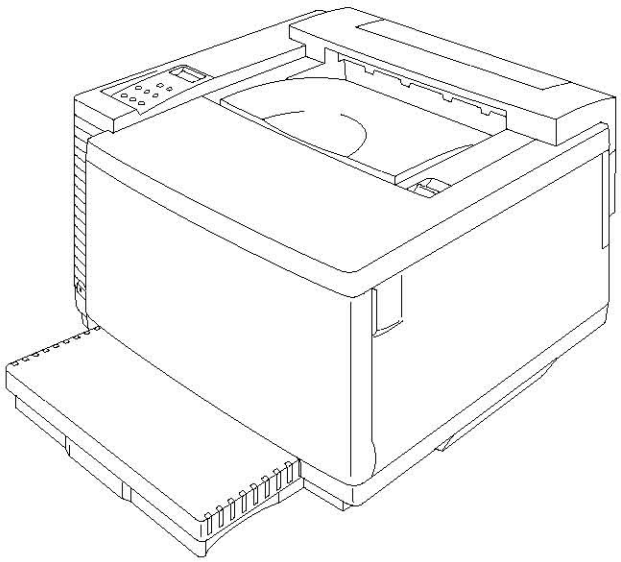
brother

Brother Color Laser Printer

SERVICE MANUAL

MODEL: HL-3450CN



Read this manual thoroughly before commencing any maintenance work.

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

January, 2002
SM-PRN028

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PREFACE

This service manual contains basic information required for after-sales service of the color laser printer (here-in-after 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-3450CN color laser printer.

This manual consists of the following chapters:

CHAPTER 1: OUTLINE OF PRODUCT

Features, parts names, internal structure, and description of the control panel.

CHAPTER 2: SPECIFICATIONS

Specifications, etc.

CHAPTER 3: INSTALLATION

Installation conditions and installation procedures.

CHAPTER 4: STRUCTURE OF SYSTEM COMPONENTS

Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.

CHAPTER 5: CONTROL PANEL OPERATION

Operation and setting procedures on the control panel.

CHAPTER 6: PERIODIC MAINTENANCE

Description of periodic maintenance parts and procedures for periodic replacement and cleaning.

CHAPTER 7: DISASSEMBLY

Procedures for replacement of the mechanical system parts.

CHAPTER 8: TROUBLESHOOTING

Description of error messages on the control panel, troubleshooting image failure, etc.

APPENDICES : SERIAL NO. DESCRIPTIONS, ETC.

Information in this manual is subject to change due to improvement or re-design 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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REGULATIONS

LASER SAFETY (FOR 110-120 V MODEL ONLY)

This printer is certified as a Class I laser product under the U.S. 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 protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

FDA REGULATIONS (FOR 110-120 V MODEL ONLY)

U.S. 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.

Caution

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

IEC 60825 SPECIFICATION (FOR 220-240 V MODEL ONLY)

This printer is a Class 1 laser product as defined in IEC 60825 specifications. The label shown below is attached in countries where required.



This printer has a Class 3B Laser Diode which emits invisible laser radiation in the Scanner Unit. The Scanner Unit should not be opened under any circumstances.

Caution

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

The following caution label is attached near the laser unit.



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 INSTRUCTIONS

SAFETY PRINCIPLE

1) Before starting any operations, read this manual thoroughly. Especially read the safety instructions in this section carefully and ensure that you understand the contents.
2) Perform all the operations by following the procedures described in this manual. Follow all the cautions and warnings set out in the procedures and on safety labels affixed to the machine. Failure to do so may result in human injury or equipment damage.
3) Perform only the procedures explained in this manual. Refrain from opening or touching any portions that are not related to your required operation(s).
4) Repair and replacement of parts should be performed by trained and qualified persons only. Operators should not attempt to do such repair or replacement work.
5) It must be appreciated that the above-mentioned cautions and warnings do not cover every circumstance because it is impossible to evaluate all the conditions of repair situations.

SPECIAL SAFETY INFORMATION

Introductory Information

Cautions and warnings are made clear by them following a 'Safety Alert Symbol' or 'Signal Word' such as DANGER, WARNING and CAUTION.

<SAFETY ALERT SYMBOL>

This is the safety alert. When you find this symbol placed on the equipment or marked in this manual, be aware of the potential of human injuries. Follow the recommended precautions and safety operation practices.

<Understanding Signal Words>
DANGER is used to indicate the presence of a hazard which will cause severe human injuries or a fatal accident if the warning is ignored.
WARNING is used to indicate the presence of a hazard or unsafe practices which may cause severe human injuries or a fatal accident if the warning is ignored.
CAUTION is used to indicate the presence of a hazard or unsafe practices which may cause minor human injuries if the warning is ignored. CAUTION also calls your attention to safety messages in this manual.

<Follow Safely Instructions>
Carefully read all the safety messages set out in this manual and also in the safety warning signs placed on the equipment. In this manual, the safety instructions (safety alert symbols and signal words) are enclosed in a rectangular enclosure to bring them to your attention. Keep the safety signs on the equipment in good condition and ensure none are missing or damaged. Replace the safety signs if unreadable or damaged. Learn how to operate the equipment and how to use the controls properly. Do not let anyone operate this equipment without following the instructions. Keep the equipment in proper working condition. Unauthorized modification to the equipment may impair the function & safety and affect the life of the equipment.
Listed below are the various kinds of "WARNING" messages contained in this manual.

<Caution for the batteries>
There is a danger of explosion if the battery is incorrectly replaced.
Do not replace the battery.
Do not disassemble, recharge or dispose of in fire.
Used battery should be disposed of according to local regulations.

⚠ WARNING

HAZARDOUS VOLTAGE

May cause serious injuries or fatal accidents. Voltage is now applied from the power supply of printer. There is a danger of electrical shock if you touch the active area inside the printer.

Be sure to turn the power supply switch OFF and pull the plug out from the power outlet before starting maintenance work on the printer.

⚠ WARNING

HARMFUL OZONE GAS

Inhalation of an excessive amount of ozone gas may adversely affect the respiratory organs.

An Ozone Filter is fitted to this printer to reduce the exhausted ozone. This filter must be replaced with a new filter periodically in accordance with the manual supplied with the printer.

⚠ WARNING

HOT SURFACE

The Fusing Unit reaches a temperature of approx.160°C and adjacent parts are also very hot.

When you need to change the cleaning pad or remove jammed paper, wait about 20 minutes after opening the paper exit unit to allow the unit to cool down.

⚠ CAUTION

ROTATING PARTS

Be aware of the potential danger of various rollers and take care not to get your fingers or hand caught in the machine, this can cause serious injuries. Note that the exit roller that ejects the printed paper rotates during printing.

Be careful not to get your hair, fingers, hands, sleeve or necktie caught in the machine while operating the machine.

CAUTION

HAZARDOUS POWDER

Toner is a fine powder which can cause a powder explosion if disposed of into a fire. Under no circumstances dispose of toner into a fire.

CAUTION

HAZARDOUS POWDER

Toner is a fine powder which may cause irritation to the eyes and respiratory organs if inhaled.

Handle the toner cartridge, waste toner pack and developing unit carefully so as not to spill the toner.

CAUTION

POWER CORDS & PLUGS

This printer is equipped with a 3-wire power cord fitted with a 3-pronged plug (bi-polar plug with grounding) for the user's safety.

Use these power cords in conjunction with a properly grounded electrical outlet to avoid an electrical shock.

CAUTION

SAFETY INTERLOCK

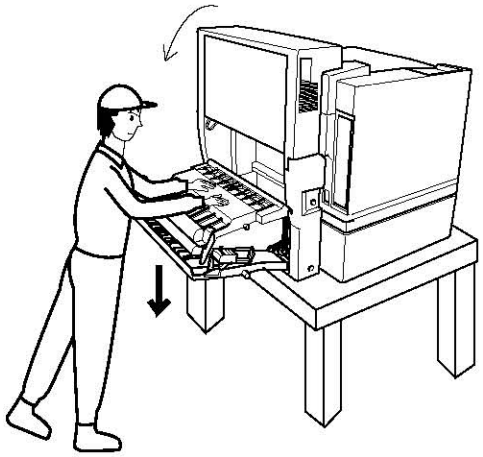
The front cover, paper exit unit and transfer unit of this printer have electrical safety interlocks to turn the power off whenever they are opened. Do not attempt to circumvent these safety interlocks.

CAUTION

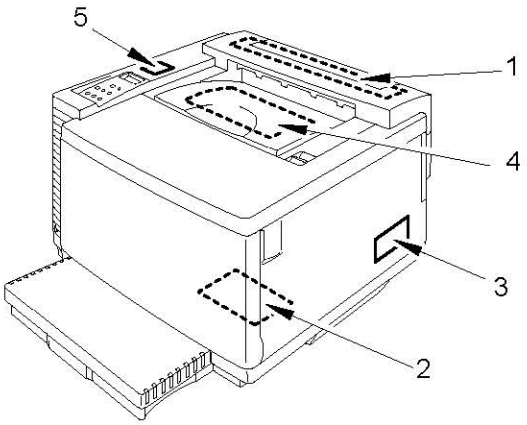
- *Do not step on or lean against the media cassette. It may cause the product to tilt or fall over and result in injuries.*
- *Do not lean against or apply any excessive force to the media cassette or open covers, otherwise it may cause the product to tilt or fall over and result in injuries.*

CAUTION

Do not lean against or apply any excessive force to the paper cassette, open cover of Duplex unit. Otherwise it may cause the product to decline or fall down and result in the injuries.



<Label Location>



1. Hot Caution Label

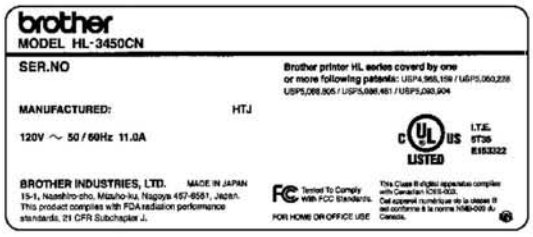


2. Laser Caution Label

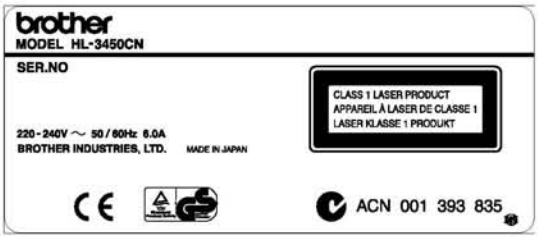


3. Rating Label

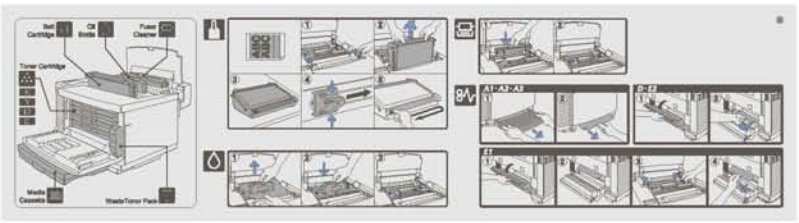
(For US)



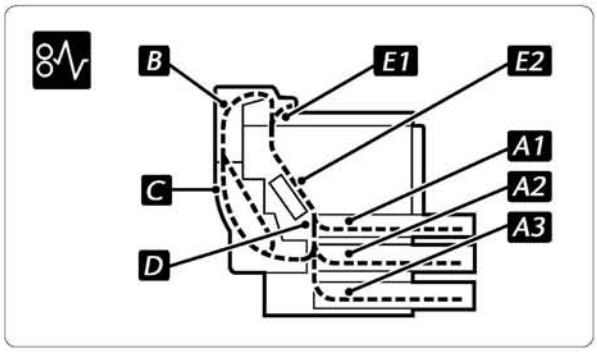
(For Europe)



4. Operation Label



5. Jam Label

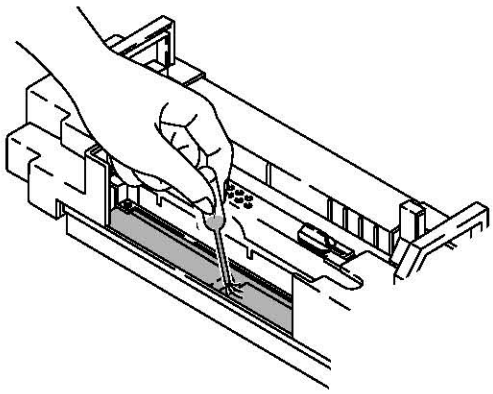


SHIPMENT OF THE PRINTER

If for any reason you must ship the printer, carefully package the printer to avoid any damage during transit. It is recommended that you save and use the original packaging. The printer should also be adequately insured with the carrier.

⚠ CAUTION

- *When shipping the printer, remove the toner cartridges, the OPC belt cartridge and the waste toner pack from the printer to prevent toner spill in the printer or damage of the toner cartridge and the OPC belt cartridge.*
- *When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit with the supplied syringe. Failure to do so will cause severe damage to the printer.*



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CHAPTER 1 PRODUCT OUTLINE

1. FEATURES

This printer has the following features:

2400 x 600 dpi Class Resolution

The printer prints pages with a resolution of 600 dots per inch (dpi) as default. It also provides higher quality printout which is the equivalent of 2400 x 600 dpi resolution when using High Resolution Control (HRC) or Color Advanced Photoscale Technology (CAPT).

High Speed Color Laser Printing

The printer allows crisp printing in 24 bit brilliant color. The printer prints at a speed of 24 pages per minute in monochrome mode and 6 pages per minute in full color mode when printing A4 or Letter size paper in Landscape orientation. The controller utilizes a high speed 32-bit RISC microprocessor and special hardware chips, which provides a very fast processing speed.

High Resolution Control (HRC)

The high resolution control (HRC) technology provides clear and crisp printouts and improves even the 600 dpi resolution. This mode is effective when printing text data.

Color Advanced Photoscale Technology (CAPT)

The printer can print graphics in 256 shades for each color in HP® color printer PCL5C™ and BR-Script 3 emulations, producing nearly photographic quality. This mode is effective when printing photographic images.

Maintenance-Free & Economical Toner Cartridge

A toner cartridge can print up to 14,000 (Black) and 8,500 (Cyan, Magenta and Yellow) single-sided pages at 5% coverage. The one piece, easy-to-replace toner cartridges do not require difficult maintenance.

Universal Media Cassette

This printer loads paper automatically from the media cassette. Since the media cassette is a universal type, a number of different sizes of paper can be used. Even envelopes can be loaded from the media cassette.

Three Interfaces

This printer has a high speed, bi-directional parallel interface, USB and Ethernet 10/100BaseTX.

If your application software supports the bi-directional parallel interface, you can monitor the printer status. It is fully compatible with the industry-standard bi-directional parallel interface.

The Brother network board (NC-4100h) is factory installed in the HL-3450CN, which enables you to use this printer in the TCP/IP, IPS/SPX, Apple Talk, DLC/LLC, Banyan VINES, DEC LAT and NetBEUI environments. Also, many useful utilities, such as BRAdmin Professional for the administrator and Brother network printing software, are included in the CD-ROM supplied with the HL-3450CN printer. For setup, see the Network User's Guide.

Automatic Interface Selection

The printer can automatically select the bi-directional parallel, USB, or Ethernet 10/100 Base TX depending on the interface port through which it receives data. With this feature, the printer can be connected to more than one computer.

Five Emulation Modes

The printer can emulate Hewlett-Packard® Color PCL® 5C language (PCL6® in monochrome mode), PostScript® 3 language emulation (Brother BR-Script 3) printers, the industry-standard HP-GL™ plotter as well as EPSON® FX-850™, and IBM® Proprinter XL® printers (in monochrome mode). It is possible to print with all application programs that support one of these printers.

Automatic Emulation Selection

The printer can automatically select the printer emulation mode depending on the print commands it receives from the computer software. With this feature, many users can share the printer on a network.

Data Compression Technology

The printer can internally compress the received graphics and font data in its memory so that it can print larger graphics and more fonts without additional memory.

Various Fonts

The printer has 66 scalable and 12 bitmapped fonts. The fonts that can be used will vary according to the selected emulation mode.

In PCL mode, you can also print the 13 kinds of bar codes listed below. In BR-Script mode, the printer has 165 scalable fonts.

< Bar Code Printing >

This printer can print the following 13 types of bar codes:

- Code 39
- Code 128
- Interleaved 2 of 5
- Codabar
- ISBN (EAN)
- ISBN (UPC-E)
- UPC-A
- UPC-E
- EAN-8
- EAN-13
- EAN-128
- FIM (US-PostNet)
- Post Net (US-PostNet)

CCITT G3/G4

Since the printer supports the CCITT G3/G4 format in addition to HP-compatible formats, it can quickly receive and print data compressed in this format.

Lock Panel

If the panel button settings have been changed, the printer may not work as expected. It is possible for the administrator of the printer to lock the settings to prevent changes from being made.

Power Save Mode

The printer has a power save mode. As laser printers consume power to keep the fixing assembly at a high temperature, this feature can save electricity when the printer is on but not being used. The factory setting of the Power Save mode is ON so that it complies with the new EPA Energy Star new specification.

Toner Save Mode

The printer has an economical toner save mode. This mode allows you to reduce the printer running cost substantially in addition to the improved life expectancy of the toner cartridge.

Reprint Function

A touch of a panel button allows reprinting of the last print job without sending the data again from the computer. When there is not enough memory to print the last complete job out, the last print page can be reprinted. Data can be stored in an IDE HDD that can be optionally installed. It can be reprinted by selecting a document from the control panel or the browser. When the private print driver is selected, Secure Printing can be executed which allows you to print only when a password is entered.

Saving User Settings

It is possible to operate the printer differently from other users with the panel button settings. One set of user settings can be stored.

***PANTONE® Calibrated**

There are many variables in process reproduction of colors generated by the HL-3450CN, any one of which may affect the quality of the PANTONE Color simulation, including;

- Type of paper used
- Type of toner used
- Effective final resolution
- Dot structure/halftones

For optimal results, it is recommended that the following materials and settings are used.

1) NEUSIEDLER color copy paper
2) Brother Toner Cartridges TN-02 BK/C/M/Y
3) 600 x 600 dpi resolution

2. PARTS NAMES & FUNCTIONS

<Front View>

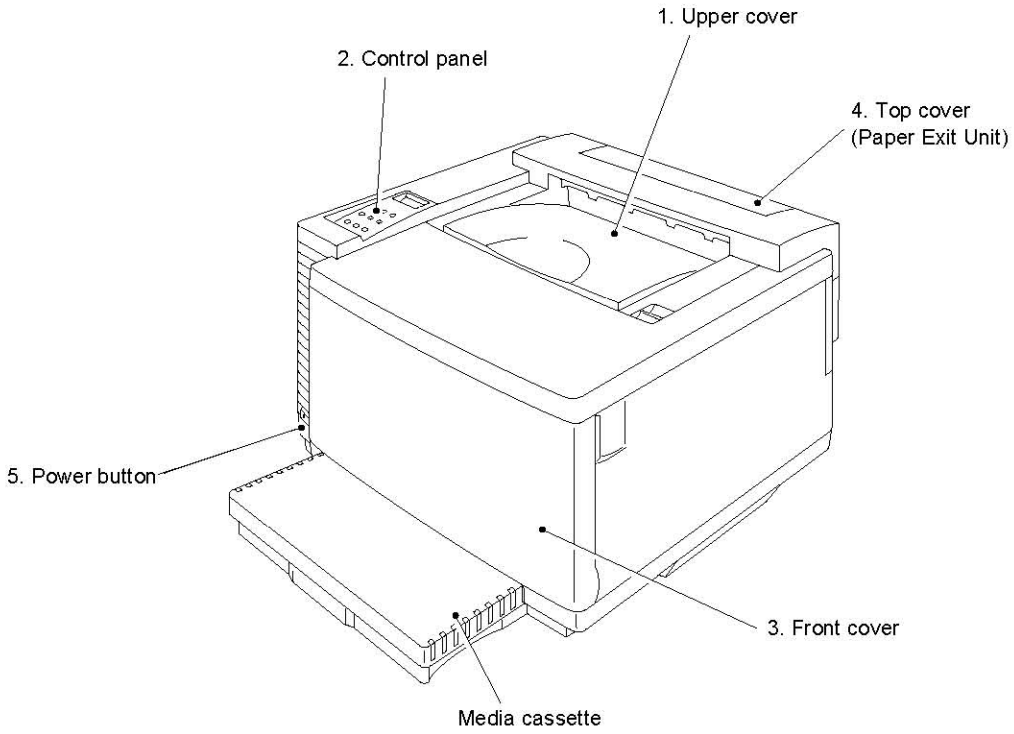


Fig. 1-1

<Rear View>

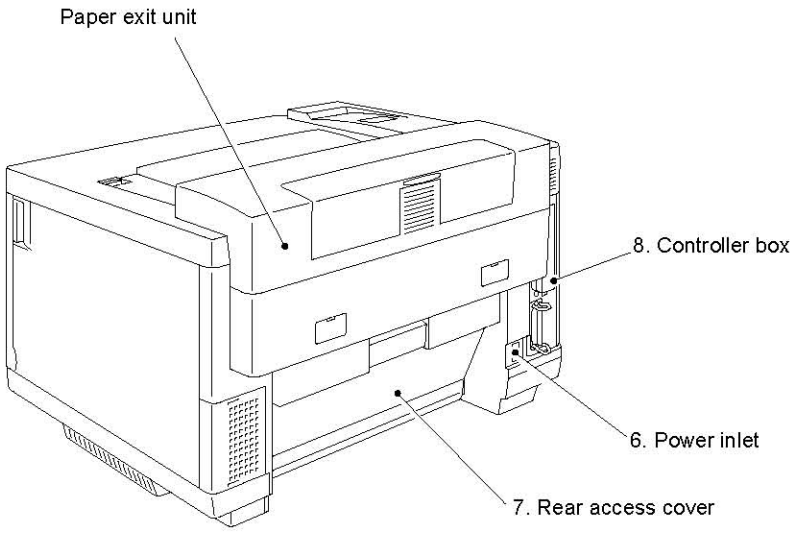


Fig. 1-2

No.	Part Name	Outline of Functions
1	Upper cover	To act as an upper enclosure and also as a paper tray for printed paper.
2	Control panel	To display the status of printer operations and control the printer directly.
3	Front cover	To act as a front enclosure, opened when replacing a toner cartridge or waste toner pack.
4	Top cover (Paper exit unit)	To exit the printed paper onto the upper cover, acting also as part of the paper tray for printed paper. To be opened when replacing an OPC belt cartridge or Drum cleaner.
5	Power button	To operate power-on and off to the printer. (Push for On/Off operation)
6	Power inlet	To connect a power supply cable.
7	Rear access cover	To act as a rear enclosure, opened when clearing an internal jam or doing maintenance work.
8	Controller box	Space where the main (video controller) PCB is installed.

3. INTERNAL STRUCTURE

<Cross Sectional View >

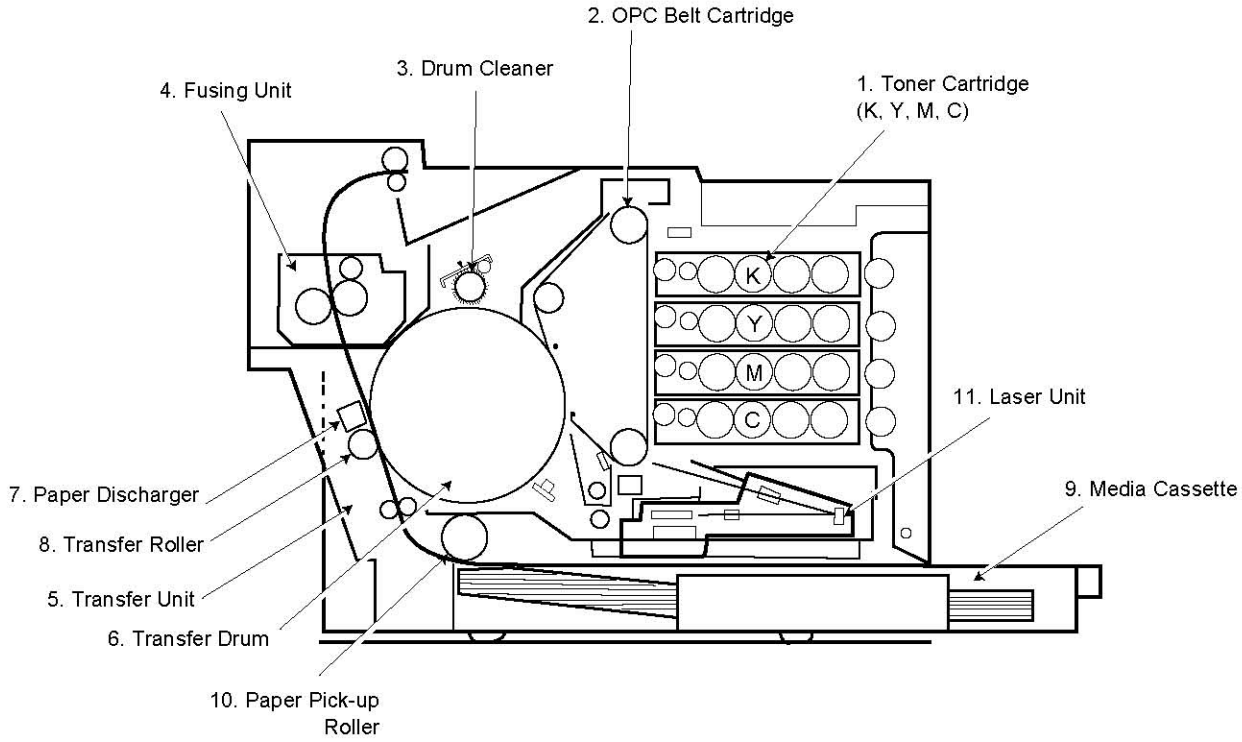


Fig. 1-3

No.	Components Name	Outline of Functions
1	Toner Cartridge	Contain the toner (K, Y, M, C) for developing. Each toner cartridge (K, Y, M, C) is independent.
2	OPC Belt Cartridge	Forms images and includes the OPC belt.
3	Drum Cleaner	Cleans and collects waste toner adhering to the transfer drum.
4	Fusing Unit	Fixes by heat and pressure the toner image onto the paper.
5	Transfer unit	Transfers toner images from the transfer drum to the paper.
6	Transfer Drum	Forms color images, combining the toner images from the OPC belt on the drum.
7	Paper Discharger	Emits a corona charge for separating the paper from the transfer drum.
8	Transfer Roller	Transfers the toner image on the transfer drum to the paper.
9	Media Cassette	Feeds paper automatically.
10	Paper Pick-up Roller	Feeds paper automatically from the media cassette.
11	Laser Unit	Generates a modulated laser beam and scans the OPC belt to produce the image.

4. DESCRIPTION OF CONTROL PANEL

The printer control panel provides control of the printer including test printing, maintenance operations performed by the video controller and also the ones which are performed by the engine controller.

The Video Controller Mode and the Engine Controller Mode have some common functions. Under normal circumstances the functions in the Video controller mode will be used. Refer to CHAPTER 5 for further information.

4.1 Video Controller Mode

The printer goes into the Video Controller Mode when the power is turned on by pressing the power button.

The Video Controller Mode supplies the general test printing and setting functions and some of the maintenance operations. If further engine settings are required, use the Engine Controller Mode.

4.2 Engine Controller Mode

The printer goes into the Engine Controller Mode when power is turned on by pressing the power button at the same time as holding down the **Secure print**, **Back** and **Set** buttons. (Refer to Fig.1-4.)

NOTE:

This mode provides unique control panel display and operation functions which are completely different from the ones described on the actual control panel labels or in the user's guide. Refer to CHAPTER 5 for detailed information.

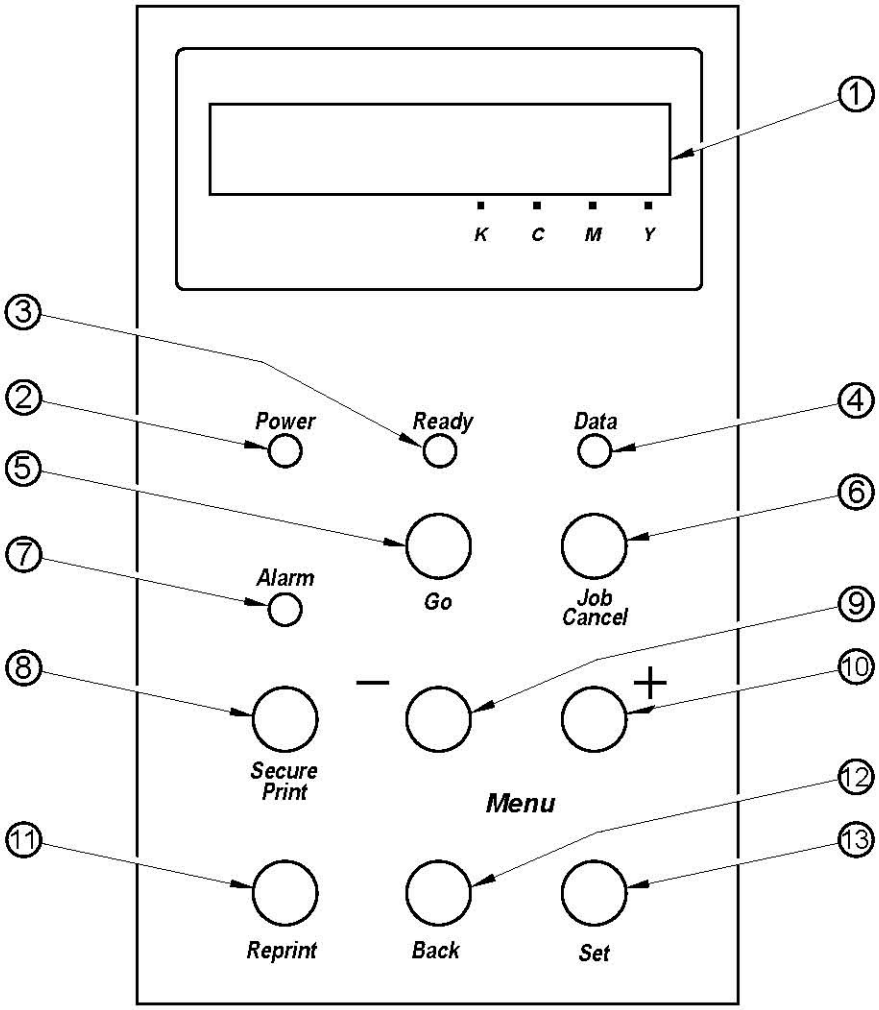


Fig. 1-4

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Power LED
3	Ready LED
4	Data LED
5	Go button
6	Job Cancel button
7	Alarm LED
8	Secure Print button
9	- button
10	+ button
11	Reprint button
12	Back button
13	Set button

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CHAPTER 2 SPECIFICATIONS

1. RATING

WARNING

Use the power supply cable supplied with the printer, or a similar cable complying with the following specification (3-wire power cable with ground).

Use of an "out of specification" cable may result in an electric shock.

Destination	Voltage (V)	Frequency (Hz)	Input Current (A)	Power Cord (Piece)
US / Canada	120	50/60	11	1
Europe	220 - 240	50/60	6	1 *

* For European models, the power supply cable depends on the country as follows;

Figure	Rating	Approval Agency	Applicable Area
A	250VAC, 6A	VDE, DEMKO, SEV	Europe (Continent)
B		BS	UK

Figure A: For Europe (Sample)

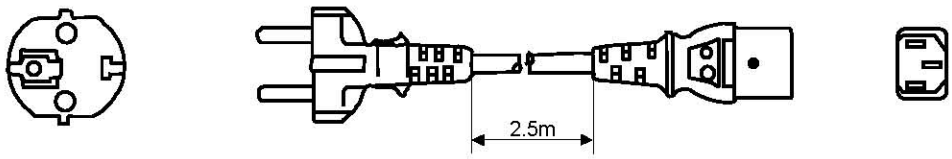
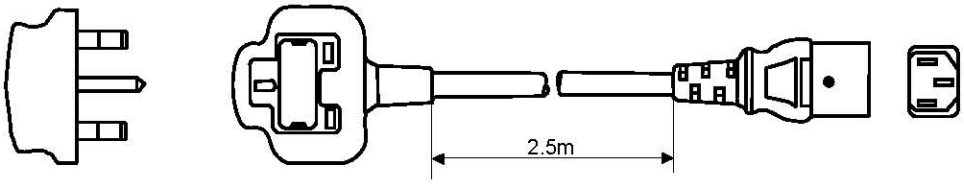


Figure B: For UK



NOTE:

For details of other power supply cables, refer to the parts reference list.

** For rating labels, refer to 'Safety Instruction' on Page viii.

2. GENERAL SPECIFICATIONS

2.1. Printing

Print method	Electro photography by semiconductor laser beam scanning
Laser	Wavelength: 780nm Output: 5mW max.
Resolution	600 x 600 dots per inch (Fine) 2400 x 600 dots per inch (using HRC and CAPT) (The resolution can be enhanced to 2400dpi class by using Brother exclusive HRC (High Resolution Control) and CAPT (Color Advanced Photoscale Technology).)
Print speed	Monochrome mode: 24 page/minute Full color mode: 6 page/minute (when printing A4/Letter-size paper in Landscape orientation) Monochrome mode: 12 page/minute Full color mode: 3 page/minute (when printing A3/Ledger-size paper in Portrait orientation)
Warm-up	Max. 210 seconds at 20°C (68°F)
First print	Monochrome mode: 19 seconds or less Full color mode: 34 seconds or less (when loading A4/Letter-size plain paper in Landscape orientation by face down print delivery from standard upper cassette feed)
Print media	Toner in a single-color single-component cartridge. Life Expectancy: 14,000 single-sided pages/cartridge (Black) 8,500 single-sided pages/cartridge (C/M/Y) (when printing on A4/Letter-size paper with 5% coverage)
Resident printer fonts	<HP PCL, EPSON FX-850, and IBM Proprinter XL modes> 66 scalable fonts and 12 bitmapped fonts,11 bar codes <BR-Script 3 mode> 165 scalable fonts

2.2. Functions

CPU	Toshiba TMPR4955-266 (TX4955-266MHz)
Emulation	Automatic emulation selection • HP Color Printer (PCL5C) including HP LaserJet 4+ (PCL5e) and HP LaserJet 5 (PCL6 monochrome) • BR-Script 3 (Adobe PostScript 3 compatible) • HP-GL • EPSON FX-850 • IBM Proprinter XL
Interface	Automatic interface selection among the bi-directional parallel, Universal Serial Bus (USB) and Ethernet 10/100 Base TX.
RAM	64 Mbytes (Expandable up to 384Mbytes with DIMMs) The standard memory fitted can vary depending on the printer model and country.
HDD option	2.5 inch IDE HDD
Compact Flash	1 card slot: Compact Flash Type II
Control panel	8 buttons, 4 LEDs and a 16-column x 2 lines liquid crystal display
Diagnostics	Self-diagnostic program

2.3. Electrical and Mechanical

Power source	U.S.A. and Canada:	AC 120V, 50/60Hz
	Europe and Australia:	AC 220 to 240V, 50/60Hz
Power consumption	Printing (peak*):	1350W or less
	Printing (average):	600W or less
	Standing by (peak*):	1350W or less
	Standing by (average):	200W or less
	Sleep:	30W or less
Noise:	Printing:	55dB A or less
	Standing by:	48dB A or less
Temperature:	Operating:	10 to 32.5°C (50 to 90.5°F)
	Non operating:	5 to 35°C (41 to 95°F)
	Storage:	0 to 35°C (38 to 95°F)
Humidity:	Operating:	20 to 80% (non condensation)
	Storage:	10 to 90% (non condensation)
Dimensions: (W x D x H)	615 x 540 x 420 mm (24.2 x 21.3 x 16.5 inches) 615 x 620 x 610 mm (24.2 x 24.4 x 24.0 inches) with the Duplex Unit and one optional lower tray unit fitted 615 x 620 x 750 mm (24.2 x 24.4 x 30.6 inches) with the Duplex Unit and two optional lower tray units fitted	
Weight:	Approx. 46kg (101lbs.) Approx. 54kg (119lbs.) including consumables*	

*Consumables are defined as:
Belt cartridge, Toner cartridge (Y, M, C, K), Fuser oil bottle, Fuser cleaning roller, Waste toner Pack

Optional Units:

- Lower Tray Unit: Approx. 11kg (24lbs.)
- Duplex Unit: Approx. 12kg (26lbs.)
- Standard Media Cassette: Approx. 2.1kg (4.6lbs.)
- Lower Tray Unit Media Cassette: Approx. 2.7kg (6.0lbs.)

**NOTE:*

- *The peak figure of power consumption is worked out when the halogen heater lamp is turned ON.*
- *The peak figure of power consumption is worked out excluding inrush current value.*
- *The peak figure of power consumption is a reference value and should be used internally at Brother offices only.*
- *The power consumption figure quoted for sleep mode is when the fan has stopped.*

2.4. Paper

The standard media cassette (upper cassette) is supplied with the printer. The optional lower tray unit and the optional A4/Letter cassette can also be installed.

NOTE:

The standard upper cassettes and the optional A4/Letter cassette are interchangeable between the upper and the lower feeder.

2.4.1 Printable media

(1) Type & size

Paper source	Paper type	Paper Size
Standard upper cassette	Plain paper	A3, B4, A4, Ledger, Executive, Legal, Letter, B5 (ISO/JIS), 330x483mm (13"x19")
	Envelope	COM10, DL,
	Transparency	A4, Letter
	Label	A4, Letter
	Other size	width 210-330mm (8.2"-12.9") length 176-483mm (6.9"-18.8")
Optional lower cassette	Plain paper	A3, B4, A4, B5 (ISO/JIS), Legal, Ledger, Letter
Optional A4/Letter cassette	Plain paper	A4, Letter, B5 (ISO/JIS), Executive
	Envelope:	COM10, DL
	Transparency	A4, Letter
	Label	A4, Letter
	Other size:	width 210-297mm (8.2"-11.7") length 176-297mm (6.9"-11.7")

(2) Paper weight specifications

	Paper cassette	Optional lower tray	Optional duplex unit
Normal paper	60 to 90 g/m^2 (16 to 24 lbs)	←	←
Thick stock	90 to 160 g/m^2 (24 to 43 lbs)	———	90 to 105 g/m^2 (24 to 28 lbs)

(3) Recommended paper specifications

Item	Description
Basis Weight (g/m^2)	82 ± 5
Thickness (μ m)	95 ± 6
Smoothness (Bekk) (seconds)	90 ± 20
Stiffness (Clark)	100 ± 15
Brightness (%)	85 ± 2
Surface Resistance (Ω)	10^{10} ~ 10^{11}
Grain Direction	Long

Measurement Condition: 17.5 ~ 27.0°C, 50 ~ 70%RH

CAUTION:

When you are choosing print media, be sure to it is designed for use with a laser printer and load the media cassette correctly. Also follow the information given below to prevent any paper jams, print quality problems or printer damage;

<Paper type to avoid>

- *Highly textured paper.*
- *Smooth or shiny paper.*
- *Paper that is coated or has a chemical finish.*
- *Damaged, wrinkled or pre-folded paper.*
- *Paper exceeding the recommend weight specification in the manual.*
- *Paper with tabs and staples.*
- *Letterheads using low temperature dyes or thermography.*
- *Multipart or carbonless paper.*

<Envelopes type to avoid>

- *Envelopes constructed with a paper with a weight that exceeds the paper weight specifications for the printer.*
- *Poorly manufactured envelopes with edges that are not straight or consistently square.*
- *Envelopes with 'baggy' construction of folds that are not sharply creased.*
- *Envelopes with transparent windows, holes, cutouts or perforations.*
- *Envelopes with clasps, snaps or tie strings.*
- *Envelopes made with smooth or shiny paper.*
- *Envelopes that are rough, highly textured, or deeply embossed.*
- *Envelopes that do not lie flat or that are curled, wrinkled, or irregularly shaped.*
- *Envelopes having an open flap with an adhesive that seals the envelope.*

<Transparencies / labels type to avoid>

- *Transparencies / labels that cannot withstand a temperature of 200 degrees centigrade (392 degrees Fahrenheit) for a period of 0.1 seconds.*

NOTE:

Keep the paper sealed in the bag as supplied and do not open the bag until the paper is required for use.

2.4.2 Media cassette capacity

Maximum load height: 27mm (1.06 inches)

- Plain paper: 250 sheets of 75g/m^2 (20lb) paper for the standard/optional A4/Letter cassette
  500 sheets of 75g/m^2 (20lb) for the optional lower cassette
- Envelopes : 15 sheets
- Transparency: 50 sheets
- Label: 80 sheets

2.4.3 Printed output

(1) Capacity

250 sheets of 75g/m^2 (20lb) paper (plain paper stacked in the output tray)

(2) Delivery

Face-down print delivery

Note: Face down: Delivers the printed side of the paper downwards.

2.5 Printing Area

2.5.1 Effective printable area

The effective printing area means the area within which the printing of all the data received without any omissions can be guaranteed. (Refer to Table 2-1 for details.)

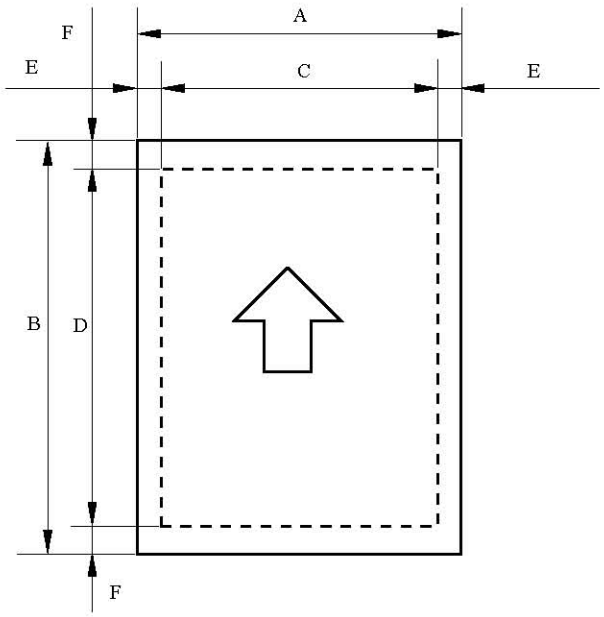


Fig. 2-1

Table 2-1: Effective Printing Areas

Size	A	B	C	D	E	F
A 4	210.0mm 8.27" (2,480 dots)	297.0mm 11.69" (3,507 dots)	203.2mm 8.0" (2,400 dots)	288.5mm 11.36" (3,407 dots)	3.4mm 0.13" (40 dots)	4.23mm 0.17" (50 dots)
Letter	215.9mm 8.5" (2,550 dots)	279.4mm 11.0" (3,300 dots)	207.44mm 8.16" (2,450 dots)	271.0mm 10.67" (3,200 dots)	4.23mm 0.17" (50 dots)	↑
Legal	215.9mm 8.5" (2,550 dots)	355.6mm 14.0" (4,200 dots)	207.44mm 8.16" (2,450 dots)	347.1mm 13.67" (4,100 dots)	↑	↑
B5 (JIS)	182.0mm 7.16" (2,149 dots)	257.0mm 10.12" (3,035 dots)	173.54mm 6.82" (2,049 dots)	248.5mm 9.78" (2,935 dots)	↑	↑
B5 (ISO)	176.0mm 6.93" (2,078 dots)	250.0mm 9.84" (2,952 dots)	167.54mm 6.59" (1,978 dots)	241.5mm 9.5" (2,852 dots)	↑	↑
Executive	184.2mm 7.25" (2,175 dots)	266.7mm 10.5" (3,150 dots)	175.74mm 6.91" (2,075 dots)	258.3mm 10.17" (3,050 dots)	↑	↑
COM-10	104.8mm 4.125" (1,237 dots)	241.3mm 9.5" (2,850 dots)	96.34mm 3.785" (1,137 dots)	232.8mm 9.16" (2,750 dots)	↑	↑
D L	110.1mm 4.33" (1,299 dots)	221mm 8.66" (2,598 dots)	101.64mm 3.99" (1,199 dots)	211.5mm 8.33" (2,498 dots)	↑	↑
13x19	330mm 13" (3,900 dots)	482.6mm 19" (5,700 dots)	306.5mm 12.1" (3,620 dots)	475.8mm 18.7" (5,620 dots)	11.85mm 0.47" (140 dots)	↑
A 3	297mm 11.7" (3,507 dots)	420mm 16.5" (4,960 dots)	288.5mm 11.4" (3,407 dots)	411.5mm 16.2" (4,860 dots)	4.23mm 0.17" (50 dots)	↑
B 4	257mm 10.1" (3,035 dots)	364mm 14.3" (4,298 dots)	248.9mm 9.8" (2,935 dots)	355.4mm 14" (4,198 dots)	↑	↑
Ledger	279.4mm 8.5" (3,300 dots)	432mm 14" (5,100 dots)	270.9mm 10.7" (3,200 dots)	423.3mm 16.7" (5,000 dots)	↑	↑

NOTE:

- *The paper sizes indicated here should conform to the nominal dimensions specified by JIS.*
- *A4 paper must accommodate 80 characters printed in pica pitch (203.2 mm).*
- *The dot size is based on 300 dpi resolution.*
- *Organizer is not supported by any printer emulation (command).*

2.5.2 Print guarantee area

<Plain paper>

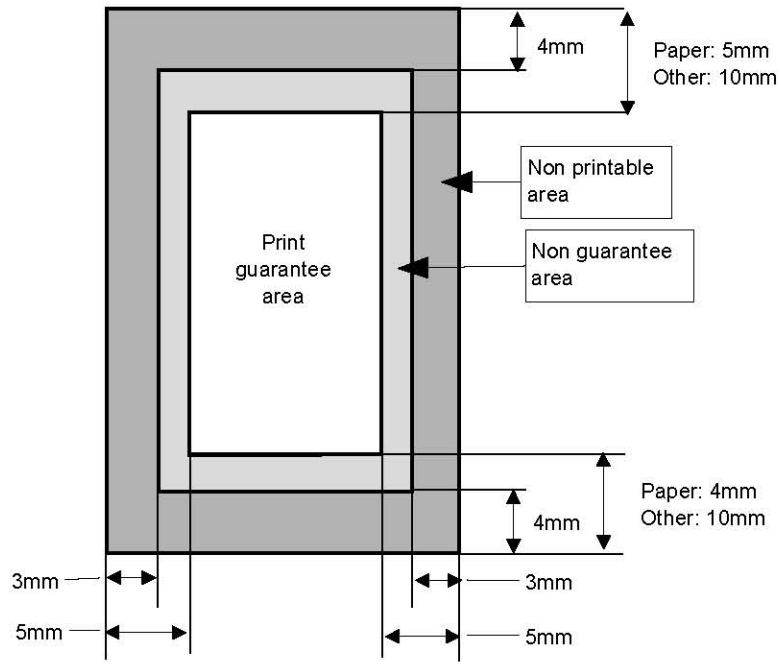


Fig. 2-2

<Envelope>

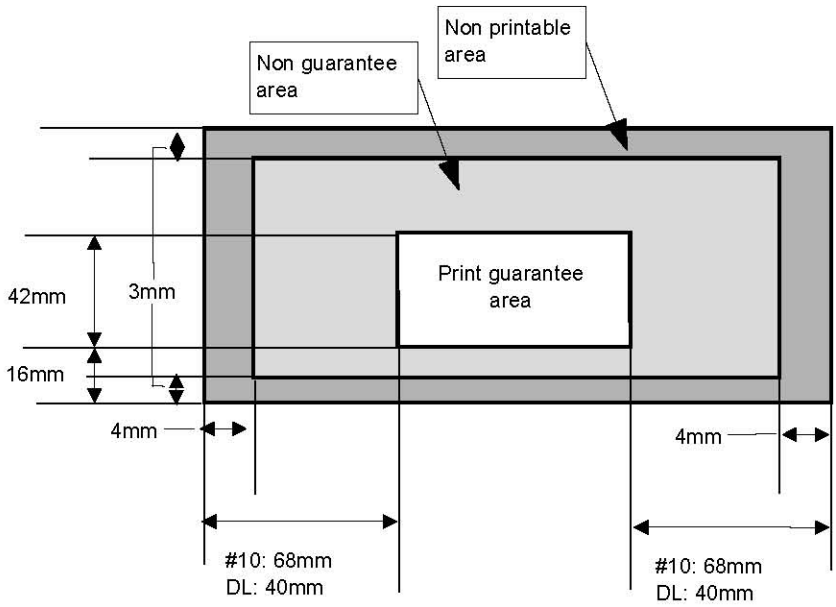
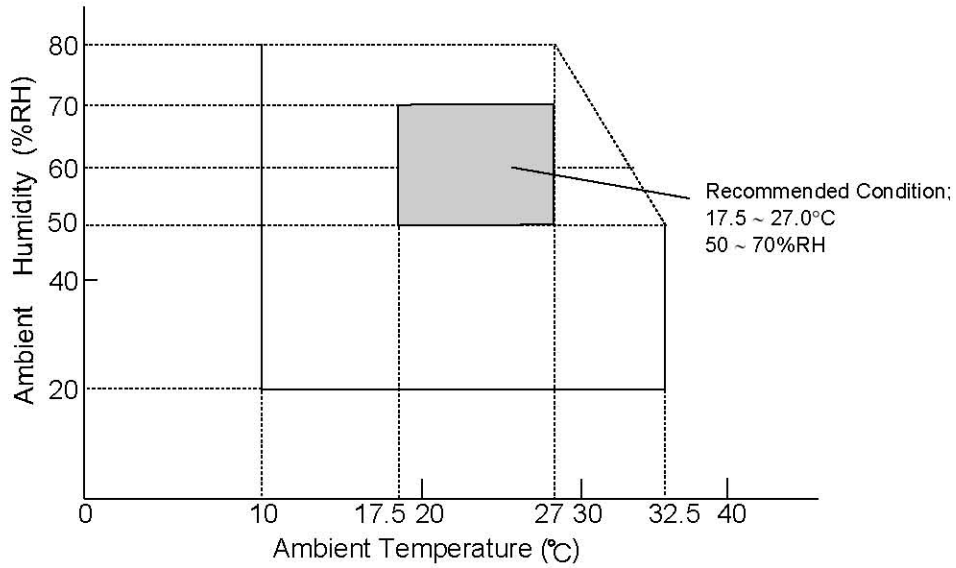


Fig. 2-3

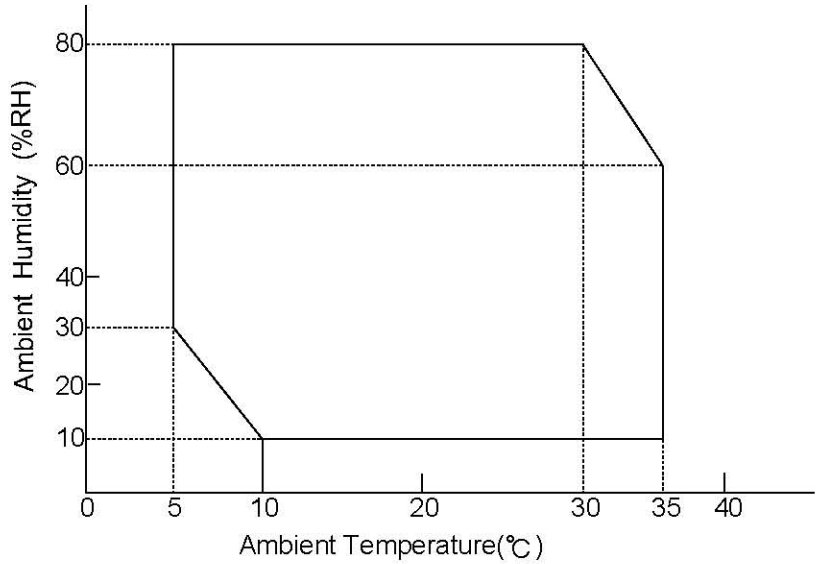
3. ENVIRONMENTAL CONDITIONS

3.1 Ambient Temperature / Humidity / Altitude

(1) Under Operational conditions: 10.0 ~ 32.5°C (50 ~ 90.5°F), 20 ~ 80%RH (See the figure below)



(2) Under Non Operational conditions: 5.0 ~ 35.0°C (41 ~ 95°F), 10 ~ 80%RH (See the figure below.)



(3) Storage and transportation environment of printer

The following defines the storage and transportation environment of printers that have been packed according to Brother specification. However, this section does not cover the OPC belt cartridge, toner cartridges and developer cartridges.

In particular, since consumables such as the toner cartridges and OPC belt are individually packaged, the following environmental conditions should be respected. During transportation, strictly refrain from leaving the goods on the ground or under the sun.

Temperature	Normal Conditions	0°C ~ 35°C (32°F ~ 95°F)
	Severe Conditions	High Temperature: 35°C ~ 40°C (95°F ~ 104°F) Low Temperature: -10°C ~ 0°C (14°F ~ 32°F)
Humidity	10% ~ 90%RH	
Period of Storage	One Year	
Other	No condensation	
Atmosphere	613 ~ 1,067hpa (460 ~ 800mmHg)	

The period under the severe conditions should not be continuous, and is assumed as an accumulation of intermittent time. However, an individual period of intermittent time under severe conditions should not be allowed to exceed 48 hours.

NOTE:

Normal conditions should occupy more than 90% of total storage period.

Severe conditions should be less than 10% of total storage period.

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CHAPTER 3 INSTALLATION

1. CONDITIONS REQUIRED FOR INSTALLATION

Any Laser beam printer is likely to be influenced by the environment of the set-up location. If the printer is set-up in an inappropriate location, the printer may not perform as expected. Therefore, the following factors should be taken into consideration before deciding where to set-up the printer.

1.1. Environmental Conditions

The printer should not be set up in the locations referred to in the following items (1) through (8) which specify inappropriate locations for set-up.

(1) Where it is likely to receive direct sunlight or similar light. (For example, next to a window)

(2) Where it is likely to suffer a big difference in temperature and humidity between the maximum and minimum levels. (Normal operation environment is within 10°C ~ 32.5°C, 20 ~ 80%RH and without any condensation.)

(3) Where it is likely to be in a draft of cold air from an air-conditioner or warm air from a heater, or to receive direct radiant heat.

(4) Where it is likely to be excessively dusty or be subject to corrosive gases such as ammonia.

(5) Where it is likely that an ultrasonic humidifier will be used.

(6) Where it is likely to have poor ventilation.

(7) Where it is likely to have unstable conditions such as when the set-up table is not strong enough.

(8) Where it is likely to be tilted (angle from the horizontal should not be greater than ±1°).

1.2. Basic Layout of Printer Set-up Location

CAUTION

In the case when the printer is set on a table, confirm that the media cassette does not to protrude out beyond the edge of the table.

- *Any protrusion of the media cassette may catch a passersby and result in damage to the printer.*
- *Protrusion of the media cassette may cause the printer to tilt or fall over if the operator leans against or applies excessive force to the media cassette, which may cause injuries.*

Fig.3-1 shows the basic layout of the printer set-up location that is suitable for smooth operation and maintenance of the printer.

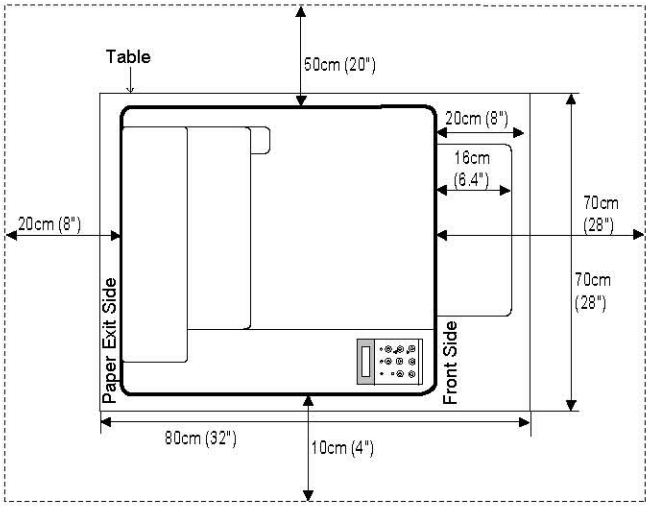


Fig. 3-1

- A space in front of the printer of 70cm is necessary to open the front cover.
- A space at back of the printer of 20cm is necessary to open / close the rear access cover.
- The space on both sides of the printer of 10cm is necessary for general access.

2. UNPACKING

WARNING

- *The package containing a printer weighs approximately 66kg (145lbs), so it is too heavy for one person to carry. It needs two adults or more to move the printer. Since the printer is a precision machine, make sure that it is carried slowly with care so that no impact occurs to the printer while moving it.*
- *Do not attempt to lift a printer when it is covered by the polyethylene bag because it is slippery and may result in damage and injury if dropped.*

2.1 Unpacking the Printer

Refer to Fig.3-2 on the next page.

1) Cut the two bands from around the packing carton.
2) Remove the binding tape from the top of the package.
3) Open the top of the package and take the ST packing set out.
4) Remove the upper packing (4 locations).
5) Take the customisation kit** out of the box.
6) Take the power cable out of the box. (for US / Canada only).
7) Open up the polyethylene bag enclosing the printer and remove it.
8) Remove the silica gel.
9) Lift up and set up the printer in a suitable location using at least two persons.

** For USA/Canada, the kit contains the use's guide and printer driver disks.
For other countries, the kit contains the use's guide, printer driver disks and the powercable.

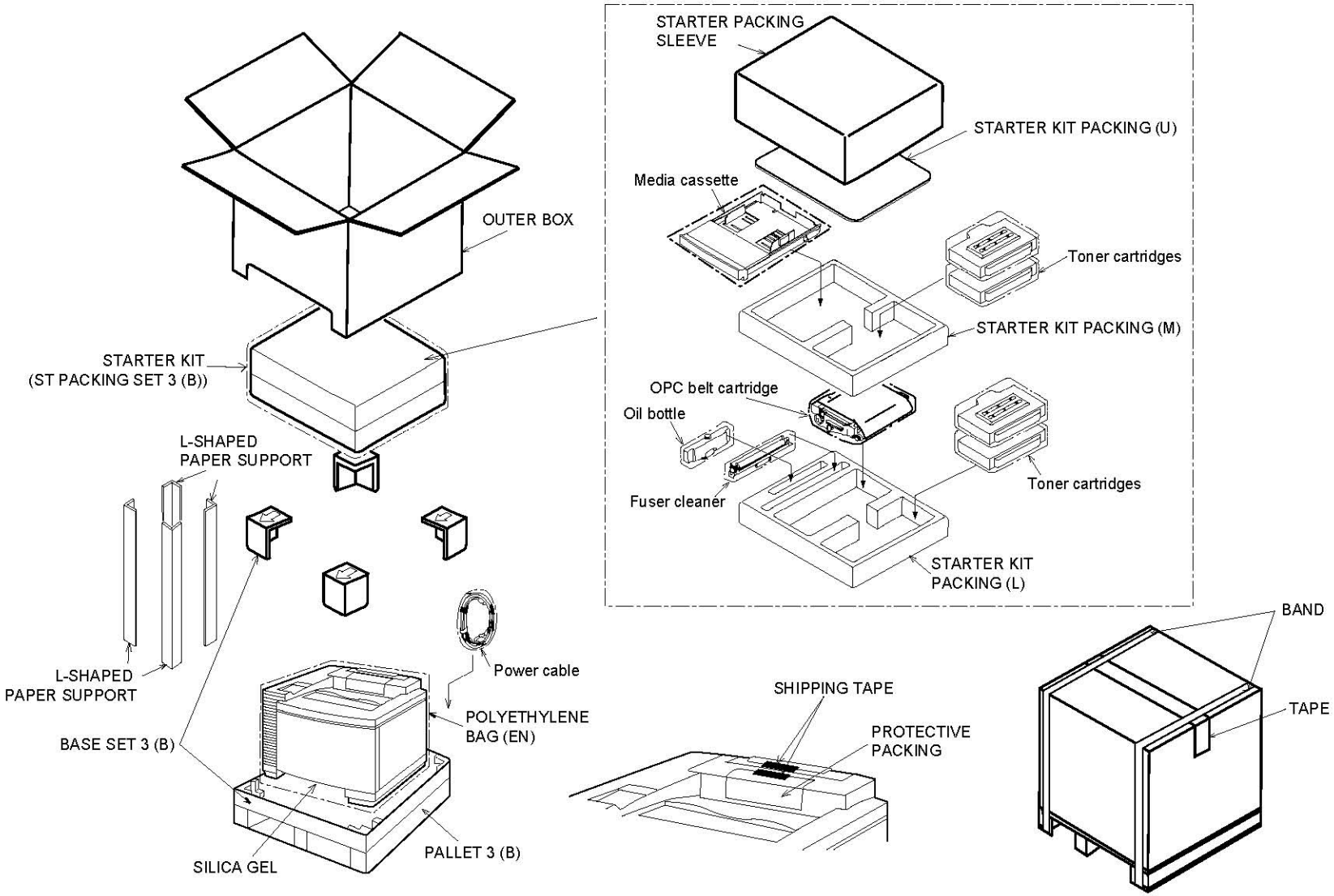
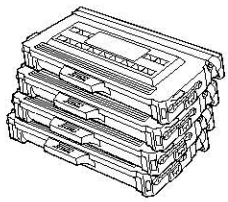
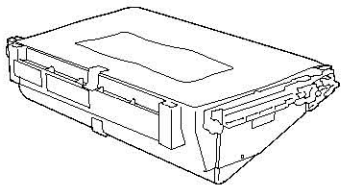
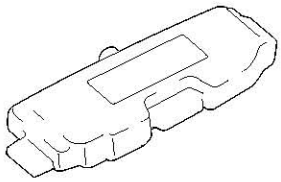
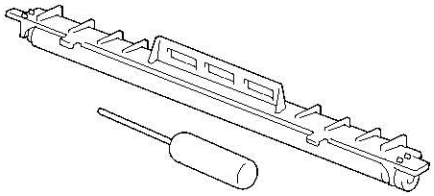
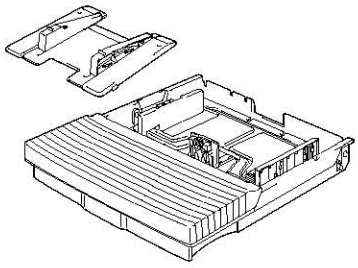

STARTER PACKING SLEEVE
STARTER KIT PACKING (U)
Media cassette
Toner cartridges
STARTER KIT PACKING (M)
OPC belt cartridge
Oil bottle
Toner cartridges
Fuser cleaner
STARTER KIT PACKING (L)
OUTER BOX
STARTER KIT (ST PACKING SET 3 (B))
L-SHAPED PAPER SUPPORT
L-SHAPED PAPER SUPPORT
Power cable
POLYETHYLENE BAG (EN)
BASE SET 3 (B)
SILICA GEL
PALLET 3 (B)
SHIPPING TAPE
PROTECTIVE PACKING
BAND
TAPE

Fig. 3-2

2.2 Unpack the Starter Kit

<Unpacking Procedure>

1) Open the vinyl bag and slide off the cardboard sleeve covering the starter kit.
2) Confirm all of the following parts are inside the starter kit packing box.

No.	Kit Name	Appearance	Quantity
1	Toner Cartridge (Y, M, C, K)	 Y (Yellow) M (Magenta) C (Cyan) K (Black)	4
2	OPC Belt Cartridge		1
3	Oil Bottle		1
4	Fuser Cleaner & Syringe		1
5	Media Cassette with Envelope Adapter		1

PRECAUTION

When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit with the supplied syringe. Failure to do so will cause severe damage to the printer.

3. INSTALLATION WORK

CAUTION

Do not lean against or apply any excessive force to the media cassette or open covers; otherwise it may cause the product to tilt or fall over and result in injuries.

Install the parts of the starter kit into the printer according to the following procedures:

3.1 Install the Oil Bottle and Fuser Cleaner

(1) Release the two sets of retainer lock levers for both the oil bottle and the fuser cleaner.

(2) Set the fusing unit pressure release levers to the SET position.

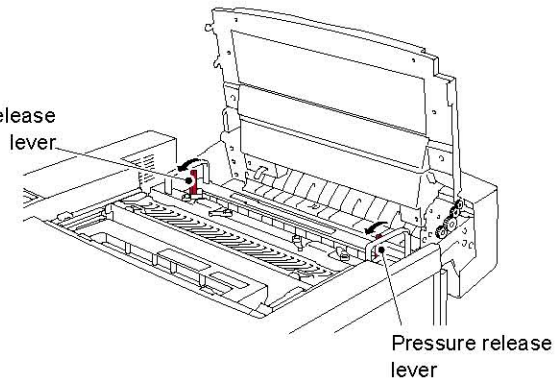


Fig. 3-3

(3) Install the oil bottle into the fusing unit.

NOTE:

When installing the oil bottle, be sure not to touch the oil feed connection at the bottom of the bottle to avoid oil leakage.

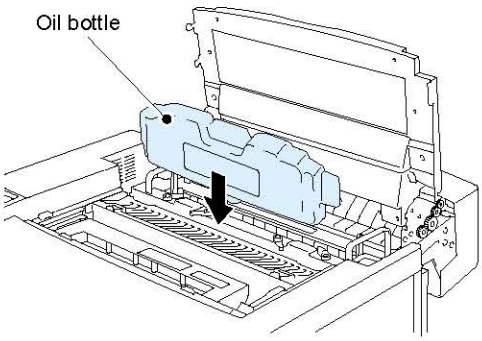


Fig. 3-4

(4) Install the fuser cleaner into the fusing unit.

(5) Secure the oil bottle and the fuser cleaner with the retainer lock levers.

(6) Close the top cover.

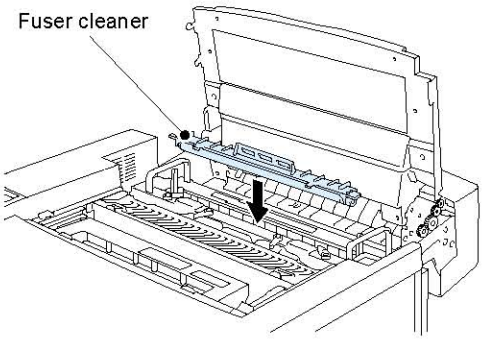


Fig. 3-5

NOTE:

The retainer lock levers for the fuser cleaner and oil bottle are located as shown in the figure below;

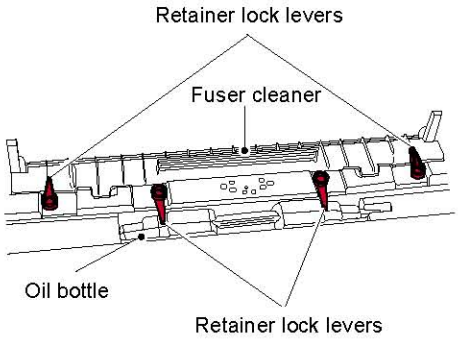


Fig. 3-6

3.2 Install the OPC Belt Cartridge

PRECAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*



- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*



(1) Open the front cover and the top cover by releasing the latches.

PRECAUTION

When installing or removing the OPC belt, be sure to open the front cover first. Failure to do so will cause the OPC belt to be damaged due to contact with the toner cartridges.

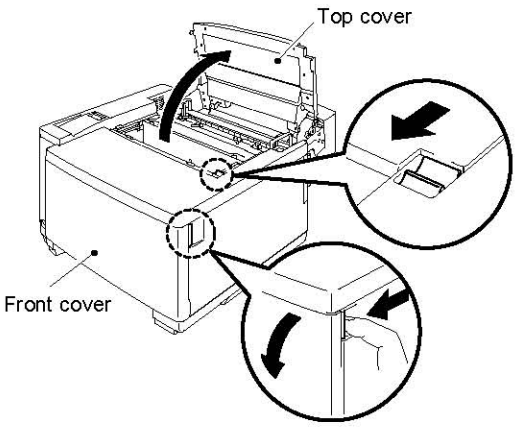


Fig. 3-7

(2) Release the belt cartridge lock levers (left & right).

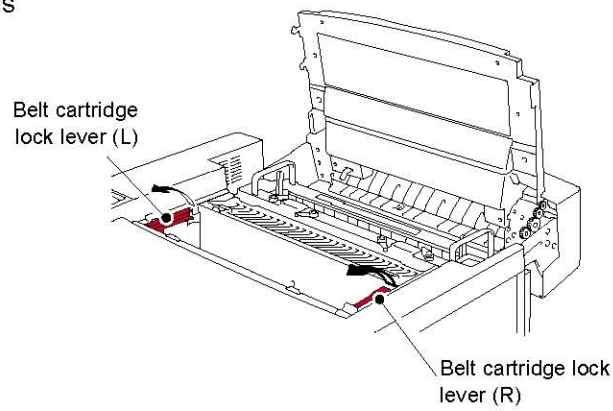


Fig. 3-8

(3) Pull and remove the tension release pins on both sides (left & right) of the OPC belt cartridge.

(4) Remove the protective sheet from the OPC belt cartridge.

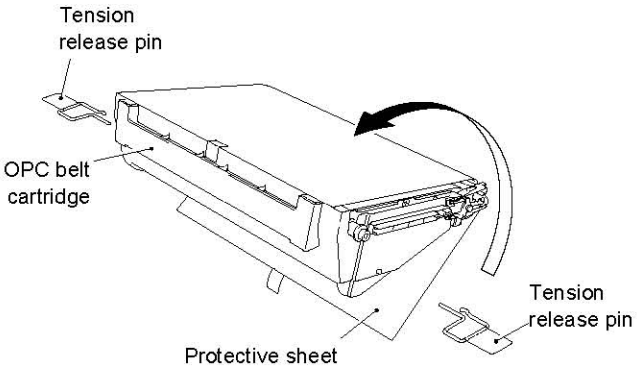


Fig. 3-9

(5) Install the OPC belt cartridge into the guides at both sides in the printer.

(6) Set the belt cartridge lock lever at both sides (left and right).

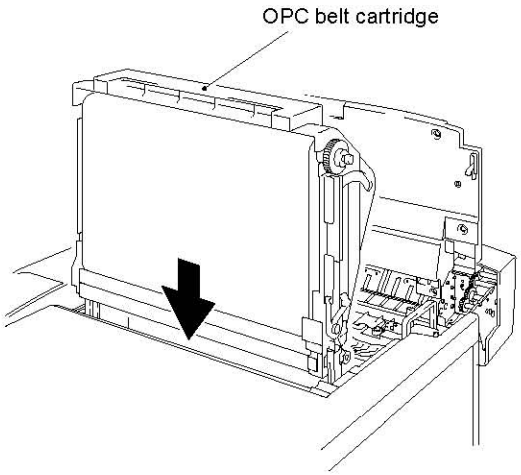


Fig. 3-10

3.3 Install the Toner Cartridges into the Printer

(1) Rock each of the cartridge 3 to 4 times through 30 ° to the horizontal.

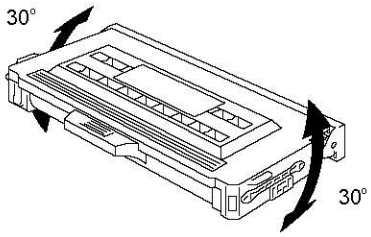


Fig. 3-11

(2) Pull off the tape labeled 'REMOVE' from the toner cartridge.

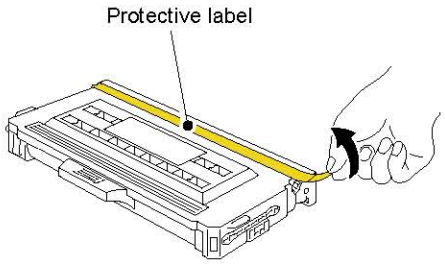


Fig. 3-12

(3) Remove the protective cover from the toner cartridge.

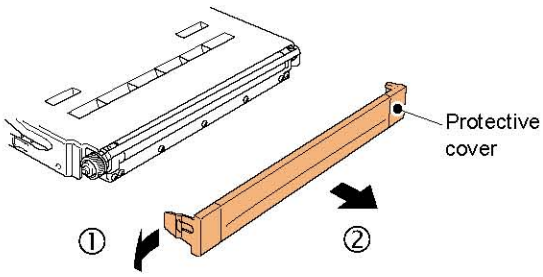


Fig. 3-13

(4) Install the four toner cartridges by sliding them gently along the guides into the printer. DO NOT USE FORCE TO INSERT THE CARTRIDGES AND DO NOT PUSH THEM FULLY INTO THE PRINTER, THEY WILL BE POSITIONED CORRECTLY WHEN THE FRONT COVER IS CLOSED.

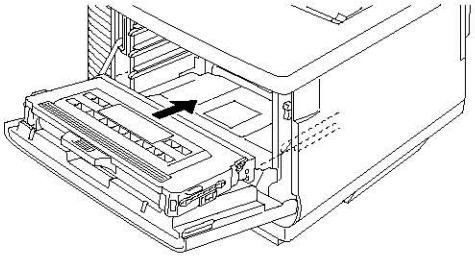


Fig. 3-14

NOTE:

The installation order of the four toner cartridges should be from the bottom to the top, in terms of colors this is in the order Cyan (C), Magenta (M), Yellow (Y), and Black (K).

(3) Close the front cover.

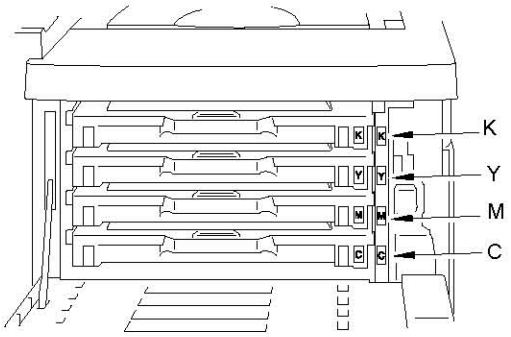


Fig. 3-15

3.4 Install the Media Cassette and Adapter

3.4.1 Install the media cassette

(1) Remove the cassette cover from the media cassette.

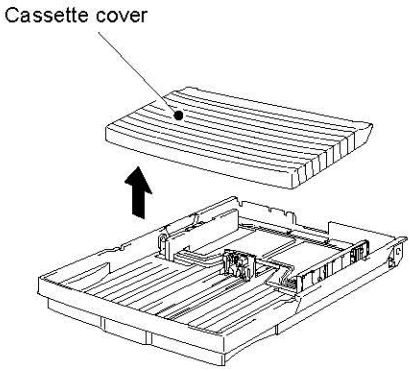


Fig. 3-16

(2) Set the paper guide according to the print paper size.

i) Horizontal direction; Holding the green side plate to meet the paper size position.

ii) Vertical direction; Holding the green color lever, adjust the end plate to meet the paper size position.

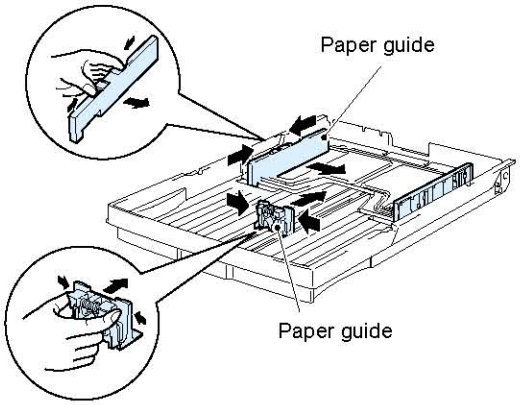


Fig. 3-17

(3) Load the paper into the cassette.

> **PRECAUTION**
>
> Loading capacity of the cassette is subject to the type of media in use. Keep the loading level below the upper limit marked on the label. Excessive loading of media over the upper limit will result in paper feed jams or print quality problems.

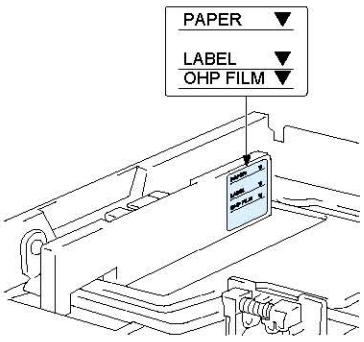


Fig. 3-18

(4) Install the cassette cover.

(5) Install the cassette into the printer.

3.4.2 Install the envelope adapter

NOTE:
The specification of envelopes feedable from the envelope adapter are as follows;

- *Capacity: 15 envelopes*
- *Size: DL (110 x 220 mm), #10 (105 x 241 mm)*

(1) Prepare the media cassette and envelope adapter.

(2) Put the adapter on the cassette base and engage the hooks provided on the leading edge of the adapter (left and right) into the cassette base.

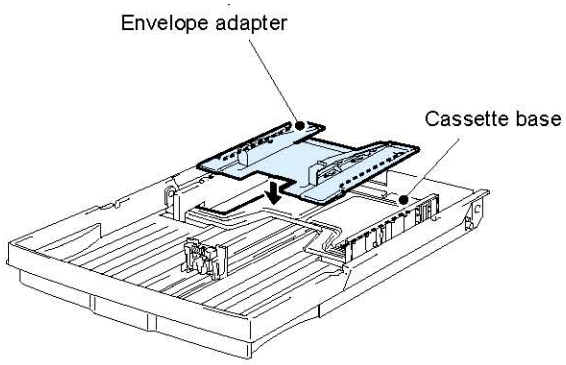


Fig. 3-19

(3) Move the envelope guide to meet the adapter base.

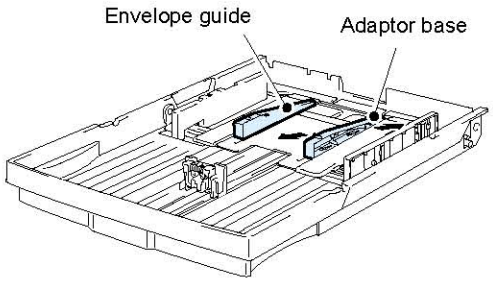


Fig. 3-20

(4) Move the paper guides to meet the desired envelope size.

(5) Load the envelopes into the adapter.

PRECAUTION

Do not load media in the adapter higher than the specified capacity limit, otherwise it may result in paper feed jams or print quality problems.

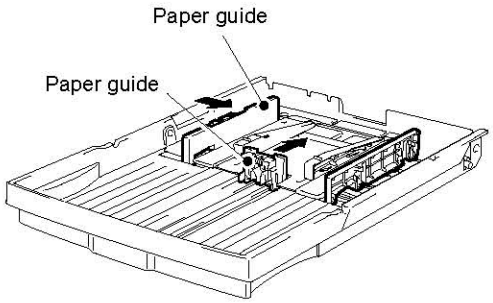


Fig. 3-21

CAUTION

When removing the envelope adapter from the media cassette, pull the adapter toward you while holding the trailing edge of the adapter up approximately 10mm.
Do not hold up the trailing edge of the adapter by force, otherwise it may result in damage to the hooks provided at the leading edge of the adapter.

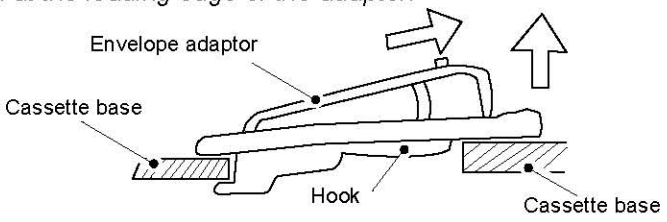


Fig. 3-22

3.5 Test Print

(1) Make sure the printer power button is off. Do not connect the interface cable.

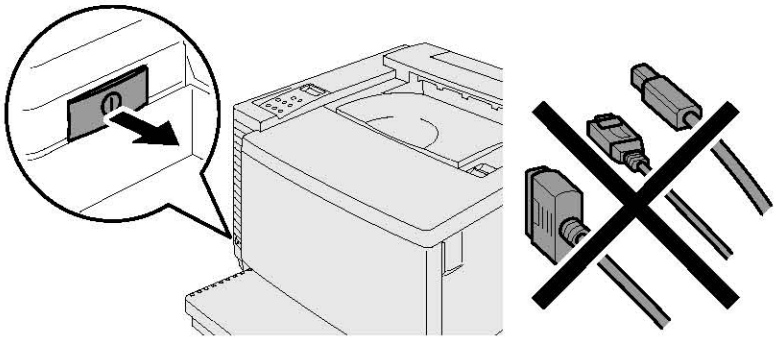


Fig. 3-23

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

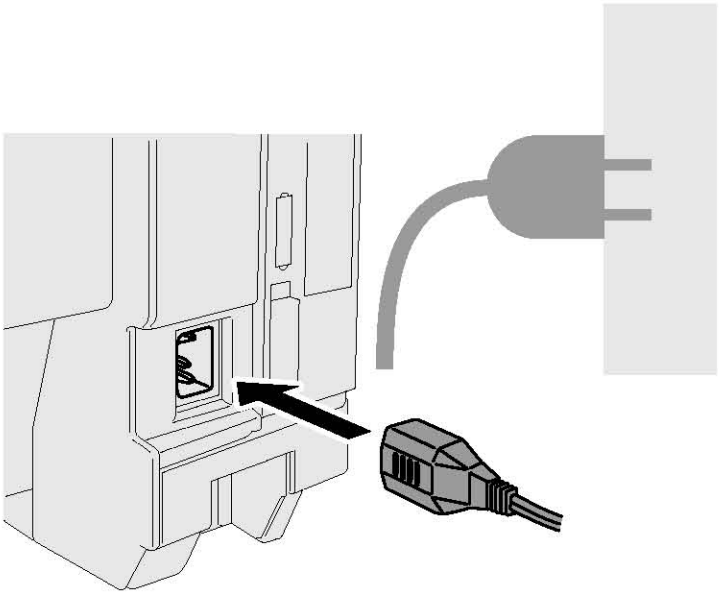


Fig. 3-24

(3) Turn on the power button.

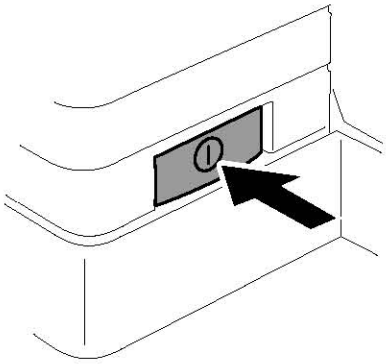


Fig. 3-25

(4) After the printer warms, the READY message will appear.

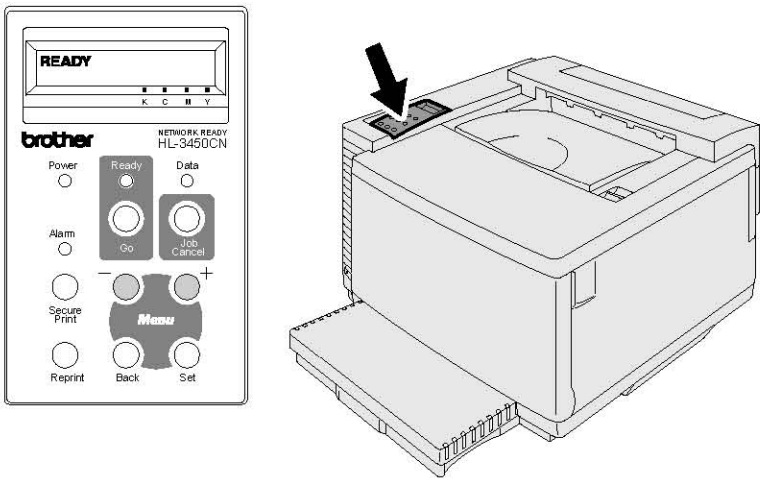


Fig. 3-26

(5) Press the Go button. The printer will print a test page. Check that the test page is printed correctly.

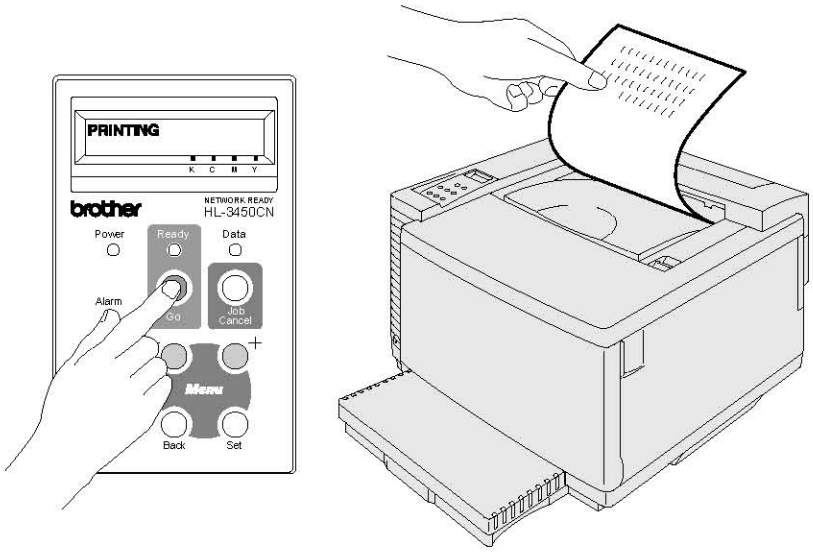


Fig. 3-27

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CHAPTER 4 STRUCTURE OF SYSTEM COMPONENTS

1. BASIC STRUCTURE

1.1 Mechanical Structures

This laser beam color printer (hereinafter called "Printer") consists of five mechanical systems; Print, Transfer, Scanning, Paper Transport and Control System. The printer produces color printing through the interactive operations of these five systems as shown in Fig.4-1.

(1) Print System

The print system consists of the following 6 (six) functional parts located around the OPC belt which form a toner image on the OPC Belt.

- Charger Part
- Exposure Part
- Development Part
- First Transfer Part
- Discharger Part
- Cleaner Part

(2) Scanning System

The scanning system consists of the following 2 (two) functional parts which form an electrostatic latent image on the OPC Belt by scanning it with a laser beam.

- Scanner Unit
- Scanner Motor (SCM)

(3) Transfer System

The transfer system consists of the following 3 (three) functional parts and transfers the toner image formed on the transfer drum onto the page.

- Transfer Drum
- Second Transfer Part
- Drum Cleaner Unit

(4) Paper Transport System

The paper transport system consists of the following 5 (five) functional parts and picks up paper from the media cassette, separates the paper from the transfer drum and exits it from the printer body after fusing the toner image on the paper.

- Media Cassette
- Transport rollers
- Paper Discharger
- Fusing unit
- Paper Exit

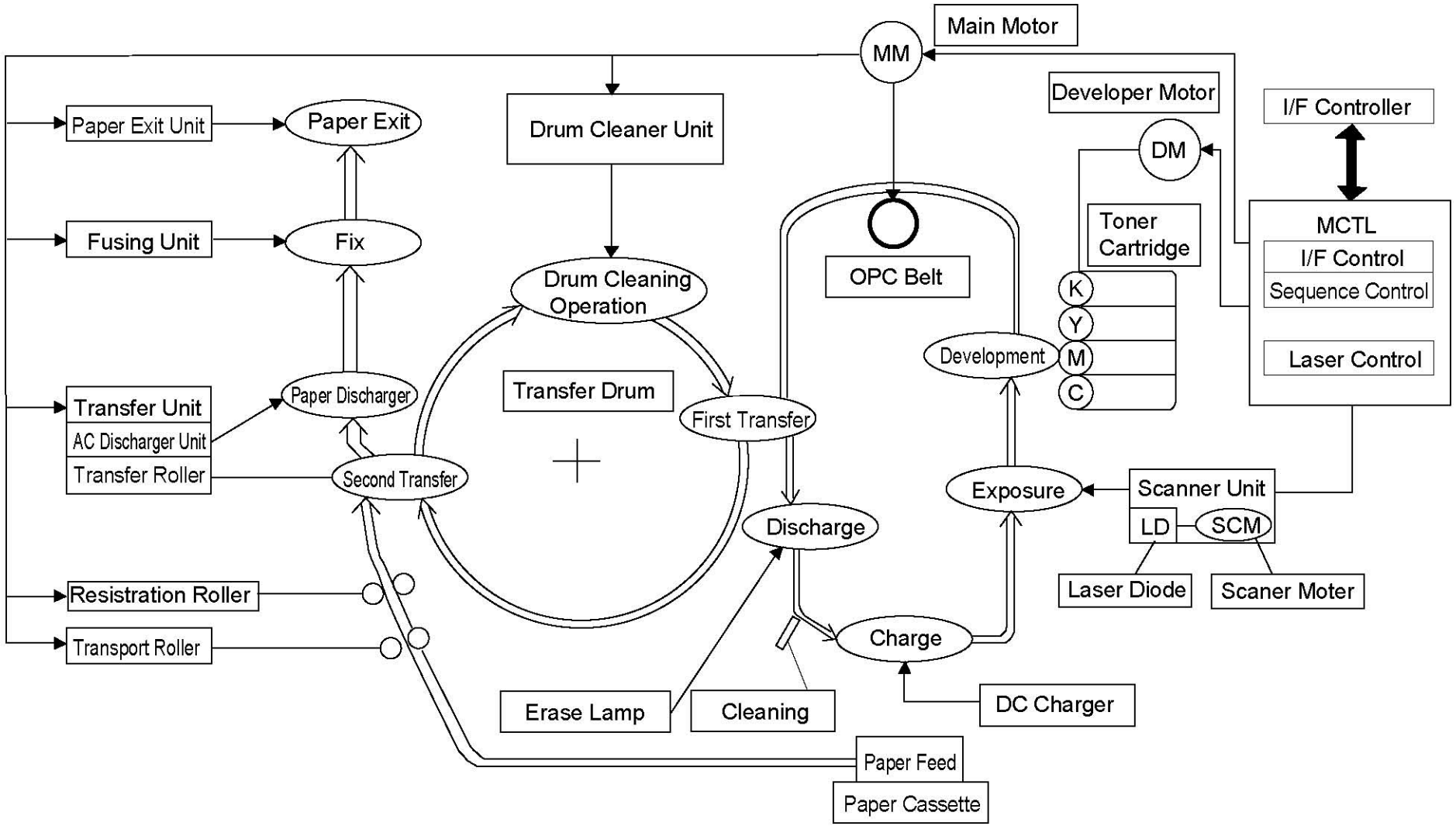

Main Motor
MM
Developer Motor
DM
I/F Controller
Paper Exit Unit
Paper Exit
Drum Cleaner Unit
Toner Cartridge
MCTL
I/F Control
Sequence Control
Laser Control
Fusing Unit
Fix
Drum Cleaning Operation
OPC Belt
K
Y
M
C
Development
Transfer Unit
AC Discharger Unit
Transfer Roller
Paper Discharger
Transfer Drum
First Transfer
Second Transfer
Exposure
Scanner Unit
LD
SCM
Discharge
Laser Diode
Scaner Moter
Resistration Roller
Transport Roller
Charge
Erase Lamp
Cleaning
DC Charger
Paper Feed
Paper Cassette

Fig. 4-1

(5) Control System

The control system consists of the following 4 (four) control parts and runs the printer by processing the interface signals transmitted from the Host computer and interfacing to the print, transfer, scanning and transport systems.

- Sequence Control
- Laser Control
- Fusing Temperature Control
- Interface Control

1.2 Basic Mechanism of Color Printing

1.2.1 Principle of color printing

Color printing is made through the subtractive process by combining the three primary colors, yellow, magenta, and cyan. Fig.4-2 shows the three primary colors and subtractive process:

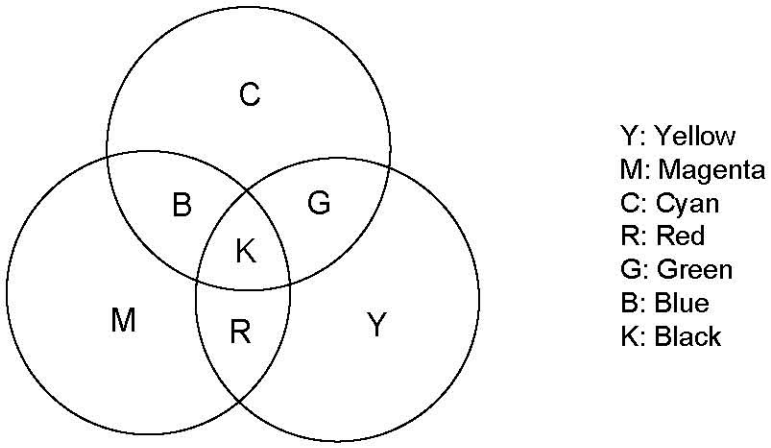


Fig. 4-2

1.2.2 Basic color printing process

(a) The printer has a toner cartridge of each color yellow, magenta, cyan and black as shown in Fig.4-3.

(b) The toner image developed using the primary colors is transferred to the transfer drum for the printed color combination as shown in Fig.4-4ⓐ .

(c) The toner image formed on the transfer drum is transferred to the transported paper as shown in Fig.4-4 ⓑ .

(d) The toner on the paper is fused by the thermal fixing unit to fix the toner image onto the paper as shown in Fig.4-4 ⓒ .

Summarizing the above processes, a toner color layer is formed on the transported paper, and subsequently, the color image is made through the subtractive process.

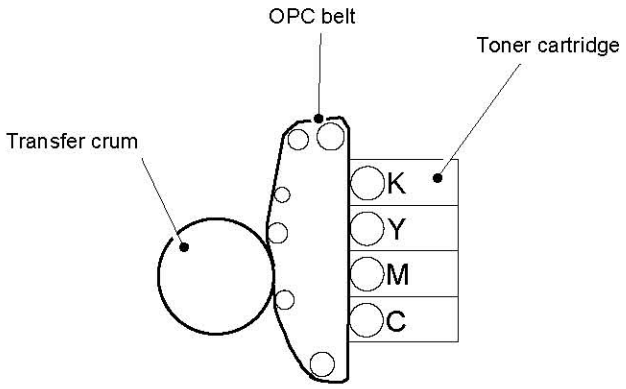

OPC belt
Toner cartridge
Transfer crum
K
Y
M
C

Fig. 4-3

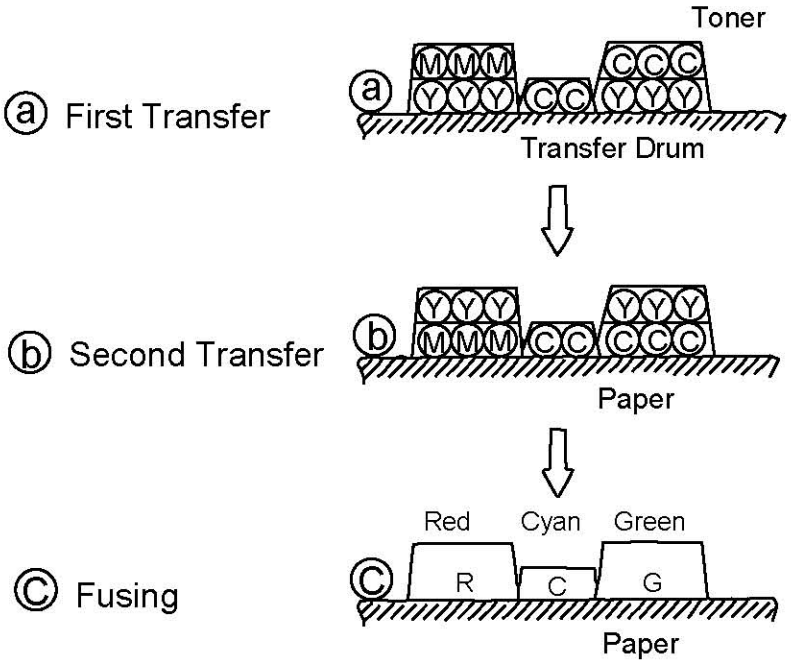

Toner
ⓐ First Transfer
Transfer Drum
ⓑ Second Transfer
Paper
Red
Cyan
Green
Ⓒ Fusing
R
C
G
Paper

Fig. 4-4

1.3 Structure of the OPC Belt

The OPC belt consists of a surface layer having a photoconductor (OPC) of organic material, the inner layer of an insulator material (PET) and an aluminum deposit layer in between. The OPC belt is located as shown in Fig.4-5 as the main part of the print system.

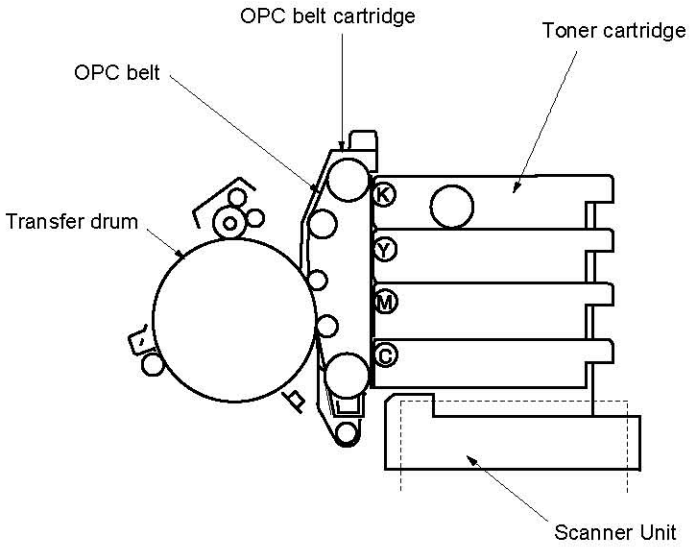


Fig. 4-5

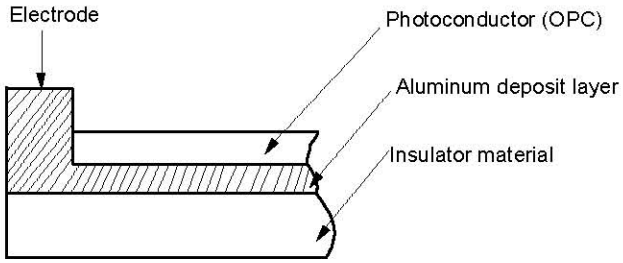


Fig. 4-6

1.4 Print System and Transfer System

Fig.4-7 shows the basic structure of the print system having the OPC belt as the main part and the transfer system having the transfer drum. Color printing is achieved by actuating in sequence each process in the print system and transfer system.

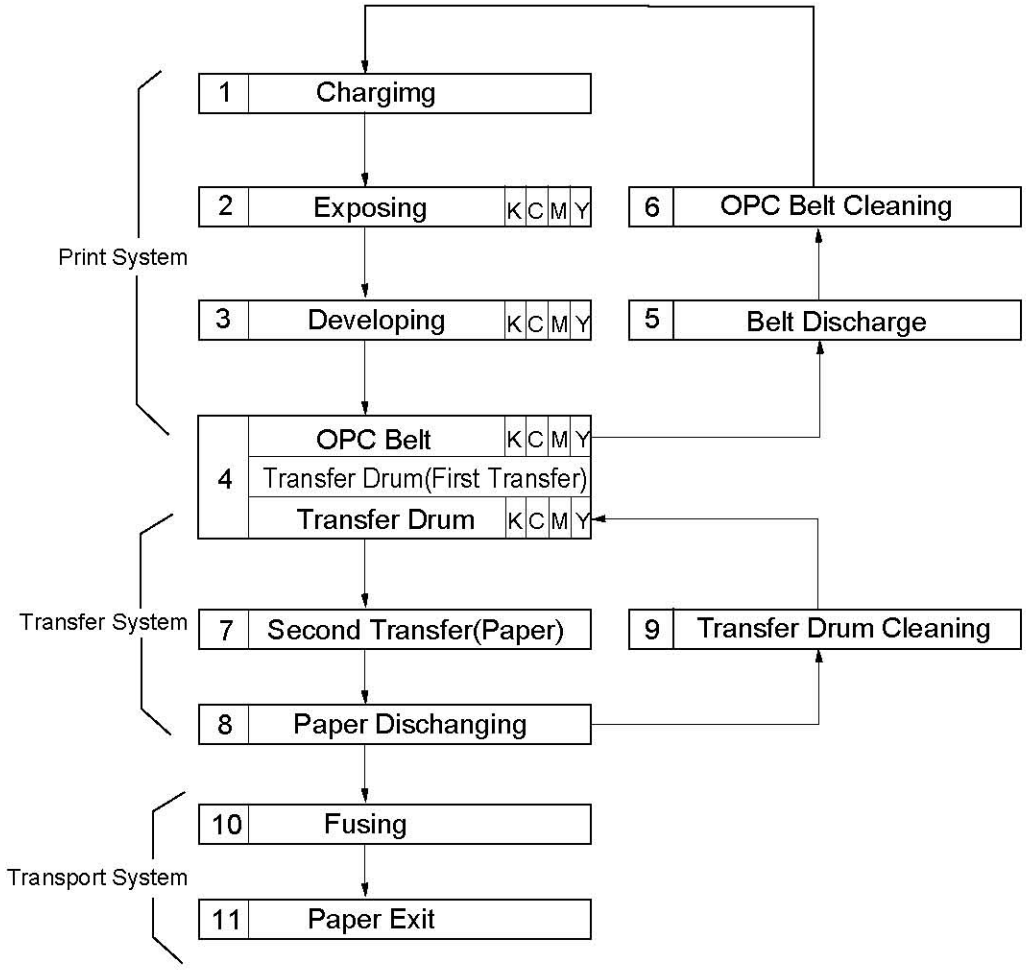


Fig. 4-7

1.4.1 Structure of the printer

No.	Component Part	Process
1	Charger	Charging
2	Scanner Unit	Exposing
3	Toner cartridge	Developing
4	OPC belt cartridge	Receives the Image
5	Transfer drum	Transfers the Image
6	Erase lamp	Discharges the Belt
7	Cleaning blade	Cleaning the Belt
8	Transfer roller	Transferring
9	Paper discharger	Discharges the Paper
10	Drum cleaner	Cleans the Drum
11	Fusing unit	Fusing
12	Paper exit unit	Exits the Paper

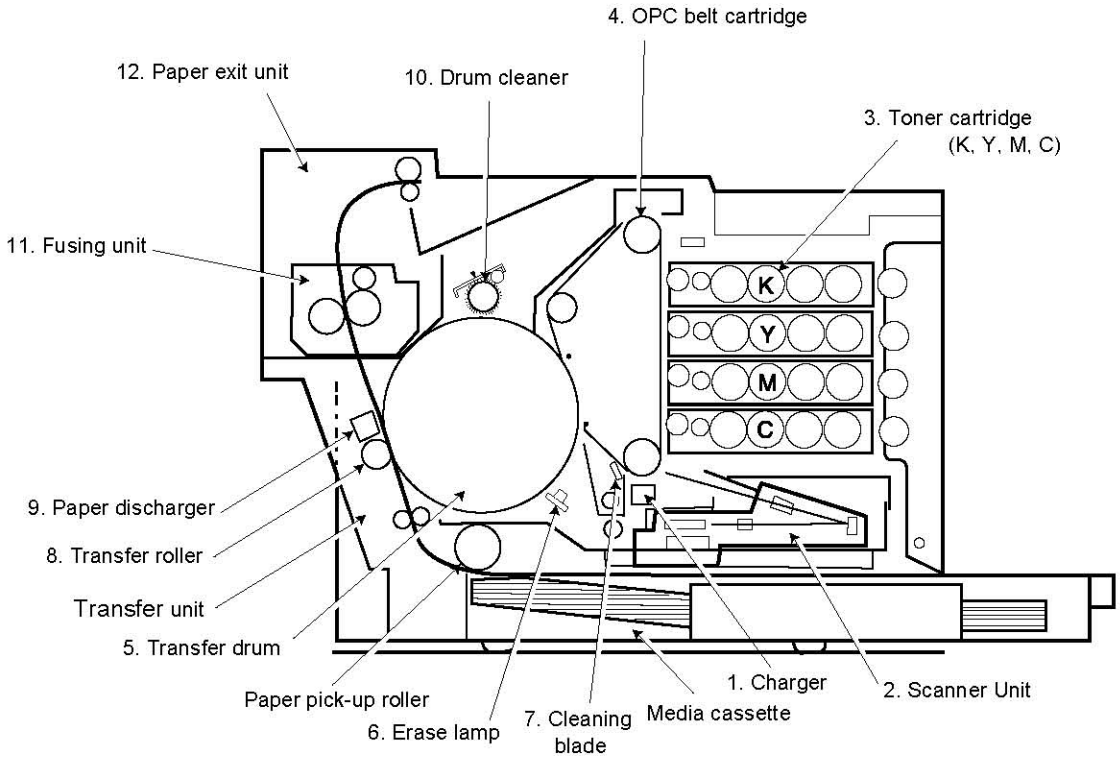


Fig. 4-8

1.4.2 Basic structure of the printing system

A toner image is formed through the potential of the OPC belt varying in each of the charger, exposure, development, transfer and cleaning processes.

(1) Process of Print System (See Fig.4-9.)

i) The OPC belt is biased to the voltage -CBV (V) by the power supply CBV.

ii) A negative high voltage is applied to the charger unit by the power supply CHV, and a corona is generated as the result.

iii) The developer roller of the toner cartridges is biased to -DBV (V) by the power supply DBV.

iv) The frame potential of the transfer drum is GND.

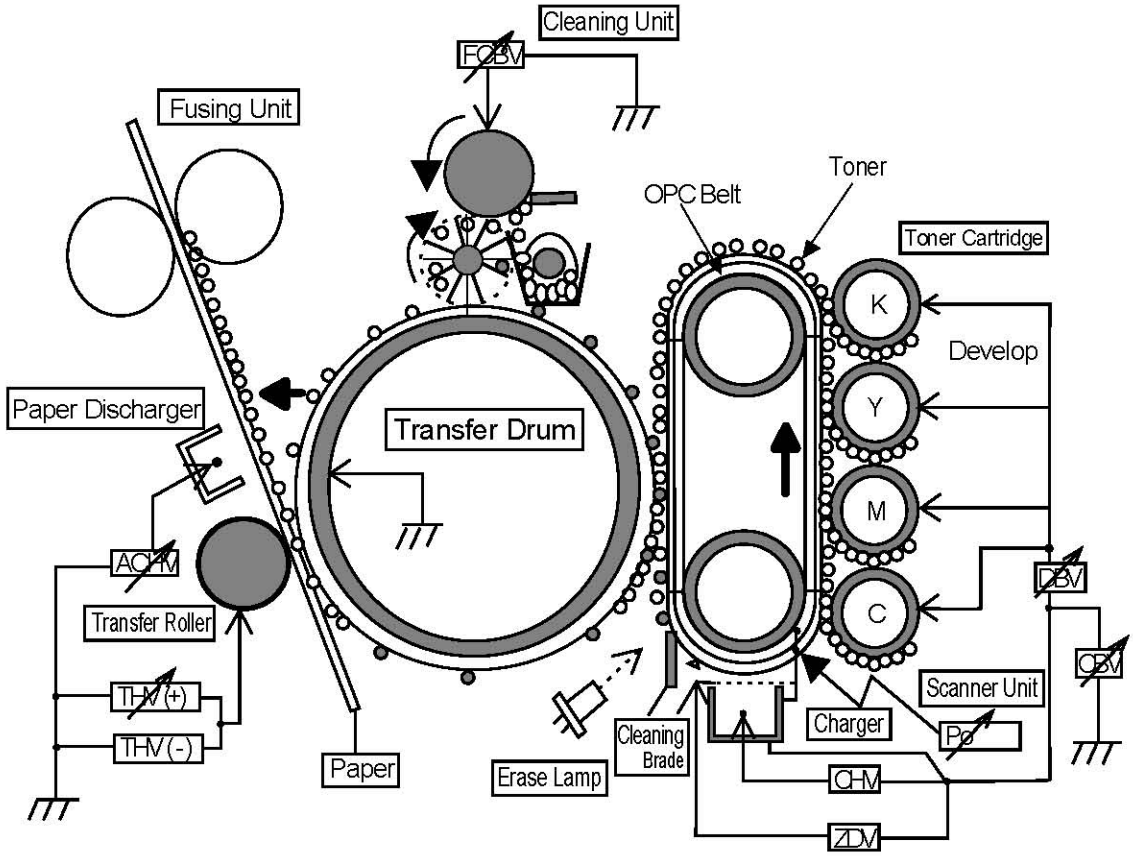


Fig. 4-9

(2) Variation of OPC Belt Potential (See Fig.4-10.)

i) The OPC belt is initially biased to -CBV (V).

ii) The OPC belt surface is evenly charged to V_0 (V) in the charging process.

iii) The potential of the exposure part of the OPC belt is reduced to -VR (V) as it is exposed to the laser beam in the process of exposing, and an electrostatic latent image is formed on the OPC belt as the result.

iv) Negatively charged toner is moved onto the exposed part of the OPC belt in the development process due to the difference of potential between -VR (V) and -DBV (V), and a visible toner image is formed as the result.

v) Negatively charged toner on the OPC belt moves to the transfer drum surface in the transfer process because the GND potential of the transfer drum is greater than -VR (V) of the OPC belt.

vi) The OPC belt is discharged by the erase lamp.

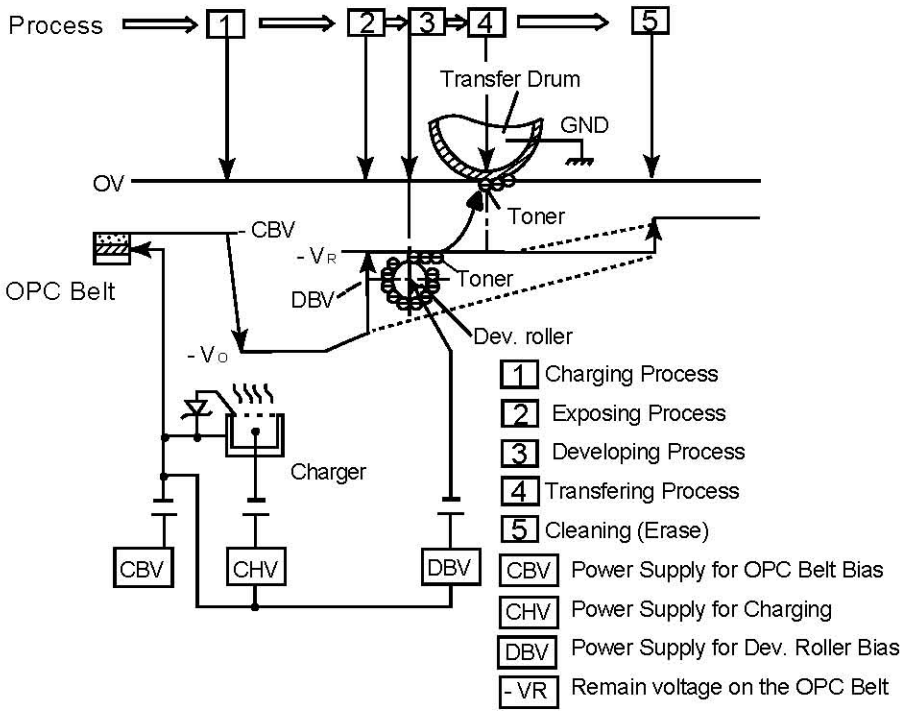


Fig. 4-10

1.4.3 Details of each process

1	Charging

The charging process ensures that the OPC belt is evenly charged by the charger system.

(1) Structure of the charger unit (Refer to Fig.4-8 and Fig.4-11)

i) The charger unit is located as shown in Fig.4-8.

ii) The charger unit consists of the case, corona wire and grid.

iii) The charger unit charges the OPC belt surface to the potential $-V_0$ (V) with the corona charge.

iv) The charger unit has the grid controlled to the constant voltage ZD (V) for even charging.

(2) Process of charging (Refer to Fig.4-12.)

i) The status of the OPC belt surface before charging is -CBV (V).

ii) The charger unit charges the OPC belt surface evenly to $-V_0$ (V) by generating a negative charge.

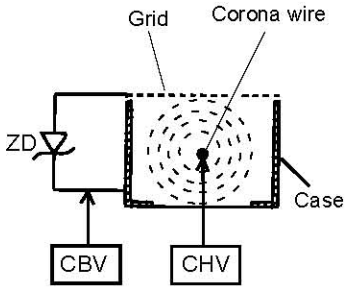


Fig. 4-11

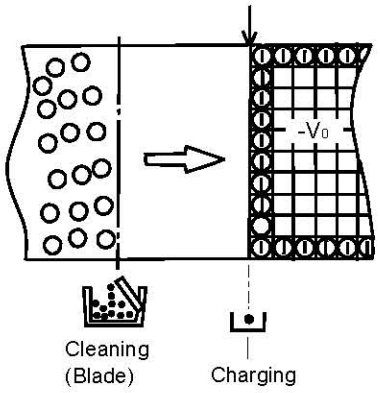


Fig. 4-12

2	Exposing

The exposing process means that the OPC belt surface is exposed to the laser beam to form an electrostatic latent image.

(1) Structure of scanner unit

i) The scanner unit is located as shown in Fig.4-8.

ii) The source of the laser beam is a semiconductor laser.

iii) The laser light is scanned onto the OPC belt by converting the laser light to a beam of light through the lens and reflective mirror to form an electrostatic latent image.

(2) Process of exposing (Refer to Fig.4-13.)

i) The OPC belt surface has been charged to the potential -Vo (V) in the charging process.

ii) The laser light is scanned at right angles to the forward direction of the OPC belt.

iii) High speed switching of the laser is made according to the transmitted image data.

iv) The charge of the areas radiated by the laser light is reduced to the potential -VR (V).

v) An invisible electrostatic latent image is formed on the OPC belt as shown in Fig. 4-13.

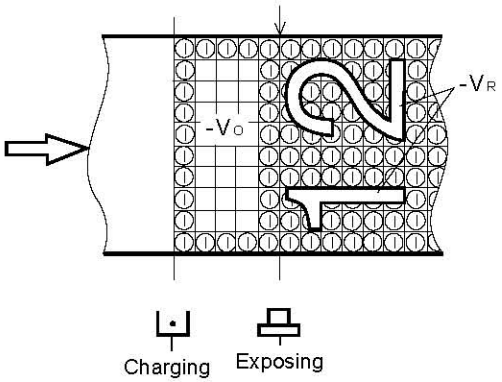


Fig. 4-13

3	Developing

The developing process means that an electrostatic latent image on the OPC belt is made visible by depositing toner onto the exposed areas of the OPC belt.

(1) Structure of the Toner Cartridge (Refer to Fig.4-8 & 4.14.)

i) The toner cartridge is located as shown in Fig.4-8.

ii) Four toner cartridges are made available from the top to bottom in the order black, yellow, magenta and cyan.

iii) Each color toner is loaded in the corresponding toner cartridge.

(2) Process of Developing (Refer to Fig.4-8, 4-14, 4-15, and 4-16)

i) Toner adheres to the developer roller of the toner cartridge.

Developing is processed by this roller contacting the OPC belt surface.

ii) The developer roller has been biased to the potential -DBV (V). Fig.4-15 describes the relationship established between the potential of the toner, the potential $-V_0$ (V) at the non-exposed area of OPC belt and the potential -VR (V) on the exposed area of the OPC belt.

iii) Developing is processed by the toner adhering to the OPC belt due to the attraction between the potential of the toner and the potential -VR (V) on the exposed area of the OPC belt. A visible Toner image is formed on the OPC belt.

iv) No developing takes place on the non-exposed area because the potential of the toner and that of the OPC belt is the same polarity and therefore repel each other.

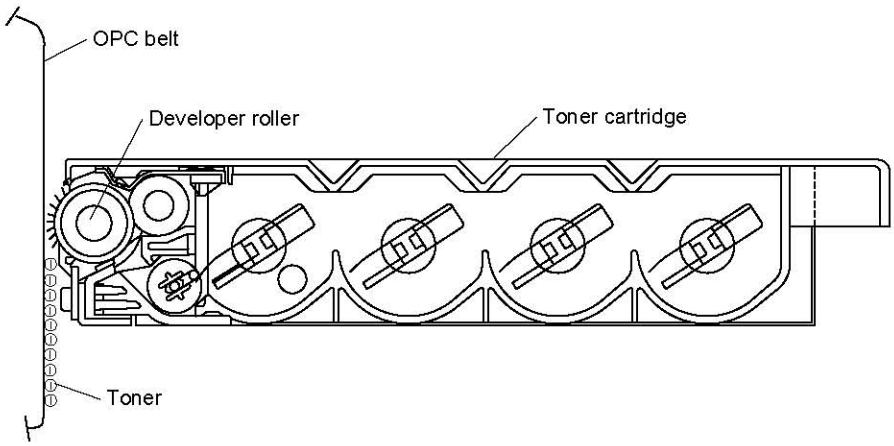


Fig. 4-14

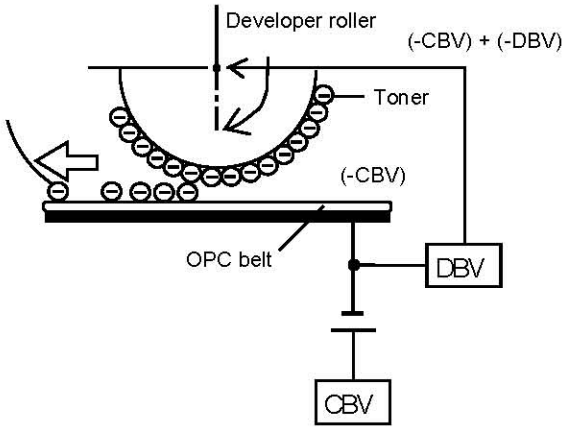


Fig. 4-15

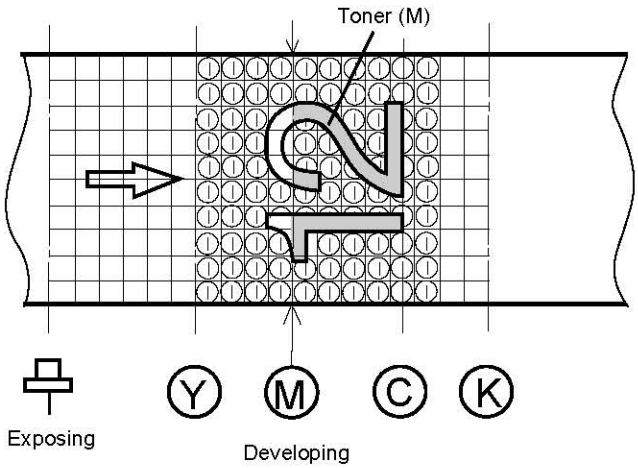


Fig. 4-16

4	First Transfer (Drum)

The first transfer process means that the toner image on the OPC belt is transferred onto the transfer drum.

(1) Structure of the Transfer Drum (Refer to Fig.4-8.)

i) The drum is located as shown in Fig.4-8.

ii) Material of the drum is aluminum.

iii) Semiconductor rubber is used to provide the drum surface as shown in Fig.4-17.

iv) The transfer drum rotates by contacting and synchronizing with the OPC belt.

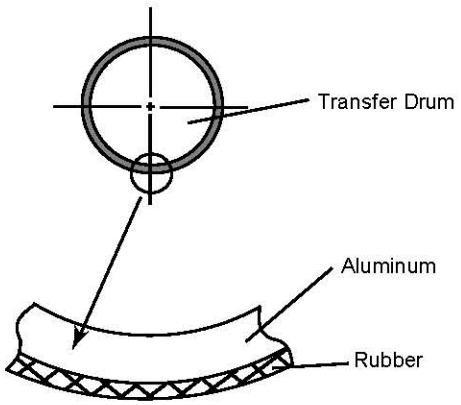


Fig. 4-17

(2) First Transfer Process (Refer to Fig.4-18.)

i) The OPC belt has been through the development process and contacts and synchronizes with the transfer drum.

ii) The OPC belt has been biased to the potential of -CBV (V). The potential of the transfer drum is nearly GND.

iii) Toner on the OPC belt is moved onto the transfer drum due to the difference of potential between the OPC belt and the transfer drum.

iv) Toner that has been developed by each color in sequence is moved from the OPC belt onto the transfer drum and the color toner images overlap on the transfer drum.

v) Upon completion of the drum transfer process, the complete toner image is transferred onto paper in the paper transfer process.

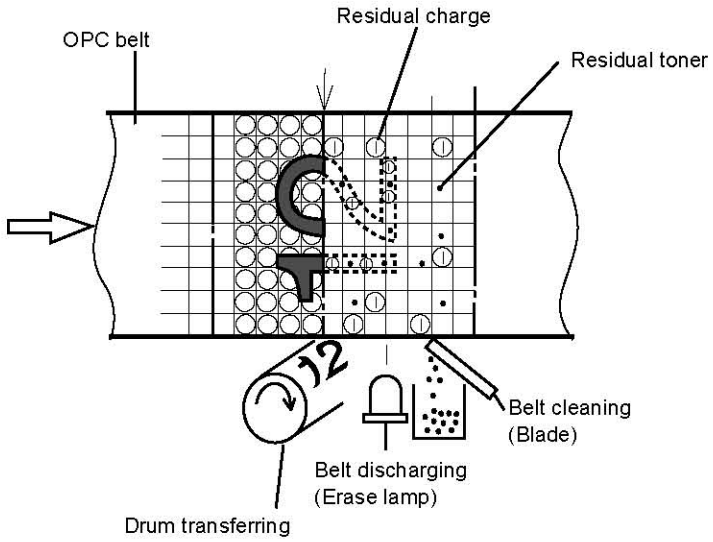


Fig. 4-18

5	Belt Discharging (Erase Lamp)

The belt discharging process means that upon completion of the drum transfer process, an LED light is radiated onto the OPC belt prior to mechanically cleaning the belt to discharge the residual charge.

(1) Structure of Erase Lamp

i) The erase lamp is located as shown in Fig.4-8.

ii) The light source of the erase lamp is 24 light emitting diodes (LEDs).

(2) Process of Discharging (Refer to Fig.4-19.)

i) Though the toner image was transferred to the transfer drum in the drum transfer process, there is still a residual charge on the OPC belt.

ii) The residual charge (-VR) on the OPC belt is discharged by the radiation of the erase lamp light prior to cleaning the belt.

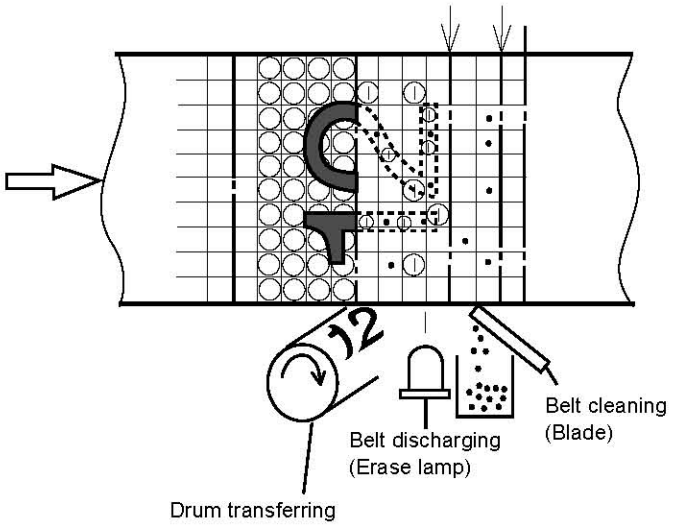


Fig. 4-19

6	Belt Cleaning

The belt cleaning process means that the residual toner adhering to the OPC belt surface is mechanically scavenged.

(1) Structure of Belt Cleaning

The blade for the belt cleaning is located relative to the OPC belt cartridge as shown in Fig.4-8.

(2) Process of Belt Cleaning (Refer to Fig.4-20.)

i) There is residual toner on the OPC belt as it has not been completely transferred in the drum transfer process.

ii) Residual toner is mechanically scavenged by the blade edge.

iii) The scavenged residual toner is collected in the waste toner pack by the waste toner feeder.

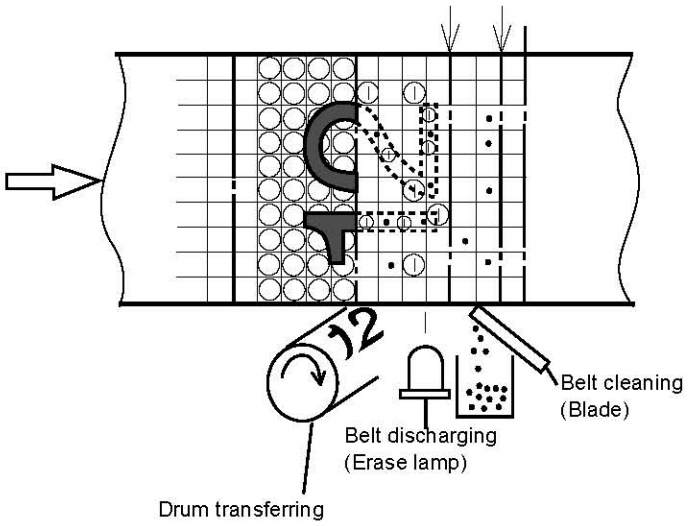


Fig. 4-20

7	Second Transfer (Paper)

The second transfer process is where the toner image on the transfer drum is transferred onto the transported paper.

(1) Second Transfer Structure

i) The transfer roller for the paper transfer is located as shown in Fig.4-8.

ii) The transfer roller is normally kept out of contact with the transfer drum until the second transfer process starts.

iii) The transfer roller is positively biased by the power supply THV.

iv) The transfer roller is in contact with the transfer drum only in the second transfer process.

v) Transported paper passes between the transfer roller and transfer drum.

(2) Second Transfer Process (Refer to Fig.4-21.)

i) Paper is transported and is synchronized with the transfer drum.

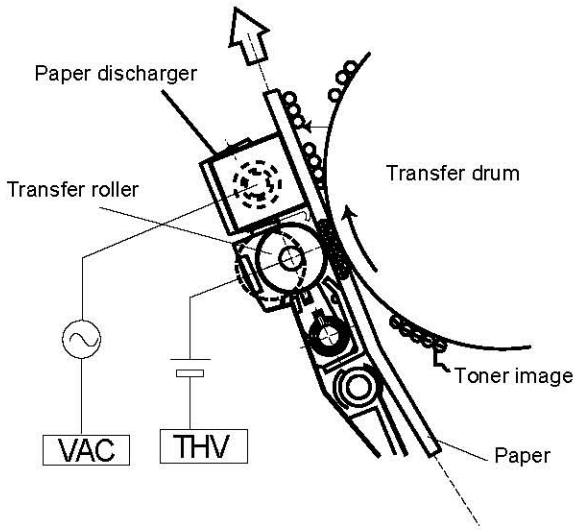
ii) The transfer roller operates and is synchronized with the transported paper and is in contact with the transfer drum through the transported paper.

iii) The transported paper passes between the transfer roller and transfer drum.

At this time the positive high voltage (THV) is fed to the transfer roller.

iv) Negatively charged toner on the transfer drum is moved to the positively charged paper.

v) The transported paper with the toner transferred to it is moved to the paper discharging process.



VAC: Power supply for paper discharging
THV: Power supply for transfer roller bias

Fig. 4-21

8	Paper Discharging

The paper discharging process is where the transported paper onto which the toner transfer has been completed is separated from the transfer drum by applying an AC charge to the paper.

(1) Structure of Paper Discharger (Refer to Fig.4-22.)

i) The AC charger unit for discharge the paper is located as shown in Fig.4-8.

ii) The AC charger unit consists of the case and a charger wire.

iii) A high alternating voltage (VAC) is fed to the AC charger unit.

(2) Process of Paper Discharging (Refer to Fig.4-22.)

i) The paper adheres to the transfer drum in the transfer process.

ii) The paper is neutralized (discharged) in terms of any electrical charge by the alternate voltage generated by the discharger.

iii) Paper is separated from the transfer drum and subsequently transported to the fusing (fixing) process.

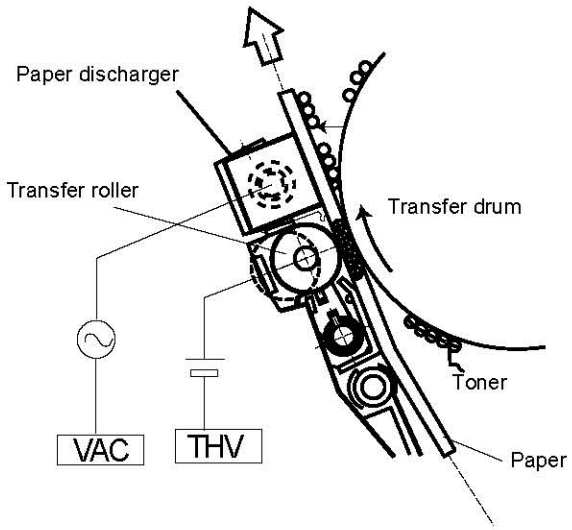


Fig. 4-22

9	Drum Cleaning

The drum cleaning process is where the residual toner on the transfer drum is removed.

(1) Structure of Drum Cleaning (Refer to Fig.4-23.)

i) The drum cleaning unit is located as shown in Fig.4-8.

ii) The drum cleaning brush is a semiconductor type so that the brush can clean the surface of the rotating transfer drum. The Drum cleaning brush is kept out of contact with the transfer drum when the print image on the transfer drum is being created.

iii) The drum cleaning roller is positively biased by the positive voltage FCBV (V).

iv) FCBV (V) is fed to the cleaning brush in contact with the roller and the cleaning brush is self-biased by the resistance of the brush.

v) The drum cleaning roller rotates in contact with the drum cleaning brush.

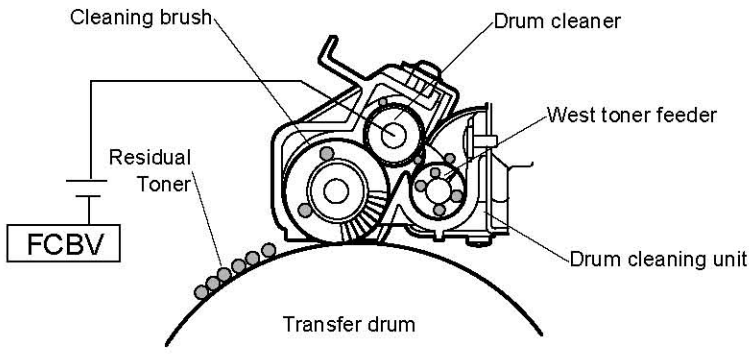
(2) Process of Drum Cleaning (Refer to Fig.4-23.)

i) There is residual toner on the surface of the transfer drum after the paper transfer process.

ii) The Drum cleaning brush is positively self-biased and so the negatively charged residual toner is removed from the surface of the transfer drum onto the drum cleaning brush.

iii) The Drum cleaning roller has been biased to the positive voltage FCBV (V). As the cleaning brush rotates, the residual toner absorbed into the brush from the transfer drum is attracted by the positive FCBV (V) voltage on the roller and adheres to the surface of the drum cleaning roller.

iv) Waste toner adhering to the surface of the drum cleaning roller is scavenged by the cleaning blade and collected into the waste toner pack by the waste toner feeder.



FCBV: Cleaning roller
Power supply for
fuser cleaner bias

Fig. 4-23

1.5 Scanning System

This printer employs a semiconductor laser diode as a light source. This laser diode is switched according to the transmitted image data (video signal).

The generated laser light scans over the OPC belt through a polygon mirror and lens, by which method electrostatic latent images will be formed on the OPC belt.

(1) Structure of the Scanning System (Refer to Fig.4-24.)

The scanner unit is located as shown in Fig.4-8.

The scanner unit consists of the following parts;

①	Scanner Unit:	Light emitting source incorporating a laser diode.
②	Cylinder lens:	Condenser for the laser beam.
③	Polygon mirror:	Hexahedral mirror for scanning the laser beam.
④	F-θ lens:	Focus lens for the laser beam.
⑤	Scanner motor:	Motor to rotate the polygon mirror.
⑥	Mirror:	Reflecting mirror for the laser beam path.
⑦	LDC:	Laser diode control circuit.
⑧	PD:	Beam detector.
⑨	BTD mirror:	Beam timing detector mirror to guide the laser beam to the PD sensor.

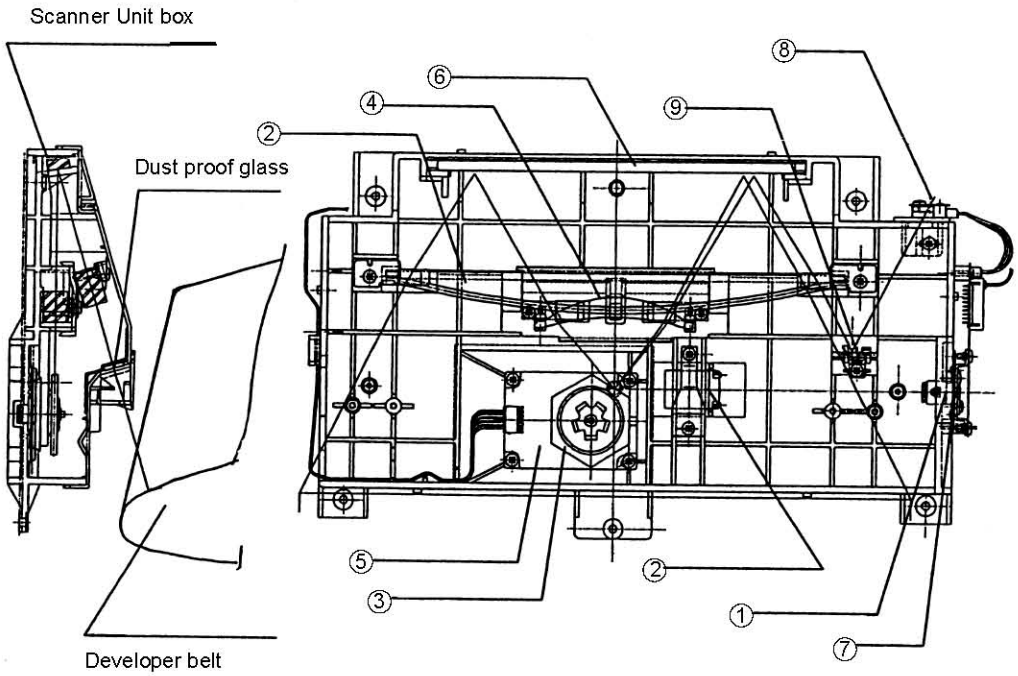


Fig. 4-24

(2) Specification:

Specification of the scanner unit is as follows;

Item	Specifications
Rated output of laser diode	5 mW.
Wave length of laser beam	Approx.785nm.
Scanning density	600dpi
Scanning width	310mm
Scanner motor speed	24,072rpm
Number of polygon mirror faces	6

1.6 Paper Transportation System

1.6.1 Outline

This printer employs automatic paper feeding from the media cassette.

When toner images are formed on the transfer drum through the operations of the print system and transfer system, paper is fed by the pick-up roller and transported to the register roller. The transported paper is further transported to the transfer, fuser and exit parts by the register roller synchronizing with the rotation of the transfer drum.

1.6.2 Structure of paper transportation system

The paper transportation system consists of the following parts;

①	Media cassette:	Case to accommodate paper to be fed automatically.
②	Paper pick-up roller:	Roller to feed sheets of paper one by one, preventing multi-feed.
③	Register roller:	Roller to transport papers synchronized with the transfer drum.
④	Transfer part:	Print processing part consisting of transfer drum and transfer roller to transfer the toner image onto the paper.
⑤	Paper discharger unit:	Corona generator to generate AC corona for separating paper from the transfer drum.
⑥	Fusing unit:	Mechanical part to fuse the toner image with heat rollers and fix it on the paper.
⑦	Paper exit unit:	Mechanical part to exit the fused paper from the printer.
⑧	Paper exit roller:	Roller to feed paper from the printer.

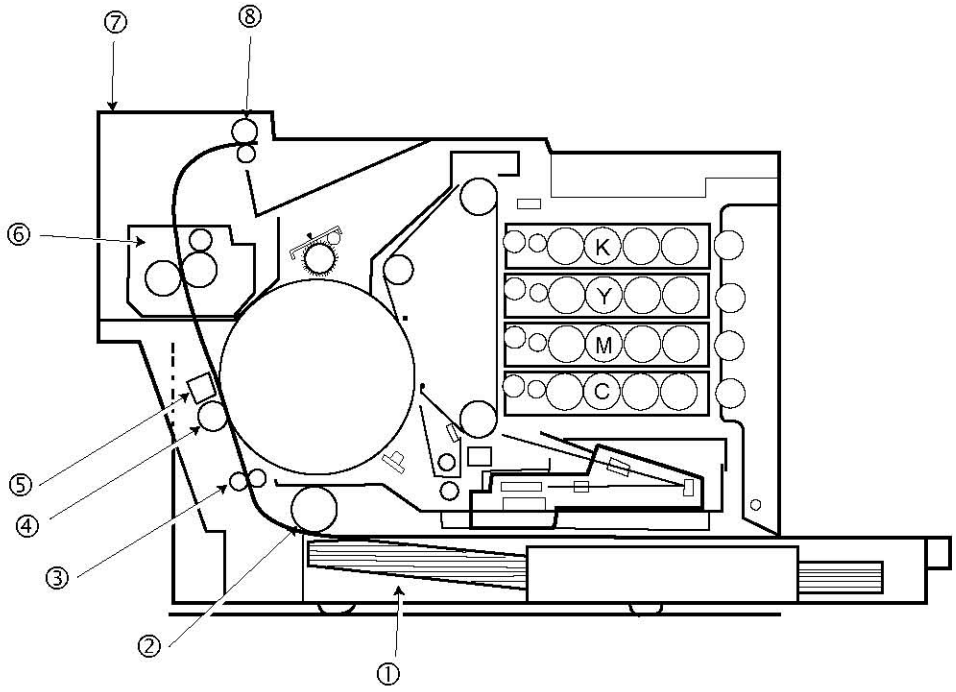


Fig. 4-25

1.7 Fusing Unit

The fusing unit employs a thermal fusing system using heater lamps in the rollers. Paper carrying the combined toner image passes between the heat rollers. Heat and pressure is applied to the paper when passing between the heat rollers so that the toner image is melted and fused onto the paper.

1.7.1 Structure

The fusing unit consists of the following component parts; (Refer to Fig.4-26.)

①	Fuser roller:	incorporates a heater lamp.
②	Back-up roller:	is a pressure roller and incorporates a heater lamp.
③	Fusing heaters:	halogen lamps to heat the rollers.
④	Thermistor:	is a sensor to detect the temperature of the fuser roller's surface.
⑤	Thermal fuse:	prevent the fuser roller from being excessively heated up.
⑥	Oil bottle:	contains silicone oil for fusing.
⑦	Fuser cleaner:	cleans the fuser roller.

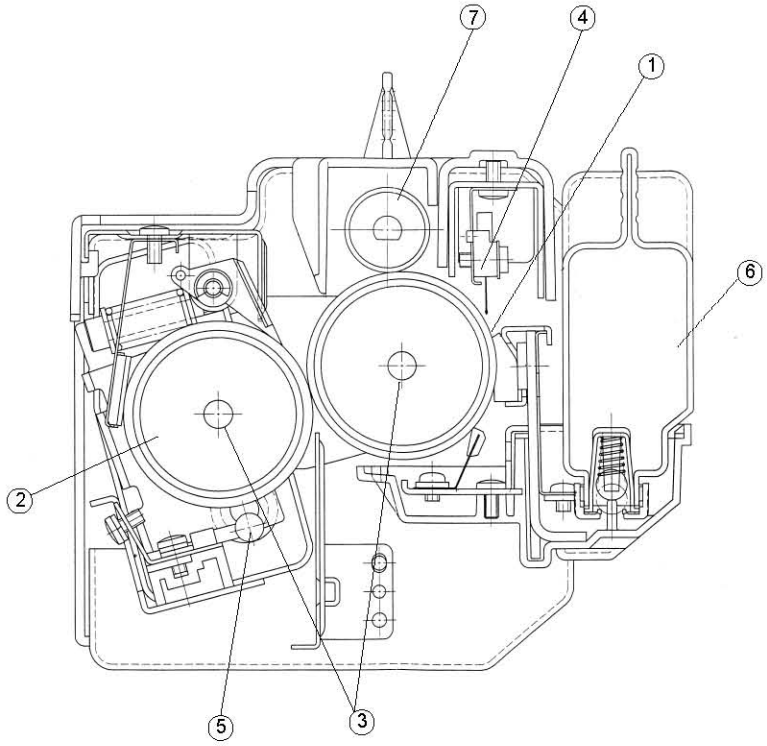


Fig. 4-26

1.7.2 Fusing process

① Silicone oil supplied from the oil bottle is applied to the surface of fuser roller.

② The toner image has been transferred onto the paper, but not yet fused.

③ Transported paper passes between the heater roller and back-up roller.

④ Each roller is heated up to approx.150°C, and receives approximately 156N pressure from the opposite heat roller.

⑤ When the paper carrying the toner images passes between the two heat rollers, the toner images are melted and fused on the transported paper.

⑥ The paper carrying the fused image is separated from the heat rollers, and ejected from the printer.

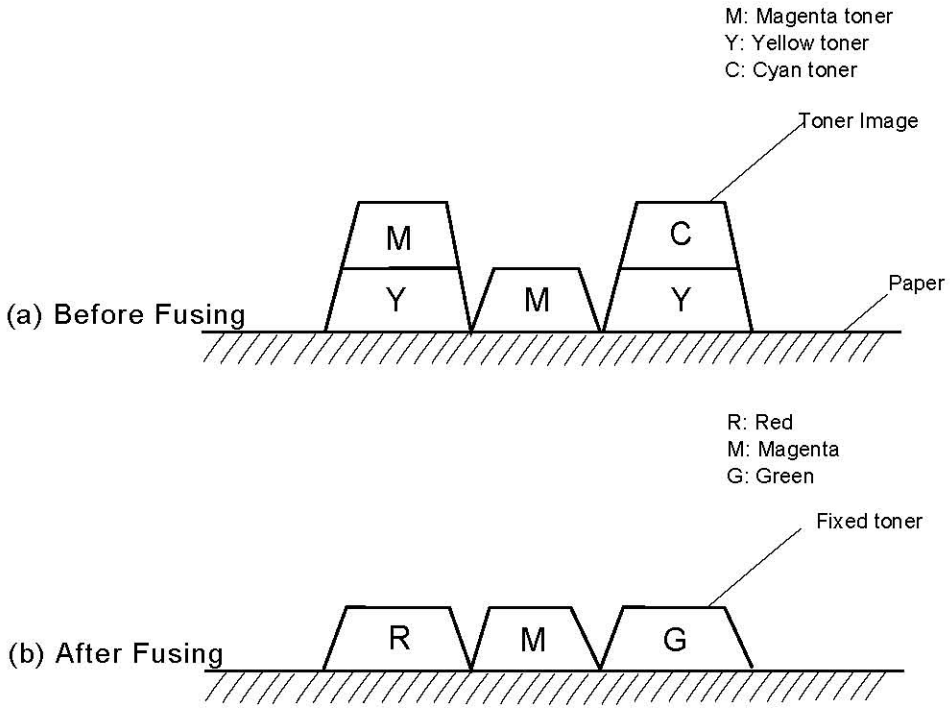


Fig. 4-27

2. STRUCTURE OF THE CONTROL SYSTEM

2.1 Basic Structure - Electrical System and Functions

Most of the main electrical parts of this printer are controlled by the MCTL (engine controller) PWB.

<Structure of the sequence control>

The basic structure of the sequence control is shown in Fig.4-28.

①	Print Process Control:	To control the print process from the paper feed through to the paper exit.
②	Laser Output Control:	To automatically control the laser output.
③	Fuser Temperature Control:	To control the fixer heater so that the temperature of the fuser roller and back-up roller will be correct.
④	Toner Sensing Control:	To control the sensing of the toner empty status.
⑤	Interface Control: (Video Signal)	To process the input and output signals to and from the external controller (host).
⑥	Control Panel Indicator:	To display the printer operational status on the control panel indicator.
⑦	Error Control:	To control the safety stop procedures when errors occur in the printer.

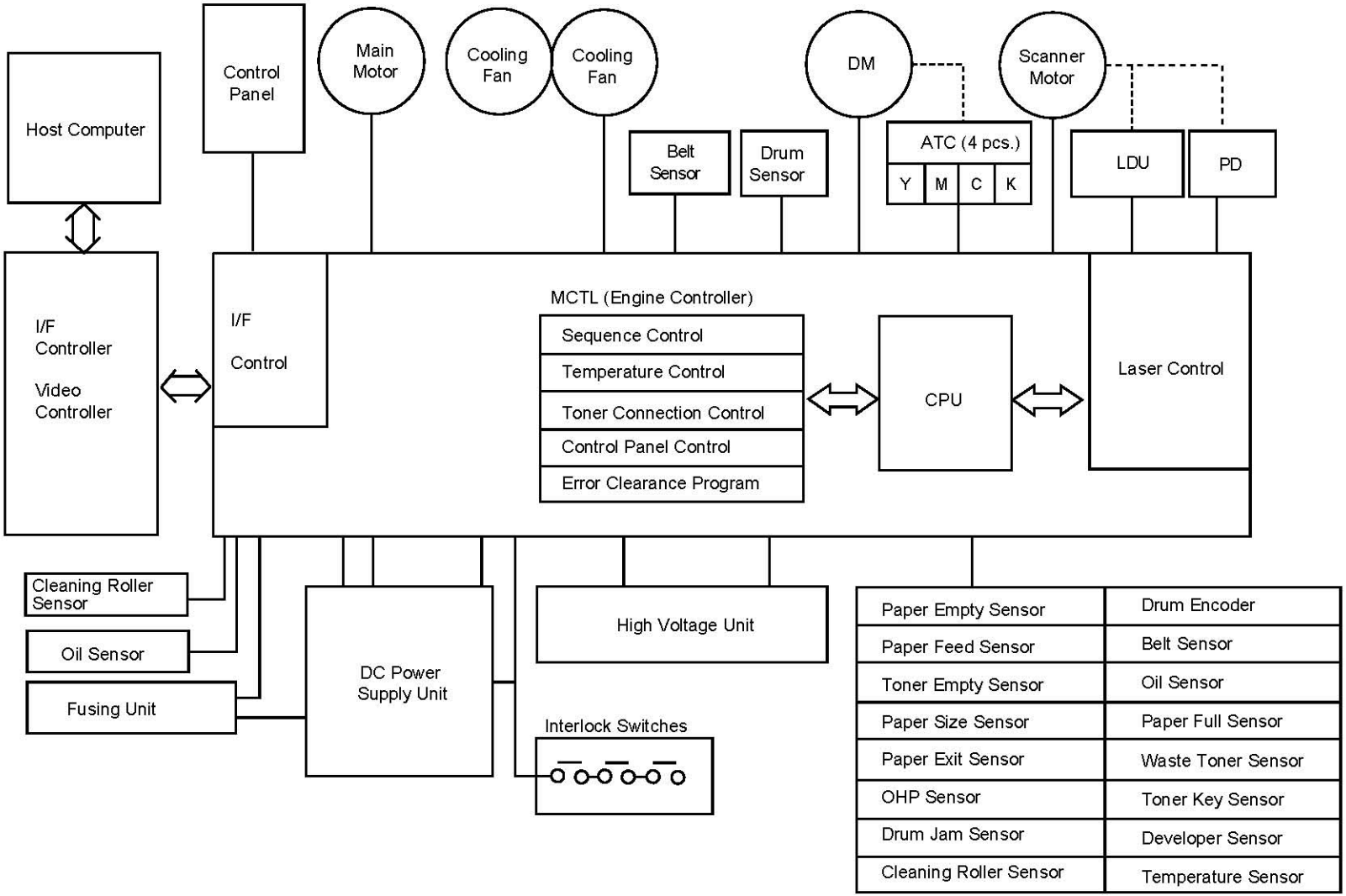

Host Computer
Control Panel
Main Motor
Cooling Fan
Cooling Fan
DM
Scanner Motor
Belt Sensor
Drum Sensor
ATC (4 pcs.)
Y
M
C
K
LDU
PD
I/F Controller
Video Controller
I/F Control
MCTL (Engine Controller)
Sequence Control
Temperature Control
Toner Connection Control
Control Panel Control
Error Clearance Program
CPU
Laser Control
Cleaning Roller Sensor
Oil Sensor
Fusing Unit
DC Power Supply Unit
High Voltage Unit
Interlock Switches
Paper Empty Sensor
Paper Feed Sensor
Toner Empty Sensor
Paper Size Sensor
Paper Exit Sensor
OHP Sensor
Drum Jam Sensor
Cleaning Roller Sensor
Drum Encoder
Belt Sensor
Oil Sensor
Paper Full Sensor
Waste Toner Sensor
Toner Key Sensor
Developer Sensor
Temperature Sensor

Fig. 4-28

<Layout & Function of the Electrical Parts>

(1) Print PCB (Refer to Fig. 4-29.)

No.	Name	Function
1	Video controller PCB	To receive the print data from the host computer, convert it into image data and then send the printing image data to the MCTL PWB.
2	Engine controller PCB (MCTL PWB)	To control the sequence of processes of the printer: Fusing Temperature Control, Laser Output Control, Control Panel Indications, Toner Empty Sensing Control, Error Processing Control, Interface Control.
3	Control panel PCB (Panel PWB)	To display the printer's operation status and support the control panel switches.
4	LDU PCB	To control the drive and output to the laser diode in the scanner unit.
5	PDU PCB	To sense the emission of the laser diode and the beam position in the scanner unit.
6	Erase lamp	To discharge the OPC belt with the LEDs.
7	IOD1 PWB	To send the signals from the sensors to the MCTL PWB, and to drive the outputs from the MTCL PWB to the motors, clutches and solenoids.
8	IOD2 PWB	- Ditto -
9	DC power supply (LVPS) PCB	To provide the printer with the power for printer control.
10	High-voltage power supply (HVU) PCB	To provide the printer with the high voltage power supplies necessary for the printing process.

Layout of PCBs

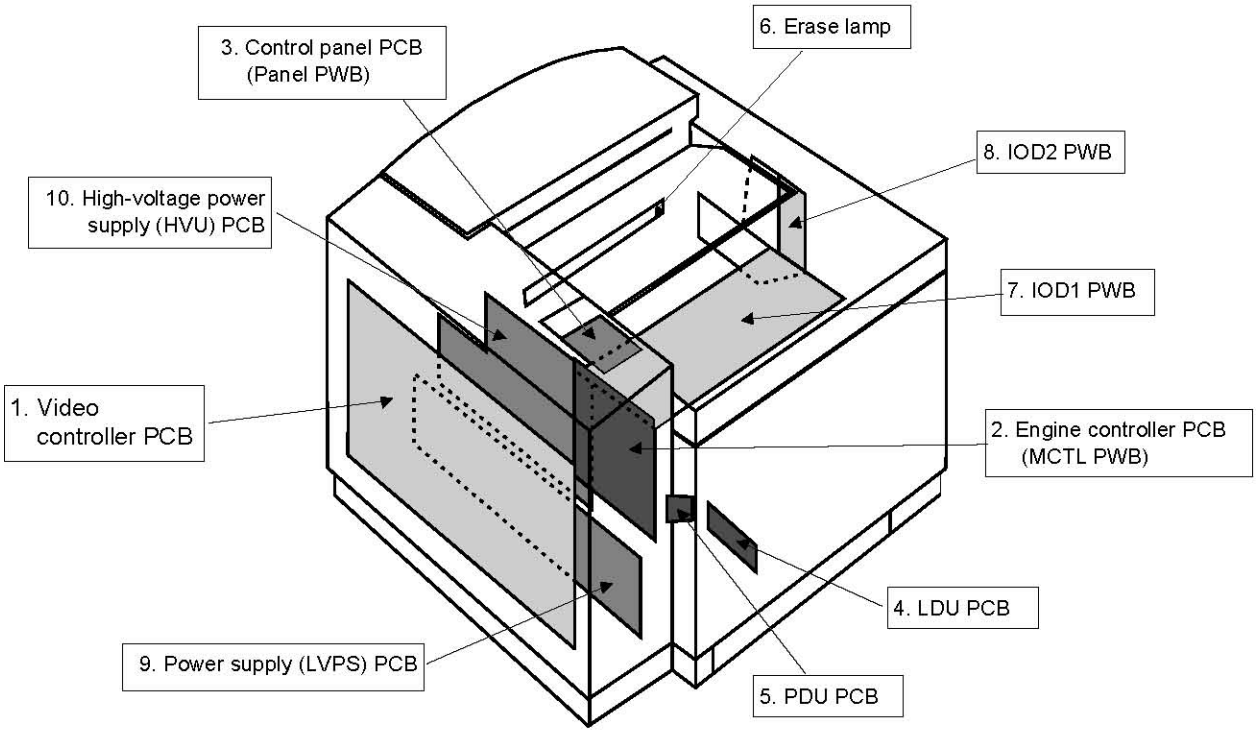


Fig. 4-29

(2) Motors (Refer to Fig.4-30.)

No.	Name	Code	Function
1	Main motor	MM	To drive the OPC belt and the paper transport system.
2	Developing motor (Developer drive motor)	DM	To drive the toner cartridge and the developing system.
3	Scanner motor	SCM	To scan the laser beam
4	Ozone fan motor (Cooling fan motor)	OZFAN (OZ)	To exhaust the ozone from the printer (charger unit).
5	Fuser fan motor (Cooling fan motor)	HTFAN (EX)	To exhaust the heat of the fusing
6	Controller fan motor (Cooling fan motor)	CTLFAN (PS)	To exhaust the heat of the power supply unit and Interface Controller.
7 7-1 7-2 7-3	Interlock switch Front cover switch Top cover switch Rear access cover (TR unit cover) switch	DSW1 DSW2 DSW3	These are the safety interlock switches that operate when the covers are opened.

Layout of Motors

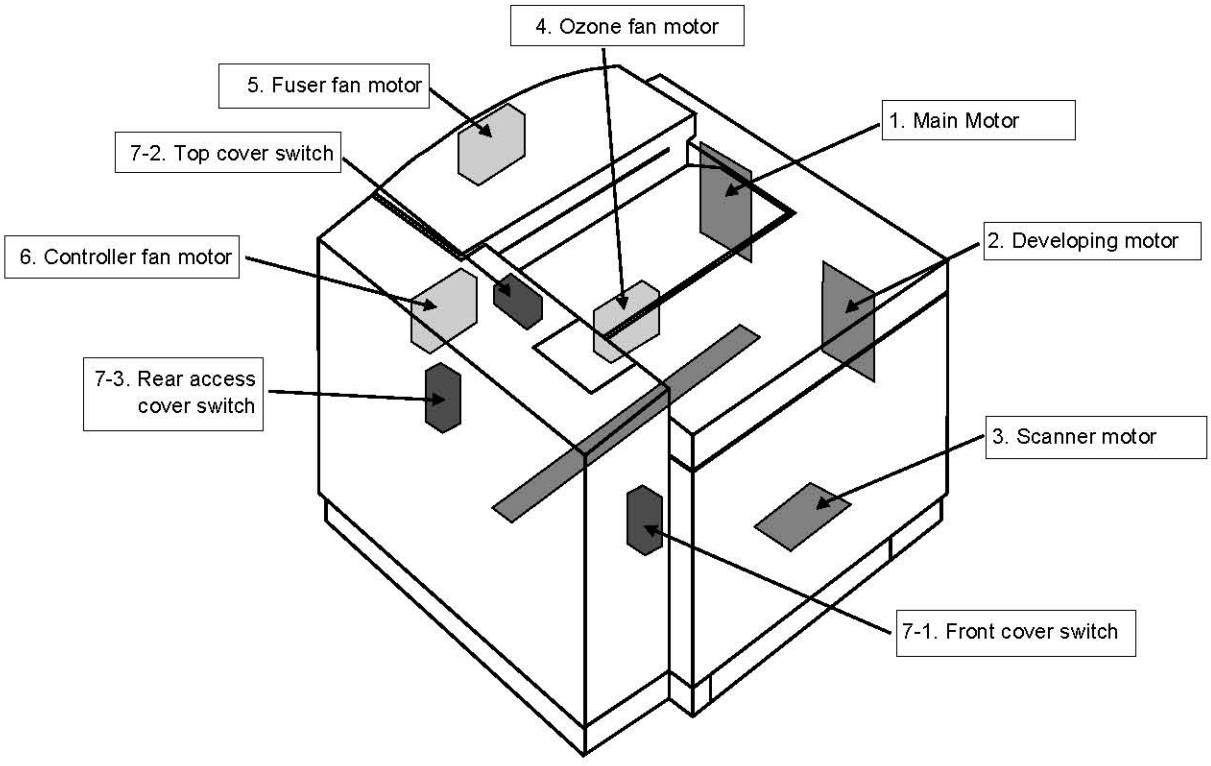


Fig. 4-30

(3) Clutches (Refer to Fig.4-31.)

No.	Name	Function
1	Paper feeding clutch	To feed paper by coupling the feed roller to the main gear unit at the correct timing for paper feeding.
2	Registration clutch	To transport paper by coupling the register roller to the main gear unit synchronized with the rotation of the transfer drum.
3	Fuser clutch	To drive the fusing rollers by coupling the fusing unit to the main gear unit.
4	Cleaner clutch	To drive the brush of the drum cleaner by coupling the cleaner clutch to the main gear unit at the correct timing for drum cleaning.
5 ~ 8	Developer clutch	To drive the magnetic roller of the desired color toner cartridge by coupling that toner cartridge to the developer gear unit during developing.
9	TR cam clutch	To make the transfer roller contact the transfer drum surface at the time of the second transfer.
10	Cleaner cam clutch	To make the drum cleaner contact the surface of the transfer roller at the correct timing for drum cleaning. *NOTE: The cleaner cam clutch is identical to the TR cam clutch.*

Layout of Clutches

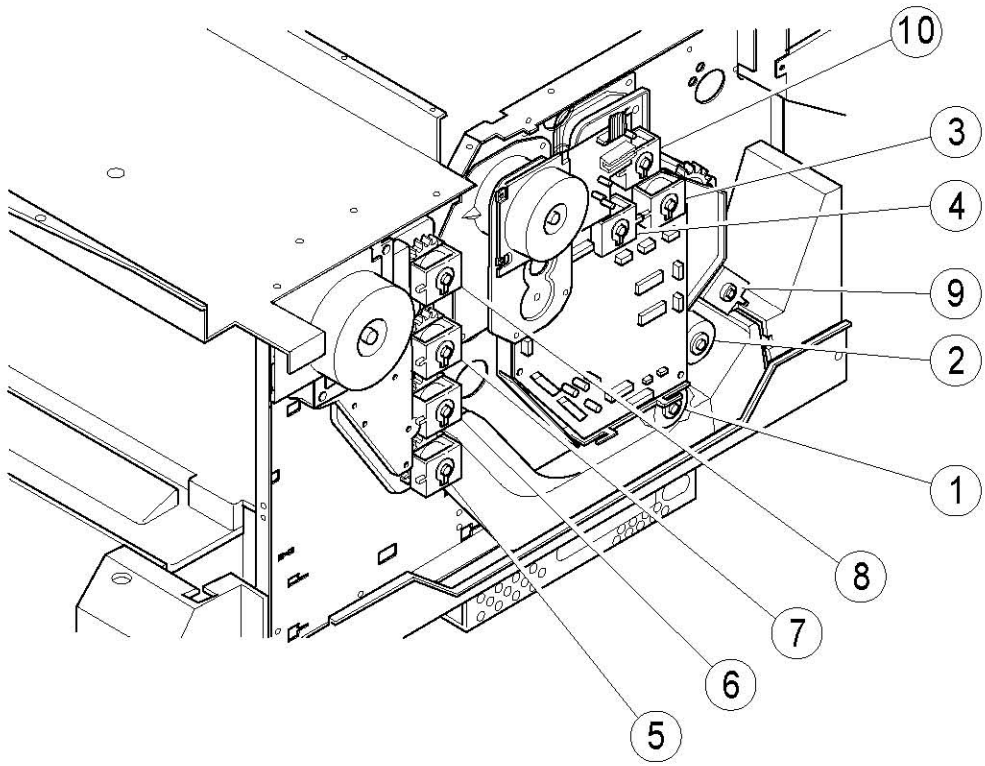


Fig. 4-31

(4) Sensors

No.	Name	Code	Function
1	Paper size sensor	PSU	Photo sensor to detect the paper size.
2	Paper feeding sensor	PS 1	Photo sensor to detect when paper is fed from the media cassette.
3	Paper exit sensor	PS 2	Photo sensor to detect that paper is exited from the paper exit unit.
4	Paper empty sensor	PS 3	Photo sensor to detect if paper is loaded in the media cassette.
5	Oil sensor	OIL	Photo sensor to detect if the fusing unit oil is empty.
6	OHP sensor	OHP	Photo sensor to detect if media in the media cassette is an OHP.
7	Drum jam sensor	DPJ	Photo sensor to detect if paper is wound around the transfer drum.
8	Drum encoder sensor	PS 4	Photo sensor to detect rotation of the transfer drum.
9	Belt sensor	PBS	Photo sensor to detect the home position of the OPC belt.
10	Toner sensor	TPD/TTR	Photo sensor to detect if the toner is empty for each toner cartridge.
11	Waste toner sensor	WTS	Photo sensor to detect if the waste toner bottle is full of toner.
12	Home position sensor	GHP1/ GHP2	Photo sensor to detect the position of the toner cartridge.
13	Cleaning roller sensor	PS 5	Photo sensor to detect if the fuser cleaner is fitted in the fixing unit.
14	Temperature sensor for fusing unit	TH	Thermistor to detect the fuser temperature.
15	Paper full sensor	PS 6	The sensor to detect when the paper eject tray is full of paper.
16	Toner key sensor	TNK	The sensor to detect the key provided in the toner cartridge.

Layout of Sensors

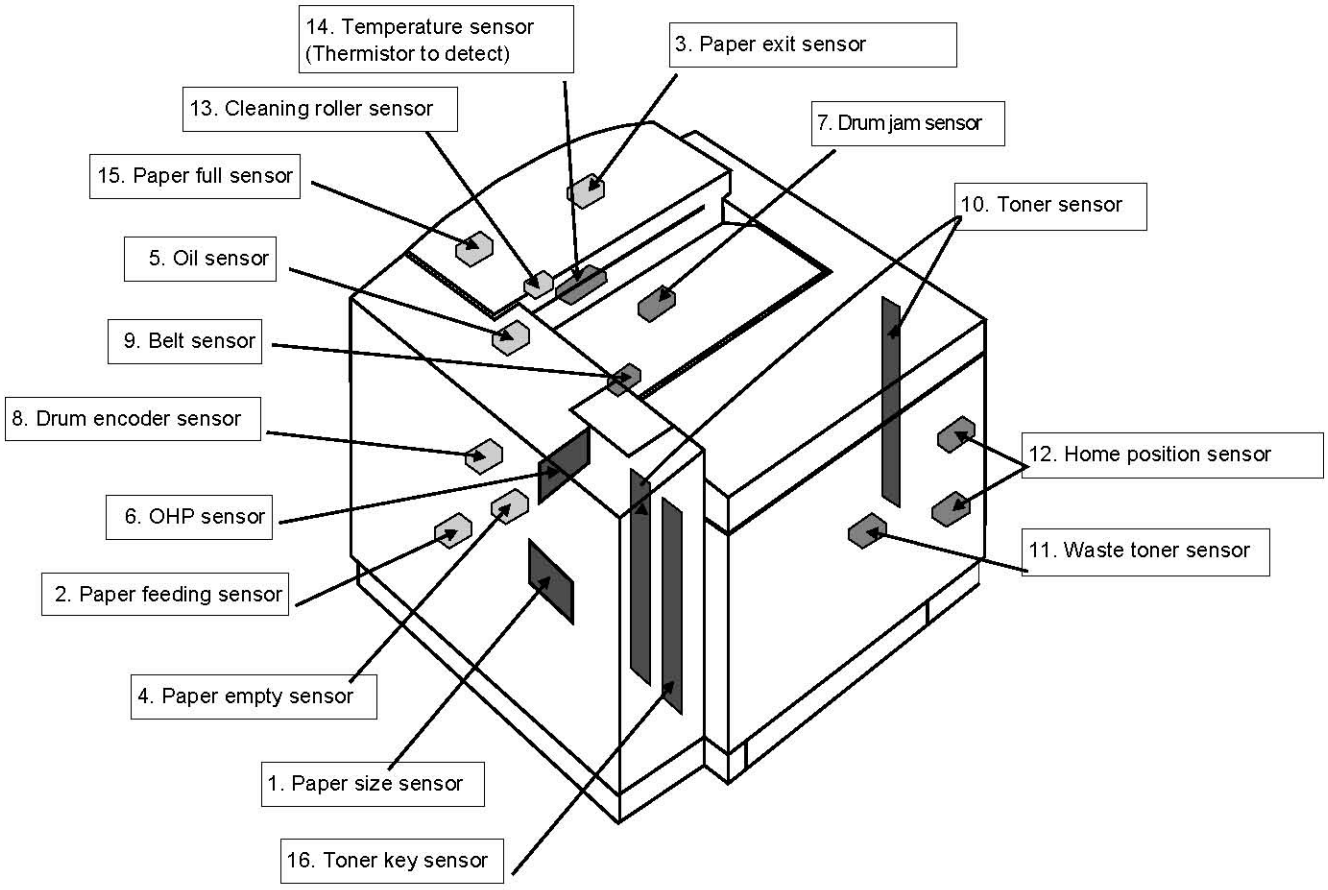


Fig. 4-32

2.2 Control System - Control of the Print Process

A Micro CPU mounted on the MCTL PWB controls the print processes.

<Print Sequence Diagram>

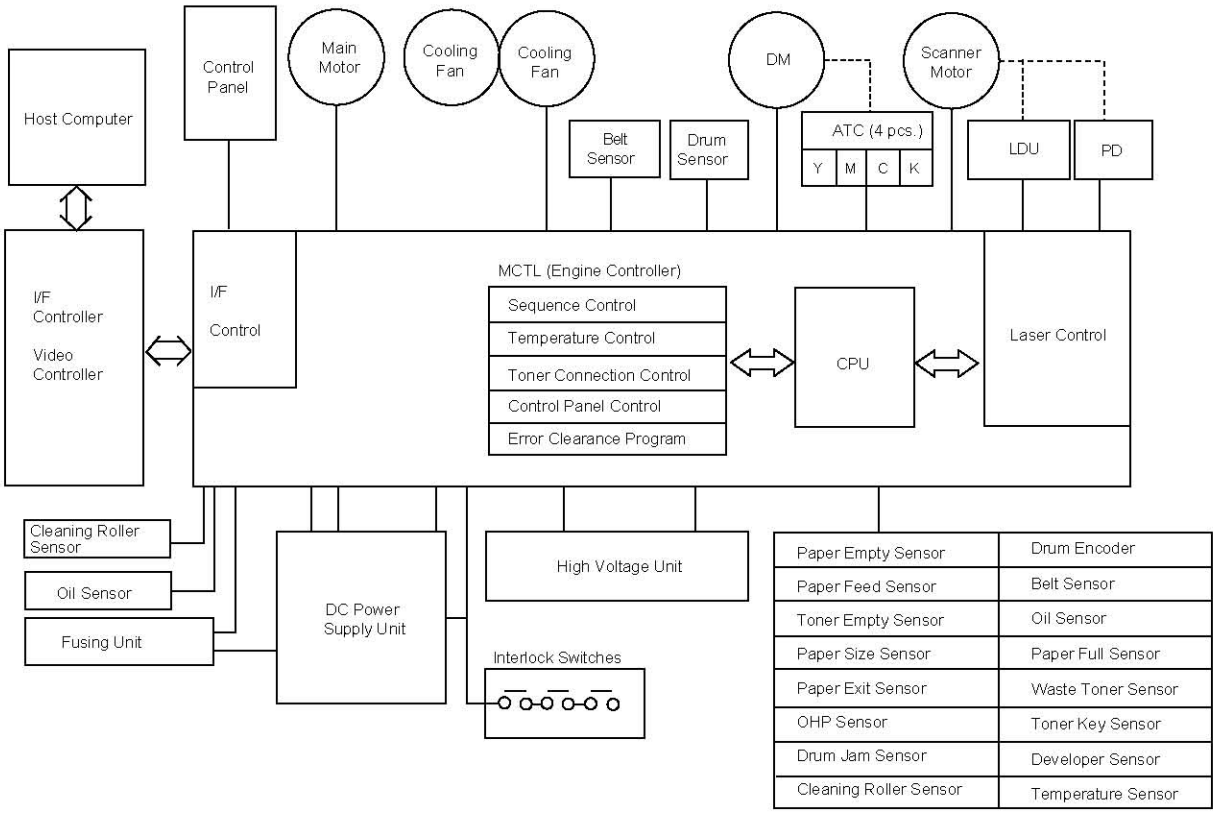


Fig. 4-33

(1) Control Block Diagram (Refer to Fig.4-33.)

No.	Name	Function
1	Sequence Control	To control the sequence of printer operations.
2	Temperature Control	To control the temperature of the fixing unit.
3	Toner Empty Sensing Control	To detect the toner empty status of each toner cartridge.
4	Control Panel Control	To control the control panel indications and the operational signals.
5	Error Processing Control	To sense errors occurring in the printer and control the stop procedures.
6	Interface Control	To control the receipt and transmission of the interface signals from the external controller.
7	Laser Control	To control laser scanning and laser power.

(2) Laser Drive Control Circuit

Laser Drive Control Circuit (LDC) consists of the video signal input circuit, laser drive circuit, laser diode, output sensing circuit and output control circuit, as shown in Fig.4-34.

<Operation>

(1) When the video signal is received, the laser drive control circuit switches the laser diode according to the video signal data.

(2) The radiated laser beam is sensed by the photo detector (PD) and the signal is fed back to the output control circuit.

(3) The output control circuit controls the laser output to make the level constant by comparing the laser output with the feed-back value transmitted from the output sensing circuit.

(4) The scanning laser beam is sensed by the beam detector (PD), then the beam detecting timing (BDT) signal is output.

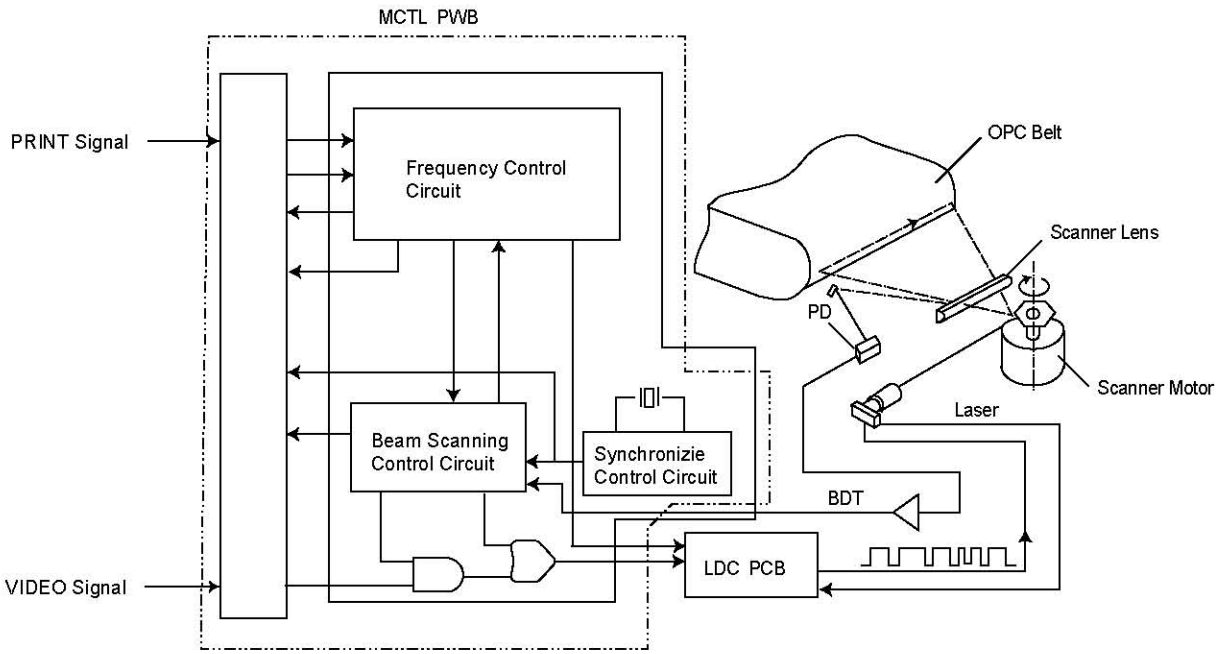


Fig. 4-34

(3) Control of the Fusing Temperature

Each roller of the fusing unit is controlled to maintain the appropriate temperature so that toner will be fixed correctly onto the print paper.

<Basic Structure of Temperature Control (Fig.4-36)>

FLS:	Thyristor to switch the power supply to the heat lamp.
TFU1/TFU2:	Temperature fuse to shut down the circuit for safety when the temperature becomes too hot within the fixing unit.
TH:	Temperature sensor to detect the surface temperature of the heat roller (HR).
RY:	Relay to prevent further heating when it becomes hotter than the set temperature within the fixing unit.
GA/CPU:	Process circuit to control the temperature signal (micro computer).
CM1:	Sensor circuit for temperature signal (for ACOFF signal).
CM2:	Sensor circuit for temperature signal (for HON signal).
CM3:	Sensor circuit for temperature signal (for processing).
Q:	Sensor circuit for shut-down by the thermistor (for THERR signal).
HR:	Heat lamp for the heat roller.
BR:	Heat lamp for the back-up roller.

< Signal Functions >

HON-N	To turn on/off the heater inside the fuser roller.
ACOFF	To turn off the relay RY1 if overheat occurs.
THERR	To detect the shut-down by the thermistor.
AD	To convert the temperature sensing signal to AD.

<Controlled Temperature and Safety>

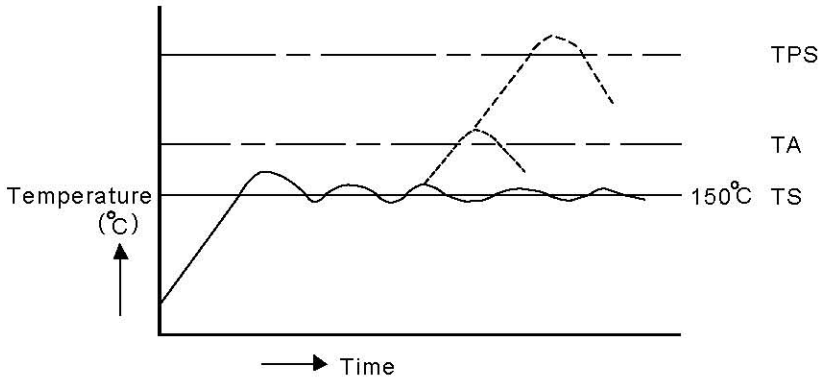


Fig. 4-35

<Basic Structure of Fuser Control>

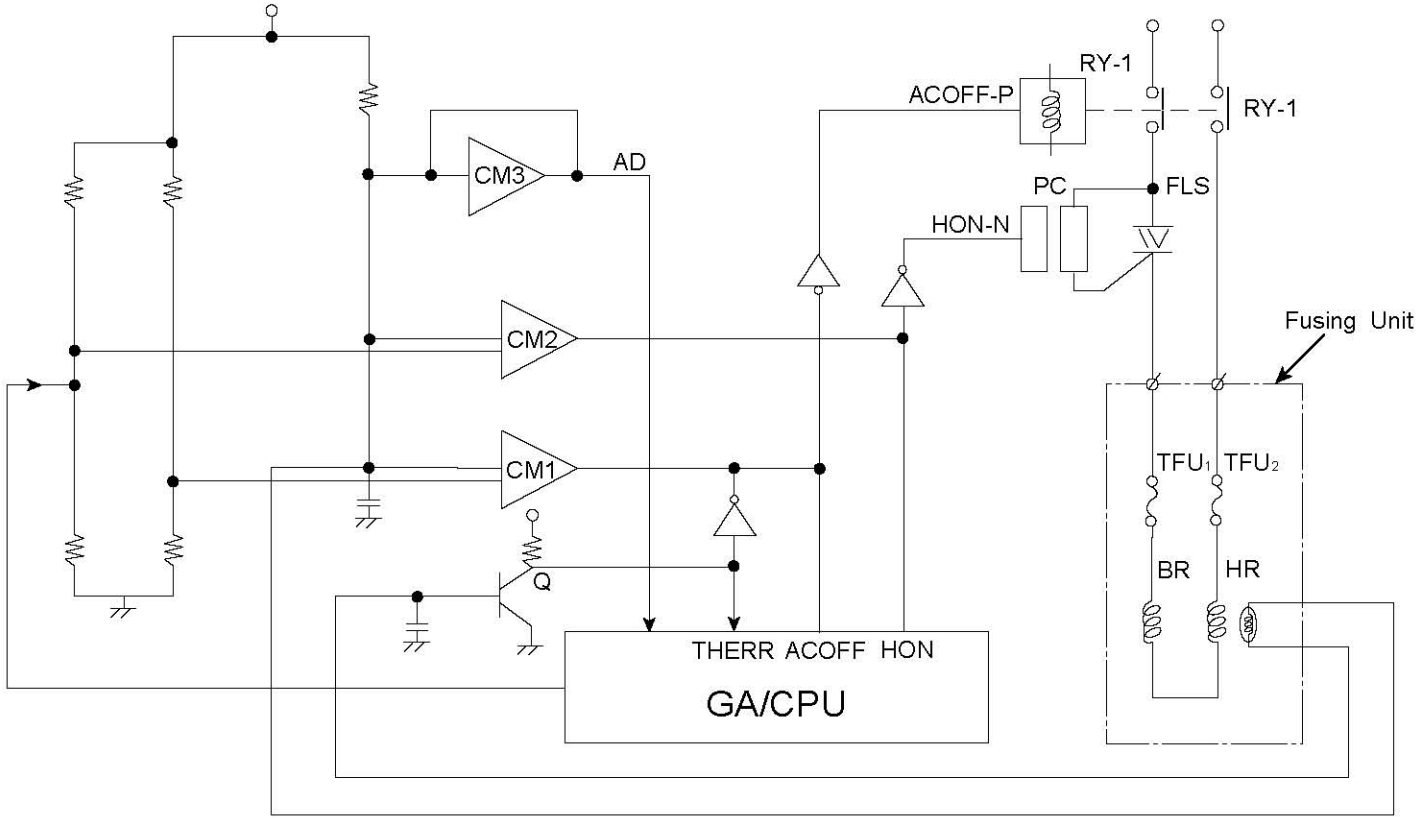


Fig. 4-36

TS:	To maintain the temperature for fixing of the toner at 150°C by turning the thyristor on and off.
TA:	Reference temperature (approx. 185°C) to identify that it is excessively hot inside the fusing unit. When it reaches this point, the relay RY turns off, the power supply to the heat lamp is shut down and the printer stops operating.
TPS:	Limit temperature when the thermal fuse will start to melt and shut down the power supply to the heat lamp if the temperature control circuit should break down. When the thermal fuse melts, the printer will stop operating.

<Safety Control by Temperature Control Signal>

H0:	When the THERR signal is input, the control panel indicates "H0", and the printer will stop operating.
H2:	If the temperature of the fixing unit does not reach the required point "T1" after a certain time, the control panel indicates "H2" and the printer will stop operating.
H3:	If the "Heater On" signal still continues after a certain time, the control panel indicates "H3", and the printer will stop operating.
H4:	If the temperature within the fusing unit becomes unusually hot and when ACOFF signal is input, the control panel indicates "H4", and the printer will stop operating.

(4) Interface Control

<General>

(a) Interface Type

The video interface handles laser image data that corresponds to dots for printing but does not store image data in a buffer. The video data signals of the input image data switches the semiconductor laser diode to form a print image.

(b) Interface Connection

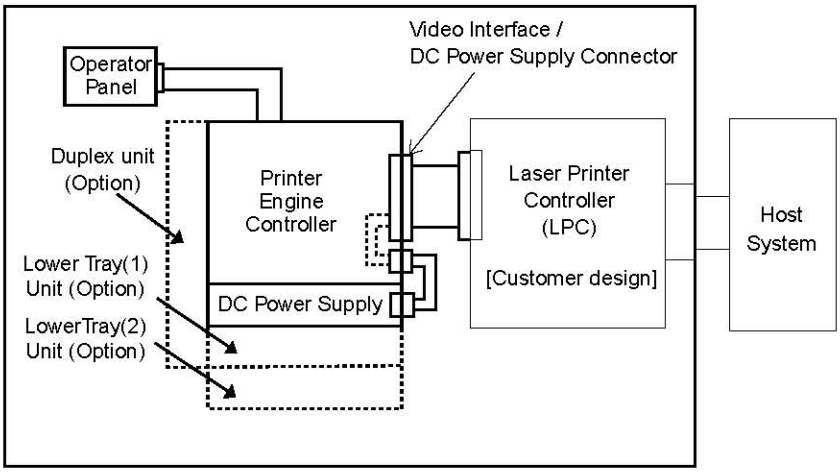
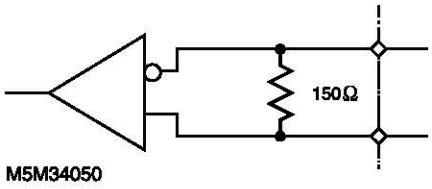
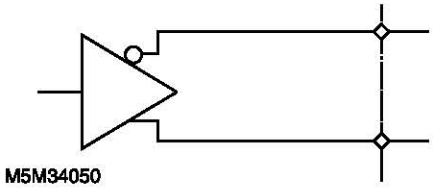
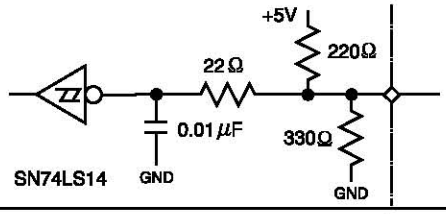
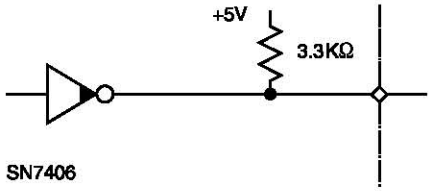


Fig. 4-37

The interface connector of this laser printer is connected to the host system as shown in Fig.4-37.

(c) Interface Circuit (Printer side)

Table 4-1: Interface Circuit

No.	Interface Circuit	Signal Name
1		• VIDEO-N • VIDEO-P
2		• HSYNC-N • HSYNC-P
3		• PRREQ-N • COMMAND-N • ID1-N • ID2-N
4		• VSYNC-N • IREADY-N • STATUS-N • KEY-STATUS-N

(d) Connector Pin Assignment

The connector in the printer to connect to the controller board is type 128A-064S2B-L14A(DDK) or the equivalent.

Table 4-2: Connector Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1A	PSGND	1B	+5V
2A	PSGND	2B	+5V
3A	PSGND	3B	+5V-D
4A	PSGND	4B	+5V-D
5	PSGND	5B	+5V-D
6A	PSGND	6B	+5V-D
7A	PSGND	7B	+5V-D
8A	PSGND	8B	+5V-D
9A	VIDEO-P	9B	VIDEO-N
10A	RET (GND)	10B	Reserve
11A	HSYNC-P	11B	HSYNC-N
12A	ID2-N	12B	Reserve
13A	RET (GND)	13B	VSYNC-N
14A	RET (GND)	14B	Reserve
15A	RET (GND)	15B	STATUS
16A	RET (GND)	16B	IREADY-N
17A	RET (GND)	17B	Reserve
18A	RET (GND)	18B	COMMAND
19A	RET (GND)	19B	PRREQ-N
20A	RET (GND)	20B	Reserve
21A	ID1-N	21B	Reserve
22A	RET (GND)	22B	KEY_STATUS-N
23A	Reserve	23B	Reserve
24A	Reserve	24B	Reserve
25A	RET (GND)	25B	Reserve
26A	RET (GND)	26B	Reserve
27A	RET (GND)	27B	Reserve
28A	RET (GND)	28B	Reserve
29A	RET (GND)	29B	Reserve
30A	RET (GND)	30B	Reserve
31A	RET (GND)	31B	Reserve
32A	RET (GND)	32B	Reserve

2.3 Main PCB (Video Controller PCB)

2.3.1 Outline

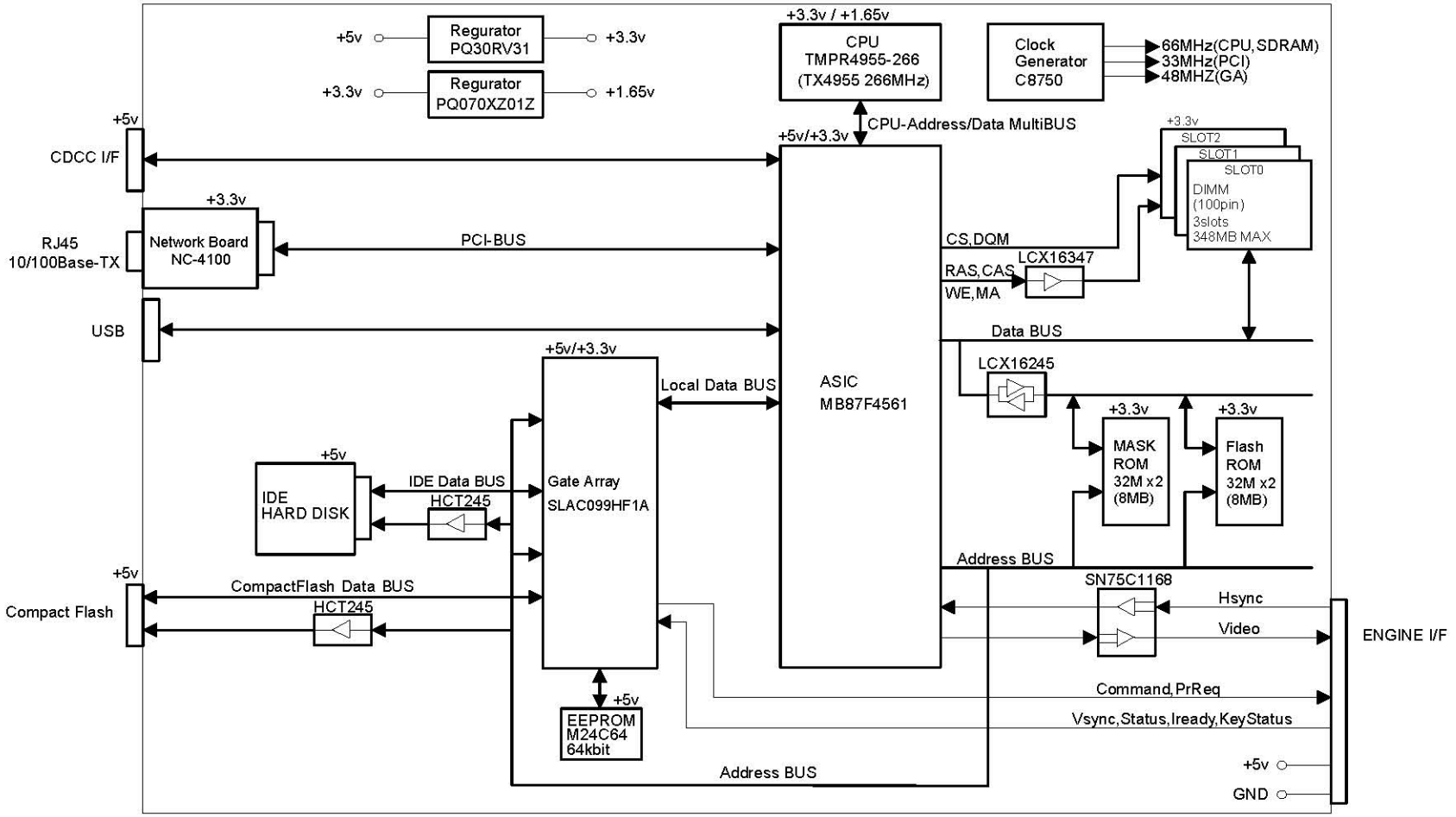
The main PCB consists of the circuits which perform the following functions;

- 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 engine through the engine interface connector.

<Main PCB Block Diagram>



2.3.2 Circuit

(1) CPU block

- Model name: TMPR4955-266MHz
  MiPS 64 bits RISC CPU manufactured by TOSHIBA
- Clock speed: 66.7MHz (external) / 266MHz (internal)
- Cache memory: 32KB (Command cache) / 32KB (Data cache)
- Bus width: 32 bits (external) / 64 bits (internal),
  Floating point unit (FPU) incorporated
- 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 (Centronics, BR-NET, iDE, Compact Flash, USB)
  * Engine interface (Video signal control)
  * Supports Software

(3) Gate array block

- Model name: SLAC099H1A manufactured by Epson
- Appearance: 160-pin QFP
- Functions: Engine control

(4) ROM block

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

<Masked ROM>

- Access time: less than 100nsec. (Page access less than 30nsec.)
- Appearance: 48-pin TSOP

<Flash ROM>

- Model name: MBM29DL32BD-90 manufactured Fujitsu
- Access time: less than 90nsec.
- Appearance: 48-pin TSOP

(5) DIMM block

DIMM (Dual-Inline-Memory-Module) allows memory extension by up to 128MB in each socket. 3 DIMM sockets are available.

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

- Appearance: 100-pin
- Memory type: SDRAM
- Access time: 66MHz or more, CL=2
- Parity: either Parity or Non-parity can be used
- Memory capacity: 16MB, 32MB, 64MB, 128MB

<Recommended DIMM type>

<US>

• 16 Megabytes	TECHWORKS	12456-0001
• 32 Megabytes	TECHWORKS	12457-0001
• 64 Megabytes	TECHWORKS	12458-0001
• 128 Megabytes	TECHWORKS	12459-0001

<Europe>

• 16 Megabytes	BUFFALO TECHNOLOGY	12323-0001
• 32 Megabytes	BUFFALO TECHNOLOGY	12324-0001
• 64 Megabytes	BUFFALO TECHNOLOGY	12325-0001
• 128 Megabytes	BUFFALO TECHNOLOGY	12326-0001

Any combination of DIMM size can be installed into any slot in any order.

(6) External interface block

- Centronics Interface
- Universal Serial Bus (USB)
- Compact Flash
- Ethernet 10/100 Base-TX
- IDE Interface

(7) Engine interface block

The engine interface consists of the following signals;

<IREADY>
The signal indicating the engine is ready
<PRREQ>
Signal requesting printing from the controller
<KEY_STATUS>
Signal indicating that a key switch status on the control panel has changed.
<VSYNC>
Vertical synchronization signal for printing
<HSYNC>
Horizontal synchronization signal for printing
<VIDEO>
Video data signal
<COMMAND>
Command signal sent from the controller to the engine
<STATUS>
Status signal sent from the engine to the controller

Fig.4-38 shows the timing of each signal after the power switch is turned on.

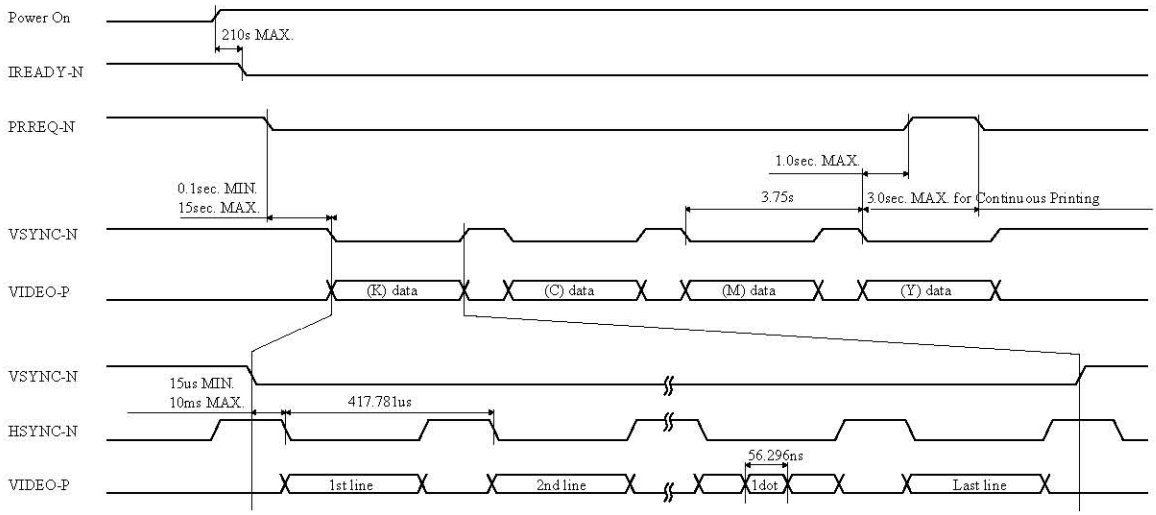


Fig. 4-38

The COMMAND signal and STATUS signal are the signals that are used to transfer the data between the controller and the engine, which perform as a half-duplex asynchronous serial communication. Refer to Fig.4-39.

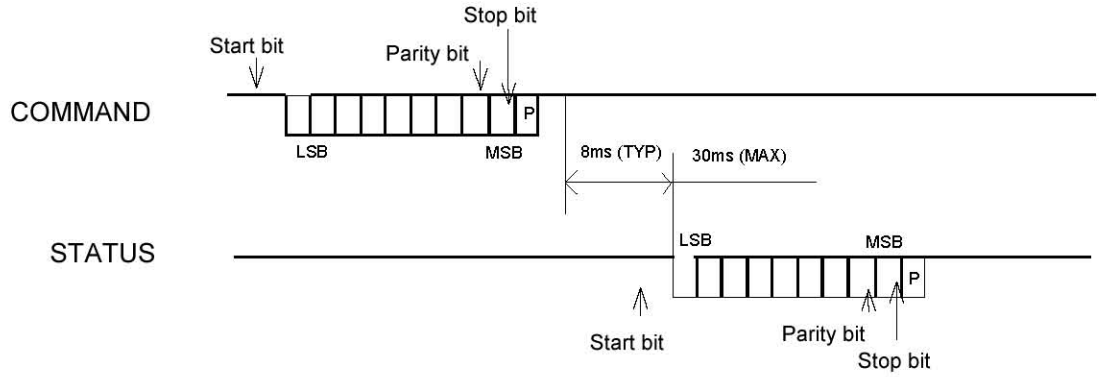


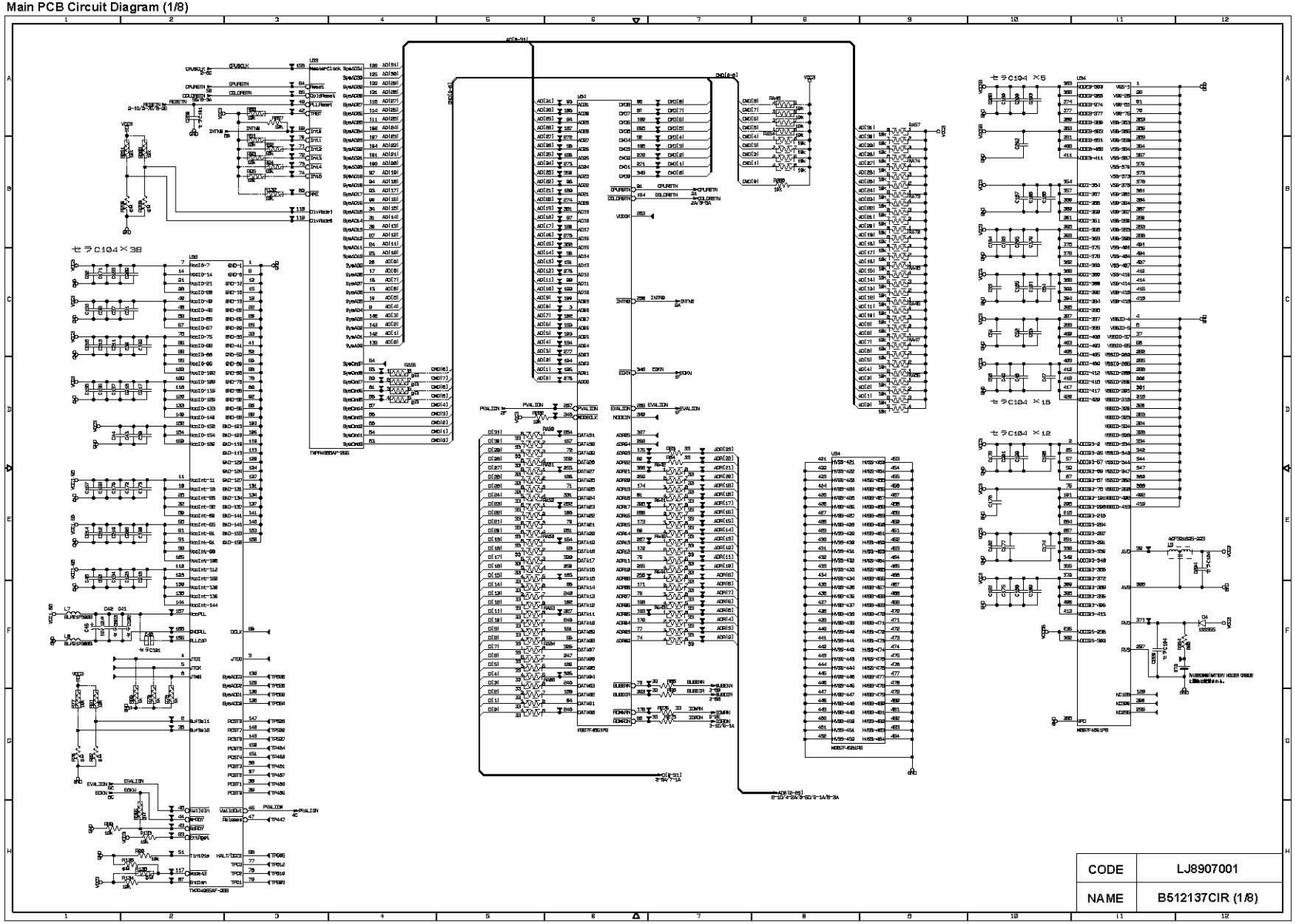
Fig. 4-39

NOTE:

- *Based on "Asynchronous Communication" method.*
- *Command/Status communication must keep the "Handshake Rule".*
- *Baud rate is 9600 bps.*
- *Frame format: - one (1) start bit,*
  - eight (8) data bits
  (Start bit side is LSB, Parity bit is MSB),
  - one (1) odd parity bit,
  - one (1) stop bit.
- *The video controller has to send an "Initialize Command" to the engine controller after power on in order to establish communication.*

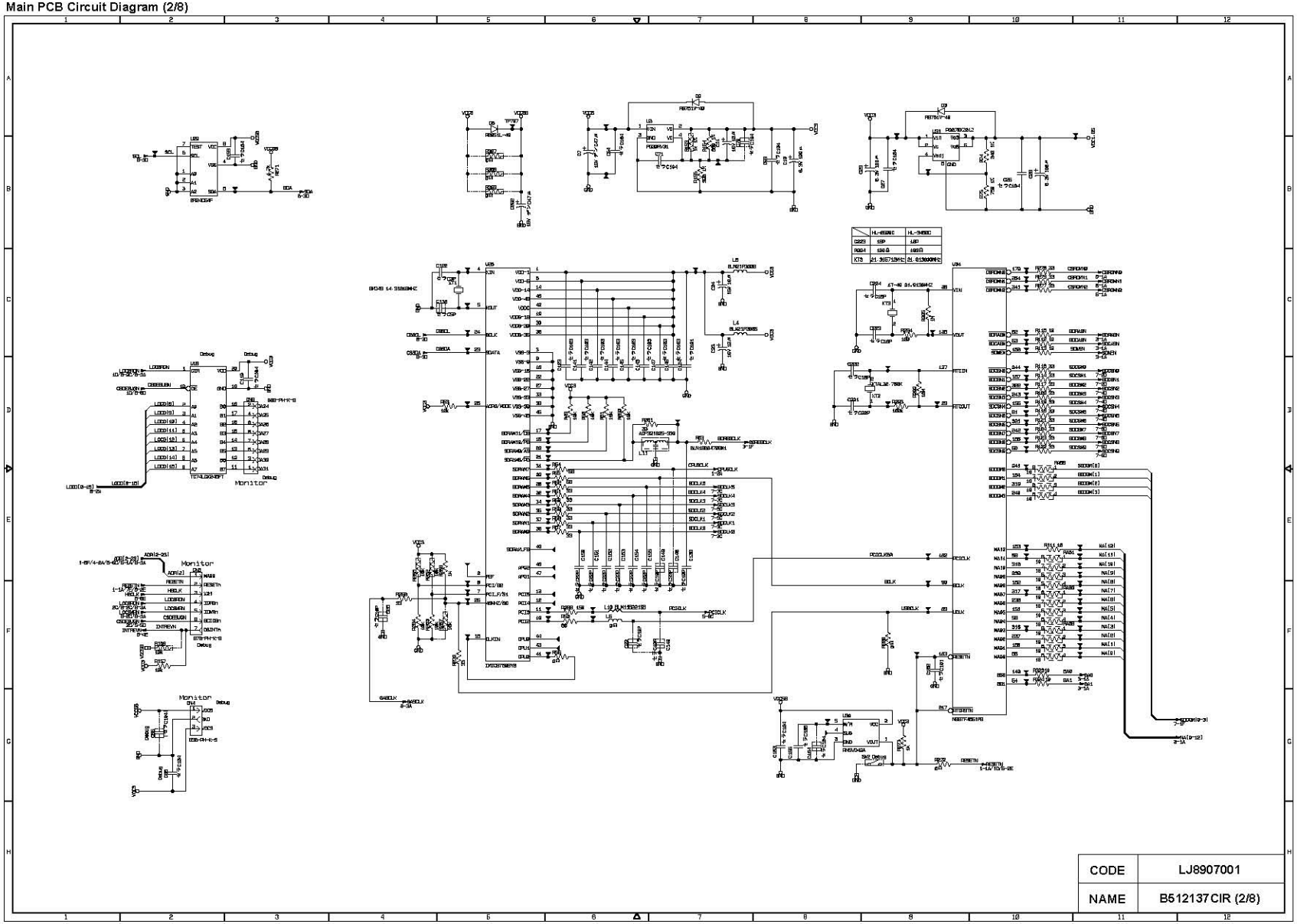
The power for the Main PCB is supplied through the engine interface connector.

Main PCB Circuit Diagram (1/8)



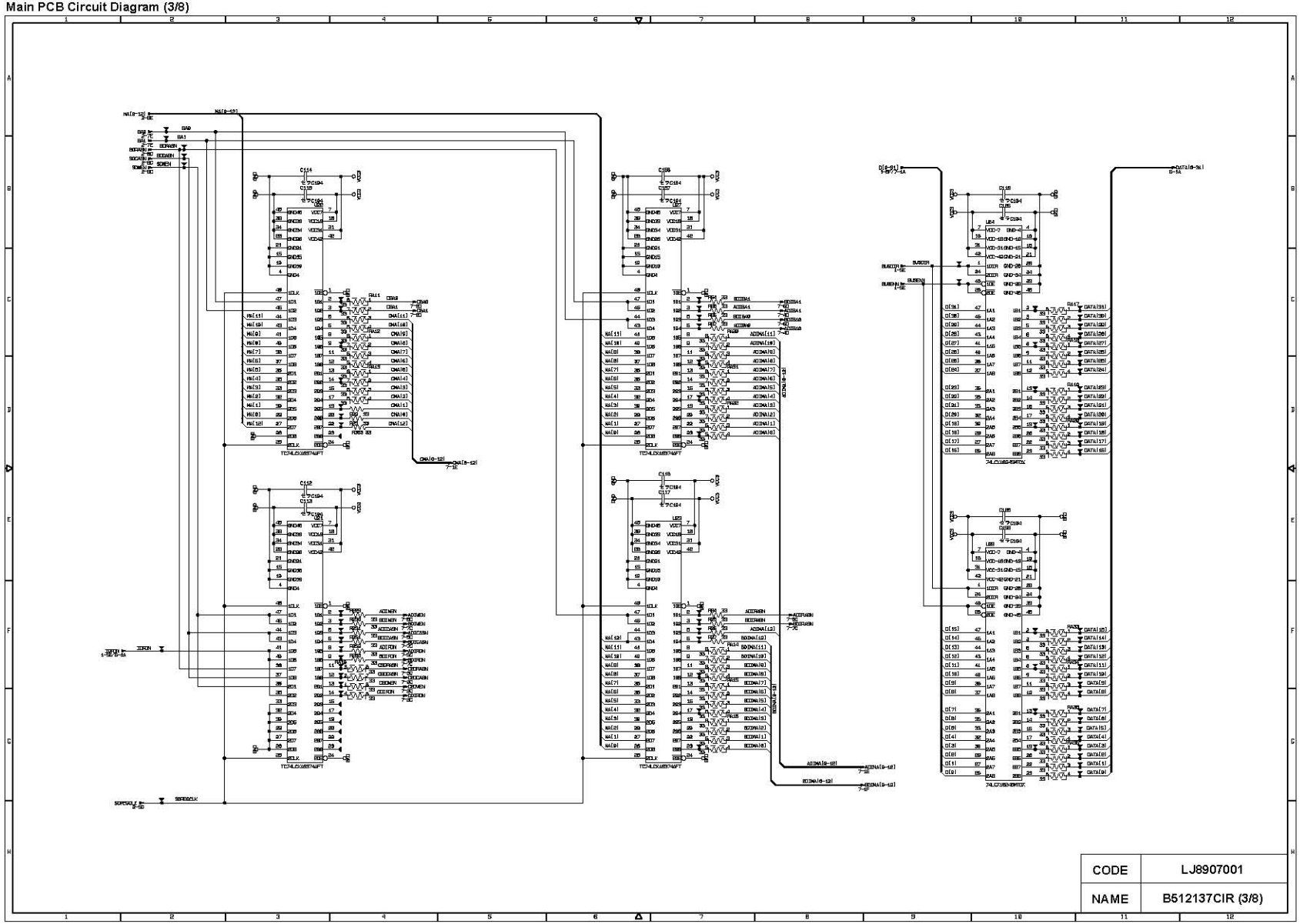
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NAME	B512137CIR (1/8)

Main PCB Circuit Diagram (2/8)



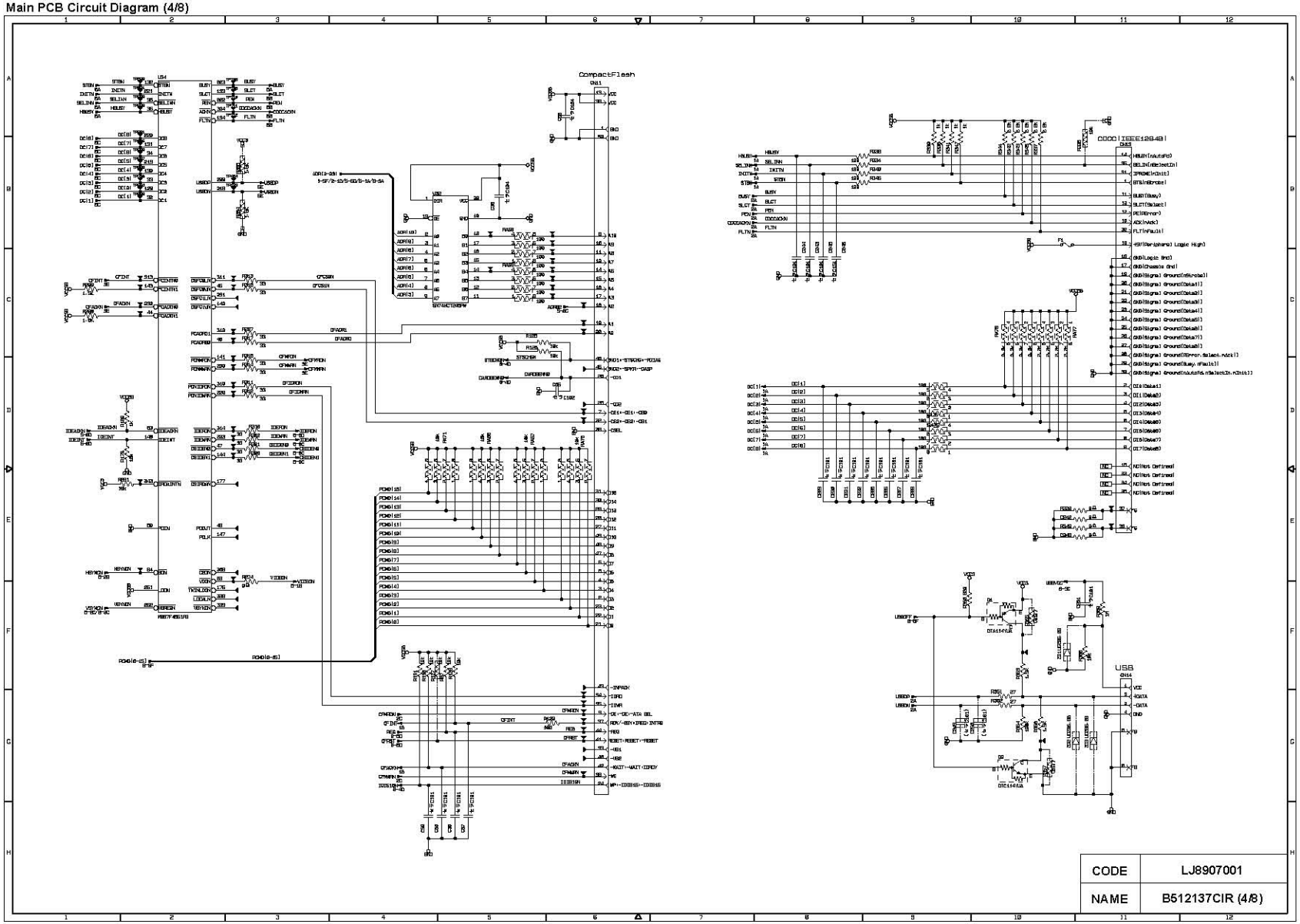
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NAME	B512137CIR (2/8)

Main PCB Circuit Diagram (3/8)

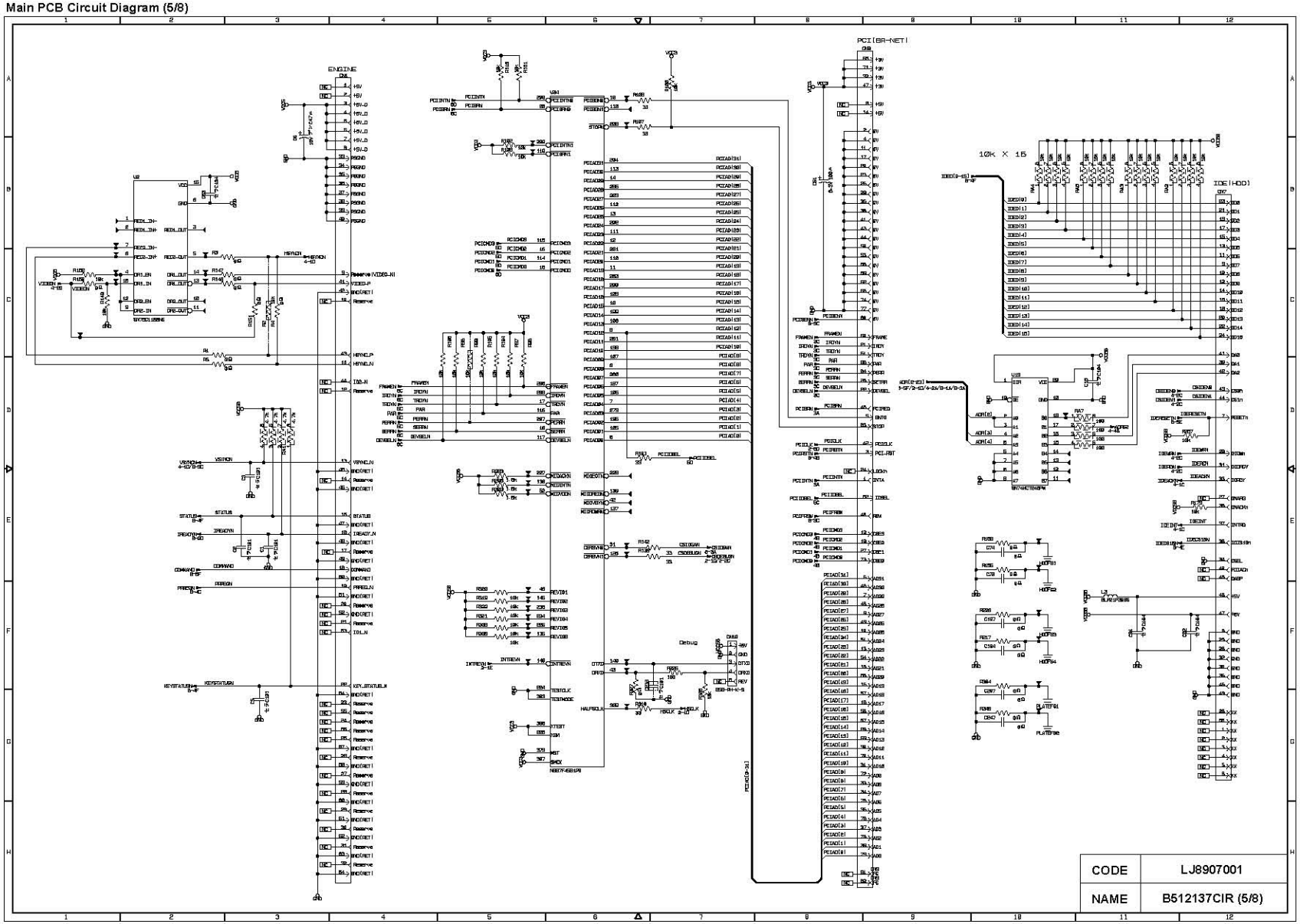


CODE	LJ8907001
NAME	B512137CIR (3/8)

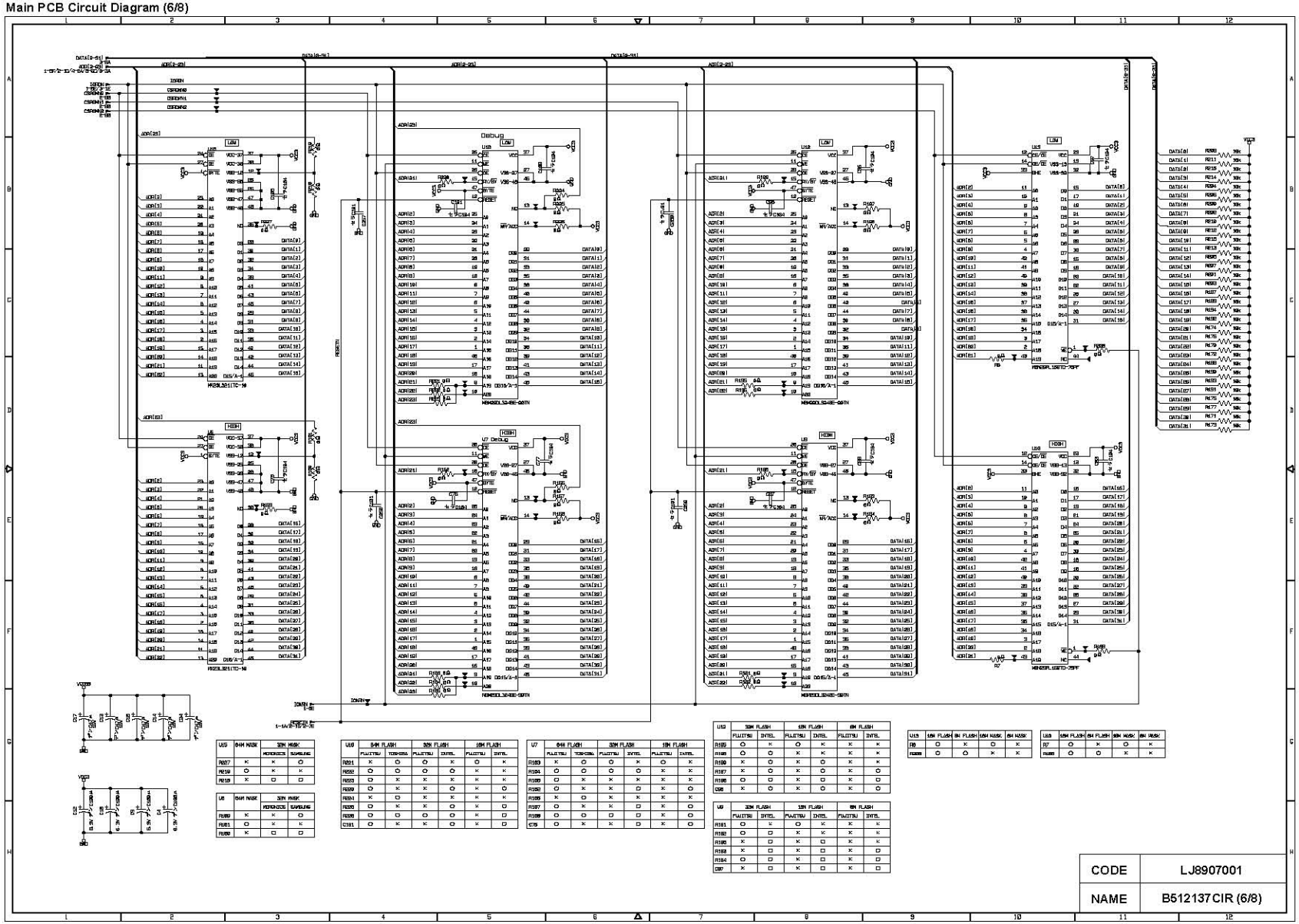
Main PCB Circuit Diagram (4/8)



Main PCB Circuit Diagram (5/8)

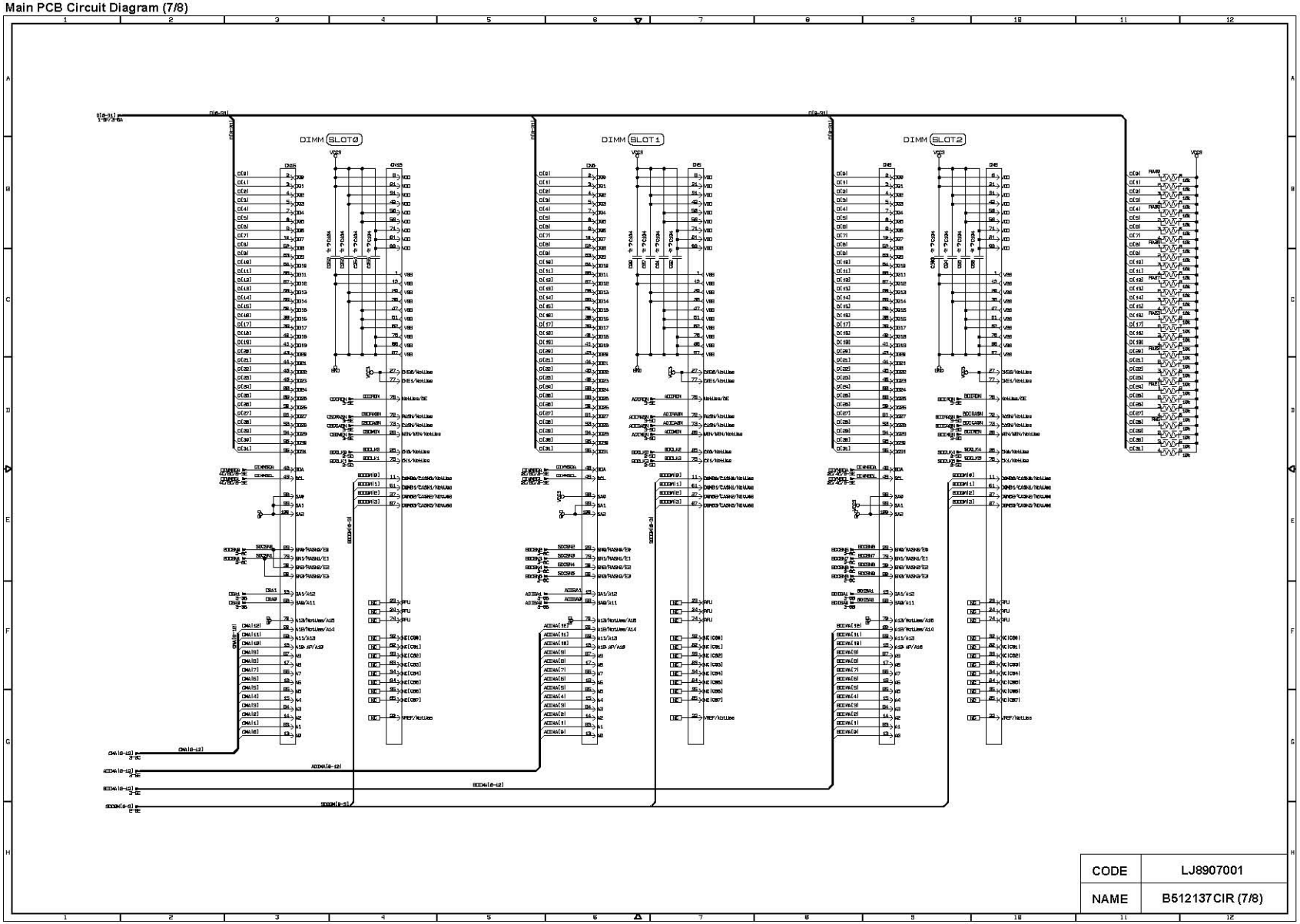


Main PCB Circuit Diagram (6/8)

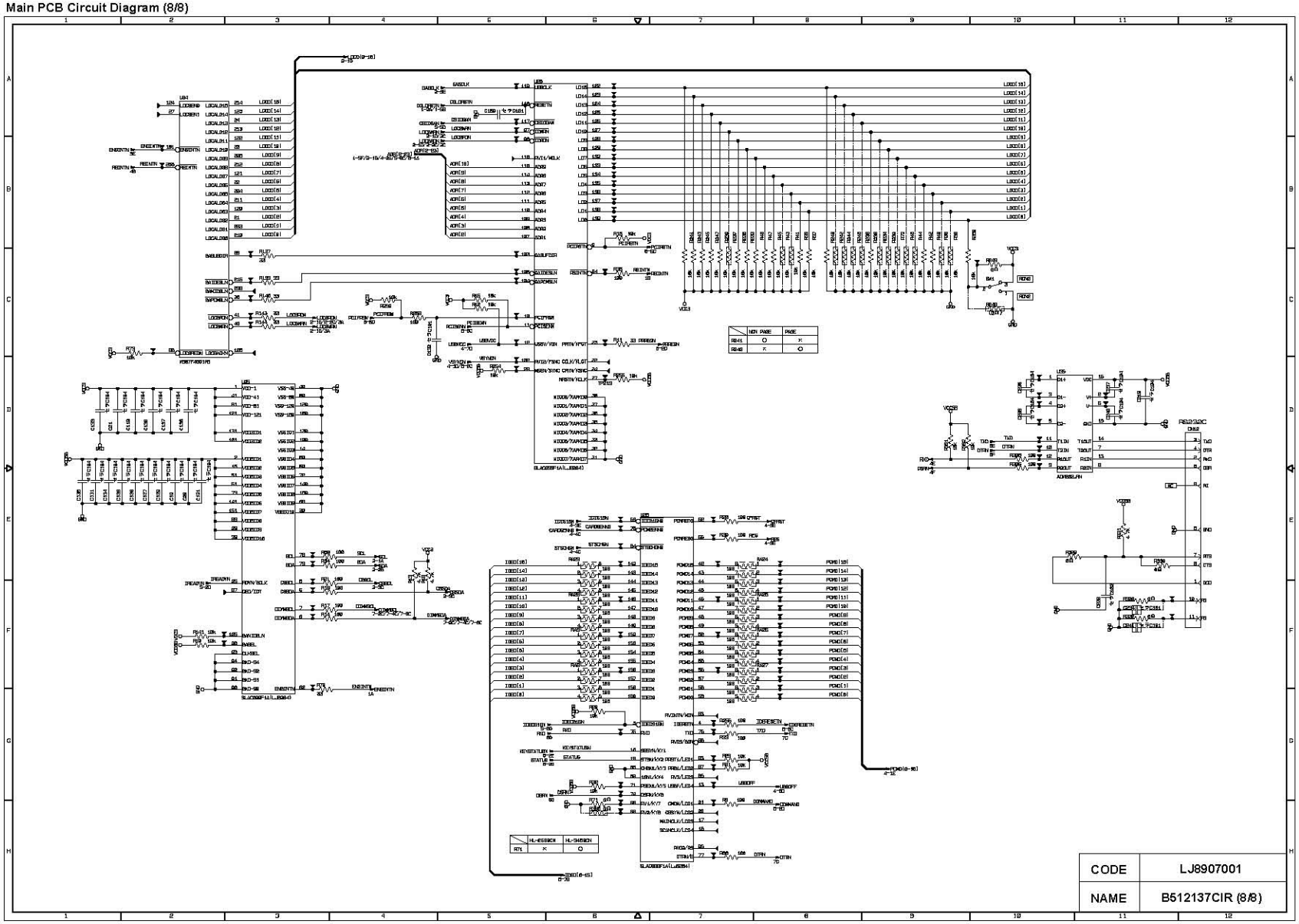


CODE	LJ8907001
NAME	B512137CIR (6/8)

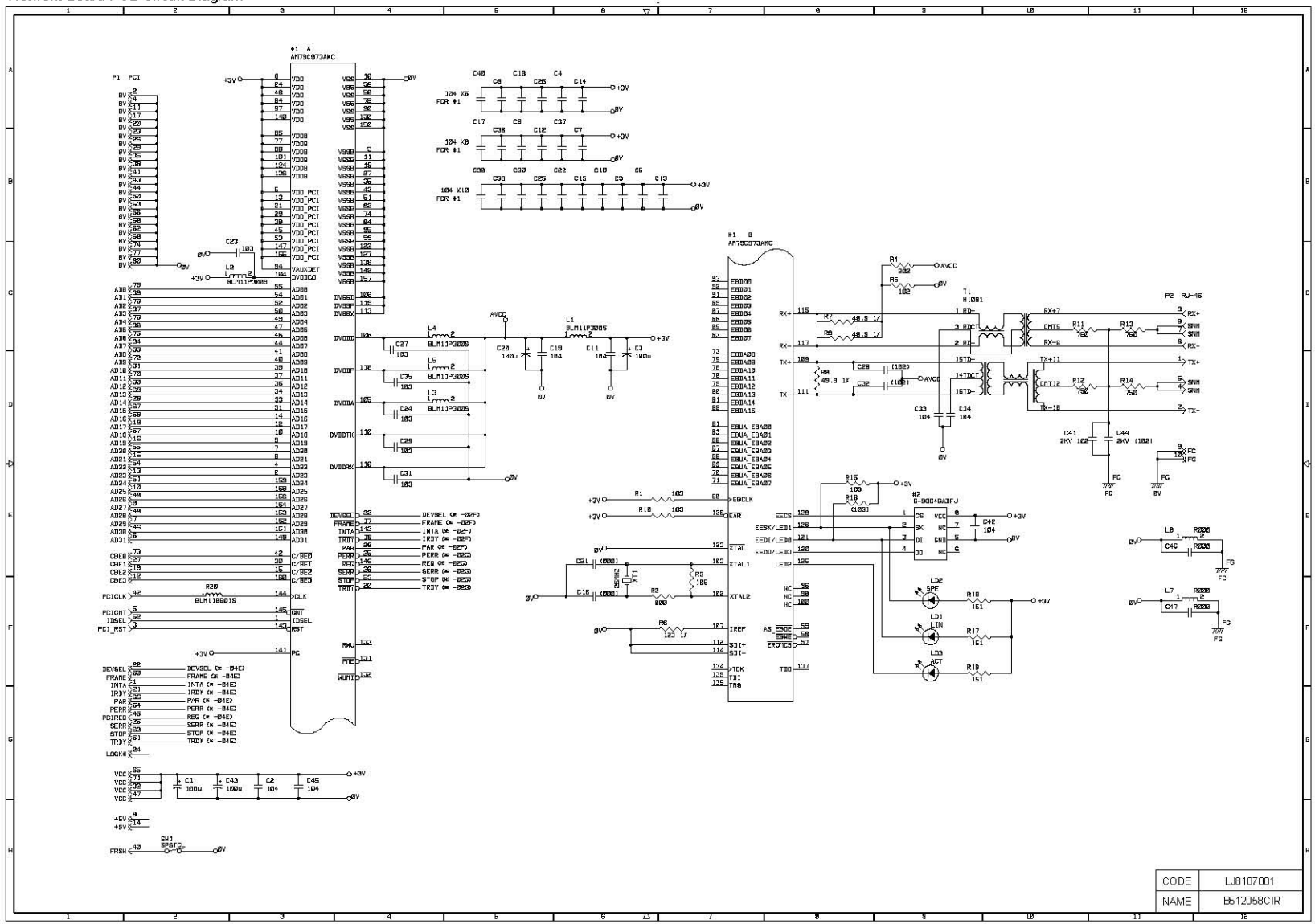
Main PCB Circuit Diagram (7/8)



Main PCB Circuit Diagram (8/8)



Network Board PCB Circuit Diagram



2.4 Low-voltage Power Supply Unit

(1) Outputs and Use

Output Terminal	Rated Output	Use
+5V-1	4.8 ~ 5.3V, 8.5A	For control of the printer
+5V-1R		For control of the laser
+5V-2		For control of the interface (7A Max.)
+24V-1	+24V, 6.5A	For control of printer charging.
HP HN	120V, 8A 220V, 5A	For connection of the fuser heater (HP). For connection of the fuser heater (HN).

(2) Layout of Connector Pin Assignment

See Fig.4-41 on the following page.

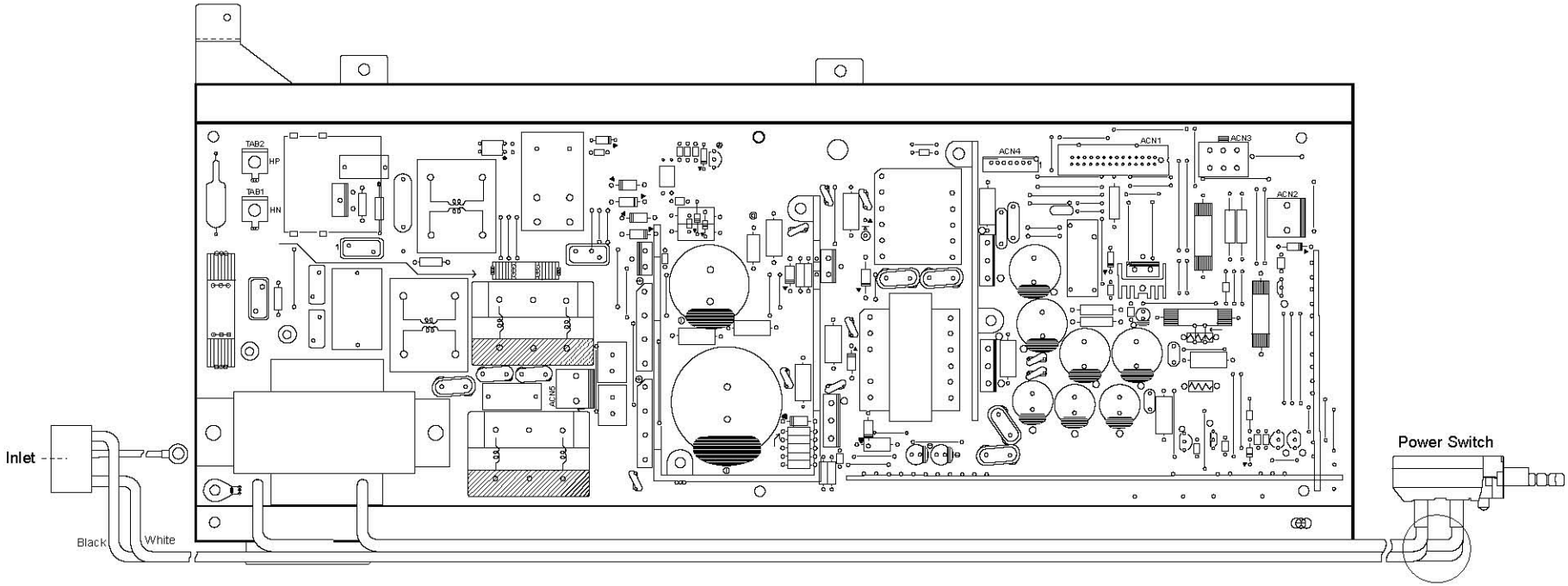

TAB2
HP
TAB1
HN
ACN1
ACN2
ACN3
ACN4
ACN5
Inlet
Black
White
Power Switch

Fig. 4-40

(3) Connector Pin Assignment

ACN1

MoLex: 53313-2815

Pin #	Signal Name	Interface
1	+5V-1	+5V-1 Output
3	+5V-1	+5V-1 Output
5	+5V-D	+5V-D Output
7	+5V-D	+5V-D Output
9	ACSYNC-N	AC Zero-Cross Signal (Open Collector Output)
11	+24V	+24V Output Corresponding to Door Switch
13	+5V-1R	+5V through the relay when +24V-1 is shut down.
15	HON-N	Heater On Signal (Pull-up required)
17	+24V-1	+24V Output through Door Switch
19	+24V-1	+24V Output through Door Switch
21	+24V-1	+24V Output through Door Switch
23	+24V-1	+24V Output through Door Switch
25	PGND	Power Ground (+24V type ground)
27	PGND	Power Ground (+24V type ground)

Pin #	Signal Name	Interface
2	DCOFF2-P	+5V-2D OFF Signal
4	SGND	Signal Ground (+5V type ground)
6	SGND	Signal Ground (+5V type ground)
8	SGND	Signal Ground (+5V type ground)
10	SGND	Signal Ground (+5V type ground)
12	DCOFF1-P	OFF Signal (Pull-up required)
14	ACOFF-P	AC Forced Shut-down Signal (Pull-up required)
16	TESTI2	Terminal for Dielectric Strength Test
18	TESTO2	Terminal for Dielectric Strength Test
20	TESTI1	Terminal for Dielectric Strength Test
22	TESTO1	Terminal for Dielectric Strength Test
24	PGND	Power Ground (+24V type ground)
26	PGND	Power Ground (+24V type ground)
28	PGND	Power Ground (+24V type ground)

ACN1

MoLex: 53324-0710

Pin #	Signal Name	Interface
1	+5V-1	+5V-1 Output
2	+5V-D	+5V-D Output
3	SGND	Signal Ground (+5V type ground)
4	+24V-2	+24V-2 Output
5	+24V-2	+24V-2 Output
6	PGND	Power Ground (+24V type ground)
7	PGND	Power Ground (+24V type ground)

ACN1

MoLex: 5277-02A

Pin #	Signal Name	Interface
1	DSW-O	+24V Output through Door switch
2	DSW-I	+24V Output through Door switch

ACN3

MoLex: 5566-06A

Pin #	Signal Name	Interface
1	+5V-2	+5V-2 Output
2	+5V-2D	+5V-2D Output
3	+5V-2D	+5V-2D Output
4	SGND	Signal Ground (+5V type ground)
5	SGND	Signal Ground (+5V type ground)
6	SGND	Signal Ground (+5V type ground)

2.5 High-voltage Power Supply Unit

(1) Outputs and Function

No.	Function		Power Supply (P/S)	
			P/S Name	Approx. Output Voltage
1	Charging		CHV (-)	(4.6KV) 600μA
2	First transfer		CBV (-)	200V ~ 900V
3	Developing bias	Y, M	DBV (-A)	200V ~ 400V
		C, K	DBV (-B)	200V ~ 400V
4	Second transfer		THV (+)	400V ~ 3,000V
5	Transfer roller cleaning		THV (-)	600V
6	Paper discharging		ACV (~)	4.9KV
			DCV (+)	400V
7	Drum cleaning		FCBV	200V ~ 1,000V

(2) Layout of Connector Pin Assignment

See Fig.4-42 below;

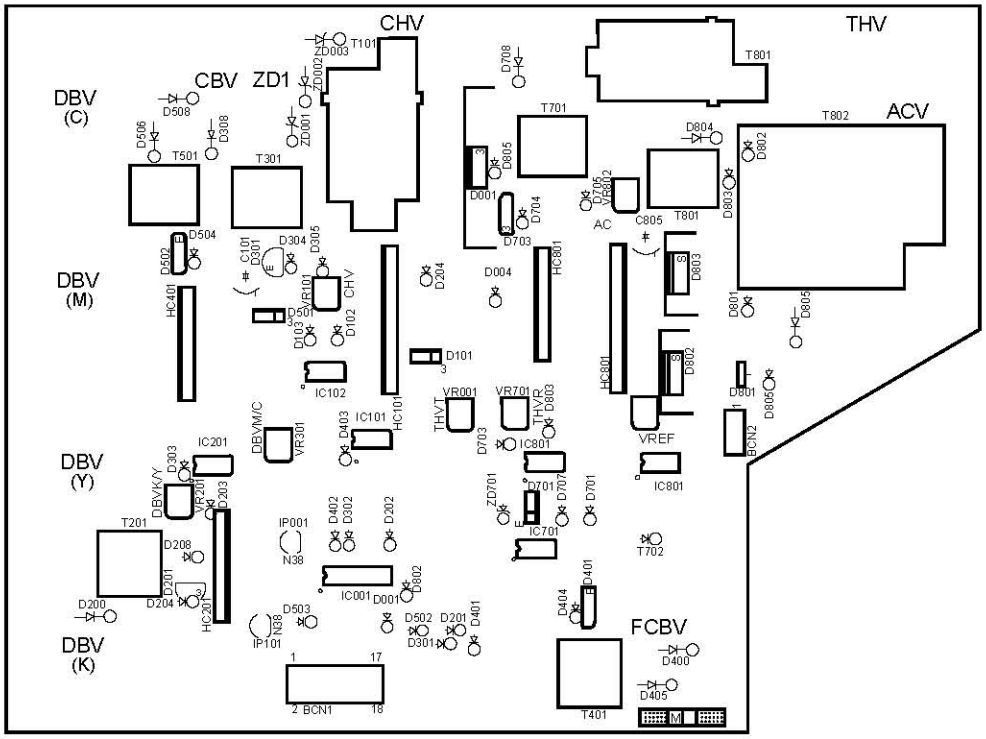


Fig. 4-41

(3) Connector Pin Assignment

BCN1

MoLex: 53313-1815

Pin #	Signal Name	Interface
1	+24V-1	+24V-1
3	FUCHK	Sensor Signal of Fuser Unit Installation
5	ACVON-N	AC Output ON Signal
7	CHVON-ON	CHV Output ON Signal
9	CBVPWM-N	CBV PCB Control Signal
11	DBVYMPWM-N	DBV PCB Control Signal
13	DBVCKPWM-N	CBV PCB Control Signal
15	FCBVPWM-N	FCBV PCB Control Signal
17	NC	NC

Pin #	Signal Name	Interface
2	PGND	PGND
4	PGND	PGND
6	PWMON-N	PCB Control ON Signal
8	CHVERR	CHV ERROR Sensor Signal
10	THVRON-N	THV ON Signal
12	THVPWM-N	THV PCB Control ON Signal
14	THV-I	Transfer Voltage Select Signal
16	TH1	Thermistor Temperature Sensor Signal
18	TH2	Thermistor Temperature Sensor Signal

BCN2

MoLex: 53324-0410

Pin #	Signal Name	Interface
1	TH1	Thermistor1
2	TH2	Thermistor2
3	FUCHK	Fuser Check
4	FUCHKGND	GND

2.6 Connection Diagram

CONNECTION DIAGRAM

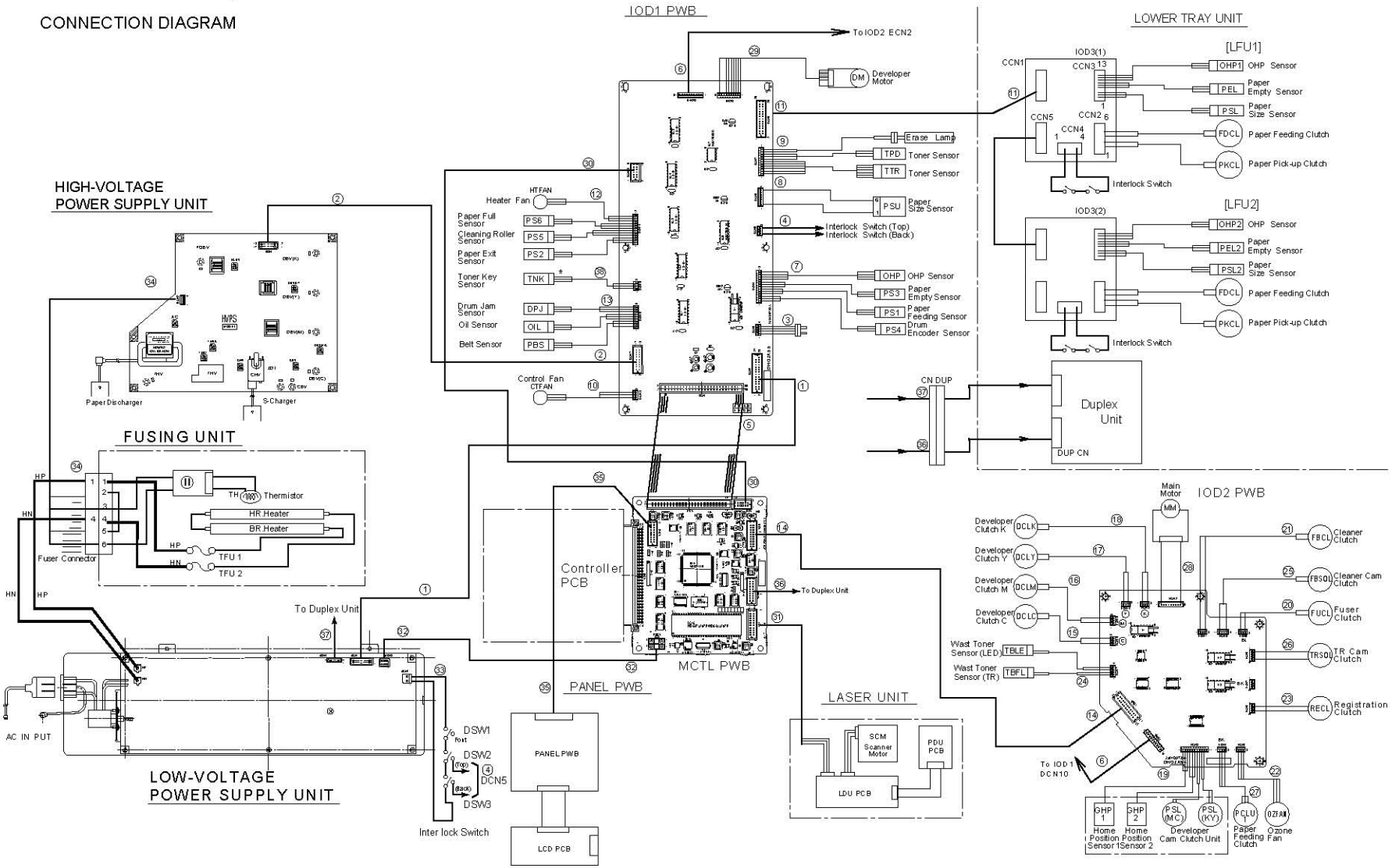


Fig. 4-42

(1) Symbol and Parts Name

Symbol	Parts Name	Symbol	Parts Name
LVPS	Low-voltage power supply unit	IOD1	IOD1 PWB
DSW1	Interlock switch (Front)	OHP	OHP sensor
DSW2	Interlock switch (Top)	PEU (PS3)	Paper empty sensor
DSW3	Interlock switch (Back)	PT1 (PS1)	Paper feeding sensor
FUSER Unit	Fusing unit	EN (PS4)	Drum encoder sensor
TH	Thermistor	Erase Lamp	Erase lamp
HR	Heat roller	TDP / TTR	Toner sensor
BR	Back-up roller	TNK	Toner key sensor
TFU1 / TFU2	Thermal fuse	PSU	Paper size sensor
HVU	High-voltage power supply unit	PFUL (PS6)	Paper full sensor
MCTL	MCTL PWB	CSR (PS5)	Cleaning roller sensor
PANEL	Panel PWB	PT2 (PS2)	Paper exit sensor
LCD	LCD PWB	DPJ	Drum jam sensor
Scanner Unit	Scanner Unit (Optical unit)	OIL	Oil sensor
SCM	Scanner motor	BPS	Belt sensor
PDU	PDL PCB	TBLE / TBFL	Waste toner sensor
LDU	LDU PCB	IOD2	IOD2 PWB
MM	Main motor	IOD3	IOD3 PWB
DM	Developer drive motor	FBCM	Cleaning cam clutch
FUFAN (EX)	fuser fan motor	TRCM	TR cam clutch
CTFAN (PS)	Control fan motor	LFU	Lower tray unit
OZFAN (OZ)	Ozone fan motor	PCLU	Paper feeding clutch
DVLK/DVLY/ DVLM/DVLC	Developer clutch (K.Y.M.C)	PSL(MC) / PSL (KY)	Developer cam clutch
FUCL	Fuser clutch	RECL	Registration clutch
FBCL	Cleaning clutch		

(2) Connector Pin Assignment

1) DCN2: IOD1 PWB - Power Supply Unit ACN1 (28 pins)

Pin No.	Signal	Pin No.	Signal
1	+5v - 1	2	DCOFF2-P
3	+5v - 1	4	SGND
5	+5v - D	6	SGND
7	+5v - D	8	SGND
9	ACSYNC - N	10	SGND
11	+24	12	DCOFF1 - P
13	+5v - 1R	14	ACOFF - P
15	HON - N	16	TESTI2
17	+24v - 1	18	TESTO2
19	+24v - 1	20	TESTI1
21	+24v - 1	22	TESTO1
23	+24v - 1	24	PGND
25	PGND	26	PGND
27	PGND	28	PGND

2) DCN17: IOD1 PWB - High Voltage Unit (18 pins)

Pin No.	Signal	Pin No.	Signal
1	+24v - 1	2	PGND
3	FUTEMP	4	PGND
5	ACVON - N	6	PWMON - N
7	CHVON - N	8	CHVERR
9	CBVPWM - N	10	THVRON - N
11	DBV (MC) PWM - N	12	THVPWM - N
13	DBV (KY) PWM - N	14	THV - I
15	FCBVPWM - N	16	TH1
17	AC_DCON-N	18	TH2

3) DCN3: For Factory Use Only (4 pins)

Pin No.	Signal
1	TESTO1
2	TESTI1
3	TESTO2
4	TESTI1

4) DCN5: IOD1 PWB

Pin No.	Signal
1	REARDOPEN - P
2	NC
3	TOPDOPEN - P

5) DCN1: MCTL PWB - IOD1 PWB (50 pins)

Pin No.	Signal	Pin No.	Signal
1	I/OAD2	2	DMON-N
3	I/OAD1	4	DCOFF1-P
5	I/OAD0	6	DMCLK
7	I/ODATA3	8	ACVON-N
9	I/ODATA2	10	CHVON-N
11	I/ODATA1	12	PWMON-N
13	I/ODATA0	14	CBVPWM-N
15	LEDON-N	16	DVB (MC) PWM-N
17	DMRDY-N	18	DBV (KY) PWM-N
19	I/ODATA4 (REVI1)	20	FCBVPWM-N
21	PKCLL2ON-P	22	THVRON-N
23	AC_DCON-N	24	THVPWM-N
25	PKCLL1ON-P	26	THV-I
27	ELON-P	28	TH2
29	PBSEN-N	30	TH1
31	HPSEN-N	32	OILLES-P
33	CTFANON-P	34	FUTEMP
35	HTFANON-P	36	HON-N
37	+5v-1R	38	ACOFF-P
39	SGND	40	ACSYNC-N
41	SGND	42	+24
43	SGND	44	PGND
45	+5v-1	46	PGND
47	+5v-1	48	+24v-1
49	+5v-1D	50	+24v-1

6) ECN2: IOD1 PWB - IOD2 PWB (10 pins)

Pin No.	Signal
1	+24v-1
2	+24v-1
3	+24v-1
4	PGND
5	PGND
6	PGND
7	+5v-1
8	SGND
9	SGND
10	+5v-D

7) DCN4: IOD1 - Paper Empty Sensor
IOD1 - Paper Feeding Sensor
IOD1 - Drum Encoder Sensor
IOD1 - OHP Sensor

Pin No.	Signal
1	+5v-D
2	HPSEN - N
3	SGND
4	+5v-D
5	PT1 - N
6	SGND
7	+5v-D
8	PEU-P
9	SGND
10	+5v-D
11	OHPSENU
12	SGND
13	SGND

8) DCN6: IOD1 - Paper Size Sensor

Pin No.	Signal
1	+5v-D
2	PSU1
3	PSU2
4	PSU3
5	PSU4
6	PSU5
7	SGND

9) DCN7: IOD1 - Toner Sensor (Y, M, C, K)

Pin No.	Signal
1	TLES (K)-P
2	TLES (Y)-P
3	TLES (M)-P
4	TLES(C)-P
5	TLES-G
6	SGND
7	LEDON-P
8	TLESCHK
9	SGND
10	+24v-1
11	ELON-N

10) DCN18: IOD1 - Control Fan

Pin No.	Signal
1	CTFANON-P
2	PGND
3	CTFANERR

11) DCN8: IOD1 - Lower Tray Unit

Pin No.	Signal
1	+24v-1
2	PKCLLON-N
3	FDCLL1ON-N
4	PSL1
5	PSL2
6	PSL3
7	PSCST1
8	PEL1-P
9	OCST1-N
10	OHPSENL1
11	+5v-D
12	SGND
13	CASTDOPEN-N
14	+24v-1
15	KCLL2ON-N
16	FDCLL2ON-N
17	PSL4
18	PSL5
19	PSL6
20	PSCST2
21	PEL2-P
22	OCST2-N
23	PHPSENL2
24	+5v-D
25	SGND
26	NC

13) DCN14: IOD1 - Fuser Fan
IOD1 - Paper Exit Sensor
IOD1 - Cleaning Roller Sensor
IOD1 - Paper Full Sensor

Pin No.	Signal
1	+5v-D
2	PT2-N
3	SGND
4	+5v-D
5	CLROL-N
6	SGND
7	+5v-D
8	PEFULL-N
9	SGND
10	HTFANON-P
11	PGND
12	HTFANERR

14) ECN1: MCTL PWB - IOD1 (22 pins)

Pin No.	Signal
1	DCL(C) ON-P
2	DCL (M) ON-P
3	DCL (Y) ON-P
4	DCL (K) ON-P
5	PSL (KY) ON-P
6	PSL (MC) ON-P
7	MMCLK
8	MMON-N
9	MMREV-N
10	MMENC
11	RECLON-P
12	AHUMB
13	ISCK
14	IDATA
15	ILOAD
16	FBCLON-P
17	FBSLON-P
18	TRSLON-P
19	OZFANON-P
20	FUCLON-P
21	PKCLU1ON-P
22	PKCLU2ON-P

15) ECN16: IOD2 - Developer Clutch (C)

Pin No.	Signal
1	+24v-1
2	NC
3	DCL(C) ON-N

16) ECN15: IOD2 - Developer Clutch (M)

Pin No.	Signal
1	+24v-1
2	NC
3	DCL (M) ON-N

(17) ECN14: IOD2 - Developer Clutch (Y)

Pin No.	Signal
1	+24v-1
2	NC
3	DCL (Y) ON-N

18) ECN13: IOD2 - Developer Clutch (K)

Pin No.	Signal
1	+24v-1
2	NC
3	DCL (K) ON-N

19) ECN3: IOD2 - Home Position Sensor1
- Home Position Sensor2
- Developer Cam Clutch (YM)
- Developer Cam Clutch (CK)

Pin No.	Signal
1	+5v-D
2	GHPSEN1-N (MC)
3	SGND
4	+5v-D
5	GHPSEN2-N (KY)
6	SGND
7	PSL (MC) ON-N
8	+24v-1
9	+24v-1
10	PSL (KY) ON-N
11	NC

20) ECN9: IOD2 - Fuser Clutch

Pin No.	Signal
1	+24v-1
2	NC
3	FUCLON-N

21) ECN11: IOD2 - Cleaner Clutch

Pin No.	Signal
1	+24v-1
1	NC
2	FBCLON-N

22) ECN5: IOD2 - Ozone Fan

Pin No.	Signal
1	OZFANON-P
2	PGND
3	OZFANERR

23) ECN6: IOD2 - Registration Clutch

Pin No.	Signal
1	+24v-1
2	NC
3	RECLON-N

24) ECN17: IOD2 - Waste Toner Sensor

Pin No.	Signal
1	TBFL1-N
2	SGND
3	WTLEDON
4	SGND

25) ECN10: IOD2 - Cleaner Cam Clutch

Pin No.	Signal
1	+24v-1
2	NC
3	NC
4	FBSLON-N

26) ECN8: IOD2 - TR Cam Clutch

Pin No.	Signal
1	+24v-1
2	NC
3	NC
4	TRSLON-N

27) ECN4: IOD2 - Paper Feeding Clutch

Pin No.	Signal
1	+24v-1
2	NC
3	PKCLU1ON-N

28) ECN12: IOD2 - Main Motor

Pin No.	Signal
1	MMRDY-N
2	MMON-N
3	MMCLK
4	PGND
5	+24v-1
6	SGND
7	+5v-1
8	MMENC
9	MMREV-N

29) DCN9: IOD1 - Developer Drive Motor

Pin No.	Signal
1	DMRDY-N
2	DMON-N
3	DMCLK
4	PGND
5	PGND
6	+24v-1
7	+24v-1
8	SGND
9	+5v-1

30) I3CN: MCTL I3CN - IOC1 DCN13

Pin No.	Signal
1	TMLEDON-P
2	TMASEN1
3	TMSOLON-P
4	TMASEN2
5	SIN2 (REVI2)
6	TMSOLERR
7	SOUT2 (REVO1)
8	DCOFF2-N (REVO2)
9	FDCLL1ON-P (REVO3)
10	FDCLL2ON-P (REV04)

31) LCN: MCTL LCN - LDU (20 pins)

Pin No.	Signal
1	+5v-1R
2	LDREF2
3	LDREF3
4	+5v-1
5	LDREF1
6	LDREF0
7	LREADY
8	LCONT2
9	LCONT1
10	VIDEO-P
11	VIDEO-N
12	BDT-P
13	BDT-N
14	SGND
15	SGND
16	SCMCLK
17	SCMRDY-N
18	SCMON-N
19	PGND
20	+24v-1

32) ACN3: LVPS ACN3 - MCTL POCN

Pin No.	Signal
1	+5v-2
2	+5v-2D
3	+5v-2D
4	SGND
5	SGND
6	SGND

33) ACN2: LVPS - Interlock Switch

Pin No.	Signal
1	DSW-O
2	DSW-I

34) BCN2: HVPS BCN2 - Fusing Unit

Pin No.	Signal
1	TH1
2	TH2
3	FUTEMP
4	FUCHKGND

35) PACN: MCTL PACN - Panel (16 pins)

Pin No.	Signal
1	PAI/ODATA0
2	PAI/ODATA1
3	PAI/ODATA2
4	PAI/ODATA3
5	PAI/ODATA4
6	PAI/ODATA5
7	PAI/ODATA6
8	PAI/ODATA7
9	LCDRS
10	LCDE
11	PASWRDN
12	PALEDWRN
13	SGND
14	+5v-1
15	LCDBLED
16	NC

36)37) CNDUP: Printer - Duplex Unit

Pin No.	Signal
1	D-COMMAND
2	SGND
3	DUMBUSY2-N
4	SGND
5	D-STATUS
6	SGND
7	+24VOFF-P
8	DUPCHK-N
9	DUMBUSY1-N
10	PT-1
11	DUPRES-N
12	SGND
13	NC
14	NC
15	PGND
16	PGND
17	+24v-2
18	+24v-2
19	+5v-1D
20	SGND
21	+5v-1
22	NC
23	NC
24	NC

38) DCN15: IOD1 - Toner Key Sensor

Pin No.	Signal
1	TONEROK-N
2	NC
3	SGND

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CHAPTER 5 CONTROL PANEL OPERATION

1. PANEL LAYOUT

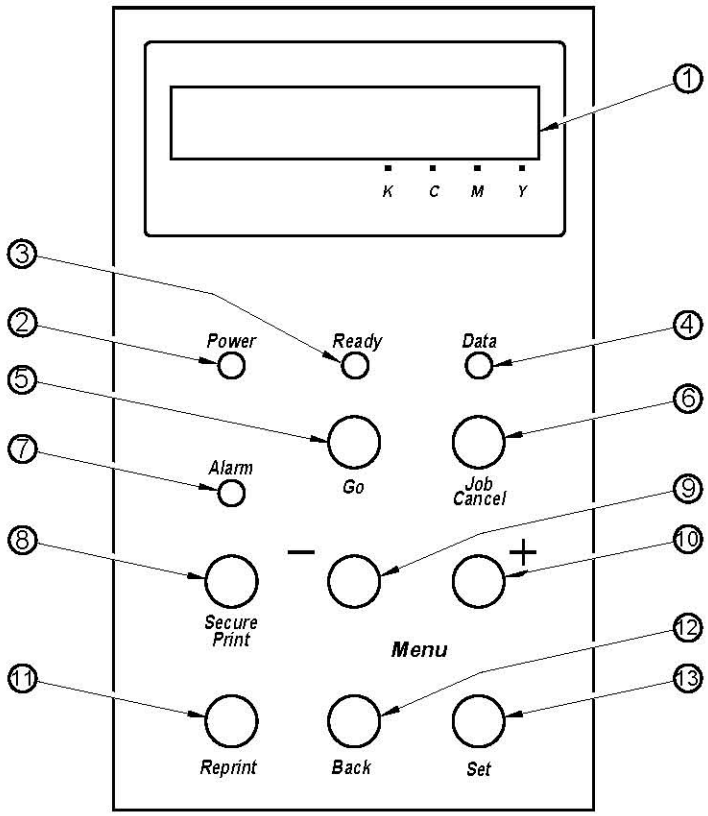


Fig. 5-1

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Power LED
3	Ready LED
4	Data LED
5	Go button
6	Job Cancel button
7	Alarm LED
8	Secure Print button
9	- button
10	+ button
11	Reprint button
12	Back button
13	Set button

2. VIDEO CONTROLLER MODE

This section describes the operation and maintenance functions in the Video Controller Mode.

2.1 Configuration of Operational Mode

This printer has various functions as set out in Table 5-1 for users to easily perform general test printing, general settings and some maintenance work.

(1) Normal Mode: After turning on the printer, the printer goes into Normal Mode. This mode provides normal printing for the end user. The following section describes the toner save mode and the power save mode. For other modes, refer to the user's guide.

(2) Line Test Mode: This mode provides a self-test for each function in the Video Controller Mode mainly for use when replacing the main (video controller) PCB.
Whenever the video controller is replaced, these checks should be carried out.
This mode provides performance tests for the engine LCD, control panel buttons and various sensors.

(3) DRAM Test Mode: This mode is provided to test installed DIMM(s) on the main (video controller) PCB.

(4) Test Print Mode: This mode allows you to print the selected test pattern in order to check the engine.

(5) NVRAM Reset Mode:
This mode forces the NVRAM values of the video controller to be reset to the factory settings.
When replacing the main PCB, the NVRAM value is automatically reset to the factory setting. However, this mode is effective when the video controller does not work due to errors.

Table 5-1

Power on	→	Normal Mode
+ button + - button + Power on	→	Line Test Mode
Go button + + button + Power on	→	DRAM Test Mode
Press the –, + and Set buttons in this order while holding down the Go button.	→	Test Print Mode
Set button + Power on	→	NVRAM Reset Mode

2.2 Line Test Mode

This mode tests the following items;

Item	Self-test Description
LCD TEST	Displays the checker pattern
LED TEST	Checks that all LEDs are on / off.
SW TEST	Checks that all buttons work correctly.
SENSOR TEST	Checks that all sensors work correctly.
RAM SIZE TEST	Displays the NVRAM size
TRAY 1 CHECK	Displays the paper size of the upper cassette (Tray 1).
TRAY 2 CHECK	Displays the paper size of the lower cassette (Tray 2).
FLASH CARD-R/W TEST	Checks the compact flash card.

<Procedure>

NOTE:

- *It is possible to skip the test and proceed with the next test by pressing the Go button.*
- *If any errors occur during the following procedures, an error message appears on the LCD. By pressing the Go button, it is possible to proceed with the test.*

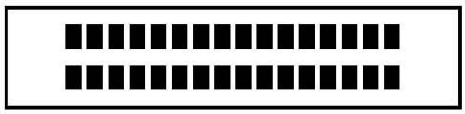
1) Turn on the power while holding down the + and – buttons. The following message appears.



2) Press the Go button to implement the LCD TEST.

All columns of the LCD are turned on as shown below and also the LEDs are all turned on.

Check that the LCDs are all displayed correctly and none of the dots have dropped. Also, check that the LEDs are all on.

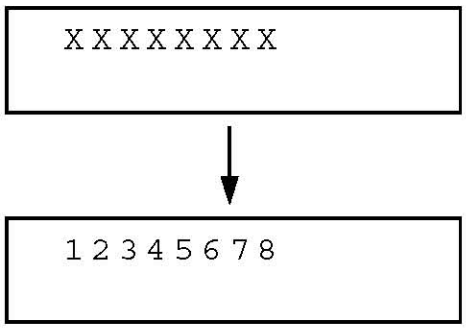


All of the LCDs are displayed at a time.

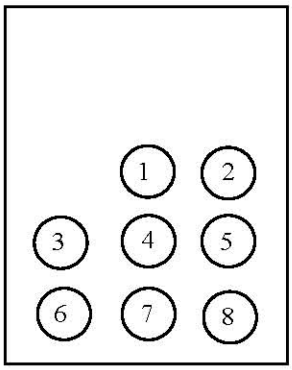
3) Press the Go button to implement the SW TEST.

The following display appears on the LCD and the LEDs are all turned off.

Check that the LEDs are turned on and the corresponding number appears as follows when pressing the buttons on the control panel in order.

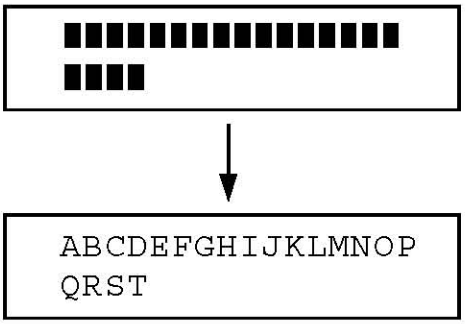


Corresponding button number on the panel



4) Press the Go button to implement the SENSOR TEST.

The following display appears on the LCD.
Check that the display of each sensor is changed to the corresponding character.



Corresponding sensor code

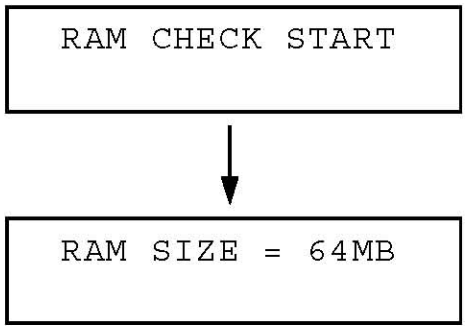
A:	Front Cover
B:	Top Cover
C:	Rear Cover (Transfer Unit)
D:	Toner Cartridge (K)
E:	Toner Cartridge (C)
F:	Toner Cartridge (M)
G:	Toner Cartridge (Y)
H:	OPC Belt Cartridge
I:	Fuser Cleaner
J:	Fusing Unit
K:	Waste Toner
L:	Upper Cassette
M:	Lower Cassette
N:	Upper Cassette Paper
O:	Lower Cassette Paper
P:	Upper Cassette Media
Q:	Lower Cassette Media
R:	Paper Sensor 1
S:	Paper Sensor 2
T	Paper Sensor 3

NOTE:

- *For the sensor of 'Q' for HL-3450CN, the display is not changed to 'Q' and stays* ■.

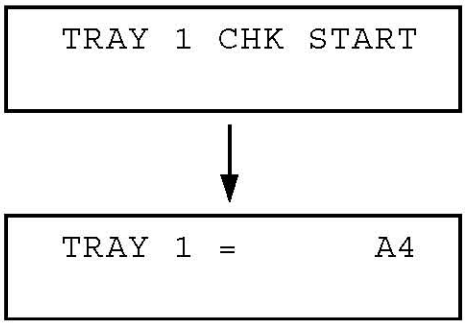
5) Press the Go button to implement the RAM SIZE CHECK.

The RAM size installed into the printer is displayed.
Check that the RAM size is correct.



6) Press the Go button to implement the TRAY1 CHECK.

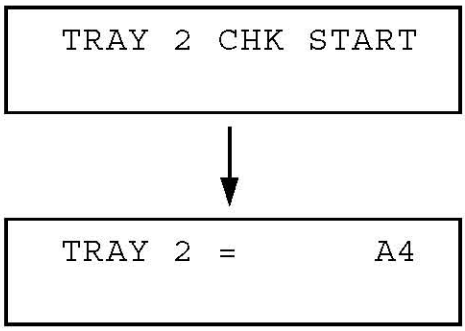
The paper size of the installed cassette 1 is displayed.
Check that the paper size is correct.



TRAY 1 = A4: A4 size cassette is installed.
TRAY 1 = LETTER: Letter size cassette is installed.
TRAY 1 = NO: No cassette is installed.
TRAY 1 = SIZE ERR: The paper size is other than A4 or Letter size.

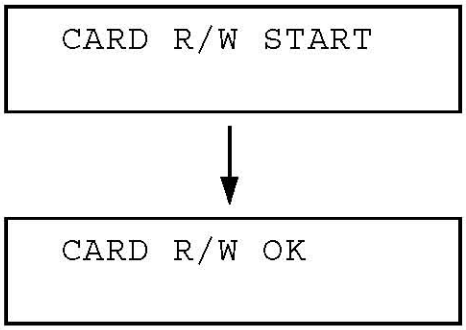
7) Press the Go button to implement the TRAY2 CHECK.

The paper size of the installed cassette 2 is displayed.
Check that the paper size is correct.



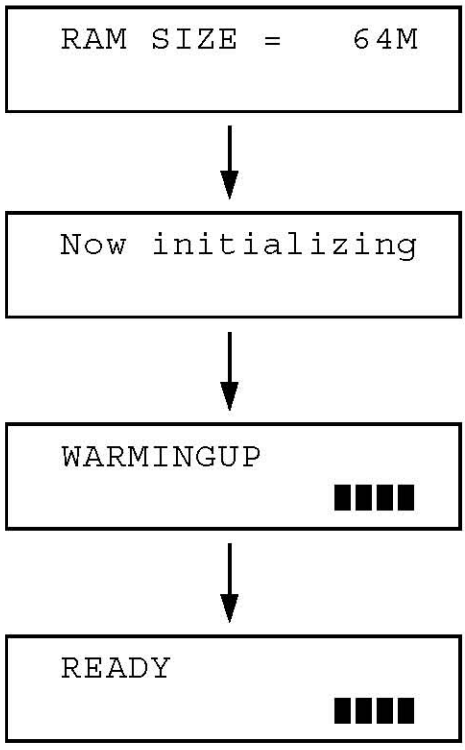
TRAY 2 = A4: A4 size cassette is installed.
TRAY 2 = LETTER: Letter size cassette is installed.
TRAY 2 = NO: No cassette is installed.
TRAY 2 = SIZE ERR: The paper size is other than A4 or Letter size.

8) Press the Go button to implement the COMPACT FLASH - R/W TEST.
The reading/writing test of the compact flash card is implemented.
Check that no error occurs.



CARD R/W OK: The compact flash card works correctly.
CARD R/W ERROR: The compact flash card has a problem.
NO FLASH CARD: The compact flash card is not installed.

9) Press the Go button to exit the LINE TEST mode and reset the printer.



When this message appears, the printer may be turned off.

10) Turn off the power.

2.3 DRAM Test Mode

This mode tests DIMMs installed on the main (video controller) PCB.

<Procedure>

1) To start the test program:

   While holding down the Go button and + button, turn on the power. "DRAM CHECK START" will be displayed. Press the Job Cancel button to start the DRAM check.

2) The LCD will display "START DRAM TEST", and the Data LED blinks.

3) On satisfactory completion of all the RAM tests, the LCD will display: "DRAM OK!!", and the Alarm LED is on.

4) If any DRAM error has occurred, the LCD will display a fail message as follows;



5) Enter the hidden menu mode as follows to confirm the current memory map;

   i) Press the -, + and Set buttons in this order while holding down the Go button.

   ii) The LCD will display "HIDDEN PANEL"

   iii) Select the "DRAM ADDRESS" menu using the scroll buttons.

   iv) Whenever the Set button is pressed, the LCD will display the DRAM error address on Slot 1, Slot 2, and Slot 3 in turn.

6) If a DIMM DRAM has an error, replace the DIMM corresponding to the above memory map information.

Note:

- *There may be a case where the above sequence does not work correctly due to complete RAM failure, or in faulty assembly such as a solder bridge or ineffective soldering etc.*
- *"PRINT CHECK" may be displayed when exiting from the Test mode. It will disappear in 20 or 30 seconds, displaying "READY" on the LCD. It is not a fault.*

2.4 Test Print Mode

This mode prints the specified pattern in order to check the engine.

<Procedure>

1) Press the -, + Set buttons in this order while holding down the Go button to enter the test print mode.
2) The 'PRINT MENU' message is displayed on the LCD. Select 'single test print' or 'repeat test print' by pressing the – or + button, then press the Set button.
3) If selecting 'single test print', select one of the following items by pressing the – or + button, then press the Set button.

   Single test print

TEST PTN=A – H	Halftone Reproduction
TEST PTN=G – H	Line Reproduction
TEST PTN=K2	Color Reproduction, registration and jitter
TEST PTN=STRIPE	Fusing
TEST PTN=NORMAL	Prints the test print page normally.
TEST PTN=GRID	10mm grid pattern (to check the magnification and paper skew.)
TEST PTN=LINE	Horizontal line with 2 dots and 3 spaces (to check the pitch of paper feeding.)
TEST PTN=BLACK	Prints the all black page. (to check the damage on the fusing unit.)
TEST PTN=WHITE	Prints the blank page. (to check the black spots or dark printing.)

4) If selecting 'repeat test print', select one of the following items by pressing the – or + button, then press the Set button.

   Repeat test print (For the printed page, refer to 'single test print' described above.)

   TEST PTN=NORMAL

   TEST PTN=GRID

   TEST PTN=LINE

   TEST PTN=BLACK

   TEST PTN=WHITE

2.5 NVRAM Reset Mode

This mode forces the NVRAM value of the video controller to be reset to the factory settings.

<Procedure>

1) While holding down the Set button, turn on the power.
2) Hold down the Set button until "RAM SIZE" is displayed on the LCD panel and the LEDs are all on momently.
3) The printer is reset to the factory setting.

3. ENGINE CONTROLLER MODE

This section describes the operation and setting procedures for each engine test in the Engine Controller Mode.

In order to go into the Engine Controller Mode, turn on the printer while holding down the Secure Print, Back, Set buttons.

3.1 Configuration of Operational Mode

This printer has the various functions as set out in Table 5-2 for the user to easily understand the operation status of the printer engine during maintenance work.

(1) Normal Mode: After removing the main PCB from the printer and pressing the **Ready** button under the Engine Controller Mode, the printer goes into the Engine Normal Mode.

This mode provides functions to indicate the operation status of the printer and also messages relating to normal operations which the operator is controlling.

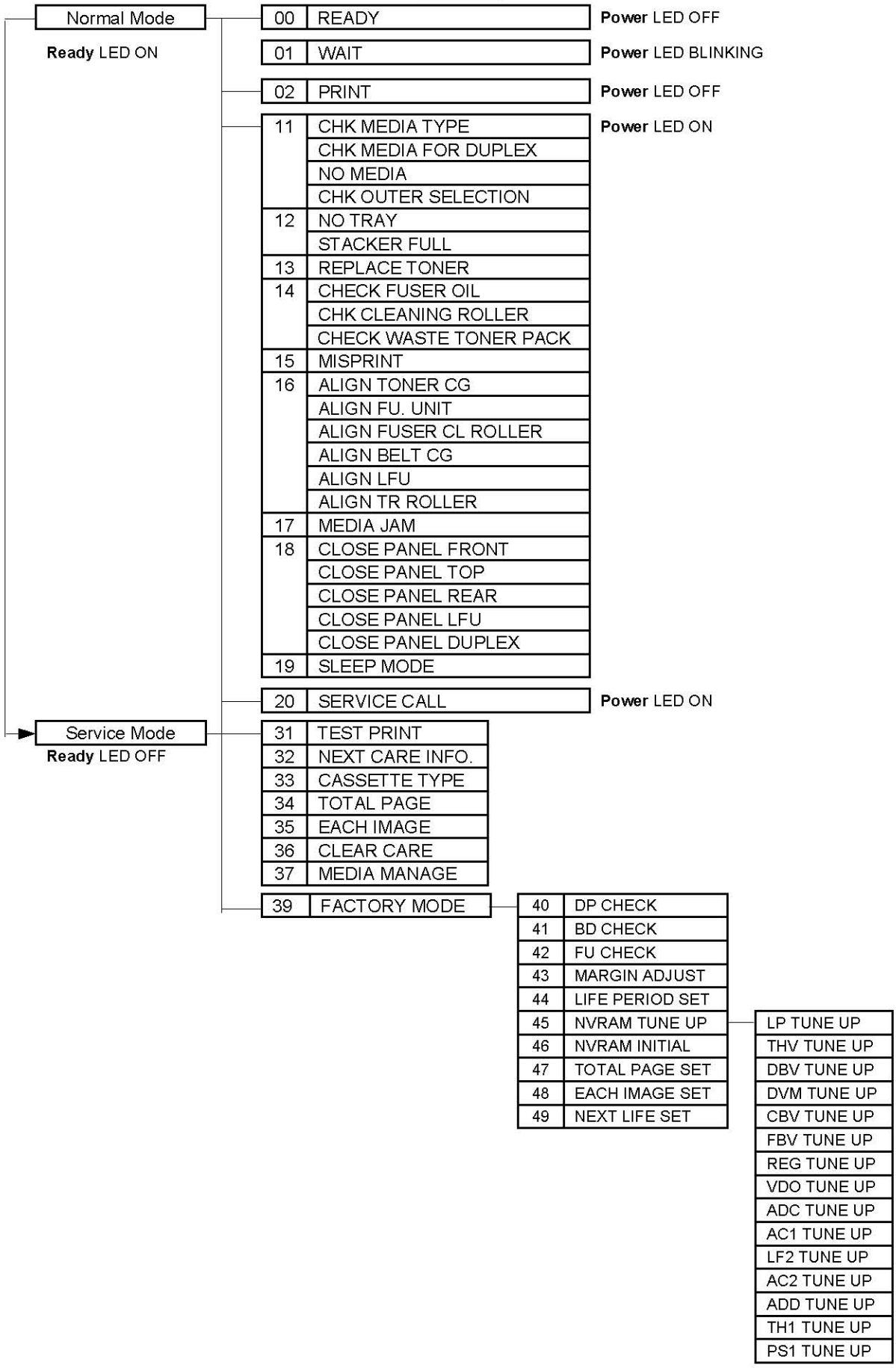
NOTE:

Be sure to remove the main controller PCB before the printer goes into the Engine Normal Mode. If you fail to do so, the printer goes into sleep mode.

(2) Service Mode: After turning on the printer in the off-line status, the printer goes into Service Mode.

This mode is a unique mode for the serviceman only and provides additional functions (codes 31 through 37) to confirm the operational status during maintenance work and '39 FACTORY MODE' to confirm and set the operational status of the main components.

Table 5-2


Normal Mode
Ready LED ON
00 READY
Power LED OFF
01 WAIT
Power LED BLINKING
02 PRINT
Power LED OFF
11 CHK MEDIA TYPE
CHK MEDIA FOR DUPLEX
NO MEDIA
CHK OUTER SELECTION
12 NO TRAY
STACKER FULL
13 REPLACE TONER
14 CHECK FUSER OIL
CHK CLEANING ROLLER
CHECK WASTE TONER PACK
15 MISPRINT
16 ALIGN TONER CG
ALIGN FU. UNIT
ALIGN FUSER CL ROLLER
ALIGN BELT CG
ALIGN LFU
ALIGN TR ROLLER
17 MEDIA JAM
18 CLOSE PANEL FRONT
CLOSE PANEL TOP
CLOSE PANEL REAR
CLOSE PANEL LFU
CLOSE PANEL DUPLEX
19 SLEEP MODE
Power LED ON
20 SERVICE CALL
Power LED ON
Service Mode
Ready LED OFF
31 TEST PRINT
32 NEXT CARE INFO.
33 CASSETTE TYPE
34 TOTAL PAGE
35 EACH IMAGE
36 CLEAR CARE
37 MEDIA MANAGE
39 FACTORY MODE
40 DP CHECK
41 BD CHECK
42 FU CHECK
43 MARGIN ADJUST
44 LIFE PERIOD SET
45 NVRAM TUNE UP
46 NVRAM INITIAL
47 TOTAL PAGE SET
48 EACH IMAGE SET
49 NEXT LIFE SET
LP TUNE UP
THV TUNE UP
DBV TUNE UP
DVM TUNE UP
CBV TUNE UP
FBV TUNE UP
REG TUNE UP
VDO TUNE UP
ADC TUNE UP
AC1 TUNE UP
LF2 TUNE UP
AC2 TUNE UP
ADD TUNE UP
TH1 TUNE UP
PS1 TUNE UP

3.2 Operation of Normal Mode

Normal Mode displays on the control panel the operational status of the printer when in the "ONLINE" state and the necessary information for the operator to implement ordinary maintenance work.

Operation Procedures

(1) Press the power button to turn on the printer while holding down the **Secure Print**, **Back** and **Set** buttons. Refer to Fig.5-1.

(2) Press the **Ready** button so that the printer is on-line and the **Power** LED starts to flash.

(3) The **Power** LED lights approximately 210 seconds after power-on and the printer is ready to print.

Normal Mode

See Table 5-2 for details of indications available in normal mode.

Code No.	LCD Message	Description of Message
00	00 READY [*1] [*2][*4]	• The **Power** LED is lit. • The engine has completed the warming-up process and is now ready to print. [*1]: Applicable paper feeder is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2) [*2]: Size of the paper loaded in the upper or lower cassette is indicated as follows; Indication is displayed from the left in the order of the upper cassette, lower cassette (1) and lower cassette (2). LT: Letter size DL: Envelope EX: Executive size PC: Post card LG: Legal size CM: Envelope Commercial #10 A4: A4 size FR: Free size B5: B5 size LD: Ledger L+: A3 Nobi A3: A3 size B4: B4 size [*4]: The code numbers of consumables or periodical replacement parts will be indicated if they have reached their life or should be replaced now. If no periodical replacement is required, there will be no indication in the LCD. For details of the periodical replacement parts, see 36. CLEAR CARE in the next section.
01	01 WAIT [*1] [*2][*4]	• The **Power** LED is lit. • The engine is in the process of warming-up. • For messages [*1], [*2] and [*4] that appear on the LCD, see the description for code number 00 above.
02	02 PRINT [*5][*1] [*2][*4]	• The **Power** LED lit. • The engine is ready to print. • For messages [*1], [*2], [*3] and [*4] that appear on the LCD, see the description for code number 00 above. [*5]: Print color is indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black YM: Yellow & Magenta YMCK Full Color

Code No.	LCD Message	Description of Message
11-1	CHECK MEDIA 11 CHK MEDIA [*1] TYPE [*4] NO MEDIA UPP/LOW CHK MEDIA TYPE UPP/LOW CHK OUTER SELECTION CHK MEDIA FOR DUPLEX	• The engine is idling. • The **Power** LED is lit. [*1]: Applicable paper feeder is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2) • Confirm whether the applicable paper cassette is loaded with paper. • Press the **Job Cancel** button if the media needs to be changed.
11-2	NO MEDIA 11 NO MEDIA [*1] [*4]	• The engine is idling. • The **Power** LED is lit. [*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2) • Replenish the empty cassette with paper.
11-3	CHECK MEDIA FOR DUPLEX 11 CHK MEDIA [*1] FOR DUPLEX[*4]	• The engine is idling. • The **Power** LED is lit. [*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper cassette /LOW: Lower cassette /DPL: Duplex unit inside • Change media. • Change the media selection.
11-4	CHECK OUTER SELECTION 11 CHK OUTER [*1] SELECTION [*4]	• The engine is idling. • The **Power** LED is lit. [*1]: Media check is indicated with the following messages for each feeder; /UPP: Upper cassette /LOW: Lower cassette • Confirm the media cassette / paper exit tray and reset the settings properly.
12-1	NO TRAY UPP/LOW 12 NO TRAY [*1] [*4]	• The engine is idling. • The **Power** LED is lit. [*1]: Paper feeder without the paper cassette is indicated as follows; UPPER: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2) • Install the applicable media cassette to the paper feeder indicated on the LCD.

Code No.	LCD Message	Description of Message
12-2	STACKER FULL 12 STACKER FULL [*4]	• The engine is ready to print. • The **Power** LED is lit. • Remove the paper on the stacker (paper exit tray), then press the **-** button.
13	REPLACE TONER 13 REPLACE [*5] TONER [*4] Display of [4]: C:YT Y toner cartridge C:CT: C toner cartridge C:MT M toner cartridge C:KT K toner cartridge	• The engine is ready to print. • The **Power** LED is lit. [*5]: The toner empty condition is indicated by the color code as follows; Y: Yellow M: Magenta C: Cyan K: Black • Replace the indicated toner cartridge with a new one of the correct color.
14-1	CHECK FUSER OIL 14 CHECK FUSER OIL[*F0]	• The engine is idling. • The **Power** LED is lit. • Replace the fuser oil bottle with a new one. • This message will be automatically cleared by opening & closing the paper exit cover.
14-2	CHECK CLEANING ROLLER 14 CHECK CLEANING ROLLER[*4] [*FC]	• The engine is idling. • The **Power** LED is lit. • Replace the fuser cleaner with a new one. • Execute the Clear Care Mode after the replacement of the fuser cleaner to clear the Care Code [FC].
14-3	CHECK WASTE TONER PACK 14 CHECK WASTE TONER PACK[*4]	• The engine is idling. • The **Power** LED is lit. • Replace the waste toner pack with a new one. • This message will be automatically cleared by opening & closing the front cover while replacing the waste toner pack. The message can also be cleared by pressing the **-** button.

Code No.	LCD Message	Description of Message
15	MISPRINT 15 MISPRINT [*6][*4]	• The engine is idling. • The **Power** LED is lit. [*6] The type of misprint error is indicated as follows; NOPQR: No PRREQ-N signal is available. PAPER: No paper is available in the feeder while executing the print operation after receipt of the print command. MEDIA: While executing the print process after receipt of print command, the media type of the feeder is not consistent with the specified media type. Misprint occurred during duplex printing. • This message can be cleared by pressing the **-** button.
16-1	ALIGN FU UNIT 16 ALIGN FU.UNIT [*4]	• The engine is stopped. • The **Power** LED is lit. • The fusing unit is not installed. Reconfirm the installation status of the fusing unit. • This message will be automatically cleared by opening & closing the paper exit cover. The message can also be cleared by pressing the **-** button.
16-2	ALIGN FUSER CL ROLLER 16 ALIGN FUSER CL ROLLER [*4]	• The engine is idling. • The **Power** LED is lit. • The fuser cleaner is not installed. Reconfirm the installation status of the fuser cleaner. • This message will be automatically cleared by opening & closing the paper exit cover. The message can also be cleared by pressing the **-** button.
16-3	ALIGN TONER CG 16 ALIGN [*5] TONER CG [*4]	• The engine is ready to print. • The **Power** LED is lit. [*5]: The color of the incorrectly installed toner cartridge will be indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black • Reinstall the toner cartridge correctly. • This message will be automatically cleared by opening & closing the front cover.

Code No.	LCD Message	Description of Message
16-4	ALIGN BELT CG 16 ALIGN BELT CG [*4]	• The engine is stopped. • The **Power** LED is lit. • The OPC belt cartridge is not installed. Reconfirm the installation status of the OPC belt cartridge. • This message will be automatically cleared by opening & closing either the paper exit cover or front cover.
16-5	ALIGN LFU 16 ALIGN LFU [*4]	• The engine is ready to print. • Turn the power off and connect the harness between the engine and fusing unit. • Turn the power on. If the warming-up process starts, it means that proper connection is now made.
16-6	ALIGN TRANSFER ROLLER 16 ALIGN BELT CG [*4]	• The engine is ready to print. • The **Power** LED is lit. • The transfer roller is not installed. Reconfirm the installation status of the transfer roller. • This message will be automatically cleared by opening & closing either the paper exit cover or front cover.
17	MEDIA JAM 17 MEDIA JAM [*7] [*4]	• The engine is stopped. • The **Power** LED is lit. [*7]: The kind of jam (location of jam) is indicated as follows; FEED: Paper feeder INNER: Inside of the printer OUTER: Paper exit unit DRUM: Transfer drum DPL: Inside the duplex unit • This message can be cleared by pressing the **-** button after opening & closing the front cover, back cover and paper exit cover.
18	CLOSE PANEL 18 CLOSE PANEL [*8] [*4]	• The engine is ready to print. • The **Power** LED is lit. [*8]: The open cover is indicated as follows; FRONT: Front cover TOP: Paper exit cover REAR: Rear access cover DPL: Rear access cover LFU: Fusing unit cover • This message can be cleared by opening & closing the indicated cover.

Code No.	LCD Message	Description of Message
19	SLEEP MODE 19 SLEEP MODE [*4]	• The engine is idling. • The **Power** LED is lit. • This mode is cleared by sending a WAKE-UP command (EC24) from the video controller. • The printer is ready to print after the warming-up process of the engine.
20	SERVICE CALL 20 SERVICE CALL [*9]	• The engine is stopped. • The **Power** LED is lit. [*9]: Service Call error code is indicated as follows; For the details of error codes, refer to Chapter 8 "Troubleshooting" in this manual.

3.3 Service Mode

Service Mode is a unique mode for the maintenance of the printer only, without the video controller card. In this mode, you can check the operation status of the printer engine Off-line and also carry out maintenance work for each of the printer components.

Procedure

(1) Hold down the **Secure Print**, **Back** and **Set** buttons and turn the printer Power on.

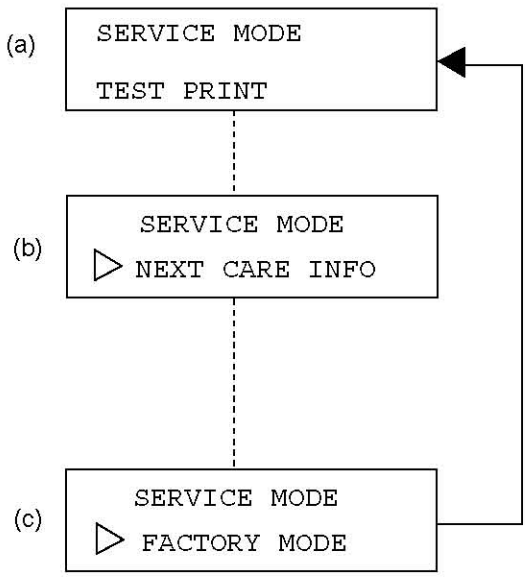
(2) Using the **-**, **Reprint**, **Back** and **Set** buttons, select the mode necessary for the maintenance work from the test list shown in Table 5-2.

How to designate the necessary mode

(1) Press the **Back** and **Set** button so that service modes (a), (b) and (c) show up in sequence to be selected.

(2) After selecting the desired mode, execute the selected mode by pressing the **Reprint** button.

(3) Press the **-** button to exit the mode.



31	GRID PRINT

A single color or two color (R,G,B) Grid Pattern and a full color Stripe Pattern can be printed as Test Prints.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button. (a) → (b) 2) Using the **Back** or **Set** button, select the desired pattern (ex. grid pattern), and then press the **Reprint** button. (b) → (c) 3) Using the **Back** or **Set** button, select the desired color (ex. red color), and then, press the **Reprint** button. (c) → (d) 4) After completion of the warming-up process, the desired pattern of the selected color will be continuously printed. (d) 5) Print operation is suspended by pressing the **-** button. (d) → (e) If it is desired to return to the previous screen (message), press the **-** button one more time. (e) → (d) 6) If it is desired to return to On-line mode, press the **Go** button. (f) → (g)	a) SERVICE MODE ▷TEST PRINT b) 31 GRID PRINT ▷ GRID PRINT c) 31 GRID PRINT ▷ Y/M/C/K/R/G/B R:YM G:YC B:MC d) 31 GRID PRINT [YM] e) 31 GRID PRINT ▷ Y/M/C/K/R/G/B f) SERVICE MODE TEST PRINT g) 01 WAIT [ ] [ ] [ ]

32	NEXT CARE INFORMATION

Information relating to the replacement timing of periodical replacement parts can be obtained. This is the life for each of the components in images or pages.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NEXT CARE INFO". (a) → (b) 2) Using the **Back** or **Set** button, select the care code for which you need the information. 2: Fuser Cleaner (FC) 7: OPC Belt Cartridge (BL) 8: Fusing Unit (FU) * 9: Transfer Drum (TD) 10: Replacement Kit 240K (240K) 13: Replacement Paper Feeding Kit (PF1) 14: Replacement Paper Feeding Kit (PF2) 15: Replacement Paper Feeding Kit (PF3) 16: Replacement Kit 120K (120K) 3) After selecting the code, press the **Reprint** button. Then, the number of images or printouts corresponding to the selected code is displayed. (b) → (c) through (l) 4) Screen (c) through (l) can be cleared by pressing the **-** button. (c) through (l) → (b) Press the **-** button one more time at screen (b) to return to the service mode. (b) → (a) * The Oil Pad change message can be changed to ON or OFF as follows: 1. Enter the hidden menu mode as follows: Press the **Job Cancel**, **Secure Print** and **Reprint** buttons at the same time in the off-line status. 2. Select the "OIL PAD SELECT" menu using the scroll buttons. 3. The LCD will display as follows. Select the mode you need. OIL PAD=OFF OIL PAD=LCD/WEB (default setting) OIL PAD=ALLDISP	a) SERVICE MODE ▷ NEXT CARE INFO b) 32 NEXT CARE 1,2,3,4,5,6,7,8,9,10 * 12 * * * 16 c) NEXT FC ROLL 018000P d) NEXT BL UNIT 12000P e) NEXT FU UNIT 100000P f) NEXT TR DRUM 600000P g) NEXT TR DRUM 599943P h) NEXT 240K KIT 24000P i) NEXT PICK ROL 120000P j) NEXT PICK LF1 120000P k) NEXT PICK LF2 120000P l) NEXT P. DSCHRG 120000P

33	CASSETTE TYPE

The type of paper feeding cassette can be selected.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "CASSETTE TYPE". (a) → (b) 2) Using the **Back** or **Set** button, select the code of the desired cassette (A, B or C), and then press the **Reprint** button. 3) Press the **-** button to exit the mode from screen (b). (b) → (c)	a) SERVICE MODE ▷ CASSETTE TYPE b) 33 CASSETTE TYPE TYPE=<A / B / C> c) SERVICE MODE ▷ CASSETTE TYPE

34	TOTAL PAGE

The total number of printouts can be confirmed.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "TOTAL PAGE" mode. (a) → (b) 2) Select one type of page from among TOTAL PAGE, LFU PAGE and DPL PAGE. 3) A 6 digit number is displayed. This number represents the total number of pages that have been printed out. (c) 4) Press the **-** button to exit the mode from screen (c)/(d)/(e). (c)/(d)/(e)→ (f)	a) SERVICE MODE ▷ TOTAL PAGE b) SERVICE MODE ▶ TOTAL/LFU/DPL c) 34 TOTAL PAGE [ ][ ][ ][ ][ ][ ] P d) 34 LFU PAGE [ ][ ][ ][ ][ ][ ] P e) 34 DPL PAGE [ ][ ][ ][ ][ ][ ] P f) SERVICE MODE TEST PRINT

35	EACH IMAGE

Number of created images for each color used in printing can be confirmed.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "EACH IMAGE" mode. (a) → (b) 2) Using the **Back** or **Set** button, select the required color and then press the **Reprint** button. (b) → (c) 3) The number of images created in the selected color is displayed. (Ex. Yellow) (c) 4) Press the **-** button to exit this mode from screen (c). (c) → (d) 5) Using the **Back** or **Set** button, select another color and then press the **Reprint** button to confirm the number of images created in that color. 6) Press the **-** button to return to the Service mode. (d) → (e)	a) SERVICE MODE / ▷ EACH IMAGE b) 35 IMAGE OF / ▷ Y/M/C/K c) 35 IMAGE OF Y / 000098P d) 35 IMAGE OF / ▷ Y/M/C/K e) SERVICE MODE / ▷ TEST PRINT

36	CLEAR CARE

Care Code counters displayed on the LCD can be cleared. Make sure that you clear the relevant CLEAR CARE mode whenever replacing periodical replacement parts with new ones. This mode should only be used to reset the counters after replacement of faulty consumables before their life expectancy is reached. For normal life replacement use the resets available in the Video controller mode

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "CLEAR CARE" mode. (a) → (b) 2) Using the **Back** or **Set** button, move the cursor to select the applicable CARE code and then press the **Reprint** button. (b) → (c) 3) When implementing CLEAR CARE, use the **Back** or **Set** button to have the cursor meet YES, then press the **Reprint** button. (Refer to the table below.) (c) → (d) 4) Press the **-** button to exit the CLEAR CARE mode. (d) → (e)	a) SERVICE MODE ▷ CLEAR CARE b) 36 CLEAR CARE No.=123456789101216 c) CARED FC ROLL? ▷ YES/NO d) 36 CLEAR CARE No.=123456789101216 e) SERVICE MODE ▷ TEST PRINT

NO.	Periodical maintenance parts	Code
2	Fuser cleaner	FC
7	OPC belt cartridge	BC
8	Fusing unit	FU
9	Drum cleaner / Transfer roller	120K / OW
10	Transfer drum	TD
13	Paper feeding roller	PK
14	Paper feeding roller (for LFU1)	P1
15	Paper feeding roller (for LFU2)	P2
16	Paper discharger	PD

37	MEDIA MANAGE

The signal from the OHP sensor can be ignored when the media is selected to OHP. However, this mode should not be used under normal circumstances.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "MEDIA MANAGE". (a) → (b) 2) Select DEFIANCE and then press the **Reprint** button if the OHP sensor signal should be ignored. (b) → (c) In normal operation, the mode is preset to MANAGE.	a) SERVICE MODE ▷ MEDIA MANAGE b) 37 MEDIA MANAGE ▷ MANAGE/DEFIANCE c) SERVICE MODE DP CHECK

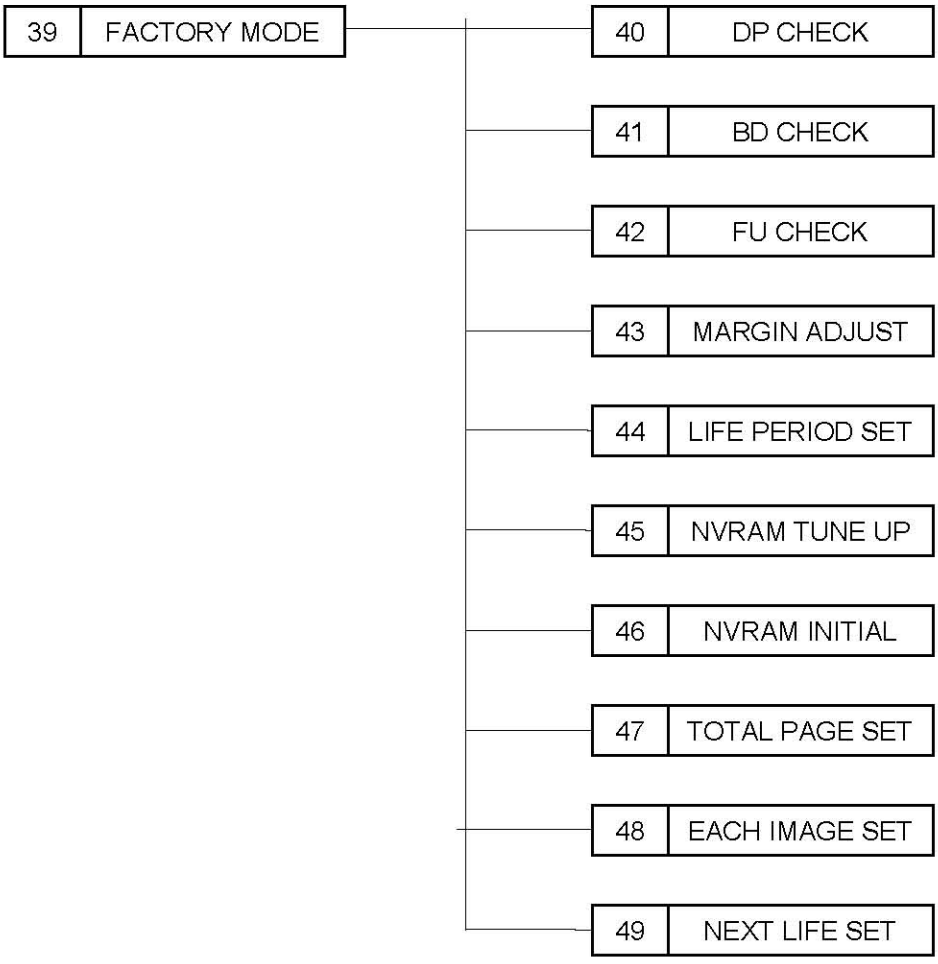
39	FACTORY MODE

This mode consists of 9 (nine) modes for the confirmation of operation and the resetting functions necessary for maintenance work.

CAUTION

Before using this mode, ensure that you have the information available to reset the Page and Image counters to the correct values. See 34 TOTAL PAGES and 35 EACH IMAGE for information on how to get the readings before starting working with these functions.

Basic Configuration



40	DP CHECK

Each individual color Toner cartridge can be driven.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "DP CHECK". (a) → (b)	a) 39 FACTORY MODE ▷ DP CHECK
2) Using the **Back** or **Set** button, select the desired color and then press the **Reprint** button. (b) → (c)	b) 40 DP CHECK ▷ Y/M/C/K
3) The selected color toner cartridge starts to drive. If no error occurs in driving, the message "GOOD" is displayed on the LCD, otherwise "FAIL". (c) Toner cartridge drive will automatically stop after 60 seconds. (c) → (d)	c) 40 DP CHECK Y GOOD d) 40 DP CHECK ▷ Y/M/C/K
4) Press the **-** button to stop the DP CHECK mode. (d) Press the **-** button one more time to return to screen (a). (d) → (e)	e) FACTORY MODE ▷ DP CHECK

41	BD CHECK

Laser beam position and laser power can be checked.

Procedure

Description of Procedures	LCD Message

1) Press the **Reprint** button after selecting screen (a) "BD CHECK". (a) → (b)
2) The scanner motor scans the laser beam as it is rotating. If the scanning position of the laser beam is normal, "GOOD" is displayed on the LCD, otherwise "FAIL". (b) or (c)
Scanner motor automatically stops rotating after 60 seconds. (d)
3) Press the **-** button to exit the BD CHECK mode. (b) → (d)
	a) `39 FACTORY MODE`
	`▷ BD CHECK`
	b) `41 BD CHECK`
	`GOOD`
	c) `41 BD CHECK`
	`FAIL`
	d) `39 FACTORY MODE`
	`▷ DP CHECK`

42	FU CHECK

Availability of oil in the fusing unit can be checked.

Procedure

Description of Procedures	LCD Message

1) Press the **Reprint** button after selecting screen (a) "FU CHECK". (a)
2) The fusing unit starts the heat-up process, and checks the availability of fuser oil. If oil is available in the fusing unit, "GOOD" is displayed in the LCD, otherwise, "FAIL". (b)
3) Press the **-** button to exit the FU CHECK mode. (c)
	a) `39 FACTORY MODE`
	`▷ FU CHECK`
	b) `43 FU CHECK`
	`OIL:GOOD`
	c) `39 FACTORY MODE`
	`▷ DP CHECK`

43	MARGIN ADJUST

The position of the top margin and left margin can be confirmed and adjusted within the range -3.5mm max. and +3.5mm max.

NOTE:

It is recommended to use the default value in normal use. Do not perform this mode frequently.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "MARGIN ADJUST". (a) → (b)	a) 39 FACTORY MODE ▷ MARGIN ADJUST
2) Using the **Back** or **Set** button, select one of TOP, LEFT, LEFT1, LEFT2, LEFT3 and then press the **Reprint** button. (b) → (c) LEFT: For adjustment of left edge of the upper cassette. LEFT1: For adjustment of left edge of the lower cassette (1). LEFT2: For adjustment of left edge of lower cassette (2). LEFT3: For adjustment of left edge from the duplex unit.	b) 43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3
	c) 43 TOP -2.0mm -<765▲32101>+
	d) 43 TOP +2.5mm -<10123▲567>+
3) The margins can be adjusted by up to 3.5mm left and right in 0.5mm steps from the reference value "0". Using the **Back** or **Set** button, select the amount of adjustment by selecting a number displayed in screen (c) or (d). The amount of adjustment selected will be displayed at the upper right corner of Screen (c) or (d). After confirming the desired amount of adjustment is displayed, press the **Reprint** button to set the adjustment.	e) 43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3
4) Press the **-** button to exit the MARGIN ADJUST mode. (d) → (e)	f) 39 FACTORY MODE ▷ DP CHECK
5) Press the **-** button one more time to return to FACTORY MODE. (e) → (f)	

44	LIFE PERIOD

Replacement life of the periodical replacement parts can be set.

NOTE:

It is recommended to use the default value in normal use. Do not adjust these settings without authorization.

Procedure

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "LIFE PERIOD" mode. (a) → (b)	a) 39 FACTORY MODE ▷ LIFE PERIOD SET
2) Using the **Back** or **Set** button, select the desired code to be set and then press the **Reprint** button. 2: Fuser cleaner (b) → (c) 7: OPC belt cartridge (d) 8: Fusing unit (e) 9: Transfer drum (f) 10: 240K replacement kit (g) 13: Paper Feeding Kit 1 (h) 14: Paper Feeding Kit 2 (i) 15: Paper Feeding Kit 3 (j) 16: 120K Replacement Kit (k)	b) 44 LIFE PERIOD 12345678910*12***16 c) PERIOD FC ROLL 018000 P SET d) PERIOD BC UNIT 120000 P SET e) PERIOD FU UNIT 100000 P SET f) PERIOD TR DRUM 600000 P SET g) PERIOD 240K UNIT 240000 P SET h) PERIOD PICK ROL 120000 P SET i) PERIOD PICK LF1 120000 P SET j) PERIOD PICK LF2 120000 P SET
3) Use the **Back** or **Set** button to select the desired digit. Use the **Reprint** button to input a new value to the selected (blinking) digit. Upon completion of inputting the values to be set, use the **Back** or **Set** button to select SET on the LCD and then press the **Reprint** button to register the set value.	k) PERIOD P. DSCHRG 120000 P SET
4) Press the **-** button to complete the setting work. (k)	l) 44 LIFE PERIOD 12345678910*12***16
5) Press the **-** button one more time to return to FACTORY MODE. (l) → (m)	m) 39 FACTORY MODE ▷ DP CHECK

45	NVRAM TUNE UP

This mode is not used in normal operations, but is used when fine adjustment of the HVPSU voltage values is required. Do not use this mode unless you are sure that you understand the effects of making adjustments to the various charge voltages in the HVPSU.

This mode consists of the following 6 (six) subordinate modes from 45-1 to 45-6:

Configuration of NVRAM TUNE UP

45	NVRAM TUNE UP			<Factory Setting>
		45-1	LP TUNE UP	+ 4
		45-2	THV TUNE UP	PPC/OHP: 0, LABEL: - 2
		45-3	DBV TUNE UP	0
		*3	DVM TUNE UP	+ 1
		45-4	CBV TUNE UP	0 *1
		45-5	FBV TUNE UP	+ 1 *2
		*3	REG TUNE UP	0
		*3	VDO TUNE UP	0
		45-6	ADC TUNE UP	0
		*3	AC1 TUNE UP	0
		*3	LF2 TUNE UP	0
		*3	AC2 TUNE UP	A/B/D: 0, C: + 1
		*3	ADD TUNE UP	- 4
		*3	TH1 TUNE UP	0
		*3	PS1 TUNE UP	

*1 '0' is applied for machines produced after June 2000. You need to set the CBV TUNE UP value to '0' for machines, which were produced before June 2000, to which '+1', has been applied. For setting procedures, see 45-4. CBV TUNE UP in this section.

*2 '+1' is applied for machines produced after June 2000. You need to set the FBV TUNE UP value to '+1' for machines which were produced before June, 2000, to which '0' has been applied. For setting procedures, see 45-5. FBV TUNE UP in this section.

*3 **Do not change settings of these modes.**

NOTE:

After performing NVRAM INITIAL in the next section, be sure to set the LP TUNE UP value to '+ 4'

45-1	LP TUNE UP

This mode should be used when optical density, line thickness and/or color reproduction needs to be adjusted. The adjustment is made by changing the laser power against the reference value 0 (zero) in the range -4 to +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting LP TUNE UP Code 1, press the **Reprint** button. (b) → (c) 3) After selecting the color to be adjusted, press the **Reprint** button. (Ex. Yellow). (c) → (d) 4) The adjustment value can be adjusted in 8 steps between the -4 and +4. After selecting the required number press the **Reprint** button. (d) 5) Press the **-** button to finish the adjustment for yellow. (d) → (e) Repeat steps 3 to 5 if adjustment work is required for another color. 6) Press the **-** button to finish the adjustments. (e) → (f)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 LP TUNE UP ▷ Y/M/C/K d) 45 YELLOW [0] -<432101234>+ e) 45 LP TUNE UP ▷ Y/M/C/K f) 45 NVM TUNE UP No.=<123456789>

45-2	THV TUNE UP

This mode shall be used when the transfer voltage needs to be adjusted due to errors such as transfer failure onto the media. The adjustment is used to change the transfer voltage, subject to the media to be used, against the reference value 0 (zero) in the range -4 to +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting THV TUNE UP Code 2, press the **Reprint** button. (b) → (c) 3) After selecting the media to be adjusted, press the **Reprint** button. (Ex. PPC). (c) → (d) 4) Adjustment can be made in 8 steps between -4 and +4. After selecting a given number, press the **Reprint** button. (d) 5) Press the **-** button to finish the adjustment for PPC. (d) → (e) Repeat steps 3 to 5 for other media such as OHP or Labels. 6) Press the **-** button to finish the adjustments. (e) → (f)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 THV TUNE UP ▷ PPC/OHP/LABEL d) 45 THV PPC [ ] -<432101234>+ e) 45 THV TUNE UP ▷ PPC/OHP/LABEL f) 45 NVM TUNE UP No.=<123456789>

45-3	DBV TUNE UP

This mode shall be used when the image optical density needs to be adjusted. Adjustment of the developer bias voltage against the reference value 0 (zero) in the range -4 and +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting DBV TUNE UP Code 3, press the **Reprint** button. (b) → (c) 3) After selecting the color to be adjusted, press the **Reprint** button. (Ex. Magenta). (c) → (d) 4) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the **Reprint** button. (d) 5) Press the **-** button to finish the adjustment work for Magenta. (d) → (e) Repeat steps 3 to 5 for each color. 6) Press the **-** button to finish the DBV adjustment work. (e) → (f)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 DBV TUNE UP ▷ Y/M/C/K d) 45 MAGENTA [ ] -<432101234>+ e) 45 DBV TUNE UP ▷ Y/M/C/K f) 45 NVM TUNE UP No.=<123456789>

45-4	CBV TUNE UP

This mode should be used when image defects attributed to the OPC belt need to be improved. Adjustment is to alter the OPC belt bias voltage against the reference value 0 (zero) in the range -4 to +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting CBV TUNE UP Code 5, press the **Reprint** button. (b) → (c) 3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the **Reprint** button. (c) 4) Press the **-** button to finish the adjustment work for CBV. (c) → (d)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 CBV TUNE UP -<432101234>+ d) 45 NVM TUNE UP No.=<123456789>

45-5	FBV TUNE UP

This mode should be used when image defects attributed to the transfer drum need to be improved. Adjustment is to adjust the drum cleaner bias voltage against the reference value 0 (zero) in the range -4 and +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting FBV TUNE UP Code 6, press the **Reprint** button. (b) → (c) 3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the **Reprint** button. (c) 4) Press the **-** button to finish the adjustment work for FBV. (c) → (d)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 FBV TUNE UP -<432101234>+ d) 45 NVM TUNE UP No.=<123456789>

45-6	ADC TUNE UP

This mode should be used to improve the problem when there is insufficient separation of paper from the transfer drum (when the winding jam occurred around the drum). Using the mode, you can adjust the bias voltage of paper discharging output from the high-voltage power supply unit. Adjustment is to adjust the drum cleaner bias voltage against the reference value 0 (zero) in the range -4 and +4.

NOTE:

Do not perform this mode frequently.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting ADC TUNE UP Code 9, press the **Reprint** button. (b) → (c) 3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the **Reprint** button. (c) 4) Press the **-** button to finish the adjustment work for ADC. (c) → (d)	a) 39 FACTORY MODE ▷ NVM TUNE UP b) 45 NVM TUNE UP No.=<123456789> c) 45 ADC TUNE UP -<432101234>+ d) 45 NVM TUNE UP No.=<123456789>

46	NVRAM INITIAL

This mode can initialize (data clear) all the data in the NVRAM on the MCTL PWB.

CAUTION

BEFORE USING THIS MODE, THE VALUES FROM '34 TOTAL PAGES' AND '35 EACH IMAGE' MUST BE READ TO ENABLE THE CORRECT VALUES TO BE RESET USING FUNCTIONS 47 AND 48.

NOTE:

- *Do not perform this mode other than when replacing the MCTL PWB.*
- *After performing this mode, be sure to set the LP TUNE UP value to '- 3'.*

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NVRAM INITIAL". (a) → (b) 2) Select YES if NVRAM INITIAL should be executed. If not select NO. Press the **Reprint** button so that the RAM INITIAL will be executed. (All the data will be cleared.) (b) → (c) 3) Following modes should be executed to set the RAM data. 43: MARGIN ADJUST 44: LIFE PERIOD SET 45: NVRAM TUNE UP 47: TOTAL PAGE SET 48: EACH IMAGE SET 49: NEXT LIFE SET When setting NVRAM TUNE UP, set LP TUNE UP +4.	a) 39 FACTORY MODE ▷ NVRAM INITIAL b) 46 NVRAM INITIAL ▷ YES / NO c) 39 FACTORY MODE ▷ DP CHECK

47	TOTAL PAGE SET

This mode can reset the number of total pages in the NVRAM whenever NVRAM INITIAL has been executed or the MCTL PWB is replaced.

NOTE:

Do not perform this mode other than when replacing the MCTL PWB.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "TOTAL PAGE SET". (a) → (b) 2) Select one type of page from among TOTAL PAGE, LFU PAGE and DPL PAGE. 3) Use the **Back** or **Set** button to select the desired digit. (b) → (c) Use the **Reprint** button to input values to the selected (blinking) digit. Upon completing the input of the values, use the **Back** or **Set** button to select SET displayed on the LCD and then press the **Reprint** button to store the set value. (c) → (d)	a) 39 FACTORY MODE ▷ TOTAL PAGE SET b) 47 TOTAL PAGE ▶ TOTAL/LFU/DPL c) 47 TOTAL PAGE [ ][ ][ ][ ][ ][ ] P or c) 47 LFU PAGE [ ][ ][ ][ ][ ][ ] P or c) 47 DPL PAGE [ ][ ][ ][ ][ ][ ] P d) 39 FACTORY MODE ▷DP CHECK

48	EACH IMAGE SET

This mode can reset the number of total pages of each color in the NVRAM whenever NVRAM INITIAL is executed or the MCTL PWB is replaced.

NOTE:

Do not perform this mode other than when replacing the MCTL PWB.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "EACH IMAGE SET". (a) → (b) 2) Select the desired color to reset in EACH IMAGE SET. (b) → (c) 3) Use the **Back** or **Set** button to select the desired digit. Use the **Reprint** button to input values to the selected (blinking) digit. Upon completing the input of the values, use the **Back** or **Set** button to select SET on the LCD and then press the **Go** button to store the set value. (c) → (d) 4) Press the **-** button to exit the EACH IMAGE SET mode. (d) → (e)	a) 39 FACTORY MODE ▷ EACH IMAGE SET b) 48 IMAGE OF ▷ Y/M/C/K c) 48 IMAGE OF C 005432 P SET d) 48 IMAGE OF ▷ Y/M/C/K e) 39 FACTORY MODE ▷ DP CHECK

49	NEXT LIFE SET

This mode can set the replacement timing (number of prints) of periodic replacement parts.

NOTE:

Do not perform this mode other than when replacing the MCTL PWB.

Description of Procedures	LCD Message
1) Press the **Reprint** button after selecting Screen (a) "NEXT LIFE SET". (a) → (b) 2) After selecting the code to be set, press the **Reprint** button. (b) 2: Fuser cleaner 7: OPC belt cartridge 8: Fusing unit 9: Transfer drum 10: 240K kit 3) Designate or alter the figure with the **Back** or **Set** button. (b) → (c) Use the **Reprint** button to input values to the selected (blinking) digit. Upon completing the input of the values, use the **Back** or **Set** button to select SET on the LCD and then press the **Reprint** button to store the set value. (c) → (d) 4) Press the **-** button to exit the NEXT LIFE SET mode. (d) → (e)	a) 39 FACTORY MODE ▷ NEXT LIFE SET b) 49 NEXT LIFE SET NO.=<123456789> c) PERIOD FC ROLL 007800 P SET d) 49 NEXT LIFE SET NO.=<123456789> e) 39 FACTORY MODE ▷ DP CHECK

3.4 Adjustment Work Procedures

3.4.1 Adjustment of top and left margin

The top and left margins can be adjusted by button operation on the control panel.

<Purpose>

If there is no top margin or left margin set for the print guarantee area or when the MCTL PWB is replaced, the adjustment of top and left margin will be required.

<Adjustment Method>

(1) Execute "GRID PRINT" in Service Mode.

(2) Measure the position 'A' and 'B' of top margin.

[Leading edge] (A + B) / 2 ≤ Default Value 4.0 ± 1.5mm

(3) Measure the position 'C' and 'D' of left margin.

[Left edge] (C + D) / 2 ≤ Default Value 3.0 ± 1.5mm

(4) If the specification value is not met, implement the adjustment.

Execute "43 MARGIN ADJUST" in the FACTORY MODE.

(5) After adjustment execute "GRID PRINT" and confirm the margins.

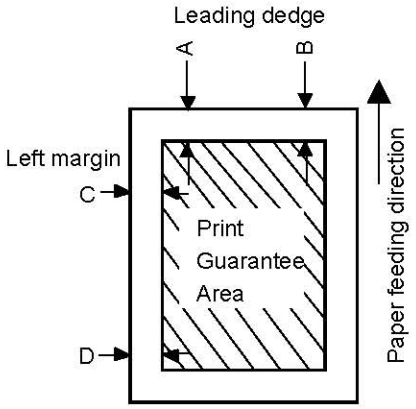


Fig. 5-2

3.4.2 Setting of engine NVRAM data

As data in the NVRAM has been preset to the optimum value at the factory, it is not necessary to change the preset values under normal conditions. However, fine adjustment may be required subject to the media or operational conditions.

<Purpose>

Print quality can be improved by changing the preset value in the engine NVRAM.

<Procedures of Setting>

(1) Follow the procedures set out in Section 3.3 'Service Mode' in this chapter.

(2) Select RAM TUNE UP mode.

(3) Select the desired TUNE UP mode.

(4) Adjust the preset value to the appropriate value (step).

(5) Carry out a test print to confirm the print quality.

<Subject TUNE UP Mode>

Mode	Subject of Adjustment	Purpose
LP TUNE UP	Adjustment of laser power	Optical density
THV TUNE UP	Adjustment of transfer voltage	Transfer efficiency
DBV TUNE UP	Adjustment of developer bias	Optical density
CBV TUNE UP	Adjustment of OPC belt bias	Optical density
FBV TUNE UP	Adjustment of cleaning roller bias	Drum cleaning efficiency
ADC TUNE UP	Adjustment of paper discharging output bias	Reduction of winding paper jam around the drum.

3.4.3 Confirmation and setting of total number of printouts

The total number of printouts is stored in the RAM. Confirmation and setting of total number of printouts can be carried out on the control panel.

<Purpose>

Total number of printouts will be reset when changing the MCTL PWB or executing an NVRAM INITIAL.

<Procedures of Setting>

(1) Execute 47 TOTAL PAGE SET in Factory Mode.

(2) Reset the total number of printouts.

(3) After making the setting, execute 34 TOTAL PAGE to confirm that the desired number of printouts in now set.

3.4.4 Setting of number of images for each color

The number of printouts for each color (4 colors) is stored in the RAM. Confirmation and setting of the number of images for each color can be carried out on the control panel.

<Purpose>

Number of images for each color will be reset when changing the MCTL PWB or executing NVRAM INITIAL.

<Procedures of Setting>

(1) Execute 48 EACH IMAGE SET in Factory Mode.

(2) Reset the number of printouts for each color.

(3) After making the setting, execute 35 EACH IMAGE to confirm that the desired number of images is now set.

3.4.5 Initial setting of engine NVRAM

Implement the initial setting at the replacement of MCTL PWB after clearing the contents of NVRAM.

<Purpose>

The number of images for each color will be reset when changing the MCTL PWB or executing NVRAM INITIAL.

<Procedures of Setting>

(1) Before replacing the MCTL PWB, confirm the contents of the NVRAM for the following items.

"Factory Mode"

Code	Subject	Confirmation Value
43	MARGIN ADJUST	Top margin set value
43	MARGIN ADJUST	Left margin set value
45	LP TUNE UP	Adjustment value ("+4" in ordinary case)
45	THV TUNE UP	Adjustment value (PPC/OHP "0", LABEL "-2")
45	DBV TUNE UP	Adjustment value ("0" in ordinary case)
45	CBV TUNE UP	Adjustment value ("0" in ordinary case) *1
45	FBV TUNE UP	Adjustment value ("+1" in ordinary case) *2
45	ADC TUNE UP	Adjustment value ("0" in ordinary case)
47	TOTAL PAGE SET	Total print count
47	LFU PAGE SET	Print count from LFU
47	DPL PAGE SET	Print count from Duplex
48	EACH IMAGE SET	Formed image count for 4 individual colors
49	NEXT LIFE SET	Print count for maintenance replacement parts

(2) Execute 46 NVRAM INITIAL in Factory Mode.

(3) After implementing the NVRAM INITIAL, input the values obtained in procedure 1) into the NVRAM to complete the settings.

*1 '0' is applied for machines produced after June 2000. You need to set the CBV TUNE UP value to '0' for machines which were produced before June 2000, to which '+1' has been applied. For setting procedures, see 45-4. CBV TUNE UP in this section.

*2 '+1' is applied for machines produced after June 2000. You need to set the FBV TUNE UP value to '+1' for machines which were produced before June, 2000, to which '0' has been applied. For setting procedures, see 45-5. FBV TUNE UP in this section.

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CHAPTER 6 PERIODIC MAINTENANCE

1. GENERAL

1.1 Handling Precautions

Since this high quality laser printer is a precision equipment, daily checking and periodic maintenance is indispensable to maintain the expected high performance.

The following is the list of important precautions & action items for maintenance and periodic replacement parts:

1) Refrain from any operation, disassembly or modification that is not set out in this manual.
2) When assembling or disassembling the printer, turn off the power supply and unplug the power cable from the power outlet before commencing any work.
3) Whenever any parts are replaced, confirm that all the removed and replaced parts are re-installed correctly prior to testing the printer.
4) Read carefully and take note of any precaution or warning labels affixed to any parts.
5) Unless otherwise specified, follow exactly the reverse order of the disassembly procedures for re-assembly. Do not get the types of removed screws mixed up and check that the screw is the correct length.
6) Do no use any solvent for cleaning, both inside and outside the printer.
7) It is strictly forbidden to dump waste toner with flammable substances or throw it into a fire. This is a very important caution to respect.

1.2 List of Maintenance Tools

Table 6-1 below lists the maintenance tools required for the printer.

Table 6-1

No.	Tool Name	Function
1	Phillips Screwdriver #1	For M3
2	Phillips Screwdriver #2	For M4
3	Phillips Screwdriver (short shank) #2	For M4
4	Slotted Screwdriver #1	For slotted head screw
5	Slotted Screwdriver #2	For slotted head screw
6	Long-Nose Pliers	For general use
7	Pincette	For general use
8	Precision Driver Set (#1 ~ #6)	For general use
9	Gap Gauge	For general use
10	Pliers for C Ring	C Ring
11	Ruler (150mm)	For general use
12	Slide Caliper	For general use
13	Digital Meter	For general use
14	Handy Type Cleaner unique for toner	For cleaning
15	Soft Fur Brush	For cleaning

1.3 List of Consumables for Maintenance

Table 6-2 below lists the consumables for maintenance.

Table 6-2

No.	Tool Name	Quantity	Function
1	Toner Cartridge (Y)	1 piece	Test Print
2	Toner Cartridge (M)	1 piece	Test Print
3	Toner Cartridge (C)	1 piece	Test Print
4	Toner Cartridge (K)	1 piece	Test Print
5	Fuser Cleaner / Oil Bottle	1 piece	Test Print
6	OPC Belt Cartridge	1 piece	Test Print
7	Recommended Paper (A4 or letter)	5 sheets	Test Print
8	Recommended Paper (Transparency)	2 sheets	Test Print
9	Cotton Cloth	10~15 pcs	Cleaning
10	Cotton Swab	10~15 pcs	Cleaning
11	Grease	10 grams	M.G** PS265
12	Vinyl Bag	2 bags	Disposal

** M.G stands for Molybdenum Grease.

2. PERIODIC MAINTENANCE CLEANING

See Table 6-3 for details of periodic maintenance cleaning for the following parts.

(1) Register Roller
(2) Paper Guide
(3) Paper Exit Roller
(4) Transfer Roller
(5) Paper Discharger
(6) OPC Belt Cartridge
(7) Transfer Drum
(8) Dustproof Glass of the Laser Unit
(9) Printer Interior
(10) Oil Pad

WARNING

- *Before starting any maintenance work, make sure you have unplugged the power cable from the power outlet*
- *There is a risk of electric shock working on the printer with the power connected.*

Periodic Maintenance Cleaning Work

Table 6-3

No.	Parts Name	Cleaning Work		Cleaning Cycle *1 (Condition or Case)
		Description	Section	
1	Register Roller	1. Open the transfer unit. 2. Clean roller and surrounding area using a dry cloth.	2.1	• Defective image • Smeared paper • 20K prints
2	Paper Guide	1. Remove the media cassette from the printer. 2. Clean the paper guide using a dry cloth.	2.2	20K prints
3	Paper Exit Roller	1. Open the top cover. 2. Clean the paper exit roller using a dry cloth.	2.3	20K prints
4	Transfer Roller	1. Open the transfer unit. 2. Clean roller and surrounding area using a dry cloth.	2.4	• Defective image • Smeared paper • Periodic maintenance
5	Paper Discharging Roller	1. Open the transfer unit. 2. Remove the paper discharger. 3. Clean the corona wire and case, using a cotton swab.	2.5	• Defective image • Paper jam • Periodic maintenance
6	OPC Belt Cartridge	1. Remove the OPC belt cartridge. 2. Clean up spilt toner around the OPC belt cartridge and cleaning blade. 3. Clean the corona wire with a cotton swab.	2.6	• Defective image • Periodic maintenance

Periodic Maintenance Cleaning Work

Table 6-3

No.	Parts Name	Cleaning Work		Cleaning Cycle *1 (Condition or Case)
		Description	Section	
7	Transfer Drum	1. Remove the transfer drum. 2. Clean the dirt from the transfer drum surface using a cloth.	2.7	• Defective image • Periodic maintenance
8	Dustproof Glass of Laser Unit	1. Remove the toner cartridges and the OPC belt cartridge. 2. Remove the dust-proof glass. 3. Using a dry cloth and swab, clean the dirt from the dust-proof glass.	2.8	• Defective image • Periodic maintenance
9	Printer Interior	1. Remove the toner cartridges and OPC belt cartridge. 2. Clean the printer's base, using a toner vacuum cleaner and dry cloth.	2.9	• Defective image • Periodic maintenance
10	Oil Pad	1. Remove the oil pan unit 3. 2. Using a slotted screwdriver, clean the white felt surface of the oil pad and the oil blade of the oil pan unit 3.	2.10	• Periodic maintenance
[Note] *1: If a periodic maintenance agreement has been made, checks will be made at every periodic maintenance service to prevent any problems from occurring.				

CAUTION

The register roller, paper guide, and paper exit roller should be cleaned every 20K prints. Failure to do so may cause paper jams inside or outside of the printer.

2.1 Cleaning the Register Roller

The register roller should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply, and unplug the power cable.

(2) Open the rear access cover (transfer unit).

(3) Using a cotton cloth, clean the register roller incorporated in the transfer unit to remove the paper dust.

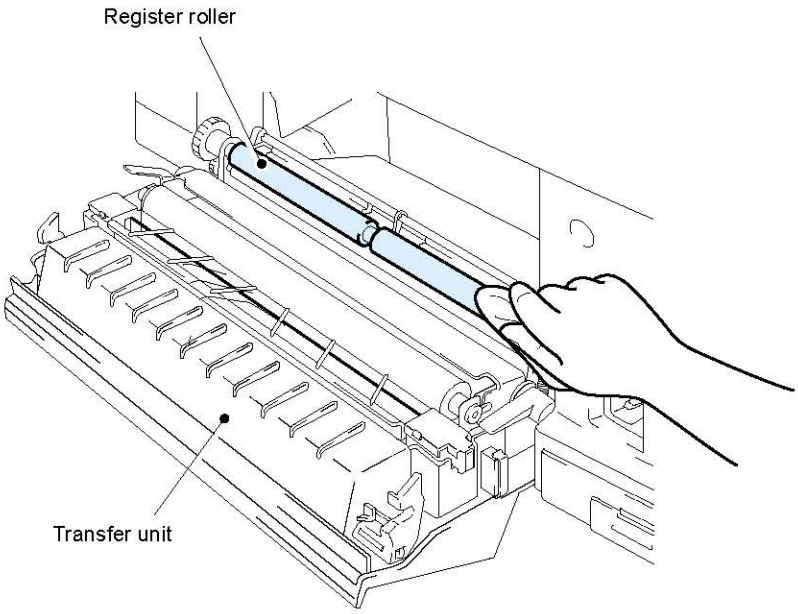


Fig. 6-1

CAUTION

NEVER use alcohol or similar solvents for cleaning the register roller.

2.2 Cleaning the Paper Guide

The paper guide should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Remove the media cassette from the printer.

(2) Remove paper in the media cassette.

(3) Using a dry cotton cloth, clean the paper guide to remove paper dust.

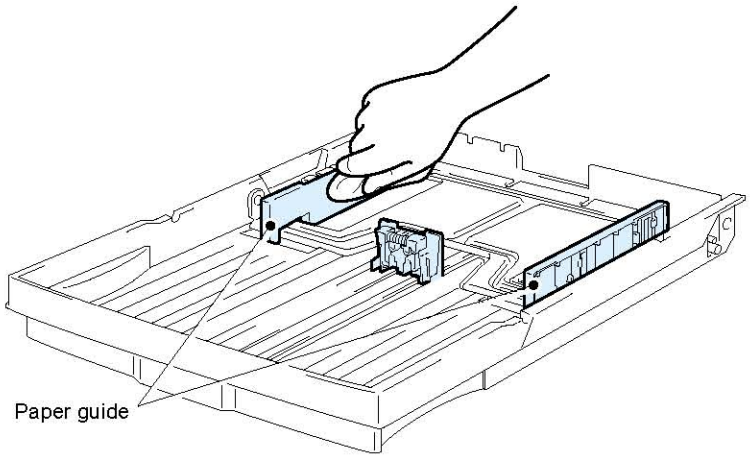


Fig. 6-2

2.3 Cleaning the Paper Exit Roller

The paper exit roller should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply, and unplug the power cable.

(2) Open the top cover (paper exit unit).

(3) Using a dry cotton cloth, clean the paper exit roller to remove paper dust.

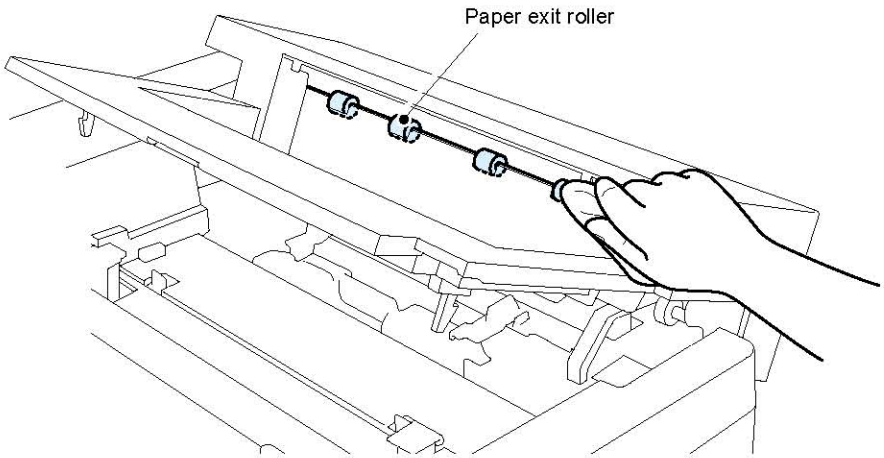


Fig. 6-3

2.4 Cleaning the Transfer Roller

The transfer roller should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply, and unplug the power cable.

(2) Open the rear access cover (transfer unit).

(3) Using a cotton cloth, clean the transfer roller.

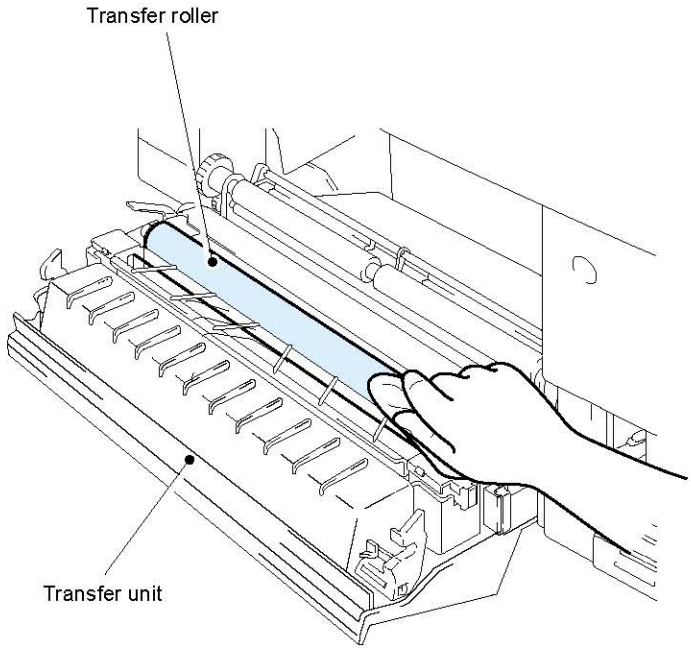


Fig. 6-4

CAUTION

NEVER use alcohol or similar solvents for cleaning the transfer roller.

2.5 Cleaning the Paper Discharger

The paper discharger should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

- Cotton cloth (2 ~ 3 pieces)
- Cotton swab (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply, and unplug the power cable.

(2) Open the transfer unit.

(3) Remove the paper discharger. (Fig.6-5)

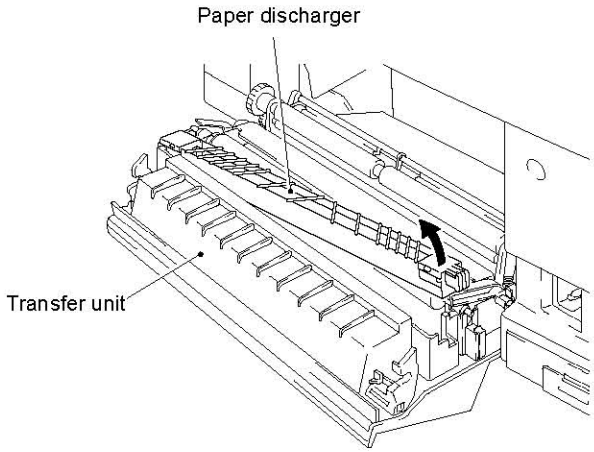


Fig. 6-5

(4) Clean the discharger case housing with a cotton cloth.

(5) Clean the corona wire and the inside of the charger case with a cotton swab. (Fig.6-6)

(6) Re-install the charger unit into the transfer unit.

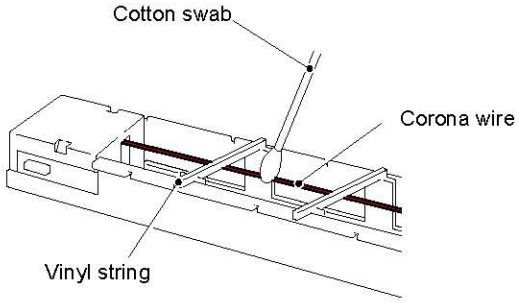


Fig. 6-6

CAUTION

- *Do not break the vinyl cord on top of the discharger unit case when cleaning the discharger unit.*
- *Do not break the corona wire.*

2.6 Cleaning the OPC Belt Cartridge

The OPC belt cartridge should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

⚠ PRECAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*



- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*



Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply.

(2) Open the top cover and the front cover.

(3) Release the belt cartridge lock levers to pull out the OPC belt cartridge.

(4) Clean the OPC belt cartridge.

i) Clean the corona wire with the wire cleaner. Slide it backwards and forwards across the corona wire several times and then return it to the home position. Failure to return the cleaner correctly will result in vertical stripes down the printed page.

ii) Clean the OPC belt cartridge case with a cotton cloth.

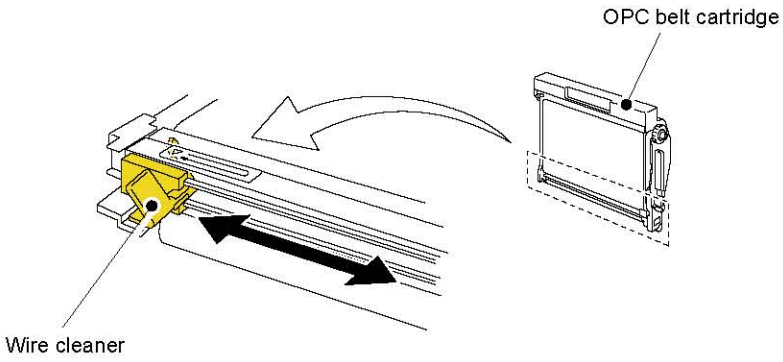


Fig. 6-7

⚠ CAUTION

Do not damage the corona wire when cleaning the corona wire.

2.7 Cleaning the Transfer Drum

The transfer drum should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply.

(2) Open the rear access cover.

(3) Clean the surface of the transfer drum with a dry or damp cotton cloth.

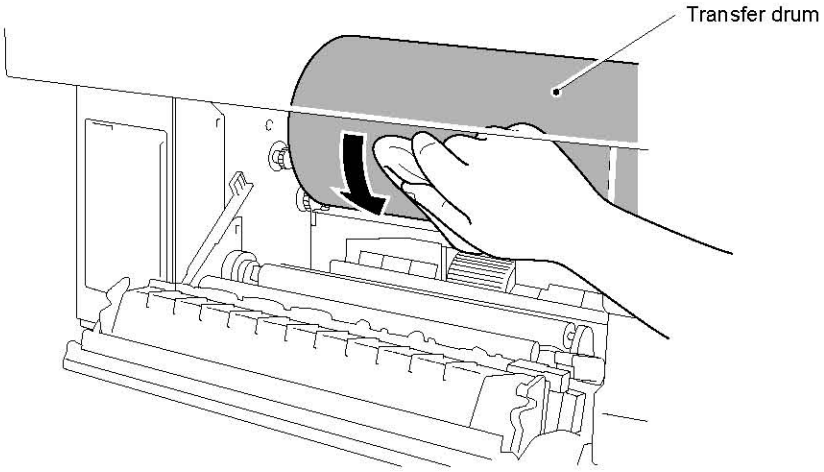


Fig. 6-8

CAUTION

- *Be sure to dry the transfer drum completely after cleaning it with a damp cotton cloth.*
- *Do not clean the transfer drum by using solvent.*
- *Do not touch the transfer drum surface with bare hands, or scratch it.*

2.8 Cleaning the Dustproof Glass in the Laser Unit

The dustproof glass in the laser unit should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

- Cotton cloth (2 ~ 3 pieces)
- Cotton swab (2 ~ 3 pieces)

Cleaning Procedure

(1) Turn off the power supply.

(2) Open the top cover and the front cover.

(3) Remove the toner cartridges and the OPC belt cartridge.

(4) Open the dust-proof glass from the laser unit.

(5) Clean the surface of the dustproof glass with a cotton swab.

> ⚠ ***CAUTION***
>
> *NEVER use alcohol or similar solvents for cleaning the dustproof glass, otherwise it will be a cause of image failures.*

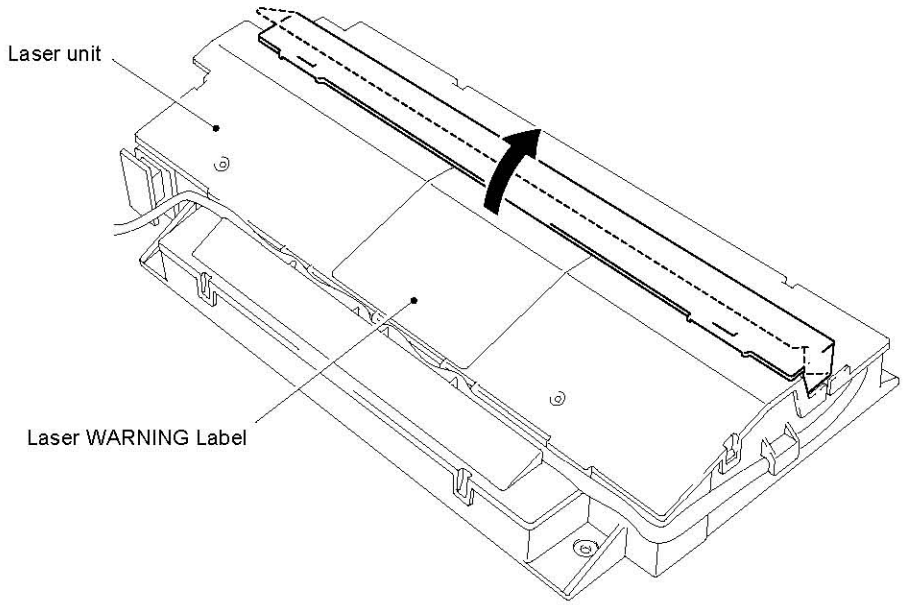


Fig. 6-9

2.9 Cleaning the Printer Interior

The printer interior (bottom) should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

Tools to Prepare

- Toner vacuum cleaner
- Cotton cloth (2 ~ 3 pieces)

Cleaning Procedure

(1) Open the top cover and the front cover.

(2) Remove the toner cartridges and the OPC belt cartridge.

(3) Vacuum up toner scattered on the bottom of printer interior with a vacuum cleaner designed to handle toner particles.

(4) Clean the printer interior with a cotton cloth and swab.

(5) Replace the removed items.

CAUTION

- *Ensure you do not to contact the nozzle of the vacuum cleaner with the terminals in the printer. Failure to do so will cause damage to the electrical parts in the printer.*
- *Before cleaning the inside of the printer, protect the transfer drum with paper so that the nozzle of the cleaner will not directly contact the transfer drum.*

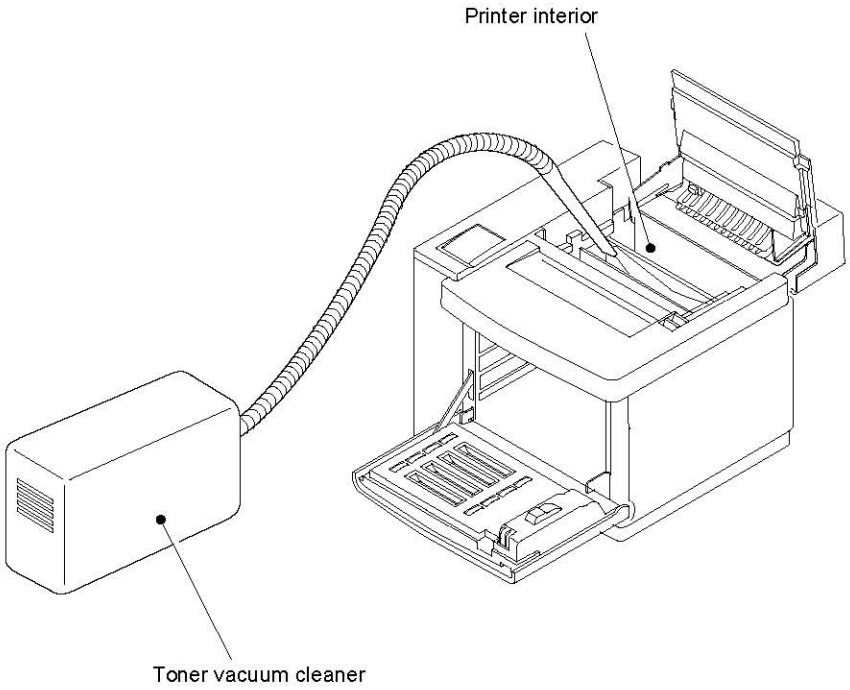


Fig. 6-10

2.10 Cleaning the Oil Pad

The oil pad should be cleaned according to the periodic maintenance cleaning cycle set out in Table 6-3.

When time is due for replacement of the oil pad, the following message appears on the control panel.*

```
REPLACE OIL PAD
              ■■■■
```

* The message can be turned OFF to prevent it from appearing on the control panel. Refer to 32 NEXT CARE INFORMATION, Section 3.3 of Chapter 5.

Tools to Prepare

- Slotted screwdriver

Cleaning Procedure

(1) Turn off the power supply, and unplug the power cable.

(2) Open the top cover.

(3) Remove the fusing unit from the printer and then remove the oil bottle and the fuser cleaner form the fusing unit.

(4) Remove the oil pan unit from the fusing unit.

(5) Scour off toner scattered on the white felt surface of the oil pad and on the surface of the oil blade using the head edge of a slotted screwdriver.

CAUTION

- *Do not scrub the felt too hard, otherwise it may cause damage to it.*

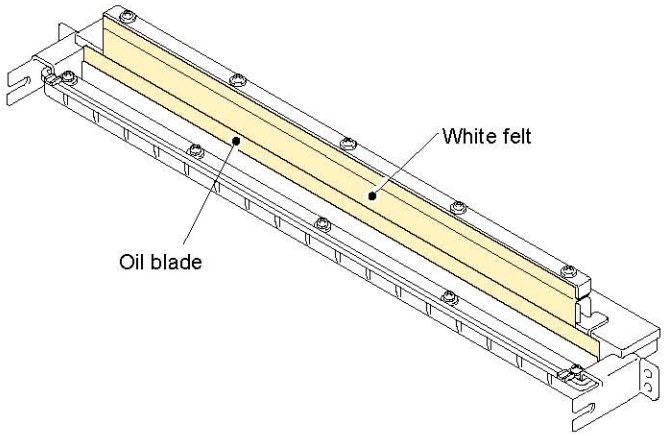


Fig. 6-11

3. PERIODIC MAINTENANCE PARTS

Maintenance Work should be implemented according to the "Periodic Maintenance Parts and Maintenance Cycle" set out in Table 6-4.

Table 6-4: Periodic Maintenance Parts and Maintenance Cycle

No.	Maintenance Parts		Description		Replacement Cycle *1 (Condition or Case)
	Parts Name	No.	Function	Section	
1	OPC Belt Cartridge	Accessory	Consists of the OPC belt and forms an electrostatic latent image.	4.1	120K images or 12 months whichever comes first.
2	Fusing Unit *2	LJ2322001 (US) LJ2323001 (EC)	Fixes the toner image onto the transported paper.	4.2	70K prints
3	Transfer Roller *3	LJ2211001	Transfers the toner image from the transfer drum onto the transported paper.	4.3	240K prints
4	Paper Discharger *4	LJ2212001	Separates paper from the transfer drum.	4.4	120K prints
5	Drum Cleaner *3	LJ2214001	Cleans residual toner from the transfer drum.	4.5	240K prints
6	Ozone Filter E	LM0310001	Absorbs ozone.	4.6	Every 12 months
7	Paper Feeding Roller Separator Pad *5	UH3485001 LJ2317001	Picks up sheets of paper one by one from the media cassette.	4.7	120K prints
8	Transfer Drum	LJ2215001	Forms the toner image and transfers it onto paper.	4.8	600K images
9	Oil Pad	LJ2329001	Cleans paper dust from the heat roller.	4.9	35K prints

*1:	These figures are based on an average of 5% coverage of the printable area for one color using A4/Letter-size laser paper. The frequency of replacement will vary, depending on the complexity of the prints, the percentage of coverage, the size of paper, pages/job, and the type of media. Transparencies, glossy coated paper, and other specialty media will result in shortened consumable life.
*2:	You can order it as a 70K Kit. (LJ2322001 (US) / LJ2323001 (EC))
*3:	You can order these item as a 240K Kit (including the transfer roller and drum cleaner) (LJ2319001)
*4:	You can order it as a 120K Kit. (LJ2320001)
*5:	You can order them as a PF Kit (including the paper feeding roller and separator pad). (LJ2321001)

** After completing maintenance work, clear the message displayed on the control panel. (Refer to the list below.)

LCD Maintenance Message	Consumables
(Toner nearly empty) □ ■ ■ ■ K C M Y	Toner cartridge Black
(Toner nearly empty) ■ □ □ □ K C M Y	Toner cartridge Cyan, Magenta, or Yellow
FUSER OIL LOW	Oil bottle
REPLACE FCR	Fuser cleaner
REPLACE OPC BELT	OPC belt cartridge
REPLACE FUSER	Fusing unit
REPLACE 120K KIT	Paper discharger
REPLACE 240K KIT	Transfer roller / Drum cleaner
REPLACE PF KIT	Paper feeding roller / Separator pad
REPLACE OIL PAD	Oil pad

LCD Operator Call Message	Consumables
TONER EMPTY K	Toner cartridge Black
TONER EMPTY CMY	Toner cartridge Cyan, Magenta, or Yellow
WASTE TONER	Waste Toner Pack
OIL EMPTY	Oil Bottle
CHANGE FCR	Fuser Cleaner

4. PERIODIC MAINTENANCE PROCEDURES

The printer displays messages on the control panel screen to indicate replacement is due for most of the periodic maintenance parts in both the Video Controller Mode and the Engine Controller Mode.

However, the procedure to clear the message differs between the two modes. The following sections describe the Video Controller Mode messages only and should be used when replacing parts that have reached their life.

If replacement parts have to be replaced for Service reasons before their life cycle is completed then the Engine Controller Mode should be used to reset the part life.

4.1 OPC Belt Cartridge Replacement

Criterion of Replacement

The OPC belt cartridge should be replaced with a new one at 120,000 images or 12 months whichever comes first.

When time is due for replacement of the OPC belt cartridge, the following message appears on the control panel.

```
REPLACE OPC BELT
              ■■■■
```

PRECAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*



- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*



Replacement Procedure

(1) Press the power button to turn off the printer.

(2) Open the front cover and the top cover.

CAUTION

When installing or removing the OPC belt, be sure to open the front cover first. Failure to do so will cause the OPC belt to be damaged due to contact with the toner cartridges.

(3) Release the belt cartridge lock levers at both sides (left & right). (Fig.6-11)

(4) Pull out the OPC belt cartridge.

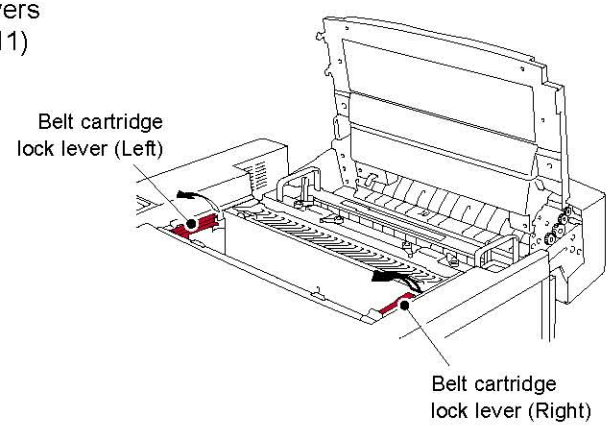


Fig. 6-12

(5) Prepare a new belt cartridge.

(6) Remove the protective sheet from a new OPC belt cartridge, and then pull and remove the tension release pins from both sides (left & right). (Fig.6-12)

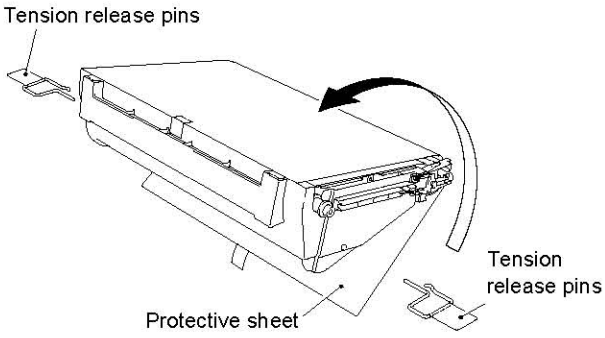


Fig. 6-13

(7) Install the new OPC belt cartridge into the guides at both sides in the printer. (Fig.6-13)

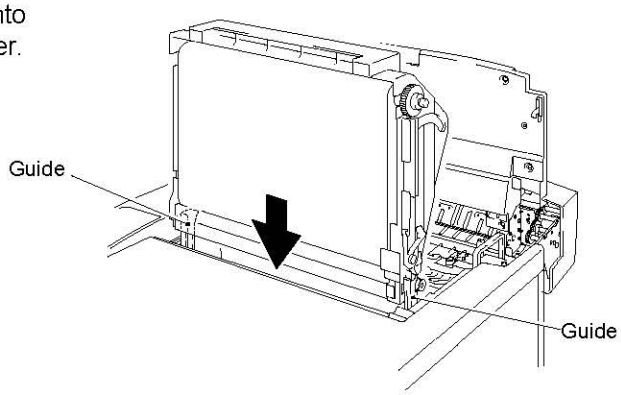


Fig. 6-14

(8) Set the belt cartridge lock levers at both sides (left and right).

(9) Close the top cover and the front cover.

(10) Press the power button to turn on the printer.

(11) The printer starts the warming-up process.

(12) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.

(13) Press + or – until "RESET MENU" appears.

(14) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.

(15) Press Set, and then press + until "OPC BELT" appears.

(16) Press Set, and then press Go. The printer is now in the READY state.

4.2 Fusing Unit Replacement

Criterion of Replacement

The fusing unit should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4.

When the time is due for replacement of the fusing unit, the following message appears on the control panel.

```
REPLACE FUSER
              ■■■■
```

Purpose of Replacement

To prevent the print quality from declining due to the deterioration of the fixing unit's fuser rollers.

WARNING

The fusing unit and its surrounding area are very hot. Make sure prior to starting the replacement work that the fusing unit and its surrounding area are well cooled down, otherwise you may get burned.

Necessary Tools and Replacement Materials

- Two or three pieces of cotton cloth for cleaning
- Fusing unit (one unit)

Work Procedure

Sequence of Disassembling

(1) After turning off the printer, unplug the power cable from the power outlet.

(2) Open the top cover.

(3) Remove the two screws securing the fusing unit. (Fig.6-14)

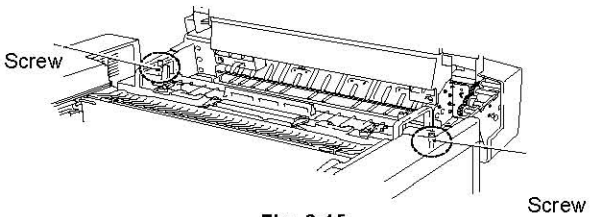


Fig. 6-15

(4) Holding the handles at both ends of the fusing unit and remove the fusing unit from the printer. (Fig.6-15)

(5) Remove the oil bottle and the fuser cleaner.

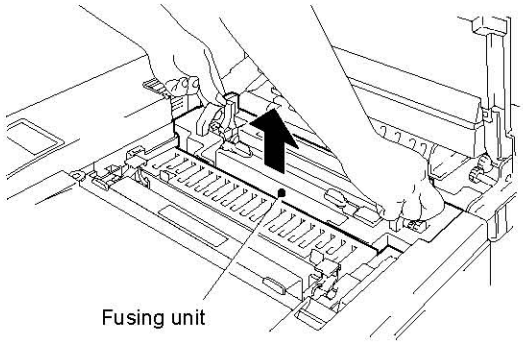


Fig. 6-16

CAUTION

- *When removing the fusing unit, take care to keep the unit level so that no oil leakage or spillage occurs.*
- *When shipping the printer, remove the oil bottle and the fuser cleaner from the fusing unit. After removing the oil bottle, be sure to remove the oil remaining in the fusing unit with the supplied syringe. Failure to do so will cause severe damage to the printer.*

Sequence of Replacement

(1) Prepare a new fusing unit before starting the replacement work.

(2) Set the fusing unit pressure release levers to the SET position. (Fig.6-16)

(3) Install the oil bottle and fuser cleaner to the new fusing unit.

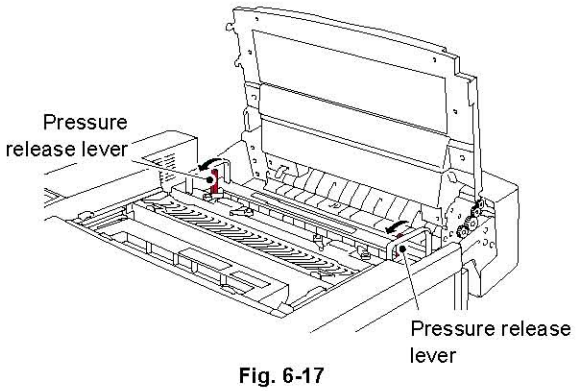


Fig. 6-17

Sequence of Assembling

(1) Install the new fusing unit onto the printer. (Fig. 6-17)

i) After setting the fusing unit in place, lightly press down the unit to firmly connect to the connector on the base.

ii) Tighten the two screws to secure the fusing unit.

iii) Close the top cover.

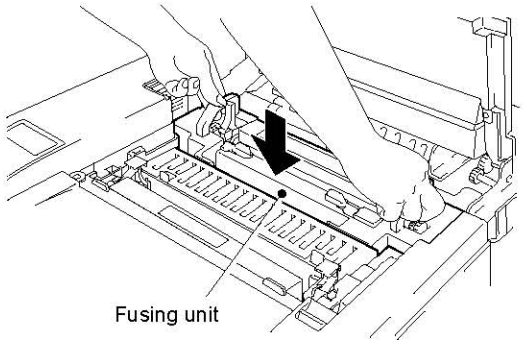


Fig. 6-18

PRECAUTION

When replacing the fusing unit, take time and great care to complete the job properly. Application of strong force to the fusing unit may result in the failure of the fusing unit and other parts.

(2) Plug the power cable into the power outlet and turn on the printer.

(3) Upon completion of the warming-up process.

(4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.

(5) Press + or – until "RESET MENU" appears.

(6) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.

(7) Press Set, and then press + until "FUSER UNIT" appears.

(8) Press Set, and then press Go. The printer is now in the READY state

NOTE:

When installing the new fusing unit into the printer, you have to wait approximately for 30 minutes after the unit is installed to allow the fusing oil to circulate in the unit.

4.3 Transfer Roller Replacement

Criterion of Replacement

The transfer roller should be replaced at the same time as a new discharger according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the transfer roller, the following message appears on the control panel.

```
REPLACE 240K KIT
          ■■■■
```

Purpose of Replacement

To prevent the transfer efficiency declining due to deterioration of the transfer roller.

Necessary Tools and Replacement Materials

1) Two or three pieces of cotton cloth for cleaning.
2) Transfer roller (one unit)

Work Procedures

Sequence of Disassembling

(1) After turning off the printer, unplug the power cable from the power outlet.
(2) Open the rear access cover. (Fig.6-18)

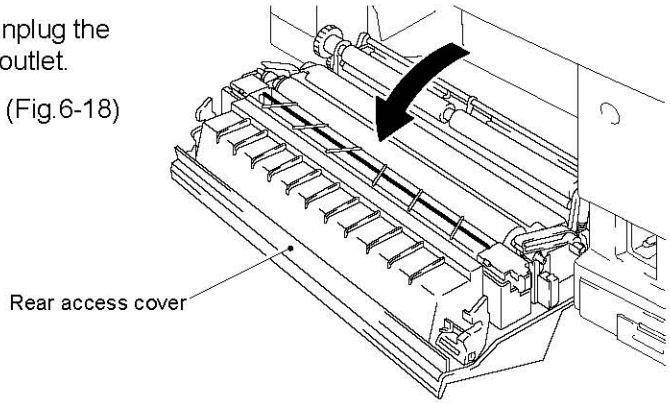


Fig. 6-19

Sequence of Replacement

(1) Lift the transfer roller lock levers to release both ends of the roller. (Fig.6-19)

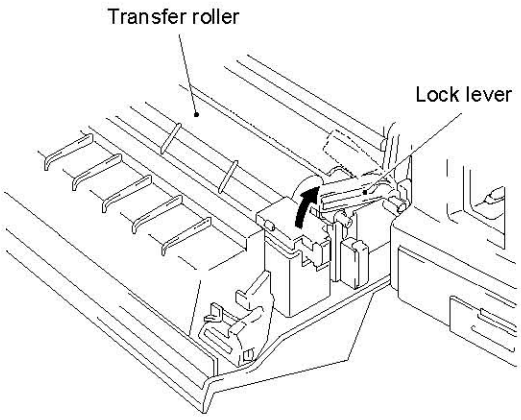


Fig. 6-20

(2) Pull up the transfer roller to remove it. (Fig.6-20)

(3) Install a new transfer roller into the printer.

(4) Fix the transfer roller with the lock levers.

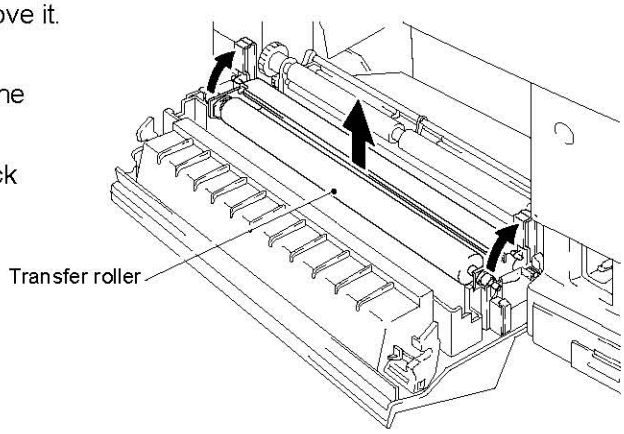


Fig. 6-21

Sequence of Assembling

(1) Close the rear access cover.

(2) Plug the power cable into the power outlet and turn on the printer.

(3) Upon completion of the warming-up process.

(4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.

(5) Press + or – until "RESET MENU" appears.

(6) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.

(7) Press Set, and then press + until "240K KIT" appears.

(8) Press Set, and then press Go. The printer is now in the READY state.

4.4 Paper Discharger Replacement

Criterion of Replacement

The paper discharger should be replaced with a new discharger at the same time as the transfer roller according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of paper discharger, the following message appears on the control panel.

```
REPLACE 120K KIT
                ■■■■
```

Purpose of Replacement

To prevent the discharging efficiency from declining due to deterioration of the paper discharger.

> ***PRECAUTION***
>
> *Do not touch the corona wire of the paper discharger.*

Necessary Tools and Replacement Materials

1) Two or three pieces of cotton cloth for cleaning
2) Paper discharger (one unit)

Work Procedures

Sequence of Disassembling

(1) After turning off the printer, unplug the power cable from the power outlet.

(2) Open the rear access cover. (Fig.6-21)

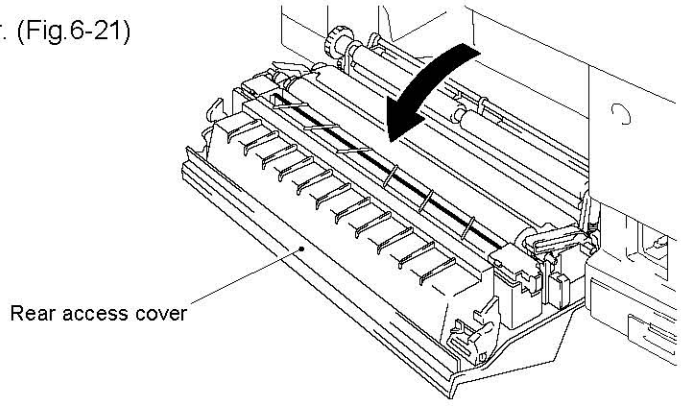


Fig. 6-22

Sequence of Replacement

(1) Pull the right hand side of the paper discharger slightly, then lift it out of the transfer unit to remove the paper discharger. (Fig.6-22)

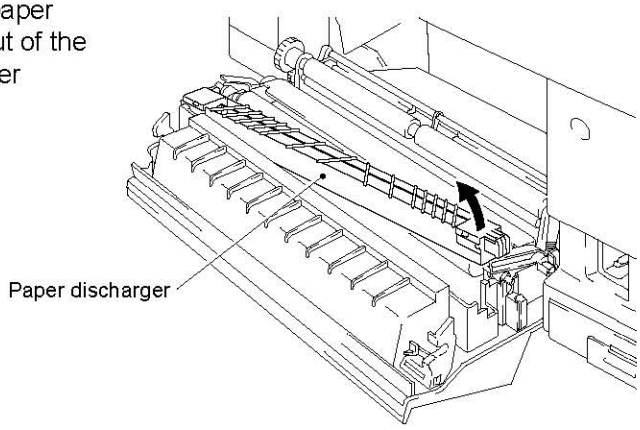


Fig. 6-23

(2) Clean the area where the paper discharger is mounted. (Fig.6-23)

(3) Install the new paper discharger into the transfer unit.

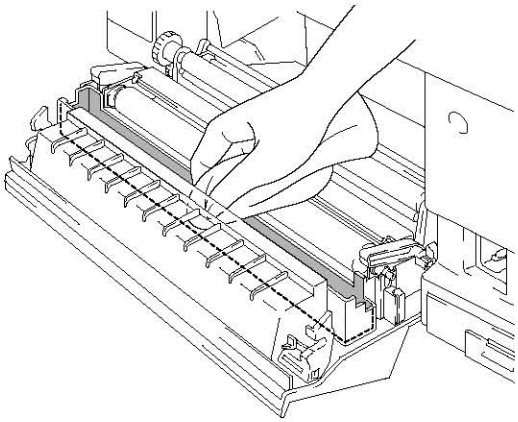


Fig. 6-24

Sequence of Assembling

(1) Close the rear access cover.

(2) Plug the power cable into the printer, and turn on the printer.

(3) Upon completion of the warming-up process.

(4) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.

(5) Press + or – until "RESET MENU" appears.

(6) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.

(7) Press Set, and then press + until "120K KIT" appears.

(8) Press Set, and then press Go. The printer is now in the READY state.

4.5 Drum Cleaner Replacement

Criterion of Replacement

The drum cleaner should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the drum cleaner, the following message appears on the control panel.

```
REPLACE 240K KIT
                ■■■■
```

Purpose of Replacement

To prevent the cleaning efficiency from declining due to deterioration of the drum cleaner.

> ⚠ ***PRECAUTION***
>
> *When installing the drum cleaner, firstly locate the bearing and the bias pole into the contacts. Reconfirm this connection prior to testing the printer.*

Necessary Tools and Replacement Materials

- Two or three pieces of cotton cloth for cleaning.
- Drum cleaner (one unit)

Work Procedure

Sequence of Disassembling

(1) Turn off the printer.

(2) Open the top cover.

Sequence of Replacement

(1) Remove the cleaner cover by releasing the two hooks.(Fig.6-24)

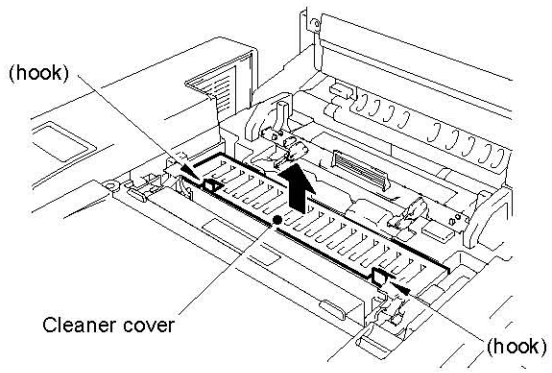


Fig. 6-25

(2) Holding the handle located on the top of the drum cleaner, push it backwards.

(3) Remove the drum cleaner by lifting it out. (Fig.6-25)

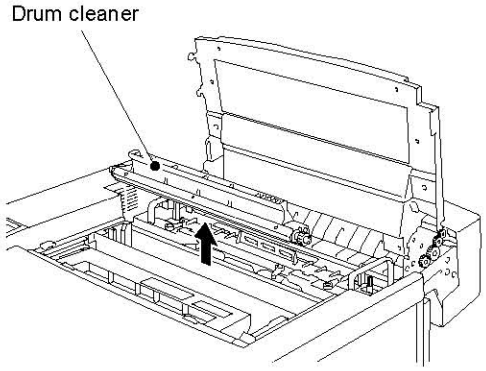


Fig. 6-26

(4) Clean the area where the drum cleaner is mounted. (Fig.6-26)

(5) Install a new drum cleaner into the printer.

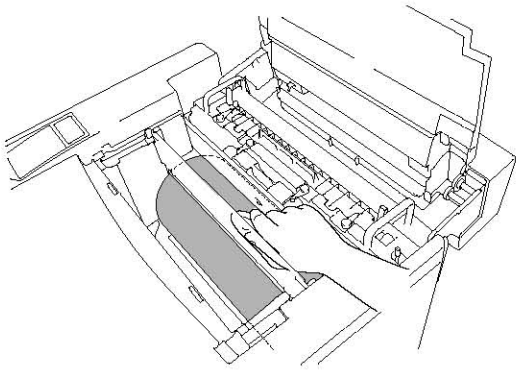


Fig. 6-27

CAUTION

When installing the drum cleaner, be sure to put it into the printer correctly, indicated by a click.

Sequence of Assembling

(1) Install the cleaner cover.

(2) Close the top cover.

(3) Press the power button to turn on the printer.

(4) Upon completion of the warming-up process.

(5) Press any of the Menu buttons (+, -, Set or Back) to take the printer Off Line.

(6) Press + or – until "RESET MENU" appears.

(7) Press Set to proceed to the next menu level, and then press + or – until "PARTS LIFE" appears.

(8) Press Set, and then press + until "240K KIT" appears.

(9) Press Set, and then press Go. The printer is now in the READY state.

4.6 Ozone Filter Replacement

Criterion of Replacement

Although the maintenance message indicating ozone filter replacement is not displayed on the LCD, the ozone filter should be replaced with a new one according to the periodical maintenance cycle set out in Table 6-4. This is to prevent ozone from being exhausted due to the deterioration of the ozone filter.

> ⚠ ***PRECAUTION***
>
> *Ozone filter should be replaced with a new filter every 12 months, otherwise it may cause an offensive smell.*

Necessary Tools and Replacement Materials

No special tools and equipment are necessary for the replacement of the ozone filter.

Work Procedure

(1) Remove the ozone filter case provided at the rear of the side cover (R).

(2) Remove the ozone filter from the ozone filter case.

(3) Install a new ozone filter to the filter case.

(4) Install the ozone filter case to the side cover (R).

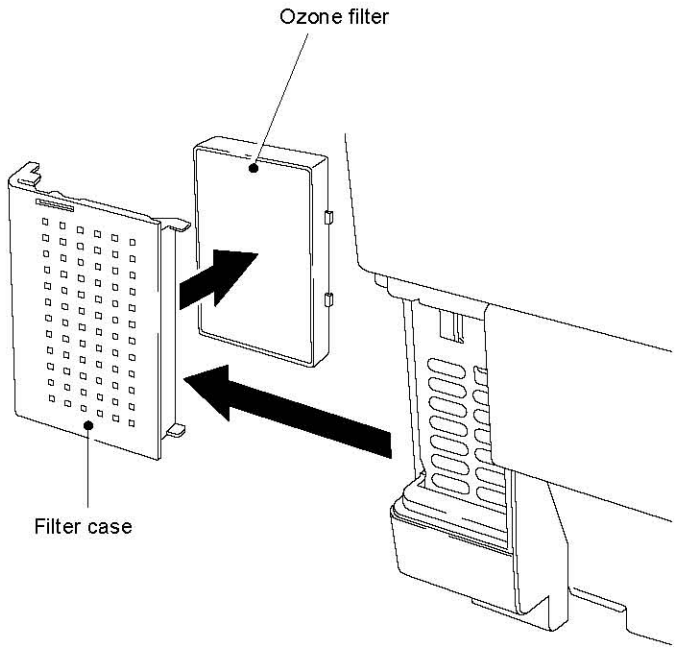


Fig. 6-28

4.7 Paper Feeding Roller and Separator Pad Replacement

Criterion of Replacement

The paper feeding roller and separator pad should be replaced with new ones according to the periodical maintenance cycle set out in Table 6-4.

When time is due for replacement of the paper feeding roller and separator pad, the following message appears on the control panel.

```
REPLACE PF KIT1
              ■■■■
```

NOTE:

The message above indicates that the paper feeding roller and separator pad in the original media cassette should be replaced. When the ones in the optional lower tray 1 or 2 are replaced, the message such as 'REPLACE PF KIT2' or 'REPLACE PF KIT3' are displayed.

They also should be replaced when paper feed jams occur.

Work Procedure

(1) Whenever paper feed jams occur, confirm the cause by following the information in Section 3 of Chapter 8.

(2) If the paper jam still occurs, replace the paper feeding roller and separator pad referring to Section 4.6.5 of Chapter 7.

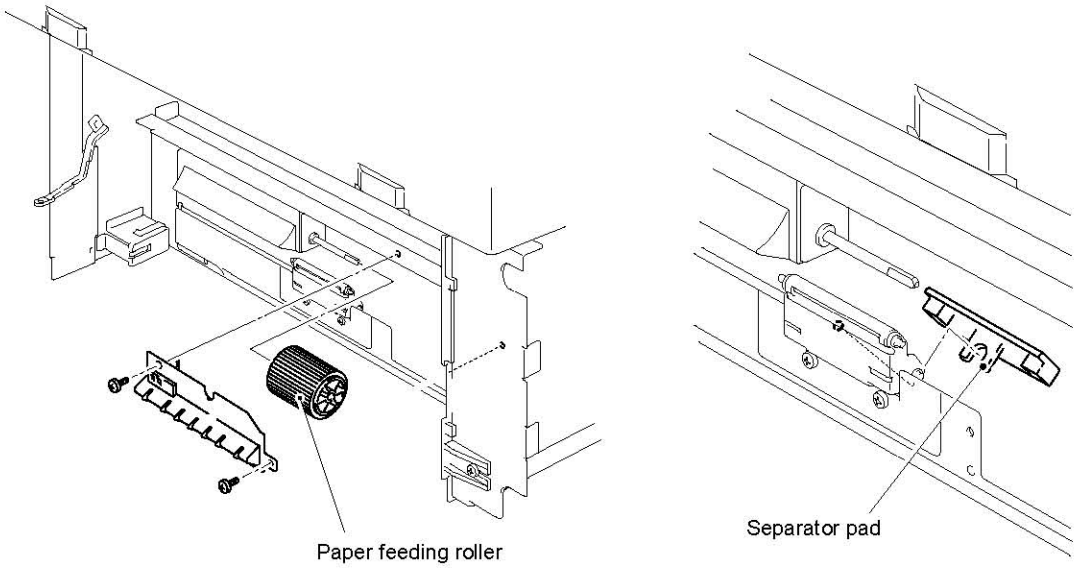


Fig. 6-29

CAUTION

- *This is one of the periodic replacement items, not customer service. It should be implemented upon request of the customer or at periodic maintenance.*
- *After replacement, confirm the improvement of paper jam problems by test printing.*

4.8 Transfer Drum Replacement

Criterion of Replacement

The transfer drum should be replaced with a new one according to the periodical maintenance cycle set out in the Table 6-4.

When time is due for replacement of the transfer drum, the following message appears on the control panel.

```
REPLACE TRF DRUM
                ■■■■
```

It should be also replaced when an image failure occurs due to transfer drum damage.

Work Procedure

(1) Whenever an image failure occurs, confirm the cause by following the information in Section 5 of Chapter VIII.

(2) If the image failure still occurs, replace the transfer drum referring to Section 4.2.10 of Chapter 7.

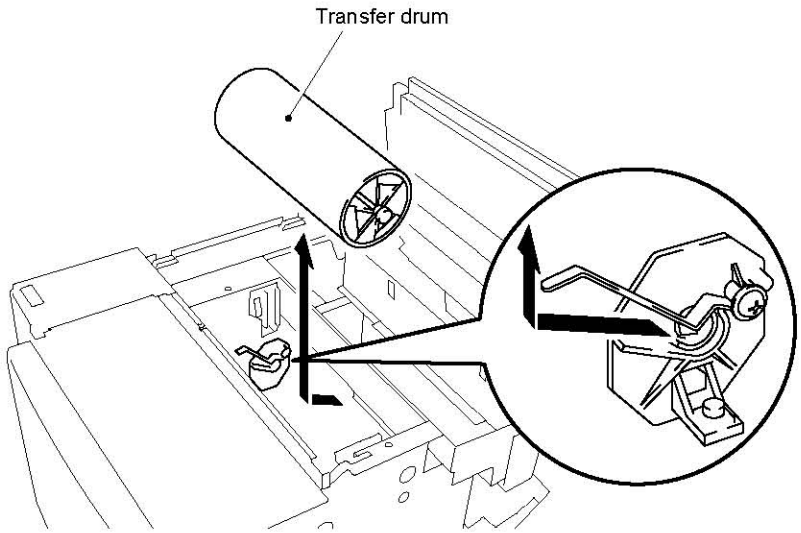


Fig. 6-30

CAUTION

- *This is one of the periodic replacement items, not customer service. It should be implemented upon request of the customer or at periodic maintenance.*
- *After replacement, confirm the improvement of print quality failure by test printing.*

4.9 Oil Pad Replacement

Criterion of Replacement

The oil pad should be replaced with a new one according to the periodical maintenance cycle set out in the Table 6-4.

When time is due for replacement of the oil pad, the following message appears on the control panel.*



* The message can be turned OFF to prevent it from appearing on the control panel. Refer to 32 NEXT CARE INFORMATION, Section 3.3 of Chapter 5.

Work Procedure

Replace the oil pad referring to Section 4.7.1 of Chapter 7.

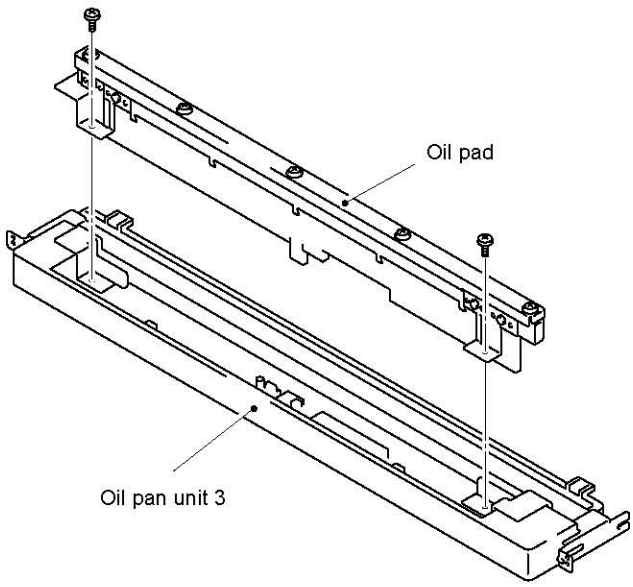


Fig. 6-31

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NOTE:
Parts names printed in light blue color are the parts names used in the HL-3450CN Parts Reference List.

CHAPTER 7 DISASSEMBLY & RE-ASSEMBLY

1. BEFORE STARTING DISASSEMBLY

1.1 Precautions

Follow the precautions described below during maintenance work.

(1) Do not implement any operation, disassembly or modification which is not set out in this manual.

(2) This printer incorporates dangerous parts subject to warnings such as "High Temperature", "High Voltage" and "Laser Radiation". Before starting any work on this printer, make sure you have read and understand the warnings set out in this manual.

(3) Collect and dispose of any waste toner cartridges removed during maintenance correctly in accordance with local regulations. Do not dispose of them with inflammable materials or dispose of them into a fire.

(4) The grounding wire is disconnected when replacing or removing the DC power supply unit. After completing the replacement work, confirm that the grounding wire is reconnected correctly to the earth mark ⏚ .

(5) Ensure that the type and length of screws removed during replacement of maintenance parts is noted and the correct screws are used during re-assembly. (See Table 7-1.)

(6) Do not use any solvent such as alcohol for the maintenance of this printer.

(7) Confirm that all the parts and covers are installed or assembled correctly before starting the test run after replacement of maintenance parts.

(8) The re-assembly order is the reverse of the dis-assembly order. In all cases, follow the flow chart in reverse to re-assemble the printer. Where there is any change to the order, this is noted in the relevant section.

1.2 Preparation of Disassembly

Follow the procedure described below for preparation before commencing any work.

(1) Ensure that the power cable is disconnected from the power outlet.

(2) Remove **all consumable parts** (OPC belt cartridge, fuser cleaner, oil bottle, all toner cartridges, ozone filter), **the Main (Video controller) PCB**, **Fusing unit** and **Fuser cleaner**, and then store them correctly before starting disassembly.

PRECAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*



- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damaged.*

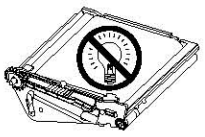
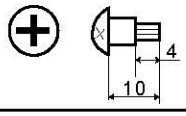
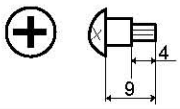
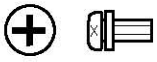
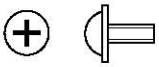


Table 7-1: Table of Screw Sizes Used in the Printer

Class Code	Name of Screw	Size and Shape of Screw			Remarks
		M-Thread TS	Length	Sharp	
BT3x8	Cross head tapping screw	T3	8mm		Used for plastic parts.
BT3x12		T3	10mm		
		T4	6mm		
BT4x8		T4	8mm		
BT4x10		T4	10mm		
ST3x6 ST4x6	S tight screw	ST	6mm		Used for steel parts fitted to steel plates.
M4x6	Cross head tapping screw (Pan head)	M4	6mm		Used for frame.
M4x6	Cross head screw (Brass)	M4	6mm		Used for GND.
SP3x10	Unique screw for heater connector.	M3	10mm		Used for the fusing unit connector.
F3x6	Cross head screw with flange.	M3	6mm 10mm		For laser unit
SP4x9	Unique screw for panel case	M4	9mm		Used for the panel case.
M3x6	Cross head screw with washer.	M3	6mm		Used for the fusing unit.
FST3x10	Cross head S tight screw with flange.	FST	10mm		Used for fusing unit.

2. PARTS NAME

2.1 Cover

Front View

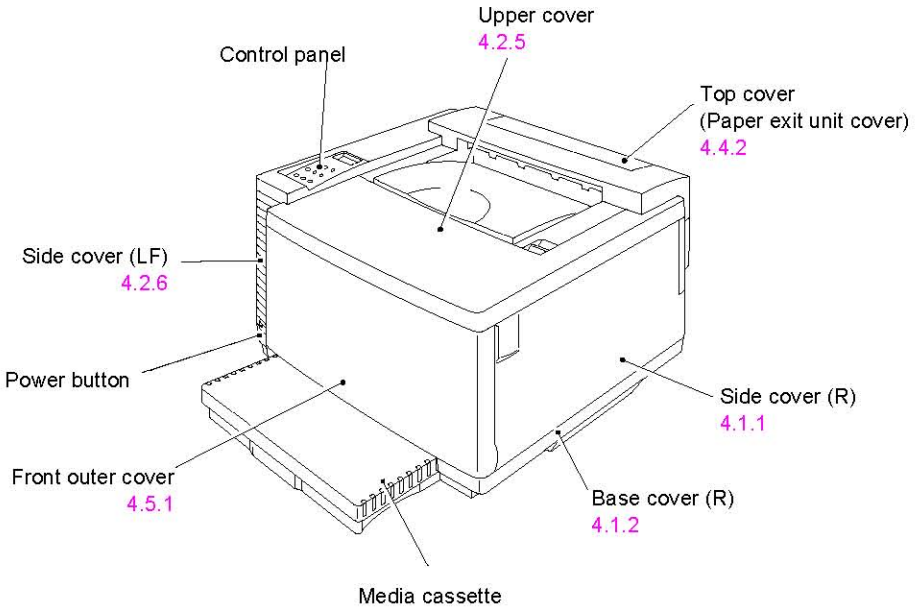


Fig. 7-1

Rear View

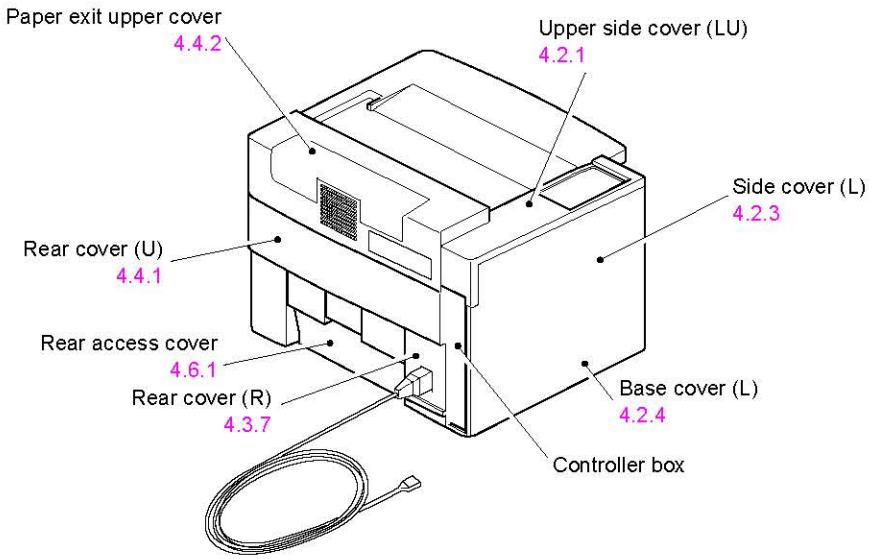


Fig. 7-2

2.2 Circuit Boards (PWBs)

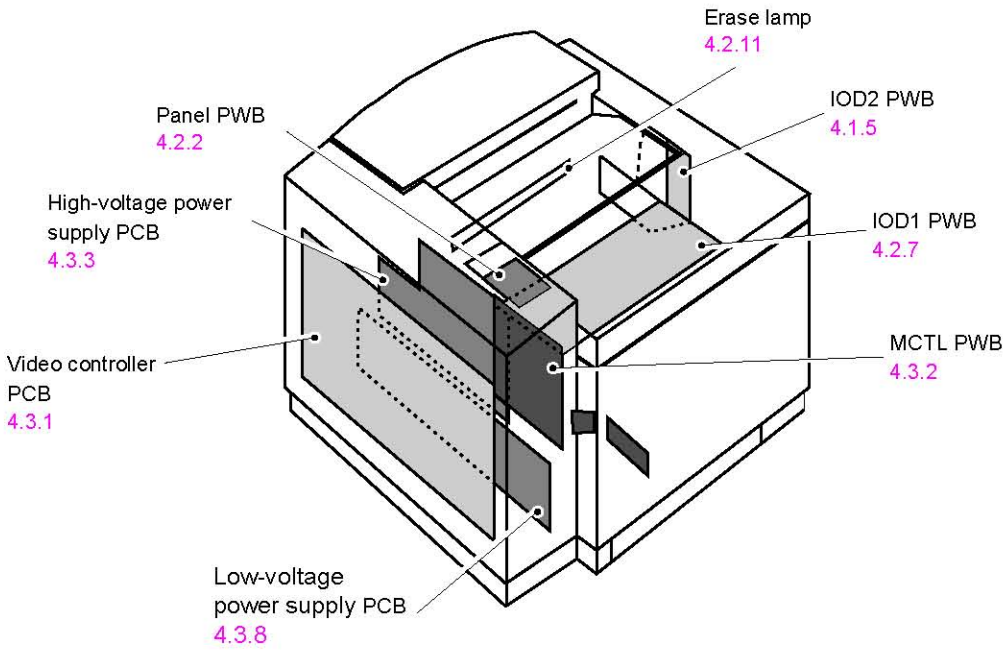


Fig. 7-3

2.3 Motor Units

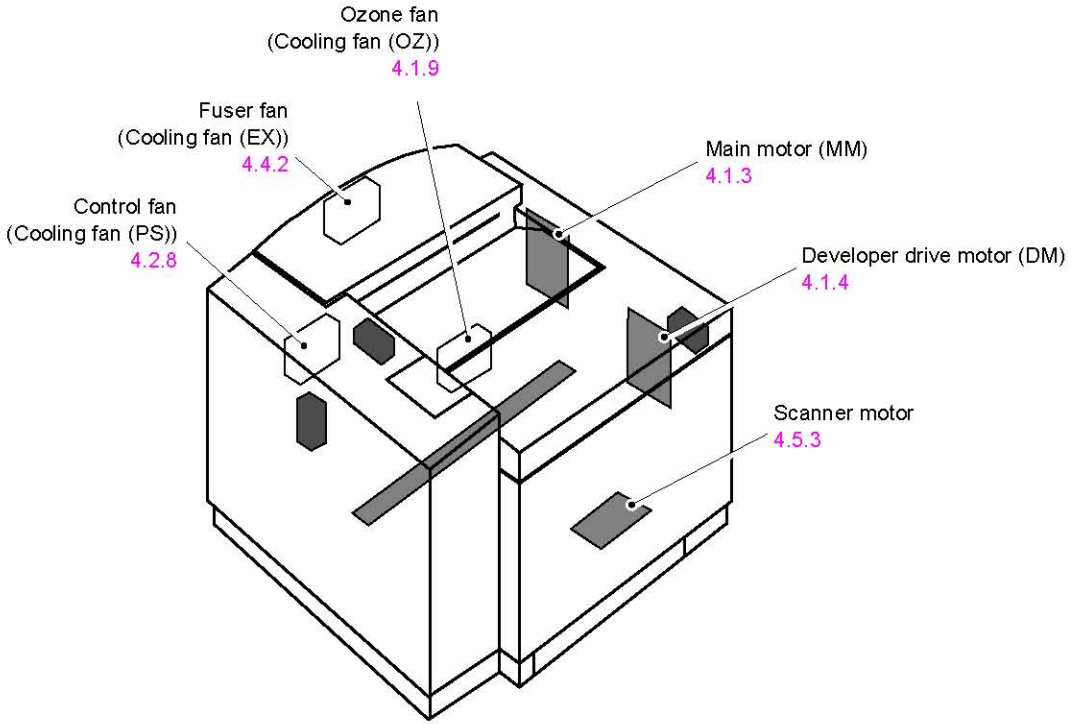


Fig. 7-4

2.4 Clutches

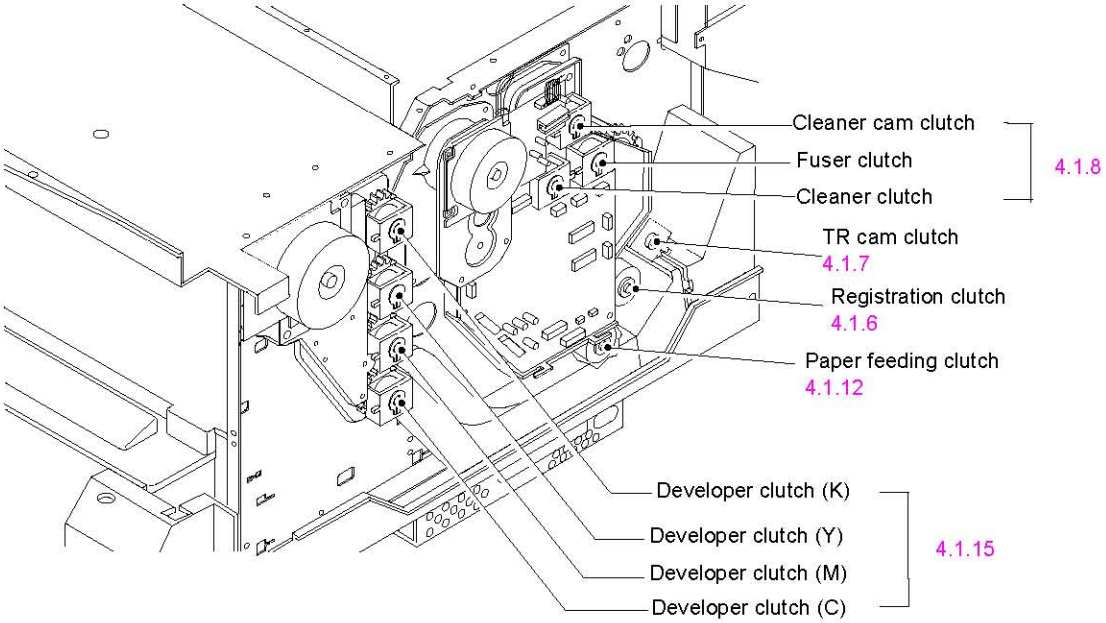


Fig. 7-5

2.5 Sensors

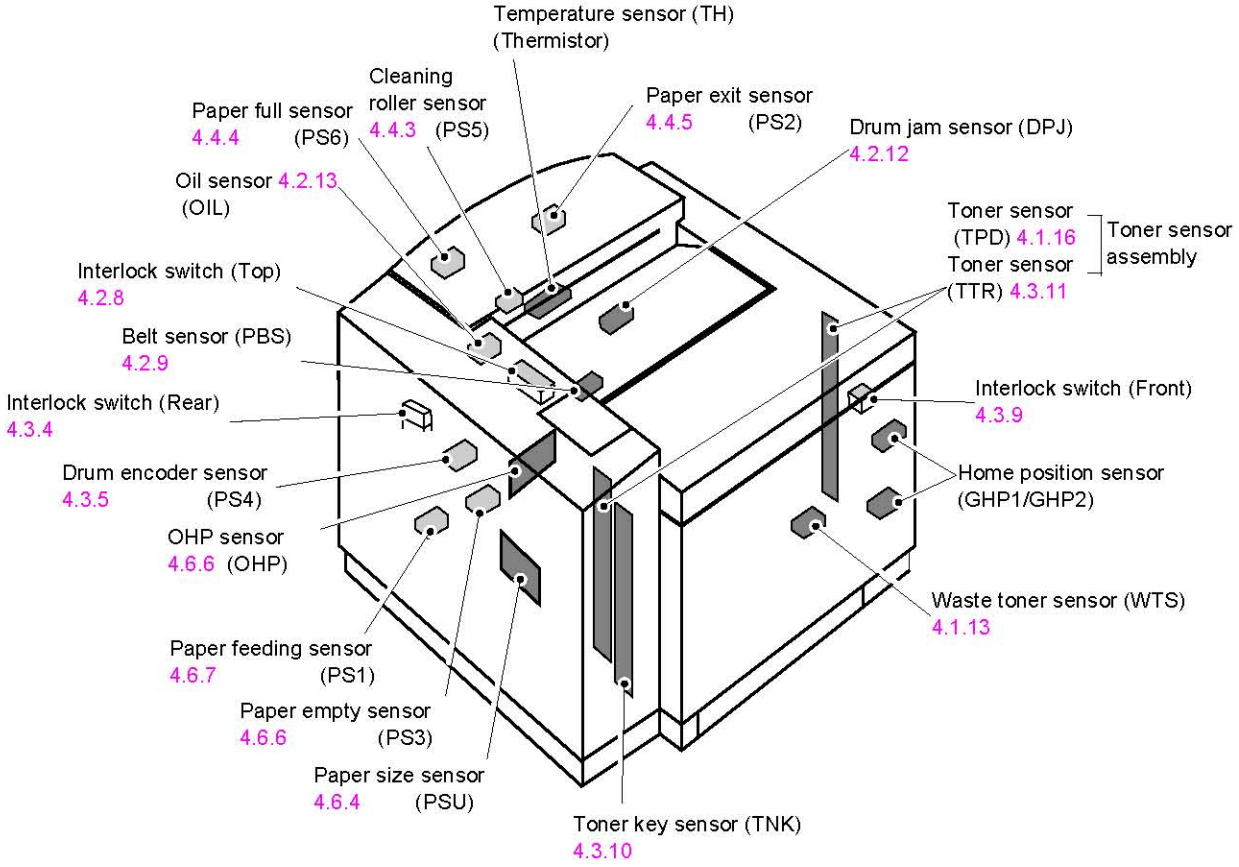
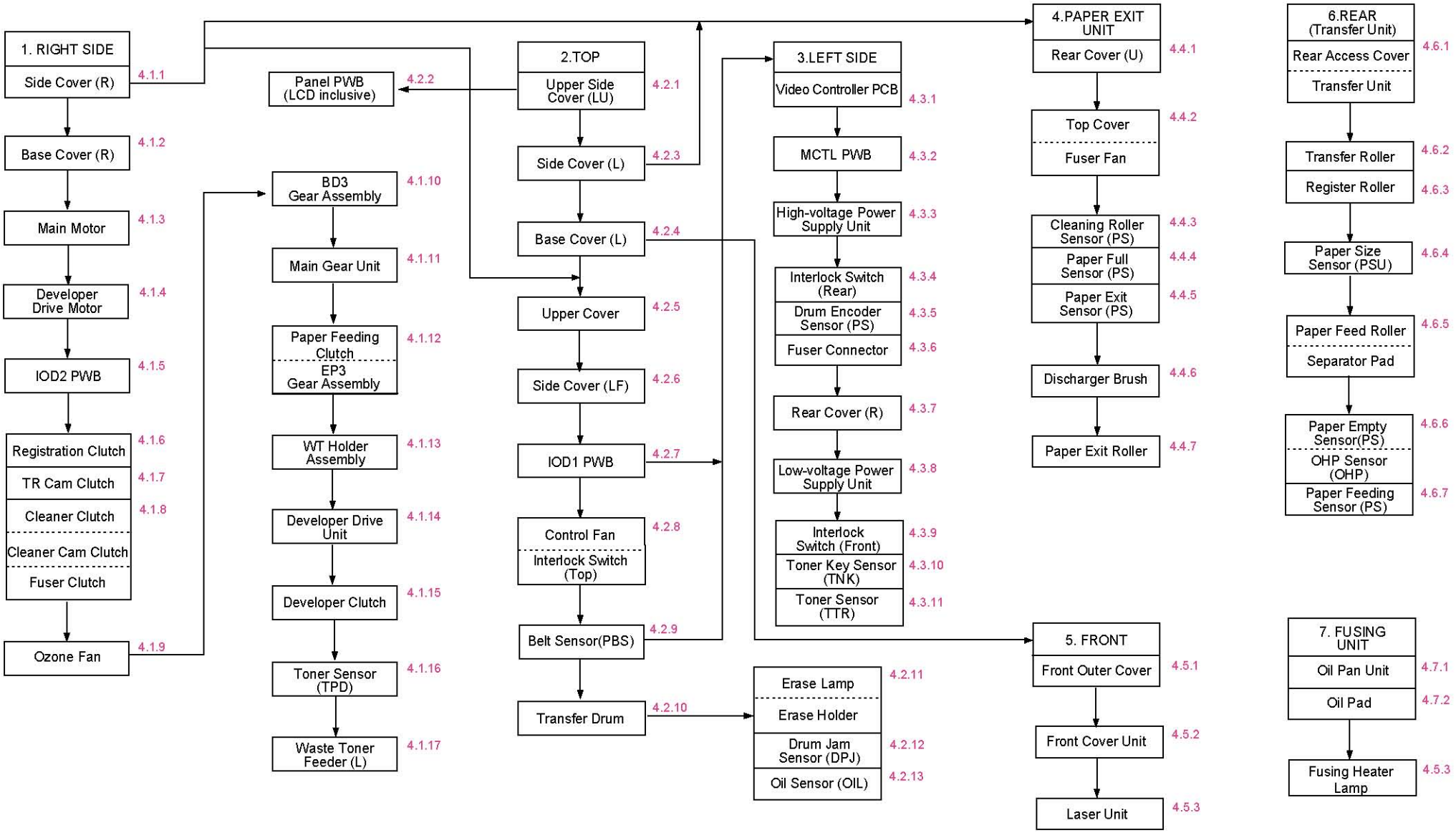


Fig. 7-6


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Base Cover (R) 4.1.2
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Developer Drive Motor 4.1.4
IOD2 PWB 4.1.5
Registration Clutch 4.1.6
TR Cam Clutch 4.1.7
Cleaner Clutch 4.1.8
Cleaner Cam Clutch
Fuser Clutch
Ozone Fan 4.1.9
BD3 Gear Assembly 4.1.10
Main Gear Unit 4.1.11
Paper Feeding Clutch
EP3 Gear Assembly 4.1.12
WT Holder Assembly 4.1.13
Developer Drive Unit 4.1.14
Developer Clutch 4.1.15
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Waste Toner Feeder (L) 4.1.17
Panel PWB (LCD inclusive) 4.2.2
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Side Cover (L) 4.2.3
Base Cover (L) 4.2.4
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Control Fan
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Belt Sensor(PBS) 4.2.9
Transfer Drum 4.2.10
Erase Lamp 4.2.11
Erase Holder
Drum Jam Sensor (DPJ) 4.2.12
Oil Sensor (OIL) 4.2.13
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High-voltage Power Supply Unit 4.3.3
Interlock Switch (Rear) 4.3.4
Drum Encoder Sensor (PS) 4.3.5
Fuser Connector 4.3.6
Rear Cover (R) 4.3.7
Low-voltage Power Supply Unit 4.3.8
Interlock Switch (Front) 4.3.9
Toner Key Sensor (TNK) 4.3.10
Toner Sensor (TTR) 4.3.11
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Top Cover 4.4.2
Fuser Fan
Cleaning Roller Sensor (PS) 4.4.3
Paper Full Sensor (PS) 4.4.4
Paper Exit Sensor (PS) 4.4.5
Discharger Brush 4.4.6
Paper Exit Roller 4.4.7
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Laser Unit 4.5.3
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Register Roller 4.6.3
Paper Size Sensor (PSU) 4.6.4
Paper Feed Roller 4.6.5
Separator Pad
Paper Empty Sensor(PS) 4.6.6
OHP Sensor (OHP)
Paper Feeding Sensor (PS) 4.6.7
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Oil Pad 4.7.2
Fusing Heater Lamp 4.5.3

4. DISASSEMBLY PROCEDURE

4.1 Right Side of the Printer

4.1.1 Side cover 3 (R)

(1) Remove the set screw BT4x10 (1 pc.) of side cover 3 (R) at the rear of the printer.

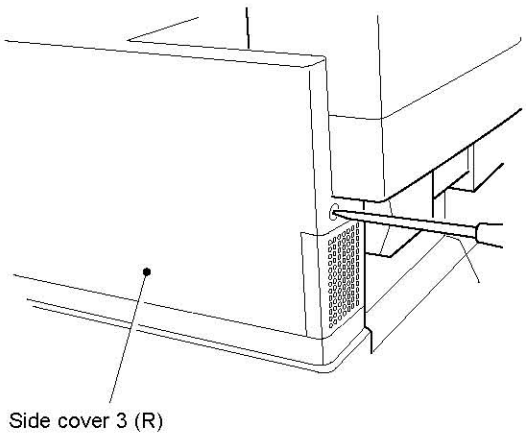


Fig. 7-7

(2) Slide the side cover 3 (R) in the direction of the arrows as shown in Fig.7-8.

(3) Remove the side cover 3 (R) by releasing the two hooks.

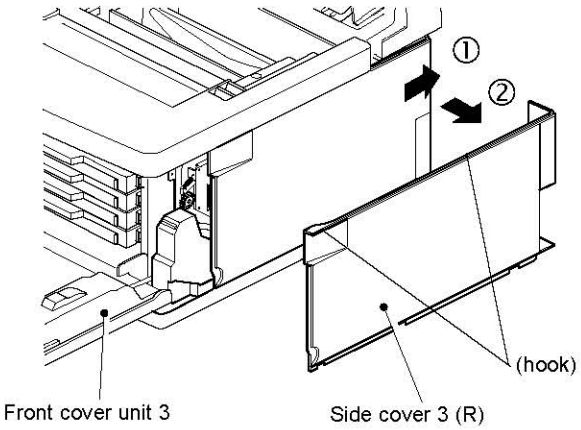


Fig. 7-8

4.1.2 Base cover 3 (R)

(1) Remove the set screws BT4x10 (2 pcs.) from the base cover 3 (R).

(2) Remove the base cover 3 (R) from the base.

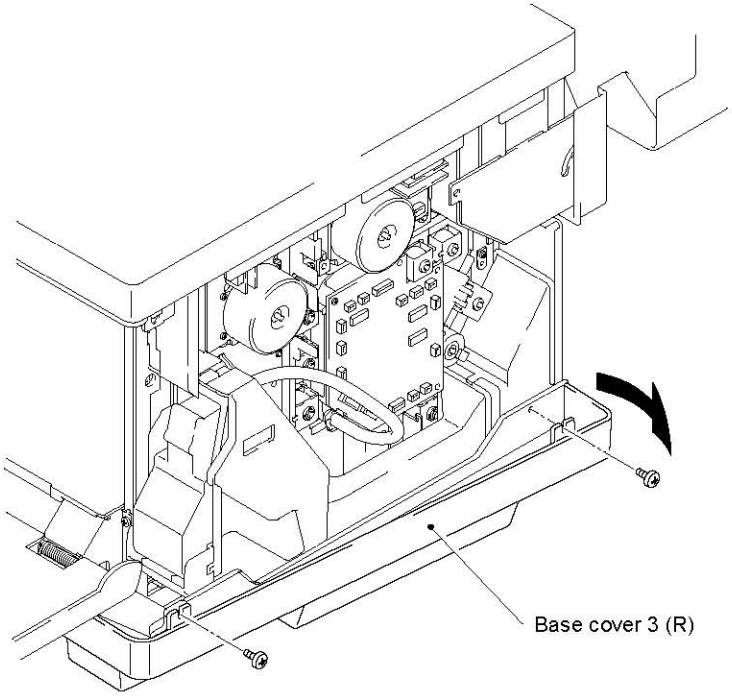


Fig. 7-9

PRECAUTION

- *When assembling the base cover, insert the leading edge of the base cover 3 (R) into the two hooks provided at the bottom (left and right) of the base plate.*
- *Ensure that the projecting part (⏏) of the base cover 3 (R) goes into the three holes in the base plate bottom.*

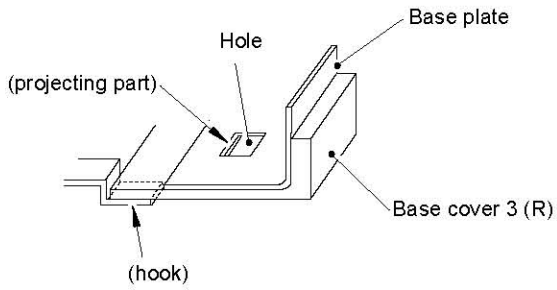


Fig. 7-10

4.1.3 Main motor 3 (MM)

> **CAUTION**
>
> *Take care not to stress the motor drive PCB when removing the connector or handling the motor / PCB assembly.*

(1) Disconnect the cable (1 pc.) from the main motor 3 PCB.

(2) Remove the tapping screws ST3x6 (4 pcs.) holding the main motor assembly.

(3) Remove the main motor 3 with the mounting plate from the main frame.

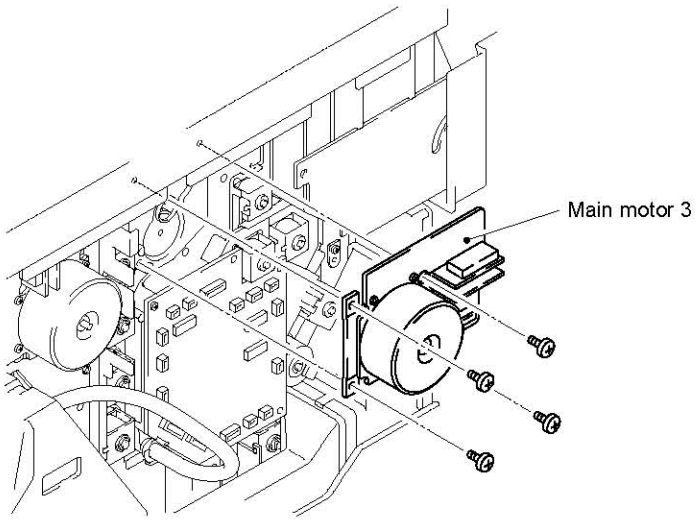


Fig. 7-11

4.1.4 Developer drive motor 3 (DM)

CAUTION

Take care not to stress the motor drive PCB when removing the connector or handling the motor / PCB assembly.

(1) Disconnect the connector (1 pc.) from the developer drive motor PCB.

(2) Remove the fixing screws ST3x6 (4 pcs.) holding the developer drive motor 3 to the developer drive unit 3.

(3) Remove the developer drive motor 3.

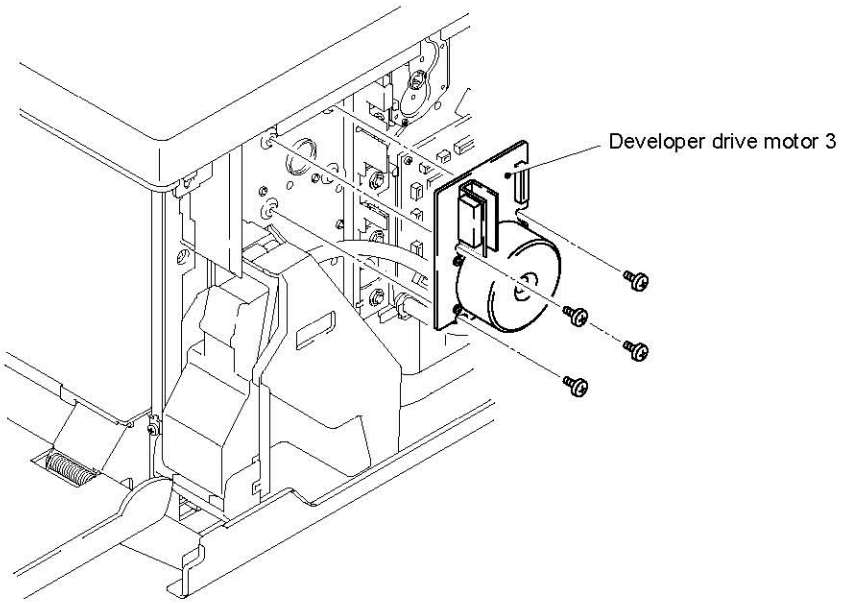


Fig. 7-12

4.1.5 IOD2 PWB

(1) Disconnect all the harness connectors (15 pcs.) connected to the IOD2 PWB.

(2) Remove the fixing screw ST3x6 (1 pc.) from the IOD2 PWB.

(3) Remove the IOD2 PWB from the main frame.

> ***PRECAUTION***
>
> *When handling the IOD2 PWB take care not to cause electrostatic damage to the PWB.*

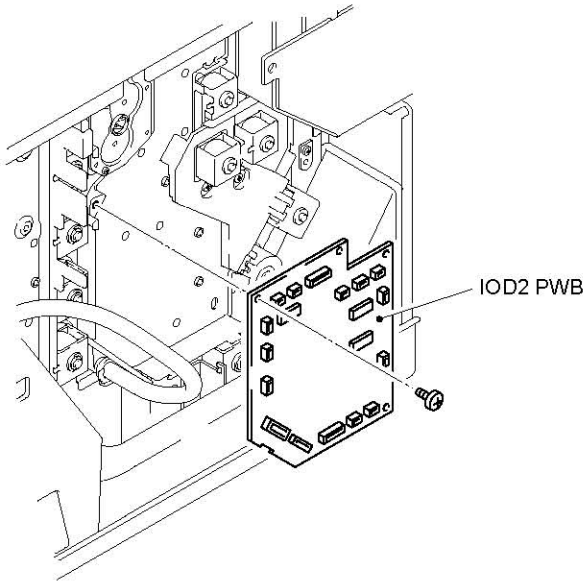


Fig. 7-13

4.1.6 Registration clutch

(1) Remove the outer plastic C ring from the shaft.

(2) Pull out the registration clutch from the shaft.

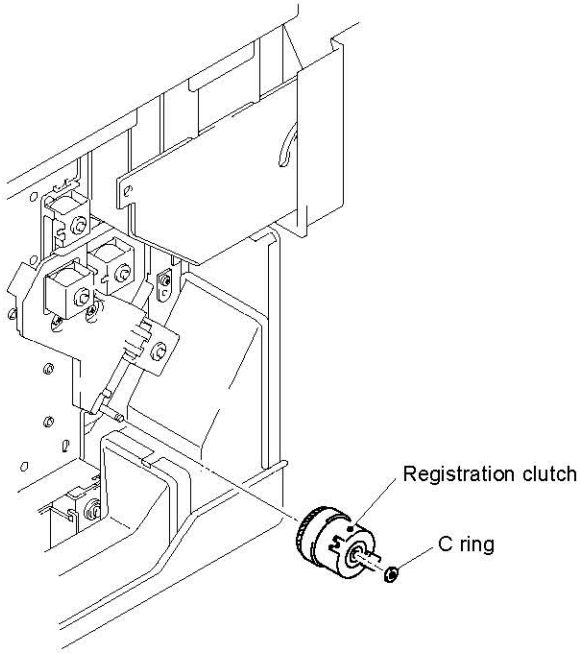


Fig. 7-14

4.1.7 TR cam clutch 3

(1) Remove the outer plastic C ring from the shaft.

(2) Pull out the TR cam clutch 3 from the shaft.

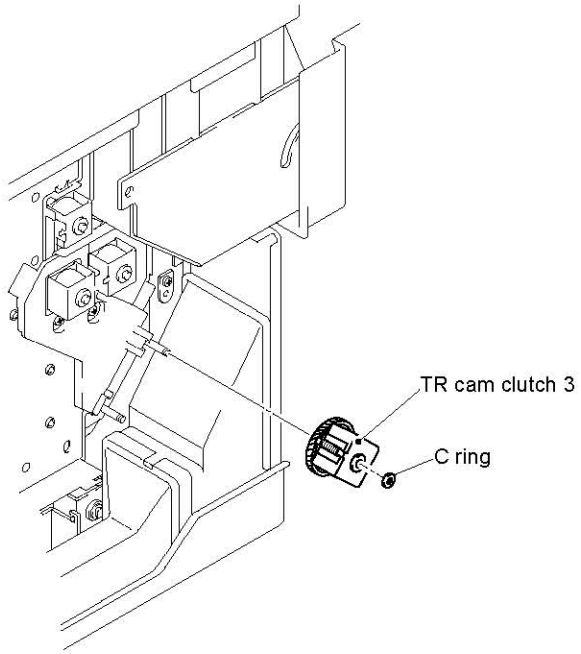


Fig. 7-15

4.1.8 Cleaner clutch 3 / Cleaner cam clutch 3 / Fuser clutch 3

(1) Remove the outer plastic C ring from the shaft of each of the clutches.

(2) Pull out the cleaner clutch 3, Cleaner cam clutch 3 and fuser clutch 3 from their shafts at the same time.

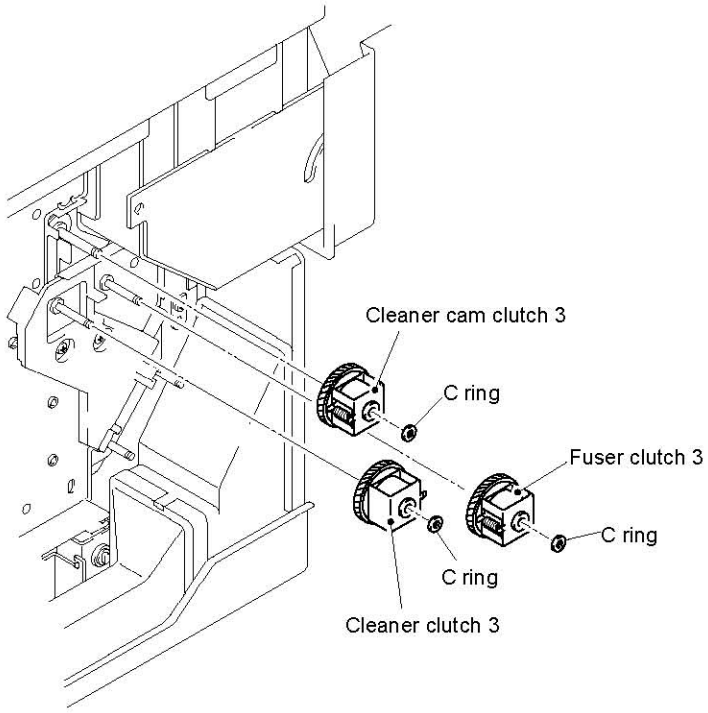


Fig. 7-16

NOTE:

When re-assembling the clutches, identify each of them referring to the features below;

- *White gear (with no spring): Cleaner clutch 3*
- *White gear (with a spring): Cleaner cam clutch 3*
- *Black gear: Fuser clutch 3*

The cleaner cam clutch is identical to the TR cam clutch.

4.1.9 Ozone fan (OZFAN) (Cooling fan (OZ))

(1) Remove the screws ST3x6 (3 pcs.) and BT4x8 (1 pc.) to remove the stay (R).

(2) Remove the set screw ST3x6 (1 pc.) to remove the ozone fan case with the duct from the main frame.

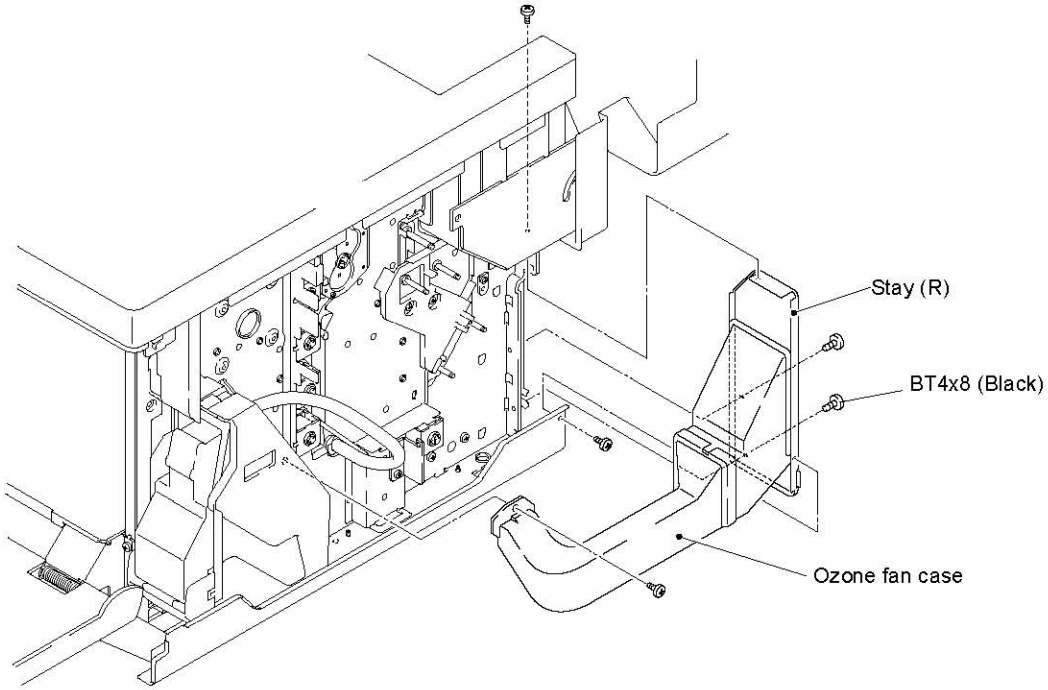


Fig. 7-17

(3) Remove the tape to remove the ozone fan case from the fan duct.

(4) Remove the ozone fan from the fan case.

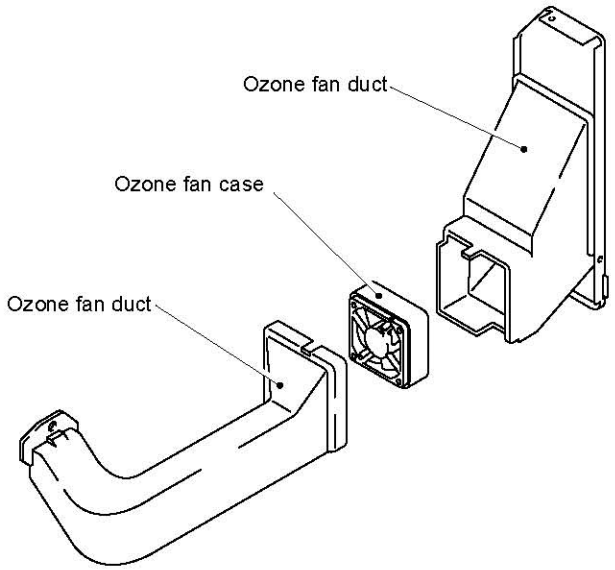


Fig. 7-18

4.1.10 BD3 gear assembly

(1) Remove the screws ST3x6 (3 pcs.) from the BD3 gear assembly.

(2) Remove the BD3 gear assembly from the frame.

NOTE:

Be sure to remove the set screws BT4x10 (2 pcs.) from the upper cover before removing the screws ST3x6 (3 pcs.) from the BD3 gear assembly.

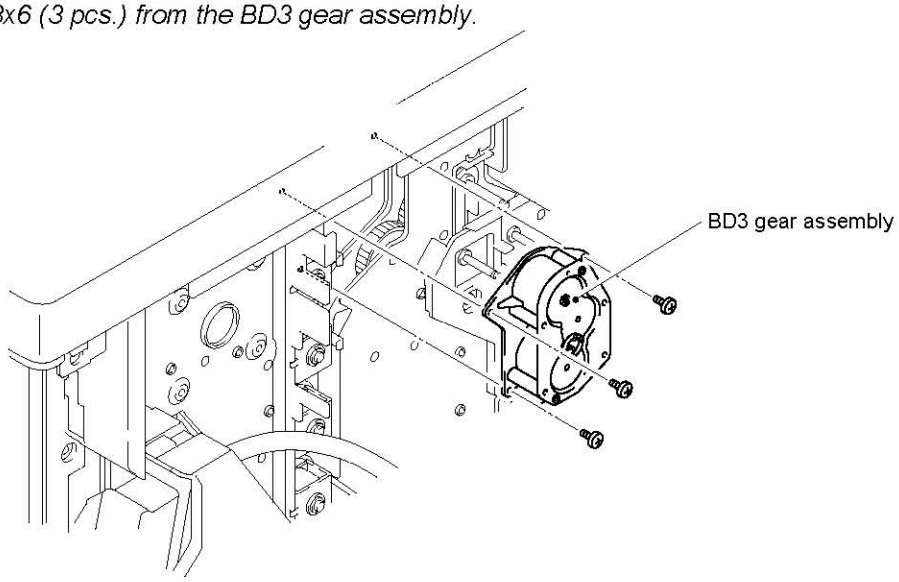


Fig. 7-19

4.1.11 Main gear unit 3

(1) Remove the set screws ST3x6 (4 pcs.) from the main gear unit 3.

(2) Remove the main gear unit 3 from the frame.

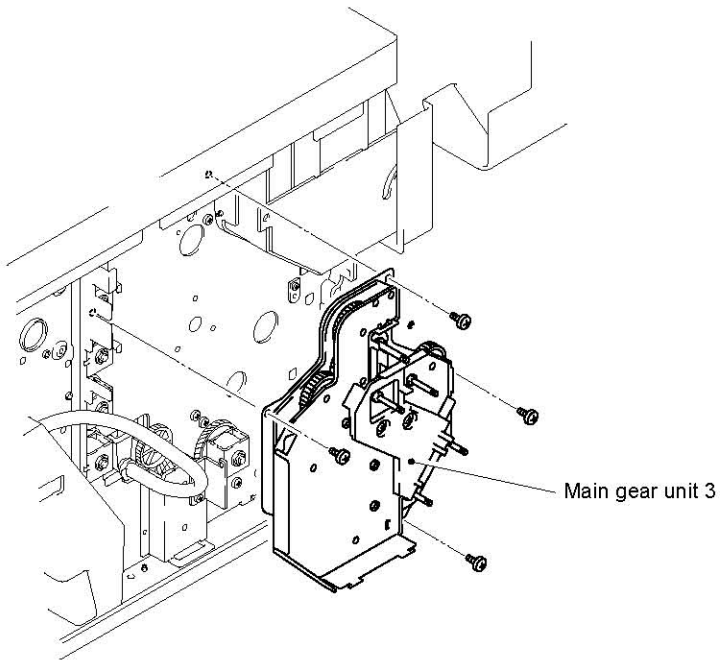


Fig. 7-20

4.1.12 Paper feeding clutch / EP3 gear assembly

(1) Remove the set screw ST3x6 (1 pc.) to remove the metal retainer.

(2) Remove the outer plastic C ring from the shaft.

(3) Remove the paper feeding clutch from the shaft.

(4) Remove the set screw ST3x6 (2 pcs.) from the EP3 gear assembly.

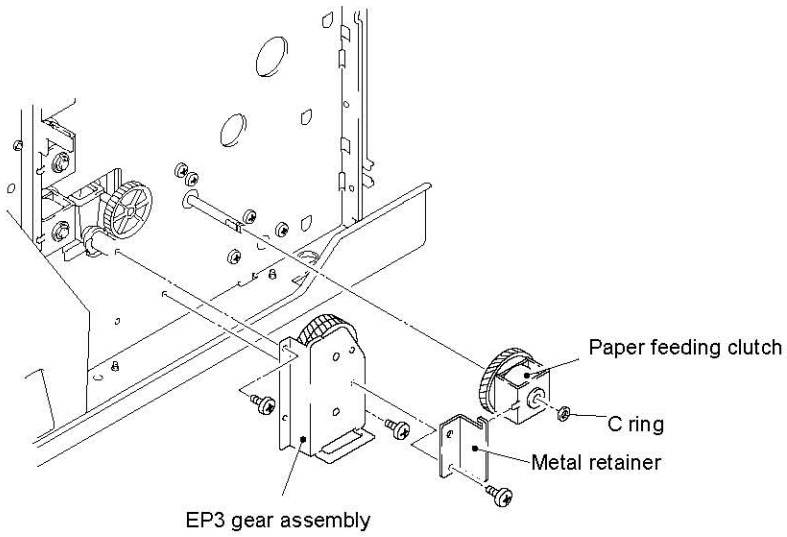


Fig. 7-21

4.1.13 WT holder assembly

(1) Open the front cover.

(2) Remove the set screw ST3x6 (1 pc.) from the frame.

(3) Remove the set screw ST3x6 (1 pc.) from the WT holder assembly and remove the holder from the frame. Note that the waste toner sensor is assembled onto the WT holder assembly.

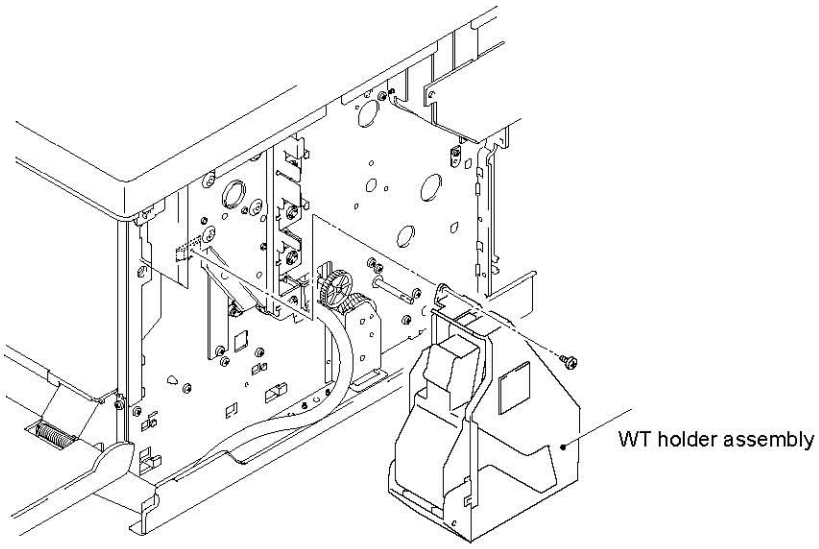


Fig. 7-22

4.1.14 Developer drive unit 3

(1) Remove the set screw ST3x6 (1pc.) to remove the cover RF.

(2) Release the harnesses from the harness holder.

(3) Remove the developer drive gear for each color toner from the inside of the developer driver unit 3.

(4) Remove the set screws ST3x6 (4 pcs.) to remove the developer drive unit 3 from the main frame.

NOTE

The gears removed in (3) must be replaced with new gears every time, do not re-use the removed gears.

Four gears are supplied with a replacement developer drive unit 3.

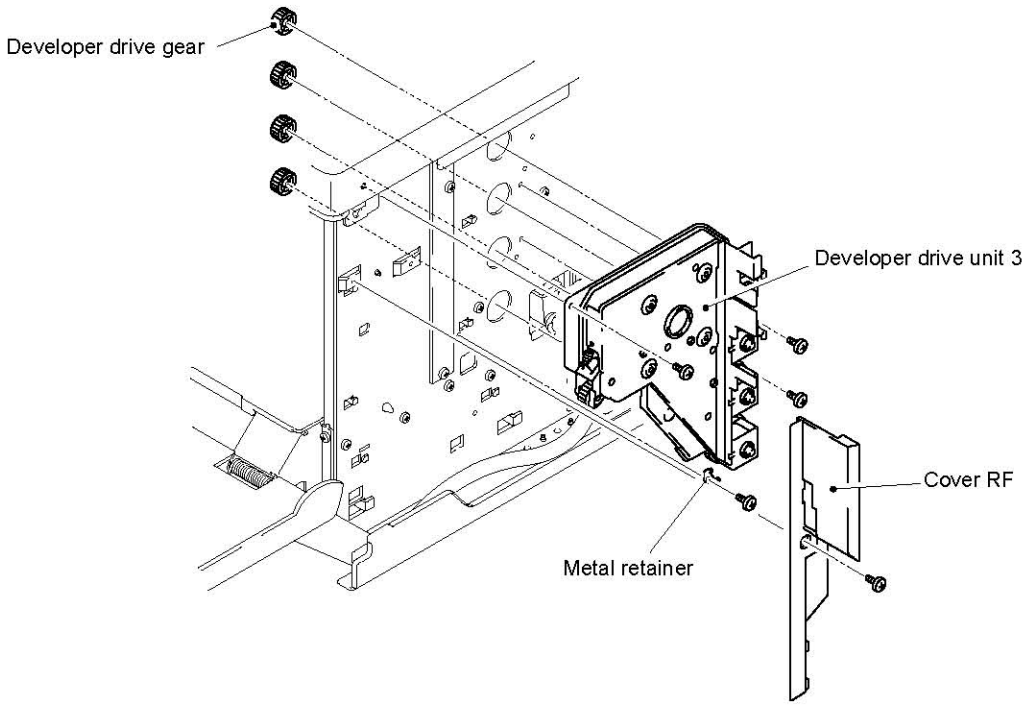


Fig. 7-23

CAUTION

When disassembling the developer drive unit 3, be sure not to lose the metal retainer holding the unit.

4.1.15 Developer clutch 3 (K, Y, M, C)

(1) Remove the inner E ring and washer of each developer clutch 3 from the shaft.

(2) Pull out the developer clutch 3 and shaft from the bearing.

NOTE:

One gear is included with each replacement developer clutch 3.

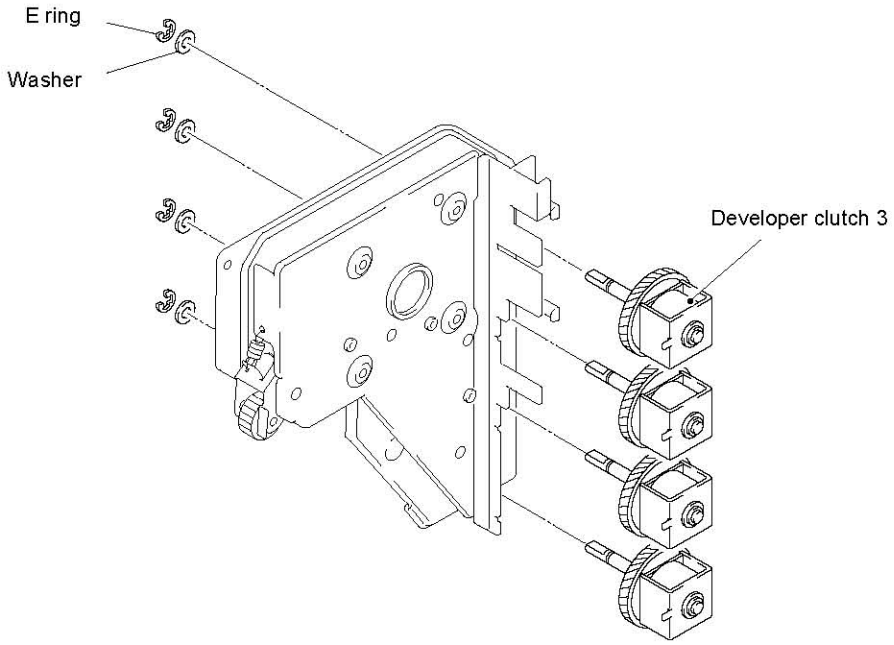


Fig. 7-24

4.1.16 Toner sensor (TPD)

(1) Remove the set screws ST3x6 (2 pcs.) from the toner sensor PCB.

(2) Disconnect the connector to the toner sensor PCB.

(3) Remove the toner sensor PCB from the main frame.

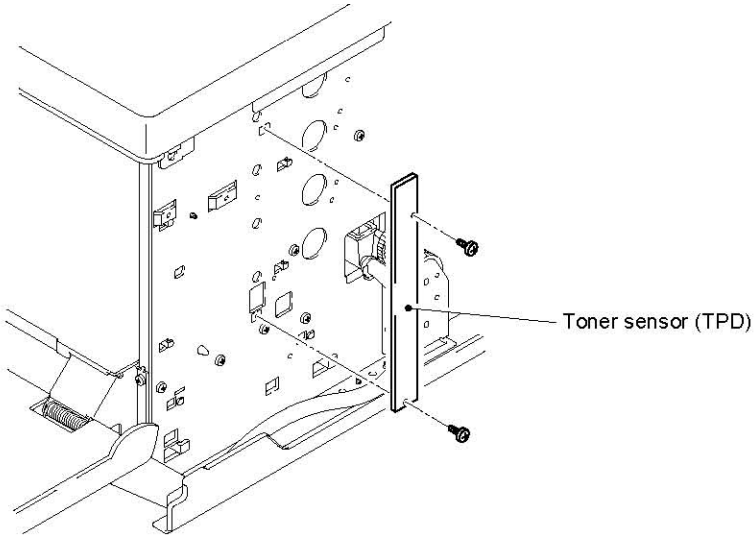


Fig. 7-25

4.1.17 Waste toner feeder (L)

NOTE:
The waste toner feeder (L) is composed of the plastic tube and auger spring gear unit.

(1) Remove the screw ST3x6 (1 pc.) holding the metal plate of the waste toner feeder.
(2) Pull out the waste toner feeder (L) from the main frame.

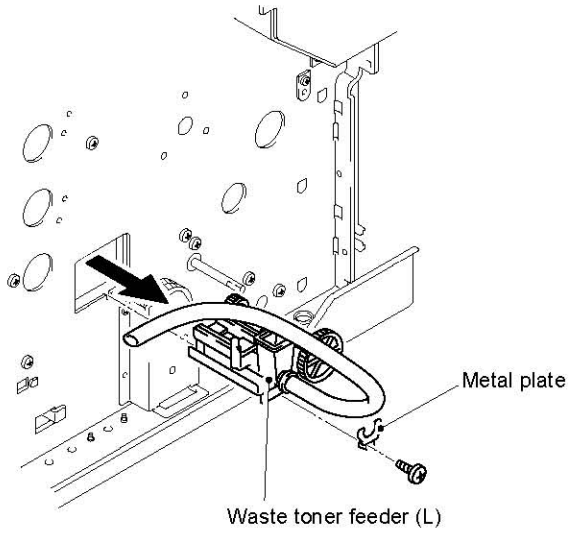


Fig. 7-26

CAUTION

Be sure to vacuum up waste toner remaining inside the plastic tube with a vacuum cleaner before removing the plastic tube.

4.2 Top of the Printer

4.2.1 Upper side cover (LU) (Upper side cover 3 (L))

(1) Open the top cover.

(2) Remove the set screw BT4x10 securing the upper side cover (LU).

(3) Press the exterior of the side cover 3 inwards and unlock the hooks (three locations) from the upper side cover (LU). (Fig.7-28)

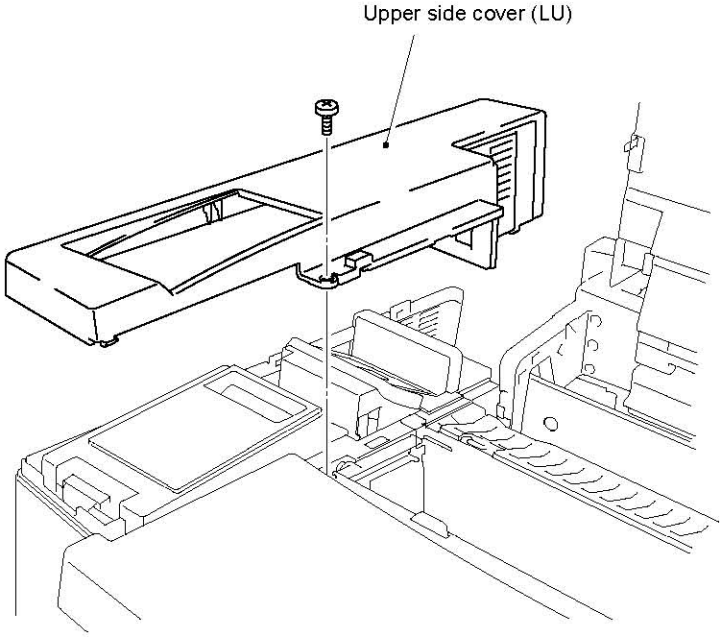


Fig. 7-27

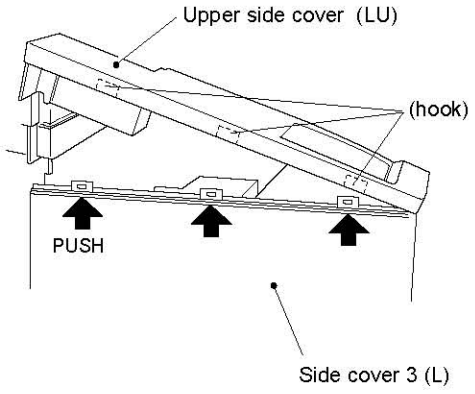


Fig. 7-28

4.2.2 Panel PWB (including LCD)

(1) Remove the shoulder screw SP4x9* (1 pc.) from the panel case assembly and disconnect the connector.

(2) Remove the set screws BT3x8 (4 pcs.) from the panel PWB and remove the panel shield plate, PWB, LCD and panel button from the panel case assembly.

* The screw securing the panel case assembly is unique.

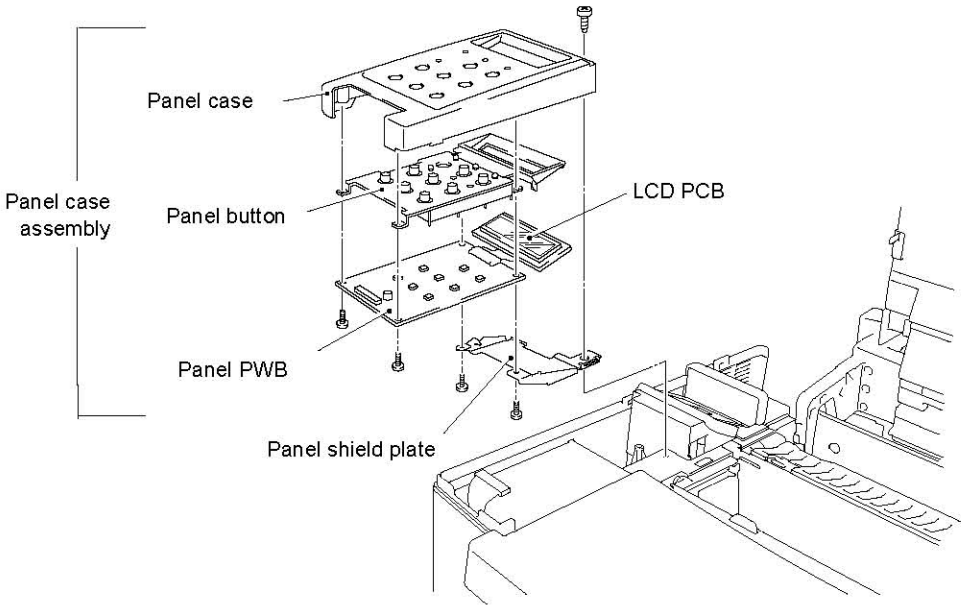


Fig. 7-29

NOTE:

When disassembling the panel PWB, be sure you do not to lose the earthing plate hooked onto the panel shield plate. Ensure it is fitted correctly during re-assembly.

4.2.3 Side cover 3 (L)

(1) Remove the set screw BT4x10 (2 pcs.) of side cover 3 (L).

(2) Slowly pull up the side cover 3 (L) and release the hook from the front of the upper cover (top cover 3).

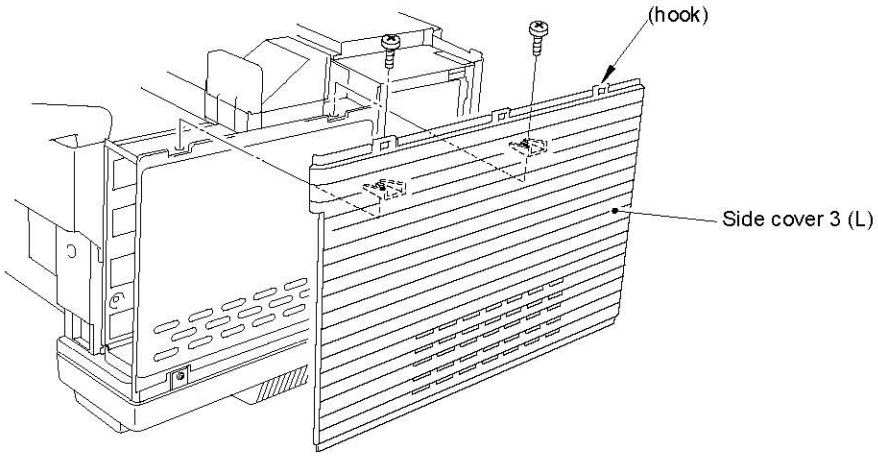


Fig. 7-30

4.2.4 Base cover 3 (L)

(1) Remove the set screws BT4x10 (2 pcs.) from the base cover 3 (L).

(2) Remove the base cover 3 (L) from the base by releasing it from the front of the printer first.

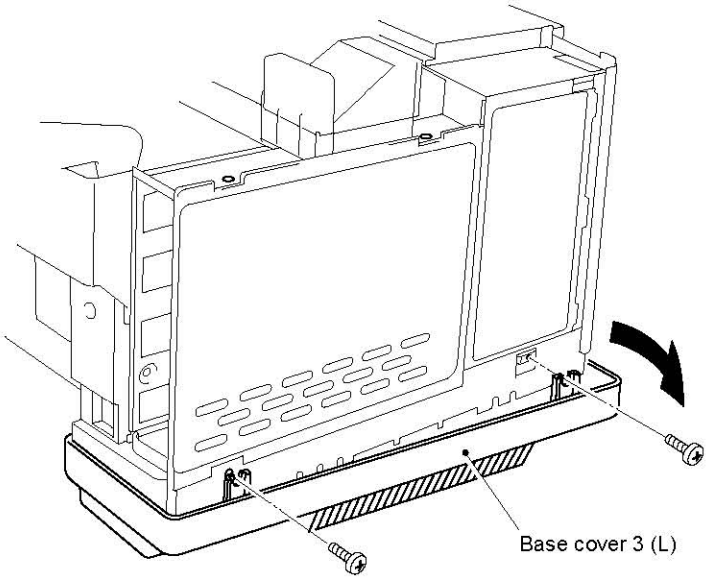


Fig. 7-31

PRECAUTION

- *When re-assembling the base cover, insert the leading edge of the base cover 3 (L) into the hook provided at the bottom (left and right) of the base plate.*
- *Ensure that the projecting part (⏍) of the base cover 3 (L) goes into the hole in the base plate bottom.*

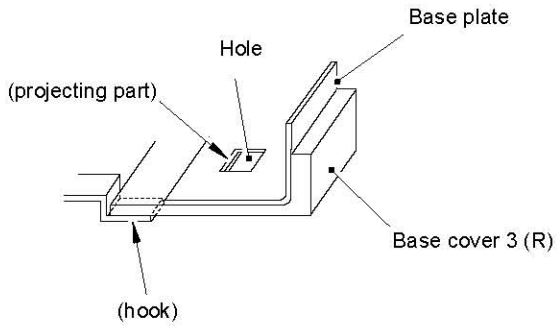


Fig. 7-32

4.2.5 Upper cover (Top cover 3)

(1) Open the front cover and release the belt cartridge lock levers.

(2) Remove the side cover 3 (R). (Refer to subsection 4.1.1 in this chapter.)

(3) Remove the set screws BT4x10 (2 pcs.) securing the upper cover. (Top x 1 and Right hand side x 1)

(4) Slightly lift up the rear edge of the upper cover.

(5) Pull the upper cover toward you and unhook the hook at the front of the cover from the frame.

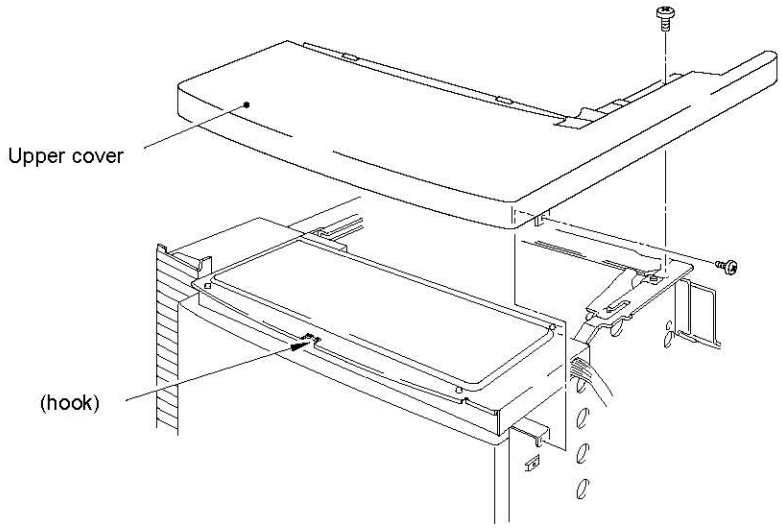


Fig. 7-33

4.2.6 Side cover (LF) (Side front cover 3 (L))

(1) Remove the set screw TS4x10 (1 pc.) of the side cover (LF).

(2) Release the hook from the frame while pulling the side cover (LF) upward, then remove the side cover (LF).

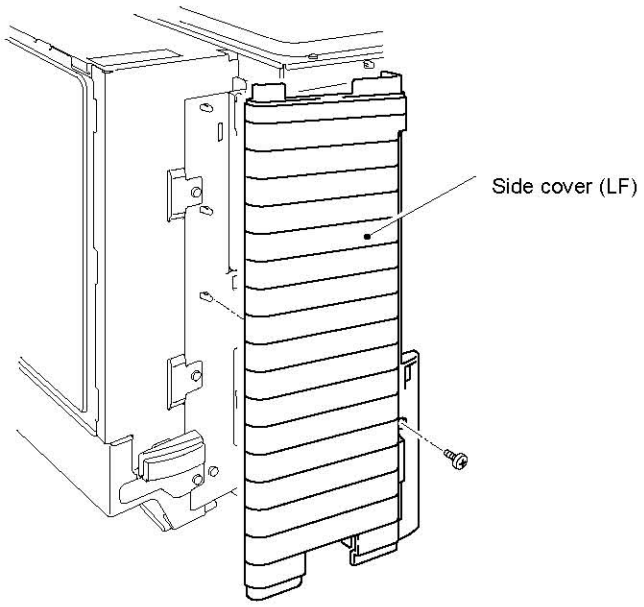


Fig. 7-34

4.2.7 IOD1 PWB

(1) Remove the set screws ST3x6 (4 pcs.) from the shield (upper).

(2) Disconnect all the harness connectors (16 pcs.) connected to the IOD1 PWB. Note that the DCN3 connector is a link plug and need not be removed unless necessary. (Refer to the figure below.)

(3) Remove the set screws ST3x6 (6 pcs.) from the IOD1 PWB.

(4) Remove the IOD1 PWB.

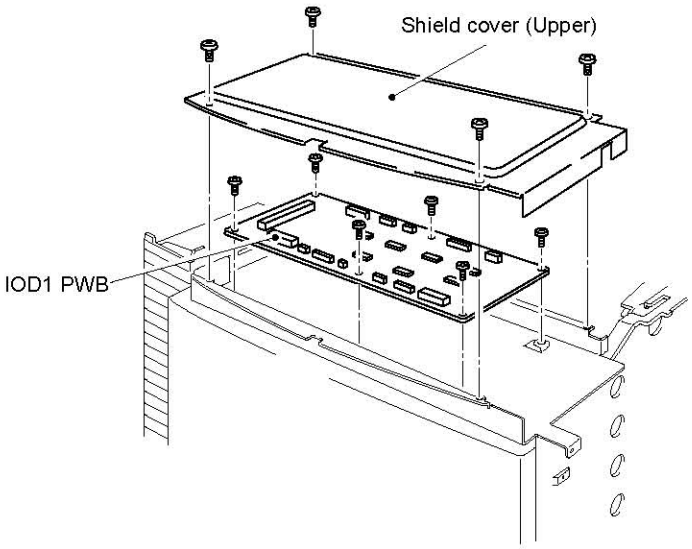


Fig. 7-35

> ***PRECAUTION***
>
> *When handling the IOD1 PWB, take care that no damage is caused due to electrostatic charges.*

4.2.8 Control fan (CTFAN) (Cooling fan (PS)) / Interlock switch (Top) (Paper exit unit)

(1) Remove the ozone filter.

(2) Remove the set screw ST3x6 (1 pc.) to remove the control fan case assembly.

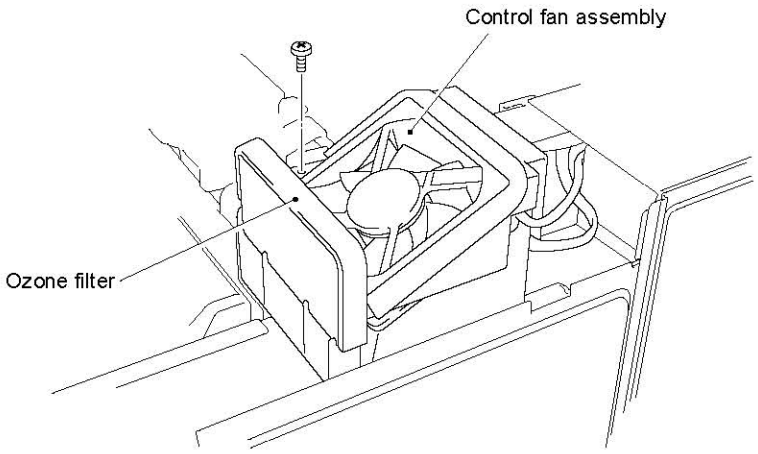


Fig. 7-36

(3) Remove the fan motor and interlock switch from the fan case after releasing the fan cover plastic clips.

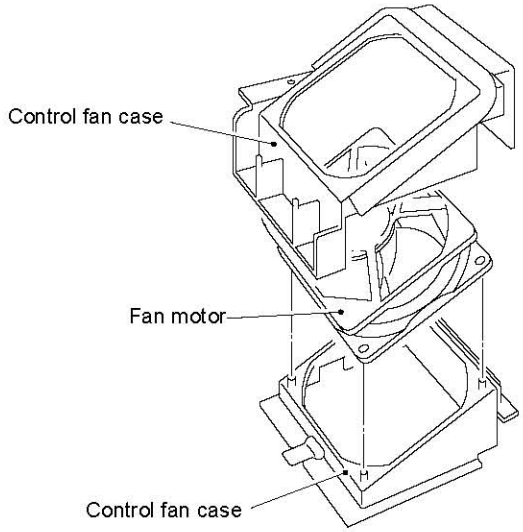


Fig. 7-37

(4) Remove the interlock switch and operating arm from the case.

> **⚠ CAUTION**
>
> *Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.*

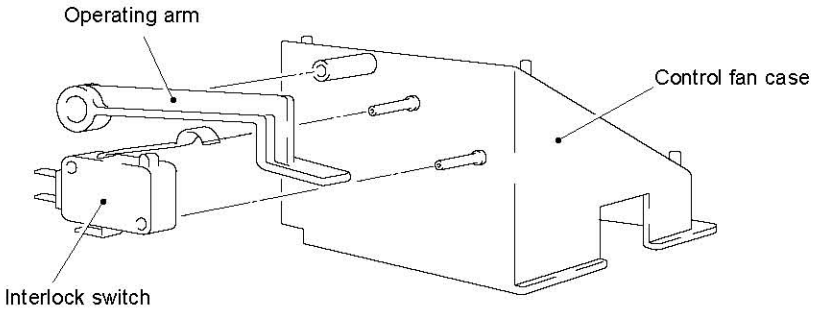


Fig. 7-38

4.2.9 Belt sensor (PBS)

(1) Remove the set screws ST3x6 (1 pc.) to remove the belt sensor base from the main frame.

(2) Disconnect the connector (1 pc.) to the belt sensor.

(3) Release the catches to remove the belt sensor from the base.

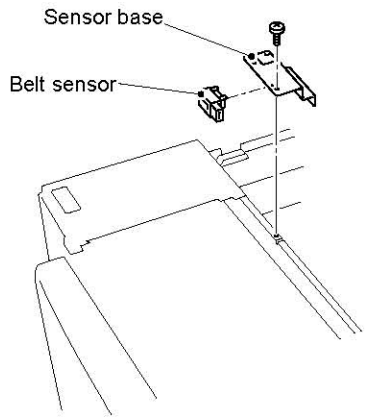


Fig. 7-39

4.2.10 Transfer drum 3

(1) Remove the set screws ST4x6 (2 pcs.) and remove the stay 'A' by sliding it forwards and then upwards in the plastic guide slots.

(2) Open the rear access cover (TR unit cover 3) and protect the surface of the transfer drum 3 by covering it with paper. Then push the transfer drum 3 up and forwards from the transfer unit side.

(3) Release the transfer drum 3 from the shaft supports, and pull up and remove the transfer drum 3 from the top of the printer.

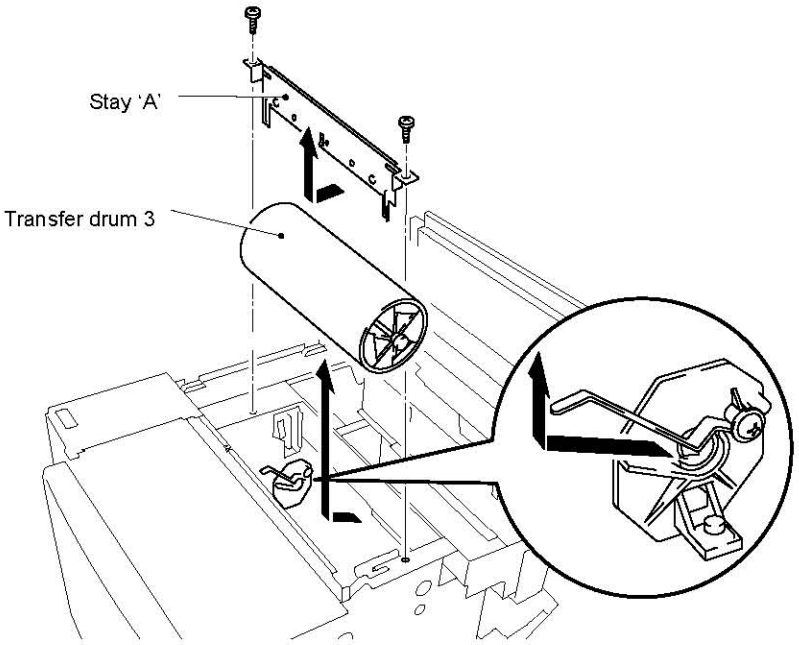


Fig. 7-40

NOTE:

- *For easier removal, push the drum upwards and diagonally forwards.*
- *When re-assembling the transfer drum 3, slide the drum shaft between the metal plates and ensure the drum is fully located into the correct retaining position.*

> ***PRECAUTION***
>
> *Do not touch the transfer drum surface with your bare hands or scratch it. Protect the drum surface during handling.*

4.2.11 Erase lamp 3 / Erase holder

(1) Disconnect the harness (1 pc.) connected to the erase lamp 3.

(2) Remove the erase lamp 3 from the holder.

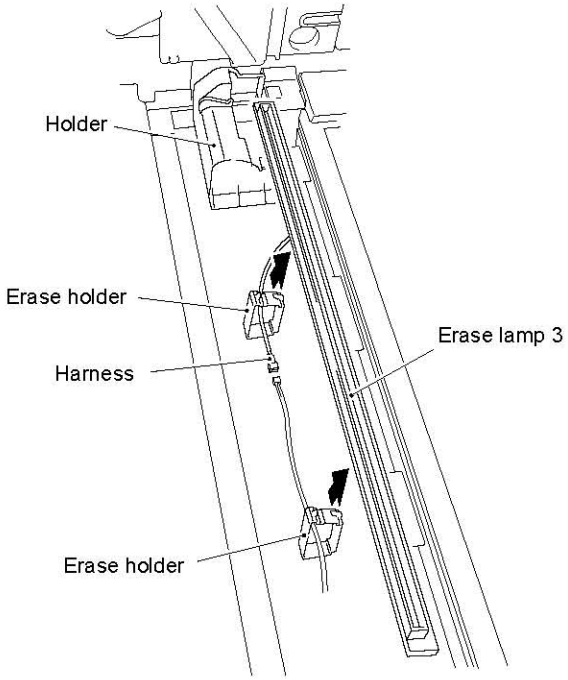


Fig. 7-41

NOTE:

When re-assembling the erase lamp 3, check the correct direction referring to the figure below. Failure to do so may cause transfer drum damage.

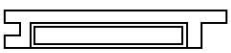
(Left Side)  (Right Side)

Fig. 7-42

4.2.12 Drum jam sensor (DPJ)

(1) Release the catches and remove the cover F.

(2) Disconnect the drum jam sensor connector.

(3) Remove the drum jam sensor.

NOTE:

The dram jam sensor (DPJ) is identical to the belt sensor (PBS).

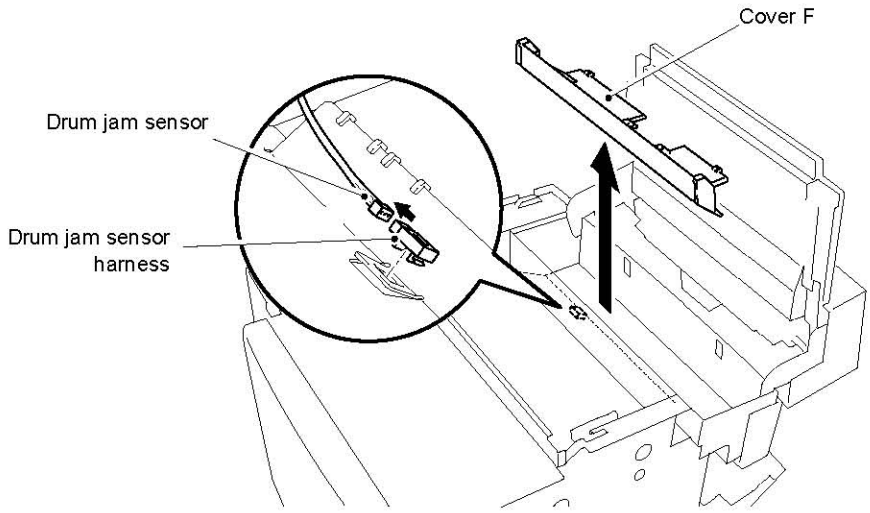


Fig. 7-43

4.2.13 Oil sensor (OIL)

(1) Remove the set screw ST3x6 (2 pcs.) from the oil sensor.

(2) Disconnect the oil sensor connector from the harness connector.

(3) Remove the oil sensor assembly.

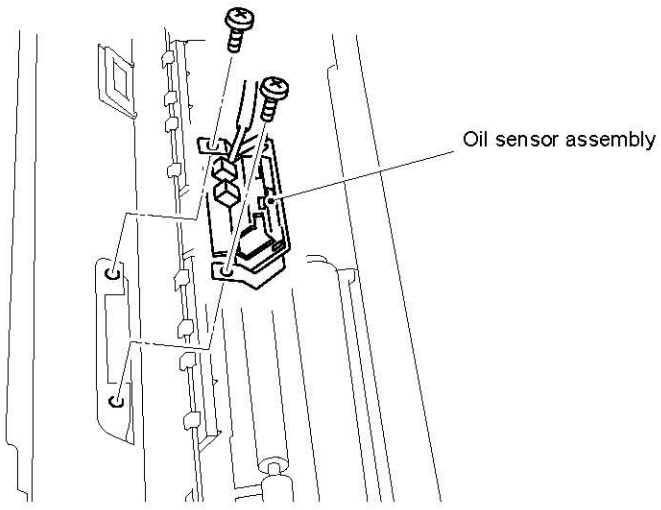


Fig. 7-44

4.3 Left Side of the Printer

4.3.1 Video Controller PCB

CAUTION

- Turn off the printer power switch and unplug the power cable from the outlet.
- Remove the interface cable connector.

(1) Remove the two screws to remove the main controller board from the printer.

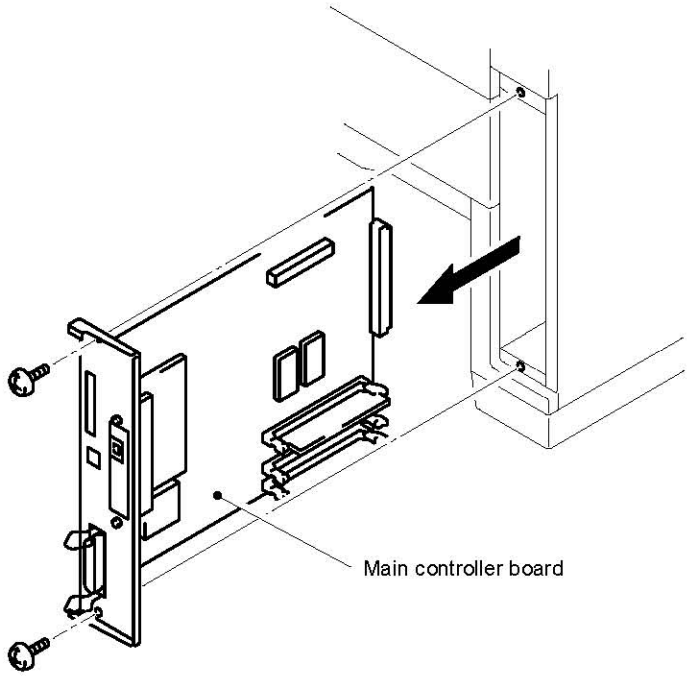


Fig. 7-45

(2) Remove the two screws securing the NC-4100h and remove the NC-4100h by pulling it upwards.

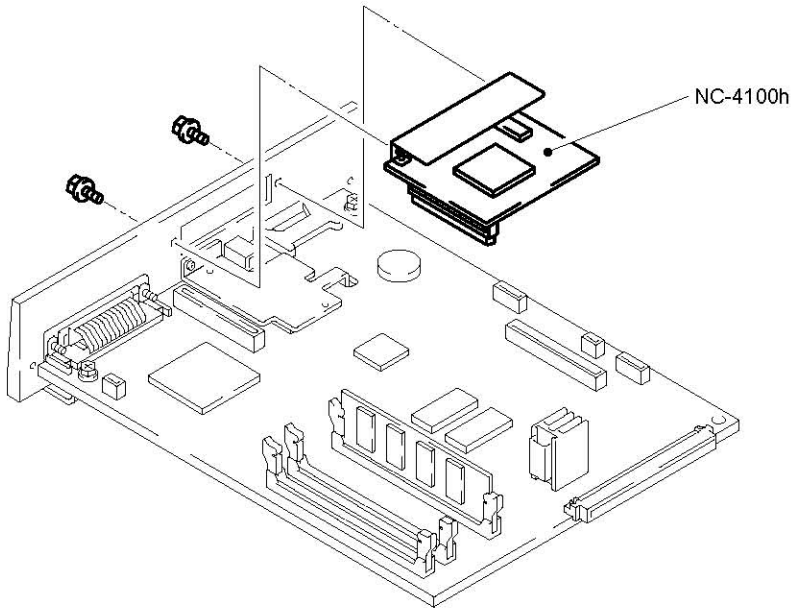


Fig. 7-46

(3) Remove the DIMM.

(4) Remove the screw at the center of the main PCB base plate.

(5) Remove the CPU heatspred.

(6) Remove the sheet (GP1-2.0-025025Y).

(7) Remove the two screws on the CDCC IF.

(8) Remove the two screws to remove the main PCB base plate.

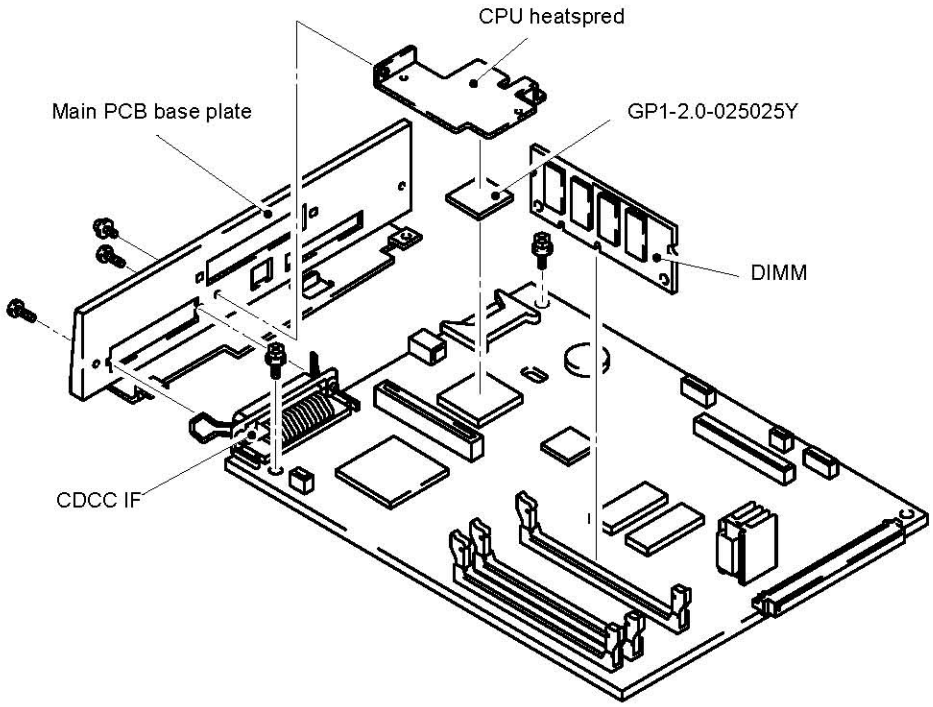


Fig. 7-47

4.3.2 MCTL PWB

CAUTION

Remove the Main (Video Controller) PWB before starting this disassembly.

(1) Remove the set screw ST3x6 (1 pc.) from shield cover 'B'. Slide the cover upwards and remove it.

(2) Disconnect all the harness connectors (7 pcs.) connected to the MCTL PWB.

(3) Remove the set screws ST3x6 (4 pcs.) from the MCTL PWB.

(4) Remove the MCTL PWB.

PRECAUTION

- *Read the internal RAM counter information from the MCTL PWB prior to replacing the MCTL PWB.*
- *When handling the MCTL PWB, ensure that no damage is caused due to electrostatic charges.*

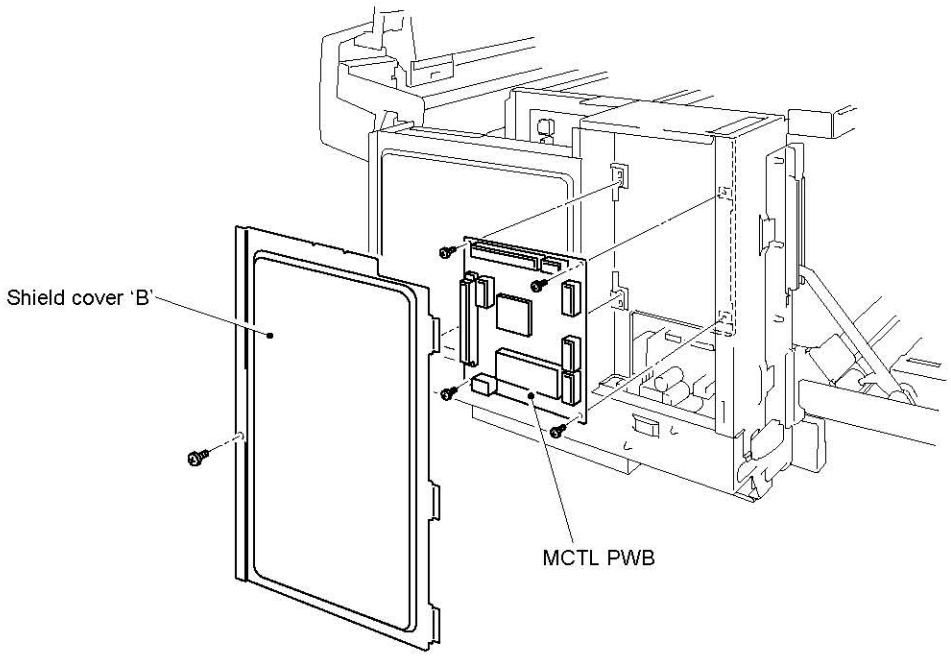


Fig. 7-48

4.3.3 High-voltage power supply unit (High voltage unit 3)

(1) Remove the set screws ST3x6 (2 pcs.) to remove the shield cover 'A'.

(2) Remove the set screws ST3x6 (4 pcs.) to remove the shield case 'A' assembly.

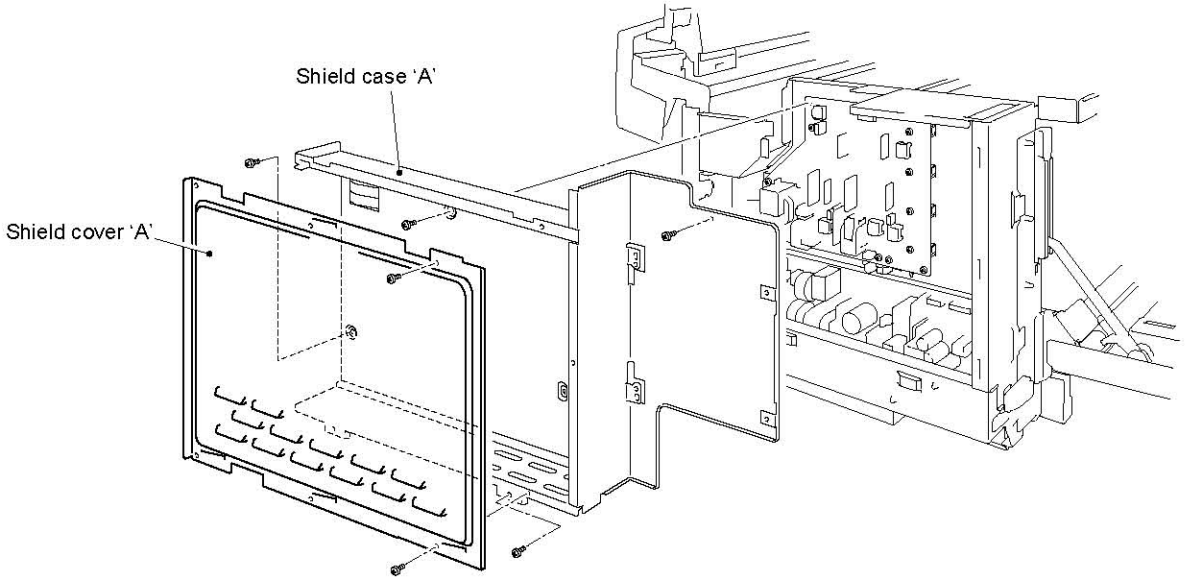


Fig. 7-49

(4) Disconnect the harnesses (2 pcs.) and high-voltage connectors (2 pcs.) connected to the high-voltage power supply unit.

(5) Remove the set screws ST3x6 (1 pc.) and BT3x8 (8 pcs.) from the high-voltage power supply unit.

(6) Remove the high-voltage power supply unit.

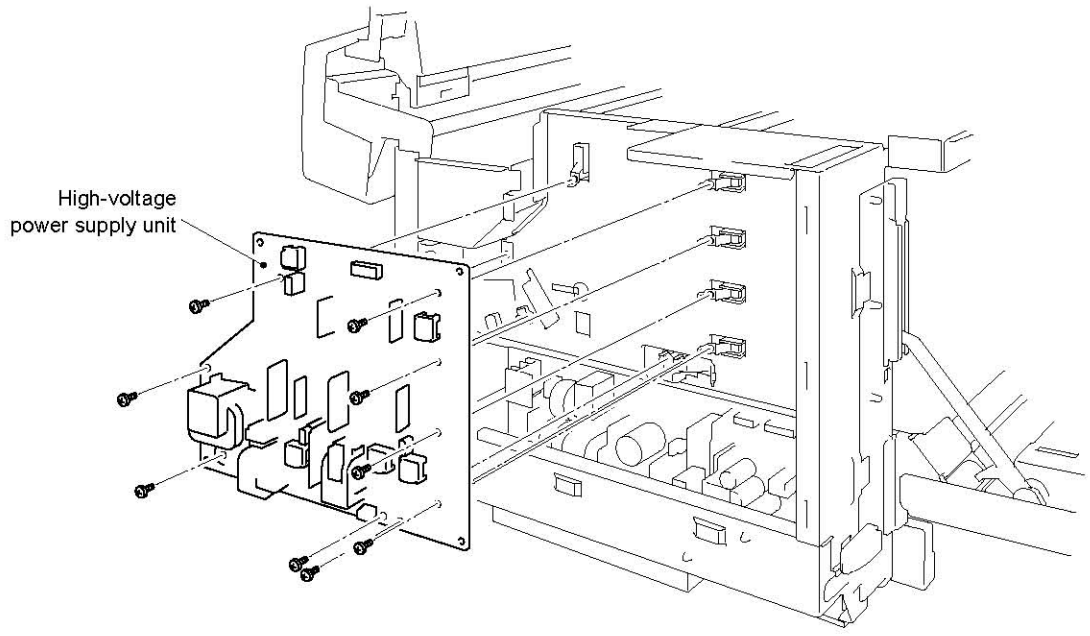


Fig. 7-50

CAUTION

When disconnecting the connector from the CBV terminal, push both sides of the connector. Pulling it hard may cause connector damage.

WARNING

The high voltage power supply unit generates high voltages of up to 5KV. You can get an electric shock if you touch the unit while it is powered on.

Turn on the power to the unit only after having refitted and secured side cover (L).

4.3.4 Interlock switch (Rear)

(1) Remove the set screws ST3x6 (2 pcs.) to remove the transfer electrode base from the frame.

(2) Disconnect the harness (1 pc.) connected to the interlock switch.

(3) Remove the interlock switch from the transfer electrode base.

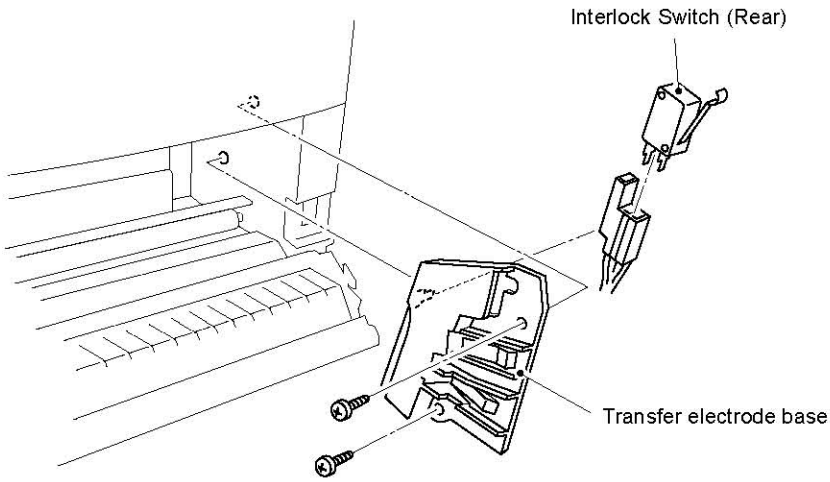


Fig. 7-51

CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.3.5 Drum encoder sensor (PS4)

(1) Remove the sensor case assembly from the frame (L) by releasing the two catches.

(2) Disconnect the connector (1 pc.) to the encoder sensor.

(3) Remove the drum encoder sensor from the sensor case.

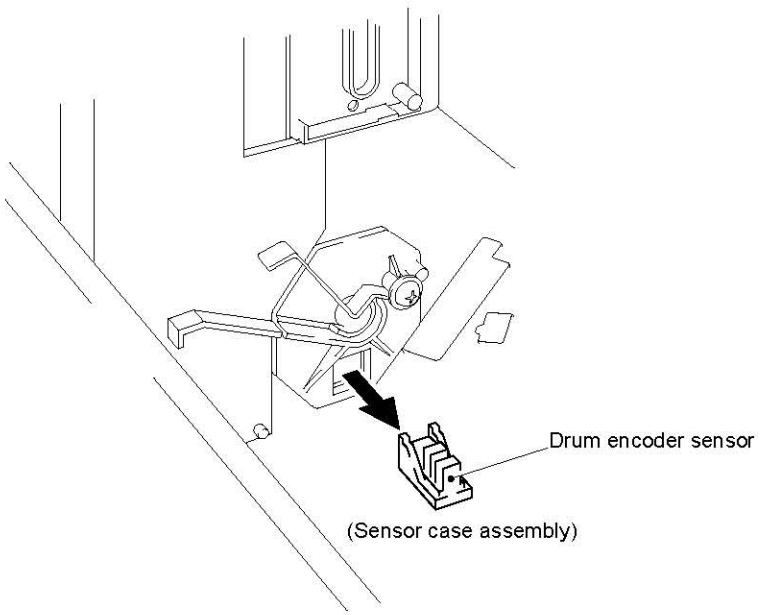


Fig. 7-52

4.3.6 Fuser connector 3

(1) Remove the shoulder screws SP3x10* (2 pcs.) from the fuser connector 3.

(2) Disconnect the connectors (2 pcs.) from the Low-voltage power supply unit (power supply unit 3).

(3) Remove the fuser connector 3.

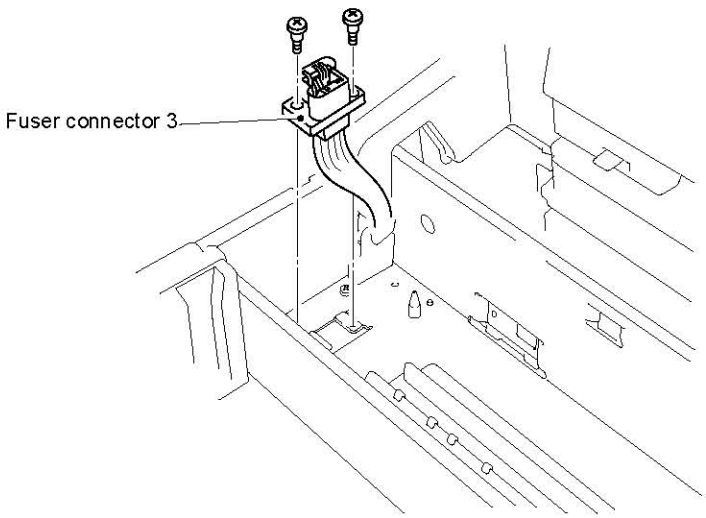


Fig. 7-53

4.3.7 Rear cover 3 (R)

(1) Remove the set screw BT4x10 (1 pc.) of rear cover 3 (R).

(2) Remove the rear cover 3 (R).

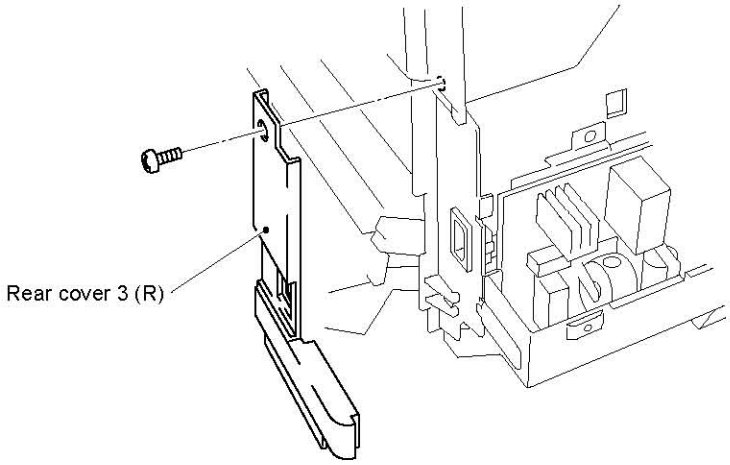


Fig. 7-54

4.3.8 Low-voltage power supply unit (Power supply unit 3 (EC)(US))

(1) Remove the power switch key by pulling it forwards.

(2) Remove the set screws ST3x6 (3 pcs.) to remove the front shield.

(3) Remove the set screws ST3x6 (2 pcs.) to remove the bottom shield plate.

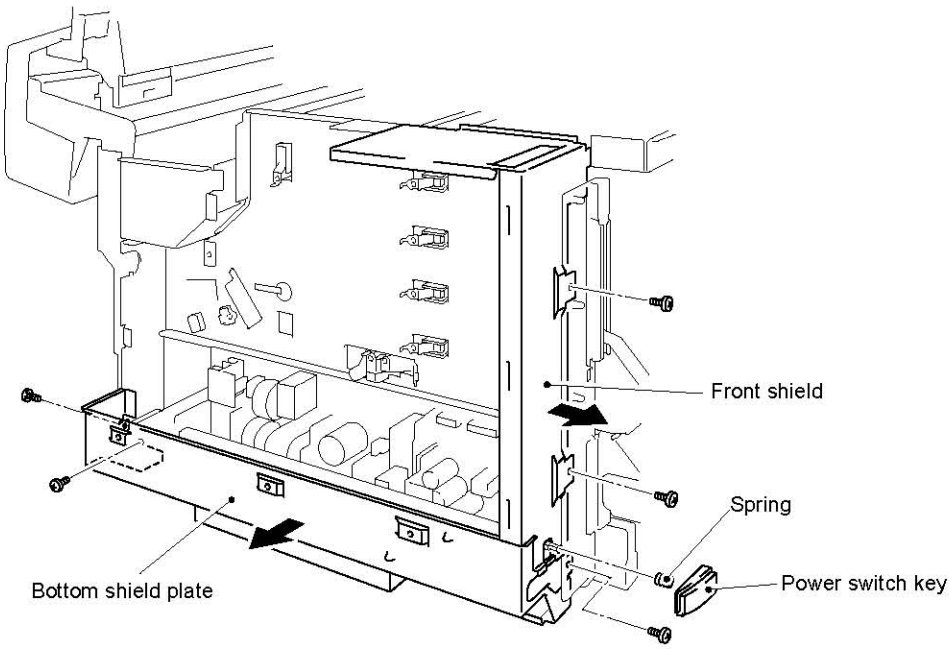


Fig. 7-55

(4) Remove the set screw ST3x6 (2 pcs.) holding the power inlet base.

(5) Remove the set screw M4x6 complete with the shakeproof washer to release the ground wire.

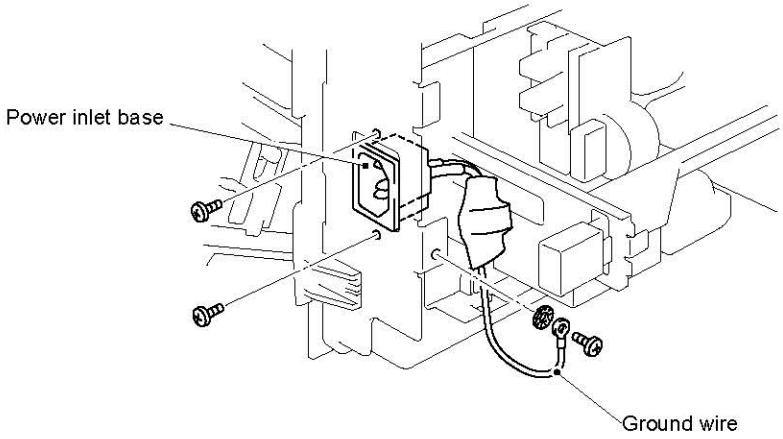


Fig. 7-56

(6) Disconnect the connectors (4 pcs.) from the low-voltage power supply PCB.

(7) Remove the set screws ST3x6 (3 pcs.) from the low-voltage power supply unit frame.

(8) Remove the low-voltage power supply unit complete with the frame.

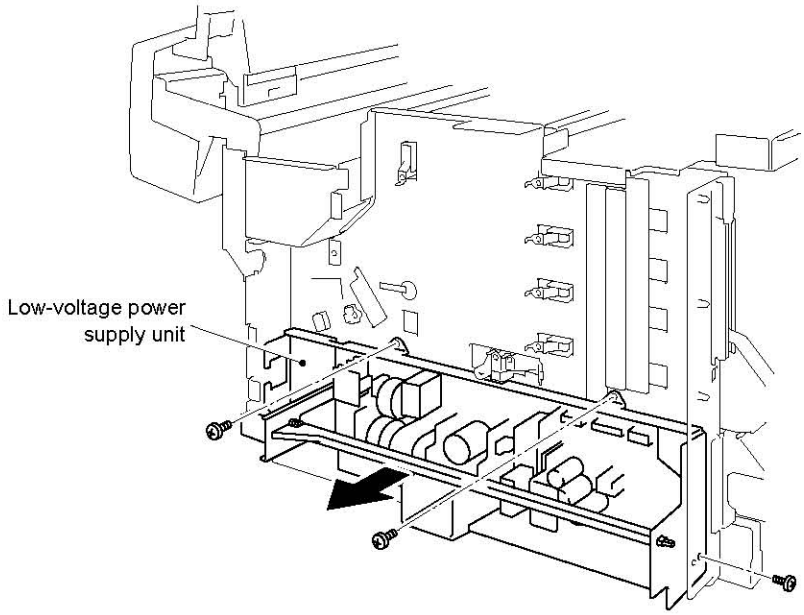


Fig. 7-57

WARNING

The ground wire is very important for the safety of users.

Upon replacement of the low-voltage power supply unit, confirm that the ground wire (green and yellow color) is securely connected to the ⏚ connector, the shakeproof washer is fitted and the screw is tightly fastened.

4.3.9 Interlock switch (Front) (for front cover)

(1) Remove the set screw (1 pc.) to remove the switch holder assembly from the frame.

(2) Release the two hooks to remove the interlock switch.

(3) Disconnect the switch connector.

(4) Remove the interlock switch from the switch case.

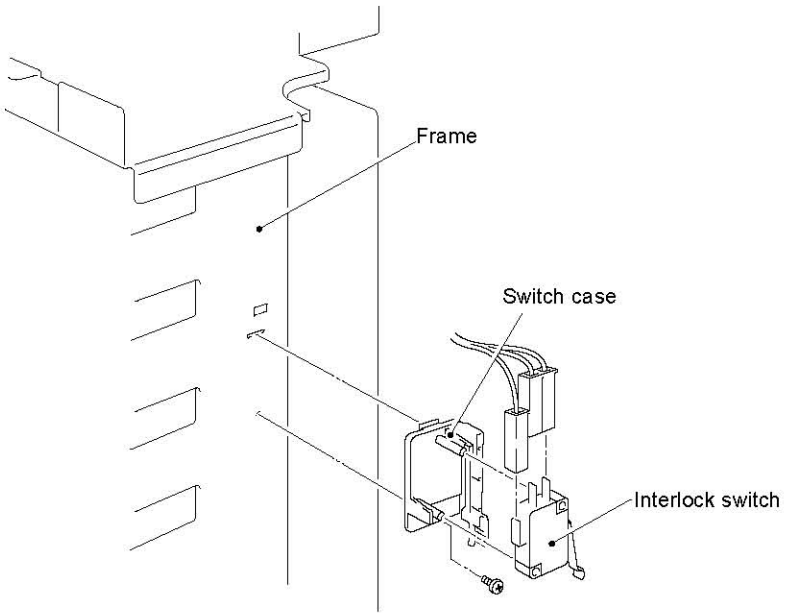


Fig. 7-58

CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.3.10 Toner key sensor (TNK)

(1) Remove the set screws ST3x6 (4 pcs.) from the toner key sensor PCB.

(2) Disconnect the connector (1 pc.) connected to the IOD1 PWB.

(3) Remove the toner key sensor PCB.

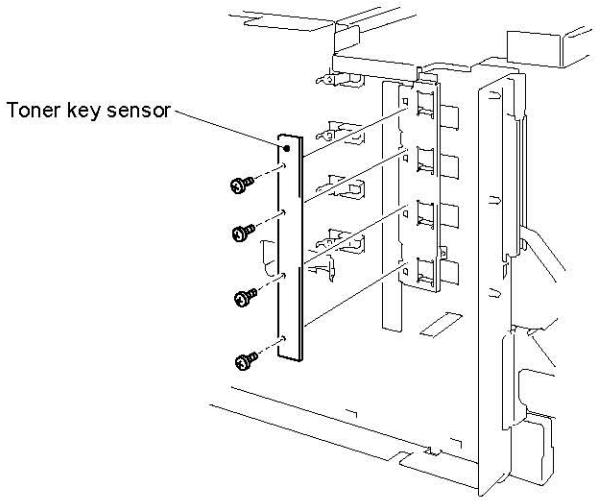


Fig. 7-59

4.3.11 Toner sensor (TTR)

(1) Remove the set screw ST3x6 (2 pcs.) to remove the metal plate.

(2) Remove the set screws ST3x6 (2 pcs.) from the toner sensor PCB.

(3) Disconnect the connector and remove the toner sensor PCB.

NOTE:

There are two sets of tapped holes for the metal plate. Be sure to attach the metal plate onto the one closest to the toner sensor.

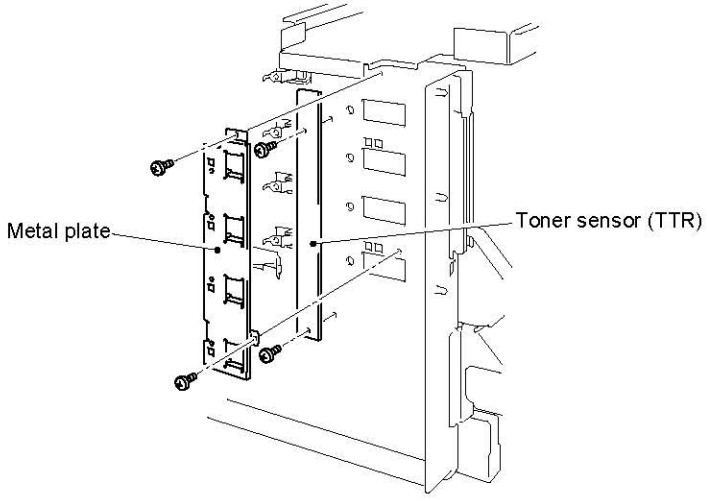


Fig. 7-60

4.4 Paper Exit Unit

4.4.1 Rear cover 3 (U)

(1) Remove the rear cover 3 (R). (Refer to subsection 4.3.6 in this chapter.)

(2) Release the two hooks to remove the rear cover 3 (U).

(3) Remove the rear cover (U) caps (2 pcs.) from the rear cover 3 (U) if necessary.

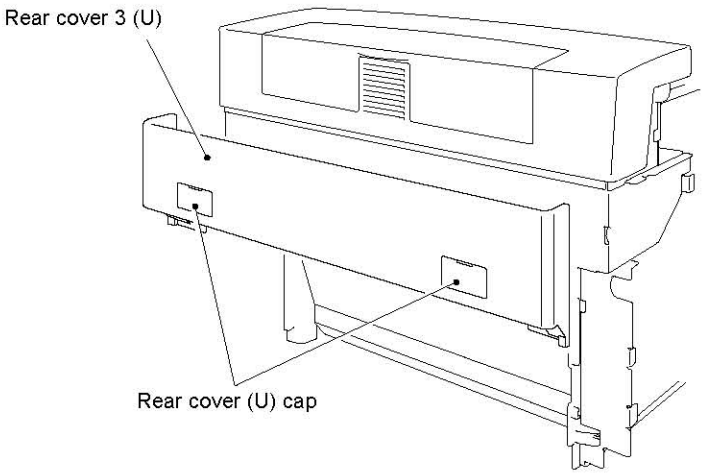


Fig. 7-61

4.4.2 Top cover (Paper exit unit 3) / Fuser fan (FUFAN) (Cooling fan EX)

(1) Disconnect the connector in the cover assembly.

(2) Remove the support pins SP4x3 (2 pcs.) at the left and right sides that act as the paper exit unit hinges.

(3) Remove the paper exit unit from the printer.

(4) Remove the side cover assembly from the paper exit unit 3.

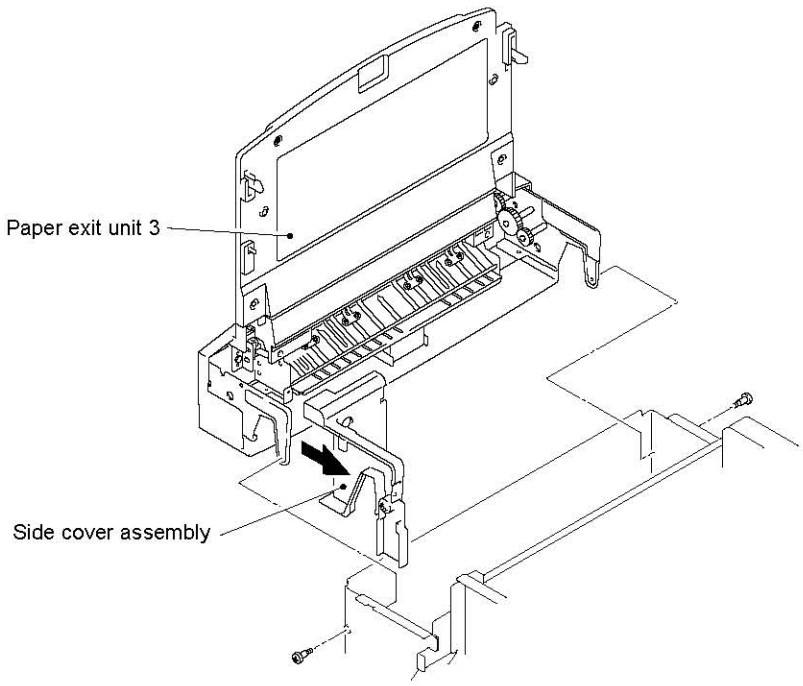


Fig. 7-62

(5) Press the top cover back plate backwards to release the fan motor assembly from the paper exit guide unit.

(6) Remove the fuser fan motor and filter from the case.

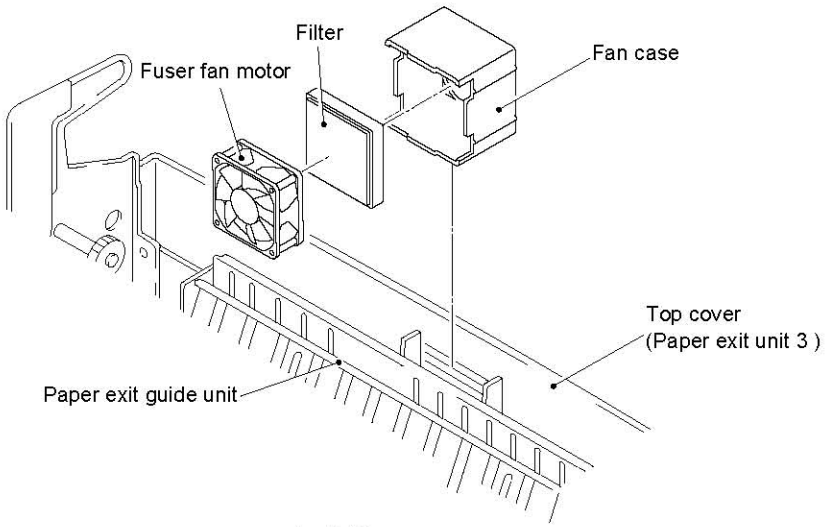


Fig. 7-63

(7) Remove the set screw BT3x8 (2 pcs.) and ST3x6 (2 pcs.) to remove the paper exit front cover 3.

(8) Remove the set screws BT3x12 (4 pcs.) to remove the top cover (paper exit unit 3) from the paper exit guide unit.

(9) Remove the paper exit upper cover 3 from the paper exit unit 3 if necessary.

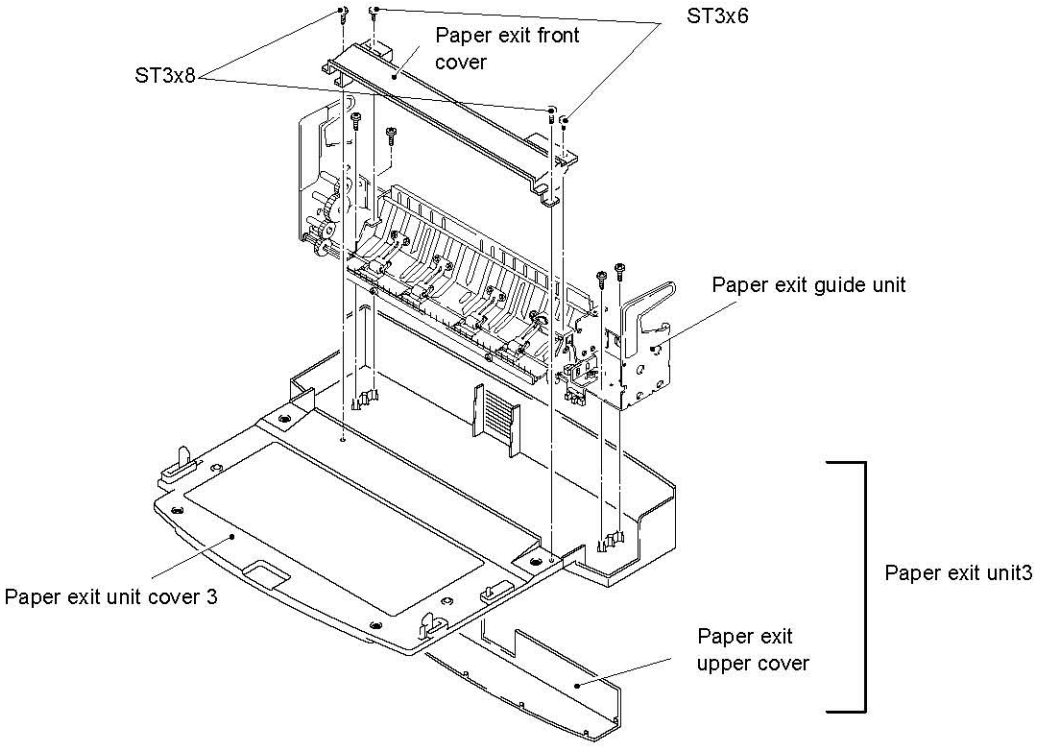


Fig. 7-64

4.4.3 Cleaning roller sensor (PS5)

(1) Remove the set screw ST3x6 (1 pc.) of the sensor base holding the cleaning roller sensor.

(2) Disconnect the harness connected to the cleaning roller sensor.

(3) Remove the cleaning roller sensor from the sensor base.

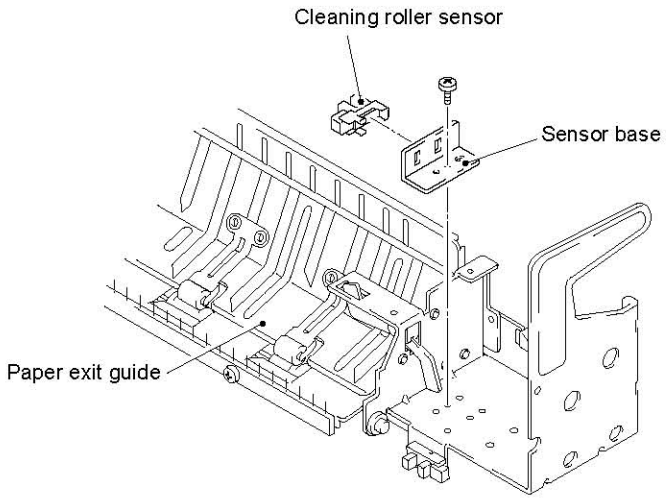


Fig. 7-65

4.4.4 Paper full sensor (PS6)

(1) Disconnect the harness connected to the paper full sensor.

(2) Release the catch to remove the sensor unit from the paper exit guide.

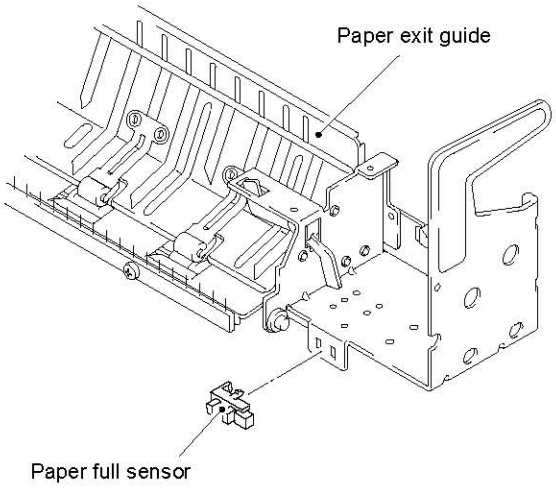


Fig. 7-66

4.4.5 Paper exit sensor (PS2)

(1) Disconnect the harness connected to the paper exit sensor.

(2) Remove the paper exit sensor from the sensor base.

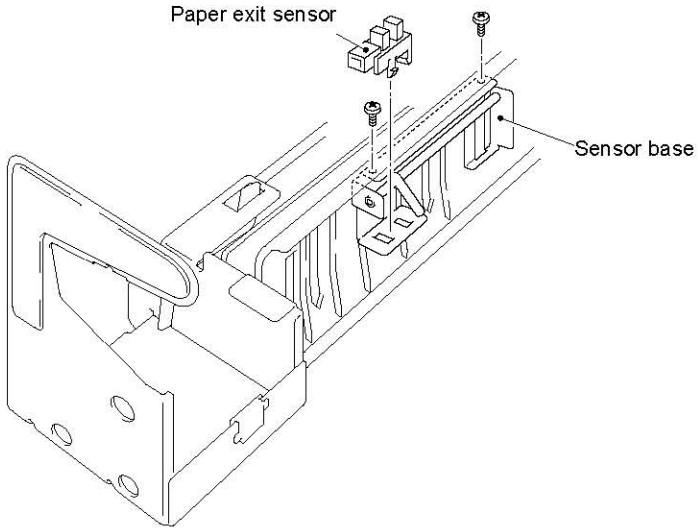


Fig. 7-67

NOTE:

When re-assembling the cleaning roller sensor and paper exit sensor, be sure to connect the correct harness to either sensors as below;

- *Cleaning roller sensor harness: Brown*
- *Paper exit sensor harness: Yellow*

4.4.6 Discharger brush (Discharging brush 3)

(1) Remove the fixing screws BT4x8 (2 pcs.) from the discharger brush.

(2) Remove the discharger brush.

> ***PRECAUTION***
>
> *Do not deform the discharger brush.*

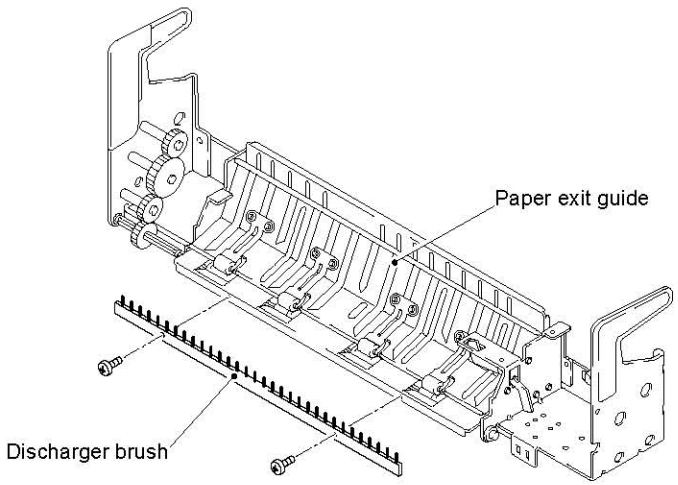


Fig. 7-68

4.4.7 Paper exit roller 3

(1) Remove the set screw ST3x6 (1 pc.) to remove the plastic retainer from the paper exit guide.

(2) Remove the C ring and washer from the left and right hand sides of the roller.

(3) Remove the plastic bush at both sides.

(4) Remove the paper exit roller 3 from the paper exit guide.

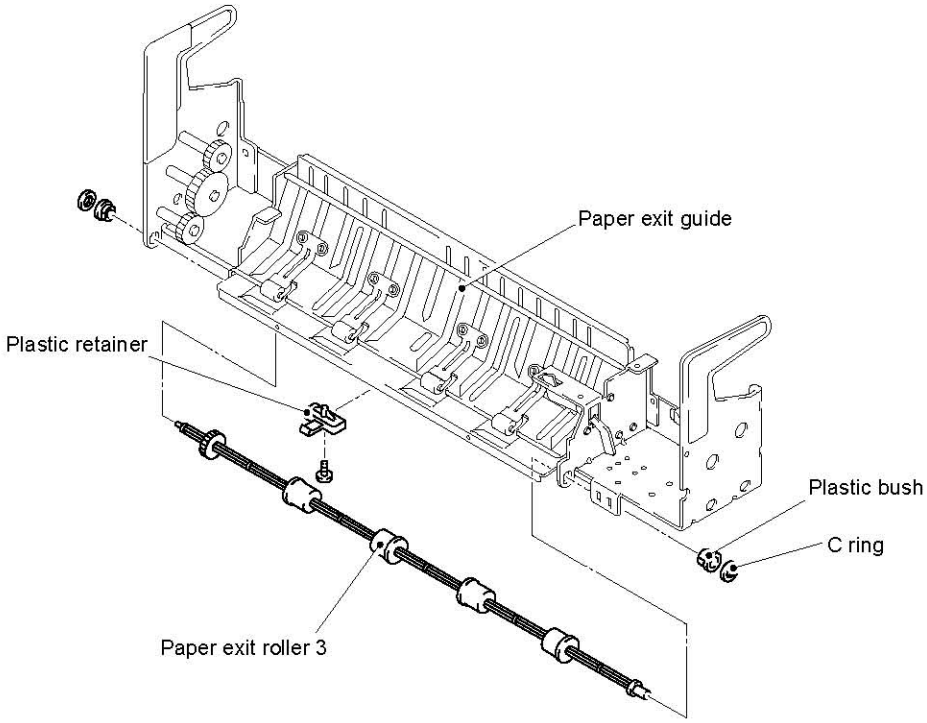


Fig. 7-69

4.5 Front of the Printer

4.5.1 Front outer cover (Front cover 3)

(1) Open the front cover unit 3.

(2) Remove the set screws BT4x10 (2 pcs.) from the front cover unit 3.

(3) Unhook the five hooks and remove the front outer cover.

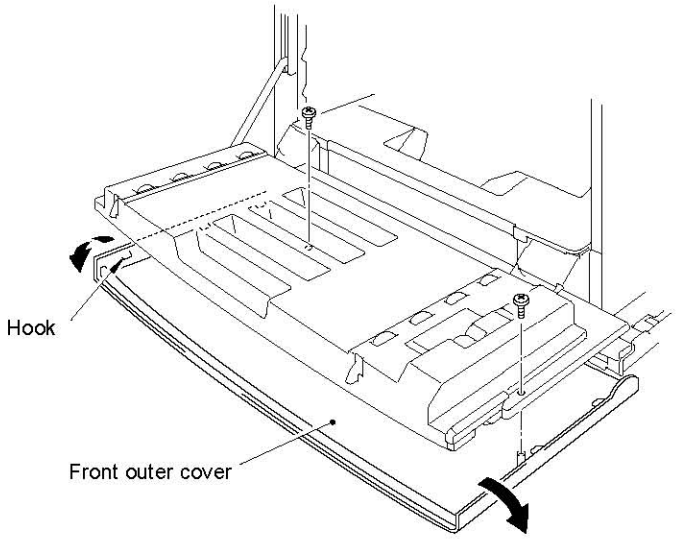


Fig. 7-70

4.5.2 Front cover unit 3

(1) Close the front cover.

(2) Remove the set screw ST4x6 (6 pcs.) to remove the front cover supports at left and right sides from the frame.

(3) Remove the set screw ST3x6 (1 pc.) from the front hinge (L) to remove the front hinge support from the frame.

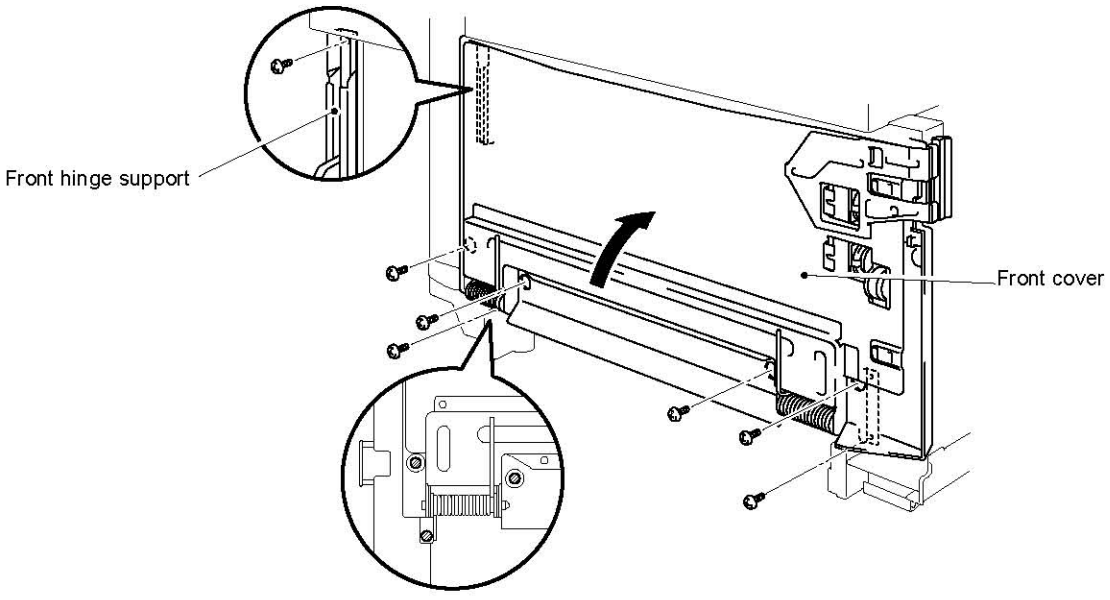


Fig. 7-71

(4) Remove the screws BT4x8 (4 pcs.) from the front inner cover.

(5) Unhook the two hooks by slightly lifting up the front inner cover and remove the hinge from the front cover unit 3.

(6) Disconnect the connectors (4 pcs.) from the front cover unit 3.

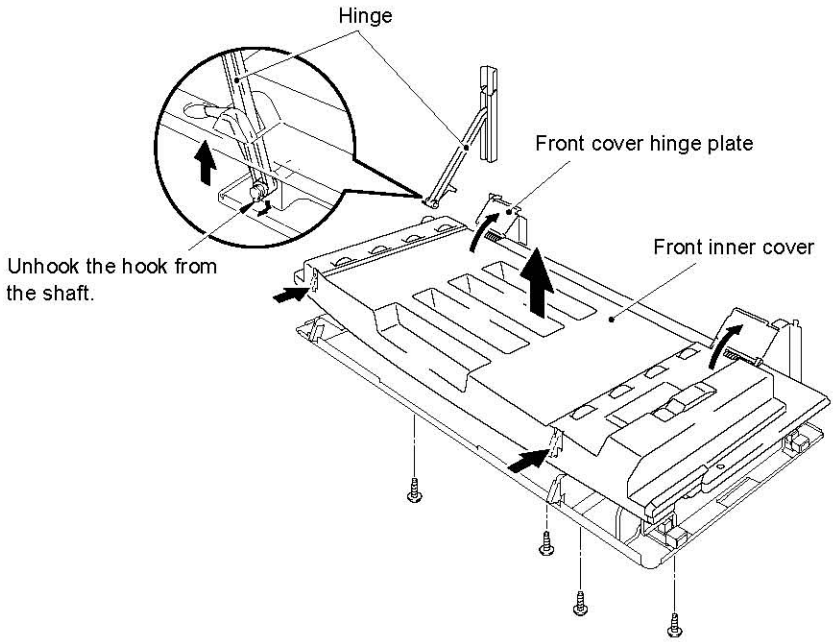


Fig. 7-72

(7) Remove the C rings (2 pcs.) to remove the shafts from the front cover hinge plates at left and right sides of the frame.

(8) Gently lower the front cover to release the hinge spring tension.

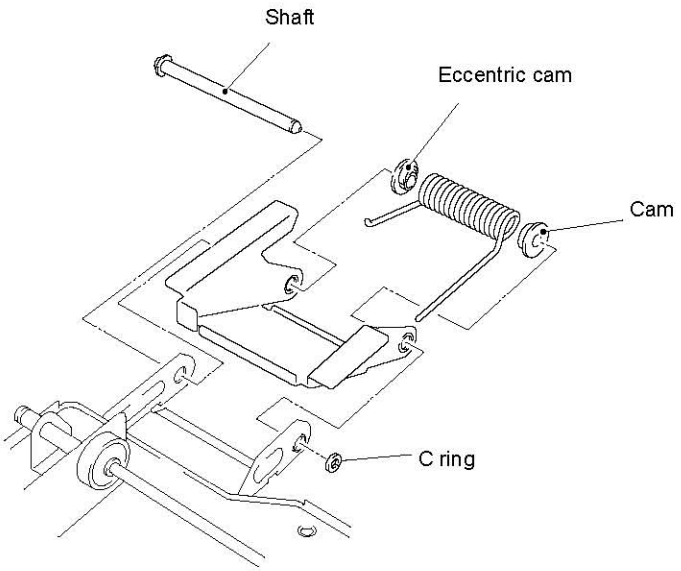


Fig. 7-73

4.5.3 Laser unit (Scanner motor inclusive) (Optical unit 3)

(1) Remove the set screws ST3x6 (2 pcs.) to remove the scanner cover.

(2) Remove the fixing screws with flanges FST3x10 (3 pcs.) from the laser unit.

(3) Disconnect the harness connector (1 pc.) from the laser unit.

(4) Remove the laser unit from the printer.

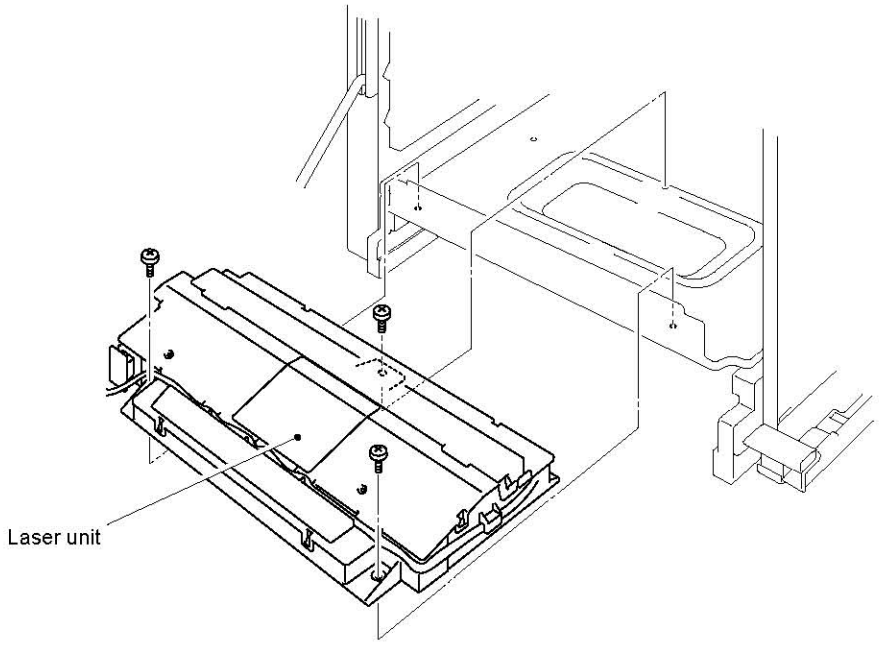


Fig. 7-74

WARNING

- *There is a class IIIb laser within the laser unit. Do not attempt to disassemble the laser.*
- *The laser unit is replaced as a complete unit. No adjustment is required to the replacement laser unit.*
- *Confirm that all the covers have been correctly installed prior to any test run or operation in order to prevent any laser radiation escaping from the printer.*

4.6 Rear of the Printer

4.6.1 Rear access cover (TR unit cover 3) / Transfer unit 3

(1) Open the rear access cover.

(2) Remove the fixing screw BT4x10 (1 pc.) of the retaining strap supporting the transfer unit 3 to the printer body.

(3) Take the transfer unit 3 out by holding the unit horizontally to remove the transfer unit 3.

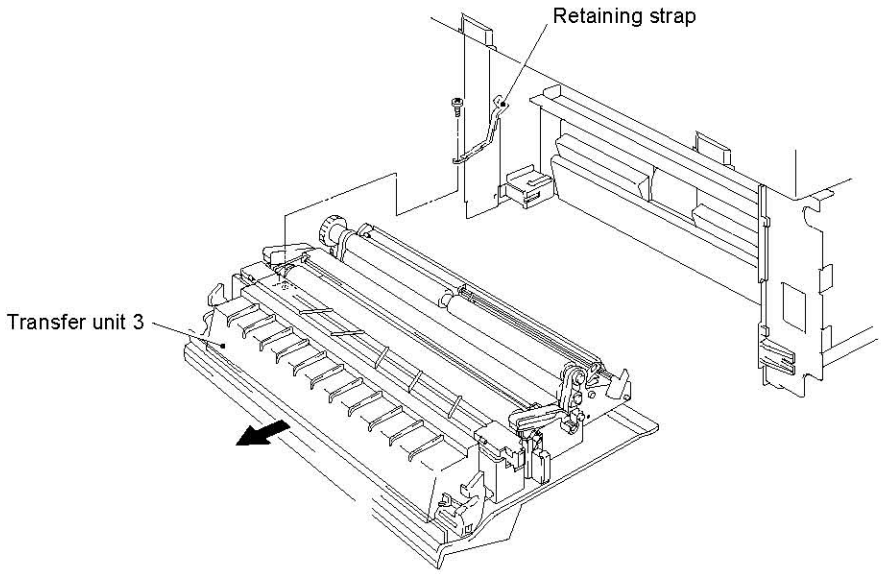


Fig. 7-75

(4) Remove the set screws BT3x8 (4 pcs.) from the transfer unit 3.

(5) Remove the transfer unit 3 from the rear access cover.

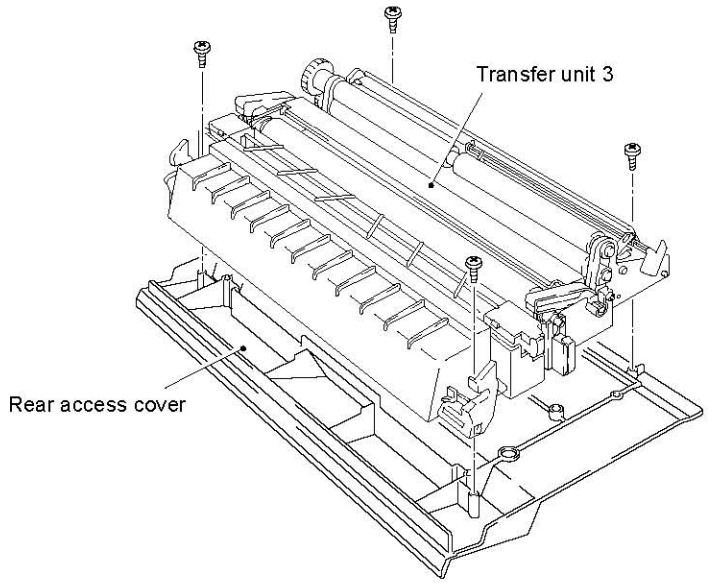


Fig. 7-76

NOTE:

When reassembling the transfer unit, install the support shaft into the right hand hole first.

4.6.2 Transfer roller 3

(1) Lift the transfer roller 3 lock levers to release both ends of the roller.

(2) Pull up and remove the transfer roller 3.

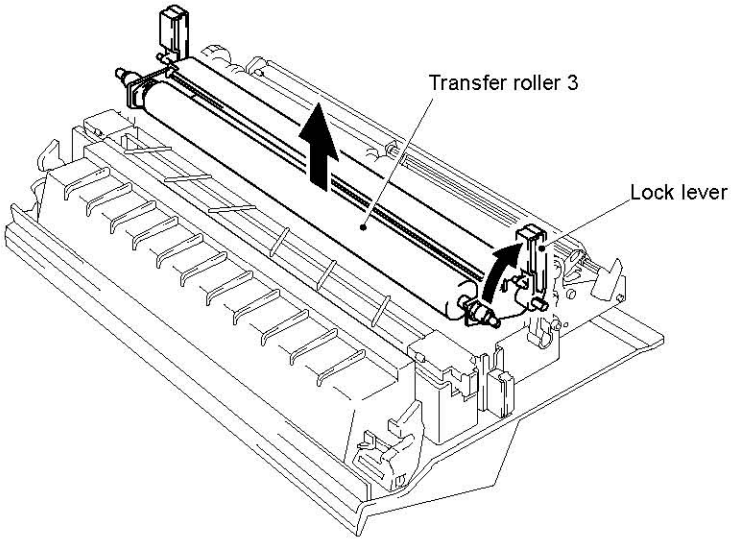


Fig. 7-77

4.6.3 Register roller

(1) Remove the roller fixing C rings from both ends of the roller.

(2) Remove the gear from the shaft (left hand side).

(3) Remove the plastic bushes at both ends.

(4) Remove the plastic bush from the frame while pressing down on the pressure roller to release the pressure from the register roller.

(5) Remove the register roller.

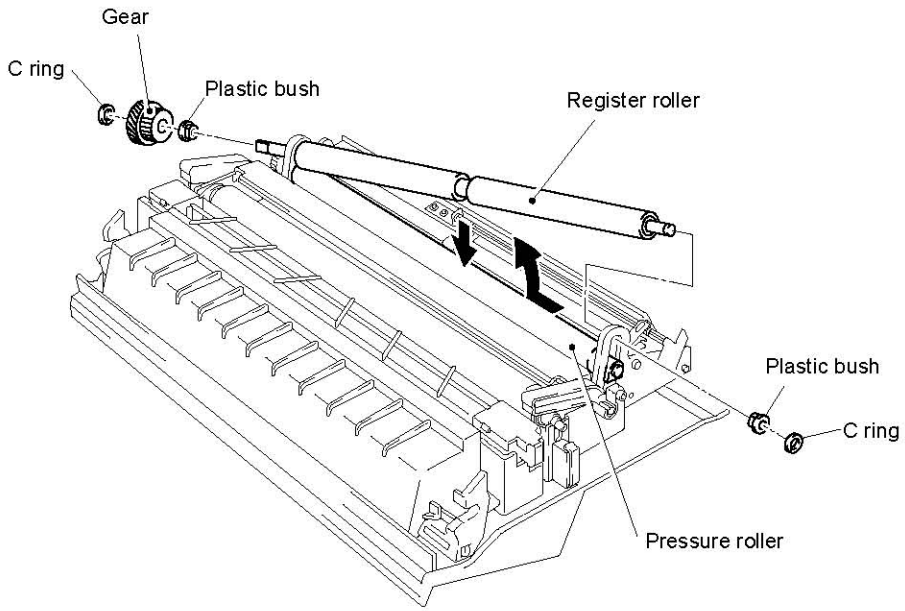


Fig. 7-78

4.6.4 Paper size sensor 3 (PSU)

(1) Remove the set screws ST3x6 (2 pcs.) to remove the lower paper guide.

(2) Remove the set screws ST3x6 (2 pcs.) holding the paper size sensor PCB.

(3) Disconnect the paper size sensor connector, and remove the paper size sensor.

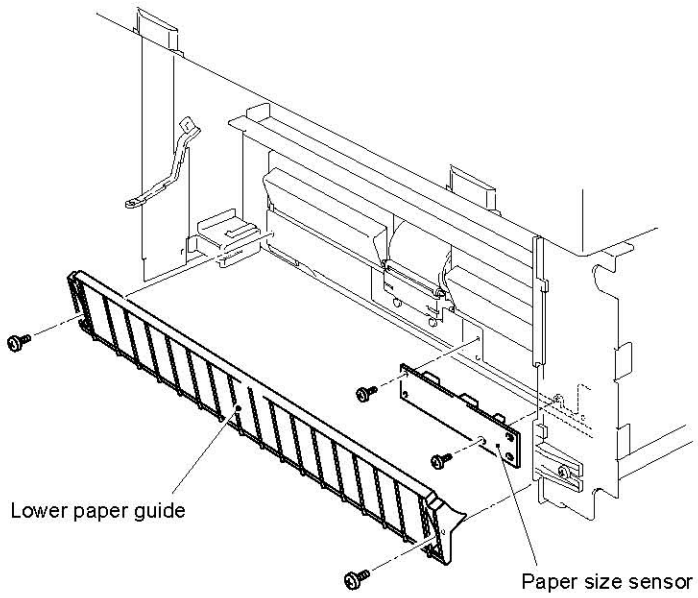


Fig. 7-79

4.6.5 Paper feeding roller / Separator pad (2)

(1) Remove the set screws ST3x6 (2 pcs.) from the paper guide (UL).

(2) Remove the paper guide (UL).

(3) Disconnect the harnesses (2 pcs.) connected to the OHP sensor and paper empty sensor.

(4) Remove the paper feeding roller from the rear of the printer.

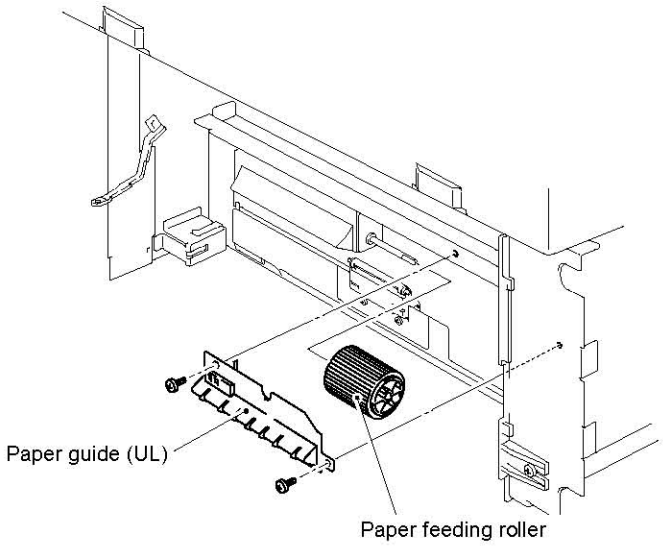


Fig. 7-80

(5) Pull up and remove the separator pad (2).

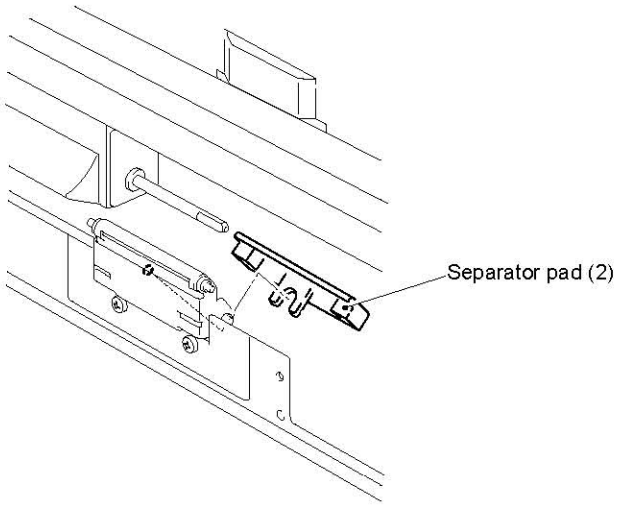


Fig. 7-81

> **⚠ PRECAUTION**
> *Do not touch the surface of the paper feeding roller and separator pad (2).*

4.6.6 Paper empty sensor (PS3) / OHP sensor (OHP)

(1) Disconnect the sensor connectors.

(2) Remove the set screws BT3x8 (2 pcs.) from the OHP sensor and remove the OHP sensor from the paper guide assembly (UL).

(3) Remove the paper empty sensor (PS3) from the paper guide assembly (UL)

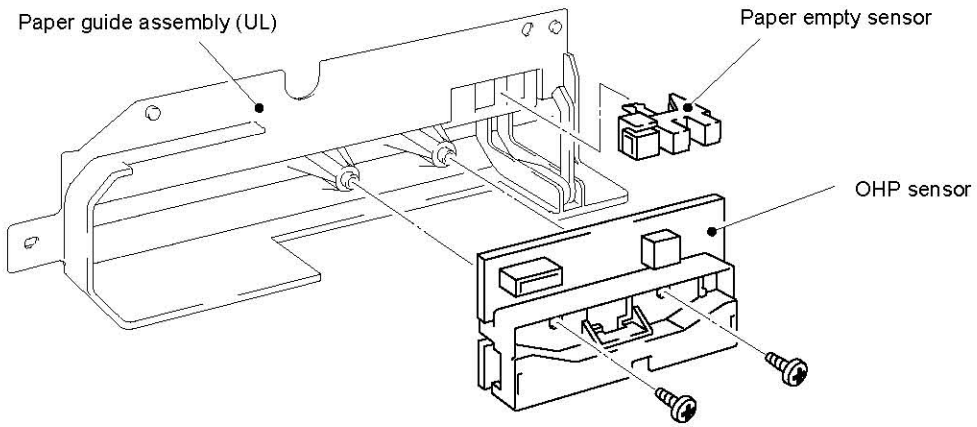


Fig. 7-82

4.6.7 Paper feeding sensor (PS1)

(1) Remove the paper feeding sensor from the rear frame.

(2) Disconnect the connector on the paper feeding sensor.

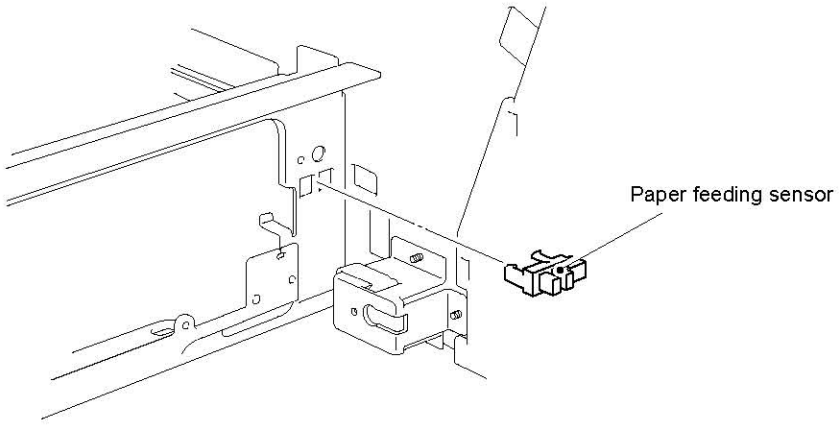


Fig. 7-83

4.7 Fusing Unit

DANGER

Note in Parts Replacement

- *The fusing unit consists of important safety parts.*

Therefore, replacement of parts or disassembly and maintenance work should only be done at an appropriate service facility by skilled service personnel acquainted with electrical safety. After re-assembly the product safety should be reconfirmed.

- *Since the fuser unit is very hot, make sure that the fuser unit and surrounding area are well cooled down prior to starting the replacement of parts. You may get burned when touching hot areas.*
- *The fusing unit contains silicone oil. Take care not to spill the silicone oil, especially on the floor, as the floor will become very slippery and dangerous.*

4.7.1 Oil pan unit 3

(1) Remove the fixing screw ST3x6 (1 pc.) to remove the F cover (L).

(2) Remove the fixing screw ST3x6 (1 pc.) to remove the F cover (R).

(3) Remove the fixing screws ST3x6 (2 pcs.) to remove the oil pan unit 3 from the fusing unit.

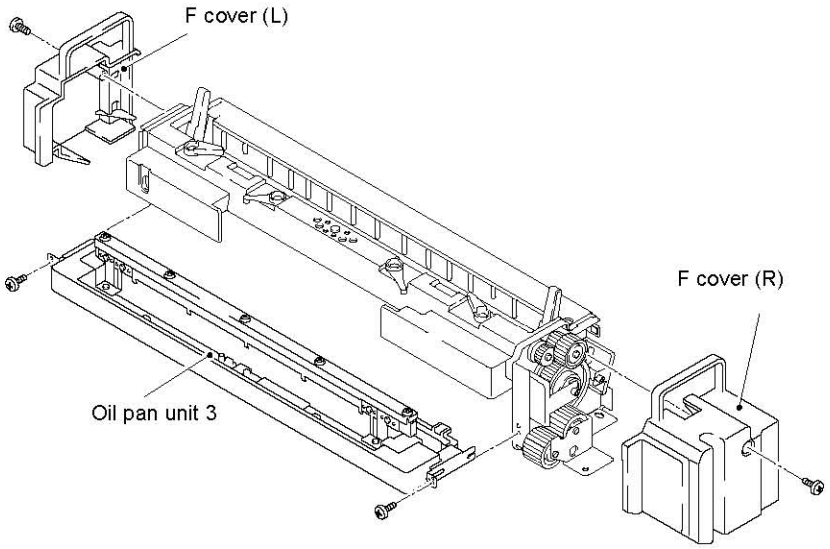


Fig. 7-84

4.7.2 Oil pad

Remove the fixing screws ST3x6 (2pcs.) to remove the oil pad from the oil pan unit 3.

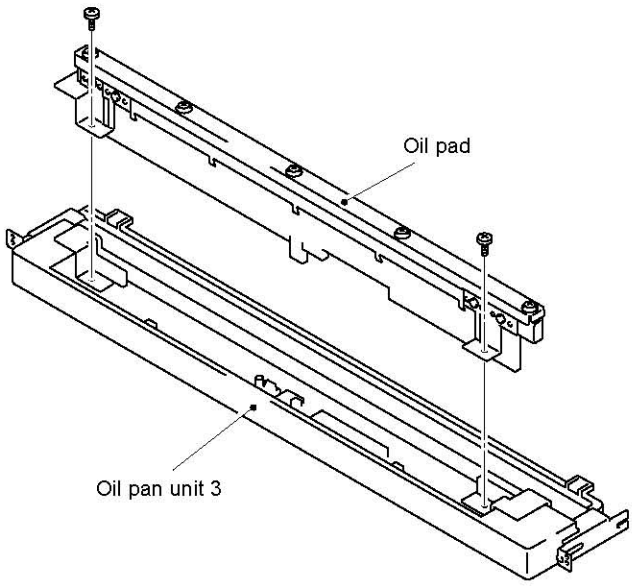


Fig. 7-85

4.7.3 Fusing heater lamp (Fusing heater 3 (US)(EC))

(1) Remove the fixing screw ST3x6 (2 pcs.) and slide the F cover (B) to the right to remove it.

(2) Remove the fixing screws with washer M3x6 (2 pc.) from securing the two heater harnesses. (1st and 3rd harnesses from the left hand side.)

(3) Remove the fixing screws ST3x6 (4 pcs.) to remove the heater support (HR/BR) at the right hand side.

(4) Remove the screw with washer M3x6 from the heater electrode plate of each lamp.

(5) Pull out the fusing heater lamps from the inside of the back-up roller and fuser roller.

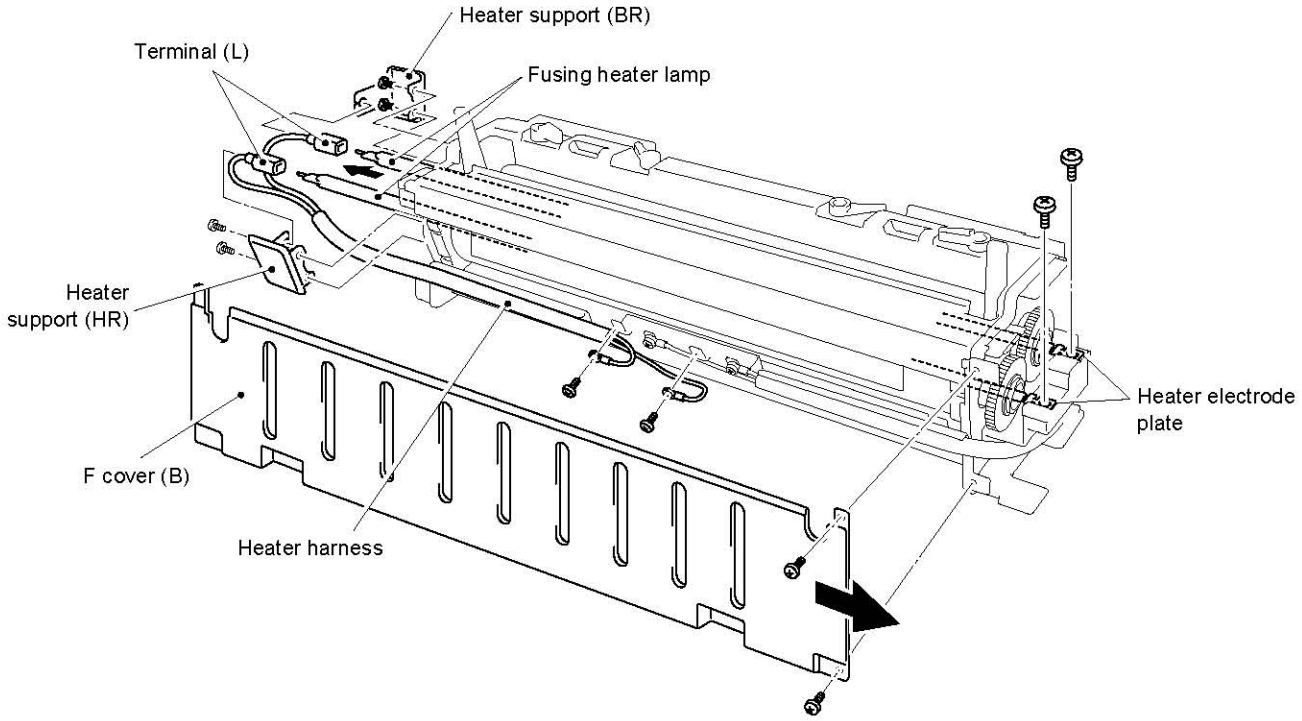


Fig. 7-86

⚠ PRECAUTION

- *Do not touch the surface of the heater lamp with your hands, the small traces of oil you leave on the lamp will affect the life of the lamp.*
- *The wattage of the heater lamp is different between the fuser roller and the back-up roller. The wattage is marked on the insulator of the lamp electrode.*

  Fuser roller: 560W

  Back-up roller : 420W

NOTE:

When installing the new fusing unit into the printer, you have to wait approximately for 30 minutes after the unit is installed to allow the fusing oil to circulate in the unit.

CHAPTER 8
TROUBLESHOOTING

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CHAPTER 8 TROUBLESHOOTING

This chapter contains troubleshooting information for both the Video Controller Mode and the Engine Controller Mode.

If any problem occurs during the normal usage of the printer, which means the printer is being used in the Video Controller Mode, clear the problem by referring to the troubleshooting information in the following sections for the Video Controller Mode or the user's guide.

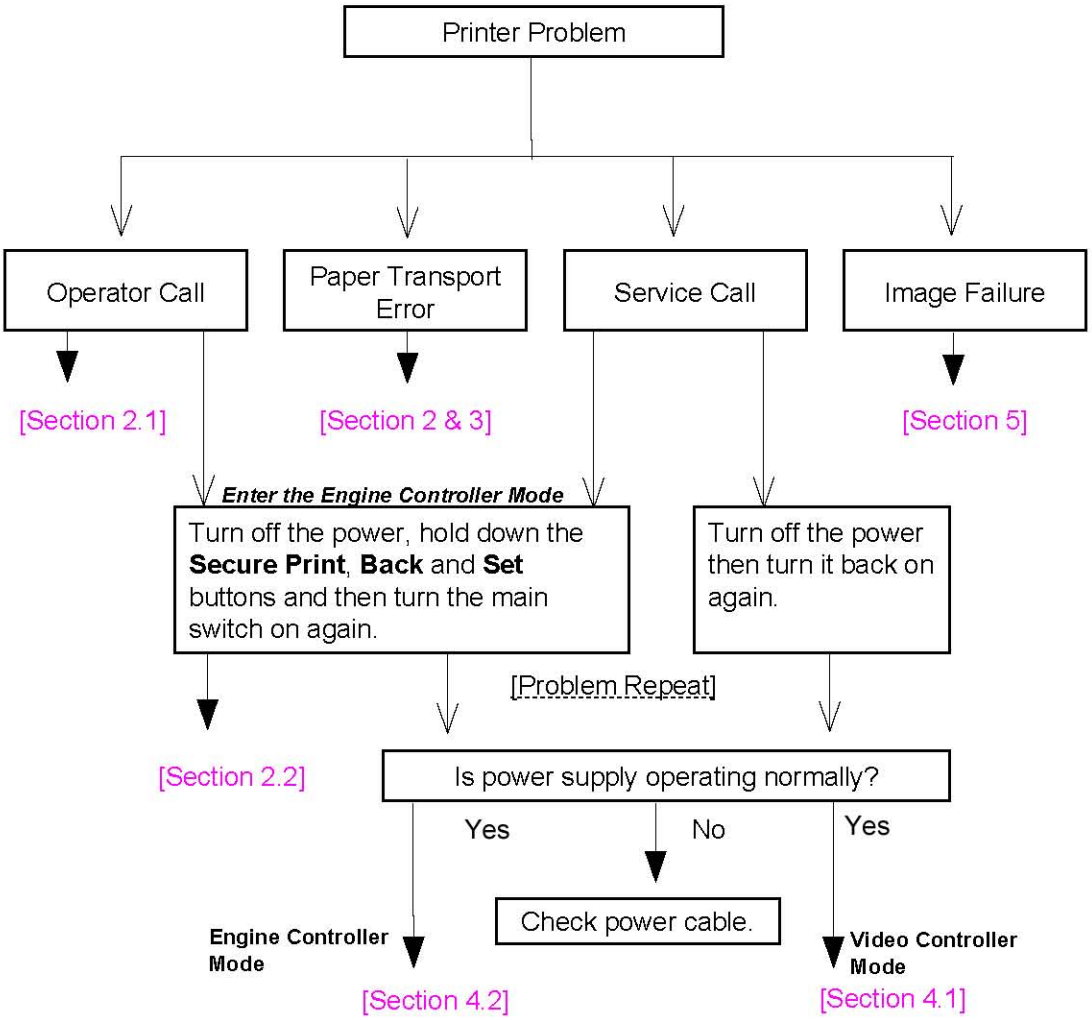
However, if a problem occurs in the video controller itself, use the Engine Controller Mode information as it may be easier to understand the cause of the problem because the Engine Controller mode can separate the problem in the video controller from the printing operations.

The error messages used in the Video Controller Mode basically contain the same ones that are used in the Engine Controller Mode. All error status messages are displayed in the Video Controller Mode other than when an error occurs in the video controller itself or in the communication between the video controller and the engine controller.

NOTE:

The operation of the control panel and the display on the LCD vary depending on the mode selected.

1. OUTLINE OF TROUBLESHOOTING



2. OPERATOR CALL

2.1 Video Controller Mode

The **Power** LED is lit and an applicable message appears on the liquid crystal display (LCD) in the following cases;

1) Consumables require to be replenished.
2) Waste toner pack is full of waste toner.
3) Paper jam.
4) Periodic maintenance.
5) Maintenance work incomplete.

The above cases are not regarded as a breakdown, and should be treated in accordance with Table 8-1;

Table 8-1

Display Message	Remarks
TONER EMPTY X Replace the X toner cartridge.	X = C, M, Y, K
NO TONER X Install the X toner cartridge.	X = C, M, Y, K
COVER OPEN Close the Front Cover.	
COVER OPEN Close the Top Cover.	
COVER OPEN Close the Rear Access Cover.	
COVER OPEN Close the Lower Feeder Unit Cover.	
COVER OPEN Close the Duplex Unit Cover.	
JAM X Refer to the diagram, and check the location. Remove the jammed paper.	X = A1, A2, A3, B, C, D, E1 ,E2
NO PAPER T1/2/3 Load paper into Tray 1/2/3.	
WASTE TONER Replace the waste toner pack.	
OIL EMPTY Replace the oil bottle.	
CHANGE FCR Replace the cleaning roller.	

Display Message	Remarks
NO OPC BELT Install the OPC belt.	
NO FC ROLLER Install the cleaning roller.	
NO LFU Install the lower tray unit.	
NO TR ROLLER Install the transfer roller 2.	
ILLEGAL TONER Use only Brother genuine toner cartridges.	
NO TRAY 1/2/3 The indicated paper Tray was not detected, install it, or ensure it is inserted correctly.	
SIZE ERROR T1/2/3 Specify the correct paper size for the indicated tray.	
SIZE ERROR DX The duplex unit can only print in the sizes specified. Specify the correct paper size.	
STACKER FULL Remove the paper from the output tray.	
MEDIA MISMATCH Media mismatch between the Printer and the Printer Driver setting. Load XX into Tray <1/2/3>.	XX = Plain Paper, Transparencies, Thick Paper
SIZE MISMATCH Paper mismatch between the Printer and the Printer Driver setting. Load Paper <size> size into Tray <1/2>.	
MANUAL FEED Load paper <size> into tray1 and press GO.	
MEDIATYPE ERROR Specify the correct media type : XX.	XX = T1, T2, T3, DX
NO FUSING UNIT A fusing Unit was not detected, please install one.	
CARD ERROR An error when accessing the Flash card, check the drive is formatted and not in Write Protect mode.	
HDD ERROR An error occurred accessing the HDD, power cycle the printer and check that it is formatted.	

Display Message	Remarks
DIMM ERROR Ensure that the DIMM is installed correctly.	
CARD REMOVAL The Flash card was removed while the printer was powered on. Power cycle the printer.	
BUFFER ERROR Check the cable connection between the computer and printer.	
STORAGE FULL There is no space on the Hard Disk.	
STORAGE FULL The RAMDISK SIZE is set to 0MB there is no more space to store jobs.	
STORAGE FULL There is no space in the Compact Flash.	
STORAGE FULL There is no space on the Flash Memory.	
DOWNLOAD FULL The download buffer of the printer is full. Add more memory to the printer.	
FONT FULL The font memory area is full. Delete fonts or add more memory to the printer.	
MEMORY FULL The printer memory is full and the printer is unable to print the page. Add more memory.	
PRINT OVERRUN Select a lower resolution or set the page protect option in the driver to the correct size.	
IGNORE DATA Check that the correct driver is being used and/or try adding more printer memory.	
MEMORY SHORTAGE Add memory.	Install additional DIMM memory so that the total memory size is 32MB or less.

2.2 Engine Controller Mode

The **Power** LED is lit, and applicable messages appear on the liquid crystal display (LCD) in the following cases;

1) Consumables require to be replenished.
2) Waste toner pack is full of waste toner.
3) Paper jam.
4) Periodic maintenance.
5) Maintenance work being incomplete.
6) Paper exit tray is full of ejected paper.

The above cases are not regarded as a breakdown, and should be treated in accordance with Table 8-2;

Table 8-2

Display Message	Meaning	Countermeasure
11 NO MEDIA UPP/LF1/LF2	No paper in the upper cassette / lower cassette	Replenish paper.
11 CHK MEDIA TYPE UPP/LF1/LF2	Inconsistency of media	Change media.
11 CHK MEDIA FOR DUPLEX	No duplex printing is possible for the designated media.	Change the media or selection.
11 CHK OUTER SELECTION	Designation of paper feed and exit is wrong for duplex printing.	Check the paper feed and exit selected, and change it accordingly.
12 NO TRAY UPP/LF1/LF2	No upper / lower media cassette	Install cassette(s).
12 STACKER FULL	Output paper tray is full.	Remove the paper.
13 REPLACE TONER Y/M/C/K	Toner (Y, M, C, K) empty	Replace with new toner cartridge(s).
14 CHECK WASTE TONER	Waste toner pack full of toner	Replace with a new waste toner pack.
14 CHECK FUSING OIL	Change the oil bottle	Replace with a new oil bottle.
14 CHK CLEANING ROLLER	Change the fuser cleaner	Replace with a new fuser cleaner
15 MISPRINT PAPER/NOPRQ/MEDIA/ DUPLEX	Misprinting occurred	• Confirm status of media cassette. • Confirm correct paper size. • Confirm consistency of media.
16 ALIGN TONER CG Y/M/C/K	Toner cartridge not installed	Confirm the installation of the toner cartridge(s).

Display Message	Meaning	Countermeasure
16 ALIGN FU UNIT	Fusing unit not installed	• Remove the fusing unit and refit it. • Confirm it is correctly installed.
16 ALIGN BELT CG	OPC belt cartridge not installed	Confirm the installation of the OPC belt cartridge.
16 ALIGN FUSER CL ROLLER	Fuser cleaner not installed.	Install the fuser cleaner.
16 ALIGN LFU	Incorrect connection between the engine and fusing unit.	Connect the cable between the engine and fusing unit correctly.
17 MEDIA JAM FEED	Paper jam at feeding area	Remove the media cassette, and remove paper jammed at feeding entrance.
17 MEDIA JAM INNER	Paper jam inside printer	Open the transfer unit, and remove paper jammed inside.
17 MEDIA JAM OUTER	Paper jam at paper exit area	Open the transfer unit / paper exit unit and remove paper jammed inside.
17 MEDIA JAM DRUM	Paper jam wound around the transfer drum	Open the transfer unit and remove the OPC belt cartridge. Remove the paper jam by unwinding the paper from the transfer drum.
17 MEDIA JAM DUPLEX	Duplex paper transportation jam.	• Open the duplex top cover and remove the jammed paper from the inside of the printer. • Open the duplex center cover and remove the jammed paper from the inside of the printer. • Open the duplex bottom cover (M) and remove the jammed paper.
18 CLOSE PANEL FRONT/TOP/REAR/LFU	Covers open	Confirm that the covers are firmly closed.
18 CLOSE TR PANEL DPL	Duplex unit cover is open.	Confirm that the cover is firmly closed.
19 SLEEP MODE	Printer under idling condition	Printer automatically returns to the operating condition when a PRINT signal is sent.
01 WAIT	Printer warming-up	These are normal operation modes.
00 READY	Printer ready to print in standby status	
02 PRINT	Printing in progress	

3. PAPER TRANSPORT ERROR

Paper is transported through the path shown in Fig.8-1. Paper jams at the following locations are easily cleared.

- Paper Feeding Roller
- Fusing Unit
- Transfer Unit
- Paper Exit Unit

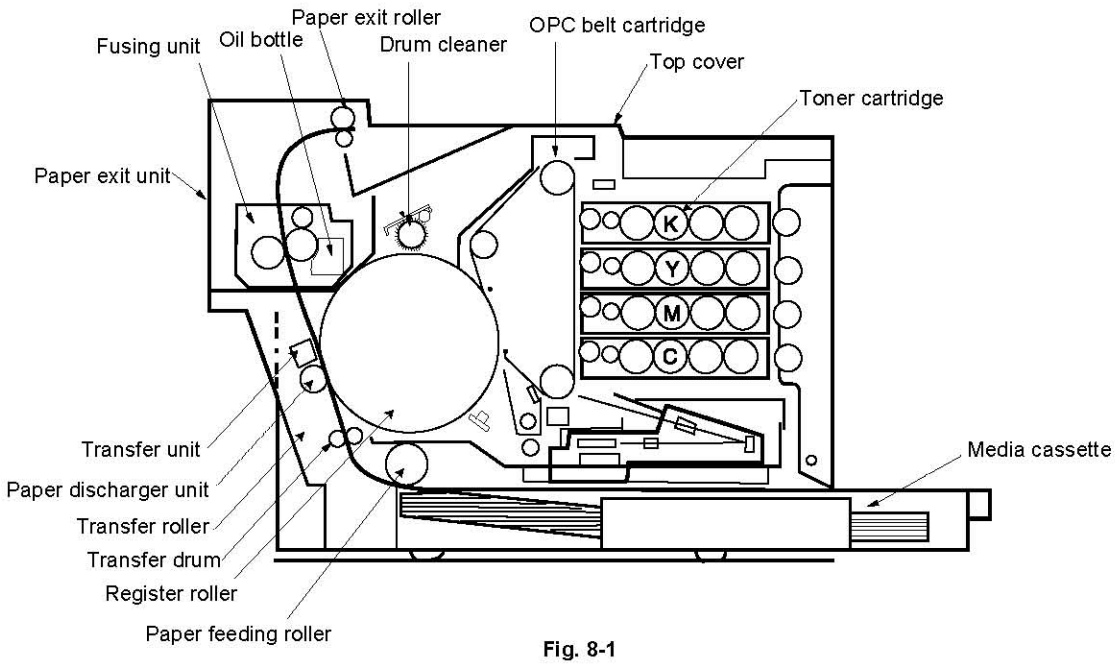


Fig. 8-1

3.1 Feed Jam

Table 8-3

Problem Item	Step	Check Item	Result	Action
Print Paper	1	Is the print paper a recommended paper?	NO	Use a recommended paper.
	2	Is the print paper damp?	YES	Replace the existing paper with new.
	3	Was the paper fanned before loading in the media cassette?	NO	Fan the paper before loading.
Media Cassette	4	Is the print paper set in place?	NO	Set the paper in the correct place.
	5	Is the end plate properly set up?	NO	Set the end plate to meet the paper size.
	6	Is the paper stacked above the line on the paper guide?	YES	Stack the paper below the line.
	7	Is there paper dust around the paper guide?	YES	Clean the paper guide with a cotton cloth.
Pick-up Roller / Separator Pad	8	Is the print paper caught in the paper feeding part?	YES	Remove the paper.
	9	Is the pick-up roller damaged?	YES	Service call required to replace the damaged pick-up roller.

3.2 Inner Jam

Table 8-4

Problem Item	Step	Check Item	Result	Action
Transfer Unit		Open the transfer unit and check.		
	1	Is there any paper inside the unit?	YES	Remove the paper inside.
	2	Is the transfer roller firmly locked by the lock lever?	NO	Fix the transfer roller with the lock lever.
	3	Is the paper discharger unit installed in place?	NO	Install the paper discharger unit firmly in place.
	4	Is there paper dust around the registration roller?	YES	Clean the registration roller with a cotton cloth.
	5	Is the wire of the paper discharger unit damaged?	YES	Replace the existing paper discharger unit with a new one.
Fusing Unit	6	Is the fusing unit installed in place?	NO	Install the fusing unit firmly in place.
	7	Is there any paper trapped between the rollers?	YES	Remove the trapped paper.
	8	Is there fuser oil still in the oil bottle?	NO	Replace the existing oil bottle with a new one.

3.2.1 Paper guide D

⚠ CAUTION

Fusing unit and its peripheral parts are very hot. Before starting the replacement work, make it sure that the unit and parts is well cooled down.

(1) Turn the power switch off and unplug the power cord from the outlet.

(2) Confirm that the temperature of the unit and parts is well cooled down.

(3) Open the paper exit unit.

(4) Turn the set screws (2pcs.) of fusing unit.

(5) Holding the handle of both sides, remove the fusing unit.

NOTE:
When removing the fusing unit, maintain the unit horizontally so that no oil leakage.

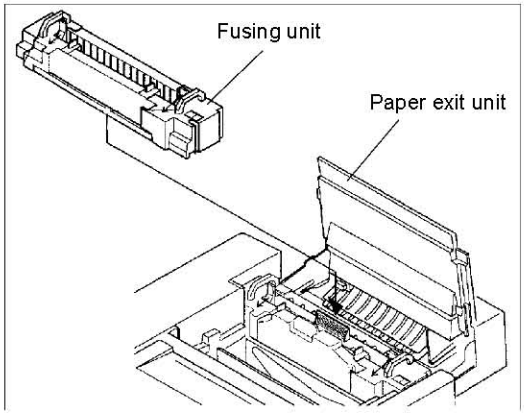


Fig. 8-2

(6) Remove the oil sensor cover.

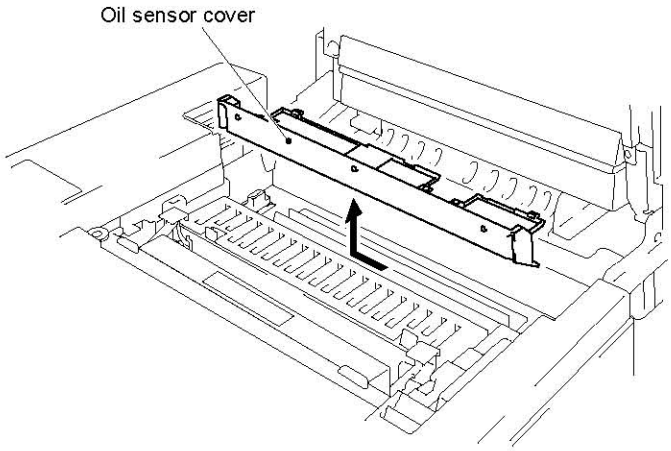


Fig. 8-3

(7) Pushing up the installation claw toward the engine, remove the paper guide.

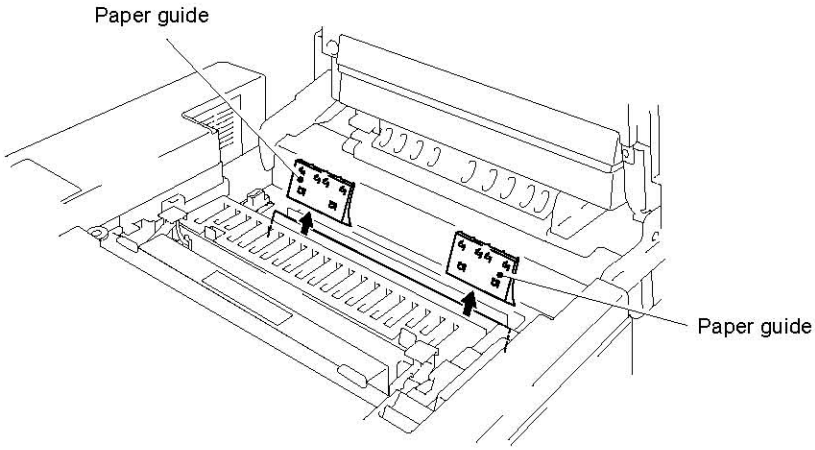


Fig. 8-4

(8) Install a new paper guide D (with a pawl for separating paper). Attend the orientation of installation.

(9) Install the each parts (the oil sensor cover and so on) in accordance with the reverse order of remove procedures.

NOTE:

This printer will be unable to print on A3+ size if these parts are used.

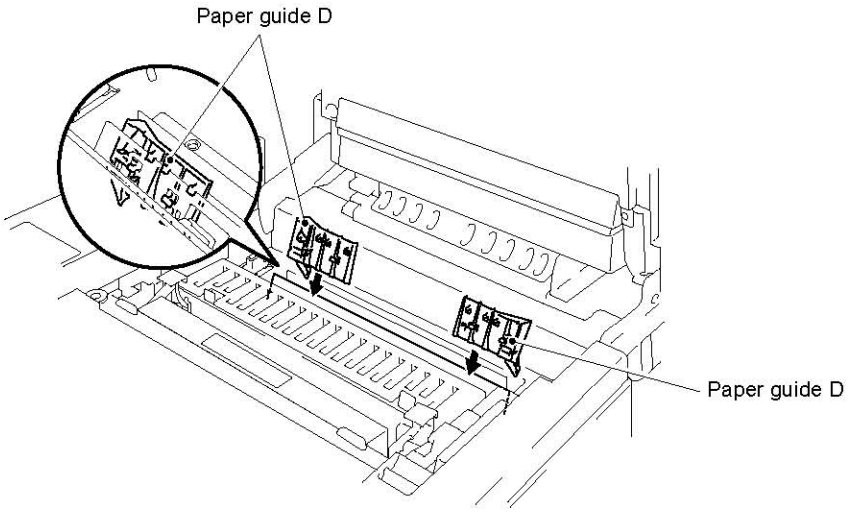


Fig. 8-5

3.3 Outer Jam

Table 8-5

Problem Item	Step	Check Item	Result	Action
Print Paper	1	Is the print paper a recommended paper?	NO	Use a recommended paper.
Paper Exit Unit	1	Is the paper exit unit firmly locked by the lock lever?	NO	Open and close the paper exit unit again.
	2	Is there paper dust around the exit roller?	YES	Clean the exit roller with a cotton cloth.

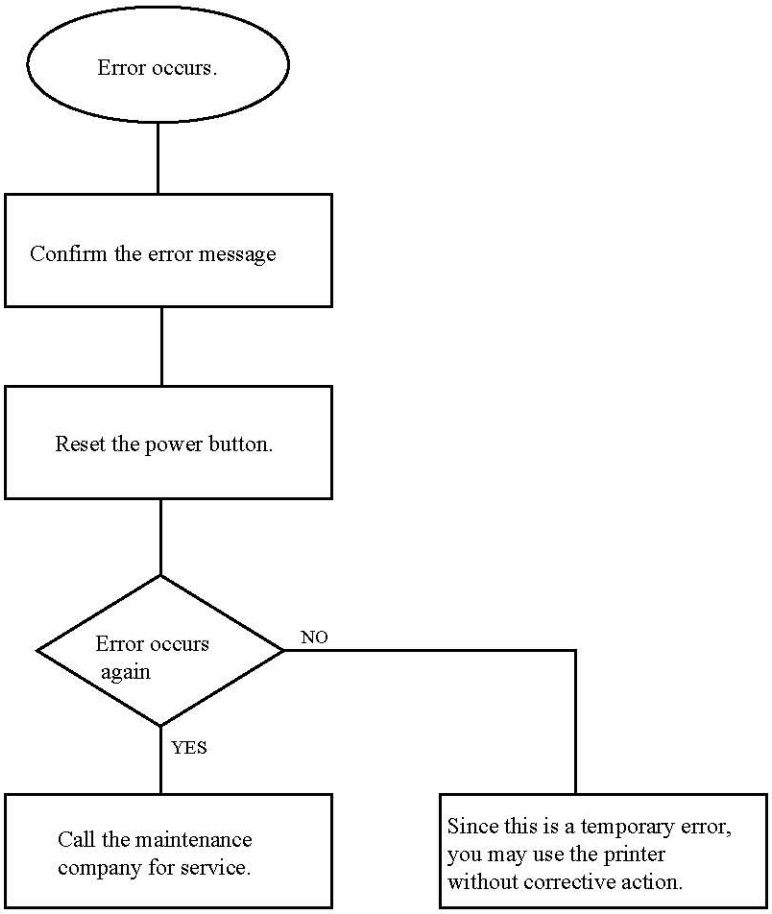
3.4 Others

Table 8-6

Problem Item	Cause	Result	Action
The edge of print paper is creased.	Is the curled paper edge creased when the paper is loaded through the pick-up roller?	YES	Turn over the paper in the media cassette.

4. SERVICE CALL

If errors or failures occurred inside the printer, the applicable error message will be displayed on the control panel, and the printer stops. If errors or failures repeat even after resetting the power button, confirm the error code and then refer to the appropriate section below.



4.1 Video Controller Mode

Table 8-7

Service Call Message	Meaning	Countermeasure
ERROR S01 SERVICE CALL	FATAL ERROR EX	Update with a new Firmware.
ERROR S02 SERVICE CALL	ADRL ERROR EX	Update with a new Firmware.
ERROR S03 SERVICE CALL	ADRS ERROR EX	Update with a new Firmware.
ERROR S04 SERVICE CALL	BUS ERROR EX (INSTRUCT)	Update with a new Firmware.
ERROR S05 SERVICE CALL	BUS ERROR EX (DATA L/S)	Update with a new Firmware.
ERROR S06 SERVICE CALL	SYSCALL EX	Update with a new Firmware.
ERROR S07 SERVICE CALL	BREAKPOINT EX	Update with a new Firmware.
ERROR S08 SERVICE CALL	RESERVED INSTRUCT EX	Update with a new Firmware.
ERROR S09 SERVICE CALL	COPROCESSOR UNUSAB EX	Update with a new Firmware.
ERROR S10 SERVICE CALL	ARITHMETIC OVERFLOW EX	Update with a new Firmware.
ERROR S11 SERVICE CALL	UNDEFINED INTERRUPT	Update with a new Firmware.
ERROR S12 SERVICE CALL	SOFTWARE 1 INTERRUPT	Update with a new Firmware.
ERROR S13 SERVICE CALL	SOFTWARE 2 INTERRUPT	Update with a new Firmware.
ERROR E41 PRINT CHECK	Engine interface error	Update with a new Firmware.
ERROR H60 BUS ERROR	Bus error	Replace with a new main (video controller) PCB.
ERROR H61 PROG ERROR	Program ROM checksum error	Replace with a new main (video controller) PCB.
ERROR H63 D-RAM ERROR	DIMM error	Replace with a new DIMM.

Service Call Message	Meaning	Countermeasure
ERROR H66 NV_W ERROR	NVRAM write error	Replace with a new main (video controller) PCB.
ERROR H67 NV_R ERROR	NVRAM read error	Replace with a new main (video controller) PCB.
ERROR H68 NV_B ERROR	NVRAM read/ write error	Replace with a new main (video controller) PCB.
ERROR H73 FLASH_R ERROR	FLASH ROM read error	Replace with a new main (video controller) PCB.
ERROR H74 FLASH_W ERROR	FLASH ROM write error	Replace with a new main (video controller) PCB.
PCI BUS ERROR	PCI BUS error	Replace with a new NC-4100h.

Table 8-8

Status Display	Description
ERROR EC3 WARNING	NVRAM error
ERROR EC4 WARNING	Engine controller hardware error
ERROR EC7 WARNING	Process timing clock error
ERROR ED1 WARNING	Yellow Switching clutch error
ERROR ED2 WARNING	Magenta Switching clutch error
ERROR ED3 WARNING	Cyan Switching clutch error
ERROR ED4 WARNING	Black Switching clutch error
ERROR ED5 WARNING	YK Switching solenoid error * The error occurs when the front cover is opened during printing.
ERROR ED6 WARNING	MC Switching solenoid error * The error occurs when the front cover is opened during printing.

Status Display	Description
ERROR EE1 WARNING	Developing motor error
ERROR EE2 WARNING	Main motor error
ERROR EE3 WARNING	Drum error
ERROR EE4 WARNING	Toner empty sensor error
ERROR EE5 WARNING	Transfer roller 2 solenoid error
ERROR EE6 WARNING	Drum cleaning solenoid error
ERROR EE7 WARNING	Drum cleaning clutch error
ERROR EE8 WARNING	Fuser unit clutch error
ERROR EE9 WARNING	Belt marker sensor error
ERROR EEL WARNING	Erase LED error
ERROR EF0 WARNING	Cooling fan error
ERROR EF2 WARNING	Ozone fan error
ERROR EF4 WARNING	Fuser fan error
ERROR EF5 WARNING	Charger HV unit error
ERROR EH0 WARNING	Fuser thermistor error
ERROR EH2 WARNING	Fuser temperature 2 error
ERROR EH3 WARNING	Fuser temperature 3 error

Status Display	Description
ERROR EH4 WARNING	Fuser temperature 4 error
ERROR EL1 WARNING	Beam detector error
ERROR EL2 WARNING	Scanner motor error
ERROR ELL WARNING	Laser power error
ERROR EP1 WARNING	Duplex controller hardware error
ERROR EP3 WARNING	Feeder pass select solenoid error
ERROR EP4 WARNING	Duplex motor error
ERROR EP5 WARNING	Outer pass select solenoid error
ERROR EP6 WARNING	Optional fan error

NOTE:
For further actions for the error messages described in Table 8-8, refer to the flow charts later in this section.

4.2 Engine Controller Mode

Table 8-9

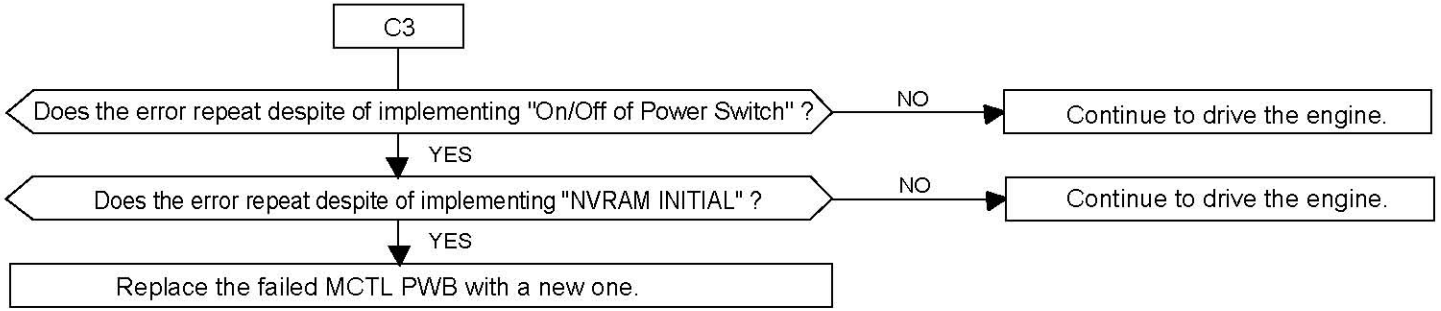
Code	Description
C3	NVRAM error (MCTL PWB)
C4	Engine controller MCTL PWB hardware error
EC7	Process timing clock error (Main motor clock error)
D1	Clutch error of the yellow developing unit
D2	Clutch error of the magenta developing unit
D3	Clutch error of the cyan developing unit
D4	Clutch error of the black developing unit
D5	HPSI signal error (Retract error of black and yellow toner cartridge)
D6	HPSI signal error (Retract error of cyan and magenta toner cartridge)

Code	Description
E1	Developing motor error
E2	Main motor error
E3	Transfer drum rotational error
E4	Toner sensor error
E5	TR cam clutch error
E6	Cleaner cam clutch error
E7	Cleaner clutch error
E8	Fuser clutch error
E9	Belt sensor error
EL	Erase lamp error
F0	Control fan error
F2	Ozone fan error
F4	Fuser fan error
F5	Charging HV (DC High Voltage) error
H0	Fuser thermistor error
H2	Fusing temperature error (Warming-up tme error)
H3	Fusing temperature (3) error (Heater continuous ON time error)
H4	Fusing temperature (4) error (Heater continuous ON time error)
L1	Beam sensor error
L2	Scanner motor error
LL	Laser power error
(P1)	DCTL error
(P3)	Solenoid (L) error
(P4)	Duplex drive motor error (DPM1, DPM2)
(P5)	Solenoid (U) error
(P6)	Duplex fan error

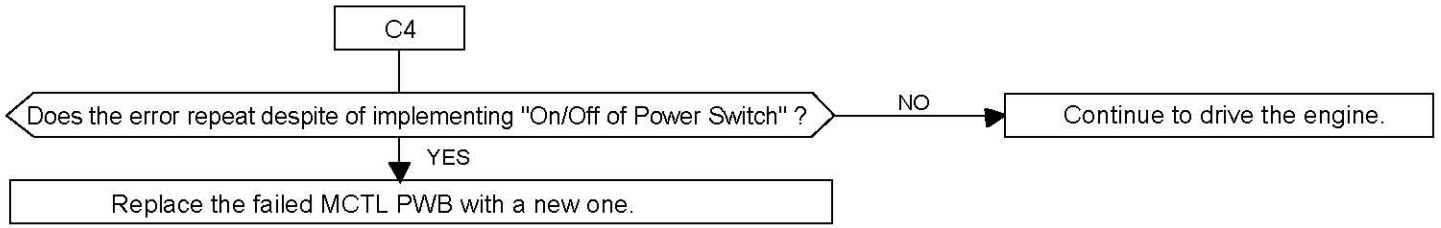
NOTE:

- *For further actions for the error messages described in Table 8-4, refer to the flow charts later in this section.*
- *The code in the bracket is the error when the duplex unit is installed. For troubleshooting for those codes, refer to the DX-3400 duplex unit service manual.*

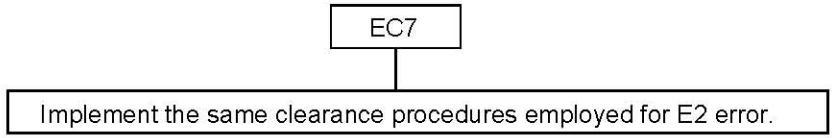
Code	Description of Error	Cause of Error	Clearance Method
C3	NVRAM Error	1. Failure of MCTL PWB CPU EEPROM	1. Turn on and off the power switch. 2. Above method 1 does not work, implement "C3 Error Clearance Procedure". 3. Replace the failed MCTL PWB with a new one.



Code	Description of Error	Cause of Error	Clearance Method
C4	Hard Error of MCTL Control Circuit.	1. Failure of MCTL PWB.	1. Turn on and off the power switch. 2. Replace the failed MCTL PWB with a new one.



Code	Description of Error	Cause of Error	Clearance Method
EC7	Process Timing Error.	1. Power Feeding Failure 2. MM Failure 3. MM Input Circuit Failure	1. Implement the same clearance procedures employed for E2 error. [Note]: MM stands for OPC Belt Drive Main Motor.



Error Code	D1
Name of Part	Developer Clutch (DCLY)

Confirm the connection of Connector.

Is the connection proper between ECN14 of IOD2 and Clutch (DCLY) ?
Is the harness of Clutch (DCLY) broken ?

NO → Connect the harness.
Connect the connector properly.

YES

Is D1 Error cleared ?

YES → Complete

NO

Check the voltage at DCLY ON-N.

Does the voltage drop (+24V) between ECN14-3 and ECN2-6?

YES → Replace the clutch (DCLY) with a new clutch.

NO

Does the voltage jump ( ) between ECN1-3 and ECN2-8 ?

YES → Replace IOD2 PWB with a new one.

NO

Is D1 Error cleared ?

YES → Complete

NO

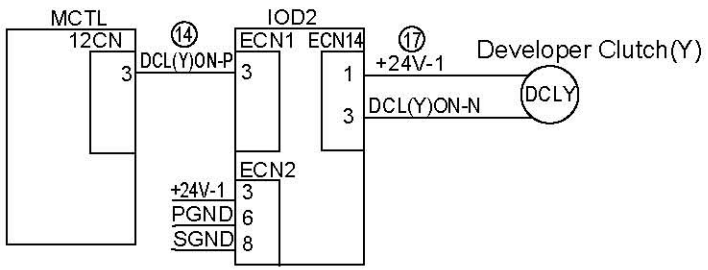
Replace current MCTL PWB with a new one.

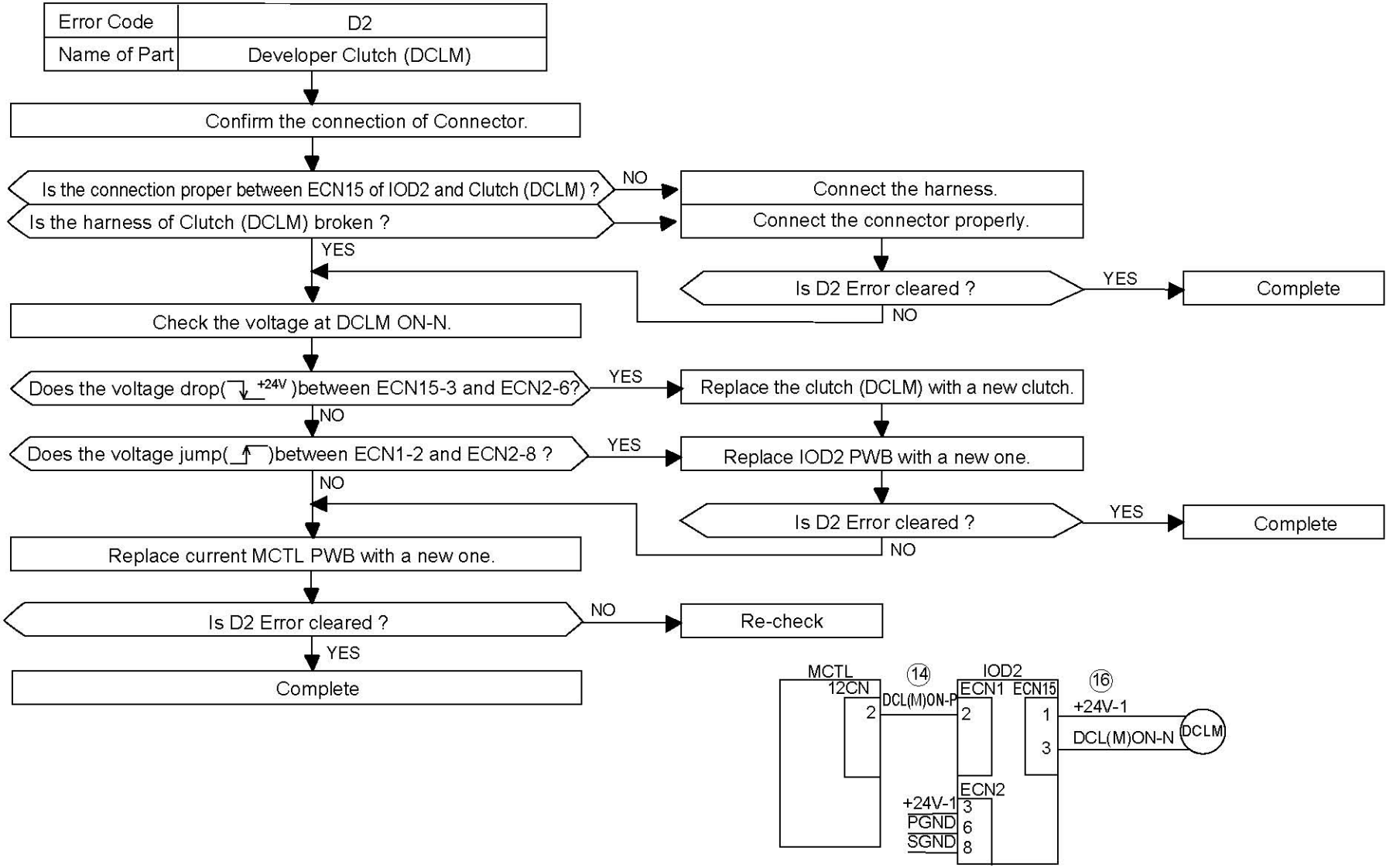
Is D1 Error cleared ?

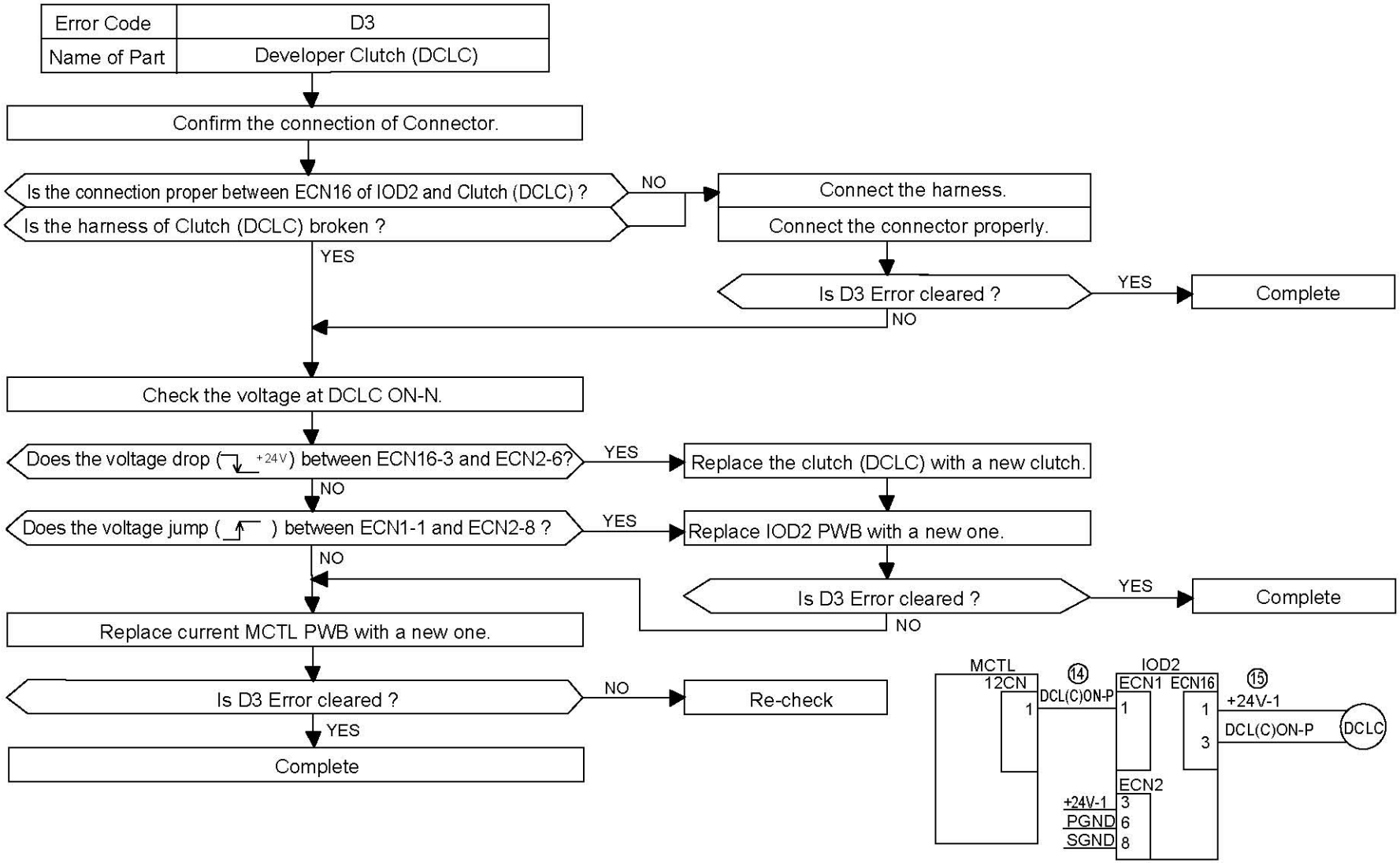
NO → Re-check

YES

Complete




Error Code
D2
Name of Part
Developer Clutch (DCLM)
Confirm the connection of Connector.
Is the connection proper between ECN15 of IOD2 and Clutch (DCLM) ?
NO
Connect the harness.
Is the harness of Clutch (DCLM) broken ?
Connect the connector properly.
YES
Is D2 Error cleared ?
YES
Complete
NO
Check the voltage at DCLM ON-N.
Does the voltage drop(+24V)between ECN15-3 and ECN2-6?
YES
Replace the clutch (DCLM) with a new clutch.
NO
Does the voltage jump( )between ECN1-2 and ECN2-8 ?
YES
Replace IOD2 PWB with a new one.
NO
Is D2 Error cleared ?
YES
Complete
NO
Replace current MCTL PWB with a new one.
Is D2 Error cleared ?
NO
Re-check
YES
Complete
MCTL
12CN
2
DCL(M)ON-P
14
IOD2
ECN1
2
ECN15
1
3
16
+24V-1
DCL(M)ON-N
DCLM
ECN2
+24V-1
3
PGND
6
SGND
8


Error Code
D3
Name of Part
Developer Clutch (DCLC)
Confirm the connection of Connector.
Is the connection proper between ECN16 of IOD2 and Clutch (DCLC) ?
Is the harness of Clutch (DCLC) broken ?
NO
Connect the harness.
Connect the connector properly.
YES
Is D3 Error cleared ?
YES
Complete
NO
Check the voltage at DCLC ON-N.
Does the voltage drop (+24V) between ECN16-3 and ECN2-6?
YES
Replace the clutch (DCLC) with a new clutch.
NO
Does the voltage jump ( ) between ECN1-1 and ECN2-8 ?
YES
Replace IOD2 PWB with a new one.
NO
Is D3 Error cleared ?
YES
Complete
NO
Replace current MCTL PWB with a new one.
Is D3 Error cleared ?
NO
Re-check
YES
Complete
MCTL
12CN
1
14
DCL(C)ON-P
IOD2
ECN1
1
ECN16
1
3
15
+24V-1
DCL(C)ON-P
DCLC
ECN2
+24V-1
3
PGND
6
SGND
8

Error Code	D4
Name of Part	Developer Clutch (DCLK)

Confirm the connection of Connector.

Is the connection proper between ECN13 of IOD2 and Clutch (DCLK) ?
Is the harness of Clutch (DCLK) broken ?

NO → Connect the harness.
Connect the connector properly.

YES

Is D4 Error cleared ?

YES → Complete

NO

Check the voltage at DCLK ON-N.

Does the voltage drop (+24V) between ECN13-4 and ECN2-6?

YES → Replace the clutch (DCLK) with a new clutch.

NO

Does the voltage jump ( ) between ECN1-4 and ECN2-12 ?

YES → Replace IOD2 PWB with a new one.

NO

Is D4 Error cleared ?

YES → Complete

NO

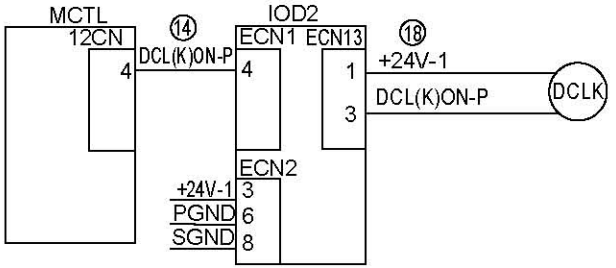
Replace current MCTL PWB with a new one.

Is D4 Error cleared ?

NO → Re-check

YES

Complete



Error Code	D5
Name of Part	Developer Solenoid (PSL KY)

Confirm the connection of Connector.

Is the connection proper between ECN3 of IOD2 and Solenoid (PSL YM) ?
Is the harness of Solenoid (PSL KY) broken ?
NO → Connect the harness.
Connect the connector properly
YES

Is D5 Error cleared ?
YES → Complete
NO

Check the voltage at (PSL YM) ON-N.

Does the voltage drop (+24V) between ECN3-10 and ECN2-6?
YES → Replace the front cover unit with a new unit.
NO

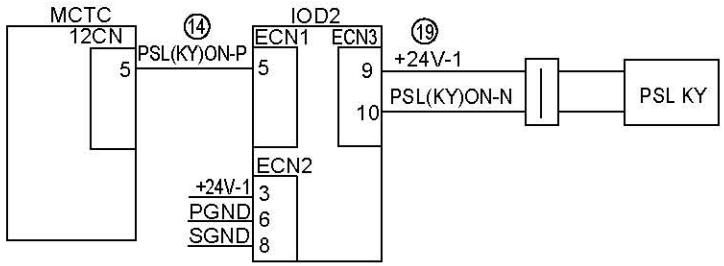
Does the voltage jump ( ) between ECN1-5and ECN2-8 ?
YES → Replace IOD2 PWB with a new one.
NO

Is D5 Error cleared ?
YES → Complete
NO

Replace current MCTL PWB with a new one.

Is D5 Error cleared
NO → Re-check
YES

Complete



Error Code	D6
Name of Part	Developer Solenoid (PSL MC)

Confirm the connection of Connector.

Is the connection proper between ECN3 of IOD2 and Solenoid (PSL KC) ? — NO → Connect the harness.

Is the harness of Solenoid (PSL KC) broken ? — NO → Connect the connector properly.

YES

Check the voltage at (PSL KC) ON-N.

Does the voltage drop (+24V) between ECN3-7and ECN2-6? — YES → Replace the front cover unit with a new unit.

NO

Does the voltage jump ( ) between ECN1-6and ECN2-8 ? — YES → Replace IOD2 PWB with a new one.

NO

Replace current MCTL PWB with a new one.

Is D6 Error cleared ? — NO → Re-check

YES

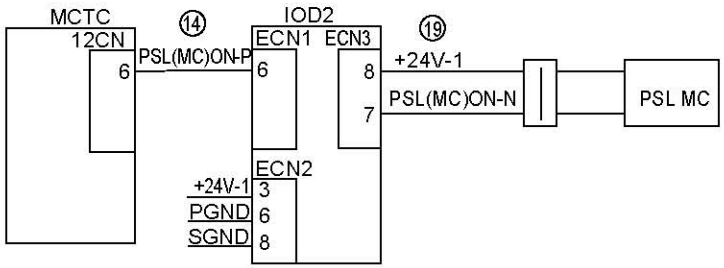
Complete

Is D6 Error cleared ? — YES → Complete

NO

Is D6 Error cleared ? — YES → Complete

NO



Error Code	E1
Concerned Part	Developer Motor(DM)

Is there any unusual rotation noise while printing ?
YES → Replace the toner cartridge.
NO → Confirm the connection of connector.

Is the noise cleared ?
YES → Job is complete.
NO → Replace developer gear unit and motor.

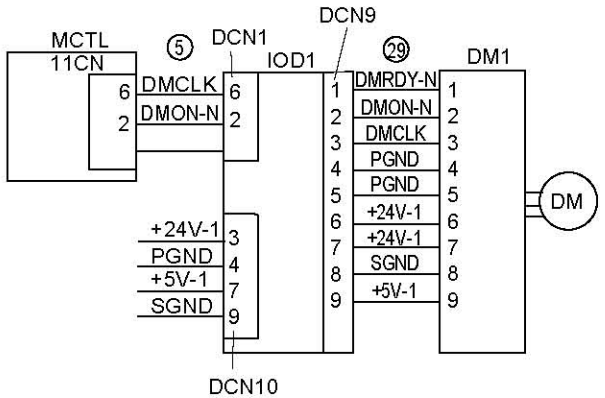
Is DCN9 of IOD1 properly connected with connector of DM1?
NO → Connect the connectors properly.
YES → Is DCN1 of IOD1 properly connected with 11CN of MCTL?
NO → Connect the connectors properly.
YES → Check the voltage: +24V-1 and +5V-1.

Is E1 error cleared ?
YES → Job is complete.
NO

+24V-1: Is the voltage +24V between DM1-4 and 6,DCN9-4 and 6, DCN10-3 and 4 ?
+5V-1: Is the voltage +5V between DM1-5 and 9,DCN9-5 and 9, DCN10-7 and 9 ?
YES → Replace the developer motor.
NO → Replace the IOD2.

Is E1 error cleared ?
YES → Job is complete.
NO → Replace the IOD1.

Is E1 error cleared ?
NO → Replace the MCTL PWB.
YES → Job is complete.



Error Code	E2
Concerned Part	Main Motor(MM)

Does a belt cartridge rotate lightly ?
NO → Replace the belt cartridge.
YES

Does a fuser unit rotate lightly ?
NO → Replace the fuser unit.
YES

Confirm the connection of connector.

Is E2 error cleared ?
YES → Job is complete.
NO

Is ECN12 of IOD2 properly connected with connector of DM1 ?
Is ECN2 of IOD2 properly connected with DCN10 of IOD1 ?
Is ECN1 of IOD2 properly connected with 12CN of MCTL ?
NO → Replace developer gear unit and motor.

Is E2 error cleared ?
YES → Job is complete.
NO

YES

Check the voltage:+24V-1 and +5V-1.

+24V-1: Is the voltage +24V between MM1-4 and 5, ECN12-4 and 5, ECN2-5 and 1 ?
+5V-1: Is the voltage +5V between MM1-6 and 7, ECN12-6 and 7, ECN2-7 and 1 ?
YES → Replace the main motor.

Is E2 error cleared ?
YES → Job is complete.
NO

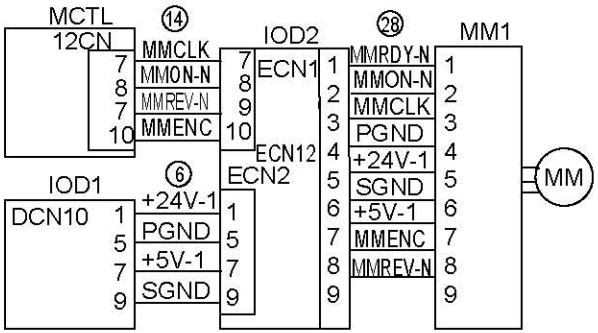
Replace the IOD2.

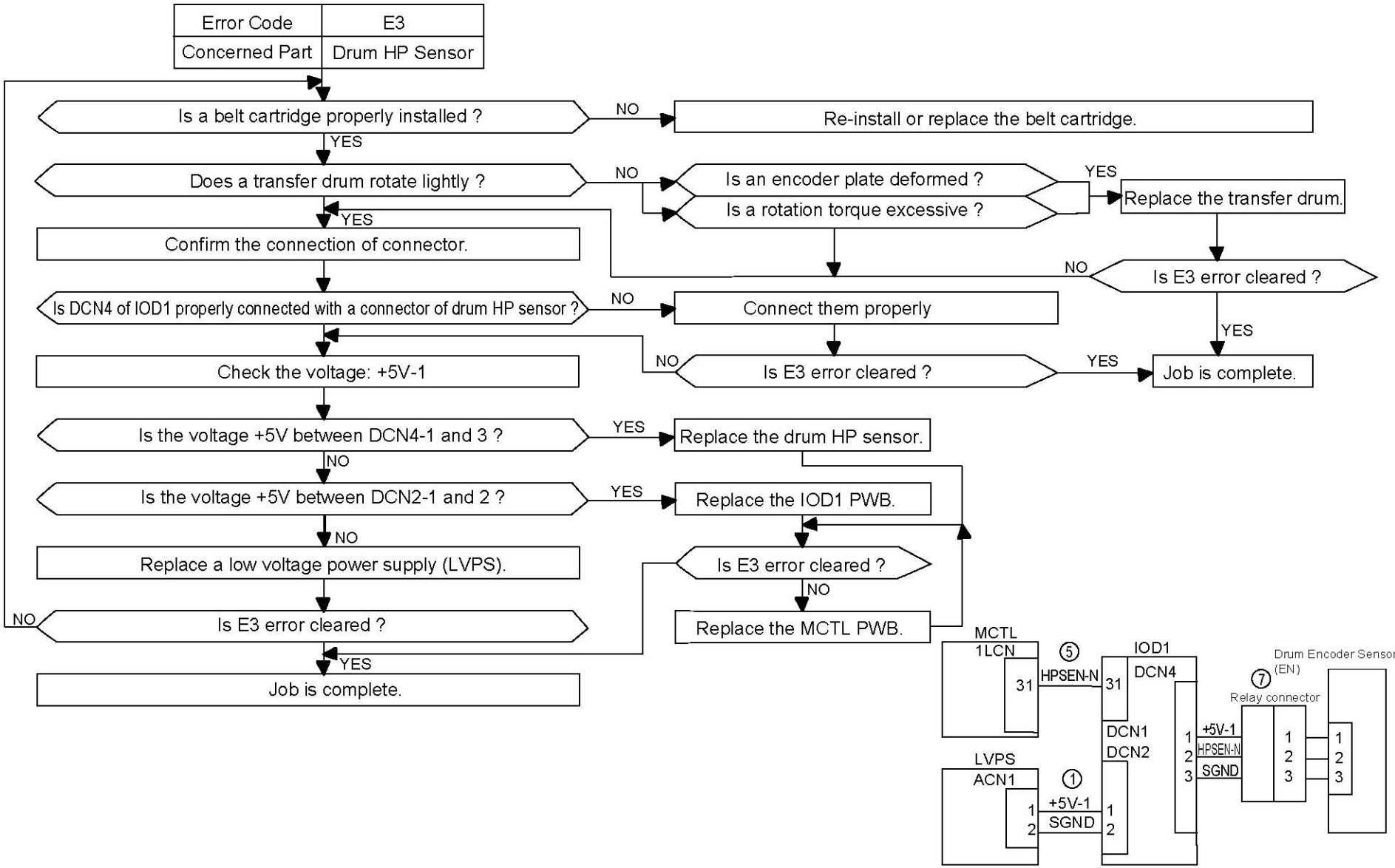
Is E2 error cleared ?
YES → Job is complete.
NO

Replace the IOD1.

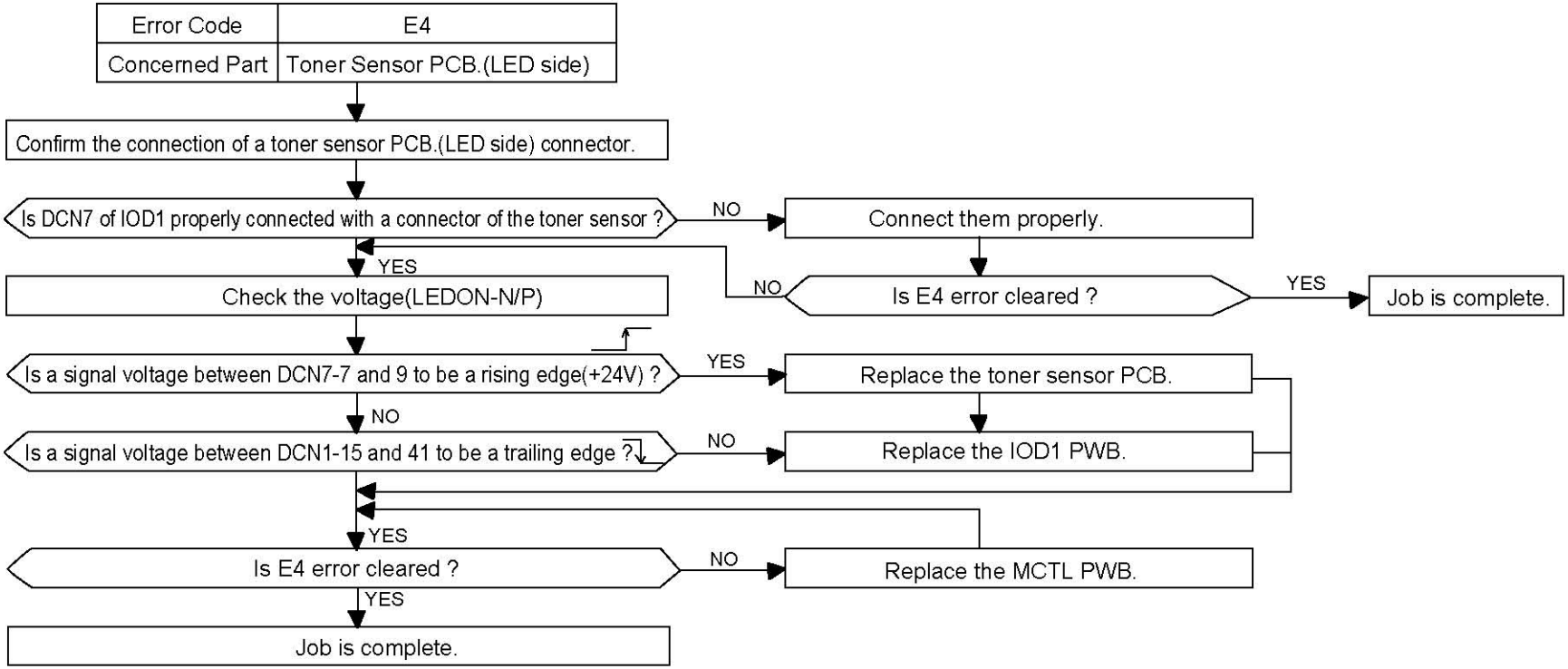
Is E2 error cleared ?
NO → Replace the MCTL PWB.
YES

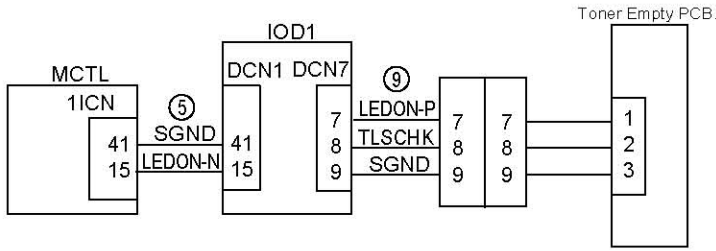
Job is complete.



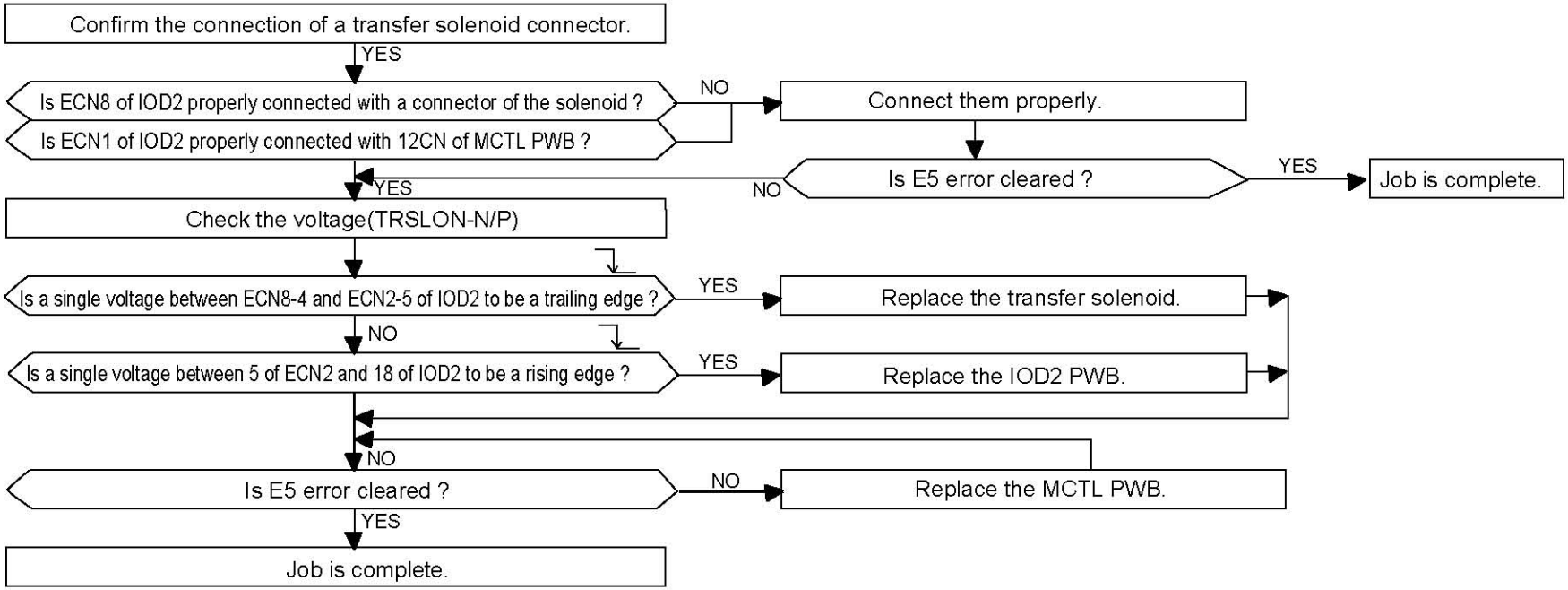

Error Code
E3
Concerned Part
Drum HP Sensor
Is a belt cartridge properly installed ?
NO
Re-install or replace the belt cartridge.
YES
Does a transfer drum rotate lightly ?
NO
Is an encoder plate deformed ?
Is a rotation torque excessive ?
YES
Replace the transfer drum.
YES
Confirm the connection of connector.
NO
Is E3 error cleared ?
Is DCN4 of IOD1 properly connected with a connector of drum HP sensor ?
NO
Connect them properly
YES
Check the voltage: +5V-1
NO
Is E3 error cleared ?
YES
Job is complete.
Is the voltage +5V between DCN4-1 and 3 ?
YES
Replace the drum HP sensor.
NO
Is the voltage +5V between DCN2-1 and 2 ?
YES
Replace the IOD1 PWB.
NO
Replace a low voltage power supply (LVPS).
Is E3 error cleared ?
NO
Is E3 error cleared ?
NO
Replace the MCTL PWB.
YES
Job is complete.
MCTL
1LCN
31
⑤
HPSEN-N
IOD1
DCN4
31
DCN1
DCN2
Drum Encoder Sensor
(EN)
⑦
Relay connector
1
2
3
+5V-1
HPSEN-N
SGND
LVPS
ACN1
①
+5V-1
SGND
1
2

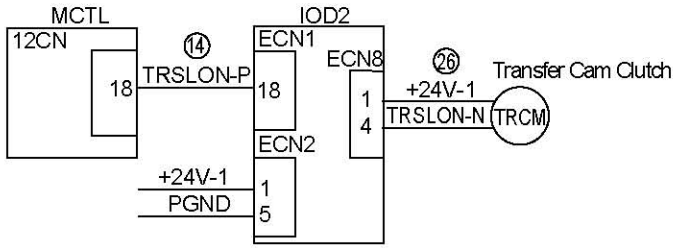
Error Code	E4
Concerned Part	Toner Sensor PCB.(LED side)





Error Code	E5
Concerned Part	Transfer Cam Clutch (TRCM)





Error Code	E6
Concerned Part	Cleaning Brush Solenoid (FBCM)

Confirm the connection of a cleaning brush solenoid connector.

YES

Is ECN10 of IOD2 properly connected with a connector of the solenoid ?
Is ECN1 of IOD2 properly connected with 11CN of MCTL PWB ?

NO → Connect them properly.

YES

Check the voltage (FBSLON-N/P)

Is a single voltage between ECN10-4 and ECN2-5 of IOD2 to be a trailing edge ?

YES → Replace the transfer solenoid.

Is a single voltage between ECN1-17 and ECN2-5 of IOD2 to be a rising edge ?

YES → Replace the IOD2 PWB.

NO

Is E6 error cleared ?

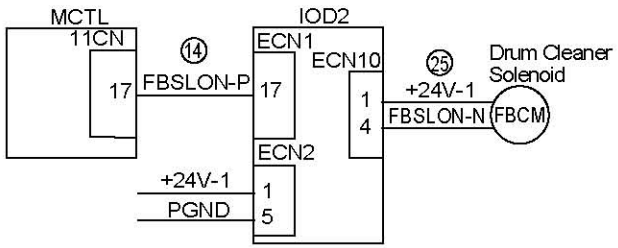
NO → Replace the MCTL PWB.

YES → Job is complete.

Connect them properly. → Is E6 error cleared ?

NO → Check the voltage (FBSLON-N/P)

YES → Job is complete.



Error Code	E7
Concerned Part	Cleaner Clutch

Confirm the connection of a cleaner clutch connector.

Is ECN11 of IOD2 properly connected with a connector of the clutch ?
Is ECN2 of IOD2 properly connected with DCN10 of IOD1 ?
Is ECN1 of IOD1 properly connected with 11CN of MCTL PWB ?

NO → Connect them properly.

Is E7 error cleared ?

YES → Job is complete.

NO

YES

Check the voltage (FBCLON-N/P)

Is a single voltage between ECN11-3 and ECN2-5 of IOD2 to be a trailing edge?

YES → Replace the cleaner clutch.

Is a single voltage between ECN2-5 and 16 of ECN1 to be a rising edge ?

YES → Replace the IOD2 PWB.

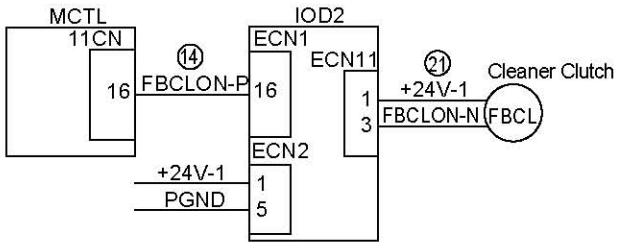
NO

Is E7 error cleared ?

NO → Replace the MCTL PWB.

YES

Job is complete.



Error Code	E8
Concerned Part	Fuser Clutch(FUCL)

Confirm the connection of a fuser clutch connector.

Is ECN9 of IOD2 properly connected with a connector of the clutch ?
Is ECN1 of IOD2 properly connected with 12CN of MCTL PWB ?
NO → Connect them properly.
Connect them properly. → Is E8 error cleared ?
Is E8 error cleared ? YES → Job is complete.
Is E8 error cleared ? NO → Check the voltage (FUCLON-N/P)

YES

Check the voltage (FUCLON-N/P)

Is a single voltage between ECN9-3 and ECN2-8 of IOD2 to be a trailing edge ? YES → Replace the cleaner clutch(FUCL).

NO

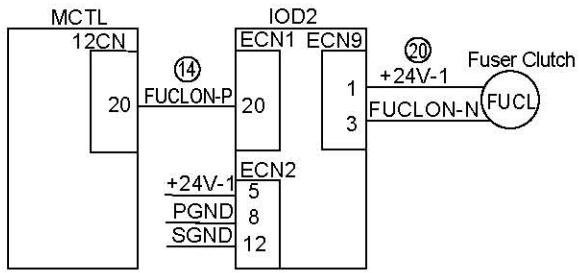
Is a single voltage between ECN1-20 and ECN2-12 of IOD2 to be a rising edge ? YES → Replace the IOD2 PWB.

NO

Is E8 error cleared ? NO → Replace the MCTL PWB.

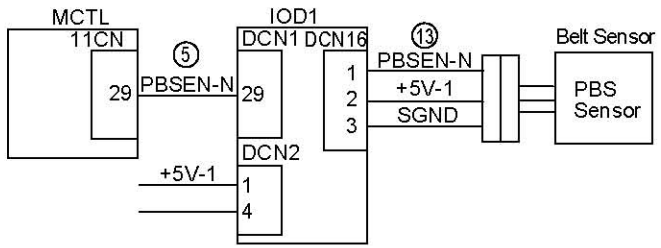
YES

Job is complete.

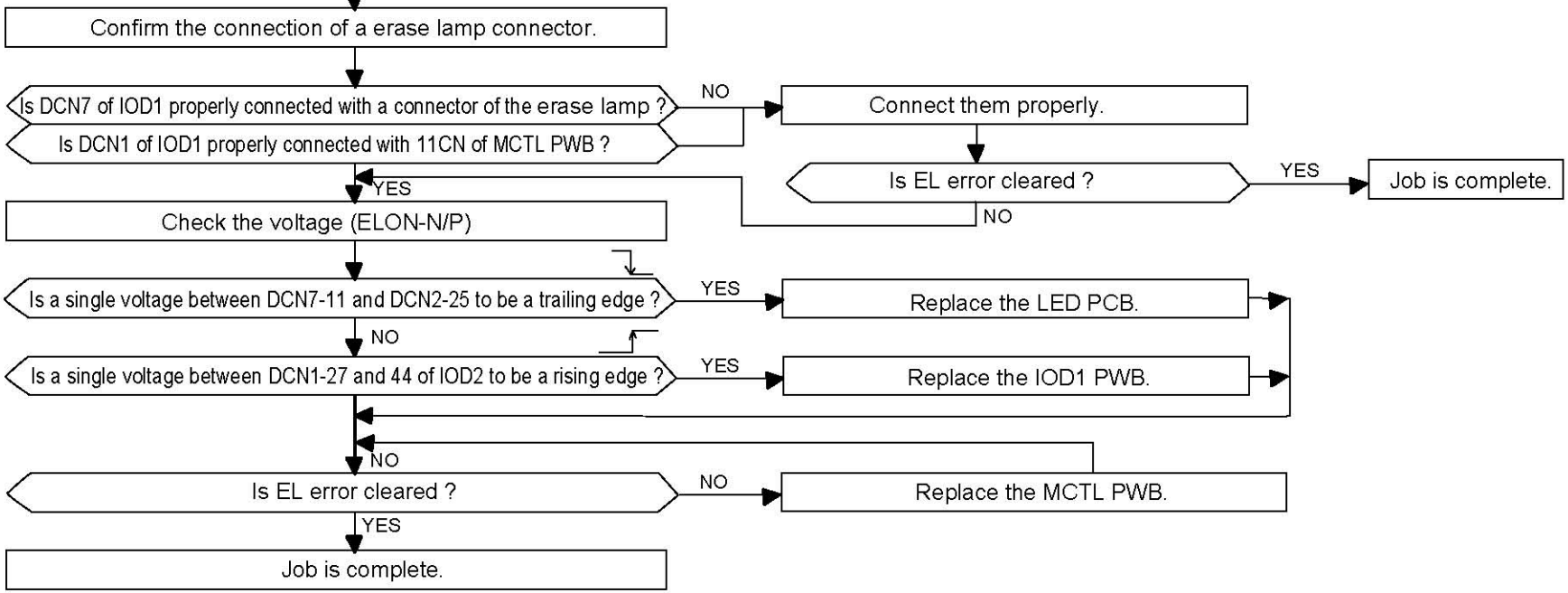


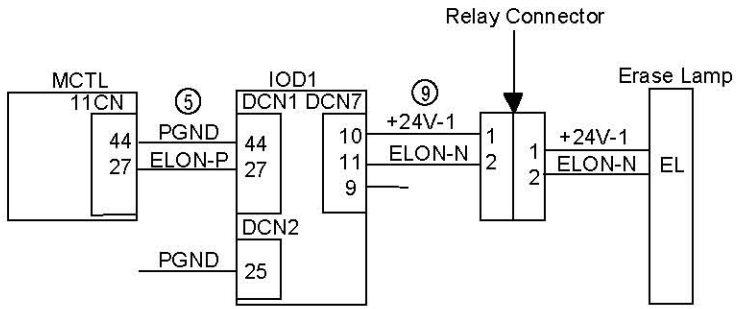
Error Code	E9
Concerned Part	Belt Sensor (PBS)

Is a belt cartridge leaned to one side ?
YES → Replace the belt cartridge.
NO
Is a belt sensor stained ?
YES → Install the printer to be leveled out. / Clean the belt.
NO
Confirm the connection of connector.
Is E9 error cleared ?
NO
Is DCN16 of IOD1 properly connected with a connector of the sensor ?
Is DCN1 of IOD1 properly connected with 11CN of MCTL PWB ?
NO → Connect them properly.
Is E9 error cleared ?
YES → Job is complete.
NO
YES
Check the voltage (+5V-1)
Is the voltage +5V between DCN16-2 and 3 of IOD1?
YES → Replace the belt sensor (PBS).
NO
Is the voltage +5V between DCN2-1 and 4 of IOD1?
YES → Replace the IOD1 PWB.
Is E9 error cleared ?
NO → Replace the MCTL PWB.
YES
Job is complete.

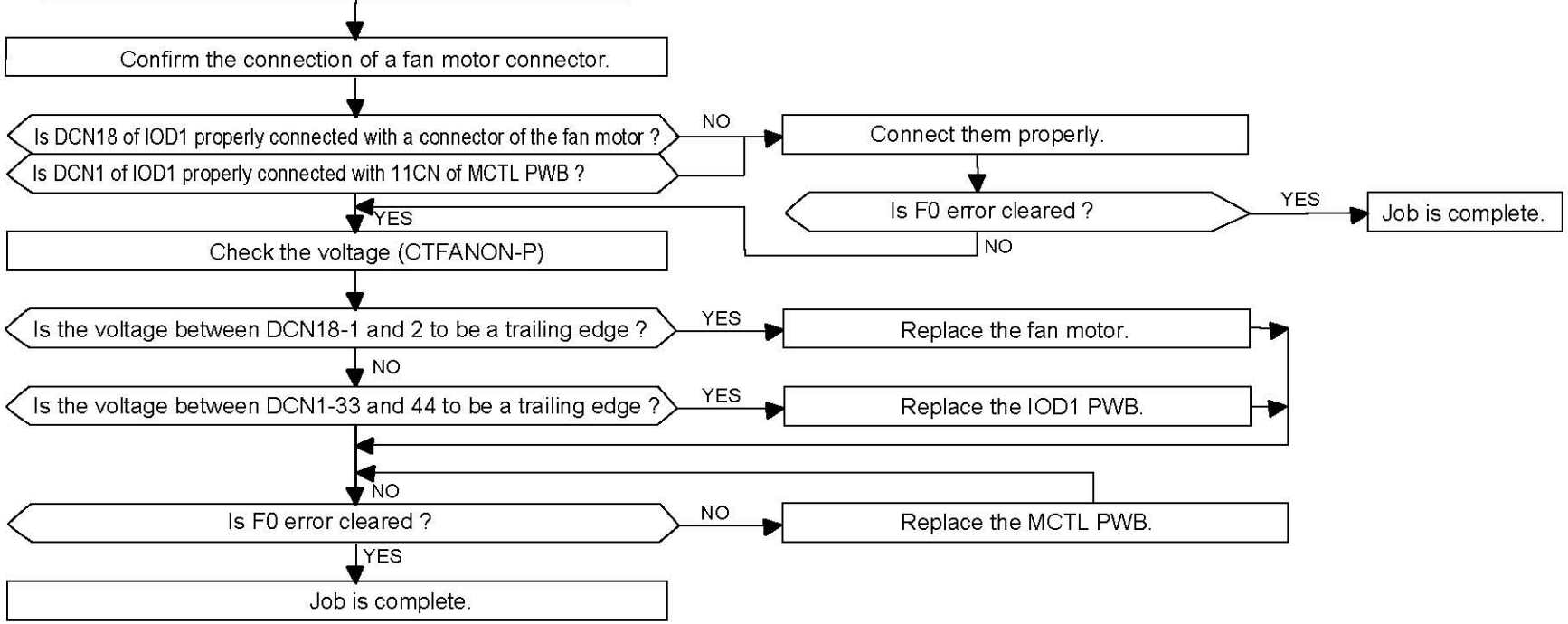


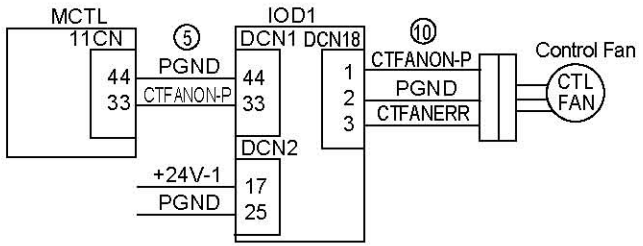
Error Code	EL
Concerned Part	Erase Lamp (EL)





Error Code	F0
Concerned Part	Fan Motor (Control Cooling)





Error Code	F2
Concerned Part	Fan Motor (OZFAN)

Confirm the connection of a fan motor connector.

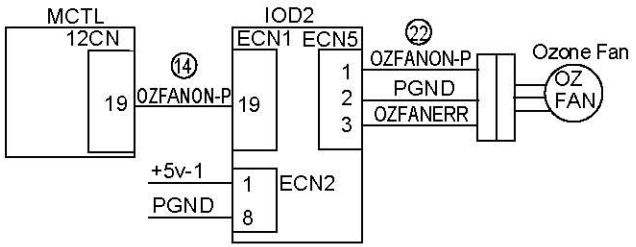
Is ECN5 of IOD2 properly connected with a connector of the fan motor ?
Is ECN1 of IOD2 properly connected with 12CN of MCTL PWB ?
NO → Connect them properly.
Connect them properly. → Is F2 error cleared ?
Is F2 error cleared ? YES → Job is complete.
Is F2 error cleared ? NO → Check the voltage (OZFANON-P)
YES → Check the voltage (OZFANON-P)

Check the voltage (OZFANON-P)

Is the voltage between ECN5-1 and 2 to be a trailing edge ?
YES → Replace the fan motor (OZFAN).
NO →

Is the voltage between ECN1-19 and ECN2-8 to be a trailing edge ?
YES → Replace the IOD2 PWB.
NO →

Is F2 error cleared ?
NO → Replace the MCTL PWB.
YES → Job is complete.



Error Code	F4
Concerned Part	Heater Fan (HTFAN)

Confirm the connection of a heater fan connector.

Is DCN14 of IOD1 properly connected with a connector of the heater fan ?
Is DCN1 of IOD1 properly connected with 11CN of MCTL PWB ?
NO → Connect them properly.
Is F4 error cleared ?
YES → Job is complete.
NO

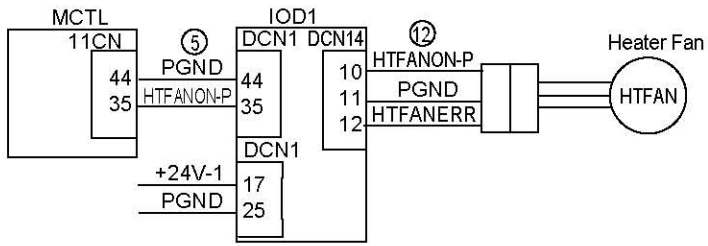
NO
Check the voltage (HTFANON-P).

Is the voltage between DCN14-10 and 11 to be a rising edge ?
YES → Replace the heater fan.
NO

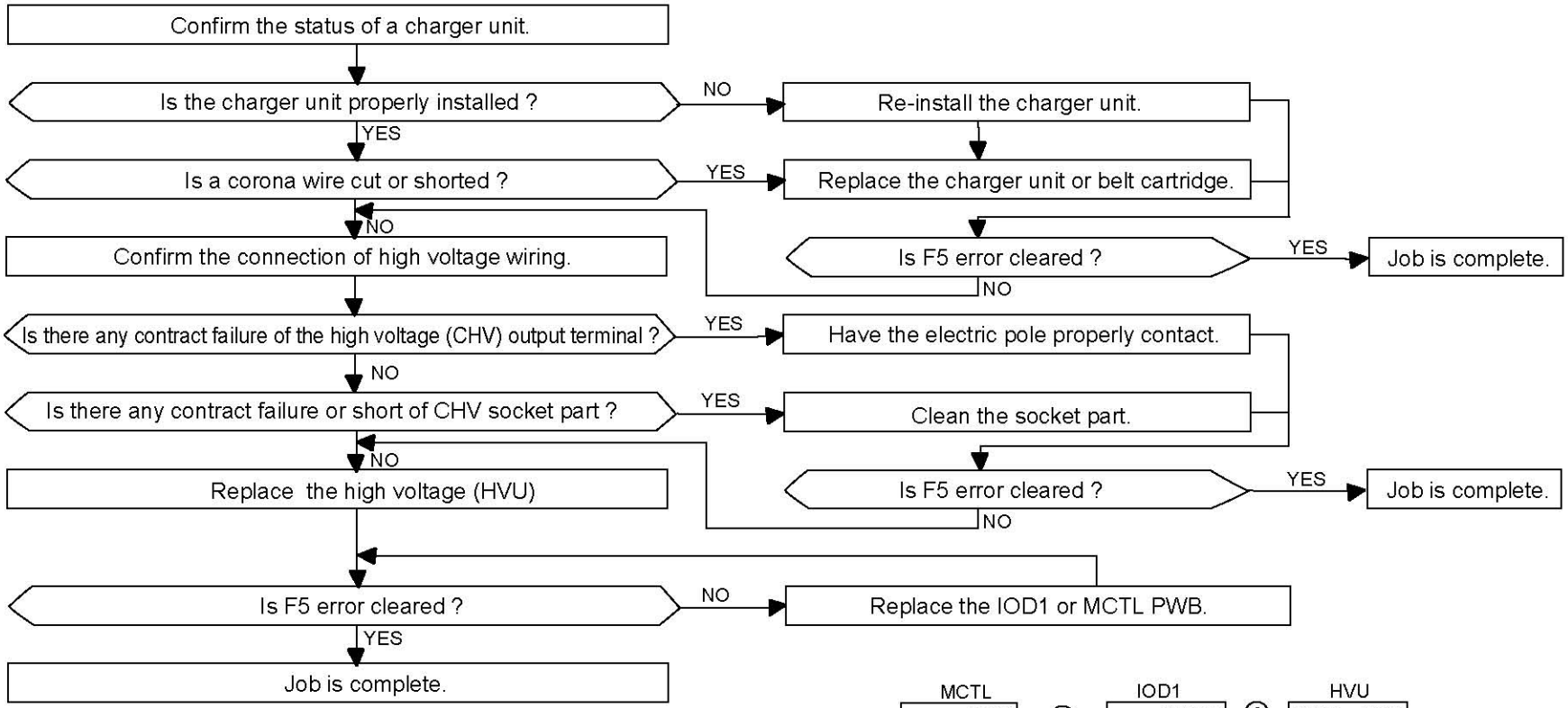
Is the voltage between DCN1-35 and 44 to be a rising edge ?
YES → Replace the IOD1 PWB.
NO

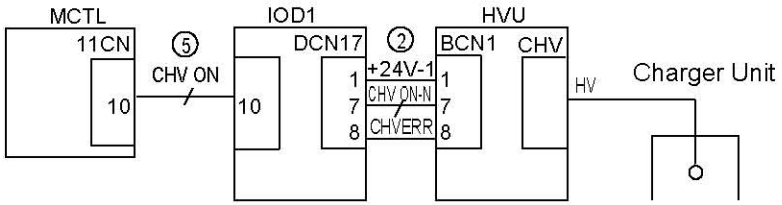
Is F4 error cleared ?
NO → Replace the MCTL PWB.
YES

Job is complete.



Error Code	F5
Concerned Part	High-voltage power supply unit (HVU)





Error Code	H0 (wire cut/ short error of thermistor)
Concerned Part	Fusing Unit

Confirm the connection of a fusing unit connector.

Is the fusing unit properly installed ? — NO → Re-install the fusing unit.

Is there any contact failure due to damaged connector of fusing unit ? — YES → Replace the charger unit or belt cartridge.

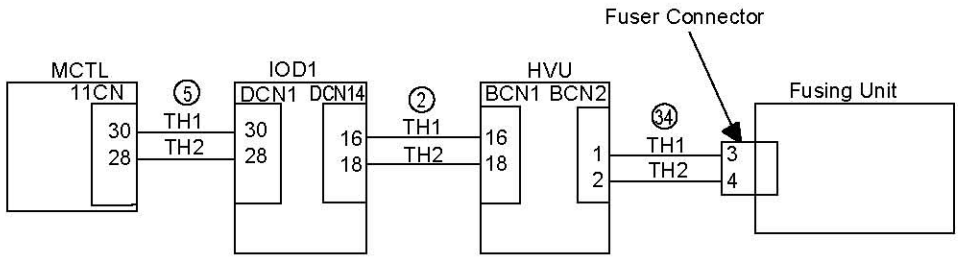
Are the connectors properly connected between the fusing unit and BCN2 of the high voltage unit (HVU) ? — NO → Connect them properly.

Is H0 error cleared ? — NO → Replace the fusing unit.

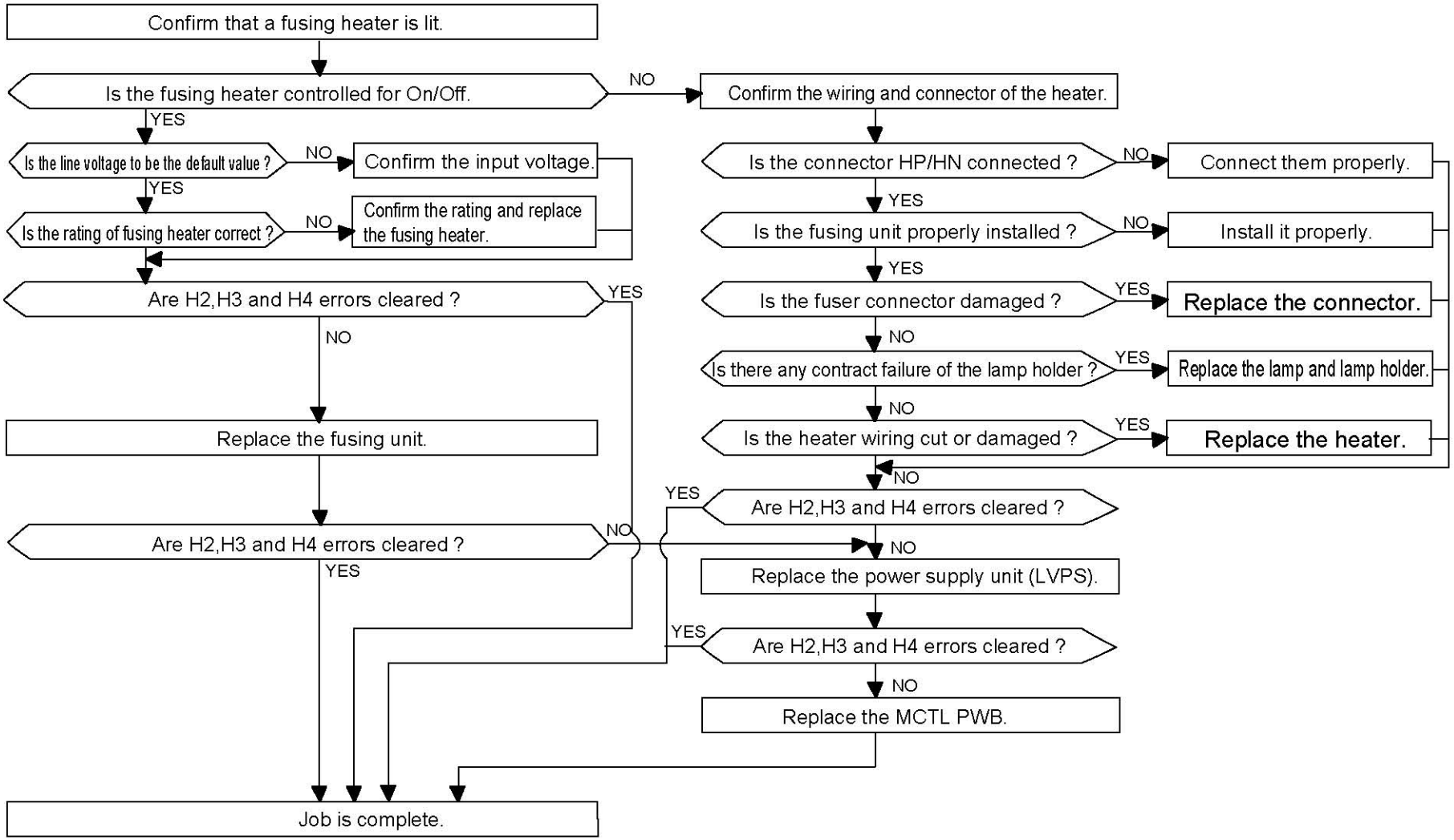
Is H0 error cleared ? — YES → Job is complete.

Is H0 error cleared ? — NO → Replace the IOD1 or MCTL PWB.

Is H0 error cleared ? — YES → Job is complete.



Error Code	H2,H3,H4
Concerned Part	Fusing Unit and Others



Error Code	L1 (Beam Detecting Error)
Concerned Part	Laser Unit

Confirm the connection of an laser unit connector.

Is the connector PDCN properly connected ?
Are the connector LCN1 and LCN of MCTL properly connected ?

NO → Connect the connector properly.

Is L1 error cleared ?

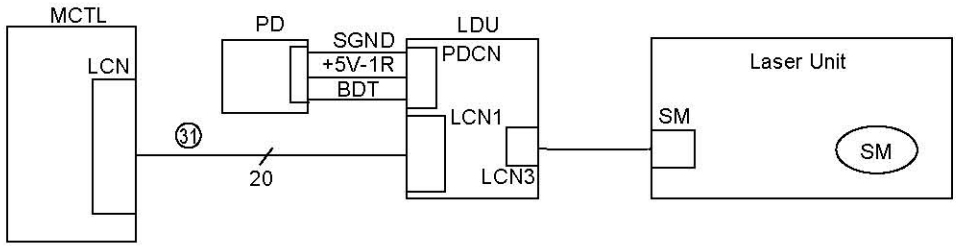
YES → Job is complete.

NO → Replace the laser unit.

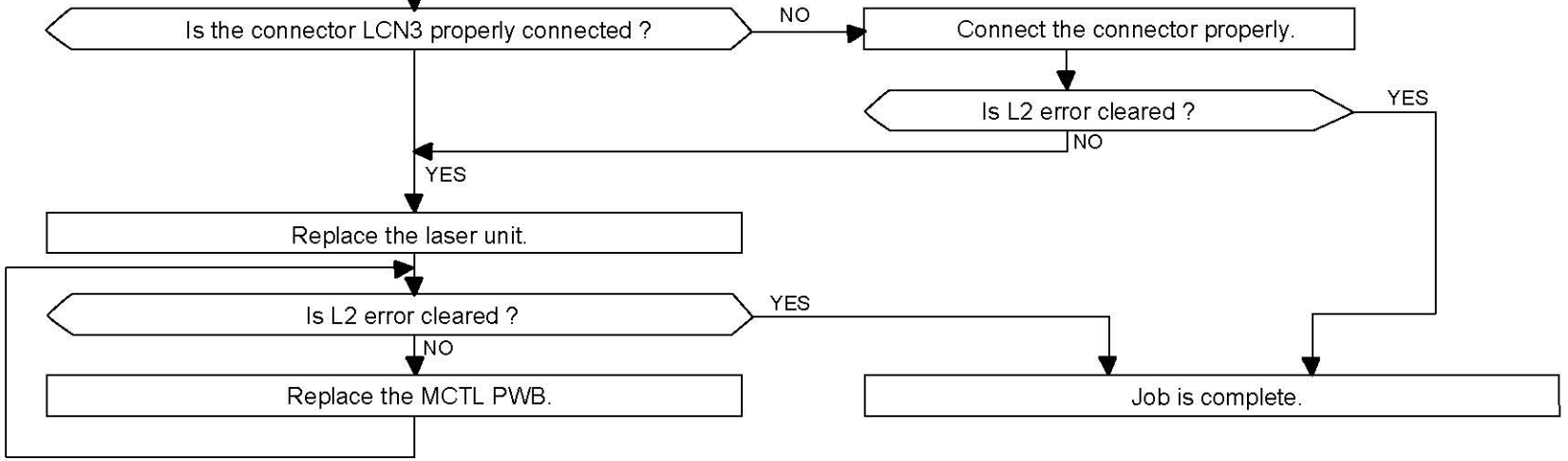
Is L1 error cleared ?

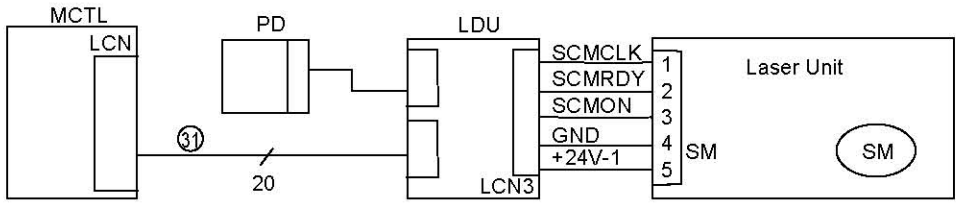
YES → Job is complete.

NO → Replace the MCTL PWB.

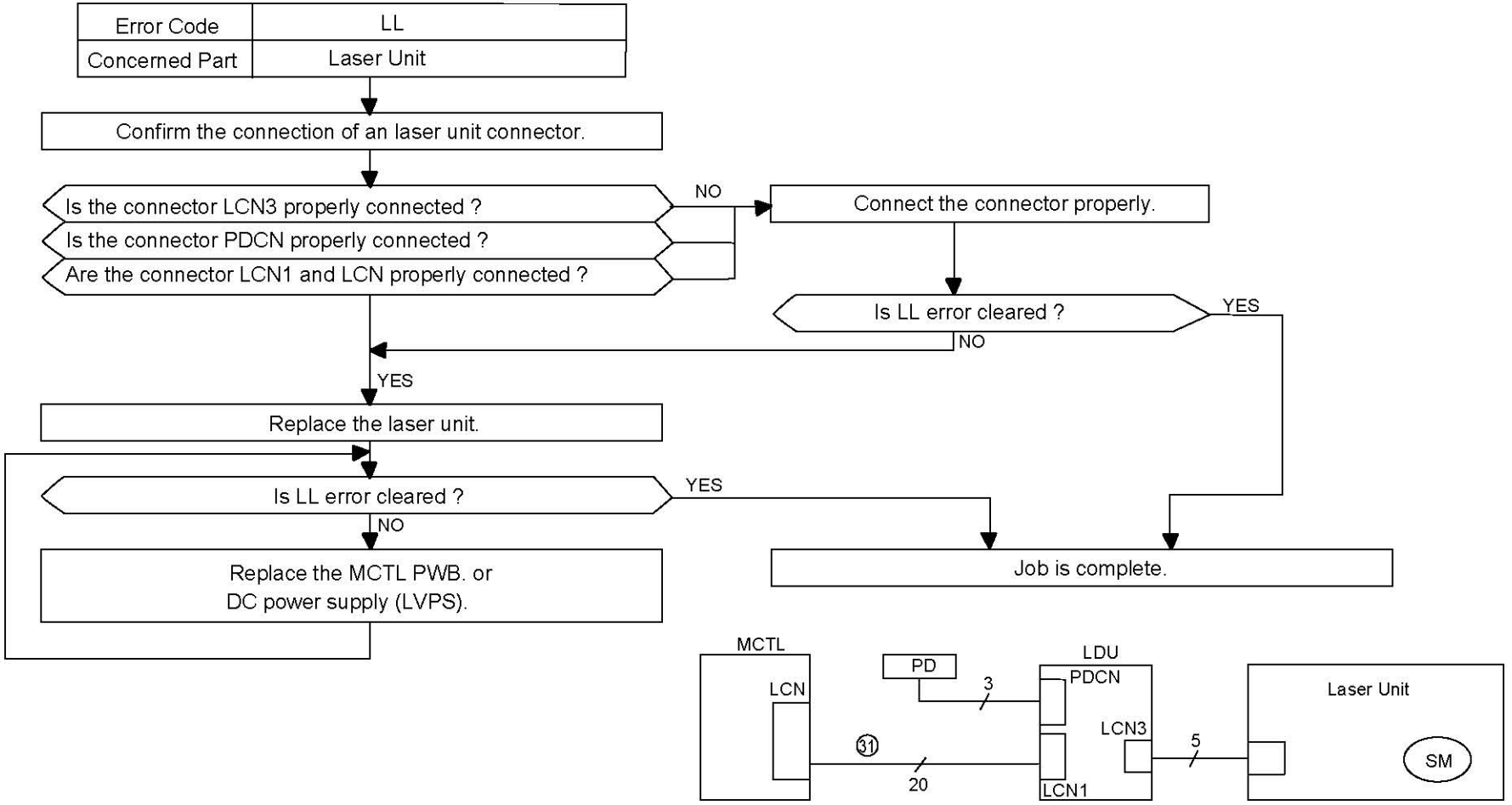


Error Code	L2
Concerned Part	Laser Unit





Error Code	LL
Concerned Part	Laser Unit

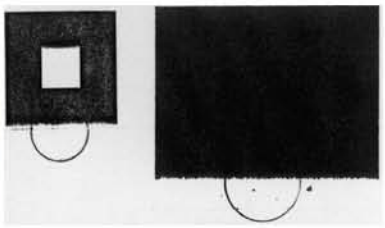


5. IMAGE FAILURE

(1)



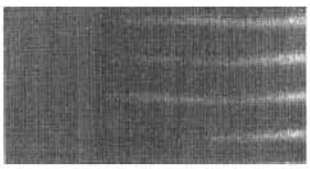
(2)



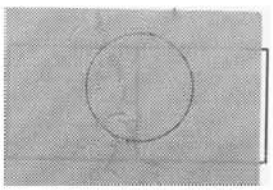
(3)



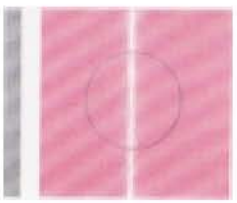
(4)



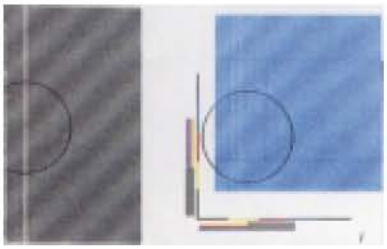
(5)



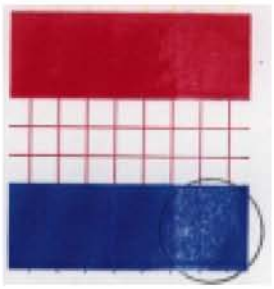
(6)



(7)



(8)



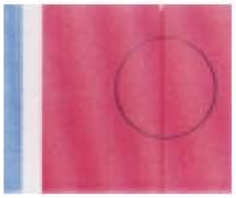
(9)-a



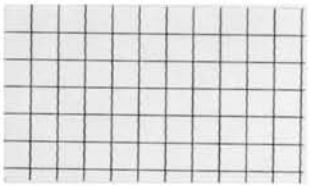
(9)-b



(10)



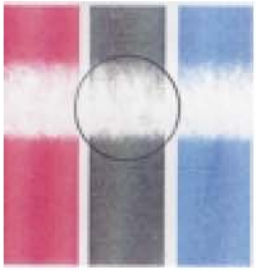
(11)



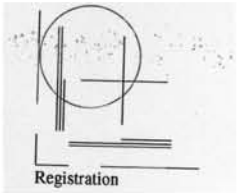
(12)



(13)



(14)



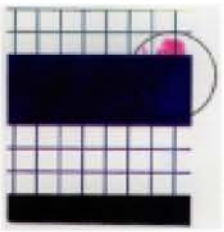
(15)-a



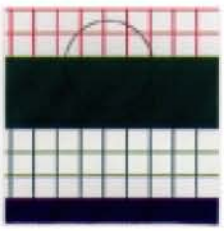
(15)-b



(16)



(17)



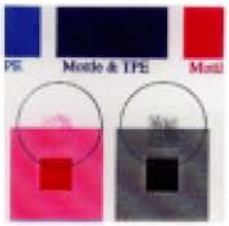
(18)



(19)



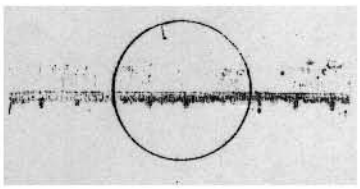
(20)



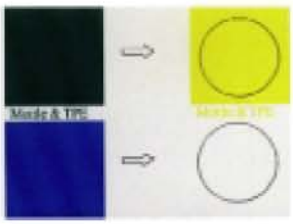
(21)



(22)



(23)



(24)



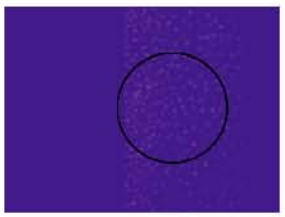
(25)



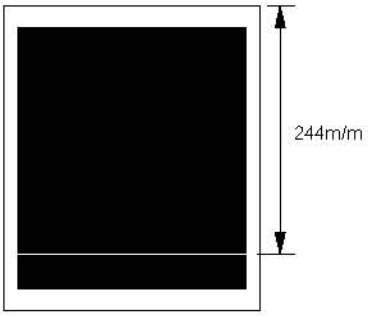
(26)



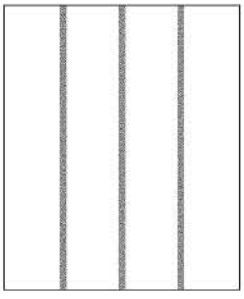
(27)



(28)



(29)



I-1	Background

Phenomenon

Background is smeared due to toner spread as shown in print sample (1) of Page 8-45.

Main Causes

(1) Too small toner mass and charging level in the developing process.

(2) Poor contact of the developer roller's bias pole.

(3) Life expired or failure of the OPC belt cartridge.

(4) Failure of the high-voltage power supply unit.

Countermeasures

(1) Replace the toner cartridge.

(2) Confirm if the developer bias pole is deformed or not.

(3) Replace the OPC belt cartridge.

(4) Replace the high-voltage power supply unit.

I-2	Missing Image at Edge

Phenomenon

There is missing or peeling toner found in the image at the edge as shown in the print sample (2) of Page 8-45.

Main Causes

(1) Too small toner mass and charging level in the developing process.

(2) The OPC belt is deformed (waving).

Countermeasures

(1) Replace the toner cartridge with a new one.

(2) Replace the OPC belt cartridge with a new one.

I-3	Jitter

Phenomenon

Uneven optical density appears periodically in the horizontal direction on the printed image as shown in print sample (3) of Page 8-45.

Main Causes

(1) Failure of main motor.

i) Irregular rotation of the drive motor.

ii) Failure of the gears.

iii) Variation of OPC belt running speed due to above reasons.

(2) Failure of the OPC belt.

Countermeasures

(1) Replace the main motor with a new one.

(2) Replace the OPC belt cartridge with a new one.

NOTE:

If the print mode is set to CAPT (Color Advanced Photoscale Technology) in the driver, this problem might occur. Change the mode setting to normal mode.

I-4	Ribbing

Phenomenon

Light print occurs on the right or left hand side of the image as shown in print sample (4) of Page 8-45.

Main Causes

(1) Slight tilt on the surface of printer installation table.
(Tilt should be less than 1°.)

(2) Toner amount in the toner cartridge is insufficient.

(3) Toner concentrates to one side in the toner cartridge since the toner cartridge is not level.

(4) The spring at the back of the developer unit is deformed.

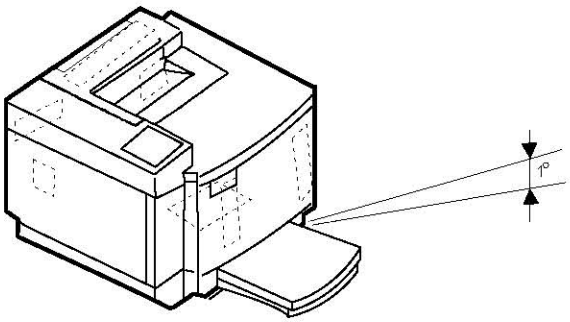


Fig. 8-6

(5) The front cover unit is not firmly closed.

Countermeasures

(1) Confirm that the printer installation table is flat and level.

(2) Shake the toner cartridge horizontally several times to remedy the concentration.

(3) Replace the toner cartridge with a new one.

(4) Confirm the open/close position of the front cover to be firmly closed.

I-5	Wrinkle / Image Migration

Phenomenon

Banding shadows of different optical density appear due to wrinkle, image migration and color misregistration occurring on the print paper as shown in print sample (5) of Page 8-45.

Main Causes

(1) Print paper other than the recommended paper is being used.

(2) The paper discharger unit of the transfer unit is not functioning.

(3) The transfer unit is not locked properly.

(4) Fuser roller is deformed or is reaching the end of life.

(5) One side of the fusing unit is lifted up slightly.

Countermeasures

(1) Use a recommended paper.

(2) Confirm if the transfer unit is properly installed to the paper discharger unit and functioning normally.

2-1) Push the transfer unit and ensure it is locked at right and left sides.

(3) Refit the fusing unit correctly and lock it in position.

(4) Replace the fusing unit with a new one.

I-6	White Line (1)

Phenomenon

Vertical white line appears in the specific color area when test-printed in the four color mode (Stripe Mode), as shown in print sample (6) of Page 8-45.

Main Causes

(1) Foreign particles adhering to the following places around the developer roller. (Refer to Fig.8-12.)

- Between the cartridge cover and developer roller (a)
- On the surface of the developer roller (b)
- Between the blade fixing plate and the developer roller (c)
- Between the blade and the developer roller (d)

(2) Foreign particles adhering to the toner cartridge's main blade of the color in question.

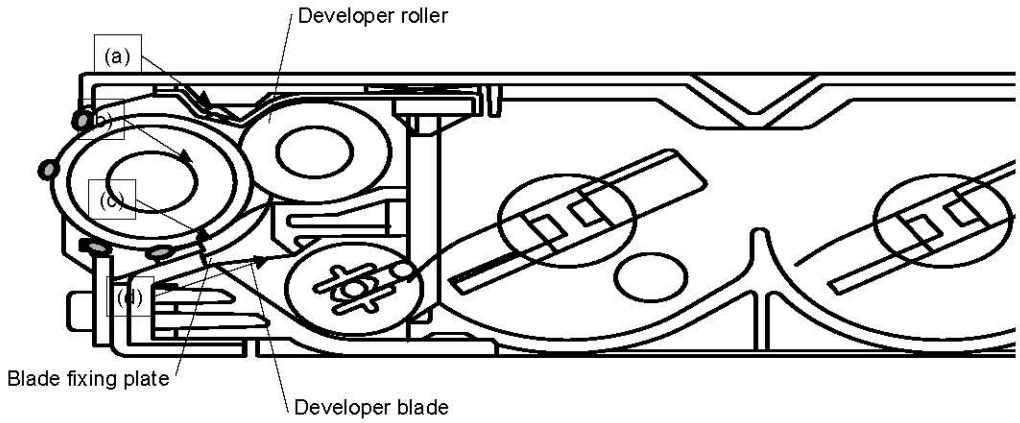


Fig. 8-7

Countermeasures

(1) Implement the test print.

(2) Confirm the color of the toner cartridge in question that has caused the white line.

(3) Remove the foreign particles adhering to the developer roller.

If foreign particles adhere to (d) of Fig.8-12, remove them referring to one of the figures below.

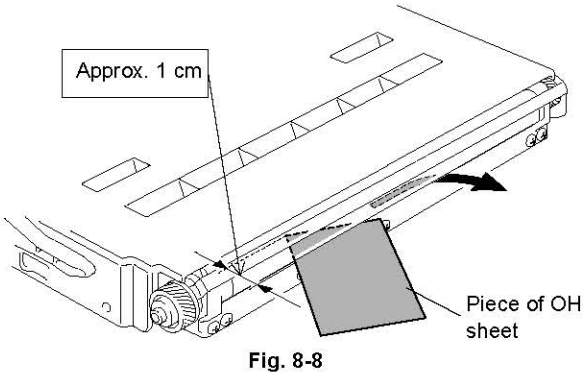


Fig. 8-8

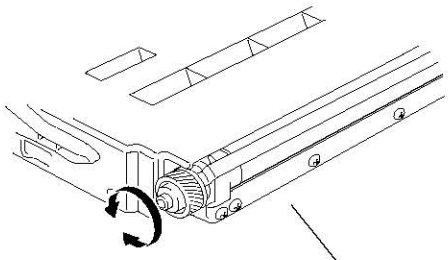


Fig. 8-9

I-7	White Line (2)

Phenomenon

Vertical white line appears from the leading edge to the trailing edge of the printed image as shown in print sample (7) of Page 8-45.

Main Causes

The dustproof glass of the laser unit is smeared with toner or foreign particles.

Countermeasures

Clean the dustproof glass. (See Section 2.8 of Chapter 6.)

(1) Remove the OPC belt cartridge and toner cartridges.

(2) Remove the dustproof glass from the laser unit.

(3) Clean the dustproof glass.

I-8	Vertical White Band

Phenomenon

White band appears in the vertical direction of printed image as shown in print sample (8) of Page 8-45.

Main Causes

Silicone oil adhering to the transfer drum.

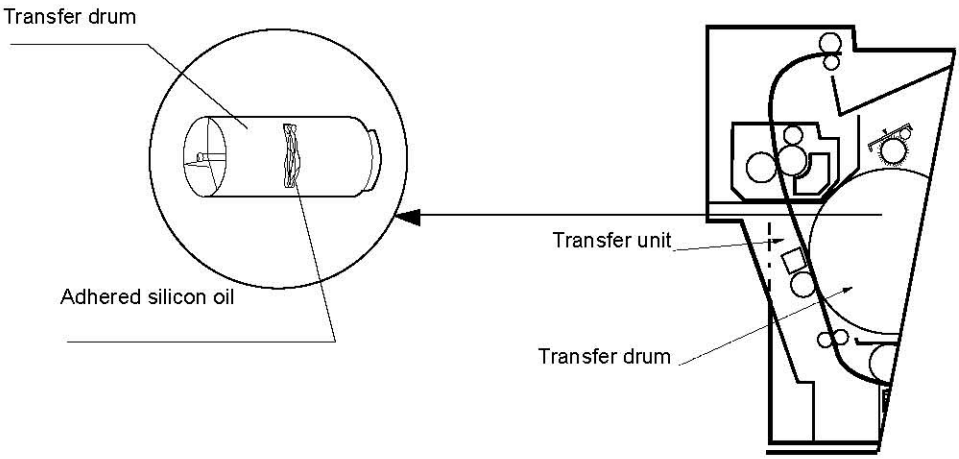


Fig. 8-10

Countermeasures

(1) Wipe off the oil adhering to the transfer unit and its perimeter.

(2) Replace the transfer drum with a new one. (See Section 4.8 of Chapter 6.)

(3) If the oil adhesion is excessive, replace the OPC belt cartridge and drum cleaner with new ones. (See Section 4.1 and 4.5 of Chapter 6.)

I-9	Black Line / Blur in the Image

Phenomenon

Fine black line or blur appears in the printed image as shown in print sample (9) of Page 8-45.

Main Causes

(1) The corona wire of the paper discharger unit is dirty.

(2) OPC belt surface is damaged.

(3) Foreign particles (paper dust, etc.) are stuck between the cleaning blade and OPC belt.

(4) Debris adhering to the base of the toner cartridge's developer roller where it contacts with the OPC belt.

Countermeasures

(1) Remove the OPC belt cartridge.

1-1) Clean the discharger unit (corona wire). (See Section 2.6 of Chapter 6.)

1-2) Replace the OPC belt cartridge with a new one. (See Section 4.1 of Chapter 6.)

(2) Clean the surface of the developer roller.

I-10	Vertical Line

Phenomenon

Vertical line appears in the printed image as shown in print sample (10) of Page 8-45.

Main Causes

(1) Foreign particles (dust, etc.) adhering to the parts located around the transfer drum, and consequently in contact with the toner image on the transfer drum.

(2) Damage of the OPC belt due to foreign particles adhering to the blade of the OPC belt cleaner.

Countermeasures

(1) Clean the paper discharger unit. (See Section 2.5 of Chapter 6.)

(2) Clean the charger unit (corona wire) of the OPC belt cartridge. (See Section 2.6 of Chapter 6.)

(3) Clean the rear face of the waste toner feeder.

(4) Replace the OPC belt cartridge with a new one.

I-11	Vertically Staggered Image

Phenomenon

Printed image staggered in the vertical direction as shown in print sample (11) of Page 8-45.

Main Causes

(1) Shock or vibration applied to the printer.

(2) Failure of the laser unit; vibration from rotation of the scanner motor.

Countermeasures

(1) Do not apply shock or vibration to the printer body.

(2) Installation location should be appropriate with no possibility of shock or vibration.

(3) Replace the laser unit with a new one. (See Section 4.5.3 of Chapter 7.)

I-12	Banding

Phenomenon

Banding line appears in the horizontal direction as shown in print sample (12) of Page 8-45.

Main Causes

This is a transfer failure due to the shock caused when the OPC belt seam passes over the cleaning blade.

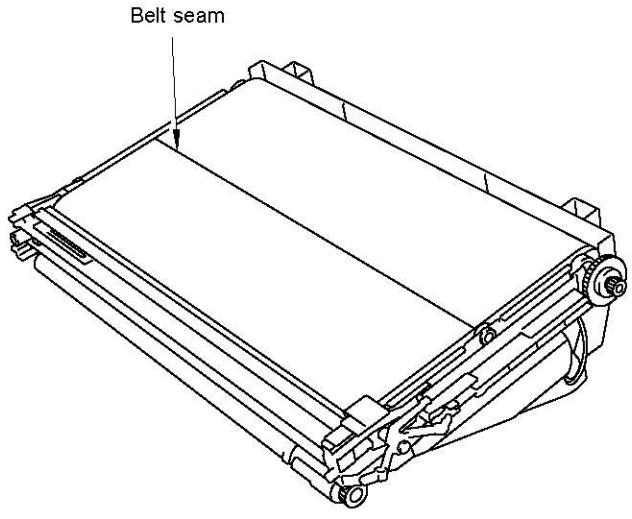


Fig. 8-11

Countermeasures

Replace the OPC belt cartridge with a new one. (See Section 4.1 of Chapter 6.)

I-13	White Band

Phenomenon

White banding line appears in the horizontal direction, and consequently causes a missing image as shown in print sample (13) of Page 8-45.

Main Causes

(1) Installation failure of the transfer unit, and deformation of the transfer roller.

(2) Contact failure of the transfer roller bias pole.

(3) TR cam clutch failure.

Countermeasures

(1) Confirm if the transfer unit is properly locked in position and that both ends of the transfer unit are held by the hooks.

(2) Confirm if the transfer unit is properly installed or not.

(3) Replace the TR cam clutch with a new one. (See Section 4.1.7 of Chapter 7.)

(4) Replace the transfer unit with a new one. (See Section 4.6.1 of Chapter 7.)

I-14	Toner Drop

Phenomenon

Toner spot stain is caused on the print by toner dropping within the printer engine as shown in print sample (14) of Page 8-45.

Main Causes

(1) Toner drops onto the transfer drum due to the breakdown of the waste toner feeder.

1-1) Mylar of the waste toner feeder is deformed.

1-2) Waste toner is not properly collected by the waste toner feeder.

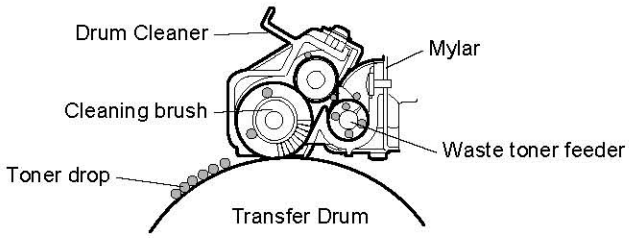


Fig. 8-12

(2) Toner adhering to the developer roller drops on the OPC belt .

Countermeasures

(1) Check the cleaning brush and waste toner feeder.

1-1) Clean the perimeter of the cleaning brush installation location.

1-2) Check if the seal is deformed or damage. If there is any deformation or damage, replace the waste toner feeder with a new one.

1-3) Check if waste toner is stuck in the printer engine. Remove the waste toner with a vacuum cleaner designed to manage toner.

2) Remove the toner cartridge.

2-1) Clean the surface of the developer roller.

2-2) Replace the toner cartridge with a new one.

I-15	White Spot / Black Spot

Phenomenon

White spots and black spots appear on the print as shown in print sample (15) of Page 8-46.

Main Causes

(1) Foreign particles adhering to the OPC belt or transfer drum.

(2) The OPC belt or transfer drum is damaged.

(3) Foreign particles mixed in the toner.

(4) Foreign particles adhering to the transfer roller, or local deformation of the transfer roller.

Countermeasures

(1) Remove the OPC belt cartridge.

1-1) Lightly wipe off the foreign particles adhering to the OPC belt using a cotton cloth.

1-2) Replace the damaged OPC belt cartridge with a new one. (See Section 4.1 of Chapter 6.)

(2) Open the transfer unit, and check the transfer drum.

2-1) Lightly wipe off the foreign particles adhering to the transfer drum using a cotton cloth.

2-2) Replace the damaged transfer drum with a new one. (See Section 4.8 of Chapter 6.)

(3) Remove the toner cartridge.

3-1) Clean the surface of the developer roller.

3-2) Replace the toner cartridge with a new one.

(4) Replace the transfer unit with a new one. (See Section 4.6.1 of Chapter 7.)

I-16	Mixed Color Image

Phenomenon

Mixed color image appears in the print as shown in print sample (16) of Page 8-46.

Main Causes

(1) Failure of toner cartridge: Blade pressure of the developer roller is incorrect or the blade is deformed.

(2) Restitution error of toner cartridge.

Countermeasures

(1) Confirm the toner cartridge can be inserted smoothly.

(2) Replace the toner cartridge with a new one.

(3) Reconfirm that the front cover unit is locked.

I-17	Color Misregistration

Phenomenon

Color misregistration is caused between two colors as shown in print sample (17) of Page 8-46.

Main Causes

(1) The OPC belt cartridge is not properly installed.

(2) The OPC belt cartridge is deformed.

(3) The cleaning brush of the drum cleaner is unstable in operation.

(4) Rotational load on the OPC belt cartridge is excessive.

** This problem might occur in the first page printed in color mode immediately after printing in monochrome mode, or the first page immediately after turning on the printer.

Countermeasures

(1) Reset the OPC belt cartridge properly.

(2) Replace the OPC belt cartridge with a new one. (See Section 4.1 of Chapter 6.)

(3) Replace the drum cleaner with a new one.

I-18	Toner Streak

Phenomenon

Brush mark line of uneven scanning density is caused in the image as shown in print sample (18) of Page 8-46.

Main Causes

(1) Main blade of the developer unit and the reset roller is not normal.

(2) Location of the toner cartridge is not correct.

(3) Transport paddle in the toner cartridge is deformed.

(4) Brush mark line appears in the continuous printing of high coverage (solid) patterns.

Countermeasures

(1) Replace the toner cartridge with a new one.

(2) Temporarily suspending the printing, agitate the toner cartridge and stabilize the replenishment of toner.

I-19	Mottle

Phenomenon

Variation of the scanning density is found in the image as shown in print sample (19) of Page 8-46.

Main Causes

(1) The transfer unit is not fixed in place.

(2) Assembly of the transfer roller is inaccurate.

(3) THV output of the high-voltage power supply unit is not normal.

(4) Failure of the toner cartridge.

(5) Deformation of the print paper.

Countermeasures

(1) Confirm that the transfer unit is firmly locked in place.

(2) Confirm that the transfer roller is properly installed.

(3) Replace the high-voltage power supply unit with a new one. (See Section 4.3.3 of Chapter 7.)

(4) Replace the toner cartridge with a new one.

(5) Replace the paper with new paper from a freshly opened ream.

I-20	Residual Image

Phenomenon

Image of the preceding page appears on every other page as shown in print sample (20) of Page 8-46.

Main Causes

(1) Cleaning failure due to lifting of the cleaning brush of the drum cleaner.

(2) Contact failure of the drum cleaner's bias pole.

(3) Failure of the high-voltage power supply unit.

Countermeasures

(1) Check if the drum cleaner is properly installed or not.

(2) Replace the failed high-voltage power supply unit with a new one. (See Section 4.3.3 of Chapter 7.)

I-21	Insufficient Gloss

Phenomenon

Gloss of the print is not sufficient as shown in print sample (21) of Page 8-46.

Main Causes

(1) The fuser cleaner is stained.

(2) The fuser roller is deteriorated.

Countermeasures

(1) Replace the fuser cleaner with a new one. (See Section 4.2 of Chapter 6.)

(2) Replace the fusing unit with a new one. (See Section 4.2 of Chapter 6.)

NOTE:
When replacing the fusing unit, wait approximately for 30 minutes after the new unit is installed to allow the fusing oil to circulate in the new fusing unit.

I-22	Back Stain

Phenomenon

Back side of the print paper is stained as shown in print sample (22) of Page 8-46.

Main Causes

Fusing unit:

(1) The cleaning pad of the fuser cleaner is stained.

(2) Silicone oil in the oil bottle is short.

(3) The fuser roller and back-up roller are dirty.

Countermeasures

(1) Replace the fuser cleaner with a new one. (See Section 4.2 of Chapter 6.)

(2) Clean the fuser roller and back-up roller.

(3) Replace the fusing unit with a new one. (See Section 4.2 of Chapter 6.)

I-23	White Print

Phenomenon

A blank page (no print at all) is output or a specific color is missing (not printed) as shown in print sample (23) of Page 8-46.

Main Causes

(1) Laser light path is blocked by paper or other material stuck at the opening of the laser unit.

(2) The TR cam clutch is broken (not functioning).

(3) There is no belt bias voltage (CBV).

(4) There is no output from the high-voltage power supply unit (HVU) due to breakdown.

Countermeasures

(1) Confirm that there are no foreign objects stuck in the opening of the laser unit.

(2) Replace the TR cam clutch with a new one. (See Section 4.1.7 of Chapter 7.)

(3) Replace the OPC belt cartridge with a new one. (See Section 4.1 of Chapter 6.)

(4) Replace the high-voltage power supply unit with a new one. (See Section 4.3.3 of Chapter 7.)

I-24	Insufficient Fusing

Phenomenon

Printed image is partially missing as shown in print sample (24) of Page 8-46. This proves that the fusing is insufficient.

Main Causes

(1) Wrong selection of print media (label or envelope, etc.) at the Host (driver) side.

(2) Recommended paper is not being used.

(3) Double-feed paper.

(4) Failure of the fusing unit.

Countermeasures

(1) Adjust the mode of Host side to suit the print media in use.

(2) Use the recommended paper.

(3) Fan the paper before loading in the media cassette.

(4) Replace the failed fusing unit with a new one. (See Section 4.2 of Chapter 6.)

I-25	Vertical Smear

Phenomenon

Printed image is smeared vertically as shown in print sample (25) of Page 8-46.

Main Causes

(1) Paper dust between the cleaning blade and OPC belt.

(2) Debris adhering to the base of a toner cartridge's developer roller where it contacts with the OPC belt.

Countermeasures

(1) Remove paper dust between the cleaning blade and OPC belt referring to the figure below.

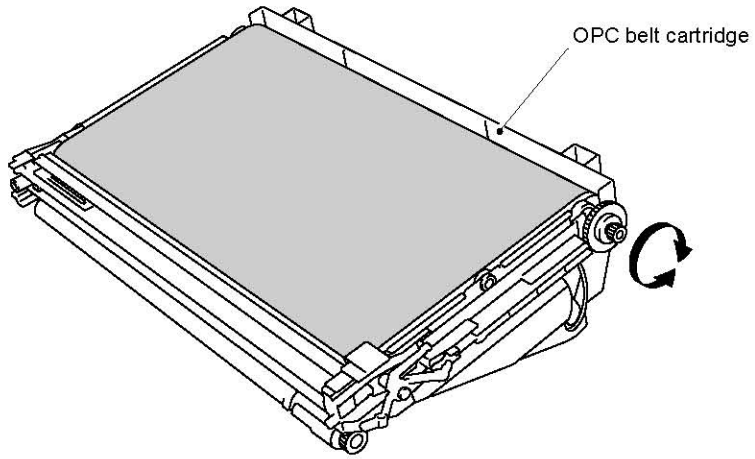


Fig. 8-13

(2) Replace the OPC belt cartridge with a new one.

I-26	Black Toner Light

Phenomenon

Black color of printed image is light as shown in print sample (26) of Page 8-46, and the printer clatters at the same time.

Main Causes

Black toner in the cartridge has solidified because the printer is used under high temperature circumstance or due to continuous printing.

Countermeasures

Replace the black toner cartridge with a new one.

I-27	Color Missing

Phenomenon

Color is missing in the printed image as shown in print sample (27) of Page 8-46.

Main Causes

Fusing failure due to using damp paper or using the printer under high humidity conditions.

Countermeasures

(1) Use the paper immediately after open the paper bag.

(2) Change the NVRAM setting. (Refer to '45-2 THV TUNE UP' in Section 3.3 of Chapter 5.)

I-28	Horizontal Line 244mm from the Edge of Paper

Phenomenon

A horizontal line appears 244mm from the edge of the printed paper as shown in print sample (28) of Page 8-46.

Main Causes

Vibration is caused when an OPC belt and the transfer drum contact.

Countermeasures

Change the resolution to 600 dpi.

I-29	Vertical Lines on OHP

Phenomenon

Vertical lines appear when printing the OHP sheet as shown in print sample (29) of Page 8-46.

Main Causes

Paper dust around the paper exit roller adhering to the OHP sheet.

Countermeasures

(1) Use the recommended OHP sheet.

(2) Clean the paper exit roller.

APPENDIX 1. SERIAL NO. DESCRIPTIONS

The descriptions as below show how to read labels fitted to the printer parts.

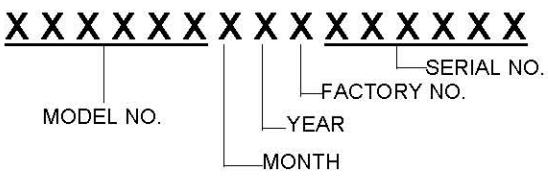
< ID for production month of the Printer >

A:	January	E:	May	J:	September
B:	February	F:	June	K:	October
C:	March	G:	July	L:	November
D:	April	H:	August	M:	December

< ID for production month of parts other than the printer >

1:	January	5:	May	9:	September
2:	February	6:	June	X:	October
3:	March	7:	July	Y:	November
4:	April	8:	August	Z:	December

(1) Printer



<Location>

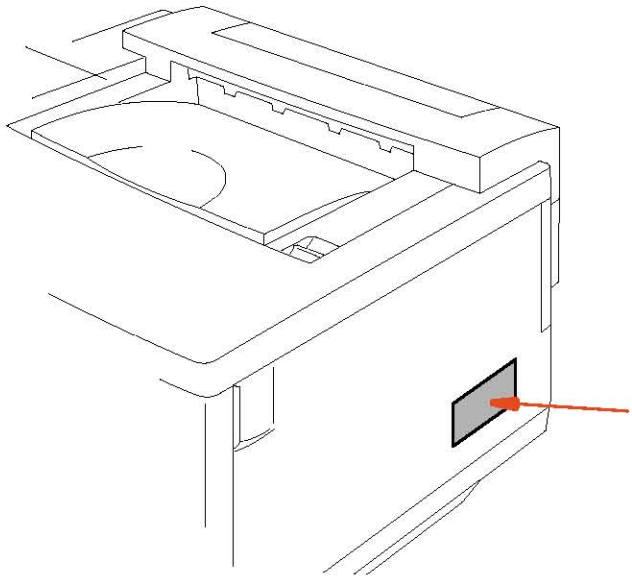
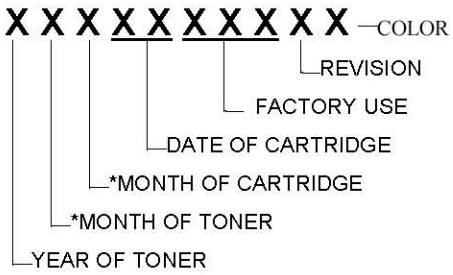


Fig. A- 1

(2) Toner Cartridge



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

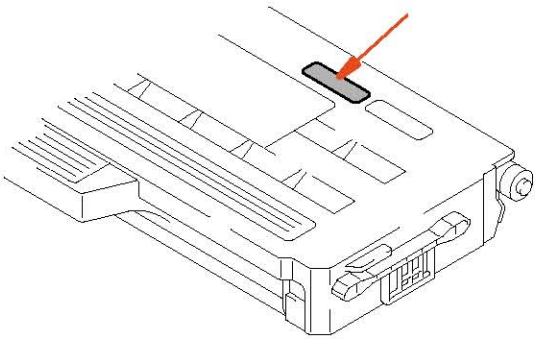


Fig. A- 2

(3) OPC Belt Cartridge



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

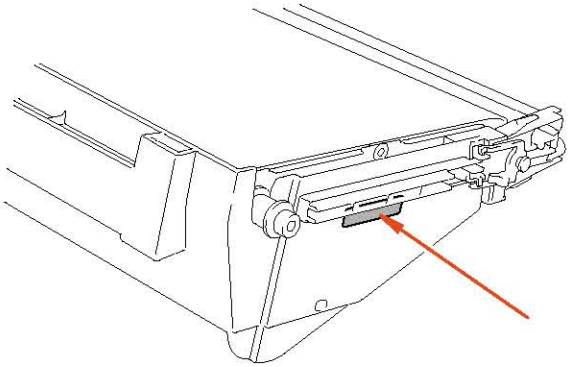
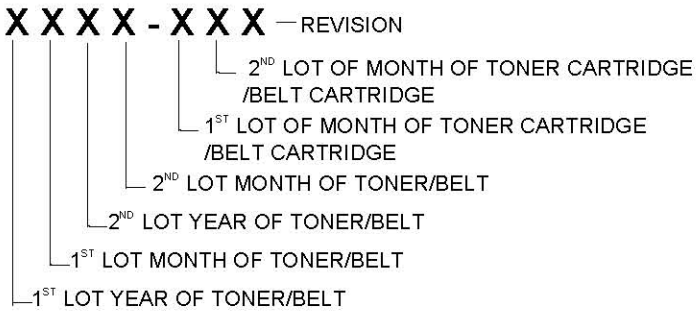
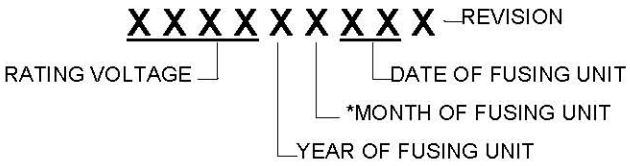


Fig. A- 3

(4) Toner Cartridge, OPC Belt Cartridge Master Box



(5) Fusing Unit



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

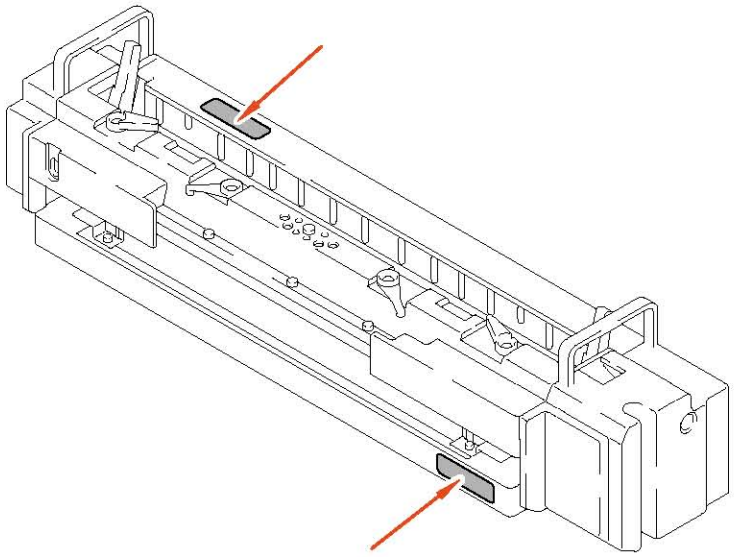
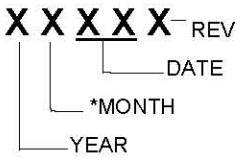


Fig. A- 4

(6) Laser Unit



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

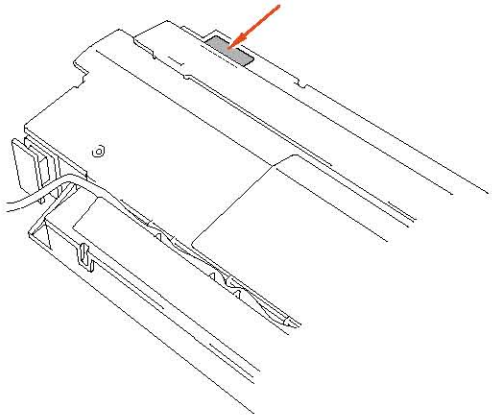
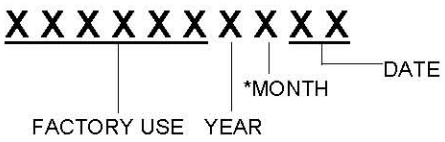


Fig. A- 5

(7) Transfer Drum



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

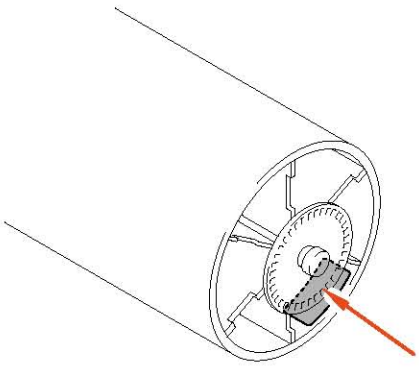


Fig. A- 6

(8) Power Supply Unit

S/N X X X X X X X

FACTORY USE

REV X X

YY/WW X X / X X

WEEK OF YEAR

YEAR OF POWER SUPPLY UNIT

<Location>

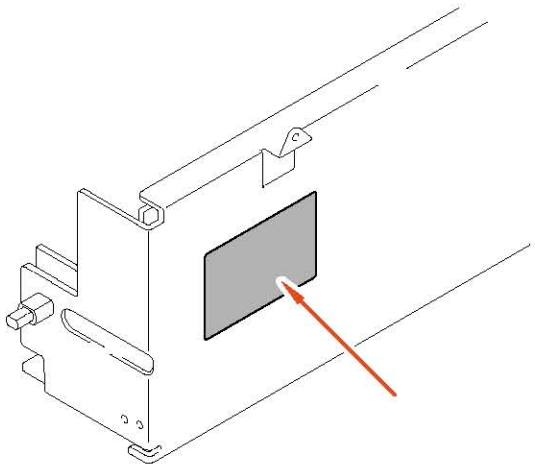


Fig. A- 7

APPENDIX 2. DIAMETER / CIRCUMFERENCE OF ROLLERS

The diameter or circumference of each roller is listed below;

No.	Parts Name	Diameter (Circumference)
1	OPC Belt	(509 mm)
2	Belt Drive Roller	ϕ 32.4 mm (101.74 mm)
3	Developer Roller	ϕ 22 mm (69.80 mm)
4	Transfer Roller	ϕ 25 mm (78.5 mm)
5	Paper Pick-up Roller	ϕ 40 mm (125.60 mm)
6	Transfer Drum	ϕ 162 mm (508.68 mm)
7	Back-up Roller	ϕ 40 mm (125.6 mm)
8	Fuser Roller	ϕ 40 mm (125.6 mm)
9	Drum Cleaner	ϕ 25 mm (78.50 mm)
10	Cleaning Roller	ϕ 18 mm (56.52 mm)
11	Register Roller	ϕ 18 mm (56.52 mm)
12	Paper Exit Roller	ϕ 15.4 mm (48.36 mm)

APPENDIX 3. SHELF LIFE OF EACH CONSUMABLE

Each consumable has its own shelf life as follows. Shelf life varies depending whether the consumable packaging is open or not.

Consumable	Before unpacking *1	After unpacking *2
Toner cartridge (all colors)	3 years	1 year
OPC belt cartridge	3 years	1 year *3
Fuser cleaner	N/A	N/A

NOTE:

**1: The remaining consumable life is 1 year if it is stored for 2 years.*

**2: Even though shelf life is one year after unpacking, the consumable life will be less than one year if it is stored for more than 2 years before unpacking.*

**3: The OPC belt cartridge must not be exposed to light after unpacking, if it is then this life is invalid.*

APPENDIX 4. CONSUMABLES REPLACEMENT

Each consumable below should be replaced according its own life.

1) Toner Cartridge

Life: K = 14,000 prints, CYM = 8,500 pritns

Condition: Above figures are based on A4 or letter size 5% coverage. Life is detected by the toner empty sensor.

NOTE:
Life of the starter toner cartridge supplied with the printer is half of the above figures.

2) Oil Bottle

Life: 12,000 prints (A4 or letter)

Condition: Life is detected by the oil empty sensor.

3) Waste Toner Pack

Life: 18,000 images

Condition: Above figure is based on A4 or letter size 5% coverage for each color. Life is detected by the waste toner sensor.

4) Fuser Cleaning Roller

Life: 20,000 images

Condition: Above figure is based on A4 or letter size 5% coverage.

5) 120K Kit

Life: 120,000 prints

Condition: None

6) 240K Kit

Life: 240,000 prints

Condition: None

7) OPC Belt Cartridge

Life: 120,000 images

Condition: Above figure varies depending on pages/job. Refer to the list below.
(Figures of the list below are based on the condition printed with 50% of monochrome and 50% of color on the letter size paper.)

Pages per job	1 page	2 pages	3 pages	4 pages	5 pages
Life	60,000	65,000	75,000	87,000	96,000

Pages per job	6 page	7 page	8 page	9 page	10 page
Life	100,000	103,000	106,000	108,000	111,000

Pager per job	11 page	12 page	13 page
Life	115,000	117,000	120,000

8) Cleaning Roller

Life: 20,000 pages

Condition: Above figure varies depending on coverage. Refer to the list below.

Coverage	~ 20%	20% ~ 40%	40% ~
Additional life deleted	0	1	2
Life (pages)	20,000	10,000	6,666

9) Fusing Unit (70K Kit)

Life: 70,000 pages

Condition: Above figure varies depending on coverage. Refer to the list below.

Coverage	~ 12.5%	12.5% ~ 20%	20% ~ 40%	40% ~ 60%	60% ~
Additional life deleted	0	0.2	0.5	1	2
Life (pages)	70,000	58,333	46,666	35,000	23,333

10) Transfer Drum

Life: 600,000 images

Condition: None

11) Paper Feeding Kit

Paper Feeding Roller

Life: 120,000 pages

Condition: None

Separator Pad

Life: 120,000 pages

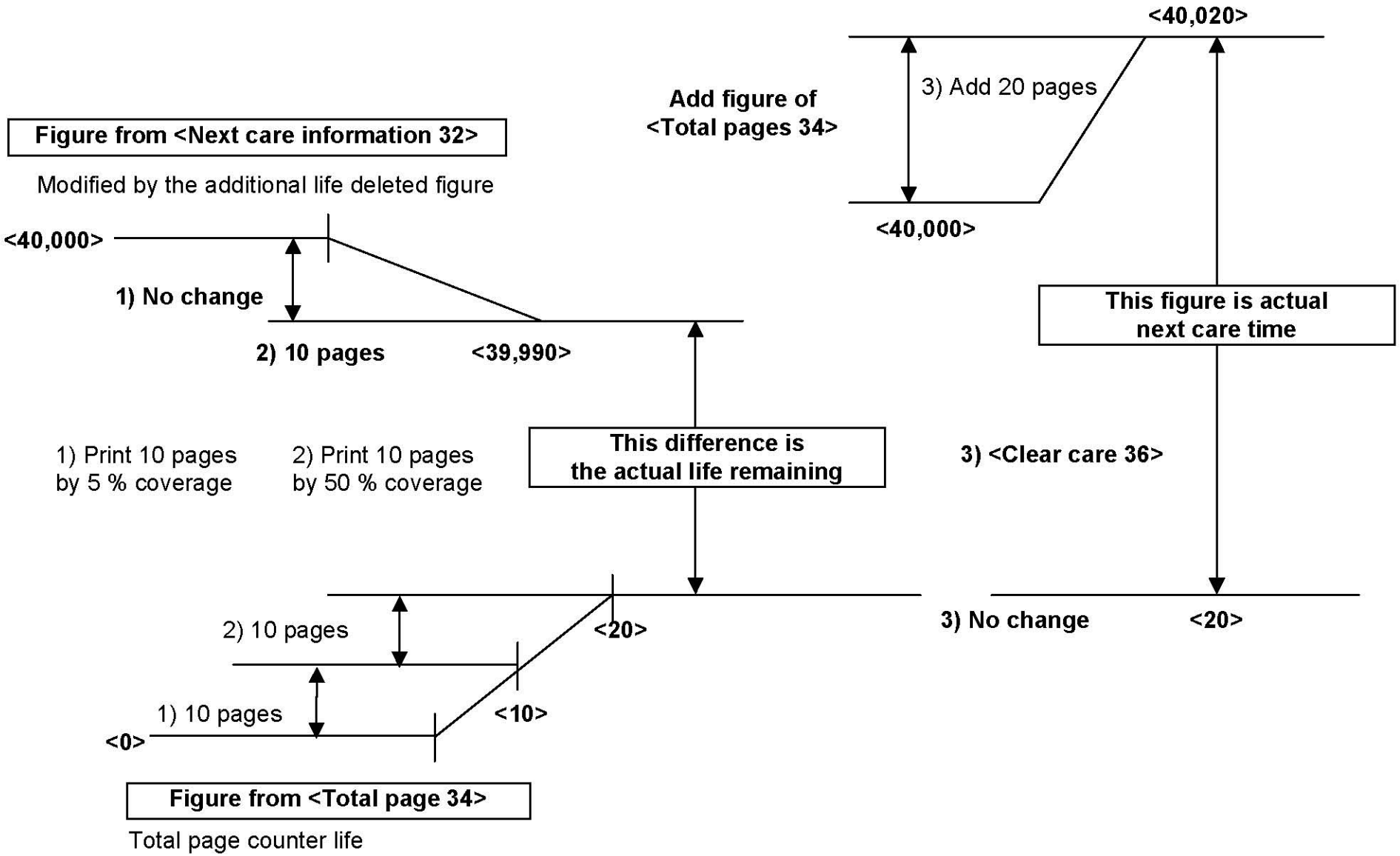
Condition: None

12) Oil Pad

Life: 35,000 pages

Condition: Above figure varies depending on coverage. Refer to the list below.

Coverage	~ 12.5%	12.5% ~ 20%	20% ~ 40%	40% ~ 60%	60% ~
Additional life deleted	0	0.2	0.5	1	2
Life (pages)	35,000	29,167	23,333	17,500	11,667


<40,020>
3) Add 20 pages
Add figure of
<Total pages 34>
<40,000>
Figure from <Next care information 32>
Modified by the additional life deleted figure
<40,000>
1) No change
2) 10 pages
<39,990>
This figure is actual
next care time
1) Print 10 pages
by 5 % coverage
2) Print 10 pages
by 50 % coverage
This difference is
the actual life remaining
3) <Clear care 36>
2) 10 pages
<20>
3) No change
<20>
1) 10 pages
<10>
<0>
Figure from <Total page 34>
Total page counter life

APPENDIX 5. HOW TO RE-ENTER ORIGINAL DATA TO THE MCTL PWB

> **CAUTION**
>
> ***Actions 1) and 2) MUST be carried out BEFORE the MCTL PWB is removed or the NVRAM initialized otherwise ALL READINGS WILL BE LOST.***

1) Go into the Engine Controller Mode. (Refer to Section 3 "ENGINE CONTROLLER MODE" of Chapter 5.)

2) Before initializing the NV-RAM or replacing the MCTL PWB, record the following values;

   i) Display **TOTAL PAGE** to record the value.

   (i.e.) TOTAL PAGE (T) = 412P

   ii) Display **EACH IMAGE** to record the values.

   (i.e.) EACH IMAGE (IY)=348P

   (IM)=353P

   (IC)=365P

   (IK)=439P

   iii) Display **NEXT CARE** to record the values.

   (i.e.) FC ROLL (NC2) = 12,050P

   BL UNIT (NC7) = 49,135P

   FU UNIT (NC8) = 39,684P

   TR DRUM (NC9) = 599,943P

   240K KIT (NC10) = 240,000P

   PICK ROLL (NC13) = 120,000P

   PICK LF1 (NC14) = 120,000P

   PICK LF2 (NC15) = 120,000Piv) Display **LIFE PERIOD SET** of FACTORY MODE to record the values.

   (i.e.) FC ROLL (LP2) = 12,000P

   BL UNIT (LP7) = 50,000P

   FU UNIT (LP8) = 70,100P

   TR DRUM (LP9) = 600,000P

   240K KIT (LP10) = 240,000P

   PICK ROLL (LP13) = 120,000P

3) When you have recorded all the values above, initialize the data in the NV-RAM on the MCTL PWB or replace the MCTL PWB.

After initializing all the data in the NV-RAM on the MCTL PWB, or replacing the MCTL PW

B, all the original counter values for the cleaning roller, OPC belt cartridge, fusing unit, 120K kit and 240K kit should be re-entered as below;

The method used to correct the counters is to reset the page counter to a calculated TOTAL PAGE value and then to perform a CLEAR CARE for the item to reset the NEXT CARE for that item to the value recorded in 2) iii).

The basic formula used in these calculations is:-

TOTAL PAGE = NEXT CARE - LIFE PERIOD

Where this formula would result in a negative number, the LIFE PERIOD should be temporarily set to a lower value so that the result is a positive number and then this number and LIFE PERIOD used to perform the CLEAR CARE to reset the NEXT CARE counter.

4) Re-enter the FC ROLL (NC2) value as follows;

i) Enter the value of NC2 - LP2 into the TOTAL PAGE counter.

(i.e.) NC2 - LP2 $\Rightarrow$ 12,050P - 12,000P = 50

Enter the value '50' in the TOTAL PAGE counter.

ii) Perform CLEAR CARE 2. (Refer to '36 CLEAR CARE' in page V-24 of Chapter V.)

iii) Check that the value of NEXT CARE is reset to the recorded value in 2) iii).

(i.e.) NC2 = 12,050P

5) Re-enter the BL UNIT (NC7) value as follows;

i) After calculating the values so that they work in the following formula

(IY + IM + IC + IK) = NC7 - LP7,

enter each value of LP7, IY, IM, IC, IK.

(i.e.) (IY + IM + IC + IK) = NC7 - LP7

$\Rightarrow$ (348 + 353 + 365 + 439) = 49,135 - 50,000

Since the above result is minus, reduce the value of LP7 is 40,000P in order to make the result plus, then enter it into the LIFE PERIOD SET counter in FACTORY MODE.

The formula is as follows;

(IY + IM + IC + IK) = NC7 - LP7

$\Rightarrow$ (348 + 353 + 365 + 439) = 49,135 - 40,000

$\Rightarrow$ (348 + 353 + 365 + 439) = 9,135

Change the value of IK from 439 to 8,069 so that the formula works out.

(348 + 353 + 365 + 8,069) = 9,135

Then, enter each value for IY=348, IM=353, IC=365, and IK=8,069 in the EACH IMAGE SET counter in FACTORY MODE.

ii) Perform CLEAR CARE 7. (Refer to '36 CLEAR CARE' in page V-24 of Chapter V.)

iii) Check that the value of NEXT CARE is reset correctly.

(i.e.) NC7 = 49,135P

iv) Reset the LIFE PERIOD counter in FACTORY MODE to 50,000.

6) Re-enter the FU UNIT (NC8) value as follows;

i) Enter the value of NC8 - LP8 into the TOTAL PAGE counter.

(i.e.) NC8 - LP8 = 39,684 - 70,000 = - 30,316

Since the above result is minus, reduce the value of LP8 is 30,000P in order to make the result plus, then enter it into the LIFE PERIOD SET counter in FACTORY MODE.

The formula is as follows;

NC8 - LP8 = 39,684 - 30,000 = 9,684

Enter the value '9,684' in TOTAL PAGE.

ii) Perform CLEAR CARE 8. (Refer to '36 CLEAR CARE' in page V-24 of Chapter V.)

iii) Check that the value of NEXT CARE is reset correctly.

(i.e.) NC8 = 39,684P

iv) Reset the LIFE PERIOD counter in FACTORY MODE to 60,100.

7) Re-enter the 240K KIT (NC10) value as follows;

i) Enter the value of NC10 - LP10 into the TOTAL PAGE counter.

(i.e.) NC9 - LP9 = 120,000 - 120,000 = 0

Enter the value '0' into the TOTAL PAGE counter.

ii) Perform CLEAR CARE 9. (Refer to '36 CLEAR CARE' in page V-24 of Chapter V.)

iii) Check that the value of NEXT CARE is reset correctly.

(i.e.) NC10 = 120,000P

8) Re-enter the original TOTAL PAGE (T) value in TOTAL PAGE SET in FACTORY MODE.

(i.e.) T = 412P

9) Re-enter the original EACH IMAGE (IY, IM, IC, IK) values in EACH IMAGE SET in FACTORY MODE.

(i.e.) (IY)=348P, (IM)=353P, (IC)=365P, (IK)=439P

10) Ensure that the values in the LIFE PERIOD SET counters in FACTORY MODE are correct.

(i.e.) FC ROLL (LP2)=12,000P

BL UNIT (LP7)=50,000P

FU UNIT (LP8)=60,100P

120K KIT (LP10)=120,000P

11) Completed.

APPENDIX 6. RE-PACKING INSTRUCTIONS

PRECAUTION

When re-packing the printer before shipping, be sure to follow the steps and cautions below. Failure to do so will cause toner or oil spill in the printer and severe damage to the printer.

6.1 Toner Cartridge

1) Open the front cover and remove all the toner cartridges (K, Y, M, C) from the printer.

2) Put the original protective cover (orange) onto each cartridge and put it into the polyethylene bag.

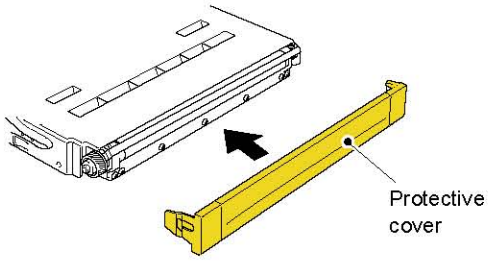


Fig. A- 8

3) Put the toner cartridges into the original starter kit packings.

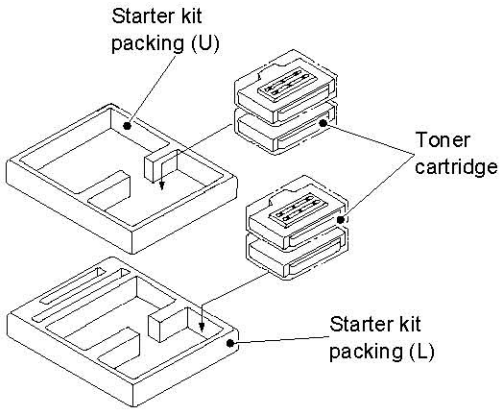


Fig. A- 9

CAUTION

- *If you do not have the original protective cover, cover each toner cartridge with bubble sheet to protect the developer roller.*
- *If you do not have the original starter kit packing, pack each toner cartridge firmly with bubble sheet and put them into the outer carton.*

6.2 OPC Belt Cartridge

1) Open the top cover and remove the OPC belt cartridge from the printer.
2) Open the shutter on the OPC belt cartridge and remove toner in the cartridge with a vacuum cleaner.

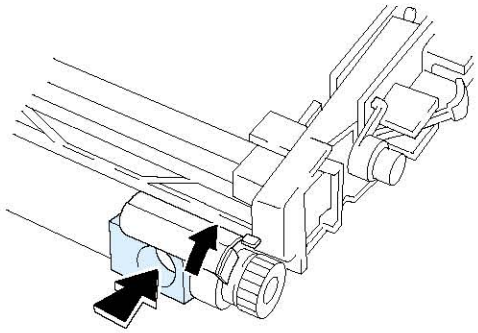


Fig. A- 10

3) Cover the OPC belt cartridge with the original protective sheet (black).
4) Put the cartridge into the lightproof polyethylene bag.

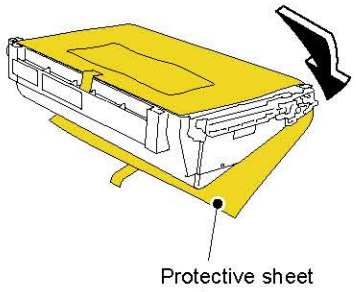


Fig. A- 11

5) Put the OPC belt cartridge into the original starter kit packing (L).

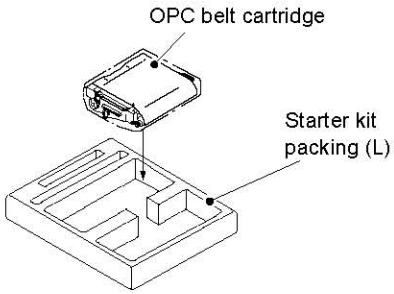


Fig. A- 12

CAUTION

- *Do not directly touch the OPC belt surface with bare hands or gloves.*
- *If the belt is exposed for more than two minutes to a light source of 800 lux, the belt may be damage.*
- *If you do not have the original starter kit packing, put the OPC belt cartridge in a light proof bag and pack it firmly with bubble sheet and put it into the outer carton.*

6.3 Fusing Unit

1) Remove the fusing unit securing screws (2 pcs.)

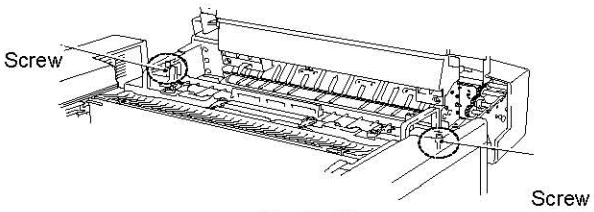


Fig. A- 13

2) Holding the handles at both ends of the fusing unit and remove the fusing unit from the printer.

3) Remove the oil bottle and the fuser cleaner from the fusing unit and put each of them into the polyethylene bag.

> ***CAUTION***
>
> *Pack the oil bottle in the polyethylene bag and seal it firmly. Failure to do so will cause oil spill during shipping and damage to the printer.*

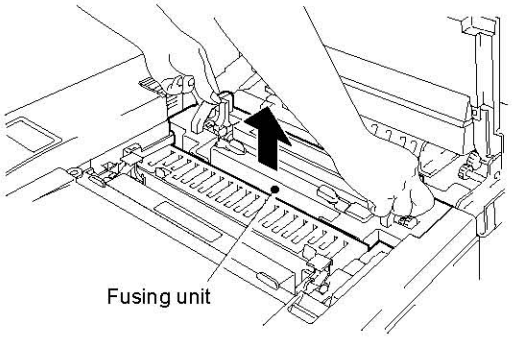


Fig. A- 14

4) Put the oil bottle and the fuser cleaner into the original starter kit packing (L).

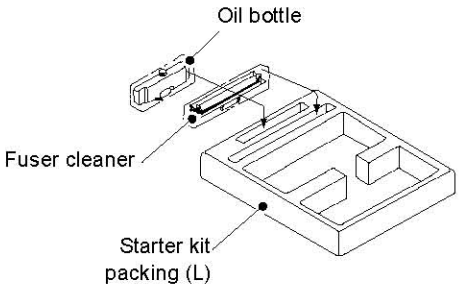


Fig. A- 15

5) Remove the oil remaining in the fusing unit with the supplied syringe to avoid oil spill in the printer.

NOTE:

Re-install the fusing unit into the printer after cleaning the printer as instructed in the following section. For re-installation of the fusing unit, see Section 6.6 'Packing'.

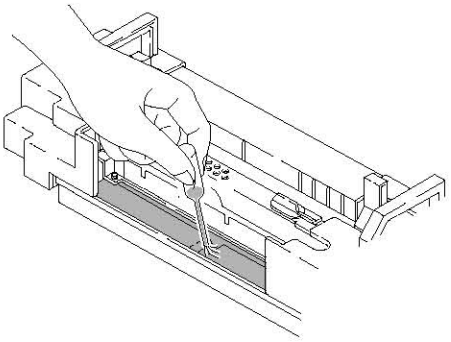


Fig. A- 16

6.4 Waste Toner Pack

1) Remove the waste toner pack from the printer.

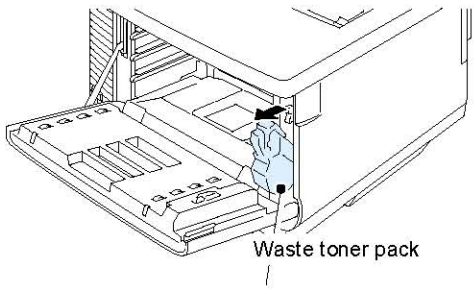


Fig. A- 17

2) Clean toner from around the pack. Then, remove the seal from the side of the waste toner pack and fit it to cover the hole of the waste toner pack completely.

3) Put the waste toner pack into the polyethylene bag and seal it firmly.

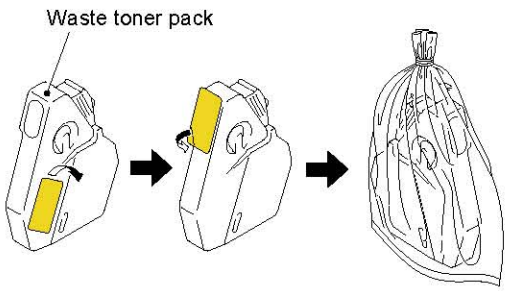


Fig. A- 18

6.5 Cleaning

Clean the following areas with a vacuum cleaner to remove toner.

1) Around the waste toner pack / Waste toner feeder tube.

   i) Remove the one screw of side cover (R) at the rear of the printer to remove the side cover (R).

   ii) Vacuum toner from the exit of the waste toner feeder tube and around the waste toner pack holder.

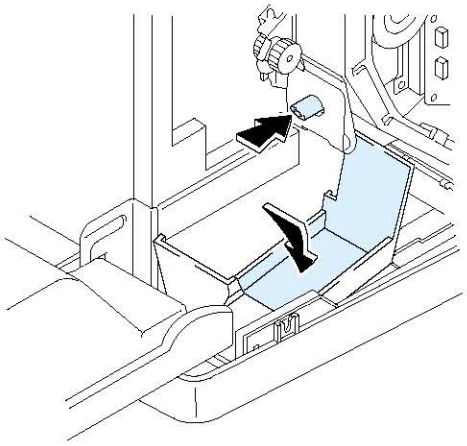


Fig. A- 19

   iii) Cover the exit of the waste toner feeder tube with vinyl wrap.

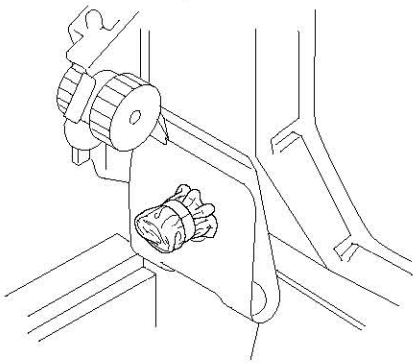


Fig. A- 20

2) Drum cleaner

i) Remove the cleaner cover by releasing the two hooks.

ii) Holding the handle located on the top of the drum cleaner, push it backwards.

iii) Remove the drum cleaner by lifting it out.

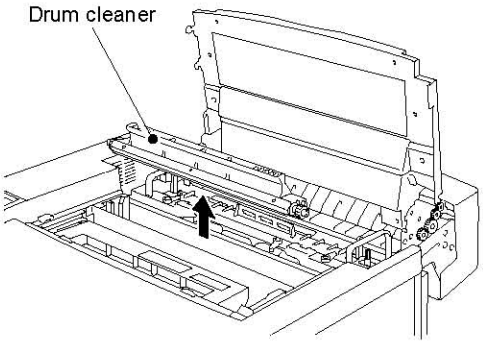


Fig. A- 21

iv) Clean the area where the drum cleaner is mounted with a vacuum cleaner and a cloth. (Refer to the figure on the right.)

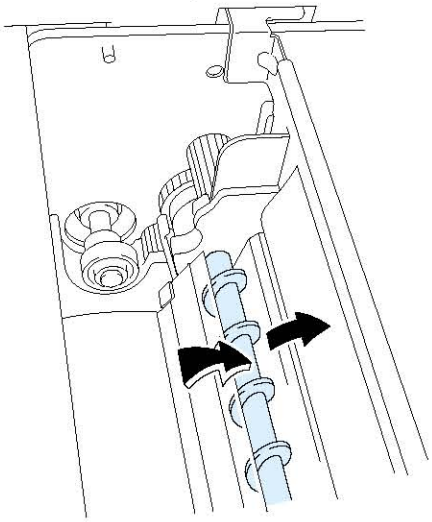


Fig. A- 22

3) Inside the printer

i) Remove the upper side cover, side cover (L), and upper cover from the printer.

ii) Remove the control fan, and then remove the waste toner feeder unit.

iii) Vacuum toner from around the other side of the waste toner feeder tube and inside the printer. (Refer to the figure on the right.)

iv) Reassemble the waste toner feeder unit, control fan, upper cover, side cover (L), and upper side cover.

v) Re-install the drum cleaner and cleaner cover.

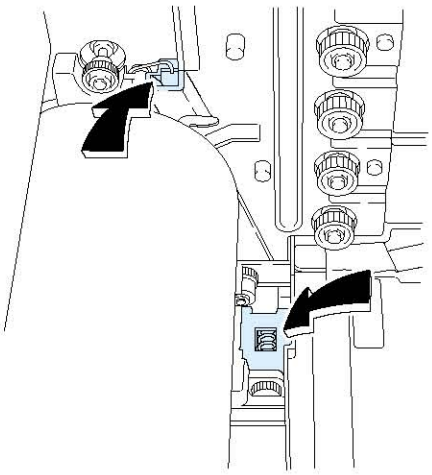


Fig. A- 23

CAUTION

- *Be sure not to damage the surface of the transfer drum with the vacuum cleaner nozzle when cleaning the areas around the transfer drum.*
- *Be sure not to contact the nozzle of the vacuum cleaner with the terminals inside the printer. Failure to do so will cause damage to the electrical parts in the printer.*
- *It is recommended to ground the nozzle of the vacuum cleaner by using an earth wire.*

4) Paper cassette

i) Remove the paper cassette from the printer and remove paper from the cassette.

ii) Vacuum up any paper dust in the paper cassette.

iii) Reinstall the paper cassette.

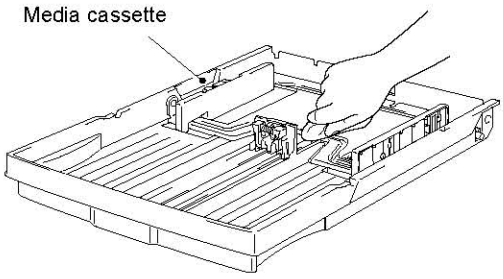


Fig. A- 24

6.6 Packing

1) Re-install the fusing unit into the printer.

i) After setting the fusing unit in place, lightly press down the unit to firmly connect it to the connector on the base.

ii) Tighten the securing screws while pressing down the fusing unit.

iii) Close the top cover.

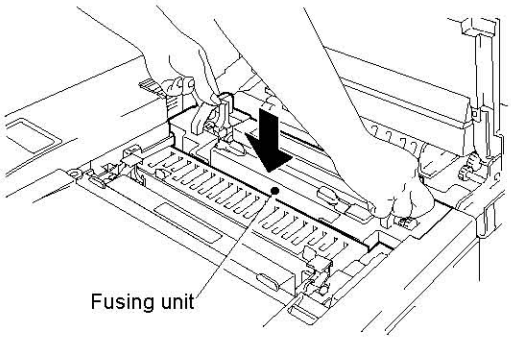


Fig. A- 25

2) Check the following items are packed in the starter kit packing;

Four toner cartridges (K, Y, M, C), OPC belt cartridge, Oil bottle, Fuser cleaner. (Refer to the figure on the right.)

3) Put the printer into the polyethylene bag.

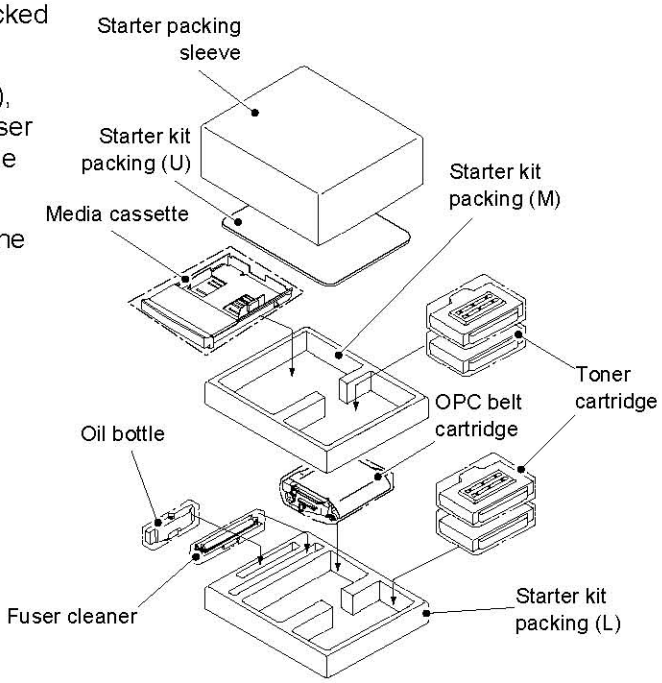


Fig. A- 26

4) Pack the printer, starter kit packing, waste toner pack, and power cable in the carton using the original packing material.

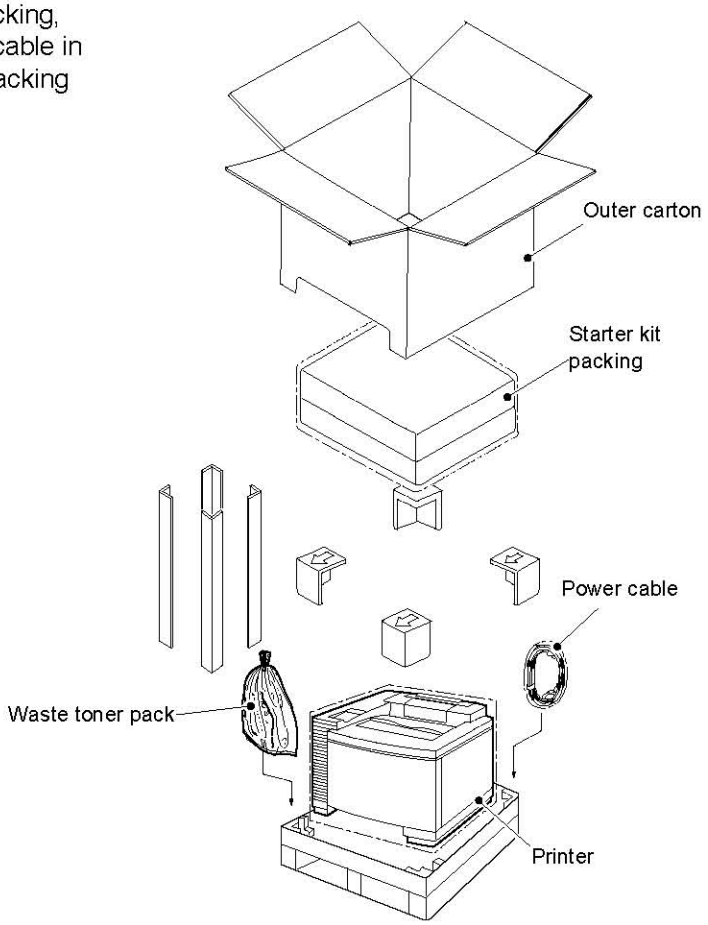


Fig. A- 27

5) Seal the outer carton firmly.

6) Band the carton with two plastic bands.

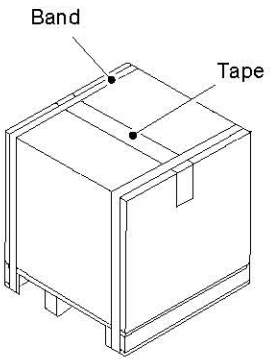


Fig. A- 28

APPENDIX 7. HIDDEN FUNCTION MENU

7.1 Line Test Menu

Hold down the + and - buttons and turn the print ON

LINE TEST ----- < Press the Go button >

	Item	Descriptions
1	LCD TEST	All columns of the LCD are turned on to check that the LCDs are all displayed correctly.
2	LED TEST	All LEDs are turned on in LCD TEST above and turned off in SW TEST below to check the LED performance.
3	SW TEST	The corresponding number appears when pressing the button to check the performance of all buttons.
4	SENSOR TEST	The corresponding character appears when the sensor performs to check the performance of all sensors.
5	RAM SIZE TEST	Displays the size of the RAM installed in the printer and checks that the size is correct.
6	TRAY1 CHECK	Displays the paper size of the installed cassette 1 to check it.
7	TRAY2 CHECK	Displays the paper size of the installed cassette 2 to check it.
8	FLASH CARD R/W TEST	Implements the reading/writing test of the compact flash card to check the interface and flash card.

DRAM CHECK START ----- < Press the Go button >

DRAM test mode

NV-RAM CLEAR ----- < Press the Go button >

SURE? (SET/ELSE) NV-RAM clear

ROM/RAM WAIT SET ----- < Press the Go button >

CARD/CART SEL (WAIT LEVEL = 4*)

ROM/RAM wait setting (0 to 15)

7.2 Professional Menu

The professional menu is open to users as per request to customize the printer functions mainly.

To enter the professional menu, press the Go and Set buttons together.

The details for each menu are described as follows;

```
TRAY SETTING
```

TRAY PRIORITY ----- T1>T2(>T3), (T3>)T2>T1

Specifies the priority of the paper source when selecting 'Auto' in the paper source setting.

```
ENGINE ADJUST
```

LEFT MARGIN

Adjusts the horizontal gap of the printing position when the optional lower cassette is installed.

The setting in the main PCB is changed.

-3.5mm ~ +3.5mm The setting value can be changed by 5mm.

TRAY1 = *** mm

TRAY2 = *** mm

TRAY3 = *** mm

DUPLEX = *** mm

YPOS ADJUST

Adjusts the vertical gap of the printing position when the optional lower cassette is installed.

The range of the setting value is +100 ~ -100. (Default is 0.)

The setting value can be changed by 1 dot.

TRAY1 = **** dot

TRAY2 = **** dot

TRAY3 = **** dot

DUPLEX = **** dot

```
RESET SETTINGS
```

RESET SETTING1

Sets the current printer setting to the user setting 1.

```
SAVE SETTINGS
```

SAVE SETTING1

Saves the current printer setting to the user 1.

```
SAVE FONT
```

(Only when selecting the LaserJet emulation.)

PRIMARY FONT

Saves the fonts to be currently registered as the primary font into the storage device (compact flash card, hard disk).

FONT ID = ####

SECONDARY FONT

Saves the fonts to be currently registered as the secondary font into the storage device (compact flash card, hard disk).

FONT ID = ####

DOWNLOAD FONT

Saves the current download font into the storage device (compact flash card, hard disk).

FONT ID = ####

exit SAVE

```
SAVE MACRO
```

(Only when selecting the LaserJet emulation and any macros are registered.)

Saves the macros to be currently registered into the storage device (compact flash card, hard disk).

MACRO ID = ####

```
SPOOL PRINT
```

Specifies the collated printing when implementing reprint (secure print, proof print, public print).

COLLATE = ON*

COLLATE = OFF

TRAYCOMMAND MODE

Makes the command to select the paper source compatible with HP LaserJet 3.

TRAY COM. = NORM *	HP LaserJet 4 command
TRAY COM. = SPEC.	HP LaserJet 3 command

READOUT SELECT

Specifies that the printer reads DC3 in the FX emulation or not.

READOUT = ON	The data is ignored until DC1 is received when DC3 is received.
READOUT = OFF *	The data is not ignored even when DC3 is received.

FONT SELECT

SCALABLE FONT

(Only when selecting the LaserJet emulation.)

FONT = ALL*	All scalable fonts can be selected when selecting the PCL font.
FONT = LJ4	The following fonts cannot be selected when selecting the PCL font. Atlanta, BermudaScript, PCBrussels, Copenhargen, Germany, Portugal, Calgry, San Diego, UR Roman

FONT SELECT

(Only when selecting the LaserJet emulation.)

Selects the default font in the LaserJet emulation.

PRIMARY FONT	Selects the primary font.
SELECT FONT	
SYMBOL FONT	
SECONDARY FONT	Selects the secondary font.
SELECT FONT	
SYMBOL FONT	

IBM CHR SET MODE

IBM E1H = Beta	Places 'Beta' on E1h of the IBM character set.
IBM E1H = Esszet *	Places the character of 'Esszet' on E1h of the IBM character set.

W BOLD ON/OFF

The application software is provided for the dot printer, which reprints the character onto the same position to make the bold font. On the other hand, the laser printer detects the reprinted character and converts it to the bold font. After the HL-8V model, however, the function has caused that print speed gets slow in the FX and XL emulations. Therefore the setting is added, which selects to implement the function or to print fast without using the function.

W BOLD = OFF *	Not converts the reprinted character to the bold font in the FX and XL emulations.
W BOLD = ON	Converts the reprinted character to the bold font in the FX and XL emulations. (The print speed is decreased.)

DLFNT Bd / It

Brother has an original function such that the printer creates the bold font when receiving the command of the bold font which the printer does not have. If the download font is selected by ID, however, the bold font which has been specified before can remain in the printer so that the download font is printed in bold.

Though the function was deleted from the printer for the mean time, it also caused the claims. Therefore the setting which deletes the function is added.

DLFNT Bd / It = YES	Creates the bold or italic font from the download font.
DLFNT Bd / It = NO *	Not creates the bold or italic font from the download font.

B PROD ON/OFF

B PROD = ON*	Creates the bold or italic font from the bitmap font.
B PROD = OFF	Creates the bold or italic font from the bitmap font.

CONDENCE SELECT

The condensed font is printed at 16.66cpi in the dot printer emulation for the Brother laser printers in conjunction with that the 16.66cpi font is used. However, some customers need the same pitch with the one of the dot printer, and many customers still use the printer at 16.66cpi on the other hand. Therefore the setting which selects the pitch of the condensed font is added.

CONDENCE = 16.66p *

Sets the pitch of the Epson/IBM condensed character 16.66cpi.

CONDENCE = 17.14p

Sets the pitch the Epson/IBM condensed character 17.14cpi.

OEM FONT SELECT

The special character set is necessary when the printer is supplied to the European countries. For the HL-1260 printer, the special character set is stored into the program ROM additionally. Since the font number is moved due to the addition, the character set is disabled for the normal model.

OEM FONT = DISABL*	Disables to select the European character.
OEM FONT = ENABLE	Enables to select the European character.

BRO FONT SELECT

The Brougham bitmap font of 10 pitch and 12 pitch is built in due to the user's request.

BROBITM = DISABL*	Disables the internal 10/12 pitch Brougham bitmap font.
BROBITM = ENABLE	Enables the internal 10/12 pitch Brougham bitmap font.

ISR FONT SELECT

ISRFONT = DISABLE	Normal mode
ISRFONT = ENABLE	Israel mode

300DPI PRIORITY

Though it was necessary to select and print the cartridge font of Courier for the US customer, the 300dpi bitmap font could not be selected because the priority of the font selection was low in rank. Since the current model is compatible with HP LaserJet 4, the setting is added, which disables the compatibility with HP LaserJet 4 and makes the priority of the 300dpi bitmap font high.

3B PRIO = LOW *	Makes the priority of selection for the 300dpi bitmap font standard (low) in the font setting. Command: <ESC><CR>!1T
3B PRIO = HIGH	Makes the priority of selection for the 300dpi bitmap font high in the font setting. Command: <ESC><CR>!2T

The priority in each setting is as follows;

< When the printer resolution is 600dpi >

3B PRIO = LOW	3B PRIO = HIGH
1. DOWNLOAD 600	1. DOWNLOAD 600
2. DOWNLOAD SCALABLE	2. DOWNLOAD 300
3. CARD 600	3. DOWNLOAD SCALABLE
4. CARD SCALABLE	4. CARD 600
5. CART 600	5. CARD 300
6. CART SCALABLE	6. CARD SCALABLE
7. RESIDENT 600	7. CART 600
8. RESIDENT SCALABLE	8. CART 300
9. DOWN 300	9. CART SCALABLE
10. CARD 300	10. RESIDENT 600
11. CART 300	11. RESIDENT 300
12. RESIDENT 300	12. RESIDENT SCALABLE

< When the printer resolution is 300dpi >

3B PRIO = either of low or high

1. DOWNLOAD 300
2. DOWNLOAD SCALABLE
3. CARD 300
4. CARD SCALABLE
5. CART 300
6. CART SCALABLE
7. RESIDENT 300
8. RESIDENT SCALABLE

FX / XL SCALE FONT

Specifies the setting for the default font and font selected on the control panel in the Epson/IBM emulation.

SCAL.F = NORMAL*	Enables to select the only similar size of the font when the scalable font is selected.
SCAL.F = ALL SIZE	Enables to select all sizes of the font when the scalable font is selected.

FX / XL SCALE ITA

Specifies the setting for the italic font of the scalable font in the Epson/IBM emulation.

ITA = OBLIQUE*	Makes the upright font oblique to have italic when the scalable font is selected.
ITA = ITALIC SEL	Uses the upright font to have italic when the scalable font is selected.

PAPER&TRAY SIZE

Specifies the default paper size.

DEF PAPER =LT	The default paper size is letter for the US and Canada models.
DEF PAPER =A4	The default paper size is A4 for the other models.

PARALLEL MENU

Changes the signal timing of the Centronics interface

PARALLEL TIMING

CDCC PSW = L	The BUSY signal gets high when the STROBE signal goes up.
CDCC PSW = H*	The BUSY signal gets high when the STROBE signal goes down.

STB / ACK DELAY

CDCC BSSL = H	The ACK signal is output when the BUSY signal goes down.
CDCC BSSL = L*	The ACK signal is output before the BUSY signal goes down.

INPUT PRIME

INPUT PRIME = OFF*	The INPUT PRIME signal does not reset the printer.
INPUT PRIME = ON	The INPUT PRIME signal resets the printer.

REPRINT ON/OFF

Specifies that the reprint function is enabled or disabled forcedly.

REPRINT = ON*	The reprint function is enabled or disabled following the setting of the user menu.
REPRINT = OFF	The reprint function is enabled forcedly.

AUTO HRC OFF

Specifies that the smoothing control is enabled or disabled automatically depending on the contents of the file.

AUTO HRC = OFF*

AUTO HRC = ON

```
APPLETALK AT/PS
```

Specifies that the emulation is switched to the PS mode forcedly with AppleTalk.

APPLE TALK = PS*	Switches the emulation to the PS mode with AppleTalk.
APPLE TALK = AUTO	Uses the auto emulation function with AppleTalk.

```
PS BINARY SELECT
```

Specifies that the data from the parallel interface is handled as the binary data.

PS BINARY = ASCII*	Default. Enables the commands such as Ctrl-T, Ctrl-C and disables to use the binary data.
PS BINARY = BIN	Enables to print the binary data and disables the commands such as Ctrl-T.

```
PS QUOTE BINARY
```

PS QUOTEBIN = OFF*	Disables to input the binary data even by the special codes.
PS QUOTEBIN = ON	Enables to input the binary data by the special codes.

```
PS IMAGE MASK
```

Revises the image mask procedure to make print speed faster with an OS/2 driver.

PS IMAGEMSK = OFF*	Not revises the image mask procedure.
PS IMAGEMSK = ON	Revises the image mask procedure.

```
PS CEIL MODE
```

PS CEIL = FLOOR*

PS CEIL = CEIL

```
PS STATUS
```

STATUS ECHO = ON*

STATUS ECHO = OFF

PROTECT OFF MODE

Specifies the performance of the page protection function.

PRO.OFF = AUTO*	Protects the data spuriously even when the page protection is turned off. (Countermeasure for the memory full or print overrun error.)
PRO.OFF = NORMAL	Specification up to the 4th mask ROM.

HP ESC E COMMAND

Specifies the performance of the ESC E command.

HP ESC E = RESET*	Resets the printer.
HP ESC E = F / F	Implements form feed.

PS300RESO

Specifies that the resolution is reduced to 300dpi in the PS mode automatically.

PS300RESO = NO*	Not reduces the resolution automatically.
PS300RESO = IF 2M	Reduces the resolution to 300dpi when the RAM size is 2MB.
PS300RESO = FORCE	Reduces the resolution to 300dpi.

COPY PAGES

Fixes the copy page number to one page when COPY PAGES = OFF.

COPY PAGES = ON*
COPY PAGES = OFF

PANEL RESET MODE

Changes the setting of the reset printer function.

RESET = JOB	Resets the data per job.
RESET = NORMAL*	

JOB TIMEOUT SEL

Specifies the setting of the job timeout.

Though the job timeout has been set to 5 minutes in the PJL emulation since the HL-1260 printer, the setting to disable the timeout is added due to the user's request.

TIME OUT = ON* Enables the job timeout.

TIME OUT = OFF Disables the job timeout.

DEMO PAGE ON/OFF

Specifies that the demo page is printed or not.

When the setting is OFF, the demo page is deleted from the control panel and printer Web page, and the demo page is not printed by the PJL command and MIB.

DEMO PAGE = ON*

DEMO PAGE = OFF

JOB CANCEL TIME

Specifies the timeout of job cancel. (1~255)

TIME OUT = ???sec

PSCOPYPAGE

PSCOPYPAGE = L3*

PSCOPYPAGE = L2

Switches the copy page operator in the PS mode between Level2 and Level3.

@PJL DEFAULT PSCOPYPAGE = L3, L2

@PJL SET PSCOPYPAGE = L3, L2

@PJL DINQUIRE PSCOPYPAGE

@PJL INQUIRE PSCOPYPAGE

APPLEUSBPS

BINARY = OFF*

BINARY = ON

Enables to print the PS pure binary data through the Mac USB interface.

@PJL DEFAULT APPLEUSBPS = ON / OFF

@PJL SET APPLEUSBPS = ON / OFF

@PJL DINQUIRE APPLEUSBPS

@PJL INQUIRE APPLEUSBPS

7.3 Reset Parts Life

The Reset parts life menu is implemented when the service personnel replaces the periodic maintenance parts. For the parts to be replaced easily, however, it is assumed that the user replaces them by him/herself. Therefore the reset parts life menu is distinguished from the service menu described in the next section, '4. Service Menu'.

(The following descriptions are not open to other than the service personnel in principal. You may let users know as necessary.)

To enter the reset parts life menu, press the Go and + buttons together.

The details for the menu are described as follows;

```
RESET PARTS LIFE
```

FC Roller	Initializes the life of the fuser cleaner.
OPC Belt	Initializes the life of the OPC belt cartridge.
FUSER UNIT	Initializes the remaining life of the fusing unit.
120K Kit	Initializes the life of the paper discharger.
Trf Drum	Initializes the life of the transfer drum.
240K Kit	Initializes the life of the 240K kit.
Oil Pad	Initializes the remaining life of the oil pad.
PF KIT1	Initializes the remaining life of the paper feeding kit 1.
PF KIT2	Initializes the remaining life of the paper feeding kit 2.
PF KIT3	Initializes the remaining life of the paper feeding kit 3.

7.4 Service Menu

The service menu provides the printer information for the service personnel. (The following descriptions are not open to other than the service personnel.)

To enter the service menu, press the + and Set buttons in this order while holding down the Go button.

The details for each menu are described as follows;

```
--SERVICE MENU--
SERVICE INFO
```

PAGE COUNT	Number of printing pages
IMAGECOUNTERS	
C =	The number of printing pages with using cyan.
M =	The number of printing pages with using magenta.
Y =	The number of printing pages with using yellow.
K =	The number of printing pages with using black.
TOTAL =	The number of printing pages with using all colors.
JAM COUNT	Paper jam frequency
REPLACE COUNT	Number of replacement (Counts the frequency after clearing the counter when 100 pages or more are printed.)
C TONER	The number of the cyan toner cartridge replacement.
M TONER	The number of the magenta toner cartridge replacement.
Y TONER	The number of the yellow toner cartridge replacement.
K TONER	The number of the black toner cartridge replacement.
FC Roller	The number of the fuser cleaner replacement.
OPC Belt	The number of the OPC belt cartridge replacement.
FUSER UNIT	The number of the fusing unit replacement.
240K Kit	The number of the 240K kit replacement.
120K Kit	The number of the 120K kit replacement.
PF KIT1	The number of the paper feeding kit 1 replacement.
PF KIT2	The number of the paper feeding kit 2 replacement.
PF KIT3	The number of the paper feeding kit 3 replacement.
Waste Toner Box	The number of the waste toner box replacement.
Oil Bottle	The number of the oil bottle replacement.
Trf Drum	The number of the transfer drum replacement.
Oil Pad	The number of the oil pad replacement.
COVERAGE	Average coverage (Based on that the letter size printed all black is 100%)
C =	Average coverage of cyan.
M =	Average coverage of magenta.
Y =	Average coverage of yellow.
K =	Average coverage of black.

PRINT PAGES	Number of printing pages depending on the paper size. (Counted up to 100K.)
A4 PAGE	The number of printing pages of the A4 size.
A4 S PAGE	The number of printing pages of the A4 S size.
LETTER PAGE	The number of printing pages of the letter size.
LETTER S PAGE	The number of printing pages of the letter S size.
LEGAL PAGE	The number of printing pages of the legal size.
LEDGER PAGE	The number of printing pages of the ledger size.
B4 PAGE	The number of printing pages of the B4 size.
B5 PAGE	The number of printing pages of the ISO B5 size.
JISB5 PAGE	The number of printing pages of the JIS B5 size.
EXEC PAGE	The number of printing pages of the EXECUTIVE size.
A3 PAGE	The number of printing pages of the A3 size.
A3NOBI PAGE	The number of printing pages of the A3 NOBI size. (330mmx483mm size)
COM-10 PAGE	The number of printing pages of the COM10 size.
DL PAGE	The number of printing pages of the DL size.

* The number of replacement is counted after clearing the counter when 100 pages or more are printed.

```
--SERVICE MENU--
ERROR HISTORY
```

1 : ########	The 10 latest errors in order of the newest to the oldest.
2 : ########	
3 : ########	
.....	
10 : ########	

```
--SERVICE MENU--
MODIFY COUNT
```

* For modifying of the number of pages and remaining life, the digit to be modified is raised whenever pressing the Set button. The pages and remaining life are fixed on when pressing the Set button on the highest digit.

JAM COUNT	Paper jam frequency
REPLACE COUNT	
C TONER	The number of the cyan toner cartridge replacement.
M TONER	The number of the magenta toner cartridge replacement.
Y TONER	The number of the yellow toner cartridge replacement.
K TONER	The number of the black toner cartridge replacement.
FC Roller	The number of the fuser cleaner replacement.
OPC Belt	The number of the OPC belt cartridge replacement.
FUSER UNIT	The number of the fusing unit replacement.
240K Kit	The number of the 240K kit replacement.
120K Kit	The number of the 120K kit replacement.
PF KIT1	The number of the paper feeding kit 1 replacement.
PF KIT2	The number of the paper feeding kit 2 replacement.
PF KIT3	The number of the paper feeding kit 3 replacement.
Waste Toner Box	The number of the waste toner box replacement.
Oil Bottle	The number of the oil bottle replacement.
Trf Drum	The number of the transfer drum replacement.
Oil Pad	The number of the oil pad replacement.

```
--SERVICE MENU--
RESET COUNT
```

COVER AGE	Clears the average coverage of the cyan, magenta, yellow and black toner.

Caution 1

The counter is limited for the following items;

COVERAGE : The number of pages over 100K is not stored.
PRINT PAGE : Counted up to 100K pages.
ERROR HISTORY : Up to 100K errors are stored.

Caution 2

When modifying the life period, enter the Hitachi mode.

APPENDIX 8. TO LEVEL THE PRINTER CORRECTLY

Please read the leveling instructions described below carefully.

If the printer is not installed level, image failures may occur or the life expectancy of the OPC belt cartridge may be shortened.

Please do not install the printer as shown in the figures below.

Note:
If the printer is inclined at 1° as shown in the figures below, the printer is approximately 9mm out of level from one side to the other.

i) Printer is installed across two or more tables.

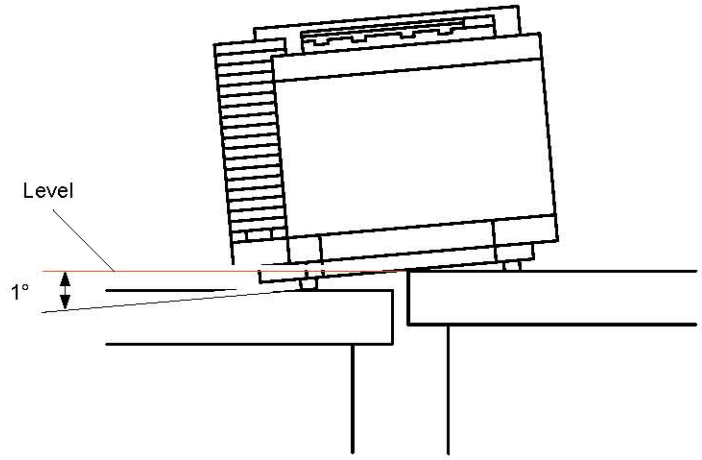


Fig. A- 29

ii) There is something under the printer or something stuck to the printer base.

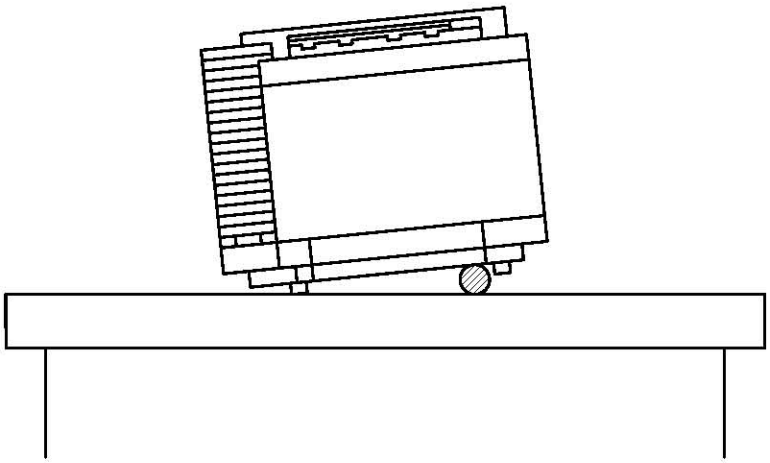


Fig. A- 30

iii) The table the printer is installed on is not level.

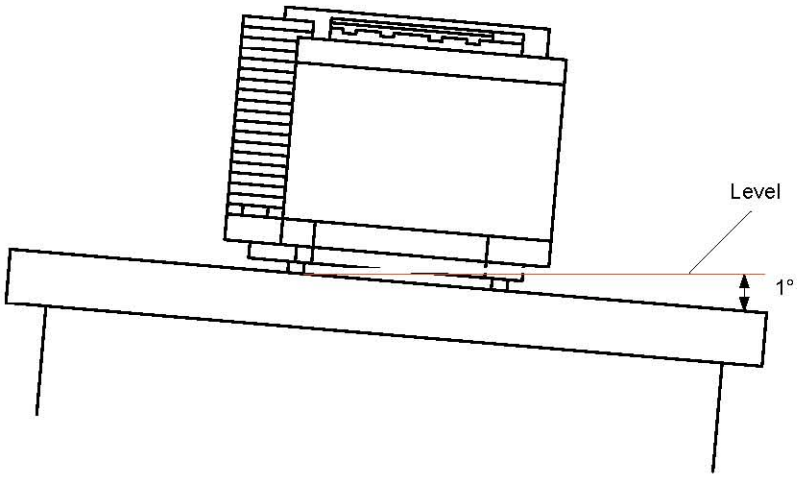


Fig. A- 31

iv) The table surface the printer is installed on is not strong enough.

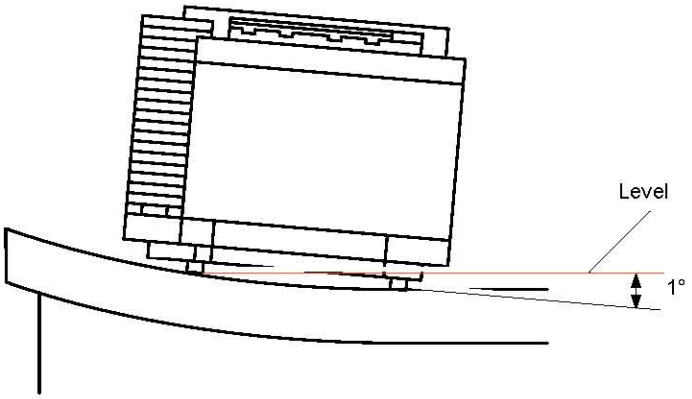


Fig. A- 32

NOTE:
If you have a spirit level, put it on the output tray and install the printer as level as possible referring to the level.

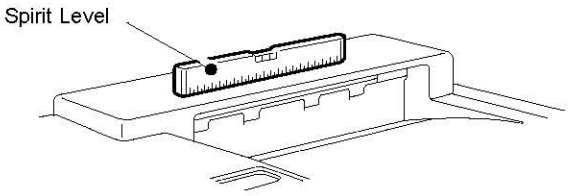


Fig. A- 33

APPENDIX 9. PAPER POSITIONS DURING DUPLEX PRINTING

Fig. A-34 below shows the paper positions when printing using the available duplex printing function.

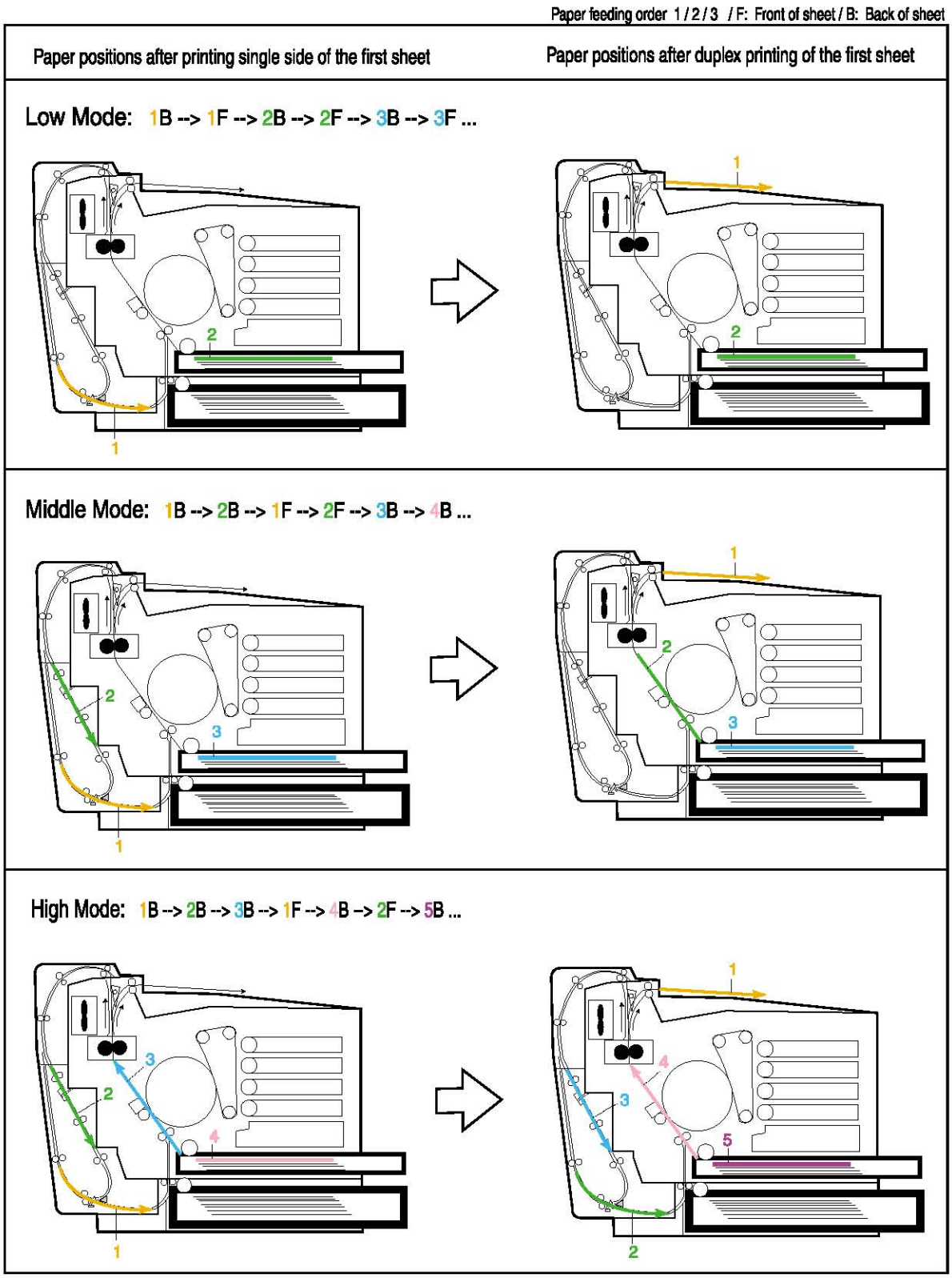


Fig. A- 34