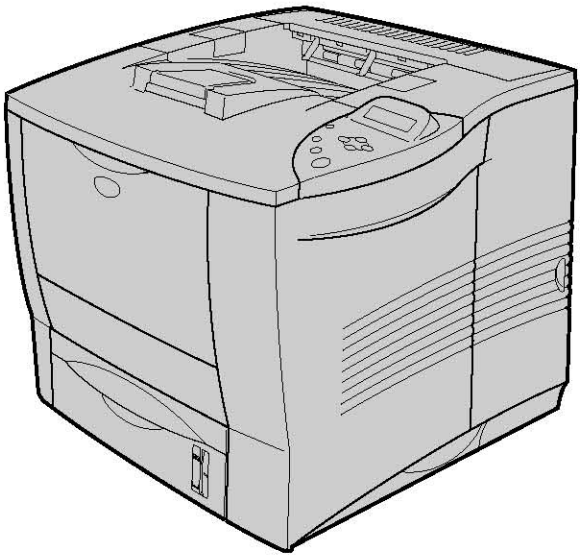
brother

Brother Laser Printer
SERVICE MANUAL

MODEL: HL-2460



Read this manual thoroughly before maintenance work.

Keep this manual in a convenient place for quick and easy reference at all times.

April 2001
SM-PRN010

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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-2460** 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: HIDDEN FUNCTIONS
Professional Menu mode and Service Menu mode, etc.

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

The label for Chinese manufactured products

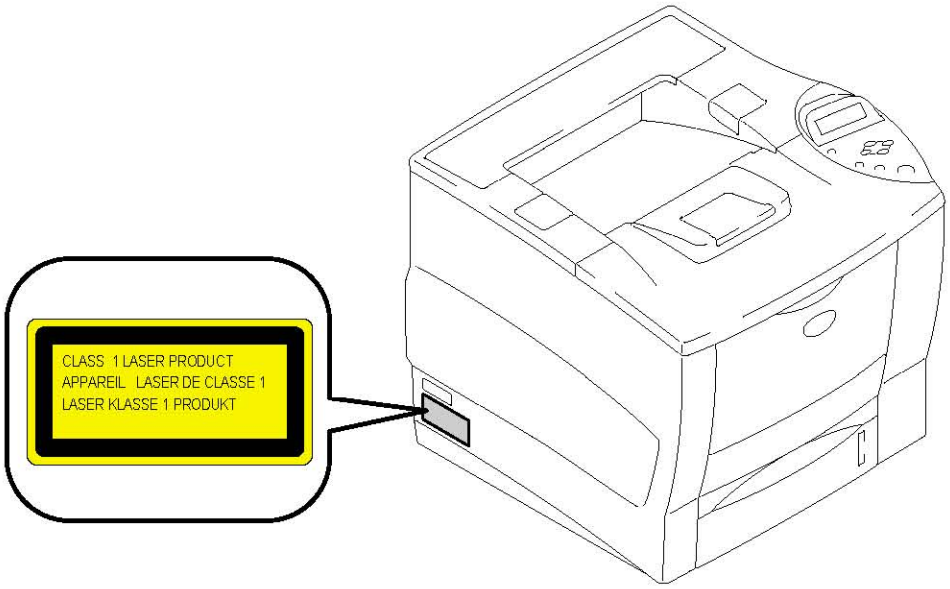
MANUFACTURED: C BROTHER Corporation (Asia) Ltd. Shenzen Buji Nan Ling Factory Gold Garden Ind., Nan Ling Village, Buji, Rong Gang, Shenzen, CHINA This product complies with FDA radiation performance standards, 21 CFR Subchapter J.

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

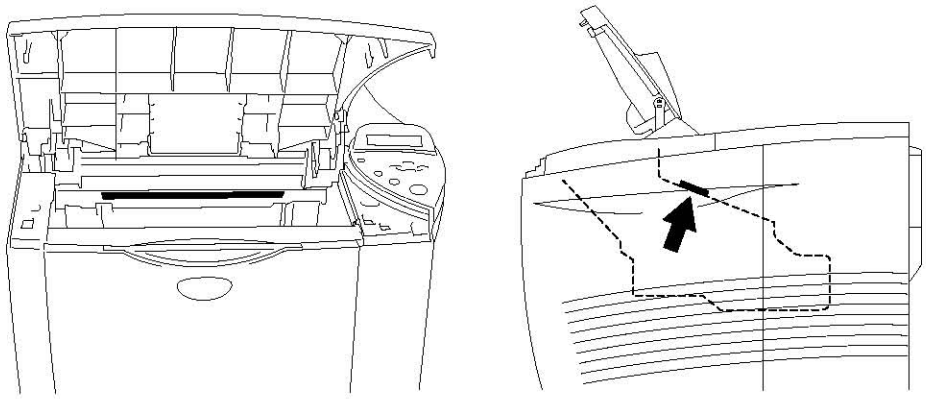
CAUTION FOR LASER PRODUCT (WARNHINWEIS FUR LASER DRUCKER)

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.

<Location of the laser beam window>



LITHIUM BATTERIES

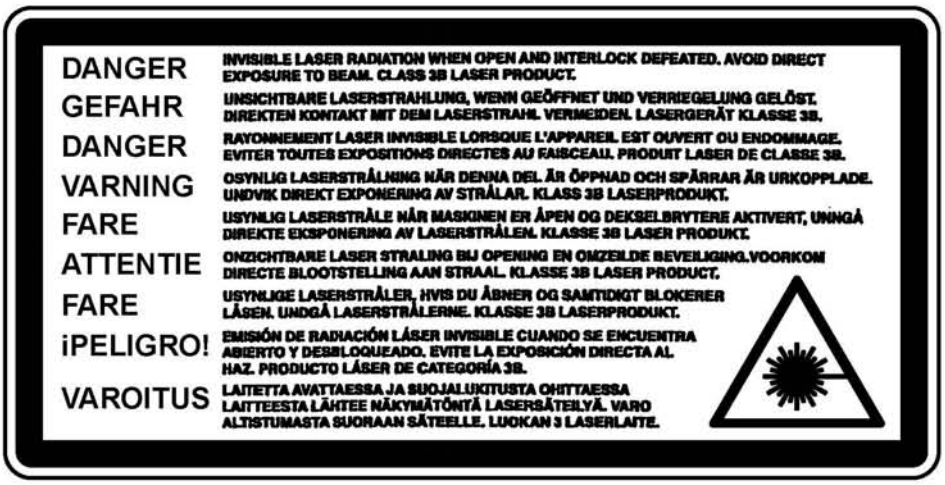
CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED.
REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER.
DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

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:

> ***WARNING***
>
> ***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.*

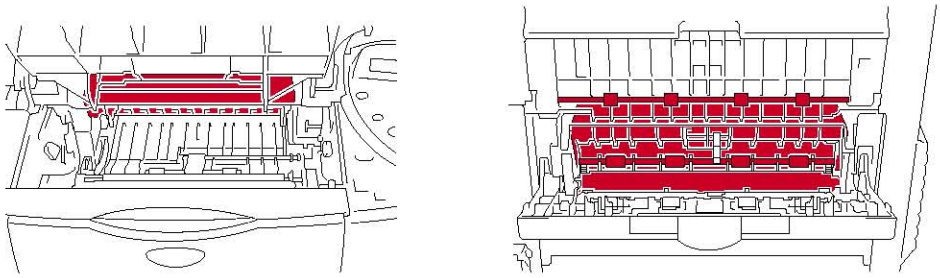
NOTE:

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

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

> ***WARNING***
>
> ***Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.***

> ***WARNING***
>
> ***Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.***



> ***WARNING***
>
> ***If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is 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 600 x 600 dots per inch (dpi) and HQ1200 for graphics with microfine toner and up to 24 pages per minutes (ppm) print speed (A4 or Letter paper).

Versatile Paper Handling

The printer loads paper automatically from the paper cassette. The paper cassette can hold A4, letter, B5 (ISO), B5 (JIS), A5, B6 (ISO), A6, Executive and Legal sizes of paper. The manual feed slot allows manual paper loading sheet by sheet so you can use a variety of types and sizes of 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 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, water mark and many 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 (Windows® 95/98/Me only) you can get visual guidance on your PC screen on the actions 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 600 dpi graphic and text data, including large fonts, with the standard printer memory.

USB Interface (for Windows® 98, 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 font 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. You can select from two economy modes, 50% toner saving through the Windows® printer driver supplied with your printer.

<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 25W when in sleep mode.

Bar Code Print

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

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

Network Feature

The Brother printer has 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, 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>

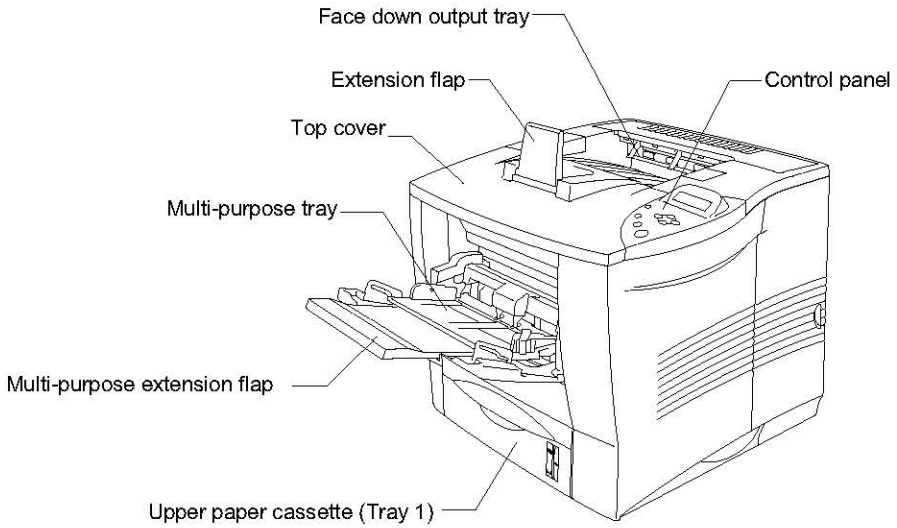


Fig. 1-1

<Rear View>

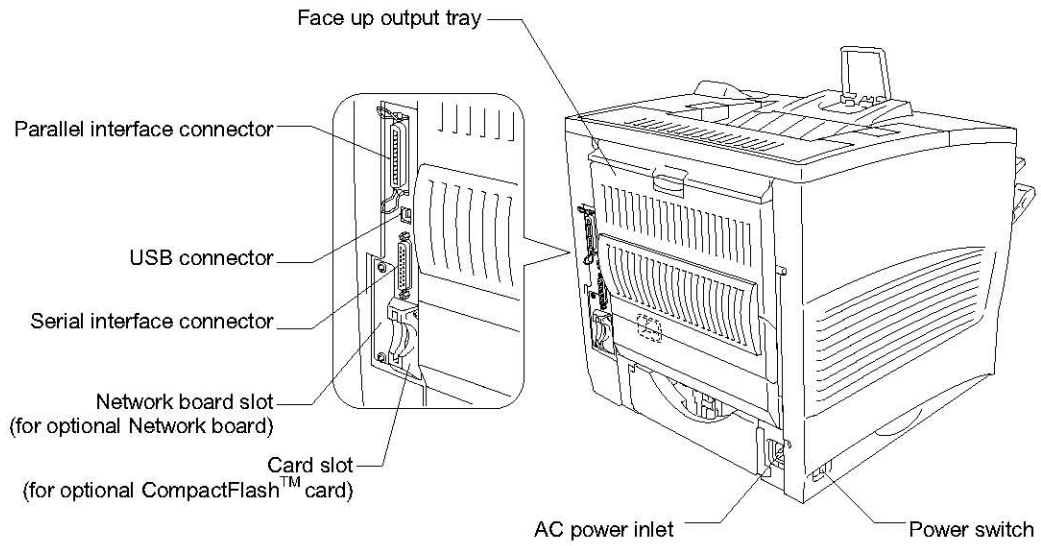


Fig. 1-2

3. SPECIFICATIONS

3.1 Printing

Print method	Electrophotography (single-component dry toner)
Laser	Semiconductor laser Wave length: 780 nm Output: 5mW max
Resolution	HQ1200 (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000 and Mac OS) 600 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000, DOS and Mac OS) 300 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000, and Mac OS)
Print quality	Normal printing mode Economy printing mode (up to 25% and 50% toner saving)
Print speed	Up to 24 pages/minute* (When loading A4 or Letter-size paper.)
Warm-up	Max. 20 seconds at 23°C (68°F)
First print	Max. 12 seconds (When loading A4 or Letter-size paper using face down print delivery from cassette feeder.) Prestart by software command for 10 second first print
Print media	Toner cartridge Life expectancy: 11,000 pages/cartridge (When printing A4 or Letter-size paper with the print density set at level 0 with about 5% print coverage)

*NOTE:

Print speed varies depending on the paper size or media type. For details, refer to APPENDIX 17 'PRINT SPEEDS WITH VARIOUS SETTINGS'.

3.2 Functions

CPU	Toshiba TMPR4955 200MHz
Emulation	Brother Printing Solution for Windows® Automatic emulation selection among HP LaserJet 5(PCL 6), Brother BR-Script Level 3, HP-GL, EPSON FX-850 or IBM Proprinter XL
Printer driver	<PCL Driver> Windows® 95/98/Me, Windows® NT 4.0/2000 driver, supporting Brother Native Compression mode <PS Driver> PPD file driver for Windows® 95/98/Me, Windows NT® 4.0/2000 driver and Macintosh driver
Interface	• Bi-directional parallel • Universal Serial Bus (USB) • RS-232C
Memory	16.0 Mbytes*1 Expandable up to 272 Mbytes by installing an industry standard DIMM*2
Control Panel	• Display LCD: 2 lines by 16-column liquid crystal display with back light LED: 1 LED • Buttons 7 switches
Diagnostics	Self-diagnostic program

*1*NOTE:

The standard memory installed varies depending on the country.

*2NOTE:

The DIMM must have the following specifications: -

Type:	100 pin
Access time:	60 nsec - 80 nsec
Capacity:	16, 32, 64, 128 Mbytes
Height:	35.0 mm (1.38 inches) or less
Output:	32 bit or 36 bit (independent of parity)

3.3 Options

Paper handling	• Lower tray unit (LT-4000); Maximum 500 sheets x 3 trays • Duplex unit for duplex printing (DX-4000) • Mailbox unit for output source (MX-4000 series)
Stabilizer	Stabilizer for safe installation of the printer with options fitted (SB-4000)
Storage Device	Hard Disk Drive, CompackFlash Card

3.4 Electrical and Mechanical

Power source	U.S.A. and Canada:	AC 110 to 120V, 50 Hz/60 Hz
	Europe and Australia:	AC 220 to 240V, 50 Hz/60 Hz
Power consumption	Printing (average):	600 W or less
	Standing by:	80 W or less
	Sleep*[1]:	18 W or less (default activation time: 30 min.)
Noise	Printing:	55 dB A or less
	Standing by:	40 dB A or less
	Noise per ISO 9296:	
	Printing:	Lwad = about 67 dB (A) *[2]
		Lwad = about 48 dB (A)
Temperature	Operating:	10 to 32.5°C (50 to 90.5°F)
	Storage:	0 to 35°C (38 to 95°F)
Humidity	Operating:	20 to 80% (non condensing)
	Storage:	10 to 80% (non condensing)
Dimensions	471 x 480 x 422 mm (W x D x H) (18.5 x 18.9 x 16.6 inches)	
Weight	Approx. 21 kg (46.3 lb.)	

*[1]NOTE:

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

*[2]NOTE:

You might want to install printers with a sound power level of Lwad 63 dB (A) or more in a separate room or cubicle.

3.5 Network

Type / Speed	Ethernet 10/100BaseTX Print server (NC-4100h) Auto speed detection
Protocols	TCP/IP (DHCP, BOOTP, RARP, DHCP, NetBIOS over IP LPR/LPD, Port9100, Custom Port, POP3/SMTP SMB Print TELNET, SNMP, HTTP, TFTP), EtherTalk, IPX/SPX, DEC LAT, Banyan VINES, NetBEUI, DLC/LLC
Management	• Web Based Management • BRAdmin Professional Windows® based management utility
Firmware update	2MB flash ROM. Use BRAdmin Professional when upgrading print server software or BOOTP, TFTP PUT/GET or IPX for Netware.
Supplied software	• BRAdmin Professional management utility (for Windows® 95/98/NT 4.0) • Port driver for Windows® 95/98/Me/NT 4.0 LPR port driver (for Windows® 95/98/Me only) NetBIOS port driver SMTP port driver

3.6 Paper

3.6.1 Feedable paper

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

(1) Paper type

Paper type	Tray 1 60- 105 g/m² (16 - 28 lbs.)	MP tray 60- 200 g/m² (16 - 53 lbs.)	Tray 2/3/4 60- 105 g/m² (16 - 28 lbs.)	DX 60- 105 g/m² (16 - 28 lbs.)	MX 60- 105 g/m² (16 - 28 lbs.)	Select the media type from the printer driver
Plain paper	✓	✓	✓	✓	✓	Plain paper
Recycled paper	✓	✓	✓	✓	✓	Plain paper
Bond paper	✓	✓	✓	✓	✓	Bond paper
Thick paper		✓				Thick paper or thicker paper
Transparency		✓ Only A4 or Letter size				Transparency
Label		✓ Only A4 or Letter size				Plain paper
Envelope		✓				Envelope
Card		✓				Thick paper or thicker paper

(2) Paper size

	Tray 1	MP tray	Tray 2/3/4	DX	MX
Paper size	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5, A6, B6	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5, A6, B6, COM-10, Monarch, C5, DL Width: 73.5 to 216 mm (2.89 to 8.5 in.) Length: 116 to 356 mm (4.57 to 14.0 in.)	A4, Letter, Legal, B5(JIS), B5(ISO), Executive, A5	A4, Letter, Legal, B5(JIS), Executive	A4, Letter, B5(JIS), B5(ISO), Executive
Capacity	500 sheets (80 g/m² or 20 lbs.)	100 sheets (80 g/m² or 20 lbs.) Transparencies: 10 sheets Envelopes: 10 sheets Label stock: 10 sheets	500 sheets (80 g/m² or 20 lbs.)		100 sheets (80 g/m² or 20 lbs.)

(3) Other paper specifications

Paper Cassette

	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

MP Tray

	Cut sheet	Envelope
Basis weight	60 to 200 g/m^2 (16 to 53 lb.)	75 to 90 g/m^2 (20 to 24 lb.) single thickness
Caliper	0.08 to 0.2 mm (0.003 to 0.008 in.)	0.084 to 0.14 mm (0.003 to 0.005 in.) single thickness
Moisture content	4% to 6% by weight	4% to 6% by weight

(4) Recommended paper

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

CAUTION:

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 caused damaged 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 cassette to avoid any paper jams or misfeeds.

3.6.2 Print delivery

(1) Face down output tray

Capacity: Maximum 500 sheets (80 g/m^2)
Face-down only

(2) Face up output tray

Capacity: 100 sheet **Thicker paper printing is recommended.
Face-up only

NOTE:

Face-down: Delivery with the printed face of the paper downwards.
Face-up: Delivery with the printed face of the paper upwards.

(3) We recommend the following print methods (output tray) for each paper media type.

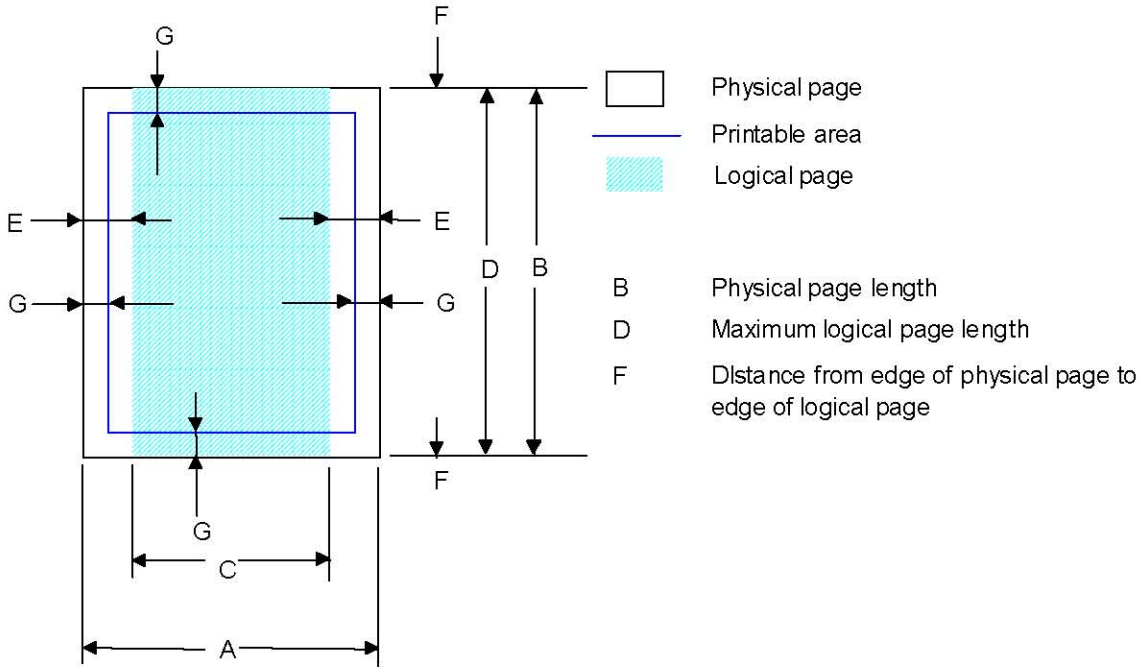
Media type	Paper output	
	Face down	Face up
Plain paper	✓	✓
Recycled paper	✓	✓
Bond paper	✓	✓
Thick paper	✓	✓
Thicker paper	✓	✓
Transparency	✓	✓
Label		✓
Envelope		✓
Card		✓

3.7 Printable Area

3.7.1 PCL5e/EPSON/IBM emulation

The figure below shows the printable area each emulation guarantees when printing on Portrait and Landscape.

Portrait



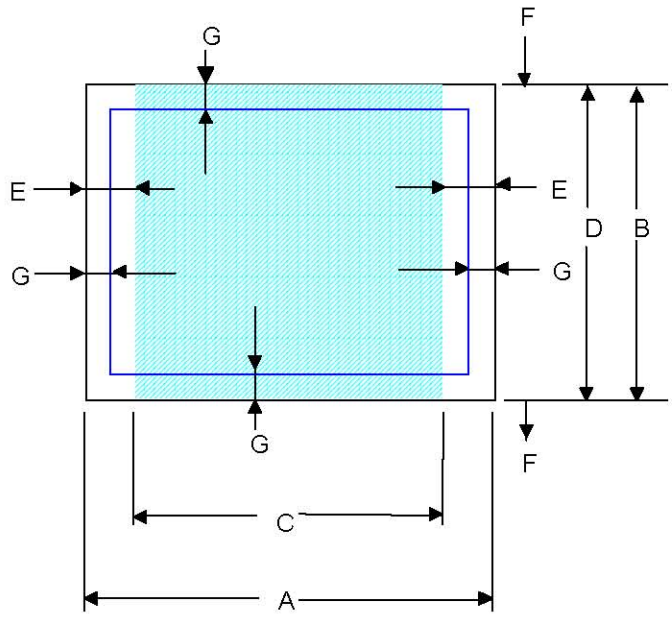
The table below shows the printable areas when printing on Portrait for each paper size.

Size	A	B	C	D	E	F	G
Letter	215.9 mm 8.5" (2,550 dots)	279.4 mm 11.0" (3,300 dots)	203.2 mm 8.0" (2,400 dots)	279.4 mm 11.0" (3,300 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	215.9 mm 8.5" (2,550 dots)	355.6 mm 14.0" (4,200 dots)	203.2 mm 8.0" (2,400 dots)	355.6 mm 14.0" (4,200 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	184.15 mm 7.25" (2,175 dots)	266.7 mm 10.5" (3,150 dots)	175.7 mm 6.92" (2,025 dots)	266.7 mm 10.5" (3,150 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	210.0 mm 8.27" (2,480 dots)	297.0 mm 11.69" (3,507 dots)	198.0 mm 7.79" (2,338 dots)	297.0 mm 11.69" (3,507 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	148.5 mm 5.85" (1,754 dots)	210.0 mm 8.27" (2,480 dots)	136.5 mm 5.37" (1,612 dots)	210.0 mm 8.27" (2,480 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	105.0 mm 4.13" (1,240 dots)	148.5 mm 5.85" (1,754 dots)	93.0 mm 3.66" (1,098 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	182.0 mm 7.1" (2,130 dots)	257.0 mm 10.11" (3,033 dots)	170.0 mm 6.69" (2,007 dots)	257.0 mm 10.11" (3,033 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	176.0 mm 6.93" (2,078 dots)	250.0 mm 9.84" (2,952 dots)	164.0 mm 6.46" (1,936 dots)	250.0 mm 9.84" (2,952 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6	125.0 mm 4.92" (1,476 dots)	176.0 mm 6.93" (2,078 dots)	164.0 mm 4.44" (1,334 dots)	176.0 mm 6.93" (2.078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	104.78 mm 4.125" (1,237 dots)	241.3 mm 9.5" (2,850 dots)	92.11 mm 3.63" (1,087 dots)	241.3 mm 9.5" (2,850 dots)	6.35 mm 0.25" (75 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	98.43 mm 3.875" (1,162 dots)	190.5 mm 7.5" (2,250 dots)	85.7 mm 3.37" (1,012 dots)	190.5 mm 7.5" (2,250 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	162.0 mm 6.38" (1,913 dots)	229.0 mm 9.01" (2,704 dots)	150.0 mm 5.9" (1,771 dots)	229.0 mm 9.01" (2,704 dots)	6.01 mm 0.24" (71 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	110.0 mm 4.33" (1,299 dots)	220.0 mm 8.66" (2,598 dots)	98.0 mm 3.86" (1,157 dots)	220.0 mm 8.66" (2,598 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).
- The dot size is based on 300 dpi resolution.

Landscape



Physical page
Printable area
Logical page

B Physical page length
D Maximum logical page length
F D istance from edge of physical page to edge of logical page

The table below shows the printable areas when printing on Landscape for each paper size.

Size	A	B	C	D	E	F	G
Letter	279.4 mm 11.0" (3,300 dots)	215.9 mm 8.5" (2,550 dots)	269.3 mm 10.6" (3,180 dots)	215.9 mm 8.5" (2,550 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
Legal	355.6 mm 14.0" (4,200 dots)	215.9 mm 8.5" (2,550 dots)	345.5 mm 13.6" (4,080 dots)	215.9 mm 8.5" (2,550 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
Executive	266.7 mm 10.5" (3,150 dots)	184.15 mm 7.25" (2,175 dots)	256.6 mm 10.1" (3,030 dots)	184.15 mm 7.25" (2,175 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 4	297.0 mm 11.69" (3,507 dots)	210.0 mm 8.27" (2,480 dots)	287.0 mm 11.2" (3,389 dots)	210.0 mm 8.27" (2,480 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
A 5	210.0 mm 8.27" (2,480 dots)	148.5 mm 5.85" (1,754 dots)	200.0mm 7.87" (2,362 dots)	148.5 mm 5.85" (1,754 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
A 6	148.5 mm 5.85" (1,754 dots)	105.0 mm 4.13" (1,240 dots)	138.5 mm 5.45" (1,636 dots)	105.0 mm 4.13" (1,240 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (JIS)	257.0 mm 10.11" (3,033 dots)	182.0 mm 7.1" (2,130 dots)	247.0 mm 9.72" (2,916 dots)	182.0 mm 7.1" (2,130 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 5 (ISO)	250.0 mm 9.84" (2,952 dots)	176.0 mm 6.93" (2,078 dots)	240.0 mm 9.44" (2,834 dots)	176.0 mm 6.93" (2,078 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
B 6	176.0 mm 6.93" (2,078 dots)	125.0 mm 4.92" (1,476 dots)	166.4 mm 6.55" (1,960 dots)	125.0 mm 4.92" (1,476 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
COM10	241.3 mm 9.5" (2,850 dots)	104.78 mm 4.125" (1,237 dots)	231.1 mm 9.1" (2,730 dots)	104.78 mm 4.125" (1,237 dots)	5.0 mm 0.2" (60 dots)	0 mm	4.2 mm 0.16" (50 dots)
MONARCH	190.5 mm 7.5" (2,250 dots)	98.43 mm 3.875" (1,162 dots)	180.4 mm 7.1" (2,130 dots)	98.43 mm 3.875" (1,162 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)
C 5	229 mm 9.01" (2,704 dots)	162 mm 6.38" (1,913 dots)	219.0 mm 8.62" (2,586 dots)	162 mm 6.38" (1,913 dots)	4.8 mm 0.19" (59 dots)	0 mm	4.2 mm 0.16" (50 dots)
DL	220 mm 8.66" (2,598 dots)	110 mm 4.33" (1,299 dots)	210.0 mm 8.26" (2,480 dots)	110 mm 4.33" (1,299 dots)	↑	0 mm	4.2 mm 0.16" (50 dots)

NOTE:

- The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).
- The dot size is based on 300 dpi resolution.

3.7.2 PCL6/BR-Script3 emulation

You can not print within 4.2 mm (50dots in 300-dpi mode) on all four sides of the paper.

CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. CONDITIONS REQUIRED FOR INSTALLATION

1.1 Power Supply

- The source voltage must stay within ±10% of the rated voltage shown on the rating plate.
- The power cord, including extensions, should not exceed 3 meters (10 feet).
- Do no share the same power circuit with other high-power appliances, particularly an air conditioner, copier or shredder. If it is unavoidable that you must use the printer with these appliances, it is recommended that you use an isolation transformer or a high-frequency noise filter.
- Use a voltage regulator if the power source is not stable.

1.2 Environment

- The printer should be installed near a power outlet, which is easily accessible.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer should be used in a well ventilated room.
- Place the printer on a flat, horizontal surface.
- Keep the printer clean. Do not place the printer in a dusty place.
- Do not place the printer where the ventilation hole of the printer is blocked. Keep approximately 100 mm (4 inches) between the ventilation hole and the wall.
- Do not place the printer where it is exposed to direct sunlight. Use a blind or a heavy curtain to protect the printer from direct sunlight when the printer is unavoidably set up near a window.
- Do not place the printer near devices that contain magnets or generate magnetic fields.
- Do not subject the printer to strong physical shocks or vibrations.
- Do not expose the printer to open flames or salty or corrosive gasses.
- Do not place objects on top of the printer.
- Do not place the printer near an air conditioner.
- Keep the printer horizontal when carrying.
- Do not cover the slots in the side cover.

1.3 System Requirements for Brother Printer Solution for Windows®

Check the following system requirements to setup and operate the printer using Brother Printing Solution for Windows®:

Operating system	Computer / Processor	Memory
Windows® 95	486DX / 66MHz or higher processor	24MB
Windows® 98	Pentium 150MHz or higher processor	32MB
Windows® Me	Pentium 150MHz or higher processor	32MB
Windows® NT 4.0	Pentium 150MHz or higher processor	24MB
Windows® 2000	Pentium 133MHz or higher processor	64MB

2. UNPACKING

When unpacking the printer, check to see that all of the following components are included in the carton.

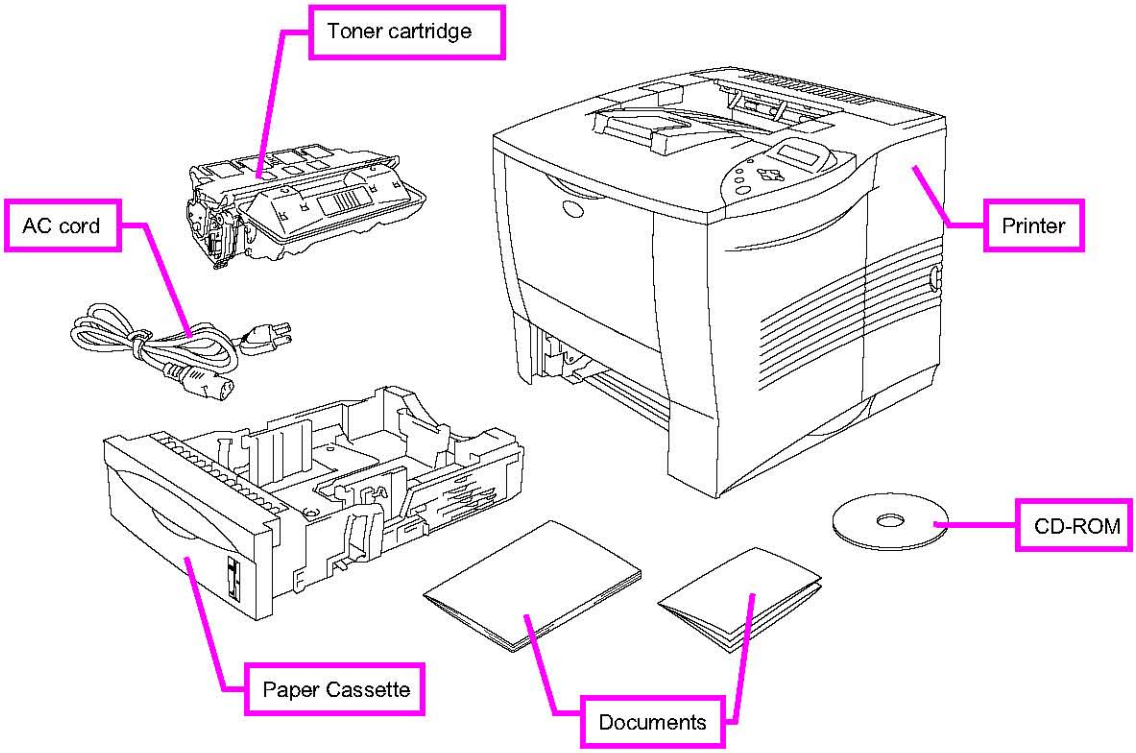


Fig. 2-1

NOTE:
Components may vary depending on the country.

3. INSTALL THE PRINTER

Implementation of hardware setup and driver installation is necessary to use the printer.

Firstly, identify the Operating System on the computer (Windows® 95/98/Me, Windows NT® 4.0/2000 or Macintosh® OS versions from 8.5 to 9.1). Then, purchase the appropriate interface cable (parallel, USB or network) for the computer.

When printing from a Macintosh computer, connect it to the printer via a Network (Brother recommends using the NC-4100h network board).

The installation programs for the hardware setup and driver installation are contained on the supplied CD-ROM.

3.1 For All Users

For Windows® Users

(1) Turn on the PC power. Close all the applications running on the PC.
(2) Insert the supplied CD-ROM into the CD-ROM drive.
(3) The opening screen will appear automatically.

NOTE:
If the opening screen does not appear, click Start *and select* Run*, enter the CD drive letter and type* \START.EXE *(for example: D:\START.EXE).*

(4) Select the appropriate language.
(5) Click the Initial Setup icon.
(6) The Initial Setup instructions will appear on the display.

For Macintosh® Users

(1) Turn on the PC power. Close all the applications running on the PC.
(2) Insert the supplied CD-ROM into the CD-ROM drive.
(3) Click the *Initial Setup* icon.
(4) Select the language you want.
(5) The initial Setup instructions will appear on the display.

3.1.1 *Remove the protective parts*

(1) Open the top cover of the printer.
(2) Remove the protective parts from the printer.

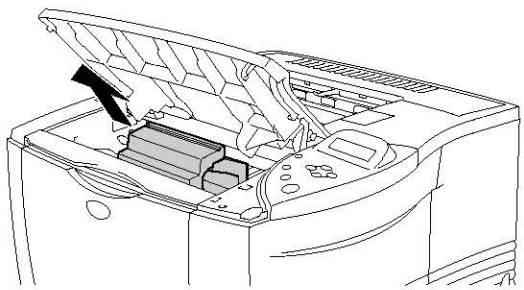


Fig. 2-2

(3) Close the top cover of the printer.
(4) Pull out the paper cassette, and then remove the tape and the indicator sponge.

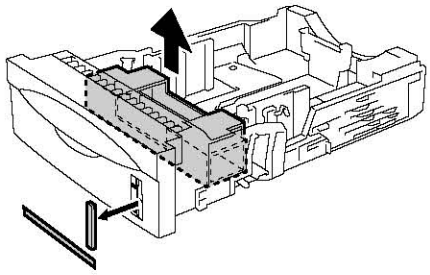


Fig. 2-3

(5) Re-install the paper cassette into the printer.

3.1.2 Install the toner cartridge

(1) Open the top cover of the printer.
(2) Unpack the toner cartridge. Rock it gently several times at a 45° angle.

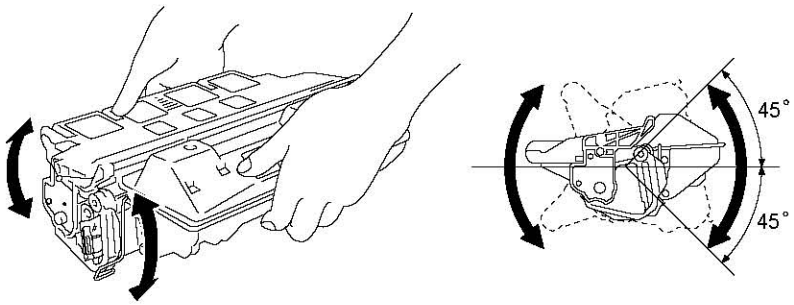


Fig. 2-4

(3) Bend the tab up and down several times, and then pull it out until the sealing tape comes out all the way.

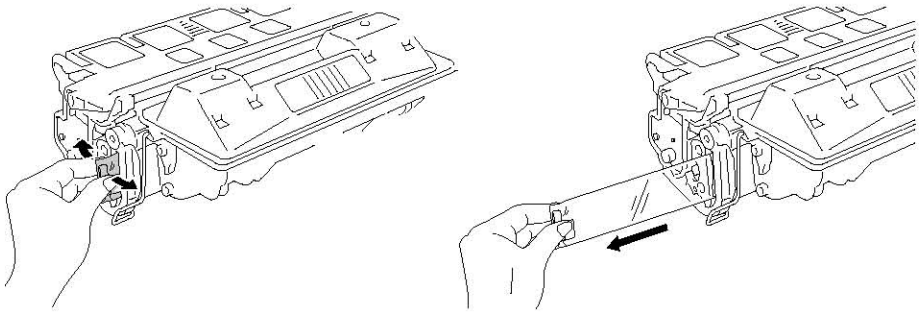


Fig. 2-5

(4) Install the toner cartridge into the printer.
(5) Close the top cover of the printer.

3.1.3 *Load paper in the paper cassette*

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

(2) While pressing the paper guide release lever, slide the adjusters to fit the paper width size. Check that they fit correctly into the slots.

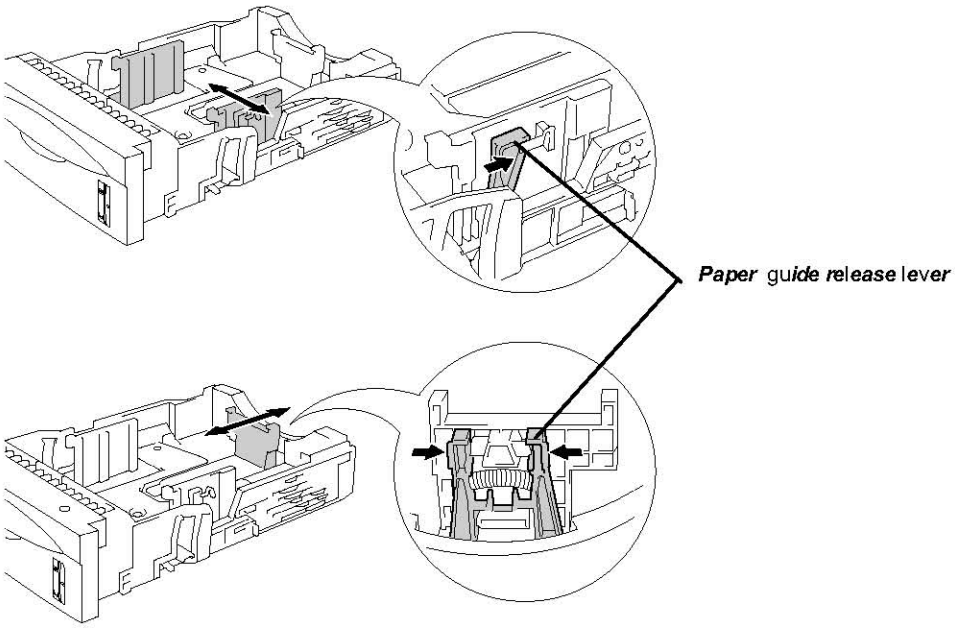


Fig. 2-6

NOTE:

For legal size paper, press the universal guide release button and pull out the rear of the paper cassette.

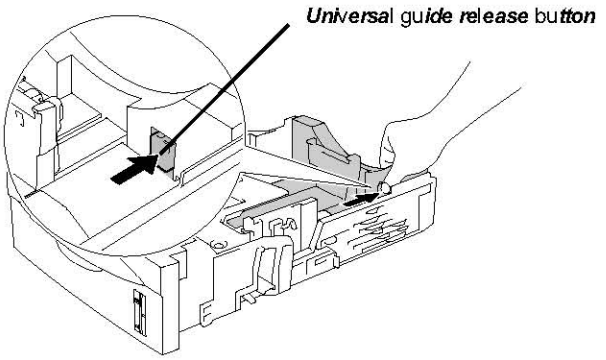


Fig. 2-7

(3) Load paper in the paper cassette. Check that the paper is flat in the tray and below the maximum paper mark.

(4) Re-install the paper cassette into the printer.

3.1.4 Print a test page

(1) Make sure the printer power switch is off. Connect the AC power cord to the printer. Do NOT connect the interface cable.

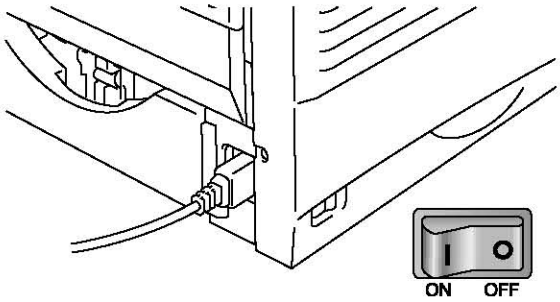


Fig. 2-8

(2) Plug the AC power cord into an AC outlet, and then turn on the power switch.

(3) After the printer has finished warming up, the READY message appears on the LCD display of the control panel.

(4) Press the Go switch. The printer prints a test page. Check that the test page has printed correctly.

NOTE:

This function is available only when the interface cable is not connected.

3.2 For Parallel Interface Cable Users (for Windows® users only)

Follow the steps below only after completing steps 3.1.1 through to 3.1.4 above.

Connect the printer to your PC & Install the printer driver

(1) Click "Connect the interface cable and install the printer driver / utilities.

Fig. 2-9

(2) Select the parallel interface cable.

NOTE:

If "Add New Hardware Wizard" appears, click the Cancel button.

(3) Click the Next button.

(4) Click the Finish button. The setup is now complete.

3.3 For USB Interface Cable Users (for Windows® users only)

Follow the steps below only after completing steps 3.1.1 through to 3.1.4 above.

3.3.1 Install the driver & connect the printer to your PC

NOTE:

When the "Add New Hardware Wizard" appears on your PC, click the Cancel button.

NOTE:

Install the driver before connecting the USB interface cable to the printer. If the cable has already been connected then remove the USB interface cable.

(1) ***Click "Connect the interface cable and install the printer driver / utilities.***

Fig. 2-10

(2) Select the USB cable.

(3) ***Click the Next button.***

(4) ***Click the OK button.***

(5) ***Make sure the printer power switch is on.***

(6) ***Connect the USB interface cable to the PC, and then connect it to the printer.***

For Windows© 98/Me users: The set up is now complete.
For Windows© 2000 users: Go to the next section 3.3.2 'Set up the ***PC printer port***'.

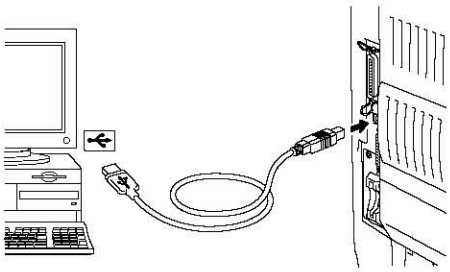


Fig. 2-11

3.3.2 Setting the PC printer port

For Windows® 2000 Users only

(1) After the PC has restarted, click Start, Setting and Printers.
(2) Select the Brother HL-2460 (Copy2) icon.
(3) Click the File menu, and then select Set as Default printer.
The setup is now complete.

3.4 For Network Users

NOTE:

- **For connecting the printer to a network, it is recommended to contact the system administrator prior to installation.**
- **For the administrator: Configure the printer referring to the following instructions.**
- **For installing the driver on the PC, refer to the following instructions once the administrator has configured the printer.**

3.4.1 For the administrator

Install the BRAdmin Professional Configuration utility

The BRAdmin Professional software provides sophisticated network and printer management capabilities for Brother and non-Brother products. By identifying potential problems before they arise, and by addressing important IT requirements such as streamlined printer configuration, mass configuration and enterprise-wide upgrades, the BRAdmin Professional software plays an important role in printer network management.

(1) Insert the CD-ROM.
(2) Select the appropriate language.
(3) Click the Install Software icon.
(4) Select BRAdmin Professional. Install the BRAdmin Professional utility referring to the on-screen instructions.

Network Printer Driver Wizard: Useful utility for peer-to-peer users

Use the Brother Network Printer Driver Wizard software to automate the installation of Brother networked printers in a TCP/IP environment. The Wizard can create an Executable file that can be sent to other network users, when run, the Executable file installs the appropriate printer driver and network printing software.

To access the Network Printer Driver Wizard:

(1) Insert the CD-ROM supplied with the printer.
(2) Click the Install Software icon and select the Network Printer Driver Wizard.

3.4.2. Installing the driver for Windows© users only

(1) Click the **Connect the interface cable and install the printer driver / utilities**.
(2) Select the Network cable.
(3) Turn the printer power switch off.
(4) Connect the cable to the printer, and then connect it to a free port on the hub.
(5) Turn the printer power switch on.
(6) Click the **Next** button.
(7) Select the Network shared printer or the Brother peer-to-peer network printer, and then click the **Next** button.
(8) Select the network connection style and follow the instructions below:

For Network shared printer users

Select the appropriate printer Queue or 'Sharename'

(1) Select the current printer's queue, and then click the **OK** button.

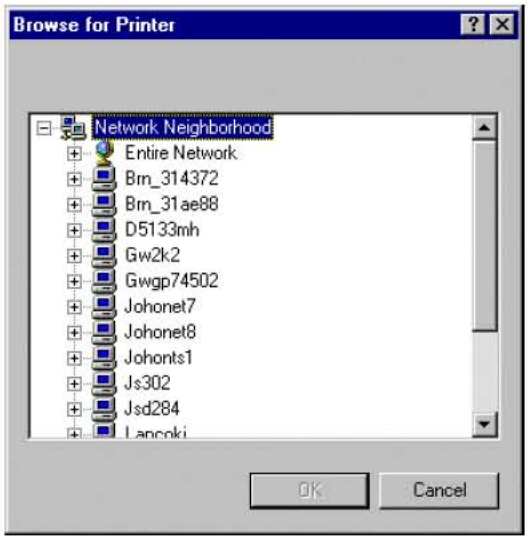


Fig. 2-12

(2) Once the appropriate queue is specified, the printer driver will be installed. The setup is now complete.

For Brother Peer-to-Peer network printer users (LPR-recommended Peer-to-Peer printing method)

Configuring the LPR port

<For Windows® 95/98/Me users>

(1) Select "LPR (Recommended)" and then click the Next button.

(2) Enter a unique port name (ex. BLP1), and then click the OK button.

(3) Specify the printer's IP address (or click the Browse button to see a list of printers), and click the OK button.

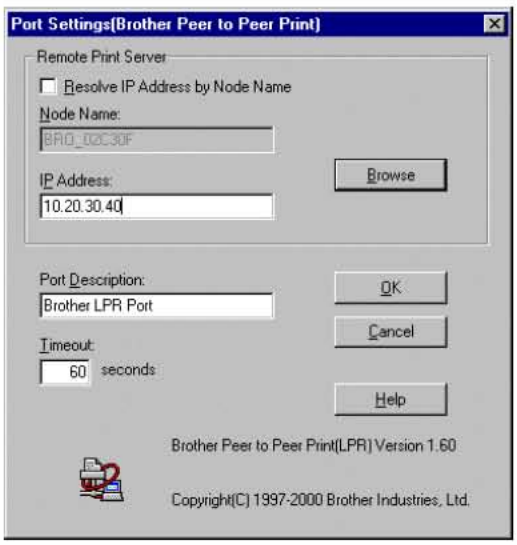


Fig. 2-13

(4) Click the Finish button and restart the PC. After the PC has restarted, setup is complete.

<For Windows NT® 4.0/ Windows ® 2000 users>

(1) Select "LPR (Recommended)", and then click the Next button.

NOTE:

If the following screen appears, insert the Windows NT® 4.0 CD-ROM into the CD-ROM drive.

Fig. 2-14

(2) Click the Next button.

(3) Enter the printer's IP address and the port name BINARY_P1, then click the Next button.

(4) Click the Finish button and restart the PC. After the PC has restarted, setup is complete.

For Brother Peer-to-Peer network printer users (NetBIOS)

Configuring the NetBIOS port

(1) Select NetBIOS, and click the Next button.
(2) Enter a unique port name (ex. BNT1), and then click the OK button.
(3) Enter the path name (or click the Browse button to see a list of printer's), and then click the OK button.
(4) Click the Finish button and restart the PC. After the PC has restarted, setup is complete.

3.4.3 Installing the driver for Macintosh® users only

Connect the printer to your Macintosh & install the BR-Script PPD file

(1) Double-click the BR-Script PPD Installer icon, and then follow the instructions on the screen.
(2) Turn the printer power switch off.
(3) Connect the cable to the printer, and then connect it to a free port on the hub.
(4) Turn the printer power switch on.
(5) Open the Chooser from the Apple® menu on the Macintosh®.
(6) Click the LaserWriter8* icon (for changing the network zone, select the appropriate zone), and then select the network zone form the AppleTalk® zones list.

NOTE:
If connecting via Appletalk, the Brother print server Appletalk service name default is BRN_xxxxxx_P1_AT, where "xxxxxx" is the last six digits of the Ethernet address (MAC address).

(7) Click on the appropriate print server, and then close the Chooser.
The setup is now complete.

*[1] If the Apple LaserWriter8 Driver is not on the system, download it from http://www.apple.com.

4. PRINTING METHODS

The printer provides two types of printing method, printing from upper paper tray and printing form the multi-purpose tray,

4.1 Printing from Upper Paper Tray (Face down printing)

Plain paper, recycled paper or transparencies can be loaded into the paper cassette. If paper is loaded into the paper cassette, the printer automatically feeds paper sheet by sheet and ejects the printed page into the output tray.

For the details on cassette loading, refer to subsection 3.1.3 'Load paper into the paper cassette' in this chapter and subsection 3.6 'Paper' in CHAPTER 1.

NOTE:

If the paper is misfed or multi pages frequently feed at once when printing on small size paper or thick paper, change the paper thickness switches on the floor of the paper cassette using a coin pushing down the plate of the cassette as follows:

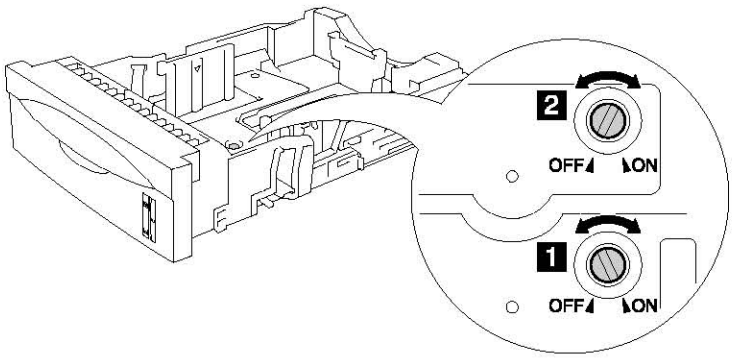


Fig. 2-15

The switches shown in this illustration are in the default setting position.

A6	Switch 1: OFF Switch 2: OFF
A4 100 g/m^2 (26.7 lbs) Letter 105 g/m^2 (28 lbs) Legal 105 g/m^2 (28 lbs)	Switch 1: ON Switch 2: ON
Executive, A5, B6	Switch 1: OFF Switch 2: ON

Tray ID setting (Only if the lower tray unit is installed)

If someone moves the cassette into another tray position and even if the data is still printed without knowing this has been done, the driver automatically selects the correct tray and prints according to this setting.

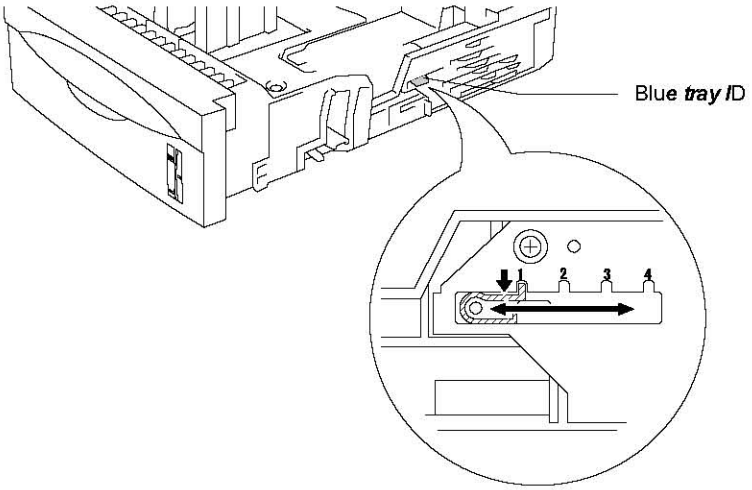


Fig. 2-16

4.2 Printing from the Multi-purpose Tray

Plain paper, recycled paper, bond paper, thick paper, transparency, label, envelope and card can be fed into the multi-purpose tray. (For details on feedable paper, see subsection 3.6 'Paper' in CHAPTER 1.)

NOTE:

- For correct printing, select the same paper size from within the software application as the paper in the tray.
- If the application software does not support paper size selection in its print menu, the paper size can be changed on the printer's control panel under the PAPER menu. For more information, see subsection 5.5.2 'Paper' in this chapter.

When using the multi-purpose tray, follow the steps below;

(1) Open the multi-purpose tray and lower it gently.

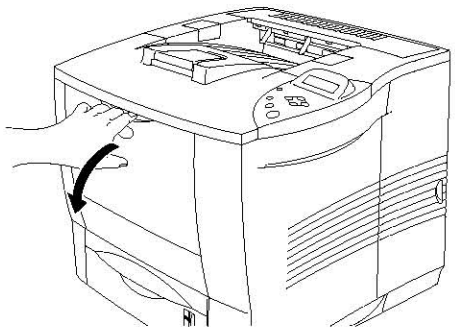


Fig. 2-17

(2) Pull out the multi-purpose extension flap.

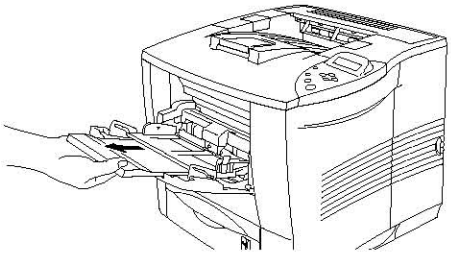


Fig. 2-18

(3) When loading paper in the multi-purpose tray, make sure it touches the back of the tray and remains below the limit ▼ mark.

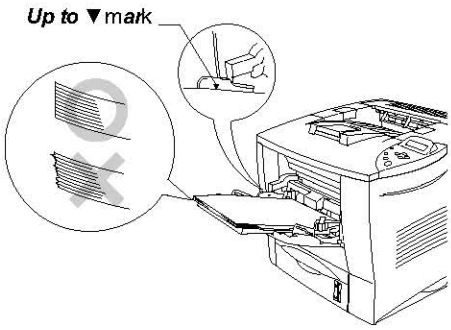


Fig. 2-19

NOTE:

Make sure that the neatly stacked paper is correctly seated on the multi-purpose tray, otherwise paper may not be fed correctly, resulting in a skewed printout or a paper jam.

(4) While pressing the paper guide release lever, slide the adjuster to fit the paper size.

When printing on special paper such as envelopes, thick paper, labels, etc., open the face up output tray to print face up. See '*Printing on Envelopes*' or '*Printing on Labels, Transparencies, etc.*" in this chapter.

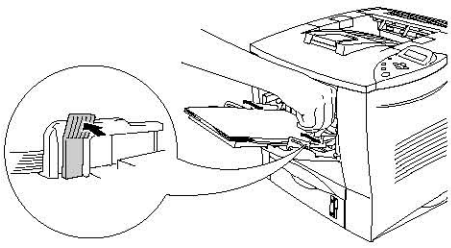


Fig. 2-20

NOTE:

When placing paper on the multi-purpose tray, note the following:

- ***When printing, the inside tray automatically rises to feed paper into the printer.***
- ***The print surface must be face up.***
- ***Insert the leading edge of the paper first and push it gently into the tray.***
- ***The top of the paper stack must be under the guides that are on both sides of the tray. The maximum thickness is 10 mm (or 0.39 inch).***

(5) Change the settings in the printer driver.

4.3 Printing on Envelopes (Face up printing)

Use of any of the envelopes listed below may cause damage to your printer. Such damage is not covered under any warranty or service agreement.

- Envelopes that are damaged, curled, wrinkled, or irregularly shaped
- Envelopes that are extremely shiny or highly textured
- Envelopes with clasps, snaps or tie strings
- Envelopes with self-adhesive closures
- Envelopes of baggy construction
- Envelopes that are not sharply creased
- Embossed envelopes
- Envelopes that were previously printed by a laser printer
- Envelopes that are pre-printed on the inside
- Envelopes that cannot be arranged uniformly when placed in a pile
- Envelopes constructed with paper that exceeds the paper weight specifications for the printer.
- Poorly manufactured envelopes with edges that are not straight or consistently square.
- Envelopes with transparent windows, holes, cutouts or perforations.

NOTE:

- Before printing envelopes, fan the stack well to avoid paper jams and misfeeds.
- Do not load different types of paper at the same time in the paper tray because it may cause paper jams or misfeeds.
- Do not print envelopes using duplex printing.
- For correct printing, select the same paper size from within the software application as the paper in the tray.
- If the application software does not support paper size selection on its print menu, the paper size on the printer's control panel under the PAPER menu can be changed. For more information, see subsection 5.5.2 'Paper' in this chapter.

(1) Open the multi-purpose tray and lower it gently.
(2) Pull out the multi-purpose extension flap.
(3) Open the face up output tray.
(4) Pull out the face up output tray extension.
(5) Place the envelopes in the multi-purpose tray so they touch the back of the tray and remain below the limit mark.
(6) Press and slide the paper width adjuster to fit the envelope size.
(7) Change the settings in the printer driver.

NOTE:

- When printing, the inside tray automatically rises to feed paper into the printer.
- If envelopes get smudged during printing, set the print density to a higher value in the QUALITY mode with the control panel setting for darker printouts. To adjust the print density setting, see subsection 5.5.3 'Quality' in this chapter.
- Envelope joints that are sealed by the manufacturer should be secure.
- All sides should be properly folded without any wrinkles or creases.

Most envelopes will perform acceptably on the HL-2460 printer. However, some envelopes will have feed and print quality problems because of their construction. A suitable envelope should have edges with straight, well creased folds and should not have more than two thicknesses of paper along the leading edge. The envelope should lie flat and not have baggy or flimsy construction. Purchase quality envelopes only from a supplier who understands that the envelopes will be used in a laser printer. All envelopes should be tested prior to use to ensure desirable print results.

NOTE:

The manufacturer neither warrants nor recommends the use of a particular envelope because envelope properties are subject to change by the envelope manufacturer. The entire responsibility for the quality and performance of envelopes lies with the customer.

4.4 Printing on Label, Transparency, etc.

Use of any of the types of paper listed below may cause damage to your printer. Such damage is not covered under any warranty or service agreement.

- Envelopes that are damaged, curled, wrinkled, or irregularly shaped

NOTE:

- *Before using paper with holes, such as organizer sheets, fan the stack well to avoid paper jams and misfeeds.*
- *Do not use paper with perforations at the edges.*
- *Do not place the punch hole near the actuator (paper sensor).*
- *Do not use organizer sheets that are stuck together. The glue that is used might cause damage to the printer.*
- *Do not load different types of paper at the same time in the paper tray because it may cause paper jams or misfeeds.*
- *For correct printing, select the same paper size from within the software application as the paper in the tray.*
- *If the application software does not support paper size selection on its print menu, the paper size on the printer's control panel under the PAPER menu can be changed. For more information, see subsection 5.5.2 'Paper' in this chapter.*

(1) Open the multi-purpose tray and lower it gently.
(2) Pull out the multi-purpose extension flap.
(3) Open the face up output tray.
(4) Pull out the face up output tray extension.
(5) When loading paper in the multi-purpose tray, make sure it touches the back of the tray and remains below the limit mark.

NOTE:

Make sure that the neatly stacked paper is correctly seated on the multi-purpose tray, otherwise paper may not be fed correctly, resulting in a skewed printout or a paper jam

(6) While pressing the paper guide release lever, slide the adjuster to fit the paper size.

> CAUTION:
> Do not touch transparencies that have just been printed because they are very HOT.

NOTE:

When placing paper in the multi-purpose tray, note the following:

- ***When printing, the inside tray automatically rises to feed paper into the printer.***
- ***The print surface must be face up.***
- ***The leading edge must be placed inside first so it rests lightly against the printer.***
- ***The top of the paper stack must be under the guides that are on both sides of tray.***

(7) Change the settings in the printer driver.

4.5 Printing to the Face up Output Tray (Face up printing)

When the face up output tray is open, the printer has a straight paper path from the paper cassette or multi-purpose tray to the rear of the printer. Use this output method when you want to print on special media that is thick or should not be bent, such as thick paper, labels, card stock or envelopes.

(1) Open the face up output tray.

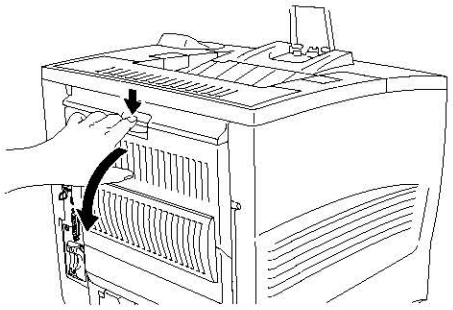


Fig. 2-21

(2) Pull out the face up output tray extension.

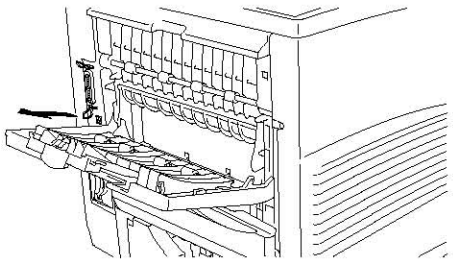


Fig. 2-22

(3) Place the paper in the paper tray or the multi-purpose tray.

(4) After the printer ejects all the printed pages, remove them and close the face up output tray.

4.6 Manual Feed

If paper is placed in the multi-purpose tray when the setting MANUAL FEED = ON has been set in PAPER mode using the control panel, the printer will load paper only from the multi-purpose tray.

NOTE:

When feeding paper manually, note the following:

- If the application software supports a manual feed selection in the print menu, it can be selected through the software. Since the software or command setting overrides the switch setting, it is unnecessary to set the MANUAL FEED mode and the paper size with the PAPER mode.
- When using pre-printed paper in the multi-purpose tray, the paper should be inserted top edge first with the pre-printed side face up.

5. CONTROL PANEL OPERATION

There is one LED and 7 switches on the control panel. The LED and LCD display indicate the printer status, and pressing the switches enables several functions in the printer.

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

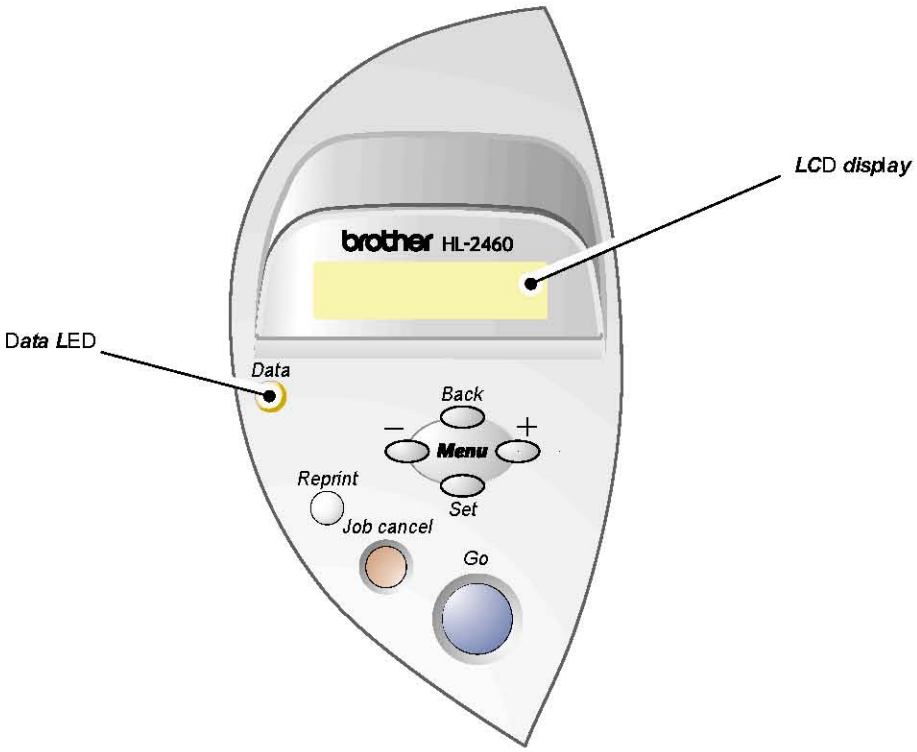


Fig. 2-23

5.1 Data LED Indications

The Data LED indicates with orange lamp the current status of the printer.

LED	Printer status
On	Data remains in the printer buffer.
Blinking	Receiving or processing data.
Off	No remaining data.

5.2 Panel Switches Functions

7 control panel switches (Go, Job Cancel, Reprint, +, -, Set, Back) enable to control the basic printer operations and change various printer settings.

Key	Function
Go	Exit from the control panel menu. Reprint settings and Error messages. Pause / Continue printing.
Job Cancel	Stop and cancel the printer operation in progress.
Reprint	Select the reprint menu. (1-999)
+	Move forward through menus. Move forward through selectable options.
-	Move backward through menus. Move backward through selectable options.
Set	Select the control panel menu. Set the selected menus and settings.
Back	Go back one level in the menu structure.

5.2.1 Go switch

The panel indications can be changed from the current status (MENU, ERROR and REPRINT settings) by pressing the Go switch once. For ERROR indications, the panel changes only when the error is cleared.

Printing can be paused with the Go switch. Pressing the Go switch again restarts the print job and clears the PAUSE. During PAUSE, the printer is in the off-line state.

NOTE:

If you do not wish to print the remaining data when the printer is in PAUSE, the job can be canceled by pressing the Job Cancel **switch. Press the** Go **switch to clear the PAUSE and return the printer to the "Ready" state.**

5.2.2 Job Cancel switch

The processing or printing of data can be canceled with the Job Cancel switch. The display shows JOB CANCELING until canceling is completed. After canceling the job, the printer returns to the READY state.

When the printer is in any state except receiving data or printing, the display shows "NO DATA!!!" and the job cannot be canceled.

5.2.3 Reprint switch

Pressing the Reprint switch enables to reprint a document that has just been printed. Also, by simply spooling a document to a non-secure area of printer, the document can be shared with colleagues.
This document can then be re-printed by anyone who is on the network or at the printer control panel.

The reprint function can be used when the printer is READY or in the settings menu.

For printing PROOF, PUBLIC or SECURE data, we recommend installing the optional HDD or CompactFlash card.

The reprint function can be also used from RAM if an HDD or CompactFlash card is not installed. The print data in RAM will be deleted when the printer is turned off.

When you use RAM to reprint:

i) Press the Set switch on the control panel to exit from the READY status and select "RAMDISK SIZE" in the SETUP mode.

ii) The default RAM size is 0MB. Press the + switch to increase the reprint RAM size in increments of 1MB steps.

NOTE:

- When increasing the RAM size to use for secure printing, the work area of the printer is decreased and the printer performance will be reduced. Ensure to reset the "RAMDISK SIZE" to 0MB when secure printing has finished being used.
- When data is stored in RAM, the data is deleted when the printer power is turned off.
- It is also recommended adding additional RAM for printing a large amount of secure data.

(1) Reprinting the last job

The last print job data can be reprinted without sending it from the computer again.

NOTE:

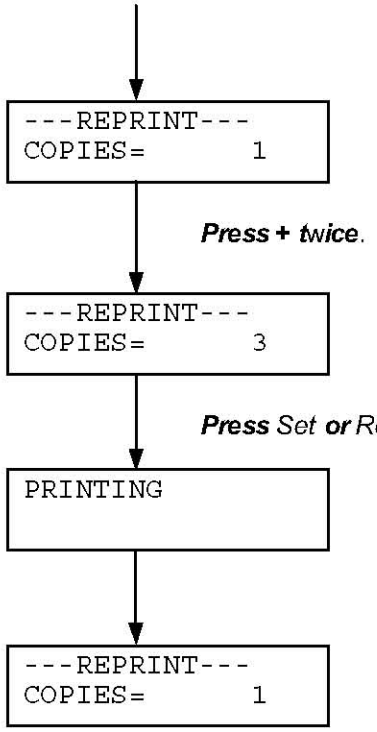
- When REPRINT is selected off on the panel and the Reprint switch is pressed, the LCD shows "NO DATA STORED" for a short time."
- For canceling reprinting, press the Job Cancel switch.
- If the printer does not have enough memory to spool the print job, it prints the last page only.
- Pressing the – or + switch makes the number of reprint copies decrease or increase. You can select between COPIES= 1 and COPIES=999.

Reprint the last job 3 times

1. Set the REPRINT menu ON with SETUP mode using the control panel.

NOTE:
If you print using the driver supplied with the printer, the settings for Job Spooling in the printer driver will take priority over the settings made on the control panel.

2. ***Press*** the *Reprint* ***switch***.



If you wait too long to continue the switch panel operation, the display exits the REPRINT menu automatically.

NOTE:

- ***If you press the*** Go ***switch, the printer will exit from the reprint menu.***
- ***If you want to reprint the data and have pressed the*** Go ***switch, the display shows*** "PRESS SET TO PRINT". ***Press the*** Set ***switch to start reprinting, or press the*** Go ***switch to cancel the reprint job.***

(2) Printing PROOF data

You can use this function to reprint PROOF data that has just been printed and has no security settings. Documents that are placed in the PROOF area are available to anyone. This function can also be used for a document that will be moved to a public folder at a later date.

When the area to spool data is full, the earliest data is automatically deleted first. The order of deleting data is not connected to the order of reprinting.

When you reprint PROOF data, refer also to 'Operations for printing SECURE data' in this chapter.

NOTE:

- If the optional HDD or CompactFlash has not been installed, the reprint data will be deleted when the printer is turned off.
- If there is data in the job information that cannot be displayed on the LCD, the display shows "?".

(3) Printing PUBLIC data

You can use this function to reprint documents stored in a PUBLIC area of the printer memory. Documents here will not be password protected and anyone can access them using the front panel or a web browser. The printer will not print a PUBLIC document when you send it to the printer. You must use the control panel of the printer or connect to the printer through a web browser.

PUBLIC data can be deleted using the control panel of the printer or from the web-based management software.

When you reprint PUBLIC data, refer also to 'Operations for printing SECURE data' in this chapter.

NOTE:

If there is data in the job information that cannot be displayed on the LCD, the display shows "?".

(4) Printing SECURE data

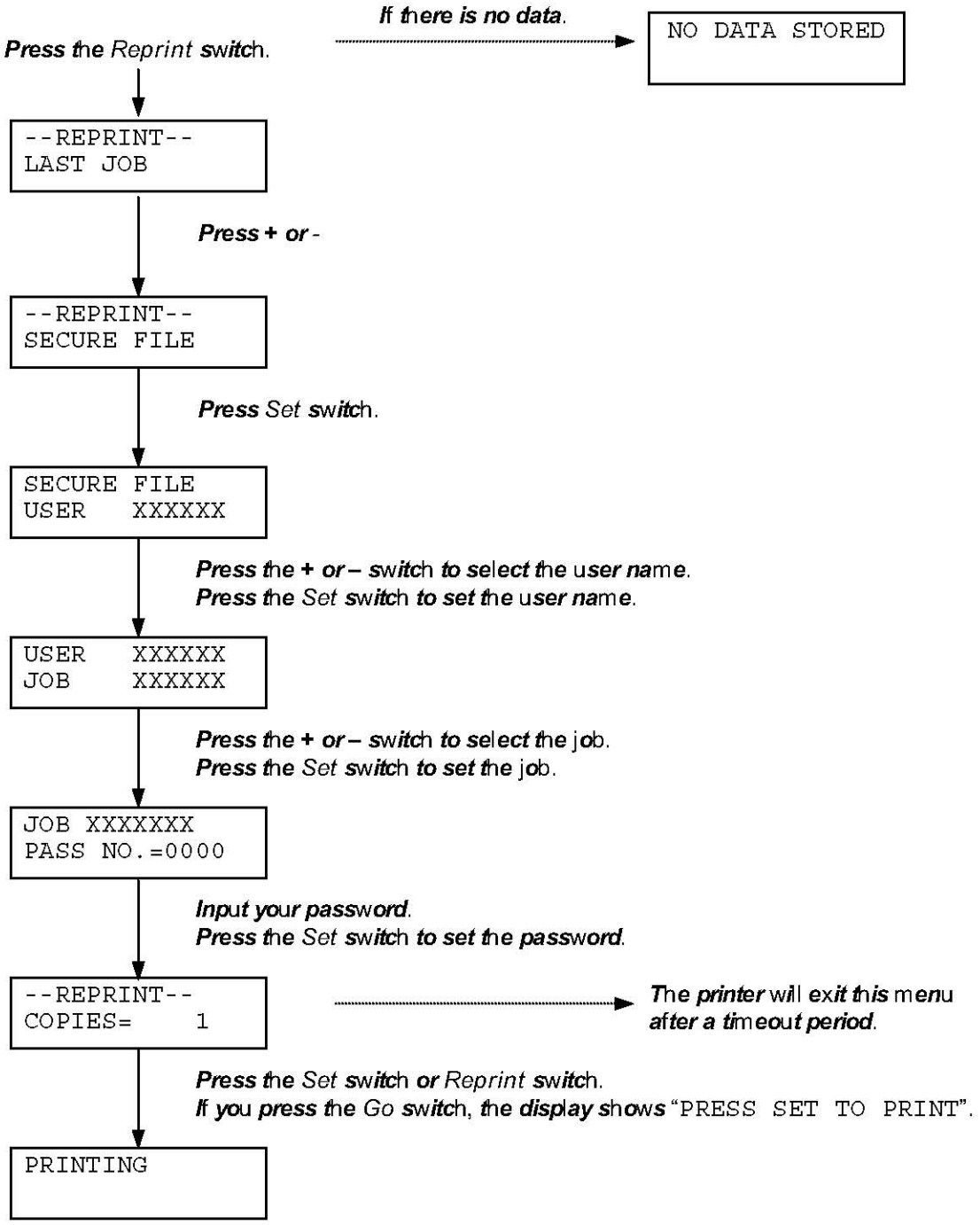
Secure documents are password protected and only those people that know the password will be able to print the document. The printer will not print the document when you send it for printing; to print the document you must use the control panel of the printer (with password) or connect to the printer using a web browser.

When you want to delete the spooled data, you can carry out this operation using the control panel or in the web-based management software.

NOTE:

If there is data in the job information that cannot be displayed on the LCD, the display shows "?".

Operations for printing SECURE data



When there is no reprint data in memory

If the printer does not have reprint data in buffer memory and you press the Reprint switch, the LCD shows "NO DATA STORED."

To cancel the reprint job

Pressing the Job Cancel switch allows you to cancel the current reprint job. The Job Cancel switch also allows you to cancel a paused reprint job.

5.2.4 + & - switch

If you press the + or – switch when the printer is in the on-line state (READY), it goes off-line and the LCD displays the menu.

(1) To display menus in the current mode

If you press the + or – switch when the printer is in the on-line state (READY), it goes off-line and the LCD displays the current mode.

You can enter other menus in the current mode by pressing the + or – switch. Pressing the + or – switch allows you to scroll forward or backward through the menus and settings on the display. Press or keep pressing the switch until you access the desired item.

(2) To set numbers

There are two ways to input numbers. You can use the + or – switch to scroll up or down one number at a time, or you can hold down the + or – switch to scroll faster. When you see the number you want, press the Set switch.

5.2.5 Set switch

If you press the Set switch when the printer is in the on-line state (READY), it goes off-line and the LCD goes to the menu display.

Pressing the Set switch allows you to set the selected menu or number. After changing the menu or the number, an asterisk appears briefly on the right hand side of the message.

5.2.6 Back switch

If you press the Back switch when the printer is in the on-line state (READY), it goes off-line and the LCD goes to the menu display.

Pressing the Back switch allows you to return to the previous level from the current menu level. The Back switch also allows you to select the next digit while inputting numbers. When the leftmost digit is selected, the Back switch allows you to go up one level in the menu. When a menu or number without an asterisk (Set switch not pressed) is selected, the Back switch allows you to return to the previous menu level with the original setting unchanged.

NOTE:

When you press the Set switch to select a setting, an asterisk appears briefly at the end of the display. Since the asterisk indicates the selection, you can easily find the current setting as you scroll through the display.

5.3 LCD Display

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

If you take the printer off-line, the display changes to show the selected emulation.

If any problems occur, the display shows the corresponding error message, maintenance message, or call service message to prompt you to take an action. For more information about these messages, see CHAPTER 6 'TROUBLESHOOTING'.

5.3.1 Backlights

The backlight of the LCD shows the current printer status with the different colors and the light indications (on, off and blinking).

Light indication	Meaning
Off	The printer is off-line or in sleep status.
Green (General)	Ready to print
	Printing
	Warming up
Red (Error)	Some problem has occurred at the printer.
Orange (Setting)	Selecting menu
	Setting reprint times
	Pause

5.3.2 LCD message

You can choose the messages that display on the second line of the LCD message as shown below.

Choose NONE/PAGE/JOB in the lower LCD menu of the SETUP mode.

Printer status messages

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

Printer Status Message	Meaning
READY	Ready to print.
PROCESSING	Busy processing data.
SLEEP	In sleep status (power save mode).
PRINTING	Printing.
PROGRAM-WAIT	Accessing CompactFlash card or HDD.
SELF TEST	Performing self-diagnostics.
PAUSE	The printer has suspended feeding forms. Pressing the Go switch resumes form feed.
NOW INITIALIZING	The printer is setting up.
WARMING UP	The printer is warming up.
MEMORY SIZE=XX MB	This printer has XX MB memory.
JOB CANCELING	Canceling the job.
RESOLUTION ADAPT	Printing with reduced resolution.
PRESS SET TO PRINT	Press the Set switch to start printing.
RESET TO FACTORY SETTING	The printer setting returns to the factory setting.
FAX SENDING	Sending fax data (Fax function: see Brother Solutions Center: http://solutions.brother.com)
FAX RECEIVING	Receiving fax data (Fax function: see Brother Solutions Center: http://solutions.brother.com)

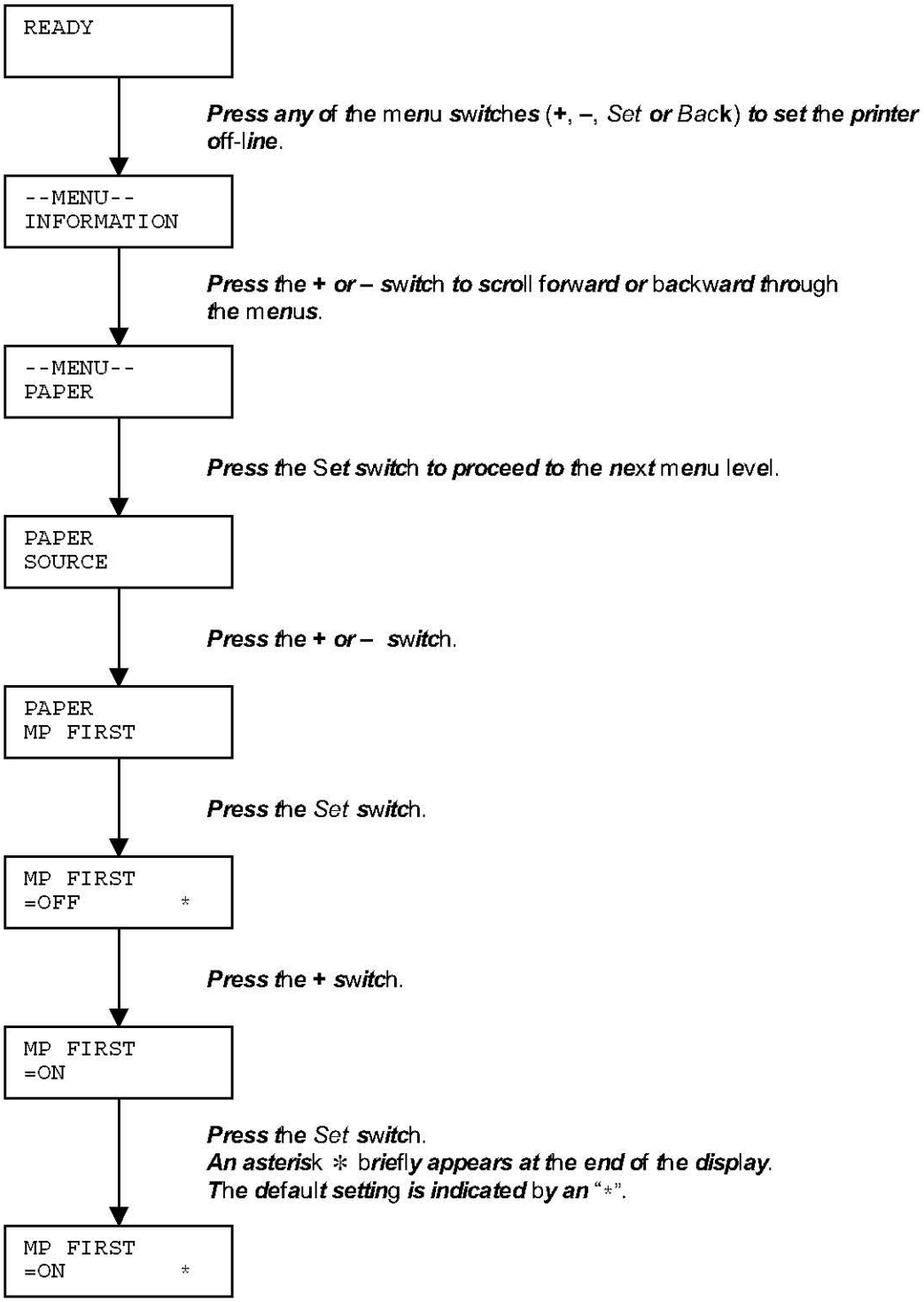
5.4 How to Use the Control Panel

The followings are the basic steps when operating the menu switches; +, –, Set, and Back.

- If no control panel operation is performed for 30 seconds, the LCD automatically returns to READY.
- When pressing the Set switch to select a setting, an asterisk appears at the end of the display for a short time. After that, the display returns to the previous menu level.
- After changing the status or number, pressing the Back switch before pressing the Set switch will cause the display to return to the previous menu with the original setting unchanged.
- Numbers can be input by scrolling through the available setting range or by setting digits one at a time. When setting digits one at a time, the blinking digit is the changeable digit.

Example for operation: When turning the 'MP FIRST' setting ON

NOTE:
Choose this setting to load paper from the multi-purpose tray first.



5.5 *Control Panel Setting Menu*

There are 8 modes. For more information about the selections available for each mode, refer to the pages listed below.

INFORMATION:
For more information, see subsection 5.5.1 'INFORMATION' in this Chapter.

PAPER:
For more information, see subsection 5.5.2 'PAPER' in this Chapter.

QUALITY:
For more information, see subsection 5.5.3 'QUALITY' in this Chapter.

SETUP:
For more information, see subsection 5.5.4 'SET UP' in this Chapter.

PRINT MENU:
For more information, see subsection 5.5.5 'PRINT MENU' in this Chapter.

NETWORK:
For more information, see subsection 5.5.6 'NETWORK ' in this Chapter.

INTERFACE:
For more information, see subsection 5.5.7 'INTERFACE' this Chapter.

RESET MENU:
For more information, see subsection 5.5.8 'RESET MENU' in this Chapter.

5.5.1 *Information*

Setting Menu	Description		
PRINT SETTINGS	***Print** the **configuration** page.*		
PRINT TEST	***Print** the **test** page.*		
PRINT DEMO	***Print** the **demonstration**.*		
PRINT FILE LIST	***Print** the file **list**.*		
PRINT FONTS	***Print** the **font list and sa**mples.*		
PRINT FAX LOG	***Print** the fax log file.*		
	Sub-setting Menu	Description	
VERSION	SER.NO=#########	***Printer seria**l **n**umber*	
	ROM VER=####	R***OM** **f**irmware **version***	
	ROM DATE ##/##/##	R***OM date***	
	NET VER=####	***Networ**k **f**irmware **version*** (***only network** users*)	
	NET DATE ##/##/##	***Networ**k bu**ild date*** (***only networ**k **users***)	
	RAM SIZE=###MB	***The size o**f mem**ory in this printer**.*	
MAINTENANCE	CLEANING PAGE	***Print** the **cleanin**g **page to c**lean **the thermistor**.*	
	PAGE COUNTER	=######	***The current tota**l **printed pa**ges.*
	REMAIN PF KIT1	=######	
	REMAIN PF KIT2	=######	
	REMAIN PF KIT3	=######	
	REMAIN PF KIT4	=######	
	REMAIN FUSER	=######	
	REMAIN LASER	=######	
	REMAIN TRANSFER	=######	

5.5.2 Paper

Setting Menu	Description
SOURCE	=AUTO / MP TRAY / TRAY1 / TRAY2 / TRAY3 / TRAY4 *
MP FIRST	=OFF / ON Feed paper from the MP tray as priority.
MP SIZE	=A4 / LETTER / LEGAL / … Select the size of paper you loaded in the MP tray. A4 / Letter / Legal / …
MANUAL FEED	=OFF / ON
DUPLEX	=OFF / ON (LONG BIND) / ON (SHORT BIND)
OUTPUT	=STANDARD / MAILBOX1-10 / MX STACK / MX SORT

* MP TRAY = Multi-purpose tray, TRAY1 = Upper paper tray, TRAY2/3/4= Optional lower tray

5.5.3 Quality

Setting Menu	Description
RESOLUTION	=300 / 600 / HQ1200 You can choose a print resolution of 300, 600 or HQ1200.
HRC	=OFF / LIGHT / MEDIUM/DARK HRC: High Resolution Control offers improved print quality of characters and graphics that conventional laser printers cannot attain with a resolution of 300 or 600 dpi.
TONER SAVE	=OFF / ON
DENSITY	=-2:0:2 Increase or decrease the print density.

5.5.4 Setup

Setting Menu	Description	
LANGUAGE	=ENGLISH / FRANÇAIS / …	
LOWER LCD	=NONE / PAGE COUNTER / JOB NAME	
LCD DENSITY	=0 / 1 / 2	
POWER SAVE TIME	=1 MIN : 99 MIN	
TONER LOW	=CONTINUE / STOP CONT: Continue printing even if a "TONER EMPTY" error occurs. STOP: Stop printing if the "TONER EMPTY" error occurs.	
AUTO CONTINUE	=OFF / ON	
LOCK PANEL	=OFF / ON Turn on / off the lock panel function.	
	PASS NO.=###	
REPRINT	=ON / OFF	
PAGE PROTECTION	PROTECT = AUTO	AUTO, OFF, LETTER, A4 OR LEGAL
EMULATION	=AUTO (EPSON) / AUTO (IBM) / HP LASERJET / …	
KEEP PCL	=OFF / ON	
RAMDISK SIZE	=0 / 1 / 2 … MB	RESTART?
DELETE STORAGE	Delete the data in CompactFlash card or HDD.	
	Sub-setting Menu	*Description*
	SECURE FILE	Select the user name, job name and password.
	PUBLIC FILE	Select the user name and job name.
	PROOF FILE	Select the user name and job name.
	DATA ID (HD)	=####
	DATA ID (CF)	=####
	MACRO ID (HD)	=####
	MACRO ID (CF)	=####
	FONT ID (HD)	=####
	FONT ID (CF)	=####
	FORMAT ID (HD)	OK?
	FORMAT ID (CF)	OK?
TIME STYLE	=YY / MM / DD or MM / DD / YY or DD / MM / YY	
DATE & TIME	DISPLAY	YYYY / MM / DD HH / MM
	YEAR	=####
	MONTH	=##
	DAY	=##
	HOUR	=##
	MINUTE	=##

5.5.5 Print menu

Setting Menu	Description	
MEDIA TYPE	=PLAIN PAPER / TRANSPARENCIES / THICK PAPER / THICKER PAPER / BOND PAPER / ENVELOPES	
PAPER	Set cut sheet paper size to Letter, Legal, A4, A5, A6, B5, B6, Executive, COM10, Monarch, C5 and DL	
COPIES	You can check the total number of printed pages.	
	Shows the number of printed pages. (1:999)	
ORIENTATION	=PORTRAIT / LANDSCAPE This printer can print pages in portrait or landscape orientation.	
PRINT POSITION	This printer can be adjusted to align the page format.	
	Sub-setting Menu	Description
	X OFFSET=0	=-500:+500 Move the print start position (at the upper left corner of pages) horizontally up to –500 (left) to +500 (right) dots in 300 dpi units.
	Y OFFSET=0	=-500:+500 Move the print start position (at the upper left corner of pages) vertically up to –500 (up) to +500 (down) dots in 300 dpi units.
AUTO FF TIME	=OFF / 1:99 (sec) Allows you to print the remaining data without pressing the Go switch.	
FF SURPRESS	=OFF / ON Turn on / off the form feed suppress function.	
HP LASERJET	FONT NO.	=I0000:#####
	FONT PITCH/POINT	=###.##
	SYMBOL SET	PC-8 / … Set the symbol set or the character set.
	TABLE PRINT	Print code table
	AUTO LF	=OFF / ON ON: CR→CR+LF, OFF: CR→CR
	AUTO CR	=OFF / ON ON: LF→LF+CR, FF+CR, or VT→VT+CR OFF: LF→LF, FF→FF, or VT→VT
	AUTO WRAP	=OFF / ON Line feed and carriage return occur when the printer reaches the right margin.
	AUTO SKIP	=ON / OFF Line feed and carriage return occur when the printer position reaches the bottom margin.

Setting Menu	Description	
HP LASER JET	LEFT MARGIN	=#### Set the left margin at column 0 to 126 columns at 10 cpi.
	RIGHT MARGIN	=#### Set the right margin at column 10 to 136 columns at 10 cpi.
	TOP MARGIN	=#### Set the top margin at a distance from the top edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting=0.5
	BOTTOM MARGIN	=#### Set the bottom margin at a distance from the bottom edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting: 0.33 (None-HP), 0.5 (HP)
	LINES	=#### Set the number of lines per page from 5 to 128 lines.
EPSON FX-850	FONT NO.	=I00:#####
	FONT PITCH/ POINT	=###.##
	CHARACTER SET	PC-8 / ... Set the symbol set or the character set.
	TABLE PRINT	Print code table.
	AUTO LF	=OFF / ON ON: CR→CR+LF OFF: CR→CR
	AUTO MASK	=OFF / ON
	LEFT MARGIN	Set the left margin at column 0 to 126 columns at 10 cpi.
	RIGHT MARGIN	Set the right margin at column 10 to 136 columns at 10 cpi.
	TOP MARGIN	Set the top margin a distance from the top edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting=0.33
	BOTTOM MARGIN	Set the bottom margin at a distance from the bottom edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting=0.33
	LINES	Set the number of lines per page from 5 to 128 lines.

Setting Menu	Description	
IBM PROPRINTER	FONT NO.	=I0000:#####
	FONT PITCH/ POINT	=###.##
	CHARACTER SET	PC-8 / ... Set the symbol set and the character set.
	TABLE PRINT	Print code table.
	AUTO LF	=OFF / ON ON: CR→CR+LF OFF: CR→CR
	AUTO CR	=OFF / ON
	AUTO MASK	=OFF / ON
	LEFT MARGIN	Set the left margin at column 0 to 126 columns at 10 cpi.
	RIGHT MARAGIN	Set the right margin at column 10 to 136 columns at 10 cpi.
	TOP MARGIN	Set the top margin a distance from the top edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting=0.33
	BOTTOM MARGIN	Set the bottom margin a distance from the bottom edge of the paper: 0, 0.33, 0.5, 1.0, 1.5 or 2.0" Factory setting=0.33
	LINES	Set the number of lines per page from 5 to 128 lines.
HP-GL	CHAR SET (STD)	=#####
	CHAR SET (ALT)	=#####
	PEN # SIZE	PEN 1 to 6 (Set size and gray percentage for the selected pen.)
	PEN # GRAY	PEN 1 to 6 15,30,45, 75, 90 or 100 % (# is the selected pen number)
BR-SCRIPT	ERROR PRINT	=OFF / ON
	APT	=OFF / ON APT: Advanced Photoscale Technology offers photographic fine grayscale on graphics. APT setting is available only at 600 dpi.

5.5.6 Network

Setting Menu	Description	
TCP/IP	Sub-setting Menu	Description
	TCP/IP ENABLE	=ON / OFF
	IP ADDRESS=	###, ###, ###, ###
	SUBNET MASK=	###, ###, ###, ###
	GATEWAY=	###, ###, ###, ###
	IP BOOT TRIES	=#
	IP METHOD	=AUTO / STATIC / RARP / BOOTP / DHCP
NETWARE	NETWARE ENABLE	=ON / OFF
	NET FRAME	=AUTO / 8023 / ENET / 8022 / SNAP
APPLETALK	=ON / OFF	
NETBEUI	=ON / OFF	
DLC/LLC	=ON / OFF	
BANYAN	=ON / OFF	
LAT	=ON / OFF	
NETBIOS/IP	=ON / OFF	
ENET	=ATUO / 100B-FD / 100B-HD / 10B-FD / 10B-HD	

5.5.7 Interface

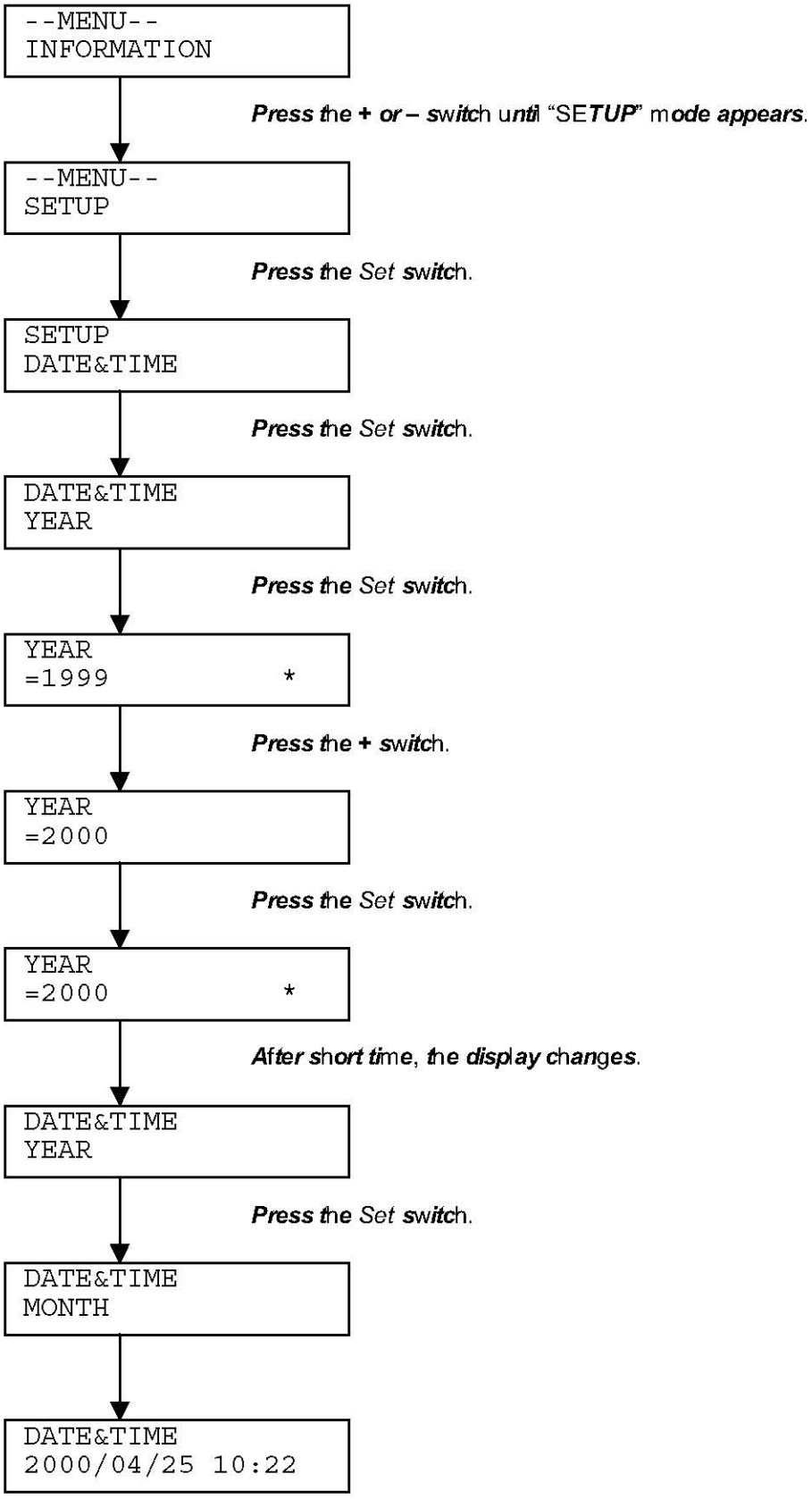
Setting Menu	Description	
SELECT	=AUTO / PARALLEL / RS232C / USB / NETWORK	
AUTO IF TIME	= 1:99 (sec) You need to set the timeout period for the auto interface selection.	
INPUT BUFFER	= Level 1:15 Increase or decrease the input buffer capacity.	RESTART PRINTER?
PARALLEL	When using the parallel interface	
	Sub-setting Menu	Description
	HIGH SPEED	=ON / OFF Turns high-speed parallel communications ON / OFF.
	BI-DIR	=ON / OFF Turns bi-directional parallel communications ON / OFF.

Setting Menu	Description		
RS-232C	When using the serial interface		
	Sub-setting Menu	**Description**	
	FAX MODE	=ON / OFF	RESTART PRINTER?
	BAUDRATE	Data transfer speed can be set to 150/300/600/1200/2400/4800/ 9600/19200/38400/57600/15200 baud.	
	DODETYPE	=8 BITS / 7 BITS Data length can be set to 7 or 8 bits.	
	PARITY	=NONE / ODD / EVEN Data error check can be set to NONE, ODD or EVEN.	
	STOP BIT	=1 BITS / 2 BITS Data separator can be set to 1 or 2 stop bits.	
	XON/XOFF	=ON / OFF Handshake protocol can be set to ON / OFF.	
	DTR (ER)	=ON / OFF	
	ROBUST XON	=OFF / ON	
	RING DELAY	=0 / 1 / 2 / 3 / 4	
	REDUCTION	=AUTO / OFF / 90%	
	RAM SIZE	=1:##MBYTE	
	RECEIVE	=ON / OFF	
	INTERVAL	=OFF / 1H / … 7D	

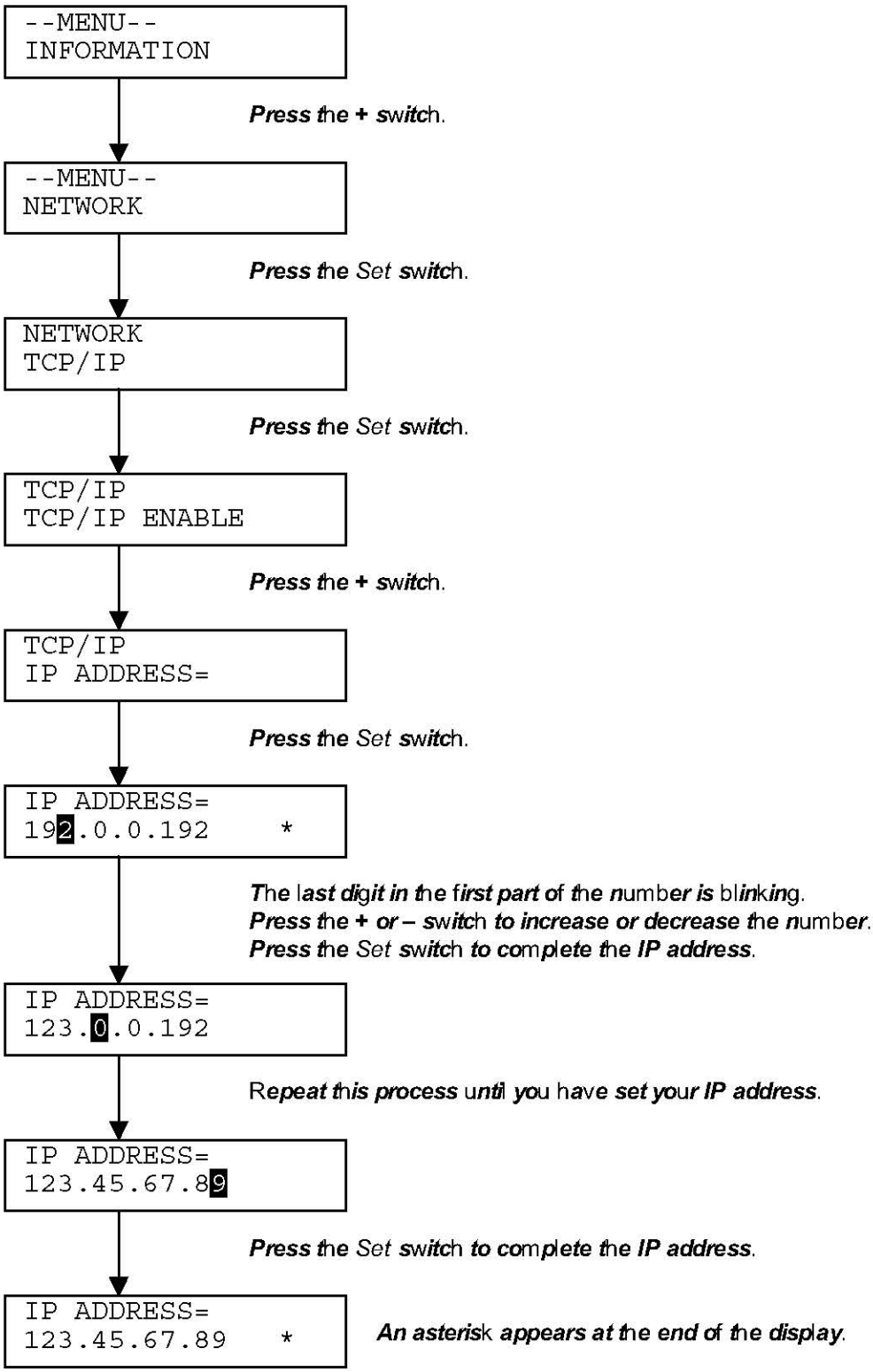
5.5.8 Reset menu

Setting Menu	Description
RESET PRINTER	Resets the printer and restores all printer settings – including command settings – to settings you have previously made with the control panel switches.
FACTORY RESET	Resets the printer and restores all printer settings – including command settings – to the factory settings. See subsection 5.5.12 'List of factory settings' in this chapter.

5.5.9 *Set date and time*



5.5.10 Set IP address



5.5.11 About emulation modes

This printer has the following emulation modes.

HP LserJet Mode

The HP LaserJet mode (or HP mode) is the emulation mode in which this printer emulates the Hewlett-Packard LaserJet laser printer. Many software applications support this type of laser printer. Using this mode will allow your printer to operate at its optimum performance with those applications.

BR-Script 3 Mode

BR-Script is an original page description language and a PostScript language emulation interpreter. This printer supports level 3. The BR-Script interpreter of this printer enables full and satisfactory control of text and graphics on pages.

See the following commercial manuals for more technical information about PostScript commands.

- **Adobe Systems Incorporated.** *PostScript Language Reference Manual*, 3rd *Edition*. **Menlo Park: Addison-Wesley Publishing Company, Inc., 1999.**
- **Adobe Systems Incorporated.** *PostScript Language Program Design*. **Menlo Park: Addison-Wesley Publishing Company, Inc., 1988.**
- **Adobe Systems Incorporated.** *PostScript Language Reference Manual*. **Menlo Park: Addison-Wesley Publishing Company, Inc., 1985.**
- **Adobe Systems Incorporated.** *PostScript Language* Tutorial and Cookbook. **Menlo Park: Addison-Wesley Publishing Company, Inc., 1985.**
- **Adobe Systems Incorporated.** *PostScript Language Reference Manual*, third *Edition*. **Addison-Wesley Longman, Inc., 1999.**

HP-GL Mode

The HP-GL mode is the emulation mode in which this printer emulates the Hewlett-Packard plotter model HP-7475A. Many graphics and CAD applications support this type of plotter. Use this mode for optimum performance when printing from those types of applications.

EPSON FX-850 and IBM Proprinter XL Mode

The EPSON FX-850 and IBM Proprinter XL modes are the emulation modes that this printer emulates to meet the industry-standard for dot matrix printers of their respective manufactures. Some applications support these dot matrix printer emulations. Use these emulation modes for optimum performance when printing from those types of applications.

5.5.12 List of factory settings

The following table shows the initial factory default settings.

NOTE:

- The settings are subject to the emulation mode. Effective modes are indicated in parentheses in the following table.
- The following settings cannot be restored to the factory settings with the RESET menu in the FACTORY SETTINGS mode: INTERFACE MODE, HRC SETTING, PAGE PROTECTION, SCALABLE FONT, LOCK PANEL, PAGE COUNTER and local language for display messages.
- The COPY setting is always restored to the factory setting when the printer is turned off and on again.
- **It is not possible to reset NETWORK settings using the Control panel. If you wish to reset the print server back to its default factory settings (resetting all information such as the password and IP address information) hold down the Network Test Button of the Network board (NC-4100h) for more than 5 seconds.**

Mode	Menu	Factory Setting
PAPER	SOURCE	=AUTO
	MP FIRST	=OFF
	MP SIZE=	=A4 / LETTER
	MANUAL FEED	=OFF
	DUPLEX	=OFF
	OUTPUT	=STANDARD
QUALITY	RESOLUTION	=600
	HRC	=MEDIUM
	TONER SAVE	=OFF
	DENSITY	=0
SETUP	LANGUAGE	=ENGLISH
	LOWER LCD	=OFF
	LCD DENSITY	=0
	POWER SAVE TIME	=30 MIN
	AUTO CONTINUE	=OFF
	LOCK PANEL	=OFF
	REPRINT	=ON
	PAGE PROTECTION	=AUTO
	EMULATION	=AUTO (EPSON)
	KEEP PCL	=OFF
	RAMDISK SIZE	=#MB
	TIME STYLE	=YY / MM / DD hh:mm

Mode	Menu	Factory Setting
PRINT MENU	MEDIA TYPE	=PLAIN PAPER
	PAPER	=A4 / LETTER
	COPIES	=1
	ORIENTATION	=PORTRAIT
	PRINT POSITION	X OFFSET=0 Y OFFSET=0
	AUTO FF TIME	=5
	FF SUPPRESS	=OFF
	HP LASER JET	FONT NO.=59
		FONT PITCH / POINT=10.00 / 12.00
		SYMBOL / CHARACTER SET=PC8
		AUTO LF=OFF
		AUTO CR=OFF
		AUTO WRAP=OFF
		AUTO SKI=ON
		LEFT MARGIN=####
		RIGHT MARGIN=####
		TOP MARGIN=####
		BOTTOM MARGIN=####
		LINES=####
	EPSON FX-850	FONT NO.=####
		FONT PITCH / POINT=10.00 / 12.00
		SYMBOL / CHARACTER SET =US ASCII
		AUTO LF=OFF
		AUTO MASK=OFF
		LEFT MARGIN=####
		RIGHT MARGIN=####
		TOP MARGIN=####
		BOTTOM MARGIN=####
		LINES=####

Mode	Menu	Factory Setting
PRINT MENU	IBM PROPRINTER	FONT NO.=####
		FONT PITCH / POINT=10.00 / 12.00
		SYMBOL / CHARACTER SET =PCB
		AUTO LF=OFF
		AUTO CR=OFF
		LEFT MARGIN=####
		RIGHT MARGIN=####
		TOP MARGIN=####
		BOTTOM MARGIN=####
		LINES=####
	HP-GL	CHAR SET (STD)=####
		CHAR SET (ALT)=####
		PEN # SIZE
		PEN # GRAY
	BR-SCRIPT	ERROR PRINT=OFF
		APT=OFF
NETWORK	TCP/IP	TCP/IP ENABLE=ON
		IP METHOD=AUTO
		IP ADDRESS=192.0.0.192
		SUBNET MASK=0.0.0.0
		GATEWAY=0.0.0.0
		IP BOOT TRIES=3
		IP METHOD=AUTO
	NETWARE	NETWARE ENABLE=ON
		NEE FRAME=AUTO
	APPLETALK	=ON
	NETBEUI	=ON
	DLC/LLC	=ON
	BANYAN	=ON
	LAT	=ON
	NETBIOS/IP	=ON
	ENET	=AUTO

Mode	Menu	Factory Setting
INTERFACE	SELECT	=AUTO
	AUTO IF TIME	=5
	INPUT BUFFER	=LEVEL 3
	PARALLEL	HIGH SPEED=ON
		BI-DIR=ON
	RS-232C	FAX MODE=OFF
		BAUD RATE=9600
		CODE TYPE=8 BITS
		PARITY=NONE
		STOP BIT=1 BITS
		X ON / X OFF=ON
		DTR (ER)=ON
		ROBUST XON=OFF
		RING DELAY=0
		REDUCTION=AUTO
		RAM SIZE=1MB
		RECEIVE=ON
		INTERVAL=OFF

5.6 Other Control Features

The printer has the following useful features;

5.6.1 Sleep mode

When the printer does not receive data for a certain period of time (timeout), it enters sleep mode. The default timeout is 5 minutes and it is automatically adjusted to the most suitable time-out setting depending on the frequency of your printer use (Intelligent Sleep Mode).

While the printer is in sleep mode, the data LED and the LCD back light are off and it is as if they were turned off, but the printer can still receive data from the computer. Receiving a print file or document automatically wakes up the printer to start printing. Pressing any switch on the control panel also wakes up the printer.

NOTE:

- *When the printer goes into sleep mode, the fan will not stop until the printer engine has cooled down. The fan running time varies depending on the sleep mode timeout because the fan running conditions are defined as follows;*

1) The fan runs for 10 minutes whenever printing finishes.

2) The fan runs while the printer is in ready status.

3) The fan runs for at least 5 minutes after the printer goes into sleep mode.

(EX: If the timeout is 5 minutes, the fan will be running for 5 minutes after the printer goes into sleep mode.)

- *Sleep mode allows the print engine to cool, so the temperature of the room and how long the printer has been in sleep mode affects the warm-up time. This warm-up time can take up to 45 seconds. The LCD back light turns green with the "WARMING UP" message on the display to indicate that the printer is warming up.*

5.6.2 Inspection mode

The printer incorporates various inspection modes. The printer enters into each inspection mode by panel switch operation.

For details on inspection mode, see section 9. 'INSPECTION MODE' in CHAPTER 6.

See also subsection 3.1.4 'Print a test page' in this chapter.

6. NETWORK BOARD OPERATION

Installing the network board enables you to use the printer in the TCP/IP, IPX/SPX, AppleTalk, DLC/LLC, Banyan VINES, DEC LAT and NetBEUI environments. Also, useful utilities such as BR-Admin32 and network printing software for the administrator are included. For more information about set up, see section 3. 'INSTALL THE PRINTER' in this chapter.

6.1 Installing the Network Board

(1) Turn off the printer power, and then unplug the power cord. Disconnect the interface cable (printer cable) from the printer.

(2) Open the side cover.

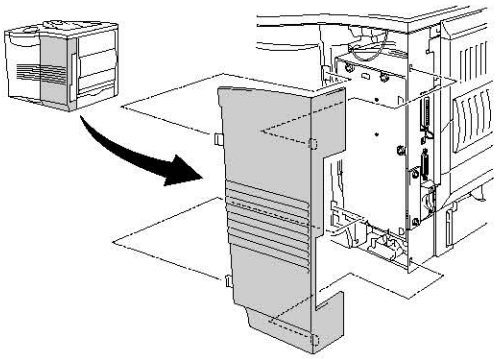


Fig. 2-24

(3) Unscrew the three screws in the order shown, and then remove the metal plate.

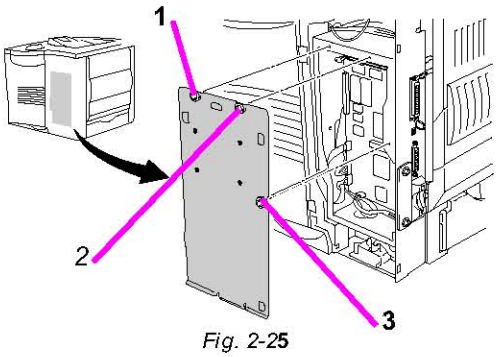


Fig. 2-25

(4) Unscrew the two screws, and then remove the network cover plate.

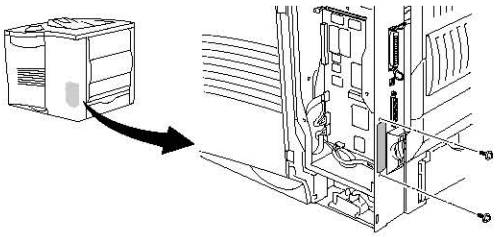


Fig. 2-26

(5) Insert the network board connector firmly into the connector of the main controller board, and then secure it with the two screws.

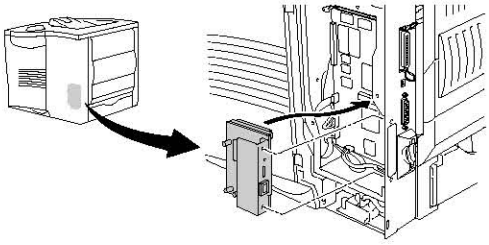


Fig. 2-27

(6) Secure the metal plate with the three screws in the order shown.

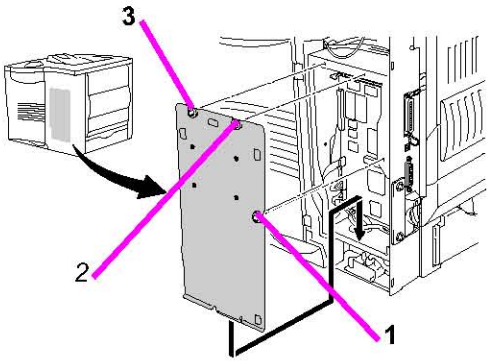


Fig. 2-28

(7) Close the side cover.

(8) Connect one end of the Ethernet Cable to the network port of the printer.

(9) Plug the power cord into the AC outlet, and then turn on the power switch.

Print configuration page

Press the network test button for less than 5 seconds to print a configuration page.

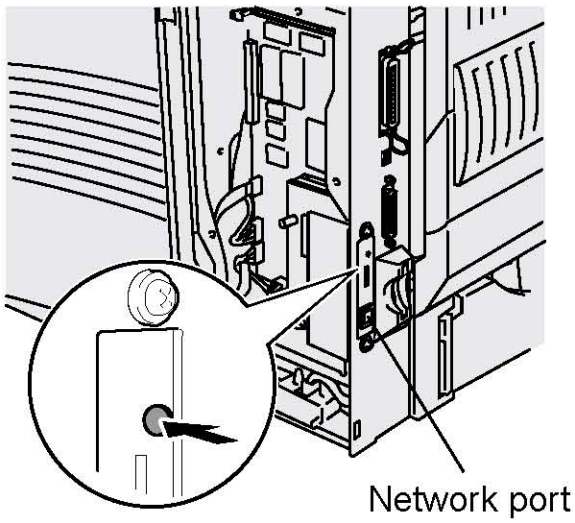


Fig. 2-29

6.2 Functions

6.2.1 LED functions

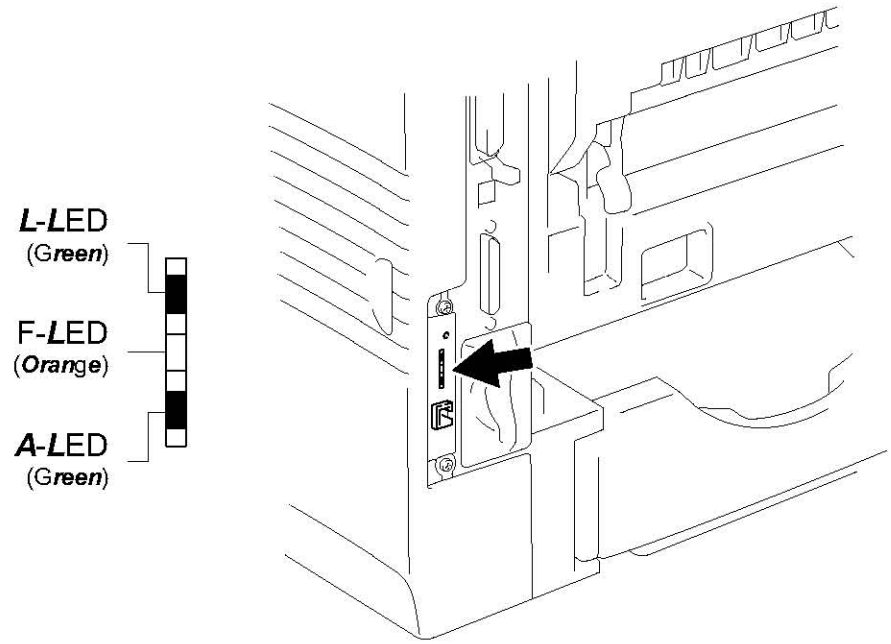


Fig. 2-30

L-LED (Green): Link activity

This LED is on if there is a valid connection to the network (either 10BaseT or 100BaseTX). It is off if no network is detected.

F-LED (Orange): Fast Ethernet

This LED will be on if the print server is connected to a 100BaseTX Fast Ethernet network. It is off if the print server is connected to a 10BaseT network.

A-LED (Green): Transmission activity

This LED will blink as the print server receives or transmits data.

6.2.2 Factory default setting

If you wish to reset the print server back to its default factory settings (resetting all information such as the password and IP address information), hold down the Network Test button for more than 5 seconds.

CHAPTER 3 THEORY OF OPERATION

1. ELECTRONICS

1.1 General Block Diagram

Fig. 3-1 shows a general block diagram of the HL-2460 printer.

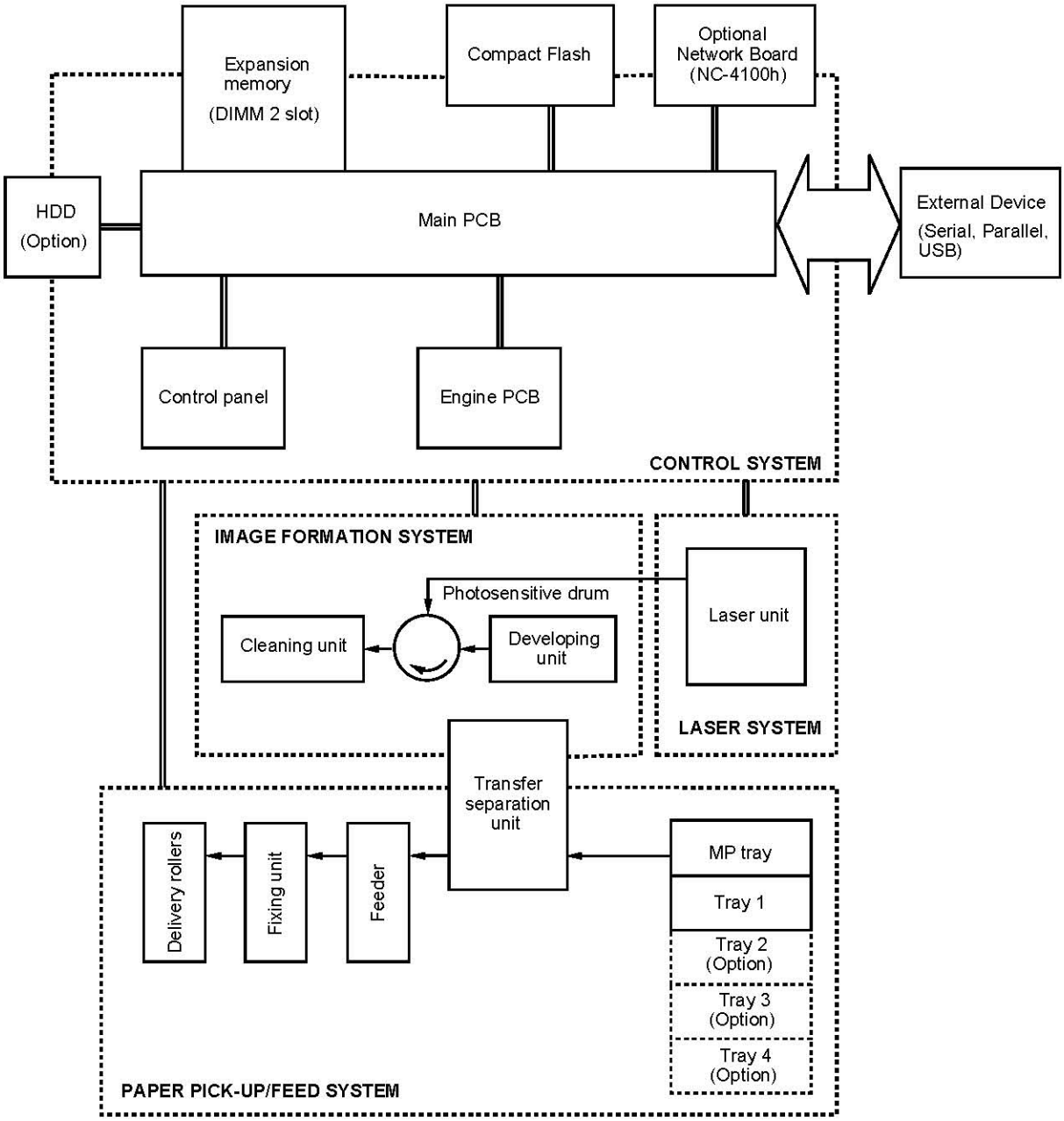


Fig. 3-1

1.2 Main PCB (Video Controller PCB)

For the entire circuit diagram of the main PCB, see APPENDIX 2 to 9 'MAIN PCB CIRCUIT DIAGRAM, HL-2460'.

1.2.1 Outline

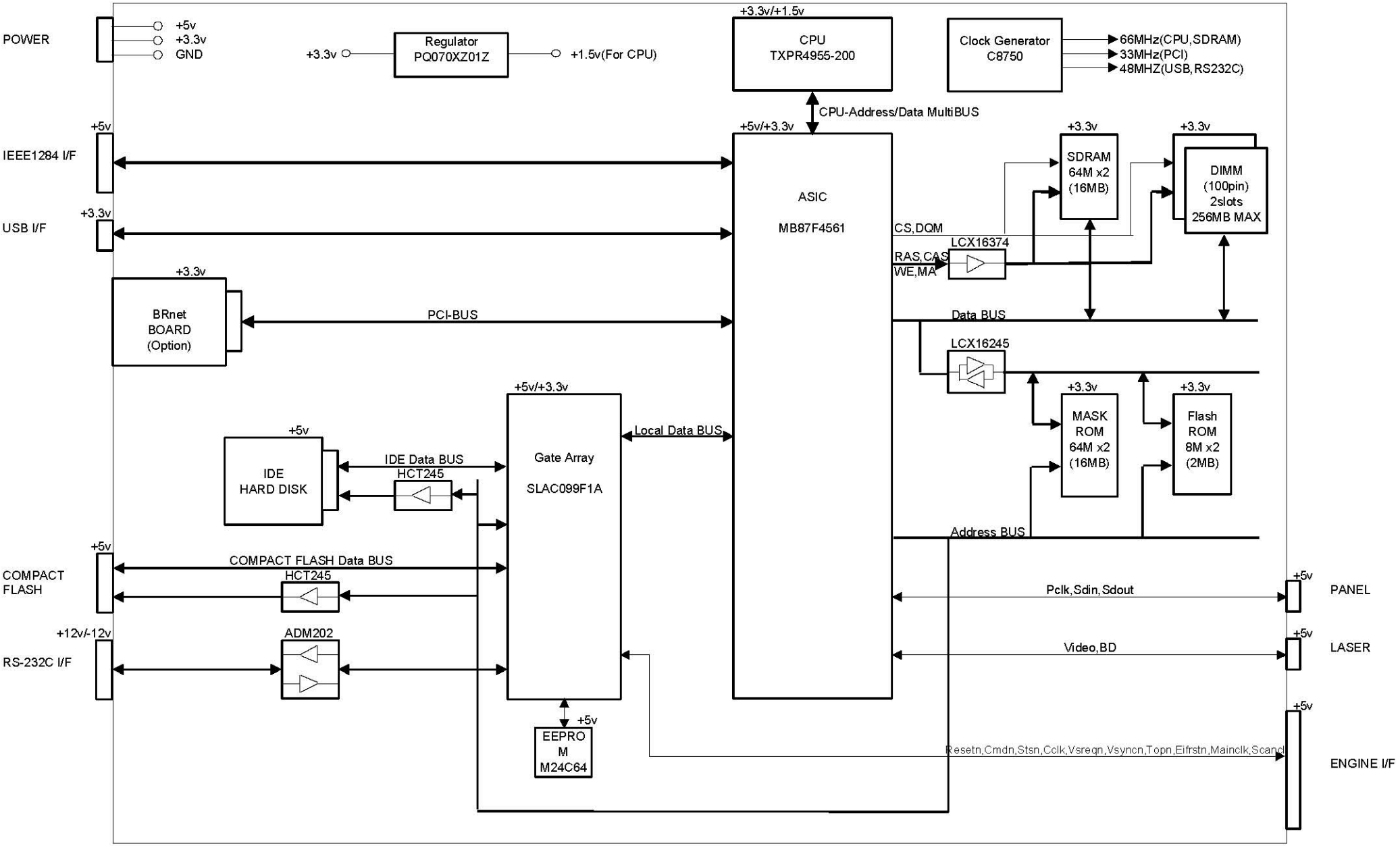
The Main PCB consists of the circuits which perform the following functions;

- 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 engine CPU to display LCD messages, light the LEDs and display the button status, etc.

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

Main PCB Block Diagram



1.2.2 Circuit

(1) CPU block

- Model name: TXPR4955-200, MIPS 64bit RISC CPU manufactured by Toshiba
- Clock speed: 66.7 MHz (external) / 200 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: MF87F4561 manufactured by Fujitsu
- Appearance: 420 pin BGA
- Functions:

  Controls CPU
  Controls memory
  Controls interrupts
  Timer
  External interfaces (iEEE1284 *1, USB *2, BR-NET *3, IDE, 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 Sores the data received from the PC into DRAM as controlled by the DMA controller. The transmission speed is 12 Mbps.

  *3 Compatible with PCI bus of 33 MHz clock speed

(3) Gate Array block

- Model name: SLAC099FIA manufactured by Epson
- Appearance: 160 pin QFP
- Functions: Engine control (Clock synchronous serial transmission)
  RS-232C

(4) ROM block

The ROM stores the CPU control program and font data. ROMs used are 16Mbytes masked ROM, and an 2Mbytes flash ROM which can be rewritten on the board.

<Masked ROM>

- Access time: Less than 120 nsec. (Page access: Less than 50 nsec)
- Appearance: 48 pin TSOP

<Flash ROM>

- Model name: MBM29LV800TA manufactured by Fujitsu
- 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 64Mbit SDRAM, thus having 16MB memory capacity in total.

- Model name: HY57V651620BTC manufactured by Hyundai (or equivalent)
- Type: 64Mbit 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

<Recommended DIMM type>

16MB: Techworks PM-HP 16M
32MB: Techworks PM-HP 32M
64MB: Techworks PM-HP 64M
128MB: Techworks PM-HP 128M

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

M24C64 type of two-wire method with a 8K x 8 bits configuration

(8) Reset circuit

The reset IC is a RN5VD42A. The reset voltage is 4.2V (typ.) and the LOW period of reset if 80ms (typ.).

(9) External interface block

- IEEE1284 interface
- USB interface
- RS-232C interface
- CompactFlash interface
- IDE interface

1.3 Engine PCB

The engine PCB controls the following parts by using signal data that the CPU (8 bit M38869) obtains through correspondence with the main PCB. The engine PCB also corresponds with the optional parts to give operational commands to the CPU.

- Main motor
- Fan motor
- Thermistor
- Polygon motor
- Paper feed motor
- Paper feed solenoid
- Multi paper tray solenoid
- Registration clutch
- High-voltage power supply
- Cover open sensor
- Pre-registration sensor
- Registration sensor
- Multi purpose tray paper empty sensor
- Tray paper empty sensor
- Face up open sensor
- Full stack sensor
- Fuser exit sensor
- Eject sensor
- Paper size sensor
- Tray ID sensor

For the entire circuit diagram of the engine PCB, see APPENDIX 10 to 11 'ENGINE PCB CIRCUIT DIAGRAM, HL-2460'.

1.4 Power Supply

1.4.1 Low-voltage power supply

The power supply uses a switching regulation system to generate the regulated DC power (+3.3V, +5V and +24V), which are converted from the AC line.

The regulated output and the production code of each power supply are listed below;

Regulated Output	Production Code
+3.3V / 3.0A +5V / 1.5A +24V / 7.8A	100V: MPS3515 200V: MPS3415

For the circuit diagram of the low-voltage power supply PCB, see APPENDIX 12 'LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM, HL-2460'.

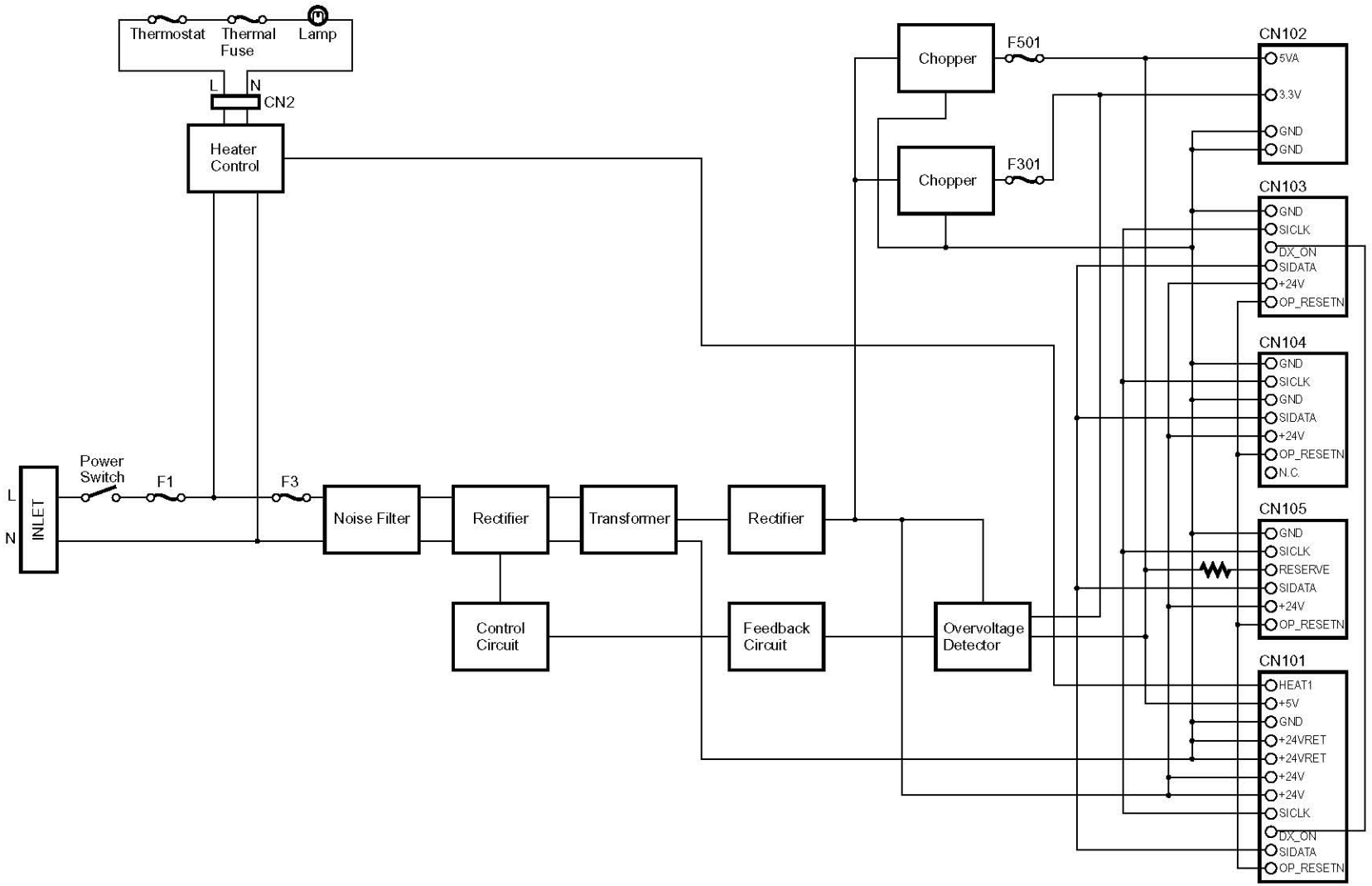

Thermostat
Thermal Fuse
Lamp
L
N
CN2
Heater Control
Chopper
F501
Chopper
F301
CN102
5VA
3.3V
GND
GND
CN103
GND
SICLK
DX_ON
SIDATA
+24V
OP_RESETN
CN104
GND
SICLK
GND
SIDATA
+24V
OP_RESETN
N.C.
CN105
GND
SICLK
RESERVE
SIDATA
+24V
OP_RESETN
CN101
HEAT1
+5V
GND
+24VRET
+24VRET
+24V
+24V
SICLK
DX_ON
SIDATA
OP_RESETN
L
N
INLET
Power Switch
F1
F3
Noise Filter
Rectifier
Transformer
Rectifier
Control Circuit
Feedback Circuit
Overvoltage Detector

Fig. 3-2

1.4.2 High-voltage power supply

The high-voltage power supply generates and outputs the voltages and currents for the charging, development and transfer functions.

For the circuit diagram of the high-voltage power supply PCB, see APPENDIX 13 'HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM, HL-2460'.

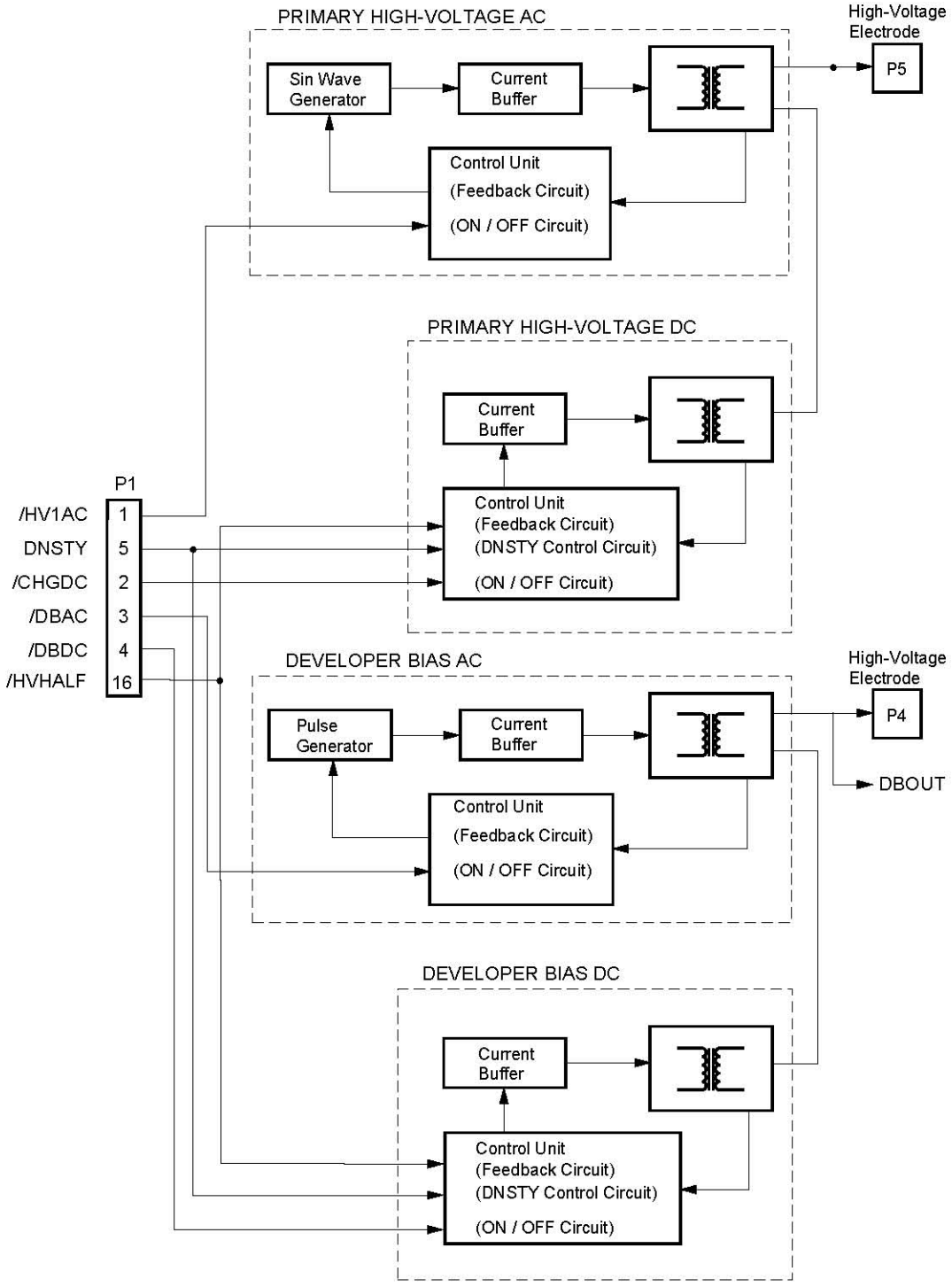


Fig. 3-3

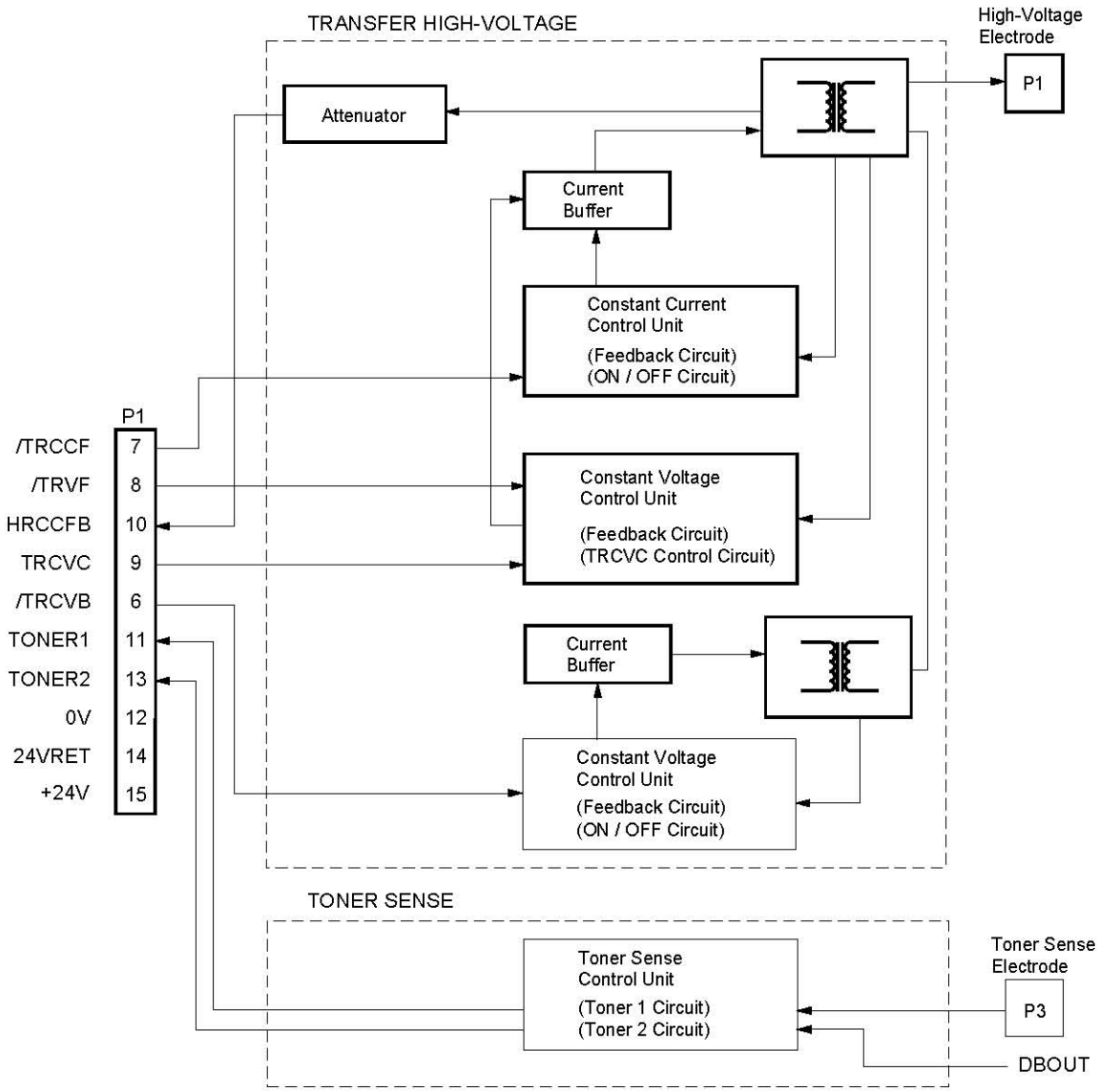

TRANSFER HIGH-VOLTAGE
High-Voltage Electrode
P1
Attenuator
Current Buffer
Constant Current Control Unit
(Feedback Circuit)
(ON / OFF Circuit)
Constant Voltage Control Unit
(Feedback Circuit)
(TRCVC Control Circuit)
Current Buffer
Constant Voltage Control Unit
(Feedback Circuit)
(ON / OFF Circuit)
P1
/TRCCF 7
/TRVF 8
HRCCFB 10
TRCVC 9
/TRCVB 6
TONER1 11
TONER2 13
0V 12
24VRET 14
+24V 15
TONER SENSE
Toner Sense Control Unit
(Toner 1 Circuit)
(Toner 2 Circuit)
Toner Sense Electrode
P3
DBOUT

Fig. 3-4

2. MECHANICS

2.1 Overview of Printing Mechanism

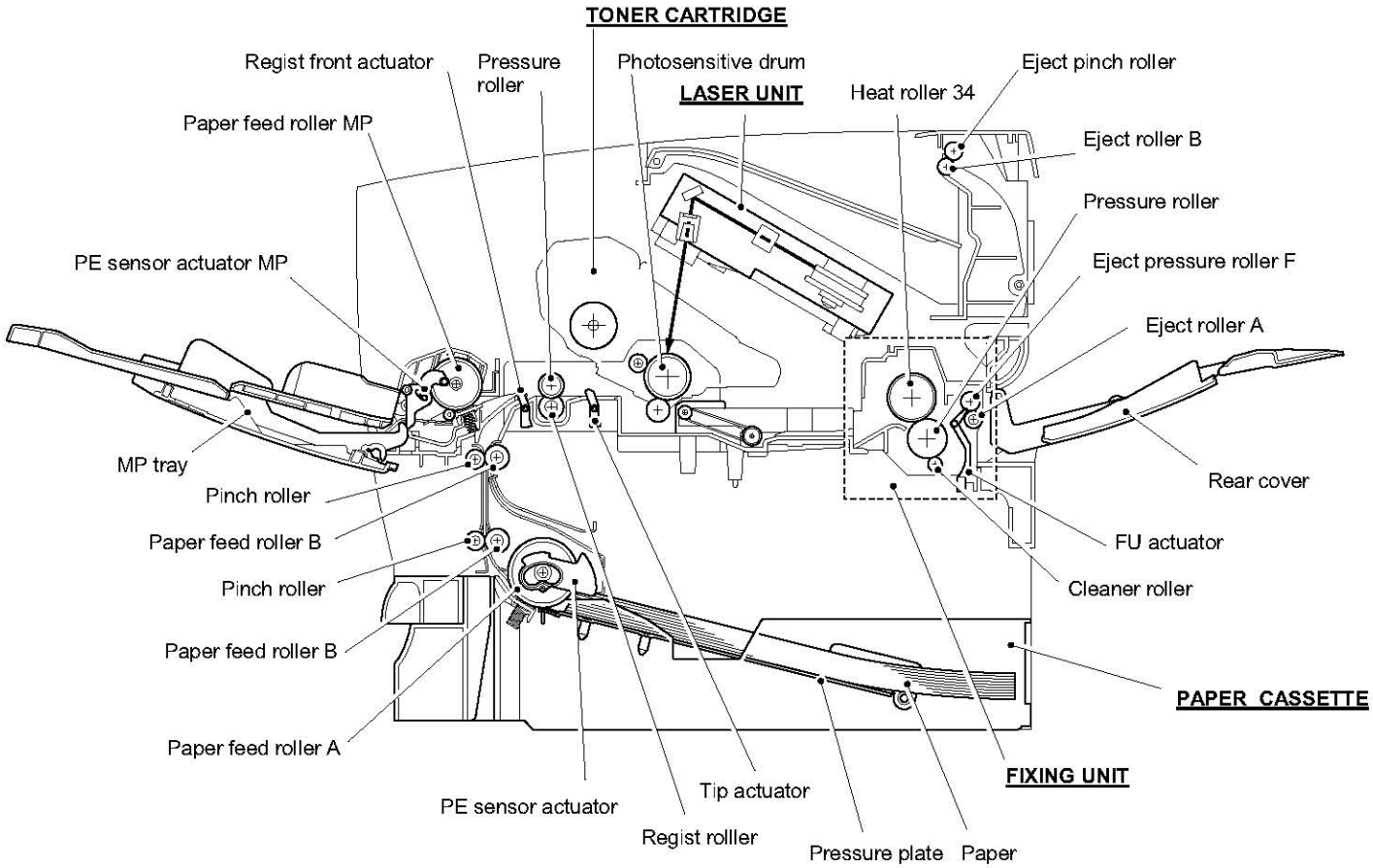


Fig. 3-5

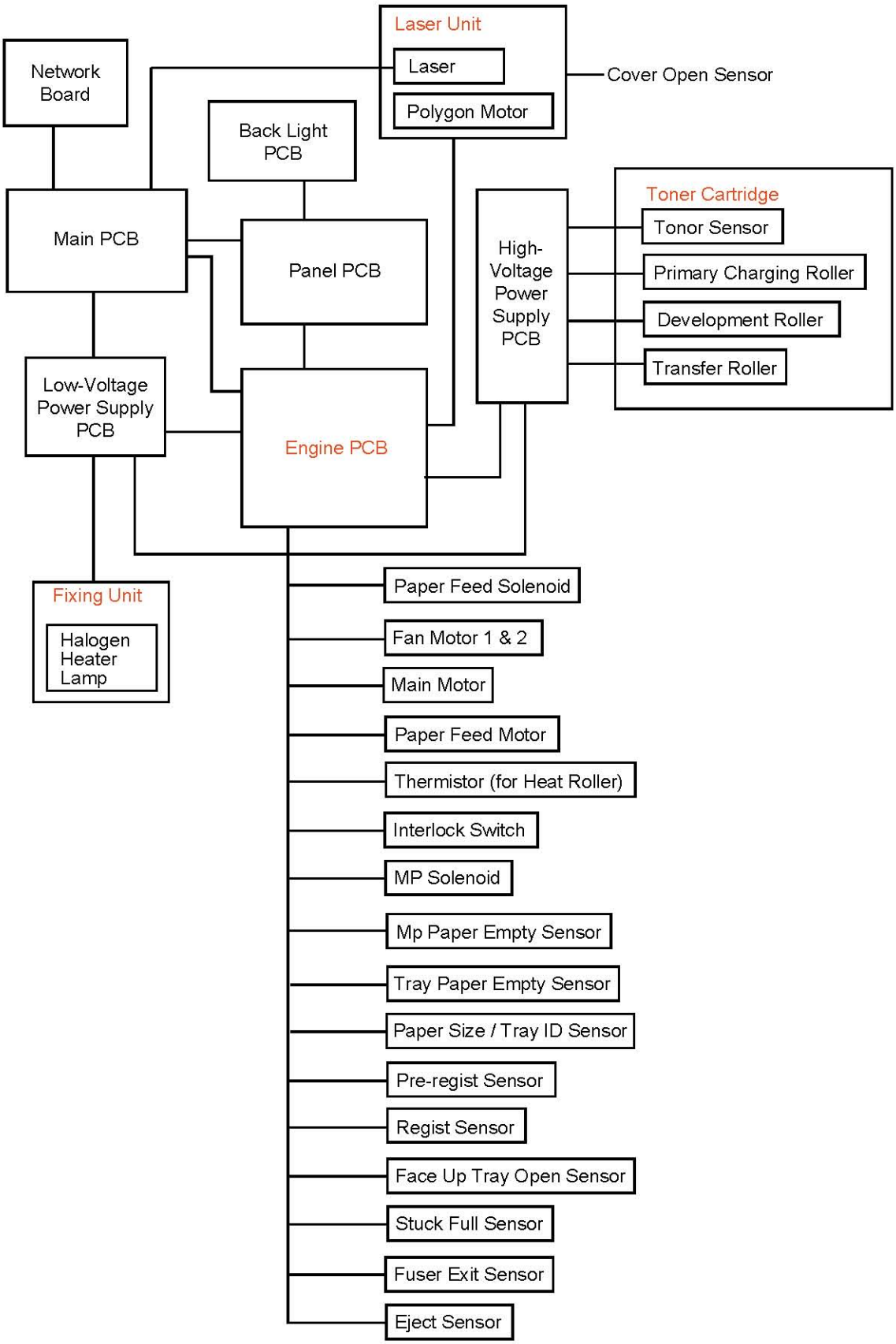

Laser Unit
Laser
Polygon Motor
Cover Open Sensor
Network Board
Back Light PCB
Main PCB
Panel PCB
High-Voltage Power Supply PCB
Toner Cartridge
Tonor Sensor
Primary Charging Roller
Development Roller
Transfer Roller
Low-Voltage Power Supply PCB
Engine PCB
Fixing Unit
Halogen Heater Lamp
Paper Feed Solenoid
Fan Motor 1 & 2
Main Motor
Paper Feed Motor
Thermistor (for Heat Roller)
Interlock Switch
MP Solenoid
Mp Paper Empty Sensor
Tray Paper Empty Sensor
Paper Size / Tray ID Sensor
Pre-regist Sensor
Regist Sensor
Face Up Tray Open Sensor
Stuck Full Sensor
Fuser Exit Sensor
Eject Sensor

Fig. 3-6

2.2 Paper Transfer

2.2.1 Paper supply

The paper feed roller A picks up one sheet of paper from the paper cassette every time it is rotated and feeds it to the paper feed roller B.

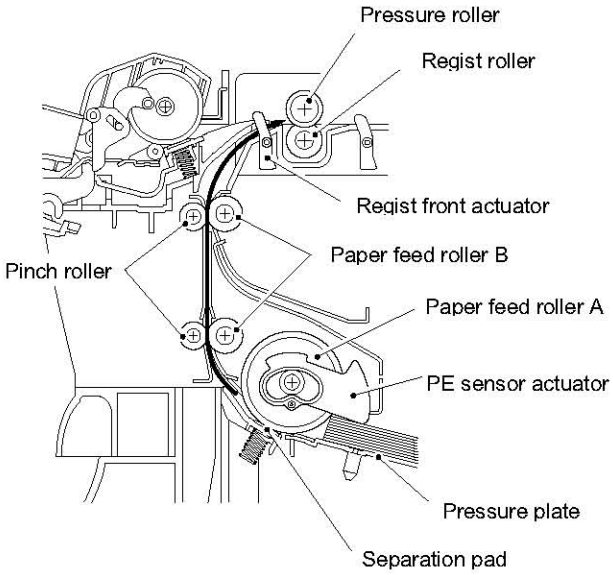


Fig. 3-7

The paper is gripped between the paper feed roller A and the separation pad and separated into individual sheets.

The paper feed roller A is directly connected to the clutch mechanism, whose rotation is stopped by the stopper arm. When the pick-up solenoid is activated, the clutch mechanism is engaged by the solenoid action and the paper feed roller A is driven. The paper drawn out of the tray by the paper feed roller A pushes against the regist front actuator lever and the paper top position/absence of paper is detected by sensing the motion of the lever.

2.2.2 Paper registration

After the paper top position is detected by the regist front actuator, the paper, separated into individual sheets by the paper feed roller A, is fed further for a specified time, and the paper top position reaches the regist roller so that the paper skew is adjusted. Then, the solenoid is turned off, the regist roller starts turning, and the paper is fed to the transfer block in the toner cartridge.

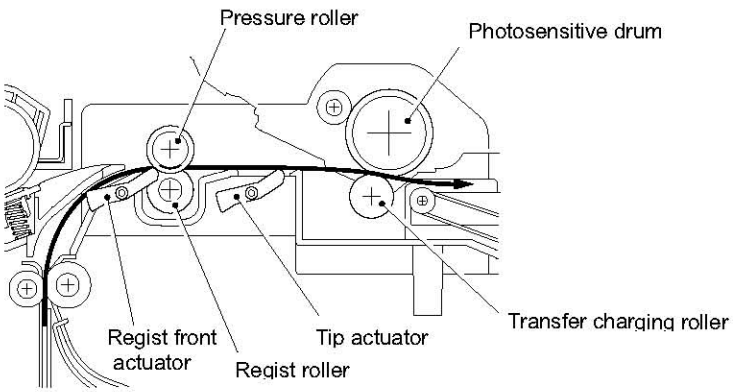


Fig. 3-8

The tip actuator in the path from the pressure roller to the transfer charging roller controls the first print position on the paper.

2.2.3 Paper eject

After the printing image on the photosensitive drum is transferred onto the paper, the paper is fed to the fixing unit to fix unfixed toner onto the paper.

Afterwards, the paper is ejected from the fixing unit by the first eject roller A in the fixing unit. The FU actuator detects whether the paper is ejected correctly or not.

After the paper exits from the eject roller A, the paper is turned by the rear cover and ejected face down into the top output tray through the eject roller B. If the rear cover is open, the paper is ejected face up straight to the printer rear.

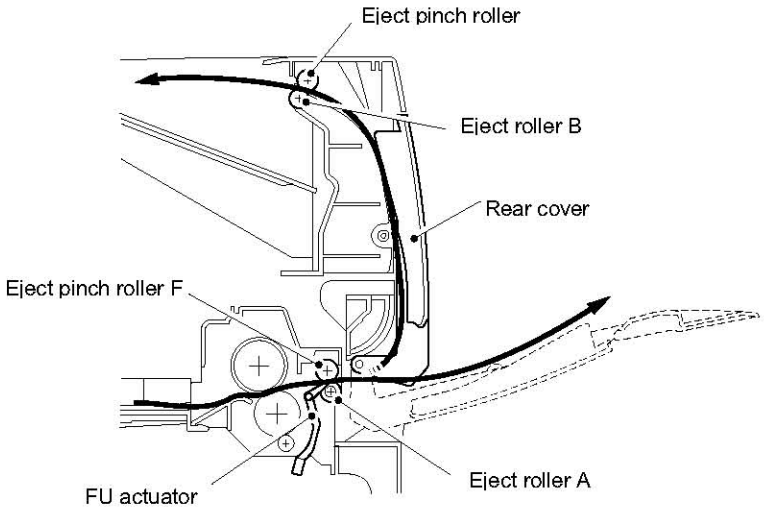


Fig. 3-9

2.3 Sensors

2.3.1 Cover open sensor

Detects opening and closing of the front cover.

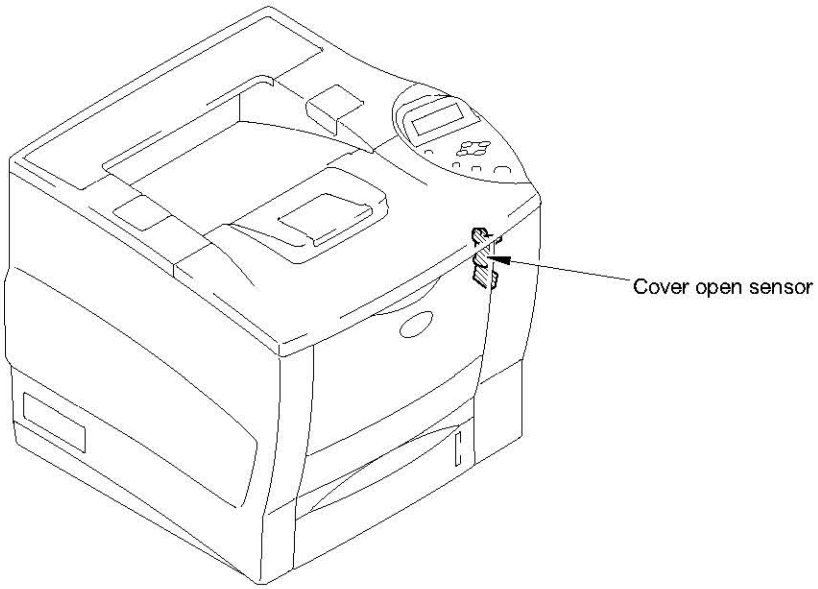


Fig. 3-10

2.3.2 Multi paper tray paper empty sensor

Detects if there is paper in the MP tray.

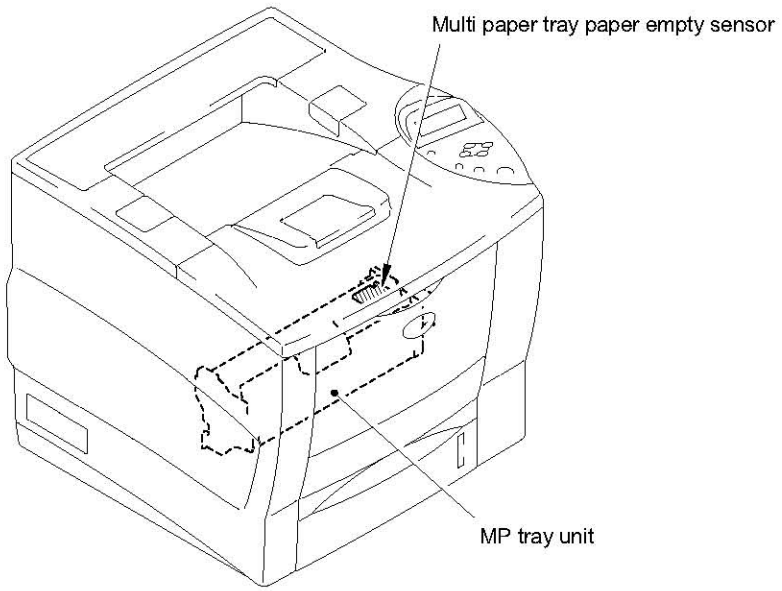


Fig. 3-11

2.3.3 Tray paper empty sensor

Detects if there is paper in the paper cassette.

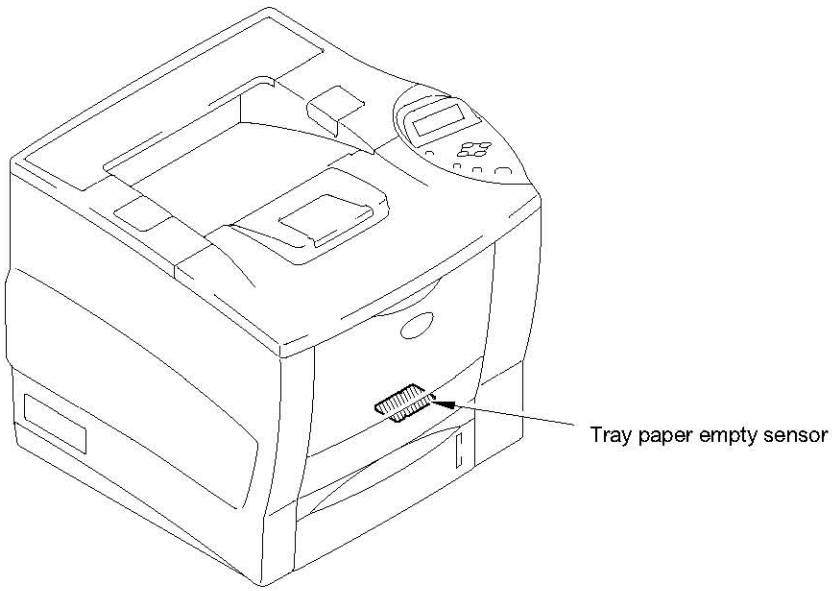


Fig. 3-12

2.3.4 Face up open sensor / Fuser exit sensor

Detects opening and closing of the rear cover. It also detects if there is jammed paper in the fixing unit.

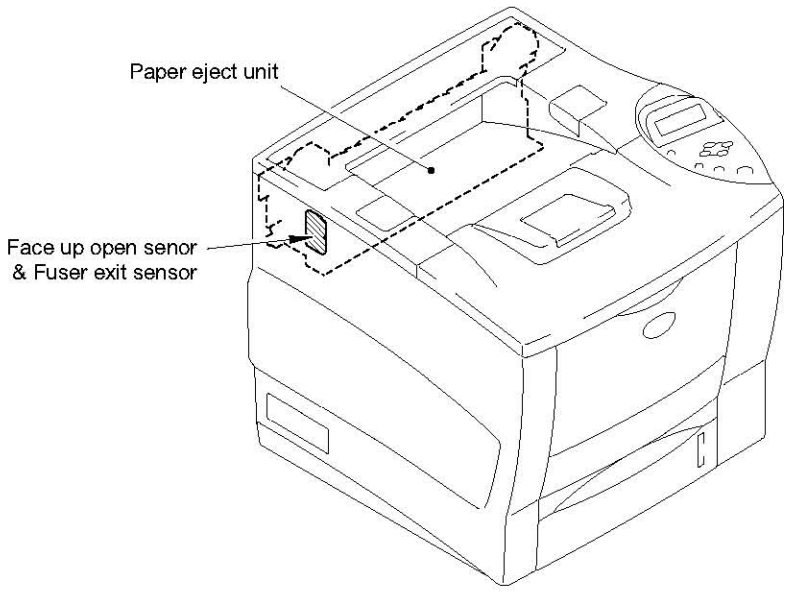


Fig. 3-13

2.3.5 Full stack sensor

Detects if paper output onto the face down output tray exceeds the number of 500 (normal paper).

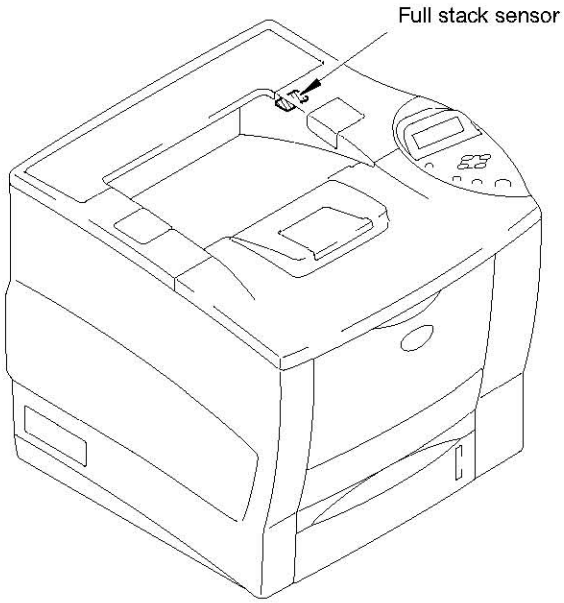


Fig. 3-14

2.3.6 Eject sensor

Detects if paper is ejected from the fixing unit.

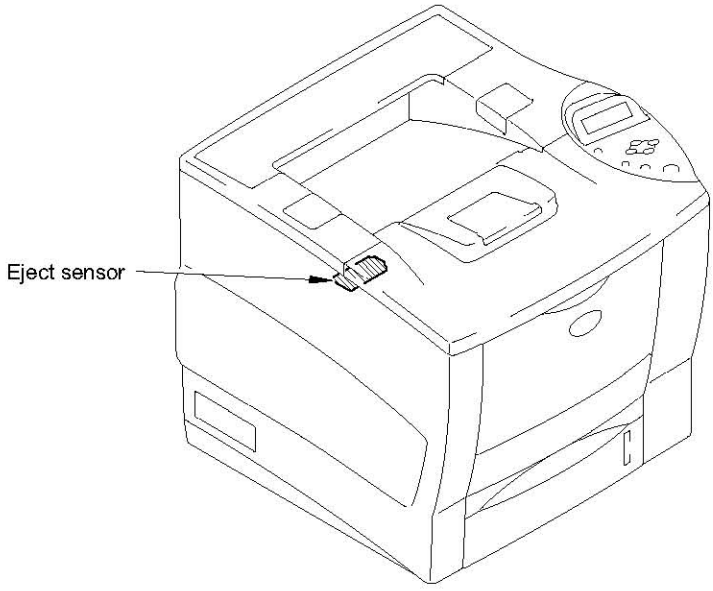


Fig. 3-15

2.3.7 Paper size sensor / Tray ID sensor

Detects if the correct size of paper and the correct tray ID is selected.

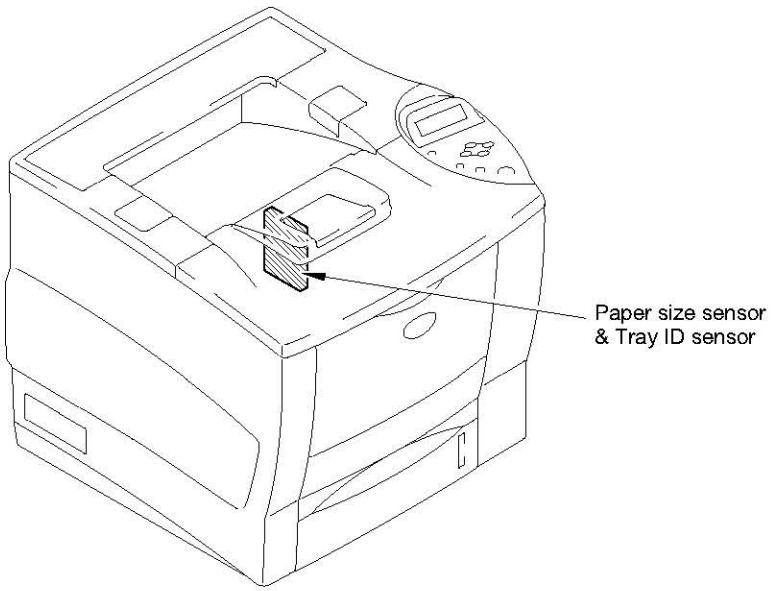


Fig. 3-16

2.4 Toner Cartridge Unit

2.4.1 Photosensitive drum

Generates the latent electrostatic image and develops the image on the drum surface.

2.4.2 Primary charging roller

Forms a uniform charge on the drum surface.

2.4.3 Transfer roller

Transfers the toner image to the paper from the drum surface.

2.4.4 Cleaner

Removes the paper dust or dirt on the surface of the photosensitive drum.

2.4.5 Toner cartridge

Develops the electrostatic latent image on the photosensitive drum with toner and forms the visible image.

2.5 Print Process

2.5.1 Charging

As preparation for latent image formation, a uniform negative potential is applied to the photosensitive drum surface. The printer uses the charging method that directly charges the drum for the primary charge.

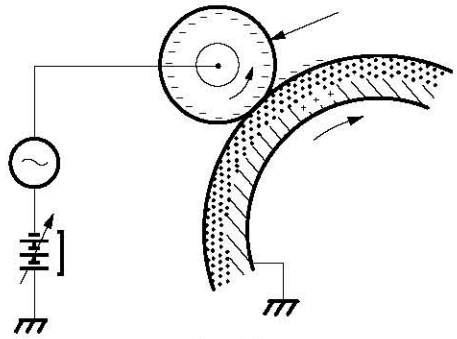


Fig. 3-17

The primary charging roller consists of conductive rubber. In addition to DC bias, AC bias is applied to the primary charging roller to keep the potential on the drum surface uniform. This DC bias is charged with the developing DC bias. This charging method has advantages such as lower applied voltage, less ozone generation, etc., compared with the corona charge system.

2.5.2 Exposure stage

After the drum is positively charged, it is exposed to the light emitted from the laser unit.

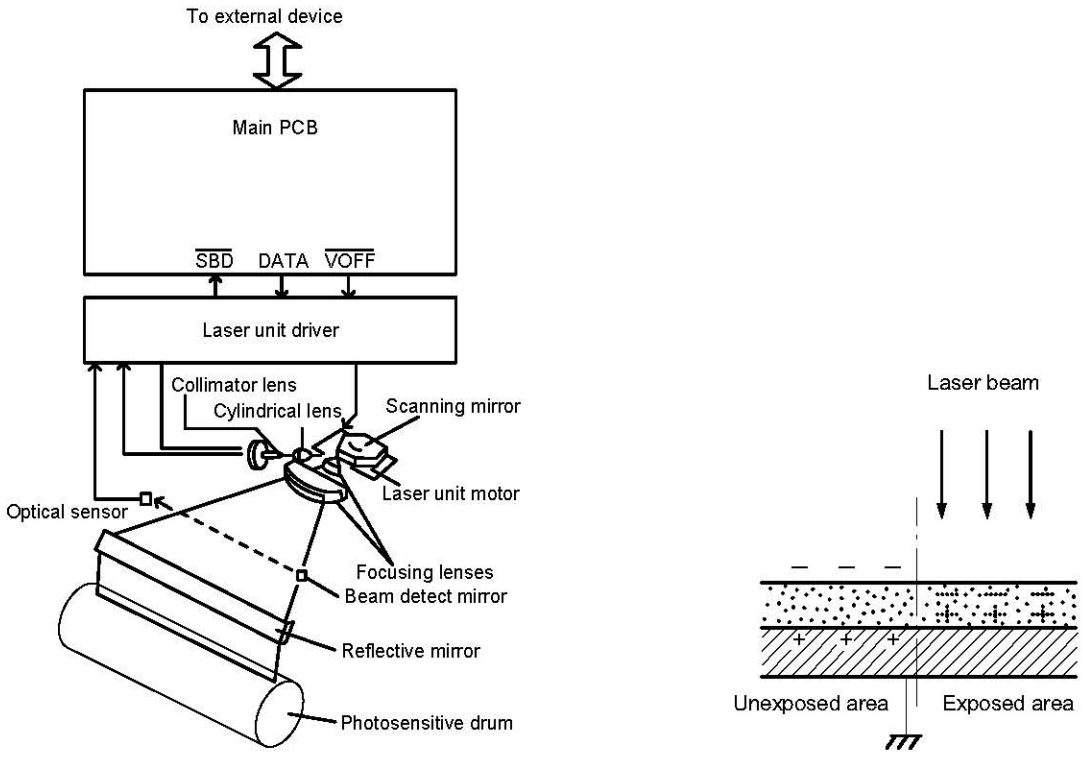


Fig. 3-18

The area exposed to the laser beam is the image to be printed. The surface potential of the exposed area is reduced, forming the electrostatic image to be printed.

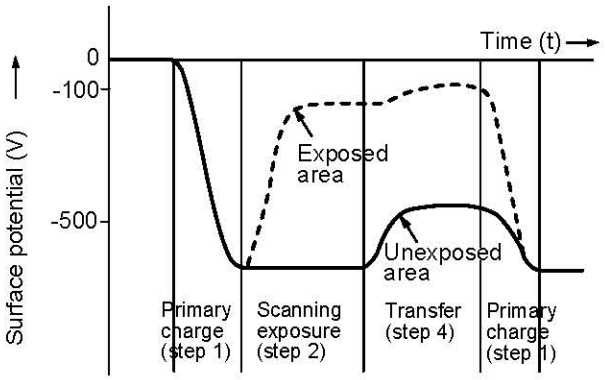


Fig. 3-19

2.5.3 Developing

Development places particles of toner onto the areas of the drum that have been cleared of charge by the laser beam. This makes a visible image. This printer uses the toner projection development method with a single-component toner.

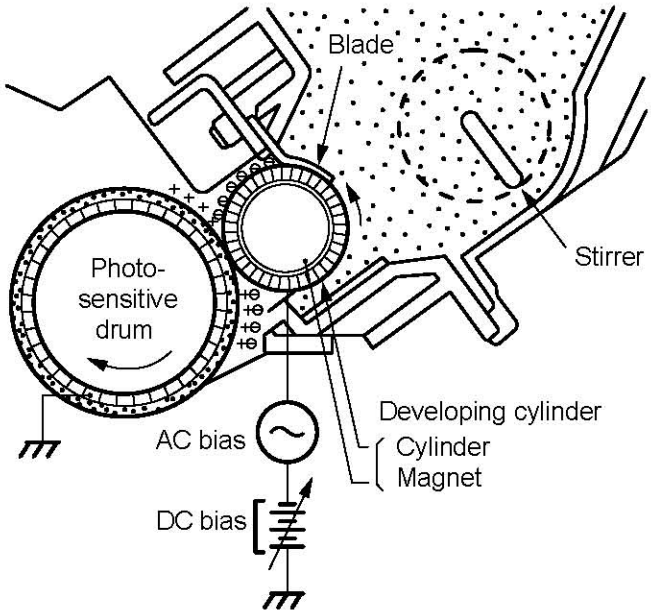


Fig. 3-20

2.5.4 Transfer

(1) Transfer process

A positive charge applied to the back of the paper attracts the negatively charged toner particles to the paper. The printer accomplishes transfer by using the charging roller method. Advantages compared with the corona transfer method are as follows:

- Low transfer voltage that is less than half that for corona transfer.
- Less ozone generation.
- The transfer charging roller and photosensitive drum supports the paper, so feed is more stable.

(2) Cleaning process of transfer roller

If the image on the photosensitive drum is not completely transferred to the paper due to jamming, etc., the toner may adhere to the transfer-charging roller. The printer removes the toner from the transfer charging roller by switching the transfer voltage between positive and negative in sequence. During wait, initial rotation, and last rotation, the printer sets the primary DC voltage to zero, and sets the charge on the drum to zero. In this case, the transfer voltage is made negative to remove the negatively charged toner on the transfer-charging roller to the drum. The transfer-charging roller is thus cleared.

2.5.5 Fixing stage

The image transferred to the paper by static electricity is fixed by heat and pressure when passing through the heat roller and the pressure roller in the fixing unit. The thermistor keeps the surface temperature of the heat roller constant by detecting the surface temperature of the heat roller and turning on or off the halogen heater lamp.

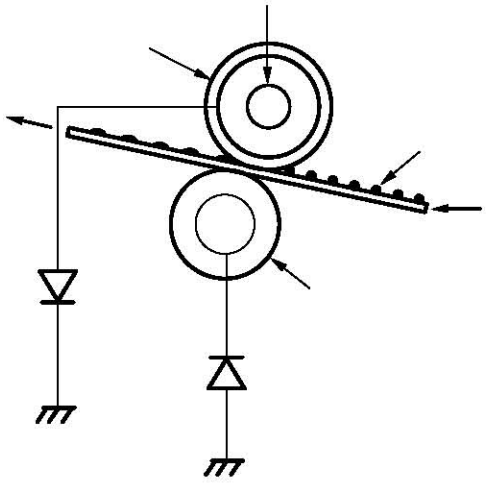


Fig. 3-21

CHAPTER 4 DISASSEMBLY AND RE-ASSEMBLY

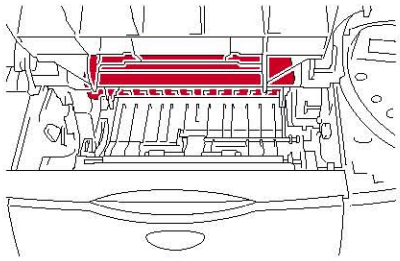
1. SAFETY PRECAUTIONS

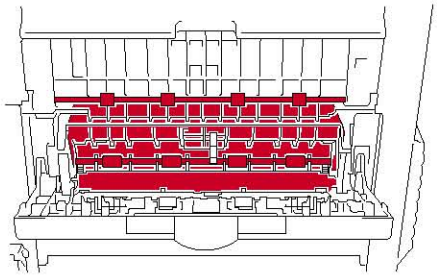
To avoid creating secondary problems by mishandling, follow the warnings and precautions below during maintenance work.

⚠ WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.





CAUTION:

(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) Before handling any PCBs, touch a metal portion of the equipment to discharge any static electricity charge on your body, or the electronic parts or components may be damaged.

(5) When transporting PCBs, be sure to wrap them in the correct protective packaging.

(6) Be sure to replace self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values.

TAPTITE, BIND or CUP B
M3: 70N • cm
M4: 80N • cm

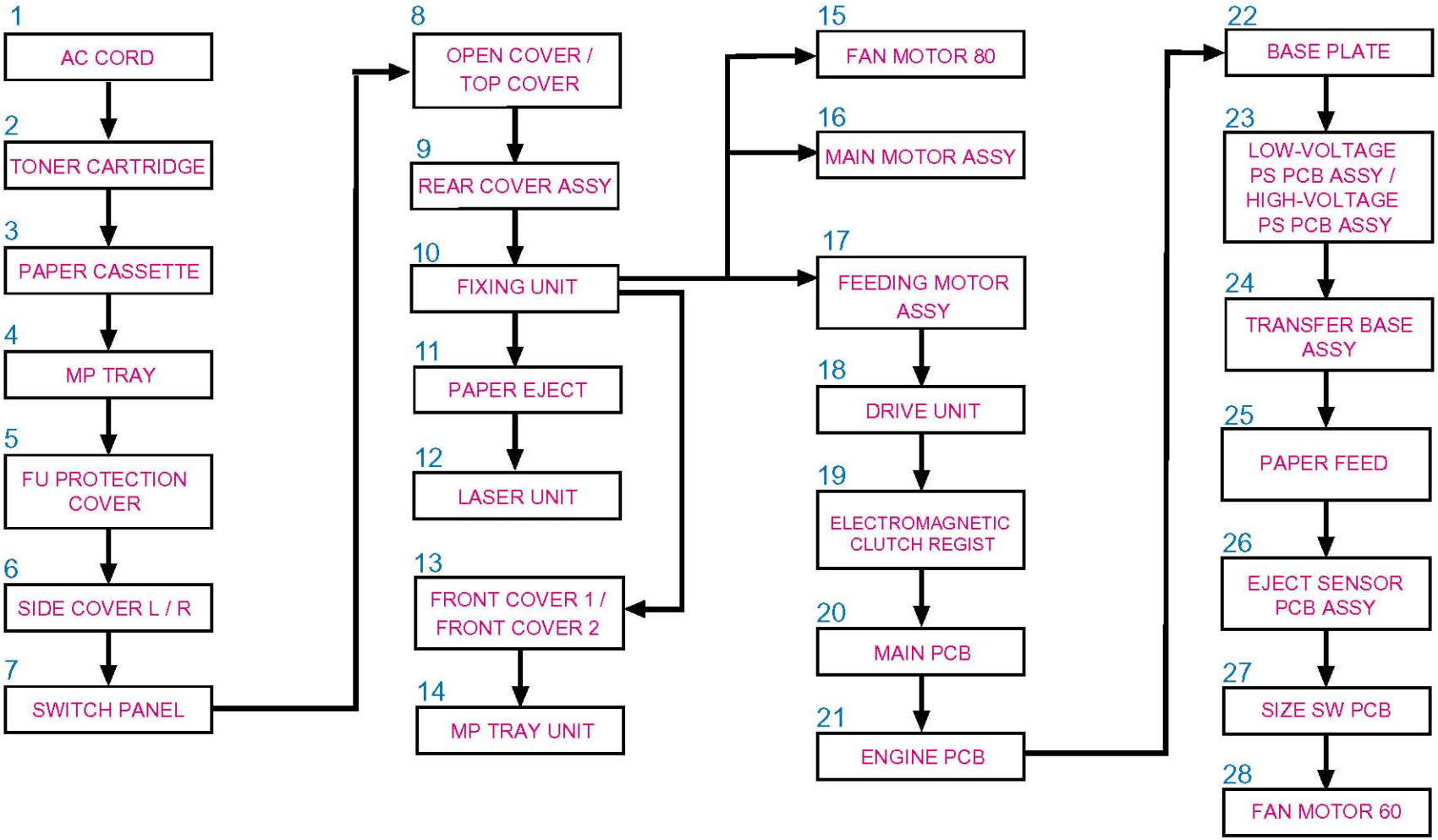
TAPTITE, CUP S
M3: 80N • cm

SCREW
M3: 70N • cm
M4: 80N • cm

(7) 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.

(8) 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 AC Cord

(1) Disconnect the AC cord from the printer.

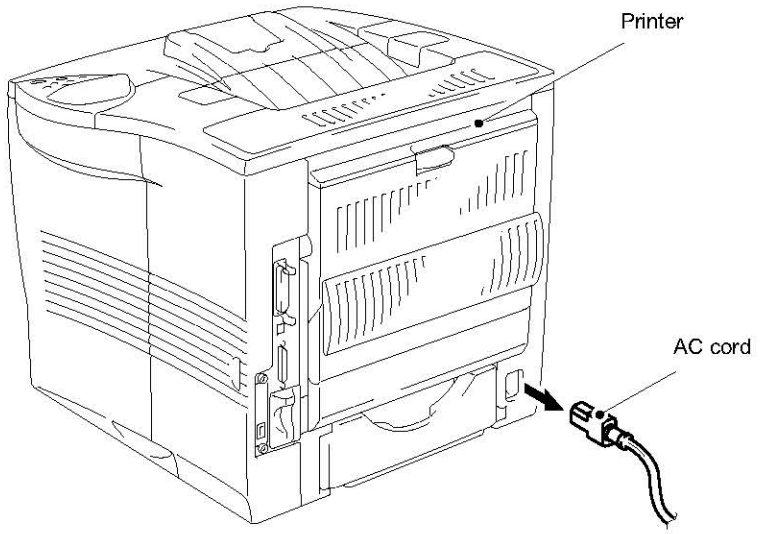


Fig. 4-1

3.2 Toner Cartridge

(1) Open the open cover and remove the toner cartridge from the printer.

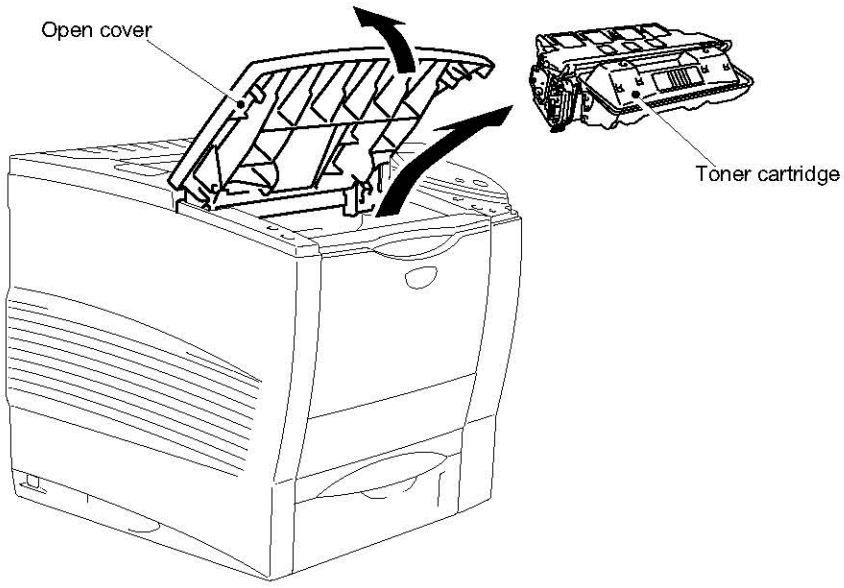


Fig. 4-2

3.3 Paper Cassette

(1) Close the open cover, pull out the paper tray unit from the printer and remove the paper from the paper tray unit.

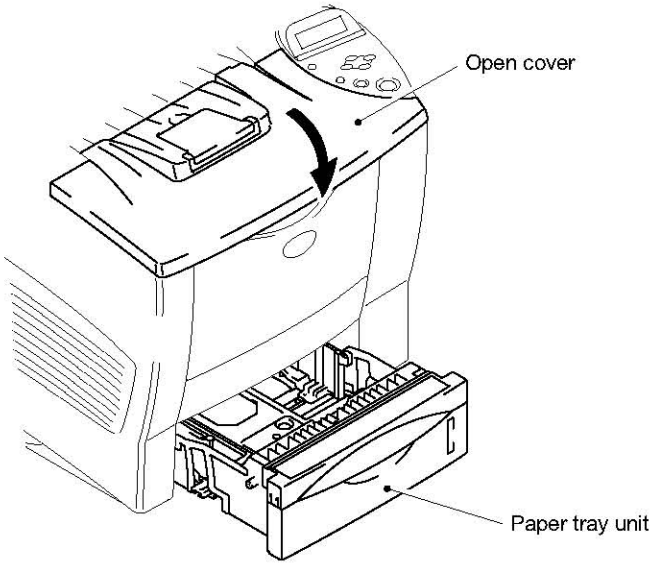


Fig. 4-3

(2) Push the hooks of the separation pad ASSY inwards to release them and stand the separation pad ASSY. Remove the separation pad spring, release the two pins of the separation pad ASSY and remove the separation pad ASSY.

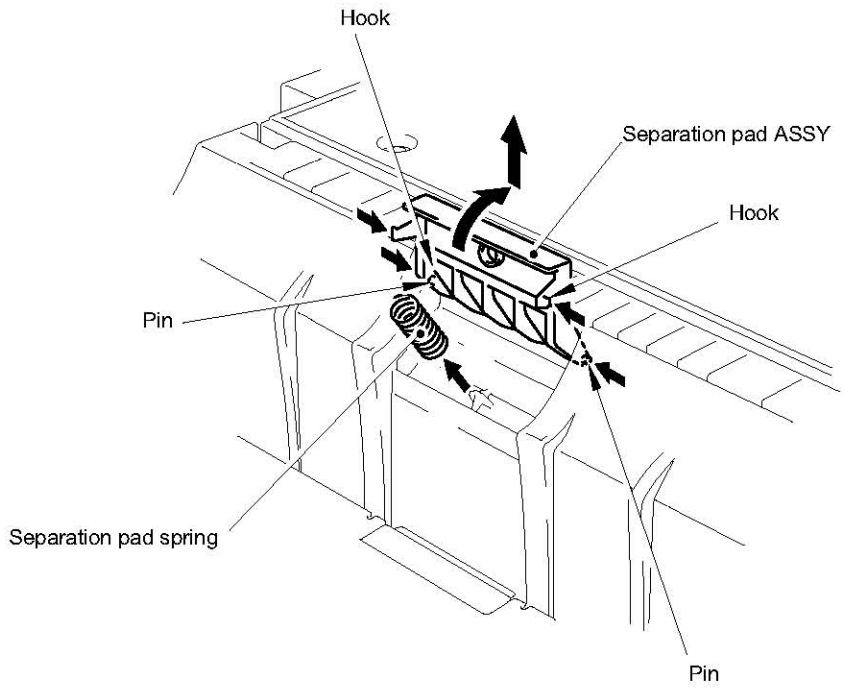


Fig. 4-4

(3) Peel the paper tray label. Remove the two bind B M4x10 Taptite screws, release the hooks at the right and left hand sides and remove the paper tray cover.

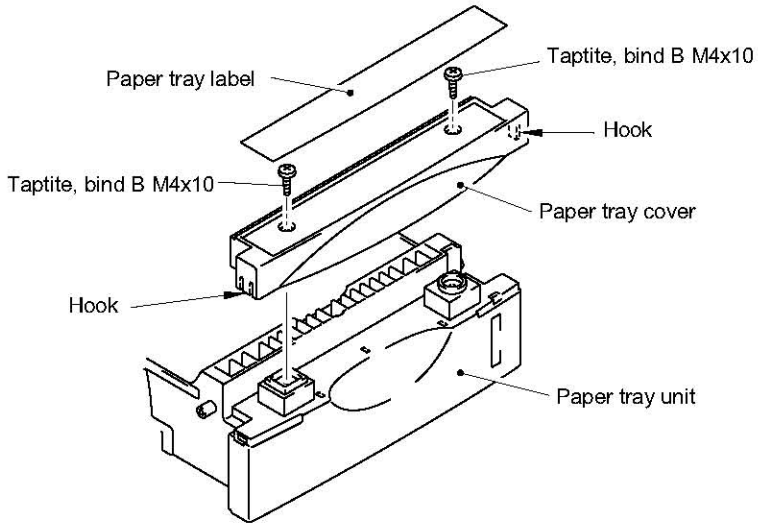


Fig. 4-5

(4) Pull the supporter stoppers L at the right and left hand sides toward you and release the plate unit.

(5) Turn the paper tray unit upside down and remove the two cup B 3x8 Taptite screws of the side guide rack 2 at the right and left hand sides. Release the hooks of the side guide R ASSY and the side guide L from the side guide rack 2.

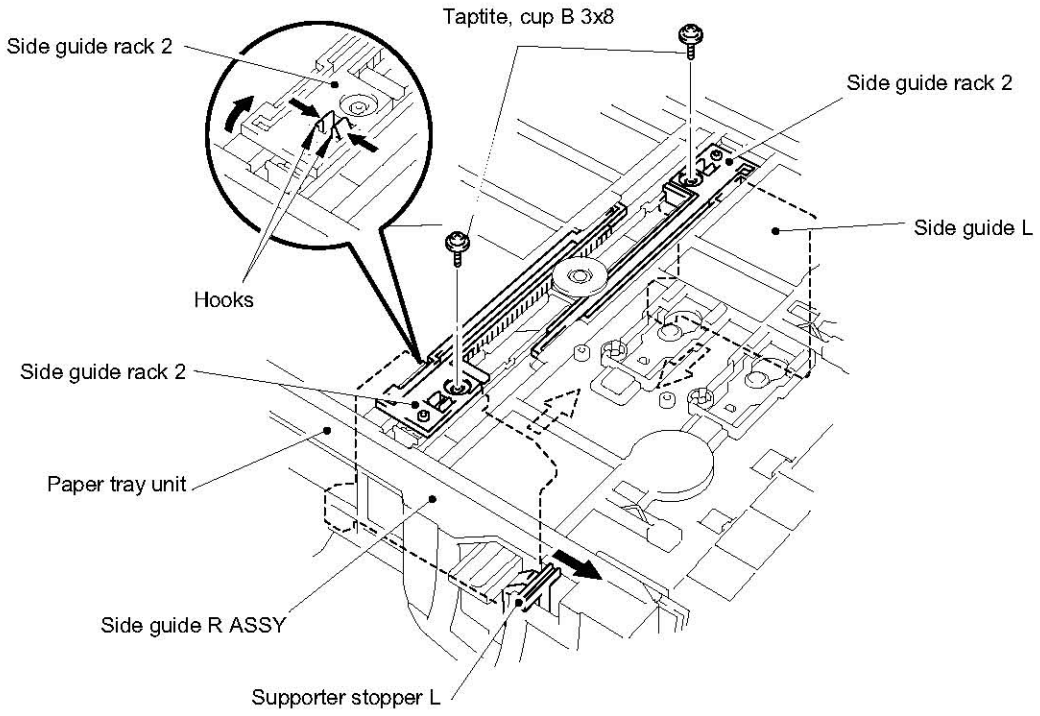


Fig. 4-6

(6) Place the paper tray unit the correct way up and slide the side guide R ASSY and the side guide L to the center. Remove the side guide R ASSY and the side guide L from the paper tray.

NOTE:
When replacing the side guide R ASSY, be sure to replace the size detection cam also.

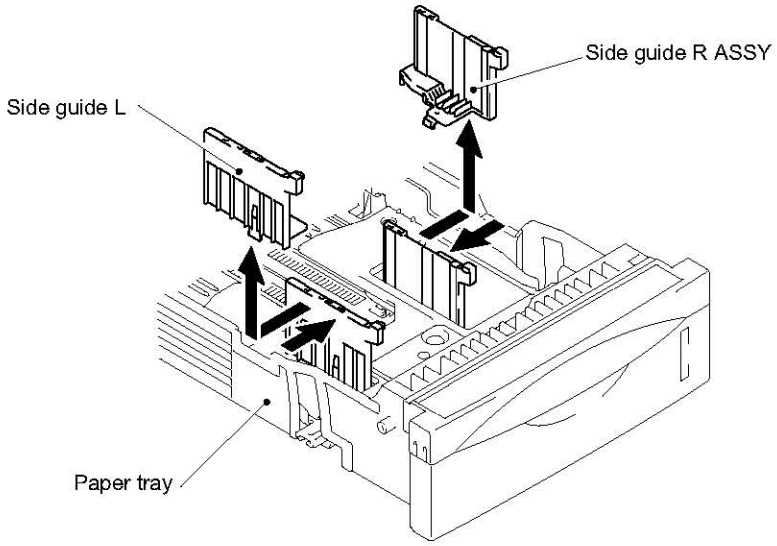


Fig. 4-7

(7) Remove the four bind B M4x10 Taptite screws from the EX rear tray guides at the right and left hand sides of the paper tray.
While pushing up the boss of the EX rear tray guide on the back of the paper tray, slide the EX rear tray guide and EX rear tray together backwards in the tray to remove them.
Since the plate unit also is released at the same time, unhook the hooks at the right and left hand sides by pulling the paper tray frame outwards to remove the plate unit from the paper tray unit.

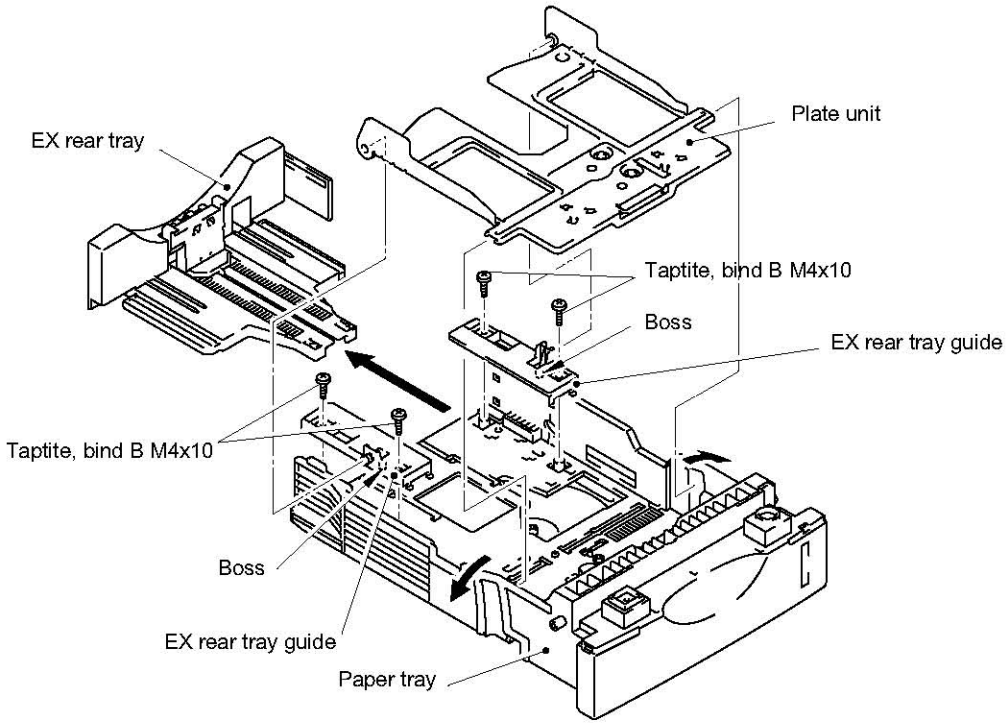


Fig. 4-8

(8) Unhook the two plate springs A from the hook of the tray to remove them from the paper tray.

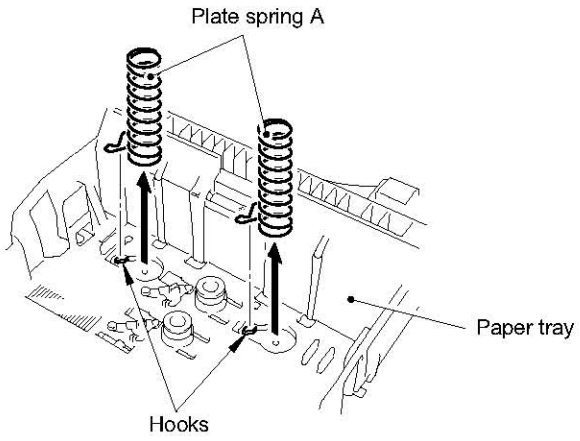


Fig. 4-9

(9) Slide the rear guide ASSY on the EX rear tray by pushing the levers inwards and remove the rear guide ASSY.

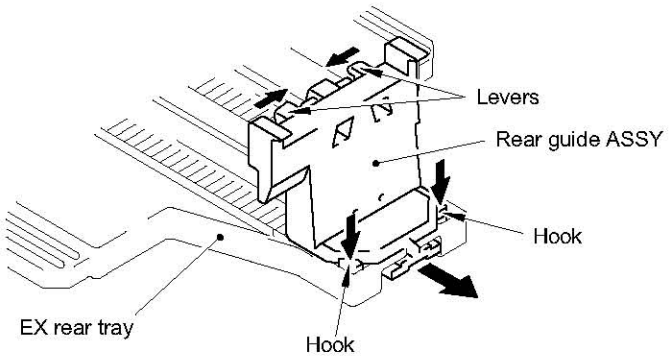


Fig. 4-10

(10) Unhook the catches from the shaft of the supporter stoppers L at both sides by pushing the catches with a screwdriver and remove the supporter stoppers L. Then remove the supporter stopper spring from the boss of the supporter stopper L by pushing the spring upwards.

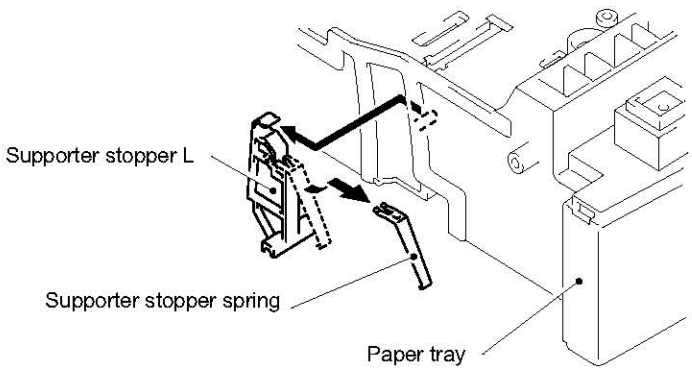


Fig. 4-11

(11) Turn the paper tray upside down. Remove the cup B 3x8 Taptite screw to remove the side guide gear.

(12) Remove the two side guide rack 2 from the paper tray.

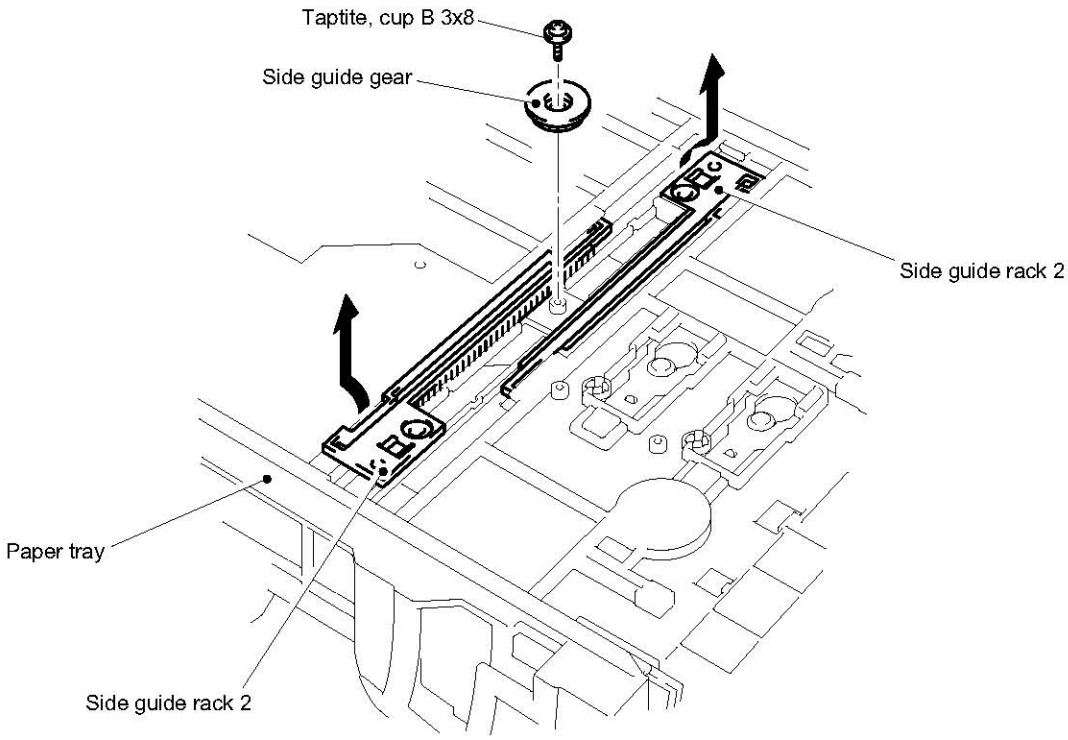


Fig. 4-12

(13) Pull the edge of the paper indicator outwards and pull the paper indicator upwards.

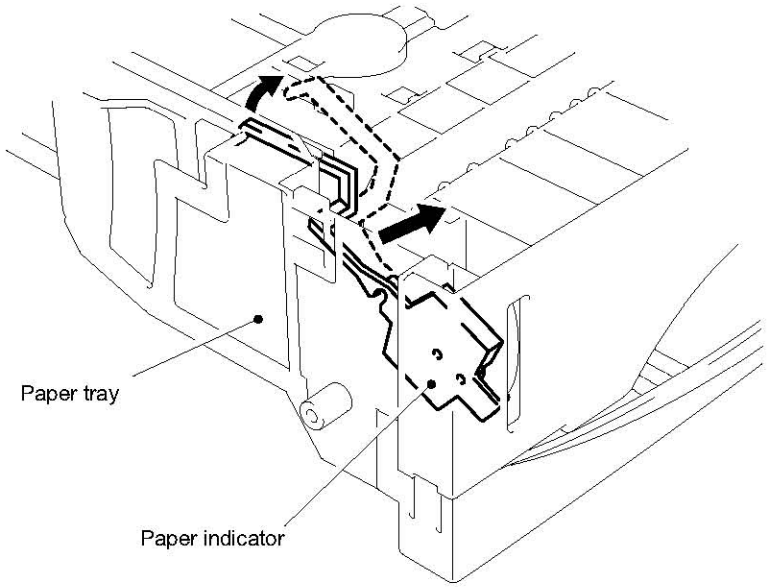


Fig. 4-13

(14) Remove the cup B M3x6 Taptite screw from the left-hand side of the tray to remove the plate.

(15) Remove the size detection cam, tray 1D detection cam, LTR/LGL detection cam, and LTR/LGL detection cam spring.

(16) Remove the size detection link spring. Then remove the size detection link.

NOTE:
When replacing the size detection cam, be sure to replace the side guide R ASSY also.

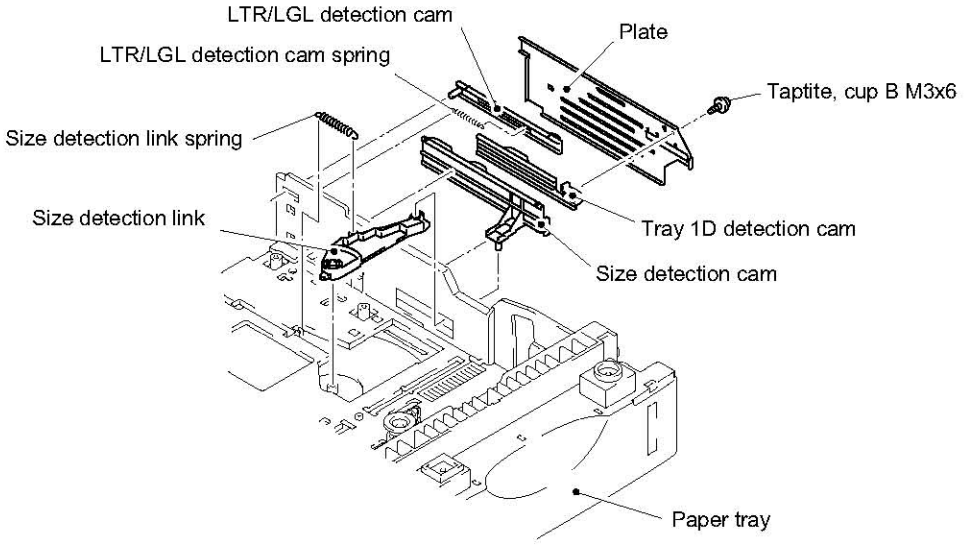


Fig. 4-14

(17) Turn the paper tray upside down and remove the plate pad, the plate spring C and the plate spring D by sliding the plate pad rock plate.

(18) Push the hooks of the two plate spring changeover knobs, and remove the knob and the plate spring. Then remove the plate spring from the knob.

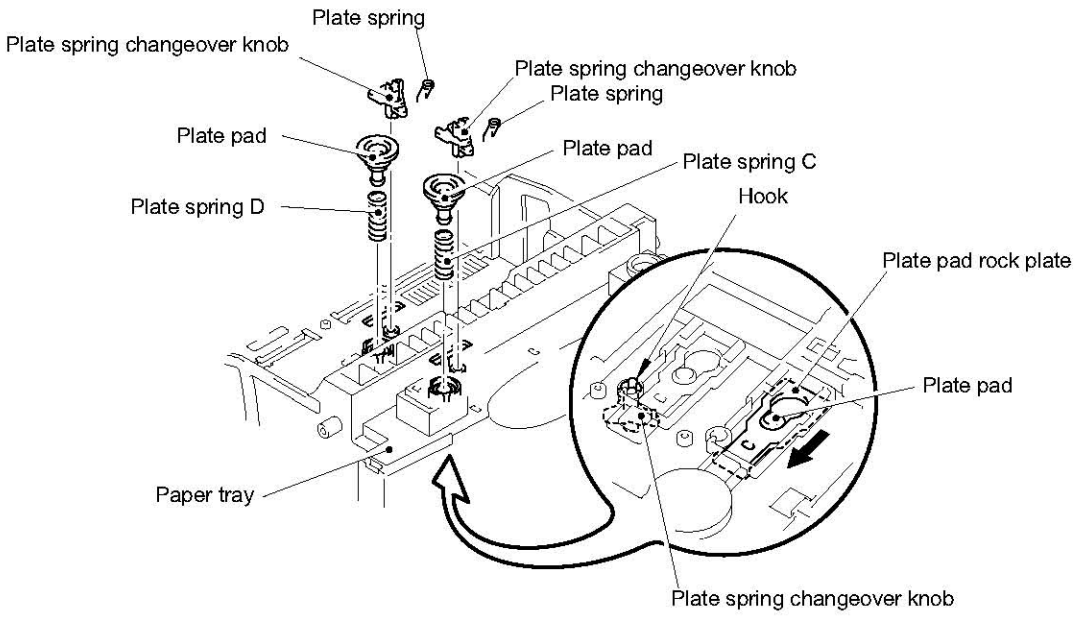


Fig. 4-15

3.4 MP Tray

(1) Open the tray cover ASSY MP. Release the bosses at the right and left hand sides of the tray ASSY MP by bending the tray cover ASSY MP slightly and pull out the tray ASSY MP in the direction of the arrow as shown in Fig. 4-18.

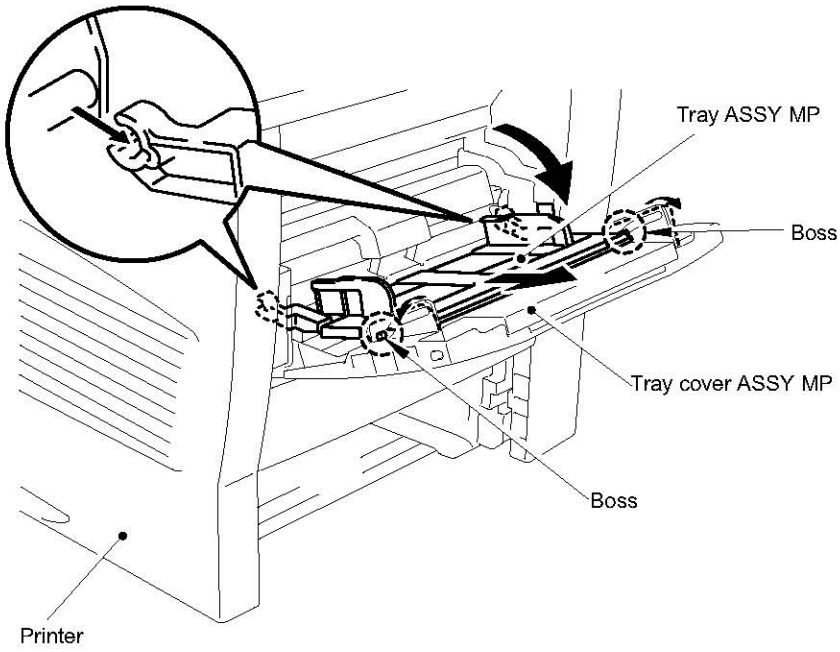


Fig. 4-16

(2) Pull out the tray cover ASSY MP in the direction of the arrow as shown in Fig. 4-19.

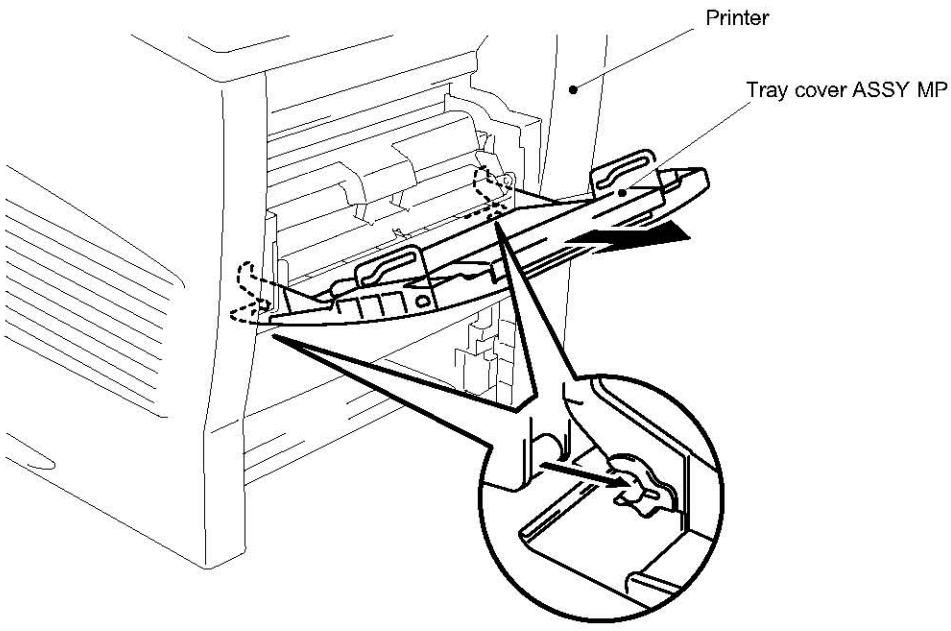


Fig. 4-17

(3) Remove the two tray cover rock springs from the tray cover ASSY MP.

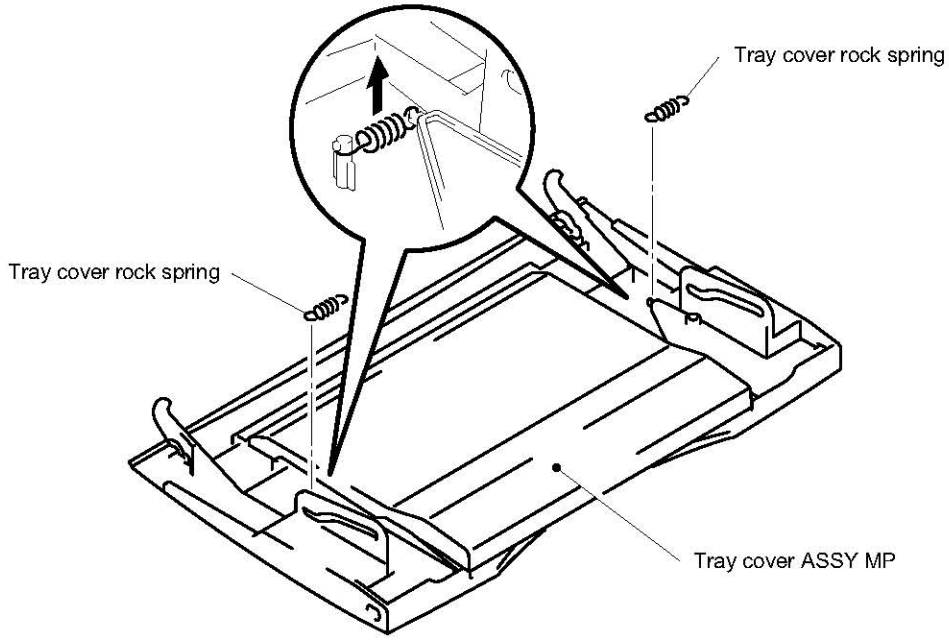


Fig. 4-18

3.5 FU Protection Cover

(1) Lift up the bottom of the FU protection cover lower and release the two hooks on the back of the FU protection cover lower.

(2) While lifting up the FU protection cover lower, release the two hooks caught on the printer and pull the FU protection cover toward you.

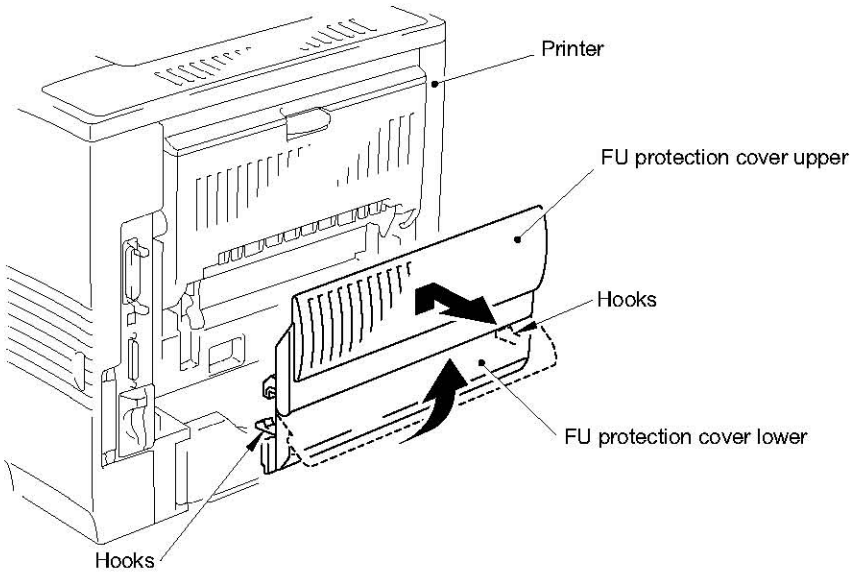


Fig. 4-19

(3) Release the bosses of the FU protection cover lower by pulling one of the boss holes of the FU protection cover upper outwards.

(4) Remove the FU protection cover springs R and L from the bosses.

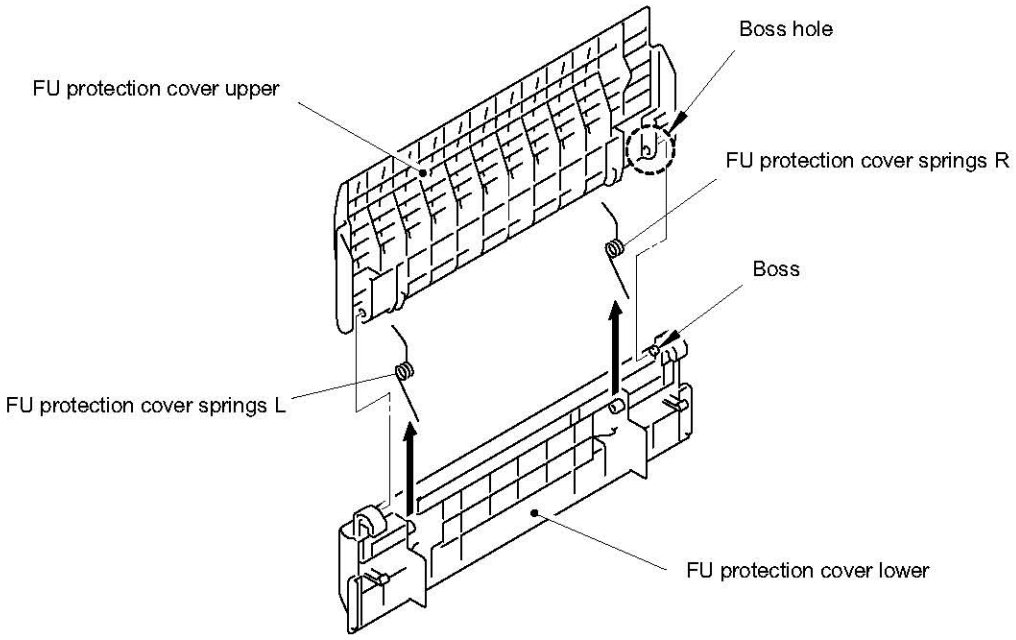


Fig. 4-20

3.6 Side Cover L / R

(1) Open the open cover. Remove the five M3x8 Taptite screws, release the five hooks inside of the cover and remove the side cover R by pulling the bottom of the side cover outwards slightly.

(2) Remove the two M3x8 Taptite screws to remove the side cover L.

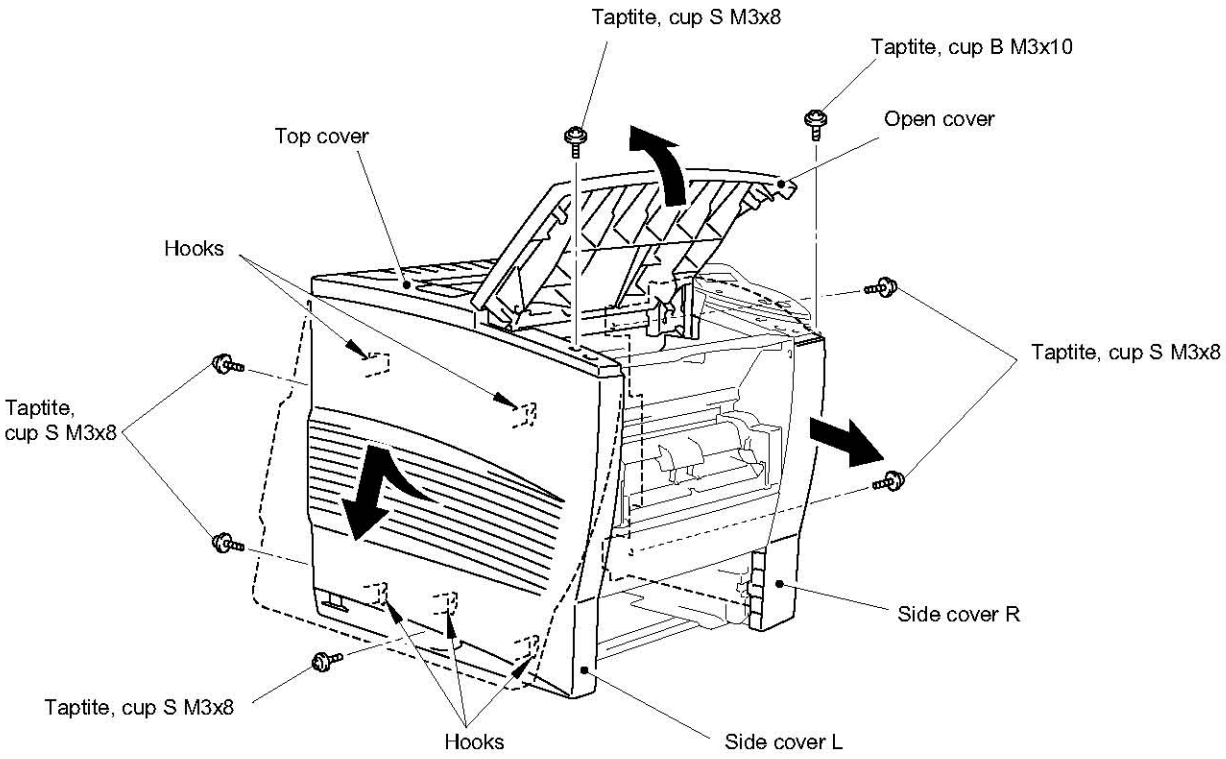


Fig. 4-21

(3) Remove the five cup S M3x6 Taptite screws securing the plate on the left-hand side to remove the plate.

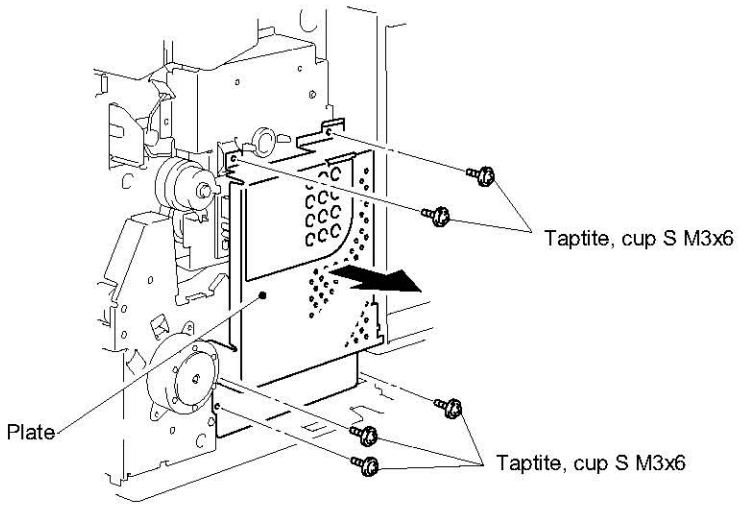


Fig. 4-22

3.7 Switch Panel

(1) Release the engine-panel harness unit 2P and main-panel harness unit from the three clamps. Then disconnect the connectors from the engine PCB and the main PCB.

(2) Remove the cup S M3x8 Taptite screw to remove the SW panel from the frame.

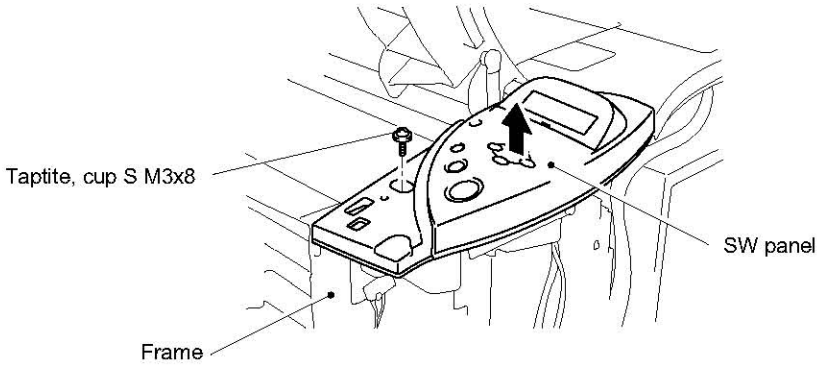


Fig. 4-23

(3) Turn the SW panel upside down. Remove the four cup B 3x8 Taptite screws to remove the panel rear cover.

(4) Release the rock of the connector and remove the LCD harness on the back of the panel PCB ASSY.

(5) Disconnect the engine-panel harness unit 2P and main-panel harness unit from the panel PCB ASSY.

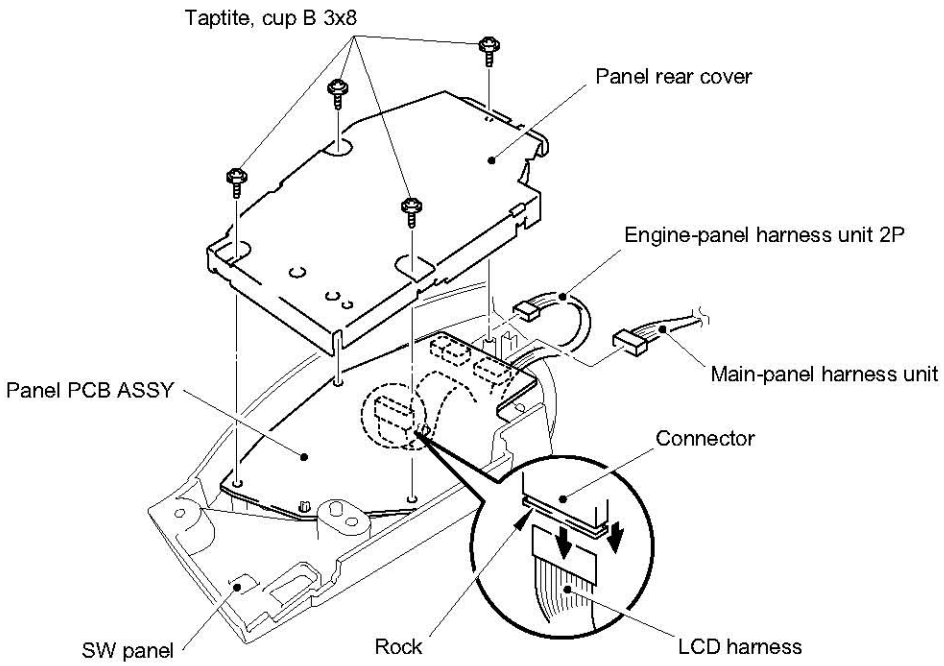


Fig. 4-24

(6) Remove the cup B M3x8 Taptite screw to remove the LCD holder.

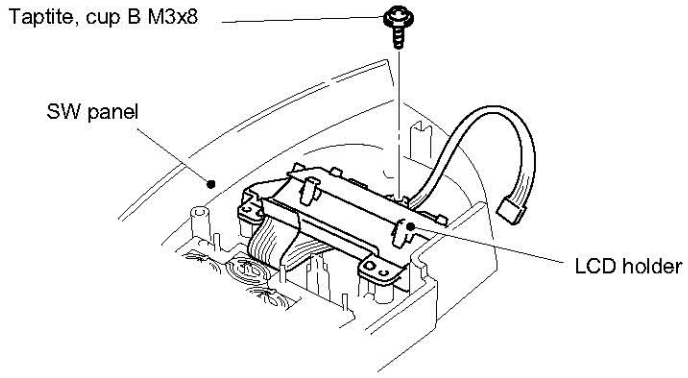


Fig. 4-25

(7) Release the two hooks from the LCD holder and remove the LCD and diffusion film.

(8) Release the two hooks on the back of the LCD holder and remove the back light PCB ASSY.

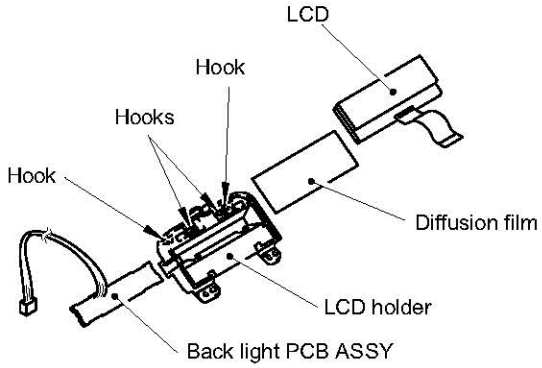


Fig. 4-26

(9) Remove the key and panel light guide from the SW panel.

(10) Remove the key top A and B from the key.

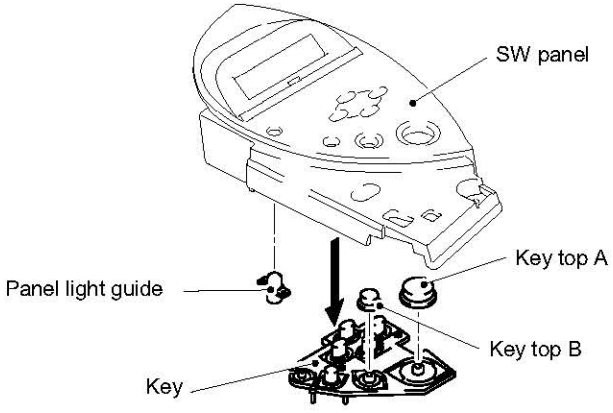


Fig. 4-27

3.8 Open Cover / Top Cover

(1) Unhook the link of the open cover at the left-hand side by bending the boss of the open cover inwards.

(2) Remove the drum gear link at the right hand side from the open cover side by releasing the hook.

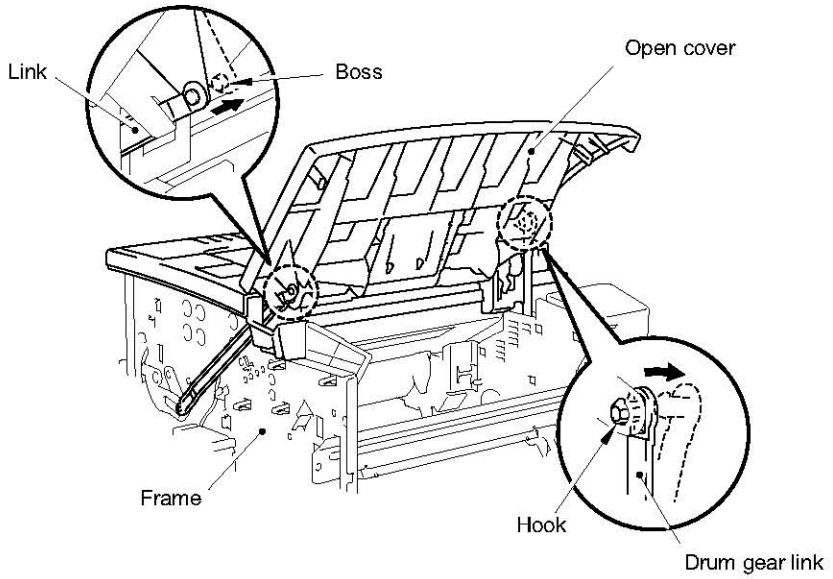


Fig. 4-28

(3) Remove the MX cap A, B and C from the top cover.

(4) Remove the two M3x8 Taptite screws securing the actuator plate. Unhook the hooks at the right and left hand sides to remove the actuator plate from the top cover.

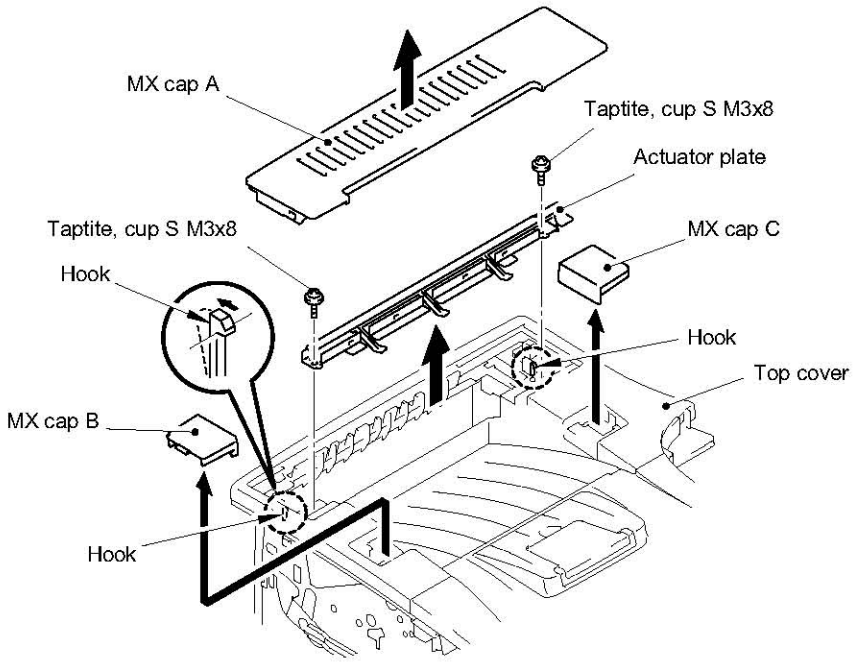


Fig. 4-29

(5) Remove the two cup S M3x6 Taptite screws securing the paper eject unit and the two shoulder screws securing the rear cover ASSY. Then remove the rear cover ASSY from the frame.

(6) Release the full sensors PCB harnesses on the top cover from the three clamps and disconnect the connector from the engine PCB.

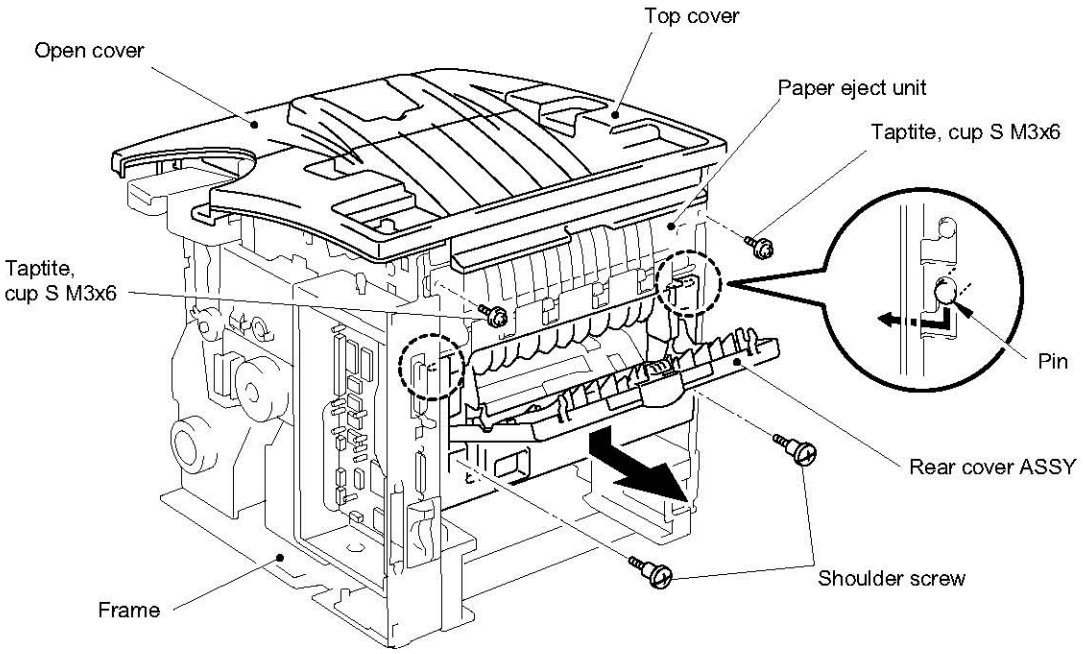


Fig. 4-30

(7) Remove the two M3x8 Taptite screws to remove the top cover from the frame.

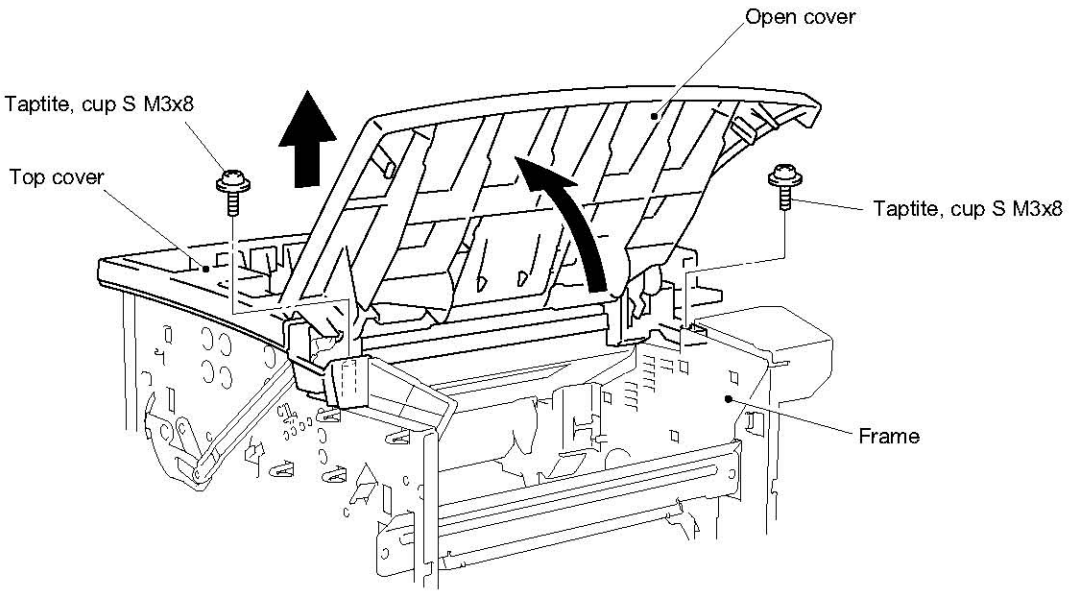


Fig. 4-31

(8) Release one end of shaft from the open cover by bending the top cover. Release another end of shaft to remove the open cover.

(9) Unlock the two hooks to remove the full sensor PCB ASSY.

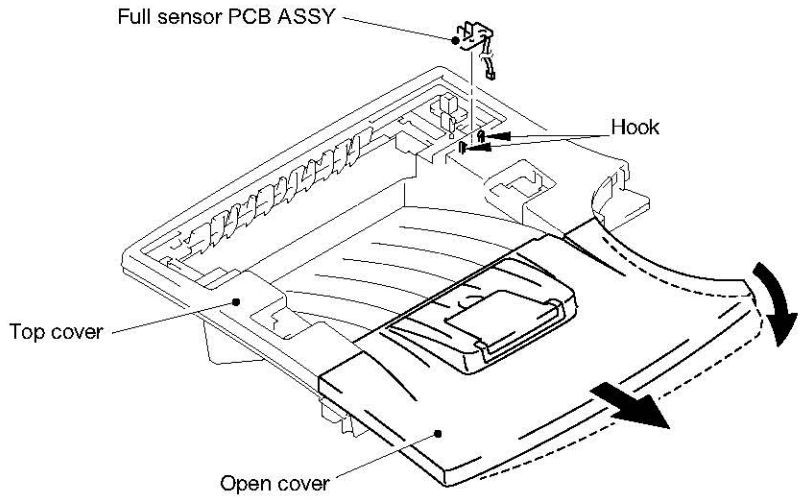


Fig. 4-32

(10) Bend the swing paper tray to remove it from the top cover and remove the two swing paper tray springs.

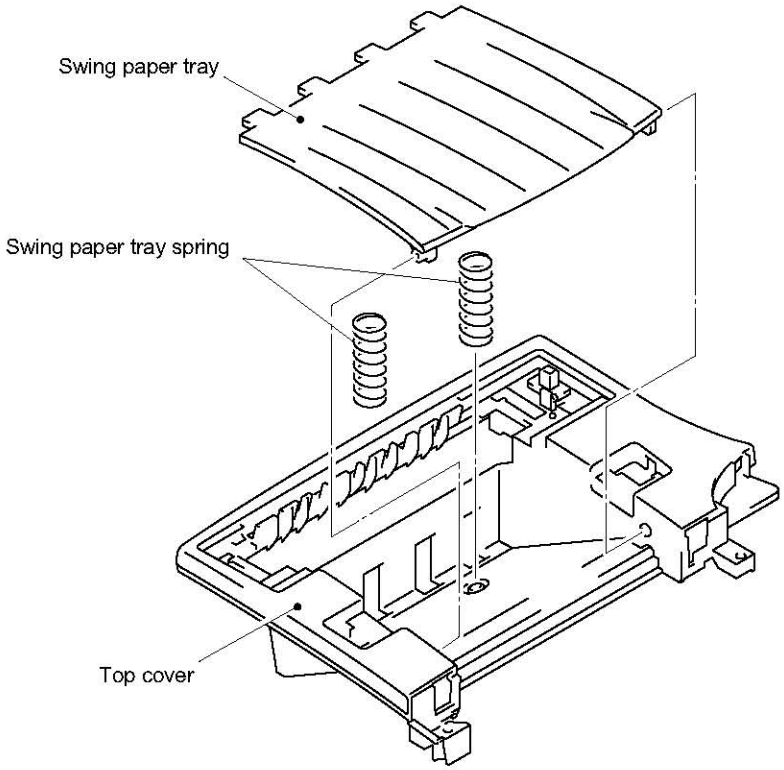


Fig. 4-33

(11) Pull out the paper stopper guide from the open cover and unlock the hooks on the back of the guide to remove the paper stopper guide.

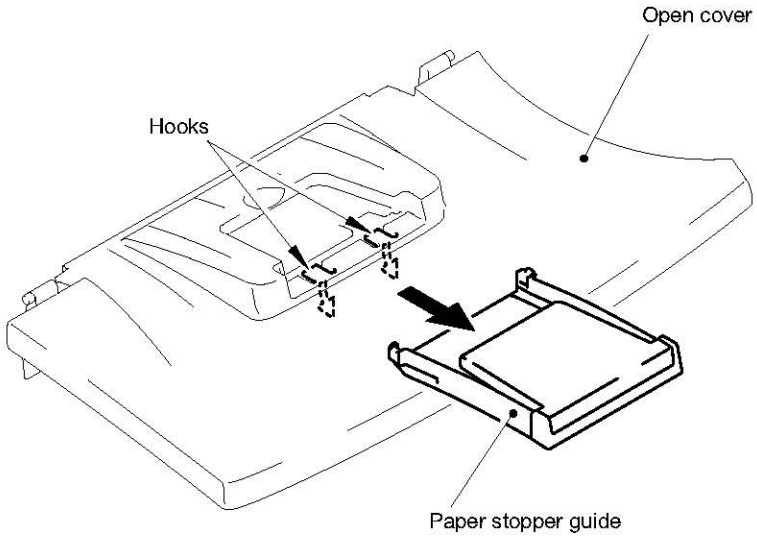


Fig. 4-34

(12) Pull one of the sides of the paper stopper guide outwards to remove the paper stopper.

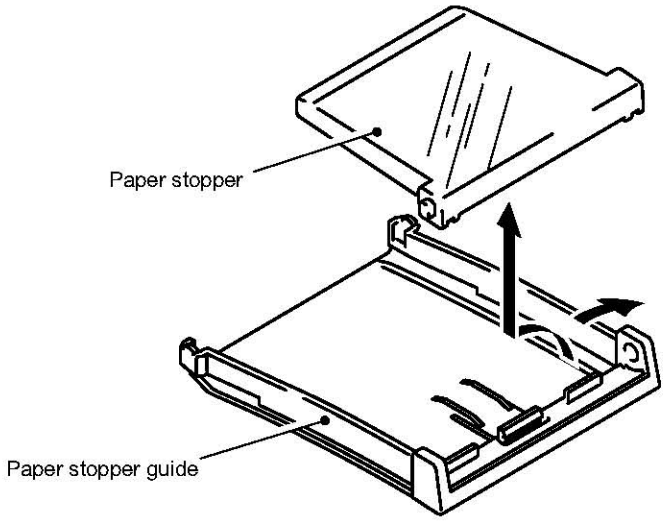


Fig. 4-35

(13) Turn the paper actuator to align the notches of the actuator plate and paper actuator as shown the figure below. Pull the paper actuator toward you slightly and pull out the other end of the shaft to remove the paper actuator from the actuator plate.

(14) Remove the eject discharging brush and actuator plate film.

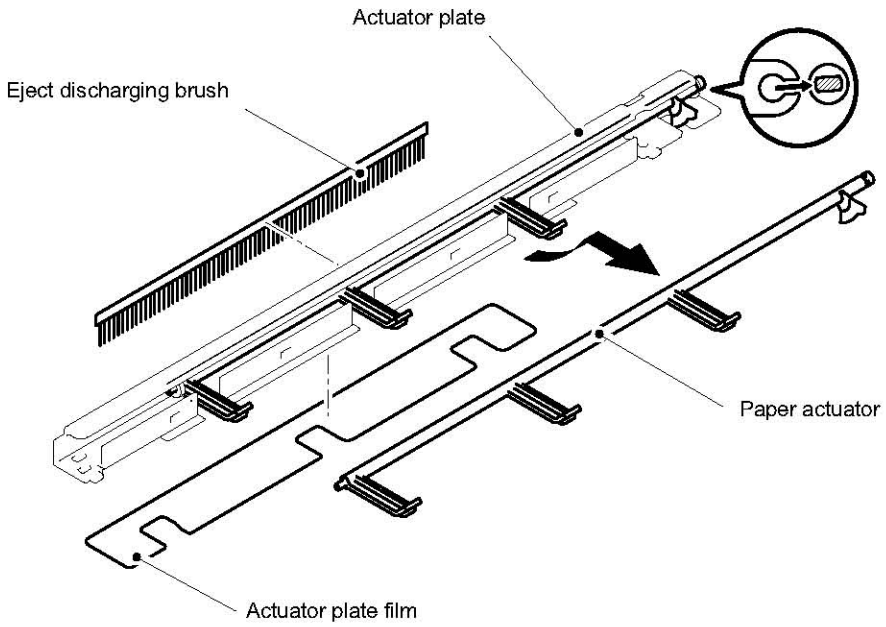


Fig. 4-36

3.9 Rear Cover ASSY

(1) Remove the rear tray ASSY by bending the shaft of the rear tray ASSY inwards.

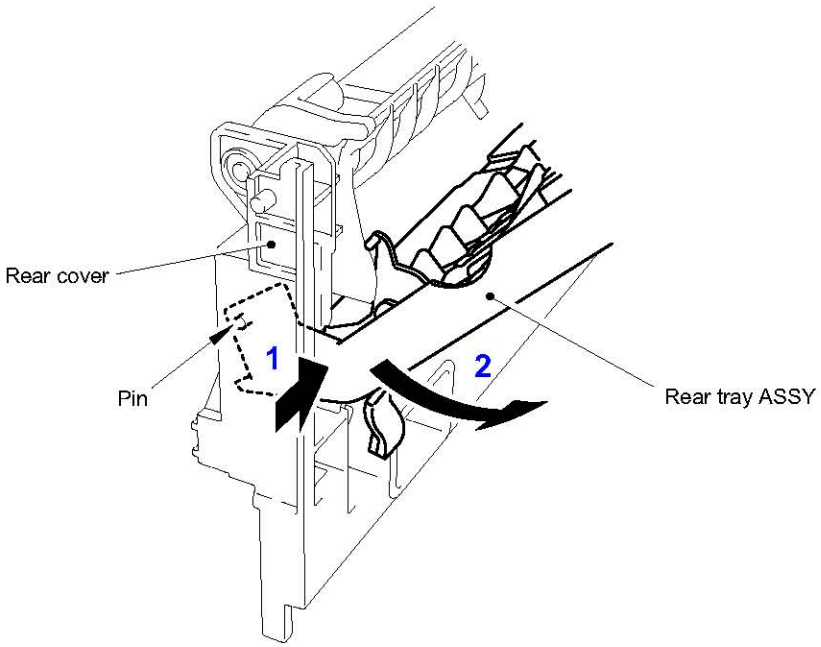


Fig. 4-37

(2) Remove the flap with the flap springs L, R from the rear tray ASSY by bending the flap.

(3) Remove the flap springs L, R from the flap.

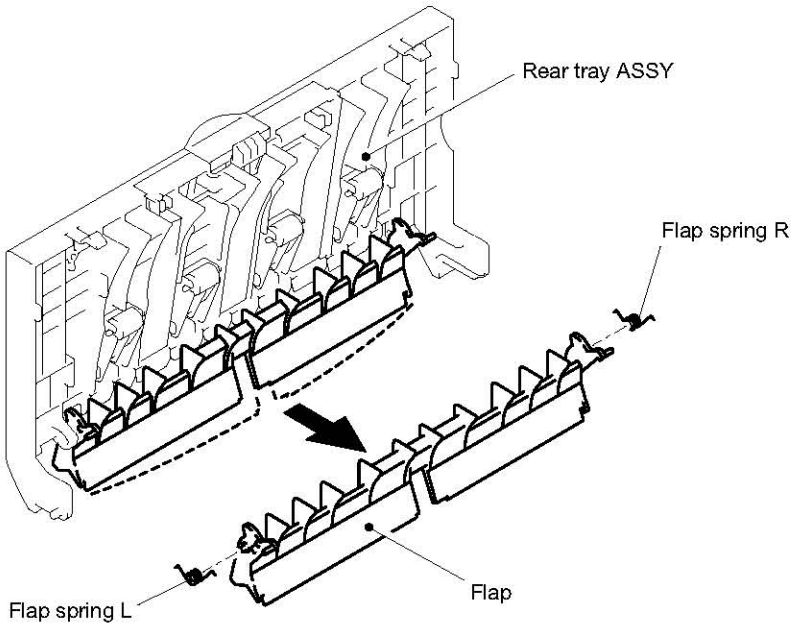


Fig. 4-38

(4) Unhook the hooks of the rock lever to remove the rock lever and rock spring from the rear tray ASSY.

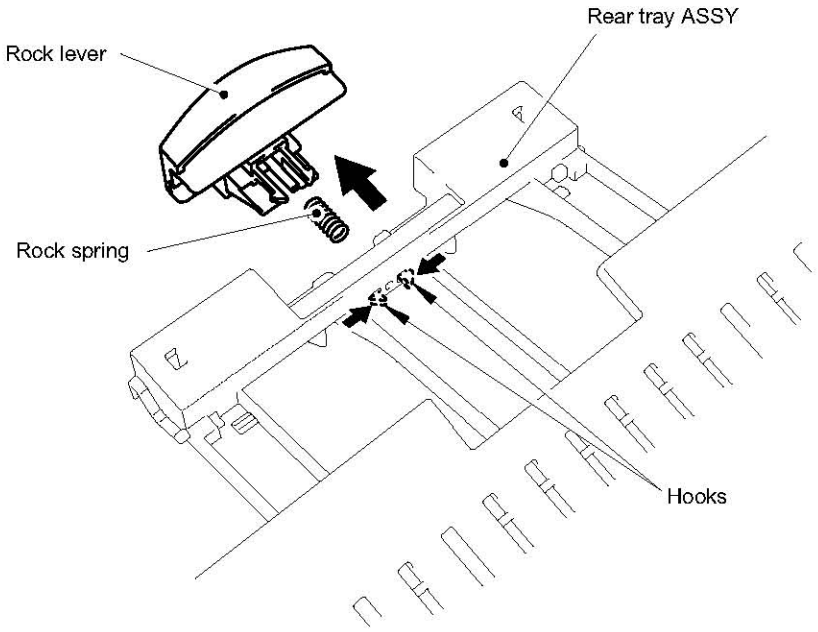


Fig. 4-39

(5) Peel the rear film from the rear cover.

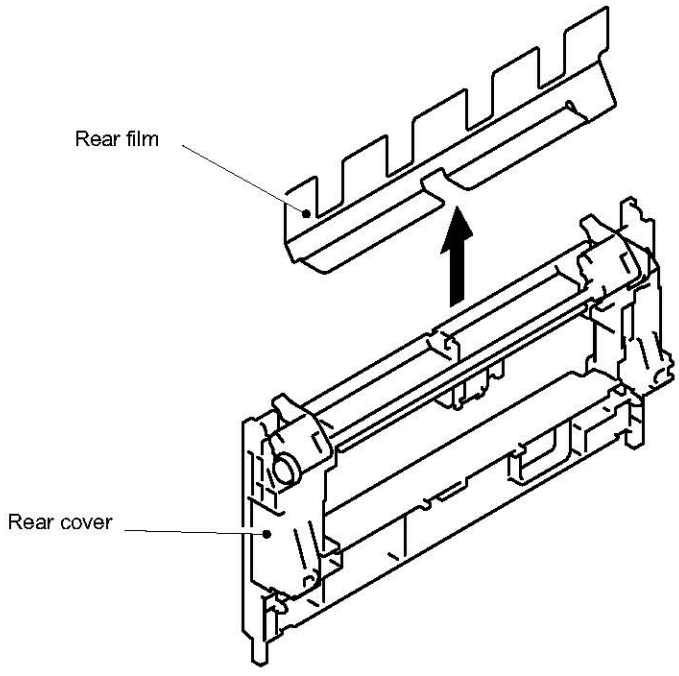


Fig. 4-40

3.10 Fixing Unit

(1) Disconnect the thermistor harness and heater harness and remove the fixing unit from the frame.

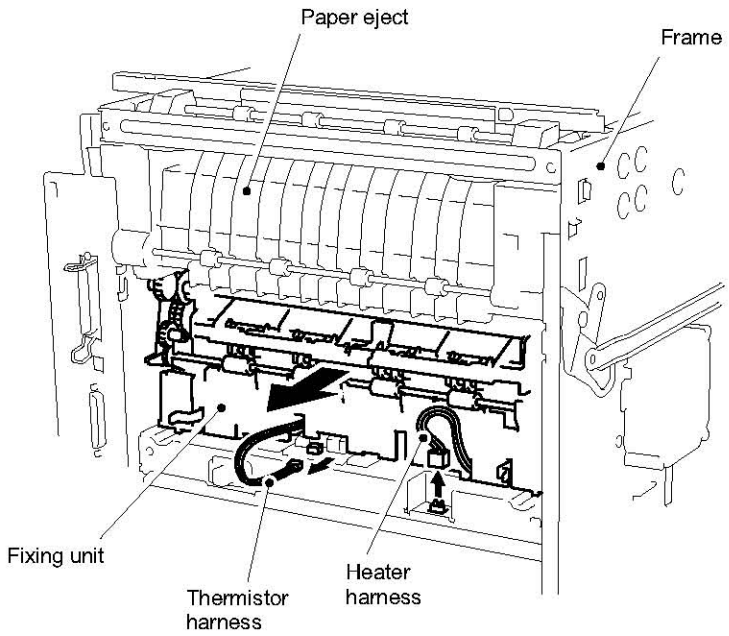


Fig. 4-41

(2) Release the thermistor harness and heater harness from the hooks on the fuser frame lower.

(3) Remove the two cup B M3x14 screws and two cup B M3x20 screws to remove the fuser frame upper from the fuser frame lower.

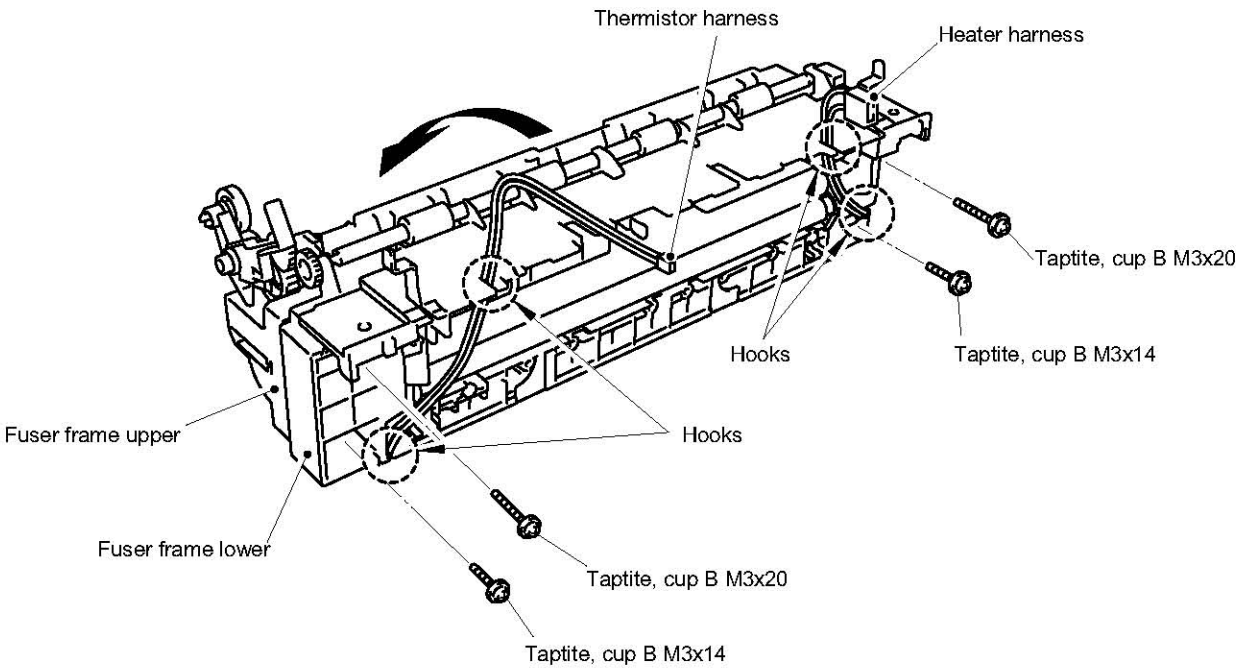


Fig. 4-42

(4) Loosen the two cup B M3x14 Taptite screws securing the connector plate at the side of the H/R gear 30 and remove the cup B M3x14 Taptite screw at the other side. Remove the power feed plate and ground wire.

(5) Lift the right hand end of the heat roller 34 (at the side of the power feed plate) and remove the fixing heater from the heat roller 34.

(6) Remove the heat roller 34 from the fuser frame upper. Remove the H/R gear 30, H/R bearing 34 and heat roller stop ring.

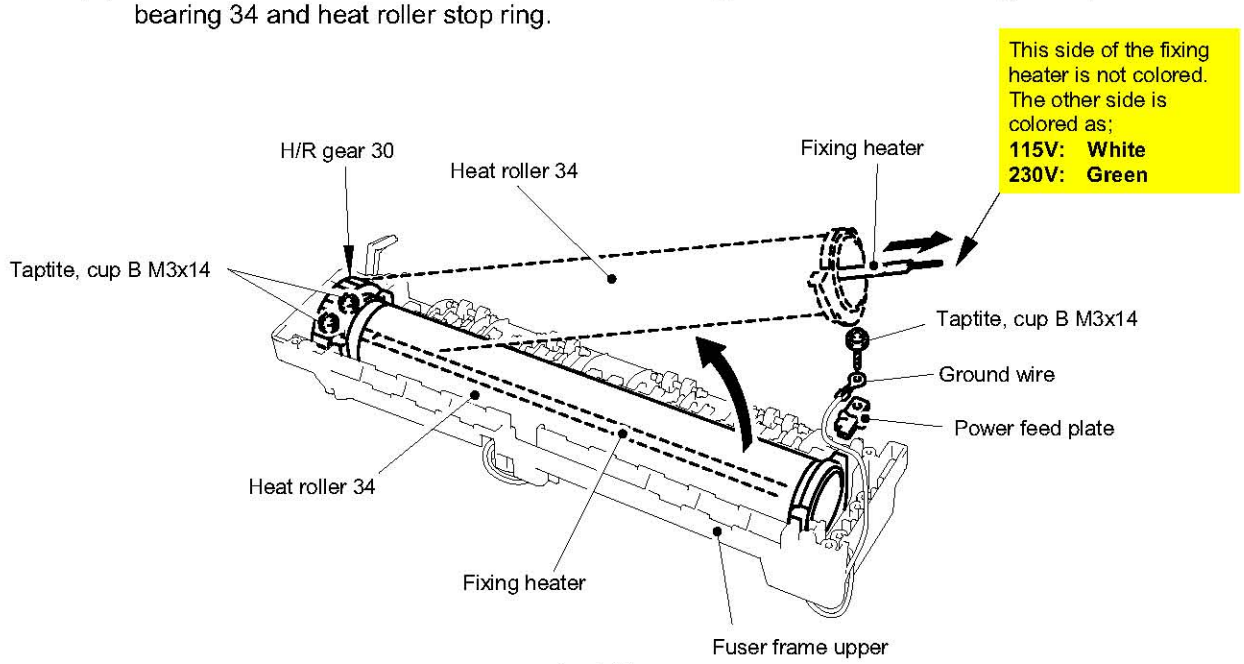


Fig. 4-43

NOTE:
When re-assembling the fixing heater, ensure that the direction of the fixing heater is correct referring to the figure above.

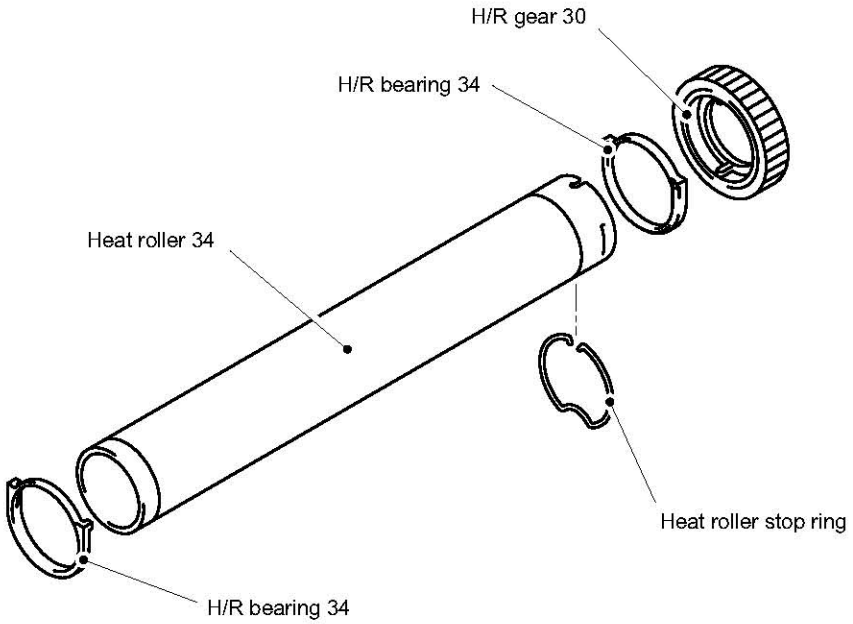


Fig. 4-44

(7) Release the thermistor harness from the two hooks of the fuser frame upper, remove the cup B M3x14 Taptite screw and remove the thermistor ASSY.

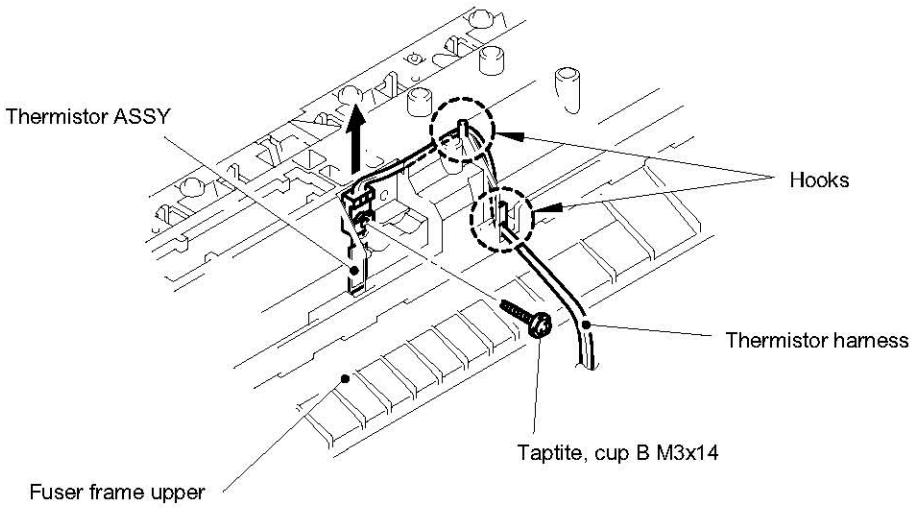


Fig. 4-45

(8) Remove the two cup B M3x14 Taptite screws from the FU frame upper to remove the thermalfuse.

(9) Remove the pressure spring from the hook and remove the eject pressure roller and pressure spring.

(10) Stick up and lift the separate pawl to remove it. Then remove the separate pawl spring.

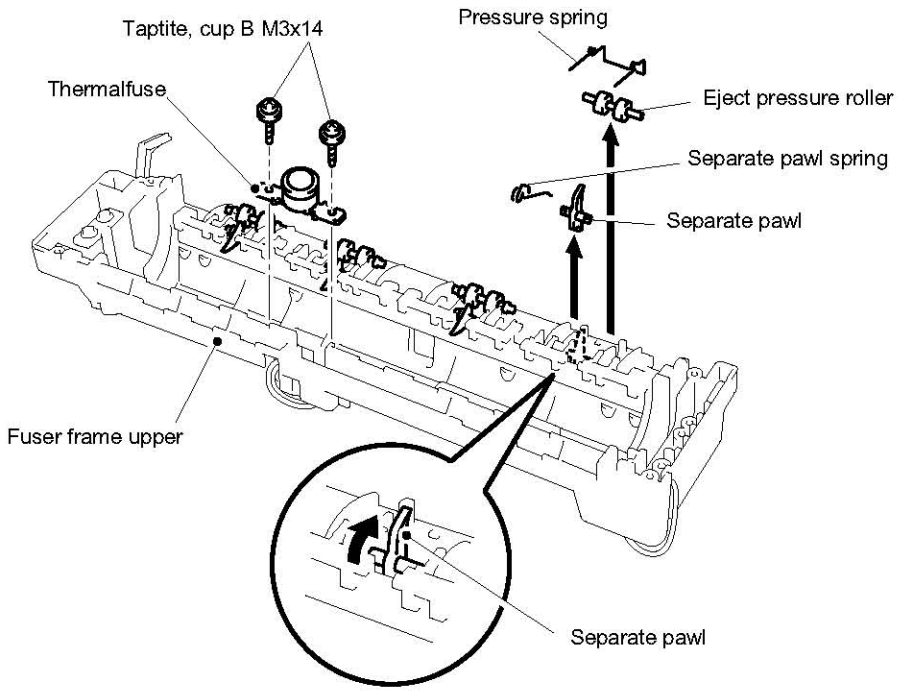


Fig. 4-46

(11) Remove the eject roller stopper from the fuser frame lower by releasing the hook from the back of the frame and remove the idle gear 14. Slide the eject roller ASSY to align the notch of the eject roller to the one of the frame and pull out the eject roller ASSY toward you to remove it.

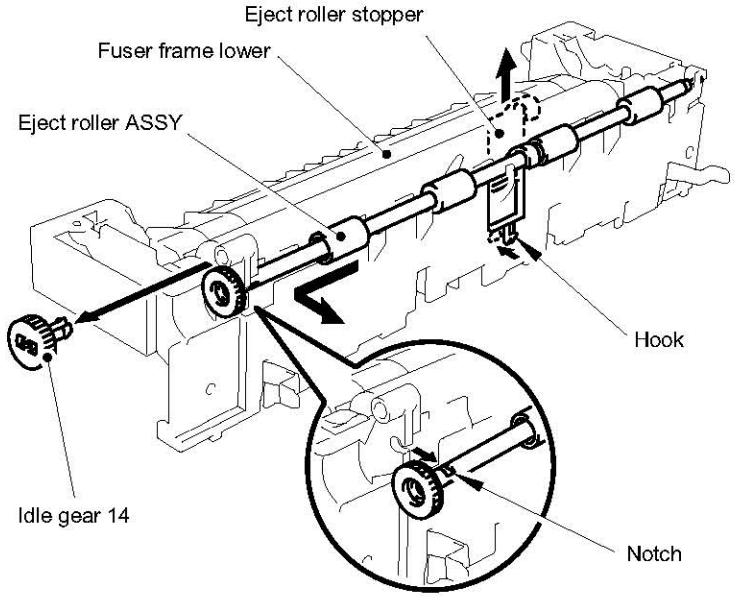


Fig. 4-47

(12) Release the FU actuator from the hook of the fuser frame lower, slide the FU actuator and remove it from the frame.

(13) Remove the FU actuator spring from the FU actuator.

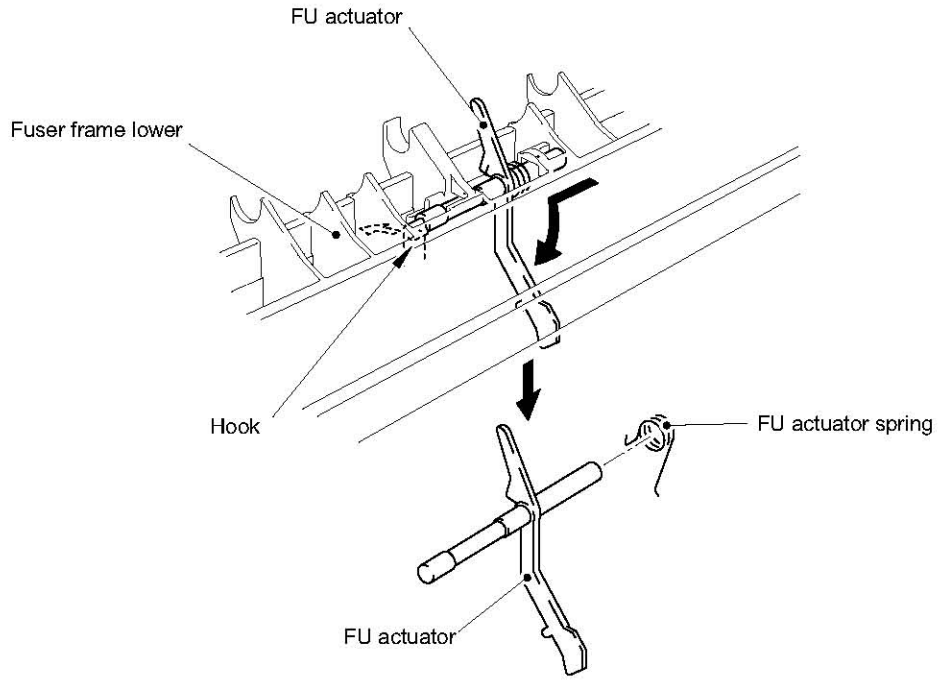


Fig. 4-48

(14) Remove the cleaner roller holder R, L, and the two P/R bearings to remove the cleaner roller ASSY from the fuser frame lower.

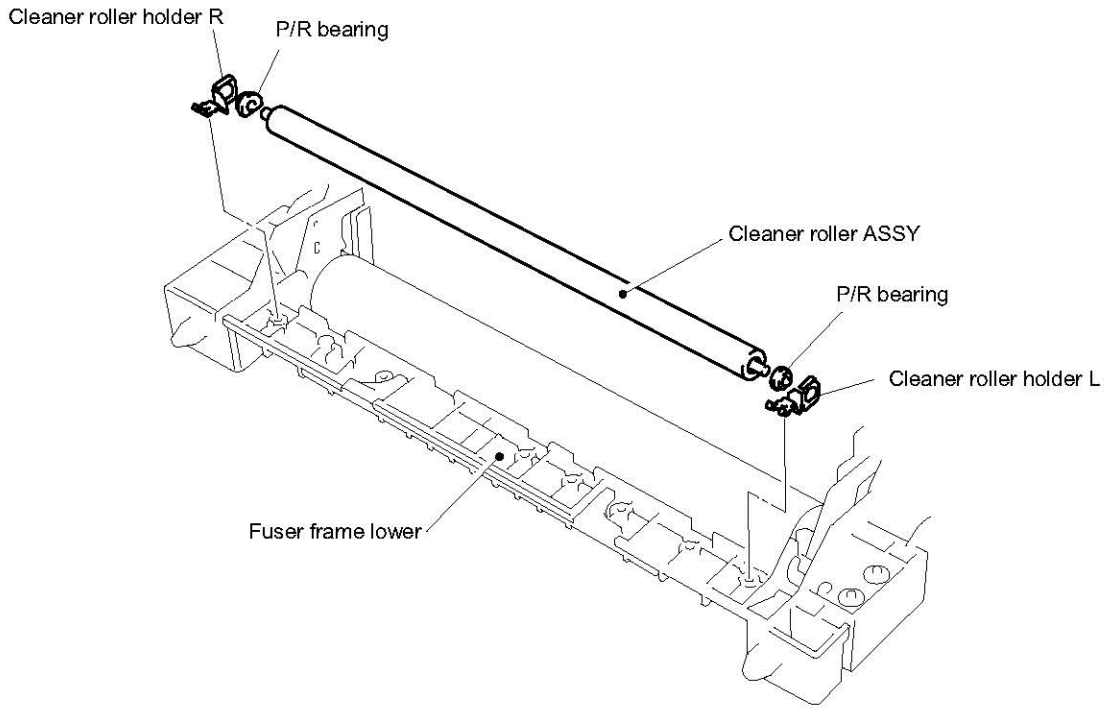


Fig. 4-49

(15) Turn the fuser frame upside down. Release the two hooks from the two springs as shown in the drawing below.

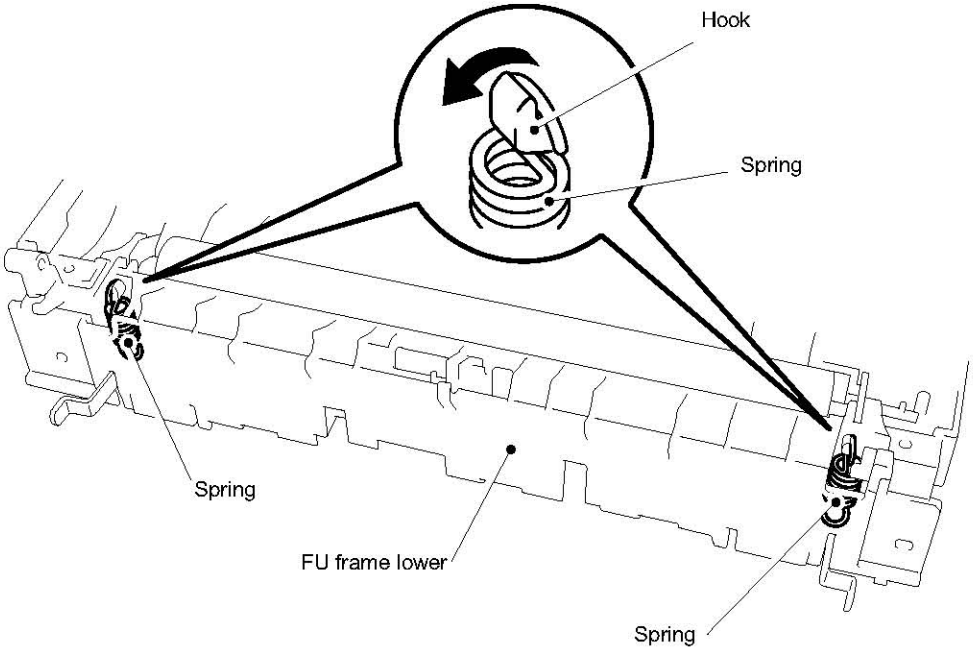


Fig. 4-50

(16) Place the FU frame lower the correct way up. Remove the ground wire 2 from the plate by pushing A at the bottom. Push up the two plates to the arrow B direction, release the two hooks from the plates, and then remove the pressure roller 25 from the FU frame lower.

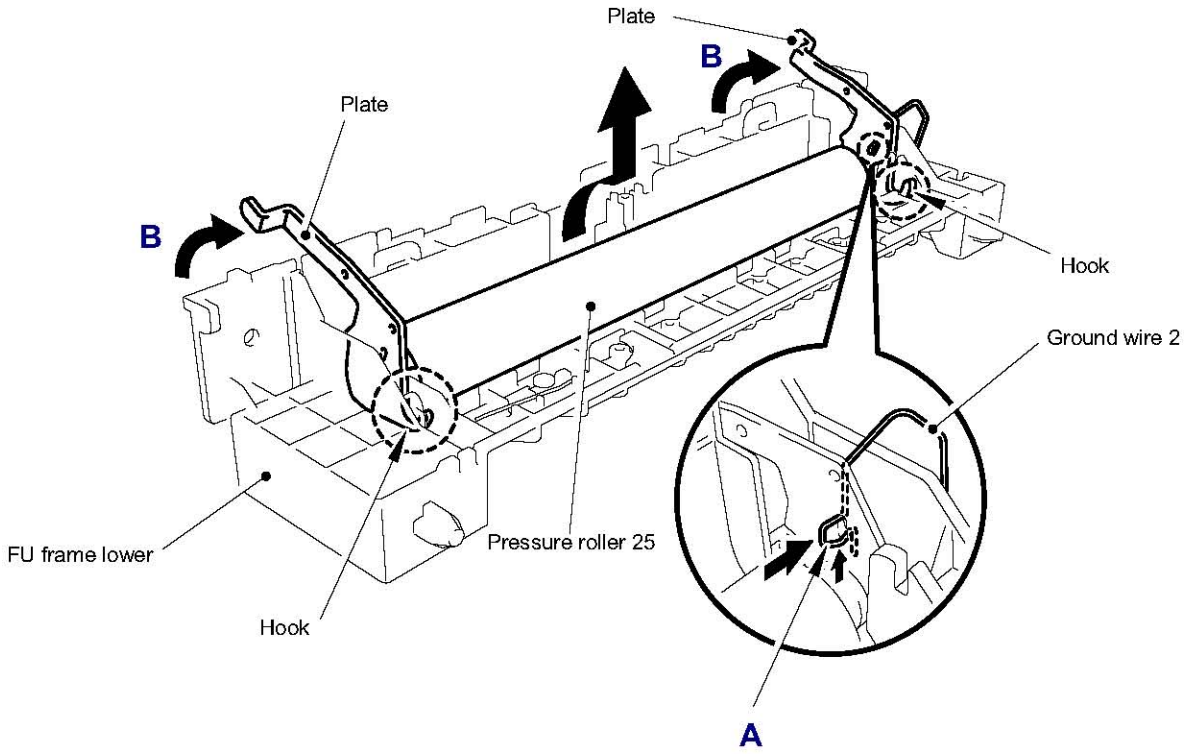


Fig. 4-51

(17) Remove the two plates and the two bearings from the pressure roller 25.

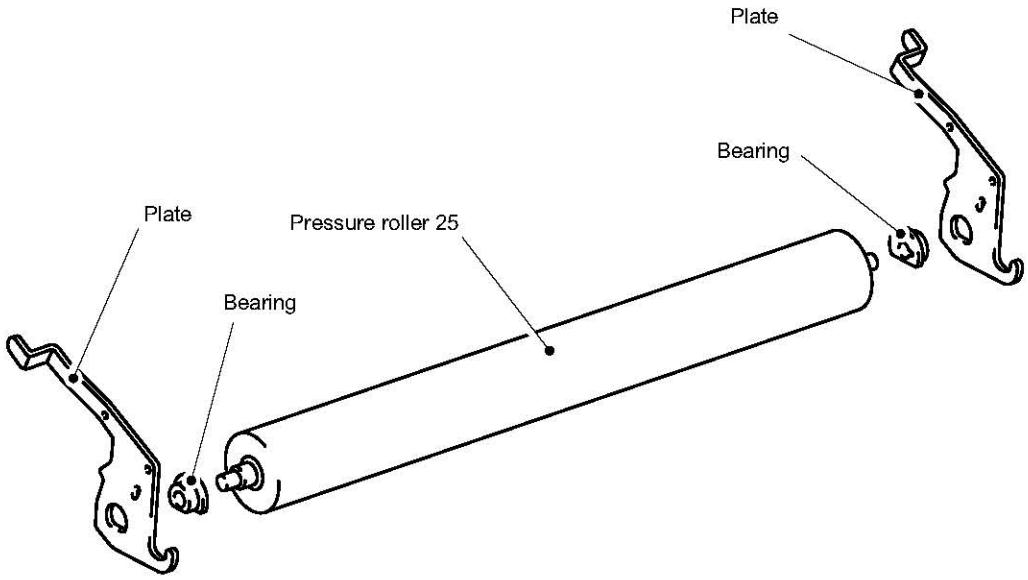


Fig. 4-52

3.11 Paper Eject

(1) Release the pin and pull out the paper eject from the frame.

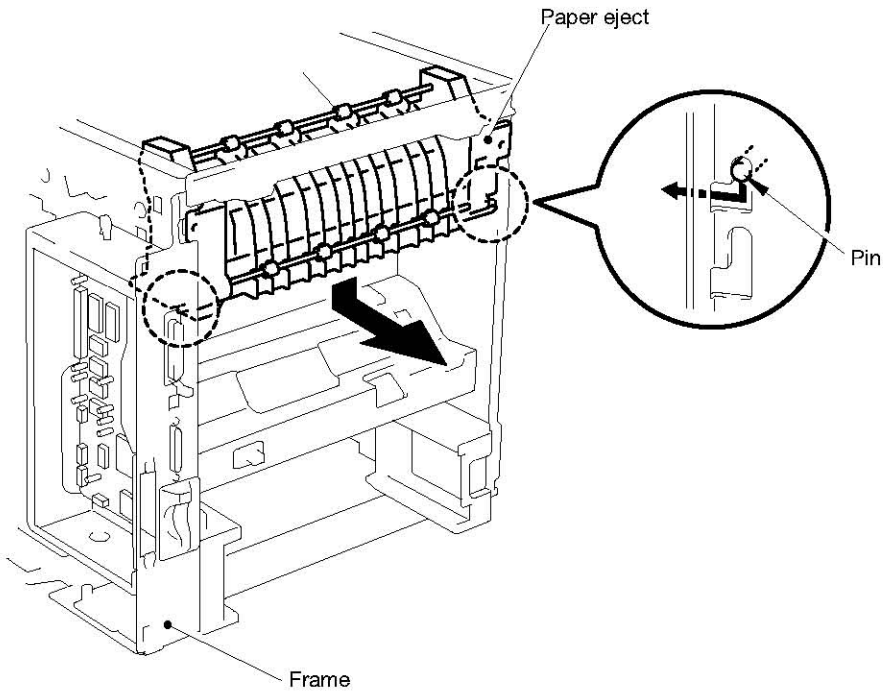


Fig. 4-53

(2) Remove the three gear 26, two idle gear 17 and two gear 14 from the right hand side of the paper eject frame by releasing the hooks.

(3) Remove the two bearings 6 from the shaft of the eject roller ASSY.

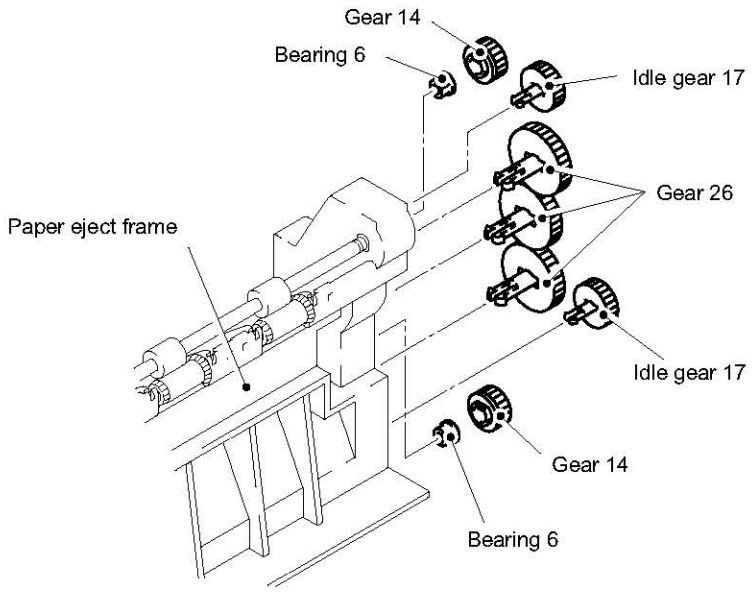


Fig. 4-54

(4) Remove the two cup B tite 3x8 screws from the left hand side of the paper eject frame and remove the two eject roller ground plates and two bearings 6. Slide the two eject roller ASSY to the left until the right ends of the shafts are released from the slot and pull them out to the oblique direction.

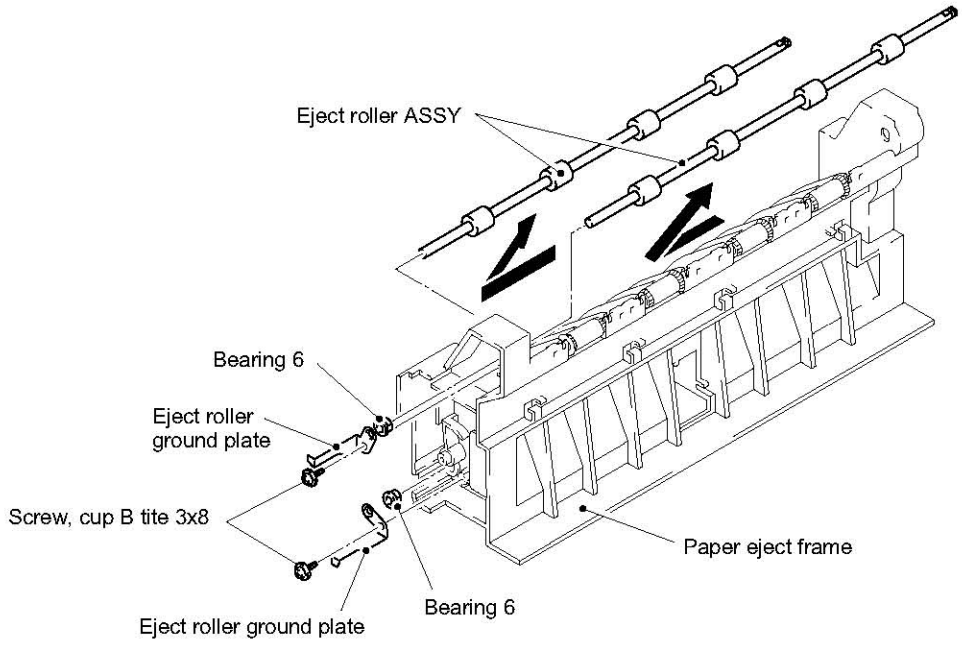


Fig. 4-55

(5) Remove the eject pinch roller ASSY with the pinch spring by lifting them upwards until the springs are released from the frame. Then remove the pinch spring from the eject pinch roller ASSY.

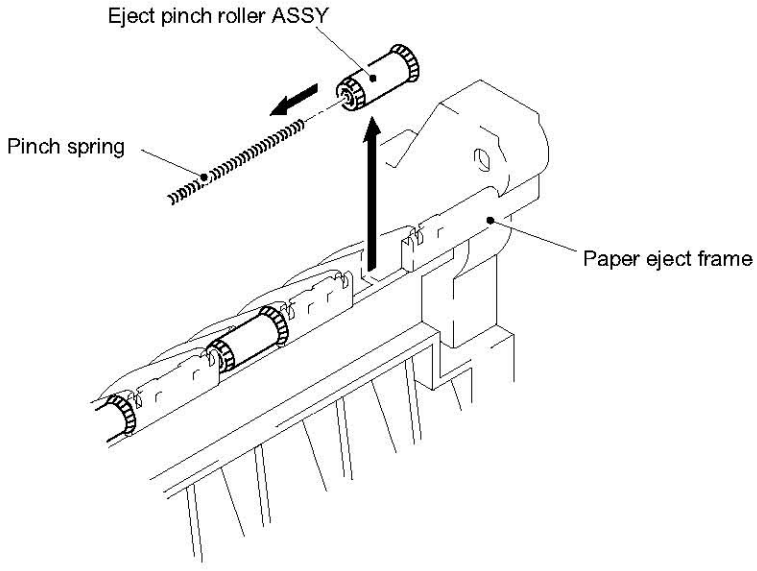


Fig. 4-56

(6) Remove the rear tray actuator from the paper eject frame and remove the rear tray actuator spring.

(7) Unhook the hook of the paper actuator 3 to remove the rear actuators 3 and 4.

(8) Remove the cup B tite 3x8 screw to remove the rear tray PCB ASSY.

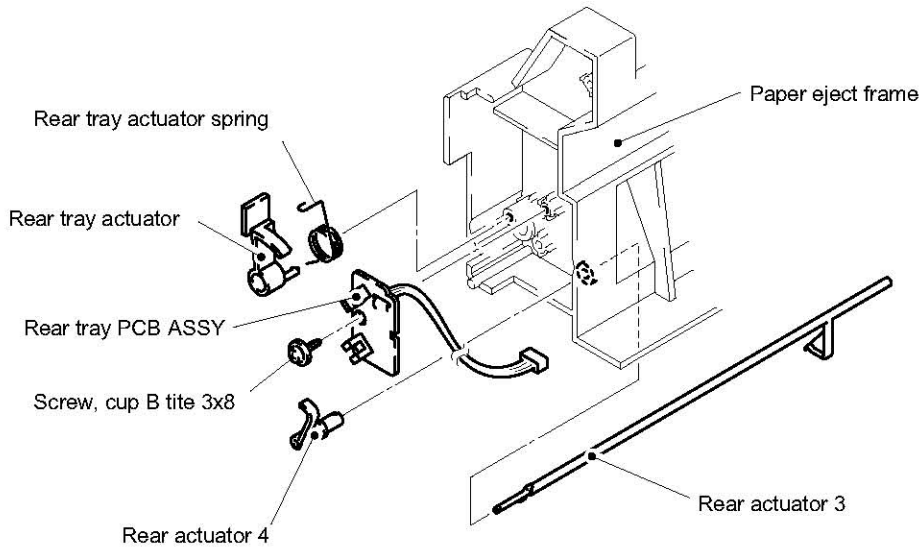


Fig. 4-57

3.12 Laser Unit

(1) Remove the four Taptite, bind B M3x10 from the laser unit.

(2) Remove the dust guard plate ASSY and disconnect the polygon motor harness and LD harness from the laser unit.

NOTE:
When removing the laser unit from the frame, never touch the glass.

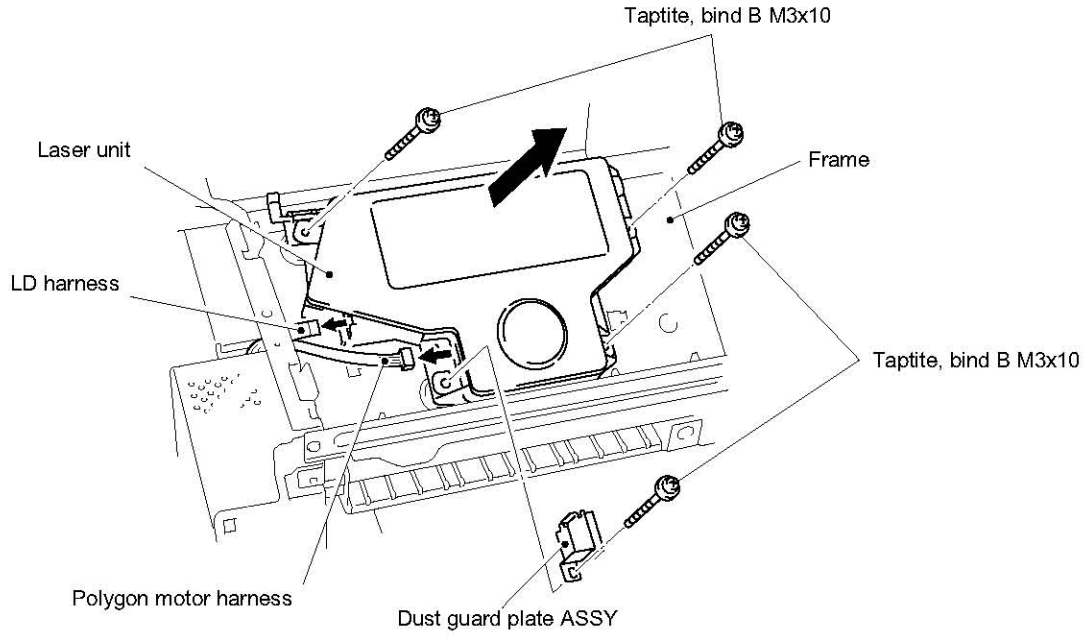


Fig. 4-58

(3) Turn the shutter link to the arrow 1 direction till it makes a click, slide the shutter link to align the boss and the notches of the shutter link to the notches of the laser unit, and then remove the shutter link by turning it to the arrow 2 direction.

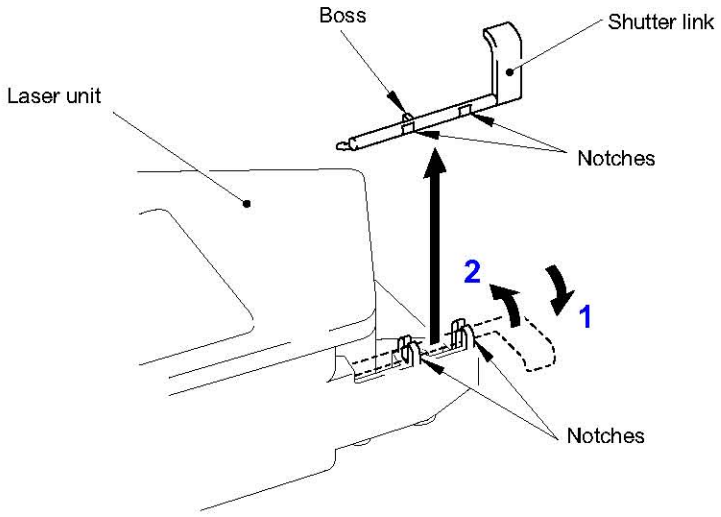


Fig. 4-59

3.13 Front Cover 1 / Front Cover 2

(1) Disconnect the SW connector at the right hand side of the front cover 1 from the engine PCB.

(2) Remove the two cup S M3x10 Taptite screws and two cup S M3x8 Taptite screws to remove the front cover 2 from the frame.

(3) Remove the four cup S M3x8 Taptite screws to remove the front cover 1 from the frame.

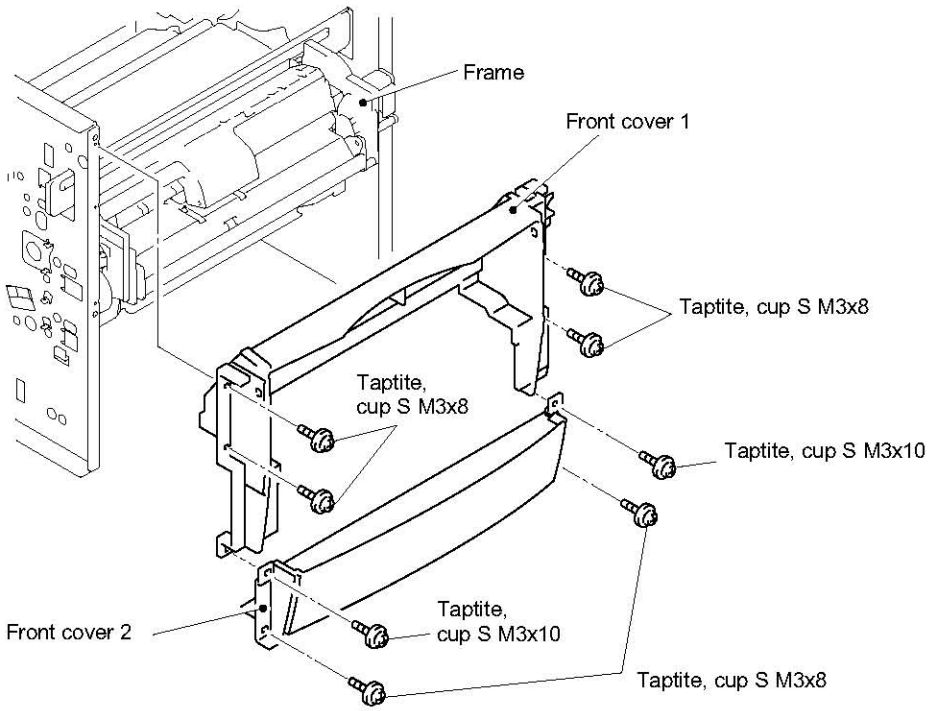


Fig. 4-60

3.14 MP Tray Unit

(1) Remove the four bind S M3x8 Taptite screws and remove the MP tray unit from the frame by disconnecting the two connectors.

(2) Remove the two bind B M3x8 Taptite screws to remove the solenoid ASSY MP at the right hand side of the unit. Then remove the solenoid spring MP.

(3) Bend the roller cover ASSY MP to release both ends of the shaft from the unit and remove the roller cover ASSY MP from the unit.

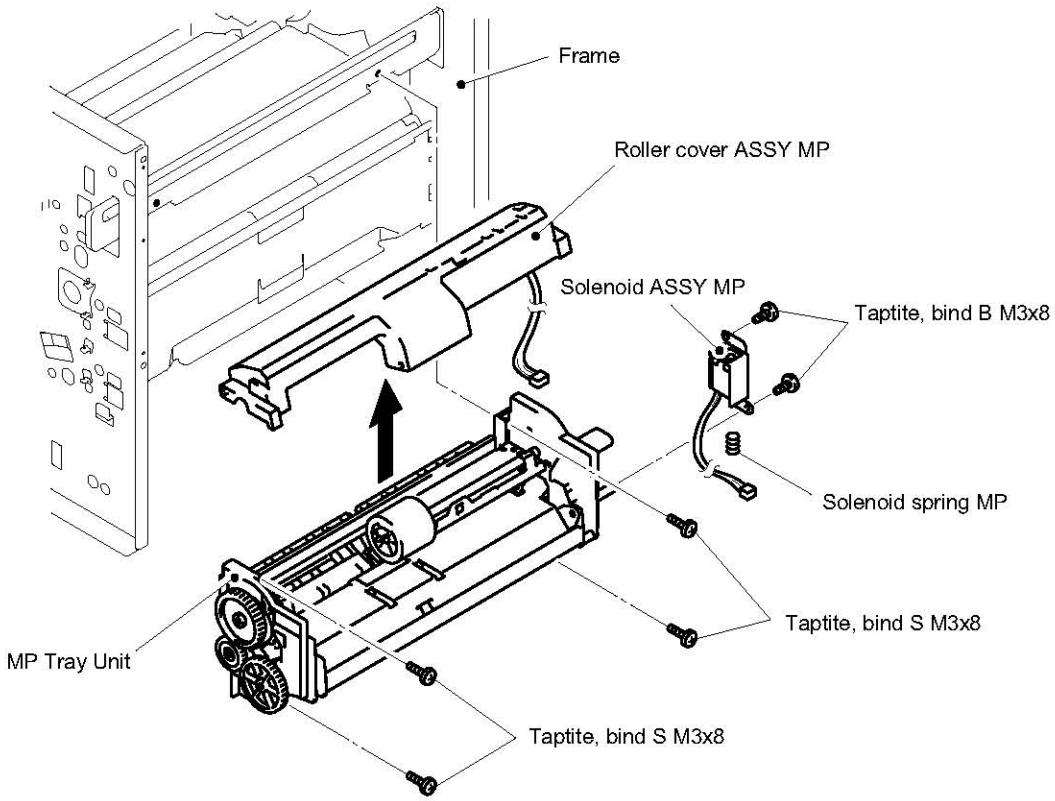


Fig. 4-61

NOTE:
When re-assembling the MP tray unit, be sure to close the roller cover MP completely.

(4) Turn the roller cover ASSY MP upside down. Unhook the hooks and bend the PE sensor actuator 2 MP to release both ends of the shaft. Then remove the PE sensor actuator 2 MP from the cover while releasing the pin of the PE sensor actuator MP.

(5) Turn the PE sensor actuator MP so that the shutter is at the top. While bending the hook on the roller cover slightly, slide the PE sensor actuator MP to the left to align the notch of the actuator to the one of the cover and pull the PE sensor actuator MP upwards.

(6) Pull the two hooks of the roller cover outwards and remove the MP PE sensor PCB ASSY.

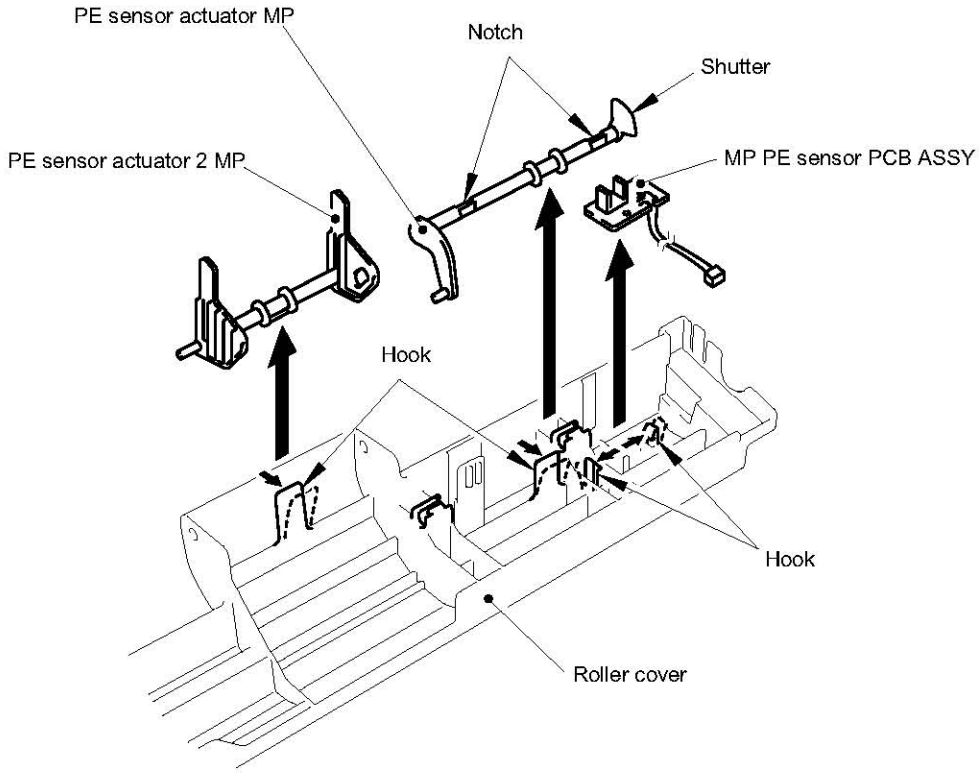


Fig. 4-62

(7) Release the hook and pull out the paper feed roller ASSY MP in the direction of the arrow as shown in the figure blow.

(8) Unhook the hook to remove the gear 44 at the right hand side from the MP tray frame. Unhook the hook to remove the plate cam gear 28. Then remove the paper feed idle gear 28 and plate cam MPR.

(9) Unhook the hooks to remove the bearing R and L from the MP feed roller shaft MP and remove the MP feed roller shaft MP from the MP tray frame.

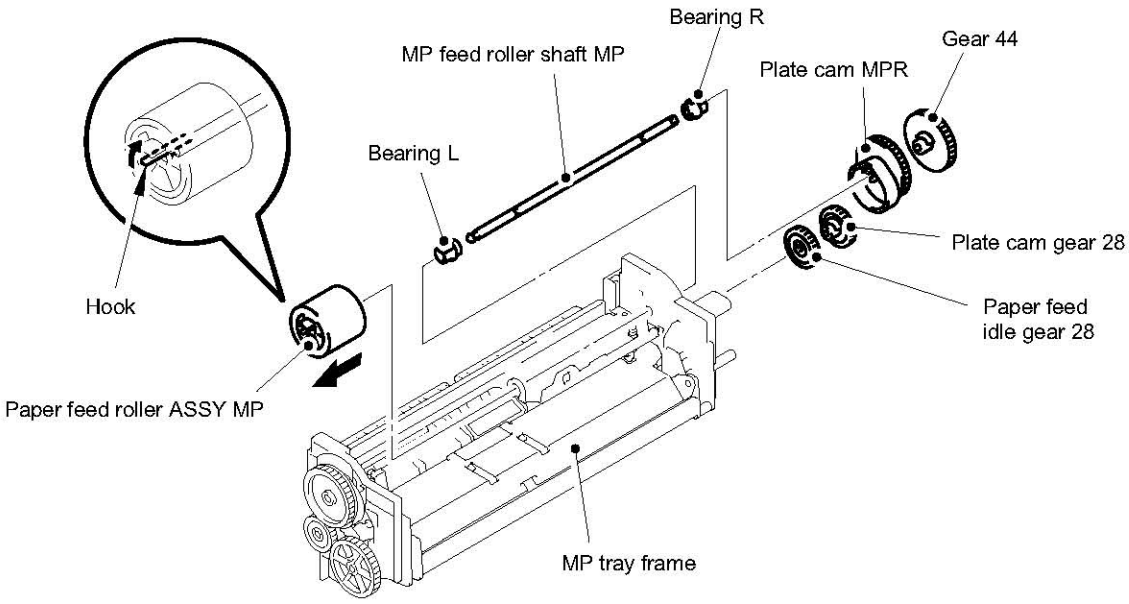


Fig. 4-63

NOTE:
After replacing the paper feed roller ASSY MP, be sure to close the roller cover MP completely.

(10) Unhook the hook to remove the plate cam gear 28 with the plate cam L at the left-hand side.

(11) Remove the two plate spring MP from the plate. Remove the three bind B M3x8 Taptite screws to remove the plate from the MP tray frame.

(12) Pull the boss of the MP tray frame outwards to release the plate ASSY MP from the MP tray frame.

(13) Remove the right side of the plate ASSY MP from the MP tray frame first while pulling the MP tray frame outwards and remove the plate ASSY MP completely.

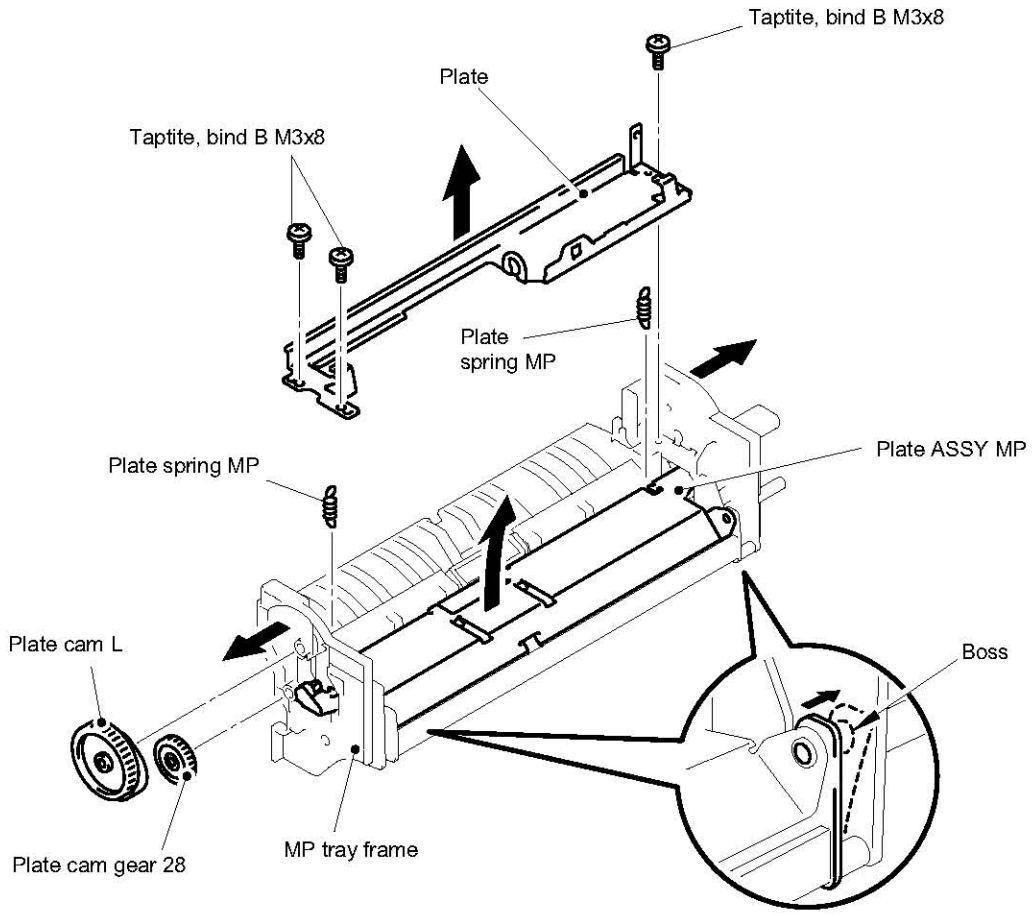


Fig. 4-64

(14) Stand the separation plate ASSY MP toward you, release one of the two bosses and remove the separation plate ASSY MP from the MP tray frame.

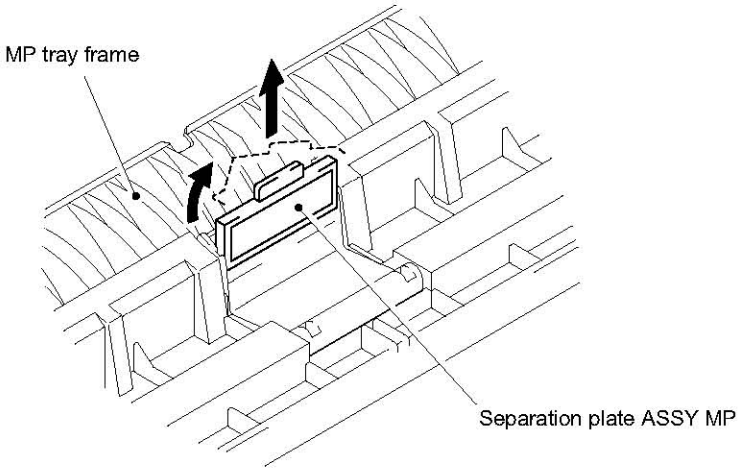


Fig. 4-65

NOTE:
After replacing the separation plate ASSY MP, be sore to close the roller cover MP completely.

(15) Unhook the two hooks of the separation pad spring MP and stand the separation pad holder MP toward you to remove it. Remove the separation pad spring MP.

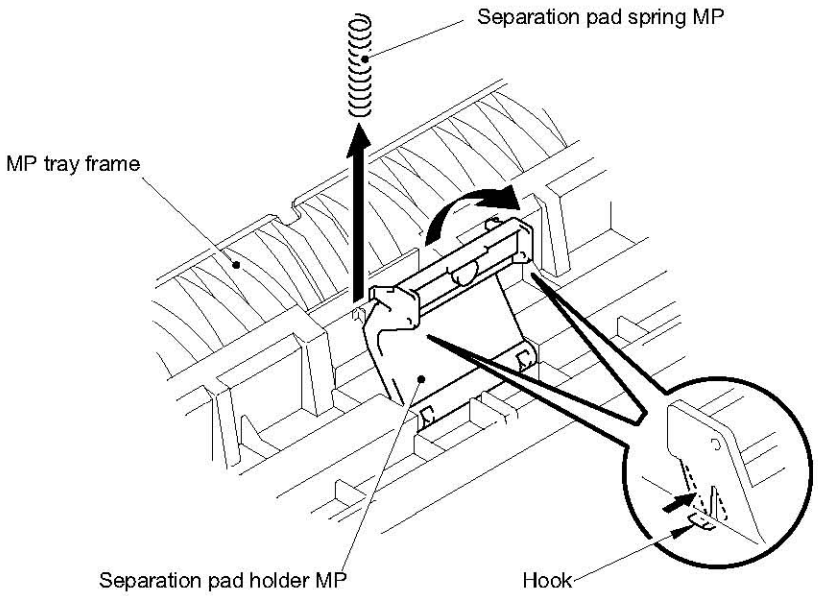


Fig. 4-66

3.15 Fan Motor 80

(1) Disconnect the fan motor 80 harness from the engine PCB.

(2) Remove the two cup S M3x30 Taptite screws to remove the fan motor 80 from the frame.

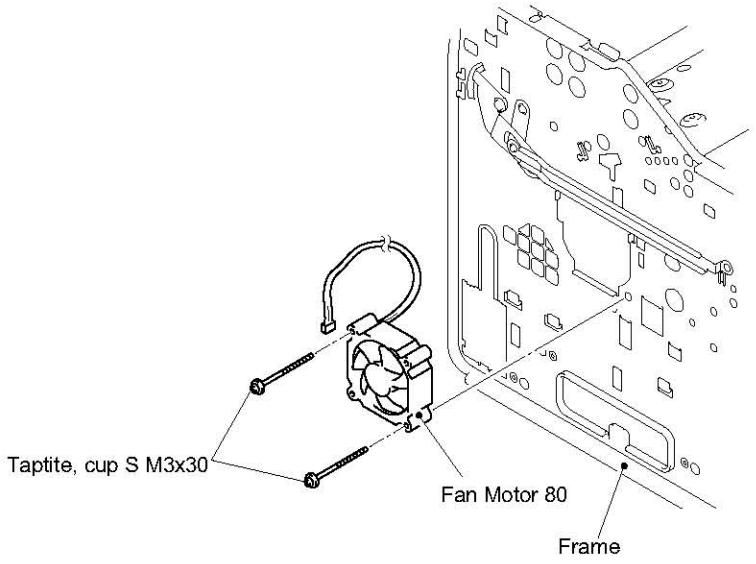


Fig. 4-67

3.16 Main Motor ASSY

(1) Disconnect the main motor harness from the engine PCB.

(2) Remove the four cup S M3x6 Taptite screws to remove the main motor ASSY from the frame.

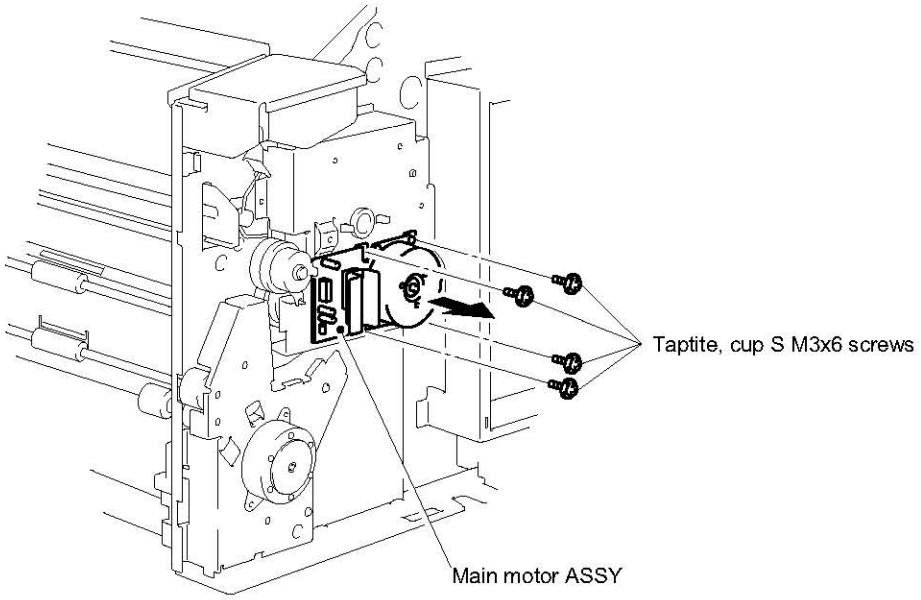


Fig. 4-68

3.17 Feeding Motor ASSY

(1) Disconnect the feeding motor harness from the engine PCB.

(2) Remove the two cup S M3x6 Taptite screws to remove the feeding motor ASSY from the drive unit.

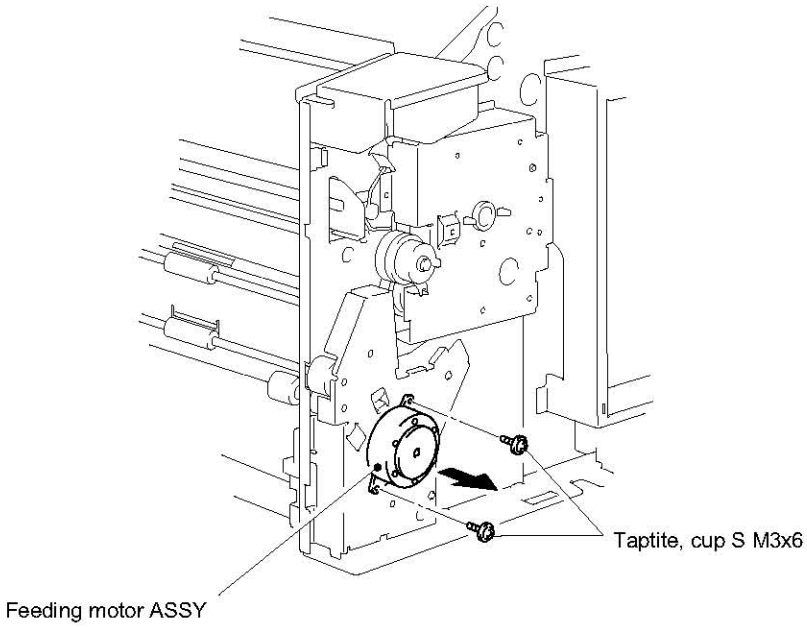


Fig. 4-69

3.18 Drive Unit

(1) Disconnect the solenoid harness from the engine PCB.

(2) Remove the four cup S M3x6 Taptite screws to remove the paper feed gear plate ASSY from the frame.

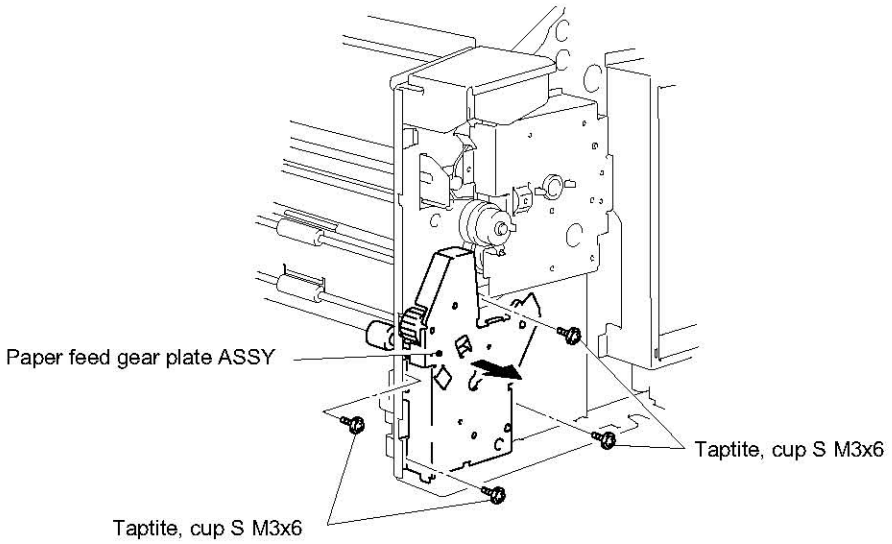


Fig. 4-70

(3) Remove the flanged M3x3.5 screw to remove the solenoid ASSY with the solenoid spring MP. Then remove the solenoid spring MP from the solenoid ASSY.

(4) Unhook the hook to remove the solenoid lever.

(5) Remove the friction spring from the spring hook and paper feed gear plate ASSY and remove the spring hook from the sector gear 35.

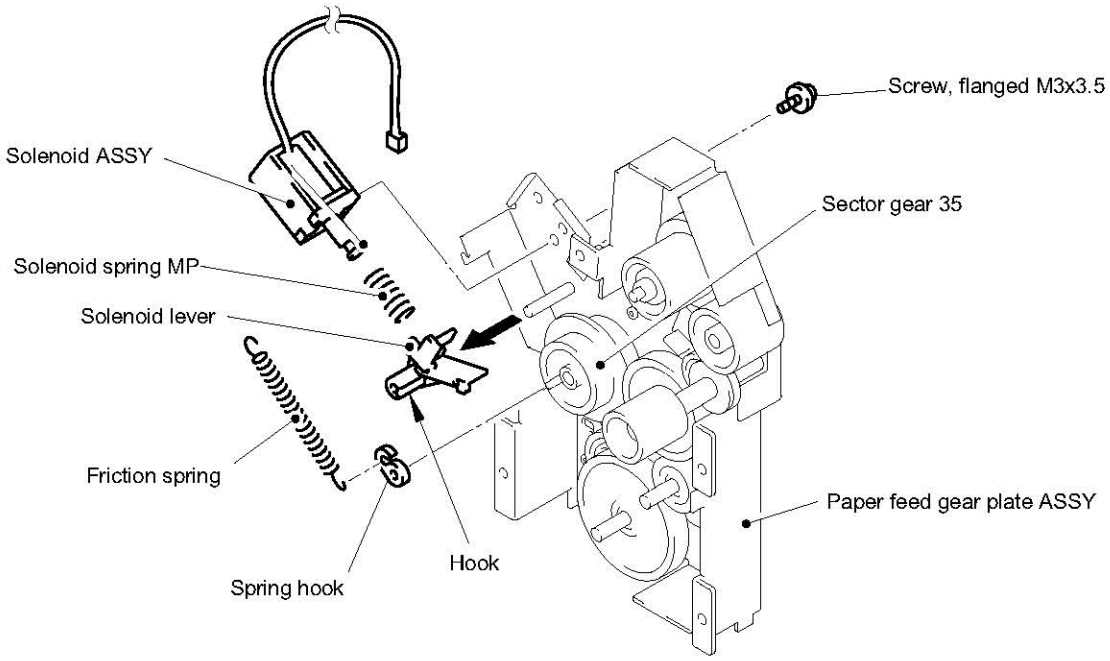


Fig. 4-71

(6) Remove the five cup S M3x6 Taptite screws to remove the main gear plate ASSY from the frame.

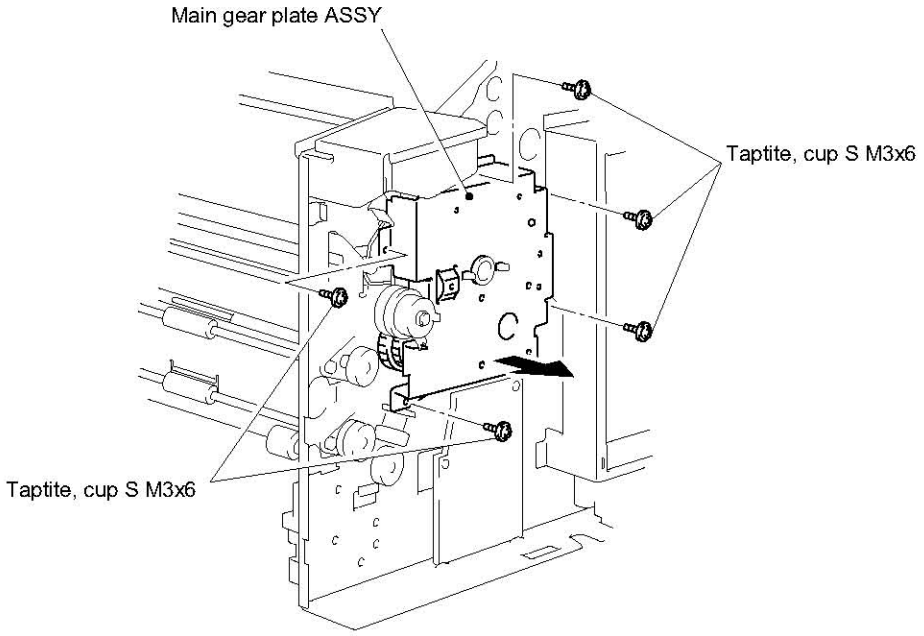


Fig. 4-72

(7) Pull the drum gear link in the direction of the arrow as shown in the figure below and remove the drum gear link with the drum gear cam.

(8) Align the joint of the drum gear link and the drum gear cam as shown in the figure below to remove the drum gear cam from the drum gear link.

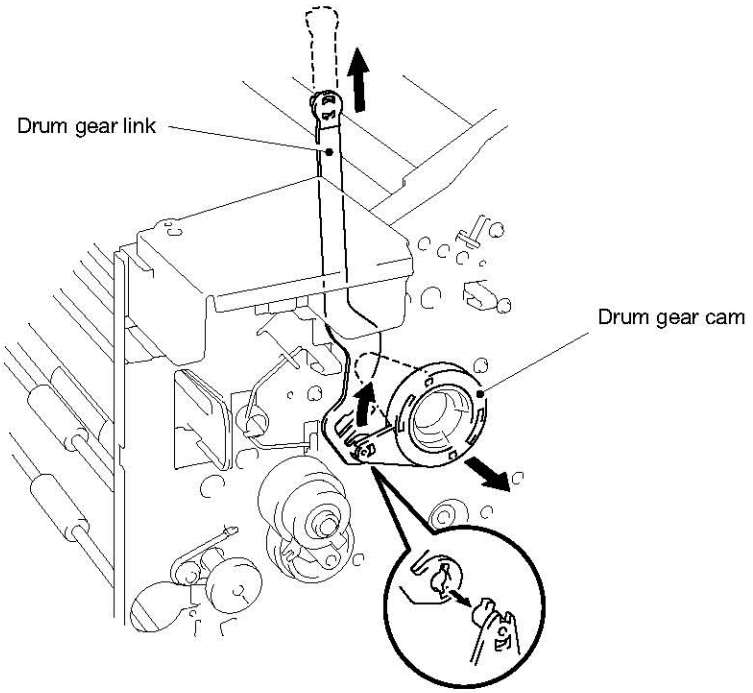


Fig. 4-73

3.19 Electromagnetic Clutch Regist

(1) Remove the retaining ring and remove the electromagnetic clutch regist from the frame.

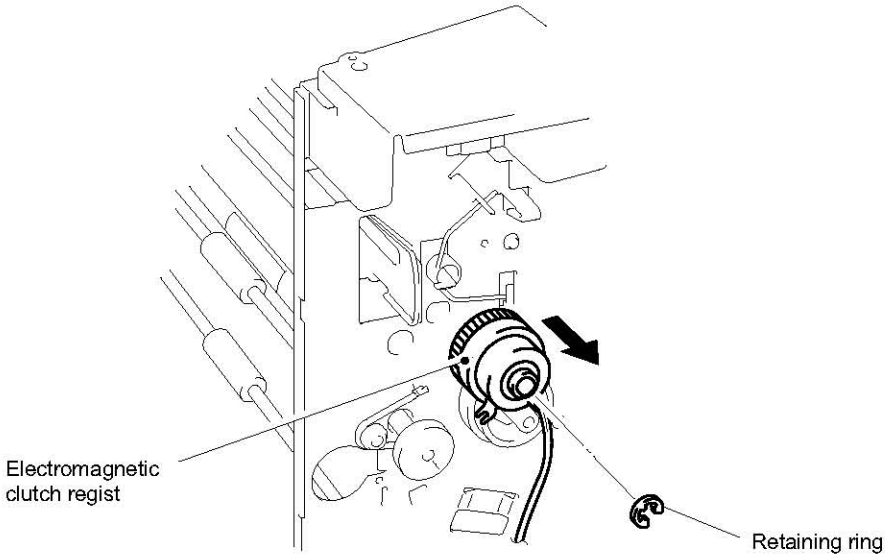


Fig. 4-74

3.20 Main PCB

(1) Remove the two bind S M3x6 Taptite screws from the rear of the frame to remove the CF slot.

(2) Disconnect the four connectors from the main PCB.

(3) Remove the four cup S M3x6 Taptite screws from the main PCB and remove the two screws and two bolts from the connectors at the rear of the frame. Then remove the main PCB from the frame.

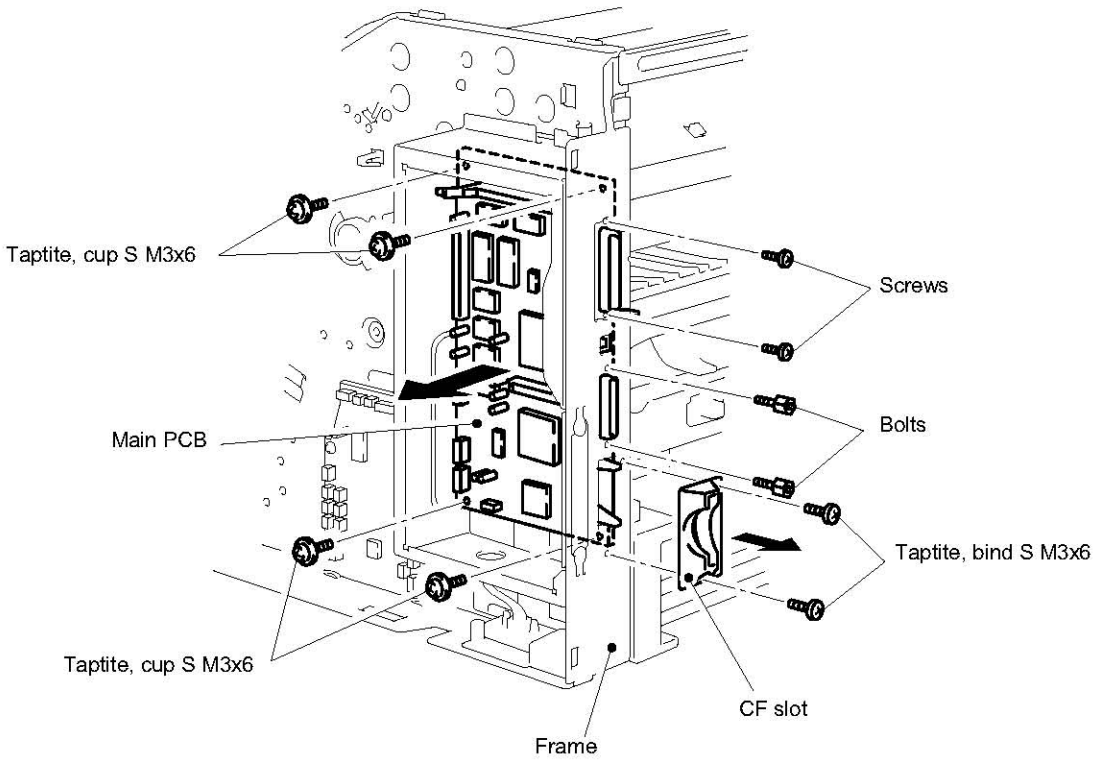


Fig. 4-75

3.21 Engine PCB

(1) Disconnect the connectors from the engine PCB.

(2) Remove the two cup S M3x6 Taptite screws, release the engine PCB from the slits at the bottom of the frame and remove the engine PCB from the frame.

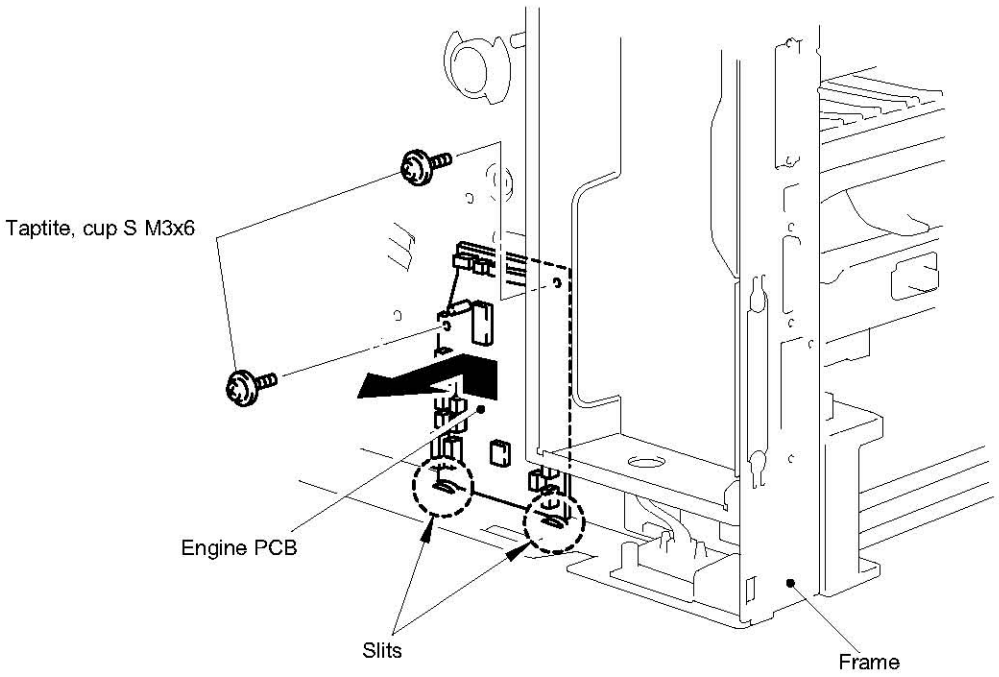


Fig. 4-76

3.22 Base Plate

(1) Place the frame so that the base plate is at the top.

(2) Remove the four pan (S/P washer) S M3x8 Taptite screws and slide the base plate in the direction of the arrow as shown in the figure below to remove it.

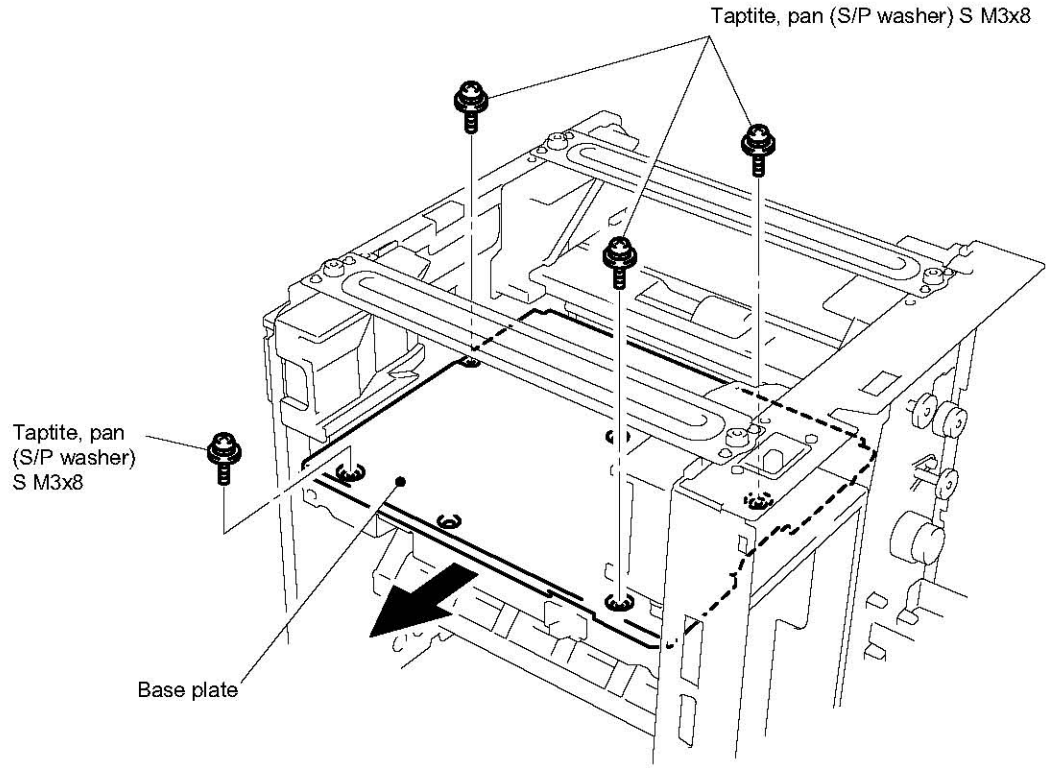


Fig. 4-77

3.23 Low-voltage Power Supply PCB ASSY / High-voltage Power Supply PCB ASSY

(1) Remove the PCB insulation sheet.

(2) Remove the two cup S M3x6 Taptite screws and remove the tray guides left rear from the frame by inclining the tray guide left rear in the direction of the arrow.

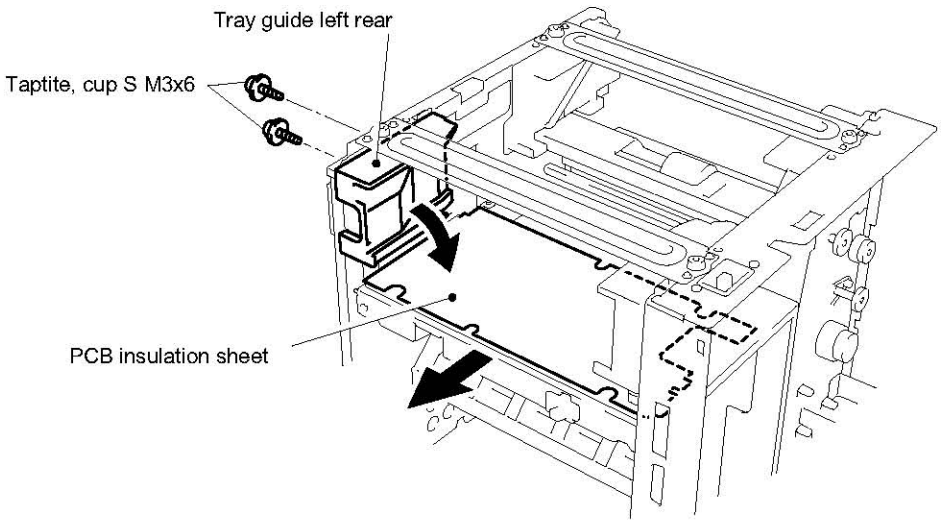


Fig. 4-78

(3) Remove the cup S M3x6 Taptite screw securing the inlet case and one pan (S/P washer) M3.5x6 screw securing the ground wire.

(4) Remove the cup S M3x6 Taptite screw from the low-voltage power supply PCB ASSY to remove the low-voltage power supply PCB ASSY with the inlet from the frame.

(5) Disconnect the connectors from the low-voltage power supply PCB ASSY.

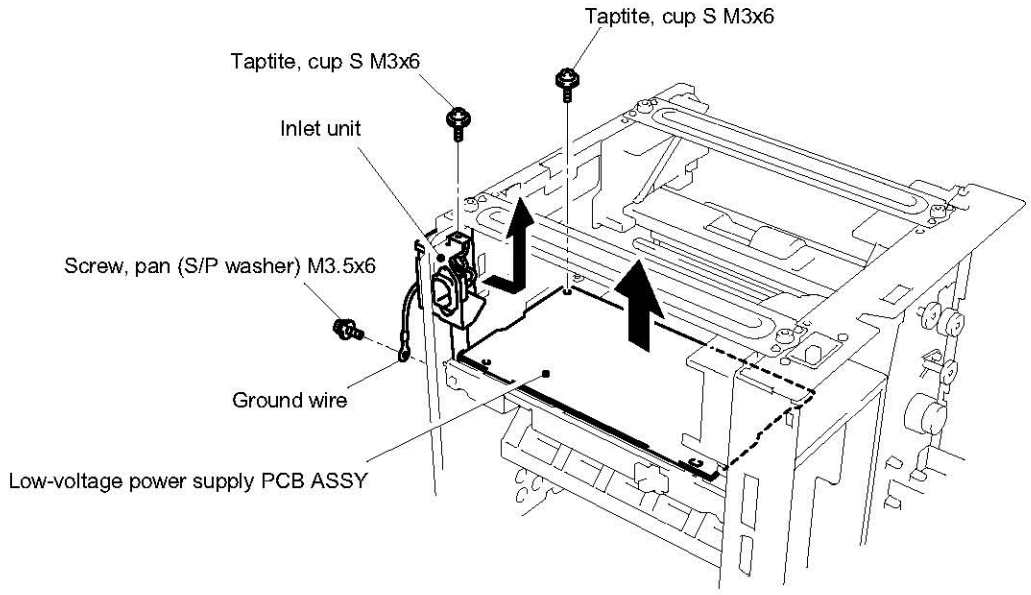


Fig. 4-79

(6) Remove the two bind B M4x10 screws and the cup S M3x6 Taptite screw, unhook the high-voltage power supply PCB from the hooks of the frame and disconnect the connectors to remove the high-voltage power supply PCB from the frame.

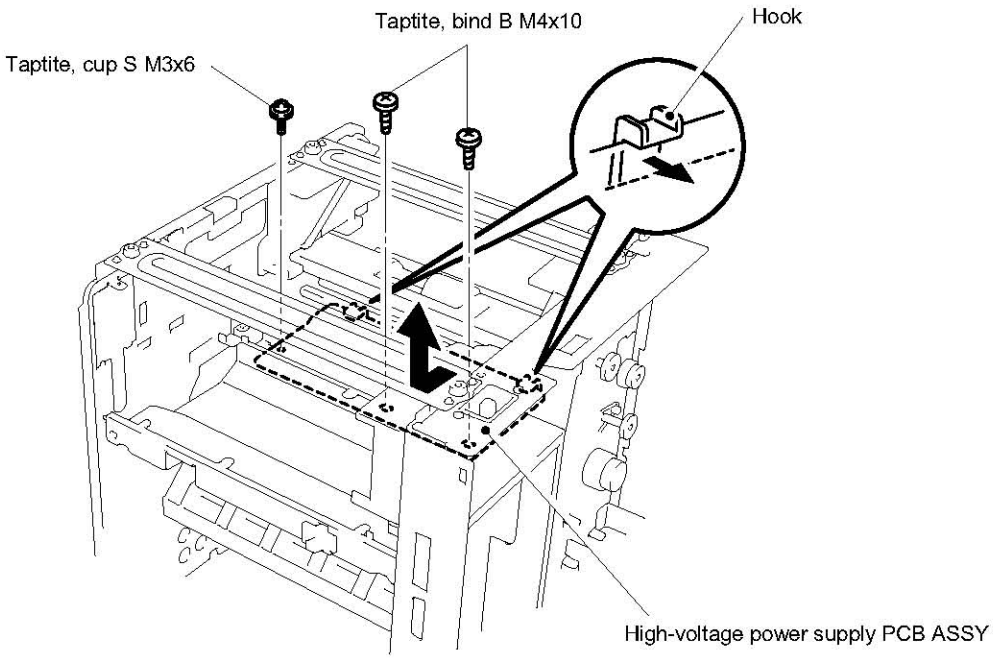


Fig. 4-80

(7) Remove the transfer plate from the high-voltage power supply PCB ASSY.

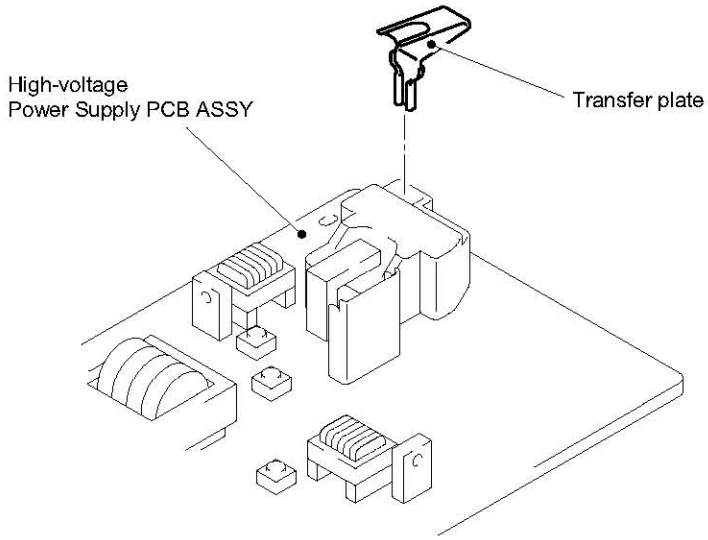


Fig. 4-81

3.24 Transfer Base ASSY

(1) Remove the two cup S M3x6 Taptite screws to remove the rear plate.

(2) Remove the pressure spring R and L from the both sides of the frame.

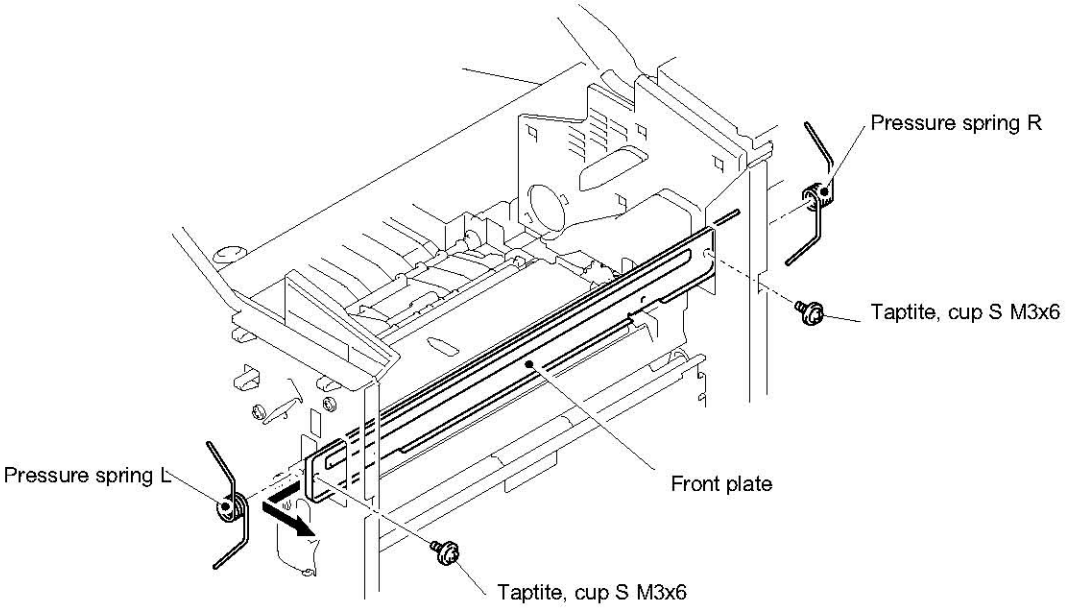


Fig. 4-82

(3) Remove the six cup B 3x8 Taptite screws from the process guide R and L, and unhook the four hooks to remove the process guide R and L from the frame.

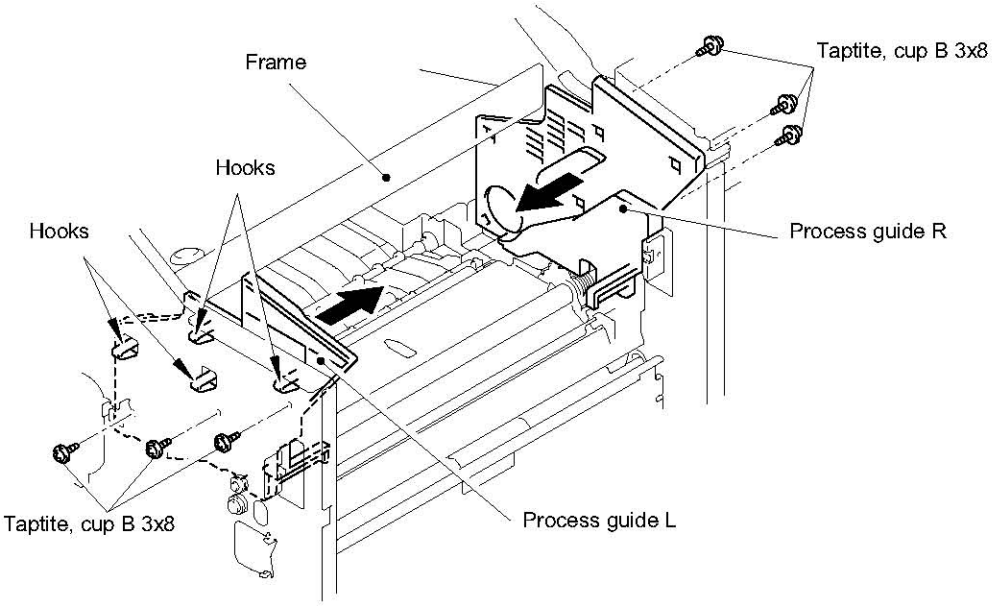


Fig. 4-83

(4) Remove the two retaining rings and the two chute bearings from the both sides of the pressure roller ASSY.

(5) Slide the pressure roller ASSY to the left until the right end of the ASSY is released from the frame and pull it out to the oblique direction.

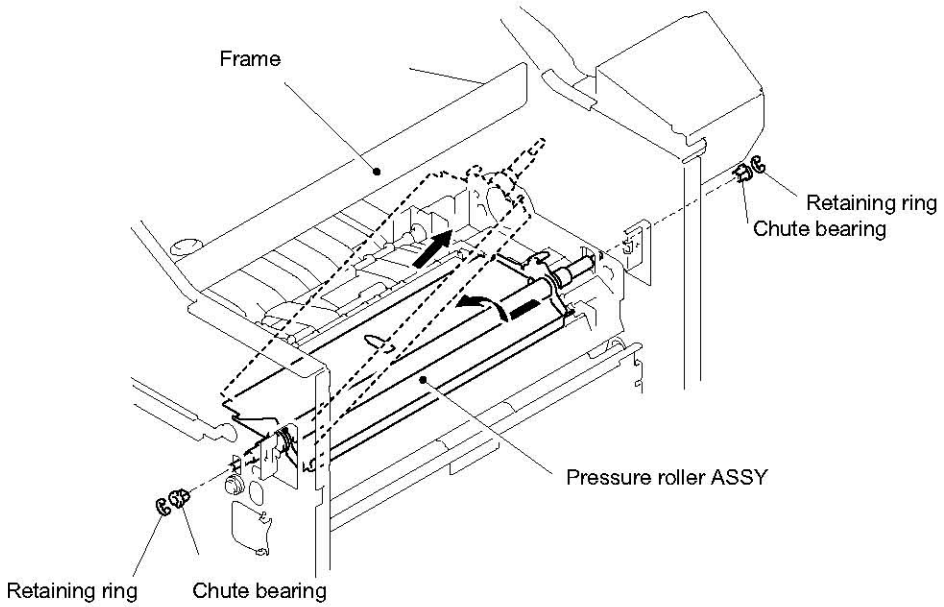


Fig. 4-84

(6) Remove the two retaining rings and the two bearings from the both sides of the regist roller ASSY.

(7) Slide the regist roller ASSY to the right until the left end of the ASSY is released from the frame and pull it out to the oblique direction.

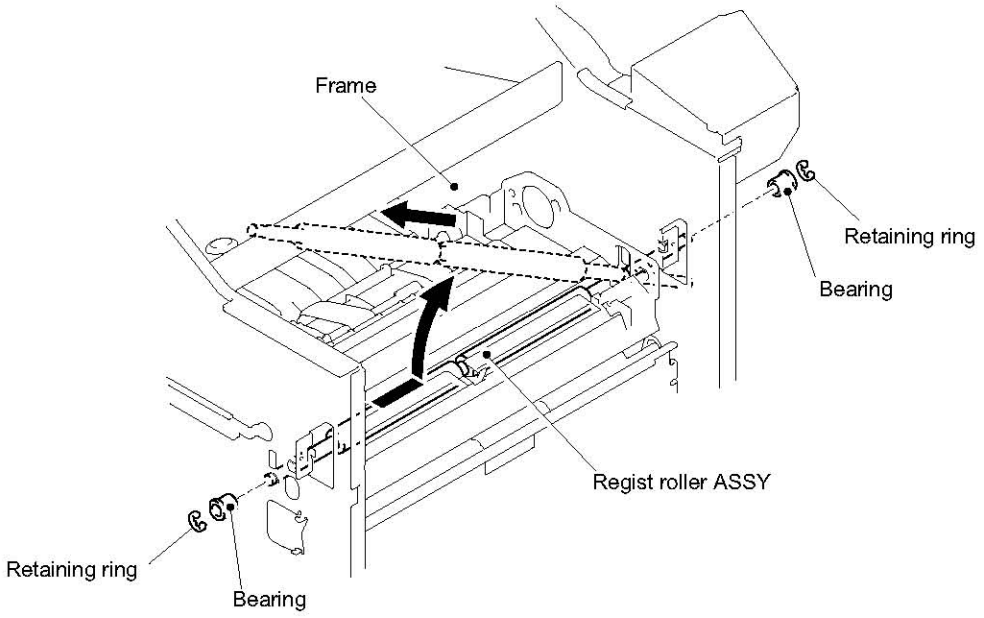


Fig. 4-85

(8) Remove the drum gear bearing L by releasing the two hooks.

(9) Remove the screw to remove the transfer base ASSY by pulling towards you.

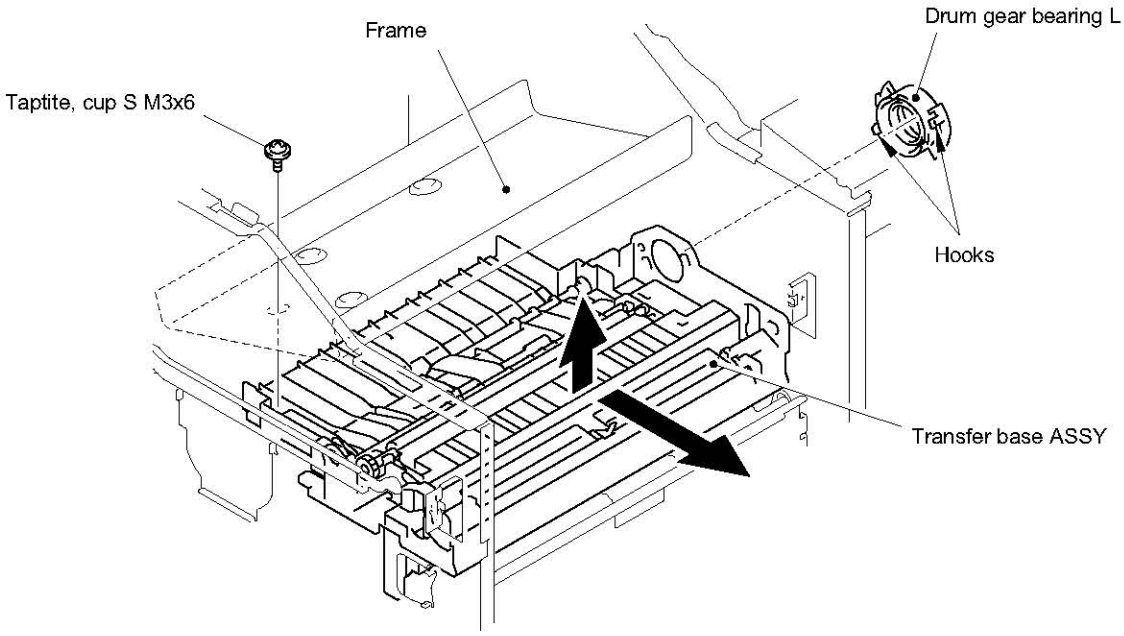


Fig. 4-86

(10) Remove the transfer roller 52 ASSY from the transfer base ASSY.

(11) Turn the transfer base ASSY upside down, and then remove the hook to remove the sensor relay PCB ASSY.

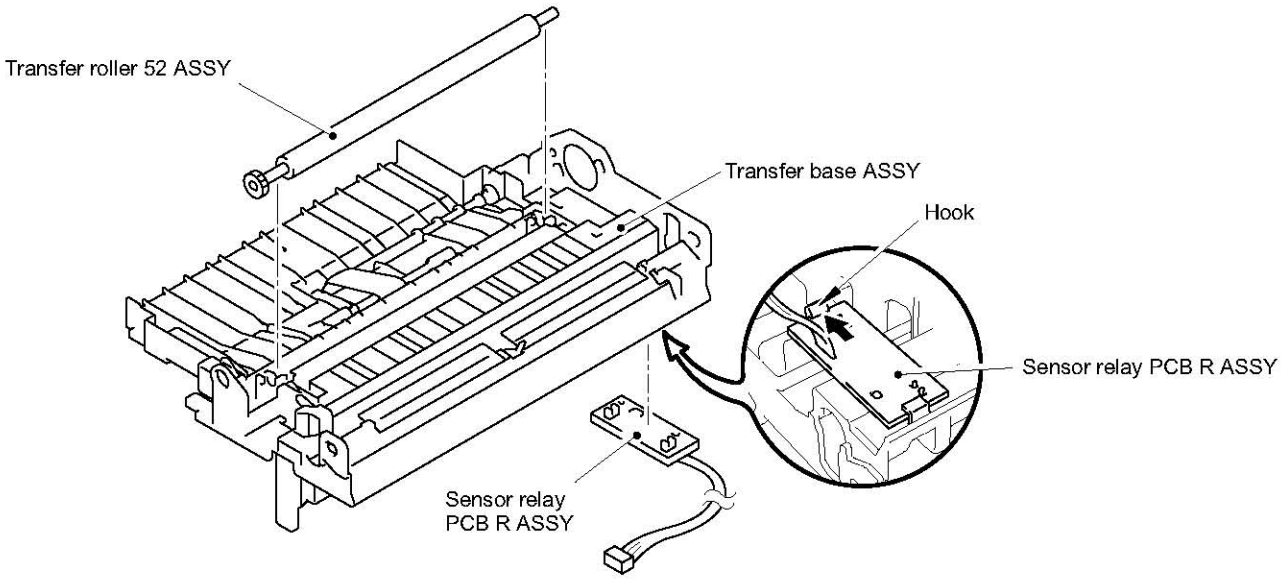


Fig. 4-87

3.25 Paper Feed

(1) Turn the frame upside down, and remove the paper feed roller ASSY 45 from the paper feed roller shaft by releasing the hook.

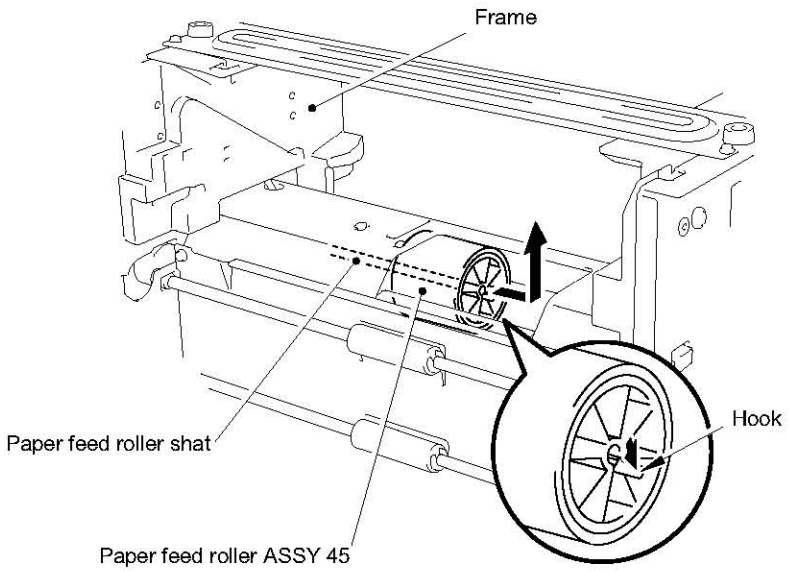


Fig. 4-88

(2) Place the frame the correct way up.

(3) Remove the gear 28 from the paper feed roller ASSY of the upper side of the frame by releasing the hook.

(4) Remove the gear 28 from the paper feed roller ASSY of the lower side of the frame by releasing the hook, and then remove the gear 28 one way and the one way clutch from the ASSY.

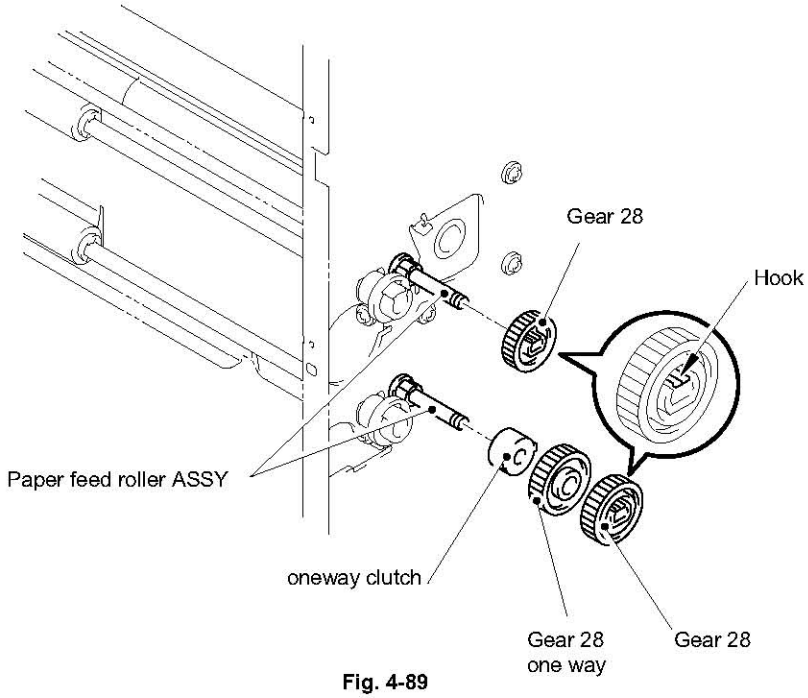


Fig. 4-89

(5) Remove the four springs and the four paper feed roller bearings by releasing the hooks of the bearings from the two paper feed rollers.

(6) Slide one of the paper feed rollers to the other side of the frame until the other end of the roller is released from the frame, and pull it out in the oblique direction. Remove the other roller in the same way.

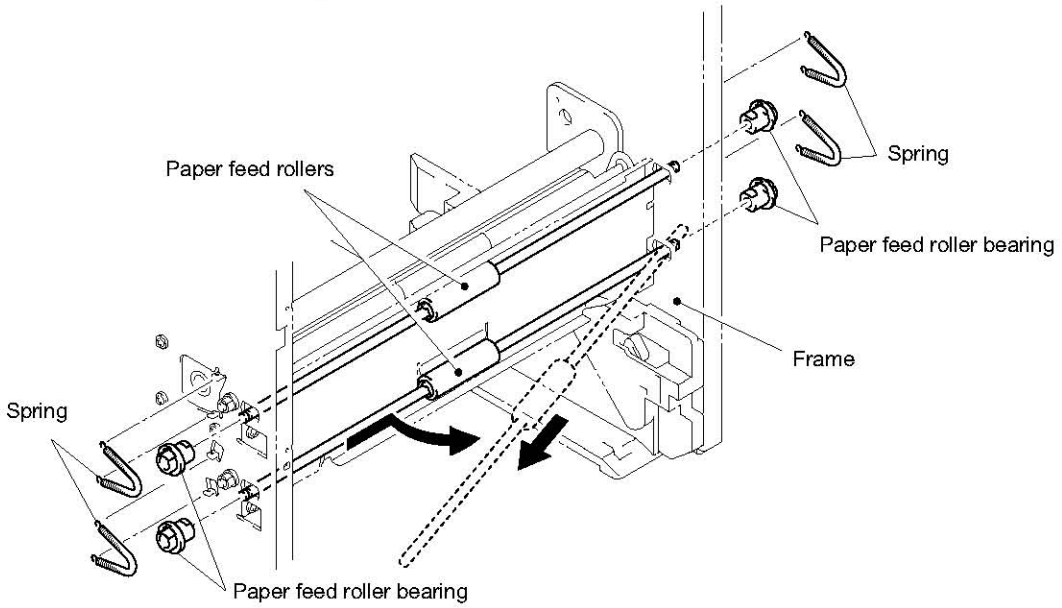


Fig. 4-90

(7) Remove the six cup S M3x6 Taptite screws from the both sides of the frame to remove the stiffener plate ASSY from the frame.

(8) Remove the two bearing from the paper feed roller ASSY of the upper side of the frame by releasing the hooks of the bearings.

(9) Slide the paper feed roller ASSY to the right until the left end of the ASSY is released from the frame, and pull it out in the oblique direction.

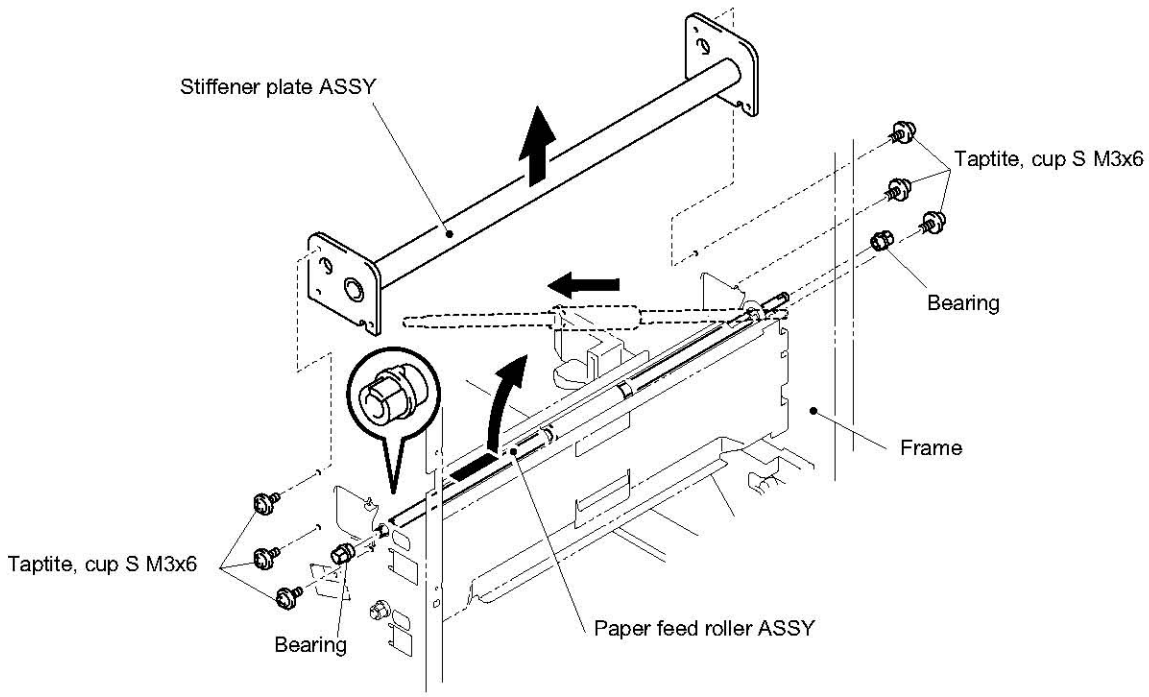


Fig. 4-91

(10) Remove the two cup S M3x6 Taptite screws from the both sides of the paper feed guide to remove the paper feed guide from the frame.

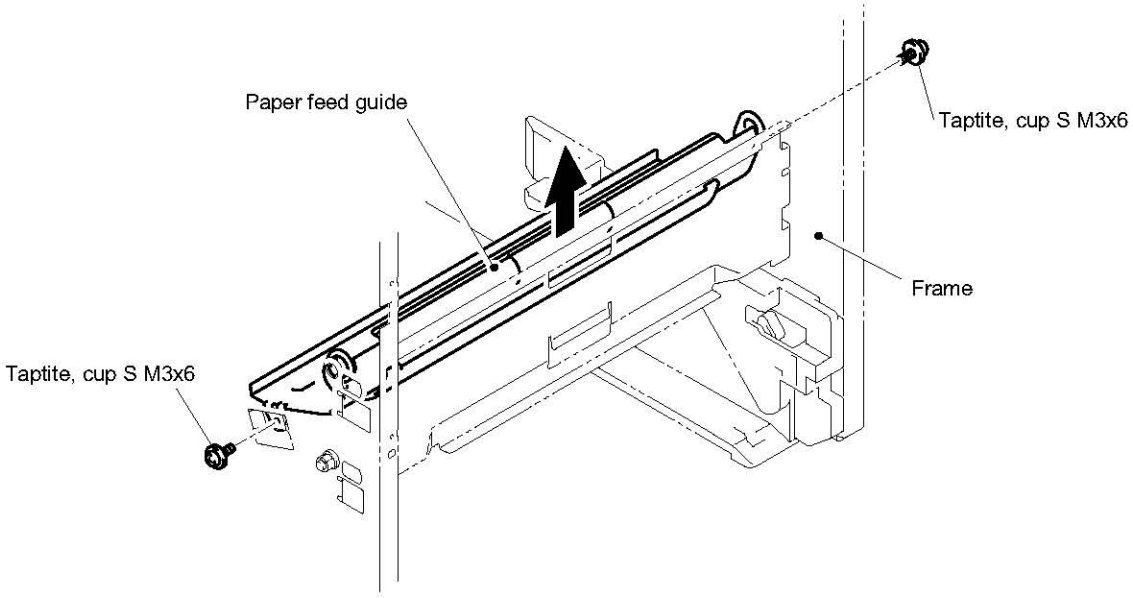


Fig. 4-92

(11) Remove the two bearings from the paper feed roller ASSY of the lower side of the frame by releasing the hooks of the bearings.

(12) Slide the paper feed roller ASSY to the right until the left end of the ASSY is released from the frame , and pull it out in the oblique direction.

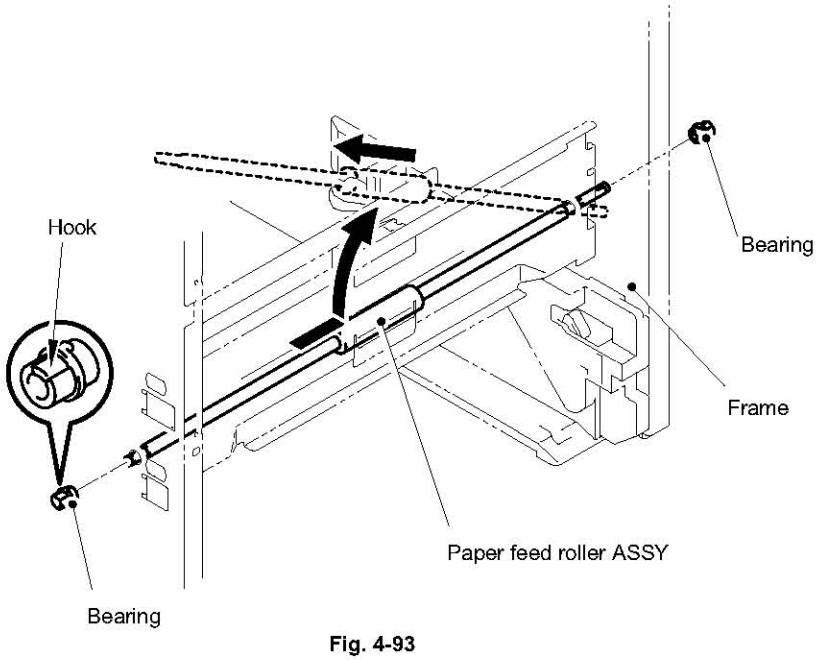


Fig. 4-93

(13) Remove the paper feed gear 28 from the paper feed roller shaft by releasing the hook of the gear.

(14) Remove the bearing from the right end of the paper feed roller shaft by releasing the hook of the bearing.

(15) Remove the paper feed roller shaft from the frame, and then remove the bearing from the left end of the paper feed roller shaft by releasing the hook.

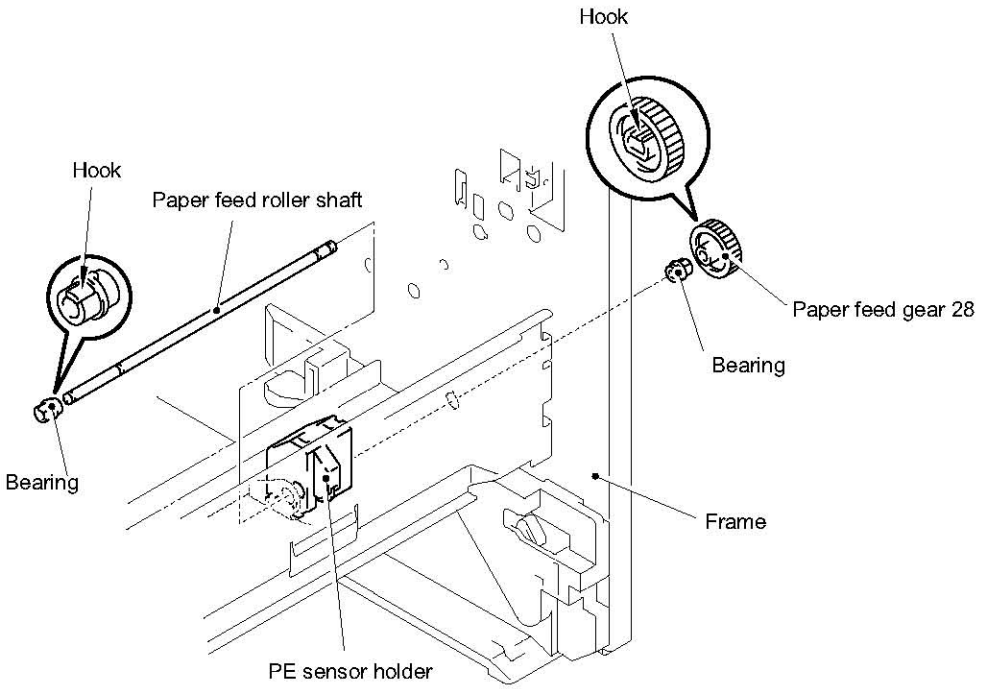


Fig. 4-94

(16) Disconnect the PE sensor connector from the engine PCB.

(17) Remove the PE sensor holder from the frame by releasing the hook.

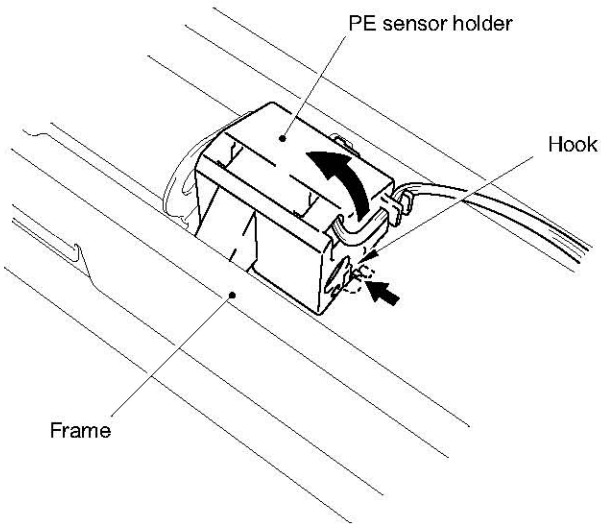


Fig. 4-95

(18) Remove the PE sensor actuator from the holes of the PE sensor holder by pulling the holder outwards in the direction of the arrows shown in the drawing below.

(19) Remove the tray PE sensor PCB ASSY from the PE sensor holder by releasing the two hooks.

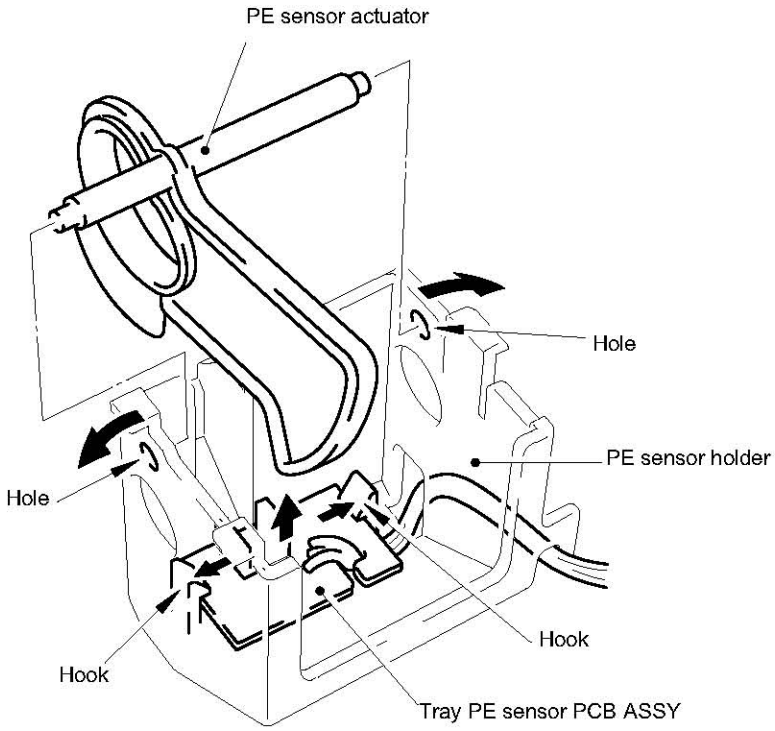


Fig. 4-96

3.26 Eject Sensor PCB ASSY

(1) Disconnect the eject sensor harness from the engine PCB.

(2) Remove the cup S M3x6 Taptite screw to remove the eject sensor PCB ASSY.

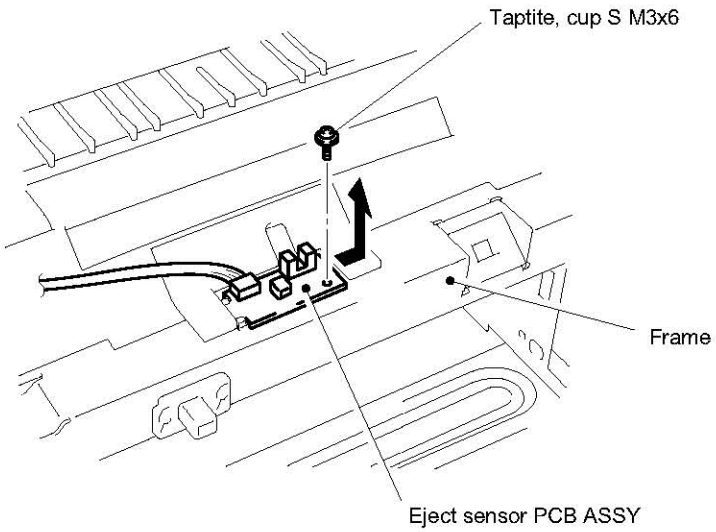


Fig. 4-97

3.27 Size SW PCB

(1) Remove the two cup S M3x6 Taptite screws from the frame on the left side of the printer and remove the tray guide right rear from the frame by inclining it in the direction of the arrow.

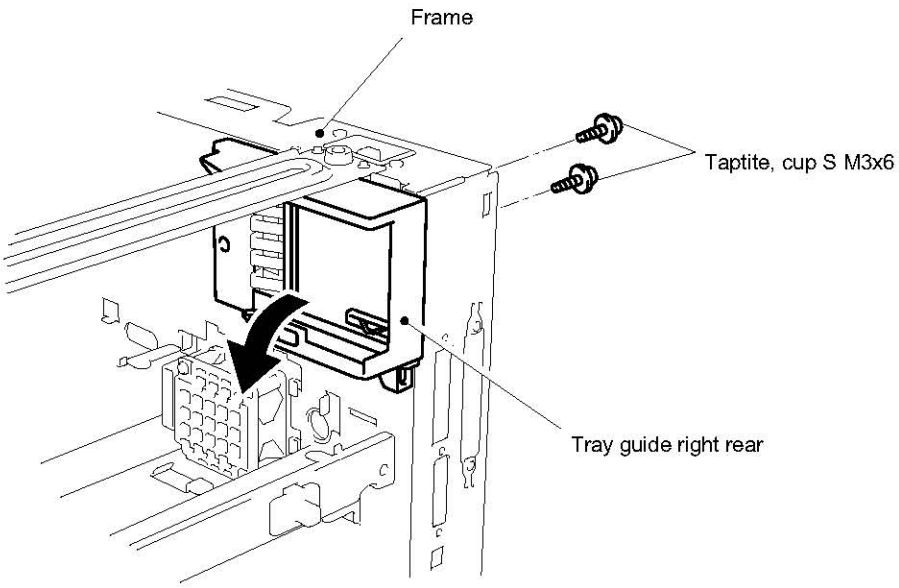


Fig. 4-98

(2) Remove the guide plate spring from the tray guide right rear.

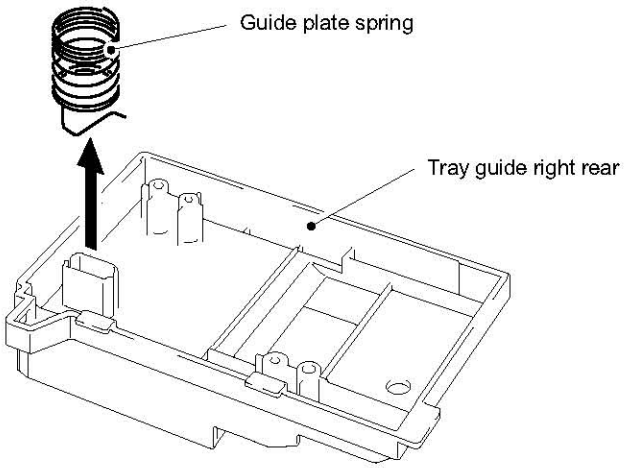


Fig. 4-99

(3) Remove the cup S M3x6 Taptite screw from the outside of the frame, release the size SW PCB from the frame by pulling the size switch spring slightly inwards to the arrow 1 direction and remove the size SW PCB as shown in the figure below.

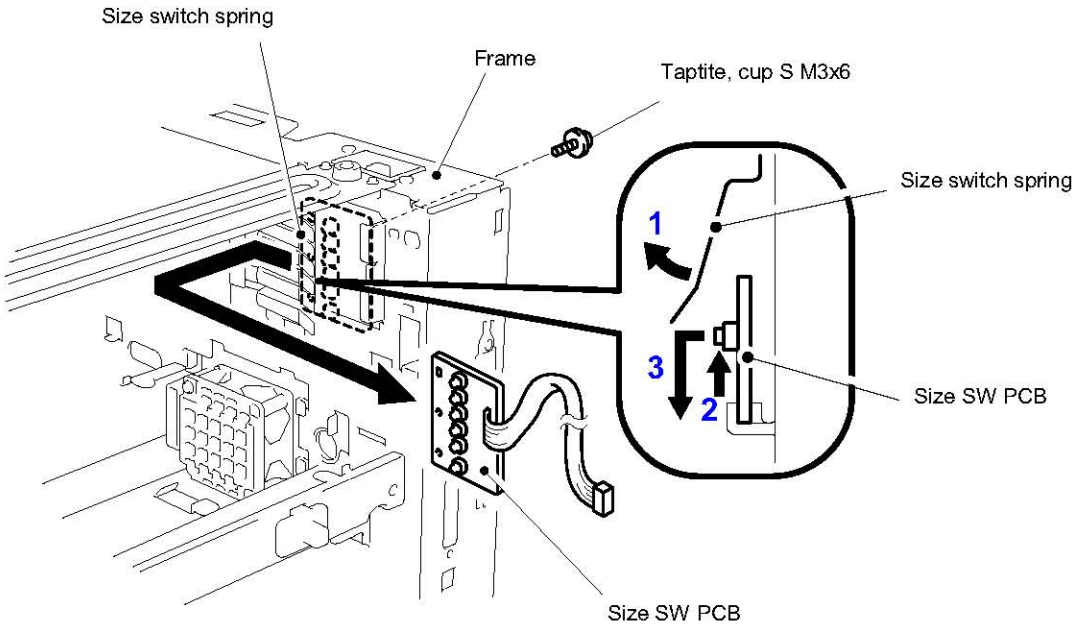


Fig. 4-100

(4) Remove the three cup S M3x4 Taptite screws to remove the size switch spring from the frame.

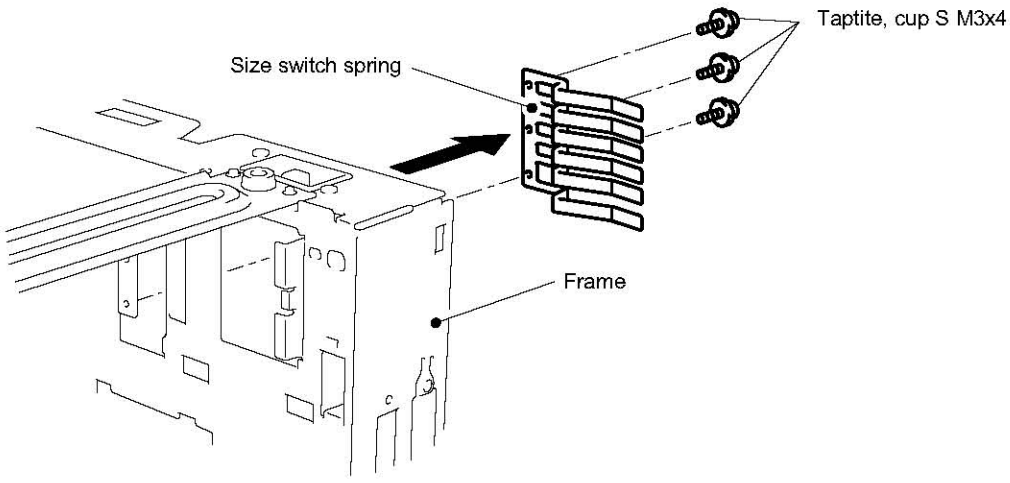


Fig. 4-101

3.28 Fan Motor 60

(1) Remove the two pan B M3x35 Taptite screws to remove the fan guard and fan motor 60 from the frame.

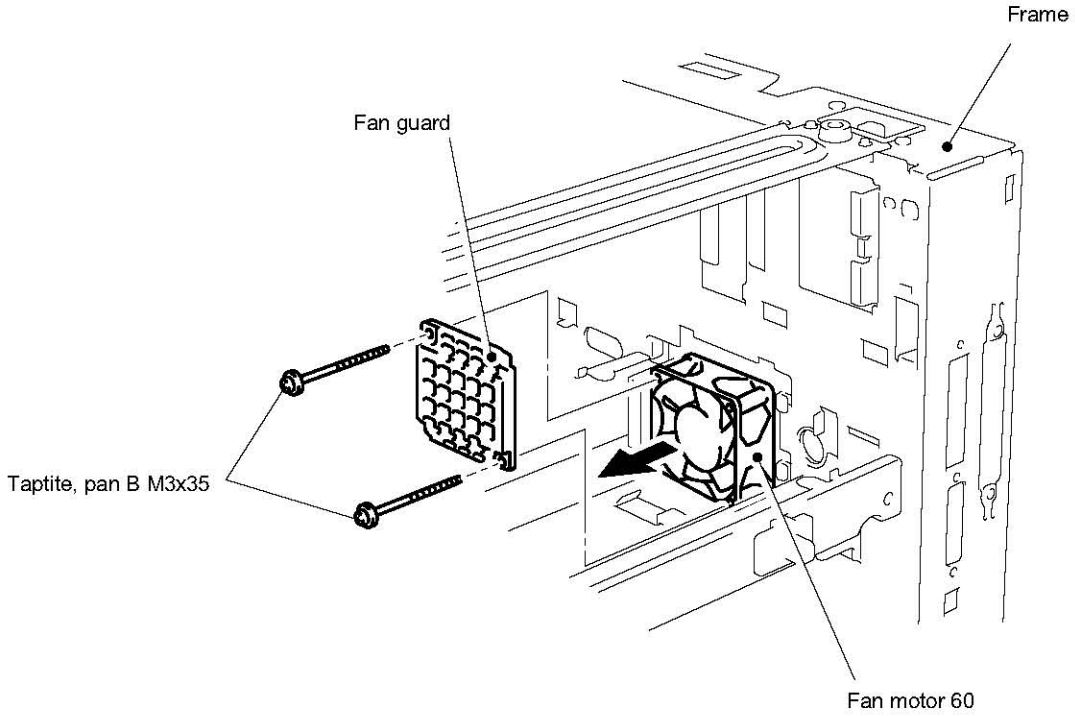


Fig. 4-102

4. PACKING

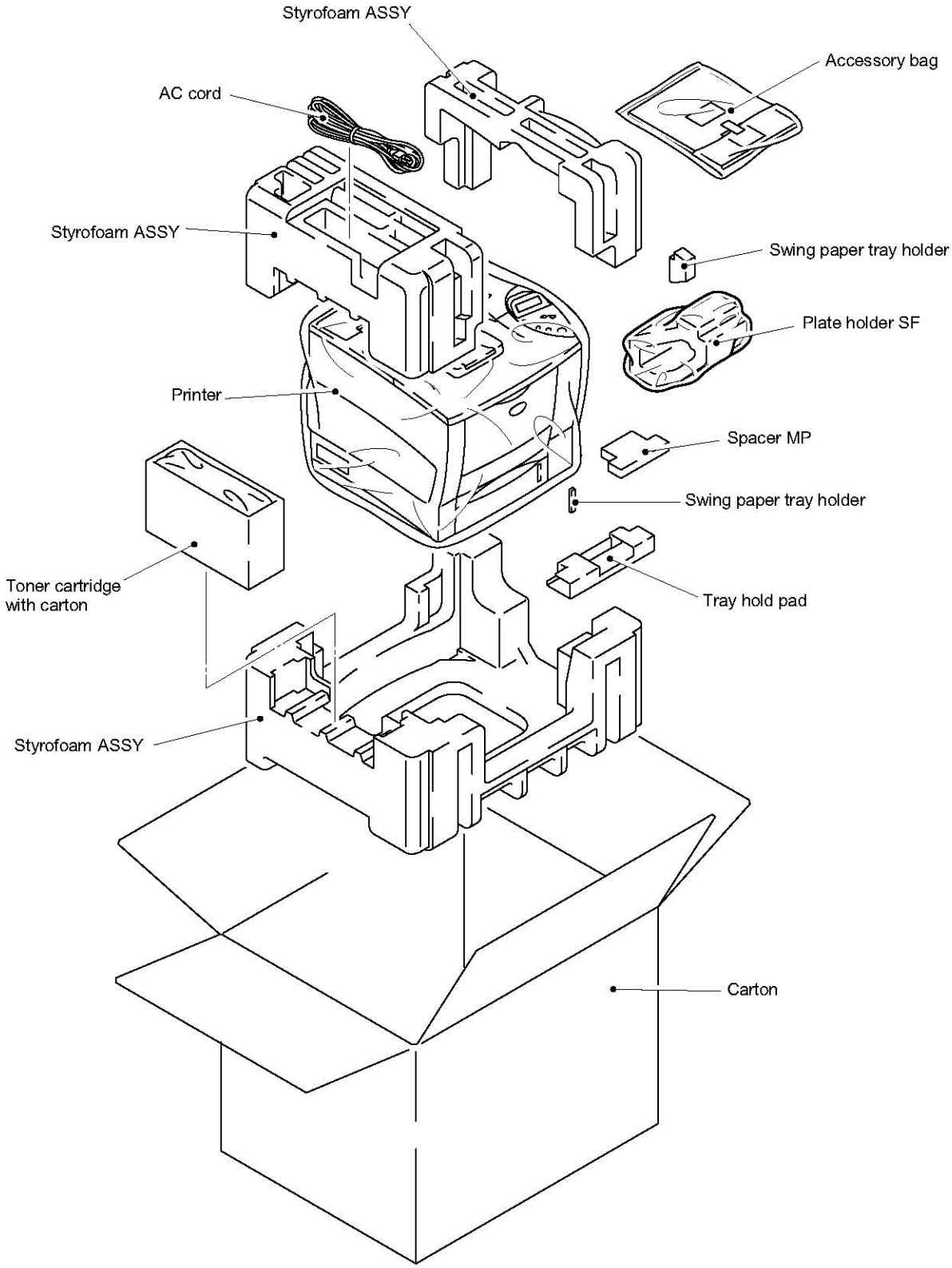


Fig. 4-103

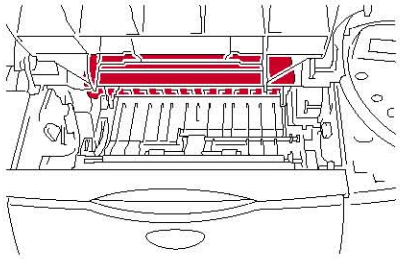
CHAPTER 5 PERIODIC MAINTENANCE

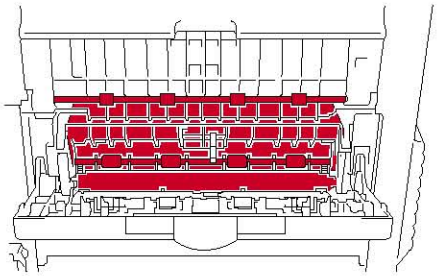
To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

⚠ WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.





1. CONSUMABLE PARTS

The consumable part described in this section is a part which is subject to deterioration or damage and should be replaced at least once during the period of warranty of the product if any print quality problem appears.

1.1 Toner Cartridge

Toner empty:	The "TONER EMPTY" message appears on the LCD display when the printer has run out of toner or the toner is not evenly distributed inside the cartridge.
Life expectancy:	11,000 pages / toner cartridge (When printing A4 or Letter size paper at 5% print coverage)

NOTE:

There are many factors that determine the actual toner life, such as temperature, humidity, type of paper that you use, etc.

<Replacement Procedure>

(1) Open the top cover of the printer.

(2) Remove the toner cartridge.

NOTE:
Never touch or clean the transfer roller, or print quality may deteriorate.

(3) Unpack the new toner cartridge.

(4) Hold the toner cartridge with both hands. Rock it gently several times at a 45° angle. This distributes the toner evenly inside the cartridge.

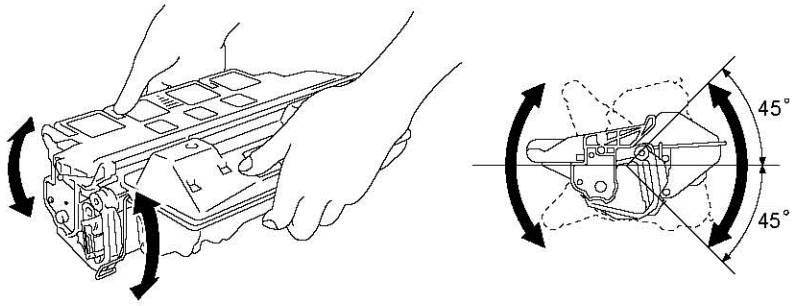


Fig. 5-1

(5) Bend the tab up and down several times until it is detached from the toner cartridge.

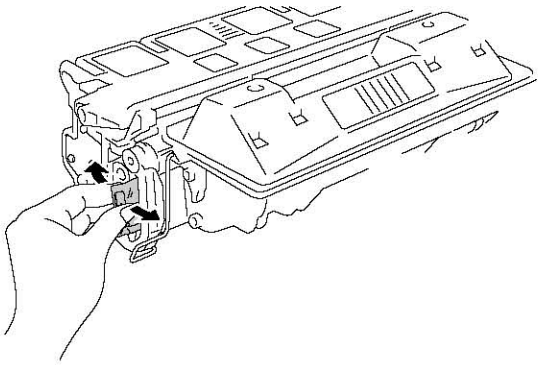


Fig. 5-2

(6) Hold the tab firmly and pull it until the sealing tape comes out all the way.

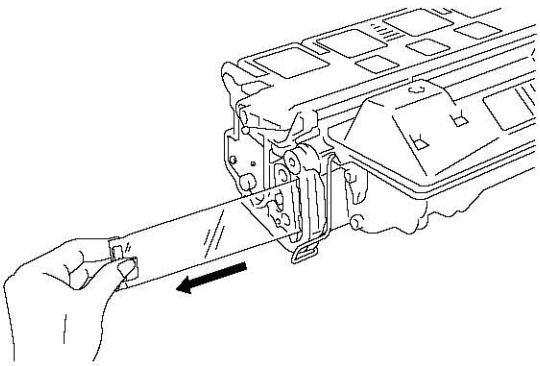


Fig. 5-3

(7) Insert the new toner cartridge firmly into the printer.

Fig. 5-4

(8) Close the top cover of the printer.

CAUTION:

- *Handle the toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.*
- *Be sure to seal the toner cartridge tightly so that toner powder does not spill out of the cartridge.*
- *This toner cartridge is a single-component cartridge. The micro fine toner does not become magnetized.*
- *Do not stand the toner cartridge on its end or turn it upside down.*
- *Dispose of the used toner cartridge in accordance with local plastic waste regulations.*
- *Only unpack a toner cartridge immediately before you need to install it into the printer. If a toner cartridge is left unpacked for a long period of time, the toner life is shortened*
- *If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.*
- *Do not open the drum shutter because it might cause serious damage, resulting in poor print quality.*
- *Use a Brother genuine toner cartridge, which is specially formulated to ensure top print quality.*
- *Printing with a 3rd party toner or toner cartridge may reduce not only the printing quality but also the quality and life of the printer itself. It may also cause serious damage to the performance and life of a genuine Brother drum unit. Warranty cover is not applied to problems caused by the use of 3rd party toner or toner cartridges.*
- *Install the toner cartridge immediately after you remove the protective cover. Do not touch the development roller and photosensitive drum colored red as shown below;*

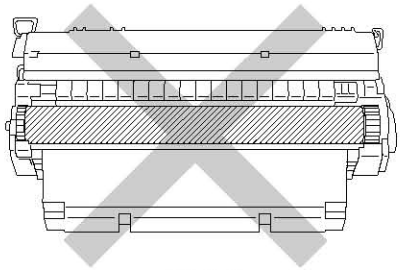


Fig. 5-5

NOTE:

It is recommended to clean the printer when you replace the toner cartridge. Refer to subsection 3. 'PERIODICAL CLEANING' in this chapter.

2. 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.)

The periodical replacement parts listed below should be replaced at the service center referring to the service life. For the procedures to replace these parts, refer to CHAPTER 4 "DISASSEMBLY AND RE-ASSEMBLY".

Parts Name	Part No.	Qty	Service life (Number of prints)	Replacement Procedure
Fixing Unit (115V)	LJ0959001	1	200,000 pages	See 3.10 'Fixing Unit' in CHAPTER 4.
Fixing Unit (230V)	LJ0963001	1	200,000 pages	
Cleaner Roller ASSY	LJ0773001	1	100,000 pages	
Paper Feeding Kit (Separation Pad ASSY and Paper Feed Roller ASSY)	LJ0977001	1	100,000 pages	See 3.3 'Paper Cassette' in CHAPTER 4 for Separation Pad ASSY and 3.25 'Paper Feed' in CHAPTER 4 for Paper Feed Roller ASSY.
Transfer Roller 52 ASSY	LJ0893001	1	200,000 pages	See 3.24 'Transfer Base ASSY' in CHAPTER 4.
Laser Unit (Scanner Unit)	LJ0935001	1	200,000 pages	See 3.12 'Laser Unit' in CHAPTER 4.

NOTE:
The above table shows only estimated values. They are subject to change without prior notice.

3. PERIODICAL CLEANING

Clean the following parts periodically to avoid any printer problems or print image defects.

> ***CAUTION:***
>
> - *While printer exterior and interior cleaning basically can be implemented by the end user, the electrical terminals inside the printer and on the drum unit should be cleaned by a service technician. Instruct the users not to touch those terminals.*
> - *Clean the printer exterior and interior periodically with a dry soft cloth. When replacing the toner cartridge, be sure to clean the printer interior. If printed pages are stained with toner, clean the printer interior with a dry soft cloth.*

3.1 Cleaning the Printer Exterior

Clean the printer exterior to keep the printer clean.

1) Turn off the power switch and unplug the power cord.
2) Pull the paper cassette out of the printer, and the open the multi-purpose tray.
3) Wipe the printer body with a soft cloth to remove dust.

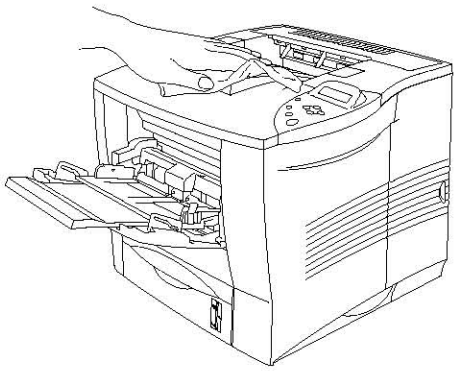


Fig. 5-6

4) If paper and foreign objects are stuck in the paper cassette, remove them.

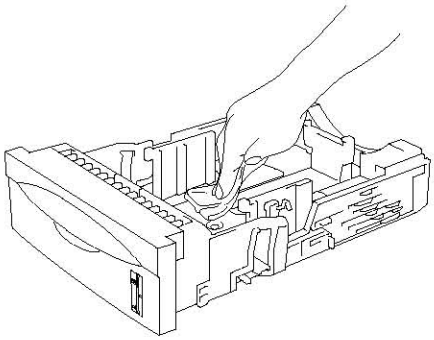


Fig. 5-7

5) Install the paper cassette into the printer, and then close the multi purpose tray.
6) Plug the power cord into the AC outlet, and then turn on the printer.

3.2 Cleaning the Printer Interior

When replacing the toner cartridge with a new one, be sure to clean the scanner window.

1) Turn off the power switch and unplug the power cord.
2) Remove the toner cartridge.
3) Wipe off toner and paper dust from the metal plate in the printer with a dry, soft cloth.

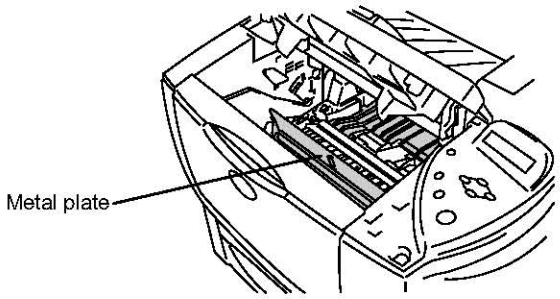


Fig. 5-8

4) Lift up the metal plate inside the printer. Wipe off toner and paper dust from the back of the metal plate and the surface underneath it with a dry, soft cloth.

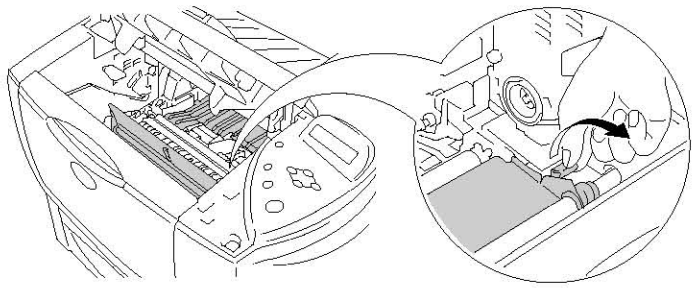


Fig. 5-9

5) Lower the metal plate.
6) Wipe the scanner window with a dry, soft cloth.

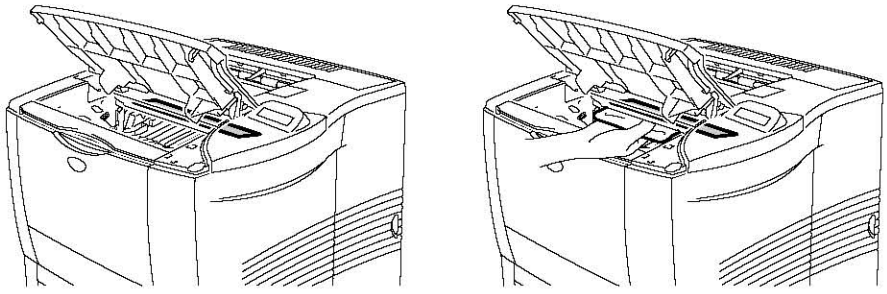


Fig. 5-10

7) Install the toner cartridge into the printer.
8) Close the top cover, plug the power cord into the AC inlet, and then turn on the printer.

CAUTION:

- *Do not touch the scanner window with your fingers.*
- *Do not wipe the scanner window with cleaning alcohol (isopropyl).*
- *Do not touch or clean the transfer roller, or print quality may be adversely affected.*
- *Be careful not to inhale the toner.*

4. MTBF / MTTR

The meantime between failure (MTBF) and the meantime to repair (MTTR) for this printer are as follows:-

MTBF: Up to 4,000 hours

MTTR: Average 30 minutes

CHAPTER 6 TROUBLESHOOTING

1. INTRODUCTION

1.1 Initial Check

(1) Operating environment

Check if:

- The source voltage stays within ±10% from the rated voltage shown on the rating plate.
- The printer is installed on a solid, level surface.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer is not located in a dusty place.
- The printer is not exposed to ammonia fumes or other harmful gases.
- The printer is not located in a hot or humid area (such as near water or a humidifier).
- The printer is not exposed to direct sunlight.
- The room is well-ventilated.
- The printer is not placed where the ventilation hole of the printer is blocked.

(2) Print paper

Check if:

- A recommended type of print paper is being used. [If the paper is too thick or too thin, or tends to curl, paper jams or paper feed problems may occur, or printed images may be blurred.]
- The print paper is damp. [If so, use fresh paper, and check whether the print quality improves or not.]
- The print paper is short-grained paper or acid paper. [If so, print quality problems may occur.]

For further information on paper, refer to subsection 3.6 'Paper' in CHAPTER 1.

(3) Consumable parts

Check if:

- The message 'TONER EMPTY" appears on the LCD display of the printer control panel when a toner cartridge is installed in the printer. [If the message appears, replace the cartridge with a new one.]

For further information on consumable parts, refer to subsection 1 'CONSUMABLE PARTS' in CHAPTER 5.

(4) Others

Condensation:

When the printer is moved from a cold room into a warm room in cold weather, condensation may occur inside the printer, causing various problems as listed below:

- Condensation on the optical surfaces such as the scanning mirror, lenses, the reflection mirror and the protection glass may cause the print image to be light.
- If the photosensitive drum is cold, the electrical resistance of the photosensitive layer is increased, making it impossible to obtain the correct contrast when printing.
- Condensation on the corona unit may cause corona charge leakage.
- Condensation on the hopper plate and separation pad may cause paper feed troubles.

If condensation has occurred, print several pages or leave the printer for 2 hours to allow it to reach room temperature.

If the drum unit is unpacked soon after it is moved from a cold room to a warm room, condensation may occur inside the unit, which may cause incorrect images. Instruct the user to allow the unit to come to room temperature before unpacking it. This will take one or two hours.

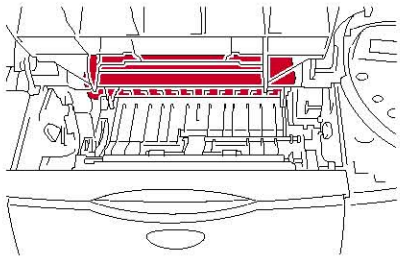
1.2 Warnings for Maintenance Work

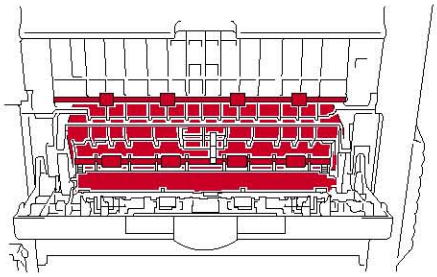
To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.



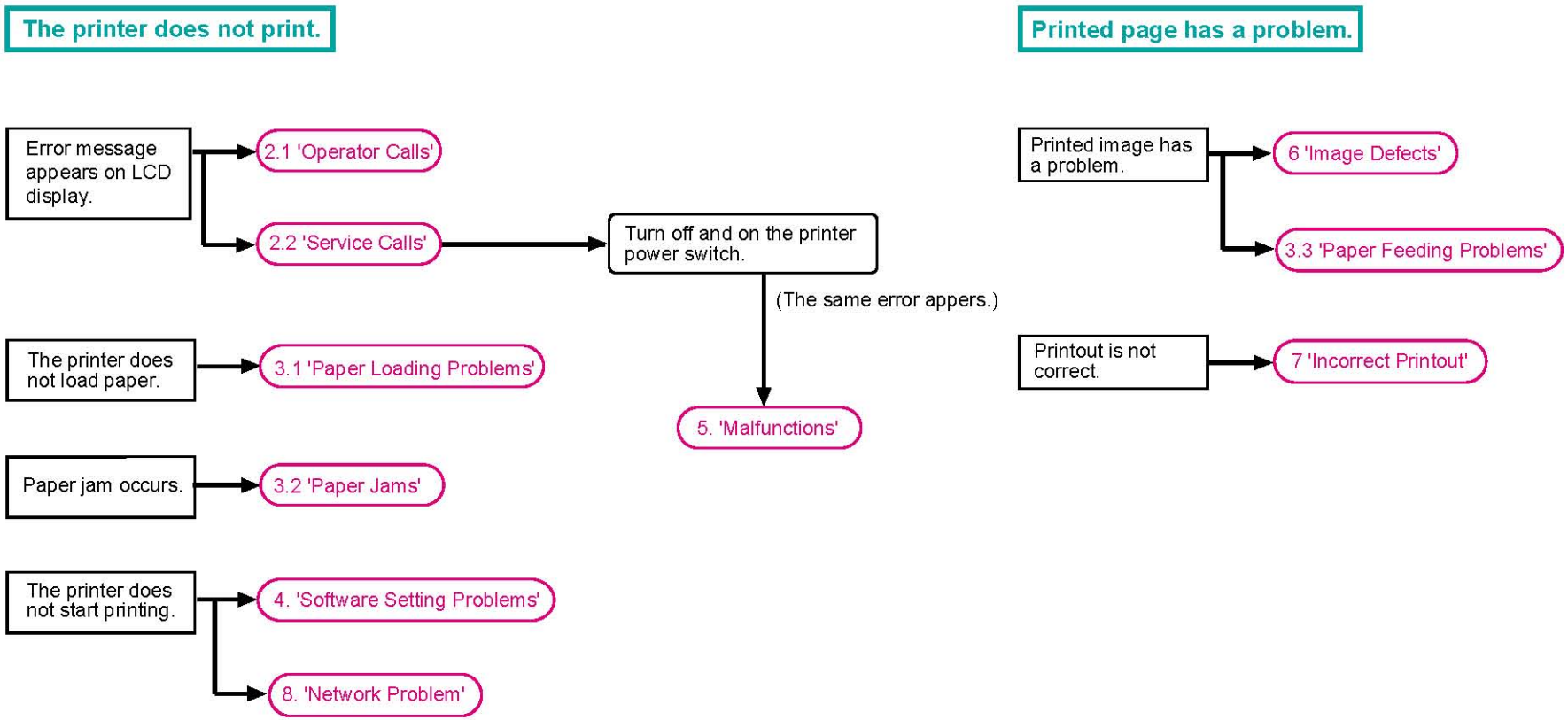


1.3 Identify the Problem

If you encounter any printer error or problem, first identify it referring to the chart below, and then see the appropriate section.

NOTE:

The following troubleshooting sections contain both the actions, which users should take or check and the ones which service technicians should perform.



2. OPERATOR CALLS & SERVICE CALLS

2.1 Operator Call Messages

An 'operator call' which the printer indicates on the LCD display is user recoverable. Identify the error from the table below and take the corrective action described for each indication to correct it. The printer automatically recovers from most errors, but it may also be necessary to reset the printer with the control panel button.

Error Message	Remedy
TONER EMPTY	Replace the toner cartridge with a new one. See subsection 1.1 'Toner cartridge' in CHAPTER 5.
NO TONER	Install the toner cartridge.
NO PAPER XXX	Load paper into the indicated tray.
NO TRAY XXX	Install the paper cassette into the indicated tray.
COVER OPEN	Close the top cover of the printer. Close the duplex cover. Close the rear cover of the mailbox.
FACE UP OPEN	Close the face up output tray.
JAM XXX	Remove the jammed paper from the indicated area. See subsection 3.2 'Paper Jams' in this chapter.
STACKER FULL	Remove the excess paper from the output tray.
SIZE MISMATCH	Load the paper that is specified in the printer driver in the paper tray or multi-purpose tray, and then press **Go** switch.
TOO MANY TRAYS	Maximum number of lower trays in three. Remove additional trays.
MEDIA TYPE ERROR	Specify the correct media type: XX
MANUAL FEED	Size of paper in the multi-purpose tray is wrong. Load the correct size of paper in the multi-purpose tray, or while the printer is in Stop mode, press the **Go** switch.
SIZE ERROR XXX	Set the correct paper that you want to use into the indicated tray, or load the same size paper that you selected in the current driver setting. Refer to subsection 3.6 'Paper' in CHAPTER 1.
NO TRAY ID XXX	Install the specified ID tray.
SIZE ERROR DX	Set the correct paper that you want to use, or load the same size paper that you selected in the current driver setting. Refer to subsection 3.6 'Paper' in CHAPTER 1.
SIZE ERROR MX	Set the correct paper that you want to use, or load the same size paper that you selected in the current driver setting. Refer to subsection 3.6 'Paper' in CHAPTER 1.
NO DX UNIT	Install the duplex unit correctly.
EX LEVER ERROR	Set the duplex lever to the correct position.
NO MX UNIT	Change the properties or install the mailbox unit correctly.

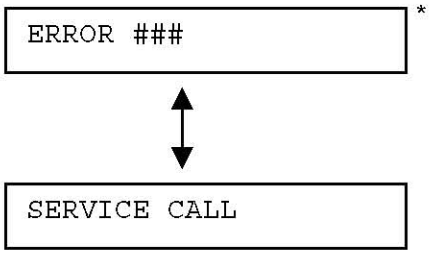
Error Message	Remedy
DIMM ERROR	Install the DIMM correctly. Turn off the printer. Wait a few seconds, then turn it on again. If this error message appears again, replace it with a new card.
CARD ERROR	Make sure of the following points: • The cable is connected correctly. • The card is installed correctly. • The installed card is formatted correctly. Turn off the printer. Wait a few seconds, then turn it on again. If this error message appears again, replace it with a new card.
HDD ERROR	Make sure of the following points: • The cable is connected correctly. • The card is installed correctly. • The installed card is formatted correctly. Turn off the printer. Wait a few seconds, then turn it on again. If this error message appears again, replace it with a new HDD.
CARD REMOVAL	Turn off the printer, then turn it on again. *NOTE:* *Do not remove the CompactFlash card while the printer power is on.*
LINE ERROR	Check the serial interface settings. (baud rate, code type, parity and handshake protocols).
BUFFER ERROR	Check the Interface settings.
STORAGE FULL	Delete unnecessary macros or fonts, or use a new card or HDD.
DOWNLOAD FULL	Add optional memory.
FONT FULL	Add optional memory.
MEMORY FULL	Add optional memory.
IGNORE DATA	Postscript error has occurred. Add optional memory.
ACCESSORY ERROR	Check the connector of the optional unit is connected correctly.

Maintenance Message	Remedy
TONER EMPTY	Replace the new toner cartridge referring to subsection1.1 'Toner Cartridge' in CHAPTER 5.
REPLACE PF KIT1	Replace the paper feeding kit (separation pad ASSY / paper feed roller ASSY 45). Refer to subsection 3.3 'Paper Cassette' and 3.25 'Paper Feed' in CHAPTER 4.
REPLACE PF KIT2	
REPLACE PF KIT3	
REPLACE PF KIT4	
REPLACE FUSER	Replace the fixing unit. Refer to subsection 3.10 'Fixing Unit" in CHAPTER 4.
REPLACE LASER	Replace the laser unit. Refer to subsection 3.12 'Laser Unit' in CHAPTER 4.
REPLACE TRANSFER	Replace the transfer roller 52 ASSY. Refer to subsection 3.24 'Transfer Base ASSY' in CHAPTER 4.

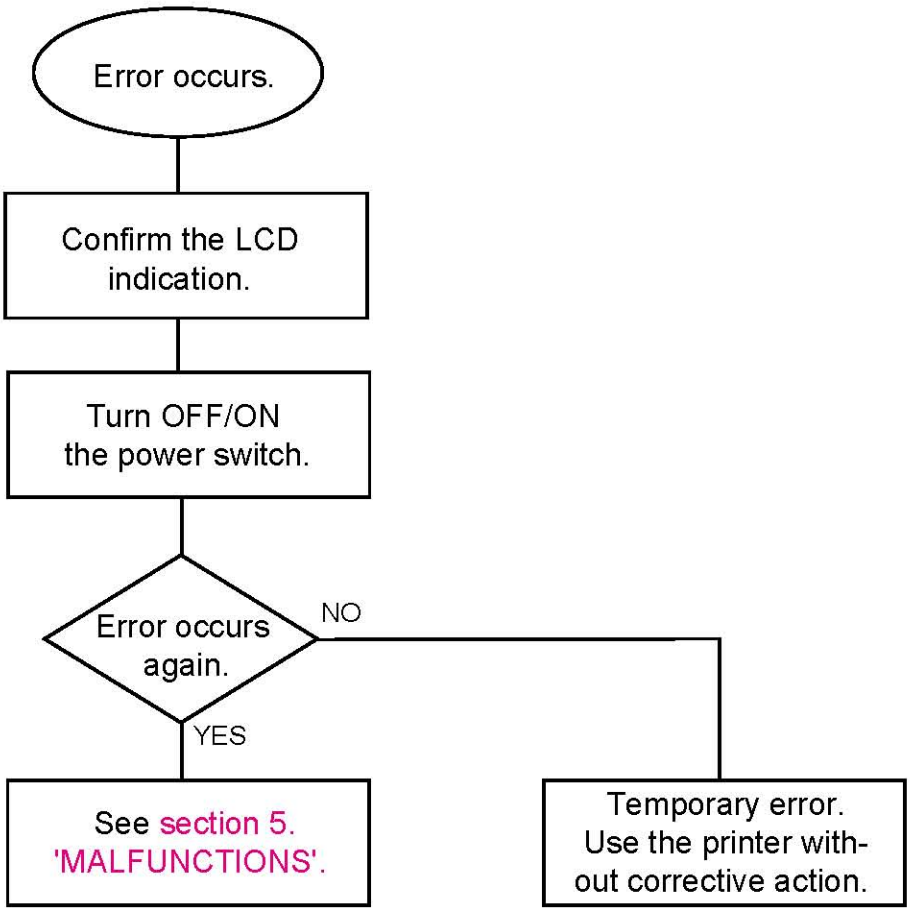
2.2 Service Call Messages

When each of the following messages appears alternately on the LCD, a user unrecoverable error may have occurred.

Instruct the user to turn off the power switch, wait a few seconds and then turn it on again. If the error is not cleared and the same service call appears, identify the error from the table on the next page and take the corrective action described for each indication to correct it.



* ### indicates the error codes.



Holding down the – switch and the **Set** switch at the same time while the error messages display will cause the type of the error appears on the LCD display.

Error Messages	Meaning	Remedy
ERROR S01		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S02	Instruction access error	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S03	Memory address not aligned	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S04	Instruction bus error	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S05	Data bus error	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S06	Privileged instruction	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S07		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S08	Illegal instruction	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S09	No fpu	Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S10		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S11		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S12		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.
ERROR S13		Turn off the printer. Wait a few seconds, then turn it on again. If still remains, replace the main PCB.

Error Messages	Meaning	Remedy
ERROR E41	Error in communication with the engine controller	Turn off the printer. Wait a few seconds, then turn it on again. Refer to M-12 'Engine interface error' in this chapter.
ERROR E49	Malfunction of fuser detected by hard wear.	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-9 'Fuser failure' in this chapter.
ERROR E50	Malfunction of fuser detected	Wait approximately 10 minutes while the printer power is turned on until the "READY" message appears on the LCD display. Refer to M-9 'Fuser failure' in this chapter.
ERROR E51	Malfunction of laser beam detector	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-8 'Scanner failure' in this chapter.
ERROR E52	Malfunction of laser unit motor	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-8 'Scanner failure' in this chapter.
ERROR E53	Malfunction of fan motor in the duplex unit	Turn off the printer. Wait a few seconds, and then turn it on again.
ERROR E54	Malfunction of main motor	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-4 'No paper supplied' in this chapter.
ERROR E55	Malfunction of high-voltage power supply Malfunction of transfer roller ASSY	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-5 'Insufficient output from high-voltage power supply unit' in this chapter.
ERROR H60	Bus error	Turn off the printer. Wait a few seconds, and then turn it on again.
ERROR H61	Program ROM checksum error	Turn off the printer. Wait a few seconds, and then turn it on again.
ERROR H63	D-RAM error	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-10 'ROM error / D-RAM error / NV-RAM error' in this chapter.
ERROR H66	NV-RAM writing error	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-10 'ROM error / D-RAM error / NV-RAM error' in this chapter.
ERROR H67	NV-RAM reading error	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-10 'ROM error / D-RAM error / NV-RAM error' in this chapter.
ERROR H68	NV-RAM bus error	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-10 'ROM error / D-RAM error / NV-RAM error' in this chapter.

Error Messages	Meaning	Remedy
ERROR H73	Flash reading error	Turn off the printer. Wait a few seconds, and then turn it on again.
ERROR H74	Flash writing error	Turn off the printer. Wait a few seconds, and then turn it on again.
ERROR H38	PCI bus error	Turn off the printer. Wait a few seconds, and then turn it on again. Refer to M-13 'PCI BUS error' is chapter.
ERROR H39	BR-NET typing error	Turn off the printer. Wait a few seconds, and then turn it on again.

3. PAPER PROBLEMS

When any paper related problem occurs, ensure that the paper used meets the recommended paper specifications referring to subsection 3.6 'Paper' in CHAPTER 1.

3.1 Paper Loading Problems

Problem	Remedy
The printer does not load paper.	(1) Check that paper in the paper cassette is straight. If it is curled, straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back into the paper cassette. (2) Reduce the amount of paper in the cassette. (3) Check that manual feed mode is not selected in the printer driver. (4) Check that the pickup roller or separation pad needs to be replaced.
The printer does not load paper from the multi-purpose tray.	(1) Fan the paper, and re-install the paper firmly. (2) Make sure the manual feed mode is selected in the printer driver.
The printer does not load envelopes.	The printer can load envelopes from the multi-purpose tray. The application software must be set up to print on the envelope size being used. This is usually done in the page setup or document setup menu of the software. See the software application manual.
A paper jam has occurred.	(1) Clear the jammed paper referring to 'Paper jams and how to clear them.' (2) Check that the pickup roller or separation pad needs to be replaced.
The printer feeds multiple pages.	Check that the pickup roller or separation pad needs to be replaced.
The printer does not print to the face down output tray.	Close the face up output tray.
The printed pages are curled, so the face down output tray cannot hold the prescribed number of sheets.	(1) Turn paper in the paper cassette over. (2) Check that printer driver setting in Media Type into thicker setting level than current setting.
The printer does not print.	(1) Check that the cable is connected to the printer. (2) Check that the appropriate printer driver is selected.

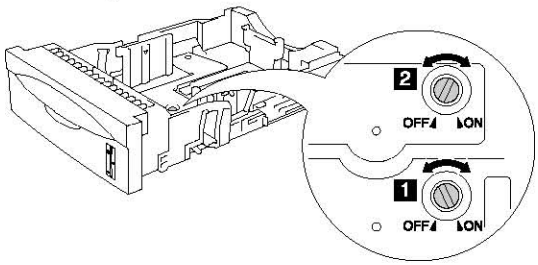
3.2 Paper Jams

- If paper jams in the printer, it will stop printing and display the following messages on the LCD display.

JAM TRAYXXXX	➢ *Paper jam in the upper paper tray (Tray1) or lower tray (Tray 2/3/4)*
JAM MP TRAY	➢ *Paper jam in the multi-purpose tray*
JAM INSIDE	➢ *Paper jam inside the printer*
JAM REAR	➢ *Paper jam at the paper exit* ➢ *Paper jam in the face up output tray*
JAM DUPLEX	➢ *Paper jam in the duplex unit*
JAM MAILBOX	➢ *Paper jam in the mailbox unit*

- The shaded areas in Fig. 6-1 show the location of jammed paper.
- Check the jam location and follow the instructions to remove the jammed paper. Refer to subsection 3.2.1 'Clearing jammed paper' in this chapter. If the printer does not resume printing even after clearing jammed paper, follow further instructions as shown in subsection 3.2.1 'Countermeasures for paper jams'.

NOTE:
If the paper is misfeeding or multiple pages frequently feed at once when printing on small-sized or thick paper, it is recommended to change the adjustment levers in the paper cassette using a coin by pushing down the plate of the cassette as follows:



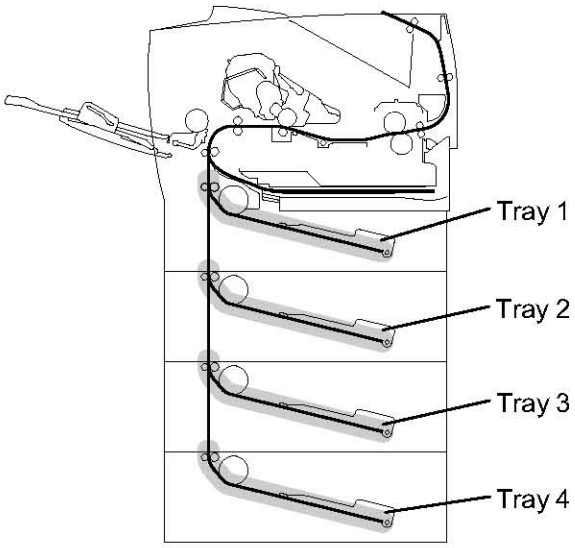
The switches in this illustration are shown in the default setting position.

A6	Switch 1: OFF Switch 2: OFF
A4 100 g/m^2 (27 lbs) Letter 105 g/m^2 (28 lbs) Legal 105 g/m^2 (28 lbs)	Switch 1: ON Switch 2: ON
Executive, A5, B6	Switch 1: OFF Switch 2: ON

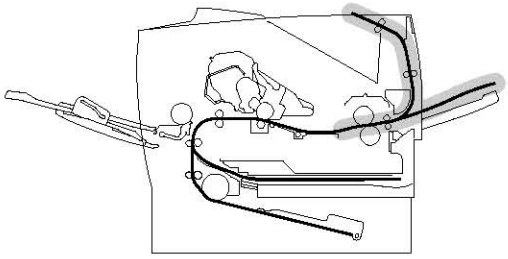
Do not use the following paper:

- *Bent paper*
- *Moist paper*
- *Paper that does not meet specifications*

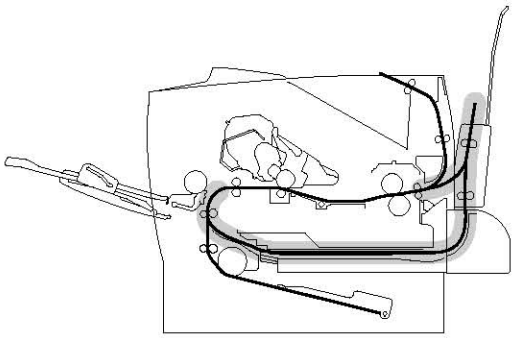
JAM TRAYXXXX



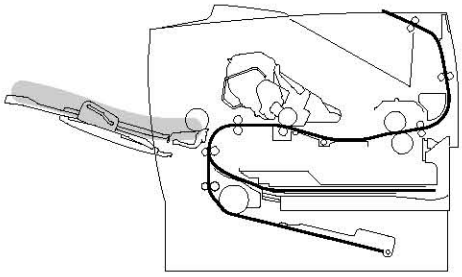
JAM REAR



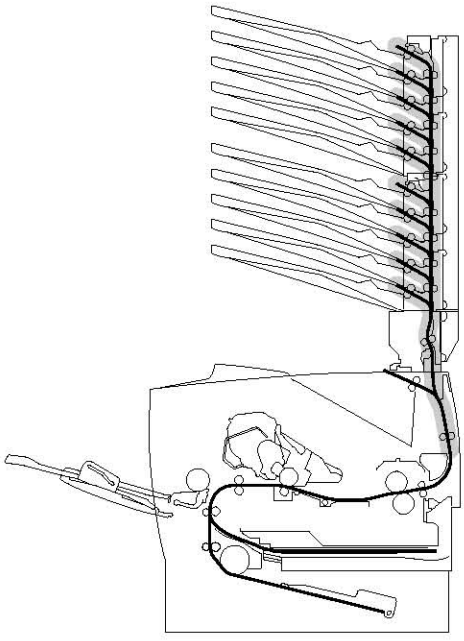
JAM DUPLEX



JAM MP TRAY



JAM MAILBOX



JAM INSIDE

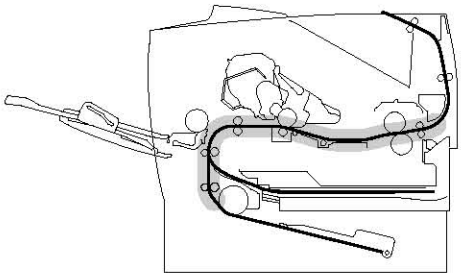


Fig. 6-1

3.2.1 Clearing jammed paper

Clear the jammed paper following the procedures below;

JAM TRAYXXXX

XXXX indicates the tray number that contains jammed paper; Tray1, Tray2, Tray3 or Tray4

NOTE:

The paper trays and LCD panel descriptions in this manual are named as shown below.

Upper paper tray: Tray 1
Optional lower tray: Tray 2, Tray 3 or Tray 4

(1) Pull the paper cassette out of the printer

(2) Remove the jammed paper.

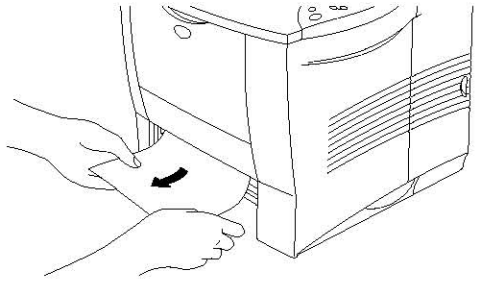


Fig. 6-2

NOTE:

- *When a small piece of jammed paper cannot be removed, it is easy to remove it by turning the dial to the lower position as shown below.*

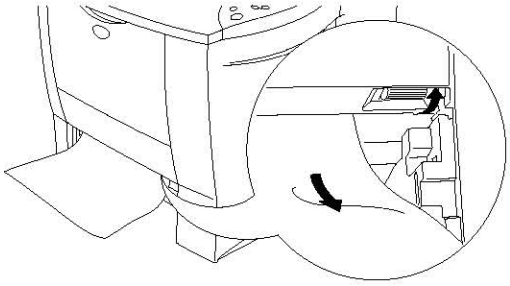


Fig. 6-3

- *If a paper jam occurs when using A6 size paper, remove the jammed paper, turn over the stack of the paper in the paper cassette, and print it again.*

(3) Make sure that the paper guide release lever is set to the paper size in the paper cassette, and paper is loaded below the limit ▼ mark.

(4) Install the paper cassette into the printer.

> ***CAUTION:***
> *Do not pull out the upper paper cassette while paper is being fed from the lower paper cassette because it will cause a paper jam.*

JAM MP TRAY

(1) Remove the paper from the multi-purpose tray.

(2) Fan the paper stack, and then reload it in the multi-purpose tray.

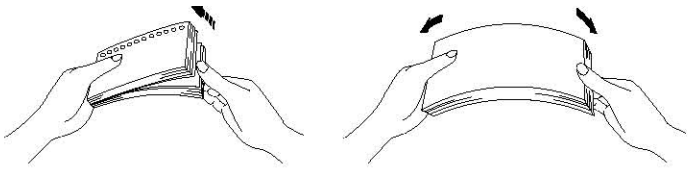


Fig. 6-4

(3) Make sure that the paper is inserted fully into the multi-purpose tray and touches the back of the tray and remains below the limit ▼ mark.

(4) Open the top cover of the printer and close it, or press the **Go** switch to start printing.

JAM INSIDE

(1) Open the top cover of the printer.

(2) Remove the toner cartridge.

(3) Lift up the metal plate inside the printer.

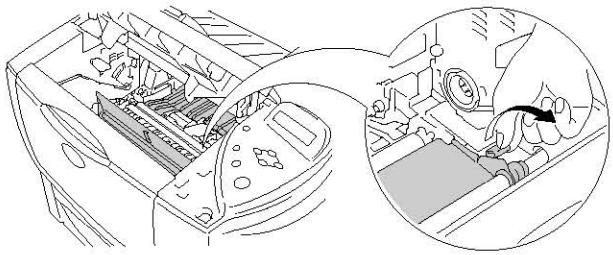


Fig. 6-5

CAUTION:

- *After having removed the jammed paper, if the printed page has toner stains, print several pages before restarting your print job.*
- *Remove the jammed paper carefully so you do not spread toner.*
- *Take care not to stain your hands and clothes with toner. Immediately wash toner stains with cold water.*
- *Never touch the transfer roller.*

(4) Slowly pull out the jammed paper from inside the printer with both hands.

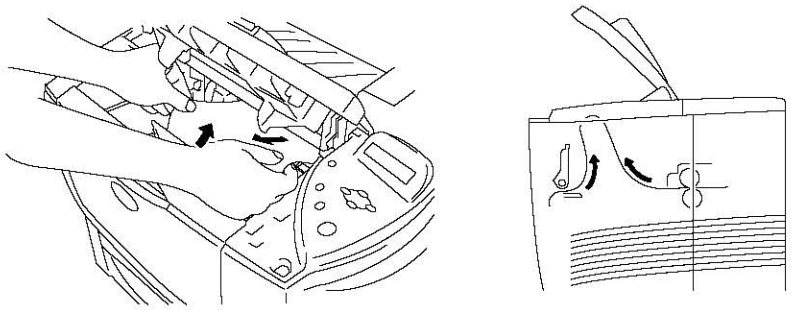


Fig. 6-6

(5) Push the metal plate down.

(6) Install the toner cartridge firmly into the printer.

(7) Close the top cover of the printer.

NOTE:

If a paper jam occurs when using A6 size paper, remove the jammed paper, turn over the stack of the paper in the paper cassette, and print it again.

JAM REAR (at paper exit)

(1) Open the top cover of the printer.

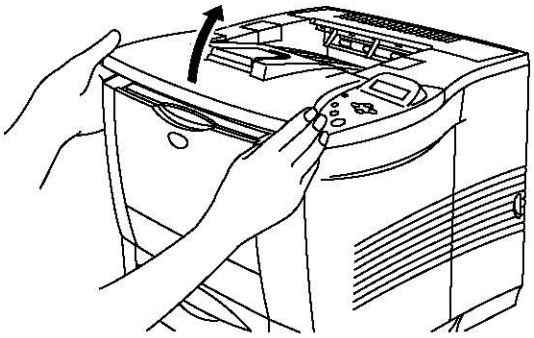


Fig. 6-7

(2) Slowly pull the jammed paper from the paper exit with both hands.

(3) Close the top cover of the printer.

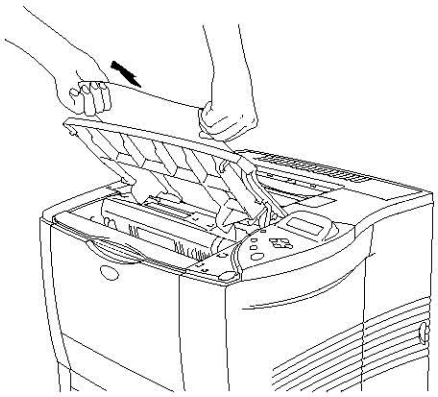


Fig. 6-8

JAM REAR (at face up output tray)

(1) Open the top cover of the printer.

NOTE:
If a duplex unit is installed on the printer, remove it from the printer. After removing the printed jammed paper, re-install the duplex unit on to the printer.

(2) Open the face up output tray.

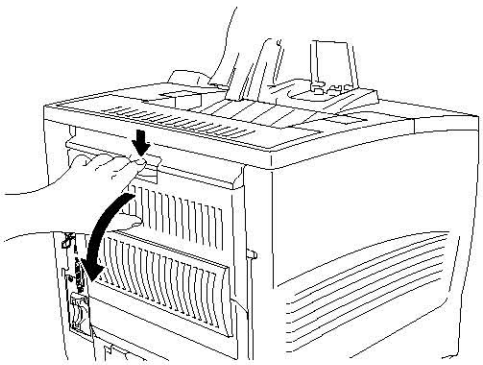


Fig. 6-9

(3) Slowly remove the jammed paper with both hands.

(4) Close the face up output tray.

(5) Close the top cover of the printer.

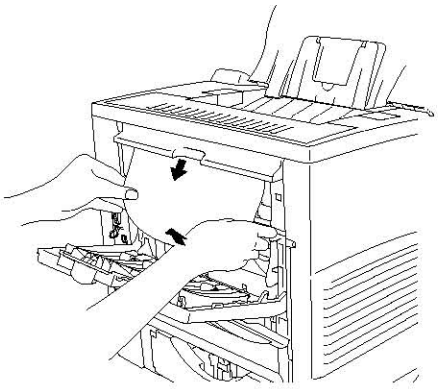


Fig. 6-10

JAM DUPLEX

(1) Open the top cover of the printer.

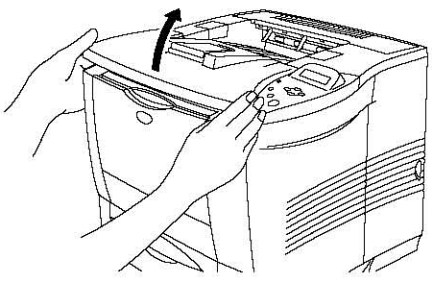


Fig. 6-11

(2) Slowly remove the jammed paper from the paper exit of the duplex unit with both hands.

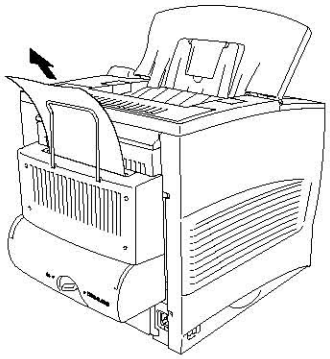


Fig. 6-12

(3) Open the duplex unit cover gently with both hands.

(4) Remove the duplex unit from the printer with both hands.

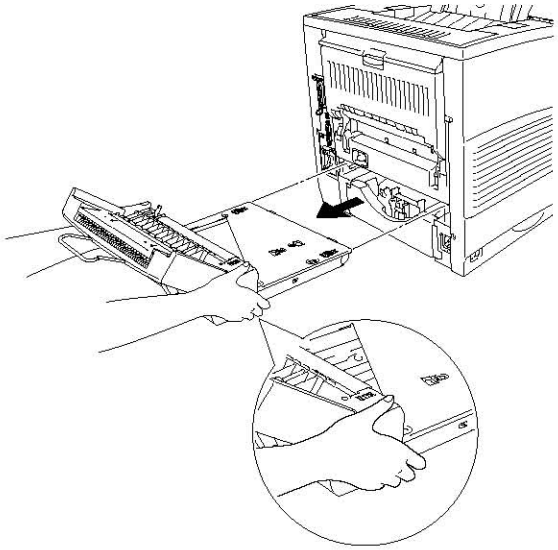


Fig. 6-13

NOTE:

Look inside the printer duplex unit slot and make sure that the jammed paper is not in there.

CAUTION:

Remove the duplex unit by holding it firmly with both hands because the shaded part in the illustration is heavier.

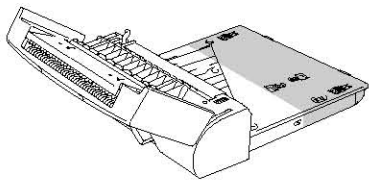


Fig. 6-14

(5) Remove the jammed paper from inside the duplex unit.

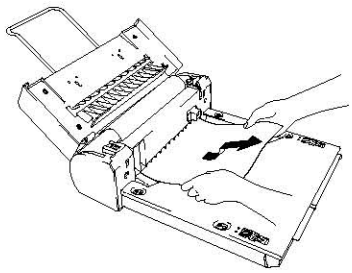


Fig. 6-15

(6) Re-install the duplex unit into the printer.

(7) Close the duplex unit cover gently.

(8) Close the top cover of the printer.

JAM MAILBOX

(1) Open the rear cover of the mailbox unit.

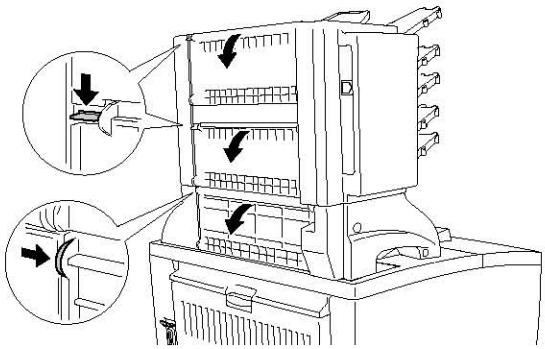


Fig. 6-16

(2) Remove the jammed paper.

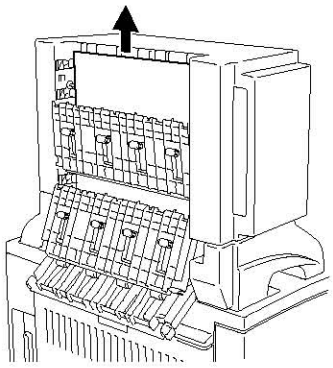


Fig. 6-17

(3) Close the rear cover of the mailbox.

(4) Open the top cover of the printer, and then close it to resume printing.

NOTE:

If this message still appears on the LCD even after the jammed paper is removed, turn off the printer. Wait a few seconds, and then turn the printer on again.

3.2.2 Countermeasures for paper jams

If the printer still displays the message on the LCD display even after the jammed paper is removed, take the appropriate countermeasures referring to the table below;

Message	Cause	Remedy
JAM TRAYXXXX	The paper feed roller ASSY 45 and the separation pad ASSY MP may be worn out.	Replace the paper feed roller ASSY 45 and the separation pad ASSY referring to subsection 3.3 'Paper Cassette' and 3.25 'Paper Feed' in CHAPTER 4.
	The regist front actuator or the tip actuator is not working properly and has not turned off.	Check actuator motion and replace it with a new one if it is broken.
JAM MP TRAY	The paper feed roller ASSY MP and the separation plate ASSY MP may be worn out.	Replace the paper feed roller ASSY MP and the separation plate ASSY MP referring to subsection 3.14 'MP Tray Unit' in CHAPTER 4.
	The regist front actuator or the tip actuator is not working properly and has not turned off.	Check actuator motion and replace it with a new one if it is broken.
JAM INSIDE	The regist front actuator, the tip actuator or the eject sensor is not working properly and has not turned off.	Check actuator or sensor motion and replace it if it is broken.
JAM REAR	The eject sensor or the fuser exit sensor is not working properly and has not turned off.	Check sensor motion and replace it with a new one if it is broken.
JAM DUPLEX	Any of the all sensors or actuators is not working properly has not turned off.	Check actuator or sensor motion and replace it with a new one if it is broken.
JAM MAILBOX	The eject sensor, fuser exit sensor, or the photo interrupter 1241 or the actuator U of the mailbox unit is not working properly and has not turned off.	Check actuator or sensor motion and replace it with a new one if it is broken.

3.3 Paper Feeding Problems

Even if the paper is printed and ejected without any problems such as paper jams, paper-feeding problems below may appear.

Users can clear these problems by following the 'User Check' items for each problem. Even if the same problem occurs again, follow the procedures in the table below.

F-1	Double feeding

User Check

Check the paper used meets the recommended paper specifications.

Possible cause	Step	Check	Result	Remedy
Separation pad	1	Is the surface of the separation pad worn out?	Yes	Replace the separation pad.

F-2	Wrinkles or creases

User Check

(1) Check that paper is loaded into the paper cassette correctly.

(2) Check the paper used meets the recommended paper specifications.

(3) Try printing using the straight-through output path.

(4) Turn over the stack of paper in the cassette or try rotating the paper 180° in the cassette.

Possible cause	Step	Check	Result	Remedy
Paper	1	Is the problem solved if new paper is used?	Yes	Instruct the user how to store paper so that it does not absorb moisture.
Fixing unit entrance guide	2	Is the entrance guide dirty?	Yes	Clean the entrance guide.
Fixing unit	3	Is the pressure roller dirty?	Yes	Clean the pressure roller.
			No	Replace the fixing unit.

F-3	Page skew

User Check

(1) Check that the paper or other media is loaded into the paper cassette correctly and that the paper guides are not too tight or too loose against the paper stack.

(2) If using the manual feed slot, check how to load paper into the manual feed slot correctly.

(3) The paper cassette may be too full. Load paper below 27mm in depth.

(4) Check the paper used meets the recommended paper specifications.

F-4	Curl or Wave

User Check

(1) Check the paper used meets the recommended paper specifications. Both high temperature and humidity will cause paper to curl.

(2) If the printer is used infrequently, the paper may have sat for too long in the paper cassette. Turn over the stack of paper in the paper cassette. Also, try rotating the paper 180° in the paper cassette.

(3) Try printing using the straight-through output path.

NOTE:

For no paper supplied as the cause of a malfunction, see 'M-4 No paper supplied' in section 5 'MALFUNCTIONS' in this chapter.

4. SOFTWARE SETTING PROBLEMS

The printer may not print the data correctly if there are incorrect software settings.

S-1	"There was an error writing to LPT1: (or BRUSB) for the printer" error message appears.

User Check

(1) Check that the printer cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the printer and PC.

(2) Check that the correct printer is selected if you have an interface-switching device.

(3) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(4) Check that the printer is not connected to the same port, which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.

(5) If the print port is set as an ECP port, change it to a normal port.

(6) Try printing the test page referring to subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2.

(7) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment, which the user used.

S-2	Unable to print from application software with the serial interface.

User Check

Check that the serial interface settings are correctly set up with the panel switches.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.

S-3	Unable to print from application software under DOS.

User Check

(1) Check that the DOS application software interface settings match that of your printer.

(2) Check if the printer has any printer alarms active.

(3) Check if the appropriate printer is selected in your application software.

(4) If the serial interface is used, check that the interface settings are correctly set up with the proper panel switches. Check that the serial parameters of baud rate, parity and stop bits match between your application software and the printer.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment which the user used.

S-4	Although the USB driver is installed, it is unable to find the BRUSB: port.

User Check

(1) Re-install the USB driver by following the steps below;
   i) Double-click the file "DeinsUSB.exe" in the USB directory of the CD-ROM or the floppy disk.
   ii) Turn the printer off and on again.
   iii) "Add New Hardware Wizard" is launched again, follow the instructions in the Wizard to re-install the driver.

(2) Try to connect the printer directly to the computer if it is connected through a network.

Possible cause	Step	Check	Result	Remedy
Computer settings	1	Does 'Universal Serial Bus Controllers' appear in the Device Manager tab of 'System Properties' in Control Panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable / printer damage	2	Does the 'BRUSB' port appear in the Device Manager tab of 'System Properties' in Control Panel?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the printer will be damaged.

5. MALFUNCTIONS

When taking countermeasures for malfunctions as described in this section, check connectors for contact failure before measuring the voltage at the specified connector pins.

M-1	No AC power supplied

Possible cause	Step	Check	Result	Remedy
Supply voltage	1	Is the correct voltage present at the outlet?	No	Inform the user that the correct voltage is not supplied at the outlet.
Power plug	2	Is the power cord securely plugged into the outlet?	No	Plug the power cord securely into the outlet.
Fuse (F1, F2)	3	Is the fuse blown?	Yes	If the fuse blows again immediately after replacing the low-voltage power supply PCB, check that there is not a short circuit somewhere in the AC power supply line.
Wiring	4	Unplug the power supply plug. Is there a broken wire between the AC input connector of the low-voltage power supply and the power plug?	Yes	Replace the AC power cord.

M-2	No DC power supplied

Possible cause	Step	Check	Result	Remedy
AC power supply	1	Is AC power supplied between connectors CN1-L and CN1-N when the power plug is plugged into the outlet?	No	Follow the same check procedure of M-1 “No AC power supplied”.
Wiring, DC load	2	Turn off the power switch and disconnect the P24 connectors on the engine PCB. Turn on the power again. Measure the voltages between the terminals. Do the measured voltage satisfy the prescribed valued in the table below?	Yes	Turn off the power switch, reconnect the connector and turn the power switch on again. If the protector circuit is activated, check the connector, the wiring from the connector, and the DC load.
Low-voltage power supply PCB	3		No	Replace the low-voltage power supply PCB.

PCB	+ lead pin	- lead pin	Voltage
Engine	P24-6 P24-2	P24-5 P24-3	Approx. 24V Approx. 5V
Main	CN1-1 CN1-2	CN1-4 CN1-4	Approx. 5V Approx. 3V

⚠ *WARNING*

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

M-3	Main motor does not rotate

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the connection of connector P6 on the engine PCB correct?	No	Reconnect the connector.
Main motor	2	Is the problem solved by replacing the main motor?	Yes	Replace the main motor.
Engine PCB	3	Is the problem solved by replacing the engine PCB?	Yes	Replace the engine PCB.
Main PCB	4	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-4	No paper supplied

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the contact of the solenoid connector on the engine PCB good?	No	Reconnect the connector.
Engine PCB circuit	2	Set paper in the manual paper slot and make a test print by pressing the control panel button.	Yes	Replace the engine PCB.
Registration Clutch (P4) MP solenoid (P3) Paper pick-up solenoid (P2)		Does the voltage between pins 2 (SOLENOID) and 1 (24V) of the P4, P3 and P2 connectors on the engine PCB change from approx. 24V DC to 0V within the specified time?	No	Replace the paper pick-up solenoid.
Separation pad / pick-up roller failure	3	Is the surface of the separation pad or the pick-up roller dirty or worn out?	Yes	1) Clean the surface of the separation pad or pick-up roller. 2) Replace the separation pad or pick-up roller.
Main PCB	4	Does replacing the main PCB solve the problem?	Yes	Replace the main PCB.

M-5	Insufficient output from high-voltage power supply unit

Possible cause	Step	Check	Result	Remedy
High-voltage contact	1	Do any of the terminals on the high-voltage contacts have dirt or contact burns?	Yes	Clean the terminals.
High-voltage power supply PCB	2	Check the connections of the connector between the high-voltage power supply and the engine PCB are secured correctly.	Yes	Replace the high-voltage power supply PCB
			No	Reconnect the connector between the high-voltage power supply and the engine PCB.

M-6	Fixing heater temperature failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector P16 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance of the thermistor. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.

M-7	BD failure

Possible cause	Step	Check	Result	Remedy
Harness connection failure	1	Is connector P8 on the main PCB secured correctly?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.

M-8	Scanner failure

Possible cause	Step	Check	Result	Remedy
Harness connection failure	1	Is the connection of the scanner motor connector P23 on the engine PCB secure?	No	Reconnect the connector securely.
Power supply input	2	Is the voltage between pins 5 (+24V DC) and 4 (GND) of connector P23 on the engine PCB 24V DC?	No	Check if +24V DC is supplied between pins 6 (+24V DC) and 4 (+24V RET) of connector P24 on the engine PCB. If not, check the power supply output on the low-voltage power supply PCB.
			Yes	Replace the laser unit.

M-9	Fuser failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector P16 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance between the input connectors. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.
Heater harness connection failure	5	Is the heater harness connector connected to the low-voltage power supply PCB and fixing unit secure?	No	Reconnect the connectors securely.

NOTE:

- *This problem will be cleared if leaving the printer power ON for ten minutes.*
- *If the heater is cooled down sufficiently, this problem may be cleared by turning on the printer power switch while pressing the panel button.* ***Be warned, however, that this operation will melt the fixing unit if the heater is hot.***

M-10	ROM error / D-RAM error / NV-RAM error

Possible cause	Step	Check	Result	Remedy
Main PCB	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Replace the main PCB.
Software bug	2	Does this problem appear when printing specific data or printing under a specific environment?	Yes	Inform the Brother office of the used specific data, printer condition and system environment.

M-11	Address error / BUS error / CPU runtime error

Possible cause	Step	Check	Result	Remedy
Main PCB	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Replace the main PCB.
Software bug	2	Does this problem appear when printing specific data or printing under a specific environment?	Yes	Inform the Brother office of the used specific data, printer condition and system environment.

M-12	Engine interface error

Possible cause	Step	Check	Result	Remedy
Fixing unit ground wire connection	1	Is the ground wire on the fixing unit secured with the shoulder screw correctly?	No	Secure the ground wire correctly with the shoulder screw.
Harness connection failure	2	Is the connection between connector P6 on the main PCB and connector P19 on the engine PCB secure?	No	Reconnect the connectors securely.
Engine PCB	3	Does replacing the engine PCB solve the problem?	Yes	Replace the engine PCB.
Main PCB	4	Does replacing the main PCB solve the problem?	Yes	Replace the main PCB.

M-13	PCI BUS error

Possible cause	Step	Check	Result	Remedy
Harness connection failure	1	Is the connection between connector CN10 on the main PCB and connector P1 on the network board secure?	No	Reconnect the connectors securely.
Network board	2	Does replacing the network board solve the problem?	Yes	Replace the network board.
Main PCB	3	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

6. IMAGE DEFECTS

6.1 Image Defect Examples

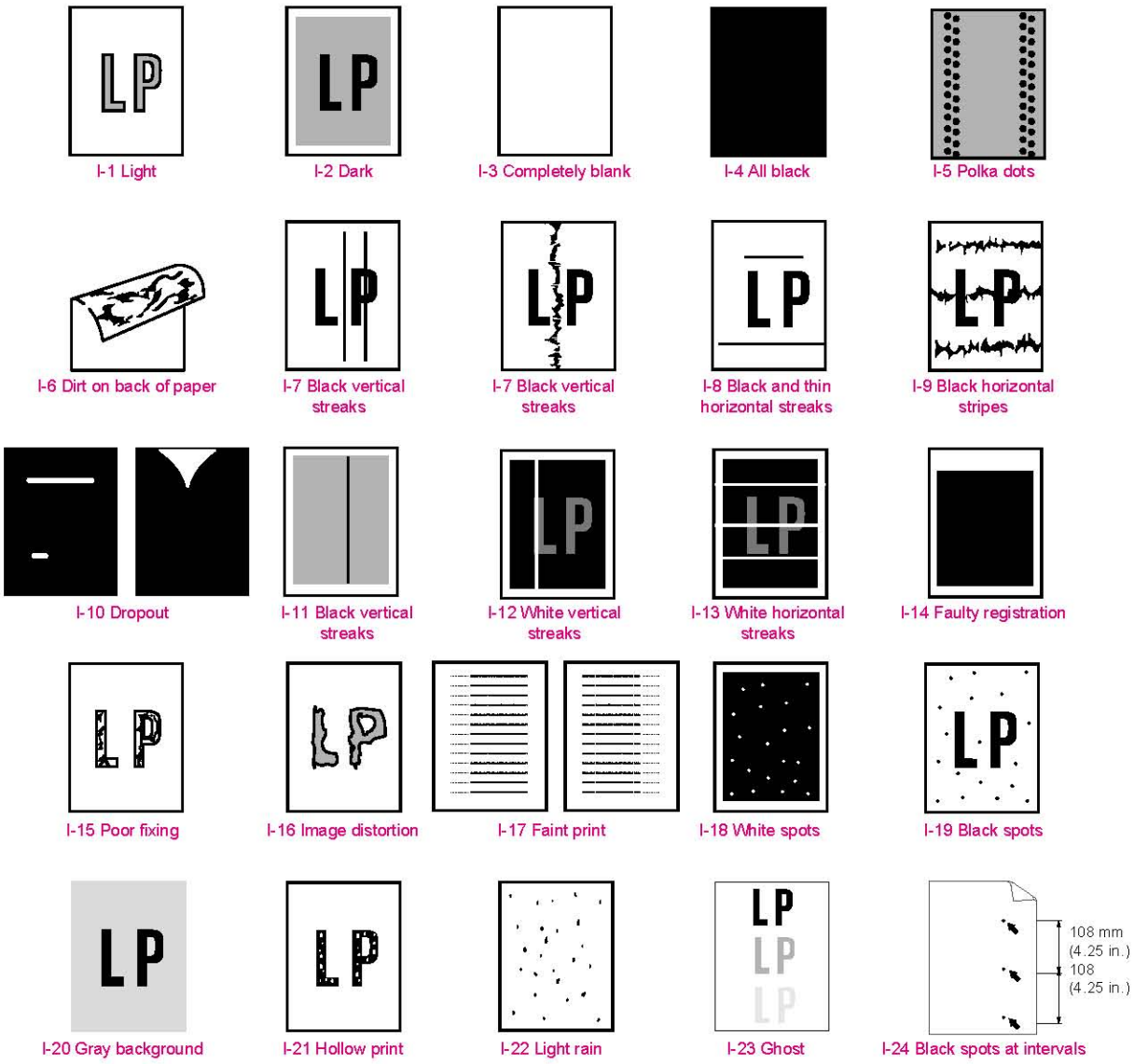


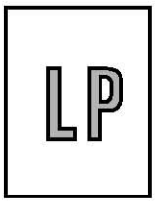
Fig. 6-18

6.2 Troubleshooting Image Defect

Several types of the image defects can be cleared by end users. For those defects, instruct the user to check the 'User Check' items described in each table. Even if the same image defect appears, the following procedures should be followed in the event of specific image defects.

> ***CAUTION:***
> *When using the printer for a special job, such as printing of name cards, print quality cannot be guaranteed.*

I-1	Light



User Check

(1) Check the printer's environment. Conditions such as humidity, high temperatures, etc. may cause this situation to occur.

(2) If the whole page is light, toner save mode may be on. Disable toner save mode within Printer Properties tab of the driver.

(3) Try installing a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Toner sensing failure (printer side)	1	Can printing be started with the toner cartridge removed?	Yes	Check if the toner sensor is dirty and check the toner sensor connection.
Toner sensing failure (toner cartridge side)	2	Is the problem solved when 4 or 5 pages are printed after the toner cartridge is replaced with a new one?	Yes	The wiper of the toner cartridge is defective. Replace the toner cartridge.
High-voltage power supply PCB failure	3	Is the harness connection between the high-voltage power supply PCB and the engine PCB correct?	Yes	Replace the high-voltage power supply PCB.
Engine PCB / Main PCB failure	4	Is the harness connection between the engine PCB and the main PCB correct?	Yes	Replace the engine PCB or the main PCB.
Dirt on the scanner window	5	Is there any dirt on the scanner window?	Yes	Wipe it off with a soft clean paper.
Laser unit failure	6	Is the problem solved after replacing the laser unit?	Yes	Replace the laser unit.

I-2	Dark

LP

User Check

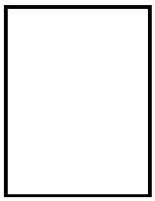
(1) Check the paper used meets the recommended paper specifications.

(2) Check the printer's environment. High temperature and high humidity conditions can increase the amount of background shading.

(3) Try installing a new toner cartridge or drum unit.

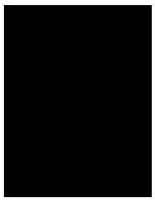
Possible cause	Step	Check	Result	Remedy
Dirt on the grounding terminal	1	Does printed image improve when continuity is improved by cleaning the toner cartridge grounding terminal and the printer unit grounding terminal?	Yes	Clean the contacts to assure the continuity.
Toner cartridge failure	2	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.
High-voltage power supply PCB failure	3	Is the connections of the connector between the high-voltage power supply PCB and the engine PCB secured correctly?	Yes	Replace the high-voltage power supply PCB.
Main PCB failure	4	Are there any disconnected connectors?	No	Replace the main PCB.
Engine PCB failure	5	Are there any disconnected connectors?	No	Replace the engine PCB.

I-3	Completely blank



Possible cause	Step	Check	Result	Remedy
Developing bias contact failure	1	Are the developing bias contacts between the printer body and drum unit dirty?	Yes	Clean the electrodes at both sides.
Toner cartridge failure	2	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.
Scanner harness connection failure	3	Is the scanner harness connected securely? (Check if there is any play in the connection.)	No	Reconnect the connector correctly.
Main PCB failure	4	Are printing signals being input to the laser unit? Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.
Laser unit failure	5	Is the scanner interlock lever damaged?	Yes	Replace the laser unit.
		Is the scanner mirror broken or loose?	No	Replace the high-voltage power supply PCB.

I-4	All black

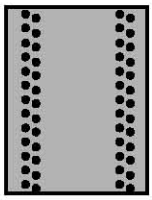


User Check

(1) The drum unit may be damaged. Install a new drum unit.

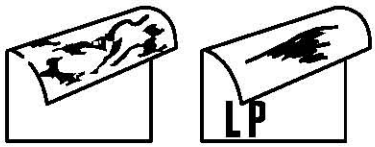
Possible cause	Step	Check	Result	Remedy
Harness connection	1	Is the laser unit connected to the main PCB correctly?	No	Connect the harness between the laser unit and the main PCB correctly.
High-voltage power supply PCB failure	2	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.
Main PCB failure	3	Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.
Dirt on power supply terminal Failure in the charging high-voltage circuit LD failure	4	Is there any dirt on the cartridge side charging terminal of the transfer unit and on the terminal of the high-voltage power supply charging unit? (Is there continuity between them?)	No	Clean the contact to assure the continuity.
			Yes	Replace the high-voltage power supply PCB ASSY and, if the problem is not solved, replace the laser unit or the harness.

I-5	Polka dots



Possible cause	Step	Check	Result	Remedy
Failure in static-charge eliminator	1	Is there any dir on the static-charge eliminator?	Yes	Clean the static-charge eliminator.
Static-charge eliminator grounding failure	2	Is there continuity between the static-charge eliminator and the chassis?	Yes	Ensure the grounding of the static-charge eliminator.
Dirt on the transfer roller	3	Does print quality improve when the transfer roller is replaced?	Yes	Clean the transfer roller [use dry lint-free paper (producing little paper dust) to clean the transfer roller. Never use solvents] and, if the dirt remains, replace the transfer roller ASSY.

I-6	Dirt on the back of paper

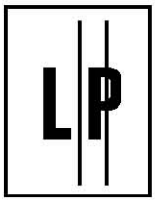


Possible cause	Step	Check	Result	Remedy
Dirt on the paper feed guide	1	Is there any dirt on the back of the paper feed guide and the jam remove cover near the static-charge eliminator?	Yes	Clean the paper feed guide or the jam remove cover.
	2	Open the toner cartridge lid in the printer, pull out the toner cartridge and remove the paper in the printer. Is there already dirt on the back of the sheet thus removed?	No	Go to Step 6.
Dirt on the transfer roller	3	Is there any dirt on the transfer roller?	Yes	Clean the transfer roller and, if the dirt remains, replace the transfer roller ASSY.
Transfer input signal error	4	Does the voltage at the 6 pin (HVT1) of the connector P6 on the main PCB change from 9V to 0V for about 0.8 seconds?	No	Replace the main PCB ASSY or the harness.
Dirt on power supply terminal Failure in the transfer high-voltage circuit	5	Clean the transfer roller right end bearing, the check continuity between the transfer roller power supply spring and the terminal of the high-voltage transfer unit. Is there continuity?	No	Clean the contact to assure the continuity.
			Yes	Replace the high-voltage power supply PCB ASSY.
Dirt the fixing guide	6	Is there any dirt on the fixing unit inlet guide?	Yes	Clean the fixing unit inlet guide.
Fixing roller grounding failure Fixing unit failure	7	Are the upper and lower roller s of the fixing unit securely connected to the chassis via the diode?	No	Ensure the grounding.
			Yes	Replace the fixing unit.

NOTE:

- *This problem may disappear after printing approximately 10 pages of completely blank sheets.*

I-7	Black and blurred vertical streaks



User Check

(1) Check that the toner cartridge is not empty.

(2) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Scratch on the drum	1	Is the drum surface scratched?	Yes	Replace the toner cartridge.
Cleaning failure	2	Is the drum surface dirty with toner in streaks?	Yes	Replace the toner cartridge.
Scratch on the heat roller	3	Is the surface of the heat roller scratched?	Yes	Replace the toner cartridge.

NOTE:

- *If you print the same pattern continuously, the drum will be worn and black vertical streaks will appear on the paper.*

I-8	Black and thin horizontal streaks

Possible cause	Step	Check	Result	Remedy
Beam detection error	1	—	—	Replace the laser unit or the harness, and if the problem is not solved, replace the main PCB ASSY.

I-9	Black and blurred horizontal stripes

User Check

(1) The drum may be damaged. Install a new drum unit.

(2) Check the paper used meets the recommended paper specifications.

(3) Clean the printer interior.

Possible cause	Step	Check	Result	Remedy
Scratch on the drum or charging roller	1	Do the stripes appear at 95mm or 38mm intervals?	Yes	Replace the toner cartridge.
Scratch on the heat roller	2	Do the stripes appear at 108mm (heat roller) intervals?	Yes	Replace the fixing unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.
Developing bias contact failure	4	Are the developing bias contacts between the printer body and drum unit dirty?	Yes	Clean the electrodes at both sides.

I-10	Dropout

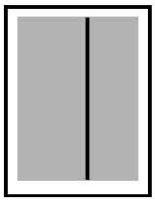
User Check

(1) Check the paper used meets the recommended paper specifications.

(2) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Transfer roller failure	1	Is there any dirt on the transfer roller or is it deformed?	Yes	Clean or replace the transfer roller ASSY.
Dirt on power supply terminal Failure in the transfer high-voltage circuit	2	Clean the transfer roller right end bearing, the check continuity between the transfer roller power supply spring and the terminal of the high-voltage transfer unit. Is there continuity?	No	Clean the contact to assure the continuity.
			Yes	Replace the high-voltage power supply PCB ASSY.

I-11	Black vertical streaks (in a gray background)



Possible cause	Step	Check	Result	Remedy
Translucent stain on the scanner window	1	Is there any dirt on the scanner window?	Yes	1) Clean the scanner window. 2) If it is not effective, replace the laser unit.

I-12	White vertical streaks

User Check

(1) Try to wipe the scanner window with a soft cloth.

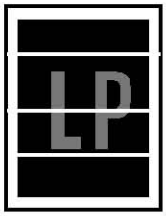
(2) The toner cartridge may be damaged. Install a new toner cartridge.

(3) Check the printer's environment. High temperature and high humidity conditions can cause this problem.

(4) Damp (wet) paper might be used. Try to change to freshly unpacked paper.

Possible cause	Step	Check	Result	Remedy
Transfer failure	1	Is the transfer roller scratched?	Yes	Replace the transfer roller.
Condensation	2	Has condensation occurred inside the printer?	Yes	Try to print several pages or leave the printer 2 hours to allow it to reach room temperature.

I-13	White horizontal stripes



User Check

(1) Check the paper used meets the recommended paper specifications. A rough surfaced paper, damp paper or thick media can cause the problem.

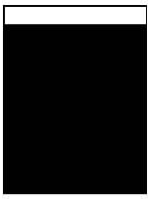
(2) Check that the appropriate media type is selected in the printer driver.

(3) The problem may disappear by itself. Try printing multiple pages to clear this problem especially if the printer has not been used for a long time.

(4) The drum may be damaged. Install a new toner cartridge.

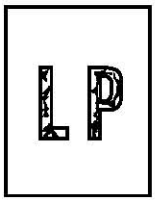
Possible cause	Step	Check	Result	Remedy
Developing bias contact failure	1	Are the developing bias contacts between the printer body and toner cartridge dirty?	Yes	Clean the electrodes at both sides.
Scratch on the drum or charging roller	2	Do the stripes appear at 95mm or 38mm intervals?	Yes	Replace the toner cartridge.

I-14	Faulty registration



Possible cause	Step	Check	Result	Remedy
Excessive paper load	1	Is the paper loaded in the paper cassette more than 54mm high?	Yes	Instruct the user to keep paper loads below 27mm in depth.
Print paper	2	Is the specified weight of the recommended paper being used?	No	Recommend using the specified types of paper.
	3	Is the first printing position within ±1mm of the tolerance specification?	Yes	Adjust the Y offset by using the utility software supplied.
Rear resist sensor position incorrect	4	Is the position of the rear registration sensor normal?	No	Reposition the sensor to the correct position.

I-15	Poor fixing

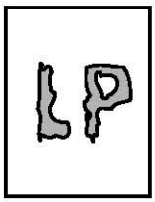


User Check

(1) Check the paper used meets the recommended paper specifications.

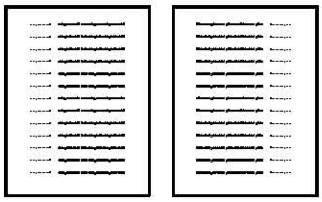
Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 43lb being used?	Yes	Recommend using the specified types of paper.
Toner sensing failure (When printing is faint.)	2	Does replacing the toner cartridge solve the problem?	Yes	If the wiper in the toner cartridge is broken, replace the toner cartridge with a new one.
Thermistor failure	3	Is the thermistor fitted correctly?	No	Fit the thermistor correctly.
Low-voltage power supply PCB failure	4	Does replacing the low-voltage power supply PCB solve the problem?	Yes	Replace the low-voltage power supply PCB.

I-16	Image distortion



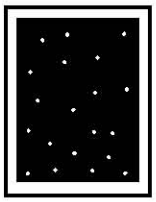
Possible cause	Step	Check	Result	Remedy
Laser unit installation	1	Is the laser unit secured to the frame incorrectly? (Check if there is any play.)	Yes	Secure the unit correctly and tighten the screws.
Scanner LD emission failure Scanner motor rotation failure	2	Is the laser diode or the scanner motor defective?	Yes	Replace the laser unit.
Scanner connection failure	3	Is the scanner harness connected properly? (Check if it is coming loose.)	No	Connect the harness correctly.

I-17	Faint print



Possible cause	Step	Check	Result	Remedy
Printer installation	1	Is the printer placed horizontally?	No	Place the printer on a flat surface.
Toner cartridge	2	Does the problem happen immediately after replacing the toner cartridge with a new one?	Yes	Remove and carefully shake the toner cartridge horizontally.
Scanner window dirty	3	Is the scanner window dirty?	Yes	Clean the scanner window with a soft dry cloth.
Laser unit failure	4	Does replacing the laser unit solve the problem?	Yes	Replace the laser unit.

I-18	White spots



User Check

(1) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy
Drum failure	1	Do the spots appear at 94mm intervals?	Yes	If the drum surface is scratched, replace a new toner cartridge.
Drum failure	2	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
No toner	3	Is the toner in the toner cartridge almost empty?	Yes	Replace the toner cartridge with a new one.
Print paper	4	Is the problem solved after changing to specified freshly unpacked paper?	Yes	Damp (wet) paper might be used. Recommend to change freshly unpacked paper.
Environment	5	Does the problem still appear after the printer has warmed up?	Yes	1) Replace the toner cartridge. 2) Advise the user of the specified print environment.

I-19	Black spots

User Check

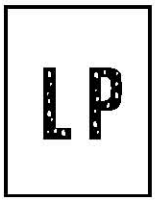
(1) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Scratch on the drum or charging roller	1	Do the spots appear at 94mm or 38mm intervals? (The problem is not solved after printing a few pages.)	Yes	If the photosensitive drum or the charging roller is scratched or deteriorated (exposed), replace the toner cartridge.
Fixing unit	2	Do the spots appear at 108mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) Check and clean the heat roller with a cloth dampened with alcohol. 2) Replace the fixing unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-20	Gray background

Possible cause	Step	Check	Result	Remedy
Print paper	1	Does the paper being used meet the paper specification (weight, etc.).	No	Recommend using the specified types of paper.
			Yes	Recommend changing too freshly unpacked paper.
Toner cartridge failure	2	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.

I-21	Hollow print



User Check

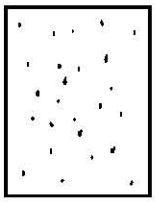
(1) Check the paper used meets the recommended paper specifications.

(2) Select the 'Thick paper mode' in the printer driver, or use thinner paper than you are currently using.

(3) Check the printer's environment, conditions such as high humidity may cause this situation to occur.

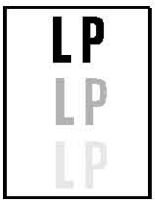
Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 53lb being used or extremely rough surface paper?	Yes	Recommend using the specified types of paper.
			No	Refer and compare with I-15.

I-22	Light rain



Possible cause	Step	Check	Result	Remedy
Toner cartridge failure	1	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
High-voltage power supply PCB failure	2	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-23	Ghost



User Check

(1) Check the paper used meets the recommended paper specifications. Damp paper, thick media or rough surfaced paper can cause the problem.

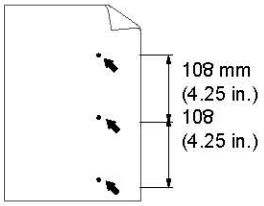
(2) Check the printer's environment. High temperature and high humidity conditions can cause the problem.

(3) Check that the appropriate media type is selected in the printer driver.

(4) Try installing a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Driver setting	1	Is thin paper such as 64g/m^2 used under the thick paper mode?	Yes	1) Change the current mode to the normal mode from the driver setting. 2) Print 5 or 6 blank pages if this problem occurs.
Toner cartridge failure	2	Is the problem solved after replacing the toner cartridge?	Yes	Replace the drum unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-24	Black spots at intervals of 108 mm (4.25 in.).



User Check

(1) Print the cleaning page. This consists of 2 sheets which can be printed by selecting the MAINTENANCE selection under the INFORMATION menu on the control panel. If the black spots still appear, print the cleaning page again.

7. INCORRECT PRINTOUT

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below in the event of a specific error.

P-1	The printer prints unexpectedly or it prints garbage.

User Check

(1) Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.

(2) Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the printer and PC.

(3) If an interface switching device is used, remove it and connect the computer directly to the printer and try again.

(4) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(5) Check that the printer is not connected to the same port, which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.

(6) If the print port is set as an ECP port, change it to a normal port.

(7) Try printing the test page referring to subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2.

(8) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of subsection 5.5 'Control Panel Setting Menu' in CHAPTER 2?	No	Identify the error type, then refer to the specified section of this chapter.

NOTE:

If the printer prints garbage or incorrect fonts, instruct the user to use the 'Troubleshooting for Printer won't print' tool of the self-diagnostics tools. If the problem cannot be solved, instruct user to use the 'Diagnostics' tool described in the Appendix so that you can get a log file to investigate the cause of the problem. For details on the self-diagnostics tools, see APPENDIX 19 'HOW TO USE SELF-DIAGNOSTICS TOOLS'.

P-2	Unable to print full pages of a document with the “PRINT OVERRUN” message.

User Check

(1) Press the panel button to print the data remaining in the printer.

(2) If this does not clear the error, reduce the complexity of your document or reduce the printer resolution.

(3) Expand the printer memory by adding a recommended DIMM.

(4) Change the following setting in the printer driver and try again. The best combination of settings below will vary depending on your document.

Graphic Mode / TrueType™ mode / Use Printer TrueType™ Fonts.

NOTE:

This problem may appear if the data is too complex. If it is not cleared by taking the actions above, it will be impossible to print such data under the printer specifications.

P-3	Unable to print full pages of a document with the “MEMORY FULL” message or the “LIMIT CHECK” message when using BR-Script driver.

User Check

(1) Press the panel button to print the data remaining in the printer.

(2) Reduce the complexity of your document or reduce the printer resolution.

(3) Expand the printer memory by adding a recommended DIMM.

NOTE:

This problem may appear if the data is too complex. Take the following procedures.

Possible cause	Step	Check	Result	Remedy
Unable to recognize DIMM	1	Check the memory size in Print Configuration. Is it the default size?	Yes	Expand the memory size by adding DIMM. If the memory is already at the maximum size, it will be impossible to print the data under the printer specifications.
DIMM / main PCB failure	2	Try installing DIMM into another printer, then check the memory size in Print Configuration. Is it possible to print the data?	Yes	Replace the DIMM.
			No	Replace the main PCB.
RAM disk setting failure	3	Check the RAM disk setting. Is the RAM disk available?	Yes	Select “0” for the RAM disk setting.

P-4	Headers or footers are not printed out even though they are viewed on PC screen.

User Check

Most laser printers have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines). Adjust the top and bottom margins in your document to allow for this.

P-5	The printer prints the first couple of pages correctly, then some pages have text missing.

User Check

A problem related to serial interface setting. The PC is not recognizing the printer's input buffer full signal. Causes could be incorrect serial cable (incorrectly wired or too long) or incorrect setting of the computer serial interface.

P-6	The printer sometimes prints a couple of characters and then ejects the page.

User Check

This problem sometimes occurs when the PC power is turned off while the printer power is on. Turn off the printer power first before turning off the PC.

8. NETWORK PROBLEM

If the error related to network occurs, refer to the following sections;

8.1 Installation Problem

If you cannot print over the network, check the following:

(1) Make sure that the printer is powered on, is on-line and ready to print.

Verify that the printer and the configuration are good by printing the Network Configuration page. (To print the Configuration page press the Network Test button for less than 5 seconds. See section 6 'NETWORK BOARD OPERATION' in CHAPTER 2.) If the test fails, the network firmware setting may be corrupted. In this event, try to restore the factory default settings of the print server by pressing the Network Test button on the back panel of the printer for more than 5 seconds. Once you have done that, turn the printer power off and then on again, and try to print out the Network Configuration page.

(2) If the Configuration page is printed but you cannot print documents, try the following

NOTE:

If none of the following steps are successful, there is almost certainly a hardware or network problem!

a) If you are using TCP/IP:

Try pinging the print server from the host operating system prompt with the command ping *IP address*, where *IP address* is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address. If a successful response is received, then proceed to the *UNIX, TCP/IP Windows NT/LAN Server, Windows98/95/Me Peer to Peer (LPR), Internet Printing or Web Browser troubleshooting section.* Otherwise, proceed to step (3), and then go to subsection 8.3 'TCP/IP Troubleshooting'.

b) If you are using Novell system:

Verify that the print server can be seen on the network. To do this, login as the SUPERVISOR (not as someone with supervisor privileges) or ADMIN (for Netware 4 or later servers), go into PCONSOLE, select PRINT SERVER INFORMATION, and select the name of the print server (make sure that you have entered the print server name). If you can see `Print Server Status` and `Control` in the menu, then the Brother print server is visible to the network, proceed to subsection 8.10 'Novell NetWare Troubleshooting'. Otherwise, go to step (3).

c) If you are running AppleTalk for Macintosh:

Make sure that you can see the print server name under the LaserWriter 8 icon in the Chooser. If it is visible, then the connection is good, so proceed to subsection 8.11 'AppleTalk Troubleshooting'. Otherwise, go to step (3).

(3) If you cannot make any of the connections in step (2), check the following:

a) Make sure the printer is turned on and on-line.

b) Verify that the cabling and network connection are good. If possible, try the print server on a different connection on the network. Also, print out a Configuration page to see if you can see any Network Statistics information.

c) Check to see if there is any LED activity.

The print server has three LEDs. These can be used to diagnose problems.

- L- LED (green): Link activity
  This LED is on if there is a valid connection to the network (either 10BaseT or 100BaseTX). It is off if no network is detected.
- F-LED (orange): Fast Ethernet
  This LED will be on if the print server is connected to a 100BaseTX Fast Ethernet network. It is off if the print server is connected to a 10BaseT network.
- A-LED (green): Transmission Activity
  This LED will blink synchronized to the transmission or receive status.

(4) If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub. Also, if you have a hub or multi-port repeater, verify that the hub or repeater port is good by trying the print server on a different port.

(5) If you have a bridge or router located between the print server and host computer, make sure that the device is set up to allow the print server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow Brother print server addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the print server.

(6) If the job exits the queue but does not print, make sure that you are not trying to print a text job to a PostScript printer. If you have a printer that is capable of automatic language switching, make sure that the printer is not forced into PostScript mode.

8.2 Intermittent Problem

If the print server and printer start up OK, but you intermittently have problems printing, check the following:

(1) If you can print small jobs but large graphics jobs are distorted or incomplete, make sure that you have adequate memory in your printer and the latest printer driver installed on your computer. The latest Brother printer drivers can be downloaded from www.brother.com.

(2) Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

8.3 TCP/IP Troubleshooting

If you are using TCP/IP and cannot print to the print server and you have checked the hardware and network as described in the previous steps, then check the following:

NOTE:

It is always a good idea to try the following in order to eliminate the possibility of setup errors.

- *Turn off the printer and then on again,*
- *Delete and recreate the print server and create a new print queue in order to eliminate the possibility of setup errors.*

(1) The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server (via the configuration page). Make sure that no other nodes on the network have this address (DUPLICATE IP ADDRESS ARE THE BIGGEST CAUSE OF TCP/IP PRINTING PROBLEMS).

(2) If you used BRCONFIG to enter the IP address, make sure that you exited the remote console properly with a CTRL-D or EXIT and that you turned the printer off and then on again (it may take up to two minutes for the IP address to take effect).

(3) Make sure that the TCP/IP protocol of the print server is enabled.

(4) If you used rarp, make sure that you started the rarp daemon on any workstation using the rarpd, rarpd-a, or equivalent command. Verify that the `/etc/ethers` file contains the correct Ethernet address and that the print server name matches the name in the `/etc/hosts` file.

(5) If you used bootp, make sure that you started the bootp daemon on any UNIX workstation and bootp is enabled (i.e., the "#" is removed from the bootp entry) in the /etc/bootptab file is correctly configured.

(6) Also verify that host computer and the print server are on the same subnet, if the printer is on a different subnet, make sure that the router is configured correctly and ensure that the GATEWAY address is configured to match the IP address of the router.

8.4 UNIX Troubleshooting

(1) Make sure that the `/etc/printcap` file (if applicable) is typed in correctly. In particular, look for missing ":" and "\" characters, because a small error *anywhere* in the file can have *major* consequences. Also check the `/usr/spool` directory to make sure that you have created a valid spool directory.

(2) If you are using a Linux operating system, the X-Window Print tool program that is included with Linux may not properly configure the etc/printcap file for lpd operation, then you might also edit the etc/printcap file and change the following line in the entry for the printer.

if

```
:lp = /dev/null: \
```

then to

```
:lp = :\
```

(3) If you are using a Berkeley-based UNIX, make sure that the daemon is started on Berkeley based systems with the command lpc start *printer*, where *printer* is the name of the local print queue.

(4) If you are using an AT&T-based UNIX, make sure the printer is enabled (enable *printer*, where *printer* is the name of the local print queue).

(5) Make sure that the lpr/lpd remote line printer service are running on the host computer (refer to your host computer documentation for information on how to do this).

(6) If you are having trouble printing more than one job at a time, try increasing the IP timeout using the SET IP TIMEOUT command or using BRAdmin32.

(7) If text or PCL jobs are run together, try setting the service (remote printer) with EOT set to string number 2 (<ESC>E). For example:

```
SET SERVICE BRN_xxxxxx_P1 EOT 2
```

(8) If PostScript jobs fail to print or are run together, try setting the service (remote printer) with EOT set to string number 3 (control-D). For example:

```
SET SERVICE BRN_xxxxxx_P1 EOT 3
```

(9) If the lines of a text file are staggered, make sure that you have specified a remote printer (rp) name of TEXT in your `/etc/printcap` file.

(10) If you are using Sun Solaris V2.4 or earlier, there is a bug which causes long print jobs to fail when using a print server. If you are having trouble printing long jobs (over 1MB), add the line `mx#0` to your `etc/printcap` file entry.

8.5 Windows NT/LAN Server (TCP/IP) Troubleshooting

If you are having trouble printing with Windows NT or LAN Server, check the following:

(1) Make sure that TCP/IP and TCP/IP print service are installed and running on the Windows NT system or the LAN Server file server.

8.6 Windows 95/98/Me Peer to Peer Print (LPR) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me Peer to Peer network (LPR method), check the following:

(1) Make sure that the Brother LPR Port driver is correctly installed and configured according to the Windows 95/98/Me Peer to Peer chapters in the Network User's Guide.

(2) You may find that during the installation of BLP software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows 95/98/Me computers. Press the ALT and TAB keys to make it appear.

8.7 Windows 95/98/Me Peer to Peer (HP JetAdmin Compatible Method) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me Peer to Peer network, check the following (HP JetAdmin compatible method):

(1) If the print server does not show up under JetAdmin on a Windows 95/98/Me Peer to Peer network, try removing all of the Windows 95/98/Me network software from the Network Control panel and then reinstalling them as follows:

- First install the IPX/SPX-Compatible Protocol (or the TCP/IP protocol if you are using a later version of JetAdmin), the Client for Microsoft Networks, and the network adapter card driver.
- Install the Latest HP JetAdmin software
- Restart the system, and then add the HP JetAdmin service.

8.8 Windows 95/98/Me/NT 4.0/2000 Peer to Peer Print (NetBIOS) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me/NT 4.0/2000 Peer to Peer network (NetBIOS), check the following:

(1) Make sure that the Brother NetBIOS Port driver is securely installed and configured according to the Windows 95/98/Me/NT 4.0/2000 Peer to Peer (NetBIOS) chapters. You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows 95/98/Me/NT 4.0/2000 computers. Press the ALT and TAB keys to make it appear.

(2) Make sure that the print server is configured to be in the same workgroup or domain as the test of your computers. It may take several minutes for the print server to appear in the network neighborhood.

8.9 Internet Print (TCP/IP) Troubleshooting

(1) The first step in troubleshooting is to make sure that you have a valid E-mail connection on both the sending PC and the receiving print server. Try sending an E-mail message from the PC to a user at the remote site who can receive mail via the POP3 server. If this does not work, there may be an E-mail configuration problem on the PC, on the local E-mail server, or on the remote POP3 server. Double check to make sure that the E-mail parameters that you configured on the PC and on the remote print server match those that are configured on the E-mail servers.

(2) If you can print small files OK but are having problems printing large files, the problem may be in the e-mail system. Some E-mail systems have difficulties printing large files. If the file does not reach its destination intact, then the problem is with the E-mail system.

(3) You can also enable the partial e-mail print facility on your client PC, this will split the e-mail up into fragments, which should then not overwhelm your e-mail server. To do this, select the property dialog of the Brother Internet Print Port.

8.10 Novell Netware Troubleshooting

If you cannot print from NetWare and you have checked the hardware and network as described in the previous steps, first verify that the Brother print server is attached to the server queue by going to PCONSOLE, selecting `PRINT QUEUE INFORMATION`, and then `CURRENTLY ATTACHED SERVERS`. If the print server does not appear in the list of attached servers, then check the following:

NOTE:

It is always a good idea to try followings in order to eliminate the possibility of setup errors

- *Turn the printer off and then on again to force the printer to rescan the Netware queue.*
- *Delete and recreate the print server and create a new print queue in order to eliminate the possibility of setup errors.*

(1) If you changed the login password, you must change the password in *both* the Brother print server (using the `SET NETWARE PASSWORD` command if you are using the BRConfig software) or by using a web browser or the BRAdmin32 utility and in the file server (using the PCONSOLE Print Server Information Change Password command).

(2) If you created the print queue using PCONSOLE and instead of BRAdmin32, make sure that you have enabled at least one NetWare file server using the `SET NETWARE SERVER` *`servername`* `ENABLED` command.

(3) Have you exceeded your NetWare user limit?

(4) Make sure that the print server name you used in PCONSOLE *exactly* matches the name that is configured in the print server, and make sure it is defined as a Queue Server for the print queue.

(5) If you are running both 802.3 and Ethernet II frames on different file servers on your network, there is a possibility that the print server may not make a connection to the desired file server. Try forcing the frame type to the desired one using the `SET NETWARE FRAME` command from the print server remote console or using BRAdmin32.

(6) If you are using DOS CAPTURE statement and losing portions of your print job, try setting the TIMEOUT parameter in your CAPTURE statement to a higher value (at least 50 seconds for Windows).

8.11 AppleTalk Troubleshooting

If you cannot print from an AppleTalk for Macintosh computer and you have checked the hardware and network as described in the previous steps, then check the following:

(1) Make sure that you are running Phase 2 AppleTalk and that you have selected the correct network interface from the Network Control Panel on the Macintosh.

(2) Make sure that the AppleTalk protocol of the print server is enabled.

(3) If you have a large network, make sure that you have the Laser Writer V8.xx or equivalent driver, since earlier versions may cause PostScript errors. Also, verify that you get the correct printer information when you select **Printer Info** from the **Setup** button in the Chooser.

(4) Make sure that you have selected the correct Printer Description File (PPD) from the Chooser (otherwise PostScript errors may result)

(5) Verify that you have selected the correct AppleTalk zone. Because the print server gets its zone information from router broadcasts, it may not be in the zone you expect, and will therefore not show up in the Chooser. If this is the case, you may need to force the zone name with the `SET APPLETALK ZONE` command described in Appendix A in the Technical Reference Guide or using BRAdmin Professional.

(6) Verify that the Laser Prep versions on all Macintosh computers that need to print to the print server are the same.

8.12 Apple TCP/IP Printing (System 8.6 or later)

(1) From system 8.6 or later, Apple introduced the Desktop Printer Utility. This utility allows TCP/IP printing from a Macintosh, which has the USB interface.

(2) From the "Internet Printer" dialogue, please ensure that you enter the correct service name in the "Queue" option. For example, for NC-4100h series network cards enter BRN_xxxxxx_P1_AT (where xxxxxx is the last six digits of the MAC address of the NC-3000 series card). For NC-2000 series network cards enter BRO_xxxxxx_P1_AT (where xxxxxx is the last six digits of the MAC address of the NC-4100h network card).

(3) This method of printing requires that the printer supports PostScript. If your printer does not support PostScript printing. Please consult your printer manual to see if your printer supports PostScript.

8.13 Web Browser Troubleshooting (TCP/IP)

(1) If you can not connect to the print server using your web browser it may be worth checking the Proxy Settings of your browser. Look in the Exceptions setting and if necessary, type in the IP address of the print server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the printer server.

(2) Make sure that you are using the proper Web Browser, we recommend Netscape Navigator version 3.0 or later/ Microsoft Internet Explorer version 3.02a or later.

9. INSPECTION MODE

9.1 Before the Operation

Before operating the inspection mode, do the followings:

(1) Confirm that CompactFlash card is installed into the printer.

(2) Confirm that the optional lower tray, the mailbox and the duplex unit are installed into the printer if the optional unit connection test is performed.

(3) Confirm that the empty toner cartridge is installed if the toner cartridge test is performed at the same time.

9.2 Line Inspection Mode Procedure

(1) Enter and exit Line Inspection Mode

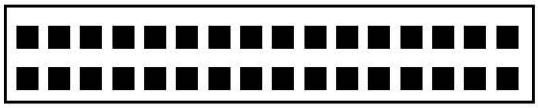
While pressing the **–** and the **+** switch together, turn the power on.
The LCD will display the following message:

"LT", "MX" or "DX" is displayed when the optional lower tray, the mailbox or the duplex unit is installed into the printer.

NOTE:
For exiting the line inspection mode, press the Back switch at any sub menu.

(2) Check LCD and LED display condition

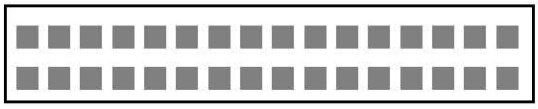
Press the **Set** switch to check if the LCD comes on as follows:



Confirm also that all the LEDs turn on.

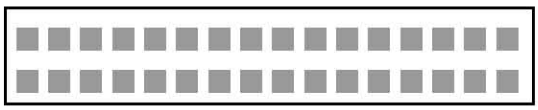
(3) Change LCD optic angle <1>

Press the **Set** switch to check if the LCD comes on. Confirm that the column color has lightened.



(4) Change LCD optic angle <2>

Press the **Set** switch to check if the LCD comes on. Confirm that the column color has become more lightened.



(5) Check control panel switch function and backlight display

Press the **Set** switch to check if all the LEDs go out.
Press all the 7 control panel switches one by one to check if the character and the backlight color will display respectively as the table shows below:

Switch	Character	Backlight color
+	1	Red
Go	2	Green
Back	3	Orange
Set	4	Red
–	5	Green
Job Cancel	6	Orange
Reprint	7	Red

(6) Check sensors

Press the **Set** switch.
Change status of the sensors and the following characters appear if the each sensor in the printer is functioning correctly.

```
ABCDE
```

A: Eject sensor
B: Multi purpose tray paper empty sensor
C: Tray paper empty sensor
D: Cover open sensor
E: Rear cover sensor

(7) Check fans (half speed)

Press the **Set** switch.
Check all the fans rotate at the half speed.

```
FAN CHECK
HALF SPEED
```

(8) Check fans (full speed)

Press the **Set** switch.
Check all the fans rotate at the full speed.

```
FAN CHECK
FULL SPEED
```

(9) Displays paper sizes in the tray and the tray ID status

Press the **Set** switch.
Check if the correct tray size ID is selected for the paper size in the paper tray which is displayed in the LCD.

```
T1 SIZE                    ID
   A4/LTR                   1
```

Use the **Set** switch to select the type of the tray. Status of Tray 2, 3 and 4 will be displayed if they are installed.
Refer to subsection 4 'PRINTING METHODS' in CHAPTER 2 for the tray ID switch.

NOTE:
The backlight turns red when paper empty is detected, and it remains green if paper empty is not detected.

(10) Check reading / writing on CompackFlash card

Press the **Set** switch.

```
CARD1 R/W START
```

Checks reading/writing on Card 1 ID.

```
CARD1 R/W OK
```

The flash card works correctly.

```
CARD1 R/W ERROR
```

There is a problem in reading/writing from the flash memory card 1.

```
NO FLASH CARD1
```

No flash memory card is installed.

(11) Exit the line test mode

Press the **Set** switch to exit the line test mode.

(12) Check toner cartridge
(If you don't need to check toner cartridge, go to the step (13).)

When the line test mode is reset, the LCD shows the message below:

```
TONER EMPTY
Replace the toner cartridge
```

Open the open cover and remove the toner cartridge from the printer, and close the open cover.

Confirm that the LCD shows the message below:

```
NO TONER
Install a toner cartridge
```

(13) Turn off the power.

CHAPTER 7 HIDDEN FUNCTIONS

1. ENTERING HIDDEN FUNCTION MENU MODES

HL-2460 has 3 entrances into the hidden function menu;

1. Power on.
   Press the **Go** switch and the **Set** switch (Professional Menu mode).
   See section 2. 'PROFESSIONAL MENU MODE' in this chapter.
2. Power on.
   While holding down the **Go** switch, press the **+** switch once and then the **Set** switch (Service Menu mode). See section 3. 'SERVICE MENU MODE' in this chapter.
3. Power on and press the specified switch(es) 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 switch and Set switch together to enter the Professional Menu mode.

Accessing the Required Menu

Use either "+" or "– " switch to scroll through the menu listing. To select an item, press the "Set" switch. Then the sub-menu will appear.
Scroll through the sub menu items using the "+/–" switches. To go back to a higher level, select the "exit …" menu in the same level using the "+/–" switches.

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 "+/–" switches, then press the "Set" switch. The previous value remains if the "Set" switch is not pressed.

Exiting the Professional Menu Mode

There are three options to exit the Professional Menu mode; either to press "Go" switch at any sub menus, to press the "–" switch consecutively to go up roots till exiting the Professional Menu mode, or to go down the menu using "+/–" switches till the menu "exit MENU" appears, and then press the "Set" switch 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
TRAY SETTING			
	MANUAL FEED	PAPER IN=CONT*	Feeds paper automatically when printing using the manual feed function.
		PAPER IN=STOP	Feeds paper by pressing the Go switch when printing using the manual feed function.
	TRAY PRIORITY	MP>T1>T2>T3>T4	Selects priority of the paper tray when the paper source tray setting is "automatically selected".
		MP>T4>T3>T2>T1	
		T1>T2>T3>T4>MP	
		T4>T3>T2>T1>MP	
RESET SETTINGS		RESET SETTING1	Selects the "user setting 1" as the current printer setting.
SAVE SETTINGS		SAVE SETTING1	Saves the current printer setting as the "user setting 1".
SAVE 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 LaserJet emulation into the 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 function when re-printing; secure print, proof print or public print
		COLLATE=OFF	
TRAYCOMMAND MODE		TRAY COM.=NORM*	HP LaserJet 4 compatible.
		TRAY COM.=SPEC.	HP LaserJet 3 compatible.

Title & Subtitle		Item to be Set	Description
READOUT SELECT		READOUT=OFF*	When receiving DC3 in FX emulation, ignores the data received before DC1.
		READOUT=ON	Not ignore the data even DC3 is received.
FONT SELECT			
	SCALABLE FONT	FONT=ALL*	Enables all scalable fonts when selecting PCL font setting.
		FONT=LJ4	Disables the fonts below when selecting PCL font setting. *Atlanta, Bermuda Script, PC Brussels, Copenhagen, Germany, Portugal, Calgary, San Diego, US Roman*
	FONT SELECT	PRIMARY FONT	Selects primary fonts in LaserJet emulation.
		SECONDARY FONT	Selects secondary fonts in LaserJet emulation.
	IBM CHR SET MODE	IBM E1H=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 bold. (Print speed would get slow.)
		W BOLD=ON	
	DLFNT Bd/It	DLFNT Bd/It=NO*	YES: Creates bold and italic font from download fonts.
		DLFNT Bd/It=YES	
	B PROD ON/OFF	B PROD=ON*	ON: Creates bold and italic font from bitmap fonts.
		B PROD=OFF	
	CONDENCE SELECT	CONDENC=16.66p*	Selects the pitch for EPSON / IBM condensed characters.
		CONDENC=17.14p	
	OEM FONT SELECT	OEMFONT=DISABLE*	Enables and disables to select European Parliament fonts.
		OEMFONT=ENABLE	
	BRO FONT SELECT	BROBITM=DISABLE*	Enables and disable the built-in 10/12 pitch Brougham bitmap font.
		BROBITM=ENABLE	
	ISR FONT SELECT	ISRFONT=DISABLE*	Enables and disables to select Hebrew font.
		ISRFONT=ENABLE	

Title & Subtitle		Item to be Set	Description
FONT SELECT			
	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	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.	ITA=OBLIQUE*	Makes upright font oblique to have italic as scalable font is selected.
		ITA=ITALIC SEL	Uses the italic font to have italic as scalable font is selected.
	exit FONT		
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.
PARALLEL MENU			
	PARALLEL TIMING	CDCC PSW=H*	BUSY signal gets high when STROBE signal goes up. This is chosen by default.
		CDDC PSW=L	BUSY signal gets high when STROBE signal goes down (low).
	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*	Resets the printer upon INPUT PRIME signal.
		INPUT PRIME=ON	Not reset the printer upon INPUT PRIME signal
	exit PARALLEL		

Title & Subtitle		Item to be Set	Description
RS-232C MENU			
	DSR(DR) ON/OFF	DSR(DR)=OFF*	Not check DSR (DR) signal when a printer send back data to a host through RS-232C. This is chosen by default.
		DSR(DR)=ON	Check DSR (DR) signal when a printer send back data to a host through RS-232C.
	RCV XON/XOFF SEL	RCV XONXOFF=OFF*	Handle Xon / Xoff as a data to be printed. This is chosen by default.
		RCV XONXOFF=ON	Handle Xon / Xoff as a protocol.
	KEEP DTR SEL	KEEP DTR=OFF*	Maintains normal DTR signal output operation.
		KEEP DTR=ON	Maintains DTR signal ready to be output except when the printer is in the off line mode.
	XOFF TIMING SEL		This allows you to set the timing to send out Xoff depending on the free receiving data buffer of the printer.
		XOFF TGM=NORMAL*	This is chosen by default.
		XOFF TMG=11K	Send out Xoff at 11k bytes of the free space remaining.
		XOFF TMG=21K	Send out Xoff at 21k bytes of the free space remaining.
		XOFF TMG=101K	Send out Xoff at 101k bytes of the free space remaining.
	exit SERIAL		
REPRINT ON/OFF		REPRINT=ON*	Follows the user menu's setting which selects either enabling or disabling reprint function.
		REPRINT=OFF	Enables reprint function.
AUTO HRC ON/OFF		AUTO HRC=OFF*	Enables and disables automatic HRC control.
		AUTO HRC=ON	
APPLETALK 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.
		PS BINARY=BIN	Binary data can be printed. Ctrl-T, Ctrl-C etc. does not work.

Title & Subtitle	Item to be Set	Description
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 IMAGE MASK	PS IMAGEMSK=OFF*	ON: Makes print speed faster with an OS/2 driver.
	BS IMAGEMSK=ON	
PS CELL MODE	PS CEIL=FLOOR*	Modulates calculation diffusion of PostScript.
	PS CEIL=CEIL	
PS STATUS ECHO	STATUS ECHO=ON*	Enables and disables PS calculation.
	STATUS ECHO=OFF	
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 page number.
	COPY PAGES=OFF	
PANEL RESET MODE	RESET=NORMAL*	JOB: Changes "reset printer" function to "job cancel" function.
	RESET=JOB	
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 PAGE" into the user menu.
	DEMO PAGE=OFF	
PICKUP RETRY SET	PICKUP RETRY=2*	Set number of re-trying of paper feeding. The number can be selected in the range from 0 to 7. 2 is chosen by default.
TOWERFEED ON/OFF	TowerFeed=OFF*	TowerFeed is not attached. This is chosen by default.
	TOwerFeed=ON	TowerFeed is attached.
JOB CANCEL TIME	TIME OUT=???sec	Selects time (1 to 255 seconds) "job cancel" job becomes time out

Title & Subtitle	Item to be Set	Description
TRANSFER VOLTAGE	VOLTAGE=MODE1*	Switches transfer voltage table. MODE1 = Normal MODE2 = Low MODE3 = Middle MODE4 = High
	VOLTAGE=MODE2	
	VOLTAGE=MODE3	
	VOLTAGE=MODE4	
COLD START MODE	MODE=MODE1*	Controls COLD START by temperature.
	MODE=MODE2	Controls COLD START by temperature and time.
	MODE=OFF	
TONER CHARGE		Selects the toner charge operation mode.
CHARGE MODE	MODE=MODE1*	Rotates the toner cartridge when the fixing unit temperature is below 45°C while the printer is warming up.
	MODE=MODE2	Rotates the toner cartridge 30 minutes after the job except when the printer is in a sleep mode.
	MODE=MODE3	Rotates the toner cartridge 60 minutes after the job except when the printer is in a sleep mode.
	MODE=MODE4	Rotates the toner cartridge 90 minutes after the job except when the printer is in a sleep mode.
	MODE=MODE5	Rotates the toner cartridge 30 minutes after the job.
	MODE=MODE6	Rotates the toner cartridge 60 minutes after the job.
	MODE=MODE7	Rotates the toner cartridge 90 minutes after the job.
	MODE=OFF	
CHARGE TIME	TIME=NORMAL*	Operate toner charge for 20 seconds.
	TIME=LONG	Operates toner charge for 25 seconds.
	TIME=OFF	Disables toner charge operation.
	TIME=SHORT	Operates toner charge for 15 seconds.
FUSER SLEEP CTRL	CONTROL=OFF*	ON = Heats up the fixing unit up to 160°C when the temperature drops to 45°C or below.
	CONTROL=ON	
exit		

Title & Subtitle		Item to be Set	Description
PRINT DELAY			Selects printing start time after the temperature of the fixing unit becomes appropriate for printing.
	THICK PAPER	DELAY=NORMAL*	Start printing 10 seconds after when thick paper loaded.
		DELAY=LONG	Start printing 15 seconds after when thick paper loaded.
		DELAY=OFF	
		DELAY=SHORT	Start printing 5 seconds after when thick paper loaded.
	THICKER PAPER	DELAY=NORMAL*	Start printing 10 seconds after when thicker paper loaded.
		DELAY=LONG	Start printing 15 seconds after when thicker paper loaded.
		DELAY=OFF	
		DELAY=SHORT	Start printing 5 seconds after when thicker paper loaded.
	BOND PAPER	DELAY=NORMAL*	Start printing 10 seconds after when bond paper loaded.
		DELAY=LONG	Start printing 15 seconds after when bond paper loaded.
		DELAY=OFF	
		DELAY=SHORT	Start printing 5 seconds after when bond paper loaded.
	exit		
EXECUTE MENU		THERM CLEANING	Enables thermistor cleaning.
		exit	
exit MENU			Exit the Professional Menu mode.

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 switch, press the + switch once and then the Set switch 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	Displays the number of jam occurrence.
	REPLACE COUNT	
	TONER	Displays the number of the toner cartridge unit replacement.
	DRUM UNIT	Displays the number of the drum unit replacement.
	PF KIT 1	Displays the number of the PF kit replacement. PF kit 1/2/3/4 = PF kit for Tray 1/Tray 2/Tray 3/Tray4.
	PF KIT 2	
	PF KIT 3	
	PF KIT 4	
	FUSER UNIT	Displays the number of the fuser unit replacement.
	LASER UNIT	Displays the number of the laser unit replacement.
	TRANSFER UNIT	Displays the number of the transfer unit replacement.
	COVERAGE	Displays the average coverage (when printing Letter size paper at 100% print coverage). COVERAGE counter can be initialized by clearing "TONER EMPTY". COVERAGE counter will be effective until the page counter counts up to 100,000 pages.

Title	Subtitle	Description
	PRINT 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.
	A4/LTR PAGE	
	LEGAL PAGE	
	B5/EXE PAGE	
	A5 PAGE	
	A6 PAGE	
	B6 PAGE	
	ENVELOPE PAGE	
	A4 LONG PAGE	
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.*
LIFE PERIOD	DRUM UNIT	Displays the drum unit life period.
	PF KIT	Displays the PF kit life period.
	FUSER UNIT	Displays the fixing unit life period.
	LASER UNIT	Displays the laser unit life period.
	TRANSFER UNIT	Displays the transfer unit life period.
REMAIN DRUM	=OFF*	Enables and disables "CHANGE DRUM SOON" display function when the drum unit remaining life period becomes "0".
	=ON	
MODIFY COUNT	JAM COUNT	Displays the number of paper jam occurrence.
	REPLACE COUNT	
	TONER	Displays the number of the toner cartridge replacement.
	DRUM UNIT	Displays the number of the drum unit replacement.
	PF KIT 1	Displays the number of the PF kit replacement. PF kit 1/2/3/4 = PF kit for Tray 1/Tray 2/Tray 3/Tray 4.
	PF KIT 2	
	PF KIT 3	
	PF KIT 4	
	FUSER UNIT	Displays the number of the fixing unit replacement.
	LASER UNIT	Displays the number of the laser unit replacement.
	TRANSFER UNIT	Displays the number of the transfer unit replacement.

Title	Subtitle	Description
MODIFY COUNT	REMAIN LIFE	
	DRUM UNIT	Displays the drum unit remaining life counters.
	PF KIT 1	Displays the PF kit remaining life counters. PF kit 1/2/3/4 = PF kit for Tray 1/Tray 2/Tray 3/Tray 4.
	PF KIT 2	
	PF KIT 3	
	PF KIT 4	
	FUSER UNIT	Displays the fixing unit remaining life counters.
	LASER UNIT	Displays the laser unit remaining life counters.
	TRANSFER UNIT	Displays the transfer unit remaining life counters.
RESET COUNT	CLEAR COVEREAGE	Initialize average coverage counter.
NV-RAM DEBUG	NV-RAM HEX PRINT	Prints NV-RAM HEX dump.
MP-CAS ADJUST	MPTRAY XADJUST	Adjusts the print top margin when printing using MP tray. The number can be selected in the range from -100 to 100.
	T1TRAY XADJUST	Adjusts the print top margin when printing using T1 tray. The number can be selected in the range from -100 to 100.
	T2TRAY XADJUST	Adjusts the print top margin when printing using T2 tray. The number can be selected in the range from -100 to 100.
	T3TRAY XADJUST	Adjusts the print top margin when printing using T3 tray. The number can be selected in the range from -100 to 100.
	T4TRAY XADJUST	Adjusts the print top margin when printing using T4 tray. The number can be selected in the range from -100 to 100.
TEMPER CONTROL	THICK PAPER	Adjusts the toner fixing temperature for thick paper. (-15, -10, -5 or 0)
	PLAIN PAPER	Adjusts the toner fixing temperature for plain paper. (-15, -10, -5 or 0)
	TRANSPARENCIES	Adjusts the toner fixing temperature for transparencies. (-5 or 0)
SCAN CLOCK HIGH	=OFF*	Adjusts the scan clock frequency. OFF=2229Hz, ON=3344Hz
	=ON	

4. OTHER HIDDEN FUNCTION MENUS

4.1 Hidden Function Menus Enabled by Pressing Switch(es) When Turning the Machine on

The following settings and function will be available by holding down the specified switch(es) while turning the machine on.

Switch(es)	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	`LANG.=ENGLISH*` `.....`	**Selects a local language for display.**
–	`HEX DUMP MODE`	**Hex dump mode. Printer reset is needed to exit this function.**
+		**Displays information about program/font ROMs by pressing the Set switch.**
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		**Skips**
– & +	`LINE TEST` `LT MX DX`	**Printer test mode.** DO NOT USE.
– & Set	`HIGHVOLT CHECKER`	**Checks the high-voltage power supply.** DO NOT USE.
+ & Set	`TONER EMPTY TEST`	

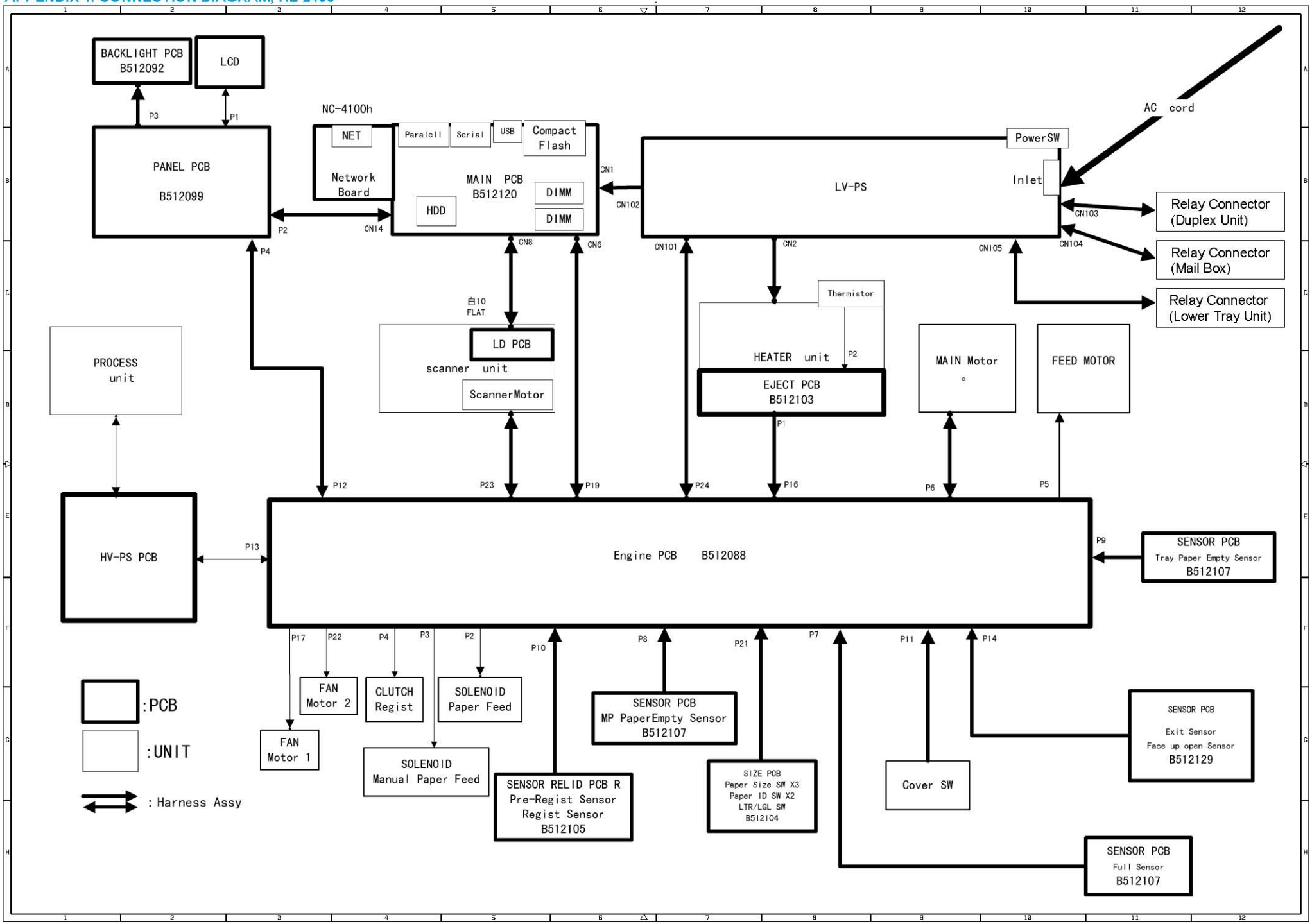
4.2 Parts Life Reset Function

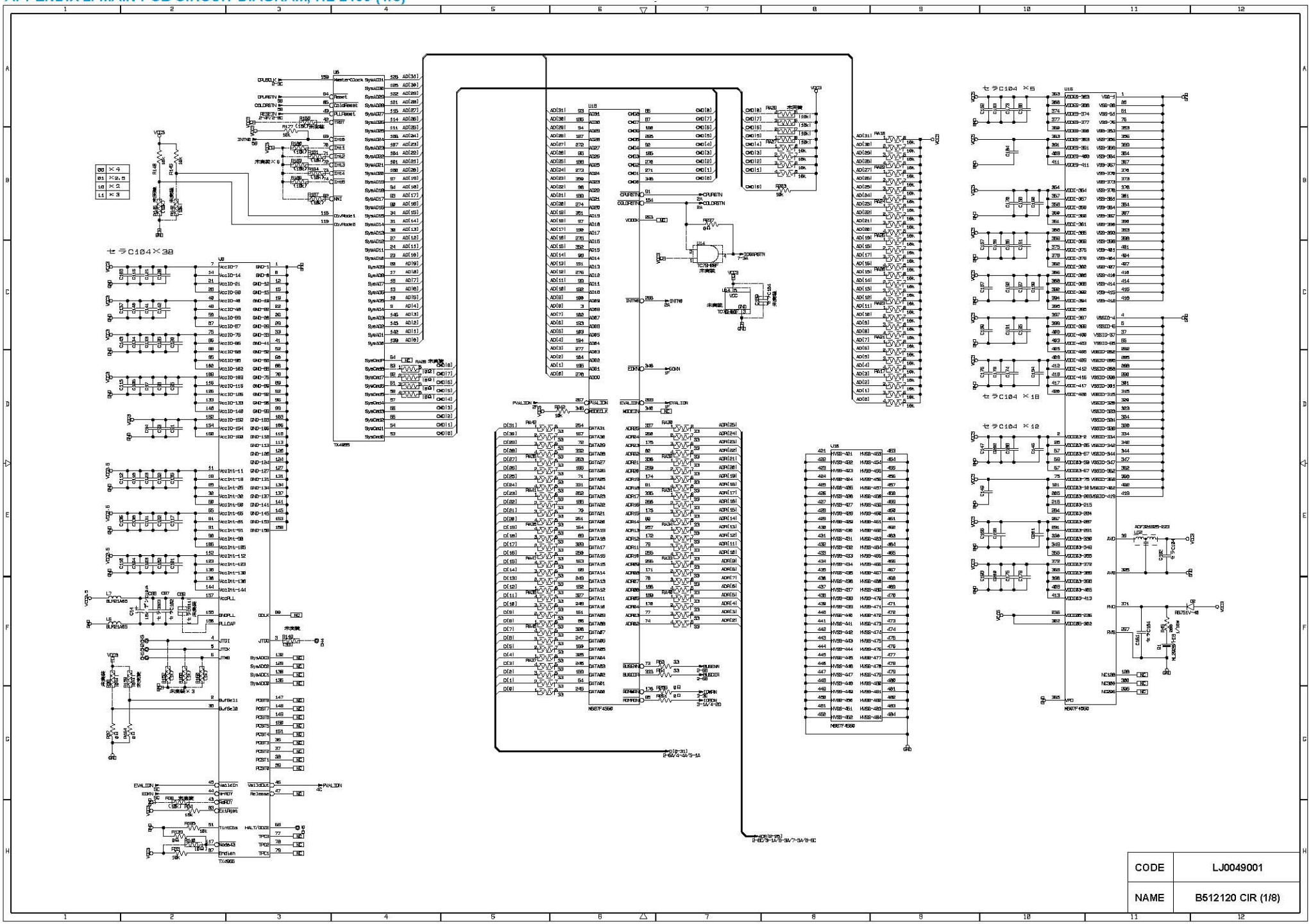
This function is used by service specialists only when changing the periodical replacement parts to clear the life counter.

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

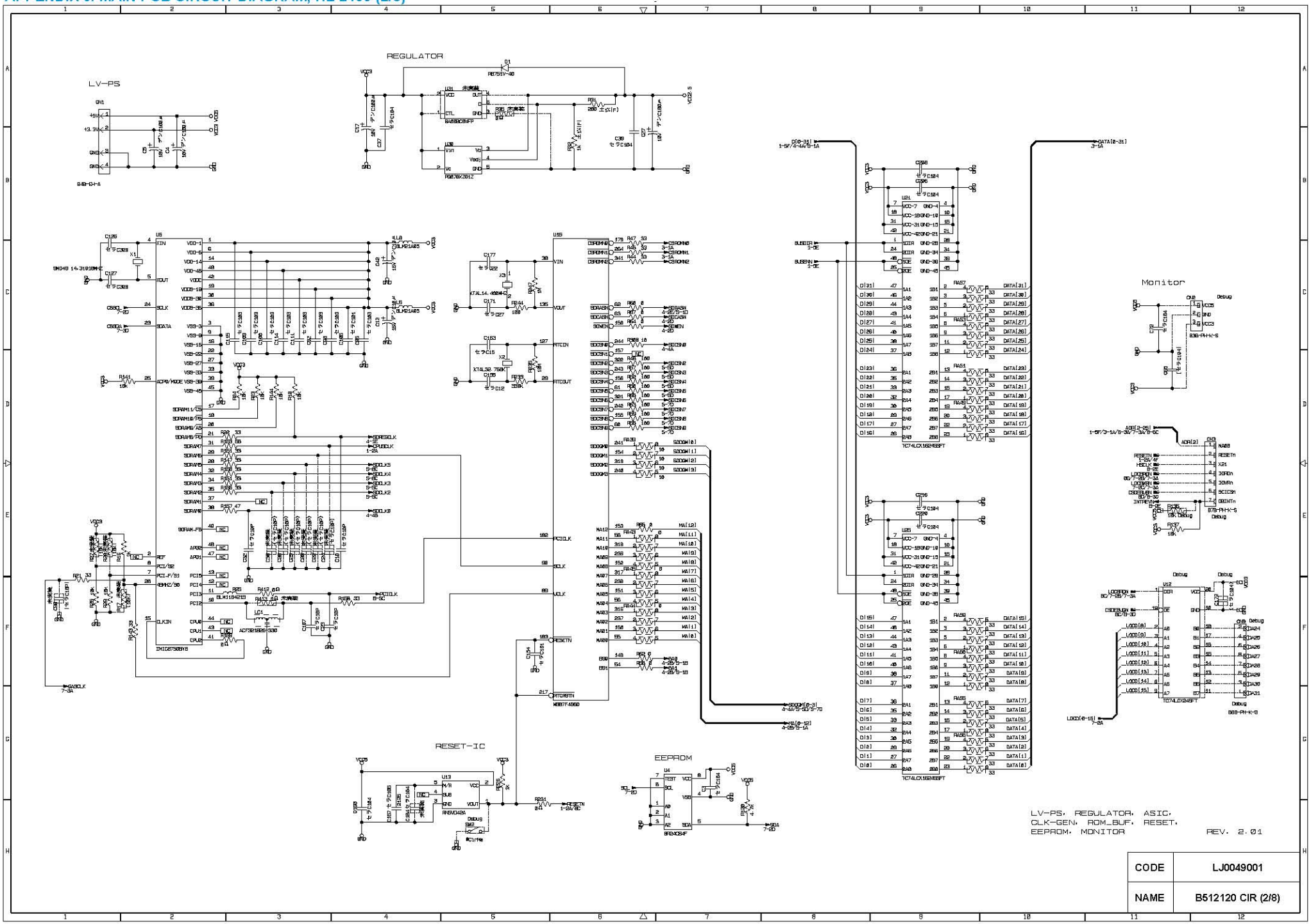
Title	Subtitle	Description
RESET PARTS LIFE	PF KIT1	Initializes the counter of the paper feeding kit to zero. PF kit 1/2/3/4 = PF kit for Tray 1/Tray 2/Tray 3/Tray 4.
	PF KIT2	
	PF KIT3	
	PF KIT4	
	FUSER UNIT	Initializes the counter of the fixing unit to zero.
	LASER UNIT	Initializes the counter of the laser unit to zero.
	TRANSFER UNIT	Initializes the counter of the transfer unit to zero.
	DRUM UNIT	Initializes the counter of the drum unit to zero.

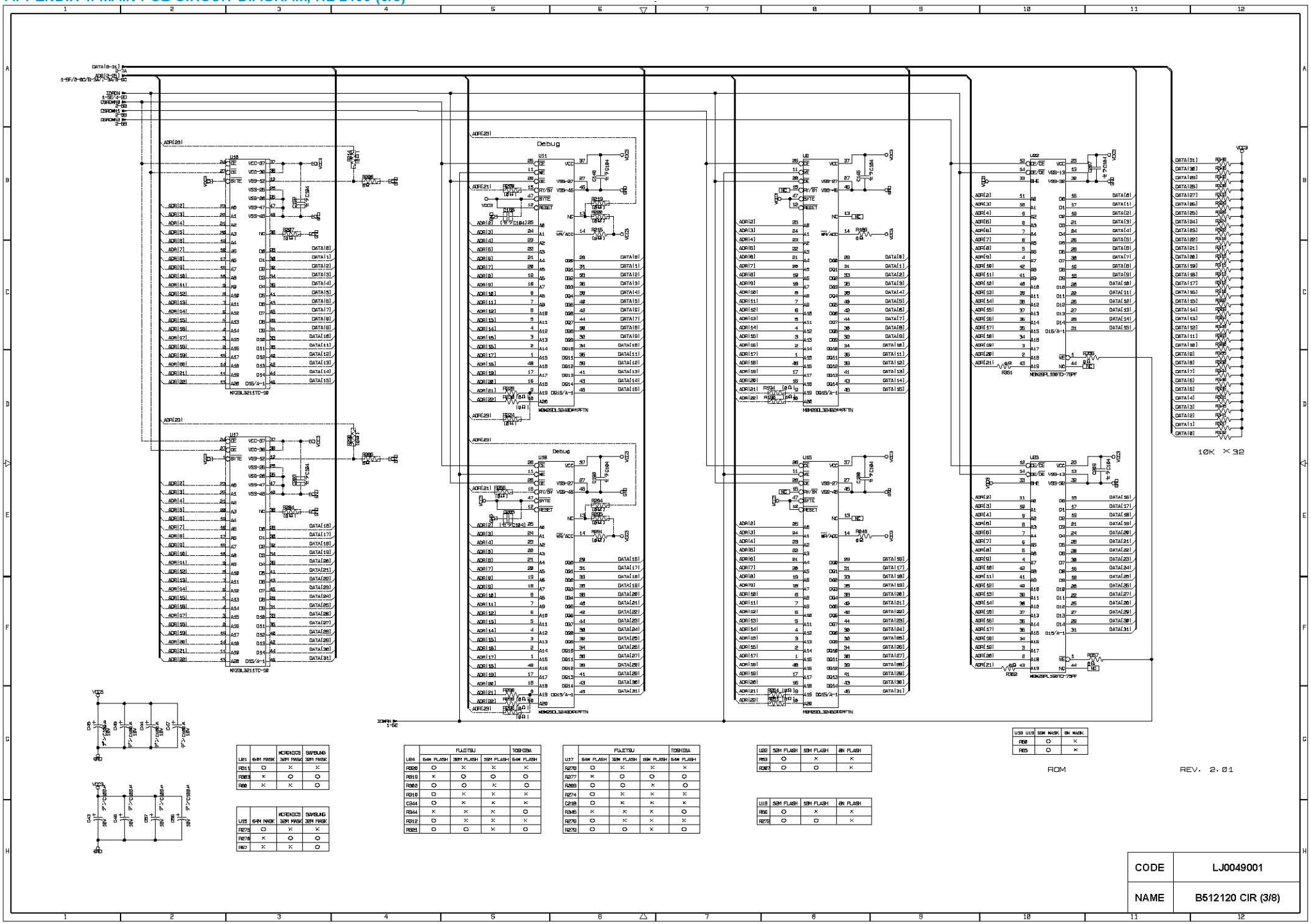
APPENDIX 1. CONNECTION DIAGRAM, HL-2460





CODE	LJ0049001
NAME	B512120 CIR (1/8)


REGULATOR
LV-PS
RESET-IC
EEPROM
Monitor
LV-PS, REGULATOR, ASIC,
CLK-GEN, ROM_BUF, RESET,
EEPROM, MONITOR
REV. 2.01
CODE
LJ0049001
NAME
B512120 CIR (2/8)



U24	64M MASK	MCP/DOC3 32M MASK	SAMSUNG 32M MASK
R811	○	×	×
R809	×	○	○
R90	×	×	○

U18	64M MASK	MCP/DOC3 32M MASK	SAMSUNG 32M MASK
R675	○	×	×
R676	×	○	○
R67	×	×	○

U24	FUJITSU 64M FLASH	FUJITSU 32M FLASH	FUJITSU 16M FLASH	TOSHIBA 64M FLASH
R809	○	×	×	×
R811	×	○	○	○
R902	○	○	×	○
R810	○	×	×	×
C344	○	×	×	×
R844	×	×	×	○
R812	○	×	×	×
R824	○	○	×	○

U17	FUJITSU 64M FLASH	FUJITSU 32M FLASH	FUJITSU 16M FLASH	TOSHIBA 64M FLASH
R276	○	×	×	×
R277	×	○	○	○
R269	○	○	×	○
R274	○	×	×	×
C218	○	×	×	×
R345	×	×	×	○
R275	○	×	×	×
R273	○	○	×	○

U22	32M FLASH	16M FLASH	8M FLASH
R63	◇	×	×
R307	○	○	×

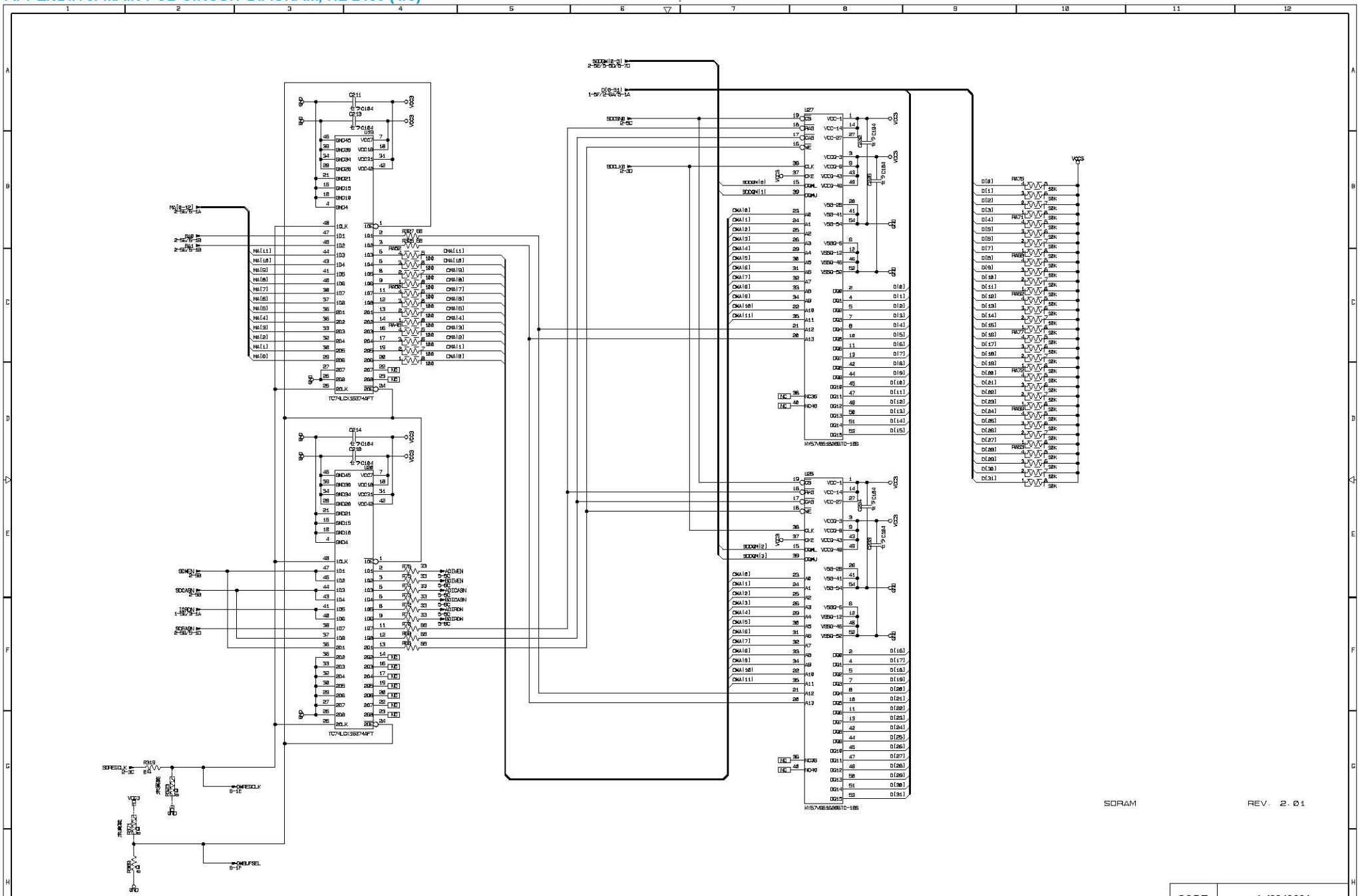
U18	32M FLASH	16M FLASH	8M FLASH
R56	◇	×	×
R276	○	□	×

U31 U19	16M MASK	8M MASK
R58	○	×
R65	○	×

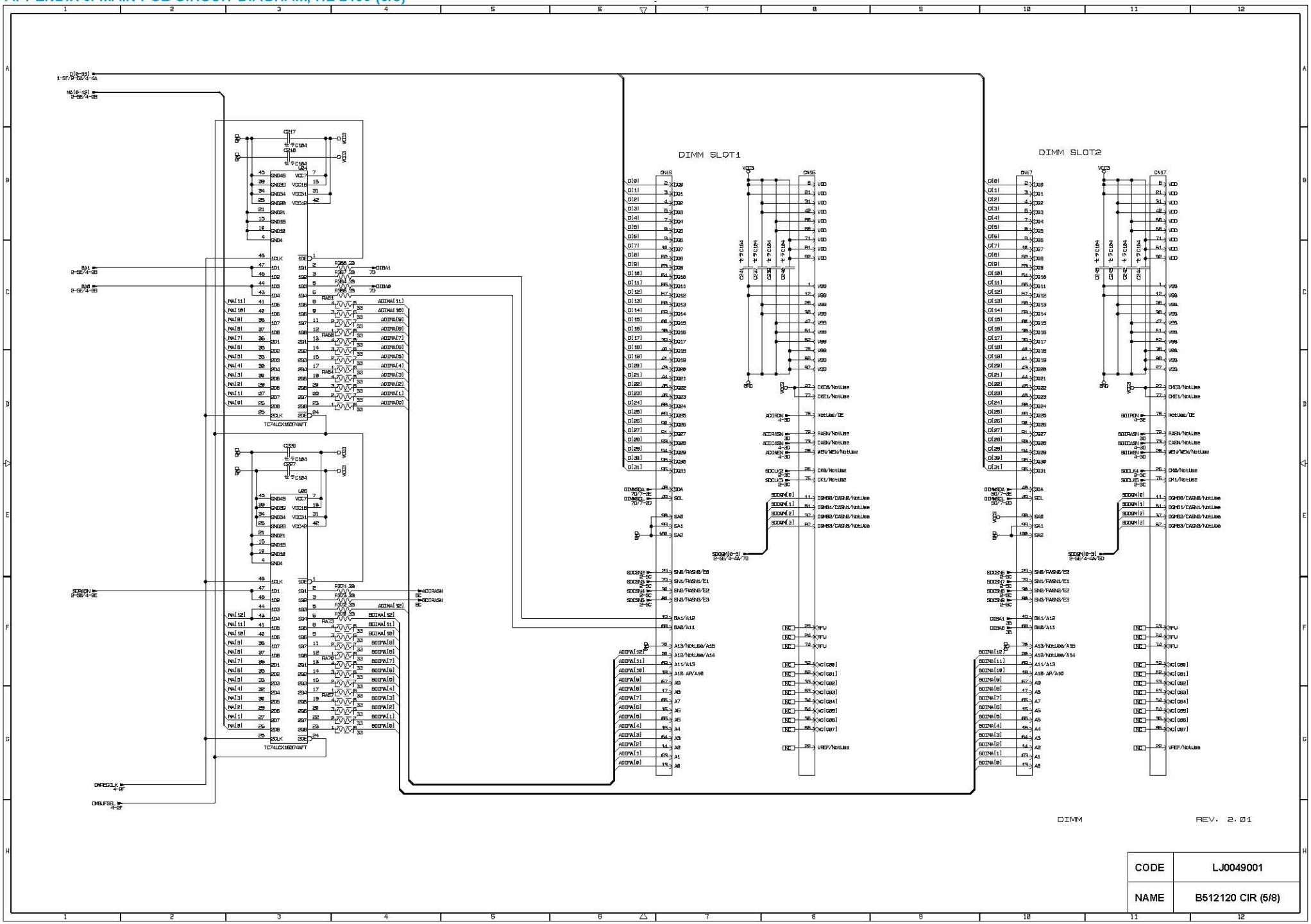
ROM

REV. 2.01

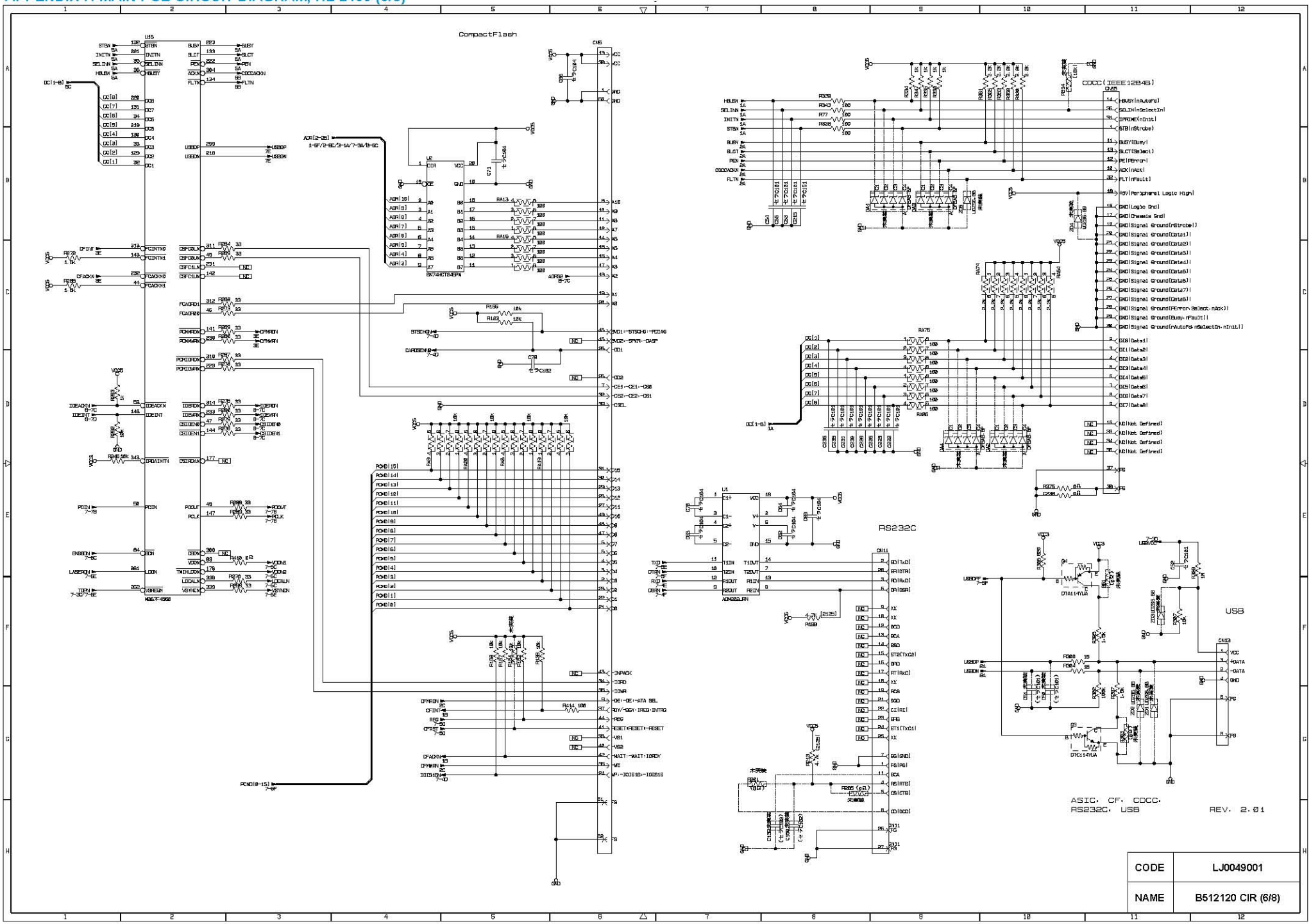
CODE	LJ0049001
NAME	B512120 CIR (3/8)

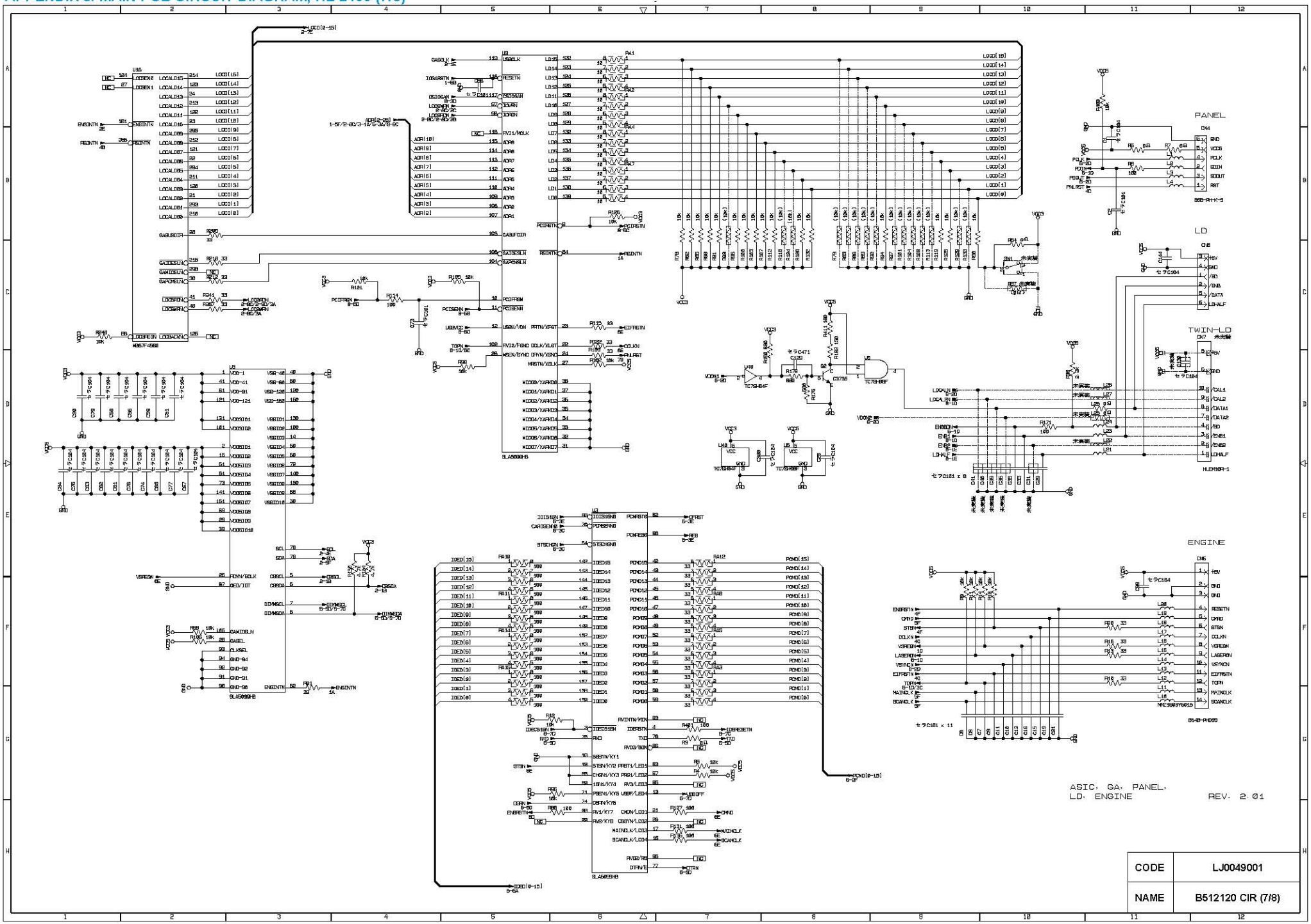


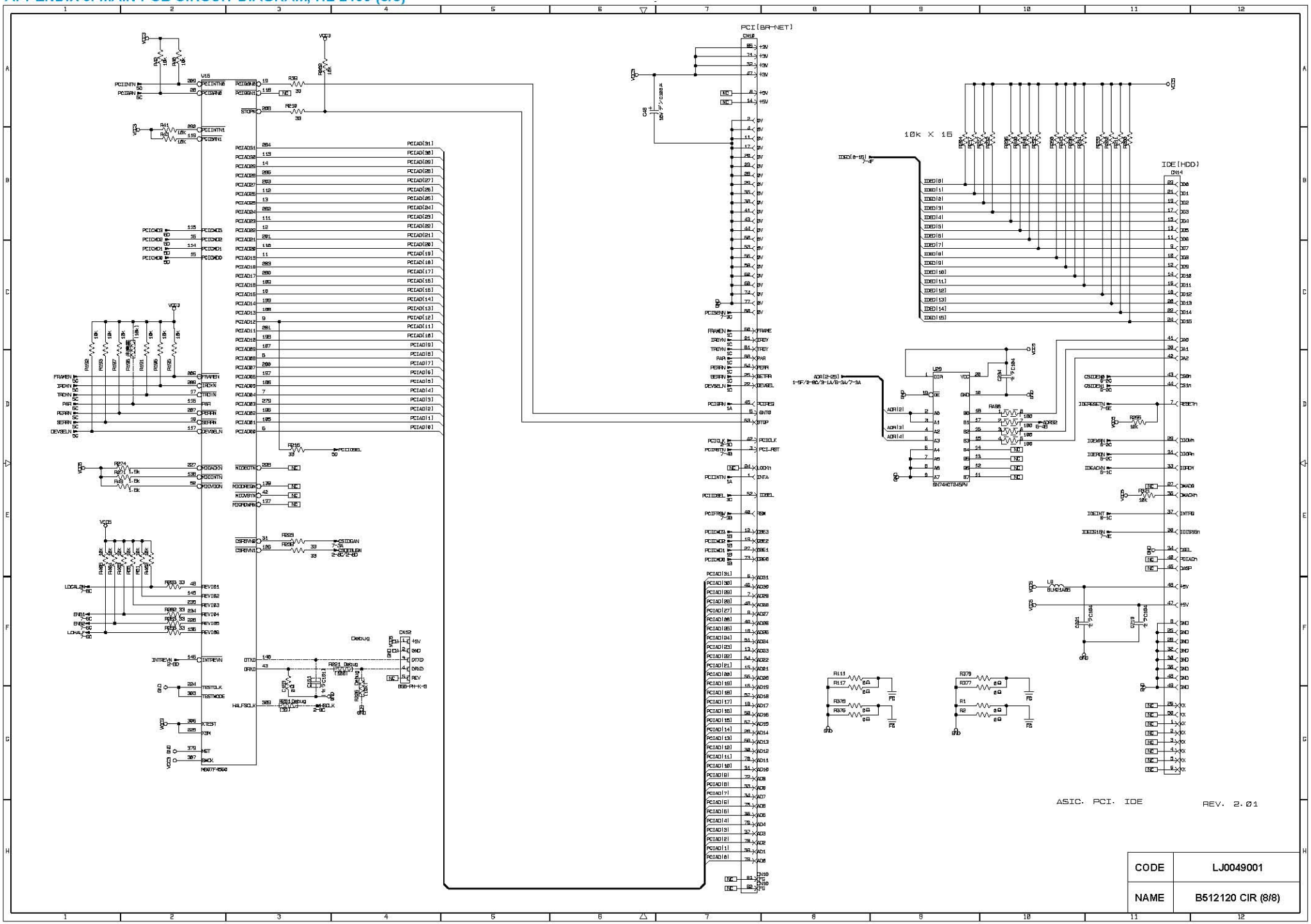
CODE	LJ0049001
NAME	B512120 CIR (4/8)

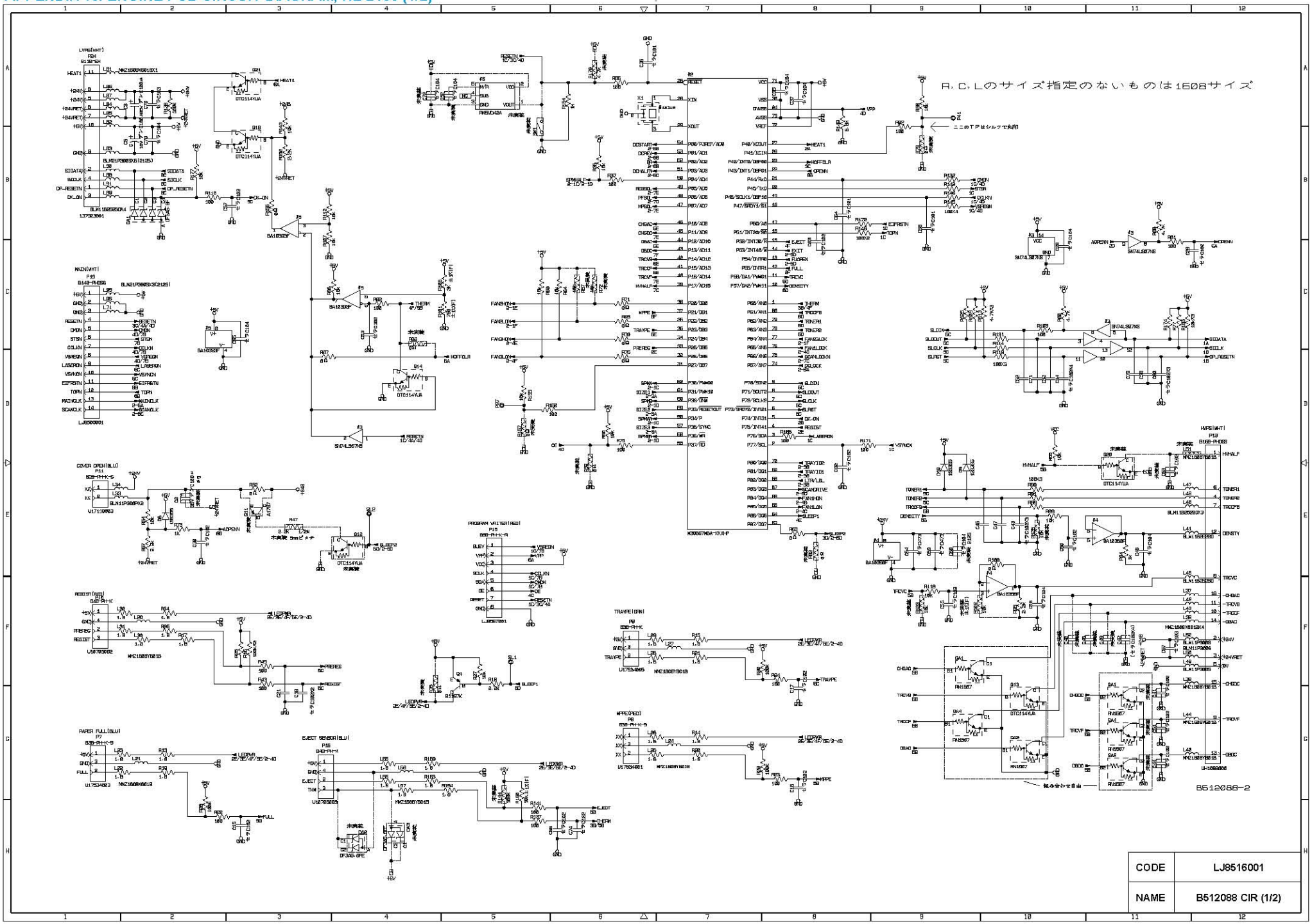


CODE	LJ0049001
NAME	B512120 CIR (5/8)

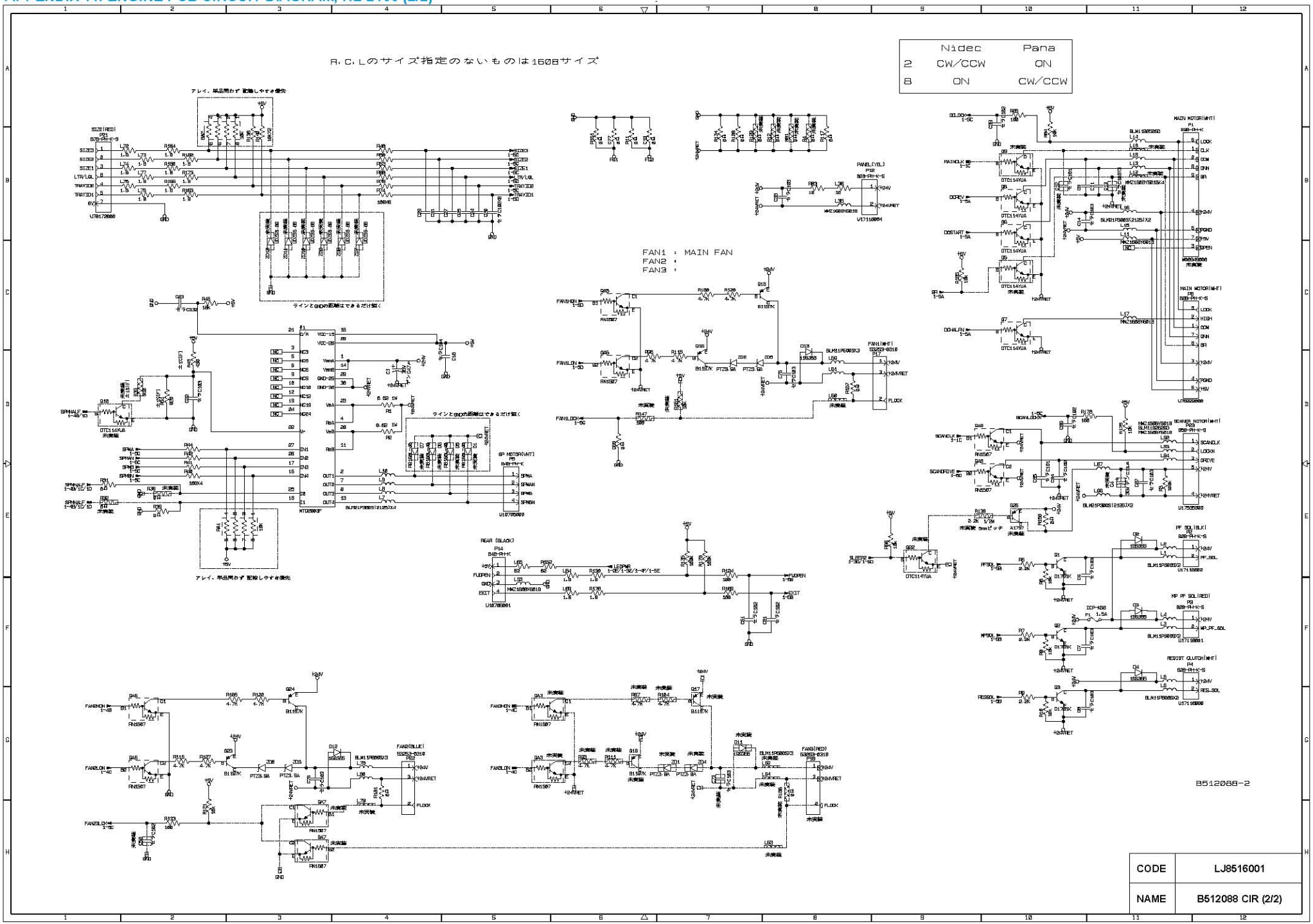

CompactFlash
CDCC(IEEE1284B)
RS232C
USB
ASIC, CF, CDCC,
RS232C, USB
REV. 2.01
CODE
LJ0049001
NAME
B512120 CIR (6/8)


PANEL
LD
TWIN-LD
ENGINE
ASIC, GA, PANEL,
LD, ENGINE
REV. 2.01
CODE
LJ0049001
NAME
B512120 CIR (7/8)


PCI[BA-NET]
10k X 16
IDE[HDD]
ASIC. PCI. IDE
REV. 2.01
CODE
LJ0049001
NAME
B512120 CIR (8/8)

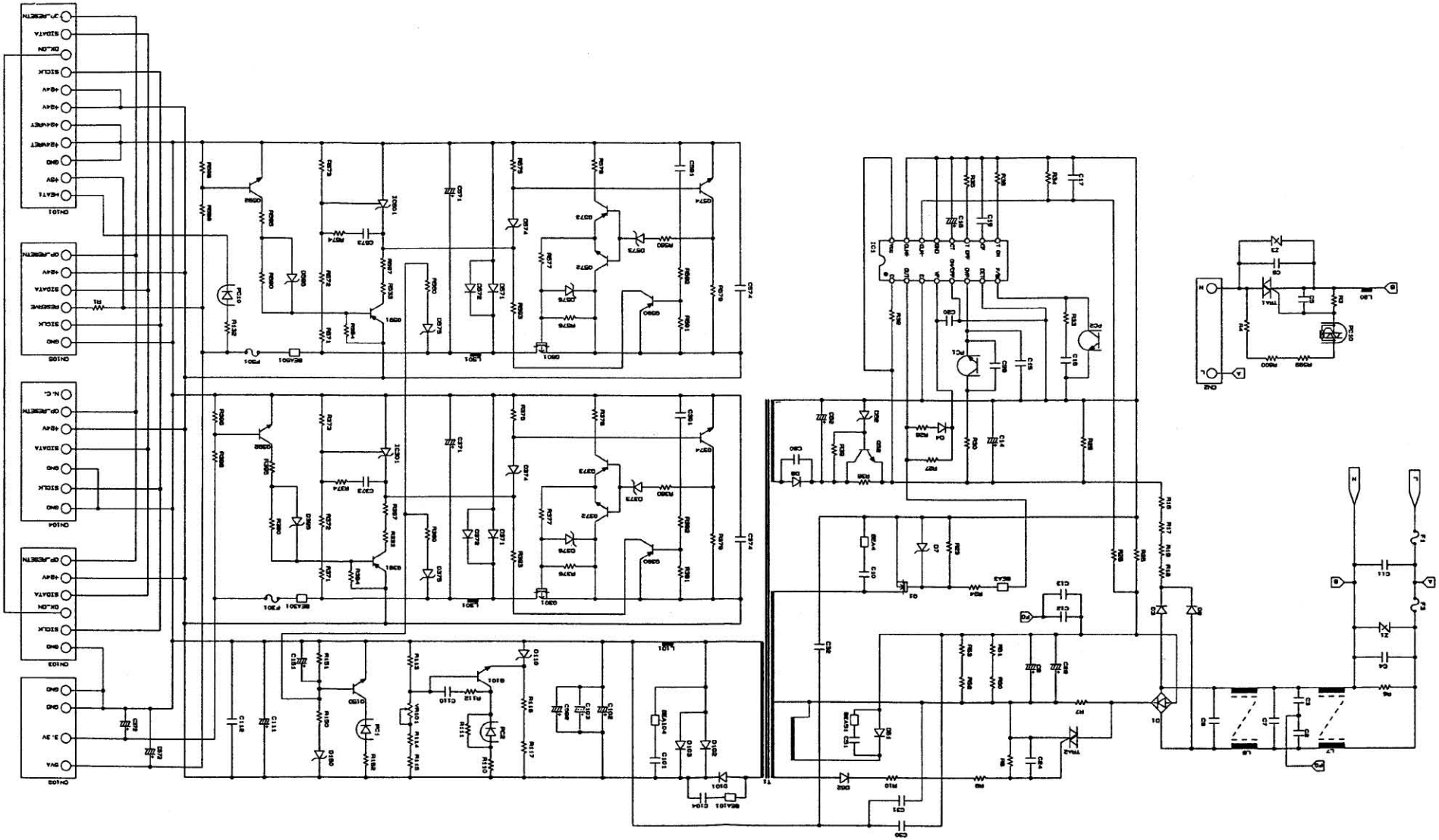


CODE	LJ8516001
NAME	B512088 CIR (1/2)



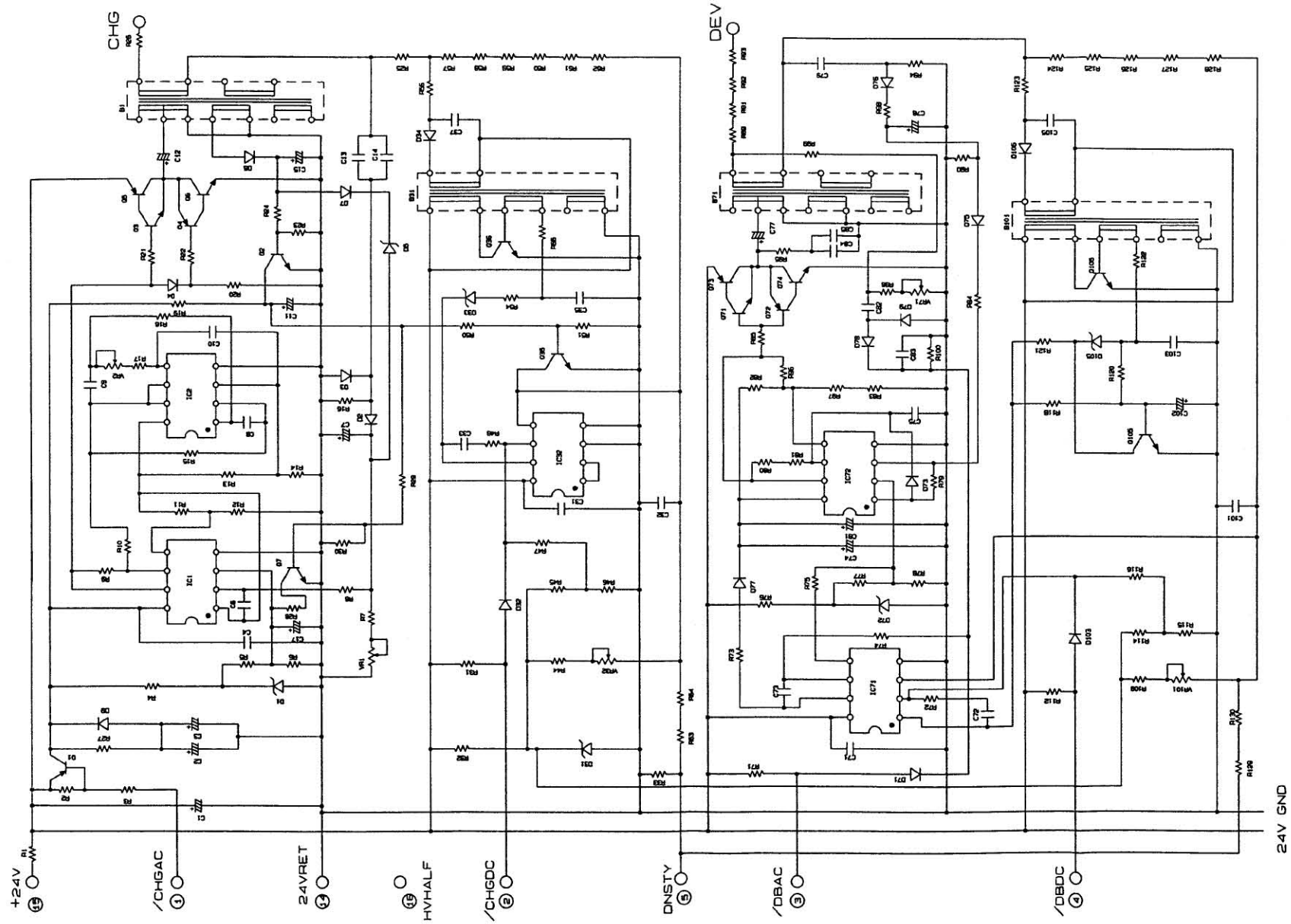
CODE	LJ8516001
NAME	B512088 CIR (2/2)

APPENDIX 12. LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM, HL-2460



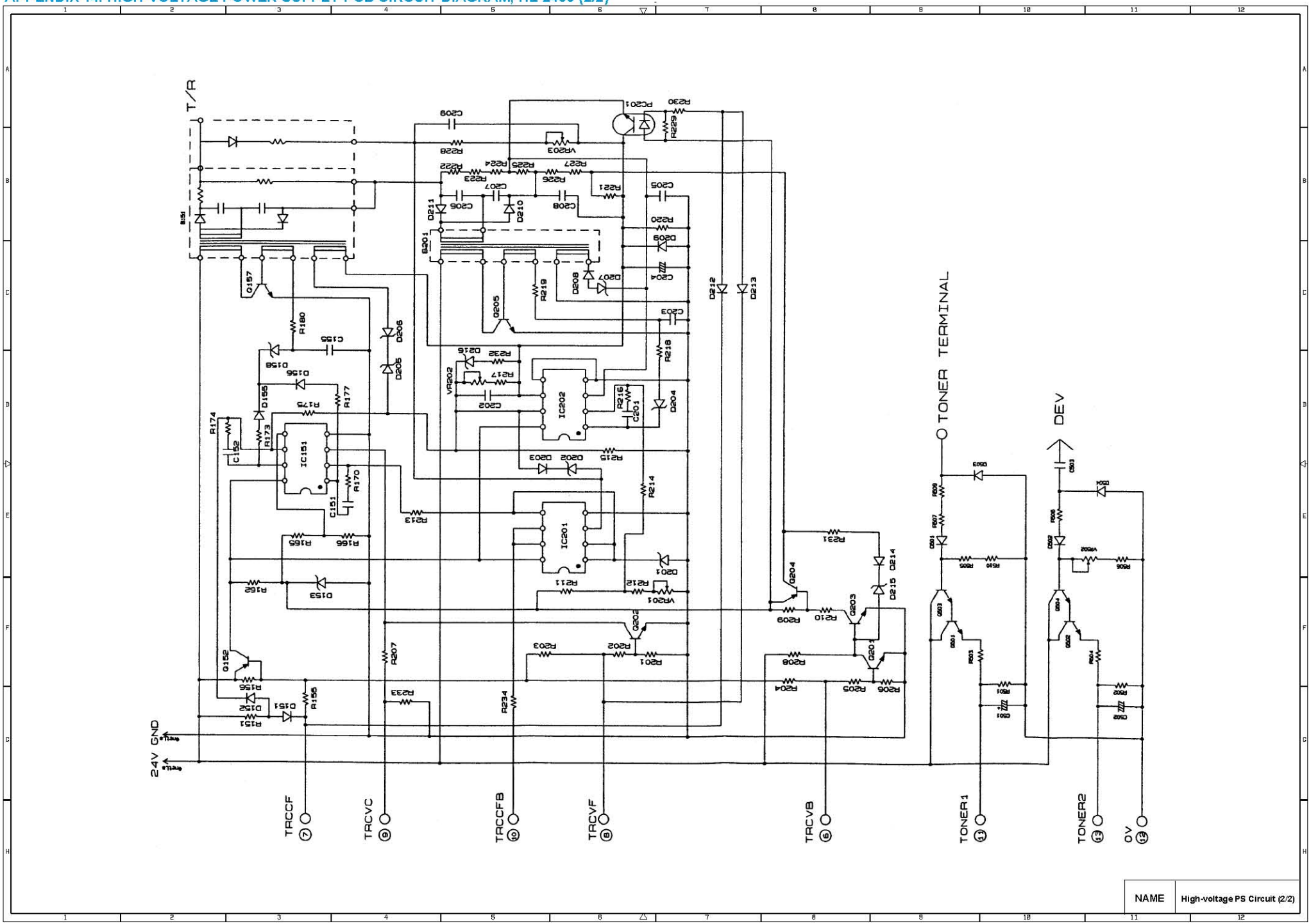
NAME	Low-voltage PS Circuit

APPENDIX 13. HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM, HL-2460 (1/2)



NAME	High-voltage PS Circuit (1/2)

APPENDIX 14. HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM, HL-2460 (2/2)



APPENDIX 15. 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 month >

A:	January	B:	February	C:	March	D:	April
E:	May	F:	June	G:	July	H:	August
J:	September	K:	October	L:	November	M:	December

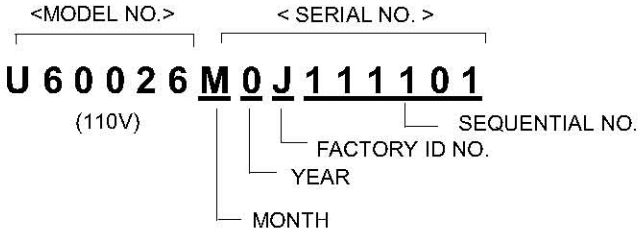
< ID for year >

0: 2000 1: 2001

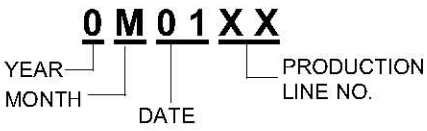
< ID for factory >

9: Kariya Plant A: Mie Brother C: BIUK
J: Buji Nan Ling Factory

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



(2) Toner cartridge



(3) Laser unit: On the laser unit

APPENDIX 16. DIAMETER / CIRCUMFERENCE OF ROLLERS

The diameter and circumference of each roller are listed below;

No.	Parts Name	Diameter (Circumference)
1	First Paper Feed Roller	ϕ 13.8 mm (43.3 mm)
2	Paper Feed Roller	ϕ 14.0 mm (44.0 mm)
3	Transfer Roller	ϕ 15.20 mm (47.7 mm)
4	Photosensitive Drum	ϕ 29.97 mm (94.1 mm)
5	Heat Roller	ϕ 34.32 mm (107.8 mm)
6	Pressure Roller	ϕ 25.0 mm (78.5 mm)
7	Development Roller	ϕ 20.0 mm (39.0 mm)

APPENDIX 17. PRINT SPEEDS WITH VARIOUS SETTINGS

Print speed of the HL-2460 printers is up to 24 ppm when loading A4 or Letter size paper from the regular paper cassette in the Regular mode.

Actual print speed varies depending on the paper type, paper size, print method (output tray type) as shown in the tables below;

(1) Print speeds (ppm) when loading paper from the **regular paper cassette**;

Paper type	Ledger	Letter A4	Executive B5	A5	B6	A6	Envelope
Transparency	24	24	24	24	24	24	24
Regular	24	24	24 → 12 *1	12	12	12	12
Thick paper	24	24	12	12	12	12	12
Thicker paper	24	24	12	12	12	12	12
Bond paper	24	24	24 → 6 *2	12	12	12	12
Envelope	12	12	12	12	12	12	12

(2) Print speeds (ppm) when loading paper from the **optional lower tray (LT-4000)**;

Paper type	Ledger A4Long	Letter A4	Executive B5	A5	B6	A6	Envelope
Transparency	24	24	24	24	24	—	—
Regular	24	24	24 → 12 *1	12	12	—	—
Thick paper	24	24	12	12	12	—	—
Thicker paper	24	24	12	12	12	—	—
Bond paper	24	24	24 → 6 *2	12	12	—	—
Envelope	12	12	12	12	12	—	—

(3) Print speeds (ppm) when using the **optional duplex unit (DX-4000)**;

Paper type	Ledger A4Long	Letter A4	Executive B5	A5	B6	A6	Envelope
Transparency	—	—	—	—	—	—	—
Regular	20	20	20 → 12 *1	—	—	—	—
Thick paper	—	—	—	—	—	—	—
Thicker paper	—	—	—	—	—	—	—
Bond paper	20	20	20 → 6 *2	—	—	—	—
Envelope	—	—	—	—	—	—	—

(4) Print speeds (ppm) when using the **optional mail box (MX-4000)**;

Paper type	Ledger A4Long	Letter A4	Executive B5	A5	B6	A6	Envelope
Transparency	24	24	24	—	—	—	—
Regular	24	24	24 → 12 *1	—	—	—	—
Thick paper	—	—	—	—	—	—	—
Thicker paper	—	—	—	—	—	—	—
Bond paper	24	24	24 → 6 *2	—	—	—	—
Envelope	—	—	—	—	—	—	—

*1 The print speed is slowed from 24 ppm / 20 ppm to 12 ppm after printing 24 pages.

*2 The print speed is slowed from 24 ppm / 20 ppm to 6 ppm after printing 12 pages.

NOTE:

- *When a smaller size paper than A4 or Letter is printed, the temperature on both edges of the fixing unit is much higher than the temperature on the center of the unit where the paper is fed depending on the setting or model. Therefore, the print speed is slowed in order to decrease the temperature on the edges after the specified time; it is maximum print speed when you first start printing.*
- *All the figures are the maximum print speeds.*

APPENDIX 18. 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. 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).

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

<Sample>

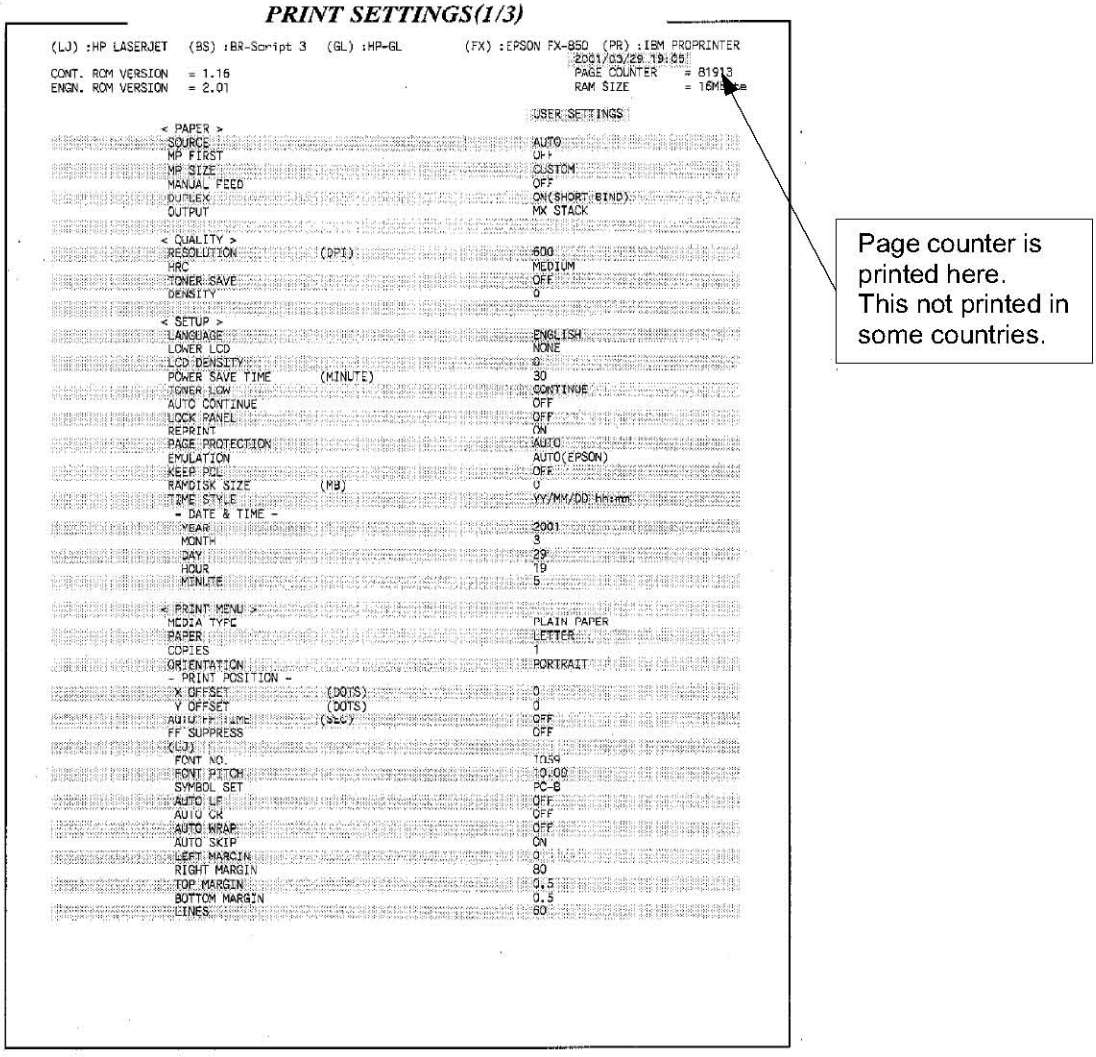


Fig. A- 1

NOTE:

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

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

The page counter is shown on page one, in the top right hand corner of the Print Configuration page.

The page counter is not shown directly for some countries. (Refer to the note in the previous page.)

Parts remaining life is shown in the bottom on page two of the print configuration page as below;

```
REMAIN     FUSER: 118026   LASER: 118026   TRANSFER: 118026
           PF KIT1: 46878  PF KIT2: 98163  PF KIT3: 98000     PF KIT4: 95738
                                                          MZ-L2A200640BCD00
```

Fig. A- 2

APPENDIX 19. 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.

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.

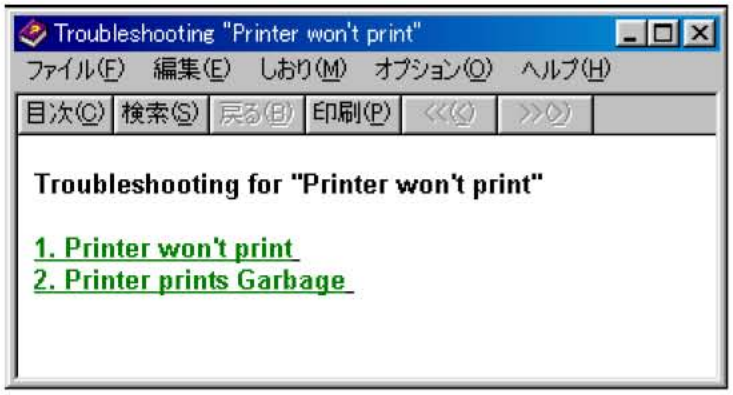


Fig. A- 3

(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'.

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.

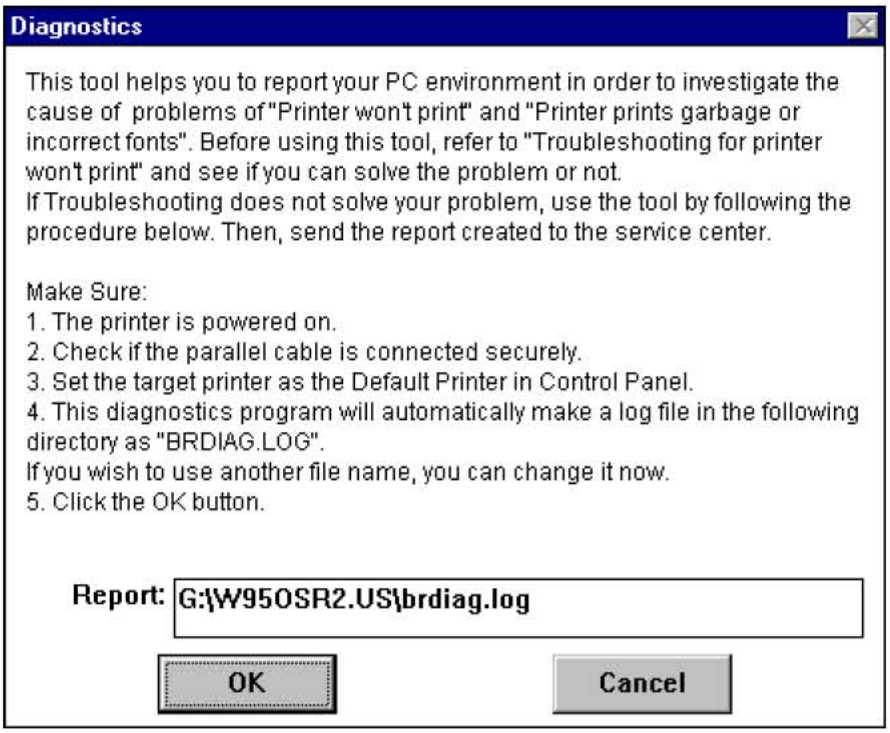


Fig. A-4

(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. A-5

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

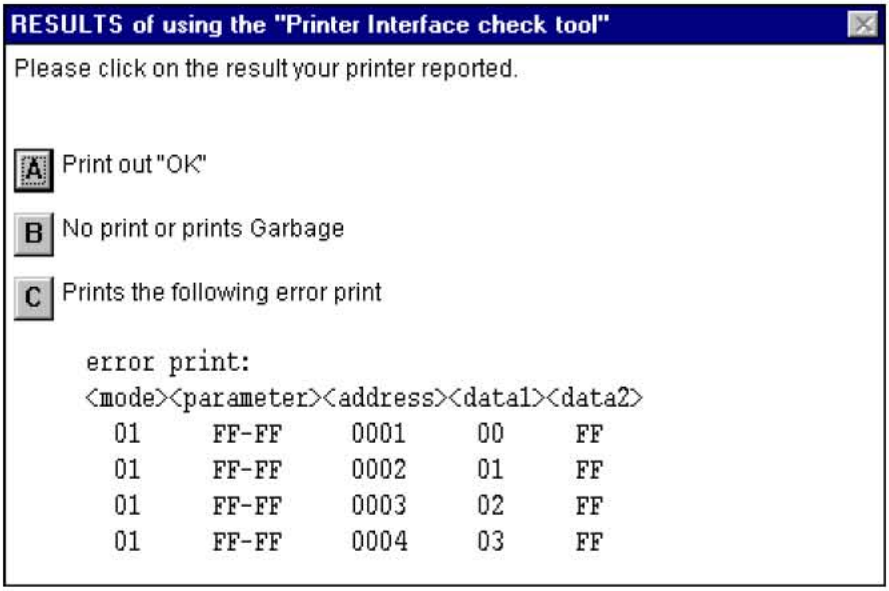


Fig. A-6

(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.

3. Printer Information

The drum unit life or page counter is printed on Print Configuration in some countries as described in APPENDIX 18 'HOW TO KNOW PAGE COUNTER & PARTS LIFE'.

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

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

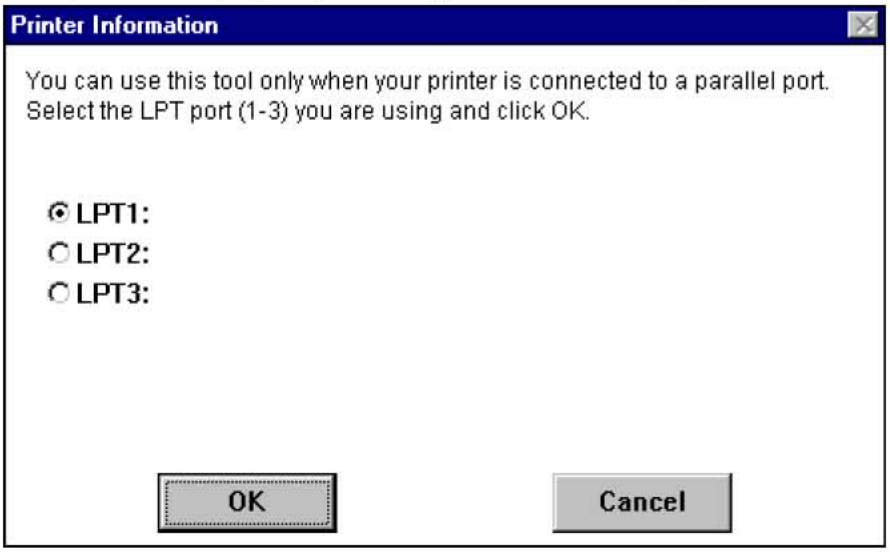


Fig. A-7

(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.

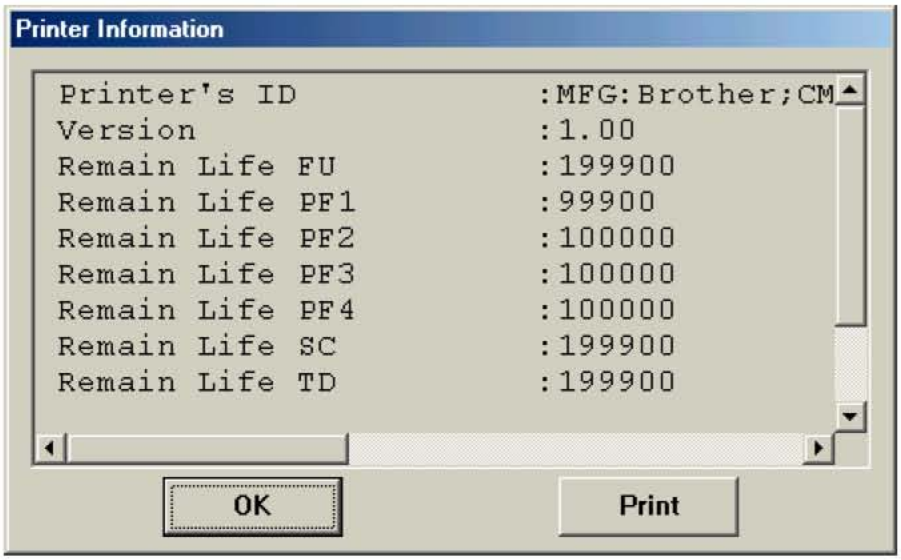


Fig. A-8

APPENDIX 20. NVRAM DEFAULT VALUE

The default values for the main items to be set in NVRAM are as follows;

Items	Descriptions
Development switching timing	The developing bias is switched from 400V to 300V when 5,000 pages are printed. It is switched to 400V again when the toner cartridge is replaced following the "TONER EMPTY" error message (Counted from the number of the drum rotation in non-continuous printing)
Fixing temperature	• Transparency: 170°C • Thin paper: 185°C • Regular paper: 208°C (195°C when printing using duplex function) • Thick paper: 220°C • Thicker/Bond paper: 220°C (in non-continuous printing)
Smaller size mode	See APPENDIX 17 'PRINT SPEEDS WITH VARIOUS SETTINGS'.

APPENDIX 21. PAPER CASSETTE INFORMATION (FOR EUROPE ONLY)

The paper cassette fitted to the printer is different from the service manual information for printers shipped to Europe as follows:

(1) The paper cassette supplied with the HL-2460 printer has a plastic rib on the paper tray cover as shown below;

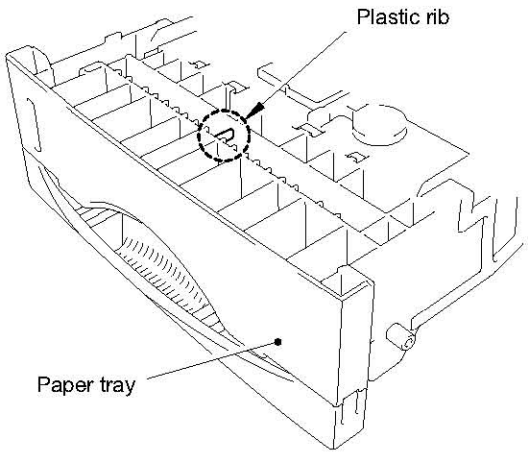


Fig. A- 9

(2) The plastic rib is removed from the tray cover for the paper cassette supplied with the LT-4000, (optional Lower Tray Unit) as shown below;

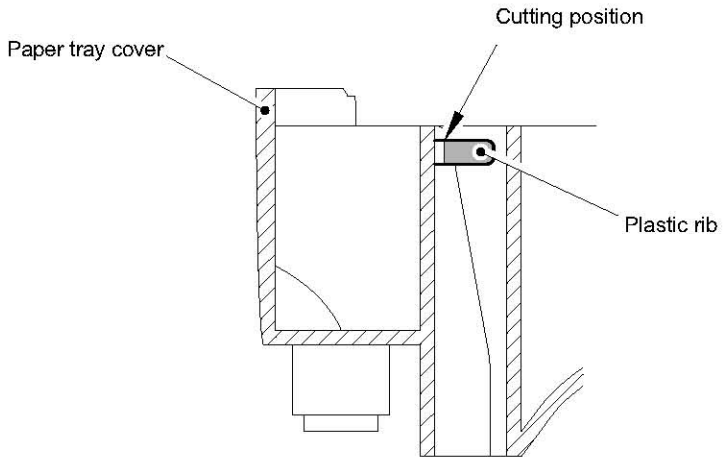


Fig. A- 10

(3) If the optional LT-4000 Lower Tray Unit is installed onto the HL-2460 printer, it is necessary to exchange the cassette supplied with the LT-4000 Unit with the upper cassette already fitted into the printer. Install the cassette originally fitted in the printer into the LT-4000 Unit.

Failure to do so will cause paper jams, as the paper cannot be fed from the lower cassette to the printer body because the plastic rib on the paper tray cover is blocking the paper path.

(4) For paper cassettes supplied as spare parts, the plastic rib has been cut off so that you can use it as both an upper cassette and lower cassette.

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