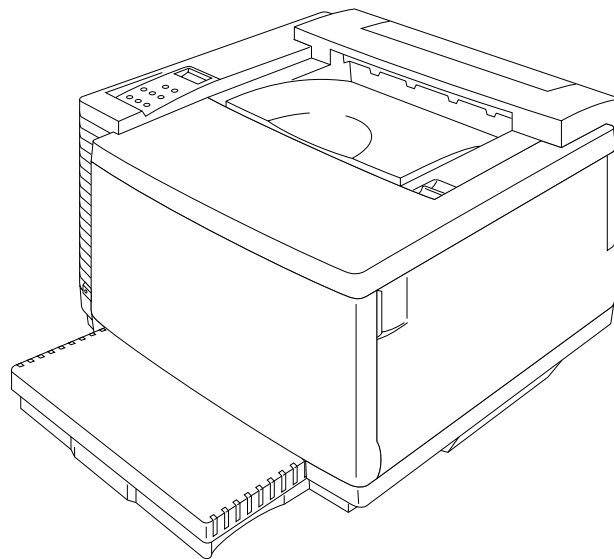




Brother Color Laser Printer **SERVICE MANUAL**

MODEL: HL-3400CN



Read this manual thoroughly before commencing any maintenance work.

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

March, 2000
SM-PRN005

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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-3400CN 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.

LITHIUM BATTERIES

Caution

Replacing the battery incorrectly may cause danger of explosion.

Batteries should only be replaced with the same or equivalent type recommended by the manufacturer.

Used batteries should be disposed of according to the manufacture's instructions.

IEC 825 SPECIFICATION (FOR 220-240 V MODEL ONLY)

This printer is a Class 1 laser product as defined in IEC 825 specifications. The label shown below is attached in countries where required.

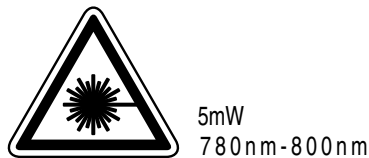


This printer has a Class 3B Laser Diode which emits invisible laser radiation in the Laser unit. The Laser unit should not be opened under any circumstances.

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.

 **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**

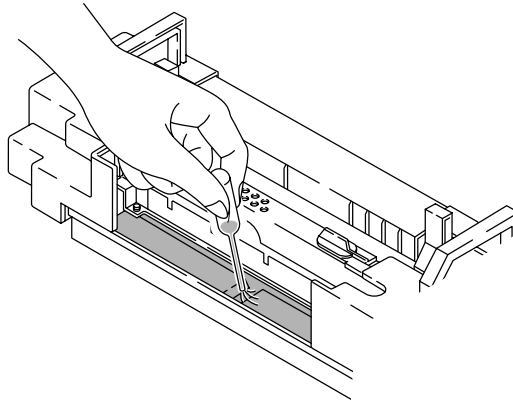
- *Do not step on or lean against the media cassette. It may cause the product to tilt or fall over and result in injuries.*
- *Do not lean against or apply any excessive force to the media cassette or open covers, otherwise it may cause the product to tilt or fall over and result in injuries.*

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.*



CHAPTER 1

PRODUCT OUTLINE

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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 accepts lower resolution data in the 300 dpi mode, or 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 level 2 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, an RS-232C serial interface, and a modular input/output (MIO) compatible interface. The Brother NC-3100h network solution can also be used as an alternative to the MIO interface.

If the 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 RS-232C serial interface is an industry standard so that you can connect it to any computer using a standard serial cable.

The MIO interface allows you to install a commercial MIO-compatible card. If the card is installed, this interface port can be used for features such as networking or printer sharing.

The NC-3100h card can enable you to connect directly to a network.

Automatic Interface Selection

The printer can automatically select the bi-directional parallel, RS-232C serial, or MIO / NC-3100h interface 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® Level 2 language emulation (Brother BR-Script Level 2) 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 72 scalable fonts and 12 bitmapped fonts. The fonts that can be used vary according to the current emulation mode.

In PCL mode, it is also possible to print 11 types of bar codes. In BR-Script mode, the printer has 66 scalable fonts.

Bar Code Printing

This printer can print the following 11 types of barcodes.

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

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.

PCMCIA Card Slot

The printer has two Type II PCMCIA card slots that also allow the use of one Type III device. PCMCIA-compatible flash memory and HDD cards can be installed.

Saving User Settings

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

***PANTONE® Calibrated**

There are many variables in process reproduction of colors generated by the HL-3400CN, 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) Xerox Premier paper
- 2) Brother Toner Cartridges TN-02 BK/C/M/Y
- 3) 2400dpi x 600 dpi resolution
- 4) CAPT setting

*PANTONE® will be supported from around 2nd quarter of 2000.

2. PARTS NAMES & FUNCTIONS

<Front View>

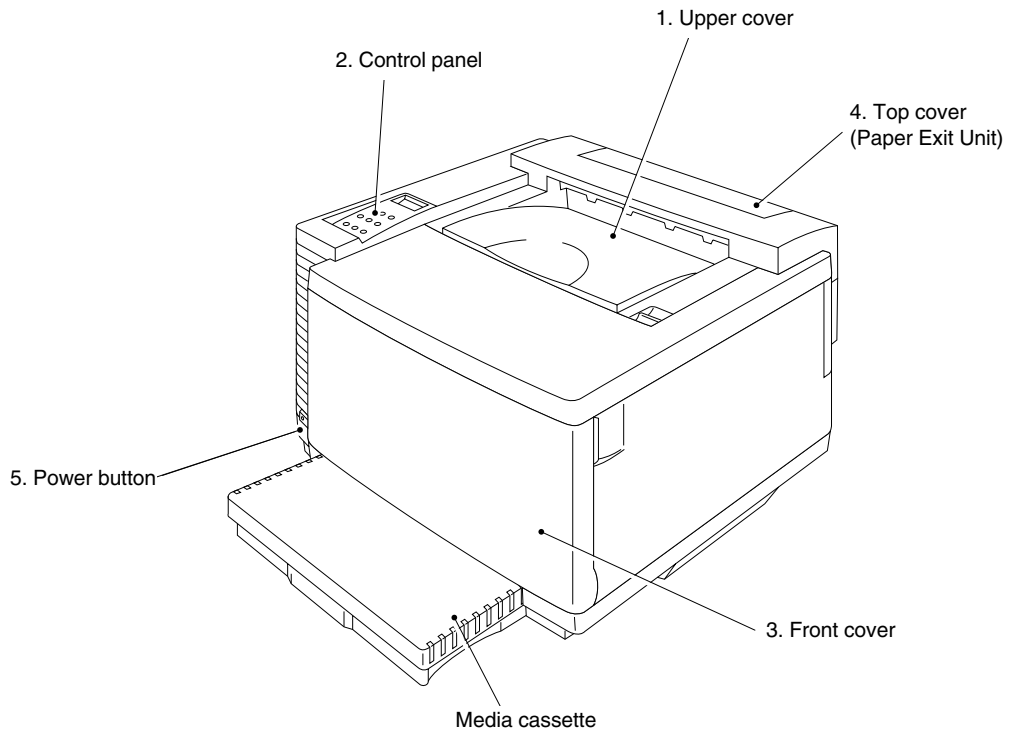


Fig. 1-1

<Rear View>

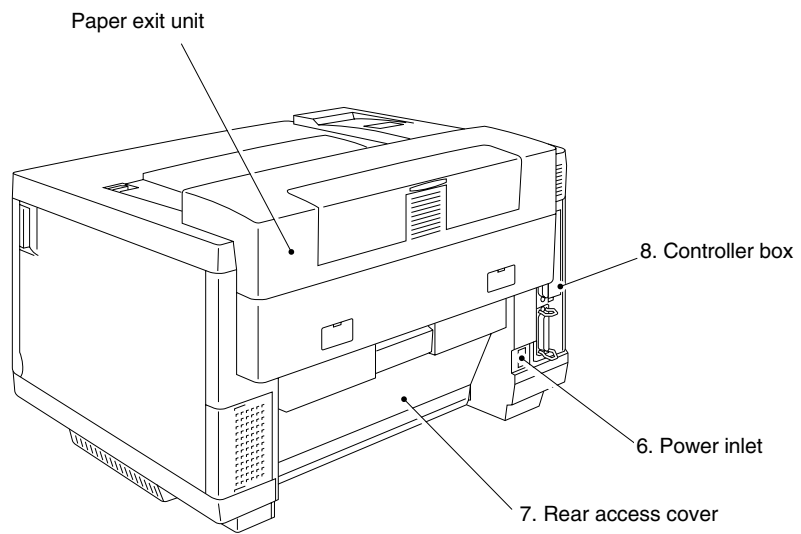


Fig. 1-2

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 >

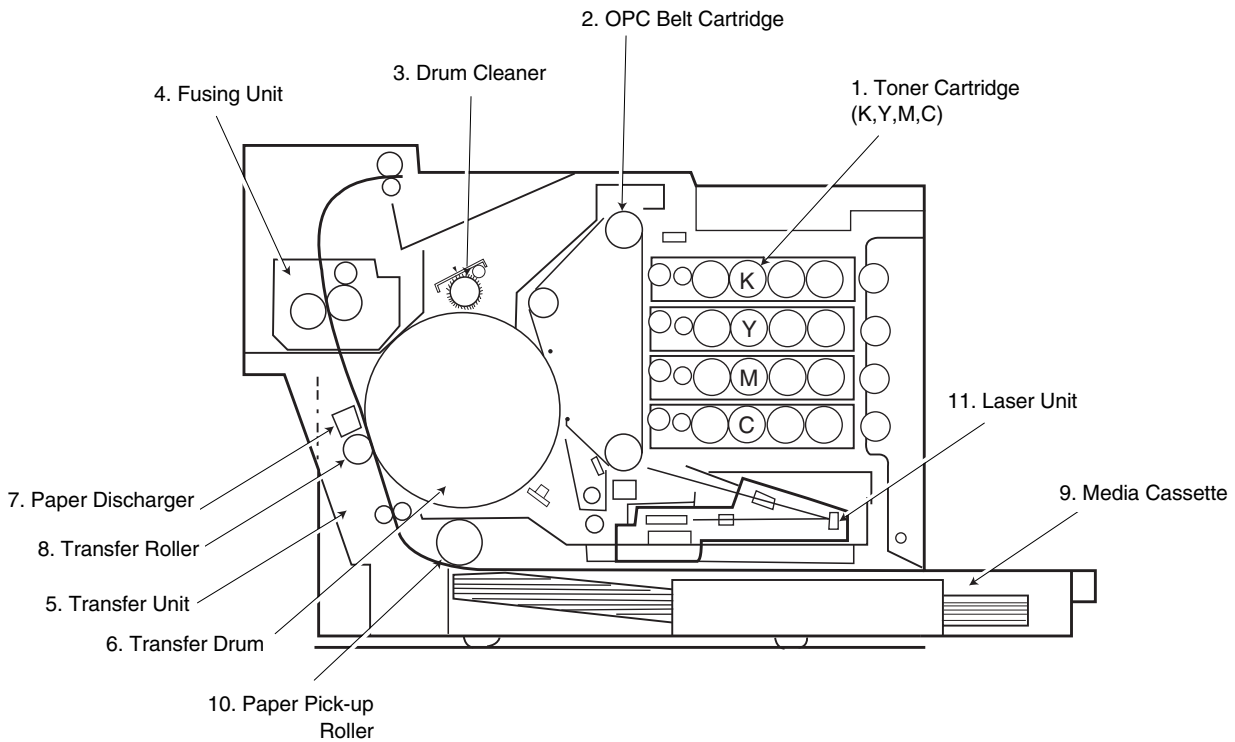


Fig. 1-3

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 **Mode**, **Set** and **▼** 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.*

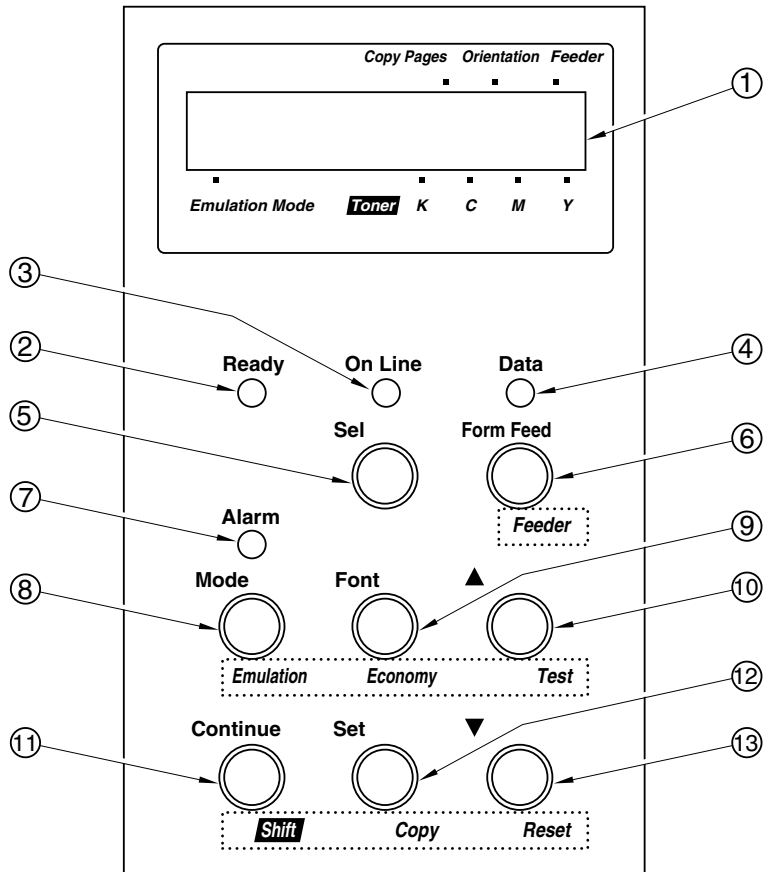


Fig. 1-4

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Ready LED
3	On Line LED
4	Data LED
5	Sel button
6	Form Feed / Feeder button
7	Alarm LED
8	Mode / Emulation button
9	Font / Economy button
10	▲ / Test button
11	Continue / Shift button
12	Set / Copy button
13	▼ / Reset button

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SPECIFICATIONS

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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)

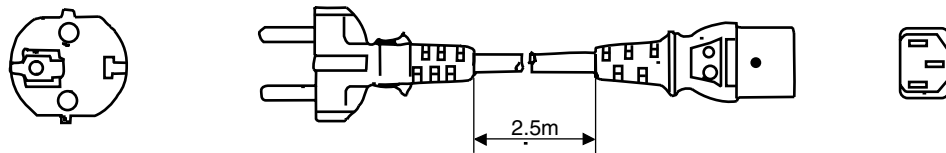
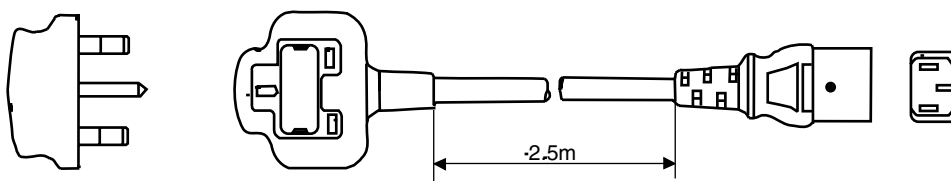


Figure B: For UK



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	Electrophotography by semiconductor laser beam scanning
Laser	Wavelength: 780nm Output: 5mW max.
Resolution	300 x 300 dots per inch (Normal), 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	75 scalable fonts, 12 bitmapped fonts, 11 barcode fonts

2.2. Functions

CPU	µPD30210 (VR4310-167MHz)
Emulation	Automatic emulation selection <ul style="list-style-type: none"> • HP Color Printer (PCL5C) including HP LaserJet 4+ (PCL5e) and HP LaserJet 5 (PCL6 monochrome) • BR-Script Level 2 (Adobe PostScript Level 2 compatible) • HP-GL • EPSON FX-850 • IBM Proprinter XL
Interface	Automatic interface selection among the bi-directional parallel, RS-232C serial, NC-3100h and MIO interface.
RAM	64 Mbytes (Expandable up to 320Mbytes with DIMMs) The standard memory fitted can vary depending on the printer model and country.
HDD option	2.5 inch IDE HDD
Card slots	2 card slots: PCMCIA Type I, II 1 card slot: PCMCIA Type III compatible for flash memory or HDD cards
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
	Other size:	width 210-297mm (8.2"-11.6") length 176-420mm (6.9"-16.4")
Optional A4/Letter cassette	Plain paper	A4, Letter, B5 (ISO/JIS),
	Envelope:	COM10, DL
	Transparency	A4, Letter
	Label	A4, Letter
	Other size:	width 105-216mm (4.1"-8.5") length 220-335.6mm (8.7"-14")

(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)

(2) 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/m² (20lb) paper for the standard/optional A4/Letter cassette
500 sheets of 90g/m² (24lb) 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/m² (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.)

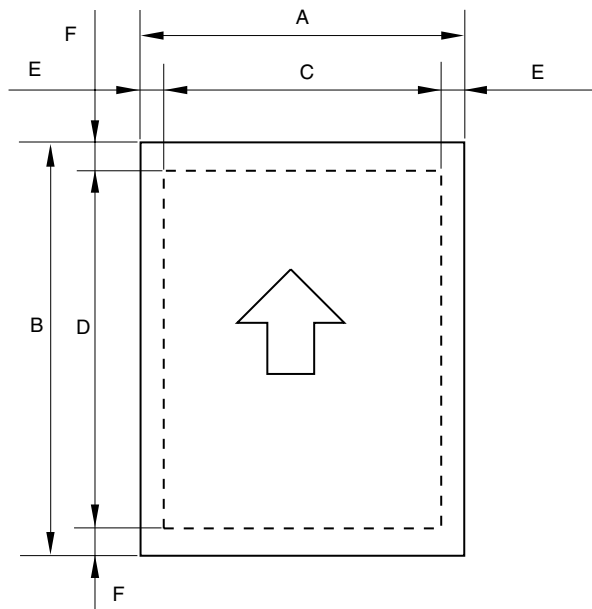


Fig. 2-1

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>

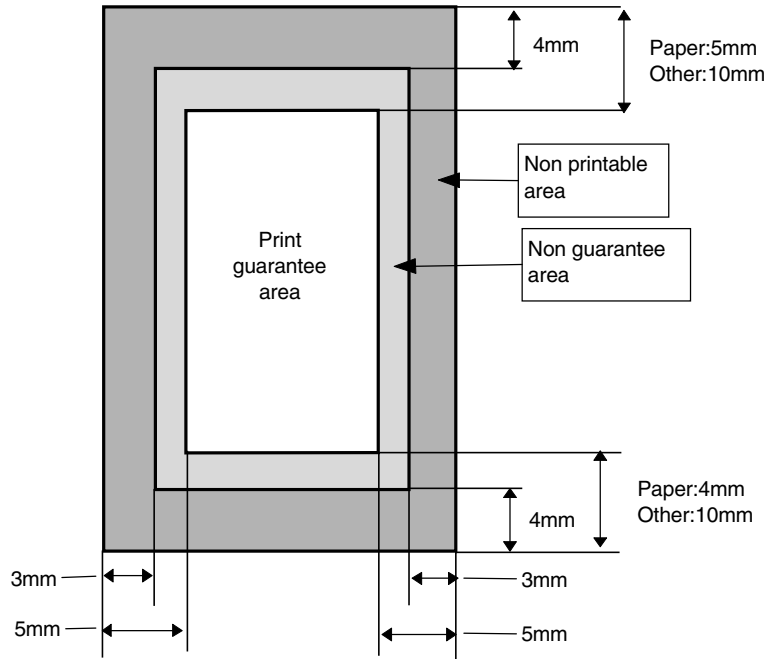


Fig. 2-2

<Envelope>

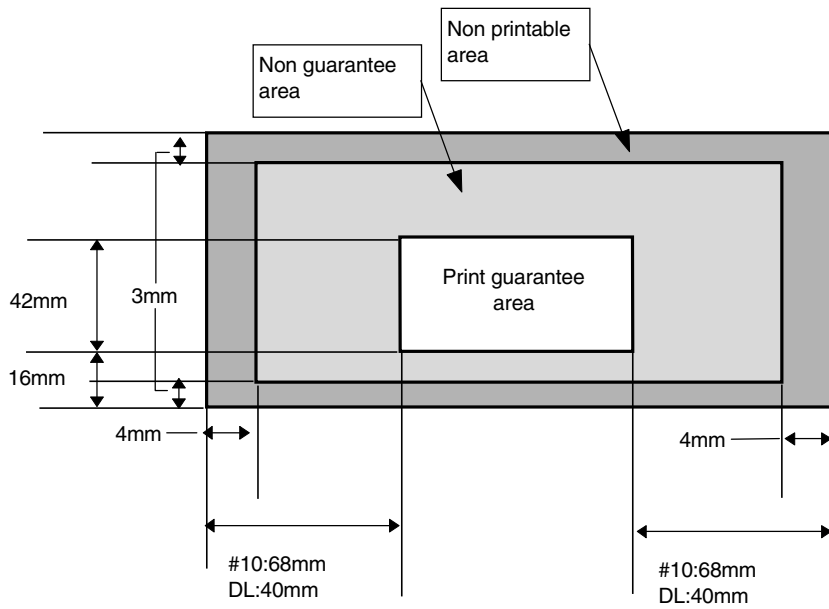
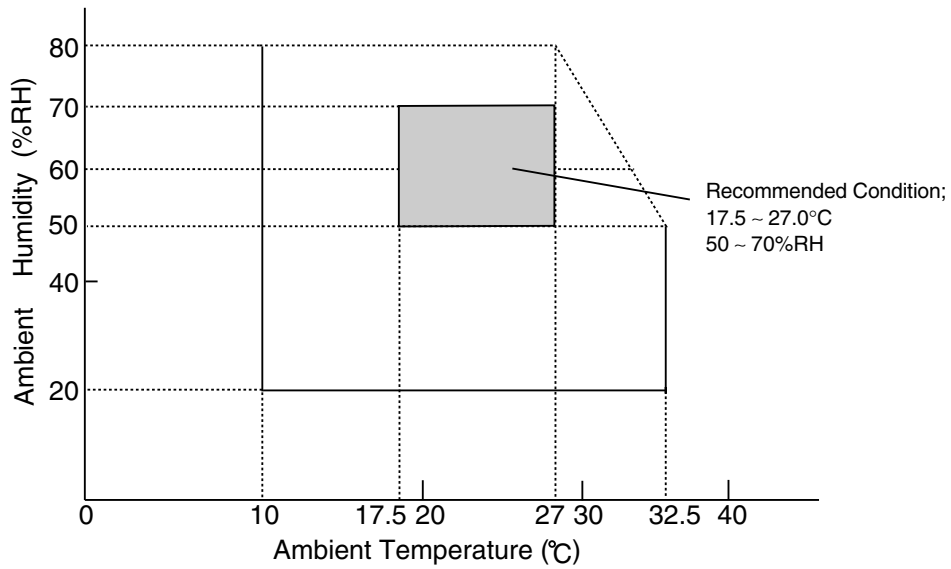


Fig. 2-3

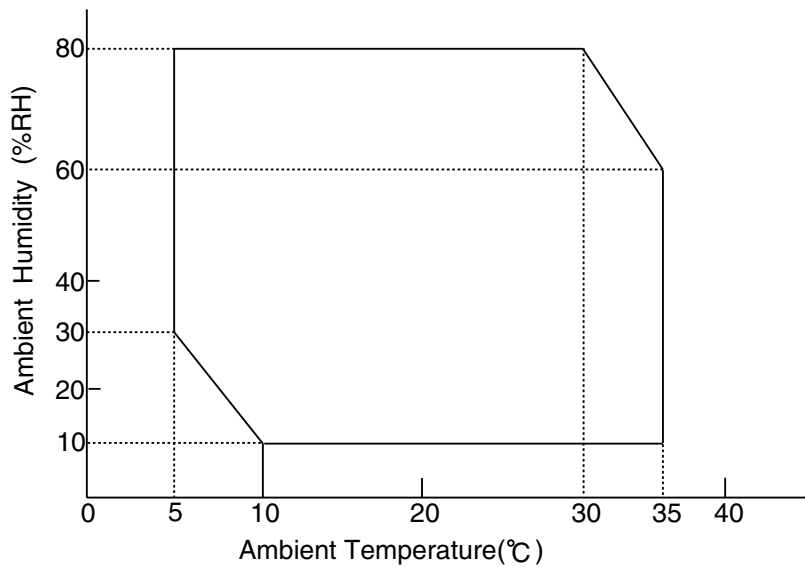
3. ENVIRONMENTAL CONDITIONS

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.

	Normal Conditions	0°C ~ 35°C (32°F ~ 95°F)
Temperature	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.

CHAPTER 3

INSTALLATION

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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 ~ 35°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 $\pm 1^\circ$).

1.2. Basic Layout of Printer Set-up Location



In the case when the printer is set on a table, confirm that the media cassette does not 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.

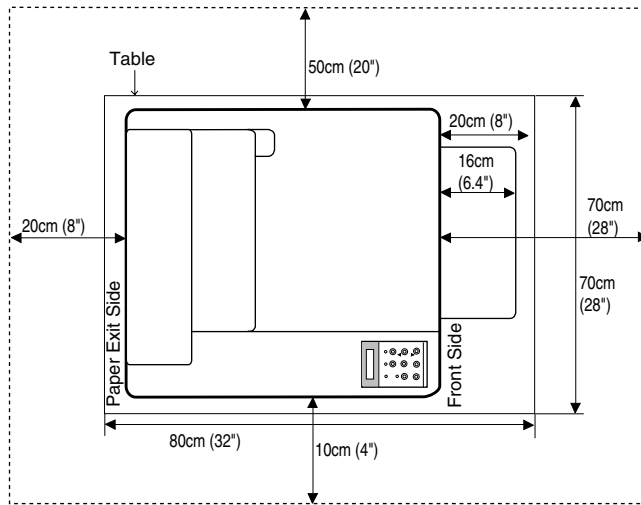


Fig. 3-1

- 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 power cable.

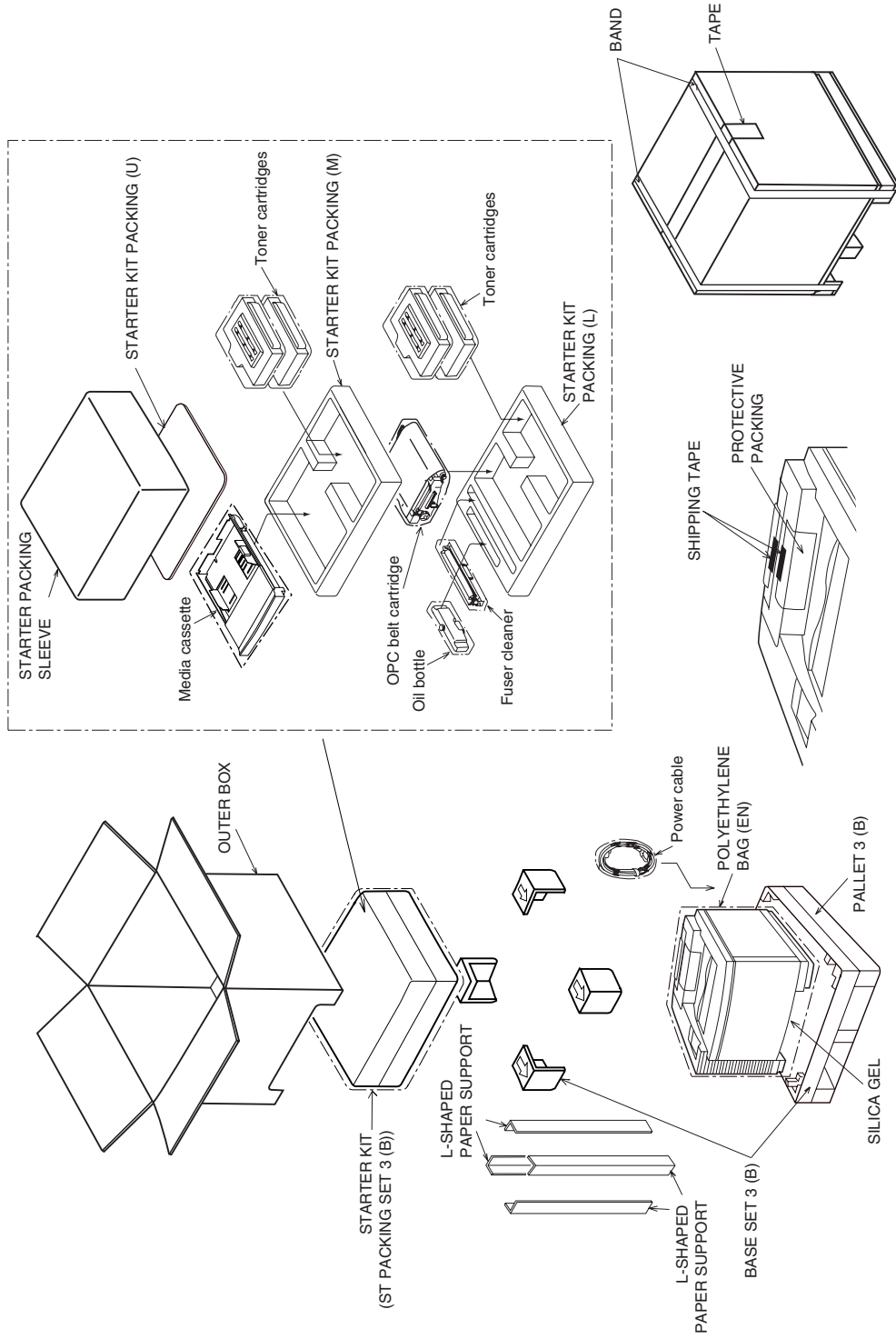
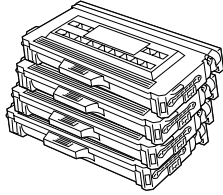
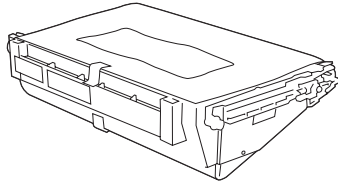
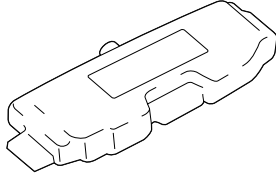
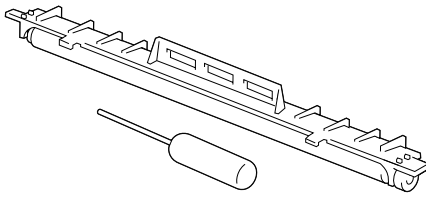
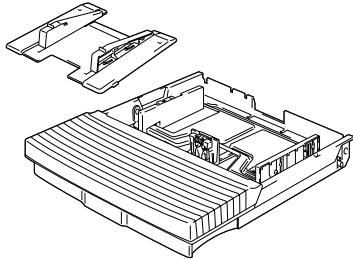


Fig. 3-2

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

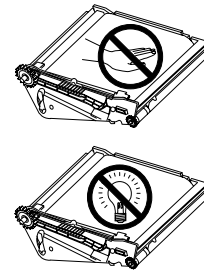
Do not lean against or apply any excessive force to the media cassette or open covers; otherwise it may cause the product to tilt or fall over and result in injuries.

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

3.1 Install the 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.

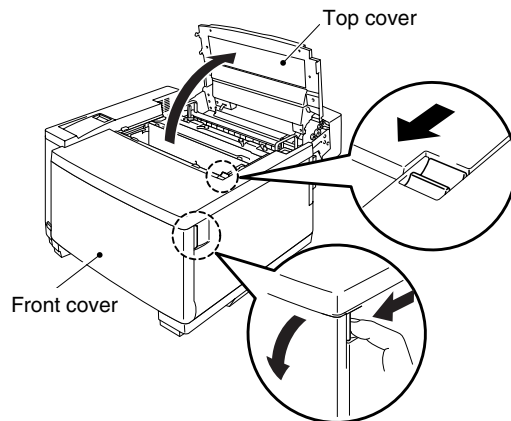


Fig. 3-3

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

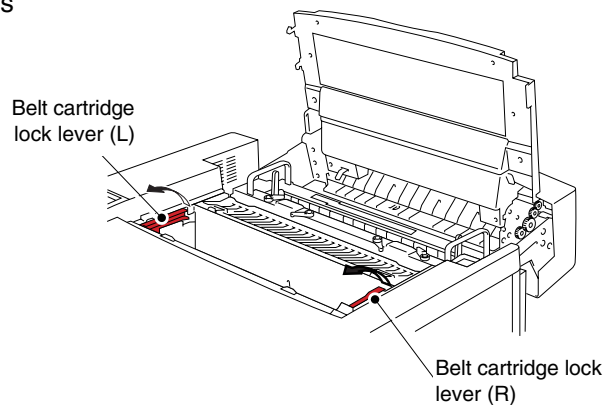


Fig. 3-4

- (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.

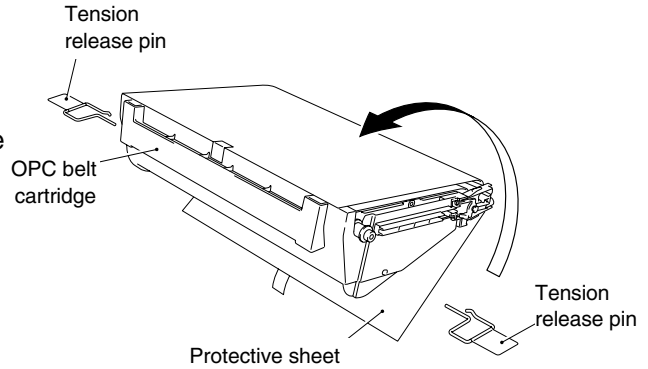


Fig. 3-5

- (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).

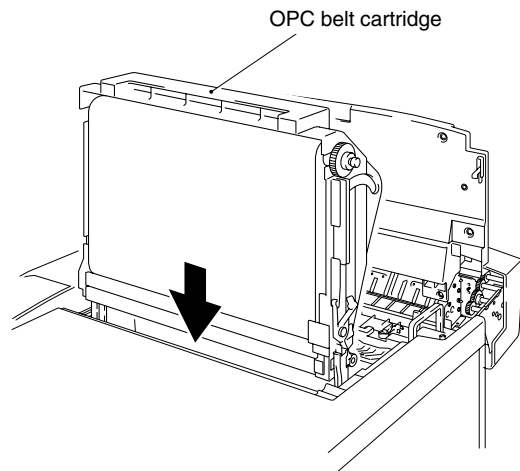


Fig. 3-6

3.2 Install the Toner Cartridges into the Printer

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

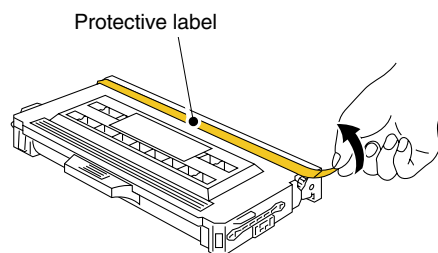


Fig. 3-7

- (2) Rock each of the cartridges 3 to 4 times through 30° to the horizontal

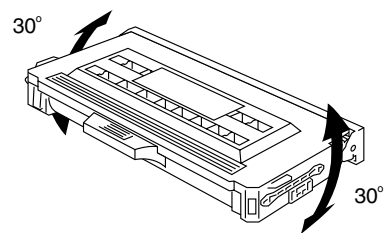


Fig. 3-8

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

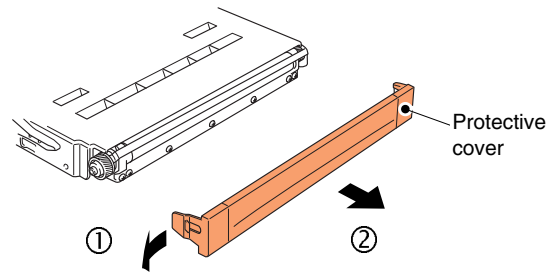


Fig. 3-9

- (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.

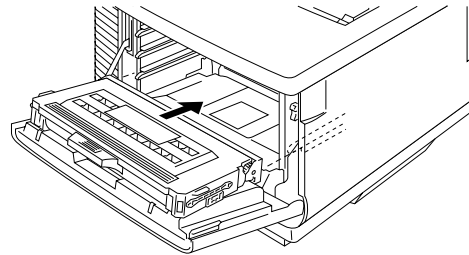


Fig. 3-10

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.

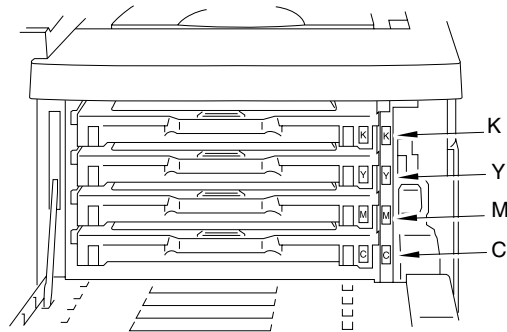


Fig. 3-11

3.3 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.

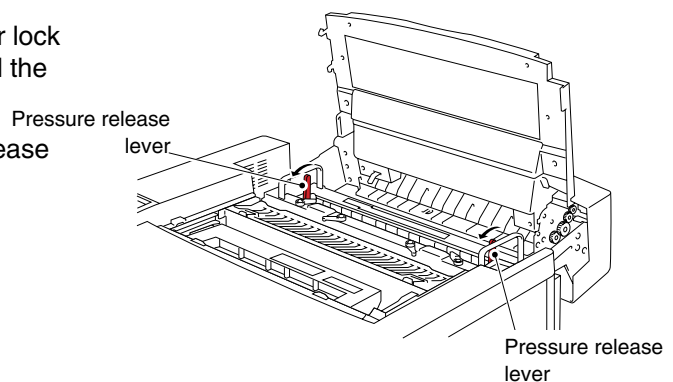


Fig. 3-12

- (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.

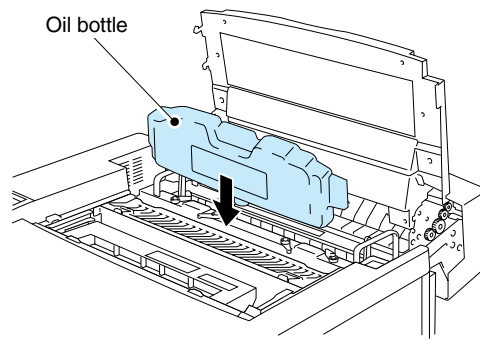


Fig. 3-13

- (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.

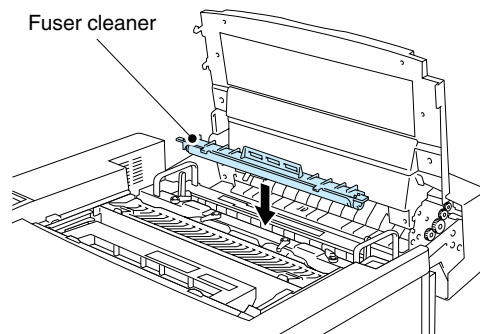


Fig. 3-14

NOTE:

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

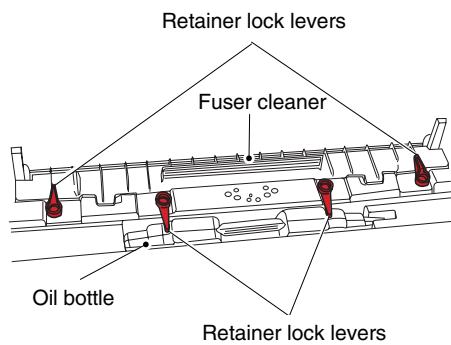


Fig. 3-15

3.4 Install the Media Cassette and Adapter

3.4.1 Install the media cassette

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

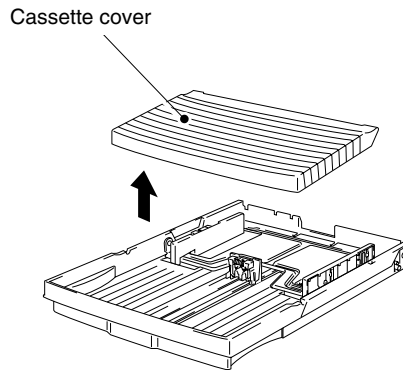


Fig. 3-16

- (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.

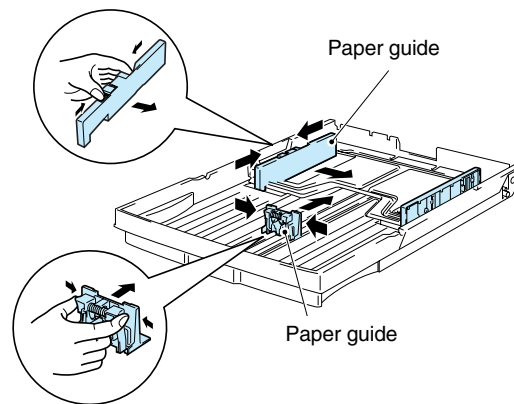



Fig. 3-17

- (3) Load the paper into the cassette.

 **CAUTION**

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.

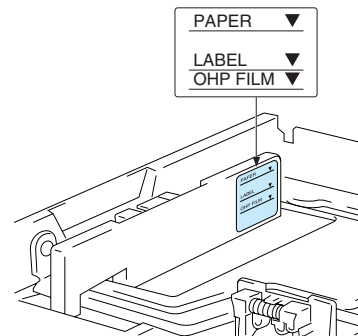


Fig. 3-18

- (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.

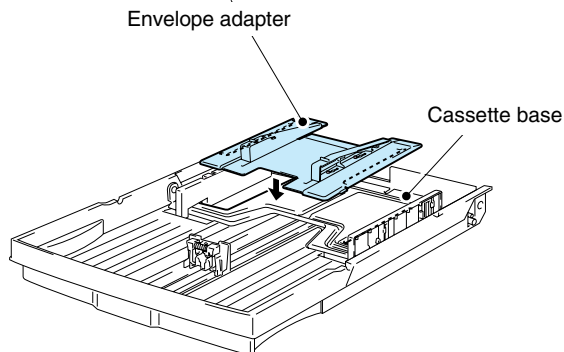


Fig. 3-19

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

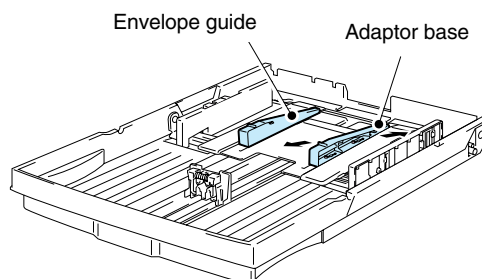


Fig. 3-20

- (4) Move the paper guides to meet the desired envelope size.
- (5) Load the envelopes into the adapter.

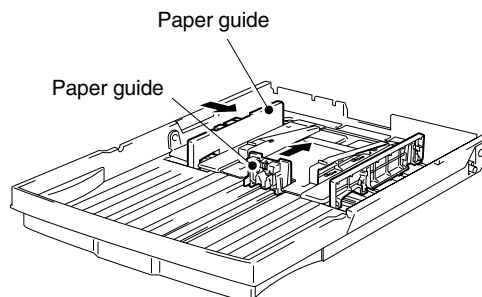




Fig. 3-21

 **CAUTION**

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.

 **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.

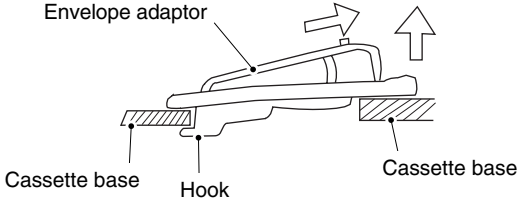


Fig. 3-22

3.5 Test Print

After completing the installation work, perform a test print. The test print should be done in the Video Controller Mode and checked for correct print output. If there appear to be any print problems then the test print in the Engine Controller Mode should be used if necessary.

NOTE:

The test print pattern differs between these two modes.

3.5.1 Test print

- (1) Check that the power button is turned off. The power button is on the front left side of the printer.

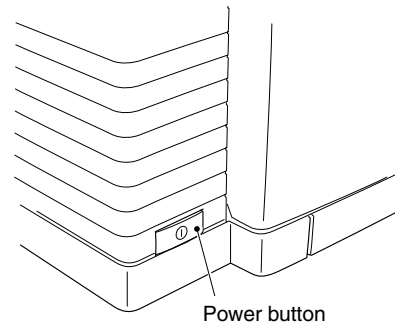


Fig. 3-23

- (2) Connect the connector of the power cable to the printer.

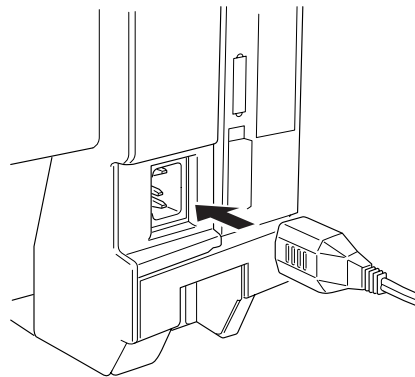


Fig. 3-24

- (3) Insert the plug of the power cable into the power outlet.

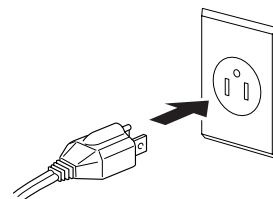
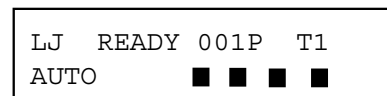
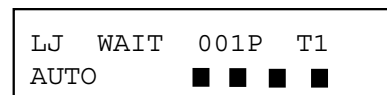


Fig. 3-25

- (4) Turn the printer on by pressing the power button. Wait until the printer initializes. This will take several minutes during which time the LCD will display the message as shown in the right.
- (5) Once the printer has finished initializing, the LCD will display the message as shown in the right.



- (6) Press the **Sel** button to set the printer off-line. The **On Line** LED goes off.
- (7) Hold down the **Shift** button and press the **Test** button so that the printer enters the test mode.
- (8) Press the **▲** or **▼** button to scroll through the display until the desired test mode appears, then press the **Set** button to print the desired test page.

NOTE:

Refer to the table below for each test mode item.

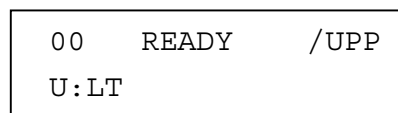
Display Message	Test Mode Description
DEMO PAGE	Prints out the demonstration.
TEST PRINT	Performs the printer test and prints out the test pattern.
PRINT CONFIG	Prints out a list of panel button settings you have configured as user settings for the printer.
PRINT FONTS I	Prints out a list of internal or resident fonts.
PRINT FONTS C	Prints out a list of optional fonts stored in the font cartridge/card.
PRINT FONTS P	Prints out a list of permanent download fonts.
Exit	Exits from the test mode. The printer does not perform any test.

- (9) Push the power button in order to shut off the power supply to the printer.

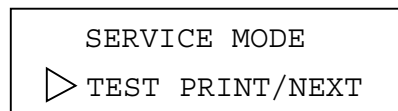
NOTE:

Use the following procedures to identify the problem if the test print is incorrect.

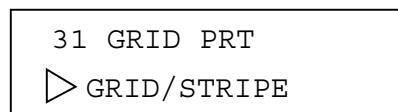
- (10) Press and hold down the **Mode, Set** and **▼** buttons and press the power button to go into the Engine Controller Mode. The **Ready** LED lights within 210 seconds maximum when the screen (a) on the right appears on the control panel display.



- (11) Press the **Sel** button after warming-up is completed, then screen (b) on the right appears on the control panel display.



- (12) Press the **Continue** button, then screen (c) on the right appears.



- (13) Select GRID or STRIPE pattern with the **Set** or ▼ button to scroll through the menu options.
- (14) The screen (d) appears on the right, then press the **Continue** button to select the color with the **Set** or ▼ button.
- (15) Warming-up starts and continuous print will be automatically carried out after warming-up.

NOTE:

If the duplex unit is installed onto the printer, the screen on the right appears after selecting the colour on screen (d).

- (16) Press the **Font** button to stop the test print and then push the power button in order to shut off the power supply to the printer.
- (17) Unplug the power cable from the outlet.

(d)

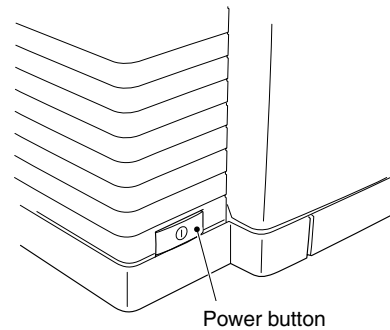
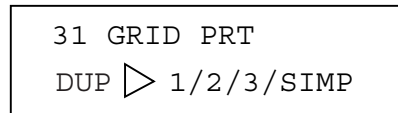
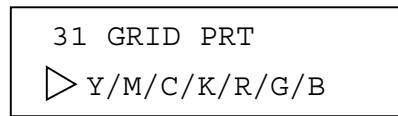


Fig. 3-26

 **PRECAUTION**

- Before unplugging the power cable, confirm that the main power button located on the front of the printer is set to Off.
- Under no circumstances power off or unplug the printer while it is performing any printing operations.
- Do not turn the printer power back on until at least 5 seconds after powering off.

3.5.2 On-line printing (Video Controller Mode only)

Upon confirmation of correct printing by the test print modes, proceed with normal On-Line Printing according to the following procedures. Since this service manual does not refer to the interface connection or operation of the host computer, read the printer User's Guide and any manuals detailing the operation procedure of the host computer before starting normal On-Line Printing.

- (1) Connect the interface cable to the host computer.
- (2) Push the power button to turn on the printer.

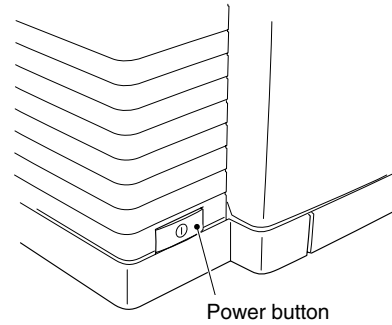


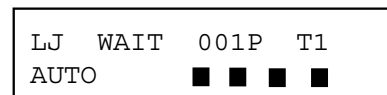
Fig. 3-27

- (3) Confirm that the printer is set to the On-Line mode. (**On Line** LED is lit.)
- (4) Upon completion of the warming-up process, the **Ready** LED lights.

This warming-up process takes 210 seconds maximum.

- (5) The printer starts printing upon receipt of print data transmitted from the host PC.

***Confirm what is indicated on the control panel.*



4. OPTIONS

4.1 Lower Tray Unit

The lower tray functions as a second paper source. It can hold a maximum of 500 sheets of paper (75g/m² or 20 lbs).

For the details such as specifications, installation or disassembly procedure, see the service manual for the lower tray unit (LT-34CL).

4.2 Duplex Unit

The duplex unit allows you to print both side of paper automatically. Note that the lower tray unit must be installed onto the printer when using the duplex unit.

For the details such as specifications, installation or disassembly procedure, see the service manual for the duplex unit (DX-3400).

4.3 Font Card / Flash Memory Card / HDD Card

The printer has two slots for optional font cards, flash memory cards or an HDD card. (Type III HDD cards will only fit into card slot 2.)

The fonts stored in the card can be used as well as the resident fonts.

<Flash memory card / HDD card>

Macros and fonts can be saved in the card.

The following type of flash memory card can be installed;

- 4 Mbyte: Fujitsu MB98A81273
- 8 Mbyte: Fujitsu MB98A81373
- 16 Mbyte: Fujitsu MB98A81473
- 32 Mbyte: Fujitsu MB98A81573

- 1 Mbyte: AMD AMC001CFLKA
- 2 Mbyte: AMD AMC002CFLKA
- 4 Mbyte: AMD AMC004CFLKA
- 10 Mbyte: AMD AMC010CFLKA

- 4 Mbyte: AMD AMC004DFLKA
- 8 Mbyte: AMD AMC008DFLKA
- 20 Mbyte: AMD AMC020DFLKA

- 2-85 Mbyte: ScanDisk PCMCIA PC Card ATA

4.4 Network Option

The printer has a modular input / output (MIO) interface slot on the interface controller at the rear of the printer. The slot allows you to install a commercial MIO-compatible sharing/networking card.

Since the NC-3100h network board is installed in the printer, you have to remove the NC-3100h first to install an MIO card.

Install the MIO card following the steps below;

- (1) Turn off the printer power switch and unplug the power cable from the outlet.
- (2) Remove the interface cable connector.
- (3) Remove the two screws to remove the main controller board from the printer.

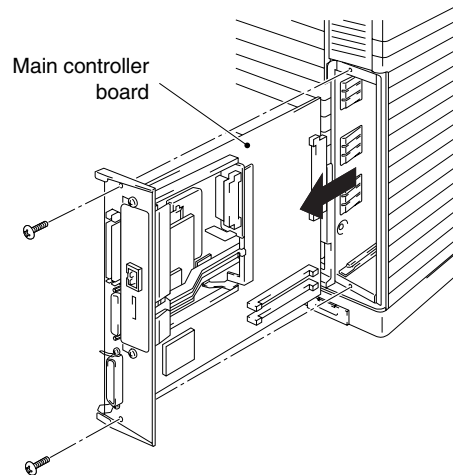


Fig. 3-28

- (4) Remove the lock bar securing the NC-3100h.

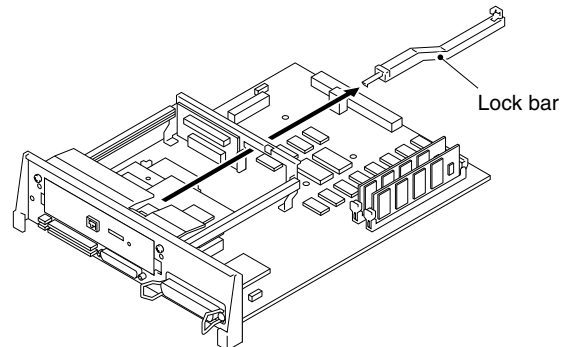


Fig. 3-29

- (5) Remove the two screws securing the NC-3100h and remove the NC-3100h by pulling it upwards.

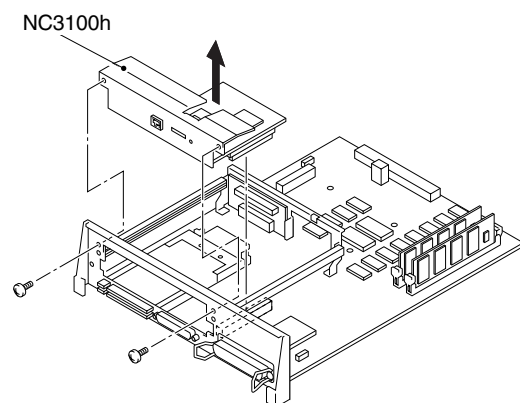


Fig. 3-30

- (6) Unpack the MIO card and hold it by its edge.
- (7) Insert the card until it is securely seated.
- (8) Secure the card with the two captive screws on the card.
- (9) Retain the cover plate and secure the two screws to hold the plate.

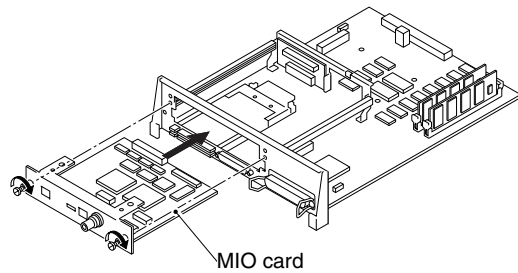


Fig. 3-31

4.5 RAM Expansion

The printer has 64 Mbytes of memory standard and 2 slots for optional expansion memory. The memory can be expanded up to 320 Mbytes by installing commercially available dual in-line memory modules (DIMMs). (The standard memory fitted can vary depending on the printer model and country.)

NOTE:

When installing the DIMM, note the following;

- The printer uses DIMM memory modules which are 100 pin, no-parity, SDRAM with 64 Mbit or more.
- The printer is not compatible with extended data output (EDO) DIMM, or DIMM which uses 16 Mbit SDRAM.

The following capacity of DIMM can be installed:

- 16 Mbyte: TECHWORKS PM-HP 16M-BR
- 32 Mbyte: TECHWORKS PM-HP 32M-BR
- 64 Mbyte: TECHWORKS PM-HP 64M-BR
- 128 Mbyte: TECHWORKS PM-HP 128M-BR

The DIMM must have the following specifications:

- Type: 100 pin and 32 bit output
- CAS Latency: 2 or 3
- Clock frequency: 66MHz or more
- Capacity: 16, 32, 64 or 128 Mbyte
- Height: 46 mm (1.8 inches) or less
- Parity: None
- DRAM type: 64 Mbit SDRAM 4 Bank SDRAM can be used.

Install the DIMMs following the steps below;

- (1) Turn off the printer power switch and unplug the power cable from the outlet.
- (2) Remove the interface cable connector.
- (3) Remove the two screws to remove the main controller board from the printer.

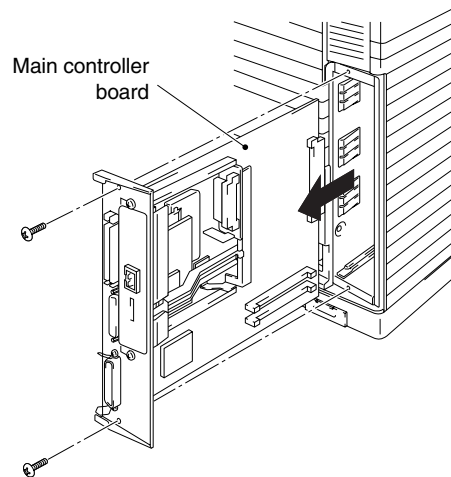


Fig. 3-32

- (4) Hold the DIMM with your fingers against the side edges and thumb against the back edge. Align the notches on the DIMM with the DIMM slot. Check that the locks on each side of the DIMM slot are open or outward.
- (5) Press the DIMM straight into the slot (press firmly). Check that the locks on each side of the DIMM snap inwards into place.

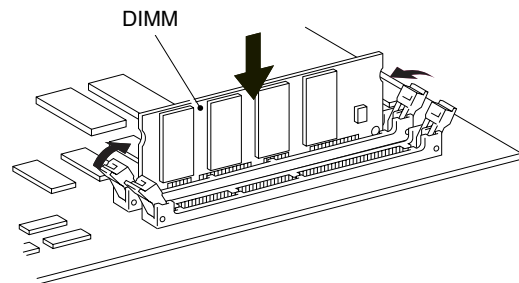


Fig. 3-33

- (6) Refit the main controller board into the printer by sliding it into the guide rails.
- (7) Secure the main controller board with the two screws.

4.6 HDD (Hard Disk Drive)

The printer allows you to install the HD-6G 2.5-inch HDD option onto the main controller board.

Install the HDD following the steps below;

- (1) Turn off the printer power switch and unplug the power cable from the outlet.
- (2) Remove the interface cable connector.
- (3) Remove the two screws to remove the main controller board from the printer.

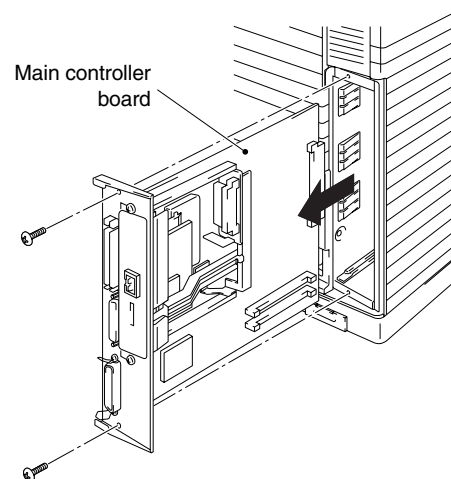


Fig. 3-34

- (4) Insert the four pins supplied with the HDD unit into the bottom of the HDD.

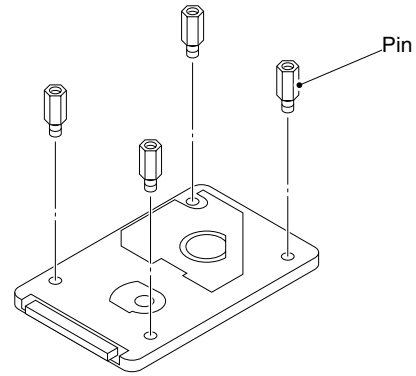


Fig. 3-35

- (5) Connect the flat cable to the HDD with the keyed side downwards, ensuring it is correctly aligned.

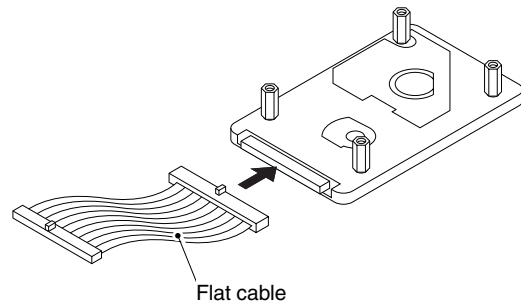


Fig. 3-36

- (6) Assemble the four HDD pins into the four holes of the main controller board and secure the pillars with the screws provided from the rear of the PCB.

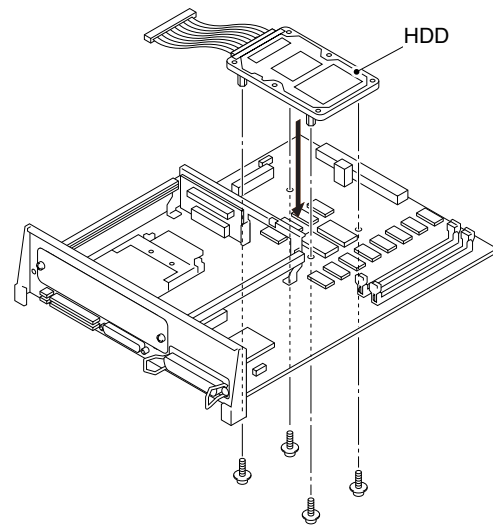


Fig. 3-37

- (7) Connect the flat cable to the main controller board.
- (8) Install the main controller board into the printer by sliding it into the guide rails.
- (9) Secure the main controller board with the two screws.

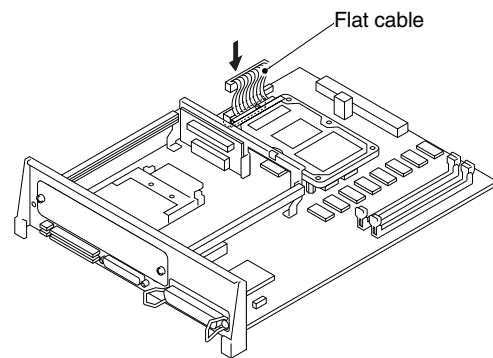


Fig. 3-38

CHAPTER 4
STRUCTURE OF
SYSTEM
COMPONENTS

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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.

- Laser 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

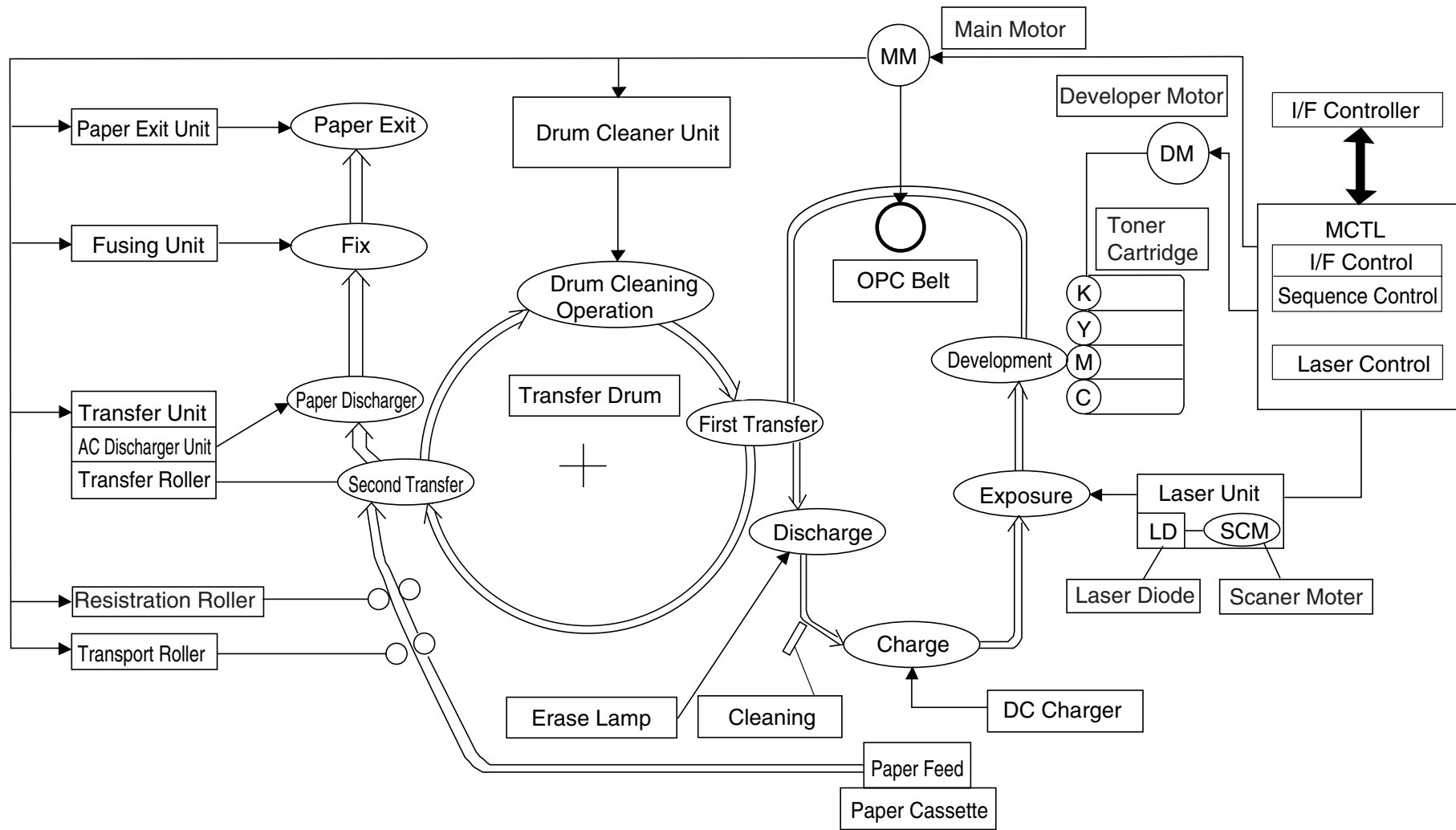


Fig. 4-1

(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:

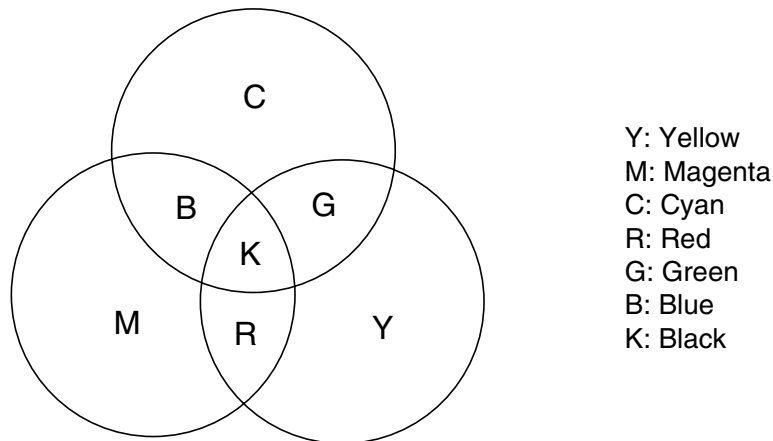


Fig. 4-2

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

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.

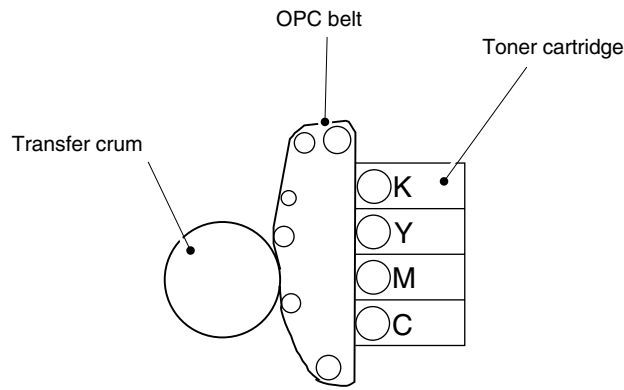


Fig. 4-3

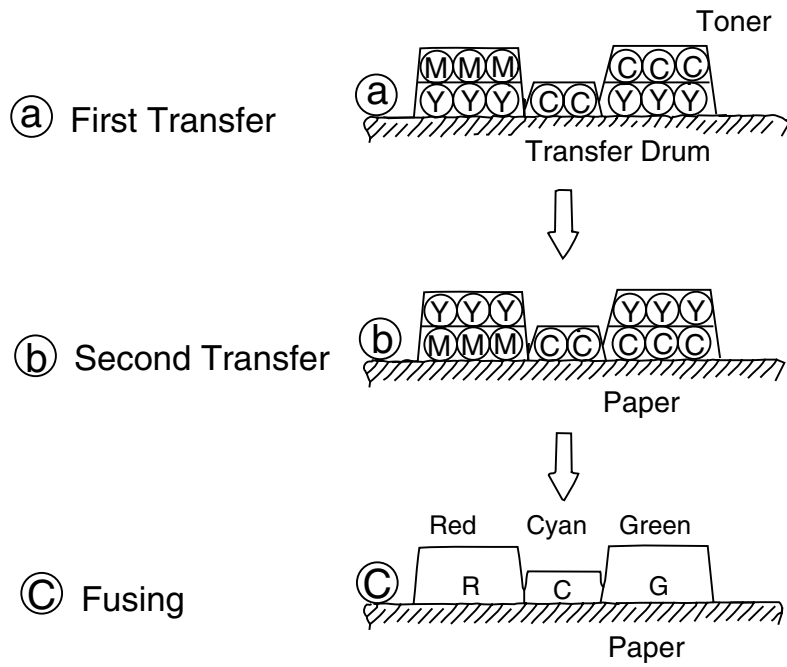


Fig. 4-4

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.

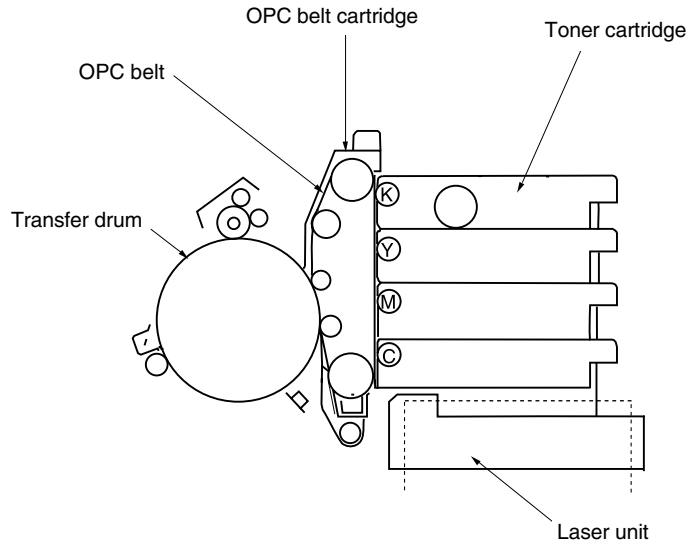


Fig. 4-5

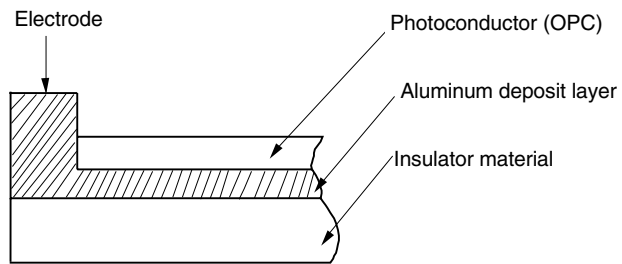


Fig. 4-6

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.

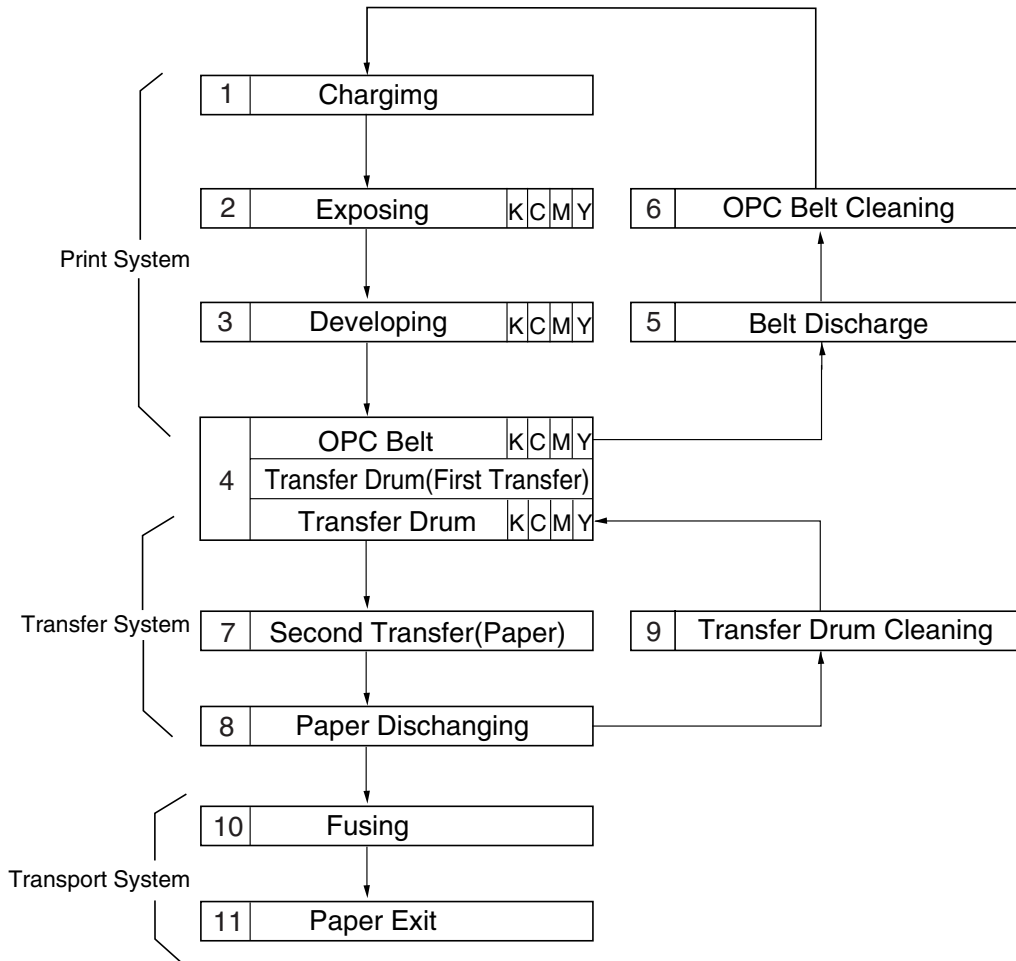


Fig. 4-7

1.4.1 Structure of the printer

No.	Component Part	Process
1	Charger	Charging
2	Laser 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

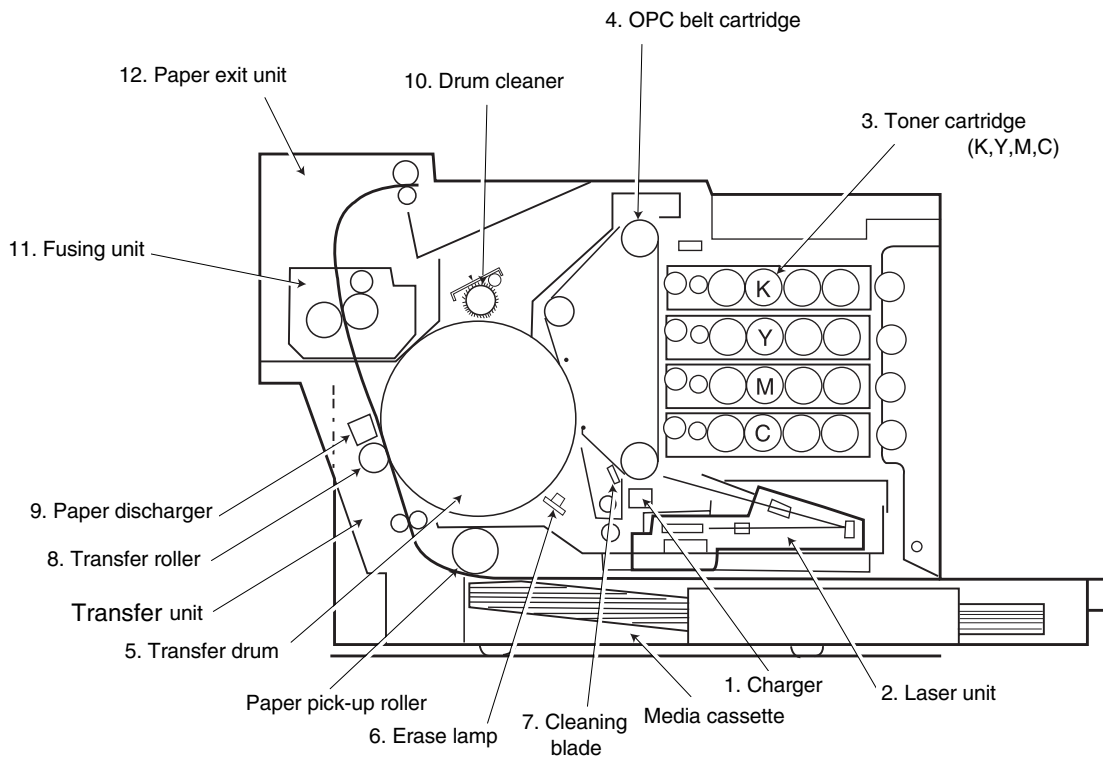


Fig. 4-8

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.

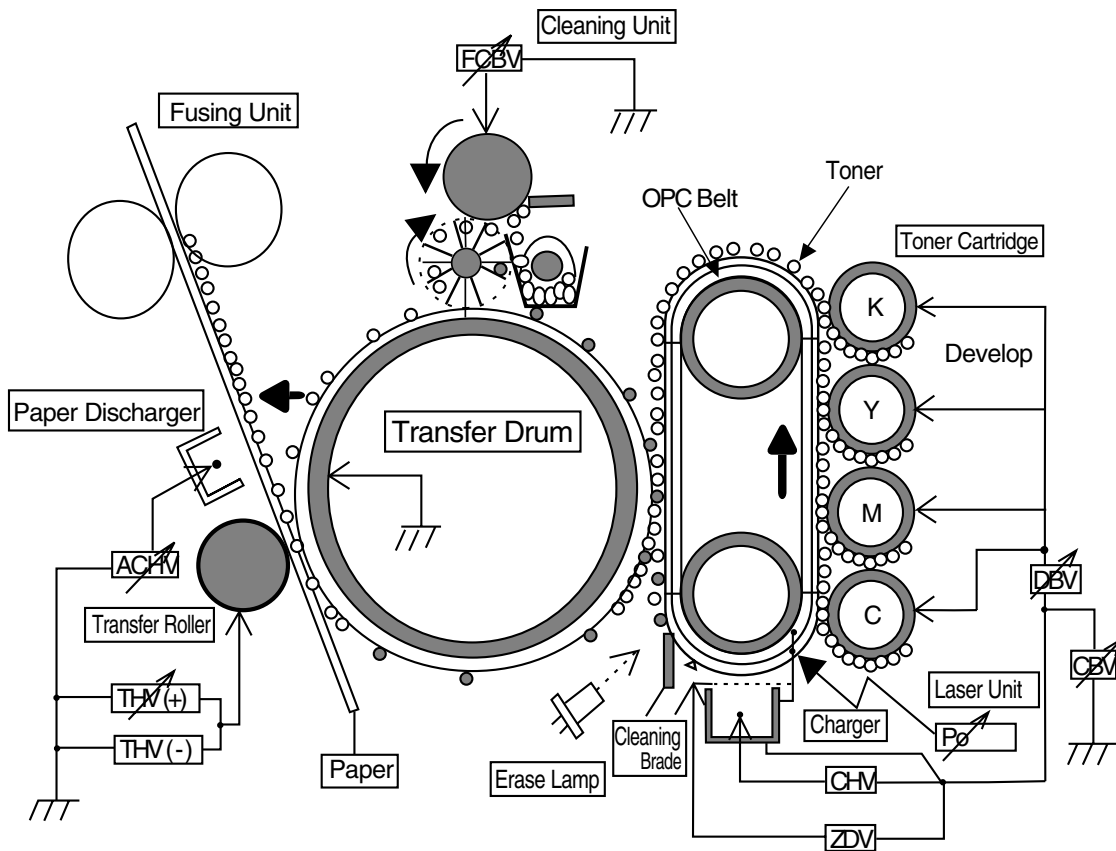


Fig. 4-9

- (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.

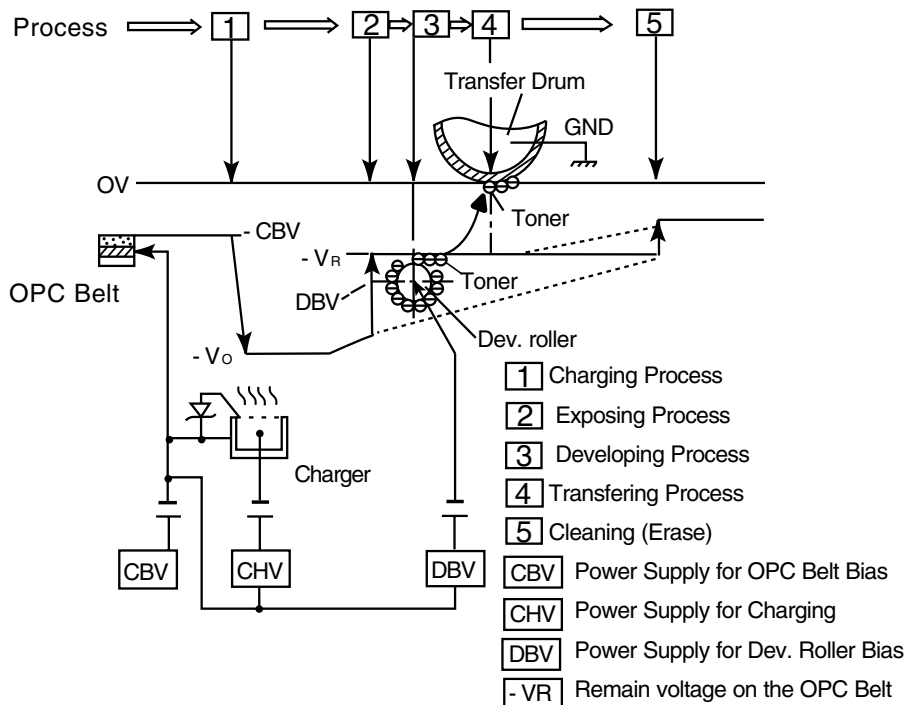


Fig. 4-10

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.

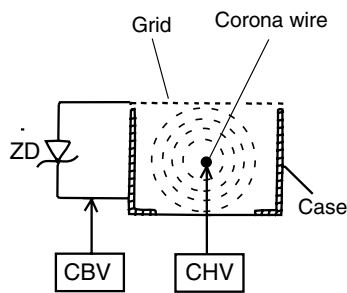


Fig. 4-11

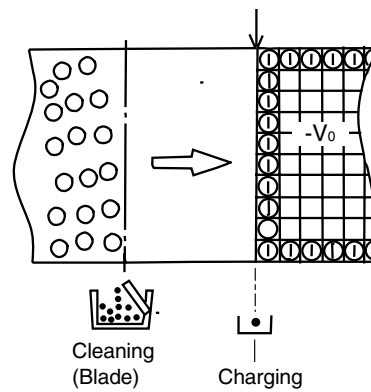


Fig. 4-12

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 laser unit
 - i) The laser 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 $-V_0(V)$ 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 $-V_R(V)$.
 - v) An invisible electrostatic latent image is formed on the OPC belt as shown in Fig. 4-13.

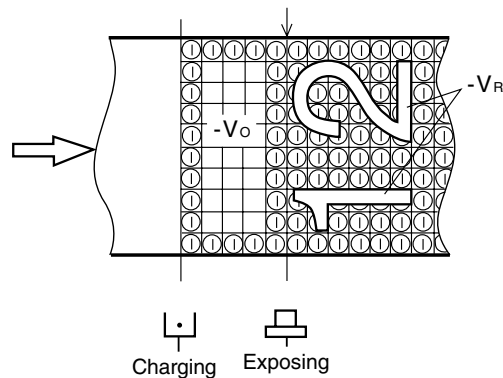


Fig. 4-13

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 $-V_o(V)$ 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.

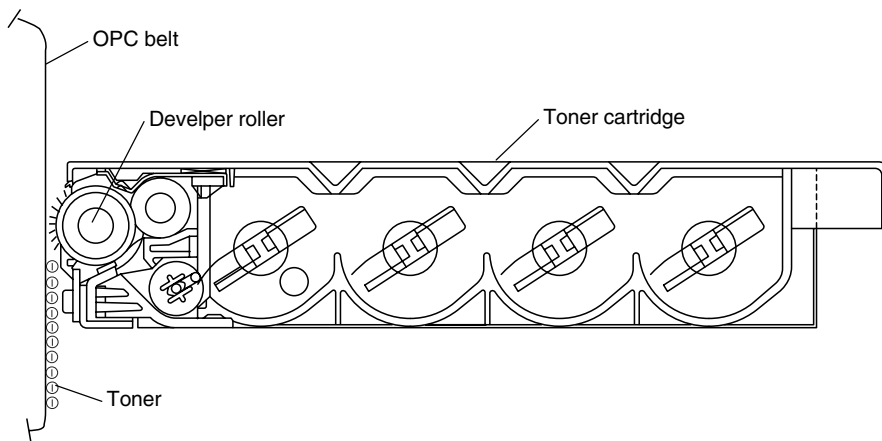


Fig. 4-14

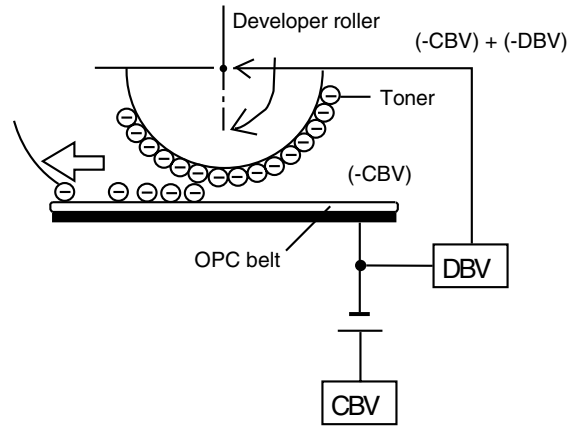


Fig. 4-15

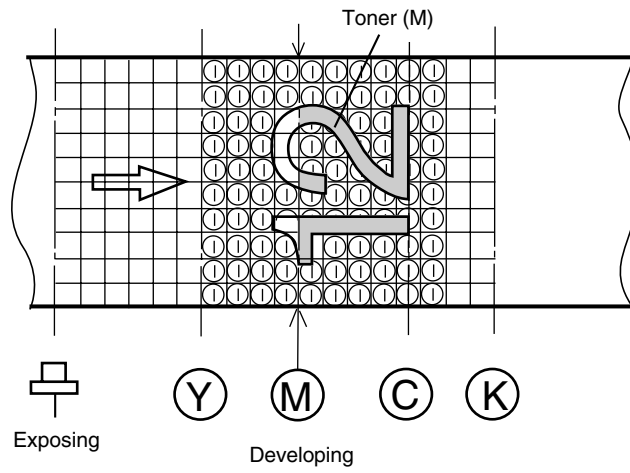


Fig. 4-16

4	First Transfer (Drum)
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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.

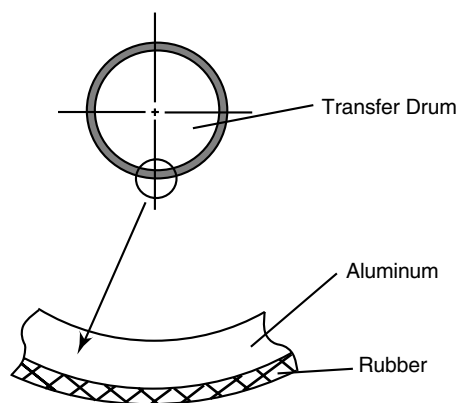


Fig. 4-17

- (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.

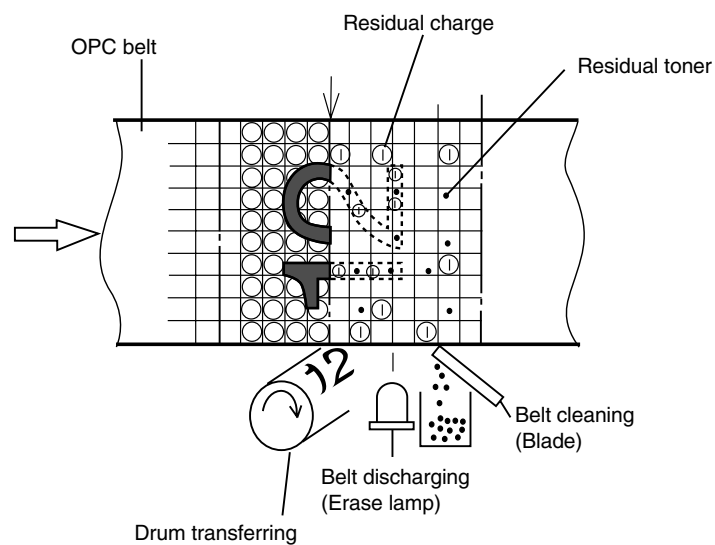


Fig. 4-18

5	Belt Discharging (Erase Lamp)
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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.

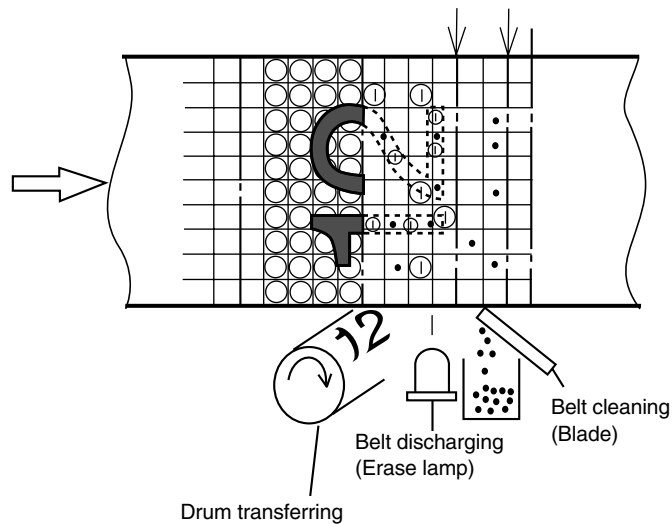


Fig. 4-19

6	Belt Cleaning
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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.

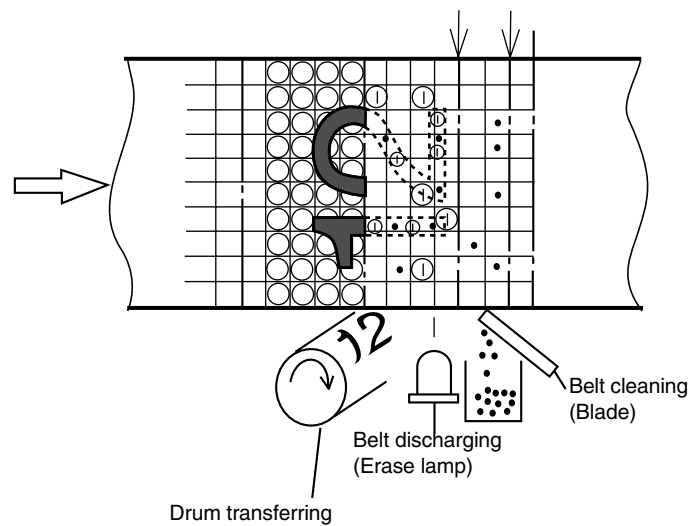


Fig. 4-20

7	Second Transfer (Paper)
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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.

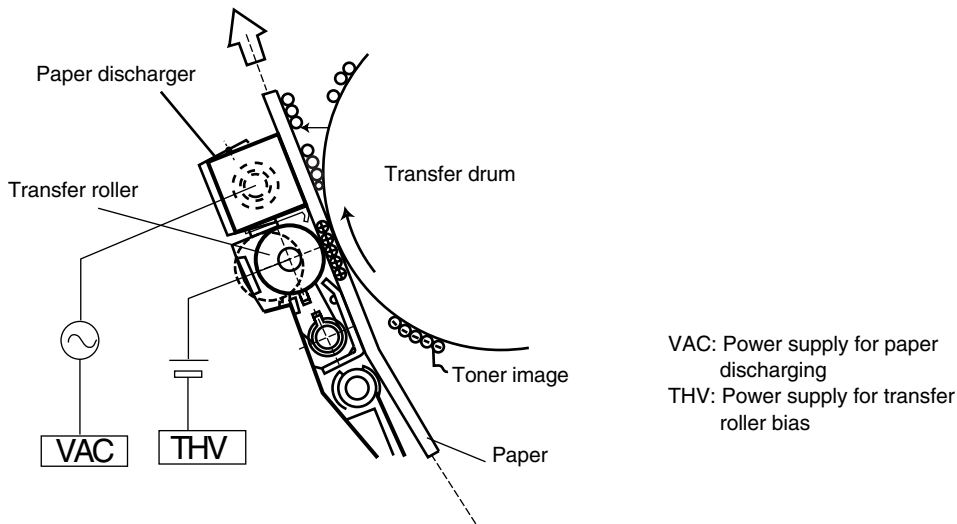


Fig. 4-21

8	Paper Discharging
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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.

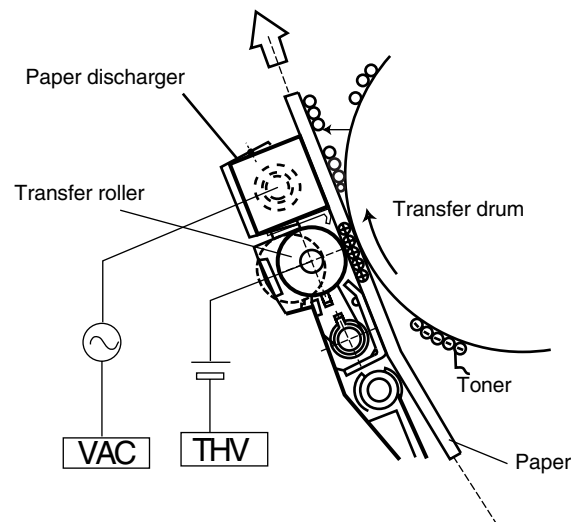


Fig. 4-22

9	Drum Cleaning
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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.

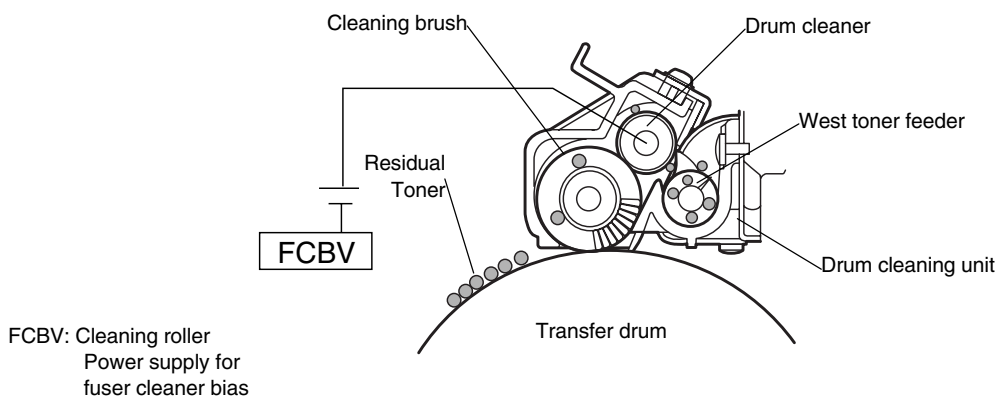


Fig. 4-23

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 | Laser 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. |

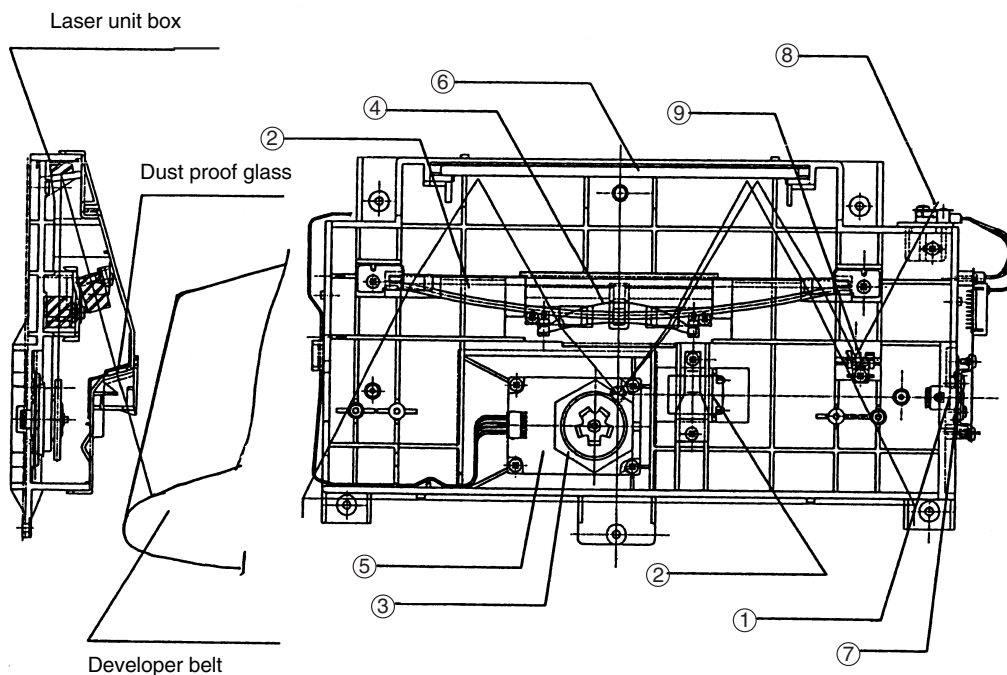


Fig. 4-24

(2) Specification:

Specification of the laser 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. |

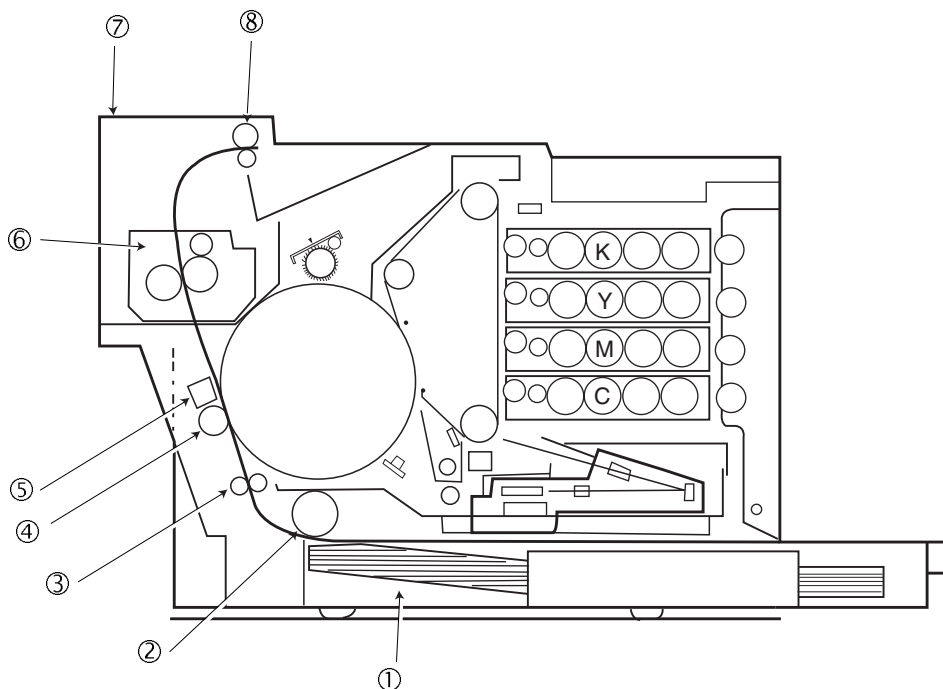


Fig. 4-25

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. |

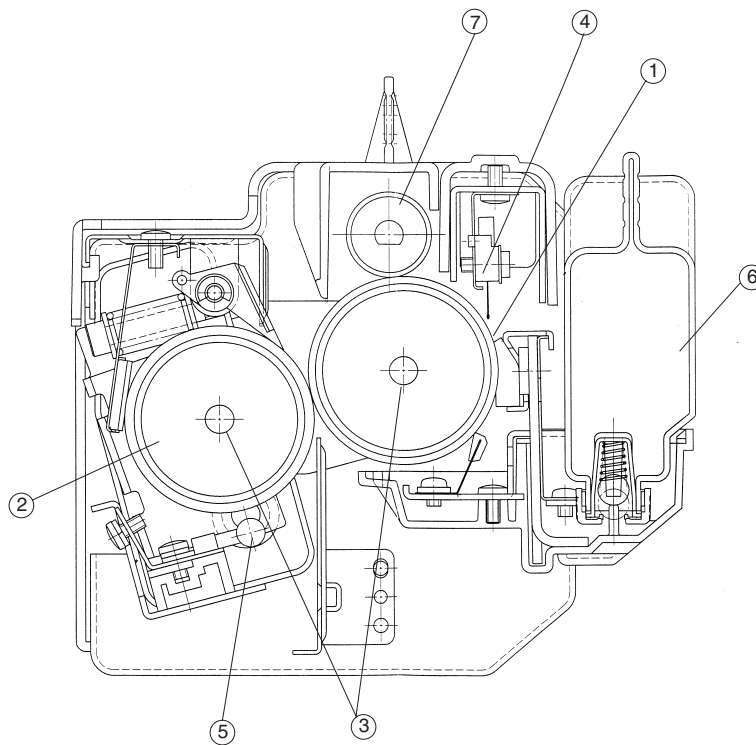


Fig. 4-26

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.

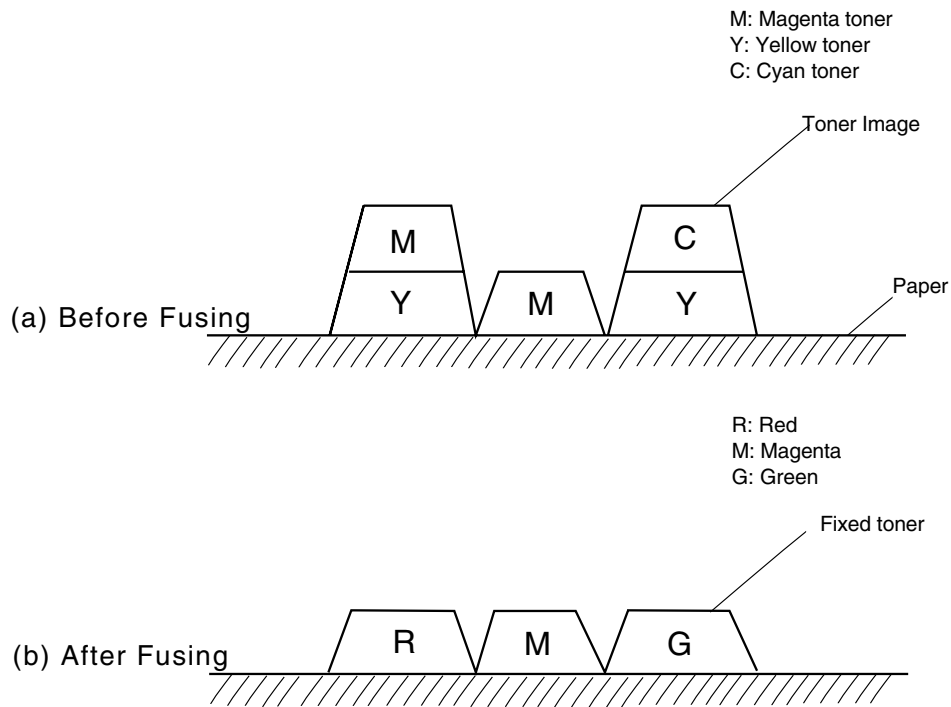


Fig. 4-27

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. |

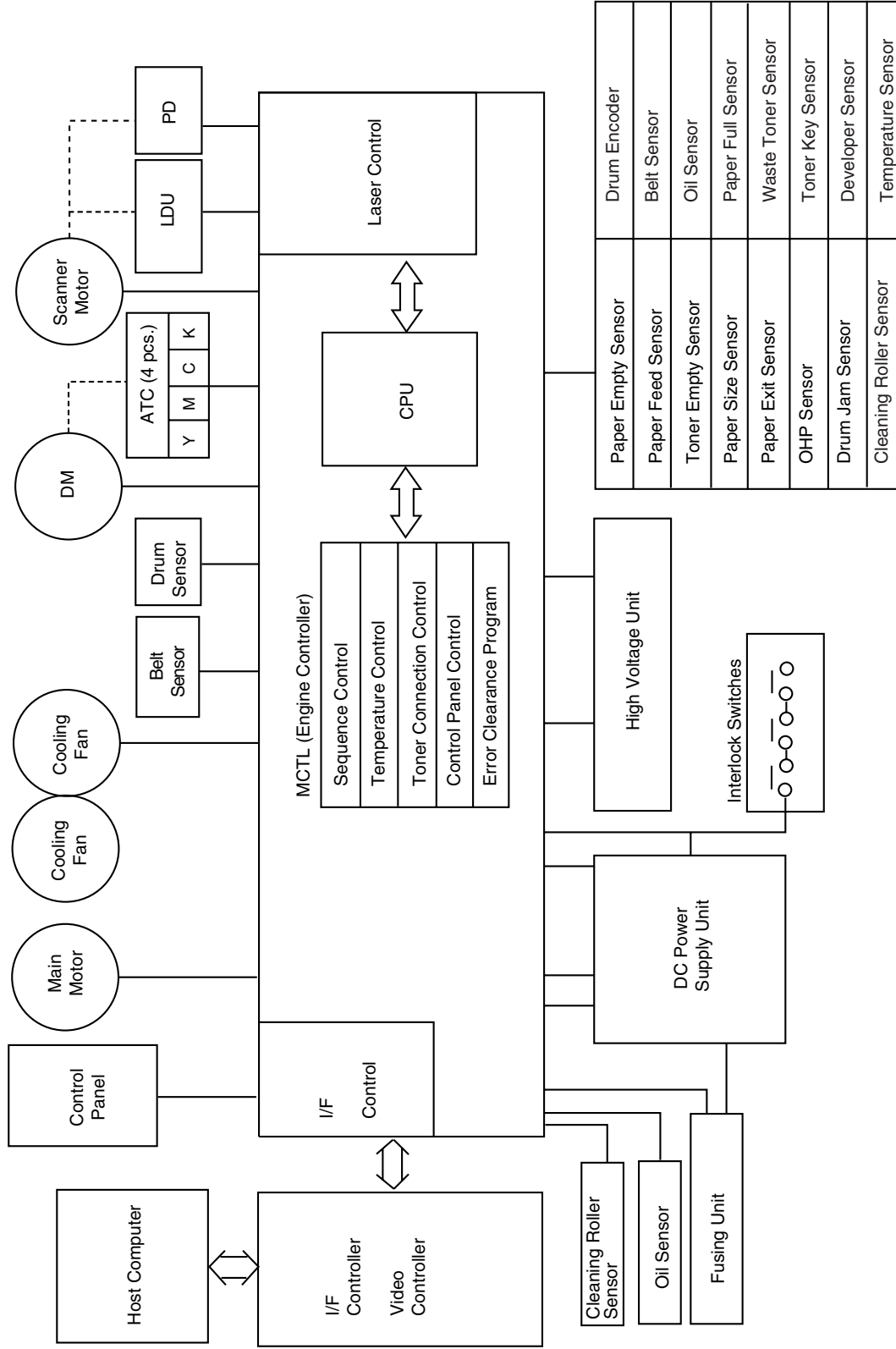


Fig. 4-28

<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

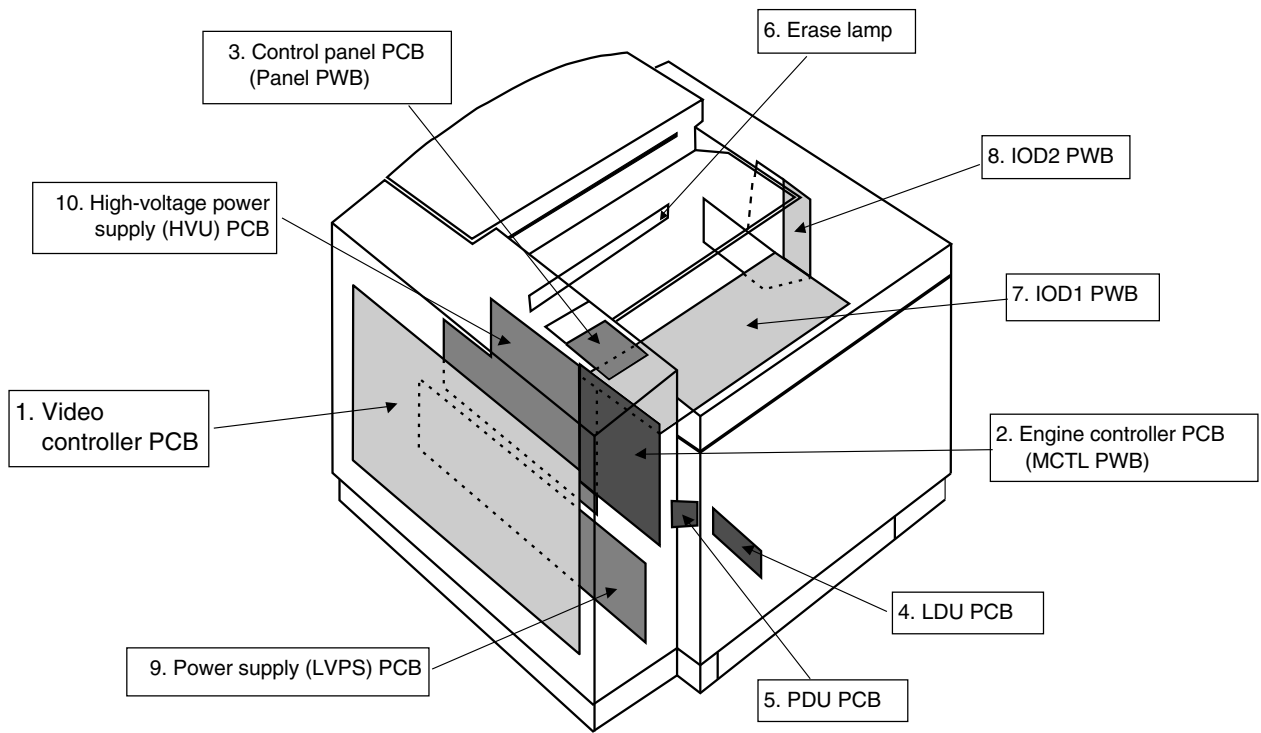


Fig. 4-29

(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 unit.
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

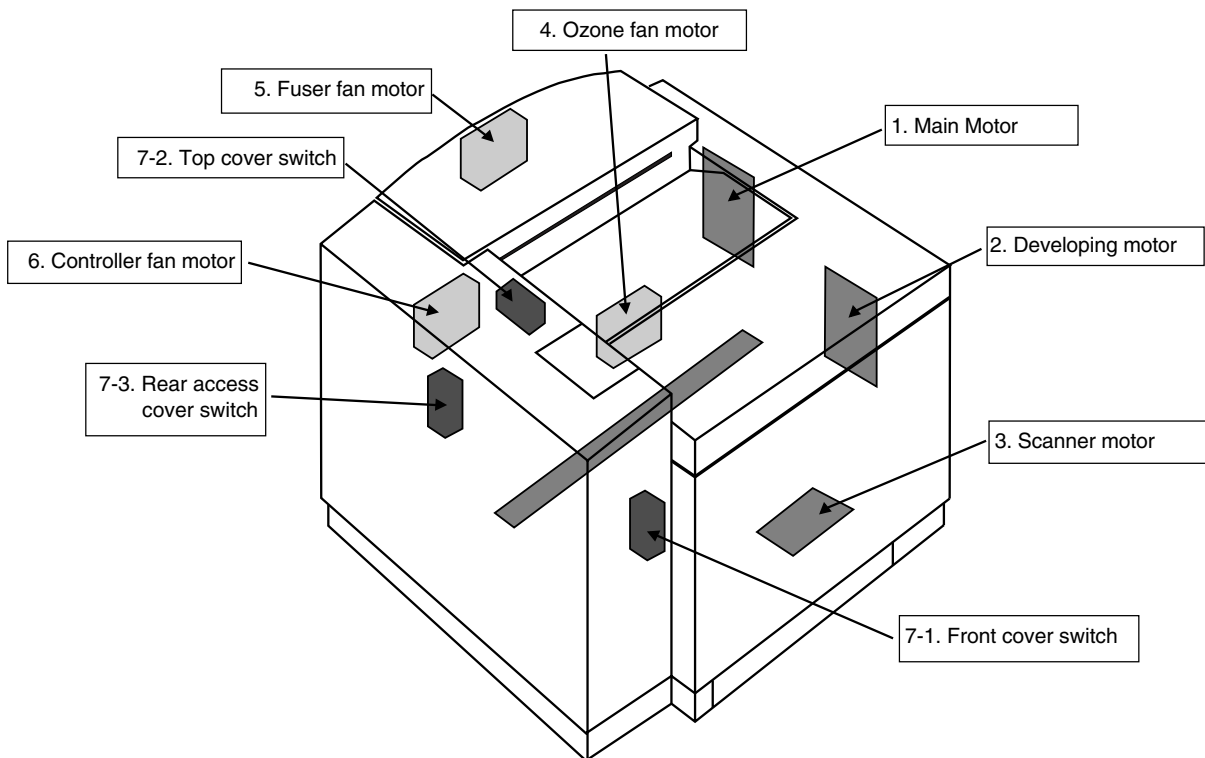


Fig. 4-30

(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. <i>NOTE: The cleaner cam clutch is identical to the TR cam clutch.</i>

Layout of Clutches

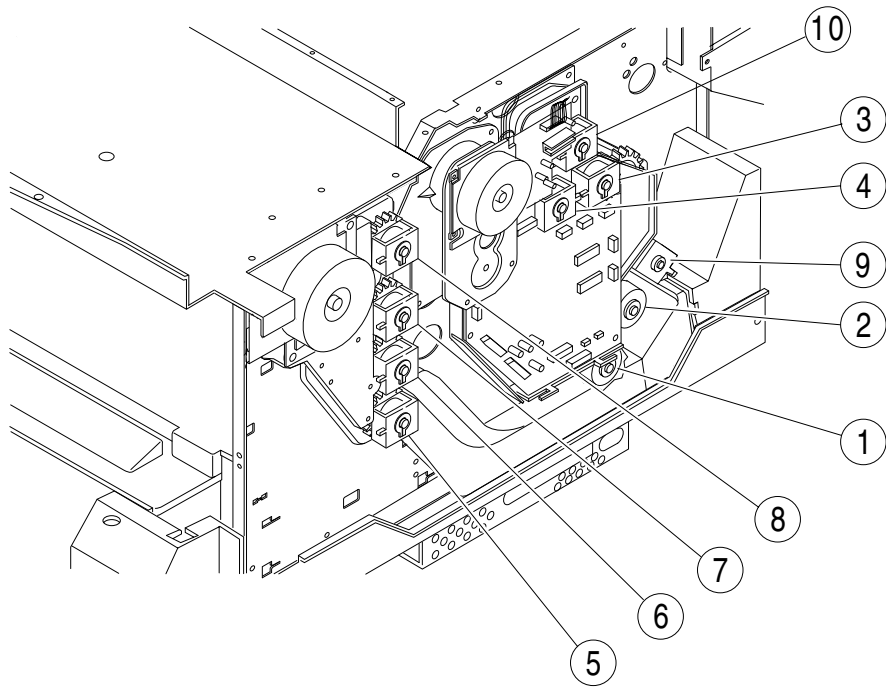


Fig. 4-31

(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

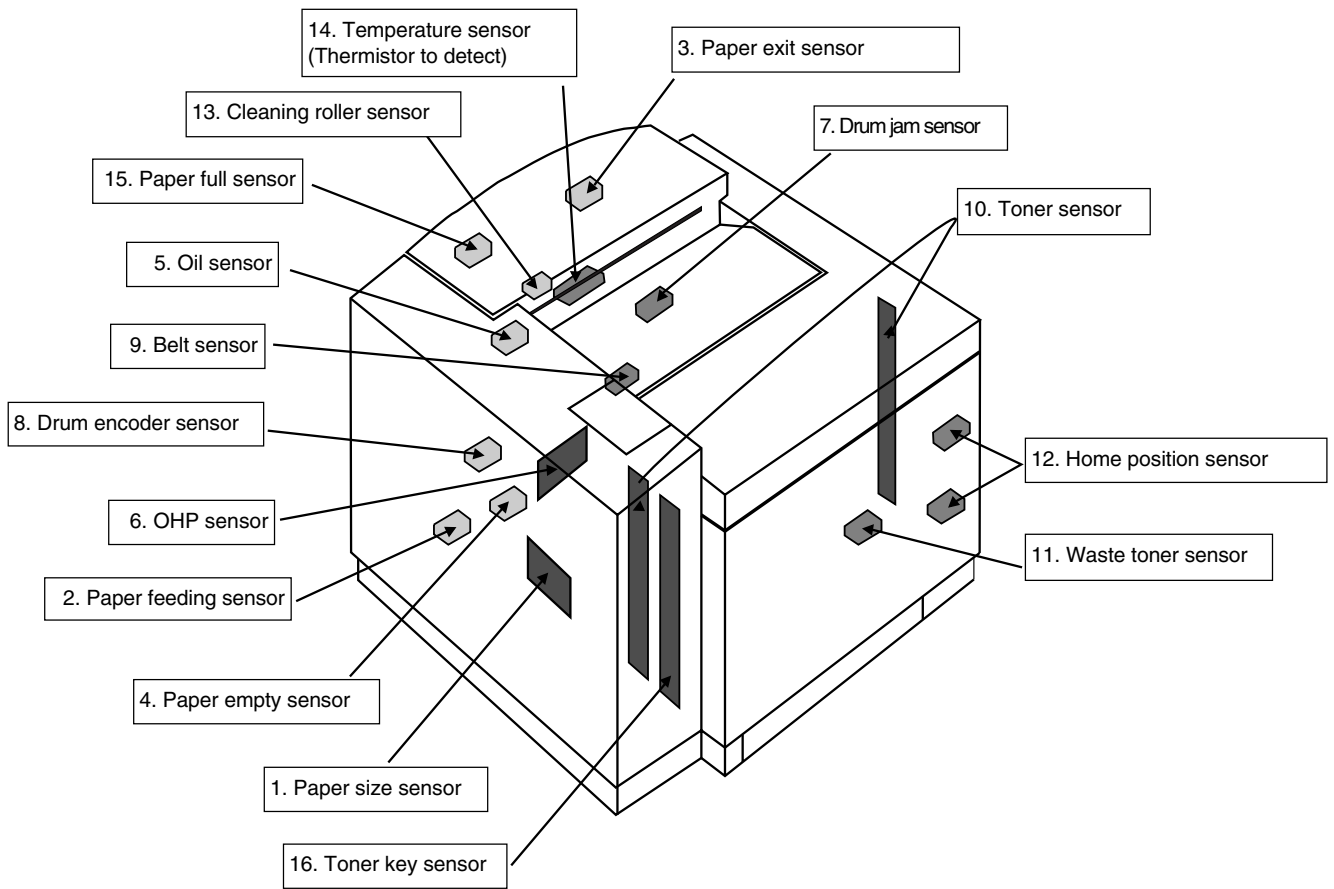


Fig. 4-32

2.2 Control System - Control of the Print Process

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

<Print Sequence Diagram>

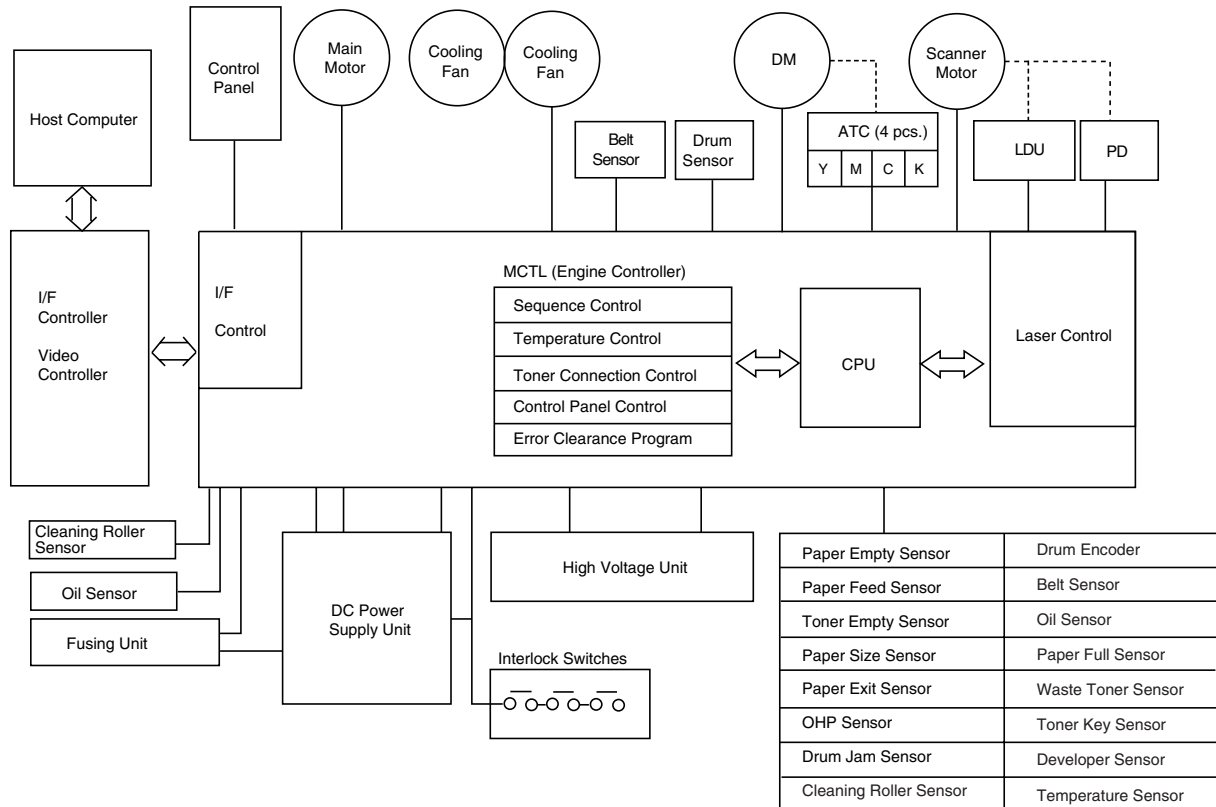


Fig. 4-33

(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.

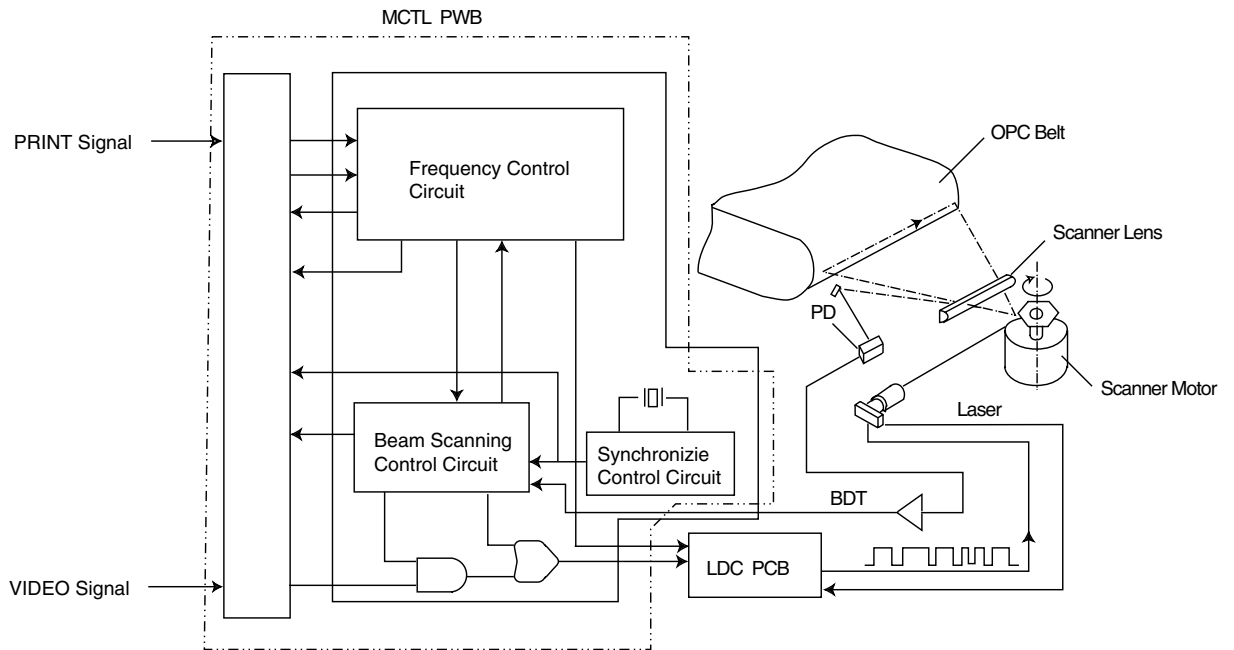


Fig. 4-34

(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>

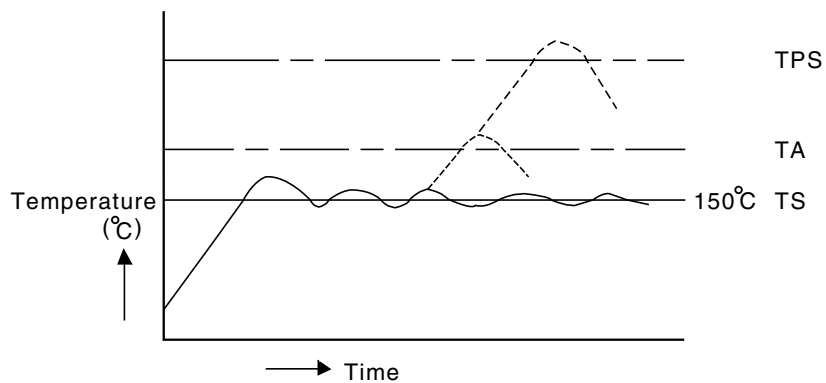


Fig. 4-35

<Basic Structure of Fuser Control>

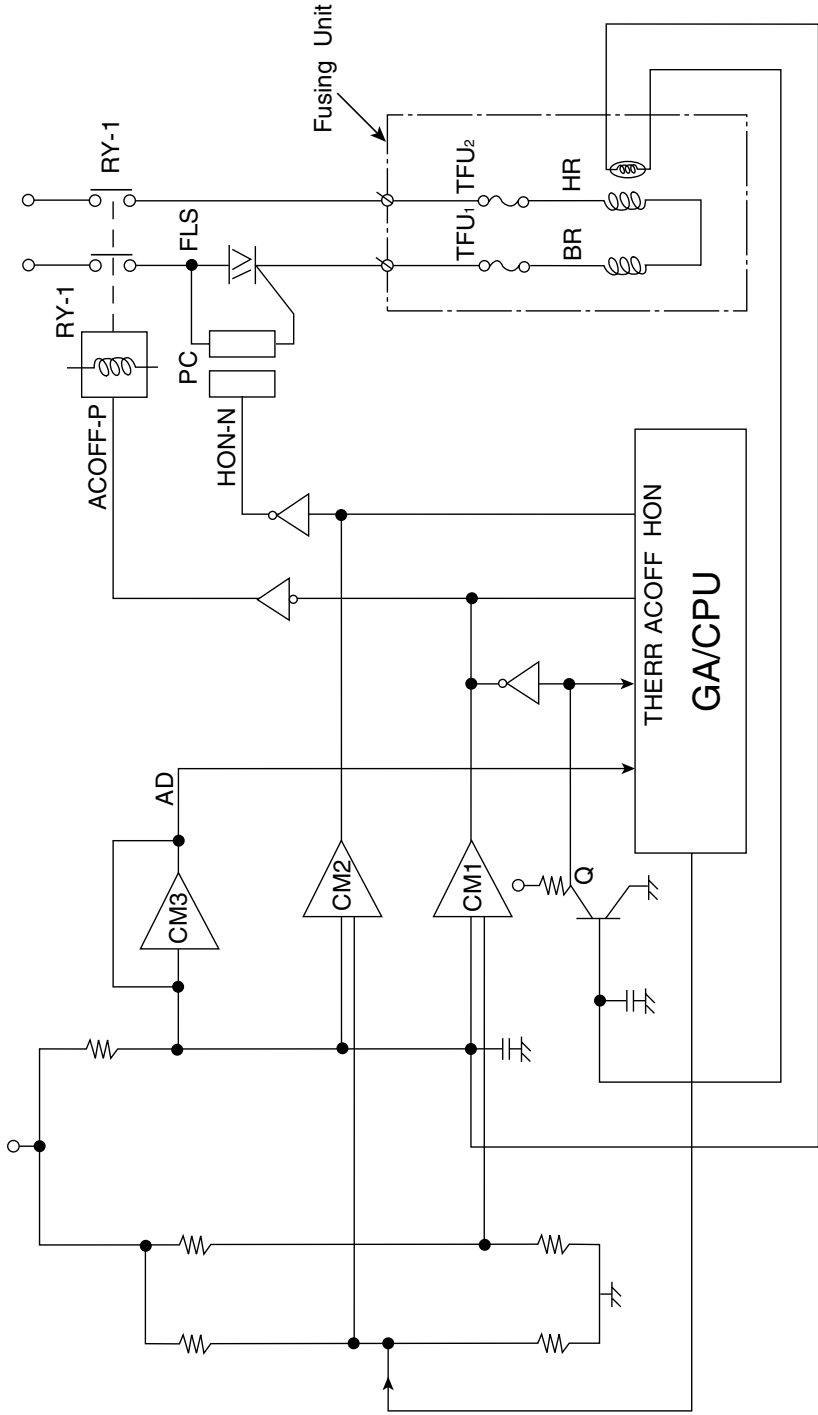


Fig. 4-36

- 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

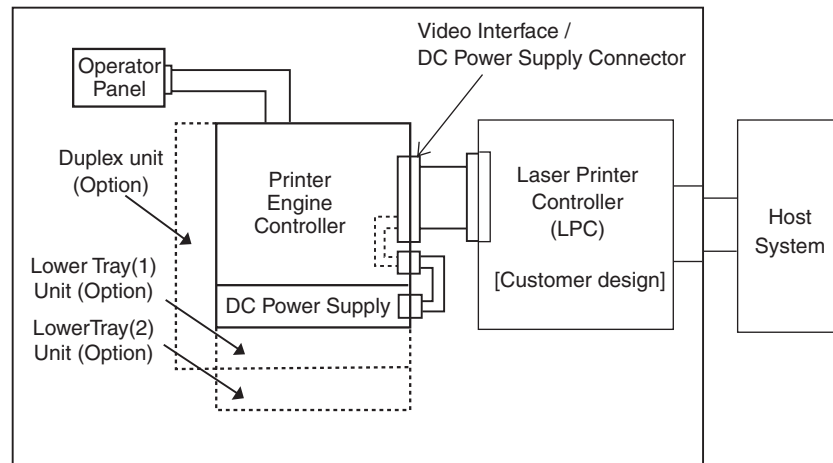
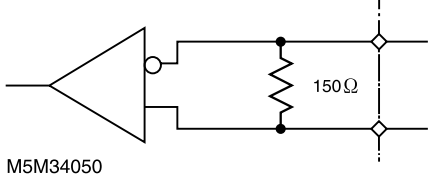
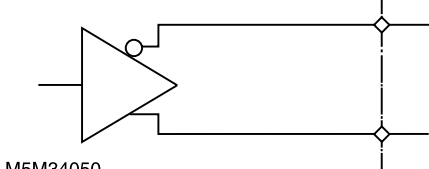
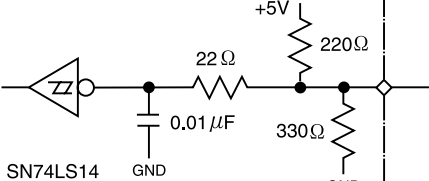
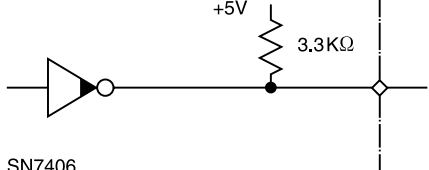


Fig. 4-37

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	 <p>M5M34050</p>	<ul style="list-style-type: none"> • VIDEO-N • VIDEO-P
2	 <p>M5M34050</p>	<ul style="list-style-type: none"> • HSYNC-N • HSYNC-P
3	 <p>SN74LS14</p>	<ul style="list-style-type: none"> • PRREQ-N • COMMAND-N • ID1-N • ID2-N
4	 <p>SN7406</p>	<ul style="list-style-type: none"> • 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
4A	PSGND	4B	+5V
5	PSGND	5B	+5V
6A	PSGND	6B	+5V
7A	PSGND	7B	+5V
8A	PSGND	8B	+5V
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

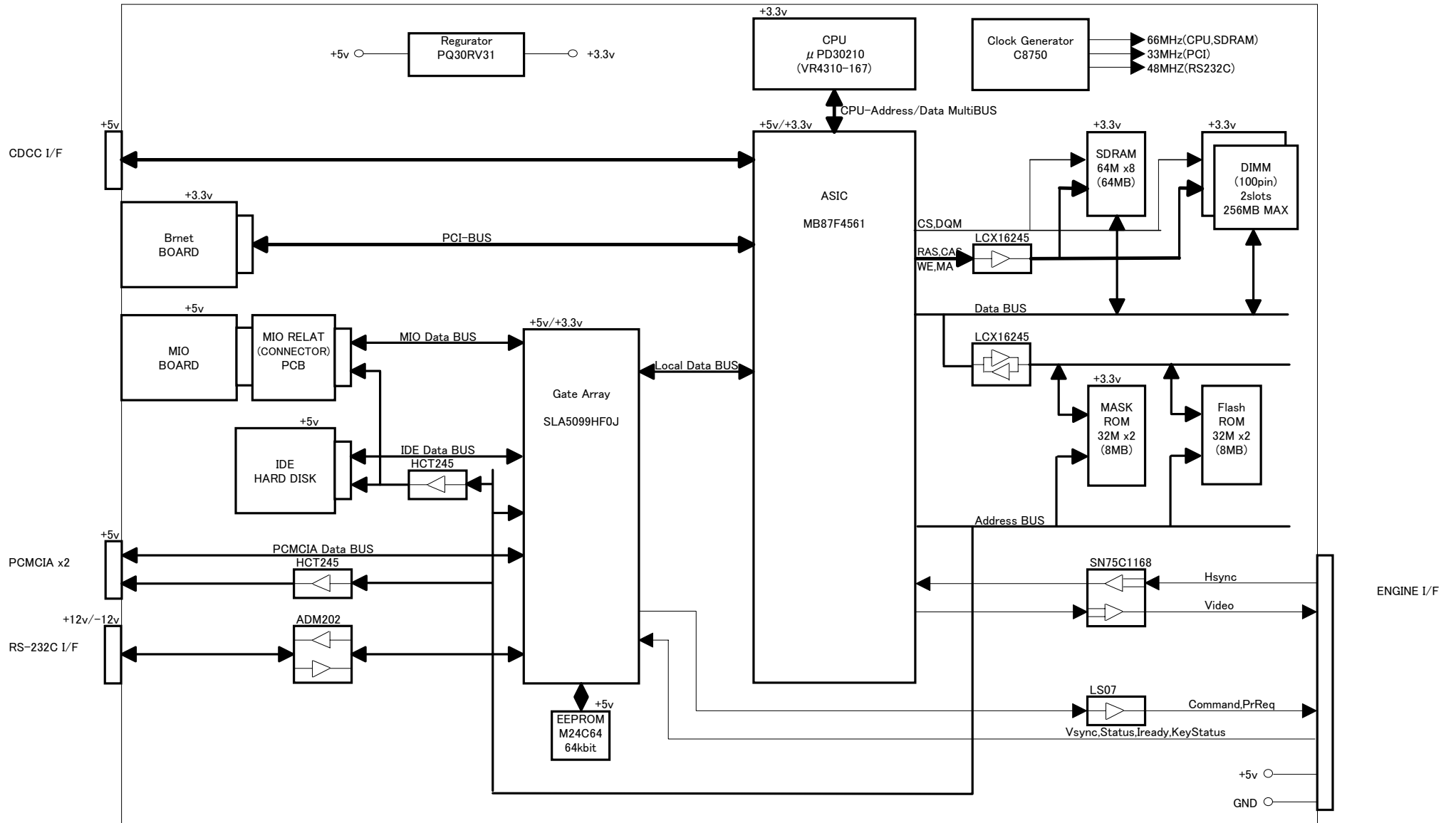
The main PCB consists of the circuits which perform the following functions;

- 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: μ PD30210-167 (VR4310-167MHz), MiPS 64 bits RISC CPU manufactured by NEC
- Clock speed: 66.7MHz (external) / 166.75MHz (internal)
- Cache memory: 16KB (Command cache) / 8KB (Data cache)
- Bus width: 64 bits (external) / 32 bits (internal), Floating point unit (FPU) incorporated
- Appearance: 120-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, PCMCIA, MIO)
 - * Engine interface (Video signal control)
 - * Supports Software

(3) Gate array block

- Model name: SLA5099H F0J manufactured by Epson
- Appearance: 160-pin QFP
- Functions: Engine control, RS-232C

(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 120nsec. (Page access less than 50nsec.)
- Appearance: 44-pin SOP

<Flash ROM>

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

(5) DRAM block

DRAMs are used for the receiving buffer and the working area of the CPU. The DRAM block contains eight 64Mbit SDRAM, thus having 64MB memory capacity in total.

- Model name: HM5264805FIT manufactured Hitachi (or equivalent)
- Type: 64Mbit SDRAM
- Access time: CL2 PC66 compatible or more.
- Appearance: 54-pin TSOP

(6) DIMM block

DIMM (Dual-Inline-Memory-Module) allows memory extension by up to 128MB in each socket. 2 DIMM sockets are available.

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

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

<Recommended DIMM type>

- * 16MB: Techworks PM-HP16M-BR
- * 32MB: Techworks PM-HP32M-BR
- * 64MB: Techworks PM-HP64M-BR
- * 128MB: Techworks PM-HP128M-BR

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

(7) External interface block

- Centronics Interface
- RS-232C Interface
- PCMCIA Interface
- MIO Interface
- IDE Interface

(8) 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.

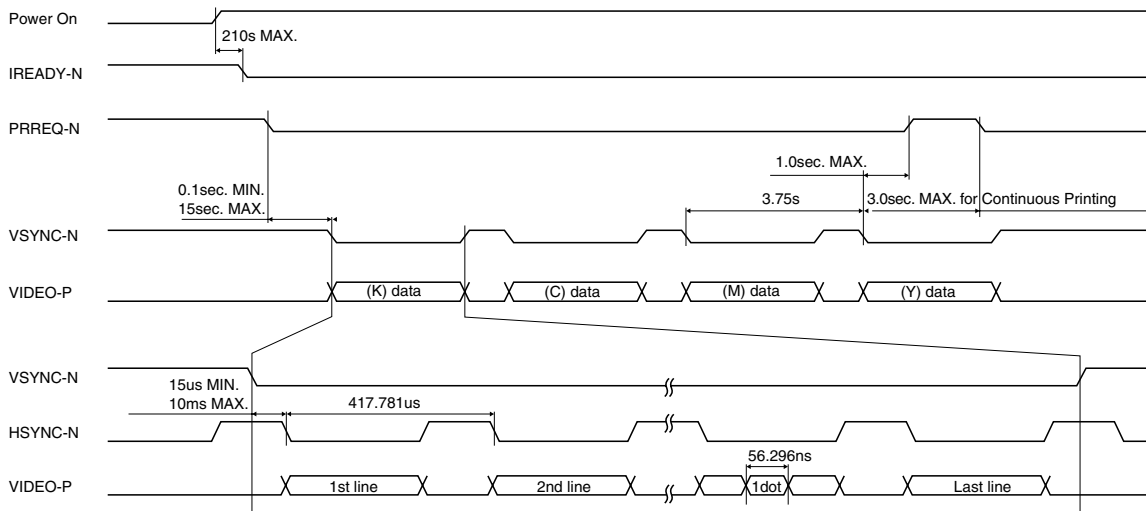


Fig. 4-38

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.

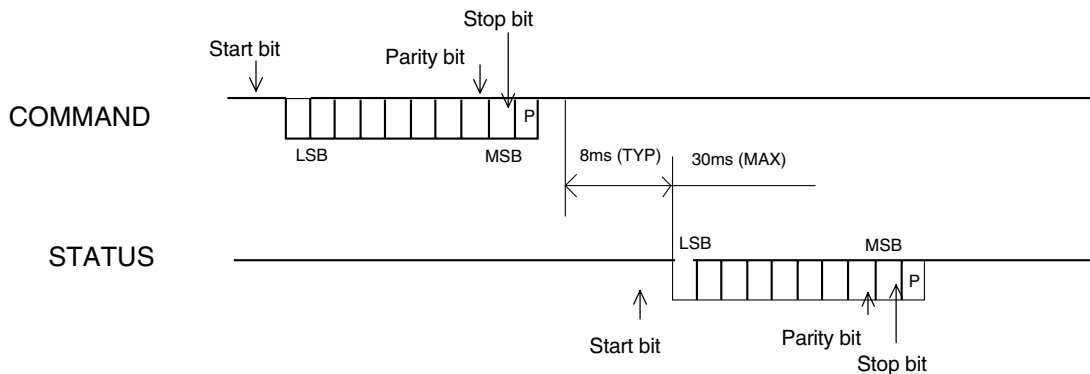


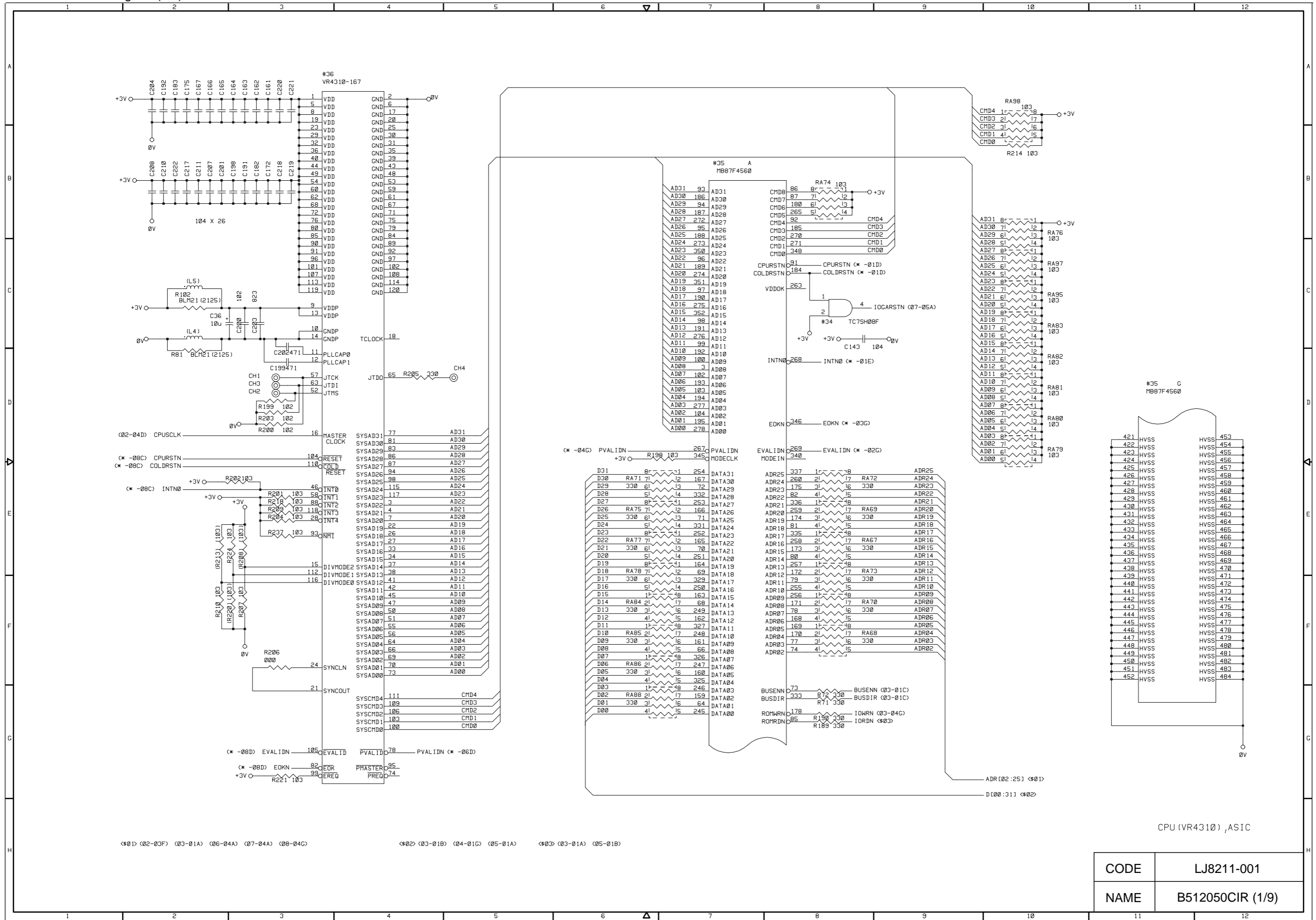
Fig. 4-39

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.

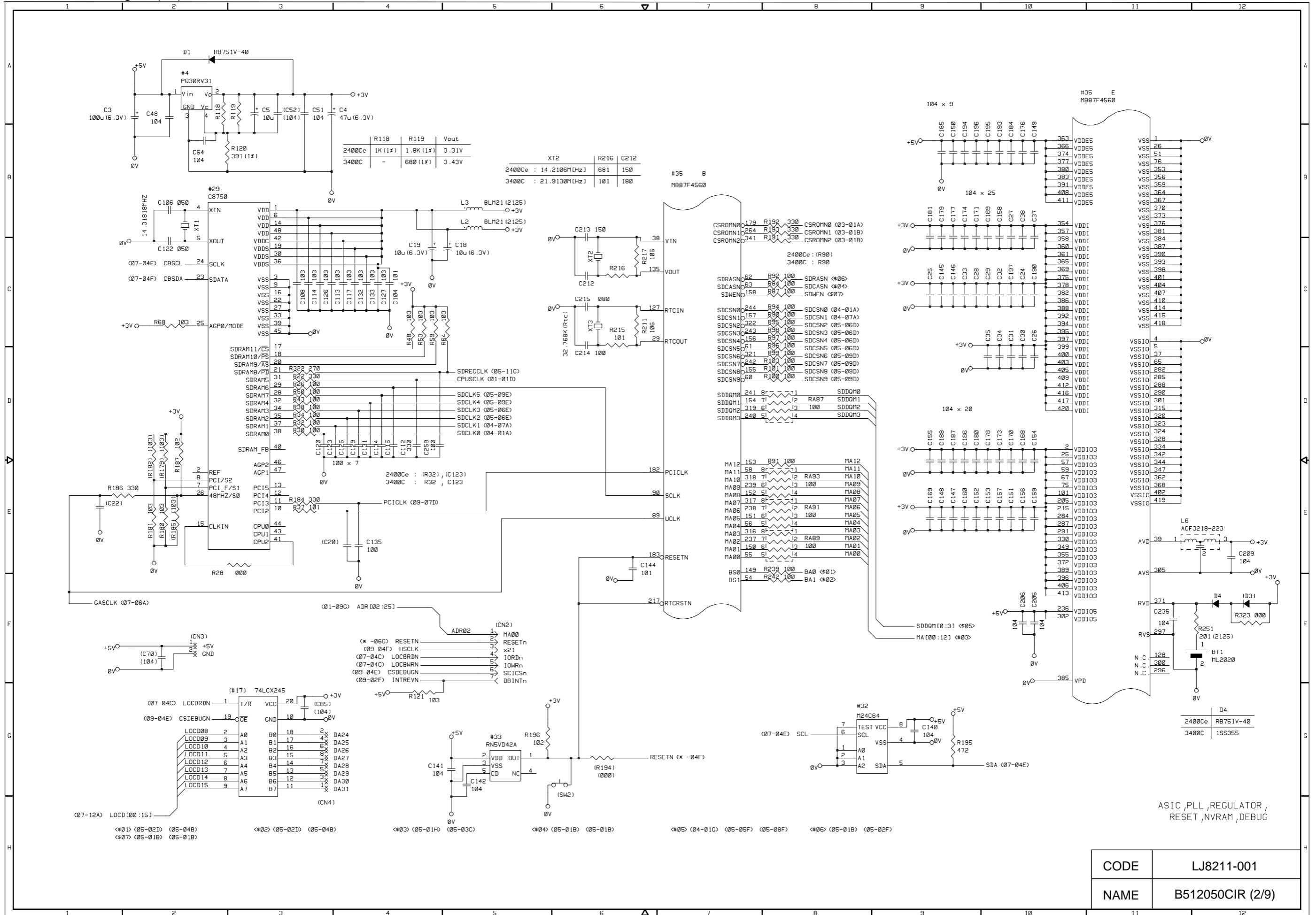
Main PCB Circuit Diagram (1/9)



CPU (VR4310) ASIC

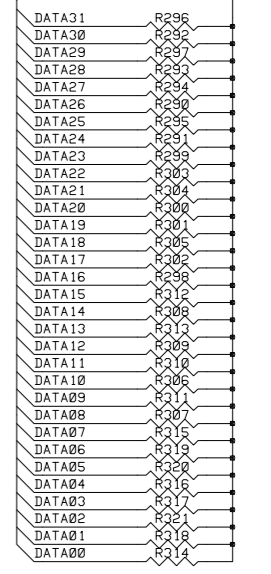
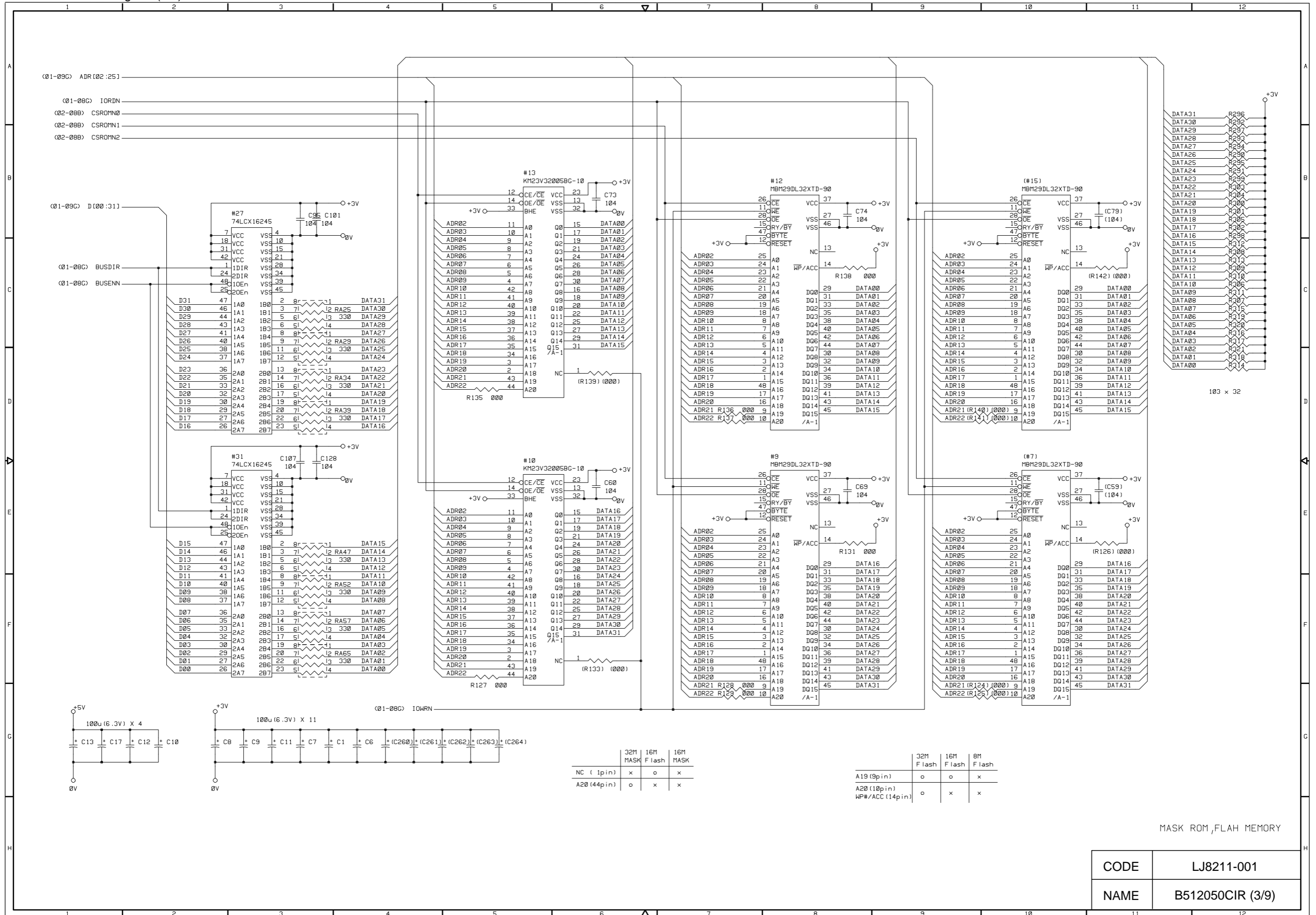
CODE	LJ8211-001
NAME	B512050CIR (1/9)

Main PCB Circuit Diagram (2/9)



CODE	LJ8211-001
NAME	B512050CIR (2/9)

Main PCB Circuit Diagram (3/9)



100 x 32

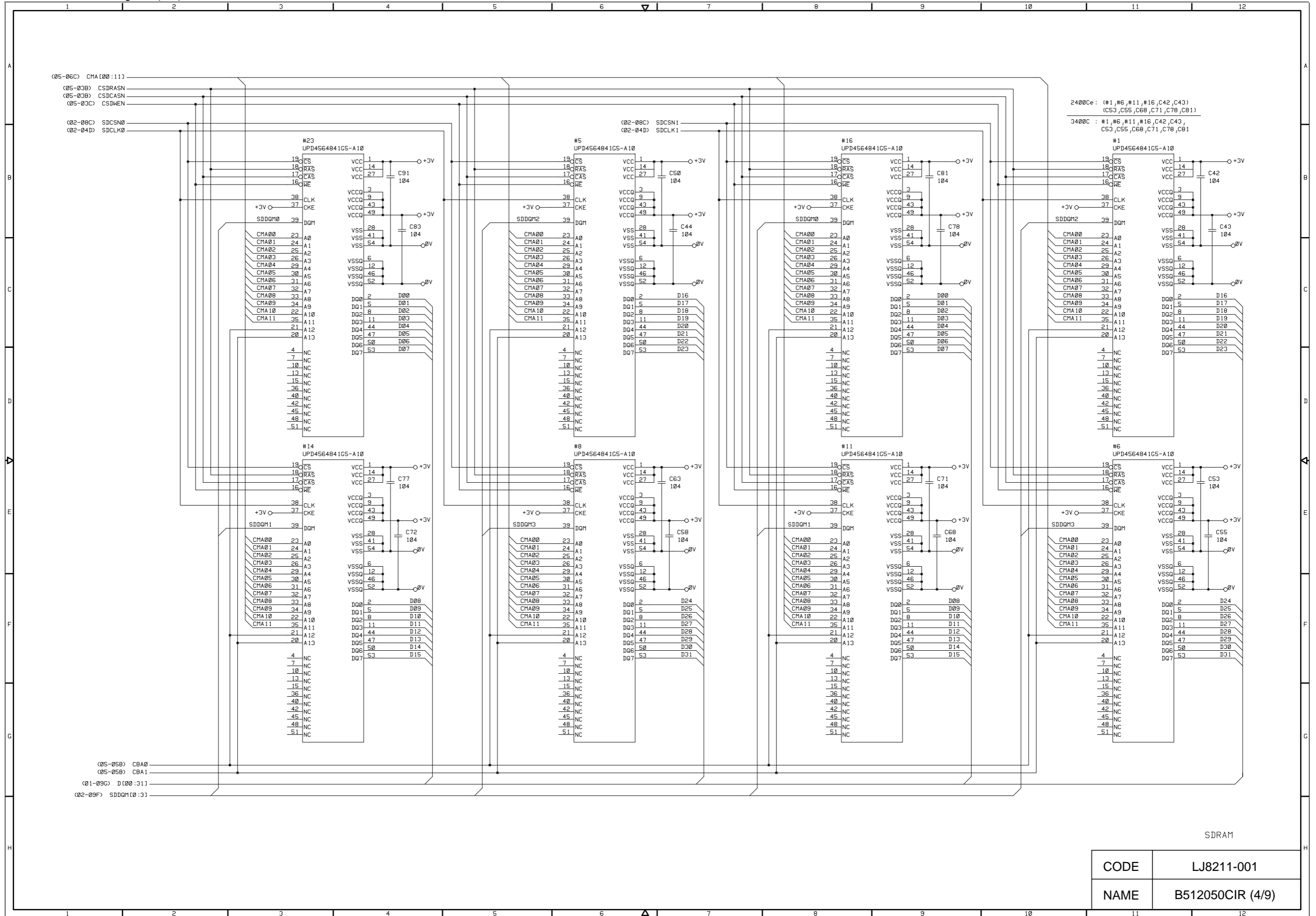
	32M MASK	16M Flash	16M MASK
NC (1pin)	x	o	x
A20 (44pin)	o	x	x

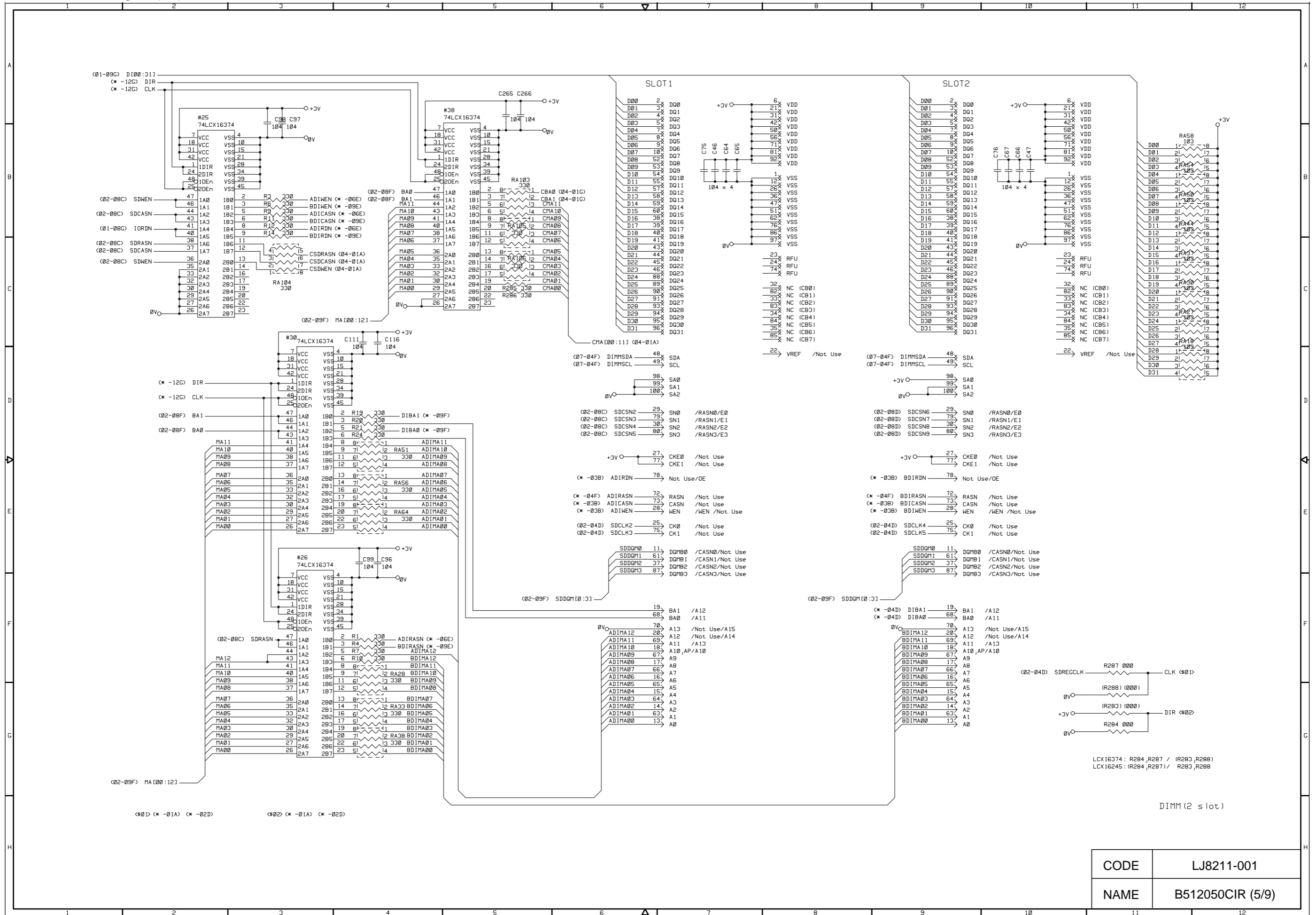
	32M Flash	16M Flash	8M Flash
A19 (9pin)	o	o	x
A20 (10pin)	o	x	x
WP#/ACC (14pin)			

MASK ROM ,FLAH MEMORY

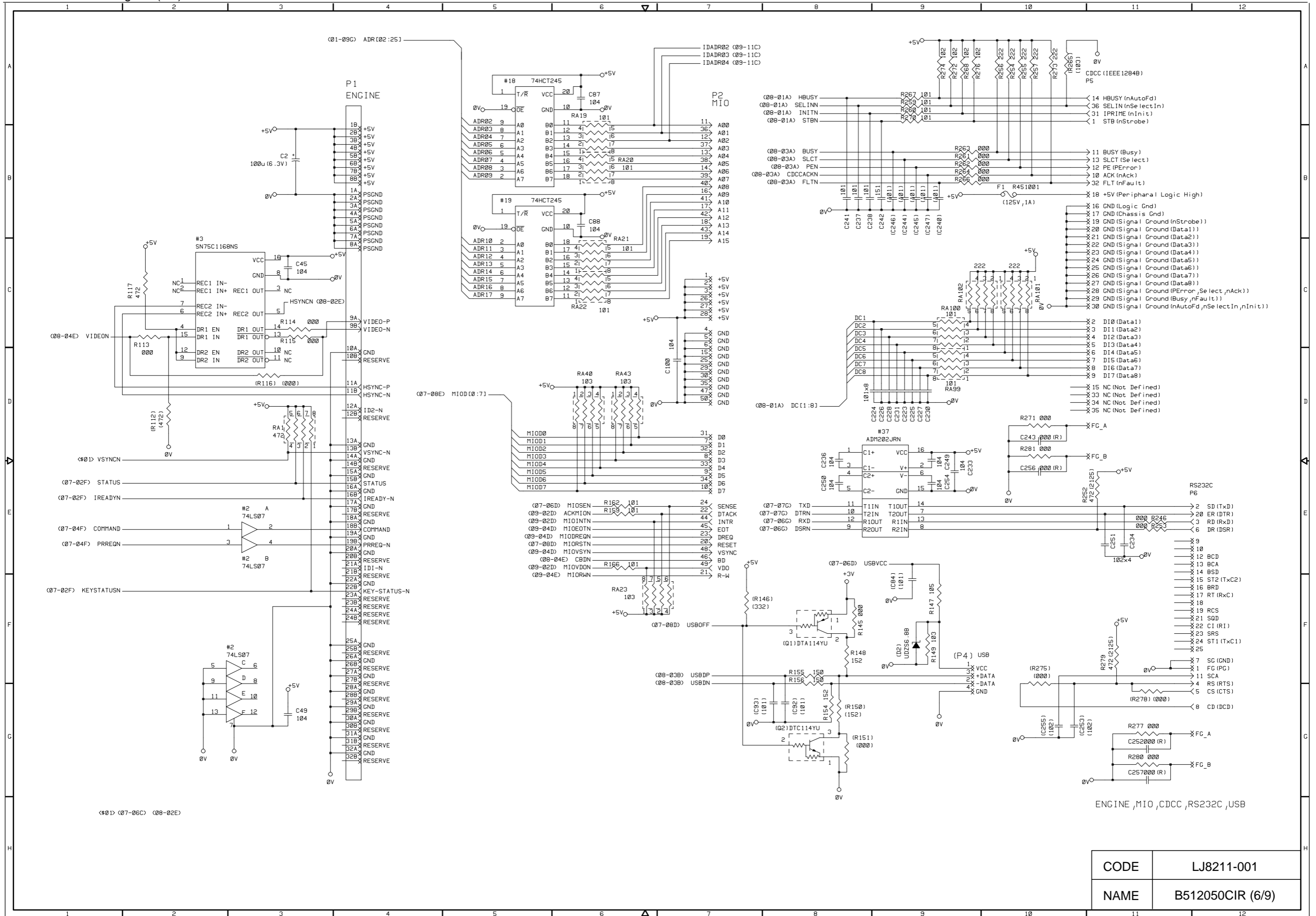
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NAME	B512050CIR (3/9)

Main PCB Circuit Diagram (4/9)



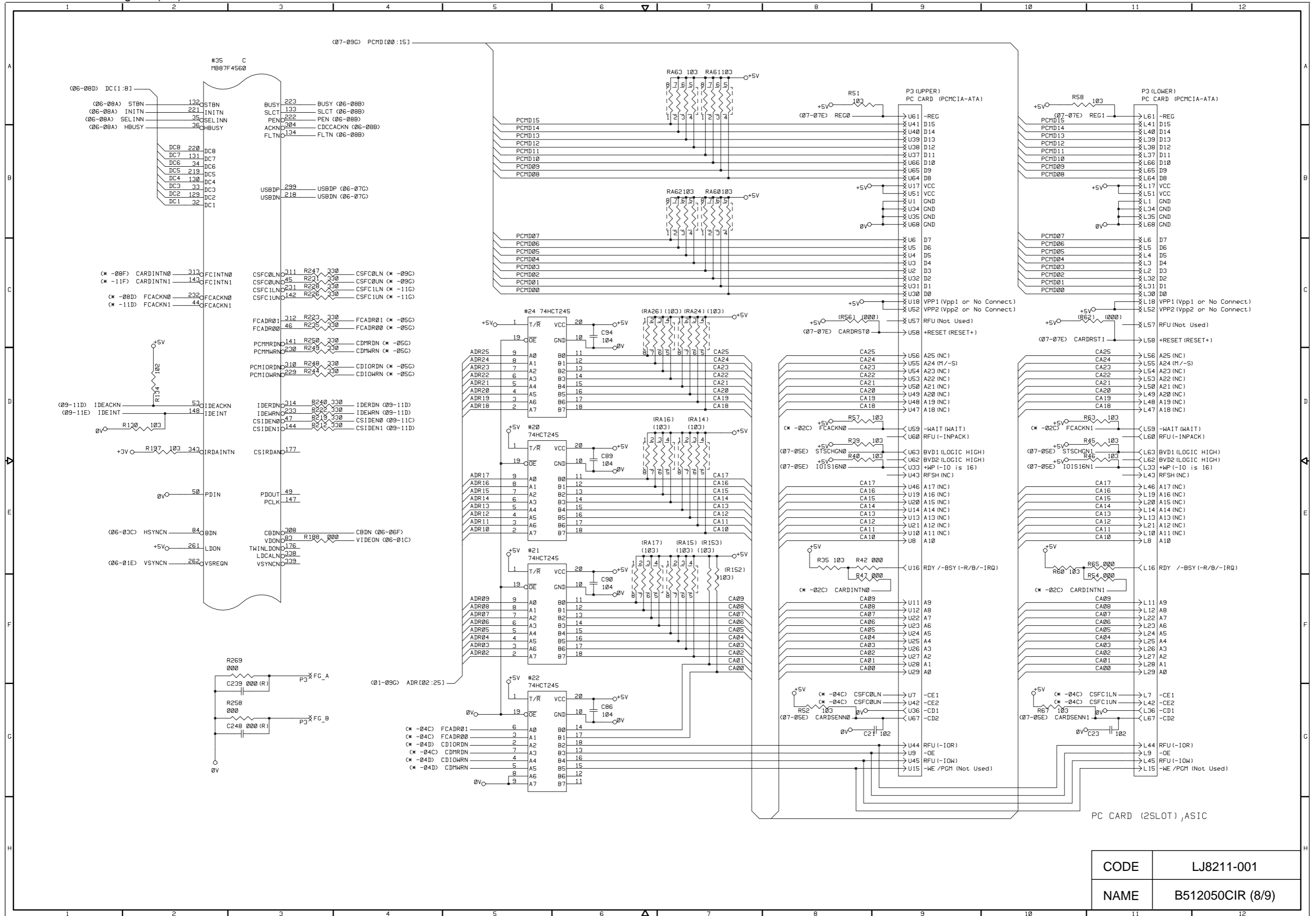


Main PCB Circuit Diagram (6/9)

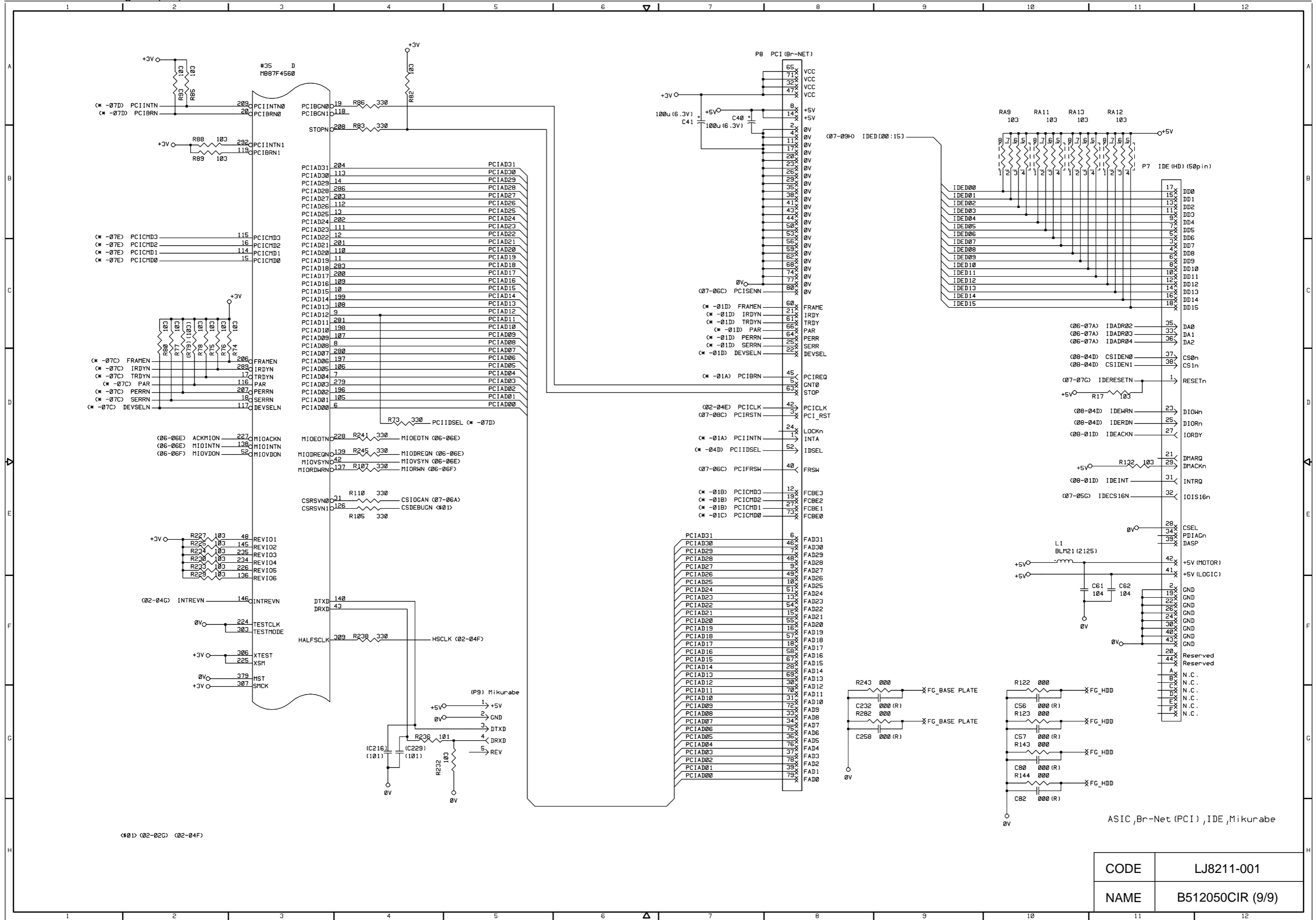


CODE	LJ8211-001
NAME	B512050CIR (6/9)

Main PCB Circuit Diagram (8/9)



Main PCB Circuit Diagram (9/9)



CODE	LJ8211-001
NAME	B512050CIR (9/9)

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	120V, 8A	For connection of the fuser heater (HP).
HN	220V, 5A	For connection of the fuser heater (HN).

(2) Layout of Connector Pin Assignment

See [Fig.4-40](#) on the following page.

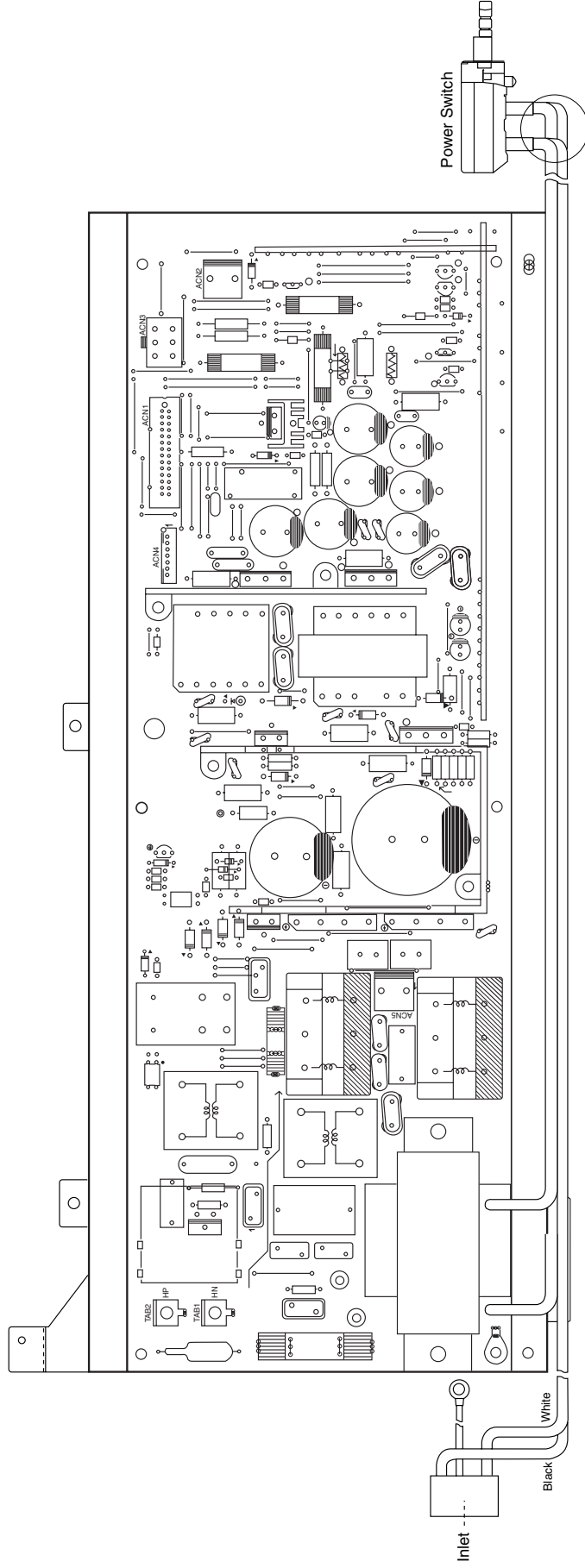


Fig. 4-40

(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)

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)

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: 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.4-41 below;

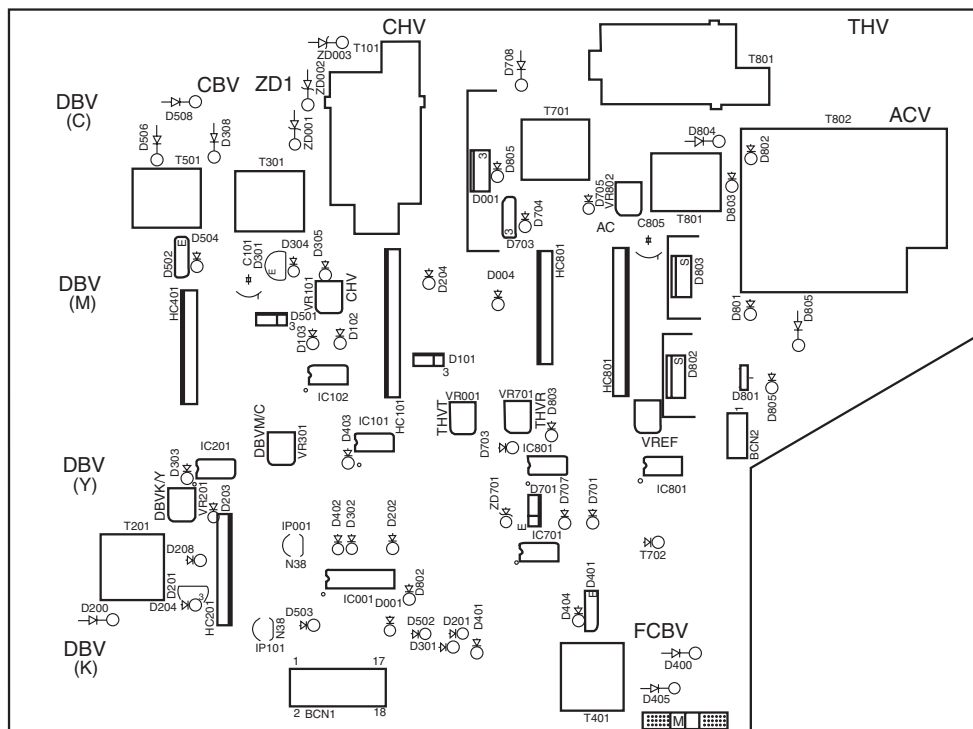


Fig. 4-41

(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

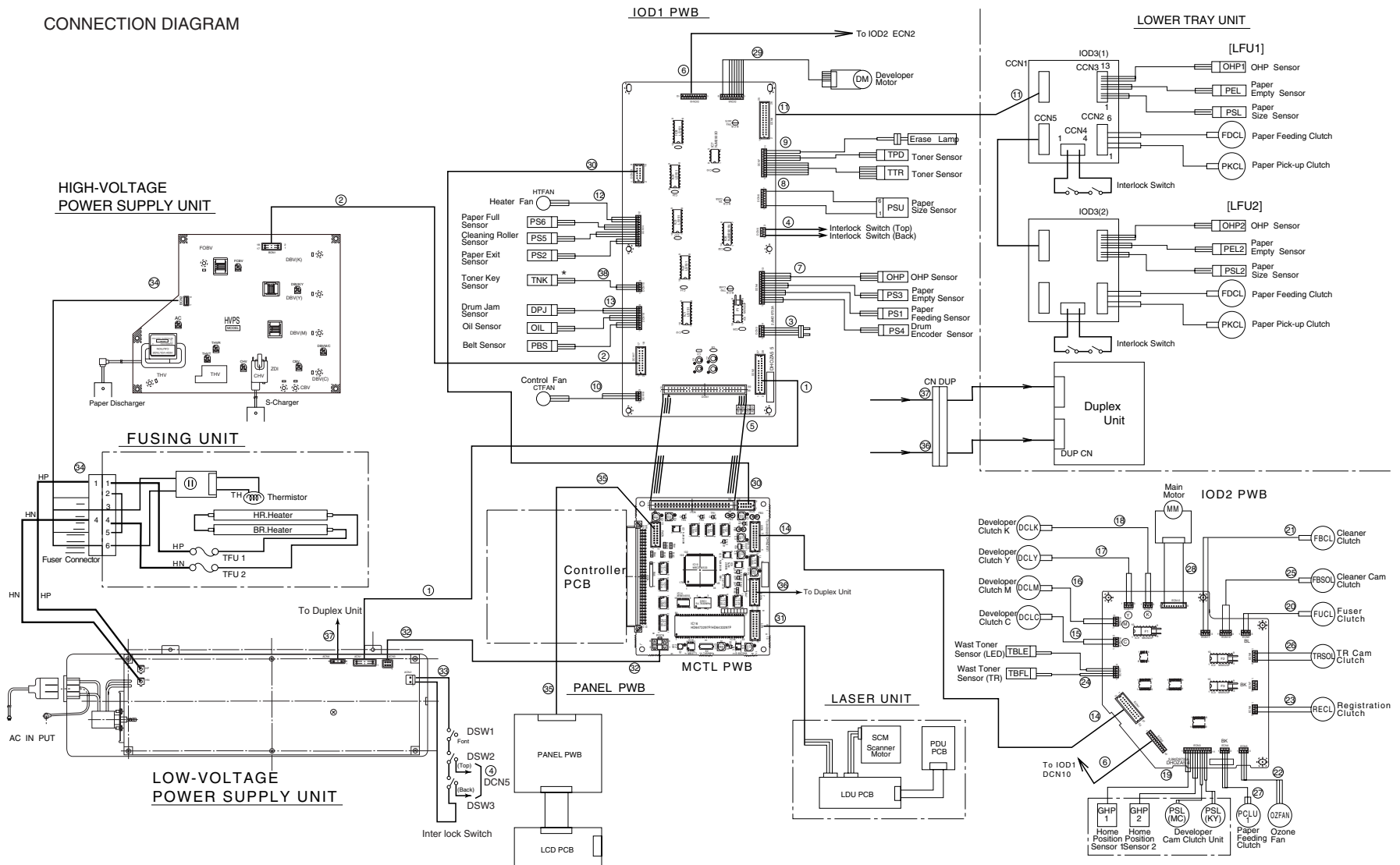


Fig. 4-42

(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
Laser Unit	Laser 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(REV11)	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(REV12)
6	TMSOLERR
7	SOUT2(REVO1)
8	DCOFF2-N(REVO2)
9	FDCLL1ON-P(REVO3)
10	FDCLL2ON-P(REVO4)

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

CHAPTER 5
CONTROL PANEL
OPERATION

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CHAPTER 5 CONTROL PANEL OPERATION

1. PANEL LAYOUT

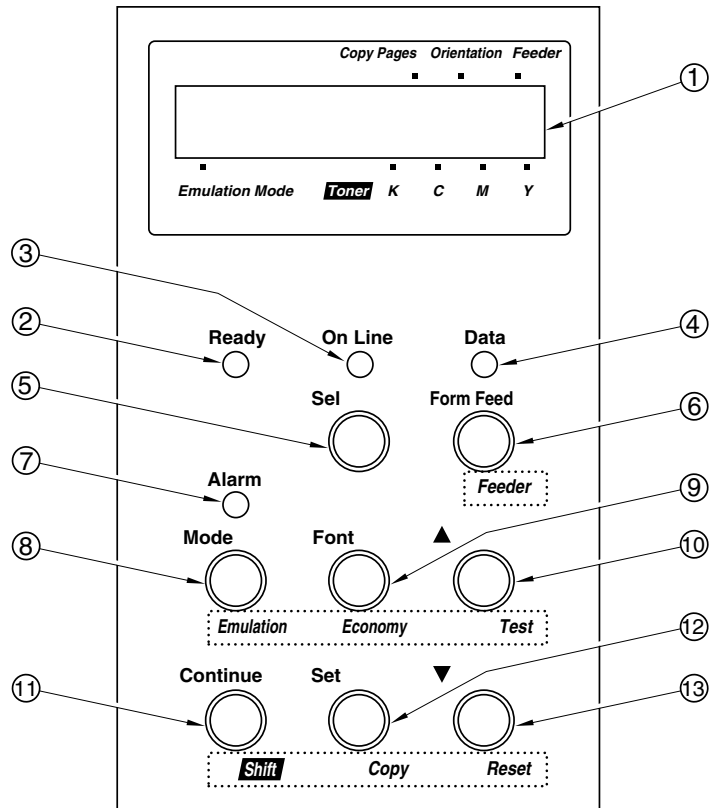


Fig. 5-1

No.	LED / Button Name
1	LCD: 16 character by 2 lines
2	Ready LED
3	On Line LED
4	Data LED
5	Sel button
6	Form Feed / Feeder button
7	Alarm LED
8	Mode / Emulation button
9	Font / Economy button
10	▲ / Test button
11	Continue / Shift button
12	Set / Copy button
13	▼ / Reset button

2. VIDEO CONTROLLER MODE

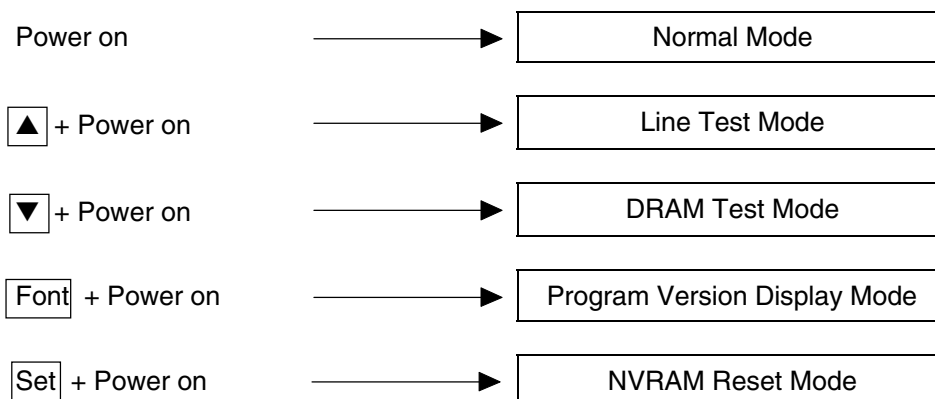
This section describes the operation and maintenance functions in the Video Controller Mode.

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 the memory and any installed DIMM(s) on the main (video controller) PCB.
- (4) Program Version Display Mode: This mode displays the firmware version of the video controller and engine controller.
- (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



2.2 Toner Save Mode / Power Save Mode

The toner save mode allows you to reduce the printer running cost and improve the life expectancy of the toner cartridge.

The power save mode allows you to save electricity when the printer is on but not being used.

<Procedure>

- (1) Turn on the printer to enter normal mode.
- (2) Press the **Shift** and **Economy** buttons at the same time.
- (3) The display shows the menu as follows;

ECONOMY
TONER SAVE MODE

- (4) Select the toner save mode or the power save mode using the scroll buttons or by pressing the **Shift** and **Economy** buttons again. Then, press the **Set** button.
- (5) Select the setting (ON/OFF) with the scroll buttons, then press the **Set** button.
- (6) When turning on the power save mode, the display shows the next sub-setting menu as follows;

POWER SAVE=ON
TIME OUT=30m

- (7) You need to set the time out from 1 to 99 minutes with the scroll buttons. (The factory setting is 30 minutes.)

NOTE:

The time out is the duration after which the fusing unit of the print engine is turned off to save power.

2.3 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 CARD1 R/W TEST	Check/delete/import/export (read/write) on Card 1 ID.
FLASH CARD2 R/W TEST	Check/delete/import/export (read/write) on Card 2 ID.
MIO TEST	Checks that the installed MIO card is initialized.

<Procedure>

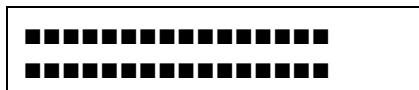
NOTE:

*If any errors occur during the following procedures, an error message appears. By pressing the **Continue** button, it is possible to proceed with the tests.*

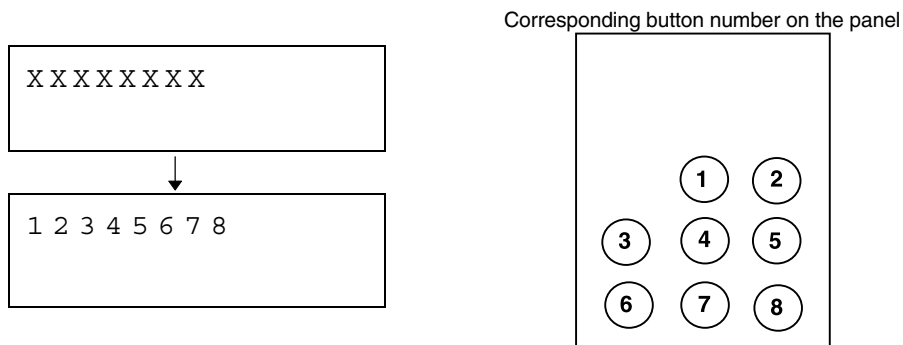
- (8) Install flash memory cards 1 & 2 and an MIO card into the printer.
- (9) Turn on the power while holding down the ▲ button. When the message below appears, release the ▲ button.



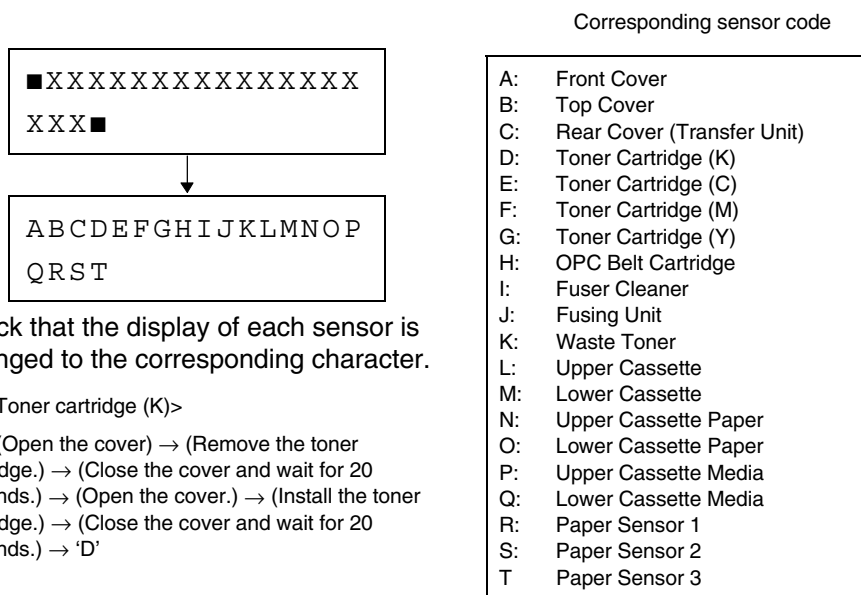
- (3) Press the **Set** button to make the printer start the self-test.
- (4) Press the **Continue** button to implement the LCD TEST. Check that the LCDs are all displayed correctly and none of the dots have dropped out. Also, check that the LEDs are all on.



- (5) Press the **Continue** button to implement SW TEST. The LEDs are all off, and then the following display appears. Check that the corresponding number appears when pressing the buttons on the control panel.



- (6) Press the **Continue** button to implement the SENSOR TEST. The LEDs are all off, then the following display appears.



Check that the display of each sensor is changed to the corresponding character.

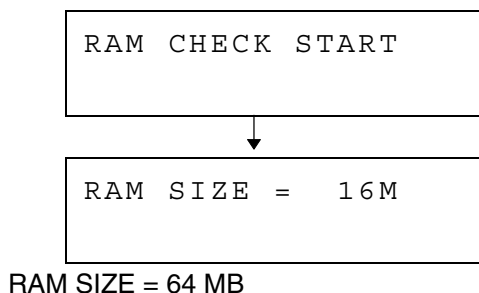
<Ex. Toner cartridge (K)>

■ → (Open the cover) → (Remove the toner cartridge.) → (Close the cover and wait for 20 seconds.) → (Open the cover.) → (Install the toner cartridge.) → (Close the cover and wait for 20 seconds.) → 'D'

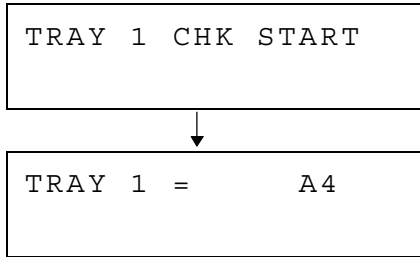
NOTE:

- Since the sensors respond only when the cover is closed, be sure to close the cover before re-installing any items.
- The sensors tests, especially the OPC test, require time to respond on the LCD panel. Operate a sensor in one sense for at least 20 seconds before restoring it to the original condition for reliable operation of these tests.

- (7) Press the **Continue** button to implement the RAM SIZE CHECK. The RAM size installed into the printer is displayed as follows;

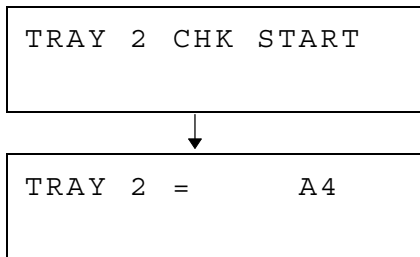


- (8) Press the **Continue** button to implement the TRAY 1 CHECK.
The paper size of the installed cassette is displayed.



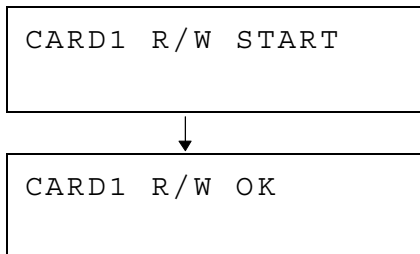
TRAY 1 = A4: A4 size cassette is installed.
TRAY 1 = LETTER: Letter size cassette is installed.
TRAY 1 = NO: The upper cassette is not installed.
TRAY 1 = SIZE ERR: The paper size is other than A4 or Letter size.

- (9) Press the **Continue** button to implement the TRAY 2 CHECK.



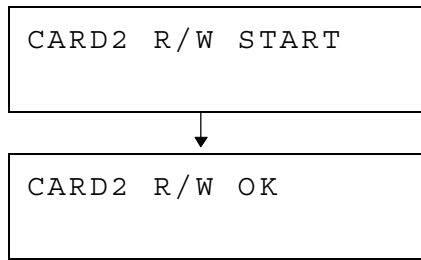
TRAY 2 = A4: A4 size cassette is installed.
TRAY 2 = LETTER: Letter size cassette is installed.
TRAY 2 = NO: The lower cassette is not installed.
TRAY 2 = SIZE ERR: The paper size is other than A4 or Letter size.

- (10) Press the **Continue** button to implement the FLASH CARD1 R/W TEST.



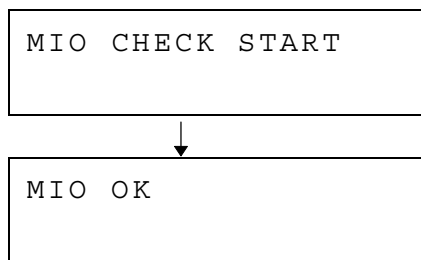
CARD1 R/W OK: The flash memory card works correctly.
CARD1 R/W ERROR: The flash memory card has a problem.
NO FLASH CARD1: The flash memory card is not installed.
WP FLASH CARD1: The write protect switch on the flash memory card is On.

(11) Press the **Continue** button to implement FLASH CARD2 R/W TEST.



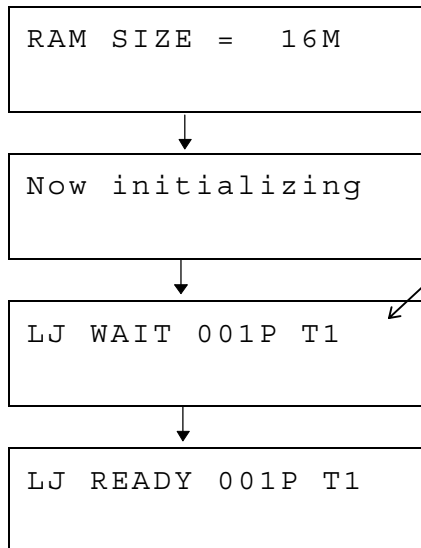
CARD2 R/W OK: The flash memory card works correctly.
 CARD2 R/W ERROR: The flash memory card has a problem.
 NO FLASH CARD2: The flash memory card is not installed.
 WP FLASH CARD2: The write protect switch on the flash memory card is On.

(12) Press the **Continue** button to implement the MIO CHECK.



MIO OK: The MIO card works correctly.
 MIO ERROR: The MIO card has a problem.
 NO MIO BOARD: The MIO card is not installed.

(13) Press the **Continue** button to exit the Line Test Mode. The printer is reset as follows;



When this messages is displayed, the printer may be turned off. However, if one of the toner cartridges is not installed or no paper is loaded, a message such as "14 NO CARTRIDGE" or "CHECK TRAY" is displayed.

(14) Turn off the power.

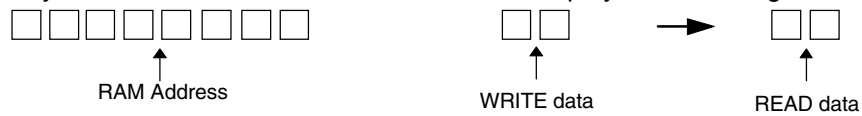
2.4 DRAM Test Mode

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

<Procedure>

To start the test program:

- (1) While holding down the ▼ button, turn on the power. “DRAM CHECK START” will be displayed. Press the **Continue** 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 **Form Feed**, **Mode** and **Continue** buttons at the same time in the off-line status.
 - 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 “START DRAM TEST”, and the **Data** LED blinks (Return to (2)).
- (6) If a DIMM has an error, replace the DIMM corresponding to the above memory map information.

If the DRAM on the main PCB has an error, replace referring to the table below;

Lower order address (where an error occurs)	DRAM chip to be replaced	
	*A	*B
0, 4, 8, C	#8	#6
1, 5, 9, D	#5	#1
2, 6, A, E	#14	#11
3, 7, B, F	#123	#16

Address

A: 2000-0000 ~ 27FF-FFFF B: 2800-0000 ~ 2FFF-FFFF

*A: If the upper digit of the data is wrong.

*B: If the lower digit of the data is wrong.

***NOTE:**

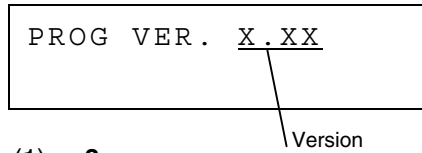
- There may be a case where the above sequence does not work correctly due to complete RAM failure, or in faulty assembly such as a solder bridge or ineffective soldering etc.

2.5 Program Version Display Mode

This mode displays the firmware version of the controllers.

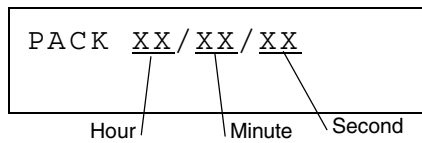
<Procedure>

- 1 While holding down the **Font** button, turn on the power.
- 2 Hold down the **Font** button until Version of the program is displayed.

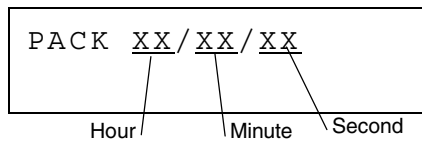


Executable either from (1) or 3.

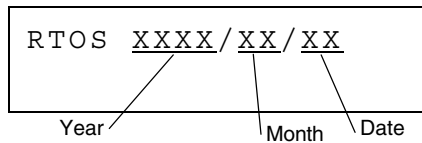
- (1) Press the **Set** button. Year/Month/Date of the program is displayed.



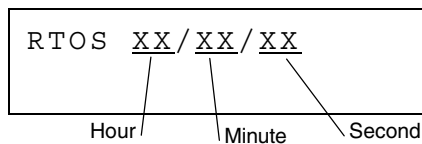
- (2) Press the **Continue** button. Hour/Minute/Second of the program is displayed.



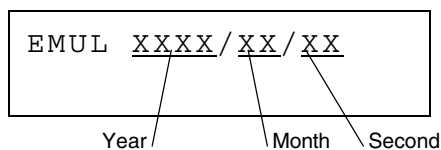
- (3) Press the **Continue** button. Year/Month/Date of the real time OS is displayed.



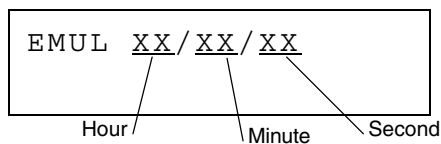
- (4) Press the **Continue** button. Hour/Minute/Second of the real time OS is displayed.



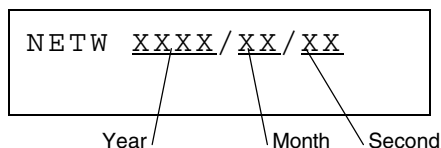
- (5) Press the **Continue** button. Year/Month/Date of the emulation is displayed.



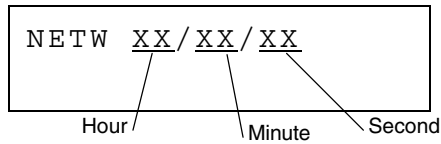
- (6) Press the **Continue** button. Hour/Minute/Second of the emulation is displayed.



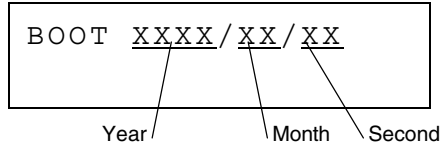
- (7) *Press the **Continue** button. Year/Month/Date of the network is displayed.



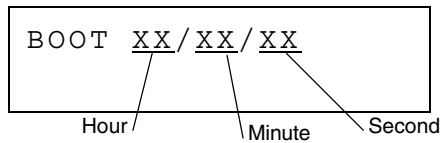
(8) *Press the **Continue** button. Hour/Minute/Second of the network is displayed.



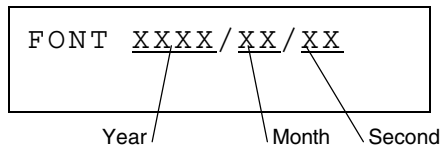
(9) Press the **Continue** button. Year/Month/Date of the boot is displayed.



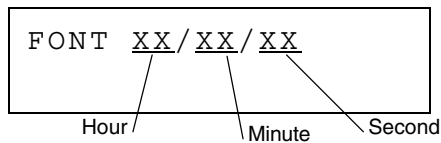
(10) Press the **Continue** button. Hour/Minute/Second of the boot is displayed.



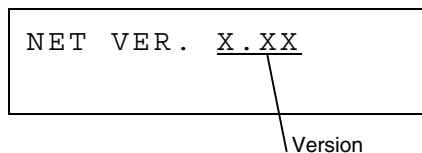
(11) Press the **Continue** button. Year/Month/Date of the font is displayed.



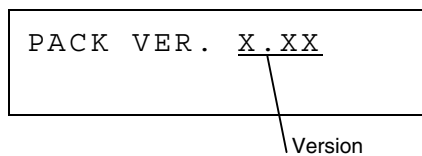
(12) Press the **Continue** button. Hour/Minute/Second of the font is displayed.



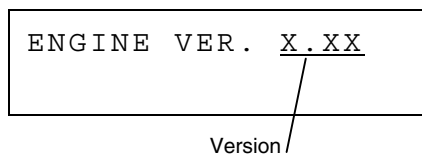
3 *Press the **Continue** button. Version of the network is displayed.



4 Press the **Set** button. Version of the program is displayed.



5 Press the **Continue** button. Version of the engine firmware is displayed.



6 Press the **Continue** button one more time to return to On-line mode.

*Network is displayed when NC-3100C is installed.

2.6 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 momentarily.
- (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 Mode, Set and ▼ 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 **On Line** 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:

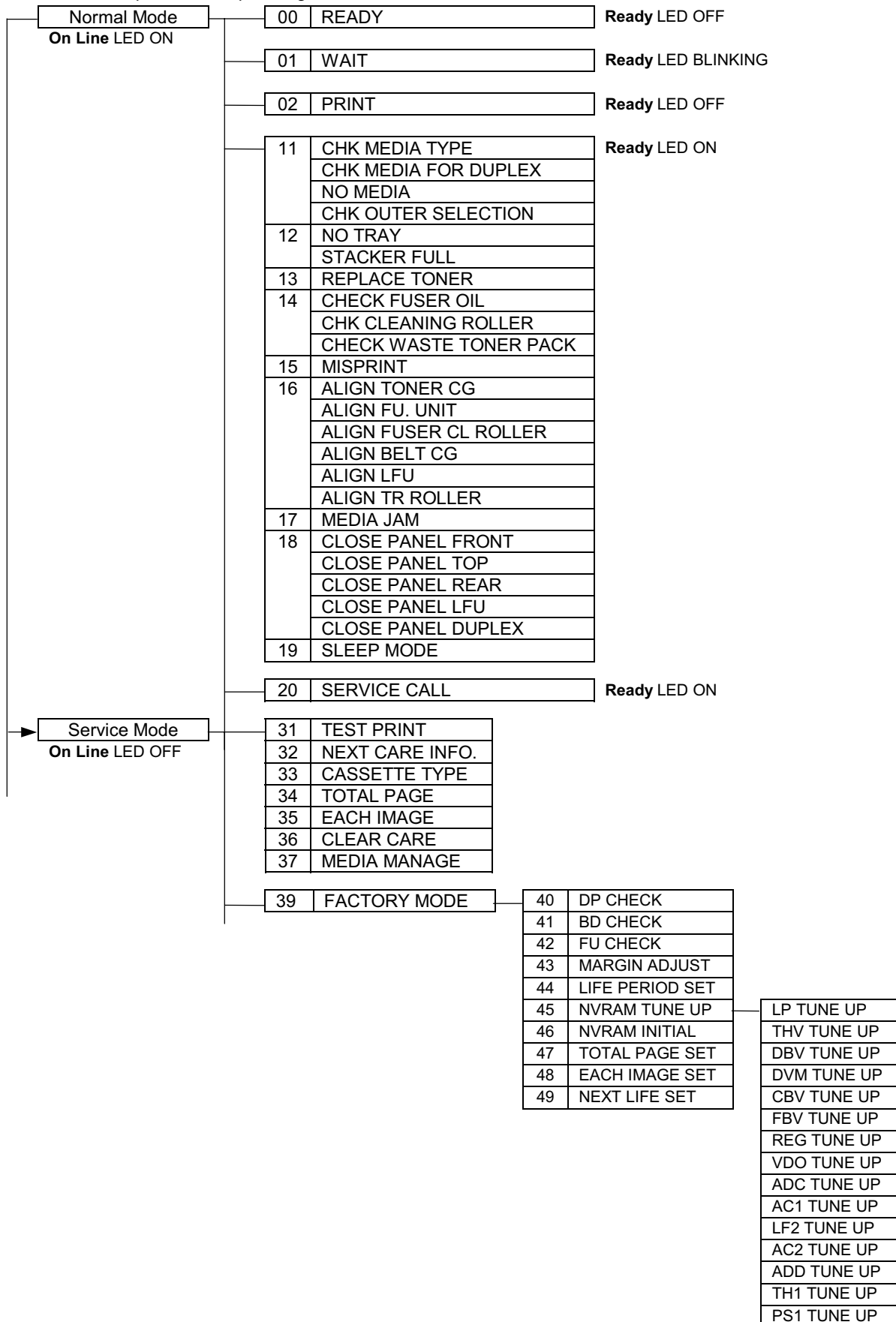
Be sure to remove the main controller PCB before the printer goes into the Engine Normal Mode. If you fail to do so, the printer goes into sleep mode.

- (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

Turn on the printer while pressing the **Mode**, **Set** and **▼** buttons.



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 **Mode**, **Set** and ▼ buttons. Refer to [Fig.5-1](#).
- (2) Press the **On Line** button so that the printer is on-line and the **Ready** LED starts to flash.
- (3) The **Ready** 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	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> 00 READY [*1] [*2] [*4] </div>	<ul style="list-style-type: none"> • The Ready LED is lit. • The engine has completed the warming-up process and is now ready to print. <p>[*1]: Applicable paper feeder is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2)</p> <p>[*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).</p> <p>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</p> <p>[*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.</p>
01	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> 01 WAIT [*1] [*2] [*4] </div>	<ul style="list-style-type: none"> • The Ready 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	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> 02 PRINT [*5] [*1] [*2] [*4] </div>	<ul style="list-style-type: none"> • The Ready 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. <p>[*5]: Print color is indicated as follows; Y: Yellow M: Magenta C: Cyan K: Black YM: Yellow & Magenta YMCK Full Color</p>

Code No.	LCD Message	Description of Message
11-1	<p>CHECK MEDIA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 11 CHK MEDIA [*1] TYPE [*4] </div> <p>NO MEDIA UPP/LOW CHK MEDIA TYPE UPP/LOW CHK OUTER SELECTION CHK MEDIA FOR DUPLEX</p>	<ul style="list-style-type: none"> The engine is idling. The Ready LED is lit. <p>[*1]: Applicable paper feeder is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2)</p> <ul style="list-style-type: none"> Confirm whether the applicable paper cassette is loaded with paper. Press the Form Feed button if the media needs to be changed.
11-2	<p>NO MEDIA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 11 NO MEDIA [*1] [*4] </div>	<ul style="list-style-type: none"> The engine is idling. The Ready LED is lit. <p>[*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2)</p> <ul style="list-style-type: none"> Replenish the empty cassette with paper.
11-3	<p>CHECK MEDIA FOR DUPLEX</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 11 CHK MEDIA [*1] FOR DUPLEX [*4] </div>	<ul style="list-style-type: none"> The engine is idling. The Ready LED is lit. <p>[*1]: Applicable paper feeder paper empty condition is indicated as follows; /UPP: Upper cassette /LOW: Lower cassette /DPL: Duplex unit inside</p> <ul style="list-style-type: none"> Change media. Change the media selection.
11-4	<p>CHECK OUTER SELECTION</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 11 CHK OUTER [*1] SELECTION [*4] </div>	<ul style="list-style-type: none"> The engine is idling. The Ready LED is lit. <p>[*1]: Media check is indicated with the following messages for each feeder; /UPP: Upper cassette /LOW: Lower cassette</p> <ul style="list-style-type: none"> Confirm the media cassette / paper exit tray and reset the settings properly.
12-1	<p>NO TRAY UPP/LOW</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 12 NO TRAY [*1] [*4] </div>	<ul style="list-style-type: none"> The engine is idling. The Ready LED is lit. <p>[*1]: Paper feeder without the paper cassette is indicated as follows; UPPER: Upper cassette /LF1: Lower cassette (1) /LF2: Lower cassette (2)</p> <ul style="list-style-type: none"> Install the applicable media cassette to the paper feeder indicated on the LCD.

Code No.	LCD Message	Description of Message
12-2	<p>STACKER FULL</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>12 STACKER FULL [*4]</p> </div>	<ul style="list-style-type: none"> The engine is ready to print. The Ready LED is lit. Remove the paper on the stacker (paper exit tray), then press the Font button..
13	<p>REPLACE TONER</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>13 REPLACE [*5] TONER [*4]</p> </div> <p>Display of [4]: C:YT Y toner cartridge C:CT: C toner cartridge C:MT M toner cartridge C:KT K toner cartridge</p>	<ul style="list-style-type: none"> The engine is ready to print. The Ready LED is lit. <p>[*5]: The toner empty condition is indicated by the color code as follows;</p> <p>Y: Yellow M: Magenta C: Cyan K: Black</p> <ul style="list-style-type: none"> Replace the indicated toner cartridge with a new one of the correct color.
14-1	<p>CHECK FUSER OIL</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>14 CHECK FUSER OIL[*F0]</p> </div>	<ul style="list-style-type: none"> The engine is idling. The Ready 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	<p>CHECK CLEANING ROLLER</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>14 CHECK CLEANING ROLLER[*4] [*FC]</p> </div>	<ul style="list-style-type: none"> The engine is idling. The Ready 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	<p>CHECK WASTE TONER PACK</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>14 CHECK WASTE TONER PACK[*4]</p> </div>	<ul style="list-style-type: none"> The engine is idling. The Ready 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 Font button.

Code No.	LCD Message	Description of Message
<p>15</p>	<p>MISPRINT</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>15 MISPRINT [*6] [*4]</p> </div>	<ul style="list-style-type: none"> • The engine is idling. • The Ready LED is lit. <p>[*6] The type of misprint error is indicated as follows;</p> <p>NOPQR: No PRREQ-N signal is available.</p> <p>PAPER: No paper is available in the feeder while executing the print operation after receipt of the print command.</p> <p>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.</p> <ul style="list-style-type: none"> • This message can be cleared by pressing the Font button.
<p>16-1</p>	<p>ALIGN FU UNIT</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>16 ALIGN FU.UNIT [*4]</p> </div>	<ul style="list-style-type: none"> • The engine is stopped. • The Ready 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 Font button.
<p>16-2</p>	<p>ALIGN FUSER CL ROLLER</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>16 ALIGN FUSER CL ROLLER [*4]</p> </div>	<ul style="list-style-type: none"> • The engine is idling. • The Ready 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 Font button.
<p>16-3</p>	<p>ALIGN TONER CG</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>16 ALIGN [*5] TONER CG [*4]</p> </div>	<ul style="list-style-type: none"> • The engine is ready to print. • The Ready LED is lit. <p>[*5]: The color of the incorrectly installed toner cartridge will be indicated as follows;</p> <p>Y: Yellow M: Magenta C: Cyan K: Black</p> <ul style="list-style-type: none"> • 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 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 16 ALIGN BELT CG [*4] </div>	<ul style="list-style-type: none"> The engine is stopped. The Ready 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 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 16 ALIGN LFU [*4] </div>	<ul style="list-style-type: none"> 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 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 16 ALIGN BELT CG [*4] </div>	<ul style="list-style-type: none"> The engine is ready to print. The Ready 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 <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 17 MEDIA JAM [*7] [*4] </div>	<ul style="list-style-type: none"> The engine is stopped. The Ready LED is lit. <p>[*7]: The kind of jam (location of jam) is indicated as follows;</p> <p>FEED: Paper feeder INNER: Inside of the printer OUTER: Paper exit unit DRUM: Transfer drum DPL: Inside the duplex unit</p> <ul style="list-style-type: none"> This message can be cleared by pressing the Font button after opening & closing the front cover, back cover and paper exit cover.
18	CLOSE PANEL <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 18 CLOSE PANEL [*8] [*4] </div>	<ul style="list-style-type: none"> The engine is ready to print. The Ready LED is lit. <p>[*8]: The open cover is indicated as follows;</p> <p>FRONT: Front cover TOP: Paper exit cover REAR: Rear access cover DPL: Rear access cover LFU: Fusing unit cover</p> <ul style="list-style-type: none"> This message can be cleared by opening & closing the indicated cover.

Code No.	LCD Message	Description of Message
19	<p>SLEEP MODE</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 19 SLEEP MODE [*4] </div>	<ul style="list-style-type: none"> • The engine is idling. • The Ready 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	<p>SERVICE CALL</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 20 SERVICE CALL [*9] </div>	<ul style="list-style-type: none"> • The engine is stopped. • The Ready LED is lit. <p>[*9]: Service Call error code is indicated as follows; For the details of error codes, refer to Chapter 8 “Troubleshooting” in this manual.</p>

3.3 Service Mode

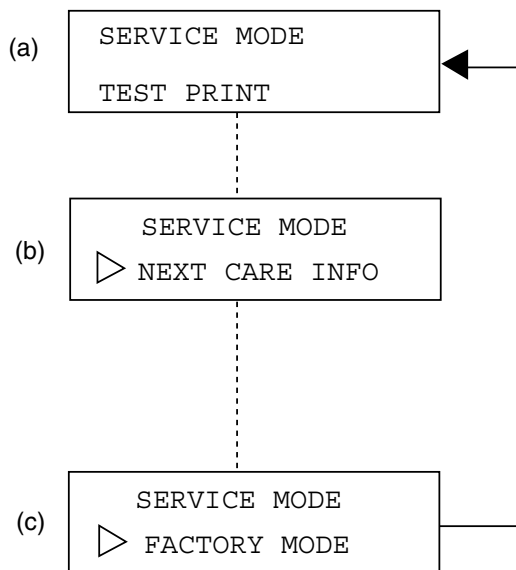
Service Mode is a unique mode for the maintenance of the printer only, without the video controller card. In this mode, you can check the operation status of the printer engine Off-line and also carry out maintenance work for each of the printer components.

Procedure

- (8) Hold down the **Mode**, **Set** and **▼** buttons and turn the printer Power on.
- (9) Using the **Font**, **Continue**, **Set** and **▼** buttons, select the mode necessary for the maintenance work from the test list shown in [Table 5-2](#).

How to designate the necessary mode

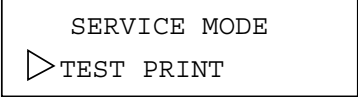
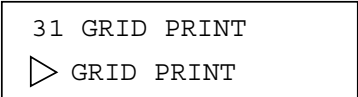
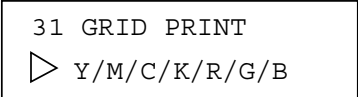
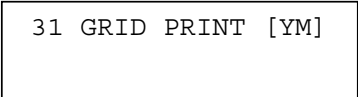
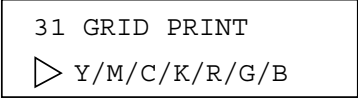
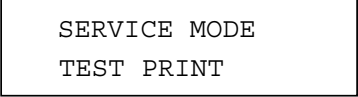
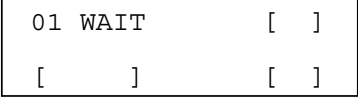
- (8) Press the **Set** or **▼** button so that service modes (a), (b) and (c) show up in sequence to be selected.
- (9) After selecting the desired mode, execute the selected mode by pressing the **Continue** button.
- (10) Press the **Font** button to exit the mode.



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

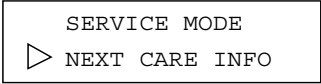
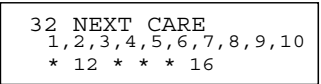
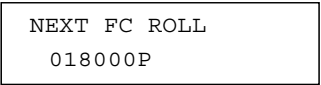
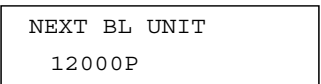
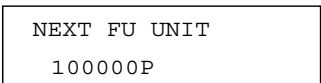
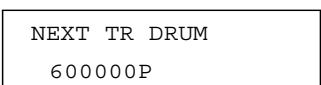
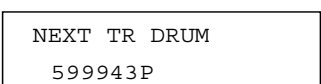
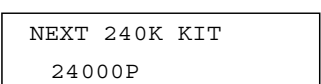
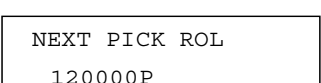
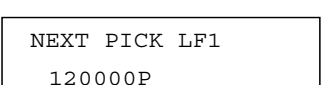
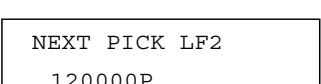

Procedure

Description of Procedures	LCD Message
1) Press the Continue button. (a) → (b)	a) 
2) Using the Set or ▼ button, select the desired pattern (ex. grid pattern), and then press the Continue button. b) → (c)	b) 
3) Using the Set or ▼ button, select the desired color (ex. red color), and then, press the Continue button. (c) → (d)	c) 
4) After completion of the warming-up process, the desired pattern of the selected color will be continuously printed. (d)	R:YM G:YC B:MC
5) Print operation is suspended by pressing the Font button. (d) → (e)	d) 
If it is desired to return to the previous screen (message), press the Font button one more time. (e) → (d)	e) 
6) If it is desired to return to On-line mode, press the Sel button. (f) → (g)	f) 
	g) 

32	NEXT CARE INFORMATION
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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
<p>1) Press the Continue button after selecting Screen (a) "NEXT CARE INFO". (a) → (b)</p> <p>2) Using the Set or ▼ 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)</p> <p>3) After selecting the code, press the Continue button. Then, the number of images or printouts corresponding to the selected code is displayed. (b) → (c) through (l)</p> <p>4) Screen (c) through (l) can be cleared by pressing the Font button. (c) through (l) → (b) Press the Font button one more time at screen (b) to return to the service mode. (b) → (a)</p> <p>* The Oil Pad change message can be changed to ON or OFF as follows:</p> <ol style="list-style-type: none"> 1. Enter the hidden menu mode as follows: Press the Form Feed, Mode and Continue 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 	<p>a) </p> <p>b) </p> <p>c) </p> <p>d) </p> <p>e) </p> <p>f) </p> <p>g) </p> <p>h) </p> <p>i) </p> <p>j) </p> <p>k) </p> <p>l) </p>

33	CASSETTE TYPE
----	---------------

The type of paper feeding cassette can be selected.

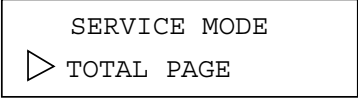
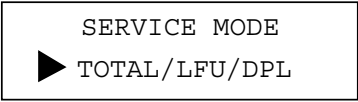
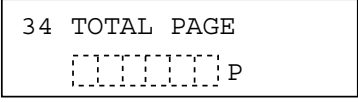
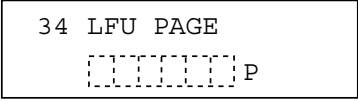
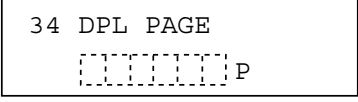
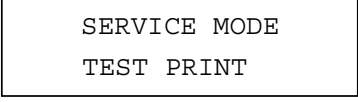
Procedure

Description of Procedures	LCD Message		
1) Press the Continue button after selecting Screen (a) "CASSETTE TYPE". (a) → (b)	a) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>SERVICE MODE</td> </tr> <tr> <td>▷ CASSETTE TYPE</td> </tr> </table>	SERVICE MODE	▷ CASSETTE TYPE
SERVICE MODE			
▷ CASSETTE TYPE			
2) Using the Set or ▼ button, select the code of the desired cassette (A, B or C), and then press the Continue button.	b) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>33 CASSETTE TYPE</td> </tr> <tr> <td>TYPE=<A / B / C></td> </tr> </table>	33 CASSETTE TYPE	TYPE=<A / B / C>
33 CASSETTE TYPE			
TYPE=<A / B / C>			
3) Press the Font button to exit the mode from screen (b). (b) → (c)	c) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>SERVICE MODE</td> </tr> <tr> <td>▷ CASSETTE TYPE</td> </tr> </table>	SERVICE MODE	▷ CASSETTE TYPE
SERVICE MODE			
▷ CASSETTE TYPE			

34	TOTAL PAGE
----	------------

The total number of printouts can be confirmed.

Procedure

Description of Procedures	LCD Message
1) Press the Continue button after selecting Screen (a) "TOTAL PAGE" mode. (a) → (b)	a) 
2) Select one type of page from among TOTAL PAGE, LFU PAGE and DPL PAGE.	b) 
3) A 6 digit number is displayed. This number represents the total number of pages that have been printed out. (c)	c) 
4) Press the Font button to exit the mode from screen (c)/(d)/(e). (c)/(d)/(e) → (f)	d) 
	e) 
	f) 

35	EACH IMAGE
----	------------

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

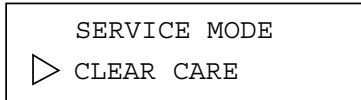
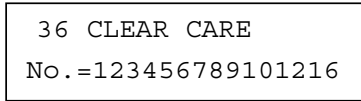
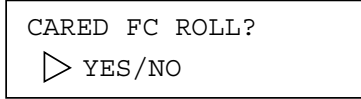
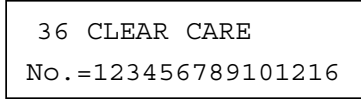
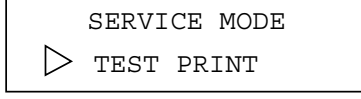
Procedure

Description of Procedures	LCD Message	
1) Press the Continue button after selecting Screen (a) "EACH IMAGE" mode. (a) → (b)	a) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">SERVICE MODE ▷ EACH IMAGE</td> </tr> </table>	SERVICE MODE ▷ EACH IMAGE
SERVICE MODE ▷ EACH IMAGE		
2) Using the Set or ▼ button, select the required color and then press the Continue button. (b) → (c)	b) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">35 IMAGE OF ▷ Y/M/C/K</td> </tr> </table>	35 IMAGE OF ▷ Y/M/C/K
35 IMAGE OF ▷ Y/M/C/K		
3) The number of images created in the selected color is displayed. (Ex. Yellow) (c)	c) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">35 IMAGE OF Y 000098P</td> </tr> </table>	35 IMAGE OF Y 000098P
35 IMAGE OF Y 000098P		
4) Press the Font button to exit this mode from screen (c). (c) → (d)	d) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">35 IMAGE OF ▷ Y/M/C/K</td> </tr> </table>	35 IMAGE OF ▷ Y/M/C/K
35 IMAGE OF ▷ Y/M/C/K		
5) Using the Set or ▼ button, select another color and then press the Continue button to confirm the number of images created in that color.	e) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">SERVICE MODE ▷ TEST PRINT</td> </tr> </table>	SERVICE MODE ▷ TEST PRINT
SERVICE MODE ▷ TEST PRINT		
6) Press the Font button to return to the Service mode. (d) → (e)		

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 Continue button after selecting Screen (a) "CLEAR CARE" mode. (a) → (b)	a) 
2) Using the Set or ▼ button, move the cursor to select the applicable CARE code and then press the Continue button. (b) → (c)	b) 
3) When implementing CLEAR CARE, use the Set or ▼ button to have the cursor meet YES, then press the Continue button. (Refer to the table below.) (c) → (d)	c) 
6) Press the Font button to exit the CLEAR CARE mode. (d) → (e)	d)  e) 

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
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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			
<p>1) Press the Continue button after selecting Screen (a) "MEDIA MANAGE". (a) → (b)</p> <p>2) Select DEFIANCE and then press the Continue button if the OHP sensor signal should be ignored. (b) → (c) In normal operation, the mode is preset to MANAGE.</p>	<p>a) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">SERVICE MODE ▶ MEDIA MANAGE</td></tr></table></p> <p>b) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">37 MEDIA MANAGE ▶ MANAGE/DEFIANCE</td></tr></table></p> <p>c) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">SERVICE MODE DP CHECK</td></tr></table></p>	SERVICE MODE ▶ MEDIA MANAGE	37 MEDIA MANAGE ▶ MANAGE/DEFIANCE	SERVICE MODE DP CHECK
SERVICE MODE ▶ MEDIA MANAGE				
37 MEDIA MANAGE ▶ MANAGE/DEFIANCE				
SERVICE MODE DP CHECK				

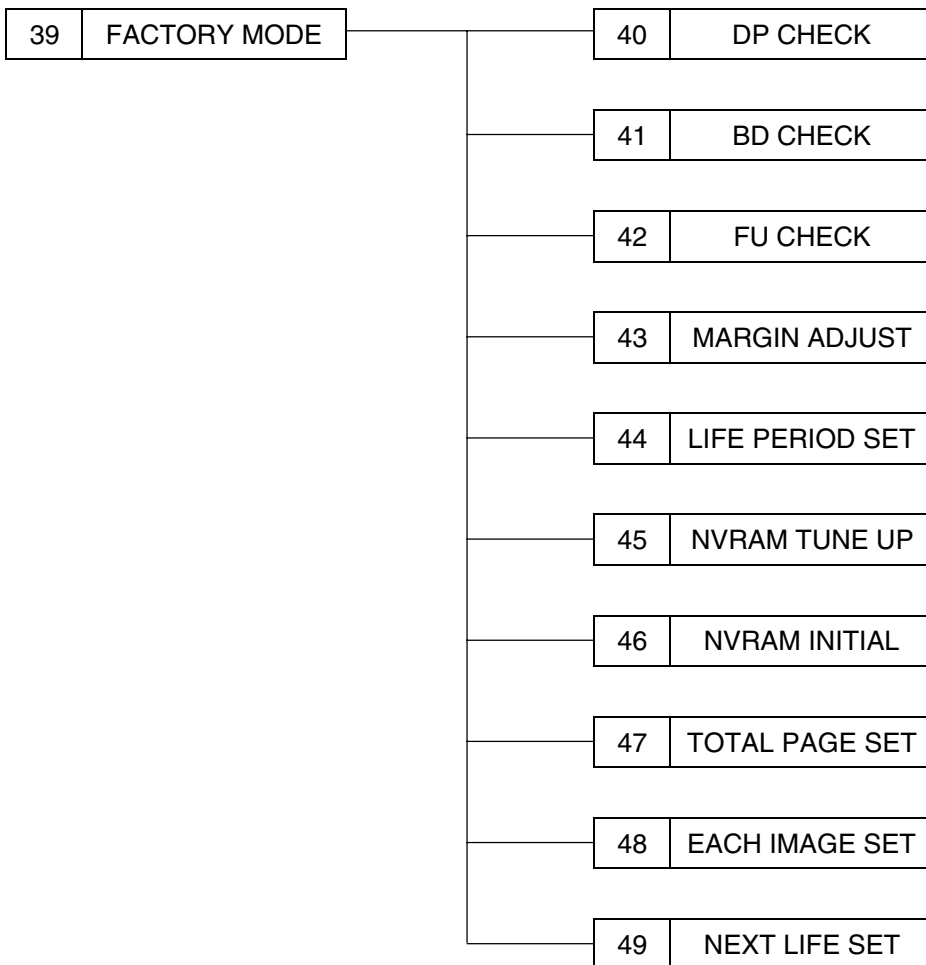
39	FACTORY MODE
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This mode consists of 9 (nine) modes for the confirmation of operation and the resetting functions necessary for maintenance work.



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
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Each individual color Toner cartridge can be driven.

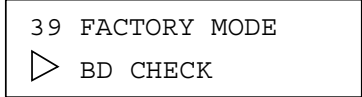


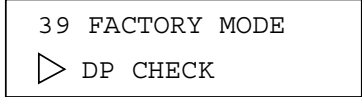
Procedure

Description of Procedures	LCD Message								
1) Press the Continue button after selecting Screen (a) "DP CHECK". (a) → (b)	a) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>39</td> <td>FACTORY MODE</td> </tr> <tr> <td>▷</td> <td>DP CHECK</td> </tr> </table>	39	FACTORY MODE	▷	DP CHECK				
39	FACTORY MODE								
▷	DP CHECK								
2) Using the Set or ▼ button, select the desired color and then press the Continue button. (b) → (c)	b) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>40</td> <td>DP CHECK</td> </tr> <tr> <td>▷</td> <td>Y/M/C/K</td> </tr> </table>	40	DP CHECK	▷	Y/M/C/K				
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) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>40</td> <td>DP CHECK Y</td> </tr> <tr> <td></td> <td>GOOD</td> </tr> </table>	40	DP CHECK Y		GOOD				
40	DP CHECK Y								
	GOOD								
4) Press the Font button to stop the DP CHECK mode. (d) Press the Font button one more time to return to screen (a). (d) → (e)	d) <table border="1" style="width: 100%; text-align: center;"> <tr> <td>40</td> <td>DP CHECK</td> </tr> <tr> <td>▷</td> <td>Y/M/C/K</td> </tr> </table> e) <table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td>FACTORY MODE</td> </tr> <tr> <td>▷</td> <td>DP CHECK</td> </tr> </table>	40	DP CHECK	▷	Y/M/C/K		FACTORY MODE	▷	DP CHECK
40	DP CHECK								
▷	Y/M/C/K								
	FACTORY MODE								
▷	DP CHECK								

41 BD CHECK

Laser beam position and laser power can be checked.

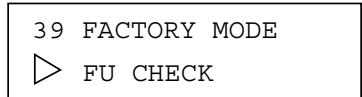
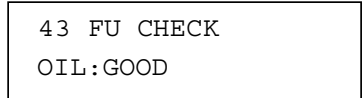
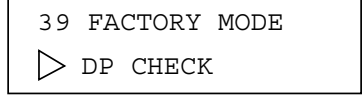
Procedure

Description of Procedures	LCD Message
1) Press the Continue button after selecting screen (a) "BD CHECK". (a) → (b)	a) 
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)	b)  c) 
3) Press the Font button to exit the BD CHECK mode. (b) → (d)	d) 

42 FU CHECK

Availability of oil in the fusing unit can be checked.

Procedure

Description of Procedures	LCD Message
1) Press the Continue button after selecting screen (a) "FU CHECK". (a)	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)	b) 
3) Press the Font button to exit the FU CHECK mode. (c)	c) 

43	MARGIN ADJUST
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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	
<p>1) Press the Continue button after selecting Screen (a) "MARGIN ADJUST". (a) → (b)</p>	<p>a) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">39 FACTORY MODE ▷ MARGIN ADJUST</td></tr></table></p>	39 FACTORY MODE ▷ MARGIN ADJUST
39 FACTORY MODE ▷ MARGIN ADJUST		
<p>2) Using the Set or ▼ button, select one of TOP, LEFT, LEFT1, LEFT2, LEFT3 and then press the Continue button. (b) → (c)</p> <p>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.</p>	<p>b) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3</td></tr></table></p>	43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3
43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3		
	<p>c) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">43 TOP -2.0mm -<765432101>+</td></tr></table></p>	43 TOP -2.0mm -<765432101>+
43 TOP -2.0mm -<765432101>+		
	<p>d) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">43 TOP +2.5mm -<101234567>+</td></tr></table></p>	43 TOP +2.5mm -<101234567>+
43 TOP +2.5mm -<101234567>+		
<p>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 Set or ▼ 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 Continue button to set the adjustment.</p>	<p>e) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3</td></tr></table></p>	43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3
43 MARGIN ADJUST ▷ TOP/LEFT/LEFT1/LEFT2/LEFT3		
<p>4) Press the Font button to exit the MARGIN ADJUST mode. (d) → (e)</p>	<p>f) <table border="1" style="width: 100%;"><tr><td style="text-align: center;">39 FACTORY MODE ▷ DP CHECK</td></tr></table></p>	39 FACTORY MODE ▷ DP CHECK
39 FACTORY MODE ▷ DP CHECK		
<p>5) Press the Font button one more time to return to FACTORY MODE. (e) → (f)</p>		

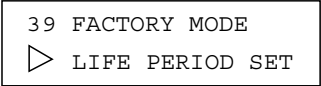
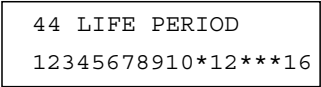
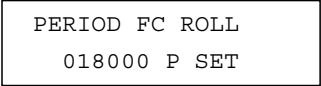
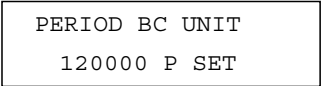
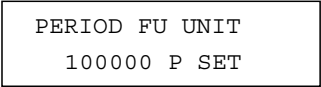
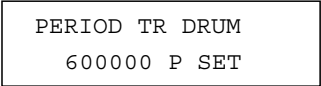
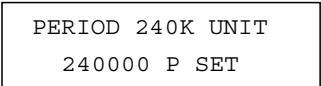
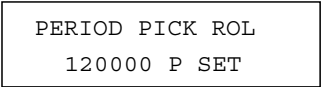
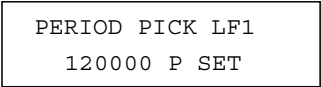
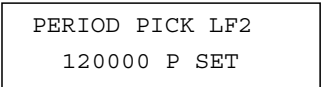
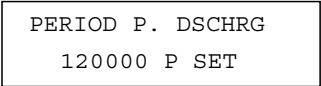
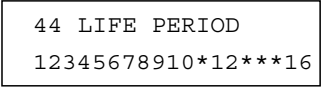
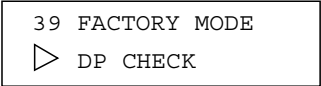
44	LIFE PERIOD
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Replacement life of the periodical replacement parts can be set.

NOTE:

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

Procedure

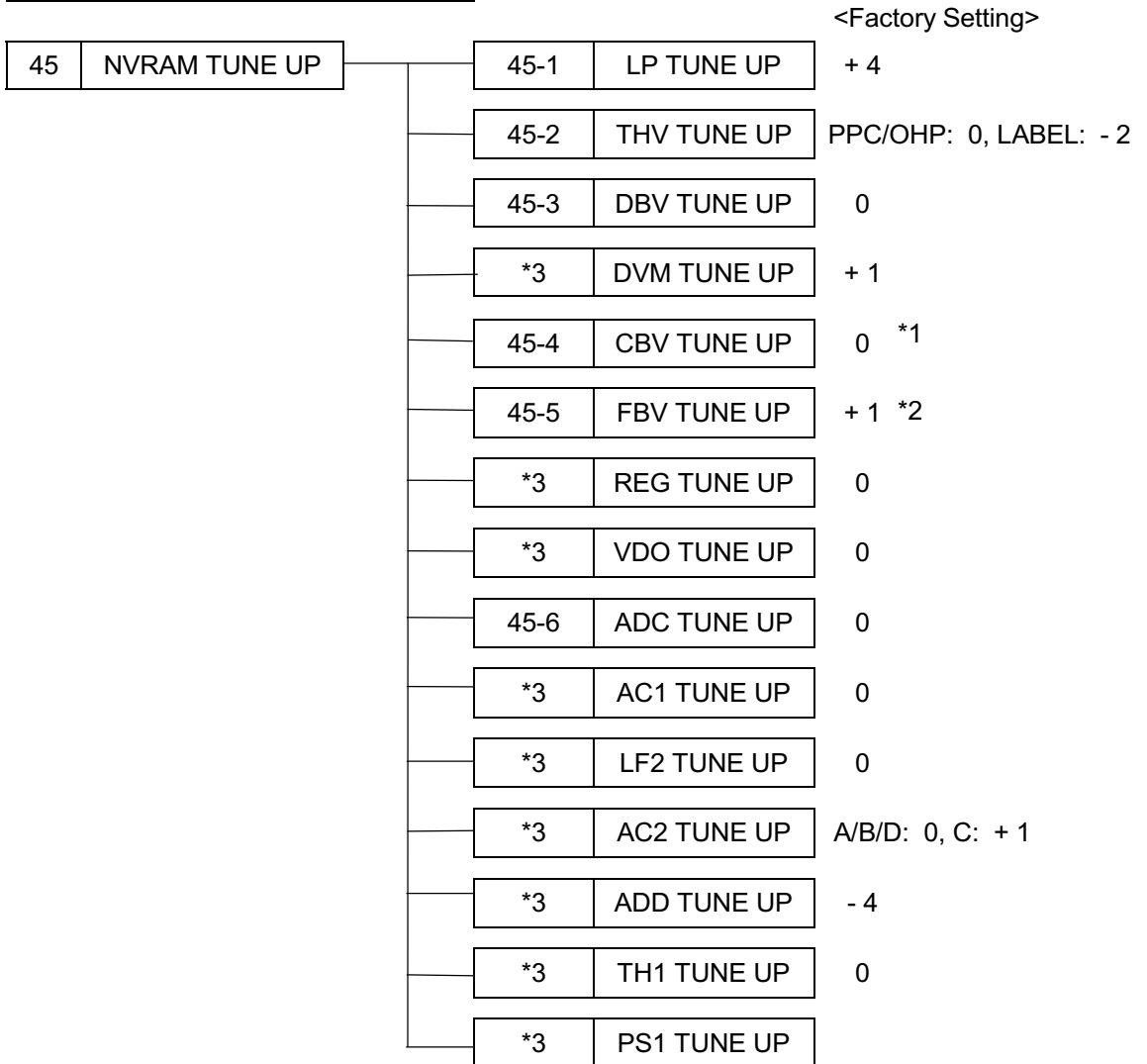
Description of Procedures	LCD Message
1) Press the Continue button after selecting Screen (a) "LIFE PERIOD" mode. (a) → (b)	a) 
2) Using the Set or ▼ button, select the desired code to be set and then press the Continue button. 2: Fuser cleaner (b) → (c) 7: OPC belt cartridge (d) 8: Fusing unit (e) 9: 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)  c)  d)  e)  f)  g)  h)  i)  j)  k) 
3) Use the Set or ▼ button to select the desired digit. Use the Continue button to input a new value to the selected (blinking) digit. Upon completion of inputting the values to be set, use the Set or ▼ button to select SET on the LCD and then press the Continue button to register the set value.	l)  m) 
4) Press the Font button to complete the setting work. (k)	
5) Press the Font button one more time to return to FACTORY MODE. (l) → (m)	

45	NVRAM TUNE UP
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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	
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*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:

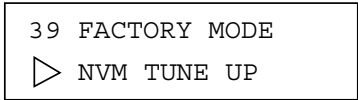
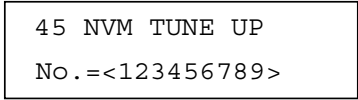
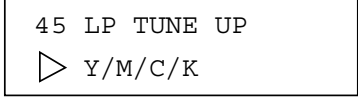
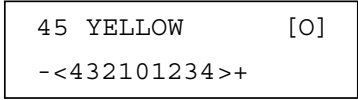
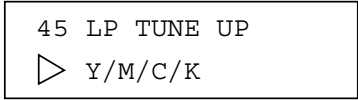
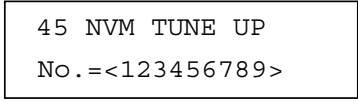
After performing NVRAM INITIAL in the next section, be sure to set the LP TUNE UP value to '+ 4'

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 Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b)	a) 
2) After selecting LP TUNE UP Code 1, press the Continue button. (b) → (c)	b) 
3) After selecting the color to be adjusted, press the Continue button. (Ex. Yellow). (c) → (d)	c) 
4) The adjustment value can be adjusted in 8 steps between the -4 and +4. After selecting the required number press the Continue button. (d)	d) 
5) Press the Font button to finish the adjustment for yellow. (d) → (e) Repeat steps 3 to 5 if adjustment work is required for another color.	e) 
6) Press the Font button to finish the adjustments. (e) → (f)	f) 

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.

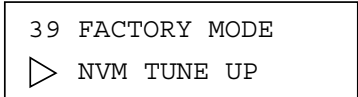
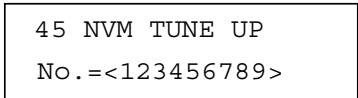
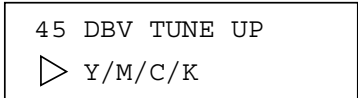
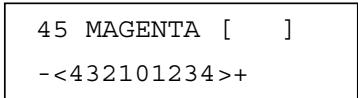
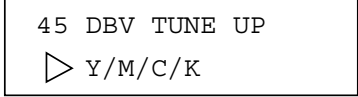
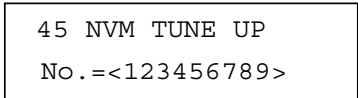
Description of Procedures	LCD Message
1) Press the Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b)	a) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 39 FACTORY MODE ▷ NVM TUNE UP </div>
2) After selecting THV TUNE UP Code 2, press the Continue button. (b)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

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 Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b)	a) 
2) After selecting DBV TUNE UP Code 3, press the Continue button. (b) → (c)	b) 
3) After selecting the color to be adjusted, press the Continue button. (Ex. Magenta). (c) → (d)	c) 
4) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Continue button. (d)	d) 
5) Press the Font button to finish the adjustment work for Magenta. (d) → (e) Repeat steps 3 to 5 for each color.	e) 
6) Press the Font button to finish the DBV adjustment work. (e) → (f)	f) 

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.

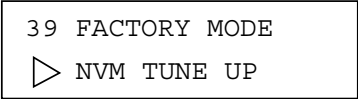
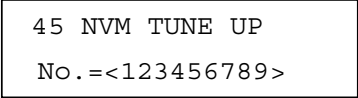
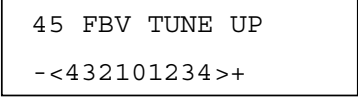
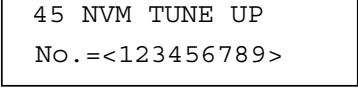
Description of Procedures	LCD Message
1) Press the Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b)	a) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 39 FACTORY MODE ▷ NVM TUNE UP </div>
2) After selecting CBV TUNE UP Code 5, press the Continue button. (b) → (c)	b) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 45 NVM TUNE UP No. =<123456789> </div>
3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Continue button. (c)	c) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 45 CBV TUNE UP -<432101234>+ </div>
4) Press the Font button to finish the adjustment work for CBV. (c) → (d)	d) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 45 NVM TUNE UP No. =<123456789> </div>

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 Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b)	a) 
2) After selecting FBV TUNE UP Code 6, press the Continue button. (b) → (c)	b) 
3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Continue button. (c)	c) 
4) Press the Font button to finish the adjustment work for FBV. (c) → (d)	d) 

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 Continue button after selecting Screen (a) "NVM TUNE UP". (a) → (b) 2) After selecting ADC TUNE UP Code 9, press the Continue button. (b) → (c) 3) The adjustment value can be adjusted in 8 steps between -4 and +4. After selecting a given number, press the Continue button. (c) 4) Press the Font button to finish the adjustment work for ADC. (c) → (d)	<table border="0"> <tr> <td style="padding-right: 10px;">a)</td> <td style="border: 1px solid black; padding: 5px;"> 39 FACTORY MODE ▷ NVM TUNE UP </td> </tr> <tr> <td style="padding-right: 10px;">b)</td> <td style="border: 1px solid black; padding: 5px;"> 45 NVM TUNE UP No. =<123456789> </td> </tr> <tr> <td style="padding-right: 10px;">c)</td> <td style="border: 1px solid black; padding: 5px;"> 45 ADC TUNE UP -<432101234>+ </td> </tr> <tr> <td style="padding-right: 10px;">d)</td> <td style="border: 1px solid black; padding: 5px;"> 45 NVM TUNE UP No. =<123456789> </td> </tr> </table>	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>
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.



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'.

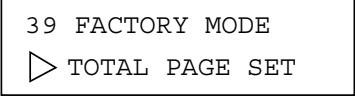
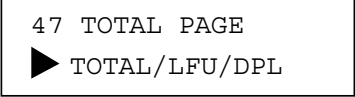
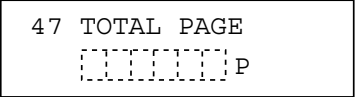

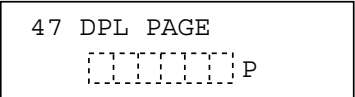
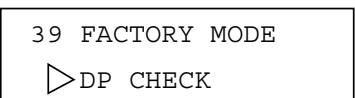
Description of Procedures	LCD Message	
1) Press the Continue button after selecting Screen (a) "NVRAM INITIAL". (a) → (b)	a) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> 39 FACTORY MODE ▷ NVRAM INITIAL </td> </tr> </table>	39 FACTORY MODE ▷ NVRAM INITIAL
39 FACTORY MODE ▷ NVRAM INITIAL		
2) Select YES if NVRAM INITIAL should be executed. If not select NO. Press the Continue button so that the RAM INITIAL will be executed. (All the data will be cleared.) (b) → (c)	b) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> 46 NVRAM INITIAL ▷ YES / NO </td> </tr> </table>	46 NVRAM INITIAL ▷ YES / NO
46 NVRAM INITIAL ▷ YES / NO		
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.	c) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> 39 FACTORY MODE ▷ DP CHECK </td> </tr> </table>	39 FACTORY MODE ▷ DP CHECK
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.

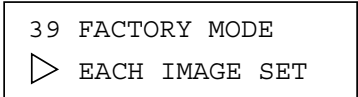
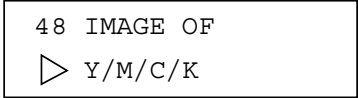
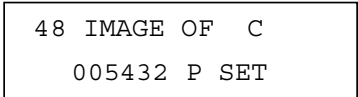
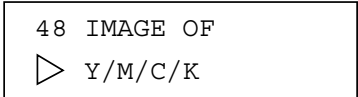
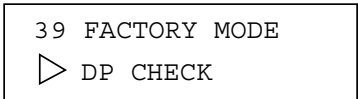
Description of Procedures	LCD Message
<p>1) Press the Continue button after selecting Screen (a) "TOTAL PAGE SET". (a) → (b)</p>	<p>a) </p>
<p>2) Select one type of page from among TOTAL PAGE, LFU PAGE and DPL PAGE.</p>	<p>b) </p>
<p>3) Use the Set or ▼ button to select the desired digit. (b) → (c) Use the Continue button to input values to the selected (blinking) digit. Upon completing the input of the values, use the Set or ▼ button to select SET displayed on the LCD and then press the Continue button to store the set value. (c) → (d)</p>	<p>c) </p> <p>or</p> <p>c) </p> <p>or</p> <p>c) </p>
	<p>d) </p>

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 Continue button after selecting Screen (a) "EACH IMAGE SET". (a) → (b)	a) 
2) Select the desired color to reset in EACH IMAGE SET. (b) → (c)	b) 
3) Use the Set or ▼ button to select the desired digit. Use the Continue button to input values to the selected (blinking) digit. Upon completing the input of the values, use the Set or ▼ button to select SET on the LCD and then press the Sel button to store the set value. (c) → (d)	c) 
4) Press the Font button to exit the EACH IMAGE SET mode. (d) → (e)	d) 
	e) 

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 Continue button after selecting Screen (a) "NEXT LIFE SET". (a) → (b)	a) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 39 FACTORY MODE ▷ NEXT LIFE SET </div>
2) After selecting the code to be set, press the Continue button. (b) 2: Fuser cleaner 7: OPC belt cartridge 8: Fusing unit 9: Transfer drum 10: 240K kit	b) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 49 NEXT LIFE SET NO. =<123456789> </div>
3) Designate or alter the figure with the Set or ▼ button. (b) → (c) Use the Continue button to input values to the selected (blinking) digit. Upon completing the input of the values, use the Set or ▼ button to select SET on the LCD and then press the Continue button to store the set value. (c) → (d)	c) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> PERIOD FC ROLL 007800 P SET </div>
4) Press the Font button to exit the NEXT LIFE SET mode. (d) → (e)	d) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 49 NEXT LIFE SET NO. =<123456789> </div>
	e) <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 39 FACTORY MODE ▷ DP CHECK </div>

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] $(A + B) / 2 \leq \text{Default Value } 4.0 \pm 1.5\text{mm}$
- (3) Measure the position 'C' and 'D' of left margin.
[Left edge] $(C + D) / 2 \leq \text{Default Value } 3.0 \pm 1.5\text{mm}$
- (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.

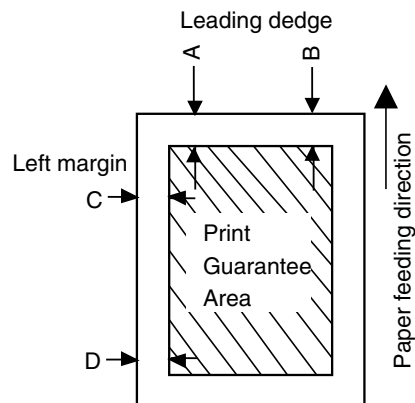


Fig. 5-2

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 is 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.

CHAPTER 6
PERIODIC
MAINTENANCE

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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 not 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 WorkTable 6-3

No.	Parts Name	Cleaning Work		Cleaning Cycle *1 (Condition or Case)
		Description	Section	
1	Register Roller	<ol style="list-style-type: none"> 1. Open the transfer unit. 2. Clean roller and surrounding area using a dry cloth. 	1.1	<ul style="list-style-type: none"> • Defective image • Smearred paper • 20K prints
2	Paper Guide	<ol style="list-style-type: none"> 1. Remove the media cassette from the printer. 2. Clean the paper guide using a dry cloth. 	1.2	20K prints
3	Paper Exit Roller	<ol style="list-style-type: none"> 1. Open the top cover. 2. Clean the paper exit roller using a dry cloth. 	1.3	20K prints
4	Transfer Roller	<ol style="list-style-type: none"> 1. Open the transfer unit. 2. Clean roller and surrounding area using a dry cloth. 	1.4	<ul style="list-style-type: none"> • Defective image • Smearred paper • Periodic maintenance
5	Paper Discharging Roller	<ol style="list-style-type: none"> 1. Open the transfer unit. 2. Remove the paper discharger. 3. Clean the corona wire and case, using a cotton swab. 	1.5	<ul style="list-style-type: none"> • Defective image • Paper jam • Periodic maintenance
6	OPC Belt Cartridge	<ol style="list-style-type: none"> 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. 	1.6	<ul style="list-style-type: none"> • Defective image • Periodic maintenance

Periodic Maintenance Cleaning Work

Table 6-3

No.	Parts Name	Cleaning Work		Page	Cleaning Cycle *1 (Condition or Case)
		Description			
7	Transfer Drum	<ol style="list-style-type: none"> 1. Remove the transfer drum. 2. Clean the dirt from the transfer drum surface using a cloth. 		1.7	<ul style="list-style-type: none"> • Defective image • Periodic maintenance
8	Dustproof Glass of Laser Unit	<ol style="list-style-type: none"> 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. 		1.8	<ul style="list-style-type: none"> • Defective image • Periodic maintenance
9	Printer Interior	<ol style="list-style-type: none"> 1. Remove the toner cartridges and OPC belt cartridge. 2. Clean the printer's base, using a toner vacuum cleaner and dry cloth. 		1.9	<ul style="list-style-type: none"> • Defective image • Periodic maintenance
10	Oil Pad	<ol style="list-style-type: none"> 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. 		1.10	<ul style="list-style-type: none"> • 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.

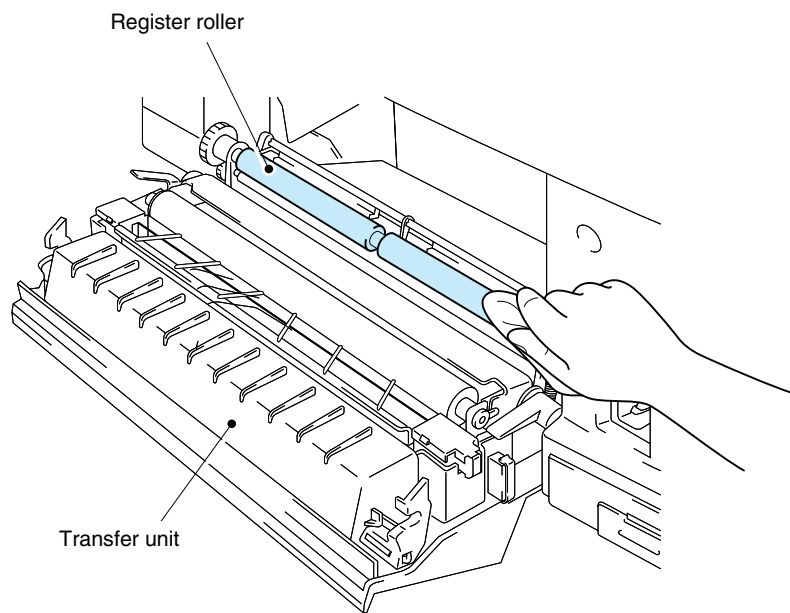


Fig. 6-1



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.

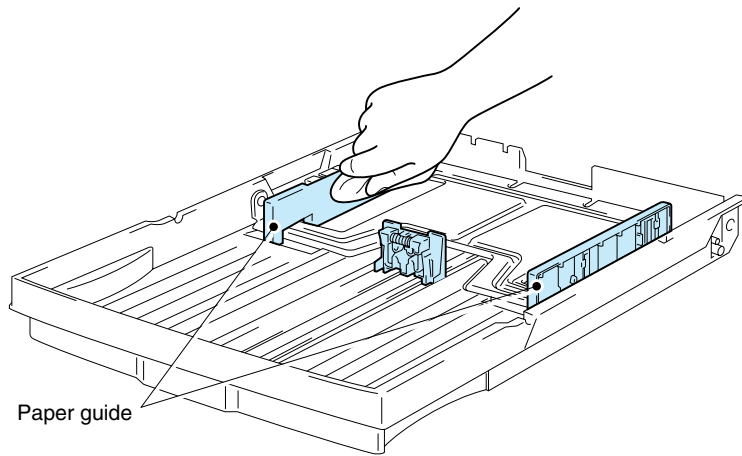


Fig. 6-2

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.

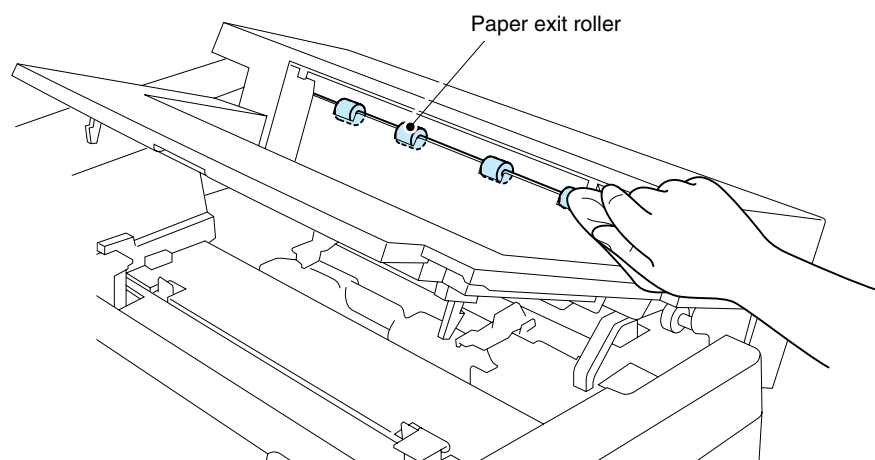


Fig. 6-3

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.

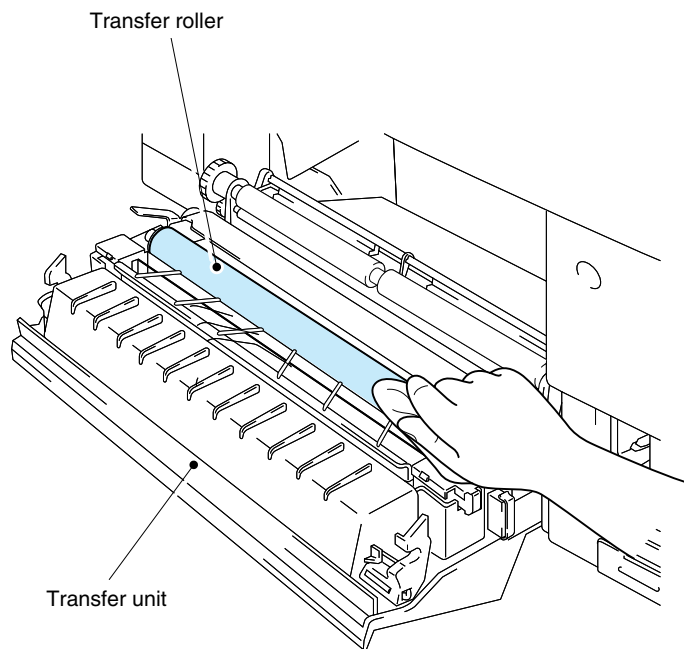


Fig. 6-4



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)

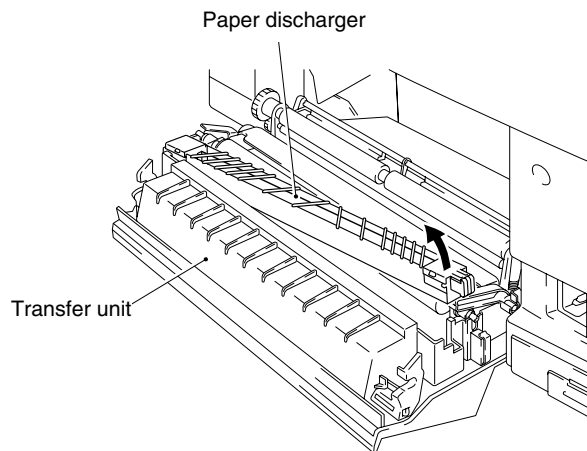


Fig. 6-5

- (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.

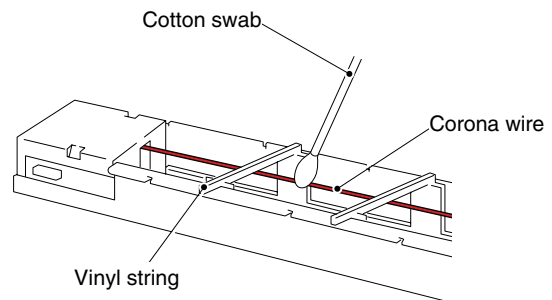



Fig. 6-6

CAUTION

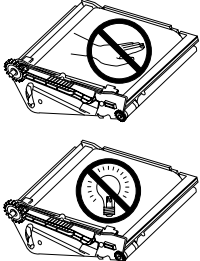
- Do not break the vinyl cord on top of the discharger unit case when cleaning the discharger unit.
- Do not break the corona wire.

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.

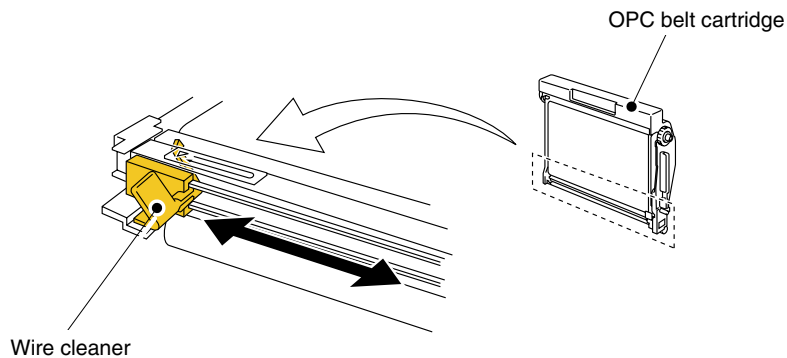


Fig. 6-7

**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.

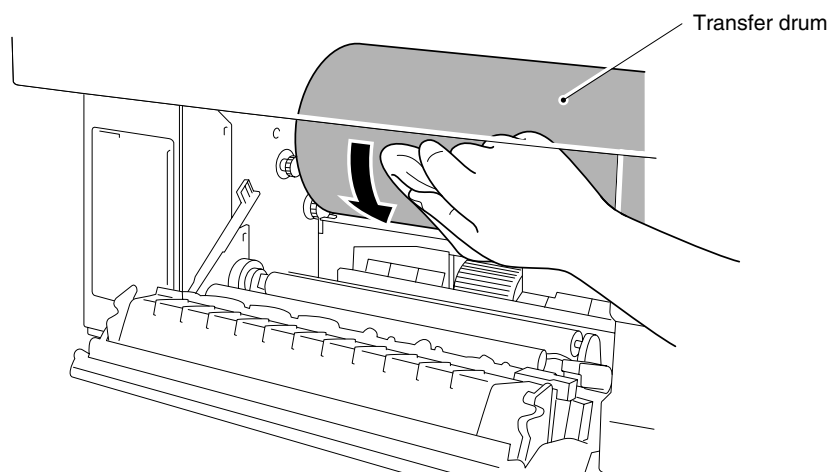


Fig. 6-8

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.

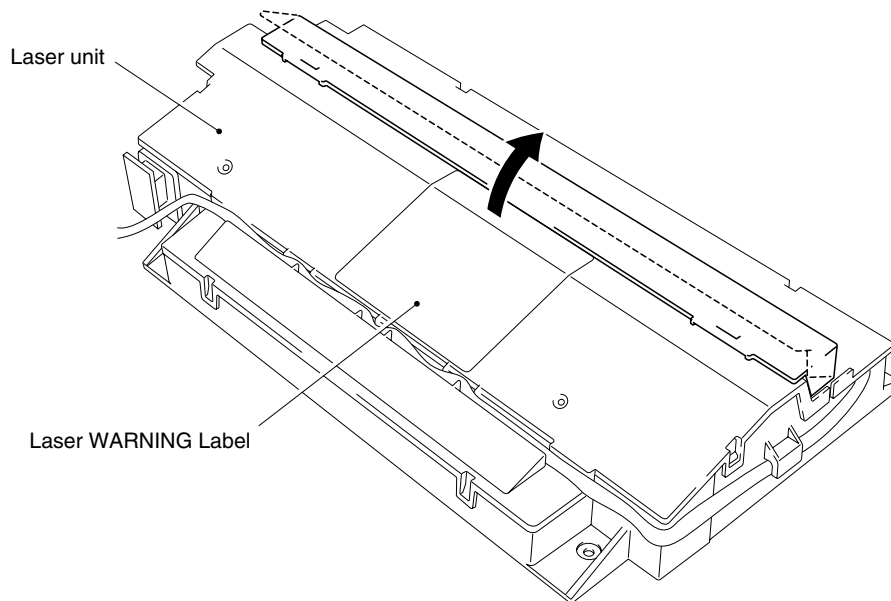


Fig. 6-9

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.*

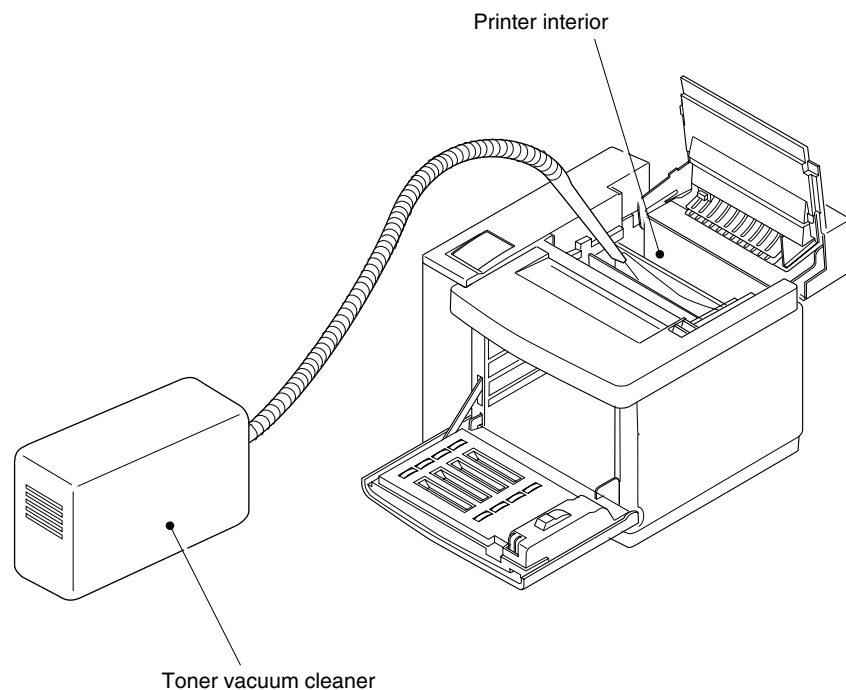


Fig. 6-10

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.*

LJ READY 001P T1 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 from 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.



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

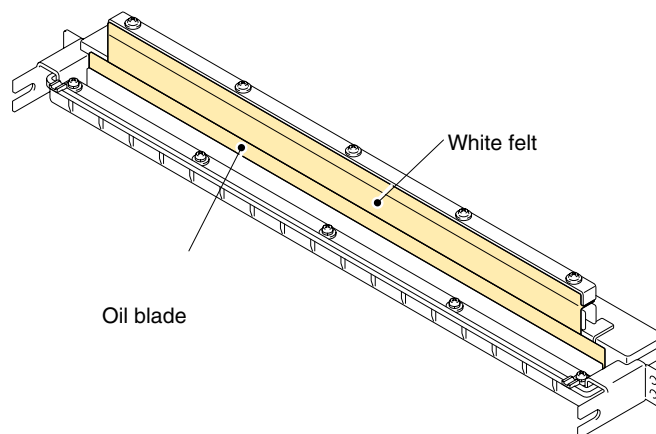


Fig. 6-11

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	Section	Replacement Cycle *1 (Condition or Case)
	Parts Name	No.			
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	UH1945001	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 items 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) <input type="checkbox"/> K <input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> M <input checked="" type="checkbox"/> Y	Toner cartridge Black
(Toner nearly empty) <input checked="" type="checkbox"/> K <input type="checkbox"/> C <input type="checkbox"/> M <input type="checkbox"/> 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 COLOR	Toner cartridge Black
TONER EMPTY CMY COLOR	Toner cartridge Cyan, Magenta, or Yellow
22 WASTE TONER	Waste toner pack
23 OIL EMPTY	Oil bottle
24 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.

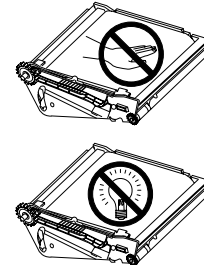
When time is due for replacement of the OPC belt cartridge, the following message appears on the control panel.

LJ READY 001P T1
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.

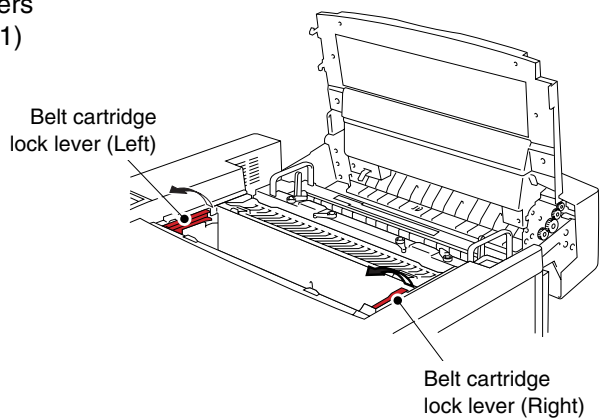


Fig. 6-12

- (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)

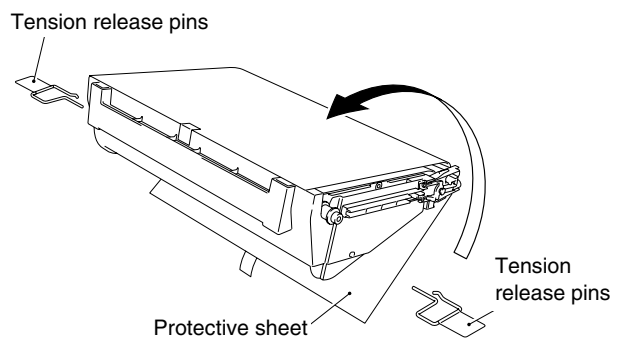


Fig. 6-13

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

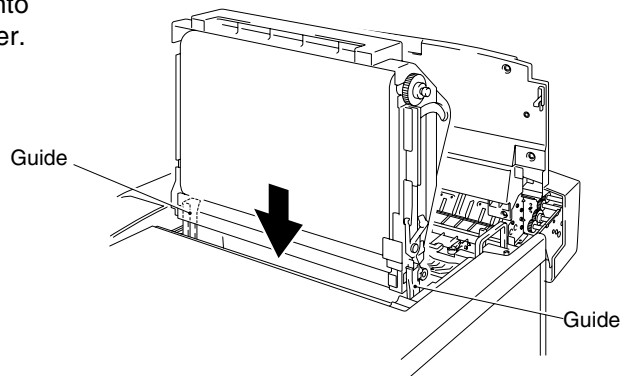


Fig. 6-14

- (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) When the printer has completed warming up, press the **Reset** button while holding down the **Shift** button, and select "RESET PARTS LIFE" and then "OPC BC".

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.

LJ READY 001P T1
REPLACE FUSER

Purpose of Replacement

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



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)

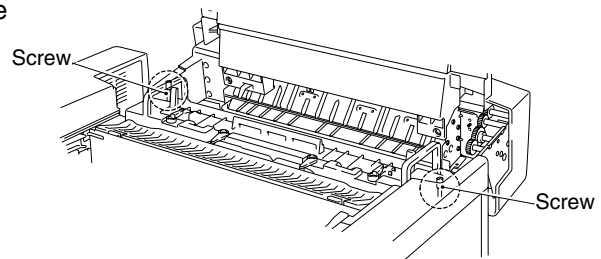


Fig. 6-15

- (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.

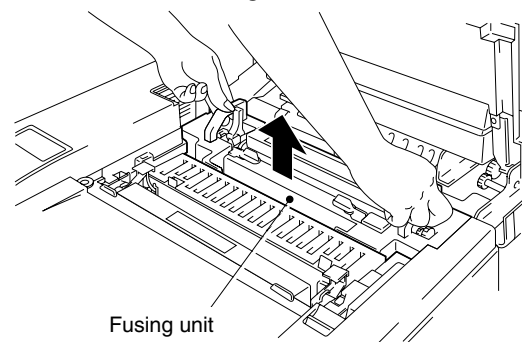


Fig. 6-16

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.

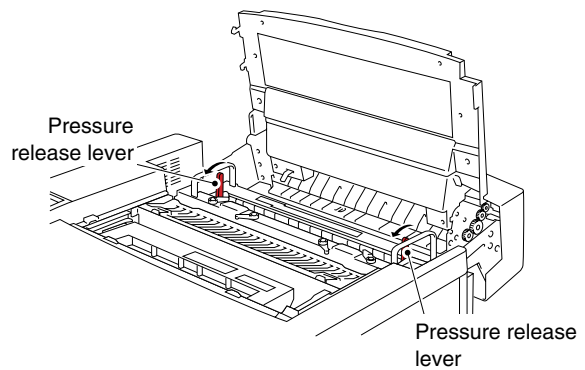


Fig. 6-17

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.

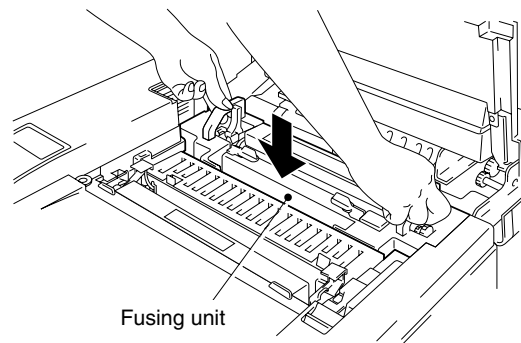


Fig. 6-18

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;
 - Press the **Reset** button while holding down the **Shift** button, and select "RESET PARTS LIFE" and then "FUSING UNIT".

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.

LJ READY 001P T1
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)

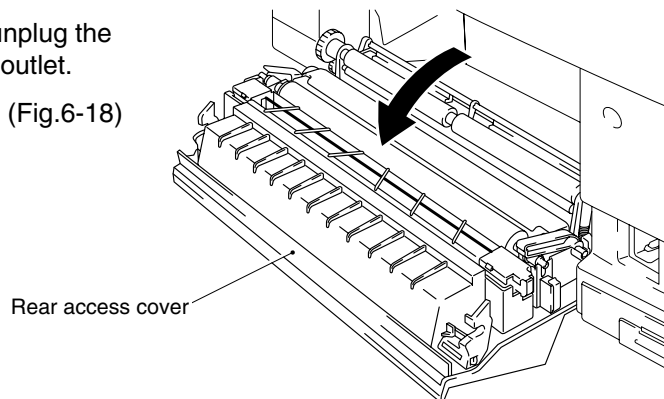


Fig. 6-19

Sequence of Replacement

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

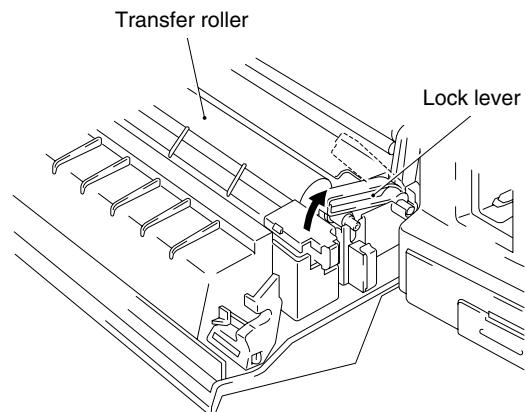


Fig. 6-20

- (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.

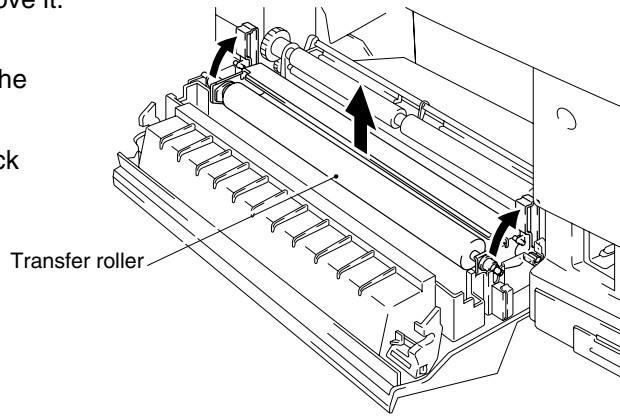


Fig. 6-21

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;
Press the **Reset** button while holding down the **Shift** button, and select "RESET PARTS LIFE" and then "TRANSFER ROLLER".

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.

LJ READY 001P T1
REPLACE 120K KIT

Purpose of Replacement

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



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)

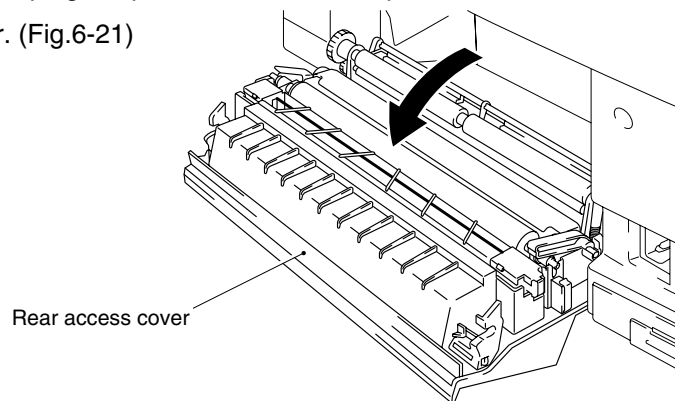


Fig. 6-22

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)

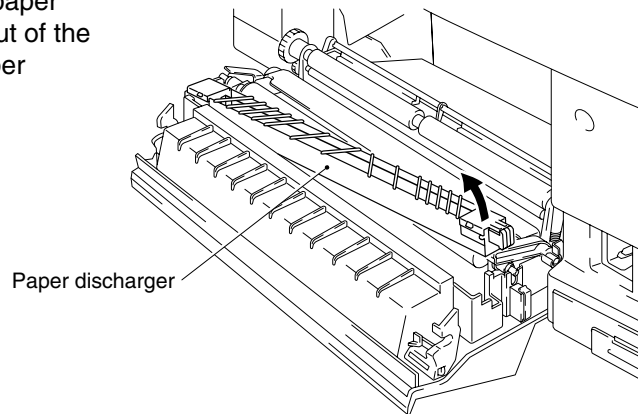


Fig. 6-23

- (2) Clean the area where the paper discharger is mounted. (Fig.6-23)
- (3) Install the new paper discharger into the transfer unit.

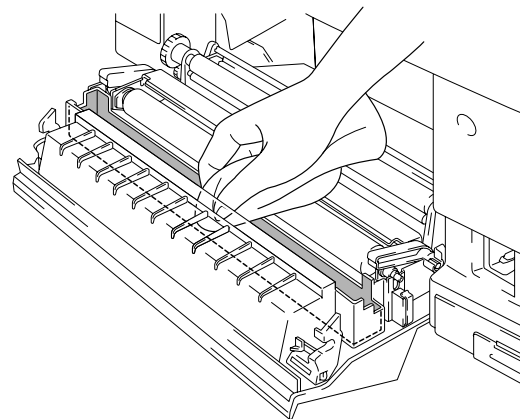


Fig. 6-24

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;
Press the **Reset** button while holding down the **Shift** button, and select "RESET PARTS LIFE" and then "120K KIT".

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.

LJ READY 001P T1
REPLACE 240K KIT

Purpose of Replacement

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



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)

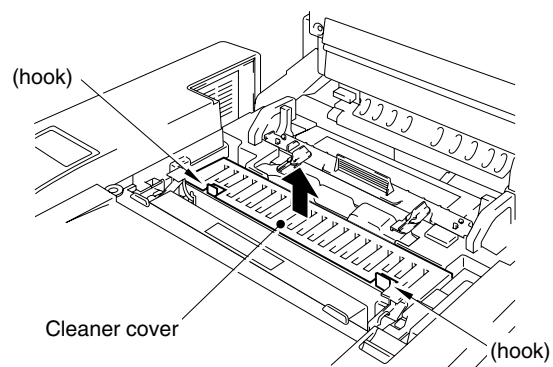


Fig. 6-25

- (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)

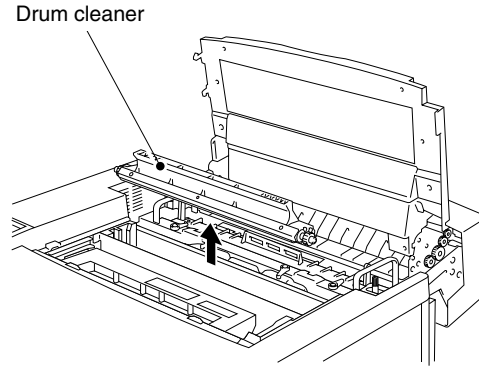


Fig. 6-26

- (4) Clean the area where the drum cleaner is mounted. (Fig.6-26)
- (5) Install a new drum cleaner into the printer.

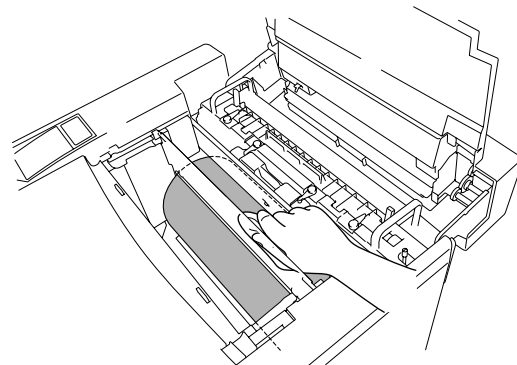


Fig. 6-27

 **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;
Press the **Reset** button while holding down the **Shift** button, and select "RESET PARTS LIFE" and then "240K KIT".

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.



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).

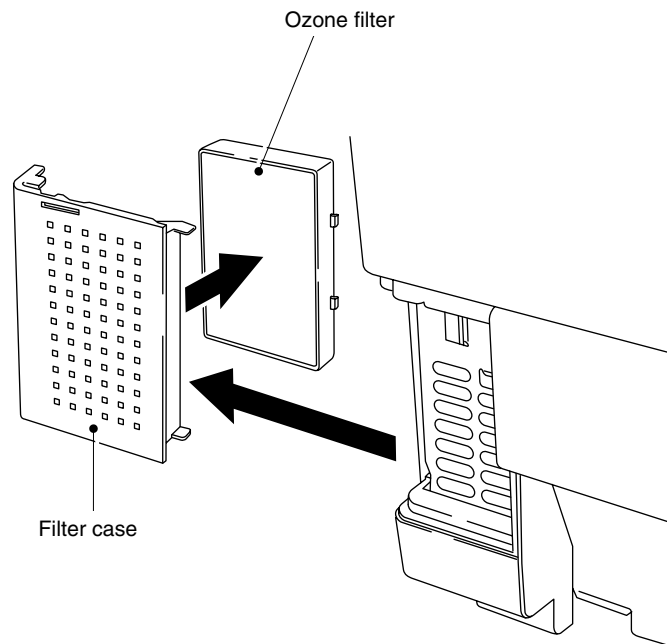


Fig. 6-28

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.

LJ READY 001P T1
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](#).

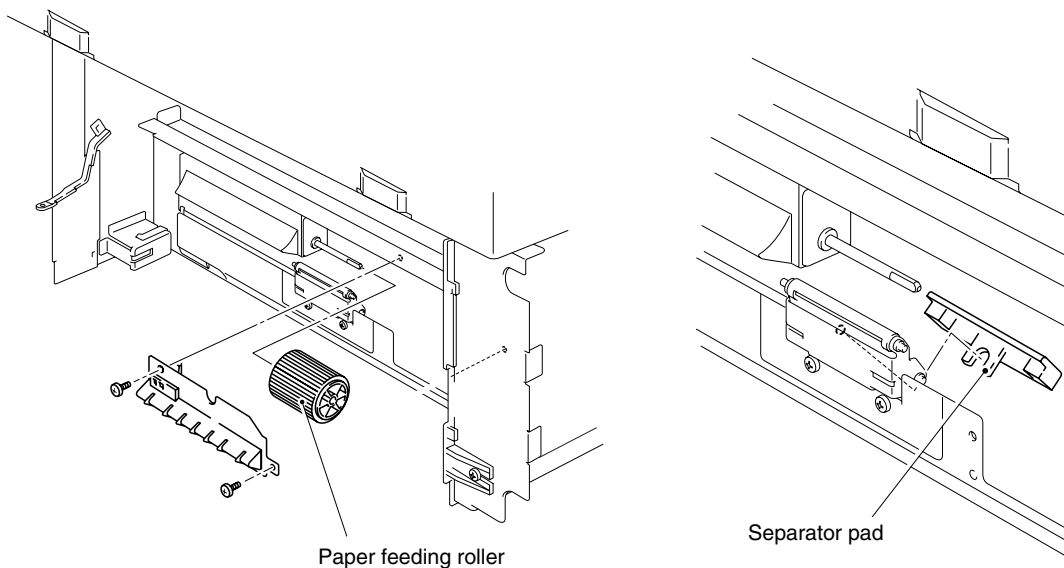


Fig. 6-29


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.

LJ READY 001P T1
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](#).

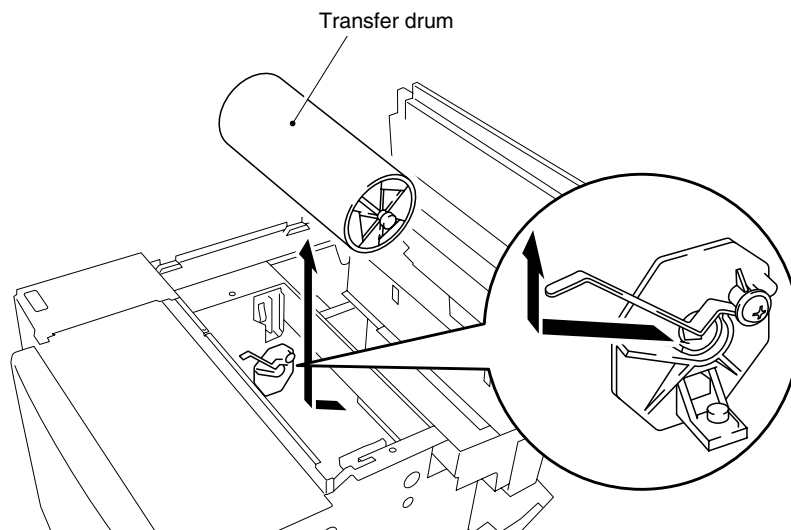


Fig. 6-30

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.*

LJ READY 001P T1 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](#).

Work Procedure

Replace the oil pad referring to [Section 4.7.1 of Chapter 7](#).

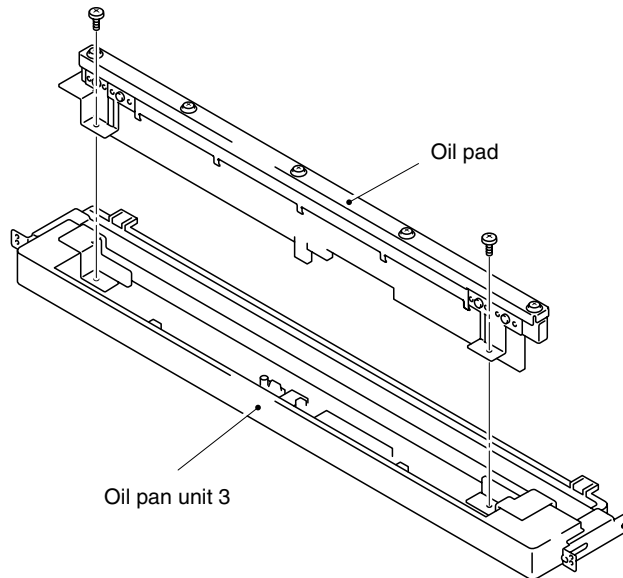


Fig. 6-31

CHAPTER 7
DISASSEMBLY &
RE-ASSEMBLY

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NOTE:


Parts names printed in light blue color are the parts names used in the HL-3400CN 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.

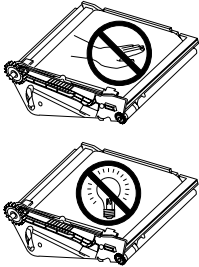
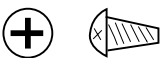

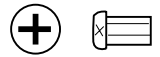
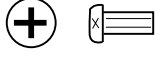
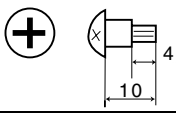
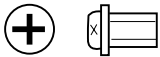
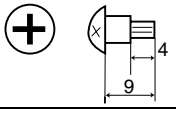
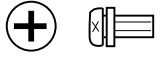



Table 7-1: Table of Screw Sizes Used in the Printer

Class Code	Name of Screw	Size and Shape of Screw			Remarks
		M-Thread TS	Length	Shape	
BT3x8	Cross head tapping screw	T3	8mm		Used for plastic parts.
BT3x12		T3	10mm		
		T4	6mm		
BT4x8		T4	8mm		
BT4x10		T4	10mm		
ST3x6	S tight screw	ST	6mm		Used for steel parts fitted to steel plates.
ST4x6					
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		For laser unit
			10mm		
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

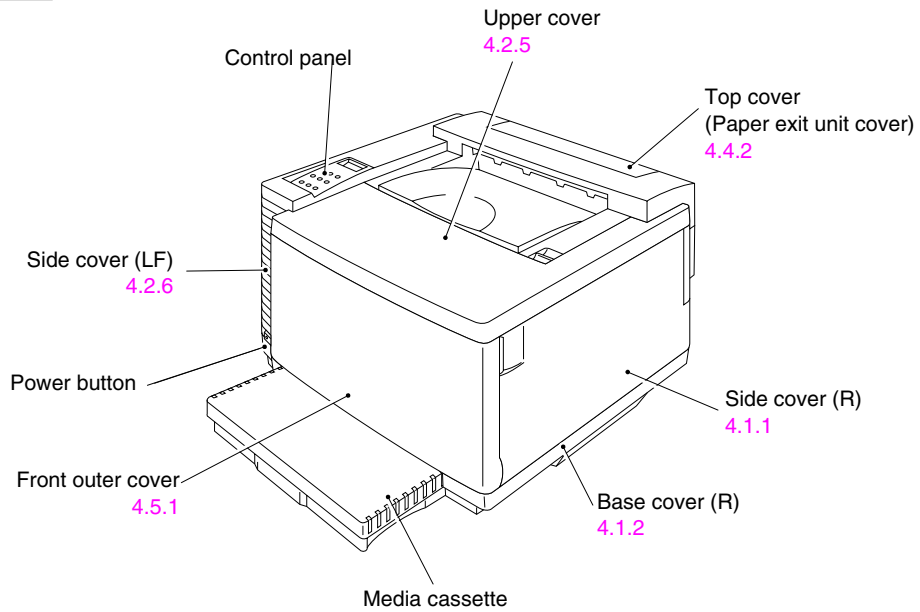


Fig. 7-1

Rear View

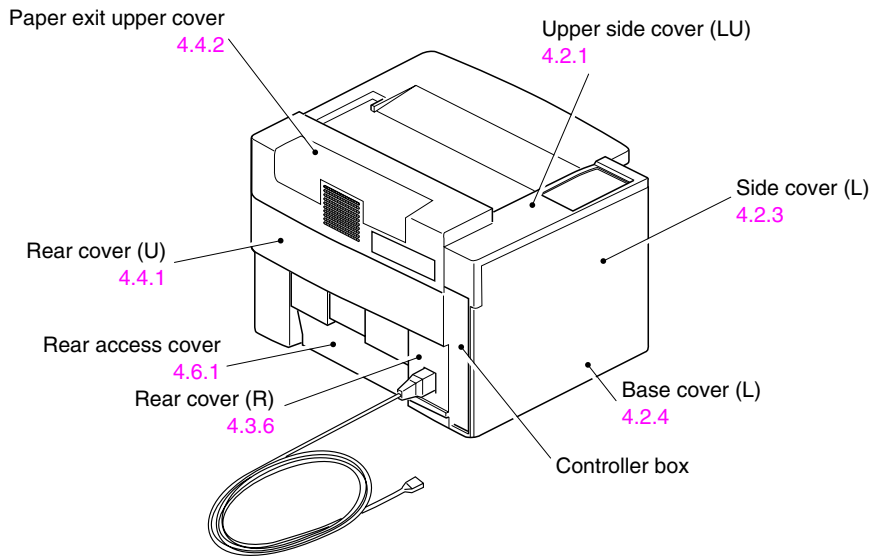


Fig. 7-2

2.2 Circuit Boards (PWBs)

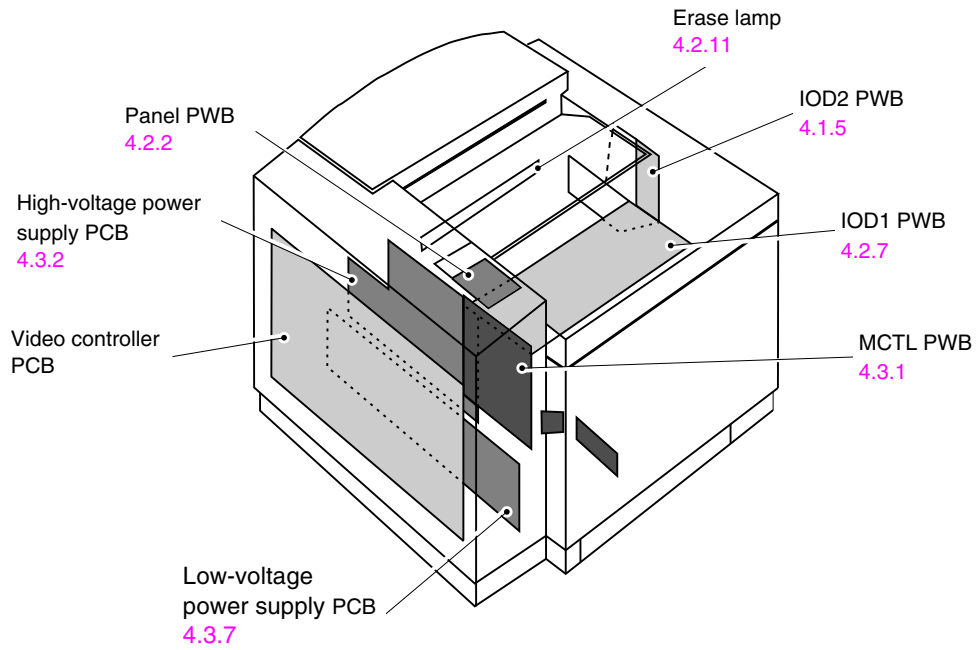


Fig. 7-3

2.3 Motor Units

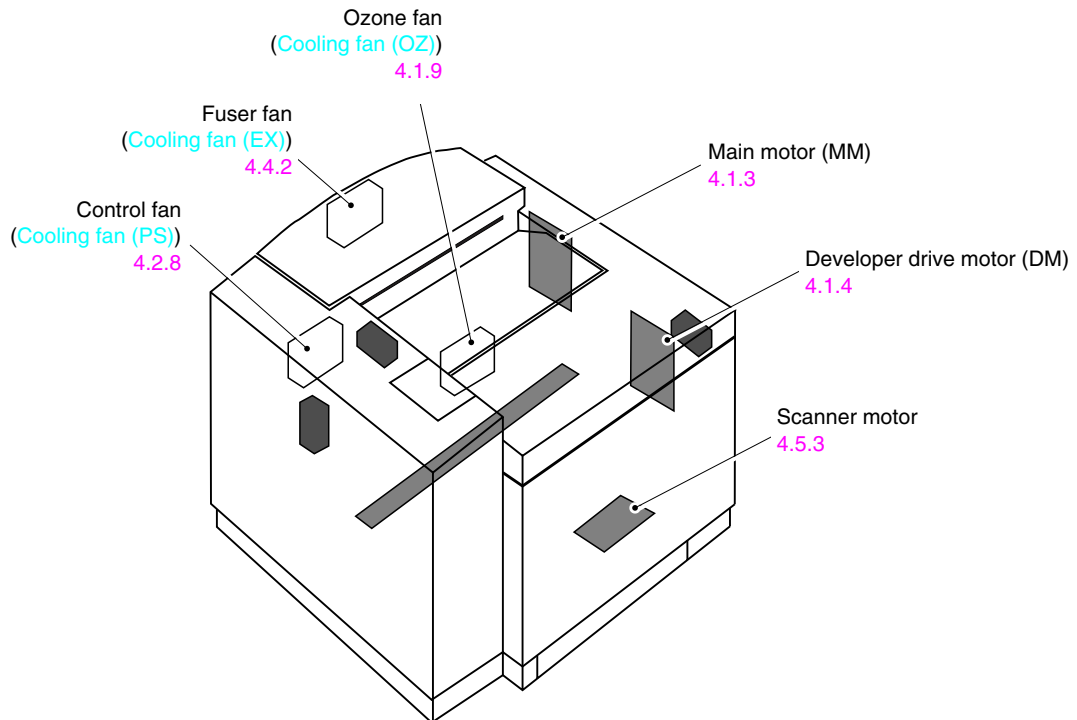


Fig. 7-4

2.4 Clutches

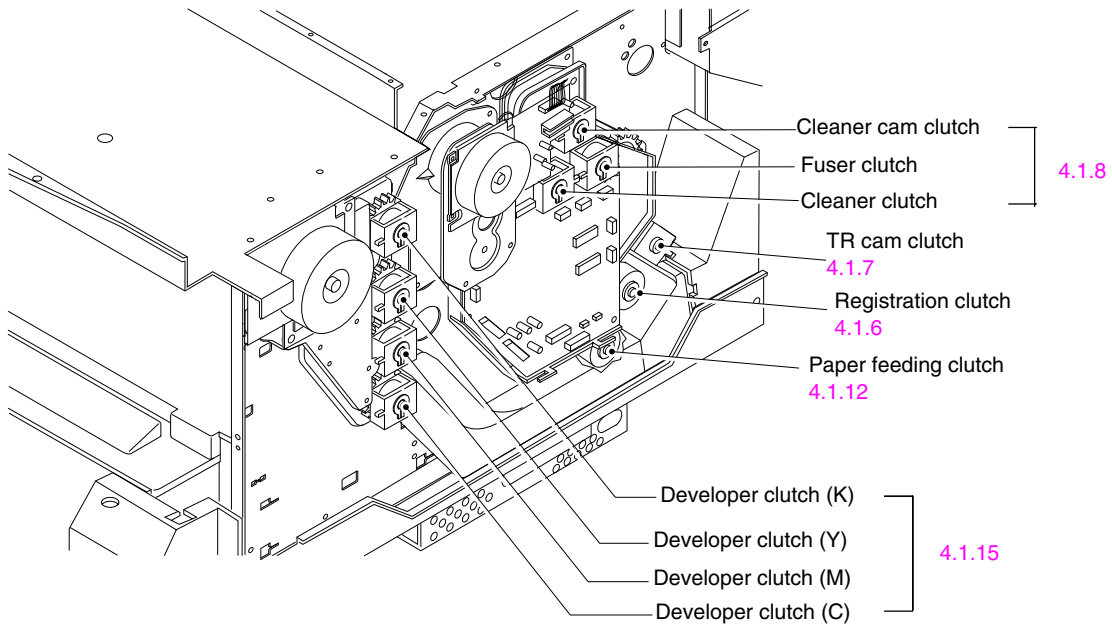


Fig. 7-5

2.5 Sensors

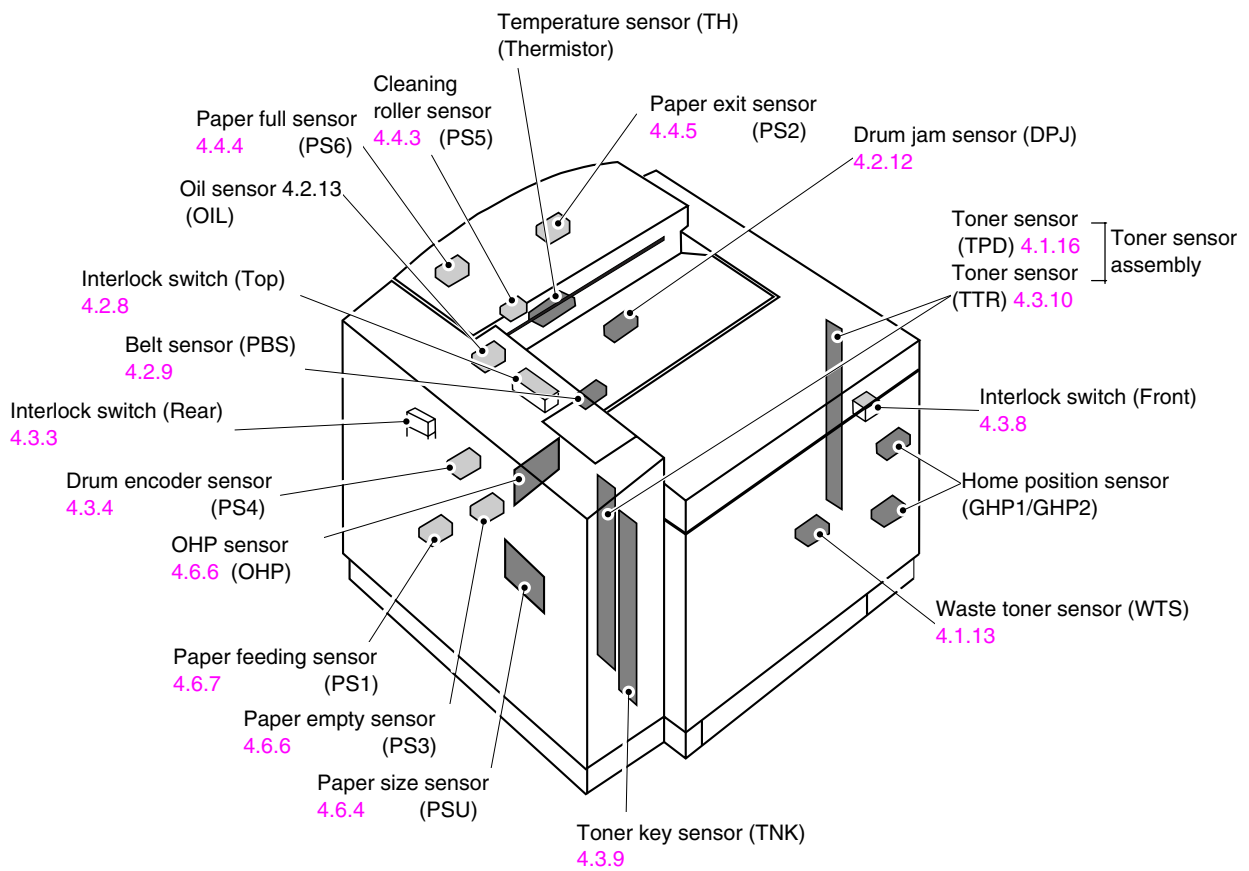
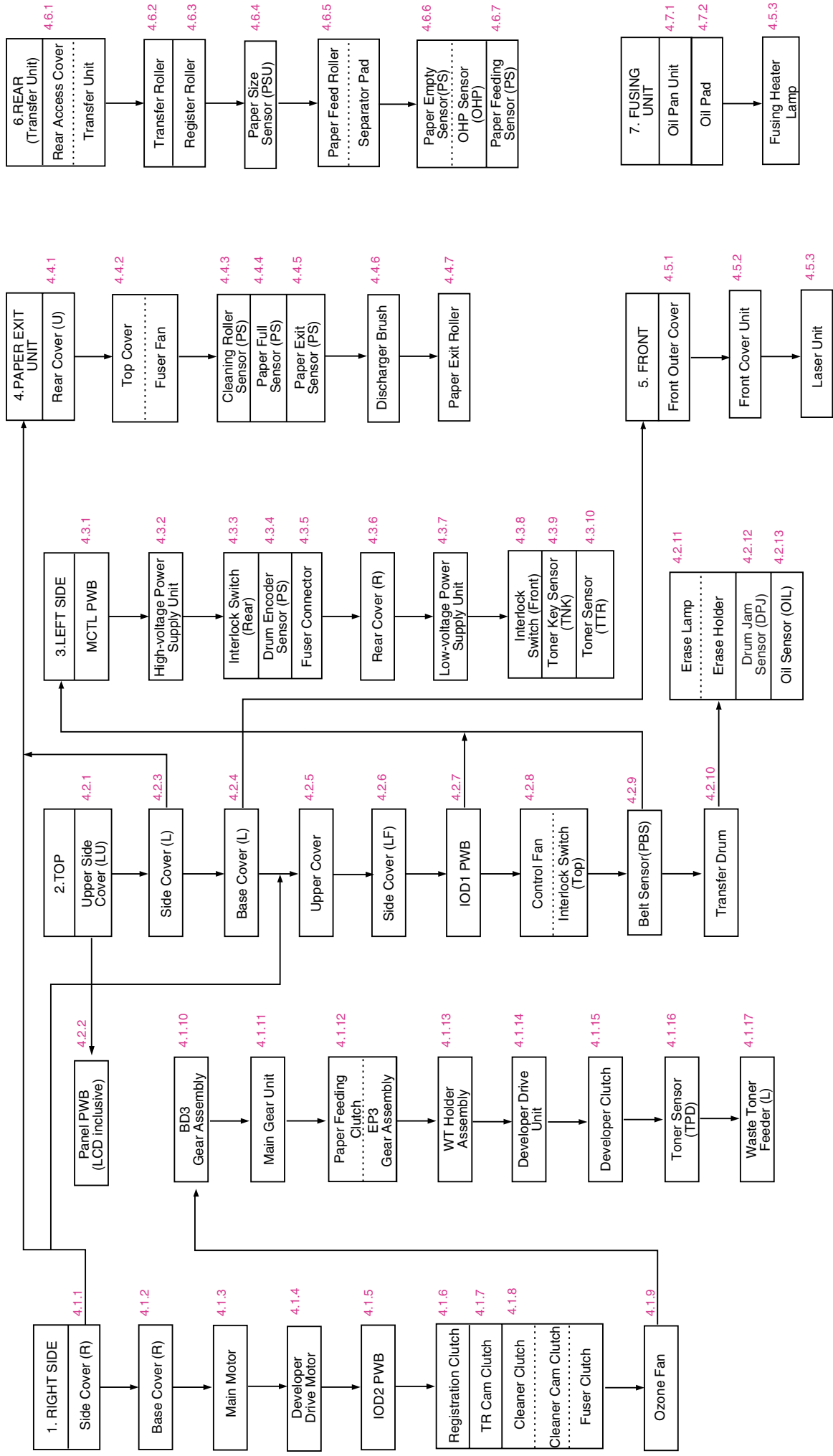


Fig. 7-6

3. DISASSEMBLY FLOW



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.

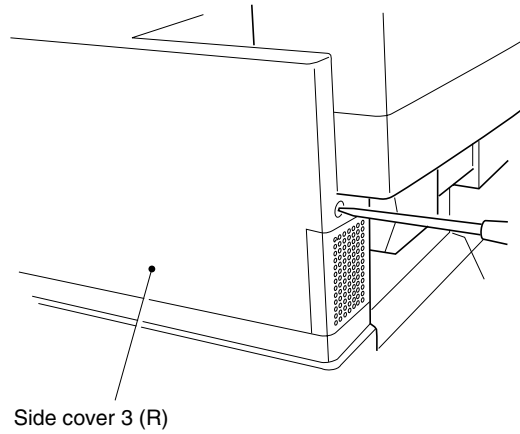


Fig. 7-7

- (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.

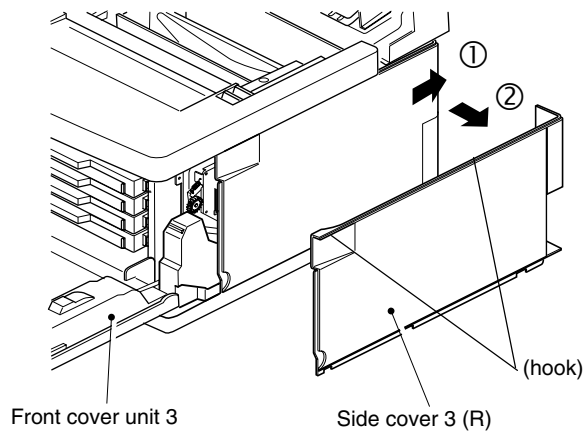


Fig. 7-8

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.

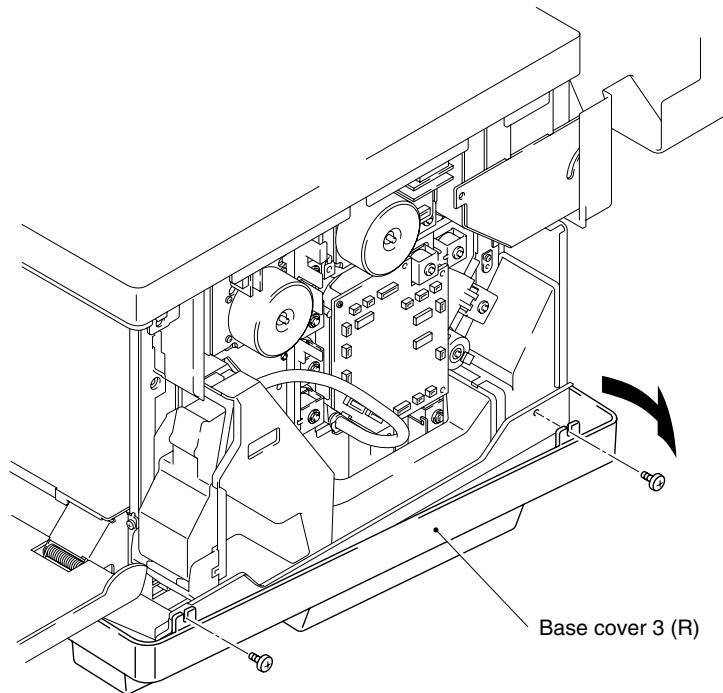


Fig. 7-9



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.

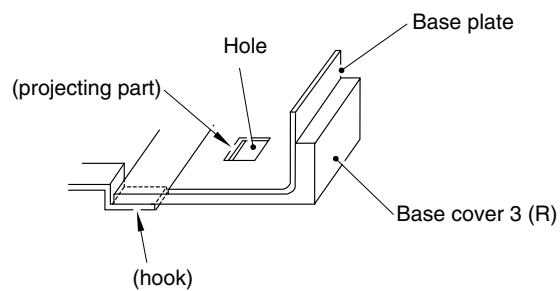


Fig. 7-10

4.1.3 Main motor 3 (MM)



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.

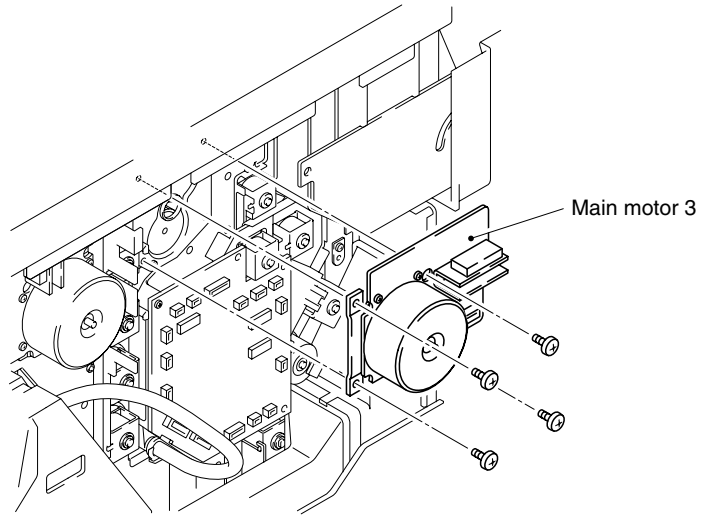


Fig. 7-11

4.1.4 Developer drive motor 3 (DM)



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.

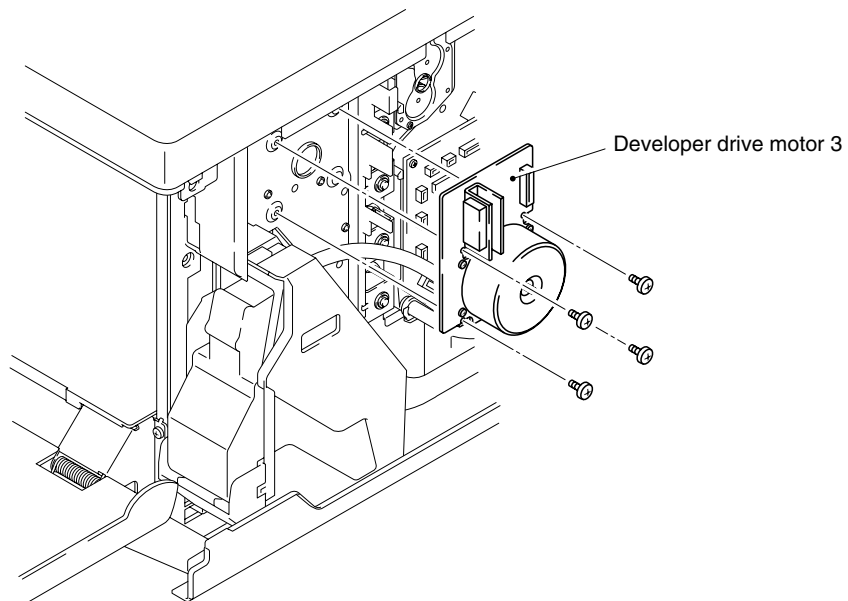



Fig. 7-12

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.

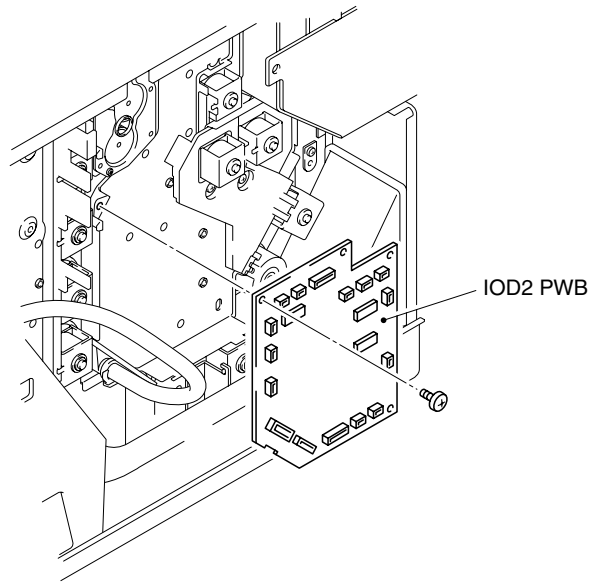


Fig. 7-13

4.1.6 Registration clutch

- (1) Remove the outer plastic C ring from the shaft.
- (2) Pull out the registration clutch from the shaft.

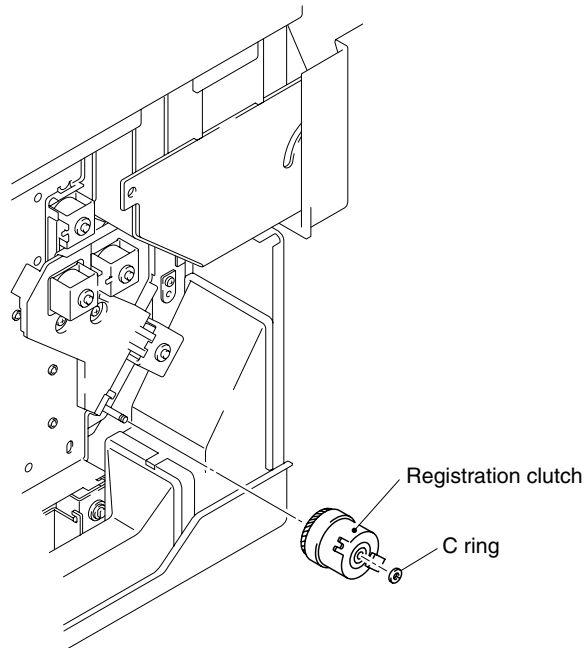


Fig. 7-14

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.

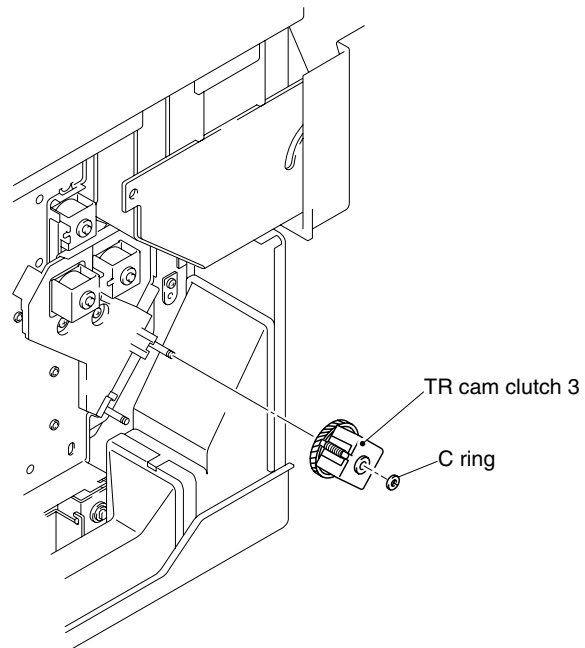


Fig. 7-15

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.

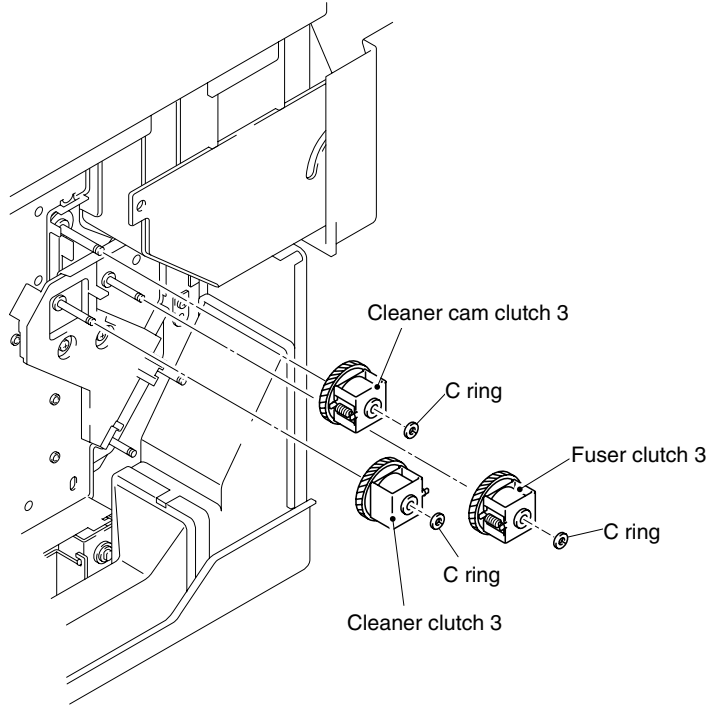


Fig. 7-16

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.

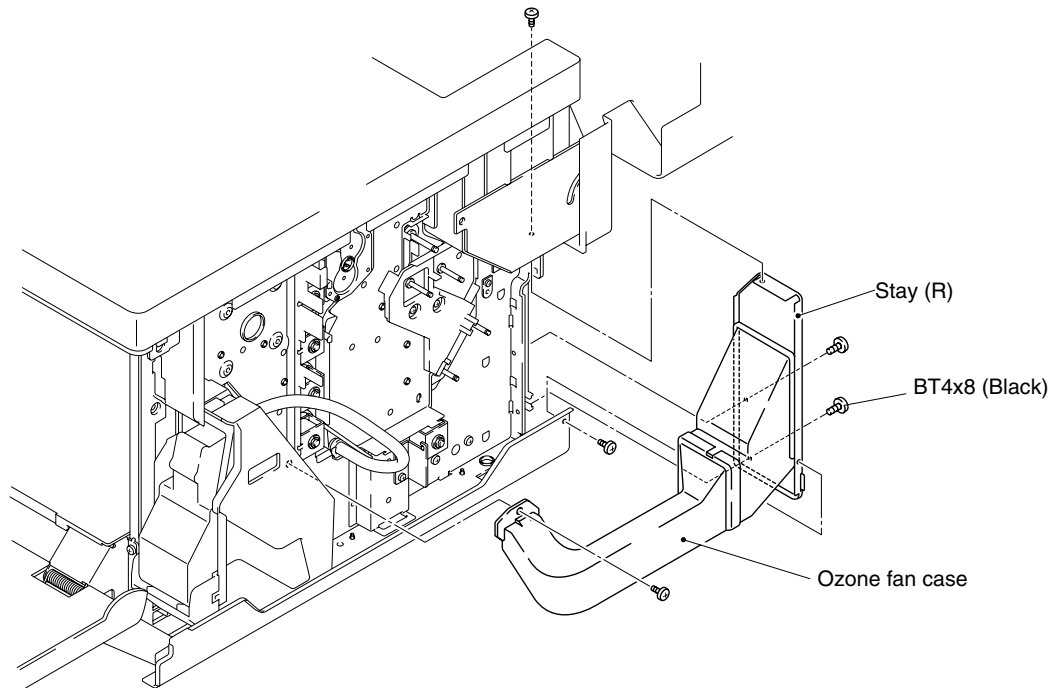


Fig. 7-17

- (3) Remove the tape to remove the ozone fan case from the fan duct.
- (4) Remove the ozone fan from the fan case.

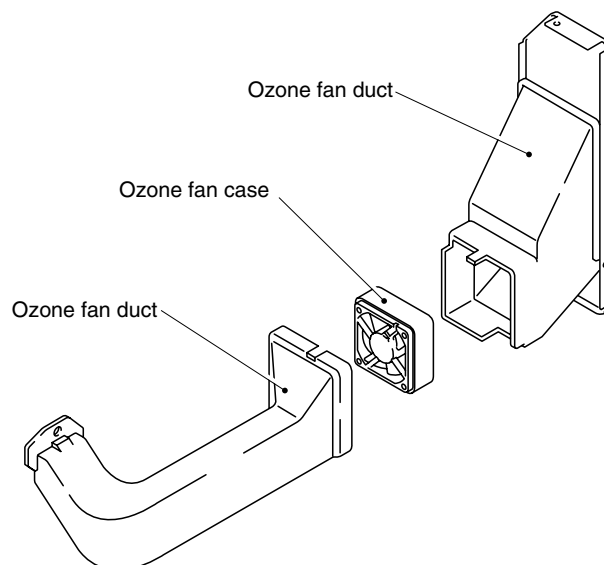


Fig. 7-18

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.

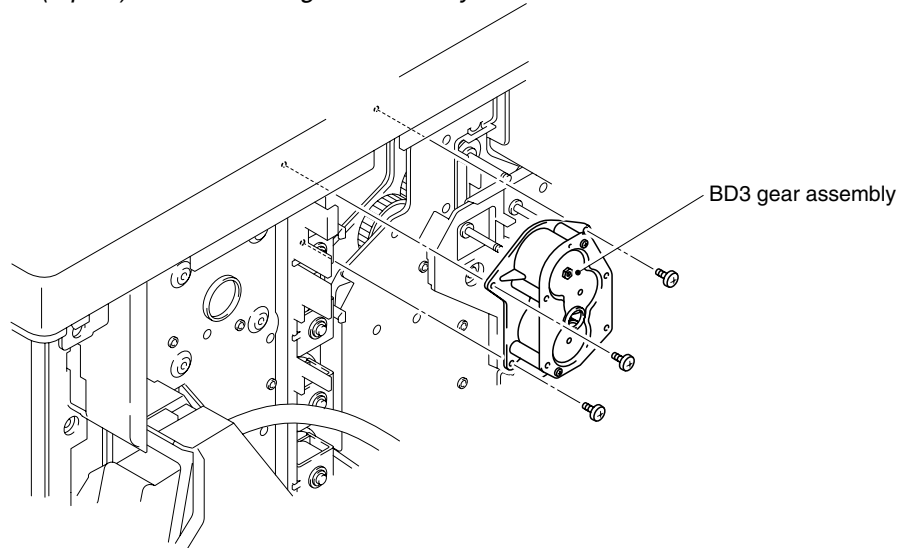


Fig. 7-19

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.

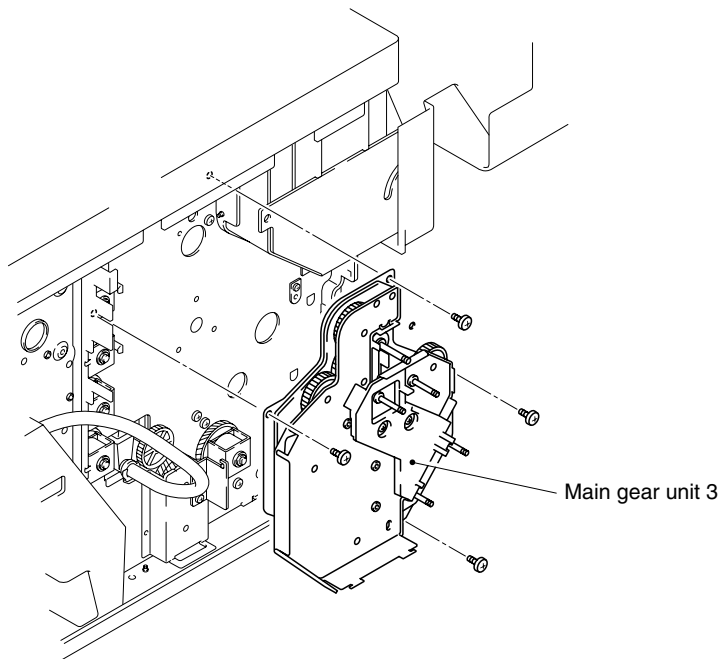


Fig. 7-20

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.

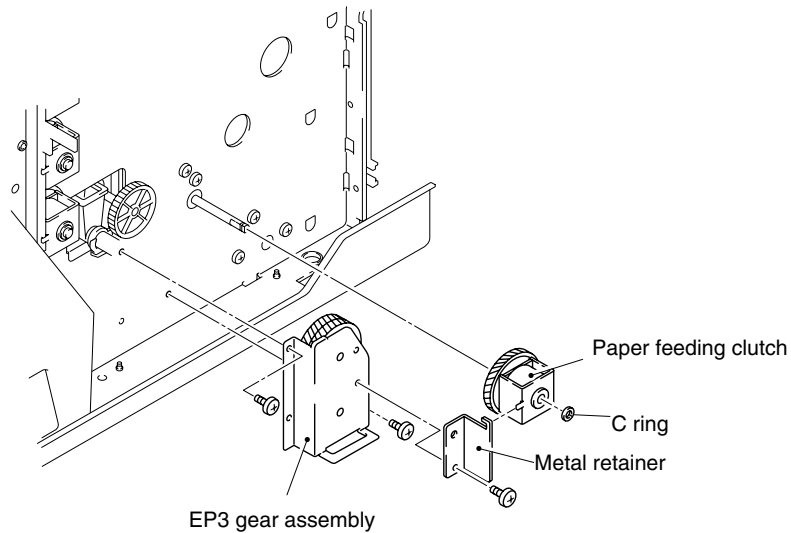


Fig. 7-21

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.

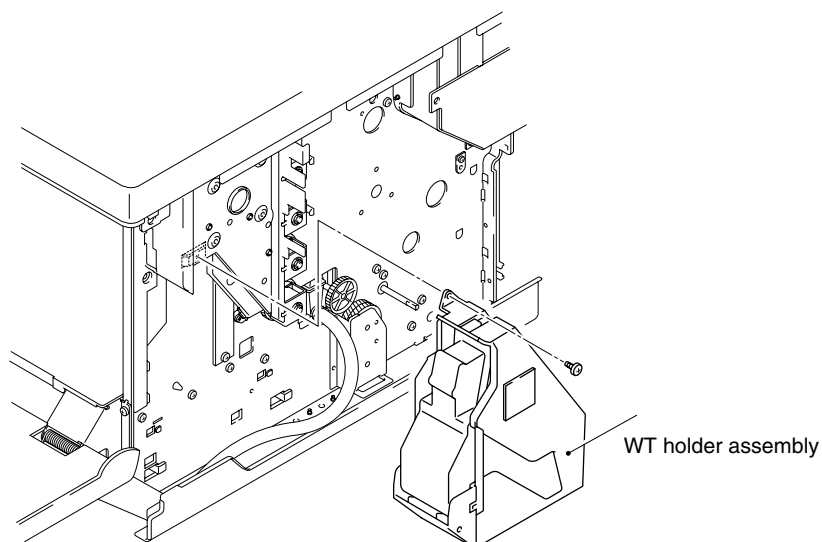


Fig. 7-22

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.

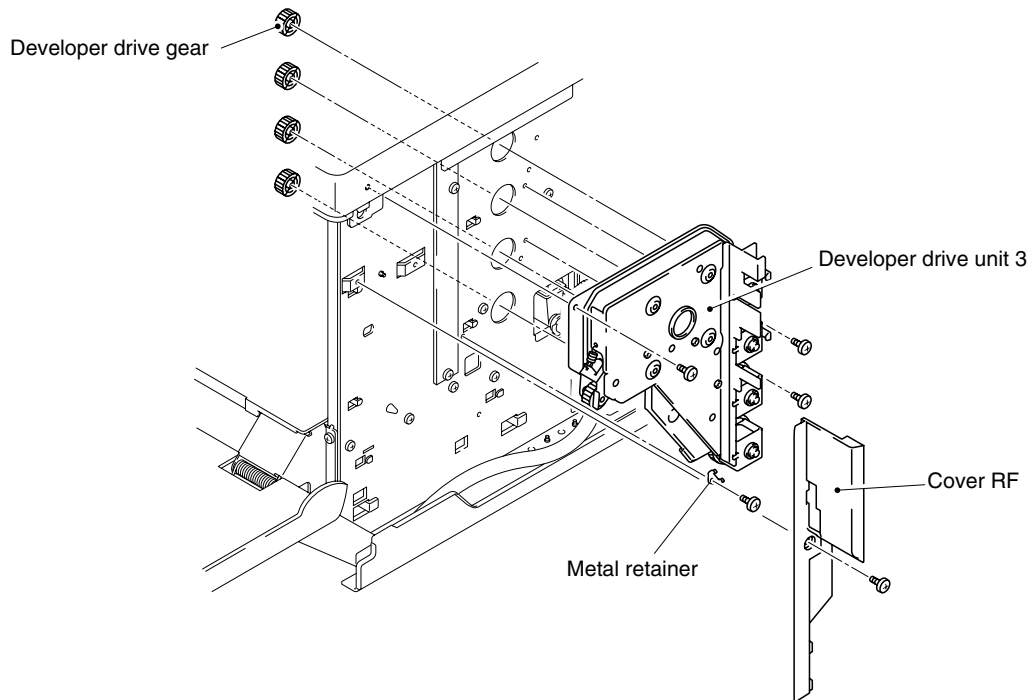


Fig. 7-23



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.

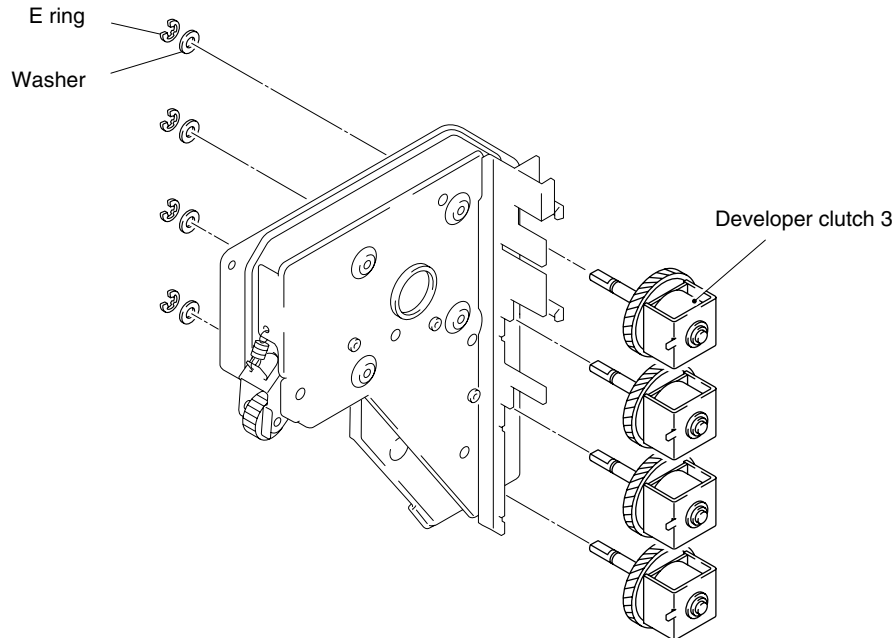


Fig. 7-24

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.

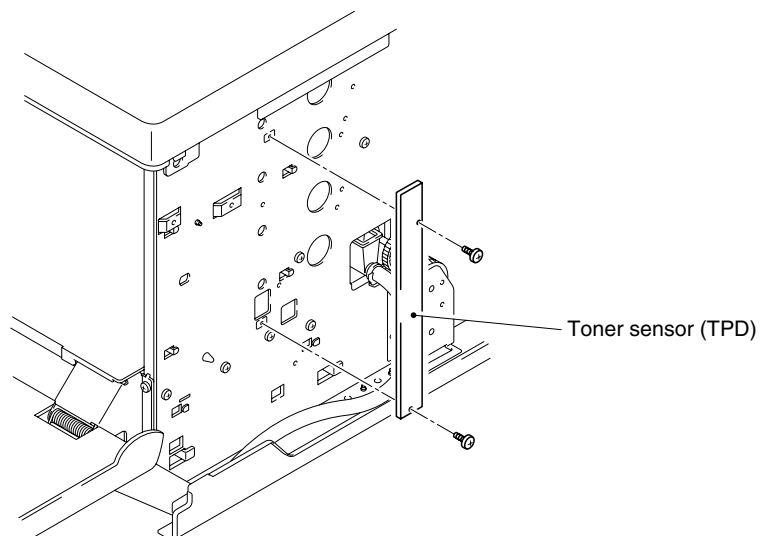


Fig. 7-25

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.

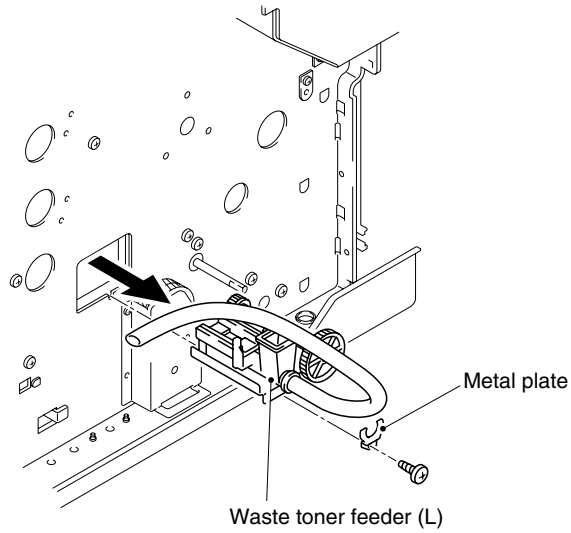


Fig. 7-26

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)

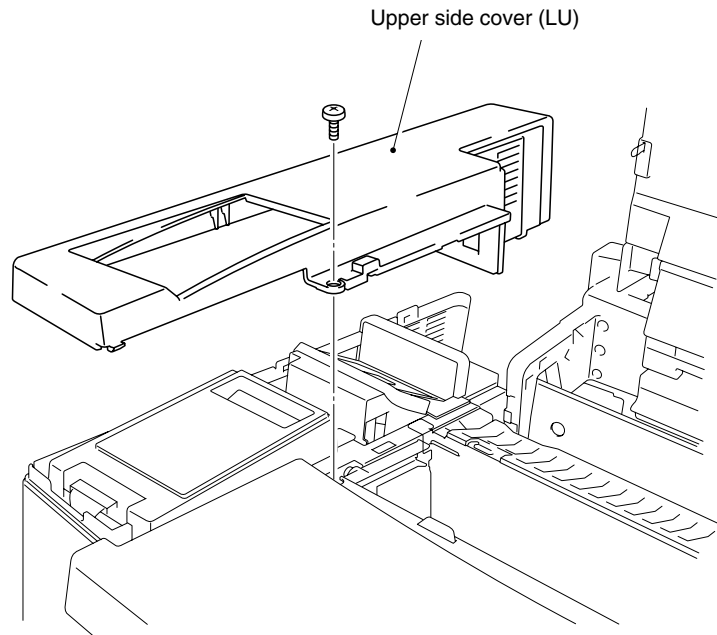


Fig. 7-27

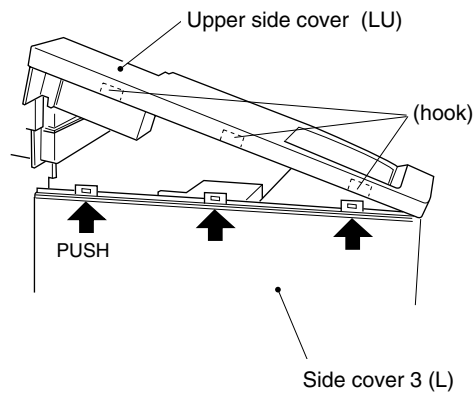


Fig. 7-28

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.

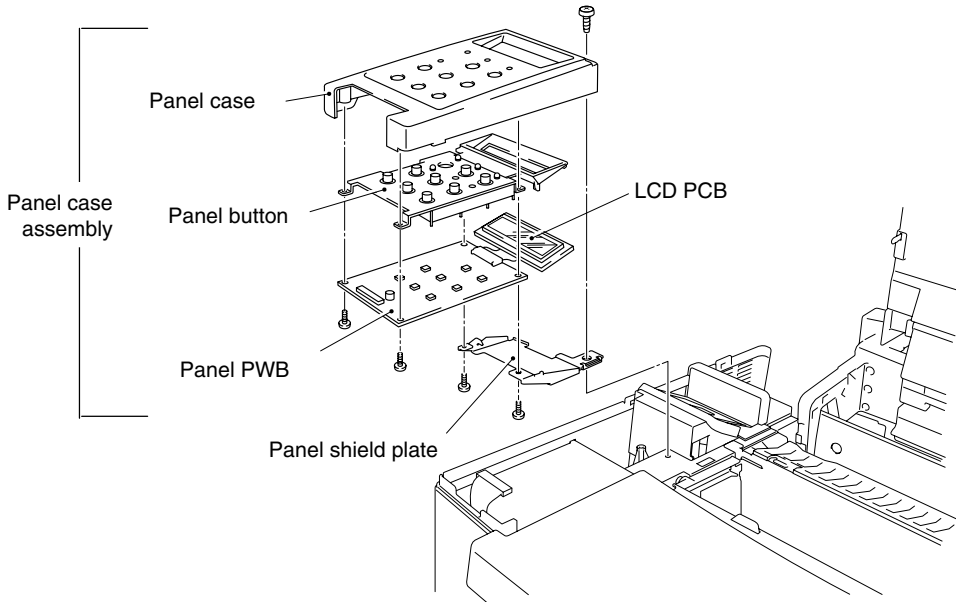


Fig. 7-29

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).

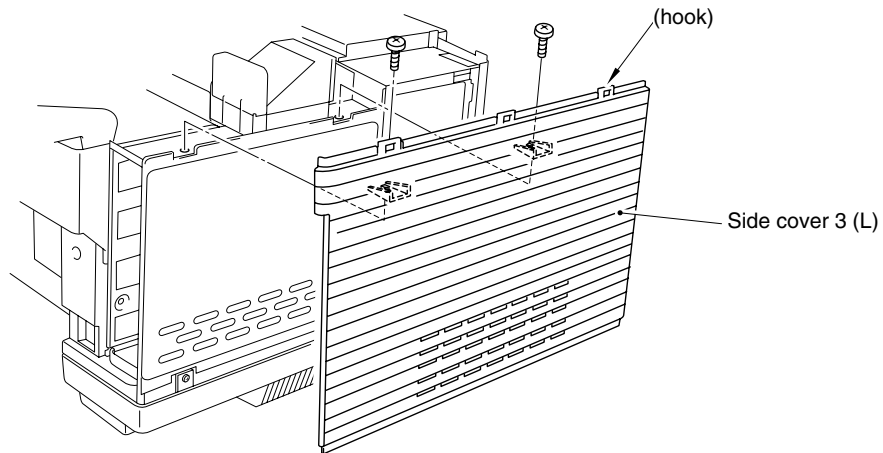


Fig. 7-30

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.

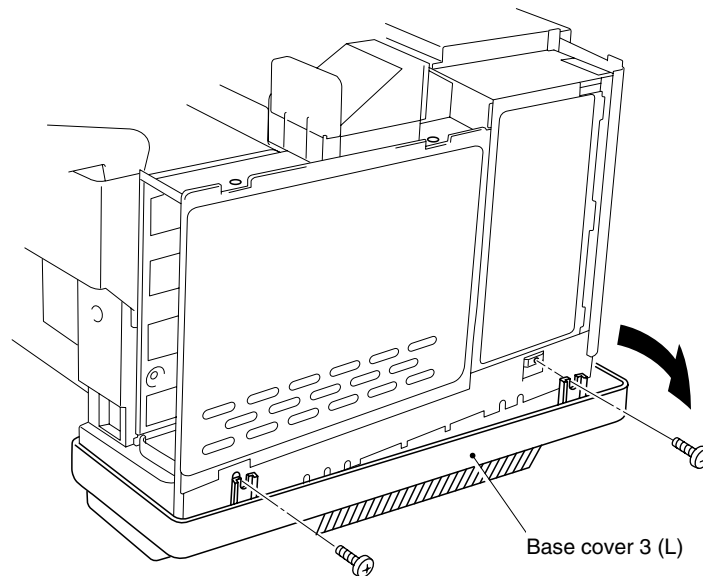



Fig. 7-31

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.

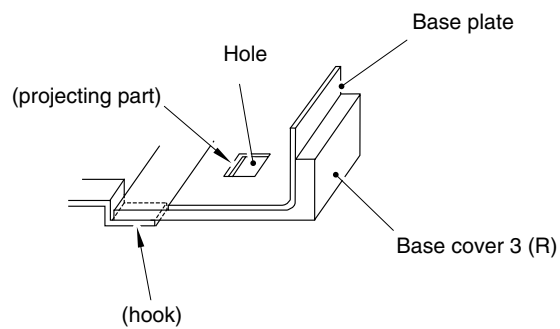


Fig. 7-32

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.

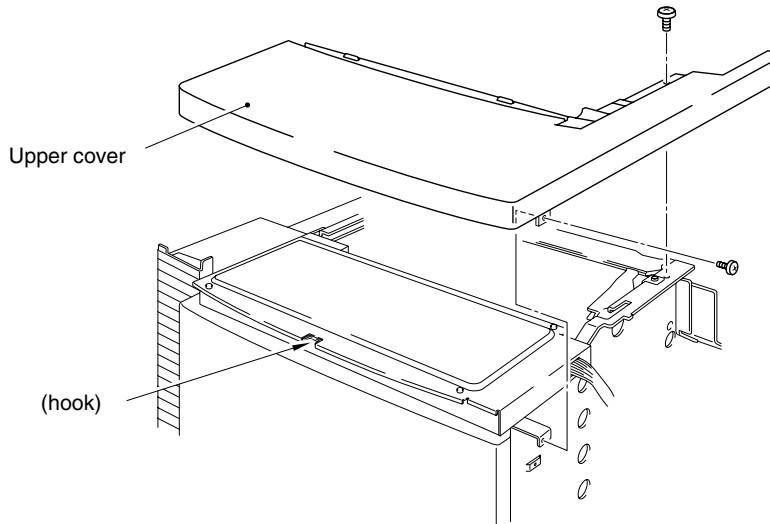


Fig. 7-33

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).

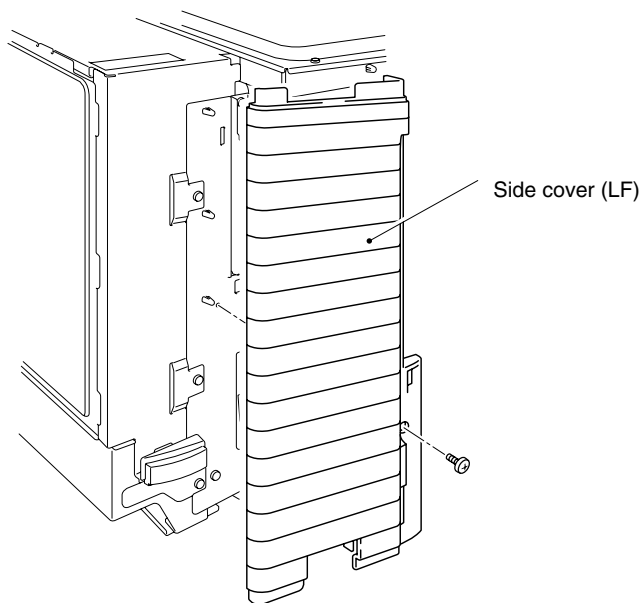


Fig. 7-34

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.

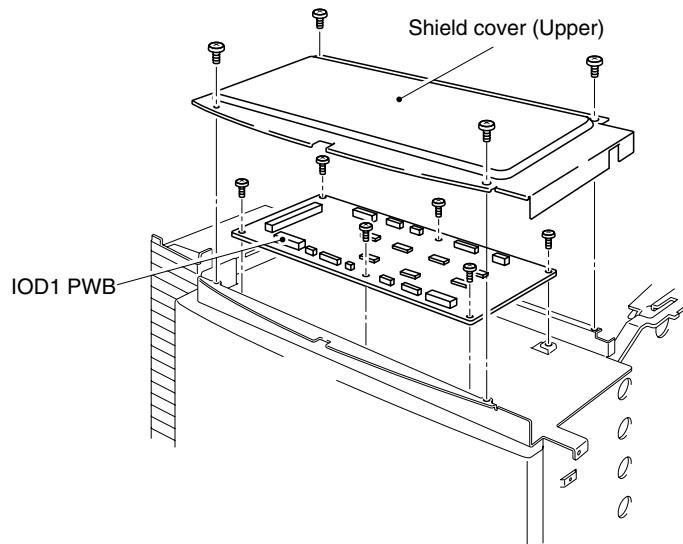


Fig. 7-35



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.

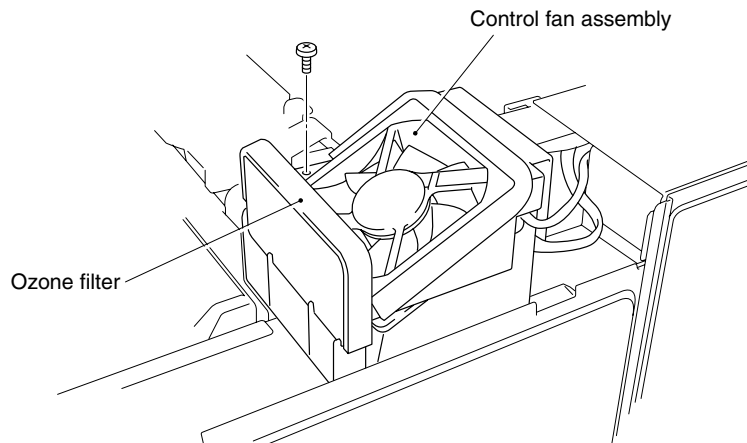


Fig. 7-36

- (3) Remove the fan motor and interlock switch from the fan case after releasing the fan cover plastic clips.

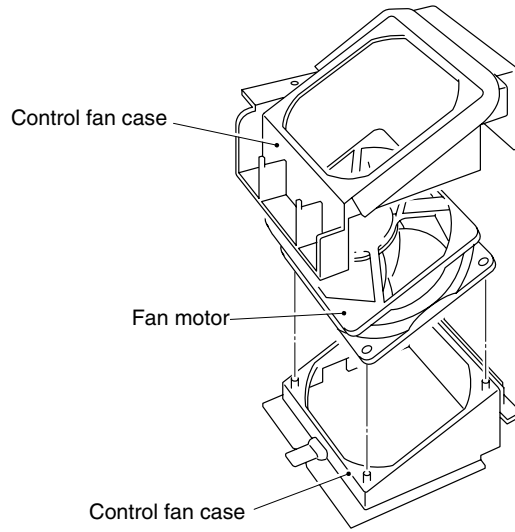


Fig. 7-37

- (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.

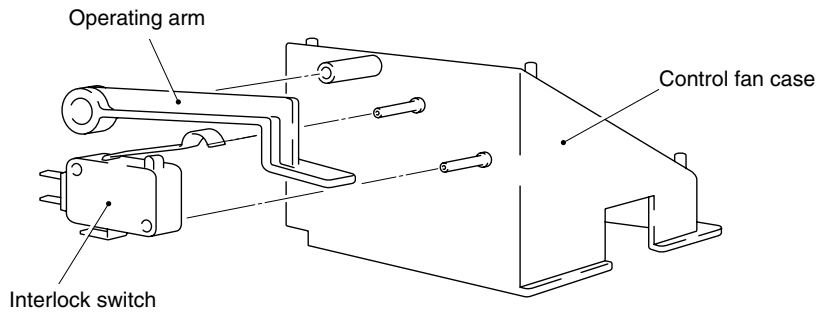


Fig. 7-38

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.

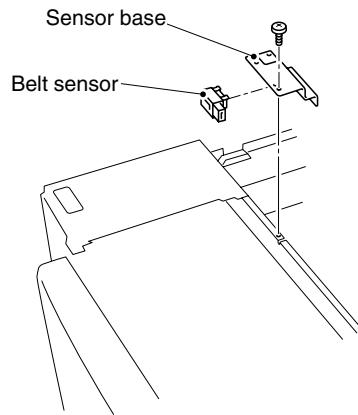


Fig. 7-39

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.

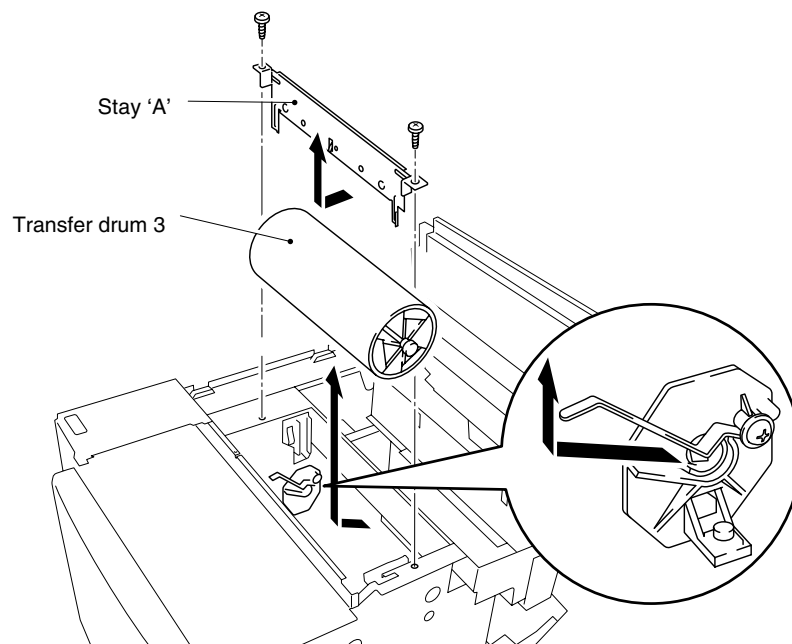


Fig. 7-40

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.

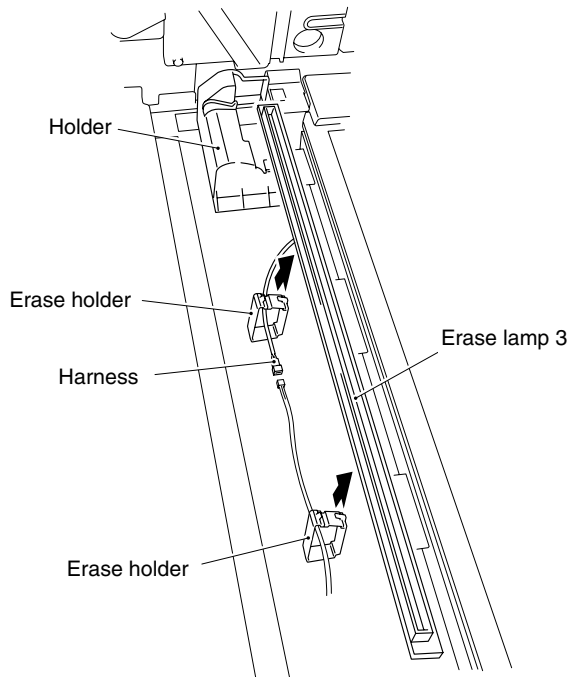


Fig. 7-41

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.

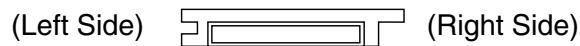


Fig. 7-42

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 drum jam sensor (DPJ) is identical to the belt sensor (PBS).

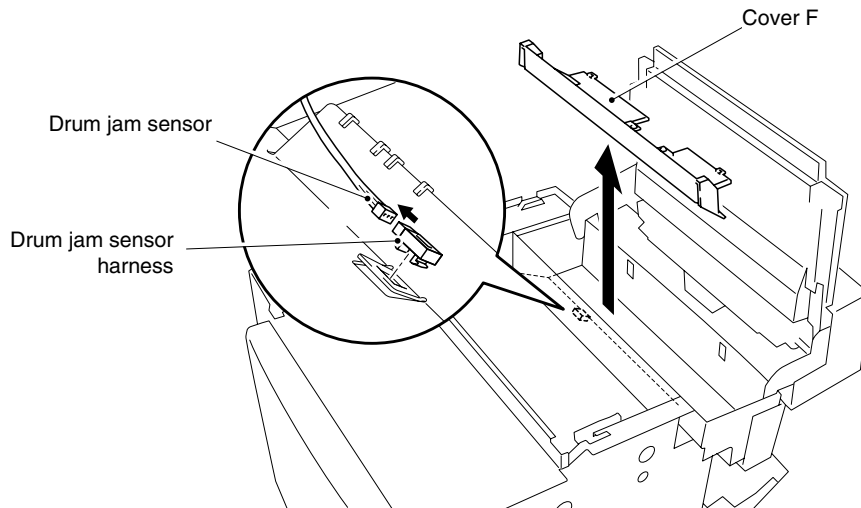


Fig. 7-43

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.

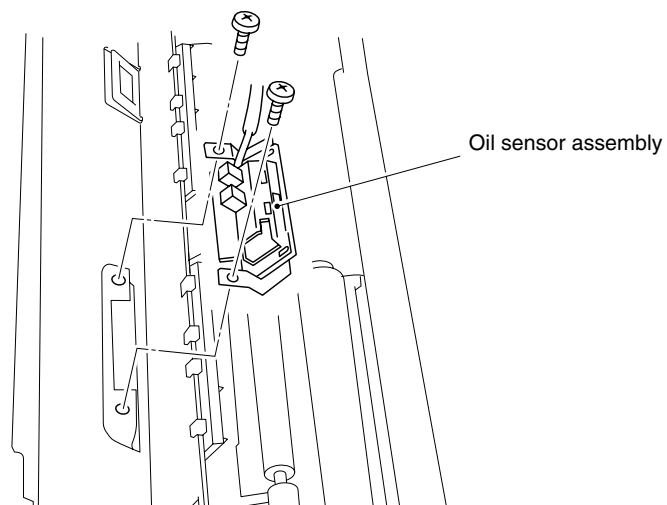


Fig. 7-44

4.3 Left Side of the Printer

4.3.1 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.

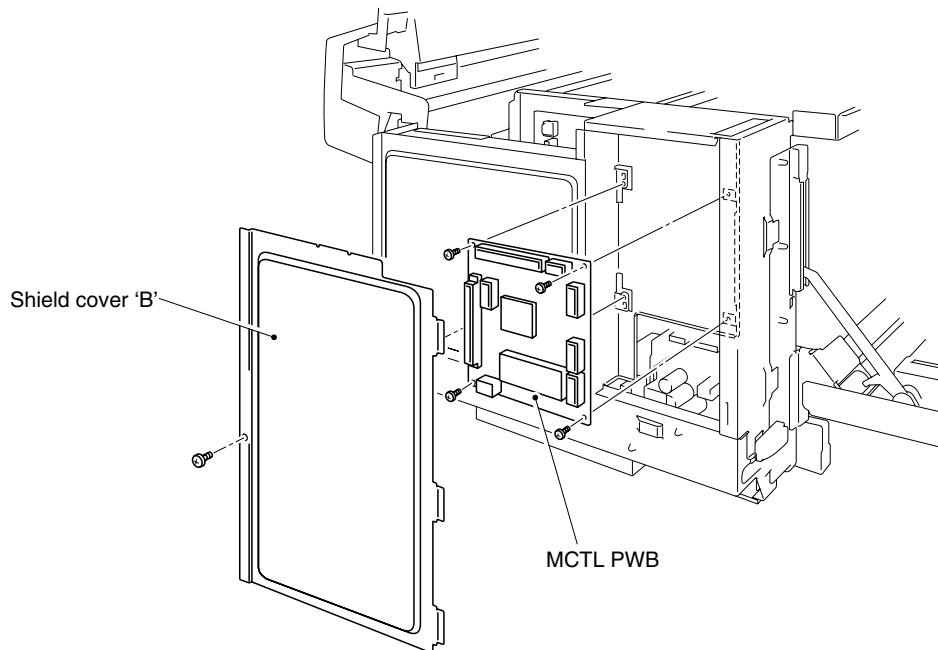


Fig. 7-45

4.3.2 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.

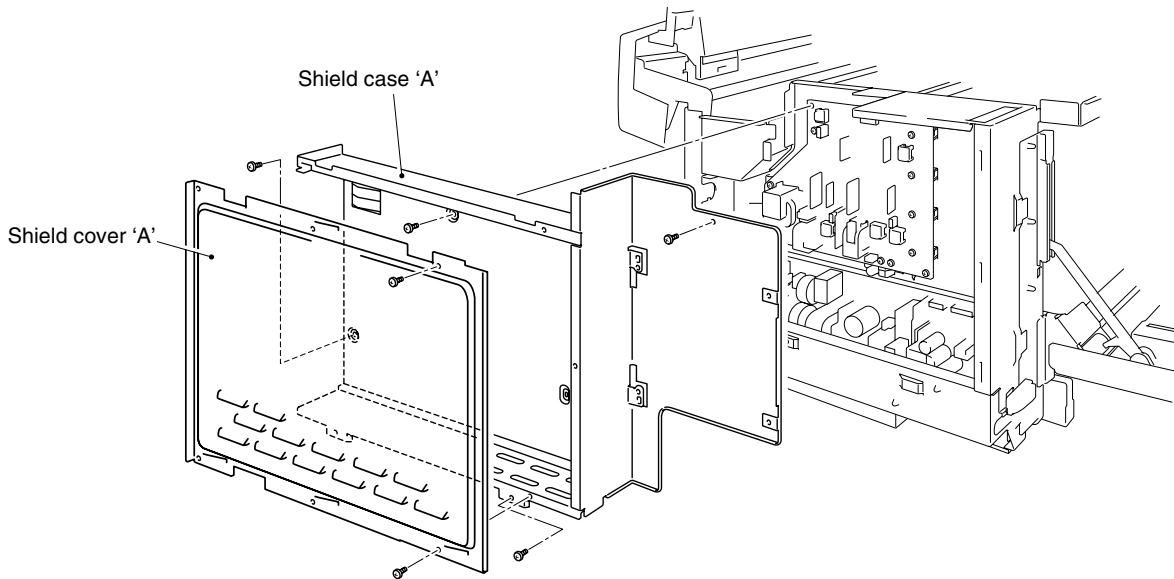


Fig. 7-46

- (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.

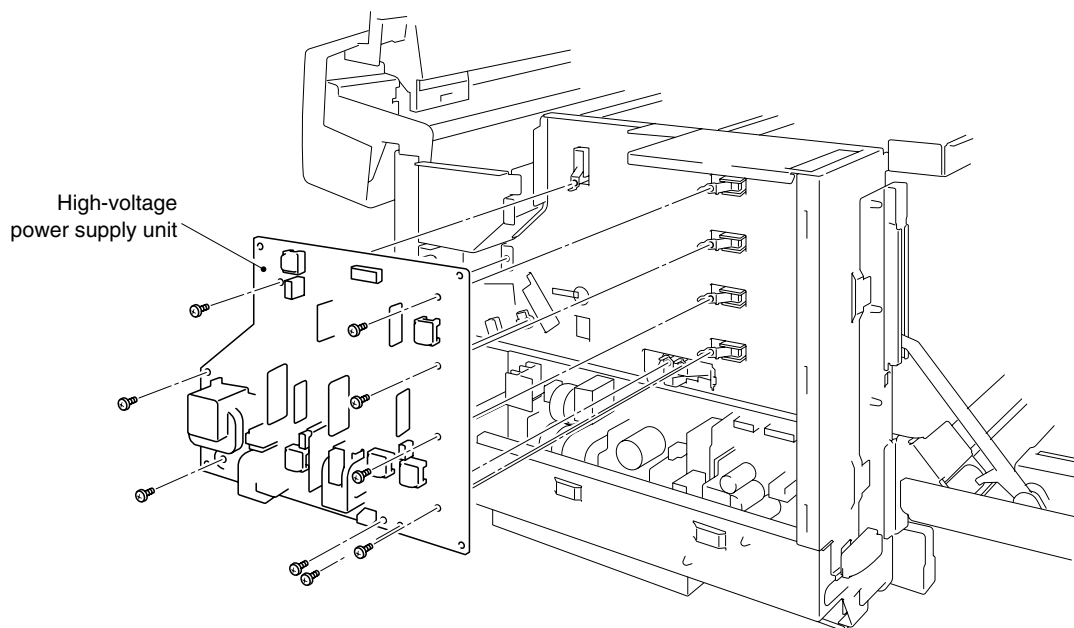


Fig. 7-47

! 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).

4.3.3 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.

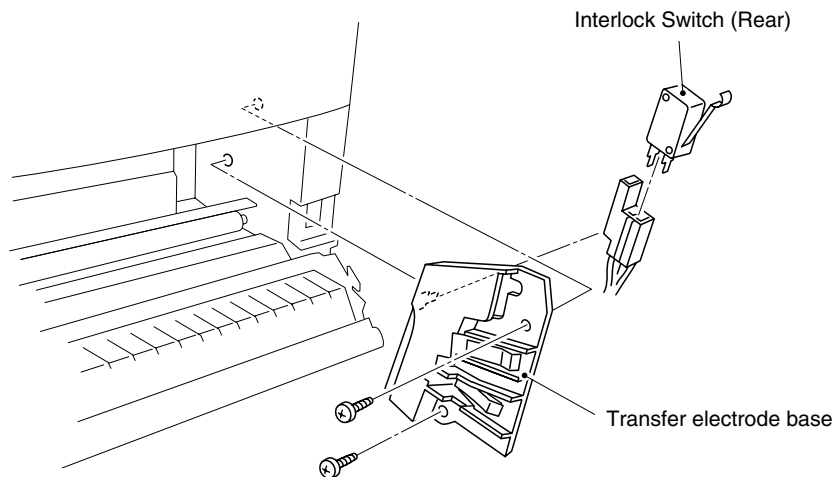


Fig. 7-48

! CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.3.4 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.

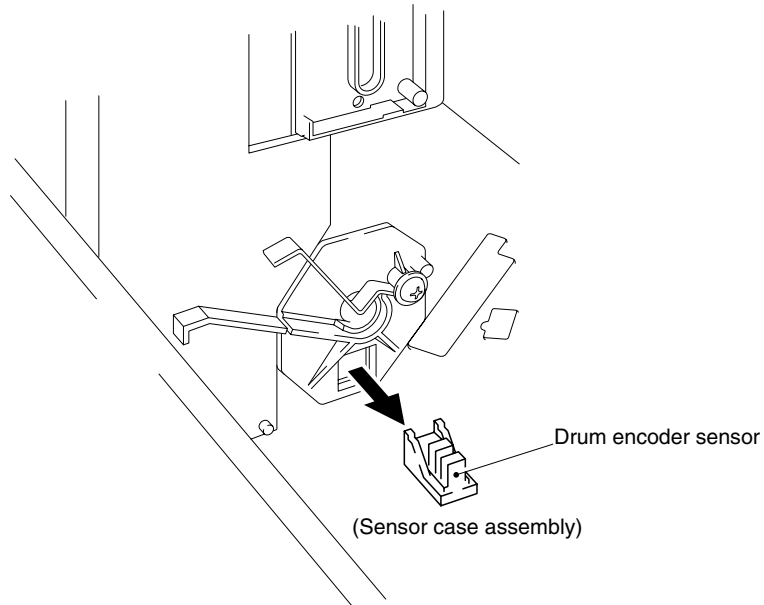


Fig. 7-49

4.3.5 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.

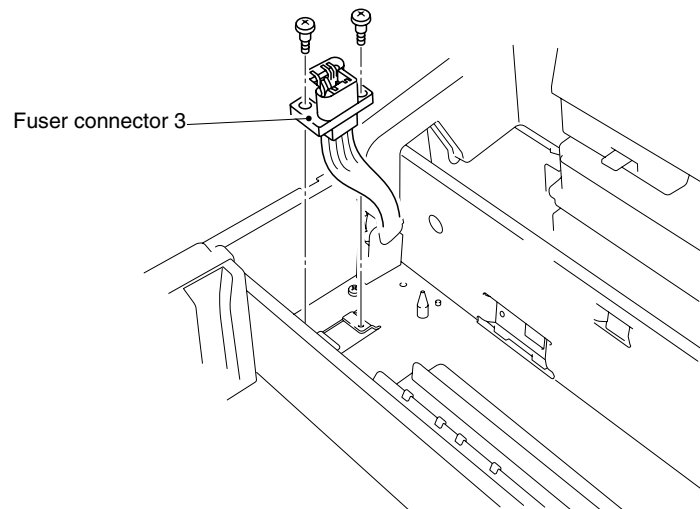


Fig. 7-50

4.3.6 Rear cover 3 (R)

- (1) Remove the set screw BT4x10 (1 pc.) of rear cover 3 (R).
- (2) Remove the rear cover 3 (R).

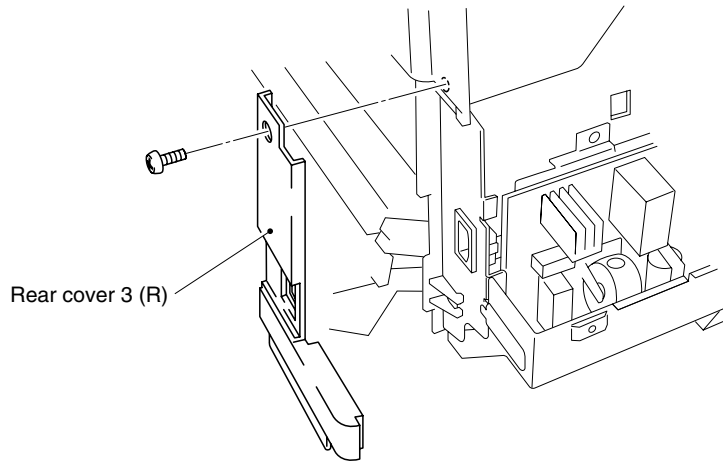


Fig. 7-51

4.3.7 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.

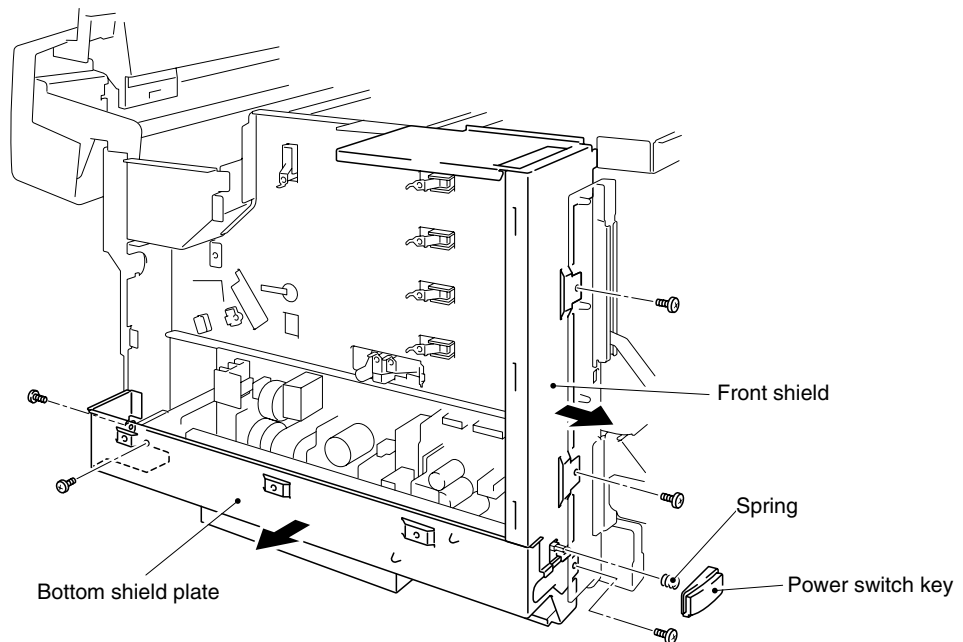


Fig. 7-52

- (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.

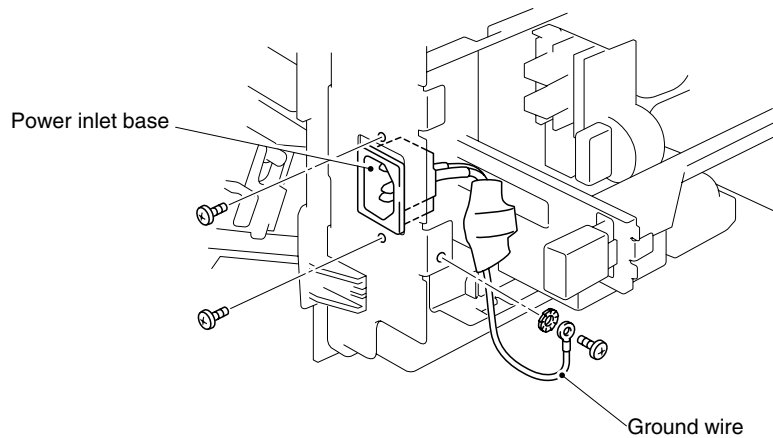


Fig. 7-53

- (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.

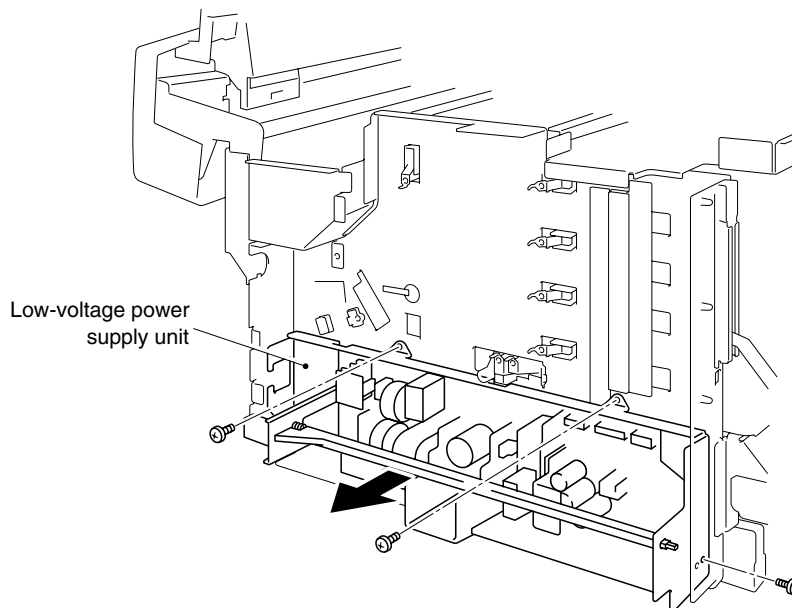


Fig. 7-54

⚠ 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.

4.3.8 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.

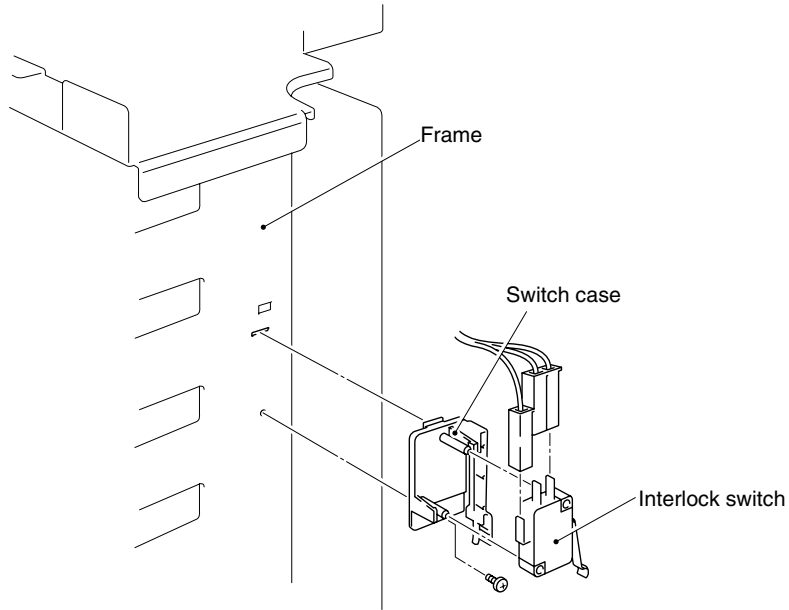


Fig. 7-55

 CAUTION

Since the interlock switch is an important safety item, after installation confirm that the switch operates correctly.

4.3.9 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.

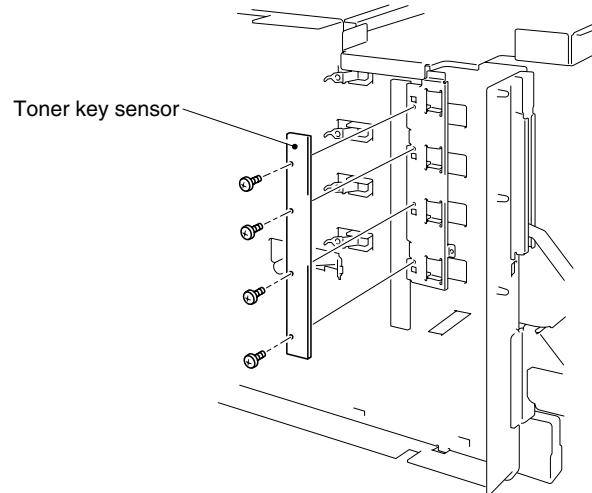


Fig. 7-56

4.3.10 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.

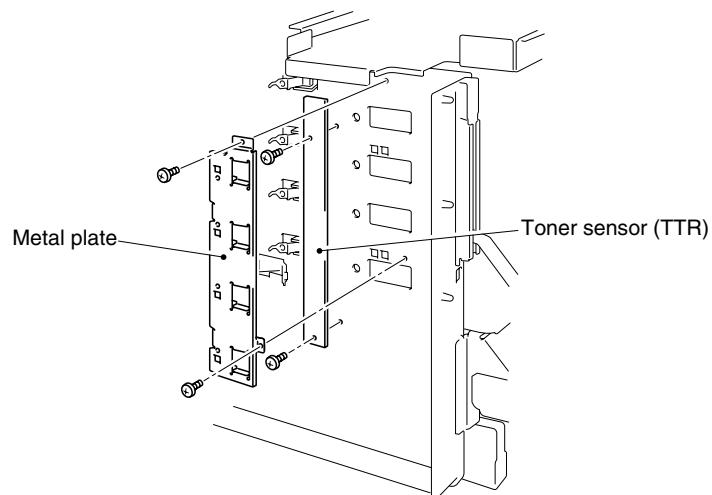


Fig. 7-57

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.

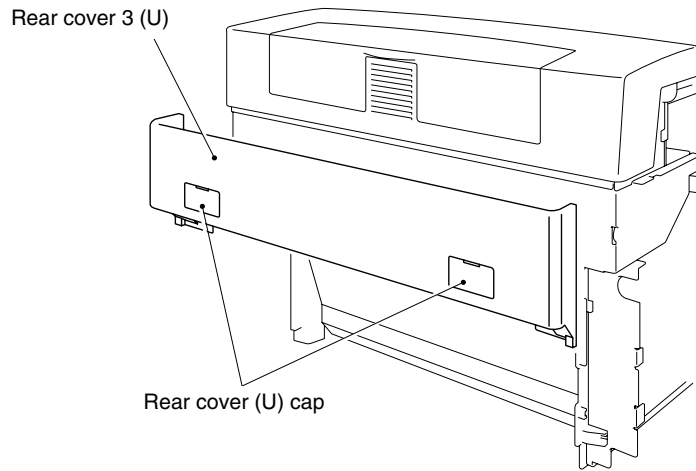


Fig. 7-58

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.

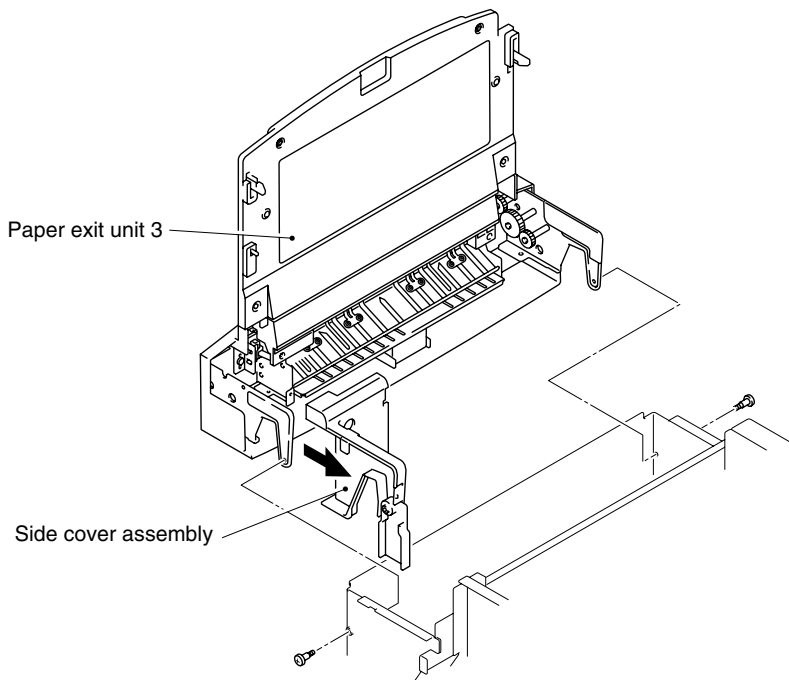


Fig. 7-59

- (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.

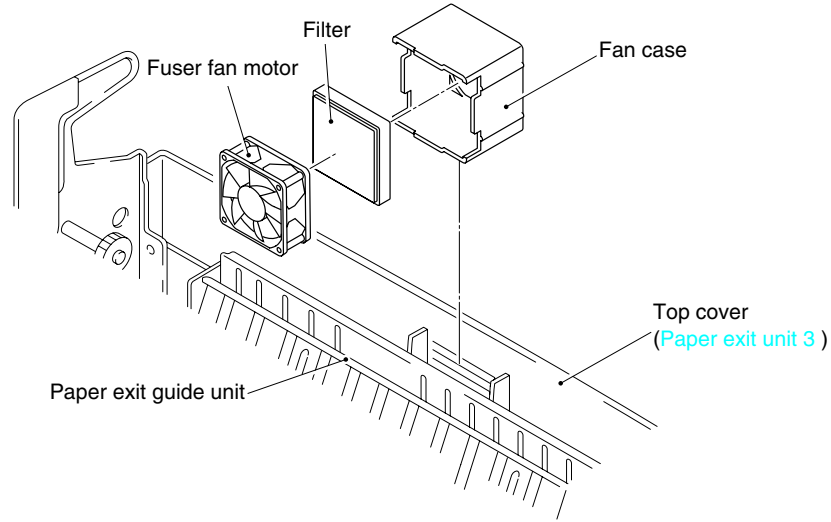


Fig. 7-60

- (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.

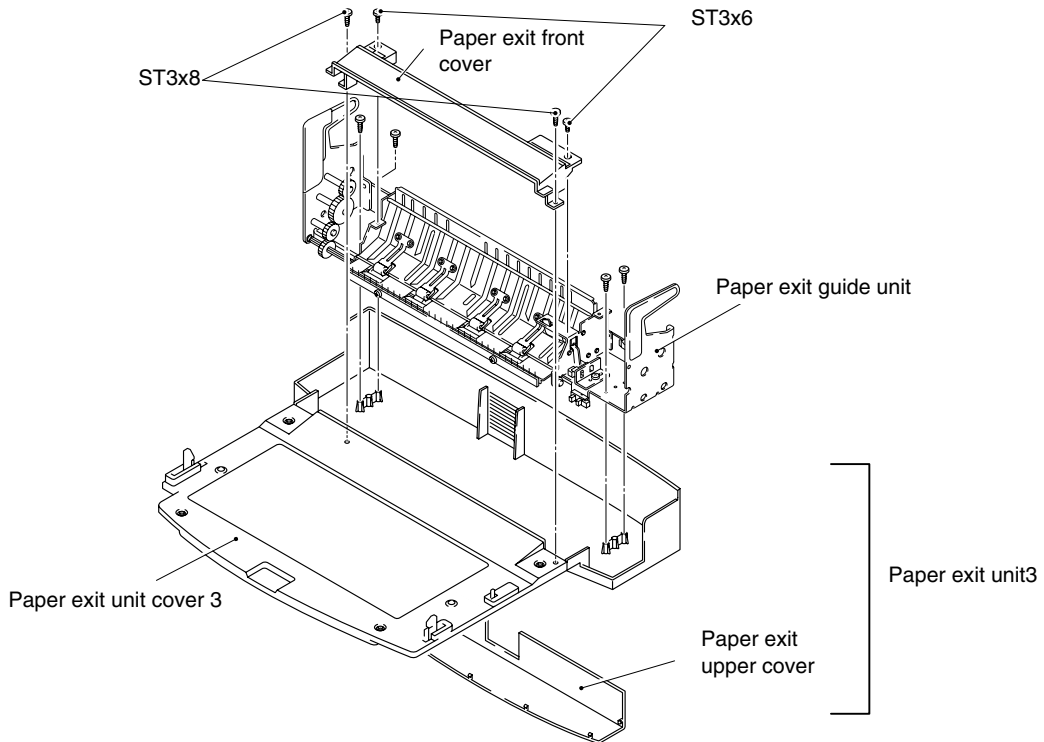


Fig. 7-61

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.

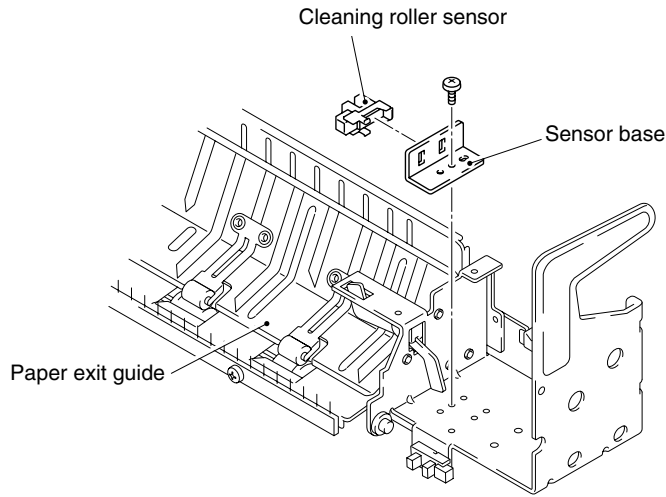


Fig. 7-62

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.

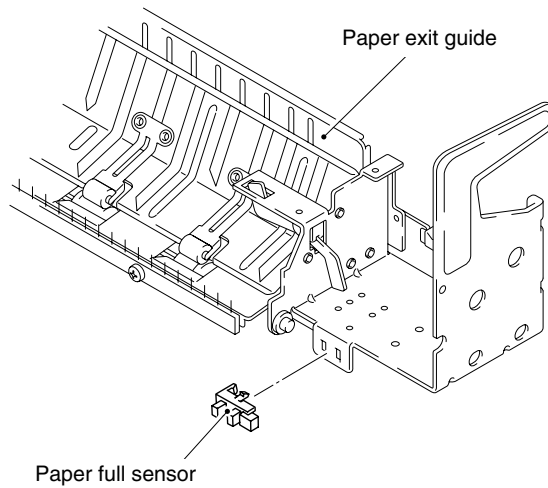


Fig. 7-63

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.

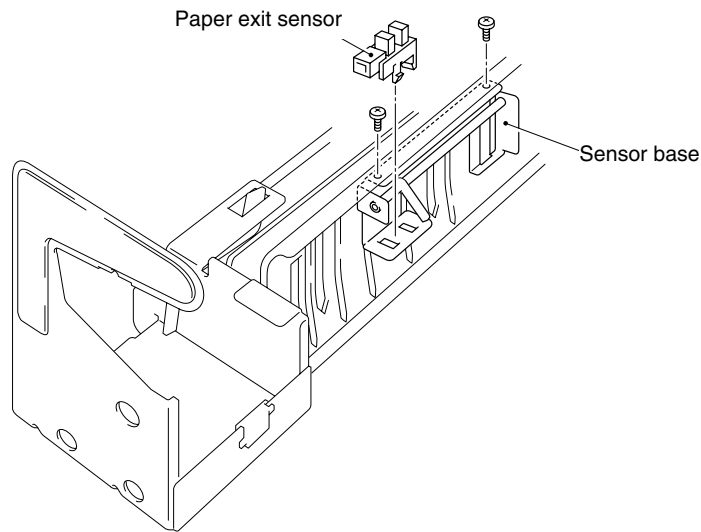


Fig. 7-64

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.



Do not deform the discharger brush.

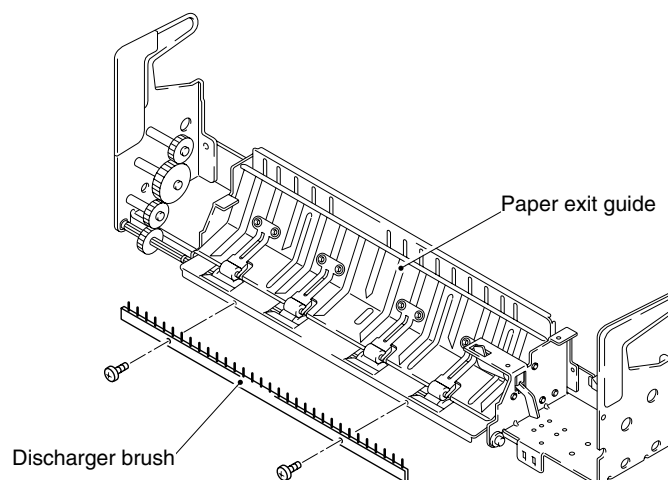


Fig. 7-65

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.

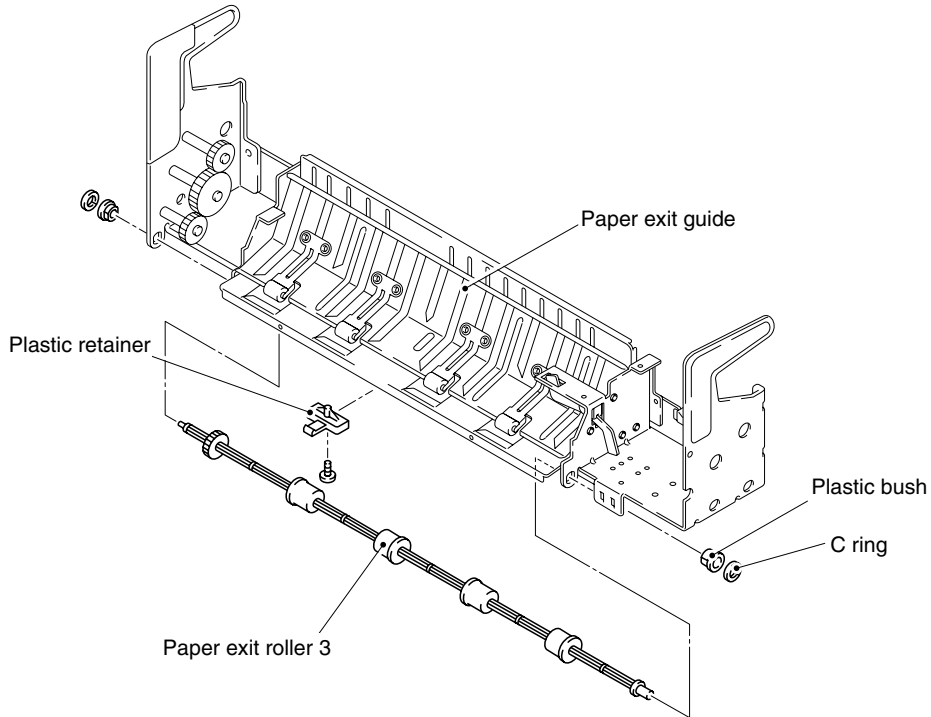


Fig. 7-66

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.

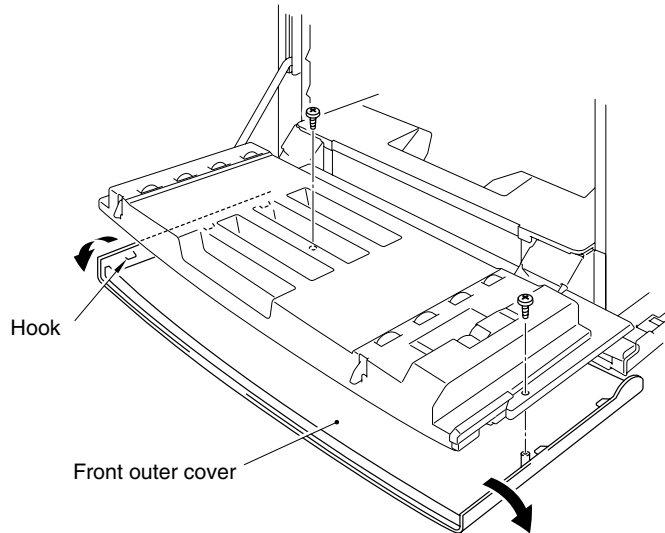


Fig. 7-67

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.

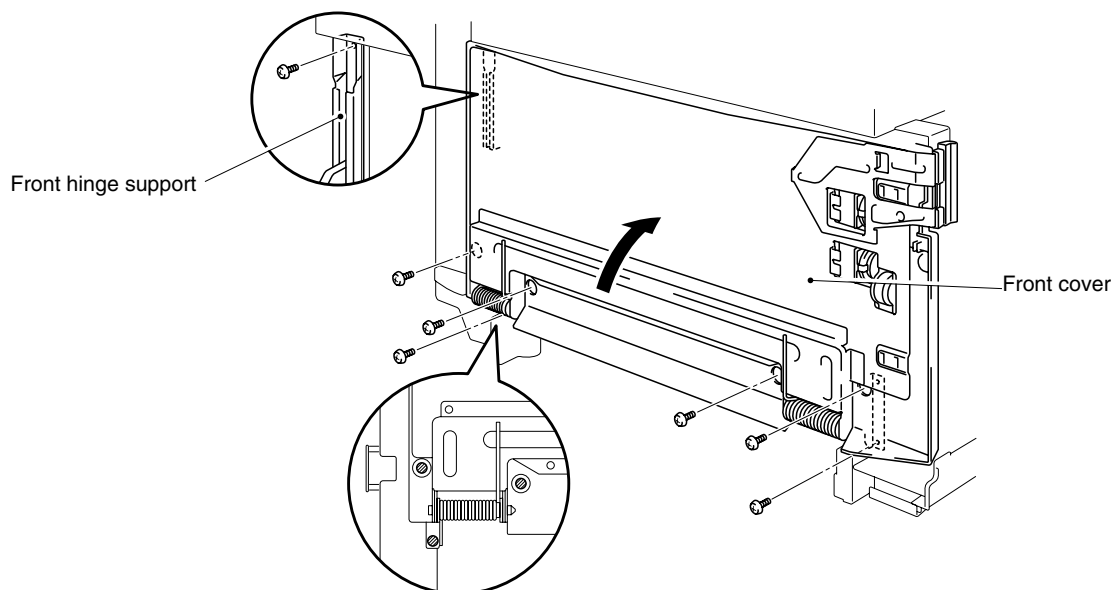


Fig. 7-68

- (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.

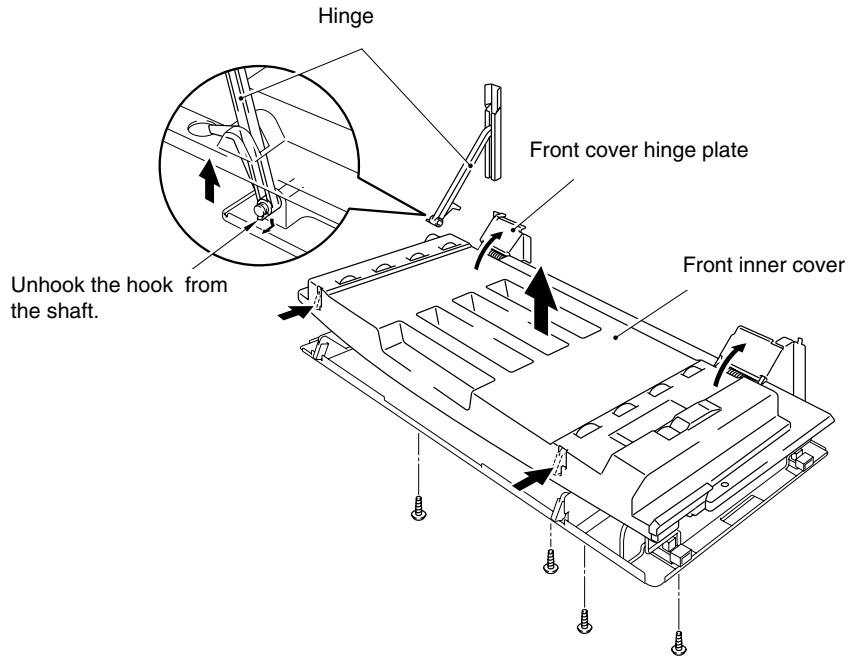


Fig. 7-69

- (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.

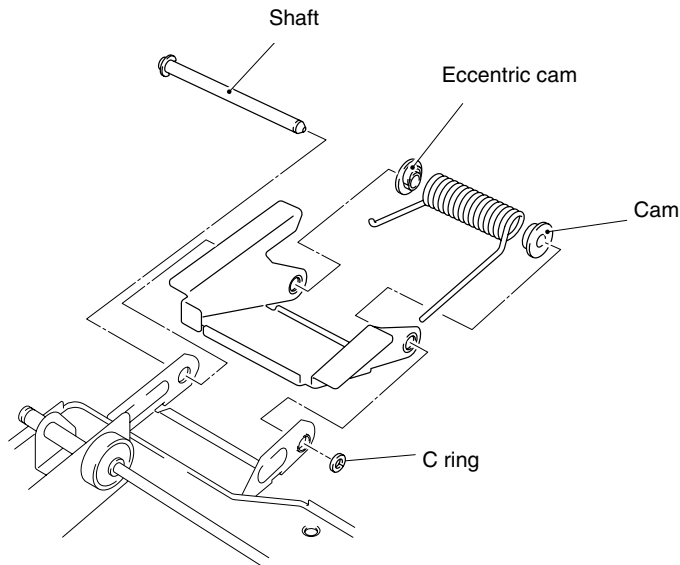


Fig. 7-70

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.

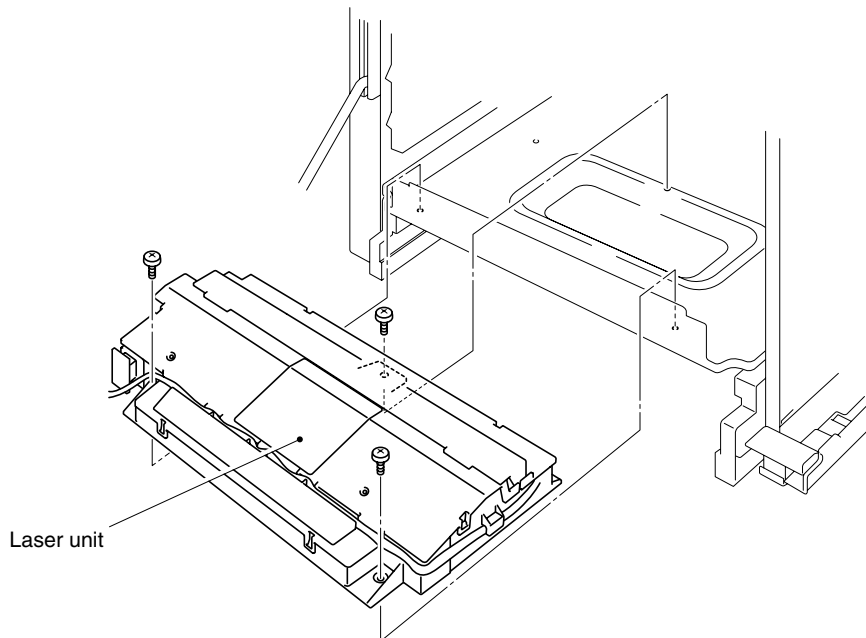


Fig. 7-71

 **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.

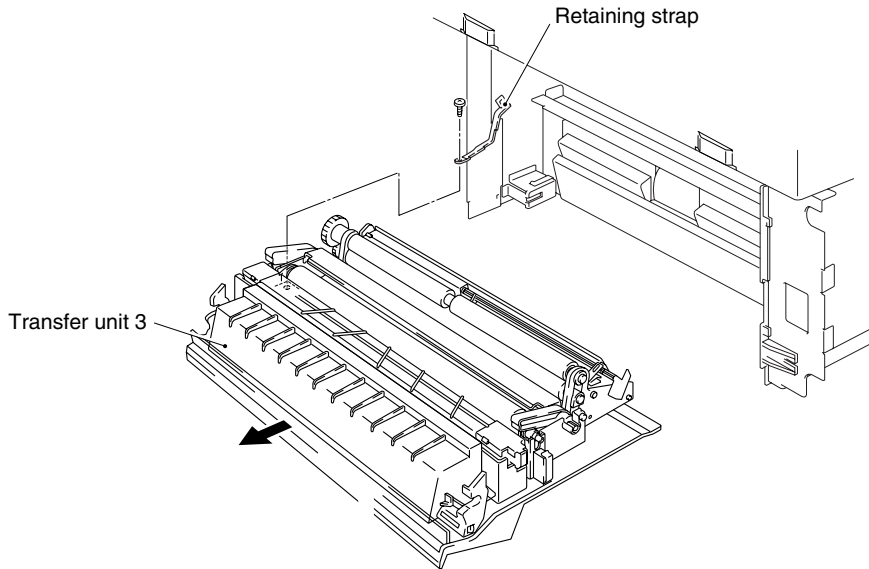


Fig. 7-72

- (4) Remove the set screws BT3x8 (4 pcs.) from the transfer unit 3.
- (5) Remove the transfer unit 3 from the rear access cover.

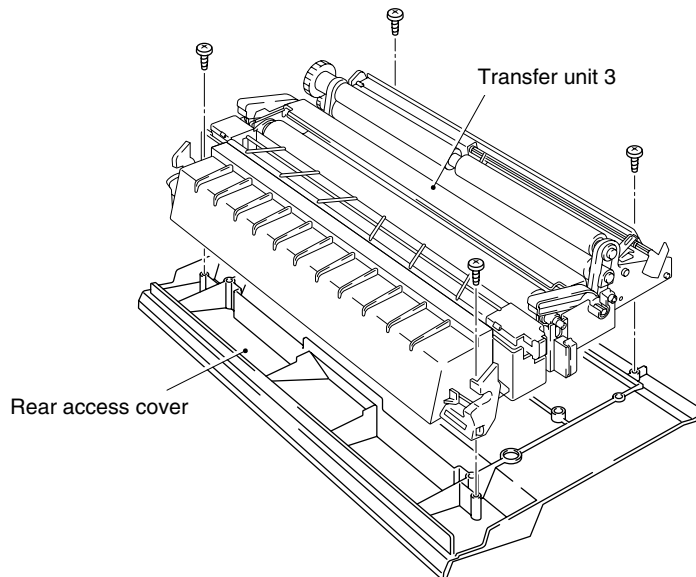


Fig. 7-73

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.

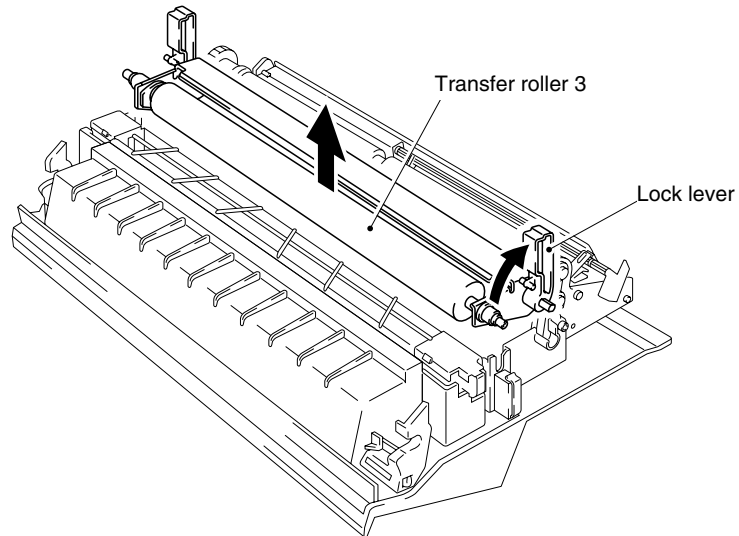


Fig. 7-74

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.

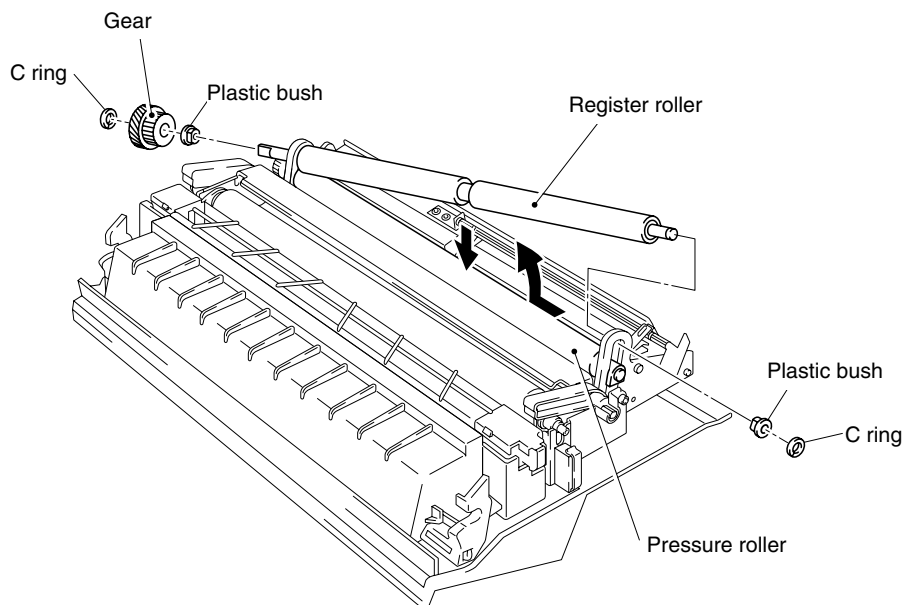


Fig. 7-75

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.

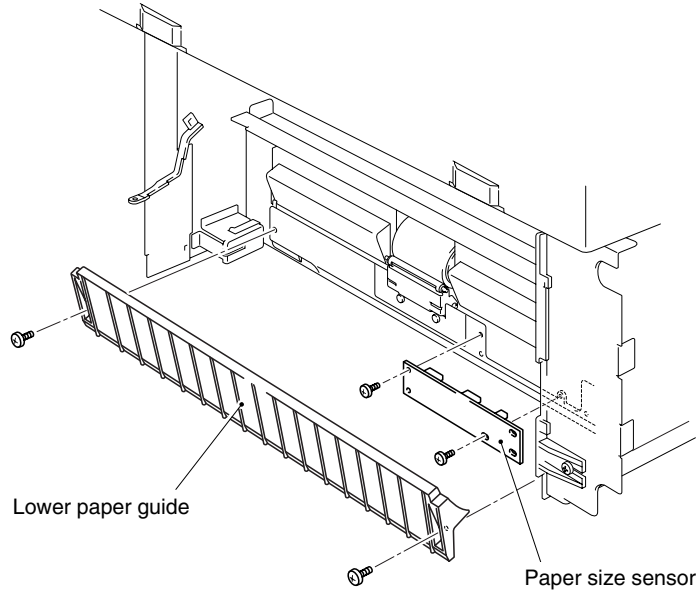


Fig. 7-76

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.

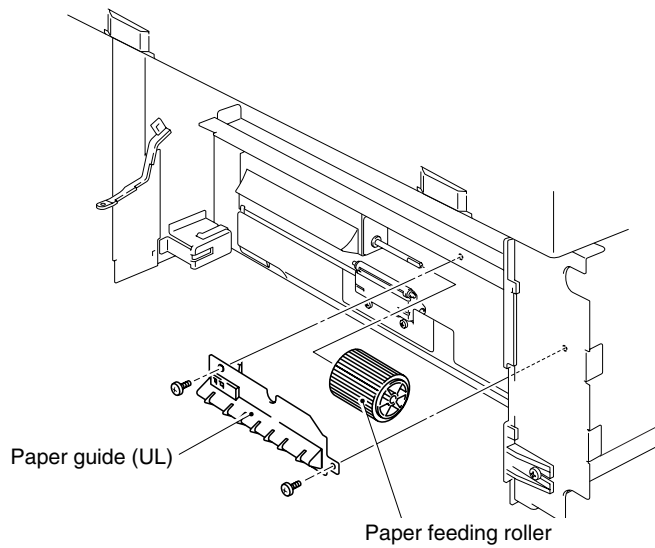


Fig. 7-77

- (5) Pull up and remove the separator pad (2).

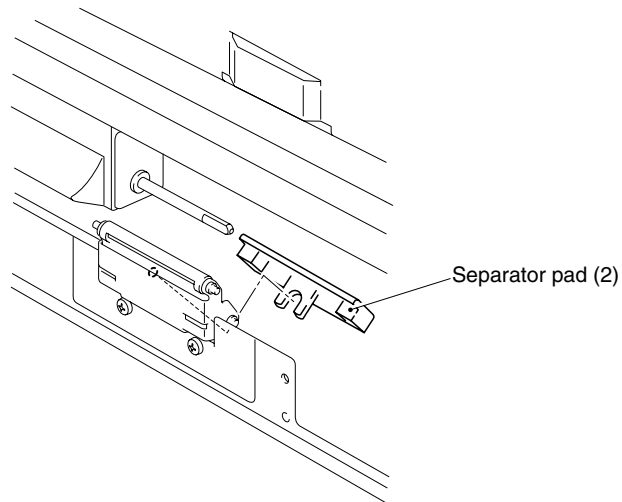


Fig. 7-78



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)

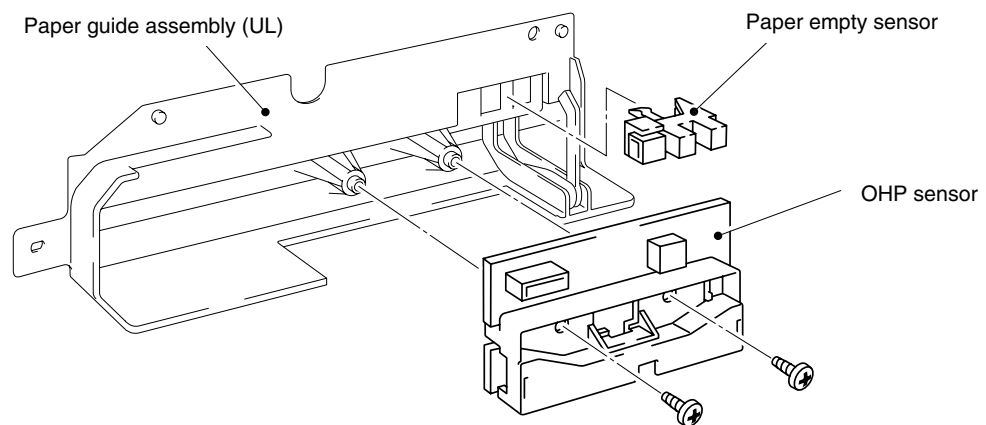


Fig. 7-79

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.

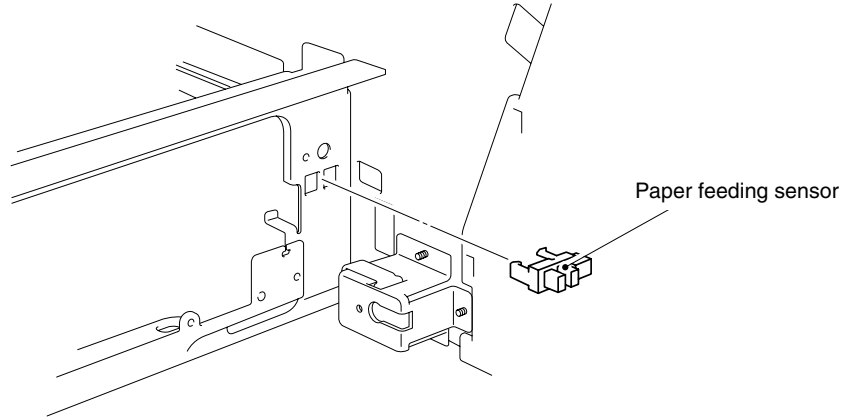


Fig. 7-80

4.7 Fusing Unit



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.

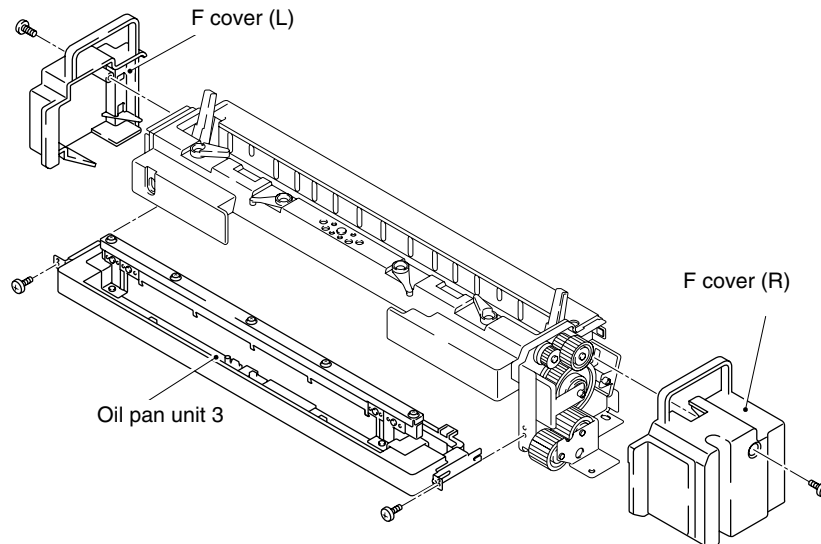


Fig. 7-81

4.7.2 Oil pad

Remove the fixing screws ST3x6 (2pcs.) to remove the oil pad from the oil pan unit 3.

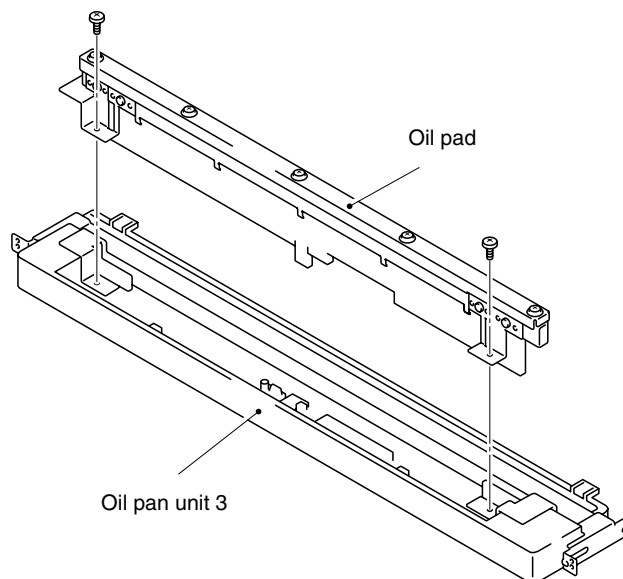


Fig. 7-82

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.

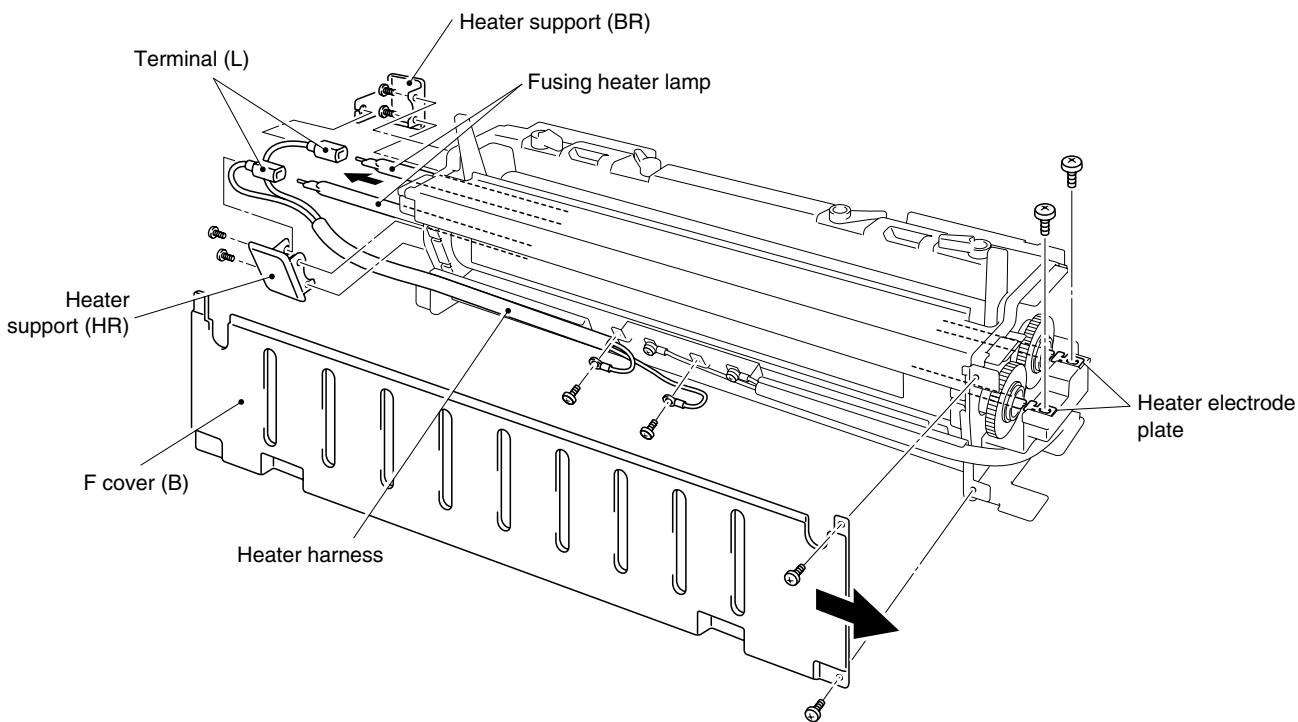


Fig. 7-83

⚠ 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.

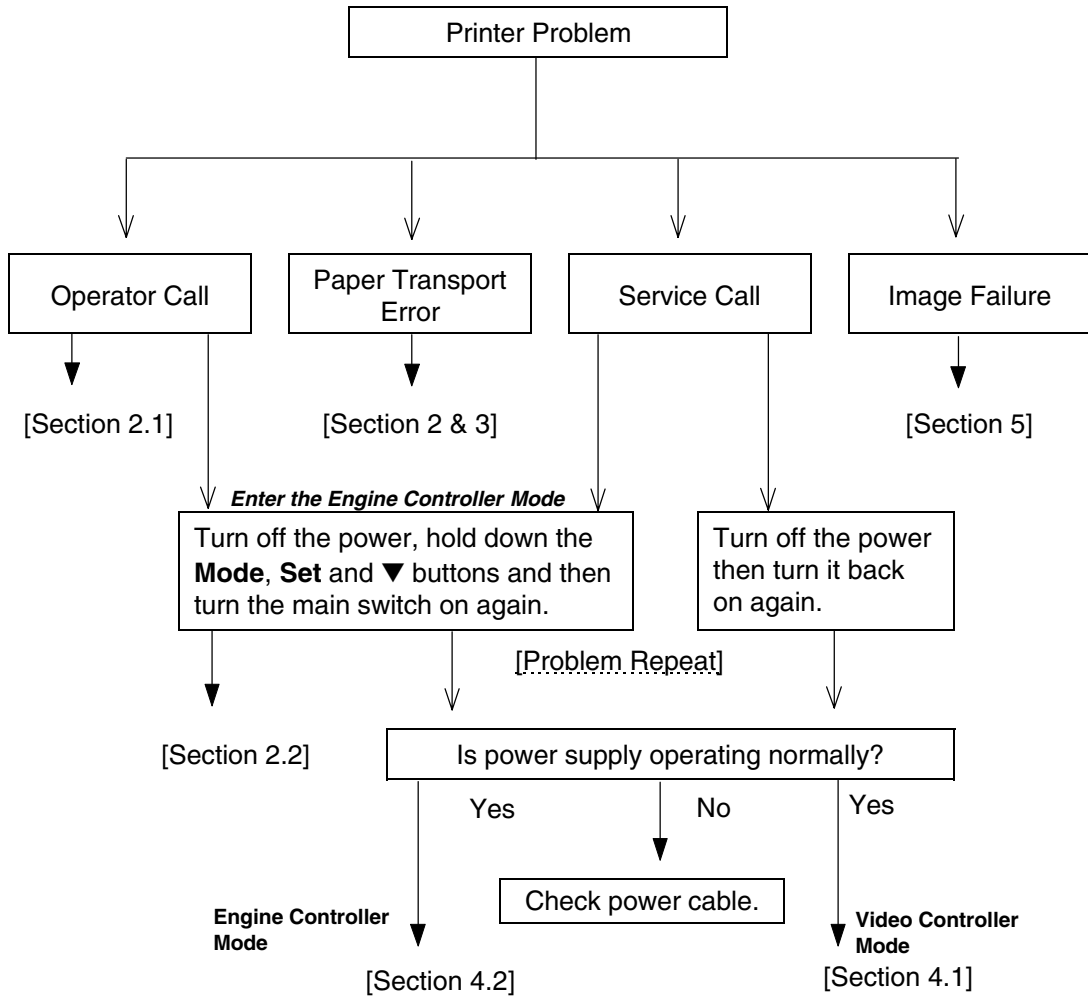
However, if a problem occurs in the video controller itself, use the Engine Controller Mode information as it may be easier to understand the cause of the problem because the Engine Controller mode can separate the problem in the video controller from the printing operations.

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 **Ready** 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	Meaning	Countermeasure
CHECK XXXXXXXX	No paper in the paper tray. XXXXXXXX is TRAY1 / TRAY2 / TRAY3.	Check the paper is correctly inserted in the tray when the CHECK TRAYX message appears. Load a stack of paper into the cassette.
12 COVER OPEN FRONT	The front cover is open	Close the front cover.
12 COVER OPEN TOP	The top cover is open.	Close the top cover.
12 COVER OPEN REAR	The rear access cover is open.	Close the rear access cover.
12 COVER OPEN LFU	The lower tray unit cover is open.	Close the lower feeder unit cover.
12 COVER OPEN DPX	The duplex unit cover is open.	Close the duplex unit cover.
13 JAM XXXXXXXX	Paper is jammed in the printer. XXXXXXXX is DRUM / TRAYS / INSIDE / REAR.	Remove the jammed paper from the indicated area.
14 NO CARTRIDGE XXXX COLOR	No toner cartridge in the printer. XXXX indicates colors.	Install the requested toner cartridge.
XX NO CASSETTE	No media cassette. XX is T1 / T2 / T3.	Install the requested media cassette.
16 TONER EMPTY XXXX COLOR	The printer has almost run out of toner: Another 50 pages may be printed. (The Alarm LED is lit at the same time.) XXXX indicates color.	Remove the toner cartridge, rock it several times at 45°, and install it again or replace the toner cartridge with a new one.

Display Message	Meaning	Countermeasure
XX LOAD PAPER ***** SIZE	The wrong size of paper in the media cassette XX. XX is T1 / T2 / T3.	Load the requested size of paper in the media cassette and press the Form Feed button.
T1 MANUAL FEED ***** SIZE	Request to load paper manually.	Load the requested size of paper into the standard media cassette and press the Sel button.
19 CHECK FONT	An error occurred in the optional font card.	Turn off the printer, and reinstall or replace the optional font card.
20 FONT REMOVAL	The PCMCIA card was removed while the printer is on-line.	Turn off the printer, re-install the font card, and turn on the printer. The Continue button will allow you to temporarily ignore this message.
22 WASTE TONER	The waste toner pack is full of toner.	Replace with a new one.
23 OIL EMPTY	The oil in the oil bottle is empty.	Replace with a new one.
24 CHANGE FCR	It is time to replace the fuser cleaner.	Replace with a new one.
25 NO FUSER UNIT	The fusing unit is not installed correctly.	Remove fusing unit and then refit it. Confirm correctly installed and clamped.
27 NO OPC BC	The OPC belt cartridge is not installed correctly.	Remove the OPC belt cartridge and then refit it. Confirm correctly installed and locked.
28 NO FC ROLLER	The cleaning roller is not installed correctly.	Remove the cleaning roller and then refit it. Confirm correctly installed and clamped.
13 JAM DPX1	Paper jam has occurred in the duplex upper unit.	Remove the jammed paper from the duplex unit.
13 JAM DPX2	Paper jam has occurred in the duplex lower unit.	Remove the jammed paper from the duplex unit.
DX MEDIA ERROR	Paper which does not meet the specification is loaded.	Load paper which meet the specification.
29 NO LFU	The lower tray unit is not installed when the duplex unit is installed.	Install the lower tray unit.
30 NO TR ROLLER	The transfer roller is not installed.	Install the transfer roller.
31 ILLEGAL TONER	The printer detects the toner installed is not Brother original.	Install the Brother original toner cartridge.
40 STACKER FULL	Output stacker is full.	Remove the paper from the output stacker.

Display Message	Meaning	Countermeasure
FUSER OIL LOW	The oil in the oil bottle is almost empty.	Replace with a new one.
REPLACE FCR	It is time to replace the cleaning roller.	Replace with a new one.
REPLACE OPC BELT	It is time to replace the OPC belt cartridge.	Replace with a new one.
REPLACE FUSER	It is time to replace the fusing unit.	Replace with a new one.
REPLACE 120K KIT	It is time to replace the paper discharger.	Replace with a new one.
REPLACE 240K KIT	It is time to replace the drum cleaner and transfer roller.	Replace with new ones.
REPLACE TRF DRUM	It is time to replace the transfer drum.	Replace with a new one.
REPLACE PF KIT1	It is time to replace the paper feeding kit (paper feeding roller and separator pad) in the printer.	Replace with new ones.
REPLACE PF KIT2	It is time to replace the paper feeding kit (paper feeding roller and separator pad) in the lower tray unit 1.	Replace with new ones.
REPLACE PF KIT3	It is time to replace the paper feeding kit (paper feeding roller and separator pad) in the lower tray unit 2.	Replace with new ones.
REPLACE OIL PAD*	It is time to replace the oil pad.	Replace with a new one.
NEAR WASTE TONER	The waste toner pack is almost full of toner.	Replace with a new one.
NEAR STACK FULL	The output stacker is almost full.	Remove the paper from the output stacker.
32 BUFFER ERROR	Input buffer overflow	Reset the printer or turn off and on the printer.
34 MEMORY FULL	Work memory overflow	Press the Continue button to resume printing. If the same error occurs after you press the Continue button, turn off the printer. Wait a few seconds, then turn it on again. Reduce the input buffer size. Turn off "KEEP PCL". Add DIMM memory with printer power off. Download font and the fonts saved in the HDD card might cause the error, for these occupy the same work area as the RAM. Memory expansion is recommended in that case.

Display Message	Meaning	Countermeasure
40 LINE ERROR	Error in the communications circuit	When the serial interface is used, check the communications parameters such as baud rate, code type, parity, and handshake protocols. When the parallel interface is used, check the interface cable connection.
41 PRINT CHECK	Error in communication with the engine controller	Turn off the printer. Wait a few seconds, then turn it on again.
42 DEVICE1 (2/3) FULL	Card in slot 1 or 2 or HDD overflow.	Delete unnecessary macros or fonts, or use a new card.
43 DEVICE1 (2/3) WERR	Card in slot 1 or 2 or HDD write error.	Set the write protect button of the card to OFF if it has been set to ON. Use a new card.
45 MIO ERROR	Error in communication with the MIO card	Install the MIO card correctly.
47 DEVICE1 (2/3) RERR	Card in slot 1 or 2 or HDD read error.	Use a new card.
IGNORE DATA (BR-Script 2 mode only)	Data is ignored because of an error in the PostScript® language program.	Press the Reset button. If the same error occurs, you may need to add optional DIMM memory.

* 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](#).

2.2 Engine Controller Mode

The **Ready** 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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
- Transfer Unit
- Fusing Unit
- Paper Exit Unit

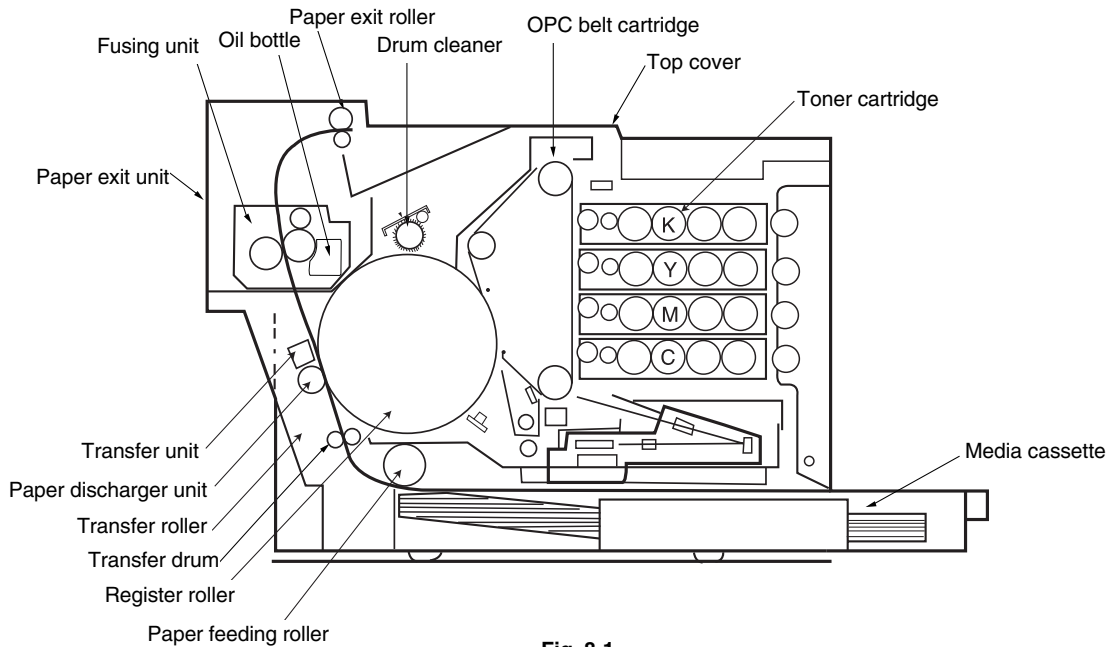


Fig. 8-1

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.

3.3 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.

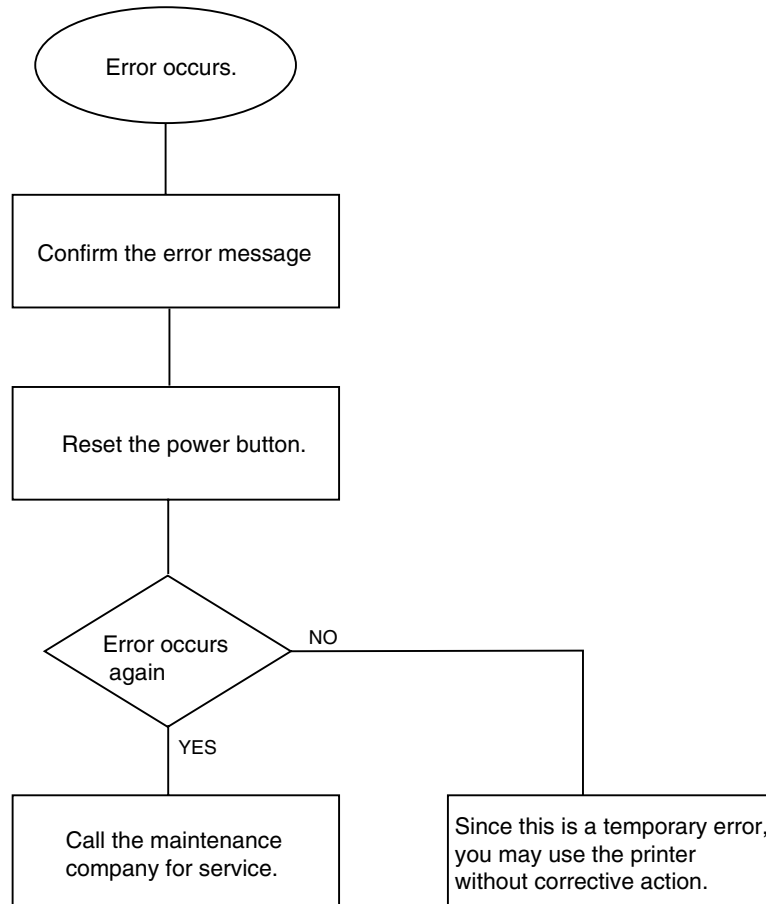
3.4 Others

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
61 PROG ERROR	Program ROM checksum error	Replace with a new ROM.
62 FONT ERROR	Font ROM checksum error	Replace with a new ROM.
63 D-RAM ERROR	D-RAM error	Replace with a new DIMM.
66 NV-W ERROR	NVRAM write error	Replace with a new main (video controller) PCB.
67 NV-R ERROR	NVRAM read error	Replace with a new main (video controller) PCB.
68 NV-B ERROR	NVRAM write/read error	Replace with a new main (video controller) PCB.
99 SERVICE 0-92	CPU address error	Replace with a new main (video controller) PCB.
88 WARNING C3	Engine NV-RAM error	See flow chart C3 later in this section.
88 WARNING C4	Engine controller error	See flow chart C4 later in this section.
88 WARNING C7	Process timing clock error	See flow chart C7 later in this section.
88 WARNING D1	Y switching clutch error	See flow chart D1 later in this section.
88 WARNING D2	M switching clutch error	See flow chart D2 later in this section.
88 WARNING D3	C switching clutch error	See flow chart D3 later in this section.
88 WARNING D4	K switching clutch error	See flow chart D4 later in this section.
88 WARNING D5	K, Y switching solenoid error	See flow chart D5 later in this section.
88 WARNING D6	C, M switching solenoid error	See flow chart D6 later in this section.
88 WARNING E1	Developer drive motor	See flow chart E1 later in this section.
88 WARNING E2	Main motor error	See flow chart E2 later in this section.
88 WARNING E3	Drum error	See flow chart E3 later in this section.
88 WARNING E4	Toner sensor error	See flow chart E4 later in this section.

Service Call Message	Meaning	Countermeasure
88 WARNING E5	TR cam clutch error	See flow chart E5 later in this section.
88 WARNING E6	Cleaner cam clutch error	See flow chart E6 later in this section.
88 WARNING E7	Cleaner clutch error	See flow chart E7 later in this section.
88 WARNING E8	Fuser clutch error	See flow chart E8 later in this section.
88 WARNING E9	Belt marker sensor error	See flow chart E9 later in this section.
88 WARNING EL	Erase lamp error	See flow chart EL later in this section.
88 WARNING F0	Control fan error	See flow chart F0 later in this section.
88 WARNING F2	Ozone fan error	See flow chart F2 later in this section.
88 WARNING F4	Fuser fan error	See flow chart F4 later in this section.
88 WARNING F5	Charge HV unit error	See flow chart F5 later in this section.
88 WARNING H0	Fuser thermistor error	See flow chart H0 later in this section.
88 WARNING H2	Fuser temperature error (Warming up time error)	See flow chart H2 later in this section.
88 WARNING H3	Fuser temperature error (On time error)	See flow chart H3 later in this section.
88 WARNING H4	Fuser temperature error (Off time error)	See flow chart H4 later in this section.
88 WARNING L1	Beam detector error	See flow chart L1 later in this section.
88 WARNING L2	Scanner motor error	See flow chart L2 later in this section.
88 WARNING LL	Laser power error	See flow chart LL later in this section.
88 WARNING P1	Duplex controller hardware error	See flow chart P1 described in the DX-3400 service manual.
88 WARNING P3	Feeder pass select solenoid error	See flow chart P3 described in the DX-3400 service manual.

Service Call Message	Meaning	Countermeasure
88 WARNING P4	Duplex motor error	See flow chart P4 described in the DX-3400 service manual.
88 WARNING P5	Outer pass select solenoid error	See flow chart P5 described in the DX-3400 service manual.
88 WARNING P6	Optional fan error	See flow chart P6 described in the DX-3400 service manual.

4.2 Engine Controller Mode

Table 8-8

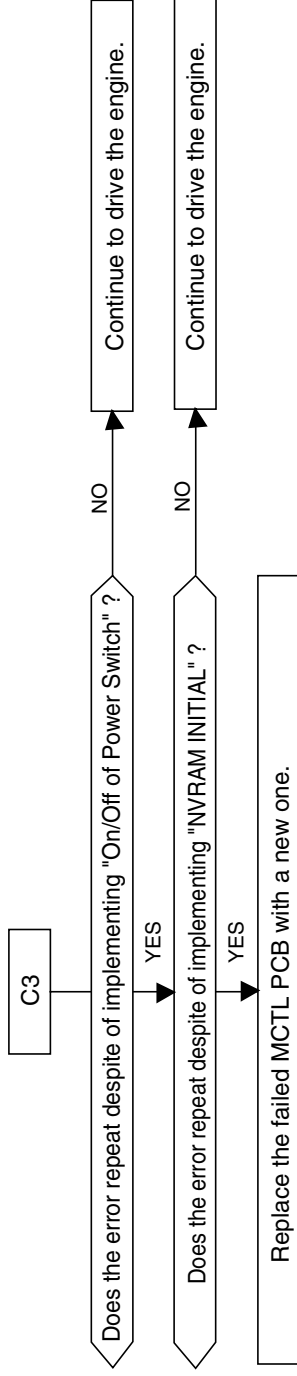
Code	Description
C3	NVRAM error (MCTL PWB)
C4	Engine controller MCTL PWB hardware error
C7	Process timing clock error (Main motor clock error)
D1	Clutch error of the yellow developing unit
D2	Clutch error of the magenta developing unit
D3	Clutch error of the cyan developing unit
D4	Clutch error of the 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)
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

Code	Description
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

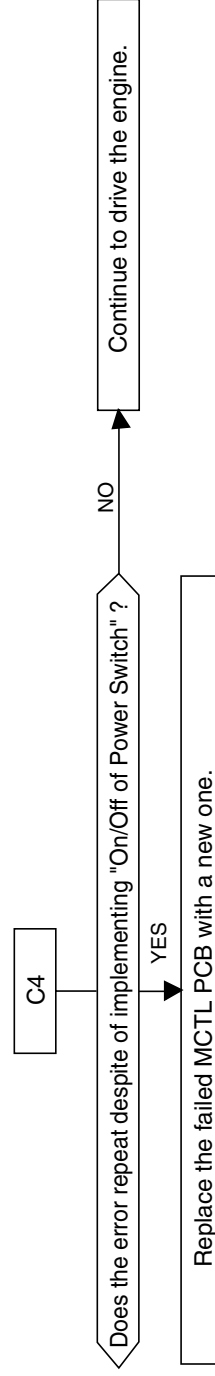
NOTE:

- 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 PCB 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 PCB with a new one.



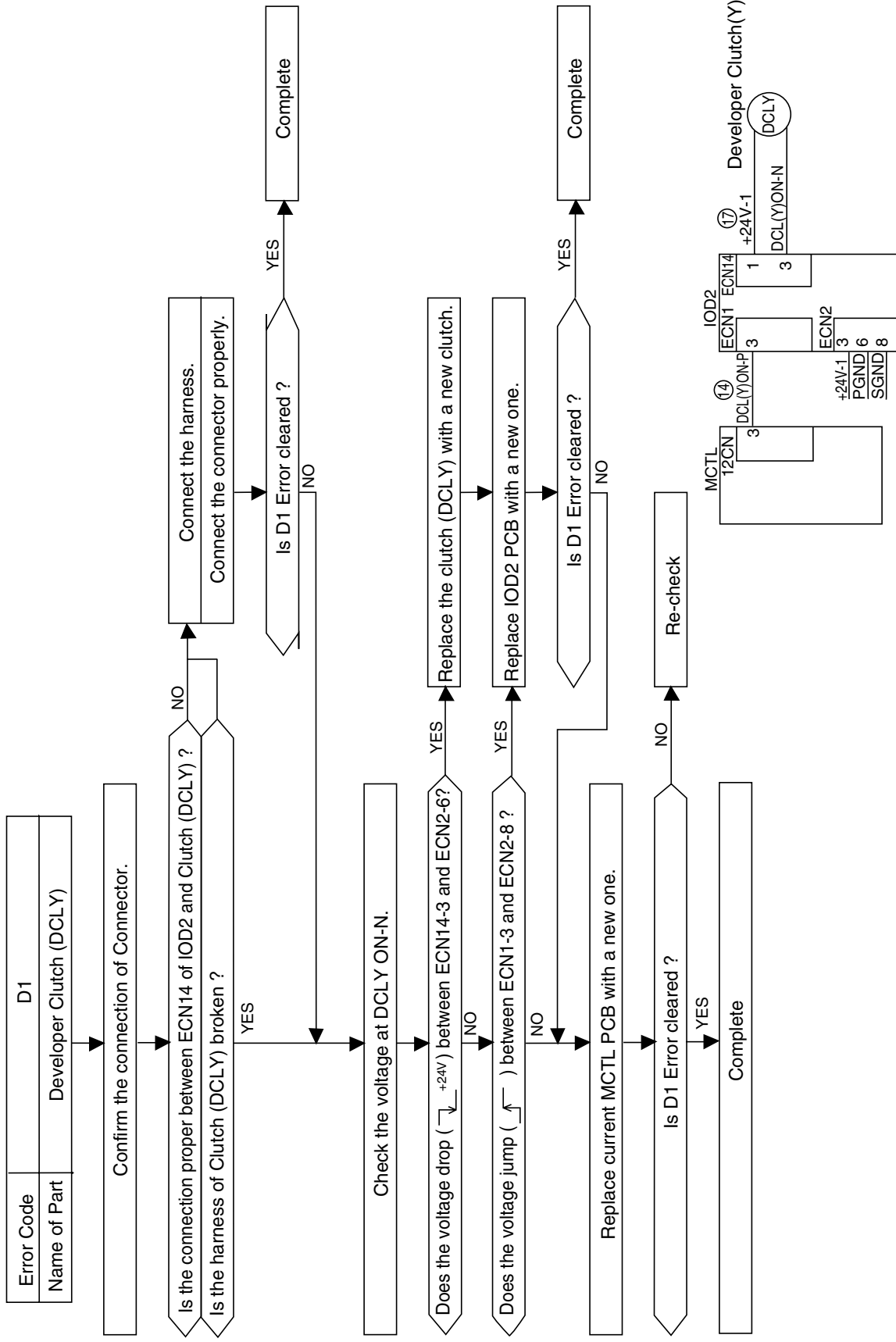
Code	Description of Error	Cause of Error	Clearance Method
C4	Hard Error of MCTL Control Circuit.	1. Failure of MCTL PCB.	1. Turn on and off the power switch. 2. Replace the failed MCTL PCB with a new one.

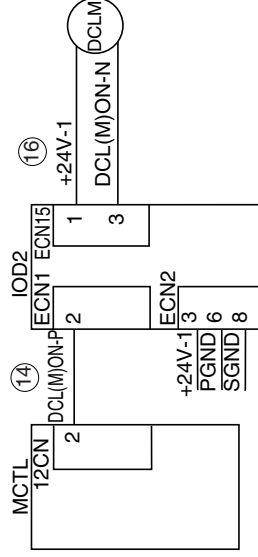
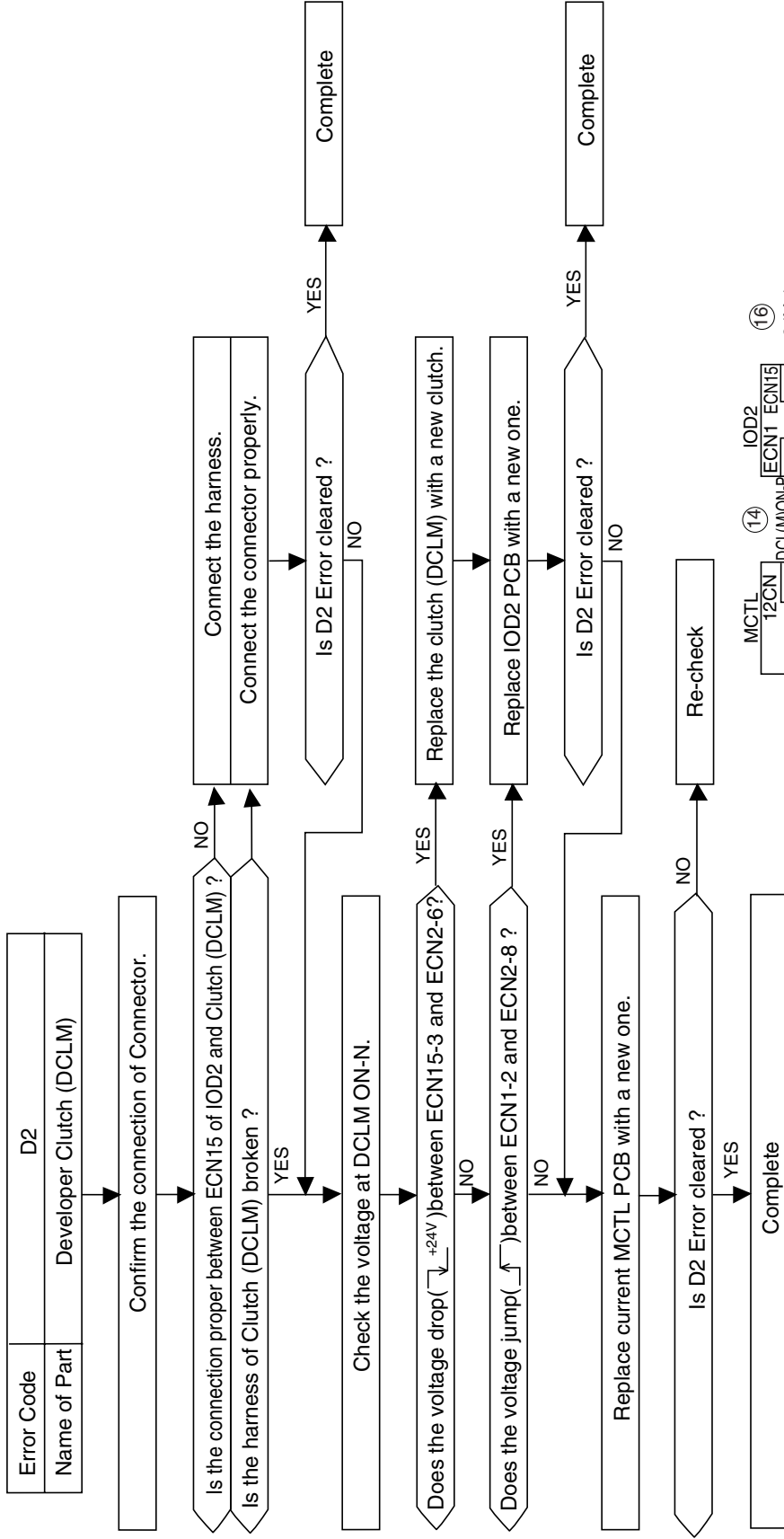


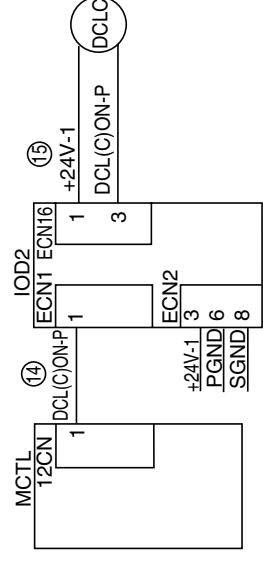
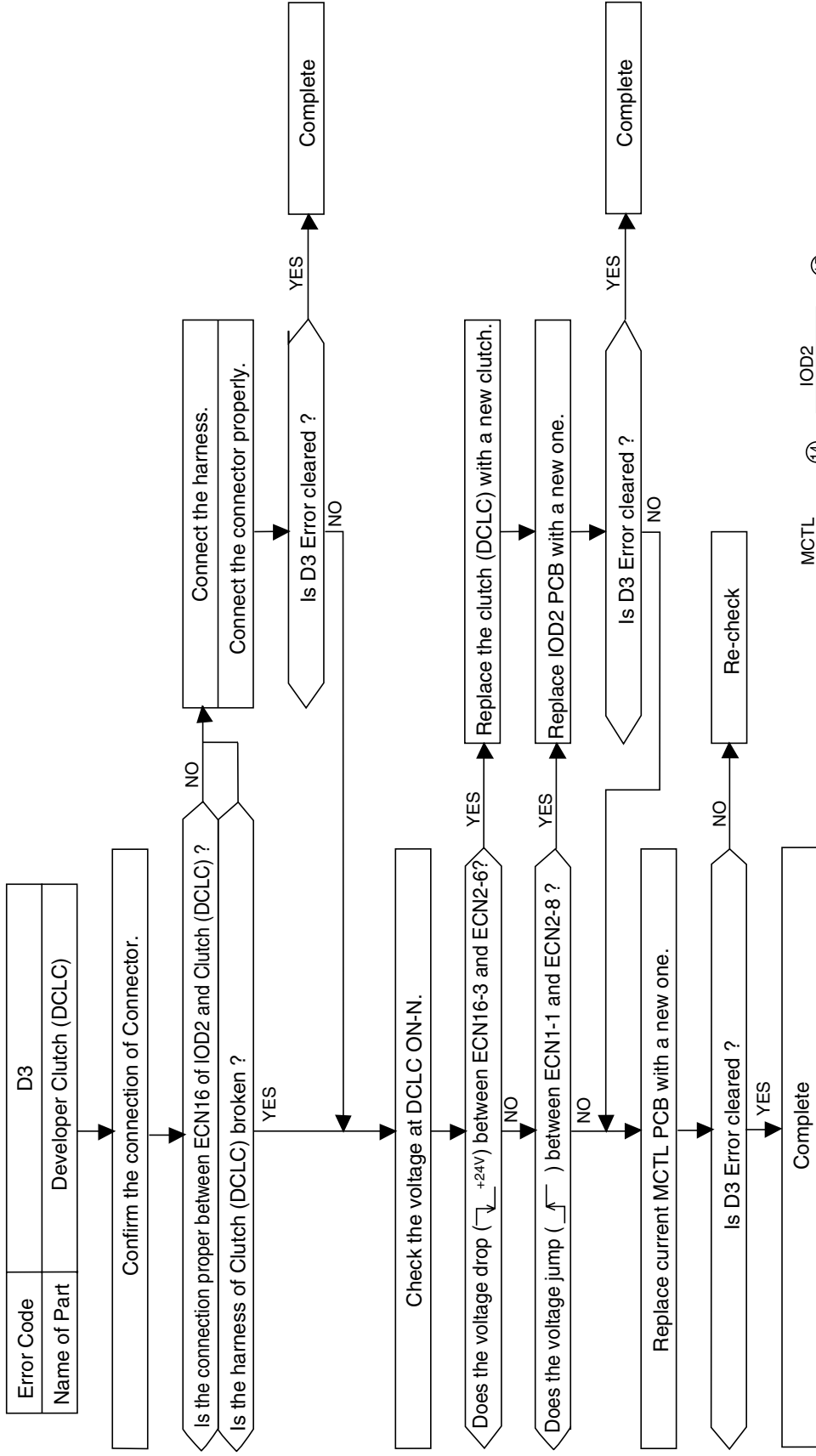
Code	Description of Error	Cause of Error	Clearance Method
C7	Process Timing Error.	1. Power Feeding Failure 2. MM Failure 3. MM Input Circuit Failure	1. Implement the same clearance procedures employed for E2 error. [Note]: MM stands for OPC Belt Drive Main Motor.

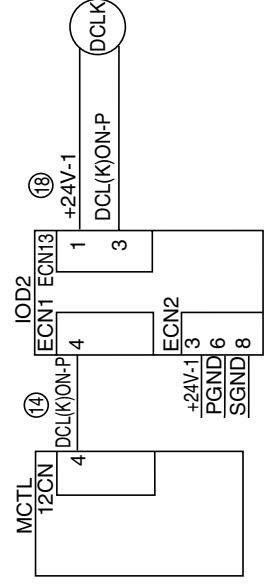
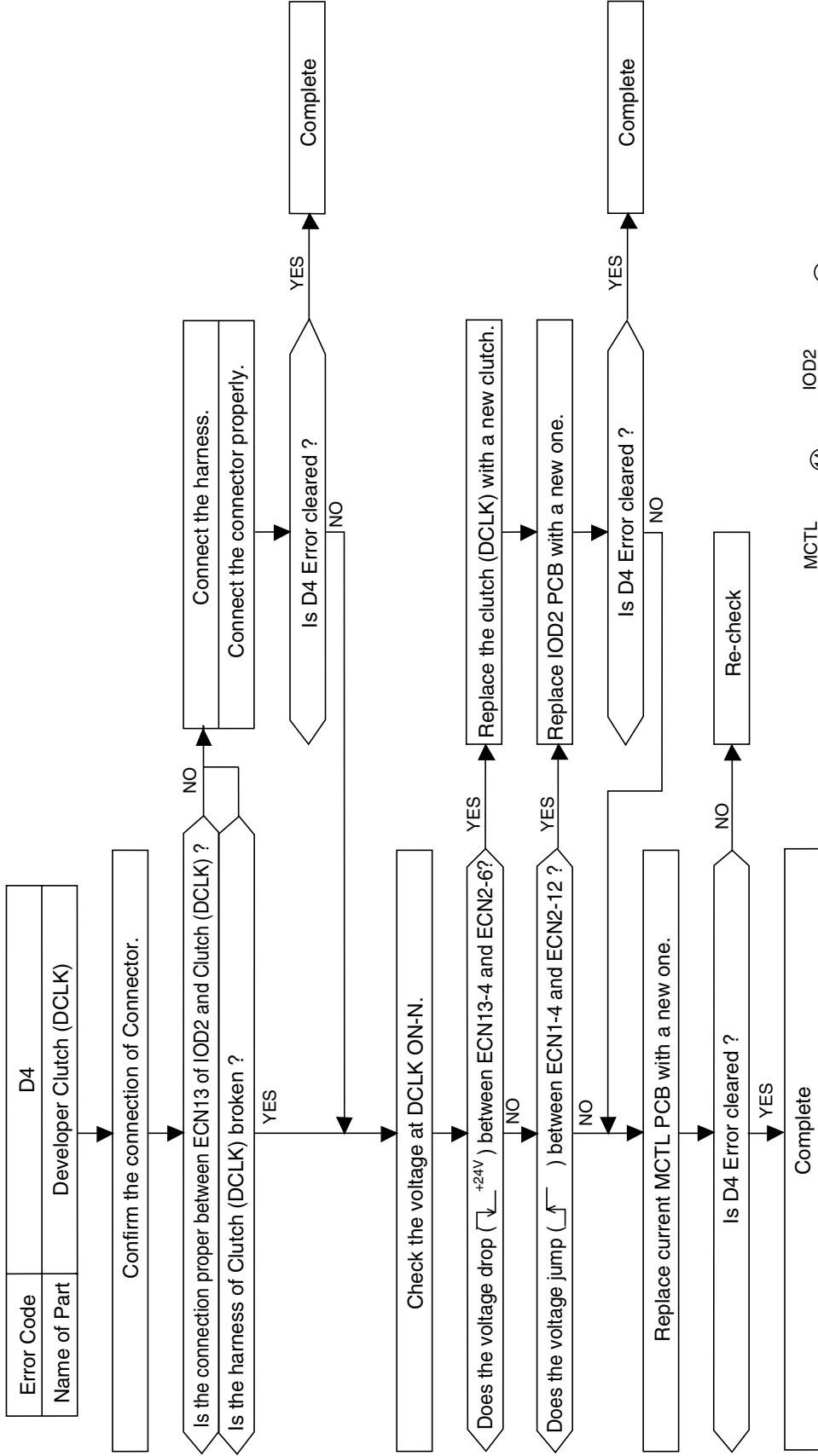
C7

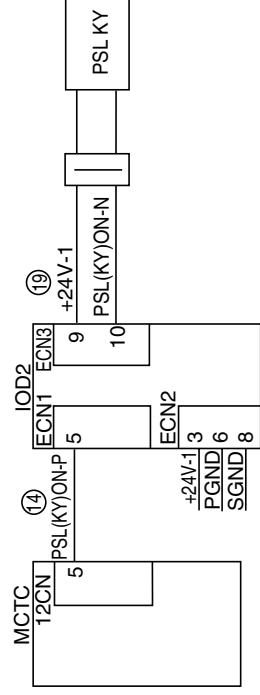
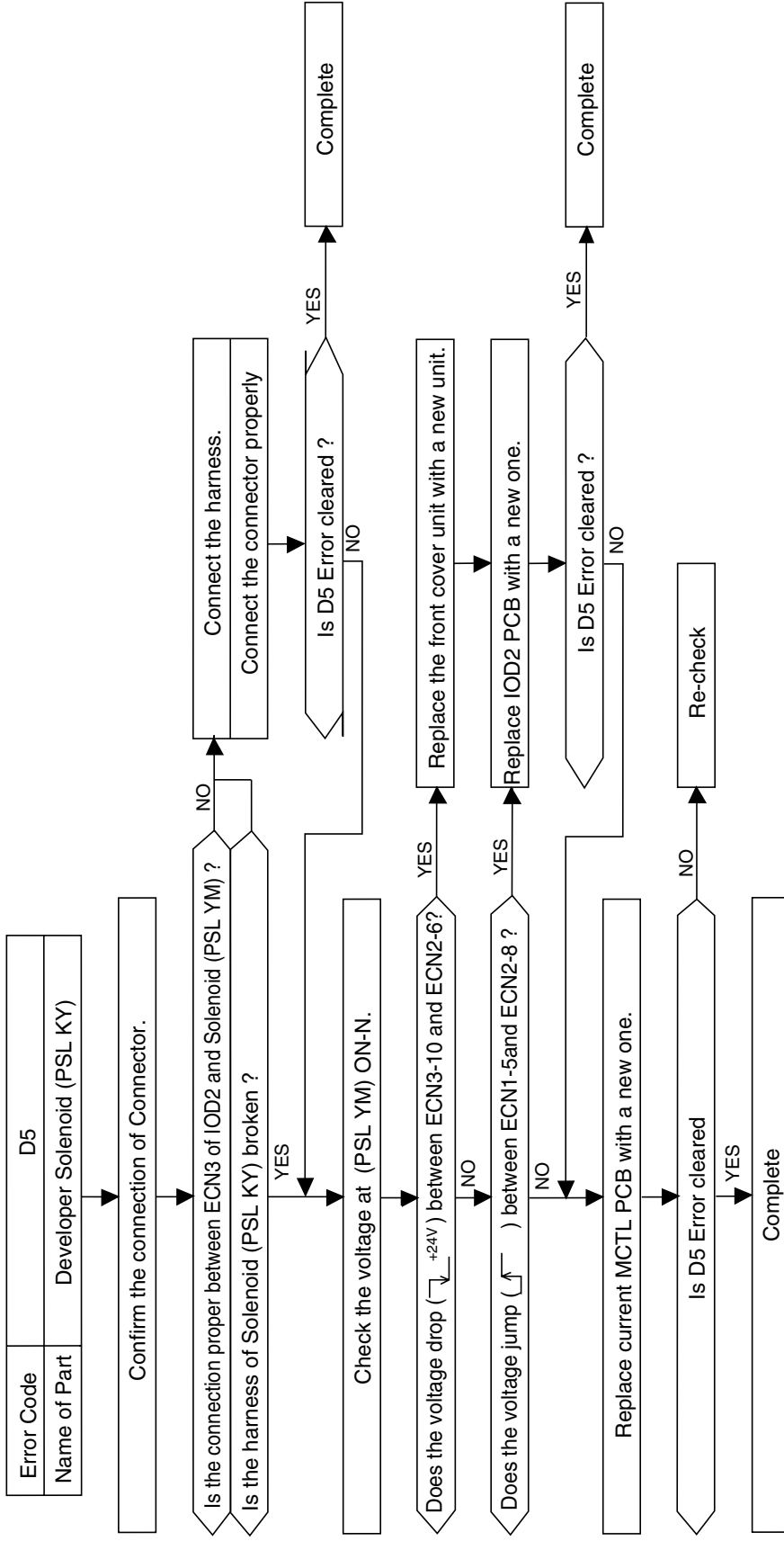
Implement the same clearance procedures employed for E2 error.

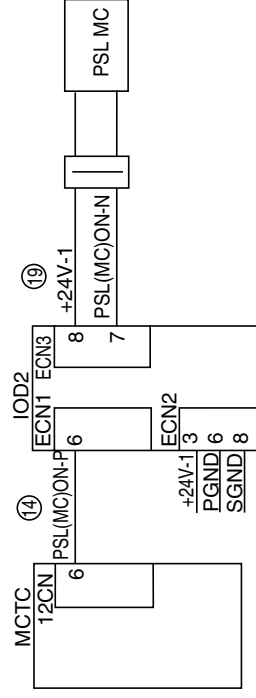
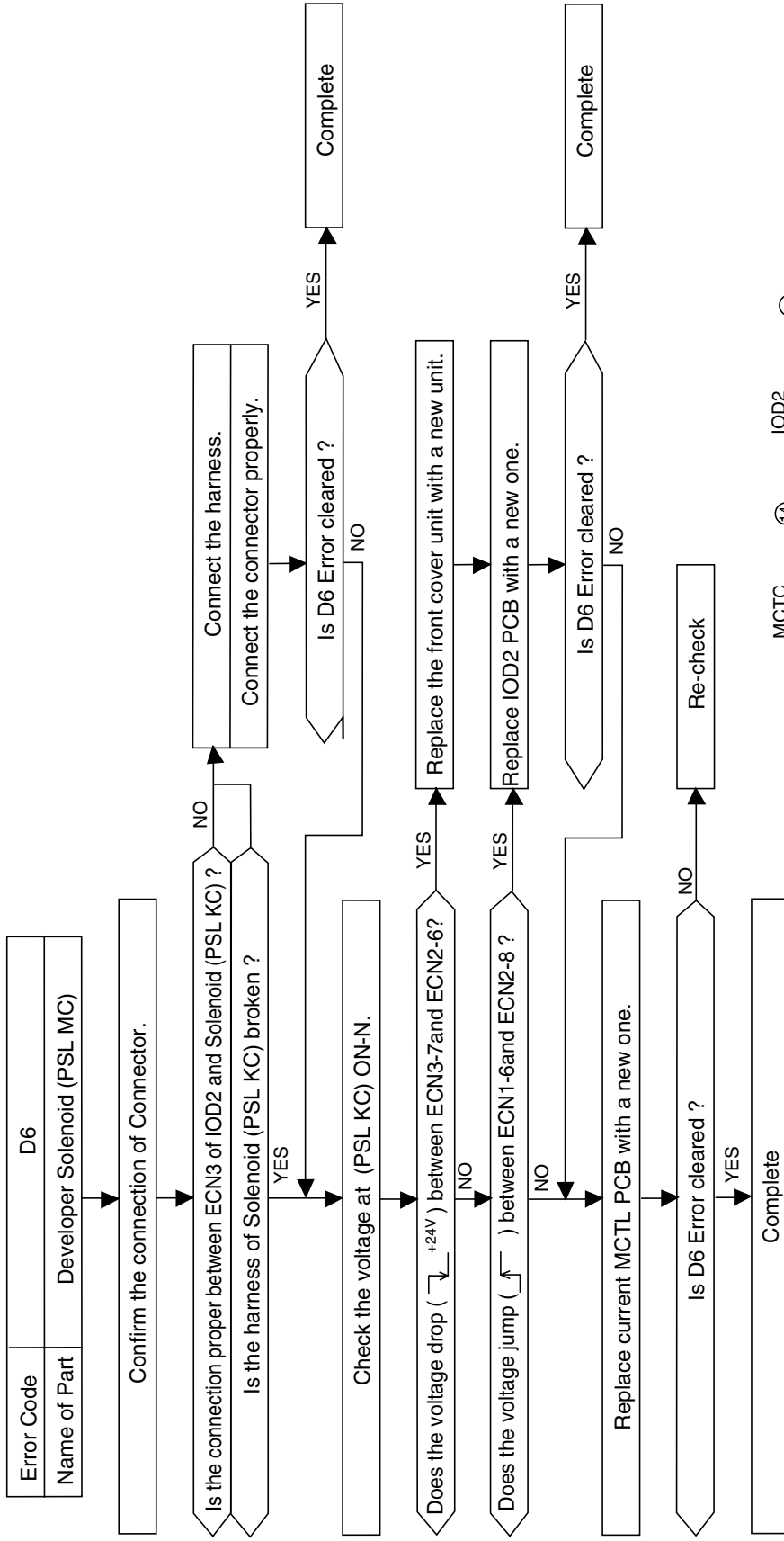




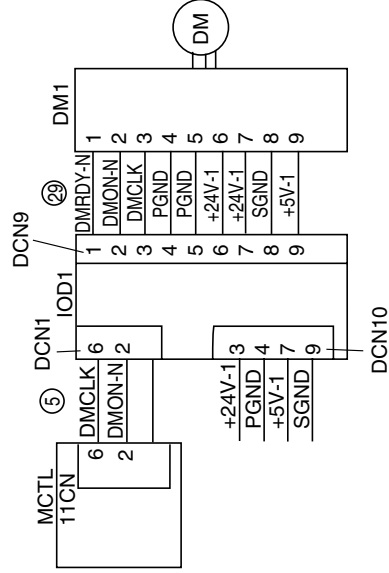
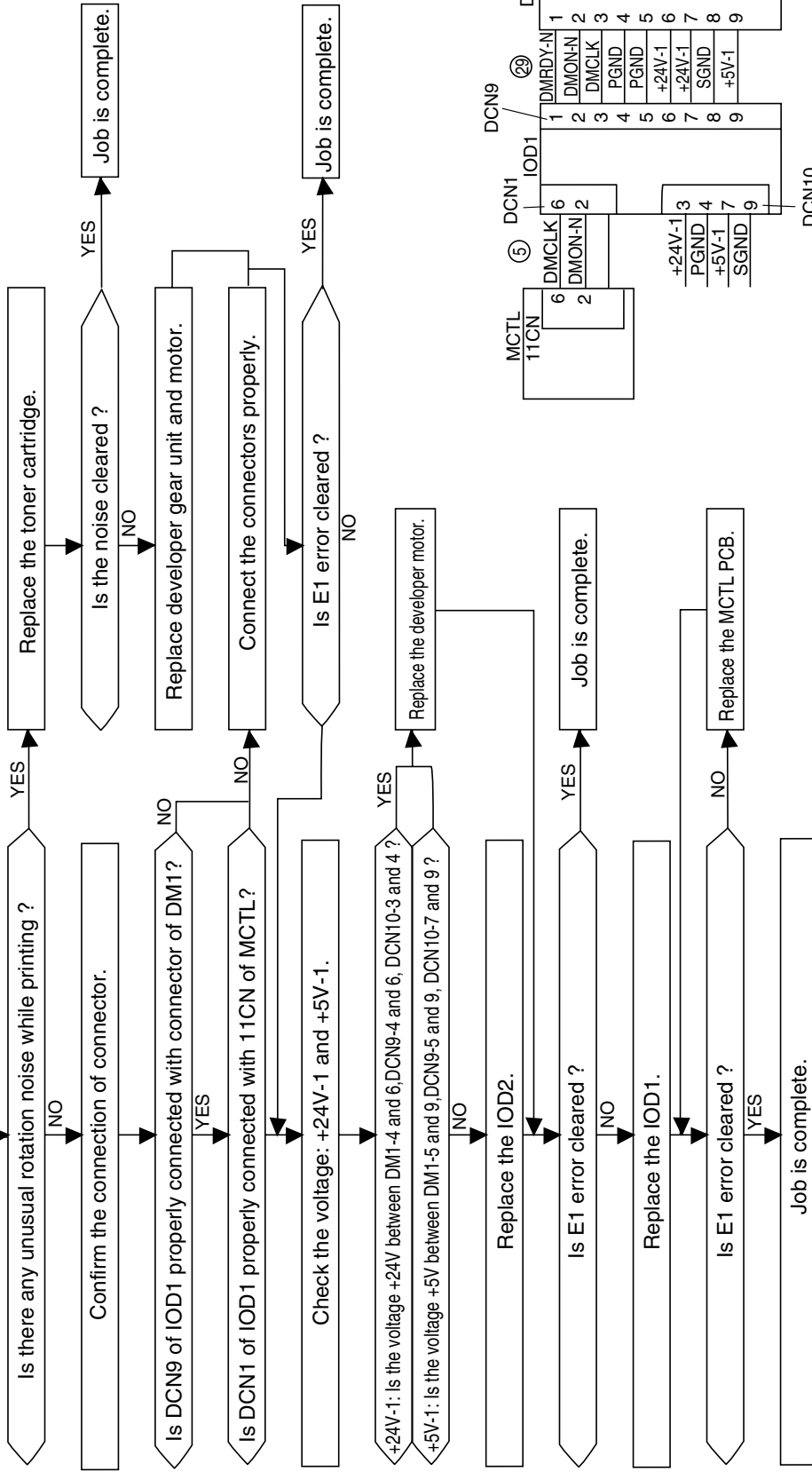


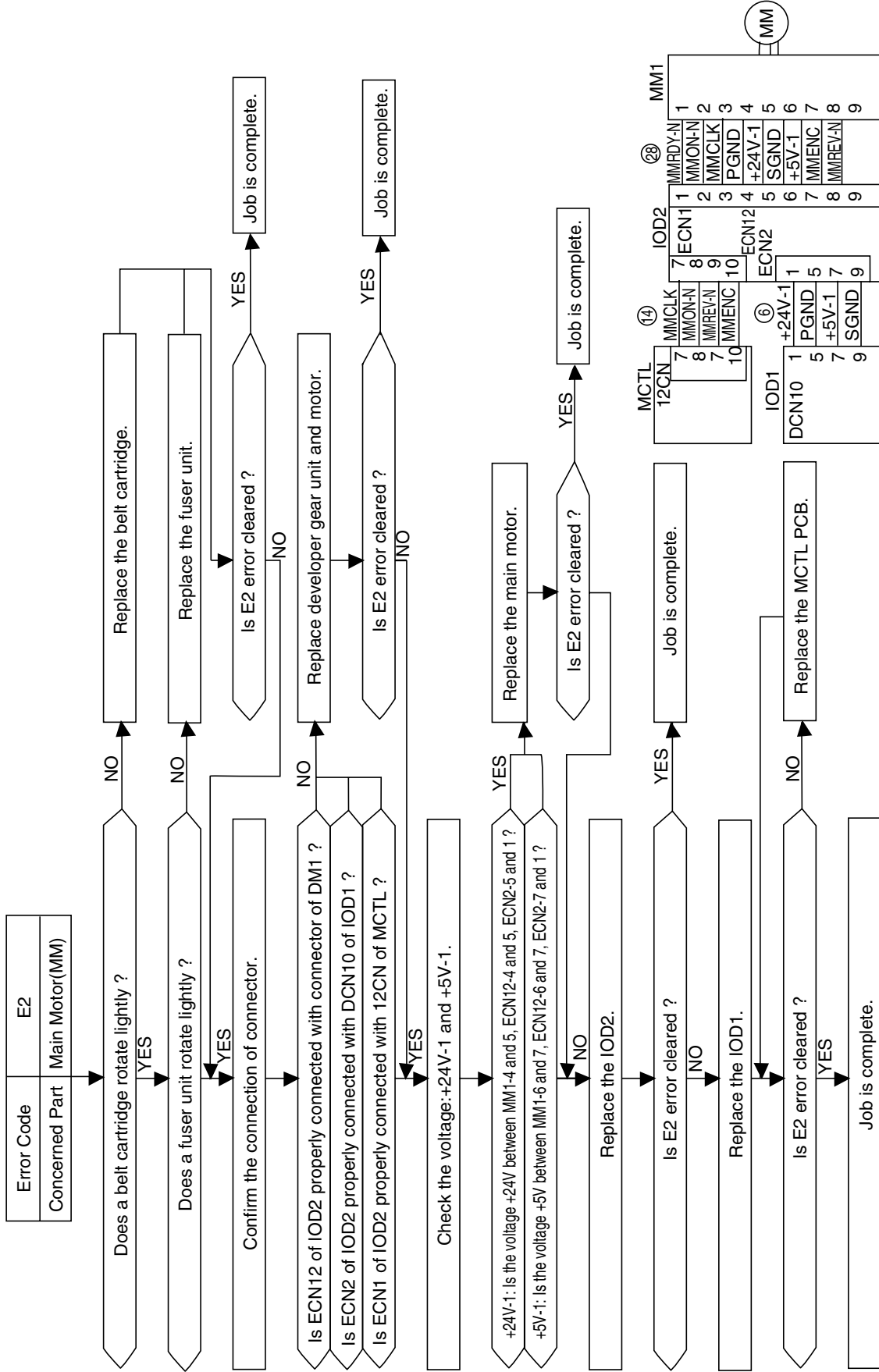


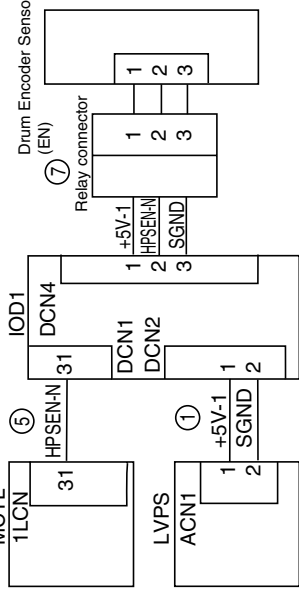
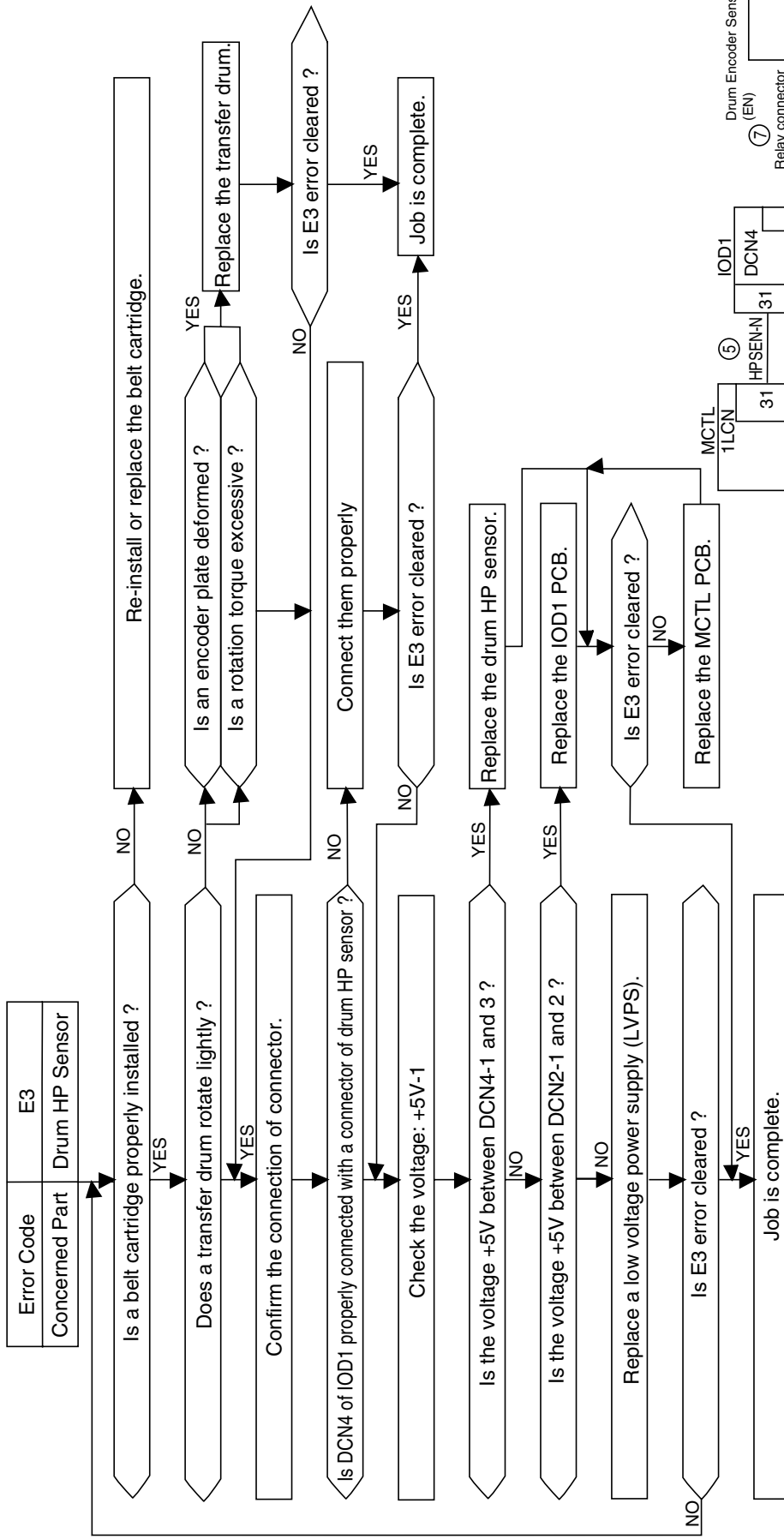


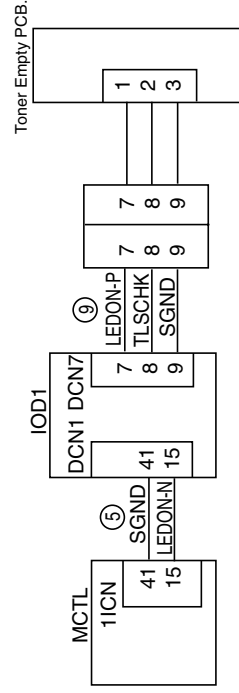
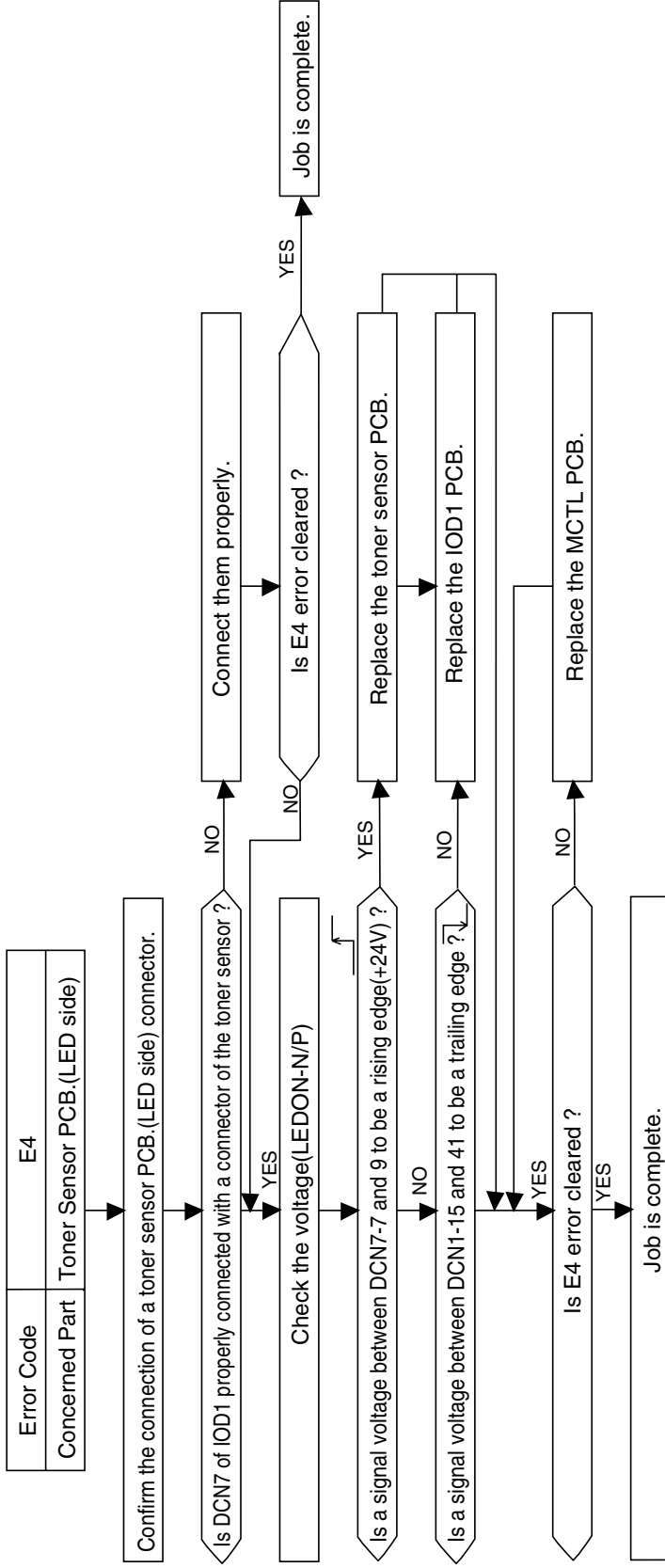


Error Code	E1
Concerned Part	Developer Motor(DM)

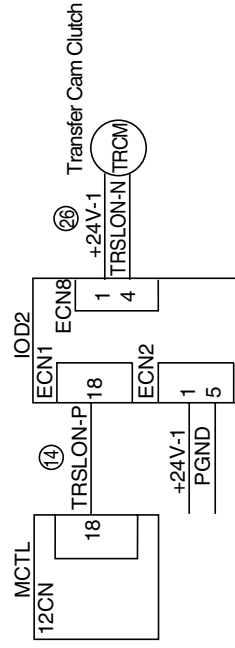
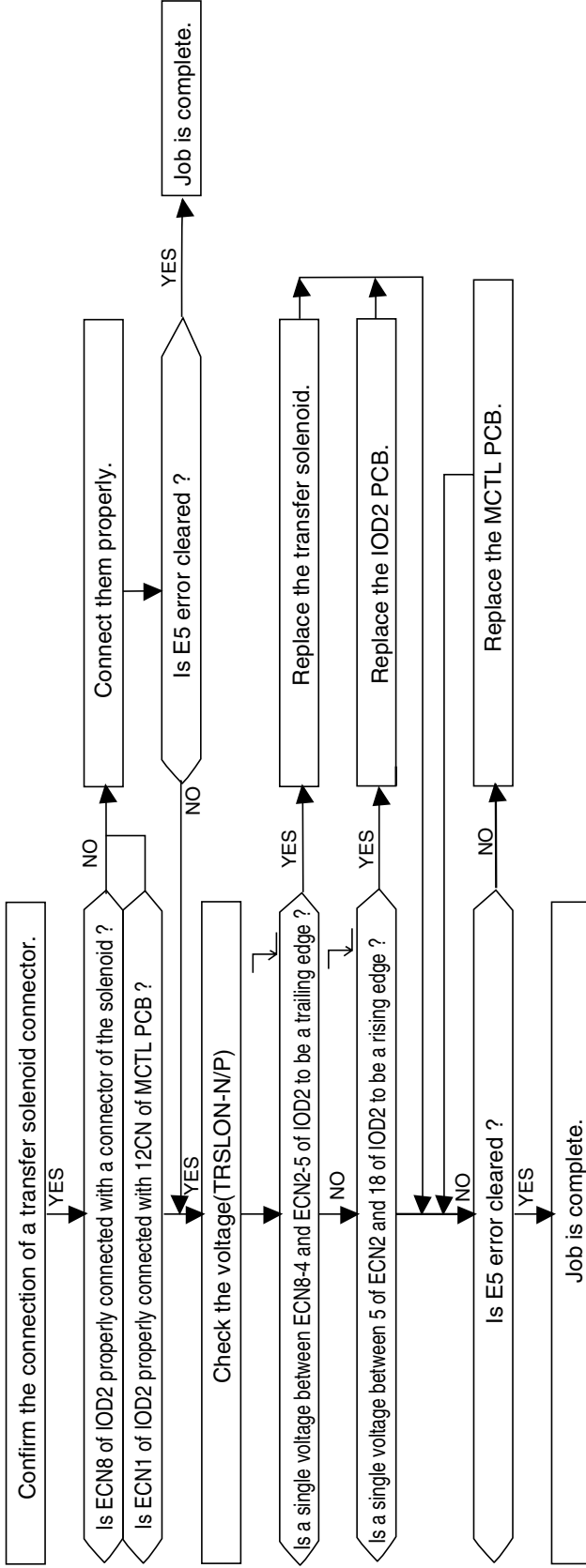


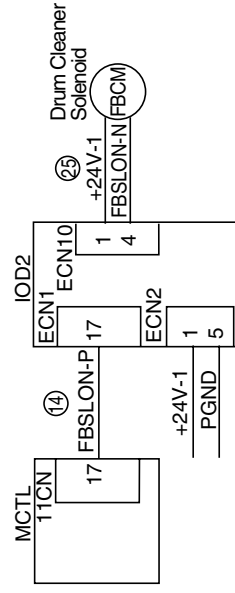
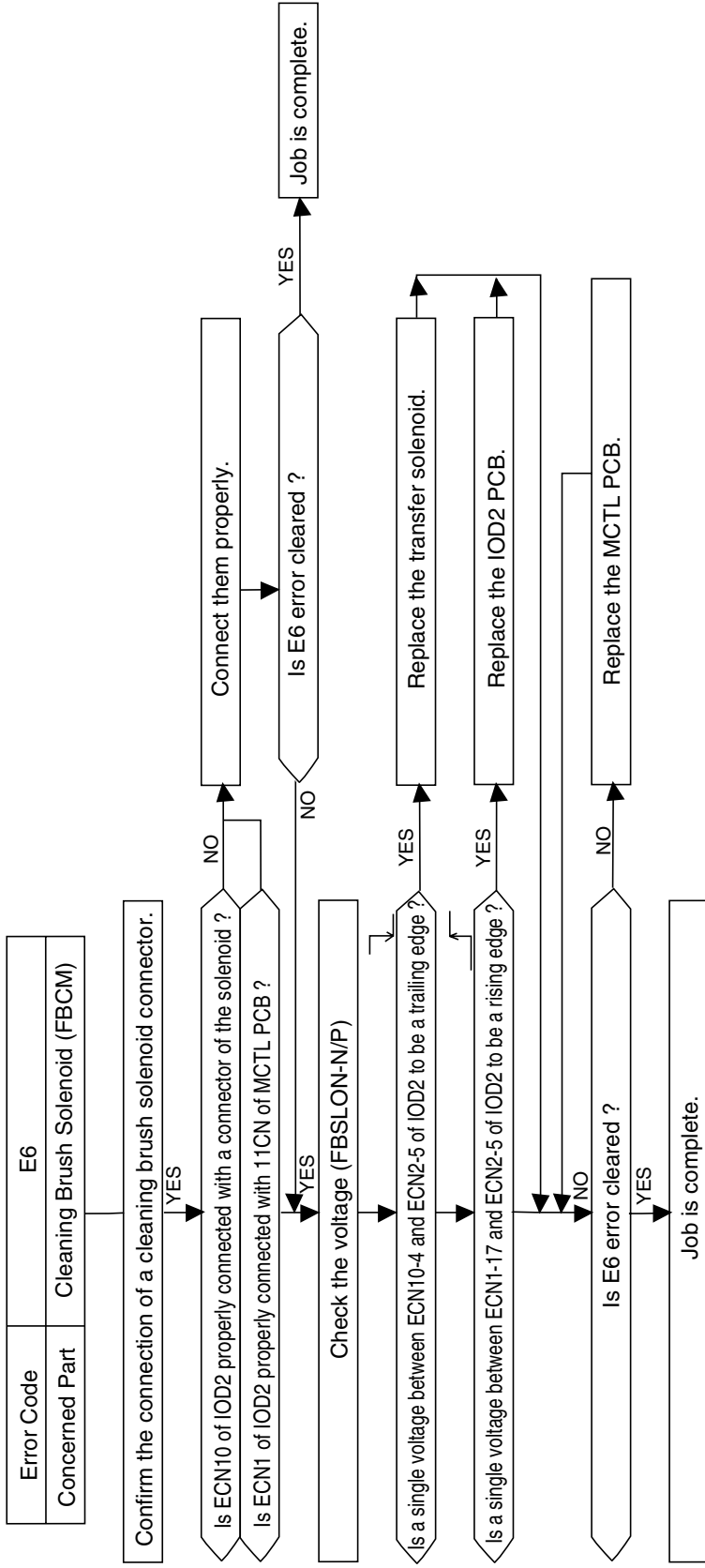


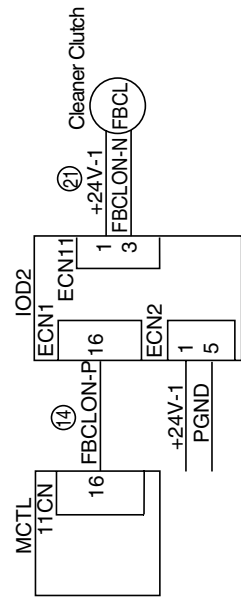
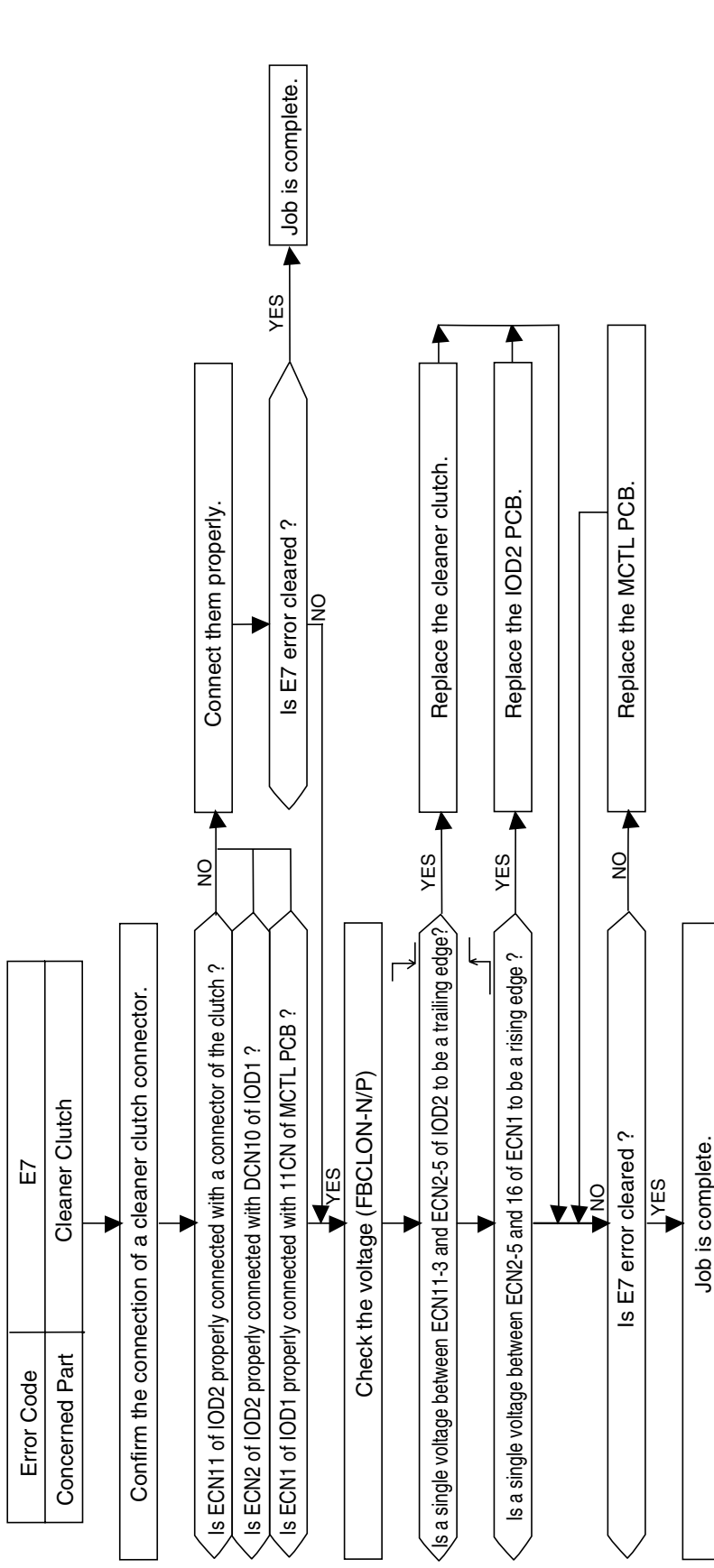


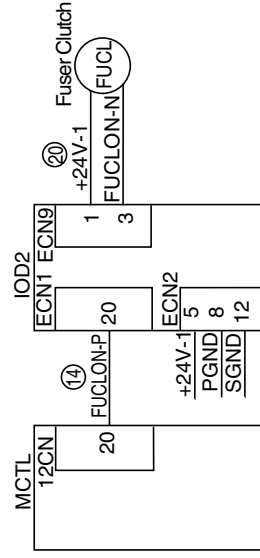
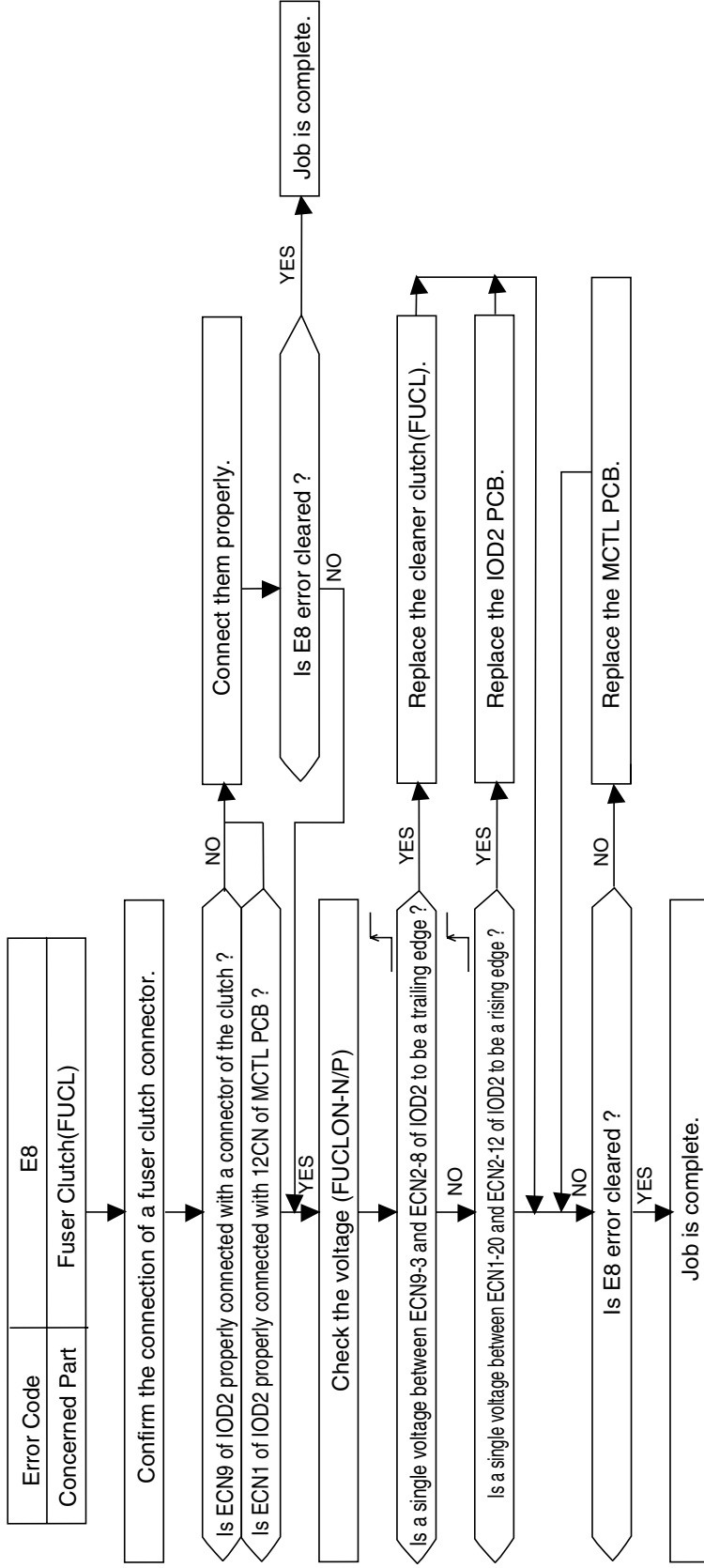


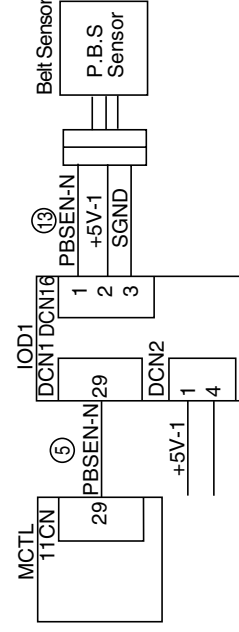
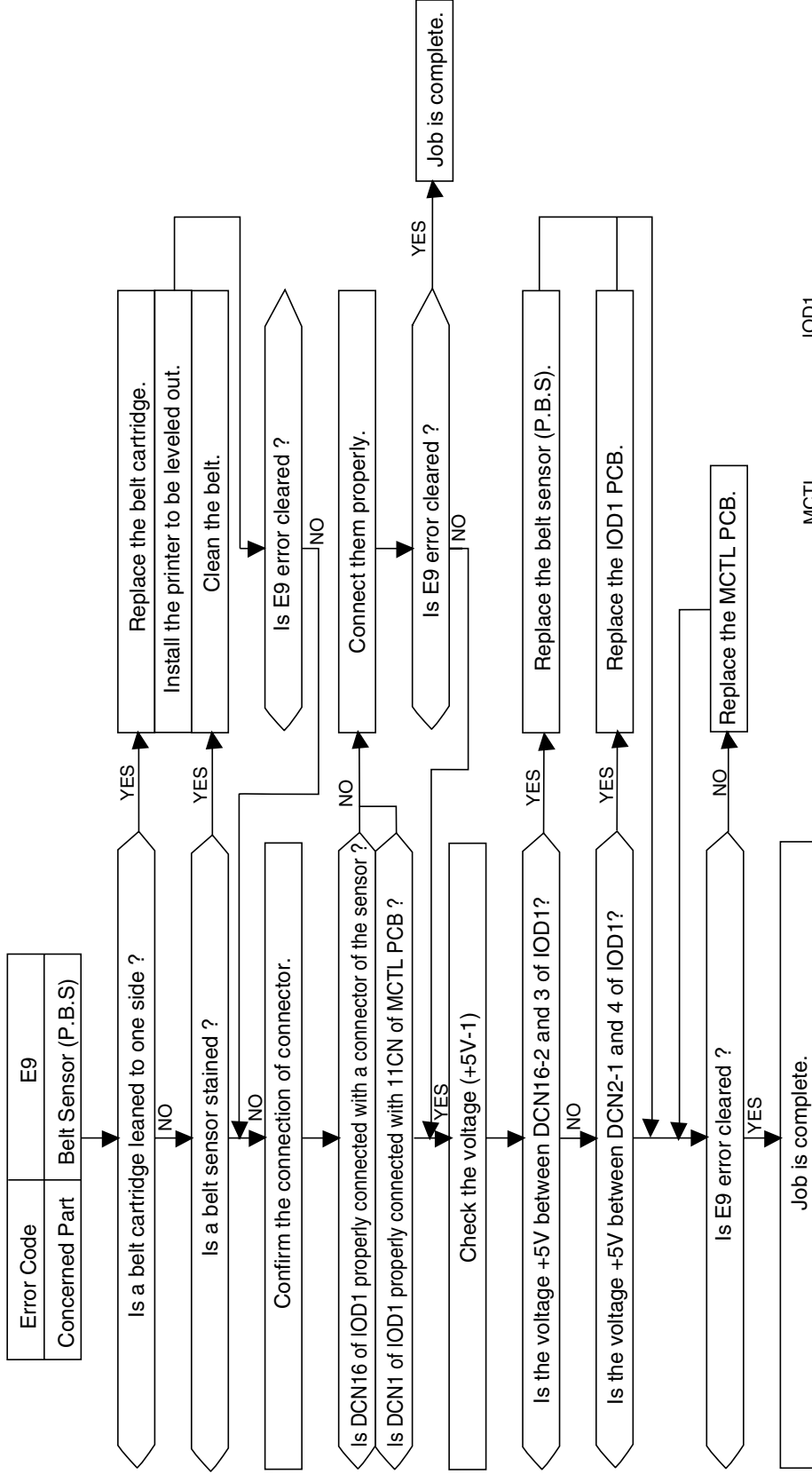
Error Code	E5
Concerned Part	Transfer Cam Clutch (TRCM)

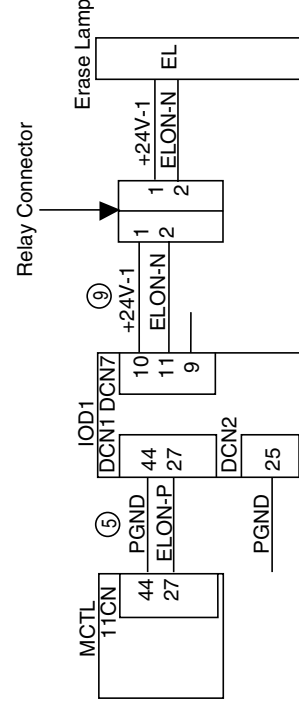
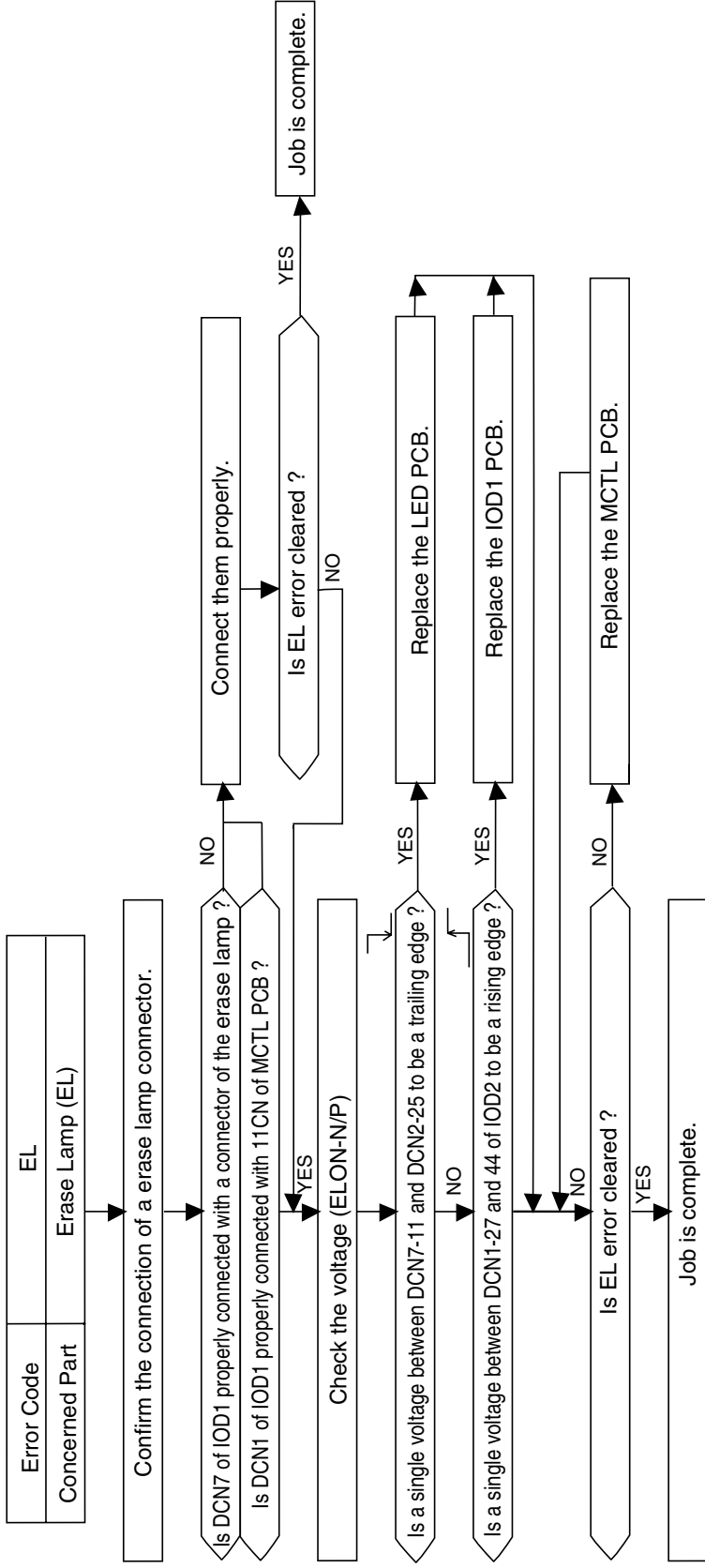


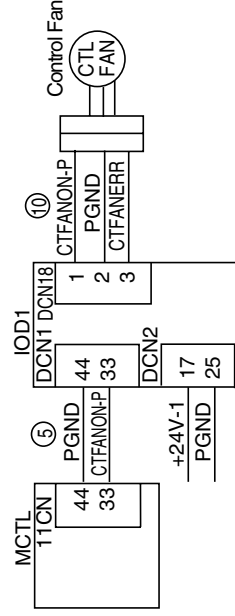
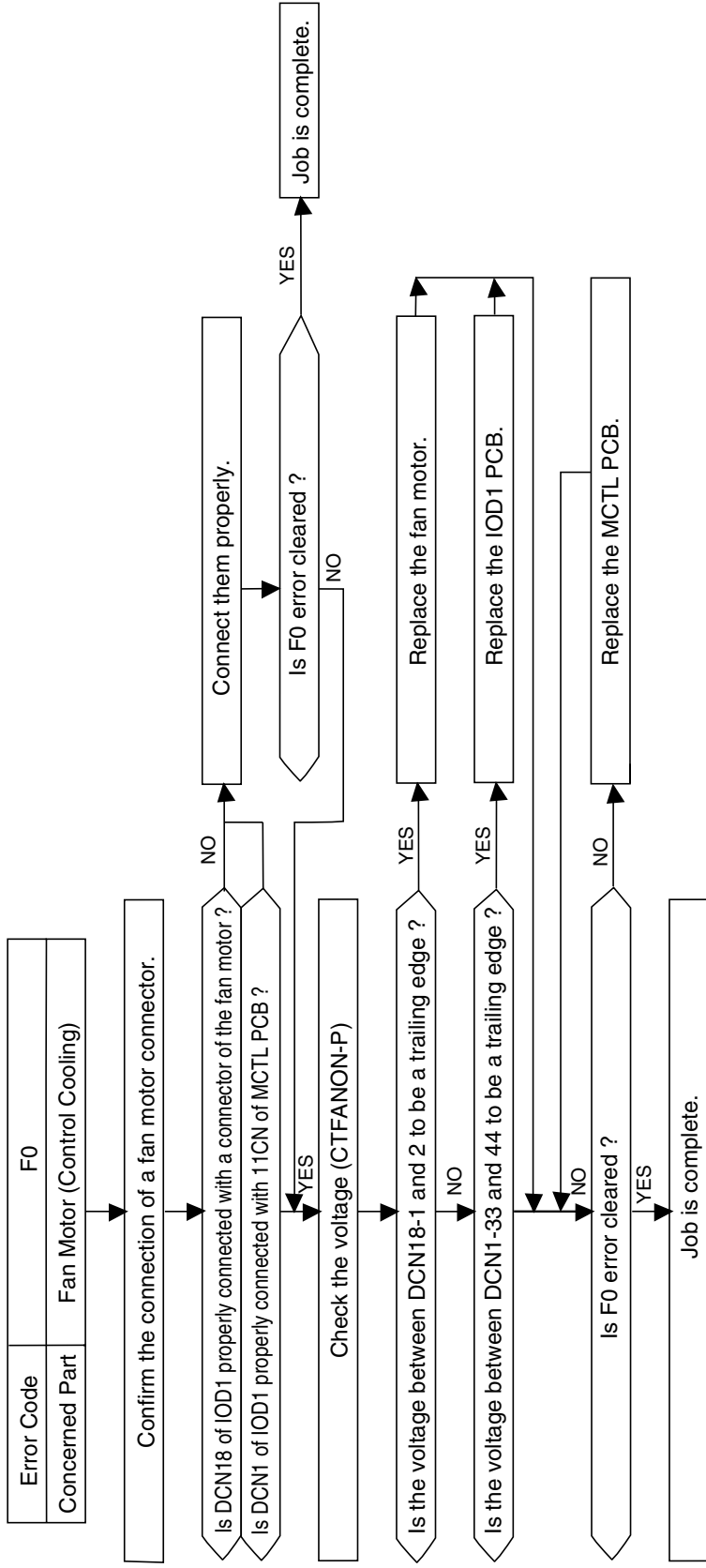


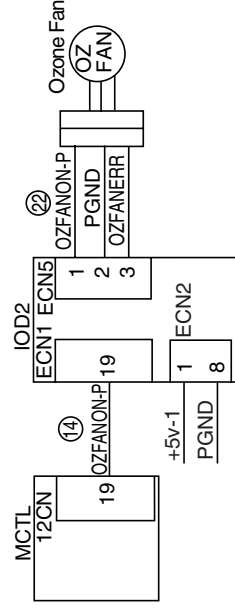
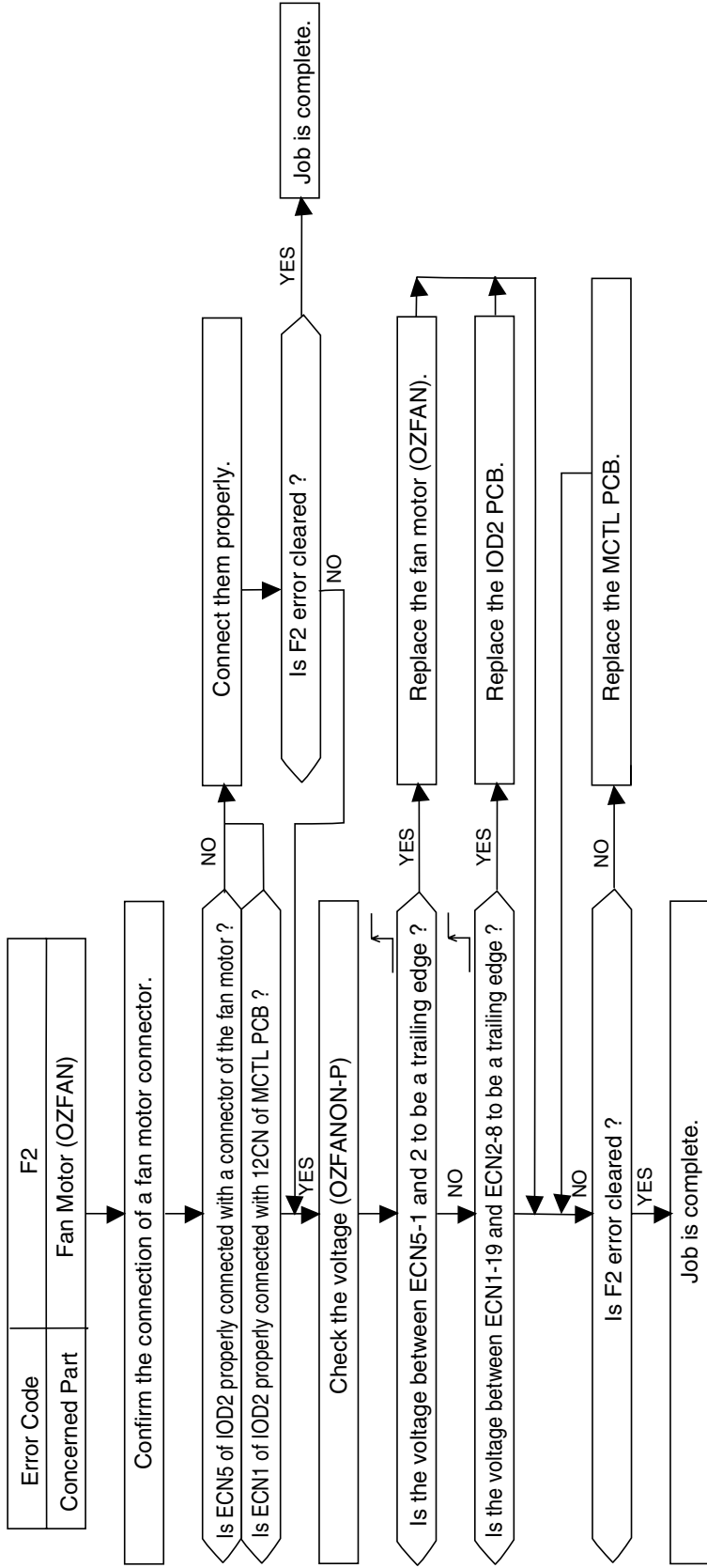


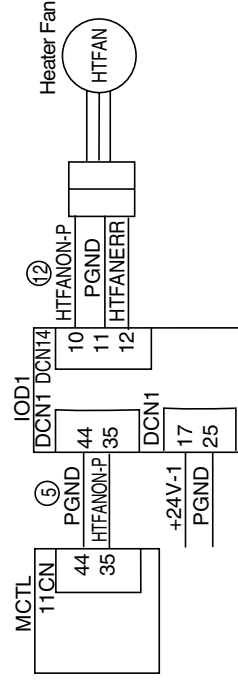
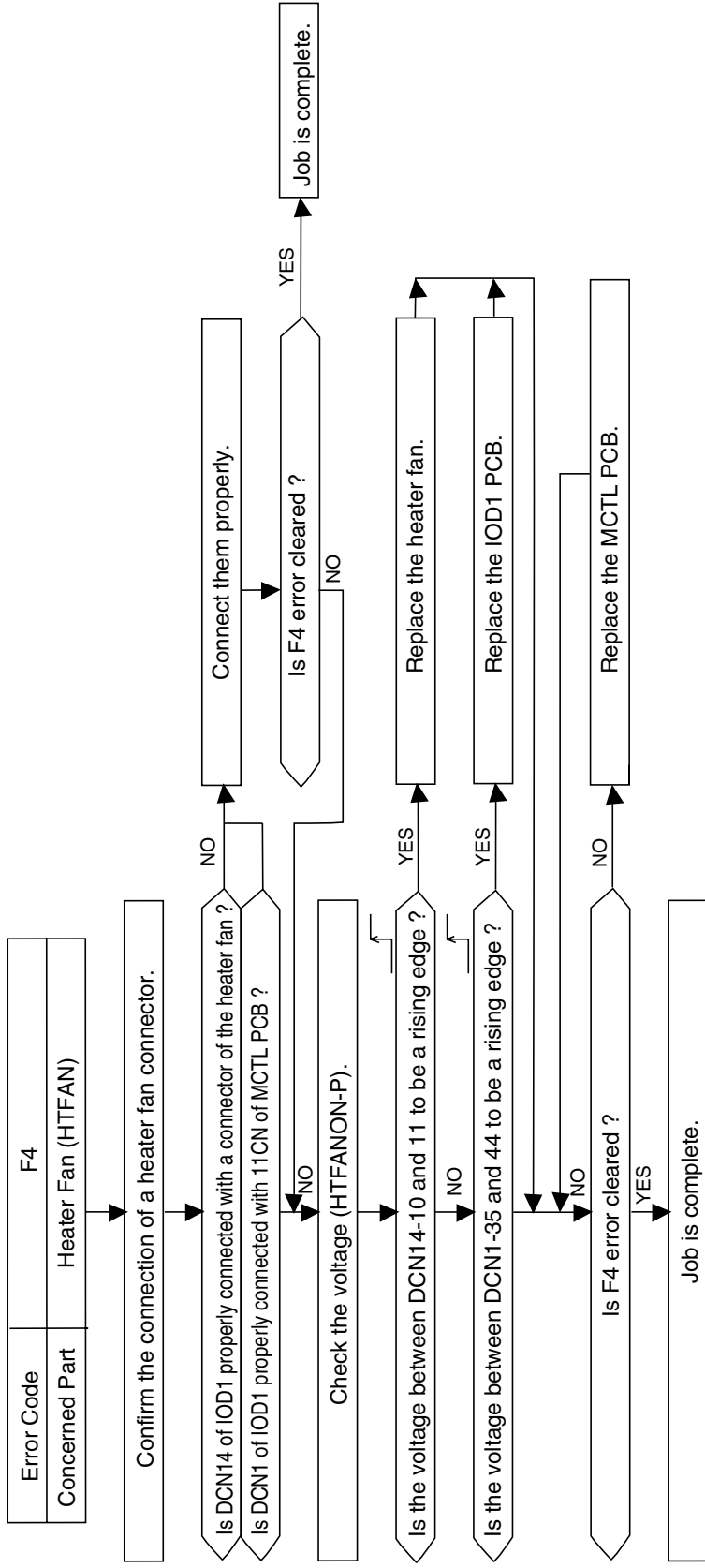




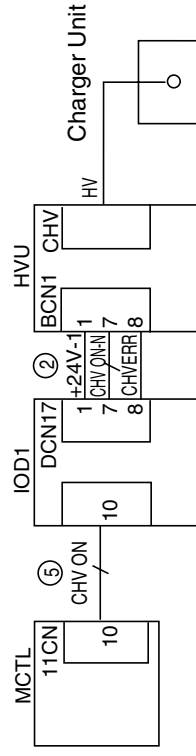
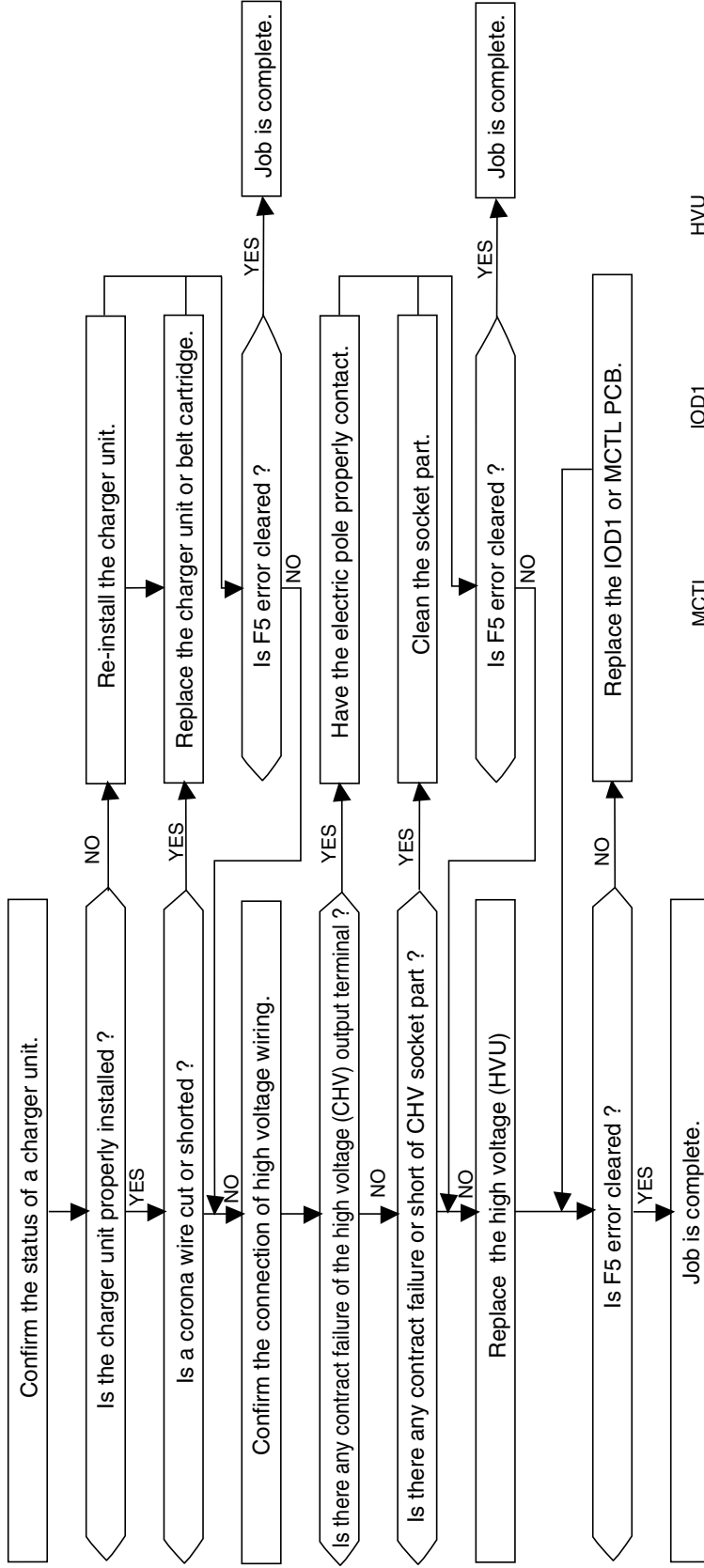


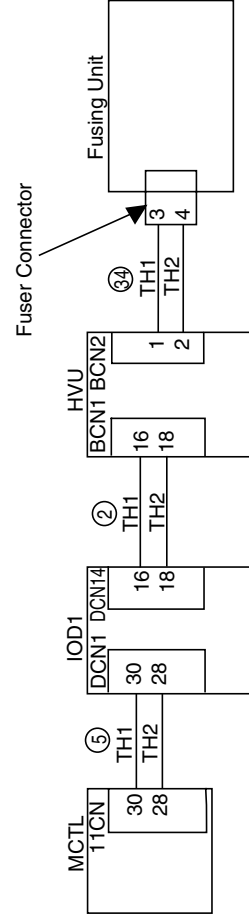
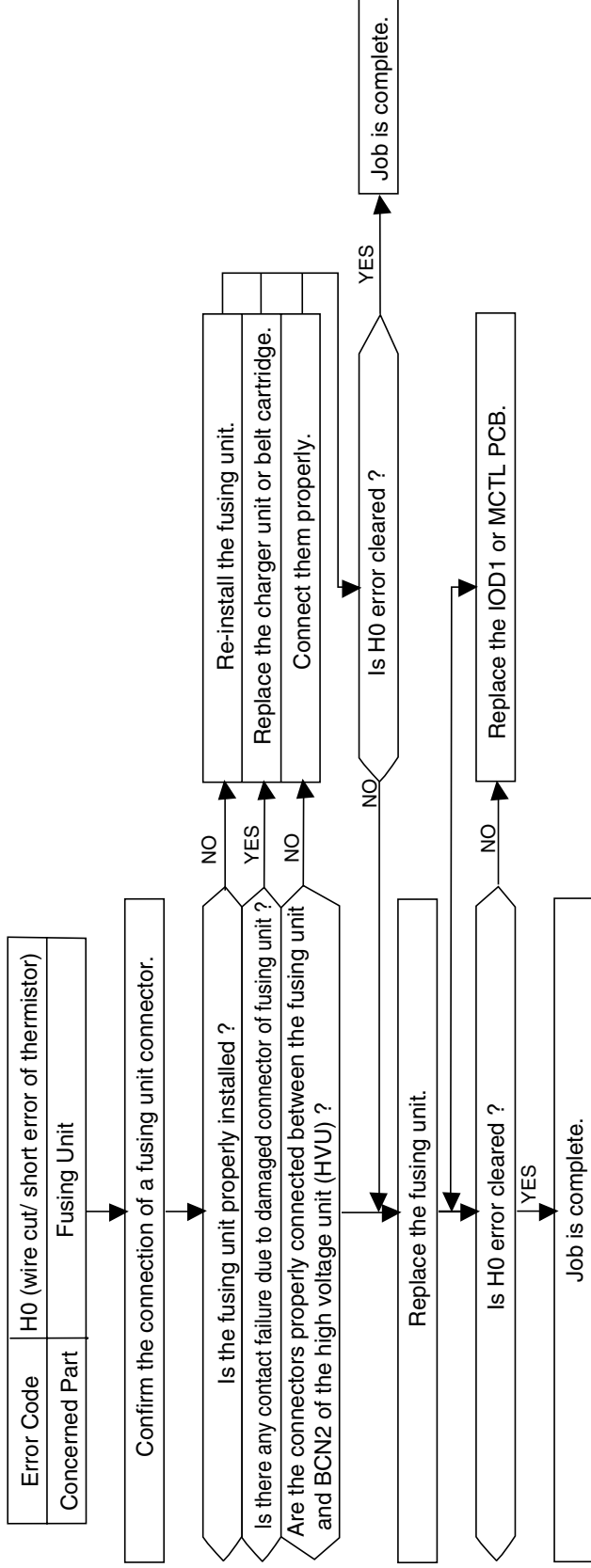


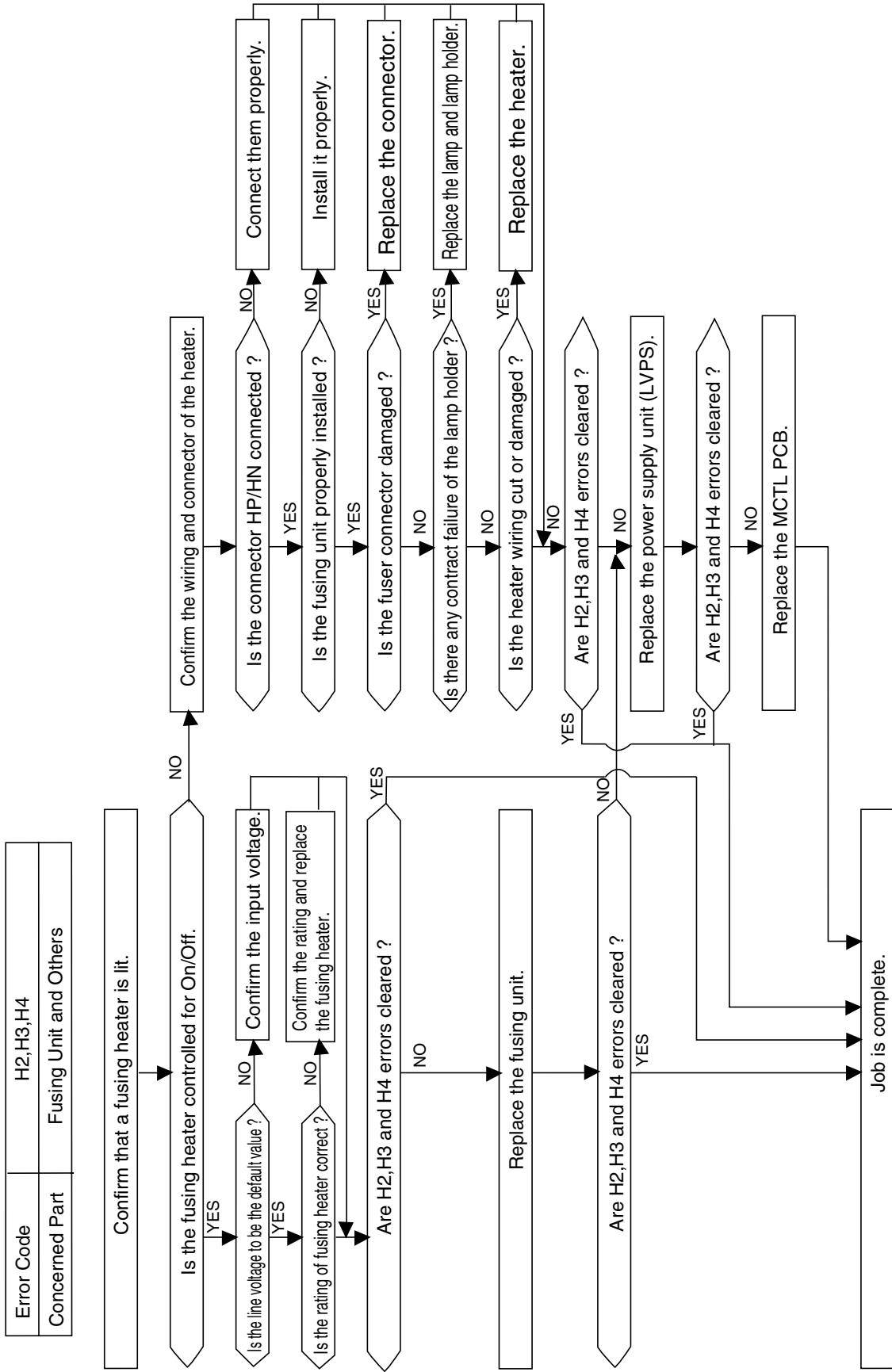


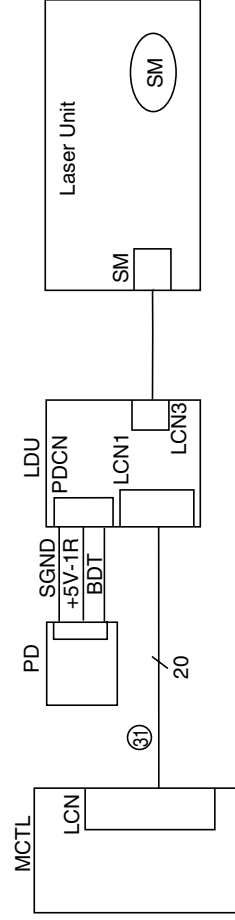
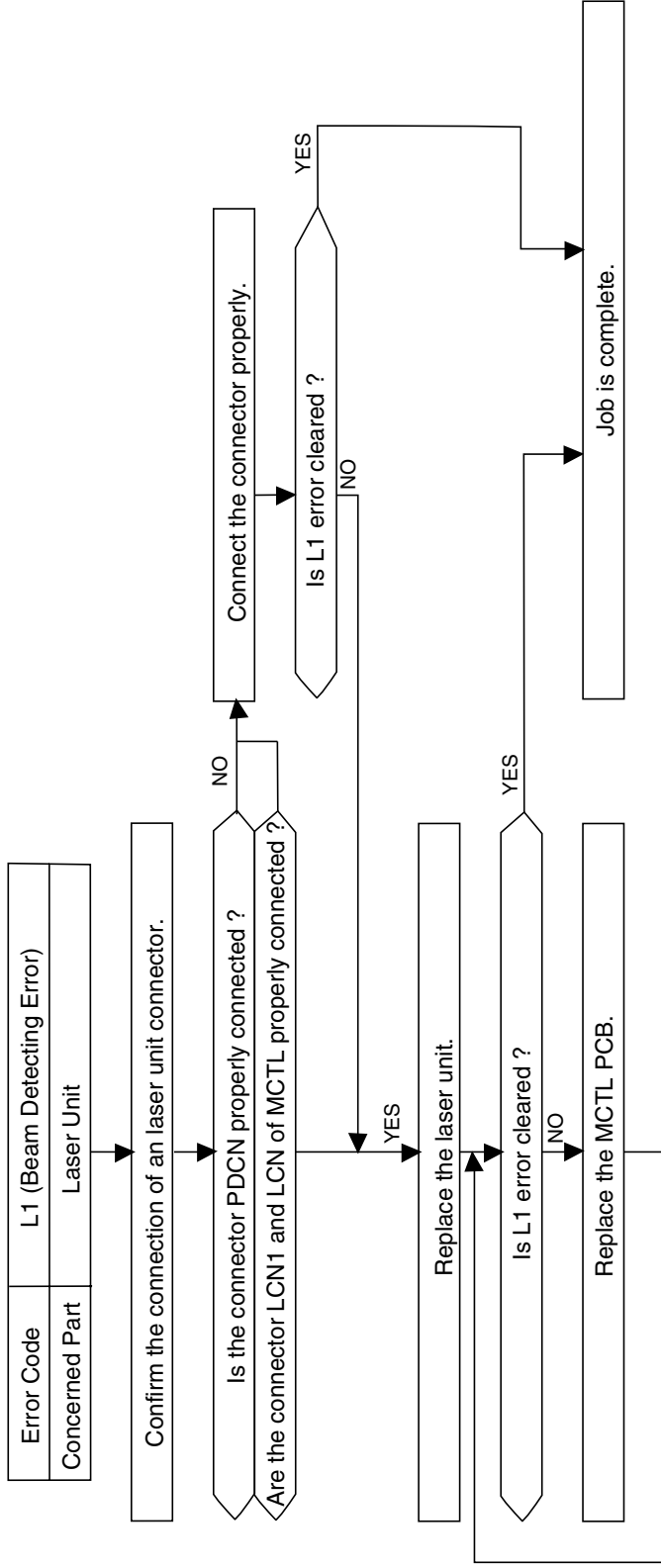


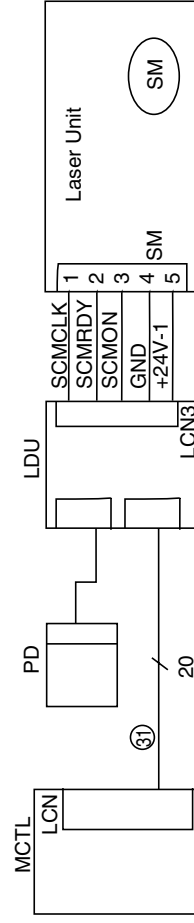
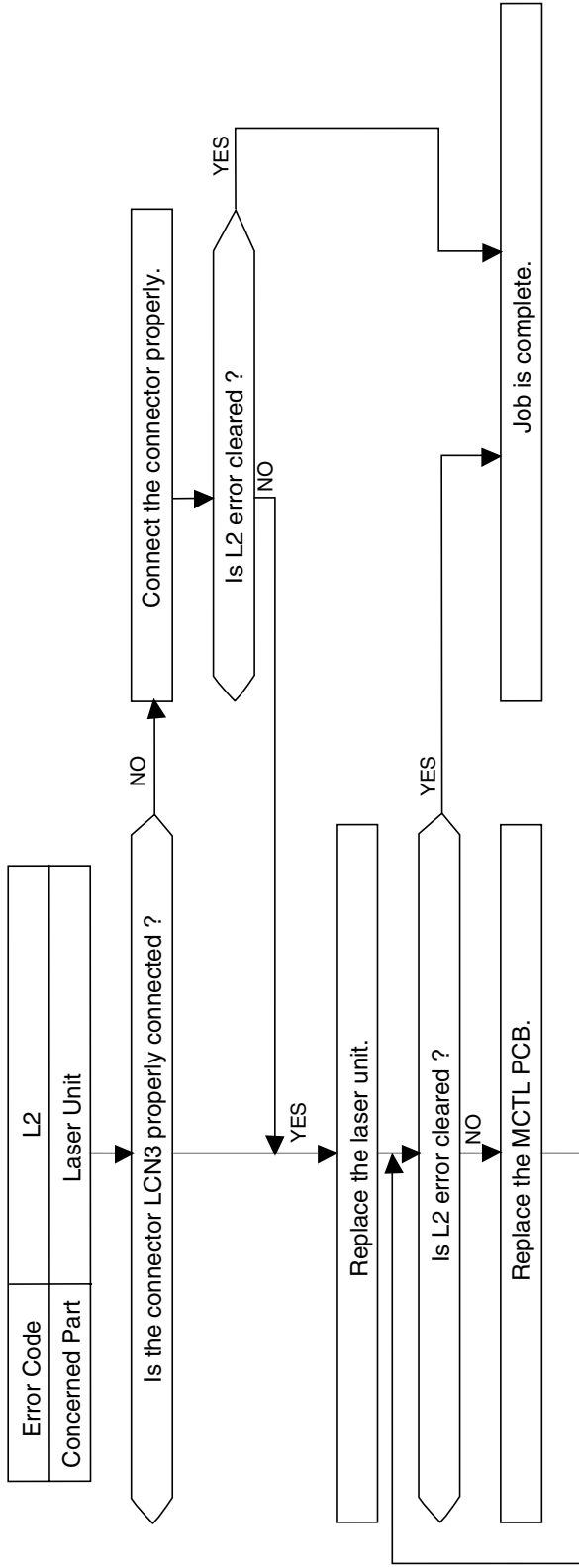
Error Code	F5
Concerned Part	High-voltage power supply unit (HVU)

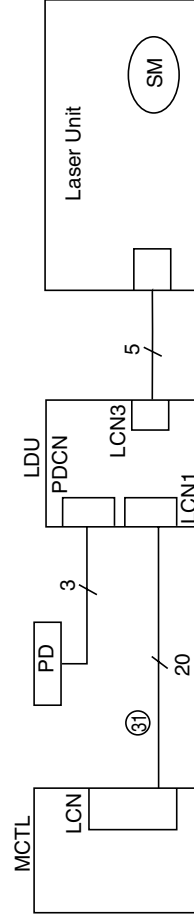
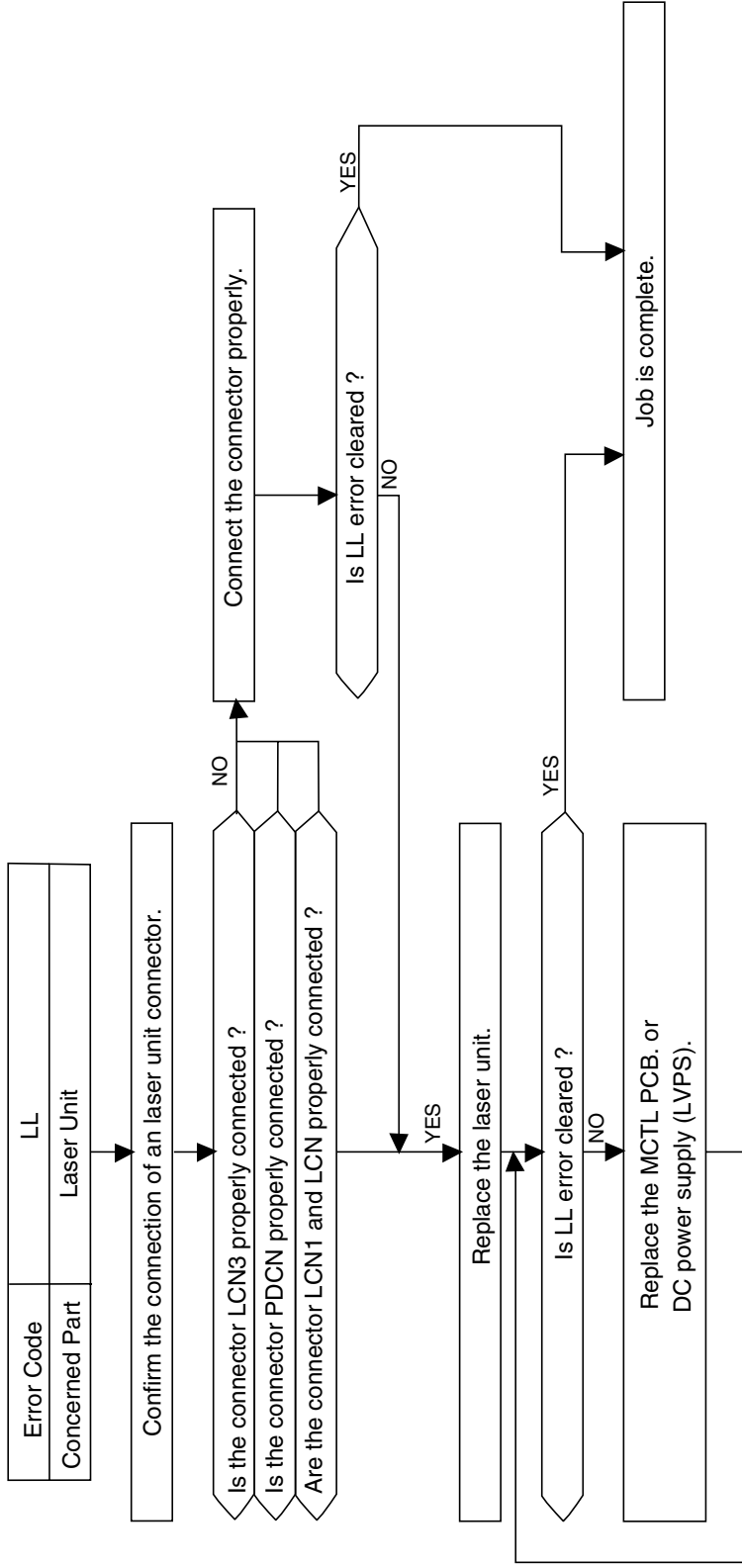










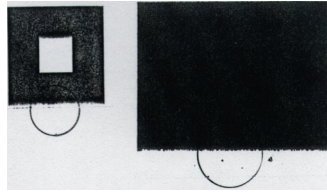


5. IMAGE FAILURE

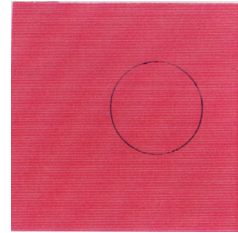
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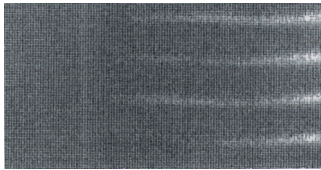
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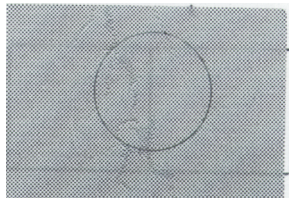
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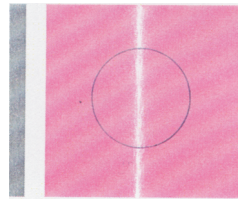
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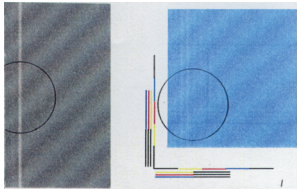
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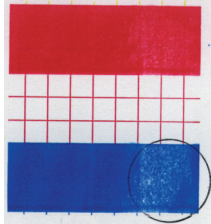
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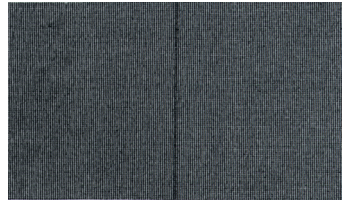
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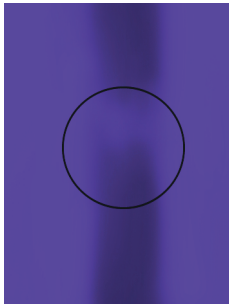
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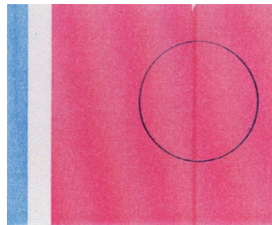
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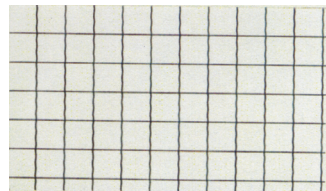
(9-b)



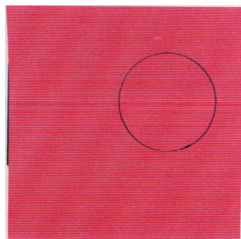
(10)



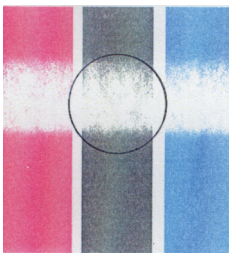
(11)



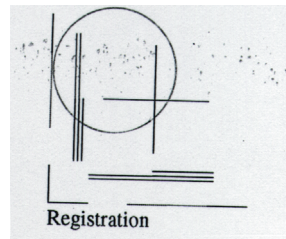
(12)



(13)



(14)



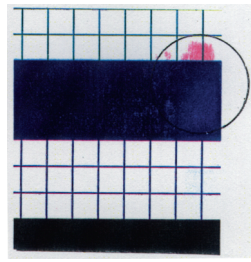
(15)-a



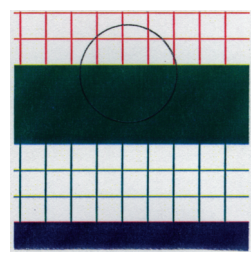
(15)-b



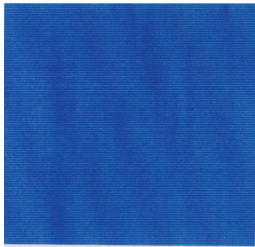
(16)



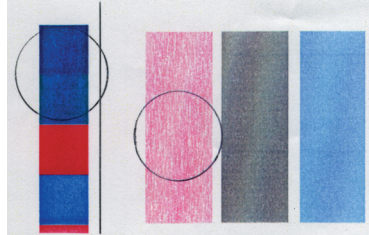
(17)



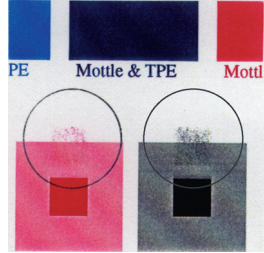
(18)



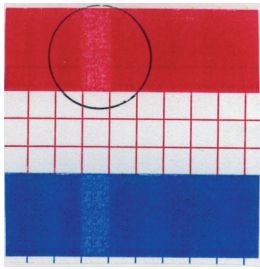
(19)



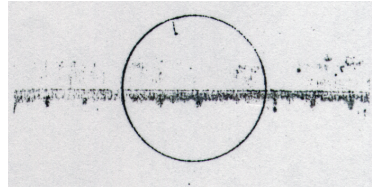
(20)



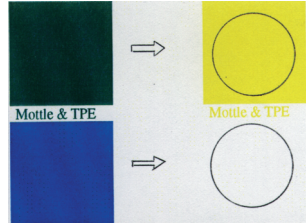
(21)



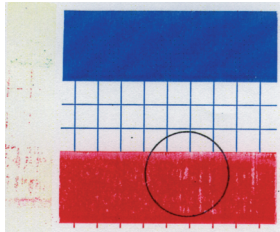
(22)



(23)



(24)



(25)



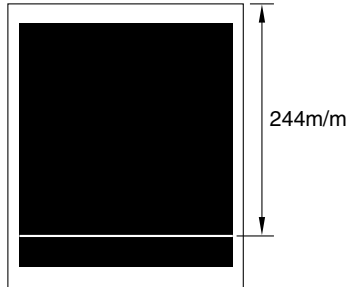
(26)



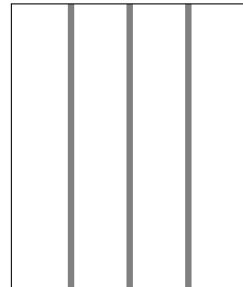
(27)



(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.
- (5) The front cover unit is not firmly closed.

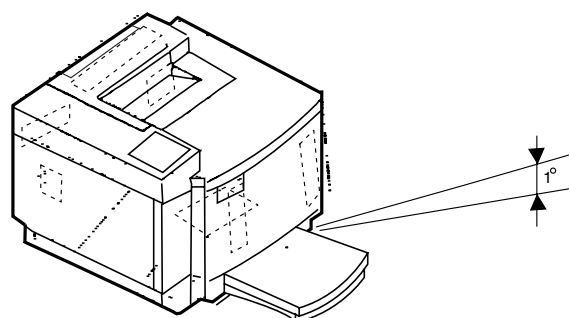


Fig. 8-2

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.8-8](#).)

- 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.

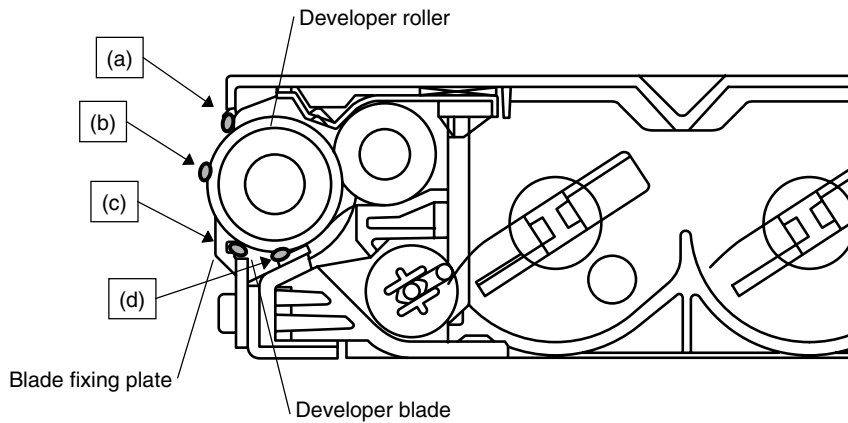


Fig. 8-3

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.8-8](#), remove them referring to one of the figures below.

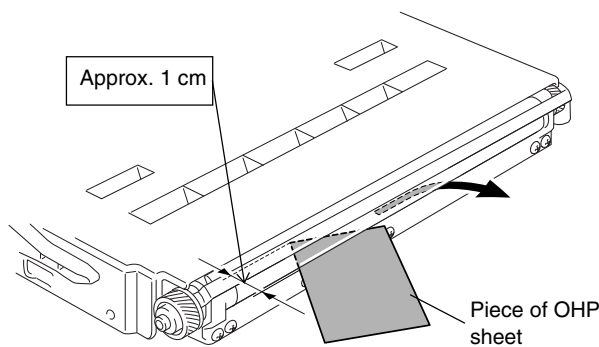


Fig. 8-4

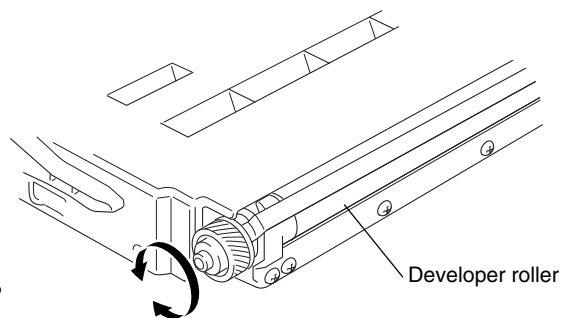


Fig. 8-5

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.

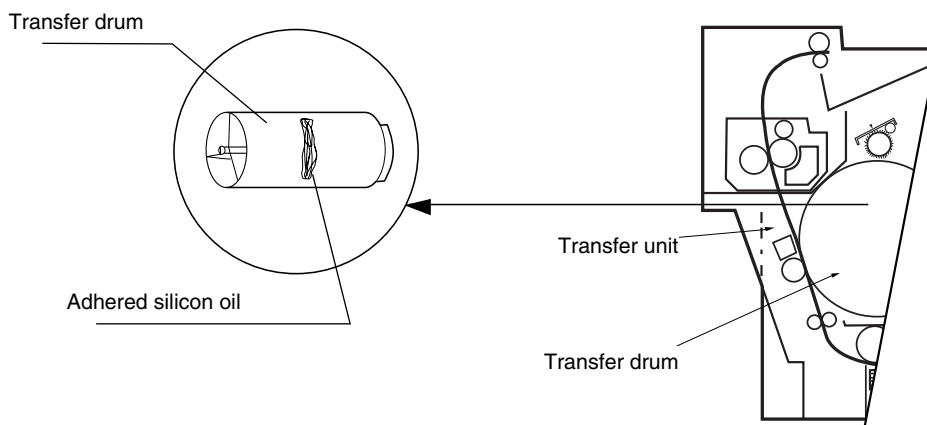


Fig. 8-6

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.

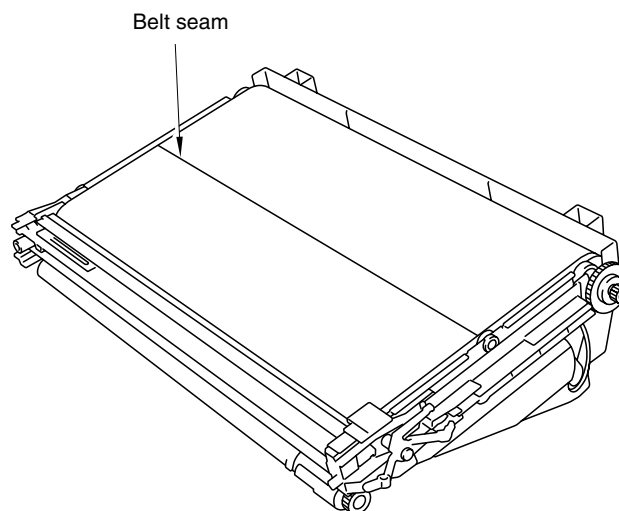


Fig. 8-7

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.

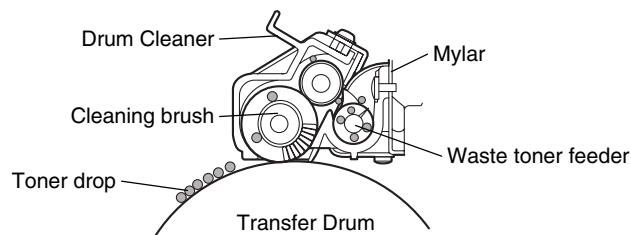


Fig. 8-8

- (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 4.3.2 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 4.3.2 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 4.3.2 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.

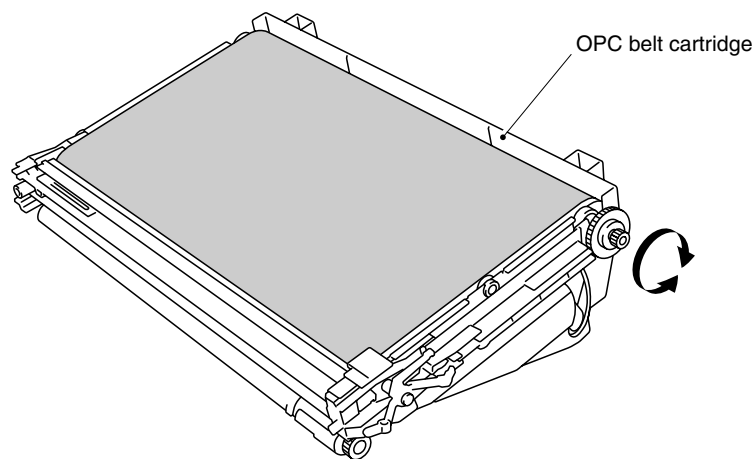


Fig. 8-9

- (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.

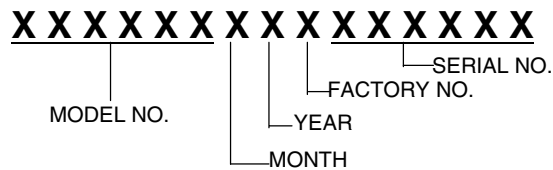
< ID for production month of the Printer >

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>

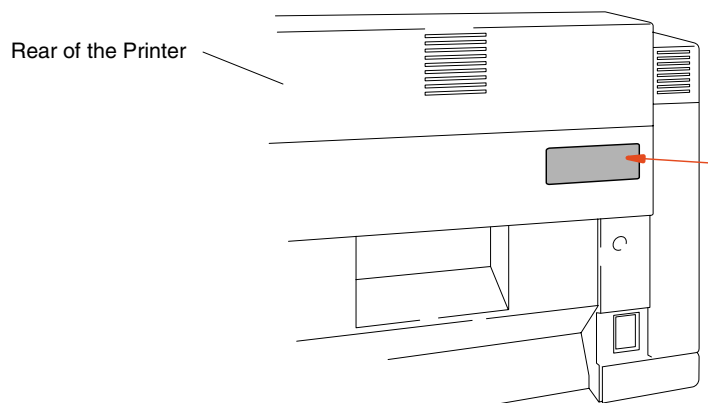
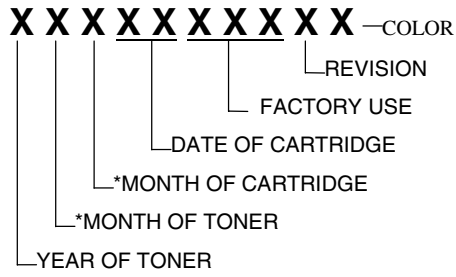


Fig. A- 1

(2) Toner Cartridge



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

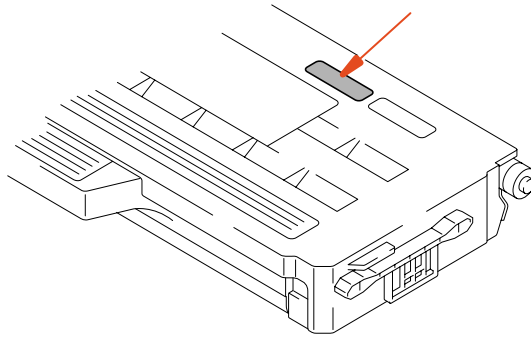
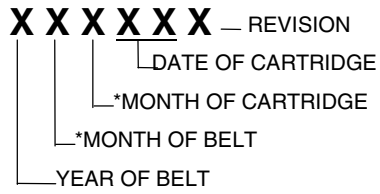


Fig. A-2

(3) OPC Belt Cartridge



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

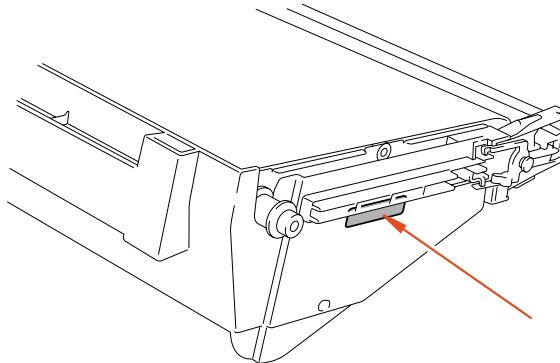
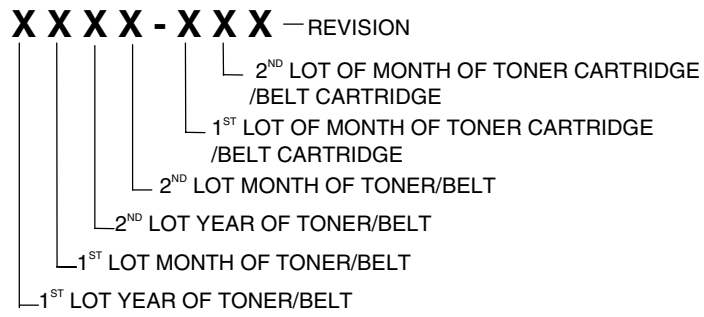
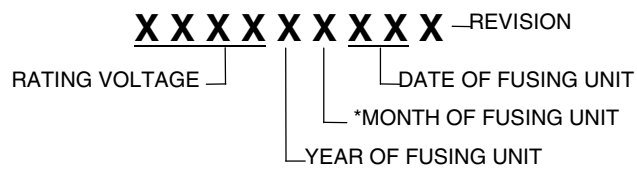


Fig. A-3

(4) Toner Cartridge, OPC Belt Cartridge Master Box



(5) Fusing Unit



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

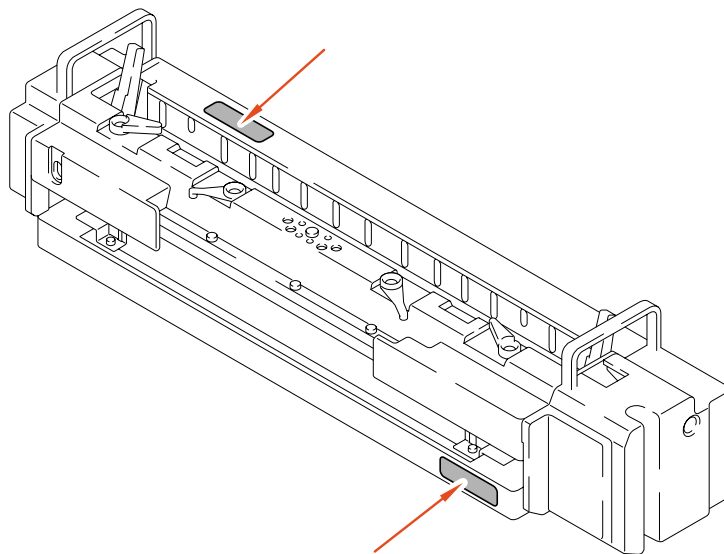
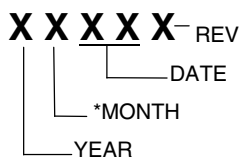


Fig. A-4

(6) Laser Unit



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

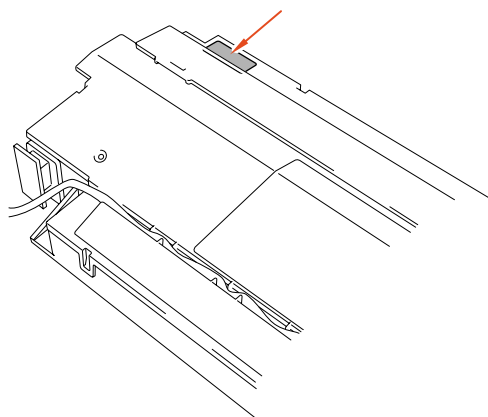
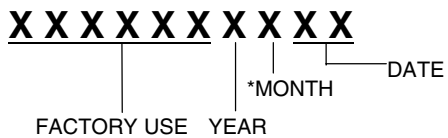


Fig. A-5

(7) Transfer Drum



*1-9 and X for Oct., Y for Nov., Z for Dec.

<Location>

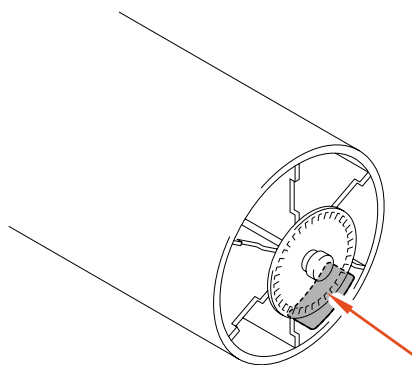


Fig. A-6

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 prints
 - 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

Pages 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

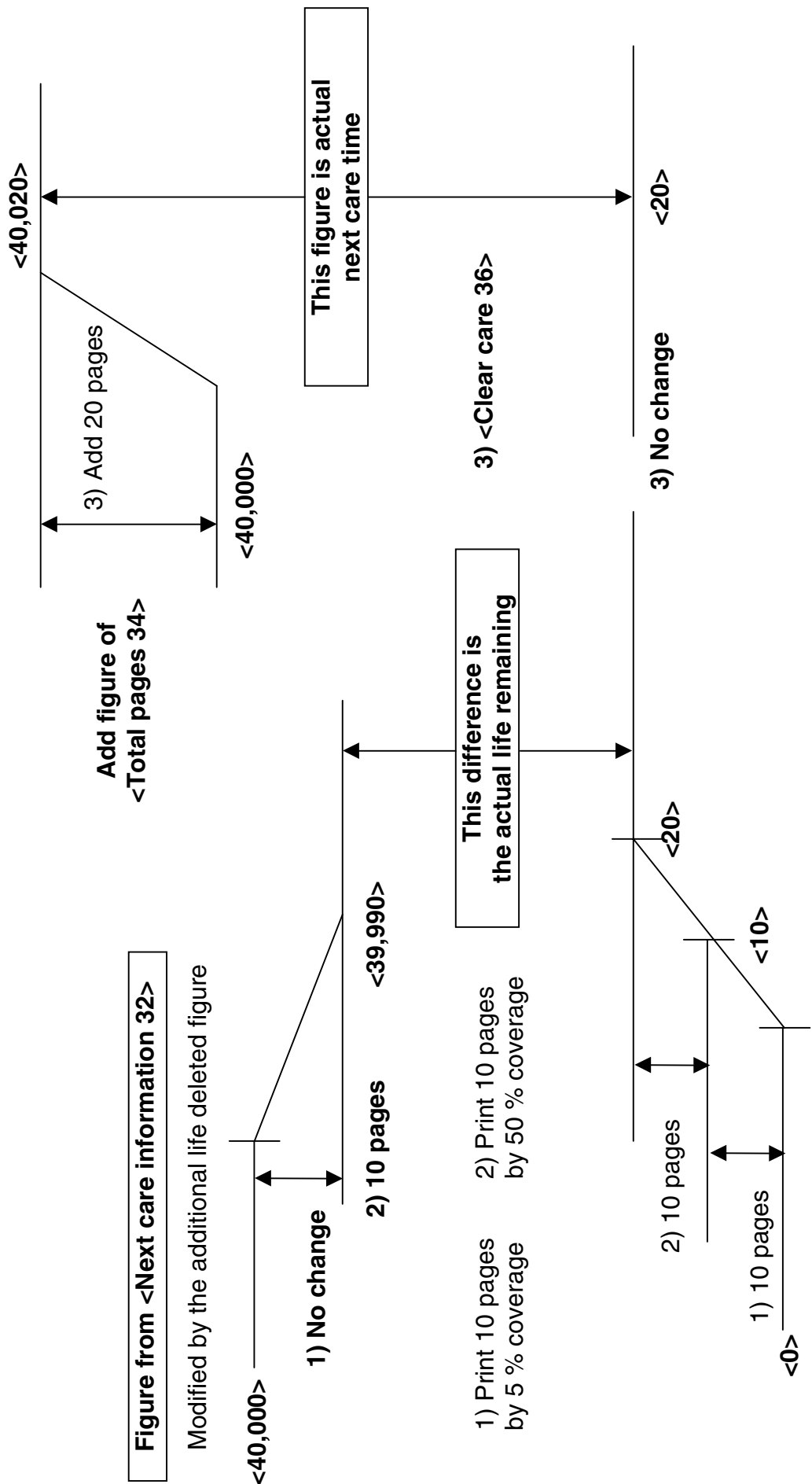


Figure from <Total page 34>
Total page counter life

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:-

$$\text{TOTAL PAGE} = \text{NEXT CARE} - \text{LIFE PERIOD}$$

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.) $\text{NC2} - \text{LP2} \Rightarrow 12,050\text{P} - 12,000\text{P} = 50$
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.) $\text{NC2} = 12,050\text{P}$

- 5) Re-enter the BL UNIT (NC7) value as follows;
 - i) After calculating the values so that they work in the following formula
 $(\text{IY} + \text{IM} + \text{IC} + \text{IK}) = \text{NC7} - \text{LP7}$,
enter each value of LP7, IY, IM, IC, IK.
(i.e.) $(\text{IY} + \text{IM} + \text{IC} + \text{IK}) = \text{NC7} - \text{LP7}$
 $\Rightarrow (348 + 353 + 365 + 439) = 49,135 - 50,000$
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;
 $(\text{IY} + \text{IM} + \text{IC} + \text{IK}) = \text{NC7} - \text{LP7}$
 $\Rightarrow (348 + 353 + 365 + 439) = 49,135 - 40,000$
 $\Rightarrow (348 + 353 + 365 + 439) = 9,135$
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.) $\text{NC7} = 49,135\text{P}$
 - 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.
- 3) Put the toner cartridges into the original starter kit packings.

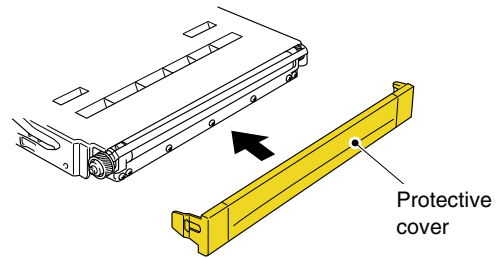


Fig. A- 8

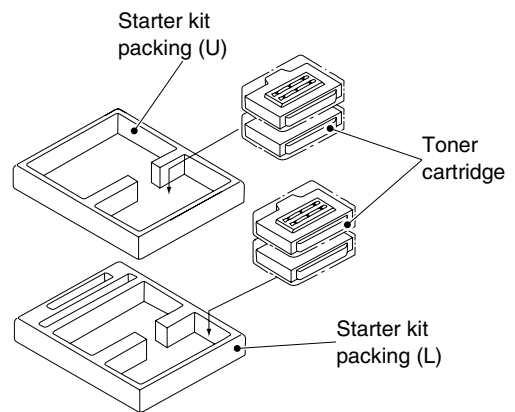


Fig. A- 9

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.

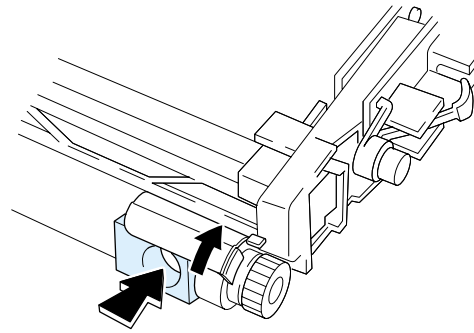
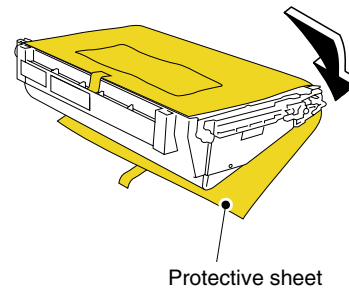


Fig. A-10

- 3) Cover the OPC belt cartridge with the original protective sheet (black).
- 4) Put the cartridge into the lightproof polyethylene bag.



Protective sheet

Fig. A-11

- 5) Put the OPC belt cartridge into the original starter kit packing (L).

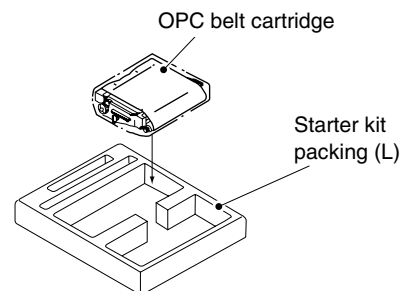


Fig. A-12

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 damaged.
- 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.)

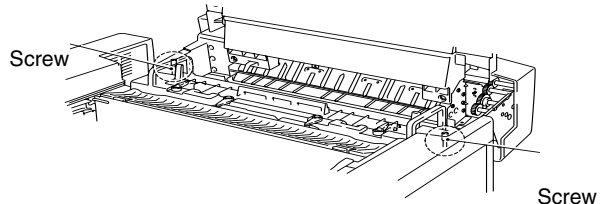


Fig. A-13

- 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.

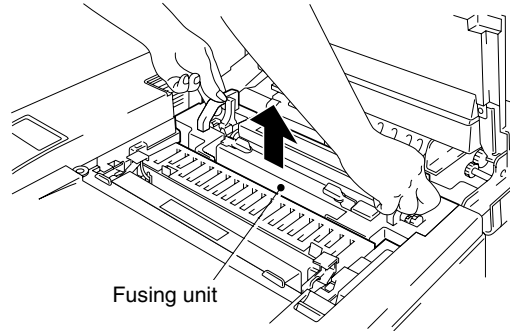


Fig. A-14

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.

- 4) Put the oil bottle and the fuser cleaner into the original starter kit packing (L).

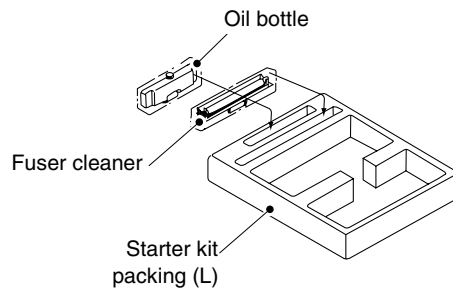


Fig. A-15

- 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'](#).

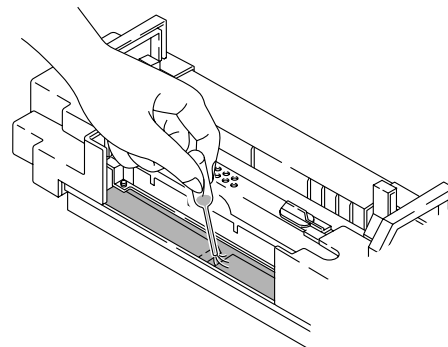


Fig. A-16

6.4 Waste Toner Pack

- 1) Remove the waste toner pack from the printer.

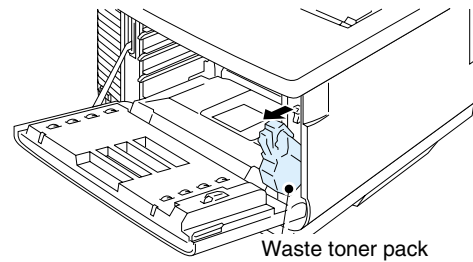


Fig. A- 17

- 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.

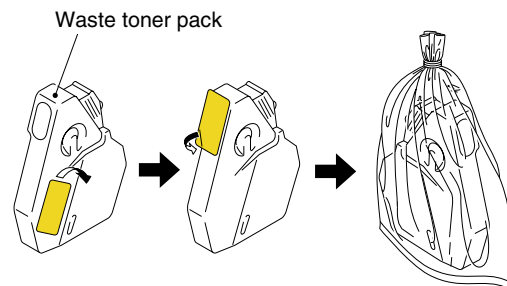


Fig. A- 18

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.

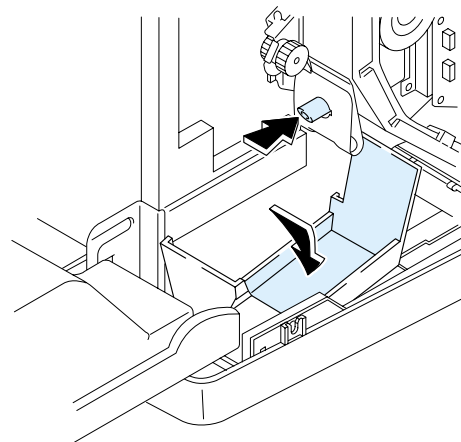


Fig. A- 19

- iii) Cover the exit of the waste toner feeder tube with vinyl wrap.

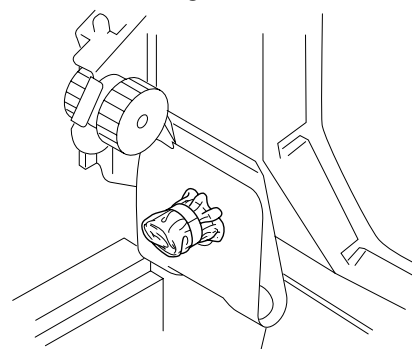


Fig. A- 20

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.

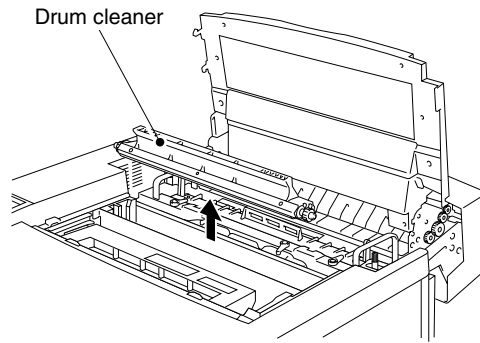


Fig. A- 21

- iv) Clean the area where the drum cleaner is mounted with a vacuum cleaner and a cloth. (Refer to the figure on the right.)

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.

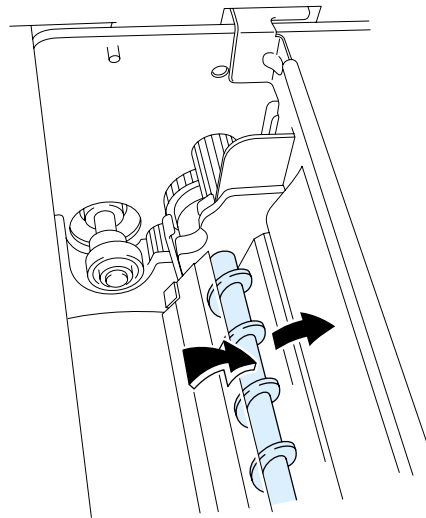


Fig. A- 22

- 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.

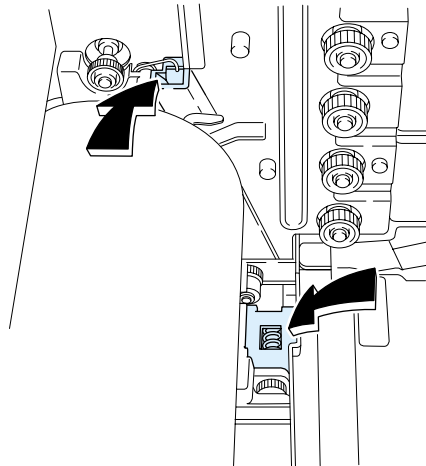


Fig. A- 23

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.

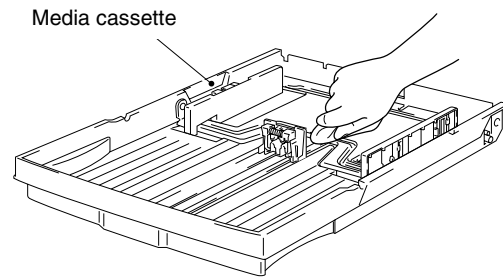


Fig. A- 24

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.

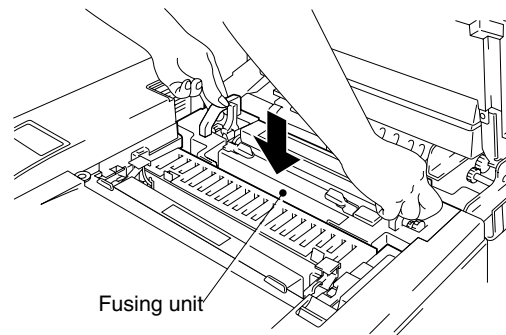


Fig. A- 25

- 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.

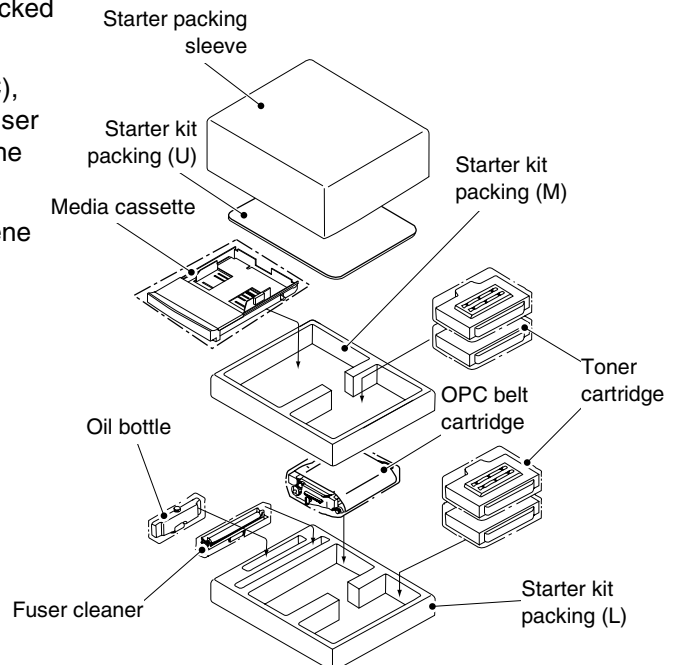


Fig. A- 26

- 4) Pack the printer, starter kit packing, waste toner pack, and power cable in the carton using the original packing material.

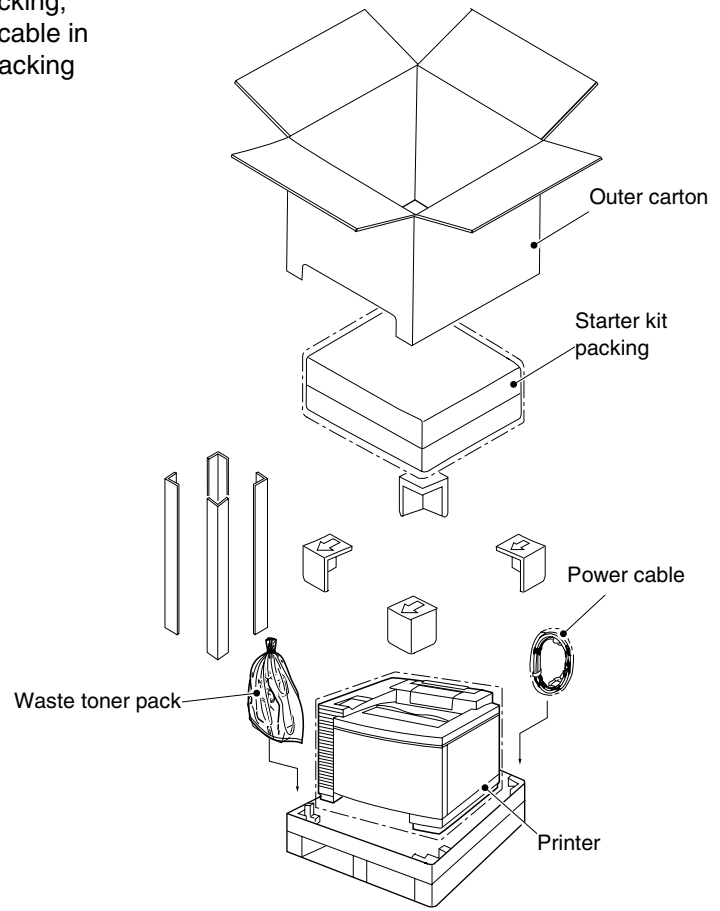


Fig. A- 27

- 5) Seal the outer carton firmly.
- 6) Band the carton with two plastic bands.

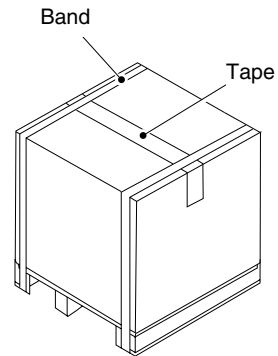


Fig. A- 28

APPENDIX 7. 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.

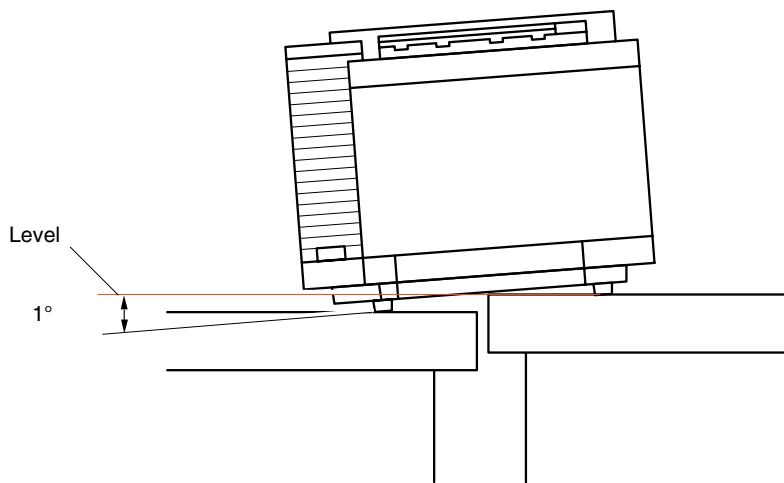


Fig. A- 29

- ii) There is something under the printer or something stuck to the printer base.

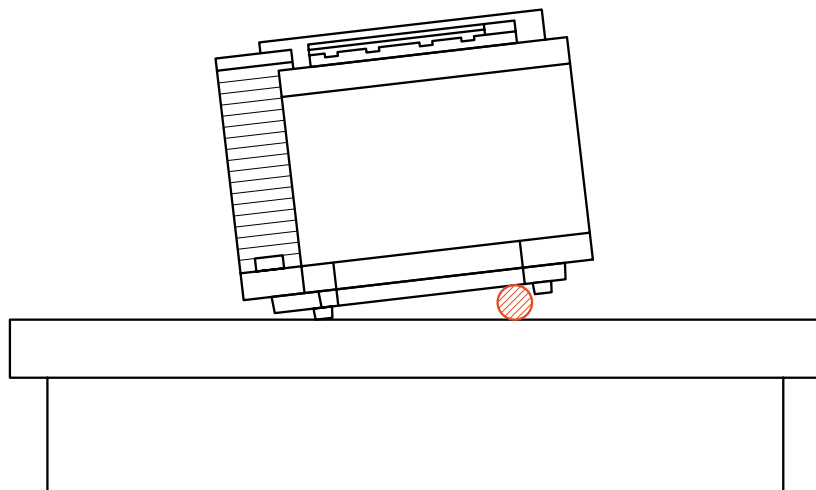


Fig. A- 30

iii) The table the printer is installed on is not level.

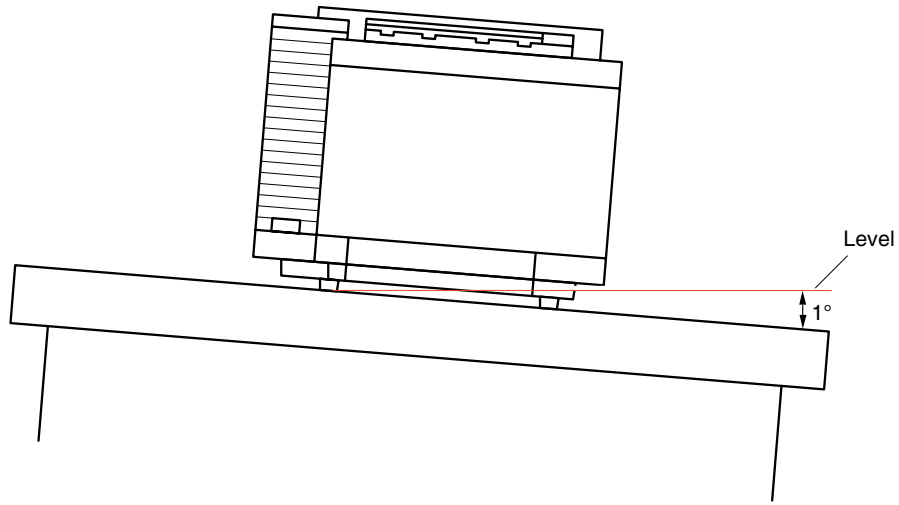


Fig. A- 31

iv) The table surface the printer is installed on is not strong enough.

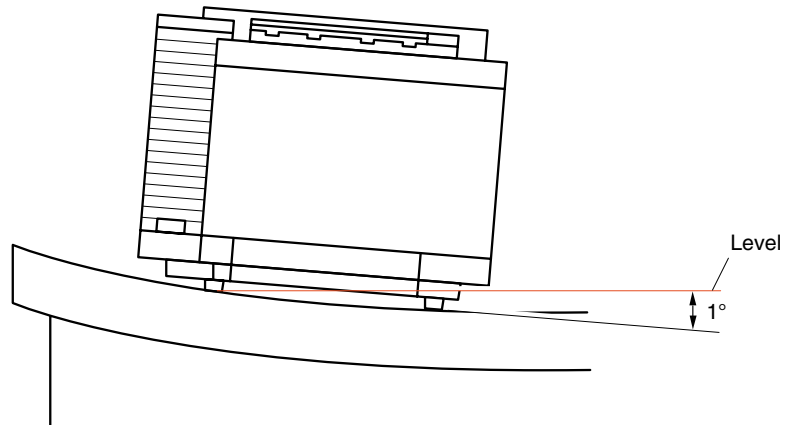


Fig. A- 32

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.

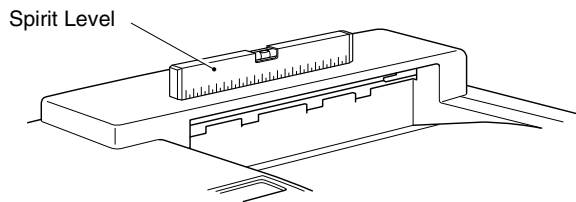


Fig. A- 33

APPENDIX 8. PAPER POSITIONS DURING DUPLEX PRINTING

Fig. A-34 below shows the paper positions when printing using the available duplex printing function.

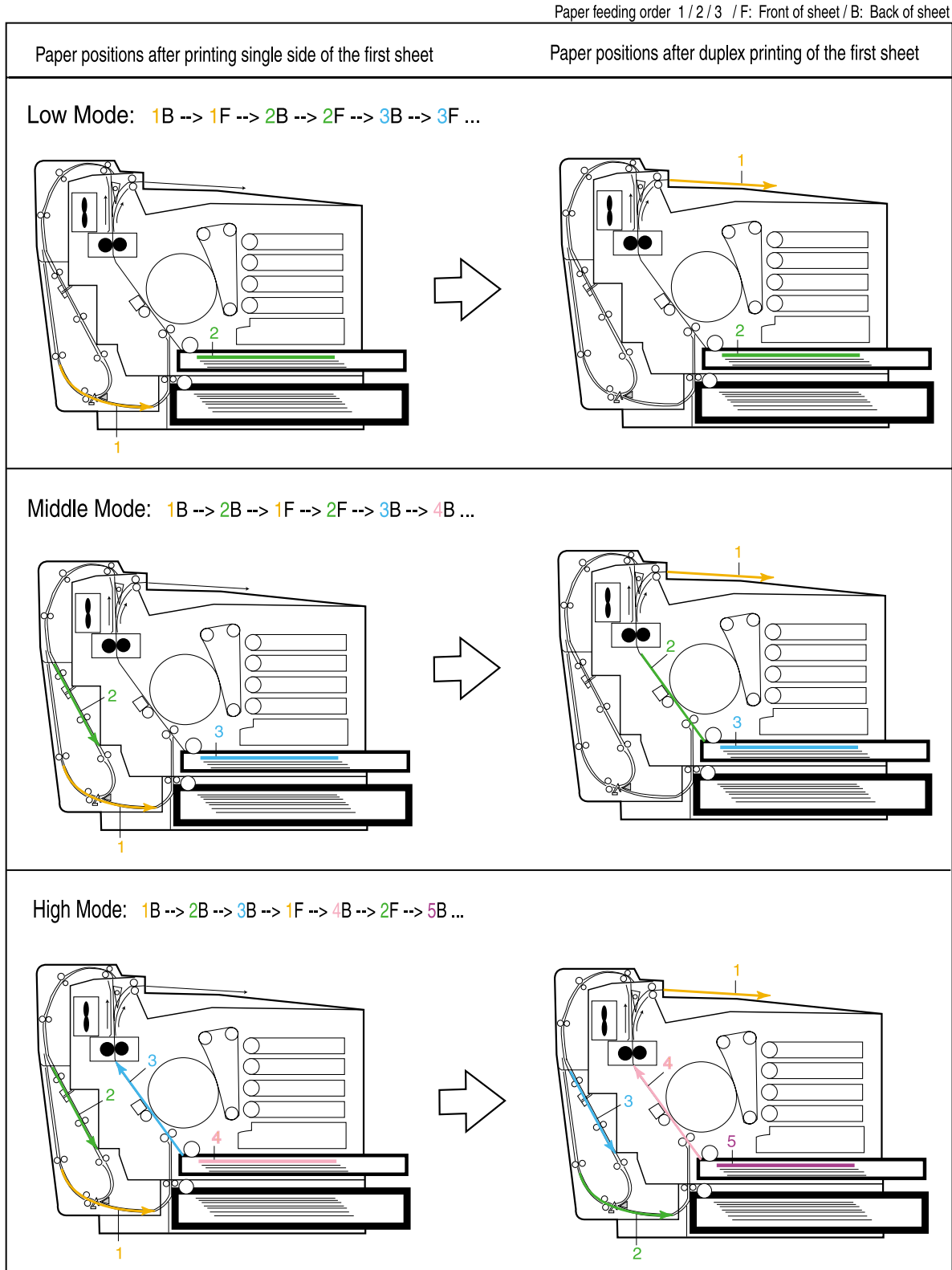


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