

LBP-1260

SERVICE MANUAL

Canon

PREFACE

This Service Manual contains basic information required for after-sales service of the LBP-1260 laser beam printer (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.

The cassette paper feeder and envelope feeder are prepared for the printer as optional equipment, which contents are also described in this manual.

This manual is comprised of the following chapters:

- Chapter 1: General Description
Features, specifications, and operation
- 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: Installation
Requirements for a suitable location, installation procedures, plus the storage and handling of EP-E cartridges
- Chapter 5: Maintenance and Servicing
Parts replacement schedule, tools, lubricants, and solvents
- Chapter 6: Troubleshooting
Reference values and adjustments: troubleshooting procedures
- Appendix:** General timing chart, general circuit diagram, PCB circuit diagrams, 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 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.

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CHAPTER 1

GENERAL DESCRIPTION

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I. FEATURES

1. Non-impact page printer

This non-impact (low-noise) printer uses electrophotographic, electronic, and laser technology.

2. High-speed printer

The same size as LBP-1260, it is a high-speed printer realizing a printing speed 1.5 times as fast [about 12.9 pages of Letter size paper a minute].

3. High print quality through use of fine toner and high resolution (600 dpi)

Toner having a particle size half that of conventional Canon toner and higher resolution (600 dpi) produce clearer images.

4. Easy maintenance

The photosensitive drum, toner, primary charging roller, and drum cleaning unit are combined into **one** replaceable assembly called the "EP-E Cartridge". By the use of the customer-replaceable cartridge, high printing quality is maintained by replacing the cartridge and simple cleaning in the printer.

5. Roller charging/transfer system

Instead of the conventional corona system, a charging **roller/transfer system** is used for the charging and transfer processes. The charging roller system considerably reduces the ozone produced by the charging system and the roller transfer system makes paper feeding more stable.

6. Space-saving front loading for paper feed

Front loading is used to make it easier to load paper. This, along with the **built-in**, multi-purpose tray, reduces the size of the printer and the space it takes up.

7. Four paper feed methods with various options

Four-way paper feeding is made possible by installing the optional **cassette paper feeder** (simply called the paper feeder below) and **envelope feeder**, in addition to the multi-purpose tray and cassette. By combining the standard cassette with the paper feeder, **up to about 750 sheets of paper can** be loaded in both the upper and lower cassettes for continuous printing.

8. Automatic interface change function

The printer has a parallel interface (Centronics) and a serial interface (RS-232C). It recognizes the type (parallel or serial) of data from the computer, and automatically • changes the interface. (Automatic interface function)

II. SPECIFICATIONS

A. Construction

Type	Desktop page printer
Printing method	Electrophotography
laser scanning system	
Laser	Semiconductor laser
Scanning system	Rotating six-faced prism mirror (Scanning mirror)
Scanning pitch	
Horizontal	600 dots/Inch
Vertical	600 raster lines/Inch
Photosensitive medium	OPC
Charging	Roller charging
Exposure	Laser scanning
Toner	Single-component dry toner
Development	Toner projection development
Toner supply	Included in replaceable EP-E cartridge (The cartridge can be used to print about 6,000 pages of A4/Letter-size paper. The average print coverage is a 4% image dot ratio with the print density setting in the middle.)
Paper feed	Multi-purpose tray feed Cassette feed (Two cassettes can be used when the paper feeder is installed.)
Transfer	Roller transfer
Separation	Curvature: (small drum radius/paper stiffness)
Cleaning	Blade
Fixing	Heat roller (750 W {120 V})
Print delivery	Face-down

B. Performance

Printing speed	About 12.2 pages/min (A4) About 12.9 pages/min (Letter)
Time for first print	18.9 s or less (The amount of time from when the printer receives a /PRNT signal from the video controller when it is ready at an ambient temperature of 20°C until the deliver of an A4-/Letter-size paper.1
Warm-up (WAIT) time	60 s or less (120 v power source) 75 s or less (100 v power source) (The amount of time elapsed after the printer is turedned ON until the completion of the warn-up time, at an ambient temperature of 20°C with a rated voltage input.)
Print paper	Plain paper, labels, OHP film, envelopes
Paper size of multi purpose tray	Plain paper from 182 mm X 257 mm to 216 mm X 356 mm (Canon-approved paper. 60 g/m ² to 128 g/m ²), and above type mentioned above
Paper size of cassette	Plain paper of A4, Legal, Letter, or Executive (Canon-approved paper. 60 g/m ² to 90 g/m ²)
Multi-purpose tray capacity	Up to 10 mm stack height (about 100 sheets of 80 g/m ² paper)
Cassette type	A4, Letter, Universal (Legal, Letter, A4, Executive]
Cassette specifications	Up to 25 mm stack height (about 250 sheets of 80 g/m ² paper)
Print delivery	Up to 25 mm stack height (about 250 sheets of 80 g/m ² paper)
Option	Envelope feeder and paper feeder

C. Others

Operating environment	10 to 32.5°C (50 to 90.5°F)	
Temperature	20 to 80% RH	
Humidity	760 to 1013 hPa (570 to 760 mmHg]	
Atmospheric pressure		
Power consumption	Max. about 1kW (at an ambient temperature of 20°C and rated voltage input)	
Noise level (DECLARED NOISE EMISSIONS in accordance with ISO 9296)	SOUND POWER LEVEL (1B=10 dB)	6.5 B or less (printing) 4.4 B or less (standby)
	SOUND PRESSURE LEVEL (Bystander positions)	51 dB or less (printing) 33 dB or less (standby)
Dimensions	416 mm X 414 mm X 295 mm (width X depth X height)	
Weight	About 17 kg (printer), About 1.5 kg (cartridge). About 1kg (cassette)	
Line voltage requirements	100- 120 V (50/60 Hz) (Voltage tolerance ± 1 0%)	

D. Video controller

Printer control language	Standard: Enhanced PCL (PCL 5e) Emulation: Optional PostScript™
Memory [RAM]	2MB (Expandable to 32 Megabytes in total with optional RAM SIMM)
Memory (ROM)	2 or 4MB (Expandable to 32 Megabytes in total with optional ROM SIMM)
Internal fonts	See Table 1-1 and 1-2.
Effective printable area	See Figure 1-1 .
Option card slot	Non
Standard Interfaces	
Serial	RS-232C. asynchronous. 300, 600, 1200, 2400, 4800, 9600 , 19200, or 38400 baud Data length: 7 or 8 bits Parity: If desired Stop bits: 1 or 2 Handshaking: XON-XOFF, ETX-ACK , or DTR
Parallel	S-bit parallel (Centronics standard) interface

E. Envelope feeder (**Envelope Feeder EF-6**)

Pick-up speed	About 9 envelopes/min
Envelope type	COM-10, DL , Monarch, C5 , B5 (recommended envelope)
Envelope size	Envelopes from 96mm X 189mm to 188mm X 254mm
capacity	Up to 55 mm stack height (about 75 envelopes)
Power supply	DC24V (Supplied by the printer)
Dimensions	297 X 293 X 91 mm (width X depth X height)
Weight	About 2 kg

F. Paper feeder (**Paper Feeder Unit PF-6**)

Cassette type	EP-E Cassette 500 Universal S (Letter, A4 , Executive) EP-E Cassette 500 Universal L (Legal , Letter, A4, Executive)
cassette specifications	Up to 50 mm stack height (about 500 sheets of 80 g/m² paper)
Power supply	DC24V (Supplied by the printer)
Dimensions	416 X 470 X 134 mm (width X depth X height) (including legal cover)
weight	About 3.9 kg (paper feeder), about 2 kg (universal cassette)

Specifications are subject to change with product improvement.

•Scalable Fonts

	eface	Symbol set	Spacing	Pitch Point (CPI) Size	Stroke Weight	Style	Orientation
1000	Courier	Roman-8	Fixed	Scalable	Medium	Uptight	Portrait
1003	Courier	Roman-8	Proportional		Bold	Upright	Portrait
1004	Courier	Roman-8	Fixed		Medium	Italic	Portrait
1005	Courier	Roman-8	Fixed		Bold	Italic	Portrait
1006	CG Times	Roman-8	Proportional		Medium	Upright	Portrait
1007	CG Times	Roman-8	Proportional		Bold	Upright	Portrait
1008	CG Times	Roman-8	Proportional		Medium	Italic	Portrait
1009	CG Times	Roman-8	Proportional		Bold	Italic	Portrait
1010	Letter Gothic	Roman-8	Fixed		Medium	Upright	Portrait
1011	Letter Gothic	Roman-8	Fixed		Bold	Upright	Portrait
1012	Letter Gothic	Roman-8	Fixed		Medium	Italic	Portrait
1013	CG Omega	Roman-8	Proportional		Medium	Upright	Portrait
1014	CG Omega	Roman-8	Proportional		Bold	Upright	Portrait
1015	CG Omega	Roman-8	Proportional		Medium	Italic	Portrait
1016	CG Omega	Roman-8	Proportional		Bold	Italic	Portrait
1017	coronet	Roman-8	Proportional		Medium	Italic	Portrait
1018	Clarendon	Roman-8	Proportional		Bold	Upright	Portrait
1019	Univers	Roman-8	Proportional		Medium	Upright	Portrait
1020	Univers	Roman-8	Proportional		Bold	Upright	Portrait
1021	Univers	Roman-8	Proportional		Medium	Italic	Portrait
1022	Univers	Roman-8	Proportional		Bold	Italic	Portrait
1023	Univers	Roman-8	Proportional		Medium	Cond	Portrait
1024	Univers	Roman-8	Proportional		Bold	Cond	Portrait
1025	Univers	Roman-8	Proportional		Medium	Cond It	Portrait
1026	Univers	Roman-8	Proportional		Bold	Cond It	Portrait
1027	AntiqueOlv	Roman-8	Proportional		Medium	Upright	Portrait
1028	AntiqueOlv	Roman-8	Proportional		Bold	Upright	Portrait
1029	AntiqueOlv	Roman-8	Proportional		Medium	Italic	Portrait
1030	Garmond	Roman-8	Proportional		Medium	Upright	Portrait
1031	Garmond	Roman-8	Proportional		Bold	Upright	Portrait
1032	Garmond	Roman-8	Proportional		Medium	Italic	Portrait
1033	Garmond	Roman-8	Proportional		Bold	Italic	Portrait
1034	Marigold	Roman-8	Proportional		Medium	Upright	Portrait
1035	Albertus	Roman-8	Proportional		Semi Bold	Upright	Portrait
1036	Albertus	Roman-8	Proportional		Ex Bold	Upright	Portrait
1037	Arial	Roman-8	Proportional		Medium	Upright	Portrait
1038	Arial	Roman-8	Proportional		Bold	Upright	Portrait
1039	Arial	Roman-8	Proportional		Medium	Italic	Portrait
1040	Arial	Roman-8	Proportional		Bold	Italic	Portrait
1041	Symbol	Roman-8	Proportional		Medium	Upright	Portrait
1042	Times New	Roman-8	Proportional		Medium	Upright	Portrait
1043	Times Bd	Roman-8	Proportional		Bold	Upright	Portrait
1044	Times New It	Roman-8	Proportional		Medium	Italic	Portrait
1045	Times New Bdit	Roman-8	Proportional		Bold	Italic	Portrait
1046	Wingdings	Roman-8	Proportional		Medium	Upright	Portrait

Table 1-1

•Fixed Fonts

Font ID	Typeface	Symbol set	spacing	Pitch (CPI)	Point Size	Stroke Weight	Style	Orientation
I002	Line Printer	Roman-8	Fixed	16.67	8.5	Medium	Upright	Landscape
I047	Line Printer	ISO L1	Fixed	16.67	8.5	Medium	Upright	Portrait
I048	Line Printer	PC-8	Fixed	16.67	8.5	Medium	Upright	Portrait
I049	Line Printer	PC-8 DN	Fixed	16.67	8.5	Medium	Upright	Portrait
I050	Line Printer	PC-850	Fixed	16.67	8.5	Medium	Upright	Portrait
I051	Line Printer	LEGAL	Fixed	16.67	8.5	Medium	Upright	Portrait
I052	Line Printer	ISO L1	Fixed	16.67	8.5	Medium	Upright	Landscape
I053	Line Printer	PC-8	Fixed	16.67	8.5	Medium	Upright	Landscape
I054	Line Printer	PC-8 DN	Fixed	16.67	8.5	Medium	Upright	Landscape
I055	Line Printer	PC-850	Fixed	16.67	8.5	Medium	Upright	Landscape
I056	Line Printer	LEGAL	Fixed	16.67	8.5	Medium	Upright	Landscape

Table 1-2

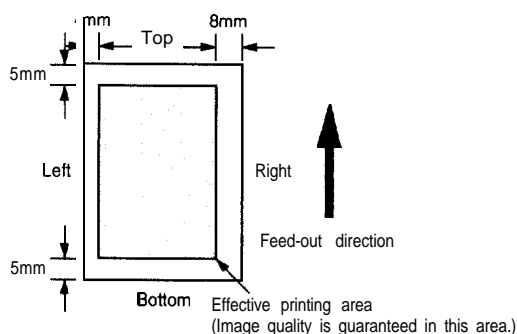


Figure 1-1

III. SAFETY INFORMATION

A. Handling the Laser/Scanner Unit

The laser/scanner unit emits invisible laser beam. Never disassemble the unit; the reflected beam, although invisible, can possibly damage your eyes. The unit cannot be adjusted in the field. The following label is attached to the cover of the unit:

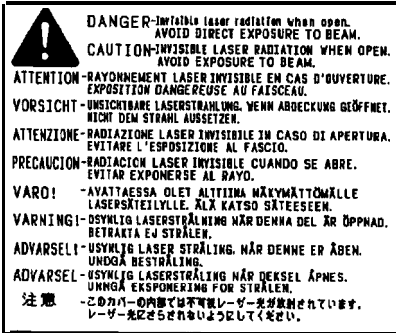


Figure 1-2

IV. PARTS OF THE PRINTER

A. External View

1. Printer

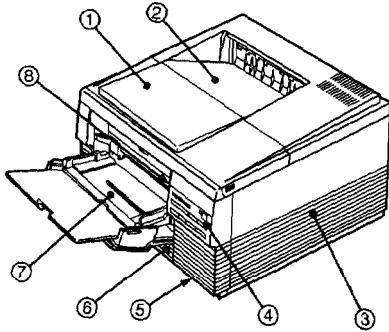


Figure 1-3

- 1: upper cover
- 2: Face-down tray
- 3: Right cover
- 4: Control panel
- 5: Power switch
- 6: Cassette
- 7: Multi-purpose tray
- 8: Test print switch
- 9: Delivery cover
- 10: Power receptacle
- 11: Parallel interface connector
- 12: Serial interface connector
- 13: Cleaning brush
- 14: Paper access door

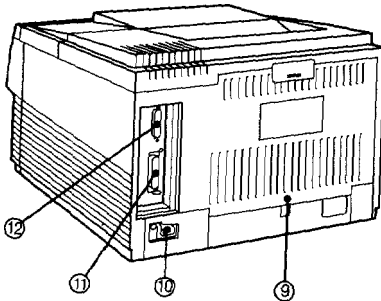


Figure 1-4

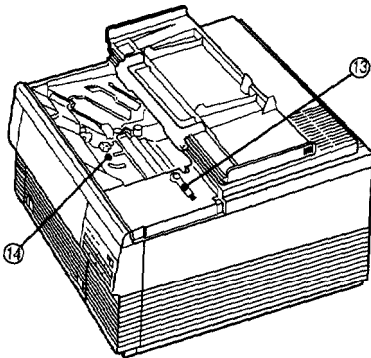
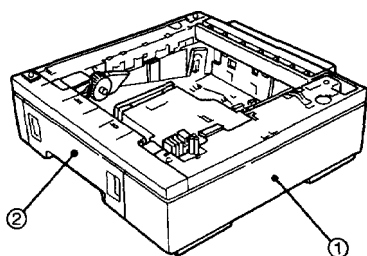
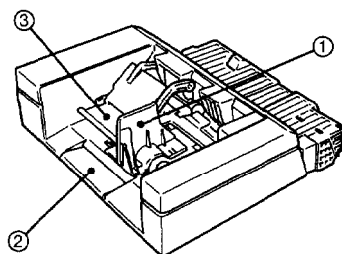


Figure 1-5

2. Paper feeder

- 1: Paper feeder
- 2: Cassette (500 sheets can be stored)

Figure 1-6**3. Envelope feeder**

- 1: Envelope side guide
- 2: Extension tray
- 3: weight

Figure 1-7

B. Cross Sectional View
1. Printer

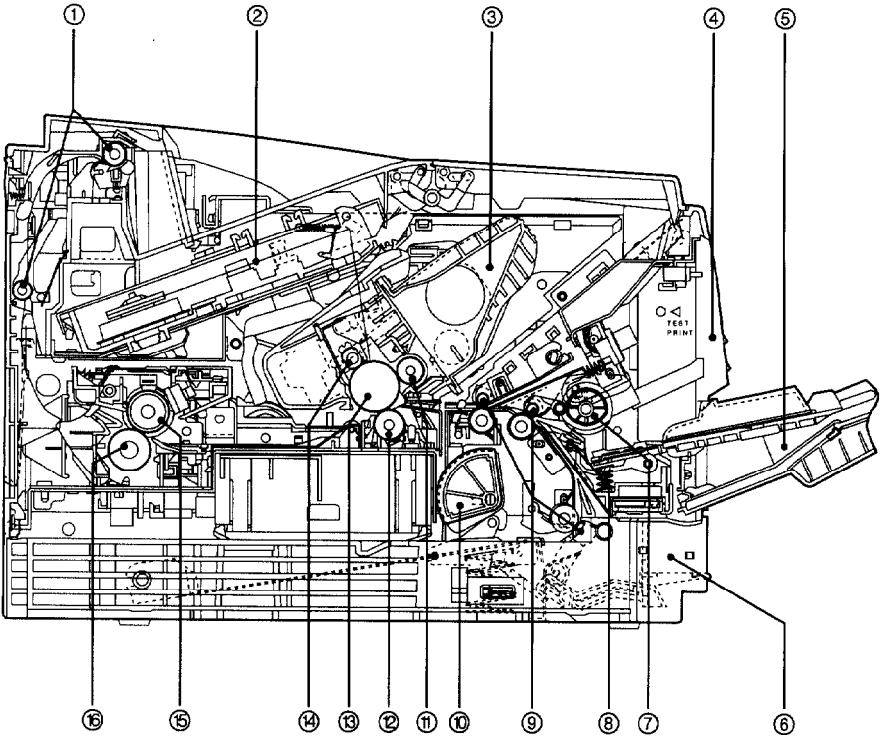


Figure 1-8

- | | |
|--------------------------------------|--------------------------------|
| 1: Delivery rollers | 9: Oblique rollers |
| 2: Laser/scanner unit | 10: Cassette pick-up roller |
| 3: EP-E cartridge | 11: Developing cylinder |
| 4: Control panel | 12: Transfer charging roller |
| 5: Multi-purpose tray | 13: Photosensitive drum |
| 6: Cassette | 14: Primary charging roller |
| 7: Multi-purpose tray pick-up roller | 15: Upper fixing roller |
| 8: Separation pad | 16: Lower fixing roller |

2. Envelope feeder

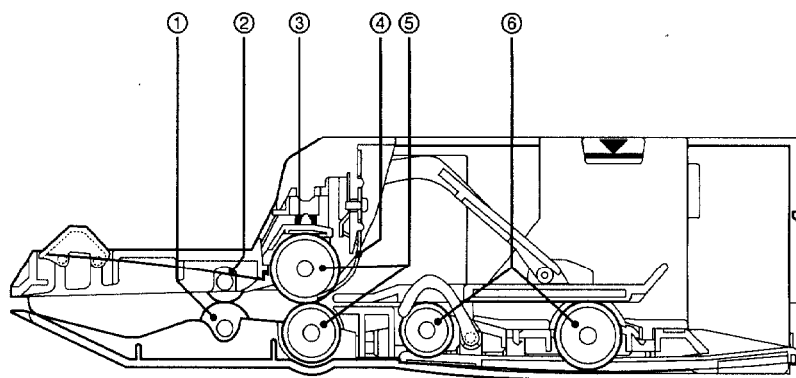


Figure 1-9

- 1: Feed roller
- 2: Oblique roller
- 3: Separation roller pressure spring
- 4: Separation guide
- 5: Separation rollers
- 6: Pick-up rollers

V. OPERATION

A. The Operator Panel

You use the operator panel to perform basic printer operations, make printer configuration changes your software application cannot control, identify available typefaces, and check the status of the printer.

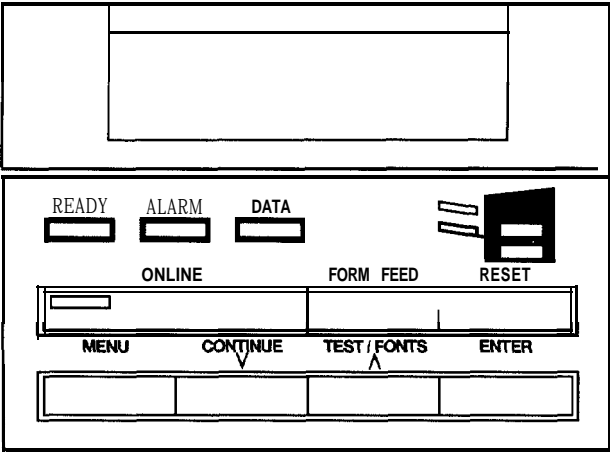


Figure 1-10

The operator panel consists of the message/menu display window, eight indicator lights, and seven menu and operation keys.

1. Message/Menu Display Window

The message/menu display window can display as many as 16 characters. It displays menu items you can select, and messages that describe the status of the printer and error conditions. This chapter describes the menu items you can display in the window. See Chapter 6 Troubleshooting, for information about the types of messages that may appear in the window.

2. Indicator Lights

The indicator lights provide status information about the printer. The lights have different meanings depending on whether they are on, off, or flashing.

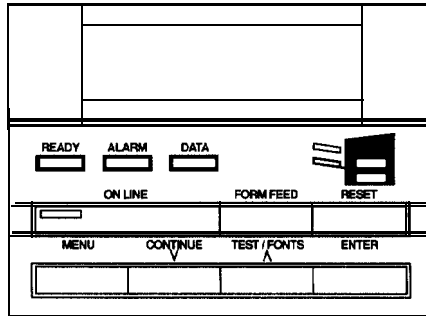


Figure 1-11

Indicator light	Mode	Description
READY	On	The printer is ready to print.
	Off	An error or attendance message appears in the display.
	Flashing	The printer is receiving data.
ALARM	On	An error has occurred and printing is disabled. An error or attendance message appears in the display.
	Off	No error has occurred.
DATA	On	Print data is currently stored in the printer's buffer.
	Off	No buffered data is in the printer.
ON LINE	On	The printer is ready to accept and print data from the computer (on-line status).
	Off	The printer cannot accept print data from the computer [off-line status). When the printer is off-line, you can use all keys on the operator panel to operate the printer.
	Flashing	You press ON LINE to set the printer off-line while a page is printing. This light flashes while the printer completes printing the page.

The paper input source indicators are:

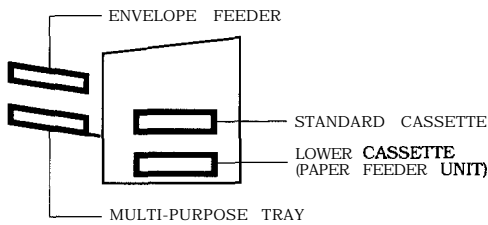


Figure 1-12

Indicator light	Mode	Description
Envelope Feeder	On Flashing	The optional Envelope Feeder is the input source. The optional Envelope Feeder is selected, but does not contain envelopes.
Multi-purpose tray	On Flashing	The multi-purpose tray is the input source. The multi-purpose tray is selected, but does not contain paper.
Standard cassette	On Flashing	The paper cassette tray is the input source. The paper cassette tray is selected, but does not contain paper.
Lower cassette	On Flashing	The optional Paper Feeder Unit is the input source. The optional Paper Feeder Unit is selected, but does not contain paper.

3. Operation Keys

You use the operation keys to control the basic functions of the printer.

•ON LINE key

You use the ON LINE key to switch the printer between **on-line** and off-line. The printer must be on-line to receive information from your computer. To use any of the other keys on the operator panel, the printer must be off-line.

The message **PCL READY** appears in the display window when the printer is on-line and ready to receive data.

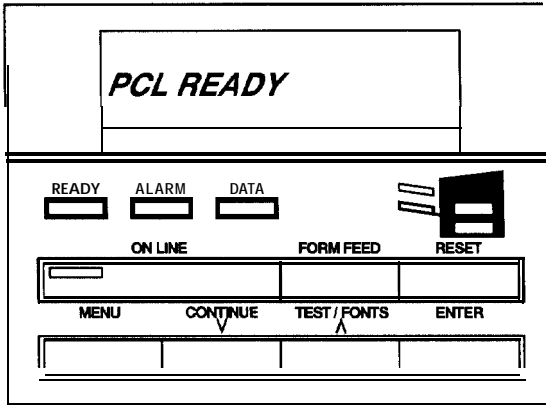


Figure 1-13

•FORM FEED key

You use the FORM FEED key to print the data stored in the printer's buffer. For example, if the last page stored in the printer's memory is a full page but your software does not send a command to print it, you can press ON LINE to set the printer off-line and then press FORM FEED to print the last page.

Keep in mind that complex pages may take **several** minutes to process. Make sure the READY indicator light **has** stopped flashing before you press FORM FEED to print the last page.

The printer must be **off-line** before you press FORM FEED.

Note: Pressing the FORM FEED key does not force a blank sheet through the printer.

•RESET key

You use the RESET key to clear the printer's buffer and remove all temporary typefaces and macros from the printer's memory. Press the RESET key for approximately three seconds until the RESET message appears in the display window. (This prevents accidental loss of a print job)

If you press and hold the RESET key for more than six seconds, the MENU RESET message appears in the display window. The printer resets all PCL parameters to their factory defaults. This includes all items in the PCL PRINT MENU except MPT SIZE and ENVELOPE. (The items in the PCL CONFIG MENU are not reset.) To reset all parameters to their factory defaults, perform a cold reset by powering on the printer while holding the ON LINE key.

•CONTINUE key

You use the CONTINUE key to allow the printer to resume printing after it is placed off-line by an operational condition. Most operational **conditions** are **identified** by a message, such as PRINT OVERRUN. Before you continue printing, you need to press CONTINUE to clear the message and set the printer back on-line.

The CONTINUE key sets the printer on-line just like the ON LINE key, but you can also use it in the following ways:

- You can press CONTINUE to override the paper or envelope **size selections** regardless of the media loaded in the multi-purpose tray, the optional Envelope Feeder, or a paper cassette. This means you could use it to **print** a letter-size page on legal-size paper if legal-size paper is loaded in the **multi-purpose** tray.
- You can press CONTINUE to override a request to manually feeder paper or an envelope. When you do this, the printer selects paper from the next available source.

•TEST/FONT key

You use the TEST/FONT key to **print** the self tests Test Page or Font List.

When the printer is off-line, you can press the TEST/FONT key once to start the Test Page. Press and hold the TEST/FONT key to print the Font **List**. If you press and hold the TEST/FONT key for more than **six** seconds, the Test Page **prints** continually. The Test Page and Font List are described later in **this** chapter.

4. Menu Keys

You use the menu keys to access the various menus and select the available menu items. This section briefly describes each key. See the Operator Panel Menus **section** for information about accessing and selecting menu items.

•MENU key

The MENU key cycles through the PCL PRINT MENU and the PCL **CONFIG** MENU.

The printer must be off-line when you press the MENU key.

A and ▼ keys

You use the A and ▼ keys to step through all available choices for a particular menu item. For example, after you access the MPT SIZE option from the PCL PRINT MENU, you press A repeatedly to display the LETTER, LEGAL, EXEC, **A4**, **COM10**, MONARC. B5. C5 and DL choices.

You can use the ▼ key to display **the** choices in reverse order. If you hold down either arrow key, the system scrolls rapidly through all choices for the menu option.

-SELECT key

You use the SELECT key to save a selection in the printer's permanent memory. An asterisk (*) appears next to the selection in the menu display window indicating it is the current default selection. This default selection **remains in** effect even when you turn off **or reset the** printer.

If you press SELECT when buffered or temporary data is present, the system only marks the **selections** with an asterisk. When you exit the menu **by pressing** ON LINE or MENU, **the** system displays the RESET TO SAVE message. At **this** point, you have two choices:

- Press RESET to clear **the** page buffers, remove temporary data, and return **all** items to their permanent default settings.
- Press ON LINE or CONTINUE to place the printer on-line without performing a reset. The selections you made in the menu are marked with an asterisk but do not become active until the printer receives the next job or you reset the printer.

When the printer is off-line, but not in the PCL PRINT MENU or PCL **CONFIG** MENU, pressing SELECT prints a Printer Settings Page that lists **the** current menu settings. See page l-20-25 for details.

B. Operator Panel Menus

You can access the following menus through the operator panel:

- PCL PRINT MENU
- PCL CONFIG MENU

Depending on the options installed in your printer, other menus may display.

1. Accessing and Selecting Menu Items

Follow these steps to access the menus and make selections:

1. Press ON LINE to set the printer off-line.
2. Press MENU once to display the PCL PRINT MENU. Press and hold MENU [for approximately five seconds) to display the PCL CONFIG MENU.
3. Press MENU until you display the item you want to change.
4. When the item you want to change appears in the display window, press A or ▼ to step through the available choices.
5. When the selection appears in the display window, press SELECT to save it as the default setting. An asterisk appears next to your selection in the display window.
6. Press ON LINE to set the printer on-line.

Note: Pressing SELECT saves the value of the menu item to the printer's nonvolatile memory (NVRAM)

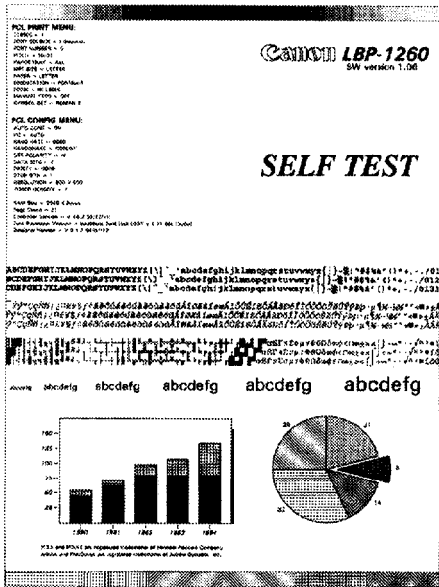


Figure 1-14

2. Confirming Your Menu Selections

There are two ways you can review the selections you made through the operator panel:

- You can scroll through the menu items to check all selections marked **with an** asterisk.
- You can print a Printer Setting Page. The printed output lists all settings that are in effect. See the Printing the Printer Setting Page section for more information.

3. Restoring the Default Settings

There are several types of default settings:

- Factory default settings are those set for each menu item at the factory. The printer uses these settings until you change them.
- Temporary default settings are those set by your application software for the current print job.
- Permanent default settings are those you set through the operator panel. These selections remain in effect even when you **turn off the printer** or send a different request through your application.

You can restore the factory default settings by performing a cold reset. To perform a cold reset, press and hold the ON LINE key while you turn on the **printer**.

The printer displays the message COLD **RESET** followed by WARMING UP. When the printer comes on-line, the factory default settings are restored.

C. PCL PRINT MENU Options

The PCL PRINT MENU contains the most commonly used options. You can override or change all options in this menu through your software application. The changes you make through the operator panel become the permanent default settings.

P r i n t option (Press MENU)	Factory default	Description (Press A or ▼)
COPIES	1	Selects the number of copies (from 1 to 99) you want to print.
FNT SOURCE	INT	Selects the font source. You can select: INT: Internal fonts SOFT: Permanent soft font You see the SOFT option only if permanent soft fonts are downloaded. If you do not know the font source and font number, you can print a Font List. The option you specify here must match the alpha portion of the Font # on the Font List, I for internal or S for soft. For more information about printing this list, see the Printing the Font List section.
FNT NUMBER	0	Identifies the Font Number (0 through 999) as listed on the Font List. Make sure you use the Font # not the Font ID.
PITCH	10.00	Selects pitch sizes from 0.44 to 99.99 characters per inch (cpi) in scroll increments of 0.01. (Hold down the arrow key to increment rapidly.) You can select a pitch if the font indicated by FNT SOURCE and FNT NUMBER is a scalable typeface with fixed spacing. The LBP-1260 adjusts the height (point size) of the characters according to the pitch you select.
PT. SIZE	12.00	Selects the point size from 4.00 to 999.75 points in 0.25-point increments. The scroll increment is 0.25. You can select the point size if the font indicated by FNT SOURCE and FNT NUMBER is a scalable font with proportional spacing. Point size is a measure of the height of a character in 1/72 of an inch. The LBP- 1260 adjusts the character's horizontal spacing according to the point size.

Print option (Press MENU)	Factory default	Description (Press A or ▼)
TRAY	ALL	<p>Selects how the printer will load paper:</p> <p>ALL Loads paper from any paper input source. The printer loads from the standard cassette first: if this cassette is empty, it loads from the lower cassette (if the Paper Feeder Unit is installed) or the multi-purpose tray.</p> <p>MPT FIRST Loads from the multi-purpose tray first. If the tray is empty, it loads from the standard cassette or the lower cassette (if it is installed).</p> <p>STD Loads from the standard paper cassette only. If this cassette is empty, you see a prompt to load paper.</p> <p>LOWER Loads from the optional Paper Feeder Unit only; If this cassette is empty, you see a prompt to load paper. You see this selection only if the optional Paper Feeder Unit is installed.</p> <p>MPT Loads from the multi-purpose tray only. If this tray is empty, you see a prompt to load paper.</p> <p>ENVELOPE Loads from the optional Envelope Feeder unit only: if this feeder is empty, you see a prompt to load envelopes. You see this selection only if the optional Envelope Feeder unit is installed.</p>
MPT SIZE	LETTER	<p>Selects the paper size loaded in the multi-purpose tray. You can select:</p> <p>LETTER: 8.5 x 11 inches LEGAL: 8.5 x 14 inches EXEC: 7.25 x 10.5 inches A4: 210 x 297 mm COM 10: 4.125 x 9.5 inches MONARC:3.875 x 9.5 inches B5: 182 x 257 mm c5: 162 x 219 mm DL: 110 x 220 mm</p>
PAPER	LETTER	<p>Selects the Image size at which the printer formats the page unless a software command overrides it. You can select:</p> <p>LETTER: 8.5 x 11 inches LEGAL: 8.5 x 14 inches EXEC: 7.5 x 10.5 inches A4: 210 x 297 mm COM 10: 4.125 x 9.5 inches MONARC:3.875 x 9.5 inches B5: 182 x 257 mm c5: 162 x 219 mm DL: 110 x 220 mm</p>
ENVELOPE	COM 10	<p>Selects the envelope size loaded in the Envelope Feeder. You see this menu item only if the optional Envelope Feeder is installed. You can select:</p> <p>COM10: 9.5 x 4.125 inches MONARC:9.5 x 3.875 Inches c5: 162 x 219 mm DL: 110 x 220 mm</p>

Print option (Press MENU)	Factory default	Description (Press A or ▼)																																
ORIENTATI P ON		<p>Selects the direction of print on the page.</p> <p>P: Portrait prints text and graphics along the width of the page</p> <p>L: Landscape prints text and graphics along the length of the page</p> <p>You can print in reverse portrait or reverse landscape orientations by making selections through your software application or using printer commands. The LBP-1260 has a font rotation feature that makes all fonts available in all orientations.</p>																																
FORM	60 LINES	<p>Selects the number of lines to print on each page (5 through 128) as well as the amount of space between lines. The FORM menu item places the first line of text at the top margin, the last line of text at the bottom margin, and spaces the remaining lines equally between them. Make sure the text length setting in your software application matches the value you use for this item. If it is set to a greater value in your application, the first line of text may begin successively lower on each page.</p>																																
MANUAL FEED	OFF	<p>Turns the manual feed function ON or OFF. Manual feed is available only through the multi-purpose tray. When MANUAL FEED=ON, the printer goes off-line when a print job is sent and displays MPT TRAY followed by FEED LETTER. Press ON LINE to manually feed the media in the multi-purpose tray. Pressing CONTINUE when the multi-purpose tray is empty override the manual feed request.</p>																																
SYM SET	ROMAN -8	<p>Selects the symbol set. The LBP-1260 provides 31 symbol sets you can choose. A symbol set is a unique grouping of all the available characters in a font. You can select these symbol sets from the operator panel:</p> <table><tr><td>Roman-8</td><td>ISO- 15</td></tr><tr><td>ISO-L1</td><td>ISO- 17</td></tr><tr><td>ISO-L2</td><td>ISO-2 1</td></tr><tr><td>ISO-L5</td><td>ISO-60</td></tr><tr><td>PC-8</td><td>ISO-69</td></tr><tr><td>PC-8 DN</td><td>VN MATH</td></tr><tr><td>PC-850</td><td>VN INTL</td></tr><tr><td>PC-852</td><td>VN US</td></tr><tr><td>PC-8 TK</td><td>PS MATH</td></tr><tr><td>WIN L1</td><td>PS TEXT</td></tr><tr><td>WIN L2</td><td>MATH-8</td></tr><tr><td>WIN L5</td><td>PI FONT</td></tr><tr><td>LEGAL</td><td>MS PUBL</td></tr><tr><td>ISO-4</td><td>WIN 3.0</td></tr><tr><td>ISO-6</td><td>DESKTOP</td></tr><tr><td>ISO- 11</td><td></td></tr></table>	Roman-8	ISO- 15	ISO-L1	ISO- 17	ISO-L2	ISO-2 1	ISO-L5	ISO-60	PC-8	ISO-69	PC-8 DN	VN MATH	PC-850	VN INTL	PC-852	VN US	PC-8 TK	PS MATH	WIN L1	PS TEXT	WIN L2	MATH-8	WIN L5	PI FONT	LEGAL	MS PUBL	ISO-4	WIN 3.0	ISO-6	DESKTOP	ISO- 11	
Roman-8	ISO- 15																																	
ISO-L1	ISO- 17																																	
ISO-L2	ISO-2 1																																	
ISO-L5	ISO-60																																	
PC-8	ISO-69																																	
PC-8 DN	VN MATH																																	
PC-850	VN INTL																																	
PC-852	VN US																																	
PC-8 TK	PS MATH																																	
WIN L1	PS TEXT																																	
WIN L2	MATH-8																																	
WIN L5	PI FONT																																	
LEGAL	MS PUBL																																	
ISO-4	WIN 3.0																																	
ISO-6	DESKTOP																																	
ISO- 11																																		

D. PCL CONFIG MENU Options

The PCL CONFIG MENU controls certain configuration settings for your LBP- 1260. To access the PCL CONFIG MENU options, press and hold the MENU key. To scroll through the options, press the MENU key again.

The resolution and page protection options can be modified by PCL commands through the print stream. However, you cannot override or change the other options in this menu through your software application.

Note: The I/O option allows you to set up the communication parameters for the serial interface (if you are using it).

Config option (Press MENU)	Factory default	Description (Press A or ▼)
AUTO FEED	ON	Determines how the printer reacts to data and printer errors. You can select: ON: Any non-critical error message appears on the display for about 10 seconds: then the PCL READY message appears and printing resumes. OFF: Any attendance or error message remains in the display until you correct the problem, tell the printer to continue, or both.
I/O	AUTO	Selects the printer interface. You can select: AUTO: Allows the printer to determine the interface port, which can be either parallel or serial. The printer displays the communications options described in the next section, SERIAL: Selects the serial interface only. The printer displays the communications options described in the next section. PARALLEL: Selects the parallel interface only. The printer skips to the RES menu option. NETWORK: Selects the optional network card. You see this setting only if the Network option is installed.
RES	600 x 600	Selects 300 or 600 dots per inch(dpi). When you change resolution, it takes effect for the next print job or when you reset the printer through the operator panel. You can select: 300 x 300: for graphics and fonts designed for 300 dpi. 600 x 600: for graphics and fonts designed for 600 dpi; use when document contains a mix of 300 and 600 dpi bitmaps.

Config option [Press MENU]	Factory default	Description (Press A or ▼)
PG PROT	OFF or LETTER	<p>Reserves additional memory for the page imaging process. This allows the printer to create the complete page Image in memory before paper starts through the printer, which ensures the entire page is printed. The value you set for page protection takes effect on the next print job</p> <p>You see this option only if you have enough memory installed to take advantage of page protection. If you have only 2MB of memory, the default is OFF. If you have 6MB of memory, the default is LETTER.</p> <p>The complexity of a page may exceed the printer's ability to create the image and keep pace with the printing process. If a page is too complex, the page may print in parts, or only part of the page may print. If data loss occurs, the PRINT OVERRUN message appears In the display window. If you often receive this message, you may need to Install additional memory and set a value for page protection.</p> <p>The memory required for page protection is dependent on the resolution you select. A page at 600 dpi requires four times more memory than a page at 300 dpi. If you use page protection, set it for the paper size you expect to use most often. Make sure you have sufficient memory Installed for the option you select. The figures shown here include 2MB of internal memory.</p> <p>You can select:</p> <p>OFF: requires minimum installed memory of 2MB for 300 and 600 dpi.</p> <p>LETTER: requires 2MB for 300 dpi; 6MB for 600 dpi.</p> <p>LEGAL: requires 3MB for 300 dpi; 6MB for 600 dpi.</p> <p>A4: requires 2MB for 300 dpi; 6MB for 600 dpi.</p>
TONER DENS	7	<p>Print density is a measure of the darkness of text and graphics on the page. You can experiment with different settings to find the best setting for your print job. To make print darker, use a higher setting; to make print lighter, use a lower setting. The selections are from 0 to 15.</p> <p>Note that when you set the density to a higher level, the printer uses more toner.</p>

● Communications Menu

The I/O option allows you to set up the **communication** parameters for the serial interface (if you are using it).

If you set I/O to AUTO or SERIAL, you see the following menu options:

Config option (Press MENU)	Factory default	Description (Press A or ▼)
BAUD POLARITY	9600	Determines the rate at which information is transferred between the computer and printer. You can select 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 , or 57600.
HANDSHK	ROBUST	Selects the handshake method for controlling data transfer between the computer and printer. For RS-232C operation, you can select ROBUST, XON, or H/W.
DTR POLARITY	HI	Allows you to choose active high (HI) or active low (LO) for the DTR signal line.
DATA BITS	8	Determines the data bits used in transmission. Some minicomputer environments only support 7 bit printer data. Setting DATA BITS=7 allows the printer function correctly in environments where the eighth bit is not supported. PCL graphics and soft fonts may not function correctly when DATA BITS=7 . You can select 8 or 7.
PARITY	NONE	Determines whether parity checking is enabled. Setting PARITY to EVEN or ODD allows parity checking for some types of data transmission errors. When the printer detects a parity error, data does not print correctly. The host computer and the printer must use the same parity setting. You can select NONE, EVEN, or ODD.
STOP BITS	1	Determines the number of stop bits to use during communication. The host computer and the printer must use the same setting . You can select 1 or 2.

E. Printing **the Self Tests**

This printer includes three self tests that allow you to confirm the printer's settings and check printer operation. The three self tests are: Test Page, Printer Settings Page, and PCL Font List.

•**Printing the Test Page**

Follow these steps to print the Test Page:

1. Press the ON LINE key to set the printer off-line.
2. Press the TEST/FONT key once. The printer displays the SELF TEST message followed by the PRINTING TEST message.
3. When the page is complete, press ON LINE to set the printer on-line.

NOTE: You can continuously print the Self Test. To do so, press and hold the TEST/FONT key for more than six seconds. The printer displays the CONT. SELF TEST message. To stop the continuous Self Test, mess the **CONTINUE** key.

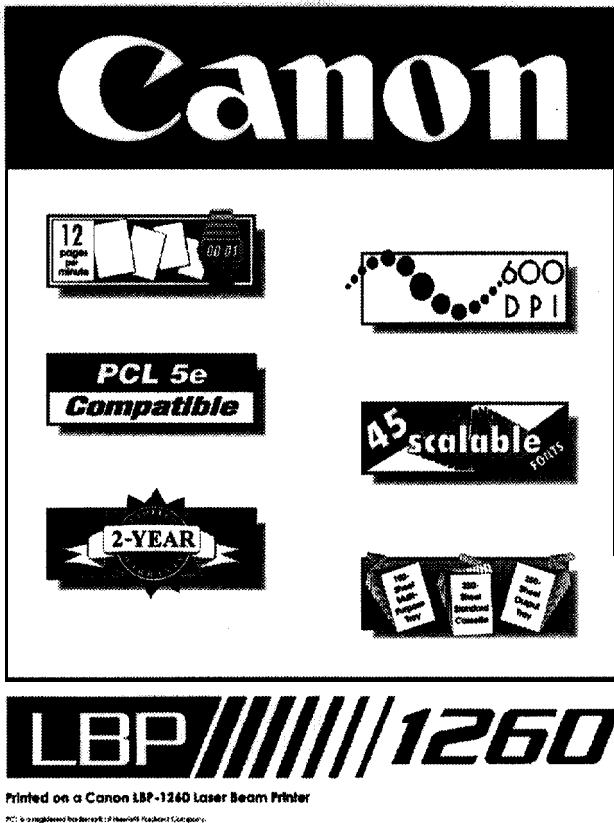


Figure 1-15

● Printing the Printer settings Page

Follow these steps to **print** the **Printer Settings** Page:

1. Press the ON LINE key to set the printer off-line.
2. Press the SELECT key. The printer displays the SELF TEST message followed by the PRINTING TEST message.
3. When the page is complete, press ON LINE to set the printer back on-line.

Use the Test Page to **verify** operator panel selections, system configuration **settings** (memory and options), and print quality.

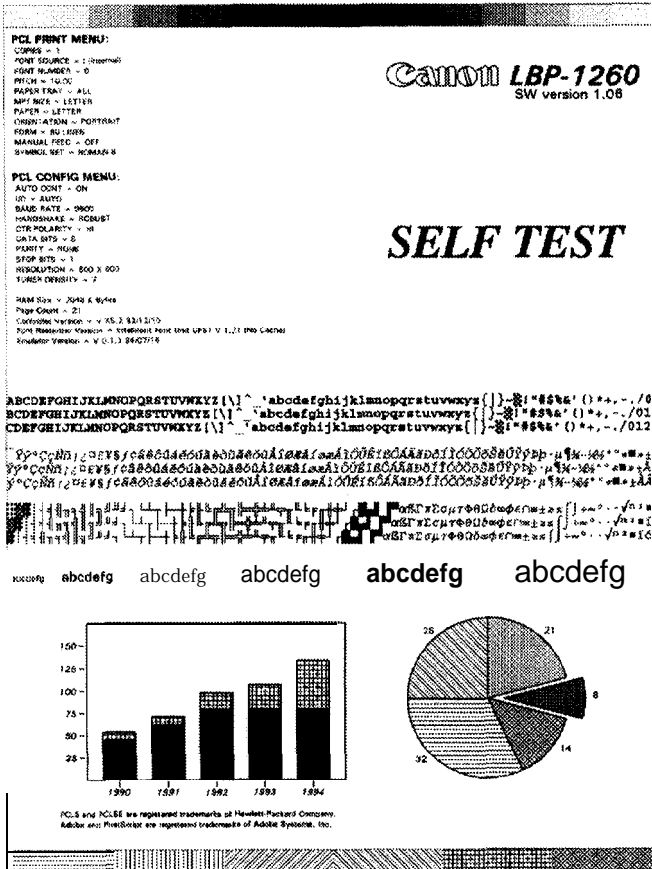


Figure 1-16

● printing the PCL Font List

Follow these steps to print the Font List:

1. Press the ON LINE key to set the printer off-line.
2. Press and hold the TEST/FONT key (for **approximately five seconds**). The printer displays the FONT PRINTOUT message.
3. When the Font List is complete, press ON LINE to set the printer on-line.

The PCL Font List shows the typeface and bitmapped fonts (both internal and optional) currently available in your printer for PCL print jobs.

The following sample shows the **first** portion of the PCL Font List.

Font List										
Font #	Font ID	Symbol Set	Fix /PS	Pitch (cpi)	Point Size	Style	Stroke Weight	Name or Typeface	Default Orient	Print Sample & Escape Sequence
"PERMANENT" SOFT FONTS										
FONT CARTRIDGE										
INTERNAL FONTS										
1000	ROMAN-8	F	Scale			Upright	Medium	Courier	Port	^M^P^LjAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h0a0b4099T
1001	ROMAN-8	F	16.67	8.5		Upright	Medium	Line Printer	Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~1234567890aAbBcCdDeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz<esc>(BU<esc>(aOp16.67h8.5v0a0b0T
1003	ROMAN-8	F	Scale			Upright	Bold	Courier	Bd Port	^M^P^LjAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h0a3b4099T
1004	ROMAN-8	F	Scale			Italic	Medium	Courier	It Port	^M^P^LjAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h1a0b4099T
1005	ROMAN-8	F	Scale			Italic	Bold	Courier	BdIt Port	^M^P^LjAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h1a3b4099T
1006	ROMAN-8	P	Scale			Upright	Medium	CG Times	Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v0a0b4101T
1007	ROMAN-8	P	Scale			Upright	Bold	CG Times	Bd Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v0a3b4101T
1008	ROMAN-8	P	Scale			Italic	Medium	CG Times	It Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v1a0b4101T
1009	ROMAN-8	P	Scale			Italic	Bold	CG Times	BdIt Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v1a3b4101T
1010	ROMAN-8	F	Scale			Upright	Medium	LetterGothic	Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h0a0b4102T
1011	ROMAN-8	F	Scale			Upright	Bold	LetterGothic	Bd Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h0a3b4102T
1012	ROMAN-8	F	Scale			Italic	Medium	LetterGothic	It Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aOp_h1a0b4102T
1013	ROMAN-8	P	Scale			Upright	Medium	CG Omega	Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v0a0b4113T
1014	ROMAN-8	P	Scale			Upright	Bold	CG Omega	Bd Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v0a3b4113T
1015	ROMAN-8	P	Scale			Italic	Medium	CG Omega	It Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v1a0b4113T
1016	ROMAN-8	P	Scale			Italic	Bold	CG Omega	BdIt Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v1a3b4113T
1017	ROMAN-8	P	Scale			Italic	Medium	Coronet	Port	ABCD EFGHIJAA^CNjzESE#S@[]^{}~123<esc>(BU<esc>(aTp_v1a0b4116T




1040	ROMAN-8	P		Scale	Italic	Bold	Arial Bd It	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(8J<esc>(s1p_v1a3b16602T
1041	SYMBOL	P		Scale	Upright	Medium	Symbol	Port	ABCD E fgh i j q Y ° Z x Ø + % & ~ # 3 = [] L { } ~ 123 <esc>(19H<esc>(s1p_v0a0b16606T
1042	ROMAN-8	P		Scale	Upright	Medium	Times New	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(8J<esc>(s1p_v0a0b16901T
1043	ROMAN-8	P		Scale	Upright	Bold	Times Bd	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(8J<esc>(s1p_v0a3b16901T
1044	ROMAN-8	P		Scale	Italic	Medium	Times New It	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(8J<esc>(s1p_v1a0b16901T
1045	ROMAN-8	P		Scale	Italic	Bold	Times New Bld It	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(8J<esc>(s1p_v1a3b16901T
1046	WINGDINGS	P		Scale	Upright	Medium	Wingdings	Port	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 <esc>(579L<esc>(s1p_v0a0b31482T
1047	ISO L1	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(0K<esc>(s0p16.67h8.5v0a0b0T
1048	PC-8	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(10U<esc>(s0p16.67h8.5v0a0b0T
1049	PC-8 DH	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(11U<esc>(s0p16.67h8.5v0a0b0T
1050	PC-850	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(12U<esc>(s0p16.67h8.5v0a0b0T
1051	LEGAL	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 <esc>(1U<esc>(s0p16.67h8.5v0a0b0T

Font List

Font #	Font ID	Symbol Set	Fix /PS	Pitch (cpi)	Point Size	Style	Stroke Weight	Name or Typeface	Default Orient	Print Sample & Escape Sequence
<u>"PERMANENT" SOFT FONTS</u>										
<u>FONT CARTRIDGE</u>										
<u>INTERNAL FONTS</u>										
1002	ROMAN-8	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j A A ° C N i z E S E S \$ @ [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(8J<esc>(s0p16.67h8.5v0a0b0T	
1052	ISO L1	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(0K<esc>(s0p16.67h8.5v0a0b0T	
1053	PC-8	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(10U<esc>(s0p16.67h8.5v0a0b0T	
1054	PC-8 DH	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(11U<esc>(s0p16.67h8.5v0a0b0T	
1055	PC-850	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z <esc>(12U<esc>(s0p16.67h8.5v0a0b0T	
1056	LEGAL	F	16.67	8.5	Upright	Medium	Line Printer	Land	ABCD E fgh i j e ' ' q ' ' w A A S S S [] ^ { } ~ 123 <esc>(1U<esc>(s0p16.67h8.5v0a0b0T	

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 explanation: (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	INTERFACE.....	2-36
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I. BASIC OPERATION

A. Functions

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

To external device (computer, etc.)

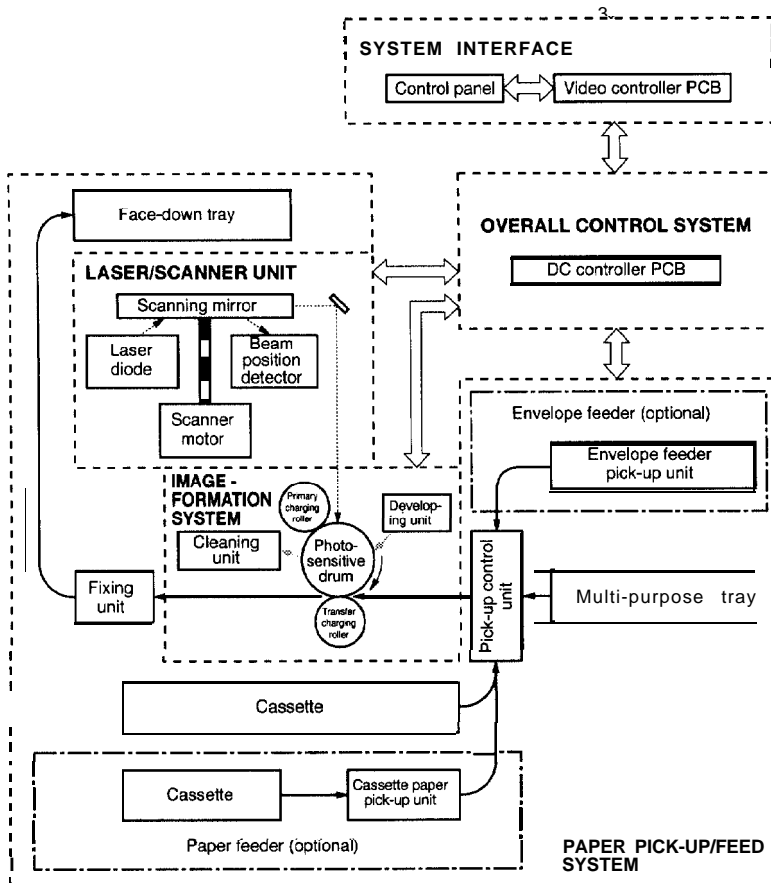


Figure 2-1

B. Outline of the Electrical System

The operations of this printer are controlled by the microprocessor located on the DC controller PCB. When the power is turned on and the printer goes into standby, the microprocessor outputs signals to drive the laser diode, motors, and solenoids in response to print commands and image data from the external device.

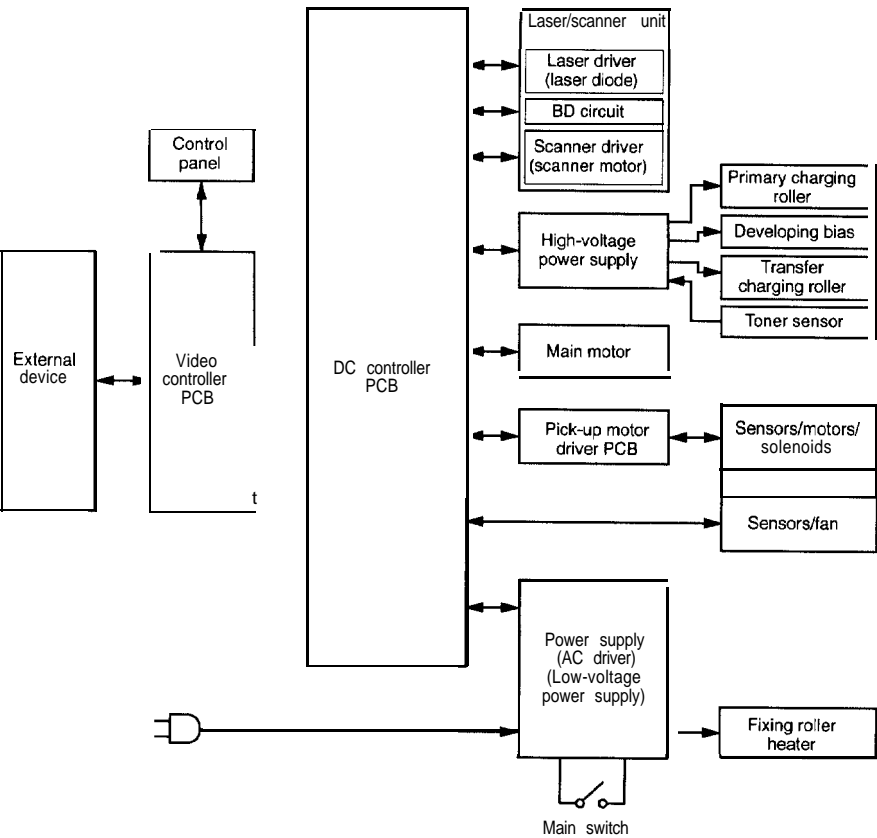


Figure 2-2

C. DC Controller Input Signals

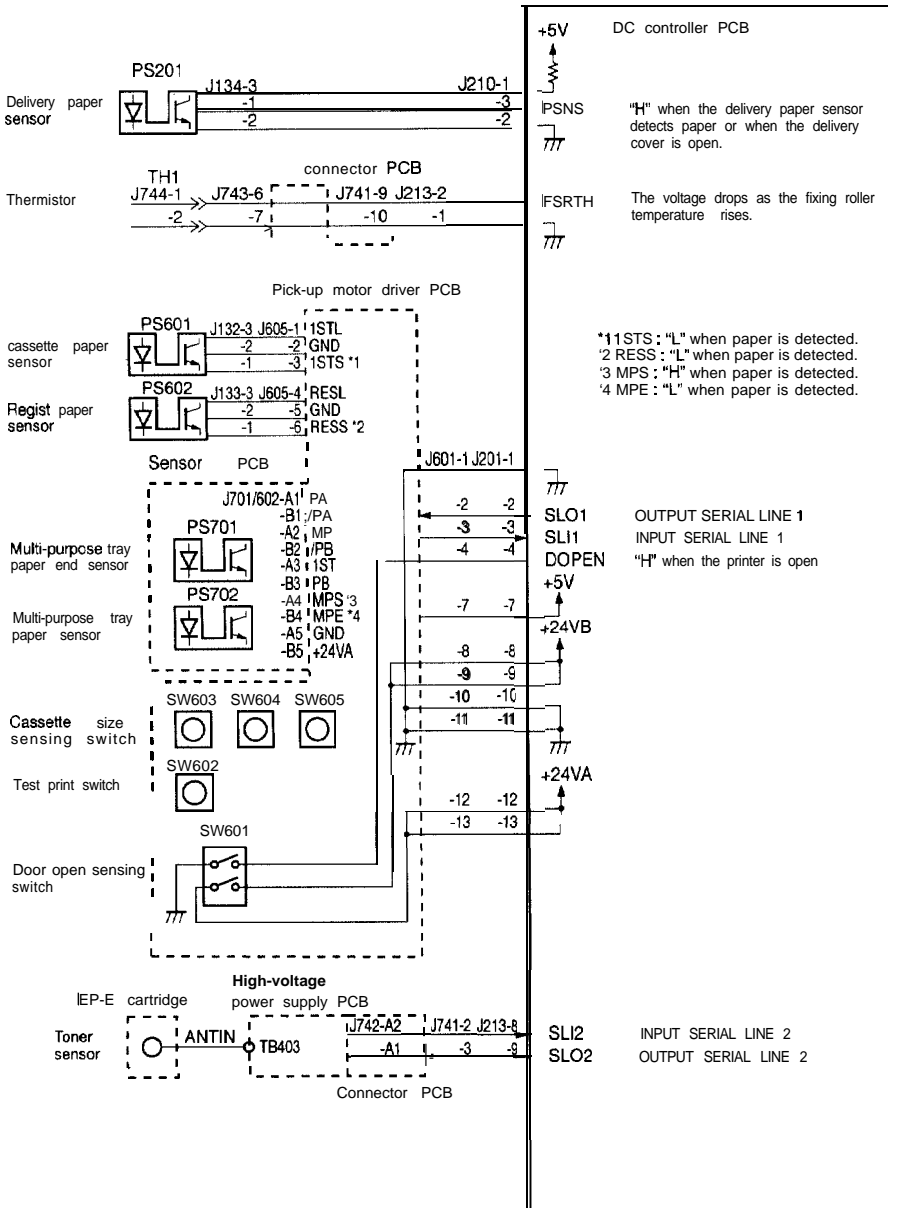


Figure 2-3

D. DC Controller Input/Output Signals (1/2)

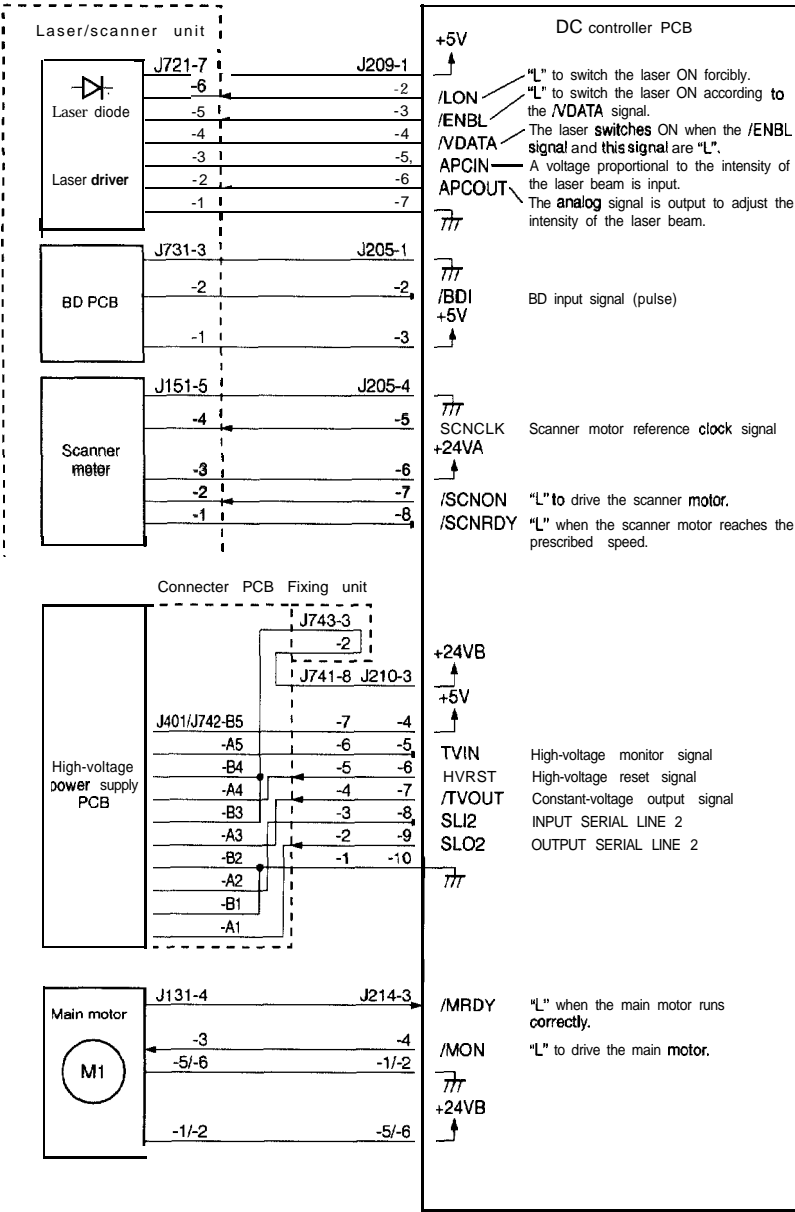


Figure 2-4

E. Basic Sequence of Operations

Two consecutive prints on A4 paper (Cassette feed)

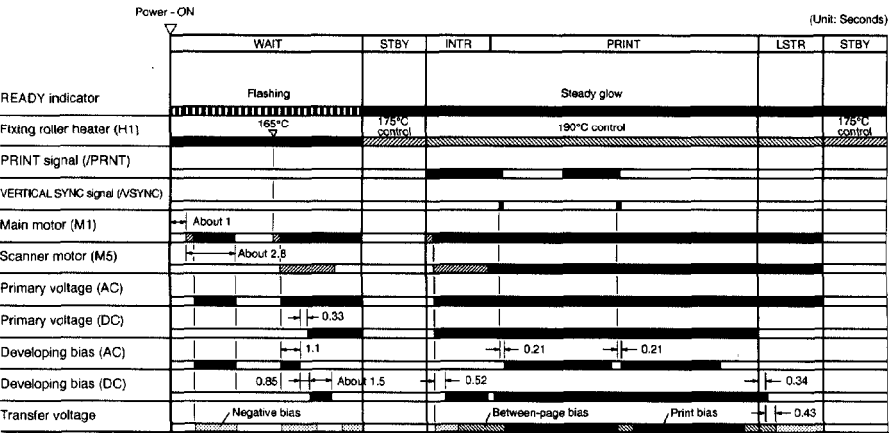


Figure 2-6

Table 2-1

Period		Purpose	Remark
WAIT (WAIT period)	From power-ON until the fixing roller temperature reaches 175°C See page 1-3 for warm-up time.	To warm up the fixing roller to put the printer in the standby state and clean the transfer charging roller.	During this period, the printer checks the cartridge Is installed and there is toner in it.
STBY (STANDBY)	From the end of the WAIT period until a /PRNT signal is Input from the video controller. or from the end of the LSTR period until a /PRNT signal is Input from the video controller or the power is switched OFF	To hold the fixing roller at 175°C to keep the printer ready to print.	If the printer stays in the standby state for five hours or more. It drives the main motor for one second to rotate the fixing roller, so that the fixing roller will not be deformed.
INTR (INITIAL ROTATIONS period)	After the /PRNT signal has been input from the video controller until the scanner motor becomes ready (about 6 seconds)	To stabilize the sensitivity of the drum In preparation for printing and to clean the transfer charging roller.	
PRINT (Print)	From the end of the INTR period until the primary voltage (DC) switches OFF	To form an image on the photosensitive drum according to the /VDO signal Input from the video controller and to transfer the image the paper.	During this period, the printer holds the fixing roller at 190°C.
LSTR (LAST ROTATIONS period)	After the primary voltage (DC) turns OFF until the main motor stops	To deliver the final page of the Job and to clean the transfer charging roller.	If a /PRNT signal is input from the video controller, the INITIAL ROTATIONS period begins immediately.

II. LASER/SCANNER SYSTEM

A. Outline

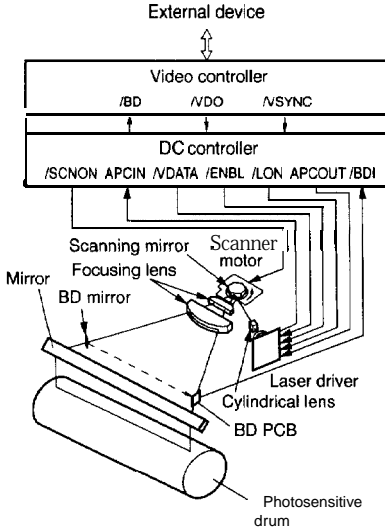


Figure 2-7

The DC controller receives the VIDEO signal (/VDO) from the video controller and sends it to the laser driver in the laser/scanner unit as the /VDATA signal. The laser driver turns the laser diode on and off according to the /VDATA signal and generates the modulated laser beam only when the VIDEO DATA ENABLE signal (/ENBL) from the DC controller is "L".

The laser activates the laser diode in response to the AUTOMATIC POWER CONTROL OUTPUT signal (APCOUT) when the FORCIBLE LASER ON signal (/LON) from the DC controller goes "L", detects the laser beam with the photodiode adjoining the laser diode, and sends an output proportional to the intensity of the laser beam to the DC controller as the AUTOMATIC POWER CONTROL INPUT (APCIN) signal.

The DC controller controls the APCOUT signal to set the APCIN signal to the

specified value to stabilize the intensity of the laser beam. (Control of laser beam intensity: APC control)

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

The beam is reflected from this mirror, then brought to a focus on the photosensitive drum by the focusing lens in front of the scanning mirror. The path of the beam passing through the focusing lens is changed by a mirror.

As the scanning mirror rotates at constant speed, the beam is scanned across the photosensitive drum, which also rotates at constant speed. As the photosensitive drum rotates, the laser beam successively scans across its surface. Thus the laser beam builds up the latent image on the surface of the photosensitive drum.

B. Scanning Exposure

The simplest example of exposure of the photosensitive drum by the laser beam is to imagine that both the drum and beam are stationary. In this case the laser beam illuminates a single point on the drum.

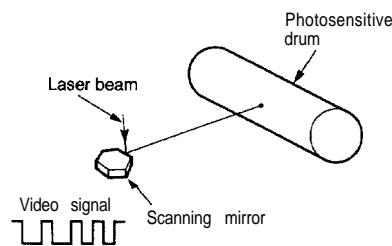


Figure 2-8

When the scanning mirror is rotating and the laser beam strikes one of its faces, the reflected laser beam scans from one end of the photosensitive drum to the other (horizontal scan).

A broken line is produced by switching the laser beam on and off during the horizontal scan according to the VIDEO signal (/VDO).

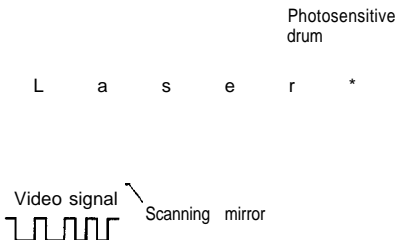


Figure 2-9

When the photosensitive drum is also rotating, in addition to the horizontal scan, the laser beam also advances around the photosensitive drum (vertical scan). The photosensitive drum rotates at constant speed while the laser beam scans across it. In the time that the beam takes to sweep across the drum and return to its original position, the drum surface rotates about

43 μm (600 raster lines/inch). Successive horizontal scans are therefore separated by this interval.

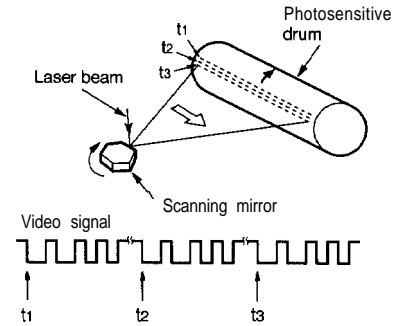


Figure 2-10

The surface of the photosensitive drum is charged to a negative potential by the primary charging roller before printing starts. When laser light strikes the photosensitive drum during the horizontal and vertical scans described above, the electrostatic charge at that location is neutralized, producing an electrostatic latent image on the photosensitive drum surface.

There is a small fixed beam-detect (BD) mirror in the laser beam path. As the laser beam is swept horizontally toward the starting point for printing a line of data (the scanning start position), the beam strikes the BD mirror and is reflected to the sensor on the BD PCB. The laser beam is converted to an electrical signal by the sensor and the signal is sent to the DC controller as the BD INPUT signal (/BDI).

The DC controller produces the BEAM DETECT signal (/BD) in response to the /BDI signal. The /BD signal is sent to the video controller as a differential signal (BD, /BD).

The laser is ON whenever the laser beam is not scanning the drum surface to allow detection of the /BD signal. This signal is called the UNBLANKING signal (UBL) and is produced by the DC controller. The UBL signal is sent to the laser driver as the FORCIBLE LASER ON

signal (/LON) to cause it to switch the laser diode ON when the /LON signal is "L".

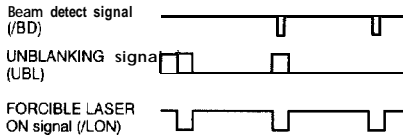


Figure 2-11

C. Laser control circuit
1. outline

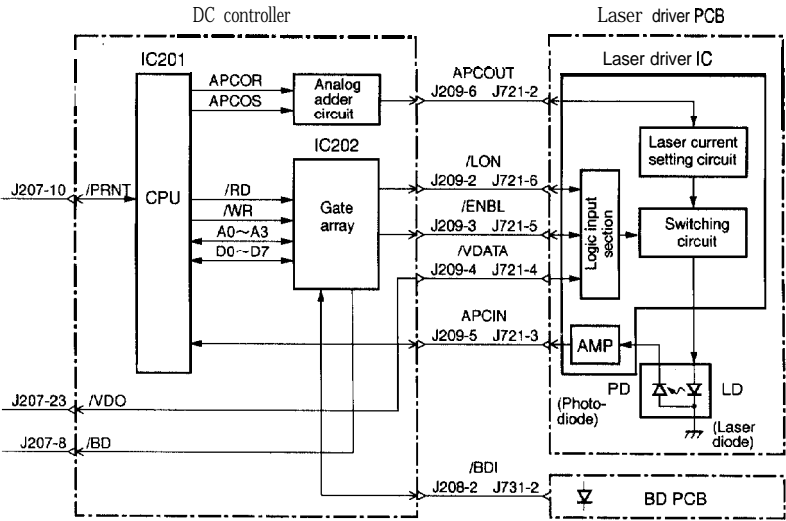


Figure 2-12

This circuit switches the laser diode (LD) ON and OFF at a constant intensity in response to the /VDO signal from the video controller. The /VDO signal, sent from the video controller to the DC controller, goes to the switching circuit in the laser driver circuit as it is as the /VDATA signal.

The microprocessor (CPU:IC201) outputs the INTENSITY CONTROL signals (APCOR, APCOS) from the DA output ports to the analog adder circuit according to the internal data. The APCOR and APCOS signals are added to this circuit at a ratio of approximately 8 to 1, and then sent to the laser current setting circuit located in the laser driver as the AUTOMATIC POWER CONTROL OUTPUT signal (APCOUT).

The CPU adjusts the value of the APCOUT signal by changing the APCOR signal for coarse adjustment, and the APCOS signal for fine adjustment.

The output current of the laser current setting circuit is sent to the switching circuit and the laser diode is switched ON and OFF in response to the /VDATA signal when the VIDEO DATA ENABLE signal (/ENBL, described later) is "L".

2. Control of laser beam intensity (APC control)

The CPU performs automatic power control (APC) of the laser diode to make the laser diode emit constant light. This control can be classified into two types: initial APC and between-page APC.

a. Initial APC

Initial APC is performed to increase the intensity of the laser beam from zero to the target value during initial rotation. The CPU sets the FORCIBLE LASER ON signal (/LON) to "L", and at the same time the CPU changes the APCOR signal (coarse adjustment) and lets the APCOUT signal gradually **rise** from the low value. As the laser current increases, the laser diode (LD) begins emitting light.

The intensity of the laser diode (LD) output is detected by the photodiode (PD). After amplification, the output voltage is fed back to the CPU as the AUTOMATIC POWER CONTROL INPUT signal (APCIN).

The CPU continues coarse adjustment **until** the input value of the APCIN signal reaches 70% of the target value stored in the CPU. The CPU then does fine adjustment with the APCOS signal, and ends the initial APC when the input value of the **APCIN** signal has become almost equal to the target value.

b. Between-page APC

Between-page APC is performed after Initial APC, and when printing is not being performed while waiting for the next page to proceed to the printing area, to correct variations in the intensity of the laser printing.

Between-page **APC** is also performed during the unblinking period, described later, to prevent the laser beam from writing on the image area of the photosensitive drum.

The CPU sets the **UNBLANKING** signal (UBL, used by IC202 and not output externally) to "H" and sets the FORCIBLE LASER ON signal (/LON) to "L".

The CPU then changes the APCOS **signal** (fine adjustment), compares the input value of the **APCIN** signal with the target value, and optimizes the intensity of the laser beam.

3. Laser diode emission control

Laser diode emission is controlled by VIDEO signal (/VDO), which is sent from the video controller and processes the paper size data.

The paper size data is input to the CPU from the cassette size sensing switches for cassette feed and by the paper size command from the video controller for multi-purpose tray feed.

The CPU (IC201) transfers the /VDO signal from the video controller to the laser driver as it is as the /VDATA signal

The CPU sends data to the gate array (IC202) to generate the IMAGE TOP ERASE AND BOTTOM ERASE signal (TOPE) and HORIZONTAL MASK signal (MSK) according to the paper size data from IC202. (TOPE and MSK are used by IC202 and not output externally.)

To prevent the laser beam from writing on the non-Image area during the non-unblinking period, IC202 makes the VIDEO DATA ENABLE signal (/ENBL) "L" only when the TOPE and MSK signals are "L". The laser driver switches the laser ON when the /ENBL signal is "L" and the /VDATA signal is "L".

The gate array (IC202) generates the UNBLINKING signal (UBL) according to the BD INPUT signal (/BDI) sent from the BD PCB in the laser/scanner unit. IC202 sets the UBL signal to "H" during the unblinking period and sets the FORCIBLE LASER ON signal (/LON). The laser driver switches the laser diode ON when the /LON signal is "L".

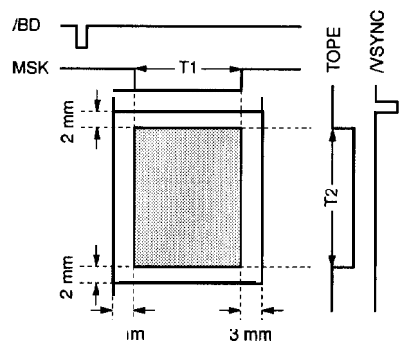


Figure 2-13

- Notes: 1. [Shaded area] Indicates the area where the laser beam writes on the drum.
2. The duration of T1 & T2 vary according to paper size. The duration of T1 becomes the legal size time when the printer does not recognize the width of the paper (maximum printable width). It is the paper size command from the video controller has not specified it on the multi-purpose tray paper feeding.
- The TOPE signal becomes "H" after the prescribed time of the multi-purpose tray paper end sensor becomes OFF.

When the scanner motor turns and reaches the prescribed speed, the CPU sets the SCANNER MOTOR READY signal (/SCNRDY) to "L".

The CPU notifies a scanner error to the video controller in the following cases:

- a. **When** the /SCNRDY signal does not go "L" within 30 seconds after the scanner motor starting rotation.
- b. When the /SCNRDY signal goes "H" for 2 seconds after it goes "L".

II. IMAGE FORMATION SYSTEM

A. outline

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

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

The primary charging roller uniformly applies a negative charge to the surface of the photosensitive drum. To form the latent image on the photosensitive drum, the laser beam modulated by the /VDO signal illuminates the photosensitive drum surface.

The latent image formed on the photosensitive drum is changed to a visible image by the *toner on* the developing cylinder, then transferred to the paper by the transfer charging roller. The residual toner on the photosensitive drum surface is scraped off by the cleaning blade. The potential on the drum is made uniform by

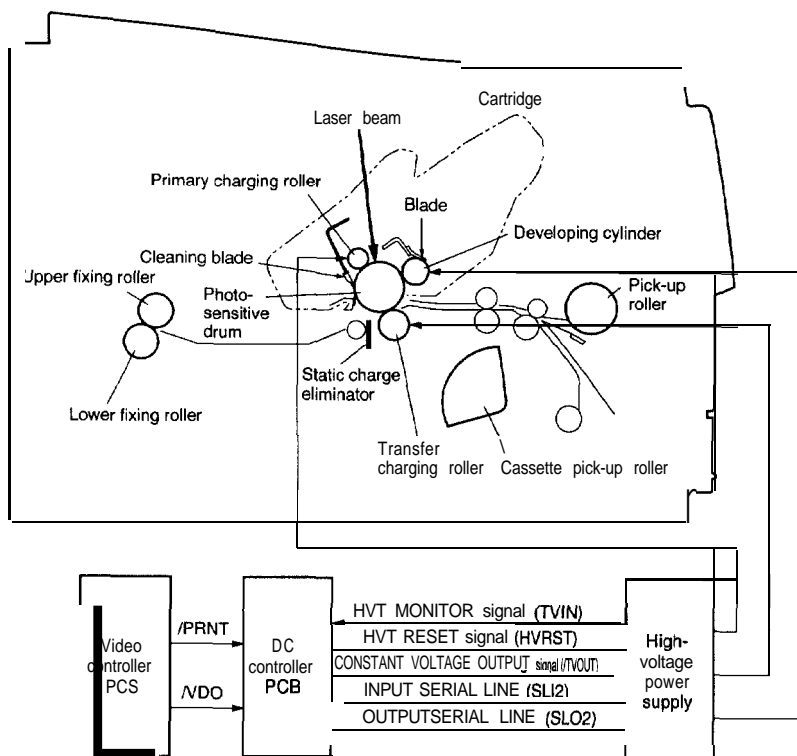


Figure 2-16

the primary charging roller prior to generation of a new latent image.

The cartridge has a toner sensor that detects whether there is enough toner or whether a cartridge is installed. If the level of toner in the cartridge becomes lower than the prescribed level, or if there is no cartridge in the printer, the high-voltage power supply PCB notifies the DC controller via the serial line.

B. Printing Process

The major part of the image formation system is contained in the cartridge, as shown in Figure 2-17.

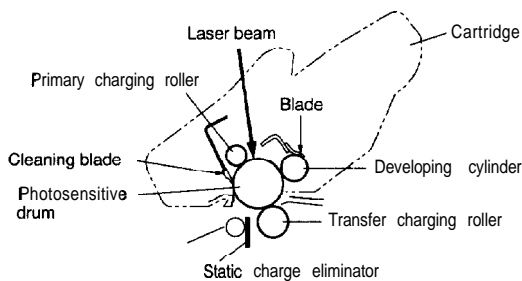


Figure 2-17

The cartridge used by the printer has a seamless photosensitive drum with the structure shown in Figure 2-18. The outer layer of the drum consists of an organic photoconductor (OPC); the base is aluminum.

The **printing** process can be divided into **five** major stages:

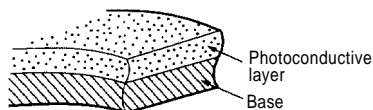


Figure 2-18

1. Electrostatic latent image formation stage
 - Step 1 Primary charge (-)
 - Step 2 Scanning exposure
2. Developing stage
 - Step 3 Development
3. Transfer stage
 - Step 4 Transfer (+)
 - Step 5 Separation
4. Fixing stage
 - Step 6 Fixing
5. Drum cleaning stage
 - Step 7 Drum cleaning

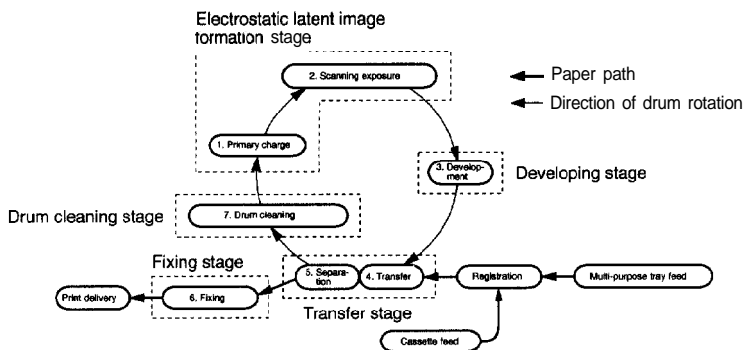


Figure 2-19

1. Electrostatic latent image formation stage

This stage has **two** steps, which together produce a pattern of electrical charges on the photosensitive drum.

At the end of the stage, negative charges remain in the unexposed “dark” areas. Charges are absent from the “light” areas, where the laser beam struck (exposed) the drum surface.

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

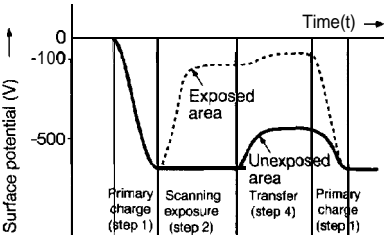


Figure 2-20

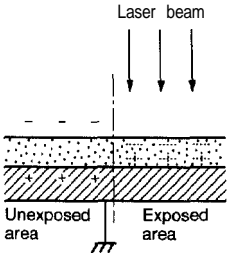


Figure 2-22

Step 1 Primary charge

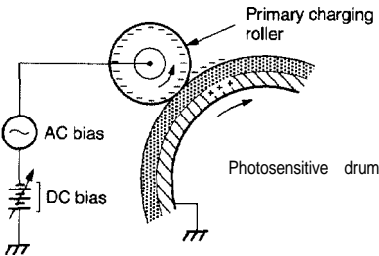


Figure 2-21

The primary charging roller consists of conductive rubber. In addition to DC bias, AC bias is applied to the primary **charging** roller to keep the potential on the drum surface uniform. This DC bias is changed with the developing DC bias.

This charging method has advantages such as lower applied voltage, less ozone generation, etc., compared **with** the corona charge system.

Step 2 Scanning exposure

When the laser beam scans the drum surface, it causes the charge to be neutralized in the areas struck by the beam. Areas on the drum with no charge form the **electrostatic latent Image**.

As preparation for latent Image formation, a uniform negative potential is applied to the photosensitive drum surface. The printer uses the charging method that directly charges the drum for the primary charge.

2. Developing stage

Development places particles of toner onto the areas of the drum that have been cleared of charge by the laser beam. This makes a visible image. This printer uses the toner projection development method with a single-component toner.

Step 3 Development

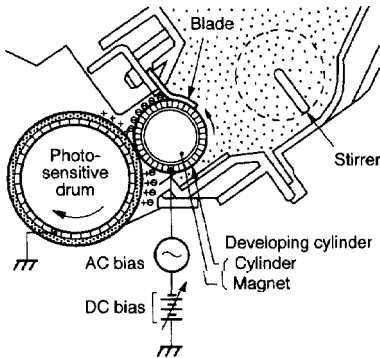


Figure 2-23

Note: The charges on the light areas on the photosensitive drum are shown as positive in this figure. Actually they are negative, but they are more positive than the developing cylinder and explanation is simplified by regarding them as positive.

As shown in Figure 2-23, the developing unit consists of a developing cylinder and rubber blade. The developing cylinder rotates around a fixed internal magnet.

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

The areas on the drum that were exposed to the laser beam have a higher potential (are less negative) than the

negatively charged toner particles on the developing cylinder. When these areas approach the cylinder, the potential difference projects the toner particles onto them. This is called toner projection, and the latent image on the drum becomes visible.

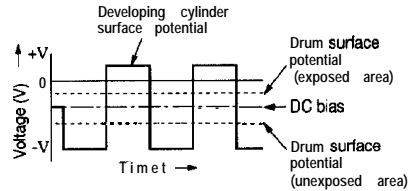


Figure 2-24

An AC bias is applied to the developing cylinder to help project the toner particles to the drum surface and improve the contrast of the printed image. The center voltage of the AC bias (1600 Vp-p) varies with the DC bias voltage.

The IMAGE DENSITY ADJUSTMENT signal (sent from the DC controller to the high-voltage power supply via the serial line) changes the DC bias, and thus the potential difference between the cylinder and drum. This changes the density of the print.

This printer has a stirring mechanism to supply toner in the cartridge smoothly to the cylinder.

3. Transfer stage

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

step 4 Transfer

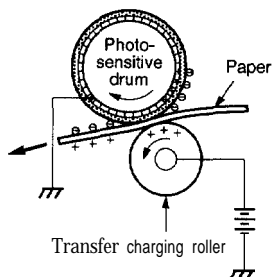


Figure 2-26

A positive charge applied to the back of the paper attracts the negatively charged toner particles to the paper. The printer accomplishes transfer by using the charging roller method. Advantages compared with the corona transfer method are as follows:

- Low transfer voltage that is less than half that for corona transfer
- Less ozone generation
- The paper is supported by the transfer charging roller and photosensitive drum, so feed is more stable.

Reference:

If the image on the photosensitive drum is not completely transferred to the paper due to jamming, etc., the toner may adhere to the transfer charging roller. The printer removes the toner from the transfer charging roller by switching the transfer voltage between positive and negative in sequence. During wait, initial rotation, and last rotation, the printer sets the primary DC voltage to zero, and sets the charge on the drum to zero. In this case, the transfer voltage is made negative to remove the negatively-

charged toner on the transfer charging roller to the drum. The transfer charging roller is thus cleaned.

step 5 Separation

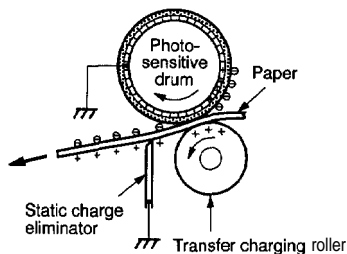


Figure 2-28

The stiffness of the paper causes it to separate from the drum. (Curvature separation)

To stabilize the paper feed and prevent small white circles from appearing in the printed image at low temperature and humidity, the charge on the back of the paper is reduced by the static charge eliminator after transfer.

4. Fixing stage

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

In the fixing stage, the toner image is fixed by heating the paper and applying pressure. This fuses the toner particles to the paper to make a permanent image.

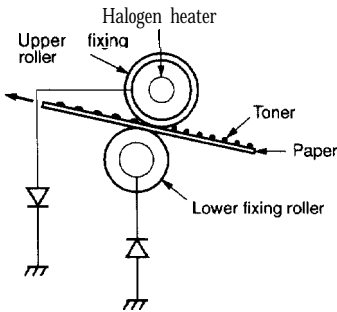


Figure 2-27

5. Drum cleaning stage

In the transfer stage, not all the toner is transferred to the paper. Some remains on the photosensitive drum. This residual toner is cleaned off in the drum cleaning stage so that the next print image will be clear.

Step 7 Drum cleaning

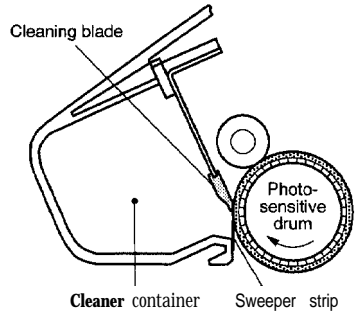


Figure 2-28

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 in the cleaner container.

Step 6 Fixing

The upper roller surface is covered with a non-stick teflon tube. The upper and lower roller surfaces are grounded via a diode to prevent the negative potential of the upper roller becoming higher than that of the lower roller, resulting in the toner being drawn to the lower roller, and adhering to the lower roller surface.

Reference: Toner projection development

Actually, both unexposed and exposed areas of the drum surface have a negative potential, but to simplify the explanation, the drum potential is shown as positive when it is higher (less negative) than the developing cylinder potential, and negative when it is lower (more negative) than the developing cylinder potential.

Table 2-2

Latent image	Development bias	Toner movement and electric potentials	Description
Exposed area	Negative bias		The electrostatic attraction caused by the difference in potential between the drum surface and the cylinder is sufficient to overcome the attraction of the magnet, so the toner particles are projected from the cylinder onto the drum. The amount of toner projected depends on the DC bias voltage on the cylinder .
	Positive bias		When the potential difference between the drum surface and the developing cylinder is reduced, the resulting weak electric field combines with the magnetic field to attract toner back from the drum to the cylinder. This removes any excessive toner adhering to the drum, and improves the contrast of the finished print.
Unexposed area	Negative bias		The drum surface potential is only slightly higher than the cylinder potential, so the magnetic attraction to the cylinder is greater than the electrostatic attraction to the drum. Therefore, only a small amount of toner is projected toward the drum.
	Positive bias		The cylinder bias and the magnetic force now combine to strongly attract the toner to the cylinder, removing the excessive toner from the unexposed areas of the drum and preventing fogging.

C. High-Voltage Power Supply

1. Outline

In response to an instruction from the microprocessor (CPU) on the DC controller PCB, the high-voltage power supply applies a voltage comprising the DC voltage and the AC voltage to the primary charging roller and developing cylinder and applies the positive or negative DC voltage to the transfer charging roller.

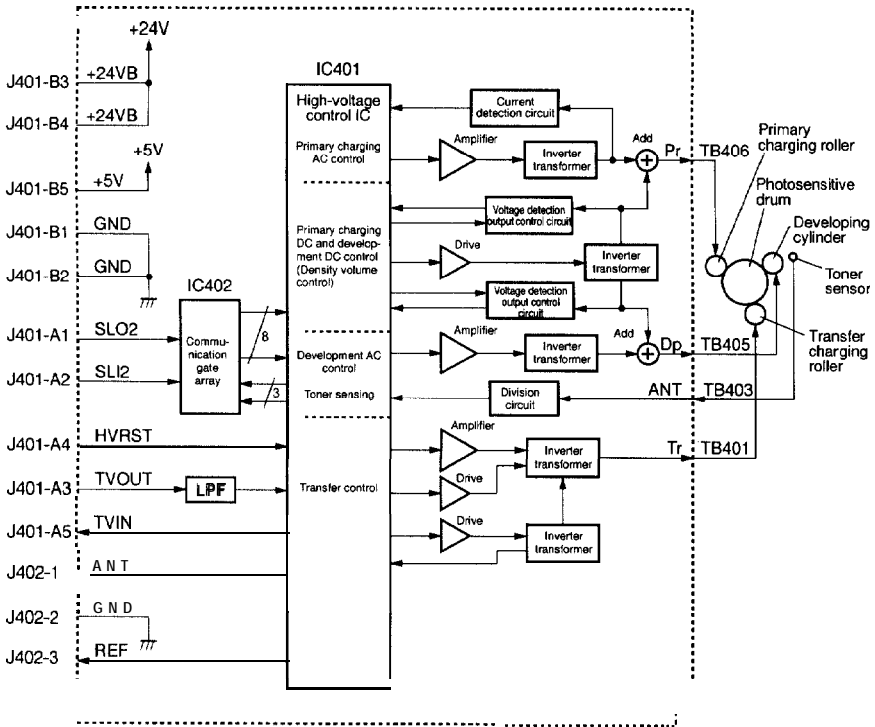


Figure 2-29

2. Principle of operation

a. Primary charging roller voltage generation

When the /PRNT signal from the video controller becomes "L", initial rotation starts. the HVT RESET signal (HVRST) becomes "H", and the circuit outputs the primary AC voltage to the primary charging roller. When the PRIMARY DC VOLTAGE ON signal is output to this circuit via the serial line, the high-voltage power supply outputs the

primary DC voltage, and the primary voltage comprising the AC bias and DC bias is applied to the primary charging roller.

The primary DC bias changes with the development DC bias according to the image density data sent from the DC controller via the serial line.

b. Developing bias generation

When the DEVELOPING BIAS DC ON signal is sent from the DC controller via

the serial line, a developing DC bias is applied to the developing cylinder.

When the VERTICAL SYNC signal (/VSYNC) is sent from the video controller, the DEVELOPING BIAS AC ON signal is sent from the DC controller via the serial line, and the voltage comprising the developing DC bias and developing AC bias is applied to the developing cylinder.

The developing DC bias changes with the image density data sent from the DC controller via the serial line, and the image density can be adjusted.

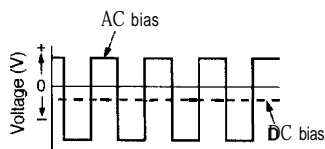


Figure 2-30

c. Transfer charging roller voltage generation

A negative or between-page or print bias is applied to the transfer charging roller according to the print sequence.

A negative bias voltage is applied to the transfer charging roller during appropriate time to move the toner attached to the transfer charging roller to the photosensitive drum, and so clean the roller.

A print bias voltage is applied to the transfer charging roller to transfer the toner on the photosensitive drum to the paper.

A between-page bias is applied to prevent the damage of the photosensitive drum in the defined timing. It is lower positive voltage than the print bias.

When the /PRNT signal from the video controller becomes "L", initial rotation starts and a negative bias is applied to the transfer charging roller for a certain time to clean the roller. A print bias is also applied during the print sequence to transfer toner to the

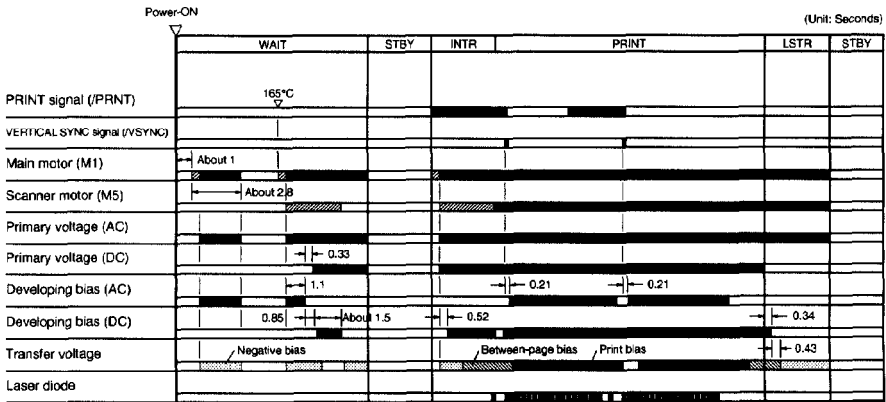
paper.

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

d. Toner sensing/cartridge sensing

The EP-E cartridge has a toner sensor that detects the toner level and whether there is a cartridge when the developing AC bias is applied to the developing cylinder by the DEVELOPING BIAS AC ON signal.

The detection result is sent to the DC controller via the serial line.



Note: The transfer **high** voltage is switched according to the printing sequence. as shown below.





-  : 0V
-  : Negative bias (A **negative voltage** is applied to the transfer **charging** roller to clean Lt.)
-  : Print bias (A positive voltage is applied to the transfer **charging** roller to transfer toner from the surface of the drum to the paper.)
-  : Between-page bias (A weak positive **charge** is applied to the transfer charging roller to prevent **excessive** toner from collecting on the **drum**.)

Figure 2-31

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IV. PICK-UP/FEED SYSTEM

A. Outline

The presence of paper on the multi-purpose tray is sensed by photointerrupter PS702, and the presence of paper in the cassette is sensed by photointerrupter PS601.

The presence and size of the cassette installed in the printer are sensed by three switches (SW603, 604, 605) mounted on the pick-up motor driver PCB.

If the pick-up roller clutch solenoid

(SL701, SL702) energizes when the pick-up motor is running, the pick-up roller turns and feeds a sheet of paper into the printer. The paper stops at the **resist** paper sensor (PS602). The video controller sends the VERTICAL SYNC signal after the paper reaches the sensor, and the leading edge of the toner image on the photosensitive drum is matched with the leading edge of the paper. The image is transferred, then the paper is separated from the drum, fed to the **fixing** unit, and delivered onto the face-down tray.

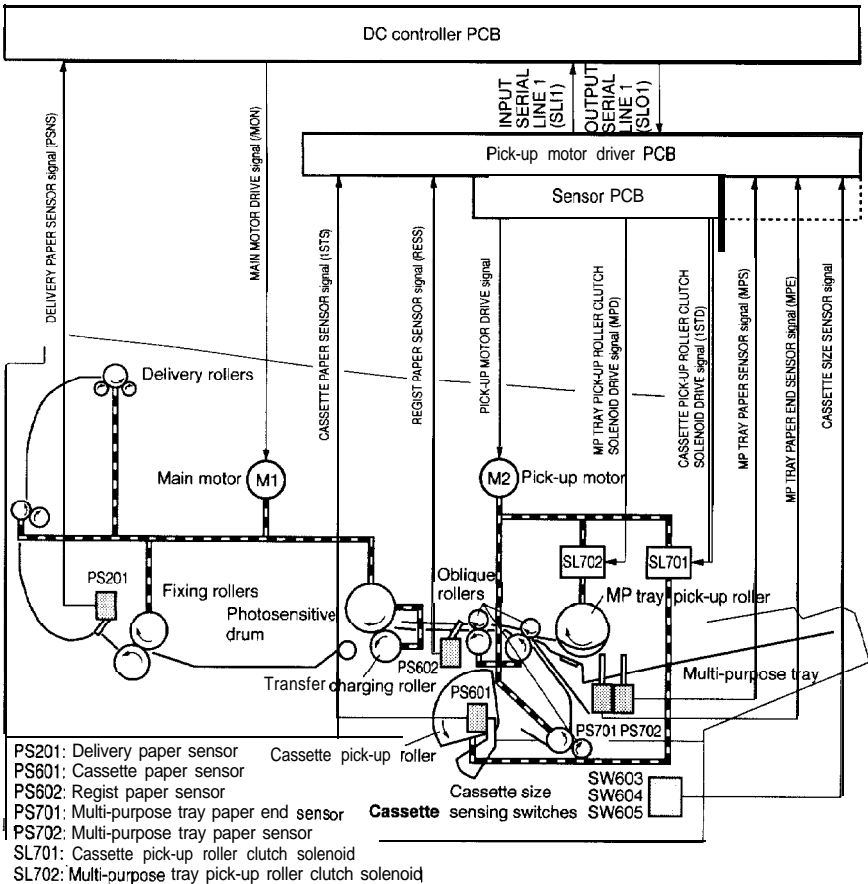


Figure 2-32

The pick-up and delivery units have photointerrupters (**PS602, PS201**) to detect paper. If the print does not reach or clear each sensor within a preset time, the microprocessor on the DC controller assumes a paper jam has occurred. The DC controller notifies the video controller of the jam.

B. Paper **Size** Detection
Loading the cassette in the printer feeder actuates **specific** switches. From the **combination** of actuated switches (**Table 2-3**), the microprocessor on the DC controller detects the cassette **size** and the presence of a cassette.

Table 2-3

Cassette	Cassette size sensing switch		
	SW603	SW604	SW605
Legal	ON	ON	OFF
Letter	ON	OFF	ON
A4	OFF	OFF	ON
Executive	OFF	ON	ON
B5	OFF	ON	OFF
No cassette	OFF	OFF	OFF

This printer cannot detect the paper size on the multi-purpose tray until the **first** page has been printed. When the **universal** cassette is used, the user sets the cassette size, so there may be a setting error.

The paper size is detected by the multi-purpose tray paper end sensor (**PS701**) if paper is fed from the multi-purpose tray, and by the resist paper sensor (**PS602**) if paper is fed from the cassette. If the paper **size is** different from that specified by the video controller, the microprocessor reports a paper size error to the video controller.

C. Cassette Feed

Each pick-up roller and the oblique rollers of the pick-up unit are driven by the pick-up motor (M2). When the video controller sends the /PRNT signal to the printer, the pick-up motor starts rotating.

After the pick-up motor rotates for 0.1 seconds, the pick-up roller clutch solenoid (SL701) or the multi-purpose tray pick-up roller clutch solenoid (SL702) activates for 0.3 seconds to rotate each pick-up roller.

The paper is fed by the oblique rollers so that the edge of the paper touches the left side plate to correct skew. The paper stops at the resist paper sensor (PS602). The VERTICAL SYNC signal (/VSYNC) is received about 0.2 seconds after the pick-up motor turns the oblique rollers.

The print paper is fed again.

. Paper path from multi-purpose tray

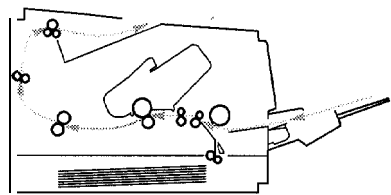


Figure 2-33

. Paper path from cassette

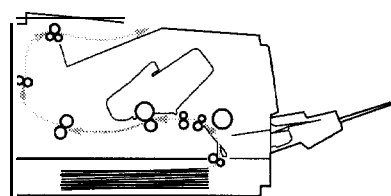


Figure 2-34

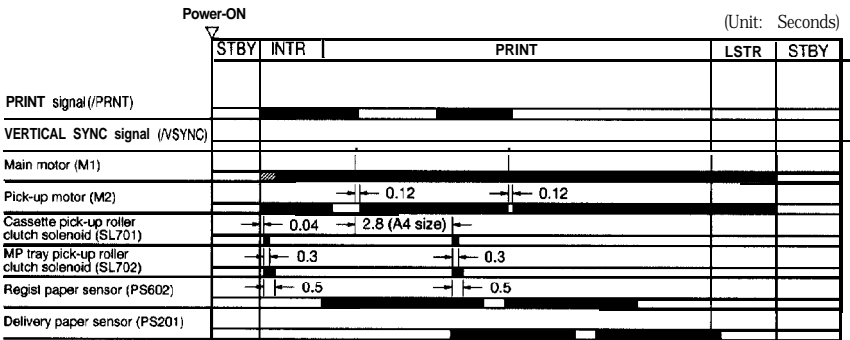


Figure 2-35

D. Fixing and **Delivery** Unit
1. outline

The upper/lower rollers of the fixing unit and the delivery rollers are driven by the main motor (M1). The upper roller is heated by a fixing roller heater (H1: 750 W).

The upper roller surface temperature is detected by a thermistor (TH1). As the surface temperature increases, the resistance of the thermistor (TH1) decreases, and the voltage of the FIXING

ROLLER SURFACE TEMPERATURE signal (FSRTH) decreases.

According to the voltage of the **FSRTH** signal, the microprocessor (CPU) on the DC controller makes the FIXING ROLLER HEATER DRIVE signal (/FSRD) "H" or "L" to set the upper roller surface temperature to the appropriate value.

The target temperatures of the upper fixing roller during WAIT, STANDBY, and PRINT state are listed in Table 2-4.

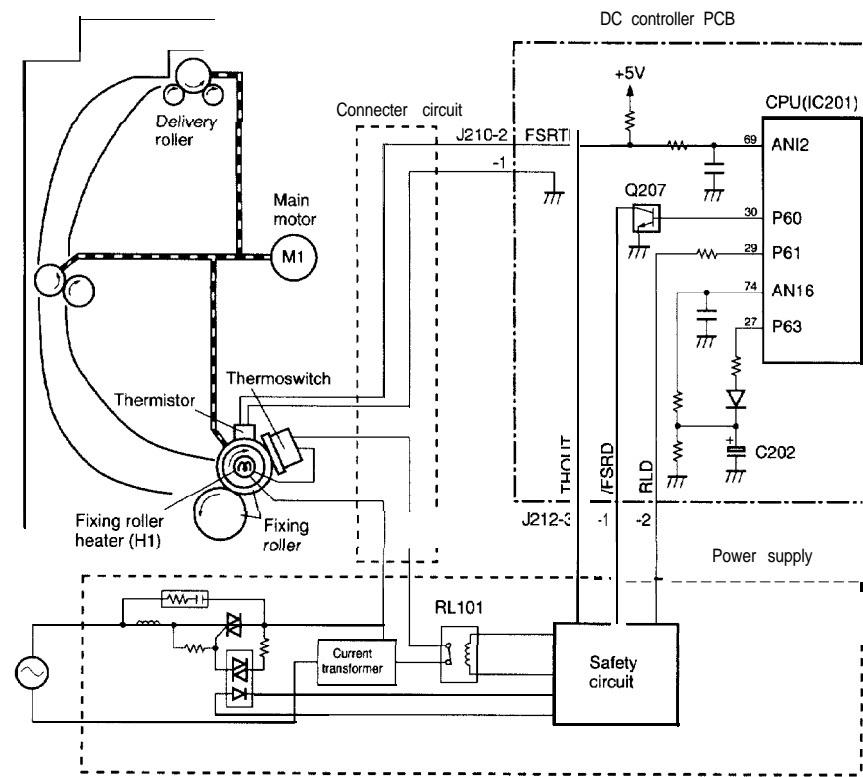


Figure 2-36

Table 2-4

	Target temperature			
	Normal temperature control		Initial warm-up temperature control (Note1)	
	Non-envelope	Envelope	Non-envelope	Envelope
WAIT	175	175	190	190
STANDBY	175	175	190	190
PRINT	(Note2)	185 (Note6) -180	(Note7)	195

Notes: 1. If the thermistor-detected temperature is 50°C or less when the power is switched ON, this temperature control is performed for 5 minutes to improve fixing.

2. The target temperature is switched depending on print interval.

See Table 2-5. There are two classification continuous printing and intermittent printing. Continuous printing is defined as when the pick-up system for the next printing is operated within 12 seconds after received /VSYNC signal. Intermittent printing is more than 12 seconds.

Table 2-5

	Continuous printing	Intermittent printing	
Print interval	within 12 sec.	12 sec. - 7 min.	more than 7 min.
A4, B5	190 (Note3) -185	185 (Note4) -180	185 (Note5) -190
Letter, legal, executive	195 (Note3) -190	185	185 (Note5) -195

3. When the continuous printing is finished within 5 minutes it is switched to 190°C or 195°C. More than 5 minutes it is switched to 185°C or 190°C. However when it is switched a middle temperature is maintained 15 seconds.
4. It is 185°C from paper pick-up start until the /VSYNC signal is received, and then it is switched

to 180°C.

5. It is 185°C from paper pick-up start until the /VSYNC signal is received, and then it is switched to 190°C or 195°C.
6. It is switched to 180°C after continuous printing of 25 envelopes on normal temperature control.
7. Under the initial warm-up temperature control, the intermittent printings is 195°C and the continuous printings is 205°C.

The printer has the following three protection functions to prevent incorrect activation of the fixing roller:

- The CPU monitors the thermistor voltage. If it is abnormal, the CPU detects the fixing unit error, interrupts the power to the fixing roller heater, and reports it to the video controller.
- If the upper roller surface temperature rises abnormally and the thermistor voltage falls below about 1.0 V (230°C), the safety circuit in the power supply interrupts the power to the fixing roller heater regardless of the CPU output.
- If the upper roller surface temperature rises abnormally and the thermoswitch temperature exceeds 210°C, the thermoswitch turns off, interrupting the power to the fixing roller heater.

2. Fixing unit error detection

The CPU assumes a **fixing unit** error in the following cases, and informs the video controller:

- a. Error memory capacitor (C205) charging detection
If the voltage at pin 62 (ANI6) of the CPU is 1.62 V or more (C205 is charged) when the power is switched ON
- b. Thermistor broken-wire detection
If the upper roller temperature does not reach 33°C within 22 seconds of the **fixing** roller heater being turned ON
- c. **Fixing** roller heater broken-wire detection
If the upper roller temperature does not reach the standby temperature within 200 seconds of the **fixing** roller heater being turned ON
- d. Broken-wire detection after the **fixing** unit becomes ready
If the upper roller temperature reaches 140°C in the standby state or during printing
- e. Thermistor short detection
If the voltage of the FIXING ROLLER SURFACE TEMPERATURE signal (FSRTH) is 0.94 V (230°C) or less

When the CPU detects a fixing error, the following are performed:

- 1) Switches the **fixing** roller heater OFF.
- 2) Sets the output from pin 24 (P63) to "H" and charges the error memory capacitor (C205).
- 3) Sets the RELAY DRIVE signal (RLD) to "L", switches the relay OFF in the power supply, and interrupts the power to the **fixing** roller heater.

When the power is switched ON, the CPU reads the voltage of pin 62 (ANI6). If the voltage is higher than the **specified** value, the CPU assumes a **fixing** unit error before power-ON and cuts the current to the **fixing** roller heater.

Note: If a **fixing** unit error occurs, do not switch the power on for about 10 minutes. As a safety measure, the roller heater will not operate even if you switch the power on during this time.

3. Fixing roller heater start sequence

The sequence of operations from power-on to standby is as follows:

- 1) The CPU turns the fixing roller heater ON a preset time after power-ON (after CPU initialization).
- 2) The CPU assumes a fixing unit error when the upper fixing roller does not reach 175°C (190°C for initial warm-up) within 200 seconds after the fixing heater is turned ON.
- 3) When the upper fixing roller temperature reaches 175°C (190°C for initial warm-up temperature control), the READY signal (/RDY) is output to the video controller.
- 4) After the /RDY signal is output, 175°C (190°C for temperature control in the morning) is maintained until the PRINT signal (/PRNT) is sent from the video controller.

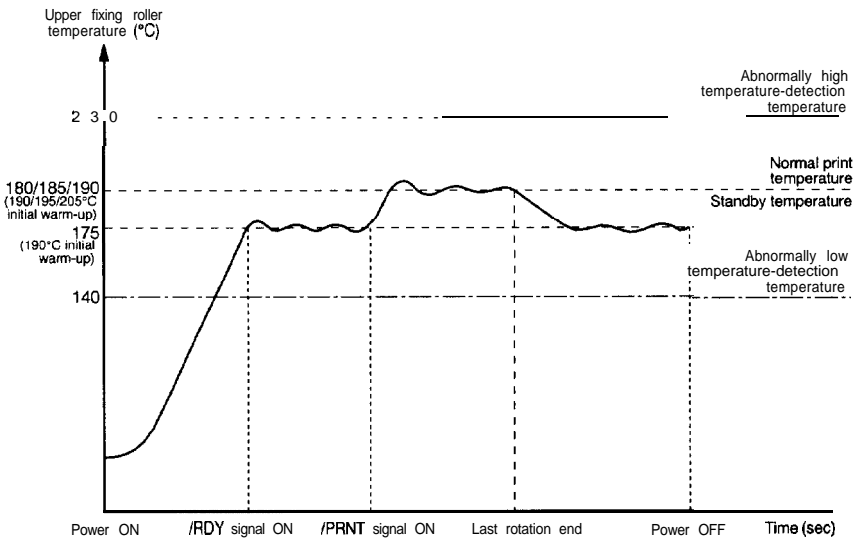


Figure 2-37

E. Paper Jam Detection

To detect the presence of paper and whether or not the paper has been fed correctly, the following paper sensors are provided:

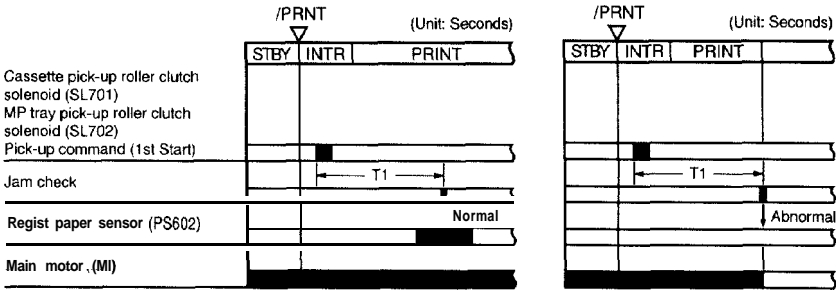
- . Resist paper sensor (PS602)
- . Delivery paper sensor (PS201)

The microprocessor (CPU) determines if a paper Jam has occurred by checking whether paper is present at the sensor within the amount of time specified in the memory.

If it detects a jam, the microprocessor immediately stops printing, and sends a signal to the video controller to notify it.

1. Pick-up unit delay jam

The microprocessor detects a pick-up unit delay jam if the paper does not reach the resist paper sensor (PS602) within the required time after the paper is picked up.

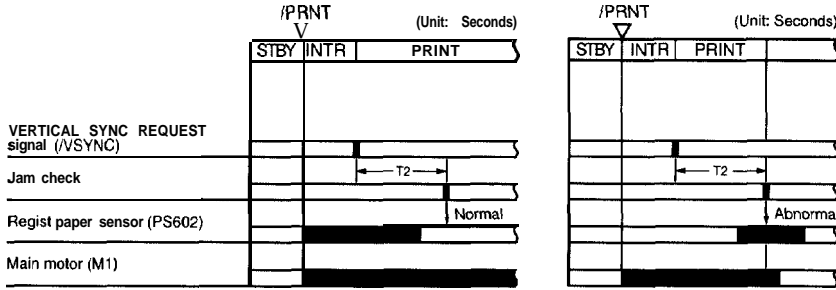


T1: 2.53 seconds (upper cassette). 2.01 seconds (multi-purpose tray). 2.55 seconds (lower cassette), 4.00 seconds (envelope feeder)

Figure 2-38

2. Pick-up unit stationary jam

The microprocessor detects a pick-up unit stationary jam when the resist paper sensor (PS602) detects the sheet of paper within the required time after the VERTICAL SYNC signal (/VSYNC) has been received.



T2: 4.95 seconds (A4), 4.37 seconds (B5), 4.70 seconds (Letter), 5.77 seconds (Legal), 4.51 seconds (Executive), 5.77 seconds (Universal), 4.37 seconds (Envelope feeder)

Figure 2-39

3. Delivery unit delay jam

The microprocessor detects a delivery unit delay jam if the paper does not **reach** the delivery paper sensor (PS201) within the required time after the **VERTICAL SYNC** signal (/VSYNC) is received.

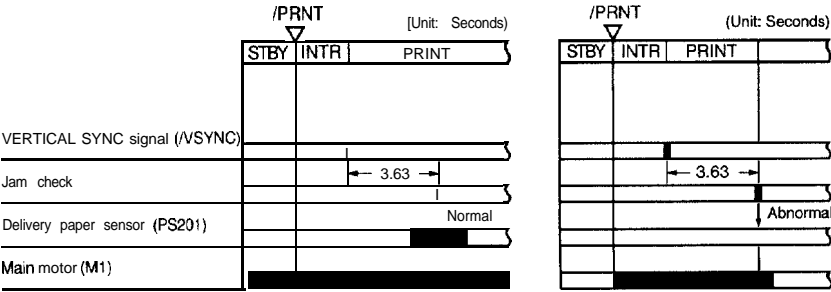


Figure 2-40

4. Delivery unit stationary jam

The microprocessor detects a delivery unit stationary jam when the delivery paper sensor (PS201) detects the sheet of paper within the required time when the paper passes through the resist paper sensor (PS602).

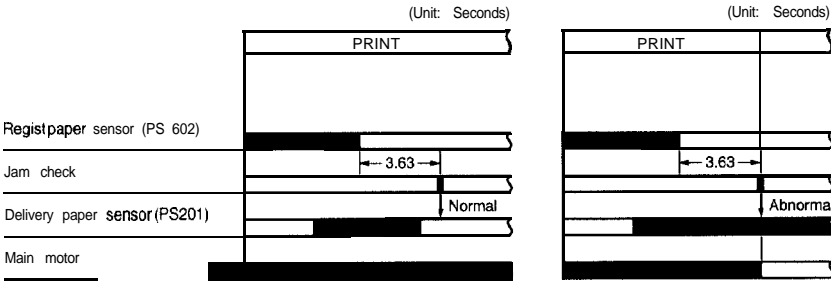


Figure 2-41

5. Pick-up unit or delivery unit stationary jam

The microprocessor detects a pick-up unit or delivery unit stationary jam if the paper **is** at the resist paper sensor (PS602) or delivery paper sensor (PS201) when the power is switched ON.

V. SYSTEM INTERFACE

A. Outline

The printer has a connector for an 8-bit parallel (Centronics) interface and RS-232C serial interface as standard equipment.

Data can be input to the video controller via the parallel or serial connector. Data is input a page at a time and edited into the format defined by the printing environment set using the control panel or the external device. If the external device sends code data, the video controller converts the data to generate the pattern of dots that the printer forms to build-up the complete image. The dot data is then sent to the DC controller.

1. System block diagram

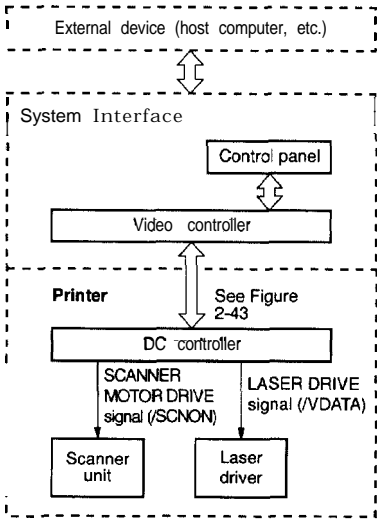


Figure 2-42

2. Interface signals

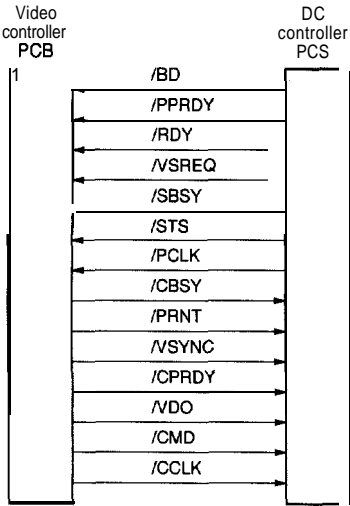


Figure 2-43

B. Operation

When the power is switched ON, the printer enters the WAIT state. When the printer is ready for operation, the READY signal (**/RDY**) is sent from the DC controller to notify the video controller that the printer is ready. When the **/RDY** signal is "L" and data for a page is ready, the video controller sends the PRINT signal (**/PRNT**) to the DC controller.

When the DC controller receives the **/PRNT** signal, it starts the INITIAL ROTATIONS (**INTR**) operations. A certain time after the **INTR** period, the DC controller sends the VERTICAL SYNC REQUEST signal (**/VSREQ**) to the video controller. After video controller receives the **/VSREQ** signal, it sends the VERTICAL SYNC signal (**/VSYNC**) to the DC controller. When the DC controller receives the **/VSYNC** signal, it starts the print (**PRINT**) sequence.

The video controller synchronizes the VIDEO signal (**VDO**) with the HORIZONTAL SYNC signal (**BD**) and the VERTICAL SYNC signal (**VSYNC**) sent from the DC controller, and sends it to the DC controller. In response to the **/VDO** signal, the DC controller generates the LASER DRIVE signal (**/VDATA**) that switches the laser diode ON and OFF, and sends it to the laser driver.

The resulting laser beam is scanned repeatedly across the photosensitive drum by the mirror drum to form a latent electrostatic Image of the original data, as described earlier.

When a page is being printed, the DC controller checks for another **/PRNT** signal from the video controller. If none has arrived by the end of the PRINT period, the DC controller begins the LAST ROTATION (**LSTR**) operations. At the end of this period, the printer enters the STANDBY (**STBY**) state.

If another **/PRNT** signal arrives during printing, however, the print sequence continues. The LAST ROTATIONS operations are performed, and the printer enters the standby state.

C. Video Controller PCB

1. outline

The Controller PCB receives print data via the serial or parallel ports. The controller processes and converts the print data into dot data. The dot data is sent to the DC controller PCB to control the laser diode emission. Figure 2-44 shows the layout of main ICs on the Controller PCB, and Figure 2-45 is a block diagram.

2. Functions of blocks

a. CPU

The CPU is an Intel 80960KB embedded 32-bit processor with a 512 byte on-chip instruction cache. The CPU runs at 20 MHz. The CPU controls the Controller according to instructions contained in the ROM.

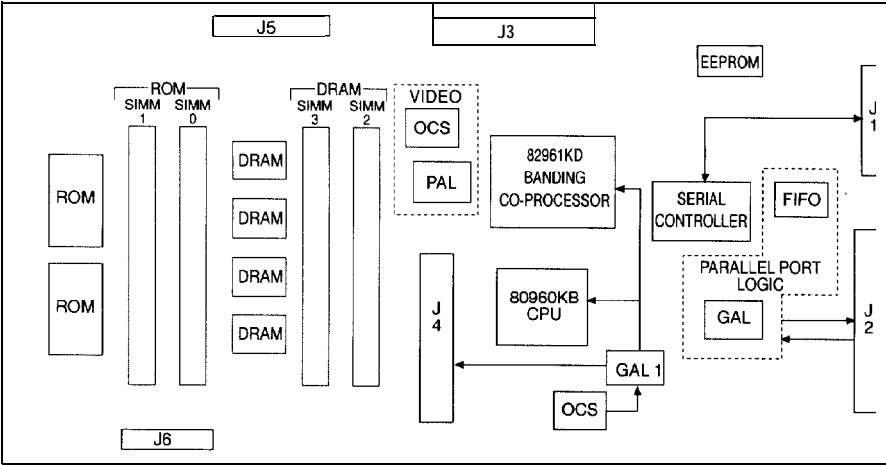


Figure 2-44

b. Banding Coprocessor

The banding coprocessor is an Intel 82961KD printer coprocessor that integrates a graphics accelerator and compression processor necessary for complex page **description** language (PDL) controllers. It provides all necessary system control for the CPU to **directly** interface to DC controller. It has the following main functions:

- Interleaved EPROM Control
- **DRAM** Control
- **Printer** Video Interface
- **Printer** Communication Interface
- Sense of **Time** support
- **Interrupt** control
- I/O Bus Interface support

The **Generic** Array Logic device (**GAL1**) generates DRAM RAS control signals under direction from the 8296 1 KD.

c. DRAM

The Controller contains two banks (1MByte each) of DRAM soldered on board, and two 72-pin DRAM SIMM modules. Each SIMM module can contain 1, 2, 4, 8, 16 or 32 MBytes of memory. The DRAM is used for storing print data, video data, fonts, and variable data used for program control.

d. ROM

The Controller contains one bank of Page Mode ROM and two 72-pin ROM SIMM modules. The Page Mode ROM may be 2 or 4 MBytes. The two SIMM modules may be from 1 to 16 MBytes. ROM is used for storing the Controller's program and font data.

e. EEPROM

The 2 KBit serial EEPROM is provided for non-volatile storage of the printing environment, number of prints, and so on.

f. Serial Controller

The NS16550A Serial Controller is used as the interface to the Host serial **RS232/RS422 port** for printer data. J 1 serves as the connector for this interface.

g. Parallel Port Interface (IEEE1284)

A 256 byte FIFO is used to buffer printer data from the Host parallel **port.J2** serves as the connector for the parallel port interface. The Generic Array Logic device (GAL) controls the transfer of printer data over the Host parallel port.

h. Engine Interface

The **engine** interface, both video signal generation and print engine communication, is controlled by the 82961KD **device**.

PRINT? Controller → Engine **Print**

BD*: Controller ← Engine **Beam Detect**

VIDEO*:Controller → Engine **Video Data**

i. Video Logic

Logic is provided to select the video clock frequency supplied to the 82961KD 8X PLL **circuit**. Selections are, 44.731516 MHz clock for 600 x 600 resolution, 22.365758 MHz clock for 300 x 300 resolution, or an external 1X clock for 1200 x 1200 resolution.

j. PSIO

The external I/O Slot [connector **J4**] supports user Installed Host I/O controllers such as AppleTalk and Ethernet. An 80-pin connector is used to interface to the 80960KB processor LAD bus. In addition, this connector provides for the addition of a video adapter interface that allows for superimposed video on the existing video data supplied by the 82961KD.

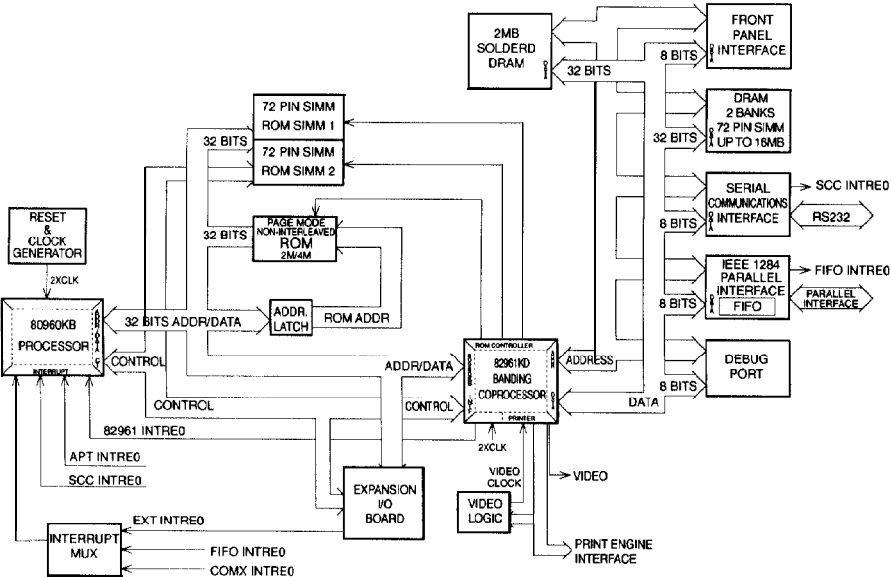


Figure 2-45

m. PCMCIA Interface

The PCMCIA Interface (connector J6) is supported by dedicated logic. This Generic Array Logic device (GAL) generates the control signals and effects data transfers over the The PCMCIA interface.

n. Front Panel

The control panel contains 8 LEDs, one vacuum fluorescent display (VFD), 7 switches, and a beeper. The function of the front panel is to display status and error messages, allows the operator to select the printing environment, operating modes, and paper sources.

3. Connectors

The following is a summary of the use for each connector:

Connector Use

J1	Host Serial Port
J2	Host Parallel (Centronics) Port
J3	Engine Interface
J4	External I/O Slot
J5	Front Panel
J6	PCMCIA

D. Control Panel

1. outline

This control panel contains 8 **LEDs**, one **LCD** (liquid-crystal display), 7 switches, and one **buzzer on the control panel**. The control panel is connected to the video controller PCB, and has the following functions.

- Displays status and error messages on the LCD.

- Displays the printer operating status on the **LEDs**.
- Selects the printing environment, operating **mode, utility, and paper source with** stitches.
- Sounds the buzzer if a switch input is **ineffective or an error occurs**.

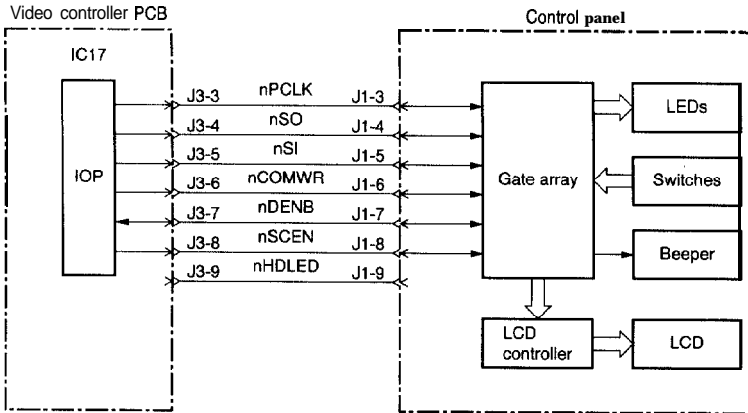


Figure 2-46

2. operation

The **LEDs**, LCD, and buzzer on the control panel are controlled by signals from the video controller. All signals generated by control panel switches are input to the video controller. Table 2- 6 lists the input and output signals.

Table 2-6

Pin No.	Signal name	Meaning
J1-1	Vcc	+5V
J1-2	GND	GND
J1-3	nPCLK	Panel Clock
J1-4	nSO	Signal out
J1-5	nSI	signal In
J1-6	nCOMWR	CoMmand WRite
J1-7	nDENB	Data ENABle
J1-8	nSCEN	Serial Clock ENable
J1-9	nHDLED	Hard Disk LED
J1-10	GND	GND

E. Self-test

When the power is switched ON, the printer executes the self-diagnosis program for the video controller to check the video controller and control panel status. This function is called the self-test. The self test procedure is as follows:

- 1) Self-diagnosis the CPU. Any errors encountered during this step are displayed on the Status indication display as service calls.
- 2) After the CPU completes a **self**-diagnosis, the video controller will also execute a self-diagnosis. Any errors encountered here are also displayed on the Status indication display (LCD) as service calls.
- 2-1) **All LEDs** light lit and all digits on the LCD are displayed. The communication between the CPU and the IOP are **subsequently** checked.
- 2-2) **The** fish will then be displayed and the check will be performed. While the **fish** are being displayed, the RAM (internal RAM and expanded RAM SIMM) will mainly be checked, and **the** time will be displayed depending upon the memory capacity of the expanded RAM. The following checks are made during this time.
 - . Check whether an optional RAM SIMM is installed (checksum check if it is installed)
 - . Internal ROM checksum check
 - . Internal RAM check
 - . IOP check
 - . SCSI controller check
 - . Optional RAM SIMM check
 - . Engine check
 - . SRAM check
- 2-3) **When** the checks end, all **LEDs** are turned off. This state lasts for about 3 seconds.
- 2-4) **The** READY indicator flashes once.
- 2-5) **All** LCD digits are cleared.
- 3) The READY Indicator flashes until **self**-diagnosis ends and the printer goes into standby.
- 4) When the printer goes into standby,

the READY indicator, ONLINE indicator, and the paper pick-up mode indicator light, and "00 READY **AUTO**" appears on the Status indication display. If any operator call or error occurs, it is indicated by an indicator and the Status indication display.

F. Status/Error Message

The following pages list the contents of and corrective actions of status and error messages which are shown on the Status indication display while the printer is operating. Figure 2-47 shows how messages appear on the Status indication display.

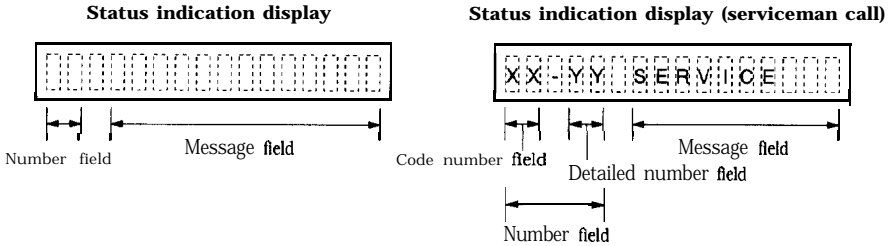


Figure 2-47

If a warning message, operator call, or error occurs, the number field flashes. The printer can display messages on the Status indication display in another language by changing of the printing environment setting. (See page 1-20-25 for details.)

1. Status messages

A status message shows printer operating state when the printer is operating normally.

Status number field	Indication display Message field	Description	Measure
00	READY JOB REJECT	Ready state Note: You can specify a READY message in each operating mode. This is the default message. The Job in which an error occurred is being skipped .	
01	TEST PRINT A FONT LIST SOFT OPTION OVERLAY PRINT STOP	Self Test is being printed. A font list is being printed. A macro or overlay form registration number is being printed. An overlay form is being printed. Utility printing stops.	
02	WARMING UP	Warming up	
03	RESET	Reset	
05	FORM FEED FORM FEED STOP	Form feeding is in progress. Form feeding stops.	
15	ENGINE TEST	The engine test print is being performed.	

2. Warning messages

When a warning message is displayed, the operator should take the appropriate action, but does not need to stop the **printer** operation.

Status indication display	Description	Measure
Number field		
16	TONER LOW	The toner level is low . Get a new toner cartridge .
17	FEEDER EMPTY	The upper or lower cassette is empty in automatic paper pick-up mode. (If both the upper and lower cassettes are empty, "1 1 PAPER OUT " is displayed.) Put print paper in the cassette.

Note: "TONER LOW" will only be displayed when the toner-low MODE value has been set to "WARNING" in the printing environment.

3. Operator call messages

Operator call messages are displayed to prompt the operator to take appropriate action if printing should be stopped. If an operator call message is displayed, the **printer** stops **printing** and goes off line. After the operator takes the correct action, the printer resumes **printing**.

Status indication display	Description	Measure
Number field		
11	PAPER OUT	Paper supply request There is no print paper at the selected paper source or no cassette is loaded. bad a cassette containing print paper at the selected paper source. or select a paper source containing print paper.
12	PRINTER OPEN	Printer door open The upper cover of the printer is open. Close the upper cover completely. then press the ON LINE key.
13	PAPER JAM	paper feed check A paper jam has occurred. Note : This message also appears when the paper delivery cover is open. Open the upper cover or paper delivery cover, remove the Jammed paper, then press the ON LINE key .
14	NO TONER CART.	No EP-E cartridge No EP-E cartridge is installed or the cartridge is not installed properly. Install the cartridge properly. then press the ON LINE key.

Status indication display		Description	Measure
umber field	Message field		
16	TONER LOW	The toner level is low.	Take the cartridge out, shake It as Instructed in Section III of Chapter 4, reinstall it. and print. If this message is displayed again. replace the cartridge, then press the ON LINE key.
PC	LOAD A4 LOAD B5 LOAD LETTER LOAD LEGAL LOAD EXECTIVE LOAD PAPER nn	Paper cassette replacement request This occurs when a cassette is being used. the paper size specified by the paper size command sent from the external device (host computer, etc.) to the printer is different from the current size of paper loaded In the printer. nn : Paper size specified by the translator	Load the cassette containg the paper specified in the message. or select the paper source containing the specified paper. If the universal cassette Is being used, change the paper size to the paper size specified in the message, load paper, then load the cassette again. When the ON LINE key is pressed, printing resumes. In this case. the paper in the current cassette loaded In the printer is printed on. However. It is not guaranteed that images will be printed correctly: that Is. an error may occur in the printed image.
MF	FEED A4 FEED B5 FEED LETTER FEED LEGAL FEED EXECTIVE FEED PAPER nn	Multi-purpose tray paper replacement request This occurs when the multi-purpose tray is being used. The paper size specified by the paper size command sent from the external device (host computer, etc.) to the printer Is different from the current size of paper loaded in the printer. nn : Paper size specified by the translator	Load the paper specified in the message on the multi-purpose tray. or select the paper source containing the specified paper. If the universal cassette is being used, change the paper size to the paper size specified In the message, load paper, then load the cassette again. When the ON LINE key is pressed. printing resumes. In this case. the paper in the current cassette loaded in the printer is printed on. However. it is not guaranteee that images will be printed correctly: that Is, an error may occur in the printed image.

Note: "TONER LOW" will only be displayed when the toner-low MODE value has been set to "STOP" in the printing environment.

Status indication display		Description	Measure
Number field	Message field		
NU	NO UPPER CASS.	Upper cassette Installation request Paper cannot be fed from the lower cassette because the upper cassette is not loaded.	Load the upper cassette. or select another paper source.
OC	XXXXXXXXXXXXXX	Operator comment (User-defined operator call) XX...XXX is a message specified by the Display Comment 1 command. This command sends the message from the external device to the printer.	

4. Error messages

If an error occurs and correct printing is not guaranteed, an error message is displayed. When the ON LINE key is pressed (error skip), printing may be possible. In some cases, but correct printing is not guaranteed. To print correctly, take the appropriate action and send the print data again. If an error occurs and this message is displayed, the printer stops printing and goes off line.

Status number field	indication display Message field	Description	Measure
21	LOW RESOL.	Development resolution reduction The printer cannot utilize 600 dpi when there is complicated or excessive data on one page. This unit can only print 300 dpi in this case.	When the ON LINE key is pressed, data is printed with a resolution of 300 dpi. If you wish to print with a resolution of 600 dpi, install optional RAM SIMMs (4 MB or more), and set "memory usage" to "FULL PAINT" in the printing environment.
	COMPLEX DATA	Data is not printed correctly even if the resolution is reduced. Since there is very complicated or much data on one page, it cannot be printed even if the resolution is reduced to 300 dpi.	When the ON LINE key is pressed, printing continues. However, correct image printing is not guaranteed. Advise the customer to add a optional RAM SIMM. If this error occurs when Legal size is used, take one of the following measures: • Install optional RAM SIMMs. This guarantees that data is printed with a resolution of 300 dpi. Install optional RAM SIMMs (4MB or more), and set the "memory usage" to "FULL PAINT" in the printing environment. This guarantees that data is printed with a resolution of 600 dpi.
22	LINE ERROR	Receive buffer memory overflow Even though the printer is busy (i.e., not ready to receive data from the external device), the external device continues sending data to the printer, and the temporary memory (receive buffer) overflows.	Press the ON LINE key to continue processing. Overflow data is not printed. If this error occurs frequently, check the connection of the interface cable between the external device and the printer, and check interface conditions. When the connection or interface condition are not properly functioning, set the optimum conditions.

Status umber field	Indication display Message field	Description	Measure
23	MEMORY FULL	Download overflow The pattern data memory overflowed because there was too much pattern data (downloaded data) for forming user-defined characters (character font) sent from the external device to the printer.	Take one of the following measures : - Press the ON LINE key to receive data from the external device. The overflow pattern data is invalid. Stop printing [see Section V of Chapter 1). then enter data again in online mode. If the error occurs again , advise the customer to check input data (erase unnecessary downloaded data. etc.) or add an optional RAM SIMM. If a hard drive is installed, ask the customer to switch the power OFF, wait about two seconds. switch the power ON, then download data again.
26	MEMORY FULL	Work memory overflow The specified function cannot be executed because of insufficient internal working memory (video controller).	When the ON LINE key is pressed, the error is cleared. and the printer accepts data from the external device. However. the function which experienced an error cannot be executed. Check whether an optional RAM SIMM has been Installed. If not, advise the customer to add a RAM SIMM.
27	JOB REJECT	Translator missing The translator specified by the command from the external device does not exist. or command parameters are not correct.	Press the ON LINE key so the Job in which the error occurred is skipped. (The document will not be printed. but the following document will be printed.) Then add the specified translator or correct the command.
26	MEMORY FULL	Drawing working memory overflow Since there are very complicated graphics on one page, they may not be printed correctly.	Press the ON LINE key to continue processing. Advise the customer to add an optional RAM SIMM.

Status indication display		Description	Measure
Number field	Message field		
40	LINE ERROR	<p>Line error Data from the external device was not received correctly when the serial interface (RS-232C) was used. Reference : When this error occurs, all pages before the page where the error occurred are printed, and this message is displayed.</p>	<p>Perform the following procedure until the error is corrected. 1) Press the ON LINE key to resume data reception. 2) Check the connection of the interface cable between the external device and the printer, and check interface conditions. (baud rate, data length, etc.) If any interface conditions are incorrect, set the optimum conditions.</p>
41	PRINT CHECK	<p>Print check request A temporary error occured in a printed image. If this error occures, unwanted horizontal lines appear in the printed image.</p>	<p>Remove the printed paper from the tray, and press the ON LINE key to continue printing. The page where the error occurred is printed.</p>
		<p>The paper size selector of the universal cassette is not set correctly. (The paper size in the cassette is different.)</p>	<p>Set the paper size selector of the universal cassette correctly. Press the ON LINE key to resume printing from the page in which the error occurred.</p>
OF	OPT.REMOVAL	<p>Envelope feeder installation/removal error The envelope feeder was installed or removed when the power was turned ON</p>	<p>Turn the power OFF and ON again.</p>
FF	FONT FULL	<p>Font registration full Since too many character sets are registered in the printer, no more fonts can be registered.</p>	<p>press the ON LINE key to receive data from the external device. The font registration of the character set in which the error occurred is ignored. Remove unnecessary fonts.</p>

Status indication display		Description	Measure
Number field	Message field		
WF	WORK FULL	Translator working memory overflow The specified translator cannot find enough working memory.	Turn the power OFF and ON again. If the error occurs again, advise the customer to add an optional RAM SIMM.
NF	NVRAM FULL	Insufficient NVRAM area The specified translator cannot find enough NVRAM area. Note: This error occurs only if the optional translator is used.	Initialize with the INITIALIZE group on the group setup menu.

5. Serviceman calls

A serviceman call is displayed if a serious unrecoverable error occurs and serviceman maintenance is required. If a serviceman call is displayed, **switch** the printer OFF, and take appropriate action. Serviceman call codes are **classified** by the number **field** code number, and the error contents are indicated by a detailed number. The calls are **classified** by code number as follows:

Code number	Location (cause)
5F	Printer engine
8F	Video controller PCB
8F	Communication between the DC controller and video controller
AF	Software in video controller

The **serviceman** call with code number **AF** is displayed if the software in the video controller is erroneous. so its cause cannot be **identified** easily. If this call occurs, turn the power OFF and ON again. If the call occurs again. report the code number, detailed number, and **detail** of the error occurrence to Canon Inc. via the **service** departments of Canon sales companies.

a. Printer engine serviceman call

Statu:	ndication display	Description	Measure
Number fiel	Message field		
5F-50	SERVICE	Fixing unit failure Reference :If this error occurs. turn the power OFF, leave the printer for about 10 minutes , then turn the power ON again. If the power is turned ON again before 10 minutes is up, the printer displays this message and interrupts the power to the fixing unit to prevent overheating of the unit even If the fixing unit functions normally.	Turn the power OFF, leave the printer for 10 minuets, then turn the power ON again. If the error is displayed again. perform the troubleshooting procedure described in Section V of Chapter 6.
5F-51	SERVICE	BD failure Since the laser bear" intensity has decreased or the optional system has failed , the horizontal synchronizing signal (/BD) cannot be sent from the DC contrller to the video controller.	Perform the troubleshooting procedure described in Section V of Chapter 6.
5F-52	SERVICE	Scanner failure The scanner motor does not run at the specified speed.	Perform the troubleshooting procedure described in Section V of Chanter 6.
5F-54	SERVICE	Main motor failure The main motor does not run at the specified speed.	Perform the troubleshooting procedure described In Section V of Chapter 6.
5F-5F	SERVICE	Printer power off The /PPRDY signal of the video interface is not true.	Check whether video interface connector J207 (J1) is making proper contact.

b. Controller serviceman call

Status indication display		Description	Measure
Number field	Message field		
6F-61	SERVICE	Internal ROM checksum error The contents of the ROM on the video controller are Incorrect.	Turn the power OFF and ON again. If the error persists, replace the video controller PCB.
6F-63	SERVICE	Internal RAM error Data cannot be correctly read from or written to the DRAM located on the video controller.	Turn the power OFF and ON again. If the error persists, replace the video controller PCB.
6F-68	SERVICE	NVRAM error Data cannot be correctly read from or written to the NVRAM (EEPROM) located on the video controller.	Turn the power OFF and ON again. If the error cannot be corrected, replace the EEPROM (IC 16).
6F-69	SERVICE	Extended interface error The response from the extended Interface PCB is not Input to the video controller PCB within the prescribed time.	Turn the power OFF and ON again. If the error cannot be corrected, replace the extended interface PCB or video controller PCB.
6F-75	SERVICE	/VSREQ signal error If the /PRNT signal is false, the /VSREQ signal is output from the DC controller to the video controller PCB.	Turn the power OFF and ON again. If the error cannot be corrected, replace the DC controller PCB or video controller PCB.
6F-77	SERVICE	No /VSYNC signal The /VSYNC signal is not output within the prescribed time after the video controller PCB receives the /VSREQ signal from the DC controller PCB.	Turn the power OFF and ON again. If the error persists, replace the video controller PCB.
6F-7A	SERVICE	Gate array internal SRAM error Data cannot be correctly read from or written to the SRAM in the gate array (GAI).	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-90	SERVICE	IOP Internal ROM error The contents of the IOP ROM are incorrect.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-91	SERVICE	IOP Internal RAM error Data cannot be correctly read from or written to the IOP RAM.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-92	SERVICE	Communication error between CPU and IOP The CPU cannot communicate with the IOP.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-93	SERVICE	Interrupt error between CPU and IOP The IOP does not generate a correct Interrupt to the CPU.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.

Status indication display		Description	Measure
umber field	Message field		
6F-94	SERVICE	Extended ROM checksum error Font data In the extended ROM SIMM is destroyed.	Turn the power OFF and ON again. If the error cannot be corrected, replace the extended ROM SIMM.
6F-95	SERVICE	Extended RAM 1 error Data cannot be correctly read from or written to the extended RAM SIMM.	Turn the power OFF and ON again. If the error cannot be corrected, replace the extended RAM SIMM.
6F-96	SERVICE	Extended RAM 2 error Data cannot be correctly read from or written to the extended RAM SIMM.	Turn the power OFF and ON again. If the error cannot be corrected, replace the extended RAM SIMM.
6F-98	SERVICE	SCSI loopback error Data cannot be read from or written to, the SCSI controller.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-99	SERVICE	SCSIIC interrupt error The SCSI controller cannot generate a correct interrupt.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-9B	SERVICE	CPU error A CPU error occurs.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
6F-9C	SERVICE	Crystal timing error The clock frequency of the CPU and IOP is incorrect.	Turn the power OFF and ON again . If the error cannot be corrected, replace the video controller PCB.

c. Engine/Controller communication serviceman call

Indication display		Description	Measure
Status number field	Message field		
8F-80	SERVICE	Command status timeout The DC controller PCB does not send a status to the video controller PCB within the prescribed time after the DC controller PCB receives a command.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB or DC controller PCB.
8F-81	SERVICE	Command status parity error A parity error is found in a command or status during communication between the DC controller PCB and video controller PCB.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB or DC controller PCB.
8F-85	SERVICE	/VSREQ signal timeout The DC controller PCB does not send a /VSREQ signal to the video controller PCB within the prescribed time after the DC controller PCB receives a /PRNT signal.	Turn the power OFF and ON again. If the error cannot be converted, replace the DC controller PCB.
8F-86	SERVICE	Invalid command sent The video controller PCB sends an invalid command to the DC controller PCB.	Turn the power OFF and ON again. If the error cannot be corrected, replace the video controller PCB.
8F-87	SERVICE	Printer engine error The video PCB is connected to the wrong printer engine.	Connect the video controller PCB to the correct printer engine.

VI. POWER SUPPLIES

A. Outline

The AC line voltage is supplied to the low-voltage power supply circuit in the power supply by turning the power switch (SW101) ON.

The low-voltage power supply circuit generates +24 VDC and +5 VDC. The +24 VDC is supplied to the main motor, scanner motor, and exhaust fan to drive them, and to the high-voltage power supply PCB. The +5 VDC is supplied to the sensors and ICs on the DC controller PCB.

The +24 VDC consists of two types of voltage: +24VA, which is normally supplied from the power supply, and +24VB, which is cut when the upper cover is opened and the door switch (SW601) is turned OFF.

The block diagram is shown below.

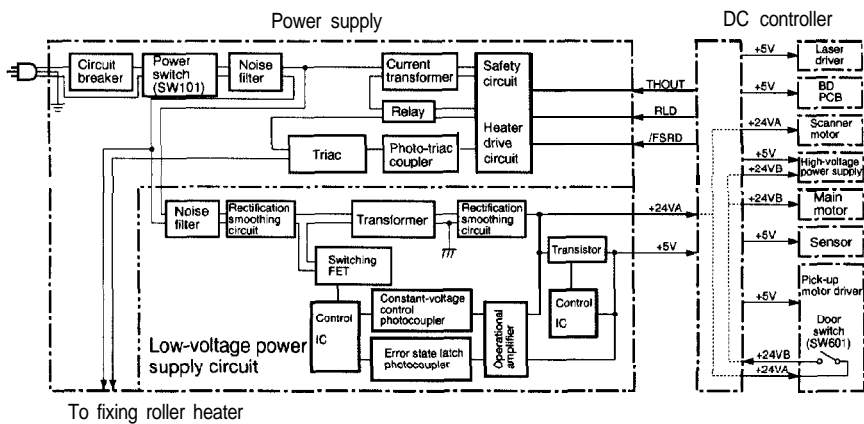


Figure 2-48

B. Protective System

If a short circuit or other fault causes excessive current from the +24 VDC and +5 VDC power supplies, the overcurrent protection system automatically shuts off the output voltage to protect the power supply. To reset the power supply after such a shutdown, switch the power OFF, correct the fault, then switch the power back ON again. If overcurrent flows through the AC line, the circuit breaker in the power supply trips and the output voltage is shut off.

VII. ENVELOPE FEEDER

A. Outline of the Electrical System

The DC controller regulates the envelope feeder driver, **outputting** pick-up commands (1st Start and 2nd Start) at the appropriate **timing** to the envelope feeder driver via the serial line. The envelope feeder driver runs the motor according to the commands. Figure 2-49 shows the flow of signals between the feeder and the printer. The envelope feeder is supplied with **+24 VDC** power from the printer.

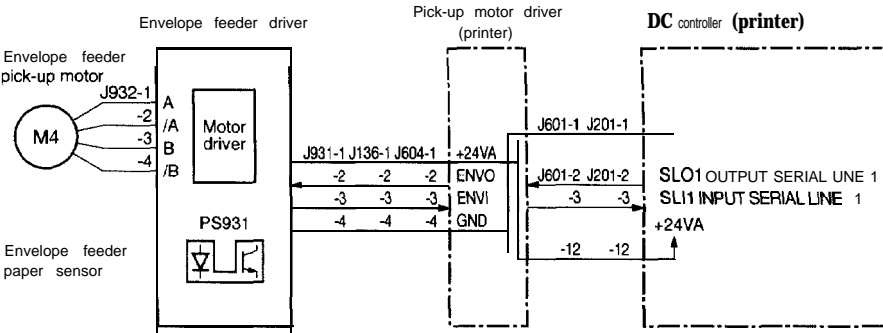


Figure 2-49

B. Pick-up/Feed System

The envelope feeder pick-up motor (M4) is a stepping motor that rotates forward or backward and is controlled by the envelope feeder driver PCB. When the motor rotates forward, all of the envelope rollers rotate, while only the upper separation roller and the feed roller rotate when the motor rotates backward.

When the envelope feeder driver PCB receives a 1st Start command from the DC controller, it runs the pick-up motor

forward for about 1.8 second, pauses for 0.1 seconds, then runs the motor backward for about 2.3 seconds. One envelope is picked up and fed into the printer by the oblique rollers so that its end touches the left side plate to correct skew. The envelope stops when it reaches the resist paper sensor (PS602).

When it receives a 2nd Start command, the envelope feeder driver PCB runs the motor backward for about 2.8 seconds to feed the envelope again.

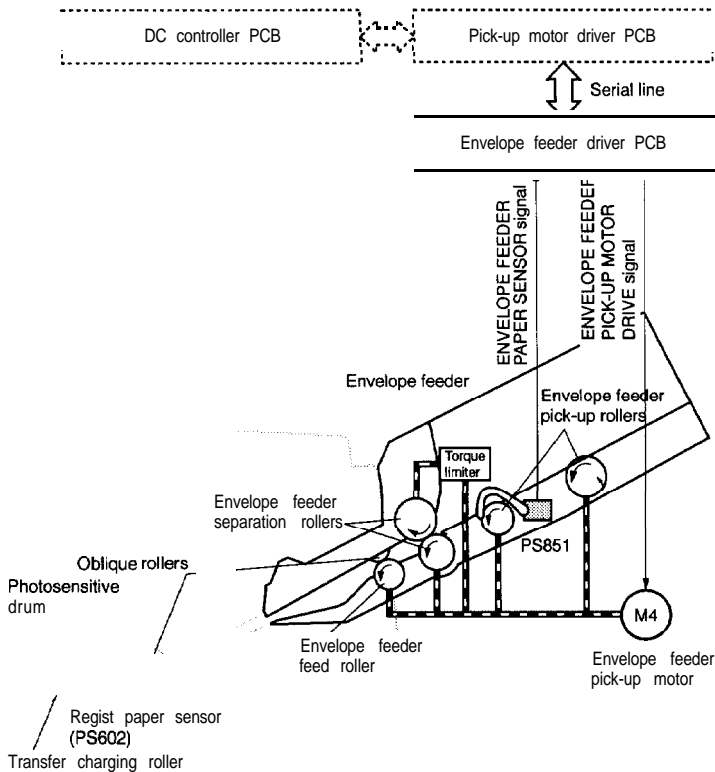


Figure 2-50

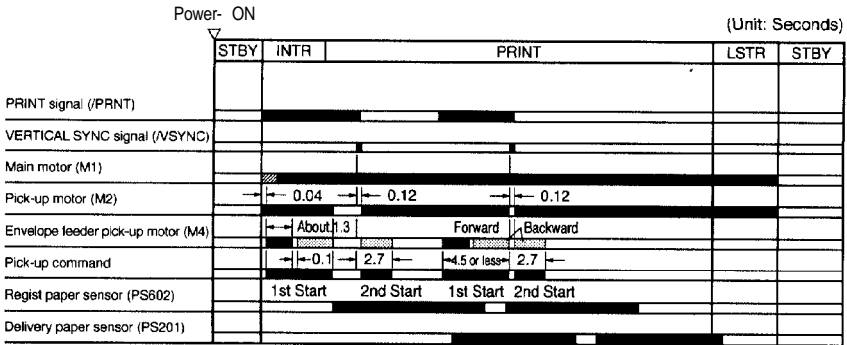


Figure 2-51

The upper separation roller is driven via a torque limiter by the motor, which imparts a turning moment in the direction of rotation of the pick-up and lower separation rollers (in the direction of the white arrow in Figure 2-52).

When a single envelope is fed, however, the upper separation roller is forced to rotate in the opposite direction (in the direction of the black arrow in Figure 2-52) by the movement of the envelope, which is driven by the lower separation roller.

Since the friction between the envelopes is weak when two or more envelopes are fed simultaneously (multi-feed), the rotating force of the lower roller is not strong enough to cause the upper roller to rotate in the same direction as it is rotating. The upper roller rotates in the direction of the white arrow in Figure 2-52, and the envelope on the bottom of the feeder passes through while the others are returned to the feeder.

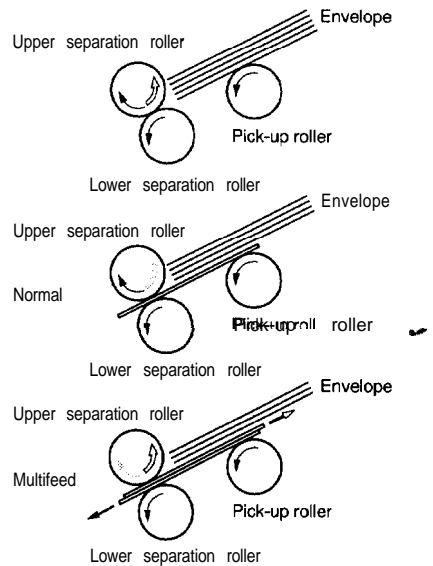


Figure 2-52

C. Paper Jam Detection

Paper jam during pick-up or feeding from the envelope feeder is detected in the same way as for a printer paper jam detection. See page 2-34 for details.

VIII. PAPER FEEDER

A. Outline of the Electrical System

The DC controller controls the paper feeder driver, outputting paper pick-up commands (1st Start and 2nd Start) at the appropriate timing to the paper feeder driver via the serial line. The paper feeder driver drives the solenoid and motor according to these commands. Figure 2-53 shows the flow of signals between the feeder and the printer. The paper feeder is supplied with +24 VDC from the printer.

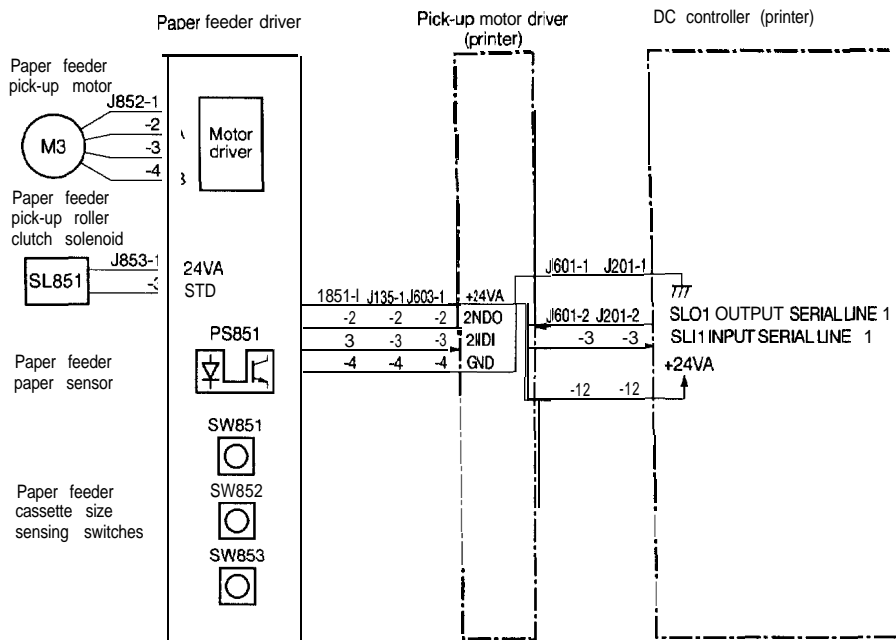


Figure 2-53

B. Pick-up/Feed System

The paper feeder pick-up motor (M3) is a stepping motor that rotates forward or backward and is controlled by the paper feeder driver PCB.

When the paper feeder driver PCB receives a 1st Start command from the DC controller, it energize the paper feeder pick-up roller clutch solenoid (SL851) for 0.08 seconds, then after 0.04 seconds, runs the motor forward for about 1 seconds, then after 0.04 seconds, runs the motor forward for about 1 seconds.

The pick-up roller runs through one turn, and the feed roller is turned at high speed. The motor is then run backward for about 0.8 seconds to turn the feed roller, and paper is fed into the printer.

The paper is fed by the oblique rollers so that Its end touches the left side plate to correct skew. The paper stops when it reaches the regist paper sensor (PS602).

When it receives a 2nd Start command, the paper feeder driver PCB runs the motor backward for about 2 seconds to feed the paper again.

C. Paper Jam Detection

Paper jam during pick-up or feeding from the paper feeder is detected in the same way as for printer paper jam detection. See page 2-34 for details.

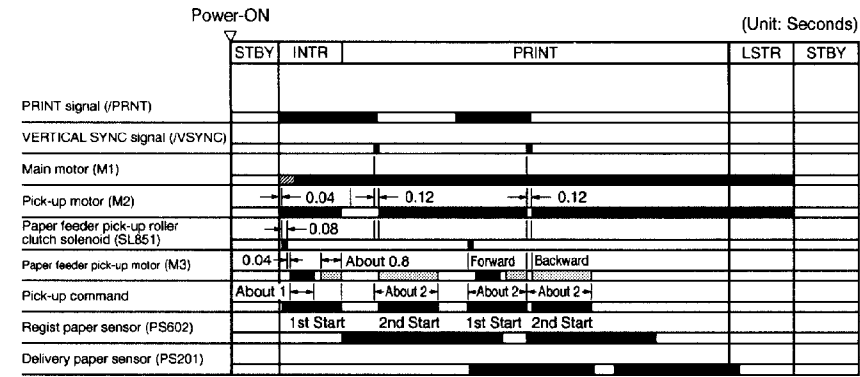


Figure 2-54



CHAPTER 3

THE MECHANICAL SYSTEM

This chapter describes mechanical operation as well as disassembly and reassembly procedures of the printer. Note the following precautions during disassembly or reassembly.

1. When you remove the EP-E cartridge, cover the cartridge with a cloth or put it in a dark place to prevent light from affecting the drum inside the cartridge.
2. Remove the EP-E cartridge from the printer before disassembling or transporting the printer.
3. **CAUTION:** Before servicing the printer, disconnect its power cord from the electrical outlet.
4. Assembly is the reverse of disassembly unless otherwise specified.
5. 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.
6. Do not operate the printer with any parts removed.
7. Discharge electrical static by touching the metal frame of the printer prior to installing the PCB in order to avoid causing by the difference in static charge at that time.

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I. EXTERNALS

A. Covers and Panels

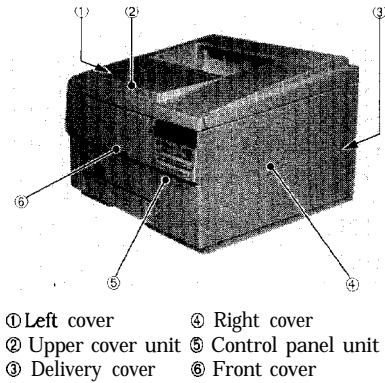


Figure 3-1

1. Right cover

- 1) Open the printer.
- 2) Remove the screw, then move the right cover in holding the rear side of the cover, and remove it.

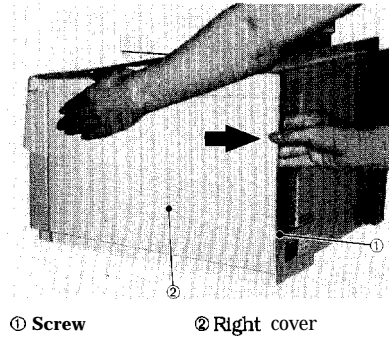
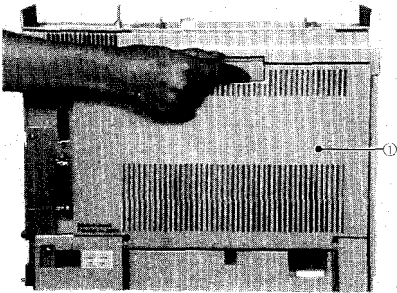


Figure 3-2

When cleaning inside the printer, or **inspecting** or **repairing** it, remove the appropriate covers and/or panels as described below.

2. Upper cover unit

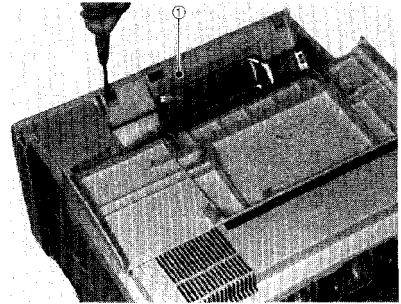
- 1) Remove the right cover.
- 2) Open the delivery cover.



① Delivery cover

Figure 3-3

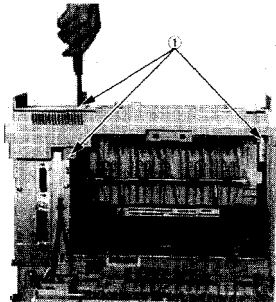
- 4) Release the hook holding the upper cover with a flat-blade screwdriver and remove the upper cover unit.



① Upper cover unit

Figure 3-5

- 3) Remove the three screws.

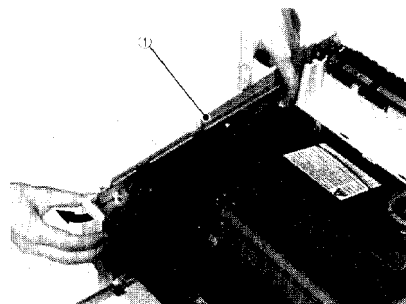


① Screws

Figure 3-4

3. Left **cover**

- 1) Open the multi-purpose tray.
- 2) Remove the right cover, and then the upper cover unit.
- 3) Release the left cover hook holding the left side plate, then open the left cover to the front and remove it.

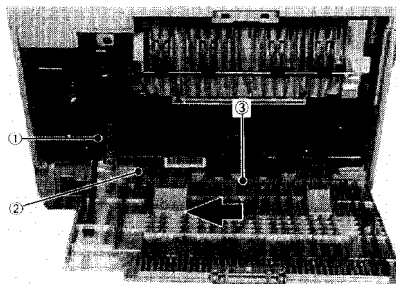


① Left cover

Figure 3-6

4. Delivery **cover**

- 1) Remove the cassette.
- 2) Open the delivery cover.
- 3) Remove the hinge from the delivery cover.
- 4) Remove the rear stopper.
- 5) Move the delivery cover to the left, and remove it.

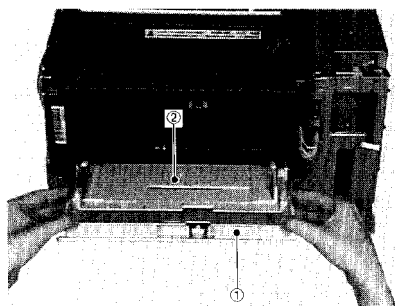


① Hinge ② Rear stopper
③ Delivery cover

Figure 3-7

5. Multi-purpose **tray**

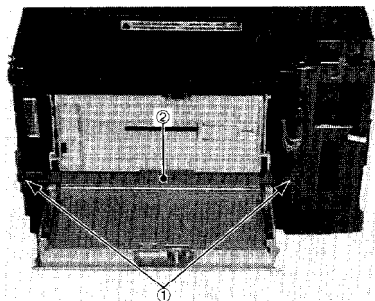
- 1) Remove the cassette.
- 2) Remove the right cover, and then the upper cover unit.
- 3) Remove the left cover.
- 4) Remove the control panel unit.
- 5) Pull the side of the front cover slightly outward, and remove the multi-purpose tray from the front cover.



① Front cover ② Multi-purpose tray

Figure 3-8

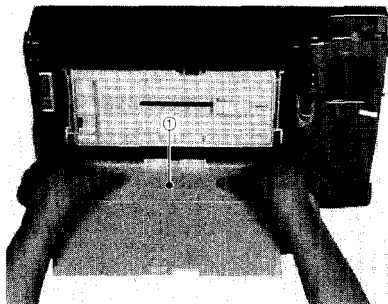
- 6) Remove the two screws, and then the stay.



① Screws ② Stay

Figure S-9

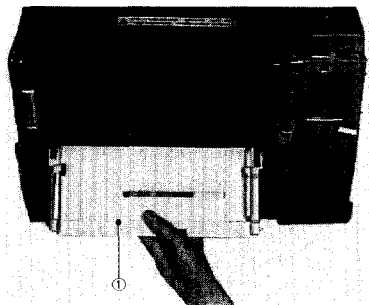
- 7) Press both ends of the front cover and remove the front cover.



① Front cover

Figure 3-10

- 8) Pull the multi-purpose tray down and out.



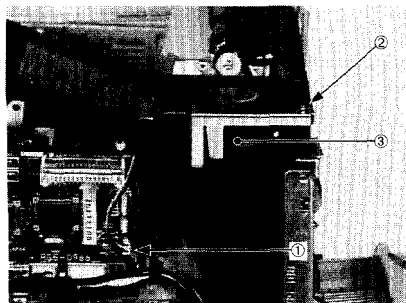
① Multi-purpose tray

Figure 3-11

B. Exhaust Fan

1. Removing the exhaust fan

- 1) Remove the right cover, and then the upper cover unit.
- 2) Perform step 1 to 5 on page 3-18, and remove the video controller unit.
- 3) Remove the DC controller cover.
- 4) Disconnect the connector.
- 5) Remove the screw and the two hooks, and then the exhaust fan.



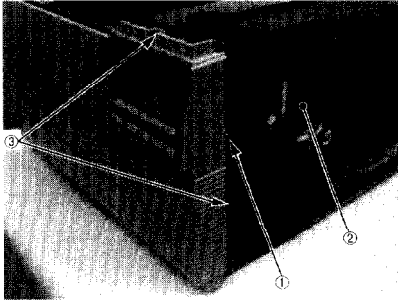
① Connector ② Screw
③ Exhaust fan

Figure 3-12

c. Control Panel unit

1. Removing the control panel unit from the printer

- 1) Remove the upper cover unit.
- 2) Loosen the screw, and open the cover.
- 3) Remove the two screws.

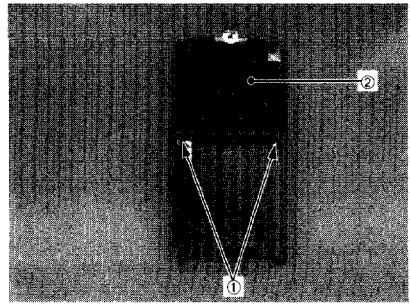


- ① Screw
② Cover
③ Screws

Figure 3-13

2. Disassembly and reassembly

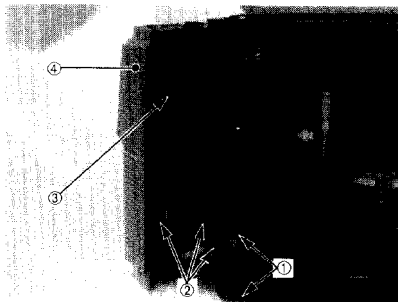
- 1) Remove the two screws, and then the control panel.



- ① Screws
② Control panel

Figure 3-15

- 4) Remove the two screws, and then the connector cover.
- 5) Release the three hooks holding the control panel unit.
- 6) Disconnect the connector from the control panel, and remove the control panel.



- ① Screws
② Hooks
③ Connector
④ Control panel unit

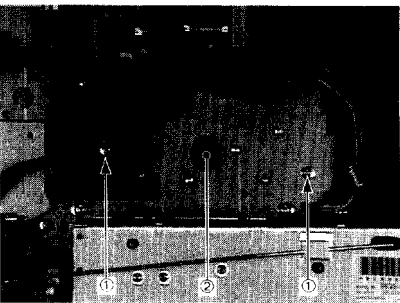
Figure 3-14

II. DRIVE SYSTEM

A. Drive Unit

1. Removing the drive unit

- 1) Perform steps 1 and 2 on page 3-14, and remove the **fixing** unit.
- 2) Remove the main motor by performing steps 1 to 2 on this page.
- 3) Remove the two screws, and remove the drive unit from the back.



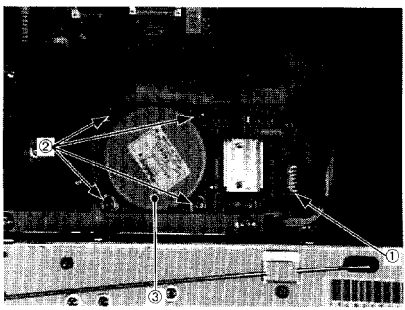
① Screws ② Drive unit

Figure 3-16

B. Main Motor

1. Removing the main motor

- 1) Perform steps 1 and 5 on page 3-18, and remove the video controller unit.
- 2) Disconnect the connector, remove the four screws, and remove the main motor.



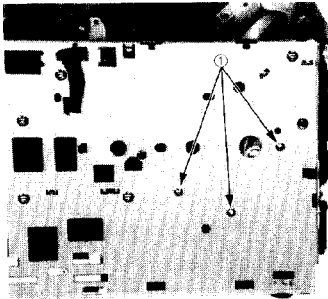
① Connector ② Screws
③ Main motor

Figure 3-17

III. PAPER TRANSPORT SYSTEM

A. Paper Pick-up Unit

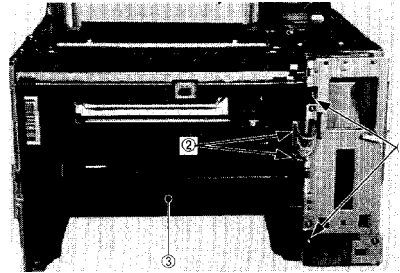
1. Removing the paper pick-up unit
 - 1) Remove the cassette.
 - 2) Remove the inner cover.
 - 3) Remove the upper cover unit.
 - 4) Remove the left cover.
 - 5) Remove the control panel unit.
 - 6) Remove the multi-purpose tray.
 - 7) Remove the three screws from the left side of the printer.



① Screws

Figure 3-18

- 8) Remove the two screws, disconnect the two connectors, and pull the paper pick-up unit forward and out.



① Screws ② Connectors
③ Paper pick-up unit

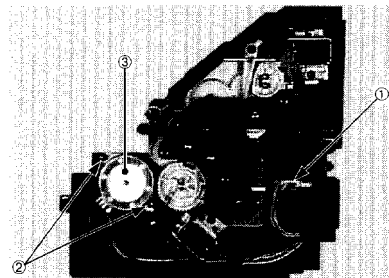
Figure 3-19

Note: If you replace the paper pick-up unit, make several test prints and check the leading edge registration is 2.0 mm. If it is not, adjust it. (See page 6- 10)

2. Disassembly and reassembly

a. Pick-up motor

- 1) Disconnect the connector, remove the two screws, and remove the pick-up motor.



① Connector ② Screws
③ Pick-up motor

Figure 3-20

b. **Regist Paper Sensor and Cassette Paper Sensor**

- 1) Remove the cassette pick-up roller.
- 2) Disconnect the connector.

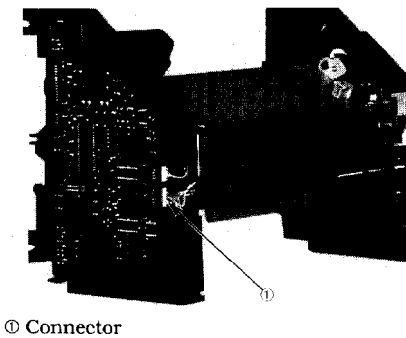
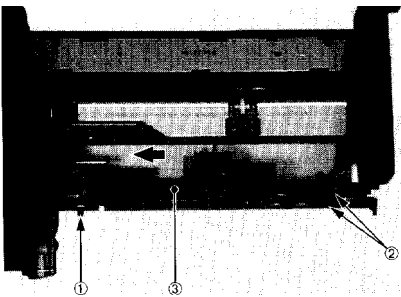


Figure 3-21

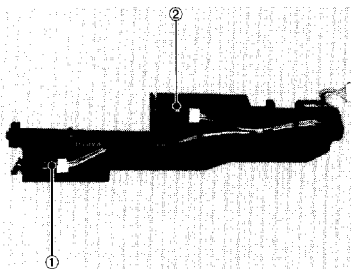
- 3) Remove the pin in the projection on the left end of the regist sensor holder and push the projection. Then, take off two claws on the right side, and slide off the regist sensor holder unit to the left. Slide the left end of the regist sensor holder toward the cassette feed roller shaft (front in the figure) so that it does not touch the oblique roller.



- 1 Projection 2 Claws
- 3 Regist sensor holder unit

Figure 3-22

- 4) Remove the sensors from regist sensor holder unit.

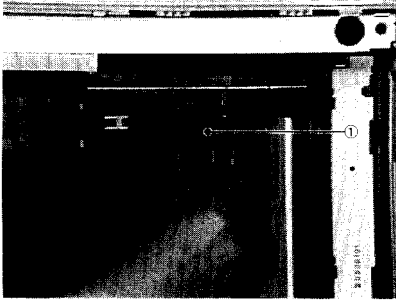


- 1 Regist paper sensor
- 2 Cassette paper sensor

Figure 3-23

B. Cassette Pick-up Roller**1. Removing the cassette pick-up roller**

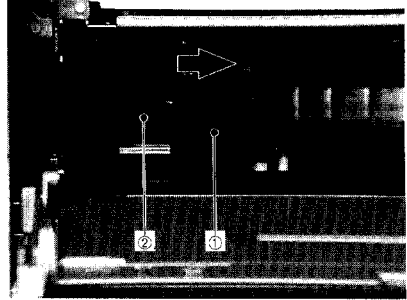
- 1) Remove the cassette.
- 2) Stand the printer on its right side.
- 3) Pull out the cassette pick-up roller by its knob.



① Cassette pick-up roller

Figure 3-24**C. Multi-purpose Tray pick-up Roller****1. Removing the multi-purpose tray**

- 1) Open the multi-purpose tray.
- 2) Remove the inner cover.
- 3) Push the sub-pad, hold the knob of the multi-purpose tray pick-up roller, and pull out the roller.



① Sub-pad

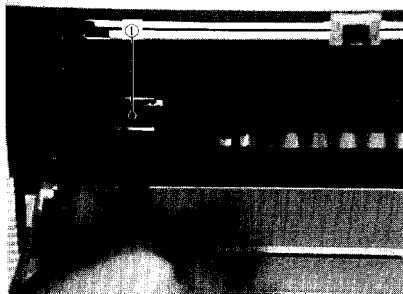
② Multi-purpose tray pick-up roller

Figure 3-25

D. Separation Pad

1. Removing the separation pad

- 1) Open the multi-purpose tray.
- 2) Remove the inner cover.
- 3) Remove the multi-purpose tray pick-up roller.
- 4) Remove the separation pad with a flat-blade screwdriver.



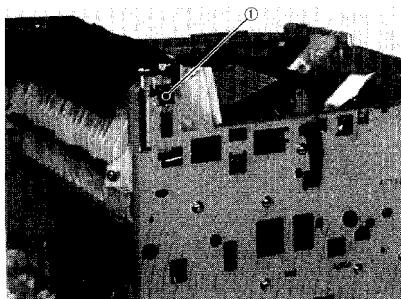
① Separation pad

Figure 3-26

E. Paper Delivery Unit

1. Removing the paper delivery unit

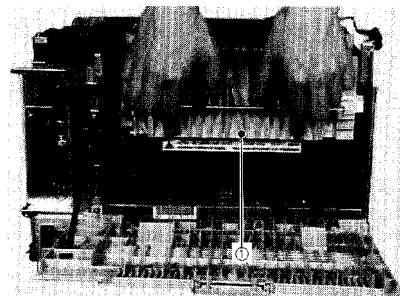
- 1) Remove the upper cover unit.
- 2) Remove the left cover.
- 3) Remove the leaf spring.



① Leaf spring

Figure 3-27

- 4) Release the two hooks holding the delivery unit, and remove the delivery unit by pulling it forward.



① Paper delivery unit

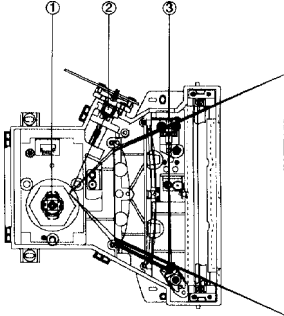
Figure 3-28

IV. EXPOSURE SYSTEM

A. Laser/scanner Unit

1. Configuration

The laser/scanner unit sweeps a laser beam across the photosensitive drum. It is configured as shown below.

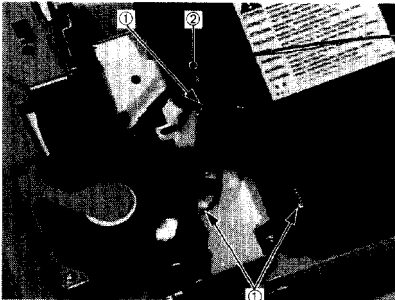


- ① Scanner unit ② Laser unit
③ ED PCS

Figure 3-29

2. Removing the laser/scanner unit

- 1) Perform steps 1 and 4 on page 3-10, and remove the paper delivery unit.
- 2) Disconnect the three connectors and remove the wire harness from the laser/scanner unit.

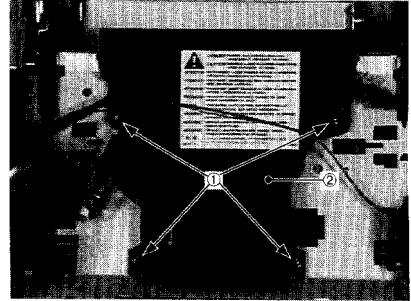


- ① Connectors ② Wire harness

Figure 3-30

Note: When removing the cable from the laser PCB, support the PCB with your hand. The PCB can be broken easily if flexed.

- 3) Remove the four screws, and then the laser/scanner unit.



- ① Screws ② Laser/scanner unit

Figure 3-31

- Notes:**
1. Never disassemble the laser/scanner unit; it cannot be adjusted in the field.
 2. When Installing the laser/scanner unit, engage the laser shutter with the shutter arm.
 3. If you replace the laser/scanner unit, make several test prints and check the leading edge registration is 2.0 mm. If It Is not, adjust it. (See page 6-10)

V. ELECTROSTATIC IMAGING/DEVELOPING/CLEANING SYSTEM

A. EP-E Cartridge

1. Configuration

The EP-E cartridge combines a photosensitive drum, primary charging roller, developing unit, and drum cleaning unit in a single housing. During printing the drum rotates and an invisible electrostatic latent image is formed on its surface and then developed into a visible image by toner.

The EP-E cartridge cannot be disassembled.

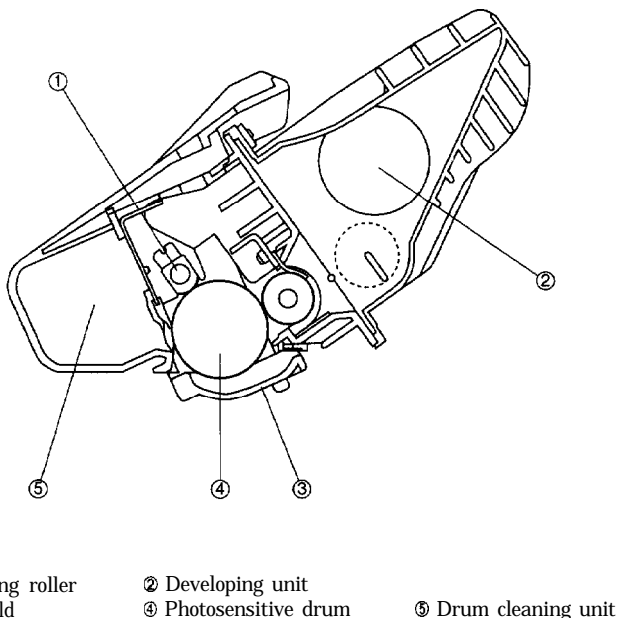


Figure 3-32

a. Protective shield

The photosensitive drum is protected by a protective shield that prevents exposure to strong light. If the drum is exposed to strong light, blank areas or black streaks may appear on prints, so do not open the protective shield unless necessary. (The protective shield is automatically opened when the EP-E cartridge is inserted into the printer.)

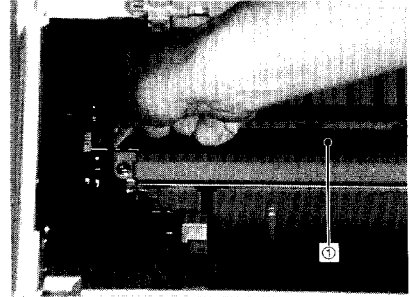
2. Cleaning the photosensitive drum

- 1) Open the printer and remove the cartridge.
- 2) Open the protective shield.
- 3) Liberally sprinkle toner on a piece of flannel or other soft cloth and clean the drum surface with it.

- Notes:
1. Only turn the drum in the direction that it turns during printing. If you turn it backward, the spring-loaded contact that conducts the developing bias to the inside rim of the developing cylinder will be bent. Do not touch the photosensitive part of the drum while rotating the drum.
 2. Use flannel or some other soft cloth to clean the drum surface. Do not use lint-free paper because it is too hard and will scratch the surface. Never use the solvents to clean the drum.
 3. Finish **cleaning** as quickly as possible to avoid exposing the drum to light for a long time, as **this** can cause abnormal Images.

B. Transfer Charging Roller

- 1) Open the printer.
- 2) Hook the left side of the transfer charging roller shaft with the supplied green **cleaning** brush, and remove the transfer charging roller.



① Transfer charging roller

Figure 3-33

- Notes:
1. Hold the transfer charging **roller** shaft, not the sponge area.

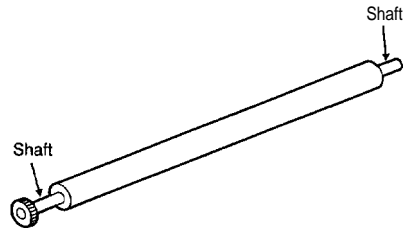


Figure 3-34

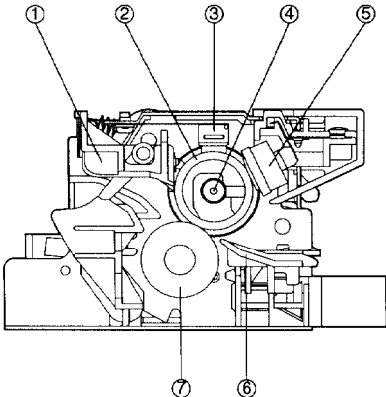
2. Use dry lint-free paper (producing **little** paper dust) to clean the transfer charging roller. Never use solvents.
3. If paper dust or toner cannot be removed from the transfer roller with the lint-free paper, or if the roller is deformed, change the roller for a new one.

VI. FIXING SYSTEM

A. Fixing Unit

1. Configuration

The fixing unit fixes the toner image onto the paper. It is configured as shown below.

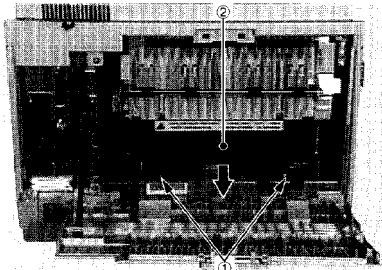


- ① Separation guide
- ② Upper fixing roller
- ③ Thermistor
- ④ Fixing roller heater
- ⑤ Thermoswitch
- ⑥ Fixing unit entrance guide
- ⑦ Lower fixing roller

Figure 3-35

2. Removing the fixing roller

- 1) Open the delivery cover.
- 2) Remove the two screws, lift the fixing unit slightly. and pull it forward and out.



- ① Screws
- ② Fixing unit

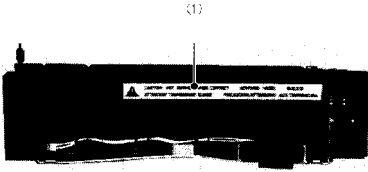
Figure 3-36

Note: When you replaced the fixing unit, push the metal levers on both sides of the new fixing unit down.

3. Disassembly and reassembly

a. Fixing roller heater

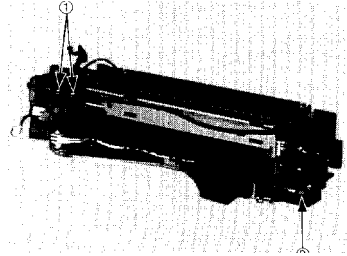
- 1) Release the six hooks holding the wire cover to the fixing unit with a flat-blade screwdriver. Remove the wire cover.



① Wire cover

Figure 3-37

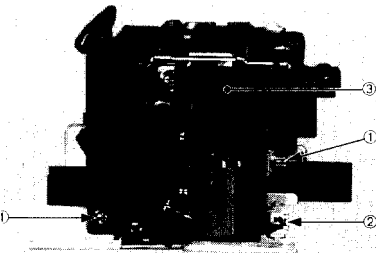
- 3) Remove the two screws, and then the fixing roller heater lead.
- 4) Remove the fixing roller heater lead from the connector..



① Screw ② Connect01

Figure 3-39

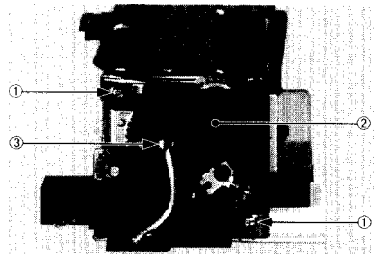
- 2) Remove the two screws. disconnect the connector, and remove the left fixing cover.



① Screws ② Connector
③ Left fixing cover

Figure 3-38

- 5) Remove the two screws. and then the right fixing cover. Pull the fixing roller heater carefully out of the upper roller.

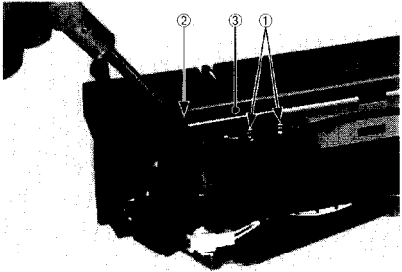


① Screws ② Right fixing cover
③ Fixing roller heater

Figure 3-40

b. Thermoswitch

- 1) Remove the **wire** cover.
- 2) Remove the two screws. Release the hook holding the **thermoswitch** with a flat-blade screwdriver, and remove the thermoswitch unit.



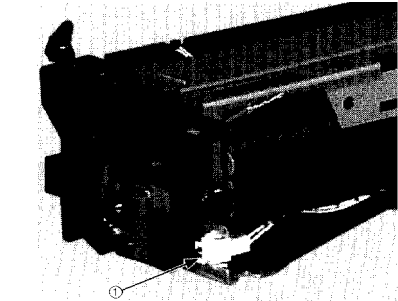
① Screws ② Hook
③ Thermoswitch unit

Figure 3-41

Note on reassembly:
When installing the thermoswitch unit, make sure that the sensing surface of the **thermoswitch** contacts the surface of the upper **fixing** roller uniformly. If it does not, check whether the leaf **spring** is bent.

c. Thermistor

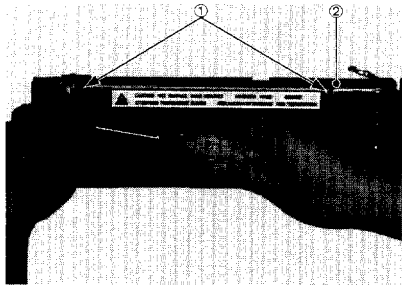
- 1) Remove the **thermoswitch**.
- 2) Disconnect the connector and remove the cable from left **fixing** cover.



① Connector

Figure 3-42

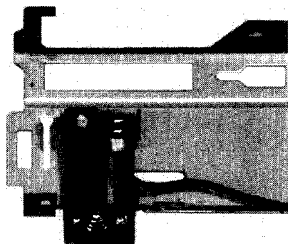
- 3) Remove the two springs and open the lower separation guide.
Release the hook holding the upper **fixing** frame with a flat-blade screwdriver and remove the upper **fixing** frame.



① Springs ② Upper fixing frame

Figure 3-43

- 4) Remove the screw and then the thermistor.



① Screw

② Thermistor

Figure 3-44

Note for reassembly:

When installing the thermistor, make sure that the sensing surface of the **thermistor** contacts the surface of the upper fixing roller uniformly. If it does not, check whether the leaf spring is bent.

VII. ELECTRONIC COMPONENTS

A. Video Controller Unit

- 1) Remove the right cover.
- 2) Remove the screw, and open the cover.

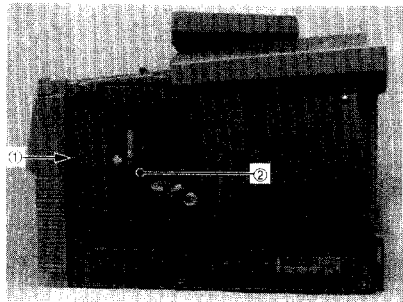
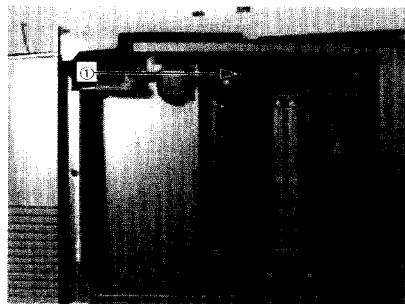


Figure 3-45

- 3) Disconnect the connector.



1 Connector (To control panel)

Figure 3-46

- 4) Remove the two screws and then the connector cover.

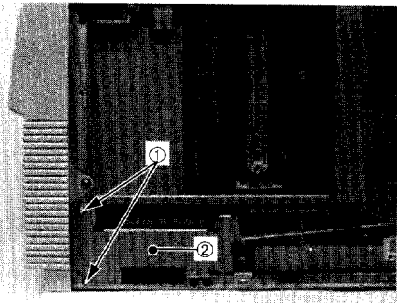
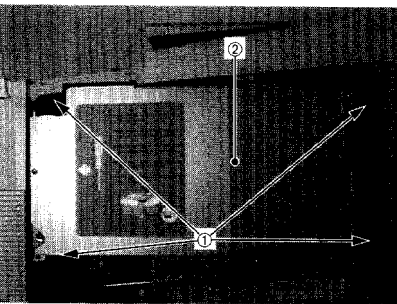


Figure 3-47

- 5) Remove the four screws and then the video controller unit.

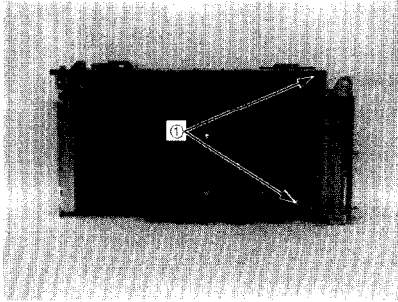


1 Screws 2 Video controller unit

Figure 3-48

B. Video Controller PCB

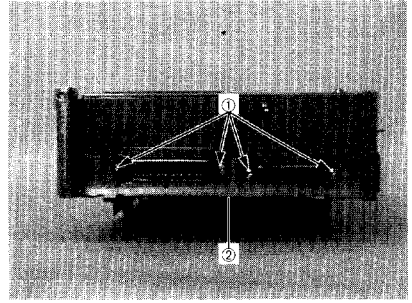
- 1) Perform step 1 to 5 on page 3- 18, and remove the video controller unit.
- 2) Remove the two screws.



① Screws

Figure 3-49

- 5) Remove the four screws and video controller PCB.



① Screws

② Video controller PCB

Figure 3-50

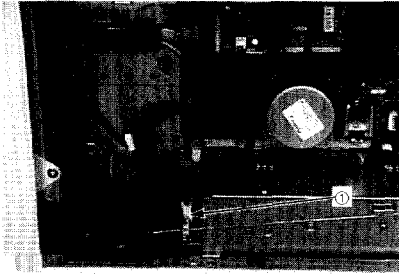
- 3) If an ROM SIMM is installed, the SIMM should be removed.
- 4) If the RAM SIMM is installed, the SIMM should be removed.

Note for assembly

If you removed the expansion ROM PCB or RAM SIMM when you replaced the video controller PCB, reinstall it on the new video controller PCB.

C. **DC Controller PCB**

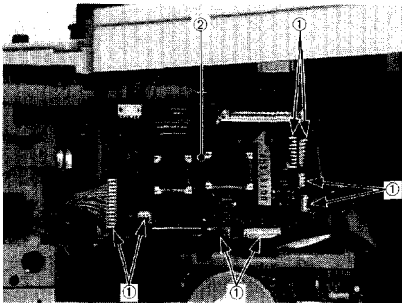
- 1) Perform steps 1 and 5 on page 3-18, and remove the video controller unit.
- 2) Disconnect the connector from the power supply.



① Connector

Figure 3-51

- 3) Remove the DC controller cover.
- 4) **Disconnect** the eight connectors from the DC controller PCB.
- 5) Release the two hooks securing the DC controller PCB to the PCB holder, and remove the DC controller PCB.



① Connectors
② DC controller PCB

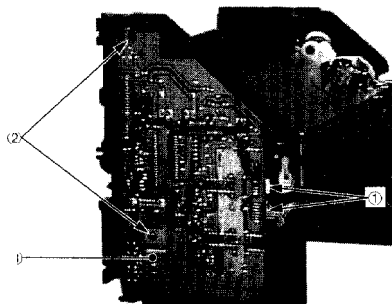
Figure 3-52

Note **on** reassembly:
When installing the DC controller PCB, put the bottom of the PCB into the PCB holder, then align the PCB with the positioning pin.

Note: When you replace the DC controller PCB, make sure you adjust the leading edge registration. (See page 6-10)

D. Pick-up Motor Driver PCB

- 1) Perform steps 1 to 8 on page 3-7. and remove the paper pick-up unit.
- 2) Disconnect the two connectors, remove the two screws, release the five hooks, and remove the pick-up motor driver PCB.

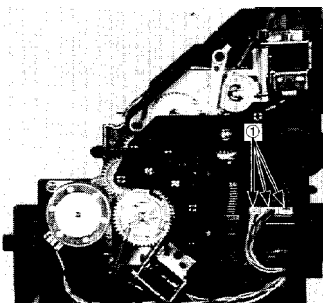


- ① Connectors
- ② Screws
- ③ Pick-up motor driver PCB

Figure 3-53

E. Sensor PCB

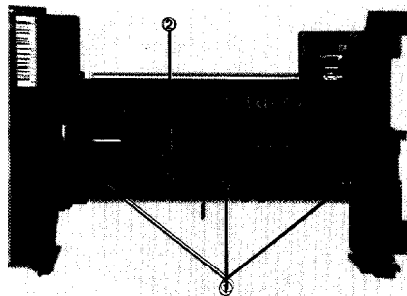
- 1) Remove the pick-up motor driver PCB
- 2) Disconnect the three connectors.



- ① Connectors

Figure 3-54

- 3) Release the three hooks, and remove the cover.



- ① Hooks
- ② Cover

Figure 3-55

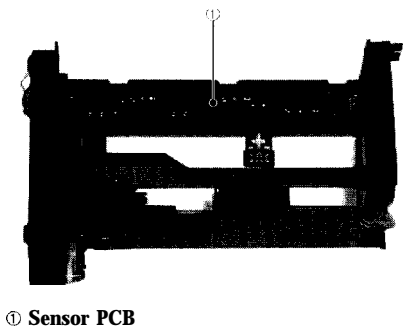


Figure 3-56

F. Power Supply

- 1) Perform steps 1 and 5 on page 3-18, and remove the video controller unit.
- 2) Remove the two screws, disconnect the two connectors, remove the rod, and pull the power supply forward and out.

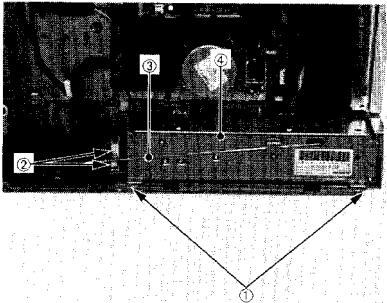
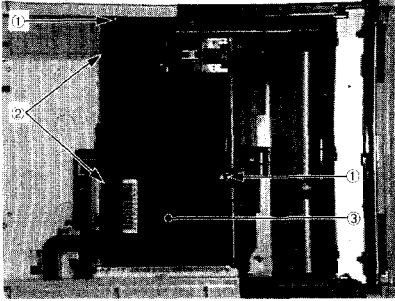


Figure 3-57

G. High-voltage **Power Supply PCB**

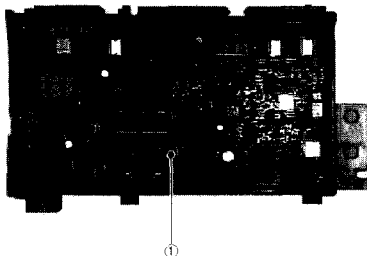
- 1) Remove the cassette.
- 2) Stand the printer on its right side.
- 3) Remove the two screws, release the two hooks, and remove the high-voltage case.



- ① Screws ② Hooks
③ High-voltage case

Figure 3-5s

- 4) Release the four hooks holding the high-voltage power supply PCB to the high-voltage case.



- ① High-voltage power supply PCB

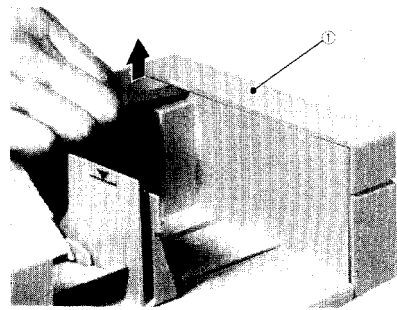
Figure 3-59

VIII. ENVELOPE FEEDER

1. Removing covers

a. Right cover

- 1) Lift the top of the cover. remove the two dowels, then remove the right cover.



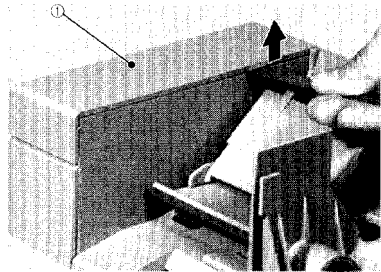
① Right cover

Figure 3-60

Note: Before checking the envelope feeder operation, be sure to hold the bottom of the PCB up or tape it to the frame if the right cover is removed.

b. Left cover

- 1) Lift the top of the cover, remove the two dowels, then remove the left cover.

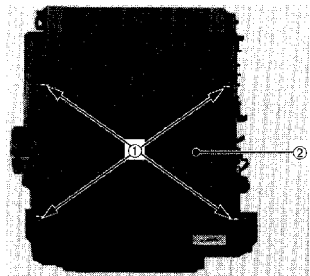


① Left cover

Figure 3-61

c. Bottom cover

- 1) Remove the right cover and left cover.
- 2) Remove the four screws. and then the bottom cover.



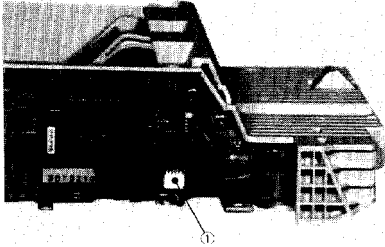
① Screw

② Bottom cover

Figure 3-62

2. Removing the envelope feeder pick-up motor

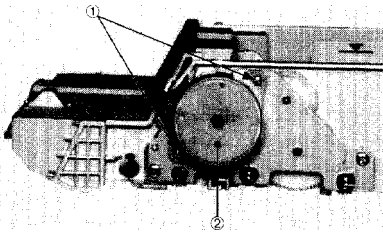
- 1) Remove the right, left, and bottom covers.
- 2) Disconnect the connector.



① Connector

Figure 3-63

- 3) Remove the two screws, and then the pick-up motor.



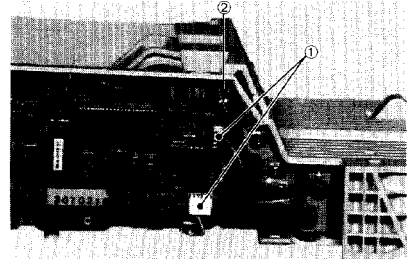
① Screws

② Pick-up motor

Figure 3-64

3. Removing the envelope feeder drive PCB

- 1) Remove the right, left, and bottom covers.
- 2) Disconnect the two connectors and remove the screw.

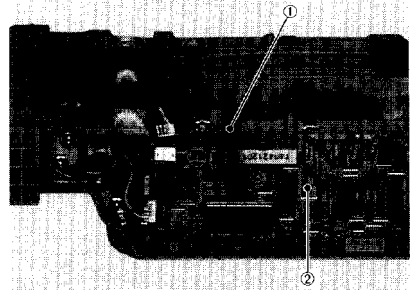


① Connectors

② Screw

Figure 3-65

- 3) Remove the sensor lever, and the the envelope feeder driver PCB.



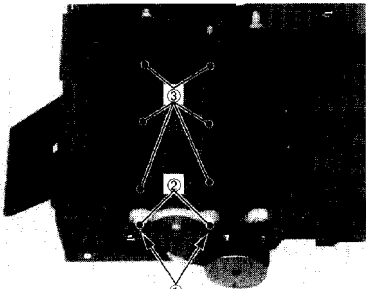
① Sensor lever

② Envelope feeder driver PCB

Figure 3-66

4. Removing the envelope feeder pick-up roller

- 1) Remove the tight, left, and bottom covers.
- 2) Remove the two E-rings and two bushings, then remove the pick-up roller shaft.



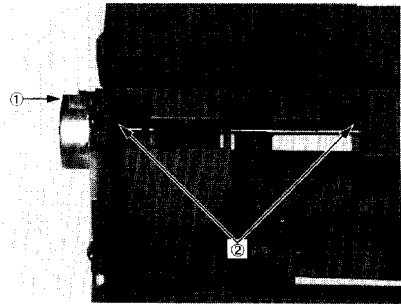
- ① E-rings
- ② Bushings
- ③ Pick-up rollers

Figure 3-87

- 3) Remove the gear from the pick-up roller shaft. Release the pick-up roller hooks holding the shaft and remove the pick-up rollers.

5. Removing the lower separation roller, upper separation roller, and torque limiter

- 1) Remove the right, left, and bottom covers.
- 2) Remove the screw holding the ground wire. Release the right and left snaps with a flat-blade screwdriver, then remove the upper cover and the spring.



- ① Screw
- ② Snaps

Figure 3-68

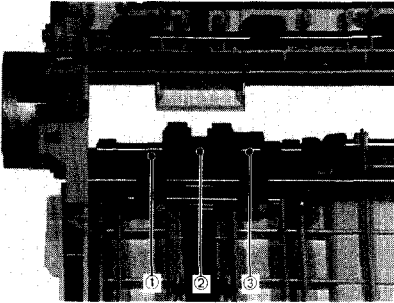
- 3) Remove the two E-rings and two bushings, then remove the lower separation roller shaft. Remove the lower separation roller from the shaft.



- ① E-rings
- ② Bushings
- ③ Lower separation roller

Figure 3-69

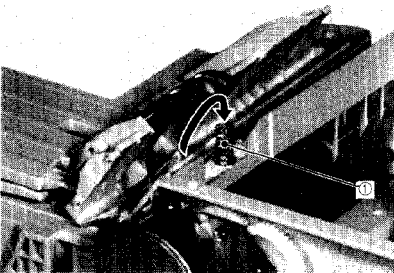
- 4) Remove the separation roller shaft from the guide. Remove the upper separation roller and torque limiter from the shaft.



- ① Guide
- ② Upper separation roller
- ③ Torque limiter

Figure 3-70

- Notes: 1: Remove the separation guide and the upper cover as a unit. If the separation guide must be removed separately, adjust the position of the guide after reinstallation. [See page S-9].
- 2: When assembling, check the separation roller pressure spring has been installed correctly.



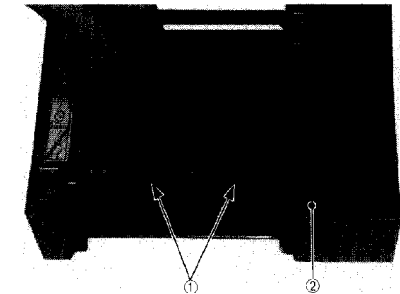
- ① Separation roller pressure spring

Figure 3-71

IX. PAPER FEEDER

1. Removing the drive unit

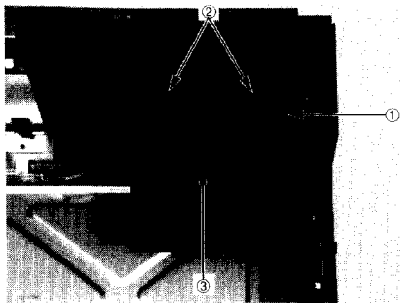
1) Release the two claws, and remove the front cover.



① Claws ② Front cover

Figure 3-72

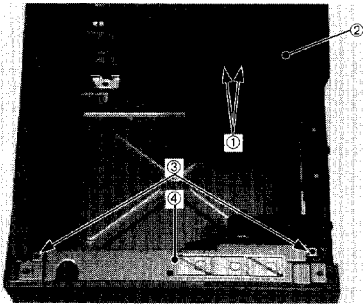
2) Remove the screw, release the two claws, and open the PCB cover.



① Screw ② Claws
③ PCB cover

Figure 3-73

4) Remove the two screws, and then remove drive unit.



① Connectors ② Cable tie
③ Screws ④ Drive unit

Figure 3-74

3) Disconnect the two connectors and remove the cable tie.

2. Removing the paper feeder pick-up motor

- 1) Remove the drive unit.
- 2) Remove the four screws, the E-ring, the gear, and remove the plate.

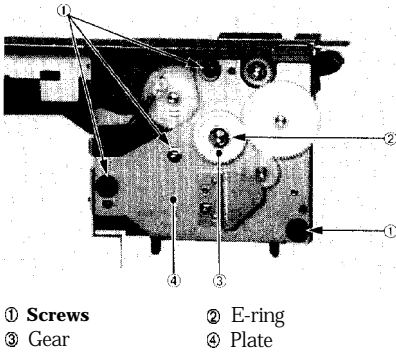


Figure 3-75

- 3) Remove the two screws, and then the pick-up motor.

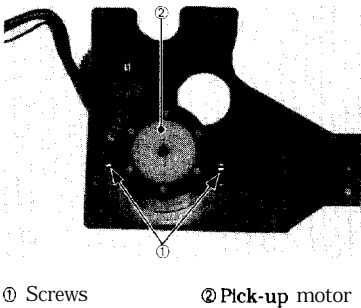


Figure 3-76

3. Removing the paper feeder driver PCB

- 1) Remove the screw, release the two claws, and open the PCB cover. (See Figure 3-7 1.)
- 2) Disconnect the three connectors and remove the cable tie.
- 3) Release the claw holding the PCB, then lift the paper feeder driver PCB.

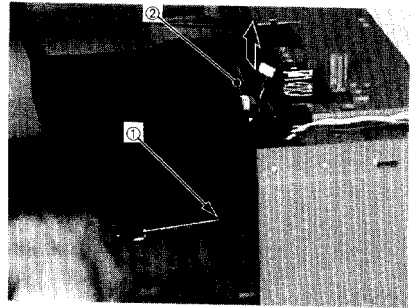


Figure 3-77

4. Removing the paper feeder pick-up roller

- 1) Pull out the pick-up roller by its knob.

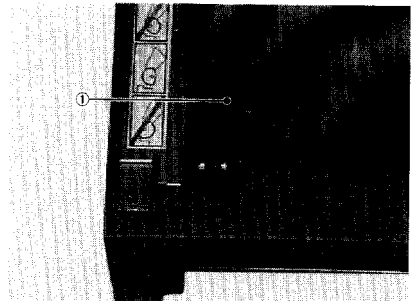


Figure 3-78

X. OTHER

A list of parts of the LBP-1260 and the LBP-860 that are not interchangeable.
Shown are parts of the LBP- 1260 installed in the LBP-860. and parts of the LBP-860 installed in the LBP- 1260.
Because the shape of the parts is identical, Install correctly by comparing and confirming based on the below comparison method (parts number, parts label, color of the cable, etc.)

Table 3-1

Parts name	Comparison method	Remarks
High-voltage power supply	Parts number, or print board silk-screen color (Is yellow for this LBP)	
Laser/scanner unit	Parts number, or scanner-motor connector color (Is light blue for this LBP)	
Fixing roller heater	Round-ended cable color (Is blue for this LBP)	
Power supply	Parts number, or label base color (Is yellow for this LBP) or "12" is printed on the label	
DC cont./scanner cable	Cable color (Is blue for the parts of this LBP) or whether it has a ferrite core (this LBP has a ferrite core)	
DC cont./laser cable	Cable color (Is green for the parts of this LBP)	
DC cont./delivery cable	Cable color (Is blue for the parts of this LBP)	The cable of LBP-86 cannot be connectec to this LBP.
DC cont./connect cable	Cable color (Is white for the parts of this LBP)	The cable of LBP-861 cannot be connectec to this LBP.
Paper pick-up unit	Label base color (Is light blue) or "- 12" is printed at the end of the label number	

CHAPTER 4

INSTALLATION

This printer was carefully adjusted and strictly inspected before being packed. This makes sure that it works as intended, it must be installed correctly. The service engineer must choose a suitable location. install the printer according to the proper procedures, then fully check the printer before it is used. The requires a thorough understanding of the printer.

I. CHOOSING A LOCATION	4-1
II. UNPACKING AND INSTALLATION	4-2

III. STORAGE AND HANDLING OF CARTRIDGE3	4-4
--	------------

I. CHOOSING A LOCATION

Make sure the requirements below are met when installing the **printer**. The service engineer should inspect the place the printer **will** go before delivery.

1. Power **supply**

- Line voltage: No more than $\pm 10\%$ outside the rated voltage
- Line frequency: $50/60 \pm 2$ Hz

2. Operating **conditions**

- Flat level, supporting surface
- Ambient temperature of 10 to 32.5°C
- Humidity of 20 to 80% RH
- No **condensation**
- Good ventilation

Do not **install** the printer in these places:

- In the sun
If the printer must go somewhere sunny, the **windows** must have curtains keep to **the** sun off.
- Near magnets or **equipment** that produces a magnetic **field**
- Where there is vibration
- Where it is dusty
- Near **flames** or water

3. **Installation space**

There must be an enough space around the printer to operate it. (See Figure 4-1) The printer must go on a desk or other level surface large enough to accommodate its feet (and those of the paper feeder, if used) and sturdy enough to carry its weight.

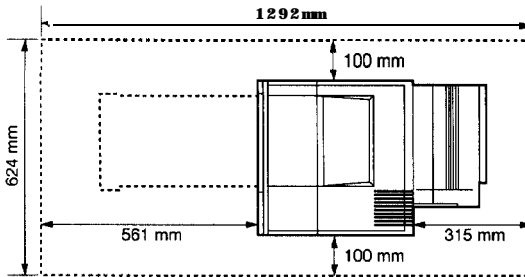


Figure 4-1

II. UNPACKING AND INSTALLATION

If the boxed printer is brought into the warm from a cold storeroom or **delivery** truck, **condensation will** form on the printer surfaces. This will cause various problems. such as print defects. To prevent this from happening, make sure you leave the printer in its box to gradually warm up to room temperature before unpacking It. This **will** take at least an hour.

1. Unpacking

tep	Action	Check	Remarks
1	Open the box .		
2	Take all the ancillary parts and the documentation out.	Check you have the following: <ul style="list-style-type: none">• Power cord• Cartridge• Manual	
3	Lift off the styrofoam pads (right and left) , then lift the printer out .		
4	Take the printer out of its plastic bag . Peel off the tape holding the various components .	Check that no external damage occurred during transportation.	
5	Take the cassette out and remove the lifting plate retainer from the cassette.		
6	Open the printer and remove the tape, the protective sheets, and the spacer Inside the printer.		
7	Remove the packing material holding the transfer charging roller.		
8	Open the multi-purpose tray and remove the protective sheet.		
9	Open the delivery cover and remove two packing pieces moving in direction of arrow.		

2. Unpacking and installing the cartridge

Step	Action	Check	Remarks
1	Take the cartridge out of Its bag.		
2	Hold the cartridge as shown in Fig. 4-2 (page 4-5) and slowly rock it 45° each way, five or six times. to distribute the toner evenly.		See Figure 4-2.
3	Place the cartridge on a level surface. hold its top down with one hand, and pull the tab out with the other hand to remove the sealing tape.		
4	Open the printer. hold the cartridge in both hands, and install it in the printer.		Slowly insert it until it is securely seated at each end.
5	Close the printer.		

3. Operation check

Step	Action	Check	Remarks
1	Load the upper cassette with paper.		
2	Plug the power cord in and switch the printer ON. When the READY indicator stops flashing. the printer is standing by: Press the ON LINE key to set the printer off-line. Then press the SELECT key. The printer displays the SELF TEST message followed by the PRINTING TEST message.	Check that the density of the test print is light.	
3	For safety, keep the area around the printer clear		

III. STORAGE AND HANDLING OF CARTRIDGES

A cartridge is affected by its storage conditions even if it is sealed in its box, so its life depends on how it is used or stored. Store and handle cartridges carefully.

A. Storage of Scaled Cartridges

When storing cartridges In a warehouse or workshop, maintain the conditions given in Table 4-1. Note the following:

- 1) Keep cartridges out of the sun.
- 2) Do not store cartridges on a surface that vibrates.
- 3) Do not knock or drop cartridge boxes.

Table 4-1 Storage conditions

Temperature	Normal (total storage time x 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 x 9/10)		35 to 65% RH
	Severe (total storage time x 1/10)	High	85 to 95% RH
		Low	10 to 35% RH
Air pressure			460 to 760 mmHg (0.6 to 1 atm)
Total storage time			2 years 6 months

Note: "Total storage time" in the Table means the cartridge validity period from the date of manufacture. This is part of the cartridge validity data information shown on the cartridge packing.

B. Storage of Unsealed Cartridges

Each cartridge contains a photosensitive drum coated with an organic photoconductor (OPC) that deteriorates when exposed to strong light. The cartridge also contains toner. This makes cartridges delicate item. so tell the customer all about correct storage and handling of cartridges.

- 1. Storage requirements after unsealing
- 1) Store the cartridge in its aluminum bag.
- 2) Avoid places in the sun or near windows. Do not leave a cartridge in a car for a long time, as the inside of the car can get extremely hot. Even if the cartridge is in its box, do not put the box in the sun or leave it in a car for a long time.
- 3) Avoid places that get too hot, too cold, or too humid. Also avoid places where the temperature can change suddenly.
- 4) Avoid places exposed to harmful gases (insecticide, etc.) or salty air.
- 5) Store cartridges in the temperature range 0 to 35°C.
- 6) Keep cartridges away from computer workstation, disk drives, and floppy disks.
- 7) Keep cartridges out of reach of children.

2. Cartridge life

The useful service life of a cartridge is two and a half years from the date of manufacture (printed on the cartridge). The expiry date (date of manufacture plus two and a half years) is given on the cartridge box and the shipping box. A cartridge used after the expiry date will produce prints of reduced quality. so cartridges should be used within their service lives.

C. Handling Suggestions

- 1) Before installing a new cartridge in the printer (or if blank spots appear on prints during use, because of uneven toner distribution) hold the cartridge horizontally and slowly rock it 45° each way about the drum axis, five or six times, as shown in Figure 4-2. This will distribute the toner evenly. Then install the cartridge in the printer. Using any other method may result in toner leaking from the developing unit or cleaning unit.

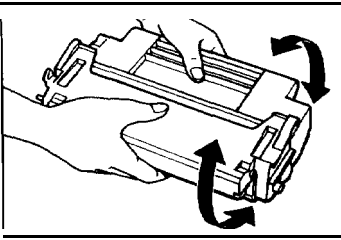


Figure 4-2

After installing a new cartridge, print three to five test patterns to check for toner leakage.

- 2) Before moving the printer, take the cartridge out, and put it into an aluminum bag or pack. It with thick cloth to prevent exposure to light.
- 3) Keep cartridges away from computer workstation, disk drives, and floppy disks. The magnet in the cartridge can corrupt the video data in the memory of the workstation, or the data on disks.

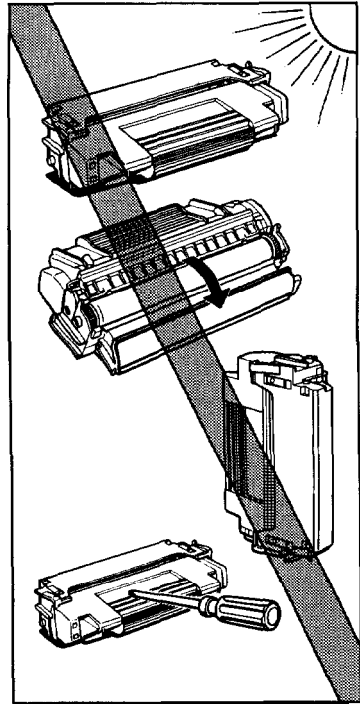


Figure 4-3

- 4) Since the photosensitive drum is sensitive to light, never expose it to direct sunlight or strong light (1500 lux or more). If you do, blank spots or black streaks may appear on prints. If this does happen, stop the printer for a while; this will usually solve the problem. If the cartridge is exposed to strong light for a long time, blank spots or black streaks may still appear on prints even after stopping the printer.
- 5) Do not open the protective shield in the bottom of the cartridge and touch the surface of the photosensitive drum. If the drum surface is dirty, clean it with flannel or some other soft cloth liberally sprinkled with toner. Do not use dry cloth, lint-free paper, or solvents.

- 6) Do not turn a cartridge upside down or stand it on end. Always lay it down with its label up.
- 7) Never take a cartridge apart.

Note: If the photosensitive drum gets exposed to normal light of about 1500 lux for about 5 minutes, store the cartridge in a dark place to recover. Direct sunlight is 10,000 to 30,000 lux. Exposing a drum to light this bright will destroy it.

CHAPTER 5

MAINTENANCE AND SERVICING

I. PERIODIC REPLACEMENT PARTS	5-1	IV. LISTS OF TOOLS	6-P
II. EXPECTED LIVES OF CONSUMABLES PARTS	5-1	V. LIST OF LUBRICANTS, CLEANERS	5-4
III. PERIODIC SERVICING SCHEDULE..	S-1	VI. SERVICE CHECKPOINTS	5-5
		VII. MAINTENANCE BY CUSTOMER	5 7

I. PERIODIC REPLACEMENT PARTS

None

II. EXPECTED LIVES OF CONSUMABLES PARTS

The following is a table of consumables which, over the warranty period of the printer, are expected to need replacement once or more because of deterioration or damage. The expected life of the consumable parts are expressed in terms of the number of prints processed: replace them when they prove to be faulty.

Table 5-1

As of September 1994

NO.	Parts name	Parts No.	Qty	Expected life	Remarks
1	Multi-purpose pick-up roller	RB1-2127-000	1	200,000 sheets	Replace the multi-purpose pick-up roller and separation pad together.
2	Separation pad	RF5-0343-000	1	200,000 sheets	
3	Fixing unit	RG5-0879-000	1	200,000 sheets	
4	Transfer charging roller	RF5-0349-000	1	200,000 sheets	
5	Cassette pick-up roller	RB 1-3477-000	1	200,000 sheets	
6	Exhaust fan	RH7-1177-000	1	25,000 hours	

Note: The values above are estimates only and subject to change based on future data.

III. PERIODIC SERVICING SCHEDULE

None

IV. LISTS OF TOOLS

A. Standard Tools

The standard tools required for servicing the printer are listed below.

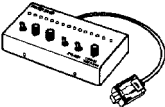
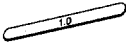
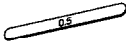
Table S-2

NO.	Tool name	Tool No.	Remarks
1	Tool case	TKN-0001	
2	Jumper wire	TKN-0069	With clips. E-Z hook
3	Thickness gauge	CK-0057	0.02 mm to 0.3 mm
4	Compression spring scale	CK-0058	For checking cassette spring strength (0-600 g)
5	Phillips screwdriver	CK-0101	M4, M5
6	Phillips screwdriver	CK-0104	M3, M4
7	Phillips screwdriver	CK-0105	M4, M5
6	Phillips screwdriver	CK-0106	M4, M5
9	Flat-blade screwdriver	CK-0111	
10	Precision flat-blade screwdriver set	CK-0114	
11	Allen wrench set	CK-0151	
12	File, fine	CK-0161	
13	Allen (hex) screwdriver	CK-0170	M4
14	Diagonal cutting pliers	CK-0201	
15	Needle-nose pliers	CK-0202	
16	Pliers	CK-0203	Slip-joint
17	Retaining ring pliers	CK-0205	For external rings. 19-30 mm
18	crimper	CK-02 18	
19	Tweezers	CK-0302	
20	Ruler	CK-0303	150 mm
21	Soldering iron	CK-0309	100 W, 30 w
22	Mallet, plastic head	CK-0314	
23	Brush	CK-03 15	
24	Penlight	CK-0327	
25	Plastic bottle	CK-0328	100cc
26	Solder	CK-0329	01.5 (mm) X 1 (ml)
27	Desoldering wick	CK-0330	1.5 mm
26	Lint-free paper	CK-0336	500 SH/PKG
29	Oiler	CK-0349	30cc
30	Plastic jar	CK-0351	30cc
31	Digital multimeter	CK-0552	

B. Special Tools

In addition to the standard tools, the following special tools **are** required for servicing the printer.

Table 5-3

No.	Tool name	Tool No.	Shape	RANK	Application/remarks
1	Printer driver tester	RY9-0091		B	Used for checking the operation of the printer or checking a failure of the laser diode.
2	Thickness gauge	RY9-0088		A	Used for installing the separation guide of the optional envelope feeder.
3	Thickness gauge	QY9-0001		A	

Note: Ranks

- A: Each service technician should **carry** one with him
- B: A group of the service technicians should share one.
- C: Each workshop should keep one.

V. LIST OF LUBRICANTS, CLEANERS

Table 5-4

No.	Material name	Components	Use	Remarks
1	Alcohol: ethyl (pure or denatured) or isopropyl (pure or denatured)	C_2H_5OH , $(CH_3)_2CHOH$	Cleaning: plastic, rubber, external parts	<ul style="list-style-type: none">• Purchase locally• Flammable: keep away from flame
2	MEK (methyl ethyl ketone)	$CH_3CO-C_2H_5$	Cleaning: oil and toner stains	<ul style="list-style-type: none">• Purchase locally• Highly flammable: keep away from flame
3	Lubricating oil	Petroleum mineral oil	Apply between gear and shaft	<ul style="list-style-type: none">• Tool No. CK-BOO3 (100 ml bottle)
4	Lubricating material	Special oil Special solid lubricating material Lithium soap	Apply to gear	<ul style="list-style-type: none">• Tool No. HY9-0007 (20 g tube)

VI. SERVICE CHECKPOINTS

A. Printer

Cartridge

Point	Tool/solvent	Remarks
Photosensitive drum	Toner	Never clean the drum with solvents. Do not touch or clean the drum unless absolutely necessary. Do not expose the drum to light.

Fixing unit

Point	Tool/solvent	Remarks
Separation guide	Ketone type	Clean the guide. Wipe it softly when removing toner.
Entry guide	Ketone type	Clean.

Transfer guide

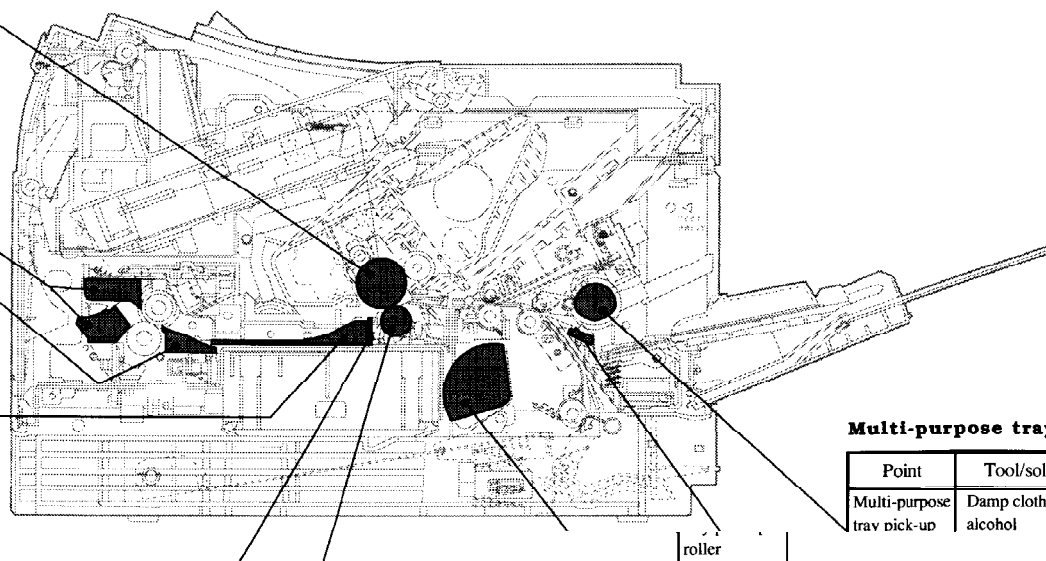
Point	Tool/solvent	Remarks
Transfer guide	Damp cloth	Clean.

Static charge eliminator

Point	Tool/solvent	Remarks
Static charge eliminator	Cleaning brush	Clean.

Transfer charging roller

Point	Tool/solvent	Remarks
Transfer charging roller	Lint-free paper	Clean the roller only if it is very dirty. Do not touch the roller and try not to have any solvents or oil on your hands when cleaning. Never use water or solvents for cleaning



Multi-purpose tray pick-up roller

Point	Tool/solvent	Remarks
Multi-purpose tray pick-up	Damp cloth or alcohol	Clean.

Separation pad

Point	Tool/solvent	Remarks
Separation pad	Dry cloth	Clean.

Cassette pick-up roller

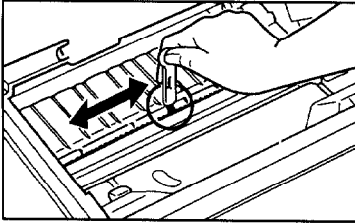
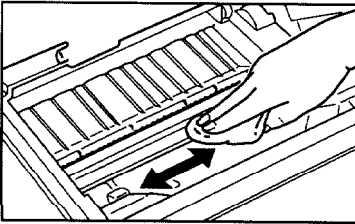
Point	Tool/solvent	Remarks
cassette pick-up roller	Damp cloth or alcohol	Clean

Figure 5-1

VII. MAINTENANCE BY CUSTOMER

The customer should do the following maintenance to maximize printer performance.

Table 5-5

Item	Customer maintenance
Cartridge	Rock the cartridge to redistribute toner. If necessary relace it.
Static charge eliminator	<p>When replacing the cartridge, clean the static charge eliminator with the green cleaning brush in the printer.</p> 
Transfer guide area	<p>When replacing the cartridge, clean the transfer guide area with the soft dry cloth.</p> 

CHAPTER 6

TROUBLESHOOTING

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III. MEASUREMENT AND ADJUSTMENT	6-8
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V. TROUBLESHOOTING MALFUNCTIONS.....	6-28

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VIII. VARIABLE RESISTORS, LEDS, TEST PINS, JUMPERS, AND SWITCHES ON PC BOARDS.....	6-56

I. INTRODUCTION

A. Initial Check

1. Operating environment

Check that:

- a. The line voltage does not vary more than 10% from the voltage shown on the rating plate.
- b. The printer is installed on the level.
- c. The room temperature is kept between 10 and 32.5°C, and the **relative** humidity, between 20 and 80%.
- d. The printer is not exposed to ammonia gas and is not located anywhere hot or humid (for instance, near a water faucet, boiler, or humidifier), near open flames, or anywhere dusty.
- e. The printer **is** not exposed to direct sunlight. If it has to be put somewhere sunny, the window should be curtained.
- f. The room is well ventilated.

2. Print paper

Check that:

- a. The recommended paper is being used. If the paper is too thick or too **thin**, or tends to curl, paper jams or transfer problems may occur, or prints may be blurred.
- b. The paper is not damp. Use new print paper and check whether the print quality improves.

3. Consumables

Check whether the toner indicator on the control panel flashes when an EP-E cartridge is installed in the printer. If the indicator flashes, the amount of toner is **insufficient**; prepare a new **cartridge**. If blank spots appear on prints, the toner is unevenly distributed in the cartridge. Take the cartridge out and slowly rock it from side to side to distribute the toner evenly as described in Section III of Chapter 4.

4. Other points

During winter, if the printer is brought into a warm room from a cold one (for instance, a **warehouse**), condensation will occur inside the printer, **causing** various problems.

For **example**:

- a. Condensation on optical surfaces (such as the scanning mirror and lenses) will make the print Image light.
- b. If the photosensitive drum is stored in a cold area, its electrical resistance **will** be high, making it impossible to obtain correct print contrast.

If condensation occurs, wipe the assemblies or parts with a dry cloth, or leave the printer ON for 10 to 20 minutes.

If an EP-E cartridge is unsealed shortly after being brought into a warm room from a cold one, **condensation** will also occur inside the cartridge: this may cause Image defects.

Be sure to inform the customer they must let the EP-E cartridge adjust to **room** temperature before unsealing it. This will take an hour or two.

B. Basic Procedure

If an image defect or a malfunction occurs, perform the initial check, then follow the basic procedure below.

1. If the printer malfunctions, read section V on troubleshooting.
2. If an image defect occurs, determine the type of image defect from the list of image defect samples on page 6-14, and correct the defect.

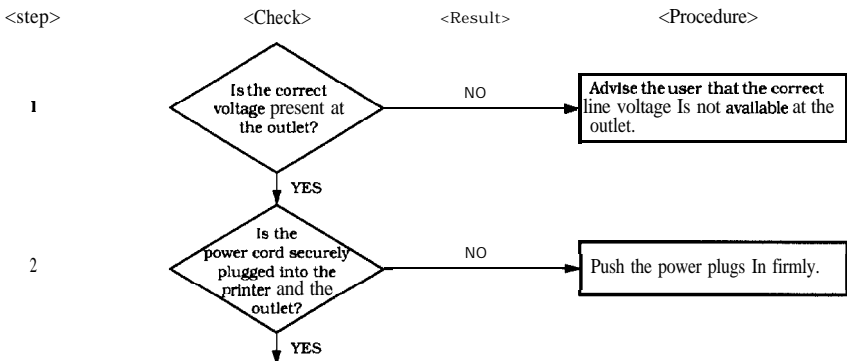
C. How to use the Troubleshooting Tables

The troubleshooting tables in this section have been created from general flowcharts. The way of using these tables is described below, based on the following examples.

Example: No AC Power

Possible cause	Step	Check	Result	Procedure
Line voltage	1	Is the correct voltage present at the outlet?	NO	Advise the user that the correct line voltage is not available at the outlet.
Power plug	2	Is the power cord securely plugged Into the printer and the outlet?	NO	Push the power plugs in firmly.

- ◆ To find the possible causes (parts likely to be defective) of a particular fault, refer to the item marked [Possible cause] in the table.
In the case of "No AC Power" in the above table, it is possible that the line voltage or power plug is defective.
- ◆ To repair or check the fault, follow the numbers in the "Step" column and answer the questions in the 'Check' column with YES or NO. If the answer agrees with that in the "Result" column, follow the procedure given in the 'Procedure' column. If this does not corrected the problem, proceed to the next check.



II. EXPLANATION OF SPECIAL TOOL

A. Printer Driver Tester

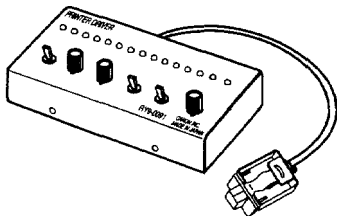


Figure 6-1

1. outline

The printer driver tester allows the printer to operate without being connected to an interface to determine whether the printer is operating normally.

The tester has the following two functions:

- a. It permits the printer to print a black image, horizontal or vertical lines, or a white image to **being** determine whether the trouble is caused by the printer or by the video controller (external device).
- b. It operates the laser in the printer. Measure the output voltage (**APCIN** signal), which is proportional to the intensity of the laser beam, with a digital **multimeter** and **confirm** that the output voltage is **within** the stipulated range.

2. Description of control panel

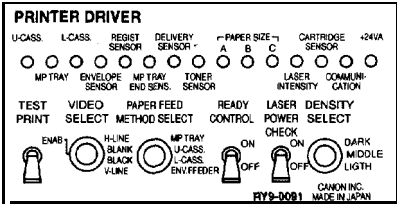


Figure 6-2

TEST PRINT

Permits the printer to print the pattern specified by VIDEO SELECT.

VIDEO SELECT

Selects the test pattern to be **printed**: black image, vertical lines, horizontal lines, or a **white** image.

PAPER FEED METHOD SELECT

Picks **up the** paper or the envelope from one of the following:

- Upper cassette
- Multi-purpose tray
- Lower cassette (cassette feeder)
- Envelope feeder

READY CONTROL

ON places the printer in a READY state when the power is ON, even if one of the following conditions **is** present (the READY INHIBIT mode).

- **No cartridge**
- No paper
- **Paper jam**
- BD error

Note: When turning the READY CONTROL switch ON to set the tester to the READY INHIBIT mode, connect the tester to the printer before turning ON the printer switch. To cancel this mode, disconnect the tester and then turn the printer switch OFF/ON. Connecting the tester with its READY CONTROL switch ON to the on-line printer causes the printer to enter the READY INHIBIT mode,

which **continues** even when the tester is disconnected.

This mode continues until the printer is turned OFF.

LASER POWER CHECK

Permits the laser diode to emit light.

Note: Do not set the **LASER POWER CHECK** switch to ON while the printer is operating, otherwise the back of the print paper will become dirty.

DENSITY SELECT

Adjusts the image density.

U-CASS. (LED)

Lights when there is paper in the upper cassette.

MP TRAY (LED)

Lights when there is paper on the multi-purpose tray.

L-CASS. (LED)

Lights when there is paper in the lower cassette.

ENVELOPE SENSOR (LED)

Lights when there is an envelope in the envelope feeder.

REGIST SENSOR (LED)

Lights when paper is at the **regist** paper sensor.

MP TRAY END SENS. (LED)

Lights when paper is at the MP tray paper end sensor.

DELIVERY SENSOR (LED)

Lights when paper is at the paper delivery sensor.

TONER SENSOR (LED)

Lights when there **is** toner in the cartridge when the primary AC bias **is** being output.

PAPER SIZE (LED)

Indicates the paper size of the cassette in the paper pick-up unit specified by the PAPER FEED METHOD SELECT switch.

Table 6-1

	A	B	C
No paper	ON	ON	ON
Executive	OFF	OFF	ON
B5	ON	OFF	ON
Legal	ON	OFF	OFF
A4	OFF	ON	ON
Letter	OFF	ON	OFF

LASER INTENSITY (LED)

Lights when the intensity of the laser beam is **insufficient**.

CARTRIDGE SENSOR (LED)

Lights when there is a cartridge in the printer when the primary AC bias is output.

COMMUNICATION (LED)

Flashes twice a second when the tester communicates **with** the printer.

+24VA (LED)

Lights when **+24 VA** is supplied to the tester.

3. List of signals

Table 6-2

Connector contact No.	Signal name	Function
J1-1	+24VA	+24VA
J1-2	OUT	Serial line (output)
J1-3	IN	Serial line (input)
J1-4	GND	GND

4. **Procedure.**
- 1) Set the printer power switch to OFF.
 - 2) Attach the tester connector to the connector (J135) for the paper feeder or the connector (J 136) for the envelope feeder.
 - 3) Set the printer power switch to ON.
 - 4) When the printer goes into stand-by, operate the tester to perform the check.

Note: If your body is electrically charged when you operate the printer driver tester, printer misoperation or malfunction may occur. So, be sure to touch a metal part of the printer with your hand to discharge the static electricity on your body before operating the tester.

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III. MEASUREMENT AND ADJUSTMENT

A. Image Adjustment

If an image problem occurs, follow the procedure below to perform a test print.

- 1) Switch the power ON.
 - 2) When the printer is ready, press the ON LINE key to set the printer off-line.
 - 3) Press the SELECT key. The printer displays the SELF TEST message followed by the PRINTING TEST message.
- This makes one test print as shown in the figure below.

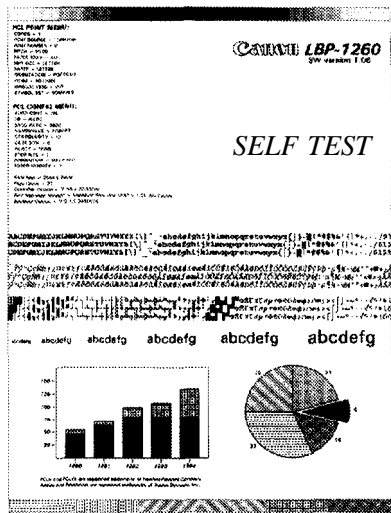


Figure 6-3

- 3) Determine the type of image problem from the test print, then proceed to Section IV.

B. Mechanical Adjustment

1. Checking the nip width of the lower fixing roller

The fixing unit does not allow adjustment of the pressure (nip width). If the nip width is set incorrectly, a fixing problem may occur.

Follow the procedure below to check the nip width.

- 1) Produce an all-black prints using an EP-E cartridge, and take the print to the customer's premise.
(Use the printer driver tester to output the solid black print.)
- 2) Put the all-black print face-up on the multi-purpose tray.
- 3) Press the TEST PRINT switch.
- 4) As soon as the leading edge of the paper can be seen at the outlet of the face-down tray. Immediately switch the printer OFF, wait for about 10 seconds, then switch the printer ON again to deliver the paper out.
- 5) Measure the width of the glossy band across the print, and check whether it meets the requirements shown in the table below.

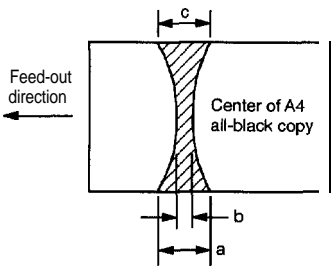


Figure 6-4

Table 6-3

	Measurement
b	2.5 - 3.9 mm
a - c	0.5 mm or less

2. Installing the separation guide (Adjusting the gap between the separation guide and the lower separation roller)

Under normal conditions, remove the separation guide along with the upper cover. If you removed just the separation guide or replaced a bent separation guide, adjust the gap as follows.

Install the separation guide at the position 1.5mm away from the lower separation roller. Adjust its position by inserting the thickness gauges (1mm and 0.5mm) into the gap between the separation guide and the lower separation guide.

<Cross sectional view of the envelope feeder>

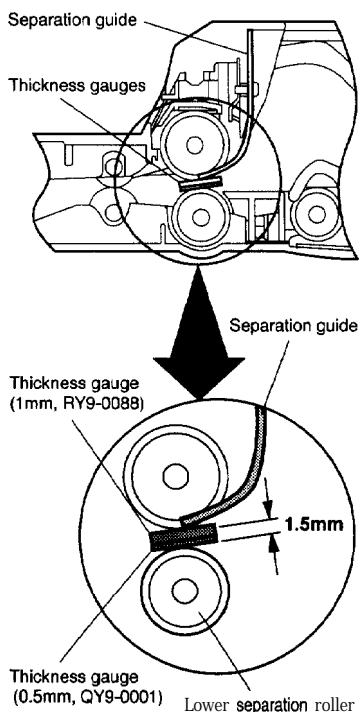


Figure 6-5

C. Electrical Adjustment

1. Leading edge registration adjustment

VR201 on the DC controller PCB has been adjusted at the factory. Therefore, it does not require adjustment in the field during installation. However, when the DC controller PCB is replaced, the leading edge registration must be readjusted by using the following procedure. (If you replace the paper pick-up unit or the laser/scanner unit, make several test prints and check the leading edge registration is 2.0 mm. If it is not, adjust it.)

- 1) Perform steps 1 and 5 on page 3-20, and replace the DC controller PCB.
- 2) Set VR201 PCB on the DC controller to ± 0 , then place sheets in the cassette. Press the TEST PRINT switch and obtain several test prints.
- 3) Measure the distance (a) from the leading edge of each sheet to the pattern. (See Figure 6-6) Take the average of the measured distances.
- 4) Adjust VR201 so that the value obtained in step 3 is 2.0 mm according to Table 6-4. For example, if the average value in step 3 is 2.6 mm, the difference is 0.6 mm. Set VR201 to +2 by turning it clockwise. (See the table 6-4 and figure 6-7.)
- 5) Obtain several prints again. Perform step 3 again and confirm that the leading edge registration is 2.0 mm. If it is not, perform steps 2 to 5 again.

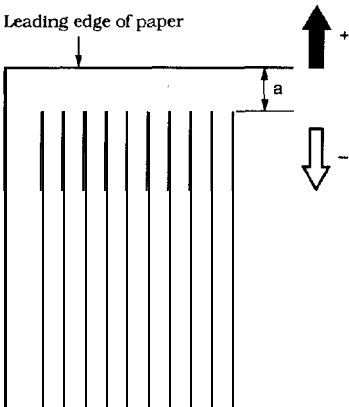


Figure 6-6

Table 6-4

VR201 position	Correction distance (mm)	VR201 reading	Correction distance (mm)
+10	+3.02	(-1)	-0.30
(+9)	+2.71	-2	-0.60
+8	+2.41	(-3)	-0.90
(+7)	+2.11	-4	-1.21
+6	+1.81	(-5)	-1.51
(+5)	+1.51	-6	-1.81
+4	+1.21	(-7)	-2.11
(+3)	+0.90	-8	-2.41
+2	+0.60	(-9)	-2.71
(+1)	+0.30	-10	-3.02
± 0	± 0		

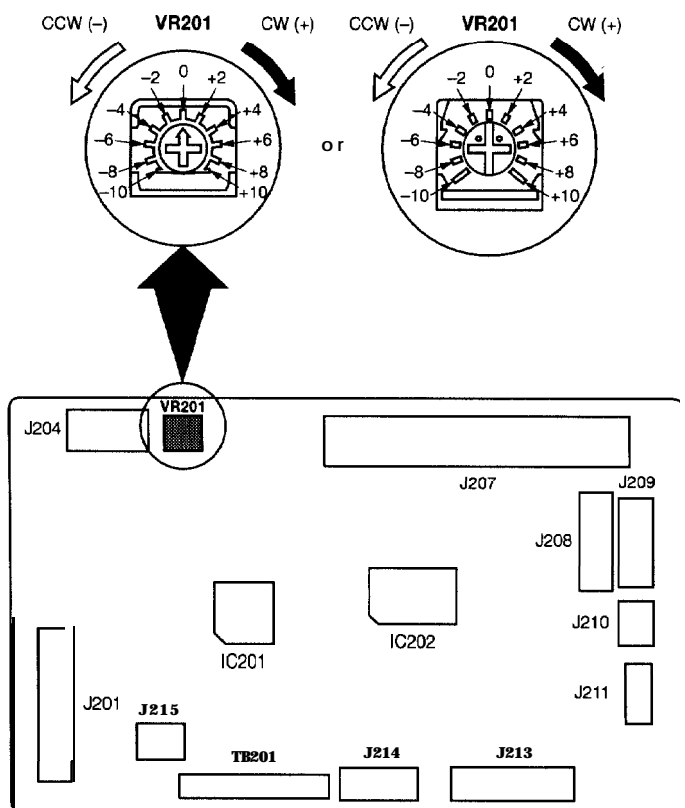


Figure 6-7

◆ **Laser malfunction diagnosis flowchart**

The laser beam is invisible. When a problem In the laser output occurs, use the laser diagnosis flowchart to determine whether the malfunction was caused with the laser/scanner unit or the DC controller PCB.

Notes for the flowchart

- 1. The following abbreviations are used in the flowchart.
 - a. Printer driver tester →→→ Driver tester
 - b. Digital **multimeter** →→→ Meter
 - c. EP-E cartridge →→→ Cartridge
- 2. The printer driver tester switches marked **with "x"** can be set to any position.
- 3. The voltage must be measured three times, and the average taken.

Before using the **flowchart**

- 1. Set the printer power stitch to OFF and remove the cartridge.
- 2. Attach the driver tester connector to the envelope feeder connector (J136).
- 3. Set the driver tester switches as follows:
TEST PRINT **NOT ENAB**
VIDEO SELECT ×
PAPER FEED METHOD SELECT ×
READY CONTROL **INH**
- 4. Check by using the flowchart on the next page.

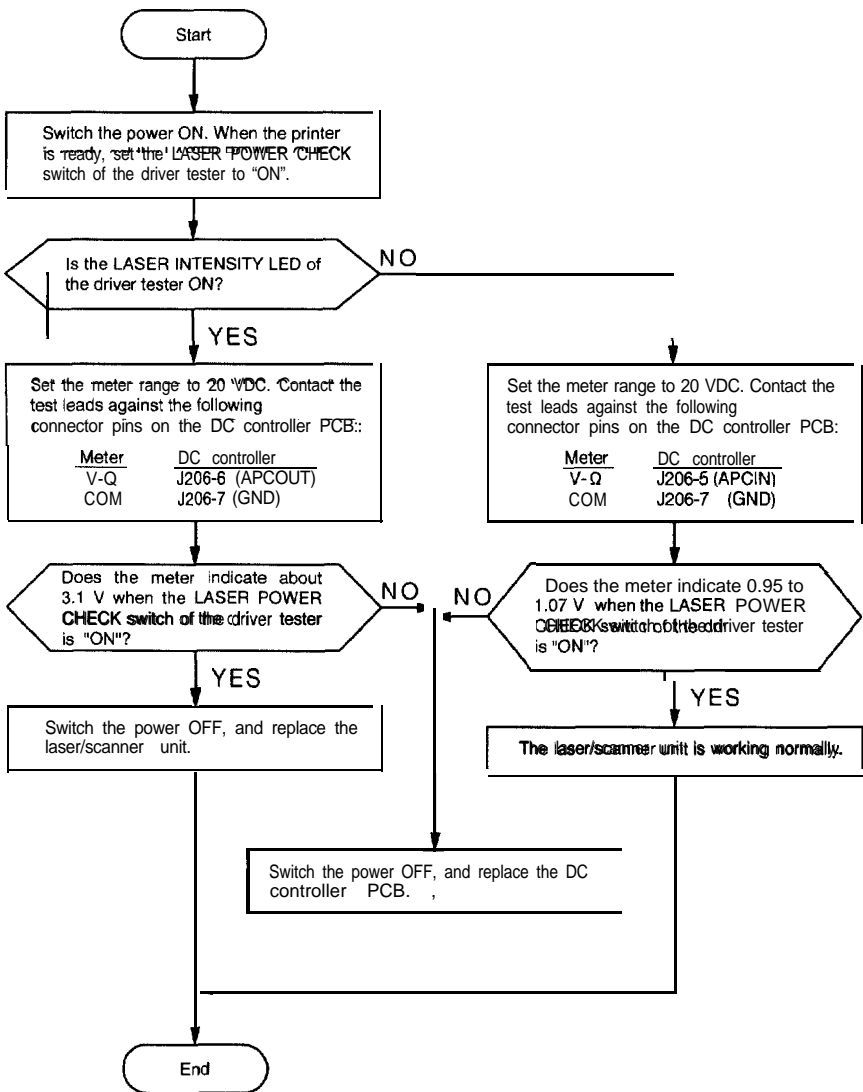


Figure 6-8

IV. IMAGE DEFECTS

A. Examples of Image Defects



I-1 Light



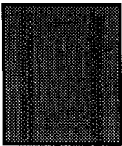
I-2 Dark



I-3 Completely blank



I-4 All black



I-5 Large dots vertically in line



I-6 Dirt on back of paper



I-7 Vertical black streaks



I-8 Irregular and smudged vertical bands



I-9 Irregular and smudged horizontal bands



I-10 Blank spots



I-11 Solid vertical white lines



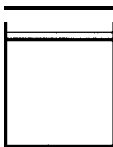
I-12 Faulty registration



I-13 Poor fixing



I-14 Distortion



I-15 Missing BD signal

Figure 6-9

B. Troubleshooting Image Defects

I - 1 Light



Possible cause	Step	Check	Result	Procedure
	1	Does the print quality improve when the image density is adjusted?	YES	Adjust the image density using the external device.
Lack of toner	2	Does the print quality improve when the EP-E cartridge is replaced?	YES	Replace the cartridge.
	3	Open the printer while a print is being made, and open the drum protective shield of the EP-E cartridge. Is the toner image on the drum being transferred to the paper? (Do not open the drum protective shield for more than 10 seconds.)	YES	If the toner image is very faint, go to step 7.
Print paper	4	Does the print quality improve when new paper is used?	YES	Replace the print paper. Advise the customer of the proper method to store paper.
Transfer charging roller	5	Does the image become darker when the transfer charging roller is replaced?	YES	Replace the roller.
High-voltage power supply PCB (transfer voltage)	6	Perform a test print. About two seconds after the main motor starts, does the voltage between J213-9 (SLO2) and J213-10 (GND) on the DC controller PCB become about 0.76 VDC?	YES	Check the continuity between the high-voltage contact and the shaft of the transfer charging roller. If it is within the proper value, replace the high-voltage power supply PCB.
DC controller PCB			NO	Replace the DC controller PCB.

Possible cause	Step	Check	Result	Procedure
High-voltage power supply PCB (Developing bias)	7	Perform a test print. About five seconds after the main motor starts, does the voltage between J213-9(SLO2) and J213-10 (GND) on the DC controller PCB become about 0.76 VDC?	YES	Check whether the high-voltage contact is making good contact with the developing bias contact of the cartridge . If It Is. replace the high-voltage power supply PCB. If the problem persists after replacing the PCB. check by using the laser malfunction diagnosis flowchart in Section III C.
DC controller PCB			NO	Replace the DC controller PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in Section III C.

I - 2	Dark
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Possible cause	Step	Check	Result	Procedure
	1	Does the print quality Improve when the image density is adjusted?	YES	Adjust the image density from the external device.
High-voltage contact	2	Clean the printer drum grounding contact and cartridge contact, then perform one test print. Does the print density Improve?	YES	Clean the contacts so they make proper contact.
High-voltage power supply PCB (Primary high voltage)	3	About one second after the main motor starts, does the voltage between J213-6 (HVRST) and J213-10 (GND) on the DC controller PCB change from 0 v to about 5 VDC?	YES	Check whether the high-voltage contact is making good contact with the primary charging roller of the cartridge. If it is, replace the high-voltage power supply PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in Section III c.
DC controller PCB			NO	Replace the DC controller PCB . If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in Section III C .

I - 3	Completely blank
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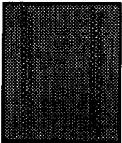
Possible cause	Step	Check	Result	Procedure
DC controller PCB	1	About one second after the main motor starts, does the voltage between J213-6(HVRST) and J213-10(GND) on the DC controller PCB change from about 5 VDC to 0 V?	NO	Replace the DC controller PCB.
High-voltage power supply PCB (Developing bias)	2	Perform a test print. About five seconds after the main motor starts, does the voltage between J213-9 (SLO2) and J213-10 (GND) on the DC controller PCB become about 0.76 VDC?	YES	Check whether the high-voltage contact is making good contact with the developing bias contact of the cartridge. If it is, replace the high-voltage power supply PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in Section III C .
DC controller PCB			NO	Replace the DC controller PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in Section III C .

I - 4 All black



Possible cause	Step	Check	Result	Procedure
EP-E cartridge	1	Does the print quality improve when the cartridge is replaced?	YES	Replace the cartridge .
High-voltage power supply PCB (Primary voltage)	2	Perform a test print. About one second after the main motor starts, does the voltage between J2 13-9 (SLO2) and J2 13-10 (GND) on the DC controller PCB become about 0.76 VDC?	YES	Replace the high-voltage power supply PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart in section III c.
DC controller PCB			NO	Replace the DC controller PCB. If the problem persists after replacing the PCB, check by using the laser malfunction diagnosis flowchart In Section III C.

I - 5 Large dots vertically in line



Possible cause	Step	Check	Result	Procedure
Static charge eliminator	1	Is the static charge eliminator dirty?	YES	Clean the static charge eliminator.
	2	Is the static charge eliminator grounded?	NO	Ground the static charge eliminator properly.
Transfer charging roller	3	Is the transfer charging roller dirty?	YES	Clean the roller. If it is not possible to clean It. replace

I - 6 Dirt on back of paper



Possible cause	Step	Check	Result	Procedure
Transfer charging roller	1	Is the transfer charging roller dirty ?	YES	Clean the roller. If it cannot be cleaned, replace it.
Entrance guide	2	Is the entrance guide dirty ?	YES	Clean the guide.
Fixing unit	3	Are the upper and lower fixing rollers grounded via the diode ?	NO	Ground the rollers properly
	4	Is the lower fixing roller dirty ?	YES	Clean the roller. If It is not possible to clean It. replace it.
Paper feed guide			NO	Clean the paper feed guide.

I - 7 | Vertical black streaks |



Possible cause	Step	Check	Result	Procedure
EP-E cartridge	1	Open the upper cover while printing is performed, and open the protective shield of the cartridge. Are vertical black streaks on the drum?	YES	Replace the cartridge.
Fixing unit			NO	Replace the fixing unit.

I - 8 | Irregular and smudged vertical bands



Possible cause	Step	Check	Result	Procedure
EP-E cartridge	1	Does the print quality improve when the cartridge is replaced?	YES	Replace the cartridge.

I - 9 Irregular and smudged horizontal bands



Possible-cause	Step	Check	Result	Procedure
EP-E cartridge	1	Do the bands appear at regular intervals?	YES	Replace the cartridge.
Fixing unit			NO	Replace the fixing unit.

I - 10 Blank spots



Possible cause	Step	Check	Result	Procedure
Print paper	1	Is the recommended paper being used?	NO	Perform a test print on recommended paper. If the problem disappears, advise the customer to only use the recommended paper.
	2	Is the paper damp?	YES	Replace the paper. Instruct the customer to wrap and store the paper to prevent it from becoming damp.
Transfer charging roller	3	Is the transfer charging roller dirty or deformed?	YES	Replace the roller.
EP-E cartridge	4	Does the print quality improve when the cartridge is replaced?	YES	Replace the cartridge.
High-voltage power supply PCB (Developing bias)	5	Perform a test print. About five seconds after the main motor starts, does the voltage between J213-9(SLO2) and J213-10 (GND) on the DC controller PCB become about 0.76 VDC?	YES	Check whether the high-voltage contact is making good contact with the developing bias contact of the cartridge . If it is, replace the high-voltage power supply PCB.
DC controller PCB.			NO	Replace the DC controller PCB.

I - 11 | Solid vertical white lines |



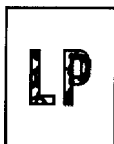
Possible cause	Step	Check	Result	Procedure
Lack of toner	1	Is there one or more straight vertical white streaks of uniform width?	YES	Take out the cartridge, rock it as shown in Section III of Chapter 4 to distribute the toner evenly, then put it back.
EP-E cartridge	2	Open the protective shield of the cartridge. Are vertical white streaks on the drum surface?	YES	Replace the cartridge.
Reflection mirror	3	Is paper dust adhering to the reflection mirror in the laser/scanner unit?	YES	Replace the laser/scanner unit.
Adherence of foreign matter	4	Is any foreign matter, such as a hair, adhering to the laser outlet of the printer or the laser inlet of the cartridge?	YES	Remove the foreign matter.
			NO	Replace the laser/scanner unit.

I • 12	Faulty registration
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Possible cause	Step	Check	Result	Procedure
Number of sheets	1	Is the multi-purpose tray or the cassette overloaded?	YES	Advise the user not to load the tray or the cassette with excessive amount of paper.
Print paper	2	Is the recommended paper being used?	NO	If the problem disappears, advise the customer to only use the recommended paper.
Paper pick-up roller	3	Is paper dust adhering to the paper pick-up roller?	YES	Clean the roller. If the roller is worn, replace it.
Leading edge registration adjustment	4	Does the registration improve when the registration is adjusted?	YES	End of check
Regist paper sensor lever Regist paper sensor			NO	Check the sensor lever and sensor. Replace them if defective.

I- 13	Poor fixing
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Possible cause	step	Check	Result	Procedure
Transfer charging roller	1	Is the transfer charging roller dirty?	YES	Clean the roller. If it is not possible to clean, replace it.
Thermistor	2	Obtain ten test prints. Is the last image lighter than the first?	YES	Replace the thermistor.
Fixing rollers (upper and lower)	3	Does poor fixing occur in a vertical band?	YES	Check whether the upper and lower fixing rollers are damaged.
Lower fixing roller	4	Is the lower fixing roller dirty?	YES	Clean the roller. If it is not possible to clean it, replace it.
Print paper	5	Is the nip width correct?	YES	Perform a print using the recommended paper. If the problem disappears, advise the customer to only use the recommended paper.
Fixing unit			NO	Replace the fixing unit.

I - 14	Distortion
I - 15	Missing BD signal



Possible cause	Step	Check	Result	Procedure
Connector	1	Are connectors J208 and 5209 on the DC controller PCB making good contact?	NO	Attach the connectors.
	2	Is connector J731 on the BD PCB making good contact?	NO	Attach the connector.
Laser/scanner unit DC controller PCB	3	Check by using the laser malfunction diagnosis flowchart in Section III C of this chapter. Is the laser/scanner unit faulty?	YES	Replace the laser/scanner unit.
			NO	Replace the DC controller PCB

V. TROUBLESHOOTING MALFUNCTIONS

When performing any of the corrective actions described below, exercise the following precautions:

- 1. When measuring voltages at designated connector pins, first check the connector for faulty contacts.
- 2. Remove ROM SIMM, RAM SIMM, and font card from the printer.
- 3. When you replace the video controller PCB, remove the EEPROM from the old PCB and mount it on the new PCB.

M - 1	No AC Power
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Possible cause	Step	Check	Result	Procedure
Line voltage	1	Is the correct voltage present at the outlet?	NO	Advise the user that the correct line voltage is not available at the outlet.
Power plug	2	Is the power cord securely plugged into the printer and the outlet?	NO	Push the power plugs in firmly.
circuit breaker	3	Is the circuit breaker OFF?	YES	Turn the circuit breaker ON. If the breaker turns OFF again as soon as the power is switched ON, check for a short circuit.
wiring	4	Pull out the power cord. Measure the resistance between the two terminals of the power switch by contacting the test leads against the terminals. Is the resistance zero when the switch is turned ON, and infinite when it is turned OFF?	YES	Check the AC power line.
Power supply			NO	Replace the power supply.

M - 2 | No DC Power

Possible cause	Step	Check	Result	Procedure									
Overcurrent detection circuit	1	Does the problem improve when the power switch is turned OFF, then back ON?	YES	Determine why the over-current detection circuit of the power supply activates.									
AC power	2	Remove the power supply and plug the power cord into it. Turn the power switch ON. Is AC power present between 5102-1 and J102-2 of the AC power supply?	NO	Check by following the steps in M- 1, "No AC Power. "									
wiring DC load DC controller PCB	3	Turn the power switch OFF, and detach connector J103. Turn the power switch ON, and measure the voltage between the terminals shown in the table below. Is the voltage normal?	YES	Check the wiring from the DC controller PCB and DC load. If it is normal, replace the DC controller PCB.									
Power supply			NO	Replace the power supply.									
<table><tr><th>Test leads (+)</th><th>Test leads (-)</th><th>Voltage</th></tr><tr><td>J103-1</td><td>J103-4</td><td>About 5 V</td></tr><tr><td>J103-2</td><td>J103-5</td><td>About 5 V</td></tr><tr><td>J103-3</td><td>J103-6</td><td>About 24 V</td></tr></table>					Test leads (+)	Test leads (-)	Voltage	J103-1	J103-4	About 5 V	J103-2	J103-5	About 5 V
Test leads (+)	Test leads (-)	Voltage											
J103-1	J103-4	About 5 V											
J103-2	J103-5	About 5 V											
J103-3	J103-6	About 24 V											

M - 3

Status indication display on control panel does not work properly.

Possible cause	Step	Check	Result	Procedure
Control panel	1	Does the problem improve when you replace the control panel?	YES	Replace the control panel.
Video controller PCB			NO	Replace the video controller PCB.

M - 4 | Beeper on the control panel keeps sounding.

Possible cause	Step	Check	Result	Procedure
Control panel	1	Does the problem improve when you replace the control panel?	YES	Replace the control panel.
Video controller PCB			NO	Replace the video controller PCB.

M - 5 Control panel LEDs do not light.

Possible cause	Step	Check	Result	Procedure
Control panel	1	Does the problem improve when you replace the control panel?	YES	Replace the control panel.
Video controller PCB			NO	Replace the video controller PCB.

M - 6 Control panel switch malfunction

Possible cause	Step	Check	Result	Procedure
Operation mistake	1	Were switches turned ON/OFF according to Section V of Chapter 1?	NO	Turn ON/OFF the switches according to Section V of Chapter 1.
Control panel	2	Does the problem improve when you replace the control panel?	YES	Replace the control panel.
Video controller PCB			NO	Replace the video controller PCB.

M - 7	Printer detects a jam and stops even though a paper jam has not occurred
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Possible cause	Step	Check	Result	Procedure
Operation mistake	1	Is the delivery cover open?	YES	Securely close the cover.
	2	Do you have a printer driver tester ?	YES	Proceed to step 3.
			NO	Proceed to step 5.
Sensor arm Regist paper sensor	3	Connect the printer driver tester to the printer. Is the REGIST SENSOR LED of the tester ON?	YES	Check whether the regist paper sensor arm is damaged. If it is , replace it: if it is not, replace the regist paper sensor.
Sensor arm Delivery paper sensor	4	Is the DELIVERY SENSOR LED of the tester ON?	YES	Check whether the delivery paper sensor arm is damaged. If it Is, replace It: If It is not, replace the delivery paper sensor.
Pick-up motor driver PCB DC controller PCB			NO	Replace the pick-up motor driver PCB. If the problem persists, replace the DC controller PCB.
Sensor arm	5	Is the regist paper sensor arm or delivery paper sensor arm damaged?	YES	Replace the damaged paper sensor arm .
Delivery paper sensor	6	When the delivery paper sensor arm Is moved, does the voltage between connectors J210-3(PSNS) and J210-2 (GND) on the DC controller PCB change from zero to about 5 VDC?	NO	Replace the delivery paper sensor.
Pick-up motor driver PCB DC controller PCB	7	When the regist paper sensor arm is moved, does the voltage between connectors J605-6(RESS) and J605-5 (GND) on the pick-up motor driver PCB change from about 5 VDC to zero?	YES	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB .
paper			NO	Replace the regist paper sensor.

M - 8	“11 PAPER OUT” appears even though paper is loaded in the selected paper source.
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Possible cause	Step	Check	Result	Procedure
	1	Has the upper cassette been selected?	YES	Proceed to step 5 and subsequent steps.
	2	Has the multi-purpose tray been selected?	YES	Proceed to step 7 and subsequent steps.
	3	Has the lower cassette been selected?	YES	Proceed to step 9 and subsequent steps.
	4	Has the envelope feeder been selected?	YES	Proceed to step 11 and subsequent steps.
Pick-up motor driver PCB (cassette size sensing switch)	5	Connect the printer driver tester to the printer. When the upper cassette size sensing switch is pressed, does the PAPER SIZE LED of the tester light?	NO	Replace the pick-up motor driver PCB.
DC controller PCB	6	When a cassette containing paper is loaded in the printer, does the U-CASS. LED of the tester light?	YES	Replace the DC controller PCB.
Cassette paper sensor			NO	Replace the cassette paper sensor.
	7	Is the print paper loaded correctly?	NO	Load the paper correctly.
DC controller PCB	8	Connect the printer driver tester to the printer. When paper is put on the multi-purpose tray, does the MP TRAY LED of the tester light?	YES	Replace the DC controller PCB.
Sensor PCB (multi-purpose tray paper sensor)			NO	Replace the sensor PCB.
Paper feeder driver PCB (cassette size sensing switch)	9	Connect the printer driver tester to the printer. When the paper feeder cassette size sensing switch is pressed, does the PAPER SIZE LED of the tester light?	NO	Replace the paper feeder driver PCB.
DC controller PCB	10	When a cassette containing paper is loaded in the printer, does the L-CASS. LED of the tester light?	YES	Replace the DC controller PCB.
Paper feeder driver PCB (paper feeder paper sensor)			NO	Replace the paper feeder driver PCB.
	11	Are envelopes loaded correctly?	NO	Load the envelopes correctly.
DC controller PCB	12	Connect the printer driver tester to the printer. When an envelope is loaded in to the envelope feeder, does the ENVELOPE SENSOR LED of the tester light?	YES	Replace the DC controller PCB.
Envelope feeder driver PCB (envelope feeder paper sensor)			NO	Replace the envelope feeder driver PCB.

M - 9 "12 PRINTER OPEN" appears even though the printer is closed.

Possible cause	Step	Check	Result	Procedure
upper cover	1	Is the upper cover actuator damaged?	YES	Replace the upper cover.
DC controller PCB	2	Is the voltage between connector J601-6(DOPEN) and J601-10(GND) on the pick-up motor driver PCB zero when the upper cover is closed?	YES	Replace the DC controller PCB.
Pick-up motor driver PCB			NO	Replace the pick-up motor driver PCB.

M - 10 "14 NO TONER CART" appears even though a cartridge is loaded.

Possible cause	Step	Check	Result	Procedure
EP-E cartridge	1	Is the cartridge loaded properly?	NO	Load the cartridge again.
DC controller PCB	2	Turn the printer OFF, connect the printer driver tester, and turn the power back ON. Does the CARTRIDGE SENSOR LED of the tester light for a while after the power is turned ON?	YES	Replace the DC controller PCB.
High-voltage power supply			NO	Replace the high-voltage power supply PCB.

M- 11	" 16 TONER LOW" indicator does not light properly.
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Possible cause	Step	Check	Result	Procedure
EP-E cartridge	1	Shake the cartridge following the instructions, and load it in to the printer. Does the message disappear ?	YES	The toner IS insufficient . Prepare a new cartridge.
High-voltage power supply (high-voltage contacts)	2	Is the toner sensor contact or the developing blas contact of the high-voltage contacts dirty ?	YES	Clean the high-voltage contact .
DC controller PCB	3	Turn the printer OFF, connect the printer driver tester, and turn the power back ON. Does the TONER SENSOR LED of the tester light for a while after the power switch is turned ON.	YES	Replace the DC controller PCB .
High-voltage power supply			NO	Replace the high-voltage power supply PCB.

M - 12	Faulty Pick-up Motor
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Possible cause	Step	Check	Result	Procedure
Connecters	1	Are the connectors (J601, J602) from connector 5201 on the DC controller PCB to connector J701 on the sensor PCB making good contact?	NO	Reattach the connectors
Sensor PCB	2	Are the connectors J701 and 5702 on the sensor PCB properly aligned ?	NO	Replace the sensor PCB .
Pick-up motor	3	About one second after switch is turned ON, do the voltages between the following pairs of terminals on the pick-up motor driver PCB change from about 24 VDC to about 15 VDC? • J602-A1 (PA) and J602-A5 (GND) • J602-B3 (PB) and J602-A5 (GND)	YES	Replace the pick-up motor.
Pick-up motor driver PCB DC controller PCB			NO	Replace the pick-up motor driver PCB . If the problem persists after replacing the PCB, replace the DC controller PCB.

M - 13 | Faulty Paper Feeder Pick-up Motor

Possible cause	Step	Check	Result	Procedure
Connectors	1	Are the connectors (J601, J603, J135, J851) between connector J201 on the DC controller PCB and connector 5852 on the paper feeder driver PCB making good contact?	NO	Reconnect the connectors.
Pick-up motor driver PCB DC controller PCB	2	Does the problem improve when the paper feeder is replaced?	NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.
Paper feeder pick-up motor	3	Place some paper in the lower cassette and perform a test print by using the printer driver tester. After the prescribed time, do the voltages between the following pairs of terminals on the paper feeder driver PCB change from about 24 VDC to about 15 VDC? • J852-1(A) and J851-4 (GND) • J852-3(B) and J851-4 (GND)	YES	Replace the paper feeder pick-up motor.
Paper feeder driver PCB			NO	Replace the paper feeder driver PCB.

M - 14 | Faulty Envelope Feeder Pick-up Motor

Possible cause	Step	Check	Result	Procedure
Connectors	1	Are the connectors (J601, J604, J136, J931) from connector 5201 on the DC controller PCB to connector 5932 on the envelope feeder driver PCB making good contact?	NO	Reconnect the connectors.
Pick-up motor driver PCB DC controller PCB	2	Does the problem improve when the envelope feeder is replaced?	NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.
Envelope feeder pick-up motor	3	Place some envelopes on the envelope feeder and perform a test print by using the printer driver tester. After the prescribed time , do the voltages between the following pairs of terminals on the envelope feeder driver PCB change from about 24 MC to about 15 MC? • J932-1(A) and J931-4 (GND) • J932-3(B) and J932-4(GND)	YES	Replace the envelope feeder pick-up motor.
Envelope feeder driver PCB			NO	Replace the envelope feeder driver PCB.

Note: Before checking the envelope feeder operation, be sure to hold the bottom of the PCB up or tape it to the frame if the **right** cover is removed.

M- 15	No Paper Pick-up from Upper Cassette
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Possible cause	Step	Check	Result	Procedure
Video controller PCB	1	Place some paper in the upper cassette and perform a test print by using the printer driver tester. Is the paper picked up from the cassette?	YES	Replace the video controller PCB.
Pick-up motor	2	Place some paper in the upper cassette and perform a test print by using the printer driver tester. After the prescribed time, does the pick-up motor start running ?	NO	Check by following the steps in M- 12. 'Faulty Pick-up Motor'.
Pick-up motor driver PCB DC controller PCB	3	Place some paper in the upper cassette and perform a test print by using the printer driver tester. After the prescribed time, does the voltage between connectors J602-A3(1ST) and J602-A5 (GND) on the pick-up motor driver PCB change from 0 V to about 1.3 VDC?	NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.
Cassette feed roller clutch solenoid	4	When step 3 is carried out, does the voltage between connectors J704-2 (1STD) and J704-1(24V) on the sensor PCB change from 0 V to about 24 VDC?	YES	Replace the cassette feed roller clutch solenoid.
Sensor PCB			NO	Replace the sensor PCB.

M- 16	No Paper Pick-up from Multi-purpose Tray
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Possible cause	Step	Check	Result	Procedure
Video controller PCB	1	Place some paper on the multi-purpose tray and perform a test print by using the printer driver tester. Is the paper picked up from the tray?	YES	Replace the video controller PCB.
Pick-up motor	2	Place some paper on the multi-purpose tray and perform a test print by using the printer driver tester. After the prescribed time, does the pick-up motor start running ?	NO	Check by following the steps In M-12, " Faulty Pick-up Motor ".
Pick-up motor driver PCB DC controller PCB	3	Place some paper on the multi-purpose tray and perform a test print by using the printer driver tester. After the prescribed time, does the voltage between connectors J602-A2 (MP) and J602-A5 (GND) on the pick-up motor driver PCB change from 0 V to about 1.3 VDC?	NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.
MP tray pick-up roller clutch solenoid	4	When step 3 is carried out, does the voltage between connectors J702-2 (MPD) and J702-1 (24V) on the sensor PCB change from 0 V to about 24 VDC?	YES	Replace the MP tray pick-up roller clutch solenoid.
Sensor PCB			NO	Replace the sensor PCB.

M - 17 | No Paper Pick-up from Lower Cassette |

Possible cause	Step	Check	Result	Procedure
Video controller PCB	1	Place some paper in the lower cassette and perform a test print by using the printer driver tester. Is the paper picked up from the cassette?	YES	Replace the video controller PCB.
Pick-up motor driver PCB DC controller PCB	2	Does the problem disappear when the paper feeder is replaced?	NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.
Pick-up motor	3	Place paper in the lower cassette and perform a test print by using the printer driver tester. After the prescribed time, does the paper feeder pick-up motor start running?	NO	Check by following the step in M- 13. 'Faulty Paper Feeder Pick-up Motor'.
Paper feeder pick-up roller clutch solenoid	4	Place paper in the lower cassette and perform a test print by using the printer driver tester. After the prescribed time, does the voltage between connectors J853-3 (2STD) and J853-1(24V) on the paper feeder driver PCB change from 0 V to about 24 MC?	YES	Replace the paper feeder pick-up roller clutch solenoid.
Paper feeder driver PCB			NO	Replace the paper feeder driver PCB.

M-18 | No Envelope Pick-up from Envelope Feeder |

Possible cause	Step	Check	Result	Procedure
Envelope	1	Are the envelopes curved, or made of special paper?	YES	Change the envelopes.
Video controller PCB	2	Place envelope on the envelope feeder and perform a test print by using the printer driver tester. Is the envelope picked up from the feeder?	YES	Replace the video controller PCB.
Pick-up motor driver PCB DC controller PCB	3	Does the problem disappear when the envelope feeder is replaced?	YES	Check according to M- 14, "Faulty Envelope Feeder Pick-up Motor".
			NO	Replace the pick-up motor driver PCB. If the problem persists after replacing the PCB, replace the DC controller PCB.

M - 19 | Poor Output from High-voltage Power Supply

Possible cause	Step	Check	Result	Procedure
High-voltage contact	1	Is any terminal of the high-voltage connector dirty or carbonized?	YES	Clean the terminals of the high-voltage contact.
High-voltage power supply PCB	2	Does the problem improve when the high-voltage power supply PCB is replaced?	YES	Replace the high-voltage power supply PCB.
DC controller PCB Connector PCB			NO	Replace the DC controller PCB. If the problem persists after replacing the PCB, replace the connector PCB.

M - 20 | Faulty Exhaust Fan

Possible cause	Step	Check	Result	Procedure
Connector	1	Is connector J2 11 on the DC controller PCB making good contact?	NO	Reattach the connector.
Exhaust fan	2	Detouch connector 5211 on the DC controller PCB. Immediately after the power is turned ON, does the voltage between connectors J211-1 (FAND) and J2 1 1-3 (GND) on the DC controller PCB change from 0 V to about 23.8 VDC. then to about 21.2 VDC?	YES	Replace the exhaust fan.
DC controller PCB			NO	Replace the DC controller PCB.

M - 21 | Laser Malfunction

Possible cause	Step	Check	Result	Procedure
laser/scanner unit DC controller PCB	1	_____	_____	Check by using the laser malfunction diagnostic flowchart in Section III C.

M - 22 "5F-50 SERVICE" Message

Possible cause	Step	Check	Result	Procedure
connector	1	Are connector 5210 on the DC controller PCB and connectors 5741 and 5743 on the connector PCB making good contact?	NO	Reattach the connectors.
Broken thermistor wire	2	Remove the fixing unit and measure the resistance between connectors J743-6 and J743-7 . Is the resistance 180 to 280 kΩ (at room temperature)?	NO	Check the wiring from connector 5213 on the DC controller PCB to the thermistor. If wiring is proper, replace the thermistor.
Fixing roller heater thermoswitch	3	Remove the fixing unit . Is there continuity between connector 5743-1 and J743-8 on the fixing unit ?	NO	Check continuity in the fixing roller heater and thermoswitch individually. Replace any defective parts .
DC controller PCB	4	Open the delivery cover and let the fixing roller cool. Close the cover and switch the power ON. Is the voltage between connectors J215-1(/FSRD) and TB201-6 (GND) on the DC controller PCB initially about 5.1 VDC, and does It change to about 1.5 VDC as the fixing roller warms up?	NO	Replace the DC controller PCB.
Power supply	5	Switch the power ON. Is the voltage between connectors J215-2(RLD) and TB201-6(GND) on the DC controller PCB about 5 VDC?	YES	Replace the power supply.
DC controller PCB			NO	Replace the DC controller PCB.

M - 23 "5F-5 1 SERVICE" Message

Possible cause	Step	Check	Result	Procedure
Laser/scanner unit DC controller PCB	1	Are connectors J208 and 5209 on the DC controller PCB making good contact?	YES	Check by using the laser malfunction diagnostic flowchart in Section III C.
Connector			NO	Reattach the connectors .

M - 24 “SF-52 SERVICE” Message

Possible cause	Step	Check	Result	Procedure
Connector	1	Is connector 5208 on the DC controller PCB making good contact?	NO	Reconnect the connector.
Power supply	2	Does the voltage between connectors J208-6 (24VA) and J208-4 (GND) on the DC controller PCB become about 24 VDC?	NO	Check whether +24 VDC is present between connectors TB20 1-4 (24VA) and TB201-7 (GND) on the DC controller PCB. If It is not, replace the power supply.
Laser/scanner unit	3	Perform a test print. Does the voltage between connectors J208-7 (/SCNON) and J208-4 (GND) on the DC controller PCB change from about 5 VDC to 0 V?	YES	Replace the laser/scanner unit.
DC controller PCB			NO	Replace the DC controller PCB.

M - 25 “SF-54 SERVICE” Message

Possible cause	Step	Check	Result	Procedure
Connectors	1	Are connector J2 14 on the DC controller PCB and connector 5131 of the main motor making good contact?	NO	Reconnect the connectors.
Pick-up motor driver PCB	2	Door switch (SW601) on the pick-up motor driver is turned ON. Is there continuity between connector J201-8 (+24VB) and J201-12 (+24VA) on the DC controller PCB?	NO	Replace the pick-up motor driver PCB.
Main motor	3	About one second after the power switch is turned ON, does the voltage between connectors J214- 1 (/MON) and J214-4 (GND) change from about 5.8 VDC to 0 V?	YES	Replace the main motor.
DC controller PCB			NO	Replace the DC controller PCB.

VI. PAPER TRANSPORT TROUBLESHOOTING

A. Print Paper Jams

Paper passes through two major sections in the printer: (1) the pick-up section and (2) the fixing and delivery section. The following explains how to troubleshoot jams in each of these sections.

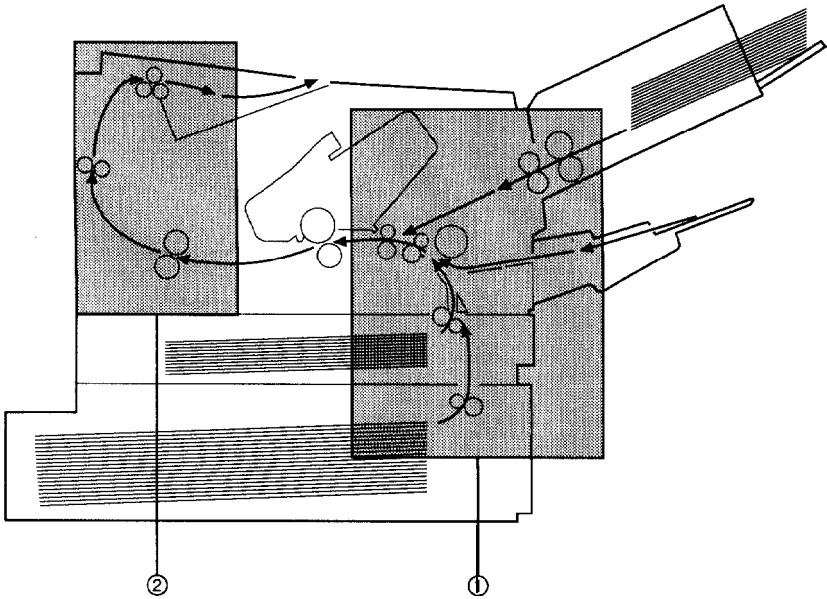


Figure 6-10

- 1: Pick-up section
- 2: Fixing and delivery section

T - 1	Pick-up section
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Possible cause	Step	Check	Result	Procedure
Print paper	1	Is the recommended paper being used ?	NO	Advise the user to only use the recommended paper.
	2	Is the paper curled or wrinkled?	YES	Replace the paper. Advise the customer on how to store the paper.
	3	Does this problem occur with the cassette feed?	YES	Proceed to step 8.
	4	Does this problem occur when feeding from the envelope feeder?	YES	Proceed to step 13.
Print paper loaded incorrectly on the multi-purpose tray	5	Does the left leading edge of the print paper touching the end of the multi-purpose tray?	NO	Load the paper correctly into the multi-purpose tray.
Too much paper on the multi-purpose tray	6	Is the multi-purpose tray overloaded?	YES	Advise the user not to load the excessive amount of paper.
Pick-up roller Pick-up failure	7	Does the pick-up roller rotate when printing is performed?	YES	Replace the roller.
			NO	Check by following the step in M-16, "No Paper Pick-up from Multi-purpose Tray".
Cassette	8	Is the cassette positioned correctly In the printer or the paper feeder ?	NO	Position the cassette correctly.
Paper loaded incorrectly in the cassette	9	Is the paper touching the cassette hook properly ?	NO	Load the paper correctly.
Paper	10	Is the paper folded?	YES	Replace the paper.
Too much paper in cassette	11	Is the cassette overloaded?	YES	Advise the user not to load the excessive amount of paper.
cassette pick-up rollers	12	Are the cassette pick-up rollers worn or deformed?	YES	Replace the rollers.
Pick-up failure			NO	Check by following the steps in M- 15 "No Paper Pick-up from Upper Cassette". or in M-17. "No Paper Pick-up from Lower Cassette".

Possible cause	Step	Check	Result	Procedure
Envelope	13	Are the proper envelopes being used In the envelope feeder 7	NO	Advise the user to only use the recommended envelopes.
Number of envelopes	14	Are there too many envelopes In the envelope feeder 7	YES	Advise the user not to load number of envelopes.
Envelope guide	15	Is the envelope guide exerting excess pressure on the envelopes?	YES	Inform the customer not to set the envelope guide too tightly against the envelopes.
Pick-up roller Separation roller	16	Are any rollers worn or deformed?	YES	Replace defective rollers.
Pick-up error			NO	Check in the same manner as for M- 18 "No Envelope Pick-Up from Envelope Feeder".

T - 2	Fixing and delivery section
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Possible cause	Step	Check	Result	Procedure
Entrance guide	1	Is the entrance guide dirty? Is the guide damaged or is there toner on it?	YES	Clean the guide.
Delivery guide	2	Is the delivery guide dirty? Is the guide damaged or is there toner on it?	YES	Clean the guide.
Lower fixing roller	3	Is the lower fixing roller dirty?	YES	Clean the roller.
Paper sensor arm	4	Does the sensor arm (fixing unit side, printer side) move smoothly?	YES	Check the movement of the delivery roller.
Delivery roller			NO	Adjust the roller to move smoothly.

B. Incomplete Paper Feed**T - 1 | Sheets stuck together**

Possible cause	Step	Check	Result	Procedure
Paper Envelope	1	Is the recommended paper or envelope being used?	NO	Advise the user to only use the recommended paper.
	2	Does the problem occur in the multi-purpose tray ?	YES	Proceed to step 4 and subsequent step .
cassette	3	Is the paper positioned correctly under the hold-down tabs?	YES	Check whether the hold-down tabs are bent.
			NO	Load paper correctly.
Separation pad	4	Is the surface of the separation pad worn ?	YES	Replace the separation pad.
Pressure	5	Does the problem disappear when the spring for the separation pad is replaced .	YES	Replace the spring.
			NO	Replace the sub-pad.

T-2 | Wrinkles

Possible cause	Step	Check	Result	Procedure
Print paper	1	Is the recommended paper being used?	NO	Advise the user to only use the recommended paper.
	2	Does the paper stop becoming tinkled when new paper is used?	YES	Advise the customer on how to store the paper to prevent it becoming damp.
Pick-up unit	3	Open the printer while a sheet of paper is passing through the feeder unit after pick-up. Is the paper wrinkled at this point ? Is the paper skewed?	YES	Check the pick-up unit.
Entrance guide	4	Is the entrance guide dirty ?	YES	Clean the guide.
Fixing unit	5	Is the lower fixing roller dirty?.	YES	Clean the roller.
			NO	Replace the fixing unit.

T - 3 | Bend of paper leading edge

Possible cause	Step	Check	Result	Procedure
Print paper Envelope	1	Is the recommended paper being used?	NO	Advise the user to only use the recommended paper.
	2	Is the paper or envelope curled or deformed?	YES	Replace the paper or envelope. Advise the user on proper storage method.
Too much paper in the paper source	3	Is the paper source overloaded?	YES	Advise the user not to load the excessive amount of paper.
Paper loaded incorrectly in the cassette	4	Is the paper touching the cassette hook properly?	YES	Load the paper correctly.
Cassette hook	5	Is the cassette hook deformed?	YES	Replace the cassette hook.
			NO	Check whether the paper is damaged in the paper feed area. If it is, replace it.

T - 4 | Skewing

Possible cause	Step	Check	Result	Procedure
Print paper Envelope	1	Is the recommended paper being used?	NO	Advise the user to only use the recommended paper.
Cassette	2	Is the cassette set properly?	NO	Set it properly.
Too much paper in the paper source	3	Is the paper source overloaded?	YES	Advise the user not to load the excessive amount of paper.
Paper loaded incorrectly	4	Is the paper touching the cassette hook properly?	NO	Load the paper correctly.
	5	Does the left leading edge of the paper touch the end of the multi-purpose tray?	NO	Load the paper correctly.
Cassette hook	6	Is the cassette hook deformed?	YES	Replace the cassette hook.
Paper dust, trash	7	Has paper dust or trash collected on the oblique roller or feed guide?	YES	Remove the paper dust or trash.
Oblique roller			NO	Check the oblique roller. Replace it if it is damaged or deformed.

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VII. LOCATION OF ELECTRICAL PARTS/FUNCTION

A. Switches

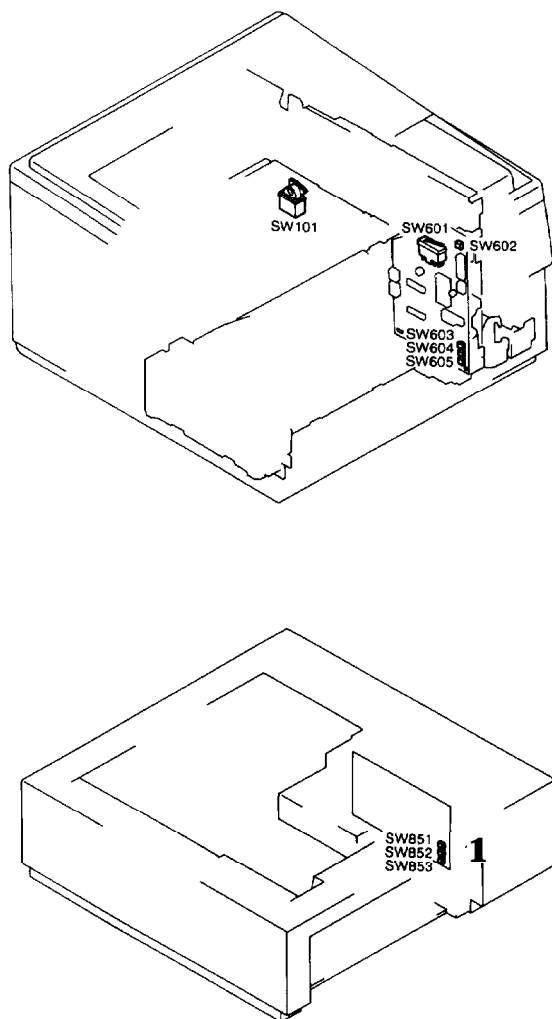



Figure 6-11

Table 6-5

Symbol	Name	Symbol	Function
	Switch	SW101	Power switch
		SW601	Detects when door is open and cuts off the +24VB output
		SW602	Test print switch
		SW603	Upper cassette size-sensing switch 1
		SW604	Upper cassette size-sensing switch 2
		SW605	Upper cassette size-sensing switch 3
		SW651	Lower cassette size-sensing switch 1 (paper feeder)
		SW652	Lower cassette size-sensing switch 2 (paper feeder)
		SW653	Lower cassette size-sensing switch 3 (paper feeder)

B. Sensors and Solenoids

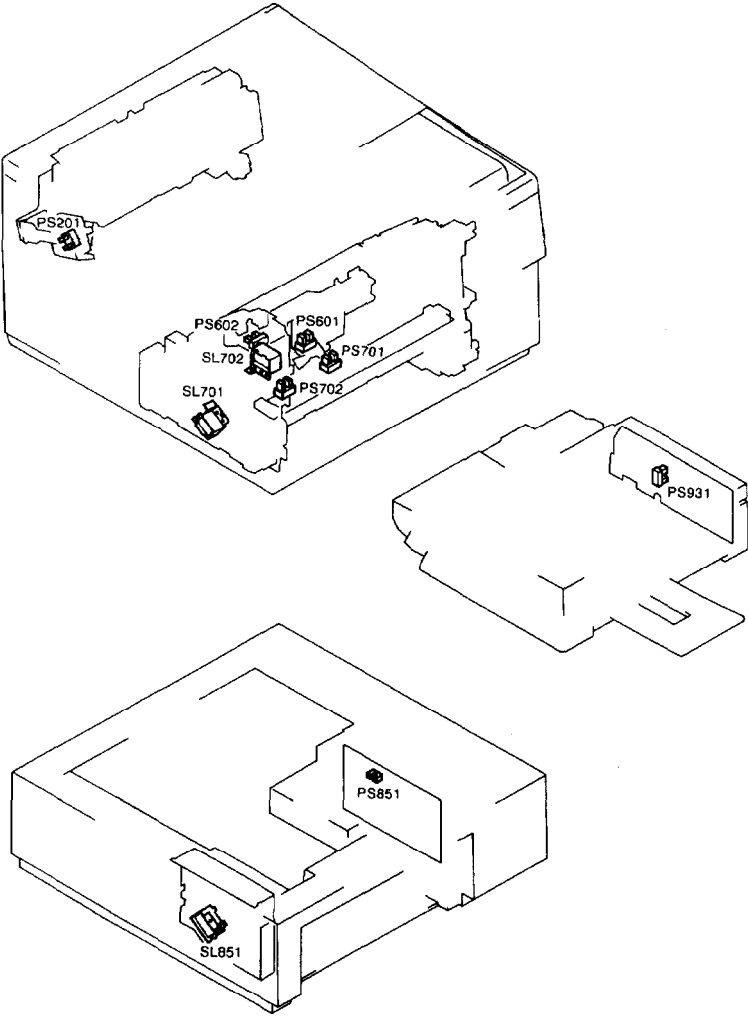




Figure 6-12

Table 6-6

Symbol	Name	Symbol	Function
	Photointerrupter	PS201	Delivery paper sensor
		PS601	cassette paper sensor
	Solenoid	PS602	Regist paper sensor
		PS701	Multi-purpose tray paper end sensor
		PS702	Multi-purpose tray paper sensor
		PS851	Paper feeder paper sensor (paper feeder)
		PS931	Envelope feeder paper sensor (envelope feeder)
		SL701	Cassette pick-up roller clutch solenoid
		SL702	Multi-purpose tray pick-up roller clutch solenoid
		SL651	Paper feeder pick-up roller clutch solenoid (paper feeder)

C. Motors and Others

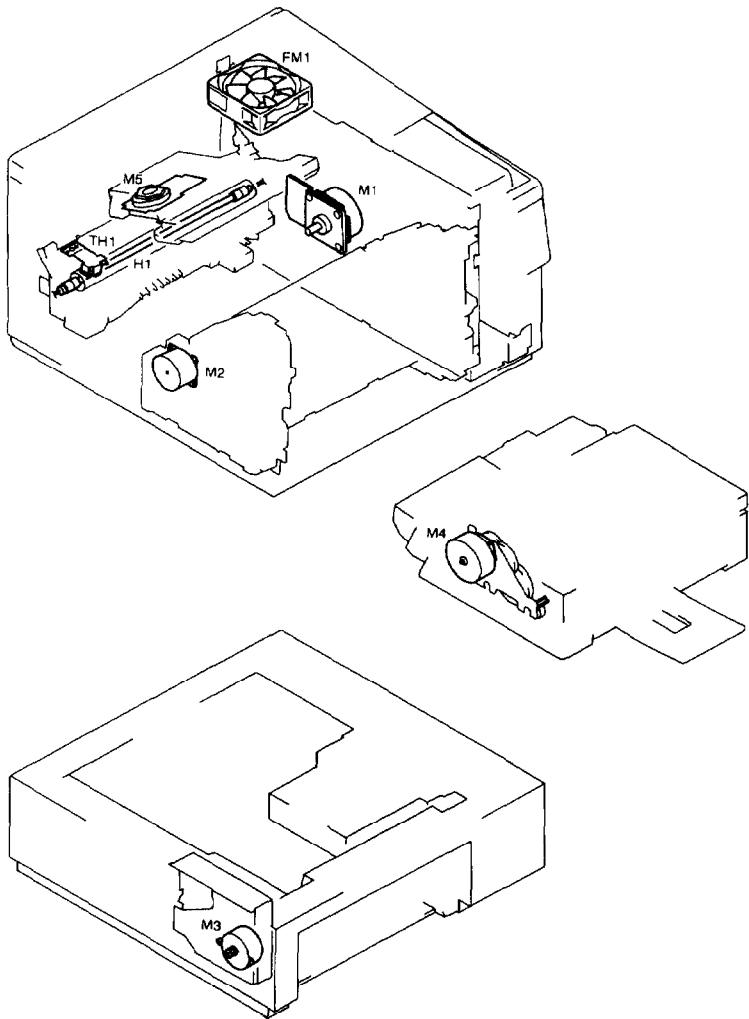






Figure 6-13

Table 6-7

Symbol	Name	Symbol	Function
	Motor	M1	Drives the photosensitive drum and feed rollers
		M2	Drives the paper pick-up rollers
		M3	Drives the paper feeder pick-up rollers (paper feeder)
		M4	Drives the envelope feeder pick-up rollers (envelope feeder)
		M5	Drives the scanning mirror
	Fan motor	FM1	Exhaust fan
	Fixing roller heater	H1	Heats the upper fixing roller
	Thermistor	TH1	Detects the upper fixing roller surface temperature

D. PC Boards

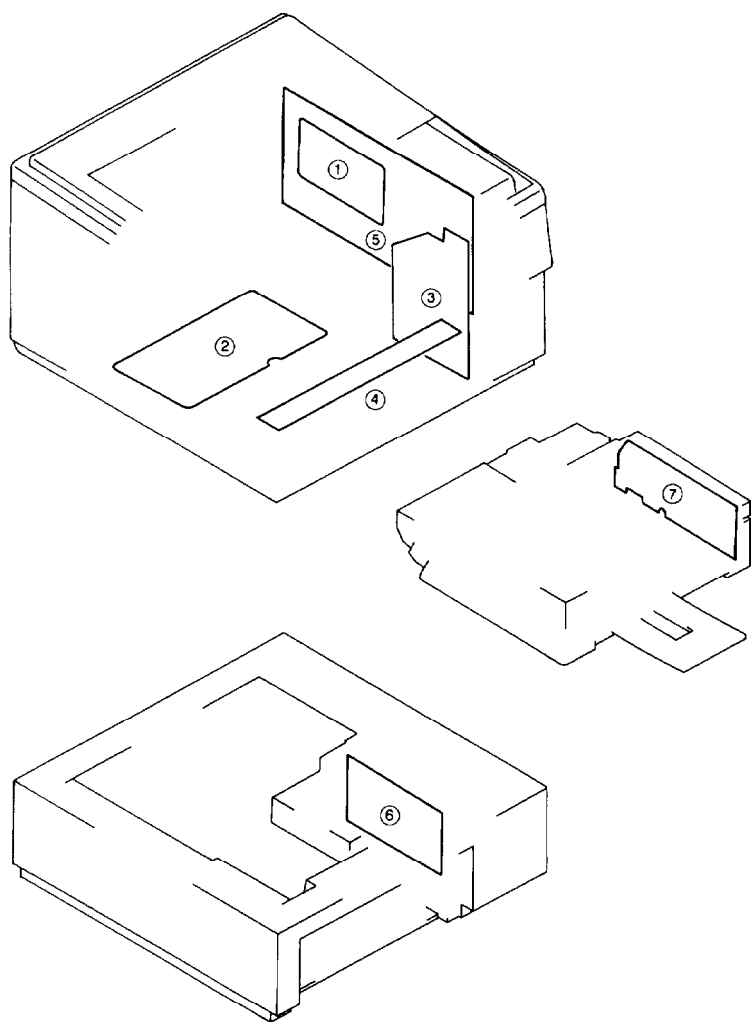


Figure 6-14

Table 6-8

No.	Name	Function
1	DC controller PCB	Controls the printing sequence
2	High-voltage power supply PCB	Applies high voltage to the primary and transfer charging rollers and the developing cylinder
3	Pick-up motor driver PCB	Drives the motors and the solenoids
4	Sensor PCB	Relays signals between the sensors, solenoids, motors, and pick-up motor driver PCB
5	Video controller PCB	Processes I/O between the printer and the external device, and various data.
6	Paper feeder driver PCB	Drives the paper feeder clutch and the motor (paper feeder)
7	Envelope feeder driver PCB	Drives the envelope feeder motor (envelope feeder)

E. Connectors

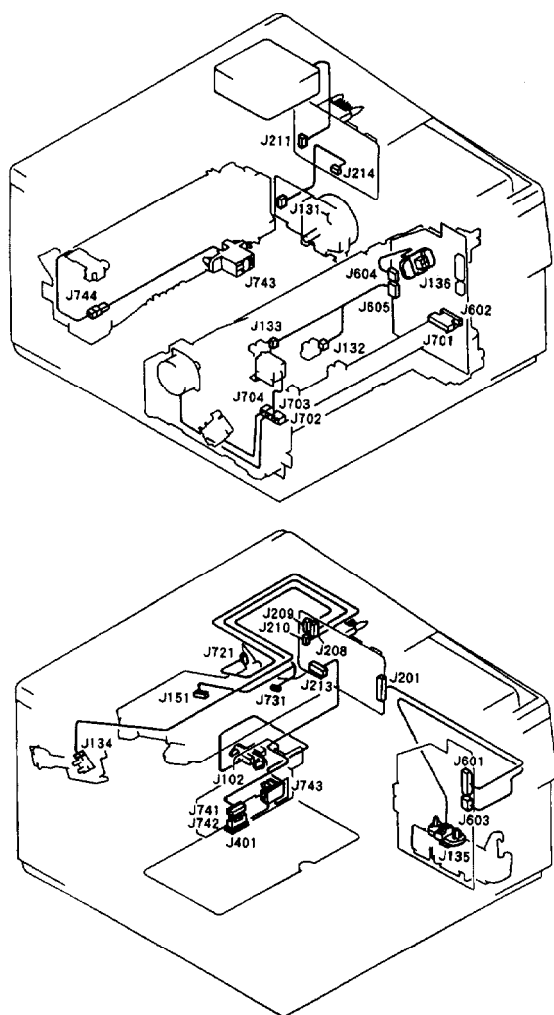
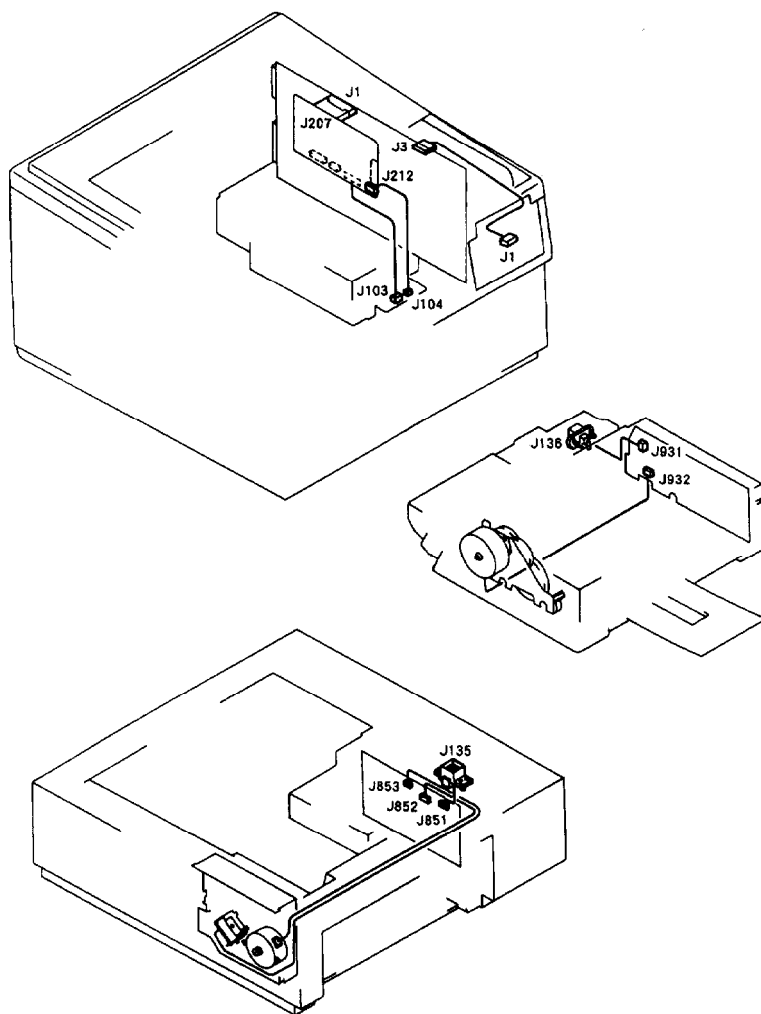




Figure 6-15

**Figure 6-16**

VIII. VARIABLE RESISTORS, LEDS, TEST PINS, JUMPERS, AND SWITCHES ON PC BOARDS

Variable resistors, LED indicators, test pins, jumpers, and switches that are utilized of when servicing are listed below.
Any variable resistors, test pins, etc.. not listed below are for factory use only: they require special tools and measuring instruments, and must be set with high precision. Do not touch them when servicing.

- Notes: 1. Some LEDs receive leakage current during normal operation, causing them to glow dimly when they should be OFF.
2. Variable resistors that may be adjusted when servicing are marked 
Variable resistors that may not be adjusted when servicing are marked ... 

A. DC Controller PCB

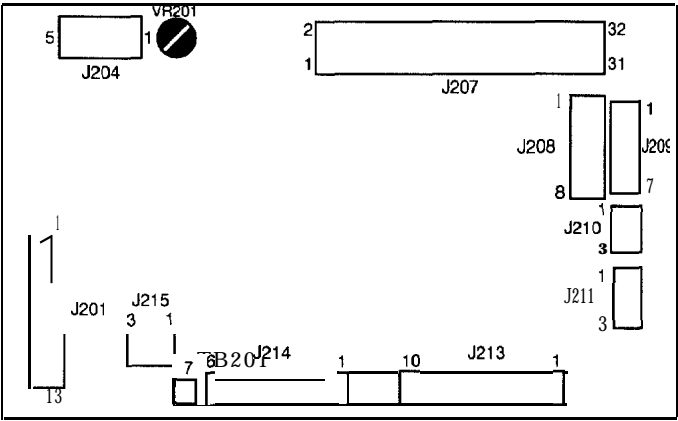


Figure 6-17

Table 6-9

VR No.	Function
VR202	Adjusting leading-edge registration

B. High-voltage Power Supply PCB



Figure 6-18

Table 6- 10

VR No.	Function
VR401	For factory use

C. Pick-up Motor Driver PCB

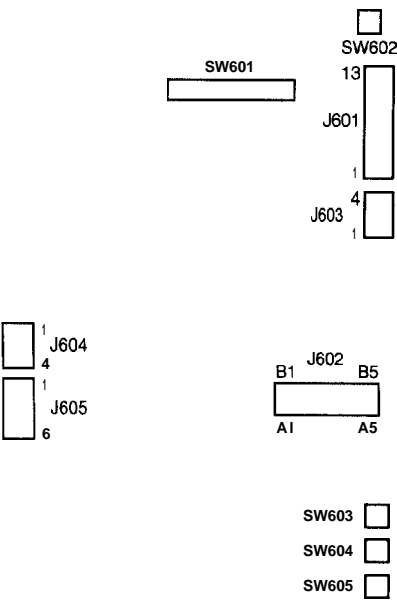


Table 6- 11

SW No.	Function
SW601	Door sensing switch
SW602	Test print switch
SW603	Cassette size sensing switch (See page 2-28 .)
SW604	
SW605	

Figure 6-19

D. Paper Feeder Driver PCB

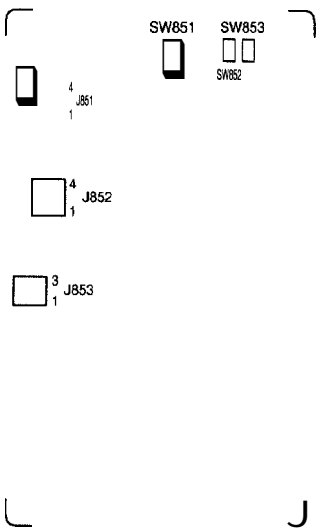


Table 6-12

SW No.	Function
SW851	Cassette size sensing switch (See page 2-28 .)
SW852	
SW853	

Figure 6-20

APPENDIX

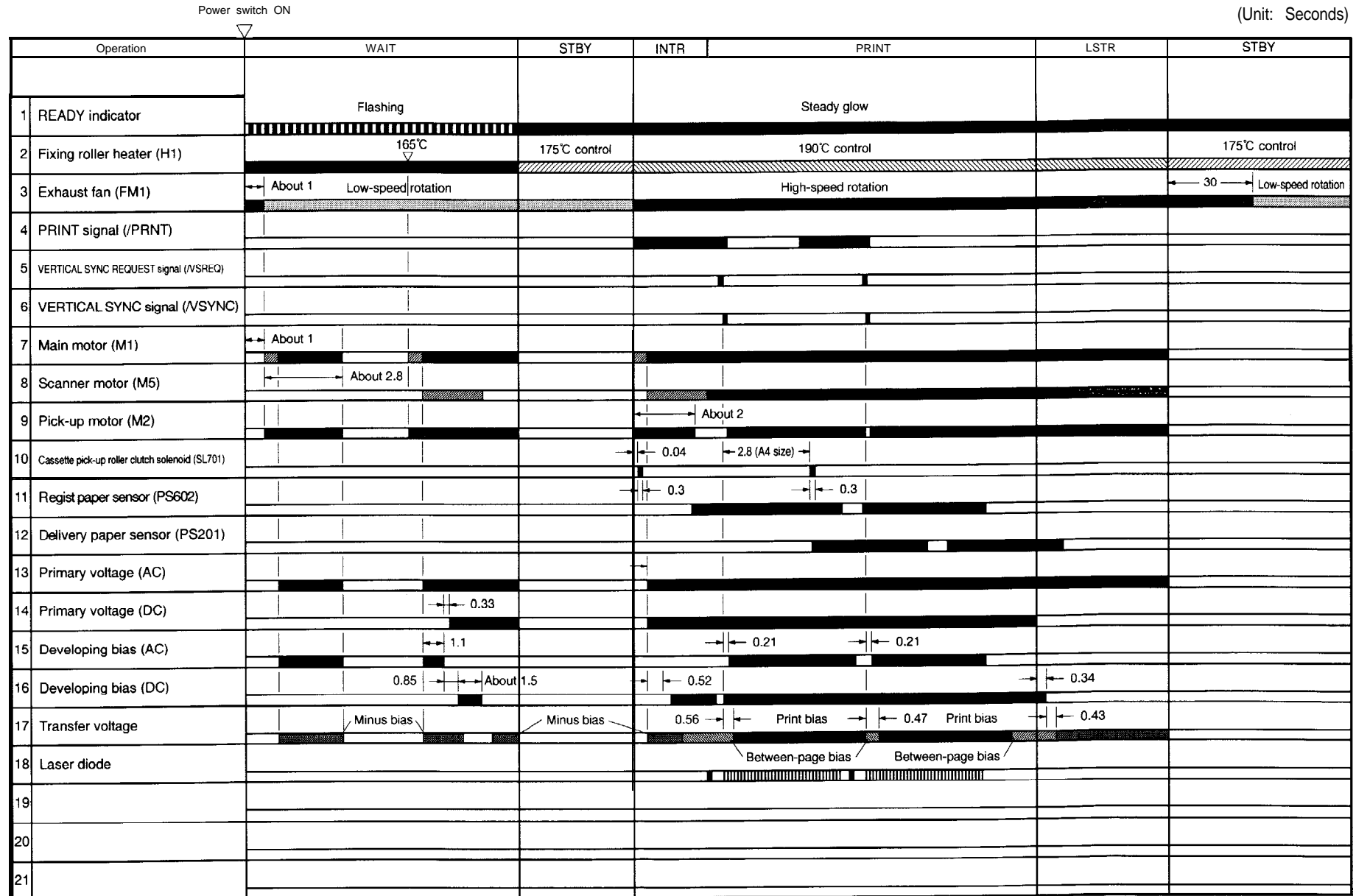
I. GENERAL TIMING CHART	A-1
II. LIST OF SIGNALS	A-3
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. Timing chart for two consecutive prints on A4 paper (Upper cassette feed)

I. GENERAL TIMING CHART

(Unit: Seconds)



II. LIST OF SIGNALS

A.DC controller

Abbreviation	Name
APCIN	AUTOMATIC POWER CONTROL INPUT signal (analog)
APCOUT	AUTOMATIC POWER CONTROL OUTPUT signal (analog)
/BD	BEAM DETECTION (Horizontal sync pulse) signal
/BDI	BD INPUT signal
/CBSY	COMMAND BUSY signal
/CCLK	CONTROLLER CLOCK signal
/CMD	COMMAND signal
/CPRDY	CONTROLLER POWER READY signal
DOPEN	DOOR OPEN DETECT signal
/ENBL	VIDEO DATA ENABLE signal
FAND	EXHAUST FAN DRIVE signal
FLOCK	EXHAUST FAN LOCK DETECT signal
/FSRD	FIXING ROLLER HEATER DRIVE signal
FSRTH	FIXING ROLLER SURFACE TEMPERATURE signal
HVRST	HVT RESET signal
/LON	FORCIBLE LASER ON signal
/MON	MAIN MOTOR DRNE signal
/MRDY	MAIN MOTOR READY signal
/PCLK	PRINTER CLOCK signal
/PPRDY	PRINTER POWER READY signal
/PRNT	PRINT signal
PSNS	DELIVERY PAPER SENSOR signal
/RDY	READY signal
RLD	RELAY DRIVE signal
SCNCLK	SCANNER REFERENCE CLOCK signal
/SCNON	SCANNER MOTOR DRIVE signal
/SCNRDY	SCANNER MOTOR READY signal
/SBSY	STATUS BUSY signal
/STS	STATUS signal
SLI1	INPUT SERIAL LINE 1
SLIP	INPUT SERIAL LINE 2
SW 1	OUTPUT SERIAL LINE 1
SLO2	OUTPUT SERIAL LINE 2
THOUT	THERMOSWITCH MONITOR signal
TVIN	HVT MONITOR signal
/TVOUT	CONSTANT VOLTAGE OUTPUT signal
/VDATA	LASER DRIVE signal

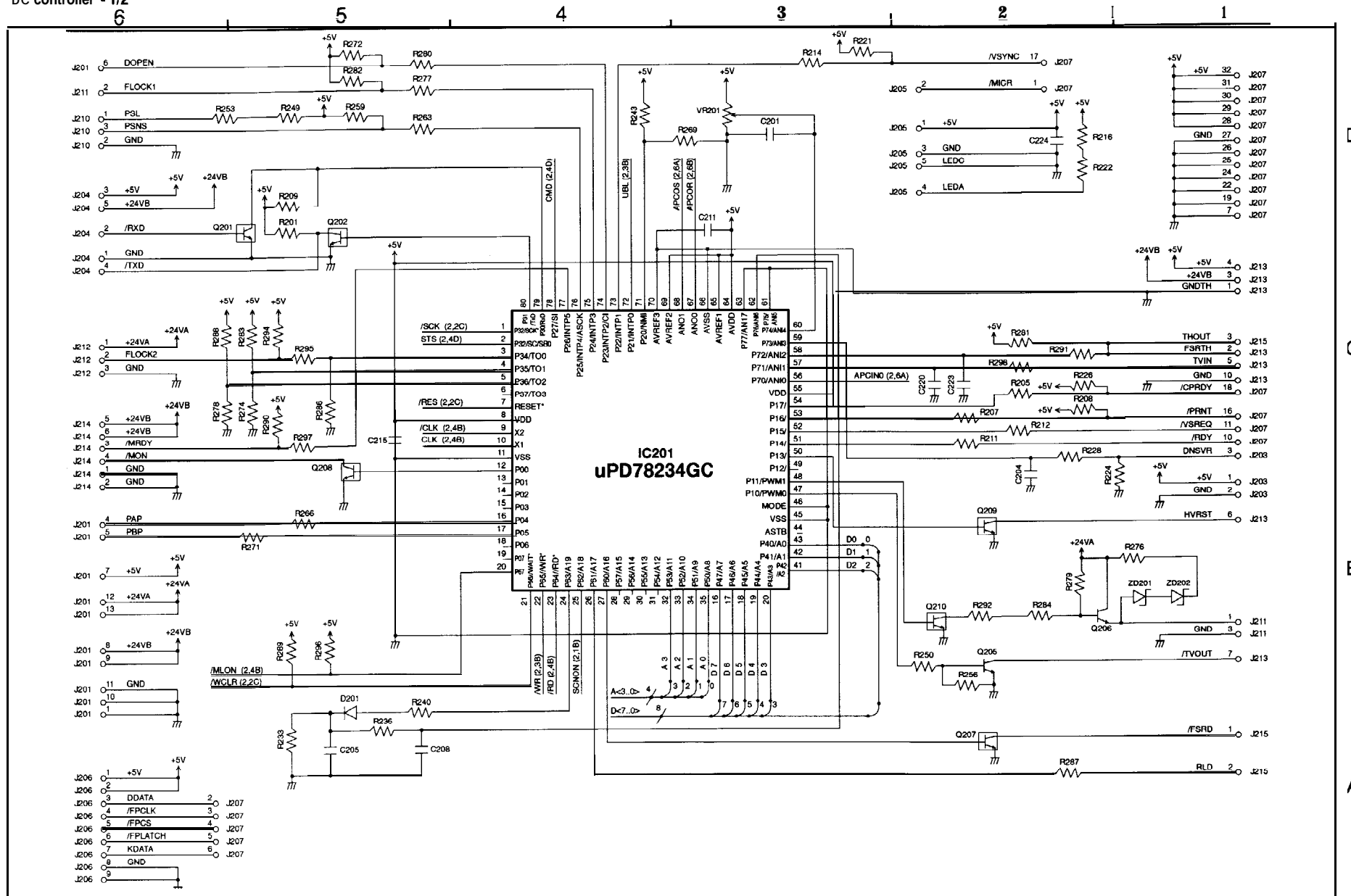
Abbreviation	Name
/VDO	VIDEO signal
/VSREQ	VERTICAL SYNC REQUEST signal
/VSYNC	VERTICAL SYNC signal

6 | **5** | **4** | **3** | **2** |



IV. DC CONTROLLER

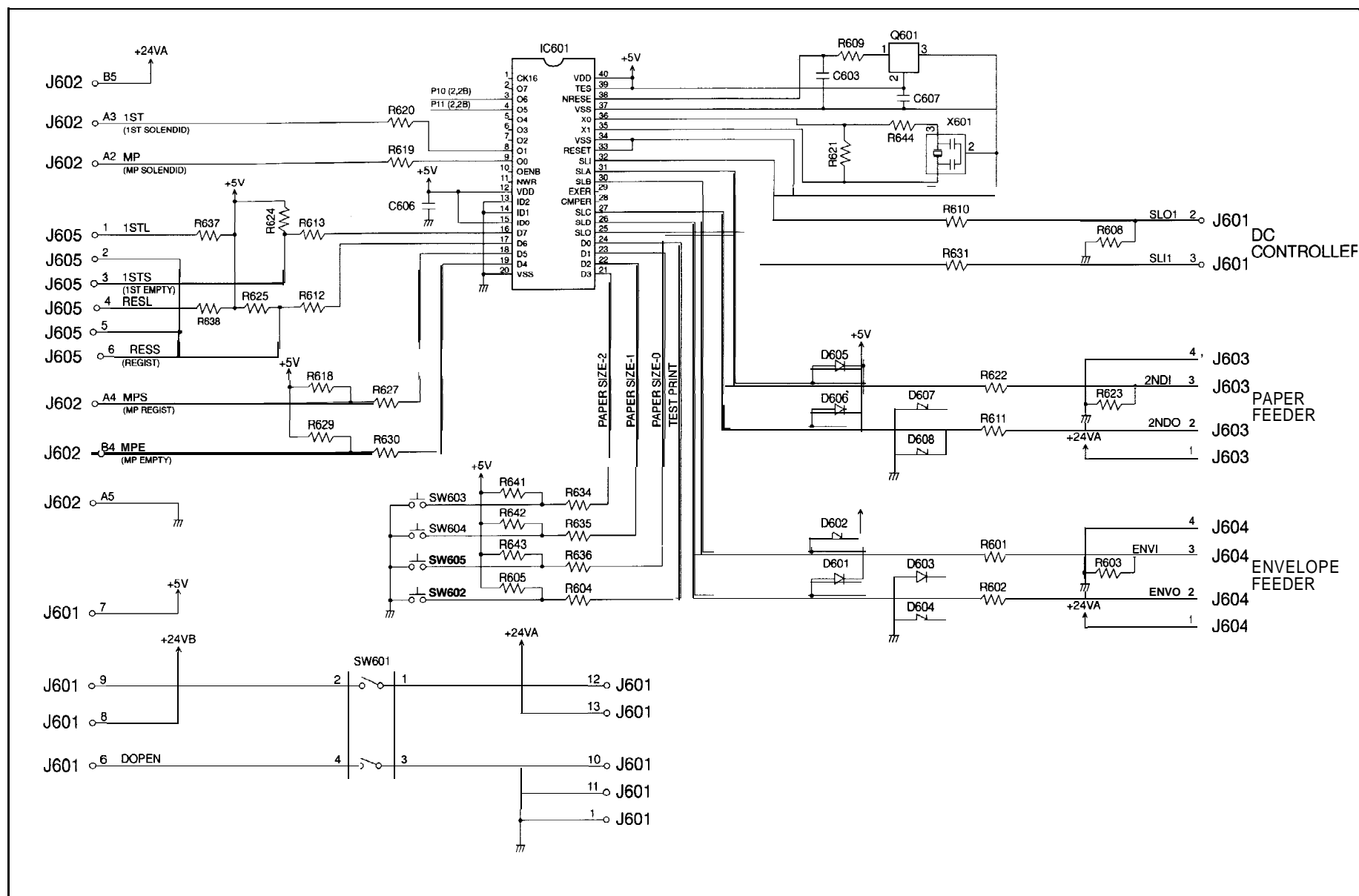
DC controller - 1/2

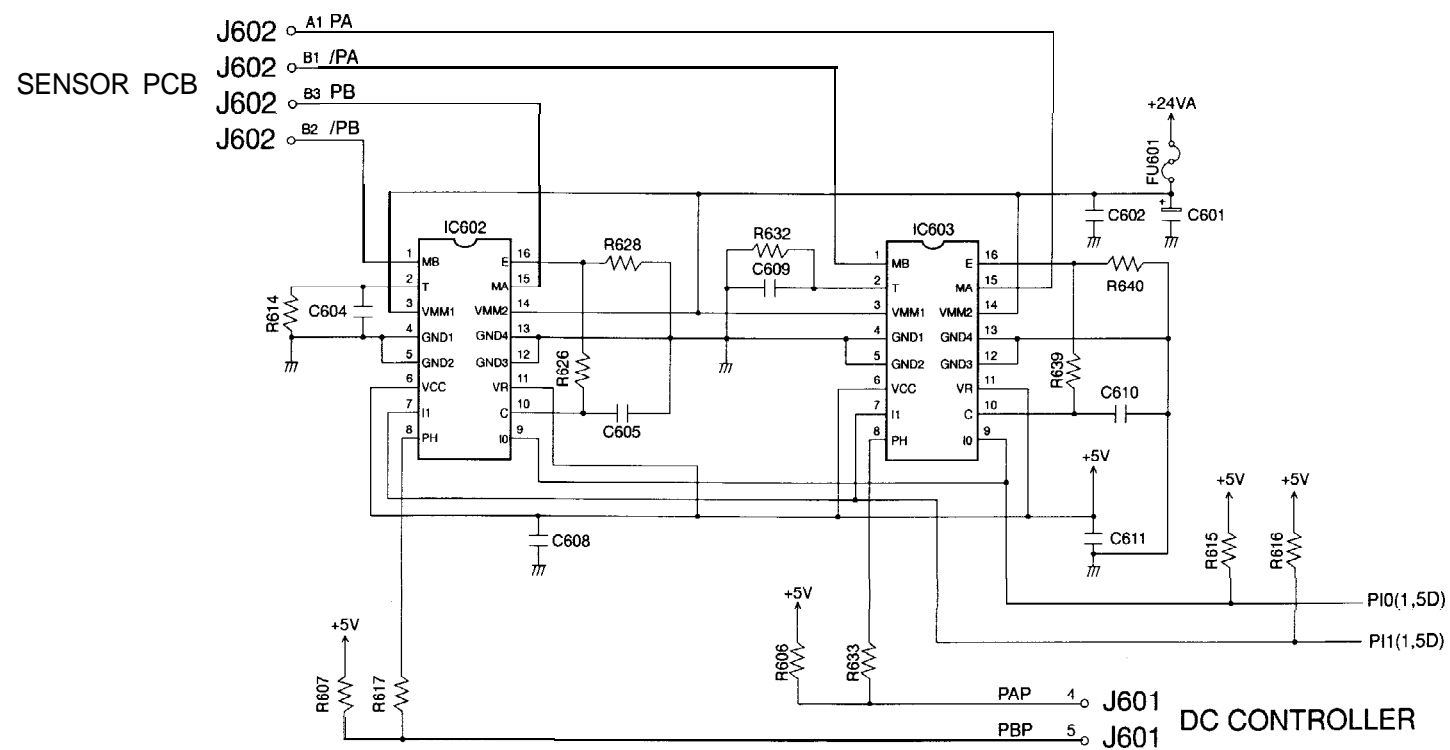




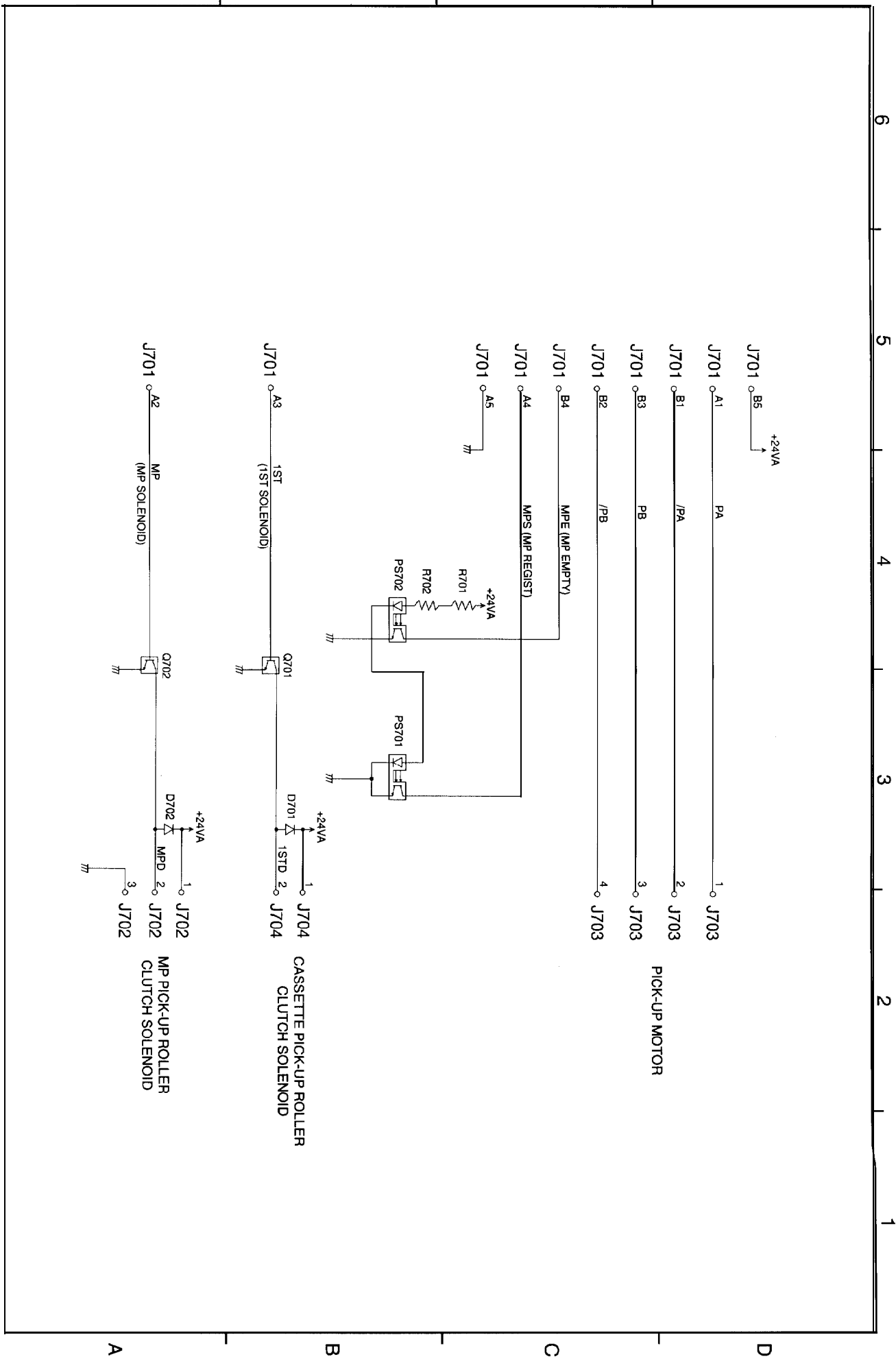
V. PICK-UP MOTOR DRIVER

Pick-up motor driver - 1/2

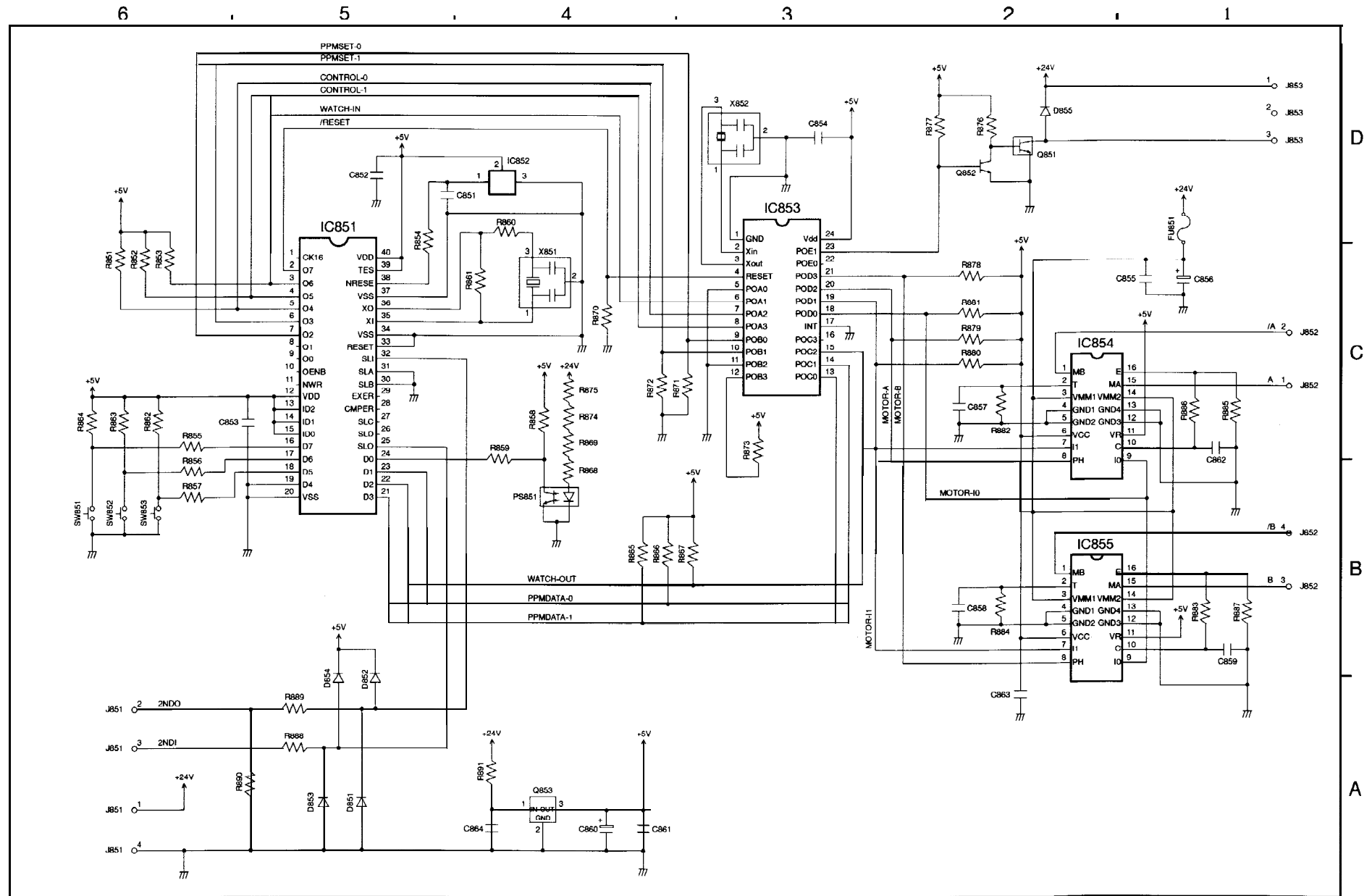




VI. SENSOR CIRCUIT



VII. PAPER FEEDER DRIVER



VIII. ENVELOPE FEEDER DRIVER

