LBP-3260

SERVICE MANUAL

REVISION 0

Canon

JAN. 1999   RY8-1390-000

Prepared by

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PREFACE

This Service Manual contains basic information required for after-sales service of the laser beam printer LBP-3260 (hereinafter referred to as the "printer"). This information is vital to the service technician in maintaining the high print quality and performance of the printer.

This manual consists of the following chapters:

Chapter 1: Product information
            Features, specifications, operation, and installation

Chapter 2: Operation and Timing
            A description of the operating principles and timing sequences of the electrical and mechanical systems.

Chapter 3: The Mechanical System
            Explanation of mechanical operation, disassembly, reassembly and adjustment procedures

Chapter 4: Troubleshooting
            Troubleshooting procedures, reference values and adjustments, maintenance and servicing, etc.

Appendix: General timing chart, general circuit diagram, etc.

Information in this manual is subject to change as the product is improved or redesigned. All relevant information in such cases will be supplied in the Service Information Bulletins.
    A thorough understanding of this printer, based on information in this Manual and Service Information bulletins, is required for maintaining its performance and for locating and repairing the causes of malfunctions.

DTP system

This manual was produced on an Apple PowerMacintosh 9500/233 personal computer and output by an Apple LaserWriter 16/600 PS laser beam printer; final pages were printed on DAINIPPON SCREEN MFG CO. LTD DT-R3100.

All graphics were produced with Macromedia FreeHand (J), and all documents and page layouts were created with QuarkXPress (E).

The video images were captured with SONY degital video camcorder and Radius PhotoDV capture board system, and modified with Adobe Photoshop™ (J).

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CHAPTER 4 TROUBLESHOOTING

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CHAPTER 1

PRODUCT INFORMATION

I. FEATURES

1. High speed printing
Equipped with Motorola's PowerPC 603e, the printer is capable of printing about 32 pages per minute (A4/Letter).

2. Superior print quality
Combination of high resolution printing at 600 DPI and the use of super fine toner offers clear print images.

3. Duplex printing
With the optional duplexing unit installed, the printer can print on both sides of paper.

4. Continuous printing
With the optional paper deck installed in the printer in addition to the standard equipped multi-purpose tray and upper and lower cassettes, up to about 3,100 sheets of paper ($75g/m^2$) can be loaded, enabling continuous printing in large volume.

5. 6-way paper pick-up
Optional 2x500 sheet paper deck and envelope feeder in addition to the standard equipped multi-purpose tray and upper and lower cassettes offer 6-way paper pick-up. The printer can change the paper pick-up source automatically according to the paper type in addition to the paper size.

6. Delivery
With the optional staple stacker installed in addition to the standard face-down tray, up to 2,300 sheets of A4 or Letter size paper ($75g/m^2$) can be delivered (simple stacking).

7. Various delivery methods
With the optional sorter attached to the printer, paper can be delivered in 4 modes: mail box, job separator, stacker and collator.

8. Memory saving technology
Memory Reduction Technology accomplishes printing at 600 DPI with standard equipped memory (8 MB). It also decreases errors, such as memory over flow, and provides stable printing.

9. Energy saving/Toner saving
The printer cuts off the power to the fixing heater when it remains idle for a specified length of time. It can also reduce toner consumption by selecting the economy mode to print light images with less toner.

10. Automatic emulation switching
The printer supports Hewlett-Packard's enhanced PCL6. With the optional PostScript ROM DIMM (Canon Translator Module A-72) installed, the printer can automatically switch between the standard PCL and Adobe® PostScript® 3™.

11. Automatic interface switching
In addition to the standard built-in bicentronics parallel port, optional interfaces can be installed in the printer. The printer can automatically switch between the parallel and expansion interface according to which interface port the data sent from the host computer enters.

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II. SPECIFICATIONS

A. Printer
1. Printer Engine

1)	Type	Desktop page printer (console type when paper deck is installed)
2)	Printing method	Electrophotography
3)	Printing speed **(Note 1)**	About 32 pages/min. (A4/Letter), about 18 pages/min. (A3)
4)	First print time **(Note 2)**	12.9 sec. or less (A4), 14.3 sec. or less (A3)
5)	Wait time **(Note 3)**	90 sec. or less
6)	Resolution	
	Horizontal	600 DPI
	Vertical	600 DPI
7)	Image formation system	
	Laser	Semiconductor laser
	Scanning system	Rotating six-faced prism mirror (Scanning mirror)
	Photosensitive drum	OPC
	Charging	Roller charging
	Exposure	Laser scanning
	Toner	Magnetic single-component dry toner
	Development	Toner projection development
	Toner supply	By EP-72 cartridge replacement (about 20,000 A4- or Letter-sized prints; with "DENSITY" in "CONFIG MENU" set to "7" and 4% dot density)
	Transfer	Roller transfer
	Separation	Curvature/discharge bias
	Cleaning	Blade
	Fixing	Heated rollers (600W, 450W)
8)	Paper pick-up	Multi-purpose tray
		Cassette
		Envelope feeder EF-9 (option)
		2,000 Sheet paper deck PD-82 (option)
		2x500 Sheet paper deck PD-82K (option)
	Print paper	Plain paper, colored paper, labels, OHT, envelopes, rough paper, bond paper, tarnsparency paper, recycled paper, letterhead
	Paper sizes	
	Multi-purpose tray	Min. 98.4mm(W) × 190.5mm(L) to max. 297mm(W) × 432mm(L) sized plain paper ($64g/m^2$ to $128g/m^2$ recommended paper) and paper mentioned above.
	Upper cassette	B4, A4, Legal, Letter-sized plain paper ($64g/m^2$ to $105g/m^2$ recommended paper), and colored paper.
	Lower cassette	A3, B4, A4, Ledger, Legal, Letter-sized plain paper ($64g/m^2$ to $105g/m^2$ recommended paper), and colored paper.
	Multi-purpose tray capacity	10mm stack (about 100 sheets of $75g/m^2$ paper)
	Cassette capacity	50mm stack (about 500 sheets of $75g/m^2$ paper)
	Cassette types	
	Upper cassette	Universal (accommodates B4, A4, Legal, Letter sizes)
	Lower cassette	Universal (accommodates A3, B4, A4, Ledger, Legal, Letter sizes)
9)	Print delivery	Face-down/face-up
10)	Print tray capacity	
	Face-down	About 500 sheets ($75g/m^2$ paper)
	Face-up	About 100 sheets ($75g/m^2$ paper)

11) Duplex print

    Auto-duplexing   When duplex unit (option) is installed, and plain paper (64g/m^2 to 105g/m^2 recommended paper) only.

    Manual duplexing
    (Note 4)   Plain paper (64g/m^2 to 128g/m^2 recommended paper) on multi-purpose tray only.

12) Environment

    Temperature   10 to 32.5°C

    Humidity   20 to 80%RH

    Air pressure   760 to 1013hPa (560 ~ 760mmHg/equivalent to 0 ~ 2,600m above the sea level)

13) Maximum power

    consumption   About 1,220W (20°C room temperature, rated voltage)

14) Noise level (Officially announced level based on ISO 9296)

Sound power level (1B=10dB)	6.9B or less (printing)	
	5.3B or less (standby)	
Sound pressure level	54dB or less (printing)	
(Bystander position)	38dB or less (standby)	

15) Dimensions   566 (w) × 520 (D) × 540 (H) mm (excluding some projections)

16) Weight   About 50kg (printer)

                        Aabout 3.4kg (cartridge)

17) Line voltage requirements

                        220 to 240V (-10%, +6%) 50/60Hz (±2Hz)

18) Options   Duplex unit DU-82, envelope feeder EF-9, 2000 sheet paper deck PD-82, 2x500 sheet paper deck PD-82K, sorter S-82, stapler stacker SS-72

Notes: **1.** A test print at room temperature of 20°C with rated voltage input.

       2. When the printer is in READY state at a room temperature of 20°C, the time from reception of the PRINT signal from the video controller until an A4 or A3-sized print is delivered onto the face-down tray.

       3. At a room temperature of 20°C with rated voltage input, the time from turning ON the printer until the end of the WAIT period.

       4. When manual duplexing, correct the curl of the print delivered in the face-down tray before setting it in the multi-purpose tray.

2. Video Controller

1) CPU   RISC processor: Motorola PowerPC 603e

2) RAM   Standard: 8MB

                        Maximum: 40MB

3) ROM   4MB

4) ROM DIMM socket   2

5) RAM DIMM socket   3

6) Host interface   Standard: IEEE 1284 compliant parallel

                        Option: expansion interface (Ethernet, Token Ring)

7) Language   Standard: PCL 5e/PCL 6

                        Option: Adobe® PostScript® 3™

8) Resident fonts   45 Scalable fonts (MicroType font), 8 Bitmap font

9) Optional fonts   136 fonts

10) Scaler   UFST

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B. Option
1. Hard disk
1) Memory   2.16GB
2) Interface   ATA-3 (IDE)
3) Dimensions   70 (w) × 12.7 (D) × 100 (H) mm (excluding mounting materials and connector.)
4) Weight   About 0.15kg
5) Power supply   DC5V (supplied from the printer)

> Specifications are subject to change with product modification.

III. ⚠ SAFETY INFORMATION

A. Laser Safety

An invisible laser beam is irradiated within the laser/scanner unit.

Since the laser beam can injure the eye if it strikes it, be sure not to disassemble the laser/scanner unit. It cannot be adjusted in the field, anyway.

The label shown below is attached to the laser/scanner unit cover.

DANGER - Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.
CAUTION - INVISIBLE LASER RADIATION WHEN OPEN.
AVOID EXPOSURE TO BEAM.
ATTENTION - RAYONNEMENT LASER INVISIBLE EN CAS D'O UVERTURE.
EXPOSITION DANGEREUSE AU FAISCEAU.
VORSICHT - UNSICHTBARE LASERSTRAHLUNG.WENN ABDECKUNG GEÖFFNET.
NICHT DEM STRAHL AUSSETZEN.
ATTENZIONE - RADIAZIONE LASER INVISIBILE IN CASO DI APERTURA.
EVITARE L'ESPOSIZIONE AL FASCIO.
PRECAUCION - RADIACION LASER INVISIBLE CUANDO SE ABRE.
EVITAR EXPONERSE AL RAYO.
VARO! - AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE
LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING! - OSYNLIG LASERSTRÅLNING NAR DENNA DEL ÄR ÖPPNAD.
BETRAKTA EJ STRÅLEN.
ADVARSEL! - USYNLIG LASER STRÅLING,NÅR DENNE ER ÅBEN.
UNDGÅ BESTRÅLING.
ADVARSEL USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES.
UNNGÅ EKSPONERING FOR STRÅLEN.

Figure 1-3-1

B. Toner Safety

Composed of plastic and minute colored components, toner is a non-poisonous substance.

If toner adheres to your skin or clothes, remove as much of it as possible with dry tissue paper, then wash with cold water. If you use hot water, the toner will gel and become difficult to remove.

As toner easily breaks down vinyl materials, avoid letting toner come into contact with vinyl.

C. Ozone Safety

An infinitesimal amount of ozone gas (O_3) is generated during corona discharge from the charging roller used in this printer. The ozone gas is emitted only when the printer is operating.

This printer meets the ozone emission reference value set by Underwriters Laboratory (UL) at the time it is shipped from the factory.

D. Power Supply Unit Safety

Care is needed as even though the printer switch may be OFF, there is a possibility that a current may still flow on the primary side. Be sure to remove the power plug before disassembly and assembly of this printer.

IV. PARTS OF THE PRINTER

A. External Views
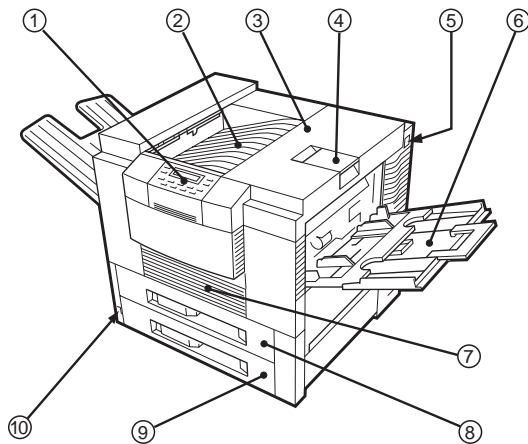
Figure 1-4-1
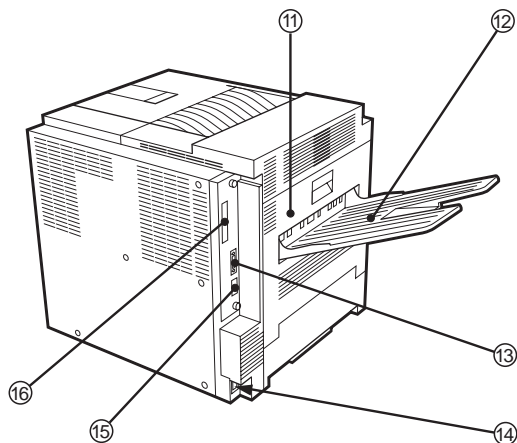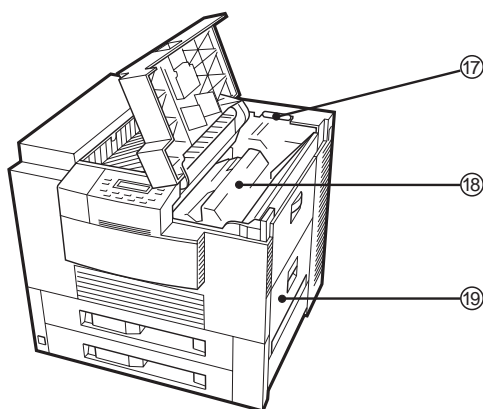
 1: Operation panel unit
 2: Face-down tray
 3: Upper cover
 4: Delivery stopper
 5: Test print switch
 6: Multi-purpose tray
 7: Duplex unit door
 8: Upper cassette
 9: Lower cassette
10: Power switch
11: Delivery cover
12: Face-up tray
13: Parallel interface connector
14: Power receptacle
15: Option interface connector (option)
16: Expansion board slot
17: Cleaning brush
18: EP-72 cartridge
19: Pick-up unit door

Figure 1-4-2

Figure 1-4-3

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B. Cross-sectional Views
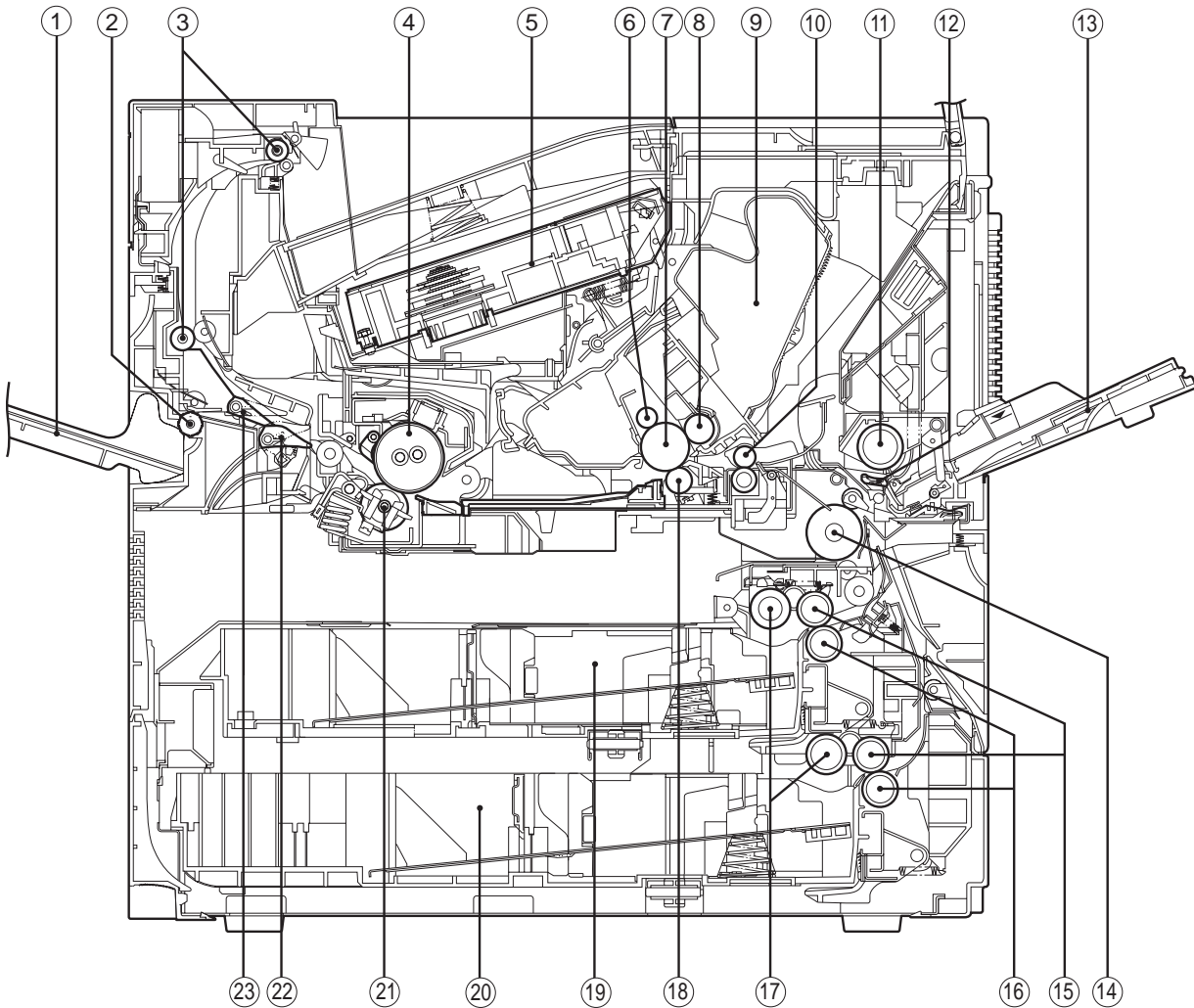
Figure 1-4-4

1: Face-up tray
2: Face-up delivery roller
3: Face-down delivery roller
4: Upper fixing roller
5: Laser/scanner unit
6: Primary charging roller
7: Photosensitive drum
8: Developing cylinder
9: EP-72 cartridge
10: Registration roller
11: Multi-purpose tray pick-up roller
12: Separation pad

13: Multi-purpose tray
14: Feed roller 1
15: Feed roller 2
16: Separation roller
17: Pick-up roller
18: Transfer charging roller
19: Upper cassette
20: Lower cassette
21: Lower fixing roller
22: Duplex deflector
23: Face-up deflector

V. INSTALLATION

A. Notes
This printer is packaged and shipped from the factory after careful adjustments and rigorous inspections.
When installing the printer, it is important to demonstrate its performance in the same way as when it passes the factory inspection.
   The service engineer must sufficiently understand the performance of the printer, install it correctly in a location with an appropriate environment, and conduct sufficient checks of the unit.

B. Location Selection
Before taking the printer to the customer's premises, you should confirm the following conditions at the installation location.

1. Power supply
Use the following power supplies:
- Alternating current (AC): -10%, +6% of the rated voltage
- Power frequency: 50/60Hz±2Hz

2. Operating environment
Install in a location that meets the following conditions:
- Level, flat surface
- Temperature, humidity within the following ranges:
  Surrounding temperature: 10to 32.5°C
  Surrounding humidity: 20 to 80%RH (relative humidity), without condensation
- Cool, well-ventilated space

Do not install in the following locations:
- Exposed to direct sunlight
  If you cannot avoid such a location, hang heavy curtains, etc. to shut out the direct sunlight.
- Near magnets and devices that emit a magnetic field.
- Areas with vibration
- Dusty places
- Near fire or water

3. Installation space
Install the printer a suitable distance from the wall, leaving enough room to operate it (see Figure 1-5-1).
   When installing the printer on a desk, etc., be sure that it is large enough to accommodate the printer's feet (rubber pads) and sturdy enough to hold its weight.
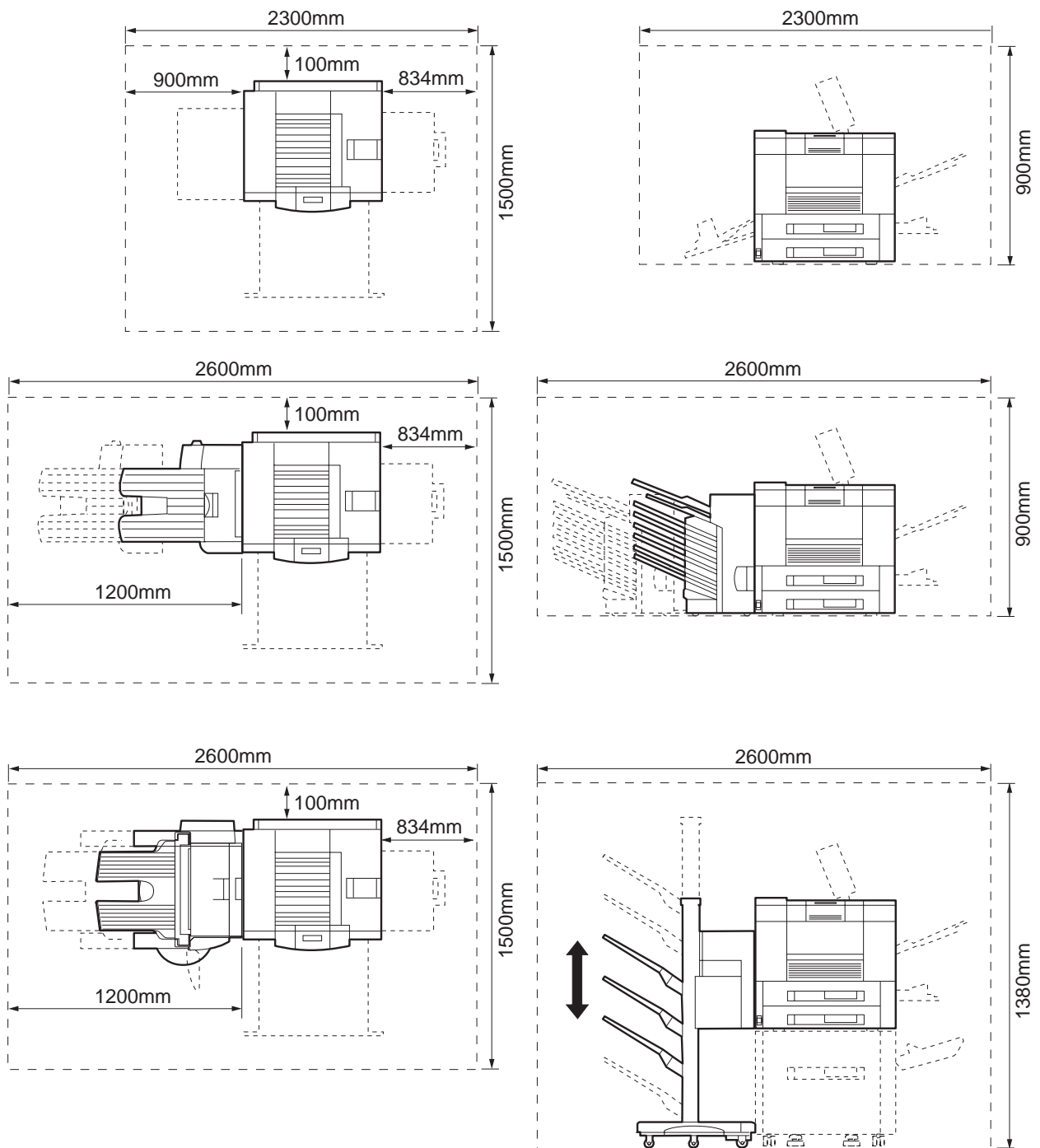
Figure 1-5-1

C. Unpacking and Installation

Condensation will form on metal surfaces when brought into a warm room from the cold. Therefore, when moving the printer to a warm environment, leave it packed in its box for at least an hour to acclimatize to room temperature.

1. Printer

1) Open the printer packaging.
2) Take out the accessories. Confirm that the power cord, cartridge, and face-up tray are included.
3) The printer weighs approx. 50kg, therefore 4 people may be needed to lift the printer and to move to the installation area.
4) Take the plastic bag off the printer and peel the tape off each part. Check that none of the covers were scratched or deformed during shipment.
5) Open the delivery cover, and remove the pressure release spacer from the fixing unit.
6) Open the upper cover, and remove the tape and the packing materials from inside the printer.
7) Pull the two cassettes out of the printer and remove the packaging from the cassette.

2. Cartridge

1) Open the bag holding the cartridge and take out the cartridge.
2) Remove the tape and the black sheet from the cartridge.
3) Hold the cartridge on each side as shown in figure 1-5-2 and slowly rock it 5 to 6 times to evenly distribute the toner.
4) Place the cartridge on a flat surface. While holding down on the top of the cartridge with one hand, grasp the tab with the other and gently pull out the sealing tape.
5) Open the upper cover of the printer, and load the cartridge with both hands. Slowly insert it until it firmly contacts with the back of the slot.

3. Unpacking and installing the hard disk

Note: **1.** Before handling the hard disk, be sure to touch the metal part of the printer to discharge electrical static from you body in order to avoid causing damage to the PCB by the difference in static charge at that time.
2. When removing the PCB at the back of the printer, be sure not to touch the electrical parts on the PCB. Make sure not to touch especially the electrical elements.

1) Open the hard disk packaging.
2) Remove the pad and then take out the hard disk from its box.
3) Remove the plastic bag holding the hard disk.
4) If the optional expansion board is installed in the printer, remove the board.
5) Loosen the 2 screws at the left back of the printer and pull out the PCB.

6) Remove the 2 screws on the PCB.
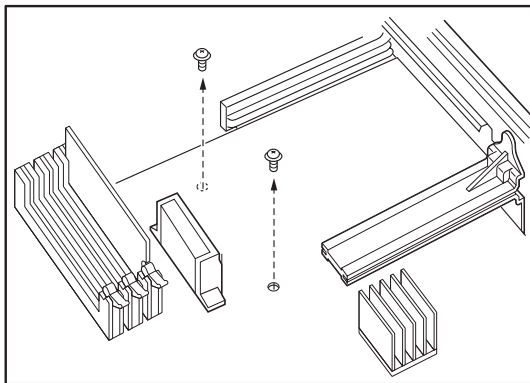
Figure 1-5-2

7) Insert the claw of the hard disk into the hole of the PCB.

Hook
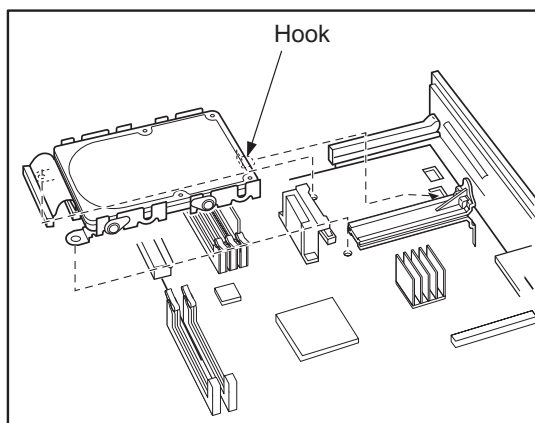
Figure 1-5-3

8) Fix the hard disk with the enclosed 2 screws and then connect the connector.

Figure 1-5-4

1 - 12
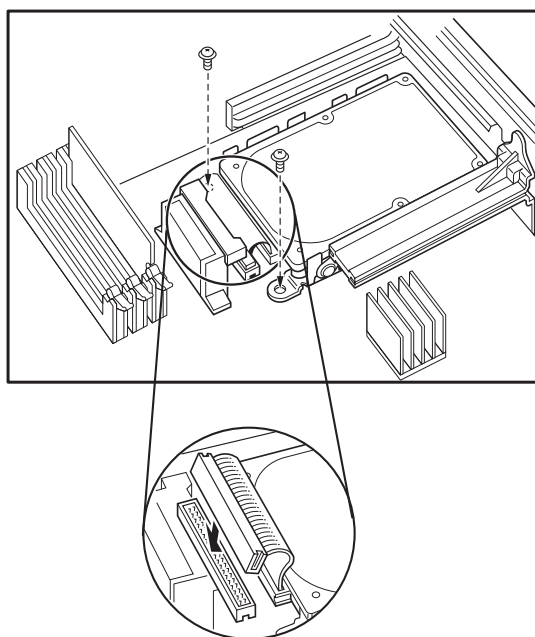
9) Install the PCB into the printer and fix it with 2 screws.
10) Turn ON the printer switch.
11) Press the On Line key when the printer becomes READY to take the printer off-line.
12) Press the Menu key to select "CONFIG MENU."
13) Press the Item key to select "FORMAT DISK."
14) Press the Enter key.
    "+FORMAT DISK -IGNORE DISK" appears in the display.
15) Press the +Plus/-Minus key.
    "+REALLY FORMAT -IGNORE DISK" appears in the display.
16) Press the +Plus/-Minus key.
    "FORMATTING..." appears in the display, Disk LED lights up and formatting starts.
17) When the printer completes formatting the hard disk, "DISK FMT RESTART" appears in the
    display, and the printer restarts automatically.
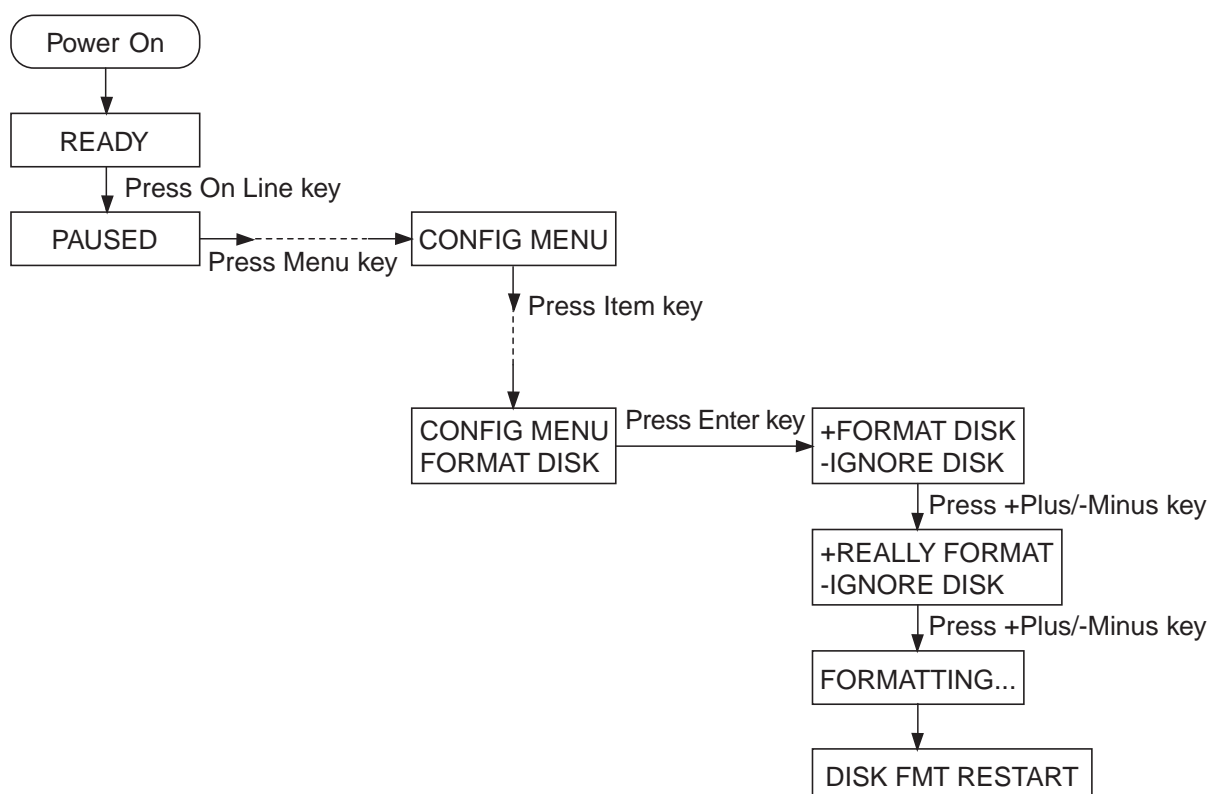
Figure 1-5-5

4. Operation confirmation

1) Load paper in the lower cassette.

2) Insert the power plug into the outlet and the printer, then turn the power switch ON.
   After the printer enters STANDBY mode, press the test print switch to make a test print.
   Check that the density of the output image is correct

3) Clean around the printer and ensure that it is ready for use at anytime.

5. Operation precautions

1) Turn ON the power of external equipment then the printer. Turn the power OFF in the
   reverse sequence. If the power of external equipment is turned ON/OFF while the printer is
   ON, noise may be transmitted through the connection cable between the external equipment
   and the printer, and error may occur on the printer.

2) Turn off the power of both the printer and the external equipment before plugging/unplug-
   ging the connector between the two. Doing so while the power is ON could cause malfunc-
   tions.

D. Storing, Handling the EP-72 Cartridge
Whether the cartridge is still sealed in its box or installed in the printer, the effect of the natural environment will change it over time regardless of the number of prints. As the progression of this natural change depends on the storage or installation environment, take sufficient care in storing and handling the cartridges.

1. Before unsealing the box
When the cartridge is stored in a warehouse, workshop, etc., be sure to keep it within the ranges shown in Table 1-5-1. Note the following points:
1) Avoid locations in direct sunlight.
2) Do not leave in areas exposed to strong vibration.
3) Do not bump or drop.

Table 1-5-1 Storage temperature and humidity conditions

Temperature	Normal (total storage time × 9/10)		0 to 35°C
	Severe (total storage time × 1/10)	High	35 to 40°C
		Low	–20 to 0°C
	Temperature change (within 3 minutes or so)		40°C→15°C
			–20°C→25°C
Relative humidity	Normal (total storage time × 9/10)		35 to 85% RH
	Severe (total storage time 1/10)	High	85 to 95% RH
		Low	10 to 35% RH
Air pressure			345 to 1013 hPa (460 to 760 mmHg)

Note: Total storage time is the valid time span following the manufacture date displayed on the cartridge box.

2. After unsealing the box
As an organic photoconductor (OPC) is used in the photosensitive drum, it will deteriorate if exposed to strong light. As there is toner in the cartridge, be sure to explain to the customer the need to be careful in handling and storing unsealed cartridges.

a. Storage environment
1) Be sure to store in the aluminum bag.
2) Avoid locations exposed to direct sunlight, near windows, etc. Do not leave them in cars for any extended period of time as heat can damage the cartridges.
3) Avoid high, low, and changeable temperature/humidity locations.
4) Avoid sites with corrosive gases (pesticides) or salt in the air.
5) Store the cartridge within a range of 0 to 35°C.
6) Do not leave cartridges near CRT displays, disk drives or floppy disks.
7) Store the cartridges out of reach of children.

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b. Effective life

Cartridges are effective for 2.5 years following the date of manufacture, which is displayed in an abbreviated form on the cartridge. The cartridge life span is also displayed (month and year) on the cartridge box as 2.5 years from the date of manufacture. Cartridges should be used within their life spans, as image quality will deteriorate after the expiry date.

3. Handling

1) When loading a new cartridge into the printer, or when the toner in an already loaded cartridge hardens and blank spots appear on output images, hold the cartridge at each end as shown in the below figure and slowly rock it about 45° in each direction 5 to 6 times. This will evenly distribute the toner, and then reload it into the printer. Do not shake the cartridge in any other way, as toner may leak from the developing cylinder or the cleaning unit.
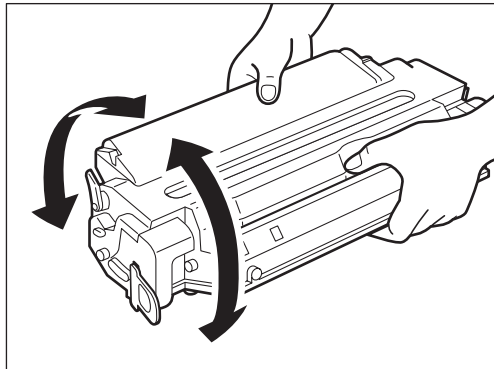
Figure 1-5-6

To ensure that toner does not leak and dirty the images, be sure to print 3 to 5 pages of test patterns after loading the cartridge in the printer.

2) When transporting the printer, remove the cartridges.
   Either insert the cartridge in the aluminum bag or wrap it in a thick cloth to ensure light does not penetrate it.

3) Do not leave the cartridge near CRT displays, disk drives, or floppy disks.
   The magnetism generated by the cartridge may destroy their data.

4) As the photosensitive drum is sensitive to strong light, do not expose the cartridge to direct sunlight or strong light (1500 lux or more). If it is exposed to strong light, blank spots or black lines may appear on images.
   Should this happen, temporarily turn OFF the printer. The distorted images such as blank spots or black lines are likely to disappear. However, if the drum was exposed to strong light for a long period of time, it is possible the black lines, etc., will remain.

5) Do not open the photosensitive drum protective shield by hand nor touch the drum surface.
   Do not clean the drum.

6) Do not place the cartridge on its end or upside down. Always place it with the label side facing upward.

7) Do not disassemble the cartridge.
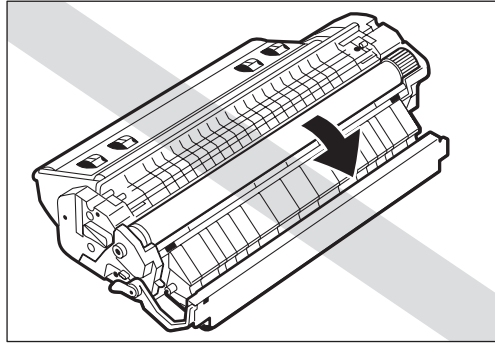
Figure 1-5-7

VI. MAINTENANCE AND SERVICING BY THE CUSTOMER

To maintain the optimum performance of the printer, the following maintenance should be performed by the customer.

1. Cartridge
Shake or replace the cartridge as the occasion demands.

2. Transfer guide, registration guide
When replacing the cartridge, clean the transfer guide and registration guide with soft flannel cloth.

Transfer chargin roller

Registration guide
(metal part)

Transfer guide
(metal part)
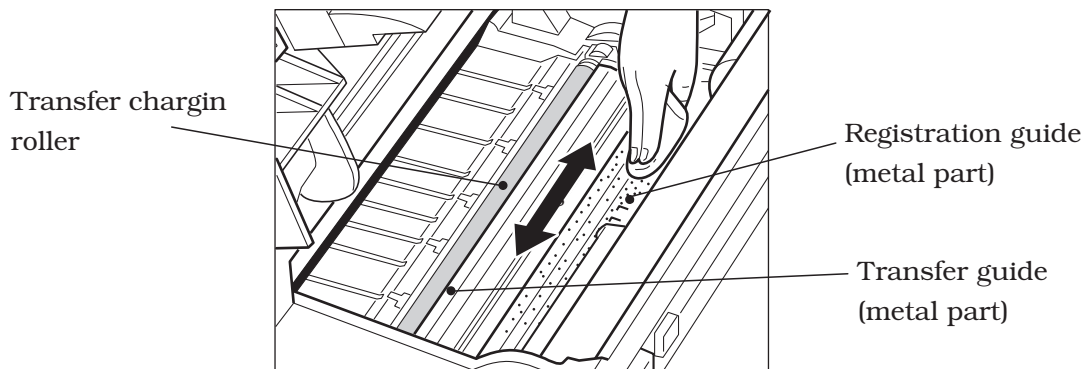
Figure 1-6-1

3. Static charge eliminator
When replacing the cartridge, clean the static charge eliminator with the cleaning brush attached inside the printer.

Transfer charging roller

Static charge eliminator
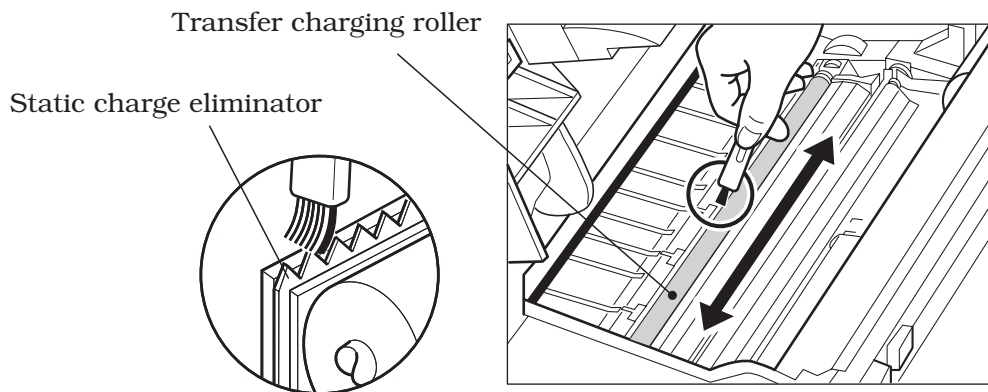
Figure 1-6-2

4. Fixing unit

When replacing the cartridge, clean the fixing unit following the procedure below.

1) Open the multi-purpose tray and load one sheet of A4 or Letter size paper into the tray.
2) Press the On Line key to take the printer off-line.
3) Press the Menu key to select "PCL MENU."
4) Press the Item key to select "PAGESIZE."
5) Press the +Plus/-Minus key to select either A4 or Letter, and then press the Enter key.
6) Press the Menu key to select "FEEDER MENU."
7) Press the Item key to select "MPTSIZE."
8) Press the +Plus/-Minus key to select either A4 or Letter, and then press the Enter key.
9) Press the Menu key to select "TEST MENU."
10) Press the Item key to select "CLEANING PAGE" , and then press the Enter key. "LOAD PLAIN A4 (or LETTER) IN MANUAL" will appear in the display and the Continue LED and Form Feed LED will light up.
11) Press the Continue key to print the Cleaning Page. "LOAD BLANK SIDE UP IN MANUAL" will appear and the Continue LED will light up.

Load this sheet, this side down, in MPT
Læg dette ark, med denne side nedad, i universalbakke
Laad dit vel met deze kant naar beneden in MPT
Lattaa tämä arkki, tämä puoli alaspäin, MPT:hen
Introduire cette page, ce côté vers le bas, dans le tiroir polyvalent
Legen Sie dieses Blatt mit dieser Seite nach unten in den MPT ein

Caricare questa pagina, con questa facciata verso il basso, nel MDT
Legg i arket med denne siden ned i den manuelle materen
Coloque esta página, com este lado para baixo, no MPT
Cargue esta hoja en MPT, con esta cara hacia abajo
Lägg detta ark med textsidan nedåt på din MPT

Figure 1-6-3

1 - 19

12) Place the printed Cleaning Page into the multi-purpose tray with the printed side face-down.
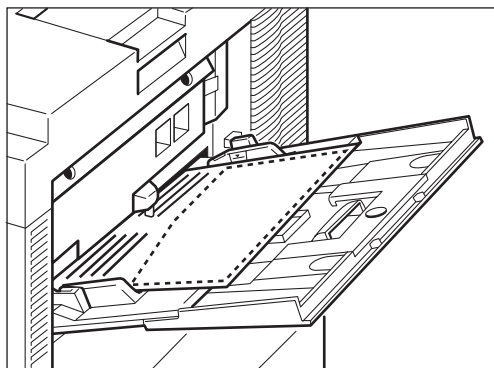
Figure 1-6-4

13) Press the Continue key to feed the Cleaning Page on the other side of the paper. "LOAD CLEANING PAGE IN MANUAL" will appear and the Continue LED will light up.
14) Place the Cleaning Page into the multi-purpose tray.
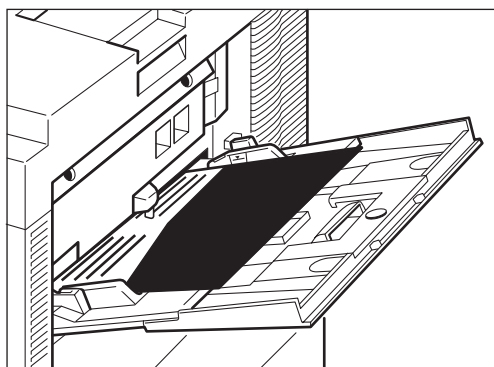
Figure 1-6-5

15) Press the Continue key to feed the Cleaning Page through the printer to clean the fixing unit.

VII. OPERATION

A. The Operation Panel

The operation panel is used to perform basic printer operations, make printer configuration changes that software applications cannot control, identify available typefaces, and check the status of the printer.

The operation panel consists of the status indication display, nine indicator lights, and seven menu and operation keys.
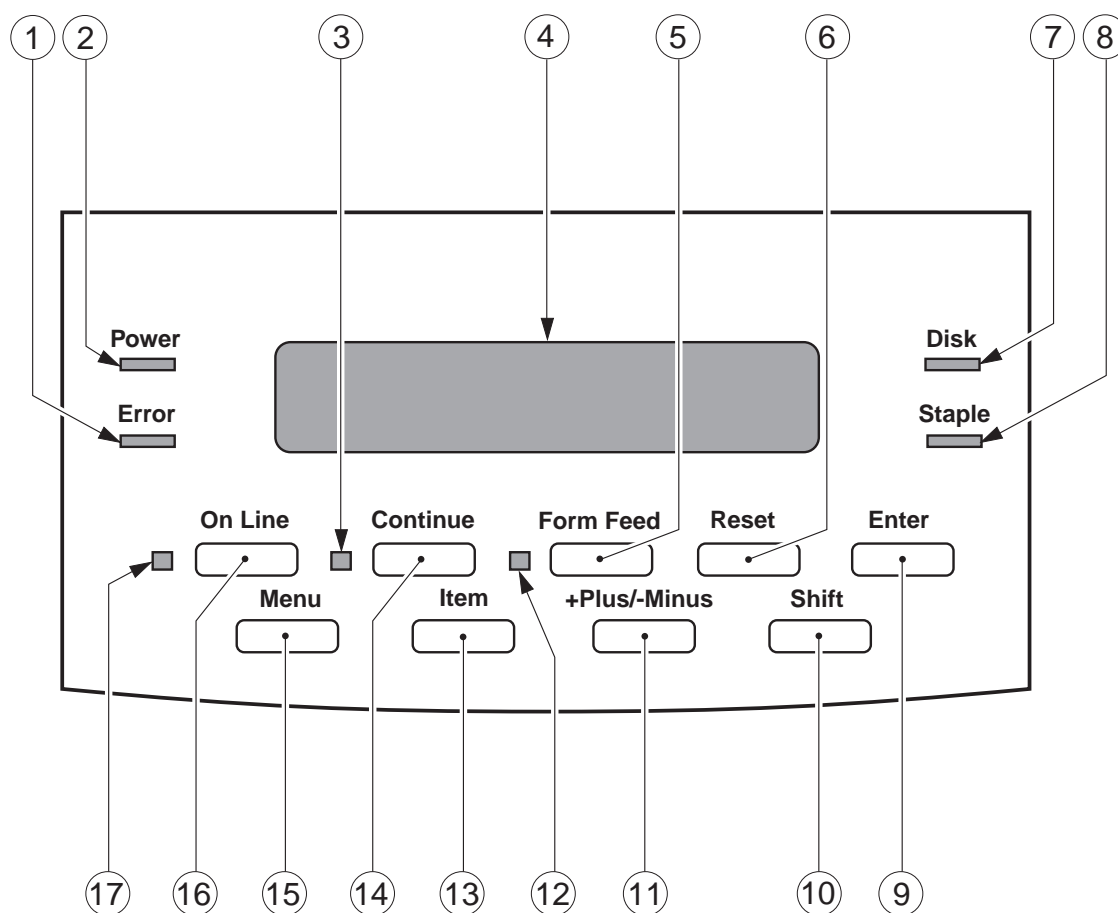
Figure 1-7-1

· **Error indicator: 1**

On:

An error has occurred and printing has stopped. Check the display for a message describing the problem.

Off:

Operation is normal and there is no error.

· **Power indicator: 2**

On:

The printer is ready to print.

Flashing:

The printer is warming up. Wait until the light stays on before you start printing operations.

Off:

The printer cannot print.

· **Continue indicator: 3**
On:
Indicates the Continue button may be pressed to exit current condition. For instance, if the message TONER LOW appears in the display panel, press Continue to continue printing but be sure to change the toner as soon as possible.
Off:
Operation is normal.

· **Status indication display: 4**
The two-line, 20-digit display tells you what is happening inside the printer and shows you the menus and settings which can be changed. The display keeps you informed about the printer's operation status, lets you make menu selections, warns you about problems and identifies errors.

· **Form Feed key: 5**
Performs a Form Feed and prints data remaining in the FORM printer. If the Form Feed indicator is on, data remains in the printer (only with PCL). Press ON LINE to take the printer off-line. Press Form Feed to print the remaining data.

· **Reset key: 6**
Accesses the RESET menu so you can select RESET PRINTER or RESET MENU. If you choose RESET PRINTER all resources in the memory (soft fonts, macros, stored page data, and so on) are erased, but the menu items selected are unaffected. If you choose RESET MENU the factory default values are restored for most menu items.

· **Disk indicator: 7**
On:
The disk is being accessed (for fonts, etc.).
Off:
The disk is not being accessed.

· **Staple indicator: 8**
On:
Stapling has been selected for the current print job.
Off:
Stapling has not been selected.

· **Enter key: 9**
Saves a value you selected for an item in the menu. An asterisk (*) marks the the current default setting.

· **Shift key: 10**
Press Shift and another key to access the alternate function of dual-function keys. The two functions on dual function keys are separated by a slash in the key name on the printer control panel.

· **+Plus/-Minus key: 11**
With an item name displayed, press to +Plus/-Minus step through the item's values. Press and hold down Shift then press +Plus/-Minus to step through the values in reverse order. Some item have a large range of numbers from which to choose a value. For example, for COPIES you can

1 - 22

set a value from 1 to 999. In this case, to rapidly step through the values, press and hold down +Plus/-Minus.

· **Form Feed indicator: 12**
On:
Indicates that a page is currently being composed in the printer's memory. To print the page before it is completed, take the printer off-line and press the Form Feed key.
Off:
No print data is currently stored in the printer's memory.

· **Item key: 13**
With a menu name displayed, press the Item key to scroll through all the items on the menu and return to the first item. To scroll back through the items in the opposite direction, press the Shift and Item keys. Depending on what options you have installed, some items may not appear.

· **Continue key: 14**
Restarts printing after the printer displays a message and halts printing. For most situations after you press Continue, the message clears and printing resumes.
When the multi-purpose tray is used as a manual feed station (when MANUAL FEED=ON), you have to press the Continue key every time you need to feed a single sheet of paper.

· **Menu key: 15**
With the printer off-line, press the Menu key to scroll through the menu names and return to the first menu name. To scroll back through the menu names in the opposite direction, press the SHIFT and MENU keys. Depending on what options have been installed, some menu names may not appear.

· **On Line key: 16**
Takes the printer off-line and back on-line. When the On Line indicator is on, the printer is on-line and ready to receive data and print. When the On Line indicator is off, the printer is off-line and the other keys on the control panel can be used to view and change settings.

· **On Line indicator: 17**
On:
The printer is on-line (power on, warmed up, and ready to receive data from the host computer for printing). Before you begin a print job, always check this indicator is on.
Flashing:
The printer is processig a print job. Do not turn the power off, otherwize you may lose print data.
Off:
The printer is off-line. You can now use the printer control panel keys to view and change settings. When off-line, the printer cannot accept data for printing.

B. Operation Panel Menus

You can access the following menus though the operation panel:

·   PCL MENU
·   PS MENU **(Note 1)**
·   FEEDER MENU
·   CONFIG MENU
·   MEMCONFIG MENU
·   PARALLEL MENU
·   LOCALTALK MENU **(Note 2)**
·   ETHERNET MENU **(Note 2)**
·   TOKEN RING MENU **(Note 2)**
·   TEST MENU
·   LANGUAGE MENU

Notes: 1. Menus that appear after the PostScript option has been installed.
          2. Menus that appear after an option has been installed such as Network modules.

1. Accessing and selecting menu items

Follow these steps to access the menus and make selections:

1)   Check the operation panel and be sure the JOB indicator is off.
2)   Press the On Line key to set the printer off-line. The On Line indicator goes off.
3)   Press the Menu key to display the name of the first menu. Press the Menu key until you see the Menu.
4)   Press the Item key to display the name of the first item on the menu. Press the Menu key until you see the item.
5)   Press the +Plus/-Minus key until you display the values you want to change.
6)   If you want to change the setting, press the +Plus/-Minus key until the value you want is displayed. Then press the Enter key.
7)   Press the On Line key to set the printer on-line.

Figure 1-7-2 list the Menu Operation Flow.

2. Restoring the default settings

There are several types of default settings:

■   Factory default settings are those set for each menu item at the factory. The printer uses these settings changed.

■   Temporary default settings are those set by the application software for the current print job.

■   Permanent default settings are those set through the operation panel. These selections remain in effect even when the printer is turned off, or send a different request through the application.

3. Resetting the default values

The printer can be reset in three ways:

■   The reset printer function clears the memory of all fonts, macros, and page information but does not affect the menu settings.

■ The reset menu function performs a printer reset to clear all fonts, macros, and page information but returns some of the menu settings to their original factory defaults.

■ A cold reset clears the memory and restores all menu settings to their factory settings with the exception of the page count value, multi-purpose tray page size, envelope feeder size, and display language.
To perform a cold reset, press and hold down the On Line key while you turn on the printer. The printer displays the message COLD RESET followed by WARMING UP. When the printer comes on-line, the factory default settings are restored.

1 - 25

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AT:	Press:	To move:
Menu level	**MENU**	Forward
	SHIFT and **MENU**	Back
Item level	**ITEM**	Forward
	SHIFT and **ITEM**	Back
Item level	**+PLUS/-MINUS**	Forward
	SHIFT and **+PLUS/-MINUS**	Back

Press **+PLUS/-MINUS** to select the item.
Press **ENTER** to select the value.

READY — Press **ON LINE** to take the printer off-line.

PAUSED — Press **MENU** to display the name of the first menu.

PCL MENU

COPIES=1 * — 1 to 999

PAGESIZE=LETTER * — A3, A4, A5, B4, 11x17, EXEC, COM10, DL, MONARCH, C5, B5-JIS, B5-ISO, LEGAL

ORIENTATION=PORTRAIT * — LANDSCAPE

FORM=60 LINES * — 5 to 128

FNTSRC=INTERNAL * — SOFT

FONTNUM=0 * — 1 to 999

PT.SIZE=12.00 * — 4.00 to 99.75

PITCH=10.00 * — 0.44 to 99.99

SYMSET=ROMAN-8 * — ISO L1, ISO L2, ISO L5, PC-8, PC-8 D/N, PC-850, PC-852, PC-8TK, WIN L1, WIN L2, WIN L5, DESKTOP, PS TEXT, VIN INTL, VN US, MS PUBL, MATH-8, PS MATH, VN MATH, PI FONT, LEGAL, ISO 4, ISO 6, ISO 11, ISO 15, ISO 17, ISO 21, ISO 60, ISO 69, WIN 3.0

PS MENU

COPIES=1 * — 1 to 999

PRINT ERRS=OFF * — ON

FEEDER MENU

FEED=DECK * — DECK1, DECK2(if installed), LOWER, UPPER, MPT, ENVELOPE(if installed)

7 BIN SORTER MODE=MAILBOX * — JOB SEPARATION, STACKER, SORTING, +TO CONFIRM/-CANCEL

OUTPUT=TOP OUTPUT BIN * — SIDE OUTPUT BIN, SORTER BIN-UP, BIN1=MAILBOX1, BIN2=MAILBOX2, BIN3=MAILBOX3, BIN4=MAILBOX4, BIN5=MAILBOX5, BIN6=MAILBOX6, BIN7=MAILBOX7, SORTER BIN-UP, 7 BIN SORTER, BIN7=MAILBOX7, SORTER BIN-UP, 7 BIN SORTER

TRAY SWITCH=ON * — OFF

MANUAL=OFF * — ON

MPTSIZE=LETTER * — LEAGAL, A3, A4, A5, 11x17, EXEC, COM10, CUSTOM MONARCH, C5, DL, B4, B5-JIS, B5-ISO

ENVSIZE=COM10 * — C5, DL, B5-ISO, MONARCH

DUPLEX=OFF * — ON

BINDING=LONG * — SHORT

PAPER TYPE MENU

UPPER=PLAIN *

LOWER=PLAIN *

DECK= PLAIN * (if installed)

DECK1=PLAIN * (if installed)

DECK2=PLAIN * (if installed)

MAT=PLAIN *

The following options are available for all items:
PLAIN, LETTERHEAD, BOND, RECYCLED, COLOR, CARDSTOCK, LABELS, TRANSPARENCY, ROUGH, CUSTOM1, CUSTOM2, CUSTOM3, CUSTOM4, CUSTOM5, CUSTOM6

CONFIG MENU

JAMRECOVERY=OFF * — ON

AUTOCONT=ON * — OFF

DENSITY=7 * — 0 to 15

PWRSAV=30MIN * — 1HR, 2HR, 3HR, 4HR, OFF, 15MIN

ECONOMY MODE=OFF * — ON

REFINE=ON * — OFF

FORMAT DISK — +FORMAT DISK -IGNORE DISK +REALLY FORMAT -IGNORE DISK

FORMAT FLASH — +FORMAT FLASH -IGNORE FLASH +REALLY FORMAT -IGNORE FLASH

MEMCONFIG MENU

PCL SAVE=OFF * — ON

PS3 SAVE=OFF * — ON

LANGUAGE MENU

LANG=ENGLISH * — DANISH, DUTCH, FINNISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, SWEDISH PORTUGUESE, SPANISH

To open the RESET menu, press RESET.
Press **+Plus/-Minus** to select PRINTER or MENU.

RESET MENU

RESET=PRINTER * — MENU

TEST MENU

SHOW PAGE COUNT

TEST PRINT

PRINT PS FONTS

PRINT PCL FONTS

PRINT PS DEMO

PRINT PCL DEMO

CLEANING PAGE

STAPLE TEST

PRINT TOKEN CONFIG

PRINT ETHER CONFIG

CONTINUOUS TEST

TOKEN RING MENU

PERSONALITY=AUTO * — PS, PCL

I/O TIMEOUT=15 * — 5 to 300

ETHERNET MENU

PERSONALITY=AUTO * — PS, PCL

I/O TIMEOUT=15 * — 5 to 300

PARALLEL MENU

PERSONALITY=AUTO * — PS, PCL

BIDIRECTION=ON * — OFF

I/O TIMEOUT=15 * — 5 to 300

Shaded menus appear after an option has been installed. E.g. A-72 module with the Adobe PostScript 3 software or Network cards.
If there is insufficient memory, MEMCONFIG may not appear in PostScript mode, even after the A-72 module has been installed. MEMCONFIG usually appears in PCL mode.
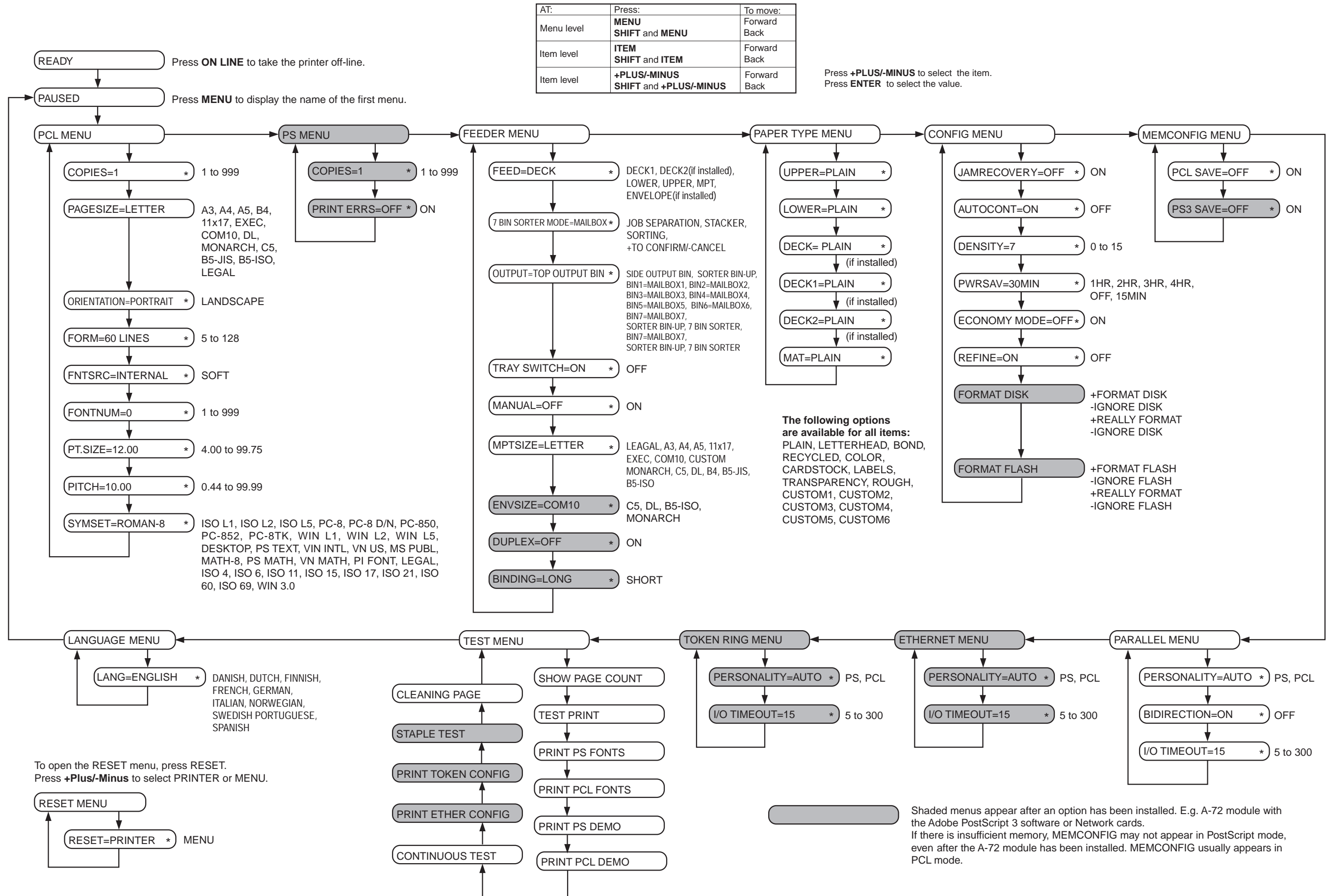
Figure 1-7-2

CHAPTER 2

OPERATION AND TIMING

1. This chapter describes the printer functions, the relationships between mechanisms and circuits, and the timing of operations. Mechanical linkages are indicated by black and white lines (▄▄▄▄), the flow of control signals by solid arrows (⟶), and the flow of groups of signals by outline arrows (▭).

2. An active-high signal is indicated by "H" or by a signal name without a slash in front of it, such as "PSNS." An active-low signal is indicated by "L" or by a signal name with a slash in front of, such as "/SCNON."

    A signal that is "H" or has a name without a slash is active at the supply voltage level (indicating that the signal is being output), and inactive at ground level (indicating that the signal is not being output).

    A signal that is "L" or has a slash in front of its name is active at ground level, and inactive at the supply voltage level.

    There is a microcomputer in this printer. But as the internal operation of the microcomputer cannot be checked, an explanation of the operation of the microcomputer has been left out.

    As it is assumed that no repair will be made to customer circuit boards, the explanation of board circuits is limited to an outline using block diagrams. So there are two types of circuit explanations; (1) everything from the sensor to the input sections of the major circuit boards, (2) everything from the output sections of the major circuit boards to the loads. These are explained with block diagrams according to the function.

I. BASIC OPERATION

A. Functions

Printer functions can be divided into four groups: the engine control system, the laser/scanner unit, the image formation system, the paper pick-up/feed system.

To external device (host computer, etc.)

OVERALL CONTROL SYSTEM

Video controller PCB

Face-down tray

LASER/SCANNER UNIT

Scanning mirror

Laser diode

BD circuit

Scanner motor

IMAGE FORMATION SYSTEM

Primary charging roller

Cleaning unit

Photosensitive drum

Developing unit

Transfer charging roller

Face-up tray

Fixing unit

Duplexing unit (option)

Upper cassette

Lower cassette

ENGIN CONTROL SYSTEM

Operation panel

DC controller PCB

High-voltage power supply

Low-voltage power supply

Envelope feeder (optional)

Envelope feeder pick-up unit

Pick-up control unit

Multi-purpose tray
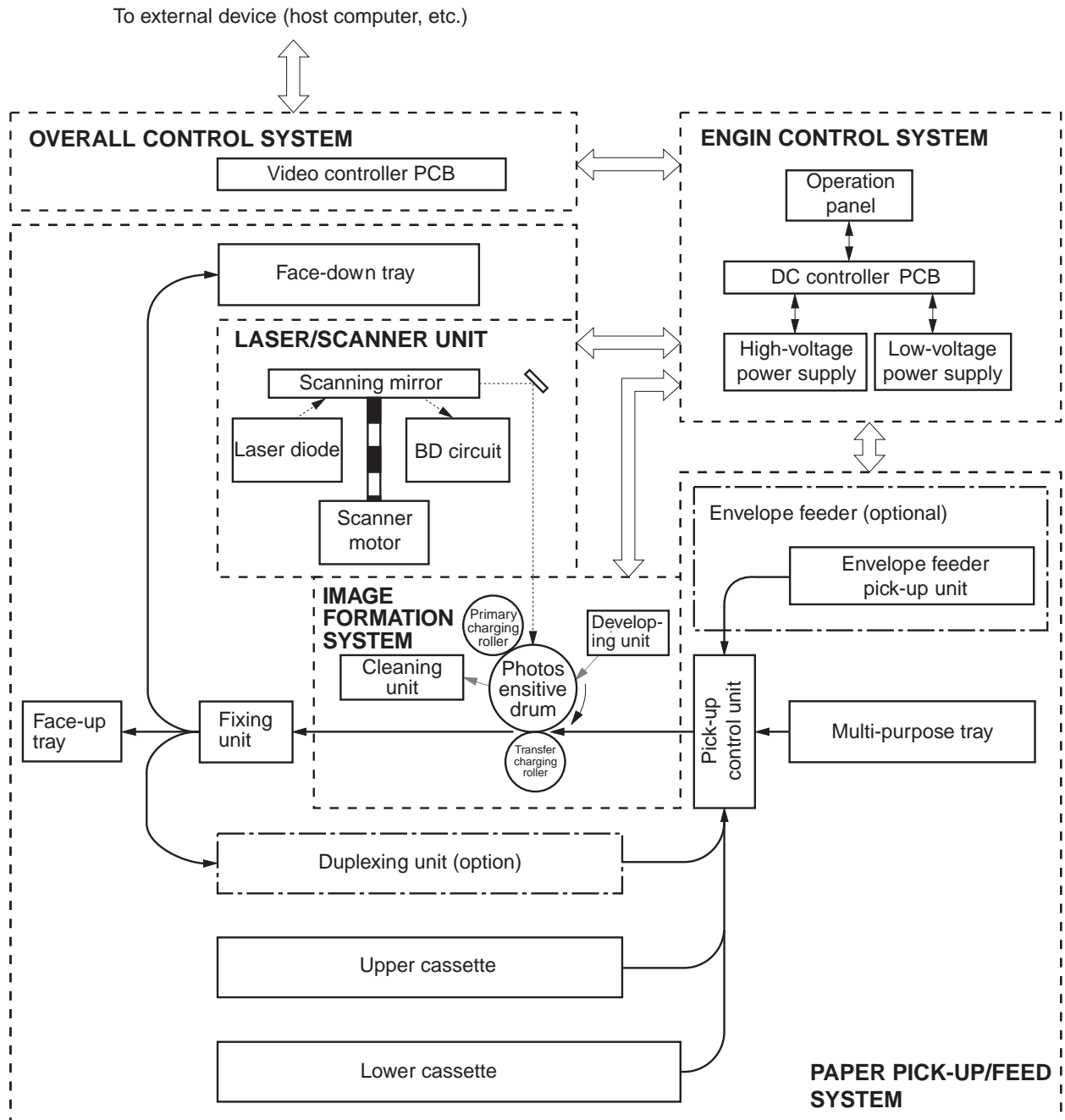
PAPER PICK-UP/FEED SYSTEM

Figure 2-1-1

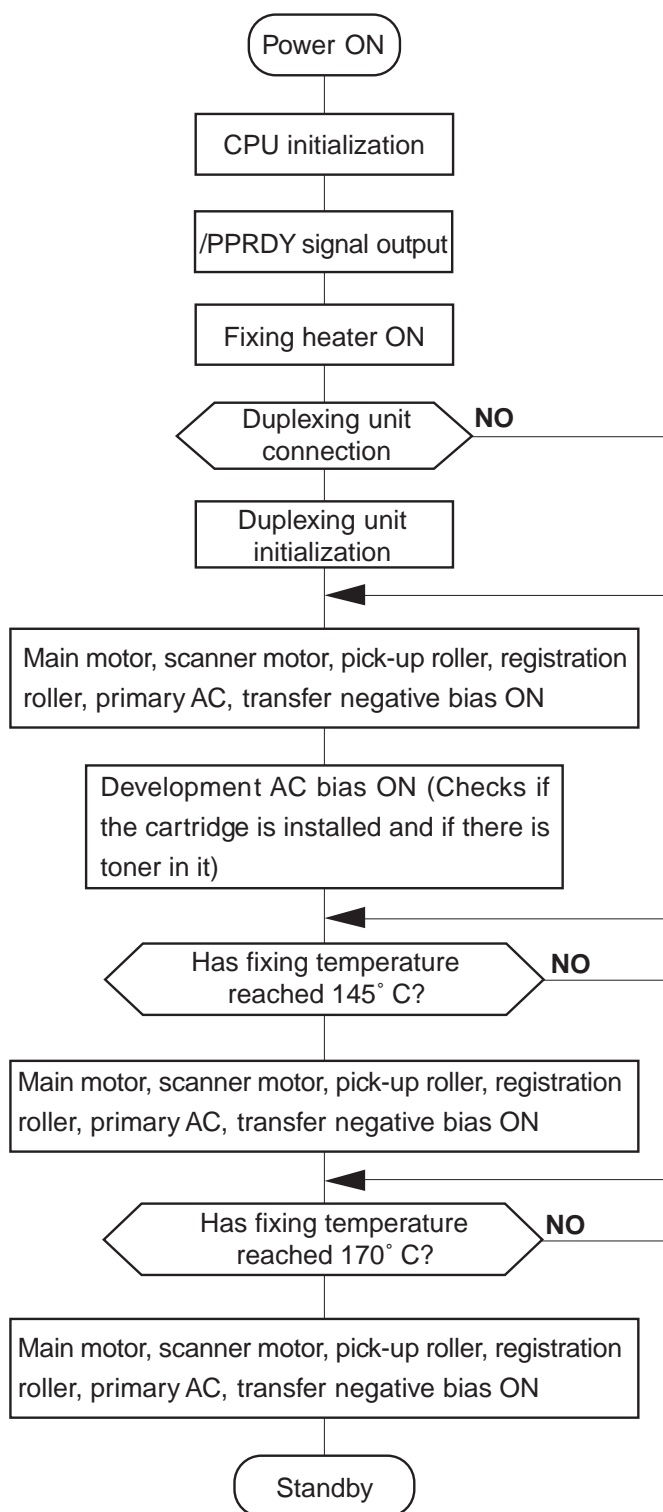**2 - 1**

B. Basic Operation Sequences

Operation sequences of the printer are controlled by the microcomputer on the DC controller PCB. Descriptions of each period from ON until the main motor stops are as shown below. See the appendix for timing chart.

Table 2-1-1

Period		Purpose	Remark
WAIT (WAIT period)	From power-ON until the fixing roller temperature reaches 170°C . (Less than 90 sec.)	Warms up the fixing rollers to put the printer in the standby mode. Cleans the transfer charging roller.	During this period, the printer checks if the cartridge is installed and if there is toner in it.
STBY (STANDBY)	From the end of the WAIT period until a /PRNT signal is input from the video controller, or from the end of the LSTR period until a /PRNT signal is input from the video controller or until the power is switched OFF.	Maintains the printing temperature of the fixing roller so that the printer is ready to print.	If the printer stays in the standby mode for longer than five hours, it drives the main motor for one second to rotate the fixing roller, to prevent it from deforming.
INTR (INITIAL ROTATIONS period)	After the /PRNT signal has been input from the video controller until the scanner motor becomes ready (about 7 seconds).	To stabilize the sensitivity of the drum in preparation for printing and to clean the transfer charging roller.	
PRINT (Print)	From the end of the INTR period until the primary DC voltage switches OFF.	To form an image on the photosensitive drum according to the VDO and /VDO signals input from the video controller and to transfer the image to paper.	During this period, the printer maintains the printing temperature of the fixing rollers.
LSTR (LAST ROTATIONS period)	After the primary DC voltage turns OFF until the main motor stops.	To deliver the final page and to clean the transfer charging roller.	If a /PRNT signal is input from the video controller, the INITIAL ROTATIONS period begins immediately.

C. Power On Sequences

Sequences of the printer from power ON until it enters the standby mode are as shown below.

```
                    ┌─────────────┐
                    │  Power ON   │
                    └──────┬──────┘
                    ┌──────┴──────────┐
                    │ CPU initialization │
                    └──────┬──────────┘
                    ┌──────┴──────────┐
                    │ /PPRDY signal output │
                    └──────┬──────────┘
                    ┌──────┴──────────┐
                    │ Fixing heater ON │
                    └──────┬──────────┘
                    ╱──────┴──────────╲   NO
                    ╲ Duplexing unit  ╱ ─────────┐
                    ╱  connection     ╲          │
                    └──────┬──────────┘          │
                    ┌──────┴──────────┐          │
                    │ Duplexing unit  │          │
                    │ initialization  │          │
                    └──────┬──────────┘          │
                    ◄──────┴─────────────────────┘
    ┌───────────────┴──────────────────────────────┐
    │ Main motor, scanner motor, pick-up roller,     │
    │ registration roller, primary AC, transfer      │
    │ negative bias ON                               │
    └───────────────┬──────────────────────────────┘
        ┌───────────┴──────────────────────────────┐
        │ Development AC bias ON (Checks if          │
        │ the cartridge is installed and if there is │
        │ toner in it)                               │
        └───────────┬──────────────────────────────┘
            ◄────────┤
        ╱────────────┴────────────╲   NO
        ╲ Has fixing temperature   ╱ ─────────┐
        ╱  reached 145° C?         ╲          │
        └────────────┬────────────┘          │
    ┌────────────────┴──────────────────────┐│
    │ Main motor, scanner motor, pick-up     ││
    │ roller, registration roller, primary AC,││
    │ transfer negative bias ON              ││
    └────────────────┬──────────────────────┘│
            ◄─────────┤                        │
        ╱─────────────┴───────────╲   NO       │
        ╲ Has fixing temperature   ╱ ──────┐   │
        ╱  reached 170° C?         ╲        │   │
        └─────────────┬───────────┘ ◄───────┘   │
    ┌─────────────────┴─────────────────────┐  │
    │ Main motor, scanner motor, pick-up     │  │
    │ roller, registration roller, primary AC,│  │
    │ transfer negative bias ON              │  │
    └─────────────────┬─────────────────────┘  │
                    ┌─┴──────┐                  │
                    │ Standby │ ◄───────────────┘
                    └─────────┘
```

During this period, checks if there is residual paper in the printer. If automatic paper delivery is required as a result of the check, residual paper is delivered automatically.

Figure 2-1-2

2 - 3

II. ENGINE CONTROL SYSTEM

A. DC Controller Circuit
1. Outline
Operation sequences of the printer are controlled by the CPU of this circuit. When DC power is supplied from the power supply by turning ON the power switch of the printer and the printer enters the standby mode, the CPU outputs the signals that drive the loads such as laser diode, motors, and solenoids, based on the print start command and image data.

2. Explanation of operations of each block
a. CPU (IC201)
An 8-bit single chip microcomputer (UPD78056) by NEC is used.
The CPU is a one-chip type in which ROM and RAM are built in, and controls the operation of the engine according to the control program stored in the ROM.

b. Gate array (IC202)
Its functions are to:
1) control the laser/scanner,
2) control the video interface,
3) communicate with the envelope feeder,
4) communicate with the printer driver tester, and
5) operate as the expansion I/O.

Figure 2-2-1

2 - 4
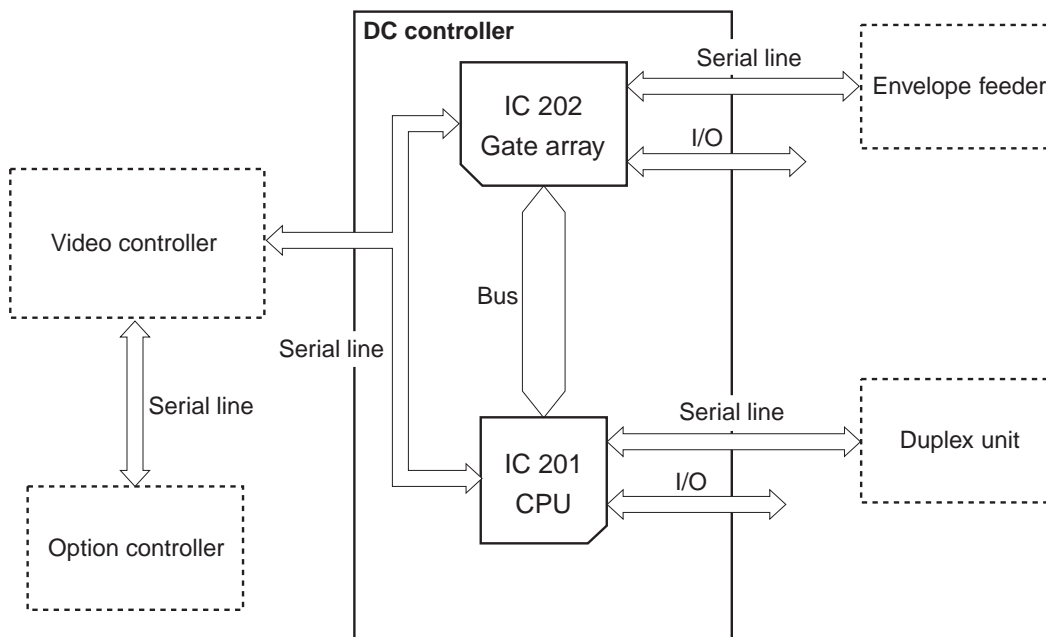
3. DC Controller Input/Output Signals
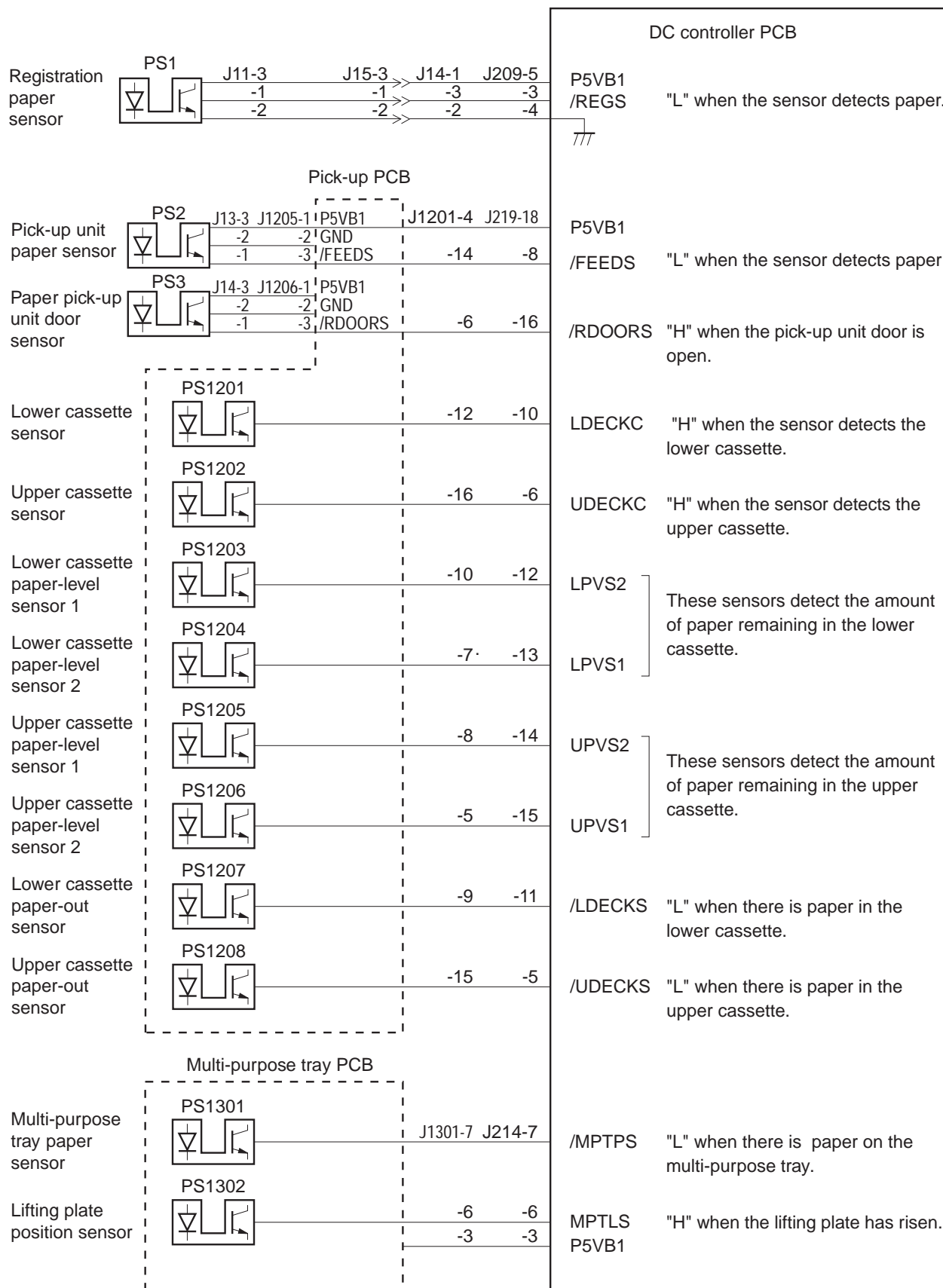
Figure 2-2-2
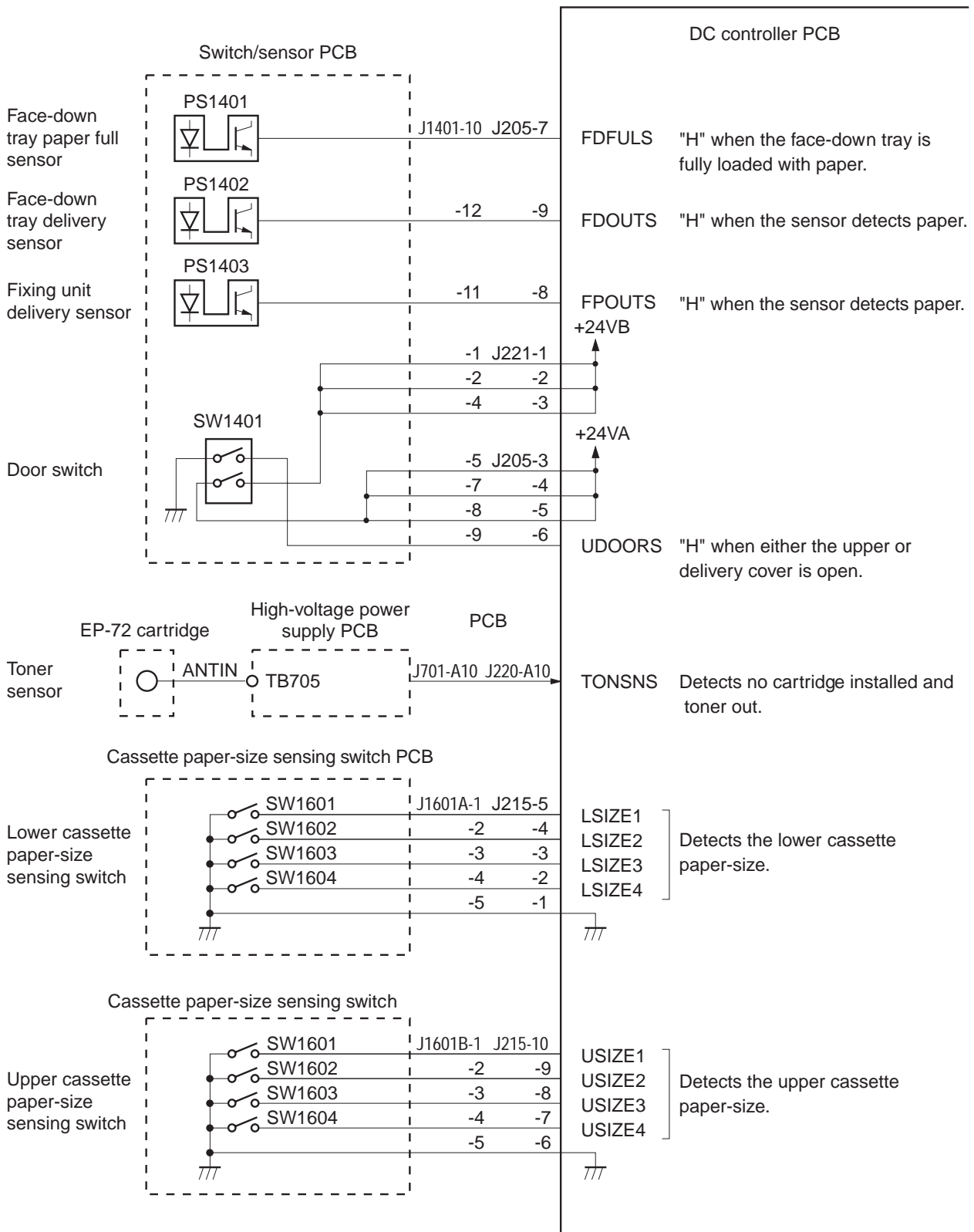
Figure 2-2-3
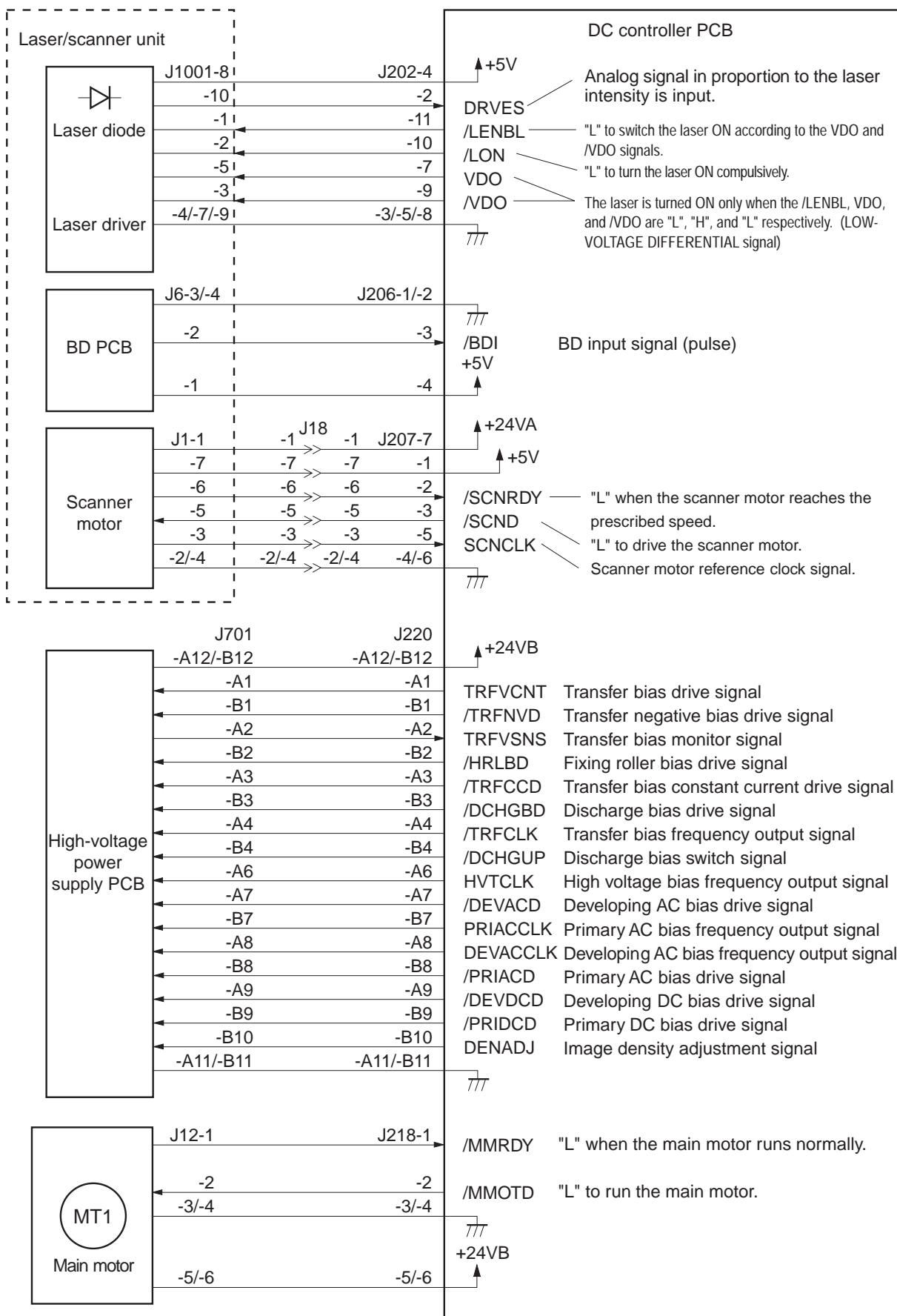
Figure 2-2-4
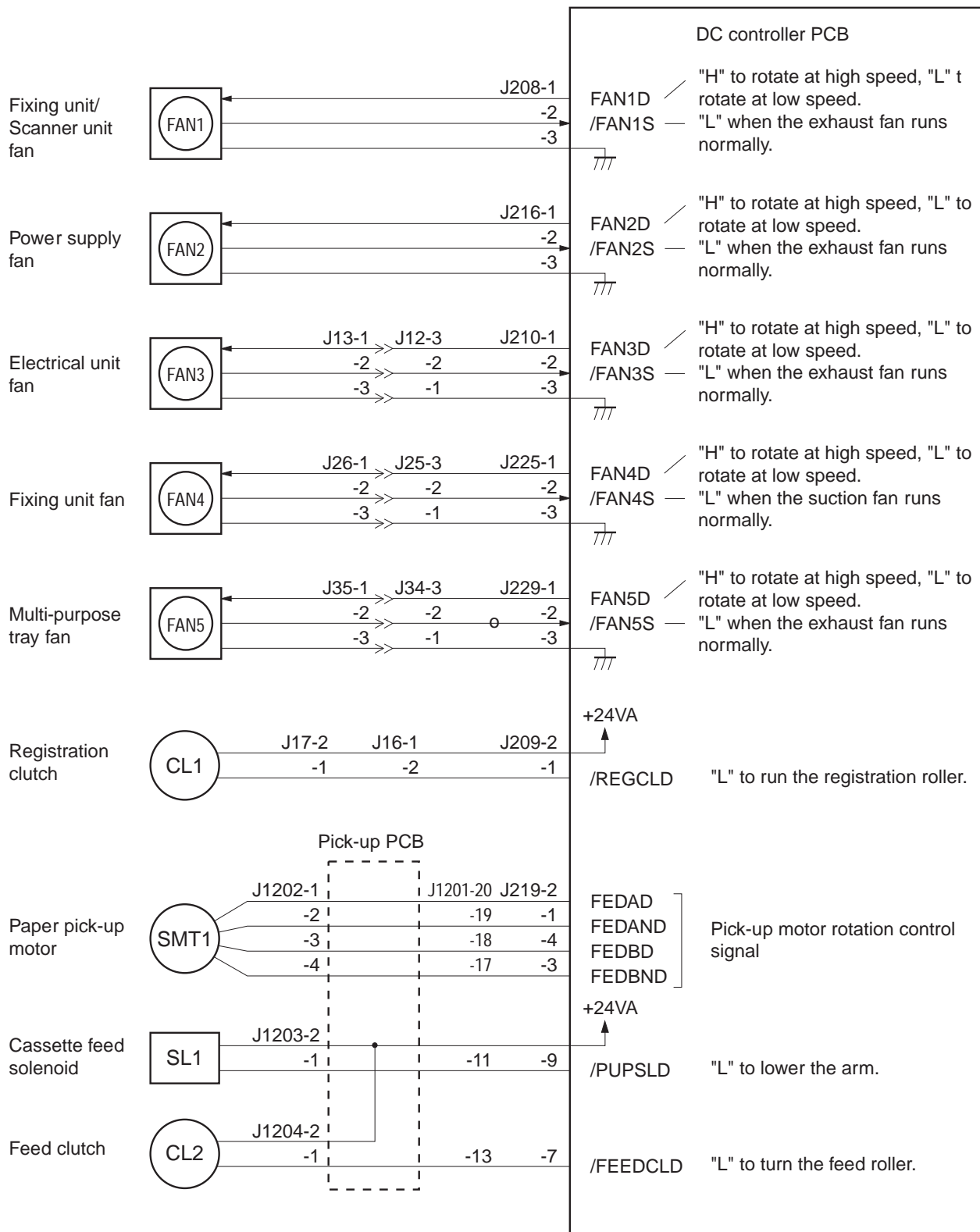
Figure 2-2-5
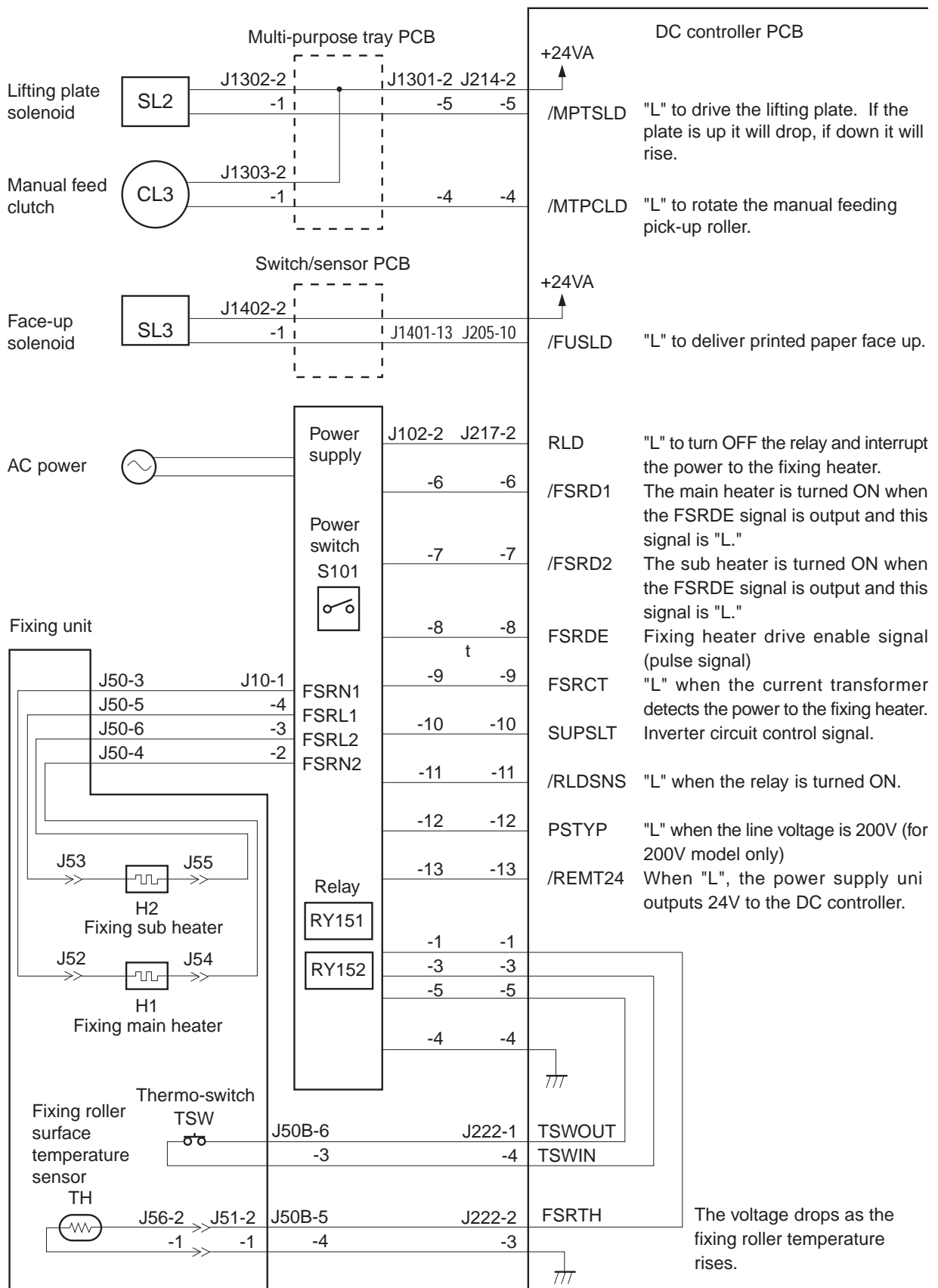
Figure 2-2-6

B. Fixing Control
1. Fixing temperature control
The upper fixing roller contains two heaters: fixing main heater (H1: 600W) and fixing sub heater (H2: 450W). The fixing main heater heats the center of the upper roller, and the fixing sub heater mainly heats both ends of the upper roller. The figure below shows the light distribution of the heaters.
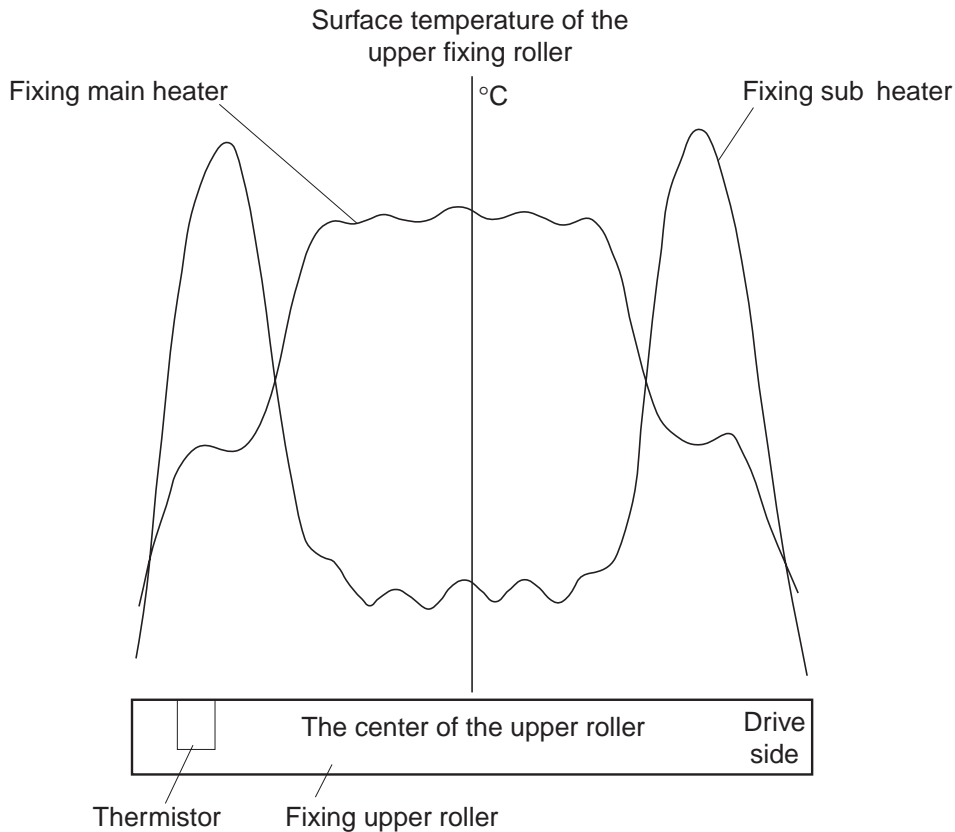

Figure 2-2-7

The surface temperature of the fixing roller is detected by the thermistor (TH1) on the fixing roller. As the surface temperature rises, the resistance of TH1 decreases, and the voltage of the FIXING ROLLER TEMPERATURE DETECTION signal (FSRTH) lowers.

The CPU (IC201) on the DC controller controls the FIXING MAIN HEATER DRIVE signal (/FSRD1), FIXING SUB HEATER DRIVE signal (/FSRD2), FIXING HEATER DRIVE ENABLE signal (FSRDE), and INVERTER CIRCUIT DRIVE signal (SUPSLT) based on the voltage of the FSRTH signal in order to bring the surface temperature of the fixing roller to the specified value.

This printer sets the TH-L/H signal to "H" when the fixing roller temperature is low (during warm-up) and to "L" when the temperature is high (during normal temperature control) in order to improve the accuracy of the FSRTH signal detection.

Table 2-2-1 shows the fixing roller target temperature during wait, standby, and print periods.

When it receives a /PRNT signal from the video controller, the CPU starts the fixing heater print temperature control. The target fixing temperature and print speed at that point is shown in Table 2-2-1. When you make duplex print or select "ROUGH" in "PAPER TYPE MENU" from the control panel, the target fixing temperature and print speed are different from that of normal printing.

2 - 10

Table 2-2-1

	Target temperature (˚C)			PRINT SPEED (note 2) (ppm)
	WAIT	STBY	PRINT (note 1)	
Normal mode	170	169	190	32
Rough mode			195	24

Notes: 1. The target temperature for the first page in duplex print is 5°C lower.
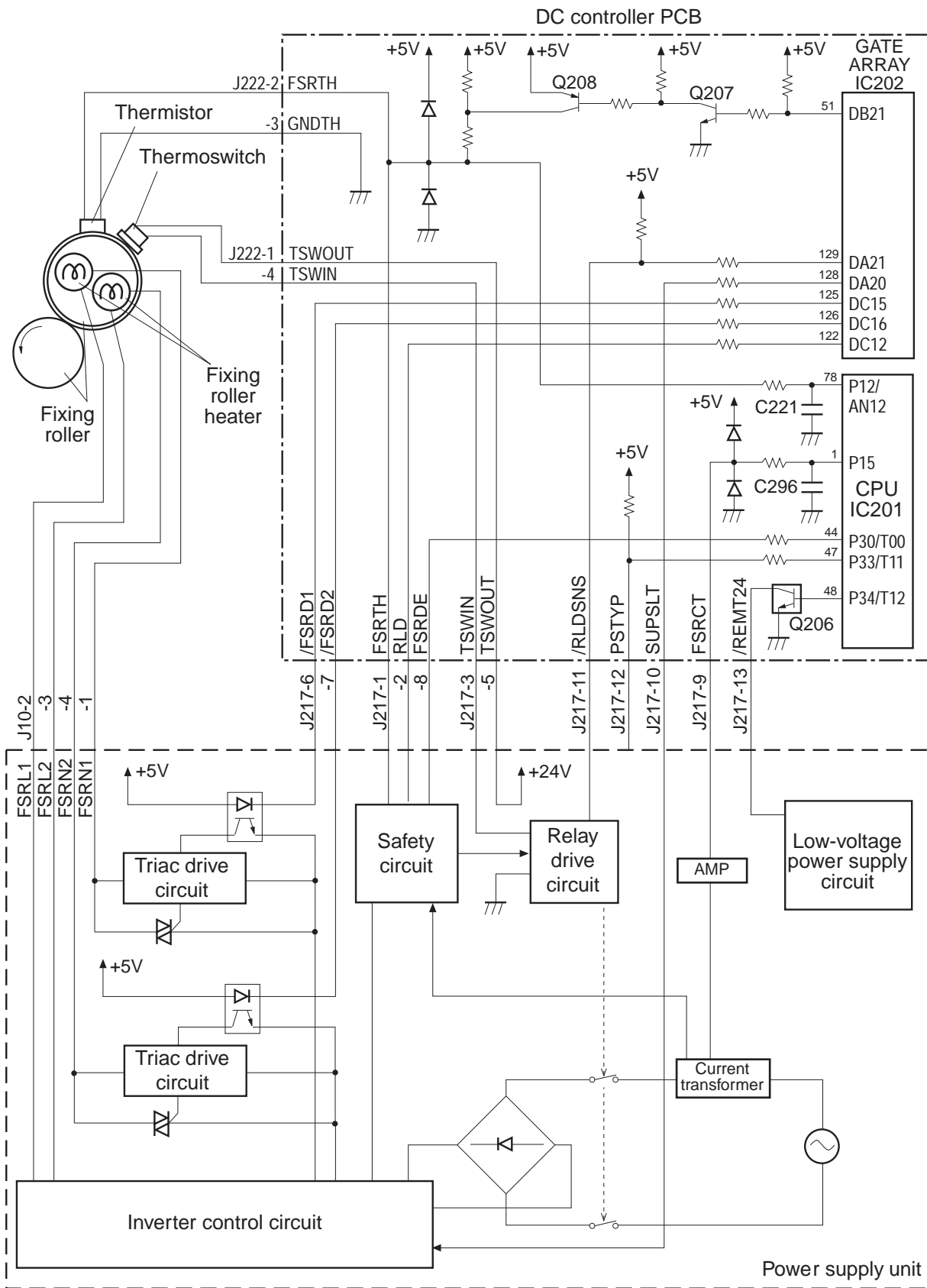2. The print speed in the above table is for A4 or Letter sized paper.

2 - 11

Figure 2-2-8

2. Protective function

The printer has three protection functions to prevent abnormal temperature rise of the fixing roller.

- The CPU monitors the thermistor voltage. If the thermistor voltage becomes lower than about 1.0V (230°C), the CPU identifies the fixing unit failure, and interrupts power to the fixing unit and reports it to the video controller.
- If the surface temperature of the upper fixing roller rises abnormally and the thermistor voltage falls below about 0.8V (235°C), the safety circuit in the power supply interrupts power to the fixing roller heater regardless of outputs from the CPU.
- If the surface temperature of the upper fixing roller rises abnormally and the thermoswitch temperature exceeds 200°C, the thermoswitch turns off and cuts power to the fixing roller heater.

3. Fixing unit failure detection

The CPU assesses a fixing unit failure in the following cases and reports it to the video controller.

a. Thermistor broken wire detection

The detected voltage of the thermistor is 4.6V or more when the thermistor voltage detection mode (note) is in the error detection mode after the fixing heater is activated.

b. Maximum temperature detection

The fixing temperature rises abnormally and the temperature detected by the thermistor exceeds about 230°C, during standby or printing.

c. Warmup error detection

The fixing unit does not reach the target temperature (see Table 2-2-1) within 180 seconds after the start of warm-up.

d. Broken wire detection after the fixing unit is ready

The temperature detected by the thermistor is 150°C, or below during standby or printing.

e. Heater current detection

- The CPU detects a fixing heater broken wire if the FIXING HEATER CURRENT SENSE signal (FSRCT) level is same as the all heaters OFF level when the fixing main heater or/and fixing sub heater is/are driven.
- The CPU detects a fixing heater excursion if the FIXING HEATER CURRENT SENSE signal (FSRCT) level is higher than the fixing main heater and fixing sub heater ON level when the fixing main heater or/and fixing sub heater is/are OFF.
- The CPU detects a fixing heater excursion if the FIXING HEATER CURRENT SENSE signal (FSRCT) level is higher than the specified value when both heaters are OFF.


Note: There are two thermistor voltage detection modes: error detection mode and normal mode. In the error detection mode, sensitivity in the initial range (low temperature range) is increased to improve detection accuracy. When the thermistor temperature exceeds 60°C , it changes to the normal mode.

If the CPU detects a fixing unit failure, it does the following:
1) Stops the fixing roller heater.
2) Sets the RELAY DRIVE signal (RLD) to "L", and turns the relay in the power supply OFF to interrupt the power to the fixing roller heater.
3) Reports the fixing unit failure to the video controller.

4. Envelope position lever function

This printer can adjust the nip width in two steps by changing the spring pressure of the lower fixing roller. If an envelope wrinkles after it is printed, set the envelope position lever to the envelope position.
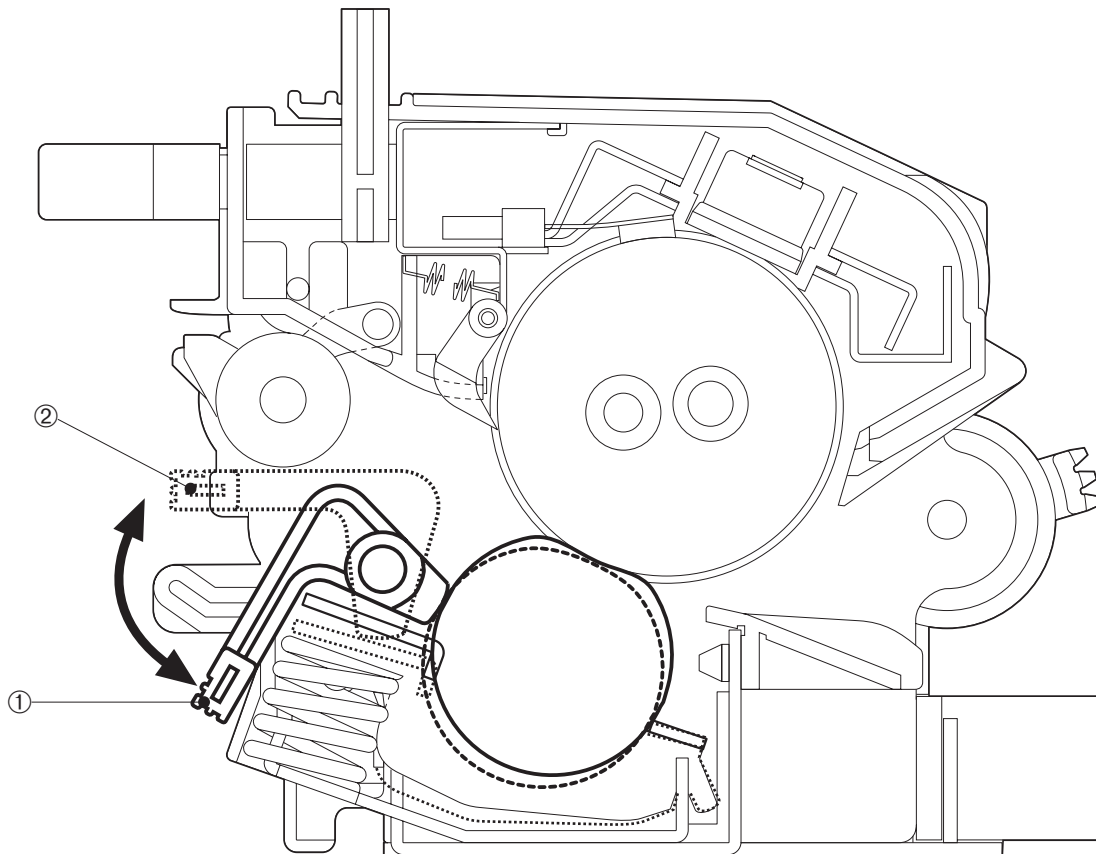
① Normal mode
② Envelope mode

Figure 2-2-9
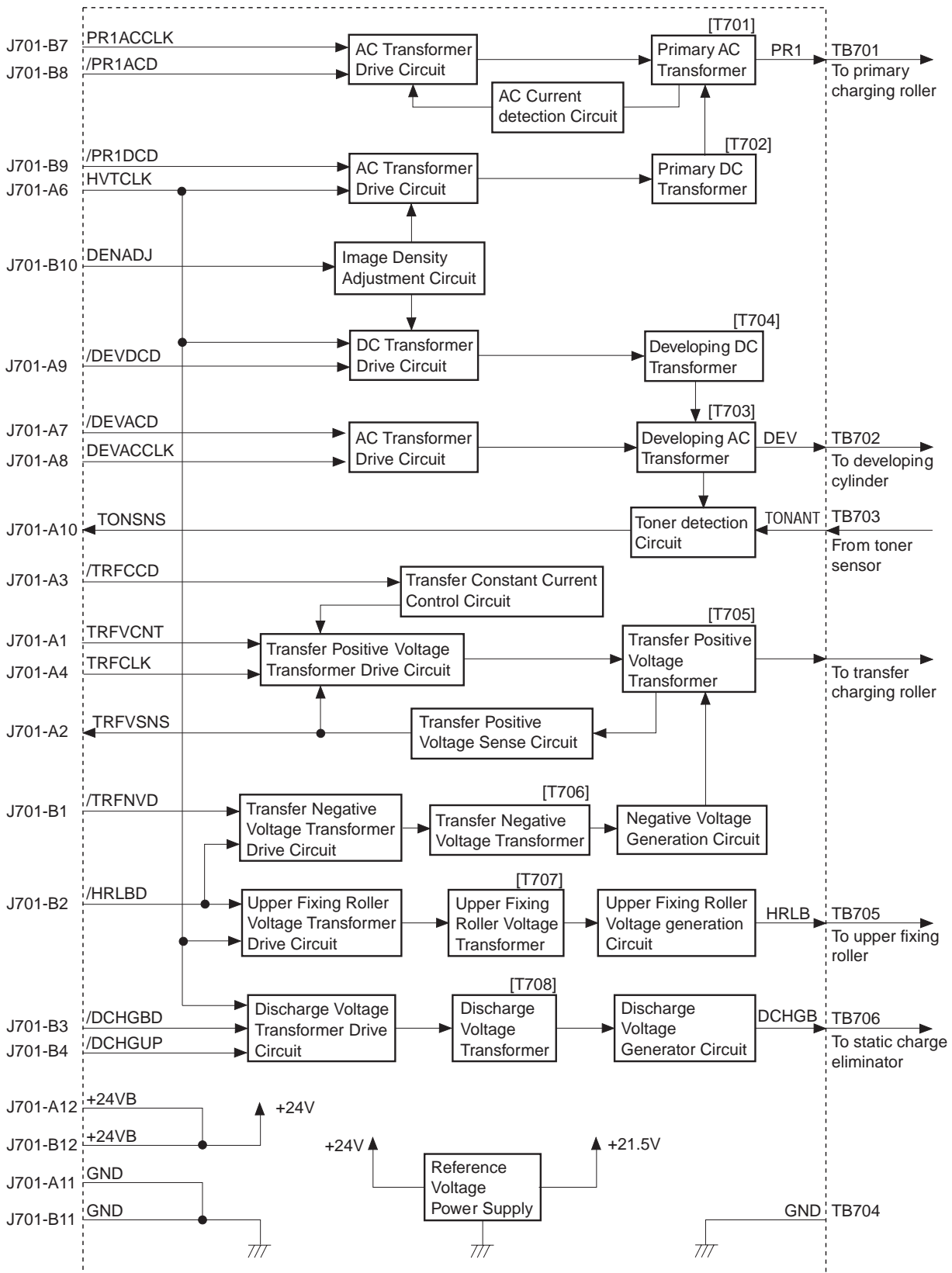
2 - 15

C. High-Voltage Power Supply

Figure 2-2-10

1. Outline

In response to the instruction from the microprocessor (CPU) on the DC controller PCB, the high-voltage power supply applies a voltage to the primary charging roller, developing cylinder, transfer charging roller, static charge eliminator, and upper fixing roller. It applies a voltage of DC voltage and AC voltage to the primary charging roller and developing cylinder, applies a positive or negative DC voltage to the transfer charging roller, and a negative DC voltage to the static charge eliminator and the upper fixing roller.

2. Principle of operation
a. Primary charging roller voltage generation

When the /PRNT signal sent from the video controller becomes "L", initial rotation starts, and the DC controller sets the PRIMARY AC BIAS DRIVE signal (/PRIACD) to "L." The circuit then applies the primary AC bias to the primary charging roller. After the specified period of time has elapsed the PRIMARY DC BIAS DRIVE signal (/PR1DCD) goes "L" and the voltage superimposing primary AC bias onto primary DC bias is applied to the primary charging roller.

The primary DC bias changes with the developing DC bias according to the IMAGE DENSITY ADJUSTMENT signal (DENADJ) sent from the DC controller.

b. Developing bias generation

When the DEVELOPING DC BIAS DRIVE signal (/DEVDCD) from the DC controller becomes "L", a developing DC bias is applied to the developing cylinder.

When the VERTICAL SYNC signal (/VSYNC) is sent from the video controller, the DC controller outputs the DEVELOPING AC BIAS DRIVE signal (/DEVACD) and DEVELOPING AC BIAS FREQUENCY OUTPUT signal (/DEVACCLK). This circuit then applies the voltage superimposing developing DC bias and developing AC bias to the developing cylinder.

The developing DC bias changes according to the IMAGE DENSITY ADJUSTMENT signal (DENADJ), making the image density adjustable.

c. Transfer charging roller voltage generation

The negative, between-page, and print bias are applied to the transfer charging roller according to the print sequence.

The negative bias voltage is applied to the transfer charging roller at an appropriate timing to move the toner attached to the transfer charging roller onto the photosensitive drum to clean the roller.

For the between-page bias, a positive low voltage is applied to the transfer charging roller at an appropriate timing so that the toner remaining on the photosensitive drum is not attracted to the transfer charging roller.

For print bias, a positive voltage is applied to the transfer charging roller in order to transfer the toner on the photosensitive drum surface to the paper.

When the /PRNT signal sent from the video controller becomes "L", initial rotation starts and a negative bias is applied to the roller for a certain time to clean the transfer charging roller. Between-page bias is then applied, and a print bias is applied to the transfer charging roller after the prescribed time has elapsed since the /VSYNC signal going "L".

A print bias is applied during the print sequence to transfer the toner onto the paper. A between-page bias is applied between pages.

After the completion of printing, a between-page bias and a negative bias are applied again to clean the transfer charging roller.

d. Generation of print voltage to the discharger

2 voltage loads, high and low output bias are applied to the discharger according to the various print sequences.

The discharger bias drive signal (/DCHGBD) output from the DC Controller is "L", and when

the discharger bias switch signal (/DCHGUP) turns "H" the low output bias changes to "L" and the circuit applies a high voltage output bias. The high voltage output bias is applied only at the trailing edge of a single side print and during the second side of a duplex print.

e. Toner sensing/cartridge sensing

The EP-72 cartridge has a toner sensor.

The DC controller detects the toner level and whether a cartridge is installed when the developing AC bias is applied to the developing cylinder by the DEVELOPING AC BIAS DRIVE signal by checking the TONER LEVEL signal (TONSNS) voltage.

D. Power Supply

1. Outline
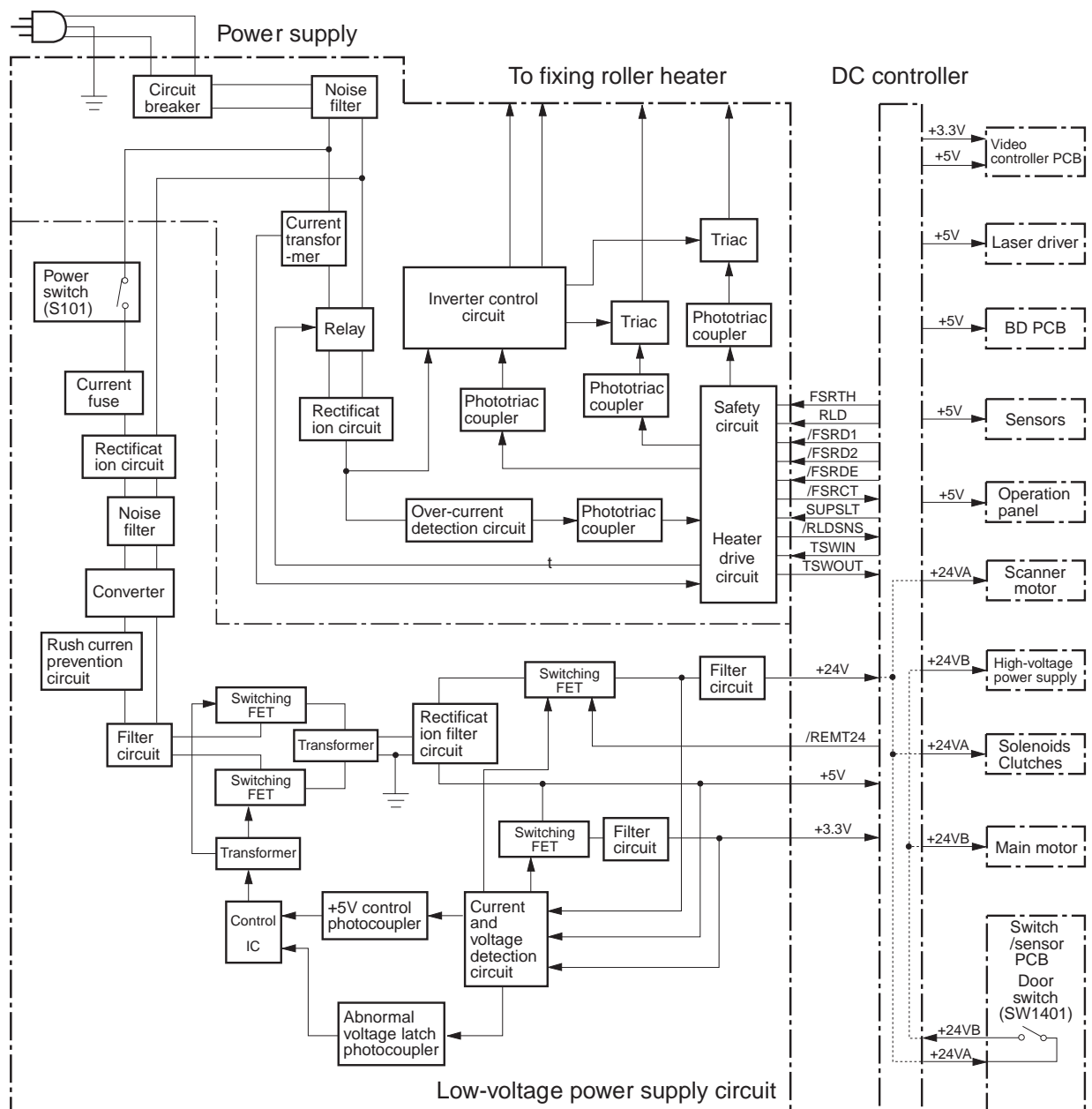
Figure 2-2-11

AC power is supplied to the low-voltage power supply when the main switch (S101) is turned ON. The low-voltage power supply generates the required +24VDC, +5VDC and +3.3VDC for the printer. +24VDC is supplied to the DC controller from the low-voltage power supply when the DC controller sets the REMOTE 24V signal (/REMT24) to "L."

+24VDC is supplied to the high-voltage power supply PCB, +5VDC main motor, scanner motor, and fans. +5VDC is used for sensors and ICs on the DC controller PCB.

+24VDC is divided into +24VA which is normally supplied from the power supply and +24VB which is shut OFF when the door switch (SW1401) is turned OFF by opening the top cover or

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delivery cover.

+5VDC is divided into +5V which is normally supplied to the ICs on the DC controller PCB from the power supply and +5V for power-saving mode (P5VB1). Supply of +5V for the power-saving mode is stopped when the sleep command is received from the video controller.   During standby mode and periods when printing is not possible (when /RDY signal is "H"), the +5V is supplied OFF and ON.

The DC controller PCB generates +5VC and supplies it to the laser driver.

This is shown in the block diagram below.

2. Protective Function

The +24VDC, +5VDC, and +3.3VDC power supply circuits have an over-current protective function and over-voltage protective function, which automatically interrupt output voltage to protect the circuits when a short circuit or other troubles on the load side result in over-current flow or abnormal voltage.

If the over-current/over-voltage protective functions are activated, and no DC voltage is output from the power supply circuits, turn OFF the power switch, rectify the trouble on the load, and then turn ON the power switch again. Wait at least for 2 minutes before turning the power switch ON again.

If over-current flows through the AC line, the circuit breaker in the power supply is turned OFF to cut off the output voltage.

E. Video Interface Control
1. Outline

To connect the printer to an external device, such as a host computer, a video controller PCB (interface PCB) is needed.

This section explains the kinds of interface signals exchanged between the printer and the video controller PCB, and gives information concerning the sequence of printer operation making use of interface signals.
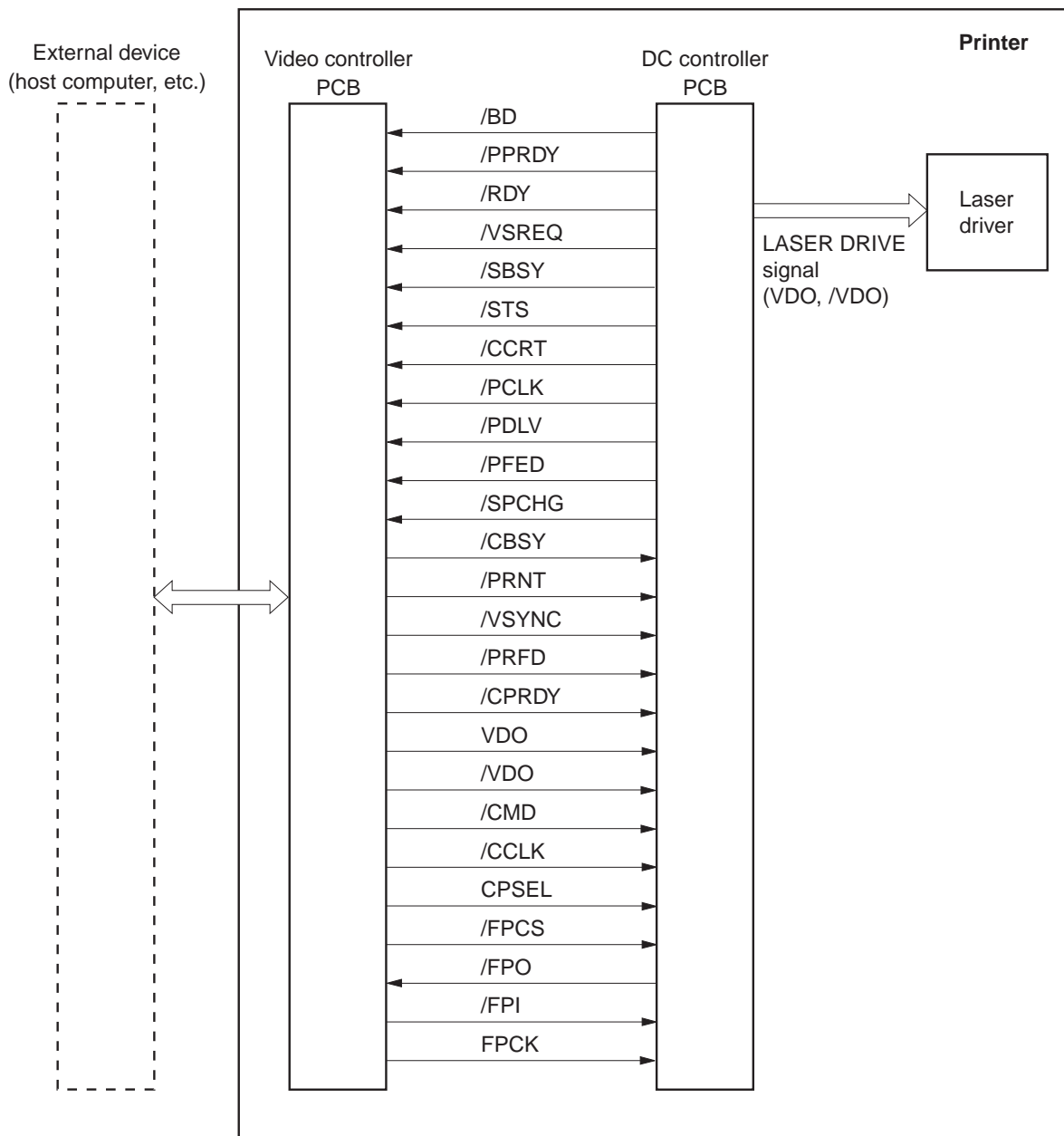
a. Video interface signals

Figure 2-2-12

2. Operation

When the power is switched ON, the printer enters WAIT mode.

At the end of the WAIT mode, the DC controller sends the READY signal (/RDY) to the video controller to inform it that printer is ready to print.

When the /RDY signal is "L" and data for a page is prepared, the video controller sends the PRINT signal (/PRNT) to the DC controller.

When the DC controller receives the /PRNT signal, it starts the operation of the INITIAL ROTATIONS (INTR) period.

At the end of the INTR period, the DC controller sends the VERTICAL SYNC REQUEST signal (/VSREQ) to the video controller.

The video controller receives the /VSREQ signal, and sends the VERTICAL SYNC signal (/VSYNC) to the DC controller. When the /VSYNC signal is received, the print sequence is started.

The video controller sends the VIDEO signals (VDO, /VDO) synchronized with the HORIZONTAL SYNC signal (/BD) and VERTICAL SYNC signal (/VSYNC) from the DC controller to the laser driver through the DC controller.The VIDEO signals (VDO, /VDO) are sent to the laser driver as two low-voltage differential signals.

In response to the VIDEO signals (VDO, /VDO), the laser driver switches the laser diode ON and OFF.

The laser beam is scanned repeatedly across the photosensitive drum with the scanning mirror to form the latent electrostatic image of the original image.

The latent electrostatic image on the photosensitive drum is transferred onto the paper in the electronic photographic process, and the paper is sent out through the face-down or face-up trays.

When a page is being printed, the DC controller checks for other /PRNT or /VSYNC signals from the video controller.

If none have arrived, the DC controller begins operation of the last rotations period (LSTR). At the end of this period, the printer enters standby (STBY) mode.

If other /PRNT or /VSYNC signals arrive-during printing, the print sequence continues. The last rotations operation is performed and the printer enters standby mode.

F. Other Controls
1. Main motor control

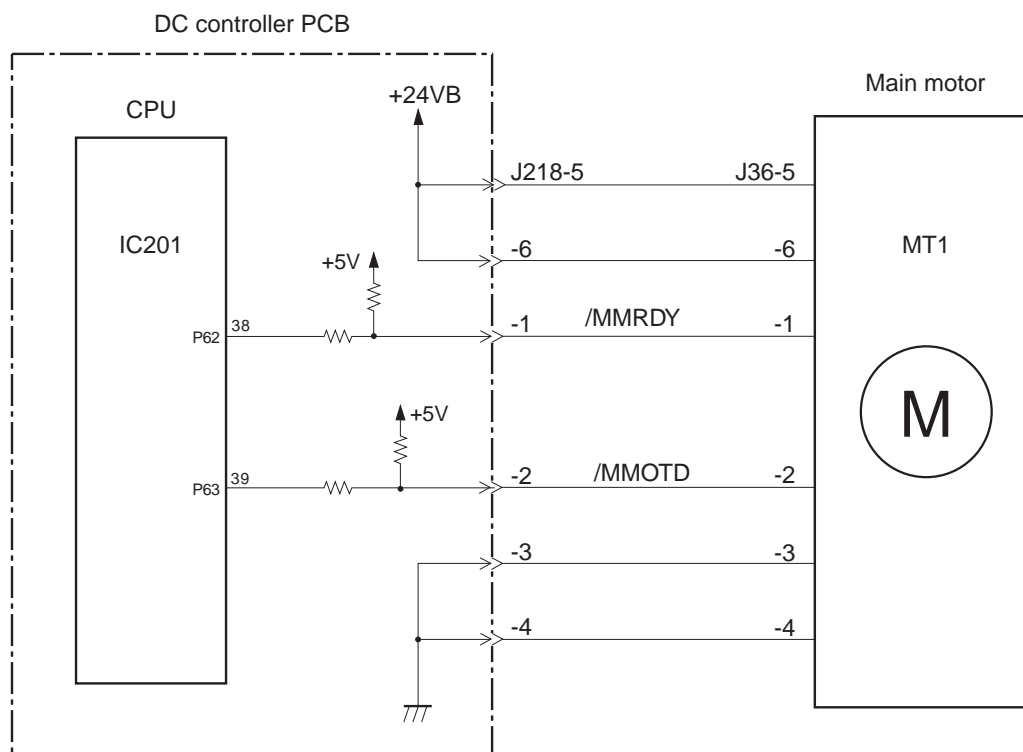Figure below shows the main motor control circuit.

Figure 2-2-13

The main motor is a DC brushless motor with hall elements, and is unified with the motor drive circuit.

The CPU (IC201) sets the MAIN MOTOR DRIVE signal (/MMOTD) to "L" and rotates the main motor.

When the main motor rotates and reaches its specified speed, it sets the MAIN MOTOR READY signal (/MMRDY) to "L."

The CPU notifies the video controller PCB of a main motor failure in the following cases:

1) The /MMRDY signal does not become "L" withing 2.5 seconds after from the main motor rotation starts.

2) The /MMRDY signal becomes "L" once, but becomes "H" for more than 0.1 seconds continuously during the specified speed rotation.

2. Fan motor control

This printer has 4 heat exhausting fans and an air intake fan. They are DC brushless motors. The figure below shows the fan motor control circuit.
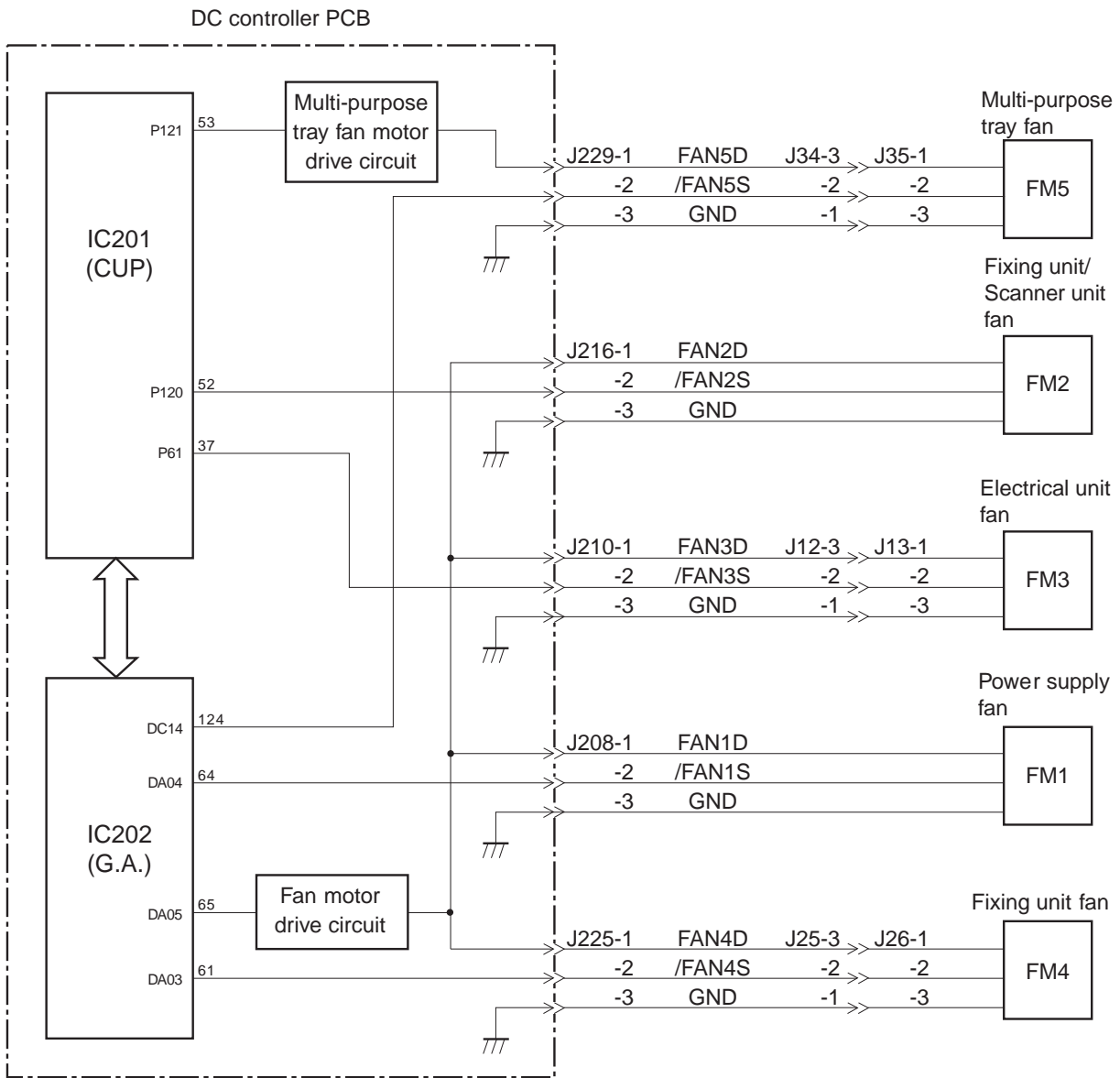

Figure 2-2-14

When the power switch of the printer is turned ON, the CPU (IC201) on the DC controller sets the No.53 pin to "H" and rotates the multi-purpose tray fan (FM5) at half speed for about 15 seconds. The CPU sets the No.65 pin to "H" via the gate array (IC202), and rotates the power supply fan (FM1), fixing unit/scanner fan (FM2), electrical unit fan (FM3), and fixing unit fan (FM4) at half speed.

When it receives a /PRNT signal from the video controller, the CPU rotates FM1, FM2, FM3, and FM4 at full speed and FM5 at half speed (full speed in case of duplex printing). When the main motor drive stops after printing, the CPU rotates FM1, FM2, FM3, and FM4 at full speed for about 30 seconds then at half speed. The CPU rotates FM5 at half speed for about 30 seconds (full speed for about 30 seconds in case of duplex printing).

The drive voltages output from the fan motor drive circuit and multi-purpose tray fan motor

drive circuit switch the fun motor rotation speed between full and half speed.

The CPU assesses a fan motor failure and reports it to the video controller, if the FAN LOCK DETECTION signals (/FAN1S, /FAN2S, /FAN3S, /FAN4S, /FAN5S) stay "L" for about 1.5 seconds or more for 3 times at 5 seconds intervals while the fan motors are ON.

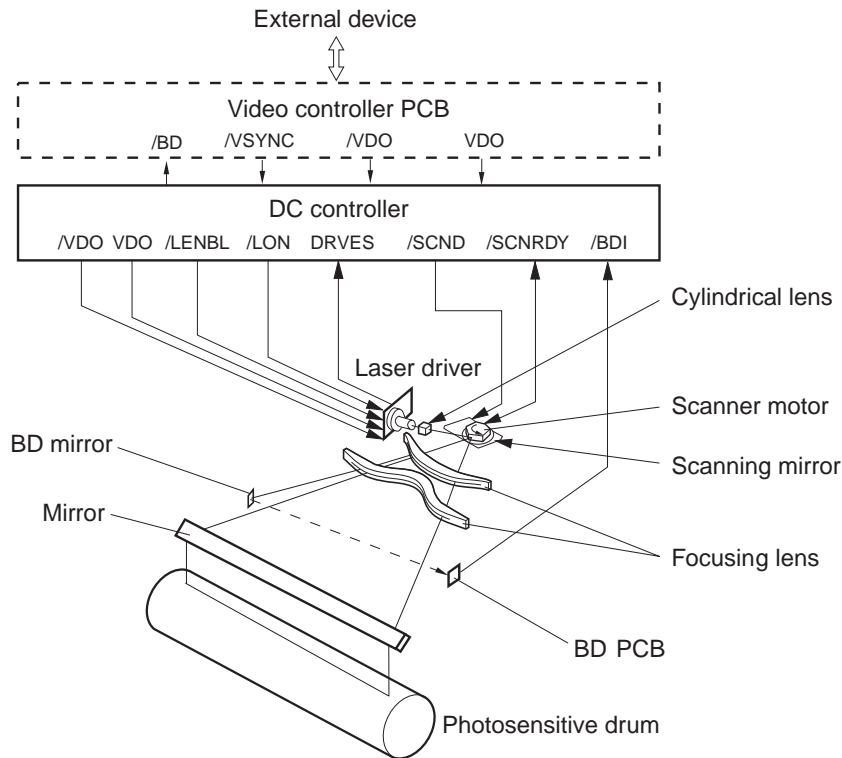# III. LASER/SCANNER SYSTEM

A. Outline

Figure 2-3-1

The DC controller PCB receives the VIDEO signals (/VDO, VDO) from the video controller PCB and sends then to the laser driver in the laser/scanner unit.

The laser driver turns the laser diode ON and OFF according to the video signal (/VDO, VDO) and generates the modulated laser beam only when the VIDEO ENABLE signal (/LENBL) from the DC controller is "L."

The modulated laser beam is aligned by a collimator lens and a cylindrical lens into a parallel beam which strikes the scanning mirror that is rotating at a specified speed.

The beam reflected from the scanning mirror is brought to a point of focus on the photosensitive drum with the focusing lens and the mirror located in front of the scanning mirror.

As the scanning mirror rotates at a specified speed, the beam is scanned across the drum at a specified speed.

The drum also rotates at a specified speed and the laser beam successively scans across its surface. Thus the laser beam builds up an image on the drum surface.

B. Laser Control Circuit
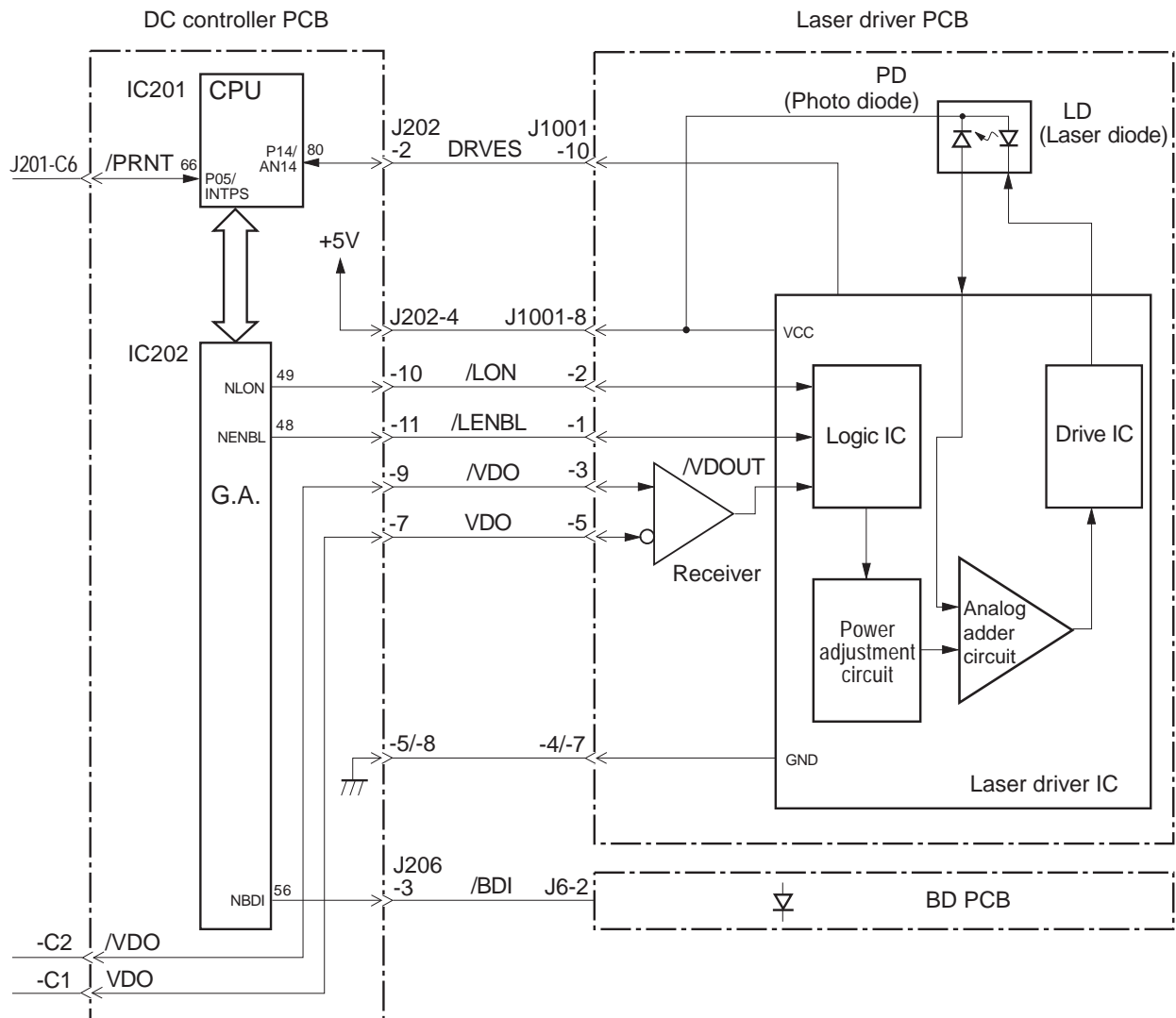### 1. Outline

Figure 2-3-2

This circuit switches ON and OFF the laser diode (LD) with a constant intensity in response to the video signals (/VDO, VDO) sent from the video controller PCB.

The /VDO and VDO signals are converted into the low voltage differential signals to suppress radiation noise from the video controller PCB and sent to the DC controller PCB, and then sent to the receiver in the laser driver circuit. The receiver demodulates the low voltage differential signals and transmits it as a VIDEO OUT signal (/VDOUT) to the logic circuit in the laser driver IC.

If the VIDEO ENABLE signal (/LENBL) from the microprocessor (CPU: IC201) is "L", the laser driver circuit turns the laser diode ON and OFF according to the /VDOUT signal.

The CPU monitors the LASER FAILURE DETECTION signal (DRVES) sent from the laser driver PCB to check whether the laser diode is generating laser normally or not.

The CPU emits laser forcibly when the /BDI signal is not input for 0.7 continuous seconds from the BD PCB while the scanner motor runs at the specified speed, and notifies the video controller of the BD failure when the DRVES signal is 3.805V or less and the laser failure when

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it exceeds 3.805V.

2. Automatic power control of laser diode

The laser driver IC controls the automatic power control (APC) of the laser diode so that the laser diode emits a beam of constant intensity.

When the FORCED LASER ON signal (/LON) becomes "L," or the VIDEO ENABLE signal (/ENBL) and /VDOUT signal become "L," the laser diode emits light according to the standard voltage of the laser driver PCB. The photo diode in the laser diode detects the beam intensity and feeds back the corresponding current value to the control amplification circuit. It is then compared with the current value set in the power adjustment circuit, and the intensity of the current to the laser diode is controlled.

The printer uses the APC method that conducts the beam intensity detection and control for each dot while the laser driver is emitting laser.   While in the conventional method, the beam intensity was measured by emitting laser for a certain period of time between pages or during unblinking, this method controls the laser output, detecting the intensity of the laser which is actually forming an image. Therefore, the APC of this printer has higher reliability of control over the conventional APC.

3. Horizontal synchronization control

The CPU generates an UNBLANKING signal inside the IC201 based on the BD input signal (/BDI) sent from the BD PCB of the laser/scanner unit.

IC201 sets the FORCED LASER ON signal (/LON) to "L" during unblanking period. The laser driver turns the laser diode ON when the /LON signal is "L."

The laser beam turned ON by the /LON signal is reflected at the small fixed BD mirror located in the light path where the laser beam scanning starts, and is input to the BD PCB in the laser/scanner unit.

The BD PCB detects the laser beam, generates a BD INPUT signal (/BDI), and sends it to the CPU. The CPU generates a BEAM DETECTION signal (/BD) according to the /BDI signal and sends it to the video controller PCB.

4. Laser diode emission control

Based on the paper size data, the CPU generates a VIDEO ENABLE signal (/LENBL) and sends it to the logic circuit of the laser driver IC. The /VDOUT signal is masked by the /LENBL signal in the logic circuit, which controls the emission period of the laser diode.

The paper size data is supplied to the CPU by the cassette paper size switches for cassette pick-up and by the paper size specification command from the video controller PCB for multi-purpose tray pick-up.

The CPU generates the IMAGE TOP ERASE AND BOTTOM ERASE signal (TOPE) and HORI-ZONTAL IMAGE MASK signal (MSK) according to the paper size data. (TOPE and MSK are used inside the CPU and are not output externally.)

To prevent the laser beam from writing on non-image area during the non-unblanking period, the CPU sets the VIDEO ENABLE signal (/LENBL) to "L" only when the TOPE and MSK signals are "L." The laser driver turns the laser diode ON when the /LENBL signal and /VDOUT signal are "L."

Figure 2-3-3

Notes: **1.** The shaded area indicates the area where the laser beam writes on the drum.
2. T1 and T2 vary according to the paper size. If no paper size is specified by the paper size specification command from the video controller during manual feed, the printer does not recognize the paper width. So the T1 and T2 values are assumed to be UNIVERSAL size (297.0mm x 635.0mm), the maximum paper width for this printer.
3. The CPU determines the actual size of the paper being fed by detecting the time from the leading edge of the paper passes through the registration paper sensor (PS1) until its trailing edge clears the sensor. The image is then masked according to the detected paper size.

C. Scanning System

Figure below shows the scanner motor control circuit.
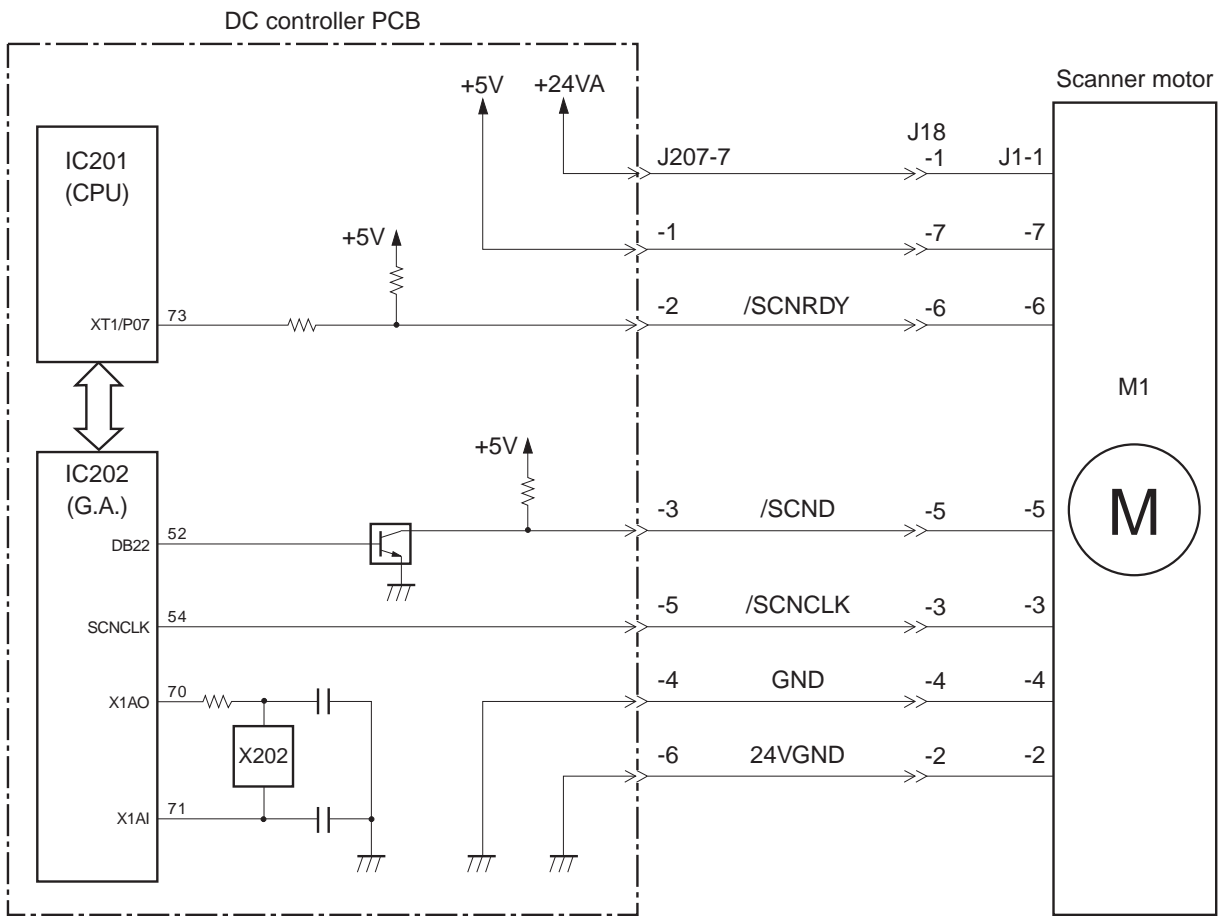
Figure 2-3-4

The scanner motor is a three-phase, eight-pole DC brushless motor with a HALL element. It forms a unit with the scanner driver, which controls the scanner motor rotation at a constant speed.

When the printer is turned ON, the oscillation frequency of the crystal oscillator (X202) is divided by the gate array (IC202), and the /SCNCLK signal is sent to the scanner driver.

When the /PRNT signal sent to the CPU (IC201) on the DC controller becomes "L", the CPU sets the /SCND signal to "L" through the gate array. When it goes "L", the scanner driver rotates the scanner motor using the SCNCLK signal. When the scanner motor reaches its prescribed speed, the scanner driver sets the SCANNER MOTOR READY signal (/SCNRDY) signal to "L".

The CPU on the DC controller PCB monitors the /SCNRDY signal to make sure that the scanner motor runs at the correct speed.

The CPU notifies the video controller of a scanner failure in the following cases:

a. When the /SCNRDY signal does not become "L" within 30 seconds after the scanner motor starts rotation.

b. When the /SCNRDY signal goes "H" for 1.5 continuous seconds after going "L."

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IV. IMAGE FORMATION SYSTEM

A. Outline

The image formation system is the central hub of the printer, and consists of the photosensitive drum, developing unit and charging roller etc.

When the PRINT signal (/PRNT) is sent from the video controller to the DC controller, the DC controller drives the main motor to rotate the photosensitive drum with the laser diode, developing cylinder, primary charging roller, and transfer charging roller.

The primary charging roller uniformly applies a negative charge on the surface of the photosensitive drum. To form a latent image on the photosensitive drum, the laser beam modulated by the VIDEO signals (VDO, /VDO) is exposed to the photosensitive drum surface.

The latent image formed on the photosensitive drum is changed to a visible image by the toner on the developing cylinder then transferred onto paper by the transfer charging roller. Residual toner on the photosensitive drum surface is scraped off by the cleaning blade. The potential on the drum is made uniform by the primary charging roller in preparation for the next latent image.

The cartridge has a toner sensor that detects whether there is enough toner remaining and whether the cartridge is installed.

If the toner in the cartridge becomes lower than the prescribed level or there is no cartridge installed in the printer, the high-voltage power supply notifies the DC controller through the TONER LEVEL signal.
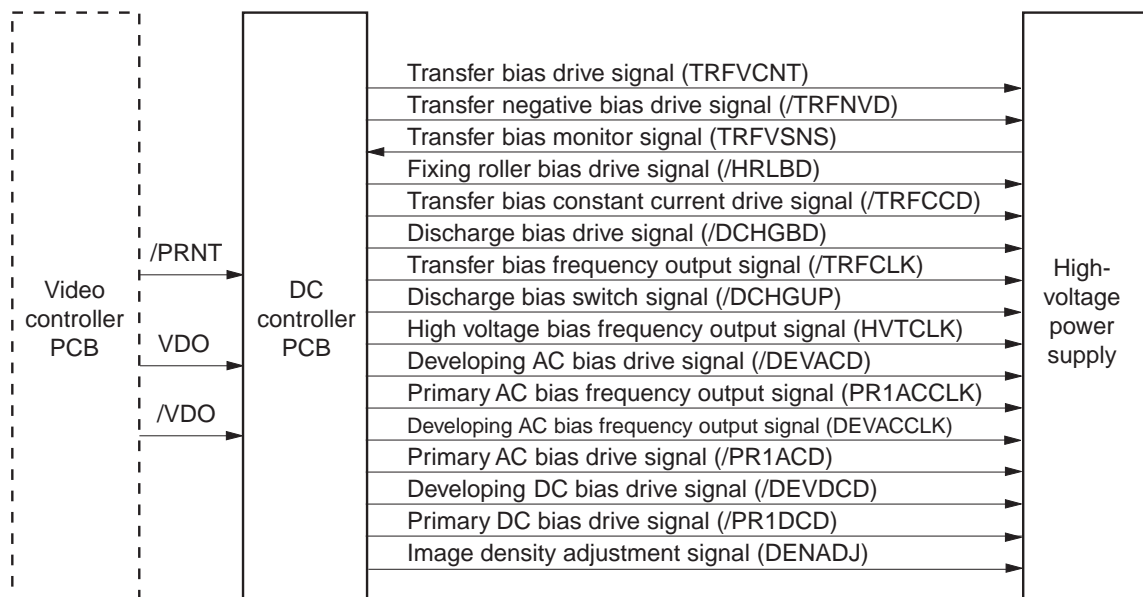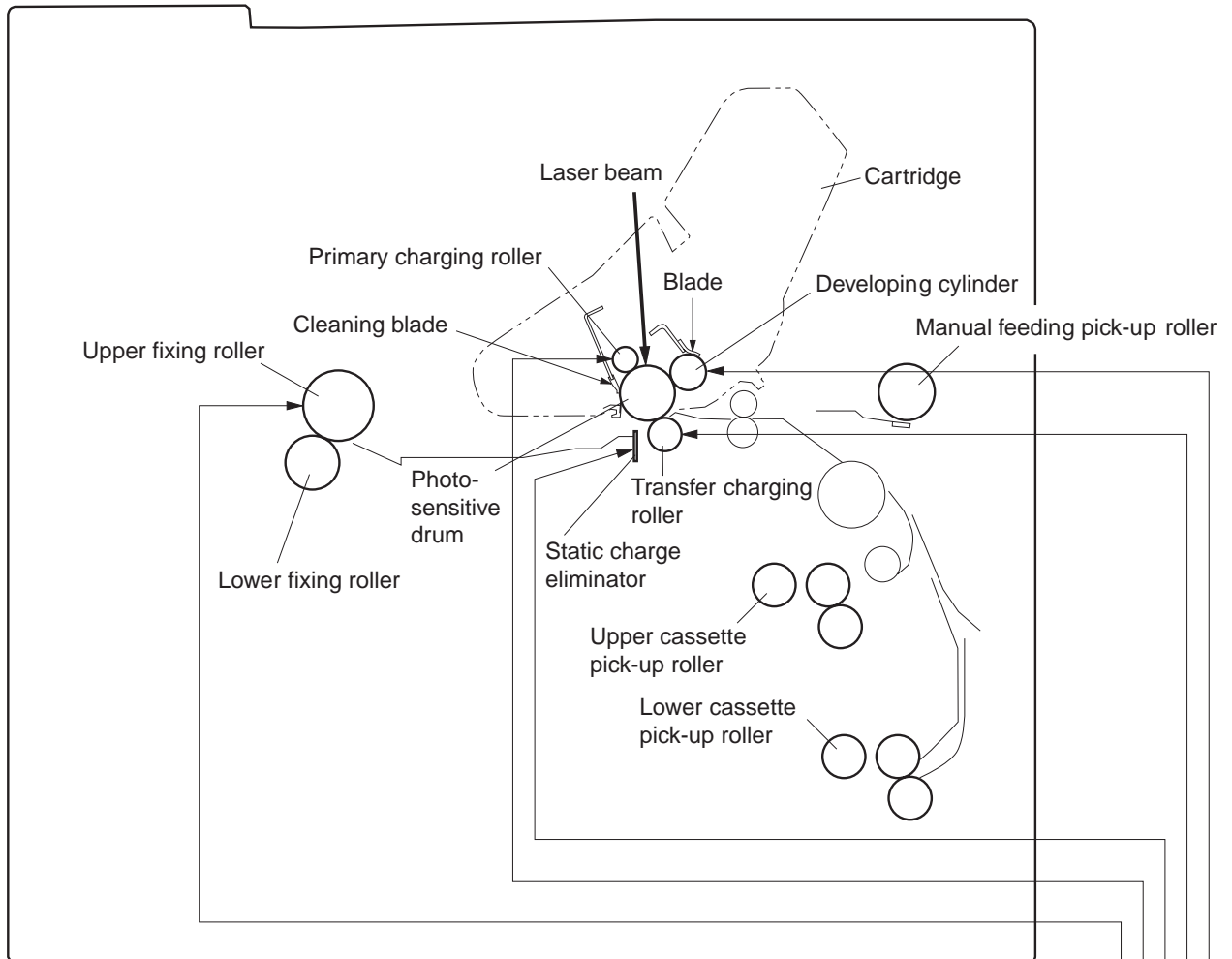
Figure 2-4-1

B. Printing Process

A major portion of the image formation system is contained with a cartridge as shown in Figure 2-4-2.
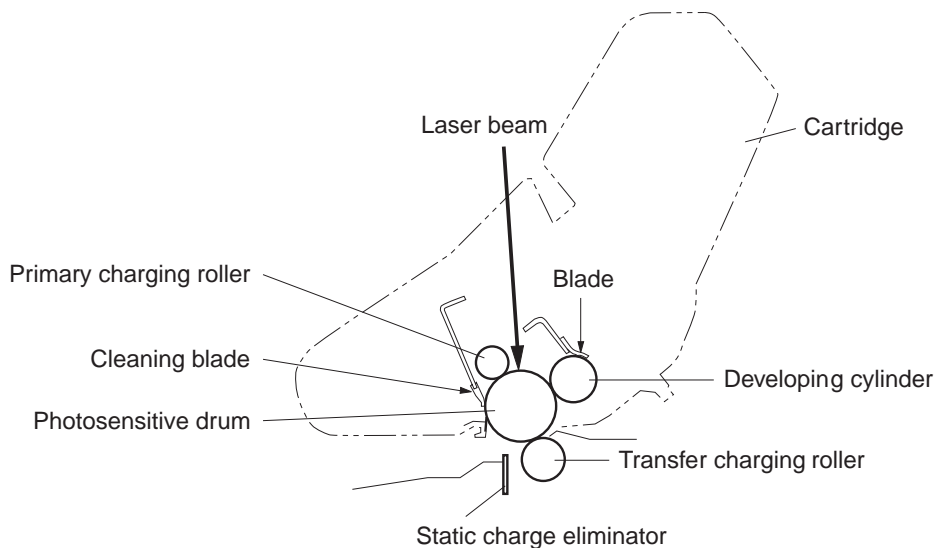
Figure 2-4-2

This printer's cartridge has a seamless photosensitive drum with a two-layer surface shown in Figure 2-4-3.

The outer layer of the drum consists of an organic photoconductor (OPC) and the base is aluminum.
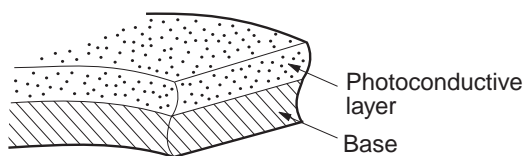
Figure 2-4-3

The printing process can be divided into five major stages.

1. Electrostatic latent image formation stage

Step 1 Primary charge (-)
Step 2 Scanning exposure

2. Developing stage

Step 3 Development

3. Transfer stage

Step 4 Transfer (+)
Step 5 Separation

4. Fixing stage

Step 6 Fixing
Step 7 Fixing roller cleaning

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5. Drum cleaning stage
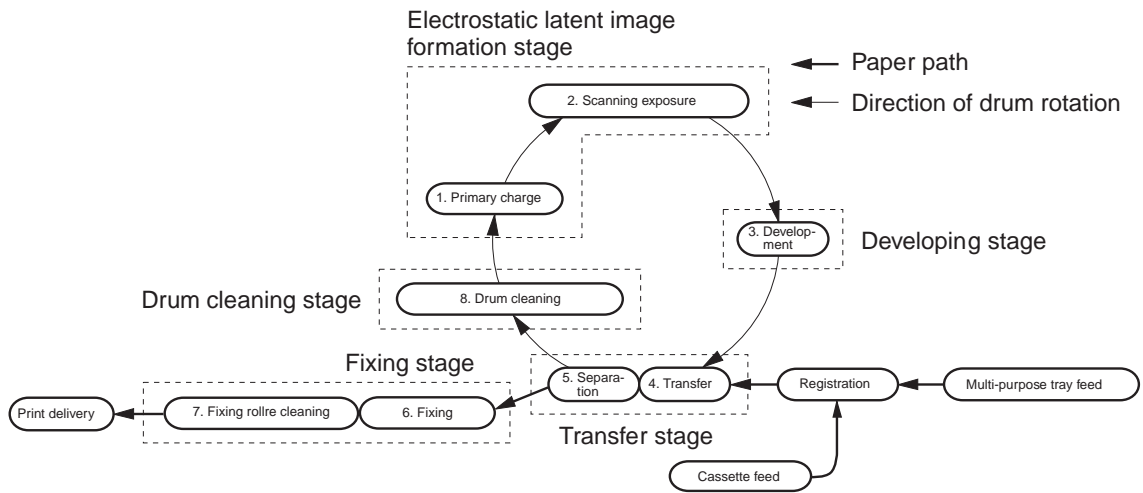Step 8 Drum cleaning

Figure 2-4-4

1. Electrostatic latent image formation stage

This stage follows two steps to produce an electrostatic latent image on the photosensitive drum.

At the end of the stage, negative charges remain on the unexposed "dark" areas, where the laser beam struck (exposed) the drum surface.

This image of negative charges on the drum is invisible to the eye, so it is referred to as an called an "electrostatic latent image."
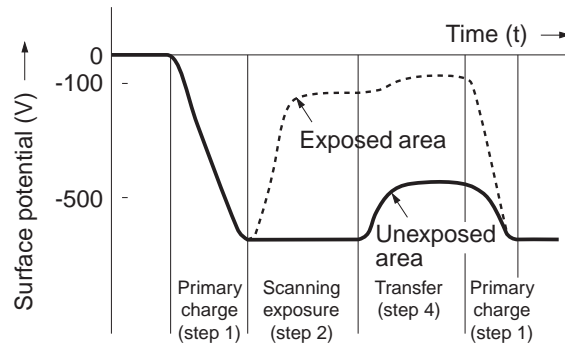

Figure 2-4-5
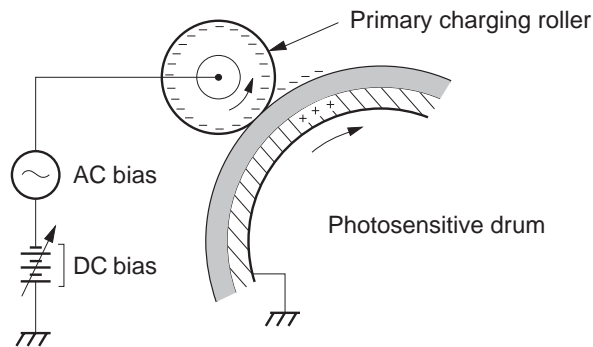
Step 1 Primary charge

Figure 2-4-6

For preparation of the latent image formation, a uniform negative potential is applied to the photosensitive drum surface. For primary charge, the printer uses the charging method, which directly charges the drum.

The primary charging roller is made of conductive rubber. In addition to DC bias, AC bias has been applied to the primary charging roller to keep the potential on the drum's surface uniform. The DC bias is changed with the developing DC bias.

Step 2 Scanning exposure
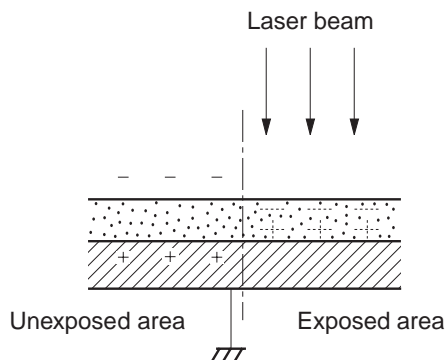
Figure 2-4-7

When the laser beam scans the drum surface, it causes the charge to be neutralized in the areas struck by the laser beam. These areas on the drum surface form the electrostatic latent image.

2. Development stage
Particles of toner are placed onto the electrostatic latent image on the surface of the drum to create a visible image. This printer uses the toner projection development method with a single-component toner.

Step 3 Development
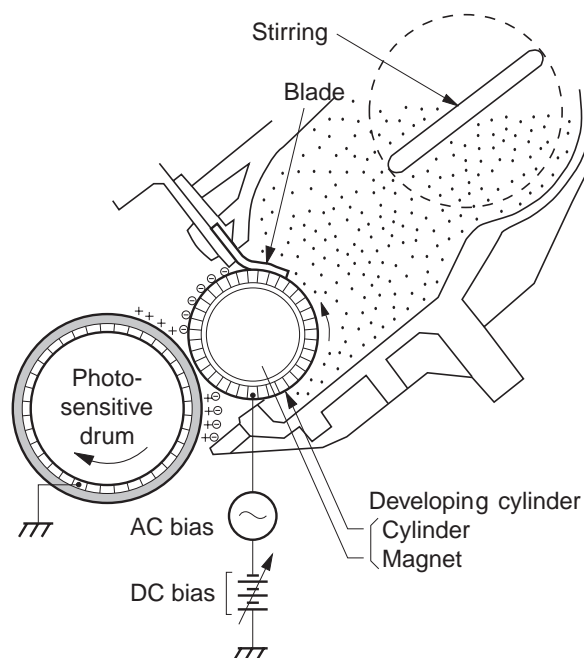
Figure 2-4-8

Note: Charges on the exposed area of the photosensitive drum are shown as positive in this figure. In actuality they are negative, but they are more positive than those on the developing cylinder.

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As shown in Figure 2-4-8, the developing unit consists of a developing cylinder and a rubber blade. The developing cylinder rotates around a fixed internal magnet.

The single-component toner consists of magnetite and a resin binder, and is held to the cylinder by magnetic attraction. The toner is an insulator, and acquires a negative charge from friction of the rotating cylinder.

The areas on the drum that were exposed to the laser beam have a higher potential (are less negative) than the negatively charged toner particles on the developing cylinder. When these areas approach the cylinder, the potential difference projects the toner particles to them.

This is called toner projection, making the latent image on the drum visible.
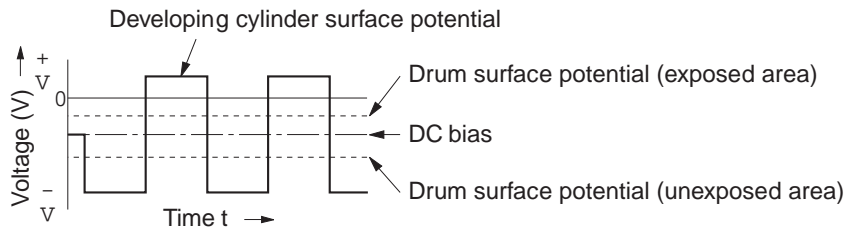

Figure 2-4-9

An AC bias is applied to the developing cylinder to help project the toner particles to the drum surface and improve the contrast of the printed image. The center voltage of the AC bias (1600 Vp-p) varies with the DC bias voltage. The change in the DC bias changes the potential difference between the cylinder and drum so the density of the print can be adjusted. It can be done through a command from an external device.

This printer has a stirring mechanism in the cartridge to ensure that toner is applied smoothly to the cylinder.

3. Transfer stage

In the transfer stage, the toner image is transferred from the drum surface to the paper.
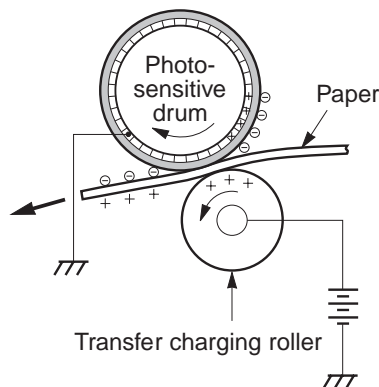
Step 4 Transfer

Figure 2-4-10

A positive charge applied to the back of the paper attracts the negatively charged toner particles to the paper.

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Reference:
If the image on the photosensitive drum is not completely transferred onto the paper due to jamming, etc., the toner may adhere to the transfer charging roller. The printer removes the toner from the transfer charging roller by switching the transfer voltage between positive and negative in the specified sequence. During wait mode, initial rotation, and last rotation, the printer sets the primary DC voltage to 0V to make the charge on the drum 0V. At the same time, the transfer voltage is set to negative to remove the toner with a negative charge from the transfer charging roller to the drum. The transfer charging roller is cleaned by removing the toner on its surface to the drum.

Step 5 Separation
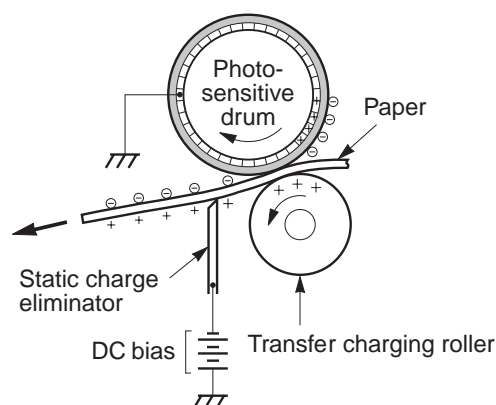
Figure 2-4-11

The stiffness of the paper causes it to separate from the drum. Thin paper or curled sheets to be duplex printed may not separate, but remain wrapped around the drum. To prevent this, a negative bias is applied to the static charge eliminator to reduce electrostatic adhesion between the drum and paper and facilitate separation.

To stabilize the paper feed system and prevent droplets on the printed image at low temperature and humidity, the charge on the back of the paper is reduced by the static charge eliminator after transfer.

4. Fixing stage

The toner image transferred onto the paper in the transfer stage is held only by electrostatic attraction and a slight physical adhesion, so even a light touch will smear the image.

In the fixing stage, the toner image is fixed by heating the paper and applying pressure. This fuses the toner particles onto the paper to create a permanent image.
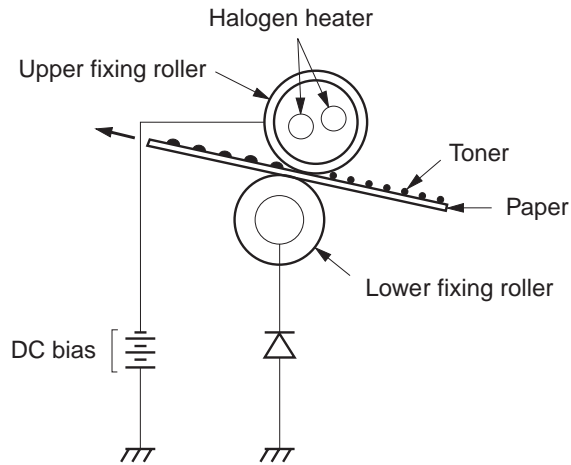
Step 6 Fixing

Figure 2-4-12

The upper and lower fixing roller surfaces are covered with teflon tubes with a very low adhesive property.

The negative DC bias is applied to the upper fixing roller to prevent the toner from adhering to the rollers.

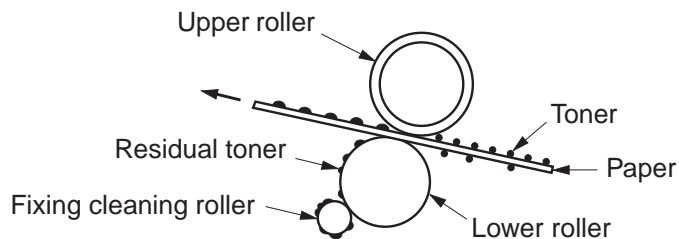**Step 7 Fixing roller cleaning**

Figure 2-4-13

In the fixing stage, not all the toner particles are fixed to the paper. In some cases, toner particles on the back of the paper are adhered to the lower roller.

The fixing cleaning roller cleans the lower fixing roller by attracting the residual toner on the lower fixing roller.

5. Drum cleaning stage
In the transfer stage, not all the toner is transferred to the paper. Some remains on the photo-sensitive drum.

    This residual toner is cleaned off in the drum cleaning stage so that the next print image will be clear and distinct.
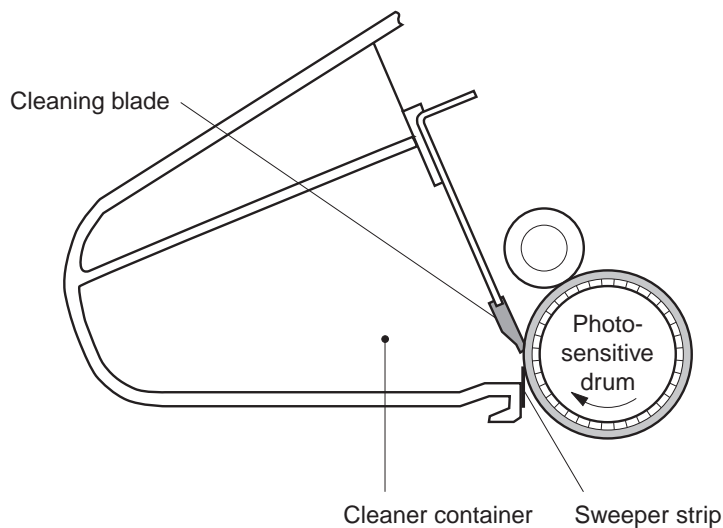
Step 8 Drum cleaning

Figure 2-4-14

The residual toner on the drum surface is scraped away with the cleaning blade to clean the drum surface in preparation for the next print. The removed toner is collected in the cleaner container.

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V. PICK-UP/FEED SYSTEM

A. Outline

Presence of paper on the multi-purpose tray is detected by the multi-purpose tray paper sensor (PS1301), and presence of paper in the upper and lower cassettes is detected by the cassette paper-out sensor (PS1207 or PS1208).
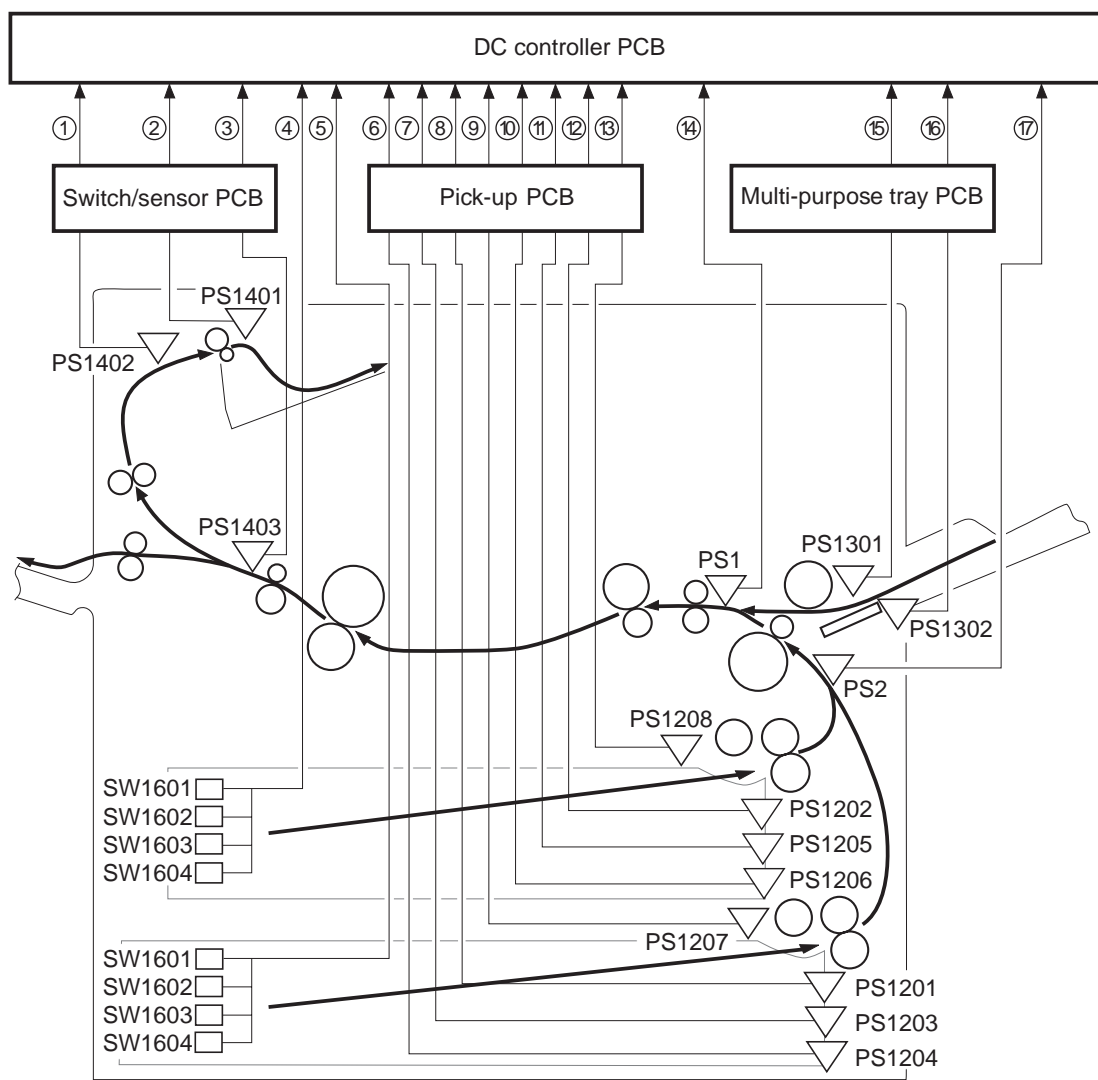
If the cassette pick-up motor (SMT1) in the paper pick-up unit rotates for cassette feeding, pick-up roller, feed roller 1, and separation roller turn to feed a sheet of paper into the printer.

If the manual feed clutch (CL3) in the manual feed pick-up unit engages for manual feeding, the manual feeding pick-up roller turns and feeds a sheet of paper from the multi-purpose tray into the printer.

The paper is controlled by the registration roller so that the leading edge of the toner image on the photosensitive drum matches the leading edge of the paper. The paper is fed, transferred, then separated from the drum, fed to the fixing unit, and delivered onto the face-up or face-down tray.
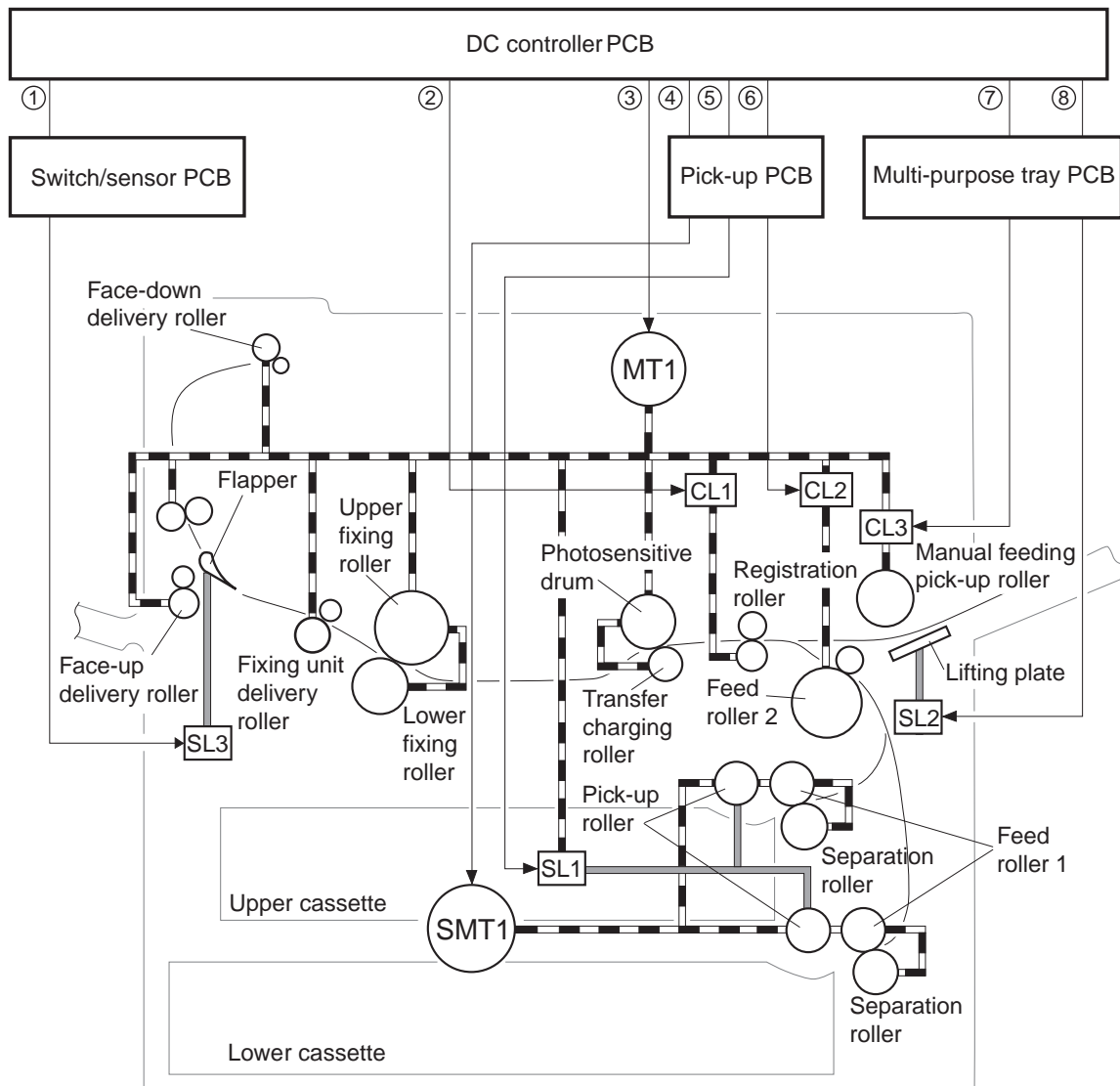
There are four photointerrupters (PS1, PS2, PS1402, and PS1403) on the paper path for sensing paper reaching or passing through each area.

If the paper does not reach or clear each sensor within the pre-set time, the microprocessor on the DC controller assumes a paper jam has occurred and notifies the video controller.

① : FACE-DOWN TRAY DELIVERY SENSE signal (FDOUTS)
② : FACE-DOWN TRAY PAPER FULL SENSE signal (FDFULS)
③ : FIXING UNIT DELIVERY SENSE signal (/FPOUTS)
④ : UPPER CASSETTE PAPER-SIZE SENSE signal
⑤ : LOWER CASSETTE PAPER-SIZE SENSE signal
⑥ : LOWER CASSETTE PAPER-LEVEL SENSE signal 1 (LPVS1)
⑦ : LOWER CASSETTE PAPER-LEVEL SENSE signal 2 (LPVS2)
⑧ : LOWER CASSETTE SENSE signal (/LDECKC)
⑨ : LOWER CASSETTE PAPER-OUT SENSE signal (/LDECKS)
⑩ : UPPER CASSETTE PAPER-LEVEL SENSE signal 1 (UPVS1)
⑪ : UPPER CASSETTE PAPER-LEVEL SENSE signal 2 (UPVS2)
⑫ : UPPER CASSETTE SENSE signal (/UDECKC)
⑬ : UPPER CASSETTE PAPER-OUT SENSE signal (/UDECKS)
⑭ : REGISTRATION PAPER SENSE signal (/REGS)
⑮ : MULTI-PURPOSE TRAY PAPER SENSE signal (/MPTPS)
⑯ : LIFTING PLATE SENSE signal (/MPTLS)
⑰ : PICK-UP UNIT PAPER SENSE signal (/FEEDS)

PS1: Registration paper sensor
PS2: Pick-up unit paper sensor
PS1201: Lower cassette sensor
PS1202: Upper cassette sensor
PS1203: Lower cassette paper-level sensor 1
PS1204: Lower cassette paper-level sensor 2
PS1205: Upper cassette paper-level sensor 1
PS1206: Upper cassette paper-level sensor 2
PS1207: Lower cassette paper-out sensor
PS1208: Upper cassette paper-out sensor
PS1301: Multi-purpose tray paper sensor
PS1302: Lifting plate position sensor
PS1401: Face-down tray paper full sensor
PS1402: Face-down tray delivery sensor
PS1403: Fixing unit delivery sensor
SW1601: Cassette paper-size sensing switch
SW1602: Cassette paper-size sensing switch
SW1603: Cassette paper-size sensing switch
SW1604: Cassette paper-size sensing switch

Figure 2-5-1

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Figure 2-5-2

①: FACE-UP SOLENOID DRIVE signal (/FUSLD)
②: REGISTRATION CLUTCH DRIVE signal (/REGCLD)
③: MAIN MOTOR DRIVE signal (MMRDY)
④: PICK-UP MOTOR DRIVE signal
⑤: FEED CLUTCH DRIVE signal (/FEEDCLD)
⑥: CASSETTE PICK-UP SOLENOID DRIVE signal (/PUPSLD)
⑦: MANUAL FEED CLUTCH DRIVE signal (/MPTCLD)
⑧: LIFTING PLATE SOLENOID DRIVE signal (/MPTSLD)

MT1: Main motor
SMT1: Cassette pick-up motor
SL1: Cassette pick-up solenoid
SL2: Lifting plate solenoid
SL3: Face-up solenoid
CL1: Registration clutch
CL2: Feed clutch
CL3: Manual feed clutch

B. Paper Pick-up

1. Pick-up operation

This printer conducts paper pick-up operation by lifting the paper to the paper pick-up position with the lifter and lowering the rotating cassette pick-up roller to the paper level.

Paper pick-up operation is conducted only when the multi-input tray driver receives the pick-up command from the option controller. The pick-up roller is lowered to the paper level by the rotational force of the main motor (MT1). At the same time, the pick-up roller is rotated by the rotational force of the pick-up motor.

Paper pick-up operation is conducted as follows.

On receiving the /PRNT from the video controller PCB, the DC controller PCB runs the main motor (MT1) and the pick-up motor (SMT1). When the cassette pick-up solenoid (SL1) is turned ON, the main motor rotates the cassette pick-up cam via the gear to drive the shaft drive arm.

At the same time, the rotational force of the pick-up motor is transmitted to the cassette pick-up roller via the feed roller gear. As a result, the rotating cassette pick-up roller goes down to the paper level, picks up a sheet of paper, goes up to the paper pick-up standby position, and stops rotation.

When the pick-up motor rotates clockwise, the paper is picked up from the upper cassette by rotating the cassette pick-up roller, feed roller 1 and separation roller of the upper cassette. When the pick-up motor rotates counterclockwise, the paper is picked up from the lower cassette by driving the cassette pick-up roller, feed roller 1 and separation roller of the lower cassette.
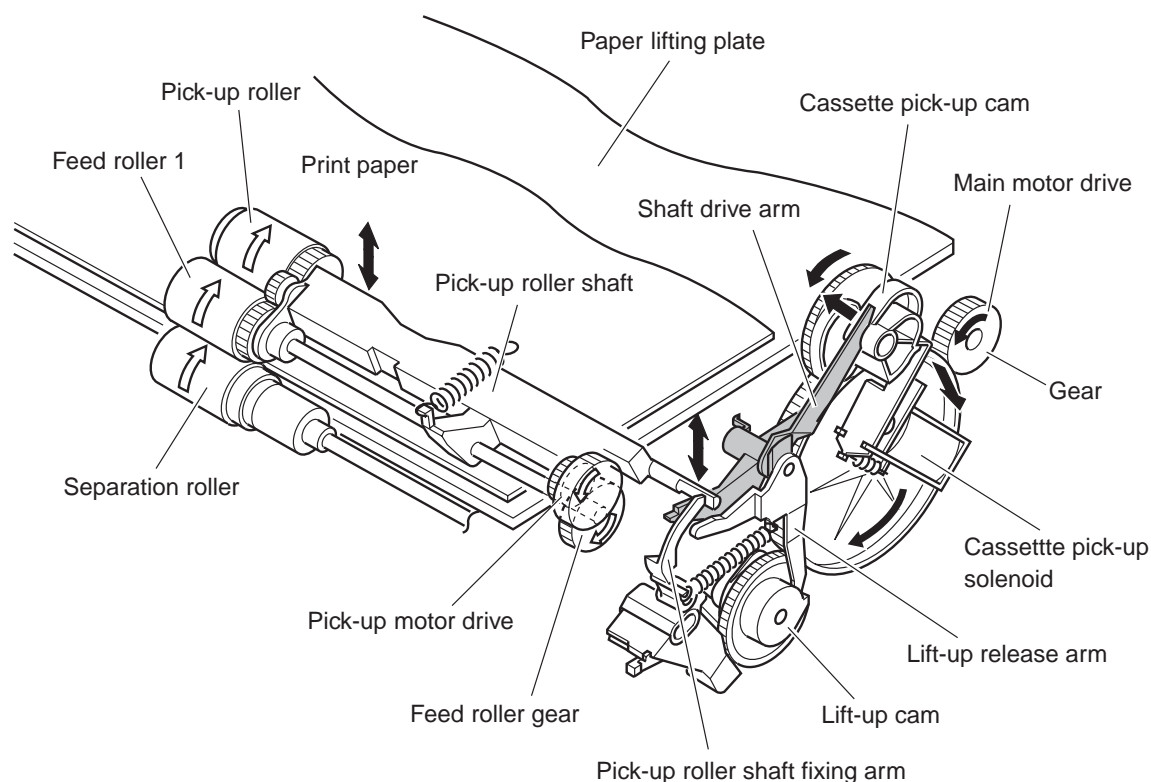

Figure 2-5-3

2 - 45

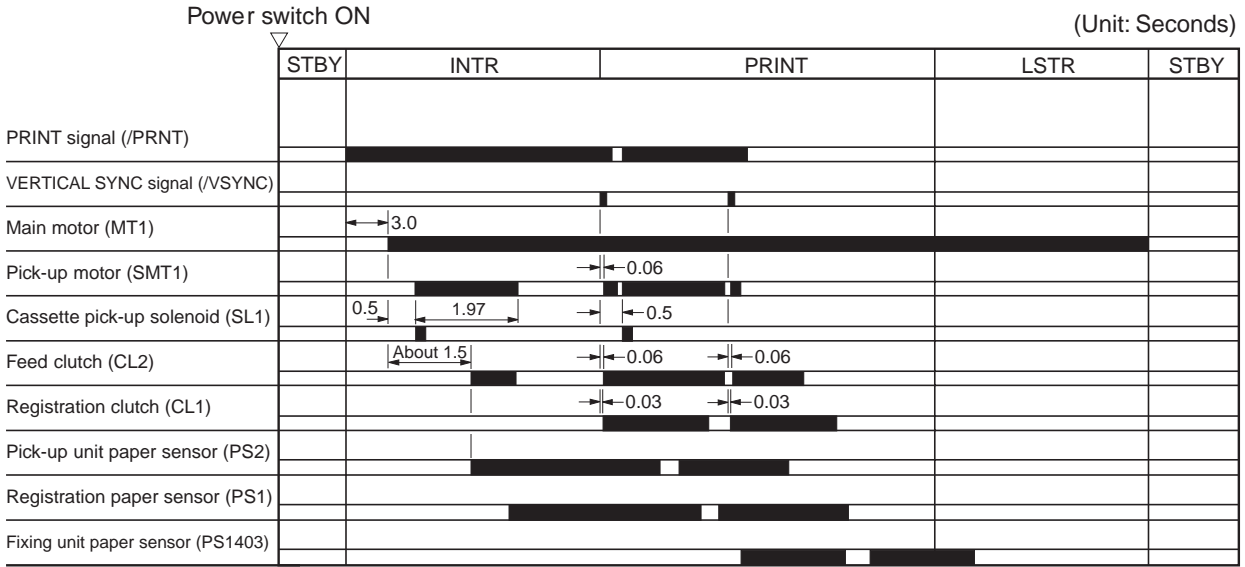• Pick-up timing from the upper cassette (A4 : tow pages continuously print)

Power switch ON   (Unit: Seconds)

	STBY	INTR	PRINT	LSTR	STBY
PRINT signal (/PRNT)					
VERTICAL SYNC signal (/VSYNC)					
Main motor (MT1)		→→ 3.0			
Pick-up motor (SMT1)			→‖← 0.06		
Cassette pick-up solenoid (SL1)		0.5 | 1.97	→ ← 0.5		
Feed clutch (CL2)		About 1.5	→‖← 0.06 →‖← 0.06		
Registration clutch (CL1)			→‖← 0.03 →‖← 0.03		
Pick-up unit paper sensor (PS2)					
Registration paper sensor (PS1)					
Fixing unit paper sensor (PS1403)					

Figure 2-5-4

• Pick-up timing from the lower cassette (A4 : tow pages continuously print)

Power switch ON   (Unit: Seconds)

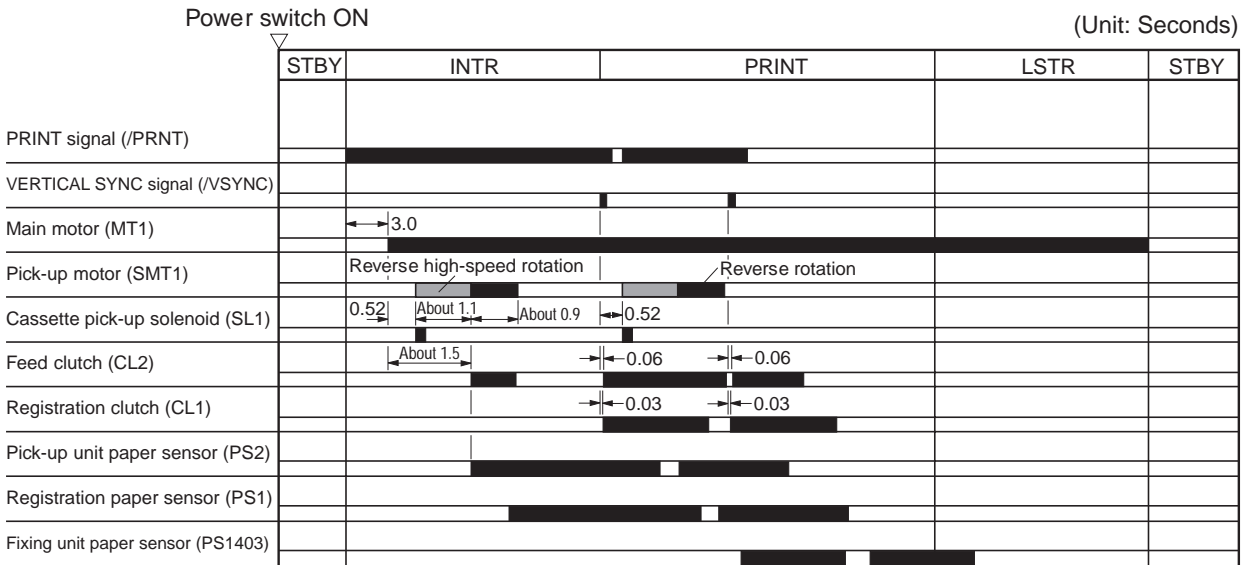|	STBY	INTR	PRINT	LSTR	STBY
PRINT signal (/PRNT)					
VERTICAL SYNC signal (/VSYNC)					
Main motor (MT1)		→→ 3.0			
Pick-up motor (SMT1)		Reverse high-speed rotation	Reverse rotation		
Cassette pick-up solenoid (SL1)		0.52 | About 1.1 |About 0.9 →‖← 0.52			
Feed clutch (CL2)		About 1.5	→‖← 0.06 →‖← 0.06		
Registration clutch (CL1)			→‖← 0.03 →‖← 0.03		
Pick-up unit paper sensor (PS2)					
Registration paper sensor (PS1)					
Fixing unit paper sensor (PS1403)					

Figure 2-5-5

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a. Cassette detection/cassette paper size detection/cassette paper level detection

The upper and lower cassettes detection is executed by the upper cassette sensor (PS1202) and the lower cassette sensor (PS1201). The paper detection in the upper and lower cassettes is executed by the upper cassette paper out sensor (PS1208) and the lower cassette paper out sensor (PS1207). The paper size detection is executed by the upper and lower cassette paper size detection switches (SW1601 to SW1604) installed to each cassette. Each cassette has the four switches. The combinations of the cassette paper size detection switches are shown in Table 2-5-1.

Table 2-5-1

Paper size	Cassette paper-size sensing switch			
	SW1601	SW1602	SW1603	SW1604
Ledger	OFF	OFF	OFF	OFF
A3	OFF	ON	OFF	OFF
B4	ON	OFF	OFF	OFF
Legal	ON	ON	OFF	OFF
Letter	OFF	OFF	OFF	ON
A4	OFF	OFF	ON	OFF

The remaining paper level in the cassette is detected according to the lifter position. The lifter contains a light blocking plate which blocks two sensors on the pick-up PCB. The lifter position is detected by these sensors. And, as a result, the remaining paper level in the cassette is detected.

The remaining paper level in the upper cassette is detected by the combination of outputs from the upper cassette paper level sensor 1 (PS1205) and the upper cassette paper level sensor 2 (PS1206). The paper level in the lower cassette is detected by the combination of outputs from the lower cassette paper level sensor 1 (1203) and the lower cassette paper level sensor 2 (PS1204). Figure 2-5-6 shows the combinations of PS1205/PS1203 and PS1206/PS1204.
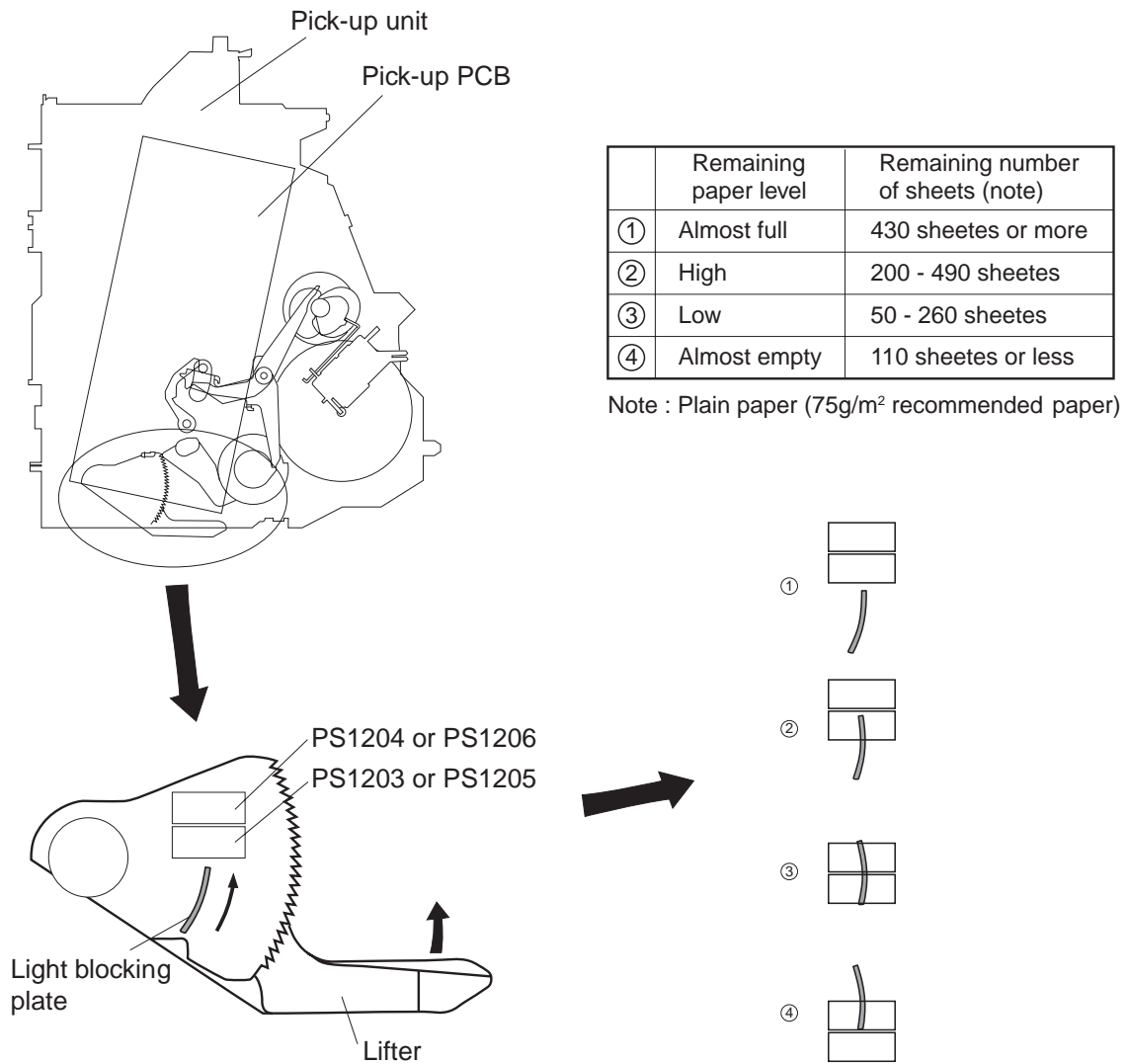
	Remaining paper level	Remaining number of sheets (note)
①	Almost full	430 sheetes or more
②	High	200 - 490 sheetes
③	Low	50 - 260 sheetes
④	Almost empty	110 sheetes or less

Note : Plain paper (75g/m^2 recommended paper)

Figure 2-5-6

b. Lift-up operation

The lift-up operation is executed by the multi-input tray drive motor when a cassette is installed or the pick-up roller shaft is set lower than certain level due to the paper reduce.

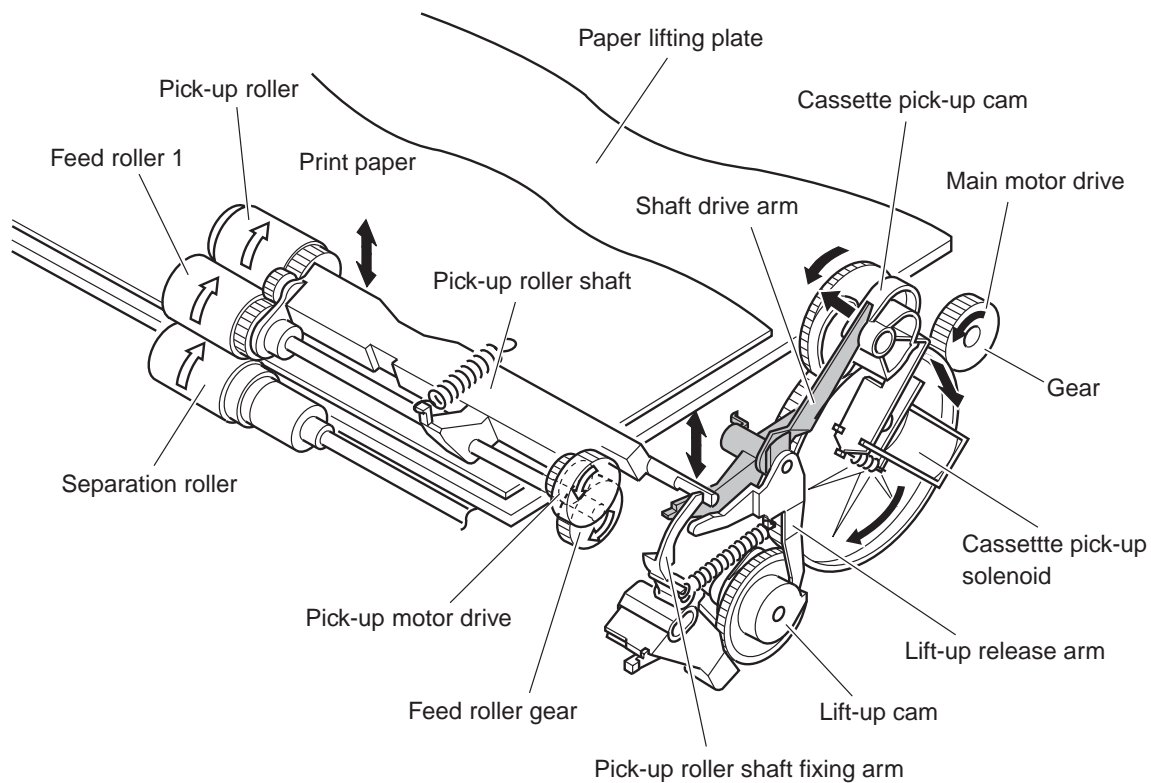The two cases for the lift-up operation are as follows.

Figure 2-5-7

1) Cassette is installed
① When a cassette is installed, the multi-input tray drive motor rotates, and the cassette paper pick-up solenoid (SL3) is turned ON. Then, the shaft drive arm is driven by the cassette paper pick-up cam rotation through the gear.
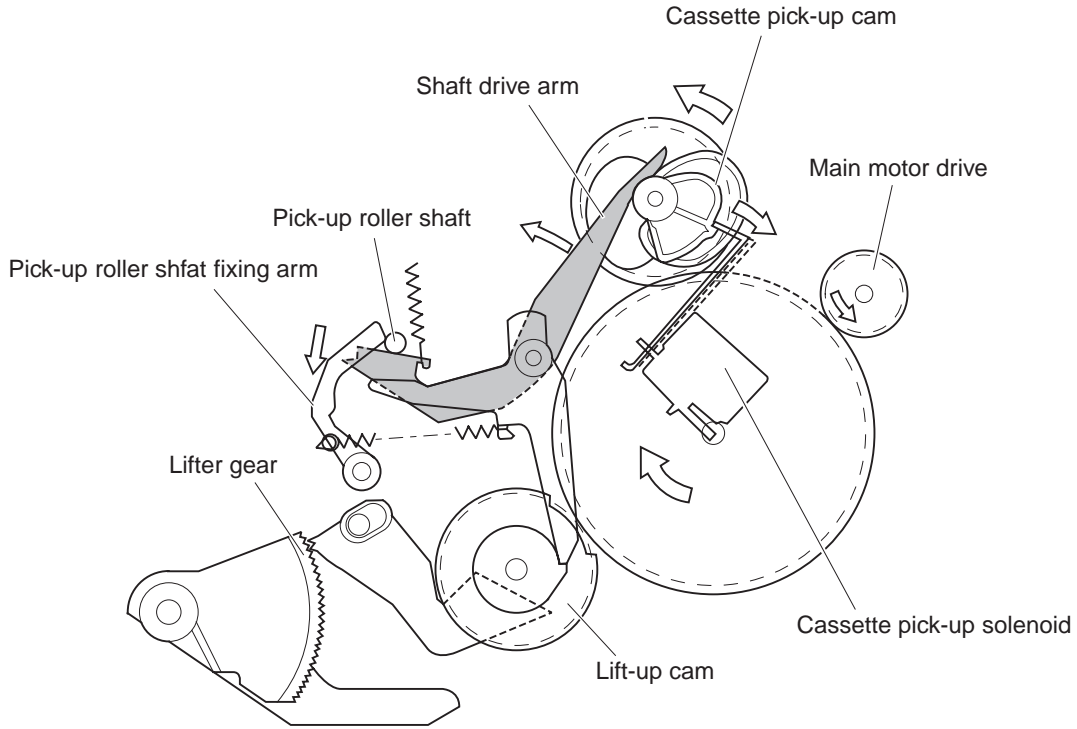

Figure 2-5-8

② As the shaft drive arm goes down, the pick-up roller shaft goes down. Then, the lift-up release arm is pushed, and the lift-up cam is unfixed. At the same time, the shaft drive arm is fixed to the pick-up roller shaft fixing arm, and the pick-up roller shaft is stopped in the designated position.
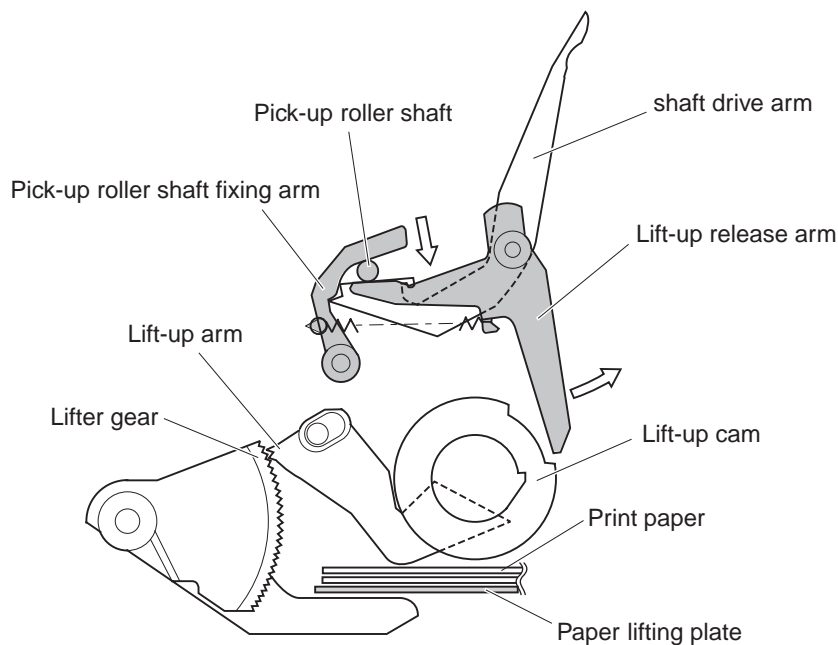

Figure 2-5-9

③ The lift up cam starts rotating when unfixed, and the lift up arm pushes up the lifter gear by one tooth. The paper lifting plate is lifted by repeating this operation.
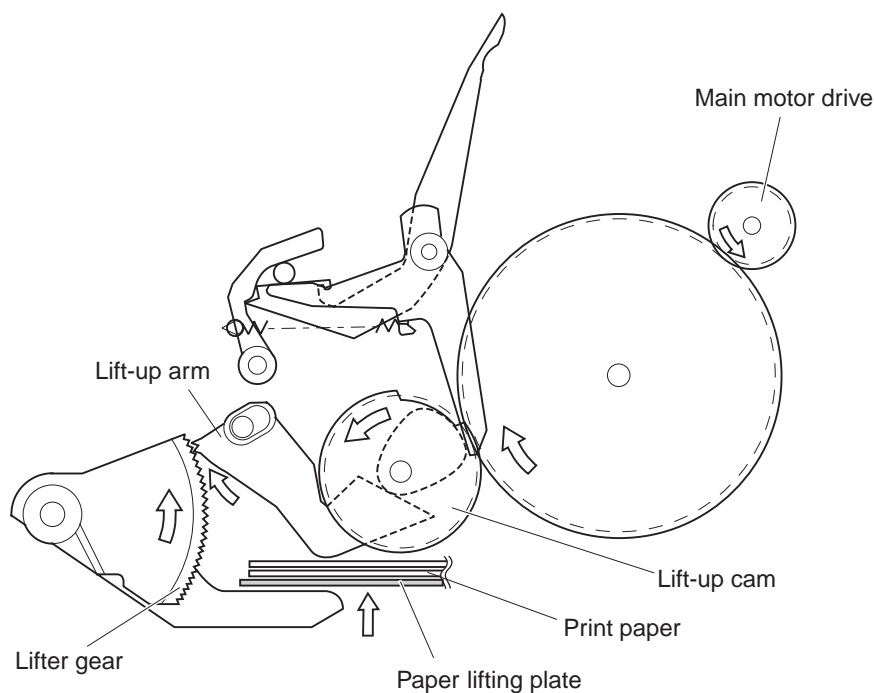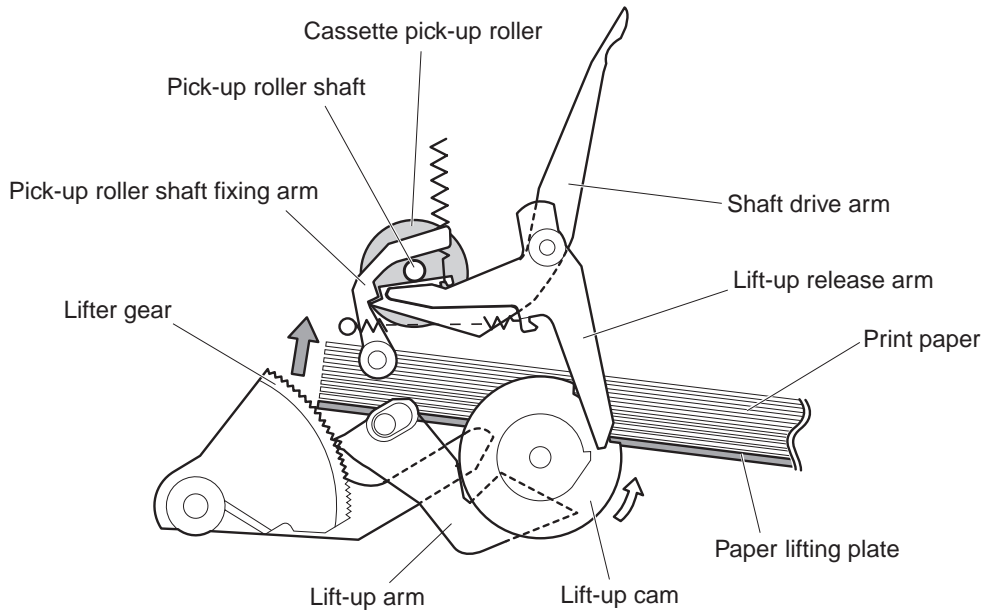

Figure 2-5-10

2 - 51

④ The pick-up roller shaft is lifted up when the paper on the paper lifting plate touches the pick-up roller. Then, the fixing arm is released, and the lift-up release arm lifts up the pick-up roller shaft to the waiting position by force of the spring. At the same time, the lift-up cam is fixed by driving the pick-up roller shaft fixing arm and the lift-up release arm. Then, the lift-up arm is stopped, and the lift-up operation is completed.

• **Lift-up operation**

Cassette pick-up roller

Pick-up roller shaft

Pick-up roller shaft fixing arm

Shaft drive arm

Lift-up release arm

Lifter gear

Print paper

Paper lifting plate

Lift-up arm

Lift-up cam

• **Completion of lift-up operation**

Figure 2-5-11

2 - 52
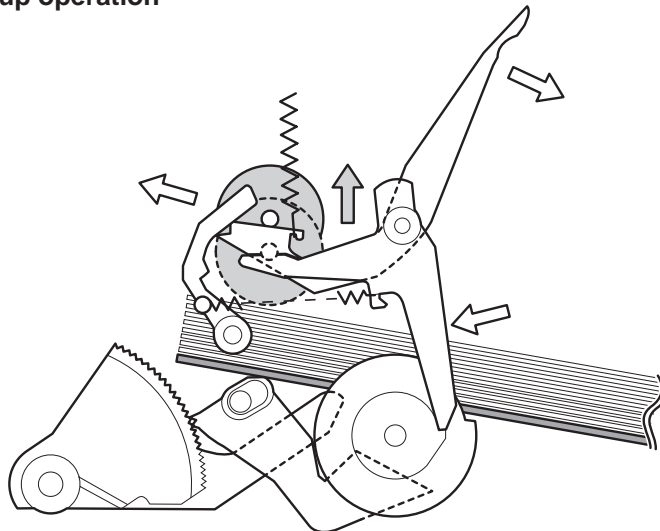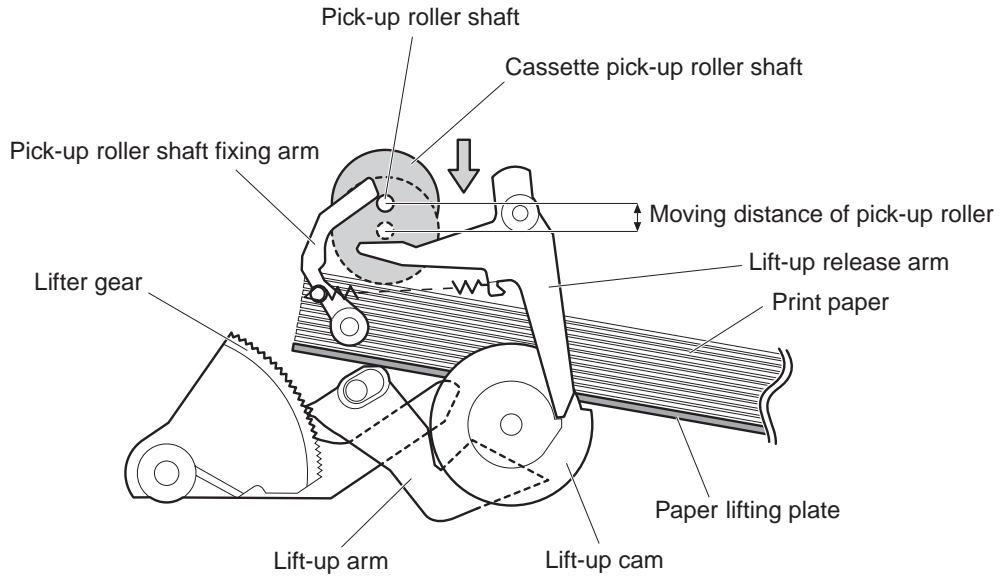
2) Paper level is lower than certain level
① As the paper level lowers, the moving distance of the pick-up roller increases. When the moving distance reaches the specified value, the pick-up roller shaft pushes the lift up release arm, and the lift up cam is unfixed.

• Certain paper level

• Less than certain paper level

Figure 2-5-12

2 - 53
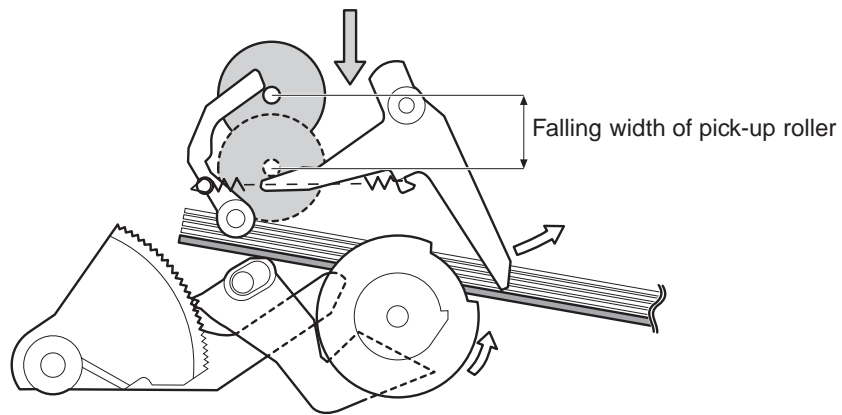
② When the lift-up cam is unfixed, the lift-up arm lifts up the lifter gear one tooth by the rotation of the lift-up cam. The paper lifting plate is lifted up by repeating the operation. (See Figure 2-5-10)

③ When the paper on the paper lifting plate touches the pick-up roller, the pick-up roller shaft is lifted up. Then, the fixing arm is released, and the lift-up release arm lifts up the pick-up roller shaft to the waiting position by force of the spring. At the same time, the pick-up roller shaft fixing arm and the lift up release arm are driven to fix the lift up cam. As a result, the lift up arm is stopped and lift up operation is competed. (See Figure 2-5-11)

c. Multi-feed prevention mechanism

When feeding from the cassette, the printer uses the separation roller to prevent multi-feeding. Normally, the separation roller is imparted with a rotational force opposite to that of the feed roller. However, since the separation roller is equipped with a torque limiter, it rotates with feed roller 1 by transmission of its rotational force via the transported paper. On the other hand, if multiple sheets of paper are picked up, the low friction force between the sheets of paper result in a weak rotational force being transmitted to the separation roller from feed roller 1. Consequently, the separation roller's own rotational force separates the extra sheet.
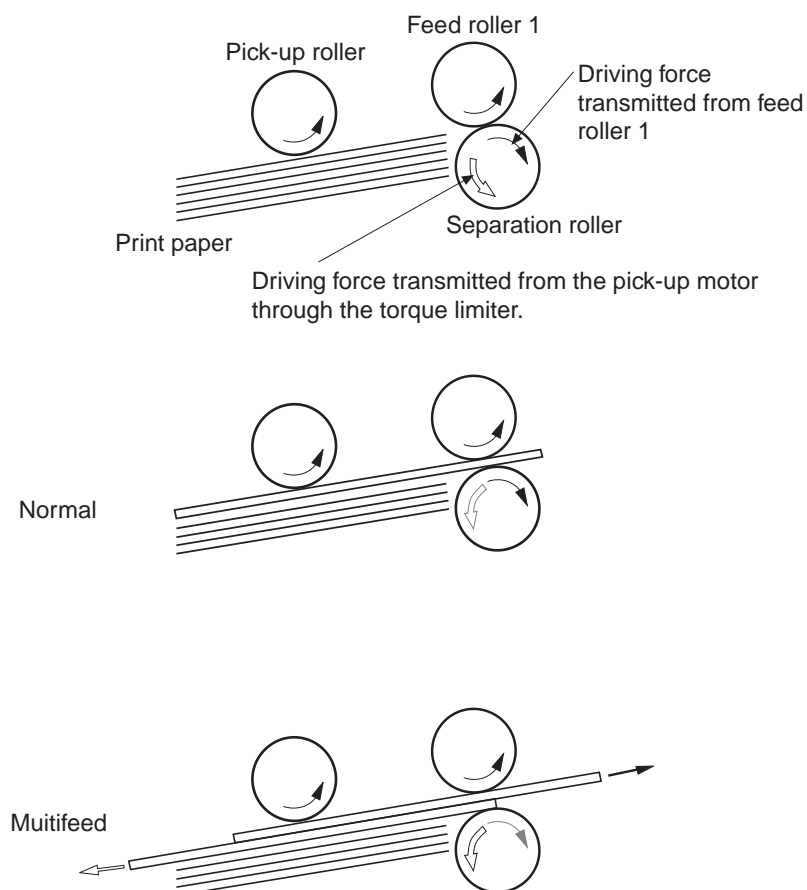

Figure 2-5-13

2. Manual feed (multi-purpose tray)

The presence of paper on the multi-purpose tray is detected by the multi-purpose tray paper sensor (PS1301).

When the DC controller receives the /PRNT signal from the video controller, the lifting plate solenoid (SL2) turns ON, the lifting plate is unlocked (the lifting plate rises), and the paper touches the pick-up roller.

The lifting plate position is detected by the lifting plate position sensor (PS1302). If the sensor detects that the lifting plate is up while waiting, SL2 is turned ON to lower the lifting plate.

The manual feed clutch (CL3) turns ON, and the main motor (MT1) power is transmitted to the manual feeding pick-up roller.

Paper pressed against the manual feeding pick-up roller by the lifting plate is picked up by the pick-up roller. Unnecessary sheets are removed by the separation pad, and one sheet is fed into the printer by feed roller 2. The subsequent operations are almost the same as for those of cassette feeding, except that SL2 is turned ON again right after the rotation of the registration roller to lower the lifting plate.

The CPU turns ON SL2 to lower the lifting plate. If it is normal, the lifting plate position sensor detects the lifting plate within about 0.5 seconds. The CPU notifies the video controller of a lifting plate position failure if the lifting plate position sensor fails to detect the lifting plate 5 times in a row when the CPU repeats this operation 5 times.

• Pick-up timing from the manual feed (A4 : two pages continuously print)
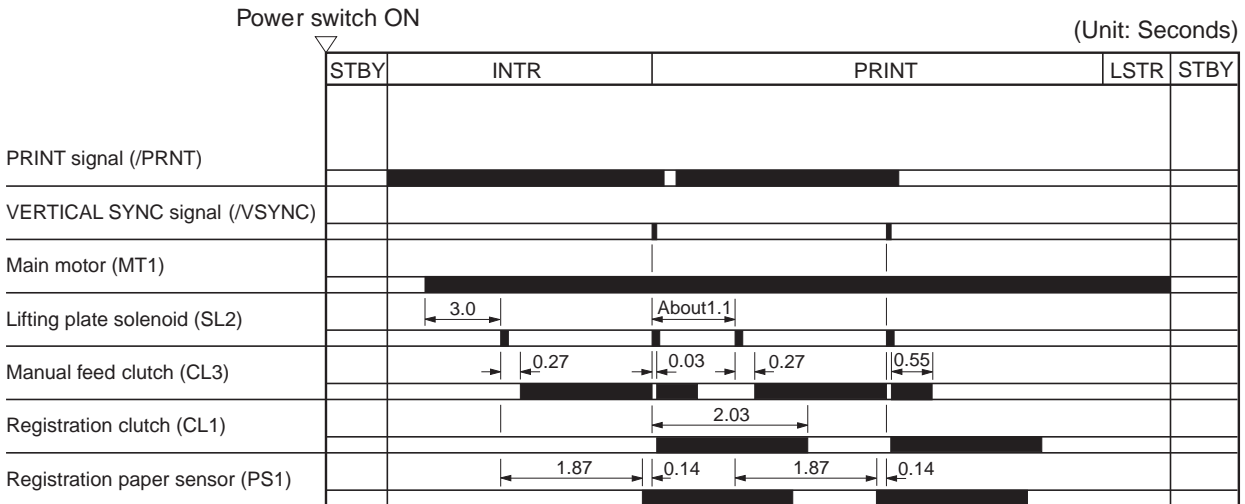
Figure 2-5-14

C. Fixing and Delivery Unit

The upper and lower rollers of the fixing unit, and the face-up and face-down delivery rollers are driven by the main motor (MT1).

The paper separated from the photosensitive drum is fed into the fixing unit, and sent from the fixing unit by the fixing roller and fixing unit delivery roller.

The paper sent from the fixing unit is detected by the fixing unit delivery sensor (PS1403).
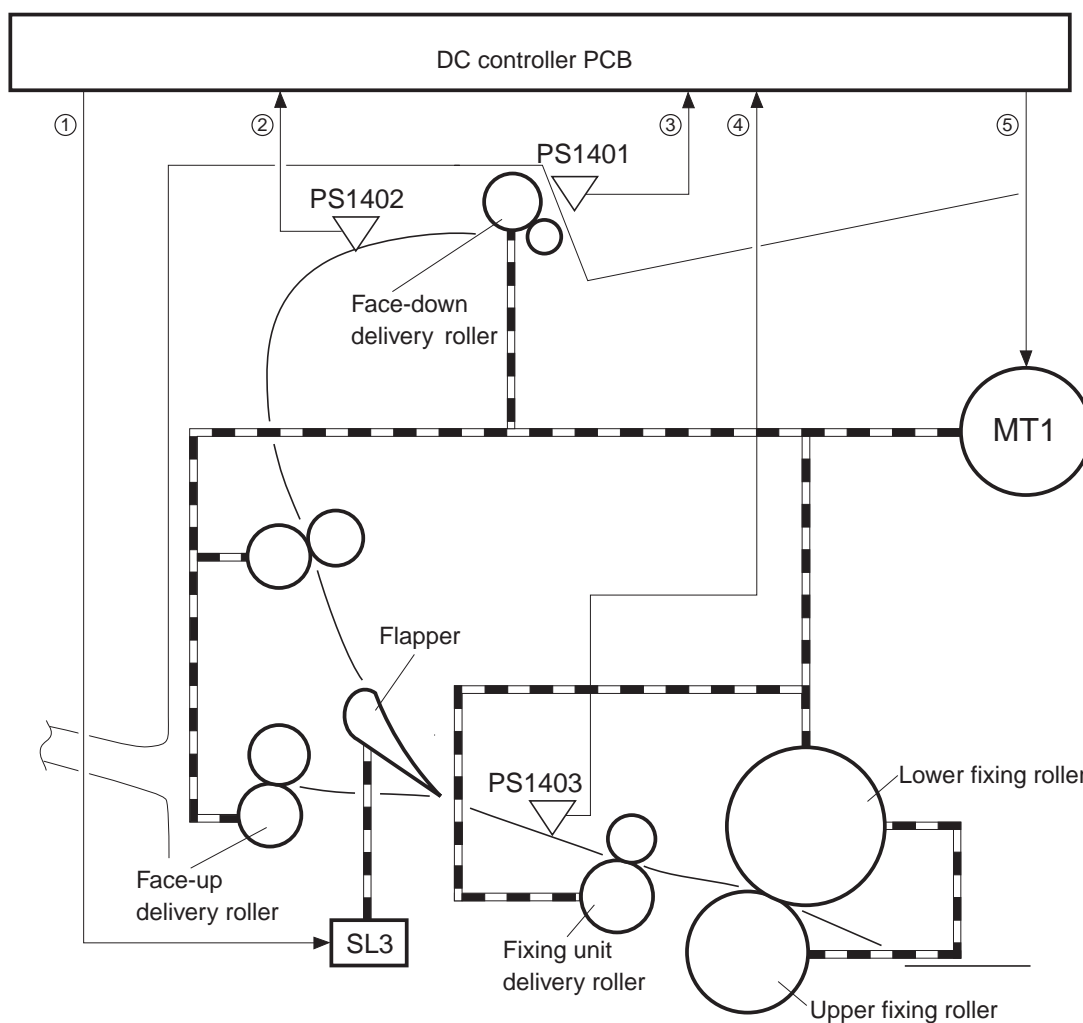
① : FACE-UP SOLENOID DRIVE signal (/FUSLD)   PS1401: Face-down tray paper full sensor
② : FACE-DOWN TRAY DELIVERY SENSE signal (FDOUTS)   PS1402: Face-down tray delivery sensor
③ : FACE-DOWN TRAY PAPER FULL SENSE signal (FDFULS)   PS1403: Fixing unit delivery sensor
④ : FIXING UNIT DELIVERY SENSE signal (/FPOUTS)   SL3: Face-up solenoid
⑤ : MAIN MOTOR DRIVE signal (/MMOTD)   MT1: Main motor

Figure 2-5-15

2 - 57

The printer switches between face-up and face-down tray delivery with the face-up deflector. When the FACE-UP SOLENOID DRIVE signal (/FUSLD) becomes "L", the face-up solenoid (SL3) moves the face-up deflector to the face-up tray and the paper is delivered through the face-up tray. If /FUSLD is "H", the paper is delivered through the face-down tray on the top of the printer.

The paper delivered through the face-down tray is detected by the face-down tray delivery sensor (PS1402). When the face-down tray becomes full, this is detected by the face-down tray paper full sensor (PS1401).

D. Paper Jam Detection

The following paper sensors are provided to detect whether paper is present and whether the paper is fed normally.

• Registration paper sensor (PS1)
• Pick-up unit paper sensor (PS2)
• Fixing unit delivery sensor (PS1403)
• Face-down tray delivery sensor (PS1402)

The microprocessor (CPU) determines whether paper is jammed by checking whether paper is present or absent at the sensors, at times stored in memory.

If the CPU determines that a jam has occurred, it stops print operation and notifies the jam to the video controller.

1. Pick-up delay jam 1

The CPU assesses a pick-up delay jam 1 if the paper does not reach the pick-up unit paper sensor (PS2) within the specified period of time after the pick-up operation.

Upper/lower cassettes: about 6.4 seconds
Duplexing unit (Option):   about 2.4 seconds
Paper deck (Option):   about 7.0 seconds

2. Pick-up delay jam 2

The CPU assesses a pick-up delay jam 2 if the registration paper sensor (PS1) cannot detect the leading edge of the paper within about 0.7 seconds after the pick-up unit paper sensor (PS2) detects the leading edge of the paper.

The CPU also assesses a pick-up delay jam 2 if the registration paper sensor (PS1) cannot detect the leading edge of the paper within about 9.5 seconds after start of pick-up operation from the multi-purpose tray or envelope feeder.

3. Fixing unit delivery delay jam

The CPU assesses a fixing unit delivery delay jam if the leading edge of the paper does not reach the fixing unit deliver sensor (PS1403) within about 2.2 seconds after receiving the VERTICAL SYNC signal (/VSYNC).

4. Fixing unit delivery stationary jam

The CPU assesses a fixing unit delivery stationary jam if the trailing edge of the paper does not pass through the fixing unit delivery sensor (PS1403) within the specified period of time (T1) after receiving the VERTICAL SYNC signal (/VSYNC).

Ledger=about 5.3 seconds, Legal=about 4.7 seconds, Letter=about 3.8 seconds,
A3=about 5.2 seconds, B4=about 4.8 seconds, A4=about 3.7 seconds

5. Face-down delivery delay jam

The CPU assesses a face-down delivery delay jam if the leading edge of the paper does not reach the face-down tray delivery sensor (PS1402) within about 3.9 seconds after receiving the VERTICAL SYNC signal (/VSYNC).

6. Face-down delivery stationary jam

The CPU assesses a face-down delivery stationary jam if the trailing edge of the paper does not pass through the face-down tray delivery sensor (PS1402) within the specified period of time (T2) after receiving the VERTICAL SYNC signal (/VSYNC).

Ledger=about 7.0 seconds, Legal=about 6.4 seconds, Letter=about 5.5 seconds,
A3=about 6.9 seconds, B4=about 6.5 seconds, A4=about 5.4 seconds

7. Residual paper jam

a. The CPU assesses a residual paper jam if the fixing unit delivery sensor (PS1403) detects the paper after the power-ON.

b. The CPU assesses a residual paper jam if it does not receive an automatic delivery command within 3 minutes after notifying the video controller of the presence of paper which can be automatically delivered out of the printer.

c. The CPU assesses a residual paper jam if one of the following sensors detects the paper after the printer has performed an automatic delivery of the relevant paper after the power switch is turned ON and the fixing roller has reached the specified temperature (150°C).

• Registration paper sensor (PS1)

• Pick-up unit paper sensor (PS2)

• Fixing unit delivery sensor (PS1403)

• Face-down tray delivery sensor (PS1402)

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VI. OVERALL CONTROL SYSTEM

A. Video Controller PCB
1. Outline
The video controller PCB receives print data consisting of code or image data sent from the external device (host computer, etc.) through the interface cable.

The print data including the contents specified by the control panel is analyzed, processed and converted into the dot data within this PCB. The dot data is sent to the engine controller PCB to turn ON/OFF the laser diode.

Figure 2-6-1 shows the location of the ICs on this PCB and Figure 2-6-2 shows the block diagram.

2. Functions by block
a. CPU (IC15)
The CPU is Motorola made 32 bit RISC microprocessor (PPC603e) and its operation frequency is 100MHz. The CPU controls the operation of the video controller PCB according to the control program stored in the ROM.

b. ASIC (IC21)
The ASIC is a graphic co-processor and has the following functions.
1) DRAM control
2) ROM control
3) Video interface control
4) IEEE 1284 parallel port interface control
5) I/O bus interface support

c. AIR (IC2)
The smoothing control circuit and SRAM are built in the AIR.
Its main functions are as follows.
1) Image smoothing control
2) EEPROM control
3) Control panel interface control

d. DRAM
8-MB DRAM is installed on the video controller PCB.
72 pin DIMM of 4-MB, 8-MB or 16-MB can be installed in the 2 slots on the PCB.

e. ROM DIMM
4-MB ROM is installed on the video controller PCB. In addition, a ROM is installed on the firmware ROM DIMM. The ROM DIMM is installed in the connector J4 on the video controller PCB.

The user can install 4-MB or 8-MB ROM DIMM in the left connector J2 and the middle connector J3. The right connector J4 is exclusively for the firmware ROM DIMM.

f. EEPROM (IC11)
The EEPROM has a memory capacity of 4-KB and is used to store the factory default values and values modified by the control panel.

2 - 61
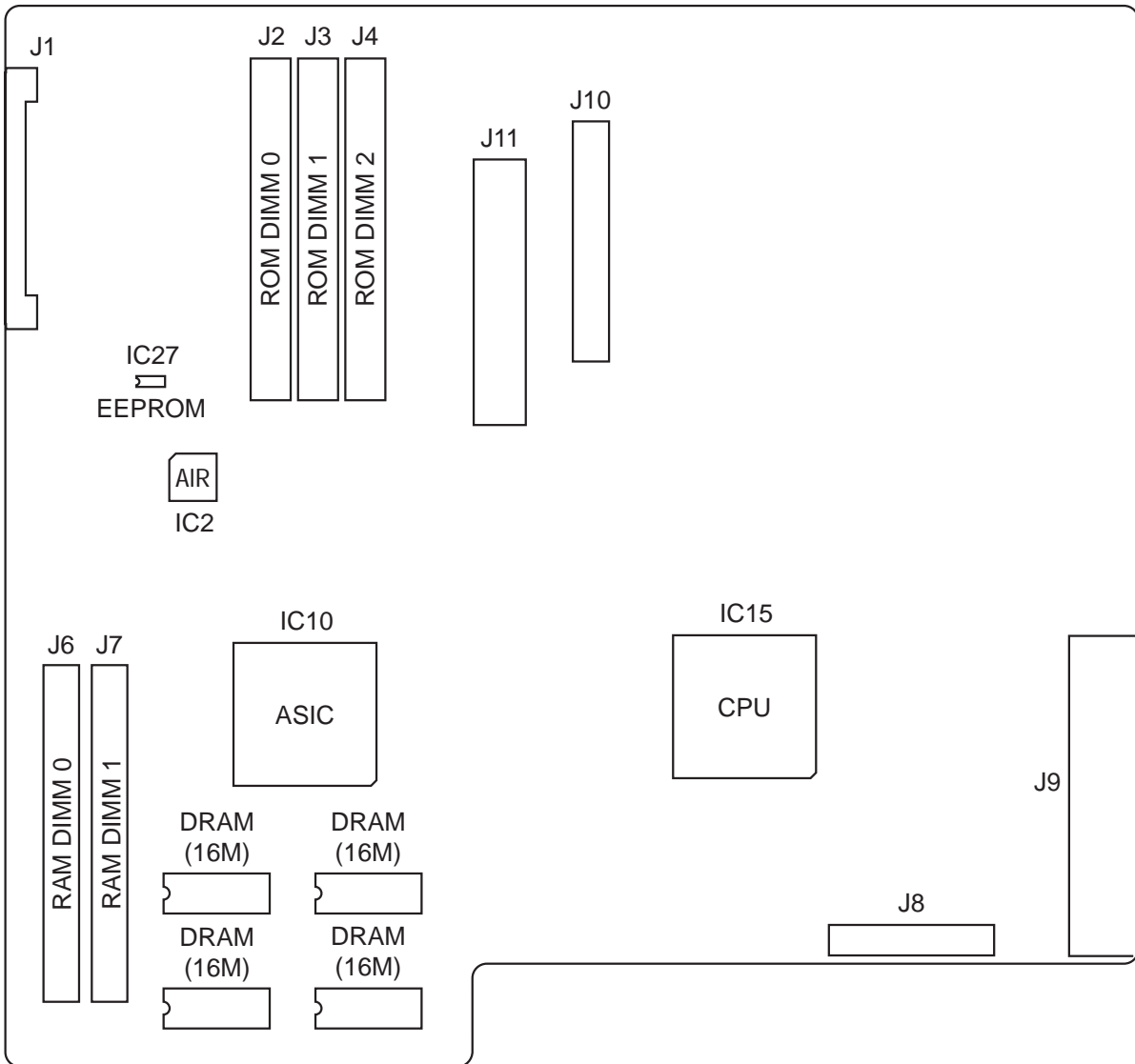
Figure 2-6-1

Video contoroller PCB Block Diagram
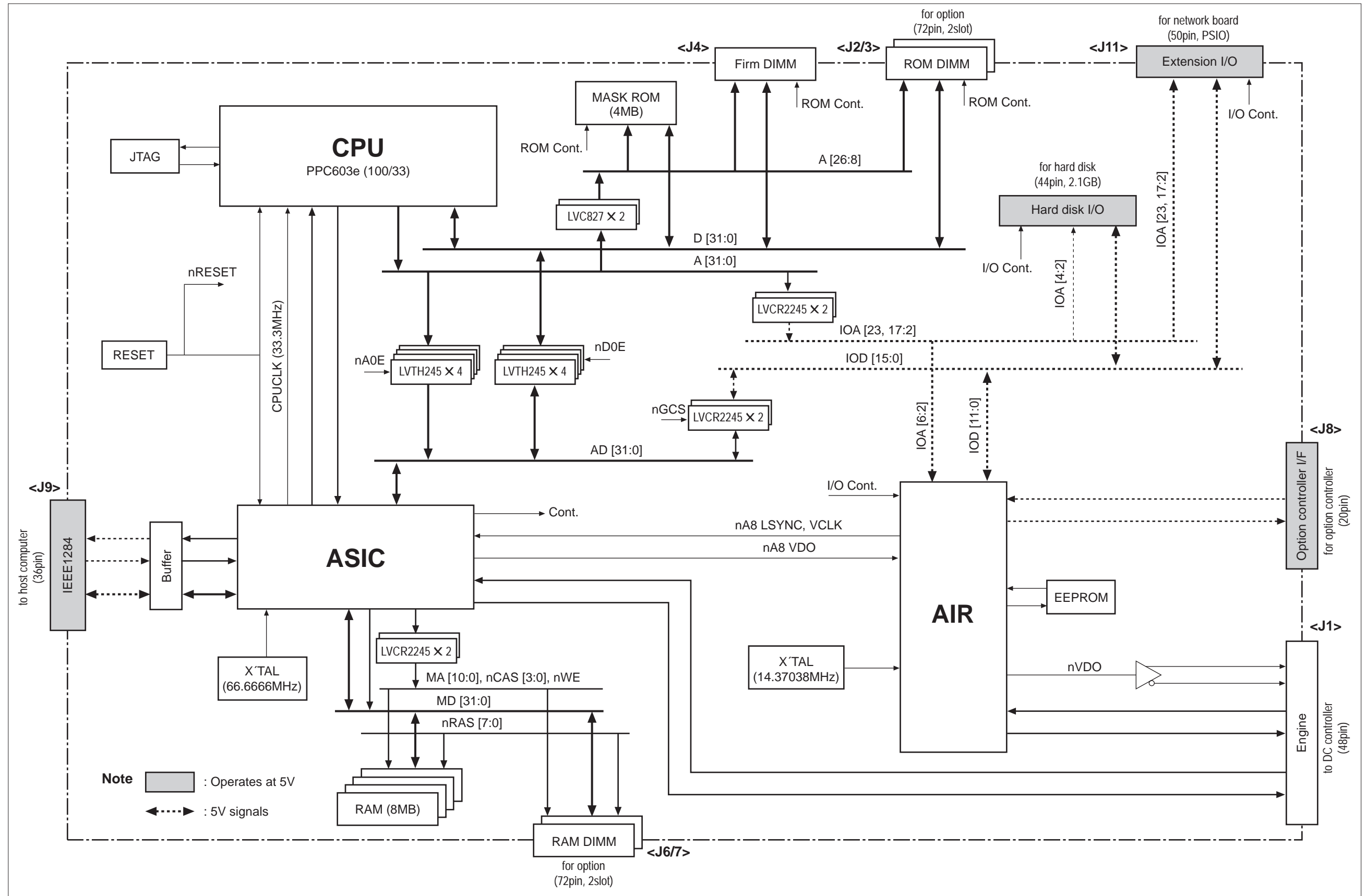
Figure 2-6-2

B. Control Panel

1. Outline

The control panel contains a LCD (20 characters x 2 lines), 9 switches, and 7 LEDs.

    The control panel is connected to the video controller PCB and has the functions listed below.

a. Displays status and error messages in the LCD.

b. Displays operation condition with the LED.

c. Changes Menus and values with the switches.

2. Operation

The LCD and LEDs on the control panel are controlled by the signals output from the video controller. The signals generated by the switches on the panel are input to the video controller.
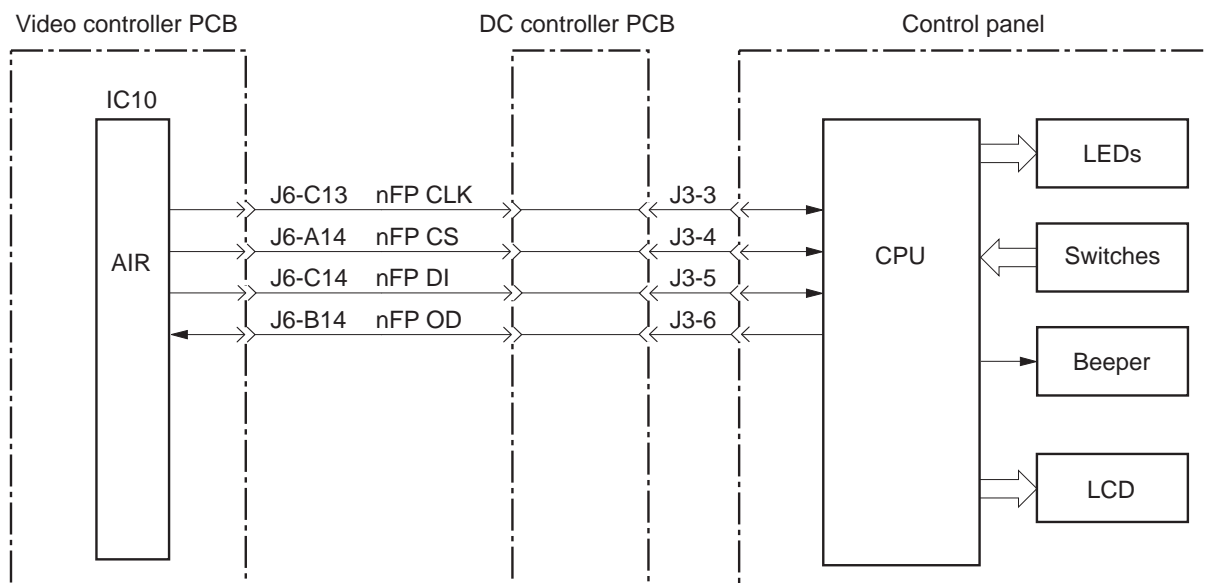
Figure 2-6-3

C. Self Test

The printer executes the self diagnostic program of the video controller to check the condition of the video controller at the power-ON. This function is called self test.

There are two types of self tests: power-ON self test and power-ON key sequence.

1. Power-ON self test

Every time the printer is turned ON, the power-ON self test is conducted following the procedure stated below.

1) Tests all the DRAMs on the video controller. Error found here will be displayed in the LCD as a service call.
2) Tests the program ROM, font ROM and optional ROM. Error found here will be displayed in the LCD as a service call.
3) Checks inside of the CPU. Error found here will be displayed in the LCD as a service call.
4) Completes the test. If an error is reported from the engine controller at this point, it will be displayed in the LCD.
5) Displays "READY" in the LCD and prints the PCL demo-page automatically.

2. Power-ON key sequence

Pressing specified keys simultaneously at the power-ON executes the specific functions. Among the following operations, only the Cold Reset sequence is for the user.

a. Cold Reset

Turn ON the printer with the On Line key pressed.
The Cold Reset resets all the printer settings to the factory default values.

b. Check Sum Functions

Turn ON the printer with the On Line and Enter keys pressed (PPG Check Sum). Or, turn ON the printer with the On Lien and Reset keys pressed (PS Check Sum).

The printer performs the check sum on the requested ROM bank. The calculated check sum will be displayed in the LCD.

c. Factory Reset Function (A4/LTR)

To reset the paper size default to A4, turn ON the printer with the Menu, Item and Shift keys pressed.

To reset the paper size default to Letter, turn ON the printer with the Menu, Item, and Plus/Minus keys pressed.

The printer uses the selected paper size (A4/Letter) as the default value, resets the page count to "0", and executes the Cold Reset. The Cold Reset executed hereafter will maintain the paper size selected here.

d. Panel Check Function

The Panel Check Function performs the control panel diagnosis and test sequence. The sequences in the Panel Check Function are as follows.

1) Turn ON the printer with the On Line and Shift keys pressed. "PANEL CHECK" message will appear in the LCD.
2) Step 3 to 11 can be executed as many times as you wish in any order.
3) Pressing the On Line key illuminates the top left half of the LCD (10 columns). Releasing the key will clear the display.
4) Pressing the Continue key illuminates the top right half (10 columns) of the LCD. Releasing the key will clear the display.
5) Pressing the Form Feed key illuminates the top line of the LCD (20 columns). Releasing the key will clear the display.

6) Pressing the Reset key illuminates the every other column of the top line of the LCD. Releasing the key will clear the display.

7) Pressing the Enter key displays "OPERATION CHECK" message. Releasing the key will clear the message.

8) Pressing the Menu key displays "OPERATION CHECK" message. Releasing the key will clear the message.

9) Pressing the Item key displays "OPERATION CHECK" message. Releasing the key will clear the message.

10) Pressing the Shift key illuminates the top line of the LCD (20 columns). Releasing the key will clear the display.

11) Pressing the +Plus/-Minus key displays "OPERATION CHECK" message. Releasing the key will clear the message.

12) When all the keys have been tested, "PANEL CHECK DONE" message appears and the DISK, STAPLE and CONTINUE LEDs keep flashing. The message starts to move in circles in about 60 seconds. This conditions is kept until the printer is turned OFF.

e. Update flash

Turn ON the printer with the Enter and Shift keys pressed.

This function supplies the flash menu for managing/down loading the firmware.

CHAPTER 3

THE MECHANICAL SYSTEM

I. PREFACE

This chapter describes disassembly and reassembly procedures of the printer.

The service technician is to find the factor of the failure according to the "Chapter 4 Troubleshooting" and to follow the disassembly procedures in this chapter to replace the defective part(s). Replacement of consumable part(s) is also to be conducted according to the procedures described in this chapter.

Note the following precautions during disassembly or reassembly.

1. At disassembly, reassembly, or transportation of the printer, remove the toner cartridge as necessary. When the cartridge is out of the printer, put it in a protective bag to prevent light from affecting it.

2. ⚠ CAUTION: Before servicing the printer, disconnect its power cord from the electrical outlet.

3. Assembly is the reverse of disassembly unless otherwise specified.

4. Note the lengths, diameters, and locations of screws as you remove them. When reassembling the printer, be sure to use them in their original locations.

5. As a general rule, do not operate the printer with any parts removed.

6. Discharge electrical static from your body by touching the metal frame of the printer prior to handling the PCBs in order to avoid causing damage by the difference in static charge at that time.

II. EXTERNALS

A. Locations
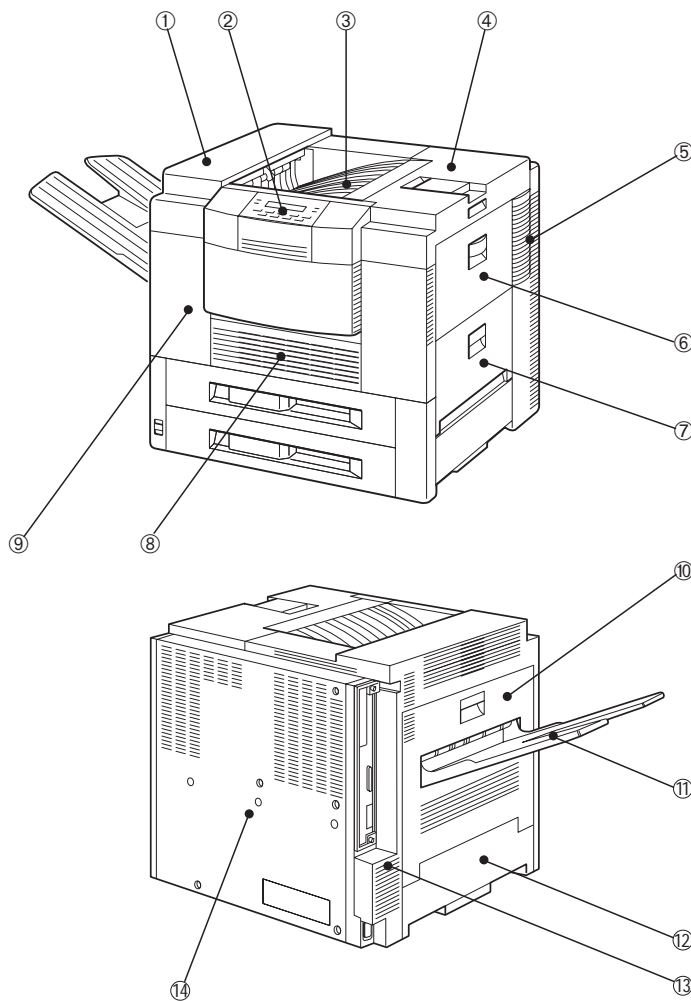
1: Upper cover unit   2: Operation panel unit
3: Face-down tray   4: Upper cover
5: Right rear cover   6: Multi-purpose tray
7: Pick-up unit door   8: Duplexing unit door
9: Front cover   10: Delivery cover unit
11: Face-up tray   12: Left lower cover
13: Left rear cover   14: Rear cover

Figure 3-2-1

Follow the procedures below to remove the cover(s) as required when cleaning, inspecting, or repairing inside the printer.

The procedures for the covers, which can be removed simply by removing screws without removing other parts, are omitted.

3 - 2

1. Face-down tray
1) Open the upper cover.
2) Holding the knob, remove the lock lever. Close the upper cover and then take out the face-down tray.

① Upper cover   ② Knob
③ Lock lever   ④ Face-down tray

Figure 3-2-2

2. Front cover
1) Remove the upper cassette.
2) Open the upper cover.
3) Open the duplexing unit door.
4) Remove the 3 screws.

① Duplexing unit door
② Screws

Figure 3-2-3

5) Open the delivery cover unit and unhook the claw.
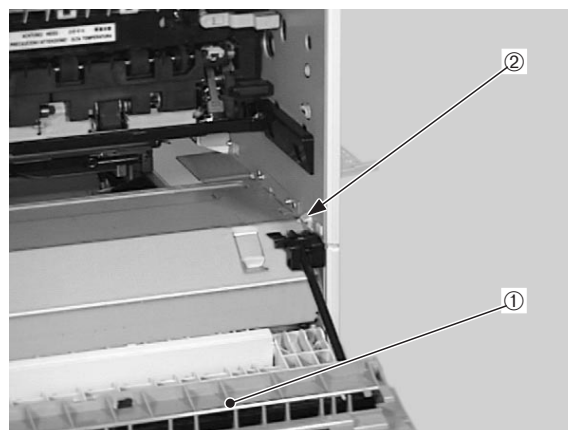
① Delivery cover unit
② Claw

Figure 3-2-4

6) Open the pick-up unit door, unhook the claw, and then remove the front cover.
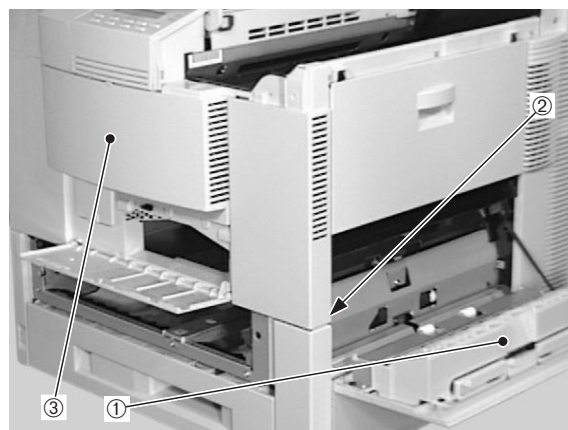
① Pick-up unit door
② Claw
③ Front cover

Figure 3-2-5

3 - 3

3. Upper cover unit
1) Remove the face-down tray.
2) Remove the 2 screws.

① Screws

Figure 3-2-6

3) Open the delivery cover unit and then remove the 2 screws.

① Screws

Figure 3-2-7

4) Pulling the knob toward you, lift the upper cover unit and disconnect the connector from the inside.

① Knob   ② Upper cover unit

Figure 3-2-8

5) Unhook the 2 claws and then remove the control panel unit.
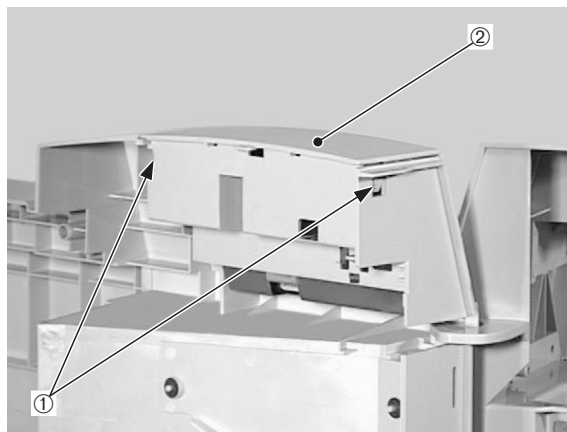
① Claws   ② Control panel unit

Figure 3-2-9

3 - 4

4. Rear cover
1) Open the upper cover.
2) Open the pick-up unit door.
3) Remove the 2 screws, unhook the claw, and then remove the right rear cover.
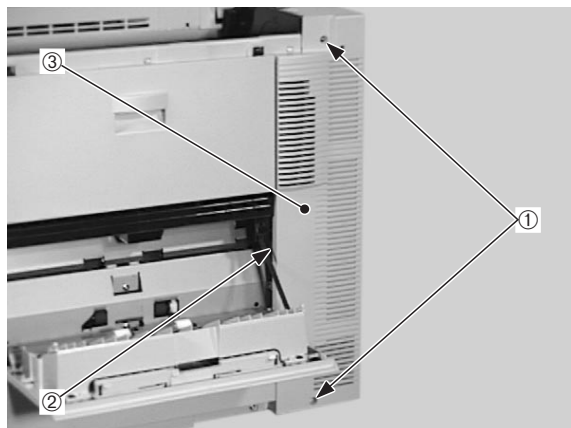
① Screws   ② Claw
③ Right rear cover

Figure 3-2-10

4) Remove the 6 screws and then the rear cover.
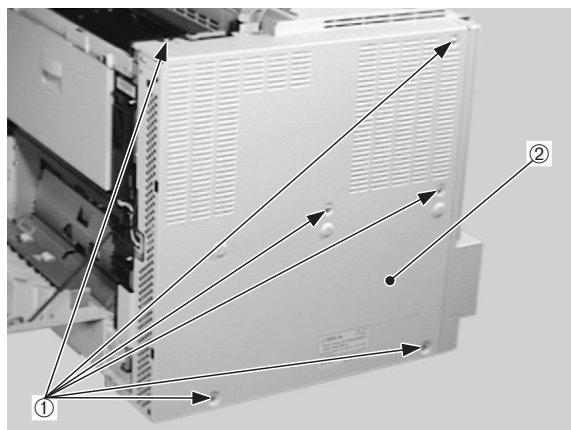
① Screws   ② Rear cover

Figure 3-2-11

5. Delivery cover unit
1) Open the delivery cover unit.
2) Remove the 2 rods that hold the delivery cover unit to the printer.
3) Lifting up the delivery cover unit slightly, remove the right and then the left side of the unit.
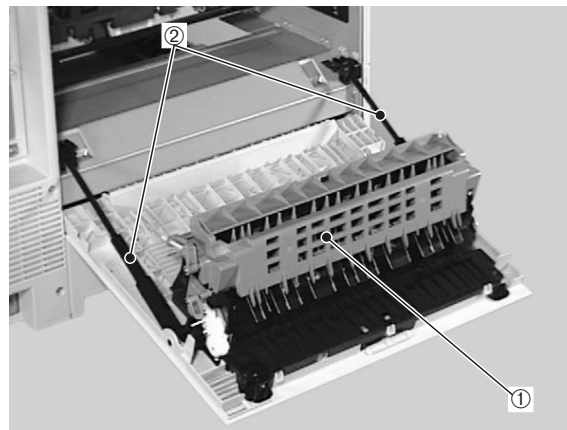
① Delivery cover unit
② Rods

Figure 3-2-12

6. Multi-purpose tray
1) Open the multi-purpose tray.
2) Unhook the 2 claws that hold the multi-purpose tray to the printer and pull out the tray toward you.

① Claws
② Multi-purpose tray

Figure 3-2-13

3 - 5

7. Right cover unit
1) Remove the upper and lower cassettes.
2) Remove the front cover.
3) Remove the right rear cover.
4) Remove the hinge and then the 4 screws from the right cover unit.
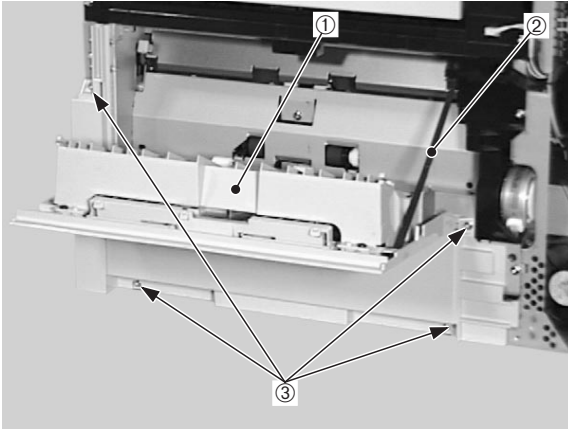
① Right cover unit ② Hinge
③ Screws

Figure 3-2-14

5) Unhook the 2 claws from the inside and then remove the right cover unit.

① Claws   ② Right cover unit

Figure 3-2-15

8. Left rear cover
1) Remove the rear cover.
2) Open the delivery cover unit.
3) Remove the 3 screws and then the left rear cover.

① Screws   ② Left rear cover

Figure 3-2-16

9. Left lower cover
1) Remove the upper and lower cassettes.
2) Remove the rear cover.
3) Remove the left rear cover.
4) Remove the delivery cover unit.
5) Remove the 2 screws.
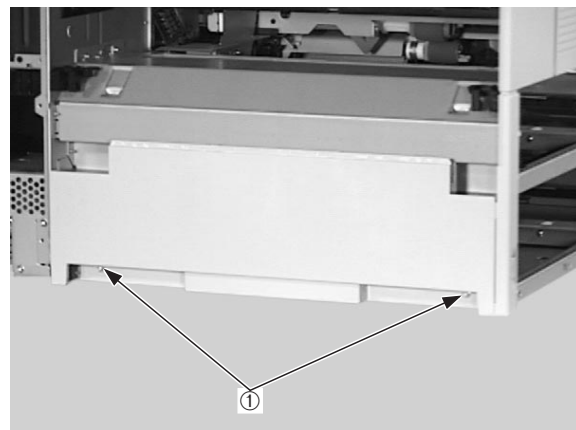
① Screws

Figure 3-2-17

3 - 6

6) Unhook the 2 claws from the inside and then remove the left lower cover.

① Claws   ② Left lower cover

Figure 3-2-18

B. Control Panel Unit
1) Remove the front cover.
2) Unhook the 2 claws. Lifting the control panel unit, disconnect the connector from the inside.
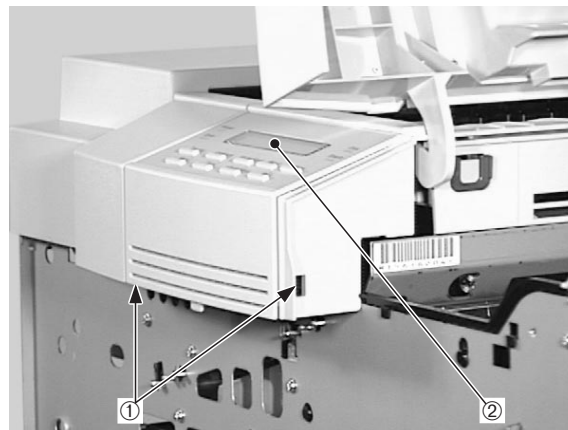
① Claws   ② Control panel unit

Figure 3-2-19

3 - 7

III. MAIN UNITS

A. Laser/Scanner Unit

1) Remove the upper cover unit.
2) Disconnect the 3 connectors from the laser/scanner unit.
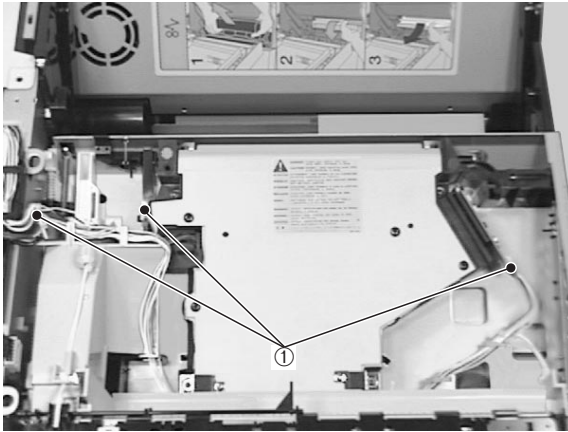
① Connectors

Figure 3-3-1

3) Remove the 4 screws and the laser/scanner unit.
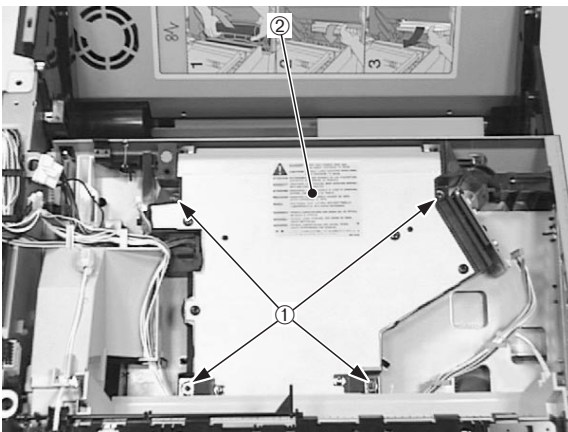
① Screws   ② Laser/scanner unit

Figure 3-3-2

Note: Do not disassemble the laser/scanner unit as it cannot be adjusted in the field

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B. Drive Unit

1) Remove the pick-up unit following steps 1-7 on Page 3-9.
2) Remove the screw, and then the cassette stay.
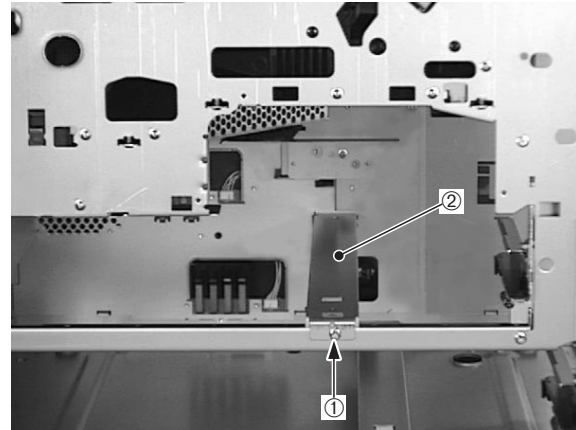
① Screw   ② Cassette stay

Figure 3-3-3

3) Disconnect the claw, and then the clutch cover.
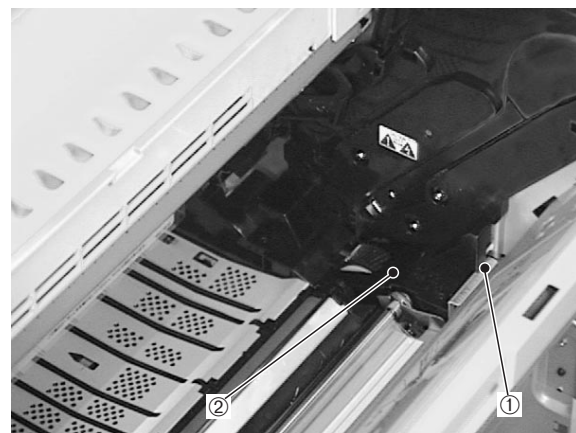
① Claw   ② Clutch cover

Figure 3-3-4

3 - 8

4) Remove the high-voltage power supply unit following steps 1-3 on Page 3-47.
5) Undo the connector, remove the 4 screws and then the main motor.
6) Remove the 2 screws and the drive unit.
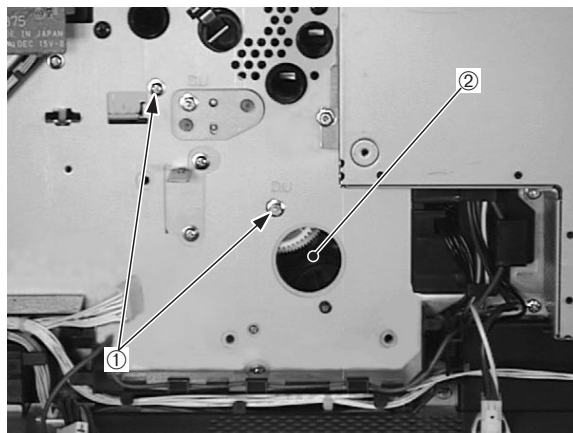
① Screws   ② Drive unit

Figure 3-3-5

C. Pick-up Unit
1) Pull out the upper and lower cassettes.
2) Perform steps 1-6 on Page 3-12 to remove the multi-purpose tray pick-up unit.
3) Remove the right cover.
4) Undo the connector and remove the cable from the cable guide.
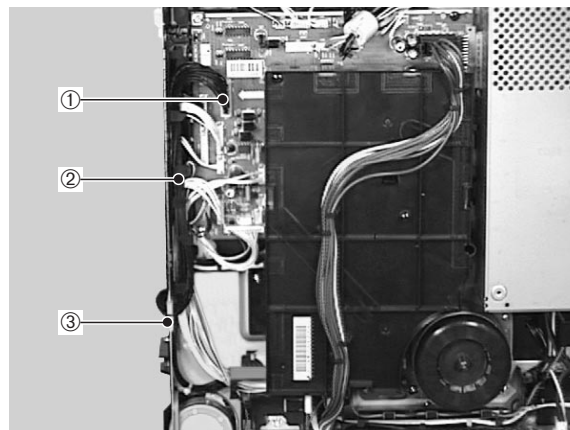
① Connector   ② Cable
③ Cable guide

Figure 3-3-6

5) Perform steps 1-2 on Page 3-17 to remove the pick-up, feed and separation rollers.
6) Remove the screw (M3x10).
7) Remove the 3 screws (M3x8), and take out the pick-up unit.
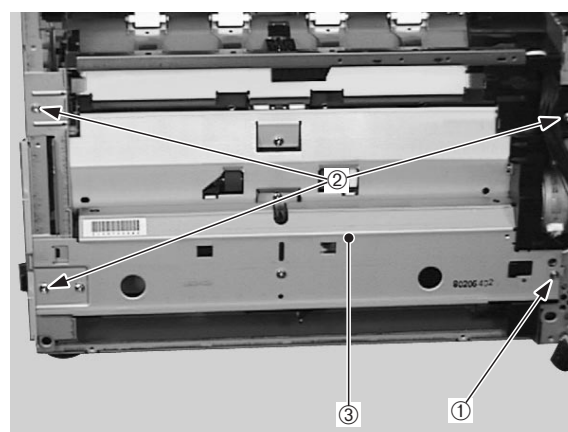
① Screw (M3×10)   ② Screw (M3×8)
③ Pick-up unit

Figure 3-3-7

3 - 9

Notes: 1. While replacing parts in the pick-up unit, to prevent grease from getting on the pick-up, feed and separation rollers, be sure to remove them before working on the unit. Take care not to get grease on the paper feed guide.

2. Be sure to grease the parts shown in figure 3-3-8 when exchanging, to prevent noise.

The type of grease (do not use grease other than the specified type) and the method of application is explained below:

Apply about one drop (1mm diameter) of HY9-0007 to the contact surface (a) of the roller holder (1) and shaft (2).

Apply a few drops (total:5mm diameter) of CK-8009 to 3 or more continuous cogs of the parts 3 to 9.

Apply CK-8009 to the whole cog surface of the lifter (10) thinly.
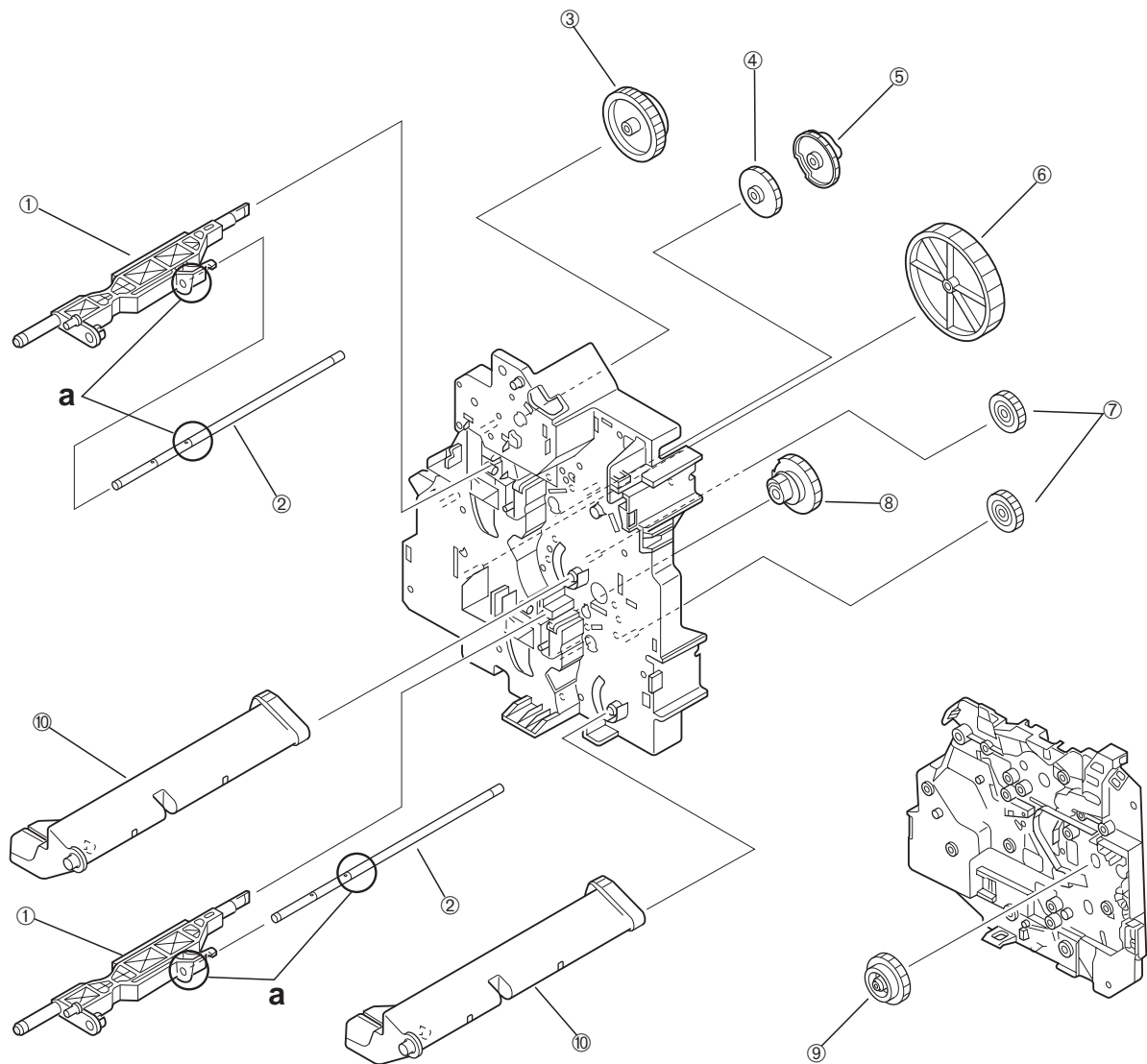
① Roller holder
③ 57T gear
⑤ Pick-up cam
⑦ 20T/41T gear
⑨ 31T/47T gear

② Shaft
④ Upper lift-up cam
⑥ 100T gear
⑧ Lower lift-up cam
⑩ Lifter

Figure 3-3-8

D. Multi-purpose Tray Pick-up Unit
1) Remove the front cover.
2) Remove the rear cover.
3) Remove the multi-purpose tray.
4) Open the pick-up unit door.
5) Disconnect the 2 connectors, and then remove the cable from the cable guide.
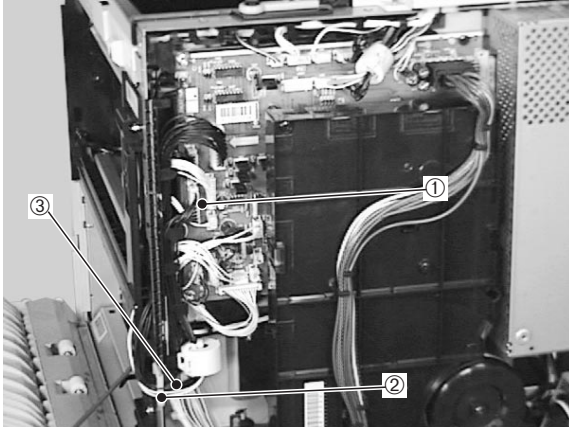
① Connectors   ② Cable guide
③ Cable

Figure 3-3-9

6) Remove the 4 screws, and then the multi-purpose tray pick-up unit.
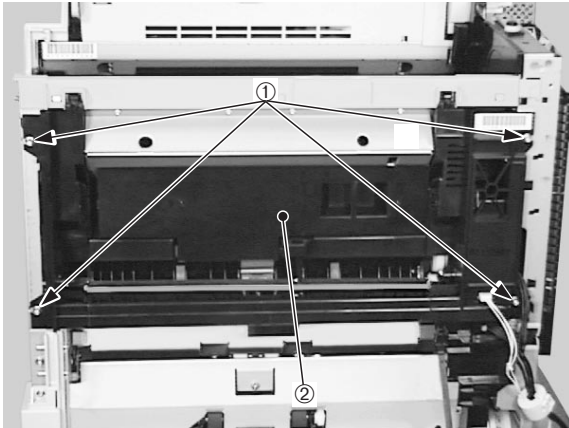
① Screws
② Multi-purpose tray pick-up unit

Figure 3-3-10

E. Registration Roller Unit
1) Open the upper cover.
2) Remove the clutch cover.
3) Open the transfer charging roller guide.

① Transfer charging roller guide

Figure 3-3-11

4) Undo the connector.
5) Remove the 4 screws and take out the registration roller unit.
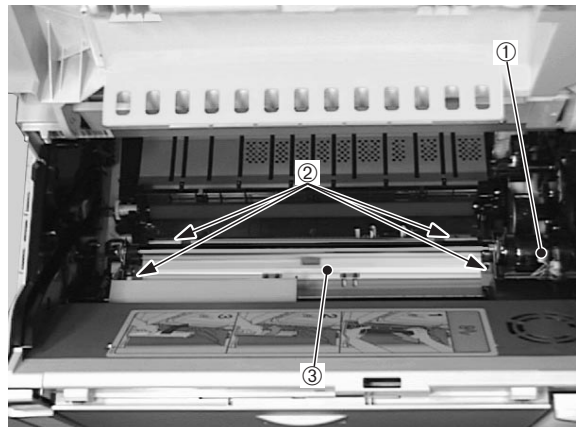
① Connector
② Screws
③ Registration roller unit

Figure 3-3-12

3 - 12

F. Delivery Unit
1) Remove the upper cover unit.
2) Remove the front cover.
3) Remove the right rear and rear covers.
4) Remove the left rear cover.
5) Disconnect the connector and remove the 3 screws.
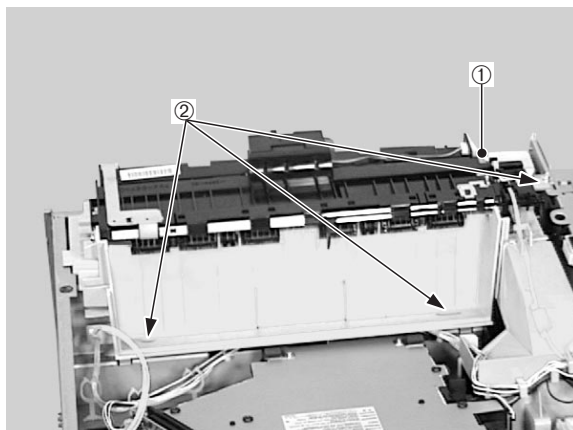
① Connector   ② Screws

Figure 3-3-13

6) Remove the 2 screws.
7) Slightly lift the delivery unit up then pull it out toward you.
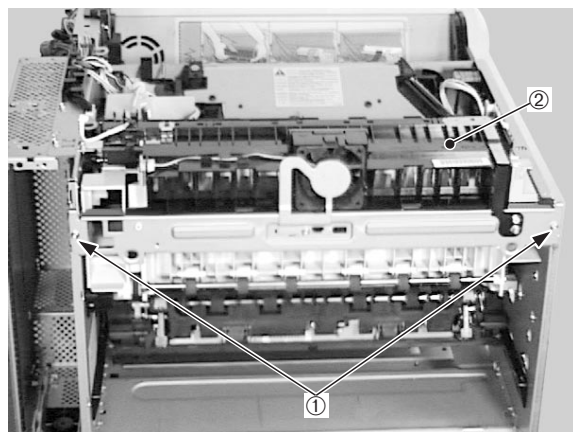
① Screws   ② Delivery unit

Figure 3-3-14

G. Fixing Unit
1) Open the delivery cover unit.
2) Move the 2 fastening levers of the fixing unit in the direction of the arrow, slightly lift the fixing unit, and pull it out toward you.

① Fixing unit fastening levers
② Fixing unit

Figure 3-3-15

3 - 13

Notes: 1. When replacing the fixing unit, be sure to confirm the location of the fixing unit envelope lever before replacement and then position it the same way after installing the new fixing unit.
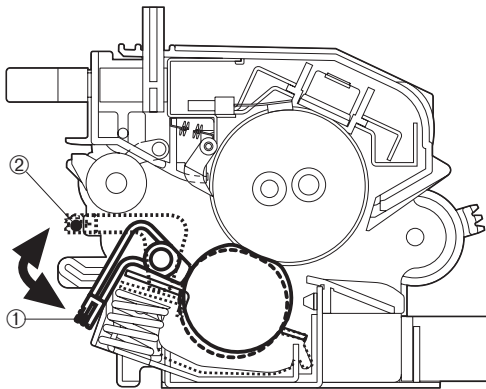
① Normal mode   ② Envelope mode

Figure 3-3-16

2. Make sure to turn the power OFF and unplug the power cord before replacing the fixing unit. After power-OFF, wait for a while to allow the fixing unit to cool down.

H. Feed Unit

1) Remove the registration roller unit following steps 1-5 on Page 3-12.
2) Remove the transfer charging roller.
3) Remove the fixing unit following steps 1-2 on Page 3-13.
4) Remove the high-voltage power supply unit following steps 1-2 on Page 3-47.
5) Remove the screw.
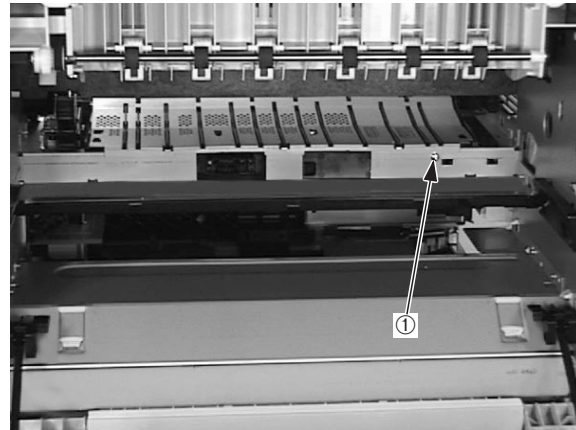
① Screw

Figure 3-3-17

6) Disconnect the connector.
7) Remove the 2 screws.
8) Remove the 4 claws and then the feed unit.
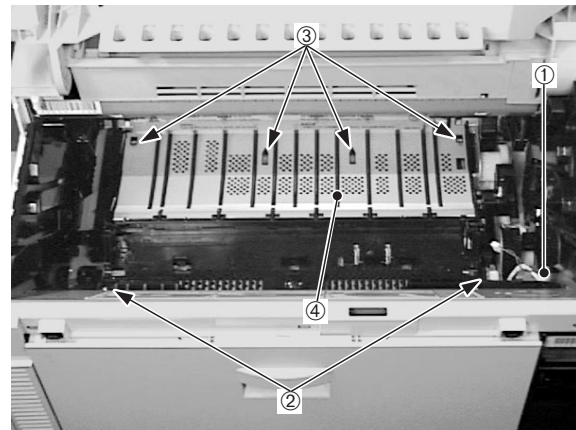
① Connector   ② Screws
③ Claws   ④ Feed unit

Figure 3-3-18

3 - 14

IV. MAIN PARTS

A. Locations
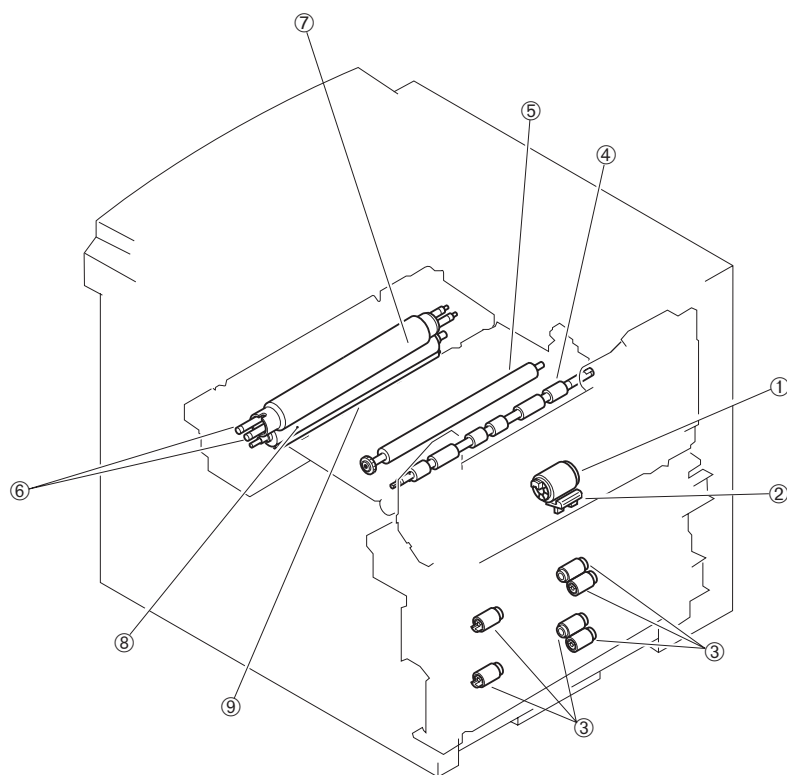
① Multi-purpose tray pick-up roller   ② Separation pad
③ Pick-up/Feed/Separation rollers   ④ Registration lower roller
⑤ Transfer charging roller   ⑥ Fixing roller heater
⑦ Fixing upper roller   ⑧ Fixing lower roller
⑨ Cleaning roller

Figure 3-4-1

B. Multi-purpose Tray Pick-up Roller

1) Open the multi-purpose tray.
2) Remove the cover.

① Cover

Figure 3-4-2

3) While pressing the lifting plate, grasp the multi-purpose tray pick-up roller knob, and pull out the roller.
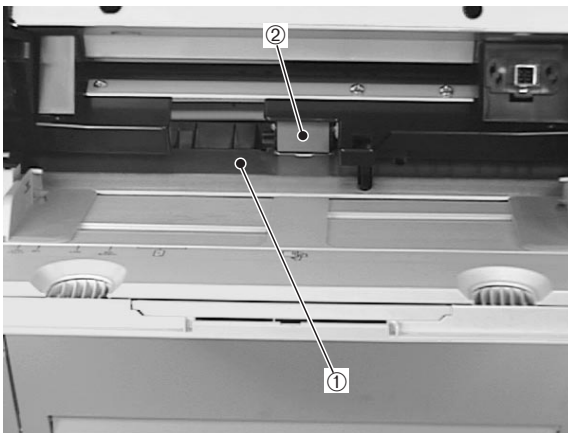
① Lifting plate
② Multi-purpose tray pick-up roller

Figure 3-4-3

C. Separation Pad

1) Open the multi-purpose tray.
2) Remove the cover.
3) Remove the multi-purpose tray pick-up roller.
4) Use a flat-bladed screwdriver to remove the separation pad.
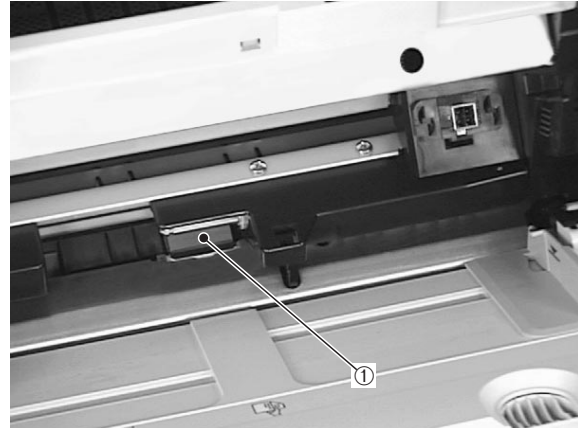
① Separation pad

Figure 3-4-4

3 - 16

D. Pick-up/Feed/Separation Rollers

1) Pull out the upper and lower cassettes.
2) Grasp the knobs of each roller and pull the rollers out of the printer.
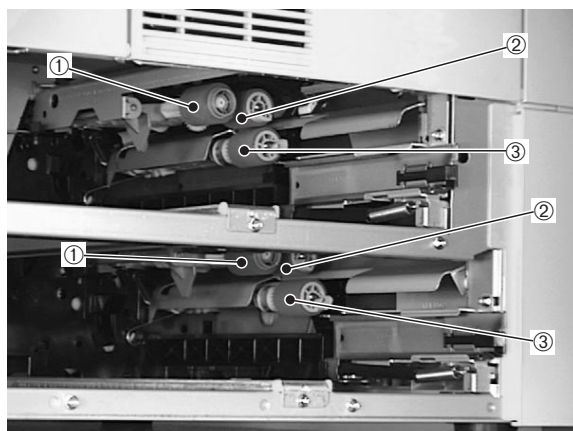
① Pick-up roller   ② Feed roller
③ Separation roller

Figure 3-4-5
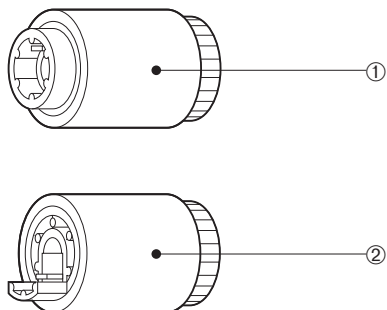
① Pick-up roller
② Feed roller/Separation roller

Figure 3-4-6

Note: Be sure to replace the feed roller and the separation roller together.

E. Registration Lower Roller

1) Remove the registration roller unit following steps 1-5 on Page 3-12.
2) Remove the registration clutch.
3) Remove the spring, the E-ring and the bushing.
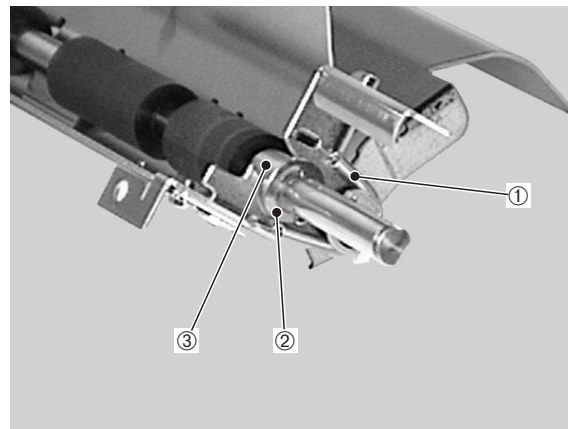
① Spring   ② E-ring
③ Bushing

Figure 3-4-7

4) Remove the gear, the spring, the E-ring, the bushing, and then the registration lower roller.
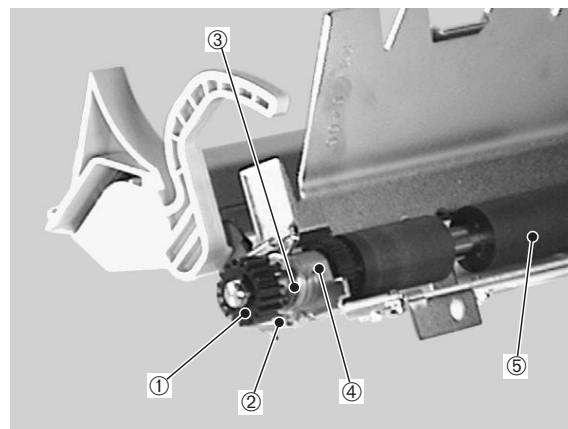
① Gear
② Spring
③ E-ring
④ Bushing
⑤ Registration lower roller

Figure 3-4-8

3 - 17

F. Transfer Charging Roller

1) Open the upper cover.
2) Open the transfer charging roller guide.
3) Pinch the gear, lift it slightly, and slide it to the left. Remove the transfer charging roller.
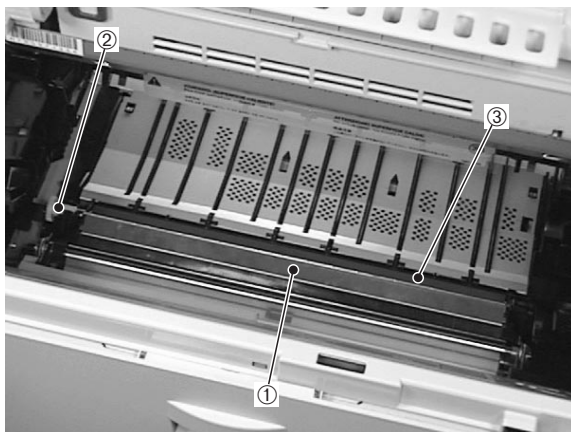
① Transfer charging roller guide
② Gear
③ Transfer charging roller

Figure 3-4-9

< Notes for reassembly >
Hold the shaft and bushing, not the sponge area, of the transfer charging roller when installing the roller.

G. Fixing Roller Heater

1) Remove the fixing unit following steps 1-2 on Page 3-13.
2) Disconnect the 2 claws that hold the wire cover to the fixing unit, and then remove the wire cover.
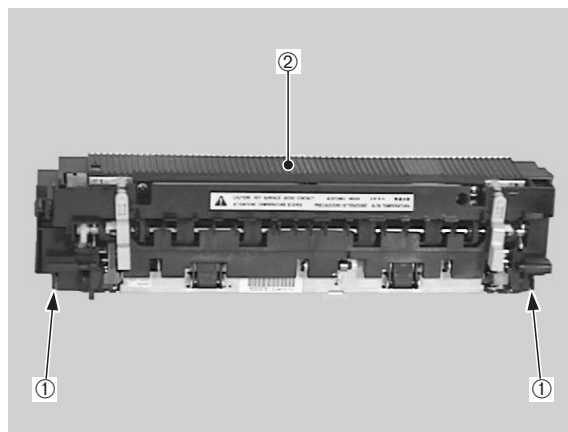
① Claws   ② Wire cover

Figure 3-4-10

3) Unhook the claw, and then remove the fixing entry guide.
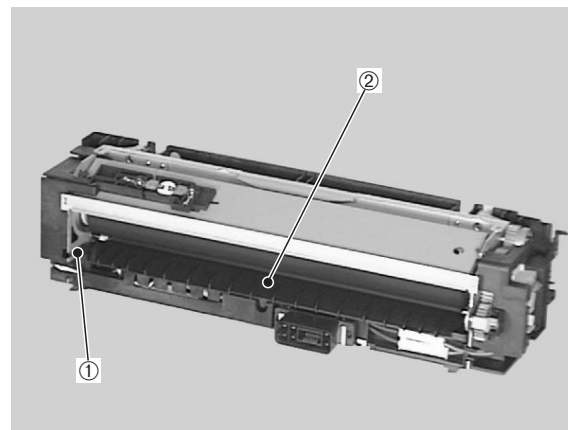
① Claw   ② Fixing entry guide

Figure 3-4-11

4) Take out the 4 connectors.
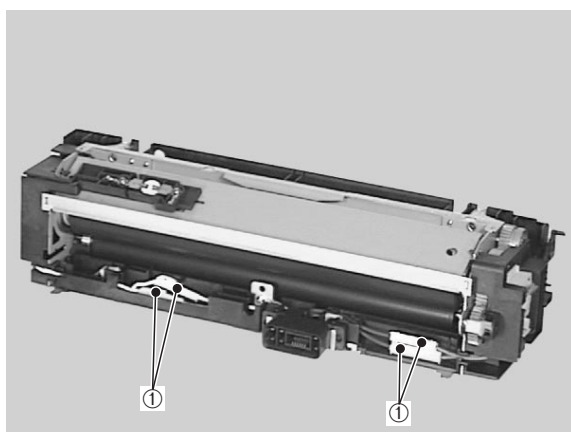
① Connectors

Figure 3-4-12

5) Disconnect the heater claw of the holder and remove the holder. Then, gently pull out the fixing heater from the fixing upper roller.
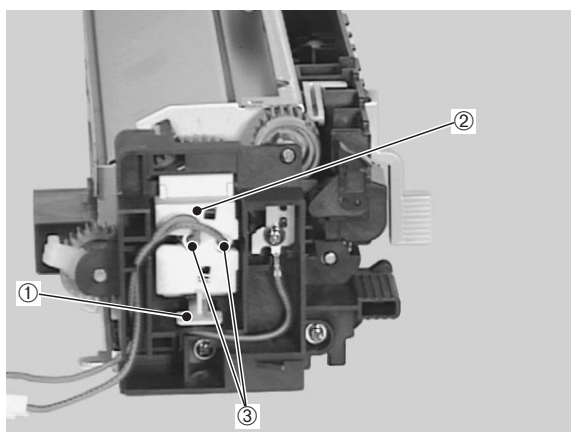
① Claw
② Heater holder
③ Fixing roller heater

Figure 3-4-13

H. Fixing Upper Roller
1) Remove the fixing unit following steps 1-2 on Page 3-13.
2) Hold up the left and right levers in the direction of the arrow.
3) Remove the 2 screws.
4) Remove the claw then remove the separation upper guide while pulling out the separation lower guide.
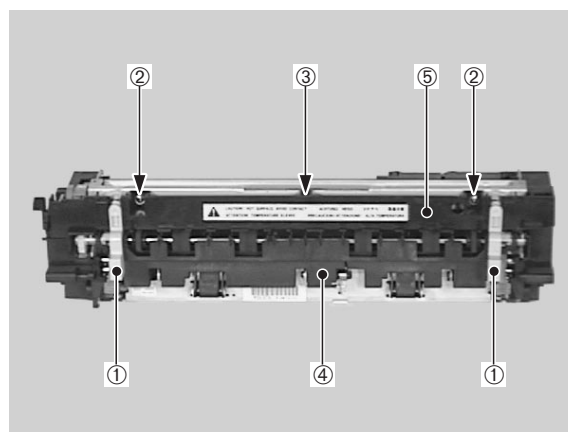
① Fixing unit fastening levers
② Screws
③ Claw
④ Separation lower guide
⑤ Separation upper guide

Figure 3-4-14

3 - 19

5) Remove the E-ring and the spring, then pull out the separation lower guide toward you and slide it off in the direction of the arrow.
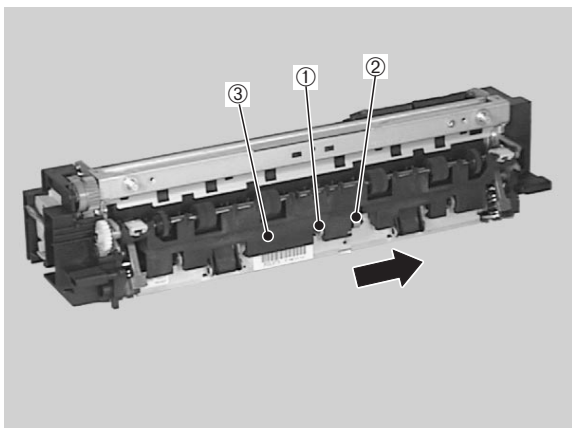
① E-ring
② Spring
③ Separation lower guide

Figure 3-4-15

6) Remove the fixing roller heater following steps 2-5 on Page 3-18.
7) Remove the thermoswitch following step 3 on Page 3-25.
8) Remove the thermistor following steps 3-4 on Page 3-26.

9) Remove the screw and diode holder.
10) Remove the screw and the right fixing cover.
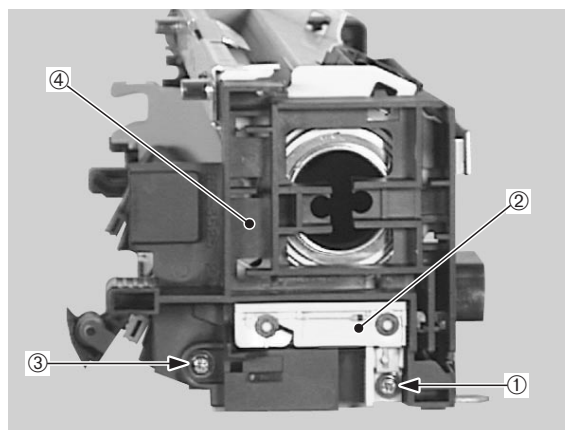
① Screw   ② Diode holder
③ Screw   ④ Right fixing rcover

Figure 3-4-16

11) Remove the 2 screws (M3), stepped screw, and then the left fixing cover.
12) Remove the 4 gears.
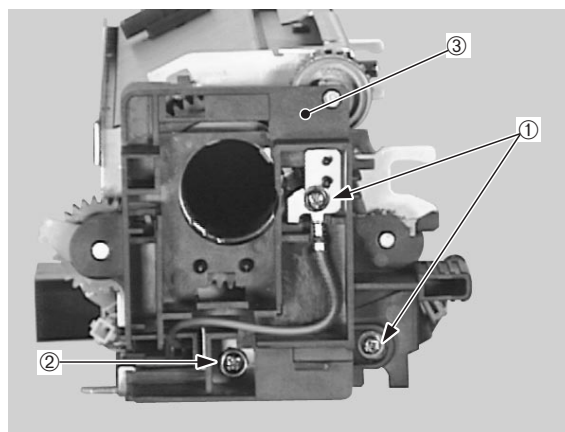
① Screws (M3)   ② Stepped screw
③ Left fixing cover

Figure 3-4-17

13) Remove the screw, and the thermoswitch stay.
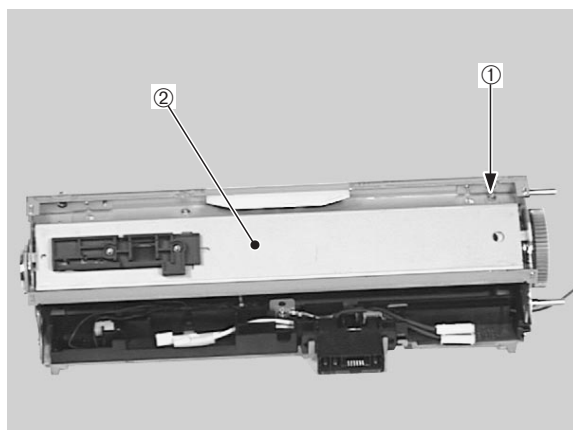
① Screw
② Thermoswitch stay

Figure 3-4-18

14) Remove the screw, undo the 2 claws, and take off the fixing roller cover.
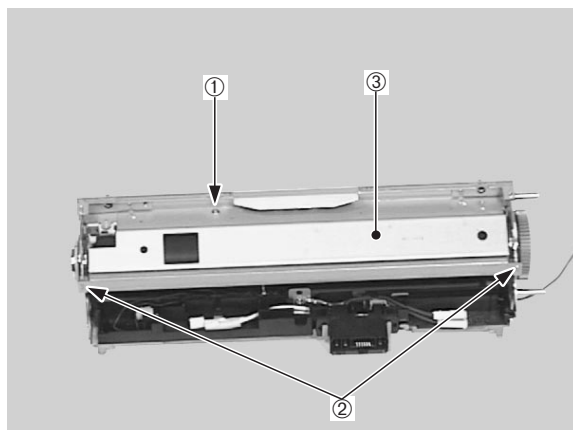
① Screw
② Claw
③ Fixing roller cover

Figure 3-4-19

15) Remove the grounding ring.
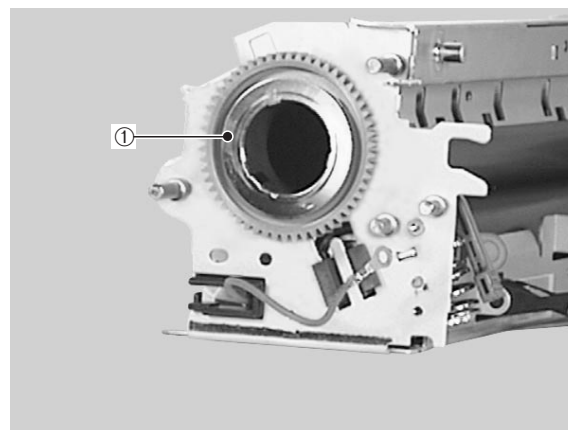
① Grounding ring

Figure 3-4-20

16) Remove the C-ring and the gear.
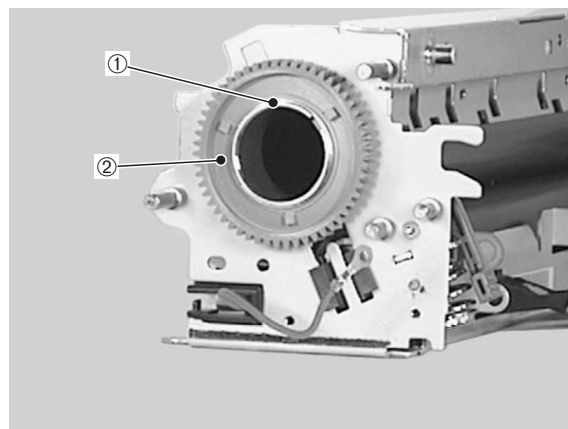
① C-ring   ② Gear

Figure 3-4-21

3 - 21

17) Removing the insulating bushing.
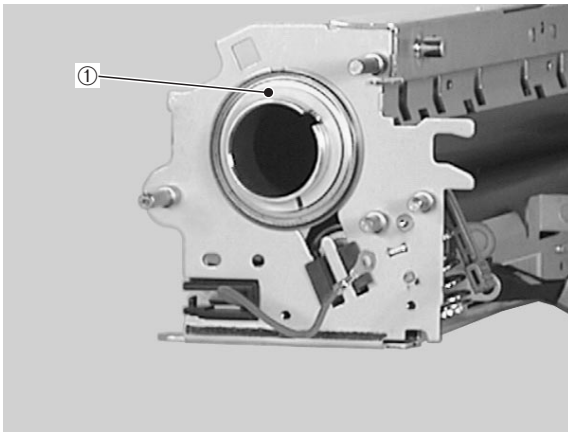
① Insulating bushing

Figure 3-4-22

18) Remove the C-ring, O-ring and insulating bushing.
19) Remove the bearing and the fixing upper roller.
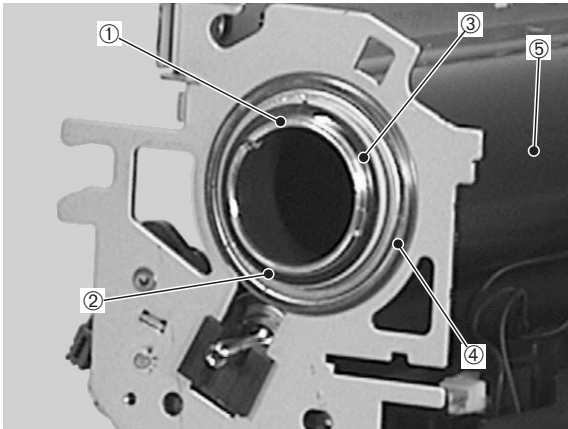
① C-ring
② O-ring
③ Insulating bushing
④ Bearing
⑤ Fixing upper roller

Figure 3-4-23

I. Fixing Lower Roller
1) Remove the fixing unit following steps 1-2 on Page 3-13.
2) Remove the fixing upper roller following steps 2-19 from Page 3-19.
3) Remove the fixing lower roller.
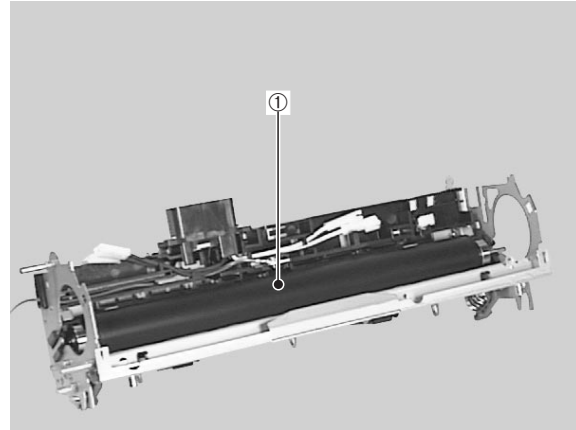
① Fixing lower roller

Figure 3-4-24

3 - 22

J. Cleaning Roller

1) Remove the fixing unit following steps 1-2 on Page 3-13.

2) Remove the fixing lower roller following steps 2-3 on Page 3-22.

3) Remove the cleaning roller.
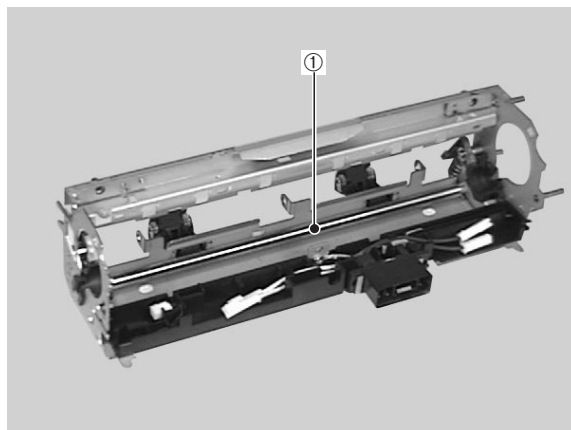
① Cleaning roller

Figure 3-4-25

V. SWITCHES/SENSORS

A. Locations
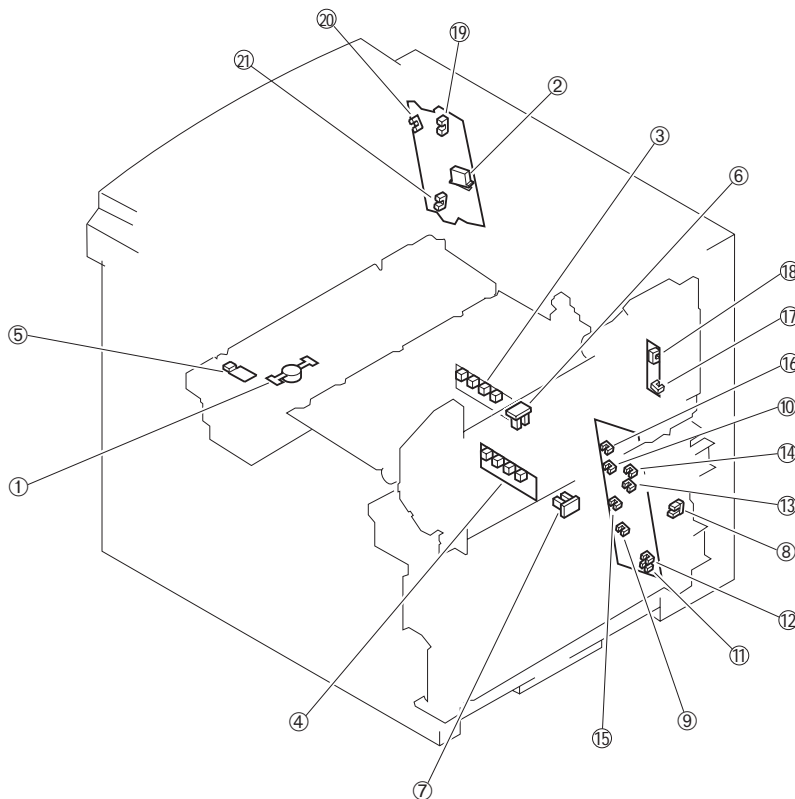
1: Thermoswitch   2: Door switch
3: Upper cassette paper-size sensing switch   4: Lower cassette paper-size sensing switch
5: Thermistor   6: Registration paper sensor
7: Pick-up unit paper sensor   8: Pick-up unit door sensor
9: Lower cassette sensor   10: Upper cassette sensor
11: Lower cassette paper-level sensor 1   12: Lower cassette paper-level sensor 2
13: Upper cassette paper-level sensor 1   14: Upper cassette paper-level sensor 2
15: Lower cassette paper-out sensor   16: Upper cassette paper-out sensor
17: Multi-purpose tray paper sensor   18: Lifting plate position sensor
19: Face-down tray paper full sensor   20: Face-down tray delivery sensor
21: Fixing unit delivery sensor

Figure 3-5-1

3 - 24

B. Thermoswitch

1) Remove the fixing unit following steps 1-2 on Page 3-13.
2) Remove the wire cover.
3) Remove the 2 screws and then the lead wire and the thermoswitch.
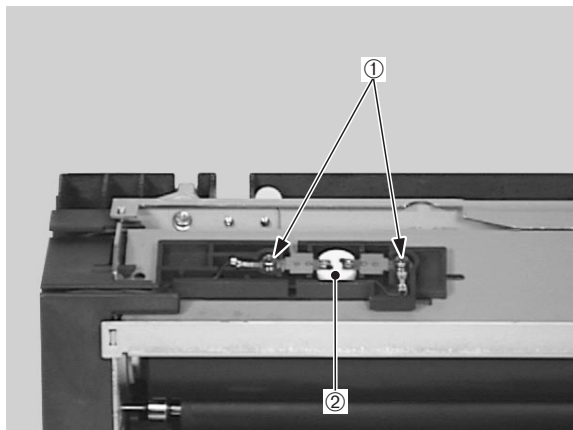
① Screws   ② Thermoswitch

Figure 3-5-2

C. Door Switch

1) Remove the switch/sensor PCB following steps 1-10 on Page 3-45.

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D. Upper Cassette Paper-size Sensing Switch/Lower Cassette Paper-size Sensing Switch

1) Remove the cassette paper-size sensing PCB following steps 1-4 on Page 3-47.

E. Thermistor

1) Remove the fixing unit following steps 1-2 on Page 3-13.
2) Remove the wire cover.
3) Remove the fixing entry guide.
4) Disconnect the connector and remove the cable from the fixing left cover.
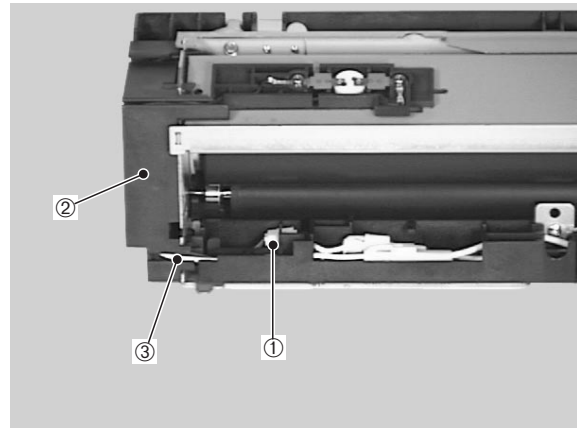
① Connector   ② Fixing left cover
③ Cable

Figure 3-5-3

5) Remove the screw and the thermistor.
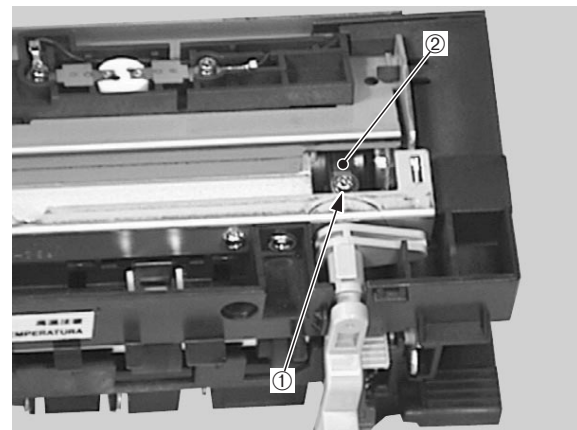
① Screw   ② Thermistor

Figure 3-5-4

<Note on reassembly>
When installing the thermistor, ensure that its detection surface is uniformly contacting the fixing upper roller surface.
If it is not making an uniform contact,

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check that the plate spring has not deformed.

F. Registration Paper Sensor

1) Remove the feed unit following steps 1-7 on Page 3-14.

2) Disconnect the connector from the back of the feed unit, and then remove the registration paper sensor.

G. Pick-up Unit Paper Sensor

1) Remove the pick-up unit following steps 1-7 on Page 3-9.

2) Disconnect the connector, and then remove the 2 claws and the sensor unit.
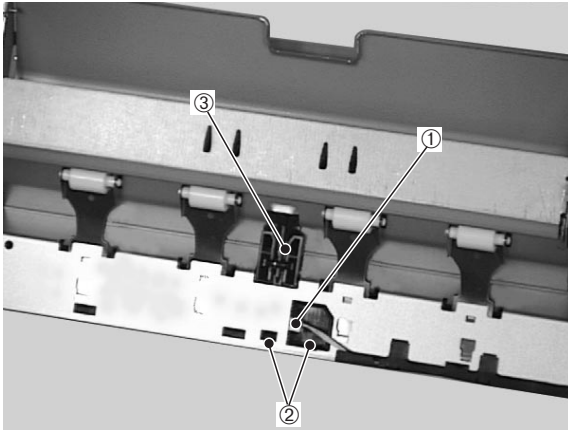
① Connector　　　② Claws
③ Sensor unit

Figure 3-5-5

3) Remove the pick-up unit paper sensor from the sensor unit.

H. Pick-up Unit Door Sensor

1) Remove the pick-up PCB following steps 1-3 on Page 3-44.

2) Remove the 2 screws.

3) Unhook the 2 claws and remove the gear cover.
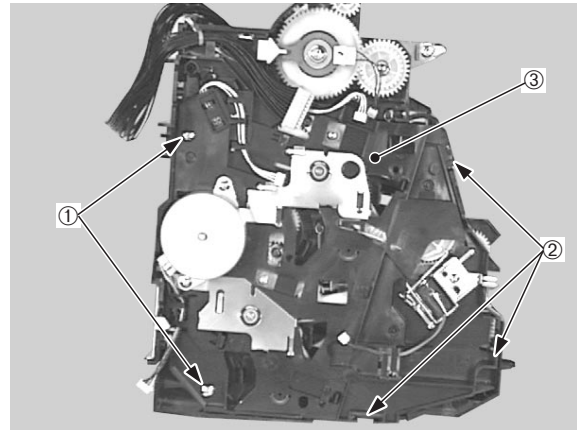
① Screws　　　② Claws
③ Gear cover

Figure 3-5-6

4) Disconnect the connector from the gear cover, and remove the pick-up unit door sensor.

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I. Lower Cassette Sensor/Upper Cassette Sensor/Lower Cassette Paper-level Sensor 1/Lower Cassette Paper-level Sensor 2/Upper Cassette Paper-level Sensor 1/Upper Cassette Paper-level Sensor 2/Lower Cassette Paper-out Sensor/Upper Cassette Paper-out Sensor

1) Remove the pick-up PCB following steps 1-3 on Page 3-44.

J. Multi-purpose Tray Paper Sensor /Lifting Plate Position Sensor

1) Remove the Multi-purpose tray PCB following steps 1-7 on Page 3-44.

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**K. Face-down Tray Paper Full Sensor
/Face-down Tray Delivery Sensor
/Fixing Unit Delivery Sensor**

1) Remove the switch/sensor PCB following steps 1-11 on Page 3-45.

VI. CLUTCHS/SOLENOIDS

A. Locations
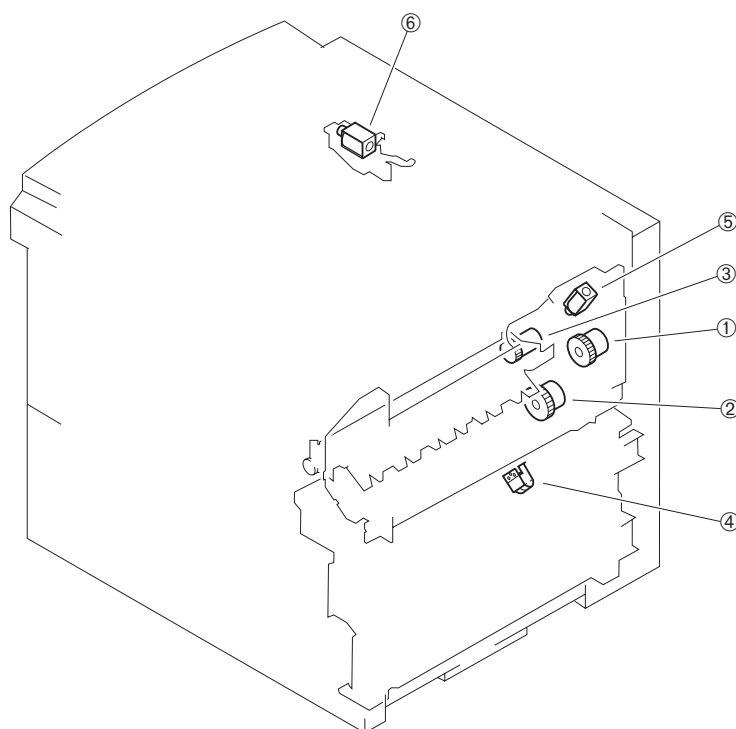
① Multi-purpose tray pick-up clutch   ② Feed clutch
③ Registration clutch   ④ Lifting plate solenoid
⑤ Cassette pick-up solenoid   ⑥ Face-up solenoid

Figure 3-6-1

B. Multi-purpose Tray Pick-up Clutch

1) Remove the multi-purpose tray pick-up unit following steps 1-6 on Page 3-12.
2) Disconnect the 2 connectors.
3) Remove the 2 screws, the clutch cover unit, and then the multi-purpose tray pick-up clutch.
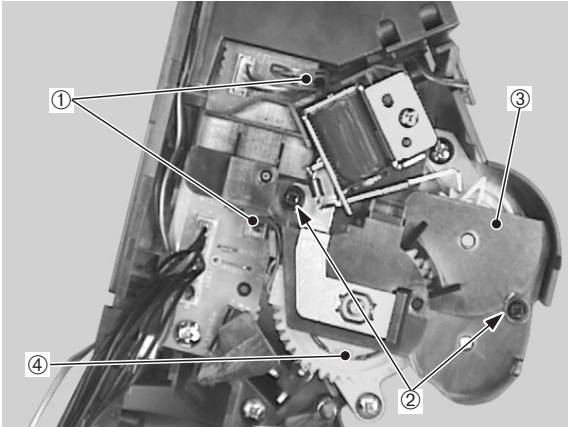
① Connector
② Screws
③ Clucth cover unit
④ Multi-purpose tray pick-up clutch

Figure 3-6-2

C. Feed Clutch

1) Remove the pick-up unit following steps 1-7 on Page 3-9.
2) Disconnect the connector.
3) Remove the screw, and disconnect the 2 claws to remove the pick-up PCB.
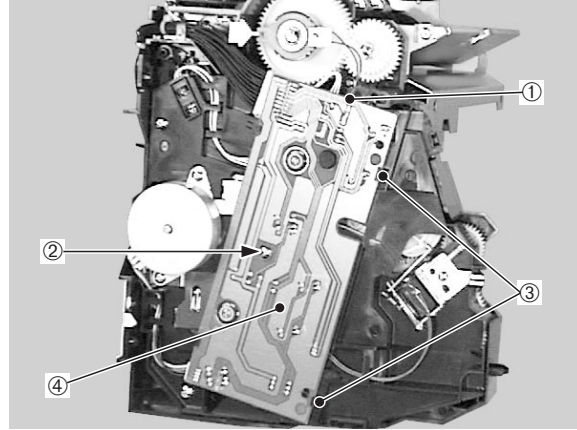
① Connector   ② Screw
③ Claws   ④ Pick-up PCB

Figure 3-6-3

4) Undo the claw and remove the clutch fixing plate.
5) Remove the E-ring, and then the feed clutch.
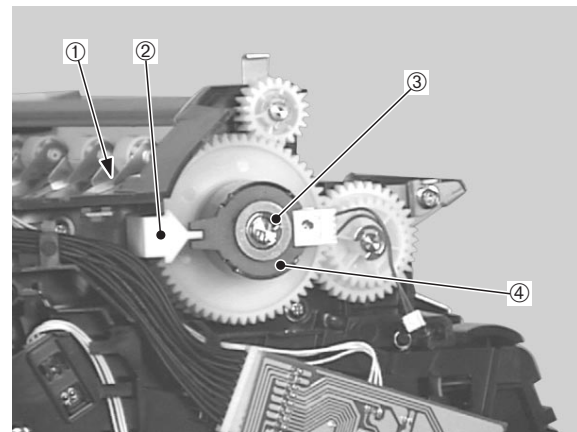
① Claw   ② Clutch fixing plate
③ E-ring   ④ Feed clutch

Figure 3-6-4

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D. Registration Clutch

1) Remove the registration roller unit following steps 1-5 on Page 3-12.
2) Remove the E-ring and the registration clutch.
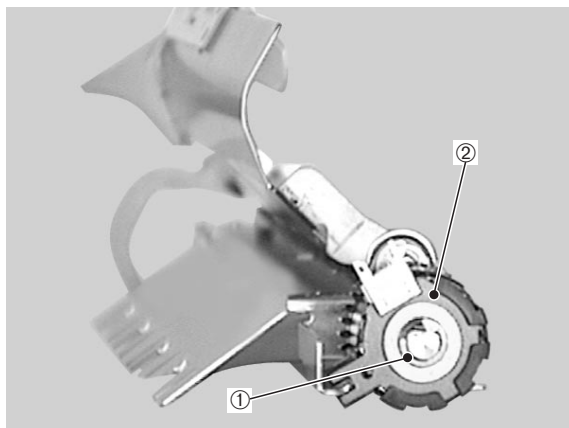
① E-ring ② Registration clutch

Figure 3-6-5

E. Lifting Plate Solenoid

1) Remove the multi-purpose tray pick-up unit following steps 1-6 on Page 3-12.
2) Disconnect the connector.
3) Remove the screw and then the lifting plate solenoid.
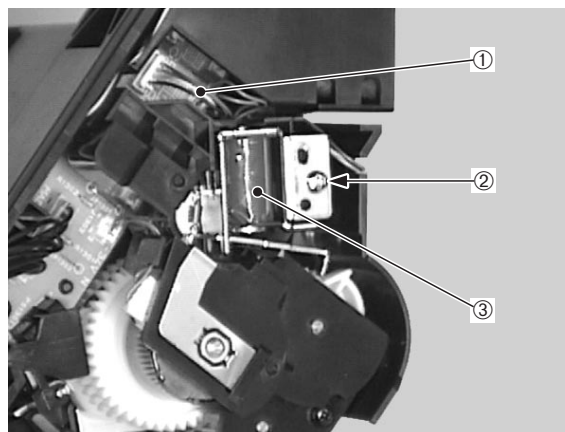
① Connector
② Screw
③ Lifting plate solenoid

Figure 3-6-6

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F. Cassette Pick-up Solenoid

1) Remove the pick-up unit following steps 1-7 on Page 3-9.
2) Disconnect the connector.
3) Remove the screw and take out the cassette pick-up solenoid.
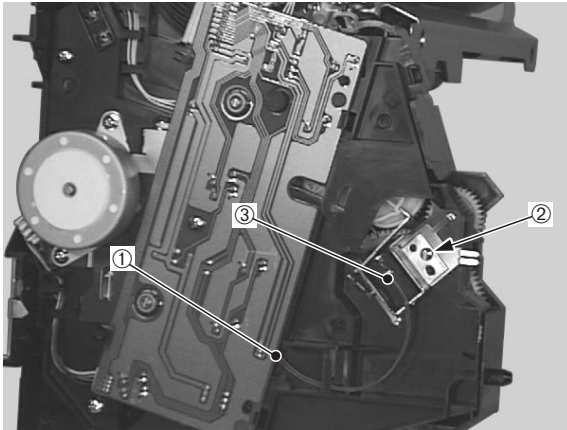
① Connector
② Screw
③ Cassette pick-up solenoid

Figure 3-6-7

G. Face-up Solenoid Unit

1) Remove the delivery unit following steps 1-7 on Page 3-13.
2) Disconnect the connector.
3) Remove the screw and then the face-up solenoid unit
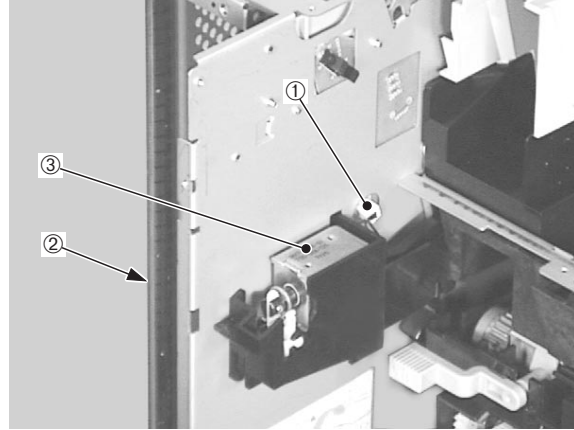
① Connector
② Screw
③ Face-up solenoid unit

Figure 3-6-8

VII. MOTORS/FANS

A. Locations
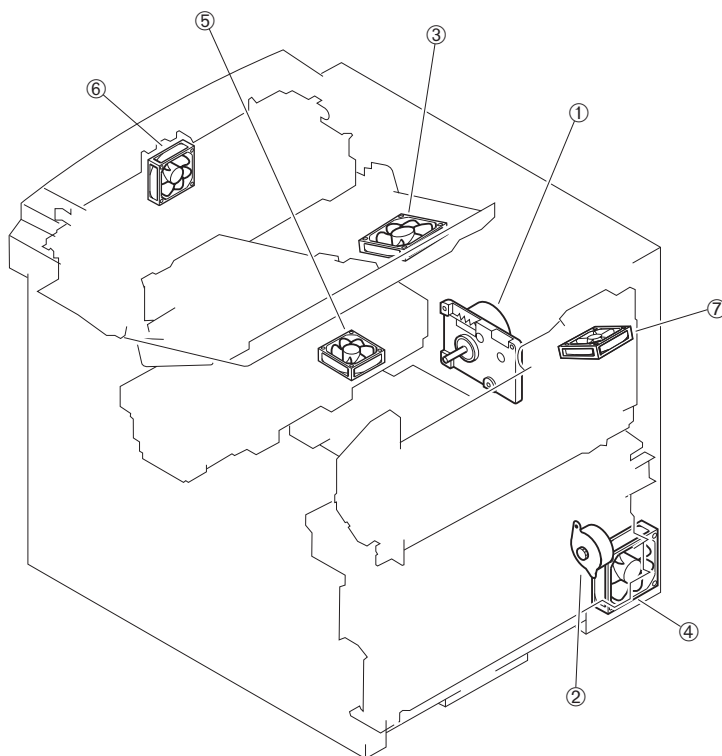
① Main motor   ② Pick-up motor
③ Fixing unit/scanner unit fan   ④ Power supply fan
⑤ Electrical unit fan   ⑥ Fixing unit fan
⑦ Multi-purpose tray pick-up unit fan

Figure 3-7-1

B. Main Motor

1) Remove the high-voltage power supply unit following steps 1-3 on Page 3-47.

2) Undo the connector, remove the 4 screws and then the main motor.
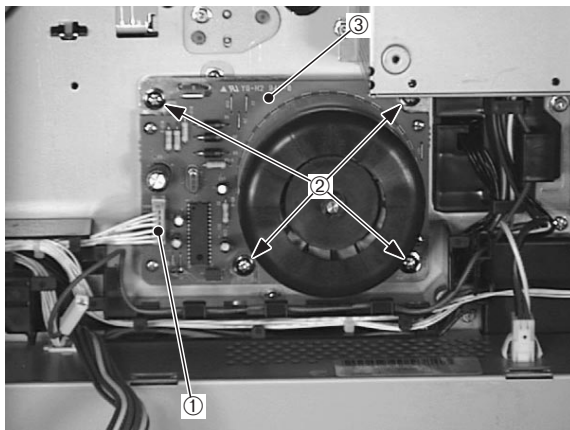
① Connector   ② Screws
③ Main motor

Figure 3-7-2

C. Pick-up Motor

1) Remove the pick-up unit following steps 1-7 on Page 3-9.

2) Undo the connector.

3) Remove the 2 screws, and slide the pick-up motor out in the direction of the arrow.
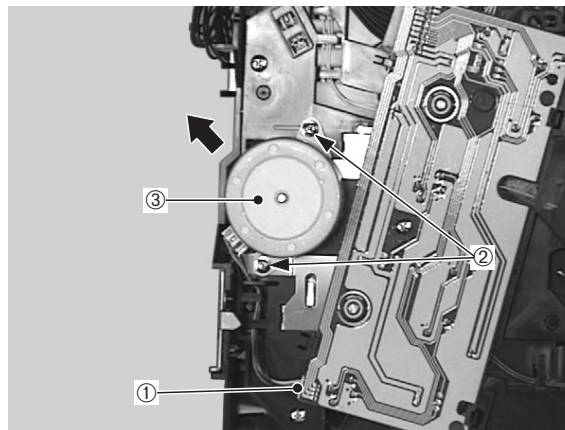
① Connector   ② Screws
③ Pick-up motor

Figure 3-7-3

D. Fans

1. Summary

There are 4 fan motors installed to circulate air within the printer and prevent the internal temperature from rising.

- Fixing unit/scanner unit fan (FM1):
  Blows air from the fixing unit and the scanner unit vicinity.
- Power supply fan (FM2):
  Blows air from the power supply.
- Electrical unit fan (FM3):
  Intake fan for the video controller unit.
- Fixing unit fan (FM4):
  Blows air from the fixing unit vicinity.
- Multi-purpose tray pick-up unit fan (FM5):
  Blows air to the cartridge and laser/scanner unit vicinity.
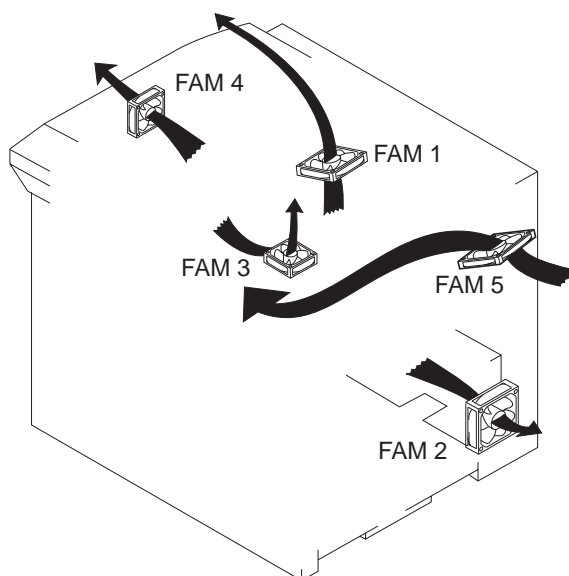
Figure 3-7-4

2. Fixing unit/scanner unit fan

1) Remove the right rear and rear covers.
2) Remove the upper cover unit.
3) Disconnect the connector.
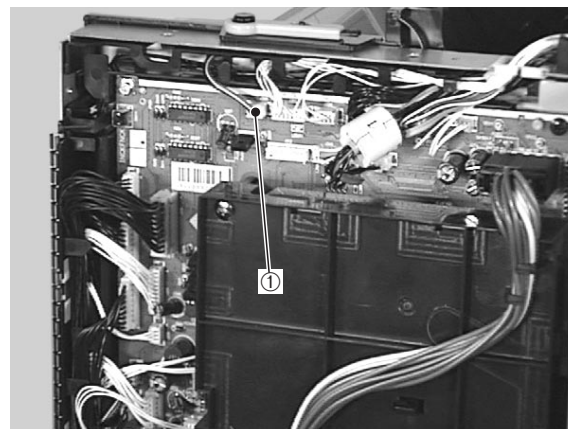
① Connector

Figure 3-7-5

4) Disconnect the connector.
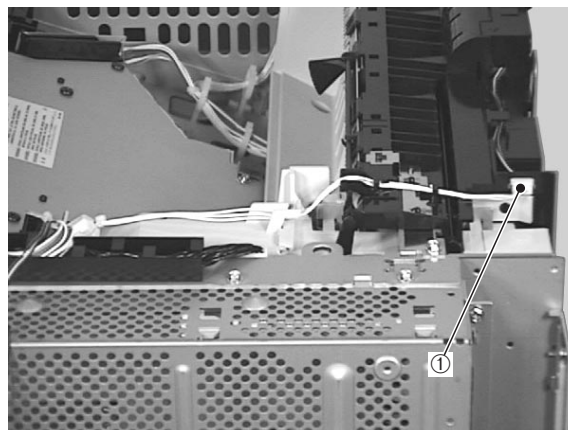
① Connector

Figure 3-7-6

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5) Remove the cable from the guide.
6) Unhook the claw, then remove the fan duct.
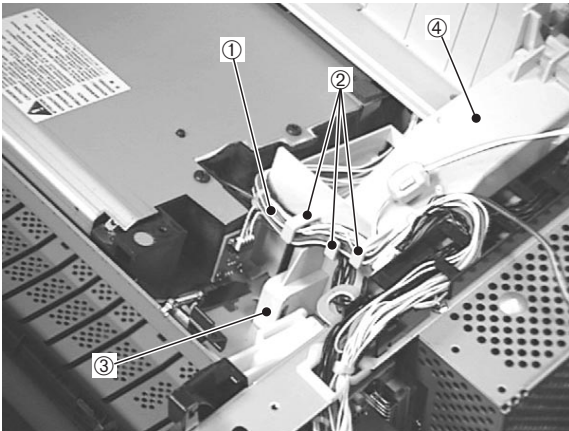
① Cable   ② Cable guide
③ Claw   ④ Fan duct

Figure 3-7-7

7) Remove the 2 screws, and then the fixing unit/scanner unit fan.
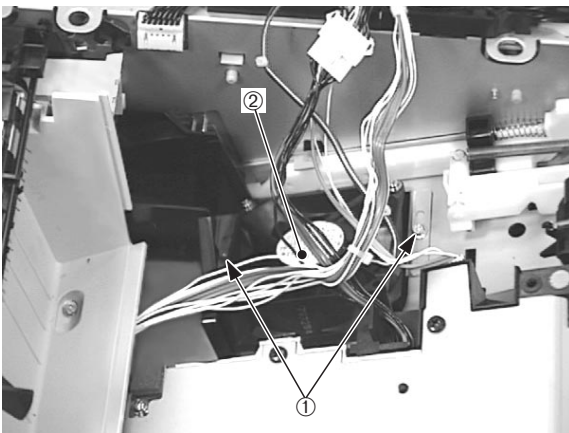
① Screws
② Fixing unit/scanner unit fan

Figure 3-7-8

3. Power supply fan
1) Remove the right rear and rear covers.
2) Disconnect the connector.
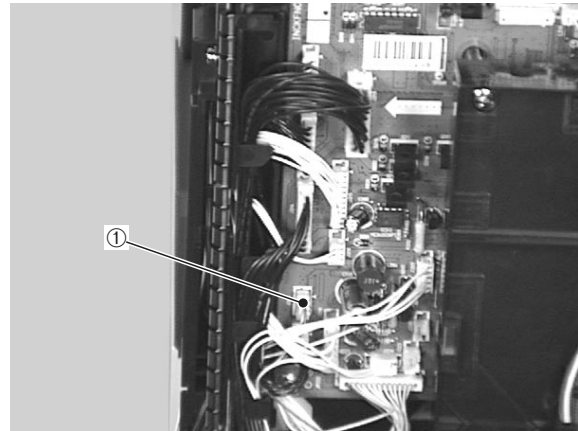
① Connector

Figure 3-7-9

3) Remove the 2 screws, and then the power supply fan.
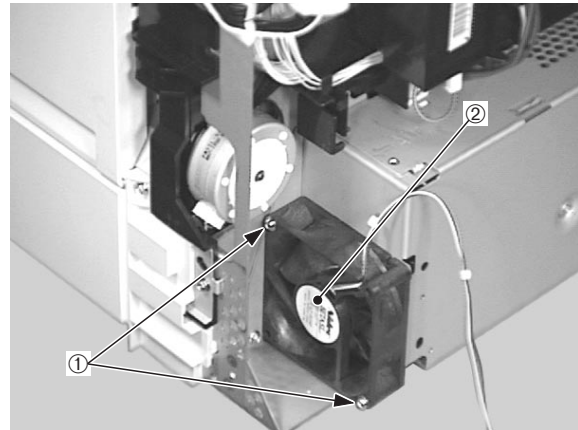
① Screws   ② Power supply fan

Figure 3-7-10

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4. Electrical unit fan
1) Remove the right rear and rear covers.
2) Remove the left rear cover.
3) Undo the connector.
4) Pinch the 2 claws holding the electrical unit fan and pull out the fan.
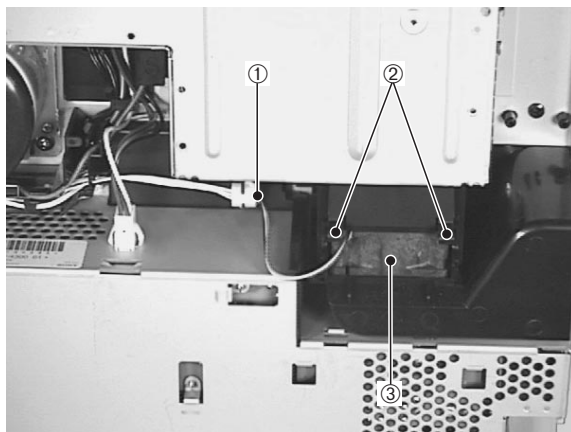
① Connector
② Claws
③ Electrical unit fan

Figure 3-7-11

5. Fixing unit fan
1) Remove the upper cover unit.
2) Undo the connector.
3) Remove the screw, and then the fan grounding plate. Disconnect the 4 claws to remove the fixing unit fan.
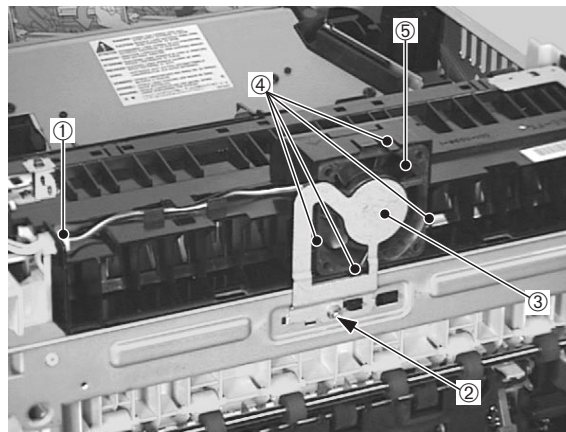
① Connector
② Screw
③ Fan grounding plate
④ Claws
⑤ Fixing unit fan

Figure 3-7-12

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6. Multi-purpose tray pick-up unit fan

1) Remove the multi-purpose tray pick-up unit following steps 1-6 on Page 3-12.
2) Disconnect the connector.
3) Remove the screw, claw, and then the fan duct together the multi-purpose tray pick-up unit fan.
4) Remove the multi-purpose tray pick-up unit fan from the fan duct.
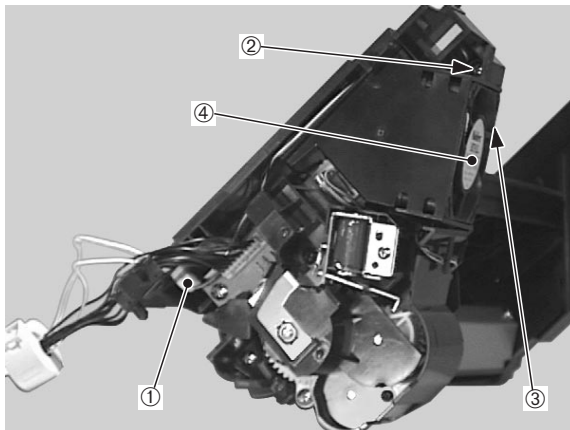
① Connector
② Screw
③ Claw
④ Multi-purpose tray pick-up unit fan

Figure 3-7-13

VIII. PCBS

A. Locations
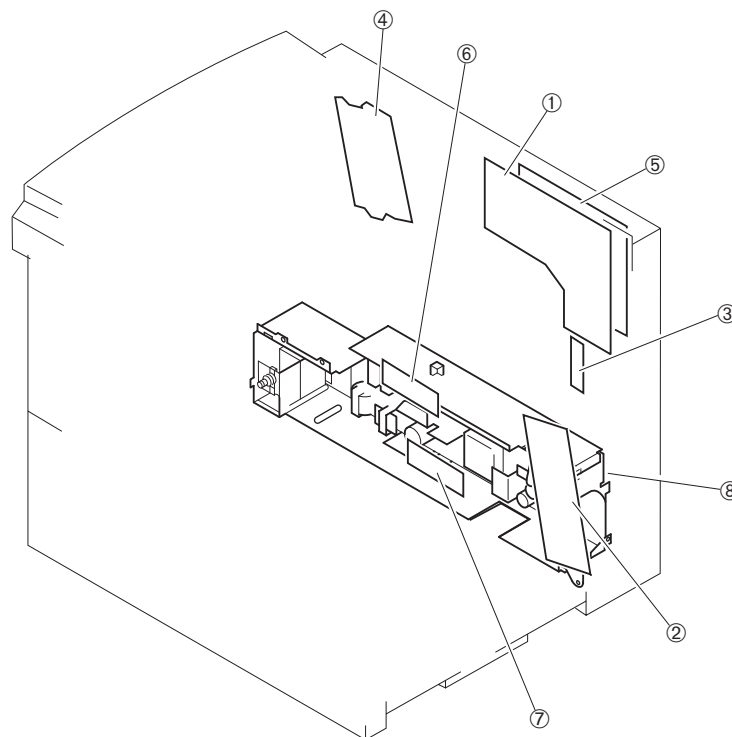
① DC controller PCB   ② Pick-up PCB
③ Multi-purpose tray PCB   ④ Switch/sensor PCB
⑤ High-voltage power supply PCB   ⑥ Upper cassette paper-size sensing PCB
⑦ Lower cassette paper-size sensing PCB   ⑧ Power supply

Figure 3-8-1

B. Video Controller PCB Unit

1. Removal from the printer

1) Loosen the 2 screws then pull out the video controller PCB unit.

① Screws

② Video controller PCB unit

Figure 3-8-2

2. Disassembly/reassembly

a. Video Controller PCB

1) Remove the 2 screws.
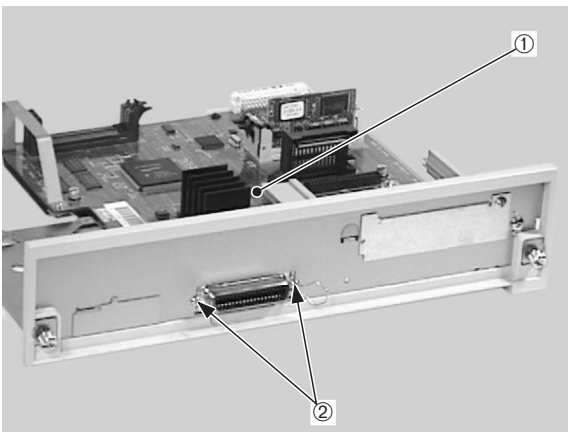
① Video controller PCB ② Screws

Figure 3-8-3

2) Remove the 2 screws (M3) and the guide.

3) Remove the 1 screw (M4) and the 4 screws (M3), then take out the video controller PCB.
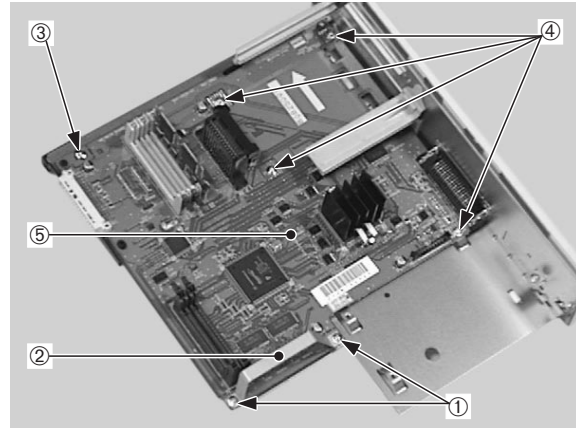
① Screw (M3)

② Guide

③ Screws (M4)

④ Screws (M3)

⑤ Video controller PCB

Figure 3-8-4

Note: If you removed ROM DIMM or RAM DIMM when you repaced the video controller PCB, reinstall it on the new video controller PCB.

b. Removal of RAM DIMM/ROM DIMM (option)

1) Push down the socket lever to remove the RAM DIMM or ROM DIMM. Be sure not to touch the elements.
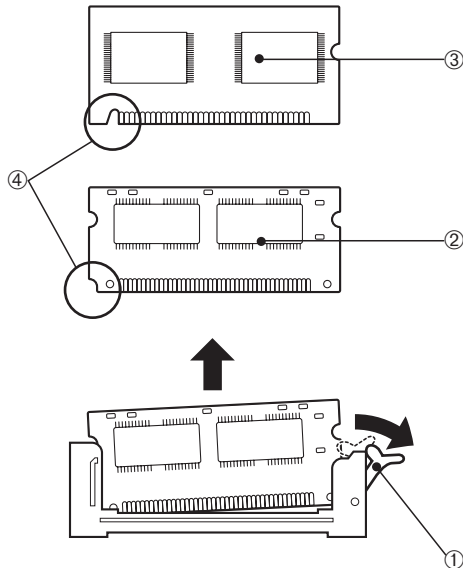
① Socket lever
② RAM DIMM
③ ROM DIMM
④ Cutout

Figure 3-8-5

Note: When installing the RAM DIMM or ROM DIMM onto the video controller PCB, note that the shape of the RAM DIMM cutout differs from that of the ROM DIMM cutout.

C. DC Controller PCB

1) Remove the high-voltage power supply unit following steps 1-3 on Page 3-47.
2) Disconnect the 19 connectors from the DC controller PCB.
3) Remove the 2 screws (M3) and the 2 screws (M4).
4) Unhook the claw, and then remove the DC controller PCB.
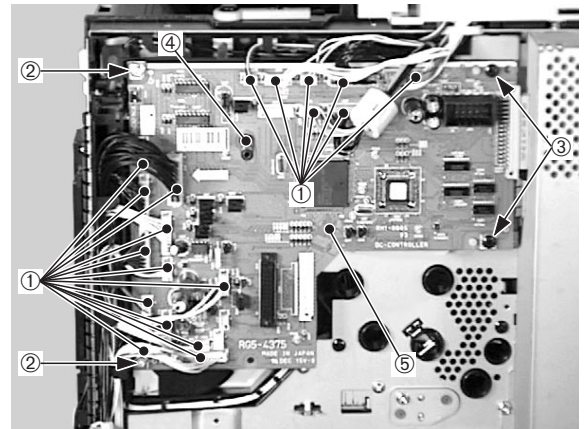
① Connectors
② Screws (M3)
③ Screws (M4)
④ Claw
⑤ DC controller PCB

Figure 3-8-6

D. Pick-up PCB

1) Remove the pick-up unit following steps 1-7 on Page 3-9.
2) Disconnect the 6 connectors.
3) Remove the screw, disconnect the 2 claws, and take out the pick-up PCB.
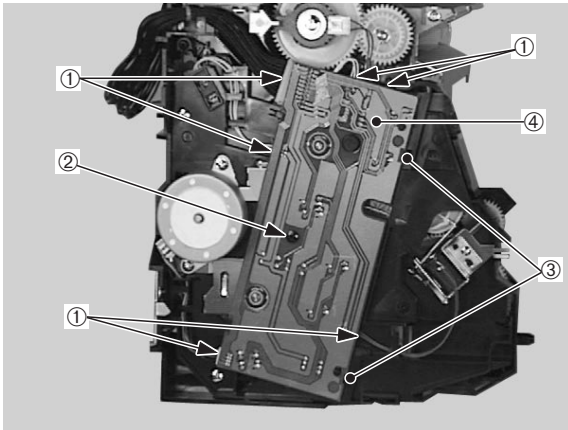
① Connectors   ② Screw
③ Claws   ④ Pick-up PCB

Figure 3-8-7

E. Multi-purpose Tray PCB

1) Remove the multi-purpose tray pick-up unit following steps 1-6 on Page 3-12.
2) Remove the multi-purpose tray pick-up unit fan following steps 2-3 on Page 3-40.
3) Remove the multi-purpose tray pick-up clutch following steps 2-3 on Page 3-32.
4) Disconnect the 2 connectors
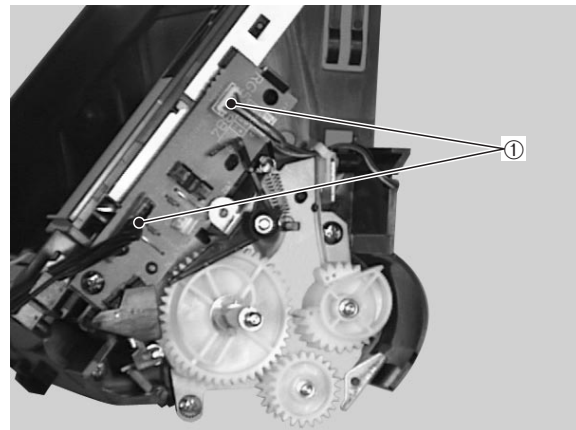
① Connector

Figure 3-8-8

5) Remove the spring and then the lifting plate position detection arm.
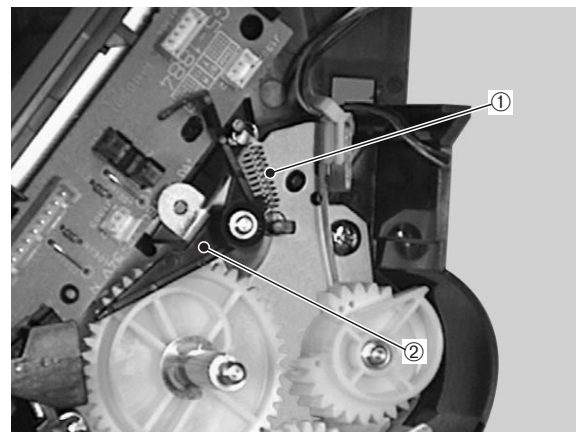
① Spring
② Lifting plate position detection arm

Figure 3-8-9

6) Remove the screw
7) Unhook the claw, and then remove the multi-purpose tray PCB.
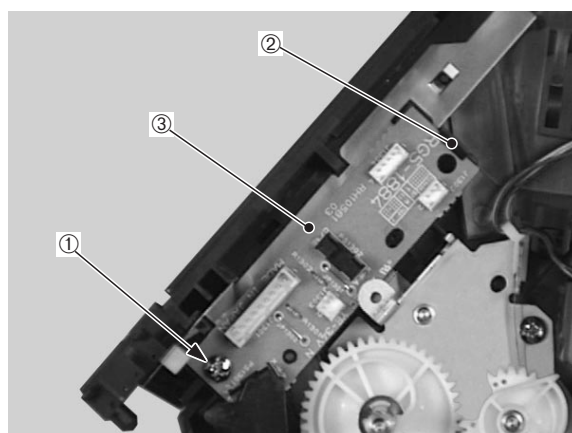
① Screw
② Claw
③ Multi-purpose tray PCB

Figure 3-8-10

F. Switch/Sensor PCB
1) Remove the upper cover unit.
2) Remove the right rear and rear covers.
3) Remove the left rear cover.
4) Remove the connector, the 2 screws, and then the fan duct.
5) Remove the 4 screws.
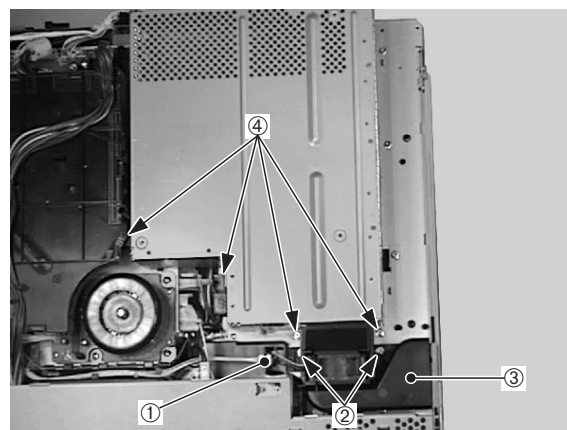
① Connector　　　② Screws
③ Fan duct　　　　④ Screws

Figure 3-8-11

6) Remove the 3 screws and the shield cover.
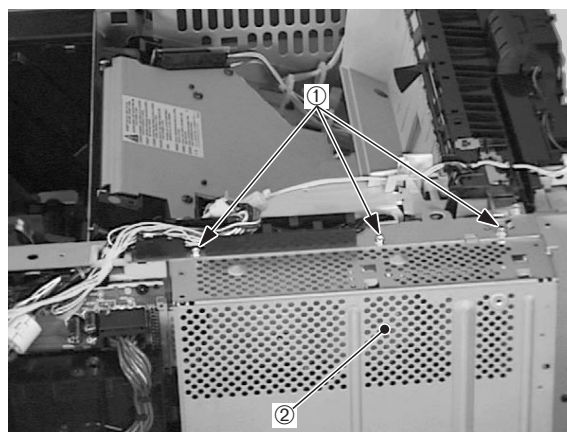
① Screws　　　　② Shield cover

Figure 3-8-12

3 - 45

7) Remove the 5 screws and the shield plate.
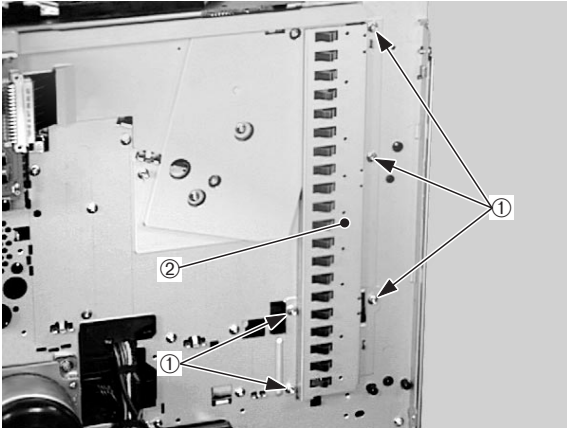
① Screws   ② Shield plate

Figure 3-8-13

8) Remove the DC controller PCB following steps 1-4 on Page 3-43.
9) Remove the 3 screws.
10) Remove the claw and take out the DC controller mounting plate.
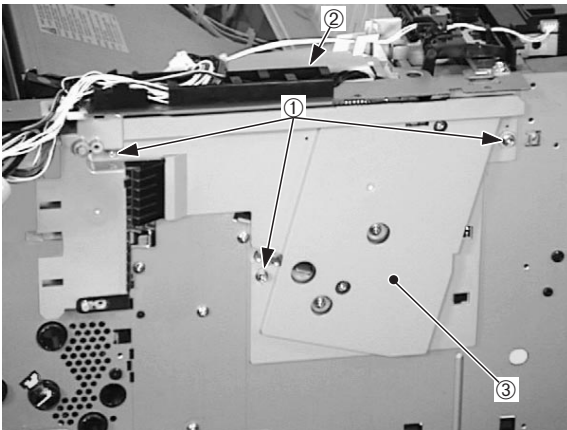
① Screws
② Claw
③ DC controller mounting plate

Figure 3-8-14

11) Disconnect the connector, remove the 2 screws, and pull out the board. Disconnect the other connector and remove the switch/sensor PCB.

① Connectors
② Screws
③ Switch/sensor PCB

Figure 3-8-15

G. High-voltage Power Supply Unit
1) Remove the right rear and rear covers.
2) Disconnect the 2 connectors.
3) Remove the screw (M4), the 2 screws (M3), and then the high-voltage power supply unit.
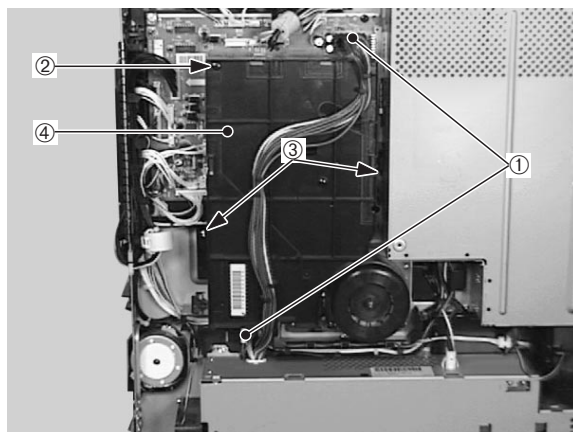
① Connectors
② Screws (M4)
③ Screws (M3)
④ High-voltage power supply unit

Figure 3-8-16

H. Cassette Paper-size Sensing PCB
1) Remove the cassettes.
2) Remove the power supply following steps 1-7 on Page 3-48.
3) Disconnect the connector, remove the screw, then take out the cassette paper-size sensing cover.
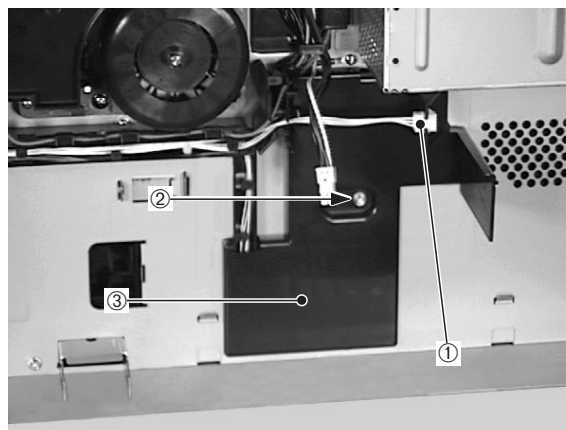
① Connector
② Screw
③ Cassette paper-size sensing cover

Figure 3-8-17

4) Disconnect the connector and remove the 3 screws from each PCB, then take out the cassette-size sensing PCBs.
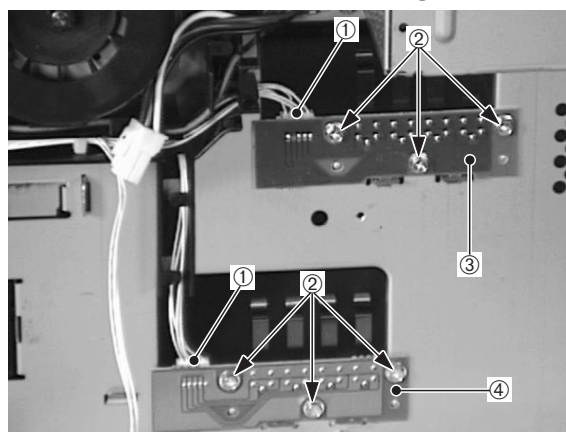
① Connectors
② Screws
③ Upper-cassette paper-size sensing PCB
④ Lower-cassette paper-size sensing PCB

Figure 3-8-18

3 - 47

I. Power Supply

1) Remove the left rear and rear covers.
2) Disconnect the connector, remove the 2 screws, then take out the fan duct.
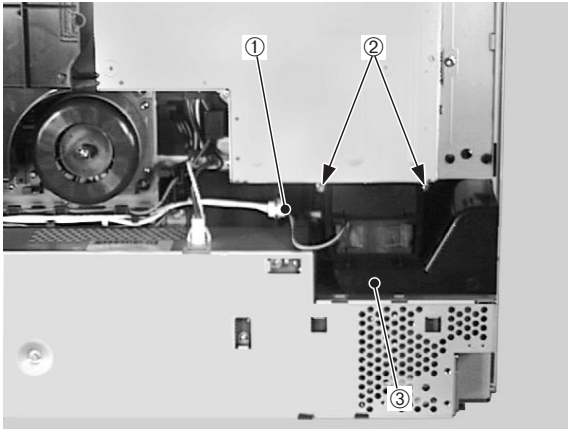
① Connector   ② Screws
③ Fan duct

Figure 3-8-19

3) Remove the connector.
4) Take out the 5 screws.
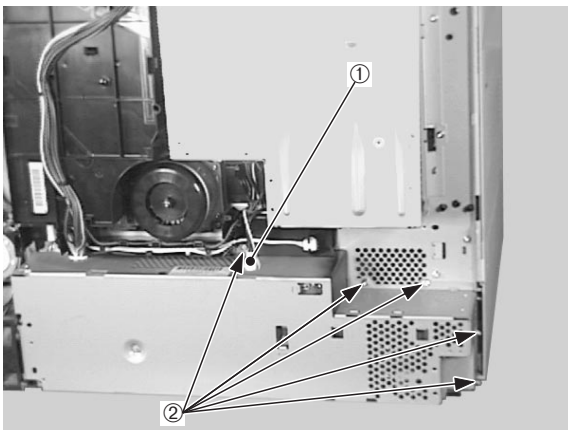
① Connector   ② Screws

Figure 3-8-20

5) Remove the 3 connectors.
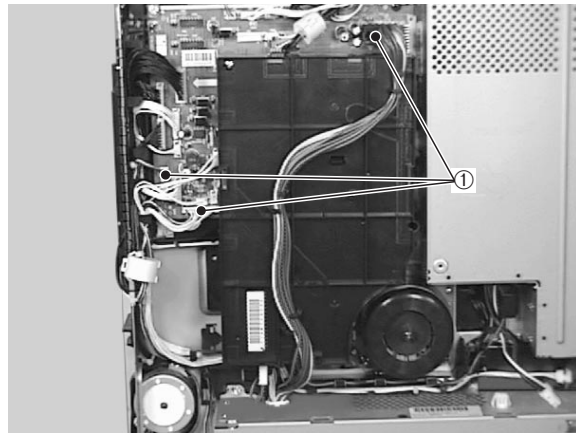
① Connectors

Figure 3-8-21

6) Remove the 2 screws and the power supply unit fan.
7) Remove the 2 screws and take off the power supply unit.
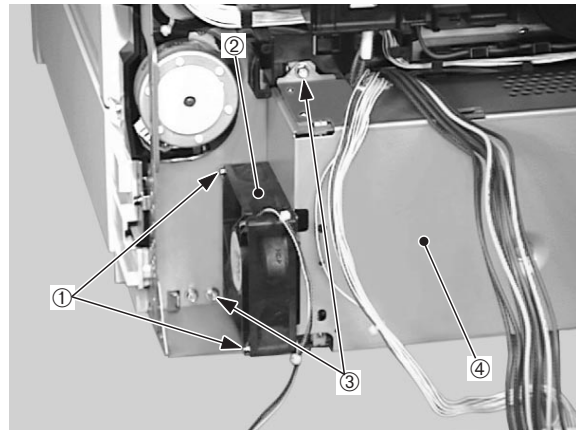
① Screws   ② Power supply fan
③ Screws   ④ Power supply

Figure 3-8-22

CHAPTER 4

TROUBLESHOOTING

I. PREFACE

A. Malfunction Diagnosis Flowchart

The malfunctions that occur in the printer fall into five main factors; "image defects," "paper jams," "paper transport troubleshooting," "malfunction troubleshooting," and "malfunction status troubleshooting."

If a malfunction occurred in the printer, the service technician is to find the factor according to the malfunction diagnosis flowchart and to clear the problem following the action procedure for each malfunction.

Make sure the following points at the execution of troubleshooting.

- Be sure that the connector has no poor contact when measuring the voltage at the specified terminal of the connector.
- Before handling PCBs, be sure to touch a metal part of the printer to discharge static electricity, as it can cause damage to the PCBs.
- Do not attempt to disassemble the laser/scanner unit as it cannot be adjusted in the field.

```
┌─────────────────────────┐
│ Initial check execution │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│        Power ON         │
└─────────────────────────┘
             │
             ▼
      Displays "READY"?  ──No──▶  Displays "operator call"  ──No──▶  Refer to the item, "malfunction
                                   or "service call"?                  troubleshooting"
             │                           │
            Yes                         Yes
             │                           │
             ▼                           ▼
   Is test print executable?  ──No──▶  Refer to the item, "malfunction
        (Note 1)                       status troubleshooting"
             │
            Yes
             ▼
┌─────────────────────────┐
│     Make a test print   │
└─────────────────────────┘
             │
             ▼
      Occurs paper jam?  ──Yes──▶  Refer to the item, "paper jams"
             │
            No
             ▼
      Delivers paper      ──No──▶  Refer to the item, "paper
      normally?                    transport troubleshooting"
             │
            Yes
             ▼
      Occurs image        ──Yes──▶  Refer to the item, "image defects"
      defect?
      (Note 2)
             │
            No
             ▼
      Displays "operator call"  ──Yes──▶  Refer to the item, "malfunction
      or "service call"?                   status troubleshooting"
             │
            No
             ▼
        ┌─────────┐
        │   END   │
        └─────────┘
```

Figure 4-1-1

4 - 2

Notes : **1.** Before executing a test print, make sure to select the same pick-up source and delivery source that were used when the malfunction occurred according to the information given by the user.

  If the information is not available, make test prints with all feasible combination of paper source and delivery source in the printer, and find out the factor.

  2. The image defect occurred at the user side might not re-occur on its test print.

  In this case, make a print from external device and infer the factor by the output image. Then, find the factor according to the item, "image defects."

B. Initial Check

Check the following items before making a diagnosis of malfunction. If any failure is found, the service technician is to clear the problem and to give the instruction to the user.

1. Installation environment

Make sure that the requirements stated below meet when installing printer:

a. The power supply voltage is from -10% to +6% of the rated voltage.
b. The printer is securely installed on a level surface.
c. The room temperature is kept between 10°C and 32.5°C, and the relative humidity, between 20% and 80%.
d. Avoid sites generating ammonia gas, high temperature or high humidity (near water faucet, kettle, humidifier), cold places, open flames and dusty areas.
e. Avoid sites exposed to direct sunlight. If unavoidable, advise the customer to hang curtains.
f. A well-ventilated place.
g. Make sure that the power plug is inserted to the printer and the outlet securely.

2. Paper checks

a. The recommended paper for this printer is used.
b. The paper is not damp.

3. Paper sets

a. The paper is set to the pick-up source within the specified volume.
b. The paper is set to the selected pick-up source correctly.
c. The cassette is installed in the printer correctly.

4. EP-72 cartridge sets

The cartridge is installed in the printer correctly.

5. Condensation

During winter, particularly when moving the printer into a warm room from a cold location such as a warehouse, various problems can occur due to condensation in the printer.

Example)

a. Condensation in the optical system (six-faced mirror, reflecting mirror, lens, etc.) will result in light output images.
b. As the photosensitive drum is cold, the resistance of the photoconductive layer is high. This will lead to incorrect contrast.

If condensation appears, leave the printer ON for 10 to 20 minutes.

If a cartridge is opened soon after being moved from a cold room to a warm room, condensation may appear inside the cartridge and may cause various image defects.

Be sure to instruct the customer that it is necessary to leave the cartridge sealed for one to two hours at room temperature to allow it to acclimatize.

C. Test Print

The test print is divided into two types: engine test print and controller test print.

   If a malfunction occurs in this printer, make a test print and assess the abnormality of the printer.

1. Engine test print

Test print patterns of horizontal lines are printed in this test print. The test prints can be made by using the printer driver tester which can make all four test patterns (vertical lines, horizontal lines, solid black and solid white), or the test print switch located on the right side of the printer (see Figure 1-4-1).

   One print of test pattern can be made by pressing the switch once when the power is turned ON and the "READY" appears on the display. If the switch is held down, test prints are made continuously.

   Make sure that paper is loaded into the lower cassette before pressing the switch as this is where the paper is picked up from.
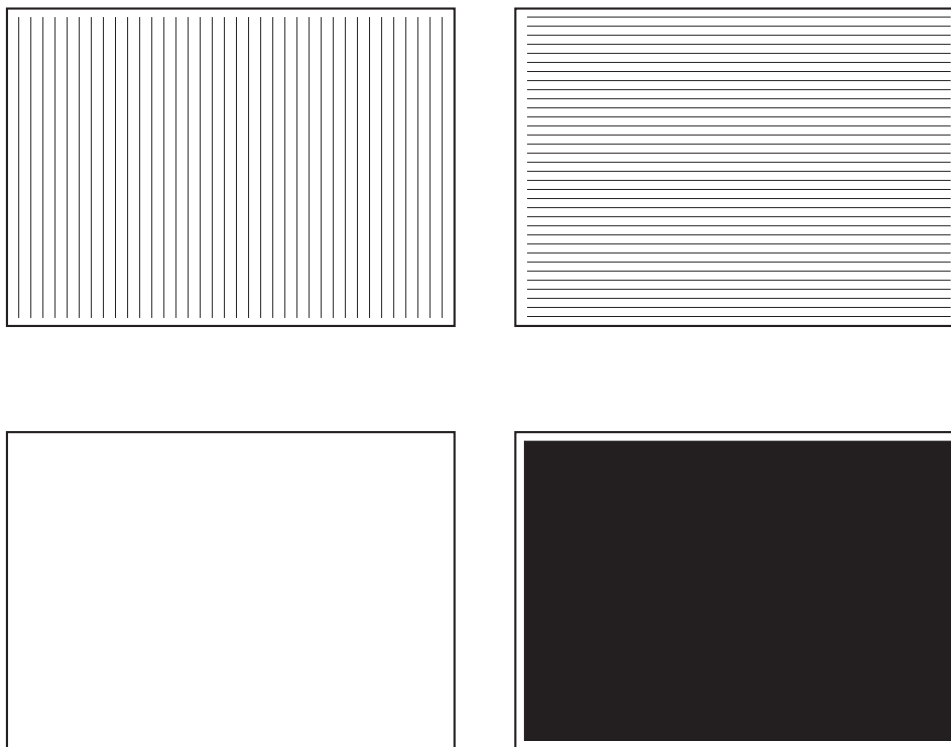
Figure 4-1-2

2. Controller test print
The following items can be printed by selecting and executing a TEST MENU:

• SHOW PAGE COUNT
   Displays the total number of pages printed. The total page number is only shown briefly on the display but does not print. The page count prints in the TEST PRINT.

• TEST PRINT
   Make a Test Print. The Test Print lists the printing environment settings and also displays the graphic and text printing capabilities.

• PRINT PS FONTS
   Available only after the Translator Module A-72 for Adobe PostScript Level 3 module has been installed. Prints the PS Font List.

• PRINT PCL FONTS
   Prints the PCL Font List.

• PRINT PS DEMO
   Available only after the Translator Module A-72 for Adobe PostScript Level 3 module has been installed. Prints the PS demonstration page.

• PRINT PCL DEMO
   Prints the PCL demonstration page.

• CONTINUOUS TEST
   Make continuous Test Prints.

• STAPLE TEST
   Available only when the staple stacker SS-72 is installed. Use "STAPLE TEST" when you replaced the staple cartridge.

• CLEANING PAGE
   Use "CLEANING PAGE" to print cleaning patterns to clean the fixing unit when an image defect occurred and its cause is suspected to be the fixing unit. Refer to "Maintenance and servicing by the customer" in Chapter 1 for details.

Follow these steps to make a Test Print:

1) Press the On Line key to set the printer off-line. The On line indicator should be OFF and "PAUSED" appears in display.
2) Press the Menu key until you see "TEST MENU" in the top line.
3) Press the Item key until you see "TEST PRINT" in the bottom line.
4) Press the Enter key to start printing a Test Print.
5) After the pages are printed, press the On Line key to put the printer on-line.

Use the Test Print to verify the operation panel selections, system configurations (memory and options), and print quality.

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Canon Inc., LBP-3260 Printer Configuration Page

Canon

PCL MENU
  COPIES = 1
  PAGESIZE = A4
  ORIENTATION = PORTRAIT
  FORM = 64LINES
  FNTSRC = INTERNAL
  FONTNUM = 0
  PT.SIZE = 12.00
  PITCH = 10.00
  SYMSET = ROMAN-8

FEEDER MENU
  FEED = LOWER
  7 BIN SORTER MODE = STACKING
  OUTPUT = 7 BIN SORTER
  FORM = 64LINES
  TRAY SWITCH = ON
  MANUAL = OFF
  MPTSIZE = A4

CONFIG MENU
  JAMRECOVERY = ON
  AUTOCONT = OFF
  DENSITY = 7
  PWRSAV = 15 MIN
  ECONOMY MODE = OFF
  REFINE = ON

MEMCONFIG MENU
  PCL SAVE = OFF

PARALLEL MENU
  BIDIRECTION = ON
  I/O TIMEOUT = 15

TEST MENU
  SHOW PAGE COUNT
  TEST PRINT
  PRINT PCL FONTS
  PRINT PCL DEMO
  CONTINUOUS TEST

LANGUAGE MENU
  LANG = ENGLISH

PAPER TYPE MENU
  UPPER = PLAIN
  LOWER = PLAIN
  MPT = PLAIN

RESET MENU/PRINTER
  RESET = PRINTER
  RESET = MENU

INSTALLED OPTIONS
  7 BIN SORTER
    3-SPEED 7-BIN SORTER VER 5.7

TOTAL MEMORY = 8 MB

AUTOSENSED PAPER
  UPPER = A4
  LOWER = A4

PRINTER DETAILS
  CODE LEVELS
    CTL B1.0408/14/98
    ENGINE OC
    OPTC 05.10
    PCL 1.4.10
  PAGE COUNT = 1

Figure 4-1-3

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II. IMAGE DEFECTS

If the factor of the malfunction is identified as "image defects" by the malfunction diagnosis flow-chart (Figure 4-1-1), find out the cause of the failure according to the table below and clear the problem.

Table 4-2-1

•	I-1	Light:	Output very light image
•	I-2	Dark:	Output very dark image
•	I-3	Completely Blank:	Output no image
•	I-4	All Black:	Output all black paper
•	I-5	Dots in Vertical Lines :	Output white dots on the paper
•	I-6	Dirt on Back of Paper:	Output dirt on the back of the paper
•	I-7	Vertical Lines:	Output vertical lines on the paper
•	I-8	Black Horizontal Lines:	Output horizontal lines on the paper
•	I-9	Dirt:	Output dirt on surface of the paper
•	I-10	Blank Spots:	Output image with blank spots
•	I-11	White Vertical Lines:	Output white vertical lines on the paper
•	I-12	White Horizontal Lines:	Output white horizontal lines on the paper
•	I-13	Poor Fixing:	Output the image with poorly fixed toner
•	I-14	Image Distortion:	Output distorted image

II-1. Light

<Possible causes>
1. The image density is not adjusted correctly.
    Action: Adjust the image density by operating the external device.

2. Open the upper cover and remove the EP-72 cartridge while a print is being made. Open the drum protective shield of the EP-72 cartridge and check the toner image on the photosensitive drum. If the toner image has not been transferred to the paper properly, go to step 3. If the toner image on the drum is faint, go to step 6.
    Do not open the drum protective shield for more than 10 seconds.

3. The transfer charging roller contact of the high-voltage power supply is not making a good connection with the contact of the transfer charging roller shaft.
    Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

4. The transfer charging roller is deformed or has deteriorated.
    Action: Replace the roller.

5. The high-voltage power supply PCB is defective.
    Action: Replace the high-voltage power supply PCB.

6. The DC controller PCB is defective.
    Action: Replace the DC controller PCB.

II-2.   Dark

<Possible causes>

1. The image density is not adjusted correctly.
    Action: Adjust the image density by operating the external device.

2. The drum grounding contact of the high-voltage power supply is not making a good connection with the cartridge contact.
    Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

3. The primary bias contact of the high-voltage power supply is not making a good connection with the cartridge contact.
    Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

4. The high-voltage power supply PCB is defective.
    Action: Replace the high-voltage power supply PCB.

5. The DC controller PCB is defective.
    Action: Replace the DC controller PCB.

II-3.   Completely blank

<Possible causes>

1. The projection for opening and closing the laser shutter of the EP-72 cartridge is damaged.
    Action: Replace the cartridge.

2. The laser shutter arm or laser shutter is malfunctioning or damaged.
    Action: If the laser shutter arm or laser shutter does not move smoothly, or parts are damaged, replace them.

3. The developing bias contact of the high-voltage power supply is not making a good connection with the cartridge contact.
    Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

4. The high-voltage power supply PCB is defective.
    Action: Replace the high-voltage power supply PCB.

5. The DC controller PCB is defective.
    Action: Replace the DC controller PCB.

II-4.   All black

<Possible causes>

1. The primary bias contact of the high-voltage power supply is not making a good connection with the cartridge contact.
    Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

2. Defective primary charging roller

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Action: Replace the cartridge.

3. The high-voltage power supply PCB is defective.
   Action: Replace the high-voltage power supply PCB.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

II-5.   Dots in vertical line

<Possible causes>
1. Static charge eliminator is dirty.
   Action: Clean the eliminator with brush.

2. The static charge eliminator contact of the high-voltage power supply is not making a good connection with the static charge eliminator contact.
   Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

3. The transfer charging roller is deformed or has deteriorated.
   Action: Replace the transfer charging roller.

4. The high-voltage power supply PCB is defective.
   Action: Replace the high-voltage power supply PCB.

5. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

II-6.   Dirt on back of paper

<Possible causes>
1. Dirty paper
   Action: Replace the paper with new one. Advise the customer on how to store paper.

2. Periodical stain (pick-up roller, transfer charging roller, lower fixing roller)
   Action: Referring to Table 4-2-1 on page 4-11, identify the dirty roller(s) and clean the dirty areas. If the dirt cannot be removed, replace the dirty roller(s).

3. The feed guide or fixing entry guide is dirty.
   Action: Clean dirty parts.

II-7.   Vertical lines

<Possible causes>
1. Circumferential scars on the photosensitive drum
   Action: Replace the cartridge

2. The upper fixing roller is scratched.
   Action: Remove the cause of the damage and replace the roller.

II-8.　Black horizontal lines

<Possible causes>

1.　Horizontal scar(s) on photosensitive drum
　　Action: Replace the cartridge.

2.　The upper fixing roller is dirty, deformed, or worn.
　　Action: Replace the upper fixing roller.

II-9.　Dirt

<Possible causes>

1.　The print paper is dirty.
　　Action: Replace with new paper. Advise the customer how to store print paper.

2.　Periodical stain (separation roller, transfer charging roller, upper fixing roller, EP-72 cartridge)
　　Action: Referring to Table 4-2-1 on page 4-11, identify the dirty roller(s) and clean the dirty areas. If the dirt cannot be removed, replace the dirty roller(s).

3.　Dirty delivery roller
　　Action: Clean the delivery roller.

II-10.　Blank spots

<Possible causes>

1.　Lack of toner
　　Action: Remove the cartridge from the printer. Rock the cartridge in the way described in the chapter 1, and then install it back in the printer. If the problem persists, replace the cartridge.

2.　The transfer charging roller is dirty or deformed.
　　Action: Replace the transfer charging roller.

3.　Defective photosensitive drum or developing cylinder
　　Action: Replace the cartridge.

II-11.　White vertical lines

<Possible causes>

1.　Lack of toner
　　Action: Remove the cartridge from the printer. Rock the cartridge in the way described in the chapter 1, and then install it back in the printer. If the problem persists, replace the cartridge.

2.　Circumferential scars on the photosensitive drum
　　Action: Replace the cartridge.

3.　Defective developing cylinder
　　Action: Replace the cartridge.

4.　Foreign materials are on the laser outlet of the printer or the laser inlet of the cartridge.

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Action: Remove the foreign materials.

5. The upper fixing roller surface is damaged or dented.
   Action: Replace the upper fixing roller.

6. The mirror in the laser/scanner unit is dirty.
   Action: Replace the laser/scanner unit.

II-12. White horizontal lines

<Possible causes>
1. Horizontal scar(s) on the photosensitive drum
   Action: Replace the cartridge.

2. Upper fixing roller is defective.
   Action: Replace the upper fixing roller.

II-13. Poor fixing

<Possible causes>
1. The envelope position lever of the fixing unit is raised.
   Action: Push down the lever.

2. The nip width of the fixing unit is not correct.
   Action: Replace the fixing unit.

3. The fixing roller surface is damaged or dented.
   Action: Replace the roller.

4. The lower fixing roller is dirty.
   Action: Clean the roller. If it cannot be cleaned, replace the roller.

5. The thermistor has deteriorated.
   Action: Replace the thermistor.

II-14. Image distortion

<Possible causes>
1. Connectors on the DC controller PCB are loose.
   Action: Reconnect the J202, J206, and J207 connectors properly.

2. The laser/scanner unit connectors are loose.
   Action: Reconnect J1001, J1 and J6.

3. The laser/scanner unit is faulty.
   Action: Replace the laser/scanner unit.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

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Table 4-2-2

Periods of appearance of dirt, blank spots on images

Problem location	Diameter (mm)	Period on image (mm)	Phenomenon			
			Dirt	Blank spot	Dirt on back of paper	Poor fixing
Transfer charging roller	17.15	About 54		◯	◯	
Upper fixing roller	45	About 141	◯	◯		◯
Lower fixing roller	32	About 100			◯	◯
Pick-up roller	24	About 75			◯	
Feed roller	24	About 75			◯	
Separation roller	24	About 75	◯			
Photosensitive drum	30	About 94	◯	◯		
Developing cylinder	20	About 52	◯	◯		
Primary charging roller	14	About 44	◯	◯		

III. PAPER JAMS TROUBLESHOOTING

Paper passes through 4 major sections of the printer.
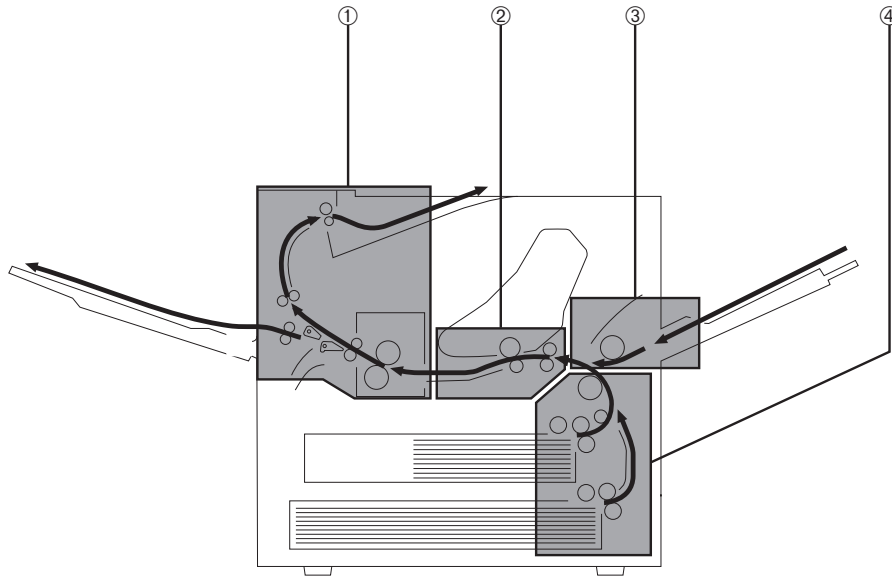
Figure 4-3-1

III-1: Multi-purpose tray pick-up block
III-2: Cassette pick-up block
III-3: Transfer and feed block
III-4: Fixing and delivery block

If the factor of the malfunction is identified as "paper jams" by the malfunction diagnosis flow-chart (Figure 4-1-1), check the block in which the paper jam occurred, and find out the defective part.

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III-1. Multi-purpose tray pick-up block

<Possible causes>

1. Curled paper
    Action: Straighten the paper, and then instruct the user.

2. The multi-purpose tray pick-up roller is worn, deformed, or dirty.
    Action: Clean the tray pick-up roller if it is dirty. Replace if worn or deformed.

3. Spring of the sensor is out of place or defective
    Action: Set the spring in the right position. Replace it if defective.

4. Gears are damaged.
    Action: Remove the multi-purpose tray pick-up unit and check the gears. Replace any damaged gears.

5. The multi-purpose tray pick-up clutch is defective.
    Action: Remove the multi-purpose tray pick-up unit and disconnect multi-purpose tray pick-up clutch connector J1303 from the multi-purpose tray PCB. Measure the resistance between connector J1303-1 and J1303-2 on the cable side. If it is not about 155Ω, replace the multi-purpose tray pick-up clutch.

6. The multi-purpose tray PCB is defective.
    Action: Replace the multi-purpose tray PCB.

7. The DC controller PCB is defective.
    Action: Replace the DC controller PCB.

III-2. Cassette pick-up block

<Possible causes>

1. The print paper is bent.
    Action: Replace the paper.

2. The cassette pick-up roller, separation roller, or feed roller is worn or deformed.
    Action: Replace if worn or deformed. Replace the separation roller and the feed roller together.

3. Pick-up drive unit is damaged.
    Action: Remove the pick-up unit and replace any damaged parts.

4. The pick-up motor is defective.
    Action: Use the printer driver tester to rotate the paper pick-up motor. If it does not rotate, replace it.

5. The cassette pick-up solenoid is defective.
    Action: Remove the pick-up unit, and disconnect cassette pick-up solenoid connector J1203 from the pick-up PCB. Measure the resistance between connector J1203-1 and J1203-2 on the cable side. If it is not about 190Ω, replace the cassette pick-up solenoid.

6. The pick-up PCB is defective.

Action: Replace the pick-up PCB.

7. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

III-3. Transfer and feed block

<Possible causes>
1. The registration roller is worn, deformed, or dirty.
   Action: Clean the registration roller if it is dirty. Replace if worn or deformed.

2. Transfer charging roller does not rotate smoothly.
   Action: Replace the transfer sub roller. Replace any worn gear(s).

3. Registration paper sensor lever does not move smoothly, or is damaged.
   Action: Adjust the lever so that it moves smoothly. Replace it if damaged.

4. Registration roller drive gears are damaged.
   Action: Replace any damaged gears.

5. The registration clutch is defective.
   Action: Disconnect registration clutch connector J17. Measure the resistance between connector J17-1 and J17-2 on the cable side. If it is not about 210Ω, replace the registration clutch.

6. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

III-4. Fixing and delivery block

<Possible causes>
1. Paper longer than the paper length set by the user was loaded during manual feeding.
   Action: Advise the user to replace it with the set paper size.

2. The fixing roller does not rotate smoothly.
   Action: Check whether any gears are worn or fractured.

3. The fixing entry guide is dirty, damaged, or clogged with toner.
   Action: Clean the guide.

4. The fixing separation guide is dirty, damaged, or clogged with toner.
   Action: Clean the guide.

5. The fixing separation claw is worn or damaged.
   Action: Replace the claw.

6. The upper or lower fixing roller is deformed or damaged.
   Action: Replace deformed or damaged rollers.

7. The nip width of the lower fixing roller is not correct.
   Action: Replace the fixing unit.

8. The fixing unit delivery sensor lever does not move smoothly or is damaged.
   Action: Adjust the lever so that it moves smoothly. If it is damaged, replace it.

9. The fixing unit delivery roller is worn.
   Action: Replace the fixing unit delivery roller.

10. The fixing unit delivery roller does not rotate smoothly.
    Action: Check the gears, and replace any worn or fractured gear(s).

11. The face-down delivery roller does not rotate smoothly.
    Action: Check the gears, and replace any worn or fractured gear(s).

12. Defective fixing unit delivery sensor.
    Action: Replace the sensor.

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IV. PAPER TRANSPORT TROUBLESHOOTING

If the factor of the malfunction is identified as "paper transport troubleshooting" by the malfunction diagnosis flowchart (Figure 4-1-1), execute the followings and mend the defect.

IV-1.   Multiple Paper Feed

<Possible causes>

1. If this problem occurs with the multi-purpose tray, perform step 4 and subsequent steps.

2. The separation roller is worn or deformed.
    Action: Replace the separation roller together with the feed roller.

3. The spring is defective.
    Action: Replace the spring that pulls the separation roller.

4. The separation pad surface is worn.
    Action: Replace the separation pad together with the multi-purpose tray pick-up roller.

5. The spring is defective.
    Action: Replace the spring of the separation pad.

IV-2.   Wrinkles/folded leading edge

<Possible causes>

1. Curled paper
    Action: A devise the user to straighten the paper.

2. After executing a test print, open the top cover before the paper enters the fixing unit. If the paper is wrinkled at this point, go to step 6).

3. The fixing entry guide is dirty.
    Action: Clean the guide.

4. The lower fixing roller is dirty.
    Action: Clean the lower fixing roller.

5. The fixing roller is deformed or worn.
    Action: Replace the worn or deformed roller.

6. Paper dust or dirt is accumulated on the feed roller, registration roller, or feed guide.
    Action: Clean the dirty areas.

7. Scarred or dirty feed guide
    Action: Check the paper path. Replace any scarred or deformed guide(s).

IV-3.   Skew

<Possible causes>

1. Paper dust or dirt is adhering to the registration rollers or the feed guide.
    Action: Remove the paper dust or dirt.

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2. The spring of the registration roller unit is out of place.
   Action: If the spring is out of place, set it in the right position or replace it with new one.

V. MALFUNCTION TROUBLESHOOTING

If the factor of the malfunction is identified as "malfunction troubleshooting" by the malfunction diagnosis flowchart (Figure 4-1-1), execute the followings and mend the malfunction.

V-1.   No AC Power Input

<Possible causes>
1. The correct voltage is not present at the outlet.
    Action: Inform the customer that the correct line voltage is not available at the outlet.

2. The power cord is not firmly plugged into the printer, the option (with power receptacle), and the outlet.
    Action: Push the power plugs in firmly.

3. The circuit breaker is OFF.
    Action: Remove the power supply. Press the circuit breaker button to set the circuit breaker ON.
    Turn the circuit breaker ON 30 seconds after it is activated (turned OFF). Before plugging the power cord into the outlet, turn the power switch ON and check the AC line circuit short and the circuit breaker states (continuity and contact resistance) using a multimeter.

4. The power supply is defective.
    Action: Replace the power supply.

V-2.   No DC Power Input

<Possible causes>
1. The AC power is not present.
    Action: Make a check using the steps of E-1 "No AC Power Input".

2. The overcurrent/overvoltage detection circuit is active.
    Action: If the problem is not rectified when the power switch is turned OFF and ON again, find the cause of activation of the overcurrent/overvoltage detection circuit of the power supply. Turn the power switch OFF for 2 minutes then turn it ON again.

3. The fuse has blown.
    Action: Remove the power supply and replace the fuse.

4. The power supply is defective.
    Action: Turn the power switch OFF and disconnect the connector J204 from the DC controller PCB. Plug the power cable and turn the power switch ON. Measure the DC power supply output of the connector J204. Do not short the connector. If the correct value is not output, replace the power supply.

5. Wiring, DC load, DC controller PCB
    Action: Turn the power switch OFF. Check the wiring from the DC controller PCB and the DC load. If they are normal, replace the DC controller PCB.

VI. MALFUNCTION STATUS TROUBLESHOOTING

If the factor of the malfunction is identified as "malfunction status troubleshooting" by the malfunction diagnosis flowchart (Figure 4-1-1), execute the followings and mend the malfunction.

VI-1. **"10.1 ERROR FUSER CALL FOR SERVICE"**
Fixing unit failure (abnormal low temperature)
"10.2 ERROR FUSER CALL FOR SERVICE"
Fixing unit failure (abnormal Warm-up)

<Possible causes>
1. The rated voltage of the fixing unit installed in the printer differs from the line voltage.
    Action: Replace the fixing unit.

2. The thermistor is dirty.
    Action: If the thermistor contact area of the upper fixing roller is dirty, clean it.

3. The thermistor is not installed correctly.
    Action: If the thermistor is not evenly contacting the upper fixing roller, re-install the thermistor correctly.

4. The thermistor wire is broken.
    Action: Turn the power OFF and remove the fixing unit. Measure the resistance between the fixing unit connector J50B-5 (FSRTH) and J50B-4 (GNDTH). If the resistance is not between about 190kΩ and 290kΩ (room temperature of 25°C), check the wiring from connector J222 on the DC controller PCB to the thermistor. If it is normal, replace the thermistor.

5. The main heater wire is broken.
    Action: Remove the fixing unit. If there is no continuity between the fixing unit connector J50-3 (FSRN1: the upper right terminal of the left connector) and J51-5 (FSRN2: the upper right terminal of the right connector), replace the main heater.

6. The sub heater wire is broken.
    Action: Remove the fixing unit. If there is no continuity between the fixing unit connector J50-4 (FSRL1: the lower right terminal of the left connector) and J51-6 (FSRL2: the lower right terminal of the right connector), replace the sub heater.

7. The thermoswitch is open.
    Action: Remove the fixing unit and wiring cover. If there is no continuity between thermoswitch terminals, replace the thermoswitch.

8. The fixing unit drive circuit is defective.
    Action: Replace the power supply unit.

9. The DC controller PCB is defective.
    Action: Replace the DC controller PCB.

VI-2. "10.3 ERROR FUSER CALL FOR SERVICE"
Fixing unit failure (abnormal high temperature)

<Possible causes>
1. The thermistor has shorted.
   Action: Turn the power OFF and remove the fixing unit. Measure the resistance between the fixing unit connector J50B-5 (FSRTH) and J50B-4 (GNDTH). The connector J50B is the upper terminal of the left connector. If the resistance is 1kΩ or less, check the wiring from connector J222 on the DC controller PCB to the thermistor. If it is normal, replace the thermistor.

2. The fixing unit drive circuit in the power supply is defective.
   Action: Replace the power supply.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-3. "10.4 ERROR FUSER CALL FOR SERVICE"
Fixing unit failure (wrong type)

<Possible causes>
1. The rated voltage of the fixing unit does not match the line voltage.
   Action: Replace the fixing unit.

2. The type detection circuit in the power supply is defective.
   Action: Replace the power supply.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-4. "11.1 ERROR SCANNER CALL FOR SERVICE" Scanner motor malfunction
"11.2 ERROR SCANNER CALL FOR SERVICE" Scanner motor malfunction

<Possible causes>
1. The scanner motor drive line connectors are loose.
   Action: Reconnect connector J1 on the scanner driver PCB, intermediate connector J18, and connector J207 on the DC controller PCB.

2. The scanner motor driver is defective.
   Action: Use the printer driver tester to rotate the scanner motor. If it does not rotate, replace the laser/scanner unit.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-5. "11.3 ERROR SCANNER CALL FOR SERVICE" BD malfunction
"11.4 ERROR LASER CALL FOR SERVICE" Laser malfunction

<Possible causes>
1. The BD signal line connector is loose.
   Action: Reconnect connector J6 on the BD PCB and J206 on the DC controller PCB.

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2. The laser drive signal line connectors are loose.
   Action: Reconnect connector J1001 on the laser driver PCB, and connector J202 on the DC controller PCB.

3. The laser/scanner unit is defective.
   Action: Replace the laser/scanner unit.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-6. "12.1 ERROR MOTOR CALL FOR SERVICE" Faulty main motor
         "12.2 ERROR MOTOR CALL FOR SERVICE" Faulty main motor

<Possible causes>
1. The main motor drive signal line connectors are loose.
   Action: Reconnect connector J12 of the main motor and connector J218 on the DC controller PCB.

2. The door switch on the switch/sensor PCB is defective.
   Action: Remove connectors J205 and J221 on the DC controller PCB. If J205-3 (+24V) and J221-1 (+24VB) on the cable side do not conduct when the door switch (SW1401) is ON, replace the switch/sensor PCB.

3. The main motor is defective.
   Action: Use the printer driver tester to rotate the main motor. If it does not rotate, replace it.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-7.   "13.1 ERROR FAM 1 CALL FOR SERVICE" Electrical unit fan (FM3) failure

<Possible causes>
1. The FM3 drive signal line connector is loose.
   Action: Reconnect connector J210 on the DC controller PCB and connectors J12 and J13.

2. The electrical unit fan is defective.
   Action: Disconnect connector J210 on the DC controller PCB. Turn the power switch ON and measure the voltage between connector J210-1 (FAN3D) and J210-3 (GND) on the DC controller PCB. If the voltage changes from 0 to more than 18V, replace the electrical unit fan.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-8.   "13.2 ERROR FAM 2 CALL FOR SERVICE" Power supply fan (FM2) failure

<Possible causes>
1. The FM2 drive signal line connector is loose.
   Action: Reconnect connector J216 on the DC controller PCB.

2. The power supply fan is defective.

Action: Disconnect connector J216 on the DC controller PCB. Turn the power switch ON and measure the voltage between connector J216-1 (FAN2D) and J216-3 (GND) on the DC controller PCB. If the voltage changes from 0 to more than 18V, replace the power supply fan.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-9. "13.3 ERROR FAM 3 CALL FOR SERVICE" Fixing unit/scanner fan (FM1) failure

<Possible causes>
1. The FM1 drive signal line connector is loose.
   Action: Reconnect connector J208 on the DC controller PCB.

2. The fixing unit/scanner fan is defective.
   Action: Disconnect connector J208 on the DC controller PCB. Turn the power switch ON and measure the voltage between connector J208-1 (FAN1D) and J208-3 (GND) on the DC controller PCB. If the voltage changes from 0 to more than 18V, replace the fixing unit/scanner fan.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-10. "13.4 ERROR FAM 4 CALL FOR SERVICE" Fixing unit fan (FM4) failure

<Possible causes>
1. The FM4 drive signal line connector is loose.
   Action: Reconnect connector J225 on the DC controller PCB and connectors J25 and J26.

2. The fixing unit fan is defective.
   Action: Disconnect connector J225 on the DC controller PCB. Turn the power switch ON and measure the voltage between connector J225-1 (FAN4D) and J225-3 (GND) on the DC controller PCB. If the voltage changes from 0 to more than 18V, replace the fixing unit fan.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-11. "13.5 ERROR FAM 5 CALL FOR SERVICE" Multi-purpose tray pick-up unit fan (FM5) failure

<Possible causes>
1. The FM5 drive signal line connector is loose.
   Action: Reconnect connector J229 on the DC controller PCB and connectors J34 and J35.

2. The multi-purpose tray pick-up unit fan is defective.
   Action: Disconnect connector J229 on the DC controller PCB. Turn the power switch ON and measure the voltage between connector J229-1 (FAN5D) and J229-3 (GND) on the DC controller PCB. If the voltage changes from 0 to more than 18V, replace the multi-purpose tray pick-up unit fan.

3. The DC controller PCB is defective.

Action: Replace the DC controller PCB.

VI-12. "14.1 ERROR AUX TRAY CALL FOR SERVICE" Lifting plate failure

<Possible causes>

1. Lifting plate drive unit parts are damaged.
   Action: Replace any damaged parts.

2. The lifting plate position sensor is defective.
   Action: Check the sensor state using the printer driver tester. If it is defective, replace the multi-purpose tray PCB.

3. The lifting plate solenoid is defective.
   Action: Disconnect lifting plate solenoid connector J1302. Measure the resistance between connector J1302-1 and J1302-2 on the cable side. If it is not about 160Ω, replace the lifting plate solenoid.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-13. "TONER CARTRIDGE MISSING" message appears when it is installed

<Possible causes>

1. The developing bias contact of the high-voltage power supply is not making a good connection with the cartridge contact.
   Action: If the contacts are dirty, clean them. If the problem continues after cleaning, or parts are deformed or damaged, replace them.

2. Defective cartridge
   Action: Replace the cartridge.

3. The high-voltage power supply PCB is defective.
   Action: Replace the high-voltage power supply PCB.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-14. "LOAD <MEDIA> <SIZE> IN MPT" message appears when the specified sized paper is in the multi-purpose tray

<Possible causes>

1. Damaged paper detection lever
   Action: Replace the defective lever.

2. Defective multi-purpose tray paper sensor
   Action: Replace the multi-purpose tray PCB.

3. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

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VI-15. Displays "LOAD\<MEDIA\>\<SIZE\> IN UPPER" or "LOAD\<MEDIA\>\<SIZE\>IN LOWER" when the specified cassette is loaded with paper.

\<Possible causes\>
1. Pull out the upper and lower cassettes, and install the specified cassette in the printer. If the lifter does not lift, perform step 5 and subsequent steps.

2. Damaged paper detection lever
   Action: Replace the defective lever.
3. Defective upper cassette paper-out sensor/lower cassette paper-out sensor
   Action: Replace the pick-up PCB.

4. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

5. Pick-up drive unit is damaged.
   Action: Remove the pick-up unit and replace any damaged parts.

6. The cassette pick-up solenoid is defective.
   Action: Remove the pick-up unit, and disconnect cassette pick-up solenoid connector J1203 from the pick-up PCB. Measure the resistance between connectors J1203-1 and J1203-2 on the cable side. If it is not about 160Ω, replace the cassette pick-up solenoid.

7. The pick-up PCB is defective.
   Action: Replace the pick-up PCB.

8. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VI-16. "PAPER JAM" message appears when the paper jam has not occurred, and the printer cannot be in READY mode.

\<Possible causes\>
1. Registration paper sensor lever does not move smoothly, or is damaged.
   Action: Adjust the lever so that it moves smoothly. Replace it if damaged.

2. Pick-up unit sensor lever does not move smoothly, or is damaged.
   Action: Adjust the lever so that it moves smoothly. Replace it if damaged.

3. Fixing unit delivery sensor lever does not move smoothly, or is damaged.
   Action: Adjust the lever so that it moves smoothly. Replace it if damaged.

4. Face-down tray delivery sensor lever does not move smoothly, or is damaged.
   Action: Adjust the lever so that it moves smoothly. Replace it if damaged.

5. Sensor failure
   Action: Using the printer driver tester, check the condition of the sensors. If the LED of the tester does not light up when the sensor lever is shifted, replace the sensor.

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VI-17. "PRINTER OPEN" message appears when the cover is closed.

<Possible causes>

1. The projection for the delivery cover is damaged.
   Action: Replace the delivery cover.

2. The projection for the upper cover is damaged.
   Action: Replace the upper cover.

3. The projection for the pick-up unit door is damaged.
   Action: Replace the pick-up unit door.

4. The pick-up unit door sensor is defective.
   Action: Using the printer driver tester, check the condition of the sensor. If the LED of the tester does not light up when the pick-up unit door is opened, replace the sensor.

5. Interlock arm does not move smoothly, or is damaged.
   Action: Adjust the arm so that it moves smoothly. Replace it if damaged.

6. Connector is loose.
   Action: Reconnect connector J1401 on the switch/sensor PCB and connectors J205 and J221 on the DC controller PCB.

7. The door switch is defective.
   Action: Replace the switch/sensor PCB.

8. The DC controller PCB is defective.
   Action: Replace the DC controller PCB.

VII. MEASUREMENT AND ADJUSTMENT

A. Mechanical Adjustment
1. Checking the nip width of the lower fixing roller
The fixing unit is not designed to allow adjustment of the pressure (nip width); however, the incorrect nip width can cause fixing problems.

   Follow the procedures below to check the nip width:
1) Make an all-black print using an EP-72 cartridge, and take the print to the customer's site. (Use the printer driver tester to output an all-black print.)
2) Place the all-black print in the lower cassette of the printer, with the printed side facing down.
3) Press the test print switch.
4) Turn OFF the printer when the leading edge of the print emerges at the face-down tray. Turn ON the printer 10 seconds later, and operate the printer to deliver the print.
5) Measure the width of the glossy band across the paper and check that it meets the require-ments as shown in Figure 4-7-1.
   • Center (a) : 6.5 ± 1.0mm
   • Left/right side (b) : 6.9 ± 1.0mm
   • Difference between right side and left side (|b-c|) : 1.0mm or less
   • Difference between right/left sides and center (b-a, c-a) : 1.5mm or less
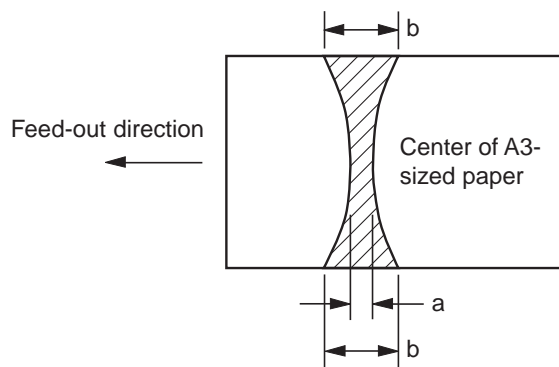
Figure 4-7-1

2. Side registration adjustment of the cassette
When the side registration of the cassette is not aligned, this adjustment needs to be made.

   The side registration adjustment levers (see Figure 4-7-2) in the upper and lower cassettes are adjusted in the factory. Therefore, there is no need to make any adjustments when installing the printer. However, when either upper or lower cassette is replaced in the field, re-adjustment of the left margin is necessary. This procedure is outlined below.
1) Load 20 to 30 sheets of paper into the cassette. Then, using the printer driver tester, print several pages of all-black or horizontal line test prints.
2) Measure the distance (a) between the left edge of the page to the edge of the printed pattern (see Figure 4-7-2). Measure several test prints to find the average distance.
3) Move the side registration adjustment lever based on Figure 4-7-2 so that the distance mea-sured in step 2) become 3.0mm. (one notch alters length (a) by 0.5mm.)
   For example, if the average length of step 2) is 2.0mm, by moving the lever 2 steps clockwise the necessary adjustment of 1.0mm can be made.
4) Make several more test prints. Make sure that the left margin is 3.0mm by repeating step 2) above.
   If the margin needs further adjustment, repeat steps 1) to 3) again.

The value of "a" drops by 0.5mm
for each notch moved.

Leading edge of paper

a

The value of "a" rises by 0.5mm
for each notch moved.
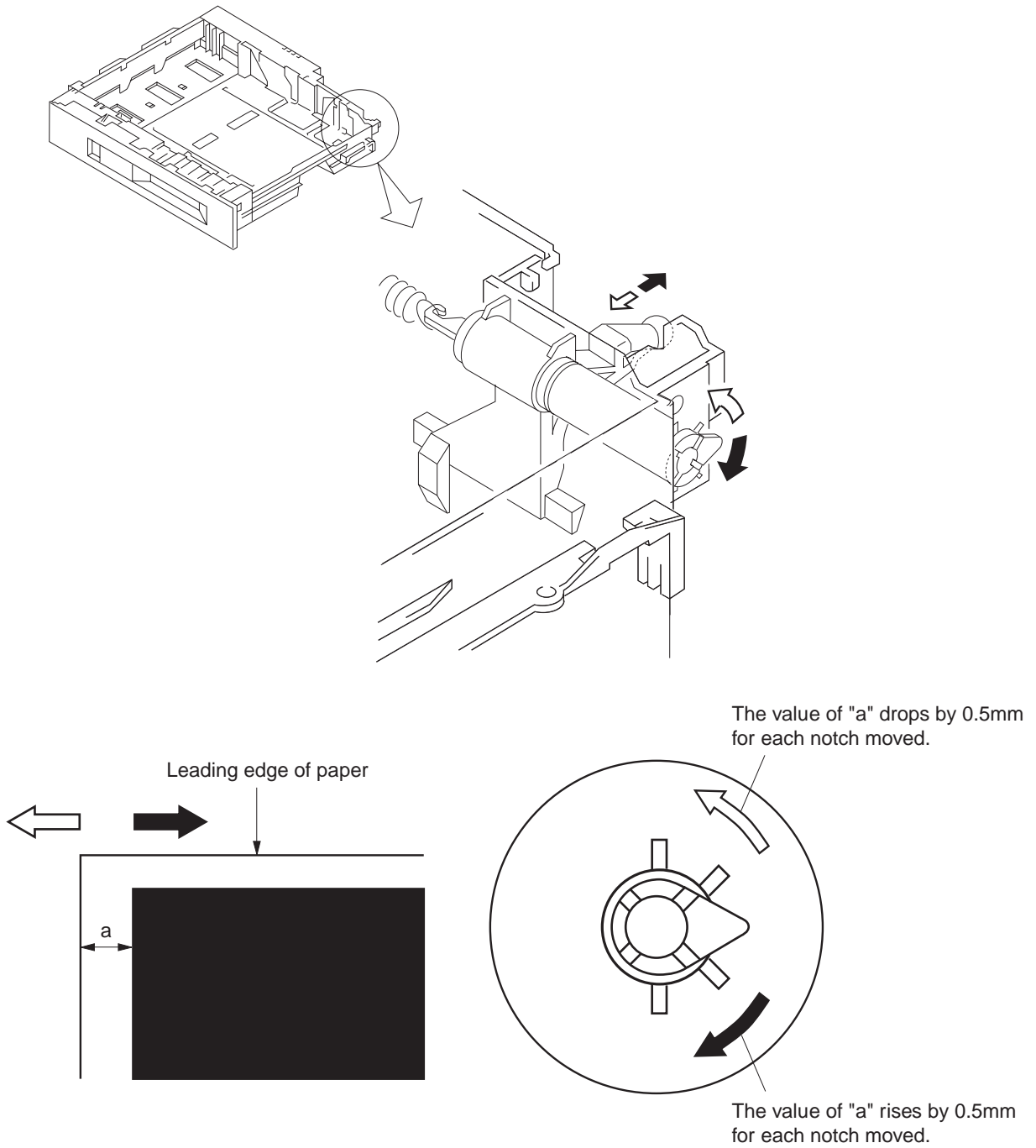
Figure 4-7-2

B. Electrical Adjustment
• No electrical adjustment for this printer.

C. Variable Resistors, LEDs, Test Pins, Jumpers and Switches on PCBs

Only the variable resistors, LEDs, test pins, jumpers, and switches required for after-sales service in the field are listed below.

All other variable resistors, test pins, etc. are for the factory use only. The adjustment and check using these test pins, etc. require special tools, measuring instruments and high precision. Do not touch them in the field.

Notes: 1. Some LEDs receive leakage current during normal operation, thus glow dimly even when they should be OFF.
2. Variable resistor which may be adjusted in the field are marked ....
Variable resistor which may not be adjusted in the field are marked ...

1. DC controller PCB
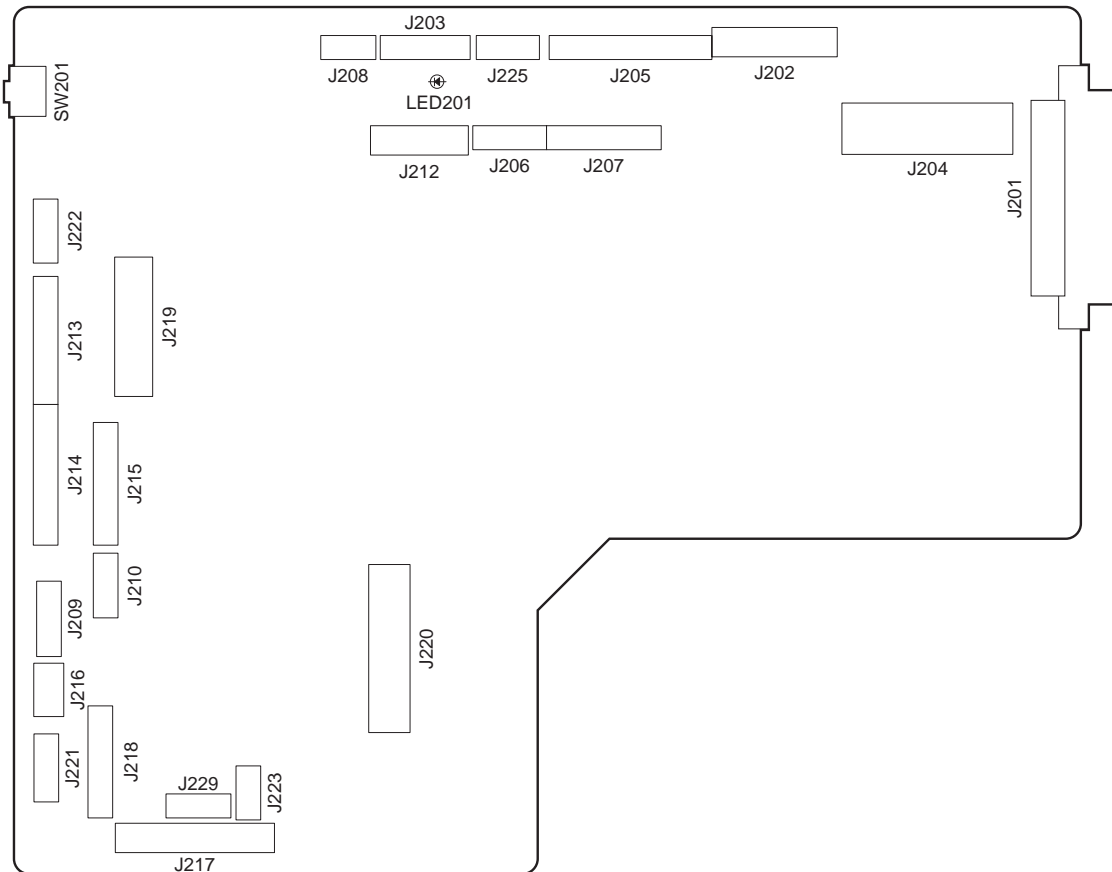
Figure 4-7-3

Table 4-7-1

SW No.	Function
SW201	Test print switch
LED201	Sensor check (Note)

Note: Sensor check is available only when the service mode is specified by the printer driver tester. (Refer to the operating manual of the printer driver tester for details.)

2. Switch/sensor PCB
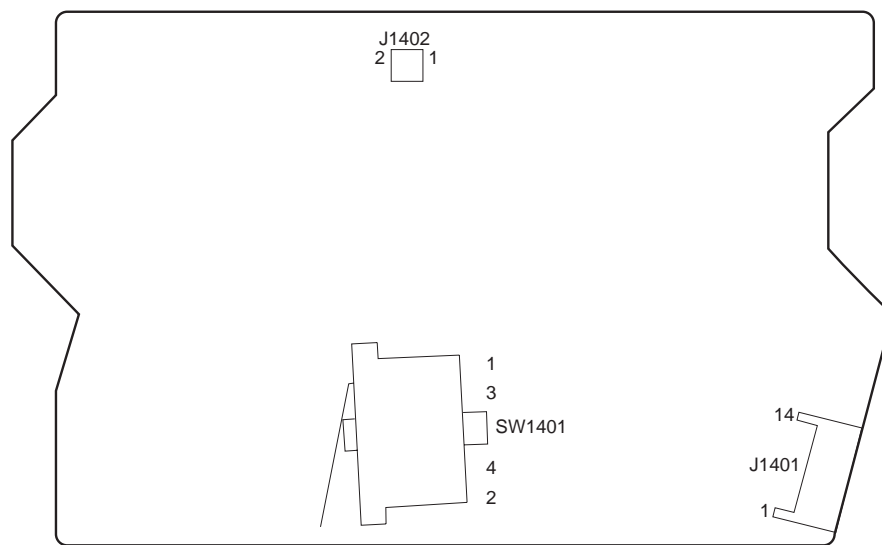
Figure 4-7-4

Table 4-7-2

SW No.	Function
SW1401	Door switch

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3. Cassette paper size detection PCB
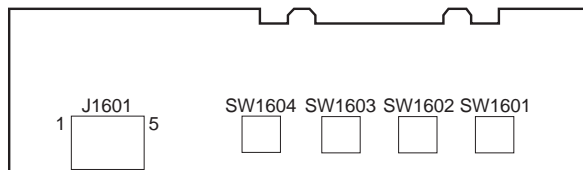
Figure 4-7-5

Table 4-7-3

SW No.	Function
SW1601	Cassette paper-size sensing switch (See page 2-47.)
SW1602	
SW1603	
SW1604	

4. High-voltage power supply PCB
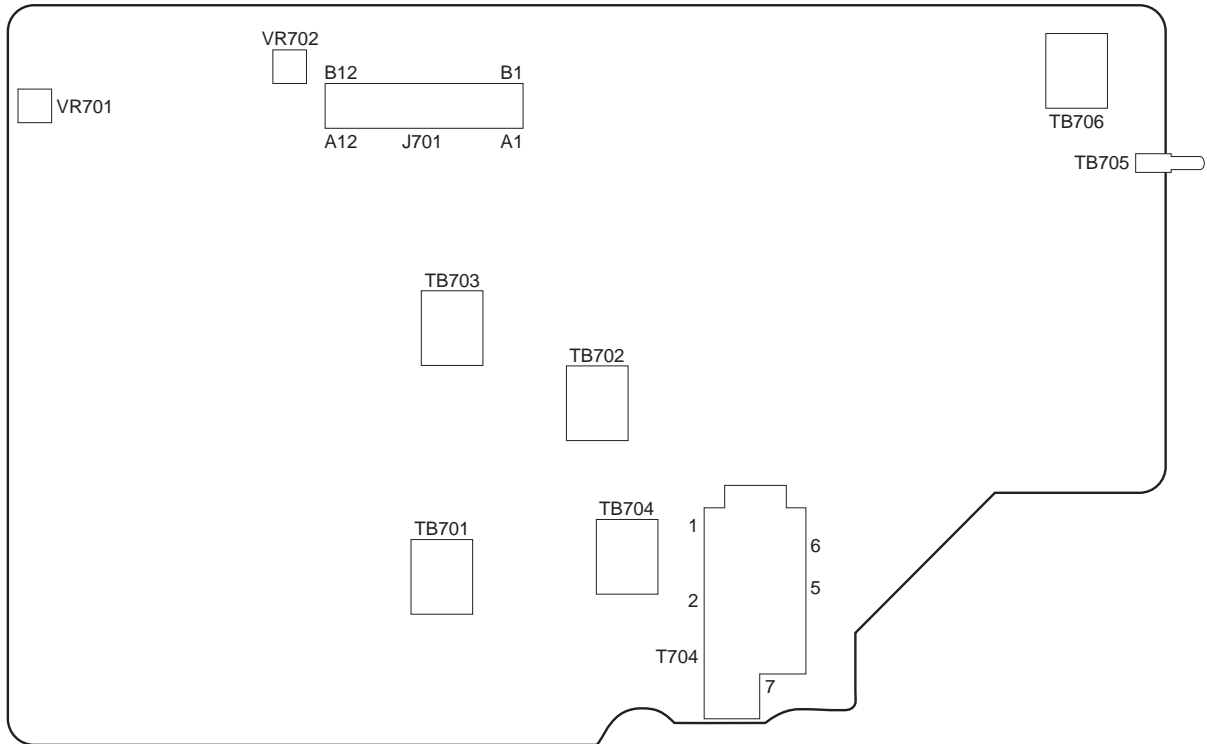
Figure 4-7-6

Table 4-7-4

VR No.	Function
VR701	For factory use
VR702	

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VIII. MAINTENANCE AND SERVICING

A. Periodic Replacement Parts
• No parts require periodic replacement in this printer.

Note: Periodic replacement parts are the parts that must be replaced at regular intervals, even if they are functioning properly and show no signs of wear. (Failure of these parts can seriously affect the performance.) These parts should be replaced during a regular service visit closest to the end of the parts expected life.

B. Expected Service Life of Consumable Parts
Shown below are the average life expectancies (number of prints) of parts that may need to be replace due to deterioration or damage at least once prior to the elapse of the warranty period of the printer. These parts should be replace when faulty.

Table 4-8-1

As of December, 1998

No.	Part name	Part No.	Qt'y	Expected life	Remarks
1	Multi-purpose tray pick-up roller	RB1-9526-000	1	200,000 prints	Replace the multi-purpose tray pick-up roller and separation pad together.
2	Separation pad	RF5-2703-000	1	200,000 prints	
3	Fixing unit	RG5-4319-000	1	350,000 pages (Note 2)	220-240V
4	Transfer charging roller	RF9-1394-000	1	350,000 pages (Note 2)	
5	Feed roller and separation roller	RF5-1834-000	4	350,000 prints	For both upper and lower rollers. Replace the feed rollers and separation rollers together.
6	Power supply fan	RH7-1266-000	1	25,000 hours	
7	Electrical unit fan	RH7-1271-000	1	25,000 hours	
8	Fixing unit fan	RH7-1289-000	1	25,000 hours	
9	Fixing unit/scanner fan	RH7-1396-000	1	25,000 hours	
10	Multi-purpose tray fan	RH7-1397-000	1	25,000 hours	

Notes: 1. The values above are only estimates based on part data, and are subject to change.
2. 2 pages are counted as 1 print in case of duplexing. Expected life of the fixing unit is 350,000 pages when it is used only in the normal mode.

C. Periodic Service
• The printer has no parts that require periodic servicing.

D. Cleaning during a Service Visit
Following the procedures below, clean the printer during service visit.

1. Transfer charging roller
As a general rule, the transfer charging roller is not to be touched or cleaned. If it is unavoidable, clean the roller with dry lint free paper (which produces little paper dust). Do not use water or solvent. Make sure not to contaminate the roller with solvent or oil.

2. Multi-purpose tray pick-up roller, cassette pick-up roller, separation roller, and feed roller
Clean with lint-free paper, either dry or moistened with ethyl/isopropyl alcohol.

3. Separation pad
Clean with lint-free paper.

4. Registration roller unit
Clean with lint-free paper. If badly contaminated, use it with ethyl/isopropyl alcohol for rubber parts and MEK(methyl ethyl ketone) for other parts. Avoid skew or paper jams caused by removal of the springs.

5. Transfer guide unit
Clean with soft, dry flannel cloth.

6. Static charge eliminator
Clean with brush.

7. Feed guide unit
Clean with lint-free paper.

8. Fixing unit
• Fixing entry guide
Clean with lint-free paper moistened with MEK.

• Fixing separation guide
Clean lightly with lint-free paper moistened with MEK, only to remove the toner deposit.

• Fixing separation claw
Clean lightly with lint-free paper moistened with MEK, only to remove the toner deposit. Replace if badly worn.
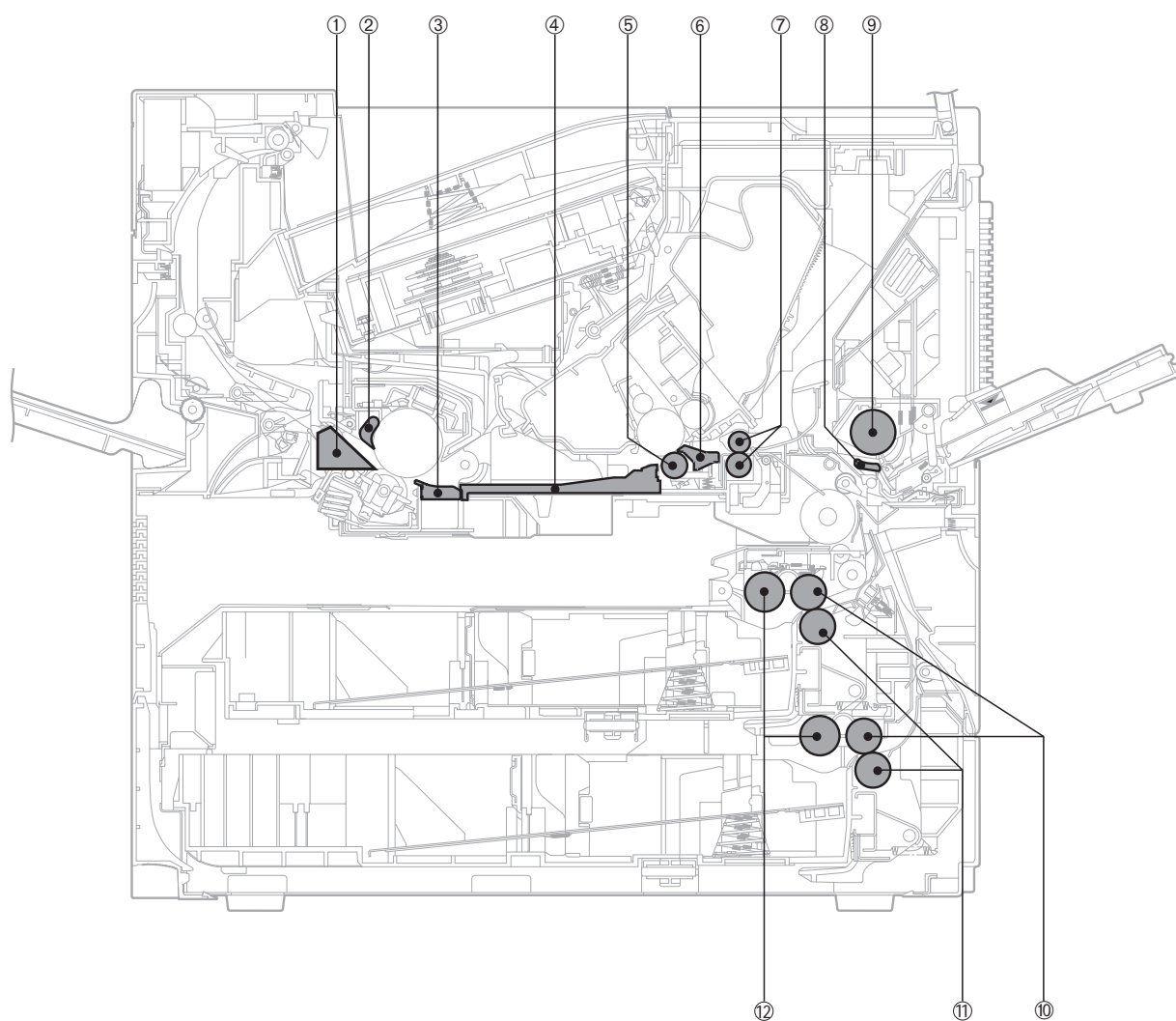
Figure 4-8-1

1: Fixing separation guide
2: Fixing separation claw
3: Fixing entry guide
4: Feed guide
5: Transfer charging roller
6: Transfer guide

7: Registration roller unit
8: Separation pad
9: Multi-purpose tray pick-up roller
10: Feed roller
11: Separation roller
12: Pick-up roller

E. Standard Tools

The standard tools required for servicing the printer are listed below.
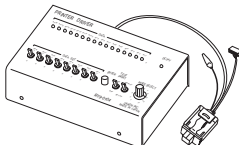
Table 4-8-2

No.	Tool name	Tool No.	Remarks
1	Tool case	TKN-0001	
2	Jumper wire	TKN-0069	With clips
3	Thickness gauge	CK-0057	0.02 mm to 0.3 mm
4	Compression spring scale	CK-0058	For checking cassette spring strength (0–600 g)
5	Phillips screwdriver	CK-0101	M4, M5 length: 363mm
6	Phillips screwdriver	CK-0104	M3, M4 length: 155mm
7	Phillips screwdriver	CK-0105	M4, M5 length: 191mm
8	Phillips screwdriver	CK-0106	M4, M5 length: 85mm
9	Flat-blade screwdriver	CK-0111	
10	Precision flat-blade screwdriver set	CK-0114	Set of 6
11	Allen wrench set	CK-0151	Set of 5
12	File, fine	CK-0161	
13	Allen (hex) screwdriver	CK-0170	M4 length: 107mm
14	Diagonal cutting pliers	CK-0201	
15	Needle-nose pliers	CK-0202	
16	Pliers	CK-0203	
17	Retaining ring pliers	CK-0205	For shaft rings
18	Crimper	CK-0218	
19	Tweezers	CK-0302	
20	Ruler	CK-0303	150 mm (for measuring)
21	Soldering iron	CK-0309	100 V, 30 W
22	Mallet, plastic head	CK-0314	
23	Brush	CK-0315	
24	Penlight	CK-0327	
25	Plastic bottle	CK-0328	100cc
26	Solder	CK-0329	ø1.5 (mm) × 1 (m)
27	Desoldering wick	CK-0330	1.5 mm
28	Lint-free paper	CK-0336	500 SH/PKG
29	Soldering iron	CK-0348	240 V, 30 W
30	Oiler	CK-0349	30cc
31	Plastic jar	CK-0351	30cc
32	Digital multimeter	FY9-2032	

F. Special Tools
In addition to the standard tools, the following special tools are required for servicing the printer.

Table 4-8-3

No.	Tool name	Tool No.	Shape	RANK	Application/remarks
1	Printer driver tester	RY9-0104		B	Used for checking printer operations.

Note: Ranks
  A: Tools used for part replacement or adjustment on site.
  B: Tools used on site or in regions.
    These tools include tools used for failure analysis, and tools which are difficult to carry around.
  C: Tools used in the workshop.
    These tools include the tools used for PCB and unit repairs.

G. Special Tools (printer driver tester) Explanation
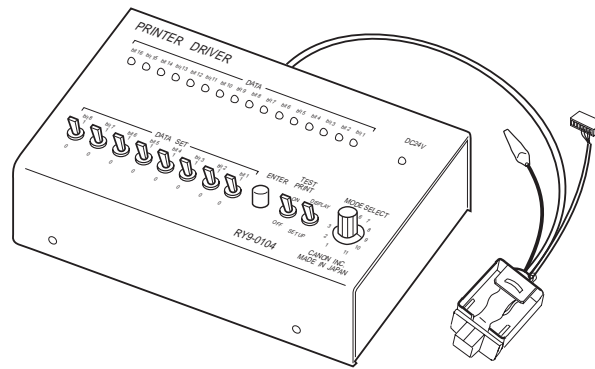
Figure 4-8-2

1. Outline

The tester runs the printer independently to test operation of printer and options (duplexing unit and envelope feeder). It has three uses which are outlined below;

a. Commands the printer to print out solid black, horizontal lines, vertical lines and solid blank images. It can also select the pick-up and delivery trays and simplex and duplex print.

b. Monitors the status of the sensors, and forcibly operates the various solenoids and motors.

c. In the event of a printer failure, the error information sent from the printer to the video controller (external device) can be displayed on the tester LED.

Note: This manual covers the basic operation of the printer driver tester. For more defailed explanation please refer to the operation manual attached to the tester.

---

2. Operation Panel

PRINTER DRIVER

DATA
bit 16 bit 15 bit 14 bit 13 bit 12 bit 11 bit 10 bit 9 bit 8 bit 7 bit 6 bit 5 bit 4 bit 3 bit 2 bit 1

DC24V

DATA SET
bit 8 bit 7 bit 6 bit 5 bit 4 bit 3 bit 2 bit 1

ENTER   TEST PRINT   MODE SELECT

ON   DISPLAY

OFF   SET UP

RY9-0104   CANON INC. MADE IN JAPAN
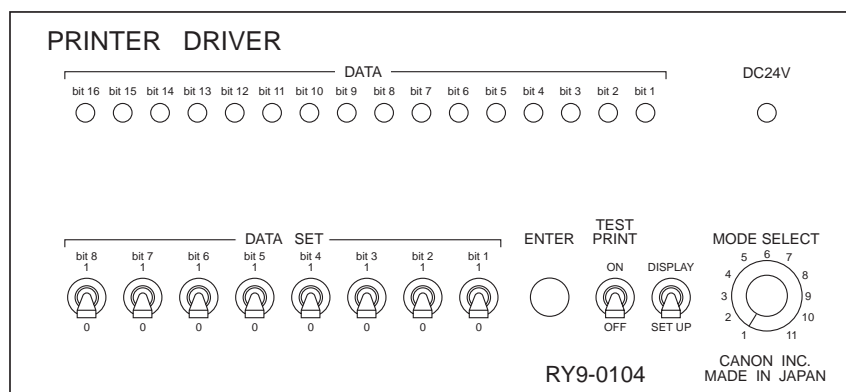
Figure 4-8-3

DATA LED
Monitors the status of the various loads and sensors sent from the printer with the 16 LEDs.
+24VA LED
Lights up when +24VA is being supplied to the tester.
TEST PRINT switch
When set to "ON", test patterns set by the DATA SET switches are printed.
MODE SELECT switch
To select the various modes. See table 4-8-4.
DISPLAY/SET UP switch
Switches between DISPLAY and SET UP.
DISPLAY: Mode to display the status of the various sensors and loads sent from the printer with the DATA LED.
SET UP: Mode to set data with the DATA SET switches.
DATA SET switch
Sets the various data sent to the printer. See in table 4-8-4.
ENTER switch
Inputs data set by the DATA SET switches.

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Table 4-8-4

DISPLAY /SET UP Mode	DISPLAY (displays the status of the sensors and loads sent from the printer)	SET UP (sets up various data sent to the printer)
1	Operator call/ service call	———
2	Service call/ misprint details/ warning/ fan malfunction details 2 (72X)	Print density select
3	Pick-up unit configuration/ select pick-up unit/ pick-up unit paper-out	Ready inhibit/ forced laser emission (WX)/ sleep setting
4	Sensor status (WX)/ Sensor status 1 (72X)	———
5	Select paper size/ select print density	Multi-purpose tray paper size select
6	———	———
7	Upper and lower cassette paper size detection data/ Sensor status 2 (72X)	———
8	Cause of paper jam/ fan malfunction details (WX)/ fan malfunction details 1 (72X)	Test print paper pick-up/ delivery slot allocation/ pattern setting
9	Paper transport system electrical parts status/ Sensor status 3 (72X)	Paper transport system electrical parts drive 1
10	Motor status	Paper transport system electrical parts drive 2
11	———	Paper transport system electrical parts drive 3

3. Connector Signal Chart

Table 4-8-5

Connector 1		
Pin No.	Signal name	Function
J1-1	+24VA	+24VA
J1-2	IN	Serial line (input)
J1-3	OUT	Serial line (output)
J1-4	GND	GND

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4. Operation Method

a. Preparation

1) Switch OFF the printer.
2) Connect the tester connector 1 to the envelope feeder connector (J24) in the printer.
3) Turn ON the printer.
4) When the printer is in standby mode, start performing checks with the tester.
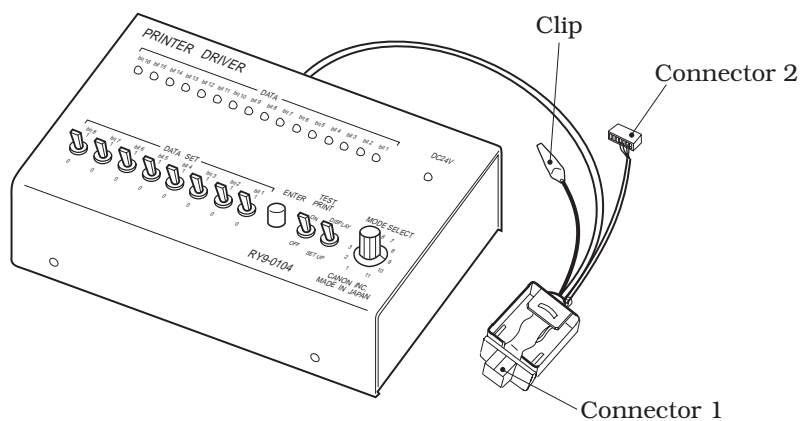
Figure 4-8-4

Note: When operating the printer driver tester, electrostatic energy can cause operation failures. Therefore, when connecting the tester be sure to touch a metal part of the printer with your hand to discharge any electrostatic energy.

---

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b. Confirming Printer Status

Select DISPLAY with the DISPLAY/SET UP switch. Check can be made with the LED display (see table 4-8-7).

For example, when checking the contents of operator call/ service call, follow the directions below.

1) After the printer has entered standby mode, set the DISPLAY/SET UP switch to "DISPLAY".
2) Set the MODE SELECT to "1".
3) Look up the corresponding chart for the bit that is lit up by a DATA LED.

For example, when a fixing unit failure occurs, the LED of bit 16 will light up.
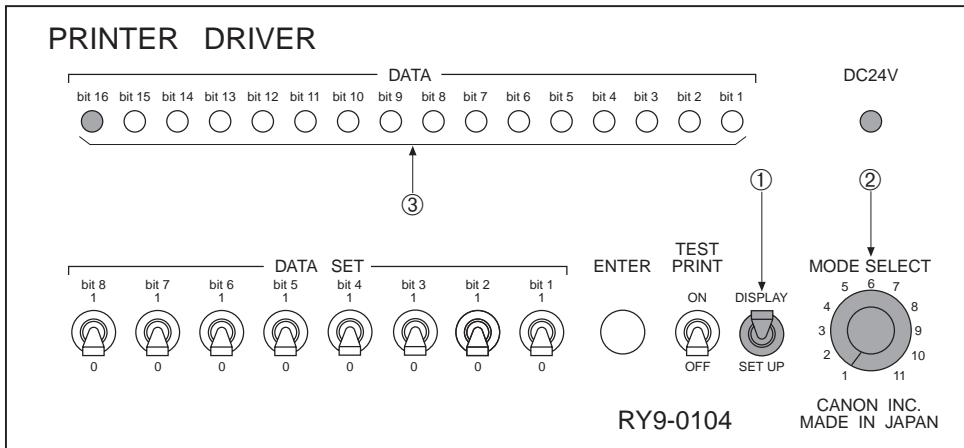
Figure 4-8-5

Table 4-8-6

Mode select 1

	bit	Display Content Details/ Set Up Content Details
D I S P L A Y	16	Fixing unit malfunction
	15	BD malfunction
	14	Laser malfunction
	13	Main motor malfunction
	12	Scanner motor malfunction
	11	Fan motor malfunction
	10	Duplex pick-up roller malfunction (When duplexing unit is installed)
	9	Lifting plate malfunction
	8	Side registration guide malfunction (When duplexing unit is installed)
	7	————
	6	Misprint
	5	Cartridge-out
	4	Paper-out
	3	Door open
	2	Jam
	1	Printer ready
S E T U P	8	————
	7	————
	6	————
	5	————
	4	————
	3	————
	2	————
	1	————

c. Itemize the Data Set

Select SET UP with the DISPLAY/SET UP switch. Various settings and commands can be made according to the DATA SET (see table 4-8-4).

For example, when commanding a test print pick-up, delivery tray allocation or pattern setting operation, follow the steps below by operating the the tester. (when you want to have paper picked-up from the multi-purpose tray, duplex-print a horizontal line test print pattern and deliver it through the face up tray.)

1) When the printer has entered standby mode, set the DISPLAY/SET UP switch on the tester to "SET UP".
2) Set the MODE SELECT to "8".
3) Set DATA SET switch bit 8 to 0, bit 7 to 1, bit 6 to 0, bit 5 to 0, bit 4 to 1, bit 3 to 1, bit2 to 0 and bit 1 to 1 (see Table 4-8-7).
4) Press the ENTER switch.
5) By turning the TEST PRINT switch ON once, a test print can be made.
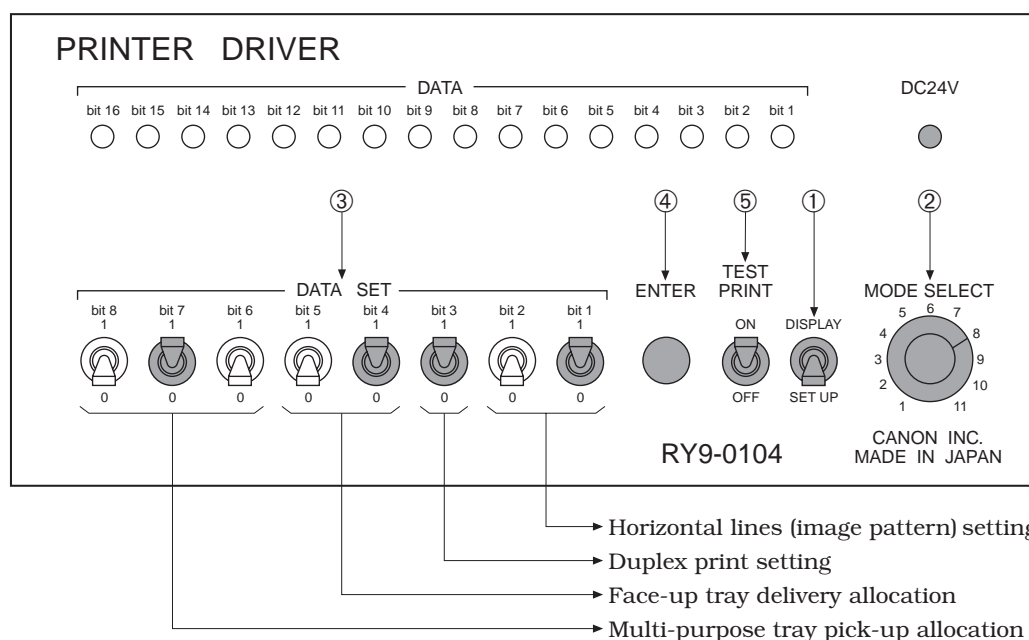
Figure 4-8-6

Notes: **1.** After setting a test print in this mode, the data will remain the same even if the test print is set in another mode.

2. By keeping the TEST PRINT switch "ON", continuous test prints will be made.

3. When setting the image pattern to "All black", do not make duplex prints.

Table 4-8-7

Mode select 8

	bit	Display content details
	16	Initial residual jam
	2	Electrical unit fan malfunction
	1	Fixing unit fan malfunction

SET UP

Pick-up slot			Delivery slot		Print mode	Image pattern		
bit 8	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	
0	0	0						Lower cassette pick-up
0	0	1						Upper cassette pick-up
0	1	0						Multi-purpose tray pick-up
0	1	1						Envelope feeder pick-up
			0	0				Face-down tray delivery
			0	1				Face-up tray delivery
					0			Single side print
					1			Duplex print
						0	0	Vertical lines
						0	1	Horizontal lines
						1	0	All-white
						1	1	All-black

Table 4-8-8

Mode select 3

		bit	Display Content Details/ Set Up Content Details
		16	Lights when the upper cassette pick-up function is ready in the printer
		2	Lights when there are envelopes loaded in the envelope feeder.
		1	Lights when paper is present at the re-feed position
S E T U P		8	RDYINH set **(Note 1)**
		7	————
		6	Forced laser emission (WX only)
		5	————
		4	Service mode (1: start, 0: stop) (72X only)
		3	Display panel light up test (WX only)
		2	Sleep mode (1: deep mode, 0: nap mode) **(Note 2)**
		1	Sleep set **(Note 3)**

Notes: **1.** When performing the ready inhibit setting, set MODE SELECT to "3" and turn ON the printer while pressing the ENTER switch.
2. Deep mode halts all drives. (stop +24V supply)
Nap mode halts all drives except the fan motor.
3. The sleep mode setting can not be released. When releasing, turn the printer power ON/OFF again.

H. Solvents and Oil List

Table 4-8-9

No.	Material name	Use	Components	Remarks
1	Alcohol: ethyl (pure or denatured) or isopropyl (pure or denatured)	Cleaning: plastic, rubber	C_2H_5OH, $(CH_3)_2CHOH$	• Purchase locally • Flammable: keep away from flame
2	MEK (methyl ethyl ketone)	Cleaning: oil and toner stains	$CH_3CO\text{-}C_2H_5$	• Purchase locally • Highly flammable: keep away from flame
3	Lubricating oil	Apply between gear and shaft	Petroleum mineral oil	• Tool No. CK-8003 (100 ml bottle)
4	Lubricating agent	Apply to gears	Special oil Special solid lubricating material Lithium soap	• Tool No. HY9-0007 (20 g tube)
5	Lubricating agent	Apply to gears of the pick-up unit	Lithium oil	• Tool No. CK-8005 (40 g bottle)
6	Lubricating agent	Apply to gears of the pick-up unit (Refer to Chapter 3)	Poly α olefin oil Lithium soap	• Tool No. CK-8009 (20 g tube)

IX. LOCATION OF CONNECTORS
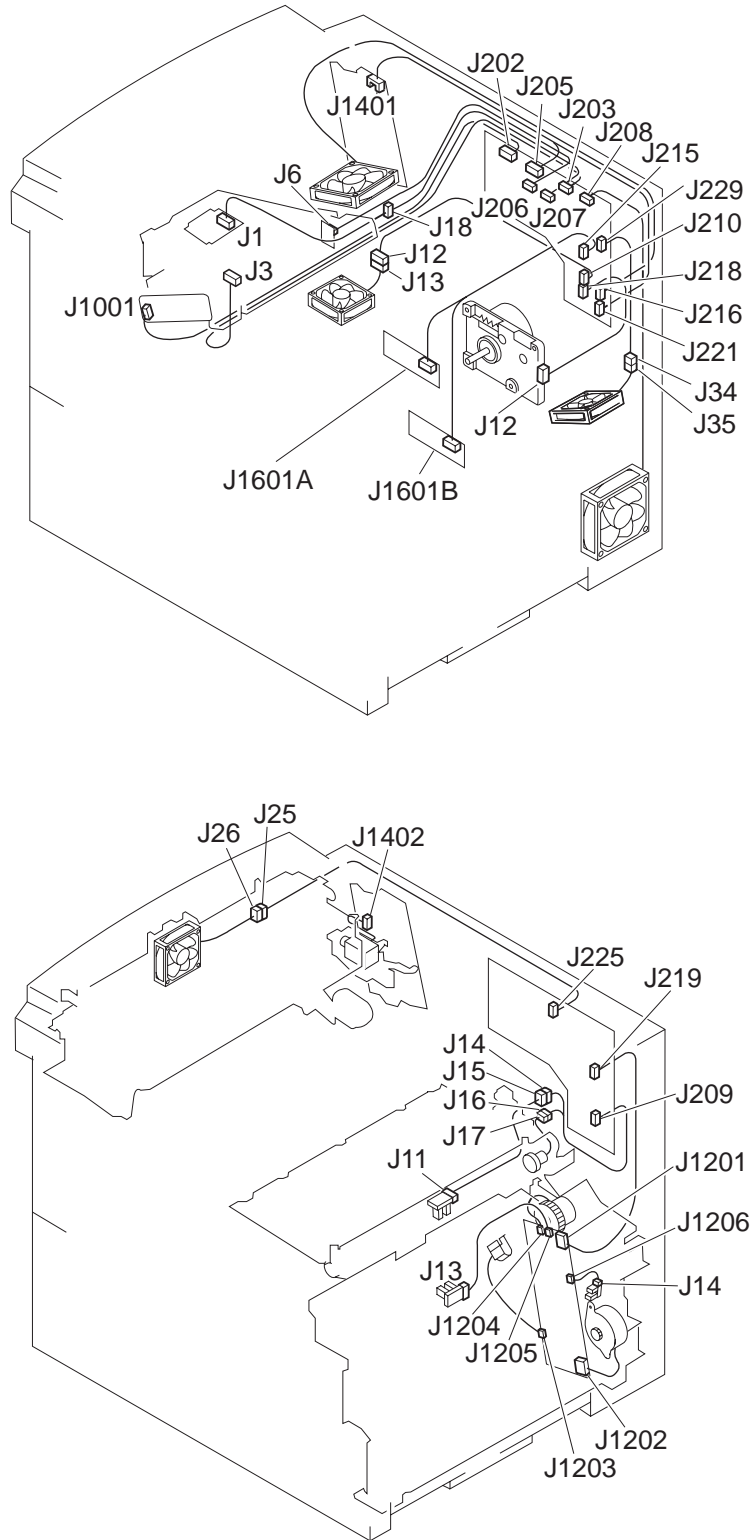
Figure 4-9-1
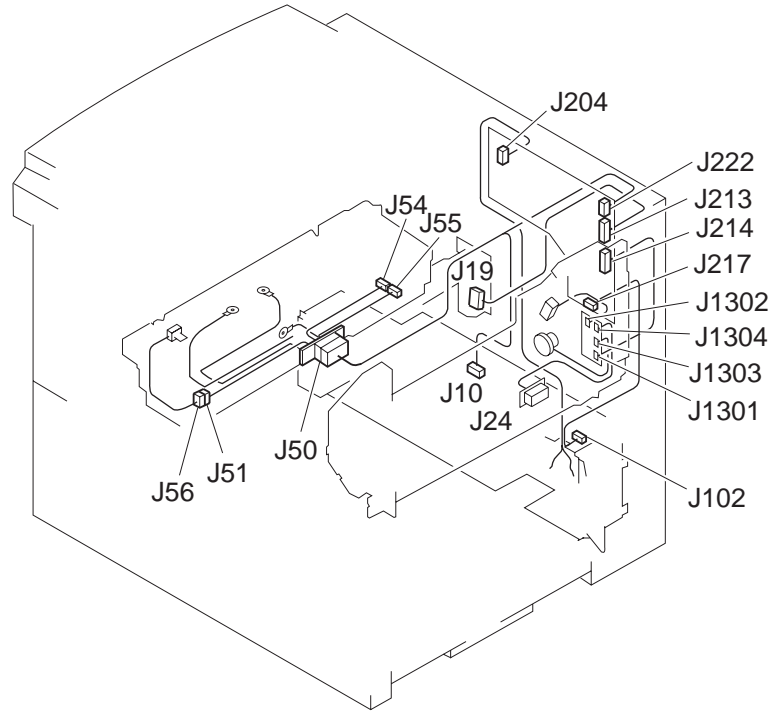
Figure 4-9-2

APPENDIX

• Timing chart for two consecutive prints on A4 paper (Lower cassette feed - face-down tray delivery)

Power switch ON

(Unit: Seconds)

	Operation	WAIT	STBY	INTR	PRINT	LSTR	STBY
1	Fixing roller heater (H1, H2)	190°C control		190°C control		169°C control	169°C control
2	Fan (FM1, FM2, FM3, FM4)	Low-speed rotation		High-speed rotation			About 30.0
3	Fan (FM5)	About 15.0		Low-speed rotation		About 30.0	
4	PRINT signal (/PRNT)	Low-speed rotation					
5	VERTICAL SYNC signal (/VSYNC)						
6	Scanner motor (M1)						
7	Scanner motor ready (/SCNRDY)			3.25			
8	Main motor (MT1)						
9	Cassette pick-up solenoid (SL1)	About 1.2		0.52			
10	Pick-up motor (SMT1)	About 1.5		About 0.9 About 0.7 0.2			
11	Feed clutch (CL2)	High-speed rotation Rotation		1.1	0.04 0.04		
12	Registration clutch (CL1)				0.01 0.01		
13	Pick-up unit paper sensor (PS2)						
14	Registration paper sensor (PS1)			About 1.5			
15	Fixing unit delivery sensor (PS1403)						
16	Face-down tray delivery sensor (PS1402)					0.77	
17	Primary voltage (AC)				1.79		
18	Primary voltage (DC)			0.52			
19	Developing bias (AC)				0.05 0.05		
20	Developing bias (DC)			0.82	1.74 0.05		
21	Transfer voltage			About 0.31 0.31 0.37			
22	Static charge eliminator bias	Negative bias		Negative bias Between-page bias Print bias Between-page bias 0.47			
23	Upper fixing roller bias			0.1	High-voltage bias		

160°C 170°C 169°C control

About 1.5

A - 1

J2 — Firmware ROM DIMM

A		B	
A1	VCC	B1	GND
A2	D30	B2	D31
A3	D28	B3	D29
A4	D26	B4	D27
A5	D24	B5	D25
A6	D22	B6	D23
A7	D20	B7	D21
A8	D18	B8	D19
A9	D16	B9	D17
A10	GND	B10	GND
A11	D14	B11	D15
A12	D12	B12	D13
A13	D10	B13	D11
A14	D8	B14	D9
A15	D6	B15	D7
A16	D4	B16	D5
A17	D2	B17	D3
A18	D0	B18	D1
A19	A2OD	B19	A2EV
A20	GND	B20	VCC
A21	AA26	B21	A3EV
A22	AA24	B22	AA25
A23	AA22	B23	AA23
A24	AA20	B24	AA21
A25	AA18	B25	AA19
A26	AA16	B26	AA17
A27	AA14	B27	AA15
A28	AA12	B28	AA13
A29	AA10	B29	AA11
A30	AA8	B30	AA9
A31	A3OD	B31	WnR
A32	nRCS0D	B32	nRCS1
A33	nRCS2	B33	nRCS3
A34	nWR0	B34	nRD0
A35	nWR1	B35	nRD1
A36	VCC	B36	GND

J3/4 — Optional ROM DIMM

A		B	
A1	VCC	B1	GND
A2	D30	B2	D31
A3	D28	B3	D29
A4	D26	B4	D27
A5	D24	B5	D25
A6	D22	B6	D23
A7	D20	B7	D21
A8	D18	B8	D19
A9	D16	B9	D17
A10	GND	B10	GND
A11	D14	B11	D15
A12	D12	B12	D13
A13	D10	B13	D11
A14	D8	B14	D9
A15	D6	B15	D7
A16	D4	B16	D5
A17	D2	B17	D3
A18	D0	B18	D1
A19	A2OD	B19	A2EV
A20	GND	B20	VCC
A21	AA26	B21	A3EV
A22	AA24	B22	AA25
A23	AA22	B23	AA23
A24	AA20	B24	AA21
A25	AA18	B25	AA19
A26	AA16	B26	AA17
A27	AA14	B27	AA15
A28	AA12	B28	AA13
A29	AA10	B29	AA11
A30	AA8	B30	AA9
A31	A3OD	B31	WnR
A32	nRCS0D	B32	nRCS1
A33	nRCS2	B33	nRCS3
A34	nWR0	B34	nRD0
A35	nWR1	B35	nRD1
A36	VCC	B36	GND

J6/7 — Optional RAM DIMM

A		B	
A1	GND	B1	MD31
A2	MD30	B2	MD29
A3	MD28	B3	MD27
A4	MD26	B4	MD25
A5	MD24	B5	VCC
A6	N.C.	B6	BMA0
A7	BMA1	B7	BMA2
A8	BMA3	B8	BMA4
A9	BMA5	B9	BMA6
A10	BMA10	B10	N.C.
A11	MD23	B11	MD22
A12	MD21	B12	MD20
A13	MD19	B13	MD18
A14	MD17	B14	BMA7
A15	N.C.	B15	VCC
A16	BMA8	B16	BMA9
A17	nBAS3	B17	nBAS2
A18	MD16	B18	N.C.
A19	MD15	B19	MD14
A20	GND	B20	nBCAS3
A21	nBCAS1	B21	nBCAS0
A22	nBCAS2	B22	nBCAS2
A23	nBCAS3	B23	N.C.
A24	WRITE*	B24	N.C.
A25	MD13	B25	MD12
A26	MD11	B26	MD10
A27	MD9	B27	MD8
A28	N.C.	B28	MD7
A29	MD6	B29	MD5
A30	MD3	B30	MD4
A31	VCC	B31	MD2
A32	MD1	B32	MD0
A33	N.C.	B33	N.C.
A34	N.C.	B34	N.C.
A35	N.C.	B35	N.C.
A36	N.C.	B36	GND

J8 — Option controller interface board (option)

#	Signal
1	GND
2	GND
3	nTX
4	nCLK
5	nCLKEN
6	nRX
7	N.C.
8	nSTROBE
9	N.C.
10	N.C.
11	N.C.
12	nRETURN
13	nSPCHG
14	nPFED
15	nPRINT
16	nVSYNC
17	RESET
18	N.C.
19	VCC
20	VCC

J10 — Hard disk (option)

#	Signal	#	Signal
1	nHREST	23	nWR0
2	GND	24	GND
3	IOD7	25	nRD0
4	IOD8	26	GND
5	IOD6	27	N.C.
6	IOD9	28	N.C.
7	IOD5	29	N.C.
8	IOD10	30	GND
9	IOD4	31	nIDE INT
10	IOD11	32	N.C.
11	IOD3	33	IOA3
12	IOD12	34	N.C.
13	IOD2	35	IOA2
14	IOD13	36	IOA4
15	IOD1	37	nIDECS
16	IOD14	38	IOA5
17	IOD0	39	nIDE LED
18	IOD15	40	IOA1
19	GND	41	VCC
20	N.C.	42	VCC
21	N.C.	43	GND
22	GND	44	N.C.

J11 — Expansion interface board

#	Signal	#	Signal
1	VCC	26	GND
2	nPS INT	27	nWAIT
3	nHRESET	28	WnR
4	nWR0	29	nRD0
5	nPSIOCS	30	IOA23
6	N.C.	31	N.C.
7	GND	32	GND
8	IOD0	33	IOD1
9	IOD2	34	IOD3
10	IOD4	35	IOD5
11	IOD6	36	IOD7
12	IOD8	37	IOD9
13	IOD10	38	IOD11
14	IOD12	39	IOD13
15	IOD14	40	IOD15
16	GND	41	GND
17	IOA2	42	IOA3
18	IOA4	43	IOA5
19	IOA6	44	IOA7
20	IOA8	45	IOA9
21	IOA10	46	IOA11
22	IOA12	47	IOA13
23	IOA14	48	IOA15
24	IOD16	49	IOA17
25	VCC	50	GND

Video controller PCB

J9 — To host computer

#	Signal	#	Signal
1	nSTROBE	19	GND
2	D0	20	GND
3	D1	21	GND
4	D2	22	GND
5	D3	23	GND
6	D4	24	GND
7	D5	25	GND
8	D6	26	GND
9	D7	27	GND
10	nACK	28	GND
11	BUSY	29	GND
12	PERROR	30	GND
13	SELECT	31	nINIT
14	nAUTOFD	32	nFAULT
15	N.C.	33	N.C.
16	GND	34	N.C.
17	GND	35	N.C.
18	PP 5V	36	nSELIN

J1 — To DC controller PCB

A		B		C	
A1	GND	B1	GND	C1	nBD
A2	GND	B2	GND	C2	GND
A3	VCC (5V)	B3	VCC (5V)	C3	VCC (5V)
A4	VCC (5V)	B4	VCC (5V)	C4	VCC (5V)
A5	VCC (3.3V)	B5	VCC (3.3V)	C5	VCC (3.3V)
A6	VCC (3.3V)	B6	VCC (3.3V)	C6	VCC (3.3V)
A7	nSPCHG	B7	nPFED	C7	nPDLV
A8	CPSEL	B8	nPRFD	C8	nCCRT
A9	nCMD	B9	nCBSY	C9	nCCLK
A10	nSTS	B10	nSBSY	C10	N.C.
A11	nVSYNC	B11	nCPRDY	C11	nPRNT
A12	nVSREQ	B12	nRDY	C12	nPPRDY
A13	N.C.	B13	N.C.	C13	nFP_CK
A14	nFP_CS	B14	nFP_OD	C14	nFP_ID
A15	GND	B15	GND	C15	nVDO
A16	GND	B16	GND	C16	VDO

III. LIST OF SIGNALS

A. Input/output signals to/from DC controller PCB

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J201	A1	GND			
	A2	GND			
	A3	/FPCS	I	L	OPERATION PANEL CONTROLLER CHIP SELECT signal
	A4	Reservrd			
	A5	/VSREQ	O	P	VSYNC REQUEST signal
	A6	/VSYNC	I	P	VERTICAL SYNC signal
	A7	/STS	O	L	STATUS signal
	A8	/CMD	I	L	COMMAND signal
	A9	/CPSEL	I	ANALOG	COMTROLLER POWER SELCT signal
	A10	/SPCHG	O	L	SPEED CHANGE signal
	A11	3.3V	O		
	A12	3.3V	O		
	A13	+5V	O		
	A14	+5V	O		
	A15	GND			
	A16	GND			
	B1	GND			
	B2	GND			
	B3	/FPO	O	L	OPERATION PANEL SERIAL OUTPUT signal
	B4	Reserved			
	B5	/RDY	O	L	READY signal
	B6	/CPRDY	I	L	CONTROLLER POWER READY signal
	B7	/SBSY	O	L	STATUS BUSY signal
	B8	/CBSY	I	L	COMMAND BUSY signal
	B9	/PRFD	I	L	PRE-FEED signal
	B10	/PFED	O	L	PAPER FEED signal
	B11	3.3V	O		
	B12	3.3V	O		
	B13	+5V	O		
	B14	+5V	O		
	B15	GND			
	B16	GND			
	C1	VDO	I	H	VIDEO signal
	C2	/VDO	I	L	VIDEO signal
	C3	/FPI	I	L	OPERATION PANEL SERIAL INPUT signal
	C4	FPCK	I	P	OPERATION PANEL SERIAL CLOCK signal
	C5	/PPRDY	I	L	PRINTER POWER READY signal
	C6	/PRNT	I	L	PRINT signal
	C7	/PCLK	O	P	PRINTER CLOCK signal
	C8	/CCLK	I	P	CONTROLLER CLOCK signal
	C9	/CCRT	O	L	CONDITION CHANGE REPORT
	C10	/PDLV	O	L	PAPER DELIVERY signal
	C11	3.3V	O		
	C12	3.3V	O		

A - 5

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J201	C13	+5V	O		
	C14	+5V	O		
	C15	GND			
	C16	/BD	O	P	BEAM DETECTION signal
J202	1	GND			
	2	DRVES	I	ANALOG	LASER MALFUNCTION DETECTION signal
	3	GNP			
	4	5V	O		
	5	GND			
	6	N.C.			
	7	VDO	O	H	VIDEO signal
	8	GND			
	9	/VDO	O	L	VIDEO signal
	10	/LON	O	L	LASER ON signal
	11	/LENBL	O	L	VIDEO ERABLE signal
J203	1	/FPO	O	L	OPERATION PANEL SERIAL OUTPUT signal
	2	/FPI	I	L	OPERATION PANEL SERIAL INPUT signal
	3	/FPCS	O	L	OPERATION PANEL CONTROLLER CHIP SELECT signal
	4	FPCK	I	P	OPERATION PANEL SERIAL CLOCK signal
	5	+5V	O		
	6	+5V	O		
	7	GND			
J204	A1	+5V	I		
	A2	+5V	I		
	A3	GND			
	A4	GND			
	A5	24V	I		
	B1	3.3V	I		
	B2	3.3V	I		
	B3	GND			
	B4	24VGND			
	B5	24VGND			
J205	1	GND			
	2	GND			
	3	+24VA	O		
	4	+24VA	O		
	5	+24VA	O		
	6	UDOORS	I	H	UPPER DOOR OPEN SENSE signal
	7	FDFULS	I	H	FACE-DOWN TRAY PAPER FULL SENSE signal
	8	/FPOUTS	I	H	FIXING UNIT DELIVERY SENSE signal
	9	FDOUTS	I	H	FACE-DOWN TRAY DELIVERY SENSE signal
	10	/FUSLD	O	L	FACE-UP SOLENOID DRIVE signal
	11	P5VB1	O		
J206	1	GND			
	2	GND			
	3	/BDI	I	P	BEAM DETECTION INPUT signal
	4	+5V			
	5	GND			

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Connector	Pin	Abbreviation	I/O	Logic	Signal name
J207	1	+5V			
	2	/SCNRDY	I	L	SCANNER MOTOR READY signal
	3	/SCND	O	L	SCANNER MOTOR DRIVE signal
	4	GND			
	5	/SCNCLK	O	P	SCANNER MOTOR CONTOL CLOCK signal
	6	24VGND			
	7	+24VA	O		
J208	1	FAN1D	O	ANALOG	FAN MOTOR 1 DRIVE signal
	2	/FAN1S	I	L	FAN MOTOR 1 ROTATING DETECTION signal
	3	24VGND			
J209	1	/REGCLD	O	L	REGISTRATION CLUTCH DRIVE signal
	2	+24VA	O		
	3	/REGS	I	L	REGISTRATION PAPER SENSE signal
	4	GND			
	5	P5VB1	O		
J210	1	FAN3D	O	ANALOG	FAN MOTOR 3 DRIVE signal
	2	/FAN3S	I	L	FAN MOTOR 3 ROTATING DETECTION signal
	3	24VGND			
J212	1	3.3V	O		
	2	+5V	O		
	3	GND			
	4	FSRTH	I	ANALOG	FIXING ROLLER TEMPERATURE SENSE signal
	5	GND			
	6	SVIN	I		SERVICE STATUS signal
	7	SVOUT	O		SERVICE COMMAND signal
	8	+24VA	O		
J213	1	+24VA	O		
	2	+24VA	O		
	3	/DUPIDS	I	L	DUPLEXING UNIT SENSE signal
	4	/DUPSTS	I	L	DUPLEXING UNIT STATUS signal
	5	DUPCMD	O	H	DUPLEXING UNIT COMMAND signal
	6	/DUPCLK	O	P	STATAS CLOCK signal
	7	24VGND			
	8	24VGND			
J214	1	24VGND			
	2	+24VA	O		
	3	P5VB1	O		
	4	/MPTCLD	O	L	MANUAL FEED CLUTCH DRIVE signal
	5	/MPTSLD	O	L	LIFTING PLATE SOLENOID DRIVE signal
	6	MPTLS	I	H	LIFTING PLATE SENSE signal
	7	/MPTPS	I	L	MULTI-PURPOSE TRAY PAPER SENSE signal
	8	ENVCMD	O		ENVELOPE FEEDER COMMAND signal
	9	ENVSTS	I		ENVELOPE FEEDER STATUS signal
J215	1	GND			
	2	LSIZE4	I	L	LOWER CASSETTE PAPER SIZE SENSE signal
	3	LSIZE3	I	L	LOWER CASSETTE PAPER SIZE SENSE signal
	4	LSIZE2	I	L	LOWER CASSETTE PAPER SIZE SENSE signal
	5	LSIZE1	I	L	LOWER CASSETTE PAPER SIZE SENSE signal

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Connector	Pin	Abbreviation	I/O	Logic	Signal name
J215	6	GND			
	7	USIZE4	I	L	UPPER CASSETTE PAPER SIZE SENSE signal
	8	USIZE3	I	L	UPPER CASSETTE PAPER SIZE SENSE signal
	9	USIZE2	I	L	UPPER CASSETTE PAPER SIZE SENSE signal
	10	USIZE1	I	L	UPPER CASSETTE PAPER SIZE SENSE signal
J216	1	FAN2D	O	ANALOG	FAN MOTOR 2 DRIVE signal
	2	/FAN2S	I	L	FAN MOTOR 2 ROTATING DETECTION signal
	3	24VGND			
J217	1	FSRTH	I	ANALOG	FIXING ROLLER TEMPERATURE SENSE signal
	2	RLD	O	H	RELAY DRIVE signal
	3	TSWIN			
	4	GND			
	5	TSWOUT			
	6	/FSRD1	O	L	FIXING MAIN HEATER DRIVE signal
	7	/FSRD2	O	L	FIXING SUB HEATER DRIVE signal
	8	FSRDE	O	H	FIXING HEATER DRIVE ENABLE signal
	9	FSRCT	I	ANALOG	FIXING HEATER CURRENT SENSE signal
	10	SUPSLT	O	H	INVERTER CIRCUIT CONTROL signal
	11	/RLDSNS	I	L	RELAY DETECTION SENSE signal
	12	PSTYP	I		POWER SUPPLY TYPE SENSE signal
	13	REMT24	O	L	24V DRIVE signal
	14	N.C.			
J218	1	/MMRDY	I	L	MAIN MOTOR READY signal
	2	/MMOTD	O	L	MAIN MOTOR DRIVE signal
	3	24VGND			
	4	24VGND			
	5	+24VB	O		
	6	+24VB	O		
J219	1	FEDAND	O		PICK-UP MOTOR CONTROL signal
	2	FEDAD	O		PICK-UP MOTOR CONTROL signal
	3	FEDBND	O		PICK-UP MOTOR CONTROL signal
	4	FEDBD	O		PICK-UP MOTOR CONTROL signal
	5	/UDECKS	I	L	UPPER CASSETTE PAPER-OUT SENSE signal
	6	UDECKC	I	H	UPPER CASSETTE SENSE signal
	7	/FEEDCLD	O	L	FEED CLUTCH DRIVE signal
	8	/FEEDS	I	L	PICK-UP UNIT PAPER SENSE signal
	9	/PUPSLD	O	L	CASSETTE PICK-UP SOLENOID DRIVE signal
	10	LDECKC	I	H	LOWER CASSETTE PAPER-OUT SENSE signal
	11	/LDECKS	I	L	LOWER CASSETTE SENSE signal
	12	LPVS2	I		LOWER CASSETTE PAPER-LEVEL SENSE signal 2
	13	LPVS1	I		LOWER CASSETTE PAPER-LEVEL SENSE signal 1
	14	UPVS2	I		UPPER CASSETTE PAPER-LEVEL SENSE signal 2
	15	UPVS1	I		UPPER CASSETTE PAPER-LEVEL SENSE signal 1
	16	/RDOORS	I	H	PIK-UP UNIT DOOR OPEN SENSE signal
	17	+24VA	O		
	18	P5VB1	O		
	19	GND			
	20	GND			

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Connector	Pin	Abbreviation	I/O	Logic	Signal name
J220	A1	TRFVCNT	O	ANALOG	TRANSFER BIAS CONTROLL signal
	A2	TRFVSNS	I	ANALOG	TRANSFER BIAS MONITOR signal
	A3	/TRFCCD	O	L	TRANSFER BIAS CONSTANT CURRENT DRIVE signal
	A4	TRFCLK	O	P	TRANSFER BIAS FREQUENCY OUTPUT signal
	A5	N.C.			
	A6	HVTCLK	O	P	HIGH-VOLTAGE BIAS FREQUENCY OUT PUT signal
	A7	/DEVACD	O	L	DEVELOPING AC BIAS DRIVE signal
	A8	DEVACCLK	O	P	DEVELOPING AC BIAS FREQUENCY OUT PUT signal
	A9	/DEVDCD	O	L	DEVELOPING DC BIAS DRIVE signal
	A10	TONSNS	I	ANALOG	TONER LEVEL signal
	A11	24VGND			
	A12	24VB	O		
	B1	/TRFNVD	O	L	TRANSFER NEGATIVE BIAS DRIVE signal
	B2	/HRLBD	O	L	FIXING ROLLER BIAS DRIVE signal
	B3	/DCHGBD	O	L	DISCHARGE BIAS DRIVE signal
	B4	/DCHGUP	O	L	DISCHARGE BIAS SWITCH signal
	B5	N.C.			
	B6	N.C.			
	B7	PRIACCLK	O	P	PRIMARY AC BIAS FREQVENCY OUTPUT signal
	B8	/PRIACD	O	L	PRIMARY AC BIAS DRIVE signal
	B9	/PRIDCD	I	L	PRIMARY DC BIAS DRIVE signal
	B10	DENADJ	O	ANALOG	IMAGE DENSITY AD JUSTMENT signal
	B11	24VGND			
	B12	24VB	O		
J221	1	+24VB	I		
	2	+24VB	I		
	3	+24VB	I		
J222	1	TSWOUT			
	2	FSRTH	I	ANALOG	FIXING ROLLER TEMPERATURE SENSE signal
	3	GNDTH			
	4	TSWIN			
J223	1	TONSNS	I	ANALOG	TONER LEVEL signal
	2	GND			
J225	1	FAN4D	O	H	FAN MOTOR 4 DRIVE signal
	2	/FAN4S	I	L	FAN MOTOR 4 ROTATING DETECTION signal
	3	24VGND			
	4	GND			
J229	1	FAN5D	O	ANALOG	FAN MOTOR 5 DRIVE signal
	2	/FANS5	I	L	FAN MOTOR 5 ROTATING DETECTION signal
	3	24VGND			
	4	24VGND			

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IV. MESSAGES TABLE

Message	Meaning	Action
COLD RESET	Displays when the COLD RESET (Letter or A4) Power-On sequence is selected.	No action required although the printer will be reset to its factory defaults and any unique settings will have to be reset.
COLD RESET A4	Displays when Factory Reset - A4 Power-on sequence is selected.	No action required.
COLD RESET LTR	Displays when Factory Reset - LTR Power-on sequence is selected.	No action required.
CONTEXT SAVE ADJUSTED	Context Saving mechanism modified by OS. Displayed when printer powered on with context saving enabled, but due to manual reconfiguration, there is not enough memory to support it.	Press Continue key to continue.
CONTEXT SAVE CHANGE	Context saving mechanism modified by USER. Displayed when going online after modifying context saving.	Press Continue and printer will reboot to enable its new state.
WARMING UP...	Printer is warming up.	Wait until the printer has warmed up and displays "READY".
I/O INITIALIZING	This message displays when one of the network boads is being initialized.	No action required.
READY	Printer is ready to receive data and print.	No action required.
PAUSED	Printer is OFFLINE.	Press ONLINE.
PRINTING...	Usually displayed when printing an item from the TEST MENU, or when attempting to go Offline while the printer is busy.	No action required
KEY NOT VALID	Displays when a key is pressed that is not enabled at this time.	Press the correct key to complete the current function.

RESET TO SAVE	RESET verification prompt. This message will appear momentarily and then PAUSED. When a menu item was changed before the printer releases the port on which the last job was processed, such as in the middle of a job, or before the port timed out.
	
	  RESET TO SAVE doesn't display or take effect for the following menu items:
	Parallel menu
	  -bidirectional=on/off
	Config menu
	  -density
	  -pwrsav
	paper type menu
	  -upper
	  -lower
	  -deck
	  -mpt
	feeder menu
	  -mptsize
		Two options are available:
		1. Press the reset key to enter the RESET menu and save the information immediately. This will terminate the current job, deleting temporary fonts, macros and buffered data.
		2. Press ONLINE and the current job will resume where it left off. The menu items changed will not take effect until the next end of job.

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Message	Meaning	Action
	-envsize	
RESETTING PRINTER	Displays when TEST/RESET PRINTER item is selected	No action required
RESTORING DEFAULTS	Displays when TEST/FACTORY DEFAULTS item is selected.	No action required.
MEMORY OVERFLOW	Memory overflow. The printer received more data than it can fit into its available memory. This can happen if too many soft fonts, macros, or graphics which are too complex are received.	The job will resume after 10 seconds if AUTOCONT is ON. Otherwise press the Continue key to resume printing. Check the page that ejects since the page could not be processed as requested. Also simplify the job or add additional memory.
READY MRT COMPRESSION	Printer has invoked MRT Compression because of lossy compression.	No action required.

+ FORMAT DISK\ - IGNORE DISK	Either a request has been made to format the disk or the printer has determined that the disk needs formatting (engin a new unformatted disk is installed when power up).	Press + to format the disk or press - to ignore the disk.
		    For new/unformatted disk: If press - to ignore disk, the printer goes to "READY".
		    Any attempt to write to the disk will be flushed since the disk has not been formatted.

+ REALLY FORMAT - IGNORE DISK	The operator is being asked to verify the disk formatting is really wanted. This is in response to the foregoing message.	Press + to verify that the disk is to be formatted or press - to skip formatting the disk. This message will not display for new/unformatted disk (engin. The disk is to be formatted for the 1st time)
START DISK TEST	Start testing the hard disk	Press Enter to start disk testing. **Note:** This operation will cause the disk to format when press enter to end test. If the printer is powered off during the disk test, the message + FORMAT DISK \ - IGNORE DISK will appear when the printer is powered on.
ENTER ENDS TEST	Stop testing the hard disk	Press Enter to end disk testing. **Note:** The disk will be formatted and the printer will reboot automatically when press Enter to end disk test.
FORMATTING...	This message displays when the disk is being formatted.	No action required.
DSK FMT RESTART	The operator has formatted the disk and the operation has completed. The system will	Press the Continue key for the printer to reboot.

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Message	Meaning	Action
	restart after the continue key is pressed.	
DISK ALMOST FULL	Warning message when the Disk is 70+% full.	Delete pcl/ps, fonts/macros/files or format the disk to clear the message. The message doesn't clear with power cycle or COLD RESET. This message has lower priority than printer error messages such as "toner low" or "memory overflow".
DISK FULL	Disk is 95% full. The printer goes offline (also at power up with a "disk full" installed). If AUTOCONT is ON, the printer will resume back online after 10 seconds. If continue to send files to the disk that larger than the 5% left on the disk, the files will be flushed or printed out as text.	Delete pcl/ps, fonts/macros/files or format the disk to clear the message. The message doesn't clear with power cycle or COLD RESET. This message has lower priority than printer error messages such as "toner low" or "memory overflow".
READY # OF ###	Mopier is activated. ### is the total mopier count. # is the increment count up to ###. Mopier is only available when the hard disk is installed.	No action required. This message is temporarily displayed for the duration of the printer's processing time. @PJL RDYMSG DISPLAY will have higher priority than "# OF ###" message.
+ FORMAT FLASH - IGNORE FLASH	A request has been made to format the flash rom	Press + to format the flash or press - to ignore the flash. For new/unformatted flash: the printer will automatically format the flash without any message display when the printer is booting up.
+ REALLY FORMAT - IGNORE FLASH	The operator is being asked to verify the flash rom formatting is really wanted. This is in response to the foregoing message.	Press + to verify that the flash is to be formatted or press - to skip formatting the flash.
FLASH FORMATTING...	This message is displayed while the flash is being formatted. This message also displays when the printer is booting up with an unformatted or bad flash.	No action required.
FLASH FORMAT RESTART	The operator has formatted the flash and the operation has completed. The system will restart after the continue key is pressed.	Press the Continue key for the printer to reboot.
FLASH OVERFLOW	The printer received more fonts/macros data than it can fit into its FLASH ROM. The printer is "OFFLINE" when this message is displayed.	Press the Continue key for the printer to go back to "READY". Formatting or deleting Fonts/macros should be performed to regain more rom space.
FLASH ERROR	Error causes by flash format failure, read or write failure.	Printer goes offline. Job will be flushed in error occurs while receiving data. Turn printer off and on. The printer will attempt to reformat the flash when it's booting up. If the attempt to reformat

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Message	Meaning	Action
		the flash fails, FLASH ERROR will be displayed. Remove the faulty flash rom and replace with new flash.
#### +TO CONFIRM/- CANCEL	Where #### = MAILBOX, JOB SEPARATION, STACKER, or SORTING. The operator is being asked to confirm the mode change in the sorter is really wanted. This is in response to the foregoing message.	Press + to accept (confirm) the mode change in the sorter or press - to cancel the mode change.
READY TONER LOW	Toner is low.	Replace the toner cartridge as soon as possible. The printer will continue to operate, but the images will degrade.
TONER CART MISSING	Toner cartridge is missing.	Add toner cartridge.
PRINTING TO STD TRAY	Display (for the duration that the printer takes to process the job) when the bin(s) in the sorter are full and the output is directed to the standard tray.	No action required.
LOAD <MEDIA> <SIZE> IN <TRAY>	Load the specified tray with paper size. **Size:** LETTER - Letter paper size. LEGAL - Legal paper size. 11X17 - Ledger paper size. A3 - A3 paper size. A4 - A4 paper size. A5 - A5 paper size. 11x17 paper size. EXEC - Executive paper size. COM10 - Commercial #10 envelope. MONARCH - Monarch envelope. DL - DL envelope. C5 - C5 envelope. B5JIS - B5 paper size. B5ISO - B5 envelope. B4 - B4 paper size. CUSTOM - Custom paper size. ANY - Unknown paper size. **Tray:** UPPER - Internal upper cassette. LOWER - Internal lower cassette. DECK - 2000 sheet Large Capacity tray. DECK1 - Upper cassette of 2x500 deck. DECK2 - Lower cassette of 2x500 deck. MPT - Multi-purpose tray. ENV. - Envelope feeder. ANY TRAY - any paper tray that can support Letter, Legal, B4 or A4	The specified tray must be loaded with the specified paper size and media type. Depending upon circumstances, the Continue key may be required to continue the job. If the printer is printing and a tray runs out of paper, for instance, simply loading the tray and closing it will cause the printer to continue normally. If, however, the printer does not contain the required paper size or media type, the user must select/change the media type from front panel. Open the tray and load the appropriate media type/paper size into the specified tray. The printer will resume printing after the tray is reinstalled. In the case of manual feed (discussed following), the Continue key must always be pressed.

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Message	Meaning	Action
	Media Type: PLAIN - Plain LETTERHEAD - Letterhead TRANSPARENCY - Transparency LABELS - Labels BOND - Bond RECYCLED - Recycled COLOR - Color CARDSTOCK - Cardstock ROUGH - Rough paper CUSTOM1 - or user defined media type CUSTOM2 - or user defined media type CUSTOM3 - or user defined media type CUSTOM4 - or user defined media type CUSTOM5 - or user defined media type CUSTOM6 - or user defined media type **Note:** User defined media type name can be up to 15 maximum characters long.	
LOAD <MEDIA> <SIZE> IN MANUAL	Load multi-purpose tray with paper size. Like "Load" but for manual feed only.	Press the Continue key to resume printing.
LOAD BLANK SIDE UP IN MANUAL	This message displays right after the front side of the cleaning page has been created.	Load the blank side face-up in the multi-purpose tray. Press the Continue key to create the other side of the cleaning page.
LOAD CLEANING PAGE IN MANUAL	This message displays right after a cleaning page has been created.	Load the cleaning page face-down in the multi-purpose tray. Press the CONTINUE READY key to start cleaning.
LOAD STAPLES	Staples low. Only the current job will be stapled.	Load staples. The printer will resume to READY. The printer is now ready to staple.
UPPER TRAY IN MOTION	The upper cassette is repositioning the stack after new paper was loaded.	No Action Required.
LOWER TRAY IN MOTION	The lower cassette is repositioning the stack after new paper was loaded.	No Action Required.
DECK TRAY IN MOTION	The paper tray in the 2,000 sheet deck is repositioning the stack after new paper was loaded.	No Action Required.
DECK1 TRAY IN MOTION	The upper cassette in the 2x500 sheet deck is repositioning the stack after new paper was loaded.	No Action Required.
DECK2 TRAY IN MOTION	The lower cassette in the 2x500 sheet deck is repositioning the stack after new paper was loaded.	No Action Required.
UPPER MISSING	The specified upper cassette is missing.	Reinsert the upper cassette.
LOWER MISSING	The specified lower cassette is missing.	Reinsert the lower cassette.
DECK MISSING	The specified deck (2,000 sheet deck) is missing.	Reinsert the deck.
DECK1 MISSING	The specified upper cassette (2x500 sheet	Reinsert the upper cassette.

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Message	Meaning	Action
	deck) is missing.	
DECK2 MISSING	The specified lower cassette (2x500 sheet deck) is missing.	Reinsert the lower cassette.
OUTPUT FULL STD. TRAY	The specified face-down tray is paper full.	Remove the paper from the face-down tray.
OUTPUT FULL CHECK BIN 1	The specified output tray of the stapler stacker is paper full.	Remove the paper from the tray (Bin1 of the stapler stacker).
OUTPUT FULL CHECK BIN 2	The specified output tray of the stapler stacker is paper full.	Remove the paper from the tray (Bin2 of the stapler stacker.
OUTPUT FULL CHECK BIN 3	The specified output tray of the stapler stacker is paper full.	Remove the paper from the tray (Bin3 of the stapler stacker).
OUTPUT FULL SORTER BIN UP	The specified output bin (face-up bin of the sorter) is paper full.	Remove the paper from the tray.
CHECK SORTER BIN REMOVE ALL PAPER	For use only when the sorting mode of the sorter is selected. Any or all of the bins of the sorter are paper full or not empty.	Remove the paper from all the bins (bin# 1 to 7 of the sorter).
PRINTER OPEN	Top, right or left (side) cover is open.	Close all cover doors.
COVER OPEN	2,000 sheet or 2x500 sheet deck right cover (paper path) is open.	Close the right cover door.
STACKER COVER OPEN	Stapler stacker top or front (stapler door) cover is open.	Close all cover doors.
SORTER COVER OPEN	Sorter top or front cover is open.	Close all cover doors.
PAPER JAM WRONG PAPER SIZE	A paper size mismatch has occurred. More than one paper size has been found in the same tray.	Inspect the trays for mismatched paper and correct. Remove all jammed paper and insert the correct paper size in the tray. Close all covers to go back to READY.
CHECK INPUT TRAY	A paper jam occurred near the input tray.	Check the area specified.
OPEN FRONT COVER	A paper jam occurred near the front cover.	
OPEN LEFT COVER	A paper jam occurred near the left cover.	
OPEN RIGHT COVER	A paper jam occurred near the right cover.	
OPEN TOP COVER	A paper jam occurred near the top cover.	
1 PAPER JAM	Paper jam has occurred somewhere in the paper path.	Remove the jammed paper from the paper path. The top cover must be opened and closed to resume printing.
2 PAPER JAM	Paper jam has occurred in the input paper path.	
3 PAPER JAM	Paper jam has occurred in the input paper path.	
4 PAPER JAM	Paper jam has occurred in the fixing unit area.	
5 PAPER JAM	Paper jam has occurred in the fixing unit area.	
6 PAPER JAM	Paper jam has occurred near the face-down tray.	
7 PAPER JAM	Paper jam has occurred near the face-down tray.	
8 PAPER JAM	Paper jam has occurred in the fixing unit area.	
9 PAPER JAM	Paper jam has occurred near the duplexing	

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Message	Meaning	Action
	unit.	
10 PAPER JAM	Paper jam has occurred near the duplexing unit.	
11 PAPER JAM	Paper jam has occurred in the duplexing unit.	
12 PAPER JAM	Paper jam has occurred in the duplexing unit.	
13.1 PAPER JAM CHECK DECK	Paper jam has occurred in the 2,000 sheet deck or 2x500 sheet deck.	Check the deck. Remove the jammed paper from the paper path. The top cover must be opened and closed to resume printing.
13.2 PAPER JAM CHECK DECK	Paper jam has occurred in the 2,000 sheet deck or 2x500 sheet deck.	
13.3 PAPER JAM CHECK DECK	Paper jam has occurred in the 2,000 sheet deck or 2x500 sheet deck.	
13.4 PAPER JAM CHECK DECK	Paper jam has occurred in the 2,000 sheet deck or 2x500 sheet deck.	
14.1 PAPER JAM OPEN RIGHT COVER	Paper jam has occurred in the right cover.	
14.2 PAPER JAM OPEN RIGHT COVER	Paper jam has occurred in the right cover.	
14.3 PAPER JAM OPEN RIGHT COVER	Paper jam has occurred in the right cover.	
14.4 PAPER JAM OPEN RIGHT COVER	Paper jam has occurred in the right cover.	
CHECK INPUT AREA	A paper jam occurred near the input tray.	Check the area specified.
OPEN TOP COVER	A paper jam occurred near the top cover.	Check the area specified.
CHECK OUTPUT BINS	A paper jam occurred at the stapler stacker output bins.	Check the area specified.
15.1 STACKER JAM	Jam at entrance sensor - Initial Jam	Check the stapler stacker. Remove jammed paper and close cover.
15.2 STACKER JAM	Jam at entrance sensor - Stay Jam	
15.3 STACKER JAM	Jam at entrance sensor - Delay Jam	
15.4 STACKER JAM	Jam at entrance sensor - Early Jam	
16.1 STACKER JAM	Jam at reversing sensor - Initial Jam.	
16.2 STACKER JAM	Jam at reversing sensor - Stay Jam.	
16.3 STACKER JAM	Jam at reversing sensor - Delay Jam.	
16.4 STACKER JAM	Jam at reversing sensor - Early Jam.	
17.1 STACKER JAM	Jam at delivery paper sensor - Initial Jam	
17.2 STACKER JAM	Jam at delivery paper sensor - Stay Jam	
17.3 STACKER JAM	Jam at delivery paper sensor - Delay Jam	
17.4 STACKER JAM	Jam at delivery paper sensor - Early Jam	
18.1 STACKER JAM	Jam at staple tray paper sensor - Initial Jam	
18.2 STACKER JAM	Jam at staple tray paper sensor - Stay Jam	
18.3 STACKER JAM	Jam at staple tray paper sensor - Delay Jam	
18.4 STACKER JAM	Jam at staple tray paper sensor	
STAPLE JAM OPEN STAPLER COVER	Jam near the stapler	Clear jam
19.1 SORTER JAM	Jam at entrance sensor - Initial Jam	Check the soter. Remove jammed

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Message	Meaning	Action
19.2 SORTER JAM	Jam at entrance sensor - Stay Jam	paper and close cover.
19.3 SORTER JAM	Jam at entrance sensor - Delay Jam	
19.4 SORTER JAM	Jam at entrance sensor - Early Jam	
20.1 SORTER JAM	Jam at reversing sensor - Initial Jam	
20.2 SORTER JAM	Jam at reversing sensor - Stay Jam	
20.3 SORTER JAM	Jam at reversing sensor - Delay Jam	
20.4 SORTER JAM	Jam at reversing sensor - Early Jam	
21.1 SORTER JAM	Jam at vertical path sensor - Initial Jam	
21.2 SORTER JAM	Jam at vertical path sensor - Stay Jam	
21.3 SORTER JAM	Jam at vertical path sensor - Delay Jam	
21.4 SORTER JAM	Jam at vertical path sensor - Early Jam	
22.1 SORTER JAM	Jam at face-up delivery sensor - Initial Jam	
22.2 SORTER JAM	Jam at face-up delivery sensor - Stay Jam	
22.3 SORTER JAM	Jam at face-up delivery sensor - Delay Jam	
22.4 SORTER JAM	Jam at face-up delivery sensor - Early Jam	
DUPLEX OPTION ERROR	The duplexing unit has been removed or is no longer properly seated.	Re-insert the duplexing unit into the printer.
ENVELOPE OPTION ERROR	The envelope feeder has been removed or is no longer properly seated.	Re-insert the envelope feeder into the printer.
OPTIONS CONTROLLER	Option controller error with 2,000 sheet deck or 2x500 sheet deck.	Re-connect the 2,000 sheet deck or 2x500 sheet deck to the printer.
OPT CONTROLLER ERROR	There is a problem with the Options Controller	Replace the option controller.
OPT CONTROLLER COMMUNICATIONS ERROR	Cable(s) are not connected in or there is a problem with the Options Controller	Reconnect cable(s) or replace the option controller.
ERROR DISK CALL FOR SERVICE	Hard Drive Failure - Read Error -	Replace the hard disk.
MEMORY ALLOC ERROR	GRS has been unable to allocate the memory it needs.	The job will resume after 10 seconds if AUTOCONT is ON. Otherwise press the CONTINUE key to resume printing. Check the page that ejects since the image could not be processed as requested.
PS OPTION ERROR	Option PS ROM (DIMM) diagnostic error.	An option ROM has failed its startup checksum and needs to be reprogrammed or replaced.
ETHERNET OPTION ERROR	The Ethernet boad is not communicating with the controller.	Replace the Ethernet boad
TOKEN RING OPTION ERROR	The Token Ring boad is not communicating with the controller.	Replace the Token Ring boad
10.1 ERROR FUSER CALL FOR SERVICE	Fixing unit failure (Abnormally low temperature/warm up time out).	Perform the troubleshooting procedure described in section VI of Chapter 4.
10.2 ERROR FUSER CALL FOR SERVICE	Fixing unit failure (Abnormally low temperature/warm up time out).	**Note:** If this error occurs, switch off the printer for 15 minutes and then switch the printer back
10.3 ERROR FUSER CALL FOR SERVICE	Fixing unit failure (Abnormally high temperature).	
10.4 ERROR FUSER	Fixing unit failure (wrong type).	

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Message	Meaning	Action
CALL FOR SERVICE		on.
11.1 ERROR SCAN-NER CALL FOR SERVICE	Scanner motor malfunction (start up).	Perform the troubleshooting procedure described in section VI of Chapter 4.
11.2 ERROR SCAN-NER CALL FOR SERVICE	Scanner motor malfunction (rotation).	
11.3 ERROR SCAN-NER CALL FOR SERVICE	BD/Laser malfunction	
11.4 ERROR LASER CALL FOR SERVICE	BD/Laser malfunction	
12.1 ERROR MOTOR CALL FOR SERVICE	Main motor malfunction (start up)	
12.2 ERROR MOTOR CALL FOR SERVICE	Main motor malfunction (rotation)	
13.1 ERROR FAN1 CALL FOR SERVICE	Fan motor 1 failure - controller	
13.2 ERROR FAN2 CALL FOR SERVICE	Fan motor 2 failure - power supply	
13.3 ERROR FAN 3 CALL FOR SERVICE	Fan motor 3 failure - exhaust1	
13.4 ERROR FAN 4 CALL FOR SERVICE	Fan motor 4 failure - exhaust2	
13.5 ERROR FAN 5 CALL FOR SERVICE	Fan motor 5 failure - multiple	
14.1 ERROR AUX TRAY CALL FOR SERVICE	Lifting plate failure	
15.1 ERROR STACKER CALL FOR SERVICE	Malfunction of paper delivery motor	Refer to Chapter 4 (troubleshooting) of the stapler stacker service manual.
15.2 ERROR STACKER CALL FOR SERVICE	Malfunction of stapler shift motor	
15.3 ERROR STACKER CALL FOR SERVICE	Malfunction of staple motor	
15.4 ERROR STACKER CALL FOR SERVICE	Malfunction of lignment plate shift motor	
15.5 ERROR STACKER CALL FOR SERVICE	Malfunction of tray unit elevation motor	
16 ERROR CALL FOR SERVICE	Unknown Engine Error.	
16.1 ERROR STACKER	Malfunction of shutter	

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Message	Meaning	Action
CALL FOR SERVICE		
16.2 ERROR STACKER CALL FOR SERVICE	Malfunction of swing-guide	
17 ERROR CALL FOR SERVICE	Unknown Stacker Error.	
17.1 ERROR STACKER CALL FOR SERVICE	Malfunction of paper full sensor	
18 UPPER ERROR CALL FOR SERVICE	Malfunction of UPPER tray	Refer to Chapter 4 (troubleshooting) of the 2,000 sheet deck or 2x500 sheet deck service manual.
18.1 ERROR DECK CALL FOR SERVICE	Malfunction of 2,000 sheet deck or 2x500 sheet deck delivery motor	
18.2 ERROR DECK CALL FOR SERVICE	Malfunction of 2,000 sheet deck or 2x500 sheet deck lifter	
19.1 ERROR SORTER CALL FOR SERVICE	Malfunction of face-down deflector solenoid 1	Refer to Chapter 4 (troubleshooting) of the soter service manual.
19.2 ERROR SORTER CALL FOR SERVICE	Malfunction of face-down deflector solenoid 2	
32 DISK ERROR	Hard drive failure - Write error -	Replace the hard disk.
33 DISK ERROR	Hard drive failure - Read failure -	Replace the hard disk.
SRAM ERROR CALL SERVICE	The AIR Chip has failed.	Replace the video controller PCB.
OPERATION CHECK	This is the control panel diagnostic mode.	Factory Usage Only. See section on diagnostics.
PAGES: ####	Displays under TEST when SHOW PAGE COUNT is selected. #### is number of pages.	No action required.
PANEL CHECK	Displays during a panel check function	Proceed with the panel check function.
PANEL CHECK DONE	Displays when panel check function is complete	Power cycle printer

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The printing paper contains
70% waste paper.

Canon

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