pinch Exit not damaged, and rotating smoothly? Does Spring Pinch Exit attach? Turn Roll Exit with a finger to check.	Go to step 8.	Replace Roll Pinch Exit.
8	Checking Actuator Exit for operation Remove EP Cartridge. Does Actuator Exit move smoothly, when touching Actuator Exit with a finger inserted from the exit of Fuser ASSY, and moving it up and down?	With tool go to step 10. Without tool go to step 11.	Replace Fuser ASSY.
9	Checking Exit Sensor for operation (1) Remove EP Cartridge. Does the number of Sensor/Switch Check increase by one, every time Actuator Exit is pushed and released?	Replace HVPS/MCU.	Go to step 11.
10	Checking Exit Sensor for operation (2) Remove EP Cartridge. Is the voltage across P/J46-5 <=> P/J46-4 on LVPS, 0VDC when Actuator Exit is pushed, and 3.3VDC when released?	Go to step 14.	Go to step 12.
11	Checking the power to Exit Sensor Is the voltage across P/J46-3 <=> P/J46-4, 3.3VDC?	Replace LVPS.	Go to step 13.
12	Checking LVPS for continuity Is P/J41-1 <=> P/J46-3 continuous normally?	Go to FIP2.1 LVPS.	Replace LVPS.
13	Checking Harness ASSY LVPS for continuity Disconnect P/J11 on HVPS/MCU. Disconnect P/J41 on LVPS. Is J11-10 <=> J41-7 continuous normally?	Replace LVPS.	Replace Harness ASSY LVPS.

<FIP1.9 Paper Jam/Tray to Regi>

Step	Check	Yes	No
	Possible causative parts: 150 Feeder ASSY 150 Paper Cassette Sensor Regi Actuator B Chute ASSY FDR1 HVPS/MCU LVPS Chute ASSY FDR2 Clutch ASSY PH Roll ASSY Retard Clutch PR- Regi 550 Feeder Option 550 Feeder ASSY 550 Paper Cassette		
1	Checking the paper size setup Does the paper size in use match the size setup by Guide ASSY End or by the driver on the PC?	Go to step 2.	Replace the paper, or change the paper size setup.
Step	Check	Yes	No
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2	Does error occur when the power is turned ON?	Go to step 3.	Go to step 5.
3	Checking the paper at Actuator B Does the paper remain at Actuator B of Sensor Regi?	Remove the paper, and go to step 4.	Go to FIP2.5 Sensor Regi.
4	Does error occur when the power is turned ON?	Go to FIP2.5 Sensor Regi.	Go to step 5.
5	Checking Roll ASSY Retard Is Roll ASSY Retard not damaged, and installed correctly? Check the operation of it assembled each Paper Cassette.	Go to step 6.	Replace Roll ASSY Retard.
6	Carrying out a test printing Does error occur, when the test printing is done with the paper supplied from the Tray 1 or Tray 2? With the Option 550 Paper Feeder is installed, does Error occur, when the test printing is done with the paper supplied from the Tray 3 or Tray 4?	Go to step 7.	End of work
7	Checking the paper position Remove EP Cartridge. Does the front end of paper touch Actuator B of Sensor Regi?	Go to step 8.	Go to FIP2.5 Sensor Regi.
8	Checking a tray feeding the paper When test printing, is the paper supplied from Tray 1 or Tray 2?	With tool go to step 9. Without tool go to step 10.	Go to step 11.
9	Checking Clutch ASSY PH for operation Does Clutch ASSY PH operate normally?	Go to step 11.	Go to FIP2.16 Clutch ASSY PH.
10	Checking Chute ASSY FDR1/2 for operation Does each gear and roller of Chute ASSY FDR1/2 rotate smoothly? Turn each gear and roller with a finger to check.	Go to step 11.	Replace Chute ASSY FDR1/2.
11	Checking a paper feeding tray When test printing, is the paper supplied from Tray 3 or Tray 4?	With tool go to step 12. Without tool go to step 13.	Check if the paper is set, and then go to step 8.
12	Checking Clutch ASSY PH for operation Does Clutch ASSY PH operate normally?	Go to step 14.	Go to FIP2.25 Clutch ASSY PH.
13	Checking 550 Feeder Option operation Does each gear and roller of 550 Feeder Option rotate smoothly? Turn each gear and roller with a finger to check.	Go to step 15.	Replace Option 550 Paper Feeder.
14	Checking Clutch PR- Regi for operation Does Clutch PR- Regi operate normally?	Replace HVPS/MCU.	Go to FIP2.26 Clutch PR- Regi.
15	Checking Roll Pinch Turn for operation Does Roll Pinch Turn rotate smoothly? Turn Roll Pinch Turn with a finger to check.	Replace HVPS/MCU.	Replace Roll ASSY Turn.

Step	Check	Yes	No
	Possible causative parts: 150 Feeder ASSY 150 Paper Cassette Sensor Regi Actuator B LVPS HVPS/MCU Clutch Regi Chute ASSY FDR1 Gear ASSY Housing Sensor No Paper Chute ASSY FDR2 Plate ASSY BTM Roll ASSY Retard Clutch ASSY PH Roll ASSY Turn Clutch PR- Regi 550 Feeder ASSY 550 Paper Cassette		
1	Does error still occur, after removing all the jamming paper from the feeding tray?	Go to step 2.	Go to FIP1.14 Paper out / Tray 1, 2.
2	Checking paper condition Is the paper curled, damaged or damp?	Replace the paper with a new and dry one.	Go to step 3.
3	Checking the paper size setup Does the paper size in use match the size setup by Guide ASSY End or by the driver on the PC?	Go to step 4.	Replace the paper, or set up the paper size correctly.
4	Checking Plate ASSY BTM for operation Is Plate ASSY BTM pushed up, and moved up and down smoothly, when installing Paper Cassette? Remove Paper Cassette. Check if Plate ASSY BTM is pushed up, while installing Paper Cassette. Push Plate ASSY BTM down and release, and check the movement. Check visually if Plate ASSY BTM is incline to right or left.	Go to step 5.	Replace Plate ASSY BTM.
5	Is Side Guide tightening the paper too much?	Slightly widen the Side Guide, and run the paper again.	Go to step 6.
6	Checking Gear ASSY Housing for rotation Remove EP Cartridge. Does each gear of Gear ASSY Housing rotate normally?	Go to step 7.	Check operation and mounting of Gear ASSY Housing, and then go to FIP2.2 Main Motor.

<FIP1.10 Paper Jam/Misfeed>

Step	Check	Yes	No
7	Checking paper position Remove EP Cartridge. Does the front end of paper touch Actuator B of Sensor Regi?	Go to step 8.	Go to FIP2.5 Sensor Regi.
8	Checking Roll ASSY Retard Is Roll ASSY Retard clean and installed correctly? Check Roll ASSY Retard installed to each Paper Cassette.	Go to step 9.	Replace Roll ASSY Retard.
9	Checking the paper feeding tray Is the paper for test printing supplied from Tray 1 or Tray 2?	With tool go to step 10. Without tool go to step 11.	Go to step 12.
10	Checking Clutch ASSY PH for operation Does Clutch ASSY PH operate normally?	Go to step 12.	Go to FIP2.16 Clutch ASSY PH.
11	Checking Chute ASSY FDR1/2 for rotation Does each gear and roller of Chute ASSY FDR1/2 rotate smoothly? Turn each gear and roller with a finger to check.	Go to step 12.	Replace Chute ASSY FDR1/2.
12	Checking the paper feeding tray Is the paper for test printing supplied from Tray 3 or Tray 4?	With tool Go to step 13. Without tool Go to step 14.	Confirm that the paper is set, and then go to step 9.
13	Checking Clutch ASSY PH for operation Does Clutch ASSY PH operate normally?	Go to step 15.	Go to FIP2.25 Clutch ASSY PH.
14	Checking 550 Feeder Option for operation Does each gear and roller of 550 Feeder Option rotate smoothly? Turn each gear and roller with a finger to check.	Go to step 16.	Replace 550 Feeder Option.
15	Checking Clutch PR- Regi for operation Does Clutch PR- Regi operate normally?	Replace HVPS/MCU.	Go to FIP2.26 Clutch PR- Regi.
16	Checking Roll ASSY Turn for rotation Does Roll ASSY Turn rotate smoothly? Turn Roll ASSY Turn with a finger to check.	Replace HVPS/MCU.	Replace Roll ASSY Turn.

<FIP1.11 EP Cartridge>

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU EP Cartridge Guide ASSY CRU R		
1	Checking EP Cartridge (1) Is the EP Cartridge appropriate model? Remove the EP Cartridge to check the model.	Go to step 2.	Replace EP Cartridge.
2	Checking EP Cartridge (2) Install the EP Cartridge again. Does STATUS 1-6 occur again when the power is turned ON?	Go to step 3.	End of work

Step	Check	Yes	No
3	Checking Guide ASSY CRU R Remove Guide ASSY CRU R. Is each harness continuous?	Go to step 4.	Replace Guide ASSY CRU R.
4	Checking EP Cartridge (3) Replace the EP Cartridge. Does error occur again when the power is turned ON?	Replace HVPS/MCU.	End of work

<FIP1.12 Paper Size Error>

Step	Check	Yes	No
	Possible causative parts: 150 Feeder ASSY 150 Paper Cassette Sensor Regi Actuator B HVPS/MCU Guide Tray Left 550 Feeder ASSY 550 Paper Cassette		
1	Checking the paper size setup Does the paper size in use match the size setup by Guide ASSY End or by the driver on the PC?	Go to step 2.	Replace the paper, or change the paper size setting.
2	Checking NVRAM data Does NV01 Configuration 2 meet the specifications?	Go to step 3.	Modify the memory data.
3	Checking Regi Sensor Remove EP Cartridge. Keep the lever of Interlock S/W pushed as opening Cover Open. Does the number of Sensor/Switch Check increase one by one, when Actuator B of Sensor Regi is pushed and released?	Go to step 4.	Go to FIP2.5 Sensor Regi.
4	Checking the paper feeding tray Is the paper supplied from Tray 1 or Tray 2, when error is occurred?	Go to step 5.	Go to step 6.
5	Checking Paper Cassette (1) Are Guide ASSY End, Gear Sector, Rack Size, Link SW Size1/2/3 of Paper Cassette of Tray 1 or Tray 2 installed correctly?	Go to FIP2.17 Guide Tray Left.	Reinstall the parts causing Error.
6	Checking the paper tray Is the paper supplied from Tray 3 or Tray 4 when Error is occurred?	Go to step 7.	Replace HVPS/MCU.
7	Checking Paper Cassette (2) Are Guide ASSY End, Gear Sector, Rack Size, Link SW Size1/2/3 of Paper Cassette of Tray 3 or Tray 4 installed correctly?	Go to FIP2.24 OPT ASSY Size.	Reinstall the parts causing Error.

<FIP1.13 No Tray/Tray 1,2>

Step	Check	Yes	No
	Possible causative parts: Guide Tray Left 150 Paper Cassette HVPS/MCU 550 Paper Cassette		
1	Does error occur with Tray 3 or Tray 4?	Go to FIP1.22 "No Tray/Tray 3.4".	Go to step 2.
2	Does error still occur, after removing and reinserting the Paper Cassette of Tray 1 and Tray 2?	Go to step 3.	End of work
3	Checking Paper Cassette Are Guide ASSY End, Gear Sector, Rack Size, Link SW Size 1/2/3 of Paper Cassette of Tray 1 or Tray 2 installed correctly?	Go to FIP2.17 Guide Tray Left.	Reinstall the obstructive parts.

<FIP1.14 No Paper/Tray 1,2>

Step	Check	Yes	No
	Possible causative parts: Sensor No Paper Actuator No Paper HVPS/MCU LVPS		
1	Does Error Code indicate Tray 3 or Tray 4?	Go to FIP1.23 "No Paper/Tray 3, 4".	Go to step 2.
2	Checking if there is any paper Is there any paper in Tray 1 or Tray 2?	Go to step 3.	Supply paper.
3	Is Plate ASSY BTM lifted correctly?	Go to step 4.	Remove Paper Cassette, and then reinstall it correctly.
4	Checking Actuator No Paper for operation Remove Paper Cassette. When putting hand from the cassette insertion space to move Actuator No Paper, does Actuator No Paper move smoothly?	Go to step 5.	Replace Actuator No Paper.
5	Checking Sensor No Paper for operation Remove EP Cartridge. Does number of Sensor/Switch Check increase by one, when Actuator No Paper is pushed and released?.	Replace HVPS/MCU.	Go to FIP2.6 Sensor No Paper.

<FIP1.15 Low Paper in Tray/Tray 2>

Step	Check	Yes	No
	Possible causative parts: Sensor Low Paper Actuator Plate ASSY BTM HVPS/MCU 550 Paper Cassette 550 Feeder ASSY		
1	Checking the sensor for operation Does error still occur, after Paper Cassette filled with a specified amount of paper is inserted into Tray 2?	Go to step 2.	End of work
2	Checking Actuator for function Remove Paper Cassette. Does Actuator move smoothly, when moving Actuator up and down with a finger? Does Actuator go into the sensor part of Sensor Low Paper, when the flag is pushed up? Does Actuator go out of the sensor part of Sensor Low Paper, when the flag is released?	Go to step 3.	Replace Actuator.
3	Checking Plate ASSY BTM for operation Does Plate ASSY BTM move Actuator normally, when Plate ASSY BTM is pushed or released?	Go to FIP2.7 Sensor Low Paper.	Replace Plate ASSY BTM.

<FIP1.16 Drum Life>

Step	Check	Yes	No
	Possible causative parts: EP Cartridge Guide ASSY CRU R HVPS/MCU		
1	Checking EP Cartridge Does error still occur, after installing a new Cartridge?	Go to step 2.	End of work
2	Checking Guide ASSY CRU R for continuity Remove EP Cartridge. Remove Guide ASSY CRU R. Is each cable of each harness continuous?	Replace HVPS/MCU.	Replace Guide ASSY CRU R.

<FIP1.17 Fuser Life>

Step	Check	Yes	No
	Possible causative parts: Fuser ASSY Harness ASSY Fuser HVPS/MCU		
1	Checking Fuser ASSY Does error still occur, after installing a new Fuser ASSY and sending reset fuser life warning command?	Replace HVPS/MCU.	End of work

<FIP1.18 No Paper>

Step	Check	Yes	No
	Possible causative parts: Power Cord LVPS HVPS/MCU Operation Panel Harness ASSY Panel Interlock S/W 24V Interlock S/W 5V Interlock S/W Rear Fan Main Fan SUB ROS ASSY Fuser ASSY Gear ASSY Housing Main Motor Clutch Regi PWBA ESS PWBA Feeder 550 PWBA Duplex Clutch ASSY PH Clutch PR- Regi		
1	Checking Power Cord for continuity Is each cable of Power Cord continuous?	Go to step 2.	Replace Power Cord.
2	Checking AC power source Does the voltage of AC power source meet commercial voltage?	Go to step 3.	Ask the customer to arrange the AC power source.
3	Checking the fuse Remove Shield Plate LVPS. Is the fuse on LVPS melt?	Replace LVPS.	Go to step 4.
4	Checking Option 550 Paper Feeder Do two fans rotate, when the power is turned ON? Remove Option 550 Paper Feeder to check.	Go to FIP2.20,21 PWBA Feeder 550, FIP2.25 Clutch ASSY PH, and FIP2.26 Clutch PR- Regi.	Go to step 5.
5	Checking Option Duplex Do two fans rotate, when the power is turned ON? Remove Option Duplex to check.	Go to FIP2.27 PWBA Duplex, and FIP2.28 Motor Duplex.	Go to step 6.
6	Checking 24 V power line Remove Shield Plate HVPS. Check if P/J10 is connected to HVPS/MCU. Remove EP Cartridge. Check as follows, if each voltage is 24VDC. P/J10-1 <=> P/J10-4 P/J10-2 <=> P/J10-5 P/J10-3 <=> P/J10-6 P/J10-8 <=> P/J10-7	Go to step 7.	Go to FIP2.1 LVPS.

Step	Check	Yes	No
7	Checking Clutch Regi Remove Shield Plate HVPS. Disconnect P/J243. Remove EP Cartridge. Does Fan Main rotate, when the power is turned ON?	Go to FIP2.15 Clutch Regi.	Go to step 8.
8	Checking Operation Panel Disconnect Harness ASSY Panel from PWBA ESS. Remove EP Cartridge. Does Fan Main rotate, when the power is turned ON? Check with the wind from exhaust on back of the printer.	Go to step 9.	Go to step 10.
9	Checking Harness ASSY Panel for continuity Disconnect Harness ASSY Panel from PWBA ESS. Is there any open circuit or short circuit on the harness, and is every cable continuous?	Replace Operation Panel.	Replace Harness ASSY Panel.
10	Checking ROS ASSY Disconnect P/J13, P/J16 and P/J17 from HVPS/MCU. Remove EP Cartridge. Does Fan Main rotate, when the power is turned ON?	Replace ROS ASSY.	Go to step 11.
11	Checking PWBA Feeder Disconnect P/J20 from HVPS/MCU. Remove EP Cartridge. Does Fan Main rotate, when the power is turned ON?	Replace PWBA Feeder 550.	Go to step 12.
12	Checking Interlock S/W Disconnect P/J44 and P/J45 from LVPS. Are the followings continuous when pushing the lever of Interlock S/W, and not continuous when releasing? P/J44-1 <=> P/J44-3 P/J45-1 <=> P/J45-3	Go to step 13.	Replace Interlock S/W.
13	Checking Switch I/L ASSY Disconnect P/J411. Is it continuous between P/J411-3 <=> P/J411-1, when Switch I/L ASSY is pushed, and is not when released?	Go to step 14.	Replace Switch I/L ASSY.
14	Checking Clutch ASSY PH Disconnect P/J242 and P/J247 from Harness ASSY Tray 1/2. Remove EP Cartridge. Does the Fan Main rotate, when the power is turned ON?	Go to FIP2.16 Clutch ASSY PH.	Go to step 15.
15	Checking Main Motor Disconnect P/J43 from LVPS. Remove EP Cartridge. Does Fan Main rotate, when the power is turned ON?	Go to FIP2.2 Main Motor.	Go to step 16.

Step	Check	Yes	No
16	Checking Fan Main Replace Fan Main. Remove EP Cartridge. Does the Fan Main rotate, when the power is turned ON?	End of work	Go to step 17.
17	Checking Fan SUB Replace Fan SUB. Does the Fan SUB rotate, when the power is turned ON?	End of work	Replace HVPS/MCU.

<FIP1.19 LCD/LED Display Error>

Step	Check	Yes	No
	Possible causative parts: Operation Panel Harness ASSY Panel HVPS/MCU LVPS		
1	Checking 3.3VDC power line Is the voltage across the harness of Operation Panel, 3.3 VDC?	Go to step 2.	Go to step 4.
2	Checking Operation Panel for continuity (1) Is every cable of Harness ASSY Panel continuous?	Go to step 3.	Replace Harness ASSY Panel.
3	Checking Operation Panel (2) Is the display stable, after replacing Operation Panel?	End of work	Replace HVPS/MCU.
4	Checking the power to Operation Panel Is the voltage across P/J28-5 <=> P/J28-4 on HVPS/MCU, 3.3VDC?	Go to step 5.	Replace HVPS/MCU.
5	Checking FCC ASSY ESS for continuity Disconnect P/J28 from HVPS/MCU. Are the following continuous normally? P/J28-5 <=> P/J280-22 P/J28-4 <=> P/J280-23	Replace PWBA ESS.	Replace FCC ASSY ESS.

<FIP1.20 Inoperative Keypad>

Step	Check	Yes	No
	Possible causative parts: Operation Panel Harness ASSY Panel HVPS/MCU LVPS		
1	Checking 3.3 VDC power line Is the voltage across the harness of Operation Panel, 3.3 VDC?	Go to step 2	Go to step 4
2	Checking Operation Panel for continuity (1) Is every cable of Harness ASSY Panel continuous?	Go to step 3.	Replace Harness ASSY Panel.

Step	Check	Yes	No
3	Checking Operation Panel (2) Is the display stable, after replacing Operation Panel?	End of work	Replace HVPS/MCU.
4	Checking the power to Operation Panel Is the voltage across P/J28-5 <=> P/J28-4 on HVPS/MCU, 3.3VDC?	Go to step 5.	Replace HVPS/MCU.
5	Checking FCC ASSY ESS for continuity Disconnect P/J28 from HVPS/MCU. Are the following continuous normally? P/J28-5 <=> P/J280-22 P/J28-4 <=> P/J280-23	Replace PWBA ESS.	Replace FCC ASSY ESS.

<FIP1.21 Other Printer Error>

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU LVPS		
1	Carrying out a test printing Is the printer able to test print?	Go to step 4.	Go to step 2.
2	Checking LVPS (1) Remove Shield Plate LVPS. Remove EP Cartridge. Is the voltage across P/J11-13 <=> P/J11-14 on HVPS/ MCU, 5 VDC?	Go to step 3.	Go to FIP2.1 LVPS.
3	Checking LVPS (2) Remove EP Cartridge. Is the voltage across P/J11-16 <=> P/J11-15 on HVPS/MCU, 3.3 VDC?	Replace HVPS/MCU.	Go to FIP2.1 LVPS.
4	Checking the test printing after installing EP Cartridge. Is the printer reset?	Go to FIP2.19 Electrical Noise.	Go to step 5.
5	Checking Interface Cable Does the problem still occur, after replacing Interface Cable to connect the host with the printer?	Go to step 6.	End of work
6	Check after replacing HVPS/MCU Replace HVPS/MCU. Does the problem still occur, after replacing HVPS/MCU?	Let the customer know that possible cause may be in the host computer.	End of work

<FIP1.44 Face Up Tray Error>

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU Sensor Face Up Open Gate FU Lever Gate FU		
1	Checking Actuator for operation Does Actuator Full Stack in Gate FU move smoothly, when moving Lever Gate FU up and down?	With tool go to step 2. Without tool go to step3.	Replace Gate FU.
2	Checking Sensor Face Up for operation Remove EP Cartridge. Does the number of Sensor/Switch Check increase by one, every time moving Lever Gate FU up and down?	Go to step 3.	Go to FIP2.45 Sensor Face Up Open.
3	Checking Sensor Face Up Open for operation Replace Sensor Face Up Open. Does the problem still occur, after replacing Sensor Face Up Open?	Replace HVPS/MCU.	End of work

<FIP1.45 Full Stack Error/500 Paper Exit>

Step	Check	Yes	No
	Possible causative parts: Sensor Full Stack Actuator Full Stack HVPS/MCU		
1	Checking Actuator Full Stack for operation Does Actuator Full Stack in paper feed out section move smoothly?	With tool go to step 2. Without tool go to step3.	Replace Actuator Full Stack.
2	Checking Sensor Full Stack for operation (1) Remove EP Cartridge. Does the number of Sensor/Switch Check increase by one, every time pushing and releasing Actuator Full Stack?	Go to step 3.	Go to FIP2.46 Sensor Full Stack.
3	Checking Sensor Full Stack for operation (2) Replace Sensor Full Stack. Does the problem still occur, after replacing Sensor Full Stack?	Replace HVPS/MCU.	End of work

4.2 Level 2 FIP

<FIP2.1 LVPS>

Step	Check	Yes	No
	Possible causative parts: LVPS HVPS/MCU Harness ASSY LVPS		
1	Checking LVPS control power Remove Shield Plate LVPS. Disconnect P/J41 from LVPS. Turn the power ON. Check the voltages below are in specified value. P/J41-1 <=> P/J41-2: 3.3 V P/J41-4 <=> P/J41-3: 5 V	Go to step 2.	Replace LVPS.
2	Checking LVPS driving power Disconnect P/J42 from LVPS. Turn the power ON. Is the voltage across P/J42-1 <=> P/J42-2, 24 VDC?	Go to step 3.	Go to FIP2.9 Interlock S/W 24V, FIP2.11 Interlock S/W Rear or FIP2.12 Switch I/L ASSY.
3	Checking Harness ASSY LVPS for continuity Turn the power OFF. Disconnect P/J11 from HVPS/MCU. Disconnect P/J41 from LVPS. Is each cable of J11 <=> J41 continuous?	Go to step 4.	Replace Harness ASSY LVPS.
4	Checking AC power source Is AC power supply outlet appropriately wired and earthed?	Replace HVPS/MCU.	Inform the client or the electrician.

<FIP2.2 Main Motor>

Step	Check	Yes	No
	Possible causative parts: Main Motor Harness ASSY LVPS LVPS HVPS/MCU		
1	Checking Main Motor Remove EP Cartridge. Close Cover Open. Does Main Motor rotate, when the power is turned ON? Check by rotation sound of Main Motor.	Go to step 2.	Go to step 3.
2	Is the trouble eliminated?	End of work	Go to step 3.
3	Checking Harness ASSY LVPS for continuity (1) Remove Shield Plate LVPS. Disconnect P/J41 from LVPS. Disconnect P/J11 from HVPS/MCU. Is each cable of P/J41 <=> P/J11 continuous?	Go to step 4.	Replace Harness ASSY LVPS.

Step	Check	Yes	No
4	Checking Harness ASSY LVPS for continuity (2) Remove Shield Plate LVPS. Disconnect P/J42 from LVPS. Disconnect P/J10 from HVPS/MCU. Is each cable of P/J42 <=> P/J10 continuous?	Go to step 5.	Replace Harness ASSY LVPS.
5	Checking LVPS Replace LVPS. Is the trouble eliminated?	End of work	Go to step 6.
6	Checking HVPS/MCU Replace HVPS/MCU. Is the trouble eliminated?	End of work	Replace Main Motor.

<FIP2.3 ROS ASSY>

Step	Check	Yes	No
	Possible causative parts: ROS ASSY Harness ASSY ROS Interlock S/W 5V Harness ASSY LVPS HVPS/MCU LVPS		
1	Checking the power to Laser Diode of ROS ASSY Remove Cover Top ASSY. Disconnect P/J140 from ROS ASSY. Install EP Cartridge. Close Cover Open. Is the voltage across J140-8 <=> J140-7, 5 VDC?	Go to step 8.	Go to step 2.
2	Checking Interlock S/W 5V Remove Interlock S/W 5V. Is it continuous between P/J142-1 <=> P/J142-2, when Interlock S/W 5V is pushed, and is not when released?	Go to step 3.	Replace Interlock S/W 5V.
3	Checking Switch I/L ASSY 5V Remove Switch I/L ASSY 5V. Is it continuous between P/J144-1 <=> P/J144-2, when Switch I/L ASSY 5 V is pushed, and is not when released?	Go to step 4.	Replace Switch I/L ASSY 5V.
4	Checking Harness ASSY LVPS Disconnect P/J141 of Harness ASSY LVPS. Is it conductive between P/J141-1 <=> P/J141-2 when Interlock S/W 5V and Switch I/L ASSY 5V are pushed simultaneously, and is not when released?	Go to step 5.	Replace Harness ASSY LVPS.
5	Checking Harness ASSY ROS Disconnect P/J14 from HVPS/MCU. Disconnect P/J140 from ROS ASSY. Is it continuous between P/J14-1 <=> P/J140-8, when Interlock S/W 5V and Switch I/L ASSY 5V are pushed simultaneously, and is not when released?	Go to step 6.	Replace Harness ASSY ROS.

Step	Check	Yes	No
6	Checking power to HVPS/MCU Remove Shield Plate LVPS. Install EP Cartridge. Disconnect P/J41 from LVPS. Is the voltage across P/J41-4 <=> P/J41-3, 5 VDC?	Replace LVPS.	Go to step 7.
7	Checking HVPS/MCU for continuity Disconnect P/J14 and P/J11 from HVPS/MCU. Is P/J14-1 <=> P/J11-13 continuous normally?	Go to step 8.	Replace HVPS/MCU.
8	Checking Harness ASSY LVPS for continuity Disconnect P/J11 from HVPS/MCU. Is P/J11-13 <=> P/J41-4 continuous normally?	Go to step 9.	Replace Harness ASSY LVPS.
9	Checking /ROSMOT ON signal of Scanner Motor Install EP Cartridge. Close Cover Open. Is P/J13-3 <=> P/J13-2 on HVPS/MCU, 0 V just after when the power is turned ON, and 5VDC 10 seconds after stopping Main Motor?	Go to step 11.	Go to step 10.
10	Checking Harness ASSY ROS for continuity Disconnect P/J13 from HVPS/MCU. Is each cable of P/J13 <=> P/J130 continuous?	Replace HVPS/MCU.	Replace Harness ASSY ROS.
11	Checking Harness ASSY ROS for continuity Disconnect P/J17 and P/J16 from HVPS/MCU. Disconnect P/J170 and P/J160 from ROS ASSY. Are the following continuous normally? P/J17 <=> P/J170 P/J16 <=> P/J160	Go to step 12.	Replace Harness ASSY ROS.
12	Checking SOS power circuit of ROS ASSY Disconnect P/J140 from ROS ASSY. Are the following continuous normally? P/J140-8 <=> P/J201-1 P/J140-6 <=> P/J201-2 P/J140-7 <=> P/J201-3	Go to step 13.	Replace ROS ASSY.
13	Checking after replacing HVPS/MCU Replace HVPS/MCU. Does the problem still occur, after replacement?	Go to step 14.	End of work
14	Checking after replacing ROS ASSY Replace ROS ASSY. Does the problem still occur, after replacement?	Go to FIP2.19 Electrical Noise.	End of work

<FIP2.4 Fuser ASSY>

Step	Check	Yes	No
	Possible causative parts: Fuser ASSY HVPS/MCU Interlock S/W 24V Harness ASSY Fuser 100V/200V Harness ASSY AC100V/200V LVPS Harness ASSY LVPS		

Step	Check	Yes	No
1	Checking Heater circuit for continuity Remove Shield Plate LVPS. Disconnect P/J47 from LVPS. Are the following continuous normally? J47-1 <=> J47-5 J47-1 <=> J47-3	Go to step 3.	Go to step 2.
2	Checking Harness ASSY Fuser for continuity Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Are the following continuous normally? J4647B-3 <=> J47-1 J4647B-2 <=> J47-3 J4647B-1 <=> J47-5	Replace Fuser ASSY.	Replace Harness ASSY Fuser.
3	Checking Fuser power source voltage Disconnect P/J48 from LVPS. Remove EP Cartridge. Turn the power to ON. Is the voltage across P/J48-1 <=> P/J48-3, commercial voltage?	Go to step 5.	Go to step 4.
4	Checking AC line voltage Is the AC line voltage the commercial voltage?	Replace Harness ASSY AC100V/200V.	Inform the client or the electrician.
5	Checking Heater Rod ON signal voltage Make sure Fuser ASSY is cooled down. Make sure that EP Cartridge is removed. Is the voltage across P/J41-13 and P/J41-12 <=> P/J41-3, 0VDC when Heater Rod lights on, and 3.3VDC when off?	Go to step 7.	Go to step 6.
6	Checking Harness ASSY LVPS for continuity Disconnect P/J11 from HVPS/MCU. Are the following continuous normally? P/J41-1 <=> P/J11-16 P/J41-9 <=> P/J11-8 P/J41-10 <=> P/J11-7 P/J41-12 <=> P/J11-5 P/J41-13 <=> P/J11-4	Replace HVPS/MCU.	Replace Harness ASSY LVPS.
7	Checking the resistance of Thermistor of Temperature Sensor Disconnect P/J46 from LVPS. Is the resistance between P/J46-6 <=> P/J46-7 and P/J46-1 <=> P/J46-2 about 480 k-ohm in the normal temperature (about 20 °C)?	Go to step 8.	Replace Fuser ASSY.
8	Checking after replacing HVPS/MCU Replace HVPS/MCU. Does the problem still occur after replacement?	Go to step 9.	End of work
9	Checking after replacing LVPS Replace LVPS. Does the problem still occur after replacement?	Replace Fuser ASSY.	End of work

Check Yes No Step Possible causative parts: Sensor Regi Actuator B 150 Feeder ASSY Harness ASSY Tray1 Harness ASSY Chute HVPS/MCU LVPS Checking Actuator B for operation and shape With tool go to Replace Actuator B. Remove 150 Feeder ASSY. step 2. Does Actuator B operate smoothly? Is the flag of Without tool go Actuator B formed normally to shield the Sensor to step 3. 1 detecting point? Check if the flag of Actuator B is formed normally again, pushing Actuator B by inserting a mini screwdriver from the paper entrance space at the lower and side sections each of 150 Feeder ASSY. Checking Sensor Regi (1) Replace Go to step 4. Connect the connector J241 of Harness ASSY HVPS/MCU. Tray1 to Sensor Regi, with 150 Feeder ASSY removed. 2 Remove EP Cartridge. Close Cover Open. Does the number of Sensor/Switch Check increase by one, by moving Actuator B with a mini screwdriver? Check Sensor Regi (2) Replace Go to step 4. Connect the connector J241 of Harness ASSY HVPS/MCU. Tray1 to Sensor Regi, with 150 Feeder ASSY removed. Remove EP Cartridge. 3 Close Cover Open. Is the voltage across P/J24-11 <=> P/J24-10, 3.3 VDC when Actuator B is pushed, and 0 VDC when released? Measure the voltage by moving Actuator B with a mini screwdriver. Checking the power to Sensor Regi Go to step 5. Go to step 7. Remove EP Cartridge. 4 Is the voltage across P/J24-9 <=> P/J24-10 on HVPS/MCU, about 3.3 VDC? Checking Harness ASSY Chute for continuity Go to step 6. Replace Disconnect P/J24 from HVPS/MCU. Harness ASSY Disconnect P/J245. Chute. 5 Are the following continuous normally? J24-9 <=> J245-10 J24-10 <=> J245-9 J24-11 <=> J245-8 Checking Harness ASSY Tray 1 for continuity Replace Go to step 8.

<FIP2.5 Sensor Regi >

Harness ASSY

Tray1.

Remove Sensor Regi.

P/J245-4 <=> P/J241-3 P/J245-5 <=> P/J241-2 P/J245-6 <=> P/J241-1

Are the following continuous normally?

Disconnect P/J245.

6

Step	Check	Yes	No
7	Checking HVPS/MCU for continuity Disconnect P/J11 from HVPS/MCU. Is P/J11-16 <=> P/J24-9 continuous normally?	Go to FIP2.1 LVPS.	Replace HVPS/MCU.
8	Checking Sensor Regi (3) Replace Sensor Regi. Does the problem occur after replacement?	Replace HVPS/MCU.	End of work

<FIP2.6 Sensor No Paper>

Step	Check	Yes	No
	Possible causative parts: Sensor No Paper Actuator No Paper 150 Feeder ASSY Harness ASSY Tray 1 Harness ASSY Tray 2 Harness ASSY Chute HVPS/MCU Plate ASSY BTM LVPS 550 Feeder ASSY		
1	Checking Actuator No Paper for shape and operation Does Actuator No Paper operate smoothly? Is the flag between the sensor detecting point when Actuator No Paper is low (there is no paper), and out of the detecting point when Actuator No Paper is high (there is paper)?	Go to step 2.	Replace Actuator No Paper.
2	Checking Plate ASSY BTM Fit the empty Paper Cassette. Is the flag of Actuator No Paper located in between sensor detecting point?	With tool go to step 3. Without tool go to step 4.	Replace Plate ASSY BTM.
3	Checking Sensor No Paper (1) Remove EP Cartridge. Close Cover Open. Remove Paper Cassette. Put the hand from the tray insertion space, and move Actuator No Paper up and down. Does the number increase one by one, as Actuator No Paper operates?	Replace HDVS/MCU.	Go to step 5.
4	Checking Sensor No Paper (2) Remove EP Cartridge. Close Cover Open. Remove Paper Cassette. Put the hand from the tray insertion space, move Actuator No Paper up and down. Is each voltage across P/J24-8 <=> P/J24-7 and P/J24-3 <=> P/J24-2, 0VDC when Actuator No Paper is moved up, 3.3VDC when down?	Replace HDVS/MCU.	Go to step 5.
5	Checking the power to Sensor No Paper Remove EP Cartridge. Is each voltage across P/J24-6 <=> P/J24-7 and P/J24-1 <=> P/J24-2 on HVPS/MCU, 3.3 VDC?	Go to step 6.	Go to step 8.

Step	Check	Yes	No
6	Checking Harness ASSY Chute for continuity Disconnect P/J24 from HVPS/MCU. Disconnect P/J245 and P/J248. Are the following continuous normally? $J24-6 \iff J245-13$ $J24-7 \iff J245-12$ $J24-8 \iff J245-12$ $J24-8 \iff J245-11$ $J24-1 \iff J248-5$ $J24-2 \iff J248-4$ $J24-3 \iff J248-3$	Go to step 7.	Replace Harness ASSY Chute.
7	Checking Harness ASSY Tray1 and Harness ASSY Tray 2 for continuity Remove Sensor No Paper. Disconnect P/J24 from HVPS/MCU. Are the following continuous normally? P/J245-1 <=> P/J240-3 P/J245-2 <=> P/J240-2 P/J245-3 <=> P/J240-1 P/J248-1 <=> P/J246-3 P/J248-2 <=> P/J246-3 P/J248-3 <=> P/J246-2 P/J248-3 <=> P/J246-1	Go to step 9.	Replace Harness ASSY Tray 1 or Harness ASSY Tray 2.
8	Checking HVPS/MCU for continuity Disconnect P/J11 from HVPS/MCU. Is P/J11-16 <=> P/J24-6 and P/J11-16 <=> P/J24- 1 each continuous normally?	Go to FIP2.1 LVPS.	Replace HVPS/MCU.
9	Checking Sensor No Paper (3) Replace Sensor No Paper. Does the problem still occur, after replacement?	Replace HVPS/MCU.	End of work

<FIP2.7 Sensor Low Paper>

Step	Check	Yes	No
	Possible causative parts: Sensor Low Paper Actuator Plate ASSY BTM Harness ASSY Low1 LVPS HVPS/MCU		
1	Checking Actuator for operation Install Paper Cassette. Does Actuator operate smoothly, when Plate ASSY BTP is pushed and released by the hand? Does the flag go into the detection point of the sensor, when Plate ASSY BTM is released (Actuator is pushed up), and out of the detection point, when pushed down?	With tool Go to step 2. Without tool Go to step 3.	Replace Actuator.
2	Checking Sensor Low Paper for operation (1) Remove EP Cartridge. Close Cover Open. Remove Paper Cassette. Put the hand in the tray insertion space, move Actuator. Does the number increase one by one, as Actuator moves?	Replace HDVS/MCU.	Go to step 3.

Step	Check	Yes	No
3	Checking Harness ASSY Low1 for continuity Remove Harness ASSY Low1. Is J260 <=> J26 continuous normally?	Go to step 4.	Replace Harness ASSY Low1.
4	Checking Sensor Low Paper (2) Replace Sensor Low Paper. Does the problem still occur, after replacement?	Replace HDVS/MCU.	End of work

<FIP2.8 Sensor Toner>

Step	Check	Yes	No
	Possible causative parts: Sensor Toner Sensor Toner ASSY Harness ASSY Toner1 Harness ASSY Toner2 EP Cartridge HVPS/MCU		
1	Checking EP Cartridge (1) Does sufficient toner in EP Cartridge remain?	Go to step 3.	Go to step 2.
2	Checking EP Cartridge (2) Does the problem still occur, after replacing EP Cartridge?	Go to step 3.	End of work
3	Checking Sensor Toner ASSY installation Is Sensor Toner ASSY installed correctly, and does Holder-D operate smoothly?	Go to step 4.	Replace Sensor Toner ASSY.
4	Checking Harness ASSY Toner1 for continuity Remove Harness ASSY Toner1. Is J220 <=> J221 continuous normally?	Go to step 5.	Replace Harness ASSY Toner1.
5	Checking Harness ASSY Toner2 for continuity Remove Harness ASSY Toner2. Is J22 <=> J221 continuous normally?	Go to step 6.	Replace Harness ASSY Toner2.
6	Checking Sensor Toner Replace Sensor Toner. Does the problem still occur, after replacement?	Replace HVPS/MCU.	End of work

<FIP2.9 Interlock S/W 24V>

Step	Check	Yes	No
	Possible causative parts: Interlock S/W 24V LVPS HVPS/MCU		
1	Checking Interlock S/W 24V Disconnect P/J45 from LVPS. Is P/J45-1 <=> P/J45-3 continuous, when Interlock S/W 24V is pushed, and not when released?	Go to FIP2.1 LVPS.	Replace Interlock S/W 24V.

<fip2.10 5v,="" assy<="" i="" interlock="" l="" p="" s="" switch="" w=""></fip2.10>	<fip2.10< th=""><th>Interlock</th><th>S/W</th><th>5V,</th><th>Switch</th><th>I/L</th><th>ASSY</th></fip2.10<>	Interlock	S/W	5V,	Switch	I/L	ASSY
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Step	Check	Yes	No
	Possible causative parts: Interlock S/W 5V Switch I/L ASSY Harness ASSY ROS Harness ASSY LVPS LVPS HVPS/MCU		
1	Checking Interlock S/W 5VL Remove Interlock S/W 5VL. Is P/J142-1 <=> P/J142-2 continuous, when Interlock S/W 5V is pushed, and not when released?	Go to step 2.	Replace Interlock S/W 5VL.
2	Checking Switch I/L ASSY Remove Interlock S/W 5VR. Is P/J144-1 <=> P/J144-2 continuous, when Interlock S/W 5VR is pushed, and not when released?	Go to step 3.	Replace Switch I/L ASSY.
3	Checking Harness ASSY LVPS for continuity Disconnect P/J141, P/J142 and P/J144 of Harness ASSY LVPS. Are the following continuous normally? J141-2 <=> P142-1 J141-1 <=> P144-2 J142-2 <=> P144-1	Go to step 4.	Replace Harness ASSY LVPS.
4	Checking Harness ASSY ROS for continuity Disconnect P/J141, P/J14 and P/J140 of Harness ASSY ROS. Are the following continuous normally? P141-1 <=> J14-1 P141-2 <=> P140-8	Go to FIP2.1 LVPS.	Replace Harness ASSY ROS.

<FIP2.11 Interlock S/W Rear>

Step	Check	Yes	No
	Possible causative parts: Interlock S/W Rear LVPS HVPS/MCU		
1	Checking Interlock S/W Rear for continuity Disconnect P/J44 from LVPS. Is P/J44-1 <=> P/J44-3 continuous, when Interlock S/W Rear is pushed, and not when released?	Go to FIP2.1 LVPS.	Replace Interlock S/W Rear.

<FIP2.12 Switch I/L ASSY (Interlock S/W Front R)>

Step	Check	Yes	No
	Possible causative parts: Switch I/L ASSY LVPS HVPS/MCU		
1	Checking Switch I/L ASSY for continuity Disconnect P/J411. Is P/J411-1 <=> P/J411-3 continuous, when Switch I/L ASSY is pushed, and not when released?	Go to step 2.	Replace Switch I/L ASSY.
2	Checking Harness ASSY LVPS for continuity Disconnect P/J11, P/J41 and P/J411. Are the following continuous normally? P411-3 <=> J41-5 P411-1 <=> J11-12	Go to FIP2.1 LVPS.	Replace Harness ASSY LVPS.

<FIP2.13 PWBA Exit Motor>

Step	Check	Yes	No
	Possible causative parts: PWBA Exit Motor Harness ASSY LVPS LVPS HVPS/MCU		
1	Checking Harness ASSY LVPS for continuity Disconnect P/J27, P/J10, P/J102 and P/J101 from Harness ASSY LVPS. Are the following continuous normally? J27 <=> J102 J10-8 <=> J101-2	Go to step 2.	Replace Harness ASSY LVPS.
2	Checking PWBA Exit Motor power source voltage Disconnect P/J101 from PWBA Exit Motor. Is the voltage across J101-2 <=> J101-1, 24 VDC?	Go to step 3.	Replace LVPS.
3	Checking PWBA Exit Motor Replace PWBA Exit Motor. Is the problem cleared, after replacement?	End of work	Replace HVPS/MCU.

<FIP2.14 Motor ASSY Exit>

Step	Check	Yes	No
	Possible causative parts: Motor ASSY Exit PWBA Exit Motor Harness ASSY LVPS LVPS HVPS/MCU		
1	Checking Motor ASSY Exit for operation Replace Motor ASSY Exit. Is the problem cleared, after replacement?	End of work	Go to step 3.
2	Checking Motor ASSY Exit Replace Motor ASSY Exit Is the problem cleared, after replacement?	End of work	Go to step 3.

Step	Check	Yes	No
3	Checking Harness ASSY LVPS for continuity Disconnect P/J27, P/J10, P/J102 and P/J101 from Harness ASSY LVPS. Are the following continuous normally? J27 <=> J102 J10-8 <=> J101-1	Go to step 4.	Replace Harness ASSY LVPS.
4	Checking Motor ASSY Exit power source voltage Disconnect P/J101 from PWBA Exit Motor. Is the voltage across J101-2 <=> J101-1, 24 VDC?	Go to step 5.	Replace LVPS.
5	Checking PWBA Exit Motor Replace PWBA Exit Motor. Is the problem cleared, after replacement?	End of work	Replace HVPS/MCU.

<FIP2.15 Clutch Regi>

Step	Check	Yes	No
	Possible causative parts: Clutch Regi Harness ASSY Chute Harness ASSY Tray1 LVPS HVPS/MCU		
1	Checking Harness ASSY Chute for continuity Disconnect P/J24 from HVPS/MCU. Are the following continuous normally? J24-14 <=> J245-5 J24-15 <=> J245-4	Go to step 2.	Replace Harness ASSY Chute.
2	Checking Harness ASSY Tray1for continuity Remove Clutch Regi. Disconnect P/J245. Are the following continuous normally? P/J245-9 <=> P/J243-2 P/J245-10 <=> P/J243-1	Go to step 3.	Replace Harness ASSY Tray1.
3	Checking the resistance of Clutch Regi Is the resistance of the wireround resistor between P/J243-1 <=> P/J243-2 of Clutch Regi, 172 ohm +/- 10% (at 20 °C)?	Go to step 4.	Replace Clutch Regi.
4	Checking HVPS/MCU for continuity Disconnect P/J24 and P/J10 from HVPS/MCU Is J24-14 <=> J10-1 continuous normally?	Go to FIP2.1 LVPS.	Replace HVPS/MCU.

<FIP2.16 Clutch ASSY PH>

Step	Check	Yes	No
	Possible causative parts: Clutch ASSY PH Harness ASSY Tray1 Harness ASSY Tray2 Harness ASSY Chute LVPS HVPS/MCU		

Step	Check	Yes	No
1	Checking Harness ASSY Chute for continuity Disconnect P/J24 from HVPS/MCU. Are the following continuous normally? J24-13 <=> J245-6 J24-12 <=> J245-7 J24-5 <=> J248-1 J24-4 <=> J248-2	Go to step 2.	Replace Harness ASSY Chute.
2	Checking Harness ASSY Tray1 and Tray2 for continuity Remove Clutch ASSY PH. Disconnect P/J245 or P/J248. Are the following continuous normally? P/J245-8 <=> P/J242-1 P/J245-7 <=> P/J242-2 P/J248-5 <=> P/J247-1 P/J248-4 <=> P/J247-2	Go to step 3.	Replace Harness ASSY Tray1 or Tray2.
3	Checking the resistance of Clutch ASSY PH Is each resistance of the wireround resistor between P/J242-1 <=> P/J242-2, and P/J247-1 <=> P/J247-2 of Clutch ASSY PH, 172 ohm +/- 10% (at 20 °C)?	Go to step 4.	Replace Clutch ASSY PH.
4	Checking HVPS/MCU for continuity Disconnect P/J24 and P/J10 from HVPS/MCU. Are the following continuous normally? J24-12 <=> J10-1 J24-4 <=> J10-1	Go to FIP2.1 LVPS.	Replace HVPS/MCU.

<FIP2.17 Guide Tray Left>

Step	Check	Yes	No
	Possible causative parts: Guide Tray Left Harness ASSY LVPS LVPS HVPS/MCU		
1	Checking Harness ASSY LVPS for continuity Disconnect P/J18 from HVPS/MCU. Disconnect P/J1821. Is each cable between J18 <=> J1821 continuous?	Go to step 2.	Replace Harness ASSY LVPS.
2	Checking Guide Tray Left for continuity Is each cable between Tray1 Size Switch <=> J1821, and Tray2 Size Switch <=> J1821 of Guide Tray Left continuous?	Go to FIP2.18 HVPS/MCU.	Replace Guide Tray Left.

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU Guide ASSY CRU R EP Cartridge Harness ASSY ANT Harness ASSY LVPS		
1	Checking the power by Guide ASSY CRU R Is Guide ASSY CRU R installed appropriately? Does the conducting part of Guide ASSY CRU R contact with the plate of HVPS/MCU and EP Cartridge appropriately?	Go to step 2.	Replace Guide ASSY CRU R.
2	Checking Guide ASSY CRU R Remove Guide ASSY CRU R. Is the Plate Earth of Guide ASSY CRU R damaged or soiled?	Go to step 3.	Replace Guide ASSY CRU R.
3	Checking 24 V to HVPS/MCU Remove EP Cartridge. Is the voltage across P/J10-1 <=> P/J10-4 on HVPS/MCU, 24 VDC?	Go to step 5.	Go to step 4.
4	Checking Harness ASSY LVPS for continuity Disconnect P/J10 from HVPS/MCU. Disconnect P/J42 from LVPS. Is P/J10 <=> P/J42 continuous normally?	Go to FIP2.1 LVPS.	Replace Harness ASSY LVPS.
5	Checking Harness ASSY ANT for continuity Disconnect P/J15 from HVPS/MCU. Is J15 <=> J150 continuous normally?	Replace HVPS/MCU.	Replace Harness ASSY ANT.

<FIP2.18 HVPS/MCU>

<FIP2.19 Electrical Noise>

Step	Check	Yes	No
	Possible causative parts: HVPS/MCU Guide ASSY CRU R Fuser ASSY EP Cartridge Harness ASSY ANT Harness ASSY AC100V/200V Harness ASSY LVPS Option 550 Paper Feeder PWBA Feeder 550 PWBA Duplex		
1	Checking a foreign noise Are there any other electrical appliances within 3 m of the printer, such as generators, radios and appliances with motors? Either turn off the other electrical appliances, or re- locate the printer at least 6 m from other appliances. Does the electrical noise problem still occur?	Go to step 2.	End of work
2	Checking AC ground Is AC power supply outlet wired and grounded appropriately?	Go to step 3.	Request the client to fix AC power supply outlet.

Step	Check	Yes	No
3	Checking Harness ASSY AC100V/200V Is the cable connected to Harness ASSY AC100V/200V appropriately grounded?	Go to step 4.	Install the ground screw appropriately.
4	Checking after replacing EP Cartridge Replace EP Cartridge. Does the electrical noise problem still occur, after replacement?	Go to step 5.	End of work
5	Checking Guide ASSY CRU R (1) Does the Plate Earth of Guide ASSY CRU R contact terminals on HVPS/MCU appropriately?	Go to step 6.	Replace Guide ASSY CRU R.
6	Checking Guide ASSY CRU R (2) Remove EP Cartridge. Remove Guide ASSY CRU R. Is the Plate Earth of Guide ASSY CRU R normal and not damaged or soild, or there is no disturbing object?	Go to step 7.	Clean the plate or replace Guide ASSY CRU R.
7	Checking Harness ASSY ANT for continuity Disconnect P/J15 from HVPS/MCU. Is J15 <=> J150 continuous normally?	Go to step 8.	Replace Harness ASSY ANT.
8	Checking PWB ground Remove Shield Plate LVPS and Shield Plate HVPS. Is the ground normal? Are screws for ground of the following PWBs firmly tightened? All screws of HVPS/MCU All screws of LVPS When Option 550 Paper Feeder is installed: Are screws of PWBA Feeder 550 firmly tightened? When Option Duplex is installed: Are screws of PWBA Duplex firmly tightened? When Option CT is installed: Are screws of PWBA CT firmly tightened?	Go to step 9.	Restore the inappropriate ground.
9	Checking after replacing Fuser ASSY Warning; Start the operation after the Fuser ASSY have cooled down. Replace Fuser ASSY. Does the problem still occur, after replacement?	Go to step 10.	End of work
10	Checking after replacing HVPS/MCU Replace HVPS/MCU. Does the problem still occur, after replacement?	Replace all related parts.	End of work

<FIP2.44 Motor ASSY Exit>

Step	Check	Yes	No
	Possible causative parts: Motor ASSY Exit Harness ASSY LVPS PWBA Exit Motor LVPS HVPS/MCU		

Step	Check	Yes	No
1	Checking Motor ASSY Exit. Replace Motor ASSY Exit. Is the problem cleared?	End of work	Go to step 3.
2	Checking Motor ASSY Exit Replace Motor ASSY Exit. Is the problem cleared?	End of work	Go to step 3.
3	Checking Harness ASSY LVPS for continuity Disconnect P/J27, P/J10, P/J102 and P/J101 of Harness ASSY LVPS. Are the following continuous normally? J27 <=> J102 J10-8 <=> J101-2	Go to step 4.	Replace Harness ASSY LVPS.
4	Checking the power to Motor ASSY Exit Disconnect P/J101 from PWBA Exit Motor. Is the voltage across J101-2 <=> J101-1, 24 VDC?	Go to step 5.	Replace LVPS.
5	Checking PWBA Exit Motor Replace PWBA Exit Motor. Is the problem cleared, after replacement?	End of work	Replace HVPS/MCU.

<FIP2.45 Sensor Face Up Open>

Step	Check	Yes	No
	Possible causative parts: Sensor Face Up Open Gate FU Lever Gate FU Harness ASSY Exit SNR HVPS/MCU		
1	Checking Gate FU for operation Move Lever Gate FU up and down. Does Gate FU operate smoothly? Does the actuator go into the sensor detecting point when Lever Gate FU is moved up, and out of the detecting point when down?	With tool go to step 2. Without tool go to step 3.	Replace Lever Gate FU and Gate FU.
2	Checking Sensor Face Up Open for operation (1) Remove EP Cartridge. Close Cover ASSY Rear 500. Move Lever Gate FU up and down. Does the number increase one by one, every time Lever Gate FU operates?	Replace HVPS/MCU.	Go to step 3.
3	Checking Harness ASSY Exit SNR for continuity Remove 500 Exit ASSY. Remove Harness ASSY Exit SNR. Are the following continuous normally? J29-4 <=> J291-3 J29-5 <=> J291-2 J29-6 <=> J291-1	Go to step 4.	Replace Harness ASSY Exit SNR.
4	Checking Sensor Face Up Open for operation Replace Sensor Face Up Open. Is the problem cleared?	End of work	Replace HVPS/MCU.

<FIP2.46 Sensor Full Stack>

Step	Check	Yes	No
	Possible causative parts: Sensor Full Stack Actuator Full Stack Harness ASSY Exit SNR HVPS/MCU		
1	Checking Actuator Full Stack Open Cover ASSY Rear 500. Move Actuator Full Stack with a finger. Does Actuator Full Stack operate smoothly? Does the flag go into the sensor detecting point when there is low paper, and out of the detecting point when full?	With tool go to step 2. Without tool go to step 3.	Replace Actuator Full Stack.
2	Checking Sensor Full Stack (1) Remove EP Cartridge. Close Cover ASSY Rear 500. Does the number increase one by one, every time Actuator Full Stack operates?	Replace HVPS/MCU.	Go to step 3.
3	Checking Harness ASSY Exit SNR for continuity Remove 500 Exit ASSY. Remove Harness ASSY Exit SNR. Are the following continuous normally? J29-1 <=> J290-3 J29-2 <=> J290-2 J29-3 <=> J290-1	Go to step 4.	Replace Harness ASSY Exit SNR.
4	Checking Sensor Full Stack (2) Replace Sensor Full Stack. Is the problem cleared?	End of work	Replace HVPS/MCU.

5. IMAGE QUALITY TROUBLE

5.1 Entry Chart for Image Quality Troubleshooting



Fig. 6-3

NOTE:

It is stated as the Printer Controller is normal. By operating test print with the engine only, if the trouble is on Printer Controller side or the engine side can simply be diagnosed, except those phenomena that are not able to be diagnosed by test print.

- Test print result with the engine only is normal. ---> Malfunction on Printer Controller side

- Test print result with the engine only is also abnormal. ---> Malfunction on the engine side

When it is the case of [Malfunction on Printer Controller side], replace with normal Printer Controller and normal Interface Cable, and check.

When the trouble still occurs after replacement, check the host side, and then operate Troubleshooting efficiently, using the following image quality FIP according to each phenomenon.

When the image quality trouble of print occurs, get a print to judge, understand and treat the trouble substance precisely and appropriately, and then troubleshoot efficiently, using the image quality FIP table according to each phenomenon.

When trouble restoration with image quality FIP is not possible, check again with the image quality FIP, and then replace [ESS and possible causative parts] in order and check.

- FIP-1.P1 Faint print (Low contrast)
- FIP-1.P2 Blank print (No print)
- FIP-1.P3 Solid black
- FIP-1.P4 Vertical blank lines (White stripes in paper transport direction)
- FIP-1.P5 Horizontal band cross out
- FIP-1.P6 Vertical stripes
- FIP-1.P7 Horizontal stripes
- FIP-1.P8 Partial lack
- FIP-1.P9 Spots
- FIP-1.P10 Afterimage
- FIP-1.P11 Background (Fog)
- FIP-1.P12 Skew
- FIP-1.P13 Paper damage
- FIP-1.P14 No fix

NOTE:

When horizontal lines and/or spot occur periodically, it is possibly caused by the trouble of a particular roll. In this case, measure the trouble interval on the test print, and check the relation to the roll in the table below. The interval does not necessarily match circumference of the roll. The trouble may be solved easily by the check.

Roll	Parts name	Roll diameter (mm)	Interval (mm)
Drum	EP cartridge	30.5	94.3
BTR	BTR ASSY	16.2	50.7
Heat Roll	Fuser ASSY	24.9	78.3
Pressure Roll	Fuser ASSY	30	94.2

5.2 Image Quality FIP

<FIP-1.P1 Faint print (Low contrast)>



Step	Check	Yes	No
1	Checking the paper condition Have new, dry and recommended paper on, and operate Test Print. Is the density of the image normal?	End of work	Go to step 2.
2	Checking the laser beam course Make sure there is no obstacle between ROS ASSY and Drum. Check if any stains on ROS ASSY window. Are there any obstacles on the laser beam course? Is ROS ASSY window clean?	Go to step 3.	Remove obstacles and/or clean ROS ASSY window.
3	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Is the image density normal?	End of work	Go to step 4.
4	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 5.	Replace BTR ASSY.
5	Checking the drum ground Remove Guide ASSY CRU R. Check the Plate Earth, located on the back of Guide ASSY CRU R. Is the Plate Earth stained and/or deformed?	Go to step 6.	Reform or clean the Plate Earth, or replace Guide ASSY CRU R.
6	Checking HVPS/MCU Replace HVPS/MCU. Carry out a test printing Is the problem cleared?	End of work	Go to step 7.

Step	Check	Yes	No
7	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 8.	Go to FIP2.18 HVPS/MCU.
8	Checking the image transcribe process Check the toner image formed on the drum, right after the transcribe part (BTR). Is the toner image on the drum completely transcribed on the paper?	Go to step [ESS and possible causative parts].	Go to FIP2.18 HVPS/MCU.

<FIP-1.P2 Blank print (No print)>

<pre><trouble substance=""></trouble></pre>
The entire paper is printed pure white.
< ESS and possible causative parts >
- EP Cartridge
- Guide ASSY CRU R
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- ROS ASSY
- Fuser ASSY
- LVPS

- HVPS/MCU

- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking the laser beam course Make sure there is no obstacle between ROS ASSY and Drum. Are there any obstacles on the laser beam course?	Go to step 2.	Remove obstacles.
2	Checking ROS ASSY Check if any obstacles entirely cover the ROS ASSY window. Check if the connectors of the ROS ASSY are disconnected.	Go to step 3.	Remove obstacles of ROS ASSY window and/or connect the connectors of ROS ASSY.
3	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image Is the image density normal?	End of work	Go to step 4.
4	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 5.	Replace BTR ASSY.
5	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 6.	Go to FIP2.18 HVPS/MCU.
6	Checking the image transcribe process Check the toner image formed on the drum, right after the transcribe part (BTR). Is the toner image on the drum completely transcribed on the paper?	Go to step [ESS and possible causative parts].	Go to FIP2.18 HVPS/MCU.

<FIP-1.P3 Solid black>



<Trouble substance>

The entire paper is printed jet-black.

- < ESS and possible causative parts >
- EP Cartridge
- 150 Feeder ASSY
- PWBA ESS
- ROS ASSY
- LVPS
- HVPS/MCU
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking EP Cartridge Install a new EP Cartridge. Carry out a test printing. Is the print normal?	End of work	Go to step 2.
2	Checking HVPS/MCU Cover entire ROS ASSY window. Carry out a test printing. Is the print black?	Go to FIP2.18 HVPS/MCU.	Go to step 3.
3	Checking ROS ASSY Cover a half of ROS ASSY window. Carry out a test printing. Is the print half white and half black? Is the print black?	Go to FIP2.3 ROS ASSY.	Replace HVPS/MCU.

<FIP-1.P4 Vertical blank lines (White stripes in paper transport direction)>



<Trouble substance>

There are some extremely faint or completely non-printed parts. Those non-printed parts cover a wide area vertically, along the paper feeding direction.

- < ESS and possible causative parts >
 - EP Cartridge
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- ROS ASSY
- Fuser ASSY
- Heat Roll
- Pressure Roll
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking the paper condition Have new, dry and recommended paper on. Re-print the problem image. Does the problem still occur?	Go to step 2.	End of work
2	Checking the paper transfer course Check if there are any stains or obstacles on the paper transfer course between the paper feeding entrance and the exit. Are there any obstacles on the paper transfer course?	Go to step 3.	Remove the obstacles or stains from the paper transfer course.
3	Checking the laser beam course Make sure there is no obstacle between ROS ASSY and Drum. Are there any obstacles on the laser beam course? Check if any stains on ROS ASSY window.	Go to step 4.	Remove all the obstacles from the laser beam course and/or clean ROS ASSY window.
4	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Does the problem still occur?	Go to step 5.	End of work
5	Checking BTR ASSY. Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 6.	Replace BTR ASSY.
6	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.

<FIP-1.P5 Horizontal band cross out>



<Trouble substance>

There are some extremely faint or completely non-printed parts. Those non-printed parts cover a wide area horizontally, perpendicular to the paper feeding direction.

- < ESS and possible causative parts >
- EP Cartridge
- Guide ASSY CRU R
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- ROS ASSY
- Fuser ASSY
- HVPS/MCU
- Heat Roll
- Pressure Roll
- Main Motor
- Gear ASSY Housing
- Clutch Regi
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking the paper condition Have new, dry and recommended paper on. Re-print the problem image. Does the problem still occur?	Go to step 2.	End of work
2	Checking EP Cartridge Install new EP Cartridge. Has the horizontal band cross out gone?	End of work	Go to step3.
3	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 4.	Replace BTR ASSY.
4	Checking ROS ASSY Are the connectors on ROS ASSY surely connected?	Go to step 5.	Reconnect the connectors.
5	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read? Has the horizontal band cross out gone?	Go to step 6.	Go to FIP2.18 HVPS/MCU.
6	Checking the image transcribe process Check the toner image formed on the drum, right after the transcribe part (BTR). Is the toner image on the drum completely transcribed on the paper?	Go to step 7.	Go to FIP2.18 HVPS/MCU.

Step	Check	Yes	No
7	Checking Drive ASSY and Gear ASSY Housing Replace Drive ASSY and Gear ASSY Housing. Re-print the problem image. Does the problem still occur?	Go to step 8.	End of work
8	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.
<FIP-1.P6 Vertical stripes>



<Trouble substance>

There are vertical black stripes along the paper.

- < ESS and possible causative parts >
 - EP Cartridge
 - Guide ASSY CRU R
 - BTR ASSY
 - 150 Feeder ASSY
 - PWBA ESS
 - ROS ASSY
 - HVPS/MCU
 - 550 Feeder ASSY

Step	Check	Yes	No
1	Check the paper transfer course. Check if there are any stains or obstacles on the paper transfer course between the paper feeding entrance and the exit. Are there any obstacles on the paper transfer course?	Go to step 2.	Remove the obstacles or stains from the paper transfer course.
2	Checking the laser beam course Make sure there is no obstacle between ROS ASSY and Drum. Are there any obstacles on the laser beam course? Check if any stains on ROS ASSY window.	Go to step 3.	Remove all the obstacles from the laser beam course and/or clean ROS ASSY window.
3	Checking EP Cartridge Install a new EP Cartridge. Carry out a test printing. Have the vertical black stripes gone?	End of work	Go to step 4.
4	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 5.	Replace BTR ASSY.
5	Checking ROS ASSY Are the connectors on ROS ASSY surely connected?	Go to step 6.	Reconnect the connectors.
6	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to FIP2.19 Electrical Noise.	Replace Fuser ASSY.

<FIP-1.P7 Horizontal stripes>



<Trouble substance>

There are horizontal black stripes along the paper.

- < ESS and possible causative parts >
 - EP Cartridge
 - Guide ASSY CRU R
- BTR ASSY
- 150 Feeder ASSY
- Main Motor
- Gear ASSY Housing
- PWBA ESS
- ROS ASSY
- LVPS
- HVPS/MCU
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Have the horizontal black stripes gone?	End of work	Go to step 2
2	Checking ROS ASSY Are the connectors on ROS ASSY surely connected? Is the ROS ASSY surely secured to the frame?	Go to step 3.	Reconnect the connectors and/or reinstall the ROS ASSY.
3	Checking Drive ASSY and Gear ASSY Housing Replace Drive ASSY and Gear ASSY Housing. Re-print the problem image. Does the problem still occur?	Go to step 4.	End of work
4	Checking Guide ASSU CRU R for continuity Remove EP Cartridge. Check if there are any deformation or stains on the plate of Guide ASSY CRU R. Check the continuity of the plate of Guide ASSY CRU R. Are there any deformation or stains on the plate of Guide ASSY CRU R, and does it continuous?	Go to step 5.	Replace Guide ASSY CRU R.
5	Checking connection of Guide ASY CRU R Check the contact of the plate of Guide ASSY CRU R with the terminal on HVPS/MCU. Does the plate of Guide ASSY CRU R correctly contact with the terminal on HVPS/MCU?	Go to step 6.	Replace Guide ASSY CRU R.
6	Checking Drum ground Check the Plate Earth of Guide ASSY CRU R. Are there any stains or deformation on the Plate Earth?	Go to step 7.	Restore or clean the Plate Earth, or replace Guide ASSY CRU R.

Step	Check	Yes	No
7	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 8.	Replace BTR ASSY.
8	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 9.	Go to FIP2.18 HVPS/MCU.
9	Checking the image transcribe process Check the toner image formed on the drum, right after the transcribe part (BTR). Is the toner image on the drum completely transcribed on the paper?	Go to step 10.	Replace BTR ASSY.
10	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.

<FIP-1.P8 Partial lack>



<Trouble substance>

There are some extremely faint or completely missing parts. Those missing parts are dotted in a limited area on the paper.

- < ESS and possible causative parts >
- EP Cartridge
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- HVPS/MCU
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking the paper condition Have new, dry and recommended paper on. Re-print the problem image. Does the problem still occur?	Go to step 2.	End of work
2	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Does the problem still occur?	Go to step 3.	End of work
3	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 4.	Go to FIP2.18 HVPS/MCU.
4	Checking the image transcribe process Check the toner image formed on the drum, right after the transcribe part (BTR). Is the toner image on the drum completely transcribed on the paper?	Go to step 5.	Replace BTR ASSY.
5	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.

<FIP-1.P9 Spots>



<Trouble substance>

There are toner spots all over the paper disorderedly.

- < ESS and possible causative parts >
 - EP Cartridge
 - Guide ASSY CRU R
 - BTR ASSY
 - 150 Feeder ASSY
 - PWBA ESS
 - ROS ASSY
 - HVPS/MCU
 - 550 Feeder ASSY

Step	Check	Yes	No
1	Checking EP Cartridge Install a new EP Cartridge. Carry out a test printing. Have the spots gone?	End of work	Go to step 2.
2	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 3.	Replace BTR ASSY.
3	Checking ROS ASSY Are the connectors on ROS ASSY surely connected?	Go to step 4.	Reconnect the connectors.
4	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 5.	Go to FIP2.18 HVPS/MCU.
5	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.

<FIP-1.P10 Afterimage>



<Trouble substance>

The ghost appears on the paper. The ghost may be the image of the previous page, or a part of the page currently printing.

< ESS and possible causative parts >

- EP Cartridge
- Guide ASSY CRU R
- Drive ASSY
- BTR ASSY
- 150 Feeder ASSY
- Main Motor
- Gear ASSY Housing
- Heat Roll
- Pressure Roll
- PWBA ESS
- Fuser ASSY
- HVPS/MCU
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking repeat printing Check the afterimage. Is the client printing a copy of the same image in a large quantity?	Go to step 2.	Go to step 3.
2	Print 30 pages of the image of every kind. Does the afterimage still appear?	Go to step 3.	Don't make a copy of the same image in a large quantity.
3	Checking the paper condition Have new, dry and recommended paper on. Re-print the problem image. Does the problem still occur?	Go to step 4.	End of work
4	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Does the problem still occur?	Go to step 5.	End of work
5	Checking BTR ASSY Remove BTR ASSY. Check if any stains and/or wear on BTR ASSY. Are there any stains and/or wear on BTR?	Go to step 6.	Replace BTR ASSY.
6	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step 7.	Replace Fuser ASSY.

Step	Check	Yes	No
7	Checking ground of Heat Roll, Pressure Roll and Inlet Chute Check visually, if there are any stains or transformation on the two plates on the left side of Fuser ASSY. Check the continuity between the plate on the left side of Fuser ASSY and the following points. - Back plate <=> Both ends of Heat Roll, without coating (5-10 k-ohm) - Front plate <=> The plate on Inlet Chute left end (1-2 k-ohm) Are the grounding plates of Heat Roll, Pressure Roll and Inlet Chute sound and continuous?	Go to step 8.	Replace Fuser ASSY.
8	Checking ground of Fuser ASSY Remove EP Cartridge. Check if there are any stains or deformation on Gear ASSY Housing. Check the continuity between the printer frame and screw on the back of Fuser ASSY. Are there any deformation or stains on Gear ASSY Housing? Is Fuser ASSY grounded?	Go to step [ESS and possible causative parts].	Replace Gear ASSY Housing.

<FIP-1.P11 Background (Fog)>



<Trouble substance>

There is toner stain all over or a part of the page. The stain appears as very bright gray stain.

- < ESS and possible causative parts >
- EP Cartridge
- Guide ASSY CRU R
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- ROS ASSY
- Fuser ASSY
- HVPS/MCU
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking EP Cartridge Install a new EP Cartridge. Carry out a test printing. Have the background gone?	End of work	Go to step 2.
2	Checking the image development process Operate Test Print, and turn off the power of the printer while printing. Remove the EP Cartridge with care, and check the toner image formed on the drum, right before the transcribe part (BTR). Is the image on the drum completely formed? Is the area clear and black, and easily read?	Go to step 3.	Go to FIP2.18 HVPS/MCU.
3	Checking ROS ASSY Are the connectors on ROS ASSY surely connected?	Go to step 4.	Reconnect the connectors.
4	Checking 150 Feeder ASSY ground Remove EP Cartridge. Check the continuity from the front open part between 150 Feeder ASSY metal part and printer frame metal part. Is 150 Feeder ASSY grounded?	Go to step 5.	Remove 150 Feeder ASSY and install again for correct ground.
5	Checking Fuser ASSY ground Open Cover Rear. Check the continuity between printer frame and the screw on the back of Fuser ASSY. Is Fuser ASSY grounded?	Go to step [ESS and possible causative parts].	Remove Fuser ASSY and install again.

<FIP-1.P12 Skew>



<Trouble substance>

The printed image is not paralleled with both sides of the paper.

- < ESS and possible causative parts >
- EP Cartridge
- BTR ASSY
- 150 Feeder ASSY
- Paper Cassette
- Plate ASSY BTM
- 150 Paper Feeder
- Option 550 Paper Feeder
- PWBA ESS
- Fuser ASSY
- 550 Feeder ASSY

Step	Check	Yes	No
1	Checking the installation place Check if there is any irregularity on the installation place. Check if there is any missing Foot. Is the setup surface normal?	Go to step 2.	Arrange the installation place normally.
2	Checking the paper feeding Remove the Paper Cassette. Insert the paper to the Paper Cassette correctly. Install the Paper Cassette to the printer. Install Plate ASSY BTM correctly. (not to incline right or left). Re-print the problem image. Does the problem still occur?	Go to step 3.	End of work
3	Check the paper transfer course. Check if there are any stains or obstacles on the paper transfer course between the paper feeding tray and the exit tray. Are there any obstacles on the paper transfer course?	Go to step 4.	Remove the obstacles or stains from the paper transfer course.
4	Checking the rolls on the paper transfer course Check all the rolls on the course, where the paper transfer between paper feeding entrance tray and exit tray, and check if there are any stains, wear or damages. Check if the pinch roll rotates freely, and the spring pressure is even. Are there any stains, wear or damages on the rolls in the paper transfer course?	Go to step 5.	Replace the damaged or worn- out rolls. (Refer to corresponding Chapter 4, for replacement.)
5	Checking EP Cartridge Install a new EP Cartridge. Re-print the problem image. Is the image still skew?	Go to step [ESS and possible causative parts].	End of work

<FIP-1.P13 Paper damage>



<Trouble substance>

The paper comes out from the printer crumpled, folded or worn-out.

- < ESS and possible causative parts >
- EP Cartridge
- BTR ASSY
- 150 Feeder ASSY
- PWBA ESS
- Fuser ASSY
- Heat Roll
- Pressure Roll
- Plate ASSY BTM
- Paper Cassette
- 150 Paper Feeder
- 550 Feeder ASSY
- Option 550 Paper Feeder

Step	Check	Yes	No
1	Checking the paper feeding Observe the paper feeding condition. Is the paper fed crooked?	Go to FIP- 1.P12 Skew.	Go to step 2.
2	Checking the paper condition Have new, dry and recommended paper on. Carry out a test printing. Dose the problem still occur?	Go to step 3.	End of work
3	Check the paper transfer course. Check if there are any stains or obstacles on the paper transfer course between the paper feeding tray and the exit tray. Are there any obstacles on the paper transfer course?	Go to step 4.	Remove the obstacles or stains from the paper transfer course.
4	Checking the rolls on the paper transfer course Check all the rolls on the course, where the paper transfer between paper feeding entrance tray and exit tray, and check if there are any stains, wear or damages. Are there any stains, wear or damages on the rolls in the paper transfer course?	Go to step 5.	Replace the damaged or worn-out rolls.
5	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the Gear HR with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step 6.	Replace Fuser ASSY.

Step	Check	Yes	No
6	Checking EP Cartridge Install a new EP Cartridge. Carry out a test printing. Is the paper still damaged?	Go to step 7.	End of work
7	Checking the NVRAM data Is NV02 set up correctly?	Go to step [ESS and possible causative parts].	Modify the NV code.

<FIP-1.P14 No fix>



<Trouble substance>

The printed image is not fixed on the paper properly. The image easily comes off when rubbed.

- < ESS and possible causative parts >
- PWBA ESS
- Heat Roll
- Pressure Roll
- Fuser ASSY
- LVPS

Step	Check	Yes	No
1	Checking Fuser ASSY installation Check that the levers on both sides of the Fuser ASSY is pushed down, and then re- print the problem image. Does the problem still occur?	Go to step 2.	End of work
2	Checking the paper condition Have new, dry and recommended paper on. Re-print the problem image. Does the problem still occur?	Go to step 3.	End of work
3	Checking Heat Roll and Pressure Roll Remove Fuser ASSY. Warning; Start the operation after the Fuser ASSY have cooled down. Turn the gear of the heater roller with a finger, and check the Heat Roll and Pressure Roll. Are the Heat Roll and Pressure Roll damaged or stained?	Go to step 4.	Replace Fuser ASSY.
4	Checking Fuser ASSY Turn the gear of the Heater Roller with a finger. Check the contact condition of Heat Roll and Pressure Roll when rotating. Do Heat Roll and Pressure Roll contact evenly?	Go to step [ESS and possible causative parts].	Replace Fuser ASSY.

6. JUDGEMENT OF PRINT CONSISTENCY

It is stated here how to judge simply the main print consistency printing with the standard paper (letter size).

Keep the paper packaged in the operating environment for 12 hours, and then use the paper just after when unpackaged.

NOTE:

The image quality cannot be evaluated when the machine is faulty.

<Leading edge registration>

Measurement of the amount of print shift from the ideal position on the paper Measure the amount of shift from the ideal point 15 mm away from the front end at center of right-and-left of the paper.

Reference: less than +/-2.0 mm



Fig. 6-4

<Side edge registration>

Measure the amount of shift from the ideal point 108.0 mm away from the left end at center of front-and- back of the paper.

Reference: less than +/-2.5 mm



Fig. 6-5

<Skew>

Measurement of the inclined paper feeding Measure the vertical distance of two points 190 mm away each other on the top horizontal line.

Reference: less than +/-1.2 mm



Fig. 6-6

<Perpendicularity>

Measurement of the perpendicularity for suppressing inclines of ROS and OPC Check the perpendicular line to the horizontal line to measure the horizontal distance at the point 114.5 mm away vertically from center of top horizontal line.

Reference: less than +/-0.8 mm



Fig. 6-7

<Parallelism>

The parallelism is difference of feeding speed between left and right sides of the paper. Measure the difference of length between two 234 mm long vertical lines 190 mm away each other.

Reference: less than +/-1.2 mm



Fig. 6-8

7. PREVENTIVE MAINTENANCE

When visiting the customer, perform the maintenance work other than the original purpose to avoid any trouble that may arise.

<Procedure for preventive maintenance>

- 1) Check how the customer is using the machine.
- 2) Write down the cumulative print count.

NOTE:

Use the cumulative print count as a guide of replacing periodic replacement parts. Replace the periodic replacement parts as required.

- 3) Print several piece of paper to check no problem.
- 4) Remove foreign articles on BTR ASSY, Fuser ASSY and paper transfer rolls, and clean stains with a brush and dry waste cloth.

NOTE:

When stains is heavy, clean with dampened cloth, and then clean with dry cloth. Be careful not to damage the parts to be cleaned.

5) Cleaning the fan exhaust.

Remove Cover Rear, and clean the dust on Main Fan with a brush. Remove Cover Front, and clean the dust on Fan SUB.

NOTE:

The clogged exhaust and fan cause a temperature rise inside and failures.

6) Print several piece of paper again to check no problem.

CHAPTER 7 SERVICE MODE

1. ENTERING HIDDEN FUNCTION MENU MODES

HL-8050N has 3 entrances into the hidden function menu:

- Power on. Press the **Go** button and the **Set** button (<u>Professional Menu mode</u>). See section 2. 'PROFESSIONAL MENU MODE' in this chapter.
- 2. Power on.

While holding down the **Go** button, press the + button once and then the **Set** button (<u>Service Menu mode</u>). See section 3. 'SERVICE MENU MODE' in this chapter.

3. Power on and press the specified buttons and others. See section 4. 'OTHER HIDDEN FUNCTION MENUS' in this chapter.)

2. PROFESSIONAL MENU MODE

The Professional Menu mode enables to customize various functions for specific users and may be opened to users if necessary.

2.1 Enabling and Disabling Professional Menu Mode

Entering the Professional Menu Mode

Turn the machine on. Press the **Go** button and **Set** button together to enter the Professional Menu mode.

Accessing the Required Menu

Use either "+" or "- " button to scroll through the menu listing. To select an item, press the "**Set**" button. Then the sub-menu will appear.

Scroll through the sub menu items using the "+/-" buttons. To go back to a higher level, select the "exit ..." menu in the same level using the "+/-" buttons.

Inputting a Value or Setting for a Professional Menu Mode

Enter the required mode as explained above. The setting appearing on the display is the current setting.

Select the required setting using the "+/-" buttons, then press the "**Set**" button. The previous value remains if the "**Set**" button is not pressed.

Exiting the Professional Menu Mode

There are two options to exit the Professional Menu mode; either to press "**Go**" button at any sub menus, or to go down the menu using "+/-" buttons till the menu "exit MENU" appears, and then press the "**Set**" button to exit the mode.

2.2 Function Table

The following printer settings and function will be available with this operation.

Title & Subtitle		Item to be Set	Description	
RESET SETTINGS		RESET SETTING1	Selects the "user setting 1" as the current printer setting.	
SAV	E SETTINGS	SAVE SETTING1	Saves the current printer setting as the "user setting 1".	
SAV	E FONT		This menu is effective when CompactFlash or HDD is installed in LaserJet emulation.	
	PRIMARY FONT	FONT ID=####	Saves the current primary fonts in LaserJet emulation into the storage devices, CompactFlash or HDD.	
	SECONDARY FONT	FONT ID=####	Saves the current secondary fonts in LaserJet emulation into the storage devices, CompactFlash or HDD.	
	DOWNLOAD FONT	FONT ID=####	Saves the downloaded fonts in	
	exit SAVE	FONT ID=####	storage devices, CompactFlash or HDD.	
SAVE MACRO		MACRO ID=####	Saves the macro in LaserJet emulation into the storage devices, CompactFlash or HDD. This menu is effective when CompactFlash or HDD is installed and macro is effective in LaserJet emulation.	
SPOOL PRINT		COLLATE=ON*	Enables and disables collating	
		COLLATE=OFF	print, proof print or public print.	
TRA	YCOMMAND MODE	TRAY COM.=NORM*	HP LaserJet 4 compatible.	
		TRAY COM.=SPEC.	HP LaserJet 3 compatible.	
READOUT SELECT		READOUT=ON*	When receiving DC3 in FX emulation, ignores the data received before DC1.	
		READOUT=OFF	Not ignore the data even DC3 is received.	
FONT SELECT				
	SCALABLE FONT This menu is effective	FONT=ALL*	Enables all scalable fonts when selecting PCL font setting.	
HDD is installed in LaserJet emulation.		FONT=LJ4	Disables the fonts below when selecting PCL font setting. Atlanta, Bermuda Script, PC Brussels, Copenhagen, Germany, Portugal, Calgary, San Diego, US Roman	

itle & Subtitle	Item to be Set	Description	
ONT SELECT			
FONT SELECT	PRIMARY FONT	Selects primary fonts in LaserJet emulation.	
	SECONDARY FONT	Selects secondary fonts in LaserJet emulation.	
IBM CHR SET MODE	IBM ElH=Esszet*	Places "Esszet" on E1h of IBM character set.	
	IBM E1H=Beta	Places "Beta" on E1h of IBM character set.	
W BOLD ON/OFF	W BOLD=OFF*	ON: Makes a reprinted character	
	W BOLD=ON	bold. (Print speed would get slow.)	
DLFNT Bd/It	DLFNT Bd/It=NO*	YES: Creates bold and italic font	
	DLFNT Bd/It=YES	from download fonts.	
B PROD ON/OFF	B PROD=ON*	ON: Creates bold and italic font	
	B PROD=OFF	from bitmap fonts.	
CONDENCE SELECT	CONDENC=16.66p*	Selects the pitch for EPSON /	
	CONDENC=17.14p	IBM condensed characters.	
OEM FONT SELECT	OEMFONT=DISABLE*	Enables and disables to select	
	OEMFONT=ENABLE	European Parliament fonts.	
DARK FONT SELECT	DARKFONT=DISABLE*	Enables and disables to select	
	DARKFONT=ENABLE	bold brougham.	
BRO FONT SELECT	BROBITM=DISABLE*	Enables and disable the built-in	
	BROBITM=ENABLE	10/12 pitch Brougham bitmap font.	
ISR FONT SELECT	ISRFONT=DISABLE*	Enables and disables to select	
	ISRFONT=ENABLE	Hebrew font.	
300DPI PRIORITY	3B PRIO=LOW*	The priority of selection for 300dpi bitmap fonts is standard (=low).	
	3B PRIO=HIGH	The priority of selection for 300dpi bitmap fonts is higher than scalable font. The compatibility of font selection manner with HP LaserJet 4 is not maintained if you choose 3B PRIO=HIGH.	
FX/XL SCALE FONT (EPSON/IBM Emulation mode)	SCAL.F=NORMAL*	Only similar size fonts are selectable as scalable is selected.	
	SCAL.F=ALL SIZE	All fonts are selectable.	
FX/XL SCALE ITA. (Epson/IBM Emulation mode)	ITA=OBLIQUE*	Makes upright font oblique to have italic as scalable font is selected.	
	ITA=ITALIC SEL	Uses the upright font to have italic as scalable font is selected.	
Exit FONT			

Title & Subtitle		Item to be Set	Description	
PAPER&TRAY SIZE		DEF PAPER=A4*	Printers to be shipped to the other area than USA and Canada have the A4 size setting by default.	
		DEF PAPER=LT	Printers to be shipped to USA and Canada have the Letter size setting by default.	
PAR	ALLEL MENU			
	PARALLEL TIMING	CDCC PSW=H*	BUSY signal gets high when STROBE signal goes down. This is chosen by default.	
		CDDC PSW=L	BUSY signal gets high when STROBE signal goes up.	
	STB/ACK DELAY	CDCC BSSL=L*	ACK signal is sent out before BUSY signal goes down. This is chosen by default.	
		CDCC BSSL=H	ACK signal is sent out when BUSY signal goes down.	
	INPUT PRIME	INPUT PRIME=OFF*	Not resets the printer upon INPUT PRIME signal.	
		INPUT PRIME=ON	Resets the printer upon INPUT PRIME signal.	
	exit PARALLEL			
REPRINT ON/OFF		REPRINT=ON*	Follows the user menu's setting which selects either enabling or disabling reprint function.	
		REPRINT=OFF	Disables reprint function.	
AUTO HRC ON/OFF		AUTO HRC=OFF*	Enables and disables automatic HRC	
		AUTO HRC=ON	control.	
APPI	ETALK AT/PS	APPLE TALK=PS*	Switches the emulation to the PS mode when AppleTalk receives data.	
		APPLE TALK=AUTO	The auto emulation function switches emulations.	
PS BINARY SELECT		PS BINARY=ASCII*	Handle the data as ASCII. Ctrl-T, Ctrl-C etc. are handled as the control codes. This is chosen by default.	
		PS BINARY=BIN	Binary data can be printed. Ctrl-T, Ctrl-C etc. does not work.	
PS QUOTE BINARY		PS QUOTEBIN=OFF*	Not accept the binary data even with special codes.	
		BS QUOTEBIN=ON	Accepts the binary data with special codes.	
PS 3	IMAGE MASK	PS IMAGEMSK=OFF*	ON: Makes print speed faster with an OS/2 driver.	
L		BS IMAGEMSK=ON		
PS (CELL MODE	PS CEIL=FLOOR*	Modulates calculation diffusion of PostScript.	
		PS CEIL=CEIL		

Title & Subtitle	Item to be Set	Description	
PS STATUS ECHO	STATUS ECHO=ON*	Enables and disables PS	
	STATUS ECHO=OFF	calculation.	
PROTECT OFF MODE	PRO.OFF=AUTO*	Carries out the page protect if it is turned OFF.	
	PRO.OFF=NORMAL	Carries out the page protect.	
HP ESC E COMMAND	HP ESC E=RESET*	Reset a printer with ESC E.	
	HP ESC E=F/F	Carries out form feed with ESC E.	
PS300RESO	PS300RESO=NO*	Does not reduce the resolution automatically.	
	PS300RESO=IF 2M	Reduces the resolution to 300dpi when the total memory is 2Mbytes.	
	PS300RESO=FORCE	Reduces the resolution to 300dpi.	
COPY PAGES	COPY PAGES=ON*	OFF: 1 page is fixed for the copy	
	COPY PAGES=OFF	page number.	
PANEL RESET MODE	RESET=NORMAL*	JOB: Changes "reset printer"	
	RESET=JOB	function to "job cancel" function.	
JOB TIMEOUT SEL	TIMEOUT=ON*	PJL JOB TIMEOUT is effective.	
	TIMEOUT=OFF	PJL JOB TIMEOUT does not carry out.	
DEMO PAGE ON/OFF	DEMO PAGE=ON*	Adds and removes "DEMO	
	DEMO PAGE=OFF	PAGE" into the user menu.	
JOB CANCEL TIME	TIME OUT=???sec	Selects time (1 to 255 seconds) "job cancel" job becomes time out.	
PSCOPYPAGE	PSCOPYPAGE=L3*	L2: Changes the PS copypage	
	PSCOPYPAGE=L2	operator from Level3 to Level2.	
1JOB1PAGE SEL	1 JOB1PAGE=SX*	Duplex=ON makes the printing	
	1 JOB1PAGE=DX	speed of 1 page of data faster. Sets up the printing mode. (Simplex/Duplex)	
APPLEUSBPS	BINARY=OFF*	Enables to print PS Pure Binary	
	BINAY=ON	data via Mac USB.	

Title & Subtitle	Item to be Set	Description	
TRAY ADJUST	T1TRAY YADJUST	Adjusts the position of starting	
	T2TRAY YADJUST	scanning in each paper tray.	
	T3TRAY YADJUST	(Set value: 0 – 15,	
	T4TRAY YADJUST	When the value is changed by 1,	
	DUPLEX YADJUST	it adjusts 6 dot (300dpi), about 0.5mm)	
	T1TRAY XADJUST	0.01111)	
	T2TRAY XADJUST		
	T3TRAY XADJUST		
	T4TRAY XADJUST		
	DUPLEX XADJUST		
Net Heap Size	HeapSize=xxxxK	Changes the size of Heap size area used in BR-Net. (K byte)	
PS FONT CACHE	CLEAR CACHE=OFF*	ON: Clears the Font Cache when	
	CLEAR CACHE=ON	the Job is complete.	
POWER SAVE	POWER SAVE=ON*	Enables and disables power save	
	POWER SAVE=OFF	function.	

3. SERVICE MENU MODE

By enabling the Service Menu mode provides, you will get various printer information. This mode is not open to users.

3.1 Entering the Service Menu Mode

Turn the machine on.

While holding down the **Go** button, press the + button once and then the **Set** button until the menu "-- SERVICE MENU --" appears on the LCD display.

3.2 Function Table

The following information will be available with this operation.

Title	Subtitle		Description	
SERVICE INFO	PAGE COUNT		Displays the number of printing pages.	
	JAM COUNT JAM A1 JAM A2 JAM A3 JAM A4 JAM B JAM C JAM D JAM E		Displays the number of jam occurrence.	
	REPL	ACE COUNT		
	TONER		Displays the number of the toner cartridge unit replacement.	
	FUSER UNIT PF KIT 1 PF KIT 2 PF KIT 3 PF KIT 4		Displays the number of the fuser unit replacement.	
	COVERAGE PRINT PAGES A4 PAGE LETTER PAGE LEGAL PAGE JIS B5 PAGE ISO B5 PAGE EXE PAGE A5 PAGE A6 PAGE B6 PAGE DL PAGE C5 PAGE C0M10 PAGE OTHER PAGE		Displays the average coverage (when printing Letter size paper at 100% print coverage). COVERAGE counter will be effective until the page counter counts up to 100,000 pages.	
			Displays the number of pages when printing each paper size. PRINT PAGES counter will be effective until it counts up to 100,000 pages for each paper size. For A4 and Letter size paper, up to 1,000,000 pages can be counted. B6:ISO B6 OTHER PAGE: User defined size	

Title	Subtitle		Description		
ERROR HISTORY	1:####### 2:####### 3:####### 10:########		Displays the 10 latest errors in order of newest to the oldest. NOTE: "COVER OPEN" and "NVRAM ERROR" are not displayed in the history. If an error occurs consecutively, it will be displayed only once.		
MODIFY COUNT	JAM COUNT JAM A1 JAM A2 JAM A3 JAM A4 JAM B JAM C JAM D JAM E		Displays the number of paper jam occurrence.		
	REPLACE COUNT				
	TONER		Displays the number of the toner cartridge replacement.		
	FUSER UNIT PF KIT 1 PF KIT 2 PF KIT 3 PF KIT 4		Displays the number of the fixing unit replacement.		
RESET COUNT	CLEA	R COVERAGE	Initialize average coverage counter.		
	CLEAR ERROR HIST		Initialize error history.		
NV-RAM DEBUG	NV-RAM HEX PRINT		Prints NV-RAM HEX dump.		
PPDS SUBSET	ON/OFF		SUPPORTS the PPDS Subset command in the FX Emulation mode.		
TEST MENU	FAN	TEST	Carries out movement test of FAN.		
	FAN MOTOR		Rotates the fan.		

Title	Subtitle		Description		
TEST MENU	MOTOR	TEST	Carries out movement test of MOTOR.		
		MAIN MOTOR	Rotates the main motor.		
	EXIT MOTOR		Rotates the EXIT motor.		
		DX MOTOR	Rotates the DX motor.		
		ROS MOTOR	Rotates the ROS motor.		
		CT MOTOR	Rotates the CT motor.		
		T3FEED MOTOR	Rotates the TRAY3 FEED motor.		
		T4FEED MOTOR	Rotates the TRAY4 FEED motor.		
		REGI CLUTCH	Turn on/off the regi clutch.		
		T1 CLUTCH	Turn on/off the TRAY1 FEED clutch.		
		T2 CLUTCH	Turn on/off the TRAY2 FEED clutch.		
		T3 CLUTCH	Turn on/off the TRAY3 FEED clutch.		
		T4 CLUTCH	Turn on/off the TRAY4 FEED clutch.		
		T3 TURN CLUTCH	Turn on/off the TRAY3 TURN ROLL clutch.		
	T4 TURN CLUTCH		Turn on/off the TRAY4 TURN ROLL clutch.		
		CT OFFSET	Offsets the CT.		
	SENSO	R TEST	LCD is changed as you move the sensor.		
		REGI	Regi sensor		
		EXIT	Exit sensor		
		СТ	CT sensor		
		T1 PAPER	TRAY1 paper sensor (ON: Paper detected)		
		T2 PAPER	TRAY2 paper sensor (ON: Paper detected)		
		T3 PAPER	TRAY3 paper sensor (ON: Paper detected)		
		T4 PAPER	TRAY4 paper sensor (ON: Paper detected)		
		TOP COVER	Top cover sensor (ON: Open)		
		BACK COVER	Back cover sensor (ON: Open)		
		DX COVER	DX cover sensor (ON: Open)		
		CT COVER	CT cover sensor (ON: Open)		
	BACK LEVER		Back lever (ON: Face-up ejecting)		
	[STD STACK	Standard ejecting stacker full sensor		
		CT STACK	CT ejecting stacker full sensor		
MAINTENANCE PRINT			Prints the maintenance information. (The contents are the same as the second page of Print Settings.)		

4. OTHER HIDDEN FUNCTION MENUS

4.1 Hidden Function Menus Enabled by Pressing Buttons When Turning the Machine on

The following settings and function will be available by holding down the specified buttons while turning the machine on.

Button	Display	Description	
Go	DEMO MODE=OFF* DEMO MODE=ON	Enables and disables DEMO MODE. If this function is ON (default setting), the user can set a printer to work as a demo machine. It turns OFF automatically when the printing data is sent to the printer.	
Reprint		Continuously print the test pattern sheet.	
Back		PCB ONLY Mode (Ignores the printer error such as "COVER OPEN", and starts by main PCB.)	
-	HEX DUMP MODE	Hex dump mode. Printer reset is needed to exit this function.	
+		Initializes Network NVRAM.	
Set		Clears NVRAM. This function is not normally used.	
Set & Back		Rewrites the data on the ROM.	
Go & +	DRAM CHECK START	Checks DRAM.	
Go & Back		Rewrites the data on the Rom by Compact Flash Card. Skips the function of NVRAM Clear Card.	
- & +	LINE TEST LT MX DX	Printer test mode. DO NOT USE.	
Go & –		Writes the NVRAM value to Compact Flash Card.	
Go & Job Cancel		Version check	

4.2 Parts Life Reset Function

This function is used by service specialists only when changing the periodical replacement parts to clear the life counter.

To operate this function, press the "**Go**" and "+" buttons together until the menu "RESET PARTS LIFE" appears on the LCD display. Select the required item (part name) using the "+/–" buttons, then press the "**Set**" button. See subsection 2 'PERIODICAL REPLACEMENT PARTS' in CHAPTER 5 for more information about the periodical replacement parts.

Title	Subtitle	Description
RESET PARTS LIFE	FUSER UNIT PF KIT 1 PF KIT 2 PF KIT 3 PF KIT 4	Initializes the counter of the fixing unit to zero.

5. HOW TO USE THE SELF-DIAGNOSTICS TOOLS

There are three self-diagnostics tools, which are automatically installed when the printer driver is installed:

- 1) Troubleshooting for Printer won't print
- 2) Diagnostics
- 3) Printer Information

The following sections describe the details on each tool.

5.1 Troubleshooting for Printer won't print

This tool instructs you how to clear the problem such as 'The printer can't print' or 'The printer prints garbage or incorrect fonts'.

(1) When you start the program, the Help dialog box shown below appears.

🤣 Troublesho	👂 Troubleshooting when your printer won't print 💦 🔲 🔀					
Eile Edit Books	ark Options	Help				
Contents Index	Back	Print	5<	22		
Troubleshoo <u>1.Printer wor</u> 2.Printer prin	ing when y <u>i't print</u> ts Garbage	your pri	nter wo	n't print	t (Parallel)	

Fig. 7-1

- (2) Select the problem you have had, then the specified window appears.
- (3) Follow the instructions that appear on the PC screen.

If the problem cannot be solved, start the "Diagnostics" tool to create a log file, which should be sent to the authorized service center to investigate the cause of problem. For the details on the "Diagnostics" tool, see the following section, 2 'Diagnostics'.

5.2 Diagnostics

This tool helps you to report your PC environment to investigate the cause of problem such as 'Printer won't print' or 'Printer prints garbage or incorrect fonts'. Before using this tool, however, you have to check if you can clear the problem using the 'Troubleshooting for printer won't print' tool described in the previous section.

(1) When you start the program, the dialog box shown below appears. Follow the steps described in the box, then click the **OK** button.

Diagnostics
This tool helps you to report your PC environment in order to investigate the cause of problems of "Printer won't print" and "Printer prints garbage or incorrect fonts". Before using this tool, refer to "Troubleshooting when your printer won't print" and see if you can solve the problem or not. If Troubleshooting does not solve your problem, use the tool by following the procedure below. Then, send the report created to the service center.
 Make Sure: 1. The printer is powered on. 2. Check if the parallel cable or the USB cable is connected securely. 3. Set the target printer as the Default Printer in Control Panel. 4. This diagnostics program will automatically make a log file in the following directory as "brdiag.log". If you wish to use another file name, you can change it now. 5. Click the OK button.
Report: C:¥WINNT¥brdiag.log OK Cancel



(2) The message below appears, click the **OK** button if you want to check whether there is any incorrect data or not. If you do not want to check it, click the **Cancel** button.



Fig. 7-3

(3) If you click the **OK** button in Step 2, the dialog box below appears.

RESULTS of u	sing the "Pri	nter Interfa	ce checl	k tool"	×
Please click on	the result yo	ur printer re	ported.		
Print out "C)K"				
B No print or	prints Garba	ge			
C Prints the f	ollowing erro	r print			
error p	orint:				
<mode><</mode>	(parameter)	×address)	×data13	> <data2></data2>	
01	FF-FF	0001	00	FF	
01	FF-FF	0002	01	FF	
01	FF-FF	0003	02	FF	
01	FF-FF	0004	03	FF	

Fig. 7-4

- (4) Check the result that the printer reported and click the **A**, **B** or **C** button depending on the result.
- (5) The created log file is shown on the PC screen. (The software will ask whether you wish to print the log file or not.)

Send the log file created with this tool to investigate the problem to the authorized service center.

5.3 **Printer Information**

The drum unit life or page counter is printed on Print Configuration in some countries as described in CHAPTER1 'HOW TO KNOW PAGE COUNTER & PARTS LIFE'.

This tool also shows the printer information such as printer version or page counter for all models <u>only when the printer is connected to a parallel port</u>.

(1) When you start the program, the dialog box shown below appears.

Printer Information
You can use this tool only when your printer is connected to a parallel port or a USB port. Select the LPT port (1-3) or the USB port you are using and click OK.
© LPT1: ○ LPT2: ○ LPT3: ○ USB:
OK Cancel

Fig. 7-5

- (2) Select the LPT port you are using and click the **OK** button.
- (3) The dialog box below appears and indicates from top to bottom, the printer ID, version, fixing unit life, PF kit life, laser unit life and transfer unit life.

Printer Information					
	Printer's ID	:MFG:Bro 🔺			
	Version	:1.00			
	Remaining Life of FU Parts	:196678			
	Remain PF Kit 1	:199994			
	Remain PF Kit 2	:199912			
	Remain PF Kit 3	:199999			
	Remain PF Kit 4	:200000			
	Page Counter	:3296 🗌			
		Þ			
OK					

Fig. 7-6

6. HOW TO REWRITE HL-8050N FLASH ROM

Working contents

Rewrite a Main firmware Note: Network firmware is automatically rewritten when you rewrite the firmware.

Preparation tool

- 1) PC (Windows[®] 98/Me/2000/XP) Create the folder "HL8050" in C drive.
- 2) 1 HL-8050N printer Install the HL-8050 driver in your PC.
- 3) 1 USB or parallel cable
- 4) 1 set of firmware and utilities for rewriting

FW8050.BAT	A batch file for rewriting (PrUt030010)
FILEDG32.EXE	An utility for data transferring (PrUt030003)
WAITSEC.EXE	A program for setting the machine to wait until the mode of machine is changed (PrUt030010)
LZ0182_X.BLF	Firmware for rewriting (ROM/Firmware DB)
s8050E.bin	Setup data (A4) (PrUt030011)
s8050U.bin	Setup data (Letter) (PrUt030011)
BRUSBSN.EXE	USB ID setting tool (FxUt030039)

Writing procedure

- 1) Copy a set of firmware and utilities for rewriting in HL8050 folder in C drive.
- 2) Connect the PC and printer with a USB or parallel cable.
- 3) Turn the printer ON.
- 4) Open the DOS window and switch to HL8050 foler (CD C:\HL8050).
- 5) Enter "FW8050 (the file name of firmware for rewriting) and press Enter. Ex) FW8050 LZ0182_C.BLF
- 6) The PC starts sending data to the printer and firmware rewriting will start.
- 7) The printer will automatically reboot when rewriting finishes.
- 8) Double click the FILEDG32 icon.
- 9) Drag and drop the setup data (s8050E.bin or s8050U.bin) to the connected HL-8050 printer icon in the FILEDG32.

10) On your PC, run the USB ID setting utility (BRUSBSN.EXE). The following window will appear.



11) On the Model menu, click Printer 2. In Port, make sure that the LPT1: is selected. In the Serial No = box, type the 9-digit serial number (e.g. J3W111101 printed on the nameplate labeled to the back of the machine as an ID code. Then, press the OK button. The setup utility will transmit the ID code data from your PC to the machine and then it will terminate.

(BIN file)

NOTE:

Rewriting with BIN file does not require connecting the printer to the computer. However, you need CompactFlash card for this method, and also, you need to write the firmware data into the CompactFlash card beforehand.

Using BIN file is recommended when you update firmware of several printers at once.

Things to prepare (Addition to the "Things to prepare" of BLF file)

<Hardware-related>

(1) 1 CompactFlash (some computer requires other equipment such as PCMCIA card to connect the CompactFlash card into it.)

<Software-related>

(2) Firmware : LZ0182_\$.BIN (Main firmware) *1

*1

LZ0182_\$.BIN	<i>\$ = Indicates the revision of the firmware</i>
	Ex) LZ0182_A.BIN = Main firmware of HL-8050N (Version A)

Download and extract the necessary firmware from "ROM/Firmware DB", then copy it to the "HL8050" folder created in C drive.

- (1) Insert the CompactFlash card to your computer.
- (2) If the CompactFlash card is unformatted, format it.

To format the CompactFlash card with the computer, do it from Explorer.

To format the CompactFlash card with the printer, plug the CompactFlash card to the printer while the power is off, then turn on the printer. Select [SETUP]-[DELETE STORAGE]-[FORMAT(CF)] with the control panel, then press the SET key. Press the SET key again when [OK?] message appears.

[PROGRAMING-WAIT] appears followed by [DELETESTORAGE]. [DELETESTORAGE] indicates that the formatting finished, therefore, turn the printer off and take out the CompactFlash card.

- (3) View the CompactFlash card from Explorer of your computer.
- (4) Create a folder,

\PRTCFG\SYS\BIN\HL-8050\12355\HL-8050\ (Main + Network firmware)

\PRTCFG\SYS\BIN\HL-8050\12360\HL-8050\ (Main firmware)

just beneath the root directory.

- (5) Change the BIN file name to 0001, then copy it into the folder above.
- (6) Take out the CompactFlash from the computer.

NOTE:

The consistency of the printer and data to rewrite with the following procedure is not confirmed. Therefore, make sure to check the data written in the CompactFlash card and the printer model before performing the following procedures.

(7) Turn the printer off, then insert the CompactFlash card into the printer.
(8) Turn the printer on. The printer automatically moves to the rewriting mode and starts rewriting.While rewriting the firmware, LCD blacks out and "DATA LED" blinks. Be sure NOT

to take out the CompactFlash card, or turn the printer off until it reaches to the condition of step (9). Rewriting may be impossible once the writing procedure fails.

(9) When rewriting finishes, [....Complete....] appears on LCD. Turn OFF the printer, then take out the CompactFlash from the printer.

7. NVRAM BACKUP

The following two methods can be used to copy the whole NVRAM with CompactFlash:

- 1. Write in NVRAM to CompactFlash
- 2. Write back NVRAM from CompactFlash
- 1. To write in NVRAM to CompactFlash:
 - 1. Turn off the power.
 - 2. Insert the CompactFlash into the printer slot.
 - 3. Turn on the power while pressing the "Go" and "-" keys.
 - 4. Keep pressing down the "Go" and "-" keys until "Complete" appears on the LCD display.
 - 5. If "Complete" appears, release the "Go" and "-" keys. NVRAM is now successfully copied.
- 2. To write back NVRAM from CompactFlash:
 - 1. Turn off the power.
 - 2. Insert the CompactFlash into the printer slot.
 - 3. Turn on the power without pressing any keys.
 - 4. The "SELF TEST" appears on the LCD, followed by "Now initializing".
 - 5. If "Complete" appears, NVRAM is successfully copied.
- **NOTE**
 - 1) If the serial number information written in the CompactFlash and the printer's serial number are different, the NVRAM will not be written in the printer.
 - 2) Once the NVRAM is written back from CompactFlash, the data on the CompactFlash will be eliminated automatically.

CHAPTER 8 PLUG/JACK(P/J) CONNECTOR LOCATIONS

1. CONNECTOR [P (PLUG) / J (JACK)]

1.1 List of P/J

P/J	Coordiates	Remarks
1	G-104	Connects Operation Panel and Harness ASSY Panel
10	B-111	Connects Harness ASSY LVPS and HVPS/MCU
11	D-111	Connects Harness ASSY LVPS and HVPS/MCU
13	E-111	Connects Harness ASSY ROS and HVPS/MCU
14	E-112	Connects Harness ASSY ROS and HVPS/MCU
15	F-112	Connects Harness ASSY ANT and HVPS/MCU
16	G-111	Connects Harness ASSY ROS and HVPS/MCU
17	G-111	Connects Harness ASSY ROS and HVPS/MCU
18	F-112	Connects Harness ASSY LVPS and HVPS/MCU
20	H-111	Connects Harness ASSY FDR1 and HVPS/MCU
22	I-110	Connects Harness ASSY Toner1 and HVPS/MCU
24	J-110	Connects Harness ASSY Chute and HVPS/MCU
26	I-110	Connects Harness ASSY Low Paper SNR and HVPS/MCU
27	D-111	Connects Harness ASSY LVPS and HVPS/MCU
28	K-110	Connects FFC ASSY ESS and HVPS/MCU
29 *1	K-107	Connects Harness ASSY Exit SNR1 and HVPS/MCU
30 *1	K-106	Connects Harness ASSY OCT1 and HVPS/MCU
31	C-111	Connects Guide ASSY CRU and HVPS/MCU
40	X-120	Connects Harness ASSY LVPS and LVPS
41	X-121	Connects Harness ASSY LVPS and LVPS
42	W-120	Connects Harness ASSY LVPS and LVPS
43	X-122	Connects Main Motor and LVPS
44	X-122	Connects Interlock SW Rear and LVPS
45	X-123	Connects Interlock SW 24V and LVPS
46	X-124	Connects Harness ASSY Fuser and LVPS
47	U-126	Connects Harness ASSY Fuser and LVPS
48	U-125	Connects Harness ASSY 100V and LVPS
101	V-120	Connects LVPS and PWBA Exit Motor
102	U-120	Connects Harness ASSY LVPS and PWBA Exit Motor
103	S-119	Connects Motor ASSY Exit and PWBA Exit Motor
131	B-111	Connects ROS ASSY and Harness ASSY ROS
140	A-108	Connects ROS ASSY and Harness ASSY ROS
141	U-120	Connects Harness ASSY ROS and Harness ASSY LVPS
142	R-119	Connects Harness ASSY LVPS and Interlock SW 5V
144	K-105	Connects Interlock SW and Harness ASSY LVPS

P/J	Coordiates	Remarks
150	M-121	Connects PWBA ASSY ANT and Harness ASSY ANT
160	A-108	Connects ROS ASSY and Harness ASSY ROS
170	A-107	Connects ROS ASSY and Harness ASSY ROS
220	R-127	Connects Sensor Toner and Harness ASSY Toner1
221	M-124	Connects Harness ASSY Toner1 and Harness ASSY Toner2
240	M-122	Connects Sensor No Paper and Harness ASSY Tray1
241	O-126	Connects Sensor Regi and Harness ASSY Tray1
242	O-126	Connects Clutch ASSY PH and Harness ASSY Tray1
243	P-126	Connects Clutch Regi and Harness ASSY Tray1
244	M-124	Connects Fan Main and Harness ASSY Tray1
245	M-125	Connects Harness ASSY Tray1 and Harness ASSY Chute
246	M-123	Connects Sensor No Paper and Harness ASSY Tray2
247	Q-126	Connects Clutch ASSY PH and Harness ASSY Tray2
248	M-126	Connects Harness ASSY Tray2 and Harness ASSY Chute
260	N-126	Connects Sensor Low Paper and Harness ASSY Low Paper SNR
270	T-119	Connects Fan SUB and Harness ASSY LVPS
280	K-109	Connects FFC ASSY ESS and PWBA ESS
290 *1	M-120	120 Connects Sensor Full Stack and Harness ASSY Exit SNR1
291 *1	M-120	Connects Sensor Face Up Open and Harness ASSY Exit SNR1
310	M-122	Connects EP Cartridge and Guide ASSY CRU
400	K-107	Connects Harness ASSY LVPS and PWBA ESS
411	K-106	Connects Cover Open SW and Harness ASYY LVPS
480	W-125	Connects Harness ASSY 100V and Power Switch
1821	A-109	Connects Guide Tray L ASSY and Harness ASSY LVPS
2083	H-111	Connects Harness ASSY FDR1 and Harness ASSY FDR2
JD2083B	K-108	Connects Harness ASSY Panel and ESS
2750	S-126	Connects Harness ASSY LVPS and Harness ASSY DUP
3070 *1	M-121	Connects Harness ASSY OCT1 and Harness ASSY OCT2
4647	T-126	Connects Harness ASSY Fuser and Fuser ASSY

*1:500 PAPER EXIT Only.

1.2 P/J Layout Diagram





APPENDIX 1. CONNECTION WIRING DIAGRAM

1.1 Connection Wiring Diagram

1.1.1 Symbols in the General Connection Wiring Diagram

The symbols in the general connection wiring diagram are described below.

Symbol	Description
	Represents an interconnection between parts using wiring harness or wire.
· ·	Represents an interconnection which differs according to the specifications.
	Represents an interconnection between parts using a conductive member such as a plate spring.
×-	Represents a connection between parts by tightening of a screw.
<u> </u>	Indicates a frame ground.
P/J XX	Represents a connector. The connector No. is indicated inside the box.
JP XX	Represents a connection terminal with a plate spring on the printed circuit board. The connector (terminal) No. is indicated inside the box.
PXX	Represents a connector directly connected to the printed circuit board. The connector No. is indicated inside the box.
Power Suuply A	The box containing a part name represents a part.
Main Motor	Represents a functional part within a part, and indicates the name of the functional part.
1.	Represents a section in "2. Interconnection Wiring Diagram of Parts," and indicates its section No.
0	Represents a screw for fixing wiring harness and a conductive member such as a plate spring.
	Represents a conductive member such as a plate spring.

1.1.2 General Wiring Diagram



Fig. A-1

1.2 Interconnection Wiring Diagram of Parts

1.2.1 Instructions for the Use of the Interconnection Wiring Diagram of Parts

The symbols in the general connection wiring diagram are described below. Note that the description of general symbols is omitted.

Symbol	Description
	Represents an interconnection between parts using wiring harness or wire, and indicates its signal name/contents. The arrow ">" or "<" on the line represents the direction of the signal.
	Represents an interconnection between parts using wiring harness or wire, which differs according to the specifications, and indicates its signal name/contents. The arrow ">" or "<" on the line represents the direction of the signal.
	Represents a interconnection between parts using a conductive member such as a plate spring, and indicates its signal name/ contents. The arrow ">" or "<" on the line represents the direction of the signal.
	Represents a function and a logical value (High (H) or Low (L)) of a signal when the function is activated. The voltage indicates a value when the signal is High. The arrow indicates the direction of the signal.
PAPER EXIT(L)	Represents a function and a logical value (High (H) or Low (L)) of a signal when the function is in a detectable state. The voltage indicates a value when the signal is High. The arrow indicates the direction of the signal.
†	Represents a connection between lead wires.
×-	Represents a connection between parts by tightening of a screw.
—A A—	Represents a connection between "A" and "A".
24VDC	The DC voltage indicates an approximate value measured when the negative side is connected to a signal ground (SG).
sg 📈	Indicates a signal ground (SG).
FG 💻	Indicates a frame ground (FG).
RTN	RTN Indicates a return.
P/J XX - 1 > - 2 >	Represents a connector. The connector and PIN Nos. are shown at the upper and lower parts respectively. "P,-" indicates the plug side of the connector. "J,>" indicates the jack side of the connector.
JP XX	Represents a connection terminal with a plate spring on the printed circuit board. The connector No. is indicated inside the box.
P/J XX	Represents a connector directly connected to the printed circuit board. The connector No. is indicated inside the box.

Symbol	Description
Power Suuply A	Represents a part.
Scanner ASSY	Represents a functional part within a part, and indicates the name of the functional part.
•	Indicates a reference item associated with the section.

1.2.2 Configuration of the Interconnection Wiring Diagram of Parts

The interconnection wiring diagram is divided into 6 sections. 1. to 6. indicate details of the interconnections of parts.

- Interlock S/W 24V, Interlock S/W Rear, Main Motor, Fan SUB, Motor ASSY Exit Connections of Interlock S/W 24V and I Interlock S/W Rear with LVPS Connections of Main Motor with LVPS Connections of Fan SUB with HVPS/MCU Connections of Motor ASSY Exit with PWBA Exit Motor Connections of HVPS/MCU with LVPS, PWBA Exit Motor and PWBA ESS
- 2. Fuser ASSY, Power Switch

Connections of Fuser ASSY with LVPS and Guide ASSY CRU R Connections of Fuser ASSY with LVPS and Guide ASSY CRU R

3. EP Cartridge, BTR ASSY

Connections of EP Cartridge with Guide ASSY CRU R Connections of BTR ASSY with Guide ASSY CRU R Connections of PWBA ASSY ANT with HVPS/MCU Connections of Guide ASSY CRU R with HVPS/MCU

4. 150 Paper Feeder, 550 Paper Feeder, Fan Main

Connections of Guide Tray L ASSY with HVPS/MCU Connections of Tray1 Sensor No Paper with HVPS/MCU Connections of Sensor Regi with HVPS/MCU Connections of Tray1 Clutch ASSY PH with HVPS/MCU Connections of Clutch Regi with HVPS/MCU Connections of Tray2 Sensor Low Paper with HVPS/MCU Connections of Tray2 Sensor No Paper with HVPS/MCU Connections of Tray2 Clutch ASSY PH with HVPS/MCU Connections of Tray2 Clutch ASSY PH with HVPS/MCU Connections of Fan Main with HVPS/MCU Connections of Sensor Toner with HVPS/MCU

- 5. ROS ASSY, Interlock S/W 5V, Switch I/L ASSY Connections of ROS ASSY with HVPS/MCU Connections of Interlock S/W 5V with HVPS/MCU Connections of Switch I/L ASSY with HVPS/MCU
- 6. 500 Paper Exit

Connections of HVPS/MCU with Sensor Face Up Open Connections of HVPS/MCU with Sensor Full Stack

1. Interlock S/W 24V, Interlock S/W Rear, Main Motor, Fan SUB, Motor ASSY Exit



Fig. A-2

Signal line name	Description
/Heat ON	AC power-supply control signal for Heater Rod.
	Low: ON/High: OFF
Motor ON	Control signal for Main Motor.
Motor ALM	Monitor signal for Main Motor.
Interlock AFT	Signal indicating that the rear cover is open. This signal goes High when the front or rear cover is open.
Interlock BEF	Signal indicating that the front cover is open. This signal goes High when the front cover is open.
Fan Alarm	Fan SUB monitor signal. If a trouble occurs, this signal goes High.
Exit /INB	Excitation signal for Exit Motor. Phase /B.
Exit /INA	Excitation signal for Exit Motor. Phase /A.
Exit INB	Excitation signal for Exit Motor. Phase B.
Exit INA	Excitation signal for Exit Motor. Phase A.
Exit CUR A	Current-switching signal for Exit Motor.
Exit CUR B	Current-switching signal for Exit Motor.
A and B	Current output to each winding of Exit Motor. Phases A and B.
/A and /B	Current output to each winding of Exit Motor. Phases A and B.
/PRFD	Pre-feed signal. This is effective only when /RDY is Low.
/CCLK	Clock signal. This is sent out simultaneously with /STA or /CMD.
/CMD	Command signal. When /CBSY is Low, it is sent out from the controller in synchronism with /CCLK.
/CPRDY	Ready signal for the controller power supply. This signal goes Low when the controller power supply is ON and, at the same time, initialization of the CPU is completed. When a trouble occurs with the CPU, the signal goes High.
/START	Print start signal. This is effective only when /RDY is Low.
/CBSY	Command busy signal. This goes Low when /CMD is sent out (except when /SBSY is Low or /PPRDY is High).
/STA	Status signal. Status is sent in synchronism with /CCLK when /SBSY is Low.
/SBSY	Status busy signal. This signal is Low when the printer is sending /STA (except when /CBSY is Low or /CPRDY is High).
/TOP	Vertical sync signal for image data. This is periodically sent out when ROS Motor is in operation.
/RDY	Ready signal. This signal is Low in a standby state where reception of / START is awaited.
/PPRDY	Ready signal for the printer power supply. This goes Low when the printer power supply is turned on and initialization of the CPU is completed. This signal goes High when the MCP detects an error.
/BD	Horizontal sync signal for image data. This is periodically sent out when ROS Motor is in operation.
/SLP	Control signal for LVPS. This goes Low in power saving mode.
/VDO1	Image data signal. This is sent out in synchronism with /TOP
/VDO2	and /BD. This signal goes High (White) for other than effective data.

2. Fuser ASSY, Power Switch



Fig. A-3

Signal line name	Description
/EXIT	Signal from Exit Sensor. This signal goes Low when light is received.
STS	Temperature monitor signal (analog signal) from Temperature Sensor (Thermistor). It detects the temperature on the surface of Heat Roll.
PRB	Output from HVPS which applies a high voltage to Pressure Roll.

3. EP Cartridge, BTR ASSY



Fig. A-4

Signal line name	Description
DB	Output from HVPS to Mag Roll (Development bias)
CR	Output from HVPS to BCR
DTS	Output from HVPS to Detack Saw
TR	Output from HVPS to BTR



4. 150 Paper Feeder, 550 Paper Feeder, Fan Main

Fig. A-5

Signal line name	Description
/Low-Paper2 SNR ON	Signal from Sensor Low Paper. This signal goes Low when light is received.
/No-Paper2 SNR ON	Signal from Sensor No Paper of Tray2. This signal goes Low when light is received.
Clutch-Tray2 ON	Control signal for Clutch ASSY PH of Tray2. Low: ON / High: OFF
/No-Paper1 SNR ON	Signal from Sensor No Paper of Tray1. This signal goes Low when light is received.
/REG SNR ON	Signal from Sensor Regi. This signal goes Low when light is received.
Clutch-Tray1 ON	Control signal for Clutch ASSY PH of Tray1. Low: ON / High: OFF
Clutch -Regi ON	Control signal for Clutch REGI. Low: ON / High: OFF
Fan Alarm	Fan monitor signal. This signal goes High if there is a trouble with Fan Main.
DOUT	Signal indicating detection of toner in the EP Cartridge, from Sensor Toner.

5. ROS ASSY, Interlock S/W 5V, Switch I/L ASSY



Fig. A-6

Signal line name	Description
/SOS	SYNC signal generated by SOS Sensor. This signal commands start of each scan.
/PCONT	Sample / Hold circuit Low: Sampled (LD is forcibly lit up); High: Held
Vref	Laser output control signal for determining or adjusting the current flowing through Laser Diode.
MO/DET-OUT	Laser output monitor signal for providing feedback of laser output beam from Laser Diode (analog signal).
/LDENB	Control signal permitting emission of Laser Diode. High: Laser Diode OFF.
XP DATA+	Print image data. DATA+ > DATA-: lit up DATA+ < DATA-: put out
XP DATA-/	
ROSMOT ON	Motor Control signal for turning ON/OFF Scanner Motor. Low: ON / High: OFF
/ROSMOT CLK	Clock signal to ROS Motor.

6. 500 Paper Exit



Fig.	A-7
------	-----

Signal line name	Description
/Full Stack SNR ON	Signal from Sensor Full Stack. This signal goes Low when light is received.
/Face Up Open SNR ON	Signal from Sensor Face Up Open. This signal goes Low when light is received.

APPENDIX 2. HOW TO KNOW PAGE COUNTER & PARTS LIFE

If you want to know the number of printed pages and the parts remaining life, you should either enter the Service Menu mode or print out the Print Configuration page. For more information about the Service Menu mode, see section 3 'SERVICE MENU MODE' in CHAPTER 7.

1.1 Printing Out the Print Configuration Page

- (1) Press the **Set** switch three times.
- (2) Print the Print Configuration page (3 pages with the network card fitted).

1.2 How to Read the Page Counter & the Parts Life.

The page counter is printed on page two, in the top left hand corner of the Print Configuration page. (Refer to the figure below.)

Parts remaining life is shown on page two of the print configuration page as below.

<Sample>



Fig. A- 8



The descriptions printed in Print Configuration vary depending on the countries.



Fig. A- 9

00:00

050N SER.NO-PM-3#007		199
<		
<node type=""> <node firmware="" ver.=""> <ethernet address=""> <node name=""></node></ethernet></node></node>	Brother NC-52055 Simmare Ver.0.13 (03.38,18) 00-80-77-42-00-16 BRM_42005	
<pre>vActive services; frx 420016_pi senxry_pi formacrist_vi ycl pi pot pi</pre>		
#RN_420016_21_AT		
(Protocols)		
ICF/IF Networe	Kosbled Fushled	
AppleTalk	Inabled	
FOD 3/85TP	Enabled	
DLC MARKET AND	Snabled	
Net 25102/11	Anabled	
IFF	zaabled	
FTP	Enabled	
CODF Renderssons	Cisabled Frabled	
AFTFA	Enabled	
Cub Address> Submat Masks	09.204.124.222 (set nanjally) 255.255.0.0	
CIP Gateways	3.5.0.0	
<tp config=""></tp>	STATIC	
	\$	
OX Timeout (sect>	5	
CDNS Address Contig>	ACTO	
<secondary dns="" servers<="" td=""><td>0.0.0.0</td><td></td></secondary>	0.0.0.0	
<netbids names<br="">NetBids Demoins</netbids>	BRD 4200 6	
<wins address="" config=""></wins>	A. TO	
<primary server,<="" td="" wins=""><td>0.0.0.0</td><td></td></primary>	0.0.0.0	
<secondary server="" wids=""></secondary>	C.C.C.D	
<printer address="" mail=""></printer>	brn4203'6@example.con	
CSMTF Snrver>	C.C.C.0	
(POP3 Folling Tree, Sector)	30	
	And the second second black	
chetware Status) chodes	No servers enacted Dueue Server	
<scrver name=""></scrver>		
<netware retries=""></netware>	0	
vw ii	Between Count	
EN 802.2	Unknown 0	
£N_802.3	Unknown Ö	
EN_SNAP	Unknown 0	
<appletal% name=""></appletal%>	BRN_420016_P	
carelately fores	BRN_420016_P1_AT	
<rendervous frinter="" nate=""></rendervous>	Brother H1-80505 series	
<ethermet link="" mode=""> <ethermot link="" status=""></ethermot></ethermet>	Aite Link DOWN, 100paseTX wlink drops=0	
<network_statistics></network_statistics>		
Packets Received	0	
syles secenced Bad Parkets Bergived		
Receive: error mask	ő	
Receiver overrung	0	
Packets Transmitted	82	
eyves fanissited (0 0	
Transmit packet fail	6	
Transmit packet fail Transmit error mask	0	

Fig. A- 10

APPENDIX 3. NOTE TO REMEMBER ABOUT TONER CARTRIDGE

The HL-8050 toner cartridge may leak because of the trim of the drum surface when you print out only a few pages in a single printing.

Therefore, when the rotation of the drum reaches 190,000 times, "TONER LOW" will be displayed on the LCD because of the engine control.

A4	297	mm	DRUM ROTATION=((L/204)+(60/P)*(n-1)+3.454)/0.464							
PPM	34	ppm	L= Page length, P=PPM, n=page							
TONER LOW LIMIT	190,000	rotations	,	,						
PRINT JOB (PAGE/JOB)	1	2	3	4	5	6	7	8	9	10
PRINT COVERAGE 5%	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000
PRINT COVERAGE 4%	21,250	21,250	21,250	21,250	21,250	21,250	21,250	21,250	21,250	21,250
PRINT COVERAGE 3%	28,333	28,333	28,333	28,333	28,333	28,333	28,333	28,333	28,333	28,333
PRINT COVERAGE 2%	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500
PRINT COVERAGE 1%	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000
DRUM ROTATION/PAGE	10.6	7.2	6.1	5.5	5.2	4.9	4.8	4.7	4.6	4.5
TONER LOW	17,956	26,417	31,339	34,559	36,829	38,516	39,819	40,855	41,700	42,400



Most customers use the machine over the condition of "A4, 3% print coverage, 3 pages per job", therefore, this problem does not occur. However, customers who use the machine under the condition of "A4, 2% print coverage", almost always see the "TONER LOW" on the LCD even though the toner is not near empty yet.

APPENDIX 4. PERIODICAL REPLACEMENT PARTS

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. These parts would affect the product quality greatly if they lost their function even if they do not appear to be damaged or there is no change in their appearance.

Part number	Description	LCD Message	Approximate Life *1	Replacement Procedure
TN-1700	Toner Cartridge	TONER LOW	Up to 17,000 pages	See subsection 1 in Chapter 5.
FP-8000	Fuser unit & BTR ASSY	REPLACE FUSER	Up to 200,000 pages	See subsection 2 in Chapter 5.
LM0731001	ROLLER ASSY (ROLLER ASSY RETARD, ROLLER ASSY NUDGER and ROLLER ASSY FEED)		Up to 200,000 pages	See subsection 3 in Chapter 5.

Note:

* A4 or Letter-size single-sided pages at about 5% coverage. The actual number of printed pages may vary depending on the print jobs and paper you use.