



---

**FS-720**  
**FS-820**  
**FS-920**

**SERVICE  
MANUAL**

Published in June 2007  
842FW112  
2FWSM062  
Rev.2

**Revision history**

Revision	Date	Replaced	Remarks
1	18 October 2004	1-1-1, 1-1-3, 1-1-5, 1-6-2, 1-6-3, 1-6-6	
2	29 June 2007	1-4-11	



---

# Safety precautions

---

This booklet provides safety warnings and precautions for our service personnel to ensure the safety of their customers, their machines as well as themselves during maintenance activities. Service personnel are advised to read this booklet carefully to familiarize themselves with the warnings and precautions described here before engaging in maintenance activities.

## Safety warnings and precautions

Various symbols are used to protect our service personnel and customers from physical danger and to prevent damage to their property. These symbols are described below:

 **DANGER:** High risk of serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

 **WARNING:** Serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

 **CAUTION:** Bodily injury or damage to property may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

### Symbols

The triangle () symbol indicates a warning including danger and caution. The specific point of attention is shown inside the symbol.



General warning.



Warning of risk of electric shock.



Warning of high temperature.

 indicates a prohibited action. The specific prohibition is shown inside the symbol.



General prohibited action.



Disassembly prohibited.

 indicates that action is required. The specific action required is shown inside the symbol.



General action required.



Remove the power plug from the wall outlet.



Always ground the printer.

# 1. Installation Precautions

## WARNING

- Do not use a power supply with a voltage other than that specified. Avoid multiple connections to one outlet: they may cause fire or electric shock. When using an extension cable, always check that it is adequate for the rated current. .... 
- Connect the ground wire to a suitable grounding point. Not grounding the printer may cause fire or electric shock. Connecting the earth wire to an object not approved for the purpose may cause explosion or electric shock. Never connect the ground cable to any of the following: gas pipes, lightning rods, ground cables for telephone lines and water pipes or faucets not approved by the proper authorities. .... 

## CAUTION:

- Do not place the printer on an infirm or angled surface: the printer may tip over, causing injury. .... 
- Do not install the printer in a humid or dusty place. This may cause fire or electric shock. .... 
- Do not install the printer near a radiator, heater, other heat source or near flammable material.

This may cause fire. .... 

- Allow sufficient space around the printer to allow the ventilation grills to keep the machine as cool as possible. Insufficient ventilation may cause heat buildup and poor copying performance. .... 

- Always handle the machine by the correct locations when moving it. .... 
- Always use anti-toppling and locking devices on printers so equipped. Failure to do this may cause the printer to move unexpectedly or topple, leading to injury. .... 
- Avoid inhaling toner or developer excessively. Protect the eyes. If toner or developer is accidentally ingested, drink a lot of water to dilute it in the stomach and obtain medical attention immediately. If it gets into the eyes, rinse immediately with copious amounts of water and obtain medical attention. .... 
- Advise customers that they must always follow the safety warnings and precautions in the printer's instruction handbook. .... 

## 2.Precautions for Maintenance

### WARNING

- Always remove the power plug from the wall outlet before starting machine disassembly. .... 
- Always follow the procedures for maintenance described in the service manual and other related brochures. .... 
- Under no circumstances attempt to bypass or disable safety features including safety mechanisms and protective circuits. .... 
- Always use parts having the correct specifications. .... 
- Always use the thermostat or thermal fuse specified in the service manual or other related brochure when replacing them. Using a piece of wire, for example, could lead to fire or other serious accident. .... 
- When the service manual or other serious brochure specifies a distance or gap for installation of a part, always use the correct scale and measure carefully. .... 
- Always check that the printer is correctly connected to an outlet with a ground connection. .... 
- Check that the power cable covering is free of damage. Check that the power plug is dust-free. If it is dirty, clean it to remove the risk of fire or electric shock. .... 
- Never attempt to disassemble the optical unit in machines using lasers. Leaking laser light may damage eyesight. .... 
- Handle the charger sections with care. They are charged to high potentials and may cause electric shock if handled improperly. .... 

### CAUTION

- Wear safe clothing. If wearing loose clothing or accessories such as ties, make sure they are safely secured so they will not be caught in rotating sections. .... 
- Use utmost caution when working on a powered machine. Keep away from chains and belts. .... 
- Handle the fixing section with care to avoid burns as it can be extremely hot. .... 
- Check that the fixing unit thermistor, heat and press rollers are clean. Dirt on them can cause abnormally high temperatures. .... 

• Do not remove the ozone filter, if any, from the printer except for routine replacement. ....



• Do not pull on the AC power cord or connector wires on high-voltage components when removing them; always hold the plug itself. ....



• Do not route the power cable where it may be stood on or trapped. If necessary, protect it with a cable cover or other appropriate item. ....



• Treat the ends of the wire carefully when installing a new charger wire to avoid electric leaks. ....



• Remove toner completely from electronic components. ....



• Run wire harnesses carefully so that wires will not be trapped or damaged. ....



• After maintenance, always check that all the parts, screws, connectors and wires that were removed, have been refitted correctly. Special attention should be paid to any forgotten connector, trapped wire and missing screws. ....



• Check that all the caution labels that should be present on the machine according to the instruction handbook are clean and not peeling. Replace with new ones if necessary. ....



• Handle greases and solvents with care by following the instructions below: .....



· Use only a small amount of solvent at a time, being careful not to spill. Wipe spills off completely.

· Ventilate the room well while using grease or solvents.

· Allow applied solvents to evaporate completely before refitting the covers or turning the power switch on.

· Always wash hands afterwards.

• Never dispose of toner or toner bottles in fire. Toner may cause sparks when exposed directly to fire in a furnace, etc. ....



• Should smoke be seen coming from the printer, remove the power plug from the wall outlet immediately. ....



### 3.Miscellaneous

#### WARNING

• Never attempt to heat the drum or expose it to any organic solvents such as alcohol, other than the specified refiner; it may generate toxic gas. ....



This page is intentionally left blank.

# CONTENTS

<b>1-1 Specifications</b>	
1-1-1 Specifications.....	1-1-1
1-1-2 Parts names.....	1-1-7
(1) Printer.....	1-1-7
(2) Operation panel.....	1-1-8
1-1-3 Cross section view.....	1-1-9
<b>1-2 Handling Precautions</b>	
1-2-1 Drum unit and developer unit.....	1-2-1
1-2-2 Installation environment.....	1-2-1
<b>1-3 Installation</b>	
1-3-1 Unpacking and installation.....	1-3-1
(1) Installation procedure.....	1-3-1
1-3-2 Installing expansion memory (optional for 16/18 ppm printers).....	1-3-6
1-3-3 Installing a memory card (optional for 16/18 ppm printers).....	1-3-7
<b>1-4 Maintenance Mode</b>	
1-4-1 Service mode.....	1-4-1
(1) Executing service mode.....	1-4-1
<b>1-5 Troubleshooting</b>	
1-5-1 Paper misfeed detection.....	1-5-1
(1) Paper misfeed indication.....	1-5-1
(2) Paper misfeed detection.....	1-5-2
1-5-2 Self-diagnosis.....	1-5-3
(1) Self-diagnostic function.....	1-5-3
(2) Self diagnostic codes.....	1-5-4
1-5-3 Electric problems.....	1-5-14
1-5-4 Image formation problems.....	1-5-17
1-5-5 Mechanical problems.....	1-5-23
<b>1-6 Assembly and Disassembly</b>	
1-6-1 Precautions for assembly and disassembly.....	1-6-1
(1) Precautions.....	1-6-1
1-6-2 Outer covers.....	1-6-2
(1) Detaching and refitting the right side cover, right cover, left cover, and top cover.....	1-6-2
1-6-3 Paper feeding/conveying section.....	1-6-4
(1) Detaching and refitting the paper feed roller.....	1-6-4
(2) Detaching and refitting the transfer roller.....	1-6-5
1-6-4 Process section.....	1-6-6
(1) Detaching and refitting the developer unit and drum unit.....	1-6-6
(2) Drum unit optimization.....	1-6-7
(3) Detaching and refitting the main charger unit.....	1-6-8
1-6-5 Fuser unit.....	1-6-9
(1) Detaching and refitting the fuser unit.....	1-6-9
(2) Detaching and refitting the heater lamp, heat roller, fuser thermistor, thermal cutout, and press roller.....	1-6-11
1-6-6 PWBs.....	1-6-15
(1) Detaching and refitting the main PWB (16 ppm GDI printer).....	1-6-15
(2) Detaching and refitting the main PWB (16/18 ppm printers).....	1-6-16
(3) Detaching and refitting the engine/high voltage PWB and power source PWB.....	1-6-17
1-6-7 Others.....	1-6-20
(1) Detaching and refitting the laser scanner unit.....	1-6-20
(2) Detaching and refitting the eraser lamp (PWB).....	1-6-22
(3) Detaching and refitting the drive unit.....	1-6-23
(4) Detaching and refitting the main motor.....	1-6-24

**1-7 Firmware**

1-7-1	Downloading .....	1-7-1
(1)	Firmware program data format .....	1-7-1
(2)	Downloading the firmware from the parallel interface (For 16/18 ppm printers) .....	1-7-2
(3)	Downloading the firmware from the memory card (For 16/18 ppm printers) .....	1-7-4

**2-1 Mechanical Construction**

2-1-1	Paper feeding/conveying section .....	2-1-1
(1)	Paper feed section .....	2-1-1
2-1-2	Drum section .....	2-1-3
(1)	Drum unit .....	2-1-3
(2)	Main charger unit .....	2-1-4
2-1-3	Expose section .....	2-1-5
(1)	Laser scanner unit .....	2-1-5
2-1-4	Developing section .....	2-1-7
(1)	Developer unit .....	2-1-7
2-1-5	Transfer section .....	2-1-9
2-1-6	Cleaning section .....	2-1-10
2-1-7	Fuser section .....	2-1-11
(1)	Fuser unit .....	2-1-11
2-1-8	Paper exit section .....	2-1-13
(1)	Paper exit section .....	2-1-13

**2-2 Electrical Parts Layout**

2-2-1	Electrical parts layout .....	2-2-1
(1)	Electrical parts layout .....	2-2-1

**2-3 Operation of the PWBs**

2-3-1	Power source PWB .....	2-3-1
2-3-2	Engine/high voltage PWB .....	2-3-3
2-3-3	Main PWB .....	2-3-6

**2-4 Appendixes**

2-4-1	Appendixes .....	2-4-1
(1)	Timing chart No.1 Cassette paper feeding, Paper size A4 (For 16/16 ppm GDI printers) .....	2-4-1
(2)	Timing chart No.2 Cassette paper feeding, Paper size A4 (For 18 ppm printer) .....	2-4-2
(3)	Timing chart No.3 Manual feed tray paper feeding, Paper size A4 .....	2-4-3
(4)	Wiring diagram .....	2-4-4
(5)	Repetitive defects gauge .....	2-4-5

**1-1-1 Specifications****16 ppm GDI printer (FS-720)**

Type .....	Desktop
Printing system .....	Electrophotographic printing
Paper type .....	Paper cassette: Plain paper (60 to 105 g/m <sup>2</sup> ) Recycled paper (60 to 105 g/m <sup>2</sup> ) Thick paper (90 to 105 g/m <sup>2</sup> ) Manual feed tray: Plain paper (60 to 163 g/m <sup>2</sup> ) Recycled paper (60 to 163 g/m <sup>2</sup> ) Thick paper (60 to 163 g/m <sup>2</sup> ) Special paper: Transparencies, labels, envelopes, postcards, tracing paper
Paper sizes .....	Paper cassette A4 (210 × 297 mm) B5 (182 × 257 mm) A5 (148 × 210 mm) Folio (210 × 330 mm) Letter (8½" × 11") Legal (8½" × 14") Officio II (8½" × 13") Non-standard size (148 × 210 mm to 216 × 356 mm) Manual feed tray A4 (210 × 297 mm) B5 (182 × 257 mm) A5 (148 × 210 mm) Folio (210 × 330 mm) Letter (8½" × 11") Legal (8½" × 14") Officio II (8½" × 13") Non-standard size (70 × 148 mm to 216 × 356 mm)
Print speeds .....	A4: 16 pages/minutes Letter: 17 pages/minutes
First print time .....	11 seconds or less (ready), 21 seconds or less (sleep)
Warm-up time .....	16 seconds or less (power on), 12 seconds or less (sleep)
Paper feed system .....	One universal cassette and one manual feed tray
Paper loading capacity .....	Paper cassette: 250 sheets (80 g/m <sup>2</sup> , 0.11 μm) Manual feed tray: 1 sheet (80 g/m <sup>2</sup> , 0.11 μm)
Paper exit system .....	Face down: 100 sheets (80 g/m <sup>2</sup> , 0.11 μm)
Photoconductor .....	OPC drum (diameter 30 mm)
Charging system .....	Scorotron (positive charging)
Developing system .....	Mono component dry developing method Toner replenishing: Automatic from the toner container
Transfer system .....	Transfer roller (negative-charged)
Separation system .....	Small diameter separation
Fixing system .....	Heat roller system
Charge erasing system .....	Exposure by eraser lamp (LED)
Cleaning system .....	Drum: Counter blade

2GL/2FV/2FW

Controller hardware .....	CPU: 32 bit RISC CPU System ROM: 1 Mbit (on-board) Main RAM: 8 MB (on-board)
Interface.....	USB: Full-Speed USB2.0
Controller software.....	Host based
Resolution.....	600 dpi mode (600 × 600 dpi)
Dimensions (H × W × D) .....	245 × 380 × 390 mm/9.6" × 15.0" × 15.4"
Weight.....	Main unit: 9.2 kg/20.3 lbs
Power source .....	220 - 240 V AC, 50/60 Hz (European countries), 120 V AC, 60 Hz (U.S.A./Canada)
Power consumption .....	Maximum: 830 W (220 - 240 V model), 823 W (120 V model) Normal operating: 302 W (220 - 240 V model), 295 W (120 V model) Ready: 5 W (220 - 240 V model), 5 W (120 V model) EcoPower: 4.2 W (220 - 240 V model), 3.8 W (120 V model)
Current.....	3.4 A (220 - 240 V model), 6.8 A (120 V model)
Noise.....	Printing: 49 dB(A), Ready: 28 dB(A)



Controller hardware .....	CPU: PowerPC405 (192 MHz) System ROM: 4 MB (on-board) Font ROM: Including System ROM Main RAM: 16 MB standard (on-board); expanding up to 272 MB (256 MB × 1) at the maximum by adding optional expansion memory Optional expansion RAM (DIMM): 1 slot 100-pin DIMM (64, 128 or 256 MB)
Interface.....	Parallel: Hi-speed (bi-directional), IEEE 1284 Nibble/ECP mode USB: Full-Speed USB2.0
Controller software.....	a) Emulation PCL6 (PCL5e/PCL-XL) b) Fonts: Bitmap font: 1 font Outline fonts: 14 fonts c) Graphic: (1) Raster graphic: 75, 100, 150, 200*, 300, 600* dpi (*200 dpi is supported when the resolution is 600 dpi.) (2) Vector graphic: Line, Box, Circle, Arc, Fill pattern etc. (3) Bar code: One dimensional bar code: 45 types Two dimensional bar code: 1 type (PDF-417) (4) Text: TEXT, RTXT etc. (5) Others: Macro, JOB, Device setting etc. d) Connectivity Plug &play (Parallel): Windows 9x/Me/2000/XP Plug & play (Full-Speed USB2.0): Windows 98SE/Me/2000/XP
Resolution.....	Fast1200 mode (1800 × 600 dpi) 600 dpi mode (600 × 600 dpi)
Dimensions (H × W × D) .....	245 × 380 × 390 mm/9.6" × 15.0" × 15.4"
Weight.....	Main unit: 9.2 kg/20.3 lbs
Power source .....	220 - 240 V AC, 50/60 Hz (European countries), 120 V AC, 60 Hz (U.S.A./Canada)
Power consumption .....	Maximum: 833 W (220 - 240 V model), 828 W (120 V model) Normal operating: 319 W (220 - 240 V model), 292 W (120 V model) Ready: 7 W (220 - 240 V model), 6 W (120 V model) EcoPower: 4.5 W (220 - 240 V model), 4 W (120 V model)
Current.....	3.4 A (220 - 240 V model), 6.8 A (120 V model)
Noise.....	Printing: 49 dB(A), Ready: 28 dB(A)
Options .....	Expansion memory (64/128/256 MB 100-pin DIMM), memory card (Compact Flash)



Controller hardware .....	CPU: PowerPC405 (266 MHz) System ROM: 4 MB (on-board) Font ROM: Including System ROM Main RAM: 32 MB standard (on-board); expanding up to 288 MB (256 MB × 1) at the maximum by adding optional expansion memory Optional expansion RAM (DIMM): 1 slot 100-pin DIMM (64, 128 or 256 MB)
Interface.....	Parallel: Hi-speed (bi-directional), IEEE 1284 Nibble/ECP mode USB: Full-Speed USB2.0
Controller software.....	a) Emulation PCL6 (PCL5e/PCL-XL) KPDL3 Line Printer Diablo 630 IBM Proprinter X24E Epson LQ850 b) Fonts: Bitmap font: 1 font Outline fonts: 80 fonts c) Graphic: (1) Raster graphic: 75, 100, 150, 200*, 300, 600* dpi (*200 dpi is supported when the resolution is 600 dpi.) (2) Vector graphic: Line, Box, Circle, Arc, Fill pattern etc. (3) Bar code: One dimensional bar code: 45 types Two dimensional bar code: 1 type (PDF-417) (4) Text: TEXT, RTXT etc. (5) Others: Macro, JOB, Device setting etc. d) Connectivity Plug &play (Parallel): Windows 9x/Me/2000/XP Plug & play (Full-Speed USB2.0): Windows 98SE/Me/2000/XP
Resolution.....	Fast1200 mode (1800 × 600 dpi) 600 dpi mode (600 × 600 dpi)
Dimensions (H × W × D) .....	245 × 380 × 390 mm/9.6" × 15.0" × 15.4"
Weight.....	Main unit: 9.2 kg/20.3 lbs
Power source.....	220 - 240 V AC, 50/60 Hz (European countries), 120 V AC, 60 Hz (U.S.A./Canada)
Power consumption .....	Maximum: 827 W (220 - 240 V model), 827 W (120 V model) Normal operating: 315 W (220 - 240 V model), 294 W (120 V model) Ready: 8 W (220 - 240 V model), 7 W (120 V model) EcoPower: 4.8 W (220 - 240 V model), 4.4 W (120 V model)
Current.....	3.4 A (220 - 240 V model), 6.8 A (120 V model)
Noise.....	Printing: 49 dB(A), Ready: 28 dB(A)
Options .....	Expansion memory (64/128/256 MB 100-pin DIMM), memory card (Compact Flash)

1-1-2 Parts names

(1) Printer

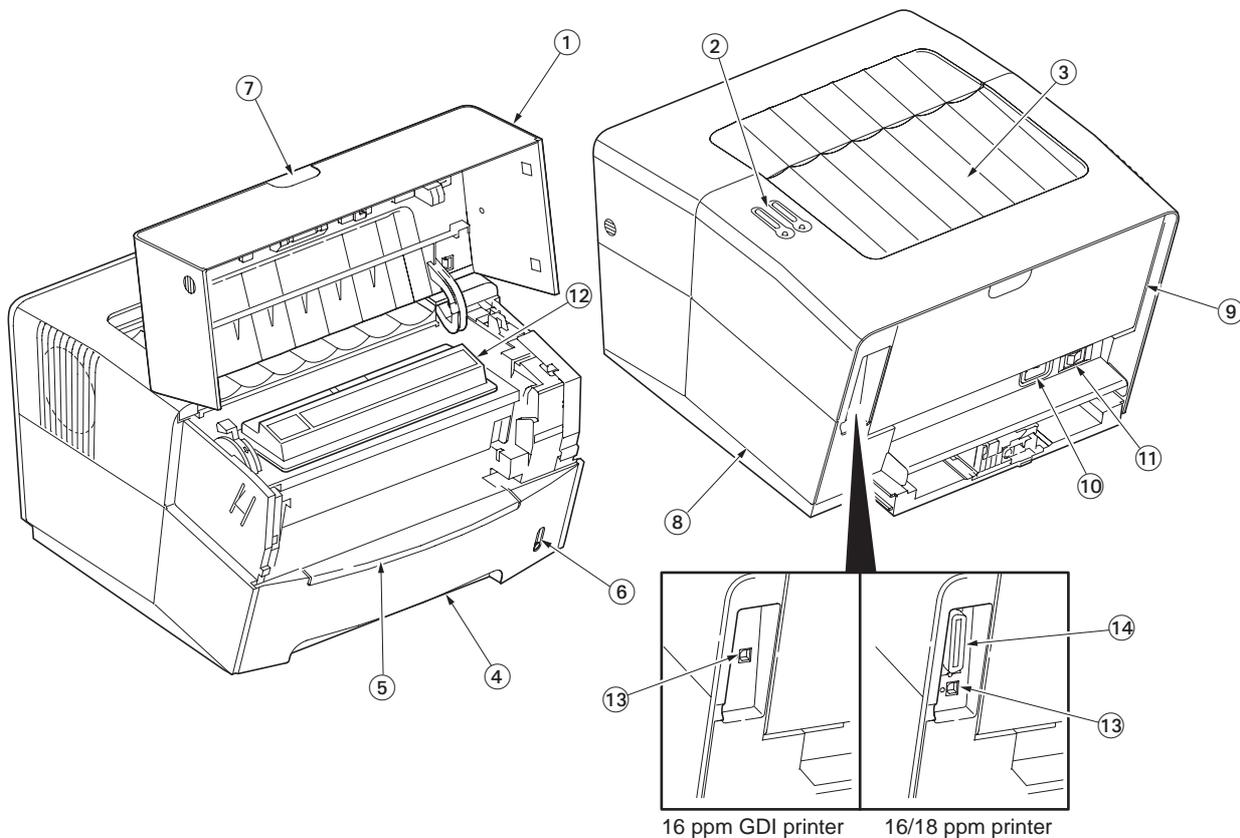


Figure 1-1-1

- |                     |                                  |
|---------------------|----------------------------------|
| 1. Top cover        | 8. Right side cover              |
| 2. Operation panel  | 9. Rear cover                    |
| 3. Output tray      | 10. AC inlet                     |
| 4. Paper cassette   | 11. Power switch                 |
| 5. Manual feed tray | 12. Toner container              |
| 6. Paper gauge      | 13. USB interface connector      |
| 7. Paper stopper    | 14. Parallel interface connector |

(2) Operation panel

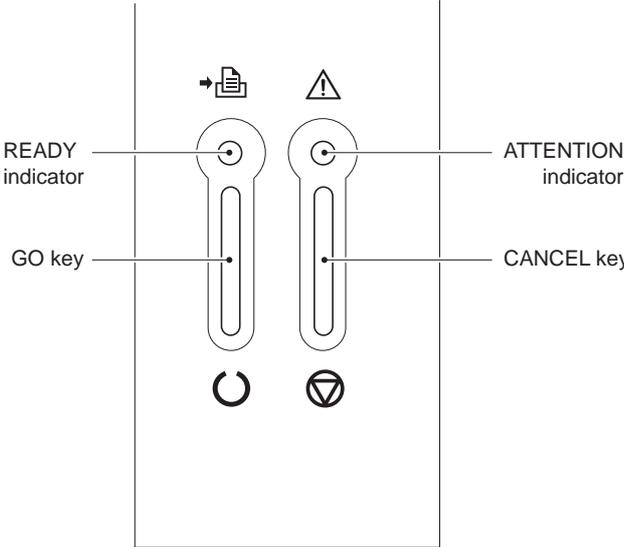


Figure 1-1-2

## 1-1-3 Cross section view

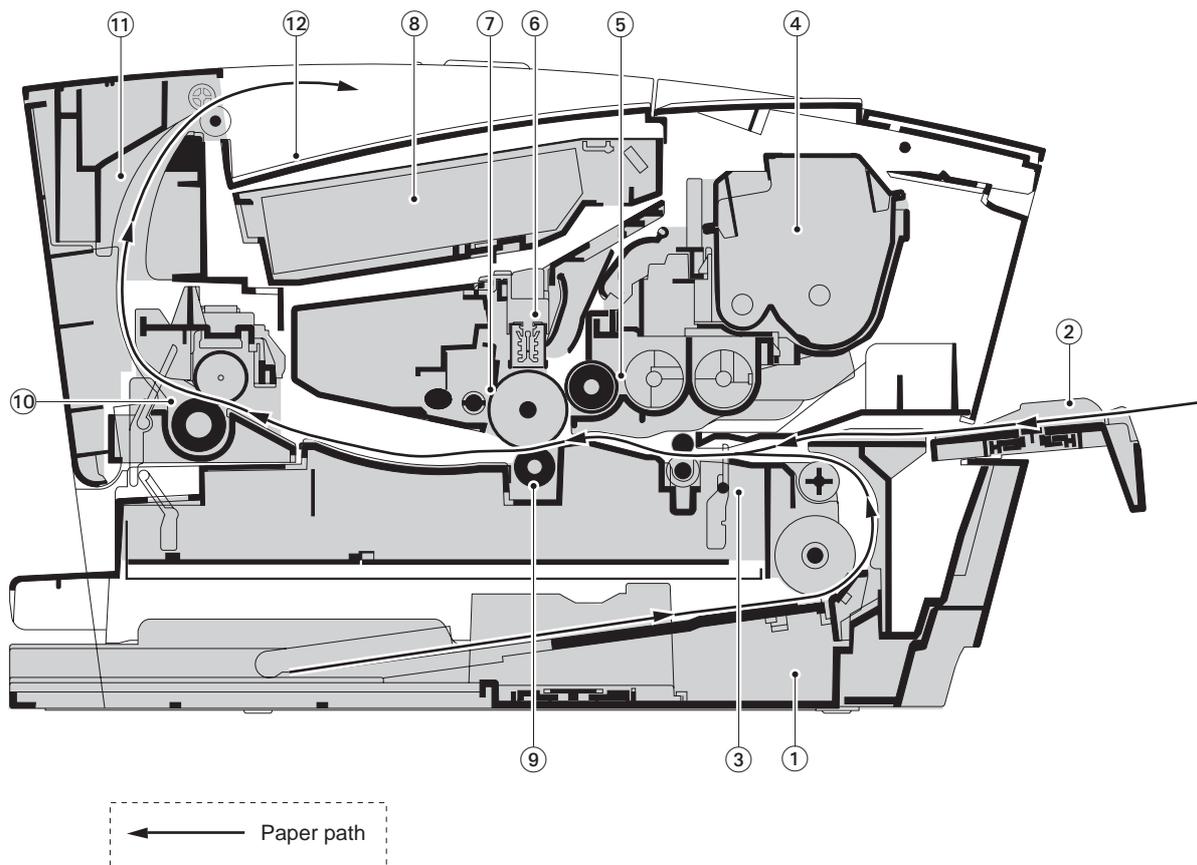


Figure 1-1-3

- |                                    |                        |
|------------------------------------|------------------------|
| 1. Paper cassette                  | 7. Drum unit           |
| 2. Manual feed tray                | 8. Laser scanner unit  |
| 3. Paper feeding/conveying section | 9. Transfer section    |
| 4. Toner container                 | 10. Fuser unit         |
| 5. Developer unit                  | 11. Paper exit section |
| 6. Main charger unit               | 12. Output tray        |

This page is intentionally left blank.

### 1-2-1 Drum unit and developer unit

Note the following when handling or storing the drum (drum unit).

- When removing the drum (drum unit), never expose the drum surface to strong direct light.
- Avoid abrupt changes in temperature and humidity.
- Avoid exposure to any substance which is harmful to or may affect the quality of the drum.
- Do not touch the drum surface with any object. Should it be touched by hands or stained with oil, clean it.

Developer unit and toner container

Store the developer unit and toner container in a cool, dark place.

Avoid direct light and high humidity.

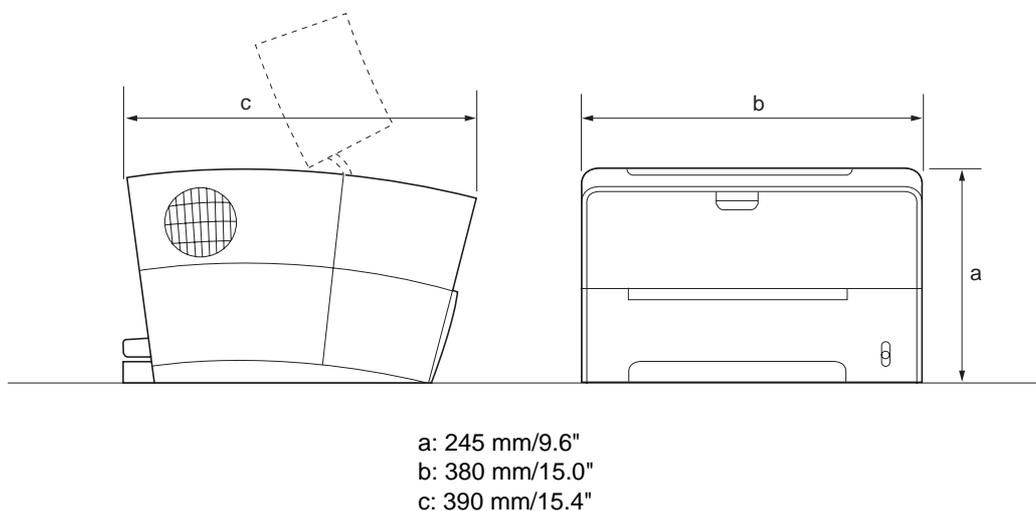
### 1-2-2 Installation environment

1. Temperature: 10 - 32.5 °C/50 - 90.5 °F
2. Humidity: 20 - 80%RH
3. Power supply: 120 V AC (U.S.A./Canada), 220 - 240 V AC (European countries)
4. Power source frequency: 50 Hz  $\pm$ 2%/60 Hz  $\pm$ 2%
5. Installation location
  - Avoid direct sunlight or bright lighting. Ensure that the photo-conductor will not be exposed to direct sunlight or other strong light when removing paper jams.
  - Avoid extremes of temperature and humidity, abrupt ambient temperature changes, and hot or cold air directed onto the machine.
  - Avoid dust and vibration.
  - Choose a surface capable of supporting the weight of the machine.
  - Place the machine on a level surface (maximum allowance inclination: 1°).
  - Avoid air-borne substances that may adversely affect the machine or degrade the photo-conductor, such as mercury, acidic or alkaline vapors, inorganic gasses, NO<sub>x</sub>, SO<sub>x</sub> gases and chlorine-based organic solvents.
  - Select a room with good ventilation.
6. Allow sufficient access for proper operation and maintenance of the machine.

Machine front: 50 cm/19.7" Machine rear: 20 cm/7.9"

Machine right: 15 cm/5.9" Machine left: 15 cm/5.9"

Machine top: 30 cm/11.8"

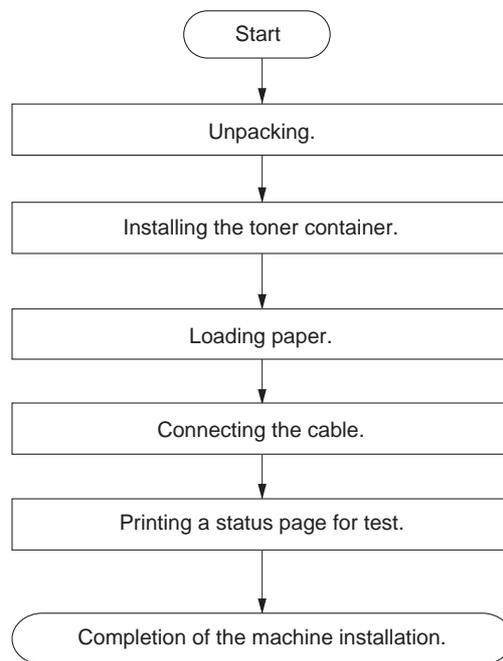


**Figure 1-2-1 Installation dimensions**

This page is intentionally left blank.

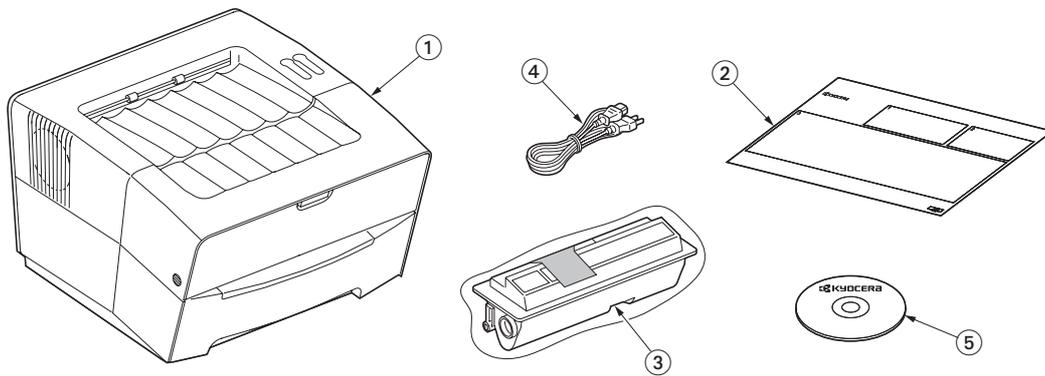
### 1-3-1 Unpacking and installation

#### (1) Installation procedure



**Figure 1-3-1**

Unpacking.



**Figure 1-3-2 Unpacking**

1. Printer
2. Installation guide
3. Toner container
4. Power cord
5. CD-ROM

### Installing the toner container.

1. Rotate the toner container 5 to 6 times and then shake the container horizontally to distribute the toner evenly.
2. Remove the label from the toner container.

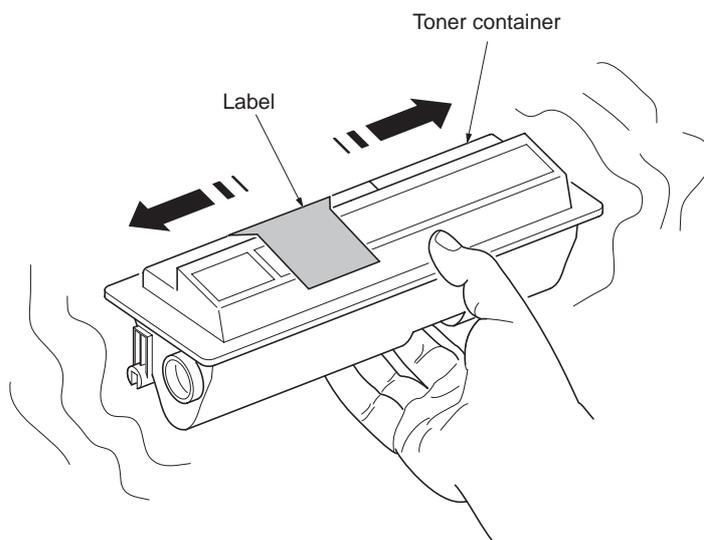


Figure 1-3-3

3. Turn the toner container release lever to the [UNLOCK] position.
4. Install the toner container in the printer. Push firmly on the top of the container at the positions marked [PUSH HERE] until you hear a click.
5. Turn the toner container release lever to the [LOCK] position.
6. Close the top cover.

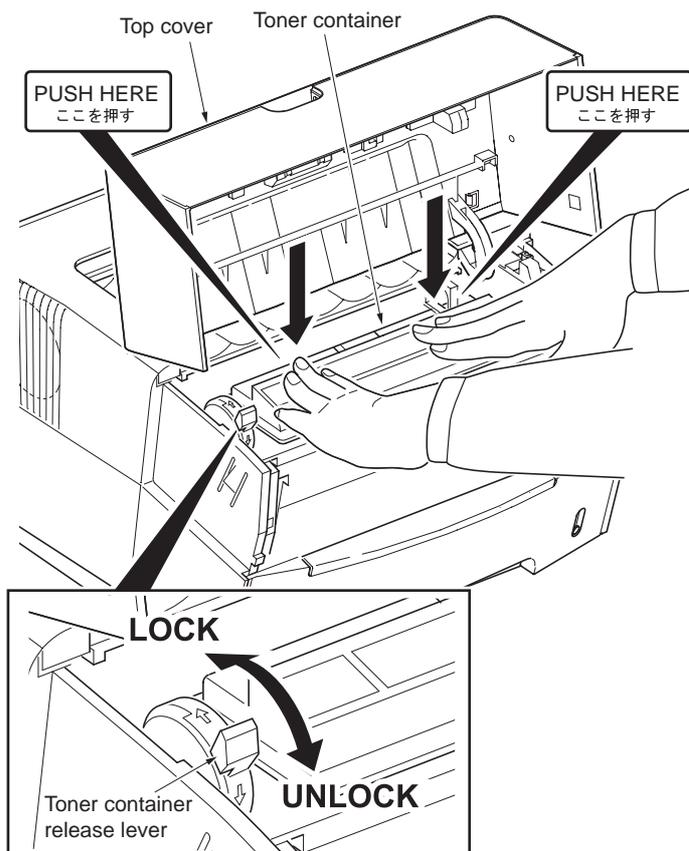


Figure 1-3-4

Loading paper.

1. Pull the paper cassette completely out of the printer.

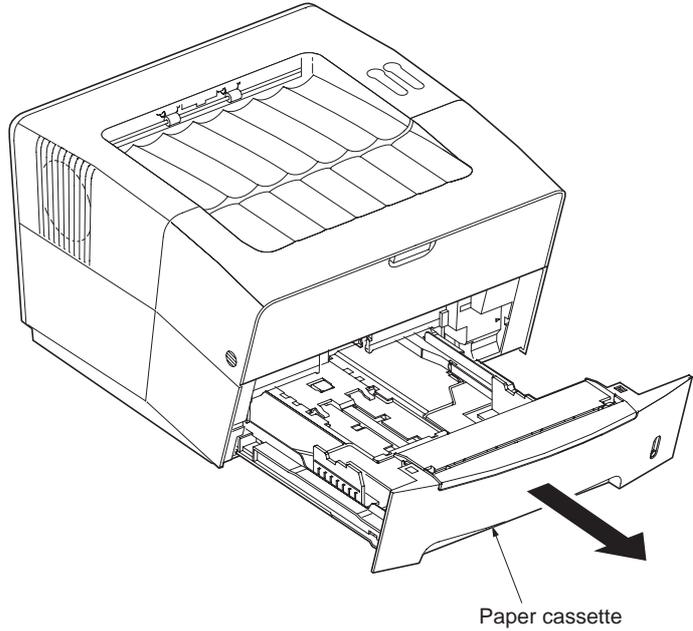


Figure 1-3-5

2. Push on the base plate until it click into position (flat).
3. Adjust the paper length guide and paper width guides to the paper size required.
4. Load the paper in the paper cassette.
5. Push the paper cassette back into the printer until it stops.

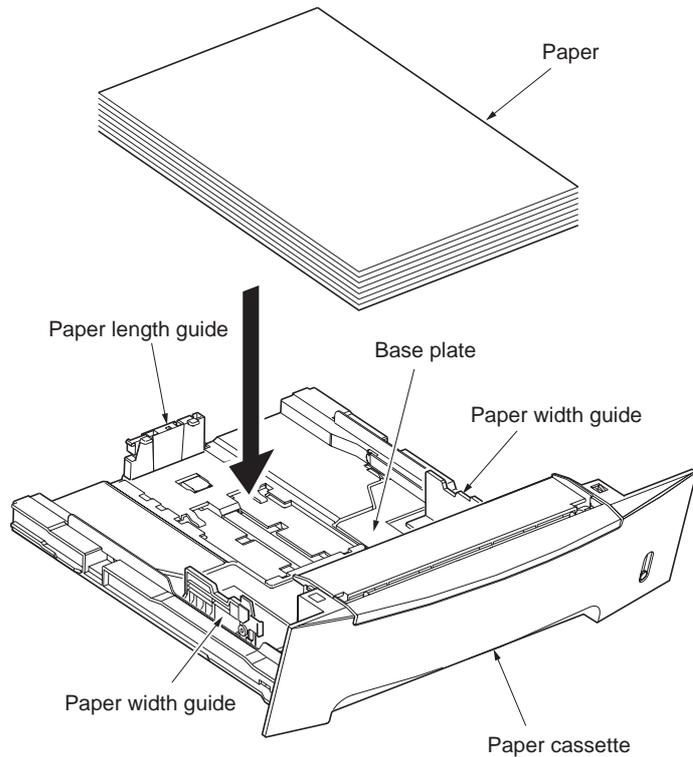
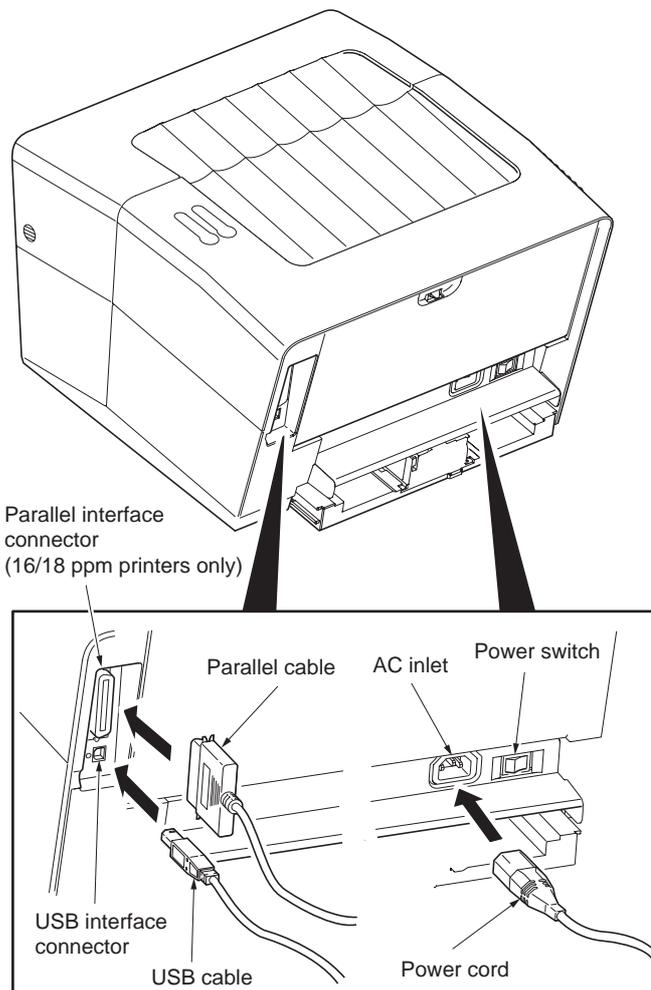


Figure 1-3-6

### Connecting the cable.

1. Connect the printer cable to the USB or parallel (16/18 ppm printers only) interface connector.
2. Connect the other end of the printer cable to the PC's interface connector.
3. Connect the power cord to the printer AC inlet.
4. Connect the power cord to the wall outlet.



**Figure 1-3-7**

### Printing a status page for test.

1. Turn on the printer power switch.
2. Press the GO key for 10 seconds or more. Test page (16 ppm GDI printer) or service status page (16/18 ppm printers) will be printed. See page 1-4-11 or 1-4-3.
3. Check to see if the test page or service status page is properly printed.

### Completion of the machine installation.

### 1-3-2 Installing expansion memory (optional for 16/18 ppm printers)

#### <Procedure>

1. Turn off printer power.
- \* Caution: Do not insert or remove expansion memory while printer power is on. Doing so may cause damage to the printer and the expansion memory.
2. Open the top cover.
3. Remove the right side cover.
4. Open the stoppers of the memory socket on the main PWB.
5. Insert the memory so that the two notches of the memory are engaged with the projections of the memory socket.
6. Close the stoppers of the memory socket.
7. Refit the right side cover.
8. Print a status page to check the memory expansion. See page 1-4-3.
- \* If memory expansion has been properly performed, information on the installed memory is printed with the total memory capacity has been increased. Standard memory capacity 16 MB (16 ppm printer), 32 MB (18 ppm printer).

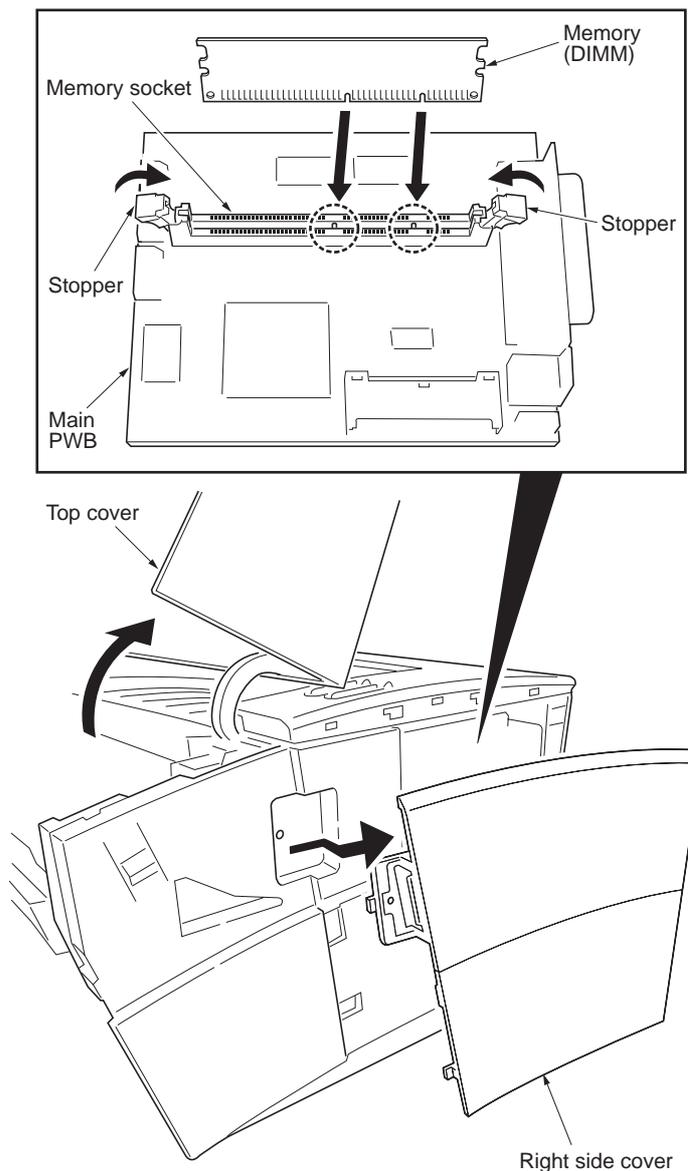


Figure 1-3-8

### 1-3-3 Installing a memory card (optional for 16/18 ppm printers)

#### <Procedure>

1. Turn off printer power.
  - \* Caution: Do not insert or remove memory card while printer power is on. Doing so may cause damage to the printer and the memory card.
2. Insert the memory card into the memory card socket on the main PWB.
3. Format the memory card before use. (Refer to the operation guide.)

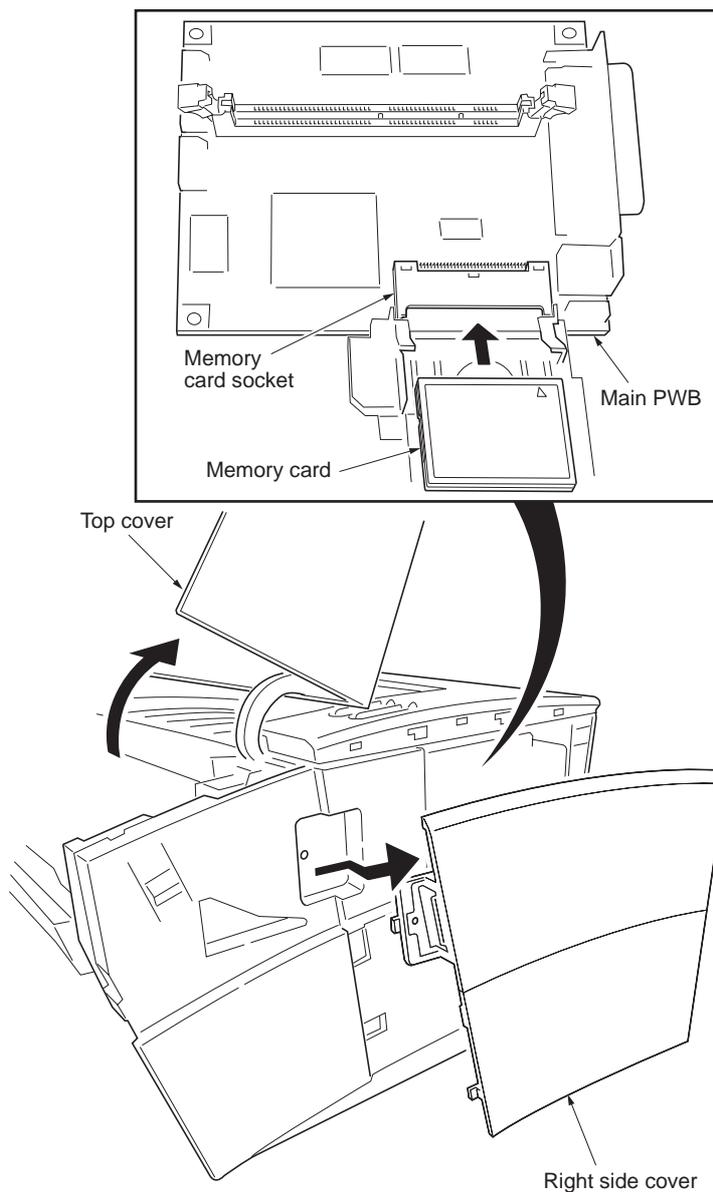


Figure 1-3-9

This page is intentionally left blank.

### 1-4-1 Service mode

The product incorporates several service modes which are activated by using the keys on the operation panel or by commanding from a PC.

#### (1) Executing service mode

- Printing service status page (For 16 ppm GDI printer) ..... See page 1-4-2.
- Printing service status page (For 16/18 ppm printers) ..... See page 1-4-3.
- Printing event log (For 16/18 ppm printers) ..... See page 1-4-6.
- Printing test page (For 16 ppm GDI printer) ..... See page 1-4-11.
- Toner install mode..... See page 1-4-11.

Service items	Description
<p><b>Printing service status page (For 16 ppm GDI printer)</b></p>	<p><b>Description</b>                      Prints a status page for service purpose.                      The service status page bears the serial number, engine firmware version, controller firmware version and the total print count. Printing a service status page should be executed by running the dedicated 16 ppm GDI printer software run on a PC.</p> <p><b>Purpose</b>                      To obtain printer information.</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"> <li>1. Load the CD-ROM (Kyocera FS-720 Library) supplied with the printer in the optical drive and proceed with software installation according to the instructions given.</li> <li>2. Starting with Windows's Menu, browse to the Configuration Tool window following the steps below.                      [Start] ► [All Programs] ► [Kyocera] ► [FS-720 Printer] ► [Configuration Tool]</li> </ol> <div> </div> <p style="text-align: center;"><b>Figure 1-4-1 Configuration tool</b></p> <ol style="list-style-type: none"> <li>3. Click [Print Status Page]. A service status page is printed.</li> </ol>
	<div> </div> <p style="text-align: center;"><b>Figure 1-4-2 Service status page (For 16 ppm GDI printer)</b></p>

Service items	Description
<p><b>Printing service status page (For 16/18 ppm printers)</b></p>	<p><b>Description</b>                      Prints a service status page for service purpose. The service status page includes various printing settings and service cumulative.</p> <p><b>Purpose</b>                      To acquire the current printing environmental parameters and cumulative information.</p> <p><b>Procedure</b>                      Press the GO key for 10 seconds or more.                      Two pages will be printed. (The second page includes service information.)</p> <div style="text-align: center; margin-top: 20px;"> </div> <p style="margin-top: 20px;">Service information (Refer to next page)</p> <p style="margin-top: 20px;">Main PWB firmware version</p> <p style="margin-top: 20px;">Release date of the firmware</p>

Figure 1-4-3 Service status page (For 16/18 ppm printers)



Service items	Description																					
	<b>Items</b>	<b>Description</b>																				
⑧	Operation panel lock status (displayed only when locked)	01: Partial lock 02: Full lock																				
⑨	NVRAM error (displayed only when any error has occurred)	01: ID error 02: Version error 03: Checksum error 04: NVRAM crash error																				
⑩	Printable area setting	/Top offset/Left offset/Page length/Page width																				
⑪	Left offset for each paper source	/Manual feed tray/Paper cassette/ (1/600 inches unit)																				
⑫	Top offset for paper sources	/Manual feed tray/ (1/600 inches unit)																				
⑬	Operation panel message language	PMSG command setting (decimal)																				
⑭	Number of rebooting for vertical distortion check	-																				
⑮	fixed asset number	(maximum 16 characters)																				
⑯	Media type attributes	Media type (paper weight) setting value from 1 to 28 (unused media types are always 0x00.)																				
⑰	Media type attributes	Media type (density) setting value from 1 to 28 (unused media types are always 0x00.)																				
⑱	Memory SPD information (slot 1)	2 to 6 byte, 8 to 36 byte, 94 to 95 byte (total 32 byte)																				
⑲	Engine parameter	Hexadecimal, 128 byte (256 digits)																				
⑳	Machine serial number	-																				
	<p><b>NOTE:</b></p> <p>Code conversion</p> <table border="1"> <tr> <td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td> </tr> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> </table>		A	B	C	D	E	F	G	H	I	J	0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J													
0	1	2	3	4	5	6	7	8	9													

Service items	Description
<p><b>Printing event log (For 16/18 ppm printers)</b></p>	<p><b>Description</b> Prints a history list of occurrences of paper jam, self-diagnostics, toner replacements, etc.</p> <p><b>Purpose</b> Analyze the failure by determining the cause depending on the history of occurrence.</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"> <li>1. Connect the parallel cable between printer and PC.</li> </ol> <div> </div> <p style="text-align: center;"><b>Figure 1-4-4</b></p> <ol style="list-style-type: none"> <li>2. Turn printer power on. Make sure the printer is ready.</li> <li>3. At the DOS prompt, send the following command to the printer:</li> </ol> <pre style="margin-left: 40px;">echo !R! ELOG;EXIT;&gt;prn</pre> <p>Event log will be printed.</p>

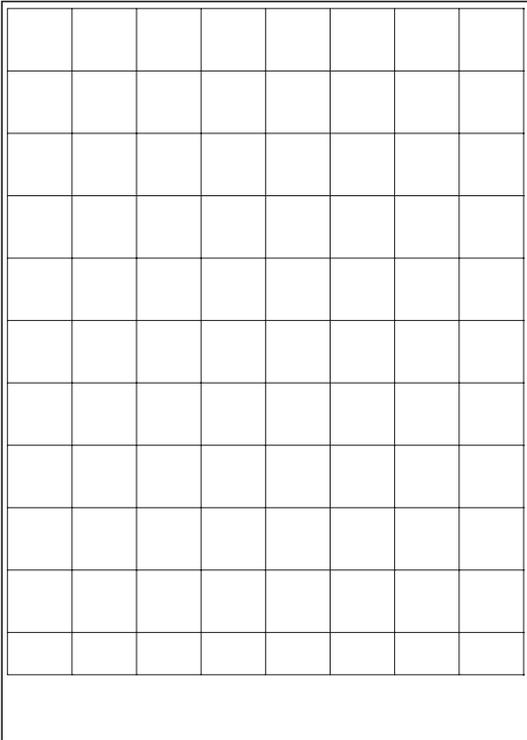
Service items	Description																																																																																																																																																													
<div style="border: 1px solid black; padding: 5px; margin: 0 auto; width: 80%;"> <h2 style="margin: 0;">EVENT LOG</h2> </div> <div style="margin: 5px 0;"> <p>[EB20MA001/2FV_1000.001.019] [C2] [40.00SFLB] [01]      Firmware version: 2FV_30000.001.024 Released: 15/Jul/2004</p> </div> <div style="margin: 5px 0;"> <p> <span style="margin-right: 40px;">①</span> <span style="margin-right: 40px;">②</span> <span style="margin-right: 40px;">③</span> <span style="margin-right: 40px;">④</span> <span style="margin-right: 40px;">⑤</span> <span style="margin-right: 40px;">⑥</span> </p> <p> <span style="margin-right: 100px;">Total page</span> <span style="margin-right: 100px;">12345</span> <span style="margin-right: 100px;">DN:SPL0000000</span> <span style="margin-right: 100px;">SN:SPL0000000</span> </p> <p> <span style="margin-right: 40px;">⑦</span> <span style="margin-right: 40px;">⑧</span> <span style="margin-right: 40px;">⑨</span> </p> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>⑩ <b>Paper Jam Log</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>#</th> <th>Count.</th> <th>Event</th> </tr> </thead> <tbody> <tr><td>8</td><td>9993</td><td>10.48.01.88.01.01</td></tr> <tr><td>7</td><td>9992</td><td>10.48.01.88.01.01</td></tr> <tr><td>6</td><td>9991</td><td>10.48.01.88.01.01</td></tr> <tr><td>5</td><td>9990</td><td>10.48.01.88.01.01</td></tr> <tr><td>4</td><td>9989</td><td>10.48.01.88.01.01</td></tr> <tr><td>3</td><td>9979</td><td>10.48.01.88.01.01</td></tr> <tr><td>2</td><td>9969</td><td>10.48.01.88.01.01</td></tr> <tr><td>1</td><td>1</td><td>10.48.01.88.01.01</td></tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="padding: 0 5px;">10</td> <td style="padding: 0 5px;">.48</td> <td style="padding: 0 5px;">.01</td> <td style="padding: 0 5px;">.88</td> <td style="padding: 0 5px;">.01</td> <td style="padding: 0 5px;">.01</td> </tr> <tr> <td style="padding: 0 5px;">(a)</td> <td style="padding: 0 5px;">(b)</td> <td style="padding: 0 5px;">(c)</td> <td style="padding: 0 5px;">(d)</td> <td style="padding: 0 5px;">(e)</td> <td style="padding: 0 5px;">(f)</td> </tr> </table> </div> </div> <div style="width: 48%;"> <p>⑪ <b>Service Call Log</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>#</th> <th>Count.</th> <th>Service Code</th> </tr> </thead> <tbody> <tr><td>8</td><td>11234</td><td>01.6000</td></tr> <tr><td>7</td><td>10000</td><td>01.6000</td></tr> <tr><td>6</td><td>9999</td><td>01.6000</td></tr> <tr><td>5</td><td>9998</td><td>01.6000</td></tr> <tr><td>4</td><td>9997</td><td>01.6000</td></tr> <tr><td>3</td><td>9996</td><td>01.6000</td></tr> <tr><td>2</td><td>9995</td><td>01.6000</td></tr> <tr><td>1</td><td>9994</td><td>01.6000</td></tr> </tbody> </table> <p>⑫ <b>Maintenance Log</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>#</th> <th>Count.</th> <th>item</th> </tr> </thead> <tbody> <tr><td>8</td><td>11234</td><td>02.00</td></tr> <tr><td>7</td><td>10000</td><td>02.00</td></tr> <tr><td>6</td><td>9999</td><td>02.00</td></tr> <tr><td>5</td><td>9998</td><td>02.00</td></tr> <tr><td>4</td><td>9997</td><td>02.00</td></tr> <tr><td>3</td><td>9996</td><td>02.00</td></tr> <tr><td>2</td><td>9995</td><td>02.00</td></tr> <tr><td>1</td><td>9994</td><td>02.00</td></tr> </tbody> </table> </div> </div> <div style="margin-top: 20px;"> <p>⑬ <b>Counter Log</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">J00: 0</td> <td style="width: 30%;">J43: 0</td> <td style="width: 30%;">(h) { C:6000: 4</td> <td style="width: 10%;">(i) M00: 1</td> </tr> <tr> <td>J05: 0</td> <td>J44: 0</td> <td>{ C:6050: 1</td> <td></td> </tr> <tr> <td>J09: 0</td> <td>J46:</td> <td></td> <td></td> </tr> <tr> <td>J10: 0</td> <td>J47:</td> <td></td> <td></td> </tr> <tr> <td>J11: 0</td> <td>J50:</td> <td></td> <td></td> </tr> <tr> <td>J12: 0</td> <td>J51:</td> <td></td> <td></td> </tr> <tr> <td>(g) J13: 0</td> <td>J52:</td> <td></td> <td></td> </tr> <tr> <td>J14: 0</td> <td>J53:</td> <td></td> <td></td> </tr> <tr> <td>J15: 0</td> <td>J60:</td> <td></td> <td></td> </tr> <tr> <td></td> <td>J61:</td> <td></td> <td></td> </tr> <tr> <td>J23: 0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>J30: 0</td> <td>J87:</td> <td></td> <td></td> </tr> <tr> <td>J35: 0</td> <td>J88:</td> <td></td> <td></td> </tr> <tr> <td>J40: 0</td> <td>J89:</td> <td></td> <td></td> </tr> <tr> <td>J41:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>J42:</td> <td></td> <td></td> <td></td> </tr> </table> </div>		#	Count.	Event	8	9993	10.48.01.88.01.01	7	9992	10.48.01.88.01.01	6	9991	10.48.01.88.01.01	5	9990	10.48.01.88.01.01	4	9989	10.48.01.88.01.01	3	9979	10.48.01.88.01.01	2	9969	10.48.01.88.01.01	1	1	10.48.01.88.01.01	10	.48	.01	.88	.01	.01	(a)	(b)	(c)	(d)	(e)	(f)	#	Count.	Service Code	8	11234	01.6000	7	10000	01.6000	6	9999	01.6000	5	9998	01.6000	4	9997	01.6000	3	9996	01.6000	2	9995	01.6000	1	9994	01.6000	#	Count.	item	8	11234	02.00	7	10000	02.00	6	9999	02.00	5	9998	02.00	4	9997	02.00	3	9996	02.00	2	9995	02.00	1	9994	02.00	J00: 0	J43: 0	(h) { C:6000: 4	(i) M00: 1	J05: 0	J44: 0	{ C:6050: 1		J09: 0	J46:			J10: 0	J47:			J11: 0	J50:			J12: 0	J51:			(g) J13: 0	J52:			J14: 0	J53:			J15: 0	J60:				J61:			J23: 0				J30: 0	J87:			J35: 0	J88:			J40: 0	J89:			J41:				J42:			
#	Count.	Event																																																																																																																																																												
8	9993	10.48.01.88.01.01																																																																																																																																																												
7	9992	10.48.01.88.01.01																																																																																																																																																												
6	9991	10.48.01.88.01.01																																																																																																																																																												
5	9990	10.48.01.88.01.01																																																																																																																																																												
4	9989	10.48.01.88.01.01																																																																																																																																																												
3	9979	10.48.01.88.01.01																																																																																																																																																												
2	9969	10.48.01.88.01.01																																																																																																																																																												
1	1	10.48.01.88.01.01																																																																																																																																																												
10	.48	.01	.88	.01	.01																																																																																																																																																									
(a)	(b)	(c)	(d)	(e)	(f)																																																																																																																																																									
#	Count.	Service Code																																																																																																																																																												
8	11234	01.6000																																																																																																																																																												
7	10000	01.6000																																																																																																																																																												
6	9999	01.6000																																																																																																																																																												
5	9998	01.6000																																																																																																																																																												
4	9997	01.6000																																																																																																																																																												
3	9996	01.6000																																																																																																																																																												
2	9995	01.6000																																																																																																																																																												
1	9994	01.6000																																																																																																																																																												
#	Count.	item																																																																																																																																																												
8	11234	02.00																																																																																																																																																												
7	10000	02.00																																																																																																																																																												
6	9999	02.00																																																																																																																																																												
5	9998	02.00																																																																																																																																																												
4	9997	02.00																																																																																																																																																												
3	9996	02.00																																																																																																																																																												
2	9995	02.00																																																																																																																																																												
1	9994	02.00																																																																																																																																																												
J00: 0	J43: 0	(h) { C:6000: 4	(i) M00: 1																																																																																																																																																											
J05: 0	J44: 0	{ C:6050: 1																																																																																																																																																												
J09: 0	J46:																																																																																																																																																													
J10: 0	J47:																																																																																																																																																													
J11: 0	J50:																																																																																																																																																													
J12: 0	J51:																																																																																																																																																													
(g) J13: 0	J52:																																																																																																																																																													
J14: 0	J53:																																																																																																																																																													
J15: 0	J60:																																																																																																																																																													
	J61:																																																																																																																																																													
J23: 0																																																																																																																																																														
J30: 0	J87:																																																																																																																																																													
J35: 0	J88:																																																																																																																																																													
J40: 0	J89:																																																																																																																																																													
J41:																																																																																																																																																														
J42:																																																																																																																																																														

Figure 1-4-5 Event log (For 16/18 ppm printers)

Service items	Description						
	<b>Items</b>	<b>Description</b>					
①	Engine/high voltage PWB mask version	[Engine mask version/Engine software version]					
②	Operation panel PWB mask version	-					
③	BROM version						
④	Software jumper switch information (hexadecimal) [First byte/second byte (displayed in OEM mode only)]	First byte bit 0 = 1: (Fixed) bit 1 = 0: Overseas, 1: Domestic (Japan) bit 2, 3 (Not used) bit 4 = 0: Kyocera, 1: OEM bit 5 = 0: For Europe, 1: For US bit 6 = 0: Non MICR mode, 1: MICR mode bit 7 (Not used) Second byte: Displayed in OEM mode only					
⑤	Main PWB mask version						
⑥	Main PWB firmware release date						
⑦	Total page counter						
⑧	Drum serial number						
⑨	Printer serial number						
⑩	Paper Jam Log	<u>#</u> Remembers 1 to 8th of occurrence. If the occurrence of the previous paper jam is less than 8, all of the paper jams are logged. When the occurrence exceeds 8, the oldest occurrence is removed.	<table border="1"> <thead> <tr> <th><u>Count.</u></th> <th><u>Event</u></th> </tr> </thead> <tbody> <tr> <td>The total page count at the time of the paper jam.</td> <td>           Log code (2 digit, hexadecimal, 6 categories)             (a) Cause of a paper jam            (b) Position of paper jam            (c) Paper source            (d) Paper size            (e) Paper type            (f) Paper exit             Refer to the next page for the details of each log code.         </td> </tr> </tbody> </table>	<u>Count.</u>	<u>Event</u>	The total page count at the time of the paper jam.	Log code (2 digit, hexadecimal, 6 categories)  (a) Cause of a paper jam (b) Position of paper jam (c) Paper source (d) Paper size (e) Paper type (f) Paper exit  Refer to the next page for the details of each log code.
<u>Count.</u>	<u>Event</u>						
The total page count at the time of the paper jam.	Log code (2 digit, hexadecimal, 6 categories)  (a) Cause of a paper jam (b) Position of paper jam (c) Paper source (d) Paper size (e) Paper type (f) Paper exit  Refer to the next page for the details of each log code.						



Service items		Description		
	Items	Description		
⑩ cont.		(e) Detail of paper type (Hexadecimal)		
		01: Plain 02: Transparency 03: Preprint 04: Labels 05: Bond 06: Recycle 07: Vellum 08: Rough 09: Letter head	0A: Color 0B: Prepunched 0C: Envelope 0D: Cardstock 0E: Coated 0F: 2nd side 10: Media 16 11: High quality	15: Custom 1 16: Custom 2 17: Custom 3 18: Custom 4 19: Custom 5 1A: Custom 6 1B: Custom 7 1C: Custom 8
		(f) Detail of paper exit location		
		01: Output tray	02 to 48: Not used	
⑪	Service Call Log (Self diagnostic error)	#  Remembers 1 to 8 of occurrence of self diagnostics error. If the occurrence of the previous diagnostics error is less than 8, all of the diagnostics errors are logged.	Count.  The total page count at the time of the self diagnostics error.	Self diagnostic error code  See page 1-5-3.
⑫	Maintenance Log	#  Remembers 1 to 8 of occurrence of replacement. If the occurrence of the previous replacement of toner container is less than 8, all of the occurrences of replacement are logged.	Count.  The total page count at the time of the replacement of the toner container.  This is virtually logged as the occurrence of the Toner Empty condition since the replacement of the toner container is not precisely detectable.	Item  Code of maintenance replacing item (1 byte, 2 category)  01: Toner container
⑬	Counter Log  Comprised of three log counters including paper jams, self diagnostics errors, and replacement of the toner container.	(g) Jam  Indicates the log counter of paper jams depending on location.  Refer to ⑩ Paper Jam Log.  All instances including those are not occurred are displayed.	(h) Self diagnostic error  Indicates the log counter of self diagnostics errors depending on cause. See page 1-5-3.  Example: C6000: 4  Self diagnostics error 6000 has happened four times.	(i) Toner container replacing  Indicates the log counter depending on the maintenance item for maintenance.  T: Toner container 00: Black  Example: T00: 1  The (black) toner container has been replaced once.

Service items	Description
<p><b>Printing test page (For 16 ppm GDI printer)</b></p>	<p><b>Description</b> Prints a test page for service purpose. A page showing a grid image is printed.</p> <p><b>Purpose</b> Performs check on operation and printing image.</p> <p><b>Procedure</b> Press the GO key for 10 seconds or more. Test page will be printed.</p> <div style="text-align: center;"></div> <p><b>Figure 1-4-6 Test page (For 16 ppm GDI printer)</b></p>
<p><b>Toner install mode</b></p>	<p><b>Description</b> Replenishes toner rapidly from the toner container into the developer unit.</p> <p><b>Purpose</b> To execute after replacing the developer unit to replenish toner rapidly into the developer unit that includes no toner.</p> <p><b>Procedure</b> Toner install mode is performed by simultaneously pressing and holding the GO and CANCEL keys for more than 5 seconds. To abort toner install mode, turn power on while pressing and holding the GO and CANCEL keys.</p>

This page is intentionally left blank.

## 1-5-1 Paper misfeed detection

### (1) Paper misfeed indication

When a paper misfeed occurs, the printer immediately stops printing and flash the ATTENTION indicator. To remove paper misfeed in the printer, pull out the paper cassette or open the rear cover.

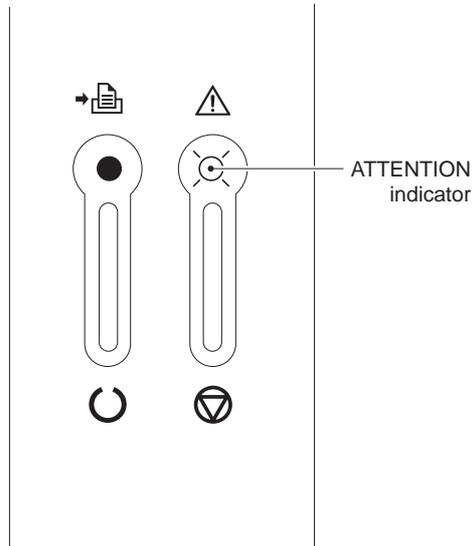


Figure 1-5-1 Paper misfeed indication

(2) Paper misfeed detection

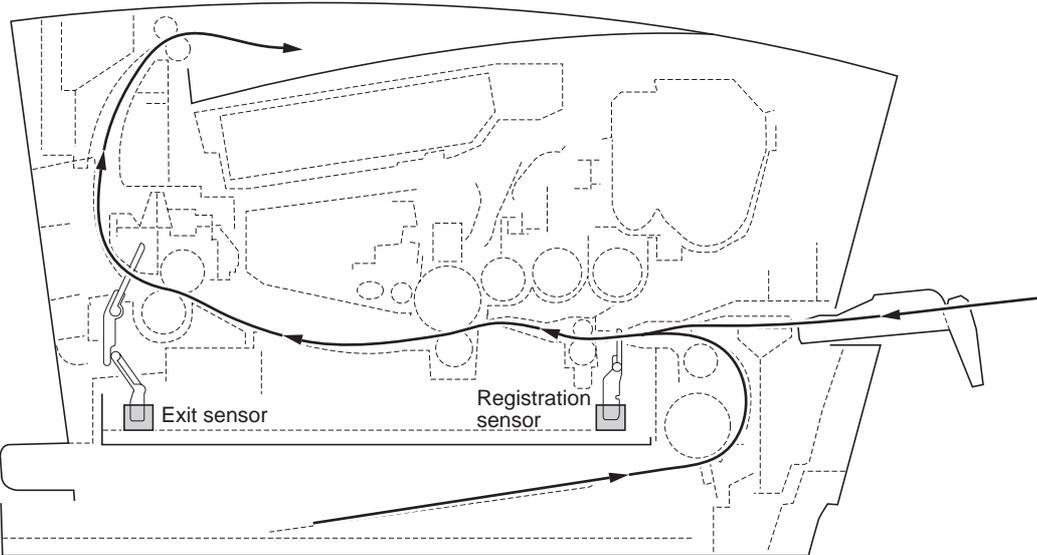


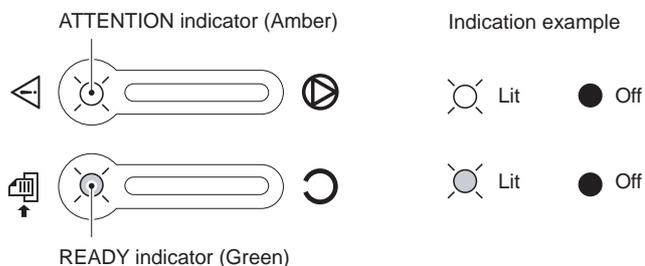
Figure 1-5-2 Paper misfeed detection

## 1-5-2 Self-diagnosis

### (1) Self-diagnostic function

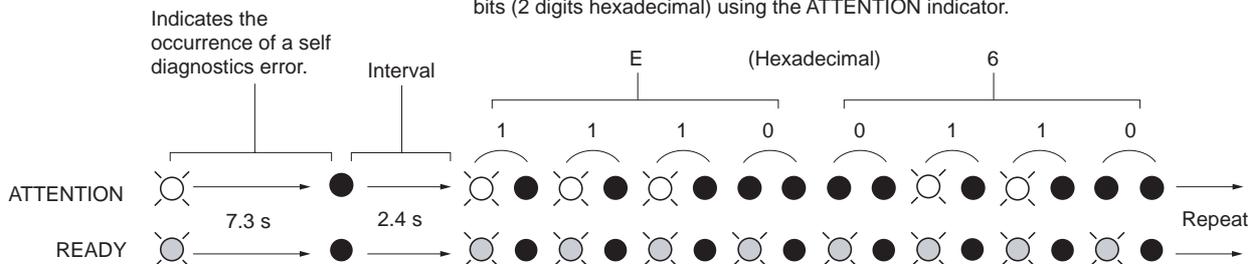
When a self diagnostics error occurs, the printer halts and displays the appropriate error code using a combination of the READY and ATTENTION indicators.

#### LED indicator



#### Example: self-diagnostic code: E6 (F050)

The ATTENTION indicator means 1 when it flashes in synchronization with the READY indicator which flashes at the interval of 1.2 second; and it means 0 when it turns off: This is repeated 8 times. Two digit self diagnostics codes are indicated in 8 bits (2 digits hexadecimal) using the ATTENTION indicator.



#### Self-diagnostic code conversion table

Self-diagnostic code		ATTENTION indicator				Remark	
4 digits	2 digits						
6400	A0	1	0	1	0	0 0 0 0	
7980	D9	1	1	0	1	1 0 0 1	
7990	DA	1	1	0	1	1 0 1 0	
F040	E0	1	1	1	0	0 0 0 0	
2000	E1	1	1	1	0	0 0 0 1	
4000	E2	1	1	1	0	0 0 1 0	
4200	E3	1	1	1	0	0 0 1 1	
6000 6010 6050	E4	1	1	1	0	0 1 0 0	
F050	E6	1	1	1	0	0 1 1 0	
F010	F1	1	1	1	1	0 0 0 1	16/18 ppm printers only
F020	F2	1	1	1	1	0 0 1 0	
F030	F3	1	1	1	1	0 0 1 1	

Figure 1-5-3 Self-diagnostic code indication

(2) Self diagnostic codes

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
2000 (E1)	<b>Main motor error</b> • The main motor ready input is not given for two seconds during the main motor is driven.	Defective harness between engine/ high voltage PWB and main motor.	Follow the flow chart.
		Defective main motor.	
		Defective engine/ high voltage PWB.	
		Defective drive unit.	

```

                    graph TD
                        Start([Start]) --> Reinsert[Reinsert the connector of harness between engine/high voltage PWB and main motor.]
                        Reinsert --> OK{OK?}
                        OK -- No --> ReplaceHarness([Replace harness between engine/high voltage PWB and main motor.])
                        OK -- Yes --> ConnectTester[Connect circuit tester to pin 1 of CN1 connector on the main motor.]
                        ConnectTester --> DC24V{24 V DC at pin 1 of CN1 connector on the main motor?}
                        DC24V -- No --> ReplaceHarness
                        DC24V -- Yes --> ConnectTester5[Connect circuit tester to pin 5 (REMOTE) of YC5 connector on the engine/high voltage PWB.]
                        ConnectTester5 --> TurnPowerOff1[Turn printer power off, then on.]
                        TurnPowerOff1 --> PrintStatus1[Print status page.]
                        PrintStatus1 --> RemoteHighLow{Does pin 5 (REMOTE) of YC5 connector on the engine/high voltage PWB goes high, then low?}
                        RemoteHighLow -- No --> ReplacePWB([Replace engine/high voltage PWB. See page 1-6-17.])
                        RemoteHighLow -- Yes --> ConnectOscilloscope[Connect oscilloscope to pin 5 (REMOTE) and pin 3 (MMOTRDY) of CN1 connector on the main motor.]
                        ConnectOscilloscope --> TurnPowerOff2[Turn printer power off, then on.]
                        TurnPowerOff2 --> PrintStatus2[Print status page.]
                        PrintStatus2 --> Pin3HighLow{Does pin 3 (MMOTRDY) of CN1 connector on the main motor goes high, then low, within 2 seconds from pin 5 (REMOTE) goes low?}
                        Pin3HighLow -- No --> ReplacePWB
                        Pin3HighLow -- Yes --> ReplaceMotor([Replace the main motor. See page 1-6-24. If not solved, check or replace drive unit. See page 1-6-23.])
                    
```

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
4000 (E2)	<b>Polygon motor (laser scanner unit) error</b> • The polygon motor ready input is not given for eight seconds during the polygon motor is driven.	Defective harness between engine/ high voltage PWB and laser scanner unit.	Follow the flow chart.
		Defective engine/ high voltage PWB.	
		Defective polygon motor (laser scanner unit).	

```

graph TD
    Start([Start]) --> D1{+24 V DC at pin 5 of YC3 connector on the engine/high voltage PWB?}
    D1 -- No --> R1(Replace engine/high voltage PWB. See page 1-6-17.)
    R1 --> T1[Turn power switch on.]
    T1 --> D2{OK?}
    D2 -- Yes --> E1([End.])
    D2 -- No --> R2(Replace laser scanner unit. See page 1-6-xx.)
    R2 --> T2[Turn power switch on.]
    T2 --> D3{OK?}
    D3 -- Yes --> E2([End.])
    D3 -- No --> R3(Replace harness between engine/high voltage PWB and laser scanner unit.)
    
    D1 -- Yes --> C1[Connect oscilloscope to pin 1 (PLGCLK) and pin 3 (PLGON) of YC3 connector on the engine/high voltage PWB.]
    C1 --> T3[Turn power switch off, then on.]
    T3 --> D4{Does pin 3 (PLGON) of YC3 connector on the engine/high voltage PWB goes high, then low?}
    D4 -- No --> R4(Replace engine/high voltage PWB. See page 1-6-17.)
    R4 --> T4[Turn power switch on.]
    T4 --> D5{OK?}
    D5 -- Yes --> E3([End.])
    D5 -- No --> R5(Replace laser scanner unit. See page 1-6-xx.)
    R5 --> T5[Turn power switch on.]
    T5 --> D6{OK?}
    D6 -- Yes --> E4([End.])
    D6 -- No --> R6(Replace harness between engine/high voltage PWB and laser scanner unit.)
    
    D4 -- Yes --> D7{Does pin 1 (PLGCLK) of YC3 connector on the engine/high voltage PWB output square-wave* signal?}
    D7 -- No --> R7(Replace engine/high voltage PWB. See page 1-6-17.)
    R7 --> T6[Turn power switch off, then on.]
    T6 --> D8{Does pin 2 (PLGDRY) of YC3 connector on the engine/high voltage PWB goes high, then low, within 8 seconds after pin 5 (REMOTE) goes high, then low?}
    D8 -- Yes --> R8(Replace engine/high voltage PWB. See page 1-6-17.)
    R8 --> T7[Turn power switch on.]
    T7 --> D9{OK?}
    D9 -- Yes --> E5([End.])
    D9 -- No --> R9(Replace harness between engine/high voltage PWB and laser scanner unit.)
    
    D7 -- Yes --> C2[Connect oscilloscope to pin 2 (PLGDRY) and pin 3 (PLGON) of YC3 connector on the engine/high voltage PWB.]
    C2 --> T8[Turn power switch off, then on.]
    T8 --> D8
    
```

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
4200 (E3)	<p><b>PD (Pin photo diode) sensor (laser scanner unit) error</b></p> <ul style="list-style-type: none"> <li>The first BD input is not given for 10 seconds after power is turned on and the laser begins emitting.</li> <li>The first BD input is not given for 7 seconds during printing and after the laser begins emitting.</li> </ul>	Defective main PWB.	Follow the flow chart.
		Defective harness between main PWB and engine/ high voltage PWB.	
		Defective engine/ high voltage PWB.	

\*1 :16 ppm GDI printer  
\*2 :16/18 ppm printers

\*3 Pin photo diode sensor detect horizontal synchronization signal (Frequency: 1417 Hz, Low level width: 10 μs)

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
4200 (E3) cont.	<p>Continued from previous page.</p> <p>(A)</p> <pre> graph TD     A1[Replace laser scanner unit. See page 1-6-21.] --&gt; A2[Replace main PWB. See page 1-6-15 or 16.]     A2 --&gt; A3[Turn power switch on.]     A3 --&gt; A4{OK?}     A4 -- No --&gt; A5[Replace engine/high voltage PWB. See page 1-6-17.]     A4 -- Yes --&gt; A6[Turn power switch on.]     A6 --&gt; A7{OK?}     A7 -- No --&gt; A8[End.]     A7 -- Yes --&gt; A9[End.]                     </pre> <p>(B)</p> <pre> graph TD     B1[Replace main PWB. See page 1-6-15 or 16.] --&gt; B2[Turn power switch on.]     B2 --&gt; B3{OK?}     B3 -- No --&gt; B4[Replace engine/high voltage PWB. See page 1-6-17.]     B3 -- Yes --&gt; B5[End.]     B4 --&gt; B6{OK?}     B6 -- No --&gt; B7[Replace harness between main PWB and engine/high voltage PWB.]     B6 -- Yes --&gt; B8[End.]                     </pre> <p>Flowchart for (A) and (B) continues with shared steps:</p> <pre> graph TD     C1[Replace harness between main PWB and laser scanner unit.] --&gt; C2[Turn power switch on.]     C2 --&gt; C3{OK?}     C3 -- Yes --&gt; C4[End.]     C3 -- No --&gt; C5[Replace harness between main PWB and laser scanner unit. See page 1-6-15 or 16.]     C5 --&gt; C6[Turn power switch on.]     C6 --&gt; C7{OK?}     C7 -- Yes --&gt; C8[End.]     C7 -- No --&gt; C9[Replace harness between main PWB and engine/high voltage PWB.]                     </pre>		

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
6000 (E4)	<p><b>Broken heater lamp error</b></p> <ul style="list-style-type: none"> <li>The temperature won't rise by 1 degree Celsius during warming up and the heater is turned on for 5 seconds.</li> <li>The temperature won't rise by 1 degree Celsius during printing and the heater is turned on for 5 seconds with the duty cycle more than 60%.</li> </ul>	Defective fuser thermistor.	Follow the flow chart.
		Broken thermal cutout or heater lamp.	
<pre> graph TD     Start([Start]) --&gt; Step1[Turn power switch off, and remove power cord.]     Step1 --&gt; Step2[Detach YC7 connector on the engine/high voltage PWB.]     Step2 --&gt; Step3[Measure resistance between pins 1 and 2 of the detached connector.]     Step3 --&gt; Dec1{Open (infinite)?}     Dec1 -- Yes --&gt; Act1([Replace the fuser thermistor. See page 1-6-11.])     Dec1 -- No --&gt; Step4[Detach YC1 connector on the power source PWB.]     Step4 --&gt; Step5[Measure resistance between pins 1 and 2 of the detached connector.]     Step5 --&gt; Dec2{Open (infinite)?}     Dec2 -- Yes --&gt; Act2([Replace the thermal cutout or heater lamp. See page 1-6-11.])     Dec2 -- No --&gt; Act3([Replace the engine/high voltage PWB. See page 1-6-17.])     </pre>			

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
6010 (E4)	<b>Fuser low temperature</b> • After the fuser heater lamp is turned on, the temperature at the upper fuser roller lower than 100 °C/212 °F continues for 30 s.	Defective the fuser thermistor.	Follow the flow chart.
		Defective the engine/high voltage PWB.	
<pre>                     graph TD                         Start([Start]) --&gt; Check[Check the installation condition of the fuser thermistor. See page 1-6-11.]                         Check --&gt; OK{OK?}                         OK -- Yes --&gt; ReplacePWB1([Replace the engine/high voltage PWB. See page 1-6-17.])                         OK -- No --&gt; Remedy[Remedy or replace the fuser thermistor.]                         Remedy --&gt; Power[Turn power switch off, then on.]                         Power --&gt; Error{"6010" error shown?}                         Error -- Yes --&gt; ReplacePWB2([Replace engine/high voltage PWB. See page 1-6-17.])                         Error -- No --&gt; End([End.])                     </pre>			

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
6050 (E4)	<b>Broken fuser thermistor</b> • The thermistor AD value is less than 1 for 3 s.	Defective the fuser thermistor.	Follow the flow chart.
		Defective the engine/high voltage PWB.	
<pre>                     graph TD                         Start([Start]) --&gt; Step1[Turn power switch off, and remove power cord.]                         Step1 --&gt; Step2[Detach YC7 connector on the engine/high voltage PWB.]                         Step2 --&gt; Step3[Measure resistance between pins 1 and 2 of the detached connector.]                         Step3 --&gt; Decision{Open (infinite)?}                         Decision -- Yes --&gt; Action1([Replace fuser thermistor. See page 1-6-11.])                         Decision -- No --&gt; Action2([Replace engine/high voltage PWB. See page 1-6-17.])                     </pre>			
6400 (A0)	<b>Zero cross signal error</b> • While fuser heater ON/OFF control is performed, the zero-cross signal is not input within 3 s.	Defective the power source PWB.	Follow the flow chart.
		Defective the engine/high voltage PWB.	
<pre>                     graph TD                         Start([Start]) --&gt; Step1[Replace the power source PWB. See page 1-6-17.]                         Step1 --&gt; Decision{OK?}                         Decision -- Yes --&gt; End([End.])                         Decision -- No --&gt; Action([Replace the engine/high voltage PWB. See page 1-6-17.])                     </pre>			

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
7980 (D9)	<b>Waste toner full (Total page count less than 100,000 pages of printing)</b> • The toner-full sensor has detected that the waste toner is full before the total print page of less than 100,000 pages.	Defective drum unit.	Follow the flow chart.
		Defective waste toner full sensor.	
		Defective engine/ high voltage PWB.	
<pre>                     graph TD                         Start([Start]) --&gt; Step1[Shake the drum unit horizontally.]                         Step1 --&gt; Step2[Turn power switch off, then on.]                         Step2 --&gt; Dec1{"'7980' error shown?"}                         Dec1 -- No --&gt; End([End.])                         Dec1 -- Yes --&gt; Step3[Replace the drum unit. See page 1-6-6.]                         Step3 --&gt; Step4[Turn power switch off, then on.]                         Step4 --&gt; Dec2{"'7980' error shown?"}                         Dec2 -- No --&gt; End                         Dec2 -- Yes --&gt; Step5([Replace the waste toner full sensor or engine/high voltage PWB. See page 1-6-17.])                     </pre>			

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
7990 (DA)	<b>Waste toner full (Total page count more than 100,000 pages of printing)</b> • The toner-full sensor has detected that the waste toner is full before the total print page of more than 100,000 pages.	Defective drum unit.	Follow the flow chart.
		Defective waste toner full sensor.	
		Defective engine/high voltage PWB.	
<pre>                     graph TD                         Start([Start]) --&gt; Step1[Shake the drum unit horizontally.]                         Step1 --&gt; Step2[Turn power switch off, then on.]                         Step2 --&gt; Dec1{"7990" error shown?}                         Dec1 -- No --&gt; End([End.])                         Dec1 -- Yes --&gt; Step3[Replace the drum unit. See page 1-6-6.]                         Step3 --&gt; Step4[Turn power switch off, then on.]                         Step4 --&gt; Dec2{"7990" error shown?}                         Dec2 -- No --&gt; End                         Dec2 -- Yes --&gt; Step5([Replace waste toner full sensor or engine/high voltage PWB. See page 1-6-17.])                     </pre>			

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
F010 (F1)	<b>Code ROM checksum error (16/18 ppm printers only)</b> <ul style="list-style-type: none"> <li>Checksum for the code ROM that holds the system program is wrong.</li> </ul>	Defective code ROM (on-board).	Replace the main PWB. See page 1-6-16.
		Defective PWB.	Replace the main PWB. See page 1-6-16.
F020 (F2)	<b>Memory check error</b> <ul style="list-style-type: none"> <li>Access to the expansion memory (DIMM) or RAM on the main PWB failed.</li> </ul>	Defective main PWB.	Replace the main PWB. See page 1-6-15 or 1-6-16.
		Defective expansion memory (DIMM). (16/18 ppm printers only)	Replace the expansion memory (DIMM). See page 1-3-6.
F030 (F3)	<b>Main PWB system error</b> <ul style="list-style-type: none"> <li>The error pertaining to the system occurred except the F0 (F010) condition.</li> </ul>	Defective main PWB.	Replace the main PWB. See page 1-6-15 or 1-6-16.
F040 (E0)	<b>Main - Engine communication error</b> <ul style="list-style-type: none"> <li>The communication breakdown occurred between the main PWB and the engine/high voltage PWB during the predetermined period in seconds.</li> </ul>	Defective engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
		Defective main PWB.	Replace the main PWB. See page 1-6-15 or 1-6-16.
F050 (E6)	<b>Engine checksum error</b> <ul style="list-style-type: none"> <li>Checksum result failed with the CPU and engine/high voltage PWB.</li> </ul>	Defective engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.

## 1-5-3 Electric problems

Problem	Causes	Check procedures/corrective measures
(1) The machine does not operate when the power switch is turned on.	No electricity at the power outlet.	Measure the input voltage.
	The power cord is not plugged in properly.	Check the contact between the power plug and the outlet.
	The top cover is not closed completely.	Check the top cover.
	Broken power cord.	Check for continuity. If none, replace the cord.
	Defective power switch.	Check for continuity across the contacts. If none, replace the power source PWB. See page 1-6-17.
	Blown fuse in the power source PWB.	Check for continuity. If none, remove the cause of blowing and replace the fuse.
	Defective interlock switch.	Check for continuity across the contacts of interlock switch. If none, replace the engine/high voltage PWB. See page 1-6-17.
	Defective power source PWB or engine/high voltage PWB.	With AC present, check for 5 V DC at YC4-11, YC7-2, YC10-1, YC6-1, and 24 V DC at YCYC3-5, YC3-6, YC5-1 YC9-1 on the engine/high voltage PWB. If none, replace the power source PWB or engine/high voltage PWB. See page 1-6-17.
(2) The main motor does not operate (Self diagnostic code 2000).	Poor contact in the main motor connector terminals.	Reinsert the connector. Also check for continuity within the connector harness. If none, remedy or replace the harness.
	Broken main motor gear.	Check visually and replace the main motor if necessary.
	Defective main motor.	Replace the main motor. See page 1-6-24.
	Defective engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
(3) The cooling fan motor does not operate.	Broken cooling fan motor coil.	Check for continuity across the coil. If none, replace the cooling fan motor.
	Poor contact in cooling fan motor connector terminals.	Reinsert the connector.
(4) The registration clutch does not operate.	Broken registration clutch coil.	Check for continuity across the coil. If none, replace the registration clutch.
	Poor contact in the registration clutch connector terminals.	Reinsert the connector.
	Defective harness between connect PWB and engine/high voltage PWB.	Check for continuity across the harness. If none, replace the harness.
	Defective engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
	Defective connect PWB.	Replace the connect PWB.

Problem	Causes	Check procedures/corrective measures
(5) The feed clutch does not operate.	Broken feed clutch coil.	Check for continuity across the coil. If none, replace the feed clutch.
	Poor contact in the feed clutch connector terminals.	Reinsert the connector.
	Defective harness between connect PWB and engine/high voltage PWB.	Check for continuity across the harness. If none, replace the harness.
	Defective engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
	Defective connect PWB.	Replace the connect PWB.
(6) The eraser lamp (PWB) does not turn on.	Poor contact in the eraser lamp (PWB) connector terminals.	Reinsert the connector.
	Defective eraser lamp (PWB).	Check for continuity. If none, replace the eraser lamp (PWB). See page 1-6-22.
	Defective engine/high voltage PWB.	If the eraser lamp (PWB) turns on when YC8-2 on the engine/high voltage PWB is held low, replace the engine/high voltage PWB. See page 1-6-17.
(6) The heater lamp does not turn on.	Broken wire in heater lamp.	Check for continuity across each heater lamp. If none, replace the heater lamp. See page 1-6-11.
	Thermal cutout triggered.	Check for continuity across thermal cutout. If none, remove the cause and replace the thermal cutout. See page 1-6-11.
(7) The heater lamp does not turn off.	Broken fuser thermistor.	Measure the resistance. If it is $\infty\Omega$ , replace the fuser thermistor. See page 1-6-11.
	Dirty sensor part of the fuser thermistor.	Check visually and clean the fuser thermistor sensor parts. See page 1-6-11.
(8) No main charging.	Poor insertion main charger unit.	See page 1-5-18.
	Broken main charger wire.	
	Poor contact of main charger terminal and high voltage output terminal on the engine/high voltage PWB.	
	Defective engine/high voltage PWB.	
(9) No developing bias is output.	Poor insertion developer unit.	See page 1-6-6, 1-6-17, 1-5-18.
	Poor contact of developing bias terminal spring and high voltage output terminal (TAB1) on the engine/high voltage PWB.	
	Defective engine/high voltage PWB.	

Problem	Causes	Check procedures/corrective measures
(10) No transfer bias is output.	Poor contact of transfer bias terminal and transfer bias terminal (J1, J2, J3) on the engine/high voltage PWB.	See page 1-5-18, 1-6-17.
	Defective engine/high voltage PWB.	
(11) The message requesting paper to be loaded is shown when paper is present in the paper cassette.	Defective paper sensor on the engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
(12) A paper jam in the paper feeding/conveying section or fuser section is indicated when the power switch is turned on.	A piece of paper torn from paper is caught around registration sensor or exit sensor.	Check and remove if any.
	Defective registration sensor on the engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.
	Defective exit sensor on the power source PWB.	Replace the power source PWB. See page 1-6-17.
(13) The indicator requesting cover to be closed is displayed when the top cover is closed.	Defective interlock switch on the engine/high voltage PWB.	Check for continuity across the interlock switch. If there is no continuity when the interlock switch is on, replace the engine/high voltage PWB. See page 1-6-17.

**1-5-4 Image formation problems**

(1) Completely blank printout.



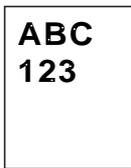
See page 1-5-18.

(2) All-black printout.



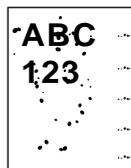
See page 1-5-18.

(3) Dropouts.



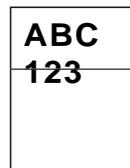
See page 1-5-19.

(4) Black dots.



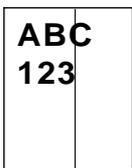
See page 1-5-19.

(5) Black horizontal streaks.



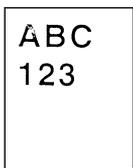
See page 1-5-20.

(6) Black vertical streaks.



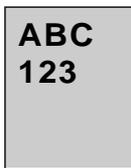
See page 1-5-20.

(7) Unsharpness.



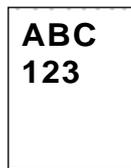
See page 1-5-21.

(8) Gray background.



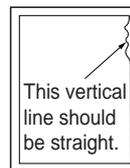
See page 1-5-21.

(9) Dirt on the top edge or back of the paper.



See page 1-5-22.

(10) Undulated printing at the right edge (scanning start position).



See page 1-5-22.

(1) Completely blank printout.



**Causes**

1. Defective drum unit or developer unit.
2. Defective transfer bias potential.
3. Defective laser scanner unit.
4. Defective main PWB.

Causes	Check procedures/corrective measures
1. Defective drum unit or developer unit.	Open the printer top cover and check that the drum unit and developer unit is correctly seated. Check for poor contact of the main charger terminal between the main charger unit and the drum unit.
2. Defective transfer bias potential.	Check the transfer bias output on the engine/high voltage PWB. This requires removal of the left cover and the test equipment. Replace the engine/high voltage PWB if high voltage potential is not available on the PWB. See page 1-6-17.
3. Defective laser scanner unit.	The scanner components within the scanner may be disordered. Replace the laser scanner unit. See page 1-6-20.
4. Defective main PWB.	Defective laser scanner unit control circuit in the main PWB. See page 1-6-15 or 1-6-16.

(2) No image appears (entirely black).

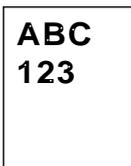


**Causes**

1. Defective main charger unit.
2. Defective main charger high voltage output.
3. Defective engine/high voltage PWB.
4. Defective main PWB.

Causes	Check procedures/corrective measures
1. Defective main charger unit.	Open the printer top cover and check that the drum unit is correctly seated. Check for poor contact of the main charger terminal between the main charger unit and the drum unit.
2. Defective main charger high voltage output.	Make sure the main charger high voltage output from the engine/high voltage PWB correctly arrives at the drum unit (main charger unit).
3. Defective engine/high voltage PWB.	Check the high voltage output on the engine/high voltage PWB. Replace the engine/high voltage PWB if high voltage potential is not available on the PWB. See page 1-6-17.
4. Defective main PWB.	Replace the main PWB. See page 1-6-15, 1-6-16.

(3) Dropouts.

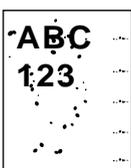


**Causes**

1. Defective developing roller (in the developer unit).
2. Defective drum unit.
3. Defective fuser unit.
4. Defective paper specifications.
5. Defective transfer roller installation.
6. Defective engine/high voltage PWB (transfer bias potential).

Causes	Check procedures/corrective measures
1. Defective developing roller (in the developer unit).	If the defects occur at regular intervals of 47.2 mm, the problem may be the damaged developing roller (in the developer unit). Replace the developer unit. See page 1-6-6.
2. Defective drum unit.	If the defects occur at regular intervals of 94 mm, the problem may be the damaged drum (in the drum unit). Replace the drum unit. See page 1-6-7.
3. Defective fuser unit.	If the defects occur at regular intervals of 63 mm (heat roller or press roller), the problem may be the damaged fuser unit. Replace the press roller or heat roller. See page 1-6-11.
4. Defective paper specifications.	Paper with rugged surface or dump tends to cause dropouts. Replace paper with the one that satisfies the paper specifications.
5. Defective transfer roller installation.	The transfer roller must be supported by the bushes at the both ends. Clean the bush to remove oil and debris. Replace the transfer roller if necessary. See page 1-6-11.
6. Defective engine/high voltage PWB (transfer bias potential).	Check the transfer bias output on the engine/high voltage PWB. This requires removal of the left cover and the test equipment. Replace the engine/high voltage PWB if high voltage potential is not available on the PWB. See page 1-6-17.

(4) Black dots.

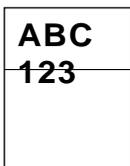


**Causes**

1. Defective drum unit.

Causes	Check procedures/corrective measures
1. Defective drum unit.	If the defects occur at regular intervals of 94 mm, the problem may be the damaged drum (in the drum unit). Replace drum unit. See page 1-6-7. If the defects occur at random intervals, the toner may be leaking from the developer unit and drum unit. Replace developer unit and drum unit. See page 1-6-6, 1-6-7.

(5) Black horizontal streaks.

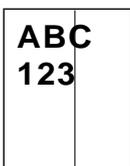


**Causes**

1. Defective drum unit's ground.
2. Defective drum unit

Causes	Check procedures/corrective measures
1. Defective drum unit's ground.	The drum axle in the drum unit and its counter part, the grounding tab in the printer, must be in a good contact. If necessary, apply a small amount of electro-conductive grease onto the tab.
2. Defective drum unit.	Replace the drum unit. See page 1-6-7.

(6) Black vertical streaks.

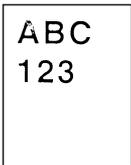


**Causes**

1. Contaminated main charger wire.
2. Defective drum surface.
3. Defective magnet roller (in the developer unit).

Causes	Check procedures/corrective measures
1. Contaminated main charger wire.	Clean the main charger wire by sliding the green colored cleaning knob in and out several times.
2. Defective drum surface.	A streak of toner remaining on drum after printing means that the cleaning blade (in the drum unit) is not working properly. Replace the drum unit. See page 1-6-7.
3. Defective magnet roller (in the developer unit).	Replace the developer. See page 1-6-6.

(7) Unsharpness.



**Causes**

1. Defective paper specifications.
2. Defective transfer roller installation.
3. Defective transfer bias potential.
4. EcoPrint setting.

Causes	Check procedures/corrective measures
1. Defective paper specifications.	Paper with rugged surface or dump tends to cause unsharp printing. Replace paper with the one that satisfies the paper specifications.
2. Defective transfer roller installation.	The transfer roller must be supported by the bushes at the both ends. Clean the bush to remove oil and debris. Replace the transfer roller if necessary. See page 1-6-5.
3. Defective transfer bias potential.	Check the transfer bias output on the engine/high voltage PWB. This requires removal of the left cover and the test equipment. Replace the engine/high voltage PWB if high voltage potential is not available on the PWB. See page 1-6-17.
4. EcoPrint setting.	The EcoPrint mode can provides faint, unsharp printing because it acts to conserve toner for draft printing purpose. For normal printing, turn the EcoPrint mode off by using the operator panel. For details refer to the operation guide.

(8) Gray background.



**Causes**

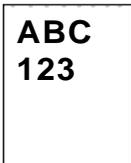
1. Print density setting.
2. Defective drum surface potential.
3. Defective main charger grid.
4. Developing roller (in the developer unit).

Causes	Check procedures/corrective measures
1. Print density setting.	The print density may be set too high. Try adjusting the print density. For details refer to the printer's operation guide.
2. Defective drum surface potential.	The drum surface potential should be approximately 470±15 V. This may vary depending on production lots. Measurement is possible only by using the jig and tool specifically designed for this purpose. The drum unit will have to be replaced if it bears values far out of the allowable range.
3. Defective main charger grid.	Clean the main charger grid.
4. Defective developing roller (in the developer unit).	If a developer unit which is known to work normally is available for check, replace the current developer unit in the printer with the normal one. If the symptom disappears, replace the developer unit with a new one. See page 1-6-6.

(9) Dirt on the top edge or back of the paper.

**Causes**

1. Toner contamination in various parts.
2. Defective transfer roller.

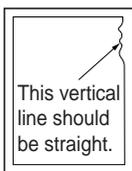


Causes	Check procedures/corrective measures
1. Toner contamination in various parts.	Dirty edges and back of the paper can be caused by toner accumulated on such parts as the paper chute, paper transportation paths, the bottom of the drum and developer, and the fuser unit inlet. Clean these areas and parts to remove toner.
2. Defective transfer roller.	If the transfer roller is contaminated with toner, clean the transfer roller using a vacuum cleaner or by continuously printing a low-density page until the symptom has faded away.

(10) Undulated printing at the right edge (scanning start position).

**Causes**

1. Defective laser scanner unit.
2. Defective engine controller circuit in the engine/high voltage PWB



Causes	Check procedures/corrective measures
1. Defective laser scanner unit.	Defective polygon motor in the laser scanner unit. Replace the laser scanner unit. See page 1-6-20.
2. Defective engine controller circuit in the engine/high voltage PWB.	Replace the engine/high voltage PWB. See page 1-6-17.

## 1-5-5 Mechanical problems

Problem	Causes/check procedures	Corrective measures
(1) No primary paper feed.	Check if the surfaces of the feed roller is dirty with paper powder.	Clean with isopropyl alcohol.
	Check if the paper feed roller is deformed.	Check visually and replace any deformed paper feed roller. See page 1-6-4.
	Defective feed clutch installation.	Check visually and remedy if necessary.
(2) No secondary paper feed.	Check if the surfaces of the upper and lower registration rollers are dirty with paper powder.	Clean with isopropyl alcohol.
	Defective registration clutch installation.	Check visually and remedy if necessary.
(3) Skewed paper feed.	Paper width guide in a cassette installed incorrectly.	Check the paper width guide visually and correct or replace if necessary.
(4) Multiple sheets of paper are fed at one time.	Check if the separator pad is worn.	Replace the separator pad if it is worn.
	Check if the paper is curled.	Change the paper.
(5) Paper jams.	Check if the paper is excessively curled.	Change the paper.
	Check if the contact between the upper and lower registration rollers is correct.	Check visually and remedy if necessary.
	Check if the upper and lower fuser roller is extremely dirty or deformed.	Clean or replace the upper and lower fuser roller.
	Check if the contact between the FD roller and FD pulley is correct.	Check visually and remedy if necessary.
(6) Toner drops on the paper conveying path.	Check if the drum unit or developer unit is extremely dirty.	Clean the drum unit or developer unit.
(7) Abnormal noise is heard.	Check if the pulleys, rollers and gears operate smoothly.	Grease the bearings and gears.
	Check if the following electromagnetic clutches are installed correctly: Feed clutch and registration clutch.	Check visually and remedy if necessary.

This page is intentionally left blank.

## 1-6-1 Precautions for assembly and disassembly

### (1) Precautions

Be sure to turn the power switch off and disconnect the power plug before starting disassembly.

When handling PWBs (printed wiring boards), do not touch parts with bare hands. The PWBs are susceptible to static charge.

Do not touch any PWB containing ICs with bare hands or any object prone to static charge.

Use only the specified parts to replace the fuser thermostat. Never substitute electric wires, as the printer may be seriously damaged.

Use the following circuit testers when measuring voltages:

- Hioki 3200
- Sanwa MD-180C
- Sanwa YX-360TR
- Beckman TECH300
- Beckman DM45
- Beckman 330 (Capable of measuring RMS values.)
- Beckman 3030 (Capable of measuring RMS values.)
- Beckman DM850 (Capable of measuring RMS values.)
- Fluke 8060A (Capable of measuring RMS values.)
- Arlec DMM1050
- Arlec YF1030C

## 1-6-2 Outer covers

### (1) Detaching and refitting the right side cover, right cover, left cover, and top cover

<Procedure>

1. Open the top cover.
2. Remove the right side cover.

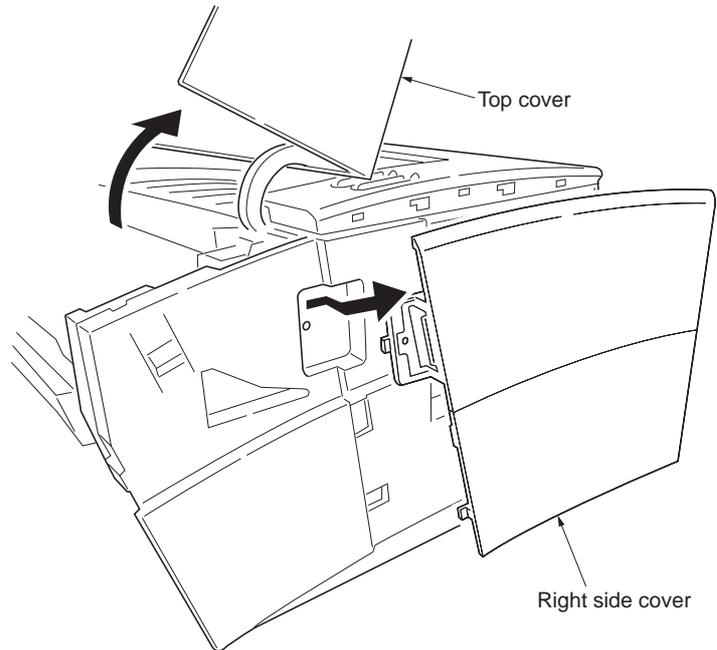


Figure 1-6-1 Removing the right side cover

3. Remove the paper cassette.
4. Unlatch the four latches and then remove the right cover.

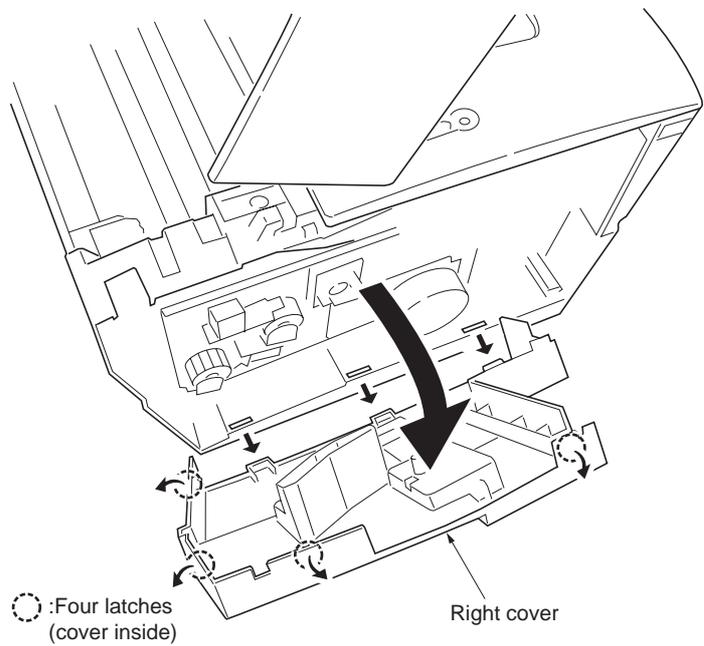


Figure 1-6-2 Removing the right cover

5. Remove the left cover by removing three hooks and three latches.
- \* When refitting the left cover, attach in order (1) to (5) shown in a figure 1-6-3.

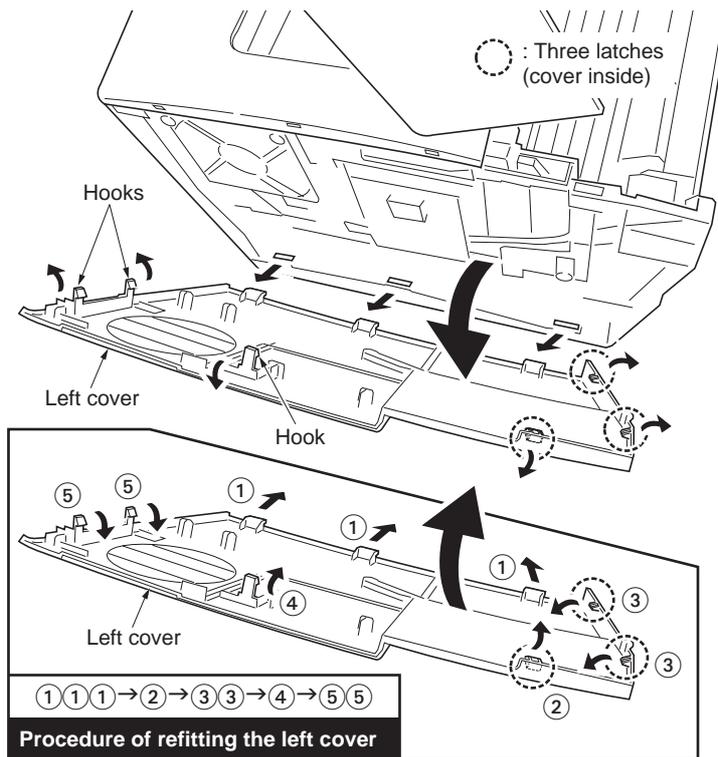


Figure 1-6-3 Removing the left cover

6. Remove the one connector.
7. While opening the rear cover and then remove the two screws.
8. While unhooking the hooks and then remove the top cover.

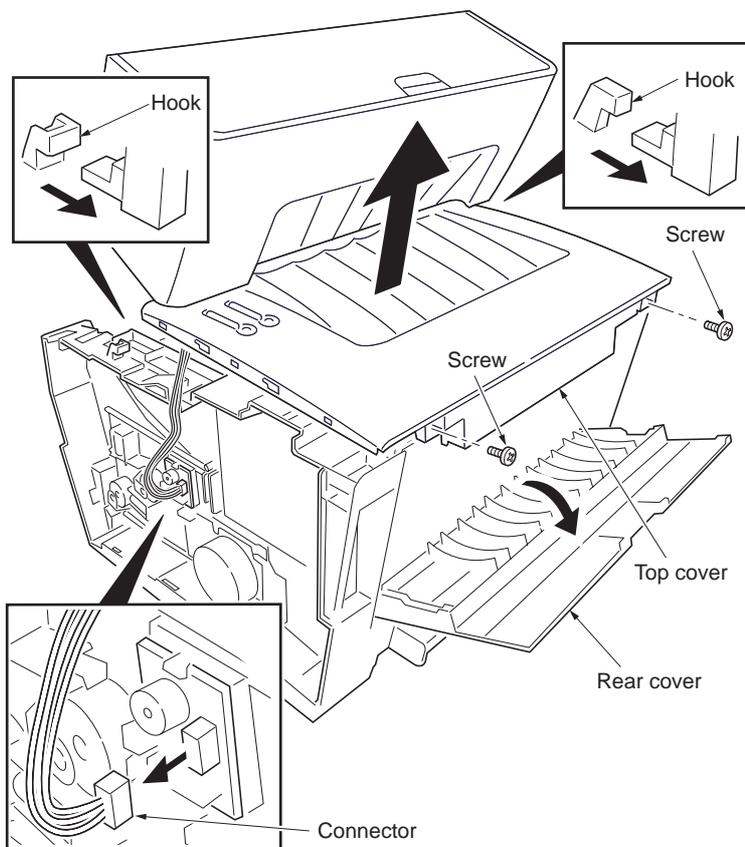


Figure 1-6-4 Removing the top cover

### 1-6-3 Paper feeding/conveying section

#### (1) Detaching and refitting the paper feed roller

<Procedure>

1. Remove the paper cassette.
2. Remove the paper feed roller.

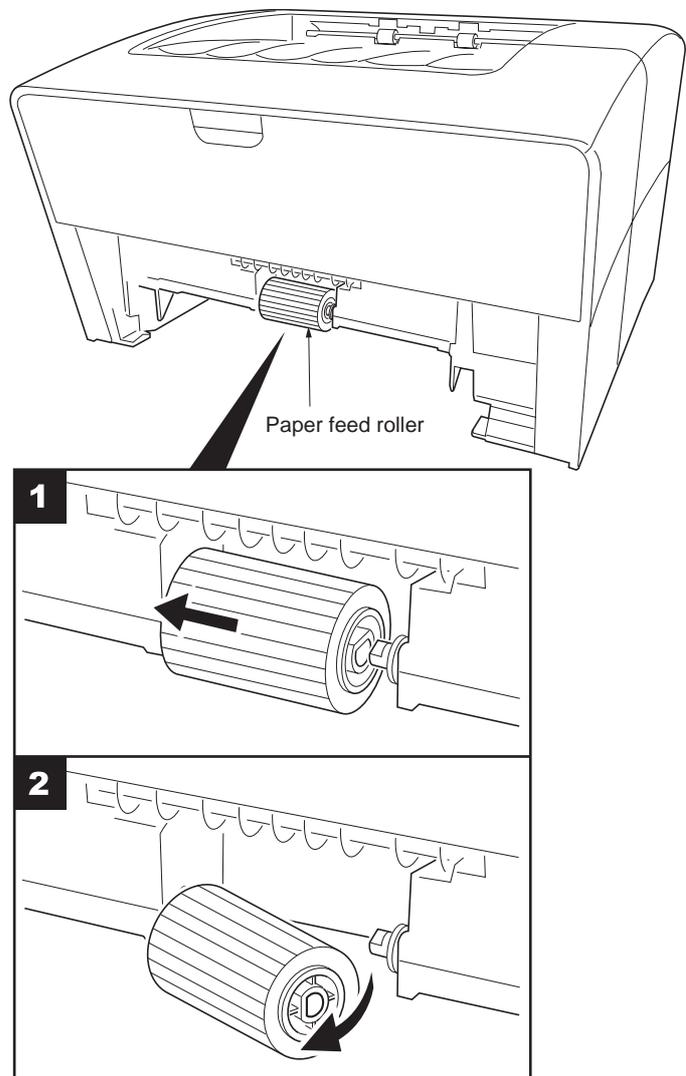
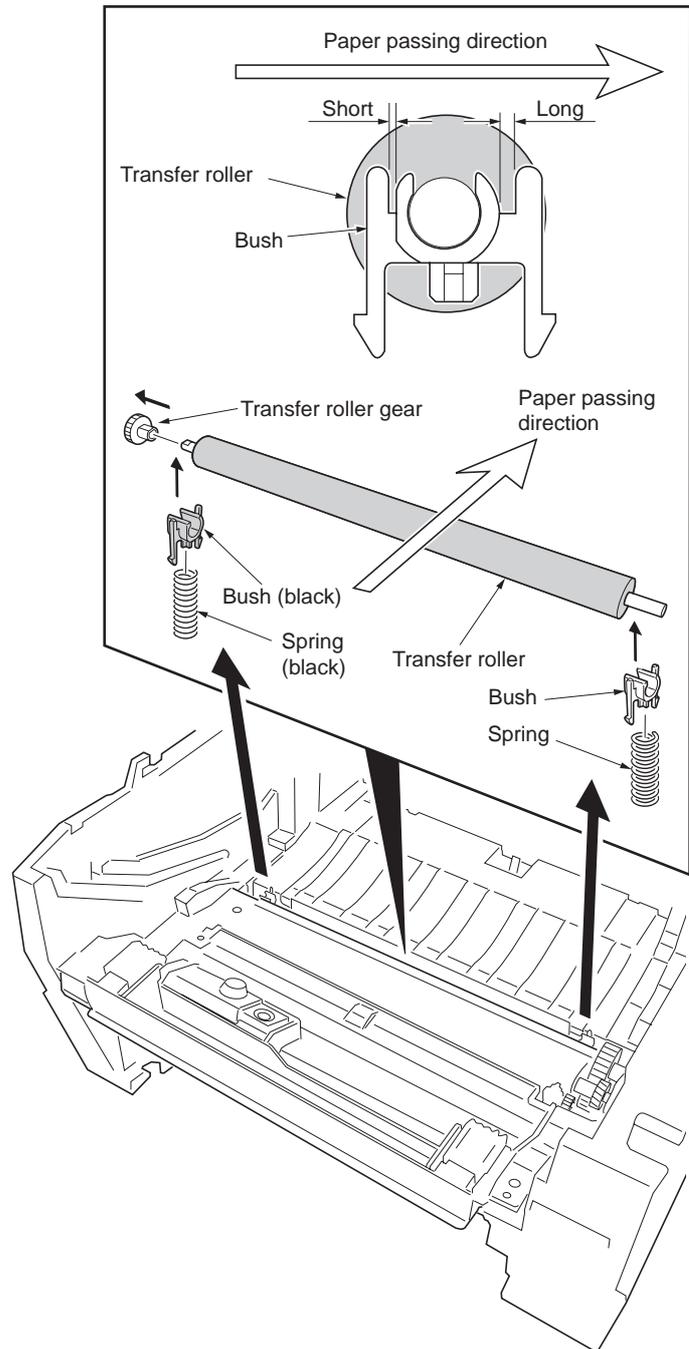


Figure 1-6-5 Removing the paper feed roller

**(2) Detaching and refitting the transfer roller**

&lt;Procedure&gt;

1. Remove the developer unit and drum unit.  
See page 1-6-6.
2. Remove the transfer roller from bushes.

**Figure 1-6-6 Removing the transfer roller**

### 1-6-4 Process section

#### (1) Detaching and refitting the developer unit and drum unit

When replacing the drum unit which was, for example, damaged due to scratches, the waste toner reservoir is full, perform the drum unit optimization procedure. See page 1-6-7.

<Procedure>

1. Open the top cover.
2. Remove the developer unit (with toner container).

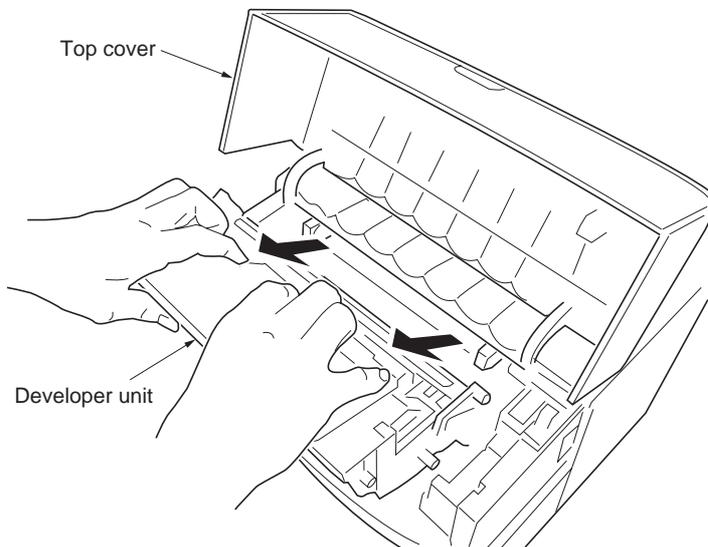


Figure 1-6-7 Removing the developer unit

3. Remove the drum unit.

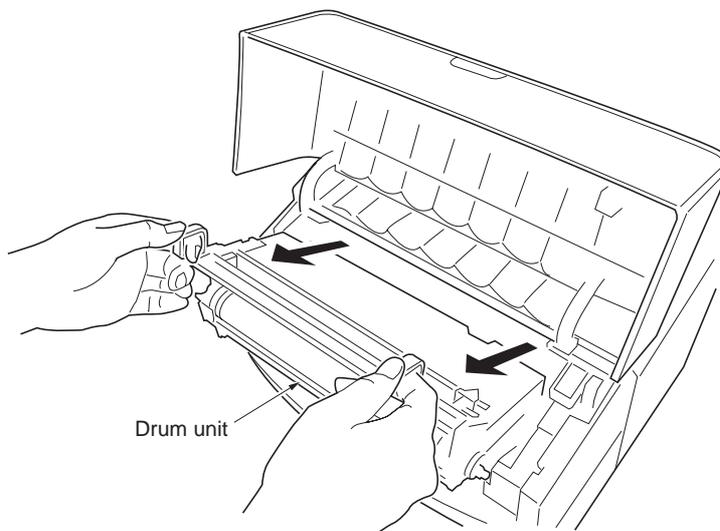


Figure 1-6-8 Removing the drum unit

## (2) Drum unit optimization

When replacing the drum unit which was, for example, damaged due to scratches, the waste toner reservoir is full, perform the drum unit optimization procedure (drum unit optimization sets the proper main charger current control according to the surface sensitivity of the drum).

### <Procedure>

1. Turn power off.
2. Open the top cover.
3. Remove the developer unit.

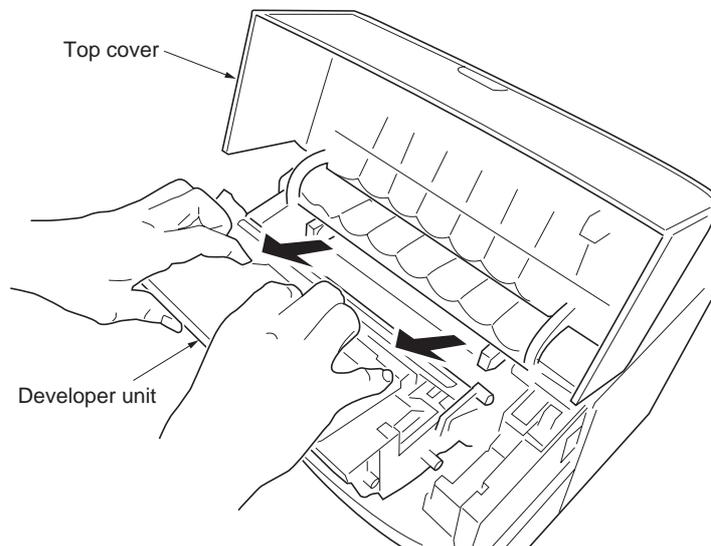


Figure 1-6-9 Developer unit

4. Remove the old drum unit.
5. Install the new drum unit.
6. Close the top cover (without installing the developer unit).
7. Turn power on. The LED indicators displayed developer unit missing error indication.
  - READY indicator: Off
  - ATTENTION indicator: Lit
8. Press the CANCEL key 5 seconds or more.
9. Drum unit optimization is complete when letting go off of the CANCEL key.
  - [Completion]
    - \* Printer starts idling for 10 seconds. (Idling can be checked by rotation of FD roller)
  - [Failure]
    - \* Printer does not start idling. Time to press the CANCEL key was 5 seconds or less. Redo from step 8.
10. Open the top cover.
11. Install the developer unit.
12. Close the top cover.

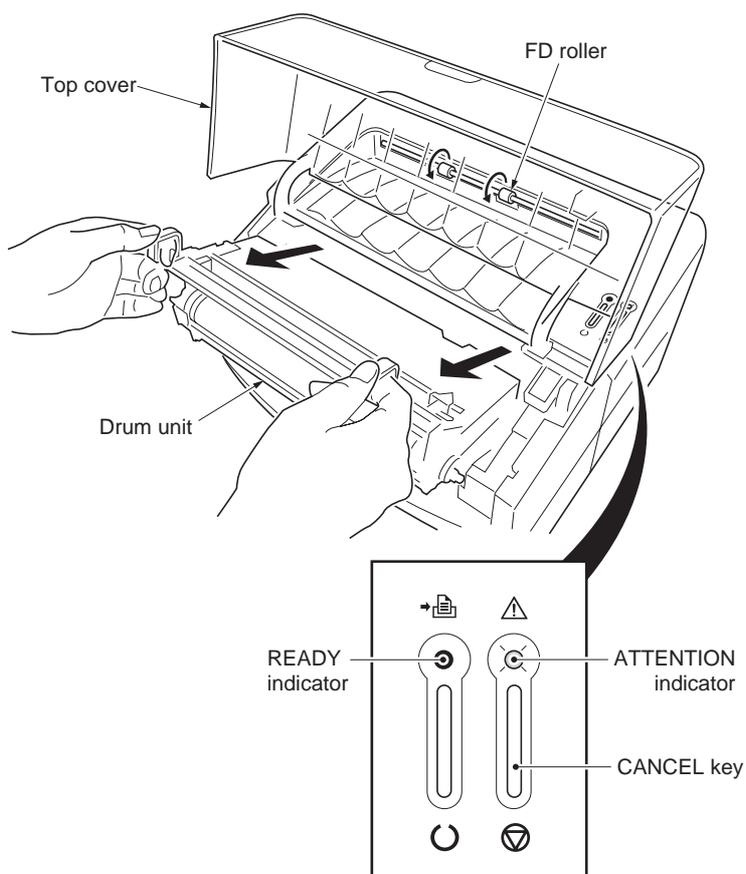


Figure 1-6-10 Drum unit and operation panel

### (3) Detaching and refitting the main charger unit

<Procedure>

1. Remove the drum unit. See page 1-6-6.
2. While pushing on the main charger terminal (①), slide the main charger unit (②).
3. Remove the main charger unit (③) by lifting it.

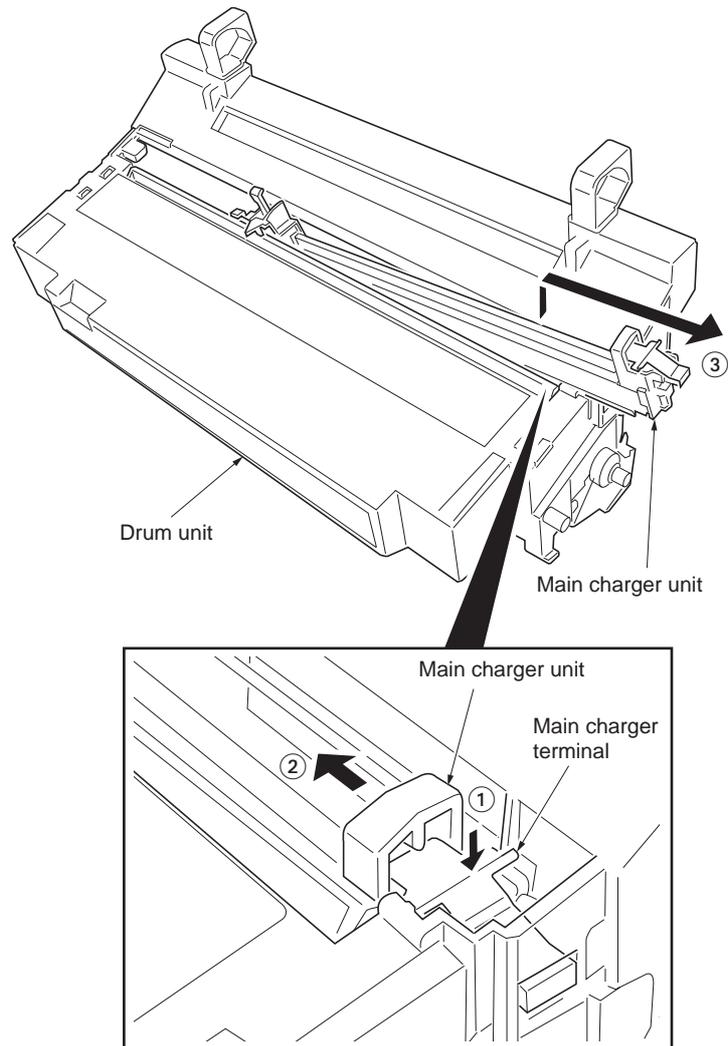


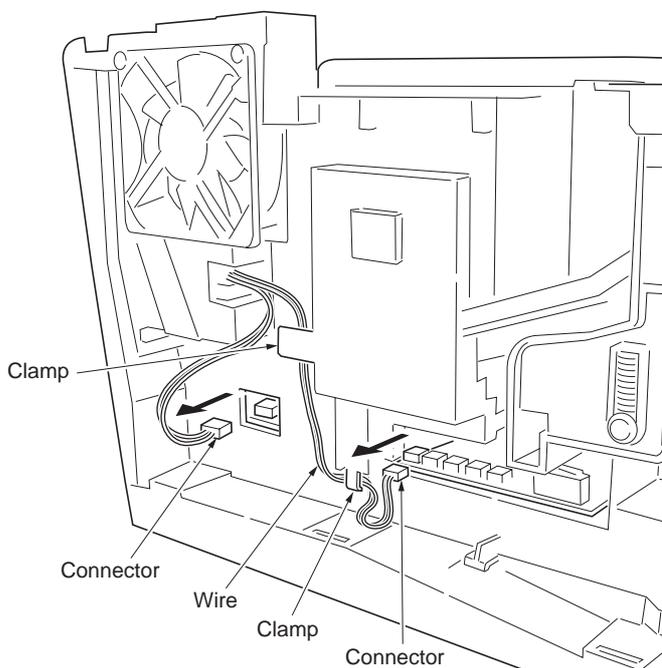
Figure 1-6-11

## 1-6-5 Fuser unit

### (1) Detaching and refitting the fuser unit

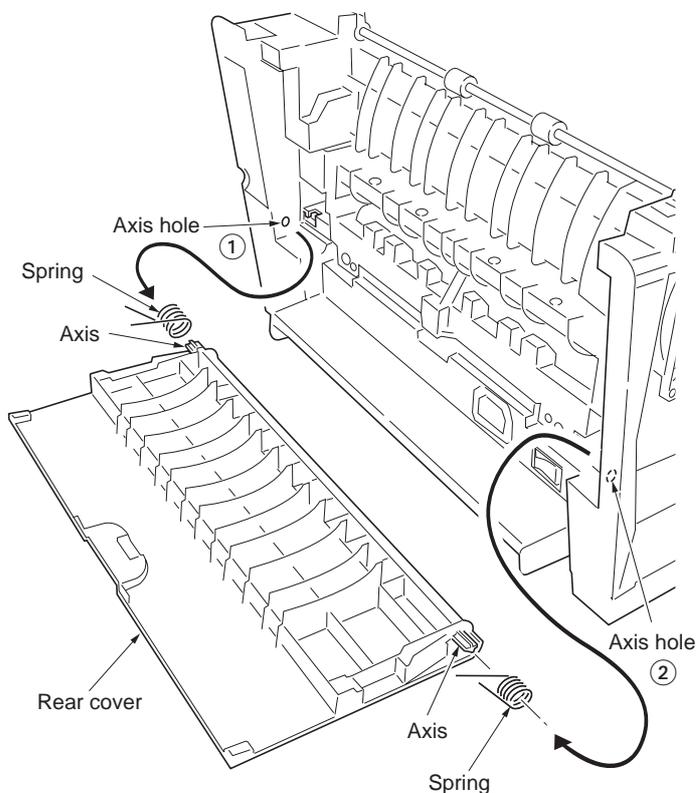
<Procedure>

1. Remove the outer covers. See page 1-6-2.
2. Remove the two connectors.
3. Remove the wire from two clamps.



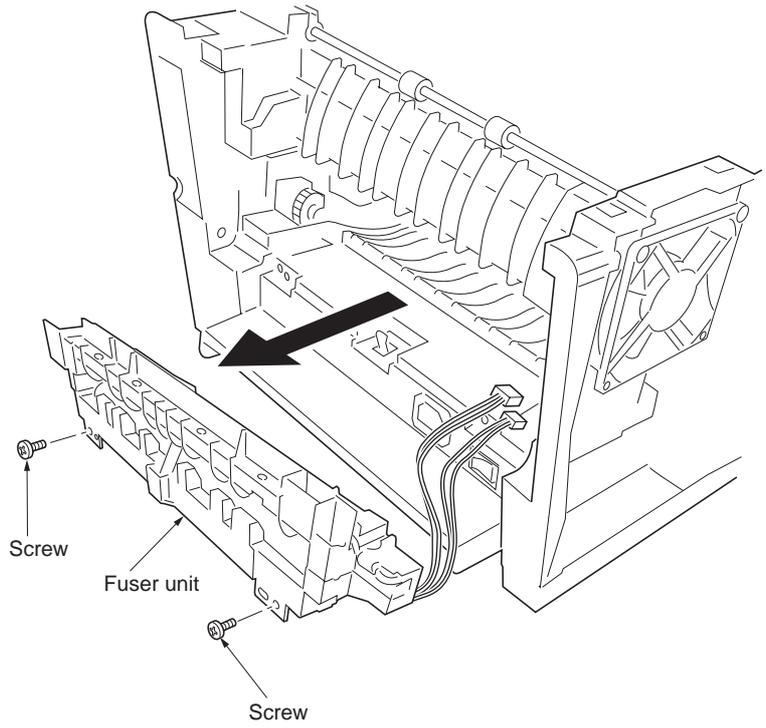
**Figure 1-6-12**

4. Pull out the rear cover axis (with spring) from the axis hole (①) on side.
5. Pull out the rear cover axis from the axis hole (②) on side and remove the rear cover and the spring.



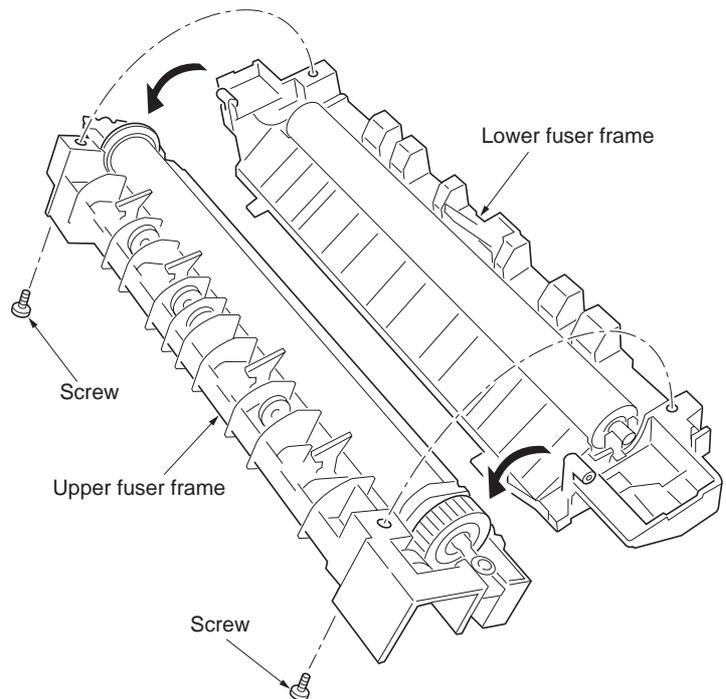
**Figure 1-6-13**

6. Remove the two screws and then remove the fuser unit.



**Figure 1-6-14**

7. Remove the two screws and then separate the upper fuser frame and lower fuser frame.

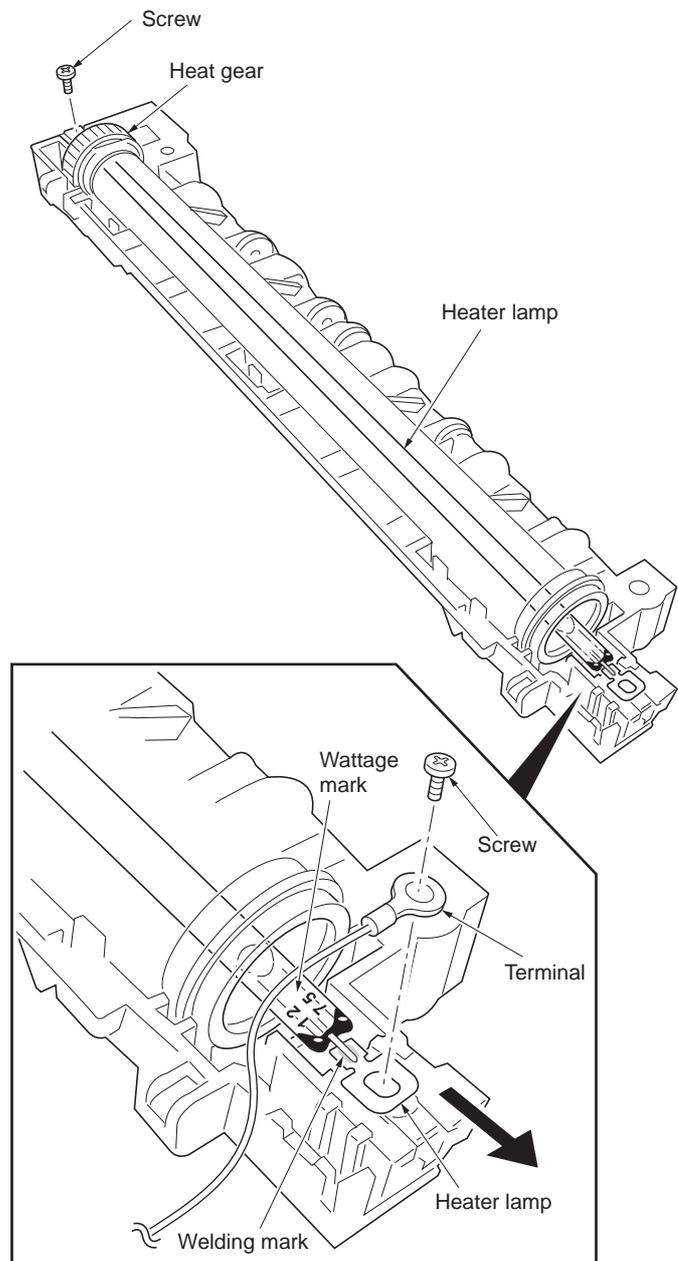


**Figure 1-6-15**

**(2) Detaching and refitting the heater lamp, heat roller, fuser thermistor, thermal cutout, and press roller**

## &lt;Procedure&gt;

1. Remove the fuser unit. See page 1-6-9.
2. Remove the two screws and terminal.
3. Remove the heater lamp.
- \* Seat the heater lamp aligning its wattage mark and welding mark faced with the correct direction and side.

**Figure 1-6-16**

4. Pull the heat R bush and heat L bush (with heat roller) from the upper fuser guide.
5. Remove the heat R bush, heat L bush and heat gear from the heat roller.

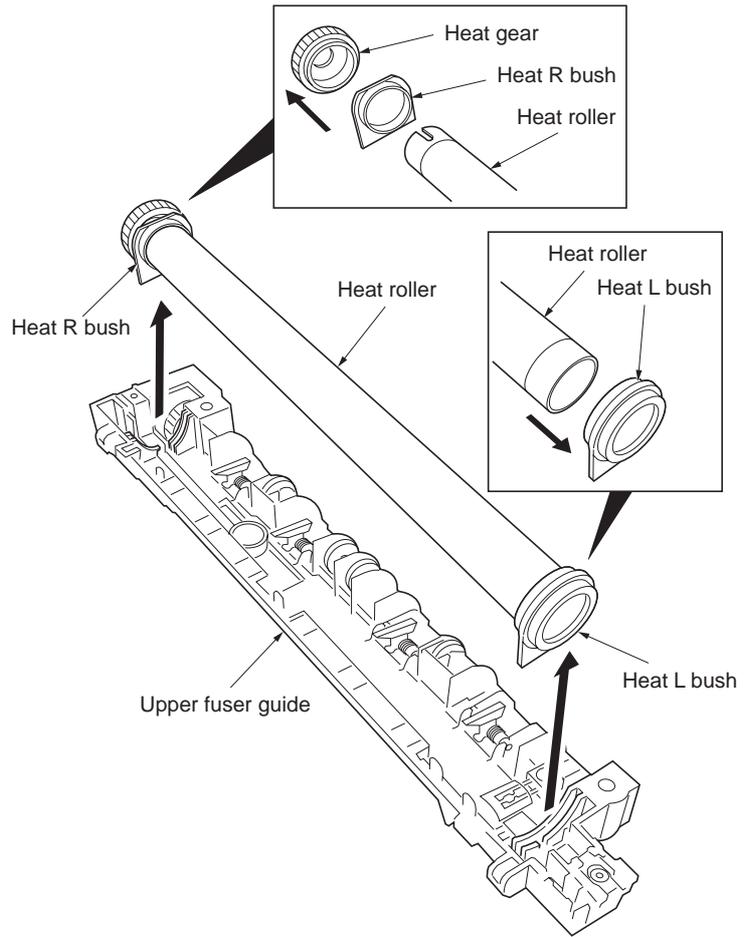


Figure 1-6-17

6. Remove the one screw and then remove the fuser thermistor.

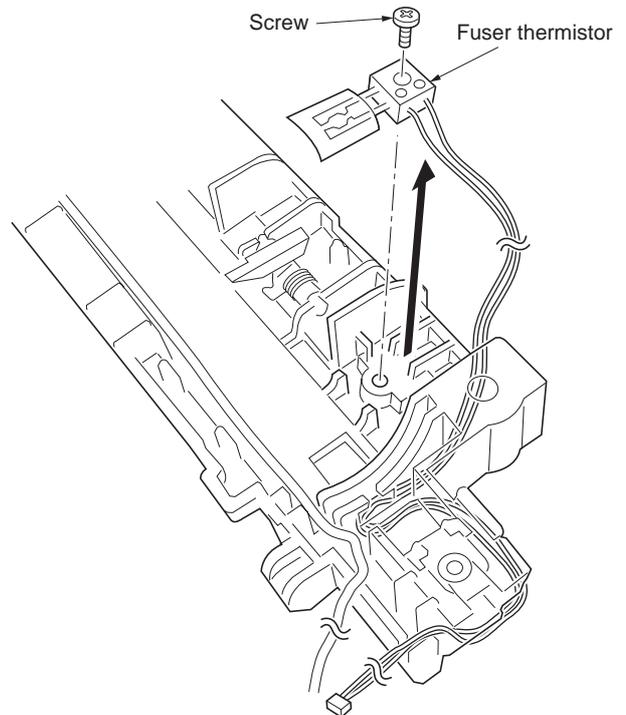
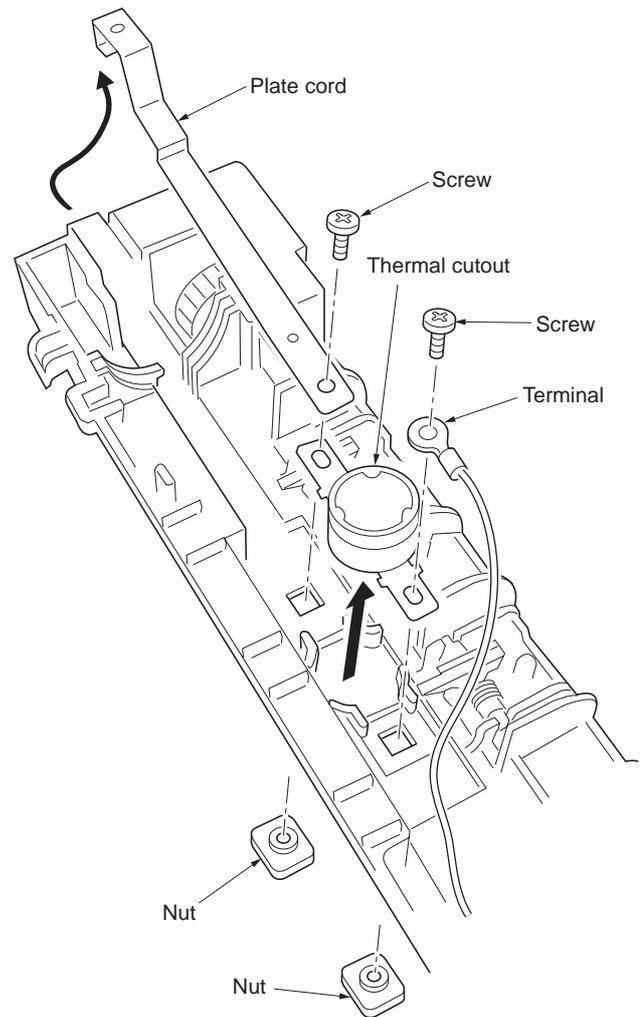


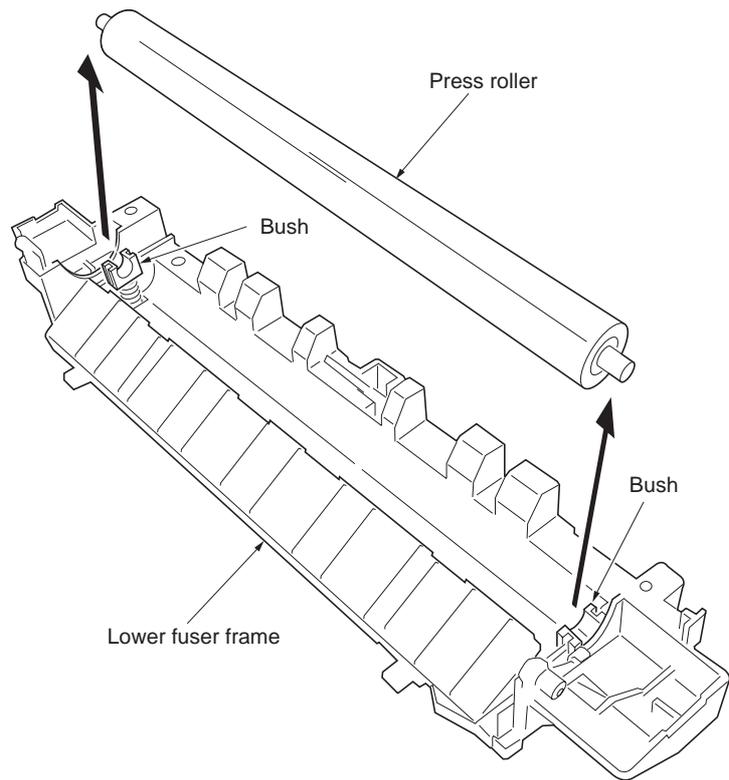
Figure 1-6-18

7. Remove the two screws (nuts), plate cord, and terminal.
8. Remove the thermal cutout.



**Figure 1-6-19**

9. Remove the press roller from the bushes.



**Figure 1-6-20 Removing the press roller**

## 1-6-6 PWBs

### (1) Detaching and refitting the main PWB (16 ppm GDI printer)

#### <Procedure>

1. Remove the right cover. See page 1-6-2.
2. Remove the two connectors from main PWB.
3. Remove one screw from the USB interface connector.
4. Remove the three screws and then remove the main PWB.

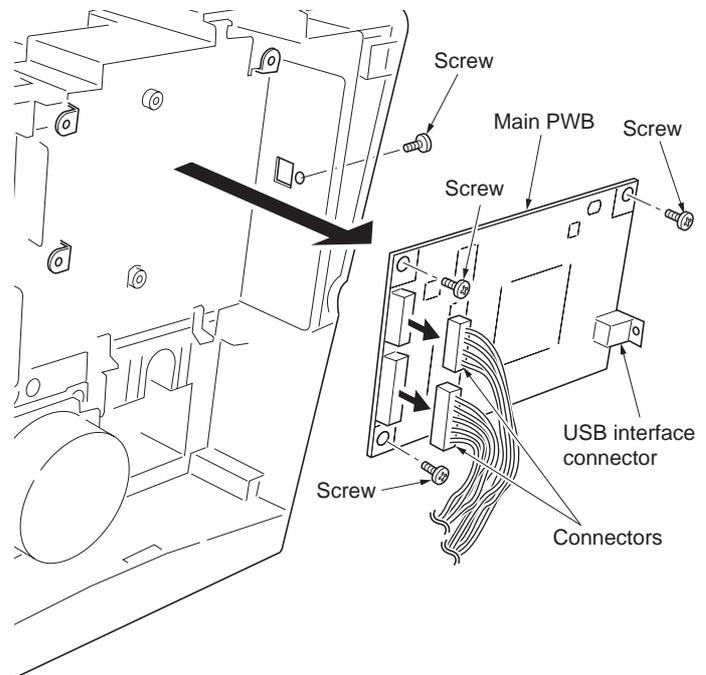
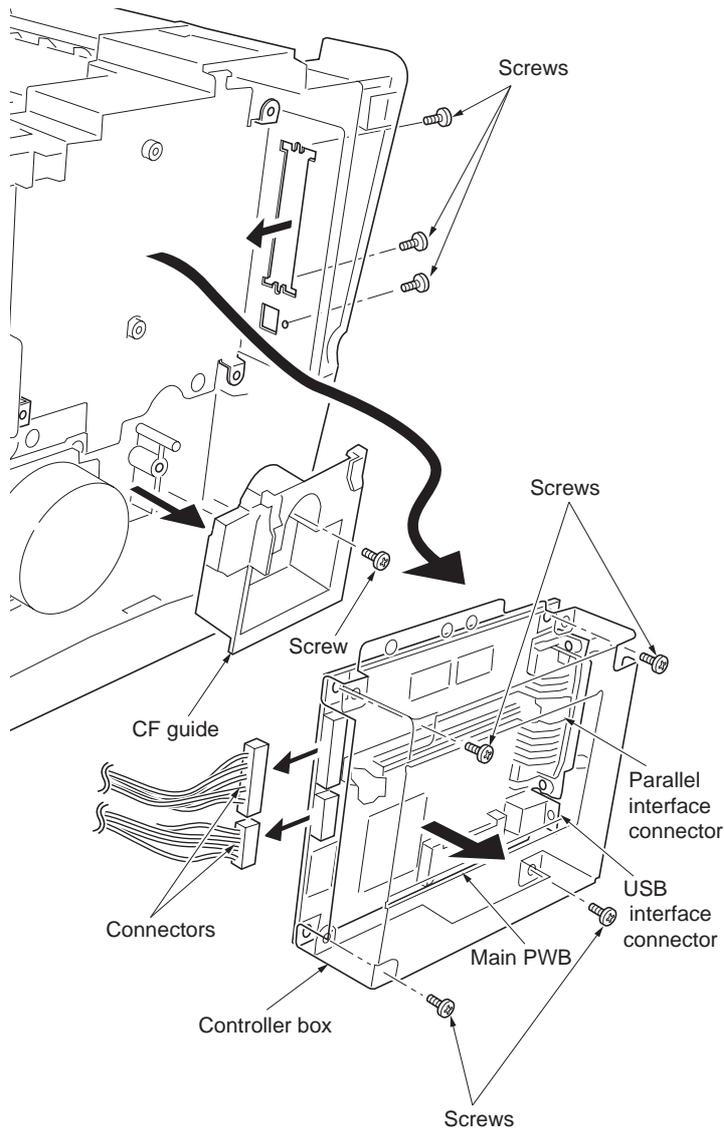


Figure 1-6-21

**(2) Detaching and refitting the main PWB (16/18 ppm printers)**

<Procedure>

1. Remove the right cover. See page 1-6-2.
2. Remove the one screw and then remove the CF guide.
3. Remove the two connectors from main PWB.
4. Remove three screws from the USB interface connector and parallel interface connector.
5. Remove the four screws and then remove the main PWB (with controller box).

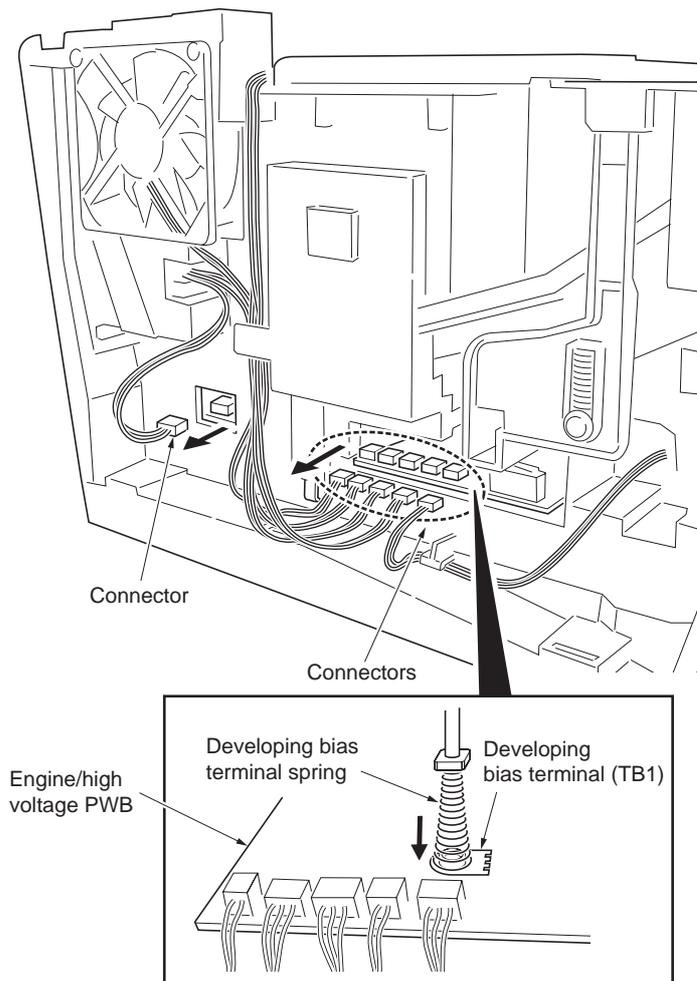


**Figure 1-6-22**

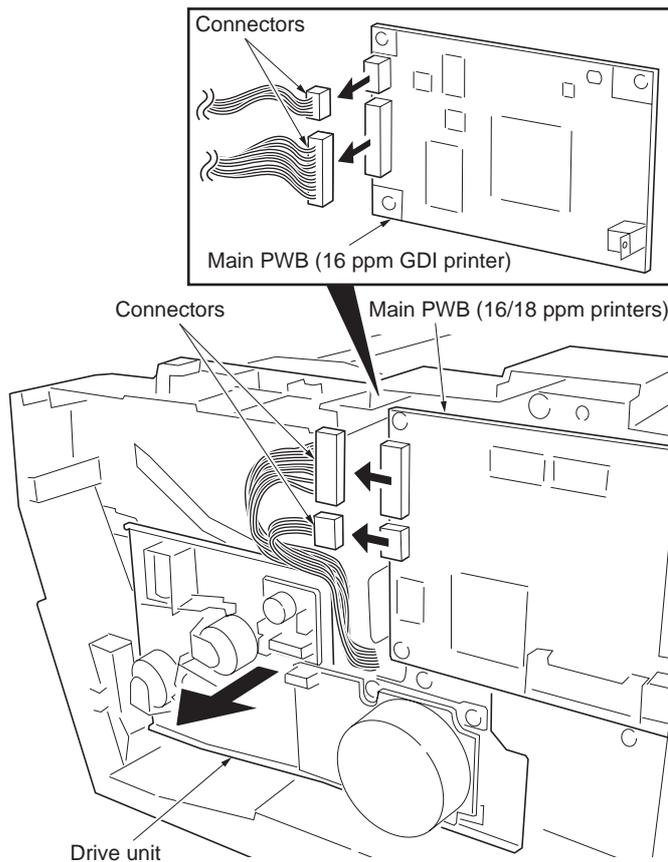
**(3) Detaching and refitting the engine/high voltage PWB and power source PWB**

## &lt;Procedure&gt;

1. Remove the developer unit and drum unit.  
See page 1-6-6.
2. Remove the paper cassette.
3. Remove the outer covers. See page 1-6-2.
4. Remove the six connectors.
- \* When seating the engine/high voltage PWB, ensure that the developer bias terminal spring is correctly in contact with the developing bias terminal (TB1) on the engine/high voltage PWB.

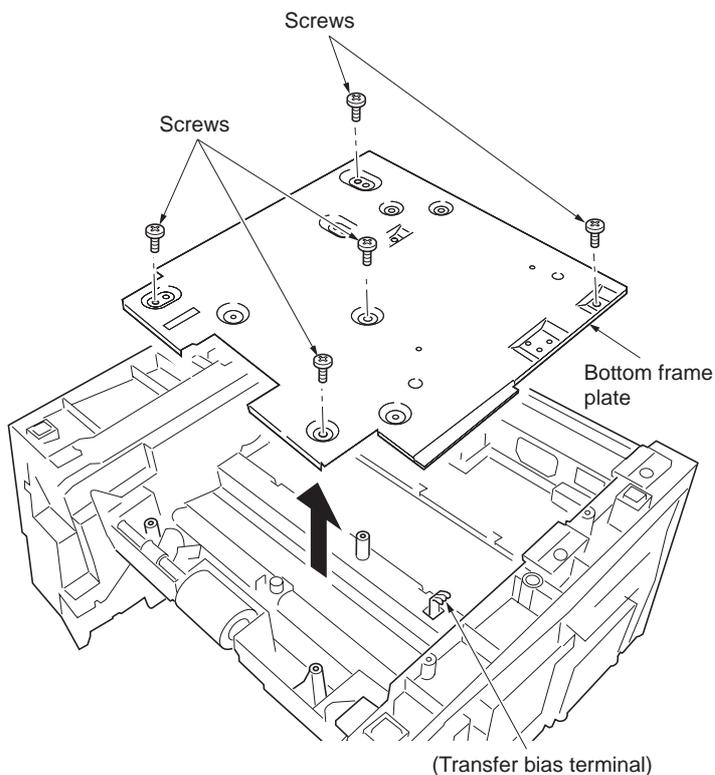
**Figure 1-6-23**

5. Remove the two connectors from main PWB.
6. Remove the drive unit. See page 1-6-23.



**Figure 1-6-24**

7. Turn the printer bottom side up.
8. Remove the five screws and then remove the bottom frame plate with PWBs (behind the plate).



**Figure 1-6-25**

9. Remove the one screw and terminal from the bottom frame plate.
- \* When securing the grounding terminal, hook the grounding wire to the projection.
10. Remove the three screws from power source PWB.
11. Remove four screws from the engine/high voltage PWB.
12. Separate the engine/high voltage PWB and power source PWB.
13. Check or replace the engine/high voltage PWB or power source PWB and then refit all the removed parts.
- \* To replace the engine/high voltage PWB, remove the EEPROM (U2) from the old engine/high voltage PWB and mount it to the new engine/high voltage PWB.

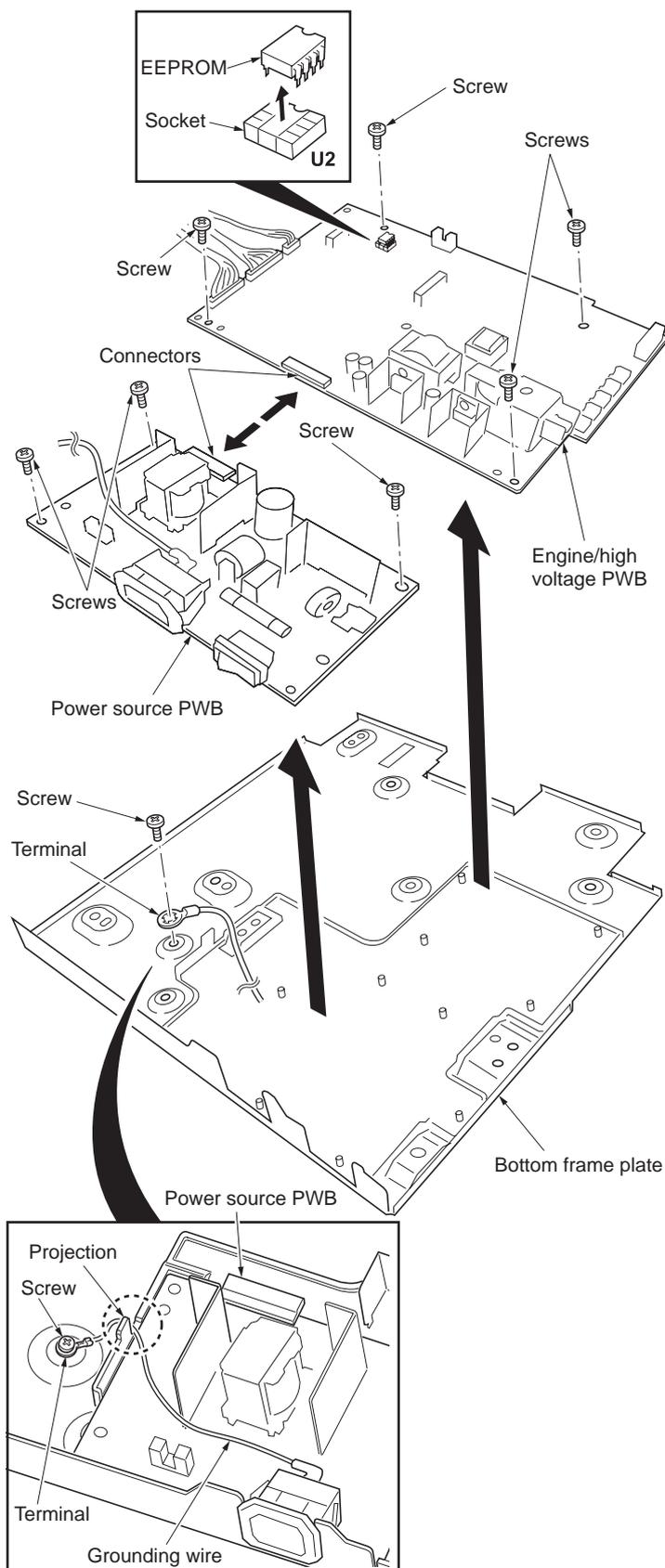


Figure 1-6-26

## 1-6-7 Others

### (1) Detaching and refitting the laser scanner unit

<Procedure>

1. Remove the outer covers. See page 1-6-2.
2. Remove the two screws and then remove the LSU lid.

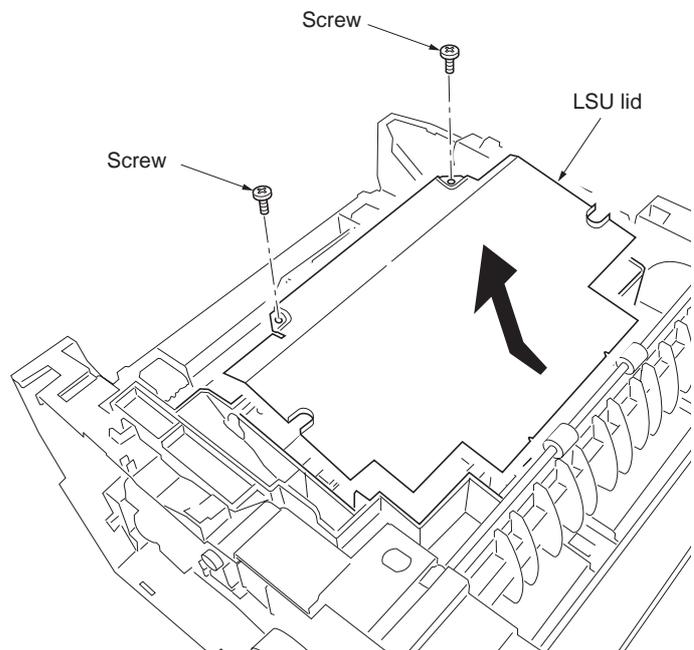
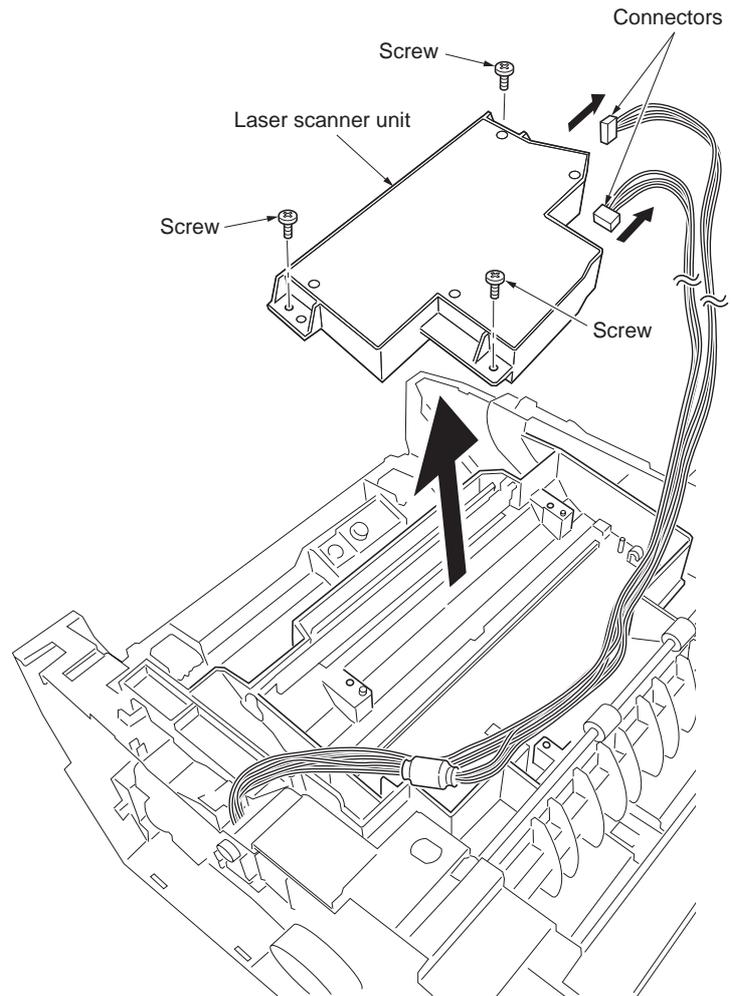


Figure 1-6-27

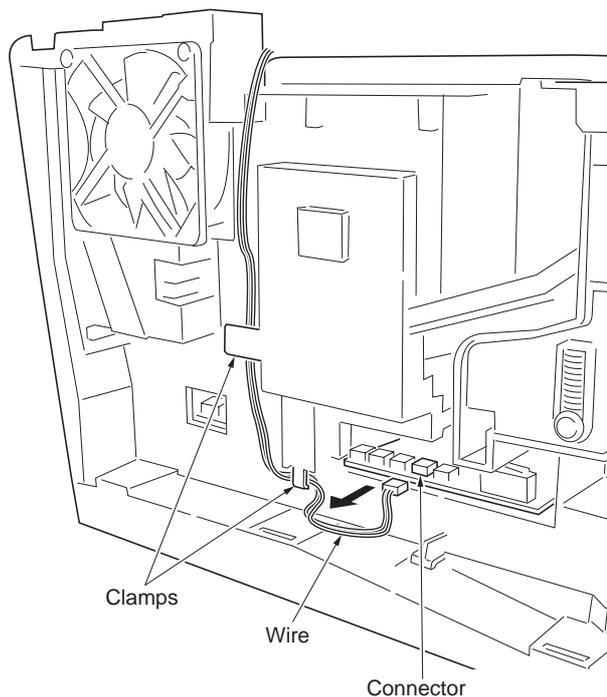
3. Remove the three screws.
4. Remove the two connectors and then remove the laser scanner unit.

**Figure 1-6-28**

**(2) Detaching and refitting the eraser lamp (PWB)**

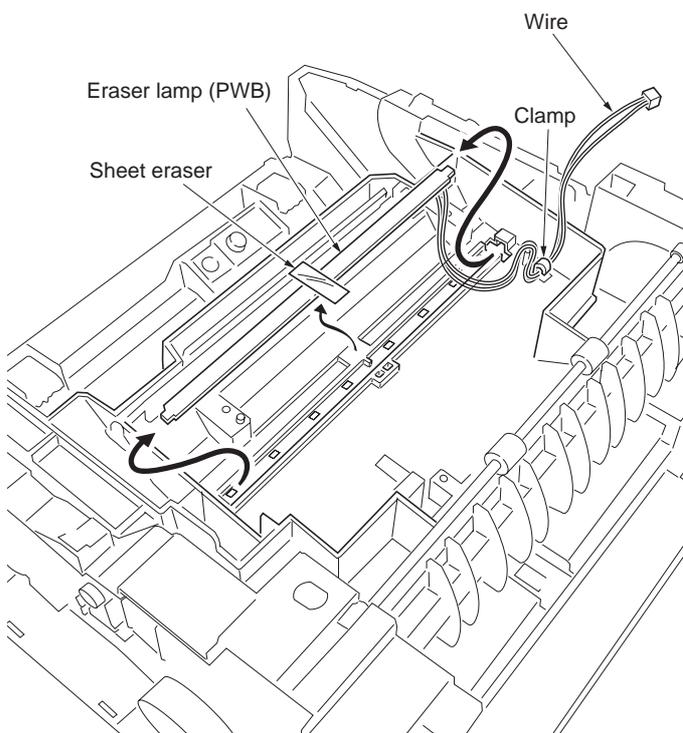
<Procedure>

1. Remove the laser scanner unit. See page 1-6-20.
2. Remove the one connector.
3. Remove the wire from two clamps.



**Figure 1-6-29**

4. Remove the wire from clamp.
5. Remove the sheet eraser.
6. Remove the eraser lamp (PWB).

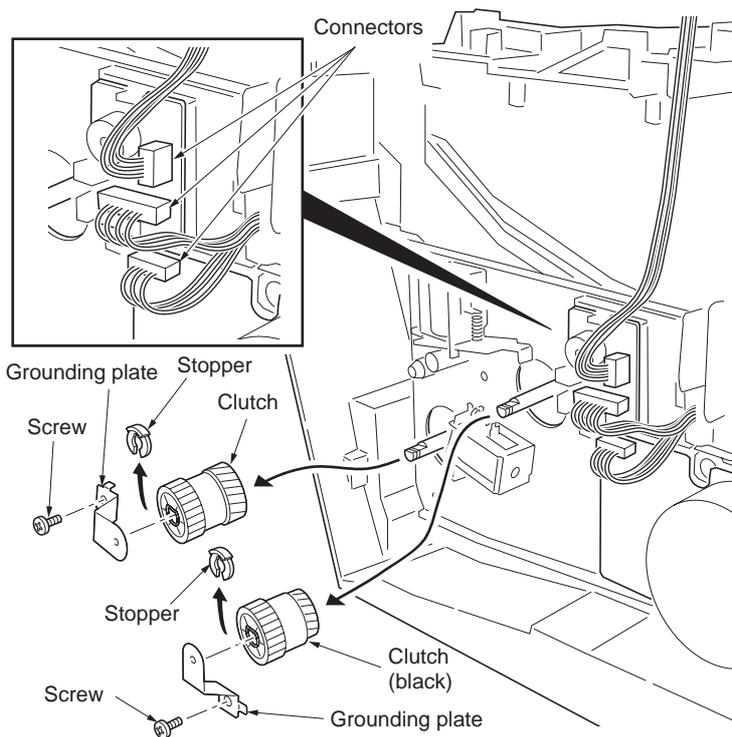


**Figure 1-6-30**

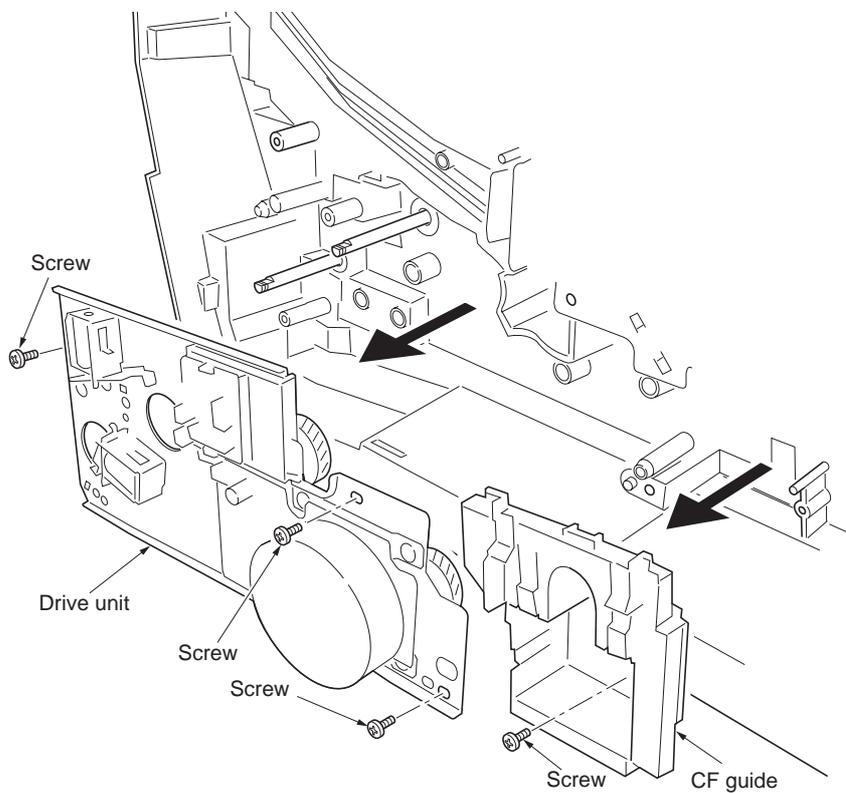
**(3) Detaching and refitting the drive unit**

## &lt;Procedure&gt;

1. Remove the right cover. See page 1-6-2.
2. Remove the three connectors.
3. Remove the two screws and then remove the two grounding plates.
4. Remove the two stoppers and then remove the two clutches.

**Figure 1-6-31**

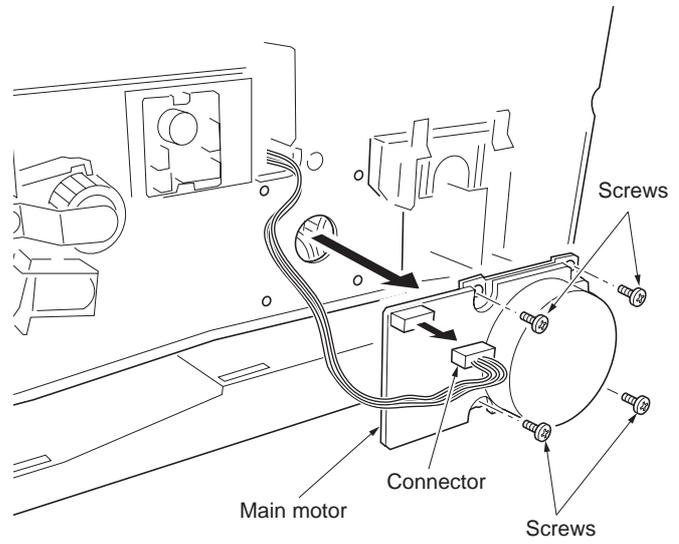
5. Remove the one screw and then remove the CF guide.
6. Remove the three screws and then remove the drive unit.

**Figure 1-6-32**

**(4) Detaching and refitting the main motor**

<Procedure>

1. Remove the right cover. See page 1-6-2.
2. Remove the one connector from main motor.
3. Remove the four screws and then remove the main motor.



**Figure 1-6-33**

## 1-7-1 Downloading

### (1) Firmware program data format

The data to be downloaded are supplied in the following format:

Firmware file name example (For 16/18 ppm printers)

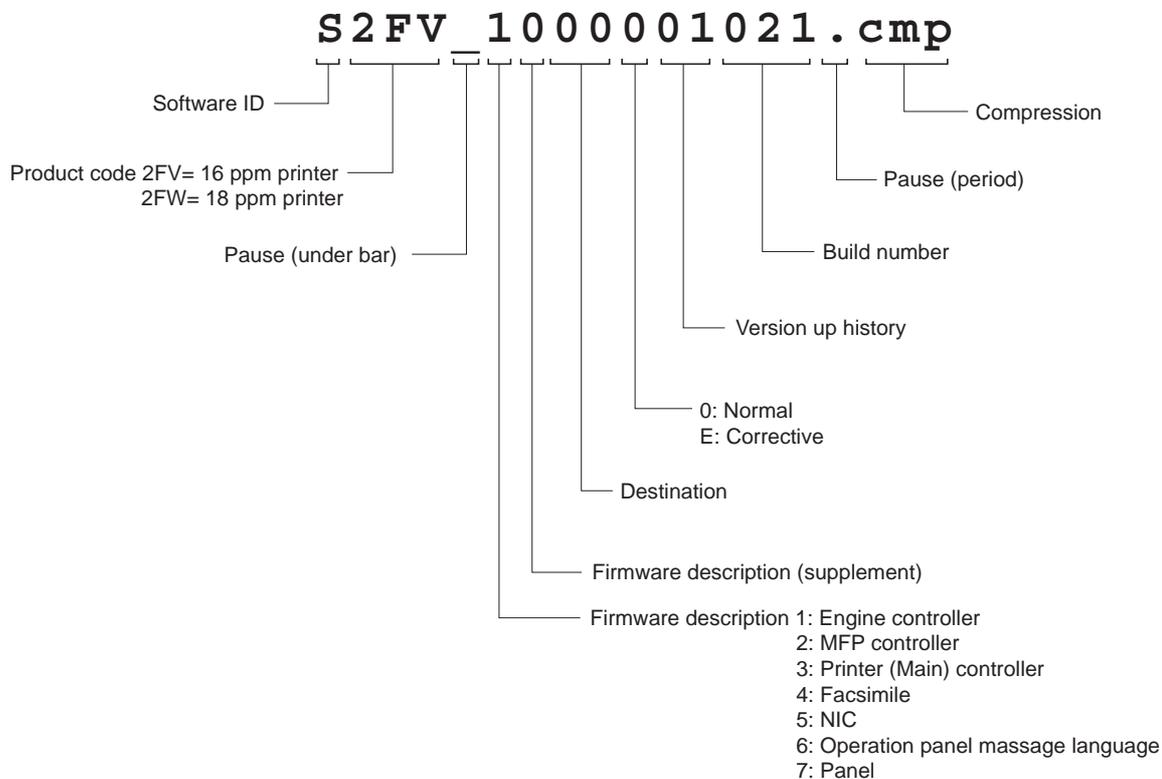


Figure 1-7-1

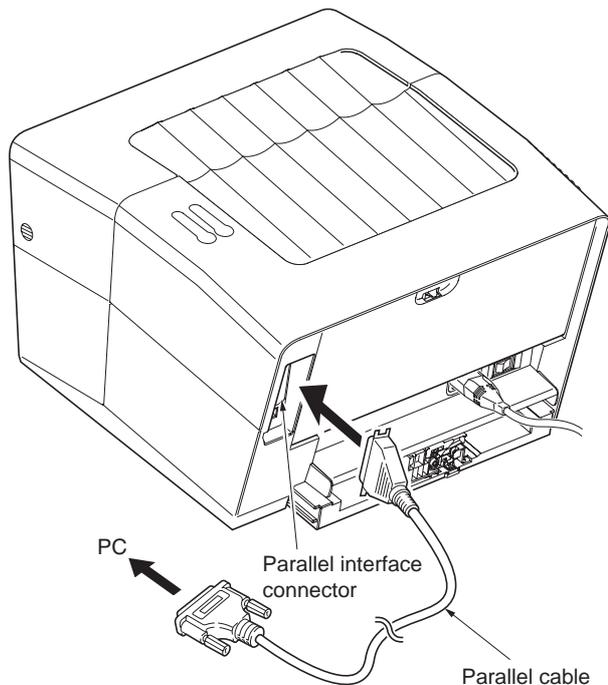
**(2) Downloading the firmware from the parallel interface (For 16/18 ppm printers)**

This section explains how to download firmware data from the parallel interface. The printer system can automatically recognize whether the data to be overwritten is for controller firmware.

**CAUTION**

Downloading the firmware takes several minutes. Do not turn power off during downloading.

1. Turn printer and PC power off.
2. Connect the parallel printer cable between the PC and the printer.



**Figure 1-7-2**

3. Turn printer power on.
4. Confirm that LED indication status (1) is displayed.
5. At the DOS prompt, enter command.  
`c:\echo!R!UPGR"SYS";EXIT;>prn`
6. Confirm that LED indication status (2) is displayed.
7. Confirm that LED indication status (3) is displayed. At the DOS prompt, enter command so that the system firmware (example: S2FV\_1000001021.cmp) is copied to the printer.  
`c:\copy\2FV_1000001021.cmp prn`
8. LED indication status (3)(4) are displayed during downloading. When LED indication status (5) is displayed to indicate downloading is finished, turn printer power off, then on.
- \* If downloading fails, the printer indicates an error display using the LED indicators. See table below, LED indication status (6).
9. Confirm that LED indication status (1) is displayed after warm-up.
10. Print a status page. (See page 1-4-3)
11. Check that the status page shows the updated firmware version.

Table 1-7-1

LED Indicator explanatory notes			ATTENTION indicator	READY indicator
			 Lit	 Off
			 Lit	 Off
(1)	Ready	 		
(2)	Supervisor mode	                		
(3)	Waiting for parallel data Receiving data	                              		
(4)	Deleting and writing data	                            		
(5)	Downloading complete	                           		
(6)	Downloading failed	                          		

**(3) Downloading the firmware from the memory card (For 16/18 ppm printers)**

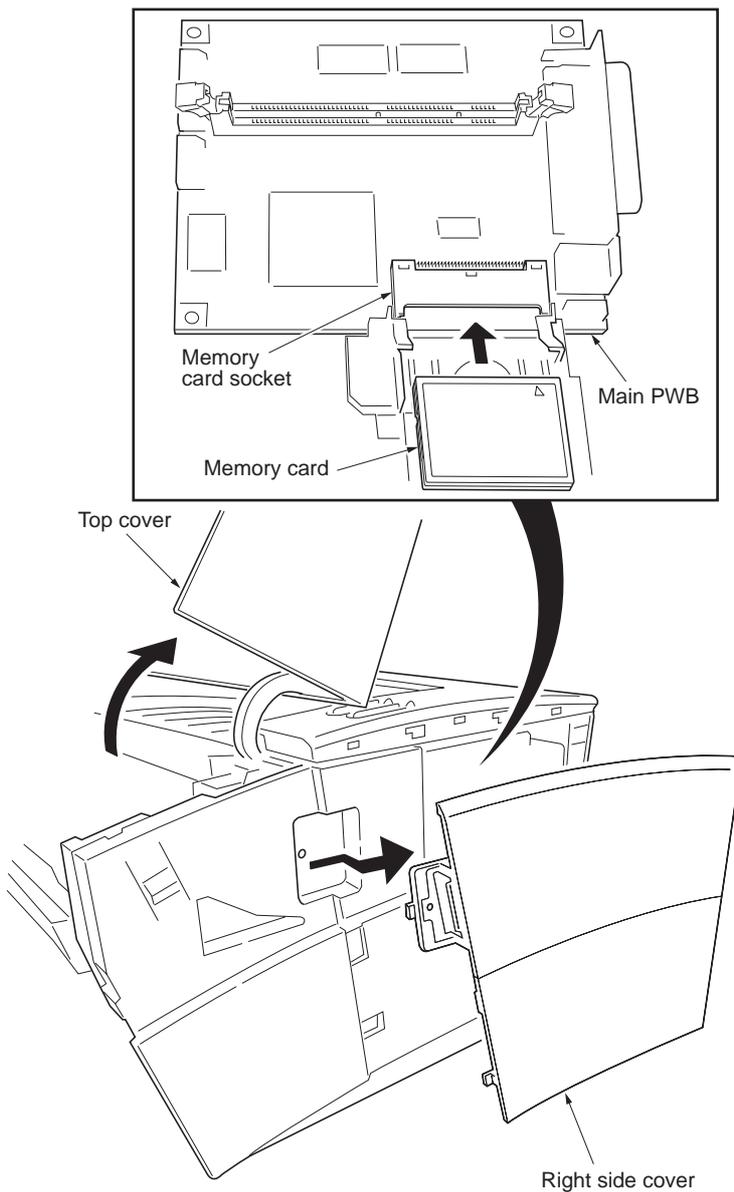
To download data written in a memory card (CompactFlash) to the printer, proceed as explained in this section.

**CAUTION**

Downloading firmware takes several minutes. Do not turn power off during downloading. If downloading is interrupted by an accidental power failure, etc., the main PWB may have to be replaced.

Do not download the system firmware and engine firmware at one time. Store the either firmware in a memory card and download one by one.

1. Turn power switch off.
2. Remove the right side cover.
3. Insert the memory card in the printer's memory card slot.



**Figure 1-7-3**



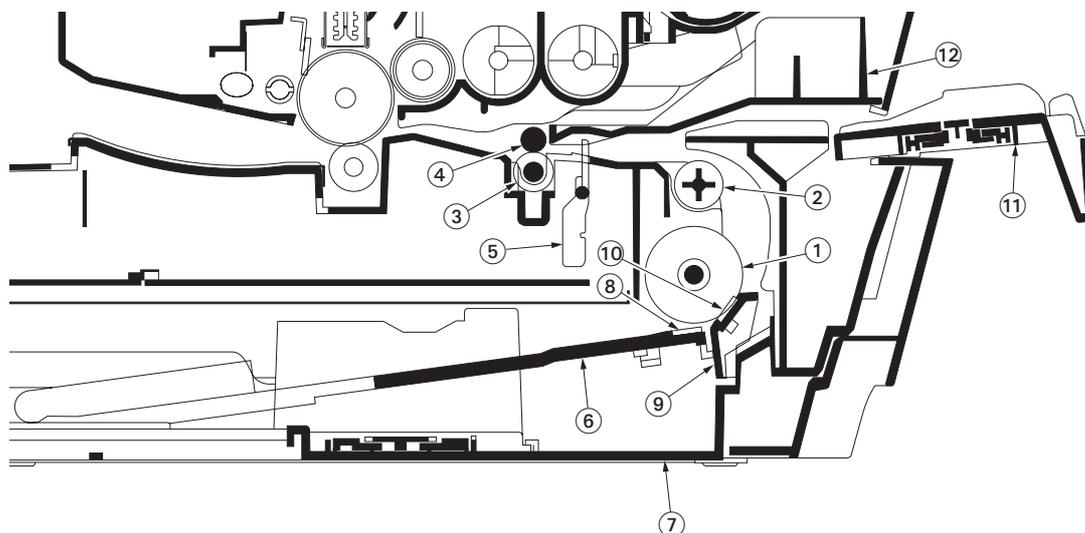
This page is intentionally left blank.

## 2-1-1 Paper feeding/conveying section

The paper feeding/conveying system picks up paper from the paper cassette, manual feed tray, feeds it in the printer and delivers in the output tray. Paper is feed at the precise timing in synchronization with data processing.

### (1) Paper feed section

The figure below shows the components in the paper feeding/conveying section and the paths through which the paper travels. The sensors, clutches, motor etc., are described in the following pages.



**Figure 2-1-1 Paper feeding/conveying section**

- |                                    |                       |
|------------------------------------|-----------------------|
| (1) Feed roller                    | (7) Cassette bottom   |
| (2) Feed pulley                    | (8) Bottom pad        |
| (3) Lower registration roller      | (9) Paper separator   |
| (4) Upper registration roller      | (10) Separator pad    |
| (5) Registration sensor (Actuator) | (11) Manual feed tray |
| (6) Base plate                     | (12) Feed guide       |

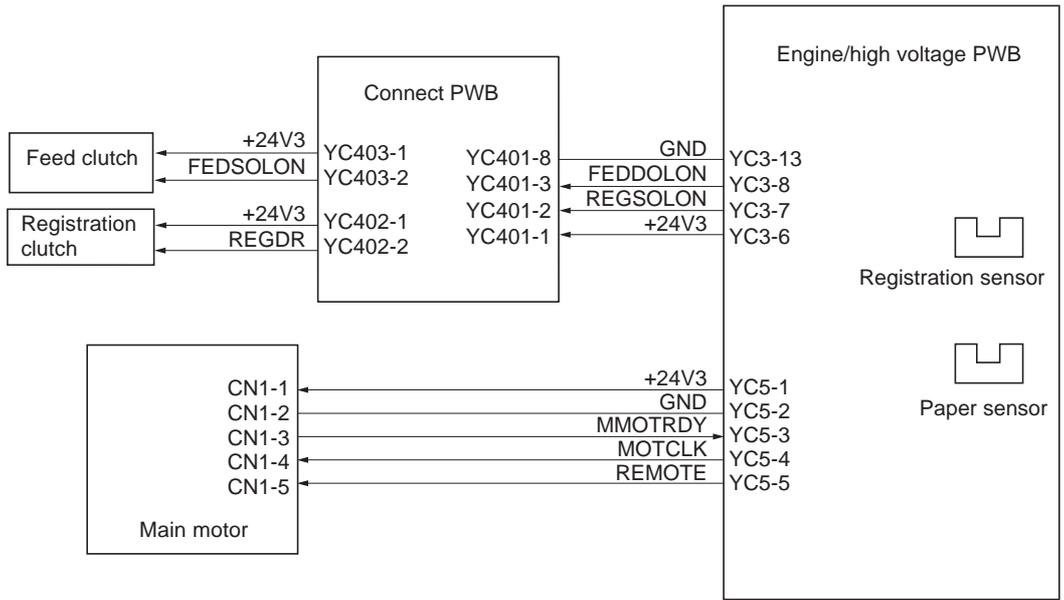


Figure 2-1-2 Paper feeding/conveying section block diagram

## 2-1-2 Drum section

### (1) Drum unit

The durable layer of organic photoconductor (OPC) is coated over the aluminum cylinder base. The OPC tends to reduce its own electrical conductance when exposed to light. After a cyclic process of charging, exposure, and development, the electrostatic image is constituted over the OPC layer.

Since the OPC is materialized by resin, it is susceptible to damage caused by sharp edges such as a screwdriver, etc., resulting in a print quality problem. Also, finger prints can cause deterioration of the OPC layer, therefore, the drum (in the drum unit) must be handled with care. Substances like water, alcohol, organic solvent, etc., should be strictly avoided.

As with all other OPC drums, the exposure to a strong light source for a prolonged period can cause a print quality problem. The limit is approximately 500 lux for less than five minutes. If the drum (drum unit) remains removed from the printer, it should be stored in a cool, dark place.

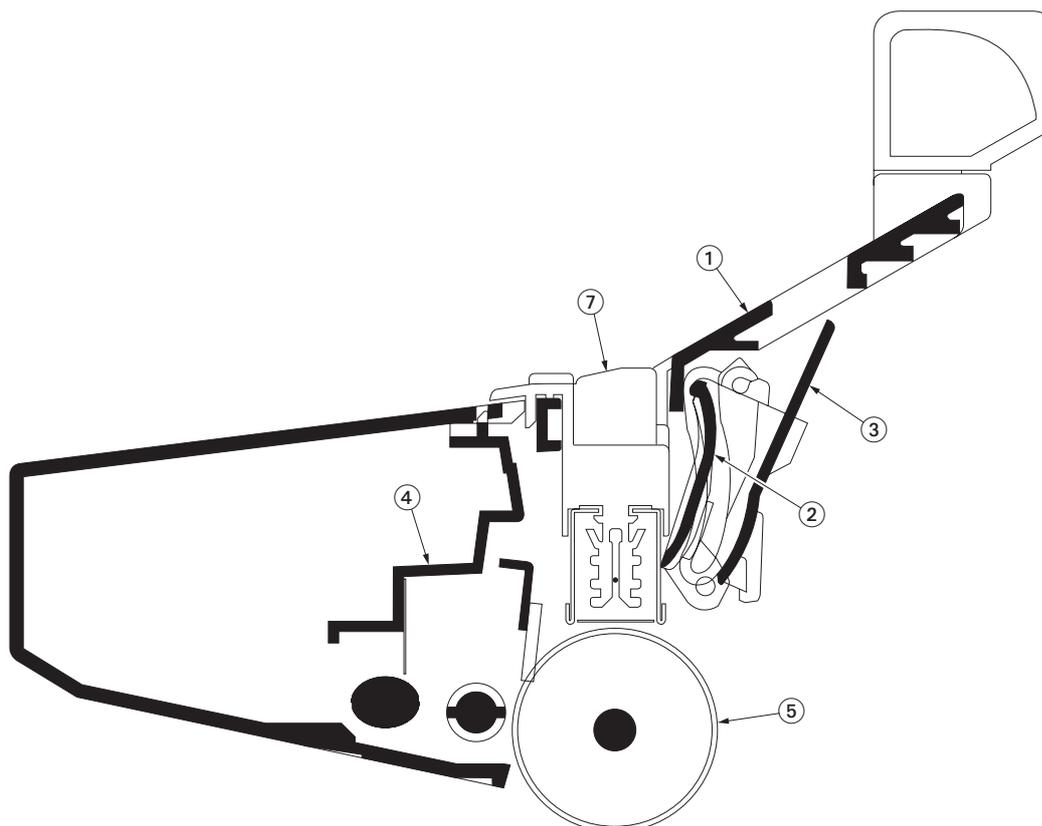
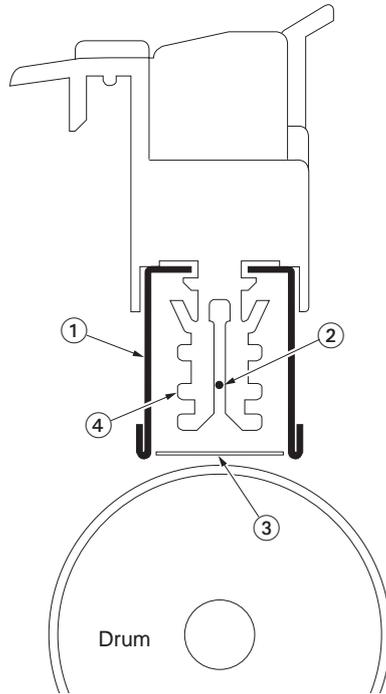


Figure 2-1-3 Drum unit

- (1) Drum frame
- (2) Drum cover A
- (3) Drum cover B
- (4) Waste toner cover
- (5) Drum (OPC)

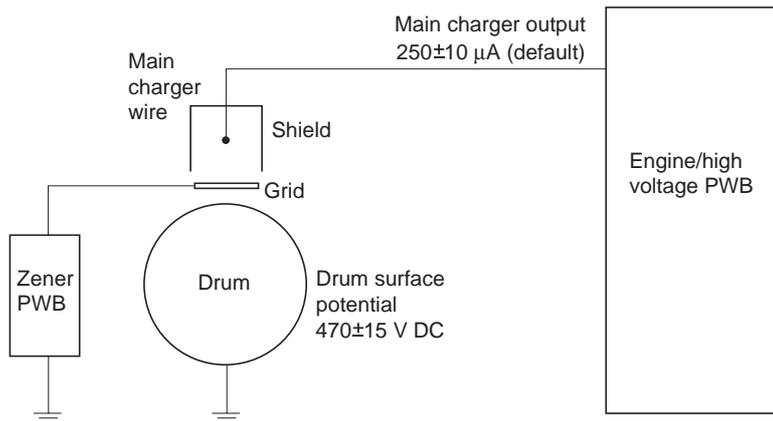
**(2) Main charger unit**

As the drum rotates in a “clean (neutral)” state, its photoconductive layer is given a uniform, positive (+) corona charge dispersed by the main charger wire. Due to high-voltage scorotron charging, the charging wire can get contaminated by oxidation after a long run. Cleaning the charging wire prevents print quality problems such as black streaks.



**Figure 2-1-4 Main charger unit**

- (1) Main charger shield
- (2) Main charger wire
- (3) Main charger grid
- (4) Main charger wire cleaner



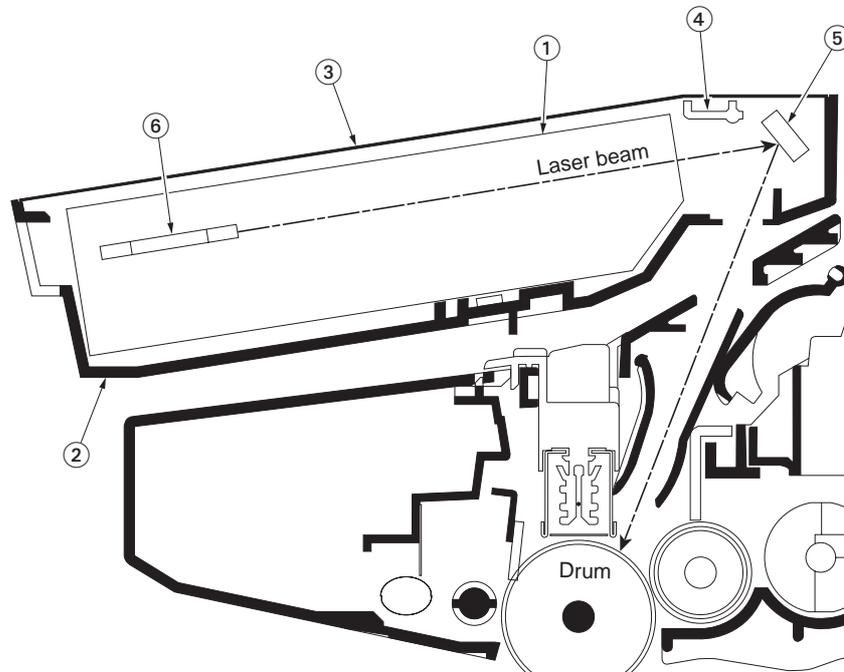
**Figure 2-1-5 Drum unit and main charger unit block diagram**

## 2-1-3 Expose section

### (1) Laser scanner unit

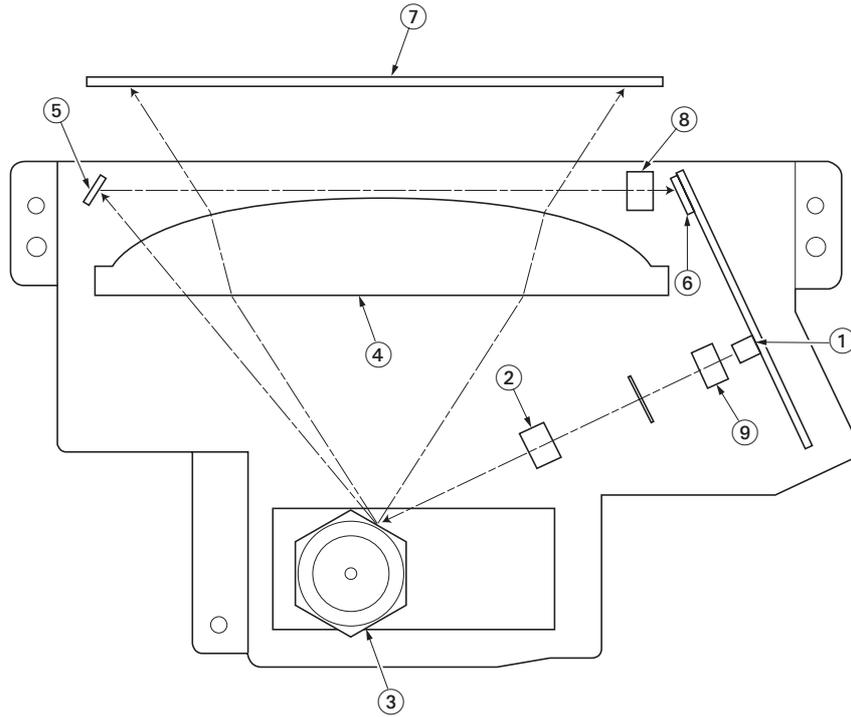
The charged surface of the drum is then scanned by the laser beam from the laser scanner unit.

The laser beam (780 nm wavelength) beam is dispersed as the polygon motor revolves (27959 rpm) to reflect the laser beam over the drum. Various lenses and mirror are housed in the laser scanner unit, adjust the diameter of the laser beam, and focalize it at the drum surface.



**Figure 2-1-6 Laser scanner unit**

- (1) Laser scanner unit
- (2) MID frame
- (3) LSU lid
- (4) LSU shutter
- (5) LSU mirror
- (6) Polygon motor (mirror)



**Figure 2-1-7 Laser scanner unit**

- 1. Laser diode ..... Emits diffused, visible laser.
- 2. Cylindrical lens..... Compensates the vertical angle at which the laser beam hits a polygon mirror segment.
- 3. Polygon mirror (motor) ..... Has six mirror segments around its hexagonal circumference; each mirror corresponding to one scanned line width on the drum when laser beam scans on it.
- 4. F-theta lens ..... The f-theta lens equalizes focusing distortion on the far ends of the drum.
- 5. Sensor mirror ..... Bends the very first shot of a laser scan towards the pin photo diode sensor (6).
- 6. Pin photo diode sensor ..... When shone by the sensor mirror above, this pin photo diode sensor generates a trigger signal for the engine controller to start activating the paper feeding system.
- 7. LSU mirror..... Diverts the laser beam vertically onto the drum. Note the diffused laser beam finally pinpoints on the drum.
- 8. PD lens ..... Condensing laser beam focus to the pin photo diode sensor.
- 9. Collimator lens ..... Aligns the laser beam to the cylindrical lens.

## 2-1-4 Developing section

### (1) Developer unit

The latent image constituted on the drum is developed into a visible image. The developing roller contains a 3-pole (S-N-S) magnet core and an aluminum cylinder rotating around the magnet core. Toner attracts to the developing roller since it is powdery ink made of black resin bound to iron particles. Doctor blade, magnetized by magnet, is positioned approximately 0.30 mm above the developing roller to constitute a smooth layer of toner in accordance with the roller revolution.

The developing roller is applied with the AC-weighted, positive DC power source. Toner on the developing roller is given a positive charge. The positively charged toner is then attracted to the areas of the drum which was exposed to the laser light. (The gap between the drum and the developing roller is 0.32 mm.) The non-exposed areas of the drum repel the positively charged toner as these areas maintain the positive charge.

The developing roller is also AC-biased to ensure contrast in yielding by compensating the toner's attraction and repelling action during development.

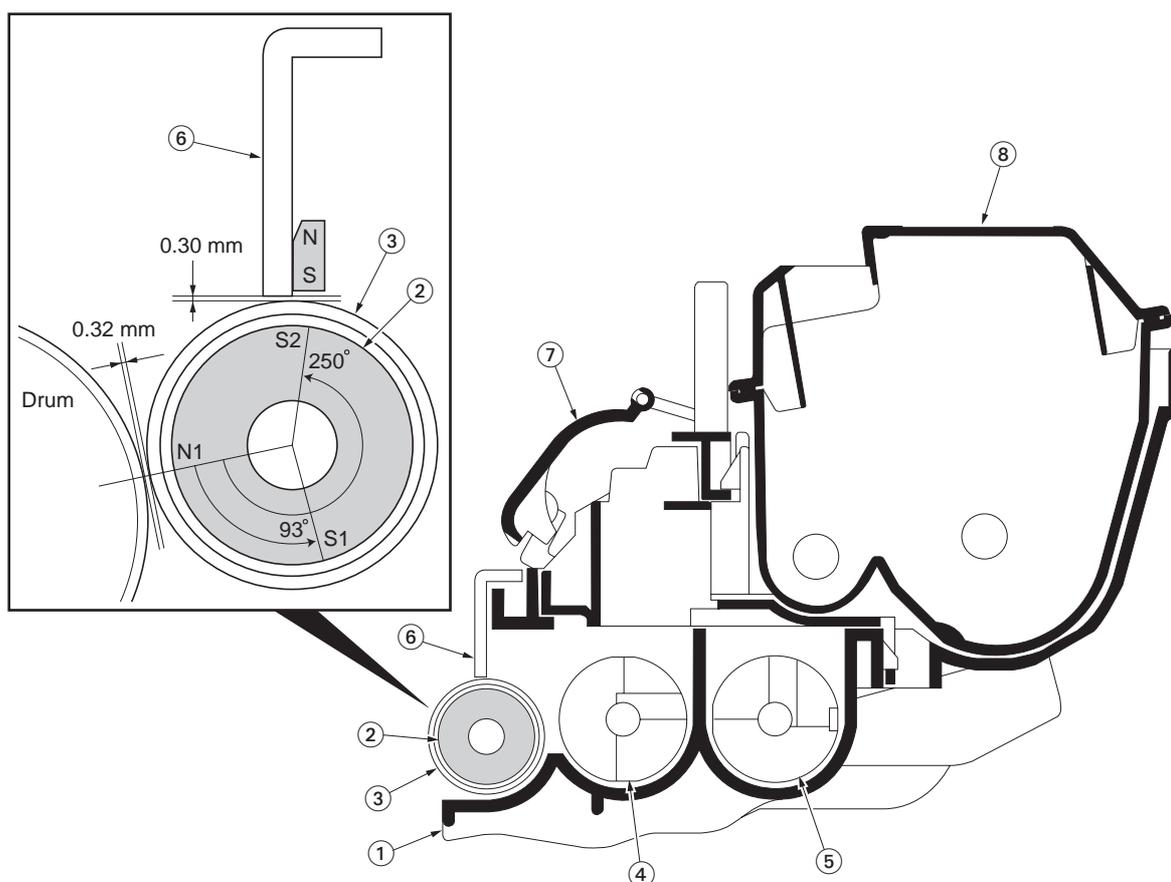


Figure 2-1-8 Developer unit and toner container

- |                       |                     |
|-----------------------|---------------------|
| (1) DLP case          | (5) DLP screw B     |
| (2) Magnet roller     | (6) Doctor blade    |
| (3) Developing sleeve | (7) DLP shutter     |
| (4) DLP screw A       | (8) Toner container |

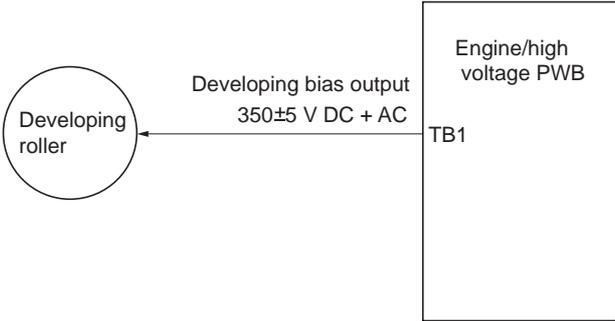
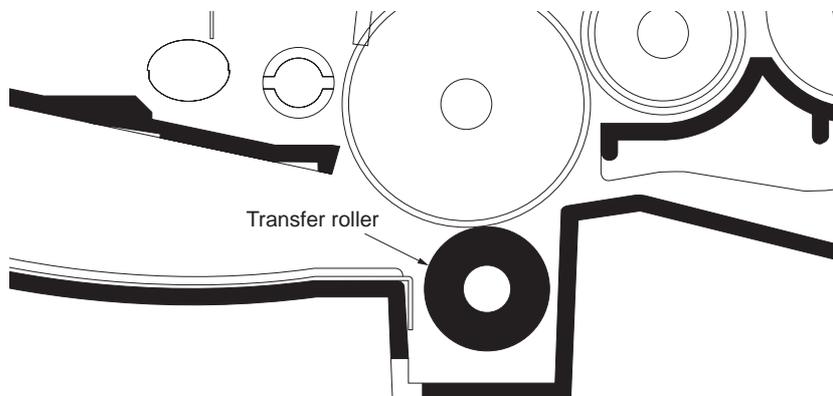


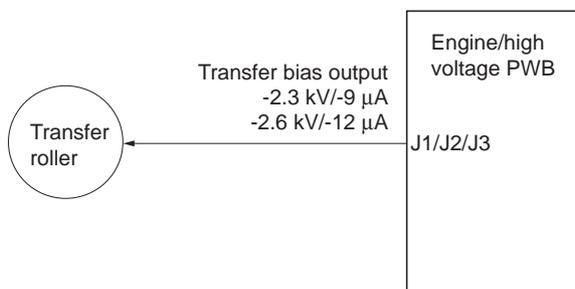
Figure 2-1-9 Developing section block diagram

**2-1-5 Transfer section**

The image developed by toner on the drum is transferred onto the paper because of the electrical attraction between the toner itself and the transfer roller. The transfer roller is negatively biased so that the positively charged toner is attracted onto the paper while it is pinched by the drum and the transfer roller.



**Figure 2-1-10 Transfer section**



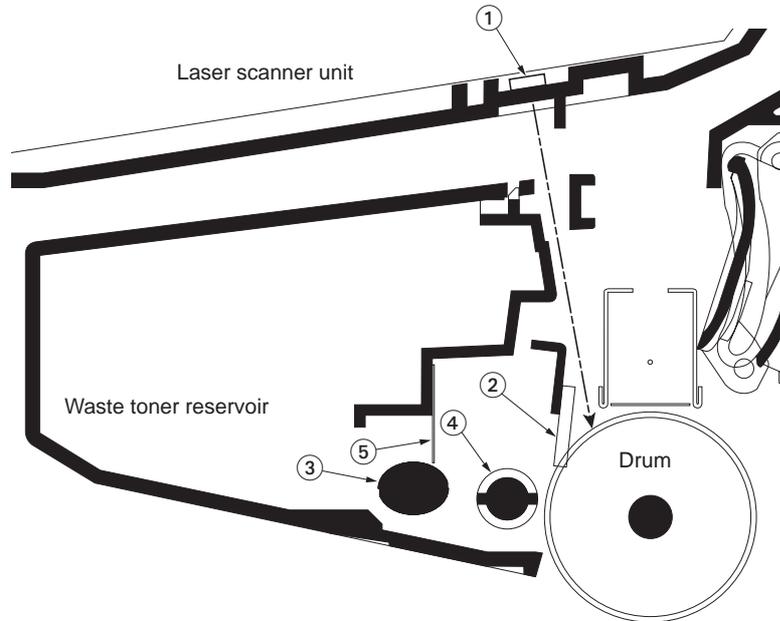
Switches output depending on media type and media size.

**Figure 2-1-11 Transfer section block diagram**

**2-1-6 Cleaning section**

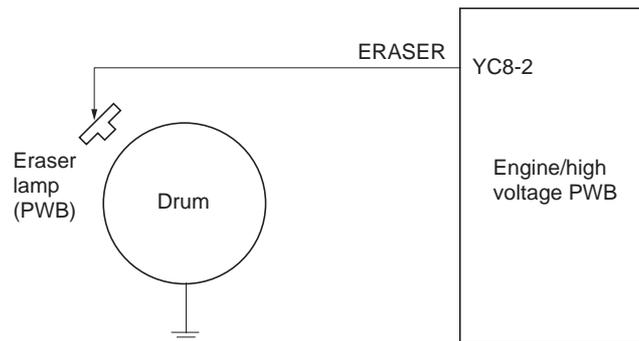
After the transferring process, the drum needs to be physically cleaned of toner which is residual after the development process. The cleaning blade is constantly pressed against the drum and scrapes the residual toner off to the sweep roller. The waste toner is collected at the output end of the sweep roller and sent back to the toner container, into the waste toner reservoir.

After the drum is physically cleaned, it then must be cleaned to the electrically neutral state. This is necessary to erase any residual positive charge, ready to accept the uniform charge for the next print process. The residual charge is canceled by exposing the drum to the light emitted from the eraser lamp (PWB). This lowers the electrical conductivity of the drum surface making the residual charge on the drum surface escape to the ground.



**Figure 2-1-12 Cleaning section**

- (1) Eraser lamp (PWB)
- (2) Cleaning blade
- (3) Sweep roller
- (4) Drum roller
- (5) Sheet sweep



**Figure 2-1-13 Cleaning section**

## 2-1-7 Fuser section

### (1) Fuser unit

The toner on the paper is molten and pressed into the paper as it passes between the heat roller and the press roller in the fuser unit.

The heat roller has a heater lamp (750 W) inside which continuously turns on and off by the fuser thermistor to maintain the constant temperature onto the heat roller surface.

The heat roller is resin coated by fluorin to prevent toner from accumulating on the roller after a long run. Care must be taken while handling the heat roller not to scratch the roller surface as doing so may result in print problems.

The heat roller has four claws (separators) which are continuously in contact with its surface. These claws (separators) prevent the paper on which toner has been fused from being wound around the heat roller causing paper jam.

The press roller is made of the heat-resistant silicon rubber. This roller is used to strongly press the paper towards the heat roller by means of coil springs.

The temperature of the heat roller is constantly monitored by the engine/high voltage PWB using the fuser thermistor and triac. Should the temperature of the heat roller exceed the predetermined value, the thermal cutout is activated to effectively disconnect the heater lamp from power.

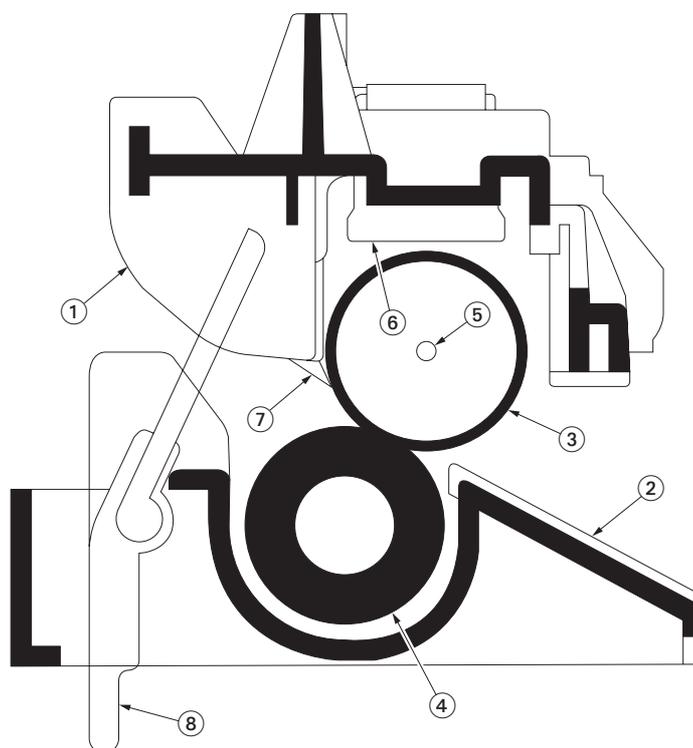


Figure 2-1-14 Fuser unit

- |                       |                    |
|-----------------------|--------------------|
| (1) Upper fuser frame | (5) Heater lamp    |
| (2) Lower fuser frame | (6) Thermal cutout |
| (3) Heat roller       | (7) Separators     |
| (4) Press roller      | (8) Fuser actuator |

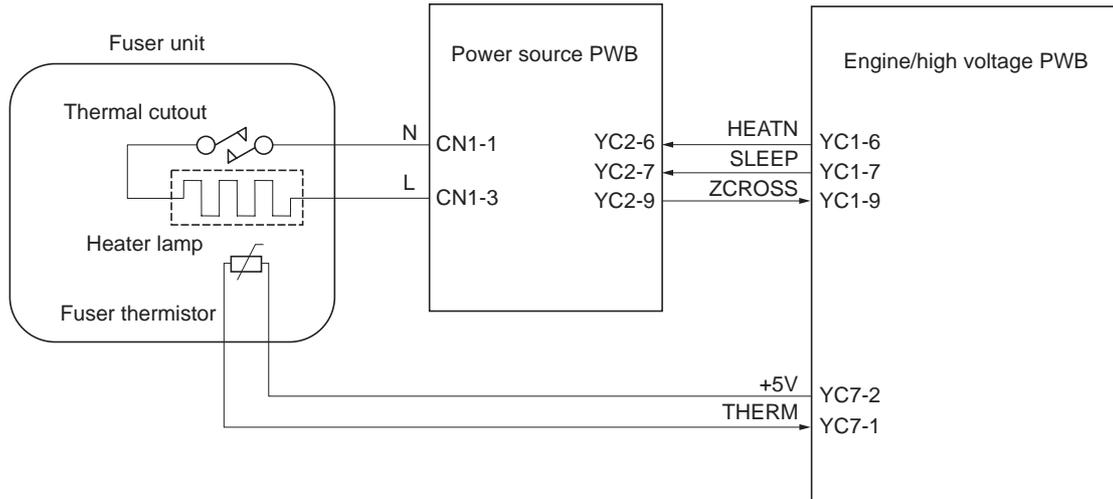
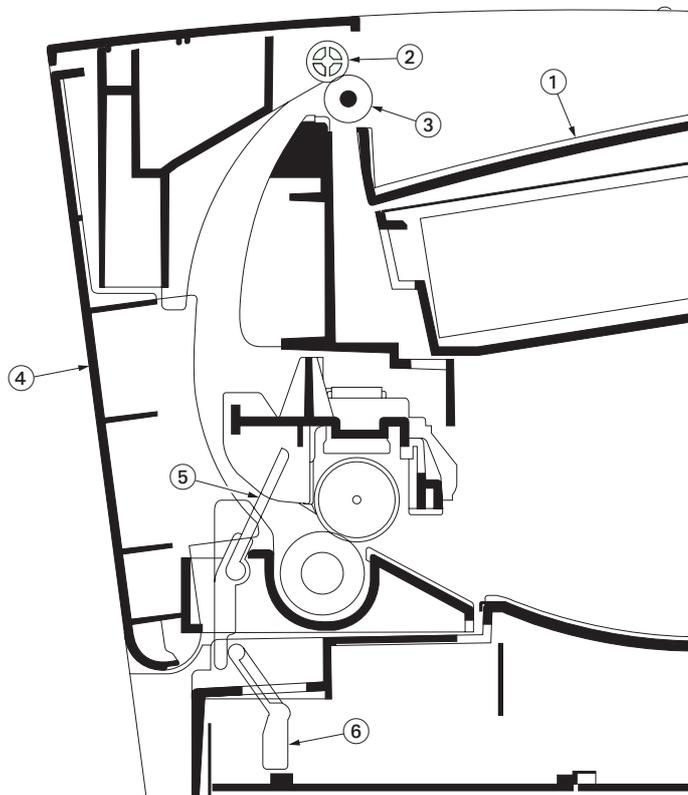


Figure 2-1-15 Fuser section block diagram

## 2-1-8 Paper exit section

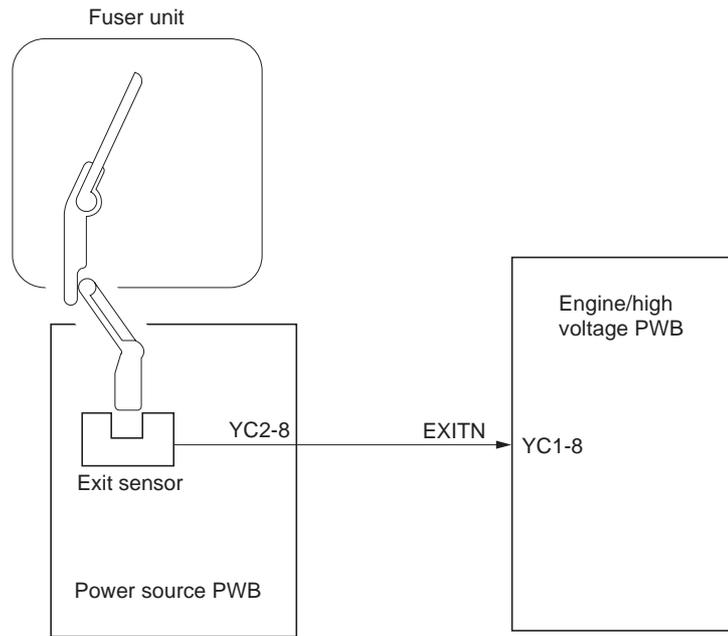
### (1) Paper exit section

The paper exit section transports the paper which passed the fuser unit towards the output tray. The paper which passed through the fuser unit turns on the exit sensor which is driven by the fuser actuator in the fuser unit, and is led by the guide comprised of the rear cover and the frame, finally reaching the FD roller. The paper is delivered to the output tray by the rotation of the FD roller.



**Figure 2-1-16 Paper exit section**

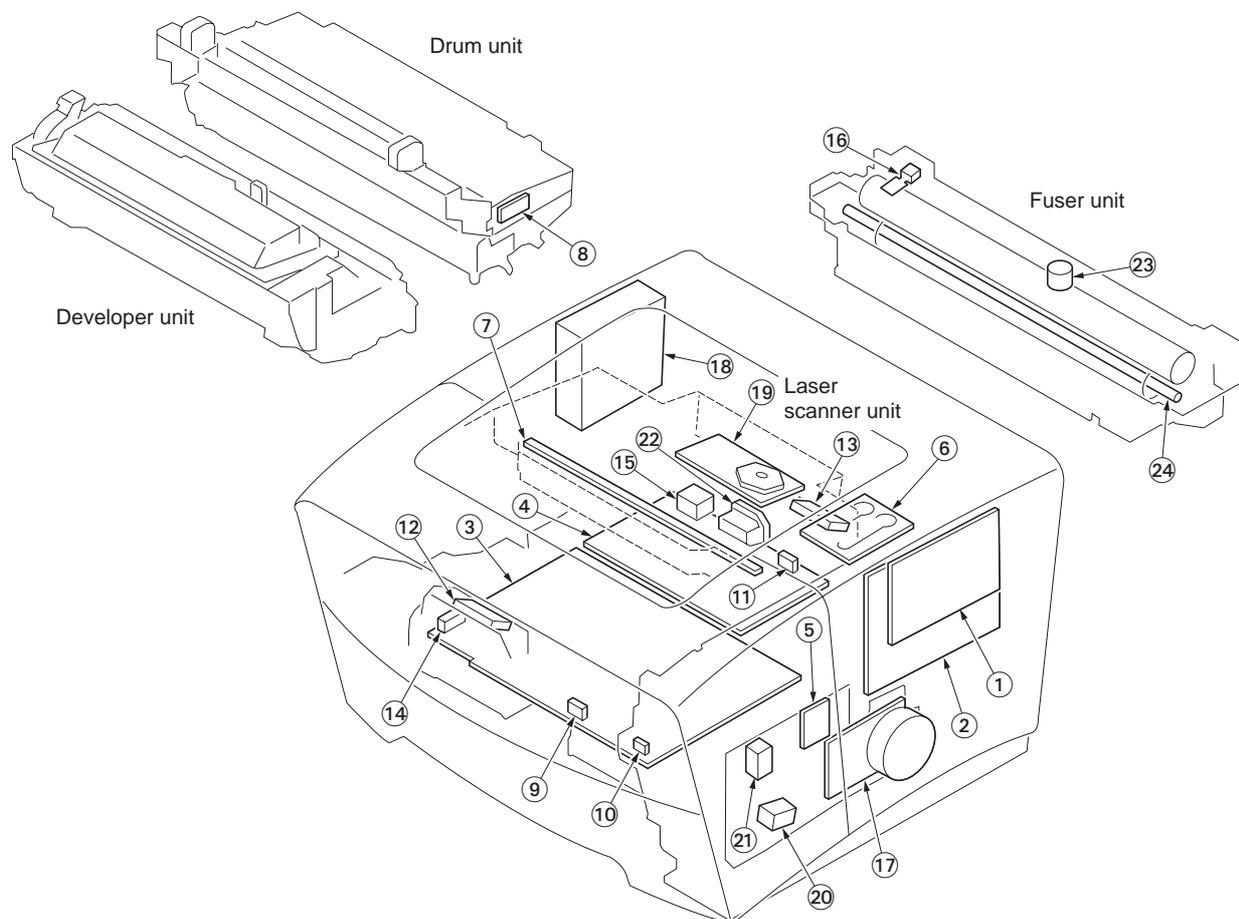
- (1) Output tray
- (2) FD pulley
- (3) FD roller
- (4) Rear cover
- (5) Fuser actuator
- (6) Exit sensor actuator



**Figure 2-1-17 Paper exit section block diagram**

## 2-2-1 Electrical parts layout

### (1) Electrical parts layout



**Figure 2-2-1 Electrical parts layout**

- |  |  |
|--|--|
| 1. Main PWB (For 16 ppm GDI printer).....  | Controls the software such as the print data processing and provides the interface with computer.                  |
| 2. Main PWB (For 16/18 ppm printers) ..... | Controls the software such as the print data processing and provides the interface with computer.                  |
| 3. Engine/high voltage PWB .....           | Controls the input/output of electrical parts and generates the high voltage.                                      |
| 4. Power source PWB.....                   | After full-wave rectification of AC power source input, switching for converting to 24 V DC and 5 V DC for output. |
| 5. Connect PWB .....                       | Consists the buzzer and wiring relay circuit.  |
| 6. Operator panel PWB.....                 | Indicates the LED indicators and controls key inputs.  |
| 7. Eraser lamp PWB .....                   | Eliminates the residual electrostatic charge on the drum.  |
| 8. Zener PWB .....                         | Adjusts the main charger grid electrostatic potential.   |
| 9. Registration sensor.....                | Detects the timing of primary feeding and paper jam.   |
| 10. Paper sensor.....                      | Detects paper in the paper cassette.   |
| 11. Exit sensor .....                      | Detects paper jam in the fuser unit and paper exit section.  |
| 12. Toner empty sensor .....               | Measures toner in the toner container.   |
| 13. Waste toner full sensor .....          | Detects the waste toner reservoir (drum unit) being full.  |
| 14. Interlock switch .....                 | Monitors whether the top cover is open and cuts off the 24 V DC power source.                                      |
| 15. Power switch.....                      | Turns ON/OFF the AC power source.  |
| 16. Fuser thermistor.....                  | Measures the heat roller temperature.  |
| 17. Main motor .....                       | Drives the entire machine.   |
| 18. Cooling fan motor.....                 | Cools the interior of machine.   |
| 19. Polygon motor.....                     | Drives the polygon mirror.   |

2GL/2FV/2FW

- 20. Feed clutch ..... Controls the paper cassette paper feed.
- 21. Registration clutch ..... Controls the primary paper feed.
- 22. AC inlet ..... Connects the AC power source.
- 23. Thermal cutout ..... Shuts off the power source to the heater lamp when the heat roller reaches extremely high temperature.
- 24. Heater lamp ..... Energizes the heat roller.

## 2-3-1 Power source PWB

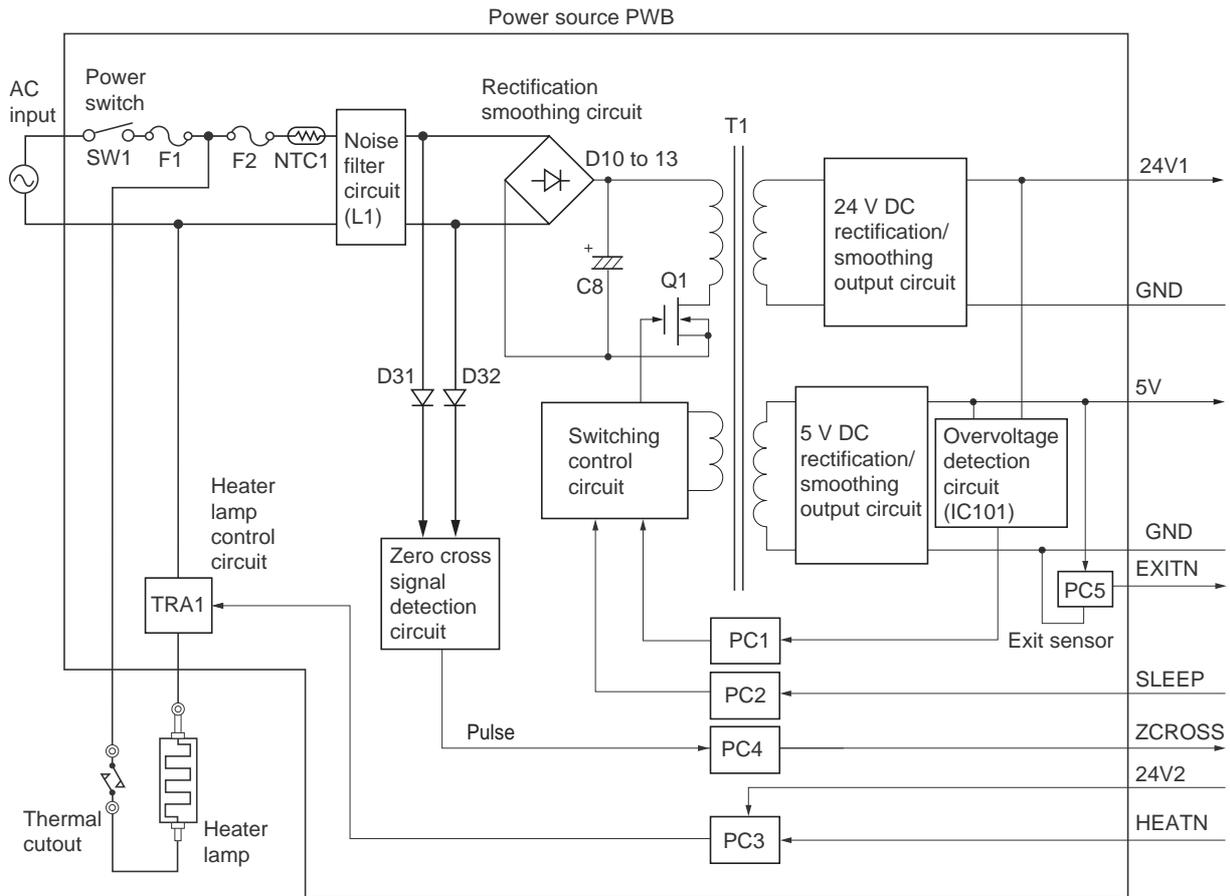


Figure 2-3-1 Power source PWB block diagram

The power source PWB consists of the switching regulator section that is the main part, other zero cross signal detection circuit and heater lamp control circuit. The switching regulator circuit consists of the noise filter circuit, rectification smoothing circuit, switching control circuit, 5 V DC rectification/smoothing output circuit, 24 V DC rectification/smoothing output circuit and overvoltage detection circuit, and this circuit converts the AC power input to the 5 V DC and 24 V DC power source by the switching operation and outputs it to the engine/high voltage PWB. The zero cross signal detection circuit detects the 0 V point (zero cross) of the AC wave form and outputs to the engine/high voltage circuit, and the engine/ high voltage PWB outputs the heater lamp ON signal (HEATN) to the heater lamp control circuit based on the timing of zero cross signal (ZCROSS) and controls the AC power loading to the heater lamp.

Connector	Pin No.	Signal	I/O	Voltage	Description
CN1	N	N	I	220 - 240 V AC 120 V AC	AC power input
Connected to the AC inlet	L	L	I	220 - 240 V AC 120 V AC	AC power input
YC1	N	N	O	220 - 240 V AC 120 V AC	Power supply for heater lamp (On/Off)
Connected to the heater lamp	L	L	O	220 - 240 V AC 120 V AC	Power supply for heater lamp (On/Off)
YC2	1	+5V	O	5 V DC	5 V DC power output
Connected to the engine/high voltage PWB	2	+5V	O	5 V DC	5 V DC power output
	3	GND	-	-	Ground
	4	GND	-	-	Ground
	5	+24V	I	24 V DC	24 V DC power input (via interlock switch)
	6	HEATN	I	0 /24 V DC	Heater lamp: On/Off
	7	SLEEP	I	0 /5 V DC	Sleep mode: On/Off
	8	EXITIN	O	0 /5 V DC	Exit sensor: On/Off
	9	ZCROSS	O	0 /5 V DC (pulse)	Zero cross signal
	10	+24V	O	24 V DC	24 V DC power output
	11	+24V	O	24 V DC	24 V DC power output
	12	GND	-	-	Ground
	13	GND	-	-	Ground

## 2-3-2 Engine/high voltage PWB

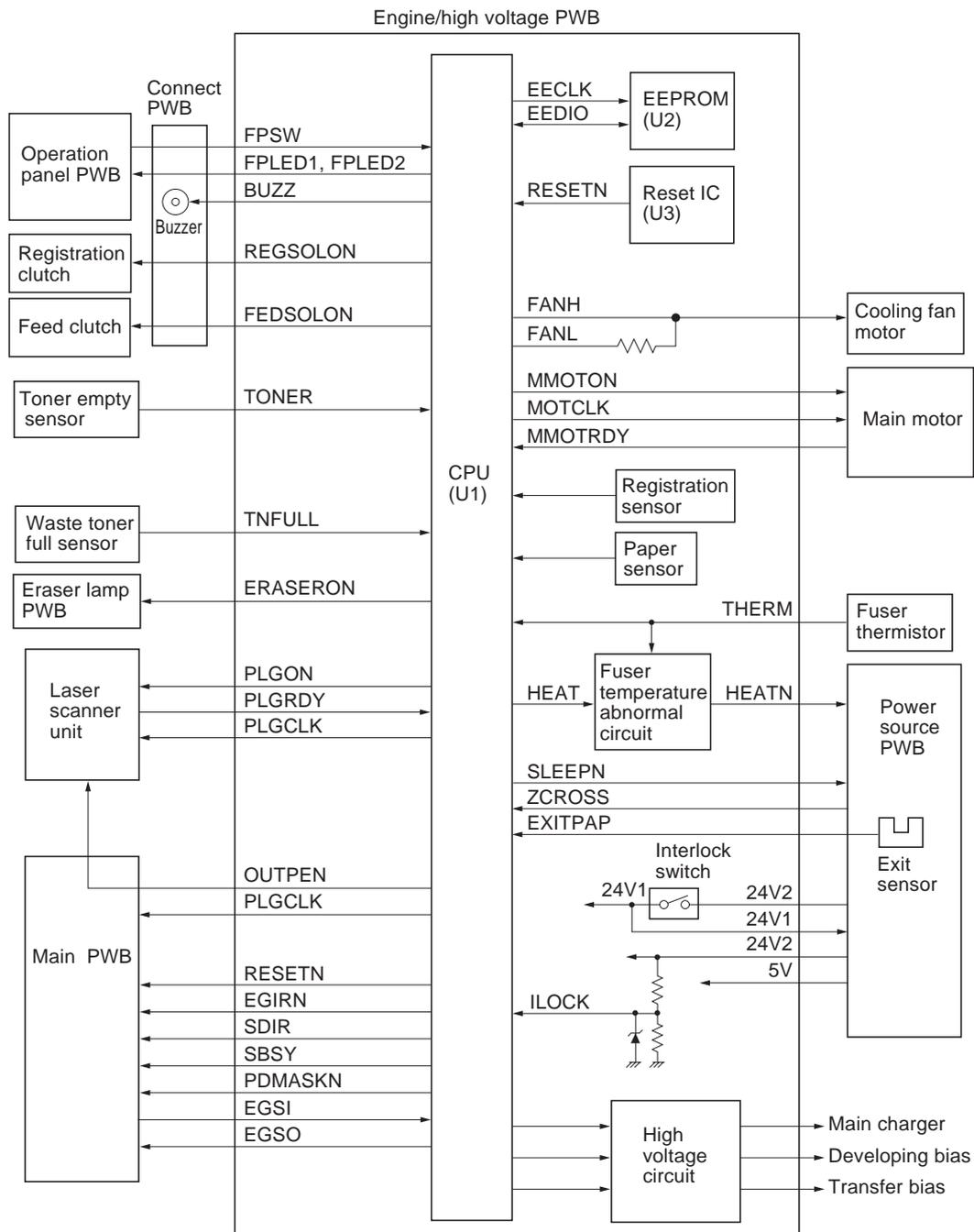


Figure 2-3-2 Engine/high voltage PWB block diagram

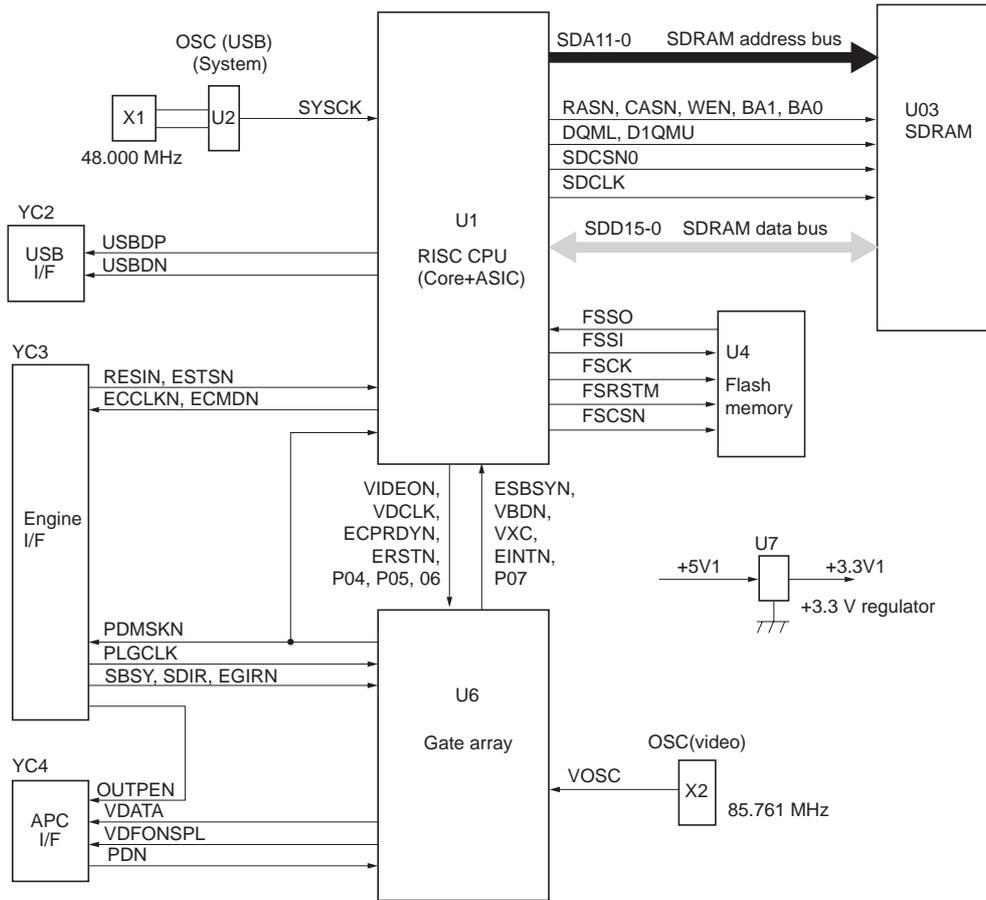
The engine/high voltage PWB consists mainly of CPU (U1) and it is primarily divided into the engine circuit section that controls the entire hardware such as the process and paper feeding/conveying mechanism and the high voltage circuit section that generates various high voltages to output during the process operation.

Connector	Pin No.	Signal	I/O	Voltage	Description
YC1 Connected to the power source PWB	1	+5V	I	5 V DC	5 V DC power input
	2	+5V	I	5 V DC	5 V DC power input
	3	GND	-	-	Ground
	4	GND	-	-	Ground
	5	+24V2	O	24 V DC	24 V DC power output (via interlock switch)
	6	HEATN	O	0/24 V DC	Heater lamp: On/Off
	7	SLEEP	O	0/5 V DC	Sleep mode: On/Off
	8	EXITIN	I	0/5 V DC	Exit sensor: On/Off
	9	ZCROSS	I	0/5 V DC (pulse)	Zero cross signal
	10	+24V1	I	24 V DC	24 V DC power input
	11	+24V1	I	24 V DC	24 V DC power input
	12	GND	-	-	Ground
	13	GND	-	-	Ground
YC3 Connected to the laser scanner unit, con- nect PWB	1	PLGCLK	O	0/5 V DC (pulse)	Polygon motor clock signal
	2	PLGRDY	I	0/5 V DC	Polygon motor: Ready/Not ready
	3	PLGON	O	0/5 V DC	Polygon motor: On/Off
	4	GND	-	-	Ground
	5	+24V3	O	24 V DC	24 V DC power output
	6	+24V3	O	24 V DC	24 V DC power output
	7	REGSOLON	O	0/24 V DC	Registration clutch: On/Off
	8	FEDDOLON	O	0/24 V DC	Feed clutch: On/Off
	9	BUZ	O	0/5 V DC (pulse)	Buzzer: On (4 kHz)
	10	FPLED2	O	0/5 V DC	READY indicator: On/Off
	11	FPLED1	O	0/5 V DC	ATTENTION indicator: On/Off
	12	FPSW	I	Analog 5 V DC 3.160 to 3.394 V DC 2.544 to 2.798 V DC 1.947 to 2.193 V DC	GO key (SW1) and CANCEL key (SW2) input: SW1: Off, SW2 Off SW1: Off, SW2 On SW1: On, SW2: Off SW1: On, SW2: On
	13	GND	-	-	Ground
YC4 Connected to the main PWB	1	RESETN	O	0/5 V DC	Reset signal
	2	EGIRN	O	0/5 V DC	Engine interrupt signal
	3	SDIR	O	0/5 V DC	Communication direction change signal
	4	SBSY	O	0/5 V DC	Engine busy signal
	5	PDMASKN	O	0/5 V DC	PD mask control signal
	6	EGSI	I	0/5 V DC (pulse)	Engine interface serial communication data
	7	SCLKIN	I	0/5 V DC (pulse)	Clock signal for engine interface
	8	SGSO	O	0/5 V DC (pulse)	Engine interface serial communication data
	9	PLGCLK	I	0/5 V DC (pulse)	Clock signal for polygon motor
	10	OUTPEN	O	0/5 V DC	Laser output: On/Off
	11	+5V	O	5 V DC	5 V DC power output
	12	GND	-	-	Ground
YC5 Connected to the main motor	1	+24V3	O	24 V DC	24 V DC power output
	2	GND	-	-	Ground
	3	MMOTRDY	-	-	Ground (power)
	4	MOTCLK	O	0/5 V DC (pulse)	Main motor clock signal
	5	REMOTE	O	0/5 V DC	Main motor: On/Off
YC6 Connected to the waste toner full sensor	1	+5V	O	5 V DC	5 V DC power output
	2	TNFULL	I	0/5 V DC	Waste toner full/Not
	3	GND	-	-	Ground
YC7 Connected to the fuser thermistor	1	+5V	O	5 V DC	5 V DC power output
	2	THERM	I	Analog	Fuser thermistor detection voltage

Connector	Pin No.	Signal	I/O	Voltage	Description
YC8	1	ERASPW	O	24 V DC	24 V DC power output
Connected to the eraser lamp (PWB)	2	ERASER	O	0/24 V DC	Eraser lamp (PWB): On/Off
YC9	1	+24V1	O	24 V DC	24 V DC power output
Connected to the cooling fan motor	2	FAN	O	0 /12/24 V DC	Cooling fan motor: Full speed/Half speed/Off
YC10	1	+5V	O	5 V DC	5 V DC power output
Connected to the toner empty sensor	2	TONER	I	0/5 V DC	Toner empty/Not
	3	GND	-	-	Ground

**2-3-3 Main PWB**

For 16 ppm GDI printer



**Figure 2-3-3 Main PWB block diagram (For 16 ppm GDI printer)**

The main PWB consists mainly of CPU (U1) and primarily performs the printing data processing and interface controls with computers. The CPU (U1) outputs the laser light and executes printing following the flash memory (U4) that stores the control programs being linked with the process and paper feeding/conveying mechanism that the engine/high voltage PWB controls.

For 16 ppm printer

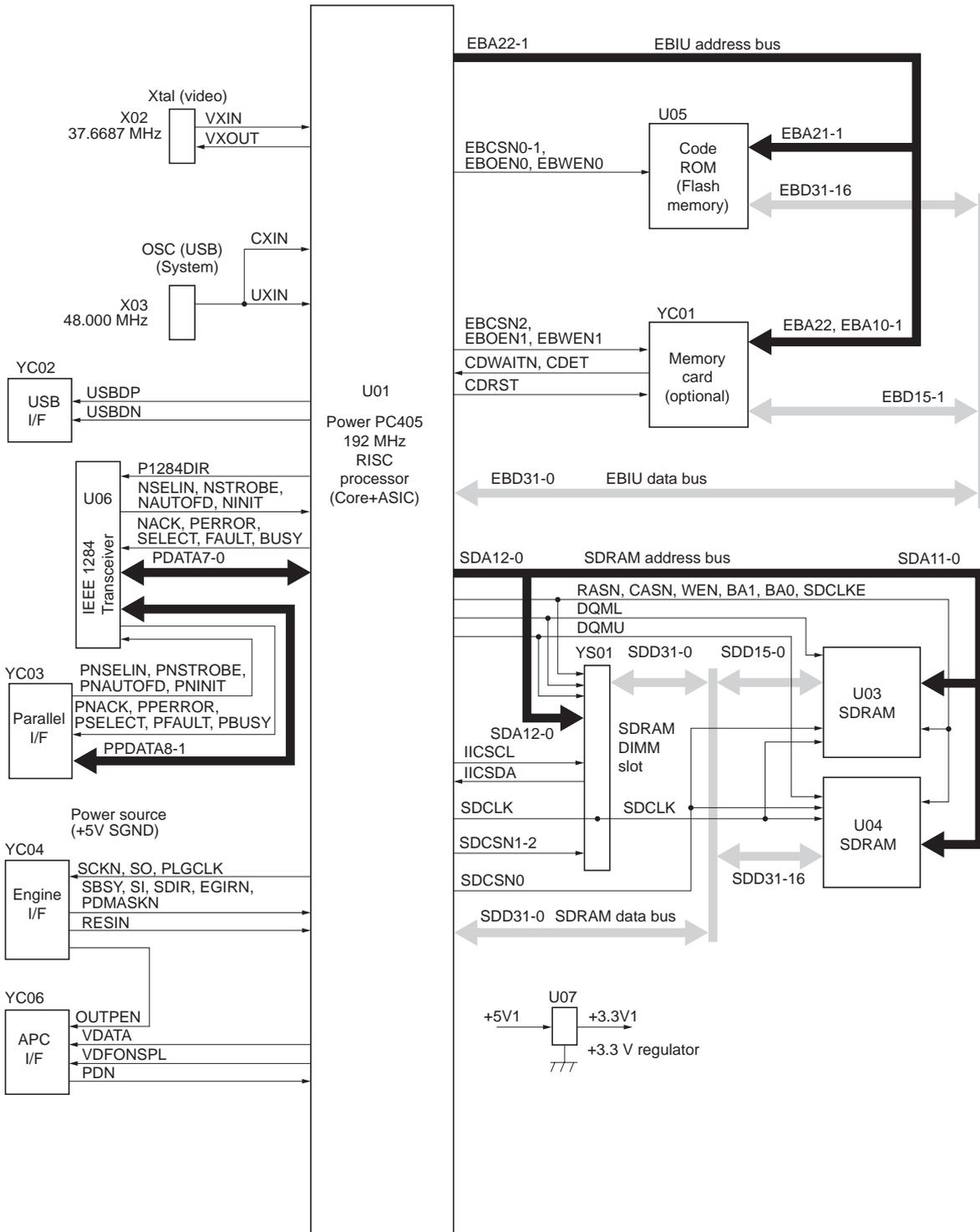


Figure 2-3-4 Main PWB block diagram (For 16 ppm printer)

The main PWB consists mainly of CPU (U01) and primarily performs the printing data processing and interface controls with computers. The CPU (U1) outputs the laser light and executes printing following the code ROM (U05) that stores the control programs being linked with the process and paper feeding/conveying mechanism that the engine/high voltage PWB controls.

For 18 ppm printer

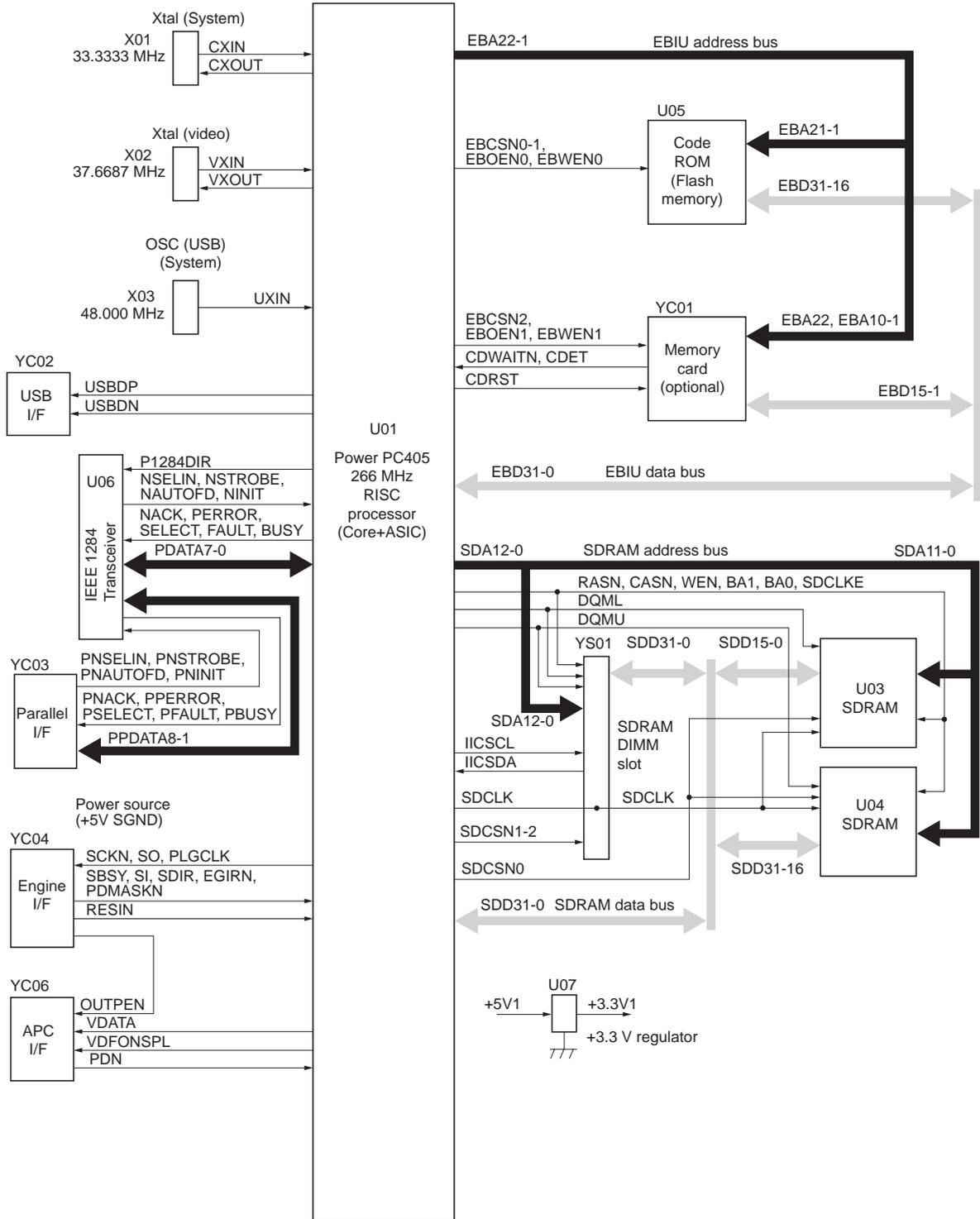
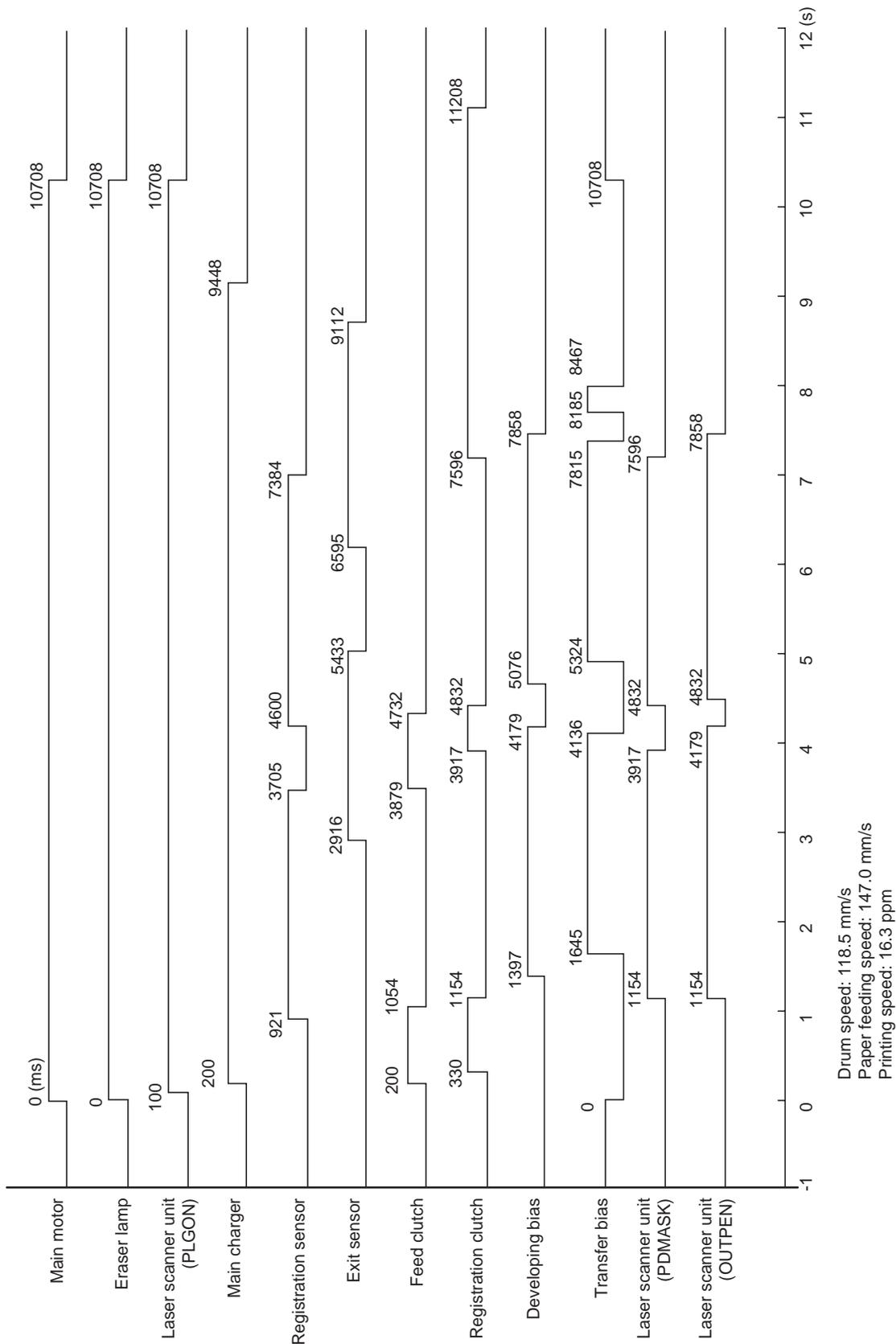


Figure 2-3-5 Main PWB block diagram (For 18 ppm printer)

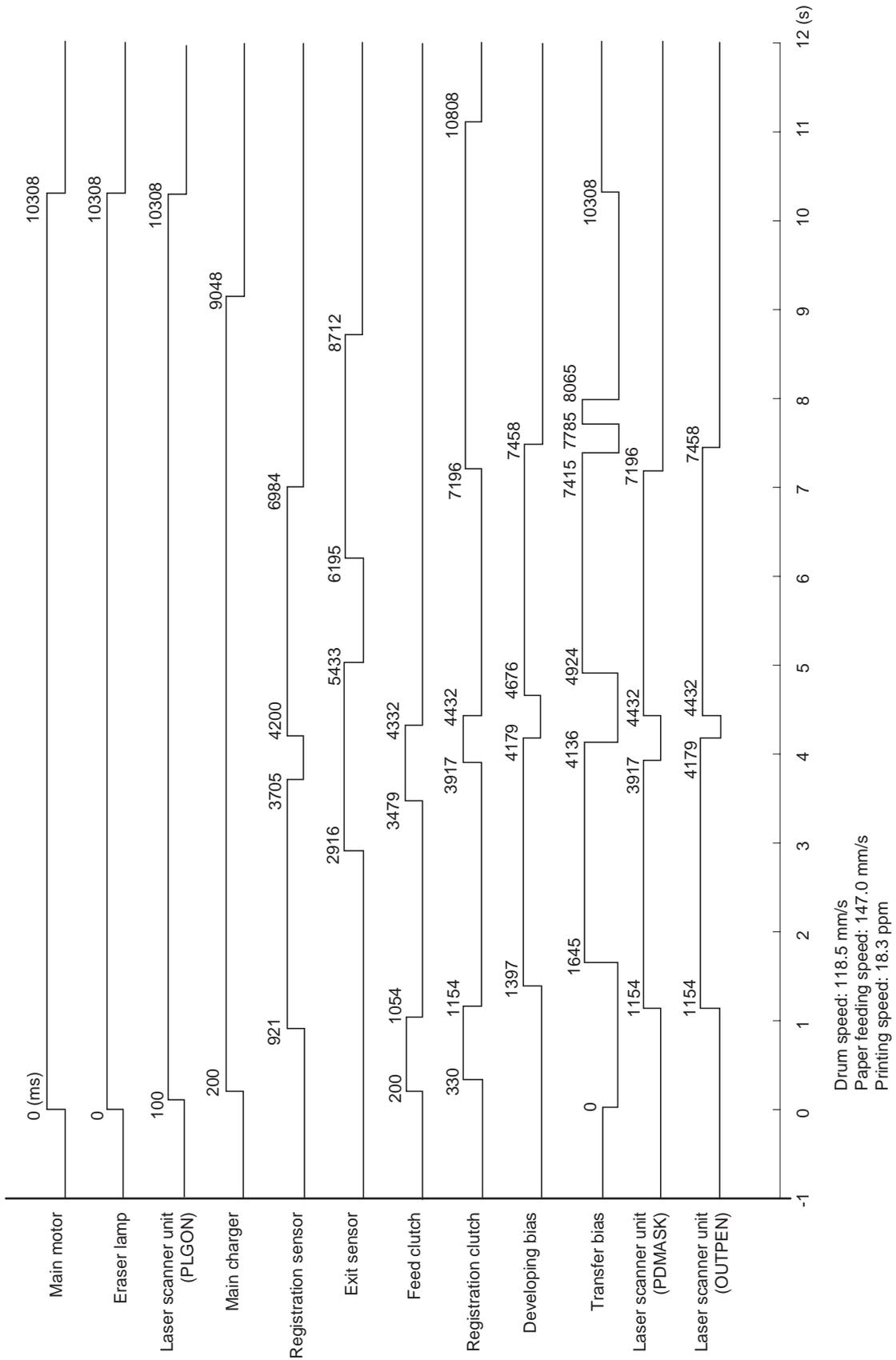
The main PWB consists mainly of CPU (U01) and primarily performs the printing data processing and interface controls with computers. The CPU (U1) outputs the laser light and executes printing following the code ROM (U05) that stores the control programs being linked with the process and paper feeding/conveying mechanism that the engine/high voltage PWB controls.

2-4-1 Appendixes

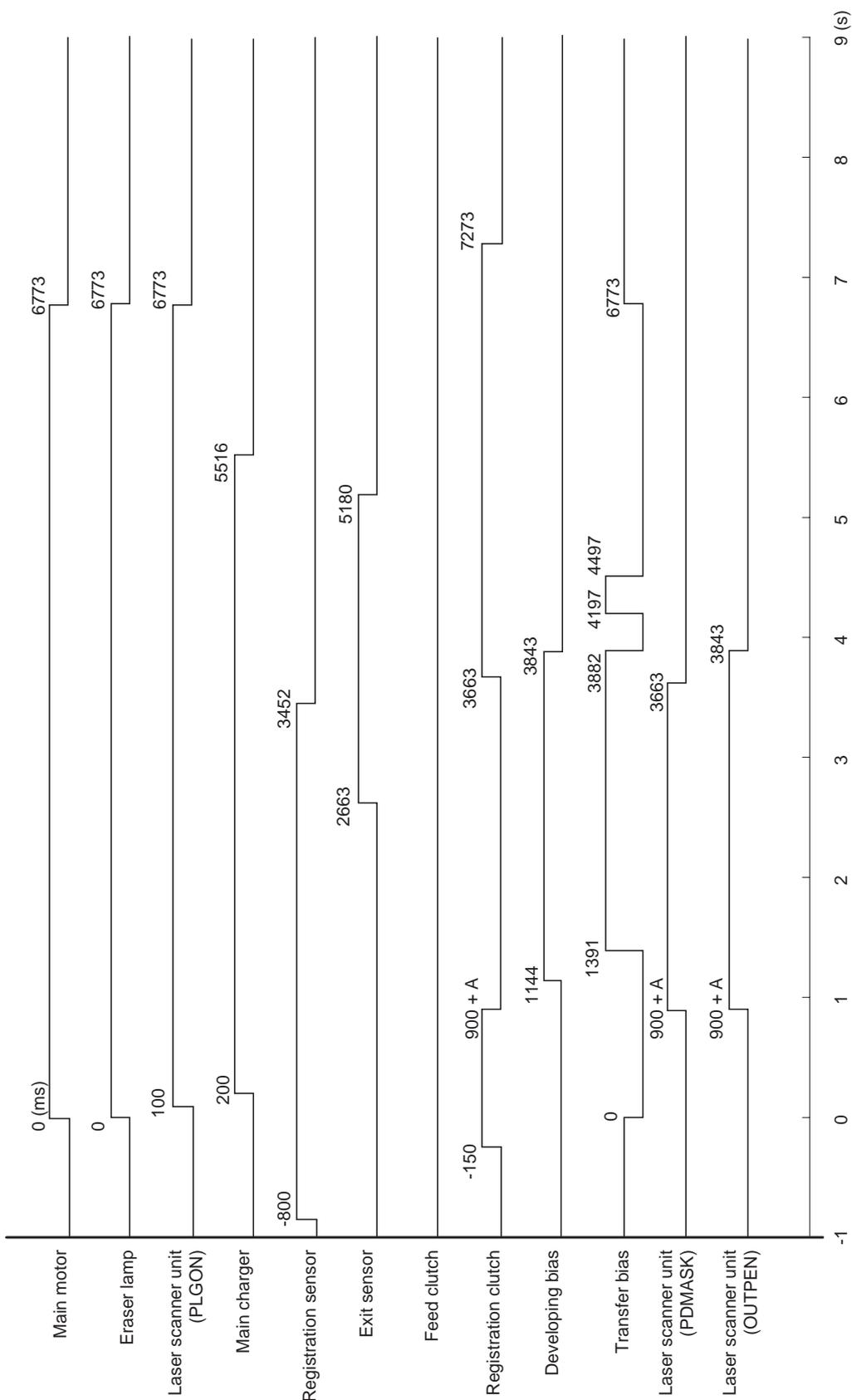
(1) Timing chart No.1 Cassette paper feeding, Paper size A4 (For 16/16 ppm GDI printers)



(2) Timing chart No.2 Cassette paper feeding, Paper size A4 (For 18 ppm printer)



(3) Timing chart No.3 Manual feed tray paper feeding, Paper size A4



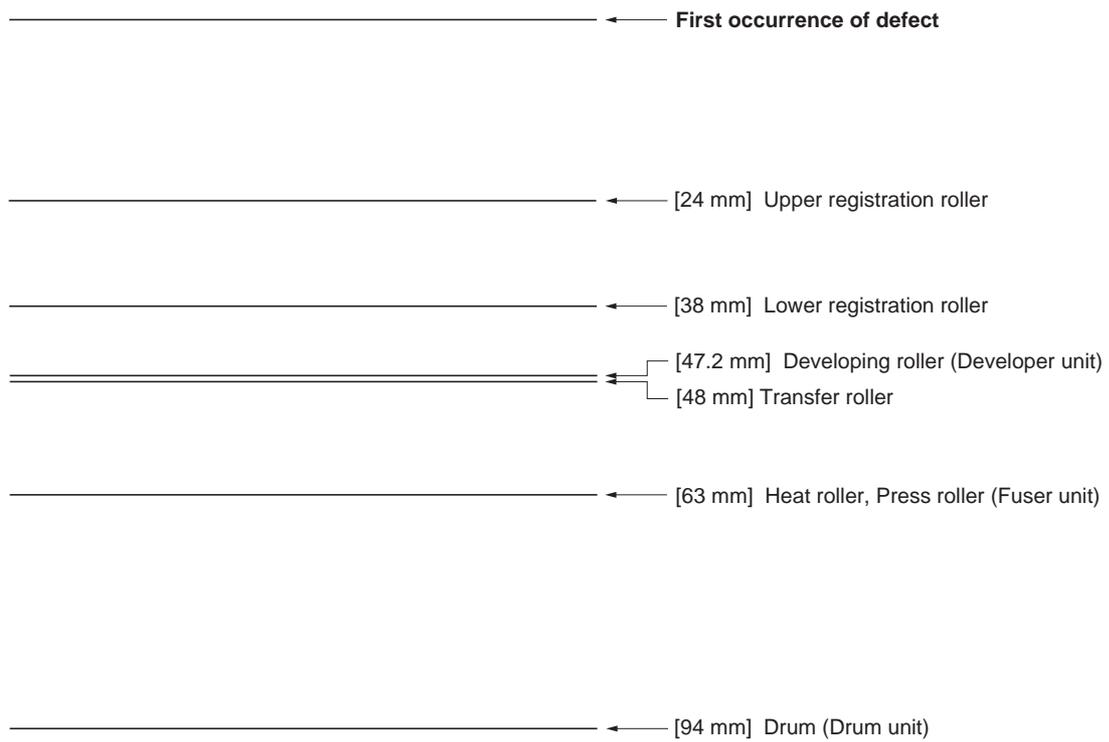
Drum speed: 118.5 mm/s

NOTE:

A represents the period of time of waiting for controlling the heater lamp.  
The period of 3.5 s should be allowed for media sizes smaller than A5.



**(5) Repetitive defects gauge**



This page is intentionally left blank.

## KYOCERA MITA EUROPE B.V.

Hoeksteen 40, 2132 MS Hoofddorp,  
The Netherlands  
Phone: +31.20.654.0000  
Home page: <http://www.kyoceramita-europe.com>  
Email: [info@kyoceramita-europe.com](mailto:info@kyoceramita-europe.com)

KYOCERA MITA NEDERLAND B.V.  
Beechavenue 25, 1119RA Schiphol-Rijk  
The Netherlands  
Phone: +31.20.58.77.200

KYOCERA MITA (UK) LTD  
8 Beacontree Plaza  
Gillette Way Reading Berks RG2 OBS,  
U.K.  
Phone: +44.1189.311.500

KYOCERA MITA ITALIA S.p.A.  
Via G. Verdi, 89 / 91, 20063 Cernusco s/N  
Milano, Italy  
Phone: +39.02.92179.1

S.A. KYOCERA MITA BELGIUM N.V.  
Hermesstraat 8A, 1930 Zaventem,  
Belgium  
Phone: +32.2.720.9270

KYOCERA MITA FRANCE S.A.  
Parc Les Algorithmes Saint Aubin  
91194 GIF-SUR-YVETTE,  
France  
Phone: +33.1.6985.2600

KYOCERA MITA ESPAÑA S.A.  
Edificio Kyocera, Avda de Manacor No. 2,  
28290 Las Matas (Madrid),  
Spain  
Phone: +34.91.631.8392

KYOCERA MITA FINLAND OY  
Kirvesmiehenkatu 4, 00880 Helsinki,  
Finland  
Phone: +358.9.4780.5200

KYOCERA MITA (SCHWEIZ)  
Hohlstrasse 614, 8048 Zürich  
Switzerland  
Phone: +41.1.908.4949

KYOCERA MITA DEUTSCHLAND GMBH  
Otto-Hahn-Str. 12 D-40670 Meerbusch,  
Germany  
Phone: +49.2159.918.0

KYOCERA MITA GMBH AUSTRIA  
Eduard-Kittenberger-Gasse 95,  
1230 Wien,  
Austria  
Phone: +43.1.86338.210

KYOCERA MITA SVENSKA AB  
Esbogatan 16B 164 75 Kista,  
Sweden  
Phone: +46.8.546.55000

KYOCERA MITA NORGE  
Postboks 150 Oppsal, NO 0619 Oslo  
Olaf Helsetsvai 6, NO 0694 Oslo,  
Norway  
Phone: +47.22.62.73.00

KYOCERA MITA DANMARK A/S  
Ejby Industrivej 1, DK-2600 Glostrup,  
Denmark  
Phone: +45.5687.1100

KYOCERA MITA PORTUGAL LDA.  
Rua do Centro Cultural, 41 (Alvalade) 1700-106 Lisbon,  
Portugal  
Phone: +351.21.842.9100

KYOCERA MITA SOUTH AFRICA (PTY) LTD.  
527 Kyalami Boulevard,  
Kyalami Business Park Midrand,  
South Africa  
Phone: +27.(0)11.540.2600

## KYOCERA MITA AMERICA, INC.

Headquarters:  
225 Sand Road,  
Fairfield, New Jersey 07004-0008,  
U.S.A.  
Phone: (973) 808-8444

KYOCERA MITA AUSTRALIA PTY. LTD.  
Level 3, 6-10 Talavera Road, North Ryde,  
N.S.W. 2113 Australia  
Phone: (02) 9888-9999

KYOCERA MITA NEW ZEALAND LTD.  
1-3 Parkhead Place, Albany  
P.O. Box 302 125 NHPC, Auckland,  
New Zealand  
Phone: (09) 415-4517

KYOCERA MITA (THAILAND) CORP., LTD.  
9/209 Ratchada-Prachachem Road,  
Bang Sue, Bangkok 10800, Thailand  
Phone: (02) 586-0320

KYOCERA MITA SINGAPORE PTE LTD.  
121 Genting Lane, 3rd Level,  
Singapore 349572  
Phone: 67418733

KYOCERA MITA HONG KONG LIMITED  
11/F., Mita Centre,  
552-566, Castle Peak Road,  
Tsuen Wan, New Territories,  
Hong Kong  
Phone: 24297422

KYOCERA MITA TAIWAN Corporation.  
7F-1~2, No.41, Lane 221, Gangchi Rd.  
Neihu District, Taipei, Taiwan, 114. R.O.C.  
Phone: (02) 87511560

## KYOCERA MITA Corporation

2-28, 1-chome, Tamatsukuri, Chuo-ku  
Osaka 540-8585, Japan  
Phone: (06) 6764-3555  
<http://www.kyoceramita.com>

©2007 KYOCERA MITA Corporation

 **KYOCERA** is a trademark of Kyocera Corporation

Printed in Holland

## KYOCERA MITA AMERICA, INC.

### **Headquarters:**

225 Sand Road,  
Fairfield, New Jersey 07004-0008  
TEL : (973) 808-8444  
FAX : (973) 882-6000

### **New York Branch:**

1410 Broadway 23rd floor  
New York, NY 10018  
TEL : (917) 286-5400  
FAX : (917) 286-5402

### **Northeastern Region:**

225 Sand Road,  
Fairfield, New Jersey 07004-0008  
TEL : (973) 808-8444  
FAX : (973) 882-4401

### **Midwestern Region:**

201 Hansen Court Suite 119  
Wood Dale, Illinois 60191  
TEL : (630) 238-9982  
FAX : (630) 238-9487

### **Western Region:**

14101 Alton Parkway,  
Irvine, California 92618-7006  
TEL : (949) 457-9000  
FAX : (949) 457-9119

### **Southeastern Region:**

1500 Oakbrook Drive,  
Norcross, Georgia 30093  
TEL : (770) 729-9786  
FAX : (770) 729-9873

### **Southwestern Region:**

2825 West Story Road,  
Irving, Texas 75038-5299  
TEL : (972) 550-8987  
FAX : (972) 252-9786

### **National Operation Center & National Training Center:**

2825 West Story Road,  
Irving, Texas 75038-5299  
TEL : (972) 659-0055  
FAX : (972) 570-5816

### **Latin America Division:**

8240 N.W. 52nd. Terrace Dawson Building,  
Suite 108 Miami, Florida 33166  
TEL : (305) 421-6640  
FAX : (305) 421-6666

## KYOCERA MITA CANADA, LTD.

6120 Kestrel Road, Mississauga,  
Ontario L5T 1S8, Canada  
TEL : (905) 670-4425  
FAX : (905) 670-8116

## KYOCERA MITA MEXICO, S.A. DE C.V.

Av. 16 de Septiembre #407  
Col. Santa Inés,  
Azcapotzalco México,  
D.F. 02130, México  
TEL : (55) 5383-2741  
FAX : (55) 5383-7804

©2007 KYOCERA MITA Corporation

<http://www.kyoceramita.com>

 **KYOCERA** is a trademark of Kyocera Corporation

Printed in U.S.A.