

LBP-800

SERVICE MANUAL

REVISION 0

Canon

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Use of this manual should be strictly supervised to avoid disclosure of confidential information.

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PREFACE

This Service Manual contains basic information required for after-sales service of the laser beam printer LBP-800 (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 9500/200 personal computer and output by an Apple LaserWriter 16/600 PS laser beam printer; final pages were printed on AGFA Selectset avantra 25.

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 digital video camcorder and Radius PhotoDV capture board system, and modified with Adobe Photoshop™ (J).

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CHAPTER 1

PRODUCT INFORMATION

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I. FEATURES

1. Small-sized Printer with High Speed and High Resolution

This printer has paper pick-up trays on its top for space saving, and is compact enough to set on the desk side. In addition, it has realized high speed of 8 pages per minute (A4) and high resolution of 600 DPI.

2. Employment of Canon Advanced Printing Technology

With Canon Advanced Printing Technology in which data are processed within a host computer, this printer needs no PDL converting/image processing. As a result, it has increased its speed performance and reduced the cost.

3. Shortened Wait Time & Low Power Consumption

By adopting an on-demand fixing method that enables driving the heater only during printing, this printer has shortened the wait time and reduced the consumption power during standby.

4. Low Noise

In addition to an on-demand fixing method, this printer has increased its heat exhaust efficiency so as to remove the fan for realizing a low noise level.

5. Direct Connection to the Network

This printer enables the user to connect directly to the printer by utilizing a specified network adapter.

II. SPECIFICATIONS

A. Printer

1. Printer Engine

- | | |
|--|---|
| 1) Type | Desktop page printer |
| 2) Printing method | Electrophotography |
| 3) Printing speed (Note1) | 8 pages/minute (A4) |
| 4) First print time (Note2) | |
| •Face-down | 18 seconds or less |
| •Face-up | 17 seconds or less |
| 5) Wait time (Note3) | 8 seconds or less |
| 6) Resolution | |
| •Horizontal | 600 dots/inch |
| •Vertical | 600 raster lines/inch |
| 7) Image formation system | |
| •Laser | Semiconductor laser |
| •Scanning system | Rotating four-faced prism mirror |
| •Photosensitive drum | OPC |
| •Charging | Roller charging |
| •Exposure | Laser scanning |
| •Toner | Magnetic single-component dry toner |
| •Development | Toner projection development system |
| •Toner supply | Replaceable EP-22 toner cartridge (able to print approx. 2,500 A4-sized print sheets: with image density set in the middle, and 4 % dot density ratio) |
| •Image transfer | Roller transfer |
| •Separation | Curvature separation |
| •Cleaning | Blade |
| •Fixing method | On-demand fixing |
| 8) Feeding | Manual feed slot
Multi-purpose tray |
| Paper types | Plain paper, recycled paper, colored paper, labels, OHT, index cads, postcards and envelops |
| Paper size | |
| •Manual feed slot | 76.2 mm(W) x 127 mm(L) ~ 216 mm(W) x 356 mm(L) sized paper (64 g/m ² to 135 g/m ² Canon recommended paper) and above mentioned paper |
| •Multi-purpose tray | 76.2 mm(W) x 127 mm(L) ~ 216 mm(W) x 356 mm(L) sized paper (64 g/m ² to 135 g/m ² Canon recommended paper) and above mentioned paper |
| Capacity | |
| •Manual feed slot | one sheet |
| •Multi-purpose | Depth 12.5 mm (Approx. 125 sheets of 75 g/m ² paper) |
| 9) Delivery (Note4) | Face-down/face-up |
| •Face-down tray capacity | Approx. 100 sheets of 75 g/m ² paper |
| 10) Duplex printing | |
| •Manual duplex printing (Note5) | The paper is picked up from the multi-purpose tray and delivered face-up. Only plain paper (64-135 g/m ² Canon recommended paper) can be printed duplex. |
| 11) Operating environment | |
| Temperature | 10 ~ 32.5 °C |
| Humidity | 20 ~ 80 % RH |

Air pressure	613 ~ 1013 hPa (460 ~ 760 mmHg)	
12) Power consumption	Approx. 770 W or less (Room temperature 20 °C, with rated line voltage on)	
13) Noise level (Officially announced noise emission level in accordance with ISO 9296)		
	Sound power level (1B = 10 dB)	6.2 B or less (printing)
		Dark sound level (standby)
	Sound pressure level (Bystander position)	42 dB or less (printing)
		Dark sound level (standby)
14) Dimensions	345(W) x 312 mm(D) x 267 mm(H)	
15) Weight	Approx. 6.35 Kg (printer only), Approx. 0.73 Kg (cartridge)	
16) Power supply	100-127V ±10% (50/60 Hz ±2 Hz)	
	220-240V +6%-10% (50 Hz ±2 Hz)	

-
- Notes:**
1. A test print when the room temperature is 20 °C and the rated power voltage is input.
 2. The time taken from that the Print signal is received from the video controller until that an A-4 sized paper is delivered completely, and also when the printer is in the Ready mode at room temperatures of 20 °C.
 3. The time taken from that the power plug is plugged in until that the printer becomes ready to print (Ready or Standby mode.)
 4. Only plain paper and recycled paper can be delivered face-down.
 5. To print duplex manually, uncurl the face-up delivered paper and set it in the multi-purpose tray.
-

2. Interface controller

1) Printing System	Canon Advanced Printing Technology
2) ROM capacity	8 KB
3) RAM capacity	512 KB
4) Interface	Bi-directional 8 bit parallel interface (Centronics specifications)

Specifications are subject to change with product improvement.
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III. SAFETY INFORMATION

A. Handling the Laser/Scanner Unit

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

The laser beam can cause eye damage if exposed, so be sure not to disassemble the laser/scanner unit. It is not necessary to adjust the laser/scanner unit in this printer in the field.

The following label is attached to the laser/scanner cover.

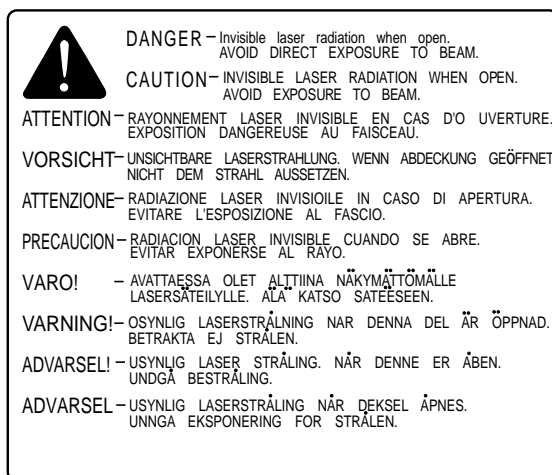


Figure 1-3-1

B. Toner Caution

The toner is non-toxic substance composed of plastics and minute color pigments.

If toner adheres to the skin or clothing, remove as much as possible with dry tissue first, then wash with cold water. Hot water should not be used with which the toner will solidify and become difficult to remove.

Toner will easily decompose vinyl materials, therefore avoid the toner to come close to vinyl.

C. Ozone Safety

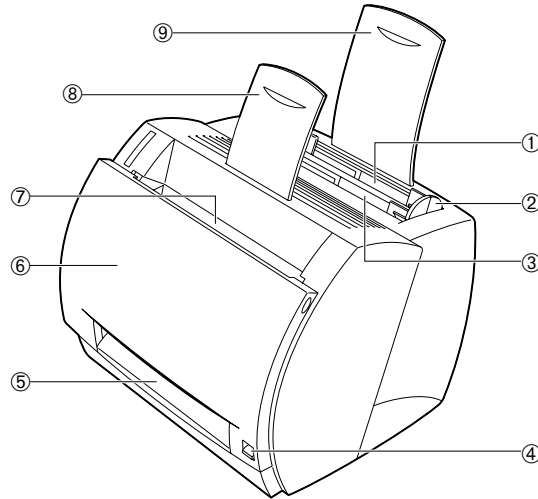
An infinitesimal amount of ozone gas (O₃) is generated during corona discharge from the charging roller. The ozone gas is emitted only while the printer is operating.

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

IV. PARTS OF THE PRINTER

A. External View

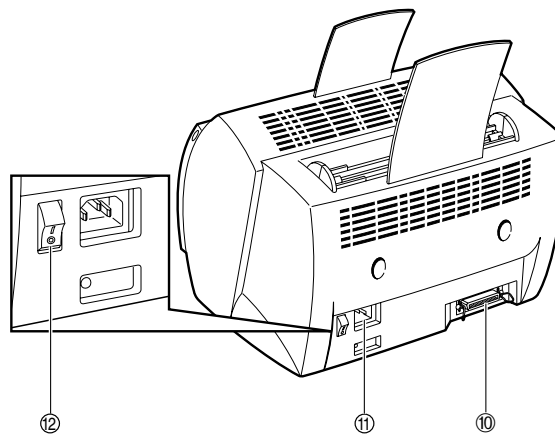
1. External view of this printer



- 1: Multi-purpose tray
- 3: Manual feed slot
- 5: Face-up delivery port
- 7: Face-down delivery tray
- 9: Paper pick-up sub-tray

- 2: Paper width guide
- 4: Delivery switching lever
- 6: Cartridge cover unit
- 8: Delivery sub-tray

Figure 1-4-1



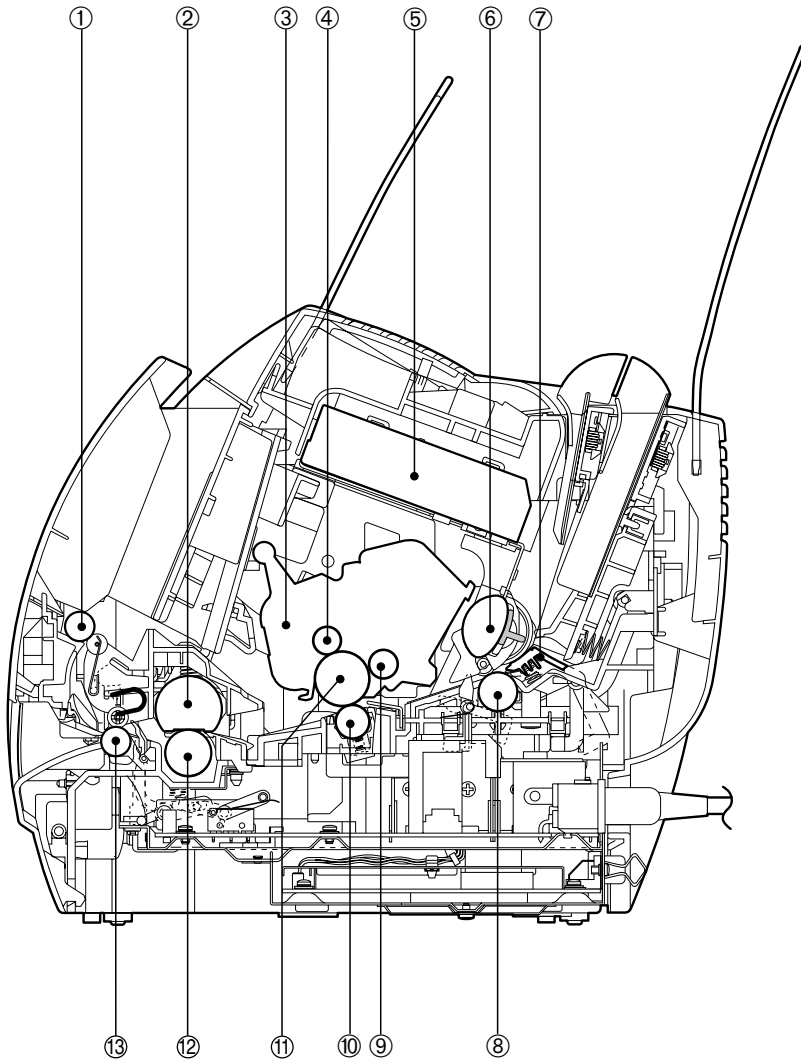
- 10: Interface connector
- 12: Power switch

- 11: Power receptacle

Figure 1-4-2

B. Cross Section

1. Cross section of this printer



- 1: Face-down delivery roller
- 3: EP-22 cartridge
- 5: Laser/scanner unit
- 7: Separation pad
- 9: Developing cylinder
- 11: Photosensitive drum
- 13: Fixing delivery roller

- 2: Fixing film unit
- 4: Primary charging roller
- 6: Pick-up roller
- 8: Feed roller
- 10: Transfer charging roller
- 12: Pressure roller

Figure 1-4-3

V. INSTALLATION

A. Precautions

- 1) This product has been carefully adjusted and strictly inspected before packing and shipping. To make the operation as intended, it is important to install it correctly. Service engineers must understand the performance of the printer sufficiently, install it in the appropriate environment with proper procedures, and operate the necessary checks.
- 2) Before taking the printer to the customer's premises, the following conditions at the installation location should be confirmed:
 - Power must be directly connectable to a single socket with a supply voltage within $\pm 10\%$ of the rated voltage (100-127V) or $+6\%$ to -10% of the rated voltage (220-240V.)
 - The temperatures should be in a range from 10 to 32.5 °C and the relative humidity from 20 to 80 %. Avoid areas closed to water faucets, boilers, humidifiers, or refrigerators.
 - Avoid areas near open flames, dusty locations, windy locations, areas which emit ammonia gas, and areas directly exposed to sunlight. When exposure to direct sunlight is unavoidable, hanging curtains is recommended.
 - The room should be well ventilated.
 - The printer should be placed on a level surface.
 - If the printer is set up on a desk, be sure a study desk is used.
 - Set the printer at a suitable distance from the wall for easy operation (See Figure 1-5-1.) There must be enough space around the printer to operate.

Following dimensions should be taken into consideration to select a installation space for the printer.

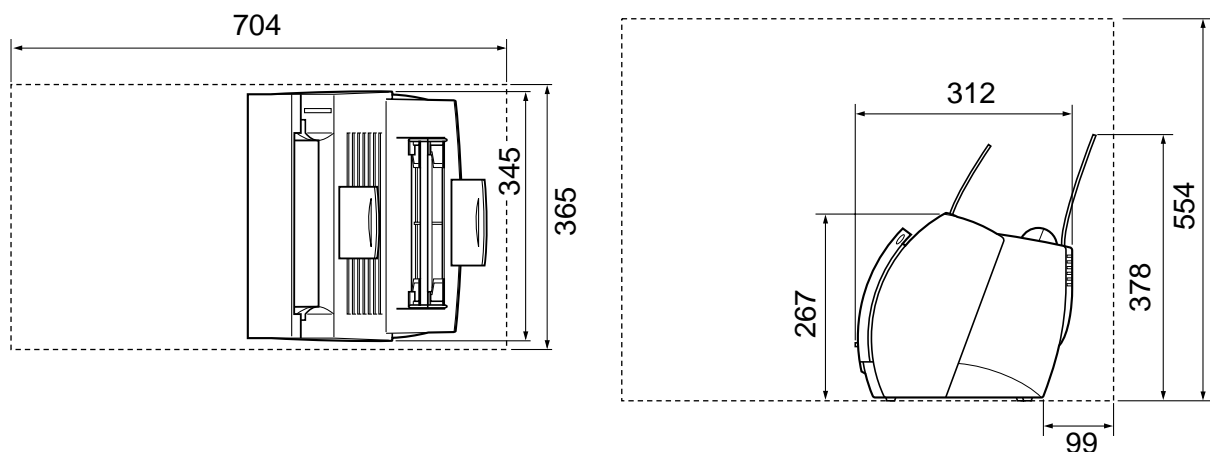


Figure 1-5-1

- 3) When metals are moved from a cold area to warm area, condensation may appear. This can lead to various troubles during an operation. When the printer needs to be moved from a cold area to warm area, leave it packed in its box for at least an hour to acclimatize to room temperature.

B. Storage and Handling of EP-22 Cartridge

As time passes, the natural environment will change the cartridge, whether sealed or installed in the printer, or regardless of the number of prints. The progression of this natural change depends largely on the storage and installation environment, therefore, take special care on storage and handling the cartridge.

a. Storage of Sealed EP-22 Cartridge Package

When storing EP-22 cartridge in warehouses or workshops, be sure that they are kept within humidity/storage conditions range shown in Table 1-5-1.

Also note the following:

- 1) Avoid areas exposed to direct sunlight.
- 2) Do not place them in locations which are subject to severe vibration.
- 3) Do not bump or drop the cartridge.
- 4) Avoid high temperature environment, keep EP-22 cartridge below 35 °C.

Table 1-5-1

Temperature	Normal (total storage time ~ 9/10)		0 to 35°C
	Severe (total storage time x-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 x-1/10)	High	85 to 95% RH
		Low	10 to 35% RH
Air pressure			613 to 1013hPa (460 to 760 mmHg)

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

b. Storage of Unsealed EP-22 Cartridge

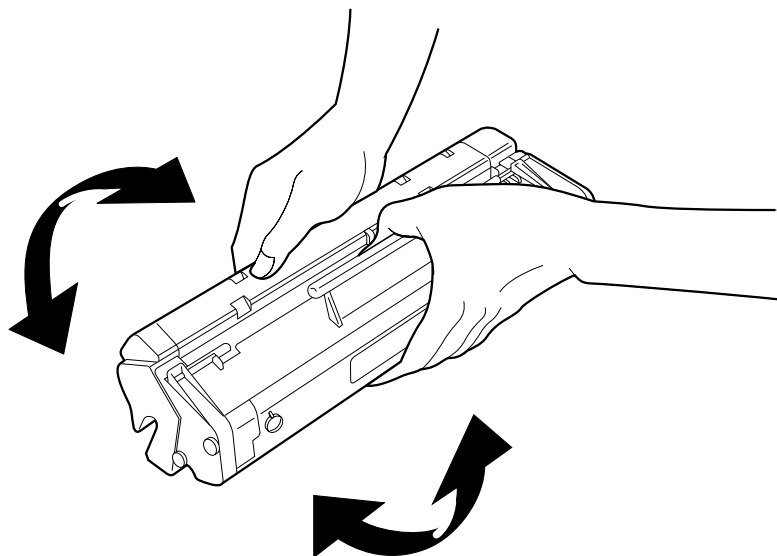
Since an organic photoconductor (OPC) is used for the photosensitive drum, intensive light will damage the drum. It is necessary to thoroughly explain to customers the various storage and handling procedures of unsealed cartridges.

Note the following:

- 1) Avoid areas which are exposed to direct sunlight such as near windows. Avoid leaving the packages in cars for an extended period of time as high temperatures can damage them.
- 2) Avoid high temperature and high humidity, and low temperature and low humidity environment. Avoid areas where the temperature or humidity drastically change such as a location near air conditioners.
- 3) Avoid dusty areas or locations which emit ammonia or organic solvent gases.
- 4) Keep EP-22 cartridge below 35 °C
- 5) Avoid placing the package near CRT displays, disk drive units, or floppy disks.

c. Notes on Handling of Cartridge

- 1) Before installing a new EP-22 cartridge in the printer, hold the cartridge at both sides as shown below, and gently slop it at about 45° right-up and left-up 5 or 6 times to distribute toner evenly. Do not rock the cartridge in any other way, as the toner may leak from the developing or cleaner units.

**Figure 1-5-2**

Print the test pattern of 3 to 5 sheets to ensure that output images are not spoiled by a toner leak after installing the cartridge in the printer.

- 2) If blank spots appear on the output image due to an uneven distribution of toner in the cartridge, shake the cartridge to evenly distribute as shown in 1).
- 3) Do not place the cartridge on its end or upside down.
- 4) Do not open the protective shutter of the photosensitive drum and never touch the drum surface. Do not clean the photosensitive drum.
- 5) Do not disassemble EP-22 cartridge.
- 6) Do not give vibration or shock to the cartridge.
- 7) As the photosensitive light is easily damaged by intensive light, blank spots or black stripes may appear on the printed image, if it is exposed to strong light. Faulty print images can be corrected by stopping the printer momentarily. However, if the drum is exposed too long, the blank spots and black stripes may remain even after stopping the printer.
To prevent this, be sure to always place the unsealed cartridges in their boxes or under a cover.
Do not leave them uncovered when removed from the printer.

Reference: If the cartridge are exposed to ordinary light for five minutes and then left in a dark area for another five minutes, the print quality will return to a virtually permissible level. However, do not expose the cartridge to direct sunlight.

VI. MAINTENANCE, CHECKS BY THE CUSTOMER

Maintenance points that should be performed by the customer to maintain the printer at optimum level are listed below.

Table 1-6-1

Item	Customer maintenance
Cartridge	Shake or replace the cartridge as necessary.
External Cover	Clean the external cover as necessary.

VII. OPERATION

A. Canon Advanced Printing Technology (CAPT)

1. Concerning Canon Advanced Printing Technology (CAPT)

Canon Advanced Printing Technology (hereafter referred to as CAPT) reduces the processing time, and simplifies operations for printing in the Microsoft Windows environment.

CAPT performs the following procedures to enable easy and speedy printing.

- Instead of converting application print data into the printer's page description language (PDL), this software translates print data into resource data corresponding to the writing system commands (GDI data.)
- The resource data corresponding to the GDI data are developed into dot data, and then passed to a host computer.
- The printing environment can be set in the dialog box on the host computer screen.
- The printer status is shown on the host computer screen, which enables the user to confirm the printing completion time, feeding status of the print paper, error conditions, and etc. on the host computer screen.

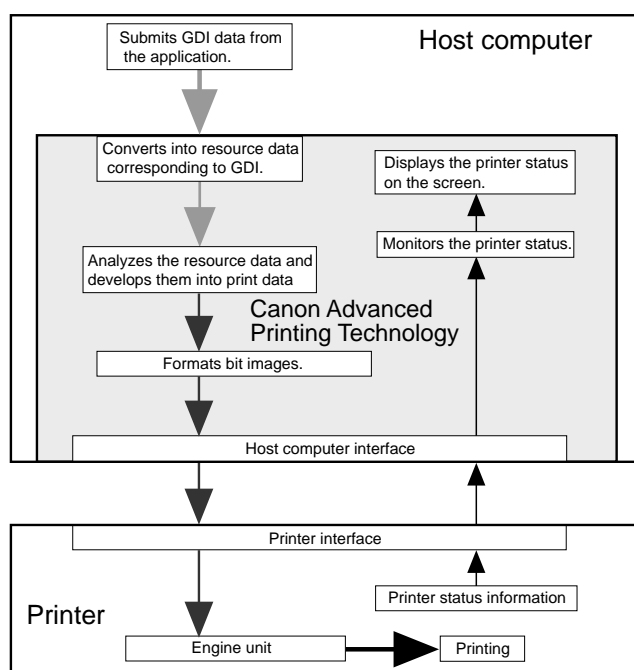


Figure 1-7-1

Note: GDI : Graphics device interface

Graphic writing system to perform printing and screen display in the Windows environment, (and a graphic writing system interface for the application.)

CAPT is used by installing on Microsoft Windows NT4.0 or Microsoft Windows 95/98. The installation is done using the Canon Advanced Printing Technology disk included with this printer.

CAPT specifies the paper size, document size, number of copies and print quality on the computer screen. The operation methods of the dialog boxes vary in Microsoft Windows NT4.0 and Microsoft Windows 95/98.

The installation procedures and operations are explained on the following pages. (Microsoft Windows NT4.0: Page 1-12, Microsoft Windows 95/98: Page 1-49)

B. Microsoft Windows NT4.0

1. Installation of CAPT

A Canon Advanced Printing Technology installation disk is packed with this printer.

The types and contents are as follows:

Types:

- A 5-inch CD-ROM disk

Contents:

- CAPT driver
- Language monitor
- Status window
- Parallel port driver
- Installer
- CD-ROM menu
- Uninstaller
- Trouble shooter
- On-line help
- On-line manual
- Voice message

a. Operating Environment

The following environment is required to install CAPT.

● PC hardware

This printer supports an IBM-PC or its compatible machine. The operating conditions are as shown below.

<Minimum Operating Environment>

- CPU: Pentium or above
- RAM: 32 MB or above
- Available memory on the disk: 10 MB or above
- Printer port: Standard Centronics parallel port
- CD-ROM drive
- Sound: PCM sound module is required to use the Voice message.
- Monitor size: 640 x 480 or above, 16 colors or above
- Network: 10 Base-T or 100 Base-TX is required to use network adapter.

<Recommended Operating Environment>

- CPU: MMX Pentium 200 MHz or above
- RAM: 48 MB or above

● OS software

This printer operates only on Microsoft Windows x86 (Intel). It does not operate on Alpha, MIPS or PPC.

This printer does not operate on other OSs such as Windows NT3.x, Windows 3.x, Windows for Workgroups, Windows CE, or Windows on OS/2. In general, Windows language and the software language of this printer must match.

● Printer cable

- Use a bi-directional 8-bit parallel interface cable for IBM-PC.
- Connections through the printer selector and printer buffer are not supported.

b. Installation Procedures

● Connecting the printer as a local printer

This section describes how to install CAPT for using the printer as a local printer. Install it to the host computer by following the procedures below.

For details, see the User's Manual packed with the printer.

1. Switch on the computer to which the printer is connected and start up Microsoft Windows NT.
2. Log in as an Administrator.
3. Use one of the following methods to start up the Add Printer Wizard.
 - Start button / Settings / Printers / Printers folder / Open the Add Printer.
 - My Computer / Printers folder / Open the Add Printer.
 - Explorer / Desktop / My Computer / Printers / Open the Add Printer.
4. Add Printer Wizard (Initial screen)

Select either to use this printer, as a local printer or network printer. The following procedures describe the installation for using the printer as a local printer by selecting the My Computer. For using the printer as a network printer, see Page 1-14 for details.
5. Add Printer Wizard (Port selection)

Select the port to which the printer is connected. If the port is not available, click the Add Port button to create a new port.

If the check box for Enable printer pooling is selected, you can select multiple ports in the Available ports list box simultaneously.
6. Add Printer Wizard (Printer selection 1)

Insert the CD-ROM into the computer, click the Have Disk button to open the Install From Disk dialog box.

Enter the name of the CD-ROM drive in the Copy manufacture's files from text box, and then click the Browse button.
7. Add Printer Wizard (Printer selection 2)

If the name of the printer appears in the Printers list box, and the printer you are installing is selected, click the Next button. If you want to change the printer, click the Have Disk button to reselect the INF file.
8. Add Printer (Overwrite selection)

This windows appears only when the same driver has already been installed.

Select whether or not the existing driver is to be overwritten by the newly installed driver.
9. Add Printer Wizard (Printer name change)

Enter the printer name to the Printer Name text box. Select whether or not the printer is to be a default printer.
10. Add Printer Wizard (Sharing/non-sharing selection)

Select whether or not the PC is to be designated as the print server and the printer is to be shared by other client PCs on a network. You can also specifies the printer sharing settings after installing CAPT.
11. Add Printer Wizard (Test page printing selection)

Select whether or not to print a test page after you have finished installing CAPT.
12. Coping Files
The Coping Files dialog box appears when the installation has been started.
13. End of Installation
When the installation has completed, restart Microsoft Windows as instructed by the on-screen message. When the printer is connected, you will be asked whether you want to print a test page. Print a test page to confirm that the installation has been made properly.

● Connecting to a network printer

Follow the procedures described in this section to perform the installation on a client PC when you want to designate the PC to which the printer is connected as a network print server and to use the printer as a network printer.

For details, refer to the User's Manual packed with the printer.

Note: Precondition for sharing the installation

- CAPT should be installed properly in the print server to which the client PC is to be connected, and the printer should be designated as a shared printer. See Page 1-24 for information on how to designate the printer as a share server.
 - The client must be able to access to the server and the shared printer.
 - As the client need no access privilegdes, which is required for the groups in the local installaion, the print server is accessible to anyone as a network client, It can, however, restrict the groups able to access to the print server by setting the Security on the print server.
-

1. Switch on the client server PC, start up Microsoft Windows NT and log in.
2. Use one of the following methods to start up the Add Printer Wizard.
 - Start button / Settings / Printers / Printers folder / Open the Add Printer.
 - My Computer / Printers folder / Open the Add Printer.
 - Explorer / Desktop / My Computer / Printers / Open the Add Printer.
3. Add Printer Wizard (Initial screen)

Select either to use this printer, as a local printer or network printer. The following procedures describe the installation for using the printer as a network printer by selecting the Network printer server. For using the printer as a local printer, see Page 1-13 for details.
4. Connect to Printer

Double-click on the print server name shown in the Shared printers list box, and click on the OK button to connect to the selected network printer.

If the connection could not be made, the Connected to Printer (printer connecting failure) dialog box will be indicated.
5. Add Printer Wizard (Installation completion)

This window tells you that the network printer has been successfully installed, click on the Finish button to finish the Add Printer Wizard.

2. Operation of CAPT

CAPT uses Properties dialog boxes to set print environment.

The table on Page 1-61 shows the list of print environment that can be set by the CAPT dialog boxes.

The main dialog boxes of CAPT are described below.

a. Printer Properties

- How to open the Printer Properties.

The Printer Properties can be opened by the following methods.

From the Microsoft Windows desktop

1) Use one of the following methods to open the Printers folder.

- Start Button / Settings / Printers
- My Computer / Printers
- Control Panel / Printers

2) Open the printer to which you want to connect from the Printers folder.

- Click the right mouse button on the Canon LBP-800 icon to select the Properties.
- Double-click on the Canon LBP-800 icon to open the Canon LBP-800 print queue window, and select the Properties from the Printer menu.

From the Microsoft Windows applications

How to open the Printer Properties varies in each application. See the application manual.

From the Microsoft Windows Shortcut

- To create a shortcut, open the Printers folder, drag the Canon LBP-800 icon with the right mouse button to the desktop, and select the Create Shortcut(s) Here. (See the Microsoft Windows NT User's Guide for details.) Double-click on the shortcut icon to open the printer window and select the Properties from the Printer menu.
- To create a shortcut to the Printer folder, open the My computer, drag the Printer's icon with the right mouse button to the desktop, and select the Create Shortcut(s) Here. (See the Microsoft Windows NT User's Guide for details.) Double-click on the shortcut icon to open the Printers folder, click right mouse button on the Canon LBP-800, and select the Properties.

The Printer Properties contains 6 tabs common to all Microsoft Windows NT printers according to the Microsoft Windows User Interface model. You can click on each tab or move the focus and then press right or left cursor to open the tab and make settings.

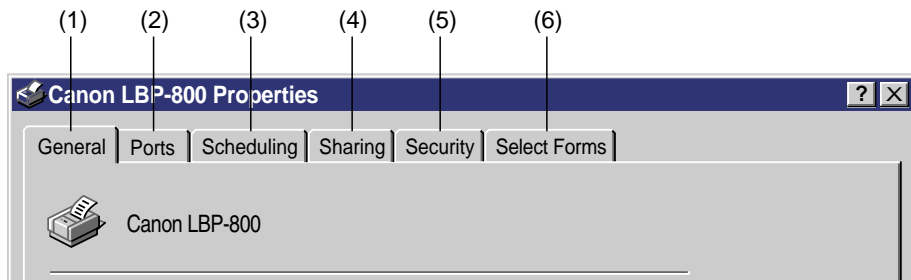


Figure 1-7-2

- (1) **General** : Makes settings relating to the entire printer driver.
- (2) **Ports** : Selects the port to which the printer is connected.
- (3) **Scheduling** : Makes settings relating to print schedule.
- (4) **Sharing** : Designates whether the printer is shared.
- (5) **Security** : Sets the security for the printer.
- (6) **Select Forms** : Makes settings for user defined paper.

To store the items set in each tab, click the OK button and close the Print Properties dialog box. To close the box without storing the items set in each tab, click the Cancel button.

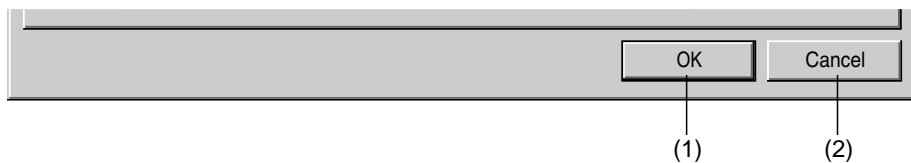


Figure 1-7-3

- (1) **OK** : Changes the items in this dialog box and closes the box.
- (2) **Cancel** : Closes this dialog box without changing its items.

Details of each tab are described below.

● General Tab

The settings in this tab apply to the entire printer driver. This tab can be opened by clicking the General tab in the Properties dialog box.

The General tab is shown in Figure 1-7-4.

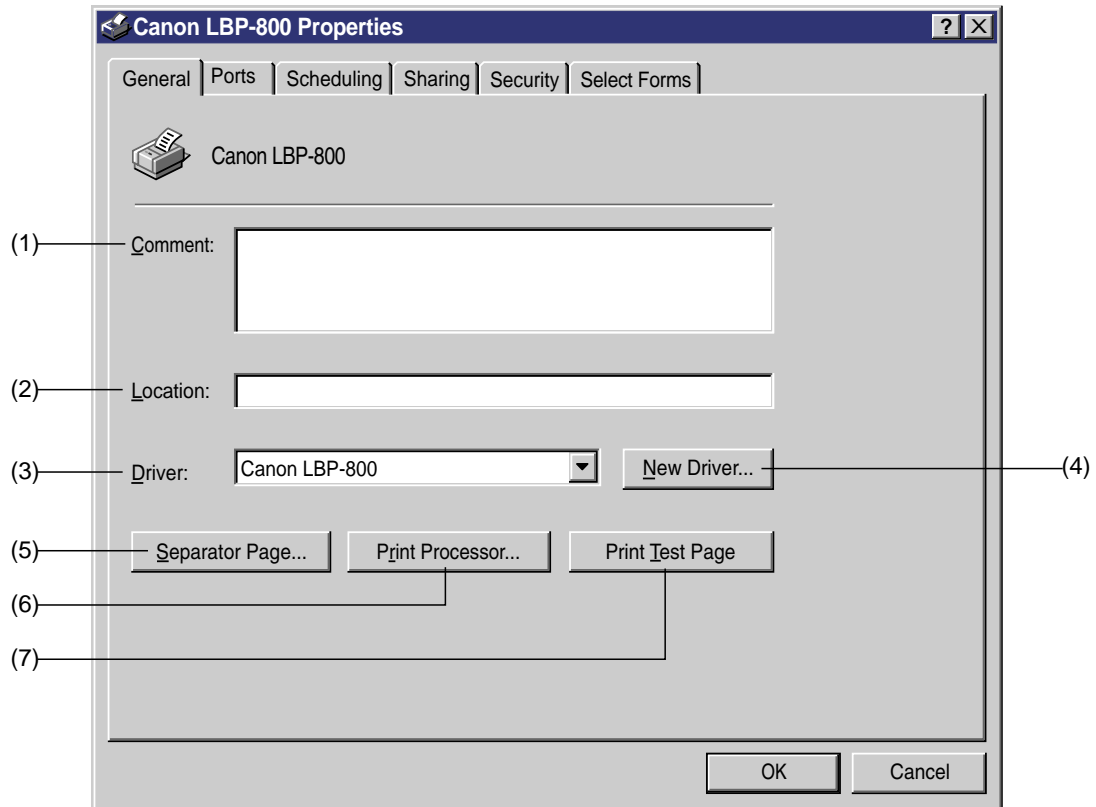


Figure 1-7-4

- (1) Comment** : Enter comments on the printer.
- (2) Location** : Enter information on the printer location.
- (3) Driver** : Displays the list of the installed printer drivers.
- (4) New Driver** : Click on this button when installing a new or updated printer driver.
- (5) Separator Page** : As this printer does not support separator pages, clicking on this button will not print a separator page.
- (6) Print Processor** : Displays the Print Processor dialog box.
- (7) Print Test Page** : Print a test page supported by the Microsoft Windows NT standard.

◆ **Print Processor Dialog Box**

In the Print Processor dialog box, you can specify the print processor and spool data type used for this printer. The Printer Processor dialog box can be opened by clicking on the Print Processor button in the General tab in the Properties dialog box.

The Print Processor dialog box is shown in Figure 1-7-5.

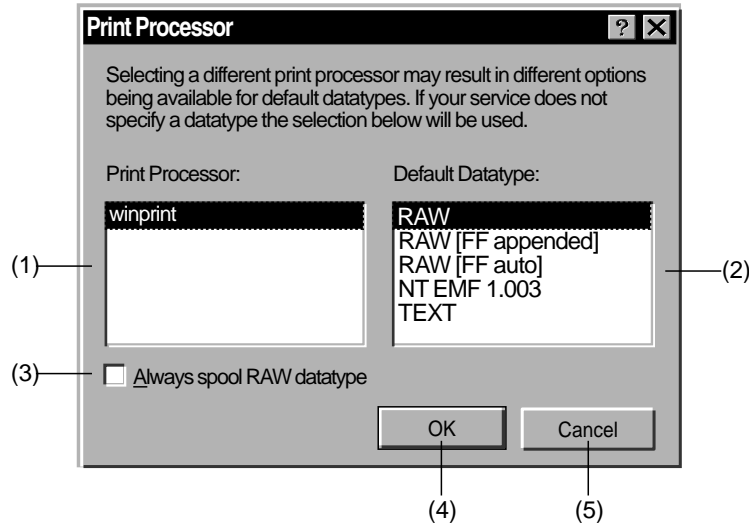


Figure 1-7-5

- (1) **Print Processor** : Specifies the print processor used for this printer. Normally, Winprint (Windows standard print processor) is available.
- (2) **Default Datatype** : Displays the list of spool datatype available for the selected print processor in the Print Processor list box.
- (3) **Always spool RAW datatype** : Select the check box when you want to always spool data as RAW datatype.
- (4) **OK** : Changes the items in this dialog box and closes the box.
- (5) **Cancel** : Closes this box without changing its items.

● Ports Tab

Use this tab to select the port to which the printer is connected. It can be opened by clicking the Ports tab in the Properties dialog box.

The ports tab is shown in Figure 1-7-6.

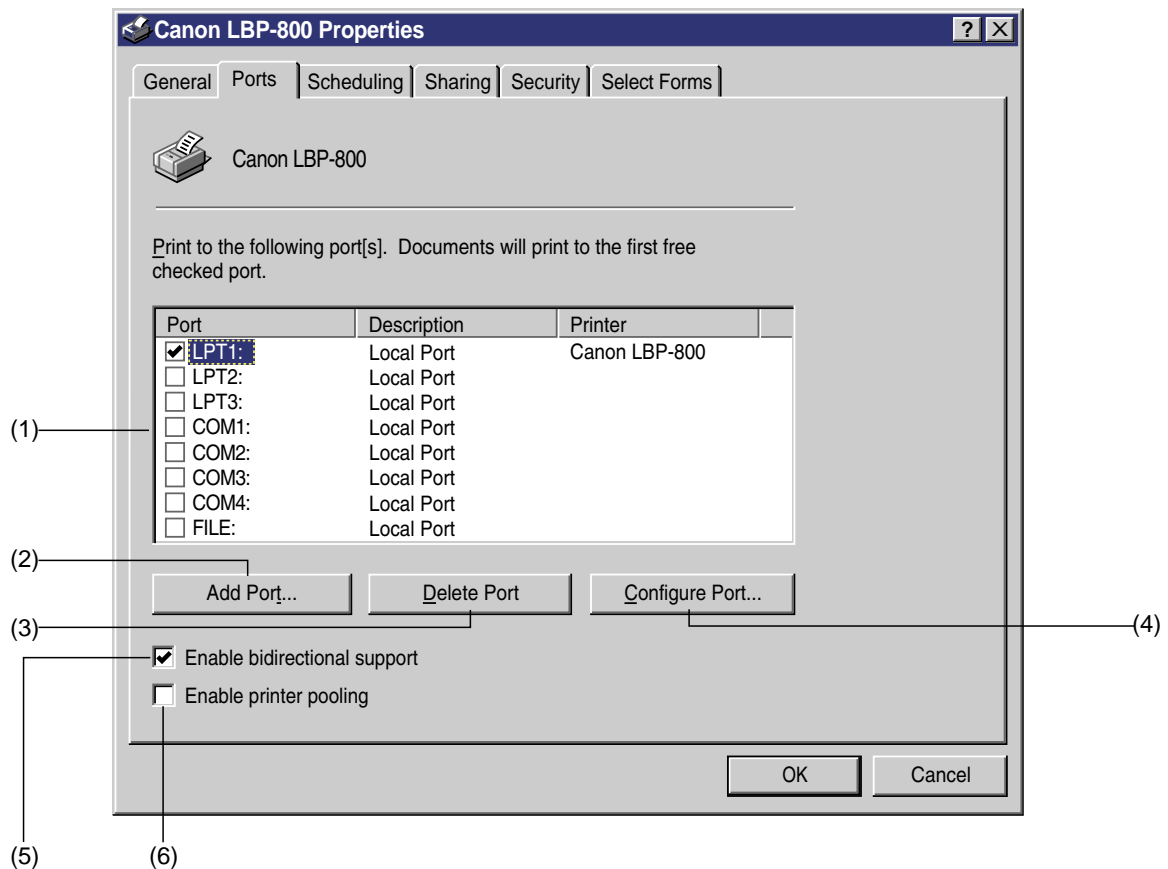


Figure 1-7-6

- (1) Print to the following port(s)** : List of check boxes for the ports to which the printer can be connected. Select one or more port(s) to which the printer is to be connected. The error dialog box will appear if a nonexistent LPT port has been selected and a print is commanded.
- (2) Add Ports** : Opens the Printer Ports dialog box which enables you to add ports. (See Page 1-20)
- (3) Delete Ports** : Opens the Delete Port dialog box which enables you to delete selected ports.
- (4) Configure Ports** : Opens the configure LPT Port dialog box which enables you to set ports.
- (5) Enable bidirectional support** : Selects whether or not the Language Monitor is used for bidirectional communication between the PC and printer.
- (6) Enable printer pooling** : Selects whether or not the printer pool is used. Select the check box when you want to select multiple ports in the Print to the following ports list box. The printer does not support printer pool.

◆ **Printer Ports Dialog Box**

Use this dialog box to add ports to which the printer is to be connected if necessary. It can be opened by clicking the Add Ports button in the Ports tab of the Properties dialog box.

The printer Ports dialog box is shown in Figure 1-7-7.

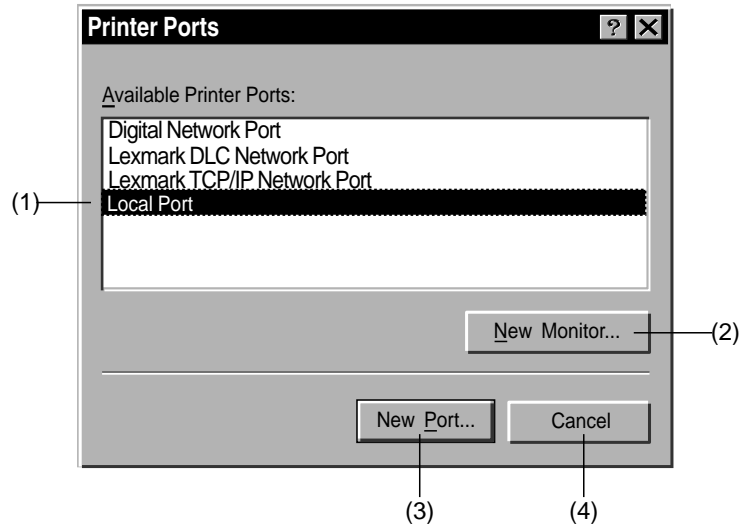


Figure 1-7-7

- (1) Available Printer Ports :** Displays the list of ports which can be added. Select one port from the list. The printer cannot be connected to ports other than Local Port and AXIS CAPT Port (network adapter port.)
- (2) New Monitor :** Installs the print monitor. Not available for this printer.
- (3) New Port :** Opens the Port Name dialog box which enables you to enter the name of the port to be added.
- (4) Cancel :** Returns to the Ports tab without changing the items.

◆ Configure LPT Ports Dialog Box

Use this dialog box to set the time-out period until the PC notifies the user that the printer does not respond. It can be opened by clicking the Configure Ports button in the Ports tab.

The configure LPT Port dialog box is shown in Figure 1-7-8.

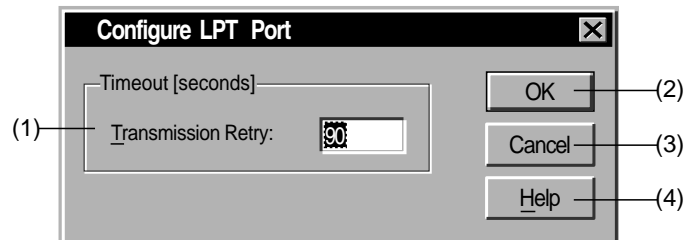


Figure 1-7-8

- (1) **Transmission Retry** : Sets the time-out period of ports (Unit: second)
- (2) **OK** : Changes the items in this dialog box and returns to the Printer Ports tab.
- (3) **Cancel** : Returns to the Printer Ports tab without changing its items in this dialog box.
- (4) **Help** : Opens the Help topics.

● **Scheduling Tab**

Use this tab to schedule a set time for printing, to set printing priorities, and to specify the print data spooling method. It can be opened by clicking the Scheduling tab in the Properties dialog box.

The Scheduling tab is shown in Figure 1-7-9.

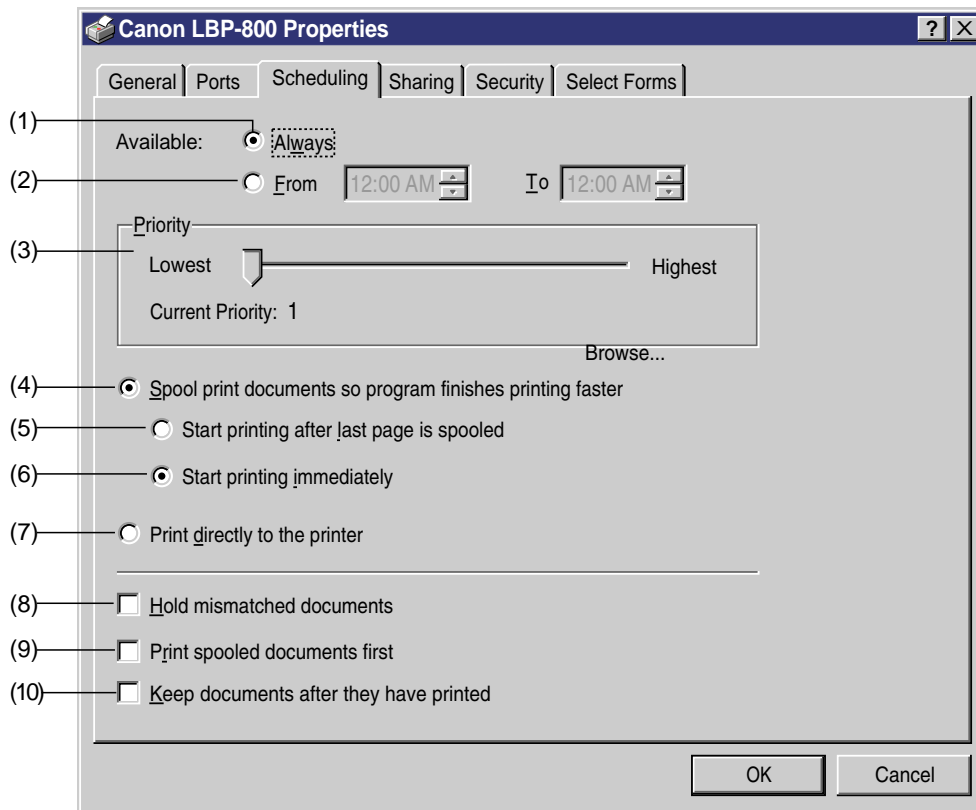


Figure 1-7-9

- (1) **Always** : Keeps the printer ready to print for 24 hours a day.
- (2) **From to** : Keeps the printer to ready to print only during the specified period. When this button is selected, specific time can be entered in the spin boxes.
- (3) **Priority** : Sets default printing priorities of documents. Documents with high priorities will be printed before documents with low priorities.
- (4) **Spool print documents so program finishes printing faster** : Sets this option on to spool page at printing. Keep this option on for this printer. When this option is on, option buttons from (6) to (10) become available.
- (5) **Start printing after last page is spooled** : Stars printing after the last page of the document is spooled.
- (6) **Start printing immediately** : Starts printing after the first page of the document is spooled.
- (7) **Print directly to the printer** : Sends the data directly to the printer without spooling. Keep this setting off as printing cannot be conducted from applications when it is on. (The Warning dialog box will appear when it is set on.)
- (8) **Hold mismatched documents** : The spooler compares the settings of the printer and document before sending the document and holds the document in the queue if the data do not match.
- (9) **Print spooled documents first** : If there is a spooled document when the document to be printed next, prints the spooled document first even if its printing priority is lower than that of the document being spooled at that moment.

(10)Keep documents after they have printed : Sets the spooler not to delete documents after they have been printed.

● **Sharing Tab**

Use this tab to designate whether or not the printer is shared with other clients through a network. It can be opened by clicking on the Sharing tab in the Properties dialog box.

The sharing tab is shown in Figure 1-7-10.

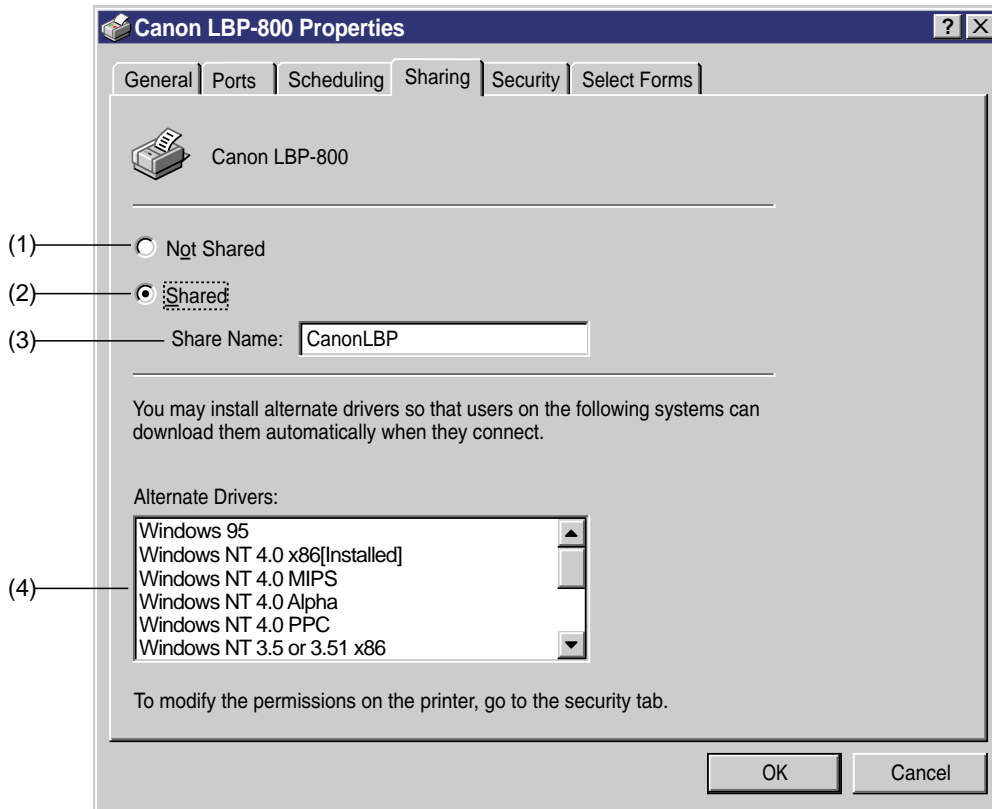


Figure 1-7-10

- (1) **Not shared** : Keep this check box on if you want to use this printer as a local printer.
- (2) **Shared** : Keep this check box on if you want to use this printer as a network printer.
- (3) **Share Name** : Available only when the Shared option button is selected. Change the network printer name appearing in the box if necessary.
- (4) **Alternate Drivers** : Enables you to install drivers of different version or with different CPU as an alternate driver. As this printer does not support Alternate Driver, do not select the alternate drivers in this list box.

● Security Tab

Use this tab to set the security for the printer such as Permissions, Auditing, and Ownership. It can be opened by clicking the Security tab in the Property dialog box.

The security tab is shown in Figure 1-7-11.

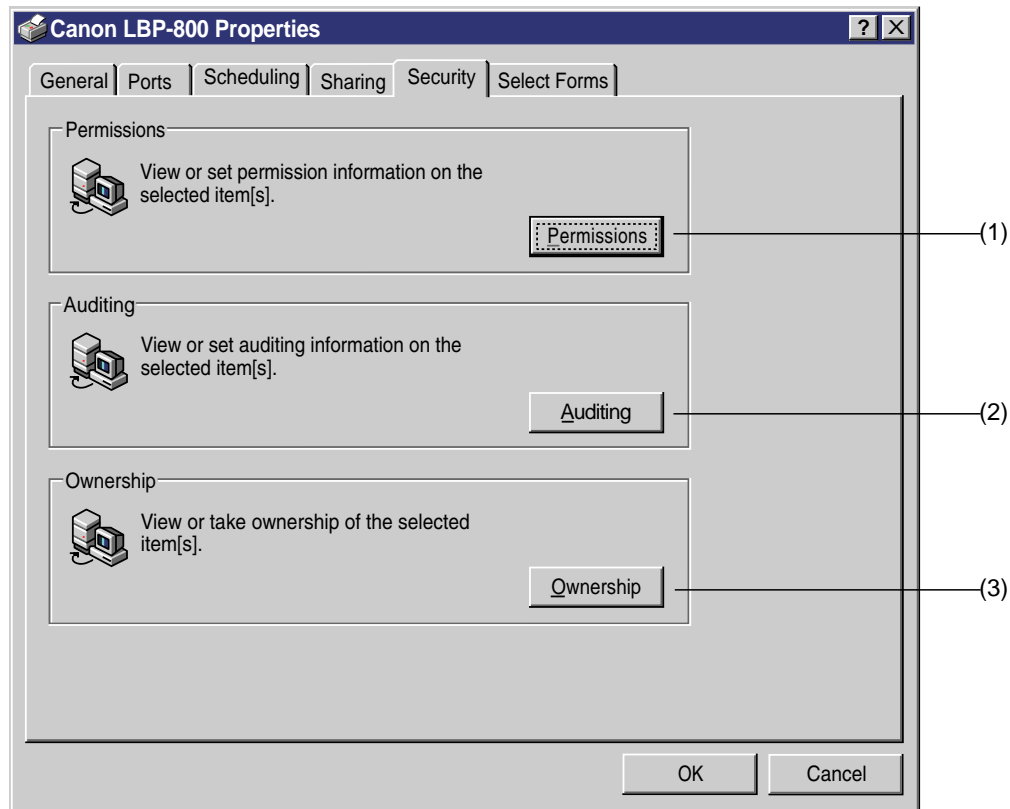


Figure 1-7-11

- (1) Permissions :** Opens the Printer Permissions dialog box. (See Page 1-26)
- (2) Auditing :** Opens the Printer Auditing Dialog box. (See Page 1-27)
- (3) Ownership :** Opens the Owner dialog box.

◆ **Printer Permissions Dialog Box**

The Printer Permissions dialog box displays and sets the access privilege of the users and groups to the printer. It can be opened by clicking the Permissions button in the Security tab of the Properties dialog box.

The Printer Permissions dialog box is shown in Figure 1-7-12.

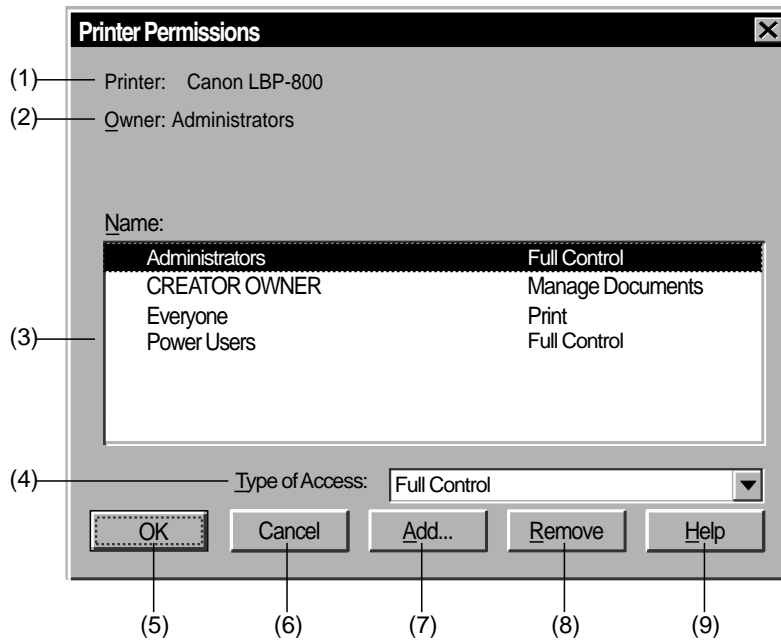


Figure 1-7-12

- (1) **Printer** : Displays the printer name.
- (2) **Owner** : Displays the owner name.
- (3) **Name** : Displays the list of the names of the users and groups and the types of their access privileges. When you want to change the access privilege, select the group or user name and then select the type of access you want from the Type of Access drop down list.
- (4) **Type of Access** : Displays the list of available types of access.
- (5) **OK** : Changes the items in this dialog box and closes the box.
- (6) **Cancel** : Closes the dialog box without changing its items.
- (7) **Add** : Opens the Add Users and Groups dialog box which enables you to add the selected group and user to the Name list.
- (8) **Remove** : Delete the selected group and user in the Name list.
- (9) **Help** : Open the Help topics.

◆ Printer Auditing Dialog Box

In the Printer Auditing dialog box, you can make settings for checking the users connected to the printer and the status of their events. To enable the PC to audit, the File and Object Access event in the Audit Policy dialog box in the User Manager dialog box must be set to permit auditing. The Printer Auditing dialog box can be opened by clicking the Auditing button in the Security tab of the Properties dialog box.

The Printer Auditing dialog box is shown in Figure 1-7-13.

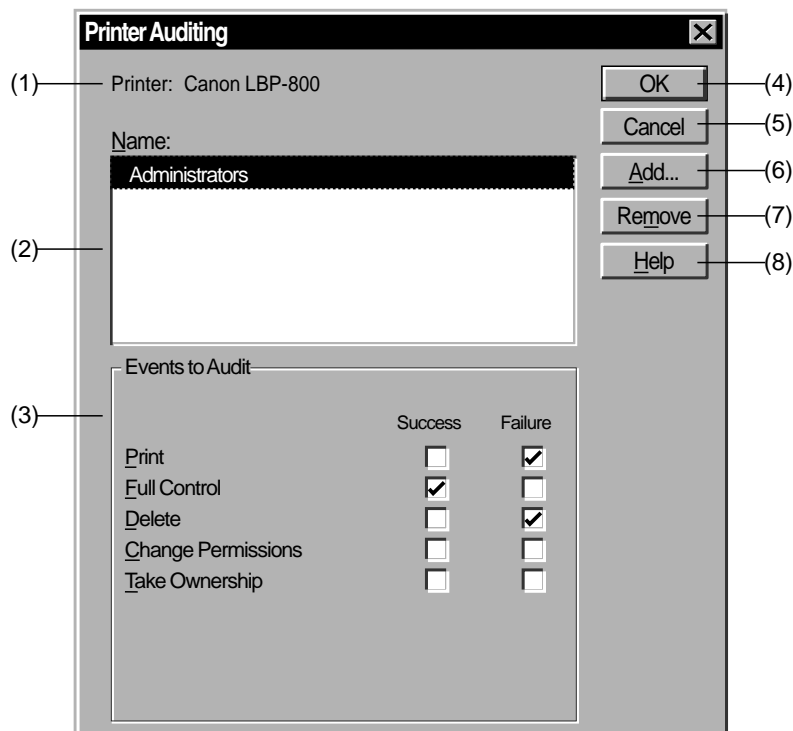


Figure 1-7-13

- (1) **Printer** : Displays the printer name.
- (2) **Name** : Displays the names of groups and users that are being audited.
- (3) **Events to Audit** : Displays the list of events which can be audited. The list includes Print, Full Control, Delete, Change Permissions and Take Ownership. Success or Failure can be selected for each event.
- (4) **OK** : Changes the items in this dialog box and closes the box.
- (5) **Cancel** : Closes the dialog box without changing its items.
- (6) **Add** : Opens the Add Users and Groups dialog box which enables you to add selected groups and users to the Name list.
- (7) **Remove** : Deletes selected groups and users from the Name list.
- (8) **Help** : Opens the Help topics.

● **Select Forms Tab**

Use this tab to set user defined paper. It can be opened by clicking the Select Forms tab in the Property dialog box.

The Select Forms tab is shown in Figure 1-7-14.

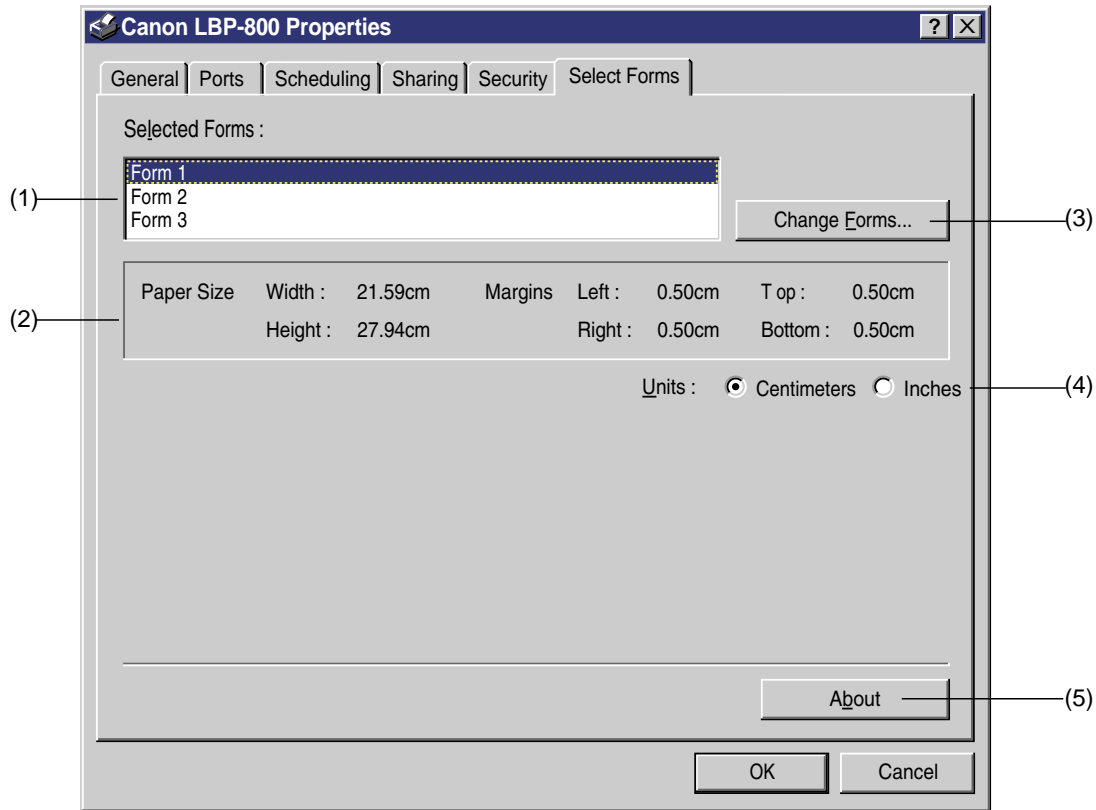


Figure 1-7-14

- (1) **Selected Forms** : Selects user defined paper.
- (2) **Paper Size** : Displays the size of the paper selected in the Selected Forms.
- (3) **Change Forms** : Opens the Change Forms dialog box and selects newly registered user defined paper from the list of paper available.
- (4) **Units** : Selects the unit used in Paper Size.
- (5) **About** : Open the About dialog box.

b. Document Defaults

- How to open the Document Defaults box

The Document Defaults box can be opened by the following procedures below.

From the Microsoft Windows desktop

1) Perform one of the following methods to open the Printer folder.

- Start button / Settings / Printers
- My Computer / Printers
- Control Panel / Printers

2) Open the printer from the Printers folder.

- Click the right mouse on the Canon LBP-800 icon and select the Document Defaults box.
- Double-click on the Canon LBP-800 icon to open the Canon LBP-800 print queue window, and select the Document Defaults in the Printer menu.

From the Microsoft Windows applications

As how to open the Document Defaults box varies in each application, refer to each application manual.

From the Microsoft Windows shortcut

- To create a shortcut, open the Printers folder, drag the Canon LBP-800 icon with the right mouse button to the desktop, and select the Create the Shortcut(s) Here. (See the Microsoft Windows NT User's Guide for details.)

Double-click on the shortcut icon to open the printer window and then select the Document Defaults in the Printer menu.

- To create a shortcut to the Printer folder, open the My Computer, drag the Printers icon with the right mouse button to the desktop, and select the Create Shortcut(s) Here. (See the Microsoft Windows User's Guide for details.)

Double-click on the shortcut to open the Printer folder, click the right mouse on the Canon LBP-800, and then select the Document Defaults.

The Document Defaults dialog consists of tabs based on the Microsoft Windows NT user interface model.

The dialog box consists of 3 tabs shown below. You can click each tab or move the focus and then press the right or left cursor key to open the tab and make settings.



Figure 1-7-15

- (1) Page Setup** : Sets items frequently used in general printing.
- (2) Finishing** : Selects whether or not to perform print in collate.
- (3) Quality** : Sets items relating to image.

To store the items set in each tab, click the OK button and close the Print Properties dialog box. To close the box without storing the items set in each tab, click the Cancel button.



Figure 1-7-16

- (1) OK** : Changes the items in this dialog box and closes the box.
- (2) Cancel** : Closes the dialog box without changing its items.

• Profile

The Profile reads and stores each item of the Page Setup tab, Finishing tab and Quality tab, which performs operations of Add, Edit, and Select. The Profile stores up to 50 items for each login user. As it stores in each login user, each Profile cannot be referred among them.

If the name of the printer driver is changed to another, all the profiles already registered will be unreadable. However, it enables the user to read the Profile again by reentering the name of the driver. It can also add and edit new profile by changing the name of the driver.

Even if the printer driver is uninstalled, the Profile will not be deleted. If the printer driver is reinstalled, you can select and edit the registered items again.

This printer driver supports submitting information to files and reading it from files. However, the Windows 95/98 profile files and the Windows NT4.0 profile files are not interchangeable.



Figure 1-7-17

- (1) Profile** : Selects the registered Profile.
- (2) Add** : Opens the Add Profile dialog box.
- (3) Edit** : Opens the Edit Profile box.

◆ **Add Profile Dialog Box**

The Add Profile dialog box adds new Profile. It can be opened by clicking the Add button in the Document Defaults dialog box.

The Add Profile dialog box is shown in Figure 1-7-18.

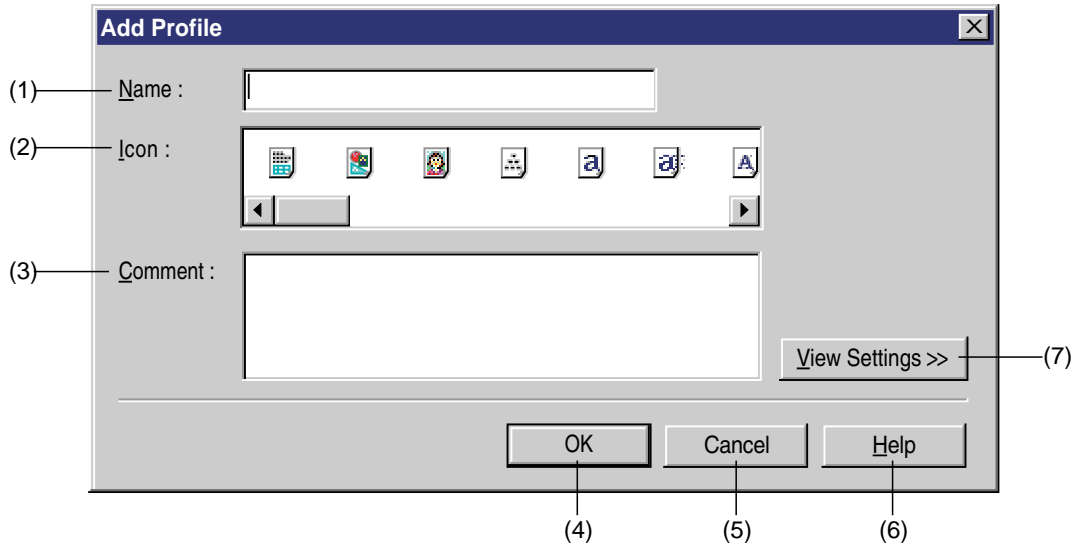


Figure 1-7-18

- (1) **Name** : Sets the name of the Profile.
- (2) **Icon** : Selects the icon symbolizing the Profile.
- (3) **Comment** : Writes comments as sub information of the Profile
- (4) **OK** : Changes the items and closes the box.
- (5) **Cancel** : Close the box without changing its items.
- (6) **Help** : Opens the Help topics.
- (7) **View Settings** : Displays information of the items.

◆ Edit Profile Dialog Box

The Edit Profile dialog box edits the Profile. It can be opened by clicking the Edit button in the Document Defaults dialog box.

The Edit Profile dialog box is shown in Figure 1-7-19.

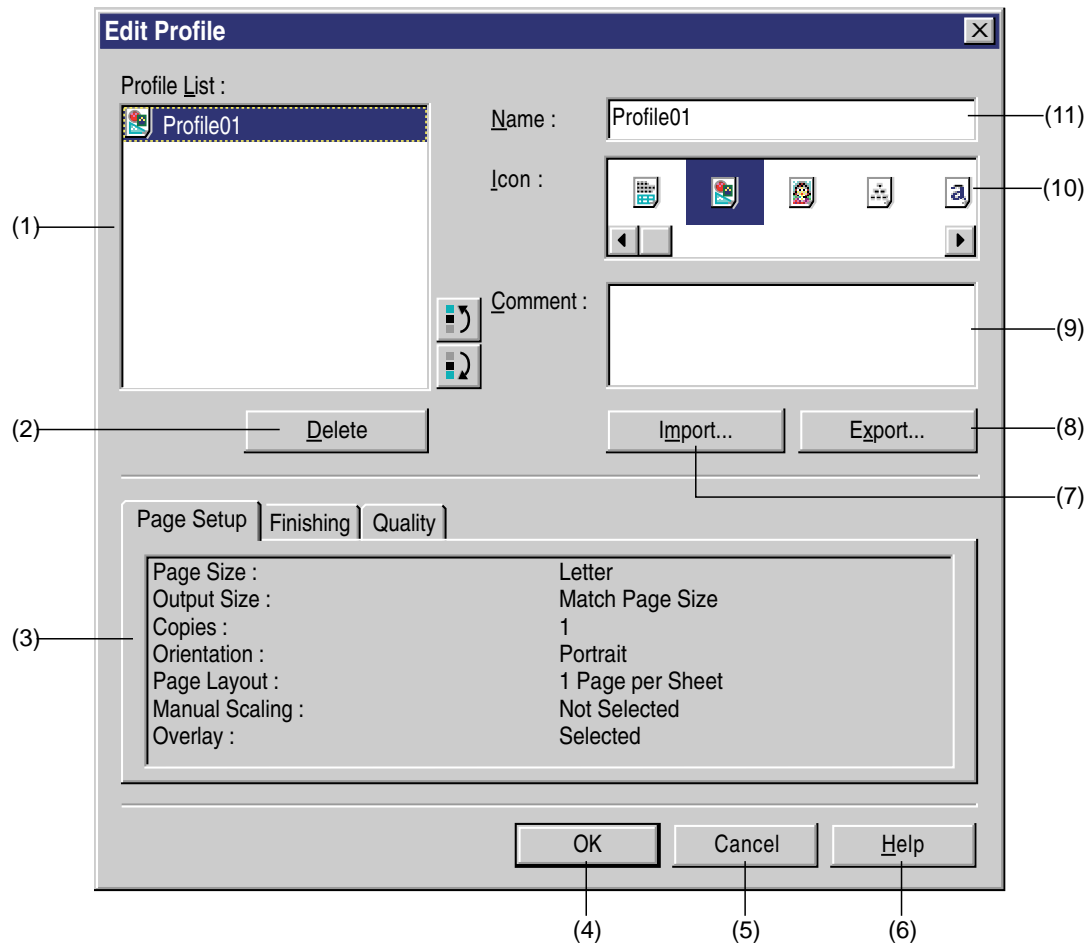


Figure 1-7-19

- (1) **Profile List** : Displays the list of the Profile names.
- (2) **Delete** : Deletes the Profile.
- (3) **Confirm the settings** : Displays in tab the list of information of profile that are being edited.
- (4) **OK** : Changes the items in this dialog box and closes the box.
- (5) **Cancel** : Closes the dialog box without changing its items.
- (6) **Help** : Open the Help topics.
- (7) **Import** : Imports the Profile information from files.
- (8) **Export** : Exports the Profile information to files.
- (9) **Comment** : Writes comments as sub information of the Profile.
- (10) **Icon** : Selects the icon symbolizing the Profile.
- (11) **Name** : Selects the name of the Profile.

Details of each tab are described below.

● **Page Setup tab**

Use this tab to set items frequently used in general printing. The items set in the Page Setup tab can be opened by clicking the Page Setup tab in the Document Defaults dialog box.

The Page Setup tab is shown in Figure 1-7-20.

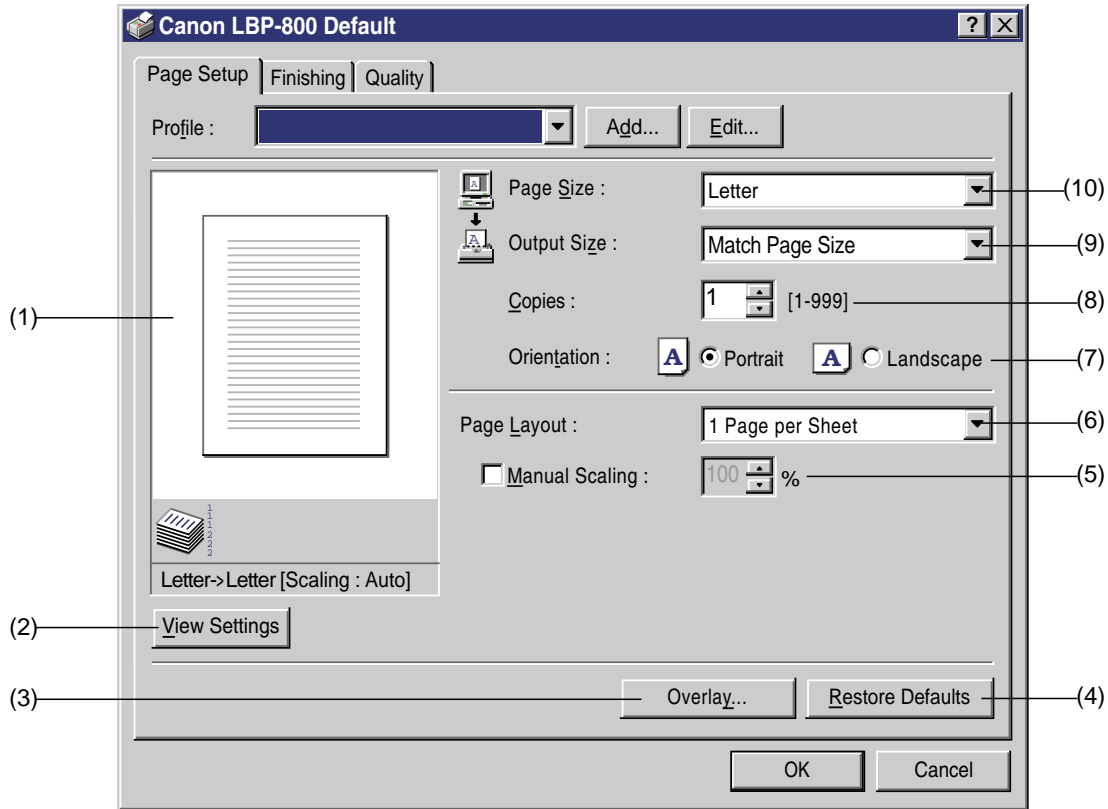


Figure 1-7-20

- (1) **Preview** : Displays the Preview.
- (2) **View Settings** : Opens the View Settings dialog box.
- (3) **Overlay** : Opens the Overlay dialog box.
- (4) **Restore Defaults** : Resets the values in the Page Setup tab to the default value.
- (5) **Manual Scaling** : Specifies the reproduction ratio of the Page Size.
- (6) **Page Layout** : Specifies the number of page printed per print sheet. When you specify the 2/4/8/9 Pages per Sheet, the Manual Scaling will disappear and Page Order will be displayed.
- (7) **Orientation** : Sets the printing orientation.
- (8) **Copies** : Sets the number of printing.
- (9) **Output Size** : Sets the paper size (physically)
- (10) **Page Size** : Sets the paper size (theoretically)

◆ View Settings Dialog Box

The View Settings dialog box displays in tab the list of setting information. It can be opened by clicking the View Settings button in the Page Setup dialog box.

The View Setup dialog box is shown in Figure 1-7-21.

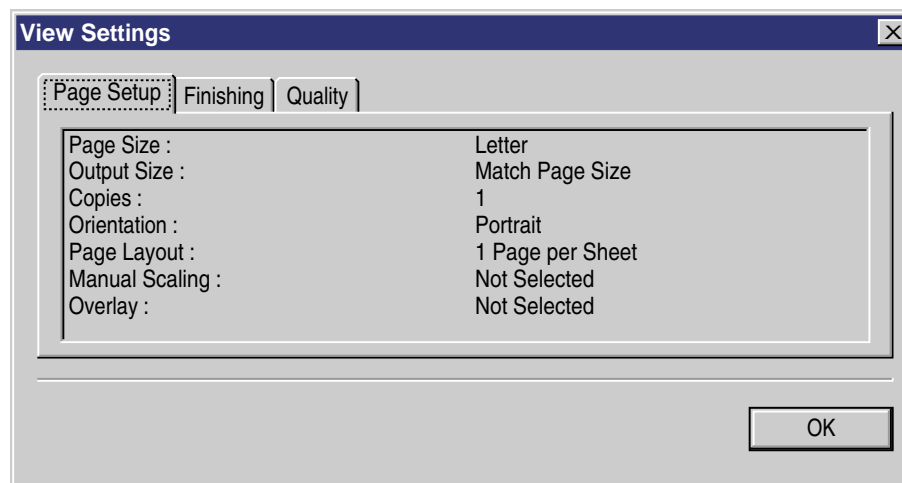


Figure 1-7-21

◆ **Overlay Dialog Box**

Use this dialog box to set items relating to Overlay form. It can be opened by clicking the Overly button in the Page Setup dialog box.

The Overlay dialog box is shown in Figure 1-7-22.

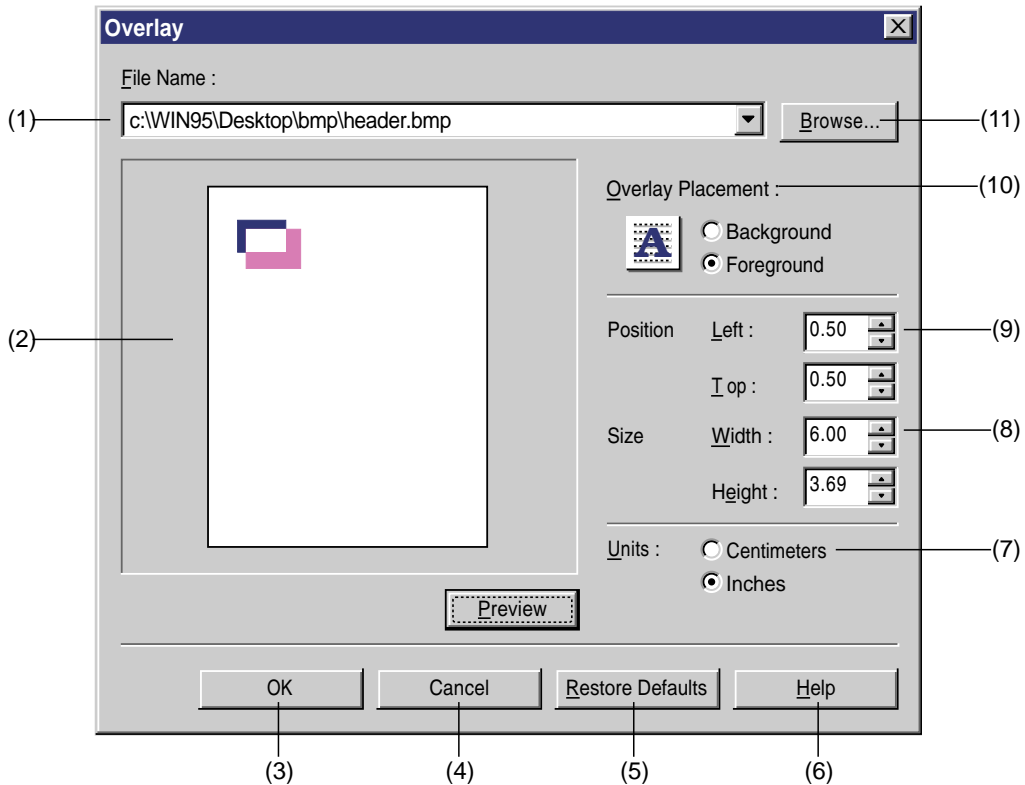


Figure 1-7-22

- (1) **File Name** : Specifies the names of the Overlay form files.
- (2) **Preview** : Displays the preview.
- (3) **OK** : Change the items in this dialog and closes the box.
- (4) **Cancel** : Closes this box without changing its items.
- (5) **Restore Defaults** : Resets the value in the Overlay dialog box to the default value.
- (6) **Help** : Opens the Help topics.
- (7) **Units** : Selects the unit used in the Size and Position.
- (8) **Size** : Specifies the Size of the Overlay form.
- (9) **Position** : Specifies the location of the Overlay form.
- (10) **Overlay Placement** : Selects either to place the Overlay form, in the background or foreground of the printing data.
- (11) **Browse** : Selects the Overlay form files.

● Finishing Tab

The Finishing tab specifies either to print, in collate or page. The Finishing tab can be opened by clicking on the Finishing tab in the Document Defaults dialog box.

The Finishing tab is shown in Figure 1-7-23.

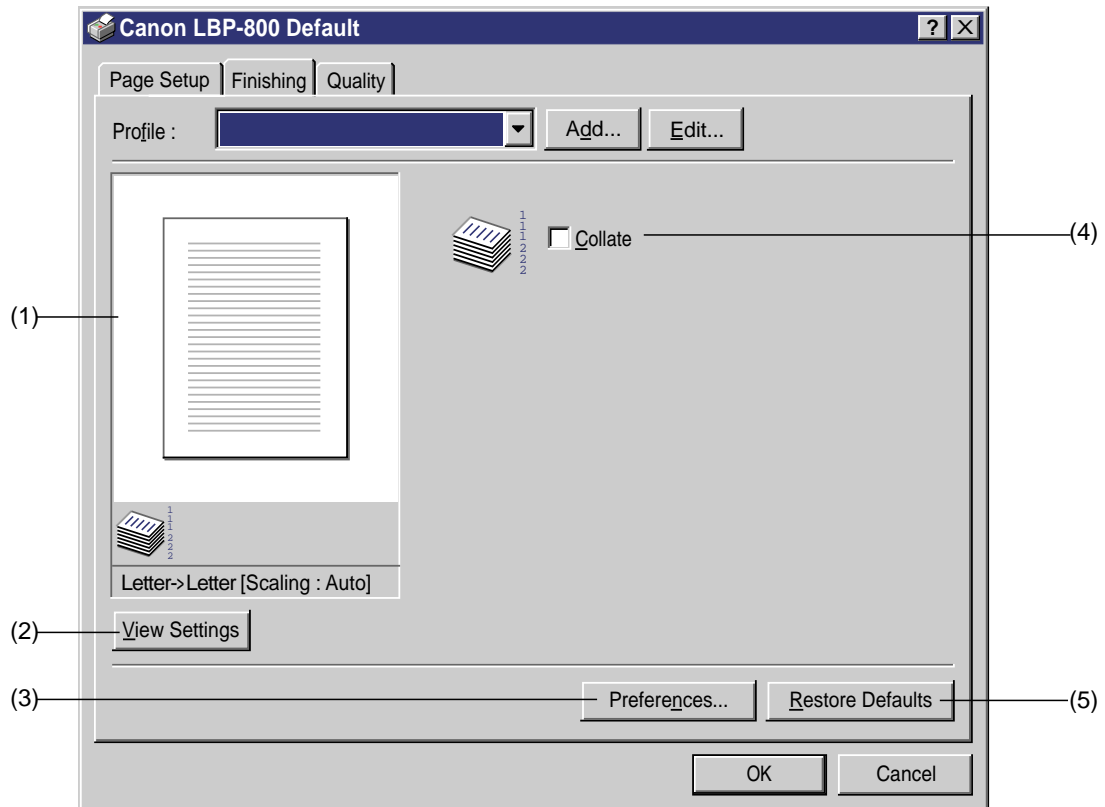


Figure 1-7-23.

- (1) **Preview** : Displays the Preview.
- (2) **View Settings** : Opens the View Settings dialog box.
- (3) **Preferences** : Opens the Preferences dialog box.
- (4) **Restore Defaults** : Resets the value in the Page Setup dialog to the default value.
- (5) **Collate** : Specifies either to print, in collate or page.

◆ **Preferences Dialog Box**

The preference dialog sets the printing environment. It can be opened by clicking the Preferences button in the Finishing dialog box.

The Preferences dialog box is shown in Figure 1-7-24.

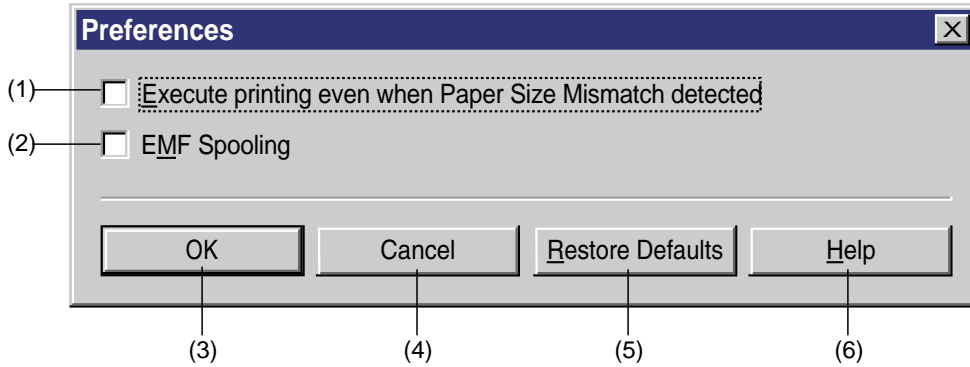


Figure 1-7-24

- (1) **Execute printing even when Paper Size Mismatch detected** : When the existing paper size differs from the paper size specified by the printer driver, you can specify either, to continue printing it, ignoring the difference of the paper sizes, or to require the user to change the paper.
- (2) **EMF Spooling** : Specifies the Spool file format.
- (3) **OK** : Changes the items in the dialog and closes the box.
- (4) **Cancel** : Closes this dialog box without changing its items.
- (5) **Restore Defaults** : Resets the value in the Preference dialog box to the default value.
- (6) **Help** : Open the Help topics.

● Quality Tab

The Quality tab sets items relating to printing image. It can be opened by clicking the Quality tab in the Document Defaults dialog box.

The Quality tab is shown in Figure 1-7-25.

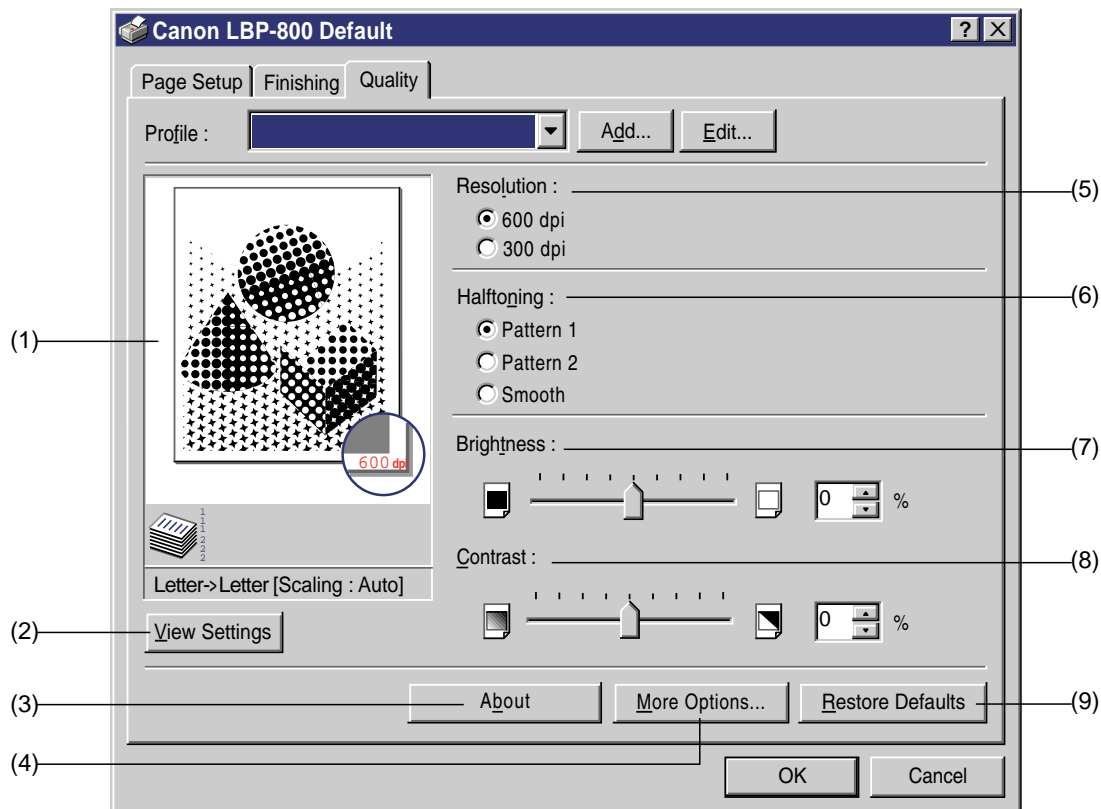


Figure 1-7-25

- (1) **Preview** : Displays the Preview.
- (2) **View Settings** : Opens the View Settings dialog box.
- (3) **About** : Opens the About dialog box.
- (4) **More Options** : Opens the More Options dialog box.
- (5) **Resolution** : Specifies the Resolution.
- (6) **Halftoning** : Specifies the Halftoning form.
- (7) **Brightness** : Adjusts -80 % to 80 % of brightness.
- (8) **Contrast** : Adjusts -80 % to 80 % of contrast.
- (9) **Restore Defaults** : Resets the value in the Quality tab to the default value.

◆ **More Options Dialog Box**

The more Options Dialog box sets the printing environment. The More Options dialog box can be opened by clicking the More Options dialog box in the Quality dialog box.

The More Options dialog box is shown in Figure 1-7-26.

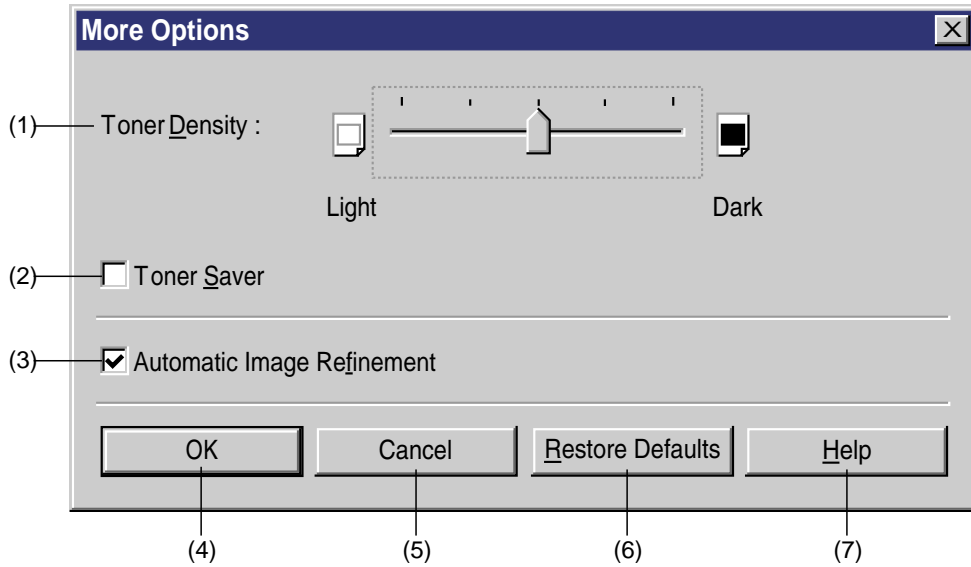


Figure 1-7-26

- (1) **Toner Density** : Specifies the Toner Density in 5 levels.
- (2) **Toner Saver** : Specifies whether or not to use the Toner Saver mode.
- (3) **Automatic Image Refinement** : Specifies whether or not to use the Super Smoothing.
- (4) **OK** : Changes the items in this dialog and closes the box.
- (5) **Cancel** : Closes the box without changing its items.
- (6) **Restore Defaults** : Resets the values in the More Options dialog to the default values.
- (7) **Help** : Opens the Help topics.

c. Status Window

The Status Window is an application designed exclusively for CAPT. It displays printing job status of the printer with a progress bar and graphic animation. You can also use the Status Window for setting items frequently used for printers.

The Printer Status Window opens when:

- You double-click on the LBP-800 Status Window icon in the CAPT group.
- You click the left mouse button on the icon registered in the Indicator area of the task bar.
- An error has occurred, or operation by the user is required.
- You print while selecting the Display Printer Status Window while Printing in the Status Option dialog box of the Status Window (See Page 1-44.)
- You quit the Windows while the Status Window is open, and then restart the Windows.

The Printer Status Window dialog box is shown in Figure 1-7-27.

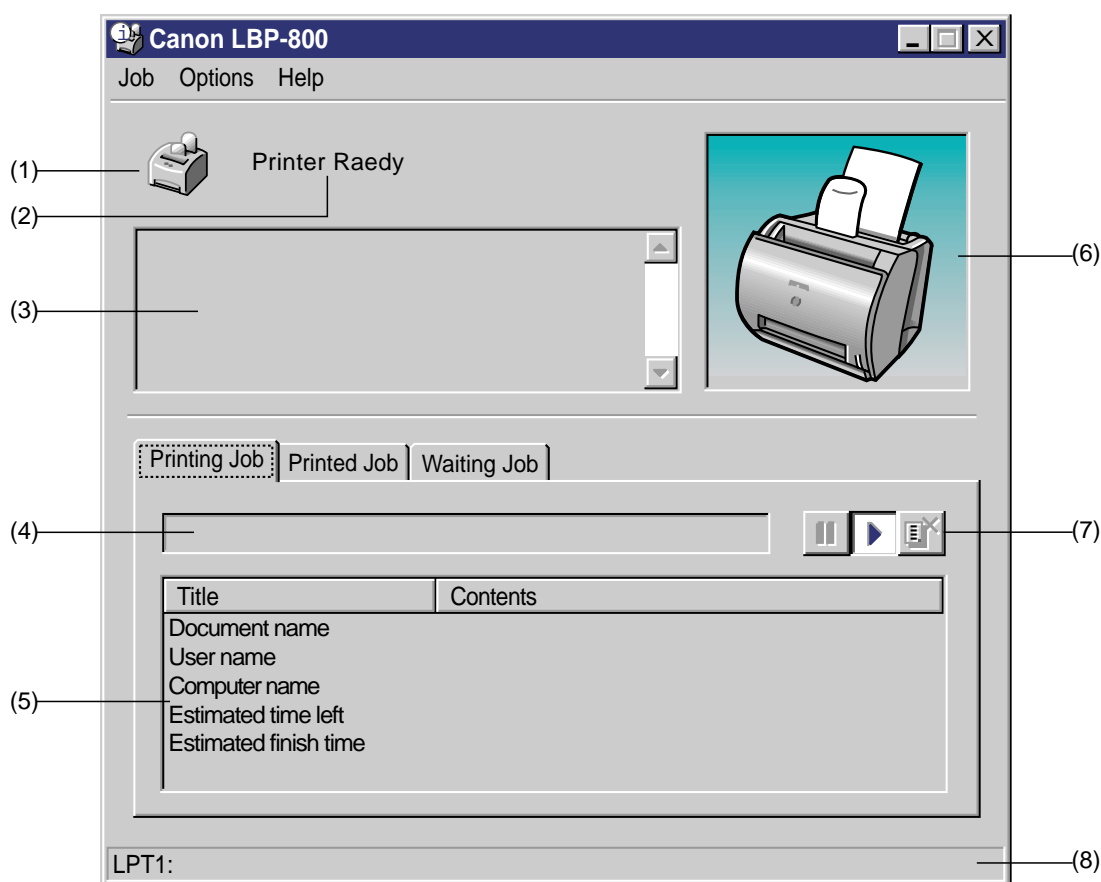


Figure 1-7-27

- (1) **Icon** : Displays 5 icons according to the situation.
- (2) **Message area** : Displays brief messages indicating the printer status.
- (3) **Error message area** : Displays error status and action procedures, when an error has occurred.
- (4) **Progress bar** : Displays the progress of an ongoing printing job.
- (5) **Job Information area** : Displays information of an ongoing printing job.
- (6) **Animation area** : Indicates the printer status by animation. The background colors of Animation area indicate the following status:
 Blue; Indicates regular condition. Orange; Requires some action by the user.
 Red; Gives warning.

- (7) **Tool bar** : Consists of 3 buttons; the Pause Job button, Resume job button and Delete job button.
- (8) **Status bar** : Displays the printer port to which the printer is connected. When performing a menu operation, it displays the status relating to its menu.

• Options menu

The Options menu sets the status options and ports, and prints a cleaning page.

The Option menu is shown on Figure 1-7-28.

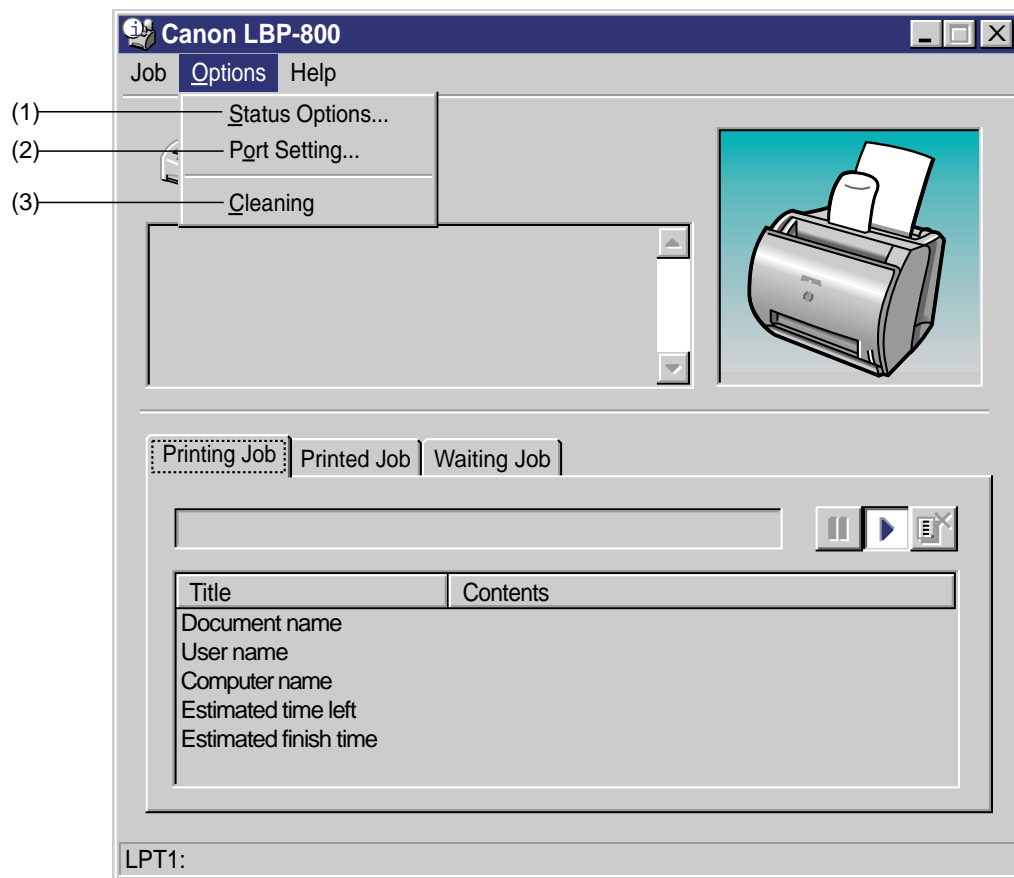


Figure 1-7-28

(1) Status Options : Opens the Status Options dialog box.

(2) Port Setting : Opens the Port Setting dialog box.

(3) Cleaning : Prints a cleaning page (Refer to Chapter 2 on Page 2-15.)

◆ **Status Options Dialog Box**

The Status Options dialog box displays the Status Window, and sets the items in the Voice messages. It can be opened by selecting the Status Options command in the Options menu of the Status Window.

The Status Options dialog box is shown in Figure 1-7-29.

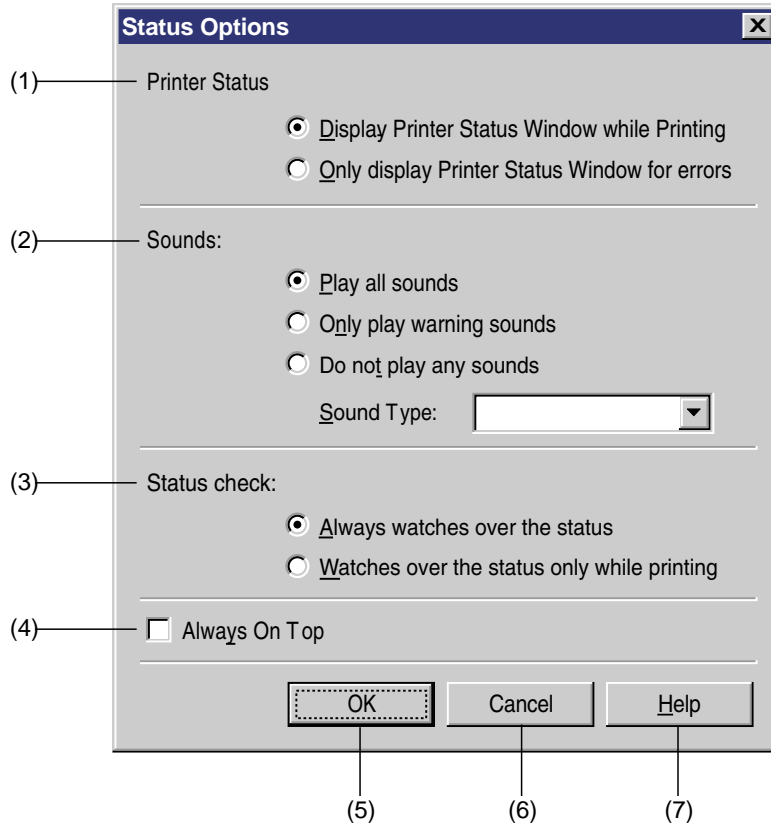


Figure 1-7-29

- (1) Printer Status group :** Sets the status window display mode.
- (2) Sounds group :** Sets sound. It provides print status or error-related information by sound. (Only when the sound file is installed and the status window is open by bi-directional communication.)
- (3) Status check group :** Selects either to check the printer status, regularly or only during printing.
- (4) Always On Top :** Displays the Status Window on top on the screen when checked.
- (5) OK :** Changes the items in this dialog box and closes the box.
- (6) Cancel :** Closes the dialog box without changing its items.
- (7) Help :** Opens the Help topics.

◆ Port Setting Dialog Box

The Port Setting dialog box sets the Port(s). The Port Setting dialog box can be opened by selecting the Port Setting command in the Option menu of the Status Window.

It can be opened only when the printer is connected to the local parallel port.

The Port Setting dialog box is shown in Figure 1-7-30.

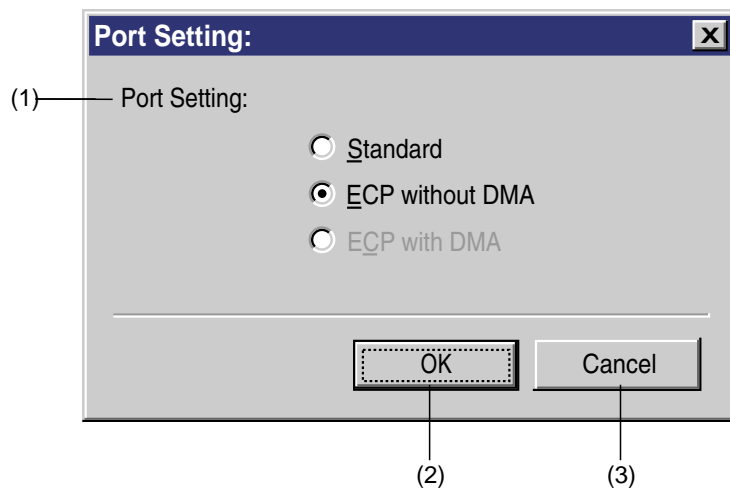


Figure 1-7-30

(1) Port Setting : Sets the Port(s).

(2) OK : Changes the items and closes the dialog box.

(3) Cancel : Closes the dialog box without changing its items.

3. Trouble Shooter

When troubles occur in the printer, the Trouble Shooter checks the Microsoft Windows NT configuration settings. If errors are found, the Trouble Shooter reports the errors to the user, and self-corrects if possible.

The Trouble Shooter cannot detect problems regarding the hardware such as printer cable and parallel port failure. It does not operate on the Network client PC.

<Starting the Trouble Shooter>

To start Trouble Shooter, double-click on the Canon LBP-800 Trouble Shooter icon in the Windows Printing System group.

◆ Trouble Shooter Dialog Box (starting-up)

The following dialog box appears when the Trouble Shooter is started.

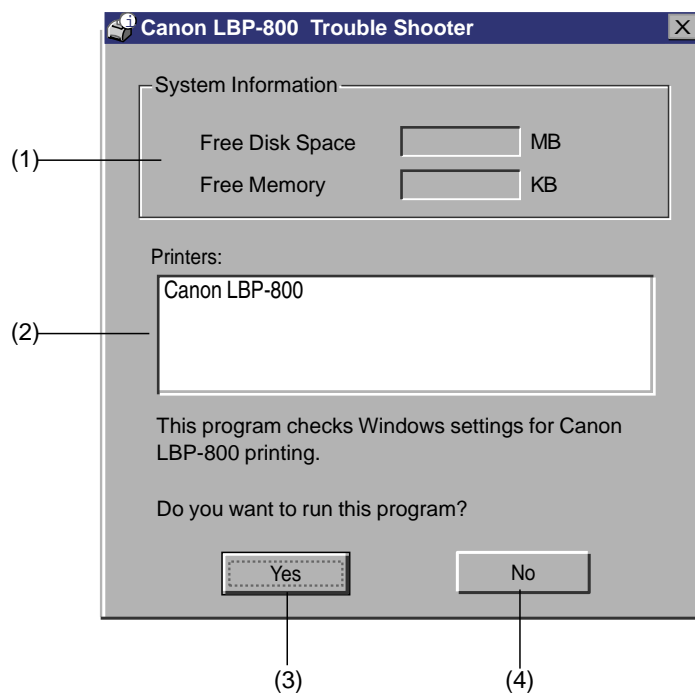


Figure 1-7-31

- (1) **System Information** : Displays the system information of the PC (Free Disk Space and Free Memory.)
- (2) **Printers** : Selects the printer that performs the Trouble Shooter.
- (3) **Yes** : Executes the Trouble Shooter.
- (4) **No** : Exits the Trouble Shooter.

When the Trouble Shooter is executed by clicking the Yes button, it checks the items below.

Checks the Local

- Displays the free disk and free memory.
- Checks the installed files.
- Checks the selected ports.
- Checks the registry.
- Checks the RapidPort communication device driver (only Microsoft Windows NT.)
- Checks the language monitor.
- Checks the printer driver.
- Checks the Status Window.
- Checks each item of the Printer Property.
- Checks the Program Folder.

Checks the Network

- Checks the Network server.
- Checks the network printer.
- Checks the reconnection of the port (only Microsoft Windows 95/98.)

The Trouble Shooter displays an error message with available information when it encounters a problem. Make sure to solve problems and perform the necessary procedures as required.

<Exiting the Trouble Shooter>

The dialog box below will be displayed when you exit the Trouble Shooter.

◆ **Trouble Shooter Dialog Box (exiting)**

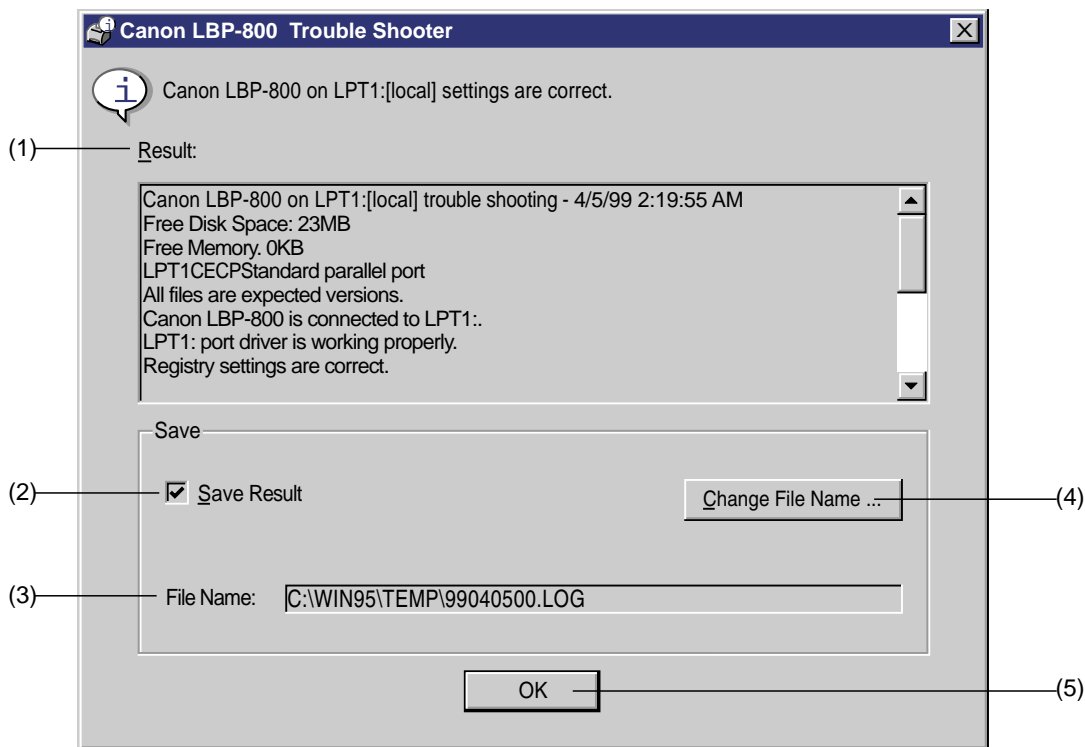


Figure 1-7-32

- (1) **Result** : Displays the details of the Result.
- (2) **Save Result** : Save the items in the Result.
- (3) **File Name** : Displays the path name that saves the Result.
- (4) **Change File Name** : Opens the File Save dialog box of the Windows standard.
- (5) **OK** : Exits the Trouble Shooter.

If problems remain, uninstall CAPT and reinstall it after rebooting the PC.

C. Microsoft Windows 95/98

1. Installation of CAPT

A Canon Advanced Printing System disk is packed with this printer. Types and contents are as follows:

Types

- A 5 inch CD-ROM disk

Contents

- CAPT driver
- Language monitor
- Status window
- Parallel port driver
- Installer
- CD-ROM menu
- Uninstaller
- Trouble shooter
- On-line help
- On-line manual
- Voice messages

a. Operating Environment

The following environment is required to install CAPT.

● PC hardware

This printer supports an IBM-PC or its compatible machine. Operation conditions are shown below:

<Minimum Operating Environment>

- CPU: Pentium or above
- RAM: 16 MB or above
- Available disk space: 15 MB or above
- Printer port: Standard Centronics parallel port
- CD-ROM drive
- Sound: PCM sound module is required to use the sound.
- Monitor size: 640 x 480 or above, 16 colors or above
- Network: 10 Base-T or 100 Base-TX is required to use the network adapter.

<Recommended Operating Environment>

- CPU: MMX Pentium 200 MHz or above
- RAM: 24 MB or above

● OS software

This printer operates on Microsoft Windows 95/98.

This printer does not operate on other OSs, such as Windows NT3.x, Windows for Workgroups, Windows CE and Windows on OS/2. In general, Windows language and the language of this printer must match.

● Printer Cable

- Use a bi-directional 8-bit parallel interface cable for IBM-PC.
- Connections through the printer selector and printer buffer are not supported.

b. Installation Procedures

● Connecting the printer as a local server

This section describes how to install CAPT for using this printer as a local printer. Install it by following the procedures below.

For details, see the User's Manual packed with this printer.

1. Switch on the PC to which the printer is connected to start up Microsoft Windows 95/98.
2. Perform one of the following methods to start up Add Printer Wizard.
 - Start button / Settings / Printers / Printers folder / Open the Add Printer.
 - My Computer / Printers folder / Open the Add Printer.
 - Explorer / Desktop / My Computer / Printers / Open the Add Printer.
3. Add Printer Wizard (Initial screen)

Select either to use this printer, as a local printer or network printer. The following procedures describe the installation for using the printer as a local printer by selecting the Local Printer. For using the printer as a network printer, see Page 1-51 for details.
4. Add Printer Wizard (Printer selection 1)

Insert the CD-ROM into the PC, and click on the Have Disk button to open the Install From Disk screen.

Enter the name of the CD-ROM drive to the Copy manufacture's files from text box, and click the Browse button.
5. Add Printer Wizard (Printer selection 2)

When the name of this printer appears in the Printers list box, confirm that it is selected, and then click the Next button. When you want to change the printer to be installed, click the Have Disk button to reselect the INF file.
6. Add Printer Wizard (Overwrite selection)

This window appears only when the same driver has already been installed. Select whether or not the existing driver is to be overwritten by a newly installed driver.
7. Add Printer Wizard (Port selection)

Select the port to which the printer is connected.

Click on the Configure Port button to open the Configure LPT Port dialog box, and check the Spool MS-DOS print jobs check box.
8. Add Printer Wizard (Printer name change)

Enter the name of this printer to the Printer Name text box. Select whether or not the printer is to be a default printer.
9. Add Printer Wizard (Test Page Printing Selection)

Select whether or not to print a test page after you have finished installing CAPT.
10. Coping Files

When the installation begins, the Coping Files dialog box appears.
11. End of installation

Click on the OK button to finish the installation. If you have selected to print a test page after installation, confirm that the installation has completed by printing a test page.

● Connecting to a network printer

Follow the procedures described in this section to perform the installation on a client PC when you want to designate the PC to which the printer is connected as a network print server, and to use the printer as a network printer.

For details, see the User's Manual packed with this printer.

Note: Precondition for starting the installation

- CAPT should be installed properly in the print server to which the client PC is to be connected, and the printer should be designated as a shared printer. See the Microsoft Windows 95/98 User's Guide for information on how to designate the printer as shared printer.
 - The client must have the access privileges to connect to the print server and the shared printer.
-

1. Switch on the client PC to start up Microsoft Windows 95/98 and log in.
2. Use one of the following methods to start up the Add Printer Wizard.
 - Start button / Settings / Printers / Printers folder / Open the Add Printer.
 - My computer / Printers folder / Open the Add Printer.
 - Explorer / Desktop / My computer / Printers / Open the Add Printer.
3. Add Printer Wizard (Initial screen)

Select either to use this printer, as a local printer or network printer. The following procedures describe the installation for using the printer as a network printer by selecting the Network Printer. For using the printer as a local printer, see Page 1-50 for details.
4. Connect to Printer

Click on the Browse button to open the Browse for Printer dialog box, and select the Network printer queue to the printer you are to connect. Click on the OK button to connect to the selected network printer.

If the connection could not be made, the Connect to Printer dialog box (printer connecting failure) will be indicated.
5. End of Installation

Click the OK button to finish the installation.

2. CAPT operation

CAPT sets printing environment by using the Property dialog box.

The list of the printing environment in the CAPT dialog box is shown on Page 1-63. Main dialogs in CAPT are described below.

a. Printer Properties

- How to open the printer properties

The printer properties can be opened by the following methods.

From the Microsoft Windows desktop

1) Use one of the following methods to open the Printers folder.

- Start Button / Settings / Printers
- Control Panel / Printers

2) Open the printer to which you want to connect from the Printers folder.

- Click the right mouse button on the Canon LBP-800 icon to select the Properties.
- Double-click on the Canon LBP-800 icon to open the Canon LBP-800 print queue window, and select the Properties in the Printer menu.

From the Microsoft Windows applications

How to open the Printer Properties varies in each application. See the application manual.

From the Microsoft Windows Shortcut

- To create a shortcut, open the Printers folder, drag the Canon LBP-800 icon to the desktop pressing the CTPL key, (See the Microsoft Windows 95/98 User's Guide for details.) Double-click on the shortcut icon to open the printer window and select the Properties in the Printer menu.

The Property dialog consists of tabs based on the Microsoft Windows 95/98 user interface model.

In the Property, following 2 types of tabs are consisted:

- Common tabs used in all the Property; General, Details, and Sharing
- Specified tabs used only in the printer driver; Page Setup, Finishing and Quality

To open the tab and make settings, you can click on each tab or move the focus and then press right or left cursor.

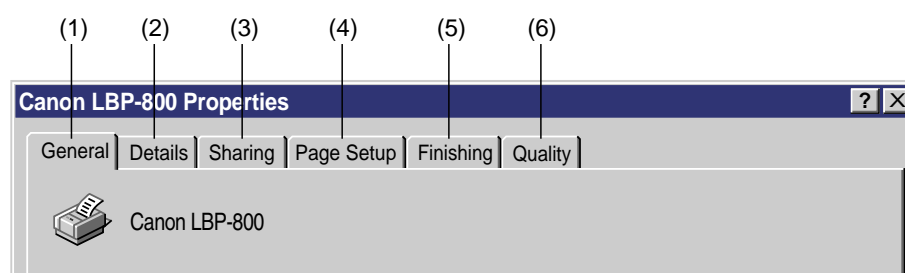


Figure 1-7-33

- (1) General** : Sets the Page separator output and executes a test print.
- (2) Details** : Sets the printer port, printer driver and time out.
- (3) Sharing** : Sets the sharing of the printer.
- (4) Page Setup** : Sets items frequently used in general printing.
- (5) Finishing** : Selects whether or not to perform printing in collate.
- (6) Quality** : Sets items for the image.

To store the items set in each tab, click the OK button and close the Print Properties dialog box. To close the box without storing the items set in each tab, click the Cancel button.

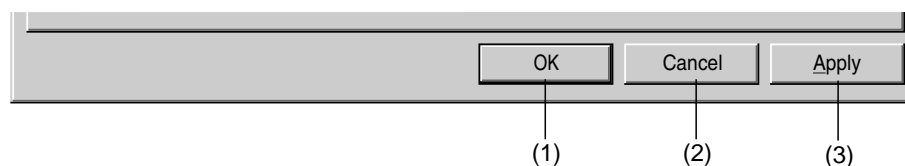


Figure 1-7-34

- (1) OK** : Changes the items in this dialog box and closes the box.
- (2) Cancel** : Closes this dialog box without changing its items.
- (3) Apply** : Changes the items and continues the Property dialog.

Details of each tab are described below. For operation and displays of the common tabs (General, Details, and Sharing), see the Microsoft Windows 95/98 User's Guide.

● **Page Setup tab**

Use this tab to set items frequently used in general printing. The Page Setup tab can be opened by clicking the Page Setup tab in the Properties dialog box.

The Page Setup tab is shown in Figure 1-7-35.

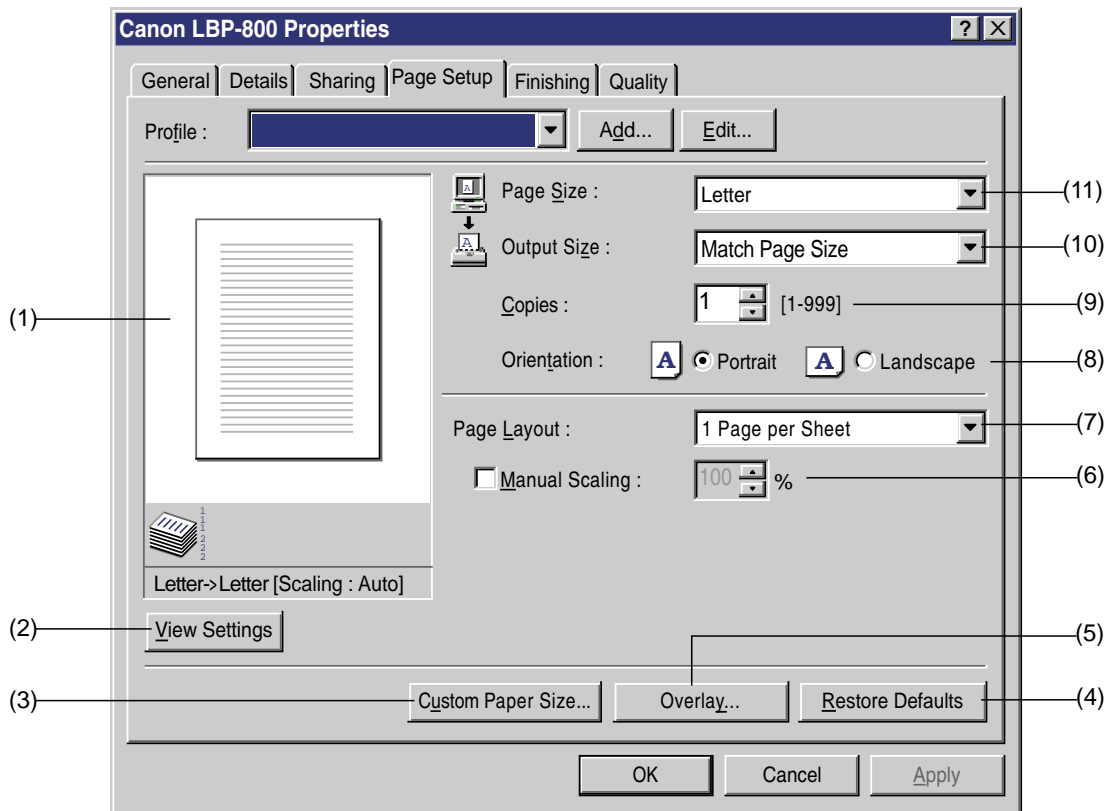


Figure 1-7-35

- (1) **Preview** : Displays the preview.
- (2) **View Settings** : Opens the View Setting dialog (See Page 1-35.)
- (3) **Custom Paper Size** : Sets user defined paper.
- (4) **Restore Defaults** : Resets the values in the Page Setup tab to the default values.
- (5) **Overlay** : Opens the Overlay dialog (See Page 1-36.)
- (6) **Manual Scaling** : Specifies the reproduction ratio of the Page Size.
- (7) **Page Layout** : Specifies the number of page printed per print sheet. When you specify the 2/4/8/9 Pages per Sheet, the Manual Scaling will disappear and Page Order will be displayed.
- (8) **Orientation** : Sets the printing orientation.
- (9) **Copies** : Sets the number of printing.
- (10) **Output Size** : Sets the paper size (Physically)
- (11) **Page Size** : Sets the paper size (Theoretically)

◆ Custom Paper Size Dialog Box

The Custom Paper Size dialog sets user defined paper. The Paper Size dialog box can be opened by clicking on the Custom Paper Size button in the Page Setup dialog box.

The Custom Paper Size dialog box is shown on Figure 1-7-36.

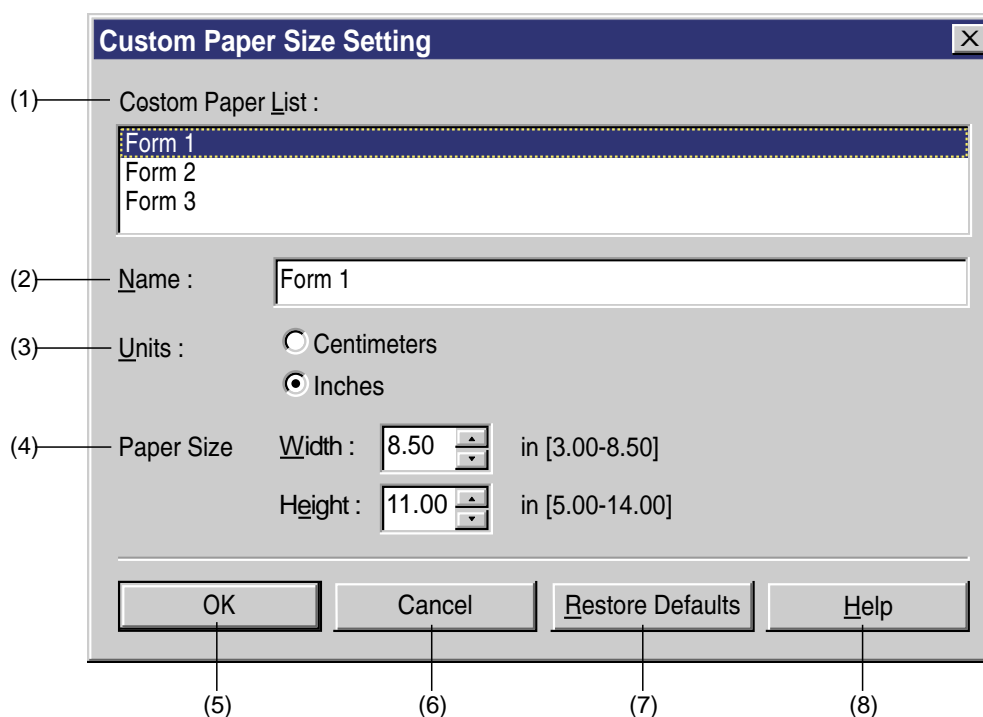


Figure 1-7-36

- (1) Custom Paper List :** Selects user defined paper.
- (2) Name :** Specifies the name of user defined paper.
- (3) Units :** Specifies the unit of user defined paper.
- (4) Page Size :** Specifies the size of user defined paper according to the unit selected in the Units.
- (5) OK :** Changes the items in the Custom Paper Size dialog box, and closes the box.
- (6) Cancel :** Closes the box without changing its items.
- (7) Restore Defaults :** Resets the values in the Custom Paper Size dialog box to the default values.
- (8) Help :** Open the Help topics.

● **Finishing Tab**

The Finishing tab specifies either to print, in collate or page. The Finishing tab can be opened by clicking on the Finishing tab in the Properties dialog box.

The Finishing tab is shown in Figure 1-7-37.

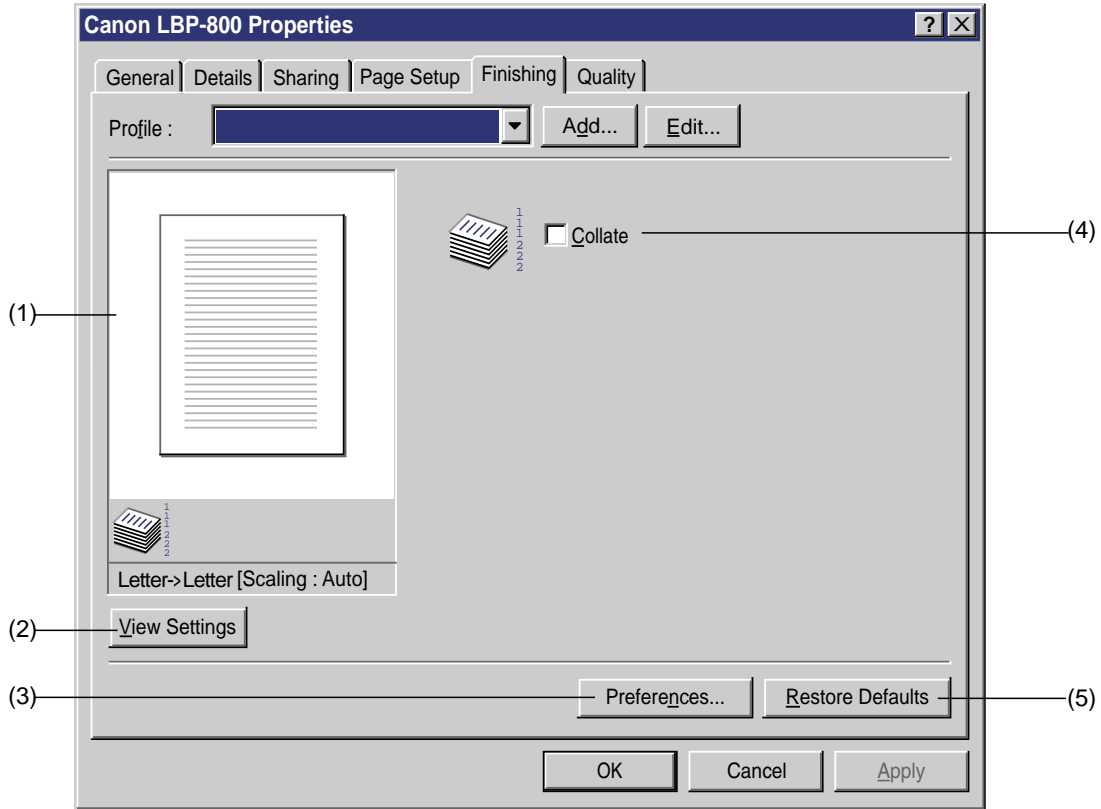


Figure 1-7-37

- (1) **Preview** : Displays the Preview.
- (2) **View Settings** : Opens the View Settings dialog box.
- (3) **Preferences** : Opens the Preference dialog box.
- (4) **Restore Defaults** : Resets the values in the Page Setup dialog box to the default values.
- (5) **Collate** : Specifies either to print, in collate or page.

◆ Preferences Dialog Box

The Preferences dialog box sets the printing environment. It can be opened by clicking the Preferences button in the Finishing dialog box.

The Preferences dialog box is shown in Figure 1-7-38.

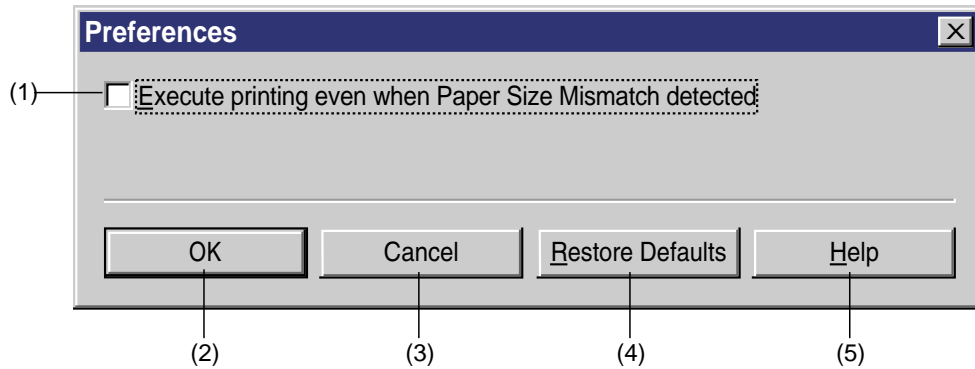


Figure 1-7-38

- (1) Execute printing even when Paper Size Mismatch detected :** When the existing paper size differs from the paper size specified by the printer driver, you can specify either, to continue printing it, ignoring the difference of the paper sizes, or to require the user to change the paper.
- (2) OK :** Changing the items in the dialog and closes the box.
- (3) Cancel :** Closes this dialog box without changing its items.
- (4) Restore Defaults :** Resets the values in the Preferences dialog box to the default values.
- (5) Help :** Open the Help topics.

● **Quality Tab**

The Quality tab sets items for printing image. It can be opened by clicking the Quality tab in the Properties dialog box.

The Quality tab is shown in Figure 1-7-39.

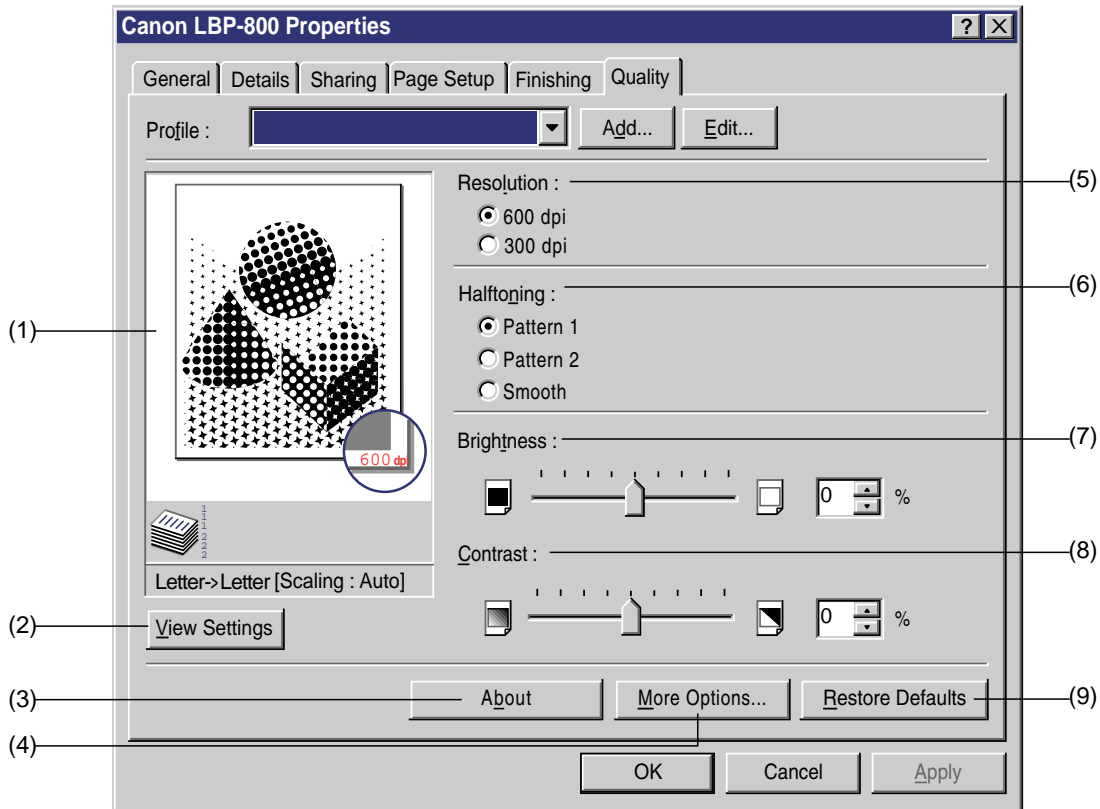


Figure 1-7-39

- (1) **Preview** : Displays the Preview.
- (2) **View Settings** : Opens the View Settings dialog box.
- (3) **About** : Opens the About dialog box.
- (4) **More Options** : Opens the More Options dialog box (See Page 1-40.)
- (5) **Resolution** : Specifies the Resolution.
- (6) **Halftoning** : Specifies the Halftone form.
- (7) **Brightness** : Adjusts -80 % to 80 % of brightness.
- (8) **Contrast** : Adjusts -80 % to 80 % of contrast.
- (9) **Restore Defaults** : Resets the values in the Quality tab to the default values.

3. Trouble Shooter

When troubles occur in the printer, the Trouble Shooter checks the Microsoft Windows 95/98 configuration settings. If errors are found, the Trouble Shooter reports the errors to the user, and self-corrects if possible.

The Trouble Shooter cannot detect problems regarding the hardware such as printer cable and parallel port failure. It does not operate on the Network client PC.

For details, refer to Page 1-46 to 1-48.

D. Printing Environment Setting and Test Printing

1. Microsoft Windows NT4.0

a. Printing Environment Setting

A list of printing environment that can be set from the CAPT dialog box is shown below.

Note: The values in bold are the default values at the time of shipment from the factory.

Table 1-7-1

• Document Defaults

Page Setup tab

Setup item	Setup Value	
Paper Size*	Letter / Legal / A4 / Executive / Envelope DL / Envelope #10 / Envelope C5 / Envelope Monarch / B5 / Index Card / Custom	
Output Size	Match Page Size / Letter / Legal / A4 / Executive / Envelope DL / Envelope #10 / Envelope C5 / Envelope Monarch / B5 / Index Card / Custom	
Copies	1 ≤ X ≤ 999	
Orientation	Portrait / Landscape	
Page Layout	1 Page per Sheet / 2 Pages per Sheet / 4 Pages per Sheet, 8 Pages per Sheet / 9 Pages per Sheet	
Manual Scaling	10% ≤ 100 ≤ 200%	
Page Order	2 Pages per Sheet/Portrait	Left to Right / Right to Left
	2 Pages per Sheet/Landscape	Top to Bottom / Bottom to Top
	4, 8, 9 Pages per Sheet	Across from Left / Down from Left Across from Right / Down from Right

* Default value is Letter size for USA and A4 size for other countries.

Quality tab

Setup item	Setup Value
Resolution	600dpi / 300dpi
Half-toning	Pattern 1 / Pattern 2 / Smooth
Brightness	-80% ≤ 0 ≤ 80%
Contrast	-80% ≤ 0 ≤ 80%

Overlay tab

Setup item	Setup Value	
Overlay Placement	Background / Foreground	
Position*	Left	0 < X < 34.00cm
	Top	0 < X < 34.00cm
Size**	Width	0 < X < 34.00cm
	Height	0 < X < 34.00cm
Unit***	Centimeters / Inches	

* Default value is the center of the paper.

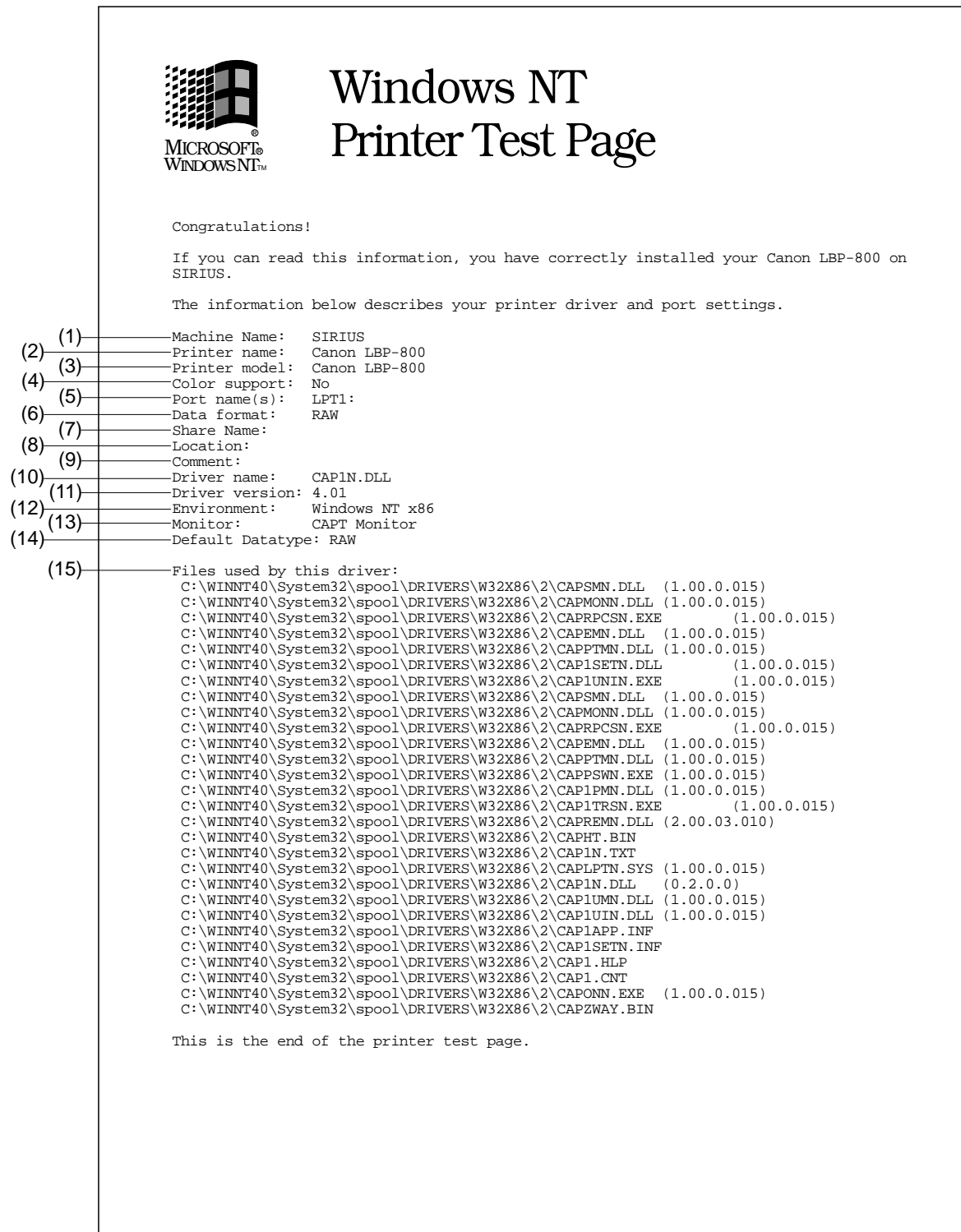
** Default value is that of file.

*** Default value is in Inch for USA and in Centimeter for other countries.

b. Test Printing (1 page)

This test page is supported by Microsoft Windows NT4.0 as a standard function, and also by this printer.

For details, see "Contents of Test Page."



Contents of Test Page

- (1) **Machine Name:** Name of the computer specified when Microsoft Windows NT was installed.
- (2) **Printer name:** Name of the printer driver specified when the printer was installed (normally "Canon LBP-800.")
- (3) **Printer model:** Name of the printer (in case of this printer "Canon LBP-800.")
- (4) **Color support:** Whether or not color printing is supported (in case of this printer, "No.")
- (5) **Port name(s):** Name of the port to which the printer is connected.
- (6) **Data format:** Selected spool data format.
- (7) **Share Name:** Share Name when printing via a network.
- (8) **Location:** Information for the location of the printer. Set it with the General tab.
- (9) **Comment:** Information for the comments of the printer. Set it with the General tab.
- (10) **Driver name:** File name of the graphics driver.
- (11) **Driver version:** Version information of the driver.
- (12) **Environment:** Information on the OS and CPU (In case of this printer "Windows x86.")
- (13) **Monitor:** Name of the language monitor.
- (14) **Default Datatype:** Default value of the spool data format.
- (15) **Files used by this driver:** List of the files used by this printer driver.

Figure 1-7-40

2. Microsoft Windows 95/98
a. Printing Environment Setting

A list of printing environment that can be set from the CAPT dialog box is shown below.

Note: The values in bold are the default values at the time of shipment from the factory.

Table 1-7-2

• Properties

Page Setup tab

Setup item	Setup Value	
Paper Size*	Letter / Legal / A4 / Executive / Envelope DL / Envelope #10 / Envelope C5 / Envelope Monarch / B5 / Index Card / Custom	
Output Size	Match Page Size / Letter / Legal / A4 / Executive / Envelope DL / Envelope #10 / Envelope C5 / Envelope Monarch / B5 / Index Card / Custom	
Copies	1 ≤ X ≤ 999	
Orientation	Portrait / Landscape	
Page Layout	1 Page per Sheet / 2 Pages per Sheet / 4 Pages per Sheet, 8 Pages per Sheet / 9 Pages per Sheet	
Manual Scaling	10% ≤ 100 ≤ 200%	
Page Order	2 Pages per Sheet/Portrait	Left to Right / Right to Left
	2 Pages per Sheet/Landscape	Top to Bottom / Bottom to Top
	4, 8, 9 Pages per Sheet	Across from Left / Down from Left Across from Right / Down from Right

* Default value is Letter size for USA and A4 size for other countries.

Quality tab

Setup item	Setup Value
Resolution	600dpi / 300dpi
Half-toning	Pattern 1 / Pattern 2 / Smooth
Brightness	-80% ≤ 0 ≤ 80%
Contrast	-80% ≤ 0 ≤ 80%

Custom Paper Size Dialog

Setup item	Setup Value	
Units*	Centimeters / Inches	
Paper Sizes	Width	7.62cm ≤ 21.0 ≤ 21.59cm
	Height	12.7cm ≤ 29.7 ≤ 35.56cm

* Default value is in Inches for USA and in Centimeters for other countries.

Overlay tab

Setup item	Setup Value	
Overlay Placement	Background / Foreground	
Position*	Left	0 < X < 34.00cm
	Top	0 < X < 34.00cm
Size**	Width	0 < X < 34.00cm
	Height	0 < X < 34.00cm
Unit***	Centimeters / Inches	

* Default value is the center of the paper.

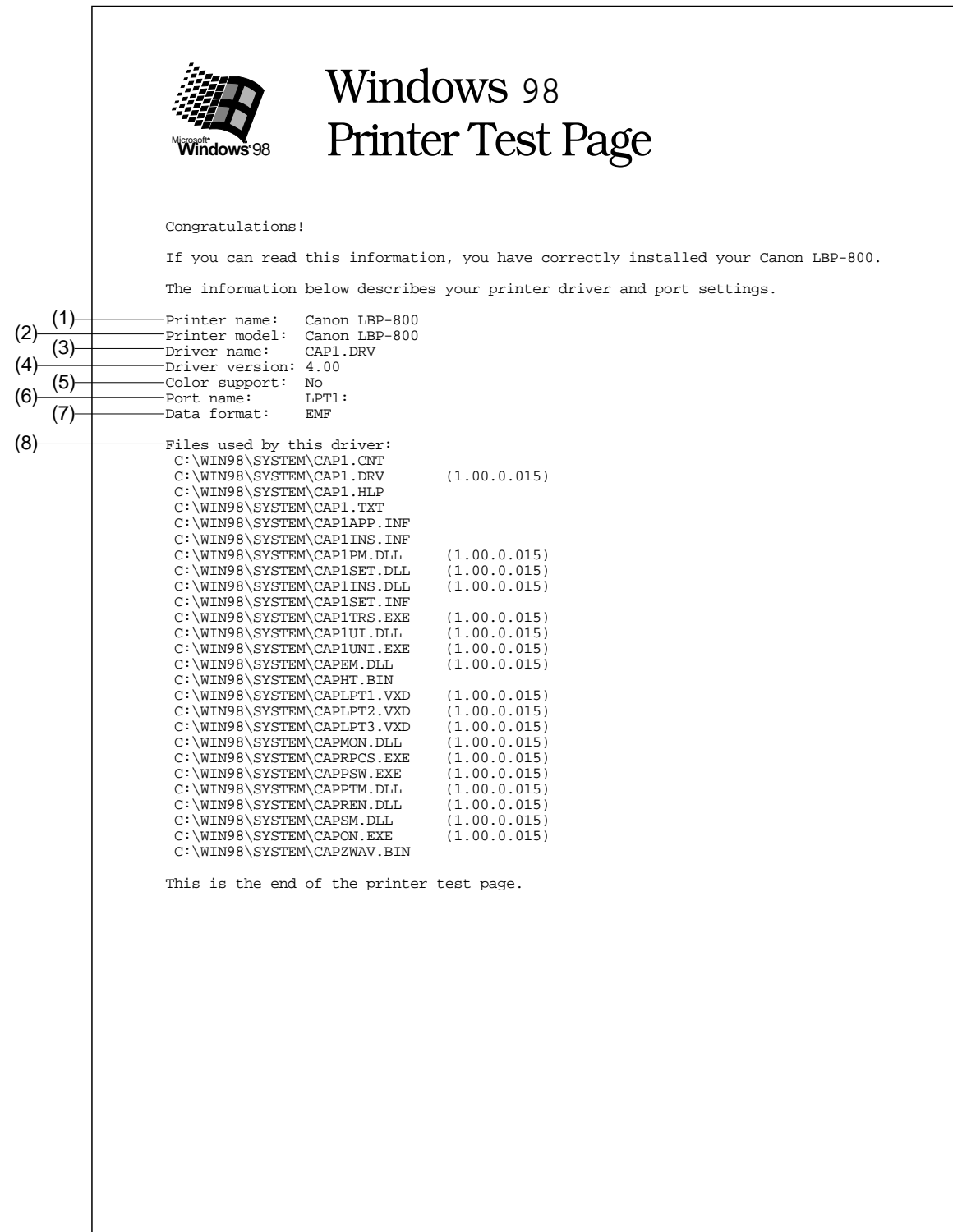
** Default value is that of file.

*** Default value is in Inch for USA and in Centimeter for other countries.

b. Test Printing (1 page)

This test page is supported by Microsoft Windows 95/98 as a standard function, and also by this printer.

For details, see "Contents of Test Page."





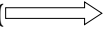
Contents of Test Page

- (1) **Printer name:** Name of the printer driver specified when the printer was installed (normally "Canon LBP-800.")
- (2) **Printer model:** Name of the printer (in case of this printer "Canon LBP-800.")
- (3) **Driver name:** File name of the graphics driver.
- (4) **Driver version:** Version information of the driver.
- (5) **Color support:** Whether or not color printing is supported (in case of this printer, "No.")
- (6) **Port name(s):** Name of the port to which the printer is connected.
- (7) **Data format:** Selected spool data format.
- (8) **Files used by this driver:** List of the files used by this printer driver.

Figure 1-7-41

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	2-1	IV. IMAGE FORMATION SYSTEM....	2-22
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I. BASIC OPERATION

A. Functions

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

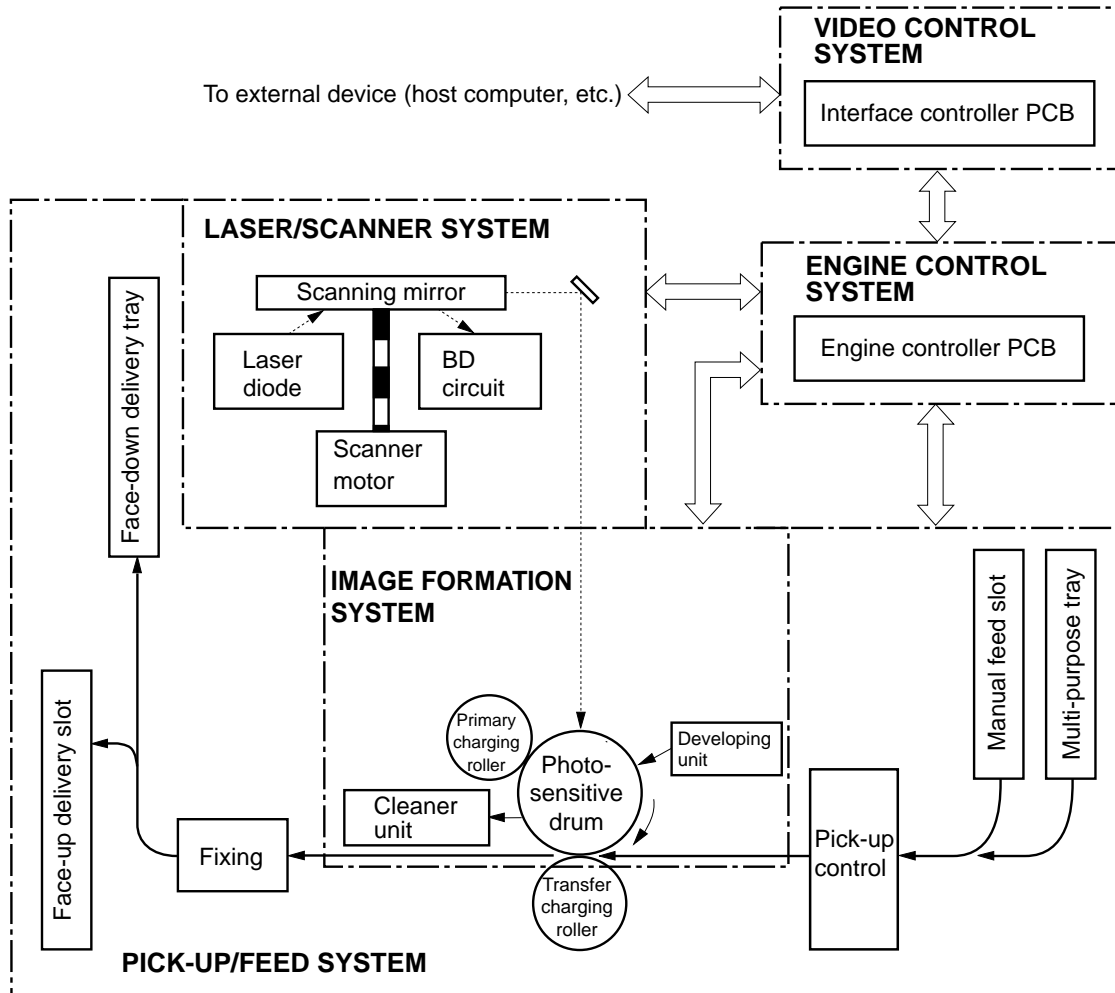


Figure 2-1-1

B. Basic Operation Sequence

The operation sequence of this printer is controlled by the microcomputer on the engine controller PCB. The purpose of each period from that the printer is turned ON until that the main motor stops rotating after completion of printing is stated below. Refer to the appendix for the detailed timing chart.

Table 2-1-1

Period		Purpose	Remarks
WAIT (WAIT period)	From power-ON until the end of the main motor initial rotation.	To clear the drum surface of potential and to clean the transfer charging roller.	Detects whether the cartridge is installed or not.
STBY (STANDBY)	From the end of the WAIT period or the LSTR period until the input of the pick-up command from the interface controller. Or, from the end of the LSTR period until power-OFF.	To keep the printer ready to print.	
INTR (INITIAL ROTATION period)	From the input of the pick-up command from the interface controller until the paper reaching the paper top sensor.	To stabilize the photosensitive drum sensitivity in preparation for printing. Also to clean the transfer charging roller.	
PRINT (Print)	From the end of the initial rotation until the primary voltage going OFF.	To form images on the photosensitive drum based on the VIDEO signals (/VDO, VDO) input from the interface controller and to transfer the toner image onto the paper.	
LSTR (LAST ROTATION period)	From the primary voltage going OFF until the main motor discontinue rotating.	To deliver the last page. Also to clean the transfer charging roller.	When the pick-up command is input from the interface controller, the printer enters the INTR period immediately after the end of the LSTR period.

C. Power-ON Sequence

The sequence from power-ON until the printer enters the STANDBY mode is as follows:

- 1) Power-ON
- 2) CPU initialization
- 3) Start of the video interface communication
0.5 seconds after the status command signal (/SC) turns "H", the video interface communication is ready for operation.
- 4) Paper jam detection and door open detection
Paper detection status of the sensors and door open are detected.
- 5) Fixing unit-ON
The fixing unit is driven for 0.5 seconds. The printer stops driving the fixing unit if the detected fixing unit temperature is 100°C or more.
- 6) Scanner motor initial rotation
- 7) Main motor initial rotation
- 8) High-voltage control
Presence or absence of the cartridge is detected after the primary high-voltage goes ON. The transfer charging roller is cleaned.
- 9) Failure/abnormality check
Scanner failure and fixing unit failure are detected.
- 10) Residual paper check
Residual paper is delivered automatically, if detected. When the delivery paper sensor detects paper, JAM is indicated.

II. ENGINE CONTROL SYSTEM

A. Engine Controller PCB

1. Outline

The operation sequence of the printer is controlled by the CPU on the engine controller PCB. When the printer is turned ON and enters the STANDBY mode, the CPU outputs signals to drive loads, such as the laser diode, motors, and solenoids, based on the pick-up command and image data input from the interface controller.

A block diagram of this circuit is shown below.

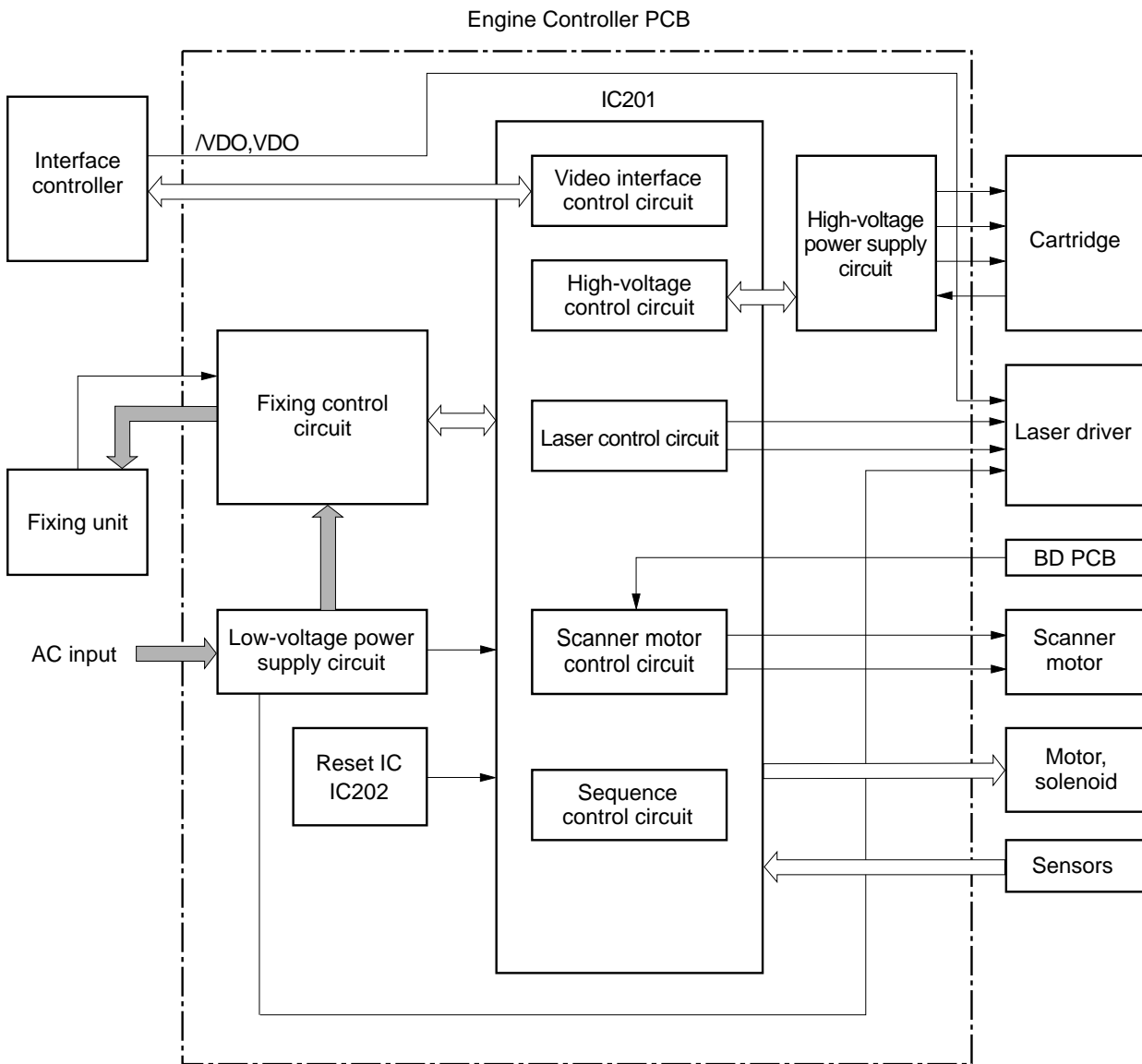


Figure 2-2-1

2. Operations**a. CPU (IC201)**

The CPU installed in this printer is an 8-bit single-chip microcomputer.

This CPU is a single-chip CPU with a built-in ROM and RAM and controls the following printer operations based on the control program stored in the ROM.

- 1) Printer sequence control
- 2) Video interface control
- 3) High-voltage power supply circuit control
- 4) Laser/scanner control
- 5) Sensor control
- 6) Control of loads such as motors, and solenoids

b. Reset IC (IC202)

IC202 monitors +3.3V and resets the CPU when the power is turned ON.

c. Fixing control circuit

See the section "B. Fixing control circuit" in this chapter.

d. High-voltage power supply circuit

See the section "C. High-voltage power supply circuit" in this chapter.

e. Low-voltage power supply circuit

See the section "D. Low-voltage power supply circuit" in this chapter.

3. Engine Controller Input/Output Signals

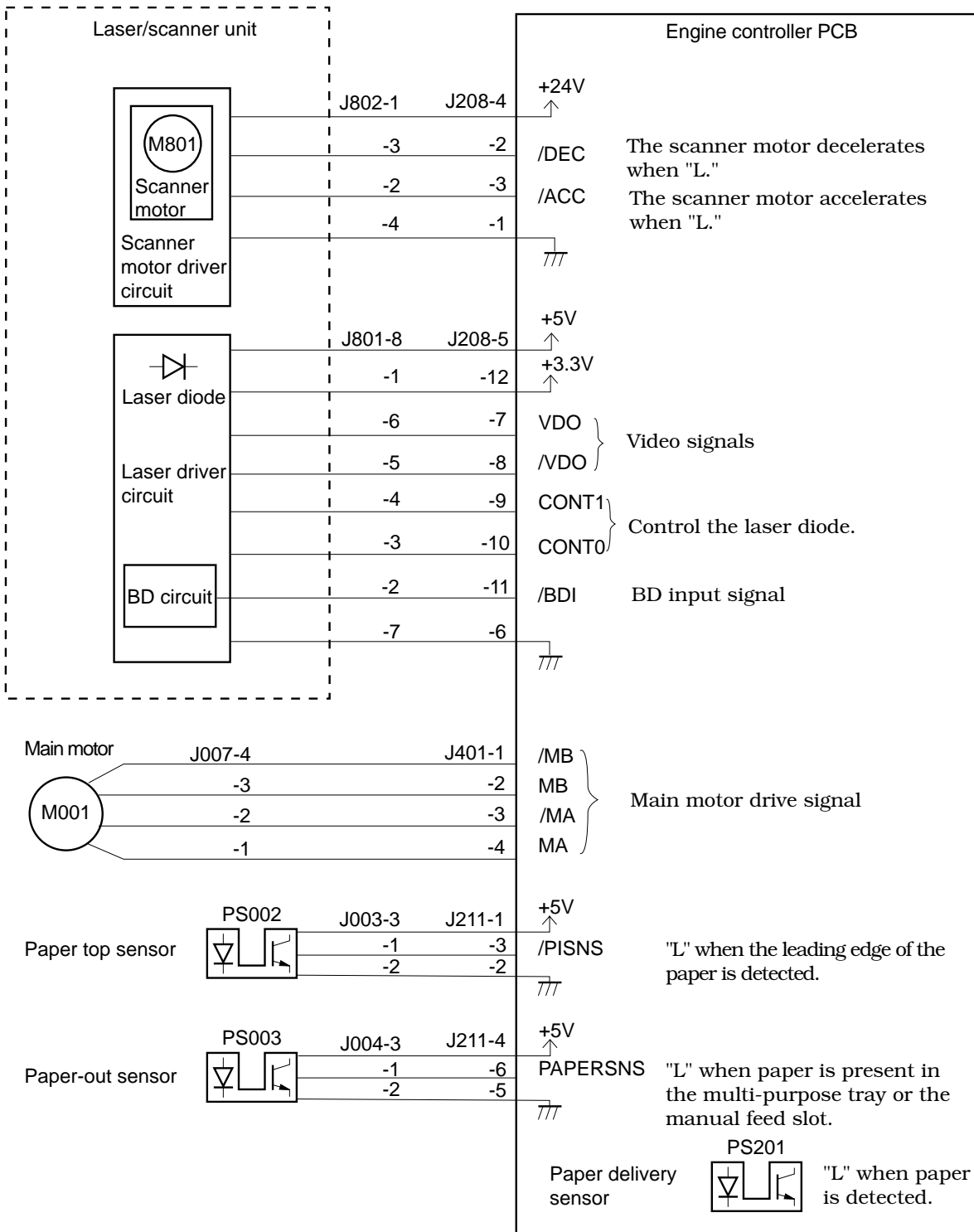


Figure 2-2-2

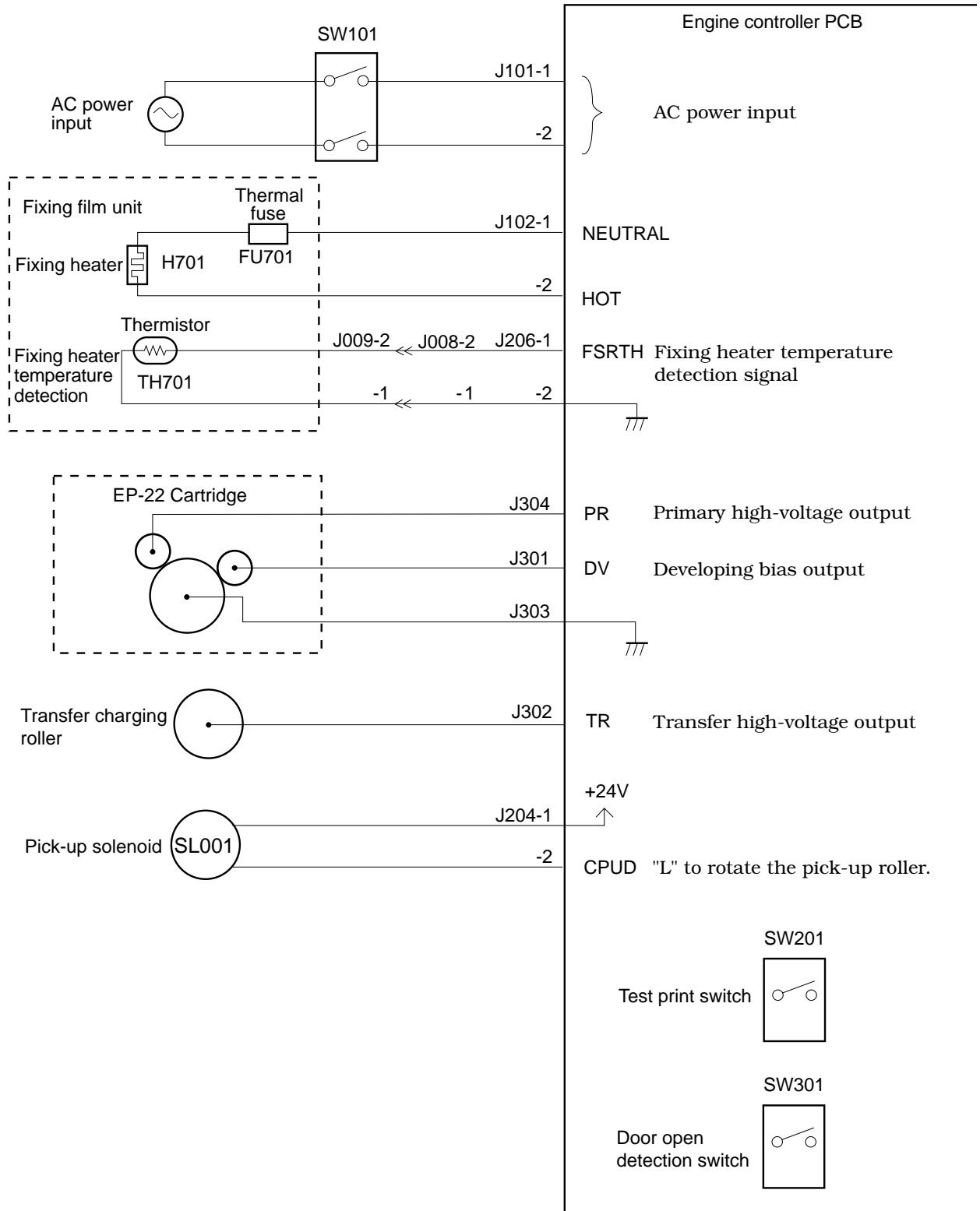


Figure 2-2-3

B. Fixing Control Circuit

1. Fixing temperature control

A plate-shaped fixing heater is installed in the fixing film unit to heat the fixing film.

The fixing heater temperature is detected by the thermistor (TH701) on the fixing heater. As the temperature of the fixing heater rises, the resistance of TH701 drops, and the voltage of the FIXING HEATER TEMPERATURE DETECTION signal (FSRTH) decreases.

The CPU (IC201) on the engine controller PCB outputs the FIXING HEATER DRIVE signal (FSRD) based on the FSRTH signal voltage to bring the fixing heater temperature within the specified value.

The fixing heater temperature is controlled in three modes:

- 1) Initial temperature control: The fixing heater temperature is increased to its normal target temperature value after the pick-up command is input to the engine controller.
- 2) Normal temperature control: The fixing heater temperature is controlled to be its normal target temperature value during printing.
- 3) Between-page temperature control: The fixing heater temperature is controlled at low temperature to prevent the temperature rise at the non-feeding areas between pages on the fixing film.

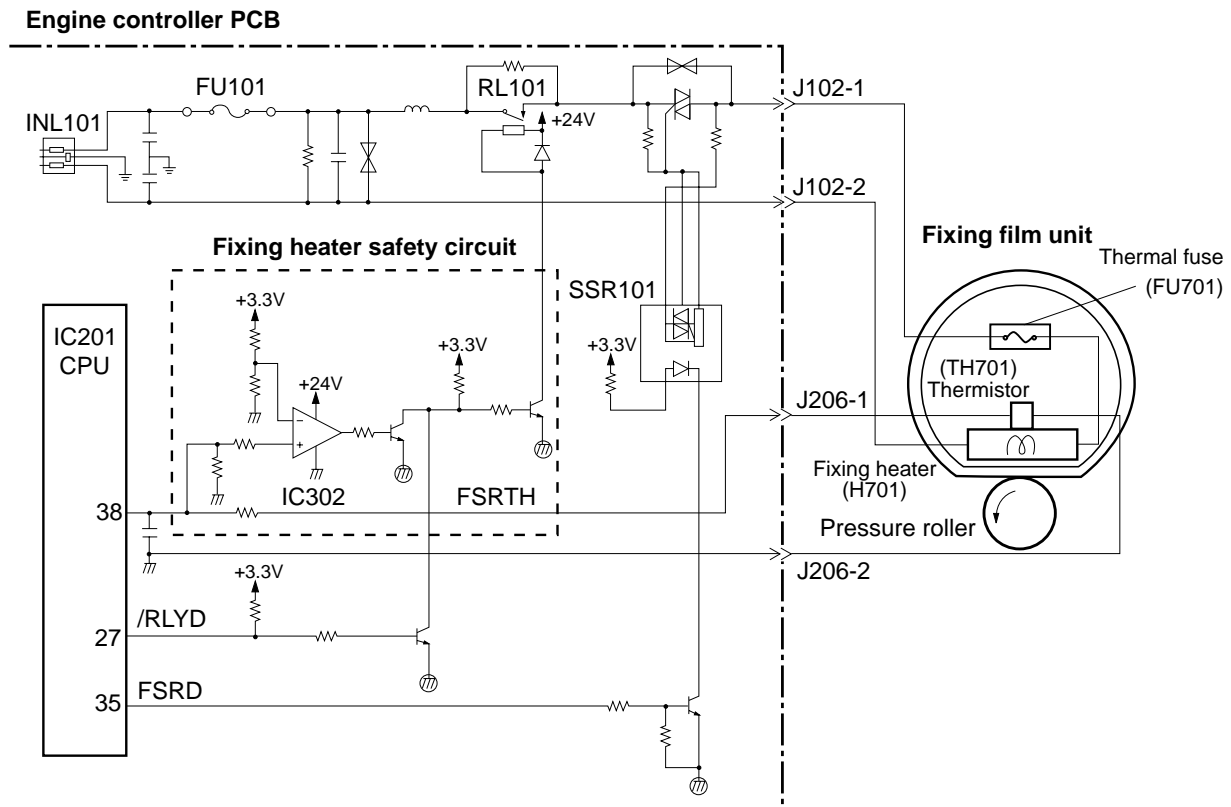


Figure 2-2-4

2. Fixing heater safety circuit

This circuit is located on the engine controller PCB and always monitors the abnormal rise of the fixing temperature.

When the output voltage from the thermistor falls below about 0.6V (240°C) due to the elevation of the fixing heater temperature, the output of the comparator (IC302) becomes “L” and the relay (RL101) goes OFF to cut off the power to the fixing heater.

3. Protection function

The printer has the following three protective functions to prevent excursion of the fixing heater.

- ◆ The CPU monitors the voltage of TH701. When an abnormality is detected, the CPU assesses a fixing heater failure and then sets the FIXING HEATER DRIVE signal (FSRD) to “L” and the /RLYD signal to “H” to turn OFF the relay (RL101). At the same time, it notifies the interface controller of the failure.
- ◆ When the fixing heater temperature rises abnormally and the temperature of the thermal fuse exceeds 240°C, the thermal fuse melts and the power to the fixing heater is cut off.
- ◆ When the fixing temperature rises abnormally and the voltage of TH701 falls below about 0.6V (240°C equivalent), the fixing heater safety circuit cuts off the power to the fixing heater regardless of the output from the CPU.

4. Detecting fixing heater error

The CPU assesses a fixing heater failure and notifies the interface controller of the failure under the following conditions.

- a. The temperature of 20°C or above is not detected within 500 msec after the start of initial temperature control.
- b. The temperature remains above 220°C for more than the specified period of time during fixing heater temperature control.
- c. The temperature of 100°C or above is not detected when the power is supplied for the specified period of time during printing or warming up.
- d. The fixing heater temperature control is performed for 500 msec when the power is turned ON. During this period, the temperature is monitored every 135 msec. The monitored temperature is below 20°C twice in a row.
- e. The fixing heater temperature falls below 100°C for the specified period of time during the normal temperature control.

Note: The fixing film may be damaged if it is rotated at a temperature of 100°C or below due to the high oil viscosity. Therefore, the temperature of the fixing heater is required to be above 100°C to melt the oil.

When a fixing unit failure is assessed, the CPU performs the following operations:

- 1) Cuts off the power to the fixing heater.
- 2) Turns off the relay.
- 3) Immediately stops driving the main motor, scanner motor, and high-voltage system and sets the printer to the error mode regardless of the presence or absence of paper being printed.

C. High-voltage Power Supply Circuit
1. Outline

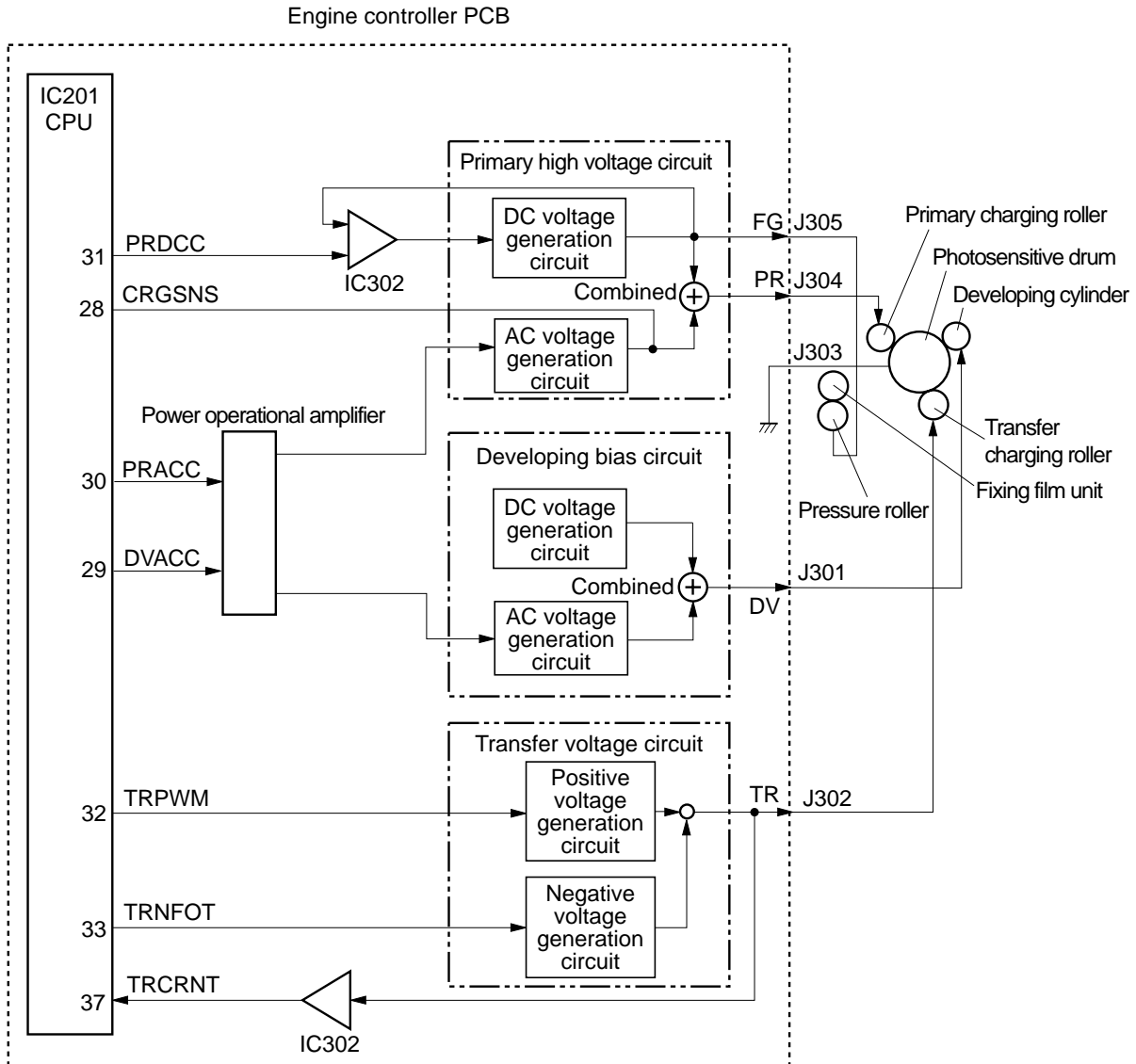


Figure 2-2-5

This circuit applies the combined voltage of the DC voltage and AC voltage to the primary charging roller and developing cylinder, and also applies the positive or negative DC voltage to the transfer charging roller, according to the instructions sent from the microcomputer (CPU) on the engine controller.

The circuit adjusts the image density by changing the primary high-voltage (DC) and the developing bias according to the image density data sent from the interface controller.

2. Operation

a. Generation of voltage applied to primary charging roller

When the pick-up command is sent from the interface controller, the INITIAL ROTATION period (INTR) starts, and the PRIMARY HIGH VOLTAGE (AC) DRIVE signal (PRACC) is input to the primary high-voltage circuit via the power operational amplifier. The PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC) sent from the CPU is input to the primary high-voltage circuit. As a result, the combined primary high-voltage of the AC bias and the DC bias is applied to the primary charging roller.

The IC302 compares the primary high-voltage (DC) with the PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC) sent from the CPU to control the voltage value of the primary high-voltage (DC).

When the cartridge is installed, a current flows into the J304. Whether the cartridge is installed or not can be detected by detecting the current with the CRGSNS.

b. Generation of developing bias

The DEVELOPING BIAS (AC) DRIVE signal (DVACC) is input to the developing bias circuit via the power operational amplifier. The constant developing DC bias is generated in the DC generation circuit on the developing bias circuit. As a result, the combined voltage of the developing AC bias and the DC bias is applied to the developing cylinder.

c. Generation of voltage applied to transfer charging roller

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

The negative bias (negative voltage) is applied to the transfer charging roller with the specified timing in order to clean the roller by removing the toner adhered to the roller onto the photosensitive drum.

The print bias (positive voltage) is applied to the transfer charging roller in order to transfer the toner on the photosensitive drum onto the paper.

The between-page bias (positive voltage lower than the print bias) is applied with the specified timing to prevent the residual toner on the photosensitive drum from adhering to the transfer charging roller.

When the pick-up command is sent from the interface controller, the INITIAL ROTATION period (INTR) starts. At the same time, the CPU outputs the TRANSFER NEGATIVE VOLTAGE DRIVE signal (TRNFOT), and the negative bias is applied to the transfer charging roller for the specified period of time in order to clean the roller.

During the print sequence, the CPU outputs the TRANSFER POSITIVE VOLTAGE DRIVE signal (TRPWM), and the print bias is applied to the transfer roller. The between-page bias is applied to the roller between pages.

After the end of printing, the negative bias is reapplied to clean the transfer charging roller.

d. Generation of fixing bias

The CPU outputs the PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC), and the primary DC bias is output from the DC generation circuit on the primary high-voltage circuit. At the same time, the fixing bias and the negative DC voltage are applied to the pressure roller.

e. Cartridge detection

When the PRIMARY HIGH-VOLTAGE (AC) DRIVE signal (PRACC) is output from the CPU and the primary AC bias is output from the AC generation circuit on the primary high-voltage circuit, the primary high-voltage circuit feeds back the CARTRIDGE DETECTION signal (CRGSNS) to the CPU.

The CPU checks the voltage of the CRGSNS signal when the primary AC bias is output during WAIT period in order to detect the presence/absence of the cartridge.

D. Low-voltage Power Supply Circuit

1. Outline

The AC voltage input from the inlet is converted to the DC voltage in the rectification circuit, transformer, and power supply circuits, and then supplied to the printer as +24VDC, +5VDC, and +3.3VDC.

When the cartridge door is opened, the door switch (SW301) is turned OFF and the +24VU supplied to the high-voltage circuit is cut OFF. At the same time, the DOSNS signal becomes “L”, and the CPU detects that the cartridge door is open and stops the printer.

The AC voltage is supplied to the fixing heater via the fuse (FU101), noise filter, relay, and triac.

+3.3VDC is supplied to the ICs on the engine controller PCB, BD PCB, and interface controller PCB.

+5VDC is supplied to the ICs on the engine controller PCB, laser/scanner driver PCB, interface controller PCB, and sensors.

+24VDC is supplied to the high-voltage power supply circuit, main motor, scanner motor, and solenoids.

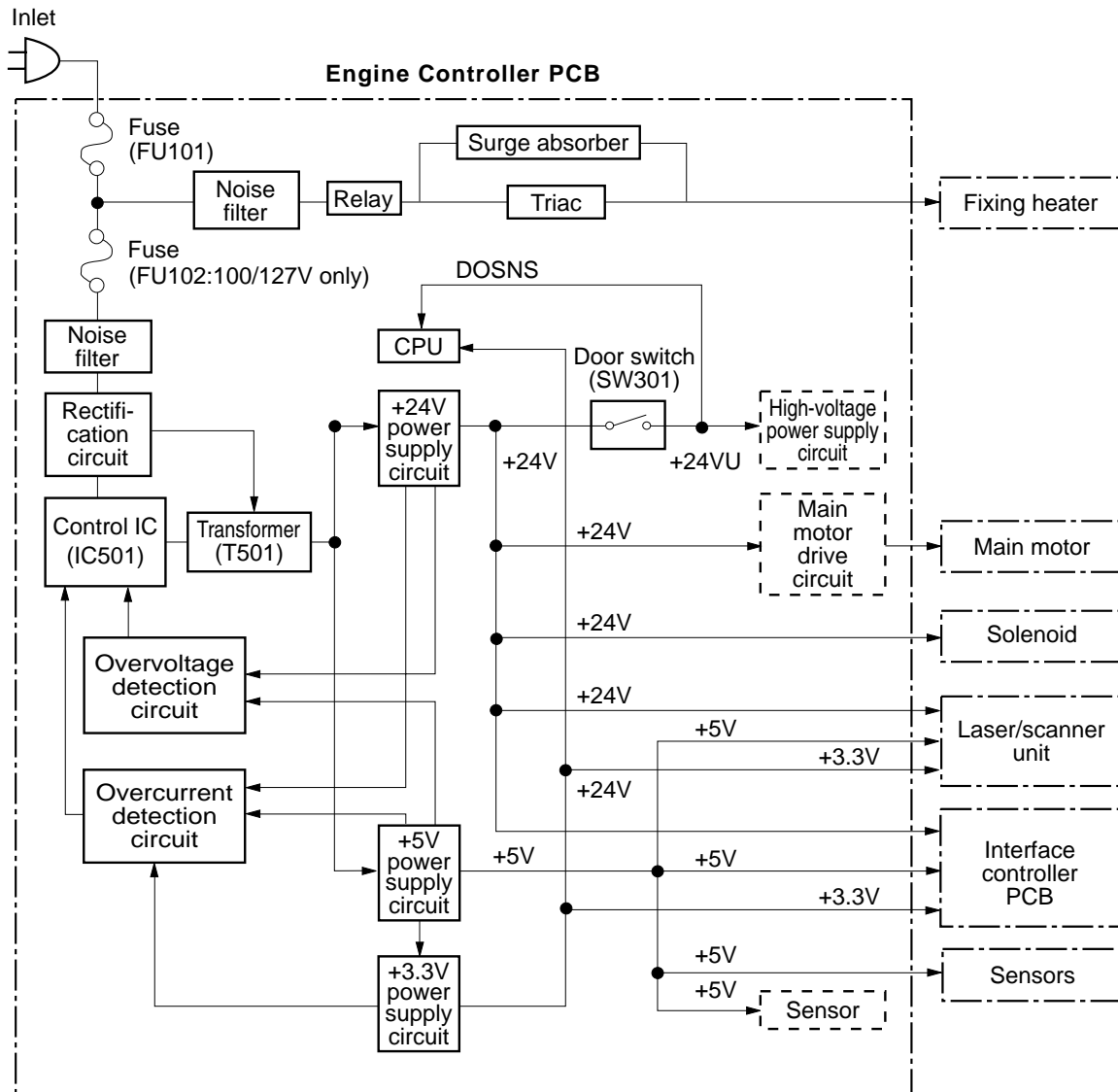


Figure 2-2-6

2. Protective function

The power supply circuits of +24VDC and +5VDC are equipped with overcurrent/overvoltage protective functions. These protective functions automatically shut off the output voltage to protect the circuits when overcurrent or abnormal voltage results from troubles such as a short on load. When these protective functions are activated and no DC voltage is output from the power supply circuits, turn OFF the power, rectify the troubles on the loads, and then turn ON the power again.

Wait about two minutes after turning OFF the power before turning it ON again.

E. Video Interface

1. Outline

Unlike the conventional video interface, which uses an individual signal line for each signal exchanged between the interface controller and engine controller, this printer uses command status.

This section describes the kinds of interface signals between the engine controller and interface controller, and gives information of the sequence of printer operation using the interface signals.

a. System diagram

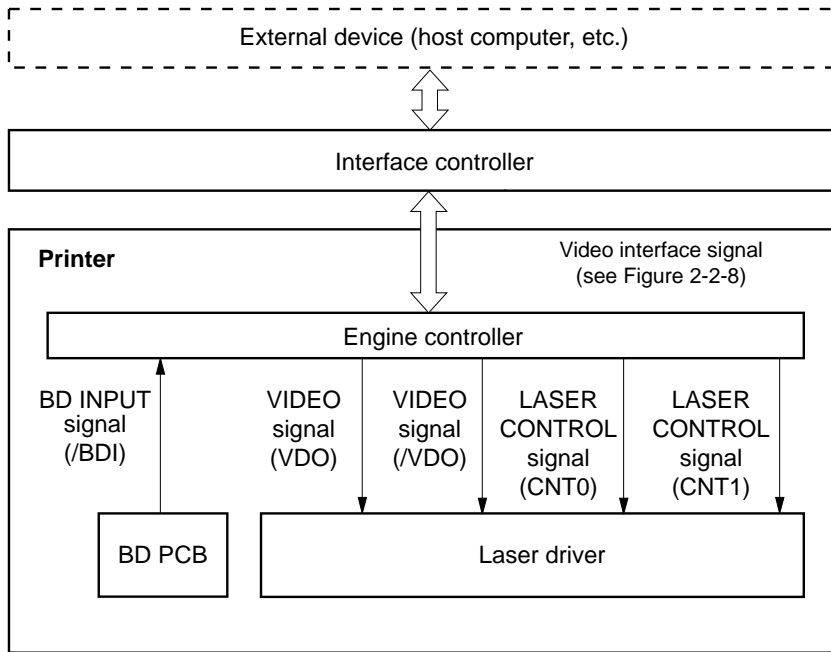


Figure 2-2-7

b. Video interface signals

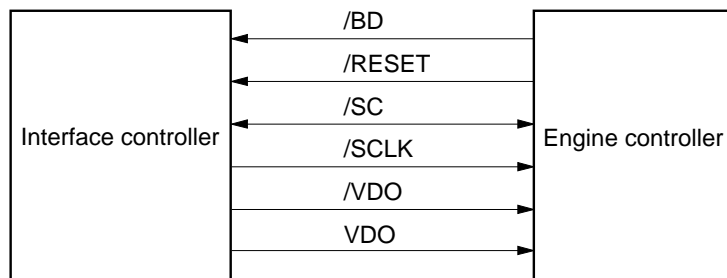


Figure 2-2-8

2. Operation

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

When the printer is ready for operation after the WAIT period, the engine controller sends the ready status to the interface controller to notify that the printer is ready.

On receiving the ready status, the interface controller sends the pick-up command to the engine controller.

When the engine controller receives the pick-up command, it starts the operation of the initial rotations (INTR) sequence.

When the paper is picked up and the engine controller detects that the paper has reached the specified position, it starts sending the /BD signal to the interface controller.

When the interface controller receives the /BD signal sent from the engine controller, it sends the VIDEO signals (/VDO, VDO) synchronized with the /BD signal to the laser driver via the engine controller.

The engine controller generates LASER CONTROL signals (CNT0, CNT1) and sends them to the laser driver.

The laser diode emits the laser beam when the /VDO signal is "L", CNT0 signal is "H", and CNT1 signal is "L." The laser beam emitted from the laser diode is scanned by the scanning mirror to form a latent image on the photosensitive drum.

The latent image on the photosensitive drum is transferred onto the plain paper through the electrophotographic process and then delivered to the face up delivery slot.

The STATUS COMMAND signal (/SC) is a bi-directional signal for serial data exchange between the interface controller and engine controller.

The interface controller uses the /SC signal to send the 16 bit serial data as a command to the engine controller. On receiving the command from the interface controller, the engine controller uses the /SC signal to send back the 16 bit serial data as a status.

The command and status sent from the interface controller and the engine controller respectively are synchronized with the SYNCHRONIZE CLOCK signal (/SCLK) output from the interface controller. When the interface controller initiates the communication with the engine controller, the interface controller outputs the data to the /SC signal synchronizing it with the falling edge of the /SCLK signal, and the engine controller inputs the data to the /SC signal synchronizing it with the rising edge of the /SCLK signal. When the engine controller initiates the communication with the interface controller, the engine controller outputs the data to the /SC signal synchronizing it with the falling edge of the /SCLK signal, and the interface controller inputs the data to the /SC signal synchronizing it with the rising edge of the /SCLK signal.

The interface controller can perform the software reset on the engine controller by keeping the /SCLK signal "L" for 2 seconds. The /RESET signal is used to initialize the interface controller at the power-ON. The signal is sent to the interface controller from the engine controller.

3. Cleaning page

This printer can execute the cleaning page sequence with the command sent from the interface controller. The cleaning page cleans the pressure roller.

On receiving the cleaning page execution command from the interface controller, the engine controller conducts the paper pick-up operation. Then, the engine controller adjusts the fixing temperature at 200°C and feeds the paper 4mm at a time by step driving the main motor. This cleans the pressure roller by fusing the toner adhered to the pressure roller onto the paper.

Note: The paper used for cleaning the pressure roller must be the maximum size used by the user in horizontal direction and 240mm or more in the vertical direction (feed direction).

III. LASER/SCANNER SYSTEM

A. Outline

The microcomputer (CPU:201) on the engine controller sends the LASER CONTROL signals (CNT0, CNT1) to the laser driver (IC801) on the laser driver PCB. The VIDEO signals (/VDO, VDO) from the interface controller are sent to the laser driver (IC801) on the laser driver PCB through the engine controller.

The laser driver (IC801) emits the laser beam according to these signals sent from the engine controller and interface controller.

The laser beam emitted from the laser diode passes through collimator lens and cylindrical lens, and then strikes the four-faced scanning mirror rotating at a constant speed.

The beam reflected from the four-faced scanning mirror passes through focusing lens and is reflected onto the photosensitive drum.

When the photosensitive drum rotates, and at the same time, the laser beam scans across its surface at a constant speed, the laser beam forms an latent image on the drum surface.

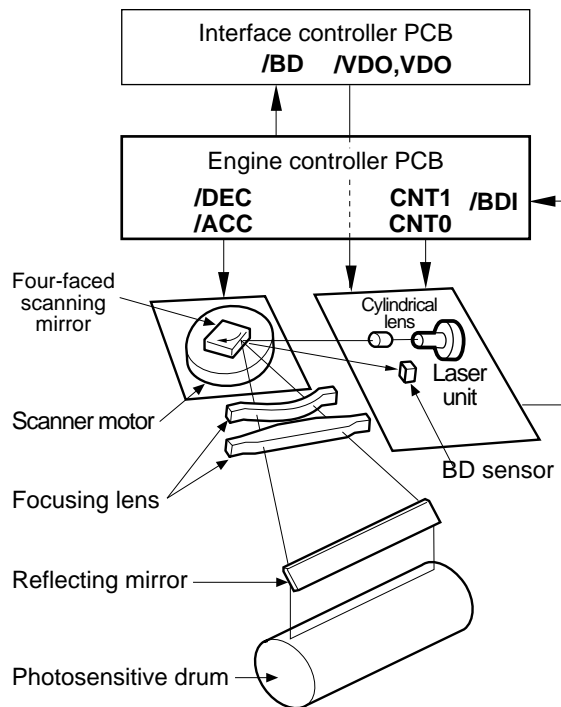


Figure 2-3-1

B. Laser Control Circuit

1. Outline

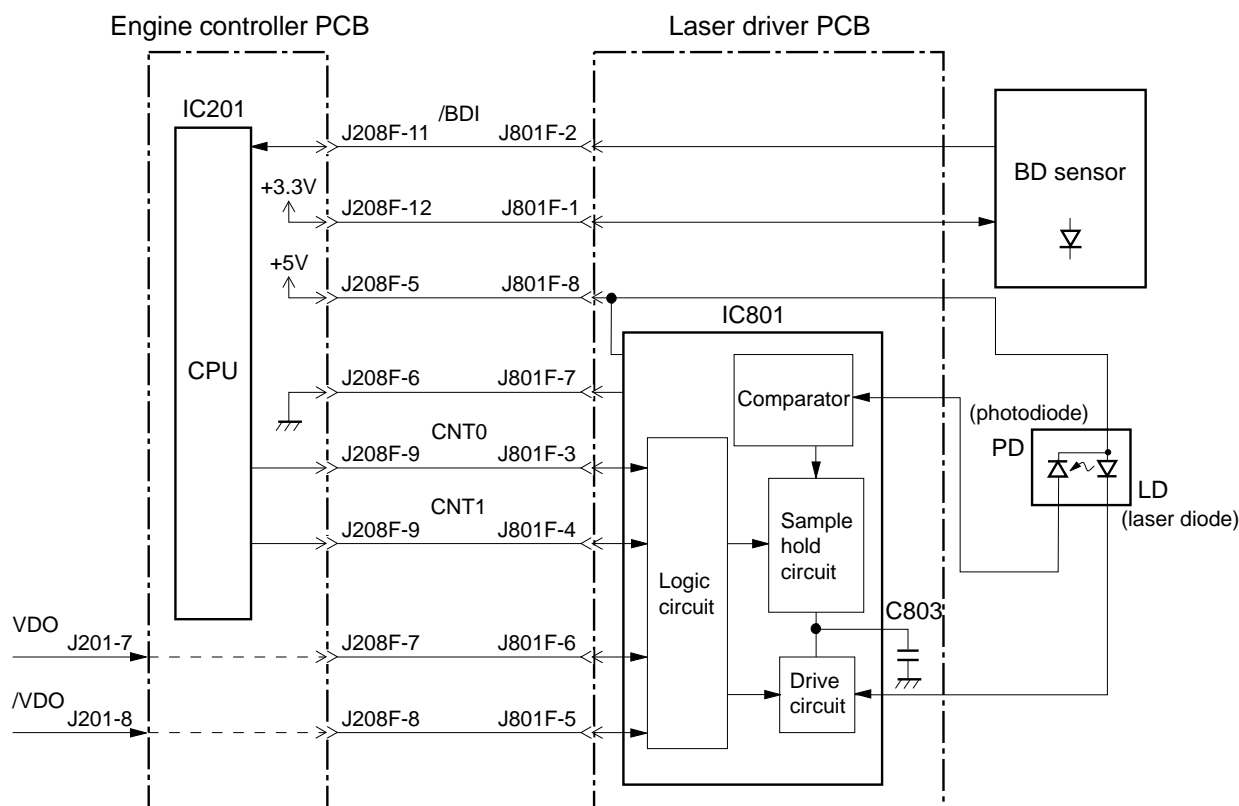


Figure 2-3-2

The CPU controls the following four modes: standby, APC emitting, masking and unmasking. They are controlled by the LASER CONTROL signals (CNT0, CNT1) sent to the laser driver (IC801) on the laser driver PCB.

When both CNT0 and CNT1 signals are "L", the laser driver enters the standby mode to reset the laser driver PCB.

When CNT0 and CNT1 signals are "L" and "H" respectively, the laser driver enters the APC emitting mode to make the laser diode emit the laser beam. The laser driver also performs the Auto Power Control, stated in the following section.

When both CNT0 and CNT1 signals are "H", the laser driver enters the masking mode. Regardless the VIDEO signals (VDO, /VDO), the laser driver prohibits the laser diode from emitting the laser beam.

When CNT0 and CNT1 signals are "H" and "L" respectively, the laser driver enters the unmasking mode to turn the laser ON/OFF according to the VDO, /VDO signals from the interface controller.

2. Laser diode automatic power control

The laser diode automatic power control (APC) is performed by the IC801 to make the laser diode emit the laser beam at a constant intensity. The APC is performed prior to the image formation (Initial APC) and between lines (between line APC).

When the CNT0 and CNT1 input to the IC801 from the CPU are "L" and "H" respectively, the sample hold circuit on the IC801 enters the sample mode (mode in which the APC is performed). At the same time, the laser diode (LD) emits the laser beam.

The intensity of the laser beam emitted from the laser diode is detected by the photo diode (PD) and is fed back to the sample hold circuit on the IC801.

The IC801 controls the output current of the drive circuit to make the fed back laser intensity become equal to the target laser intensity set in the IC801.

After a specified period of time, when the CNT0 becomes "H", the laser diode is turned OFF compulsively and the sample hold circuit enters the hold mode. The IC801 converts the controlled laser intensity to voltage and stores it in the C803.

3. Horizontal sync control

The CPU controls the horizontal sync control based on the HORIZONTAL SYNC INPUT signal (/BDI) sent from the BD sensor in the laser scanner.

The CPU turns CNT0 and CNT1 into "L" and "H" respectively, and the laser diode emits the laser beam at the specified timing based on the /BDI signal.

The laser beam passes through collimator lens and cylindrical lens. Then the laser beam is scanned by the four-faced mirror to pass through the BD lens on the scanning line and enters the BD sensor.

When the BD sensor detects the laser beam, the BD sensor generates the HORIZONTAL SYNC signal (/BD) based on the /BDI signal to send it to the interface controller.

4. Image masking control

The CPU performs the image masking control in order to prevent laser beam emission in the non-image area other than the unblanking period.

The laser beam emission enable period of the laser diode is controlled by masking the /VDO and VDO with CNT0 and CNT1 in the logic circuit on the IC801.

The CPU sets the CNT0 and CNT1 "H" in the image masking area other than the unblanking period so that the laser diode will not be turned ON/OFF when the /VDO and VDO are sent to the IC801 from the interface controller.

In image unmasking area, the IC801 turns ON/OFF the laser diode based on the /VDO and VDO by setting CNT0 "H" and CNT1 "L."

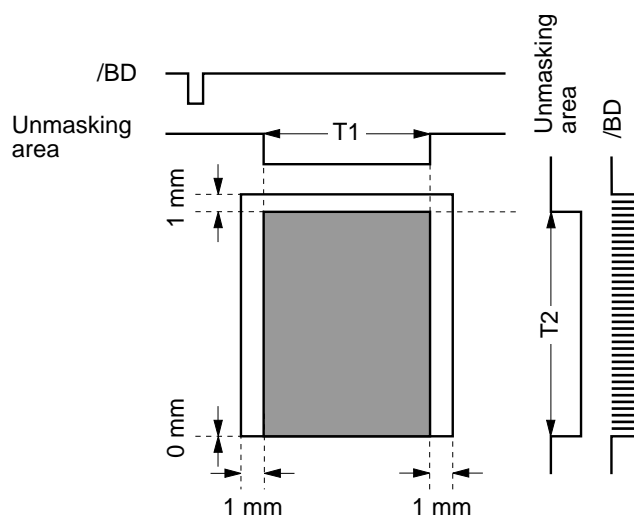


Figure 2-3-3

-
- Notes:**
1. The shaded area indicates the area where the laser beam can write.
 2. T1 is the range 1mm toward the center from the right and left sides of the Letter size regardless of the paper size specification.
 3. T2 is the range 1mm toward the center from the leading edge of the paper (start of /BD output) to the trailing edge of the paper. When the number of /BD pulse lines (number of scan lines) is specified with a scan line number specification command from the interface controller, the trailing edge of the T2 is where the /BD output for the specified number of scan lines completes. When the number of scan lines is not specified, the trailing edge of the T2 is where the paper top sensor (PS002) detects the trailing edge of the paper.
-

C. Scanner System

The scanner motor control circuit is shown below.

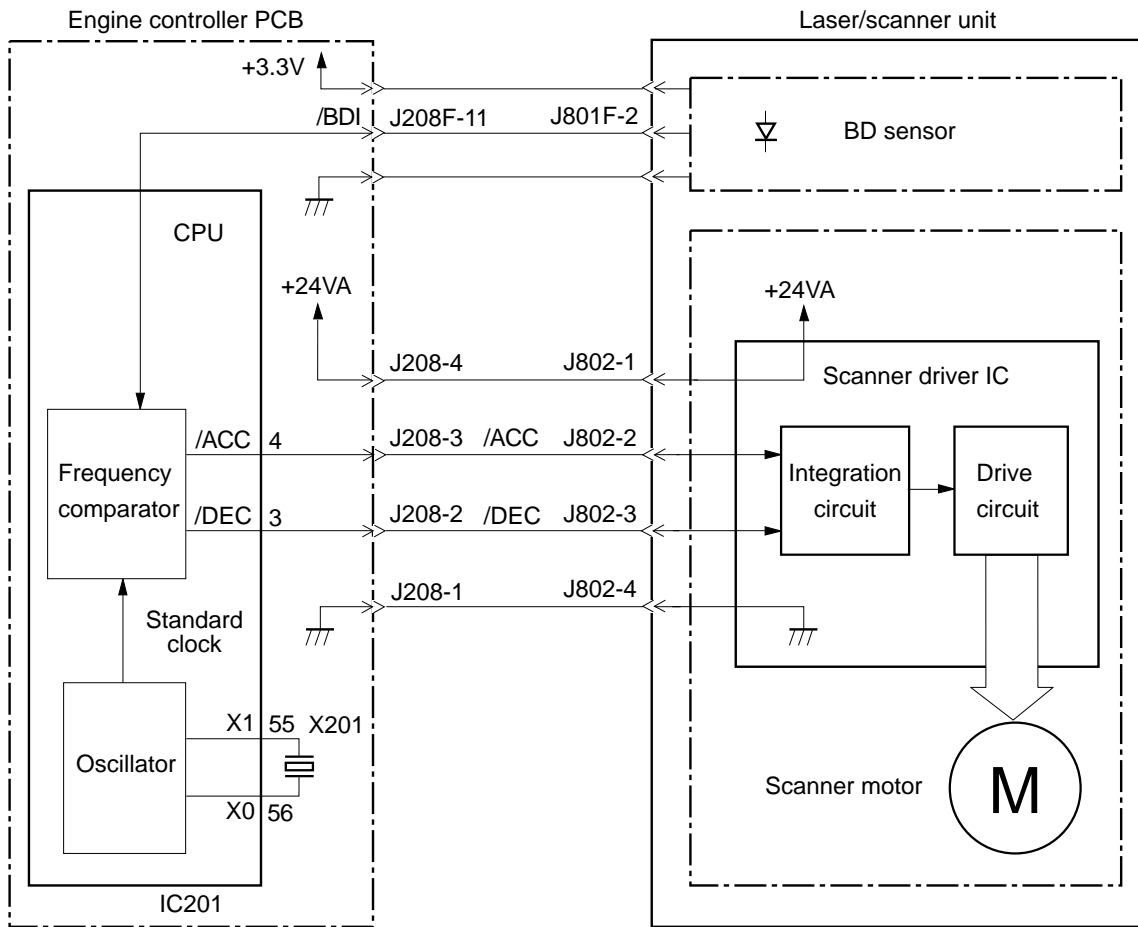


Figure 2-3-4

The scanner motor is a 3-phase brushless motor with built in hall element and is in a unit with the scanner motor drive circuit.

When the printer is turned ON, the CPU (IC201) divides the oscillation frequency of the crystal oscillator (X201) and generates the reference clock.

When a pick-up command is sent from the interface controller, the CPU forces the scanner to accelerate by turning the SCANNER MOTOR ACCELERATION signal (/ACC) to "L" and the SCANNER MOTOR DECELERATION signal (/DEC) to "H" for 0.2 seconds.

The CPU makes the laser diode emit the laser to obtain the HORIZONTAL SYNC INPUT signal (/BDI) from the BD sensor in proportion to the number of the scanner motor rotation.

Then the CPU compares the /BDI signal frequency with the reference frequency with a frequency comparator in the CPU. In order to generate the specified number of the scanner motor rotation, the CPU controls the rotation by outputting the /ACC signal and the /DEC signal. In 1.5 seconds after the number of the scanner motor rotation reaches the specified value, the scanner becomes ready.

The CPU monitors the /BDI signal sent from the BD PCB to determine whether the scanner motor is rotating at the specified value of the rotation.

When the scanner motor is rotating at the specified value, the laser beam reflected from the four-faced mirror scans onto the photosensitive drum at a constant speed.

In order to stop the scanner motor, the CPU turns the /ACC signal to "H", and the /DEC signal to "L".

The CPU detects the following failures and error by monitoring /BDI sent from the BD sensor, and reports it to the interface controller.

1) Scanner failure

The CPU assesses a scanner failure when the /BDI cycle does not reach the specified value within 3.5 seconds after the completion of the initial forced acceleration.

2) BD failure

The CPU assesses a BD failure when the /BDI is not detected within 0.1 seconds after completion of scanner motor forced acceleration or when the detected /BDI cycle is not equal to the specified value for 2 continuous seconds or more after the scanner has become ready.

3) BD error

The CPU assesses a BD error when the /BDI is not detected at the specified cycle while the /BD is output to the interface controller from the engine controller.

The CPU does not report the BD error to the interface controller if a door open is detected within 0.2 seconds after detection of the BD error.

The CPU cancels the BD error when a scanner failure or BD failure is detected after detection of the BD error.

IV. IMAGE FORMATION SYSTEM

A. Outline

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

When a pick-up command is sent from the interface controller to the engine controller, the engine controller drives the main motor to rotate the photosensitive drum, developing cylinder, primary charging roller, and transfer charging roller.

The primary charging roller uniformly applies negative charge to the surface of the photosensitive drum. To form the latent image with the laser diode on the photosensitive drum, the laser beam modulated by the VIDEO signal is illuminated on 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 and then transferred onto the paper by the transfer charging roller. The residual toner on the photosensitive drum surface is scraped down with the cleaning blade. The potential on the drum is made uniform by the primary charging roller in preparation for a new latent image.

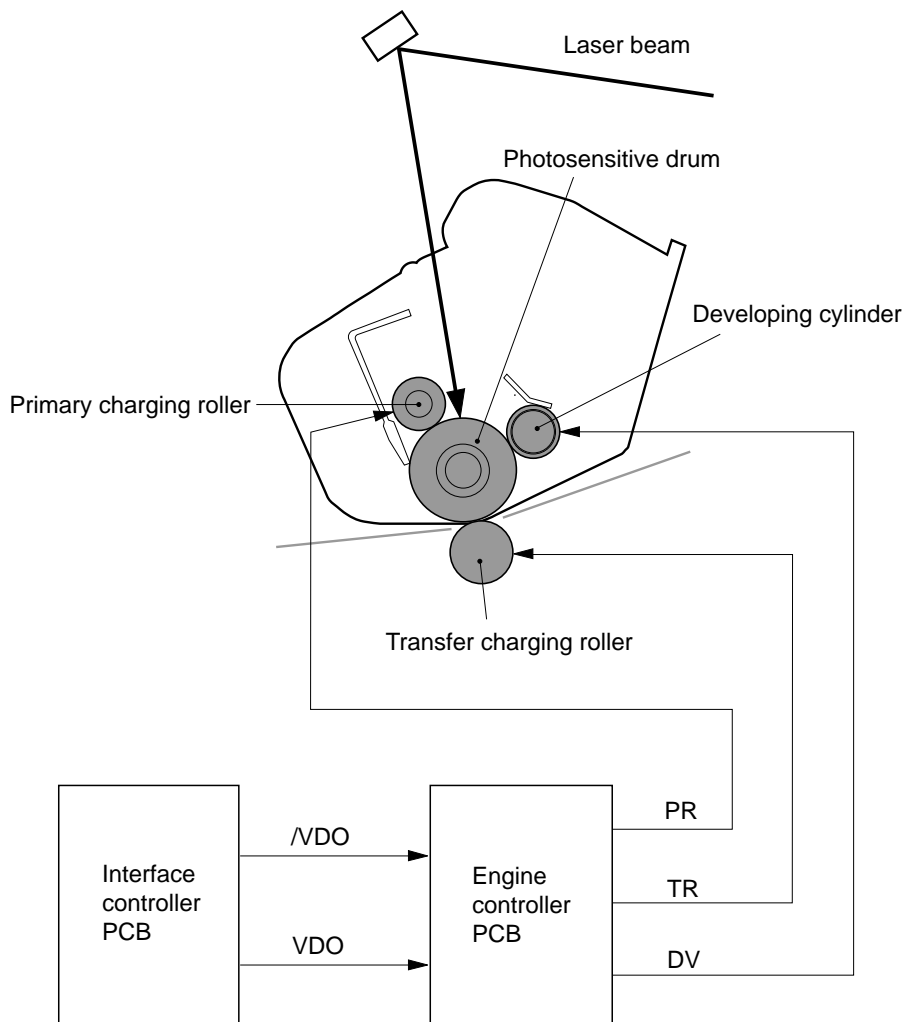


Figure 2-4-1

B. Print Process

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

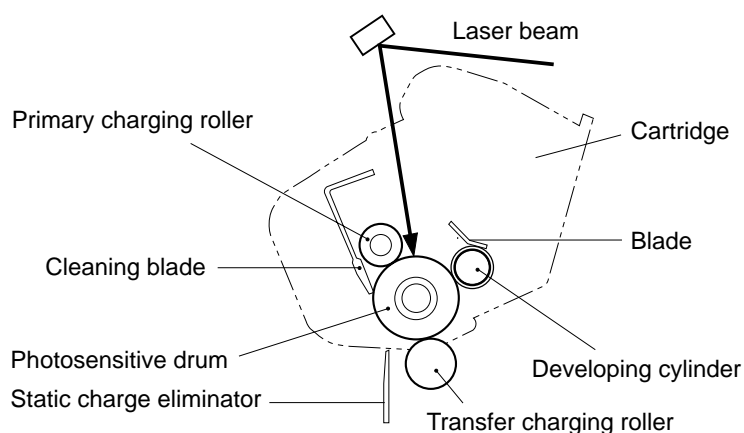


Figure 2-4-2

The cartridge used by the printer has a seamless photosensitive drum with the structure shown in Figure 2-4-3.

The seamless drum consists of an external organic photoconductive layer (OPC) and an internal aluminum substrate.

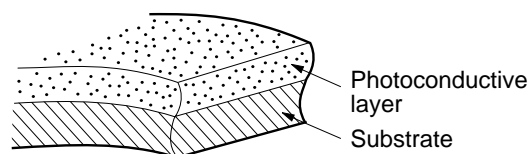


Figure 2-4-3

The printing process can be divided into five major stages.

1. Electrostatic latent image formation stage

Step 1: Primary charging (-)

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

5. Drum cleaning stage

Step 7: Drum cleaning

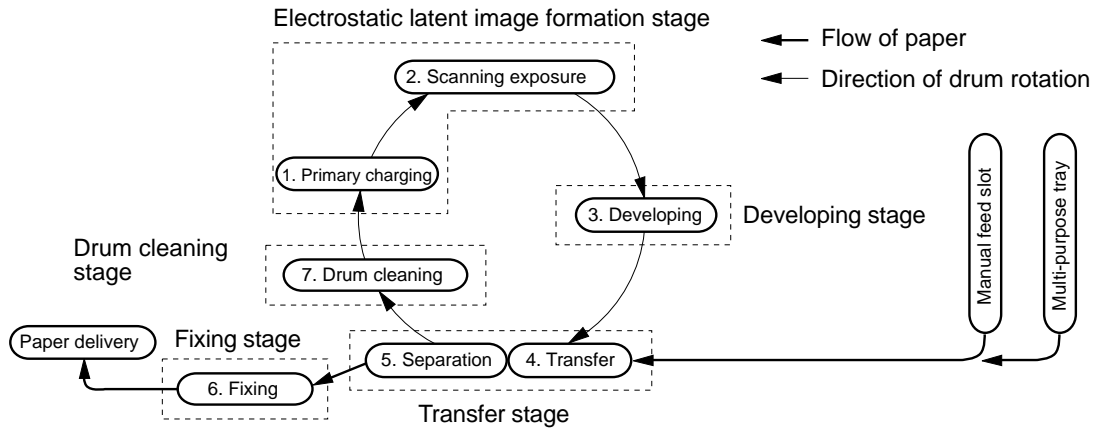


Figure 2-4-4

1. Electrostatic latent image formation stage

This stage has two steps which form an electrostatic latent image on the photosensitive drum.

At the end of this stage, negative charge remains in the unexposed dark areas, while negative charge is removed by the laser beam to form light areas.

Since this image of negative charges on the drum is invisible to eyes, it is called an electrostatic latent image.

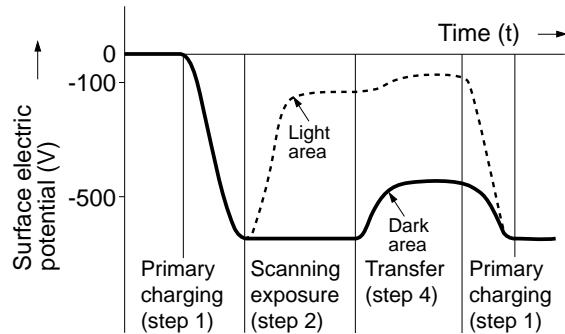
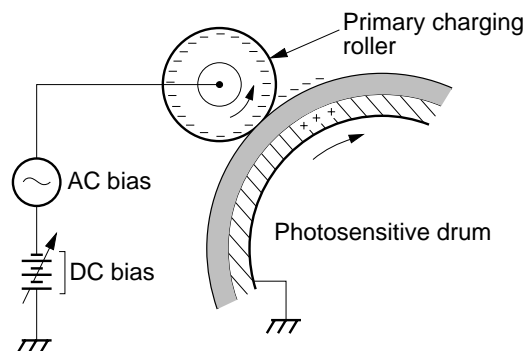


Figure 2-4-5

Step 1: Primary charging**Figure 2-4-6**

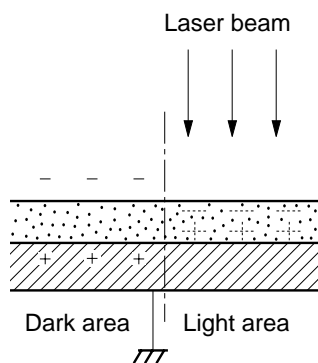
For preparation of latent image formation, a uniform negative potential is applied to the photosensitive drum surface. This printer performs primary charge by the method that directly charges the photosensitive drum.

The primary charging roller consists of semiconductive rubber. In addition to DC bias, AC bias is applied to the primary charging roller to keep the potential on the drum surface uniform. The DC bias changes with the developing DC bias that changes according to the IMAGE DENSITY DATA signal from the interface controller.

This direct charging method has advantages such as the lower applied voltage and almost no ozone generation over the conventional corona charging method.

Step 2: Scanning exposure

When the laser beam scans surface of the photosensitive drum, charges on the light area are neutralized to form an electrostatic latent image.

**Figure 2-4-7**

2. Developing stage

The toner is applied to the electrostatic latent image on the surface of the photosensitive drum to form a visible image. This printer performs the toner projection development with a single-component toner.

Step 3: Development

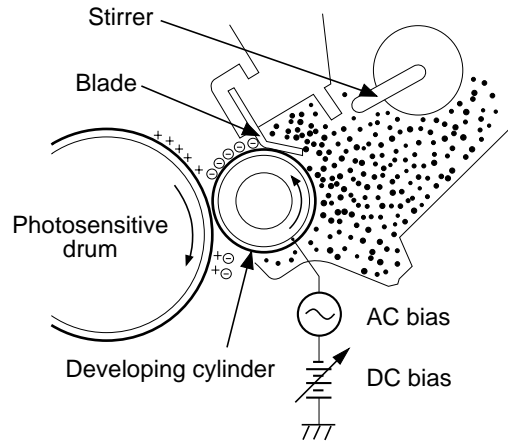


Figure 2-4-8

Note: Charges in the exposed areas of the photosensitive drum are shown as positive in this figure, even though they are actually negative. It means that the photosensitive drum potential is higher as compared with that of cylinder.

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

The single-component toner mainly consists of magnetite and resin binder and is held to the cylinder by magnetic attraction. The toner functions as an insulator, and acquires a negative charge by friction due to 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 toner layer of the cylinder (with negative charges), the potential difference (higher on the drum) projects the toner particles to them.

This is called toner projection development, which makes the latent image on the drum visible.

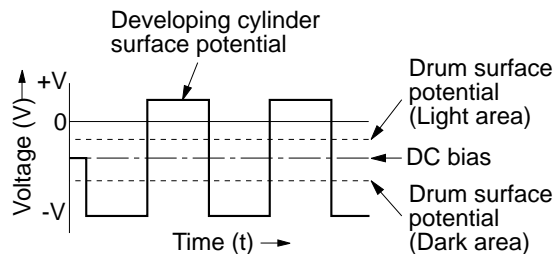


Figure 2-4-9

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 (1460 Vp-p) varies with the developing DC bias.

This printer changes the developing DC bias according to the IMAGE DENSITY DATA signal sent from the interface controller. The changes in the developing DC bias change the potential difference between the cylinder and drum so that the density of the print can be adjusted.

3. Transfer stage

In the transfer stage, the toner image is transferred from the drum surface onto the paper.

Step 4: Transfer

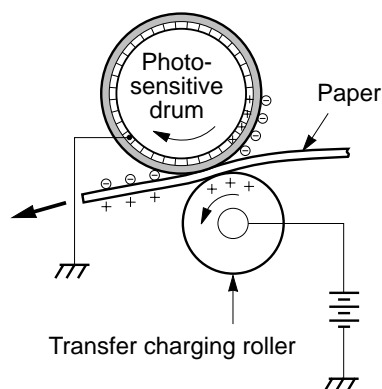


Figure 2-4-10

Positive charges are applied to the back of the paper to attract the negatively charged toner particles to the paper.

Step 5: Separation

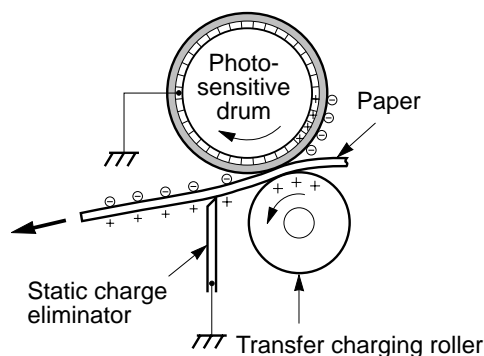


Figure 2-4-11

The elasticity of the paper causes it to separate from the drum. (curvature separation)

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

4. Fixing stage

As the toner image transferred onto the paper in the transfer stage is held to the paper only by the static electricity, even a light touch will smear the image.

The toner particles are fused to the paper to make an permanent image by applying pressure and heat to the paper and the toner.

Step 6: Fixing

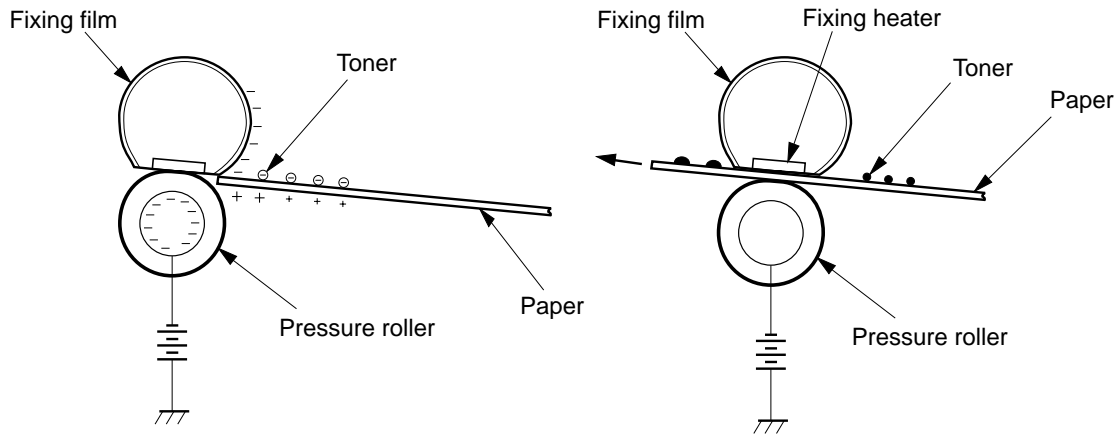


Figure 2-4-12

As the toner particles transferred onto the paper are held to the paper by the positive charge applied to the back of the paper, they may be dispersed at fixing.

This printer applies the negative DC voltage to the fixing film via the pressure roller shaft. The negative charge is applied to the paper surface by the fixing film before the paper reaches the fixing heater. This improves the adhesion force of the toner particles to the paper and prevents dispersion of the toner particles.

This printer utilizes an on-demand method which uses fixing film with small heat capacity. This method can heat the roller quickly and does not require the power supply to the fixing heater at standby mode. Therefore, the wait time is reduced to eight seconds or less, and the energy can be saved.

The fixing film is a cylindrical polyimide film. The surface is coated with fluorine to prevent offset.

5. Photosensitive drum cleaning stage

The photosensitive drum cleaning stage is to clean the photosensitive drum surface in preparation for the next print operation to obtain crisp image.

Step 7: Photosensitive drum cleaning

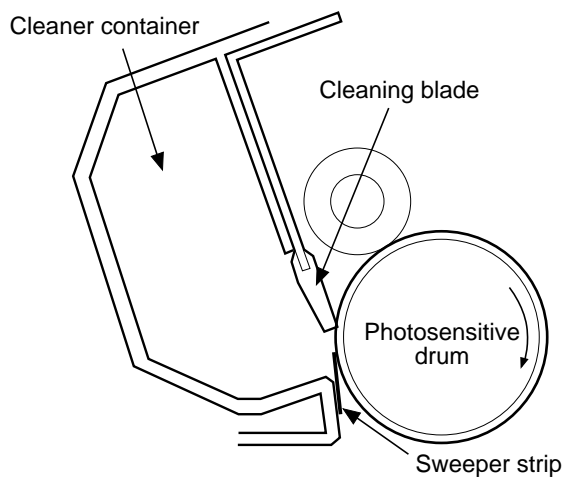


Figure 2-4-13

Prior to the next printing, the residual toner on the drum surface is scraped away by the cleaning blade to clean the drum surface. The removed toner is collected into the cleaner container.

V. PICK-UP/FEED SYSTEM

A. Outline

The printer is equipped with two pick-up sources, the multi-purpose tray and the manual feed slot.

Whether or not the multi-purpose tray and the manual feed slot are loaded with paper is detected by the paper-out sensor (PS003).

The main motor (M001) starts rotating in about 0.5 seconds after the engine controller receives a pick-up command from the interface controller.

When the printer enters the initial rotation ready mode (See Note), the pick-up solenoid (SL001) is turned ON for 0.5 seconds. The pick-up roller is rotated by the transmitted rotational force of the main motor, and the pick-up cam rotates with the roller. When the claw of the pick-up cam is unhooked from the lifting plate, the plate is lifted with the spring force. A sheet of the paper pushed up by the lifting plate is picked up by the pick-up roller and transferred into the printer. The paper pick-up timing is the same for the multi-purpose tray and the manual feed slot. If the both pick-up sources are loaded with paper, priority is given to the manual feed slot.

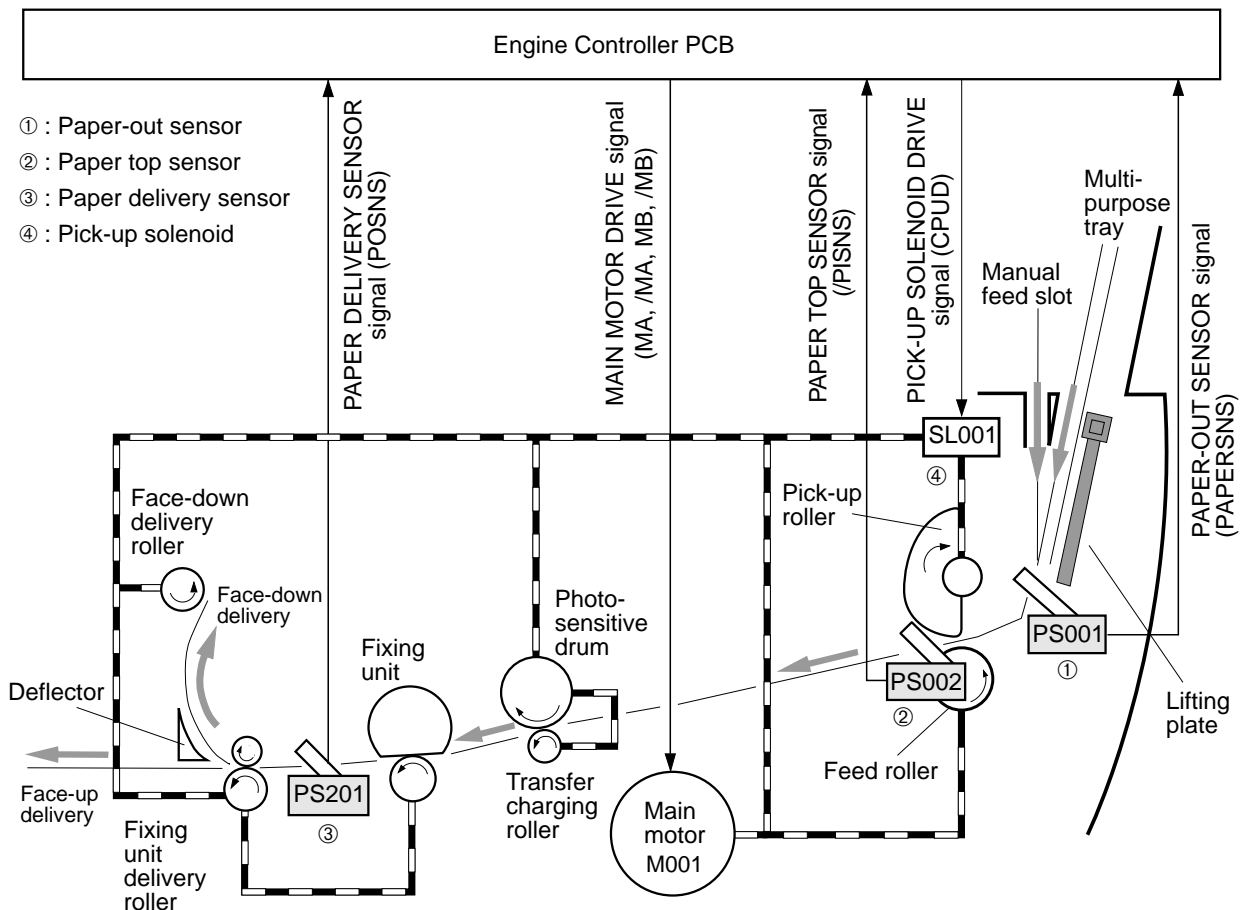


Figure 2-5-1

In the specified period of time after the paper reaches the paper top sensor (PS002), the engine controller sends the /BD signal to the interface controller. The interface controller sends the VIDEO signal to the engine controller based on the /BD signal to form an image on the photosensitive drum. As a result, the leading edge of the image matches with the leading edge of the paper. The paper is transferred to the face-up delivery slot or to the face-down tray through the transfer unit, separation unit, fixing unit, and delivery unit.

When the delivery switching lever is up, the paper is delivered to the face-down tray, and when the lever is down, to the face-up delivery slot.

There are two photointerrupters (PS002 and PS201) in the paper path to detect paper.

If the paper does not reach or pass each sensor within the specified period of time, the CPU on the engine controller assumes paper jam has occurred and notifies the interface controller of the jam.

Since this printer loads paper from the top, a few papers or a curled paper may not be picked up. The printer has a pick-up retry function. If the paper top sensor cannot detect the leading edge of paper within the specified period of time after the pick-up solenoid turns ON, the printer does not assume it as a jam and tries to pick up the paper again. The printer performs this pick-up retry function up to twice. If the paper top sensor cannot detect the leading edge of the paper within the specified period of time in the third trial, the printer assumes that a paper pick-up delay jam has occurred.

Note: Initial rotation ready

The state in which the main motor is rotating and the fixing unit temperature has reached the specified value in a specified period of time after the start of main motor rotation.

B. Jam Detection

The following paper sensors are provided to detect whether paper is present and whether the paper is fed correctly:

- Paper top sensor (PS002)
- Paper delivery sensor (PS201)

The CPU determines whether paper jam has occurred by checking for the presence of paper in the sensor at the timing stored in the CPU.

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

1. Pick-up delay jam

The CPU assesses a pick-up delay jam if the paper does not reach the paper top sensor (PS002) after the pick-up solenoid (SL001) has been turned ON three times within 7.9 seconds (includes two pick-up retry operations.)

2. Pick-up stationary jam

The CPU assesses a pick-up stationary jam if the paper top sensor (PS002) cannot detect the trailing edge of the paper within 7.8 seconds after detecting the leading edge of the paper.

3. Delivery delay jam

The CPU assesses a delivery delay jam if the paper delivery sensor (PS201) cannot detect the leading edge of the paper within 3.2 seconds after the paper top sensor (PS002) detects the leading edge of the paper.

4. Wrapping jam

The CPU assesses a wrapping jam if the paper delivery sensor (PS201) detects the trailing edge of the paper within 2.4 seconds after the paper top sensor (PS002) detects the trailing edge of the paper.

5. Delivery stationary jam

The CPU assesses a delivery stationary jam if the paper delivery sensor (PS201) detects the paper for 3 seconds after the paper top sensor (PS002) detects the trailing edge of the paper.

6. Initial residual paper jam

The CPU assesses an initial residual paper jam if the paper delivery sensor (PS201) or the paper top sensor (PS002) detects paper in the initial rotation period.

Note: Automatic paper delivery

When the paper top sensor detects paper after the power-ON or the soft reset by the video interface, the paper is delivered automatically. After the paper is delivered out of the printer, the printer becomes ready to print.

When the paper top sensor detects paper prior to the paper pick-up operation after a pick-up command has been output, the printer immediately stops supplying the high-voltage and driving laser/scanner unit and fixing unit, and then delivers the paper out of the printer.

VI. VIDEO CONTROL SYSTEM

A. Interface Controller PCB

1. Outline

The interface controller receives print information from external devices such as host computers through interface cables.

Print information described above is dot data converted from print data, corresponding to the resource type, in the host computer.

The dot data is then passed to the engine controller to control the laser diode emitting.

The external devices can check the printer status using bi-directional interface.

The location of the interface controller is shown in Figure 2-6-1, and the block diagram in Figure 2-6-2.

2. Function of Blocks

a. CPU (IC1)

The main functions of CPU (IC1) are:

- 1) To control the video interface and parallel interface (Centronics specification.)
- 2) To process the serial commands of the video interface.

b. DRAM (IC2)

DRAM has a memory capacity of 512 KB and stores the following information:

- 1) Dot data converted from the image data. (Receive buffer)

c. Cellbase IC (IC3)

The main functions of Cellbase (IC3) are:

- 1) To control the input/output of the DRAM with a built-in interface controller.
- 2) To control the timing of sending the dot pattern data to the engine controller.
- 3) To process the image such as smoothing, halftone and so on.

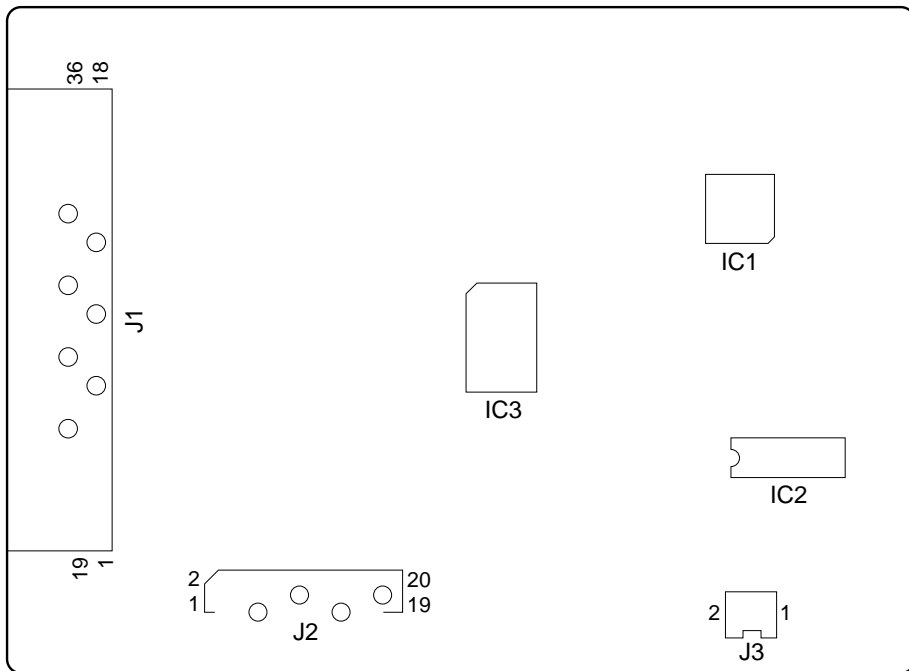


Figure 2-6-1

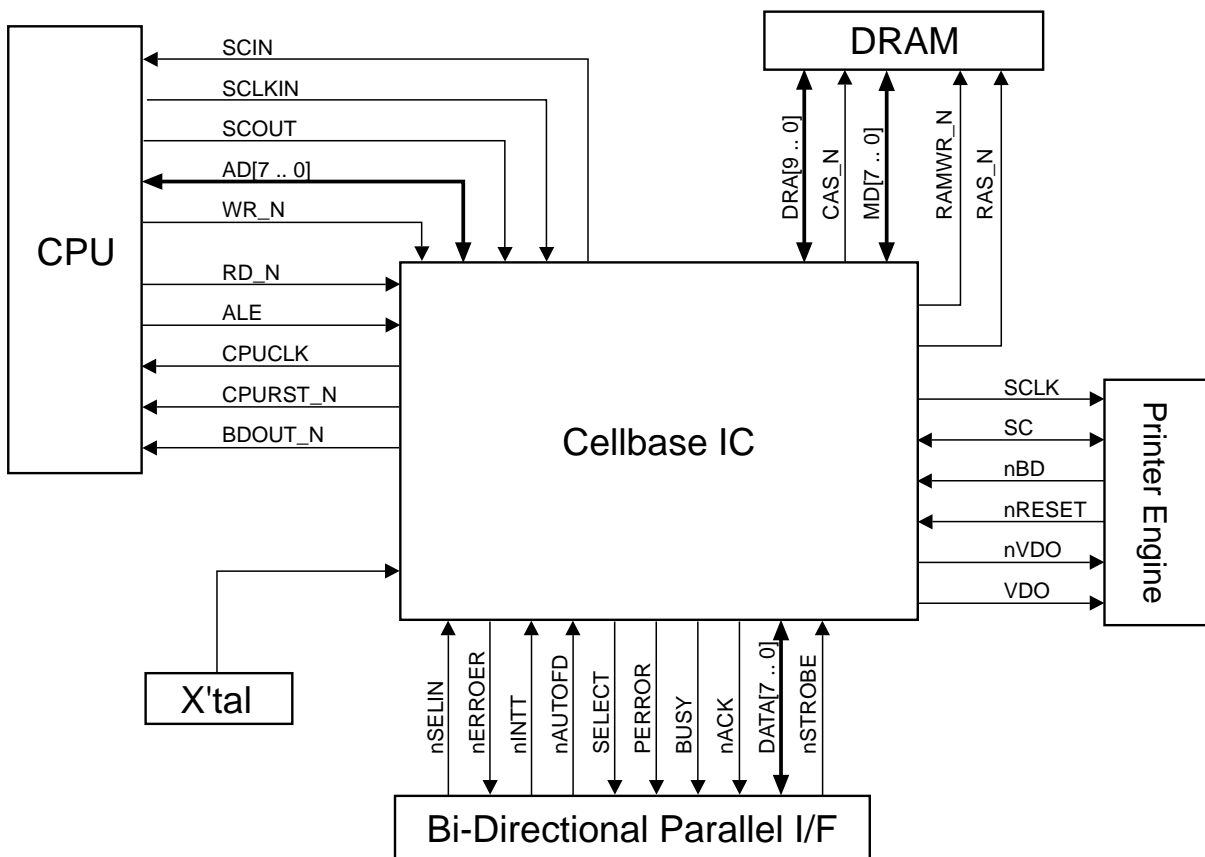


Figure 2-6-2

CHAPTER 3

THE MECHANICAL SYSTEM

I. PREFACE.....	3-1	V. SWITCHES/SENSORS/LEDS	3-15
II. EXTERNALS	3-2	VI. MOTOR/SOLENOID	3-17
III. MAIN UNITS	3-5	VII. PCBs.....	3-19
IV. MAIN PARTS.....	3-10		

I. PREFACE

This chapter describes the disassembly and reassembly procedures of the printer.

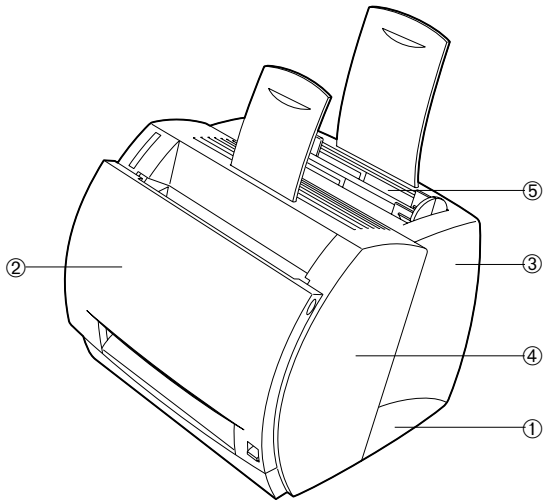
The service technician is to identify the factor of malfunction according to the “Chapter 4 Troubleshooting” and to replace the defective part(s) following the disassembly procedure of each part.

Note the following precautions when working on the printer.

1. Remove the toner cartridge when disassembling, reassembling, or transporting the printer. Removed cartridge must be put in the protective bag to prevent the adverse effect of light.
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. 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 installing the PCB in order to avoid causing damage by the difference in static charge at that time.
7. Do not place the printer with the drive unit or the laser scanner unit at the bottom.

II. EXTERNALS

A. Locations



- ① Lobe (right)
- ② Cartridge cover unit
- ③ Rear cover
- ④ Front cover
- ⑤ Multi-purpose tray

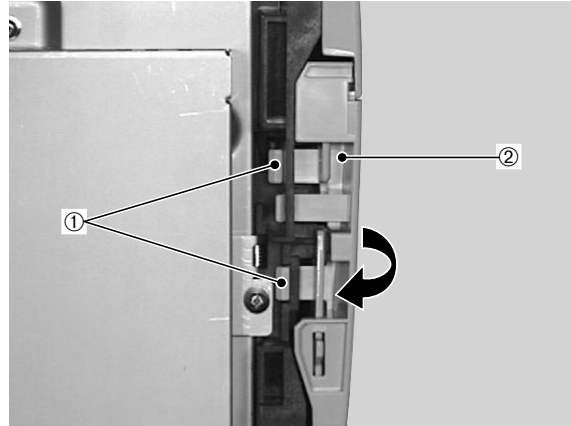
Figure 3-2-1

When cleaning, checking, or repairing inside the printer, follow the procedures to remove the covers as required.

B. External Covers

1. Lobe

- 1) Unhook the 2 claws and then turn the lobe (right) in the direction of the arrow to remove.



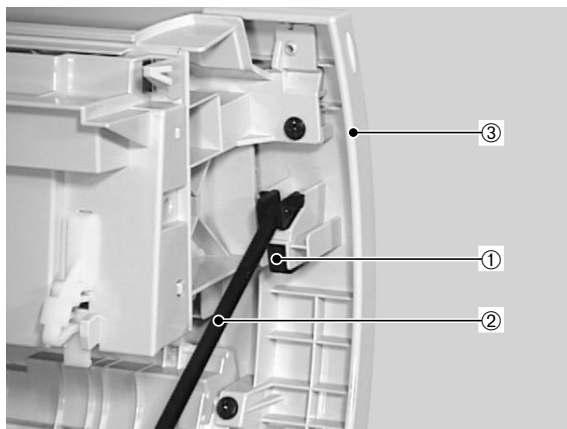
- ① Claws
- ② Lobe (right)

Figure 3-2-2

- 2) Remove the lobe (left) in the same way.

2. Cartridge cover unit

- 1) Open the cartridge cover unit.
- 2) Pressing the claw, remove the right arm from the cartridge cover unit.

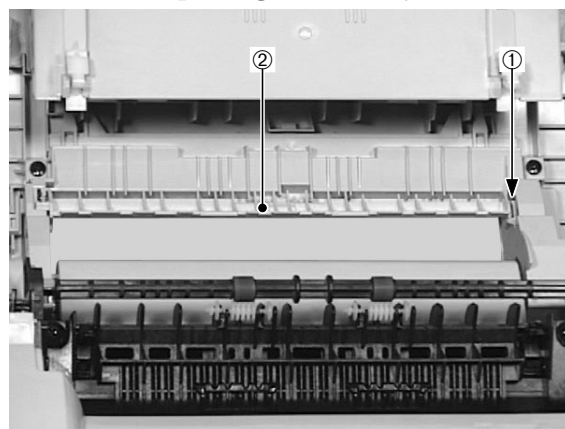


- ① Claw
- ② Right arm
- ③ Cartridge cover unit

Figure 3-2-3

- 3) Remove the left arm from the cartridge cover unit in the same way.

- 4) Unhook the claw with a precision slot head screw driver, and then remove the deflector pulling it toward you.



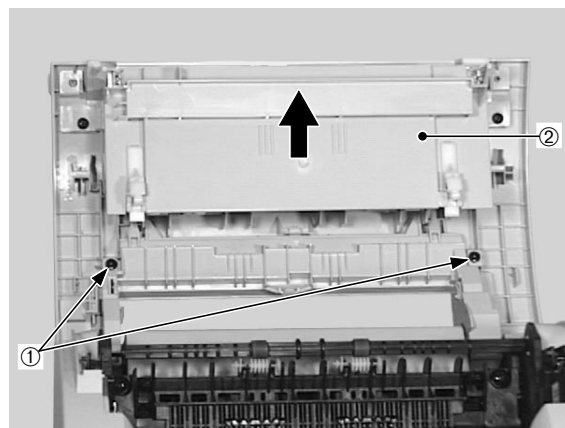
- ① Claw
- ② Deflector

Figure 3-2-4

<< Note for reassembly >>

Paper should be delivered face-up when the delivery switching lever is down.

- 5) Remove the 2 screws, and then slide the cartridge cover unit in the direction of the arrow to remove.

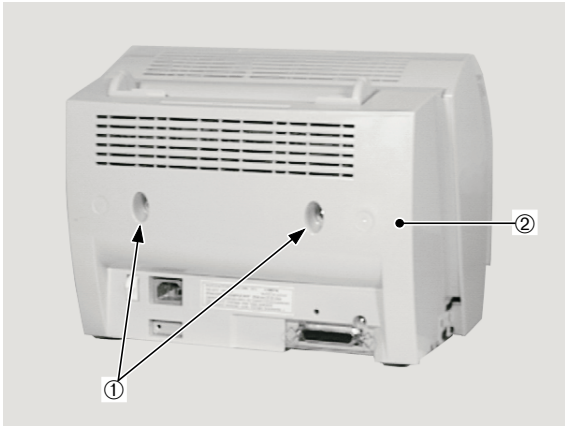


- ① Screws
- ② Cartridge cover unit

Figure 3-2-5

3. Rear cover

- 1) Remove the right and left lobes.
- 2) Remove the 2 screws and pull the lower part of the rear cover to the right and left. Remove the rear cover by lifting it.



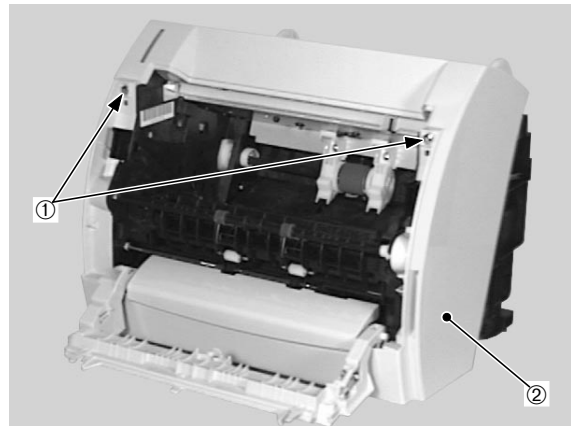
① Screws

② Rear cover

Figure 3-2-6

4. Front cover

- 1) Remove the rear cover
- 2) Remove the 2 screws and pull the lower part of the front cover to the right and left. Remove the front cover by lifting it.



① Screws

② Front cover

Figure 3-2-7

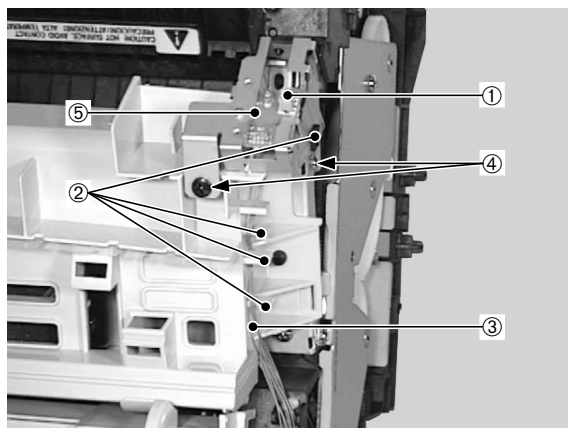
5. Multi-purpose tray

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

III. MAIN UNITS

A. Laser/Scanner Unit

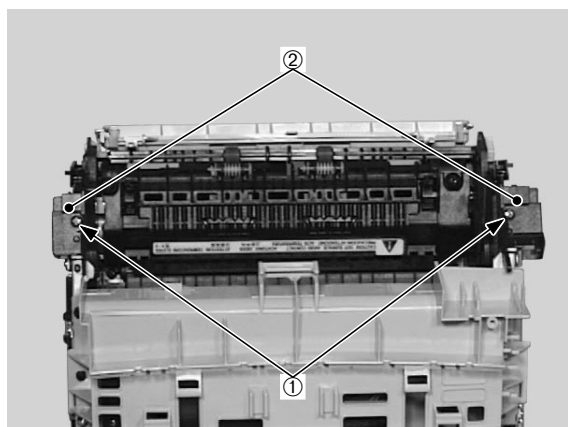
- 1) Remove the external covers.
- 2) Disconnect the connector, and then remove the cable from the cable guide.
- 3) Remove the 2 screws, then the display unit.



- | | |
|----------------|----------------|
| ① Connector | ② Cable guides |
| ③ Cable | ④ Screws |
| ⑤ Display unit | |

Figure 3-3-1

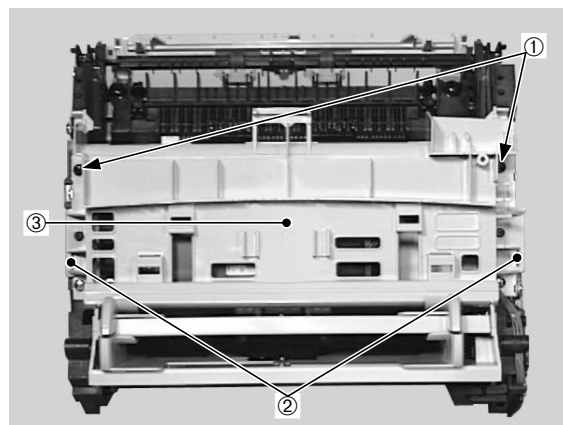
- 4) Remove the 2 screws, then the right and left covers.



- | | |
|----------|----------|
| ① Screws | ② Covers |
|----------|----------|

Figure 3-3-2

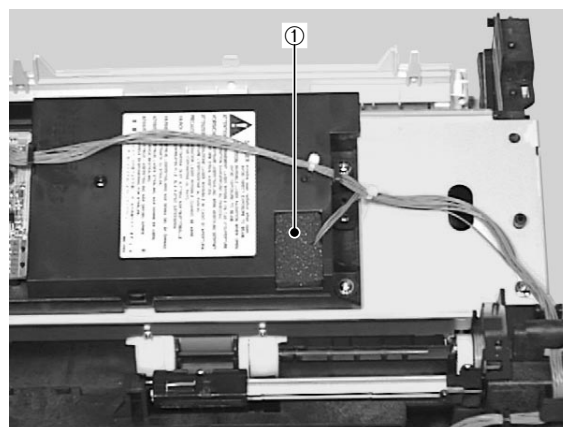
- 5) Remove the 2 screws and 2 claws, then the duct.



- | | |
|----------|---------|
| ① Screws | ② Claws |
| ③ Duct | |

Figure 3-3-3

- 6) Remove the sponge.



- | |
|----------|
| ① Sponge |
|----------|

Figure 3-3-4

<< Note for reassembly >>

Make sure to confirm the sponge attached, when installing the duct.

- 7) Disconnect the 2 connectors and remove the 4 screws. Remove the cable from the cable guides and then the laser/scanner unit.

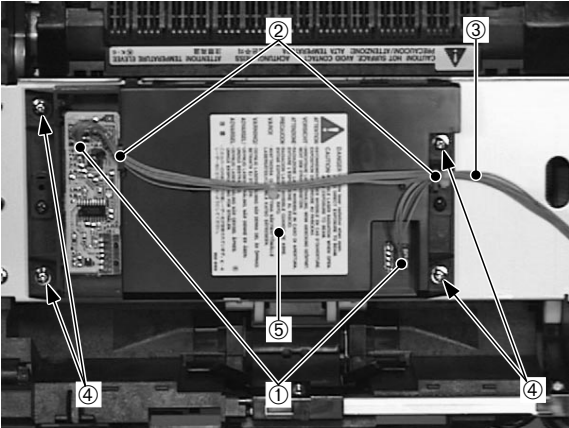


Figure 3-3-5

- ① Connectors
- ② Cable guides
- ③ Cable
- ④ Screws
- ⑤ Laser/scanner unit

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

B. Drive Unit

- 1) Remove the external covers.
- 2) Disconnect the connector from the back of the printer.

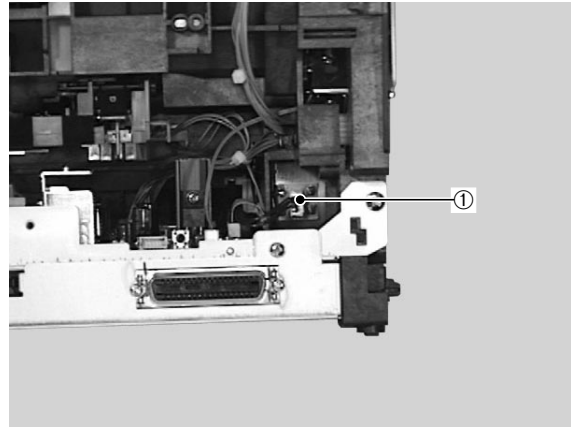
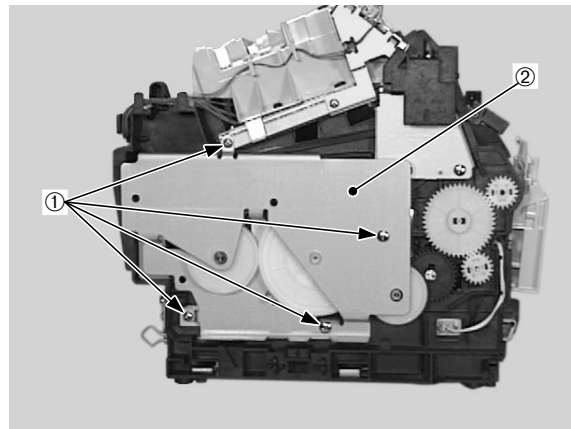


Figure 3-3-6

- ① Connector

- 3) Remove the 4 screws and then the drive unit.

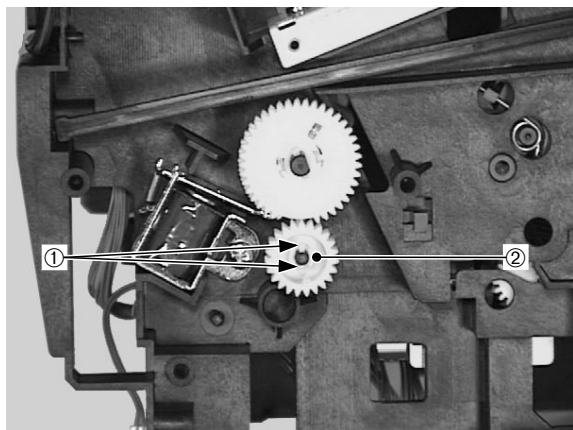


- ① Screws
- ② Drive unit

Figure 3-3-7

C. Feed Unit

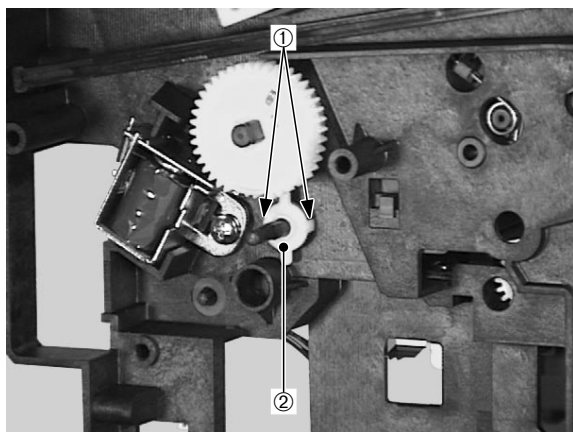
- 1) Performing the engine controller PCB removal procedures 1) through 6) on page 3-21, remove the engine controller unit.
- 2) Unhook the 2 claws and remove the 2 gears and the spring.



① Claws ② Gears

Figure 3-3-8

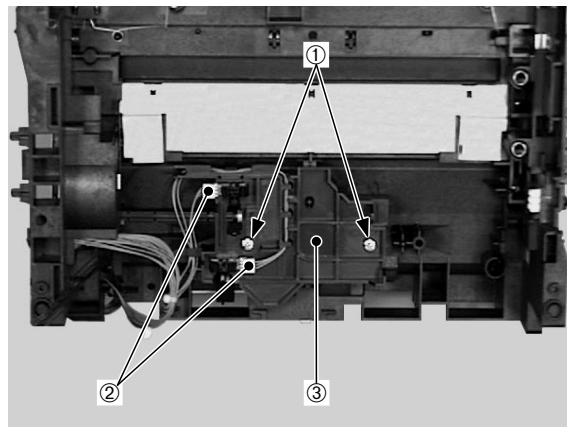
- 3) Pressing the 2 claws, remove the bushing.



① Claws ② Bushing

Figure 3-3-9

- 4) Remove the 2 screws, disconnect the 2 connectors, and then remove the feed unit.



① Screws ② Connectors
③ Feed unit

Figure 3-3-10

D. Delivery Unit

- 1) Open the cartridge cover unit.
- 2) Pressing the claw, remove the face-down delivery roller holder, and then slide the face-down delivery roller to the right to remove.

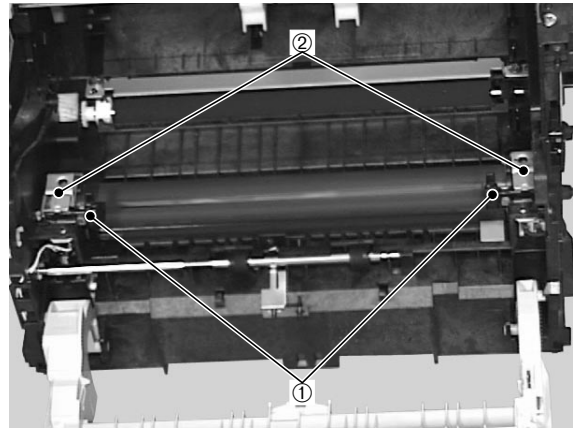


- ① Claw
- ② Face-down delivery roller holder
- ③ Face-down delivery roller

Figure 3-3-11

E. Fixing Film Unit

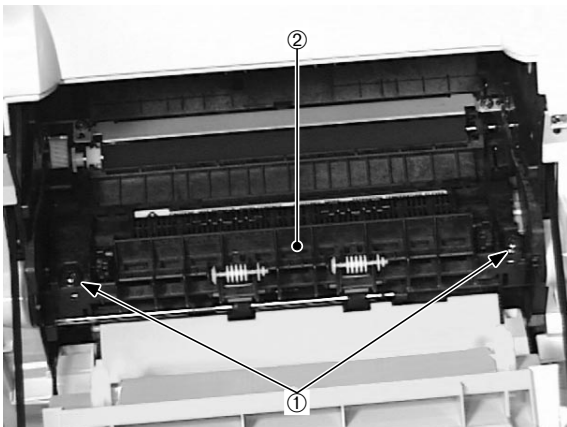
- 1) Remove the external covers.
- 2) Remove the delivery unit.
- 3) Make sure that the pressure release lever is up. Slide the right and left fixing pressure units inward by pushing down on them.



- ① Pressure release lever
- ② Fixing pressure units

Figure 3-3-13

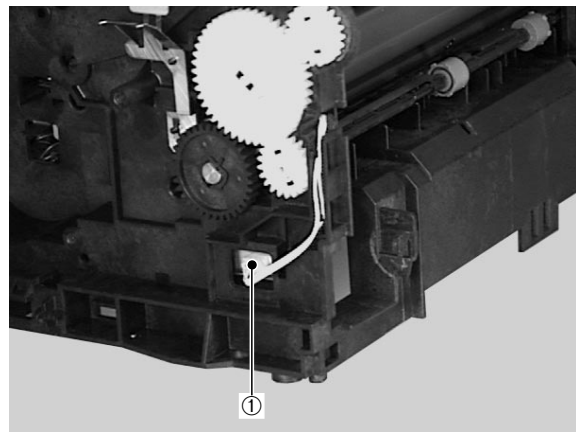
- 3) Remove the 2 screws. Then, slide the delivery unit to the right to remove.



- ① Screws
- ② Delivery unit

Figure 3-3-12

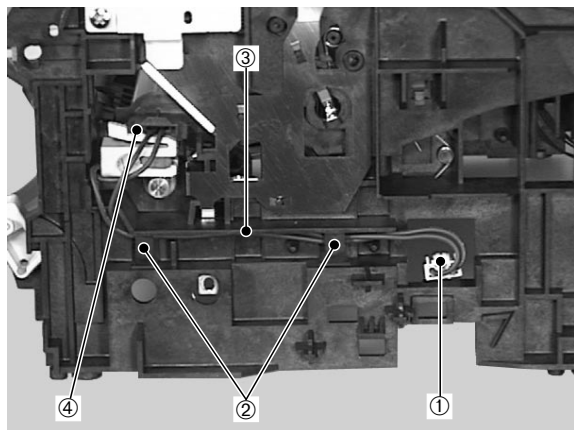
- 4) Disconnect the connector.



- ① Connector

Figure 3-3-14

- 5) Disconnect the connector and remove the cable from the cable guides.
- 6) Remove the fixing film unit.

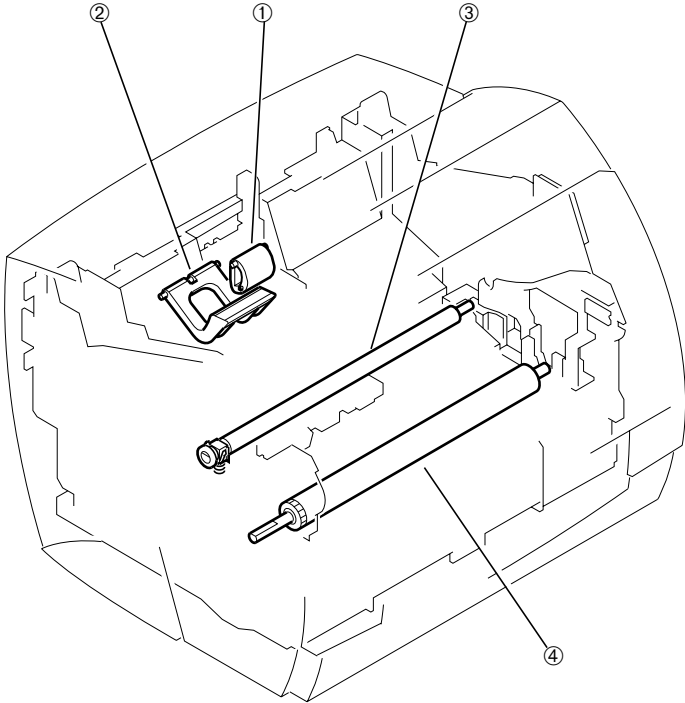


- ① Connector
- ② Cable guides
- ③ Cable
- ④ Fixing film unit

Figure 3-3-15

IV. MAIN PARTS

A. Locations

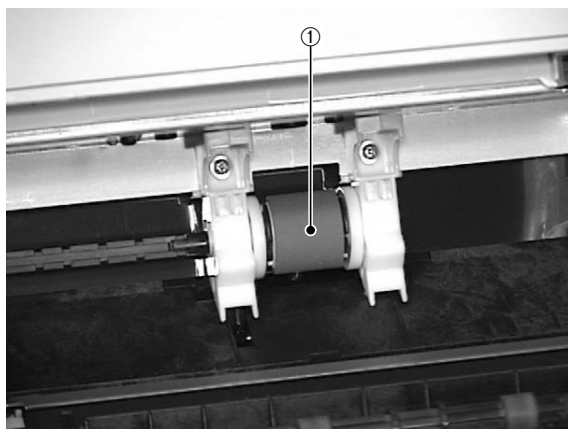


- ① Pick-up roller
- ② Separation pad
- ③ Transfer charging roller
- ④ Pressure roller

Figure 3-4-1

B. Pick-up Roller

- 1) Open the cartridge cover unit.
- 2) Remove the pick-up roller by pulling the lower part toward you.

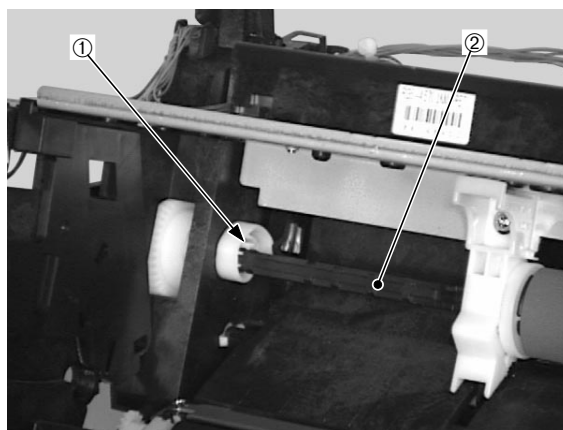


① Pick-up roller

Figure 3-4-2

C. Separation Pad

- 1) Performing the laser/scanner unit removal procedures 1) through 5) on page 3-5, remove the duct.
- 2) Performing the drive unit removal procedures on page 3-6, remove the drive unit.
- 3) Remove the claw to slide the pick-up roller shaft to the left.



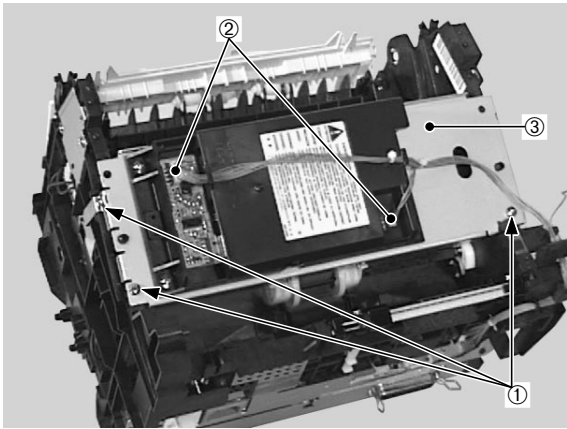
① Claw

② Pick-up roller shaft

Figure 3-4-3

- 4) Remove the sponge of the laser/scanner unit.

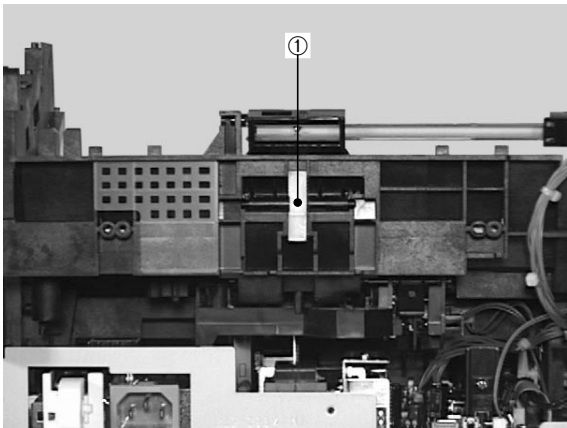
- 5) Remove the 3 screws and disconnect the 2 connectors, and then remove the scanner mounting unit.



- ① Screws
- ② Connectors
- ③ Scanner mounting unit

Figure 3-4-4

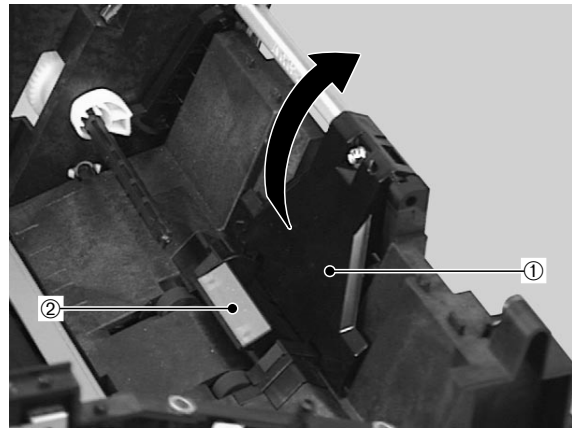
- 6) Remove the pad fixture on the back of the printer by sliding it upward.



- ① Pad fixture

Figure 3-4-5

- 7) Moving the lifting plate unit in the direction of the arrow, remove the separation pad.



- ① Lifting plate unit
- ② Separation pad

Figure 3-4-6

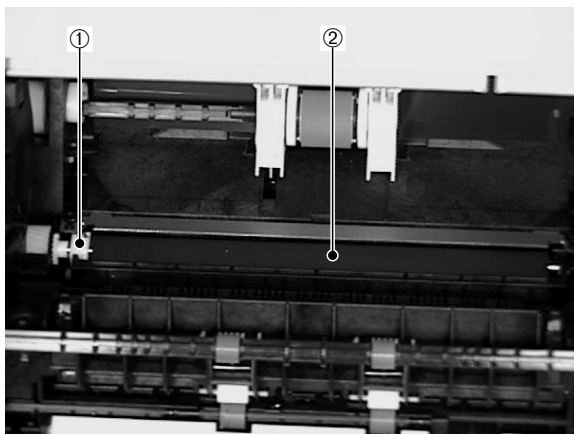
- 8) Remove the spring from the separation pad.

<< Note for reassembly >>

Make sure to set the spring securely, when installing the separate pad/lifting plate unit.

D. Transfer Charging Roller

- 1) Open the cartridge cover unit.
- 2) Holding the 2 claws on the left side of the bushing, lift the transfer charging roller, and then slide it to the left to remove.



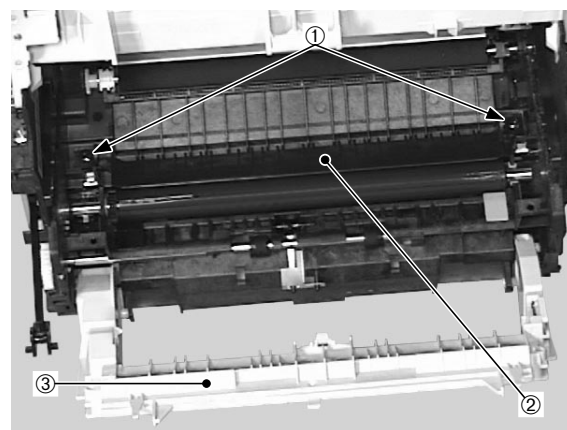
- ① Bushing
- ② Transfer charging roller

Figure 3-4-7

Note: Hold the shaft of the transfer charging roller. Do not hold the sponge area.

E. Pressure Roller

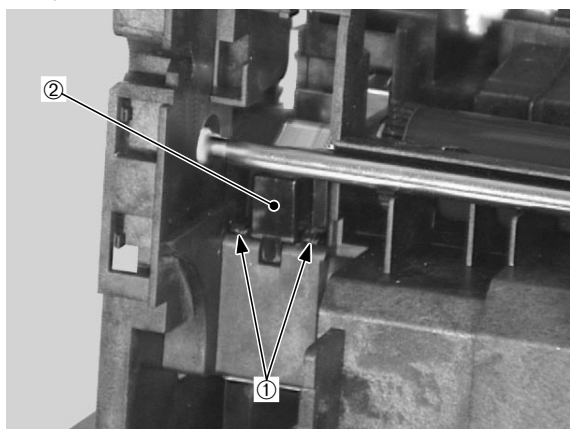
- 1) Performing the drive unit removal procedures on page 3-6, remove the drive unit.
- 2) Performing the fixing unit removal procedures on page 3-8, remove the fixing film unit.
- 3) Remove the 2 screws and then the fixing entrance guide.
- 4) Remove the holder.



- ① Screws
- ② Fixing entrance guide
- ③ Holder

Figure 3-4-8

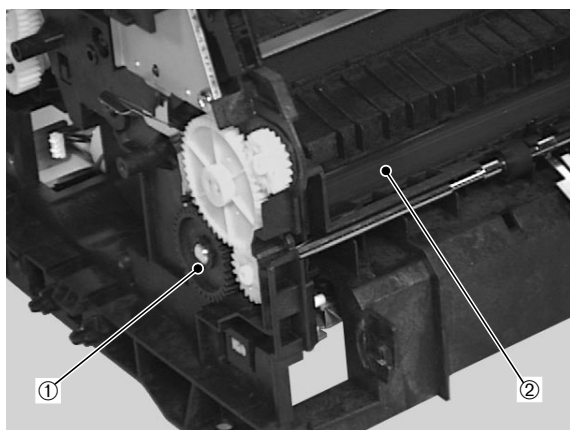
- 5) Remove the 2 claws. Remove the fixing bias contact unit by pulling it toward you.



- ① Claws
② Fixing bias contact unit

Figure 3-4-9

- 6) Remove the gear. Lift up the right shaft and slide it to the right to remove the pressure roller.

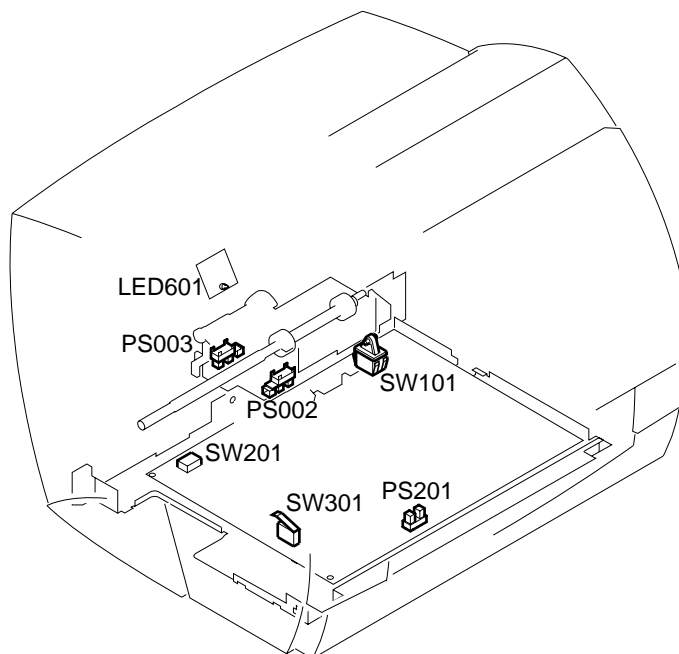


- ① Gear ② Pressure roller

Figure 3-4-10

V. SWITCHES/SENSORS/LEDS

A. Locations



- SW101: Power switch (Engine controller PCB)
- SW201: Test print switch (Engine controller PCB)
- SW301: Door open detection switch (Engine controller PCB)
- PS002: Paper top sensor
- PS003: Paper-out sensor
- PS201: Paper delivery sensor (Engine controller PCB)
- LED601: Display unit LED (Display PCB)

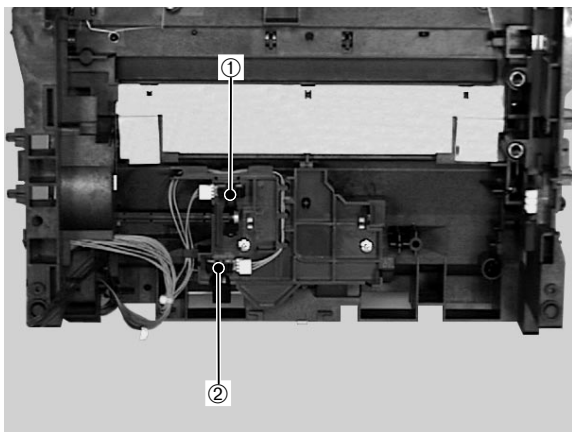
Figure 3-5-1

B. Paper Top Sensor/Paper-out Sensor

- 1) Performing the feed unit removal procedures on page 3-7, remove the feed unit.
- 2) Remove the paper top sensor or paper-out sensor.

D. Display Unit LED

- 1) Performing the display PCB removal procedures on page 3-23, remove the display PCB.



① Paper top sensor ② Paper-out sensor

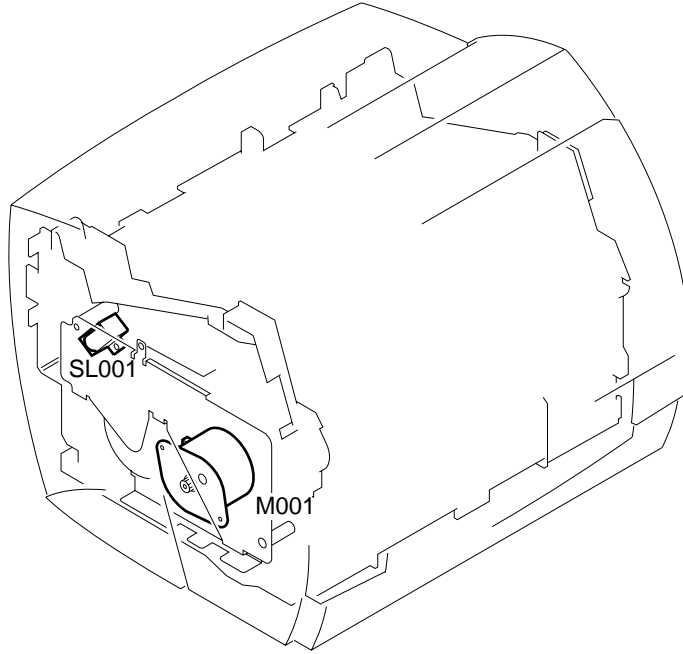
Figure 3-5-2

C. Power Switch/Test Print Switch/Door Open Detection Switch/Paper Delivery Sensor

- 1) Performing the engine controller PCB removal procedures on page 3-21, remove the engine controller PCB.

VI. MOTOR/SOLENOID

A. Locations



M001: Main motor
SL001: Pick-up solenoid

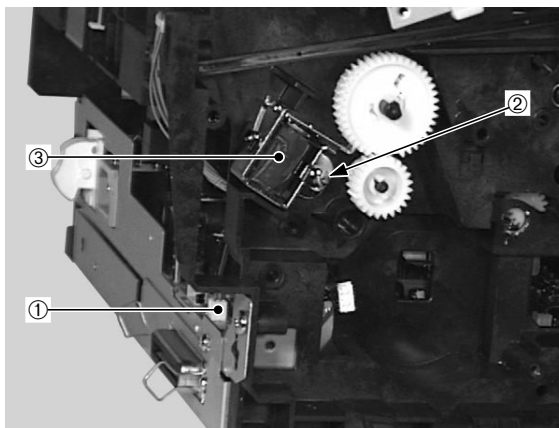
Figure 3-6-1

B. Main Motor

- 1) Performing the drive unit removal procedures on page 3-6, remove the drive unit.
- 2) Remove the 2 screws, and then the main motor.

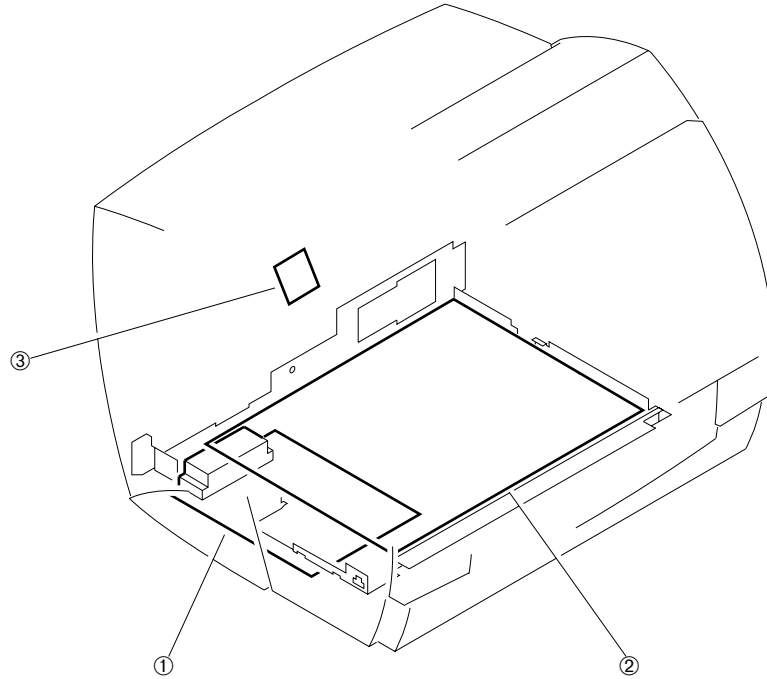
C. Pick-up Solenoid

- 1) Performing the drive unit removal procedures on page 3-6, remove the drive unit.
- 2) Disconnect the connector from the engine controller PCB, remove the screw and then the pick-up solenoid.



- ① Connector ② Screw
③ Pick-up solenoid

Figure 3-6-2

VII. PCBs**A. Locations**

- ① Interface controller PCB
- ③ Display PCB

- ② Engine controller PCB

Figure 3-7-1

B. Interface Controller PCB

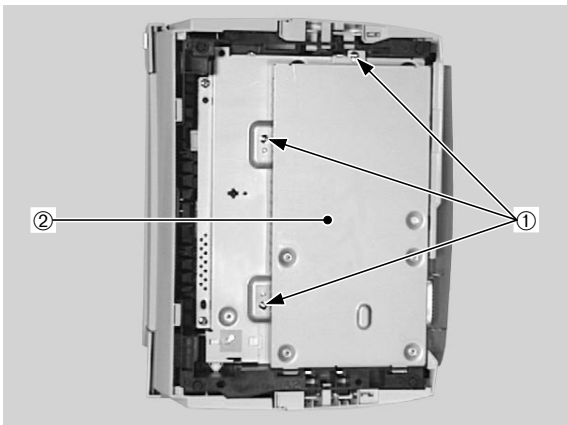
1) Remove the 3 screws



① Screws

Figure 3-7-2

2) Remove the 3 screws and pull the interface controller unit to place it down.

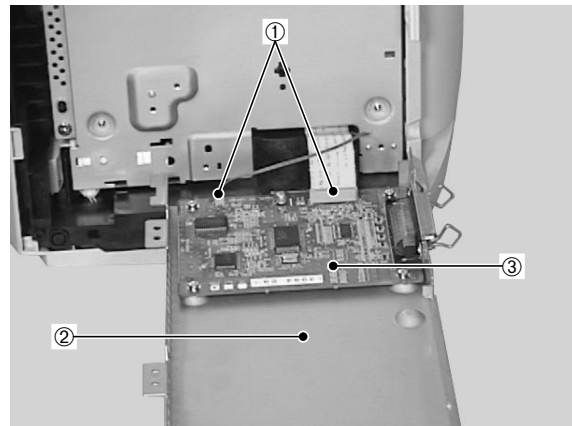


① Screws

② Interface controller unit

Figure 3-7-3

3) Disconnect the 2 connectors and remove the interface controller unit.



① Connectors

② Interface controller unit

③ Interface controller PCB

Figure 3-7-4

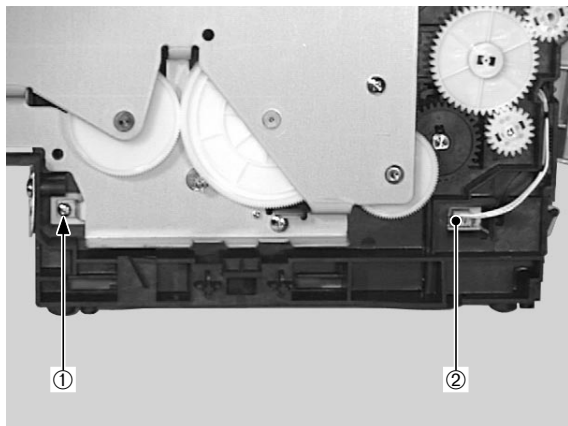
4) Remove the 4 screws and then the interface controller PCB.

<< Note for reassembly >>

Make sure to install each of the two connectors in the right positions when installing the interface controller unit.

C. Engine controller PCB

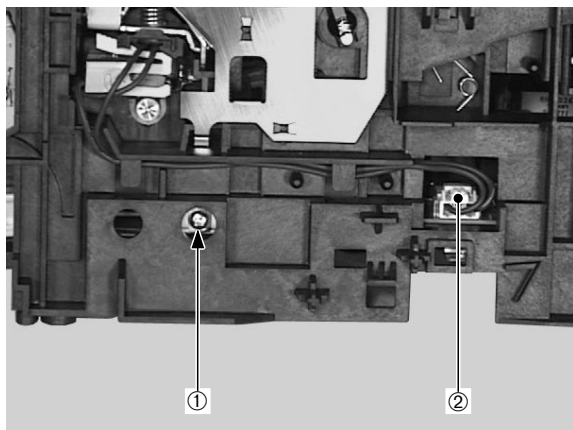
- 1) Remove the external covers.
- 2) Performing the interface controller PCB removal procedures 1) through 3) on page 3-20, remove the interface controller unit.
- 3) Remove the screw on the left of the printer, and disconnect the connector.



① Screw ② Connector

Figure 3-7-5

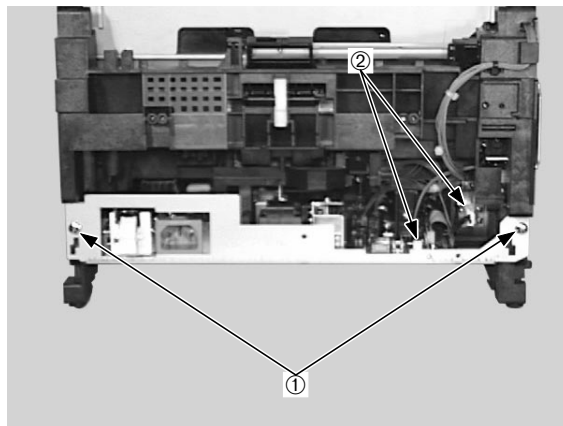
- 4) Remove the screw on the right of the printer, and disconnect the connector.



① Screw ② Connector

Figure 3-7-6

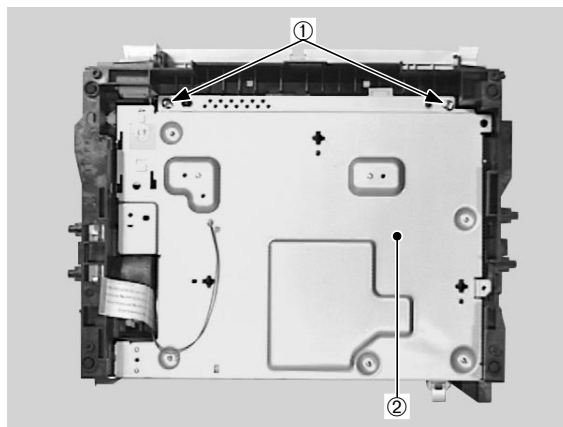
- 5) Remove the two screws on the back of the printer, and disconnect the two connectors.



① Screws ② Connectors

Figure 3-7-7

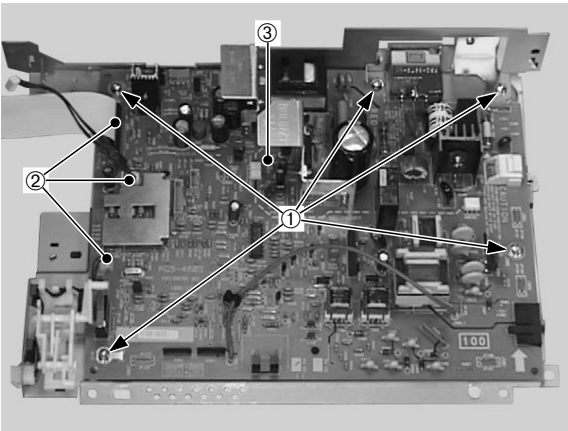
- 6) Remove the 2 screws. Pull out the engine controller unit toward you to disconnect the 2 connectors on the engine controller PCB. Remove the engine controller unit.



① Screws
② Engine controller unit

Figure 3-7-8

- 7) Remove the 5 screws and disconnect the 3 connectors, and then remove the engine controller PCB.

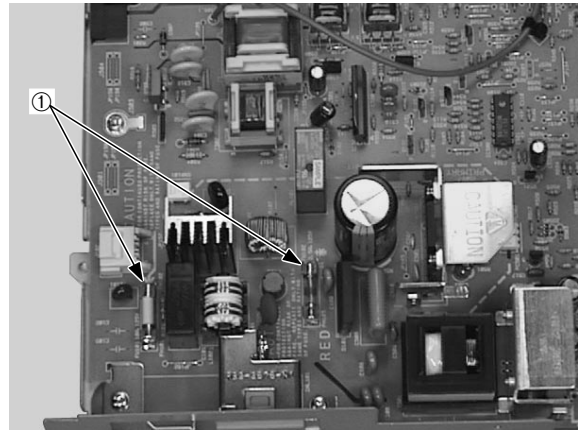


- ① Screws
- ② Connectors
- ③ Engine controller PCB

Figure 3-7-9

a. Fuses

- 1) Performing the engine controller PCB removal procedures 1) through 6) on page 3-21, remove the engine controller unit.
- 2) Remove the fuses.



- ① Fuses

Figure 3-7-10

Note: Make sure to install each fuse in the right position, when installing them.

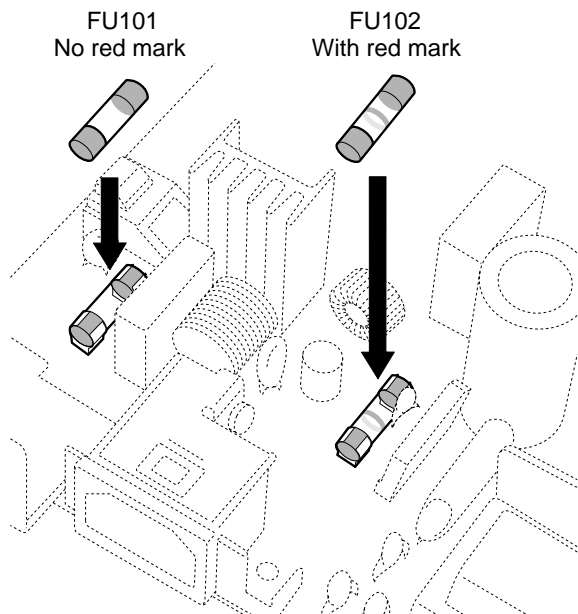
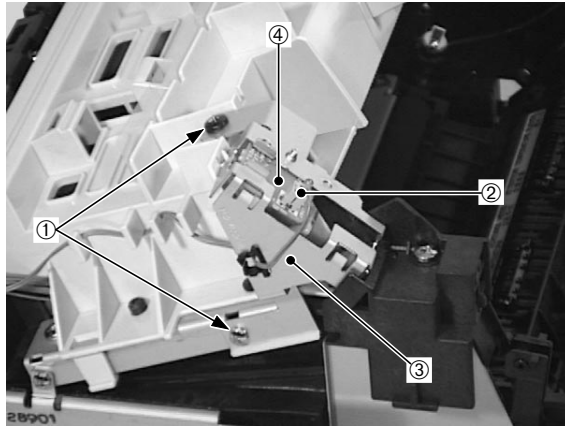


Figure 3-7-11

D. Display PCB

- 1) Remove the external covers.
- 2) Remove the 2 screws, disconnect the connector, and then remove the display unit.



- | | |
|----------------|---------------|
| ① Screws | ② Connector |
| ③ Display unit | ④ Display PCB |

Figure 3-7-12

- 3) Remove the screw and then the display PCB.

CHAPTER 4

TROUBLESHOOTING

I. PREFACE.....	4-1	VI. MALFUNCTION STATUS	
II. IMAGE DEFECTS	4-6	 TROUBLESHOOTING.....	4-17
III. JAMS TROUBLESHOOTING.....	4-12	VII. MEASUREMENT AND	
IV. TRANSPORT		 ADJUSTMENT.....	4-20
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I. PREFACE

A. Malfunction Diagnosis Flowchart

The malfunctions that occur in the printer are mainly classified to five factors; “image defects”, “jams”, “transport defect”, “malfunction”, and “malfunction status”.

If a malfunction occurred in the printer, the service technician is to identify the factor according to the flowchart and then to rectify the problem according to the action procedures of 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 metal part of the printer to discharge static electricity, as it can cause damage to the PCBs.
- The laser/scanner unit cannot be adjusted in the field, so do not attempt to disassemble it.

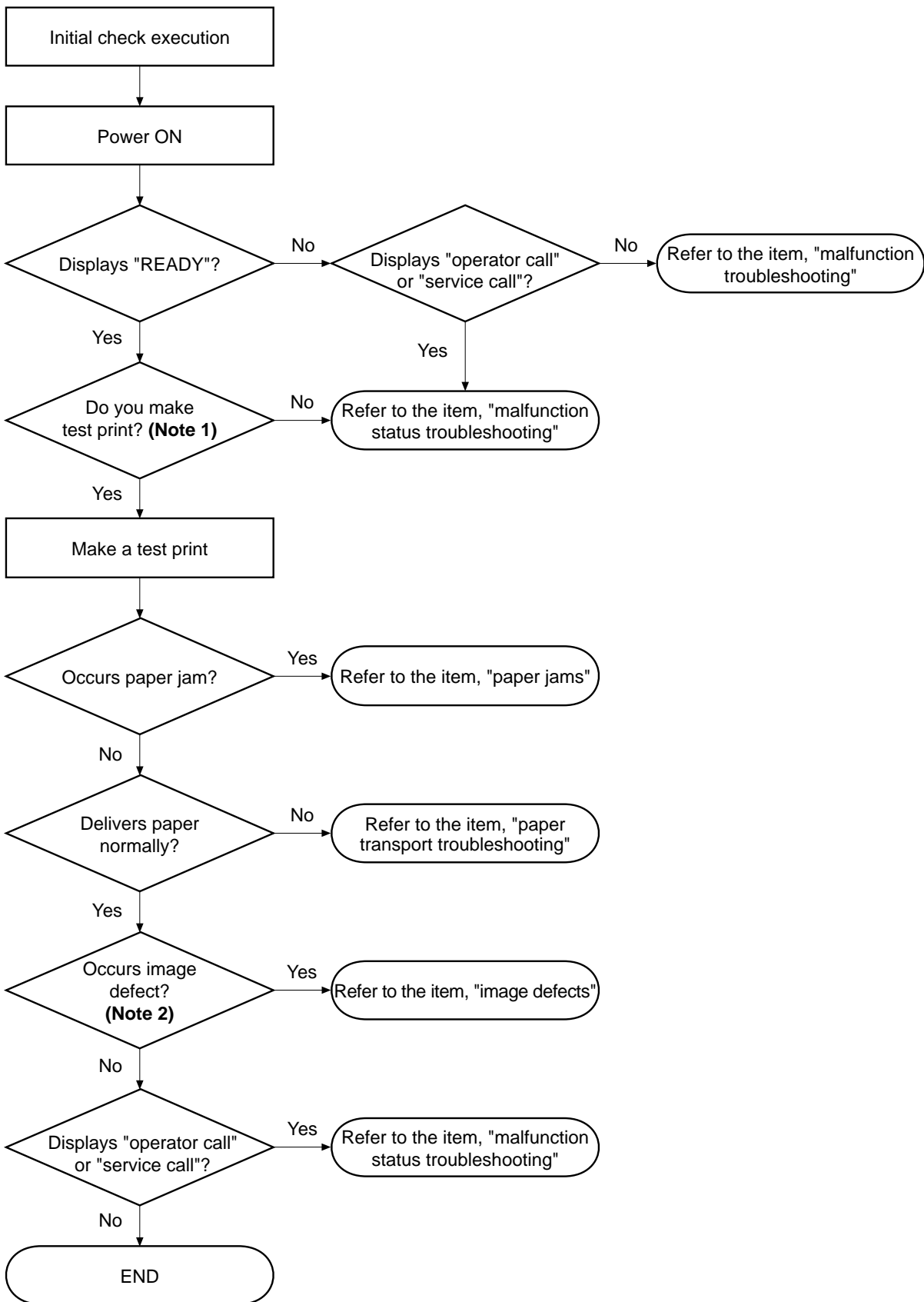


Figure 4-1-1

-
- Notes:** **1.** Before executing a test print, make sure to select the 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 test print from the 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 problems and to give instructions to the user.

1. Installation environment

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

- a. The power supply voltage is $\pm 10\%$ (100-127V) or from + 6% to - 10% (220-240V) of the rated voltage.
- b. The printer is 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, areas with high temperature and high humidity (near water faucet, kettle, humidifier), areas near open flames, and dusty place.
- e. Avoid sites exposed to direct sunlight. If unavoidable, advise the customer to hang curtains.
- f. The printer is installed at a well-ventilated place.
- g. Make sure that the power supply plug is inserted to the printer and the outlet.

2. Paper

Confirm that:

- a. Recommended paper is being used.
- b. The paper is not moist.

3. Loading paper into the pick-up source

- a. The stack of paper loaded into the pick-up source should be within the specified capacity of the source.
- b. The paper is set in the selected pick-up source correctly.

4. Installing the EP-22 cartridge

The EP-22 cartridge should be installed correctly.

5. Condensation

During winter, if the printer is brought from a cold place (such as a warehouse) into a warm room, condensation will appear inside the printer, causing various problems.

For example:

- a. Condensation on a scanner (such as 4-faced scanning mirrors, reflective mirror, and lense) will cause a light print image.
- b. If the photosensitive drum is cold, the electrical resistance will be high, making it impossible to obtain correct contrast in prints.

If condensation appears, wipe these assemblies with dry cloth, or leave the printer power on for 10 - 20 minutes.

If an EP-22 cartridge is unsealed immediately after it is brought from a cold palce into a warm room, condensation will also appear inside the cartridge; this can cause various troubles.

Be sure to instruct the customer that the cartridge needs to be left at a room temperature for 1 or 2 hours before unsealing it.

C. Test Print

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

If an image defect occurred in this printer, make a test print and assess the abnormality of the printer.

1. Engine test print

Execution of a test print prints the test print pattern shown in Figure 4-1-3.

The test print procedures are as follows.

- 1) Load paper into the printer and switch the power ON.
- 2) When the printer is in the STANDBY mode, press the test print switch (with the arrow pointing in Figure 4-1-2, in the hole) with a precision slot head screw driver, and print a test print (shown in Figure 4-1-3.)



Figure 4-1-2

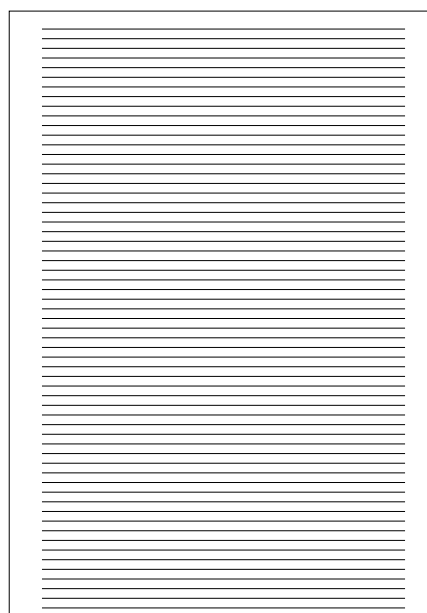


Figure 4-1-3

- 3) Identify the contents of the failure from the test print and rectify the problem according to the action procedures of image defects. Test pattern can be printed continuously as long as the test print switch is held down.

Note: Use paper with B5 size or above in width for a test print.

2. Controller test print

Refer to Chapter 1 on Page 1-62 or 1-64.

II. IMAGE DEFECTS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an “image defect” is found, the defective part must be located and rectified by the following procedure.

Table 4-2-1

Image defects

Defects	Additional explanation
2-1 Light	Output very light image.
2-2 Dark	Output very dark image.
2-3 Completely blank	Output no image.
2-4 All black	Output all black paper.
2-5 Dirt on back of paper	Output dirt on the back of the paper.
2-6 Dirt	Output dirt on surface of the paper.
2-7 Black vertical lines	Output black vertical lines.
2-8 White vertical lines	Output white vertical lines.
2-9 Black horizontal lines	Output black horizontal lines.
2-10 White horizontal lines	Output white horizontal lines.
2-11 Blank spots	Output image with blank spots.
2-12 Poor fixing	Output image with poorly fixed toner.
2-13 Image distortion	Output distorted image.
2-14 Faulty registration	Gap between the leading edges of the paper and the image.

II-1. Light

<Possible causes>

- 1) Improperly adjusted image density
Action: Adjust the image density by operating the external device.

- 2) Open the top cover and remove the EP-22 cartridge while printing. Open the drum protective shield of the cartridge and check the toner image on the photosensitive drum surface. 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) Deformation or deterioration of the transfer charging roller.
Action: Replace the transfer charging roller.

- 4) Poor contact in the transfer charging roller contact on the engine controller PCB and the transfer charging roller shaft contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

- 5) Defective laser/scanner unit
Action: Replace the laser/scanner unit.
- 6) Defective engine controller PCB
Action: Replace the engine 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) Poor contact in the drum grounding contact on the engine controller PCB and cartridge contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.
- 3) Poor contact in the primary high voltage contact on the engine controller PCB and cartridge contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.
- 4) Defective laser/scanner unit
Action: Replace the laser/scanner unit.
- 5) Defective engine controller PCB
Action: Replace the engine controller PCB.

II-3. Completely blank

<Possible causes>

- 1) Damaged laser shutter open/close projection of the cartridge cover
Action: Replace the cartridge cover.
- 2) Poor contact in the developing bias contact on the engine controller PCB and cartridge contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.
- 3) Defective engine controller PCB
Action: Replace the engine controller PCB.

II-4. All black

<Possible causes>

- 1) Poor contact in the primary high voltage contact on the engine controller PCB and cartridge contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

- 2) Defective primary charging roller
Action: Replace the cartridge.
- 3) Defective engine controller PCB.
Action: Replace the engine controller PCB.

II-5. Dirt on back of paper

<Possible causes>

- 1) Periodic dirt (transfer charging roller, pressure roller)
Action: Identify and clean the dirty roller according to Table 4-2-2 on page 4-11. If dirt cannot be removed, replace the dirty roller.
- 2) Dirty feed guide or fixing unit entrance guide
Action: Clean the dirty areas.
- 3) Dirty delivery roller
Action: Clean the delivery roller.

II-6. Dirt

<Possible causes>

- 1) Periodic dirt (pick-up roller, fixing film unit, EP-22 cartridge)
Action: Identify and clean the dirty part(s) according to Table 4-2-2 on page 4-11. If the dirt cannot be removed, replace the dirty part(s).
- 2) Dirty face-down delivery sub-roller or fixing delivery sub-roller
Action: Clean the face-down delivery sub-roller or fixing delivery sub-roller.

II-7. Black vertical lines

<Possible causes>

- 1) Circumferential scars on the photosensitive drum
Action: Replace the cartridge.
- 2) Dirty fixing unit entrance guide
Action: Clean the guide.
- 3) Scar(s) on fixing film unit
Action: Replace the fixing film unit.

II-8. White vertical lines

<Possible causes>

- 1) Lack of toner
Action: Remove the cartridge from the printer. Rock the cartridge in the way described on page 1-9 Chapter 1, and then install it back to the printer. If the problem still remains, 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 deposited on the laser outlet of the printer or the laser inlet of the cartridge.
Action: Remove the foreign materials.
- 5) Toner adhered to the face-down delivery sub-roller or fixing delivery sub-roller
Action: Clean the face-down delivery sub-roller or fixing delivery sub-roller.
- 6) Dirt or foreign materials on the fixing unit entrance guide.
Action: Clean the fixing unit entrance guide.
- 7) Foreign materials on the fixing film unit
Action: Replace the fixing film unit.
- 8) Dirty mirror in the laser/scanner unit
Action: Replace the laser/scanner unit.

II-9. Black horizontal lines

<Possible causes>

- 1) Horizontal scar(s) on the photosensitive drum
Action: Replace the cartridge.
- 2) Dirty, deformed or worn fixing film
Action: Replace the fixing film unit.

II-10. White horizontal lines

<Possible causes>

- 1) Horizontal scar(s) on the photosensitive drum
Action: Replace the cartridge.
- 2) Defective fixing film unit
Action: Replace the fixing film unit.

II-11. Blank spots

<Possible causes>

- 1) Lack of toner
Action: Remove the cartridge from the printer. Rock the cartridge in the way described on page 1-9 Chapter 1, and then install it back to the printer. If the problem still remains, replace the cartridge.

- 2) Dirty or deformed transfer charging roller.
Action: Replace the transfer charging roller.
- 3) Defective photosensitive drum or developing cylinder
Action: Replace the cartridge.

II-12. Poor fixing

<Possible causes>

- 1) The nip width of the fixing unit is not within specification
Action: Replace the fixing pressure units.
- 2) Dirty pressure roller
Action: Clean the pressure roller. If the dirt cannot be removed, replace the pressure roller.
- 3) Scar(s) or dent(s) on the pressure roller surface
Action: Replace the pressure roller.
- 4) Scar(s) or dent(s) on the fixing film
Action: Replace the fixing film unit.
- 5) Deterioration of the thermistor
Action: Replace the fixing film unit.

II-13. Image distortion

<Possible causes>

- 1) Poor contact in the connectors on the laser/scanner unit
Action: Reconnect connector J208F on the engine controller PCB, or connector J801F and J802F on the laser/scanner unit correctly.
- 2) Defective laser/scanner unit.
Action: Replace the laser/scanner unit.
- 3) Defective engine controller PCB
Action: Replace the engine controller PCB.

II-14. Faulty registration

<Possible causes>

- 1) Dirty or worn pick-up roller
Action: Clean the pick-up roller. Replace the roller if the dirt cannot be removed or the roller is worn.
- 2) Dirty or worn feed roller
Action: Clean the feed roller. Replace the roller if the dirt cannot be removed or the roller is worn.

3) Paper top sensor lever

Action: Replace the lever if it does not move smoothly or is damaged.

Table 4-2-2

Periodical dirt and spots appearing on the image

Susceptible location	Diameter (mm)	Period of the image (mm)	Phenomenon			
			Dirt	Blank spots	Dirt on back of paper	Poor fixing
Transfer charging roller	14.4	Approx. 45		○	○	
Fixing film unit	24	Approx. 75	○	○		○
Pressure roller	20	Approx. 63			○	○
Feed roller	16.5	Approx. 52	○		○	
Photosensitive drum	24	Approx. 75	○	○		
Developing cylinder	12	Approx. 38	○	○		
Primary charging roller	12	Approx. 38	○	○		

III. JAMS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If a “jams” is found, the defective part must be located and rectified by the following procedure.

The paper route can be divided into two sections: 1) paper pick-up and feed unit and 2) fixing and delivery unit.

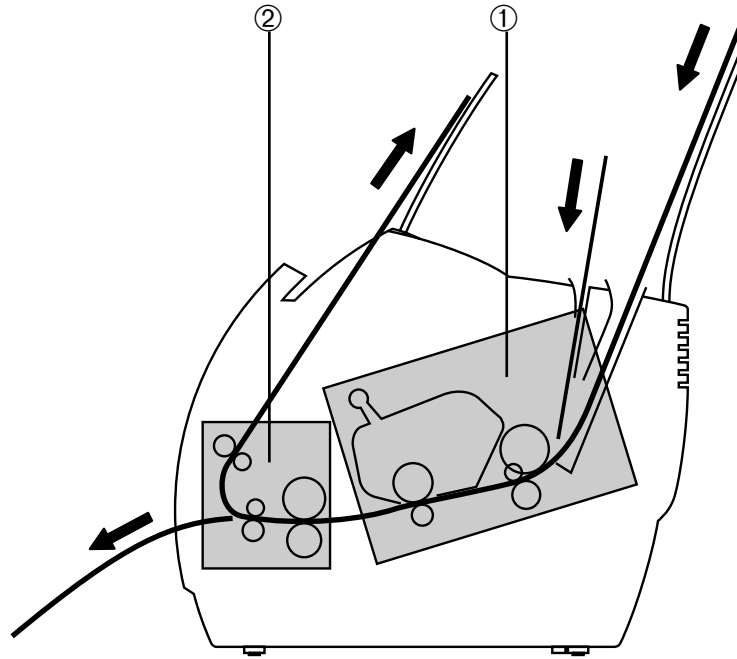


Figure 4-3-1

III-1. Paper pick-up unit

<Possible causes>

- 1) The paper top sensor lever does not move smoothly or is damaged.
Action: Replace the paper top sensor lever if damaged. If this does not rectify the situation, replace the sensor (PS002).
- 2) Defective paper top sensor lever spring
Action: Set the spring in the right position if out of place. Replace the spring if deformed or damaged.
- 3) Worn, deformed or dirty pick-up roller or feed roller
Action: Clean them if dirty. Replace them if worn or deformed.
- 4) Defective lifting plate spring
Action: Set the spring in the right position if out of place. Replace the spring if deformed or damaged.
- 5) Poor contact in the connectors on the main motor drive signal line.
Action: Reconnect connector J007F on the main motor or connector J401F on the engine controller PCB.
- 6) Poor contact in the connectors on the pick-up roller solenoid drive signal line.
Action: Reconnect connector J204F on the engine controller PCB.
- 7) Defective pick-up roller solenoid
Action: Disconnect connector J204F on the engine controller PCB. Measure the resistance value between connector J204-1 and J204-2 on the cable. If the measured value is not about 120 Ω , replace the pick-up roller solenoid.
- 8) Defective paper top sensor
Action: Replace the paper top sensor.
- 9) Defective main motor
Action: Replace the main motor.
- 10) Defective engine controller PCB
Action: Replace the engine controller PCB.

III-2. Fixing and delivery unit

<Possible causes>

- 1) Defective deflector
Action: If the deflector is worn, broken, nicked or damaged, replace it.
- 2) Dirty or scarred fixing unit entrance guide or toner attached to the guide.
Action: Clean the guide if dirty. Replace the guide if the dirt cannot be removed.
- 3) The pressure (nip width) of the pressure roller is not within specification.
Action: Replace the fixing pressure units.

- 4) The pressure roller does not rotate smoothly.
Action: Check whether the gear is worn or damaged. If the pressure roller is worn, replace it.
- 5) Deformed or damaged fixing film unit or pressure roller
Action: If deformed or damaged, replace it.
- 6) The paper delivery sensor lever does not move smoothly or is damaged.
Action: Adjust the lever to move smoothly. Replace the lever if damaged.
- 7) Defective paper delivery sensor lever spring
Action: Set the spring in the right position if out of place. Replace the spring if damaged or deformed.
- 8) The fixing delivery roller does not rotate smoothly.
Action: Check the gears, and replace any worn or fractured gear(s). If the roller is worn, replace it.
- 9) The face-down delivery roller does not rotate smoothly.
Action: Check the gears, and replace any worn or fractured gear(s). If the roller is worn, replace it.
- 10) Defective engine controller PCB
Action: Replace the engine controller PCB.

IV. TRANSPORT TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If a “transport defect” is found, the defective part must be located and rectified by the following procedure.

IV-1. Multiple feed

<Possible causes>

- 1) Worn or dirty separation pad surface
Action: Clean the separation pad surface if dirty. Replace the separation pad if worn.
- 2) Defective separation pad spring
Action: Set the spring in the right position if out of position. Replace the spring if deformed.
- 3) Worn or dirty sub pad surface
Action: Clean the sub pad surface if dirty. Replace the sub pad if worn.

IV-2. Wrinkles/Folded leading edge

<Possible causes>

- 1) Paper dust and dirt accumulated on the pick-up roller, feed roller, and paper guide
Action: Clean the dirty areas.
- 2) Dirty fixing unit entrance guide and pressure roller
Action: Clean the fixing unit entrance guide and pressure roller.
- 3) Scarred or deformed fixing film unit
Action: Replace the unit if scarred or deformed.
- 4) Scarred or dirty paper guide
Action: Check the paper path. Replace any scarred or deformed guide(s).

IV-3. Skew

<Possible causes>

- 1) Paper dust and dirt accumulated on the pick-up roller, feed roller, and paper guide
Action: Clean the dirty areas.
- 2) Scarred or deformed feed roller
Action: Replace the roller if scarred or deformed.
- 3) Scarred or dirty paper guide
Action: Check the paper path. Replace any scarred or deformed guide(s).

V. MALFUNCTION TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an “malfunction” is found, the defective part must be located and rectified by the following procedure.

V-1. No AC power

<Possible causes>

- 1) Blown fuse (FU101)

Action: Referring to page 3-22 in Chapter 3, replace the fuse (FU101).

- 2) Defective engine controller PCB

Action: Replace the engine controller PCB.

V-2. No DC power

<Possible causes>

- 1) No AC power is supplied.

Action: Make a check according to 5-1 “No AC power”.

- 2) Overcurrent/overvoltage detection circuit activated

Action: If the problem is not rectified after the power switch is turned OFF and then ON again, find the cause of activation of the overcurrent/overvoltage detection circuit in the power supply unit. Wait for two minutes or more before turning the power back ON.

- 3) Blown fuse (FU102)

Action: Referring to page 3-22 in Chapter 3, replace the fuse (FU102).

- 4) Defective engine controller PCB

Action: Replace the engine controller PCB.

VI. MALFUNCTION STATUS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an "malfunction status" is found, the defective part must be located and rectified by the following procedure.

VI-1. Laser failure/BD failure

<Possible causes>

- 1) The laser shutter cannot be opened due to the damaged claw of the cartridge cover.
Action: Replace the cartridge cover.
- 2) Poor contact in the connectors in the laser scanner unit
Action: Reconnect connector J801F, J802F on the laser/scanner unit and connector J208F on the engine controller PCB.
- 3) Defective laser/scanner unit
Action: Replace the laser/scanner unit if the voltage between connector J208M-5 and J208M-6 on the engine controller PCB is about +5V and the voltage between connector J208M-1 and J208M-4 is about +24V immediately after the printer is turned ON.
- 4) Defective engine controller PCB
Action: Replace the engine controller PCB.

VI-2. Fixing unit failure

<Possible causes>

- 1) Poor contact in the connectors
Action: Reconnect connector J206F on the engine controller PCB.
- 2) Broken wire or short circuited thermistor.
Action: Turn OFF the power and remove the fixing unit from the printer. Measure the resistance between connector J009-1 and J009-2 of the fixing unit. If the resistance is not within the range from about 250 k Ω to about 800 k Ω (room temperature), replace the fixing film unit.
- 3) Broken wire of the heater or blown thermal fuse.
Action: Replace the fixing film unit if there is no conductivity between connector J102-1 and J102-2 of the fixing unit when the fixing unit is out of the printer.
- 4) Defective engine controller PCB
Action: Replace the engine controller PCB.

VI-3. The printer cannot enter the READY mode and the "jam status" is output, although a paper jam has not occurred.

<Possible causes>

- 1) Defective paper delivery sensor spring
Action: If the spring is not installed correctly, reinstall it correctly.

- 2) Defective paper delivery sensor lever
Action: Replace the sensor lever if damaged.
- 3) Defective paper top sensor spring
Action: Replace the spring if damaged.
- 4) Defective paper top sensor lever
Action: Replace the lever if damaged.
- 5) Defective engine controller PCB
Action: Replace the engine controller PCB.

VI-4. The printer cannot enter the READY mode and the "door open status" is output, although the door is closed after installing the cartridge,

<Possible causes>

- 1) Damaged connector holder claw of the door switch ON/OFF.
Action: Replace the connector holder.
- 2) Defective door open detection unit
Action: Replace the door open detection unit.
- 3) Defective door open detection switch
Action: Replace the door open detection switch (SW301.)
- 4) Defective engine controller PCB
Action: Replace the engine controller PCB.

VI-5. The printer cannot enter the READY mode and the "paper out status" is output, although paper is set.

<Possible causes>

- 1) Defective paper out sensor lever
Action: Replace the paper out sensor lever if damaged.
- 2) Defective paper out sensor
Action: Replace the paper out sensor (PS003.)
- 3) Defective engine controller PCB
Action: Replace the engine controller PCB.

VI-6. The printer cannot enter the READY mode and the "no cartridge status" is output, although the cartridge is installed.

<Possible causes>

- 1) Poor contact in the primary high-voltage contact on the engine controller PCB and cartridge contact.
Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

- 2) Defective cartridge
Action: Replace the cartridge.

- 3) Defective engine controller PCB
Action: Replace the engine controller PCB.

VII. MEASUREMENT AND ADJUSTMENT

A. Mechanical Adjustment

1. Checking the nip width of the pressure 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 of A4 size using an EP-22 cartridge, and bring the print to the customer's site.
- 2) Place the all-black print in the multi-purpose tray of the printer, with the printed side facing down.
- 3) Select face-up delivery by shifting the delivery switching lever downward.
- 4) Press the test print switch.
- 5) Turn OFF the printer when the leading edge of the print emerges at the face-up tray. Open the top cover and take out the print about 10 seconds later.
- 6) Measure the width of the glossy band across the paper and check that it meets the requirements as shown in Figure 4-10-1.

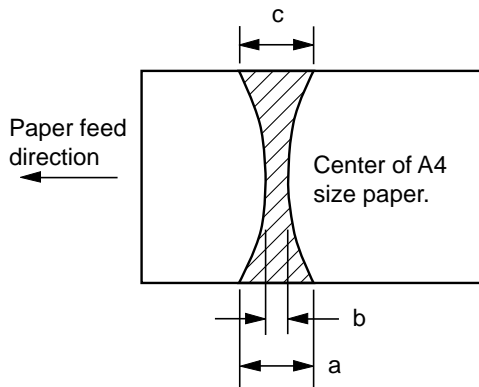


Figure 4-7-1

Table 4-7-1

	Dimensions
a,b,c	4 to 6 [mm]
a - c	0.5 [mm] or less
a - b	1.0 [mm] or less
b - c	1.0 [mm] or less

B. Electrical Adjustment

This printer's electrical system does not require adjustment.

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

Only the LEDs, test pins, jumpers, and switches required during the after-sales service in the field are listed below.

All other 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.

1. Engine controller PCB

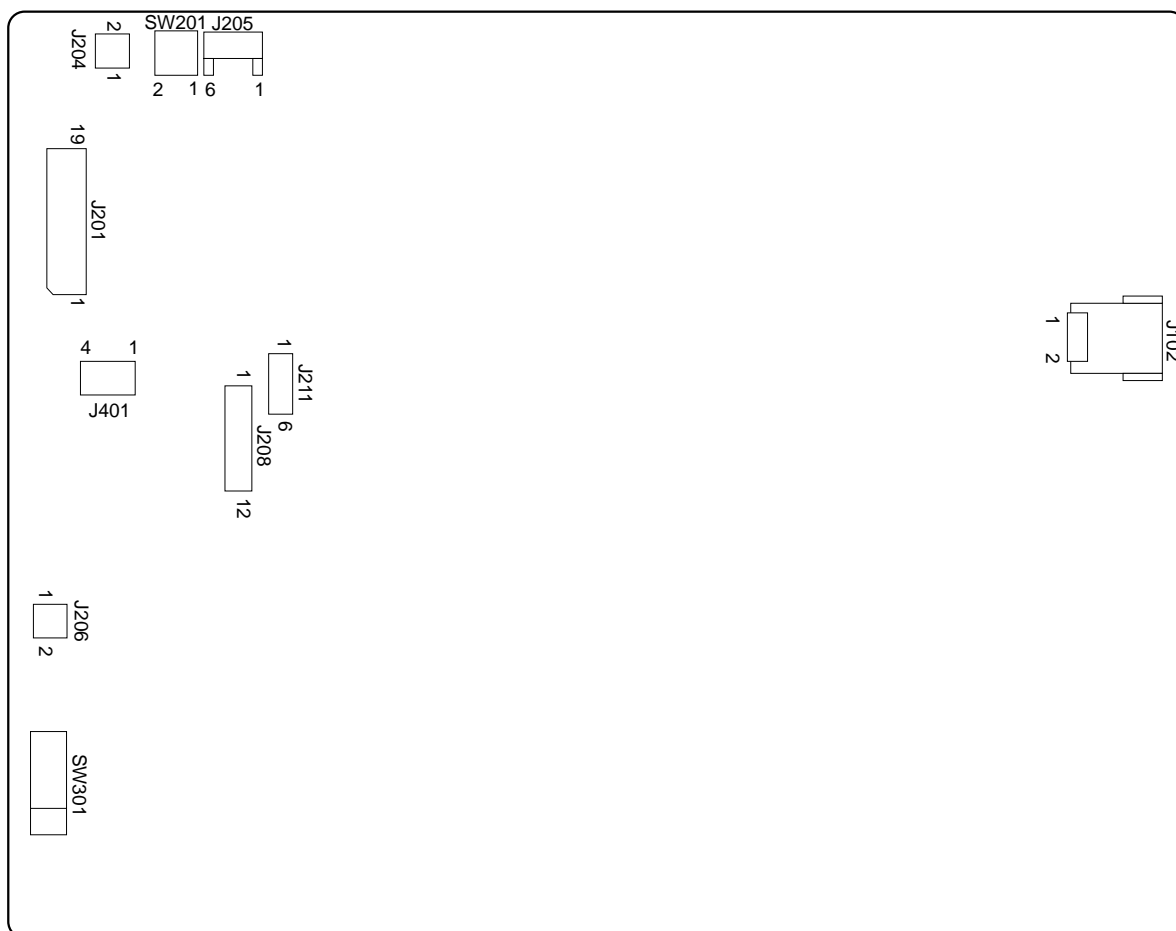


Figure 4-7-2

Table 4-7-2

SW No.	Function
SW201	Switch for test print
SW301	Switch for door open detection

VIII. MAINTENANCE AND SERVICING

A. Periodic Replacement Parts

- This printer does not have any periodic replacement parts.

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 printer performance.) These parts should be replaced during a regular service visit closest to the end of the parts expected life.

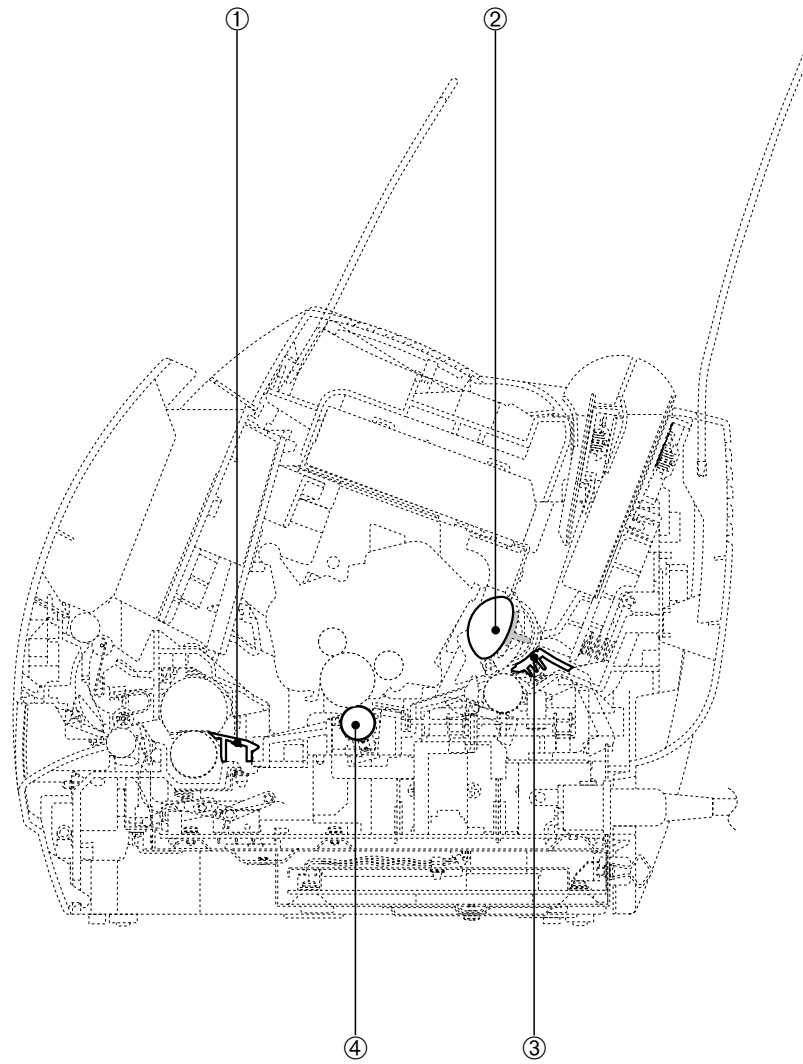
B. Expected Service Lives of Consumable Parts

- This printer does not have any consumable parts.

Note: Consumable parts are the parts that may need to be replaced due to deterioration or damage at least once prior to the elapse of the printer's warranty period. They only need to be replaced when faulty

C. Periodic Service

This printer does not have any areas that require periodic servicing.

D. Cleaning During a Service Visit

- ① Fixing unit entrance guide
- ③ Separation pad

- ② Pick-up roller
- ④ Transfer charging roller

Figure 4-8-1

Following the procedures below, clean the printer during a service visit.

1. Fixing unit entrance guide

Clean with dry lint free paper.

2. Pick-up roller

Clean with dry lint free paper.

3. Separation pad

Clean the rubber area with dry lint free paper.

4. Transfer charging roller

In general, the transfer charging roller is not to be touched or cleaned. If unavoidable, clean the roller with dry lint free paper. Do not use water or solvent. Make sure not to contaminate the roller with solvent or oil.

E. Standard Tools

The standard tools required to service the printer are listed below.

Table 4-8-1

No.	Tool name	Tool No.	Remark
1	Tool case	TKN-0001	
2	Jumper wire	TKN-0069	With a clip
3	Clearance gauge	CK-0057	0.02 to 0.3mm
4	Phillips screwdriver	CK-0101	M4, M5 Length : 363mm
5	Phillips screwdriver	CK-0104	M3, M4 Length : 155mm
6	Phillips screwdriver	CK-0105	M4, M5 Length : 191mm
7	Phillips screwdriver	CK-0106	M4, M5 Length : 85mm
8	Flat-blade screwdriver	CK-0111	
9	Precision flat-blade screwdriver set	CK-0114	Set of 6
10	Allen wrench set	CK-0151	Set of 5
11	File, fine	CK-0161	
12	Allen (hex) screwdriver	CK-0170	M4 Length : 107mm
13	Diagonal cutting pliers	CK-0201	
14	Needle-nose pliers	CK-0202	
15	Pliers	CK-0203	
16	Retaining ring pliers	CK-0205	Applied to the axis ring
17	Crimper	CK-0218	
18	Tweezers	CK-0302	
19	Ruler	CK-0303	Measure 150mm measurement
20	Soldering iron	CK-0309	100V, 30W
21	Mallet, plastic head	CK-0314	
22	Brush	CK-0315	
23	Penlight	CK-0327	
24	Plastic bottle	CK-0328	100cc
25	Solder	CK-0329	Ø1.5(mm) X 1(mm)
26	Desoldering wick	CK-0330	1.5mm
27	Lint-free paper	CK-0336	500SH/PKG
28	Oiler	CK-0349	30cc
29	Plastic jar	CK-0351	30cc
30	Blower brush	CK-0399	
31	Digital multimeter	CK-0552	

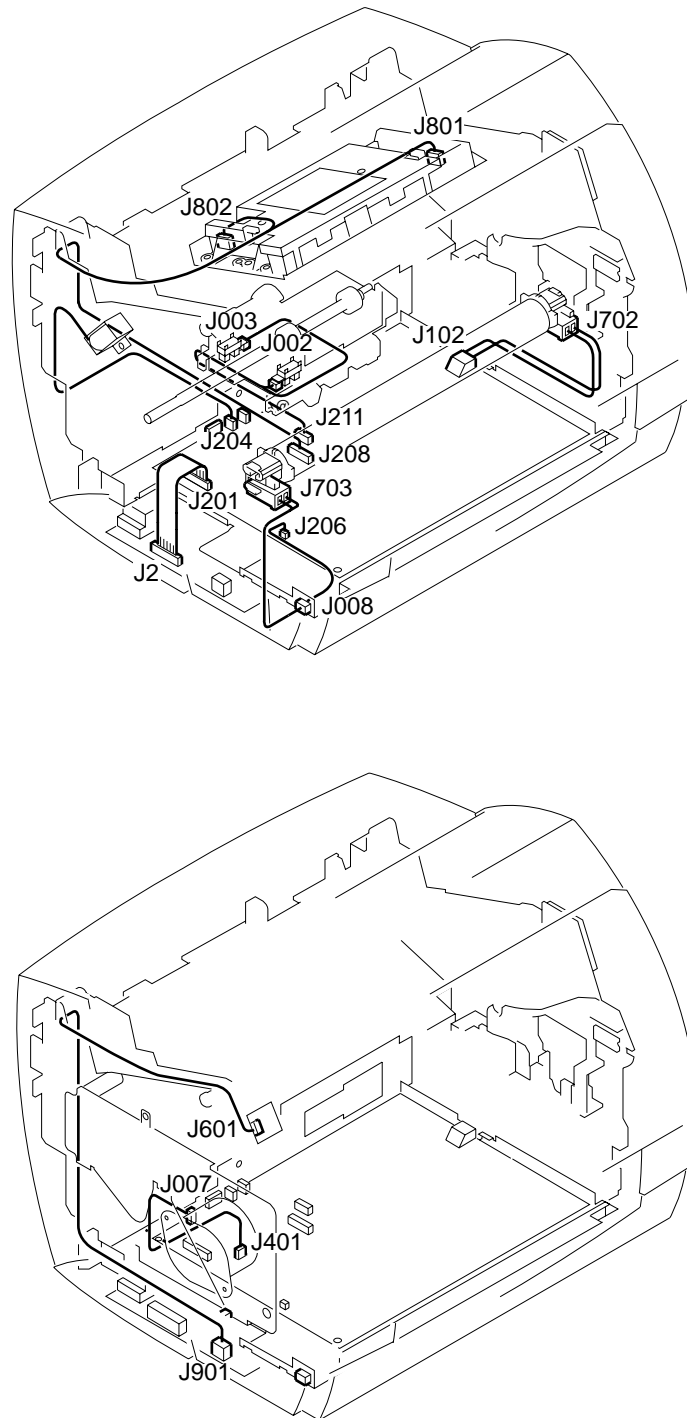
F. Special Tools

No special tools are required other than standard tools for servicing.

G. List of Lubricants and Cleaners

Table 4-8-2

No.	Name	Components	Use	Remarks
1	MEK (methyl ethyl ketone)	CH ₃ CO-C ₂ H ₅	Cleaning; oil and toner stains	<ul style="list-style-type: none"> • Purchase locally • Highly flammable: keep away from flame
2	Lubricant	Special oil Special solid lubricating material Lithium soap	Apply to gears and between gear and shaft.	<ul style="list-style-type: none"> • Tool No. HY9-0007 (20g tube)
3	Electricity grease	High performance grease	Apply to grounding plate	<ul style="list-style-type: none"> • Electricity grease • Tool No. CK-8006

IX. LOCATION OF CONNECTORS**Figure 4-9-1**

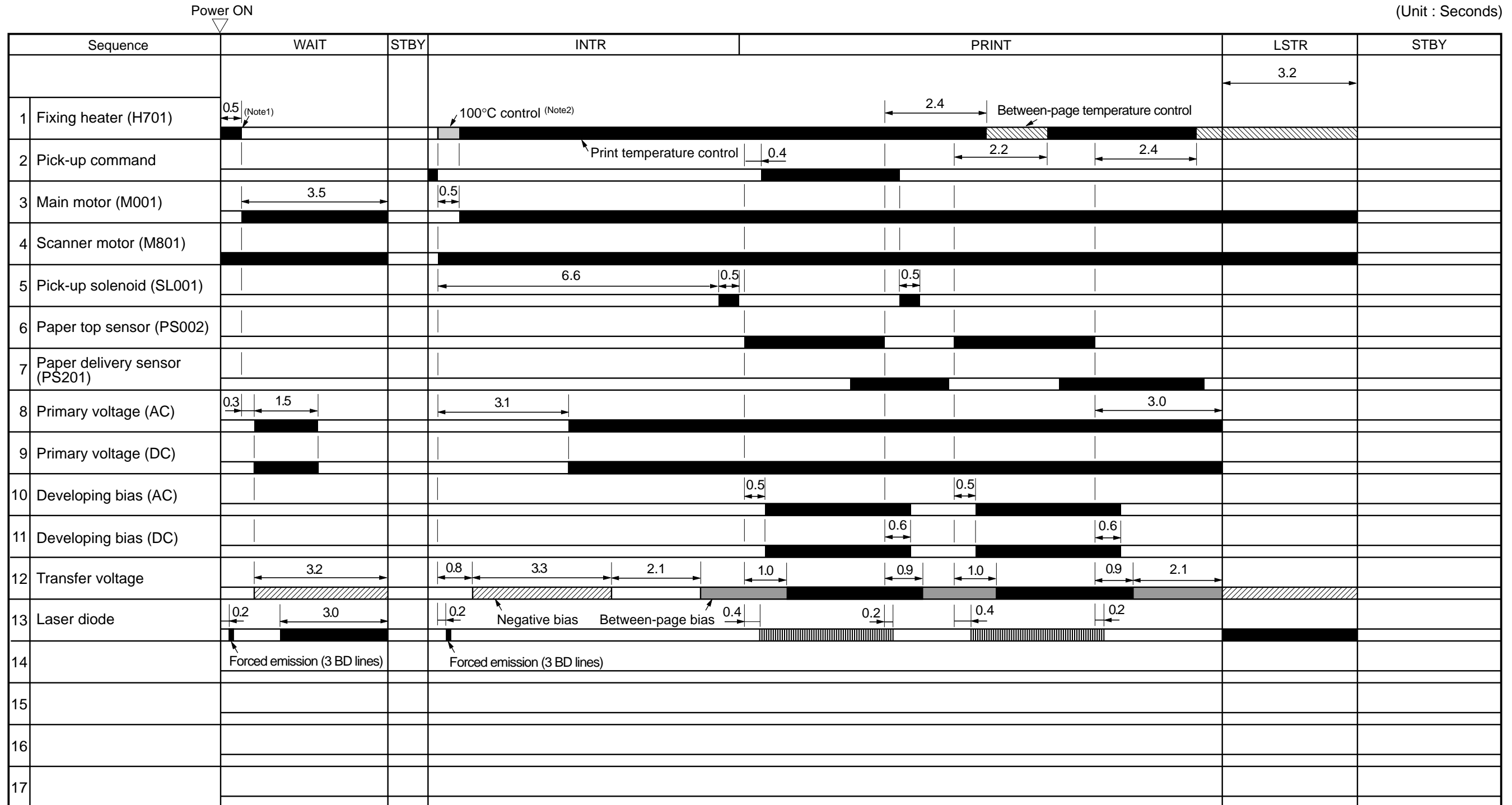
APPENDIX

I. GENERAL TIMING CHART	A-1	III. LIST OF SIGNALS	A-5
II. GENERAL CIRCUIT DIAGRAM...	A-3	IV. MESSAGES TABLE.....	A-7

I. GENERAL TIMING CHART

A. Timing Chart for Printing Two A4-size Sheet Continuously

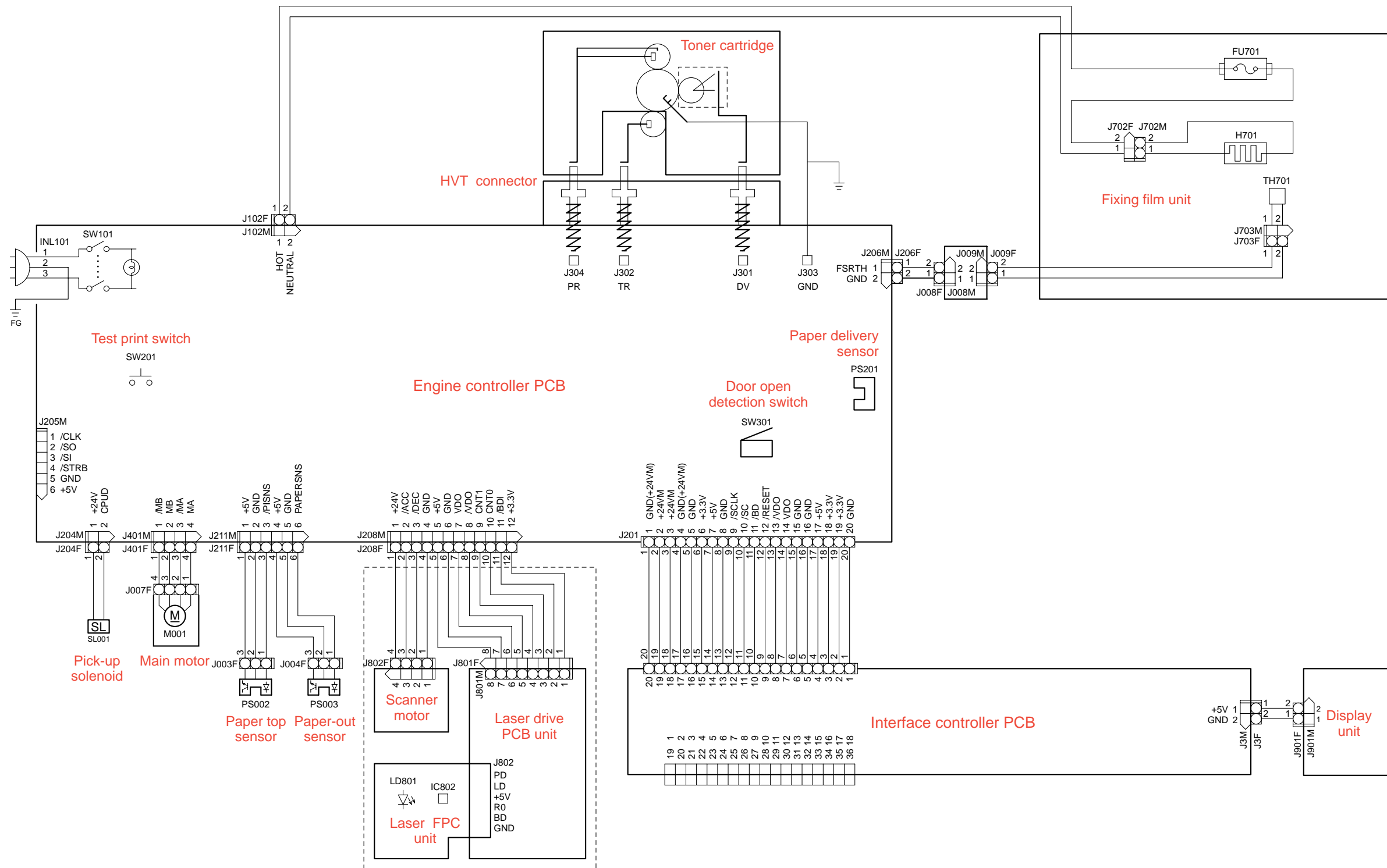
(Unit : Seconds)



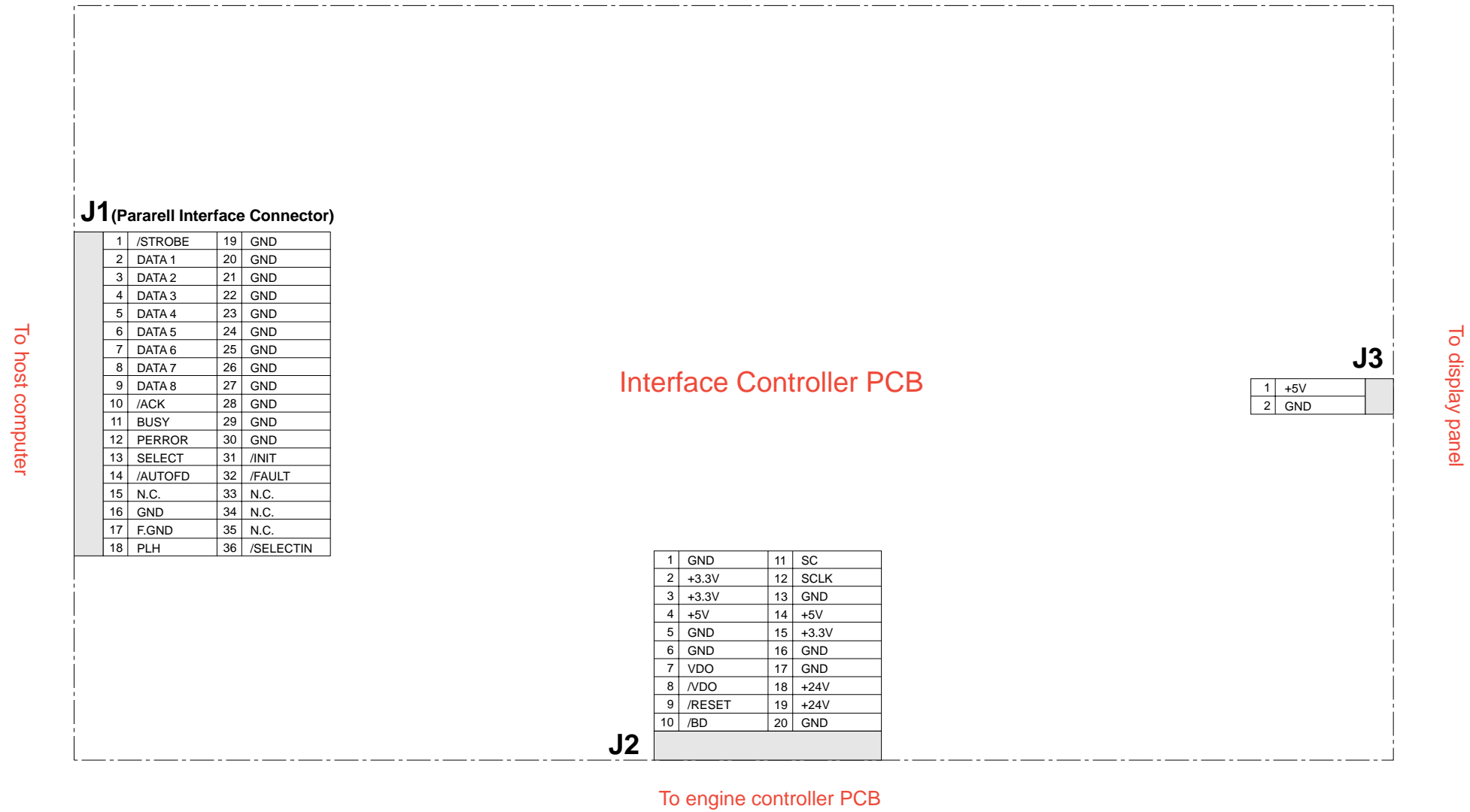
Note1 : 100°C control is not executed when thermistor temperature is already 100°C.
 Note2 : The heater is turned OFF when the thermistor temperature reaches 100°C.

II. GENERAL CIRCUIT DIAGRAM

A. Engine Controller PCB



B. Interface Controller PCB



III. LIST OF SIGNALS

A. Engine Controller

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J102	1	NEUTRAL	I		AC power input
	2	HOT	I		AC power input
J201	1	GND			
	2	+24VM			
	3	+24VM			
	4	GND			
	5	GND			
	6	3.3V			
	7	5V			
	8	GND			
	9	SCLK	I	L	SERIAL CLOCK signal
	10	/SC	I/O	H	STATUS COMMAND signal
	11	/BD	O	L	BEAM DETECTION signal
	12	/RESET	O	L	RESET signal
	13	/VDO	I	L	VIDEO signal
	14	VDO	I	L	VIDEO signal
	15	GND			
	16	GND			
	17	5V			
	18	3.3V			
	19	3.3V			
	20	GND			
J204	1	+24V			
	2	CPUD	O	H	PICK-UP SOLENOID DRIVE signal
J205	1	/CLK			
	2	/SO			
	3	SI			
	4	/STRB			
	5	GND			
	6	+5V			
J206	1	FSRTH	I		FIXING HEATER TEMPERATURE DETECT signal
	2	GND			
J208	1	+24V			
	2	/ACC	O	L	SCANNER ACCELERATION signal
	3	/DCC	O	L	SCANNER DECELERATION signal
	4	GND			
	5	+5V			
	6	GND			
	7	VDO	O	L	VIDEO signal
	8	/VDO	O	L	VIDEO signal
	9	CONT1	O	H	LASER CONTROL signal
	10	CONT0	O	H	LASER CONTROL signal
	11	/BDI	I	L	BD INPUT signal
	12	+3.3V			

APPENDIX

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J211	1	+5V			PAPER PICK-UP SENSOR signal
	2	GND			
	3	/PISNS	I	L	
	4	+5V			
	5	GND			
	6	PAPERSNS	I	H	
J301		DV	O	L	DEVELOPING HIGH-VOLTAGE DRIVE signal
J302		TR	O	L	TRANSFER HIGH-VOLTAGE DRIVE signal
J303		GND			
J304		PR	O	L	PRIMARY CHARGING HIGH-VOLTAGE DRIVE signal
J401	1	/MB	O	H	MAIN MOTOR DRIVE signal
	2	MB	O	H	MAIN MOTOR DRIVE signal
	3	/MA	O	H	MAIN MOTOR DRIVE signal
	4	MA	O	H	MAIN MOTOR DRIVE signal

IV. MESSAGES TABLE

A. Message List

CAPT displays the printing environment and printing status on the status window. On the status window, messages are indicated in the Message area corresponding to the following 4 types of status, and the status and procedures are displayed in the Error message area.

- Idling status
- Printing status
- Status not available
- Error status

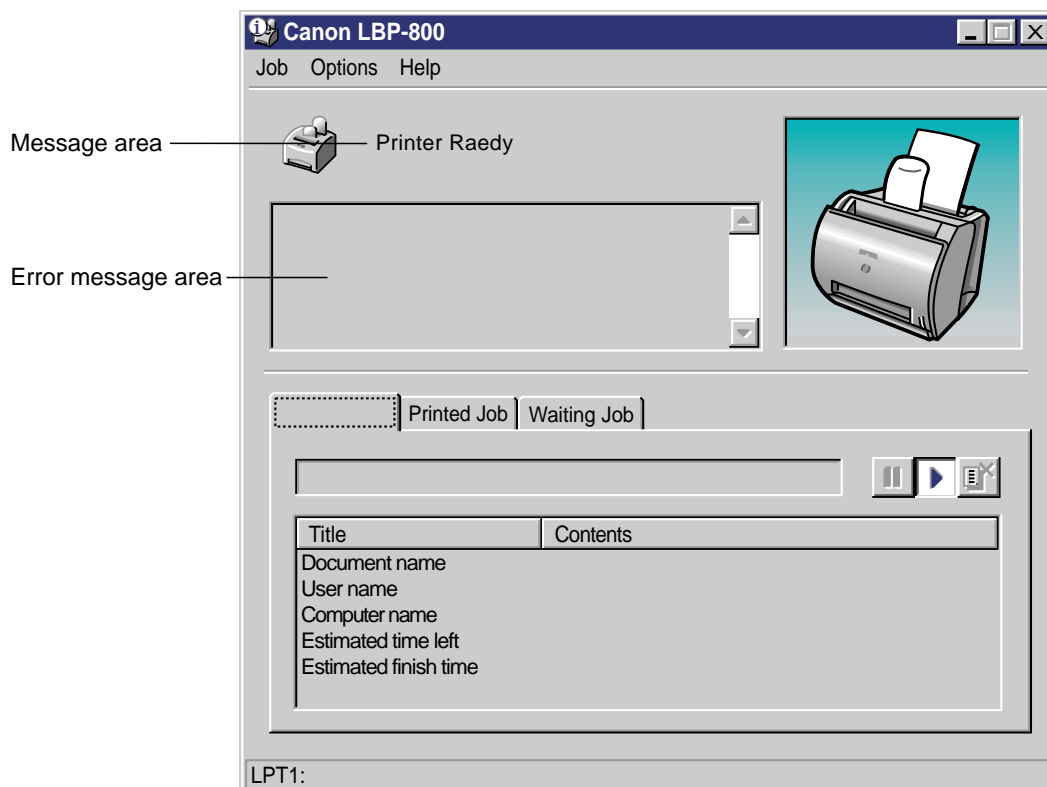


Figure A-4-1

For the details of the status window, see Chapter 1 on Page 1-50.

1. Idling status

The idling status is defined that printing jobs are not contained in the printer, and no troubles for printing are found.

The following 3 messages are indicated for the idling status:

Message area: Printer Ready

Error message area: None

Indicated regularly when the status window is started up.

Message area: Printing Completed

Error message area: None

Indicated when a printing job is completed.

Message area: Printing Stopped

Error message area: None

Indicated when a printing job is stopped.

2. Printing status

The printing status is defined that printing jobs are contained in the printer, and no troubles for printing are found.

The following 4 messages are indicated for the printing status:

Message area: Printing

Error message area: None

Indicated regularly.

Message area: Printing Paused

Error message area: None

Indicated when the Pause Job button is clicked during printing.

Message area: Stopping

Error message area: None

Indicated when the Delete Job button is clicked during printing.

Message area: Cleaning

Error message area: None

Indicated when the Cleaning menu is clicked.

3. Status Not Available

The Status Not Available is defined that printer information is not available.

The following 3 messages are indicated for the Status Not Available.

Message area: Status Not Available

Error message area: The printer is connected to a port of an unsupported type.

Indicated when the printer is connected as a local printer, and the port is not supported (FILE, LPT1.DOS, and so on.)

Message area: Check Print Server

Error message area: The printer server is down or the server status window is not active.

Indicated when the printer is connected as a network printer, and the status window in the server is not active.

Message area: Getting status

Error message area: Please wait a moment

Indicated when the port status has not been received, as the local port to which the printer is connected has just been switched from another printer.

4. Error status

The error status is defined that printer errors occur.

When multiple errors occur, an error with the highest priority will be indicated first. As the first error is solved, then an error with the next high priority will be indicated.

When errors occur and are solved in the middle of printing, the present page will be resumed printing.

The following describes the messages for the Status Not Available, from the higher priority to lower.

Message area: Port Busy

Error message area: The port is being used by another device.

Indicated when the port is being used by another device.

Message area: Network Adapter Error

Error message area : Network adapter or the printer isn't turned on.

Indicated when the network adapter or printer is not turned on, or the printer itself does not exist.

Message area: Check Printer/Cable

Error message area: Check the following. Is the printer switched on? Is the printer cable connected? Does the printer cable support bi-directional communication?

Indicated when the printer is incommunicable during printing.

This error occurs when the power of the printer fails, when the cable is unconnected, or when the cable does not correspond to the bi-directional communications.

Message area: Incompatible Printer

Error message area: The wrong printer is connected.

Indicated when the connected printer is not LBP-800.

When you use a printer other than LBP-800, make sure to switch to the driver to which you are to connect.

Message area: Printer Busy

Error message area: The network adapter is being used by another application for network setup.

Indicated when the network adapter is being used by another printer on the line connected to the same computer.

Message area: Service Error

Error message area: Printer error. Contact the store where you bought the printer.
Indicated when service errors occur in the printer engine.
Perform the Trouble Shooting in Chapter 4.

Message area: Clear Paper Jam

Error message area: 1.Open cover 2.Remove toner cartridge 3.Remove jammed paper
Indicated when paper jam occurs.

Message area: Clear Paper Jam

Error message area: 4.Replace toner cartridge 5.Close cover
Indicated when the cartridge cover is open after occurring paper jam.

Message area: Close Printer Cover

Error message area: None
Indicated when the cartridge cover is open.

Message area: Check Toner Cartridge

Error message area: None
Indicated when the toner cartridge is not present.

Message area: Change paper to xxx

Error message area: Change paper to xxx or force to print on yyy.
Indicated when the paper to be printed, that the driver detects, differs from the specified paper.
If switched to the specified paper, the printer resumes printing automatically.
If the Resume Job button is clicked, the printer resumes printing with the present paper.

Message area: Add xxx Paper

Error message area: No paper loaded in printer
Indicated when paper is not set.

Message area: Printing Failed

Error message area: Data transfer to the printer was too late or a data transfer error occurred.
Perform the following. 1.Discard last printed page. 2.Resume printing.
Indicated when Data transfer to the printer was too late or a data transfer error occurs.
If the Resume Job button is clicked, the printer resumes printing with lower resolution.

Message area: Insufficient Memory

Error message area: Quit all unnecessary applications running on the machine to which the printer is connected.
Indicated when the work memory obtained for the language monitor is not enough.

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