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A: PRODUCT INSTALLATION

1 PRECAUTIONS FOR INSTALLATION

1-1. Installation Site

When installing the printer, please avoid the types of locations listed below, both for safety conditions and to breakdowns.

- Which is exposed to direct sunlight.
- Which is damp or dusty.
- Where it may be splashed with water.
- Which is tilted or subject to undue vibration.
- Where it will be subject to extremely high or low temperature or humidity.
- Where it will be subject to sudden fluctuations in either temperature or humidity.
- Which is near volatile flammables or corrosive gas.
- Which is in the direct air stream of an air conditioner, heater, or ventilator.
- Which is near a TV set or radio.

1-2. Environmental Requirements

In order to make sure the printer functions in good condition, please make sure ambient environment satisfies the following requirements:

Temperature	: 10 to 35°C	Temperature fluctuation	: ±10°C per hour or less
Humidity	: 15 to 85% RH	Humidity fluctuation	: ±20% RH per hour or less
Altitude	: 0 to 2500m	Atmospheric pressure	: 760 hPa or more

1-3. Power Requirements

Do not plug the Power cord into a power outlet via an extension cord supplying electricity to more than one unit.

Power source	120-127V, 50-60Hz	220-240V, 50-60Hz
Voltage fluctuation	+6%, -10%	±10%
Frequency fluctuation	±3Hz	

When any other electric appliance is sourced from the same power outlet, make sure that the current capacity of the outlet is not exceeded.

- Ensure that the power outlet is not hidden behind any object, allowing the user to immediately unplug the power cord when necessary.
- The power-outlet shall be installed near the equipment and easily accessible.
- The power cord should not be cracked or scratched.

2 INSTALLATION

2-1. Connection

The following items should be connected before use.

- Connect the Parallel Interface Cable.
- Connect the Power Cord.

2-2. Moving

Caution:

The printer weighs approximately 30kg (2 pounds) without the Imaging Cartridge, paper and Options. Don't lift the printer by yourself. Have at least one other person assist you.

2-3. Space Requirement

Note:

The minimum space requirements for install of the printer are enclosed in a . To ensure easy operation, replacement of consumable, and maintenance service jobs, provide the following space for the installation of the printer.

B: GENERAL INFORMATION

1 SPECIFICATIONS

Type	: Desktop Laser Beam Printer
Printing system	: Electrostatic dry powdered imaging system + Imaging Cartridge
Exposure system	: Laser Diode + Polygon Mirror scanning
Print resolution	: 600 dpi, smoothing (Fine-ART), photo tone mode
Print image	: Single print within 4 mm of paper edge Duplex print (option) within (TBD) mm of paper edge
Printing time	: Single print 10.5 sec./Letter C (C: crosswise) Duplex print (option) 18.6 sec./Letter C
Multi printing time	: Multi print 25 sheets/min/Letter C Duplex print (option) 17.4 sheets/min/Letter C
Paper	: • Tray 1/ Manual Unit (option) Ordinary plain paper (60 - 90 g/m ²)/Recycled paper (60 - 90 g/m ²), OHP, Letterhead, Label, Thick paper (91 - 163 g/m ²), Envelop Tray 2 : Ordinary plain paper (60 - 90 g/m ²)/ Recycled paper (60 - 90 g/m ²) Tray 3 - 5 (option)/2500 Sheet LCC (option) : Ordinary plain paper (60 - 90 g/m ²)/Recycled paper (60 - 90 g/m ²)
Paper size	: • Tray 1/Manual Unit (option) A3, JIS B4, A4, JIS B5, A5, Letter, Legal 14, Ledger, Executive, Envelop (DL, Com-10, C5, B5), Custom size (92 - 297 mm (width), 140 - 432 mm (length)) Tray 2/ Tray 3 - 5 (option) A3, JIS B4, A4, JIS B5, A5, Letter, Legal 14, Ledger, Executive
PCL built-in fonts	: 35 Agfa Intellifonts, 10 TrueType fonts
Paper feeding system	: 6 way system Tray 1 (multi-purpose) (250 sheets) Tray 2 (500 Sheet Cassette) (No 250 Sheet Universal Cassette???)
Paper exit system	: Face down (500 sheets maximum/A4 C/Letter C)
Warm-up time	: Within 60 seconds (when power supplied at 23°C)
System speed	: 114.84 mm/second
Fusing system	: Heat Roller fusing system
Charging system	: Rotating Charge Brush system
Development	: Fine Micro Toning system
Separating system	: Paper separator (+ comb electrode???)
Cleaning system	: Blade system
Dimensions	: 535 mm(W) x 543 mm(D) x 428 mm(H) Options included: 590 mm(W) x 543 mm(D) x 808 mm(H)
Weight	: Approximately 30 kg (without Imaging Cartridge (TBD) kg)
Power supply	: AC 120V 60Hz , AC 230V 50/60Hz
Power consumption:	: 1050W or less (rated operation??) (TBD)W or less on the average (printing) (TBD)W or less on the average (standby) 45W or less (low power)
Atmosphere	: Temperature 10 - 35°C Humidity 15 - 85% RH (without condensation)
Acoustic noise	: 55 dB (A) or less (printing) 38 dB (A) or less (standby)
Printer life	: 500,000 prints (converted to A4 C or Letter C) or 5 years
Recommended prints per month??	: 6,000 prints on the average
Imaging Cartridge life	: 15,000 prints or more/A4 C/Letter C (when the black-to-white ratio is 5% on multi prints)

Controller

CPU : PowerPC603e 90MHz
 Memory : DRAM 4MB, ROM 4MB, NVRAM 4KB
 Interface : IEEE1284 (Compatible, Nibble, ECP) Connector type B (36 pin Centronics)
 (Automatic interface selection upon data reception if an optional Network Board is used.)
 Display Panel : LCD 16 characters x 2 lines , 3 LEDs, 8 keys
 Supporting 8 languages

Accessories

: Power Cord (only North America??)
 : Imaging Cartridge
 : CD-ROM or FDs(s??)
 • Printer driver
 Windows3.1/Windows95/WindowsNT4.0 (PCL5e + XL)
 • Status monitor
 Windows95/WindowsNT4.0
 • Fonts
 Agfa Font Manager with 96 fonts
 : Manual?? (for printer and driver, one copy each)

Options

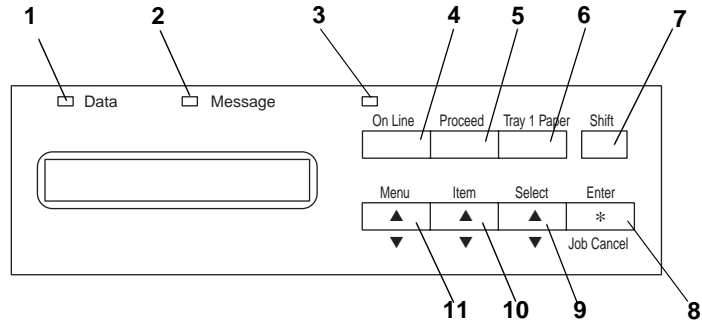
: Manual Unit
 : Duplex Unit
 : Tray 3 - 5
 250 Sheet Universal Cassette/500 Sheet Fixed Cassette
 : 2500 Sheet LCC (Large Capacity Cassette)
 : 5 Bin Main Bin (500 sheets)
 : Hard Disk Unit (2.5" EIDE??, 2.1GB)
 : Extend memory DRAM 96MB (SIMM x 3)
 : PostScript 3
 • ROM-SIMM board x 1, 4MB
 • PostScript 136 fonts
 • MacOS system Ver. 7.5 or greater, PPD file
 • PS printer driver for Windows3.1
 • PS printer driver Windows95
 : Network Board 1 slot
 • Interface
 Ethernet 100/10 Base T, 10 Base2, TokenRing
 • Protocol TCP/IP, IPX/SPX, AppleTalk
 • Managing function?? Built-in Web server function which is possible to manage with
 Web browser, SNMP (IPX, IP) + printer MIB
 • Attached software
 IPX browser (Windows95), supporting Windows95 peer to peer

Mac, AppleTalk, and TrueType are trademarks of Apple, Inc. Windows3.1, Windows95, and WindowsNT are registered trademarks of Microsoft Corporation. IPX/SPX is a registered trademark of Novel Corporation. PostScript is a registered trademark of Adobe System, Inc. Other company names or brand names are registered trademarks or trademarks of respective corporations.

2	PARTS IDENTIFICATIONS
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3 CONTROL PANEL

3-1. Control panel



- | | |
|--------------------|-------------------------|
| 1. Data LED | 8. Enter/Job Cancel key |
| 2. Message LED | 9. Select key |
| 3. On Line LED | 10. Item key |
| 4. On Line key | 11. Menu key |
| 5. Proceed key | |
| 6. Tray1 Paper key | |
| 7. Shift key | |

(1) LED

LED	On	Off	Flashing
On Line (Green??)	On-line (ready)	Off-line	Being off-line
Data (Green??)	Print data in memory	No data in memory	<ul style="list-style-type: none"> • Receiving data • Processing data
Message (Amber??)	Fatal error (Engine error, etc.) (Service call)	No problem	Restorable error (Paper empty, Memory error, etc.)

(2) Function of Keys

<u>Key</u>	<u>Function</u>
On Line	: Changes the on-line/off-line condition. Acts as a stop key during in on-line.
Proceed	: • Commands the printer to continue printing for forcibly ejecting the paper when the printer goes to off-line because of occurrence of an error. • Commands the printer to print the data in memory in off-line if the Data LED is lit. (If On Line is pressed while the Data LED is lit, the LED stays lit in off-line.)
Tray1 Paper	: • Enters the Tray1 Paper Menu mode while in off-line. • Selects a Menu from the Tray1 Paper menu.
Menu	: • Enters the Menu mode while in off-line. • Selects a Menu from the Menu mode.
Item	: • Selects an Item from the selected Menu.
Select	: • Selects an Option from the selected Item. • Selects an Option from the selected Tray1 Paper Menu. • Pressing the key continuously will cause the printer to move quickly through the Options.
Enter/Job Cancel	: • Sets up the Option being selected. • In off-line, pressing Enter/Job Cancel + Shift cancels a job being processed. Also, it clears the print data in memory if any.
Shift	: • Pressing Shift + Menu selects a Menu in the Menu mode in the reverse order. • Pressing Shift + Item selects an Item in the Menu in the reverse order. • Pressing Shift + Select selects an Option in the reverse order.

NOTE

For the Service Mode for a serviceman, see E "Adjustment".

X-X.Service Mode

(This should be moved to E "Adjustment", if this is not written in E yet.)

The service mode is prepared for a serviceman.

(1) How To Enter the Service Mode

While pressing and holding On Line + Menu + Select, turn on the power of the printer. Keep press these keys for more than three seconds, then the following "SERVICE MENU" appears on the LCD.

SERVICE MENU
TOTAL COUNT

Item

(2) How To Exit the Service Mode

Press the On Line to exit the Service mode. The initialization sequence is performed and the printer returns to normal condition.

(3) Service Mode Tree

<u>Menu</u>	<u>Item</u>	<u>Option</u>
SERVICE MENU	TOTAL COUNT	0000000 - 9999999
	LARGE SIZE COUNT	0000000 - 9999999
	STAPLE COUNT	000000 - 999999 RESET COUNT
	I/C COUNT	000000 - 999999 (??What display for "Limit"??) RESET COUNT
	LOOP ADJUST T2-5	-4.9, -4.2, -2.8, -2.1, -0.7, 0*, +0.7, +2.1, +2.8, +4.2, +4.9 mm
	LOOP ADJUST T1	-4.9, -4.2, -2.8, -2.1, -0.7, 0*, +0.7, +2.1, +2.8, +4.2, +4.9 mm
	[LOOP ADJUST DUP]	-4.9, -4.2, -2.8, -2.1, -0.7, 0*, +0.7, +2.1, +2.8, +4.2, +4.9 mm
	SERVICE MESSAGE	PERMANENT OFF, ON*

*: Default setting

[]: Displayed when the option is installed.

(4) Explanations for Items in the Service Mode

In the Service mode, you can display counter values or reset the counters. The counter value for I/C COUNT is stored in the EEPROM in the engine. Other counter values are stored in the EEPROM in the controller (controller board).

TOTAL COUNT:

The total number of printed sheets after delivery from the factory is displayed in 7 digits. You cannot clear this counter.

LARGE SIZE COUNT:

The total number of printed sheets for A3 and ledger after delivery from the factory is displayed in 7 digits. You cannot clear this counter.

STAPLE COUNT:

The number of times an optional stapler has been used is displayed in 6 digits.

To reset the counter, select "RESET COUNT" with the Select key and press the Enter key. "RESET OK?" will be displayed on the LCD. Press the Enter key again to clear the counter.

I/C COUNT:

The number of times the PC drum in the imaging cartridge has been turned is displayed in 6 digits.

To reset the counter, select "RESET COUNT" with the Select key and press the Enter key. "RESET OK?" will be displayed on the LCD. Press the Enter key again to clear the counter.

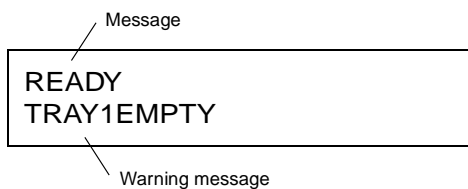
LOOP ADJUST T2-5, LOOP ADJUST T1, [LOOP ADJUST DUP]:

The loop value for tray 2 - 5, tray 1, and optional manual unit and duplex unit can be adjusted. The loop value set here will affect the registration compensation for paper (paper skew compensation). If registration is not correctly made, the loop value should be adjusted to correct it. (For registration compensation, see 2-3 "Paper Feed" in C "MECHANICAL/ELECTRICAL".)

SERVICE MESSAGE:

In the default setting ("ON"), the Maintenance Menu will be displayed normally. If "PERMANENT OFF" is set, no items and no "MAINTENANCE REQ#" will be displayed even if the Maintenance Menu is selected.

3-2. Condition Messages



Messages	READY	:Awaiting data
	OFF LINE	: Off-line
	PROCESSING	: Image processing for data received through the parallel port
	PRINTING	: Printing data
	COPYING	: Feeding paper with the engine
	CANCELING JOB	: Canceling job After canceling, the printer goes to on-line.
	Menu modes	
	TRAY1 PAPER MENU	
	PRINT MENU	
	PCL MENU	
	SYSTEM MENU	
	MAINTENANCE MENU	
	ADJUST MENU	
	PARALLEL MENU	
	[NETWORK MENU]	
	TEST PRINT MENU	
	WARMING UP	: Printer warming up
	SELF TEST	: Power-on self-check
	FORMATTING HDD	: Formatting the hard disk (option)
	CLEANING	: Engine cleaning
	POWER SAVE	: Power saving mode
	CONTEXT SAVE	: Context saving

[]: Displayed when the option is installed.

Warning messages

(Please see the instruction manual?)

3-3. Caution Messages

DATA COMPRESSION

Caution message
(Please see the instruction manual?)

3-4. Auto-continuable Messages

MEMORY OVERFLOW

Auto-continuable message
(Please see the instruction manual?)

3-5. Operator Call Messages

NO PAPER

Operator call message
(Please see the instruction manual?)

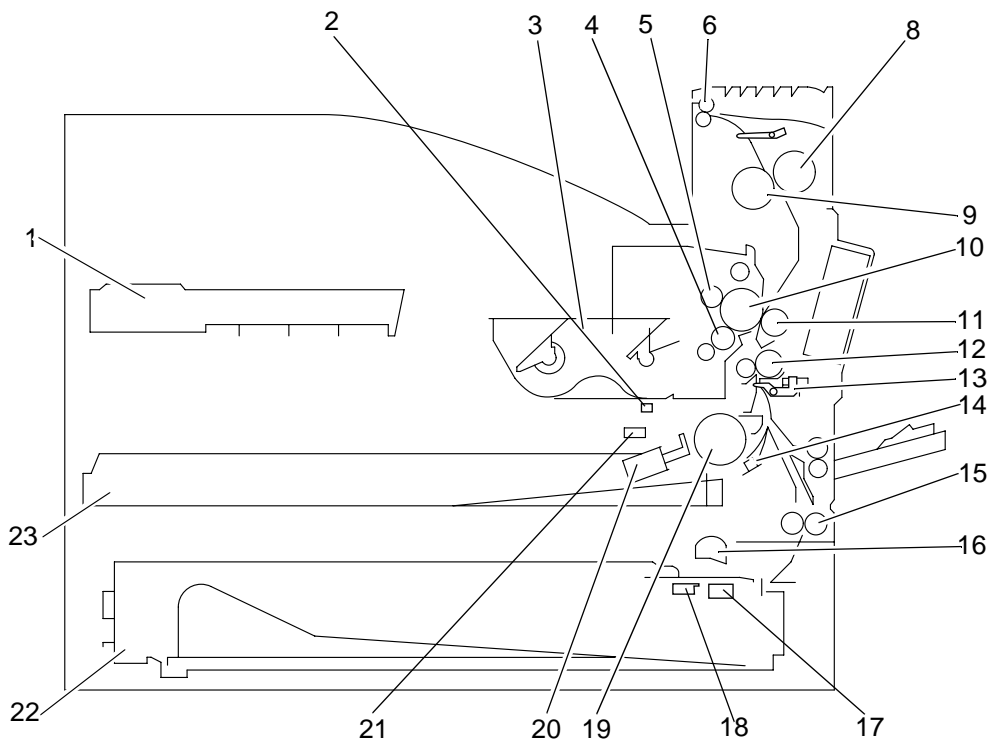
3-6. Serviceman Call Messages

FATAL ERROR1 ROM

Serviceman call message
(Please see the instruction manual?)

3-7. Key Condition Diagram

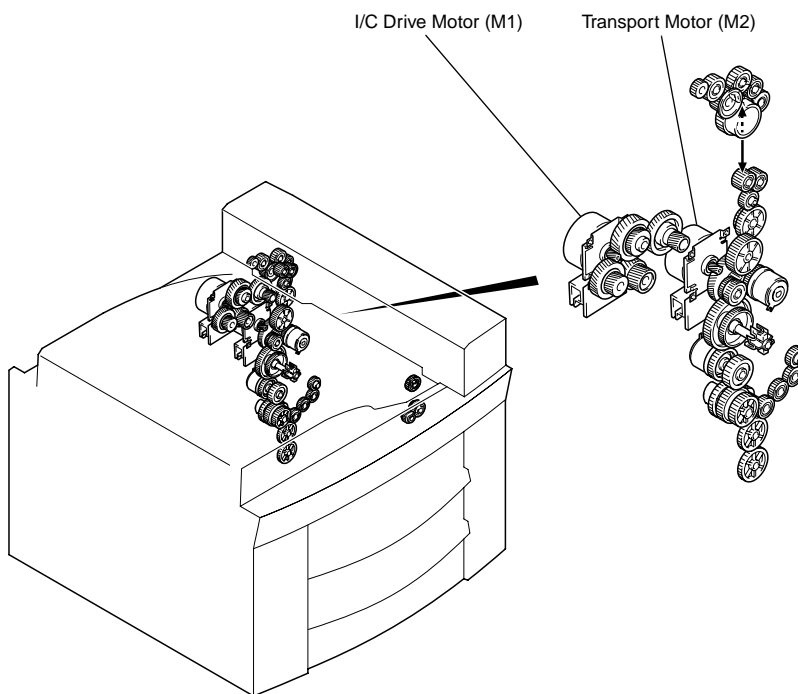
4 COMPONENT LAY- OUT



1. Print Head Unit (PU)
2. Toner Empty Detecting Board (PWB-G)
3. Imaging Cartridge
4. Sleeve Roller
5. Charge Brush
6. Paper Exit Roller
7. Paper Exit Sensor (PC3)
8. Lower Fusing Roller
9. Upper Fusing Roller (Fusing Roller Heater Lamp (H1) is incorporated.)
10. PC Drum
11. Transfer Roller
12. Synchronizing Roller
13. Synchronizing Roller Sensor (PC2)
14. Double Feed Detecting Sensor Board (PWB-H)
15. 2nd Cassette Transport Roller
16. 2nd Cassette Paper Take-up Roller
17. 2nd Cassette Paper Empty Sensor (PC22)
18. 2nd Cassette Paper Take-up Solenoid (SL21)
19. 1st Cassette Paper Take-up Roller
20. 1st Cassette Paper Take-up Solenoid (SL1)
21. 1st Cassette Paper Empty Sensor (PC4)
22. 2nd Paper Cassette
23. 1st Paper Cassette

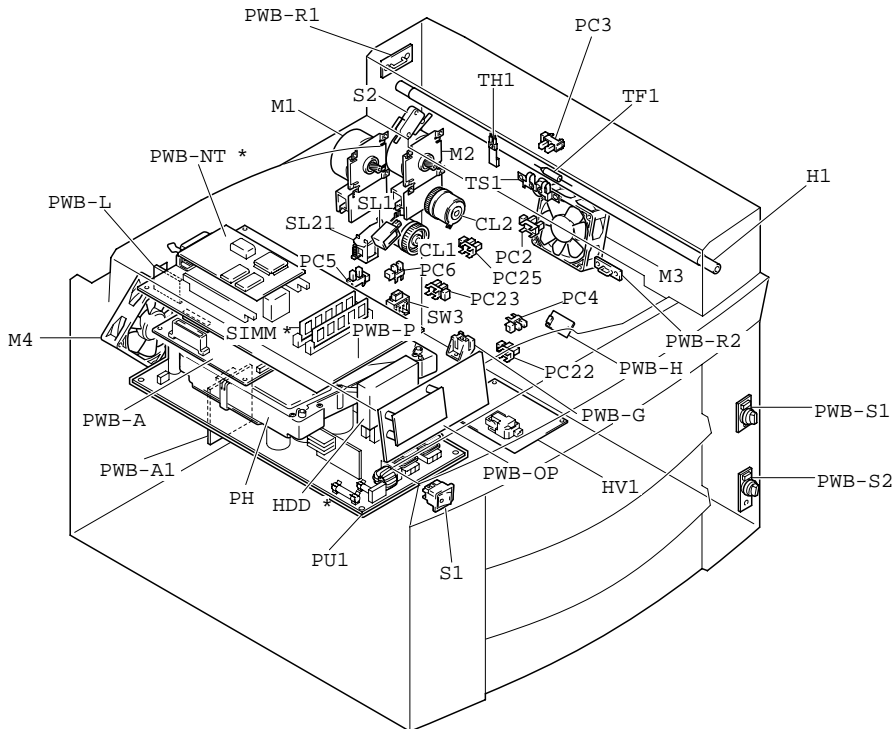
5 GEAR/ROLLER ASSIGNMENT

The locations of the gears and rollers in the printer is shown below. The transport motor (M2) transmits the power to the paper driving parts for feeding paper. Meanwhile, the I/C drive motor (M1) transmits the power to the driving parts in the imaging cartridge.



4108 (SP411) KUDOUBUHIN LAYOUT

6 ELECTRICAL COMPONENT LAY- OUT



4108 (SP411) ELECTRICAL LAYC

PU	: Print Head Unit	SL21	: 2nd Cassette Paper Take-up Solenoid
PU1	: Power Supply Unit	CL1	: Synchronizing Clutch
HV1	: High Voltage Unit	CL2	: Transport Clutch
PWB-A	: Main Board	S1	: Power Switch
PWB-A2	: 2nd Cassette Main Board	S2	: Right Door Interlock Switch
PWB-G	: Toner Empty Detecting Board	SW3	: 2nd Cassette Set Switch
PWB-H	: Double Feed Detecting Sensor Board	PC2	: Synchronizing Roller Sensor
PWB-L	: PPM Switching Board	PC3	: Paper Exit Sensor
PWB-OP	: Control Panel	PC4	: 1st Cassette Paper Empty Sensor
PWB-P	: Controller Board	PC5	: 1st Cassette Paper Near Empty Sensor
PWB-R1	: Fuser Frame Resistor Board	PC6	: 1st Cassette Set Sensor
PWB-R2	: Pre-Transfer Guide Plate Resistor Board	PC22	: 2nd Cassette Paper Empty Sensor
PWB-S1	: 1st Cassette Paper Size detecting Board	PC23	: 2nd Cassette Side Door Detecting Sensor
PWB-S2	: 2nd Cassette Paper Size detecting Board	PC25	: 2nd Cassette Paper Near Empty Sensor
M1	: I/C Drive Motor	H1	: Fusing Roller Heater Lamp
M2	: Transport Motor	TF1	: Fusing Roller Heater Lamp Fuse
M3	: Cooling Fan Motor	TH1	: Fusing Roller Thermistor
M4	: Power Unit Cooling Fan Motor	TS1	: Fusing Roller Thermostat
SL1	: 1st Cassette Paper Take-up Solenoid		

8 SWITCH/SENSOR IDENTIFICATION

Printer main body

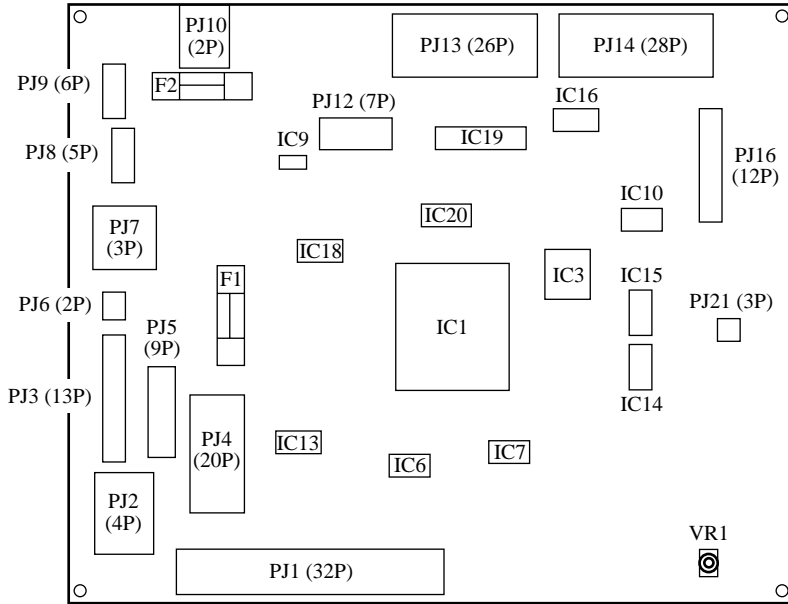
Symbol	Name	Function
S1	Power Switch	Turns power on and off.
S2	Right Door Interlock Switch	Detects open/close condition of the right door. When it is closed, the switch is ON.
PC2	Synchronizing Roller Sensor	Detects the paper fed from the tray. Active: "L".
PC3	Paper Exit Sensor	Detects paper ejection from the printer. Active: "L"
PC4	1st Cassette Paper Empty Sensor	Detects paper empty condition of the 1st paper cassette. Active: "H"
PC5	1st Cassette Paper Near Empty Sensor	Detects paper near empty condition of the 1st paper cassette. Active: "L"
PC6	1st Cassette Set Sensor	Detects that the 1st paper cassette is installed in the tray 1. Active: "H"
SW3	2nd Cassette Set Switch	Detects that the 2nd paper cassette is installed in the tray 2. Switch is turned ON when the cassette is installed. Also detects the type of cassette; 250 sheet universal cassette or 500 sheet fixed cassette.
–	Double Feed Sensor	Detects the possibility of double feeding on the 1st paper cassette. Active: "L" (Detects whether the leading edge of the paper to be taken up next runs 10 mm or more from the nip point.) The sensor is on the double feed sensor board (PWB-H)
–	Toner Empty Sensor	Detects toner empty condition. Active: "L" The sensor is on the toner empty detecting board (PWB-G).
TH1	Fusing Roller Thermistor	Detects the temperature of the upper fusing roller.
TS1	Fusing Roller Thermostat	Shuts off the application voltage to the fusing roller heater lamp (H1) when temperature becomes abnormal.
TF1	Fusing Roller Heater Lamp Fuse	Blows own fuse immediately to shut off the application voltage to the fusing roller heater lamp (H1) when temperature rises abnormally.

2nd Paper Cassette

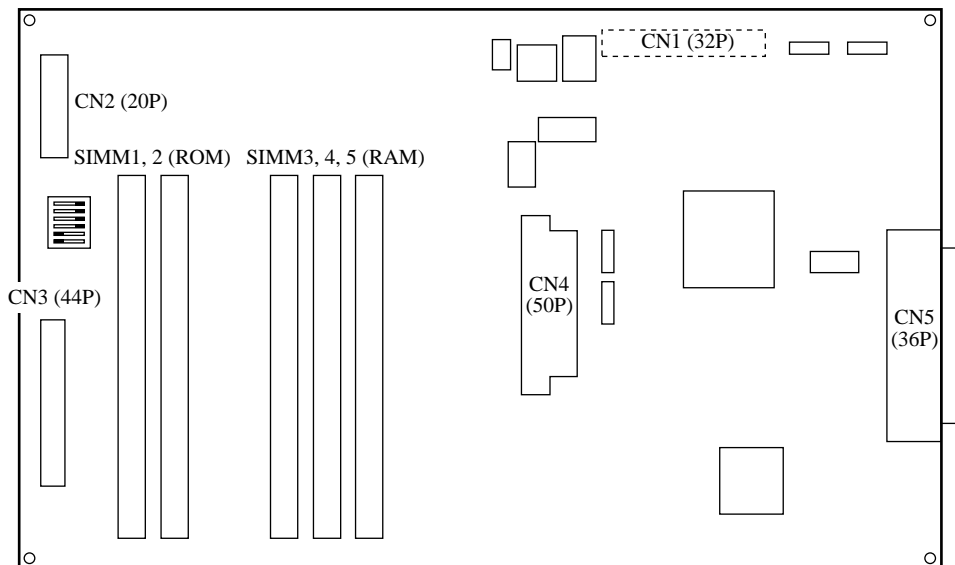
Symbol	Name	Function
PC22	2nd Cassette Paper Empty Sensor	Detects paper empty condition of the 2nd paper cassette. Active: "L"
PC25	2nd Cassette Paper Near Empty Sensor	Detects paper near empty condition of the 2nd paper cassette. Active: "L"
PC23	2nd Cassette Side Door Detecting Sensor	Detects open/close condition of the 2nd cassette side door. When it is opened, the sensor output is "H".

9 ELECTRICAL SERVICE PARTS ON P.W. BOARDS

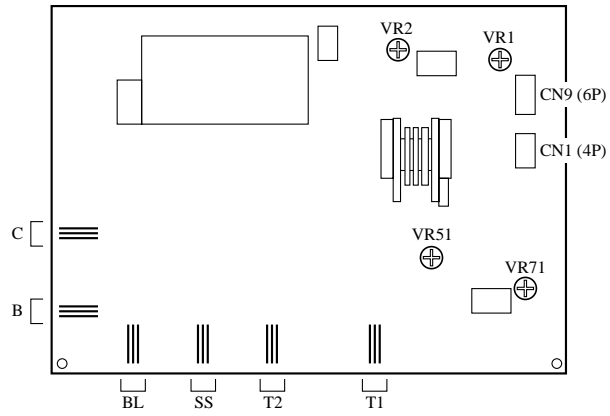
PWB-A



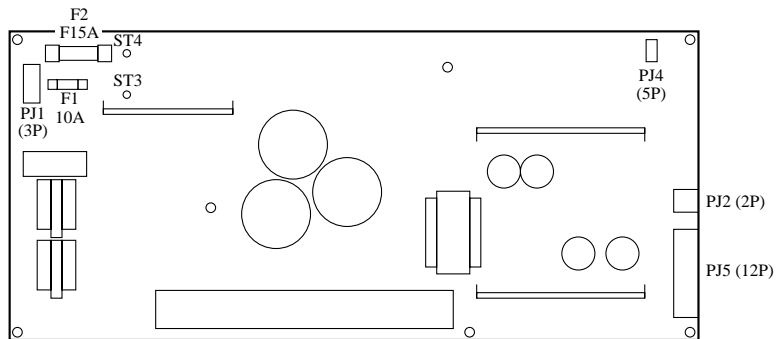
PWB-P



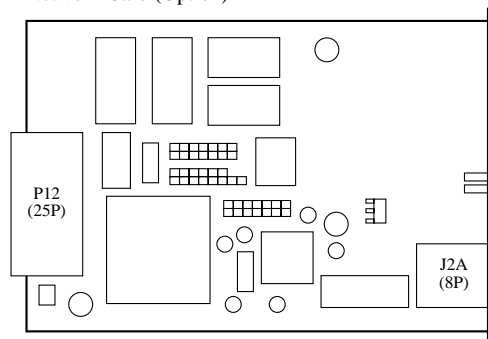
HV1



PU1



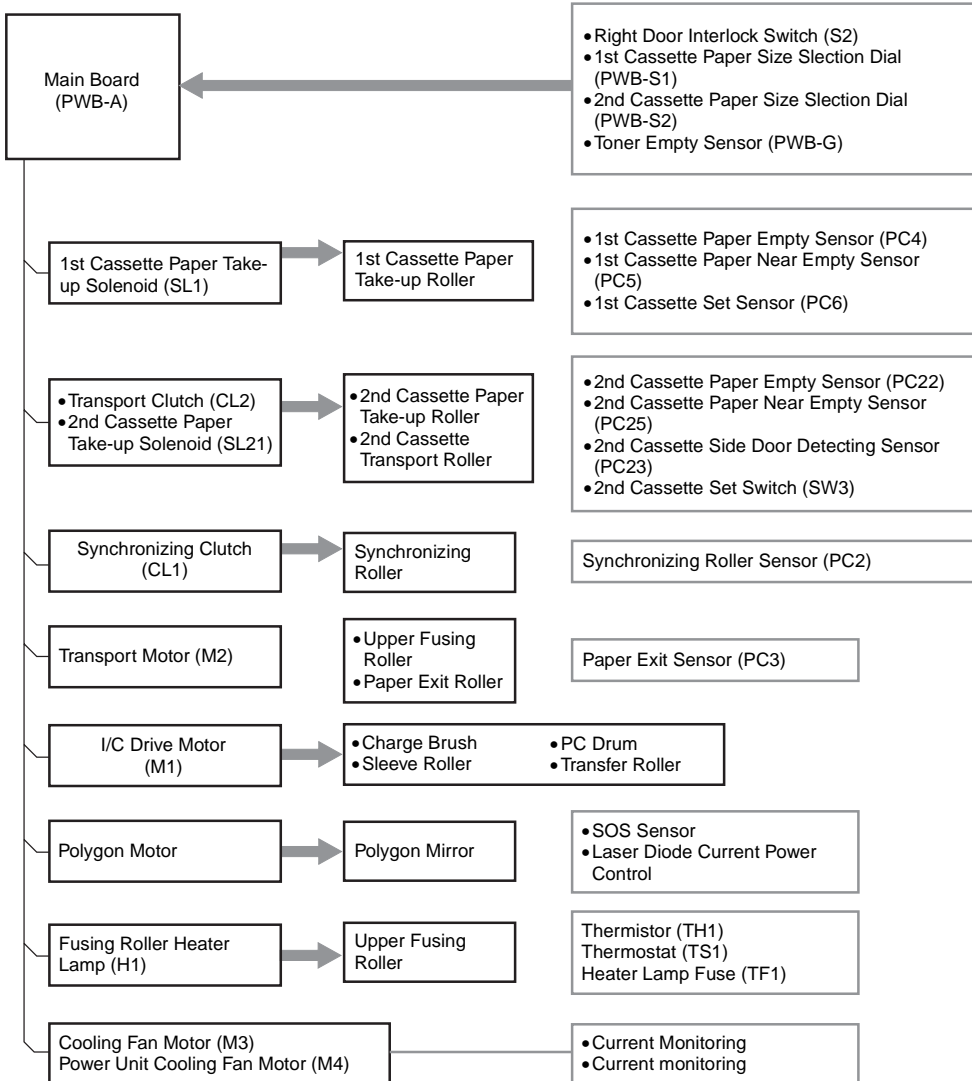
Network Card (Option)



10 SYSTEM LAY-OUT

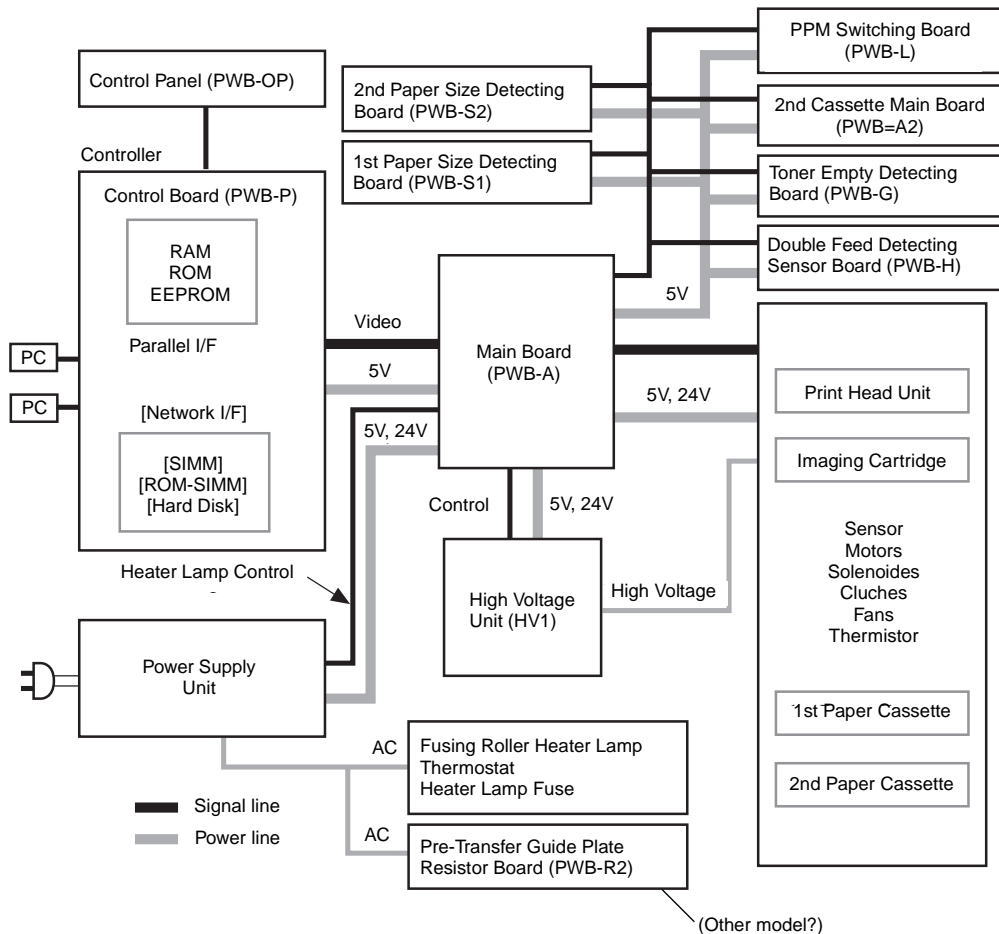
10-1. Drive Section

The parts that control the driving system are shown below. They are motors, solenoids, clutches, rollers, and sensors.



10-2.Electrical Section

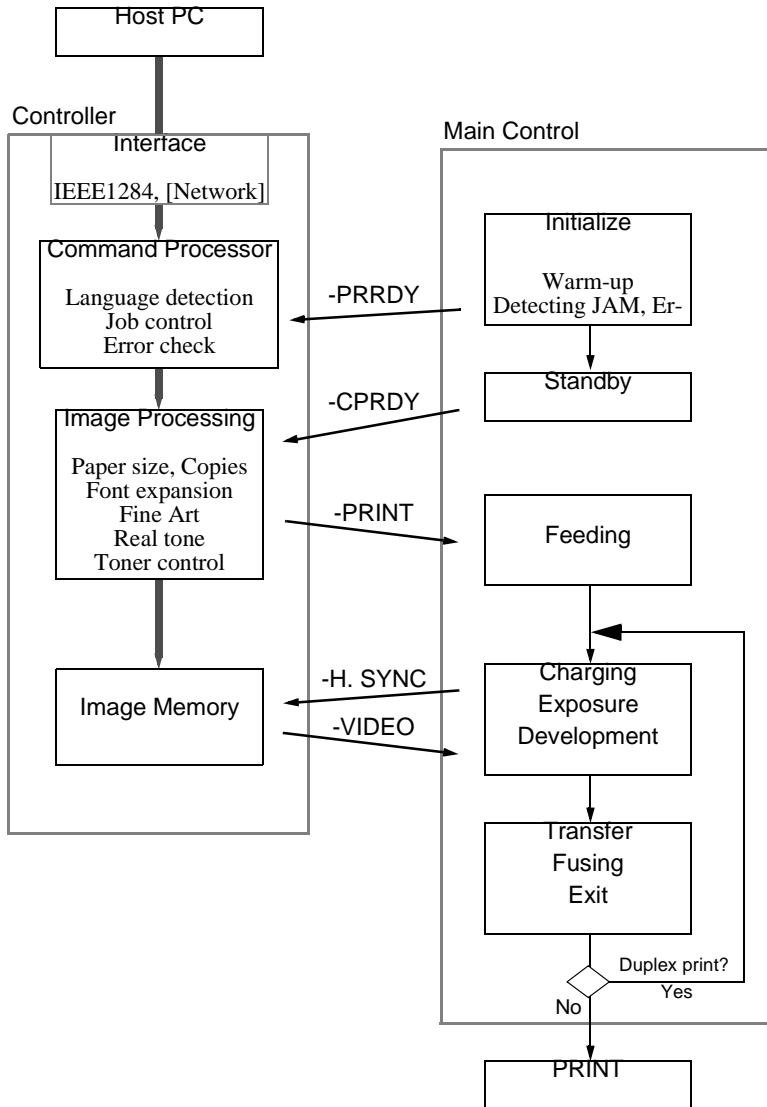
The power supply system and the signal lines are shown below.



- The power supply unit supplies DC +5 V and DC +24 V to the main board. It also supply an AC voltage to the heater lamp.
- The controller receives a compressed print data from the host PC through an interface.
In the parallel interface, the printer status is returned to the host PC in the IEEE1284 nibble mode.
- The controller adjusts the size and position of the print data to generate image data.
The image data is sent to the print head unit via the main board for printing.
- The main board controls the various parts of the engine including the paper take-up section, charging section, development section, transfer section, fusing section, and paper exit section.

11 SEQUENCE FLOW

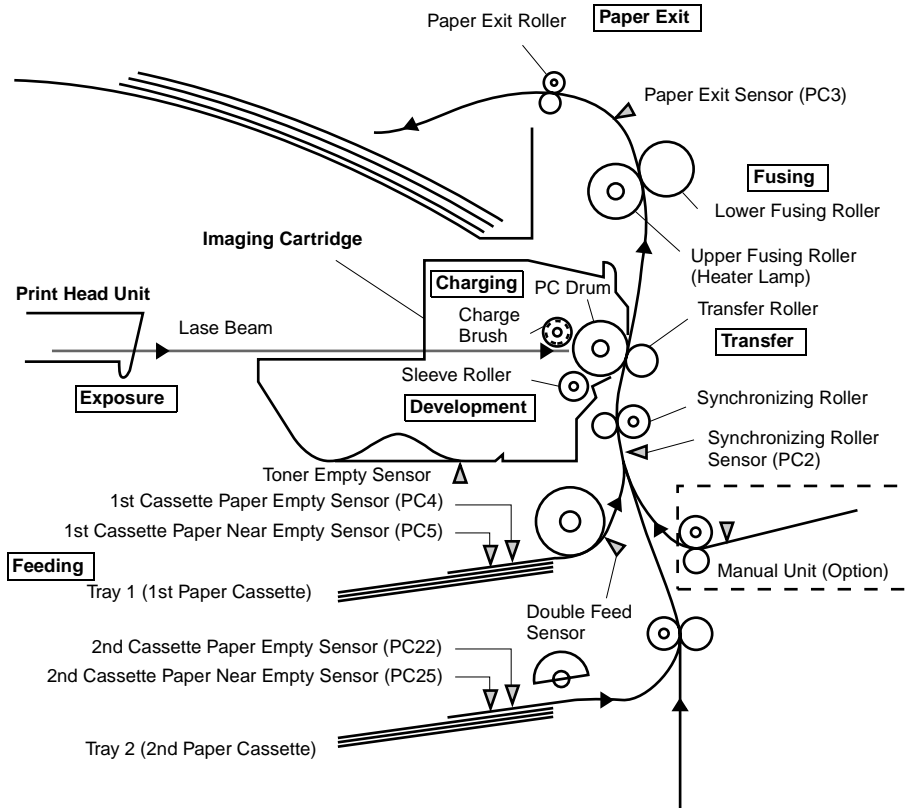
To carry out printing cycles, signals are transferred among the controller, main control and engine as shown below.



C: MECHANICAL/ELECTRICAL

1 CONFIGURATION OF THE PRINTER

The following diagram shows the major parts of the printer and the paper path in the printer. The printer consists of the paper feed section, print head unit (exposure section), imaging cartridge (charging section and development section), transfer section, fusing section, and paper exit section.



: Indicates the sensor.

1-1. General Description of Each Section

(1) Paper Feed Section

Paper is fed from either the tray 1 (1st paper cassette) or tray 2 (2nd paper cassette). When the printer receives a print command, the paper take-up solenoid turns ON and a sheet of paper is fed by the paper take-up roller in the 1st paper cassette.

The synchronizing roller sensor (PC2) detects the fed paper and the paper is fed to the synchronizing roller for printing.

Optional cassettes:

When optional trays (tray 3 to 5), LCC, or manual unit is installed, paper can be fed from respective paper sources.

(2) Print Head Unit (Exposure Section)

The laser diode in the print head unit emits a laser beam corresponding to the print data. The laser beam falls on the rotating heptagonal polygon mirror to produce a scanning beam, producing an electrostatic latent image on the surface of the PC drum in the imaging cartridge.

(3) Imaging Cartridge

The imaging cartridge consists of the charging section and development section. The moving parts of the imaging cartridge are driven by the I/C drive motor (M1). In the development section, toner is fed to the electrostatic latent image formed on the surface of the PC drum to produce a visible toner image on the PC drum.

(4) Transfer Section

The transfer section transfers the toner image on the surface of the PC drum onto the paper.

(5) Fusing Section

Using a heated roller, the fusing section permanently fixes the toner image onto the paper. The fusing temperature is controlled by using a heat sensitive element (thermistor) attached to the upper fusing roller.

(6) Paper Exit Section

The paper which has passed the fusing section is ejected to the top of the printer with the paper exit roller. The paper exit sensor (PC3) senses the ejection of the paper.

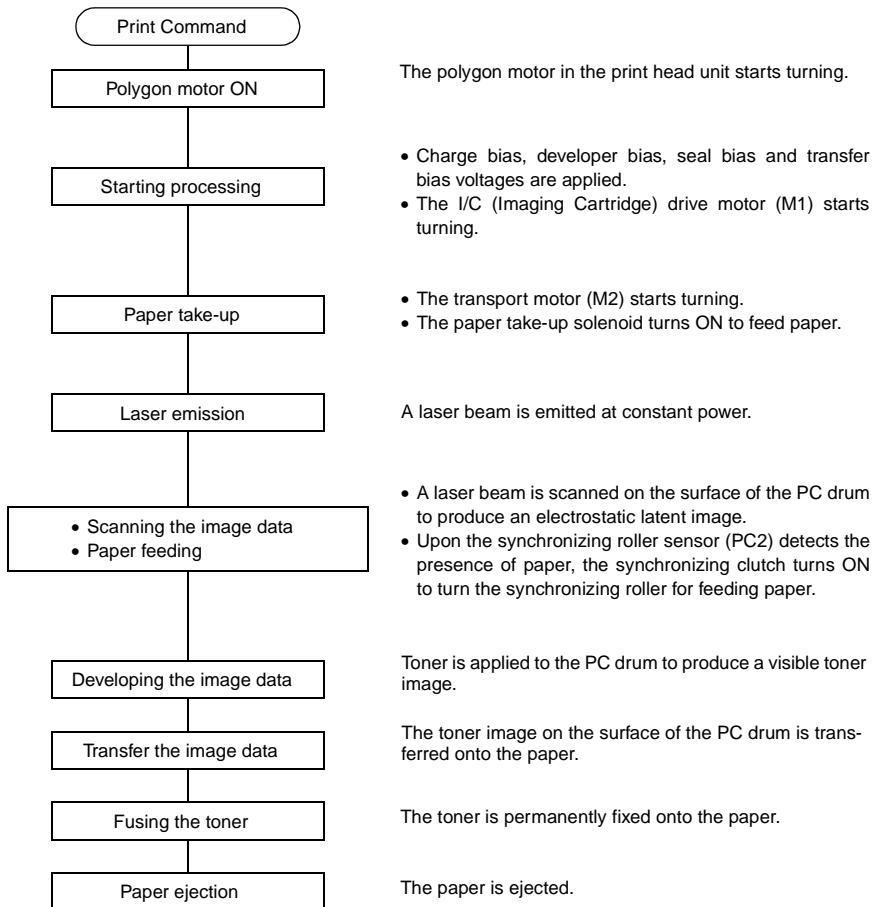
When the optional manual unit and optional duplex unit are installed:

For duplex printing, the trailing edge of the printed paper is drawn inside the duplex unit by the switch back motor in the duplex unit. Then, the paper is fed to the manual unit by the transport motor in the duplex unit and waits for the 2nd print command.

1-2. General Flow for Printing Process

The following shows the general printing process flow.

Note: For detailed printing sequence, see 10 "Printing Sequence".



2 PAPER FEED SECTION

2-1. Tray 1 (1st Paper Cassette)

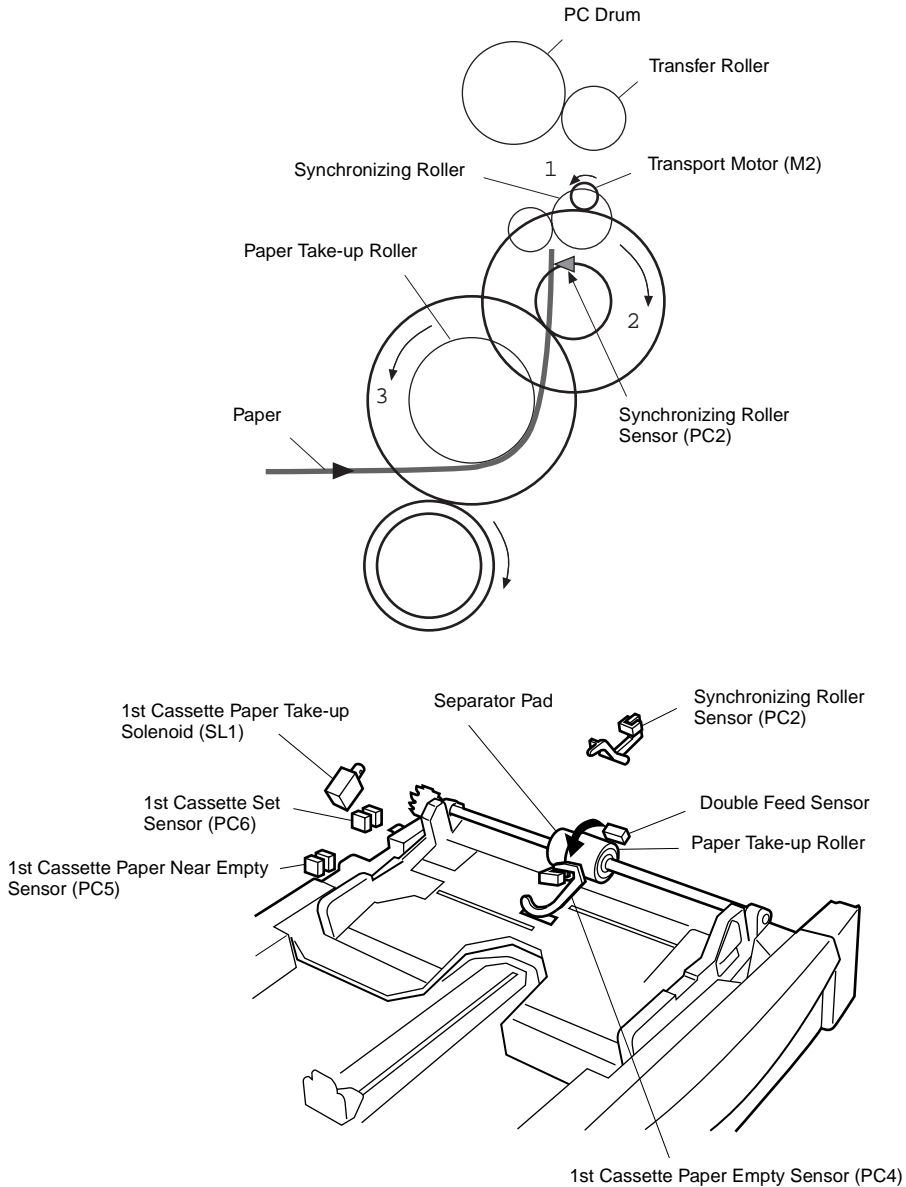
2-1-1. Taking up Paper

The power is transmitted from the transport motor (M2) as follows to take up paper from the 1st paper cassette.

1 The transport motor (M2) turns counterclockwise → 2 The idle gear turns clockwise. → The 1st cassette paper take-up solenoid (SL1) turns ON. → 3 The paper take-up roller turns counterclockwise. → Paper is taken up.

Note: The rotational direction is the one viewing from the front of the printer.

Double feed of paper in the 1st paper cassette is prevented by the friction produced with the separator pad.



2-1-2. Sensors for Tray 1

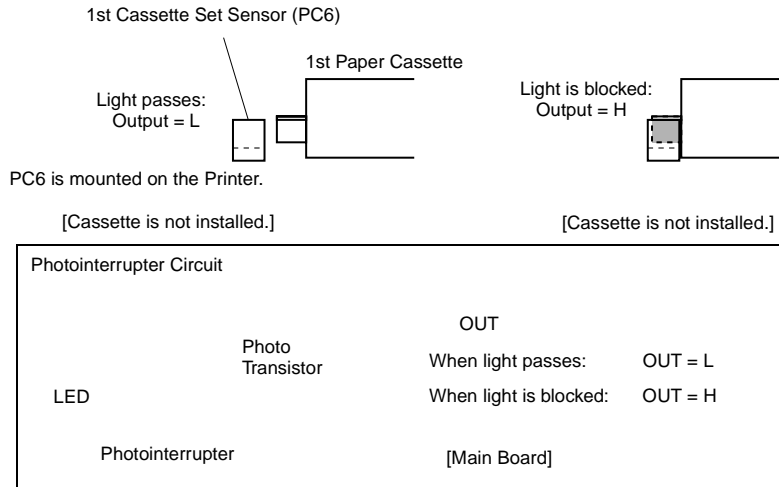
(1) 1st Cassette Set Sensor (PC6)

This sensor detects the installation of the 1st paper cassette in the tray 1. This sensor uses a photointerrupter.

If the 1st paper cassette is not installed in the tray 1, the projection of the paper cassette comes off the sensor which is mounted on the printer. In this case, the light emitted from the LED of the photointerrupter reaches the phototransistor of the photointerrupter and the phototransistor turns ON. Accordingly, the output of the phototransistor, i.e., the output of the sensor is "L".

When the 1st paper cassette is installed in the tray 1, the projection of the paper cassette engages with the sensor. In this case, the light emitted from the LED is blocked by the projecting and it does not reach the phototransistor. As a result, the phototransistor turns OFF and its output is "H".

The CPU on the main board can know whether the 1st paper cassette is installed in the tray 1 or not by sensing the output from the sensor (PC6).



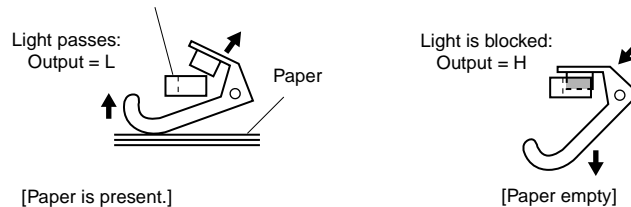
(2) 1st Cassette Paper Empty Sensor (PC4)

This sensor detects the paper empty status of the 1st paper cassette. The sensor uses a photointerrupter. When paper runs out in the 1st paper cassette, paper empty occurs.

When paper is present in the paper cassette, the lower part of the sensor arm is pressed by the paper and the projection of the upper part of the sensor arm comes off the photointerrupter. Thus, the light from the LED of the photointerrupter passes in the photointerrupter and the photointerrupter turns ON. As a result, the output of the photointerrupter is "L".

When paper runs out in the paper cassette, the lower part of the sensor arm lowers with its weight so that the projection of the sensor arm engages with the photointerrupter. Thus, the light from the LED is blocked by the projection and the photointerrupter turns OFF. As a result, the output of the photointerrupter is "H".

1st Cassette Paper Empty Sensor (PC4)

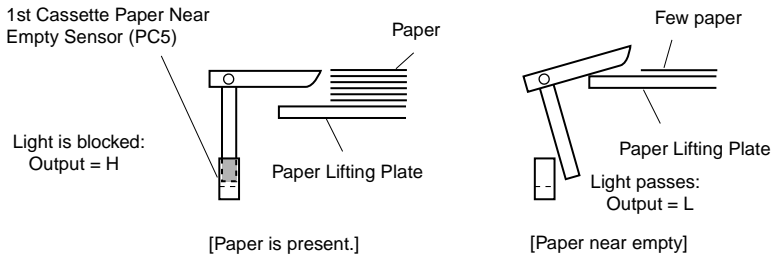


(3) 1st Cassette Paper Near Empty Sensor (PC5)

This sensor detects the paper near empty status of the 1st cassette paper. The sensor uses a photointerrupter. As the sheets of paper in the paper cassette decrease, the paper lifting plate in the paper cassette lifts. When the paper lifting plate lifts exceeding a certain point, the 1st cassette paper near empty occurs.

When enough paper is present in the paper cassette, the paper lifting plate is lowered. In this condition, the lower part of the sensor arm is engaged with the photointerrupter. Thus, the light from the LED of the photointerrupter is blocked by the sensor arm and the photointerrupter turns OFF. As a result, the output of the photointerrupter is "H".

When the remainder of paper decreases, the upper part of the sensor arm is pressed by the paper lifting plate and the lower part of the sensor arm comes off the photointerrupter. Thus, the light from the LED passes in the photointerrupter and the photointerrupter turns ON. As a result, the output of the photointerrupter is "L".



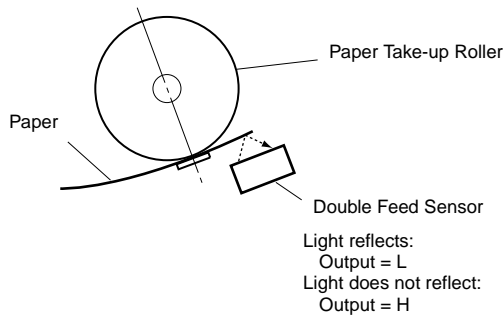
(4) Double Feed Sensor

The double feed sensor is on the double feed detecting sensor board (PWB-H) and detects the possibility of double feed. This sensor uses a photo reflector.

The double feed sensor detects whether the leading edge of paper to be taken up next runs 10 mm or more from the paper nip point. If paper runs 10 mm or more, double feeding may occur if the paper is taken up in the normal printing interval. To avoid this, the printer prolongs the printing intervals as long as the double feed sensor detects the double feed status. Thus, the number of sheets to be fed per minutes will be reduced.

When the leading edge of the paper to be taken up next runs 10 mm or more, the light emitted from the LED of the double feed sensor is reflected by the paper. The reflected light is received by the light sensitive element of the sensor and the sensor output is "L".

When the running is less than 10 mm, the light emitted from the LED is not reflected by the paper and the sensor output is "H".



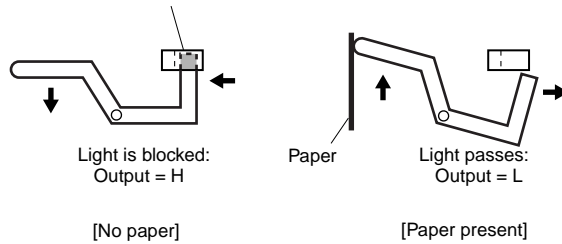
(5) Synchronizing Roller Sensor (PC2)

This sensor detects that the paper is fed inside the printer. The sensor uses a photointerrupter. The output of the sensor is used as a reference for feeding paper inside the printer. This sensor will be activated when paper is fed from any paper source.

Without paper, the sensor arm is pressed by a spring and the end of the sensor engages with the photointerrupter. Thus, the light from the LED of the photointerrupter is blocked and the photointerrupter turns OFF. As a result, the output of the photointerrupter is "H".

On the other hand, when paper is taken up, the sensor arm is pushed by the paper and the end of the sensor arm comes off the photointerrupter. Thus, the light from the LED passes in the photointerrupter and the photointerrupter turns ON. As a result, the output of the photointerrupter is "L".

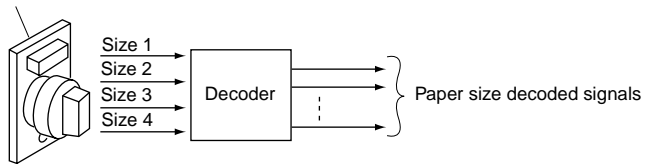
Synchronizing Roller Sensor (PC2)



(6) 1st Cassette Paper Size Detection

The paper size for the 1st paper cassette is set by the switch on the 1st cassette paper size detecting board (PWB-S1). The switch is a rotary encoder with four output lines. The output levels of the four output lines vary with the rotational angles of the switch. These four outputs are fed to the control circuit on the main board and decoded to detect the paper size being selected.

1st Cassette Paper Size Detecting Board (PWB-S1)



2-2. Tray 2 (2nd Paper Cassette)

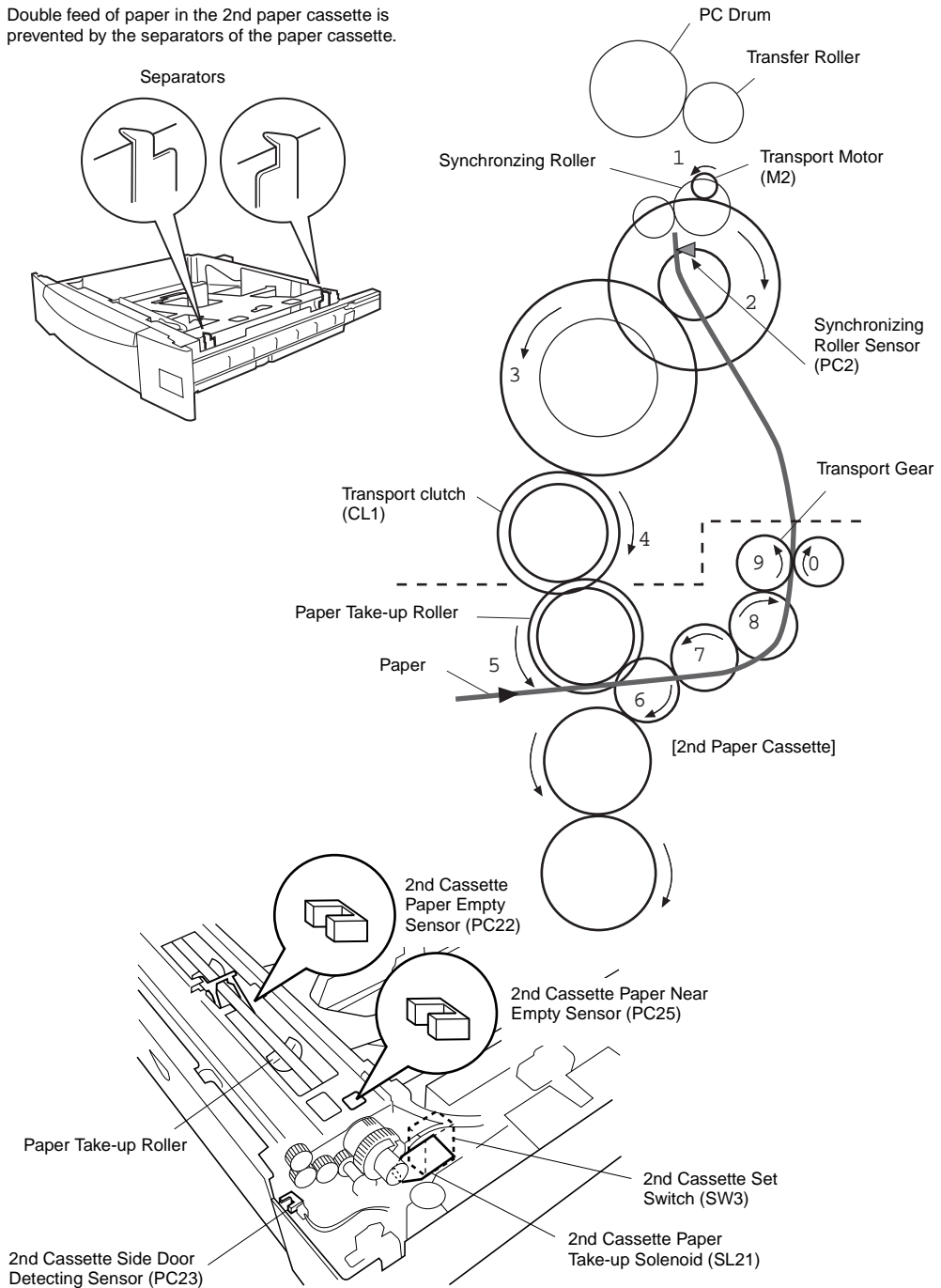
2-2-1. Taking up Paper

The power is transmitted from the transport motor (M2) as follows to take up paper from the 2nd paper cassette.

1 The transport motor (M2) turns counterclockwise → 2 The idle gear turns clockwise. → 3 The 1st cassette paper take-up gear turns counterclockwise. → 4 The 1st cassette idle gear turns clockwise. The transport clutch (CL1) turns ON. → Power is transmitted to the 2nd paper cassette. → The 2nd cassette paper take-up solenoid (SL21) turns ON. → 5 Paper Take-up Roller turns counterclockwise. → Paper is taken up. → 6 ~ 8 The gear train turns. → 9 The transport gear turns counterclockwise. → Paper is taken up. → Paper is fed.

Note: The rotational direction is the one viewing from the front of the printer.

Double feed of paper in the 2nd paper cassette is prevented by the separators of the paper cassette.



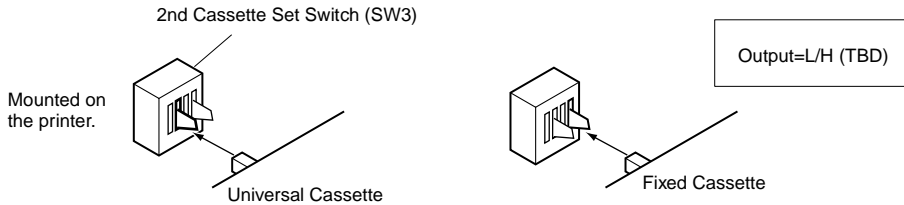
2-2-2. Sensors for Tray 2

(1) 2nd Cassette Set Switch (SW3)

This switch detects whether the 2nd paper cassette is installed in the tray 2 or not. This switch also detects the paper cassette type; 250 sheet universal cassette or 500 sheet fixed cassette.

If no paper cassette is installed on the tray 2, the switch is not pressed by the paper cassette.

When the 250 sheet universal cassette is installed, the left side of the switch is pressed by the projection of the cassette. While the 500 sheet fixed cassette is installed, the right side switch is pressed by the projection of the cassette.

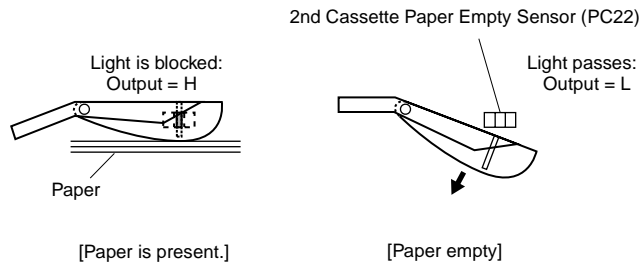


(2) 2nd Cassette Paper Empty Sensor (PC22)

This sensor detects the paper empty status of the 2nd paper cassette. The sensor uses a photointerrupter. When paper runs out in the 2nd paper cassette, paper empty occurs.

When paper is present in the paper cassette, the sensor arm is pressed by the paper and it is lifted. So, the projection of the sensor arm engages with the photointerrupter. Thus, the light from the LED of the photointerrupter is blocked and the photointerrupter turns OFF. As a result, the output of the photointerrupter is "H".

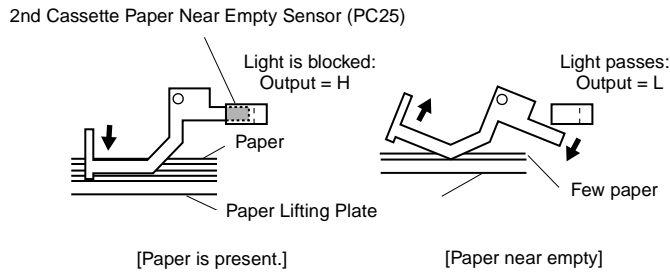
When paper runs out in the paper cassette, the sensor arm lowers by pressing a spring so that the projection of the sensor arm comes off the photointerrupter. Thus, the light from the LED passes in the photointerrupter and the photointerrupter turns ON. As a result, the output of the photointerrupter is "L".



(3) 2nd Cassette Paper Near Empty Sensor (PC25)

This sensor detects the paper near empty status of the 2nd cassette paper. The sensor uses a photointerrupter. As the sheets of paper in the paper cassette decrease, the paper lifting plate in the paper cassette lifts. When the paper lifting plate lifts exceeding a certain point, the 2nd cassette paper near empty occurs.

When enough paper is present in the paper cassette, the paper lifting plate is lowered. In this condition, the projection of the sensor arm is engaged with the photointerrupter. Thus, the light from the LED of the photointerrupter is blocked by the projection and the photointerrupter turns OFF. As a result, the output of the photointerrupter is "H". When the remainder of paper decreases, the lower part of the sensor arm is pressed by the paper lifting plate and the projection of the sensor arm comes off the photointerrupter. Thus, the light from the LED passes in the photointerrupter and the photointerrupter turns ON. As a result, the output of the photointerrupter is "L".

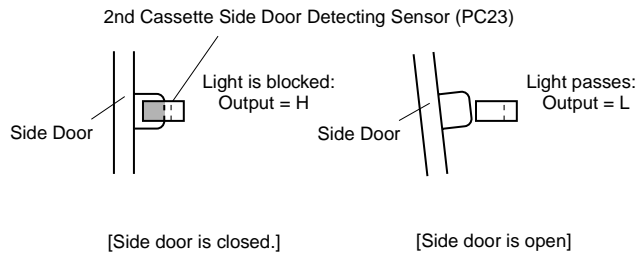


(4) 2nd Cassette Side Door Detecting Sensor (PC23)

This sensor detects whether the 2nd cassette side door is closed or not. The sensor uses a photointerrupter. The side door is normally closed except when removing jammed paper.

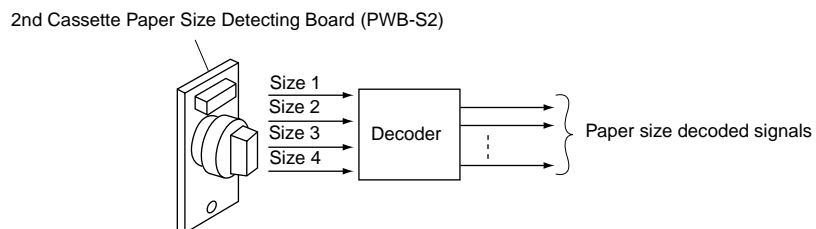
When the side door is closed, the projection of the side door engages with the photointerrupter of the 2nd paper cassette. Since the light emitted from the LED of the photointerrupter is blocked by the projection, the photointerrupter turns OFF. Thus, the output of the photointerrupter is "H".

When the side door is opened, the projection of the side door comes off the photointerrupter. Thus, the light from the LED passes in the photointerrupter and the photointerrupter turns ON. Thus, the output of the photointerrupter is "L".



(5) 2nd Cassette Paper Size Detection

The paper size for the 2nd paper cassette is set by the switch on the 2nd cassette paper size detecting board (PWB-S2). The switch is a rotary encoder with four output lines. The output levels of the four output lines vary with the rotational angles of the switch. These four outputs are fed to the control circuit on the main board and decoded to detect the paper size being selected.



2-3. Paper Feed

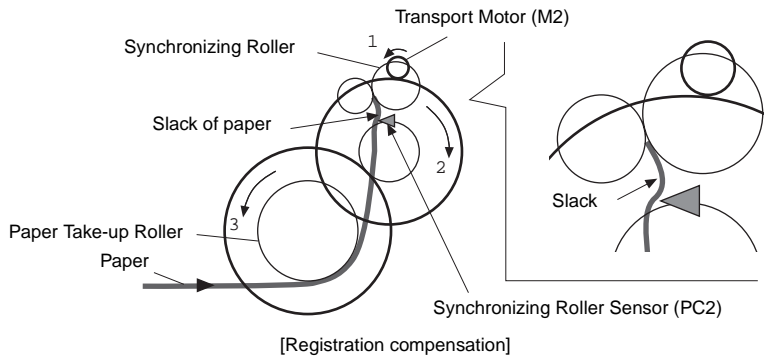
The paper taken up by the paper take-up section is fed to the transfer section after registration compensation.

(1) Registration Compensation

To eliminate any paper slant (skew), registration compensation is made by controlling the rotating timing of the paper take-up roller and synchronizing roller.

The taken up paper passes the synchronizing roller sensor (PC2) and reaches the synchronizing roller.

At this moment, the printer delays turning timing of the synchronizing roller for a moment. As a result, the leading edge of the paper is aligned with the stopping synchronizing roller, eliminating any skew. The leading edge of the paper will slack a little as shown in the figure. Next, the synchronizing clutch (CL1) is activated for feeding the paper to the inside of the printer. At the same time, the paper take-up roller turns for a moment to securely feed the paper.

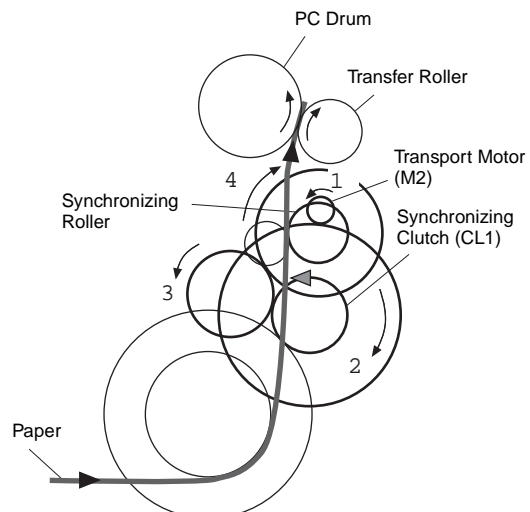


(2) Paper Feeding

When the synchronizing clutch (CL1) is activated, the power is transmitted to the synchronizing roller from the transport motor (M2) as follows and the paper is fed to the transfer section.

1 The transport motor (M2) turns counterclockwise. → 2 The idle gear turns clockwise. The synchronizing clutch (CL1) turns ON. → 3 The idle gear turns counterclockwise. → 4 The synchronizing roller turns clockwise. → Paper is fed.

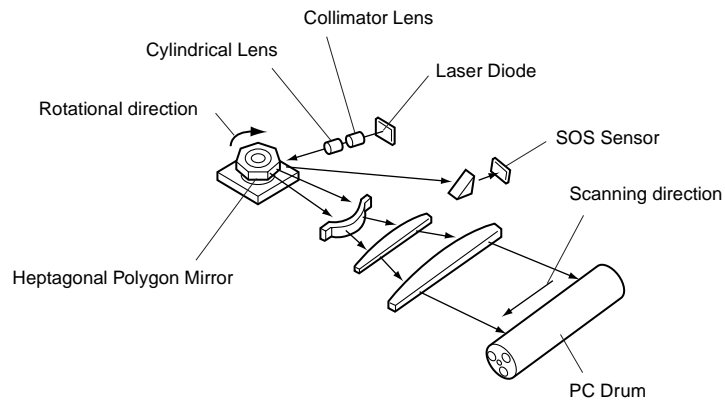
The PC drum is driven by the I/C drive motor (M1). As the PC drum turns, the transfer roller also turns. Accordingly, the paper fed by the synchronizing roller is pinched by the PC drum and transfer roller for feeding to the fusing section.



3 PRINT HEAD UNIT (EXPOSURE SECTION)

The print head unit incorporates a laser diode that emits the laser beam corresponding to the print image data. The spot of the laser beam emitted from the laser diode is shaped in a circle through the collimator lens. Then, it is applied to the heptagonal polygon mirror via the cylindrical lens. The polygon mirror is turned by the polygon motor in the print head unit in the direction as shown by the arrow.

The reflected laser beam by the rotating polygon mirror passes the three lenses, producing a parallel scanning laser beam. The scanning laser beam scans on the PC drum from left to right for producing an electrostatic latent image on the surface of the PC drum.



Operation of the SOS Sensor:

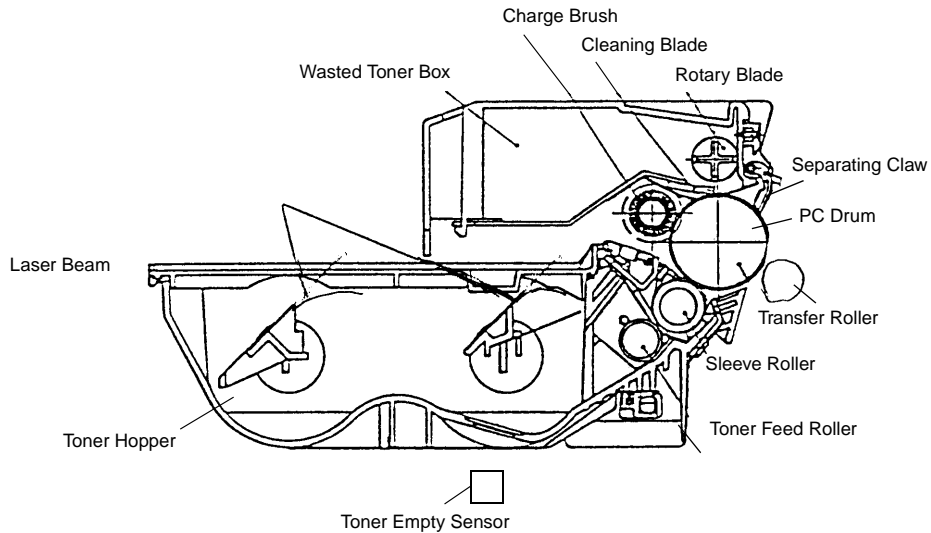
To maintain the printing density constant, it is required to emit a laser beam at constant laser power. To control the laser power to be constant is called APC (Automatic Power Control).

The SOS sensor incorporated in the print head unit is used to detect whether the laser power reaches certain laser power for printing. The SOS sensor is located outside of the printing area. When printing starts, it takes 1 or 2 scans to obtain the SOS sensor output. During printing, the SOS sensor output is monitored in every scanning for controlling the laser power constant.

4 MAGING CARTRIDGE

4-1. Parts Names and Functions of the Imaging Cartridge

The following illustrates the construction of the imaging cartridge. The power to the gears of the imaging cartridge is transmitted from the I/C drive motor (M1) of the printer main body. (The I/C drive motor (M1) turns clockwise viewing from the front of the printer.)



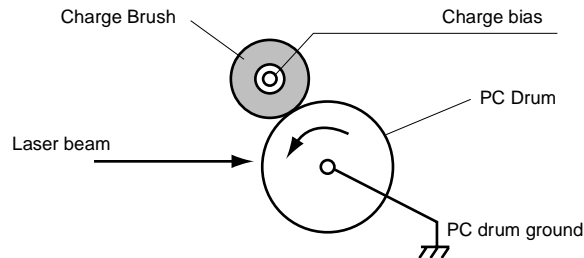
<u>Parts Name</u>	<u>Function</u>
Charge Brush	Charges the PC Drum.
Laser Beam	Acts to produce an electrostatic latent image on the surface of the PC drum. The laser beam corresponding to the print image data is emitted.
Toner Hopper	Agitates toner with the two agitator blade to feed toner to the toner feed roller.
Toner Feed Roller	Feeds toner to the sleeve roller.
Sleeve Roller	Feeds toner to the electrostatic latent image formed on the surface of the PC drum to produce a visible toner image.
Transfer Roller	Transfers the toner image on the surface of the PC drum onto the paper. (The transfer roller is not incorporated in the imaging cartridge.)
Separating Claw	Securely separates the paper from the PC drum.
Cleaning Blade	Cleans off the toner remaining on the surface of the PC drum.
Rotary Blade	Feeds the wasted toner to the wasted toner box.
Toner Empty Sensor	Detects a toner-empty status. (The toner empty sensor is not incorporated in the imaging cartridge.)

4-2. Charging Section

Before producing an electrostatic latent image on the surface of the PC drum with a laser beam, the PC drum is charged by static electricity with the rotating charge brush so that the surface of the PC drum is negatively charged. The charging system uses the rotating charge brush system. Since this charging system can apply charge directly to the PC drum, charging is possible at a low voltage, producing negligible amount of ozone.

The negative level of the surface of the PC drum will be reduced when a laser beam is applied.

Note: For the laser beam emission, see 3 "Print Head Unit (Exposure Section)".



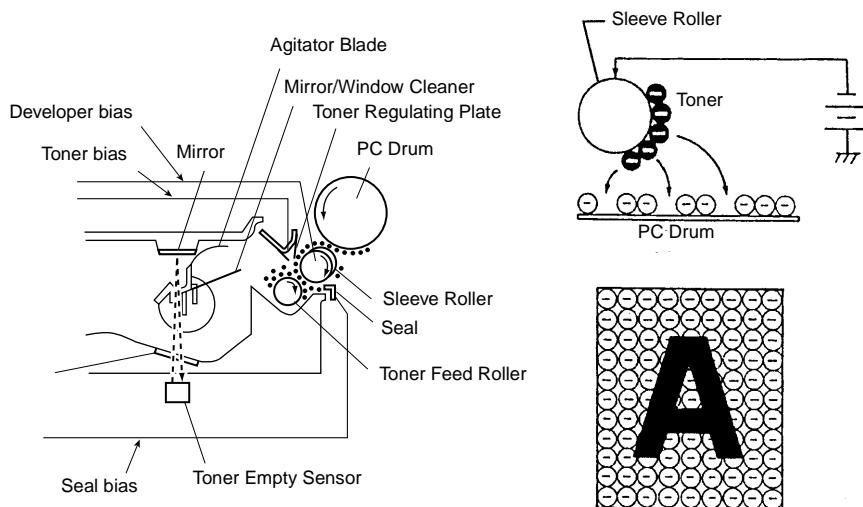
4-3. Development Section

The development section feeds toner to the electrostatic latent image on the surface of the PC drum to produce a visible toner image.

The toner in the toner hopper is agitated by the two agitator blades to feed toner to the toner feed roller. Then, the toner is fed to the sleeve roller which is negatively biased. Accordingly, the toner is negatively charged by the sleeve roller. The toner regulating plates acts to regulate the amount of toner fed to the sleeve roller. To regulate the toner, a voltage lower than the sleeve roller is applied to the toner regulating plates.

Since the toner is negatively charged by the sleeve roller, the toner will stick to the electrostatic latent image where the negative voltage is reduced. On the other hand, toner does not stick to the part where no laser beam is applied since the part maintains the negatively charged voltage with the charge brush.

The following illustrates an example where the letter "A" is written by the laser beam and toner sticks onto the letter "A" on the surface of the PC drum.



The seal beneath the sleeve roller acts to discharge the negatively-charged unused-toner on the sleeve roller. The discharged toner is fed back to the toner feed roller for recycling it. Note that, during printing, the seal voltage is the same as the sleeve roller voltage and discharge is not made. However, before and after printing, the voltage of the seal bias is set 100V higher than that of the sleeve roller to discharge the unused toner for recycling.

Operation of the Toner Empty Sensor:

The toner empty sensor detects the toner-empty status. The sensor is a photo reflector mounted on the printer.

If low toner condition occurs, the light emitted from the LED of the photo reflector passes the window of the toner hopper and reflected by the mirror. The reflected light reaches the phototransistor of the photo reflector and the phototransistor turns ON. Thus, the sensor output is "L" when the toner is empty.

In actual fact, detection of the toner empty is a little more complicate. Since toner in the hopper is agitated with the agitator blades, toner empty cannot be detected like the ON/OFF status of a switch.

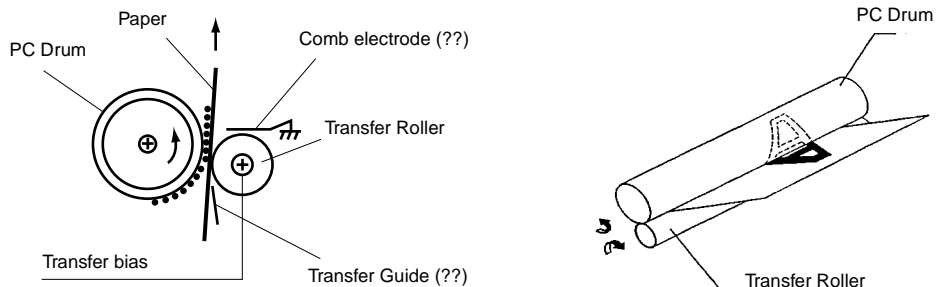
The rotating mirror/window blade cleans the mirror and window repeatedly. Basically, the CPU on the main board judges that the toner near empty occurred when a low toner condition has been detected by a certain number of times while the mirror/window blade has been rotated by a certain number of times. Next, the CPU judges that the toner empty occurred when thus detected toner near empty has been counted by a certain number of times. If toner empty is detected, printing becomes impossible.

5 TRANSFER SECTION

The transfer roller transfers the toner image on the surface of the PC drum onto the paper. A positive transfer bias is applied to the transfer roller so that the toner on the surface of the PC drum sticks to the paper.

The paper then passes through the comb electrode(?) and the static electricity remaining on the paper is discharged. This enables easy separation of the paper from the PC drum.

The separator claw of the imaging cartridge forcibly separates the paper from the PC drum.



6 FUSING SECTION

The power from the transport motor (M2) is transmitted to the upper fusing roller so that the toner-transferred paper is fed from the transfer section to the fusing section.

The paper is heated to melt the toner by the upper fusing roller and pressed by the upper and lower fusing rollers. The upper fusing roller is heated by the fusing roller heater lamp (H1) which is built in it. The fusing roller thermistor (TH1) is attached to the upper fusing roller for controlling the heater temperature. Also, the fusing roller thermostat (TS1) and fusing roller heater lamp fuse (TF1) are attached to the upper fusing roller as shown on the next page. The thermostat (TS1) and lamp fuse (TF1) are connected in series to the heater lamp (H1). The heater lamp (H1) is heated when an AC voltage is applied.

Temperature control using the thermistor:

The resistance of the thermistor (TH1) attached to the upper fusing roller varies with temperatures. When temperature rises, the resistance of the thermistor (TH1) decreases, and vice versa. As shown in the circuit diagram, the thermistor output is connected to an analog port of the CPU on the main board.

The input level to the analog port of the CPU decreases as the temperature rises. The CPU performs A/D (Analog-to-Digital) conversion for the input level to know the current temperature.

To heat the upper fusing roller, the CPU set the Heater Remote 1 output to ON ("L") state. Then, the triac on the power supply unit turns ON and an AC voltage is applied to the fusing roller heater lamp (H1) and the upper fusing roller is heated. The CPU monitors the output from the thermistor and controls ON/OFF of the triac to control the temperature of the upper fusing roller.

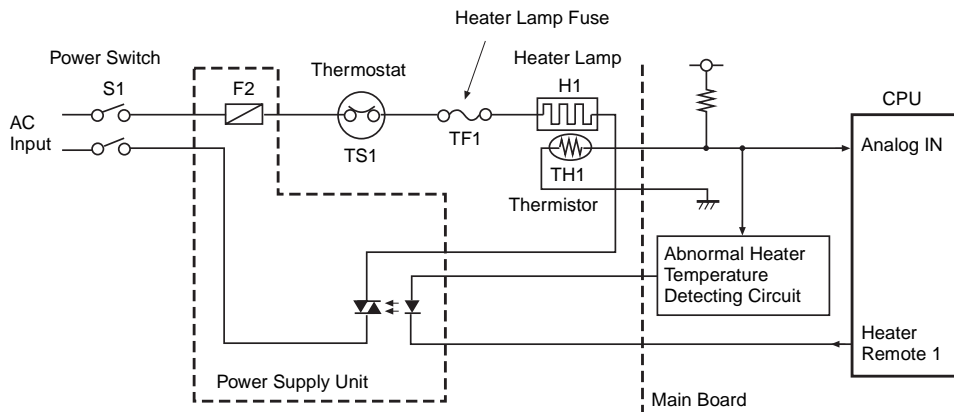
When the upper fusing roller temperature becomes abnormal and the output from the thermistor lowers than the predetermined level, the abnormal-heater-temperature detecting circuit is activated and the triac is forcibly turned OFF, resulting in shutting off an AC voltage application to the heater lamp.

Rush current preventing circuit for heater lamp (other model, circuit is omitted):

To prevent rush current when an AC voltage is applied to the heater lamp, the Heater Remote 2 signal is used. The CPU sends this signal to the (another) triac in the form of pulse before outputting the Heater Remote 1 signal. Then, the additional resistor is connected in series to the heater lamp to suppress the rush current flowing into the heater lamp.

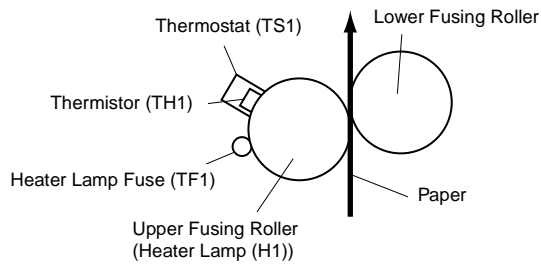
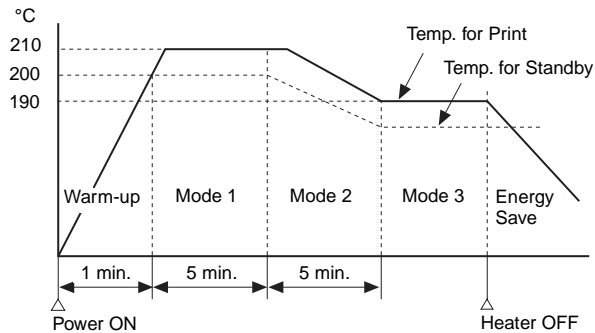
Thermostat (TS1) and heater lamp fuse (TF1):

If an abnormal current flows into the heater lamp because of thermistor trouble, etc. and the upper fusing roller temperature reaches about 220°C, the contact of the thermostat automatically opens to shut off an AC voltage. (As the temperature decreases, the contact of the thermostat closes again. However, once the thermostat has been activated, it must be replaced with new one.) When a large abnormal current suddenly flows into the heater lamp, since the thermostat cannot respond quickly, the heater lamp fuse is blown to protect the heater lamp.



Fusing temperature control:

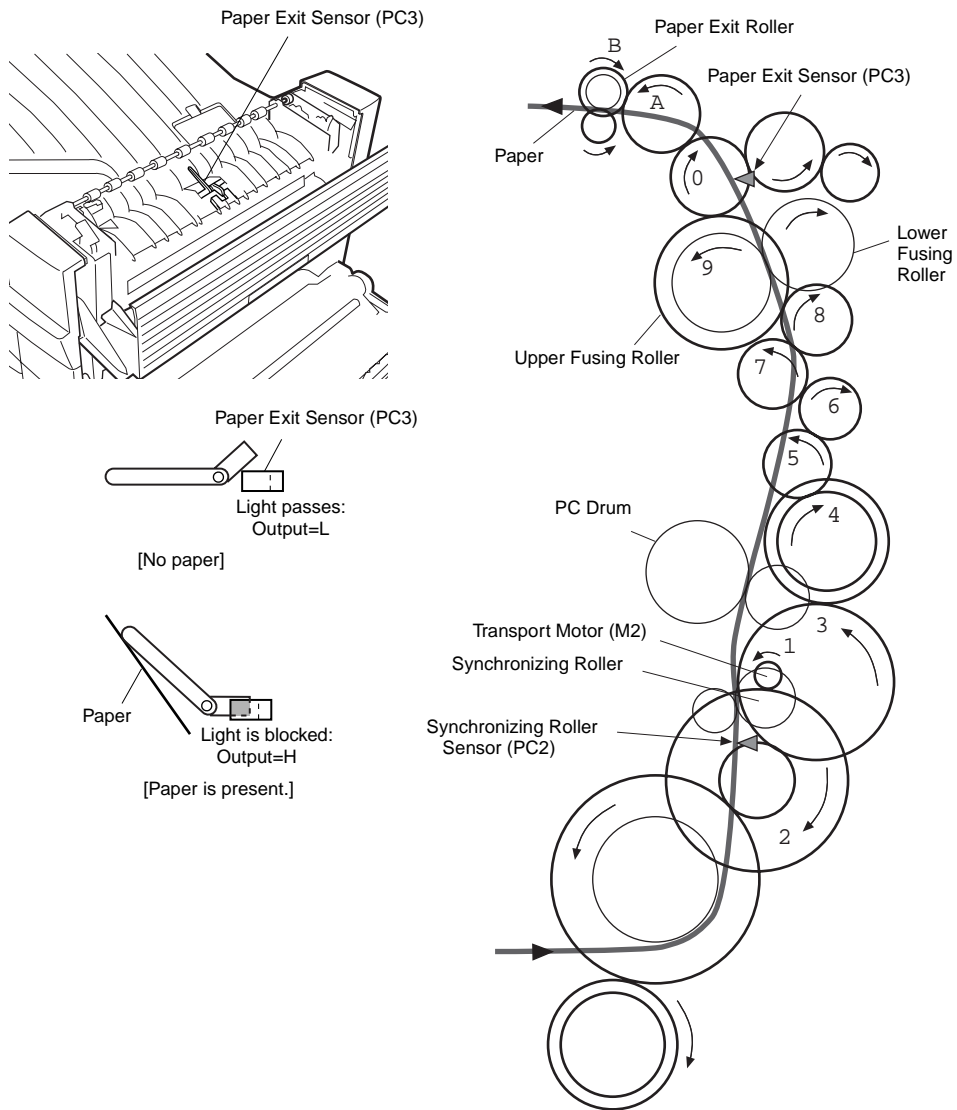
- When the power switch is turned ON, the printer starts warm-up until the upper fusing roller temperature reaches approx. 200°C. (It will take about one minute.) (Warming-up mode)
 - To maintain the upper fusing roller temperature above 190°C, the control circuit raises the temperature and keeps at approx. 210°C for approx. five minutes. (Mode 1)
 - The control circuit gradually decreases the temperature by 190°C in five minutes. (Mode 2)
 - Preparing for printing, the control circuit keeps the upper fusing roller temperature at approx. 190°C. (Mode 3)
 - In energy saving mode, the control circuit turns OFF the heater lamp.
- (*: 190°C --> 183°C for foreign model??)



7 PAPER EXIT SECTION

The paper fed from the fusing section passes through the paper exit roller and ejected to the top of the printer with its printed side facing down. The transmit power for feeding paper is given by the transport motor (M2) and transmitted in the order from 1 - B shown in the figure.s

The paper exit sensor (PC3) detects ejection of paper. This sensor uses a photointerrupter. During paper is passing through the sensor, the sensor arm is pressed by the paper so that the end of the sensor arm engages with the photointerrupter. In this condition, the light emitted from the LED of the photointerrupter is blocked and does not reach the phototransistor. Thus, the phototransistor turns OFF and the output of the photointerrupter is "H". When paper has passed the sensor, the sensor arm returns to the original position by spring force so that the end of the sensor arm comes off the photointerrupter. Thus, the light emitted from the LED passes in the photointerrupter, the phototransistor turns ON, and the output of the photointerrupter is "L".

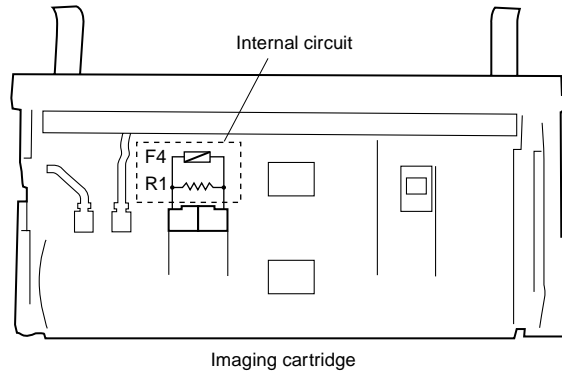


8 DETECTION OF A NEW IMAGING CARTRIDGE

The printer has the function to detect whether the newly installed imaging cartridge is a new one or used one. In the imaging cartridge, an internal circuit is incorporated as shown in the figure. A fuse is connected in parallel with a resistor and it is not blown. Accordingly, by measuring the voltage across the resistor, the printer can know whether the imaging cartridge is a new one or not.

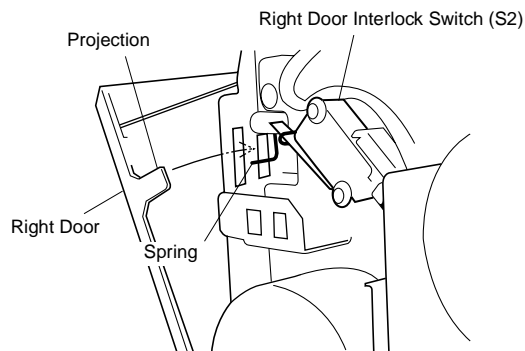
When the printer is turned ON after a new imaging cartridge has been installed, the fuse is blown by the printer. Also, when you close the right door after replacing the image cartridge while the printer is turned ON, the fuse is blown.

When the printer blows the fuse, the PC drum counter is cleared to enable detection of the image cartridge life. When power is turned OFF, the counter value is stored in the EEPROM in the imaging cartridge. When power is turned ON, the counter value is recall from the EEPROM from the imaging cartridge for continuing counting.



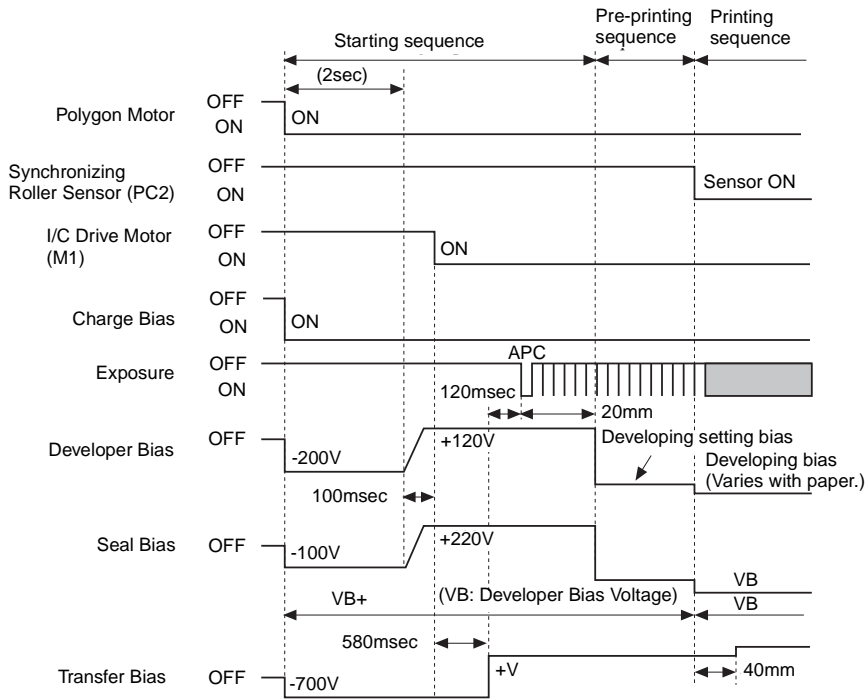
9 RIGHT DOOR INTERLOCK SWITCH (S2)

The right door is normally closed. It will be opened when the imaging cartridge is replaced or jammed paper is removed. With the door closed, the projection of the right door presses the switch lever via the spring linked with the switch lever and the switch is ON. When it is opened, the lever of the switch is set free so that the switch is OFF.

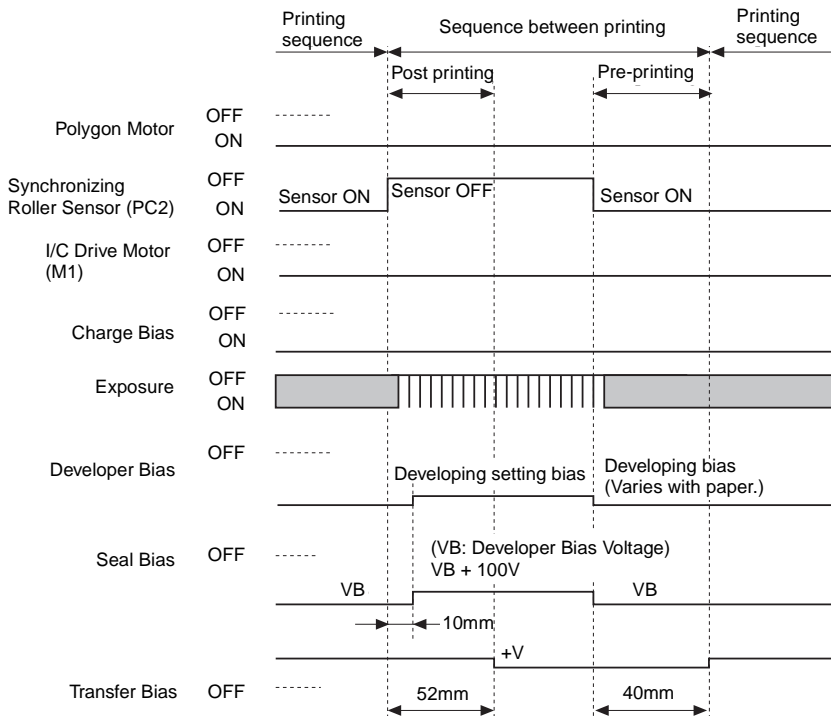


10 PRINT SEQUENCE

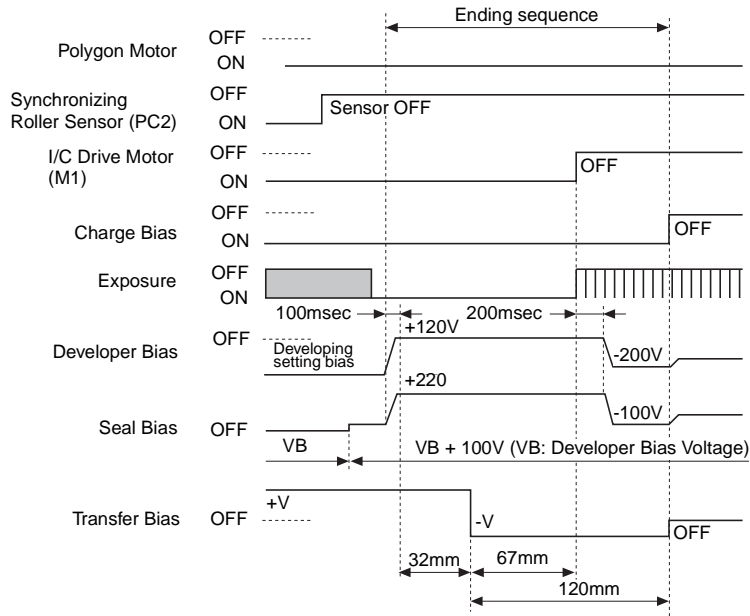
Start sequence



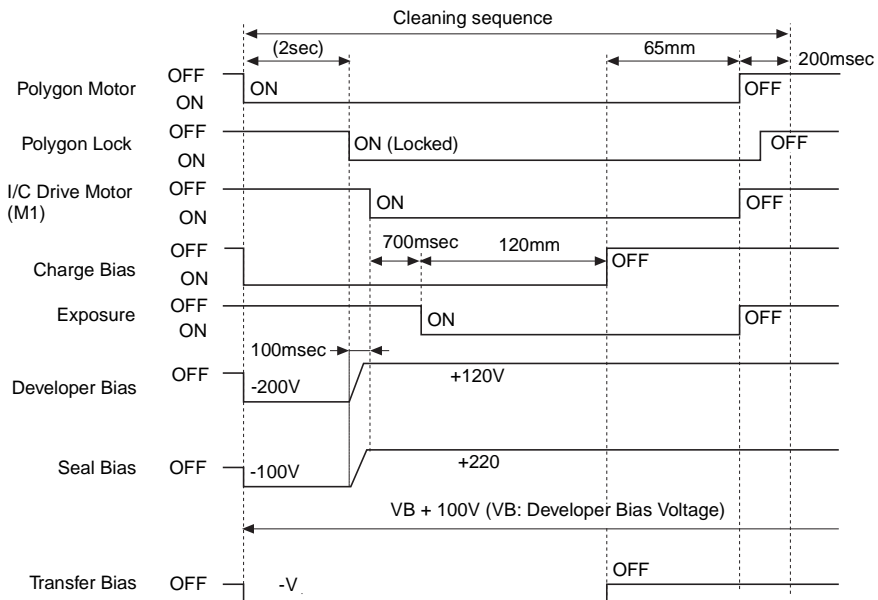
Multiple sequence



Ending sequence



Cleaning sequence



11 PARALLEL INTERFACE

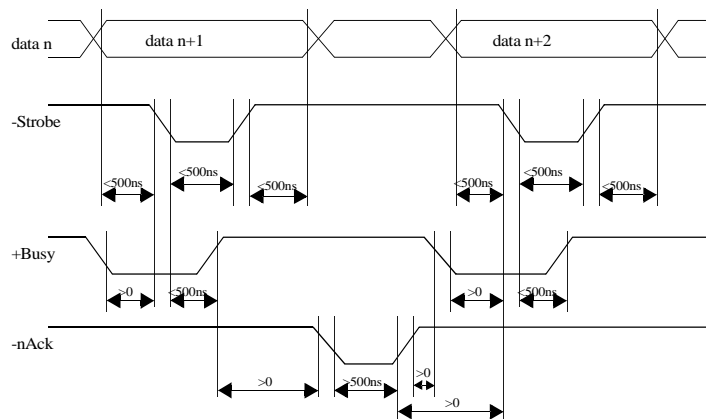
11-1.Connector pin assignments (Standard Centronics and IEEE1284-Type B)

No.	Item	No.	Item	No.	Item
1	Strobe (Host Cik)	13	Select (X flag)	25	S. Gnd (D6)
2	DA1	14	AutoFd (HostAck)	26	S. Gnd (D7)
3	DA2	15	Not defined	27	S. Gnd (D8)
4	DA3	16	Logic Gnd	28	S. Gnd/PE, Select, Ack
5	DA4	17	Chassis Gnd	29	S. Gnd/Busy, Fault
6	DA5	18	Peripheral Logic High	30	S. Gnd/aFd, selIn, Init
7	DA6	19	S. Gnd (Strobe)	31	Init (Reverse Request)
8	DA7	20	S. Gnd (D1)	32	Fault (Periph Request)
9	DA8	21	S. Gnd (D2)	33	N.C
10	Ack (PeriphClk)	22	S. Gnd (D3)	34	N.C
11	Busy (PeriphAck)	23	S. Gnd (D4)	35	N.C
12	PError (AckReverse)	24	S. Gnd (D5)	36	SelectIn (1284Active)

NOTE

D-sub full size 36 pin connector. Compatibility mode and (ECP mode).

11-2.Compatibility mode handshake timing values



D: DISASSEMBLY AND CLEANING

1 MAINTENANCE, INSPECTION, AND PROHIBITED OPERATIONS

1-1. Replacement of Parts

Parts Name	Replacement Cycle	Ref. page
Imaging Cartridge	(Continuous 15,000 sheets/intermittent 12,000 sheets)	D-2
Fusing Unit	When a malfunction develops (continuous 500,000 sheets/intermittent 300,000 sheets)	D-6
Image Transfer Roller Unit	When a malfunction develops (continuous/intermittent 150,000 sheets)	D-11
Paper Take-Up Roller	When a malfunction develops (continuous/intermittent 120,000 sheets)	D-13

1-2. Cleaning Parts

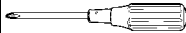

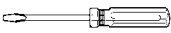

Parts Name	Cleaning Procedure
Paper Take-Up Roller	Wipe the surface clean of dirt with a cloth dampened with alcohol.
Image Transfer Roller	Wipe the surface clean of dirt with a dry cloth.

* Do not touch the rubber part of the Image Transfer Roller with bare hands.
By "alcohol," we mean "ethyl alcohol."

1-3. Screws that Should Never be Removed

* Red painted screws show that the assembly or unit secured can only be adjusted or set at the factory and shall not be readjusted, set, or removed in the field.
Note that when two or more screws are used on the part in question, only one representative screw may be marked with red paint.

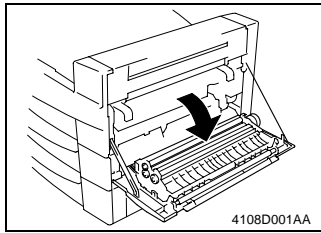
1-4. Required Service Tools

Tools	Phillips Screwdriver (No.2)  4108D041AA	Long Phillips Screwdriver  4108D042AA	Slotted Screwdriver  4108D043AA	Needle Nose Pliers  4108D044AA
Place to Used	Generally Used	High Voltage Unit	E-ring	E, G-ring

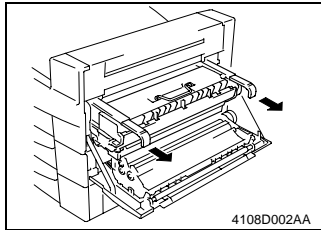
2 DISASSEMBLY PROCEDURES

* Before starting the disassembly procedure, open the Vertical Transport Door and remove the Imaging Cartridge.

2-1. Removal of the Imaging Cartridge

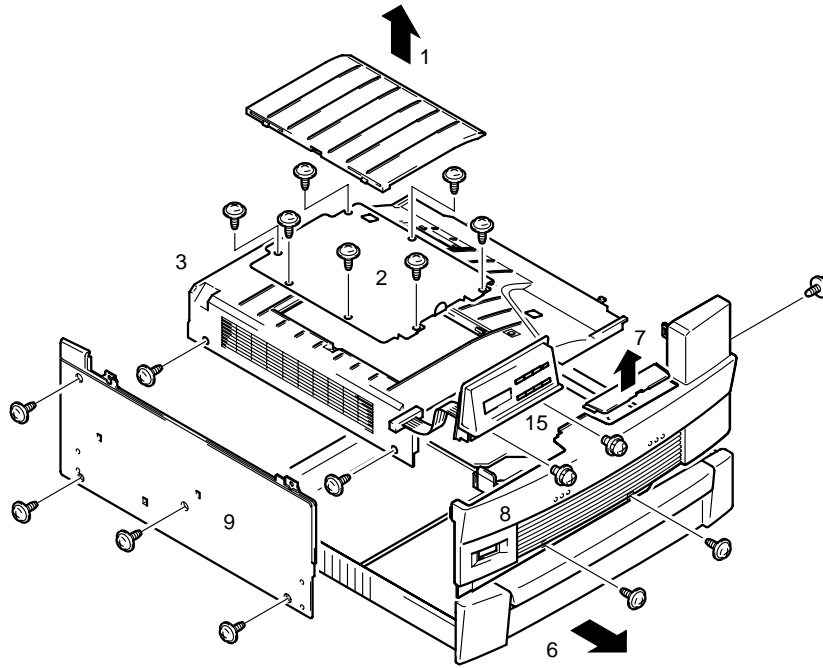


1. Open the Vertical Transport Door.

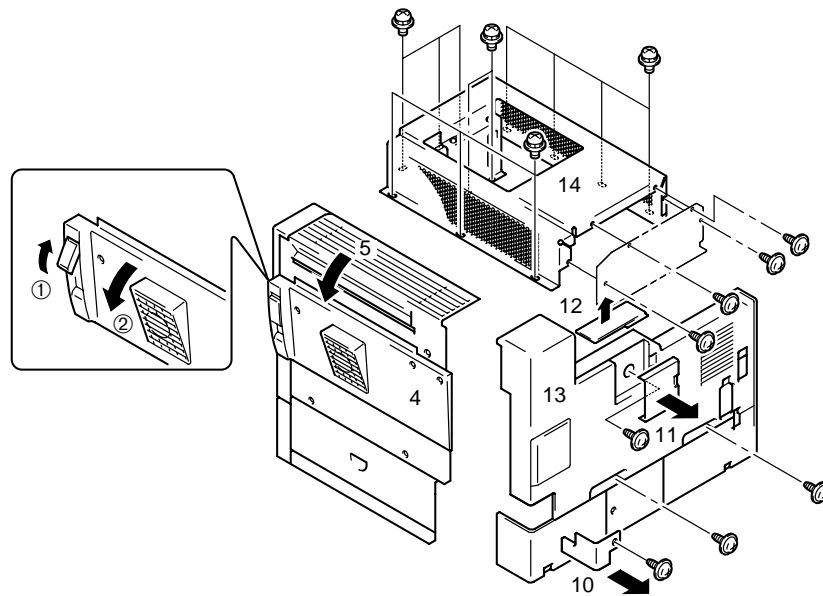


2. Hold onto the handle (green) of the Imaging Cartridge and slide the Imaging Cartridge out of the copier.

2-2. Removal of the Outer Covers



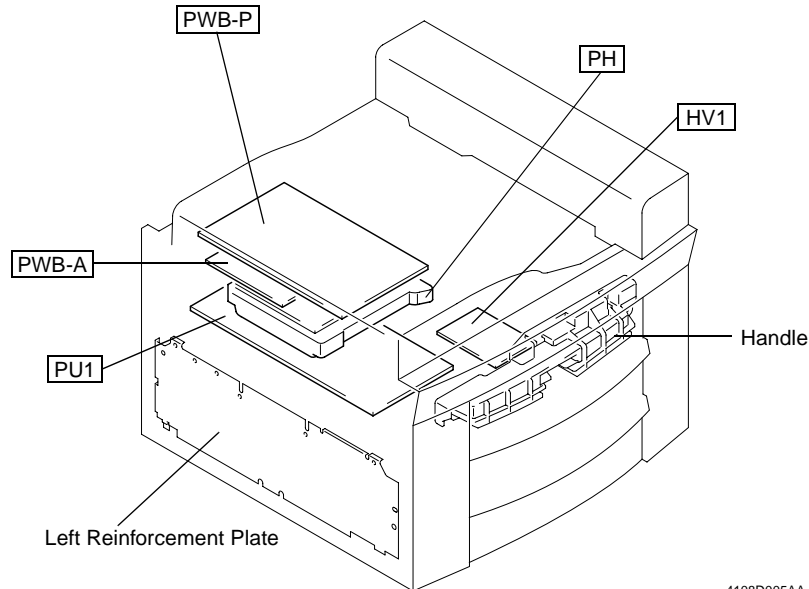
4108D045AA



4108D046AA

No.	Parts Name	Removal Procedure
1	Access Cover	Unhook the two tabs and remove the Access Cover.
2	Upper Metal Bracket	Remove seven screws and metal bracket.
3	Upper Cover	Remove two screws and remove the Upper Cover by lifting it upward.
4	Vertical Transport Door	Raise the stopper and open the Vertical Transport Door.
5	Fusing Unit Cover	Open the Fusing Unit Cover.
6	1st Cassette	Pushing the tab on the right rail, slide out the 1st cassette.
7	Front Option Cover	Remove the Front Option Cover.
8	Front Cover	Remove three screws and the Front Cover.
9	Left Cover	Remove four screws and Left Cover.
10	Harness Cover	Remove one screw and Harness Cover.
11	CN Cover	Push the tab to remove the CN Cover.
12	Rear Option Cover	Remove the Rear Option Cover.
13	Rear Cover	Remove three screws and Rear Cover.
14	Control Board Reinforcement Box	Remove 16 screws and the Control Board Reinforcement Box.
15	Control Panel	Unplug one connector from Controller Board and remove two screws and the Control Panel.

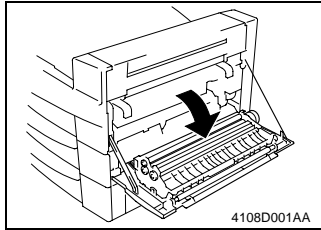
2-3. Removal of the Circuit Boards



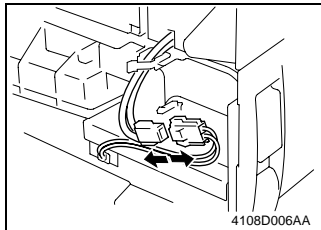
Parts Name	Removal Procedure
Controller Board (PWB-P)	Access Cover, Upper Cover, Front Cover, Left Cover, Harness Cover, CN Cover, Rear Cover, Control Board Reinforcement Box (see 2-2.) → Remove eight screws, unplug one connector, and then remove PWB-P.
Main Board (PWB-A)	PWB-P → Remove four screws, unplug 14 connectors, and then remove PWB-A.
Print Head Unit (PH)	PWB-P → PWB-A → Control Panel → Remove five screws and the handle. → Remove five screws and the left reinforcement plate. → Remove four screws and PH base plate. → Remove four screws and PH.
Power Supply Unit (PU1)	PWB-P → PWB-A → Control Panel → PH base plate → Remove seven screws, unplug five connectors, and then remove PU1.
High Voltage Unit (HV1)	Upper Cover → Open the Vertical Transport Door. → Remove the Imaging Unit. → Using the long Phillips screwdriver, remove two screws and the High Voltage Unit Cover. → Remove two screws, unplug three connectors, and then remove HV1.

2-4. Fusing Unit

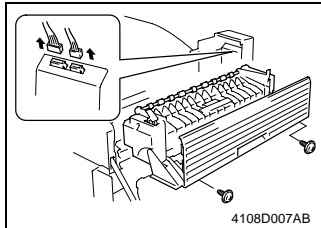
(1) Removal of the Fusing Unit



1. Open the Vertical Transport Door.



2. Remove the Front Cover.
3. Unplug one connector at the front side.



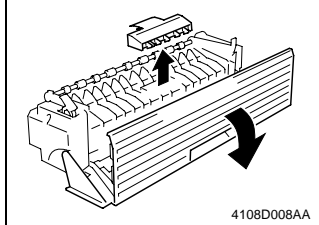
4. Open the Fusing Unit Cover and unplug two connectors (3P, 4P) in the rear.
5. Remove two screws and the Fusing Unit.

NOTE

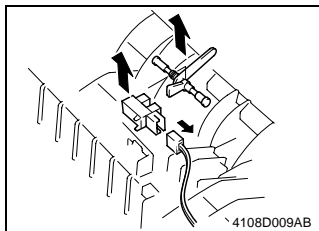
*The printer is hot immediately after it has been used.
Be careful not to get burned.*

(2) Removal of Parts

Paper Exit Sensor and Actuator

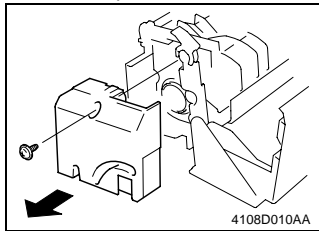


1. Open the Fusing Unit Cover and remove the Paper Exit Sensor Cover.

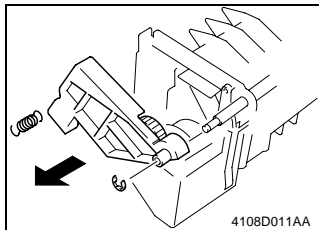


2. Unplug one connector, and remove the Paper Exit Sensor.
3. Remove the actuator.

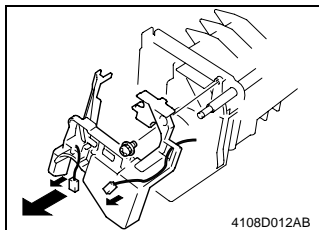
Heater Lamp Cover



4. Remove the Fusing Unit. (See 2-4. (1).)
5. Remove one screw and the Fusing Heater Lamp Front Cover.

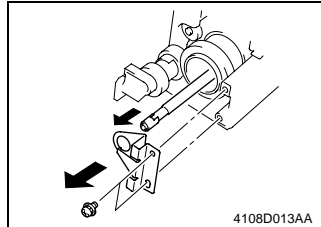


6. Snap off one E-ring and unhook one spring in the rear and remove the gear assy.



7. Remove the harness from the Fusing Heater Lamp Rear Cover.
8. Remove one screw and the Fusing Heater Lamp Rear Cover.

Fusing Heater Lamp

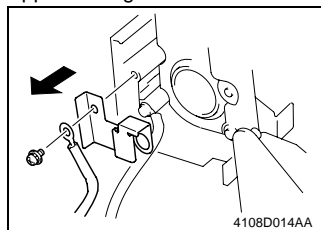


9. Remove two screws and the Heater Lamp Holder (Rear).
10. Pull out the Fusing Heater Lamp.

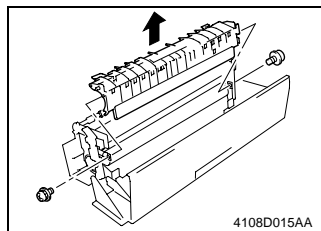
NOTES

- Do not touch the glass tube of the Fusing Heater Lamp with bare hands.
- When reinstalling Fusing Heater Lamp, ensure that its side with the lamp voltage marking is on the gear side.

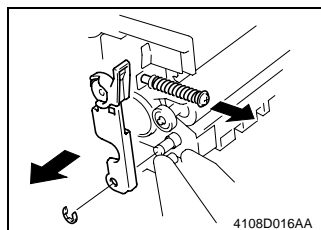
Upper Fusing Roller



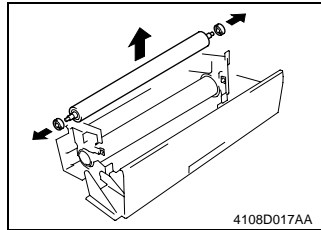
11. Remove one screw, harness, and the Fusing Heater Lamp Holder (Front).



12. Remove two screws and the Upper Paper Separator Fingers Assy.

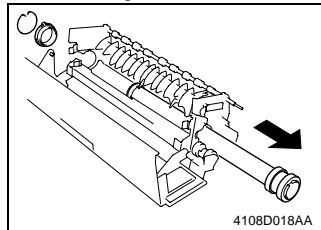


13. Remove the Roller Pressure Screw at the front, snap off the E-ring, and remove the Pressure Lever Assy (yellow).



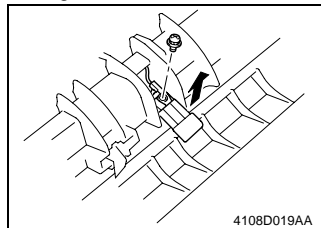
14. Remove the Upper Fusing Roller and bearings.

Lower Fusing Roller



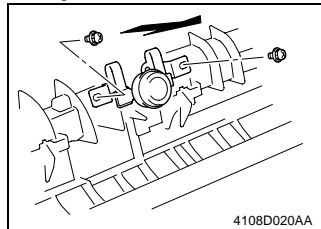
15. Remove the G-ring and bushing at the front.
16. From the gear end, pull out the Lower Fusing Roller.

Fusing Roller Thermistor



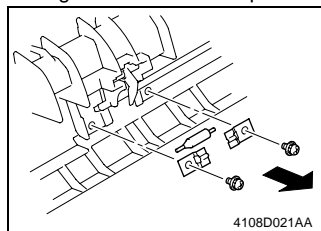
17. Remove one screw and the Fusing Roller Thermistor.

Fusing Roller Thermostat



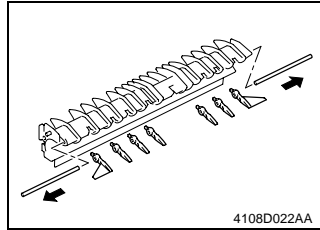
18. Remove two screws and the Fusing Roller Thermostat.

Fusing Roller Heater Lamp Fuse



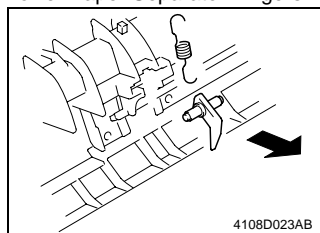
19. Remove two screws and the Fusing Roller Heater Lamp Fuse.

Upper Paper Separator Fingers



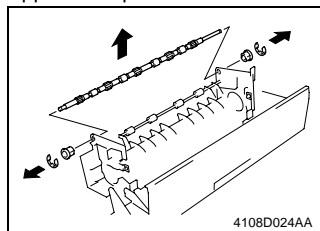
20. Slide the fixing shaft from the Upper Paper Separator Fingers Assy and remove the Upper Paper Separator Fingers.

Lower Paper Separator Fingers



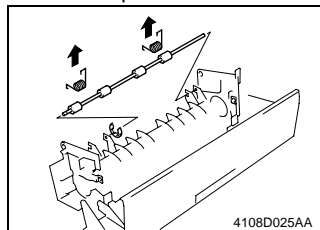
21. Unhook the finger springs, remove the Lower Paper Separator Fingers.

Upper Transport Roller



22. Snap off two E-rings and remove two bushings to remove the Upper Transport Roller.

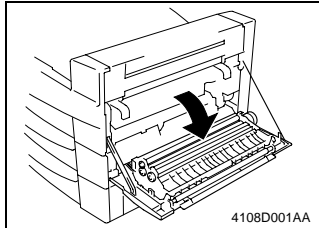
Lower Transport Roller



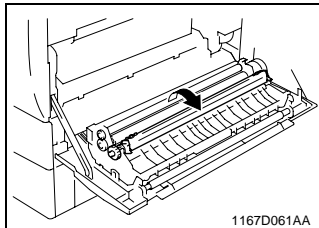
23. Remove one E-ring, two finger springs, and Lower Transport Roller.

2-5. Image Transfer Unit

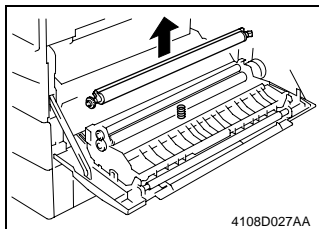
(1) Removal of the Image Transfer Roller Unit



1. Open the Vertical Transport Door.



2. Raise the Pre-Image Transfer Guide Plate.



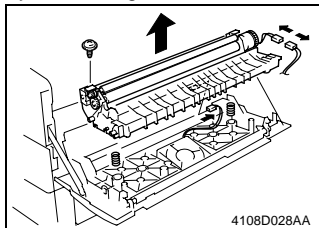
3. Remove the Image Transfer Roller Unit.

NOTE

Do not touch the Image Transfer Roller with bare hands.

(2) Removal of Parts

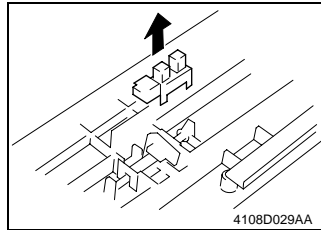
Synchronizing Roller Sensor



1. Remove the Image Transfer Roller Unit.
(See 2-5.(1).)
2. Remove one screw, unplug two connectors, and remove Image Transfer Unit.

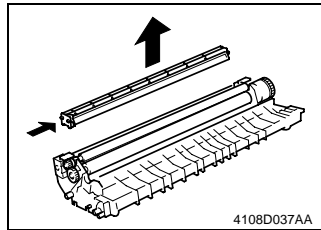
NOTE

Because the harness is short, slightly raise the Transfer Unit and unplug the connector before attempting to remove the Transfer Unit.

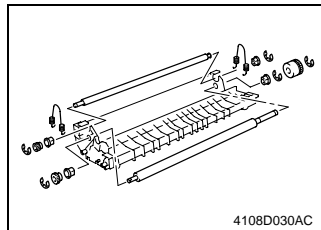


3. From the back side of the Image Transfer Unit, remove the Front Synchronizing Roller Sensor.

Synchronizing Roller

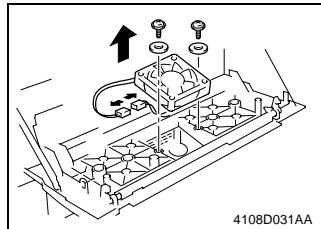


4. Remove the Paper Dust Remover.



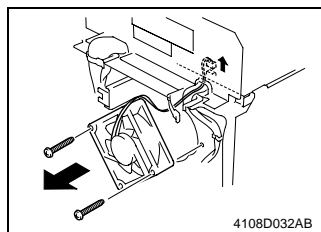
5. Remove one E-ring and Transport Clutch.
6. Snap off four E-rings, unhook two springs, and remove four bushings and two gears to remove the Synchronizing Rollers.

2-6. Removal of the Cooling Fan Motor



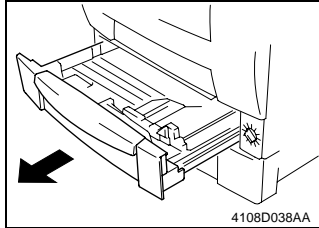
1. Remove the Image Transfer Unit. (See 2-5.(2).)
2. Remove two screws, unplug one connector, and remove the Cooling Fan Motor.

2-7. Removal of the Power Unit Cooling Fan Motor

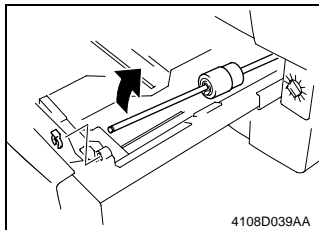


1. Remove the Controller Board. (See 2-3.)
2. Remove two screws, unplug one connector, and remove the Power Unit Cooling Fan Motor.

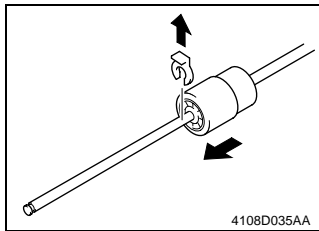
2-8. Removal of the Paper Take-Up Roll



1. Slide out the 1st Cassette.



2. Snap off one C-clip from the Paper Take-Up Roll Assy.
3. Slide the Paper Take-Up Roll Assy to the rear to remove it from the front bushing.

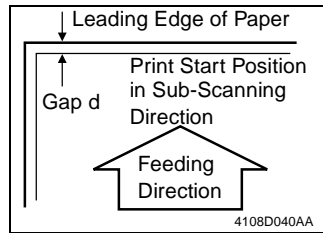


4. Snap off one C-clip and remove the Paper Take-Up Roll.

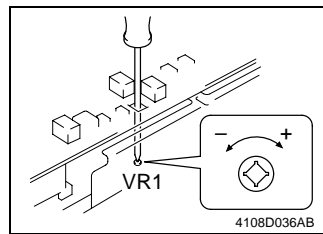
E: ADJUSTMENTS

1 ADJUSTMENT OF THE PRINT START POSITION IN SUB-SCANNING DIRECTION

* When Control Board PWB-A has been replaced, the print start position in the sub-scanning direction must be adjusted.



1. Remove the Access Cover, Upper Cover, and Control Board Reinforcement Box.
(See 2-2 of D: DISASSEMBLY AND CLEANING.)



2. Turn variable resistor VR1 on PWB-A to adjust gap d between the leading edge of the paper and print start position in the sub-scanning direction.

F: TROUBLESHOOTING

1 MALFUNCTION RECOVERY

1-1. The Printer Won't Start.

Symptom	u/s	Analysis	y/n	Action
The printer won't start.	u	Plug in another electrical appliance and see if it is started.	n	Faulty power outlet.
			y	To next step.
	u	Check the power cord for continuity.	n	Defective power cord.
			y	To next step.
	u	Listen for the fan starting whirling.	n	Defective DC Power Supply PU1.
			y	Defective or loose control panel.

1-2. The Printer Won't Print.

Symptom	u/s	Analysis	y/n	Action
The printer does not feed paper out of it.	u	Is the On Line LED ON?	n	Press the On Line key to turn ON the On Line LED.
	u	You get a message other than "Ready."	y	Follow the message.
	u	Does the printer give a correct test print?	y	Check the connection between the printer and computer.
The printer feeds out blank sheets of paper.	u	The printer does print, but feeds out blank sheets of paper.	y	Refer to Image Quality Problems.

1-3. Image Quality Problems

Symptom	u/s	Analysis	y/n	Action
Faulty image	u	Does the symptom occur even in a test print?	n	Check the connection between the printer and computer. If it is intact, the application or printer driver is probably faulty.
The printer feeds out blank sheets of paper.	s	Turn OFF the printer during a print cycle and check to see if toner sticks to the PC Drum.	y	Defective image transfer bias. Replace High Voltage Unit HV1.
	s	Replace the Imaging Cartridge to determine if the problem persists.	n	Replace P/H.
Solid black	s	Replace the Imaging Cartridge to determine if the problem persists.	n	Replace High Voltage Unit HV1.
Lines (feeding direction)	u	Is the PC Drum scratched?	y	Replace the Imaging Cartridge.
	s			Replace P/H.
Lines (direction perpendicular to feeding direction)	u	Pitch is 94.2 mm.	y	Replace the Imaging Cartridge. (Clean the PC Drum.)
	s	Pitch is 56.5 mm.	y	Clean/replace the Synchronizing Roller or Image Transfer Roller.
	s	Pitch is 93.5 mm.	y	Replace the Fusing Unit. (Clean/replace the Fusing Rollers.)
	s	Pitch is 33.9 mm.	y	Clean/replace the Exit Roller.

1-4. Tech. Rep. Call

Symptom	u/s	Analysis	y/n	Action
FATAL ERROR 1	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u	Reinstall ROM.	n	To next step.
	u/s	Replace ROM.	n	Replace the controller board.
FATAL ERROR 2	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u	Reinstall PostScript ROM.	n	To next step.
	u/s	Replace PostScript ROM.	n	Replace the controller board.
FATAL ERROR 3	u/s	Is the problem gone when the power is turned OFF, then ON?	n	Replace the controller board.
FATAL ERROR 4	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u	Reinstall RAM SIMM.	n	To next step.
	u/s	Replace RAM SIMM.	n	Replace the controller board.
FATAL ERROR 5	u/s	Is the problem gone when the power is turned OFF, then ON?	n	Replace the controller board.
FATAL ERROR 7	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u	Reinstall the network card.	n	To next step.
	u/s	Replace the network card.	n	Replace the controller board.
FATAL ERROR 8	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Remove the controller board from, and reinstall it to, PWB-A.	n	To next step.
	s	Replace the controller board.	n	Replace PWB-A.

Symptom	u/s	Analysis	y/n	Action
FATAL ERROR 9	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u	Remove the network card from, and reinstall it to, the controller board.	n	To next step.
	u/s	Replace the network card.	n	Replace the controller board.
FATAL ERROR 21	u/s	Is the problem gone when the power is turned OFF, then ON?	n	Replace PWB-A.
FATAL ERROR 22	u/s	Is the problem gone when the power is turned OFF, then ON?	n	Replace PWB-A.
FATAL ERROR 23	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between the printer head and PWB-A.	n	To next step.
	s	Replace PWB-A.	n	Replace the printer head.
FATAL ERROR 24	u/s	Is the problem gone when the power is turned OFF, then ON?	n	Replace PWB-A.
FATAL ERROR 25	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between PWB-A and main motor.	n	To next step.
	s	Replace the main motor.	n	Replace PWB-A.
FATAL ERROR 26	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between PWB-A and I/C motor.	n	To next step.
	s	Replace the main motor.	n	Replace PWB-A.

Symptom	u/s	Analysis	y/n	Action
FATAL ERROR 27	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between PWB-A and printer head unit.	n	To next step.
	s	Replace PWB-A.	n	Replace the printer head unit.
FATAL ERROR 30	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between PWB-A and ventilation fan.	n	To next step.
	s	Replace the ventilation fan.	n	Replace PWB-A.
FATAL ERROR 31	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	s	Check the connectors and wiring between PWB-A and power supply fan.	n	To next step.
	s	Replace the power supply fan.	n	Replace PWB-A.
FATAL ERROR 33 FUSER 1	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u/s	Reach your hand near the Fusing Unit to feel if it is hot.	n	Replace the Fusing Unit (defective Fusing Roller Heater Lamp).
			y	Replace the Fusing Unit (defective Fusing Thermistor).
FATAL ERROR 33 FUSER 2	u	Is the problem gone when the power is turned OFF, then ON?	n	To next step.
	u/s	Reach your hand near the Fusing Unit to feel if it is hot.	n	Replace the Fusing Unit (improperly connected Fusing Roller Heater Lamp).
			y	Replace the Fusing Unit (defective Fusing Thermistor).

Symptom	u/s	Analysis	y/n	Action
FATAL ERROR 33 FUSER 3	s	_____	y	Replace the Fusing Unit (defective Fusing Ther- mistor).
FATAL ERROR 34	u	Remove I/C, clean the contact, and reinstall the I/C.	n	To next step.
	u/s	Replace I/C.	n	Replace PWB-A.

2 MALFUNCTION DETECTION

NOTE

The printer detects the following malfunctions. When it detects any of these malfunctions, all elements are brought to an immediate stop except the fan motor.

2-1. Misfeed Detection Conditions

JAM1 (Paper take-up misfeeds)

- The Synchronizing Sensor is not activated after the lapse of a given period of time even with two paper take-up retry sequences performed during paper take-up from the Multi-purpose Tray.
- The Synchronizing Sensor is not activated after the lapse of a given period of time even with two paper take-up retry sequences performed during paper take-up from any of the expansion cassettes (1st to 4th).
- The Synchronizing Sensor is not activated after the lapse of a given period of time since the start of the paper take-up sequence during single paper manual bypass feeding.
- An LCC Paper Exit signal (EXIT) is not output even after the lapse of a given period of time after a Paper Take-Up Request signal (FEED) has been turned ON during paper take-up from the LCC.

JAM2 (Paper transport misfeeds)

- When paper is fed from any of the expansion cassettes of 2nd to 4th and after the lapse of a given period of time after the Paper Take-Up Sensor of the current cassette has been activated, the Paper Take-Up Sensor of the next cassette (Synchronizing Sensor if the next cassette is the 1st Cassette) is not activated.
- The Paper Take-Up Sensor of the next cassette (Synchronizing Sensor if the next cassette is the 1st Cassette) is not activated after the LCC Output signal has been turned ON during paper take-up from the LCC.
- When paper is fed from any of the expansion cassettes of 2nd to 4th, the printer recognizes a paper length, in its paper length detection sequence, 260 mm or more longer than the paper length data transmitted from the controller.
- During a two-sided print cycle of paper fed from any of the expansion cassettes of 2nd to 4th, the printer recognizes a difference in paper length of ± 20 mm or longer, in its paper length detection sequence, between the detected paper length and the paper length data transmitted from the controller.

JAM3 (Duplex Unit misfeeds)

- The Synchronizing Sensor is not activated even after the lapse of a given period of time after the paper has moved past the Duplex paper take-up point.
- For the paper that is to be stored into the Duplex Unit, the DUP Sensor is not activated even after the lapse of a given period of time after the Paper Exit Sensor has been deactivated.

JAM4 (Fusing Unit misfeeds)

- The Paper Exit Sensor is not deactivated even after the lapse of a given period of time after the Synchronizing Sensor has been deactivated.

JAM5 (Paper Separator misfeeds)

- The Paper Exit Sensor is not activated even after the lapse of a given period of time after the Synchronizing Sensor has been activated.
- The Synchronizing Sensor is not deactivated even after the lapse of a given period of time after it has been activated.
- When paper is fed from the Multipurpose Tray, Manual Bypass Tray, or 1st Cassette, the printer recognizes a paper length, in its paper length detection sequence, 260 mm or more longer than the paper length data transmitted from the controller.
- During a two-sided print cycle of paper fed from the Multipurpose Tray, Manual Bypass Tray, or 1st Cassette, the printer recognizes a difference in paper length of ± 20 mm or longer, in its paper length detection sequence, between the detected paper length and the paper length data transmitted from the controller.

2-2. JAM Display Reset

The JAM display is reset when any of the following covers is opened and closed.

- Right Cover
- Duplex Unit Cover
- Expansion Cassette Cover
- LCC Cover
- LCC Front Cover
- 5-Bin Mail Bin Cover
- 10-Bin Mail Bin Cover