# PrintPartner 12V
# PAGE PRINTER
# MAINTENANCE MANUAL

FUJITSU LIMITED

Communications and Electronics

Tokyo, Japan

**Control panel controller**

The control panel controller, a small LSI on the control panel board, controls the control panel LCD, LEDs, and switches. The LSI on the controller board controls the interface to the above LSI. Serial data is used as LCD and LED drive signals and switch read signals.

A separate line is provided for the READY button signal to allow an interrupt to the CPU.

### (6) Print Density Converter LSI

This LSI enables the 600-dpi laser unit to print horizontally 2400-dpi print quality.

### (7) Reset Circuit

The reset circuit initializes the printer when power is turned on.

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# PREFACE

This manual is for maintenance engineers and discusses the operation, installation, and maintenance of the PrintPartner 12V page printer. The topics covered are:

Chapter 1: Printer specifications, performance, and configuration

Chapter 2: Installation precautions and unpacking

Chapter 3: Diagnosing mechanical and electronic problems

Chapter 4: Maintenance procedures (cleaning, lubrication, inspection, adjustment), procedures for replacing parts, and list of tools

Chapter 5: Principles of operation (mechanical and electrical operations)

Chapter 6: Replacement parts

# CONTENTS

# ILLUSTRATIONS AND TABLES

# CHAPTER 1 GENERAL DESCRIPTION

## 1.1 INTRODUCTION

This manual is for maintenance service engineers. It covers overall PrintPartner 12V page printer maintenance and detailed information such as trouble-shooting and component replacement.

There are two companion manuals for PrintPartner 12V maintenance service engineers:

PrintPartner 12V Page Printer Parts Catalogue (Order No. C145-G021)
PrintPartner 12V/16DV/16ADV Page Printer Schematic Diagrams (Order No. C145-F044)

Most information is covered in this manual. The other two manuals are mostly for reference. These three manuals contain all the information necessary for PrintPartner 12V maintenance.

The PrintPartner 12V page printer is a reliable machine with a simple mechanism that requires little maintenance.

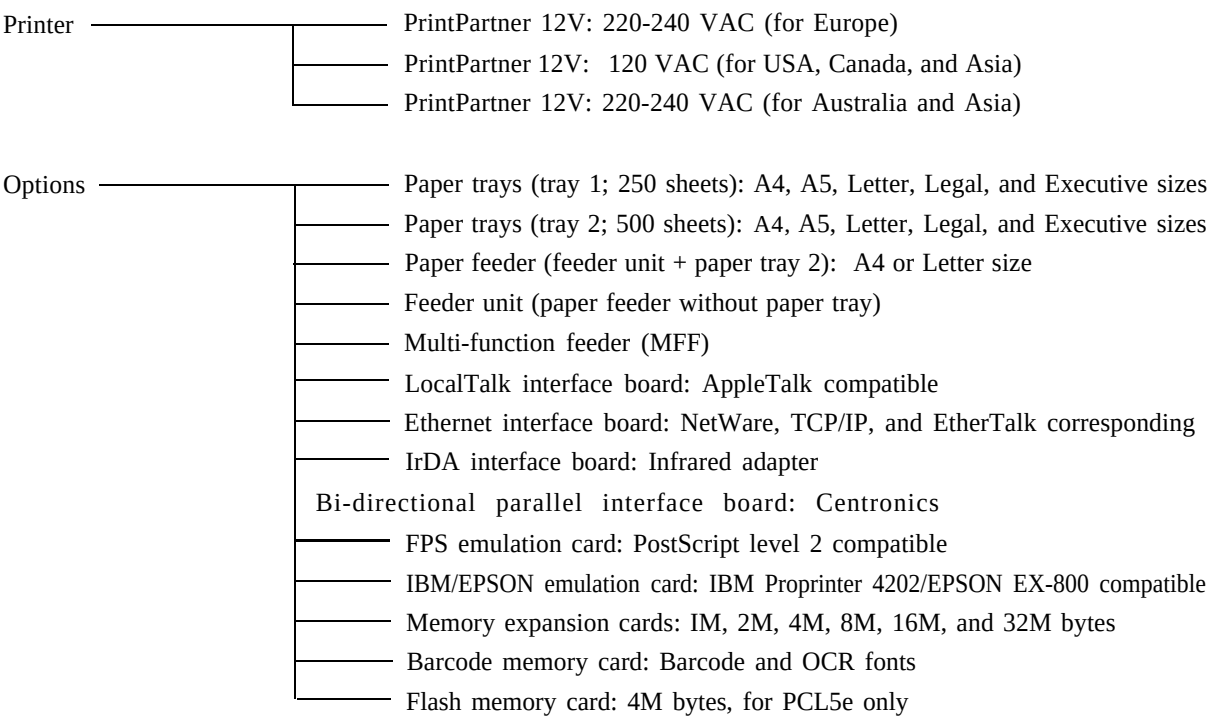
# 1.2 EQUIPMENT CONSTRUCTION

## 1.2.1 General

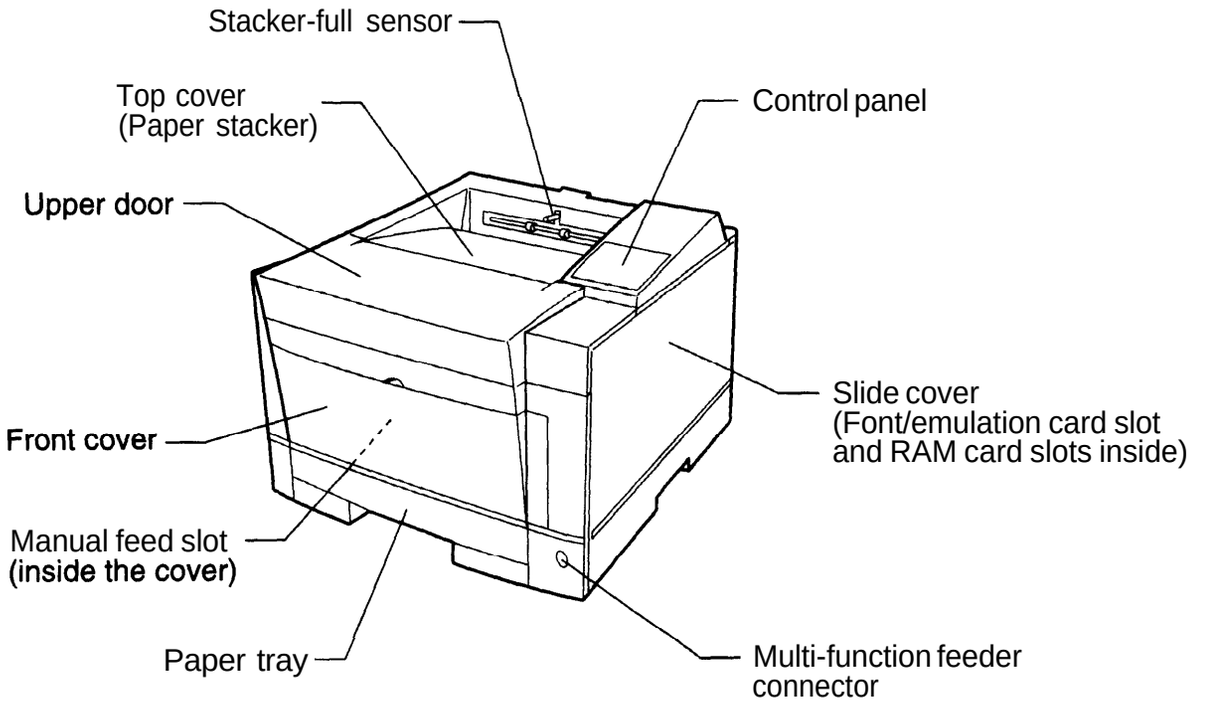
This section outlines the construction and features of the PrintPartner 12V.

## 1.2.2 Model Configuration

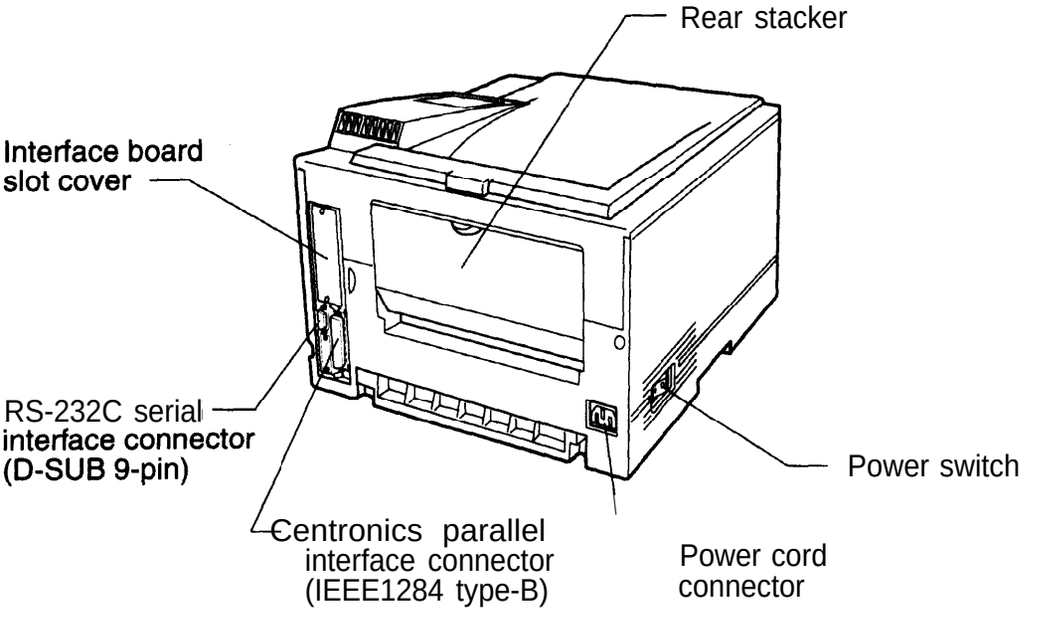
Model and input voltage




The standard printer has 4 megabytes of RAM, an HP LaserJet 5 (PCL6) emulation, a Centronics parallel interface (b&directional), and an RS-232C serial interface. Its paper tray size is A4 for Europe and Asia, and letter for USA, Canada, and Australia.




**[ Front and right side view]**



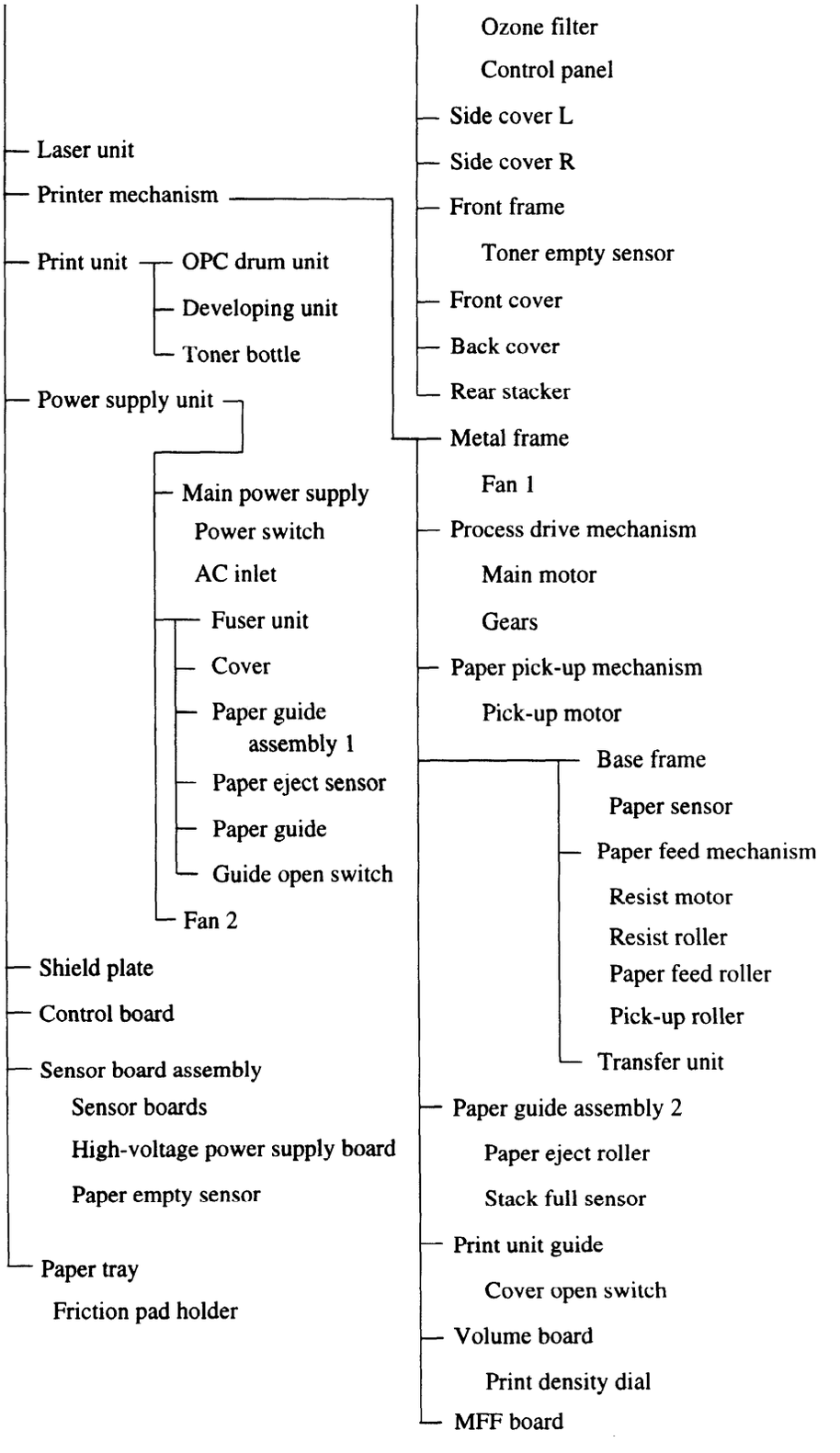

**[ Rear and left side view ]**

**Figure 1-1 PrintPartner 12V Page Printer**

## 1.2.3 Structure

The standard printer without options has the following structure. The main power supply and fuser unit differ with AC input voltage (120 or 220 - 240 VAC).

**Print Partner 12V**



**Printer + optional multi-function feeder (MFF) + optional paper feeder**

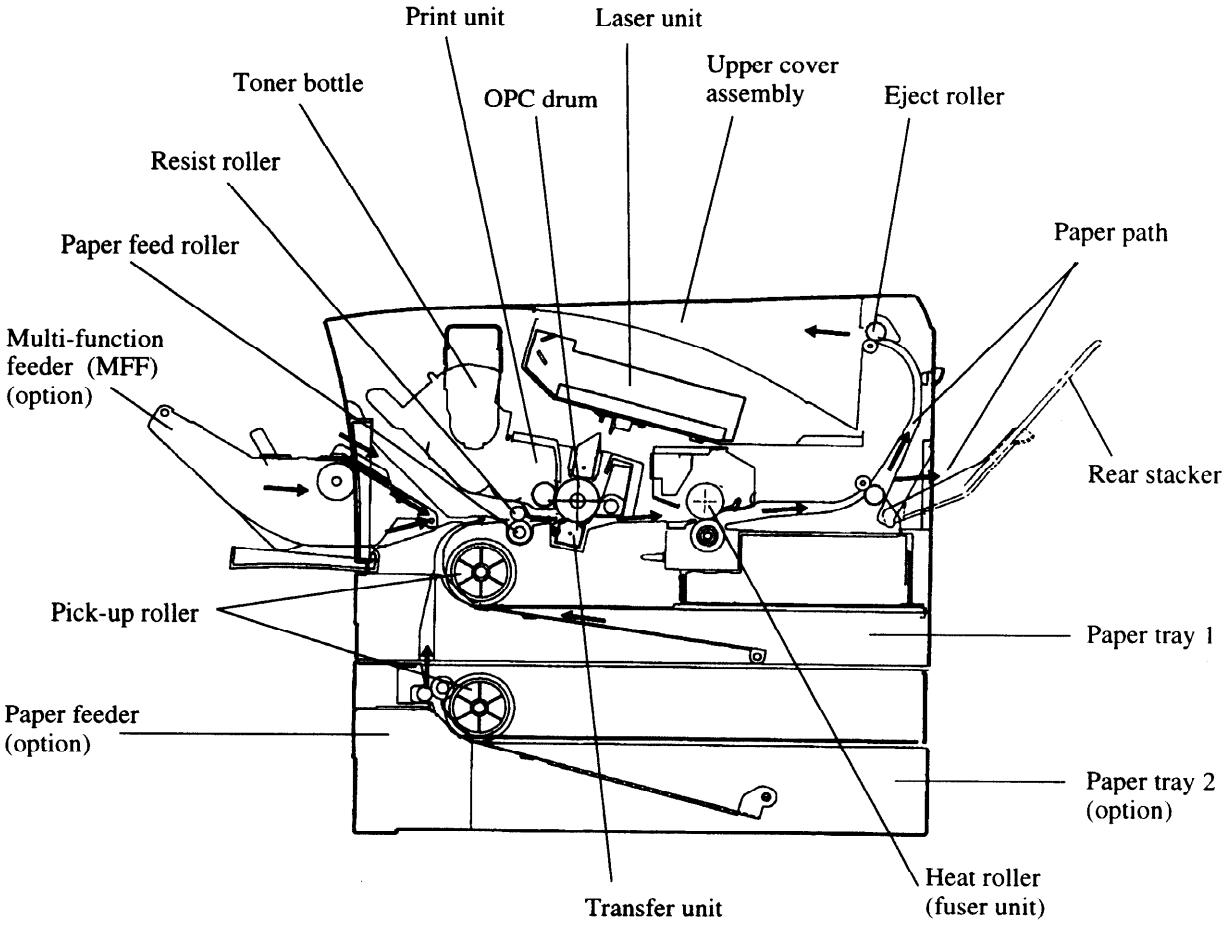



**Figure l-2 Structure**

### (1) Covers

**The covers consist of the following:**

Upper cover assembly
Side cover L
Side cover R
Front frame
Front cover
Back cover
Stacker

**Upper cover assembly**

The upper cover assembly covers the top of the printer mechanism and stacks printed paper.
The upper cover assembly has a hinge to enable the front (upper door) to open. The print unit and toner bottle can be replaced when the upper door is open.
The control panel is located at the top right and the ozone filter is inserted at the right rear. It consists of four LED indicators, an LCD, and eight push-button switches, enabling communication between the user and printer.

**Side cover L**

This cover covers the left side of the printer mechanism.

**Side cover R**

This cover covers the right side of the printer mechanism.
This cover is opened to add or replace optional cards (RAM card or emulation card).

**Front frame**

This frame is secured to the front of the printer mechanism.

**Front cover**

This cover is opened when paper is fed manually or the multi-function feeder is used.

**Back cover**

This cover covers the rear of the printer mechanism.

**Rear stacker**

The rear stacker can be opened or closed to select the output destination of printed paper. The rear stacker is usually closed to eject paper to the upper cover side.
When envelopes, labels, or transparencies are used, the rear stacker must be opened to eject paper to the rear and stack it.
Also when a paper jam occurs, the rear stacker is opened to remove the jammed paper.

**(2) Laser unit**

The laser unit is provided in the upper cover.
Images are written on the photoconductive drum of the print unit by laser beams emitted from the laser unit.

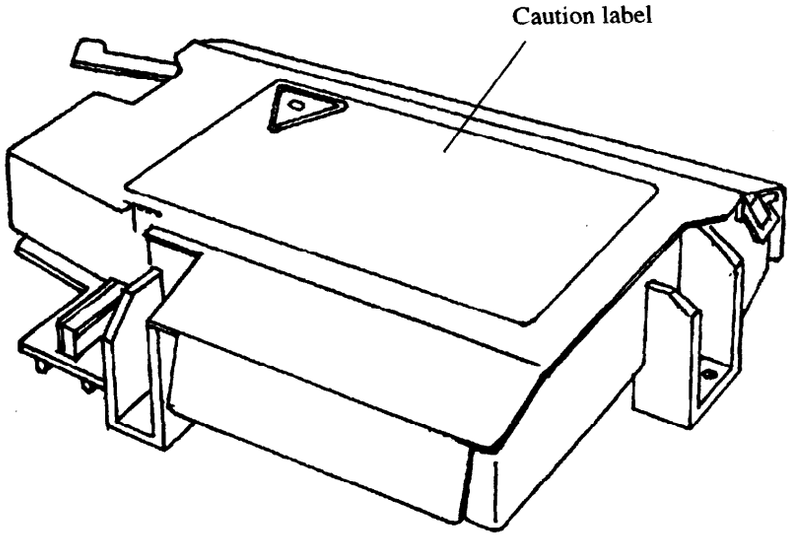



**Figure 1-3 Laser Unit**

**⚠CAUTION** Do not look at a laser beam directly.

This label is put on the laser unit.

### (3) Printer mechanism

**Metal frame**

This frame is the basic frame of he printer mechanism and made of sheet metals.
All parts are tightened with screws or snap-fitted to this frame.
The fan (FANl) is installed on this frame.

**Process drive mechanism**

This mechanism consists of the mechanism that drives the print unit and fuser unit, a DC motor, and drive system (gears, etc.).

**Paper pick-up mechanism**

This mechanism feeds paper loaded in the paper tray to the base frame of the printer mechanism sheet by sheet.
This mechanism consists of a stepping motor and drive system (gears, etc.).

**Base frame**

This frame is main part of the mechanism that transports paper and transfers toner to the paper.

Sensor that detects the picked paper
Transfer unit (service technicians replaceable)
Paper feed mechanism
(A stepping motor, resist roller, paper feed roller, and pick-up roller are tightened with screws or snap-fitted to this frame.)

**Paper guide assembly 2**

This guide transports printed paper to the output stacker. This guide is snap-fitted to the frame on which the paper eject roller is installed.
The stacker-full sensor is installed on this assembly.

**Print unit guide**

This guide is used to install the print unit in the printer.
The cover open switch that detects opening and closing of the upper door is installed on the left guide.
This guide is snap-fitted to the frame.

**Volume board**

The volume board has a variable resistor to control the print density. The control dial is accessible when the upper door is open.

Multi-function feeder board (MFF board)

This board has a connector for the optional multi-function feeder (MFF).

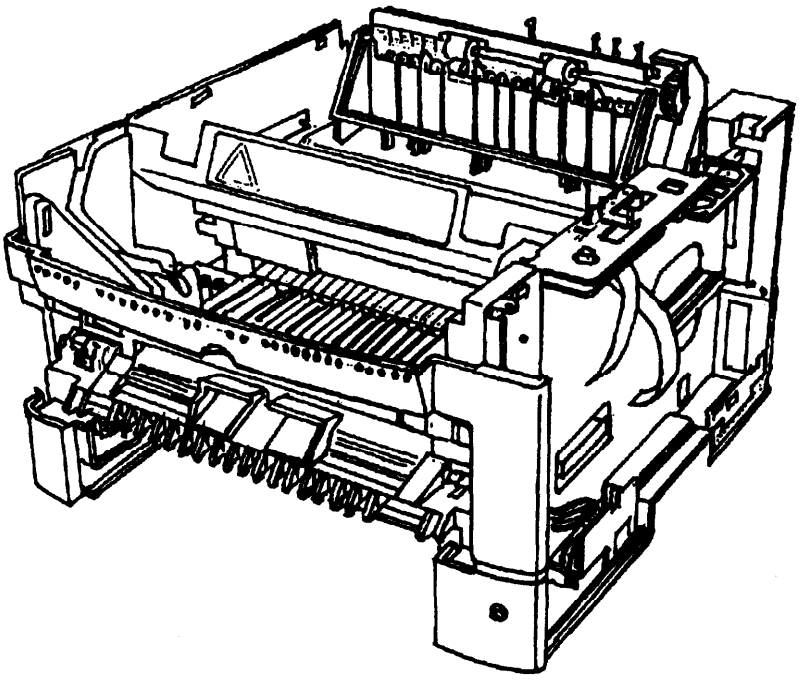


**Figure l-4 Printer Mechanism**

**(4) Print unit (user replaceable)**

The print unit consists of a photoconductive (OPC) drum unit and a developing unit. It lasts about 40,000 pages printed at 5% coverage in continuous print mode at 25°C (77°F') and 50% RH.
It can be changed easily by the user.

Toner bottle (user replaceable)

The toner bottle contains new toner. It lasts for about 5,000 pages printed at 5% coverage in continuous print mode. However, the toner bottle installed on the new print unit has a shorter life. It can be changed easily by the user.

**(5) Power supply unit**

This unit consists of the following parts:

Main power supply

- Power switch
- AC inlet
- Fuser unit
- Cover
- Paper guide assembly 1
- Paper eject sensor
- Paper guide
- Guide open switch

Fan (FAN 2)

**Main power supply**

The main power supply supplies +5 VDC and +24 VDC for the logic devices and printer mechanism. There are two types of power supplies: one for input voltage of 120 VAC and the other for 220 to 240 VAC.

The main power supply is equipped with a power switch and an AC inlet.
The main power supply is attached with screws to the cover of the fuser unit.

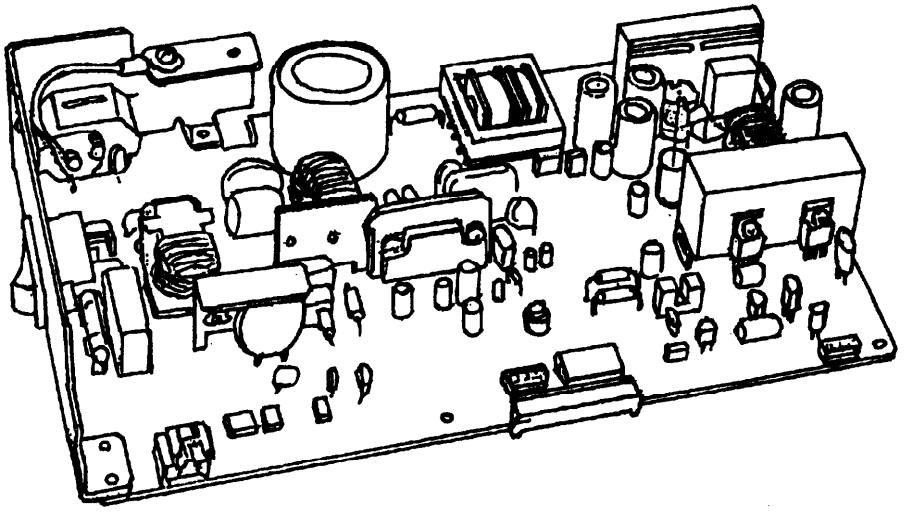


**Figure 1-5 Power Supply Unit**

Fuser unit (service technicians replaceable)

The fuser unit has an aluminium heat roller and a pressure roller. It fixes the image of toner particles on the paper using heat and pressure.

It has a temperature sensor and a thermal fuse for safety.

It lasts about for 100,000 pages printed at 5% coverage in continuous print mode. There are two types: one for input voltage of 120 VAC and the other for 220 to 240 VAC.

**Cover**

This cover, classified as a component belonging under the fuser unit category, covers the main power supply. It is attached on the bottom of the fuser unit and the power supply is installed under (inside) the cover. The paper guide assembly 1 is also installed at the edge of the cover.

**Paper guide assembly 1**

This assembly transports paper from the fuser unit to the eject roller.
When a paper jam occurs, the paper guide assembly can be drawn out to remove the jammed paper.
A guide open switch detects normal installation of the paper guide assembly.

**Fan (FAN 2)**

This fan ventilates the power supply unit.
This fan is tightened with screws to the right side of the power supply unit.

### (6) Shield plate

This plate covers the control board.
This plate is tightened with screws to the right side of the printer mechanism frame

### (7) Control board

The control board is the main controller of this printer. It has four ROMs for firmware, mechanism control, and interface control. It has connectors for a Centronics parallel interface cable, an RS-232C serial interface cable, and an optional interface board, optional memory expansion cards, and an optional emulation/font card.

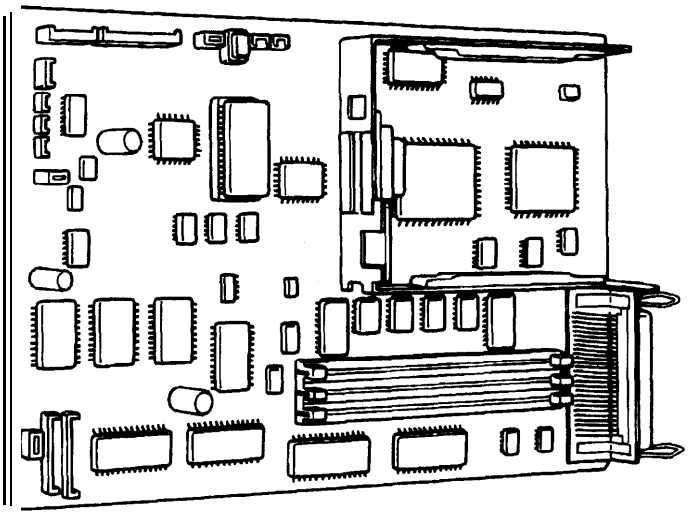


**Figure 1-6 Control Board**

### (8) Sensor board assembly

Sensor boards

There are two sensor boards.

They detect the presence of paper, the size of paper, paper empty, and paper ejection.

High-voltage power supply board (HV board)

The high-voltage power supply, which supplies high voltage to the pre-charger and the transfer unit, is tightened with screws to the left side of the sensor board assembly.

### (9) Paper tray

The paper size is universal among A4, A5, Letter, Legal, and Executive. The capacity of the paper tray (tray 1) is 250 sheets for 0.09 mm thick paper. An optional 500-sheet paper feeder (tray 2) is provided.

# CHAPTER 2 INSTALLATION

## 2.1 GENERAL DESCRIPTION

The PrintPartner 12V page printer is well-packed for shipping, and can be unpacked easily.

After the printer is unpacked, it should be checked with a test printing prior to final installation. Installation procedures are simple and require a minimum of time.

## 2.2 INSTALLATION PRECAUTIONS

Observe the following points when installing the printer:

- Install the printer on a level surface that does not have excessive vibration.
- Place the printer in a well-ventilated room, free of excessive dust.
- Do not place the printer in direct sunlight or near a heater.
- Do not expose the printer to high temperatures or high humidity. Temperature range is from 10°C to 35°C or 50°F to 95°F. Humidity range is between 20% (RH) and 80% (RH). The maximum wet-bulb temperature is 29°C or 84°F.
- Do not block the ventilation at the top and left sides of the printer.
- Use only the power cord supplied with the printer. Do not use an extension cord.
- Use a grounded AC power outlet supplying a stable voltage of the rated value marked on the nameplate at the back of the printer (90 to 110 percent for 120 VAC or 85 to 110 percent for 220 to 240 VAC)
- Avoid sharing power outlets with equipment that emits electrical noise or causes power degradation.

## 2.3 UNPACKING

If possible, retain the carton and packing materials should the printer be reshipped.

Peel off the top tape to open the four flaps.

Take the toner bottle package, the power cord package, and the package of user 's manual, software set (a CD-ROM and a floppy disk), cleaning brush, and paper size labels from the carton. With the printer customized for Letter size, the left paper guide (*) is also included as an accessory for the paper tray Then, take them from protective bags.

Remove the two upper cushions and housing, then remove the printer out of the carton.

Take the printer from the protective bag.

Set the printer where it is to be installed.

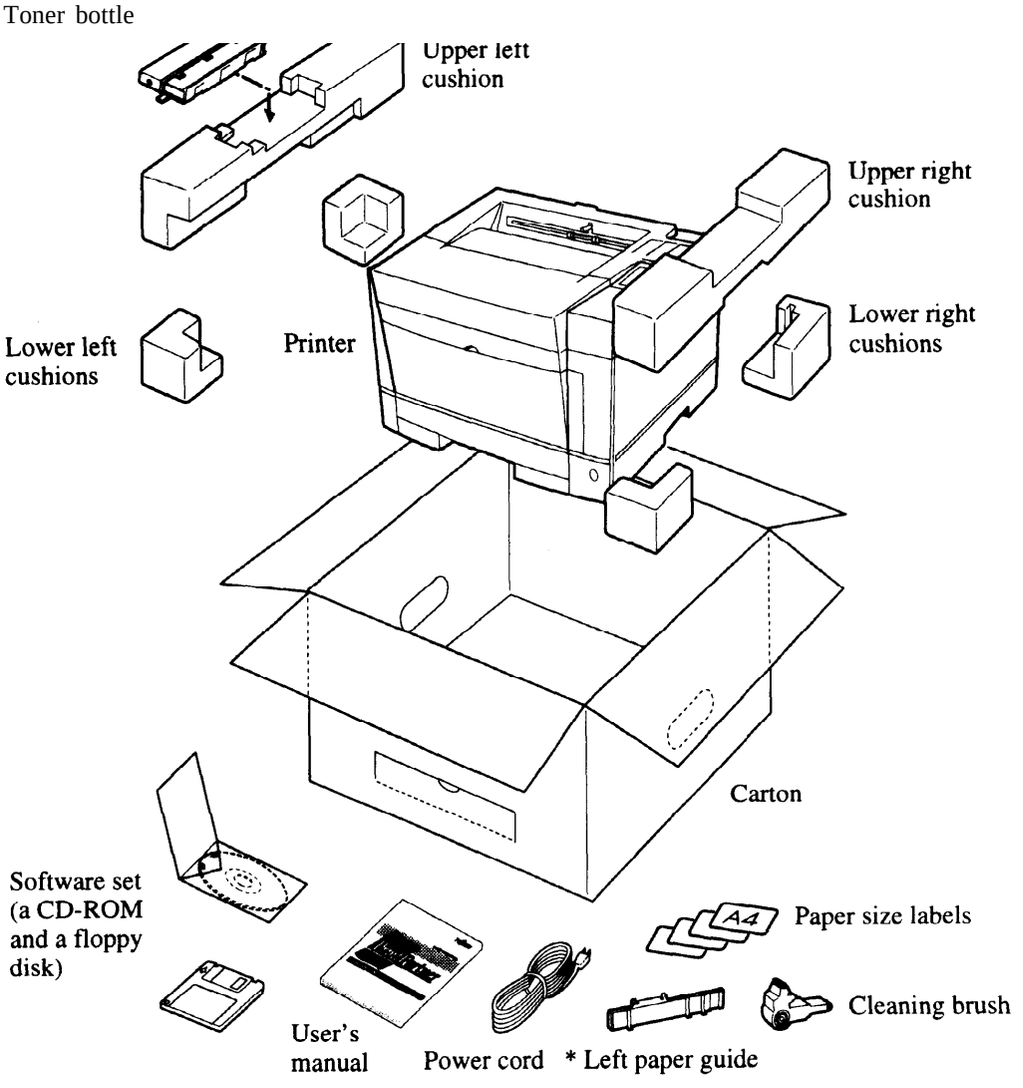
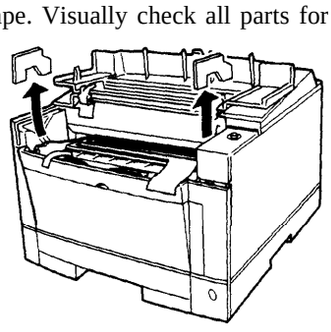
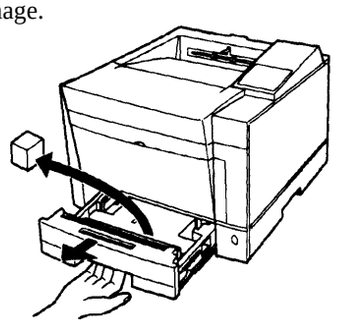
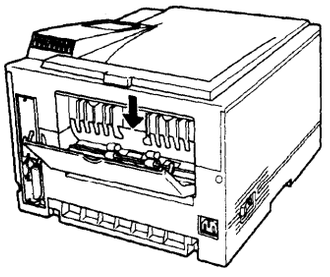



**Figure 2-l Shipping Carton and Printer and its Accessories**

## 2.4 INSPECTION AFTER UNPACKING

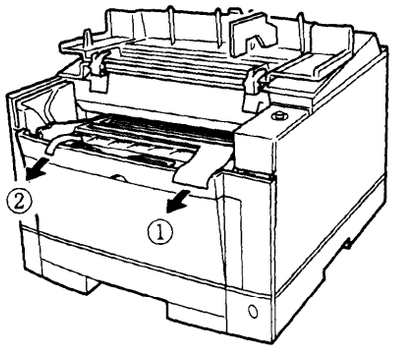
Visually check the printer exterior. Then, turn power on and check the printer performance.
See the user´s manual for details of procedures

Peel off adhesive tapes from the printer. Open the upper door and remove the two restraint cardboards.. Draw out the paper tray and remove the restraint cushion. Open the rear stacker and remove the yellow tape. Visually check all parts for damage.

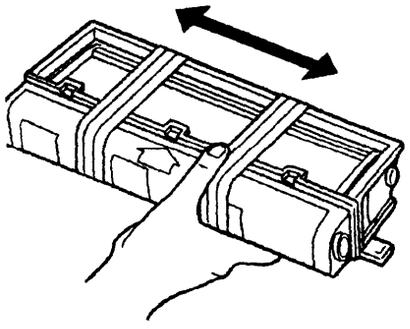
**Set up the print unit and install the toner bottle.**

Remove the protective materials from the print unit.
Remove the protective sheet 1. Gently pull the narrow clear tape 2 until its blue end is visible and remove it.



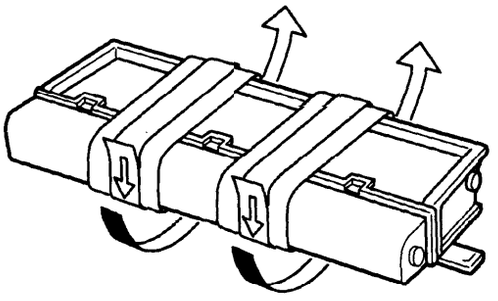

Remove the toner bottle from its envelope.

Fully shake the toner bottle.



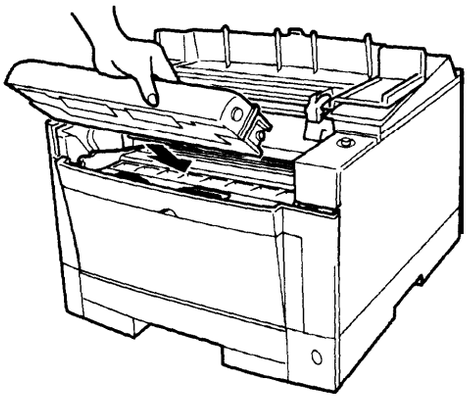
Remove the plastic seal from the toner bottle.

Pull off the seal as gently as possible to avoid spilling toner Be careful not to stain yourself with toner which is stuck to the seal



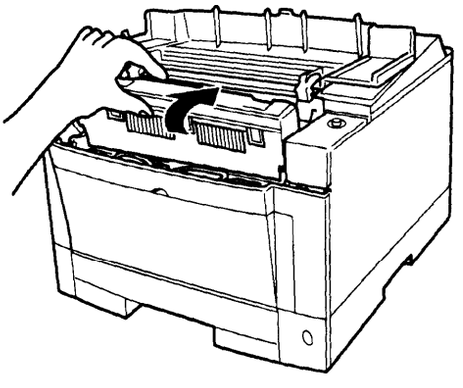
Install the toner bottle.

Slide in both projecting guides of the toner bottle along the grooves of the print unit.

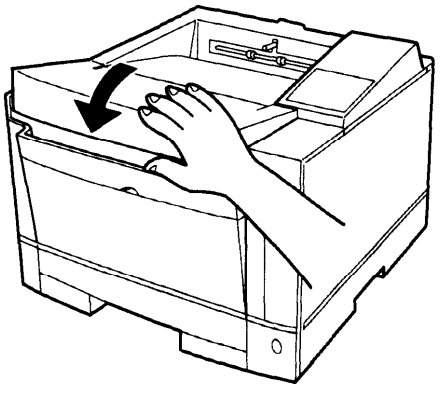


Lock the toner bottle.

Press the toner bottle backward until it clicks into place (The bottle stands nearly upright when installed correctly.) Never rotate the toner bottle from an upright position except when empty or you will cause toner leak and print quality issue could occur.



Close the printer's upper door.
Press down firmly on the front portion of the upper door and make sure the upper door is locked completely.



**⚠CAUTION**

Be sure to hold the toner bottle while removing the seal to avoid spilling toner.

If you have installed the toner bottle, never remove it from the print unit until it has no toner, to avoid spilling toner inside the printer.

**Load paper in the paper tray.**

Fan a paper stack both ways to prevent sheets from sticking together. Place the paper stack on the paper tray while sliding it backwards. If the front of the stack is raised, push it down until the pressure plate clicks into place.

**Connect the power cord.**

Be sure the voltage stated on the manufacturer's plate on the back of the printer is the voltage supplied in your area, then connect the AC power cord between the printer and the AC power outlet.

**Turn on the power switch.**

Make sure the POWER indicator on the control panel lights, printer initialization and warming-up occur, then the message display indicates READY with the ONLINE indicator lit.

**Print a trial page.**

Press the **READY** button to put the printer offline. Then, press the **SELF TEST** button for more than five seconds to enter the self test menu. If an optional FPS card is installed, press the + or - button to select a desired emulation (PCL or FPS). Press the **ENTER** button to start printing. The status report for the selected emulation is printed. The status report shown on the next page is for the standard PCL emulation. See the user's manual for details.

Check the print quality and printer performance.

-- STATUS REPORT --

| | | | |
|---|---|---|---|
| COPIES | :001 | SELECTED FONT | |
| PAPER | :A4 | FONT SOURCE | :(Intemal) |
| ORIENTATION | :PORTRAIT | FONT NUMBER | :0000 |
| FORMLINES | :064LINES | PITCH | :10.00 |
| MANUAL FEED | :OFF | SYMBOL SET | :ROMAN 8 |
| SMOOTHING(FEITI | :ON | | |
| | | COURIER | : REGULAR |
| PAGE PROTECT | : AUTO | | |
| RESOLUTION | :600 DPI | TOP OFFSET | :0,0 mm |
| I/O TIMEOUT | :15sec. | LEFT OFFSET | :0,0 mm |
| | | A4 PRINT WIDTH | :NORMAL |
| AUTO CONT | : OFF | AUTO CR | :LF-LF |
| ECONOMY MODE | : OFF | AUTO LF | :CR=CR |
| THICK PAPER | :OFF | | |
| I/O BUFFER | :16KBYTES | AVAILABLE PERSONALITIES | |
| NPAP BUFFER SIZE | : AUTO | RESIDENT | :PCL |
| POWER SAVE | :15min. | | :PCLXL |
| RESET CONFIG | :MEMORY RESET | OPTION | :NONE |
| PARALLEL I/F CONFICURATION | | OPTION FONT | :NONE |
| ACKNWLEDGE | :ACK WIDTH 1 | | |
| BIDIRECTION MODE | :ON | MEMORY (RAM) | :4096KBYTES |
| NPAP MODE | :OFF | | |
| | | FIRWARE | :ver 0.0 Lev 004-00 |
| | | FONT | :ver 01.00 Lev 002 |
| | | ENGINE FIRWARE | :ver 0.0 Lev 01 |


***Page Printer***

--- TYPEFACE LIST ---

| | | |
|---|---|---|
| Courier Md | Lyra CdMd | Nimb Sans |
| *Courier MdIt* | *Lyra CdMdIt* | *Nimb Sans It* |
| **Courier Bd** | **Lyra CdBd** | **Nimb Sans Bd** |
| ***Courier BdIt*** | ***Lyra CdBdIt*** | ***Nimb Sans BdIt*** |
| Morrison Rg | Lyra ExtnMd | Nimb Sans Cd |
| *Morrison It* | *Lyra ExtnMdIt* | *Nimb Sans CdIt* |
| **Morrison Bd** | ***Lyra ExtnBdIt*** | **Nimb Sans CdBd** |
| ***Morrison BdIt*** | **Lyra ExtnBd** | ***Nimb Sans CdBdIt*** |
| Taurus | AntiqueOlv | Nimb Roman |
| *Taurus It* | *AntiqueOlv It* | *Nimb Roman It* |
| **Taurus Bd** | **AntiqueOlv Bd** | **Nimb Roman Bd** |
| ***Taurus BdIt*** | **AntiqueOlv Cmpct** | ***Nimb Roman BdIt*** |
| *Coronet* | Garamond | LetterGot75 |
| **EFClarendon CdBd** | *Garamond Krsv* | *LetterGot75 It* |
| **EFClarendon ExBd** | Garamond Hf | LetterGot75 Bd |
| Lyra Md | Garamond KrsvHf | *LetterGot75 BdIt* |
| *Lyra MdIt* | Mauritius | Aries |
| **Lyra Bd** | Leos Md | *Aries It* |
| ***Lyra BdIt*** | *Leos MdIt* | **Aries Bd** |
| Lyra LiCd | **Leos Bd** | ***Aries BdIt*** |
| *Lyra LiCdIt* | **Leos ExBd** | Libra |

# CHAPTER 3 TROUBLESHOOTING

This chapter helps you determine the causes and remedies of problems that might occur.

Sections 3.1 and 3.2 are troubleshooting diagrams. Follow the flowchart steps to remedy the problem.

Section 3.3 describes the meaning of the various indicator displays on the control panel. The indicators help with troubleshooting..

Section 3.4 describes procedures to reset a counter which is used to estimate the life time of a consumable.

Section 3.5 describes miscellaneous printer operations.

Figure 3.1 shows the printer elements and their connections.

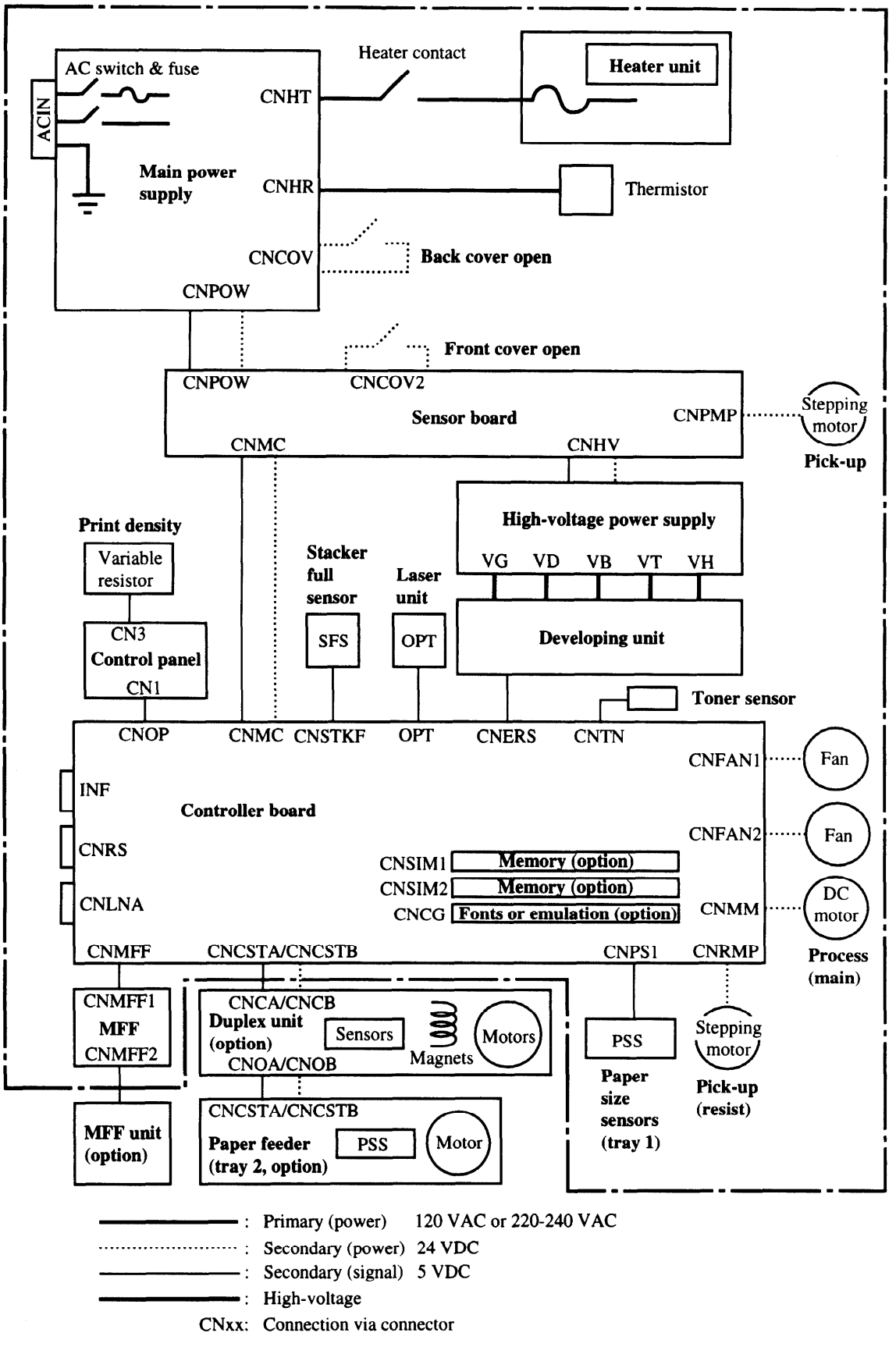
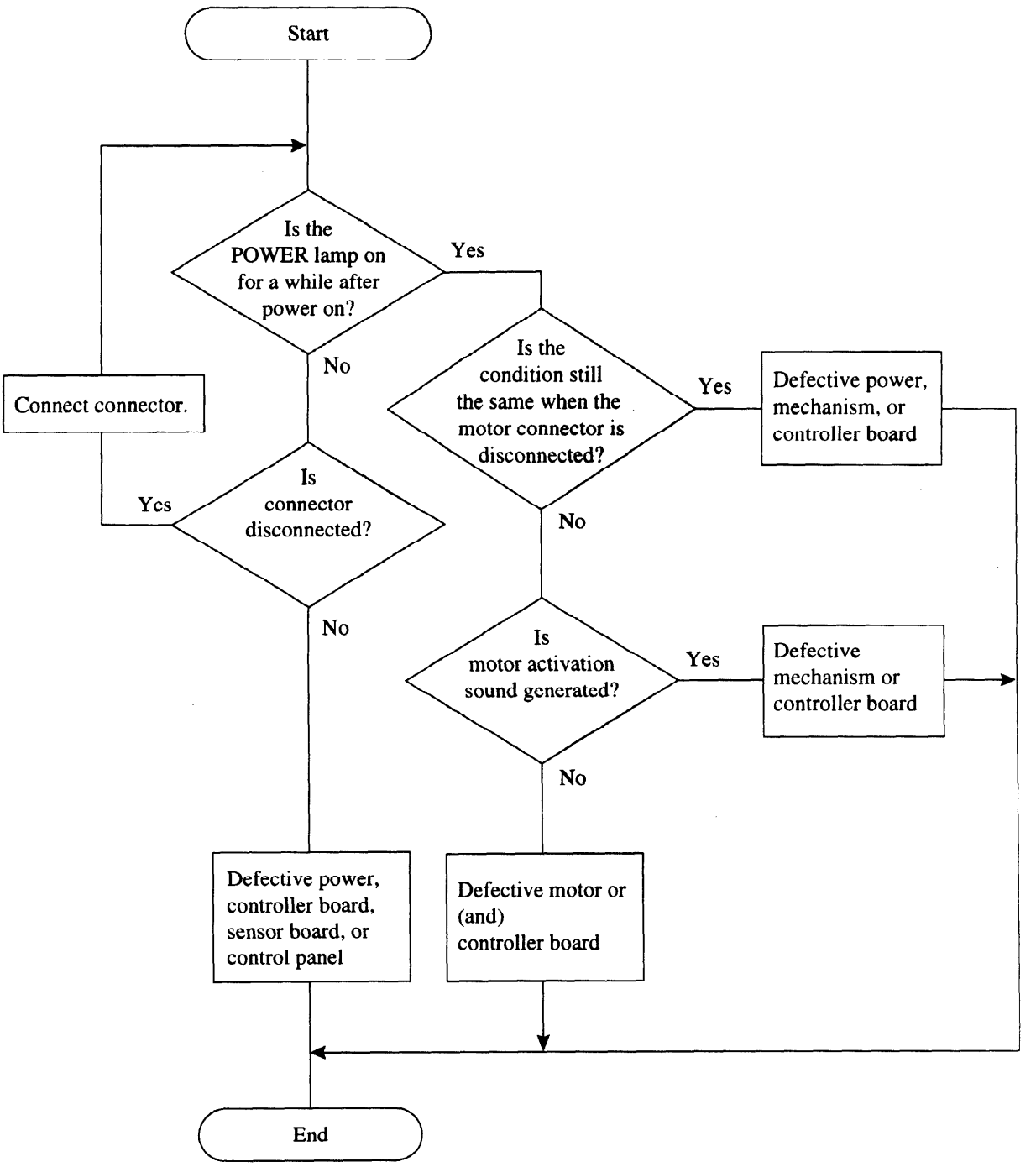


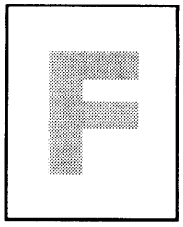

**Figure 3-1 Printer Elements and Connections**

## 3.1 WHEN THE POWER INDICATOR DOES NOT LIGHT



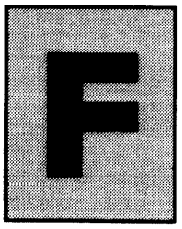
## 3.2 WHEN PRINTING QUALITY IS ABNORMAL

(1) Faint

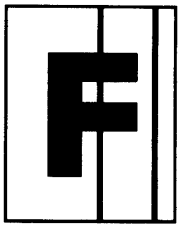


T

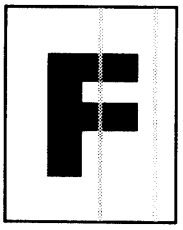
(2) Deep



(3) Clear or blurred black vertical line

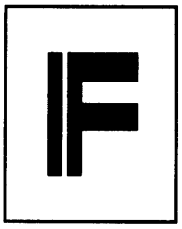


P



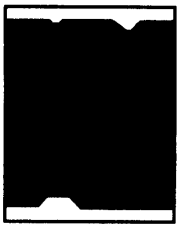
F

(4) White vertical line

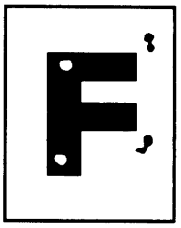


T

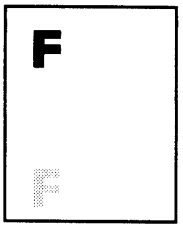
(5) Lacking space at the top and bottom



(6) Black point, white point

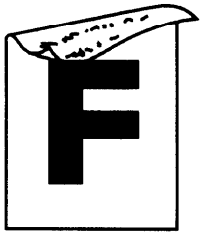


(7) Second printing (Ghost printing)



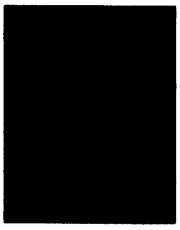
T

(8) Dirty back/edge

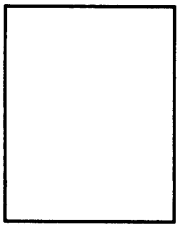


P

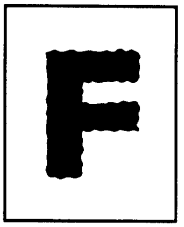
(9) Black



(10) White

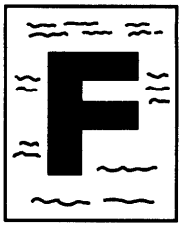


(11) Blur



P

(12) Smudge

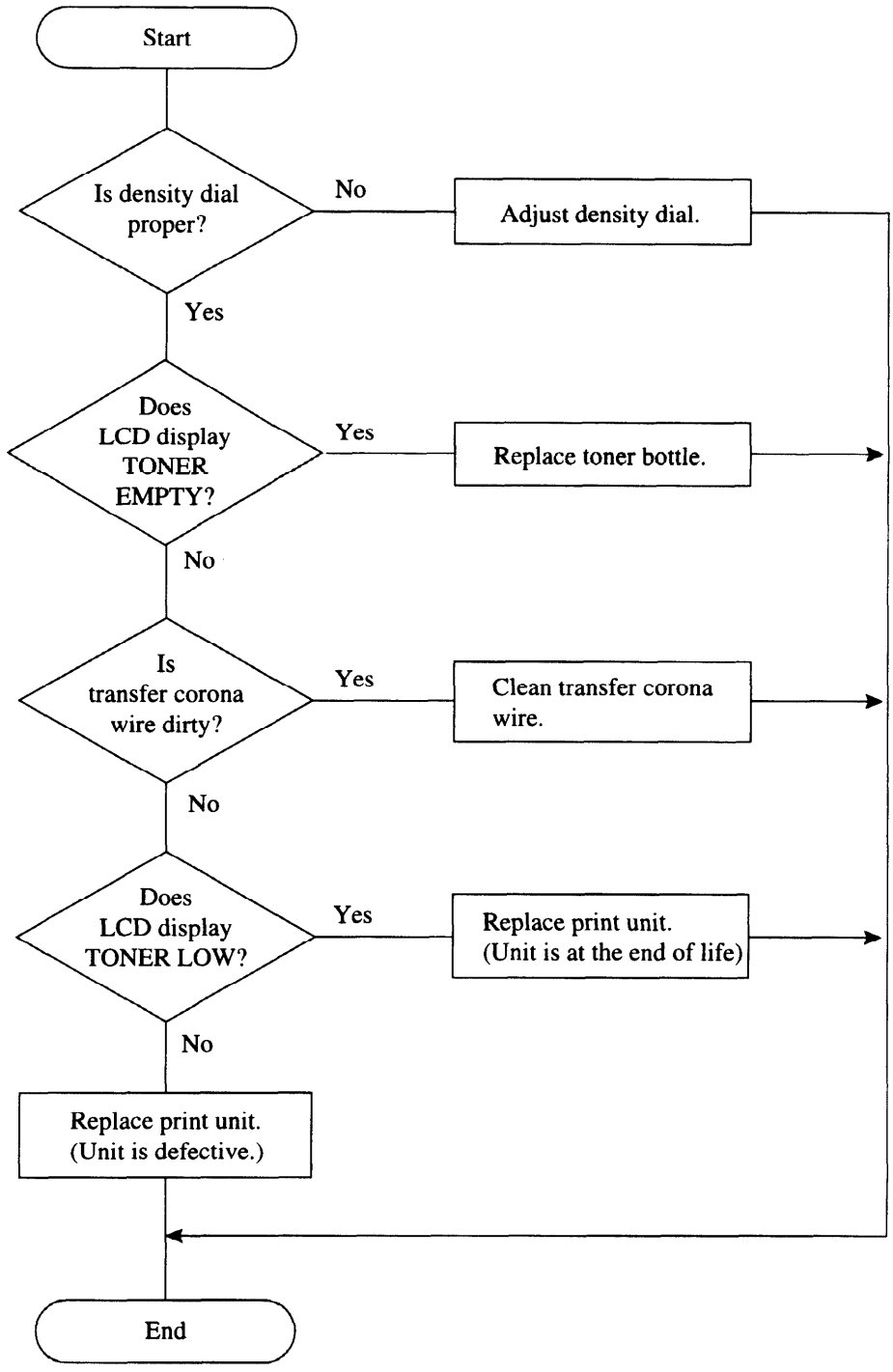


P & T

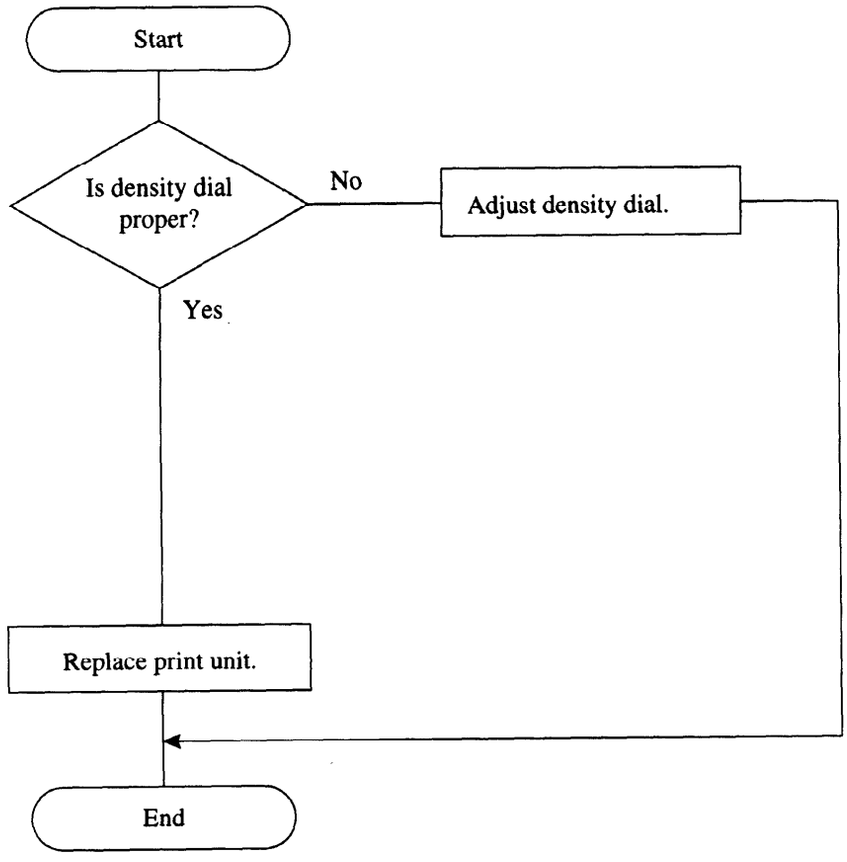
T: Transfer unit faulty
P: Print unit faulty
F: Fuser unit expired

**Figure 3-2 Abnormal Print Quality**

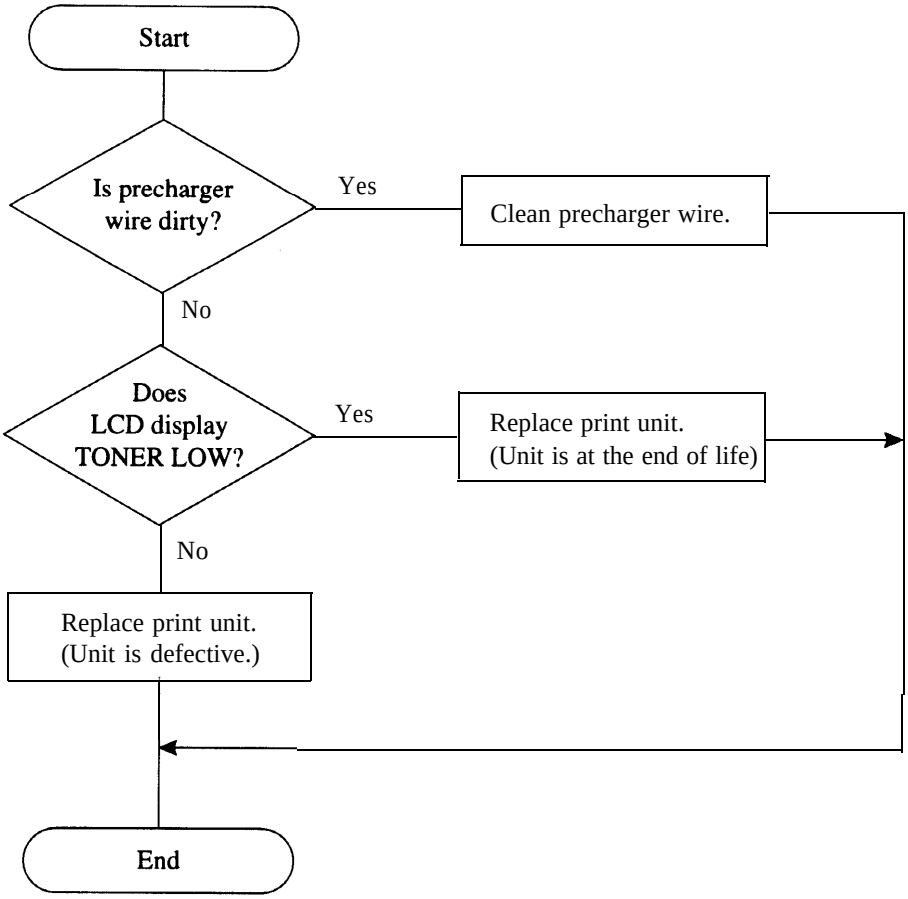
(1) When faint


Start
Is density dial proper?
No
Adjust density dial.
Yes
Does LCD display TONER EMPTY?
Yes
Replace toner bottle.
No
Is transfer corona wire dirty?
Yes
Clean transfer corona wire.
No
Does LCD display TONER LOW?
Yes
Replace print unit. (Unit is at the end of life)
No
Replace print unit. (Unit is defective.)
End

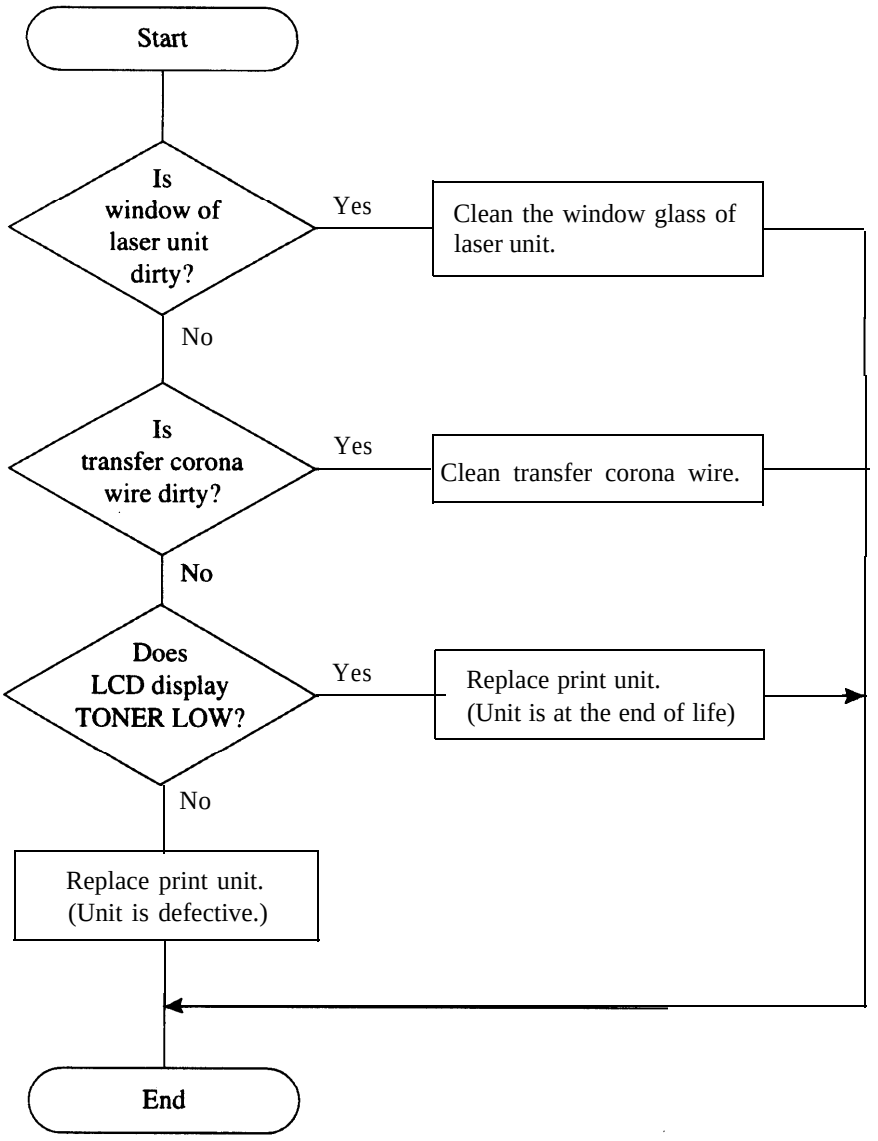
(2) When deep


Start
Is density dial proper?
No
Adjust density dial.
Yes
Replace print unit.
End

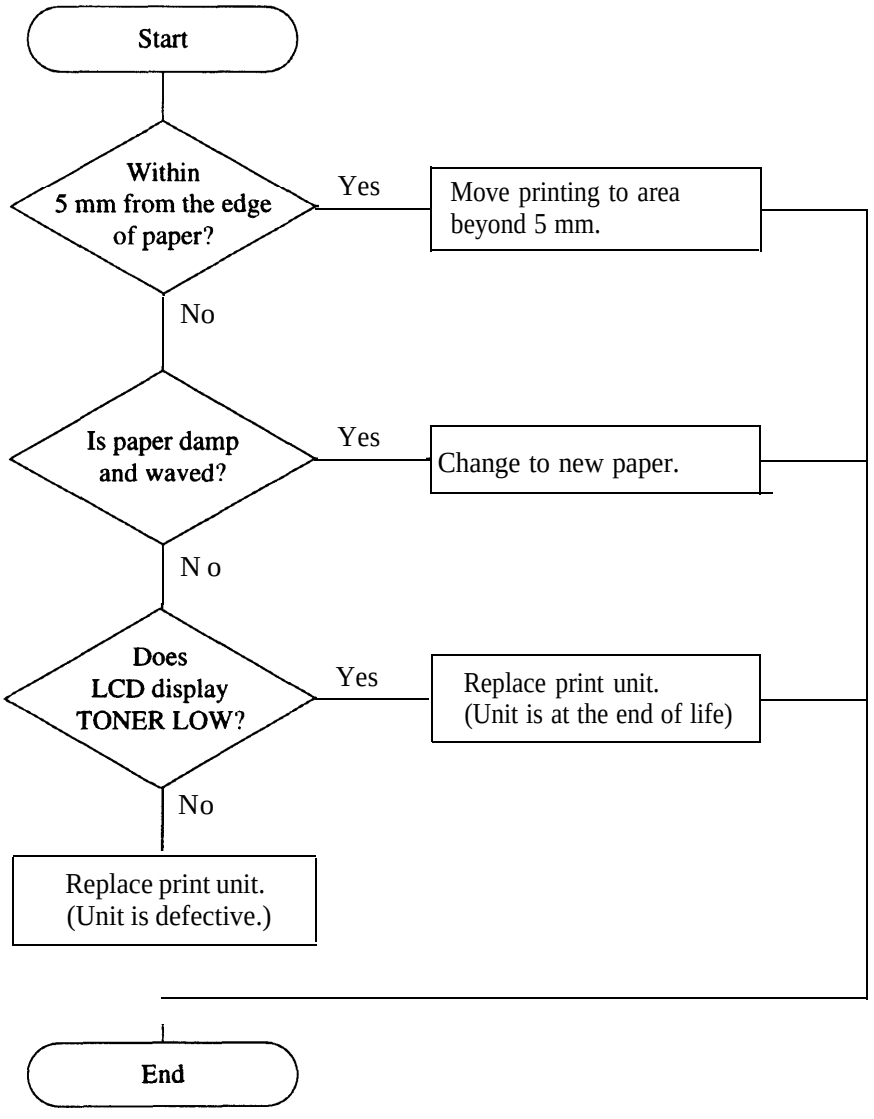
(3) Black vertical line



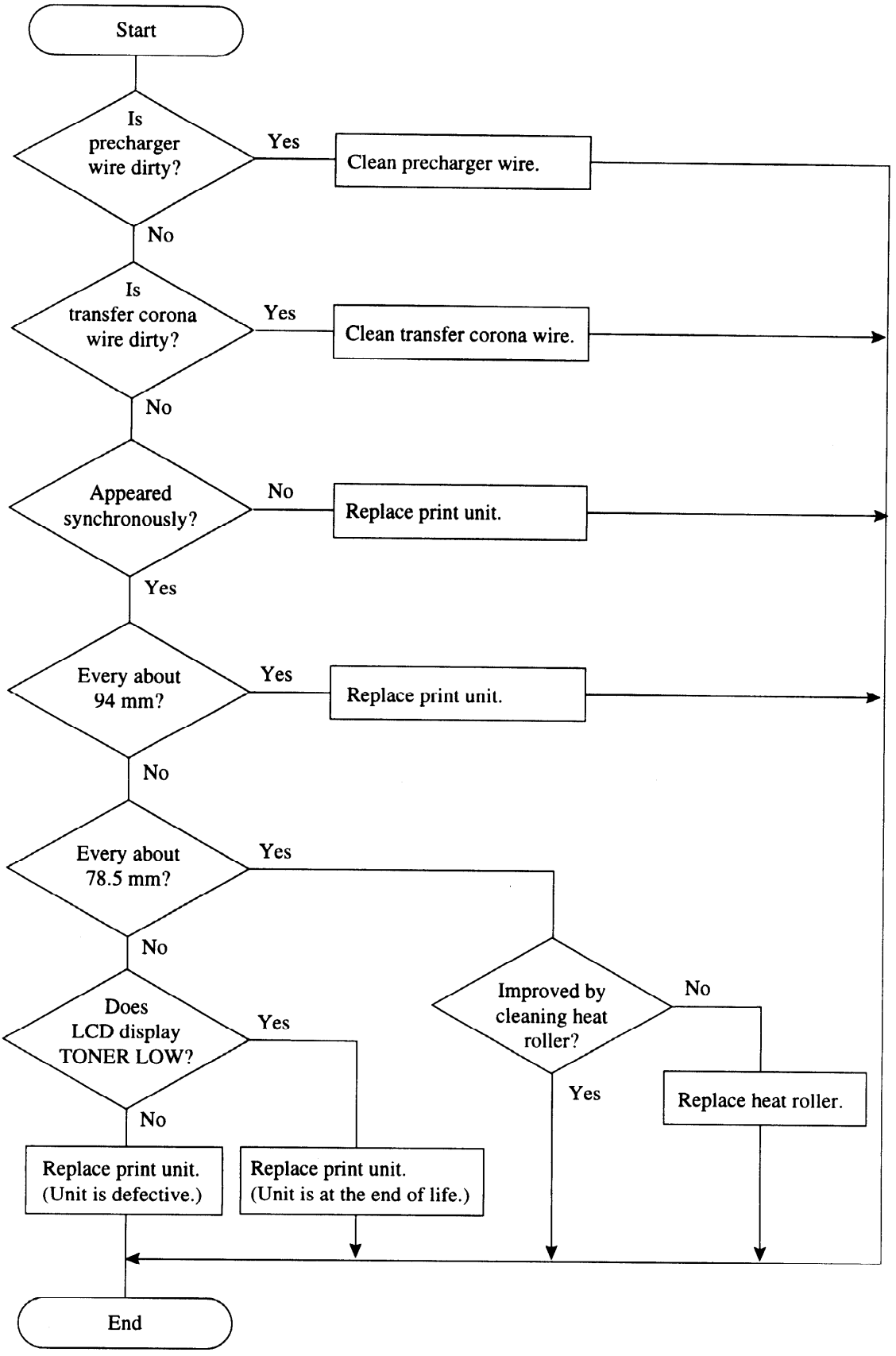
(4) White vertical line



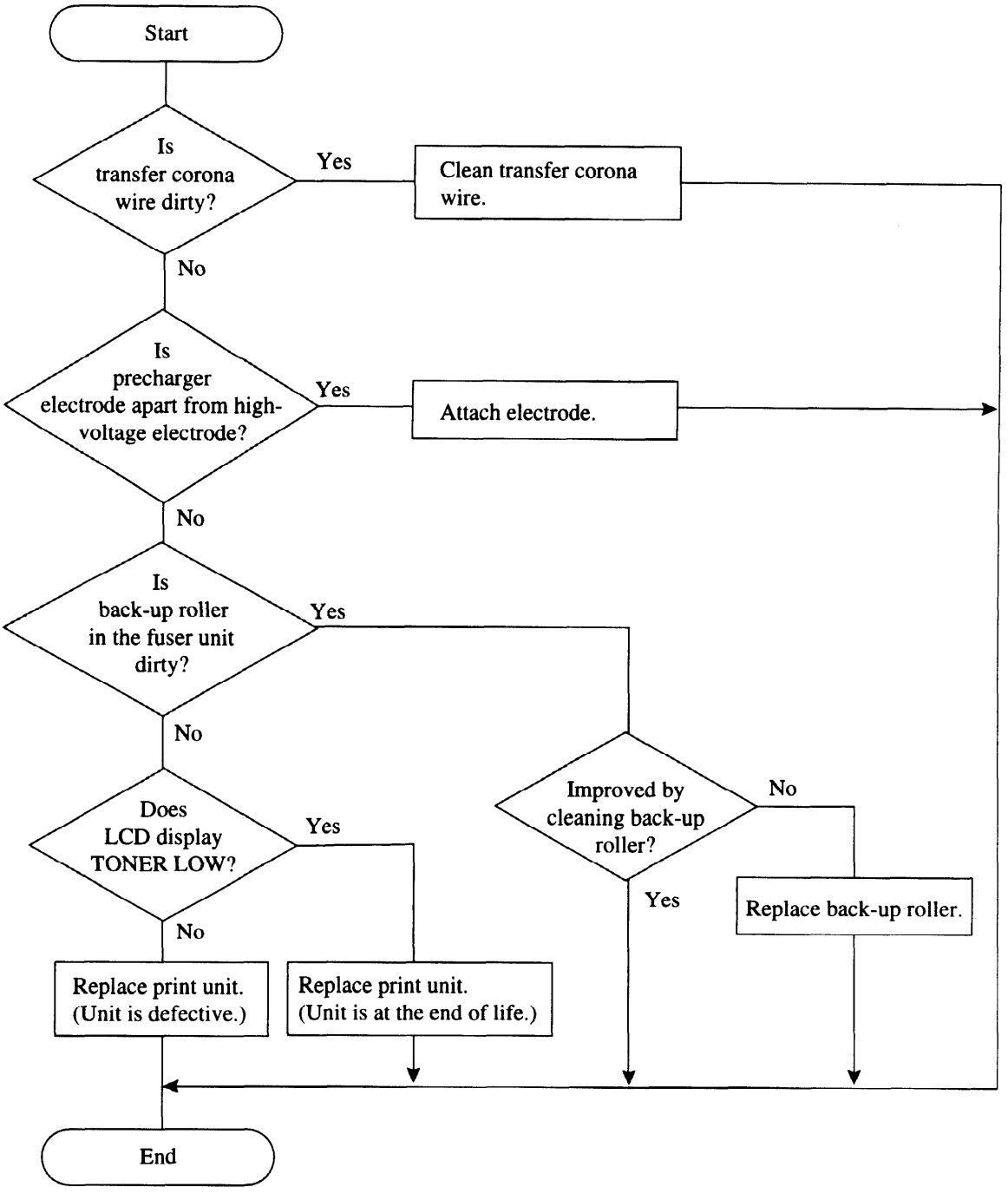
(5) Lacking space at the top and bottom



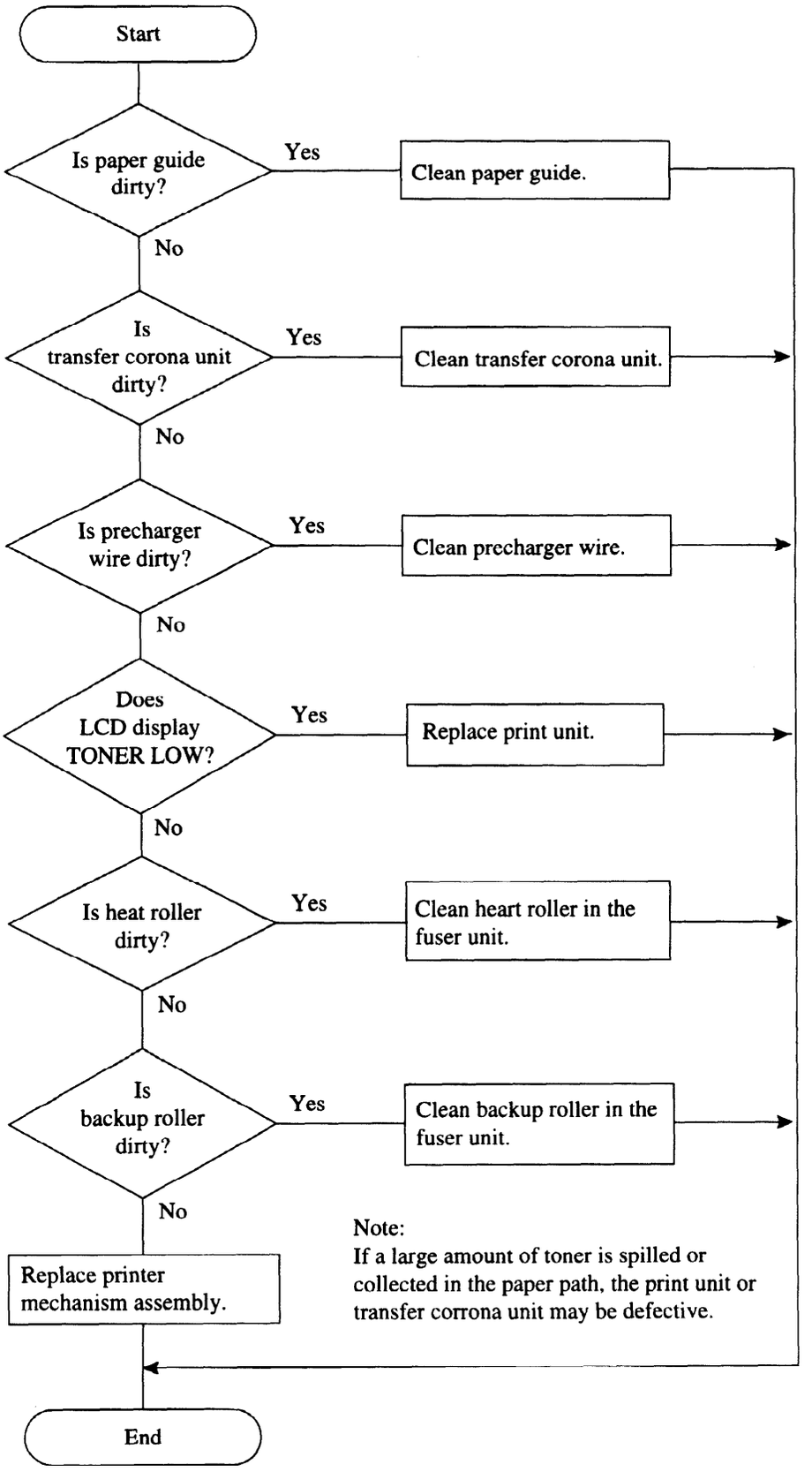
(6) Black point, white point



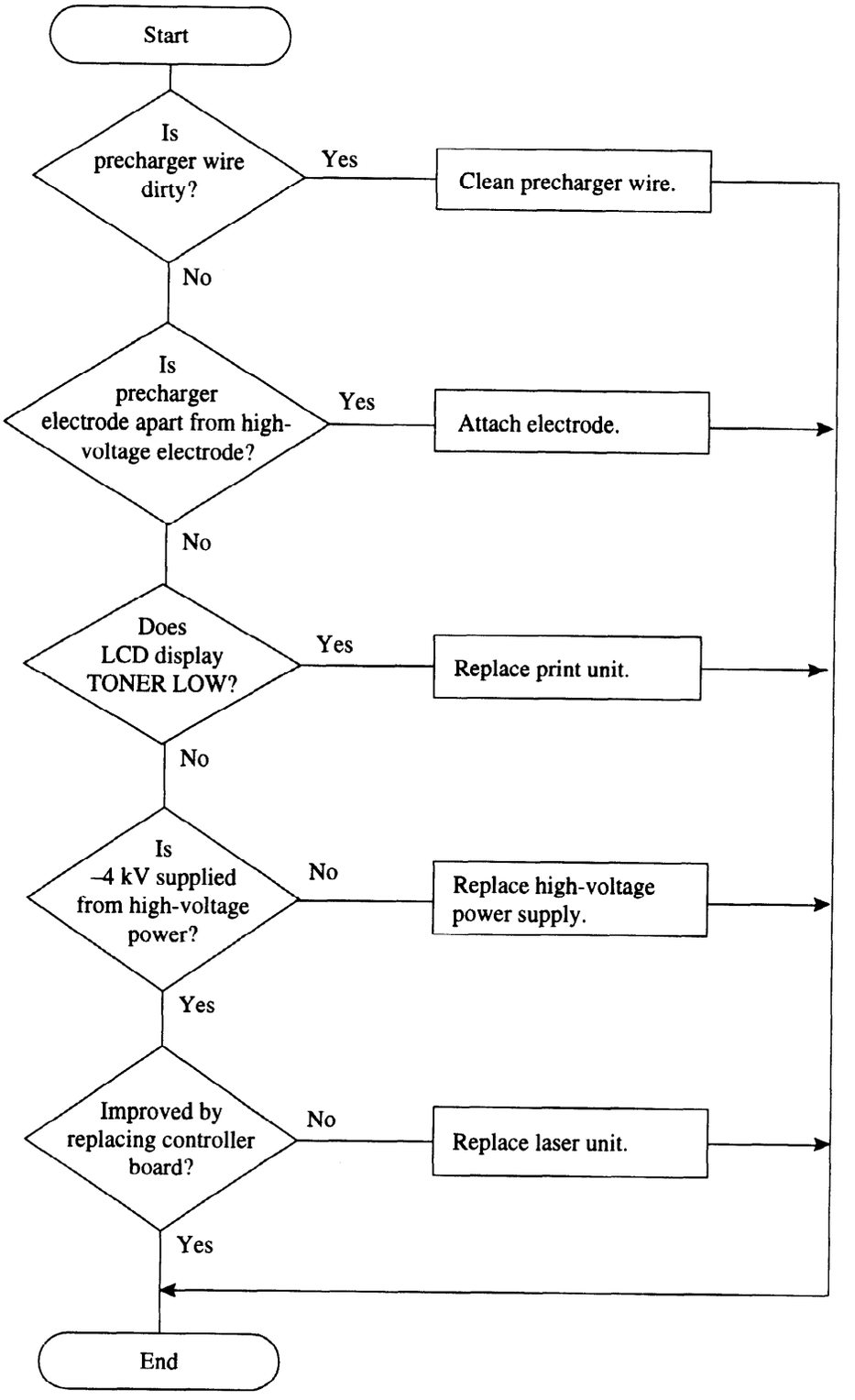
(7) Second printing (ghost printing)



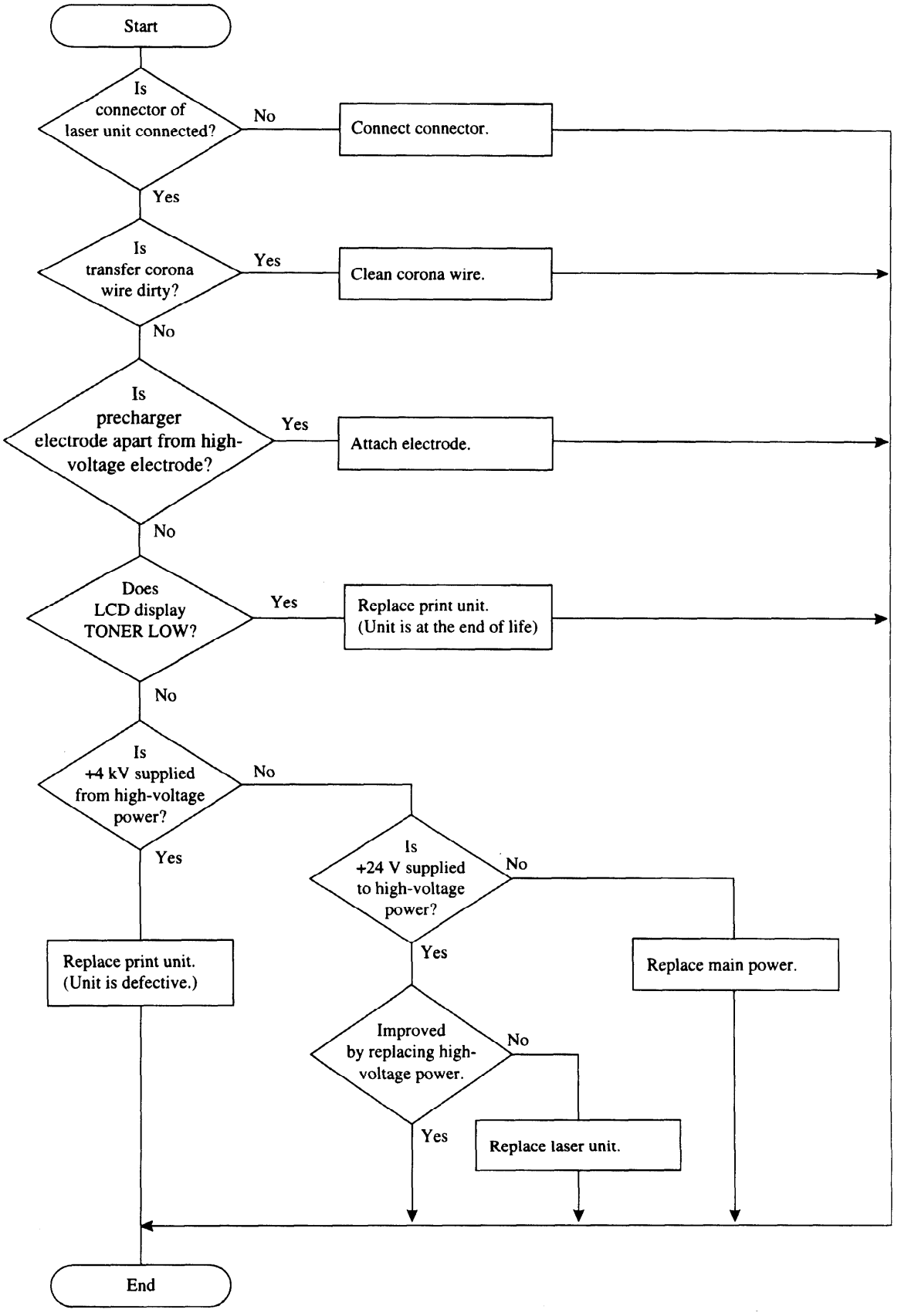
(8) Dirty back / edge



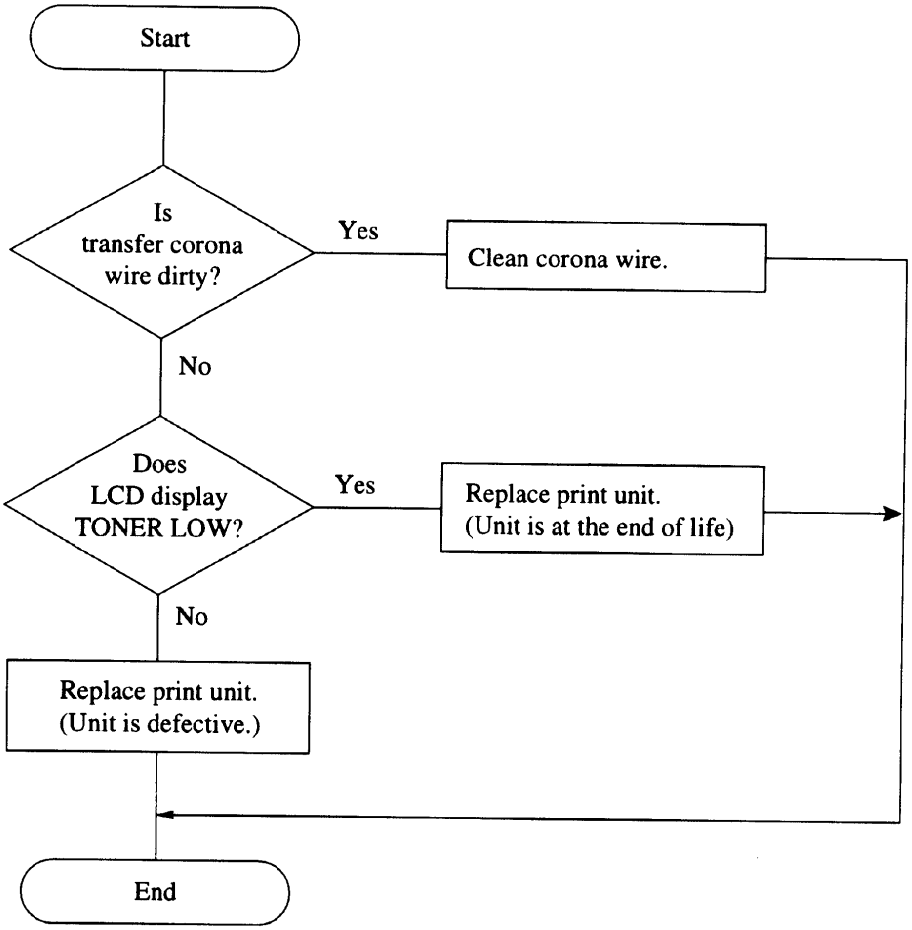
(9) Black


Start
Is precharger wire dirty?
Yes
Clean precharger wire.
No
Is precharger electrode apart from high-voltage electrode?
Yes
Attach electrode.
No
Does LCD display TONER LOW?
Yes
Replace print unit.
No
Is –4 kV supplied from high-voltage power?
No
Replace high-voltage power supply.
Yes
Improved by replacing controller board?
No
Replace laser unit.
Yes
End

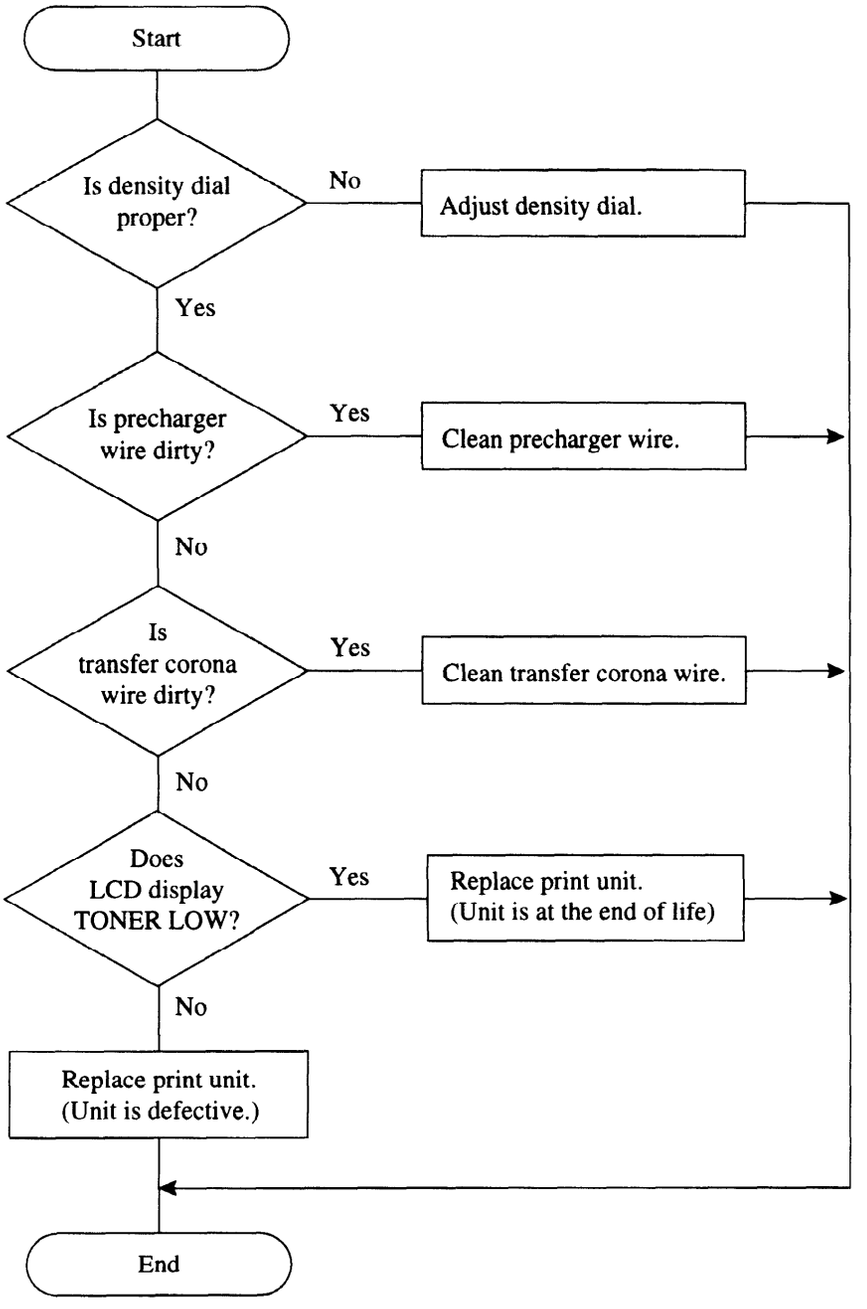
(10) White


Start
Is connector of laser unit connected?
No
Connect connector.
Yes
Is transfer corona wire dirty?
Yes
Clean corona wire.
No
Is precharger electrode apart from high-voltage electrode?
Yes
Attach electrode.
No
Does LCD display TONER LOW?
Yes
Replace print unit. (Unit is at the end of life)
No
Is +4 kV supplied from high-voltage power?
No
Yes
Is +24 V supplied to high-voltage power?
No
Yes
Replace print unit. (Unit is defective.)
Replace main power.
Improved by replacing high-voltage power.
No
Yes
Replace laser unit.
End

(11) Blur


Start
Is transfer corona wire dirty?
Yes
Clean corona wire.
No
Does LCD display TONER LOW?
Yes
Replace print unit. (Unit is at the end of life)
No
Replace print unit. (Unit is defective.)
End

(12) Smudge


Start
Is density dial proper?
No
Adjust density dial.
Yes
Is precharger wire dirty?
Yes
Clean precharger wire.
No
Is transfer corona wire dirty?
Yes
Clean transfer corona wire.
No
Does LCD display TONER LOW?
Yes
Replace print unit. (Unit is at the end of life)
No
Replace print unit. (Unit is defective.)
End

## 3.3 ERROR AND STATUS MESSAGES

This printer displays error and status messages on the LCD of the control panel. 16 characters by 2 lines of messages indicate information on errors and statuses in detail for maintenance personnel. The printer has also four indicators to display basic statuses: power-on, online, data presence in buffer, and error occurrence. The MarkVision and PPMENU utility programs can also indicate these messages on the computer's monitor.

This section lists these messages into the following three groups.

- Error messages
- Action-required status messages
- Printer status messages

### 3.3.1 Error Messages

Errors refer to a problem or condition which requires maintenance personnel to take an action. The printer shows errors by using the ERROR indicator and the message display of the control panel. Table 3-1 lists the error messages, explains causes, and suggests solutions. However, a fatal error in the controller or mechanism cannot be cleared by the user. Generally, other errors can be cleared by the user.

**Table 3-1 Error Messages**

| Message | Causes and solutions |
|---|---|
| BD CYCLE ERROR | **Cause:** Malfunction in the laser unit<br>**Solution:** If the error recurs, consult your dealer for service. |
| COMM.ERROR | **Cause:** Communication error<br>**Solution:** Press the CONT. button and select the correct settings of the serial interface using the control panel setup mode. |
| COVER OPEN 1 | **Cause:** Incomplete closing of upper door<br>**Solution:** Close the upper door. |
| COVER OPEN 2 | **Cause:** Incomplete locking of paper guide inside the rear stacker<br>**Solution:** Lock the paper guide. |
| FUSER FAILURE | **Cause:** Malfunction-in the fuser unit<br>**Solution:** If the error recurs, consult your dealer for service. |
| INVALID SIMM | **Cause:** Incorrect SIMM card (optional emulation or font) installed<br>**Solution:** Press the CONT. button. |
| JOB TIMEOUT | **Cause:** FPS job timeout (This error occurs when the FPS card is installed.)<br>**Solution:** Press the CONT. button. |
| LOAD MFF size or<br>LOAD TRAYn ***size*** | **Cause:** Paper mismatch occurred.<br>**Solution:** Set the specified tray to the correct paper size specified. |
| MANUAL TIMEOUT | **Cause:** Paper was not inserted into the manual feed slot in the prescribed time. (This error occurs when the FPS card is installed.)<br>**Solution:** Press the CONT. button. |
| MEMORY OVER FLOW | **Cause:** Memory overflow error<br>**Solution:** Press the CONT. button. |

(To be continued)

**Table 3-l Error Messages (Continued)**

| Message | Causes and solutions |
|---|---|
| MFF NOT INSTALL | **Cause:** No MFF installed<br>**Solution:** Install the MFF. |
| MOTOR FAILURE n | **Cause:** Malfunction in the feed motor, etc.<br>**Solution:** If the error recurs, consult your dealer for service. |
| NO PROCESS UNIT | **Cause: No** print unit is installed.<br>**Solution:** Install the print unit. |
| OVERRUN ERROR | **Cause:** Incomplete in extracting compressed data<br>**Solution:** Press the CONT. button. |
| PAPER ***JAMn*** | **Cause:** Paper jam in the specified position<br>**Solution:** Clear the jammed paper from the following area:<br>0: Pick roller, 1: Entry to paper path<br>2: Paper path, 3: Ejection from paper path |
| PS ERROR ***mn*** | **Cause:** A PostScript error<br>**Solution:** If the error recurs, consult your dealer for service. |
| ***Source*** PAPER OUT | **Cause:** Paper out in the specified paper source<br>**Solution:** Supply paper. |
| STACKER FULL | **Cause:** Paper stacker full<br>**Solution:** Remove paper from the paper stacker. |
| SYSTEM ERROR ***n*** | **Cause:** A system error on the controller board<br>**Solution:** If the error recurs, consult your dealer for service. |
| ***TRAYn*** MISS SET | **Cause:** Paper tray installed incorrectly<br>**Solution:** Install the paper tray. |
| TONER EMPTY | **Cause:** Toner runs out.<br>**Solution:** Replace toner bottle. |

### 3.3.2 Status Messages

Status messages in this section refer to normal conditions.

Table 3-2 lists status messages referring to conditions that require the user to take an action. It explains causes and suggests solutions. Table 3-3 lists printer status messages referring to conditions which generally require no action by the user, and explains their meaning. These tables do not include messages in menu mode.

**Table 3-2 Action-required Status Messages**

| Message | Causes and solutions |
|---|---|
| INSERT ***size*** | **Cause:** Printer is ready for paper.<br>**Solution:** Put paper into manual feed slot. |
| READY TONER LOW | **Cause:** Toner runs short.<br>**Solution:** Prepare new toner bottle. |
| READY REPLACE PARTS | **Cause:** Print unit is near end.<br>Solution: Replace print unit.<br>**Note:** Enter menu mode and select Clear Warning. After replacement, be sure to press ENTER to perform Clear Warning. |

## Table 3-3 Printer Status Messages

| Message | Meaning |
|---|---|
| FORM FEED | The printer displays this message when you press FORM FEED with the DATA indicator off. The printer is printing data remaining in buffer. |
| <<<INITIALIZE>>> | The printer is initializing. This message appears whenever you turn on the printer, close the upper door, or lock the paper guide. |
| MENU RESET | The printer displays this message when you press RESET MENU for five or more seconds. This reset returns parameter settings in the menu to their factory defaults except for interface settings as well as clears error latches, buffered data, and temporary soft fonts. |
| PRINT FONT | The printer displays this message when you press PRINT FONT for five or more seconds, then press ENTER The printer is printing the font report. |
| READY | The printer is ready to print. |
| RESET | The printer displays this message when you press RESET for five or more seconds. This reset clears error latches, buffered data, and temporary soft fonts. |
| SELF TEST | The printer displays this message when you press SELF TEST for five or more seconds, then press ENTER .The printer is printing the status report. |
| WARMING UP | The printer is warming up to its operating temperature. |

### Warning Messages

This printer counts the number of the printed sheets to estimate the life of the consumables (print unit). The printer displays the following warning message when and after the count reaches a predetermined value. Note that this value does not necessarily indicate the actual life. The print quality may remain satisfactory to users for some time after this warning appears.

**READY**
**REPLACE PARTS**

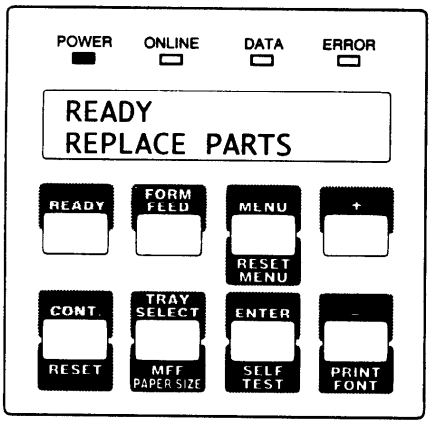
When the warning message is displayed, press the READY button to put the printer offline and press the MENU button to enter menu mode. **The Warning** message appears, indicating the expired unit by an asterisk. When the print unit is expired, the message is:

**<CLEAR WARNING>**
**PRINT UNIT***

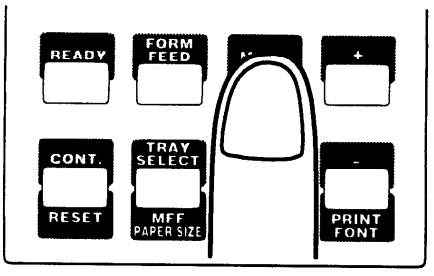
When the print unit is replaced, be sure to reset the counter according to Section 3.4.

## 3.4 RESEITING THE PRINT UNIT COUNTER

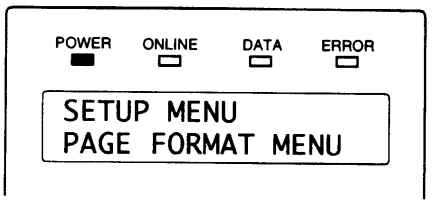
Perform this operation whenever the print unit is replaced To reset the print unit counter, follow these steps:



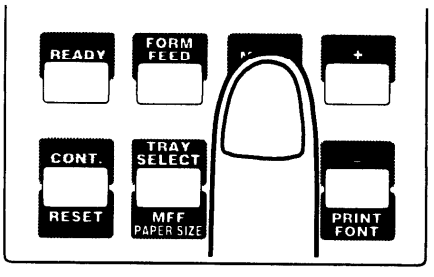

**Make sure the printer** is **offline.** If necessary, press the READY button to put the printer offline. The ONLINE indicator is off with the REPLACE PARTS message displayed.



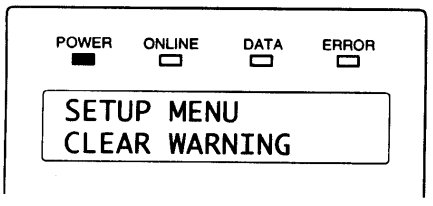

**Press the MENU button to put the printer in menu mode.**

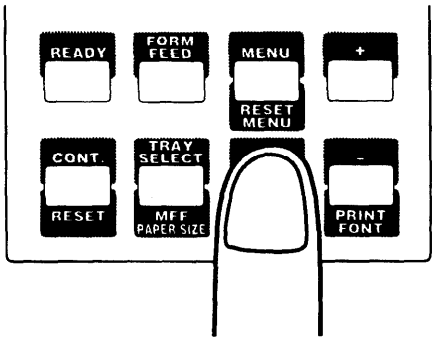



The message changes to SETUP MENU PAGE FORMAT MENU.

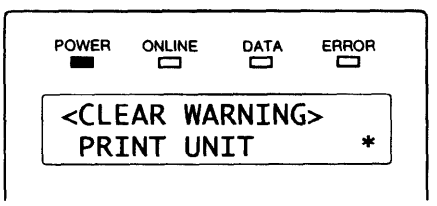



Press the MENU button repeatedly until the lower message changes to CLEAR WARNING.

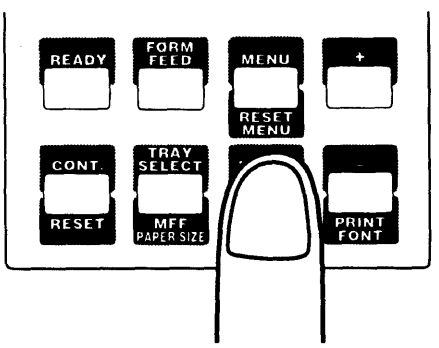




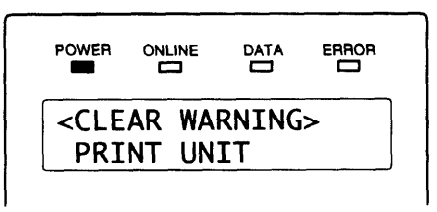

Press the ENTER button to select this function.

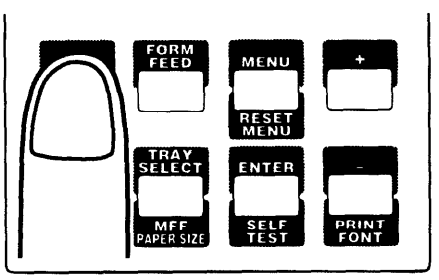



The message changes to <CLEAR WARNING> PRINT UNIT *. The asterisk means that the print unit is expired.

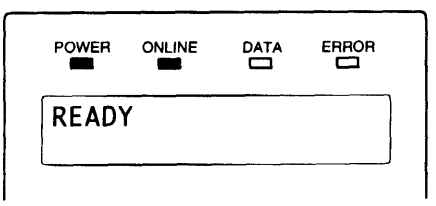



Press the ENTER button again to execute the function. The asterisk disappears, indicating the counter is reset.




Press the READY button to return the printer online. The ONLINE indicator lights up without the REPLACE PARTS message




Important:
After the reset operation, check the status report or the PPMENU's main menu to make sure that the Warning Message is cleared.

## 3.5 OTHERS

The printer performs the following controls not under commands from the computer.

(1) Fan control

The fan 1 stops after three minute has elapsed since the last printing. The fan 2 is not under this control.

(2) Initial control of motor

At initialization, the motor rotates when the temperature of the heater reaches 100°C and stops when the temperature reaches 170°C, then the printer goes ready to print.

(3) Heat roller temperature control

The heat roller temperature is reduced to 120°C from 170°C when printing does not occur for one minute. Power supply to the heat roller is stopped after additional one minute has elapsed without printing.

# CHAPTER 4 MAINTENANCE

This chapter covers the maintenance (cleaning, lubrication, inspection, and adjustment) required for levels 1 and 2 defined in Section 4.4.

## 4.1 GENERAL

Using the latest in electronic technology, the PrintPartner 12V page printer offers high reliability and ease of maintenance. The number of parts requiring lubrication and/or adjustment has been reduced.

The PrintPartner 12V has a self diagnostic function which briefly indicates the type of error using the indicators on the control panel if the printer malfunctions.

This printer has the status report function to help indicate whether an error is due to the printer or the host computer. This function is useful for testing printer performance after an error recovery.

## 4.2 GENERAL PRECAUTIONS

The following precautions will help prevent damage to the PrintPartner 12V page printer.

- Do not connect or disconnect connectors or printed circuit boards while the power is turned on.
- Use screwdrivers, pliers, and other tools appropriate to the parts to be replaced. Do not leave screws or parts inside the printer.
- Use only the specified type of oil, grease, and cleaner.
- Power should be turned off before beginning any parts replacement.
- Be careful not to cause damage to the print unit by touching the surface of the OPC drum with fingers, metal. or anything. Do not set the print unit in light for extended periods of time.

## 4.3 MAINTENANCE TOOLS

Table 4-l lists the tools required for maintenance.

**Table 4-1 Maintenance Tools**

## 4.4 MAINTENANCE LEVELS

Maintenance for the PrintPartner 12V page printer is divided into two levels.

**Level 1**

Level 1 maintenance can be done by the printer user. It includes cleaning and consumables replacement only.

**Level 2**

Level 2 maintenance includes level 1 items (cleaning) plus replacement of PC boards, electrical units, and mechanical subassemblies.

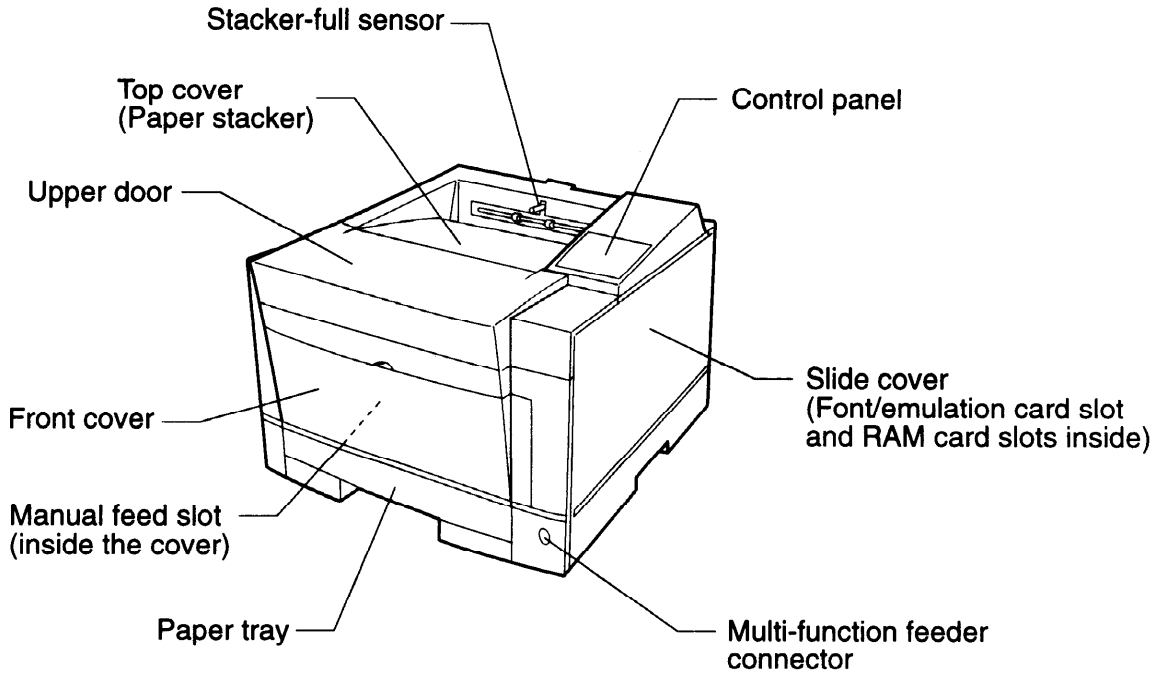
## 4.5 PREVENTIVE MAINTENANCE

No scheduled maintenance is required. However, a clean printer has a longer service life and MTBF.

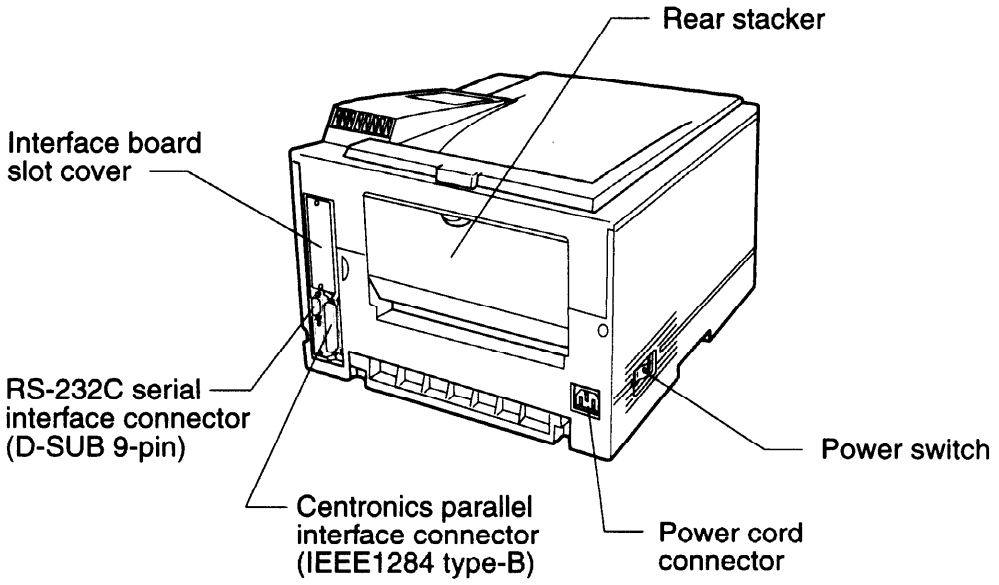
> Note:
> Clean the corona wire of the transfer unit and the precharger wire of the print unit whenever the toner bottle or the print unit is replaced.

## 4.6 PARTS DRAWINGS

This section shows the locations of the basic components.

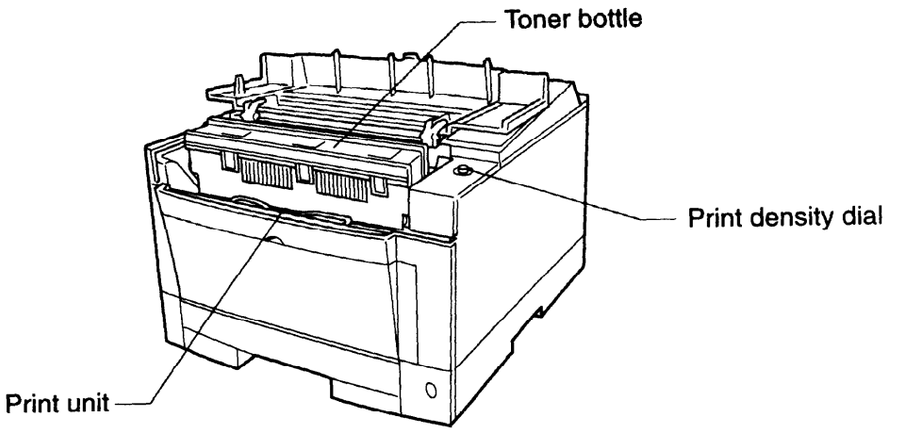



Front and right side view




Rear and Left Side View

**Figure 4-l Basic Components**




**Interior with the Upper Door Open**

**Figure 4-1 Basic Components-Continued**

## 4.7 PARTS THAT MUST BE DISASSEMBLED

Table 4-2 lists components that are not to be disassembled.

**Table 4-2 Parts That Must Not be Disassembled**

| No. | Parts Name | Specification | Remarks |
|---|---|---|---|
| 1 | Print unit | CA04040-E671 | Allowed only to separate OPC drum from developing unit |
| 2 | Toner bottle | CA02758-E300 | |
| 3 | Fuser unit | CA04291-C951<br>CA04291-C952 | For 120 VAC model<br>For 220-240 VAC model |
| 4 | Transfer unit | CA02758-F474 | |

## 4.8 LEVEL 1 MAINTENANCE

Level 1 maintenance includes only the cleaning that can be performed by the operator without removing any cover.

First, check the inside of the printer for paper particles, dust, and other foreign matter. Remove them, if any, as explained in the table shown below. If replacement is necessary, see the procedures explained in this chapter.

The areas to be cleaned and the procedures for cleaning are listed in Table 4-3.

### Table 4-3 Cleaning

| No. | Area to be cleaned | Specification | Remarks |
|---|---|---|---|
| 1 | Base frame | Remove paper particles, toner, and dust. | Use a damp cloth. |
| 2 | Pressure roller | Open the upper door . Then, wipe the roller with a cloth dampened with ethyl alcohol or equivalent while rotating it by hand. | Be careful not to damage the roller. Be sure rollers are dry before operation. |
| 3 | Paper path | Remove paper dust and fragments. | |
| 4 | Corona wire | Remove toner from the tungsten wire and chassis using the cleaning tool supplied. See Figure 4-3.<br><br>Replace the transfer unit if it is very dirty. | Be careful not to break the wire. |
| 5 | Precharger wire | Remove toner from the tungsten wire and chassis using the cleaning tool supplied. See Figure 4-4.<br><br>Replace the print unit if it is very dirty. See Chapter 5 of the User's Manual. | Be careful not to break the wire. |

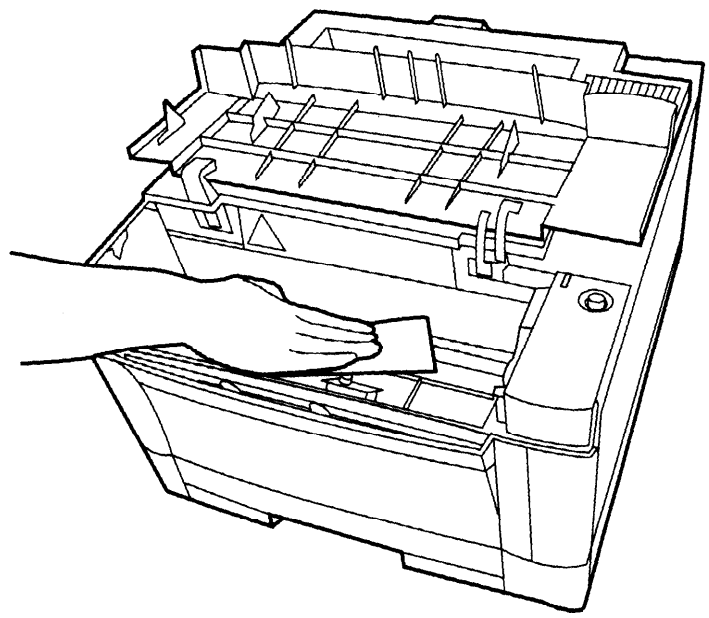


**Figure 4-2 Cleaning the Paper Path**

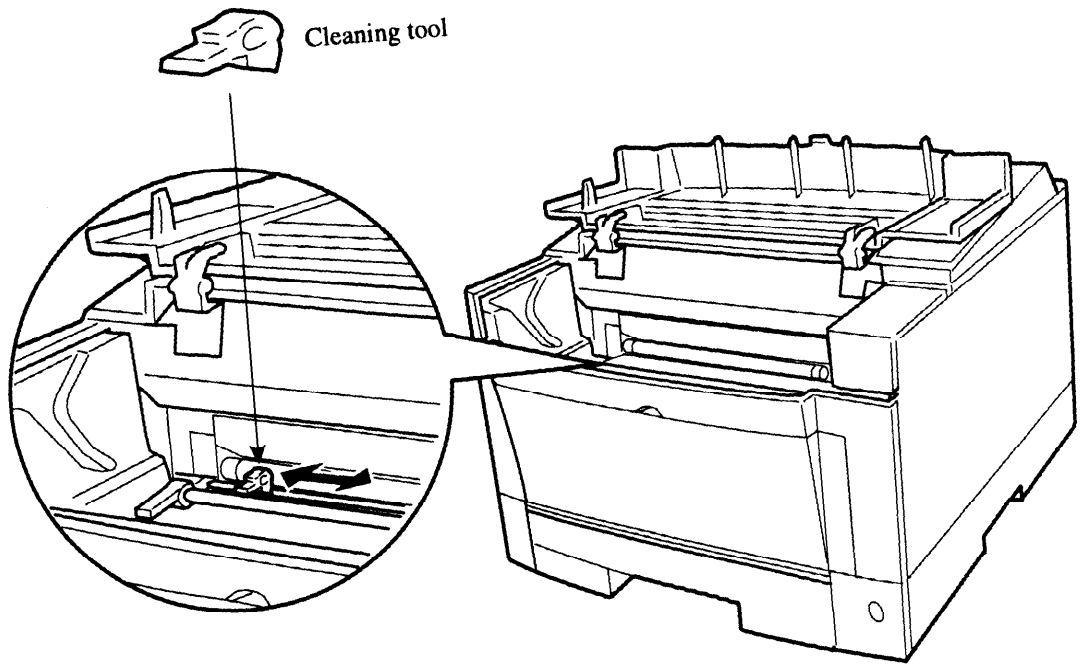



**Figure 4-3 Cleaning the Corona Wire**

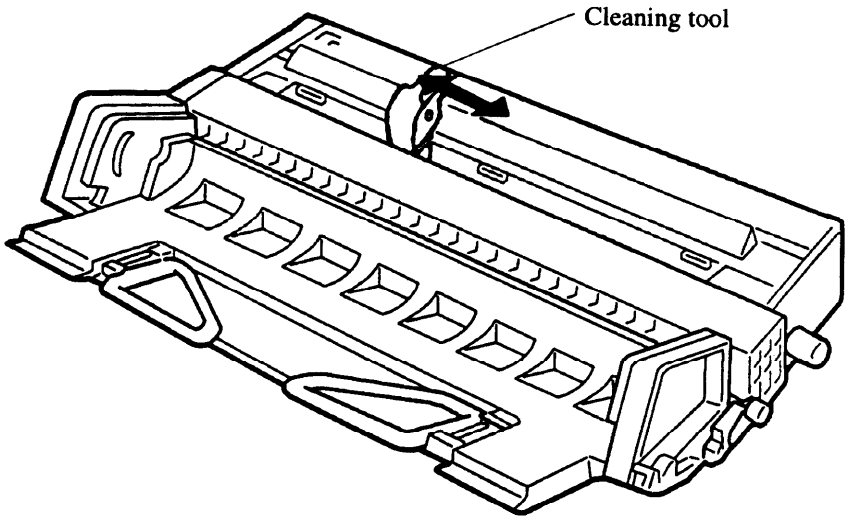



**Figure 4-4 Cleaning the Precharger Wire**

## 4.9 LEVEL 2 MAINTENANCE

Level 2 maintenance includes maintenance such as lubrication and parts replacement. Level 1 maintenance should also be performed when level 2 maintenance is Performed.

### 4.9.1 Replacement

**Precautions**

Keep assembly areas clean.

Turn off the power to the printer and disconnect the power cord and interface cable before disassembly or assembly.

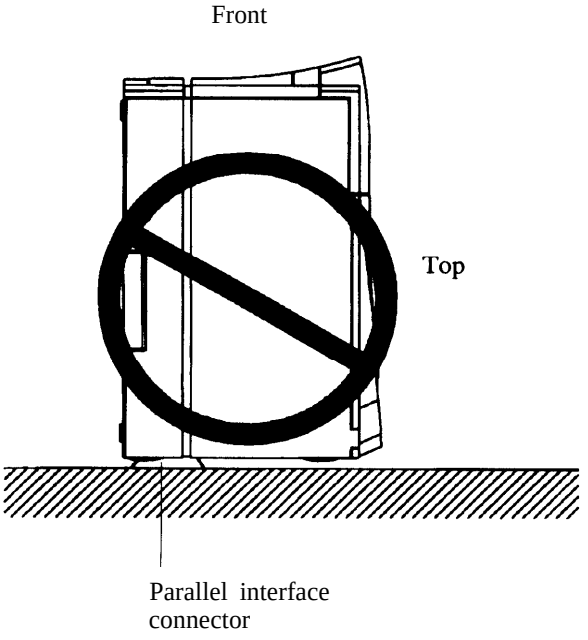
Follow the procedures carefully. Do not loosen any parts that are not to be disassembled.

Store disassembled parts in a clean place where they will not get lost.

Check parts for correct numbers and shape after replacement.

Reassemble the printer in the reverse order of disassembly. Be sure that all connectors are connected correctly.

Do not stand the printer as shown below with the control board installed. If not so, the parallel interface connector may be damaged.



(1) Upper cover replacement

Removal

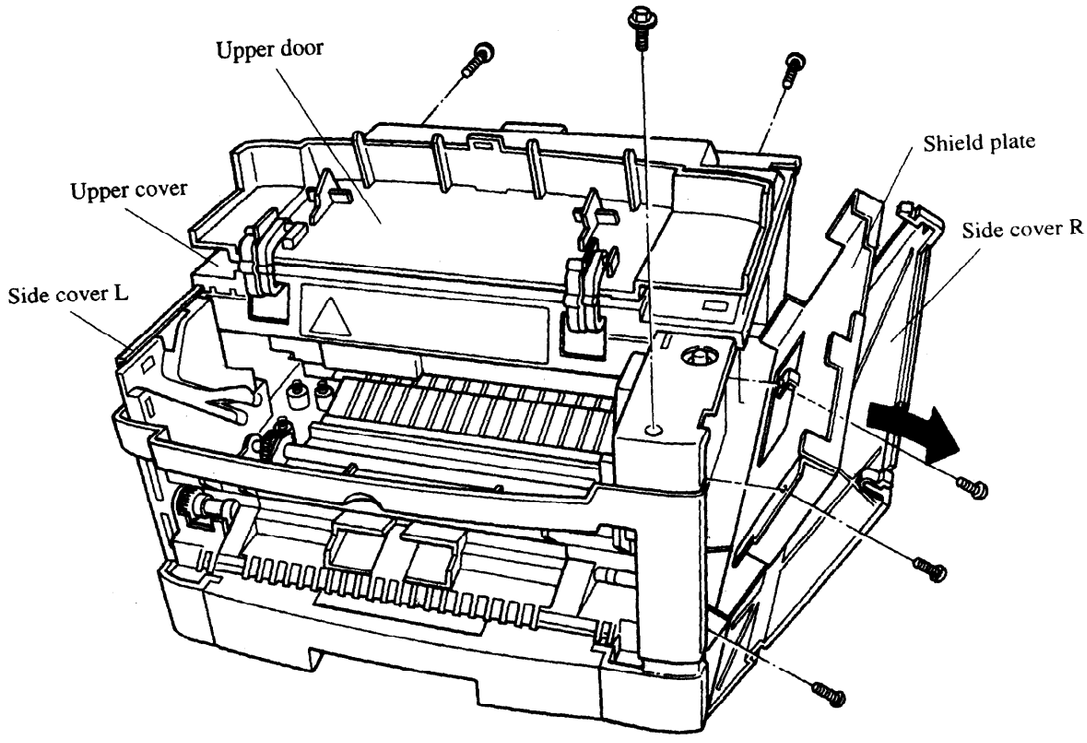
Open the upper door.

Remove three screws.

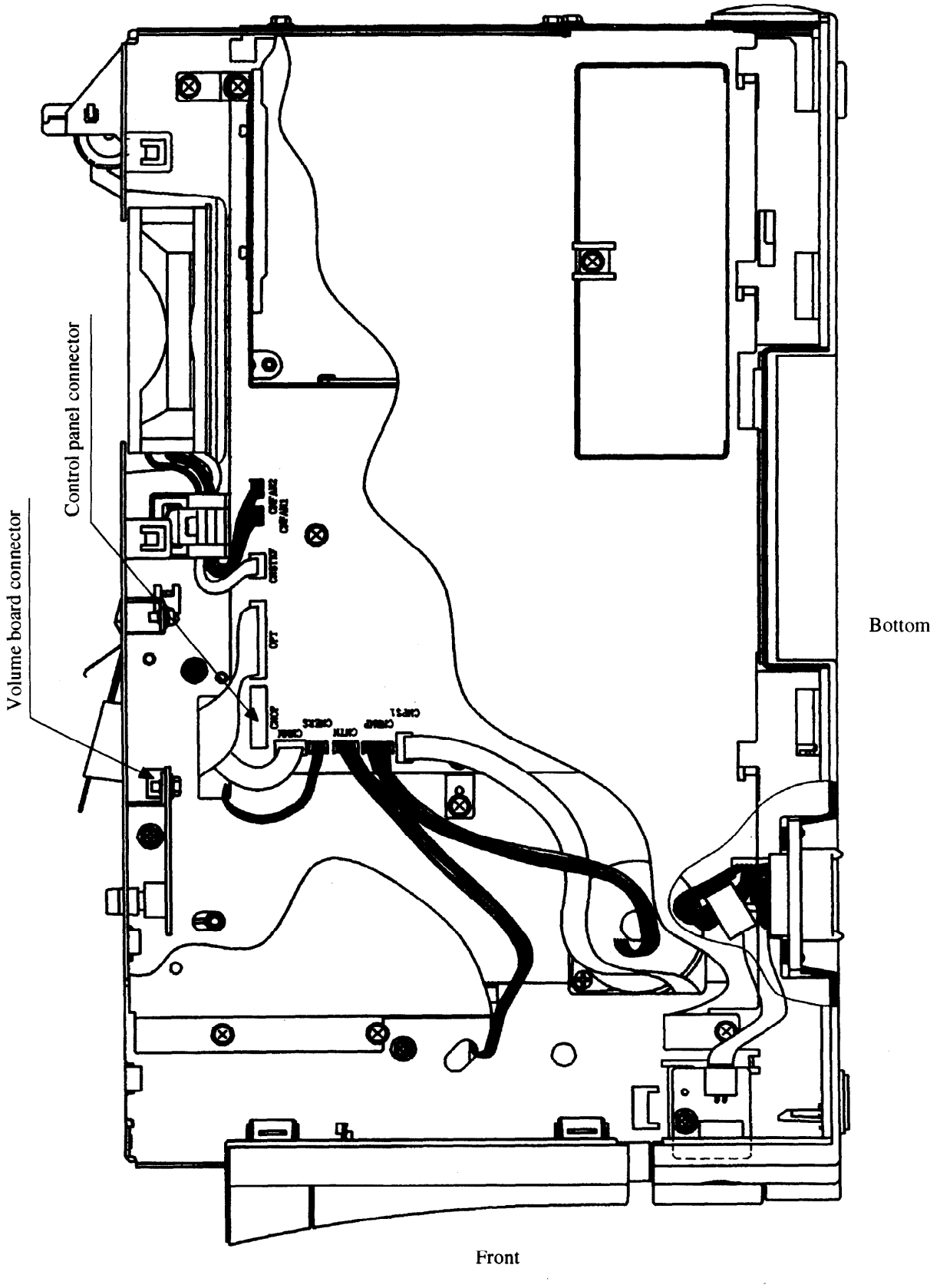
Remove one screw to remove the rear cover.

Remove side cover R and side cover L.

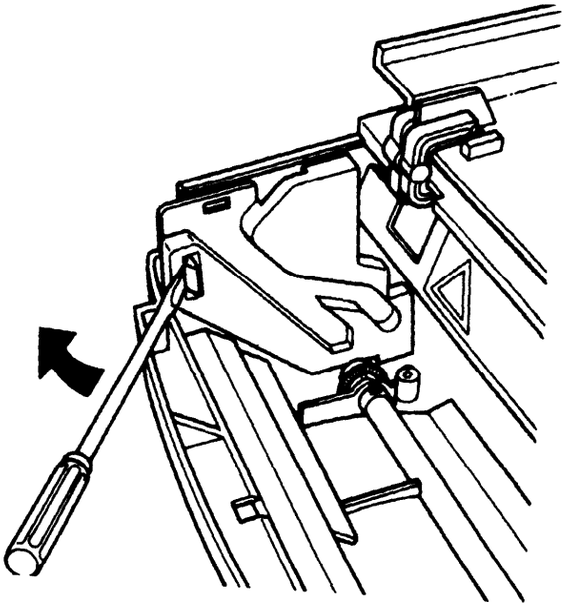
Remove six screws to remove the shield plate.

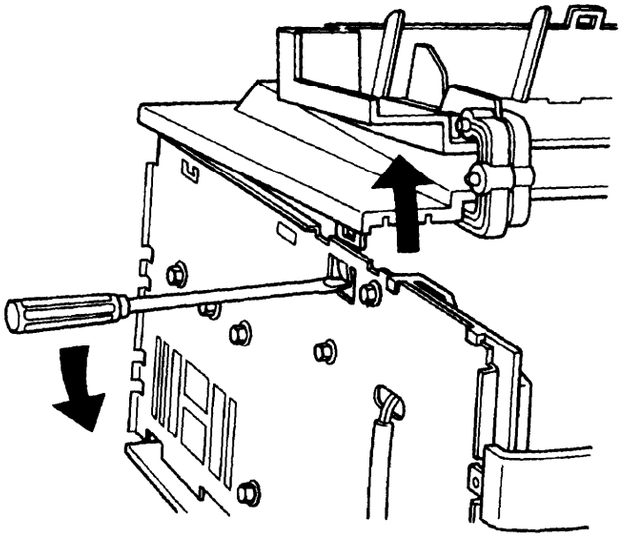


Disconnect the control panel connector and the volume board connector.



Lift the upper cover in an upward direction to remove it while pressing four claws on the left and right of the upper cover using a standard screw driver as shown below:





Installation

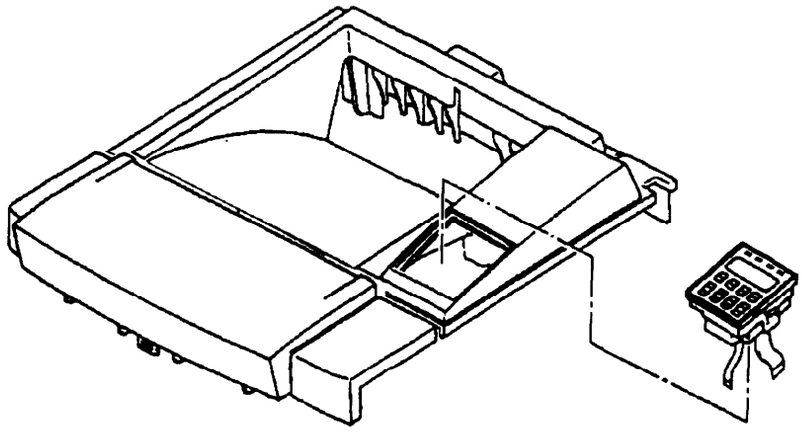
Reverse the removal procedure.

(2) Control panel replacement

Removal

Remove the upper cover. (See Item (1))

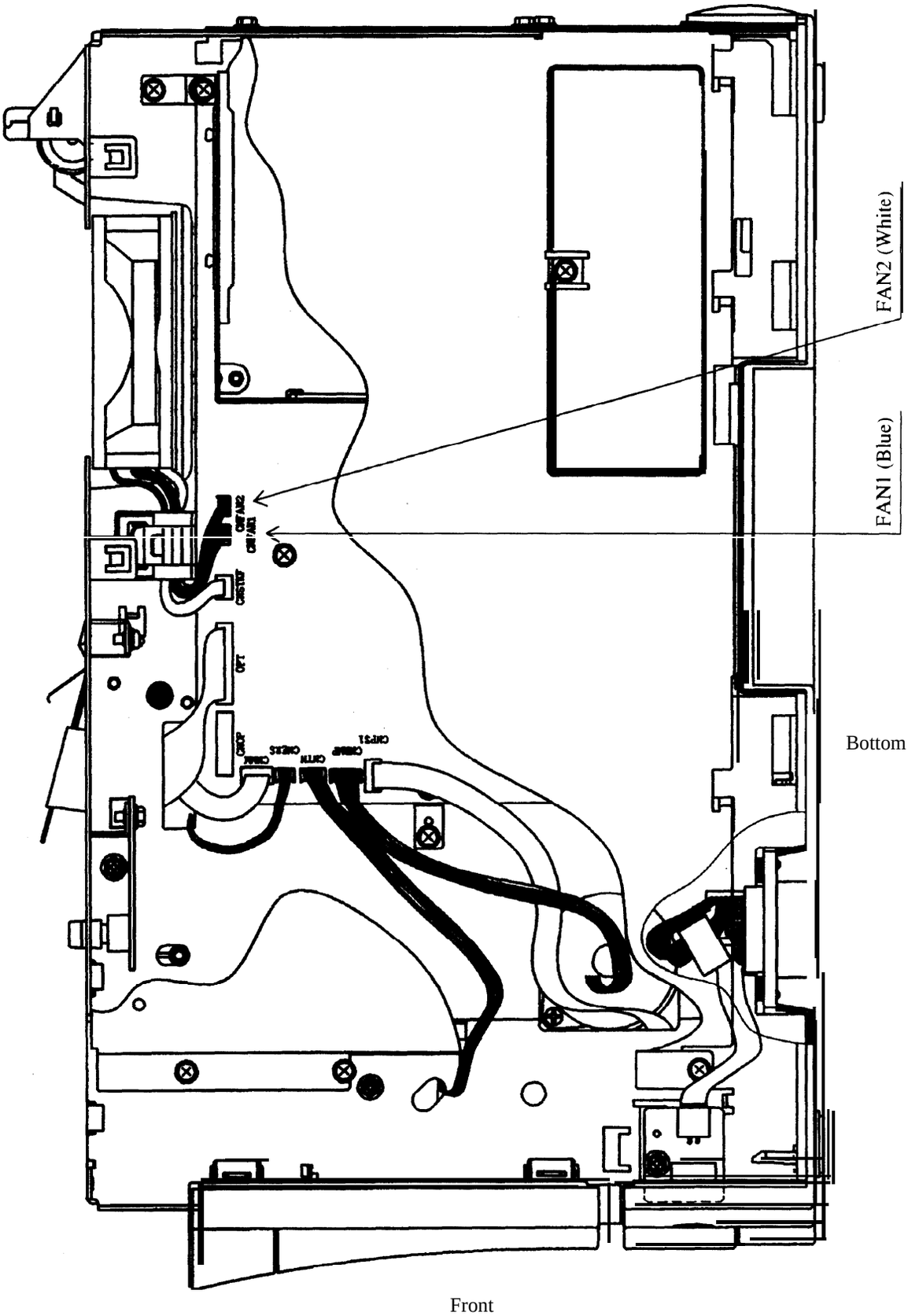
Remove the control panel while pressing the two claws on the left and right of the panel, using a standard screw driver.



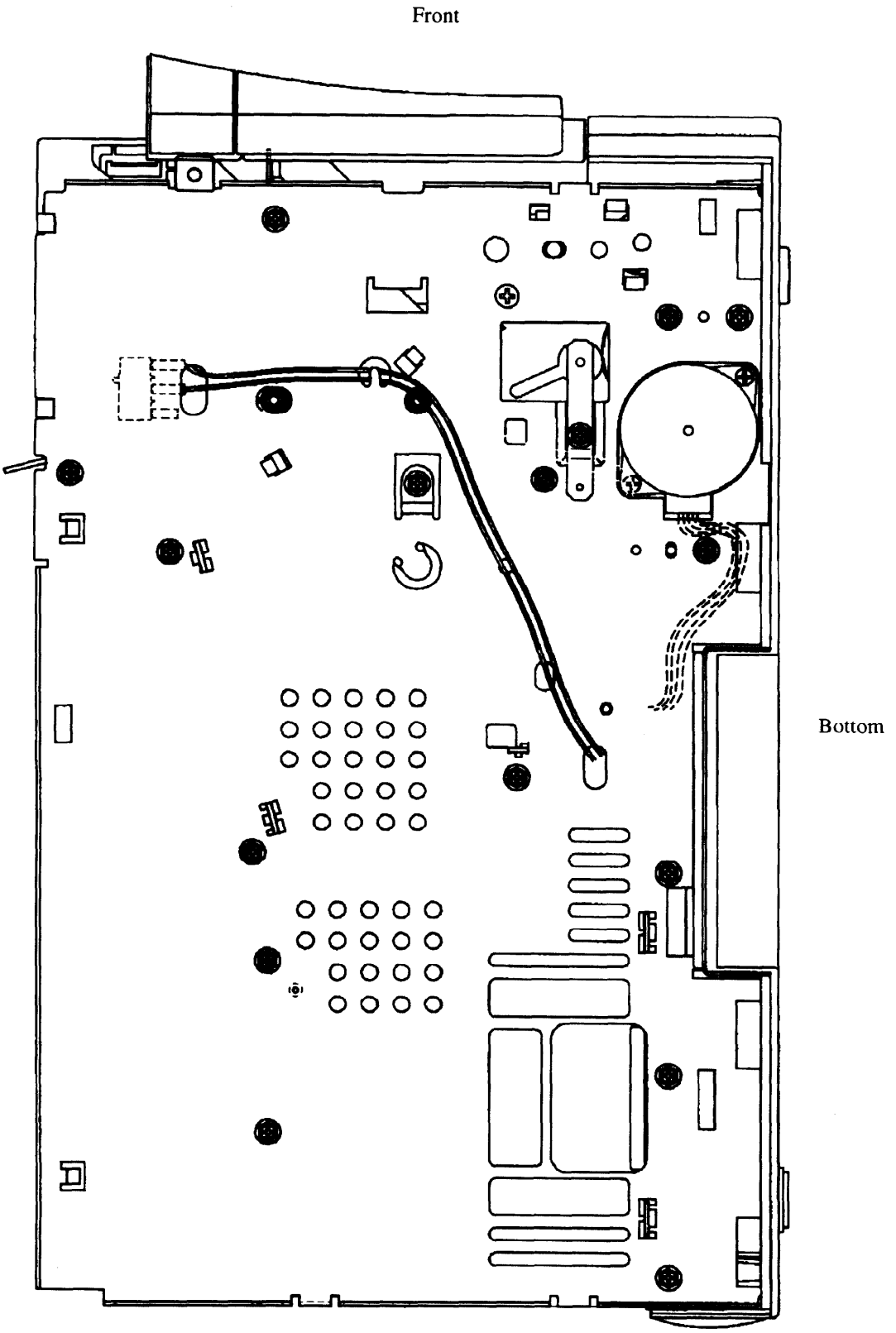
Installation

Reverse the removal procedure.

**Connectors and Cable Connections of the Control Board (Right Side View)**



**Cable Routes of the Pick-up Motor and the Cover-open Switch (Left Side View)**



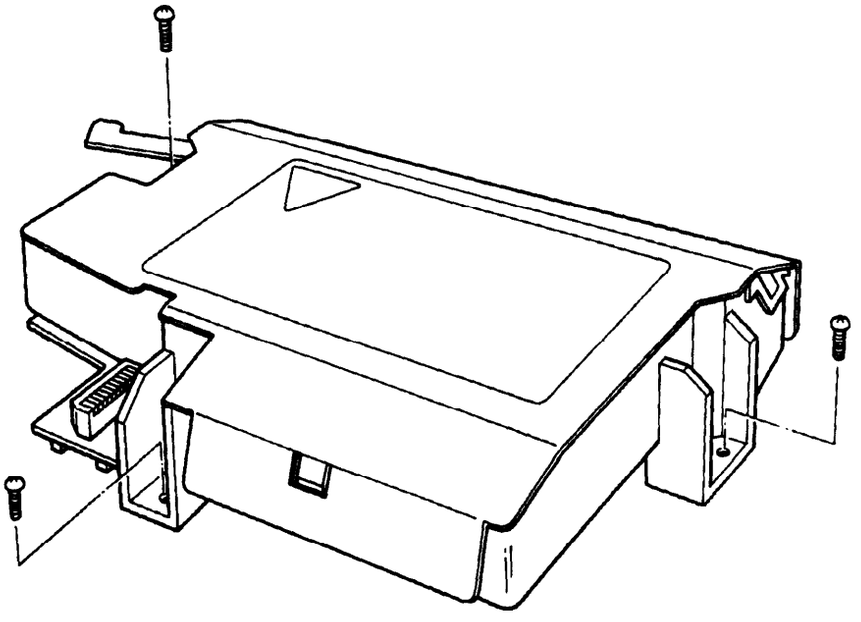
### (3) Laser unit replacement

Removal

Remove the upper cover. (See Item (1) Upper cover replacement.)

Disconnect the connector from the laser unit.

Remove three screws to remove the frame ground cover and the laser unit.



(Frame ground cover is removed from the top of the laser unit)

Installation

Reverse the removal procedure.

**(4) Fuser unit replacement**

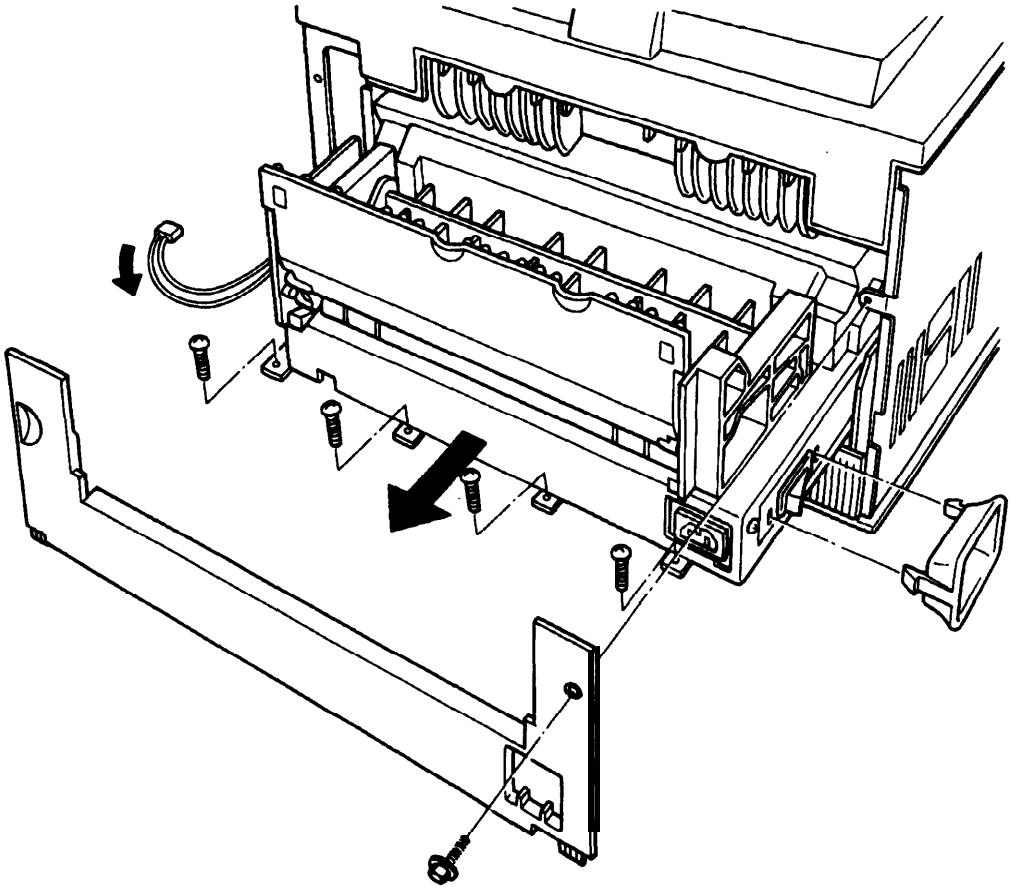
Removal

Remove side cover R. (See Item (1) Upper cover replacement.)
Remove the shield plate. (See Item (1) Upper cover replacement.)
Disconnect the connector (for FAN2) from the control board.
Remove the rear cover. (See Item (1) Upper cover replacement.)
Remove four screws from the rear of the unit to draw out the subassembly of the power supply board and the fuser unit.

Notes:

The power supply board and the fuser unit are hot immediately after printing.
Remove the power supply board and the fuser unit carefully.

Remove the rear stacker



Disconnect the two connectors while pressing the connector lock with a standard screw driver as shown below. (The following illustration shows the side that faced to the front of the printer when the unit was installed.)

Remove two screws from the front of the unit to separate the fuser unit from the power supply board.

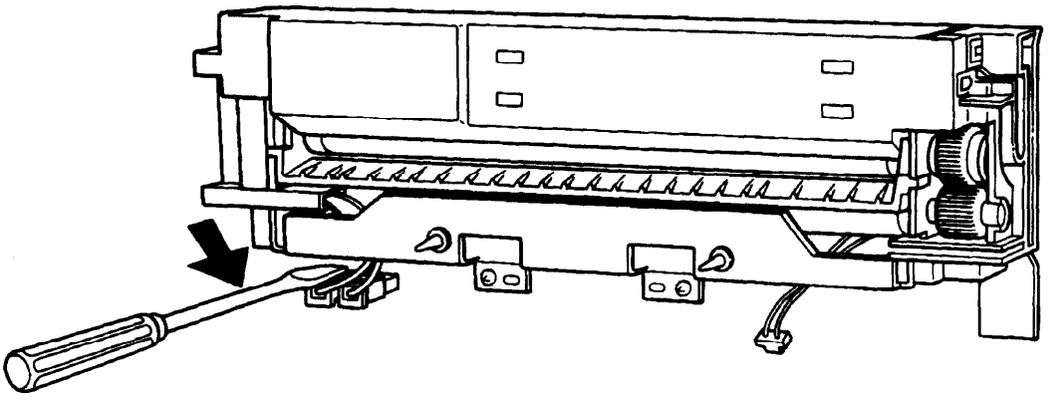
Remove the power supply board from the subassembly. (See Item (5) Power supply board replacement.)

Remove FAN2 and gears 1 to 6 from the subassembly. (See Item (7) FAN2 replacement.)

Remaining is the fuser unit.

Note:

Do not disassemble the fuser unit itself.



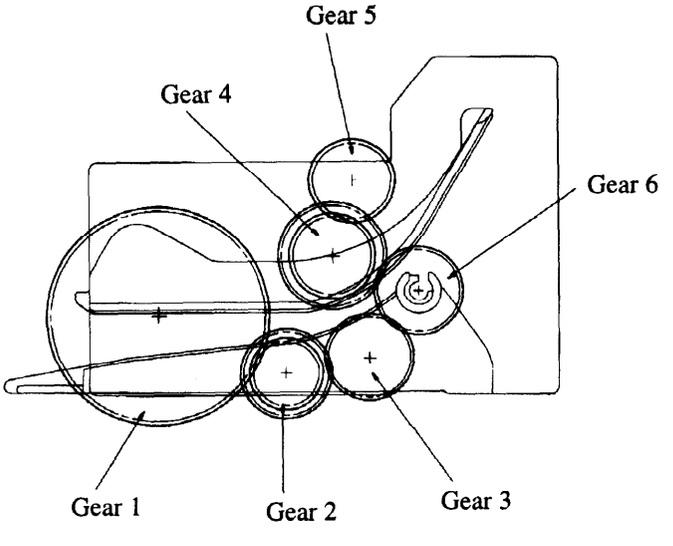
Installation

Reverse the removal procedure.

Notes:

Return gears 1 to 6 to the original positions and hold them by installing the FAN2 mounting plate.

Fasten FAN2 on the plate so that the air flow arrow is in the outward direction. (See Item (7) FAN2 replacement.)



### (5) Power supply board replacement

Removal

Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)

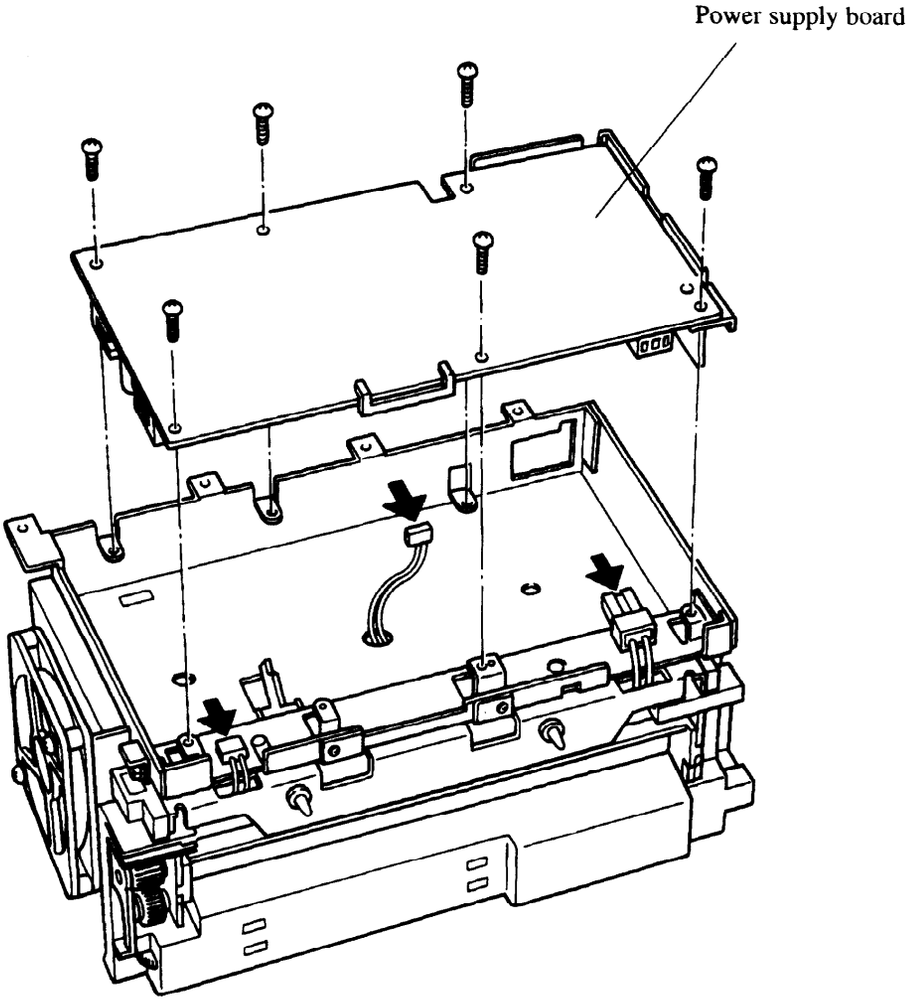
Disconnect the connector (for FAN2). (See Item (4) Fuser unit replacement.)

Remove the subassembly of the fuser unit and the power supply board. (See Item (4) Fuser unit replacement.)

Turn the subassembly upside down

Remove six screws which fasten the cover.

Disconnect the two connectors (for the fuser unit) then the connector (for the sensor board) and remove the power supply board.




Installation

Reverse the removal procedure.

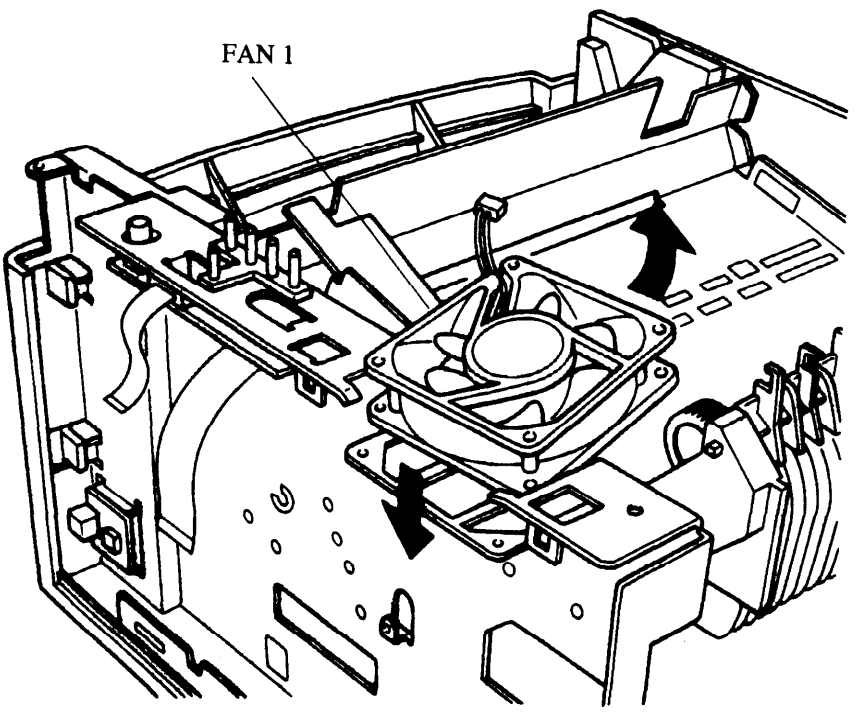
**(6) FAN 1 replacement**

Removal

Remove the upper cover. (See Item (1) Upper cover replacement.)

Disconnect the connector from FANl.

To remove FANl, lift it at an angle while pressing the lower mounting plate with a standard screw driver as shown below.

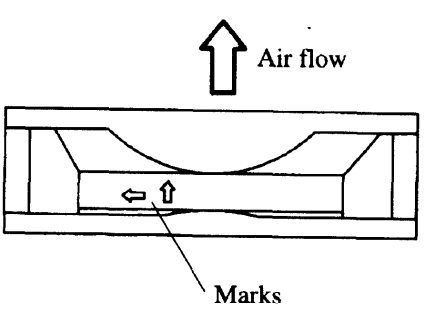



Installation

Reverse the removal procedure.

Note:

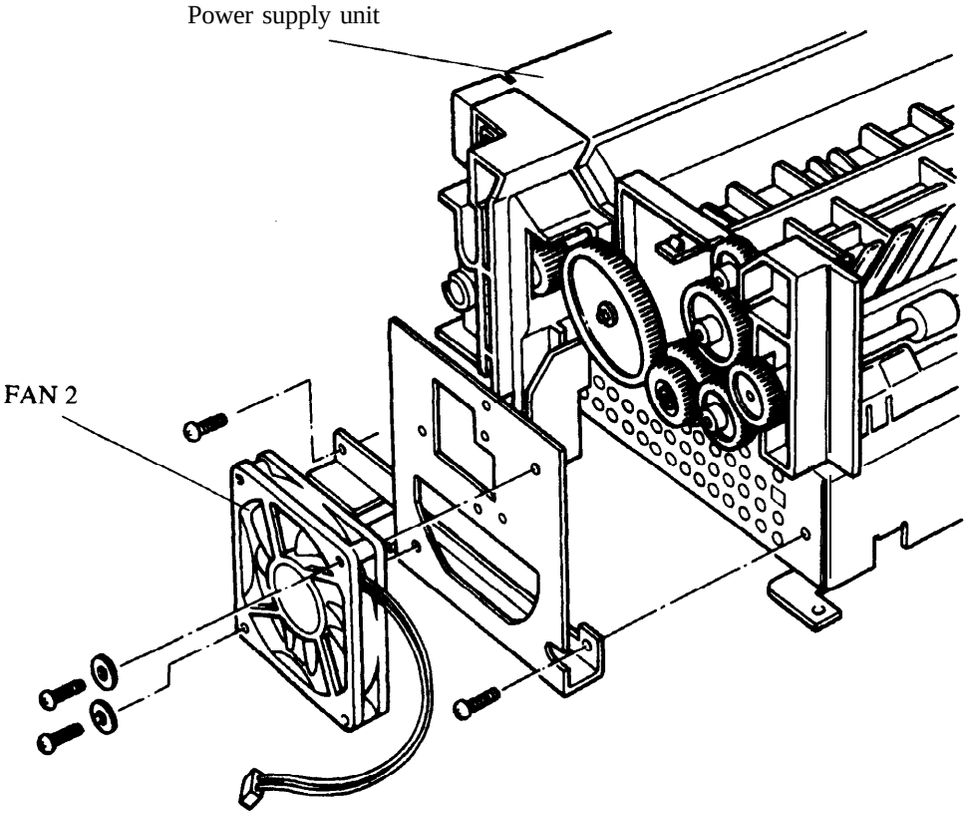
Install the FAN1 so that the labelled air flow arrow is in the upward direction.



(7) FAN 2 replacement

Removal

1. Remove the subassembly of the fuser unit and the power supply board. (See Item (4) Fuser unit replacement.)
2. Remove two screws to remove FAN2 from the side of the subassembly.

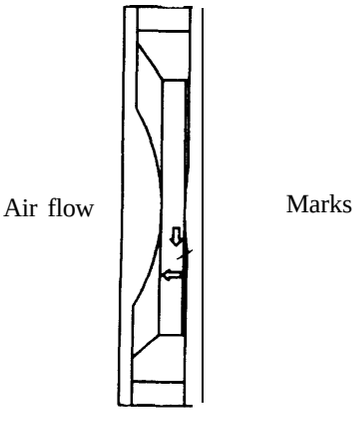



Installation

Reverse the removal procedure.

Note:

Install the FAN2 so that the labelled air flow arrow is in the outward direction.



**(8) Control board replacement**

Removal

Remove the paper tray.

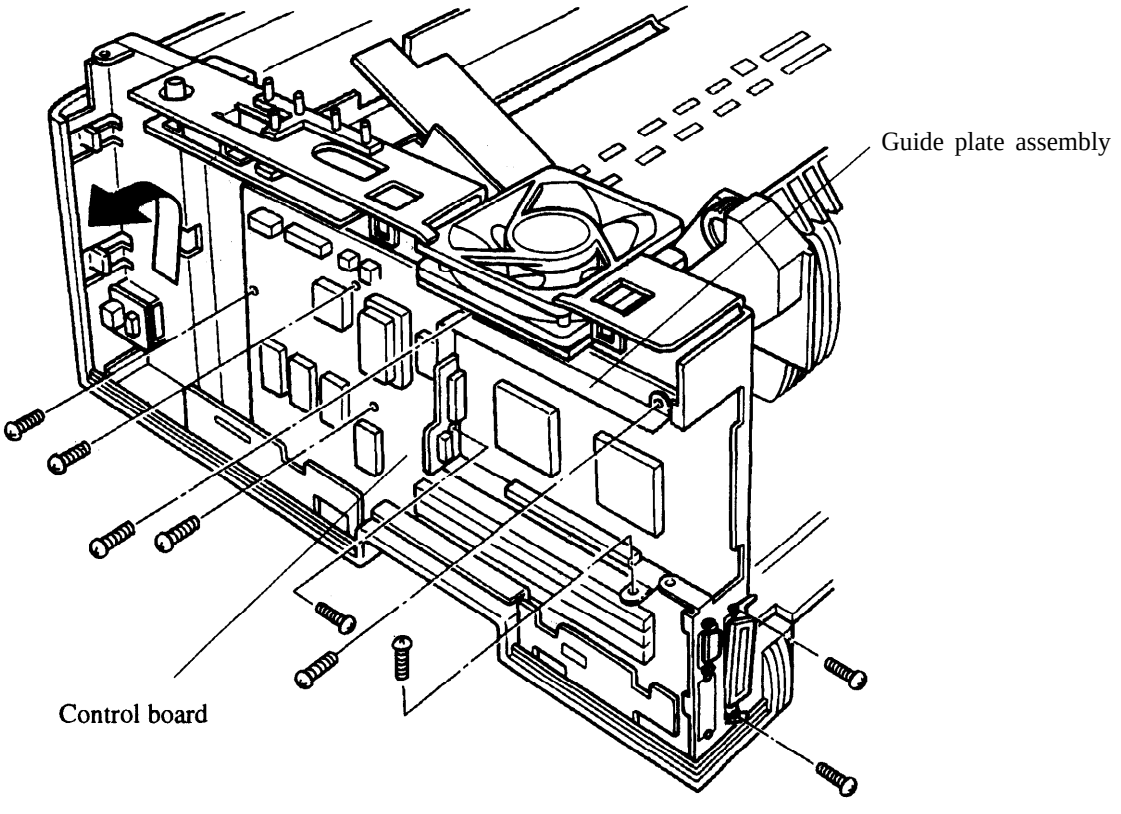
Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)

Disconnect the following all connectors:

CNFANl, CNFAN2, CNERS, CNTN, OPT, CNMM, CNRMP, CNCSTA, CNMFF, CNPSl, CNOP, and CNSTKF

Remove four screws to remove the guide plate assembly.

Remove three screws and disengage the lower hook to remove the control board.




Installation

Reverse the removal procedure.

Notes:

Engage the control board securely with the lower hook and screws.

There is a connector on the back side of the control board, which connects to the sensor boar connector. When installing the control board, lift it into place so that the control board connector faces the sensor board connector.

To CNFANl (left side), connect the connector with red and black cables from the upper fan. To CNFAN2 (right side), connect the connector with blue and red cables from the lower fan.

### (9) High-voltage power supply board and sensor board replacement

Removal

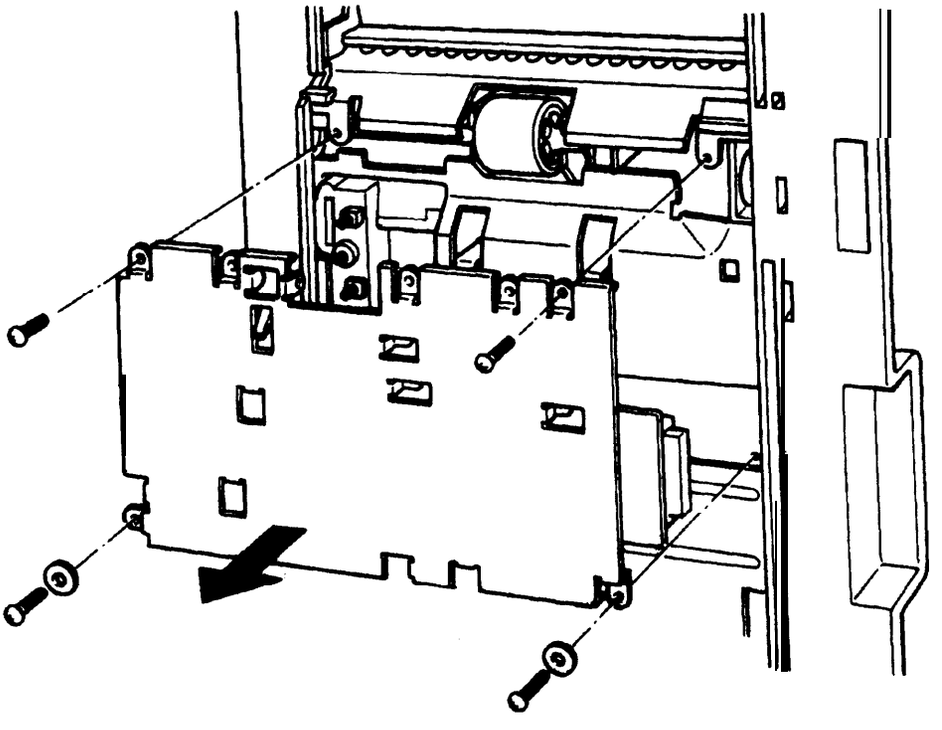
Remove the paper tray.

Remove side cover R and the shield plate. (See Item (1) Upper cover replacement.)

Remove the control board. (See Item (8) Control board replacement.)

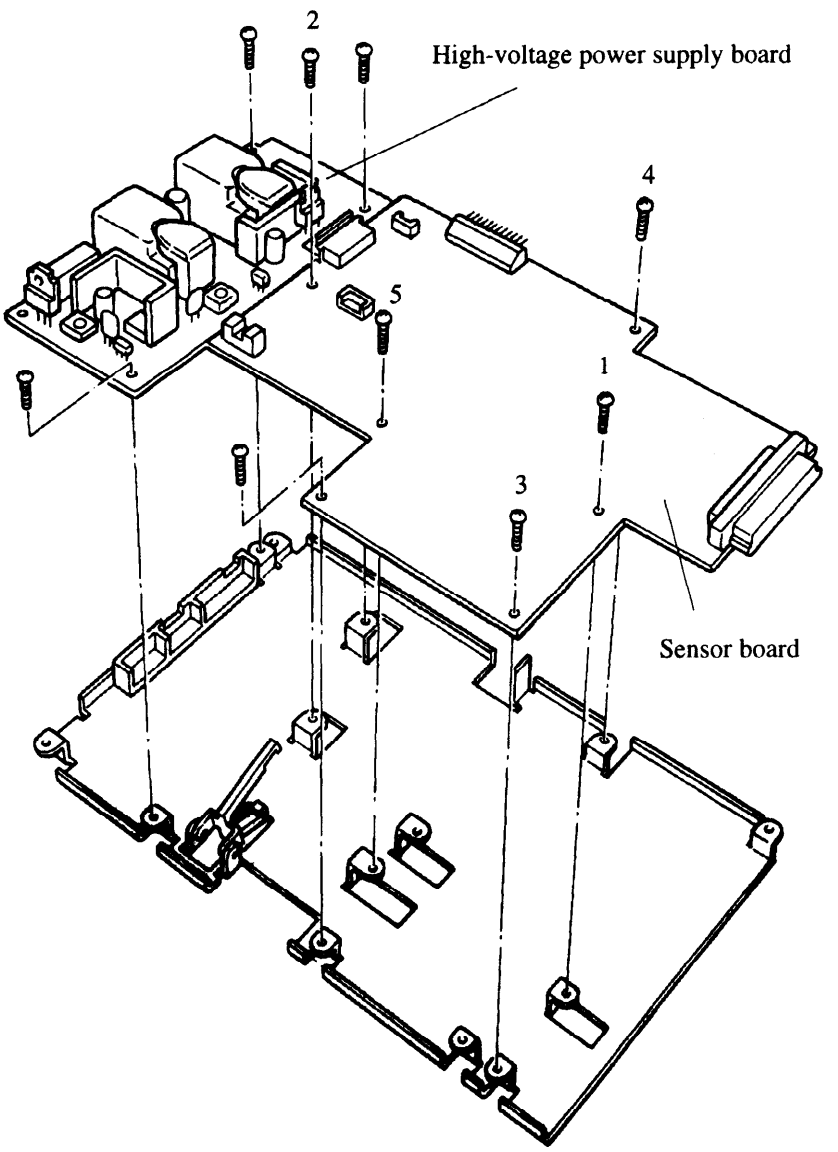
Remove four screws from the bottom of the printer to remove.

Disconnect the connector (cable from the power supply) and pull out the mechanism board from the control board.



Remove six screws to remove the sensor board assembly.

Remove four screws to remove the high-voltage power supply board.




Installation

Reverse the removal procedure.

Notes:

When installing the sensor board, observe the order of fastening screws.

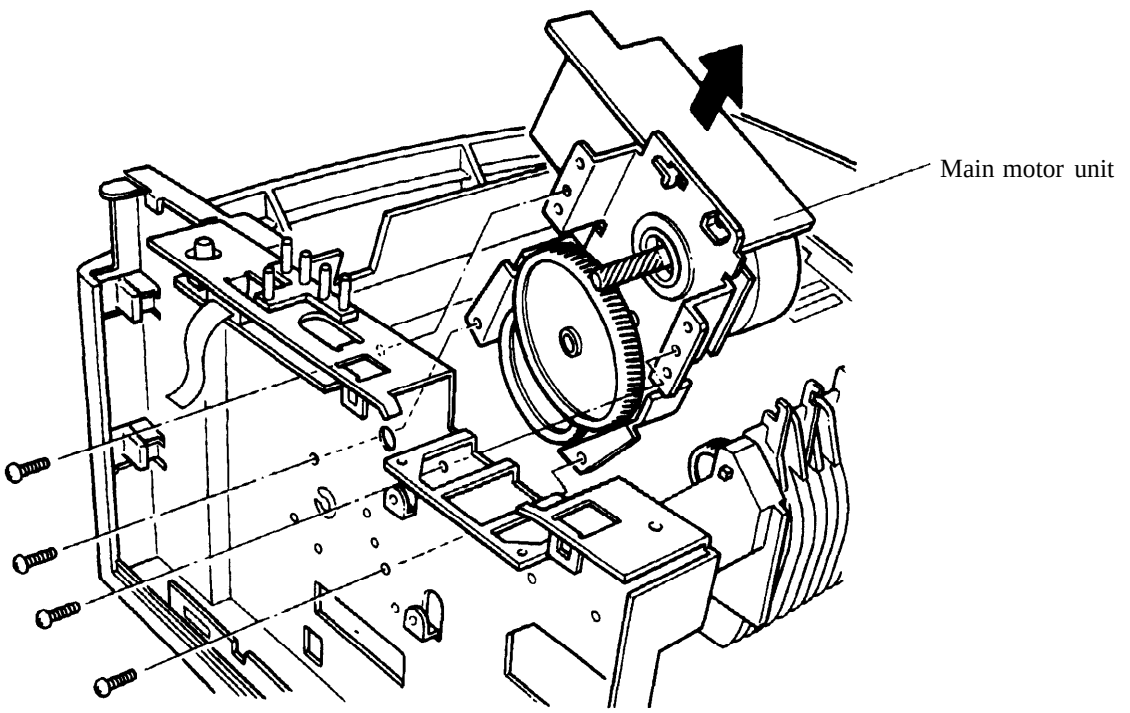
When installing the mechanism board, take care so that the cable does not overlap the four spring electrodes on the bottom left of the printer mechanism.

After connecting the connector (cable from the power supply board), install the mechanism board while matching the four screw positions.

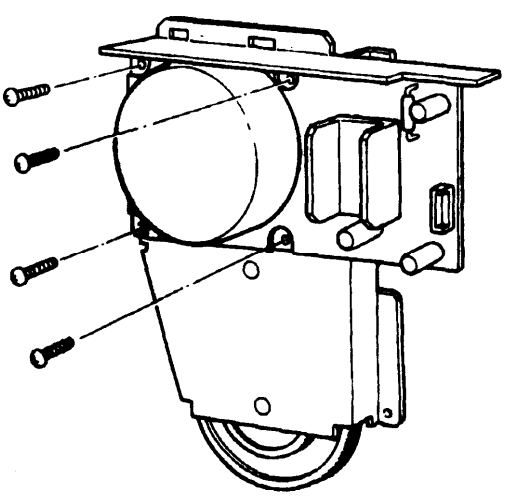
**(10) Main motor replacement**

Removal

Remove the upper cover. (See Item (1) Upper cover replacement.)
Remove the control board. (See Item (8) Control board replacement.)
Remove FANl. (See Item (6) FAN 1 replacement.)
Remove four screws to remove the main motor unit.




Remove four screws and disconnect the cable to remove the main motor.



Installation

Reverse the removal procedure.

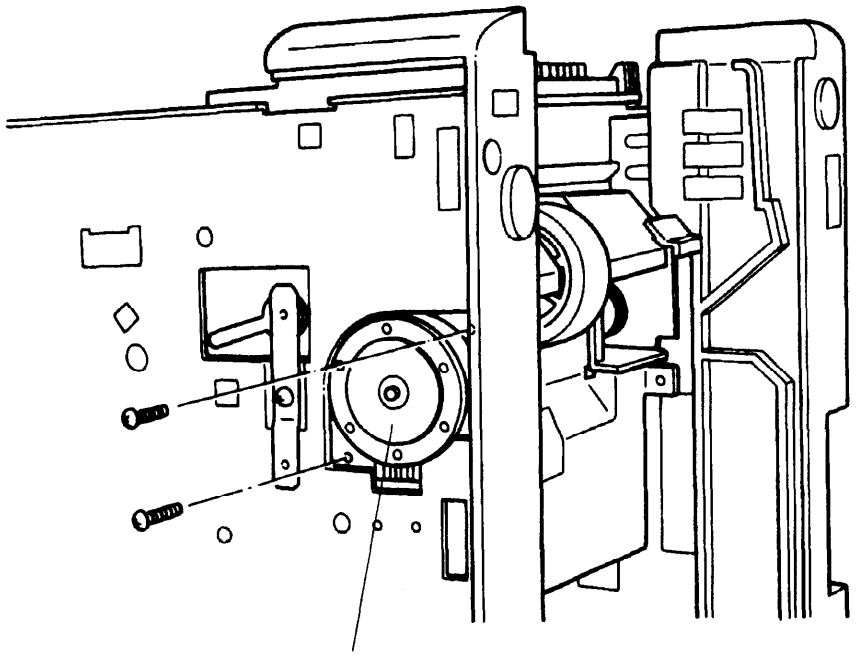
**(11) Pick-up motor replacement**

Removal

Remove side cover L. (See Item (1) Upper cover replacement.)

Remove the subassembly of the sensor board and the high-voltage power supply board. (See Item (9) High-voltage power supply board and sensor board replacement.)

Remove two screws to remove the pick-up motor.




Installation

Reverse the removal procedure.

**(12) Pick-up roller replacement**

Removal

Remove the paper tray.

Remove side cover L. (See Item (1) Upper cover replacement.)

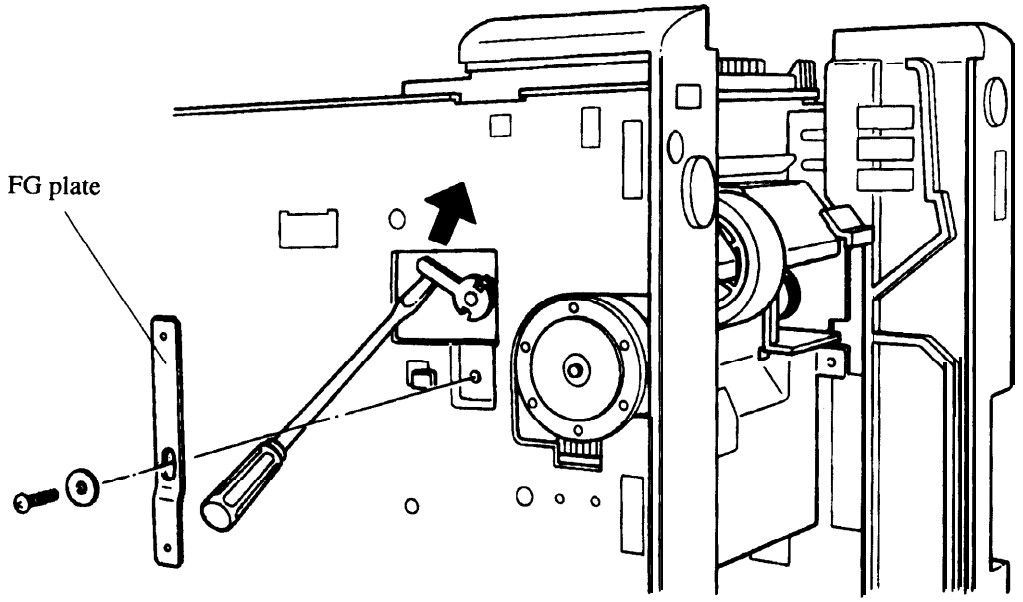
Remove the screw from the pick-up roller shaft FG plate and remove the FG plate.

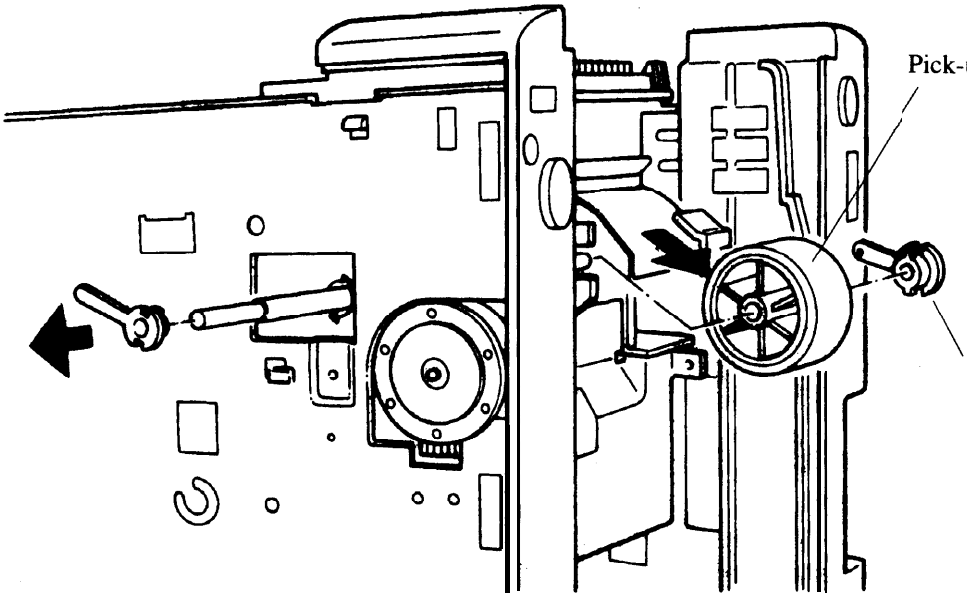
Remove the bearing using a standard screw driver.

Pull the pick-up roller shaft out approximately 50 mm to remove the pick-up roller.

Note:

Do not pull out the shaft completely.



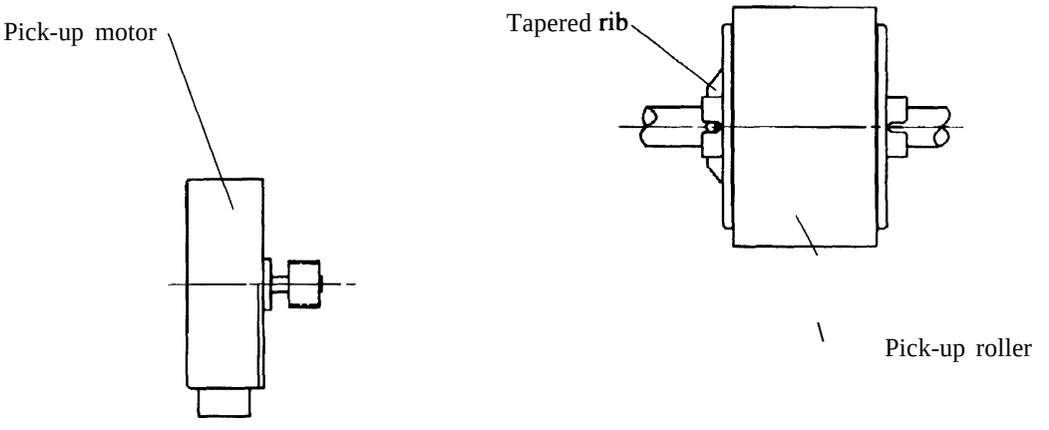

This bearing has a red dot on it and must be used next to the pick-up roller.

Installation

Reverse the removal procedure.

Note:

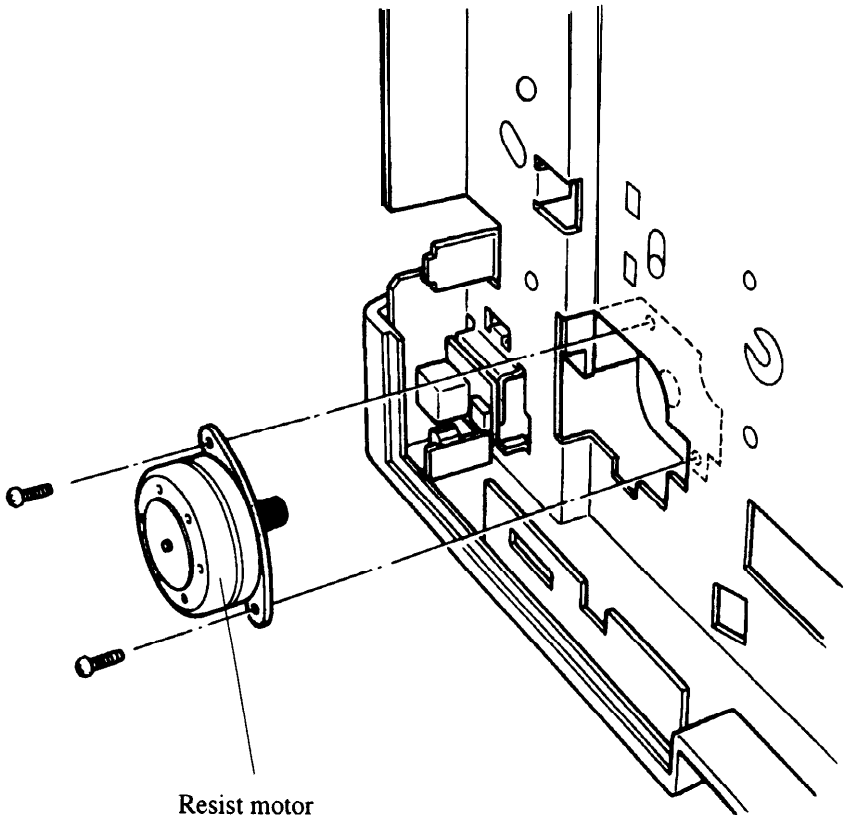
When putting the pick-up roller on the shaft, face the tapered rib of the roller toward the pick-up motor. The following shows the relative position of pick-up roller and pick-up motor viewed from the bottom.



### (13) Resist motor replacement

Removal

1. Remove the control board. (See Item (8) Control board replacement.)
2. Remove two screws to pull out the resist motor.




Installation

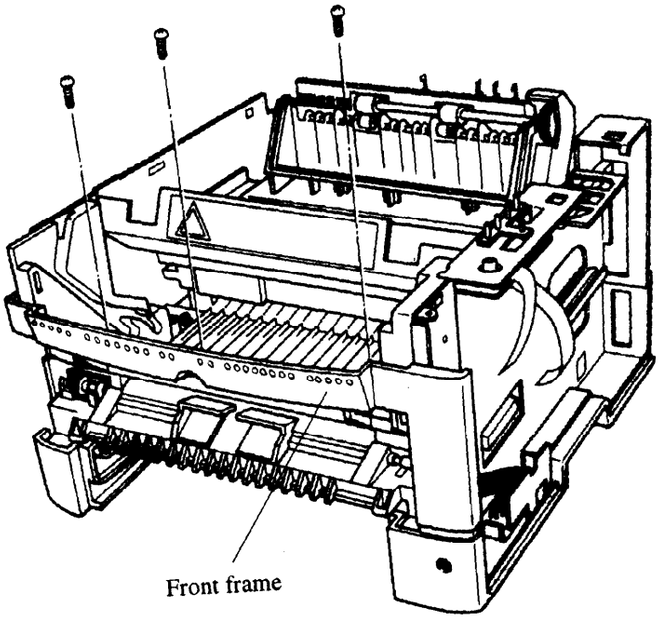
Reverse the removal procedure.

Reference:

The resist motor derives from the resist roller (in contact with the feed roller) which momentarily blocks the paper feed from the pick-up roller to align the paper.

## (14) Paper feed roller replacement

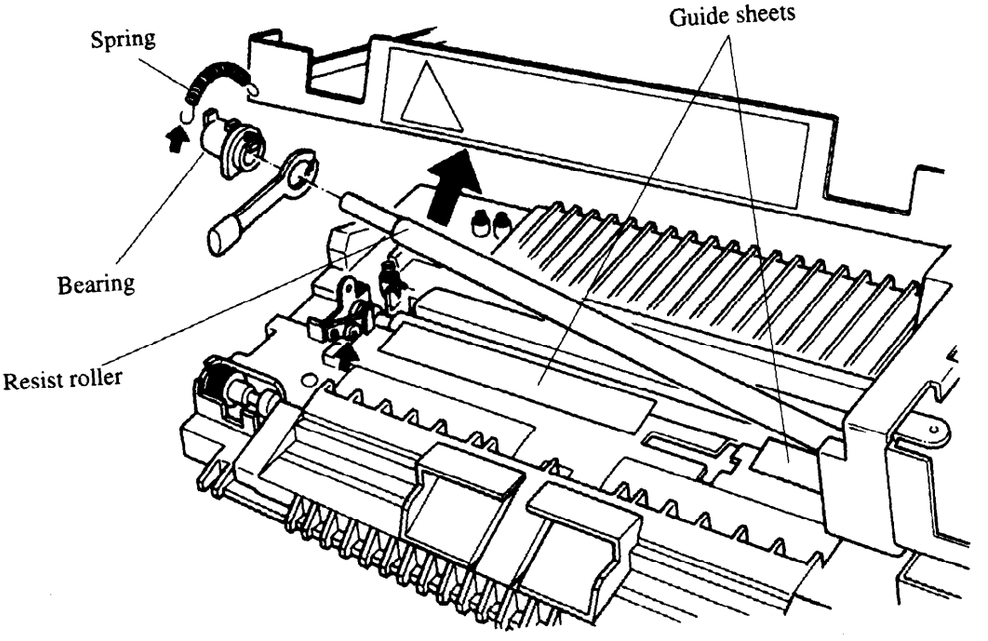
Removal
Remove the upper cover and side covers L and R. (See Item (1) Upper cover replacement.
Remove three screws, disengage three hooks, and disconnect the toner sensor connector to remove the front frame



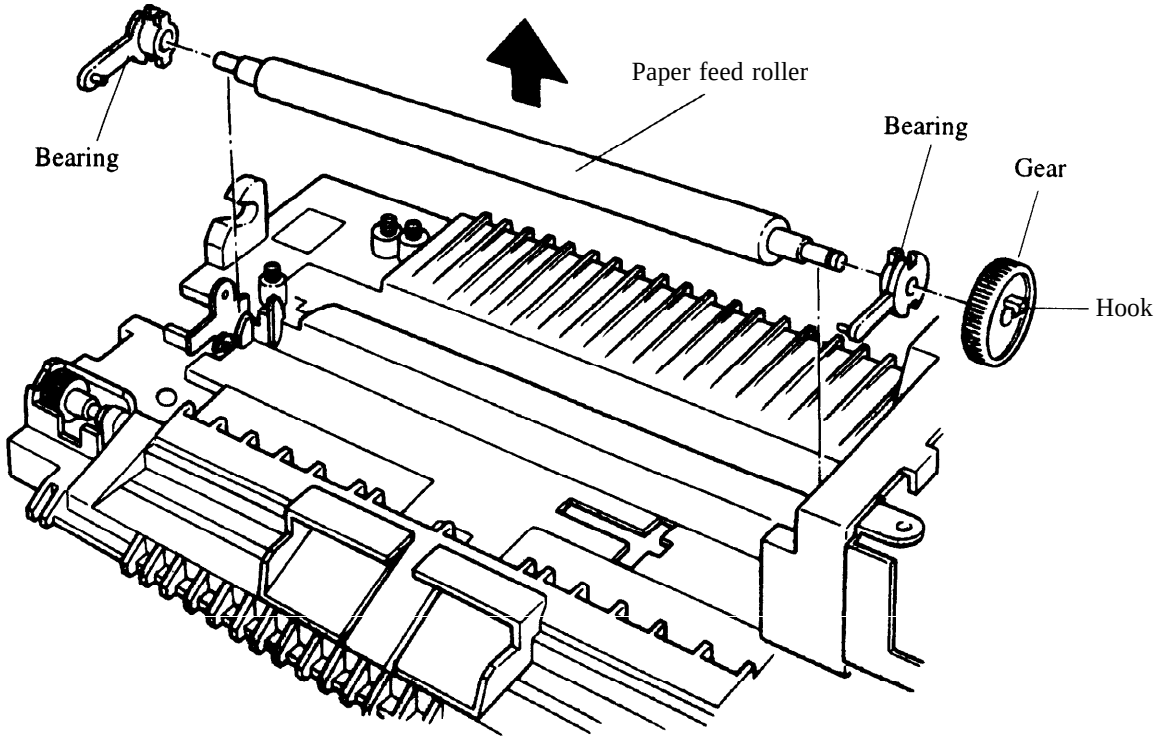

Remove the fight and left springs of the resist roller and lift the resist roller to remove it.

Peel off the two guide sheets (Mylar films). Be sure to clearly remove the remaining substance of the double-sided adhesive tape.

Disengage the bearing phase shift levers at the both ends of the paper feed roller using a standard screwdriver and raise the levers upwards to remove the paper feed roller.



Cut the hook of the gear at the right end of the paper feed roller using a diagonal cutting pliers,
Move the paper feed roller to the left and pull out the roller from the left end.




Installation

Reverse the removal procedure.

Notes:

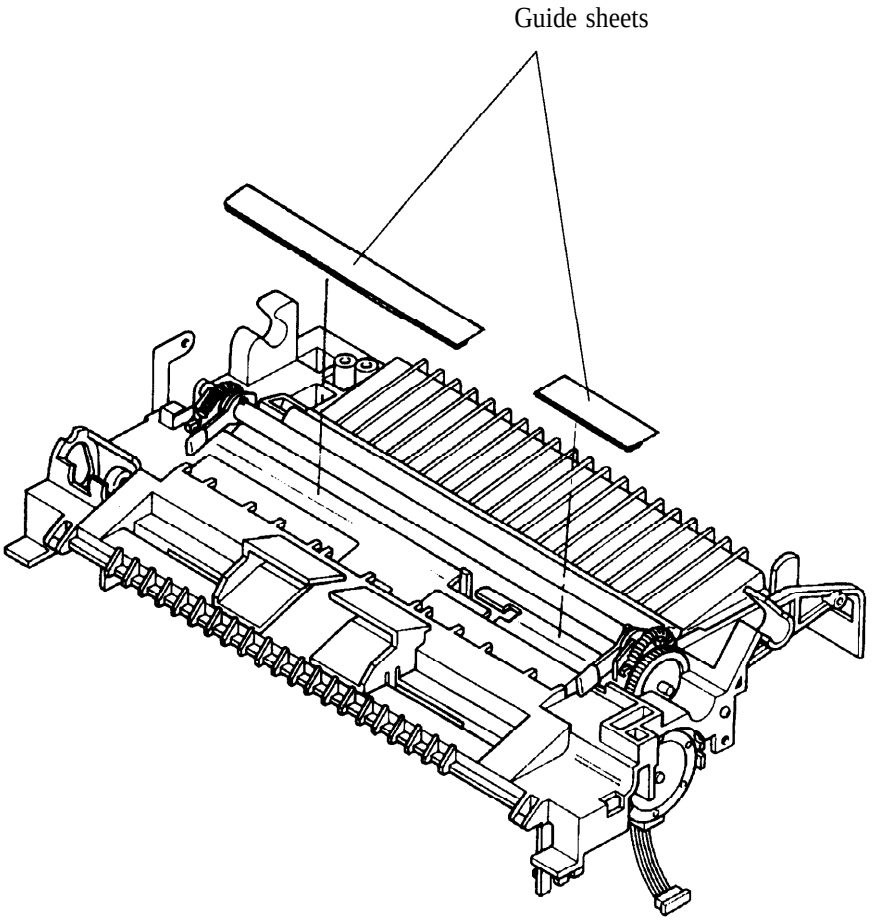
When installing the paper feed roller:

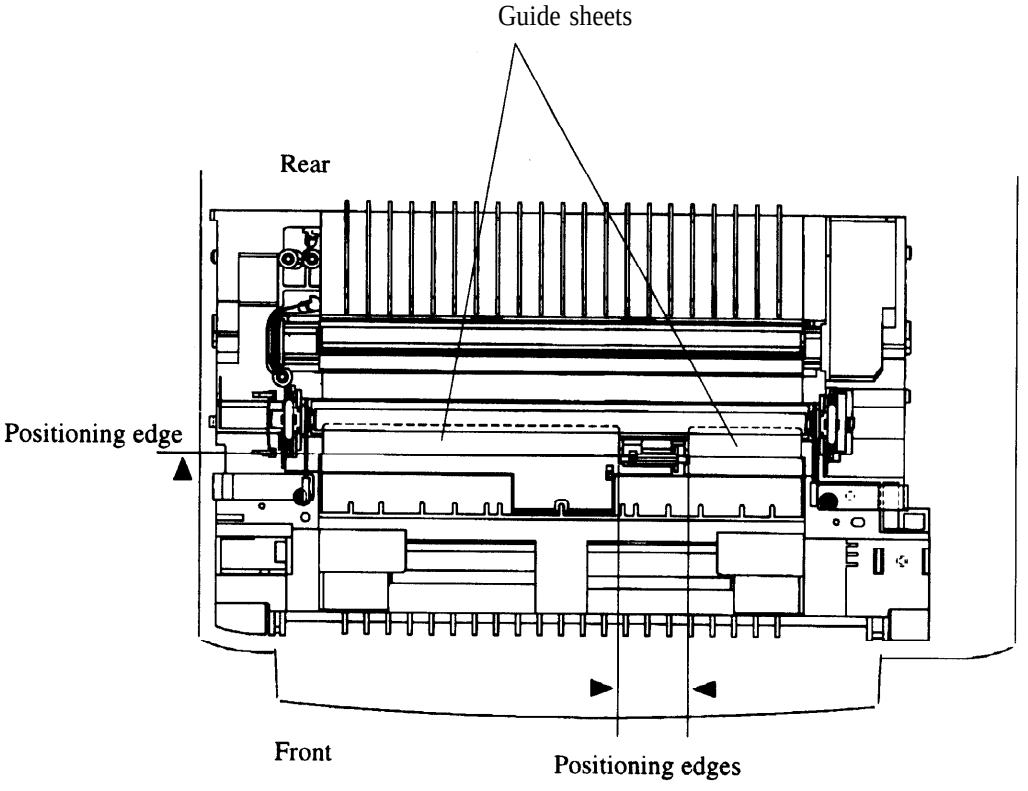
Fit one bearing to the left end (end without a D-cut) of the paper feed roller.

Insert the right end D-cut of the paper feed roller into the hole of the other bearing then the hole of a new gear until the gear is caught by the hook.

Insert the bearings into guide grooves on the base frame with the bearingphase shift levers set upwards. Then, turn the bearing levers to the initial state positions to secure the bearings to the base frame.

Adhere new guide sheets on the base frame: longer one to the left area and shorter one to the right area. Make sure that there is no clearance between the adhesive tape and the positioning edge as shown on the next page.


Guide sheets


Guide sheets
Rear
Positioning edge
Front
Positioning edges

**(15) Transfer unit replacement**

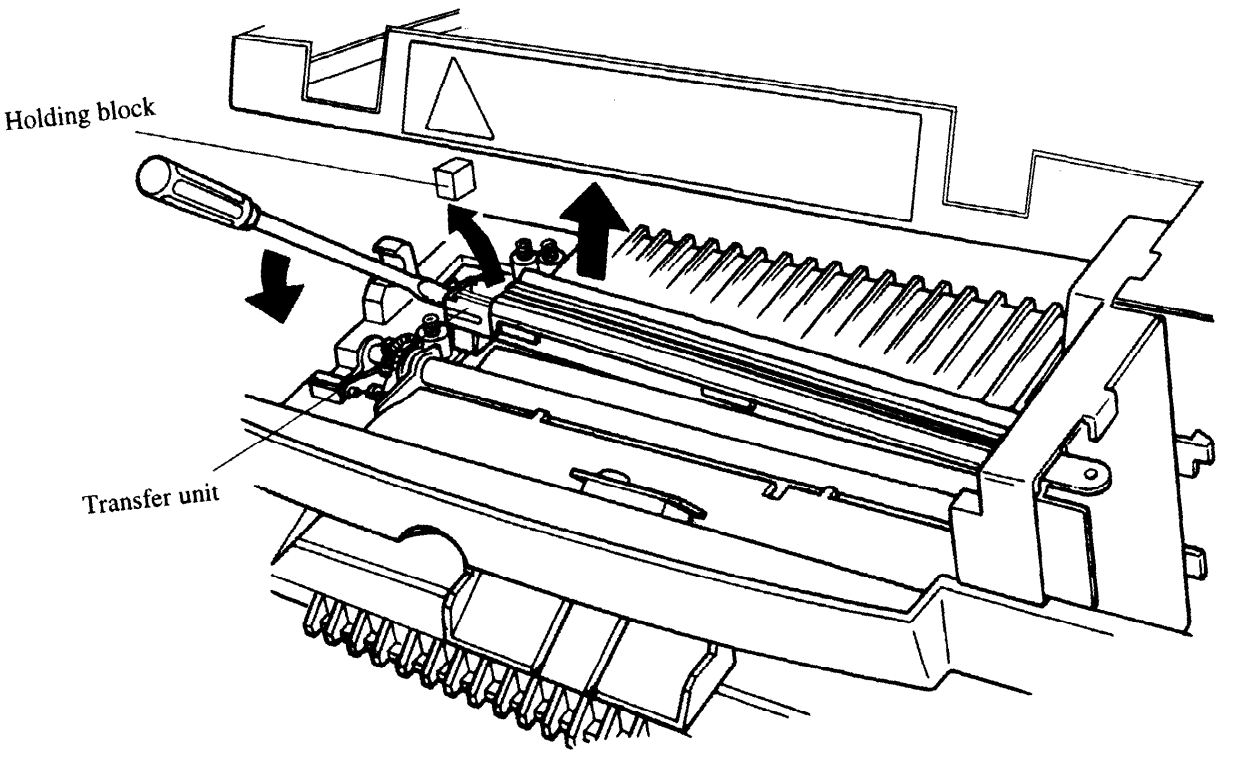
Open the upper door.

Remove the transfer unit holding block at the left side of the transfer unit using a screw driver.

Open the claw on the left side of the base frame then lift the left side of the transfer unit using a screw

Note:

Be careful not to break the wire.




Installation

Reverse the removal procedure.

Note:

The inside is hot immediately after printing.

(16) Cover-open switch replacement

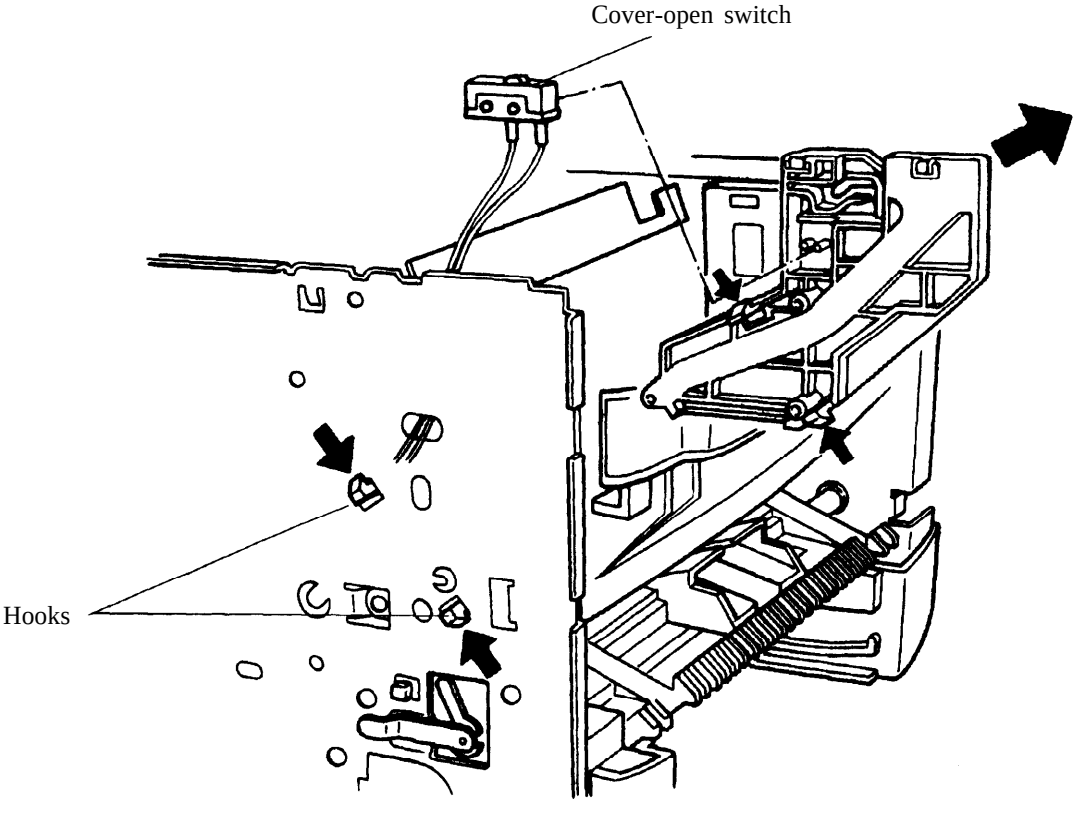
Removal

Remove the subassembly of the sensor board and the high-voltage power supply board. (See Item (9) High-voltage power supply board and sensor board replacement.)

Disconnect the connector from the cover-open switch.

Disengage the two claws of the left guide (for the print unit) and pull the left guide out in an upward direction to remove it.

Remove the cover-open switch.




Installation

Reverse the removal procedure.

**(17) Volume board replacement**

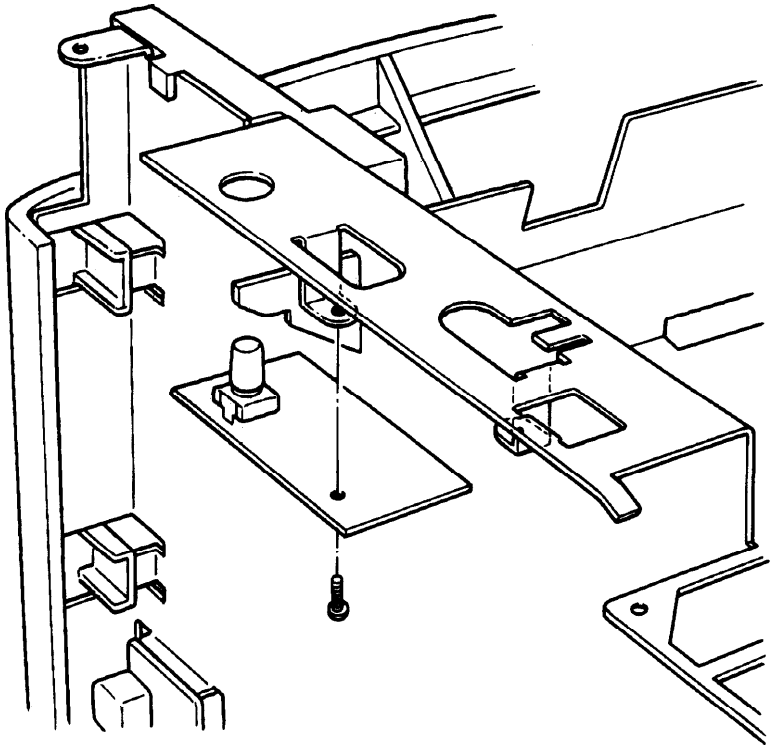
Removal

Remove the control board. (See Item (8) Control board replacement.)

Remove two screws to remove the volume board from the bottom of the frame.

Note:

Use a short Phillips screwdriver.



Installation

Reverse the removal procedure.

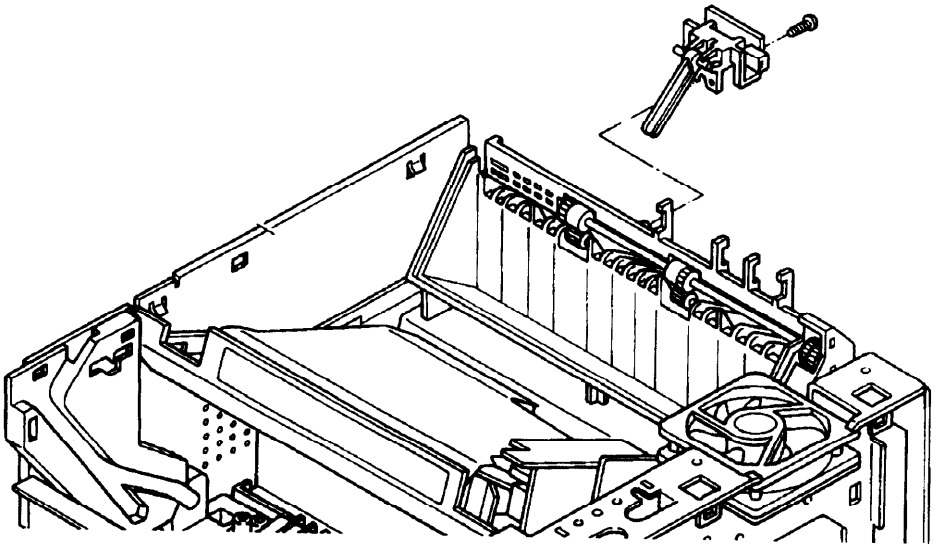
### (18) Stacker-full sensor board (SFS board) replacement

Removal

Remove the upper cover. (See Item (1) Upper cover replacement.)

Remove the cable from the stacker-full sensor.

Remove the screw at the rear of the board.



Installation

Reverse the removal procedure.

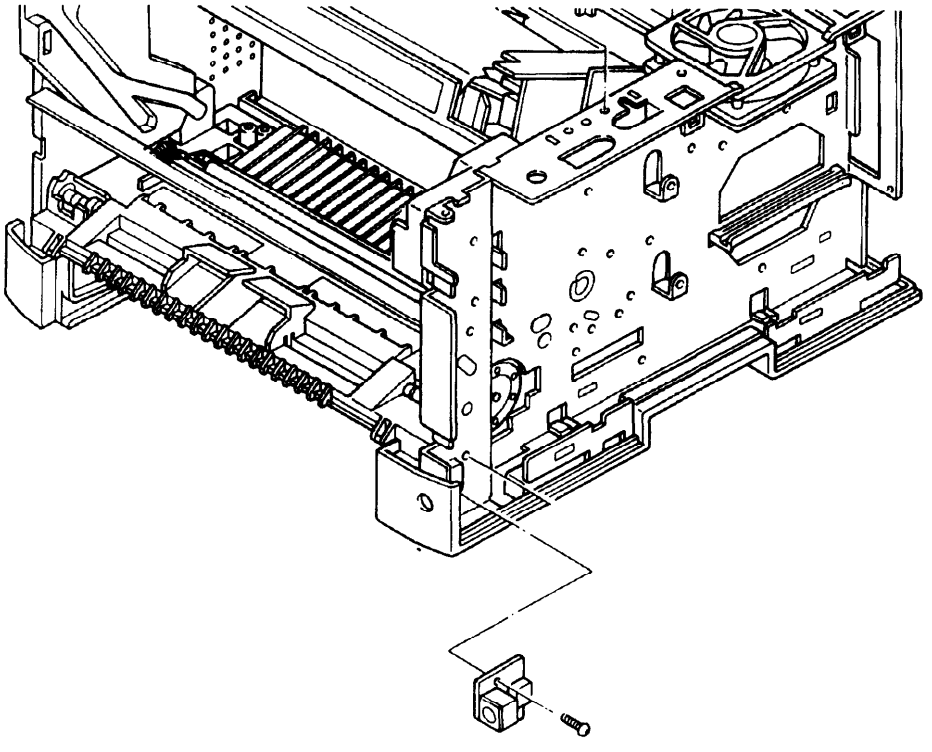
### (19) Multi-function feeder board (MFF board) replacement

Removal

Remove side cover R. (See Item (1) Upper cover replacement.)

Remove the cable from the MFF board.

Remove the screw at the top side of the board.



Installation

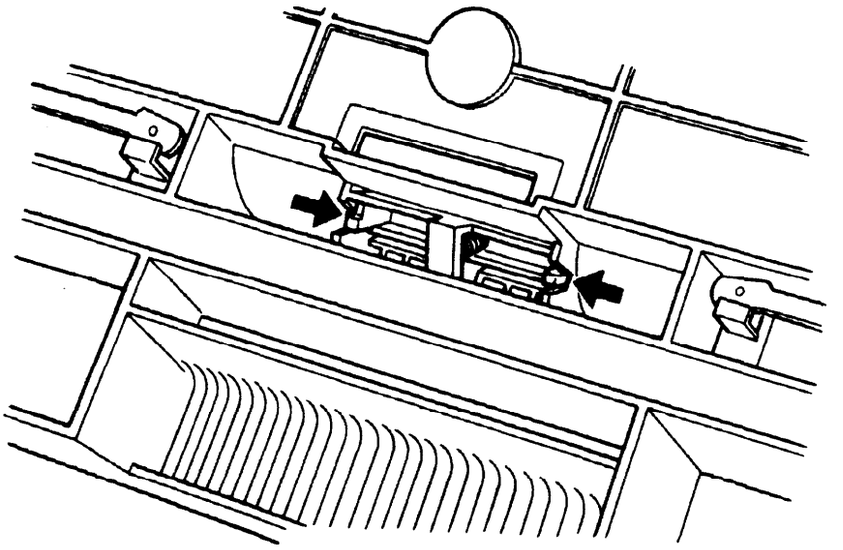
Reverse the removal procedure.

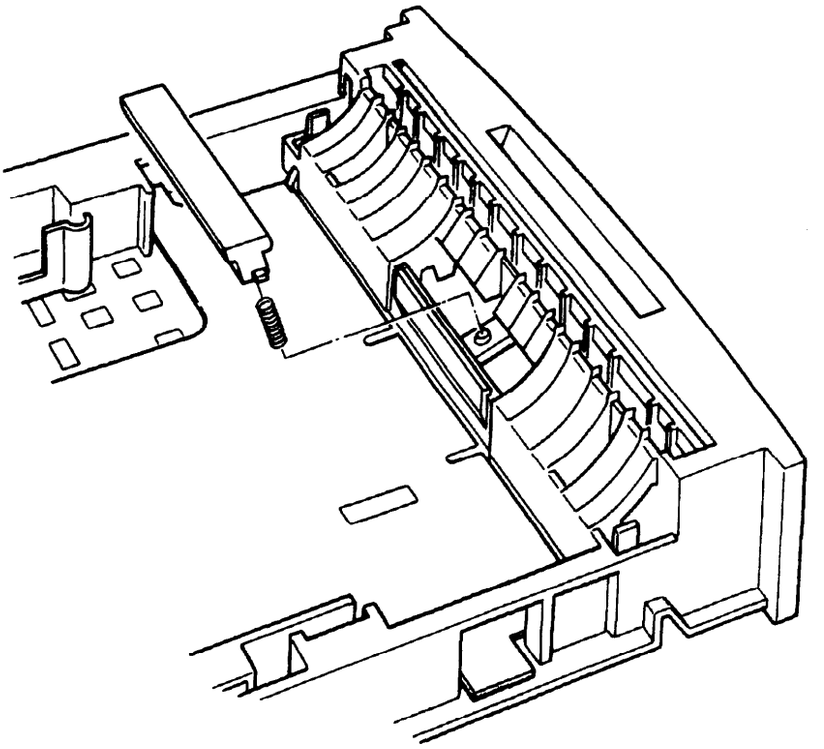
**(20) Separator assembly (friction pad holder) replacement**

Removal

Remove the paper tray from the printer.

Place the paper tray upside down and push in the two hooks of the separator assembly (friction pad holder) to release and remove it. Remember to keep the spring.





Installation

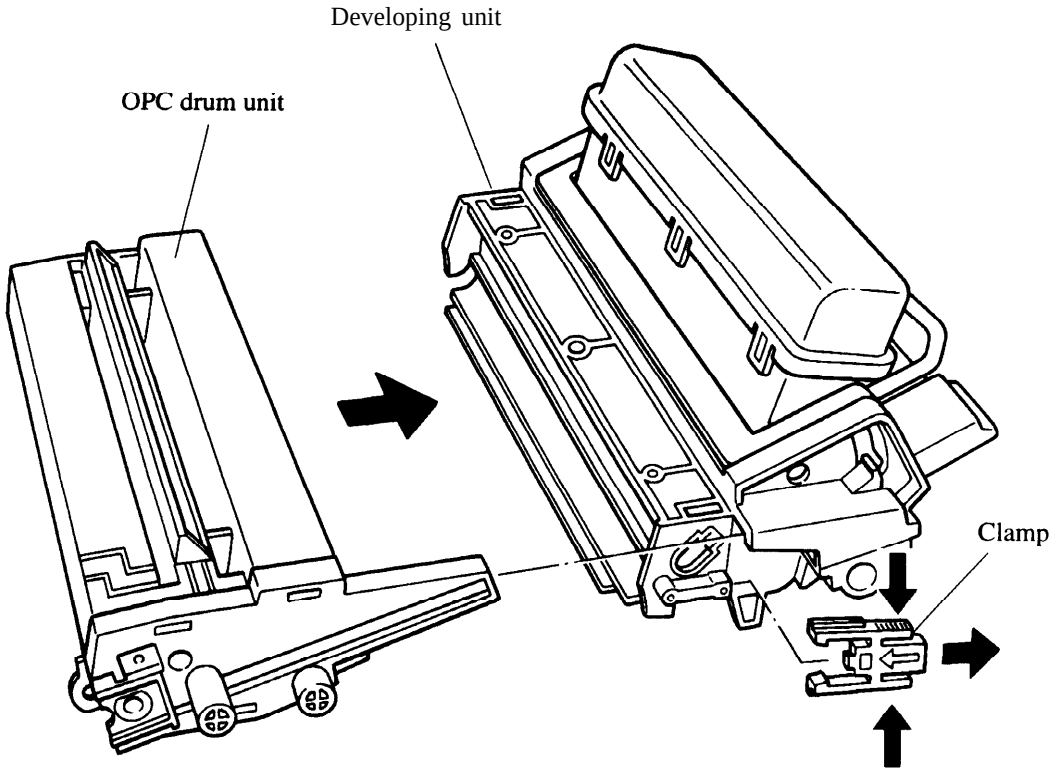
Reverse the removal procedure.

**(21) Print unit disassembly**

Disassembly

The print unit consists of two main parts, developing unit and OPC drum unit. They can be easily separated from each other.

Open the upper door and remove the print unit from the printer.
Remove the two clamps at both ends of the print unit.
Slide off the OPC drum unit along the grooves on the developing unit.

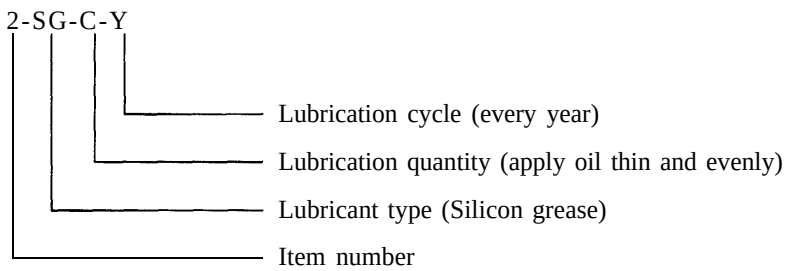



Assembly

Connect the OPC drum unit to the developer unit by reversing the procedures for removal.

### 4.9.2 Lubrication and Precautions

This section describes the lubrication procedures. The lubrication code is as follows:




Item number

Serial number of lubrication point on the diagram

Lubricant type

SG: Silicon grease Molycoat EM30L (Dow Yuning)
FG: Conductive grease FLOIL GE676 (Kant0 Kasei)
SSG: Silicon grease KF-96H- 10000CS (Shin-Etsu Silicon)
SSG: Silicon grease G501 (Shin-Etsu Silicon)
MG: Grease Mobile oil + Albania EP grease (1:1 mixing ratio)

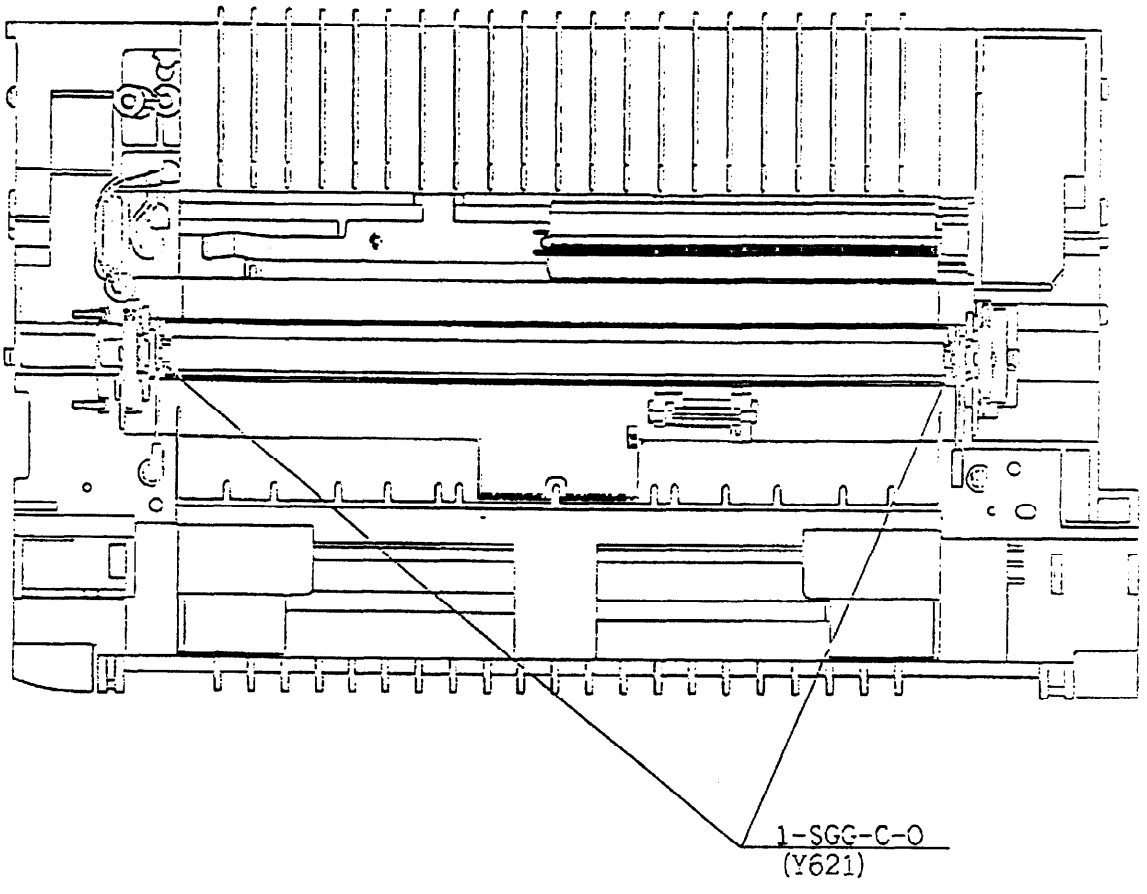
Lubricant quantity

D: One drop
S: Several drops
F: Fill wick, case, etc.
C: Apply oil thin and evenly
H: One spray

Lubrication cycle

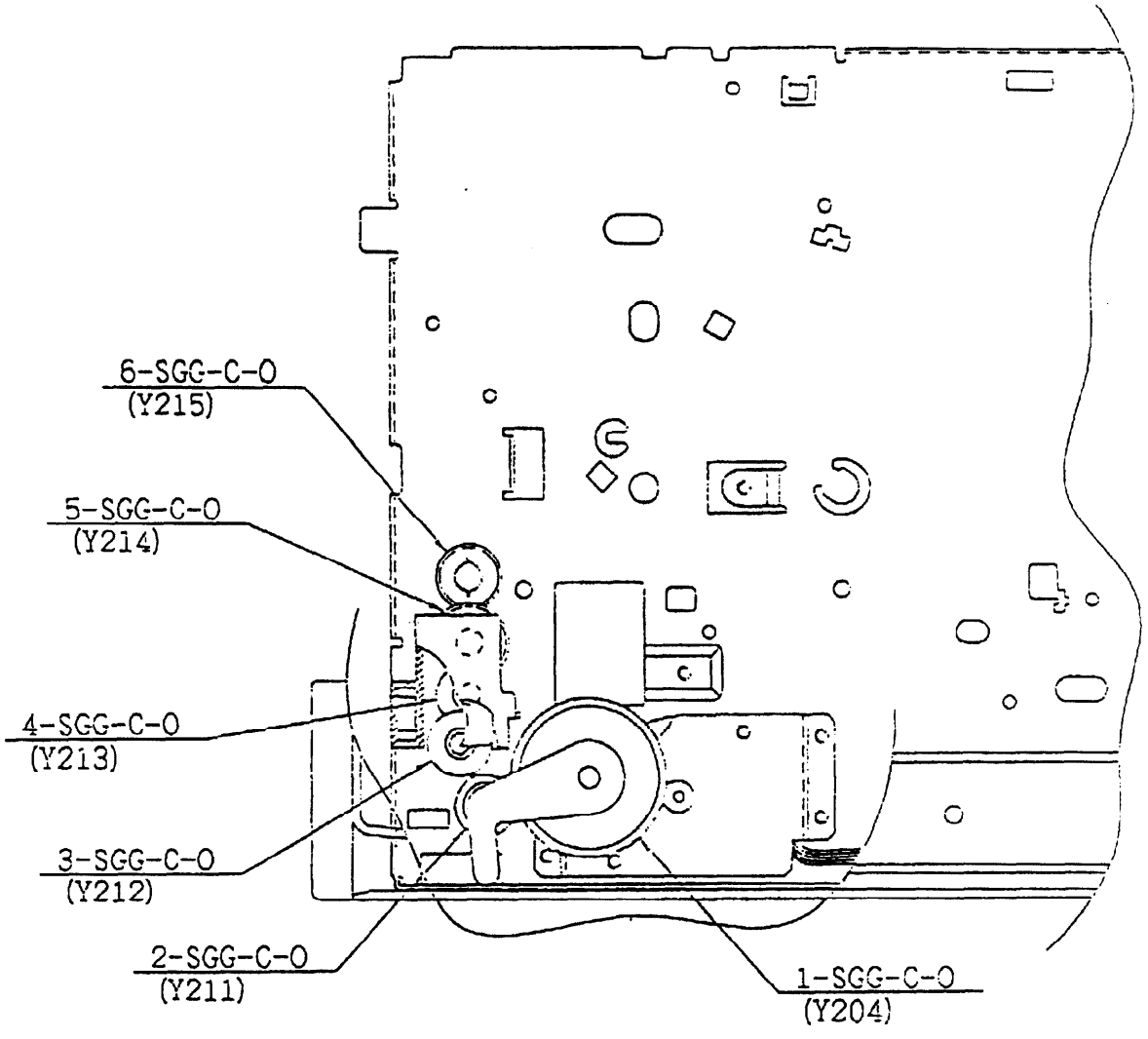
2: Every 2 months
4: Every 4 months
4: Every 6 months
8: Every 8 months
Y: Every year
0: At overhaul

**(1) Base frame assembly**



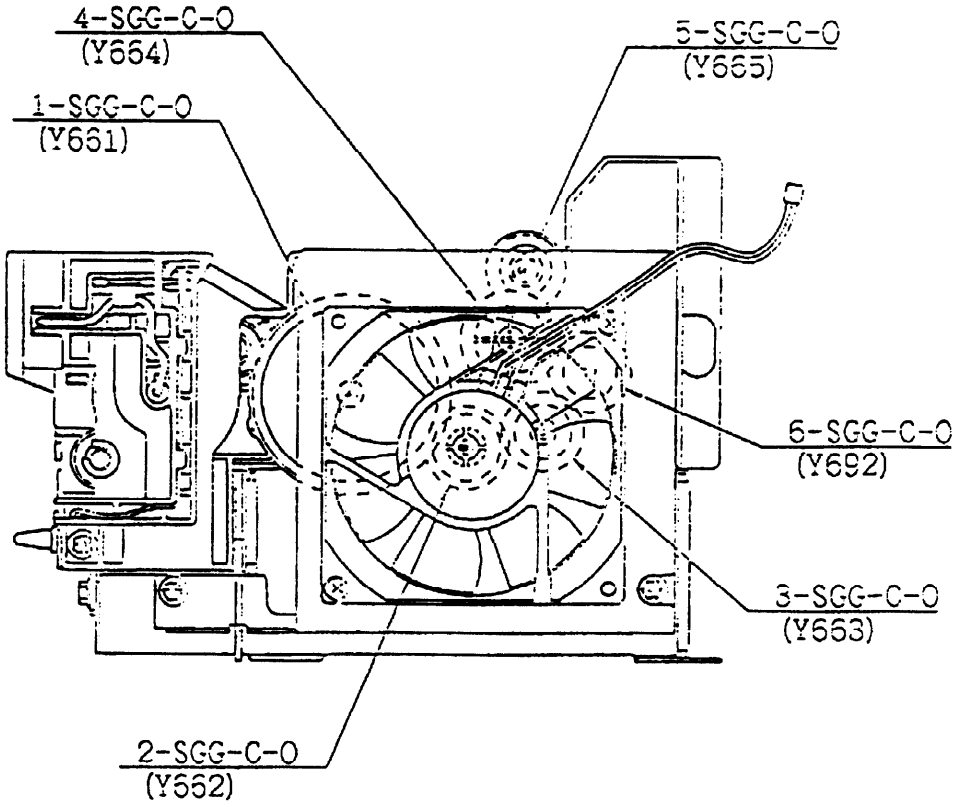

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | 0 | Y621 'bearing sections with 8 mm diameter of the paper feed roller | Apply both bearings. Do not apply to roller surface and bearing sections with 10 mm diameter. |
| | | | | | |

**(2) Frame L assembly**



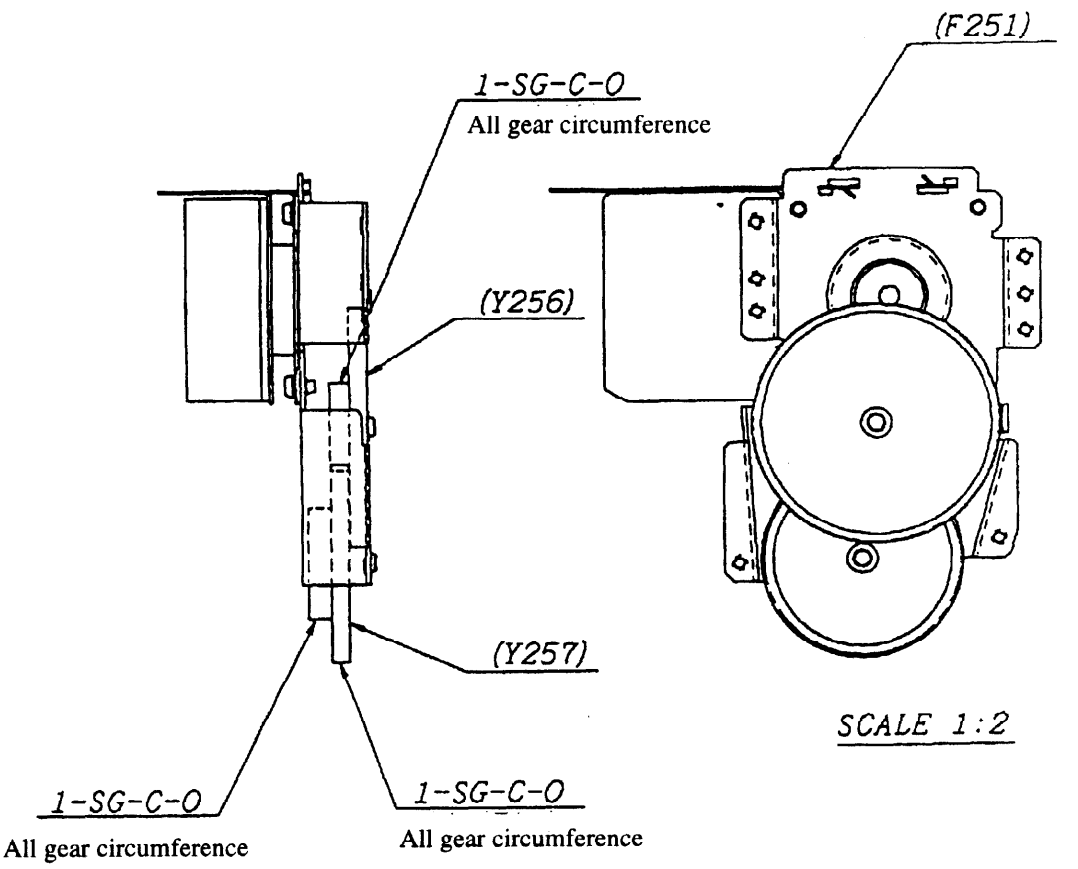

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y204 gear tooth surface and shaft | |
| 2 | SGG | C | O | - Y211 gear tooth surface and shaft | |
| 3 | SGG | C | O | - Y212 gear tooth surface and shaft | |
| 4 | SGG | C | O | - Y213 gear tooth surface and shaft | |
| 5 | SGG | C | O | - Y214 gear tooth surface and shaft | |
| 6 | SGG | C | O | - Y215 gear tooth surface and shaft | |

**(3) Fuser unit**



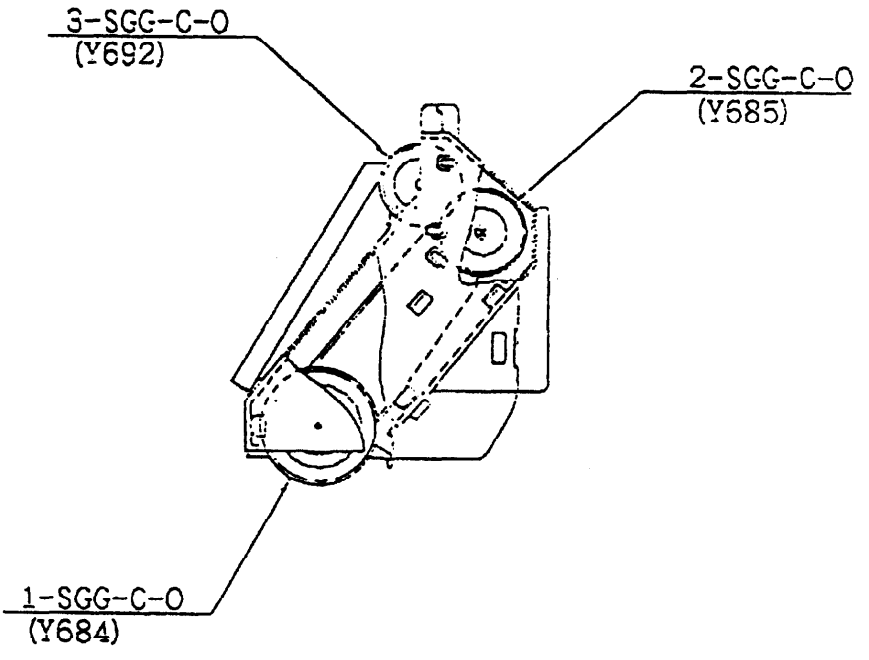

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y651 gear tooth surface and shaft | |
| 2 | SGG | C | O | - Y662 gear tooth surface and shaft | |
| 3 | SGG | C | O | - Y663 gear tooth surface and shaft | |
| 4 | SGG | C | O | - Y664 gear tooth surface and shaft | |
| 5 | SGG | C | O | - Y665 gear tooth surface and shaft | |
| 6 | SGG | C | O | - Y692 gear tooth surface and shaft | |

**(4) Main motor unit**



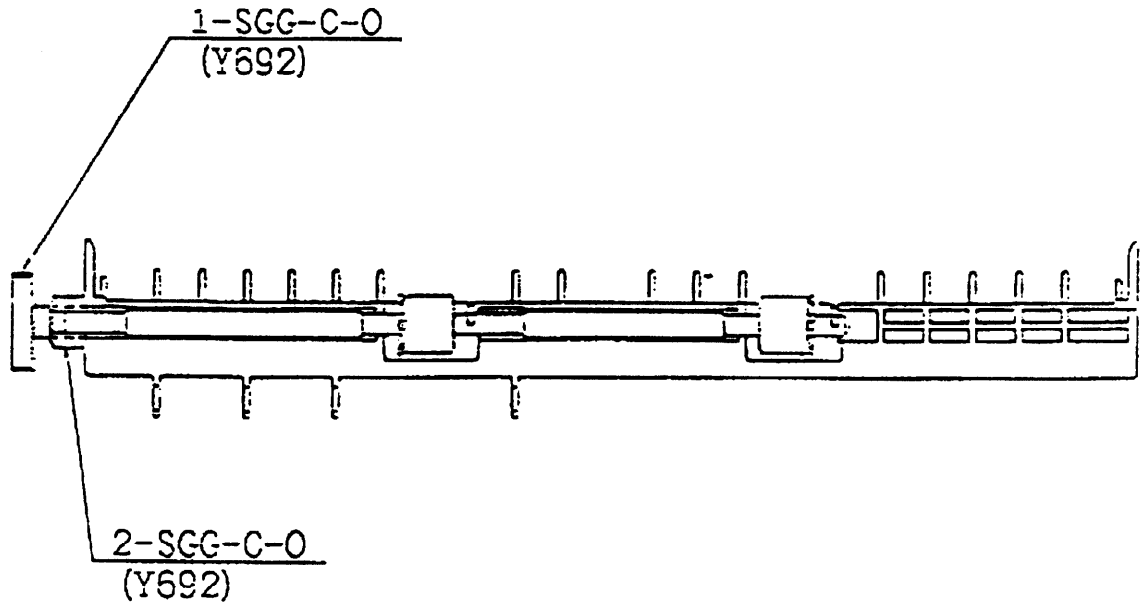

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SG | C | O | - Gear tooth surface and shaft (2) | |
| | | | | | |
| | | | | | |

**(5) Frame 2 assembly**



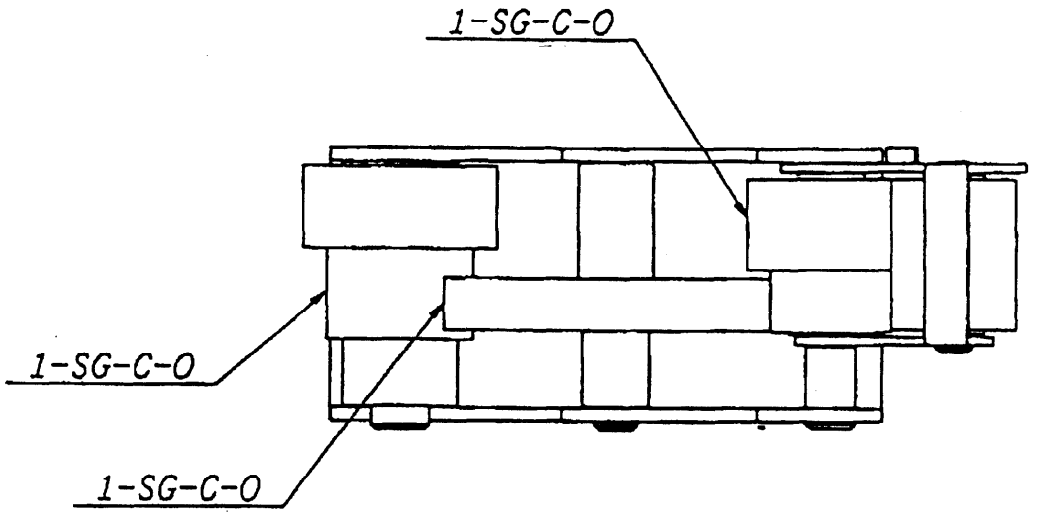

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y684 gear tooth surface and shaft | |
| 2 | SGG | C | O | - Y685 gear tooth surface and shaft | |
| 3 | SGG | C | O | - Y692 gear tooth surface and shaft | |
| | | | | | |
| | | | | | |

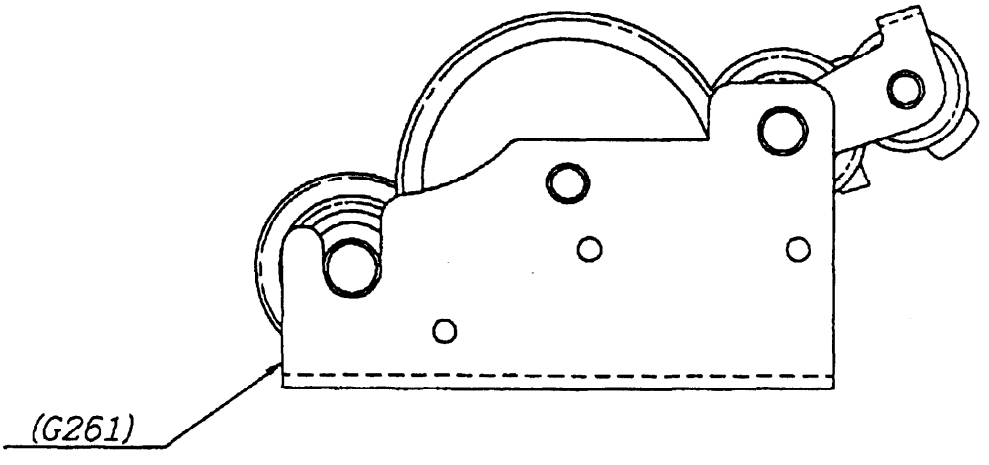
**(6) Guide assembly**




| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y692 gear tooth surface | |
| 2 | SGG | C | O | - Y692 shaft | |
| | | | | | |
| | | | | | |
| | | | | | |

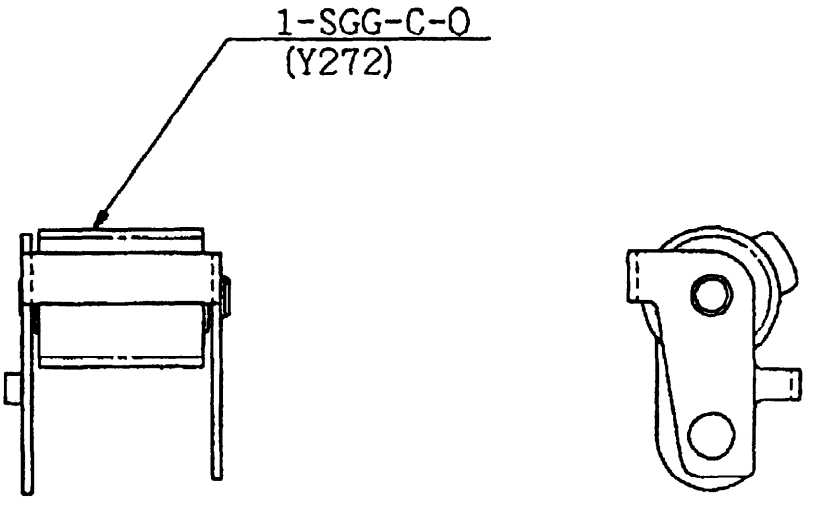
(7) **Gear box assembly**



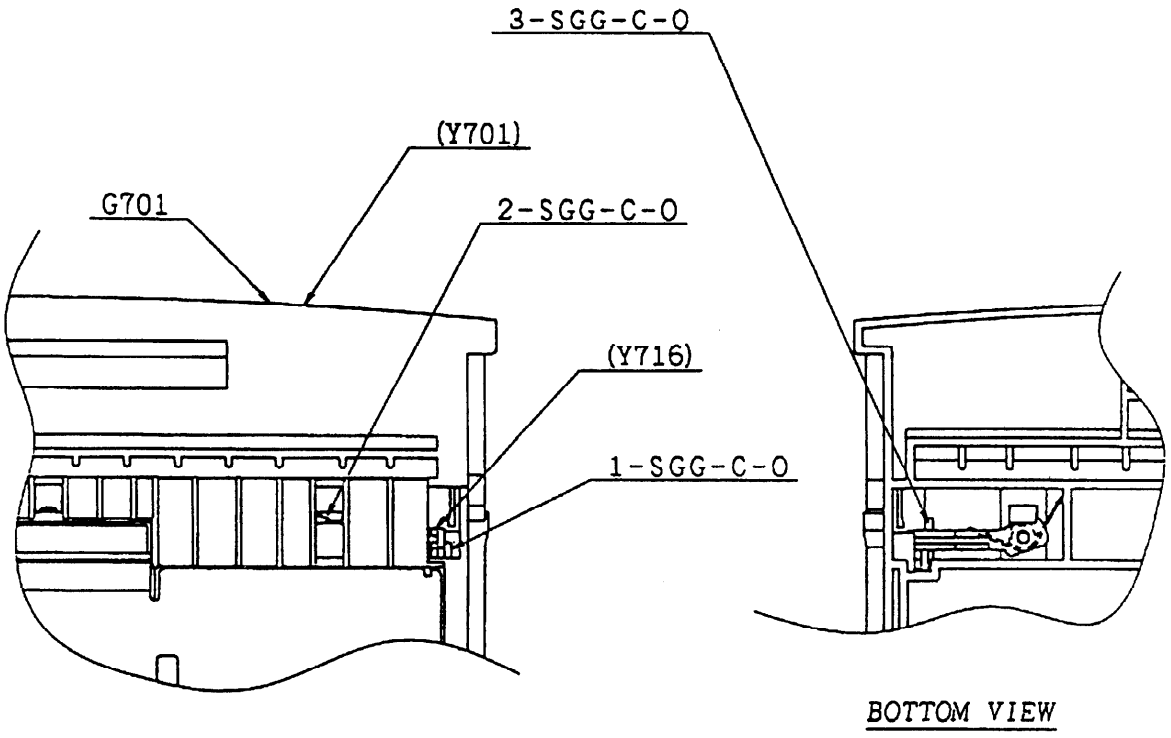

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SG | C | O | - Gear tooth surface and shaft (2) | |

**(8) Gear box lever assembly**



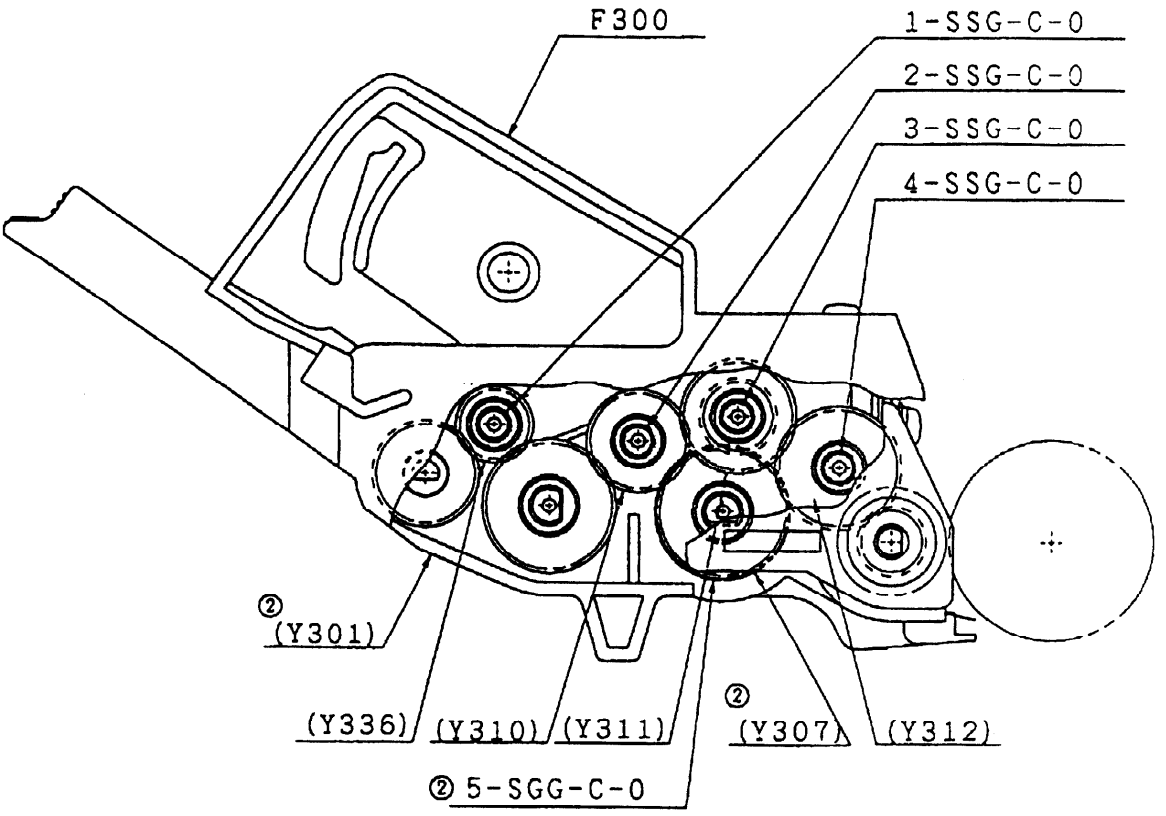

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y272 gear shaft | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**(9) Paper tray subassembly**

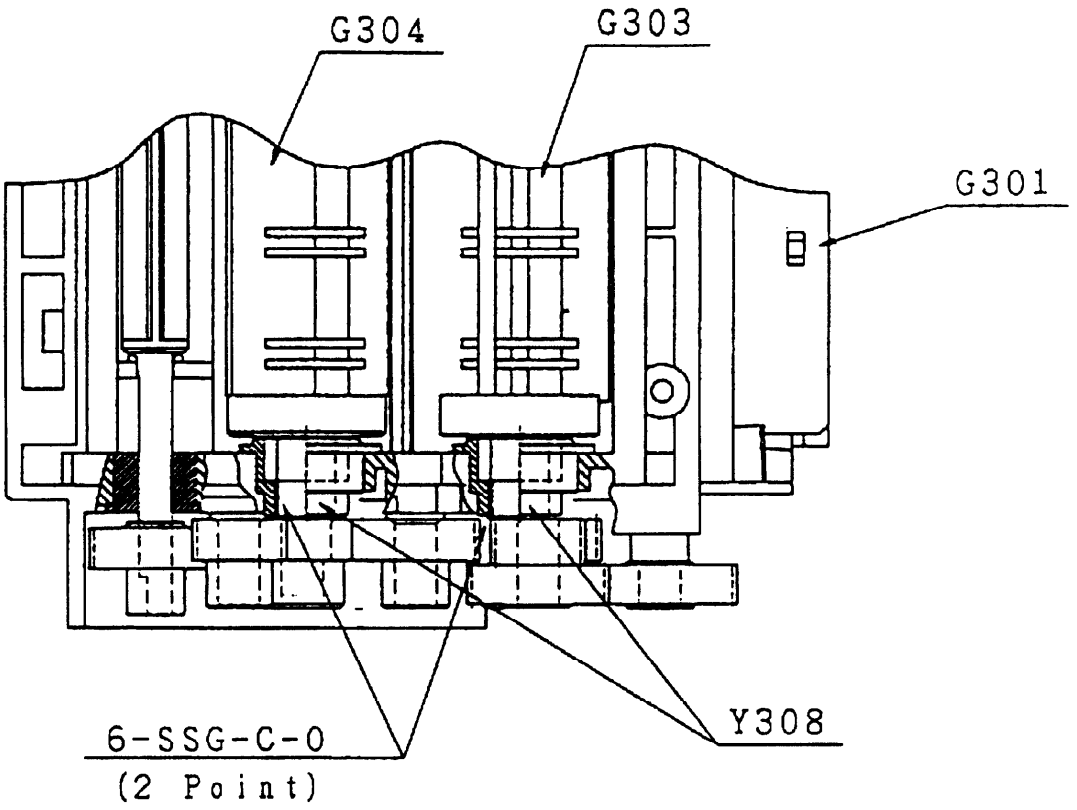



| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y701 and Y716 abrasion section | Both sides (Y717) |
| 2 | SGG | C | O | - Y701 and Y716 abrasion section | Both sides (Y717) |
| 3 | SGG | C | O | - Y701 and Y716 abrasion section | Both sides (Y717) |
| | | | | | |
| | | | | | |

**(10) Developing unit**

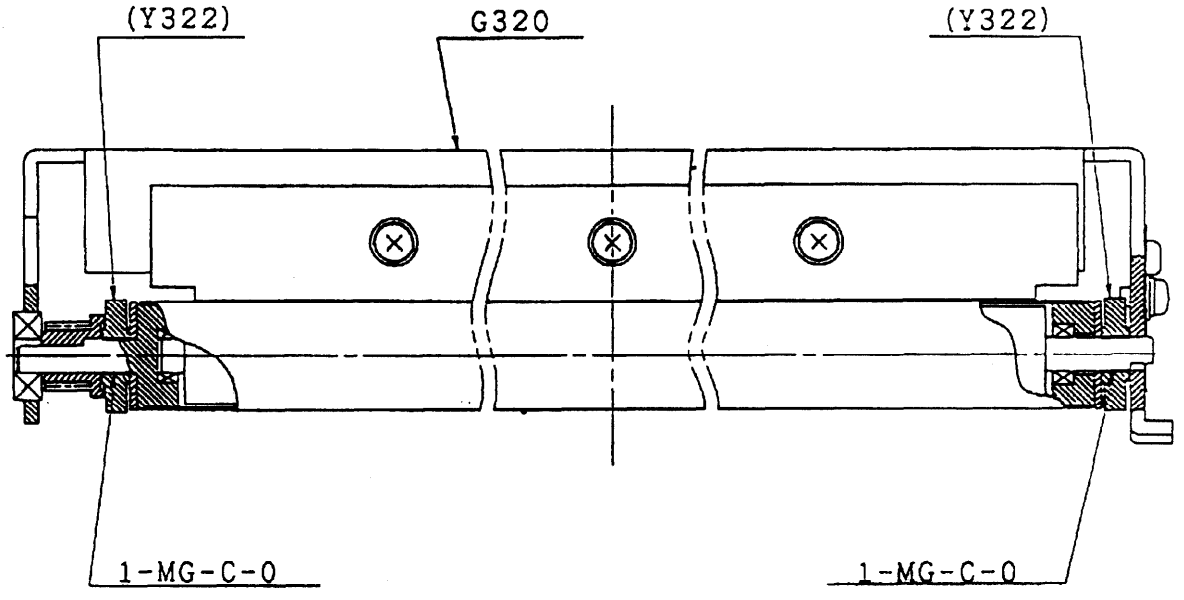



| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SSG | C | O | - Gear bore (Y336) | |
| 2 | SSG | C | O | - Gear bore (Y310) | |
| 3 | SSG | C | O | - Gear bore (Y311) | |
| 4 | SSG | C | O | - Gear bore (Y312) | |
| 5 | SGG | C | O | - Gear bore (Y307) | |



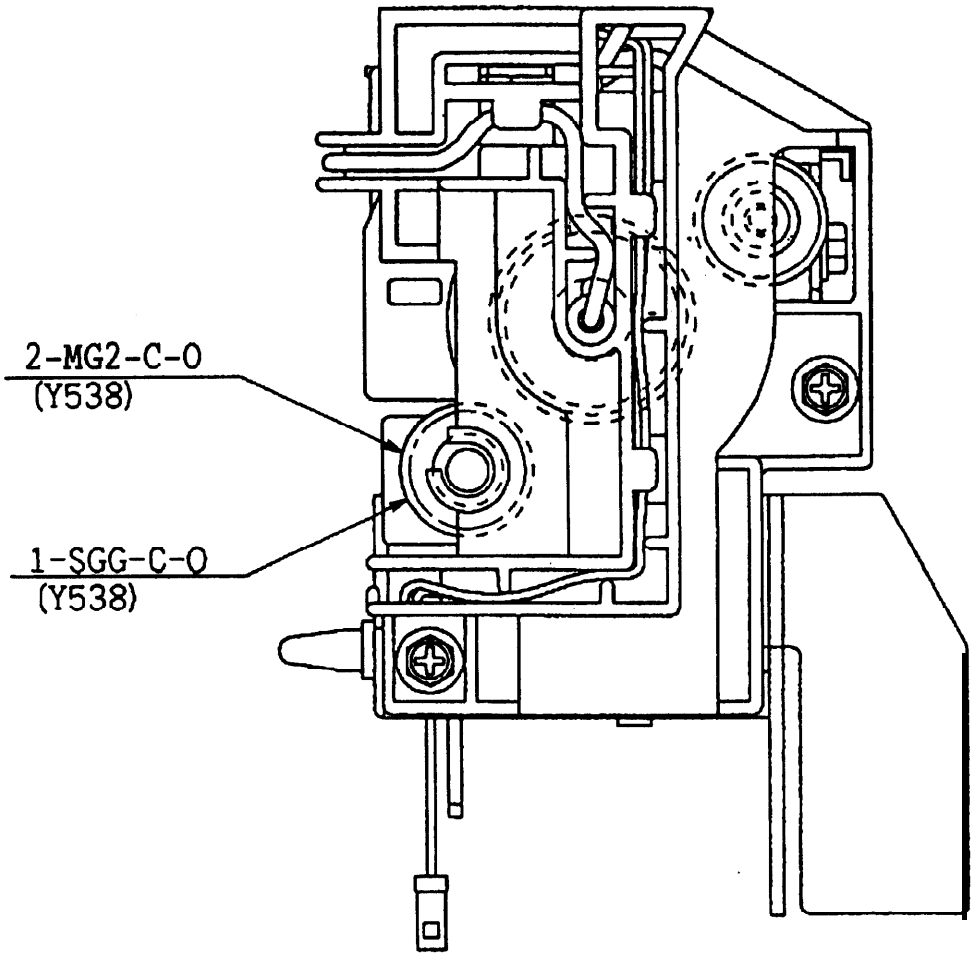

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 6 | SSG | C | O | - Bearing slide (Y308) | Two places |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**(11) Magnet roller bracket assembly**



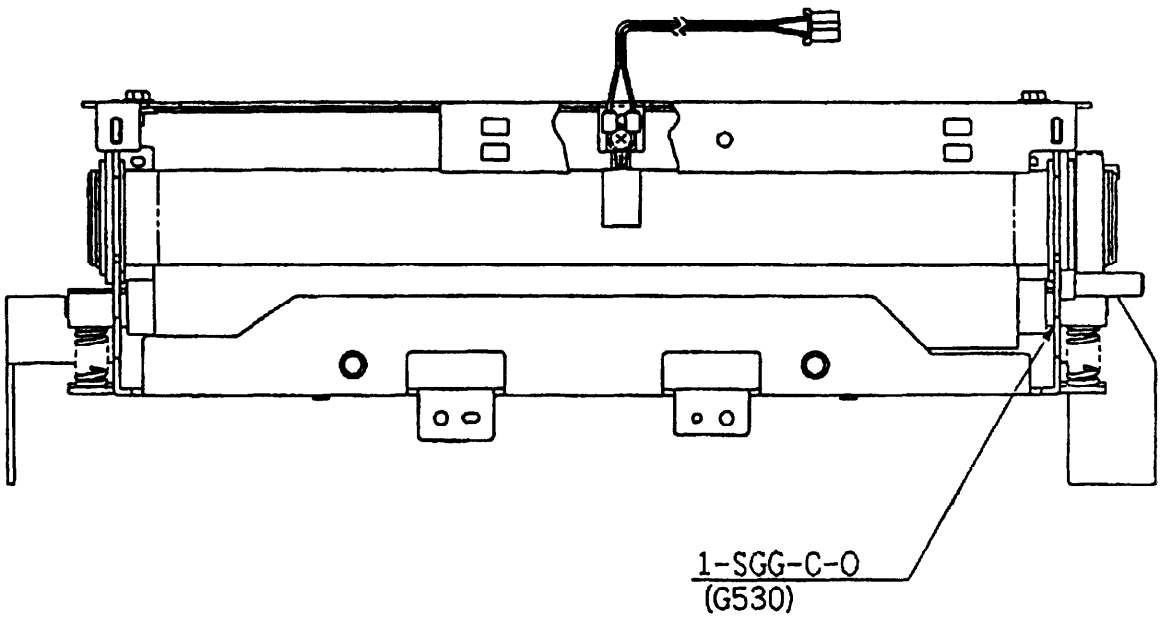

| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | MG | C | O | - Y322 bore | Two places |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**(12) Heat roller subunit**




| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - Y538 gear tooth surface | |
| 2 | MG2 | C | O | - Y538 gear shaft | |
| | | | | | |
| | | | | | |
| | | | | | |

**(13) Heat roller base unit**




| Item No. | Lubricant type | Lubricant quantity | Lubrication cycle | Part to be lubricated | Remarks |
|---|---|---|---|---|---|
| 1 | SGG | C | O | - G530 bearing (both sides) | Do not apply to the rubber roller. |
| | | | | | |
| | | | | | |

## 4.10 DIAGNOSTICS

### 4.10.1 Printing the Status Report

This function prints a page that summarizes printer option settings and lists samples of resident fonts. The option settings include information on interface parameters, available emulations, characteristics of the selected font, and firmware and font versions. See Figure 4-5. The status report includes a warning message when some of consumables reach their end of life.

The status report printing can be used in place of the test print mode (see Section 4.10.4). The method of operation and sample of results are shown below.

**Operation:**

Make sure that the message display indicates READY with the ONLINE and DATA indicators off.

Press the **SELF TEST** button for five or more seconds.

Themessagechangesto PCL PAGE CONFIG START.

If an optional FPS card is installed, press the + button or the - button to select a desired emulation.

The message changes between PCL PAGE CONFIG START and PCL PAGE CONFIG START.

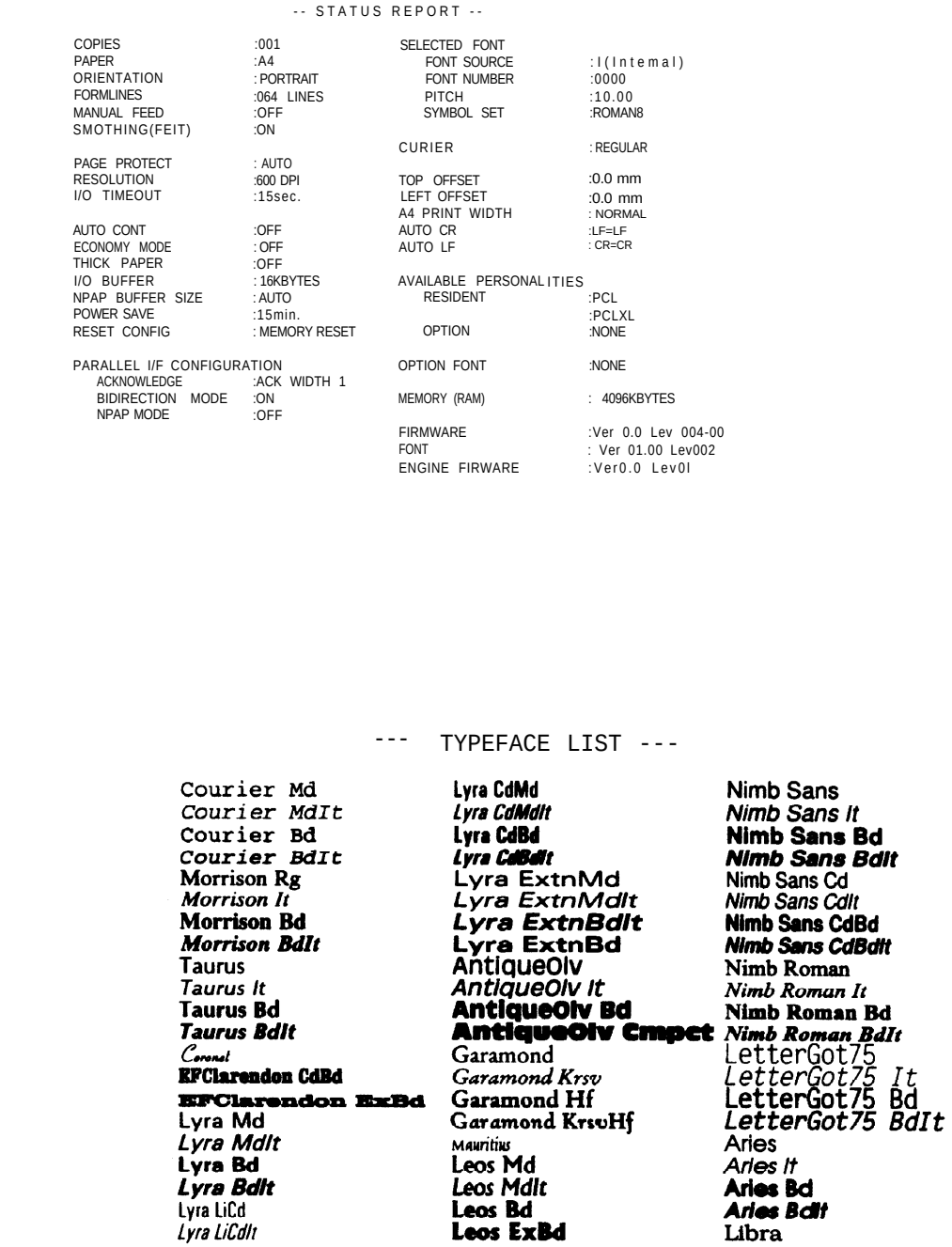
**Press** the **ENTER** button to start printing.

The message changes to SELF TEST with the DATA indicator flashing and the status report begins printing. After printing, the printer returns to the original state.

Status report printing can also be started by PPMENU. See the last section in this chapter.

Pressing the **PRINT FONT** button instead of the **SELF TEST** button starts printing the font report that lists all available fonts including ESC sequences to print fonts. See Figure 4-6.

Note:
The FPS font report does not include ESC sequences to print fonts.



-- STATUS REPORT --

| | | | |
|---|---|---|---|
| COPIES | :001 | SELECTED FONT | |
| PAPER | :A4 | FONT SOURCE | :I(Intemal) |
| ORIENTATION | :PORTRAIT | FONT NUMBER | :0000 |
| FORMLINES | :064 LINES | PITCH | :10.00 |
| MANUAL FEED | :OFF | SYMBOL SET | :ROMAN8 |
| SMOTHING(FEIT) | :ON | | |
| | | CURIER | :REGULAR |
| PAGE PROTECT | : AUTO | | |
| RESOLUTION | :600 DPI | TOP OFFSET | :0.0 mm |
| I/O TIMEOUT | :15sec. | LEFT OFFSET | :0.0 mm |
| | | A4 PRINT WIDTH | : NORMAL |
| AUTO CONT | :OFF | AUTO CR | :LF=LF |
| ECONOMY MODE | : OFF | AUTO LF | : CR=CR |
| THICK PAPER | :OFF | | |
| I/O BUFFER | : 16KBYTES | AVAILABLE PERSONALITIES | |
| NPAP BUFFER SIZE | : AUTO | RESIDENT | :PCL |
| POWER SAVE | :15min. | | :PCLXL |
| RESET CONFIG | : MEMORY RESET | OPTION | :NONE |
| PARALLEL I/F CONFIGURATION | | OPTION FONT | :NONE |
| ACKNOWLEDGE | :ACK WIDTH 1 | | |
| BIDIRECTION MODE | :ON | MEMORY (RAM) | : 4096KBYTES |
| NPAP MODE | :OFF | | |
| | | FIRMWARE | :Ver 0.0 Lev 004-00 |
| | | FONT | : Ver 01.00 Lev002 |
| | | ENGINE FIRWARE | :Ver0.0 Lev0I |

--- TYPEFACE LIST ---

| | | |
|---|---|---|
| Courier Md | Lyra CdMd | Nimb Sans |
| *Courier MdIt* | *Lyra CdMdIt* | *Nimb Sans It* |
| Courier Bd | Lyra CdBd | **Nimb Sans Bd** |
| ***Courier BdIt*** | ***Lyra CdBdIt*** | ***Nimb Sans BdIt*** |
| Morrison Rg | Lyra ExtnMd | Nimb Sans Cd |
| *Morrison It* | *Lyra ExtnMdIt* | *Nimb Sans CdIt* |
| **Morrison Bd** | ***Lyra ExtnBdIt*** | **Nimb Sans CdBd** |
| ***Morrison BdIt*** | Lyra ExtnBd | ***Nimb Sans CdBdIt*** |
| Taurus | AntiqueOlv | Nimb Roman |
| *Taurus It* | *AntiqueOlv It* | *Nimb Roman It* |
| **Taurus Bd** | **AntiqueOlv Bd** | **Nimb Roman Bd** |
| ***Taurus BdIt*** | **AntiqueOlv Cmpct** | ***Nimb Roman BdIt*** |
| *Coronet* | Garamond | LetterGot75 |
| **EFClarendon CdBd** | *Garamond Krsv* | *LetterGot75 It* |
| **EFClarendon ExBd** | Garamond Hf | LetterGot75 Bd |
| Lyra Md | Garamond KrsvHf | *LetterGot75 BdIt* |
| *Lyra MdIt* | Mauritius | Aries |
| **Lyra Bd** | Leos Md | *Aries It* |
| ***Lyra BdIt*** | *Leos MdIt* | **Aries Bd** |
| Lyra LiCd | **Leos Bd** | ***Aries BdIt*** |
| *Lyra LiCdIt* | **Leos ExBd** | Libra |

**Figure 4-5 Status Report**

| ). | F.ID | FONT NAME | POINT | PITCH | Esc Sequence | SAMPLE |
|---|---|---|---|---|---|---|
| RESIDENT FONTS | | | | | | |
| | )00 | Courier Md | scale | | <Esc>(_<Esc>(s0p_h0s0b4099T | ABCDE#$%&< ÀÇÑ¡âêØÆæ |
| | )01 | Courier MdIt | scale | | <Esc>(_<Esc>(s0p_h1s0b4099T | *ABCDE#$%&< ÀÇÑ¡âêØÆæ* |
| | )02 | Courier Bd | scale | | <Esc>(_<Esc>(s0p_h0s3b4099T | **ABCDE#$%&< ÀÇÑ¡âêØÆæ** |
| | )03 | Courier BdIt | scale | | <Esc>(_<Esc>(s0p_h1s3b4099T | ***ABCDE#$%&< ÀÇÑ¡âêØÆæ*** |
| | )04 | Morrison Rg | scale | | <Esc>(_<Esc>(s1p_v0s0b4101T | ABCDE#$%&< ÀÇÑ¡âêØÆ |
| | )05 | Morrison It | scale | | <Esc>(_<Esc>(s1p_v1s0b4101T | *ABCDE#$%&< ÀÇÑ¡âêØÆ* |
| | )06 | Morrison Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b4101T | **ABCDE#$%&< ÀÇÑ¡âêØÆ** |
| | )07 | Morrison BdIt | scale | | <Esc>(_<Esc>(s1p_v1s3b4101T | ***ABCDE#$%&< ÀÇÑ¡âêØÆ*** |
| | )08 | Taurus | scale | | <Esc>(_<Esc>(s1p_v0s0b4113T | ABCDE#$%&< ÀÇÑ¡âêØÆ |
| | )09 | Taurus It | scale | | <Esc>(_<Esc>(s1p_v1s0b4113T | *ABCDE#$%&< ÀÇÑ¡âêØÆ* |
| | )10 | Taurus Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b4113T | **ABCDE#$%&< ÀÇÑ¡âêØÆ** |
| | )11 | Taurus BdIt | scale | | <Esc>(_<Esc>(s1p_v1s3b4113T | ***ABCDE#$%&< ÀÇÑ¡âêØÆ*** |
| | )12 | Coronet | scale | | <Esc>(_<Esc>(s1p_v1s0b4116T | *ABCDE#$%&< ÀÇÑ¡âêØÆ* |
| | )13 | EFClarendon CdBd | scale | | <Esc>(_<Esc>(s1p_v4s3b4140T | **ABCDE#$%&< ÀÇÑ¡âêØÆæ** |
| | )14 | EFClarendon ExBd | scale | | <Esc>(_<Esc>(s1p_v24s3b4140T | **ABCDE#$%&< À** |
| | )15 | Lyra Md | scale | | <Esc>(_<Esc>(s1p_v0s0b4148T | ABCDE#$%&< ÀÇÑ¡âêØ |
| | )16 | Lyra MdIt | scale | | <Esc>(_<Esc>(s1p_v1s0b4148T | *ABCDE#$%&< ÀÇÑ¡âêØ* |
| | )17 | Lyra Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b4148T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )18 | Lyra BdIt | scale | | <Esc>(_<Esc>(s1p_v1s3b4148T | ***ABCDE#$%&< ÀÇÑ¡âêØ*** |
| | )19 | Lyra LiCd | scale | | <Esc>(_<Esc>(s1p_v4s-3b4148T | ABCDE#$%&< ÀÇÑ¡âêØÆæ |
| | )20 | Lyra LiCdIt | scale | | <Esc>(_<Esc>(s1p_v5s-3b4148T | *ABCDE#$%&< ÀÇÑ¡âêØÆæ* |
| | )21 | Lyra CdMd | scale | | <Esc>(_<Esc>(s1p_v4s0b4148T | **ABCDE#$%&< ÀÇÑ¡âêØÆæ** |
| | )22 | Lyra CdMdIt | scale | | <Esc>(_<Esc>(s1p_v5s0b4148T | ***ABCDE#$%&< ÀÇÑ¡âêØÆæ*** |
| | )23 | Lyra CdBd | scale | | <Esc>(_<Esc>(s1p_v4s3b4148T | **ABCDE#$%&< ÀÇÑ¡âêØÆæ** |
| | )24 | Lyra CdBdIt | scale | | <Esc>(_<Esc>(s1p_v5s3b4148T | ***ABCDE#$%&< ÀÇÑ¡âêØÆæ*** |
| | )25 | Lyra ExtnMd | scale | | <Esc>(_<Esc>(s1p_v24s0b4148T | ABCDE#$%&< ÀÇÑ¡ |
| | )26 | Lyra ExtnMdIt | scale | | <Esc>(_<Esc>(s1p_v25s0b4148T | *ABCDE#$%&< ÀÇÑ¡* |
| | )27 | Lyra ExtnBdIt | scale | | <Esc>(_<Esc>(s1p_v25s3b4148T | ***ABCDE#$%&< ÀÇÑ*** |
| | )28 | Lyra ExtnBd | scale | | <Esc>(_<Esc>(s1p_v24s3b4148T | **ABCDE#$%&< ÀÇÑ** |
| | )29 | AntiqueOlv | scale | | <Esc>(_<Esc>(s1p_v0s0b4168T | ABCDE#$%&< ÀÇÑ¡âêØ |
| | )30 | AntiqueOlv It | scale | | <Esc>(_<Esc>(s1p_v1s0b4168T | *ABCDE#$%&< ÀÇÑ¡âêØ* |
| | )31 | AntiqueOlv Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b4168T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )32 | AntiqueOlv Cmpct | scale | | <Esc>(_<Esc>(s1p_v24s5b4168T | **ABCDE#$%&< ÀÇÑ¡** |
| | )33 | Garamond | scale | | <Esc>(_<Esc>(s1p_v0s0b4197T | ABCDE#$%&< ÀÇÑ¡âêØÆ |
| | )34 | Garamond Krsv | scale | | <Esc>(_<Esc>(s1p_v1s0b4197T | *ABCDE#$%&< ÀÇÑ¡âêØÆ* |
| | )35 | Garamond Hf | scale | | <Esc>(_<Esc>(s1p_v0s3b4197T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )36 | Garamond KrsvHf | scale | | <Esc>(_<Esc>(s1p_v1s3b4197T | ***ABCDE#$%&< ÀÇÑ¡âêØÆ*** |
| | )37 | Mauritius | scale | | <Esc>(_<Esc>(s1p_v0s0b4297T | ABCDE#$%&< ÀÇÑ¡âêØÆæ |
| | )38 | Leos Md | scale | | <Esc>(_<Esc>(s1p_v0s1b4362T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )39 | Leos MdIt | scale | | <Esc>(_<Esc>(s1p_v1s1b4362T | ***ABCDE#$%&< ÀÇÑ¡âêØÆ*** |
| | )40 | Leos Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b4362T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )41 | Leos ExBd | scale | | <Esc>(_<Esc>(s1p_v0s4b4362T | **ABCDE#$%&< ÀÇÑ¡âêØ** |
| | )42 | Nimb Sans | scale | | <Esc>(_<Esc>(s1p_v0s0b16602T | ABCDE#$%&< ÀÇÑ¡âêØÆ |
| | )43 | Nimb Sans It | scale | | <Esc>(_<Esc>(s1p_v1s0b16602T | *ABCDE#$%&< ÀÇÑ¡âêØÆ* |
| | )44 | Nimb Sans Bd | scale | | <Esc>(_<Esc>(s1p_v0s3b16602T | **ABCDE#$%&< ÀÇÑ¡âêØÆ** |
| | )45 | Nimb Sans BdIt | scale | | <Esc>(_<Esc>(s1p_v1s3b16602T | ***ABCDE#$%&< ÀÇÑ¡âêØÆ*** |
| | )46 | Nimb Sans Cd | scale | | <Esc>(_<Esc>(s1p_v4s0b16602T | ABCDE#$%&< ÀÇÑ¡âêØÆæ |

**Figure 4-6 Font Report (First Page)**

## 4.10.2 MarkVision, Printer Management Utility Program by Lexmark

MarkVision by Lexmark is an integrated software for managing printers, stored in the CD-ROM labelled "PrintPartner Software Disc" which is packaged in the printer, It has the following main functions:

- Monitoring the printer
- Displaying the printer status and features (including options) and statistics
- Providing the printer control panel on the computer's screen (remote control panel)

These functions are most effective and valuable for remote printers in network environments.

MarkVision is automatically activated when an abnormal condition occurs in the printer. It operates in Windows 95 environments only.

The remote control panel is quite a nice function that enables the user to easily and remotely operate the printer even if the printer is set up remotely. MarkVision displays the printer control panel on the computer's screen and gives the user the exactly same functions as available with the control panel of the printer. The user can perform a function by clicking a button on the computer's screen without pushing a button of the printer's control panel.

(1) Installing MarkVision

To use MarkVision, your computer and its operating environments must be as follows:

- IBM PC/AT or compatible or PS/2
- Microsoft Windows 95 (not Windows 3.U3.11)
- VGA (640 x 400) or higher display
- Hard disk drive installed (9 MB essential for MarkVision)
- Compact disk-ROM drive

MarkVision is supplied with a "Software CD-ROM".

To install MarkVision files and start MarkVision, follow these steps:

Insert the "Software CD-ROM" in the CD-ROM drive (for example, drive D).

On the Start menu, click **Run.**

Type **D:/Markvis/win95/EnglishVSetup.exe,** then press **ENTER.**

Follow the instructions on the screen. If you want to install the printer driver, click the Custom box from the Printer Installation dialog.

The following screen is displayed if the printer has no error.

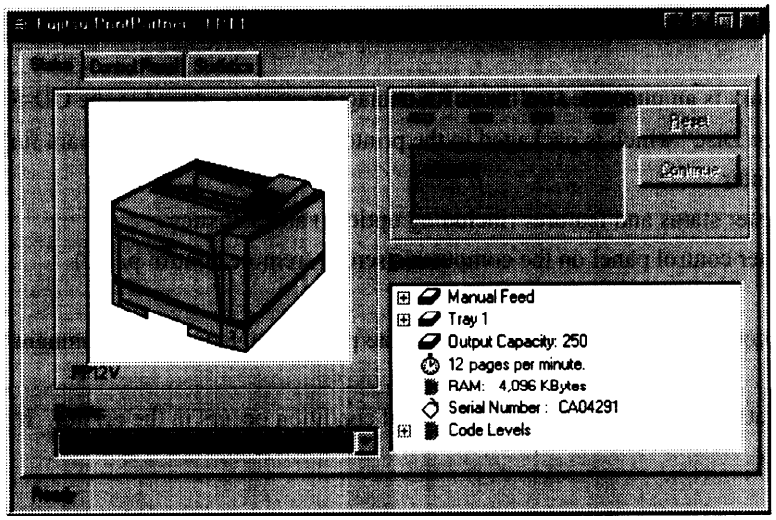



**Figure 4-7 MarkVision Main Screen (Initial Status)**

The top menu bar offers three functions. The screen displays information and a graphic of the printer corresponding to the function selected. The bottom line displays printer status.

Help is available from each screen. Highlight the item you want to know more about; then press the Fl key on the computer keyboard. Press the ESC key on the keyboard to exit the online Help.

(2) Menu bar functions

The three functions of the top menu bar are as follows:

status:

Shows a printer status message which is identical to the message appearing on the printer control panel. The status is also indicated graphically. You can determine what the printer is doing and what the printer needs to complete the task. It also includes information about the printer's features including options which are installed on the printer.

With an optional setting, the MarkVision icon flashes to let you know there is a problem with the printer even if the icon is minimized on the monitor.

**Control panel:**

Allows you to remotely operate your printer. It displays an exact replica the physical control panel on the printer, on the monitor. Click the appropriate button on the screen by the mouse as if you are pressing the real button on the printer control panel by a finger. Both panels have exactly the same functions.

**Statistics:**

Summarizes details about jobs such as the total number of jobs printed, total pages, and average print time.

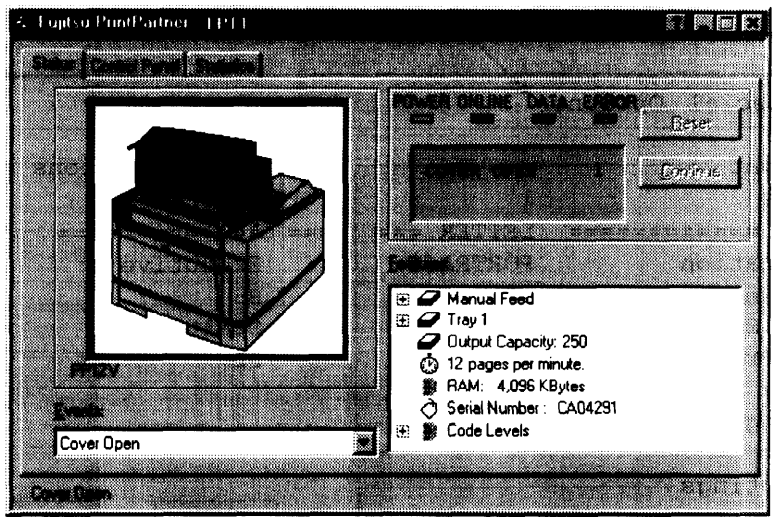



**Figure 4-8 MarkVision Status Screen (Cover Open)**

### 4.10.3 PPMENU Program

PPMENU is a software utility for setting the printer's features such as printer control languages (emulations), page margins, font characteristics, and interface parameters. All of the items that PPMENU can perform can also be done using the front control panel and LCD display (see Chapter 3 of the User's Manual). PPMENU has many other functions for printer maintenance. For example, use it for the following:

- Clearing a consumable replacement prompting message after replacing the consumable
- Collecting detailed information on printer status

PPMENU first displays the opening screen then the main menu where you can set parameters or perform a function by using pull-down menus on the menu bar accessed through your mouse or keyboard.

(1) Installing PPMENU

To start PPMENU which is installed in the hard disk (for example, drive C):

Type **PPMENU3** after the DOS prompt **C:** then press **ENTER.**

The following main menu is displayed if the printer has no error after the opening screen is displayed.

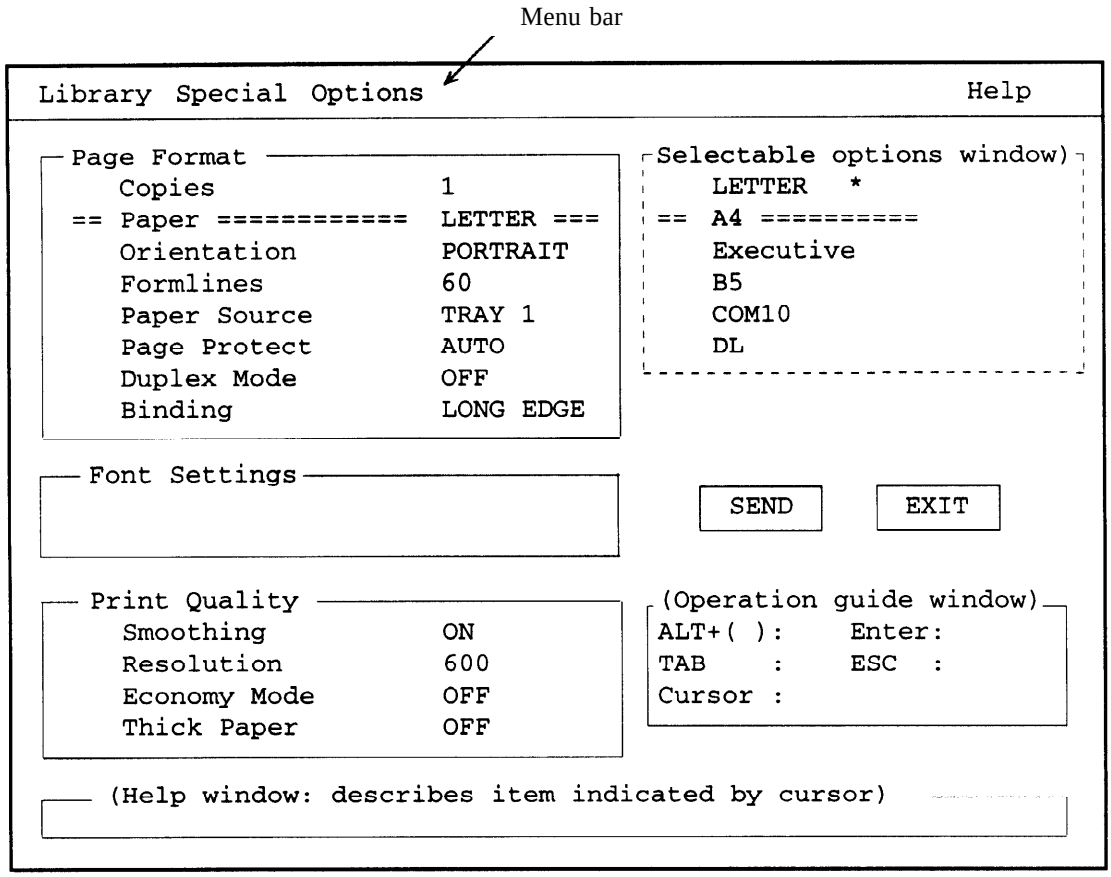



**Figure 4-9 PPMENU Main Menu (Concept)**

(2) Menu functions and items

The top menu bar offers the following functions and items:

**Library**

| | |
|---|---|
| ***Read user settings*** | Loads previously saved settings from a user settings file to the main menu. |
| ***Read default settings*** | Loads the factory default settings to the main menu. |
| ***Save current settings*** | Saves the current settings in the main menu as a user settings file under the file **name** indicated at the bottom of the screen. Note that you cannot change the factory default settings file. |
| ***Upload*** | Reads information (printer language settings) from the printer. |
| Send | Sends the current settings in the main menu to the printer. |
| ***Exit*** | Terminates the PPMENU program. |

**Special**

| | |
|---|---|
| ***Personality settings*** | Selects a printer language the printer shall use. The language selected must be the same as that selected in the application software. Auto sensing mode is also provided. |
| ***Print report*** | Starts selftest report or font list report printing. |
| ***Clear warning*** | Clears a message requesting replacement of the print unit. Be sure to execute this function after actual replacement. |

| | |
|---|---|
| ***FPS related settings*** | Selects settings for recovering paper jams and reporting FPS errors. |
| ***Auto continue*** | Selects settings for clearing recoverable interface errors. |
| ***PCL menu*** | Selects settings for PCL menu options. |
| ***Power save*** | Selects settings for the power saving function. |

**Option**

| | |
|---|---|
| ***Interface settings*** | Selects parameters on the interface. Parameters are I/O time-out and baud rate. |
| ***Interface port select*** | Selects an interface port to be used for the parallel or serial interface. |

**Help**

| | |
|---|---|
| ***General information*** | Describes the contents of the PPMENU program. |
| ***Keyboard layout*** | Explains how to use the keyboard. |
| ***Help index*** | Shows the list of help windows. |
| ***How to use the mouse*** | Describes functions of the mouse cursor and the left and right mouse buttons. |
| ***About*** | Shows the copyright, trademark, revision, and revision date. |

The main menu offers the following menus and items. Note that the functions and items are when the printer personality is set to PCL, HP LaserJet 5 emulation. The points are the same for other emulations.

**Page Format**

| | |
|---|---|
| ***Copies*** | Sets the number of copies the printer shall print from each page. Range is 1 to 999. |
| ***Paper*** | Sets a paper size to be used by the printer. |
| ***Orientation*** | Sets a printing direction, portrait or landscape. |
| ***Form lines*** | Sets the number of lines printer per page. Range is 5 to 128. |
| ***Paper source*** | Specifies the place where paper is fed from. |
| ***Page protect*** | Specifies whether the page protect is applied. |
| ***Duplex mode*** | Specifies which side (face or back) of paper the data is to be printed on. (This function is not available with this printer.) |
| ***Binding*** | Specifies which edge (long or short edge) of paper the pages are to be fastened along. (This function is not available with this printer.) |

**Font Settings**

| | |
|---|---|
| ***Typeface*** | Selects a desired font name. |
| ***Symbol set*** | Selects a desired symbol set name. |
| ***Pitch or point size*** | Selects a character pitch (width) or character point size (height). Either item is displayed depending on the selected typeface. Range of pitch is 0.44 to 99.99 in 0.01 increments. Range of point size is 4.00 to 999.75 in 0.25 increments. |
| ***Courier style*** | Sets the thickness of Courier fonts. |

**Print Quality**

| | |
|---|---|
| ***Smoothing*** | Specifies whether the edge smoothness improving technology is applied. |
| ***Resolution*** | Selects a resolution, 300 or 600 dots per inch. |
| ***Economy mode*** | Selects a toner-saving function. |
| ***Thick paper*** | Select this mode when using thick paper. Note that this mode must be off whenever you are using paper of ordinary thickness. |

PPMENU initially shows the factory defaults of each item in the main menu and the pull-down menus of the top menu bar. Table 4-4 shows the factory defaults and other options. The first three blocks are for the main menu when the PCL emulation is selected as printer personality and the others are for the pull-down menus.

## Table 4-4 PPMENU Factory Defaults When Emulation is PCL

| Feature | Default | Other options or range |
|---|---|---|
| Copies | 1 | 1 to 999 pages |
| Paper | Letter (*1) | A4, Legal, Executive, and so on |
| Orientation | Portrait | Landscape |
| Form lines | 60 (*2) | 5 to 128 lines |
| Paper source | Tray 1 | Manual feed, Tray 2, MFF, AUTO (tray 1 not used), AUTO (tray 2 not used), AUTO (MFF not used), AUTO (All select) (*3) |
| Page protect | Auto | On |
| Duplex mode (*4) | Off | On |
| Binding (*4) | Long edge | Short edge |
| Typeface name | Courier Md | Morriso Rg, Taurus, and so on |
| Font source (*5) | Internal | Soft font, SIMM font |
| Pitch | 10.00 | 0.44 to 99.99 cpi |
| Point size | 12.00 | 4.00 to 999.75 point |
| Symbol set (*6) | Roman8 | PC-8, ISO6, ISO11, and so on |
| Courier style | Regular | Dark |
| Smoothing (*7) | 1200 dpi class<br>On | Off (Resolution is 600 dpi)<br>Off (Resolution is 300 dpi) |
| Resolution | 600 | 300 dpi |
| Economy mode | Off | On |
| Thick paper | Off | On |
| Personality (*8) | Auto | PCL, FPS |
| Jam recovery (*9) | Off | On |
| FPS error report (*9) | Off | On |
| Auto continue | Off | On |
| I/O timeout (*10) | 15 | 15 to 300 seconds |
| Baud rate (*11) | 9600 | 1200, 2400, 4800, 19200 baud |
| Parallel interface | LPT1 | LPT2, LPT3 |
| Serial interface | COM1 | COM2 |
| Top offset (*12) | 0.0 | -25.0 to +25.0 mm (0.1 mm steps) |
| Left offset (*12) | 0.0 | -25.0 to +25.0 mm (0.1 mm steps) |
| A4 print width (*12) | Normal | 80 columns/line |
| Auto attach FF (*12) | No | Yes |
| Auto CR (*12) | LF | LF+CR |
| Auto LF (*12) | CR | CR+LF |
| Power save | After 15 minutes | Off, After 30 minutes, After 60 minutes, After 120 minutes |

*1 Letter for USA and A4 for Europe

*2 This is for letter and portrait. It automatically changes depending on paper size and page orientation.

*3 Tray 2 is displayed when the optional paper feeder is installed. MFF is displayed when the optional multi-function feeder (MFF) is installed. AUTO (priority: Tray), AUTO (priority: MFF), AUTO (No MFF) are displayed collectively as AUTO when above options are not installed.

*4 Duplex mode and binding are invalid for this printer.

*5 Font source is subordinate to the typeface and cannot be selected.

*6 The screen format changes depending on font information (except for resident fonts) and compatible mode setting.emulation card) is installed.

*7 FEIT is the acronym for Fujitsu Enhanced Image Technology that makes the contours of objects appear smoother than with this printer's resolution normally possible.
*8 The screen format changes depending on personality setting.
*9 Jam recovery and PS error report are valid when the optional FPS card (PostScript level 2 compatible emulation card) is installed.
*10 This is essential for sharing the printer among multiple computers.
*11 This is for the RS-232C serial interface.
*12 Effective when PCL is selected for the personality. These values are used as defaults of top and left offset specifications in PCL mode.

### 4.10.4 Special Functions for Maintenance

The PrintPartner 12V provides special functions which are started by holding the + and - buttons pressed when the power is turned on.

These functions are specially provided for service technicians only and useful for checking printer performance and changing printer internal settings during maintenance.

(1) Maintenance modes

Eleven functions are provided (see Table 4-S). The first four functions are for checking printer performance and the remainder are for changing printer internal settings. The mode is indicated by the TEST PRINT message on the control panel after normal power-on initialization.

**Table 4-5 Special Maintenance Modes**

| Mode | LCD message | Function | Remarks |
|---|---|---|---|
| 1 | TEST PRINT | Start continuous self-test printing | |
| 2 | EEPROM CLEAR | Clear EEPROM for controller | |
| 2-1 | EEPROM CLEAR Extension | Clear particular area of EEPROM for controller | factory use only |
| 3 | EEPROM CLEAR (MECHA CONT. 1) | Clèar EEPROM for engine 1 | factory use only |
| 4 | EEPROM CLEAR (MECHA CONT. 2) | Clear EEPROM for engine 2 | factory use only |
| 5 | TOP ADJUST (TRAY) PARA = XX | Adjust top edge of print area of paper fed from paper tray | factory use only |
| 6 | TOP ADJUST (MANU) PARA = XX | Adjust top edge of print area of paper fed from manual feed slot | factory use only |
| 7 | RESIST ADJUST PARA = XX | Adjust resist motor speed | factory use only |
| 8 | LEFT ADJUST FACE PARA = XX | Adjust left edge of print area of paper face | factory use only |
| 9 | LEFT ADJUST BACK PARA = XX | Adjust left edge of print area of paper back | factory use only |
| 10 | ENGINE MODE PARA = XX | Send engine command and display return value from Mecha Controller | factory use only |
| 11 | ENGINE MAINTE. | Start maintenance mode | factory use only |

Note:
When executing an EEPROM clear mode, the PrintPartner 12V determines the default paper size depending on the paper tray installed.

How to execute a maintenance mode

Press and hold the + and - buttons while turning the printer on.

Note:
Be sure to keep holding the + and - buttons until the TEST PRINT message appears. It takes about one minute (depending on warm-up time).

Release the + and - buttons when the message display shows TEST PRINT after <<<INITIALIZE>>> and WARMING UP.

TEST PRINT is the first function in maintenance mode and indicates that the printer enters maintenance mode.

To select another function, press the **MENU** button. Each time you press the **MENU** button, the message display shows the next function.

Note:
To select EEPROM CLEAR Extension, press the +or-button when EEPROM CLEAR is shown.

To change a parameter, press the + or - button. Some functions involve a parameter which is shown as PARA = XX in the bottom line of the message. Each time you press the + or - button, the value XX increases or decreases.

To execute a function, press the **ENTER** button when the desired function is shown.

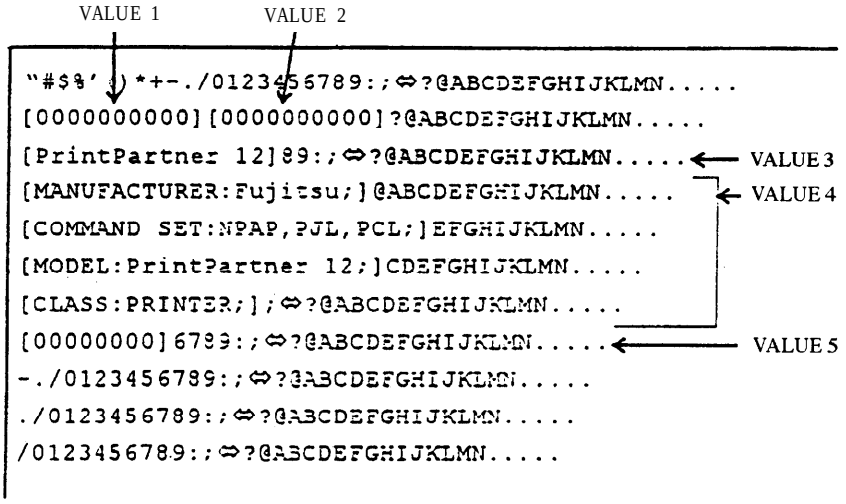
Notes:

To stop or quit the maintenance mode, turn power off.

Never execute function modes 2-l to 11 that are for factory use only. The user's setup data or mechanism-dependent adjustments will be lost.

**(3) Information printed in test print mode**

The first page of the test print in maintenance mode contains the following information in the second to eighth lines of text before a continuous print of ASCII text.




- **VALUE 1: Total number of printed pages**

  Maximum = 16,777,216 (The maximum value returns to zero.)

- **VALUE 2: Total time of rotation of the print unit's drum.** This value is 1/5120 of the actual time (second).

  Maximum = 63 (The maximum value remains unchanged.)
  = **322,560** seconds

- **[VALUE 3: Printer name (used by PJL command)**

  PrintPartner 12 ===> PrintPartner 12V (PP12V)

- **[VALUE 4: Device ID for bi-directional Centronics**

| | Device I D |
|---|---|
| PP12V | [MANUFACTURER:Fujitsu;]<br>[COMMAND SET:NPAP,PJL,PCL;]<br>[MODEL:PrintPartner 12;]<br>[CLASS:PRINTER;] |

- **[VALUE 5: Serial number of printer**

**(4) EEPROM CLEAR and EEPROM CLEAR Extention**

When EEPROM CLEAR is executed, the printer settings return to the factory default valves.
When the EEPROM CLEAR Extention is executed, the serial number of the printer is also cleared.

(5) Re-entry of the serial number of printer

If EEPROM Clear Extention is executed, the serial number of the printer must be re-entered. To do so, turn on the printer; the printer displays a message prompting to enter the serial number of the printer. Enter it as follows:

Turn on the printer.
After initialization of the printer, the printer displays the following message for a second and

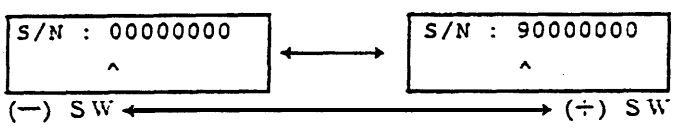
```
Enter Serial No.
```

then enters the serial number enter mode where the following message is displayed.

```
S/N : 00000000
      ^
```

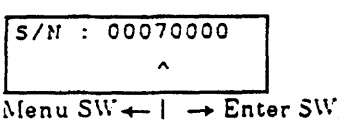
indicates the digit where you can change the value.

Enter the printer serial number of lower 8 digits except the leading alphabets.

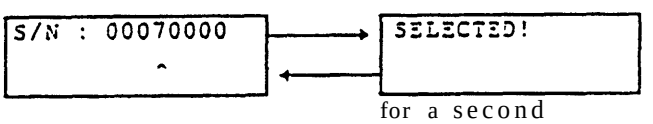



Use the + or - button to change the digit indicated by " "

Press the ENTER button when the digit is decided; " " moves to right. If you press the MENU button instead, " " moves to left.

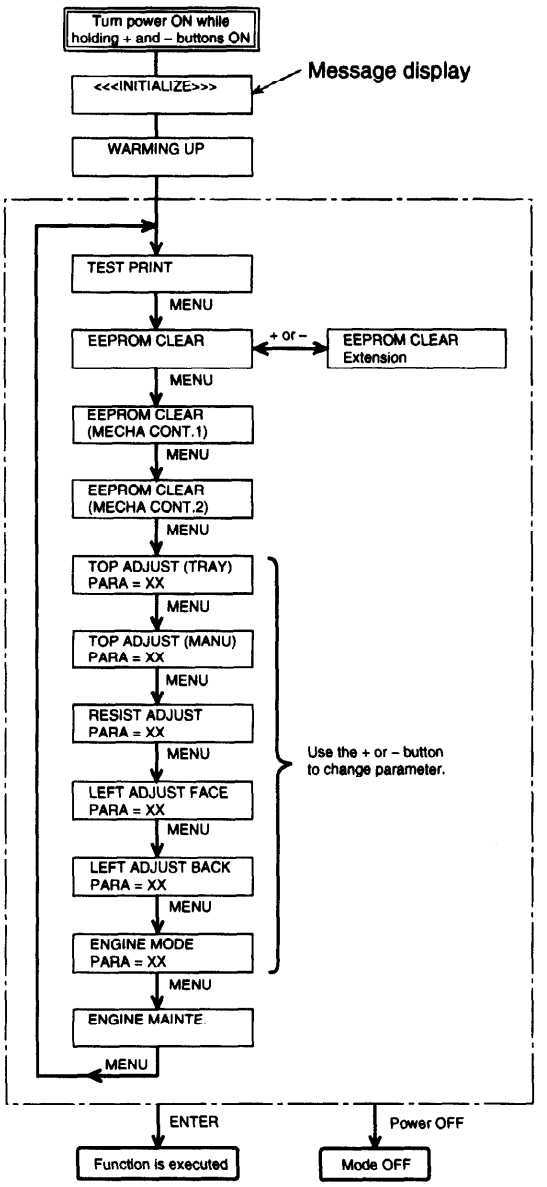



Press the READY button after you have entered all digits; the printer displays "SELECTED" for a second and saves the digits to EEPROM as the serial number.




Turn power off.

Note:
The serial number of the printer is cleared by EEPROM CLEAR Extention. To reset the menu settings to the factory defaults, use normal EEPROM CLEAR after entering the serial number.




1. Turn on the power switch while pressing and holding down the + and – buttons until the message display indicates TEST PRINT. (It takes about one minute, but depends on warming-up time.)

   TEST PRINT is the first function and means that the printer enters the maintenance mode.

2. Press the **MENU** button to select a function.
   Press the + or – button to select EEPROM CLEAR Extension as shown in flowchart.

3. Press the + or – button to change the parameter.

4. Press the **ENTER** button to execute the function.

5. Turn off the power switch to exit the maintenance mode.

**Figure 4-10 Maintenance Mode Operation Flowchart**

# CHAPTER 5 DESCRIPTION OF OPERATION

## 5.1 GENERAL

This chapter explains the principles of operation of the PrintPartner 12V. A microprocessor controls all basic functions: interface, printing, and paper feeding.

Figure 5-l shows a block diagram of the PrintPartner 12V page printer.

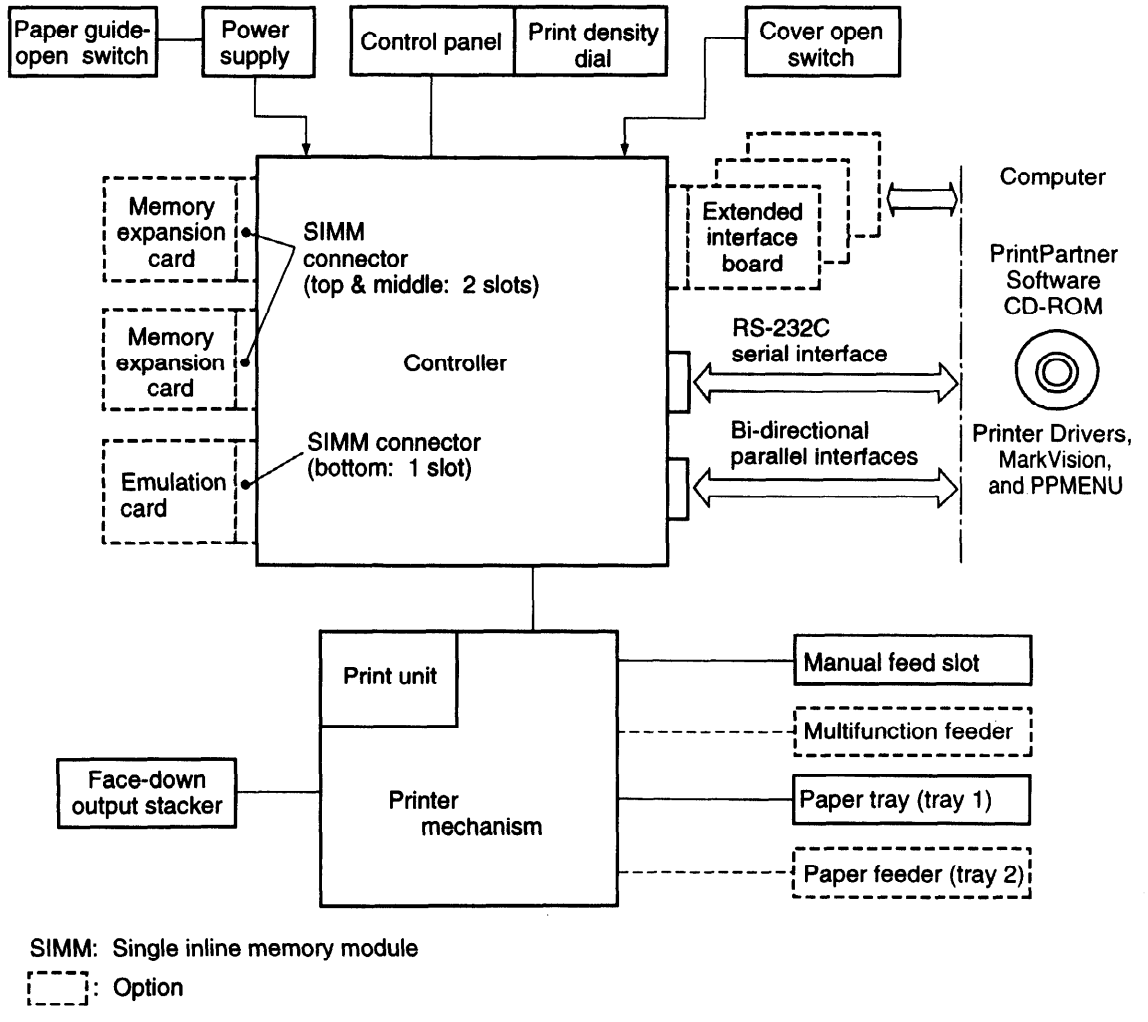



**Figure 5-1 Printer Block Diagram**

## 5.2 MECHANICAL OPERATION

This printer uses three motors to feed the paper and to drive the print unit.

The pick-up motor drives the pick-up roller in the printer or in the multi-function feeder (option). The rotating direction of the motor determines which roller will be selected.

The resist motor drives the paper feed roller.

The main motor drives the print unit, the heat roller, and the paper eject roller.

The printer operations are described below.

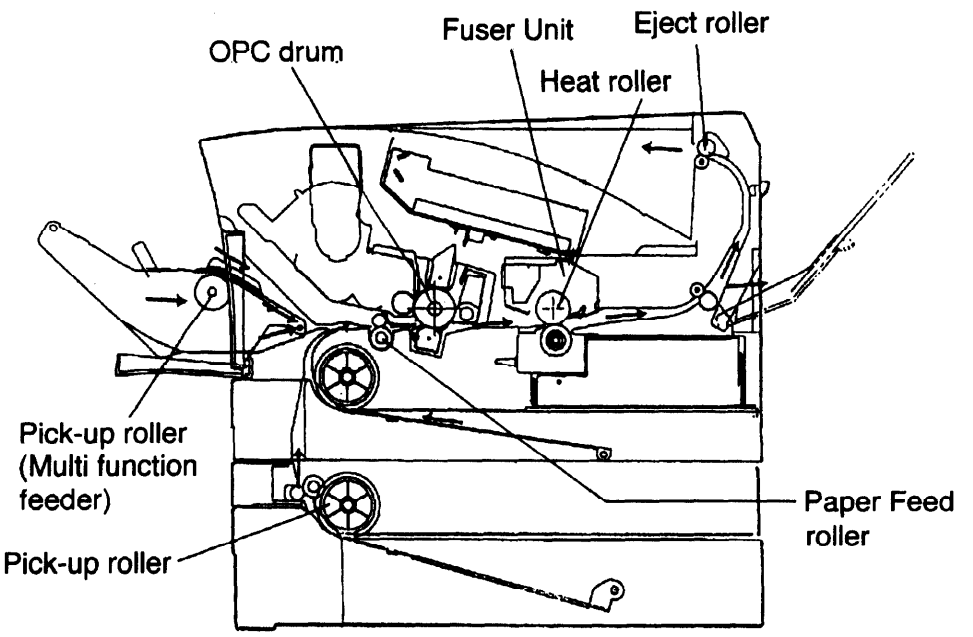



**Figure 5-2 Picking, Printing, Fusing, and Ejecting Paper**

When the printer receives a printing command, the main motor starts to rotate to initialize the print unit (including photoconductive drum, developer, cleaning roller, and toner agitator) and to warm up the heat roller.

The pick-up motor (not shown in Figure 5-2) rotates clockwise to pick up paper from the paper tray.

To print using the multi-function feeder, the host sends a paper select command , When receiving it, the pick-up motor rotates counterclockwise to drive the pick-up roller of the multi-function feeder.

The pick-up motor and the main motor continue to rotate the paper feed roller, the print unit, the heat roller, and the eject roller until the paper passes through.

When the mechanism controller detects the bottom edge of the paper by the paper eject sensor, it stops

## Detailed Description

### (1) Paper feed drive mechanism

Figure 5-3 details the paper feed drive unit. The stepping motor and the gear train are mounted on the metal frame.

The power of the pick-up motor gear is distributed to the pick-up roller of the paper tray or that of the multi-function feeder. Selection is determined by the rotating direction of the motor.

The power of the resist motor gear is distributed to the paper feed roller.

Operation:

When the pick-up motor rotates counterclockwise, the power is transmitted to the pick-up roller of the paper tray through the center gear of the epicyclic gear train.

When the pick-up motor rotates clockwise, the power is transmitted to the pick-up roller of the multi-function feeder through the circumferance gear of the epicyclic gear train.

When the resist motor rotates counterclockwise, the power is transmitted to the paper feed roller.

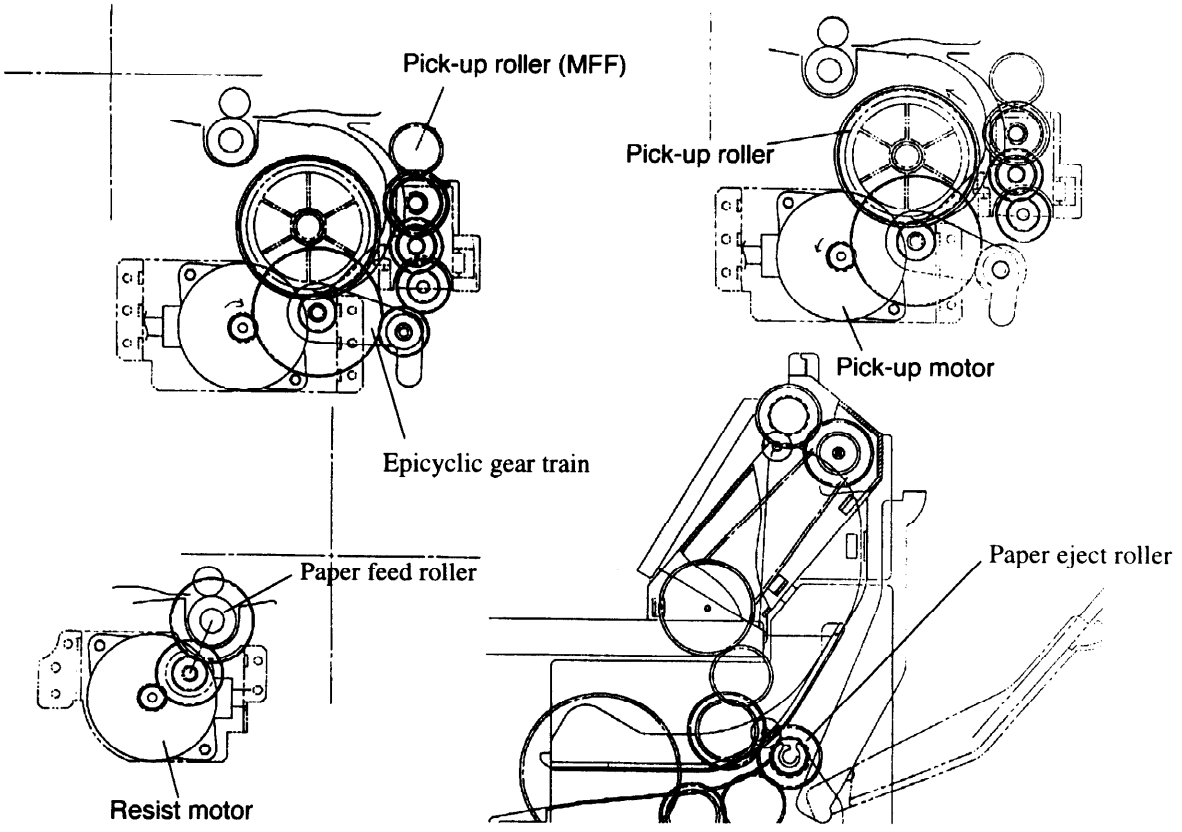



**Figure 5-3 Structure of the Paper Feed Drive Unit**

**(2) Process Drive Mechanism**

Figure 5-4 shows the process drive unit. the DC motor and the gear train are mounted on the metal plate.

The power of the main motor is distributed to the print unit, the heat roller, and the paper eject roller.

The power of the motor is transmitted to the print unit through gears A, B, C, and D, and to the heat roller through gears A, B, C, E, and F.

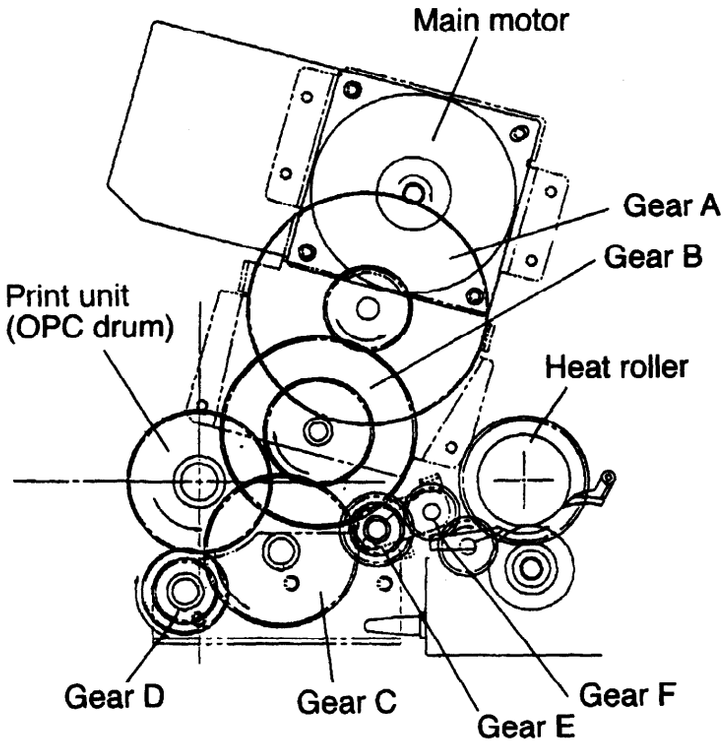



**Figure 5-4 Process Drive Unit**

**(3) Fuser Unit**

The fuser unit consists of the heat roller unit and the back-up roller (fuser pressure roller). The heat roller unit has a halogen lamp, a heat roller, a temperature sensor, a thermal fuse, and supporting parts. The back-up roller rotates with the heat roller. See Figure 5-4.

**(4) Paper Ejection Unit**

The paper ejection unit, which consists of the paper guide and the eject roller, is secured to the frame. Eject gears receive power from the heat roller gear. See Figures 5-2 and 5-4.

**(5) Print Unit**

The print unit consists of a photoconductive drum (OPC drum), a pre-charger unit, a developer unit, a recycle screw, and a toner agitator.

Gear A receives power from the process drive unit, transmitting the power to the photoconductive drum gear, the magnet roll (gear B), the toner agitator (gear C), the recycle screw, and gear D.

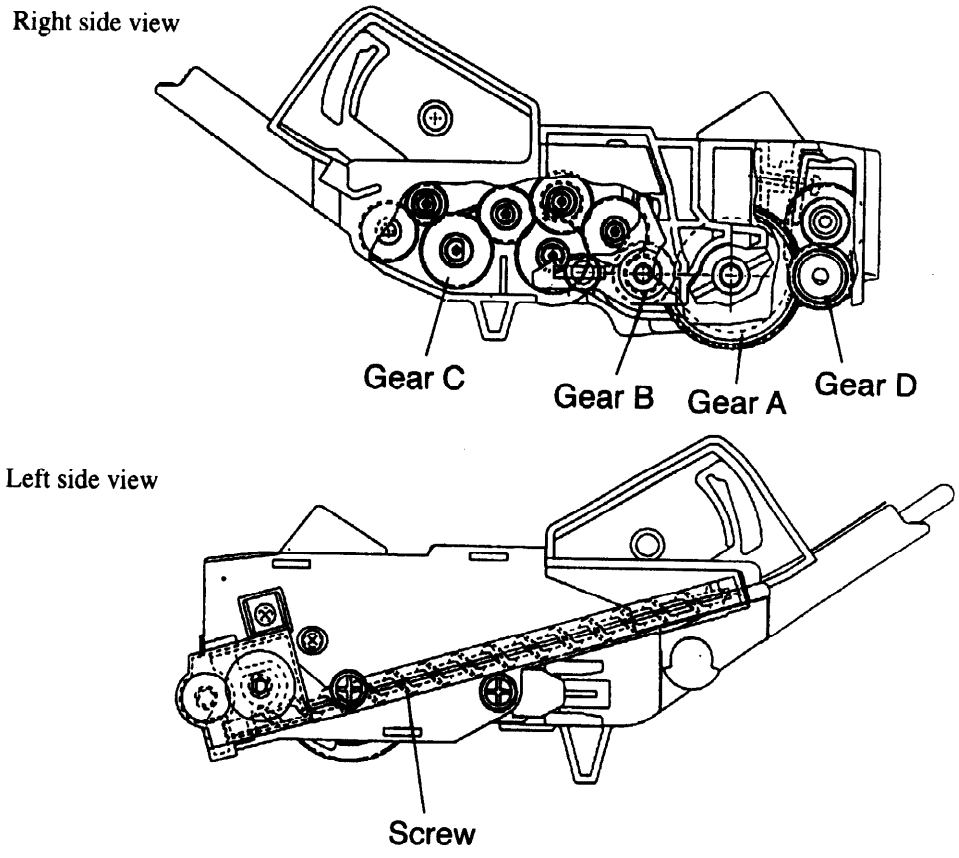



**Figure 5-5 Print Unit**

## 5.3 ELECTRICAL OPERATION

This section provides a brief description of various circuits and how they operate.

### 53.1 System Diagram

Figure 5-6 is a diagram of the system. The NKK NR4645 CPU in the main controller controls the entire printer and the data received from the interface.

Figure 5-7 is a diagram of the connections.

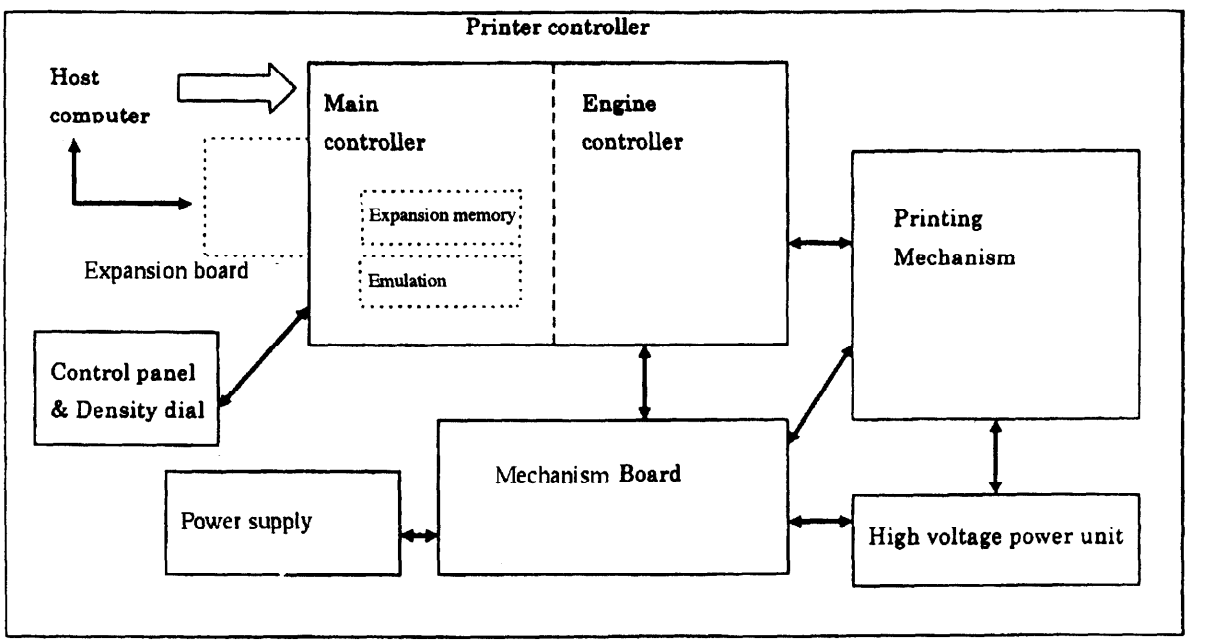



**Figure 5-6 System Diagram**

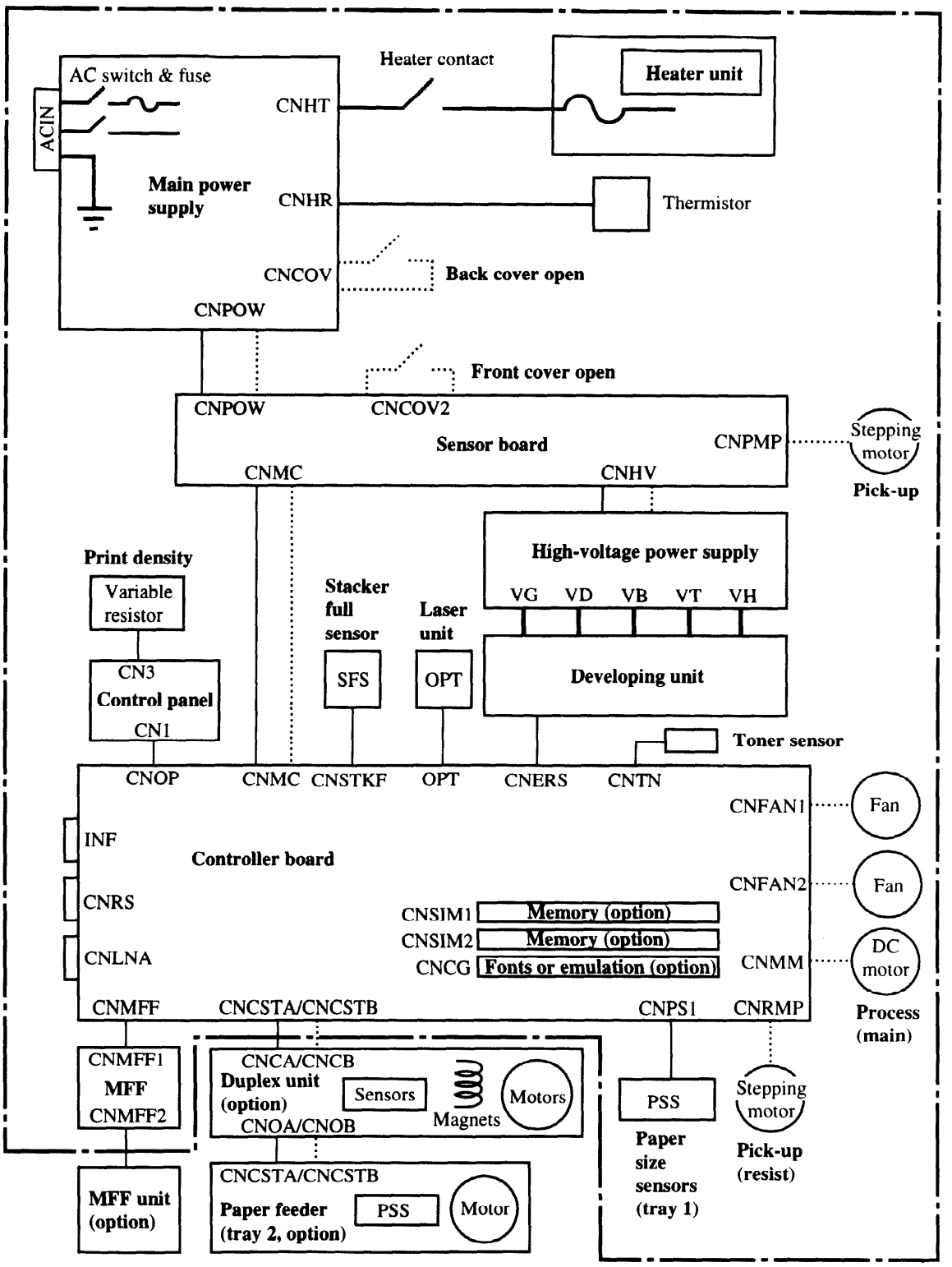



**Figure 5-7 Connection Diagram**

### 5.3.2 Main Controller

Figure 5-8 shows a block diagram of the main controller of the PrintPartner 12V.
This controller provides the HP LaserJet emulation.

The main controller uses an NKK NR4645 processor. The standard amount of RAM is 4M bytes. The program ROM is 4M bytes. The font ROM is 4M bytes. Up to 64M bytes of memory can be added by installing optional memory cards.

There are three SIMM sockets for option cards. The bottom one is for an optional emulation card and the upper two are for optional memory cards (DRAM modules). Each DRAM module is up to 32M bytes.

The parallel interface is a Centronics type. The printer supports Compatible mode and Nibble and Byte mode (bi-directional mode).

An EEPROM of 4K bits is used to store user settings

The control panel driver/receiver controls or reads the LCD, four LEDs, and eight switches on the control panel. The LCD displays messages (16 characters x two lines). The LEDs include POWER, ONLINE, DATA, and ERROR. The switches execute many functions like self test, reset, and menu mode.

The PrintPartner 12V has an expansion interface slot in which one of the four types of interface boards can be installed. Ethernet interface boards, IrDA interface boards, LocalTalk interface boards, and bi-directional parallel interface boards are available.

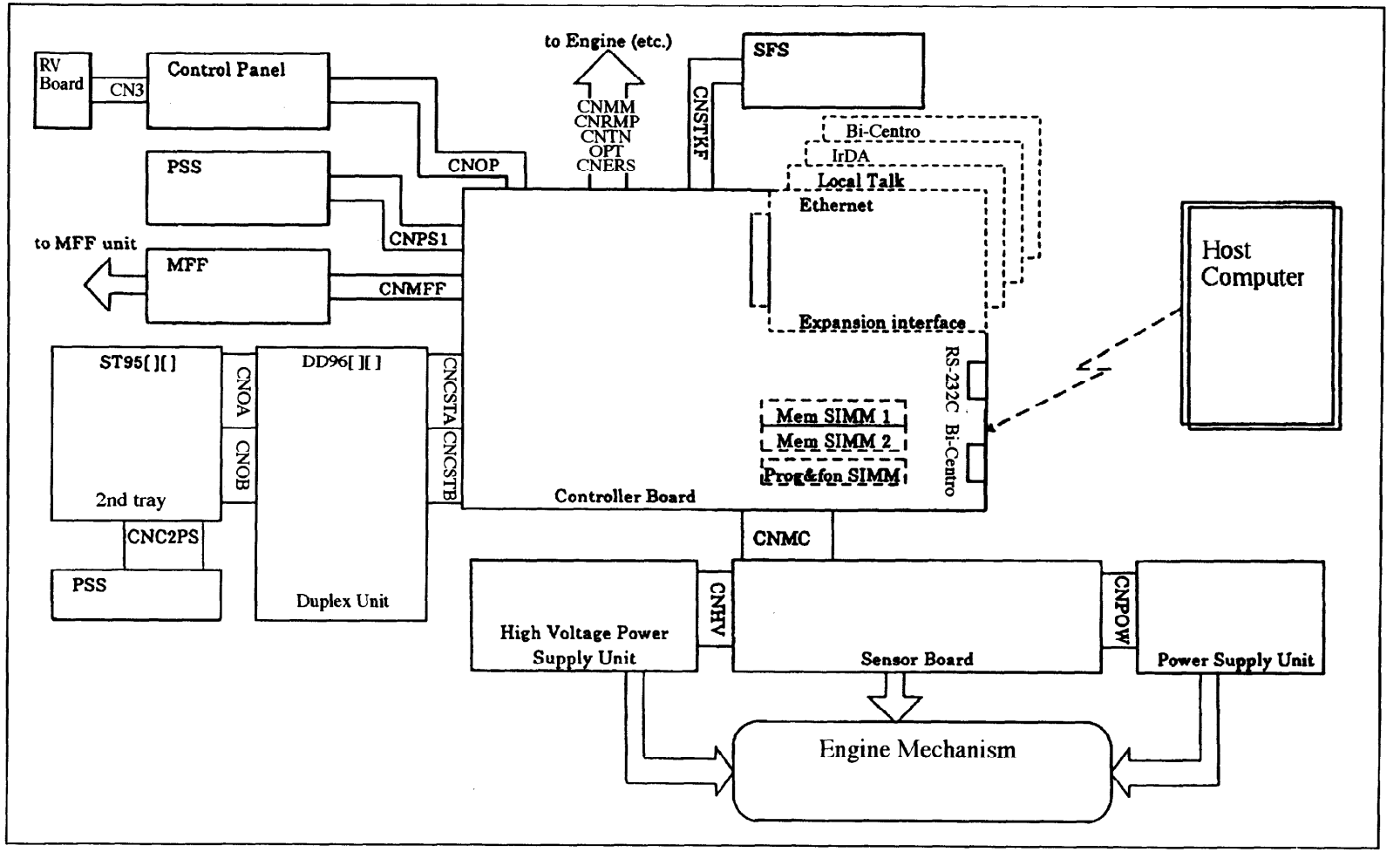



**Figure 5-8 Main Controller Block Diagram**

The following are additional block information.

CPU

The NKK NR4645 CPU is a 64-bit architecture RISC processor. It uses on-chip caching of codes (8K bytes), which allows prefetching of blocks of instructions from memory. It reduces the number of memory accesses and improves the instruction execution pipeline.

The controller provides the 25 MHz clock.

RAM

Resident RAM

The resident RAM is 4M bytes. The devices consist of two 16M-bit DARMs. The data width of devices is 16 bits, and a 32-bit data width is obtained by using 1M bits x 16 bits type.

Since the refresh operation is performed by the dedicated DRAM controller, the RISC processor operates independently of the refresh operation.

Expansion RAM

The controller supports up to 68M bytes including the resident RAM. The expansion RAM is supplied on SIMM cards. The controller accepts lM, 2M, 4M, 8M, 16M, or 32M-byte cards. The controller has two connectors for expansion RAM.

ROM

The ROM subsystem consists of the resident ROM and an optional ROM card. The program ROM is 4M-bytes. The devices typically consist of two 16M-bit flash ROMs. The font ROM is 4M-bytes. The devices consist of two 16M-bit Mask-ROMs.

The ROM card is used for adding an alternate emulation. The controller has one connector for the ROM card.

**(4) Expansion Interface**

Several interface expansion boards are available such as the LocalTalk interface board. The controller has one connector for an expansion interface board. The interface controller communicates with the CPU through the expansion interface board.

**(5) LSI-1**

a. Host interface

The printer has a Centronics parallel interface and an RS-232C serial interface as the standard configuration. The interface connectors are located at the back of the printer. The LocalTalk interface is one of the optional interfaces. The slot for an optional interface board is located at the back of the printer (at shipment, covered by the blank panel).

Parallel interface

The parallel interface is an industry-standard Centronics, using an IEEE1284 type-B connector. This interface controlled by the processor, LSI- 1, and some drivers/receivers.

A host computer sets data and sends the *STROBE pulse. When the LSI-1 receives the data, it automatically turns on the BUSY signal and stores the data in memory. After storing the data, the LSI- 1 sends the *ACK signal and turns off the BUSY signal.

The controller has two types of data storing and signal returning systems. Normally, the DMA system is selected. When the host computer requires special communications with the printer, the DMA system is switched off. Host data is then stored in the data latch register and the return signals BUSY and ACK are controlled by a processor in the controller.

According to the FCC Class B rule, the parallel interface cable should be 3 meters (10 feet) long or less.

Serial interface

The serial interface is an RS-232C version, using a male D-SUB 9-pin connector. It is controlled by the LSI. The baud rate is selected by the control panel. The communication speed is from 1200 to 57,600 bits/second.

According to the FCC Class B rule, the serial interface cable should be 15 meters (50 feet) long or less.

EEPROM (Nonvolatile RAM) control

The controller has a non-volatile RAM, X24C02 or equivalent, with a capacity of 2K bits.

The processor communicates with the non-volatile RAM via the LSI-1 serially. One bit is read or written at a time to the EEPR0M by the I/O port and firmware. The read/write speed is thus slower in comparison with the RAM connected to the bus.

Data processor

The LSI- 1 has the following data processing circuits.

Data rotate

The data size of rotation is 32 x 32 bits. Data is set by the CPU and the rotated data can be soon read by the CPU.

Data expand/shrink.

The expand/shrink circuit expands 32-bit data to 64-bit data or shrinks 64-bit data to 32-bit data. Data is set by the CPU and the expanded/shrunk data can be read by the CPU.

Data mirror

The mirror circuit mirrors 32-bit data with each bit state inverted. Data is set by the CPU and the mirrored data can be read by the CPU.

Video data.

The video data is the data that is sent to the FEIT LSI.

Video transfer DMA,

The video transfer DMA in the LSI-1 transfers the actual image, which is created on the DRAM by firmware, from the DRAM to the video buffer in the LSI-1 according to the BD signal.

FEIT LSI

The FEIT LSI receives the image data from the video buffer, enhances the image, and sends the enhanced imaee as video data to the laser unit via the engine controller.

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| 01 | March 1998 | | First issue |
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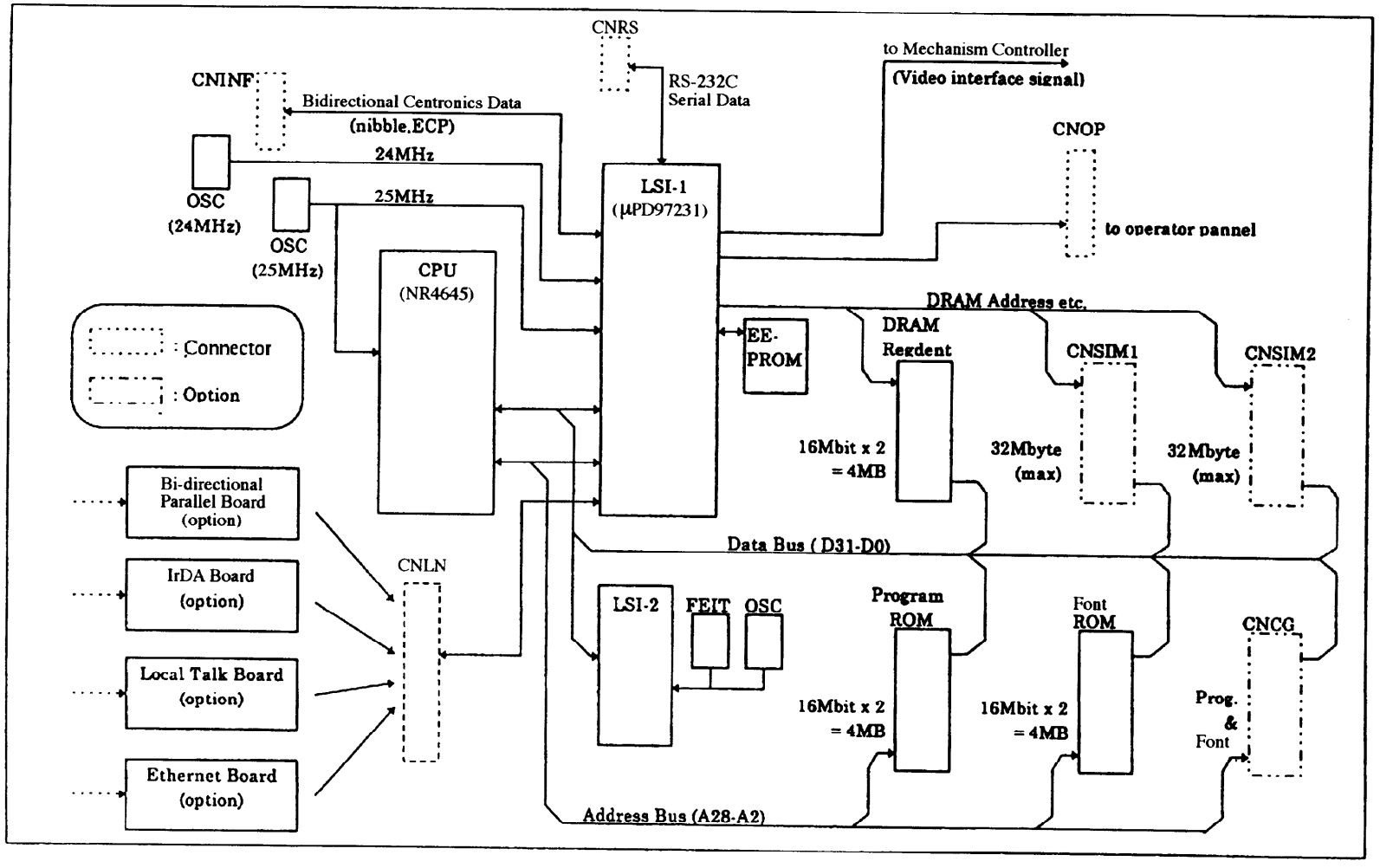



**Figure 5-9 Control Board Block Diagram**

### 5.3.3 Engine controller Block Diagram

Figure 5.10 shows a block diagram of the engine controller of PrintPartner 12V.
The engine controller controls the engine mechanism.

The engine controller uses an 8bit NEC µ PD78213 processor. This processor has 512 bytes of RAM and a timer unit. The timer has seven channels. It also has several I/O lines and communication functions.

The NEC processor also has 32K bytes of built-in ROM memory. There is no external memory in the engine control circuit.

An EEPROM of 2K bits is used to store printer status (number of printed pages, adjustment information, replace parts information, etc).

The LSI-3 has three functions. That is a I/O expander , a bus controller and laser unit controller.

This controller can control two stepping motors.

The engine controller is controlled by a video interface from the main controller.

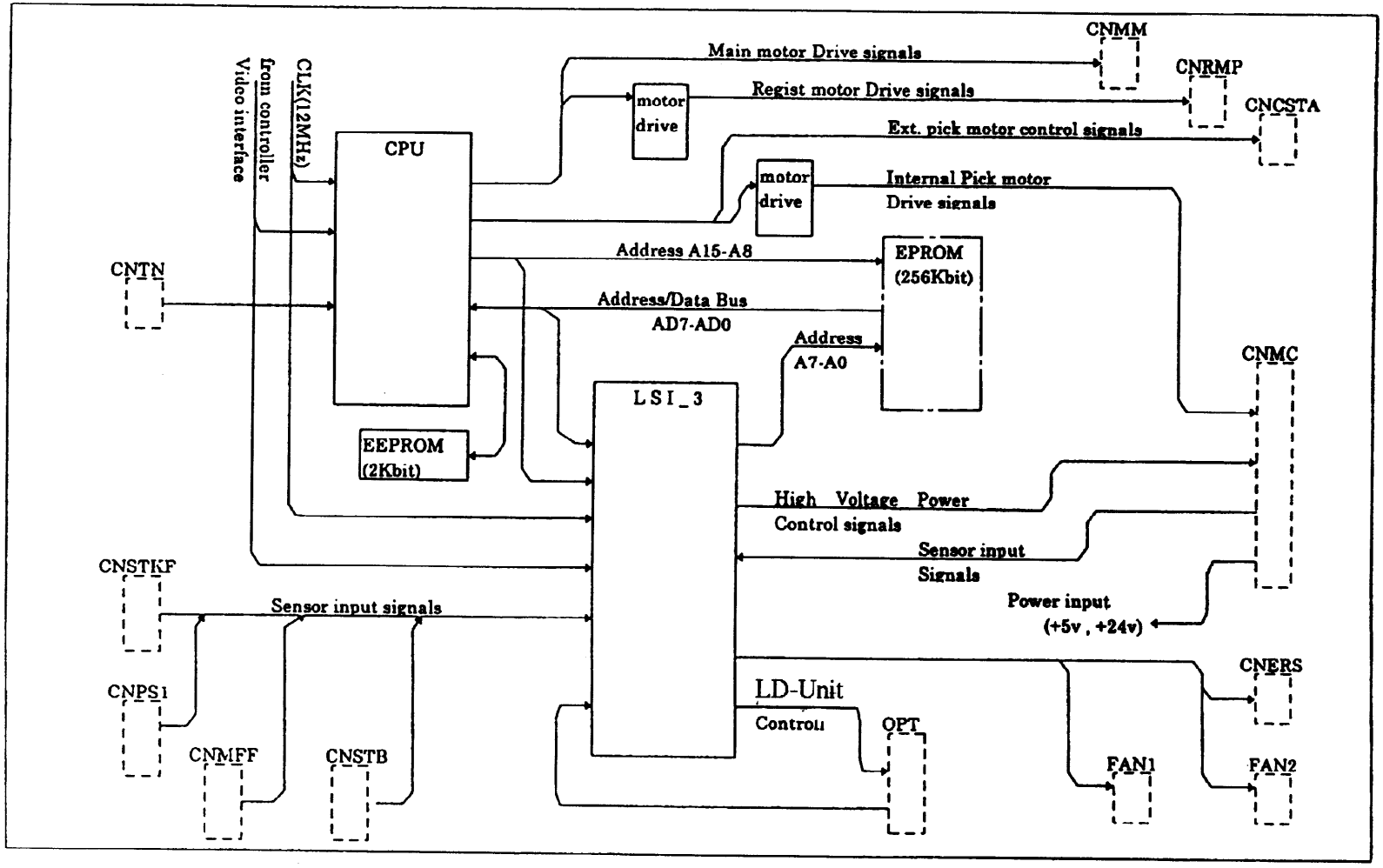



**Figure 5-10 Engine Controller Block Diagram**

**The following are additional block information.**

**(1) CPU**

The NEC μ PD78213 CPU is a one-chip micro processor.

| | |
|---|---|
| Processor speed | 12 MHz |
| Internal memory | RAM 512 bytes. |
| Input ports | 14 |
| output ports | 12 |
| Input/output ports | 10 |
| Registers | 8 bits x 8 bits x 4 banks (memory mapped) |
| Timer and Counter | 16-bit timer counter (2 channels) |
| | 8bit timer counter 1 (2 channels) |
| | 8-bit timer counter 2 (1 channel) |
| | 8-bit timer counter 3 (1 channel) |
| Serial interface | CSI (3-wire serial I/O) |
| A/D converter | 8 bits and 8 channels |
| Interrupt signals | internal: 12 and external: 7 |
| Package | 74 pins plastic QFP (20 mm x 20 mm) |

The external memory (ROM , LSI) and I/O can be accessed through the multiplexed bus (ADO-AD7), address bus (A19-A8), and *RD/*WR/ASTB signals.

The A/D converter in the CPU receives analog data from sensors and changes it to digital data. Sensors include the temperature sensor and the toner empty sensor.

The motors are controlled by the CPU timer & IRQ. The firmware sets the time data and starts the timer. When the timer has reached the setting time, IRQ is activated by the timer block. Then the firmware sets the phase switch data and sets the next time data. Thus, the motor is fully controlled by the firmware, not by the hardware.

The CPU can control the two sets of motors at the same time.

The control signals of the video interface lines are connected to the CPU I/O. If you get more information about this interface, see the Video interface specification.
But the video data and the synchronize data lines are connected with the LSI.

The controller has a non-volatile RAM, X24cO2 or equivalent, with the capacity of 2K bits. The processor communicates with the non-volatile RAM via the CPU by serial data. One bit is read or written at a time using EEPROM by the I/O port and firmware. The read/write speed is thus slower in comparison with the ROM connected to the bus.

The controller provides the 10 MHz clock for the CPU. However, the CPU divides the frequency to 5 MHz for the internal clock.

**(2) ROM**

The ROM is 8-bit EEPROM. It contains engine control programs and data tables.

**(3) LSI**

a. I/O expander

The output ports are provided for controlling the high-voltage power supply, fan rotation, and eraser LD.

The input ports are provided for receiving signals from sensors.
(stacker full, paper presence and paper size of paper trays 1 and 2, multi-function feeder status, etc.)

b. Laser unit controller

The unit consists of two parts. One is the spindle motor, the other is the laser control.

[Spindle motor]
The spindle motor is a DC motor. So the control is very simple, there are only two control lines (spindle start/stop and alarm detect).
The motor speed control is in the laser unit.

[Laser control]
First, the firmware turns on the laser unit. If the laser unit outputs the *BD="L" (indicating the start of the print area), the LSI turned on the laser beam. If the laser beam is at the end of the print area, the LSI turns off the laser beam. The LSI controls this sequence automatically. The power to the laser diode is controlled by the laser unit, but the density is user adjustable with a density control dial located on the control panel.

## 5.3.4 Interface Communication Method

This section describes the operation of the interface control.

**(1) Centronics Parallel Interface**

The received data, DATA1 through DATA8 is stored to the internal FIFO memory of the LS just after the falling edge of the *DSTB (Data Strobe) signal. At the same timing, the BUSY signal is turned on. A little later the *ACK (Acknowledge) signal is sent to the host computer and the BUSY signal is turned off.

If the host computer has more data to be sent, it sends DATA1 through DATA8 with *DSTB, then the controller repeats the above operations.

When the received data is stored to the memory, the memory control circuit changes the memory empty flag. The controller CPU reads this flag and understands that the memory holds data. The CPU reads the received data from the memory.

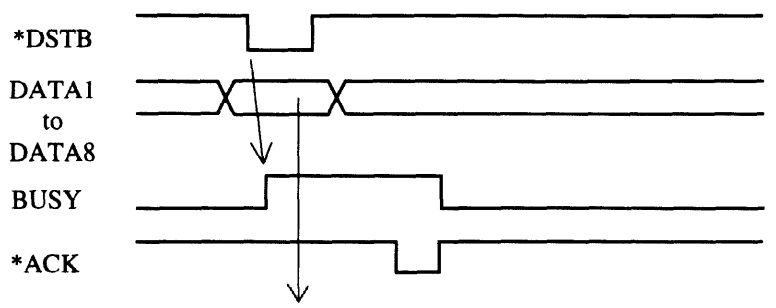



**Figure 5-11 Centronics Parallel Interface Signal Timing Chart**

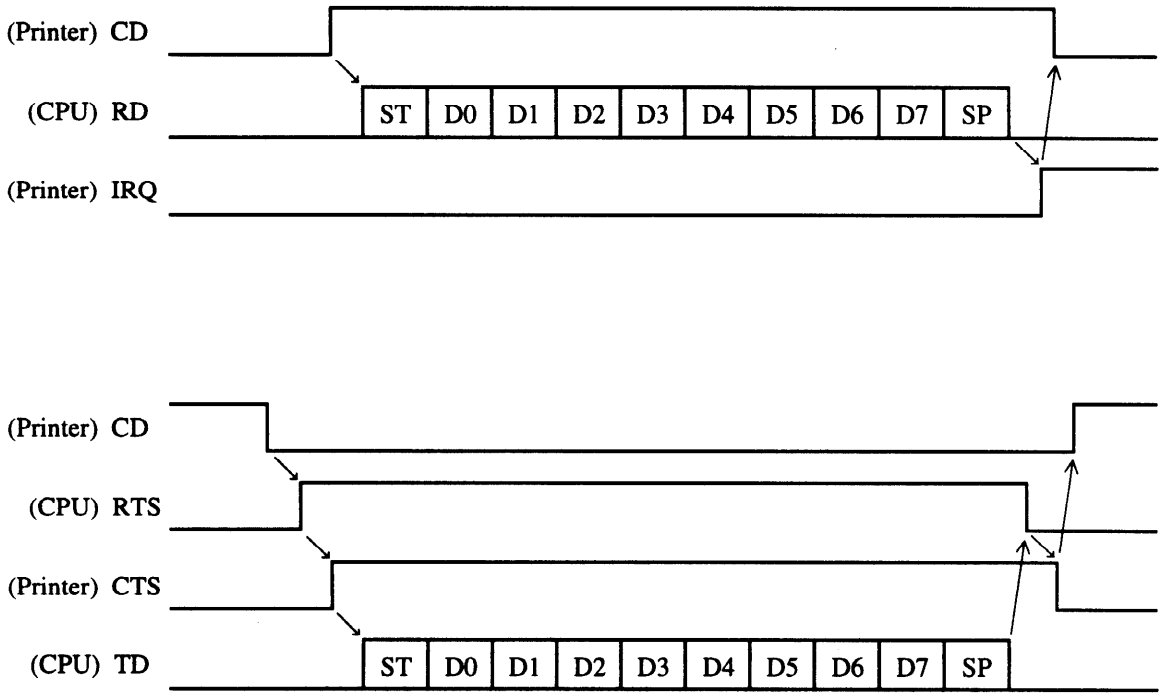
The main controller has another method of interface communication. If the host computer requires the printer to use this special communication, the controller receives data without using the memory. The received data, DATA1 through DATA8 is latched to the internal LSI at the falling edge of the *DSTB signal and the BUSY signal is turned on. At the same timing, the interrupt signal is turned on to the controller CPU. Then, the BUSY signal is turned off and the ACK signal is sent. This process is repeated for each byte received by the printer.

**(2) RS-232C Interface**

The serial data sent to the input terminal of the interface circuit is converted to ITL level by the receiver IC and is applied to the UART, PC 16550D in the LSI. The PC16550D converts the serial data to parallel data, and activates the *IRQ signal. The LSI controls the baud rate clock, some interface signals, and interrupt.

The main controller CPU recognizes that data has been received and determines what to do. Based on its decision, the CPU saves the information in the receive buffer or processes it immediately. The *IRQ is then set high. The CPU may send out certain information such as XON, XOFF, or ACK from the serial interface output terminal if the selected protocol defines such response operations. In certain protocols, the CPU may change the status of output signals such as DTR.

**Received Data**




Note: If signal lines CD, RTS, and CTS are open, the printer ignores any controls related to these signals.

**Figure 5-12 RS-232C Serial Interface Signal Timing Chart**

**(3) FEIT (smoothing technology)**

This technology improves the image quality.

This technology automatically recognizes and smoothes the jagged outlines of text (characters) and line art (drawings). In detail, the timing and pulse width of the video signal corresponding to print dot is controlled. FEIT accomplishes this by controlling the size of dots generated by the printer and the dot positions in the main scanning direction.

This achieves pseudo high-resolution printing.

In addition, 300 dpi print data can be printed with this 600 dpi printer engine. In this case, the circuit for the operation automatically recognizes the jagged outline and improves the image quality. Figure 5. I3 shows the block diagram.

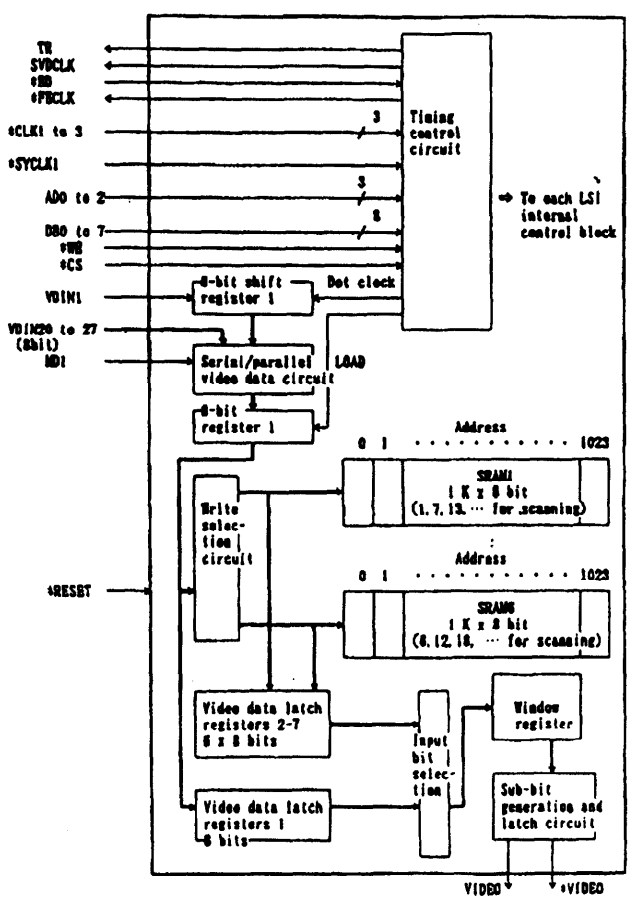



**Figure 5-13 Block Diagram (Internal Configuration)**

## 5.3.5 Printing Method

**(1) Print Control Process**

The controller receives data from the host computer. The CPU inside the controller fetches the program from the ROM and reads data sent from the host computer. The CPU manages and processes the data according to the program. The CPU converts the data to bit-map data and stores it in the bit-map memory. When the CPU recognizes that preparations for printing are complete, it starts the engine controller via the video interface. If the print start is detected, the engine controller checks the mechanism status such as paper position, heat roller temperature, etc. If the engine controller recognizes that preparations for printing are complete, it starts the motor and transfers print data to the laser diode unit (LD unit).

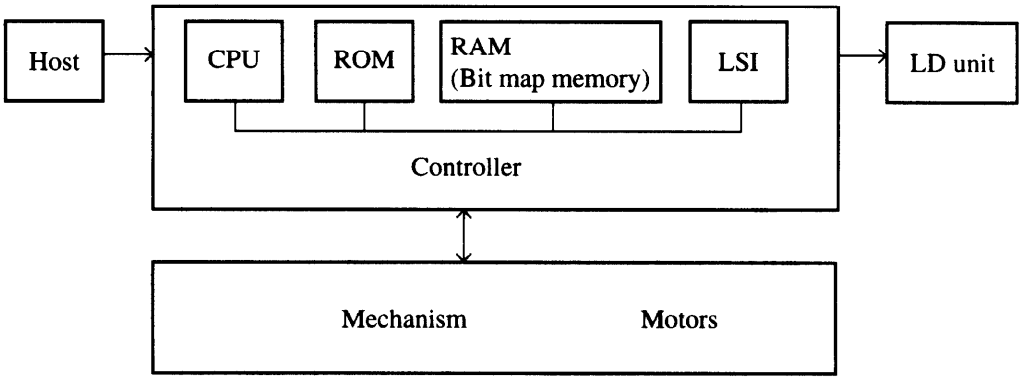



**Figure 5-14 Print Process Block Diagram**

**(2) Bit-map Data Generate**

The bit-map data is generated by the CPU. All data to be transferred to the FEIT LSI is stored in the bit-map memory. The bit-map memory uses parts of the resident RAM and expansion RAM.

The controller LSI has many auxiliary circuits to process data, such as rotate, expand, shrink, and mirror. The CPU generates bit-map data by itself or by the auxiliary circuits. The generated bit-map data remains until it is transferred to the FEIT LSI.

**(3) Video Data Transfer**

When the engine controller starts, the motor, and paper moves along the paper path. The engine controller checks sensors on the paper path. When the paper reaches the position from which video data must be prepared, the main controller starts the video data transfer from LSI- 1. The LSI starts transferring bit-map data from the bit-map memory to the buffer memory in the LSI- 1 under control of the DMA in the LSI- 1. The stored data is transferred to the FEIT LSI in synchronization with the clock signals (CLD) which is generated by the FEIT LSI. This controller generates other signals for the laser unit (LD unit), such as latch pulses and strobe pulses. The timer circuit prepares the original times signal every raster, from which the video timing controller generates the above three signals.

The FEIT circuit in the LSI receives the image data from the video buffer inside he LSI-1, and it calculates the image data for enhancing the image. The calculated result is sent as video data to the LD unit synchronized with the BD signal. The BD signal detects that the laser beam is start position, and the video data transfer is requested. The BD signal prepares the synchronization signal every raster from the LD unit.

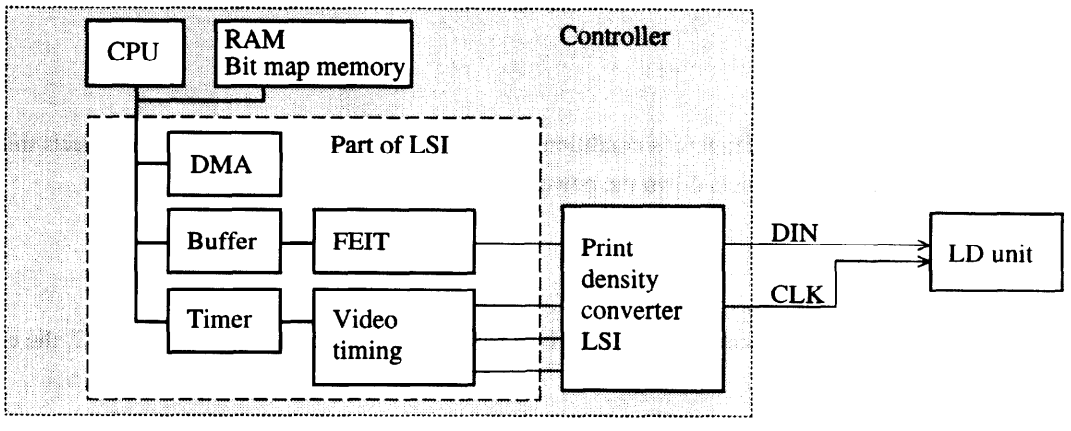



**Figure 5-15 Video Data Transfer Block Diagram**

**(4) LD unit**

The LD unit (laser diode unit) consists of the spindle motor control and the laser power control.

**(5) Heat Roller Temperature Control**

The temperature of the heat roller is sensed by a thermistor. The controller senses the potential with an A/D converter.

Whenever the temperature of the heat roller is higher than 165°C, printing can occur. After the heat roller has been powered on for 115 seconds, the heat roller alarm is detected if the temperature is lower than 165°C. A high temperature check is made if the temperature exceeds 195°C. The controller board also has hardware protection. If the temperature signal detects an abnormal condition ( more than 4.95 V), the power supply unit is shutdown by the protection circuit.

### (6) Power Saving Control

The PrintPartner 12V saves power which is used for the heat roller in the fuser unit. It is done by stopping temperature control or reducing the temperature. This control is canceled when the printer receives print data from the host or issues the release command by firmware.

Auto stand-by mode

When printing does not occur for one minute, the heat roller temperature is reduced to 100°C (normal operating temperature: 165°C). When the printer receives a printing command, this auto stand-by control is canceled and the printing can start when the temperature reaches 170°C.

Auto sleep mode

When printing does not occur for nine minute in auto stand-by mode, temperature control is stopped and the heat roller is powered off. When the printer receives a printing command, this auto sleep mode is canceled and the printing can start when the temperature reaches 170°C.

### (7) Alarm Detect

The controller can detect dangerous conditions in the printer engine. If the controller detects this condition, it indicates an alarm and shuts down the power supply without firmware control.

Heat roller temperature

The controller senses the temperature of the heat roller. If the temperature exceeds 195°C, the controller activates an alarm.

Disconnected connect@

The controller senses disconnected connectors. Actually, the sensed connectors are CNHT , CNPOW, and CNMC. If that connectors are disconnected, the controller activates an alarm.

Motor current alarm

The controller senses the current flowing through the pick-up motor and the resist motor. If the main motor draws excessive current, the controller activates an alarm immediately. If the pick-up motor draws excessive current, the controller also activates an alarm immediately. If the paper feeder (second paper tray) is installed, the controller senses the current flowing through the second paper tray's motor, too. These alarms cause the power supply to be shut down without firmware control.

## 5.3.6 Control Panel Control

The control panel has an LCD, four LED indicators, and eight push-button switches.

The LCD and indicators are controlled by LS12 according to display signals (from controller board) and switch signals. The LCD is further controlled by LSIl. The “POWER” indicator is directly connected to the +5 VDC line. The READY switch signal is directly output to the controller board.

The print density dial is fastened to a variable resistor which is mounted on the RV board. The resistor potential signal passes through the control panel board and is sent to the controller board. The controller senses the potential of the variable resistor with an A/D converter and controls the laser unit.

Figure 5-16 is a block diagram of the control panel circuit.

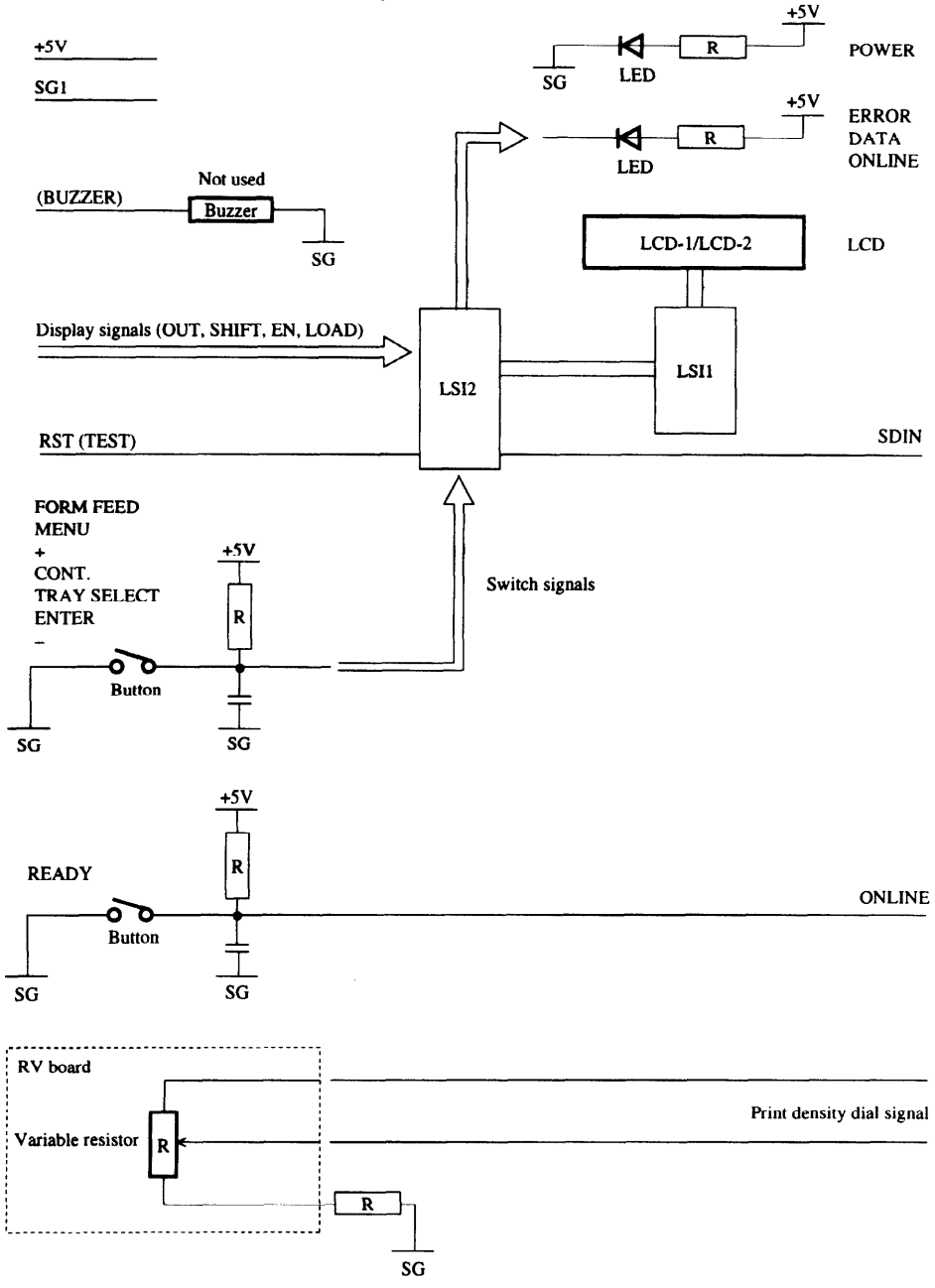



**Figure 5-16 Control Panel Block Diagram**

## 5.3.7 Power Supply

There are two separate power supplies, CA02951-4260 and CA02951-4265. The former is used for 120 VAC and the latter is used for 220 to 240 VAC.

The power supply outputs +5 V for the logic circuits and +24 V for the printer mechanism drivers and the high-voltage power supply. It also controls the AC input voltage for the fuser unit 's heater.

Figure 5-17 shows the block diagram of the power supply. AC input to this power supply via a power switch is converted to DC by rectifier and filter circuits. The amount of inrush current is limited by a negative temperature coefficient thermistor. Next, the DC is converted to AC in a high-frequency switching circuit and its voltage is reduced by a step-down transformer. Then, the AC is again rectified and smoothed before being converted to DC. This power supply has a receiver of the input signal that turns the power supply off.

**(1) Overcurrent protection**

- If +24 V overcurrent is detected, all output voltages are automatically shut down by the emergenc stopy control.

**(2) Overvoltage protection**

- If a +5 V overvoltage condition occurs, all output voltages are shut down by the +5 V overvoltage protection circuit.
- If a +24 V overvoltage condition occurs, all output voltages are shut down by the emergency stop control.

**(3) PW STOP signal**

The PW STOP signal is sent from the controller to the power supply to forcibly turn power off if the printer detects an alarm condition in the mechanism. This power stop condition is active unless the power switch is turned off. It also active for about one minute after the power switch is turned off or the power cord is disconnected.

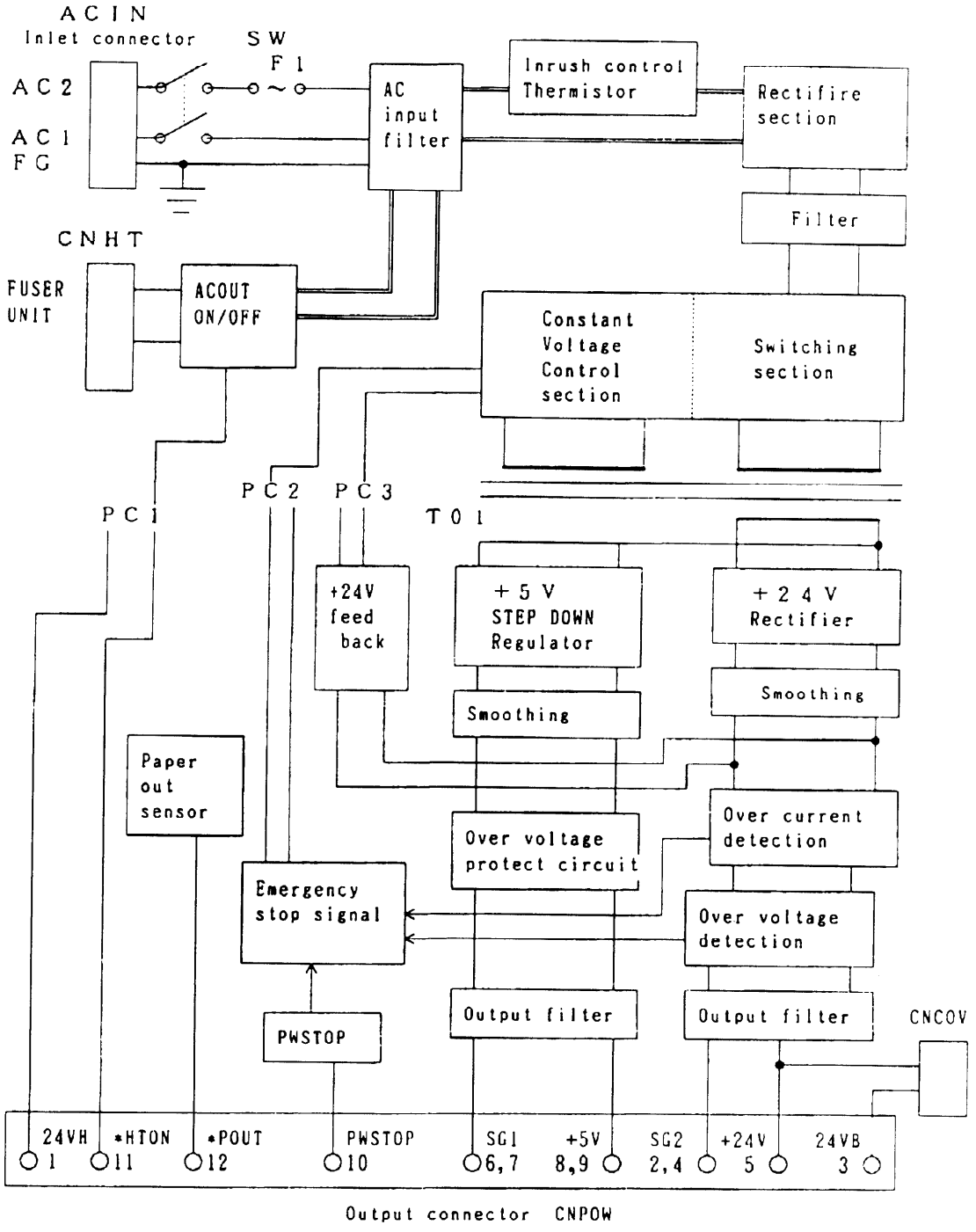



**Figure 5-17 Power Supply Block Diagram**

# CHAPTER 6 REPLACEMENT PARTS

| No. | Recommended spare parts | Product number | Section | Remarks |
|---|---|---|---|---|
| 1 | Upper cover subassembly | CA04040-G550 | 4.9.1 (1) | |
| 2 | Pick-up roller assembly | CA02758-G600 | 4.9.1 (12) | |
| 3 | Feed roller assembly | CA02758-G6 12 | 4.9.1 (14) | |
| 4 | Cover-open switch | CA02758-G 127 | 4.9.1 (16) | |
| 5 | Main motor | CA02758-0251 | 4.9.1(10) | |
| 6 | Pick-up motor | CA02758-020 1 | 4.9.1 (11) | Same as resist motor |
| 7 | Transfer unit | CA02758-F474 | 4.9.1 (15) | |
| 8 | Fan 1 | CA02758-0129 | 4.9.1 (6) | |
| 9 | Fan 2 | CA02758-G 128 | 4.9.1 (7) | |
| 10 | Power supply board | CA0295 l-4260 | 4.9.1 (5) | For 120 VAC |
| | | CA0295 l-4265 | | For 220-240 VAC |
| 11 | High-voltage power supply board | CA0295 l-4290 | 4.9.1 (9) | |
| 12 | Separator assembly (friction pad) | CA02758-G721 | 4.9.1 (20) | |
| 13 | Stacker-full sensor assembly (SF sensor board) | CA02758-F695 | 4.9.1 (18) | |
| 14 | Operator panel (control panel) | CA04040-0574 | 4.9.1 (2) | |
| 15 | Volume board (print density dial) | CA04040-G572 | 4.9.1 (17) | |
| 16 | Multi-function feeder board (MFF board) | CA02758-G171 | 4.9.1 (19) | |
| 17 | Mechanism board (shield plate) | CA02758-G176 | 4.9.1 (9) | |
| 18 | Paper sensing switch (PSS board) | CA02758-G 172 | 4.9.1 (9) | |
| 19 | ROM board (control board and ROM) | CA0429 l-5300 | 4.9.1 (8) | |

Note: The section column indicates the item number of the procedure to replace the part.

The following must be replaced at the same time the transfer unit is replaced.

| No. | Parts to be replaced periodically | Product number | Section | Remarks |
|---|---|---|---|---|
| 1 | Fuser unit | CA04291-C951<br>CA04291-C952 | 4.9.1 (4) | For 120 V model<br>For 220-240 V model |