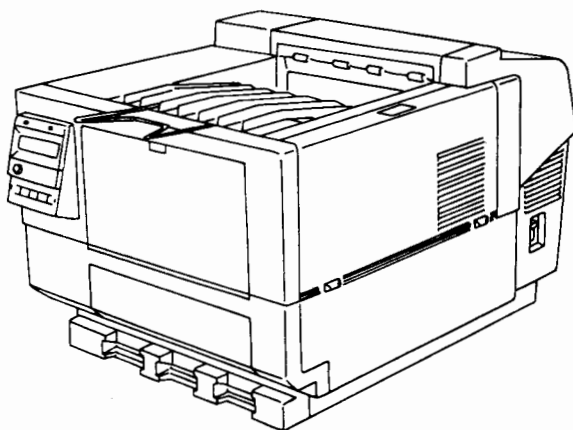


# **RX7200**

## **Page Printer**

### **User's Manual**



**RX7200**  
48FH5056E-01



# **Federal Communications Commission Radio Frequency Interference Statement for United States Users**

This equipment generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been type-tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate this equipment with respect to the receiver.
- Move this equipment away from the receiver.
- Plug this equipment into a different outlet so that this equipment and the receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to identify and Resolve Radio-TV Interference Problems."

This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-000345-4.

(This equipment has been tested as M3716 of the model number.)

## **NOTES:**

1. The use of a non-shielded interface cable with the referenced device is prohibited. The length of the interface cable must not exceed 3 m.
2. The length of the power cord must not exceed 3m.

## **Notice for German Users**

Dieses Gerät entspricht als Einzelgerät den Funkentstörungsanforderungen der Postverfügung Nr. 1046/1984 bzw. der Grenzfläche B nach VDE 0871 6.78.  
Das Kabel muß abgeschirmt und unter 3 Meter lang sein.



## Notice for Canadian Users

This digital apparatus does not exceed the class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.



## **NOTICE**

The contents of this manual may be revised without prior notice without any obligation to incorporate changes and improvements into units previously shipped.

Every effort has been made to ensure that the information included here is complete and accurate at the time of publication, but Fujitsu cannot be held responsible for errors and omissions.

48FH5056E-01 September, 1989

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## PREFACE

This manual explains how to set up, install, and operate the Fujitsu RX7200 Page Printer including optional features. It also contains information about basic maintenance but does not include detailed descriptions of commands.

This manual is for the non-technical user for word processing, graphics, or desktop publishing.

This document contains technology relating to strategic products controlled by export control laws of the producing and/or exporting countries. This document or a portion thereof should not be exported (or reexported) without authorization from the appropriate governmental authorities in accordance with such laws.

FUJITSU LIMITED



## HOW TO USE THIS MANUAL

This manual can be used as both a tutorial for the novice and as a reference for the more experienced user. New users should read the entire manual before using this printer. Those who are familiar with this type of printer need only read those parts that describe functions and operations specific to this printer. The first section contains an outline. Keep this manual nearby for easy reference.

### Organization of the Manual

The following is an outline of the manual. Appendixes contain reference tables, specifications, and information on options.

**Section 1** introduces the printer and the printing process, printer components, and printer handling.

**Section 2** provides step-by-step procedures, from unpacking the printer to connecting it to the computer. These include unpacking, checking components, checking the printer location and environment, installing components, loading paper, connecting the interface, and printing test pages.

**Section 3** provides more experienced users with procedures for quickly defining the printer's features in the host environment. It explains use of the control panel buttons, what the indicators mean, and how setup is done.

**Section 4** describes printing preparations such as paper handling, page formatting, and choosing an emulation, character set, and font style.

**Section 5** describes routine maintenance for the printer and the procedures for replacing consumables such as the toner cartridge. It also includes how to repack the printer.

**Section 6** provides basic troubleshooting for minor hardware and other errors. Lists control panel error messages and procedures for recovery.



The appendixes provide information on printer specifications, command sets, interface information, code conversion table, character set table, font table, operation overview, label information, options and supplies, and notes on software application.

The glossary explains terms used in this manual.

## **References**

For additional information, documents, and copies, contact your dealer or an authorized Fujitsu representative.

## **Description Format**

Illustrations pertaining to explanations or procedures are on the same page or the facing page for easy reference.

Procedures are divided into numbered steps.

Notes, cautions, and warnings are enclosed in boxes. Notes include remarks, exceptions, and other useful information. Cautions point out potential problems areas that may cause damage to the printer. Warnings point out situations that may be harmful to the user.

We hope you will find this manual helpful and that you will be able to use your printer to full advantage.



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**Appendixes  
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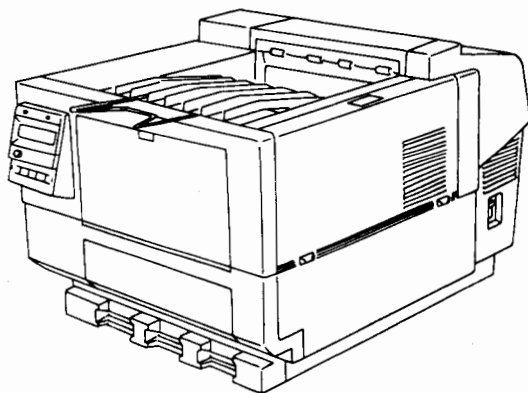


## SECTION 1 INTRODUCTION

Congratulations on purchasing this high-quality page printer.

You have made a wise selection. Your printer will provide years of reliable and versatile printing, ideal for all office applications.

This page printer is a compact electrophotographic page printer using a laser diode for the light source.



**RX7200 Page Printer**



## Printing Process

The printing process of this printer is similar to most electrophotographic copiers except that the image source is data from the host computer instead of reflection from the original document.

To print a document, the host computer translates the document page by page and sends the translated print code to your printer.

The printer's controller converts the code into bit image data. The image data is changed to light patterns by the laser diode and lens, to produce latent electrostatic charge patterns on the organic photoconductive drum.

The developing unit distributes charged black powder, called toner, onto the organic photoconductive drum. The toner adheres to the discharged areas and produces a visible image on the organic photoconductive drum.

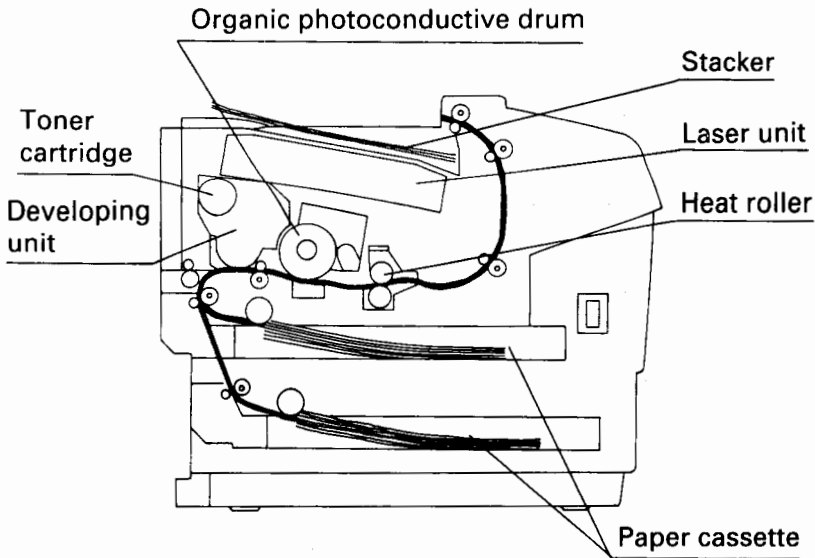


Paper fed from a paper cassette is given a polarity charge opposite to that of the toner while being pressed against the drum to transfer the toner to the paper. The heat roller melts the toner into the permanent image on the paper.

The cleaner wipes off any remaining toner from the organic photoconductive drum so the drum can be used for the next part of the image.

A full printed page is completed when the organic photoconductive drum rotates one page length. The printed paper is then fed out to the stacker. The bold line in the figure below is the paper path.

See **Appendix G** for a more detailed explanation of the printing process.



**Paper Path**



## Printer Features

Up to ten thousand sheets per month with a resolution of 300 x 300 dots per inch can be printed. The printing speed is twelve pages per minute. Several copies of a specified page can be printed by using the image data stored in memory.

The paper cassette holds up to 250 sheets of paper. Paper sizes A4, B5, letter, and legal (182 to 216 mm wide) can be used in the cassette.

Fonts (character style) can be selected from many resident fonts and optional plug-in card fonts. The printer is software-compatible with a wide variety of emulations: The resident HP LaserJet Series II, Diablo 630 ECS, IBM Proprinter XL, and Epson FX-85.

This printer consists of two main parts, the controller and engine (printing mechanism) connected through the video interface. The controller is user-removable to enable memory expansion. The mechanism is compact and has a sophisticated design with simple wiring.

The printer can communicate with most computers through the standard Centronics parallel interface and the RS-232C serial interface.

The control panel allows you to specify or adjust many of the printer's features. You can select a font and page format for your document and match your printer's interface and emulation with those of your computer. The 16-character display guides operation with messages and status information.



# Getting Acquainted with Printer Components

The following illustrations show the location of the major printer parts.

Stacker

Control panel

Manual feed guide

Paper cassette

Controller board

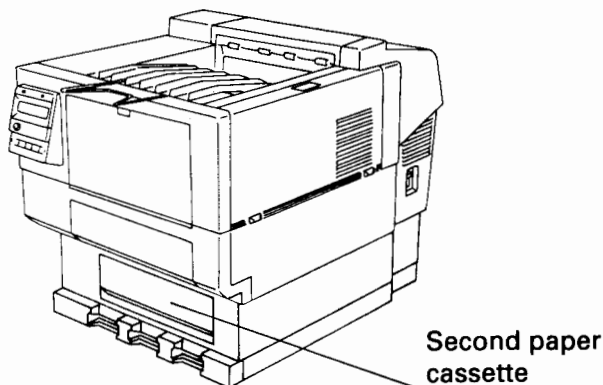
Font/emulation card slot

Air outlet

Power switch

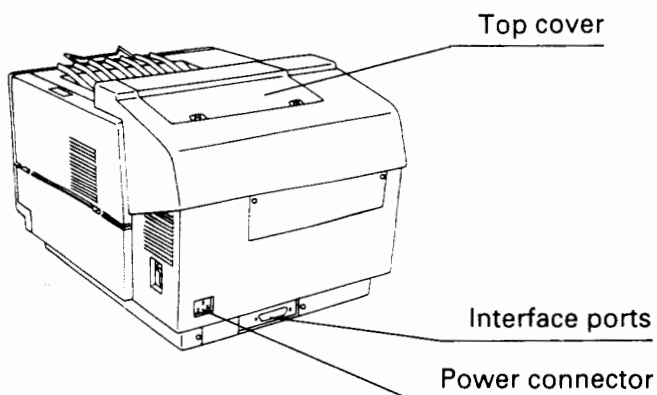
Side cover

**Front and Right Side**

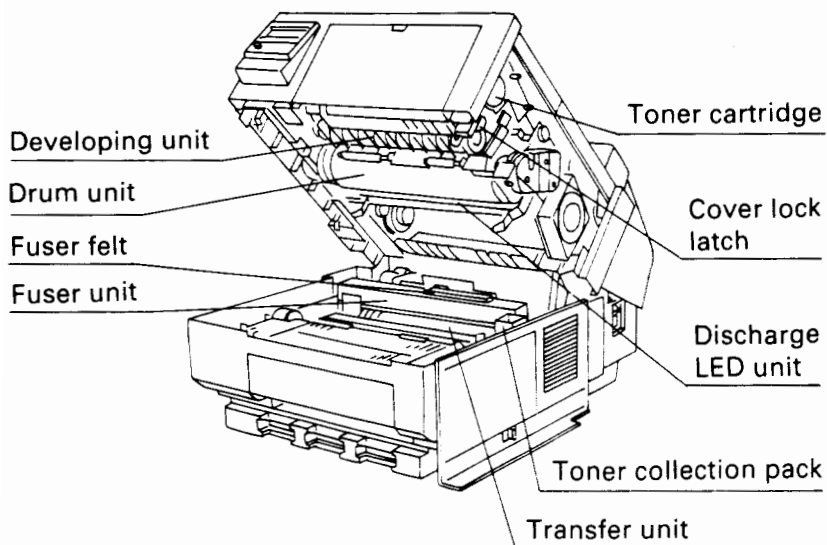


**Front and Right Side  
(with optional second paper cassette)**





### Rear Side



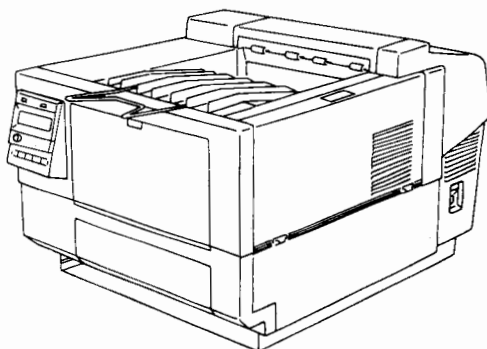
### Interior with the Upper Mechanism Open



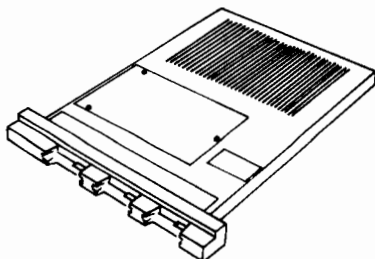
## Printing Mechanism and Controller

The printing mechanism consists of a lower and an upper part. The upper mechanism can be lifted up after you unlock the latch inside the side cover. When the upper mechanism is lifted, it will lock into place. It is released by lifting it up slightly and setting it down. When the mechanism is open, all printing operations are stopped.

The controller board, located at the bottom of the printer (the entire lower space inside the lower mechanism), receives print data and control information from the host computer and the control panel, and controls the printing mechanism through the engine controller and video signal interface. The controller board can be easily removed.



**Printing Mechanism**



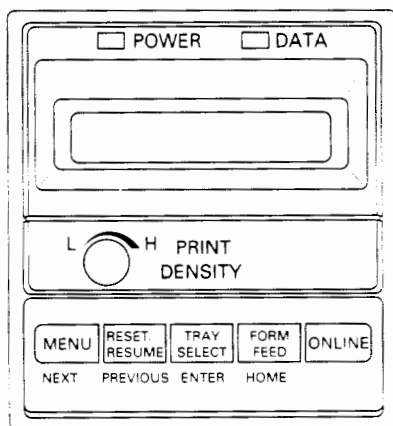
**Controller Board**



## Control Panel

The control panel has a liquid crystal display for messages. Up to 16 characters can be displayed.

Besides the message display, the control panel has two indicator lamps, a print density knob, and five push buttons.



**Control Panel**



## Five Push Buttons

Each push button has two functions depending on the control panel mode, normal or menu. The normal mode functions are printed on the buttons; the menu mode functions are printed beneath the buttons. This manual uses the name that corresponds to the mode being discussed.

### Normal Mode

You can change or set the following printer operations in normal mode:

#### MENU

**Offline:** Switches the printer to menu mode. When you press this button, the display will read "SETUP", which is the first menu in menu mode. (Menu mode is discussed in detail in Chapter 3.)

**Online:** If the printer is not idle, the display will briefly read "PRINTER BUSY"; no further action is taken. If the printer is online and idle, pressing this button has no effect.

#### RESET/ RESUME

**Offline:** Pressing this button will initialize the printer (i.e., it clears the buffer memory and resets all settings to the defaults you have saved).

**Online:** When the printer runs out of paper, it will signal you with an error message (e.g., "HP1 PAPER OUT"). Refill the bin and then press **RESET/RESUME** to notify the printer that the paper has been replaced.



If the printer is not out of paper and the Allow Job Reset parameter is true (this can be changed in the setup menu or by software command), pressing **RESET/RESUME** will display "FLUSHING JOB..." and terminate the current job. If Allow Job Reset is not enabled then pushing this button will display "WARMING UP" and processing will continue. If the printer is online and idle, pressing this button has no effect.

**TRAY  
SELECT**

**Offline:** Switches the printer to the tray selection menu, which allows you to specify a paper input tray.

**Online:** If the printer is not idle, the display will briefly read "PRINTER BUSY"; no further action is taken. If the printer is online and idle, pressing this button has no effect.

**FORM  
FEED**

**Offline:** No effect.

**Online:** No effect.

**ONLINE**

Switches the printer from online to offline or vice versa. If you switch offline during printing, the printer will display "PRINTER BUSY" and will stop after printing the current job; any remaining pages in the print buffer will be printed when you switch online again. Pushing the button multiple times while the Printer is printing has the same effect as pushing it once.



**Control Panel Push Buttons (Normal Mode)**



## Menu Mode

You can change or set the following printer operations in menu mode:

### NEXT

Moves to the next choice in the current menu. Using the menu flowcharts in this chapter, pressing the **NEXT** button moves down to the next choice. If you are at the bottom of the list, pressing this button will cycle back to the top of the list.

### PREVIOUS

Moves to the previous choice in the current menu. Using the menu flowcharts in this chapter, pressing the **PREVIOUS** button moves up to the previous choice. If you are at the top of the list, pressing this button will cycle to the bottom of the list.

### ENTER

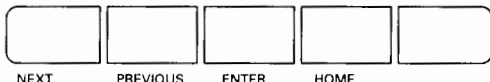
Selects the currently displayed choice. This will move you to the next menu (if it is a menu choice) or select the option (if it is an option choice). Using the menu flowcharts in this chapter, pressing the **ENTER** button moves right to the next choice.

### HOME

Moves back to the previous menu. Using the menu flowcharts in this chapter, pressing the **HOME** button moves left to the previous choice.

### ONLINE

Pressing the **ONLINE** button at any time while in menu mode returns the printer to the online idle state.



Control Panel Push Buttons (Menu Mode)



## Indicator Lamps

The indicator lamps indicate the state of power supply and data buffer.

**POWER:** Lights up when the printer is on.

**DATA:** Lights up when there is data in the printer buffer.

☐ POWER      ☐ DATA

**Indicator Lamps**



## Message Display

In normal mode, the message display shows the following types of operator messages:

- Errors
- Alarms
- Prompts

In menu mode, the message display shows the following printer menus and their options:

- Setup
  - Software (emulation)
  - Host I/O (parallel or serial interface)
  - Miscellaneous (font, line pitch, etc.)
- Font report (setup conditions and available fonts)
- Copy (number of copies)
- Enter hex dump (hexadecimal dump of commands and data)
- Set default (Restoring to factory defaults)
- Save (Storing setup conditions in permanent memory)
- Replace parts (Toner cartridge replacement, Fuser felt replacement, Drum unit replacement, Developing unit replacement, Transfer unit replacement, Fuser unit replacement)

The messages are display in an easy-to-understand form using 16 alphanumeric characters.

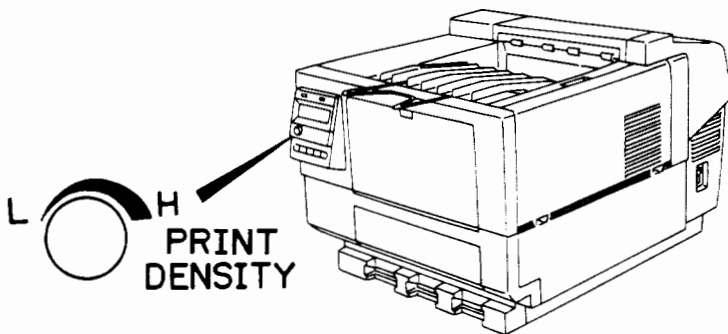
PRINT

**Message Display**



## Print Density Knob

The print density knob is used to adjust the print density on your document. To increase the density, turn the knob clockwise.

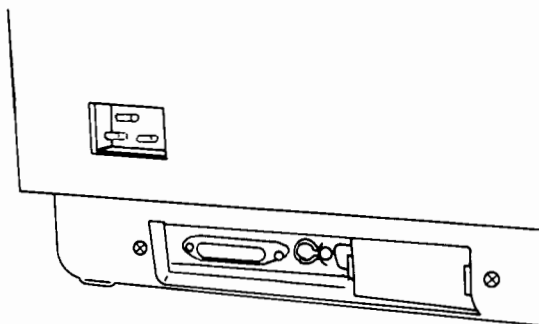


**Print Density Knob**

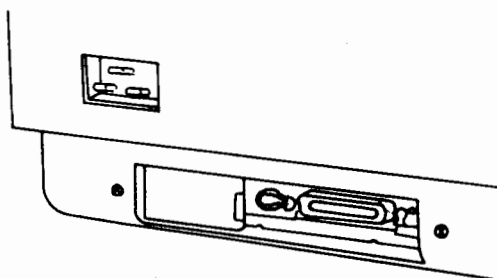


## Parallel and Serial Interface Ports

This printer can communicate with your host computer through either a parallel or serial interface connector. Both types are standard but only one can be connected at a time.



**Serial Interface Port**

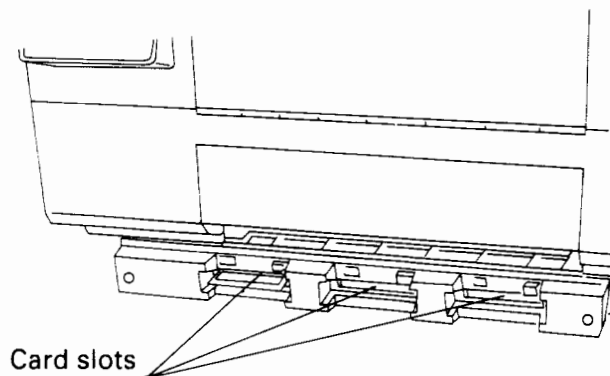


**Parallel Interface Port**



## Font/Emulation Card Slots

The lower front of the printer has three slots for cards to provide optional fonts or alternative emulations.



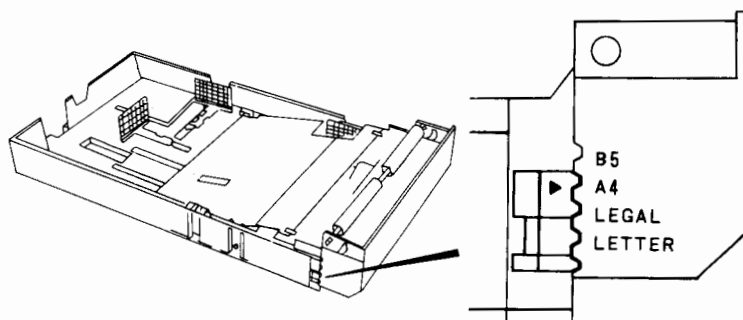
**Font/Emulation Card Slots**



## Paper Cassette

The paper cassette has a capacity of up to 250 sheets of paper in legal-, letter-, A4-, or B5-size.

Whenever the paper size is changed, select the paper size from one of the four available sizes using the slide switch on the side of the paper cassette. The figure below indicates that the A4 size is selected.

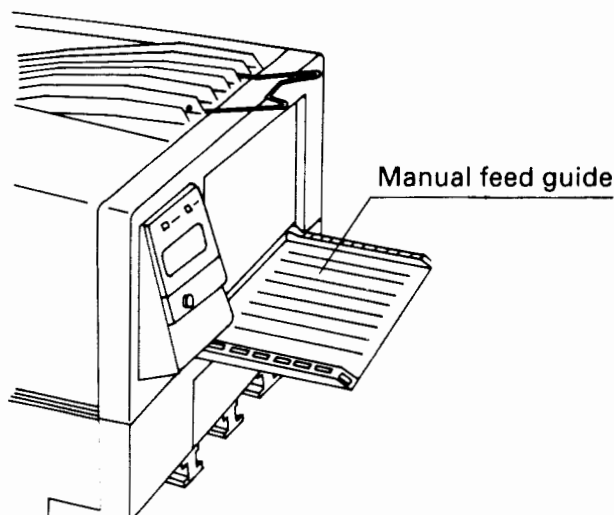


**Paper Cassette**



## Manual Feed Guide

The manual feed guide is a simple plastic plate for use when manually feeding paper into the printer.



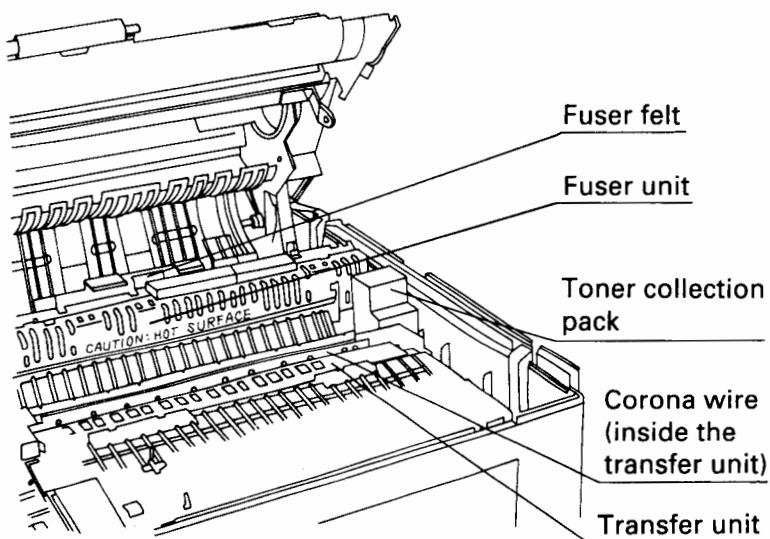
**Manual Feed Guide**



## Notes on Handling

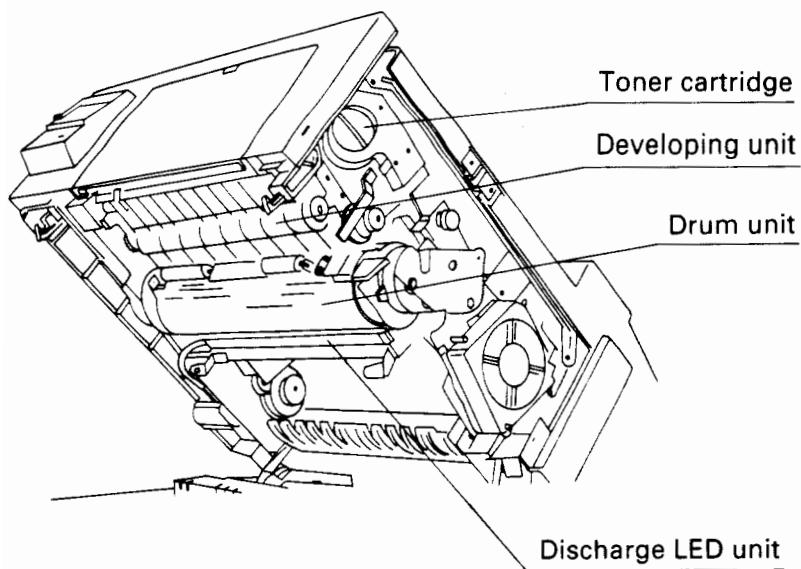
Maintain the printing mechanism, as follows:

Be sure the printer is in good working order. Follow the instructions of the maintenance messages whenever they are displayed. A complete explanation of maintenance is given in **Section 5**.



### Replacement and Maintenance Parts (1)





## Replacement and Maintenance Parts (2)



## SECTION 2

# SETTING UP THE PRINTER

This section provides step-by-step procedures for setting up your printer from unpacking to actual printing. At the end of this section there is a check list for confirming the printer settings.

If you are familiar with this type of printer, you may skip the item descriptions and go straight to the setup items.



## Checking the Printer Location

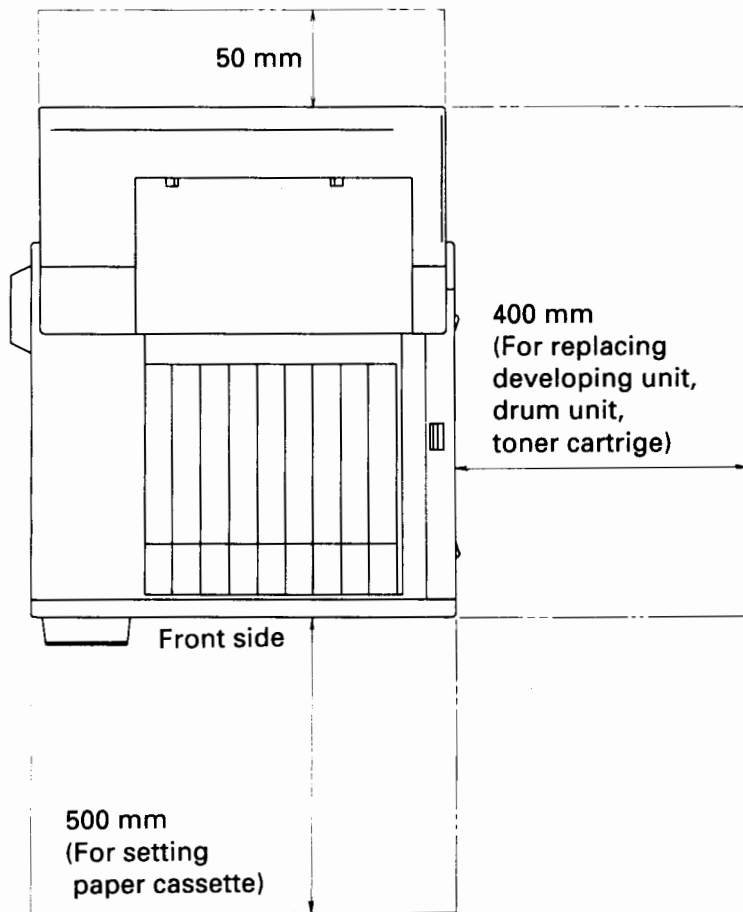
Your printer operates well in all general office environments: However, the location where you install your printer should meet the following requirements:

- Install the printer on a firm, level surface.
- The room should be well ventilated, without excessive dust.
- Do not place the printer in direct sunlight or near heaters.
- Do not expose the printer to high temperature or humidity. The room temperature ranges from 10°C to 35°C (50°F to 95°F). The humidity range is between 20% and 80% RH. The maximum wet-bulb temperature is 29°C.
- Do not block the air outlet of the printer fan.
- Do not use magnets or magnetized materials near the printer.
- Use the power cord supplied with the printer.
- Use a grounded AC power outlet of 90 to 110 percent of the voltage marked on the printer nameplate.
- Avoid sharing power outlets with equipment that causes electrical noise or power loss.



## Printer Clearance

The diagram below shows top view of the suggested clearances for the printer. The clearance on the right side for ventilation is especially important.



**Printer Clearance (top view)**



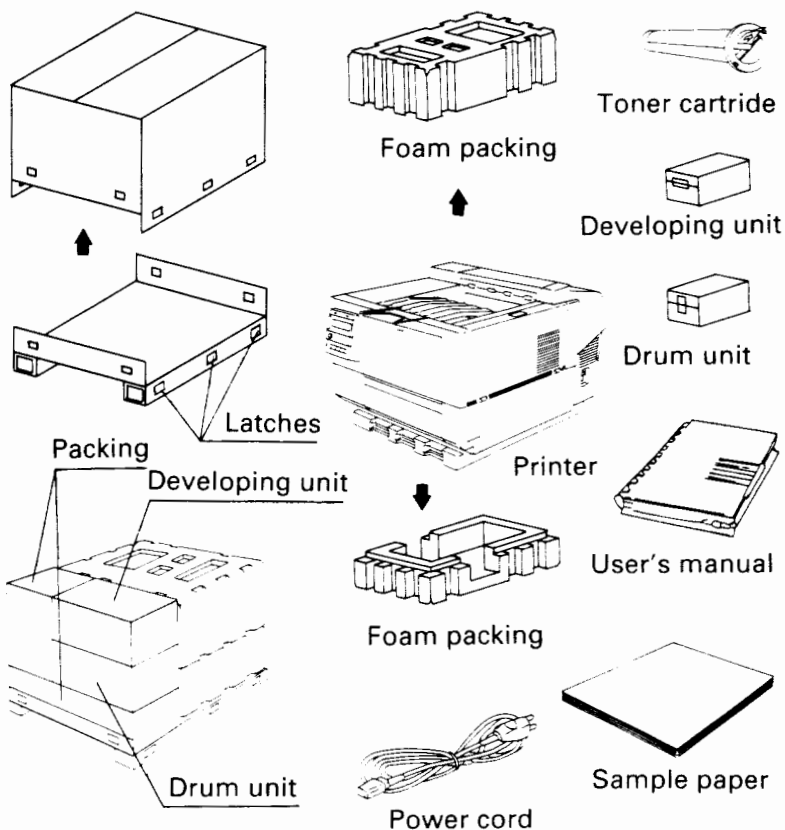
## Unpacking the Printer

This printer is shipped in a carton with its supplies and components wrapped in plastic. Both before and after you have unpacked the printer, inspect the carton and packing material for damage. If any damage is found, notify your dealer/distributor or shipping agent.

Remove the ten latches on the side of the carton.

Pull the upper carton off.

The following illustration shows the printer just after being pulled out of the carton.



**Opened Carton**



Remove the tape and packing material from the printer.

Keep the shipping carton and all packing material for storage or reshipment of your printer.

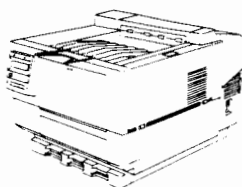
**NOTE:**

When no consumable parts are installed and the latch is released, the upper mechanism will spring up.

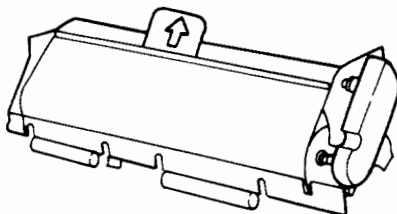


## Checking for Missing Components

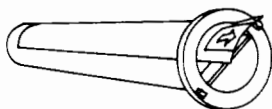
After you unpack your printer, be sure you have all the components shown below. If anything is missing, notify your dealer or distributor.



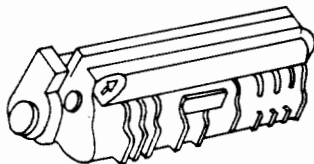
Printer



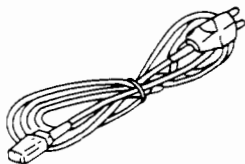
Drum unit



Toner cartridge



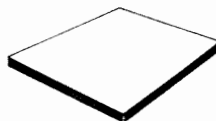
Developing unit



Power cord



User's manual



Sample paper

USA: 115-120 VAC

3-Prong

Europe: 220-240 VAC

2-Prong



## Set Up Check List

This list provides what to do and check for in setting up the printer after taking it out of the carton. If you are familiar with this type of printer, use this list to set up your printer quickly.

### Set Up

What To Do:	What To Check:	See page:
Check the printer location.	Room environment	2-2
Unpack the printer.	Shipping damage	2-4
Remove the packing material of printer	Appearance	2-5
Check that no components are missing.	Missing components	2-6
Install the components.	Developing unit, drum unit, and toner cartridge	2-8
Load the printer with paper.	Paper cassette paper size setting	2-18
Connect and turn on the power.	Correct voltage and outlet type	2-23
Print a test page.	Print operation and quality	2-27
Adjust print density.	Proper print density	2-27
Connect the printer to your computer.	Correct cable and locked connectors	2-29
Adjust the printer and computer operation modes.	If serial interface: type of data format, baud rate, protocol, etc.	2-33
Use the computer to test the printer.	Print operation with a test program	2-37

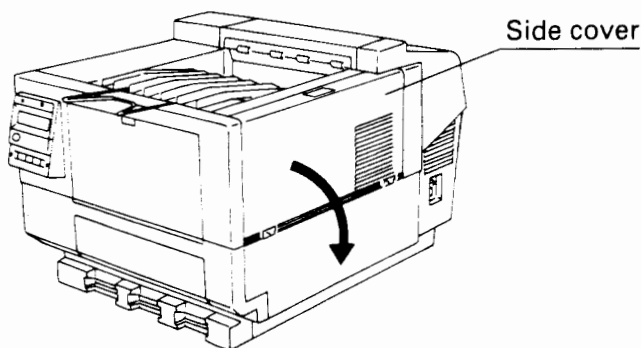
Refer to **Section 6** for troubleshooting procedures.



# Installing the Components

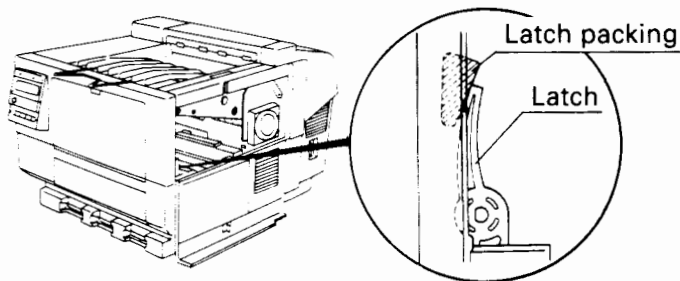
## Developing Unit and Drum Unit

1. Release the side cover by pressing on its top at the center. It will then open downward.



### Opening the Side Cover

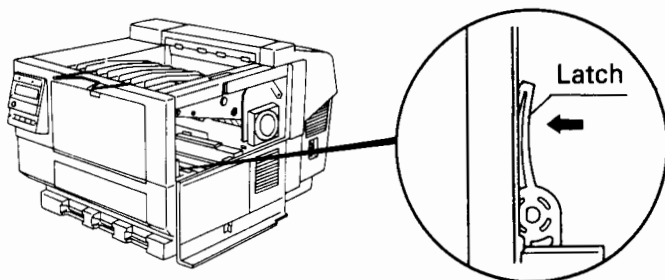
2. Remove the latch packing.



### Removing the Latch Packing



3. Hold one hand over the upper mechanism and grip the latch. The upper mechanism will spring up.

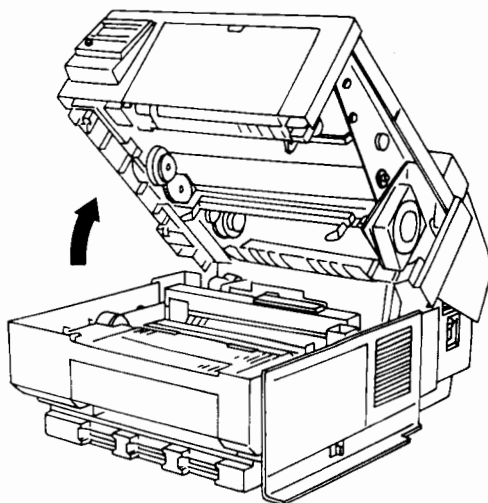


### Gripping the Latch

#### NOTE:

When no consumable parts are installed, the upper mechanism will spring up.

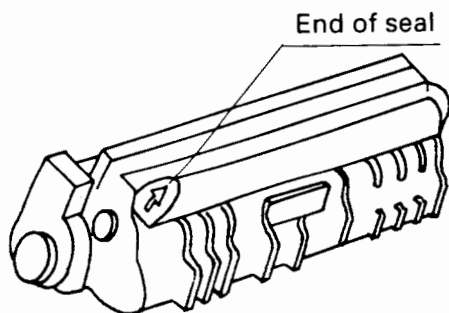
4. When the upper mechanism is lifted, it will not lock up.



### Lifting up the Upper Mechanism

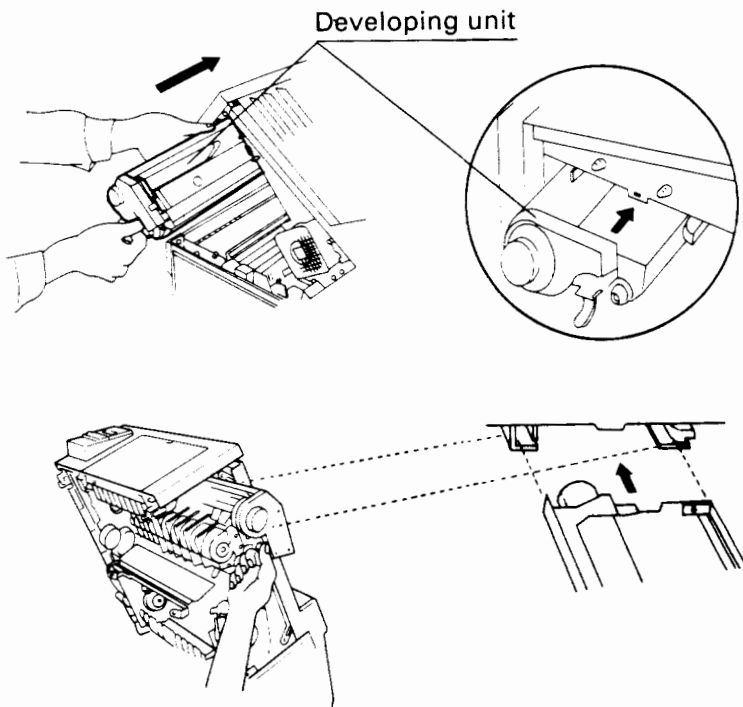


5. Grip the end of the seal of the developing unit.  
Pull the seal out.



**Pulling Out the Seal**

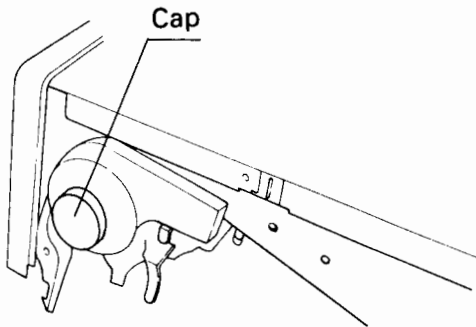
6. Insert the developing unit into the slot as shown, and check that the upper mechanism is locked. It is released by lifting it up slightly and setting it down.



**Installing the Developing Unit**

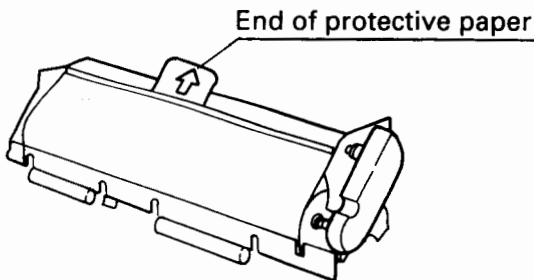


7. Remove the cap of the toner cartridge hole.



### Removing the Cap

8. Grip the end of the organic photoconductive drum protective paper. Pull the protective paper out.



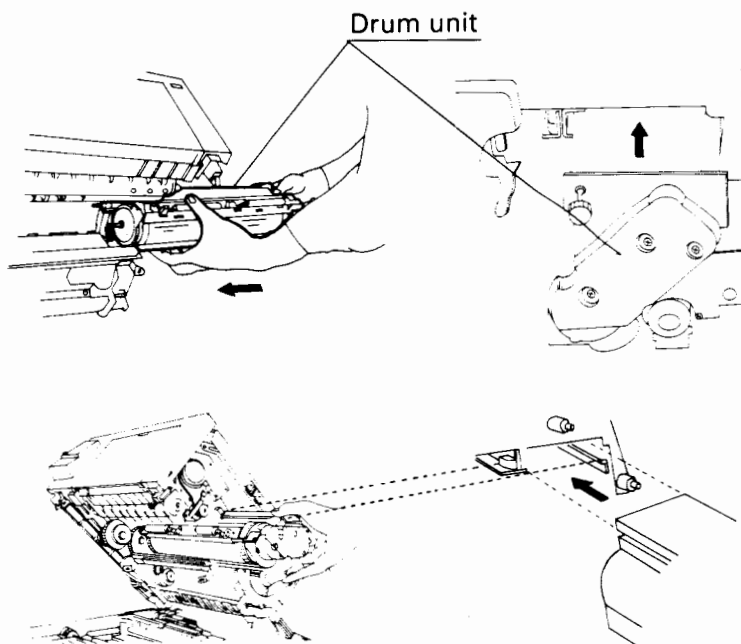
### Pulling Out the OPC Drum Protective Paper

#### CAUTION:

Never touch the drum surface with your hands. The drum must be free from any oil and dirt. When handling the drum unit, be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light. Keep the drum unit covered when out of the printer.



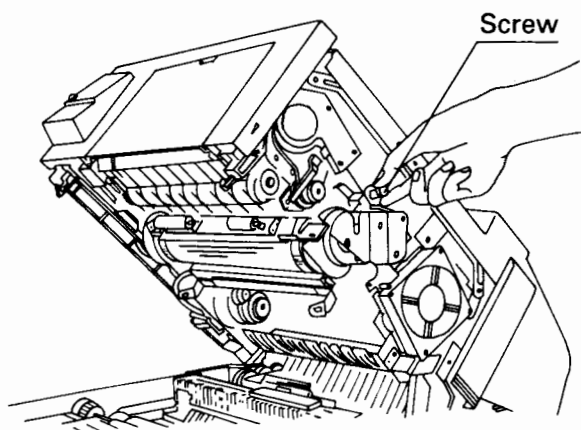
9. Insert the drum unit into the slot as shown.



**Installing the Drum Unit**



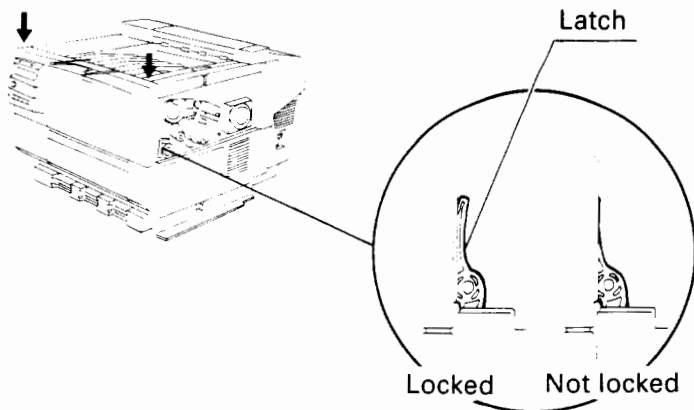
10. Tighten the drum screw by hand.



**Tightening the Drum Screw**



11. Lift the upper mechanism up slightly and set it down. Push down on both ends of the upper mechanism, and the mechanism will lock in place.



### **Closing the Upper Mechanism**



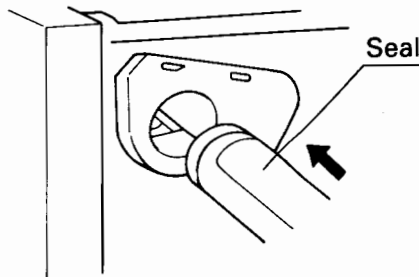
## Toner Cartridge

1. Shake the toner cartridge more than ten times to distribute the toner evenly.



### Shaking the Toner Cartridge

2. Insert the toner cartridge with the seal facing up.



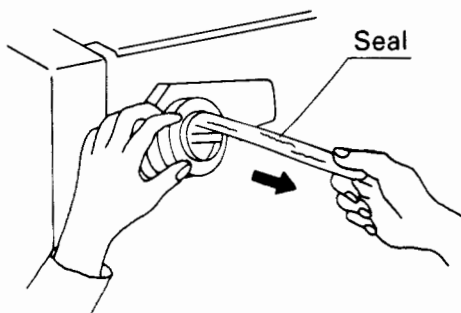
### Inserting the Toner Cartridge

#### CAUTION:

No toner cartridge and no toner other than that supplied for this printer should be used. If used, the developing unit will be damaged and the drum unit may be damaged.

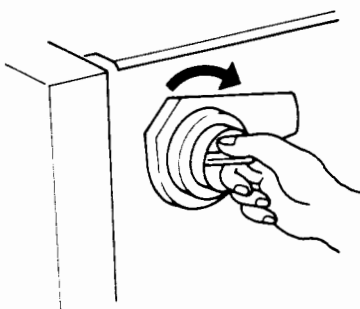


3. Hold the toner cartridge as shown.  
Remove the seal of the toner cartridge by pulling it off.



#### **Removing the Seal**

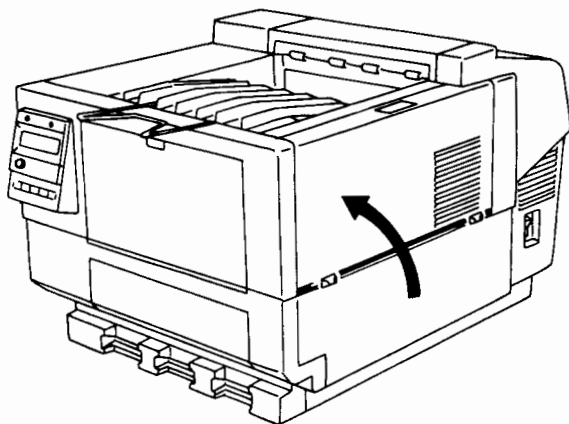
4. Rotate the toner cartridge clockwise about 180 degrees until it locks in place.



#### **Locking the Toner Cartridge**



5. Close the side cover by pushing it up and in.



**Closing the Side Cover**



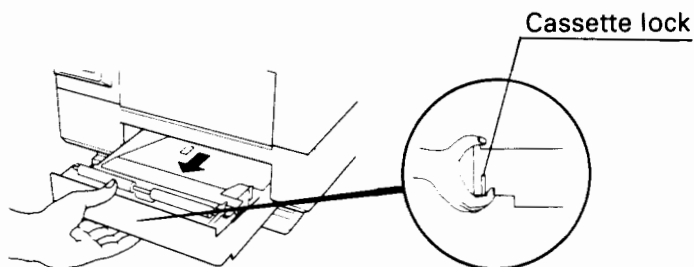
## Loading Paper

This printer handles various types and sizes of paper. Refer to **Appendix A** or ask your dealer whether a specific type of paper can be used.

### NOTE:

Curled paper may cause a jam.

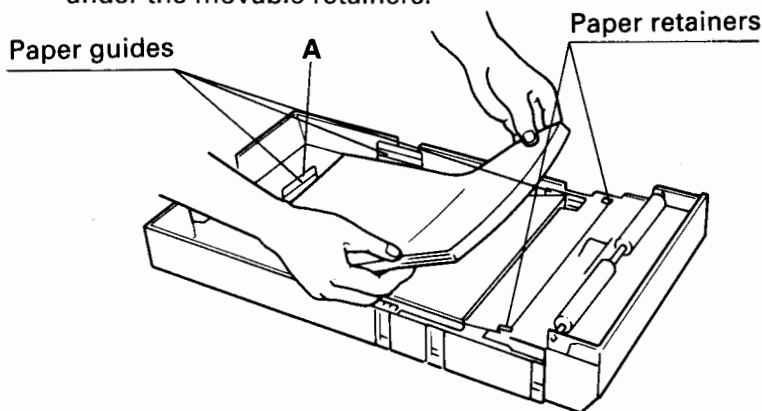
1. Remove the paper cassette by pulling the cassette lock straight out.



### Removing the Paper Cassette



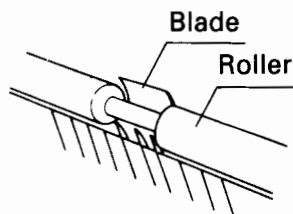
2. Adjust the horizontal and vertical guides for the size of the paper. Then load the paper stack into the cassette up against the back guide with the printing surface down, as shown. Finally, push down on the front corners of the paper stack, so that the paper is pushed under the movable retainers.



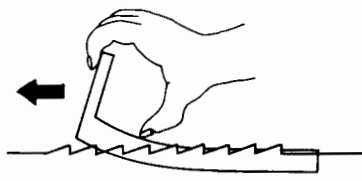
### Inserting the Paper into the Cassette

#### NOTES:

1. The blade should be between the paper guide rollers as shown.

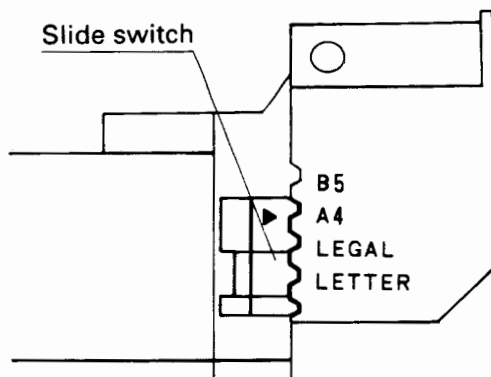


2. When sliding the paper guide A backward, slightly lift up the guide.





3. Use the slide switch to select the paper size. Slide the switch until the indicator is at the position that corresponds to the size of the paper loaded. The figure below shows the A4 size is selected.



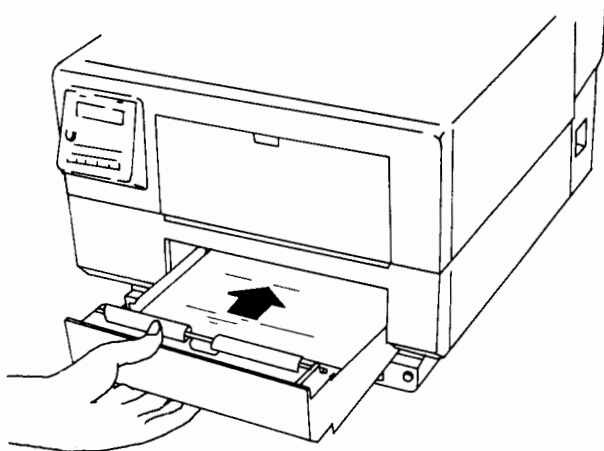
#### Slide Switch for Selecting Paper Size

##### NOTES:

1. The paper jam message appears if the paper size switch is selected incorrectly.
2. The setting is not stored in memory until a page has been printed. It is retained even if the power is turned off.



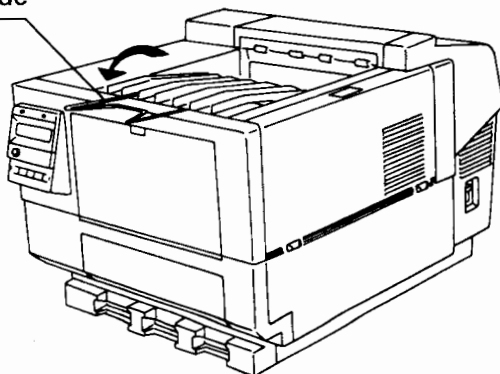
4. Insert the paper cassette into the slot.  
The cassette is locked in place when you hear the click.



### Inserting the Paper Cassette

5. Pull the paper guide to the front.

Paper guide



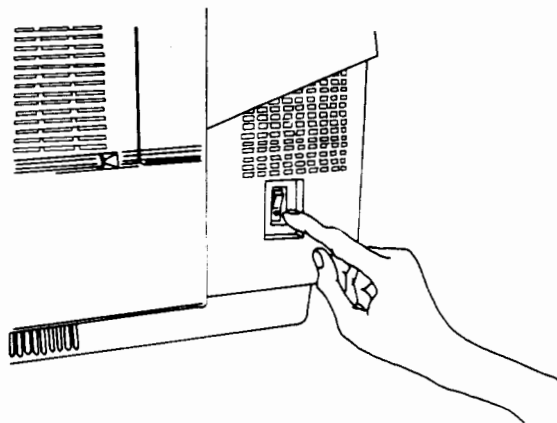
### Pulling the Paper Guide



## Power Connection and Activation

For safety, the ground pin of the power cord plug must be grounded. Therefore, the power outlet must match the printer power plug and be properly grounded. The types of power cords and plugs differ with the input voltage (115 to 120 VAC or 220 to 240 VAC) indicated on the nameplate on the rear of the printer. If the plug doesn't match the outlet, you must have a proper plug converter prepared or the plug replaced by qualified personnel. Because of possible radiation interference, the power cord must not be longer than 3 meters.

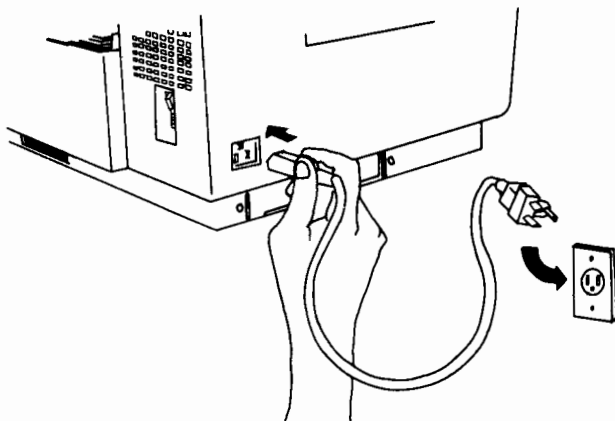
1. Make sure the power is off (the side of the power switch marked **O** is pressed).



**Printer Power Switch**



2. Plug the power cord into the power connector at the rear of the printer; plug the other end into a proper power outlet.



### Connecting the AC Power Cord

#### **CAUTION:**

Connecting the printer cable with the power on may cause serious damage to your printer or computer.



## Power Supply Cord Selection

Use the following power supply cord or equivalent when it is not provided with the unit.

Model M3711/3716 Series		
Input voltage	115-120V	220-240V
North America  (Note 1)	<u>Cord Sets;</u> Type SVT No. 18AWG 3-conductors (single phase; 2-current carrying conductors and ground) rated 10A 125V AC	<u>Connector;</u> Rated 10A 250V AC <u>Cable;</u> Type SJT No. 18AWG 3-conductors (Single phase; 2-current carrying conductors and ground) <u>Attachment Plug Cap;</u> NEMA 6-15P
Europe  U. K.  Australia  (Note 2)		<u>Cord Sets;</u> Rated 6A 250V AC <u>Connector;</u> Rated 6A 250V AC See CEE 22 <u>Cable;</u> (Note 3) 3×0.75 mm <sup>2</sup> Type H05VV-F <u>Attachment Plug Cap;</u> Rated 10A 250V AC

Note 1: Be sure that detachable power supply cord is UL Listed and CSA Certified.

Note 2: Be sure that detachable power supply cord is authorized by the country's standard.  
For example in. Germany: VDE

Note 3: Be sure that the < HAR > marking is indicated on the cable.

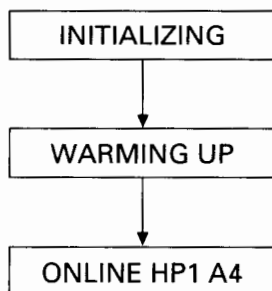
Note 4: Cable length of above power supply cords shall be less than 3m.



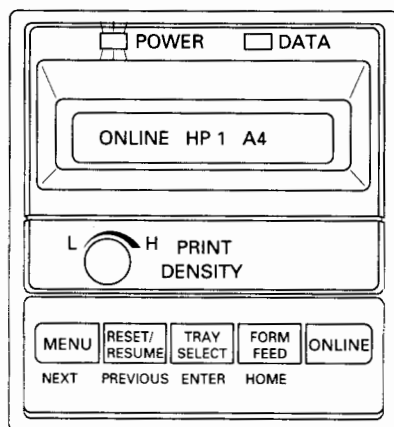
### 3. Push the power switch to the ON position.

When the power is turned on, the printer operates as follows:

- The POWER lamp lights.
- The motors rotate to initialize the mechanism.
- The control panel displays the following messages:



- It takes about 60 seconds for the printer to become ready.



**Control Panel Initial Indication**



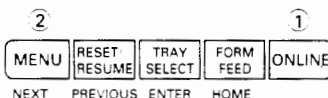
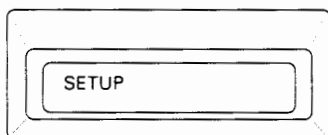
## Printing Test Pages and Adjusting Print Density

The printer has a font report function that lets you to check printer setup conditions and available fonts. It is also used as a test page to check printer operation and print quality.

The following is a procedure to print a printer setup report.

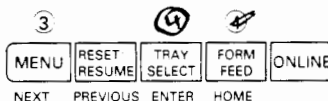
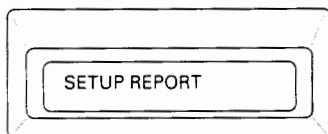
1. Press **ONLINE** to put the printer offline. **OFFLINE HP1 A4** is displayed (if HP1 A4 is selected).

Press **MENU** to enter the menu mode. **SET UP** is displayed.



### Entering Menu Mode

2. Press **NEXT** to display **SETUP REPORT**, then press **ENTER** to start printing. The printer will print a page, then stop.

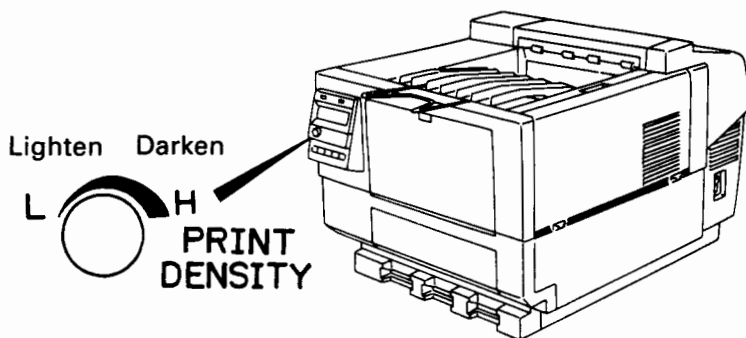


### Setup Report Printing



3. If the print is too dark or light, adjust it with the print density knob on the control panel.

You may have good results by increasing the density (darken it) when characters are printed and by decreasing the density (lighten it) when a halftone image is printed.



**Print Density Adjustment**



## ----- SET UP REPORT -----

Selected Host I/F : PARALLEL

Centronics I/F Setup  
Timing : 1

RS-232C I/F Setup  
Baud Rate : 9600 BAUD  
Data Format : 8NONE1  
Data Flow Control : XON/XOFF

Number of Copies : 1

MISCELLANEOUS  
Line Pitch : 6LPI  
LF,FF Code : LF ONLY  
CR Code : CR ONLY  
EOL Wrap : OFF  
Skip Perforation : ON  
ISO Symbol Set : ROMAN-8

Selected Font  
Slot No. : RESIDENT  
Font No. : 1

Selected Hopper : HOPPER1

Selected Emulation  
Slot No. : RESIDENT  
Emulation Name : HP LJ2  
Revision : 6

MEMORY(RAM) : 0.64MB

Available Emulations  
Resident : HP LJ2  
: DIABLO ECS  
: IBM-PRO  
: FX-85

IC Card :

---

Setup report printout

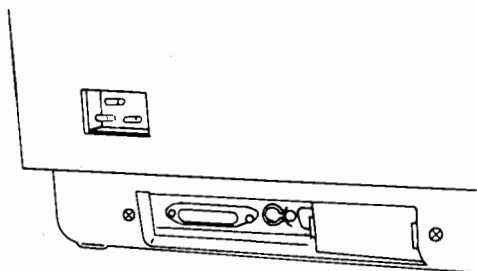
4. Press the ONLINE button to put the printer offline. .



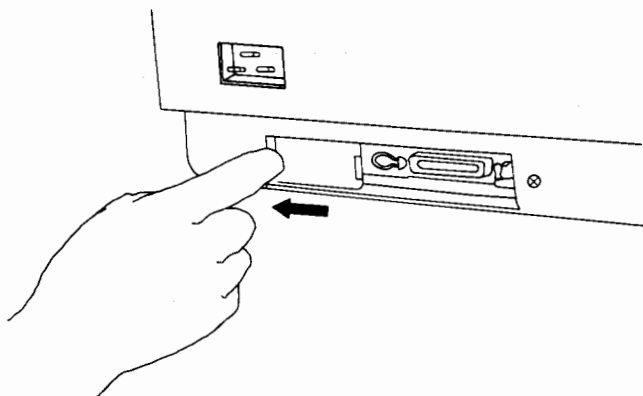
## Connection to a Computer

Your printer can be connected to a computer through the parallel (Centronics) or serial (RS-232C) interface connectors on the rear of the printer. One of these connectors is always blocked by a movable plate. The plate can be easily moved right or left.

Setting up



**Serial Interface Port**



**Parallel Interface Port**



This printer is shipped without interface cables. Interface cables must have the following plugs at the printer end.

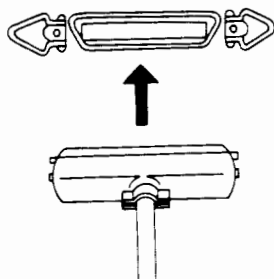
Parallel: 36-male-contact (Amphenol 57FE-30360 or equivalent)

Serial: 25-male-contact (Cannon DB-25 or equivalent)

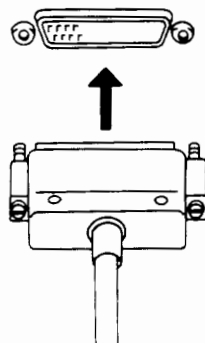
The cable should be as short as possible (no longer than 3 m) and its connector cover should be connected to the shield of the cable to avoid possible radiation interference.

If you use a parallel interface port, you need only purchase one of the two types of Centronics interface cables (25-pin or 36-pin connector). However, if you use a serial interface port, you need to choose a serial interface cable having the pin assignment of the computer interface because the RS-232C has different pin assignments. A few examples are shown in **Appendix C**. Ask your dealer for details such as cable modification.

Parallel interface



Serial interface

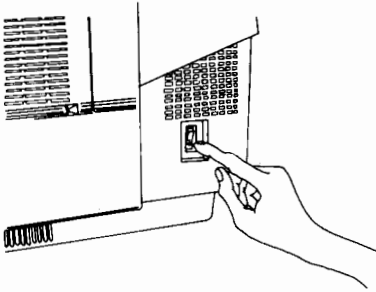


## Interface Connectors

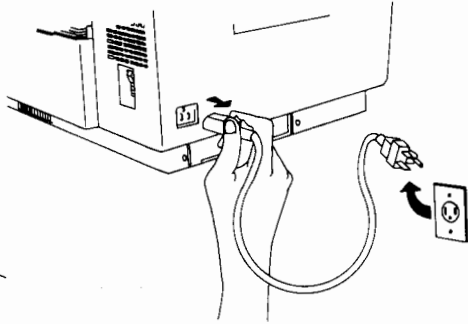


1. Make sure both the printer and host computer are turned off and unplugged.

The power is off (the side of the power switch marked **O** is pressed.)



The power cord is unplugged.



Setting up

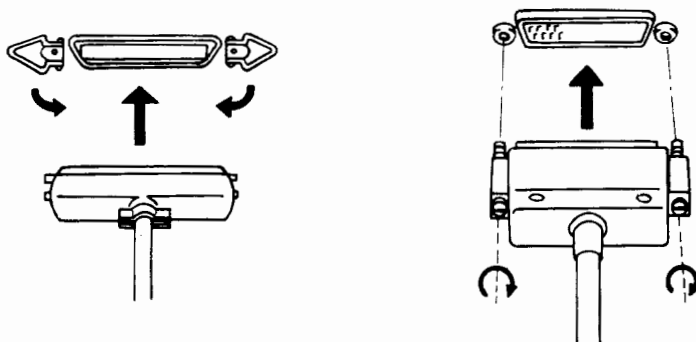
### Confirming that the Power is Off

#### CAUTION:

Connecting the printer cable with the power on may cause serious damage to your printer or computer.



2. Put the movable plate in the correct position for the connector that is to be used. Connect one end of the cable to the printer and the other to the computer. Secure the plug by snapping the spring latches inward (36-pin connector) or by tightening the screws (25-pin connector).



**Connecting the Interface Cable**



## Adjusting Printer and Host Operation Modes

After checking for connect operation in offline mode, check operation in online mode. The printer might not operate correctly or might not print documents in the correct format because the factory default settings of some of the printer's features (operation modes) do not match the corresponding specifications or settings of your host computer or software.

These types of specifications include the following:

- **Serial interface specifications:** Baud rate, data format, and flow control your computer uses for the serial interface. This is only used for the serial interface.
- **Software specifications:** Emulation type of printer (maker and model) and for your software supports.
- **Page format specifications and factors:** Character orientation, character and line spacing, top margin, and print start position (left end) suitable for your documents. New line and auto CR and LF: these all depend on the control codes your computer sends at the end of each print line.

So, for the first installation or when changing your application software, you need to adjust your printer to match your computer and application software. This initial setup can be activated from the control panel.



## Selecting an Interface with the Setup Menu

Follow these steps to select the serial interface:

	Press this button	Display	Comment
1.	<u>ONLINE</u>	ONLINE HP1 A4	Switches the printer off-line.
	<u>MENU</u>	SETUP	First option of main menu displayed.
2.	<u>ENTER</u>	SOFTWARE	You have selected the setup menu. The first option in the setup menu is "SOFTWARE".
3.	<u>NEXT</u>	HOST I/F	Displays the next option in the setup menu.
	<u>ENTER</u>	PARALLEL*	Selects the Host I/F function and displays "PARALLEL". If your printer has been configured before, "SERIAL RS-232" may be displayed.
4.	<u>NEXT</u>	SERIAL RS-232	Displays serial interface. Pressing the <b>NEXT</b> button further will cycle back to the parallel again.



## Press this button Display

## Comment

5. **ENTER** 9600 BAUD\*

Selects the baud rate menu and displays the current setting (default is 9600).

**NEXT** □ □ □ □ BAUD

Press the **NEXT** button repeatedly until the desired baud rate is displayed.

**ENTER** SELECTED  
□ □ □ □ BAUD\*

Makes your selection. "SELECTED" will be displayed briefly for confirmation then the selected option will be displayed again.

6. **HOME** BAUD RATE

Returns to the original sub-menu.

**NEXT** FORMAT

Next sub-menu, serial data format.

7. **ENTER** 8NONE1\*

Current setting.

**NEXT** □ □ □ □ □

Desired format.

**ENTER** SELECTED  
□ □ □ □ □\*

New format selected.



Press this button	Display	Comment
8. <u>HOME</u>	FORMAT	Returns to the original sub-menu.
<u>NEXT</u>	FLOW CONTROL	Next sub-menu, data flow control.
9. <u>ENTER</u>	DTR*	Current setting.
<u>NEXT</u>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Desired flow control.
<u>ENTER</u>	SELECTED <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> *	New flow control selected.
10. <u>HOME</u>	OFFLINE HP 1 A4	Press the <b>HOME</b> button repeatedly in the offline state, until you leave the menu structure.



## Printing

After the minimum requirements for communication between your printer and computer have been prepared, the following test program using BASIC can be used to check communication (parallel interface) between the printer and your computer. When you enter a simple text in the program, the printer will output the text as entered. Of course, you can use a familiar word processing program or make a test program if you prefer.

Start BASIC and enter the following program:

```
10 LPRINT "ABCDEFGHJKLMNOPQRSTUVWXYZ1234567890"  
20 LPRINT CHR$(13)  
30 LPRINT "Page Printer Communication Test Good"  
40 LPRINT CHR$(13)  
50 LPRINT CHR$(12)  
60 END
```

Enter RUN to execute this program. Your printer should print:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890  
Page Printer Communication Test Good
```

This completes the simple testing of your printer in both offline and online modes. Next, familiarize yourself with operation of the control panel, setting the printer operation mode, and preparations necessary for printing documents with your application software. These are covered in **Sections 3 and 4**.







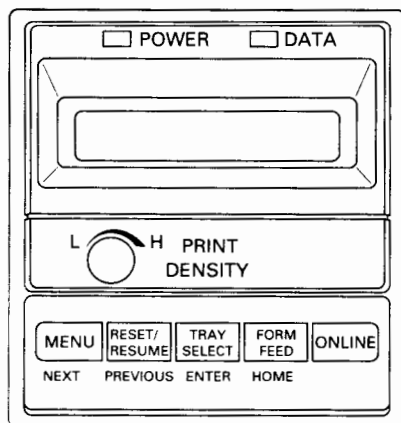
## SECTION 3

# CONTROL PANEL

The control panel displays the printer status and is used to set printer operation modes. You should be familiar with the functions necessary for setting up operation modes when first installing the printer, adjusting operation modes for the application software you are going to use, "telling" the printer that the specified consumable has been changed, and so forth.

## Layout

The control panel consists of two indicator lamps, a 16-character liquid crystal display, a print density knob, and five push buttons, as shown below.



**Control Panel Layout**



## Control Panel Buttons

The control panel buttons take on different functions when you switch from normal mode to menu mode. In menu mode, refer to the label below each button instead of the label on the button, which is used in normal mode.

---

### NOTE:

To switch from normal mode to menu mode:

Press **ONLINE** to switch the printer offline and then press **MENU** to select the main menu or **TRAY SELECT** for the tray selection menu.

To return to normal mode from menu mode:

Press **ONLINE** to leave menu mode and switch online again.

---

---

#### NEXT

Moves to the next choice in the current menu. Using the menu flowcharts in this chapter, pressing the **NEXT** button moves down to the next choice. If you are at the bottom of the list, pressing this button will cycle back to the top of the list.

---

#### PREVIOUS

Moves to the previous choice in the current menu. Using the menu flowcharts in this chapter, pressing the **PREVIOUS** button moves up to the previous choice. If you are at the top of the list, pressing this button will cycle to the bottom of the list.

---

#### ENTER

Selects the currently displayed choice. This will move you to the next menu (if it is a menu choice) or select the option (if it is an option choice). Using the menu flowcharts in this chapter, pressing the **ENTER** button moves right to the next choice.



**HOME**

Moves back to the previous menu. Using the menu flowcharts in this chapter, pressing the **HOME** button moves left to the previous choice.

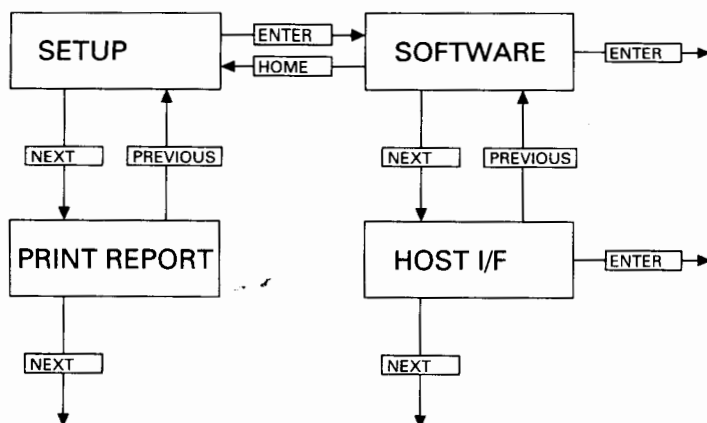
**ONLINE**

Pressing the **ONLINE** button at any time while in menu mode returns the printer to the online idle state.

Figure 3-1 below shows a small portion of the menu mode flowchart and shows how the control panel buttons are used to make a selection.

## Menu Mode Example

To get a better understanding of how the menu system works, let's try an example. Refer to Figure 3-1, and we'll demonstrate how to set the printer so that it will not print a start page each time you turn it on.



**Figure 3-1 Using the control panel buttons in menu mode**



Follow these steps:

Press this button	Display	Comment
<b>ONLINE</b>	OFFLINE HP 1 A4	Switches the printer offline.
<b>MENU</b>	SETUP	Switches to menu mode and displays the first choice from the main menu.
<b>ENTER</b>	SOFTWARE	Selects the setup menu and displays the first choice.
<b>PREVIOUS</b>	MISCELLANEOUS	Pressing the <b>PREVIOUS</b> button when the top choice on the menu is displayed moves you to the bottom choice. Alternately, you could have pressed the <b>NEXT</b> button two times to get to the miscellaneous menu.
<b>ENTER</b>	LINE PITCH	Selects the miscellaneous menu and displays the first choice.
<b>NEXT</b>	CR CODE	Moves to the next item in the miscellaneous menu.



**ENTER**

CR:CR ONLY\*

Selects the start page menu and displays the first choice. The asterisk indicates that this is the current setting.

**NEXT**

CR:CR + LF

Moves to the next item in the start page menu. Since there are only two items on the menu, pressing the **PREVIOUS** button would also get to this point.

**ENTER**SELECTED  
CR:CR + LF\*

Selects the current choice and saves it in the printer's memory. Notice that the display flashes "SELECTED" and then shows the current choice again - but with an asterisk to indicate that it is the current setting.

**ONLINE**

OFFLINE HP 1 A4

From any point in the menu structure you can press **ONLINE** to leave the menu and return to the online idle state. If you wanted to check some other settings, you could press the **HOME** button to work back through the menu tree.



## Menu Mode Reference (LaserJet)

The main menu when the Hewlett-Packard LaserJet series II emulation is selected offers these options: **setup** menu, **setup report**, **font report**, **copy** menu, **enter hex dump**, **set default**, **save**, and **replace parts** menu.

Each of these options is described below.

### Setup Menu

The **setup** menu contains four sub-menus: **software**, **host I/F**, **font** and **miscellaneous**.

### Software menu

The **software** menu allows you to select a printer type. Selecting HP LJ2 respond to Hewlett-Packard LaserJet series II commands. Other selections are DIABLO ECS for Diablo 630 ECS commands, FX-85 for Epson FX-85 commands, and IBM-PRO for IBM Proprinter XL commands, all serial printers. If you have installed an optional emulation card in slot 1, this choice will also appear on the menu. Selecting the emulation also changes the menu structure; refer to the "Menu Mode Reference (Serial Printers)" of this section. The factory default setting is LaserJet series II.

### Host I/F menu

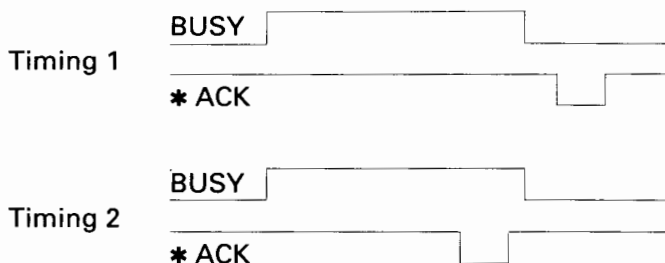
The **host I/F** menu selects which interface to use to communicate with your printer. The choices include the serial interface (RS-232) and parallel (Centronics). The factory default setting is parallel.

If you select either of the serial interfaces, you will then see the **baud rate** menu for setting the first of several serial interface parameters. You must be sure that the serial parameters are set the same for both the computer and the printer. Appendix C contains additional information on protocols and the serial interfaces. The factory default settings are 9600 baud, 8 data bits, 1 stop bit, no parity, and DTR protocol.



## Parallel Timing Menu

If you select the parallel interface, you will then see the parallel timing menu that allows you to select the relationship between the ACK signal and the trailing edge of the BUSY signal on the parallel interface. As illustrated below, it can put the ACK outside the BUSY or it can put the ACK inside the BUSY. The factory default setting is timing 1.



The baud rate is the number of bits transferred per second. The data format indicates the number of data bits, parity property, and the number of stop bits in this order. "Mark" for parity means the parity bit is fixed to logical 1. The flow control is the protocol for controlling the ready status of printer data buffer.



## Font menu

The font menu allows you to select a font for printing a document. You can select any of the resident fonts (four type faces, 82 fonts of different combinations of font attributes) or fonts on optional font cards you have installed in card slots 1 to 3. The factory default setting is portrait, roman-8, courier, 12-point, 10-pitch, upright, medium. More information on font attributes can be found in Section 4 and Appendix F.

## Miscellaneous menu

The **miscellaneous** menu allows you to select a font and set other formatting parameters with these sub menus: **line pitch**; **CR code**; **LF, FF code**; **perforation skip**; **EOL wrap**; and **ISO symbol set**.

The **line pitch** menu allows you to set line spacing to 6 lines per vertical inch, 8 lines per inch, or 3 lines per inch. Samples of each of these spacings are shown Figure 3-2. The factory default setting is 6 lines per inch.

6 LPI	8 LPI	3 LPI
ABCD	ABCD	ABCD
ABCD	ABCD	
ABCD	ABCD	
ABCD	ABCD	ABCD
ABCD	ABCD	
ABCD	ABCD	ABCD
ABCD	ABCD	
ABCD	ABCD	

Figure 3-2 Line pitch



The **CR code** menu specifies how the printer acts when it receives a carriage return (ASCII 13) code. As illustrated in Figure 3-3, it can return the cursor to the left margin or it can return to the left margin and move down one line. The factory default setting is CR only.

CR only



CR + LF



Figure 3-3 CR code

The **LF, FF code** menu specifies how the printer acts when it receives a line feed (ASCII 10) or form feed (ASCII 12) code. As illustrated in Figure 3-4, it can move the cursor down one line or it can move the cursor to the left margin and down one line. The factory default setting is LF only.

LF only



Figure 3-4 LF, FF code

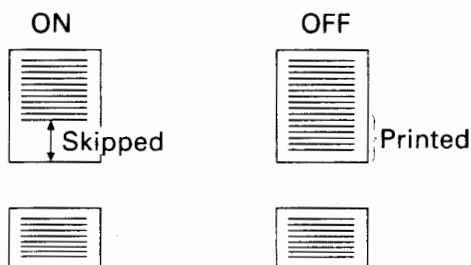
LF + CR



Figure 3-4 LF code

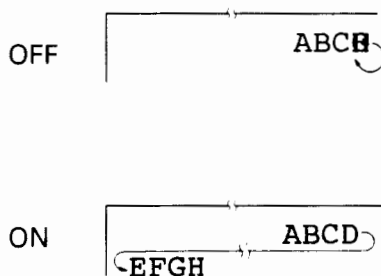
If **perforation skip** is on, then the printer will print the current page and start a new page if it receives any commands that would cause printing in the bottom margin area. Turning perforation skip off allows you to print in the bottom margin area. The factory default setting is on.





**Figure 3-5 Perforation skip**

End-Of-Line wrap specifies how the printer will act when the cursor reaches the right end of the line. If **EOL wrap** is on, then the printer automatically inserts a carriage return and line feed when the right margin is reached. If **EOL wrap** is off, printing continues beyond the right margin and the data beyond the right end is discarded. The factory default setting is off.



**Figure 3-6 EOL wrap**



The **ISO symbol set** selection menu is valid when the symbol set (or character set) of the font you selected is Roman-8. It is valid whenever you use resident fonts, but invalid, for example, when you use the optional font card No. 28 that has the PC-8 symbol set only. This menu allows you to change certain characters (called ISO symbol set) to ones specific to a software application or foreign language. Symbol sets are explained in Section 4 and ISO symbol sets are listed in Appendix E. The factory default setting is USASC II.

Decimal code	35	36	64	91	92	93	94	96	123	124	125	126
Character	#	\$	@	[	\	]	^	~	{		}	~

**Figure 3-7 ISO symbol set (USASC II)**

## Setup Report Function

Selecting **setup report** will cause a setup report to be printed. The setup report (a sample is shown on Figure 3-8) shows all of the default menu settings and lists each of the available printer emulations.

## Font Report Function

Selecting **font report** will cause a font report to be printed. The font report (a sample is shown in Figure 3-9) shows portrait and landscape fonts separately. It lists font numbers, attributes, and samples of available fonts.

## Copy Menu

You can print up to 99 copies of each page by changing the setting of the **copy** menu. Unlike the other functions, the setting of the copy function cannot be saved in the printer's permanent memory with the save function. If you turn the power off and back on, the setting automatically reverts to one copy.



## ----- SET UP REPORT -----

Selected Host I/F :PARALLEL

Centronics I/F Setup  
Timing :1

RS-232C I/F Setup  
Baud Rate :9600 BAUD  
Data Format :8NONE1  
Data Flow Control :XON/XOFF

Number of Copies :1

MISCELLANEOUS  
Line Pitch :6LPI  
LF,FF Code :LF ONLY  
CR Code :CR ONLY  
EOL Wrap :OFF  
Skip Perforation :ON  
ISO Symbol Set :ROMAN-8

Selected Font  
Slot No. :RESIDENT  
Font No. :1

Selected Hopper :HOPPER1

Selected Emulation  
Slot No. :RESIDENT  
Emulation Name :HP LJ2  
Revision :6

MEMORY(RAM) :0.64MB

Available Emulations  
Resident :HP LJ2  
:DIABLO ECS  
:IBM-PRO  
:FX-85  
IC Card :

Figure 3-8 Setup report



----- AVAILABLE PORTRAIT FONTS -----						
RESIDENT FONTS			POINT	PITCH	SAMPLE	
NO.	NAME	SYMBOL SET	SIZE			
1	Courier10	ROMAN-8	12	10	ABCDefghI\$@(\)^` AA^CN!Z00000000A	
2	Courier10	PC-8	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
3	Courier10	PC-8(D/N)	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
4	Courier10	ECMA-94	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
5	Courier10	FJ-ALL	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
6	Courier10	PC-850	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
7	Courier10	FJ-860	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
8	Courier10	FJ-863	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
9	Courier10	FJ-865	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
10	Courier10	FJ-X	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
11	Courier10.B	ROMAN-8	12	10	ABCDefghI\$@(\)^` AA^CN!Z00000000A	
12	Courier10.B	PC-8	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
13	Courier10.B	PC-8(D/N)	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
14	Courier10.B	ECMA-94	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
15	Courier10.B	FJ-ALL	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
16	Courier10.B	PC-850	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
17	Courier10.B	FJ-860	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
18	Courier10.B	FJ-863	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
19	Courier10.B	FJ-865	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
20	Courier10.B	FJ-X	12	10	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
21	LnPrinter17	ROMAN-8	8.4	16.6	ABCDefghI\$@(\)^` AA^CN!Z00000000A	
22	LnPrinter17	PC-8	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
23	LnPrinter17	PC-8(D/N)	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
24	LnPrinter17	ECMA-94	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
25	LnPrinter17	FJ-ALL	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
26	LnPrinter17	PC-850	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
27	LnPrinter17	FJ-860	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
28	LnPrinter17	FJ-863	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
29	LnPrinter17	FJ-865	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
30	LnPrinter17	FJ-X	8.4	16.6	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
31	Prstgelitel2	ROMAN-8	9.9	12	ABCDefghI\$@(\)^` AA^CN!Z00000000A	
32	Prstgelitel2	PC-8	9.9	12	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
33	Prstgelitel2	PC-8(D/N)	9.9	12	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
34	Prstgelitel2	ECMA-94	9.9	12	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
35	Prstgelitel2	FJ-ALL	9.9	12	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	
36	Prstgelitel2	PC-850	9.9	12	ABCDefghI\$@(\)^` 10 11 11 11 11 11 11 11	

Control panel

### Figure 3-9 Font report (1)



P u	67	Prstgelitel2	FJ-860	9.9	12	ABCDefgh#S@{ } ^ i d . R u : q u e - - - - - p a u l d . 1
	68	Prstgelitel2	FJ-863	9.9	12	ABCDefgh#S@{ } ^ i d . R u : q u e - - - - - p a u l d . 1
	69	Prstgelitel2	FJ-865	9.9	12	ABCDefgh#S@{ } ^ i d . R u : q u e - - - - - p a u l d . 1
	70	Prstgelitel2	FJ-X	9.9	12	ABCDefgh#S@{ } ^ i d . R u : q u e - - - - - p a u l d . 1
	81	TmsRmnl0p	ROMAN-8	9.9	PS	ABCDefgh#S@{ } ^ AA'ÇN...ueeeaeoA
	83	TmsRmnl0p.B	ROMAN-8	9.9	PS	ABCDefgh#S@{ } ^ AA'ÇN...ueeeaeoA
	85	Helv15p.B	ROMAN-8	14.3	PS	ABCDefgh#S@{ } ^ AA'ÇN...ueeeaeoA
<u>CARD SLOT 1 FONTS</u>						
	NO.	NAME	SYMBOL SET	POINT SIZE	PITCH	SAMPLE
<u>CARD SLOT 2 FONTS</u>						
	NO.	NAME	SYMBOL SET	POINT SIZE	PITCH	SAMPLE
<u>CARD SLOT 3 FONTS</u>						
	NO.	NAME	SYMBOL SET	POINT SIZE	PITCH	SAMPLE
<u>PERMANENT SOFT FONTS</u>						
	NO.	NAME	SYMBOL SET	POINT SIZE	PITCH	SAMPLE

Figure 3-9 Font report (1)



[illegible]

### Figure 3-9 Font report (2)

Control panel



77	PrstgElite12	FJ-860	9.9	12	ABCDefgh#58{ } ^ i6 - - - - -
78	PrstgElite12	FJ-863	9.9	12	ABCDefgh#58{ } ^ i6 - - - - -
79	PrstgElite12	FJ-865	9.9	12	ABCDefgh#58{ } ^ i6 - - - - -
80	PrstgElite12	FJ-X	9.9	12	ABCDefgh#58{ } ^ i6 - - - - -
82	TmsRmn10p	ROMAN-8	9.9	PS	ABCDefgh#58{ } ^ AA^C^N:u666666A
84	TmsRmn10p.B	ROMAN-8	9.9	PS	ABCDefgh#58{ } ^ AA^C^N:u666666A
86	Helv15p.B	ROMAN-8	14.3	PS	ABCDefgh#58{ } ^ AA^C^N:u666666A

CARD SLOT 1 FONTS

NO.	NAME	SYMBOL SET
<u>CARD SLOT 2 FONTS</u>		
NO.	NAME	SYMBOL SET
<u>CARD SLOT 3 FONTS</u>		
NO.	NAME	SYMBOL SET
<u>PERMANENT SOFT FONTS</u>		
NO.	NAME	SYMBOL SET

POINT SIZE	PITCH	SAMPLE
<u>CARD SLOT 2 FONTS</u>		
POINT SIZE	PITCH	SAMPLE
<u>CARD SLOT 3 FONTS</u>		
POINT SIZE	PITCH	SAMPLE
<u>PERMANENT SOFT FONTS</u>		
POINT SIZE	PITCH	SAMPLE

cartridge

Figure 3-9 Font report (2)



## Enter Hex Dump Function

The hexadecimal (hex) dump function is used primarily for determining why something is not printing the way you expect it to. All codes sent from your computer to the printer - including escape sequences and other printer commands - are printed as two-digit hexadecimal codes. For reference, the printable ASCII characters are also printed on the page. Non-printable codes are shown as periods. A sample hex dump listing is shown Figure 3-10.

Count	Hexadecimal dump	ASCII characters
000000	41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50	ABCDEFGHIJKLMN
000010	51 52 53 54 55 56 57 58 59 5A 61 62 63 64 65 66	QRSTUVWXYZabc
000020	67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76	ghijklmnopqrst
000030	77 78 79 7A 30 31 32 33 34 35 36 37 38 39 0D 0A	wxyz0123456789..
000040	41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50	ABCDEFGHIJKLMN
000050	51 52 53 54 55 56 57 58 59 5A 61 62 63 64 65 66	QRSTUVWXYZabc
000060	67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76	ghijklmnopqrst
000070	77 78 79 7A 30 31 32 33 34 35 36 37 38 39 0D 0A	wxyz0123456789..
000080	41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50	ABCDEFGHIJKLMN
000090	51 52 53 54 55 56 57 58 59 5A 61 62 63 64 65 66	QRSTUVWXYZabc
0000A0	67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76	ghijklmnopqrst
0000B0	77 78 79 7A 30 31 32 33 34 35 36 37 38 39 0D 0A	wxyz0123456789..
0000C0	41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50	ABCDEFGHIJKLMN
0000D0	51 52 53 54 55 56 57 58 59 5A 61 62 63 64 65 66	QRSTUVWXYZabc
0000E0	67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76	ghijklmnopqrst
0000F0	77 78 79 7A 30 31 32 33 34 35 36 37 38 39 0D 0A	wxyz0123456789..

Figure 3-10 Hex dump listing

Printer commands have no effect while using the hex dump function. However, the control panel display and buttons operate normally with one exception: pressing the **MENU** button while offline brings up the **hex dump** menu instead of the main menu. The **hex dump** menu offers only two options: **quit hex dump** and **replace parts**.

**Quit hex dump** returns you to normal operation (turning the power off and back on will also end the hex dump function). The **replace parts** option in the hex dump menu has the same function as the **replace parts** option in the main menu.



**NOTE:**

Nothing will print until enough data for a full page listing has been sent to the printer. After your program has finished printing, switch the printer offline and press the **FORM FEED** button to print the data remaining in the buffer.

**Set Default Function**

The set default function restores all the settings to the factory default settings. The following table lists the factory default settings of LaserJet.

Item	Default Setting
Host I/F	Parallel
RS-232C Baud Rate	9600 bps
RS-232C Data Bits	8 bits
RS-232C Stop Bits	1 bit
RS-232C Parity	Mark
RS-232C Flow Control	DTR
Parallel Timing	Timing 1
Paper Tray	Tray 1
Number of Copies	1
Font Source	Resident
Font Number	1 (Portrait, roman 8, courier, 12-point, 10-pitch, upright, medium)
Line Pitch	6 lines per inch
CR Code	CR only
LF Code	LF only
Perforation Skip	On
EOL Wrap	Off
ISO Symbol Set	USASC II



## Save Function

The **save** function is used to store menu settings in the printer's permanent memory. This causes these settings to be effective whenever the power is turned on. The number of copies cannot be saved.

Keep in mind that pressing the ENTER button saves the displayed option in temporary memory; these settings are lost when the power is turned off. The **save** function merely takes the current settings and copies them to permanent memory.

## Replace Parts Menu

Selecting the **replace parts** menu following a "REPLACE PARTS" message displays a one-item menu: cartridge. Selecting cartridge resets the printer's internal counter to signal you to change the process cartridge when another 6000 pages have been printed.

## Menu Mode Reference (Serial Printers)

The main menu has the same configuration between the HP LaserJet Series II emulation and the serial printer emulation. It differs only in default setting of the parallel interface menu and in option configuration of the miscellaneous menu. The differences are described below. See the "Menu Mode Reference (LaserJet)" for the common menus.

## Parallel Interface Menu

The factory default setting is timing 2 for serial printers.



## Miscellaneous Menu

Options offered differ with serial printer emulations: Diablo 630 ECS, Epson FX-85, and IBM Proprinter. See the "Main Menu Mode Flowcharts" at the last of this section.

The **language** menu allows you to select a certain international character set.

USA	American English (ASCII set)
FRANCE	French (ç, à, è, ù, etc.)
GERMANY	German (ä, ö, ü, ß, etc.)
ITALY	Italian (ç, ò, è, ì, etc.)
UK	British English (£)
SPAIN	Spanish (Pt, ÿ, ñ, ¿, etc.)
DENMARK	Danish (æ, ø, ü, å, etc.)
SWEDEN	Swedish (o, å, ä, é, etc.)

**Figure 3-11 Language**

The **character pitch** menu allows you to set character spacing as illustrated below. The factory default setting is 10 characters per inch.

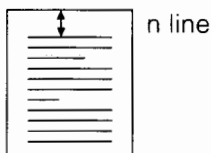
10 CPI	ABCDEFGHIJKLMNOQ
12 CPI	ABCDEFGHIJKLMNOQ
15 CPI	
17.1 CPI	ABCDEFGHIJKLMNOQ
Proportional	ABCDEFGHIJKLMNOQ

**Figure 3-12 Character pitch**



The **line pitch** menu is the same as for LaserJet series II.

The **top margin** menu allows you to set the top margin to 0 to 15 lines. Characters inside or touching the unprintable area are not printed. The factory default setting is 0 line.



**Figure 3-13 Top margin**

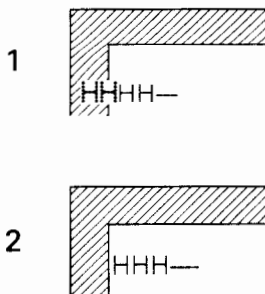
The **bottom margin** menu allows you to set the bottom margin to 0 to 15 lines. The actual distance includes a fraction of a line. Characters inside or touching the unprintable area are not printed. The factory default setting is 0 line.



**Figure 3-14 Bottom margin**



The **left end** menu allows you to set the print start position to the leftmost column on the paper or the leftmost column in the printable area. Characters inside or touching the unprintable area are not printed. The factory default setting is 2. The left margin is starting from the left end.



**Figure 3-15 Left end**

The **new line** menu is the same as the **LF, FF code** menu for HP LaserJet series II.

The **auto LF** menu is the same as the **CR code** menu for HP LaserJet series II.

The **auto CR** menu is the same as the **EOL wrap** menu for HP LaserJet series II.

The **zero** menu allows you to set the character zero to "without slash" or "with slash" as shown below. The factory default setting is a zero without slash.

Normal	0
Slash	ø

**Figure 3-16 Zero font**

The **perforation skip** menu is the same as for HP LaserJet series II.



The **character set** menu allows you to select IBM PC character set 1 or 2. Set 1 is for US English and has two sets of control codes. Set 2 is for other than US English and one set of control codes is replaced with international characters. The factory default setting is character set 2.

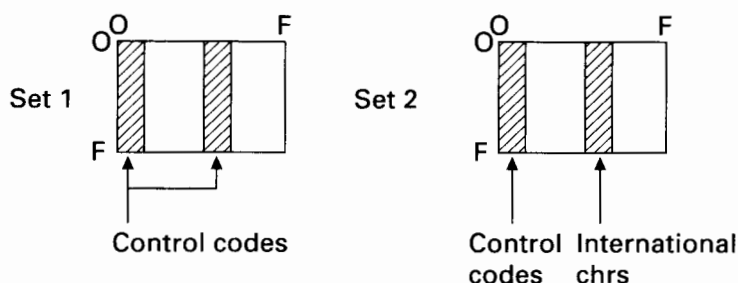


Figure 3-17 Character set

The **buzzer** menu allows you to enable or disable the buzzer. The factory default setting is ON (enabled).

The **7/8 bits mode** menu allows you to select the word length of interface data to 8 bits or 7 bits. The 8-bit mode makes the most significant bit valid and the 7-bit mode ignores than bit. Bit image graphics always uses 8-bit data. The factory default setting is 8-bit mode.

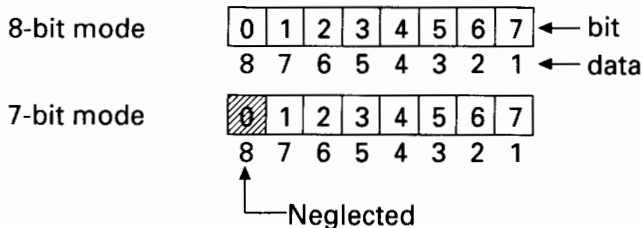


Figure 3-18 7/8 bits mode



## Factory Default Settings

The following tables list the factory default settings of serial printer emulations.



The following table lists the factory default settings of Diablo 630, FX-85, IBM Proprinter.

**Diablo 630 defaults**

Item	Default Setting
Host I/F	Parallel
RS-232C Baud Rate	9600 bps
RS-232C Data Bits	8 bits
RS-232C Stop Bits	1 bit
RS-232C Parity	Mark
RS-232C Flow Control	DTR
Parallel Timing	Timing 2
Paper Tray	Tray 1
Number of Copies	1
Font Source	Resident
Font Number	1 (Portrait, roman-8, courier, 12-point, 10-pitch, upright, medium)
Language	USA
Character Pitch	10 characters per inch
Line Pitch	6 lines per inch
Top Margin	0 line
Bottom Margin	0 line
Left End	1
New Line	Off
Auto LF	Off
Auto CR	Off
Buzzer	On
7/8 Bits Mode	8 bits mode



**FX-85 defaults**

Item	Default Setting
Host I/F	Parallel
RS-232C Baud Rate	9600 bps
RS-232C Data Bits	8 bits
RS-232C Stop Bits	1 bit
RS-232C Parity	Mark
RS-232C Flow Control	DTR
Parallel Timing	Timing 2
Paper Tray	Tray 1
Number of Copies	1
Font Source	Resident
Font Number	1 (Portrait, roman-8, courier, 12-point, 10-pitch, upright, medium)
Language	USA
Character Pitch	10 characters per inch
Line Pitch	6 lines per inch
Top Margin	0 line
Bottom Margin	0 line
Left End	1
CR Code	CR only
Zero	Normal
Buzzer	Buzzer On



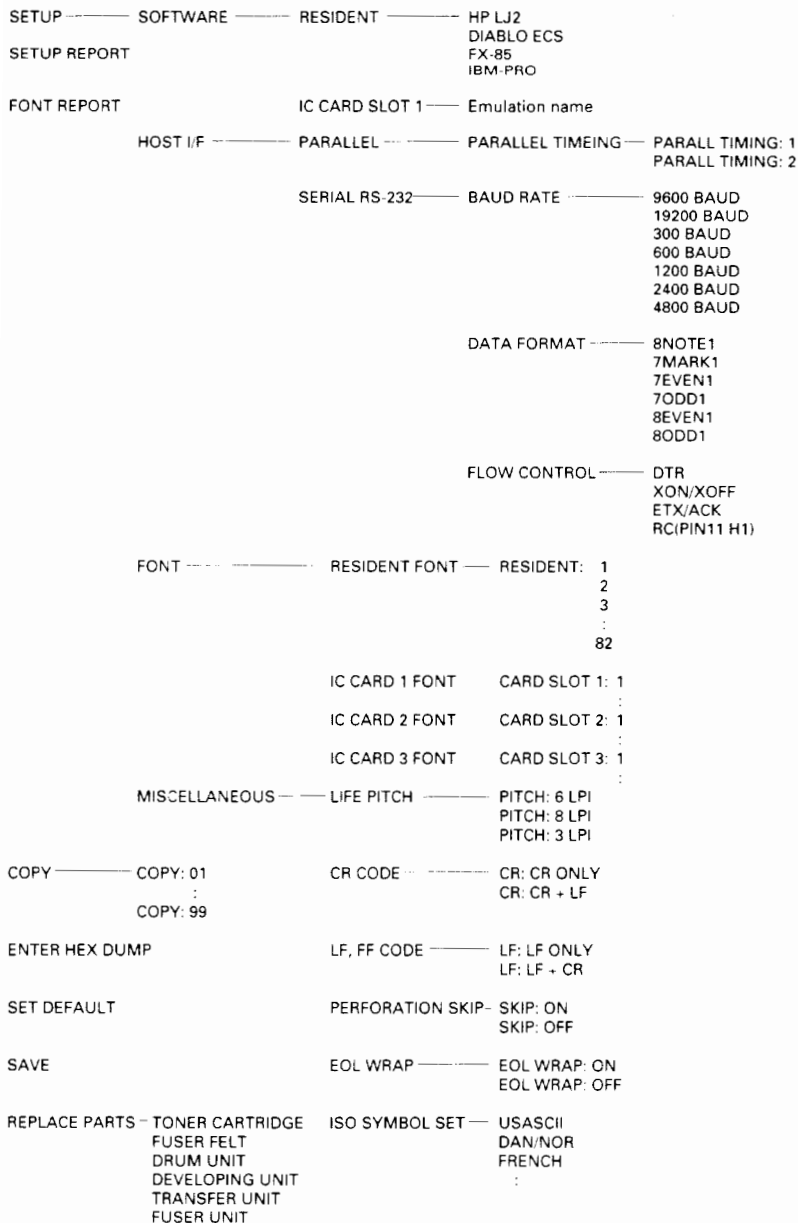
**IBM Proprinter defaults**

Item	Default Setting
Host I/F	Parallel
RS-232C Baud Rate	9600 bps
RS-232C Data Bits	8 bits
RS-232C Stop Bits	1 bit
RS-232C Parity	Mark
RS-232C Flow Control	DTR
Parallel Timing	Timing 2
Paper Tray	Tray 1
Number of Copies	1
Font Source	Resident
Font Number	1 (Portrait, roman-8, courier, 12-point, 10-pitch, upright, medium)
Character Pitch	10 characters per inch
Line Pitch	6 lines per inch
Top Margin	0 line
Bottom Margin	0 line
Left End	1
LF, FF code	LF only
CR Code	CR only
Zero	Normal
Perforation Ship	Off
Character Set	2
Buzzer	On



## Main Menu Mode Flowcharts

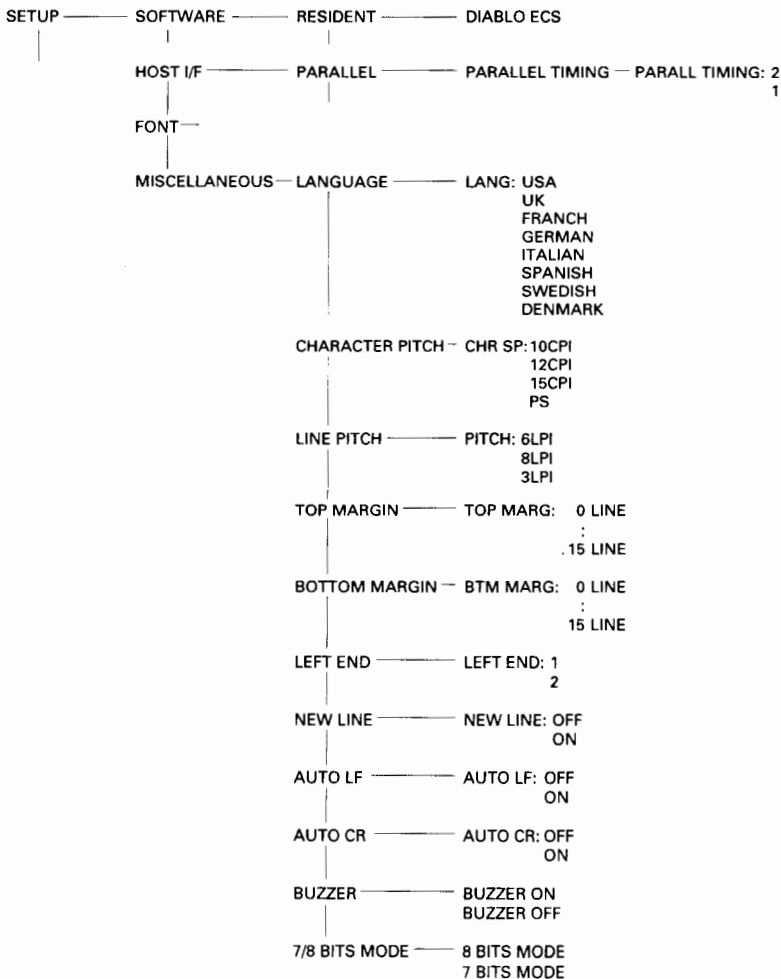
## LaserJet Main Menu





## Diablo Main Menu

See the LaserJet main menu for other than the miscellaneous menu shown below.





## Epson FX-85 Main Menu

See the LaserJet main menu for other than the miscellaneous menu shown below.

```

SETUP ——— SOFTWARE ——— RESIDENT ——— FX-85
:
HOST I/F ——— PARALLEL ——— PARALLEL TIMING — PARALL TIMING: 2
:                                     1

FONT —
:

MISCELLANEOUS — LANGUAGE ——— LANG: USA
:                                     UK
:                                     FRANCH
:                                     GERMAN
:                                     ITALIAN
:                                     SPANISH
:                                     SWEDISH
:                                     DENMARK

CHARACTER PITCH — CHR SP: 10CPI
:                                     12CPI
:                                     17.1CPI
:                                     PS

LINE PITCH ——— PITCH: 6LPI
:                                     8LPI
:                                     3LPI

TOP MARGIN ——— TOP MARG: 0 LINE
:                                     :
:                                     15 LINE

BOTTOM MARGIN — BTM MARG: 0 LINE
:                                     :
:                                     15 LINE

LEFT END ——— LEFT END: 1
:                                     2

CR CODE ——— CR: CR ONLY
:                                     CR: CR + LF

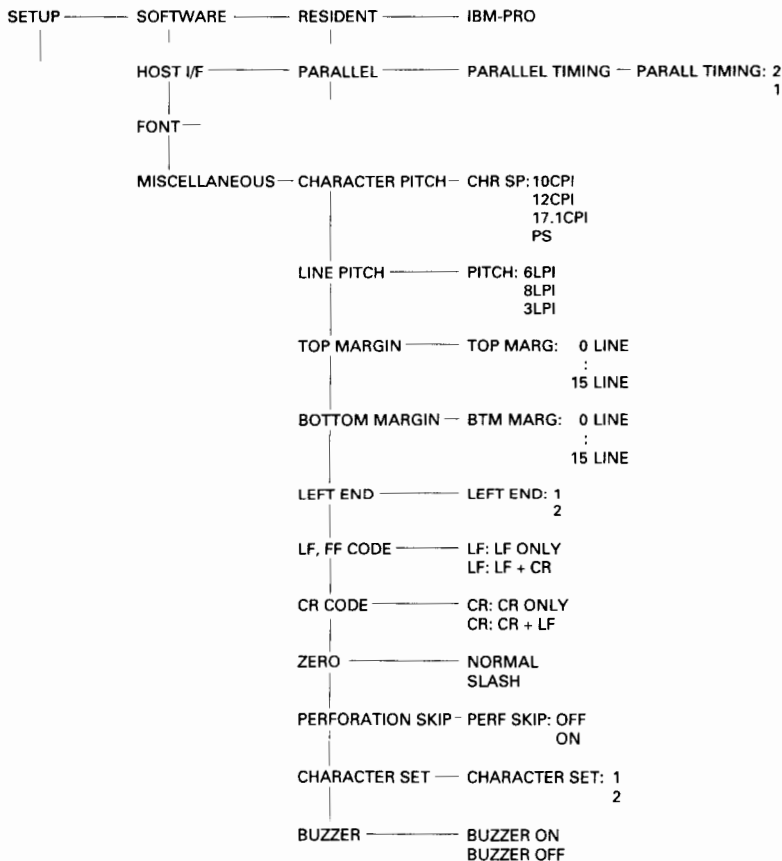
ZERO ——— NORMAL
:                                     SLASH

BUZZER ——— BUZZER ON
:                                     BUZZER OFF
  
```



## IBM Proprinter Main Menu

See the LaserJet main menu for other than the miscellaneous menu shown below.









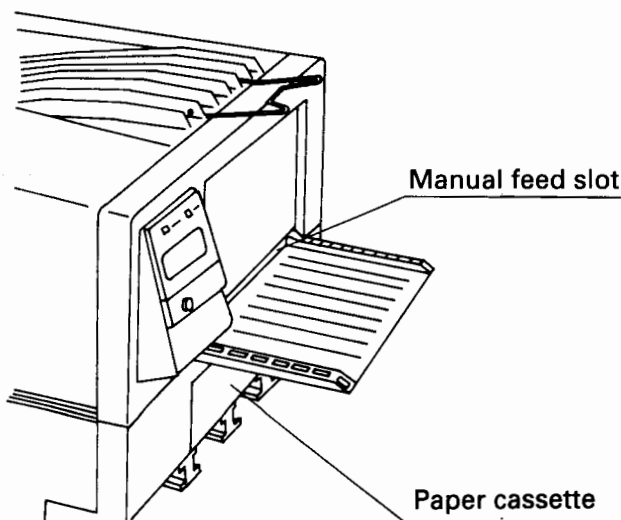
## SECTION 4

# INSTRUCTIONS FOR PRINTING

This section provides the basic information necessary for using your printer. Some explanations involve printer command examples of the HP LaserJet Series II emulation. Refer to the Programmer's Manual for details of those commands.

## Selecting Paper Cassettes and Manual Feed Slot

You can select either the paper cassette 1 (hopper 1), paper cassette 2 (hopper 2), or manual feed slot. This is done from the control panel or by using a command. The paper cassette 2 is an option.



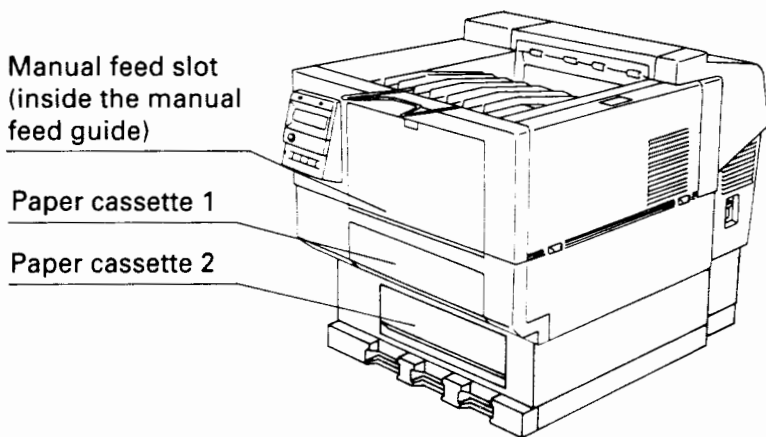
**Paper Cassette and Manual Feed Slot**



## Paper Cassette

Two paper cassettes are available. One is the first paper cassette (hopper 1) and the other is the optional second paper cassette (hopper 2). Both are at the same location; the second paper cassette is stacked under the first paper cassette. When you have a paper cassette, it must be installed at the first hopper position. This is because the paper in the second paper cassette takes more time to reach the print position than the paper in the first paper cassette.

When there are two paper cassettes, they can be used separately. For example, you can continuously print documents using two types of paper, for example, letterheads in the second paper cassette for the first page and plain paper in the first paper cassette for subsequent pages. In this case, a printer command is needed to swap the paper (paper input control or paper cassette select control command) rather than using the control panel.



**Printer with Optional Paper Cassette**

### NOTE:

When paper cassette 1 is removed, paper cassette 2 cannot be used.



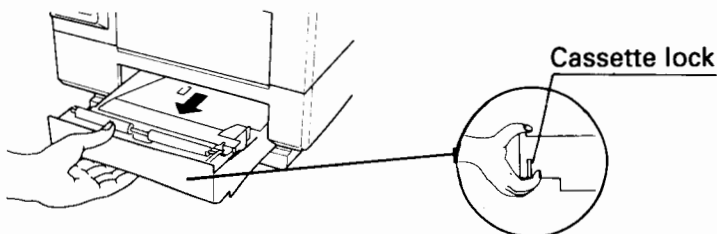
## Loading Paper

This printer handles various types and sizes of paper. Refer to **Appendix A** or ask your dealer whether a specific type of paper can be used.

### NOTE:

Curled paper may cause a jam.

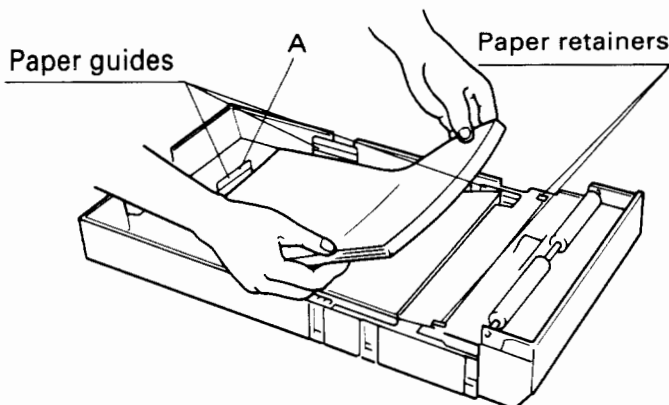
1. Remove the paper cassette by pulling the cassette lock straight out.



### Removing the Paper Cassette



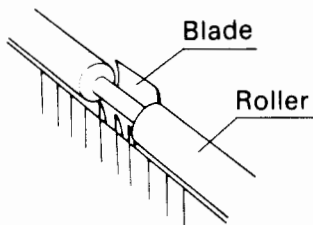
2. Adjust the horizontal and vertical guides for the size of the paper. Then load the paper stack into the cassette up against the back guide with the printing surface down, as shown. Finally, push down on the front corners of the paper stack, so that the paper is pushed under the movable retainers.



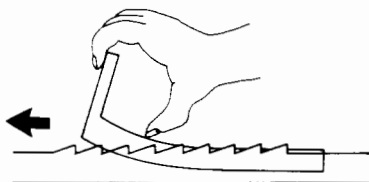
### Inserting the Paper into the Cassette

#### NOTES:

1. The blade should be between the paper guide rollers as shown.

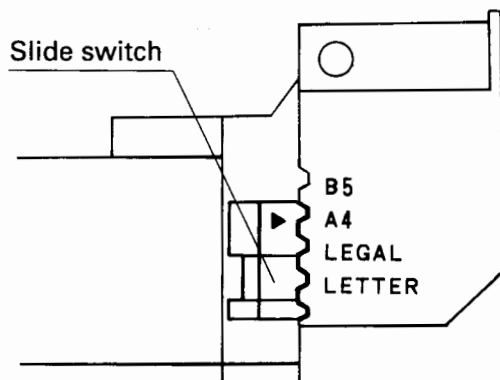


2. When sliding the paper guide A backward, slightly lift up the guide.





3. Use the slide switch to select the paper size. Slide the switch until the indicator is at the position that corresponds to the size of the paper loaded. The figure below shows the A4 size is selected.



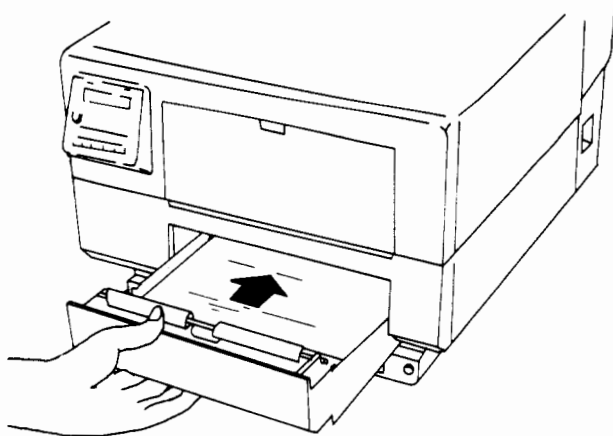
**Slide Switch for Selecting Paper Size**

**NOTE:**

1. The paper jam message appears if the paper size switch is selected incorrectly.
2. The setting is not stored in memory until a page has been printed. It is retained even if the power is turned off.



4. Insert the paper cassette into the slot. The cassette is locked in place when you hear the click.

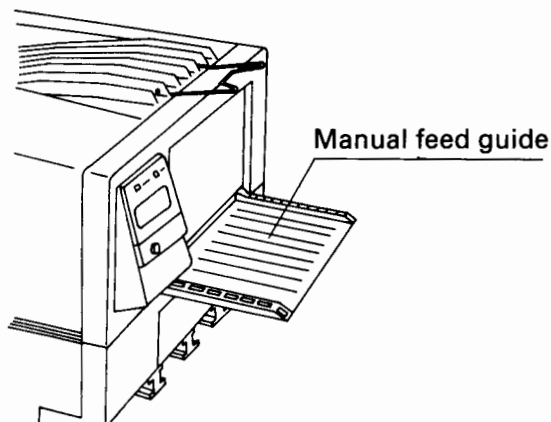


**Inserting the Paper Cassette**



## Manual Feed Slot

The manual feed slot is for handling special paper. It feeds paper that you insert one by one according to the control panel message. Open the manual feed guide by pulling towards you.



**Manual Feed Guide**

When selecting a paper cassette or slot from the control panel, use the TRAY SELECT button in the offline state. Each time you press the button, the message display changes as follows regardless of the actual installation of hoppers.

Press this button	Display	Comment
1. <b>ONLINE</b>	OFFLINE HP1 A4	Switches the printer offline.
2. <b>TRAY SELECT</b>	HP1 A4 *	Selects the tray selection menu and displays the current setting.



Press this button	Display	Comment
3. <u>NEXT</u>	HP2 A4 MANUAL AUTOMATIC HP1 A4 HP2 A4	Each time you press the NEXT button, the display changes downward and wraps around to the top.
<u>PREVIOUS</u>		Changes the display upward.
<u>ENTER</u>	SELECTED HP2 A4*	Makes your selection. "SELECTED" will be displayed briefly.
4. <u>ONLINE</u>	ONLINE HP2 A4	Leaves the tray selection menu and returns the printer online.
<u>HOME</u>	OFFLINE HP2 A4	Leaves the bin selection menu.

**NOTE:**

When HP2 A4 is not mounted, HP2 A4 and AUTOMATIC are not displayed.

If data remains unprinted in the buffer (the DATA indicator lamp lights), the new selection becomes valid after printing the current page.



## Tray Selection Menu

When selecting a paper cassette or manual feed slot by a printer command, use the following Paper Input Control command:

ESC & 0 # H.

The table below shows the value of # and the action to be taken by the printer.

**Paper Input Control Command (HP-LJ emulation)**

#	Action to be taken
0	Print and eject the current page (if any).
1	Select paper cassette 1 after printing and ejecting the current page (if any).
2	Select the manual feed slot after printing and ejecting the current page (if any).
4	Select paper cassette 2 after printing and ejecting the current page (if any).
Others	Same as 1.

The default value is 1 (paper cassette 1).



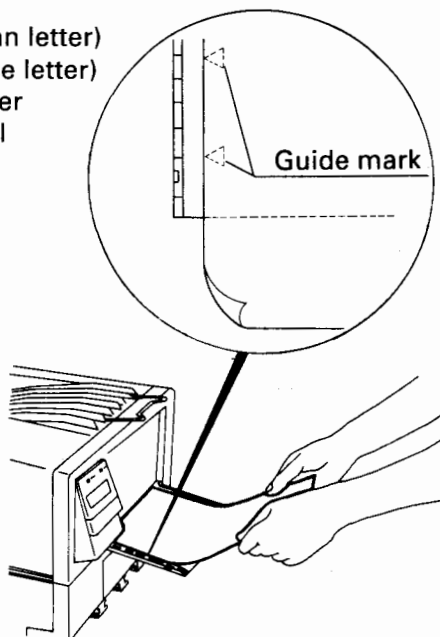
## Using the Manual Feed Slot

Select the manual feed slot by the procedure explained at the preceding pages. The following is an example when the slot is selected from the control panel.

Press this button	Display	Comment
1. <b>ONLINE</b>	ONLINE MANUAL	Switches the printer online.
2. [CPU RUN]	INSERT A4	When the CPU starts sending print data, "INSERT A4" is display.
3. [Paper Insertion]	PRINTING MANUAL	Printing starts when you insert the specified size paper and full page data is sent.



A4: A4 (European letter)  
B5: B5 (Japanese letter)  
LETTER: US letter  
LEGAL: US legal



### Setting Paper in the Manual Feed Slot

Press this button	Display	Comment
4. _____	ONLINE MANUAL	Indicates the printer is ready for the next page.
5. _____	INSERT A4	Prompts you to insert the next paper if any.

#### NOTE:

Insert paper deep enough to feed it correctly.



## Choosing Fonts

The electrophotographic printer produces print of high quality and features a wide variety of fonts as well as fine graphics. This is due to its high resolution (300 dots per inch) and 32x32 dot matrix per character. You can improve the appearance of your documents by choosing appropriate fonts.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

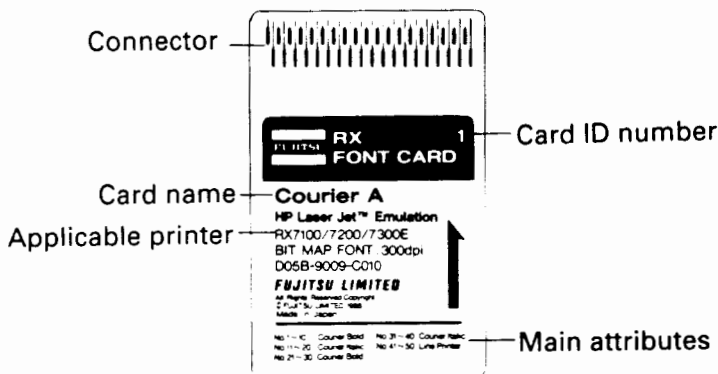
ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

### Font Samples

This printer has many types of resident fonts. A variety of additional fonts is available if you install IC font cards. An IC font card generally includes several fonts.



### Font Card and Label

See **Appendix F** for the list of resident and optional fonts.



## Attributes of Font

Fonts are identified by the attributes which are listed on the label of each font card carton. The desired font can be selected by a combination of attributes or a font number.

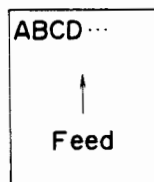
Font No.	Typestyle	Orientation	Pitch/Point Size	Character Set
1-10	<b>Courier Bold</b>	Portrait	10/12	Roman 8 USASCII Roman-Ext. DAN/NOR U.K. French German Italian SWE/FIN Spanish
11-20	<i>Courier Italic</i>	Portrait	10/12	
21-30	<b>Courier Bold</b>	Landscape	10/12	
31-40	<i>Courier Italic</i>	Landscape	10/12	
41-50	Line Printer	Landscape	16 66/8.5	

Note: Not for use with Fujitsu RX7300A or RX7400 Printers  
 ALL RIGHTS RESERVED. COPYRIGHT © FUJITSU LIMITED 1988  
 LaserJet is a registered trademark of Hewlett-Packard, Inc. Made in Japan

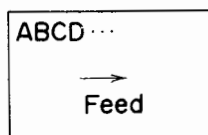
### Font Card Carton Label

## Orientation

Indicates the direction of the printed characters. Two directions are available; portrait refers to printing text along the width of the page (along the drum axis) and landscape refers to printing text along the length of the page (across the drum axis).



**Portrait**



**Landscape**

## Symbol set (character set)

Identifies the letters or symbols that are included. Some examples include Roman 8, IBM Character Set 1 or 2. General sets include the standard English alphanumeric characters, special characters, and operation symbols besides the characters or symbols specific to a given software package or machine.



## Spacing and Pitch

Fixed pitch indicates the number of characters printed per inch. Proportional spacing determines the pitch according to the width of each character.

Fixed Pitch:

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
Communication Successful!!

Proportional:

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
Communication Successful!!

## Point size

Indicates the height of characters in units of 1/72 inch.

ABCD  
ABCD

14 Points

ABCDEF  
ABCDEF

10 Points

ABCDEFGHIJ  
ABCDEFGHIJ

6 Points

## Style

Indicates the tilt of characters, that is, upright or italic.

Upright

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

Italic

*ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789*



## Weight

Indicates the thickness of the character stroke, that is, light, medium, or bold.

Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

Bold

**ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789**

## Type face

Largely classifies families of types such as Courier, Prestige Elite, Letter Gothic, HELV, and Tms Rmn.

Courier

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

Prestige

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

Tms Rmn

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

HELV

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

### NOTE:

You can see the attributes of the resident fonts and your IC card fonts from this printer manual and your font card manual or label. Main attributes can be printed out by using the list function in the setup mode.



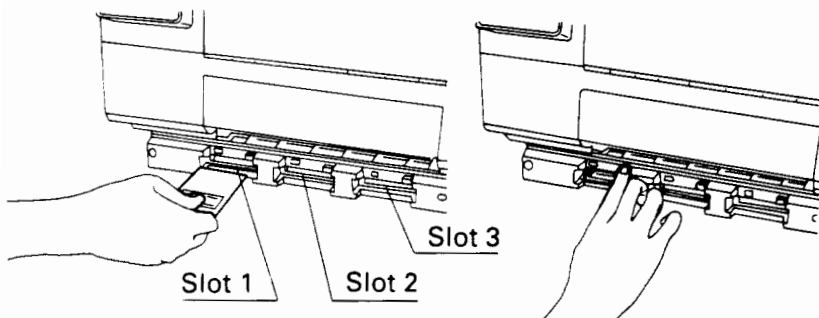
## Installing Font Cards

You can use up to three font cards at a time. This permits a variety of character styles to be printed.

There are three slots for installing font cards.

Insert the font card into one of these until it "clicks" in. Be sure the label is up and that the connector is away from you.

To change or remove the card, press the eject button, and the card will pop out.



### Installing and Removing a Font Card

---

#### NOTES:

1. When using an emulation card, it must be installed in slot 1. This leaves slots 2 and 3 available for optional font cards.
  2. The optional emulation cards will be distributed in the near future.
-



## Specifying a Font

You can specify a font by using the control panel or by using font selection commands in software. Software commands are convenient when you want to change fonts while printing. However, this feature is only available in the HP Laser Jet Series II emulation mode.

## Using the Control Panel to Select a Font

The control panel can be used to select any of the resident fonts, card fonts, or soft fonts currently loaded in the printer. To select a font, follow these steps:

Press this button	Display	Comment
1. <b>ONLINE</b>	OFFLINE HP1 A4	Switches the printer offline.
<b>NENU</b>	SETUP	Enters menu mode. The first option of the main menu is displayed.
2. <b>ENTER</b>	SOFTWARE	Selects the setup menu. The first option is displayed.
3. <b>NEXT</b>	FONT	Pressing the NEXT button twice displays the third option in the setup menu.
<b>ENTER</b>	RESIDENT FONT*	Selects the Font function and displays the current setting.



- |                  |                            |  |
|------------------|----------------------------|--|
| 4. <u>ENTER</u>  | RESIDENT: 1 *              | Selects the resident font and displays the current setting.  |
| 5. <u>NEXT</u>   | RESIDENT: 2<br>3<br>:<br>: | Press the NEXT button until the desired font number is displayed.  |
| <u>ENTER</u>     | SELECTED<br>RESIDENT: 3 *  | Makes your selection. "SELECTED" will be displayed briefly then the selected font number will be displayed with an asterisk. |
| 6. <u>ONLINE</u> | ONLINE HP1 A4              | Leaves the menu mode and returns the printer online.   |

When you use a font card, steps 4 and 5 change as follows:

- |                |                                    |  |
|----------------|------------------------------------|--|
| 4. <u>NEXT</u> | IC CARD n FONT                     | Displays the first available card slot.  |
| <u>ENTER</u>   | CARD SLOT n: 1                     | Selects the card font and displays the first font. For the first time setting, no asterisk appears.                          |
| 5. <u>NEXT</u> | CARD SLOT n: 2<br>3<br>:<br>:<br>n | Press the NEXT button until the desired font number is displayed.  |
| <u>ENTER</u>   | SELECTED<br>CARD<br>SLOT n: 3 *    | Makes your selection. "SELECTED" will be displayed briefly then the selected font number will be displayed with an asterisk. |



A font selected in this manner will remain effective until one of the following occurs:

- A new font is selected with the control panel
- A new font is selected with printer commands
- The power is turned off

If you wish to make the selected font the power-on default font, use the "SAVE" function in menu mode.

#### NOTES:

1. The font report lists the available font numbers and the corresponding font attributes and samples.
2. See Section 3 for the font report.



## From software

Although most software packages allow fonts to be selected without using printer commands, it is sometimes desirable to specify or change fonts by embedding printer commands. These commands specify the seven attributes described previously. All seven attributes do not need to be specified each time.

The current attributes remain valid unless you change them. If the printer does not have the specified fonts, the appropriate font is selected.

### Attributes and printer commands

Attribute	Command	Remarks
Orientation	ESC & ℓ 0 O ESC & ℓ 1 O	Portrait Landscape
Character set	ESC ( 8 U	Roman 8
Spacing	ESC ( s 1 P ESC ( s 0 P	Proportional Fixed
Pitch	ESC ( s # H	# = 10: 10 CPI 12: 12 CPI
Point size	ESC ( s # V	# = 10: 10 Pt.
Style	ESC ( s 0 S ESC ( s 1 S	Upright Italic
Weight	ESC ( s - 3 B ESC ( s 0 B ESC ( s 3 B	Light Medium Bold
Type face	ESC ( s # T	# = 0: Line printer 3: Courier 5: Tms Rmn etc.,

### NOTE:

When specifying more than one attribute in a single ESC sequence, give them in the sequence shown in the table.



## Combing Escape Sequences

You can combine these commands if the first two characters following the escape code are the same. You can omit the escape code and the two characters for the succeeding commands, but must change the last uppercase letter of each command to the lowercase letter except for the last command.

That is, ESC ( s 1 P and ESC(s 0 S are be combined to ESC ( s 1 p 0 S and executed in this order.

The following is an example of changing fonts when you are using Word Perfect 5.0. Assume that you have prepared a text in 12 pt. of medium stroke. If you want to emphasize captions by 18 pt. of bold stroke, the command to be sent for captions is ESC (s 18 v 3 B and that for restoring is ESC (s 12 v 0 B.

1. Position the cursor at the beginning of a caption to be emphasized..
2. Hold down the Shift key, and press the F8 key, then type 4, 6, 2, and 1.  
WordPerfect is ready to accept printer commands for your text.
3. Enter the above command for caption as <2 7> s 1 8 v 3 B.  
Unprintable characters are expressed in decimal in angle brackets.
4. Position the cursor at the next to the end of the caption.
5. Hold down the Shift key and press the F8 key, then type 4, 6, 2, and 1.
6. Enter the above command as <2 7> s 1 2 v 0 B.
7. Repeat steps 1 to 6 for each caption.

Of course, the procedure differs with the software used.

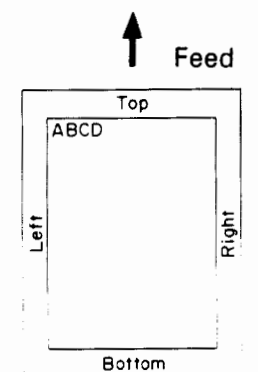


## Setting the Page Format

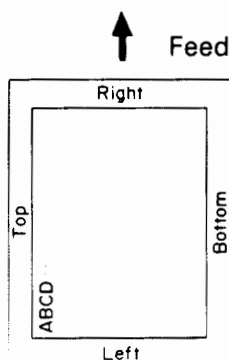
In this manual page formatting refers to setting the page orientation, page size, margins, and number of lines printed per page. The page format can be set by software commands; some of them can also be set at the control panel.

The actual format depends on the current line spacing, called the vertical motion index (VMI), and character spacing, called the horizontal motion index (HMI).

The top, bottom, left, and right position names refer to the printed text, not to the paper in the paper cassette.



**Portrait Orientation**

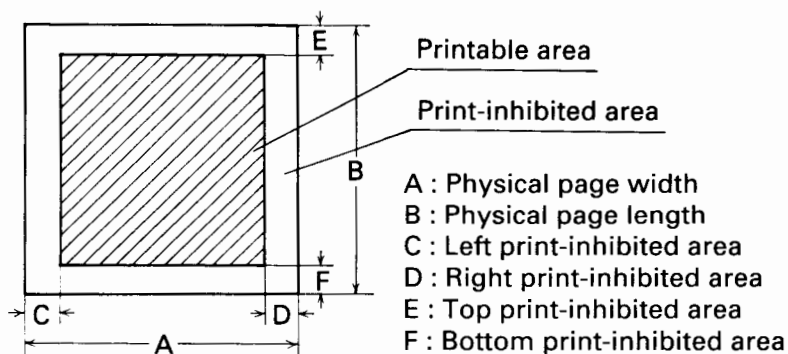


**Landscape Orientation**



## Page Formatting Parameters

No characters can be printed outside the printable area in figure below because of the physical restrictions of the printing mechanism. Figure below is for the HP LaserJet Series II emulation. The printable areas vary with the emulation. See Programmer's Manuals for other emulations.



**Page Formatting Parameters**

### Portrait mode

Unit : dot (1/300in)

Size	Width x Length	A	B	C	D	E	F
Legal	8.5 x 14in	2550	4200	50	100	60	60
Letter	8.5 x 11in	2550	3300	50	100	60	60
A4	210 x 297mm	2480	3507	50	92	60	58
B5	182 x 257mm	2149	3035	50	92	60	58

### Landscape mode

Unit : dot (1/300in)

Size	Width x Length	A	B	C	D	E	F
Legal	14 x 8.5in	4200	2550	60	60	50	100
Letter	11 x 8.5in	3300	2550	60	60	50	100
A4	297 x 210mm	3507	2480	60	58	50	92
B5	257 x 182mm	3035	2149	60	58	50	92



## Specifying a Format

The following shows the printer commands and control panel setup functions to be used for changing the page formatting parameters.

### Changing the Page Format

Parameter	Printer command	Control panel	Distance
HMI (column)	ESC & k # H	None	n/120inches
VMI (line)	ESC & l # C	None	n/48 inches
	ESC & l # D	LINE SP function	1/inches (n LPI)
Left margin	ESC & a # L	None	n columns
Right margin	ESC & a # M	None	n columns
Top margin	ESC & l # E	None	n lines
Text length	ESC & l # F	None	n lines
Page size	ESC & l # A	SIZE button (*)	Preset (A4, B5, etc.)
	ESC & l # P	None	n lines

\* : Paper cassette



## Choosing the Proper Emulation

Emulation means simulating a command set defined for a different printer and producing identical results. This printer has a resident emulation mode and several optional emulation modes. The resident mode emulates the HP LaserJet Series II printer and the others are for emulating conventional serial printers.

Note that not all commands can be emulated (especially for serial printers). This is because of architectural differences. However, most software packages will work under these emulations because you will rarely use these commands. Refer to programmer's manuals for details.

First, you must set the emulation which is selectable only from the control panel.

**Emulation and Printer**

Emulation name	Printer
HP LJ 2	HP LaserJet Series II
DIABLO ECS	Diablo 630 ECS
FX-85	Epson FX-85
IBM-PRO	IBM Proprinter XL

### NOTE:

When you select a new emulation mode and place the printer online, all downloaded fonts and data in the buffer are lost.

See **Appendix B** for command sets.



## Specifying an Emulation

An optional emulation is specified as explained below.

Press this button	Display	Comment
1. <u>ONLINE</u>	OFFLINC HP1 A4	Switches the printer offline.
<u>MENU</u>	SETUP	Enters menu mode. The first option of the main menu is displayed.
2. <u>ENTER</u>	SOFTWARE	Selects the setup menu and displays the first option.
3. <u>ENTER</u>	RESIDENT *	Selects the software (emulation) function and displays the current setting.
4. <u>ENTER</u>	HP LJ2 *	Selects the resident emulation and displays the current setting.
5. <u>NEXT</u>	DIABLO ECS IBM-PRO FX-85	Press the NEXT button until the desired emulation is displayed.
<u>ENTER</u>	SELECTED FX-85 * ONLINE HP1 A4	"SELECTED" is displayed for your confirmation, the selected emulation.



## SECTION 5

# MAINTENANCE

This printer does not require any special maintenance. However, to keep it in the best condition, it should be cleaned from time to time. Be careful not to drop anything inside the printer.

Other routine maintenance is to replace the toner cartridge, drum unit, developing unit, etc., as prompted by the control panel.

Following the procedures for general maintenance are for installing a memory expansion board and for repacking the printer.

### CAUTION:

No more maintenance than mentioned above should be done; lubrication is not required.

Make sure that power is turned off and the power cord unplugged before you perform any maintenance.

Be careful not to touch any parts which may be hot when you maintain the fuser unit or related parts.

Do not touch the drum surface of the drum unit. Be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light.

Do not use alcohol or other organic solvent to clean the feed rollers or cover.

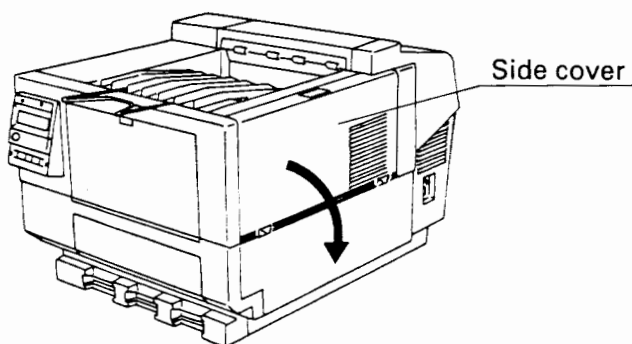
Dispose of all used parts properly. Especially, avoid burning any plastic or rubber parts.



## Opening or Closing the Upper Mechanism

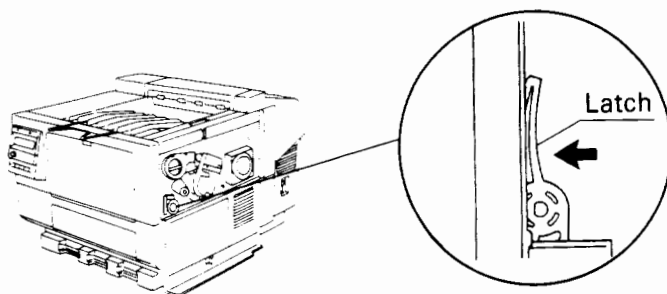
The upper mechanism must be opened when you do internal maintenance.

1. Release the side cover by pressing on its top at the center. It will then open downward.



### Opening the Side Cover

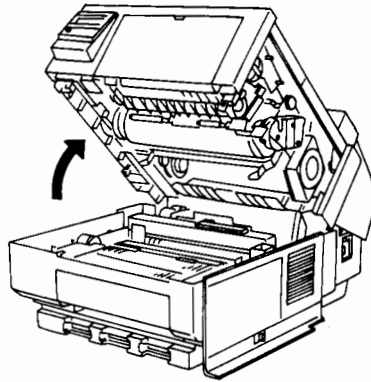
2. Grip the latch and lift the upper mechanism.



### Gripping the Latch

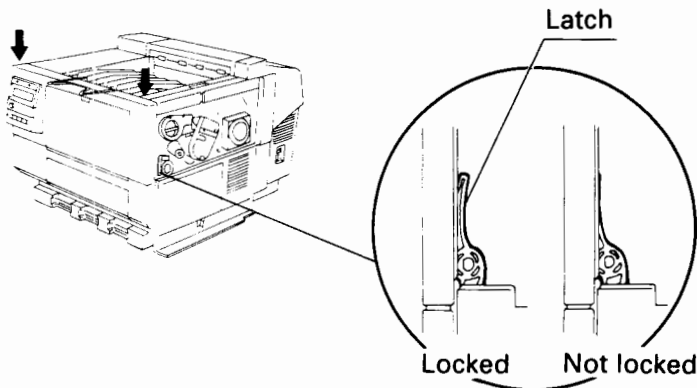


3. When the upper mechanism is lifted it will lock into place. If it doesn't lock, set it down and lift it again.



### Opening the Upper Mechanism

4. After performing maintenance, lift the upper mechanism up slightly and set it down. Push down on both ends of the upper mechanism and it will lock in place. Close the side cover by pushing it up and in.



### Closing the Upper Mechanism



## Replacing the Toner Cartridge

The toner density in the developing unit is monitored, and the control panel displays a warning message "TONER EMPTY" prompting you to replace the cartridge.

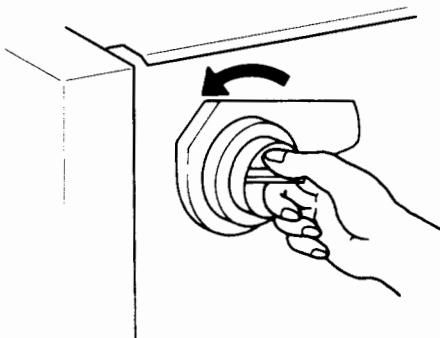
The toner collection pack must be replaced at the same time. If it is not replaced, the printer will not work.

If there is still toner in the cartridge, reinsert the cartridge and continue printing till the toner becomes empty.

### CAUTION:

No toner cartridge and no toner other than that supplied for this printer should be used. If used, the developing unit will be damaged and the drum unit may be damaged.

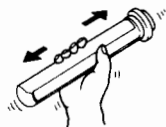
1. Keep the power on. (Do not turn the power off.) Open the side cover.
2. Rotate the toner cartridge counterclockwise by 180 degrees and pull it out slowly. Then dispose of it.



**Removing the Toner Cartridge**

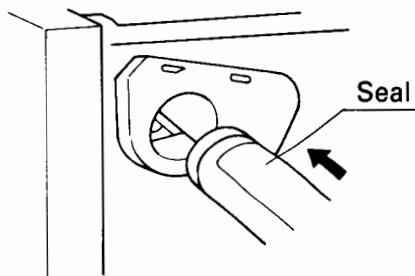


3. Shake the new toner cartridge more than ten times to distribute the toner evenly.



### Shaking the Toner Cartridge

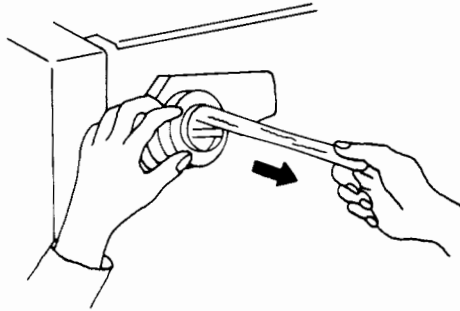
4. Insert the toner cartridge with the seal facing up.



### Inserting the Toner Cartridge

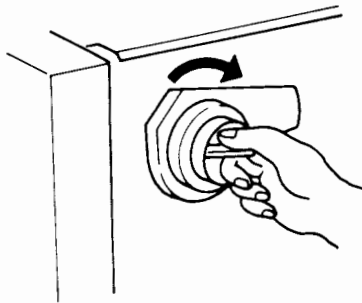


5. Hold the toner cartridge as shown and remove the seal of the toner cartridge by pulling it off.



**Removing the Seal**

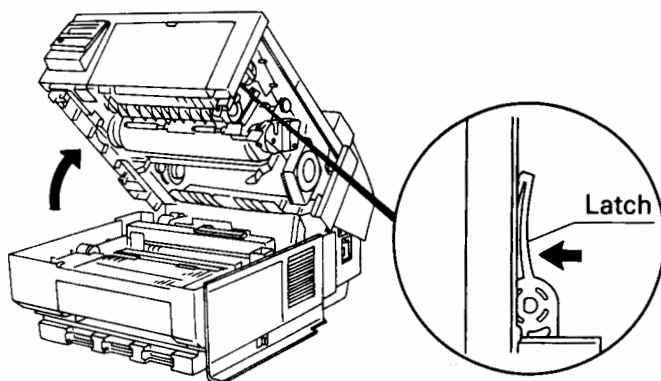
6. Rotate the cartridge clockwise about 180 degrees until it locks in place.



**Locking the Toner Cartridge**

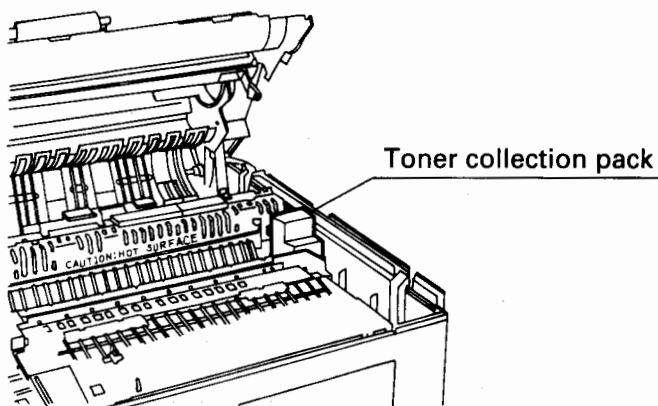


7. Grip the latch and lift the upper mechanism.



### Opening the Upper Mechanism

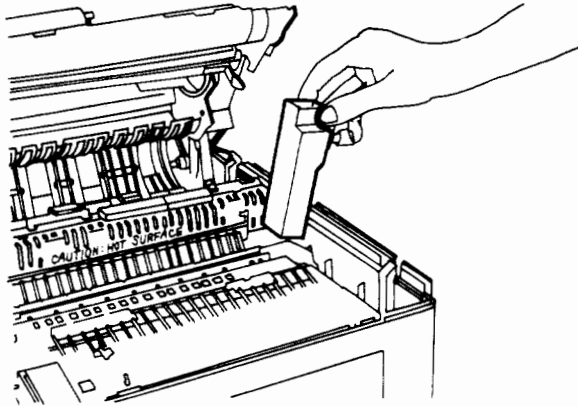
8. Remove the toner collection pack by pulling it up and out.



### Removing the Toner Collection Pack



9. Push the new toner collection pack in place. Be sure it is in the correct position.



### Installing the Toner Collection Pack

10. Set the upper mechanism down and close the side cover.

Display      Button

11. 



      The message "WARMING UP" then "OFFLINE HP 1 A4" will be shown.
12. 



      Press the ONLINE button. The display shows "ONLINE HP 1 A4".



## Replacing the Fuser Felt

- Two fuser felts are packed with the four toner cartridges. Install a new fuser felt when the message "FUSER FELT CHG" appears. The printer operation is monitored, and the control panel displays the warning message "FUSER FELT CHG," prompting you to replace the fuser felt. If the print quality deteriorates before the replacement warning is displayed, install a new fuser felt.
- For control panel operation, see **Section 3** "Replace Parts Function".

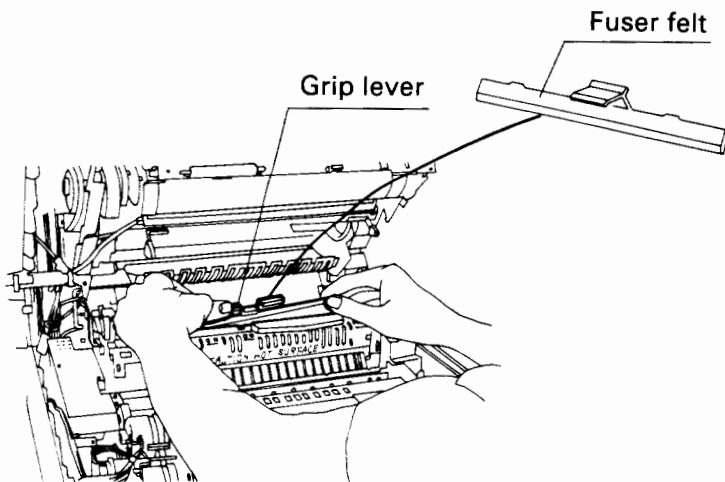
### WARNING:

The fuser unit remains hot for quite a while after the power is turned off. Be sure it has cooled before handling.

- 1. Turn the power off. Open the side cover and lift the upper mechanism up.

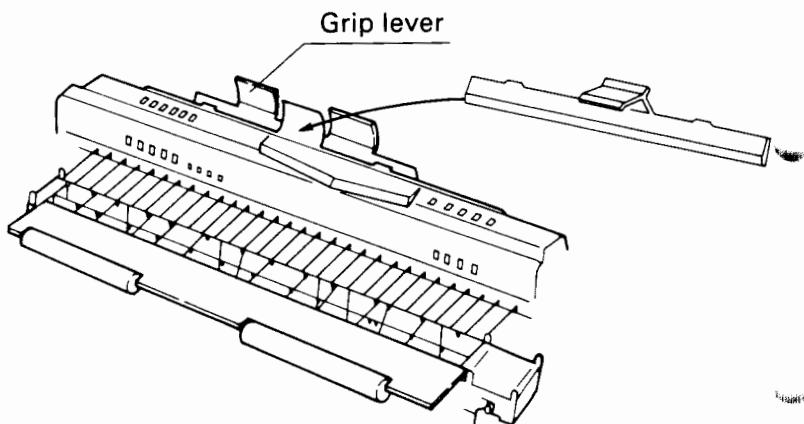


2. Press up on the grip lever, then pull out the fuser felt and dispose of it.



### Removing the Fuser Felt

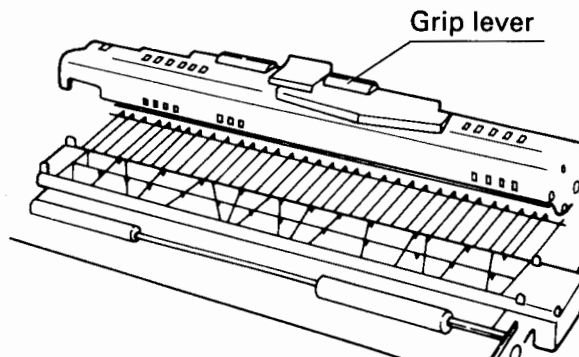
3. Insert the new fuser felt into place.



### Inserting the Fuser Felt



4. Press down on the grip lever.



### Pressing the Grip Lever

5. Set the upper mechanism down and close the side cover.
6. Turn the power on. The warning will be shown again.

### Display Button

7. **FUSER FELT** Press the ONLINE button. The printer enters offline with the same warning.  
**ON LINE**
8. **MENU** Press the MENU button. The display shows "REPLACE PARTS".  
**REPLACE PARTS**
9. **PREVIOUS** Press the PREVIOUS button until the display shows "FUSER FELT".  
**FUSER FELT**
10. **HOME** Press the HOME button and then the ONLINE button. The display shows "OFFLINE HP 1 A4".  
**ONLINE**  
**OFFLINE HP 1 A4**



## Display Button

11.

ONLINE

Press the ONLINE button. The display shows "ONLINE HP1 A4".

ONLINE HP 1 A4

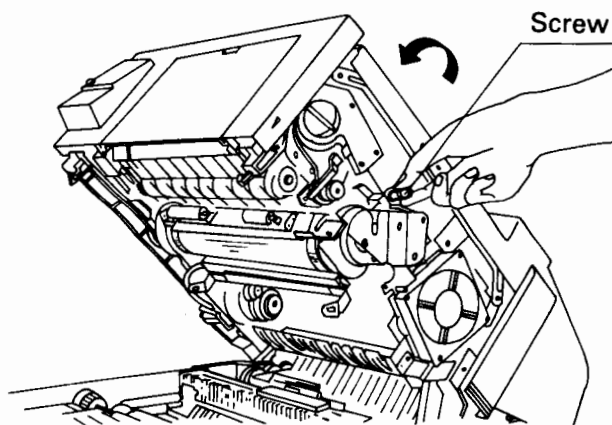


## Replacing the Drum Unit

The printer operation is monitored, and the control panel displays the warning message "DRUMUNIT CHG," prompting you to replace the drum unit.

For the control panel operation, see **Section 3** "Replace Parts Function".

1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Loosen the drum unit fixing screw by hand.



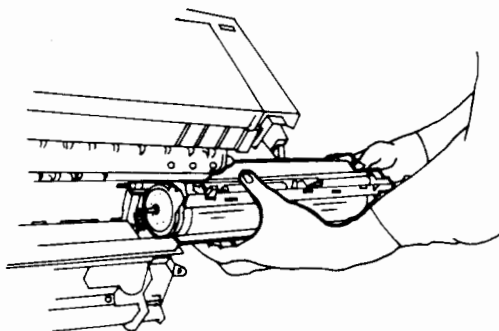
**Loosening the Fixing Screw**

### CAUTION:

When handling the drum unit, be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light.



3. Pull the drum unit straight out and dispose of it.

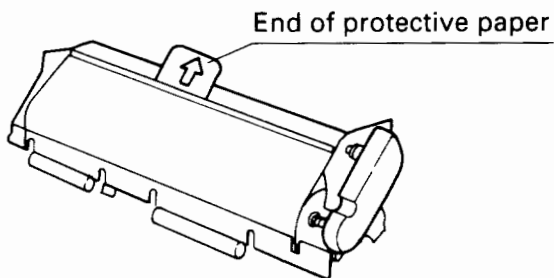


### Removing the Drum Unit

#### NOTE:

Be careful not to scatter the toner.

4. Grip the end of the protective paper of the new drum unit and pull it out.



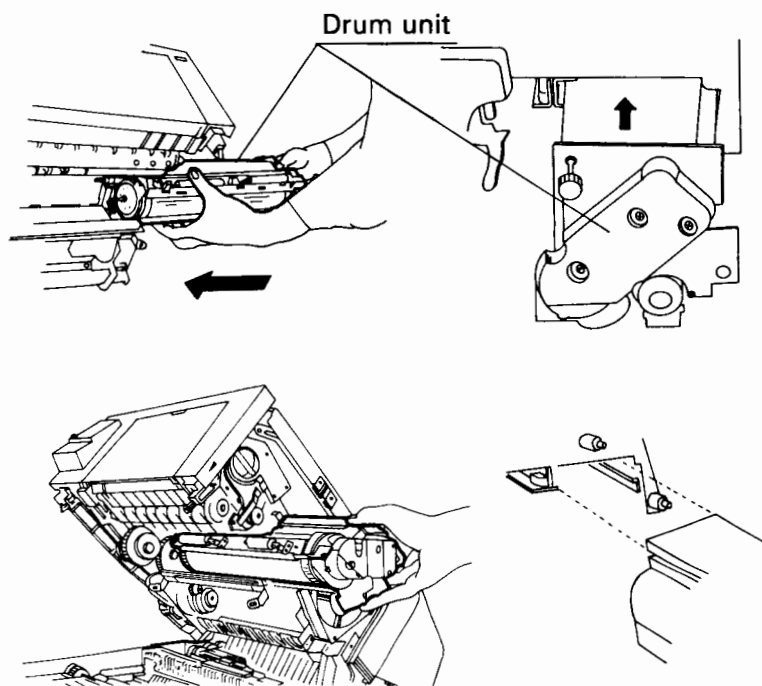
### Removing the Protective Paper

#### CAUTION:

Never touch the drum surface with your hands.  
The drum must be free from any oil and dirt.



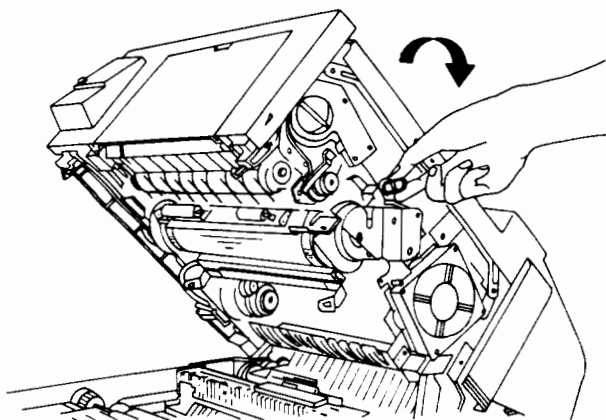
5. Insert the new drum unit in the slot as shown.



**Mounting New Drum Unit**



6. Tighten the drum screw by hand.



### Tightening the Drum Screw

7. Set the upper mechanism down and close the side cover.
8. Turn the power on. The warning will be shown again.

Display      Button

- |     |               |  |
|-----|---------------|--|
| 9.  | FUSER FELT    | Press the ONLINE button. The printer enters offline with the same warning. |
|     | ON LINE       |  |
| 10. | MENU          | Press the MENU button. The display shows "REPLACE PARTS".                  |
|     | REPLACE PARTS |  |
| 11. | PREVIOUS      | Press the PREVIOUS button until the display shows "DRUM UNIT".             |
|     | DRUM UNIT     |  |



Display      Button

12.

HOME

Press the HOME button and then the ONLINE button. The display shows "OFFLINE HP 1 A4".

ONLINE

OFFLINE HP 1 A4

13.

ONLINE!

Press the ONLINE button. The display shows "ONLINE HP 1 A4".

ONLINE HP 1 A4

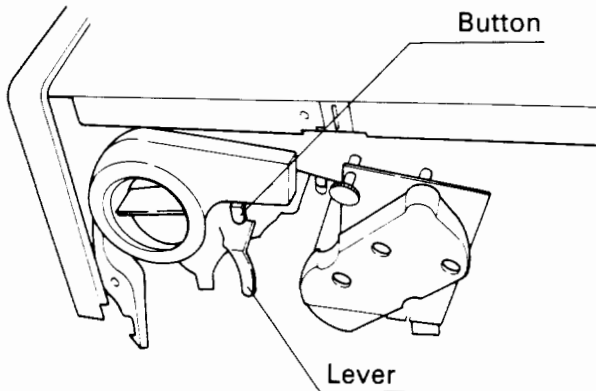


## Replacing the Developing Unit

The printer operation is monitored, and the control panel displays a warning message "DEVELOPER CHG" prompting you to replace the developing unit.

For the control panel operation, see **Section 3** "Replace Parts Function".

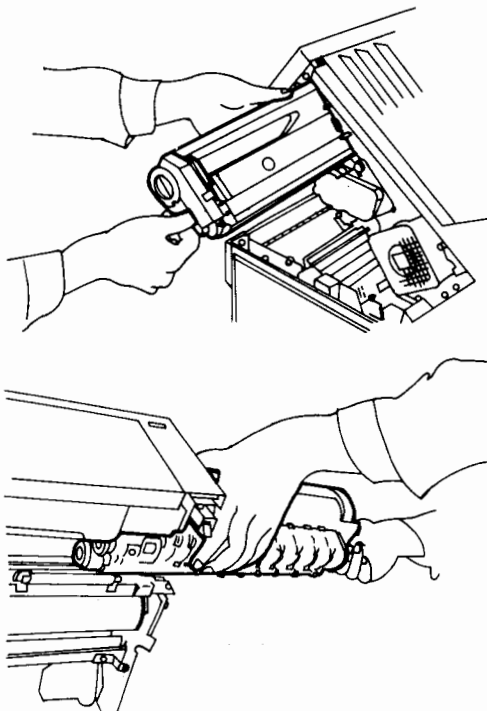
1. Turn the power off. Open the side cover and lift the upper mechanism up. Check that the upper mechanism is locked.
2. Hold the lever with your right hand and press the button with your thumb. The developing unit comes out slightly.



**Pressing the Button**

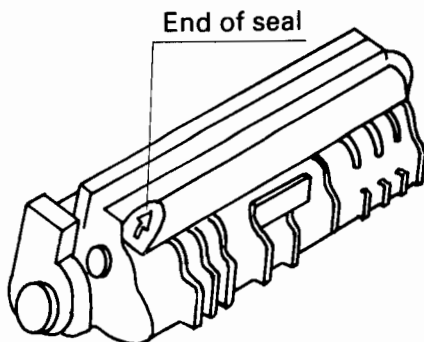


3. Pull the developing unit straight out and dispose of it.  
The developing unit is not held in place by any screws.



### Removing the Developing Unit

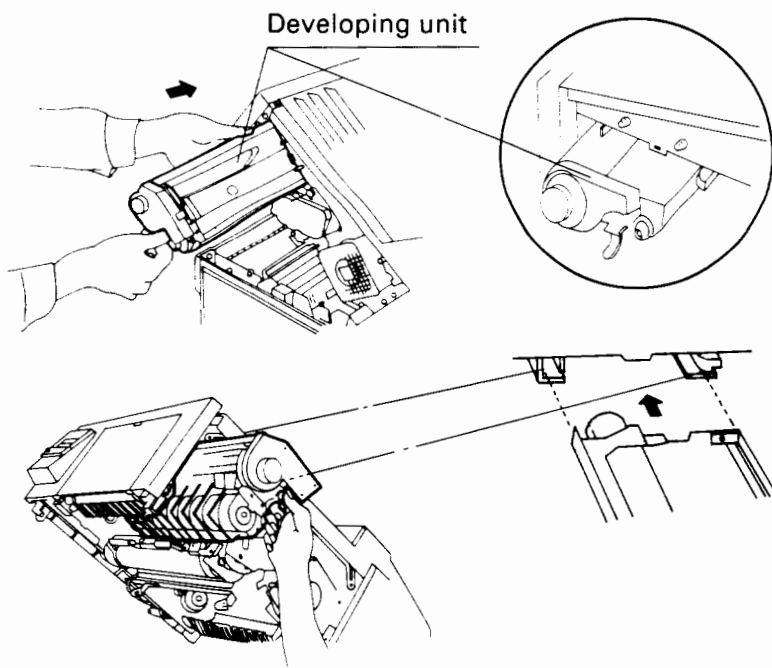
4. Hold the new developing unit horizontally and shake it up and down. Grip the end of the seal of the new developing unit. Pull the seal out.



### Pulling Out the Seal



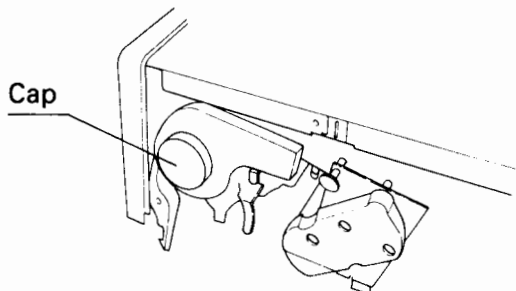
5. Insert the developing unit into the slot as shown.



**Installing the New Developing Unit**



6. Remove the toner cartridge hole cap.



### Removing the Cap

7. Set the upper mechanism down.
8. Install the toner cartridge and toner collection pack. See "Replacing the Toner Cartridge" (page 5-4).
9. Close the side cover.
10. Turn the power on. The warning will be shown again.

Display    Button

11. **FUSER FELT**      Press the **ON LINE** button. The printer enters offline with the same warning.
12.                      **MENU**      Press the **MENU** button. The display shows "REPLACE PARTS".
13.                      **PREVIOUS**      Press the **PREVIOUS** button until the display shows "DEVELOPER".

**DEVELOPER**



- |     | Display                    | Button             |  |
|-----|----------------------------|--------------------|--|
| 14. |                            | <div>HOME</div>    | Press the HOME button and then the ONLINE button. The display shows "OFFLINE HP 1 A4". |
|     |                            | <div>ONLINE</div>  |  |
|     | <div>OFFLINE HP 1 A4</div> |                    |  |
| 15. |                            | <div>ONLINE!</div> | Press the ONLINE button. The display shows "ONLINE HP 1 A4".                           |
|     | <div>ONLINE HP 1 A4</div>  |                    |  |



## Replacing the Transfer Unit

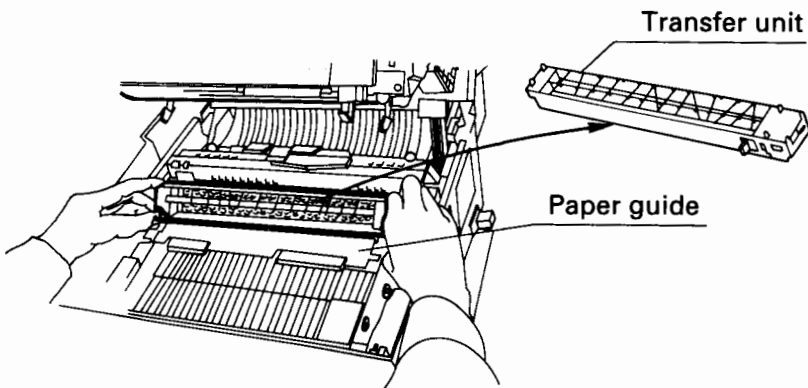
The printer operation is monitored, and the control panel displays the warning message "TRANSFER CHG," prompting you to replace the transfer unit.

For the control panel operation, see **Section 3** "Replace Parts Function".

### WARNING:

The fuser unit remains hot for quite a while after the power is turned off. Be sure it has cooled before handling.

1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Lift the paper guide slightly, then grip both ends of the transfer unit and pull both ends backward up and out, then dispose of it.



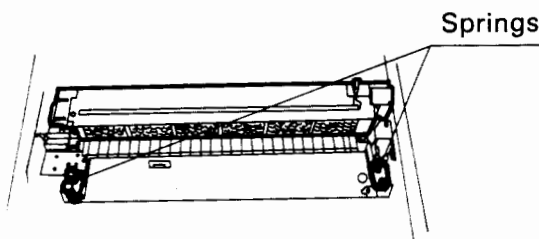
Removing the Transfer Unit



3. Install the new transfer unit in place.

The figure below shows the transfer unit before it is mounted. To install the transfer unit, pull both ends backward and down into place onto the springs.

Lower the paper guide.



#### Transfer Unit Mounting Place

4. Set the upper mechanism down and close the side cover.
5. Turn the power on. The warning will be shown again.

Display      Button

6. 

FUSER FELT
------------

ON LINE
---------

Press the ONLINE button. The printer enters offline with the same warning.
7. 

MENU
------

REPLACE PARTS
---------------

Press the MENU button. The display shows "REPLACE PARTS".
8. 

PREVIOUS
----------

TRANSFER
----------

Press the PREVIOUS button until the display shows "TRANSFER".



	Display	Button
--	---------	--------

9.


---

Press the HOME button and then the ONLINE button. The display shows "OFFLINE HP 1 A4".


---


---

10.


---

Press the ONLINE button. The display shows "ONLINE HP 1 A4".


---



## Replacing the Fuser Unit

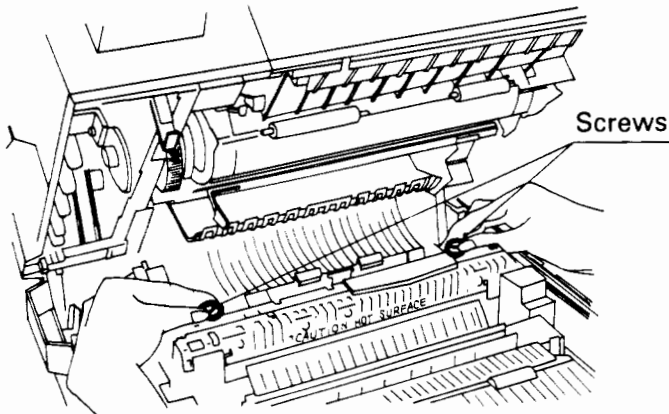
The printer operation is monitored, and the control panel displays the warning message "HEAT ROLLER CHG," prompting you to replace the fuser unit.

For the control panel operation, see **Section 3 "Replace Parts Function"**.

### WARNING:

The fuser unit remains hot for quite a while after the power is turned off. Be sure it has cooled before handling.

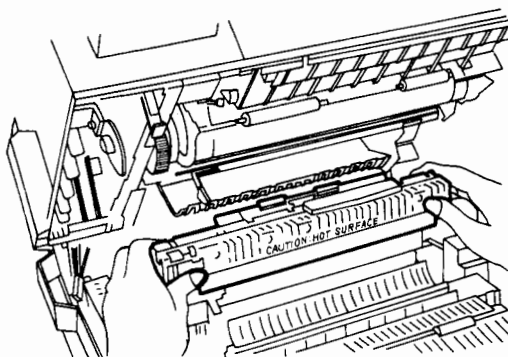
1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Loosen the two fuser unit fixing screws by hand by turning counterclockwise.



**Removing the Fixing Screws**

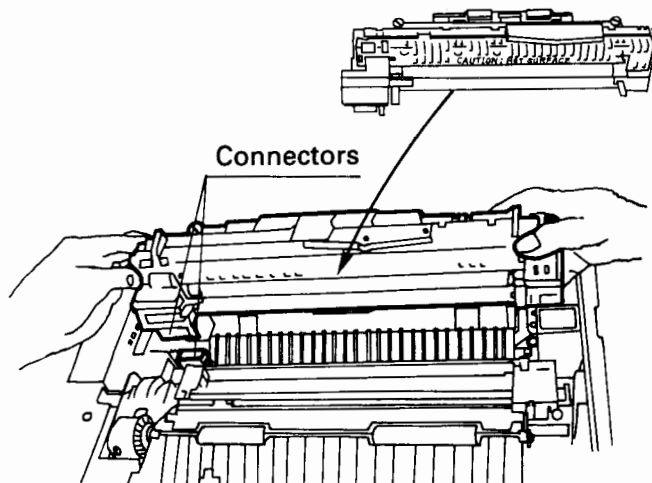


3. Pull the fuser unit up and out, and dispose of it.



### Removing the Fuser Unit

4. Install the new fuser unit in place, adjusting the connector on the bottom of the unit and tighten the two fixing screws.



### Installing New Fuser Unit



5. Set the upper mechanism down and close the side cover.
6. Turn the power on. The warning will be shown again.

Display    Button

7. 

FUSER FELT

 Press the ONLINE button. The printer enters offline with the same warning.  

ON LINE
8. 

MENU

 Press the MENU button. The display shows "REPLACE PARTS".  

REPLACE PARTS
9. 

PREVIOUS

 Press the PREVIOUS button until the display shows "HEAT ROLLER".  

HEAT ROLLER
10. 

HOME

 Press the HOME button and then the ONLINE button. The display shows "OFFLINE HP 1 A4".  

ONLINE

OFFLINE HP 1 A4
11. 

ONLINE!

 Press the ONLINE button. The display shows "ONLINE HP 1 A4".  

ONLINE HP 1 A4

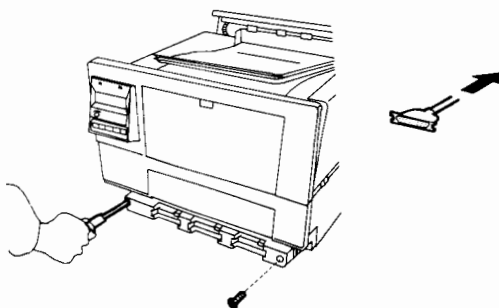


## Installing a Memory Expansion Board

You can expand the RAM capacity of your printer by adding an optional memory expansion board (1M, 2M or, 4M bytes). See **Appendix G** for the order number.

The procedure is as follows:

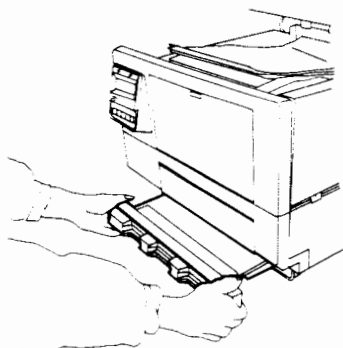
1. Turn the power off.
2. Disconnect the interface cable and remove the two retaining screws from the front.



**Removing the Retaining Screws**

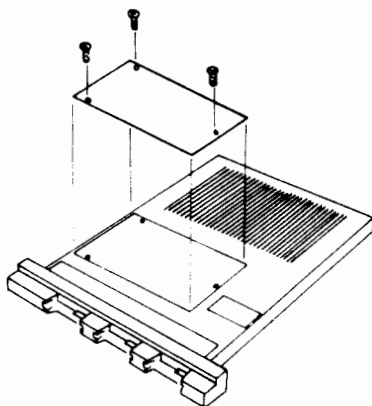


3. Pull out the controller board from the front of the printer.  
Be careful not to damage the printed circuit board by nicking the case.



### Removing the Controller Board

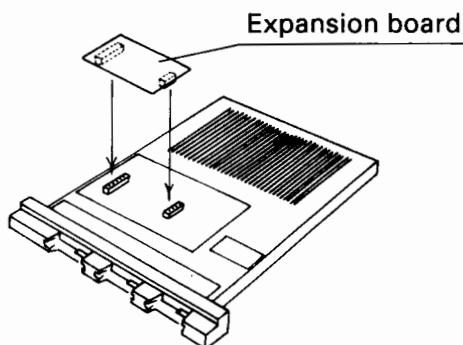
4. Remove the screws to remove the expansion slot cover.



### Removing the cover



5. Connect the two connectors carefully to install the memory expansion board while adjusting the orientation that is seen from the number of pins of each connector.



### Installing the Memory Expansion Board

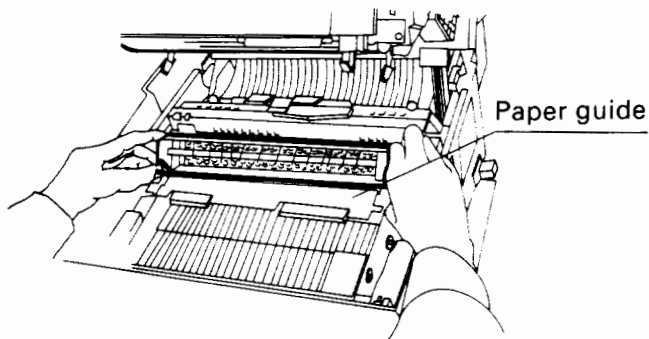
6. Install the expansion slot cover. Put the controller board in place and tighten all the screws. Connect the interface cable. Check that the edges of the board are in the grooves properly.
7. Turn the power on and confirm that no ROM/RAM errors occur.



## Cleaning the Corona Wire

The corona wire of the transfer unit should be cleaned each time the toner cartridge is replaced. If print quality deteriorates before the toner cartridge is replaced, try cleaning the corona wire.

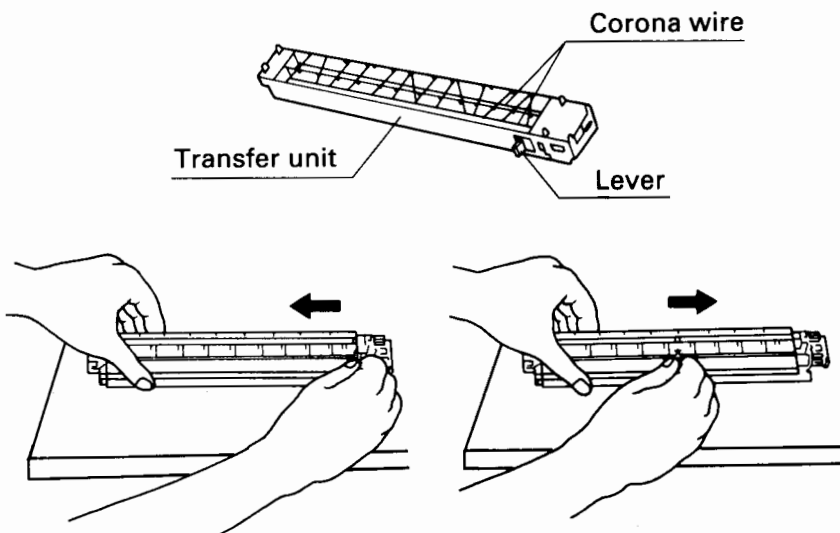
1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Lift the paper guide slightly, then grip both sides of the transfer unit and pull both ends backward up and out.



**Removing the Transfer Unit**



- Put the transfer unit on the table and grip the end of the unit. Slide the corona wire cleaning lever from right to left, and back again. Leave the lever at the right.

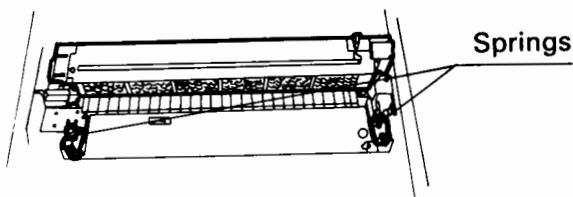


### Cleaning the Corona Wire

- Install the transfer unit in place.

The figure below shows the transfer unit before it is mounted. To install the transfer unit, pull both ends backward and down into place onto the springs.

Lower the paper guide



### Transfer Unit Mounting Place

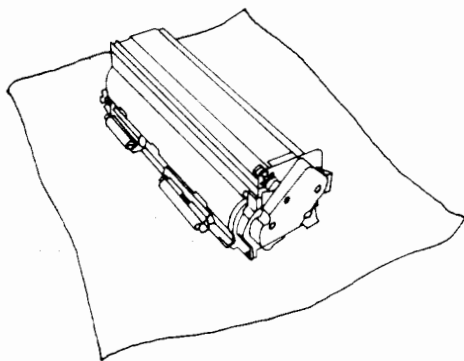
- Set the upper mechanism down and close the side cover. Turn the power on and confirm that the printer works.



## Cleaning the Discharge LED Unit

The discharge LED unit should be cleaned each time the toner cartridge is replaced. If the print quality deteriorates before the toner cartridge is replaced, try cleaning the discharge LED unit.

1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Remove the drum unit. See "Replacing the Drum Unit" (page 5-13). Put the drum unit on clean paper as shown below.



**Putting the Drum Unit on Paper**

---

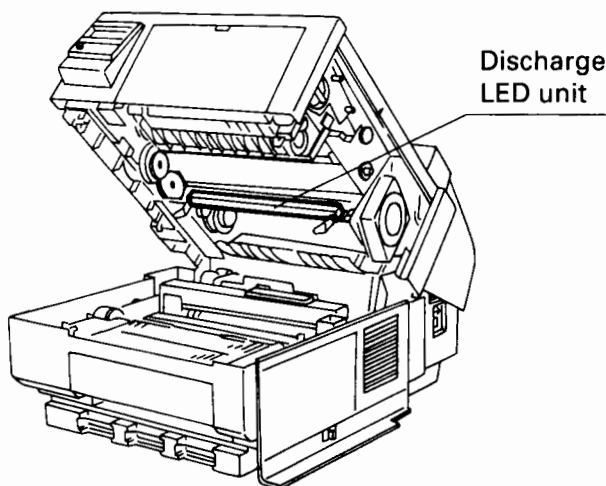
### CAUTION:

When removing the drum unit, be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light. Keep the drum unit covered when out of the printer.

---



3. Clean the discharge LED unit using a soft cloth.



### **Cleaning the Discharge LED Unit**

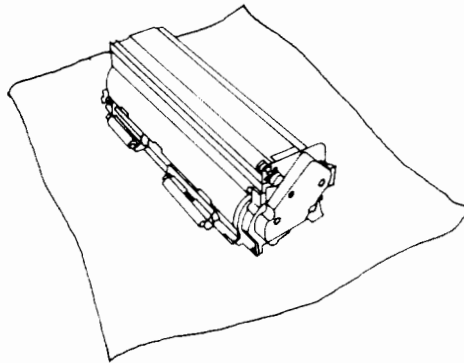
4. Install the drum unit. See "Replacing the Drum Unit" (page 5-13).
5. Set the upper mechanism down and close the side cover. Turn the power on and confirm that the printer works.



## Cleaning the Optical Unit Window

The optical unit window should be cleaned when the print density is too light or vertical white lines appear.

1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Remove the drum unit. See "Replacing the Drum Unit" (page 5-13). Put the drum unit on clean paper as shown below.



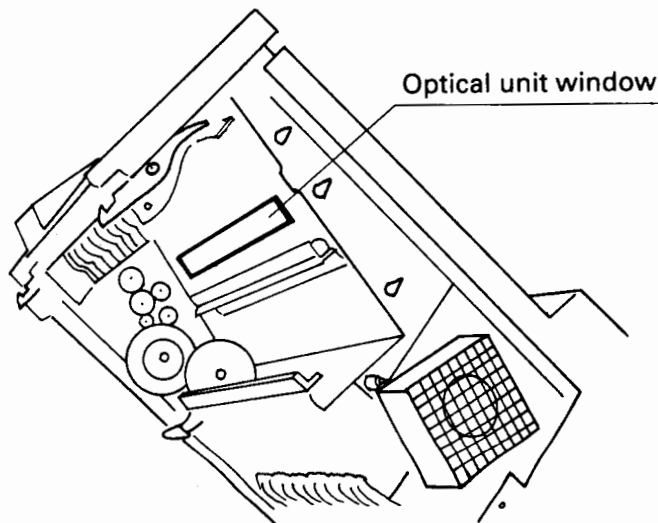
**Putting the Drum Unit on Paper**

### **CAUTION:**

When removing the drum unit, be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light. Keep the drum unit covered when out of the printer.



3. Remove the developing unit. See "Replacing the Developing Unit" (page 5-18).
4. Clean the optical unit window using a blow brush.



### **Cleaning the Optical Unit Winsow**

5. Install the developing unit. See "Replacing the Developing Unit" (page 5-18).
6. Install the drum unit. See "Replace the Drum Unit" (page 5-13).
7. Set the upper mechanism down and close the side cover. Turn the power on and confirm that the printer works.



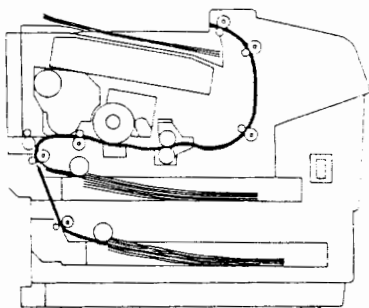
## Cleaning the Paper Feed Path

The paper feed path should be cleaned when it becomes dusty.

Wipe off any paper dust and toner particles from the paper path when dirty, especially after you remove a paper jam.

Use a vacuum cleaner and a soft cloth dampened with a mild detergent.

The bold line in the figure below is the paper feed path.



**Paper Feed Path**

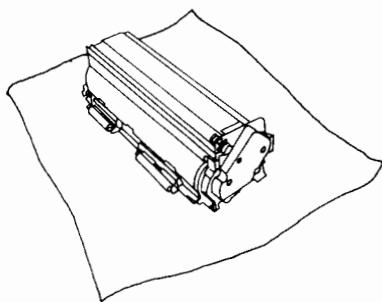
### **CAUTION:**

When cleaning the paper feed path, be careful not to damage the transfer unit and drum surface.

When removing the drum unit, be careful not to expose the drum surface to light for more than a few minutes. The drum surface may be damaged by prolonged exposure to light. Keep the drum unit covered when out of the printer.

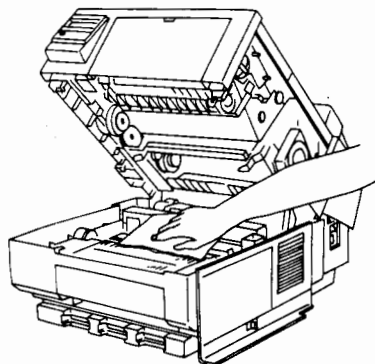


1. Turn the power off. Open the side cover and lift the upper mechanism up.
2. Remove the drum unit. See "Replacing the Drum Unit" (page 5-13). Put the drum unit on clean paper as shown below.



### Putting the Drum Unit on Paper

3. Remove the transfer unit. See "Replacing the Transfer Unit" (page 5-23).
4. Clean the paper feed path.

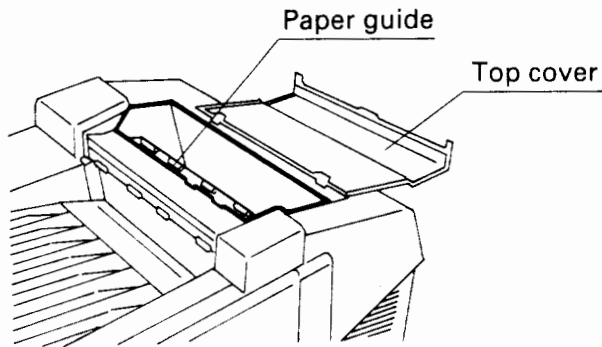


### Cleaning the Paper Feed Path



5. Install the drum unit and the transfer unit.
6. Set the upper mechanism down and close the side cover.
7. Open the top cover and push the paper guide backward.

Clean the paper feed path.



### **Cleaning the Paper Feed Path**

8. Pull the paper guide forward and close the top cover.
9. Turn the power on and confirm that the printer works.



## Repacking the Printer

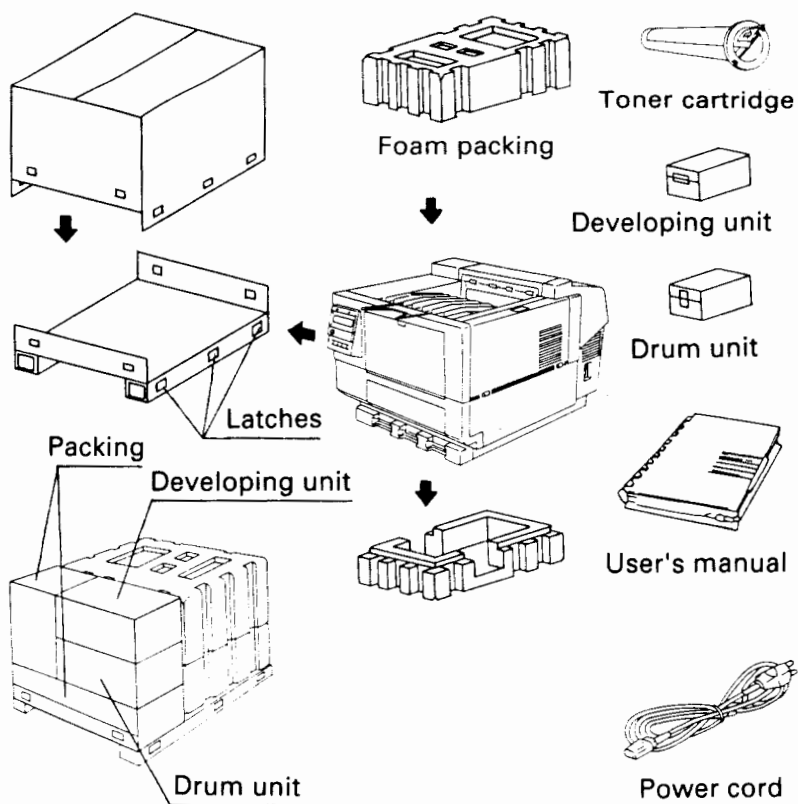
If you need to move your printer or prepare it for storage, observe the following:

- Remove the toner cartridge from the printer to prevent toner from scattering.
- Remove the toner collection pack from the printer to prevent toner from scattering.
- Remove the developing unit from the printer to prevent damage to it.
- Remove the drum unit from the printer to prevent damage to it.
- Repack above items and units using the carton and packing material originally supplied.
- Enclose the printer with the protective plastic bag to protect against moisture.
- Use the polystyrol pads as a cushion.
- Latch the carton (ten latches).

### CAUTION:

If the developing unit and the drum unit are not removed during moving, the printer may be seriously damaged.





### Repacking the Printer



## SECTION 6

# TROUBLESHOOTING

This printer is designed to provide reliable operation. Generally, the problems that occur will be due to an operator error or outside cause. Print quality problems and paper jams are the most common.

If a problem occurs, use the following tables and procedures to help with troubleshooting; the tables list several common problems.

Run the test print; normal execution means the problem is from the interface connector to your computer. In this case, check your computer and application program documentation for additional suggestions.

If the problem is difficult to resolve, contact your dealer after collecting as much information as possible.

### Printer Status Problems

Symptom	Solution
Power does not turn on.	<ul style="list-style-type: none"><li>- Check the power cord and connection.</li></ul>
Printer does not initialize correctly.	<ul style="list-style-type: none"><li>- Turn the power off and then on again.</li><li>- Close the side cover completely.</li><li>- Close the upper mechanism completely.</li><li>- Install or firmly lock in place the toner cartridge, drum unit, developing unit, fuser unit, and transfer unit.</li><li>- Correctly install the paper cassette.</li></ul>
Control panel does not operate.	<ul style="list-style-type: none"><li>- Turn the power off, then on.</li></ul>



**Print Quality Problems**

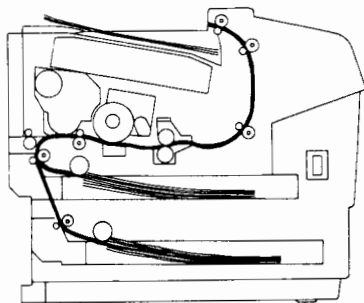
Symptom	Solution
Too light	<ul style="list-style-type: none"><li>- Turn the print density knob clockwise.</li><li>- Use dry paper.</li><li>- Clean the corona wire.</li><li>- Set the developing unit correctly.</li><li>- Clean the optical unit window.</li></ul>
Too dark	<ul style="list-style-type: none"><li>- Turn the print density knob counterclockwise.</li></ul>
Black or no printing at all	<ul style="list-style-type: none"><li>- Replace the developing unit, drum unit, or transfer unit.</li></ul>
Vertical uneven density	<ul style="list-style-type: none"><li>- Clean the corona wire.</li><li>- Replace the developing unit.</li></ul>
Vertical white lines	<ul style="list-style-type: none"><li>- Clean the corona wire.</li><li>- Set the corona wire cleaning lever at the right.</li><li>- Clean the optical unit window.</li><li>- Replace the transfer unit, developing unit, or drum unit.</li></ul>
Stains	<ul style="list-style-type: none"><li>- Replace the fuser felt.</li><li>- Clean the paper path.</li><li>- Replace the drum unit.</li><li>- Print several pages if the problem occurs after removing a paper jam.</li></ul>
Stains on the back of the paper	<ul style="list-style-type: none"><li>- Wipe the stains off by cloths.</li><li>- Print several pages.</li></ul>
White spots	<ul style="list-style-type: none"><li>- Use dry paper</li></ul>



## Removing Paper Jams

Paper jams occur very infrequently. However, remove the paper as soon as possible if there is a jam. This printer has a simple paper path as shown below, so the removal procedure is quite easy.

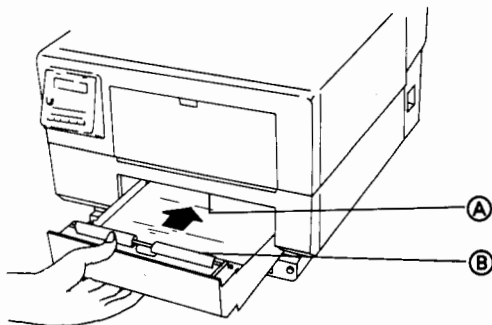
If the paper jams occur frequently, check that the drum unit, developing unit, fuser unit, and transfer unit are firmly locked in place. Check that the slide switch on the side of the paper cassette is selected correctly.



**Paper Path**

The removal procedure is as follows:

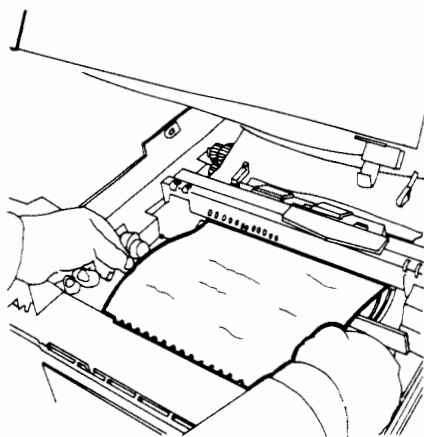
1. Remove the paper cassette by pulling it straight out. Check for the paper paths **(A)** and **(B)**. If there is the jammed paper, remove it.



**Jam in Paper Cassette**

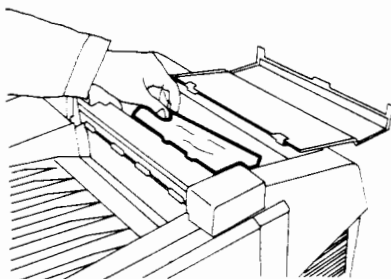


2. Open the upper mechanism and find where the jam has occurred. If the jam is inside the paper path between the upper and lower mechanism, remove the jammed paper.



### **Jam in Mechanism**

3. If the jam occurs in the rear maintenance slot of the upper mechanism, open the top cover, push the paper guide backward, and pull out the paper.



### **Removing the Jammed Paper**

4. Clean the paper path if it has become dirty with toner.



## Storage of Paper

Observe the following when storing paper to avoid print quality problems and paper jams.

1. Do not expose paper to moisture or direct sunlight. Damp paper is likely to lose its electrostatic charge and very dry paper is likely to have an undesired electrostatic charge. Both of these conditions cause poor print quality.
2. Store the remaining paper in the original package or rewrap it for the same reason above.
3. Store the paper flat. Curled paper is likely to jam.
4. Allow a day for storing paper before use in the same area as your printer. A rapid change of the environment may cause undulations in the paper. This paper will cause jams if used.



# Error or Printer Status Messages

## Error Messages

The printer will display a message on the control panel if there is a problem, or if there is some action you should take. The following chart shows each of the messages (listed alphabetically), describes the cause, and tells you how to resolve the situation.

Message	Problem	Solution
HP n NOT MOUNTED	The printer attempted to print from the indicated tray (n = 1 or 2), but the tray was not mounted.	Mount the indicated tray and press the <b>RESET/RESUME</b> button. OR Select another tray.
HP n PAPER OUT	The indicated paper tray (n = 1 or 2) is empty.	Load new paper into the tray as described in Section 4 and press the <b>RESET/RESUME</b> button.
CARD ERROR	The selected font card or emulation card was removed when the printer was online.	Turn the printer off and then back on again.



Message	Problem	Solution
COMM ERROR	The printer received data with a parity or other error through the serial interface. The most common cause of communication errors is a mismatch between the serial communication parameters on the computer and the printer. They can also occur when the printer's input buffer overflows.	Press the <b>RESET/RESUME</b> button to clear this error message. If you get this error repeatedly, check the serial interface settings on your printer (see Section 3) and on your computer (refer to your computer's operations manual), to make sure the settings are the same for both. Check the cable to make sure that it is wired correctly (see Appendix C) and that the wires are not broken. Replace it if necessary.
COVER OPEN	The top cover is open.	Press on the cover until it is firmly latched.
FAN FAILLURE:1	The temperature in the area of the power supply fan is too high.	Turn the printer power off and then back on again. If the error recurs, contact your dealer for service.
FAN FAILLURE:2	The temperature in the area of the cross-flow fan is too high.	Turn the printer power off and then back on again. If the error recurs, contact your dealer for service.



Message	Problem	Solution
FUSER FAILURE	There is a malfunction in the fuser assembly.	Turn the printer power off, wait a few seconds, then turn it back on again. If the error recurs, contact your dealer for service.
INSERT n	The printer is prompting you to insert a sheet of paper of the indicated size. (size = A4, B5, LEGAL, or LETTER) in the manual feed slot.	<p>Insert a sheet of paper of the indicated size in the manual feed slot at the front of tray 1.</p> <p>OR</p> <p>To skip manual feed, press <b>RESET/RESUME</b>.</p> <p>The printer will print from tray 1.</p> <p>OR</p> <p>To print from tray 2, select tray 2.</p> <p><b>Note:</b> Inserting paper of a size other than the one displayed may cause the printed image to be clipped. This is because the printer formats the image based on the requested size.</p>



Message	Problem	Solution
INVALID CARD n	While the printer was offline, you inserted a font card into the indicated card slot (n = 1, 2, or 3) which was damaged, or which is not supported on the printer. You then pressed the <b>ONLINE</b> button.	Remove the invalid card from the inserted card slot and press the <b>RESET/RESUME</b> button.
MOTOR FAILURE	There has been a main motor malfunction.	Turn the printer power off and then back on again. If the error recurs, contact your dealer for service.
NO TONER PACK	The toner cartridge is either not installed, or incorrectly installed.	Install the toner cartridge following the instructions in Section 2, or make sure the cartridge is firmly seated.
OUT OF MEMORY	Too much data (macros or soft fonts) has been stored in the printer's memory.	Press the <b>RESET/RESUME</b> button to clear the error message (downloaded data is not lost).



Message	Problem	Solution
OVERRUN ERROR	Data is lost because the data transmission rate is higher than the printing speed.	Adjust the baud rate between the CPU and printer.
PAPER JAM	There is a paper jam.	Follow the jam removal instructions earlier in this section.



Message	Problem	Solution
PAPER MISMATCH LOAD HP n size	The printer received a request for a paper size (size = A4, B5, LEGAL, or LETTER) that is not currently loaded in the indicated tray (n = 1 or 2)	Load paper of the indicated size in the proper tray and press the <b>RESET/RESUME</b> button. OR Press <b>RESET/RESUME</b> to cause the printer to ignore the paper size request. <b>Note:</b> If the requested paper size does not match the size of the paper currently loaded, the <b>RESET/RESUME</b> button will allow you to print. However, since the output will be formatted for the requested paper size, a clipped image could occur (due to the fact that formatting is intended for the requested paper size).
PRINT. MEM. ERROR	There is a hardware error in the controller board.	Turn the printer power off and then back on again. If the error recurs, contact your dealer for service.



Message	Problem	Solution
RE-INSERT CARD n	A font card (IC card) was removed from the indicated card slot (n = 1, 2, or 3) while the printer was offline and contained buffered data.	Reinsert the font card into the indicated card slot and press the <b>RESET/RESUME</b> button.
SELECT ERROR	The printer is short of memory.	Install the optional memory expansion board.
SYSTEM ERROR n	An error (n = 1 – 5) was detected in the printer's controller board.	Turn the printer off and then back on again. If the error recurs, contact your dealer for service.



## Printer Status Messages

This printer displays a number of messages to indicate the status, or mode, of the printer at any given time. These are informational messages and do not indicate error conditions. They require no action on the part of the user. These messages and their meanings are listed alphabetically below.

Message	Meaning
FORM FEED source	<p>The printer is printing the data remaining in the buffer and the indicated paper source (source = HP1, HP2, MANUAL, AT1, or AT2) is selected.</p> <p><b>Note:</b> When the printer is taken offline while printing, or while receiving data from the computer, the data light will go on. This indicates that some unprinted data remains in the printer's buffer. To print this data, press the <b>FORM FEED</b> button. The data will be printed from the indicated paper source.</p>
INITIALIZING	<p>The printer is initializing. This occurs whenever the printer is turned on, or when you press and hold the <b>RESET/RESUME</b> button for 3 seconds.</p>
ONLINE source	<p>The printer is online and the indicated paper source (source = HP1, HP2, MANUAL, AUTO 1, or AUTO 2) is selected.</p> <p>The printer is idle or is receiving data from the host computer.</p>



Message	Meaning
OFFLINE source	The printer is offline and the indicated paper source (source = HP1, HP2, MANUAL, AUTO 1, or AUTO 2) is selected. The printer is not printing.
PRINTING source	The printer is online and printing, and the indicated paper source (source = HP1, HP2, MANUAL, AT1, or AT2) is selected.
PRINT OFFLINE	The <b>ONLINE</b> button was pressed during printing. The printer will stop after printing the current page, then go offline.
RESET	Displayed when you press and hold the <b>RESET/RESUME</b> button for 3 seconds. All printing menu items return to their default settings, and buffer pages, temporary soft fonts, and macros are cleared.
TONER EMPTY	Six thousand pages have been printed since the toner cartridge was installed. You may continue printing if the print quality is acceptable. If the print quality is unacceptable, replace the toner cartridge (see Section 5).
WARMING UP	The printer is warming up to its operational temperature.



## Taking a Hexadecimal Dump

If possible, turn power off and on to initialize the printer, then select the hex dump function. Otherwise, the list format may be abnormal. To use the hex dump mode, follow these steps:

- | Press this button  | Display                           | Comment   |
|--|-----------------------------------|---|
| 1. <b>ONLINE</b>   | OFFLINE HP1 A4                    | Switches the printer offline.   |
| <b>MENU</b>  | SETUP                             | Enters the main menu. The first option "setup menu" is displayed.     |
| <b>NEXT</b>  | ENTER HEX MODE                    | Press the <b>NEXT</b> button until the "enter hex dump" is displayed. |
| <b>ENTER</b>   | OFFLINE HP1 A4                    | Enters hex dump mode.   |
| <b>ONLINE</b>  | ONLINE HP1 A4                     | Switches the printer online.  |
| 2. [CPU RUN]   | PRINTING HP1 A4                   | Prints a dump listing.  |
| [CPU STOP]   | ONLINE HP1 A4                     | Stops printing.   |
| 3. If the printer stops with the DATA lamp lit, the last page data is not printed. |                                   |   |
| <b>ONLINE</b>  | OFFLINE HP1 A4                    | Switches the printer offline.   |
| <b>FORM FEED</b>   | FORM FEED HP1 A4<br>ONLINE HP1 A4 | Prints the last page then printing stops.                             |



4. ONLINE OFFLINE HP1 A4 Switches the printer offline.
- MENU QUIT HEX MODE Selects quit mode.
- ENTER OFFLINE HP1 A4 Quits hex dump mode.



# APPENDIX A

## SPECIFICATIONS

This appendix lists the physical, electrical, and environmental specifications and printing performance of the printer. It also includes paper specifications to help you select the proper paper to use.

### Printer Specifications

#### Dimensions and weight

Width: 430 mm (17 in)

Depth: 580 mm (22.8 in) (Excluding the operator panel: 550 mm (21.7 in))

Height: 350 mm (13.8 in) (Single cassette)

Weight: 35 kg (77 lb) (Single cassette)

#### AC input power

115 to 120 VAC  $\pm 10\%$ , 50/60  $\pm 2$  Hz (for USA)

220 to 240 VAC  $\pm 10\%$ , 50/60  $\pm 2$  Hz (for Europe)

#### Power consumption

Operating: Maximum 800 W (115 VAC)

#### Temperature:

Operating: 10°C to 35°C (50°F to 95°F)

Storage: 0°C to 45°C (32°F to 113°F)

#### Humidity

Operating: 20% to 80% RH

Maximum wet-bulb temperature : 29°C

Storage: 20% to 80% RH (no condensation)

#### Printing technology

Laser diode light-sourced electrophotography



**Print resolution**

300 dots per inch

**Print speed**

12 pages per minute (A4-size paper from paper cassette)

**Warm-up time**

About 60 seconds (120 V and 240 V)

**Average Monthly Print Volume (AMPV)**

Up to 10,000 pages per month recommended

**Safety and regulation approvals**

Safety: UL 478, CSA 22.2-154, TÜV

Radiation: FCC Class B, VDE 0871

**Fonts**

Resident: Courier 10 Portrait and Landscape, Roman 8 and FJ all Symbol Sets  
Line Printer 16.66 Portrait and Landscape, Roman 8 and FJ all Symbol Sets  
Prestige Elite 12 Portrait and Landscape, Roman 8 and FJ all Symbol Sets  
Tms Rmn 10 Portrait and Landscape

IC card: Bitmap fonts in Fujitsu format

Downloadable: Bitmap fonts in HP format on HP emulations

**Host interface**

Standard: Centronics and RS-232C

**Emulations**

Resident: HP LaserJet Series II  
Diablo 630 ECS  
Epson FX-85  
IBM Proprinter XL



**Paper feed**

Paper cassette: 250 sheets of 75 g/m<sup>2</sup> paper  
(First cassette standard and second cassette optional)

Manual feed slot: Single sheet

Stacker: 250 sheets of 75 g/m<sup>2</sup> paper

## Paper Specifications

You can use various types and sizes of paper as long as the following requirements are met. However, please test the paper or contact your dealer before using unspecified or unusual printing materials that may cause a problem in charging, heating, or feeding the paper.

**Type**

Photocopy plain single-sheet paper (equivalent to Xerox 4024), bond paper, overhead transparency (equivalent to 3M 731, manual feed).

**Size**

Legal (US legal size, 8 1/2 by 14 in)

Letter (US letter size, 8 1/2 by 11 in)

A4 (standard European letter size, 210 by 297 mm)

B5 (standard Japanese letter size, 182 by 257 mm)

Any size 257 to 356 mm long by 182 to 216 mm wide  
(within legal size using the manual feed slot)

**Weight**

Paper cassette: 64 to 90 g/m<sup>2</sup> (17 to 24 lb)

Manual feed slot: 64 to 90 g/m<sup>2</sup> (17 to 24 lb)  
and post card 128g/m<sup>2</sup>







## APPENDIX B

### COMMAND SETS

This printer emulates the command sets listed in the table below. Emulation programs are resident in the printer or are available on optional IC cards inserted in a slot (leftmost) on the front of the printer. Emulations are selected from the control panel.

**Emulation and printer**

Emulation	Printer
HP LJ 2	HP LaserJet Series II
DIABLO ECS	Diablo 630 ECS
FX-85	Epson FX-85
IBM-PRO	IBM Proprinter XL

Nearly all printer commands are represented by a control character or an escape sequence consisting of an escape character followed by a command identifier and parameters. The escape character is indicated by ESC which has a decimal value of 27 (hexadecimal 1B).



For clarity, in this manual there is space shown between each code. Therefore, if you see two or three letters that are not separated by spaces (such as "BS"), these letters represent a single ASCII code (i.e., not the letter "B" followed by the letter "S"). Refer to Appendix D to find the numeric value of each of these codes. The lowercase letter "L" is always shown in italics (*l*) to distinguish it from the number 1.

This section gives commands and brief descriptions of emulations, but does not provide the details or programming examples required to modify your application software or writing your own programs. These are given in the programmer's manual for each emulation.



# HP LaserJet Series II

## Introduction

This section lists the control codes used to emulate the HP LaserJet series II command set. The commands are arranged in the following groups:

- Page layout
- Print positioning
- Font control
- Graphics
- Macro control
- Printer control

Each group is further subdivided according to function. In each subdivision, the first column contains a code sequence that you can send to the printer. The second column gives a description of that sequence.

This section uses the following conventions:

- A # sign indicates a variable numeric value in the sequence. The second column indicates the values you can use here. Normally you'll use the corresponding ASCII codes.  
For example, in the first command below, if you wanted to set the page length to 66 lines, send the corresponding ASCII codes for "ESC & I 6 6 P", which in decimal values would be 027 038 108 054 054 080.
- A question mark in the code sequence indicates a variable letter in the sequence. The second column indicates the letters of the alphabet you can use here. Use a capital letter as shown.



- Some of the font commands have an almost identical format for both primary and secondary fonts, and these are shown immediately following each other. In these cases, the explanation is not repeated for the secondary font command.

### NOTE:

Some fonts (or individual font characteristics, such as symbol set or typeface) described in this appendix are available only on optional font cards or soft fonts.

## Specifying Fonts

When you specify font attributes, specify them in this order: orientation, symbol set, spacing, pitch, point size, style, stroke weight, and typeface. If the font you describe is not in the printer, the font most nearly matching the specified attributes will be used. The printer will examine the attributes in order (starting with orientation), comparing them with the attributes of fonts in the printer (all fonts are checked: resident, card, and soft).

For example, send the following commands to select the resident Courier 10 Landscape font:

```
ESC & 0 1 0 ESC ( 8 U ESC ( s 0 p 1 0 h 1 2 v 0 s b 3 T
```

The commands to select the primary and secondary fonts have an almost identical format. By changing the "(" in the primary font command to ")", you can specify the secondary font. You can then switch between the two fonts with a single: command: SI (ASCII 15) to select the primary font and SO (ASCII 14) to select the secondary font.



## Combining Commands

Commands that share the same two characters following the escape code can be combined when sent to the printer.

This can simplify entry of a long string of commands. To use this feature:

- The two characters following the escape code in the command sequence must be the same.
- In the combined command, the escape code and these two characters are omitted except for the first occurrence.
- The last character of each command must be changed to lowercase, except for the last command.

For example, ESC & a 10 L (which sets the left margin at column 10) and ESC & a 75M (which sets the right margin at column 75) can be combined as ESC & a 10ℓ75M.

## Page Layout Commands

### Page Length and Size

Command	Description
ESC & ℓ # P	Set page length. Value of # is the number of possible print lines per page. With default vertical spacing (6 lpi), correct values are: 60 B5 size 66 letter size (8-1/2" x 11") 70 A4 size 84 legal size (8-1/2" x 14")
ESC & ℓ # A	Set paper size. Value of # can be: 1 executive (7-1/4" X 10-1/2") 2 letter (8-1/2" x 11") 3 legal (8-1/2" x 14") 26 A4 (210mm x 297mm)



## Margins

Command	Description
ESC & a # L	Set left margin at column number #. The left edge of the page is column 0-the default left margin.
ESC & a # M	Set right margin at column number #. The default is rightmost printable character position.
ESC & l # E	Set top margin. Value of # is number of lines (VMI units) from top edge of page. The first line of the page is line 0.
ESC & l # F	Set number of print lines per page. This value plus the top margin must not exceed the page length. Bottom margin is page length minus this value minus the top margin value. The default text length (inlines) is (page length in inches-1) x 6).
ESC & l # L	Skip over perforation. Value of # can be: 0 allow printing in bottom margin area 1 form feed if a vertical positioning command would cause printing in bottom margin area.
ESC 9	Clear left and right margin settings.



## Print Positioning Commands

### Horizontal Positioning

Command	Description
ESC & k # H	Set horizontal spacing (HMI measurement). Value is set to #/120 inches. Default is 12(10 cpi).
BS	Backspace. Move left one column (one HMI unit).
CR	Carriage return. Move to left margin of the current line (or the following line, depending on the line termination set by the "ESC & k # G" command).
ESC & a # C	Move to specified column in current row. Value of # can be any column number. If # is preceded by + (move right) or - (move left), cursor movement is relative to the current position.
ESC * p # X	Move to specified horizontal position. Value of # is number of dots (1/300inch), measured from the left edge of the page. If # is preceded by + (move right) or - (move left), cursor movement is relative to the current position.
ESC & a # H	Move to specified horizontal position. Value of # is number of decipoints (1/720 inch), measured from the left edge of the page. If # is preceded by + (move right) or - (move left), cursor movement is relative to the current position.



## Vertical Positioning

Command	Description
ESC & ℓ # C	Set vertical spacing (VMI measurement). Value is set to #/48 inches. Default is 8 (6 lpi).
ESC & ℓ # D	Set vertical spacing (lpi measurement). Value of indicates number of lines per inch, and can be 1, 2, 3, 4, 6, 8, 12, 16, 24, or 48.
FF	From feed. Print current page, go to top of next page (and move to the left margin, depending on the line termination set by the "ESC & k # G" command).
LF	Line feed. Move down one line (one VMI unit) (and move to the left margin, depending on the line termination set by the "ESC & k # G" command).
ESC =	Move down half a line (0.5 VMI units).
ESC & a # R	Move to specified row in current column. Value of # can be any line number. If # is preceded by + (move down) or - (move up), cursor movement is relative current position.
ESC * p # Y	Move to specified vertical position. Value of # is number of dots (1/300 inch), measured from the top margin. If # is preceded by + (move down) or - (move up), cursor movement is relative to the current position.
ESC & a # V	Move to specified vertical position. Value of # is number of decipoints (1/720 inches), measured from the top margin. If # is preceded by + (move down), or - (move up), cursor movement is relative to the current position.



## Horizontal and Vertical Positioning

Command	Description
ESC & f # S	Store/recall print position. Value of # can be: 0 store current print position 1 move to last stored print position Up to 20 positions can be stored; they are recalled in the order of last in, first out.

## Font Control Commands

### Font Selection

Command	Description
SI	Select the primary font as the current font.
SO	Select the secondary font as the current font.

### Orientation

Command	Description
ESC & ℓ # O	Set page orientation. Value of # can be: 0 portrait 1 landscape



## Symbol Set

Command	Description
ESC ( # ?	<p>Select symbol set for primary font. Value of # can be from 0 to 2047; value of ? can be A to U.</p> <p>Possible combinations are:</p> <p>8U Roman-8</p> <p>10U PC-8</p> <p>11U PC-8 (D/N)</p> <p>0N Latin ECMA-94 (ISO 100)</p> <p>2K Chinese(ISO 57)</p> <p>0F French (ISO 25)</p> <p>1F French (ISO 69)</p> <p>0G German (HP)</p> <p>1G German (ISO 21)</p> <p>2U International Reference Version (ISO 2)</p> <p>0I Italy (ISO 15)</p> <p>0K JIS ASCII (ISO 14)</p> <p>0D Norway (ISO 60)</p> <p>1D Norway (ISO 61)</p> <p>0S Sweden (ISO 11)</p> <p>1S Spain (HP)</p> <p>2S Spain (ISO 17)</p> <p>3S Sweden (ISO 10)</p> <p>4S Portugal (ISO 16)</p> <p>5S Portugal (IBM/ISO 84)</p> <p>6S Spain (IBM/ISO 85)</p> <p>1E United Kingdom(ISO 4)</p> <p>0U US ASCII (ISO 6)</p> <p>0B LineDraw</p>
ESC ) # ?	Select symbol set for secondary font.



## Spacing

Command	Description
ESC ( s # P	Set spacing for primary font. Value of # can be: 0 monospaced (fixed pitch) font 1 proportionally-spaced font
ESC ) s # P	Set spacing for secondary font.

## Pitch

Command	Description
ESC ( s # H	Set pitch for primary font. Value of # indicates the pitch in characters per inch (cpi). This is ignored for a proportionally-spaced font.
ESC ) s # H	Set pitch for secondary font.
ESC & k # S	Set pitch for primary and secondary fonts. Value of # can be: 0 10 cpi (standard pitch) 2 16.66 cpi (compressed pitch)

## Point Size

Command	Description
ESC ( s # V	Select point size for primary font. Value of # is the character size in points (1 point = 1/72 inch).
ESC ) s # V	Select point size for secondary font.



## Style

Command	Description
ESC ( s # S	Set style for primary font. Value of # can be: 0 upright 1 italic
ESC ) s # S	Set style for secondary font.

## Stroke Weight

Command	Description
ESC ( s # B	Set stroke weight for primary font. This controls the lightness or boldness of printed characters. Value of # can be from -7 to 7, as follows: -7 ultra thin -5 thin -3 light 0 medium 3 bold 5 black 7 ultra black
ESC ) s # B	Set stroke weight for secondary font.



## Typeface

Command	Description
ESC ( s # T	<p>Select typeface for primary font. Value of # can be from 0 to 255. Usable values are:</p> <ul style="list-style-type: none"><li>0 Line Printer</li><li>1 Pica</li><li>2 Elite</li><li>3 Courier</li><li>4 Helv</li><li>5 Tms Rmn</li><li>6 Letter Gothic</li><li>7 Script</li><li>8 Prestige</li><li>9 Caslon</li><li>10 Orator</li><li>11 Presentations</li><li>14 Swiss 721</li><li>15 Dutch 801</li><li>17 Optima</li><li>18 Garamond</li><li>19 Cooper Black</li><li>20 Coronet Bold</li><li>21 Broadway</li><li>22 Bauer Bodoni Black Condensed</li><li>23 Century Schoolbook</li><li>24 University Roman</li></ul> <p>These typeface names may be registered trade marks of a third party. Use of these fonts may be conditional upon a license grant from the owners of the fonts.</p>
ESC ) s # T	Select typeface for secondary font.



## Symbol Set/Attribute Selection

Command	Description
ESC ( # @	Select function for primary font. Value of # can be: 0 select default symbol set for this font 1 same as 0 2 select current primary symbol set for font 3 select default font and its attributes
fiESC ) # @	Select function for secondary font.

## Font Management

Command	Description
ESC * c # D	Specify font ID. Identifies a font for use in a sub-sequent command. Value of # can be from 0 to 32767.
ESC * c # F	Font management. Value of # can be: 0 delete all soft fonts (temporary and permanent) from memory 1 delete all temporary fonts from memory 2 delete font specified in last "ESC * c # D" command 4 make font specified in last "ESC * c # D" command a temporary font 5 make font specified in last "ESC * c # D" command a permanent font



## Specify Font

Command	Description
ESC ( # X	Select primary font. Value of # is font ID specified in "ESC * c # D" command (0 to 32767).
ESC ) # X	Select secondary font.

## Downloading Fonts

Command	Description
ESC * c # E	Specify character code. Identifies the decimal code that will be associated with the next character downloaded. Value of # can be 0 to 255, and is used to reference the character for printing.
ESC ) s # W <data>	<p>Download font header for font specified in the last "ESC * c # D" (specify Font ID) command. Value of # is the size of &lt;data&gt; in bytes, usually 26.</p> <p>Values of the bytes of &lt;data&gt; are expressed as the ASCII codes for numbers from 0 to 255.</p> <p>Values above 255 use 2 bytes, with the first containing the 8 most significant bits. Possible values are:</p> <p>Byte 0: always 0</p> <p>Byte 1: always 26</p> <p>Byte 2: always 0</p> <p>Byte 3: font type; either 0 (a 7-bit font using character values 33 to 127) or 1 (an 8-bit font using values 33 to 127 and 160 to 255)</p> <p>Bytes 4 &amp; 5: always 0</p> <p>Bytes 6 &amp; 7: baseline position; distance in dots from baseline to top of cell</p>



Command	Description
	Bytes 8 & 9: cell width; width of cell in dots, from 1 to 4200
	Bytes 10 & 11: cell height; distance in dots from top to bottom of cell (1 to 4200)
	Byte 12: orientation; either 0(portrait) or 1 (landscape)
	Byte 13: spacing; either 0 (monospaced) or 1 (proportional)
	Bytes 14 & 15: symbol set; calculate values for these 2 bytes based on the codes for the symbol sets in the "ESC ( # ?" command. The formula to use for calculation is $(x \times 32 + y) - 64$ , where $x$ is the value of # and $y$ is the ASCII decimal equivalent of ?. Thus for Roman-8 (code 8 U), the value is $(8 \times 32 + 85) - 64 = 277$ or binary 00000001 00010101. Thus the values for bytes 14 & 15 are 1 and 21, respectively.
	Bytes 16 & 17: font pitch, expressed in quarter-dots. Use the formula $1200/p$ , where $p$ is the pitch in cpi. Value can be from 2 to 1260.
	Bytes 18 & 19: cell height, expressed in quarter-dots. Use the formula $4 \times h$ , where $h$ is the cell height in dots. Value can be from 0 to 10922.
	Bytes 20,21 & 22: always 0
	Byte 23: style; either 0(upright)or 1(italic)
	Byte 24: stroke weight; from -7 (ultra thin) to 7 (ultra black)
	Byte 25: typeface;from 0 to 255 (see typeface codes above)



Command	Description
ESC ( s # W <data>	<p>Download a character into printer memory.</p> <p>The character loaded is specified by the last "ESC * c # E" command. Value of # is the size of &lt;data&gt; in bytes. Value of &lt;data&gt; is a 16-byte header followed by data bytes that define the shape of the character. Possible values for the 16 header bytes are:</p> <p>Byte 0: always 4</p> <p>Byte 1: always 0 or 1</p> <p>Byte 2: always 14</p> <p>Byte 3: always 1</p> <p>Byte 4: 0 (portrait) or 1 (landscape)</p> <p>Byte 5: always 0</p> <p>Bytes 6 &amp; 7: left offset; distance (in dots) from left edge of character cell to start of character (portrait), or from baseline to top of character (landscape)</p> <p>Bytes 8 &amp; 9: top offset; distance(in dots) from baseline to top of character (portrait), or from left edge of character cell to right side of character (landscape)</p> <p>Bytes 10 &amp; 11: width; character width in dots(portrait), or character height in dots(landscape)</p> <p>Bytes 12 &amp; 13: height; character height in dots (portrait), or character width in dots (landscape)</p> <p>Bytes 14 &amp; 15: escapement; distance to move after character is printed. Value is expressed in quarter- dots, and must be a multiple of 4.</p>



Command	Description
	Byte 16 onwards: character data, expressed as byte values, where 1 indicates that a dot is to be printed, and 0 that it is not. For example, a value of 255 (binary 11111111) would print all eight dots in a single byte. The order in which you specify the data follows the way in which the laser scans the character, namely top left to bottom right (portrait) or top right to bottom left (landscape).

## Graphics Commands

### Rule and Pattern Dimensions

Command	Description
ESC * c # A	Specify width of horizontal rule or fill pattern, in dots. Width is #/300 inch, default is 0.
ESC * c # H	Specify width of horizontal rule or fill pattern, in decipoints. Width is #/720 inches, default is 0.
ESC * c # B	Specify height of vertical rule or fill pattern, in dots. Height is #/300 inches, default is 0.
ESC * c # V	Specify height of vertical rule or fill pattern, in decipoints. Height is #/720 inches, default 0.



## Rules and Patterns

Command	Description
ESC * c # G	Specify degree of shading, or specify fill pattern (depending on "ESC * c # P" command). For shading, value of # can be from 1 (light) to 100 (dark). For fill pattern, value of # can be: <ol style="list-style-type: none"> <li>1 horizontal lines</li> <li>2 vertical lines</li> <li>3 diagonal lines (/ / / /)</li> <li>4 diagonal lines (\ \ \ \)</li> <li>5 square cross-hatching</li> <li>6 diamond cross-hatching</li> </ol>
ESC * c # P	Print rule or pattern. Value of # determines whether rule or pattern is printed. Pattern used is that defined in last "ESC * c # G" command. Value of # can be: <ol style="list-style-type: none"> <li>0 print rule</li> <li>2 print shading</li> <li>3 print fill pattern</li> </ol>

## Raster Graphics

Command	Description
ESC * t # R	Set resolution for printing raster graphics. Value of # is resolution in dots per inch(dpi), and can be 75,100,150,or 300. The same graphics data prints much smaller at 300 dpi than at 75 dpi.
ESC * r # A	Start printing raster graphics. Value of # can be: <ol style="list-style-type: none"> <li>0 start at leftmost print position</li> <li>1 start at current print position</li> </ol>



Command	Description
ESC * b # W <data>	Print a line of raster graphics. Value of # is size of <data> in bytes. Value of <data> is one or more byte values, each of which shows the dots in a single row that are to be printed. A bit set to one indicates that the corresponding dot should print; zero bits do not print. Use a separate command for each row of graphics to be printed.
ESC * r B	Stop printing raster graphics.

## Macro Control Commands

Command	Description
ESC & f # Y	Identify macro and make it the current macro. Value of # can be from 0 to 32767.
ESC & f # X	Macro control. Value of # can be: <ol style="list-style-type: none"> <li>0 begin definition of a macro</li> <li>1 end macro definition and store as temporary macro</li> <li>2 execute current macro, maintaining any changes the macro makes to printer settings</li> <li>3 execute current macro, discarding any changes the macro makes to printer settings</li> <li>4 enable automatic overlay(executes current macro at start of each page)</li> <li>5 disable automatic overlay</li> <li>6 delete all macros(both temporary and permanent)</li> <li>7 delete all temporary macros</li> <li>8 delete current macro</li> <li>9 make current macro a temporary macro</li> <li>10 make current macro a permanent macro</li> </ol>



## Printer Control Commands

### Reset

Command	Description
ESC E	Reset all printer settings to default values.

### Auto Underline

Command	Description
ESC & d # D	Turn on auto underline. Value of # can be: 0 fixed position 3 floating position
ESC & d @	Turn off auto underline

### End-of-Line Wraparound

Command	Description
ESC & s # C	Control end-of-line wraparound. Value of # can be: 0 enable wraparound; printer inserts CR+LF if print line extends beyond right margin 1 disable end-of-line wraparound (default)



## Paper Control

Command	Description
ESC & ℓ # X	Set number of copies of each page. Value of # can be from 1 to 99.
ESC & ℓ # H	Paper control. Value of # can be: 0 print current page 1 feed paper from bin 1 2 feed paper from manual feed slot 4 feed paper from bin 2

## Line Termination

Command	Description
ESC & k # G	Specify interpretation of line termination codes CR, LF and FF. Value of # can be: 0 CR=CR; LF=LF; FF=FF 1 CR=CR+LF; LF=LF; FF=FF 2 CR=CR; LF=CR+LF; FF=CR+FF 3 CR=CR+LF; LF=CR+LF; FF=CR+FF

## Display Function

Command	Description
ESC Y	Display functions. Print out all codes received.
ESC Z	Turn off display functions mode.

## Transparent Print Data

Command	Description
ESC & p # X <data>	Set number of characters of transparent print data. Print out all codes received, for specified number of characters.



# Diablo 630 ECS

## Control codes

Command	Description
NUL	Null operation (pad character)
ETX	End of transmission character (sent by computer; computer waits for ACK (ETX/ACK)).
BS	Backspace horizontally one HMI
HT	Move right to next horizontal tab
LF	Line feed (move down one VMI)
VT	Move down to next vertical tab
FF	Form feed (eject page and home cursor)
CR	Carriage return (move to left margin)
ESC	Escape code (begin escape sequence)
SP	Space character (move right one HMI)
DEL	Delete character (null)
DC1/DC3	Select/deselect printer

## Escape code

Command	Description
ESC BS	Backspace horizontally 1/120 inch
ESC HT n	Move to absolute horizontal position (n-1) x HMI/120 inch n: 1 to 255
ESC LF	Negative line feed (move up VMI/48 inch)
ESC VT n	Move to absolute vertical position (n-1) x VMI/48 inch n: 1 to 255
ESC FF n	Set lines per page to n(default: 66) Top margin: 0, bottom margin: VMI x n n: 1 to 126
ESC CR P	Diablo 630 reset command



Command	Description
ESC DC1 n	Add signed offset n/120 inch to HMI n range: -63 to + 63, bit 6: sign
ESC SYN n	Language select
ESC SUB I	Diablo 630 reset command
ESC RS n	Set VMI to (n-1)/48 inch (default: 6/48 inch) n: 1 to 126
ESC US n	Set HMI to (n-1)/120 inch (default: 12/120 inch) n: 1 to 126
ESC !	Inhibit auto-CR mode (no excess line length print wrapping)
ESC &	Terminate bold/shadow print mode
ESC -	Set vertical tab
ESC 0	Set right margin to current X position
ESC 1	Set horizontal tab at current X position
ESC 2	Clear all horizontal and vertical tabs
ESC 3	Enter graphic mode
ESC 4	Exit graphic mode
ESC 5	Select forward horizontal printing
ESC 6	Select reverse horizontal printing (CR cancel)
ESC 7	Enable print suppression (CR cancel)
ESC 8	Clear horizontal tab at current X position
ESC 9	Set left margin to current X position
ESC <	Select inverted horizontal axis mode (page origin at upper right edge)
ESC =	Enter auto-center mode (CR or ESC X exit)
ESC >	Select normal horizontal axis mode (page origin at upper left edge)
ESC ?	Enable auto-CR mode
ESC C	Clear top and bottom margins
ESC D	Negative half-line feed, move up VMI/2 inch
ESC E	Begin autounderscore
ESC L	Set bottom margin to current Y position
ESC M	Enter auto-justify mode (ESC X exits)
ESC O	Enable bold print (CR cancel)



Command	Description
ESC P	Enable proportional spacing mode (use char width, not HMI, except for spaces)
ESC Q	Terminate proportional spacing mode
ESC R	Terminate auto-underscore (draw line)
ESC S	Reset HMI to font panel spacing
ESC T	Set top margin to current Y position
ESC U	Half-line feed, move down VMI/2 inch
ESC W	Enable shadow printing (CR cancel)
ESC X	Cancel WP modes (reset offset) Clears bold, shadow, underscore modes Exit auto-justify and center modes
ESC Y	Print character at font position 20 (hex)
ESC Z	Print character at font position 7F (hex)
ESC EM 1	Feed from paper cassette 1
ESC EM 2	Feed from paper cassette 2
ESC EM R	Remove paper
ESC I	Feed from paper cassette 1
ESC K	Feed from paper cassette 2
ESC -	Set vertical tab
// 1 //	Select paper cassette 1
// 2 //	Select paper cassette 2
// C //	Select paper cassette change
// R //	Select remove
ESC SUB R	Remote error reset
ESC SUB SO	Memory test
ESC SUB 1	Request status byte 1
ESC SUB 3	Request status byte 3



# IBM Proprinter (XL)

## Control codes

Command	Description
BEL	Bell
BS	Backspace
HT	Horizontal tab execution
LF	Line feed
VT	Vertical tab execution
FF	Form feed
CR	Carriage return
SO	Set one-line double-width mode
SI	Set condensed mode
DC 1	Select printer
DC 2	Select 10 cpi
DC 3	Deselect printer
DC 4	Reset one-line double-width mode
CAN	Cancel line buffer
SP	Space

## Escape codes

Command	Description
ESC - (0)	Reset underline mode
ESC - (1)	Set underline mode
ESC 0	Set line spacing to 1/8 inch
ESC 1	Set line spacing to 7/72 inch
ESC 2	Enable text line spacing
ESC 3 n	Set line spacing to n/216 inch n: 1 to 255
ESC 4	Set top of form
ESC 5 (0)	Disable automatic line feed by CR code
ESC 5 (1)	Enable automatic line feed by CR code
ESC 6	Select character set II
ESC 7	Select character set I
ESC :	Set elite pitch



Command	Description
ESC A n	Set line spacing to n/72 inch (text line spacing) n: 0 to 127
ESC B NUL	Reset all vertical tabs
ESC B n1... nk NUL	Set vertical tabs nk: 0 to 254 nk-1 is smaller than nk. k: 1 to 127
ESC C NUL n	Set form length by inches (n inch) n: 1 to 22
ESC C n	Set form length by line space (n lines) n: 1 to 127
ESC D NUL	Reset all horizontal tabs
ESC D n1... nk NUL	Set horizontal tabs nk: 1 to 255 nk-1 is smaller than nk. k: 1 to 256
ESC E	Set emphasized print mode
ESC F	Reset emphasized print mode
ESC G	Set NLQ mode
ESC H	Reset NLQ mode
ESC J n	Single line feed (n/216 inch) n: 1 to 255
ESC K n1 n2 data	Single-density image
ESC L n1 n2 data	Double-density image
ESC N n	Set skip perforations (n lines) n: 1 to 127
ESC O	Reset skip perforations
ESC P n	Proportional space mode
ESC Q SYN	Deselect printer
ESC R	Reset tabs to defaults
ESC S (0)	Set superscript mode
ESC S (1)	Set subscript mode
ESC T	Reset superscript or subscript mode
ESC W (0)	Reset double-width mode
ESC W (1)	Set double-width mode



Command	Description										
ESC X n m	Set horizontal margin (columns n and m) n: 0 to 255 m: 1 to 255										
ESC Y n1 n2 data	Double-density image										
ESC Z n1 n2 data	Quadruple-density image										
ESC [@ n1 n2 m1 ... m 4	Double height, width, and line spacing printing n1: Low order byte, usually 4 n2: High order byte, usually 0 m1: Reserved, must be 0(NUL) m2: Reserved, must be 0(NUL) m3: Line spacing and character height modes										
<table> <tr> <th>Bit</th><th>Mode</th></tr> <tr> <td>5</td><td>Double line feed</td></tr> <tr> <td>4</td><td>Normal line feed</td></tr> <tr> <td>1</td><td>Double height character</td></tr> <tr> <td>0</td><td>Normal height character</td></tr> </table>		Bit	Mode	5	Double line feed	4	Normal line feed	1	Double height character	0	Normal height character
Bit	Mode										
5	Double line feed										
4	Normal line feed										
1	Double height character										
0	Normal height character										
m4: Character width mode											
<table> <tr> <th>Bit</th><th>Mode</th></tr> <tr> <td>1</td><td>Double-width character</td></tr> <tr> <td>0</td><td>Normal-width character</td></tr> </table>		Bit	Mode	1	Double-width character	0	Normal-width character				
Bit	Mode										
1	Double-width character										
0	Normal-width character										
ESC \ n1 n2 chars	Print characters from all-character set n1 and n2 specify the number of character to be printed from the all- character set. Total: n1 + 256 x n2										
ESC ^ char	Print character from all-character set										
ESC _ (0)	Reset overline mode										
ESC _ (1)	Set overline mode										



# Epson FX-85

## Control codes

Command	Description
CAN	Cancel line buffer
BS	Backspace
CR	Carriage return to left margin
DC2	Cancel condensed-print mode
DC4	Cancel one-line enlarged-print mode
ESC	Begin escape sequence
FF	Form feed to next page
HT	Horizontal tab
LF	Line feed
SO	Shift out to set enlarged print mode
SI	Shift in to set condensed print mode
SP	Space
VT	Vertical tab
DC1/DC3	Select/deselect printer
DEL	Delete one character
BEL	Bell



## Escape code

Command	Description																																				
ESC SO	Set one line enlarged print mode																																				
ESC SI	Set condensed print mode																																				
ESC EM n	(No operation) Cut-sheet feeder control																																				
ESC SP n	Select character space in n/240 inch n: 0 to 64																																				
ESC ! n	Select print mode n: 0 to 63 The print mode depends on the bit pattern:																																				
<table><tr><th>Bit</th><th>On</th><th>Off</th><th>Function</th></tr><tr><td>0</td><td>ESC M</td><td>ESC P</td><td>Elite/pica</td></tr><tr><td>1</td><td>ESC p 1</td><td>ESC p 0</td><td>Proportional or not</td></tr><tr><td>2</td><td>SI</td><td>DC2</td><td>Compressed or not</td></tr><tr><td>3</td><td>ESC E</td><td>ESC F</td><td>Emphasized or not</td></tr><tr><td>4</td><td>ESC G</td><td>ESC H</td><td>Double-strike or not</td></tr><tr><td>5</td><td>WSC W1</td><td>ESC W0</td><td>Expanded or not</td></tr><tr><td>6</td><td>ESC 4</td><td>ESC 5</td><td>Italic or not</td></tr><tr><td>7</td><td>ESC- 1</td><td>ESC-0</td><td>Underline or not</td></tr></table>		Bit	On	Off	Function	0	ESC M	ESC P	Elite/pica	1	ESC p 1	ESC p 0	Proportional or not	2	SI	DC2	Compressed or not	3	ESC E	ESC F	Emphasized or not	4	ESC G	ESC H	Double-strike or not	5	WSC W1	ESC W0	Expanded or not	6	ESC 4	ESC 5	Italic or not	7	ESC- 1	ESC-0	Underline or not
Bit	On	Off	Function																																		
0	ESC M	ESC P	Elite/pica																																		
1	ESC p 1	ESC p 0	Proportional or not																																		
2	SI	DC2	Compressed or not																																		
3	ESC E	ESC F	Emphasized or not																																		
4	ESC G	ESC H	Double-strike or not																																		
5	WSC W1	ESC W0	Expanded or not																																		
6	ESC 4	ESC 5	Italic or not																																		
7	ESC- 1	ESC-0	Underline or not																																		
ESC #	Cancel MSB control sequence																																				
ESC \$ n1 n2	Select absolute dot position in units of 1/160 inch Cursor position: $\frac{n1 + n2 \times 256}{60}$ inch n1: 0 to 255 n2: 0 to 4																																				
ESC *	Select bit image mode																																				
ESC - n	Set/cancel underlined-print mode n: 1,49,or 129 sets underline mode. n: 0,48,or 128 cancels underline mode.																																				



Command	Description
ESC / n	VFU (vertical format unit) channel selection n: 0 to 7
ESC 0	Set 1/8 inch line spacing
ESC 1	Set 7/72 inch line spacing
ESC 2	Set 1/6 inch line spacing
ESC 3 n	Set n/216 inch line spacing n: 0 to 216
ESC 4	Select alternate character set(italics)
ESC 5	Cancel alternate character set
ESC 6	Expand printable code area
ESC 7	Cancel ESC 6 setting
ESC <	No operation (Prints one line from left to right)
ESC =	Set MSB of input 8-bit data as 0
ESC >	Set MSB of input 8-bit data as 1
ESC ? s n	Reassign graphics mode
ESC @	Initialize the printer
ESC A n	Set n/72 inch line spacing n: 0 to 85
ESC B n1 n2 ... n16	Set vertical tab at n1 n2 ... n16 n: 0 to 255
ESC C n	Set form length to n lines n: 1 to 127
ESC C O m	Set page length to m inches m: 1 to 22
ESC D n1 n2 ... n32	Set horizontal tab at in n1 n2 ... n32 n: 0 to 255
ESC E	Set printing to bold
ESC F	Cancel bold printing mode
ESC G	Set double-strike print mode
ESC H	Cancel double-strike print mode
ESC I n	Disable/enable expanded characters n: 0,48, or 128 enables expanded characters. n: 1,49, or 129 disables expanded characters.
ESC J n	Feed n/216 inch line spacing for one line n: 0 to 255



Command	Description														
ESC K	Set normal-density image mode														
ESC L	Set dual-density bit image mode														
ESC M	Set elite pitch														
ESC N n	Set perforation skip n: 1 to number of lines to be skipped at the bottom of a page														
ESC O	Cancel perforation skip														
ESC P	Cancel ESC M code/set pica pitch														
ESC Q n	Set right margin to n character width														
	<table> <tr> <td>Pica</td><td>n: 2 to 80</td></tr> <tr> <td>Elite</td><td>n: 3 to 96</td></tr> <tr> <td>Pica (compressed)</td><td>n: 3 to 137</td></tr> <tr> <td>Elite (compressed)</td><td>n: 4 to 160</td></tr> <tr> <td>Pica (expanded)</td><td>n: 1 to 40</td></tr> <tr> <td>Pica (expanded compressed)</td><td>n: 2 to 68</td></tr> <tr> <td>Elite (expanded compressed)</td><td>n: 2 to 80</td></tr> </table>	Pica	n: 2 to 80	Elite	n: 3 to 96	Pica (compressed)	n: 3 to 137	Elite (compressed)	n: 4 to 160	Pica (expanded)	n: 1 to 40	Pica (expanded compressed)	n: 2 to 68	Elite (expanded compressed)	n: 2 to 80
Pica	n: 2 to 80														
Elite	n: 3 to 96														
Pica (compressed)	n: 3 to 137														
Elite (compressed)	n: 4 to 160														
Pica (expanded)	n: 1 to 40														
Pica (expanded compressed)	n: 2 to 68														
Elite (expanded compressed)	n: 2 to 80														
ESC R n	International character														
	<table> <tr> <td>n=0: USA</td><td>n=6: Italy</td></tr> <tr> <td>n=1: France</td><td>n=7: Spain</td></tr> <tr> <td>n=2: Germany</td><td>n=8: Japan</td></tr> <tr> <td>n=3: UK</td><td>n=9: Norway</td></tr> <tr> <td>n=4: Denmark I</td><td>n=10: Denmark II</td></tr> <tr> <td>n=5: Sweden</td><td></td></tr> </table>	n=0: USA	n=6: Italy	n=1: France	n=7: Spain	n=2: Germany	n=8: Japan	n=3: UK	n=9: Norway	n=4: Denmark I	n=10: Denmark II	n=5: Sweden			
n=0: USA	n=6: Italy														
n=1: France	n=7: Spain														
n=2: Germany	n=8: Japan														
n=3: UK	n=9: Norway														
n=4: Denmark I	n=10: Denmark II														
n=5: Sweden															
ESC S n	Set superscript/subscript print mode n: 0,48, or 128 sets superscript print mode n: 1,49, or 129 sets subscript print mode														
ESC T	Cancel superscript/subscript print mode														
ESC W n	Set/cancel enlarged print mode n: 0,48, or 128 cancels enlarged mode n: 1,49, or 129 sets enlarged mode														
ESC Y	Set dual-density bit image mode														
ESC Z	Set quadruple-density bit image mode														



Command	Description														
ESC \ n1 n2	Select relative dot position Cursor movement: $\frac{n2 \times n1}{120}$ inch														
ESC a n	Select NLQ justification														
	<table> <tr> <td>n: 0, 48, or 128</td><td>Left-justification</td></tr> <tr> <td>n: 1, 49, or 129</td><td>Centering</td></tr> <tr> <td>n: 2, 50, or 130</td><td>Right-justification</td></tr> <tr> <td>n: 3, 51, or 131</td><td>Word wrap (full-justification)</td></tr> </table>	n: 0, 48, or 128	Left-justification	n: 1, 49, or 129	Centering	n: 2, 50, or 130	Right-justification	n: 3, 51, or 131	Word wrap (full-justification)						
n: 0, 48, or 128	Left-justification														
n: 1, 49, or 129	Centering														
n: 2, 50, or 130	Right-justification														
n: 3, 51, or 131	Word wrap (full-justification)														
ESC b n m1 m2 ... m16 NUL	VFU (vertical format unit) position setting n: 0 to 7m: 0 to 255														
ESC j n	Executes reverse feed n/216 inch line spacing n: 0 to 255														
ESC l n	Set left margin to n character width														
	<table> <tr> <td>Pica</td><td>n: 2 to 80</td></tr> <tr> <td>Elite</td><td>n: 3 to 96</td></tr> <tr> <td>Pica (compressed)</td><td>n: 3 to 137</td></tr> <tr> <td>Elite (compressed)</td><td>n: 4 to 160</td></tr> <tr> <td>Pica (expanded)</td><td>n: 1 to 40</td></tr> <tr> <td>Pica (expanded compressed)</td><td>n: 2 to 68</td></tr> <tr> <td>Elite (expanded compressed)</td><td>n: 2 to 80</td></tr> </table>	Pica	n: 2 to 80	Elite	n: 3 to 96	Pica (compressed)	n: 3 to 137	Elite (compressed)	n: 4 to 160	Pica (expanded)	n: 1 to 40	Pica (expanded compressed)	n: 2 to 68	Elite (expanded compressed)	n: 2 to 80
Pica	n: 2 to 80														
Elite	n: 3 to 96														
Pica (compressed)	n: 3 to 137														
Elite (compressed)	n: 4 to 160														
Pica (expanded)	n: 1 to 40														
Pica (expanded compressed)	n: 2 to 68														
Elite (expanded compressed)	n: 2 to 80														
ESC p n	Set spacing mode (proportional/fixed) n: 1,49, or 129 sets proportional spacing. n: 0,48, or 128 sets normal spacing.														





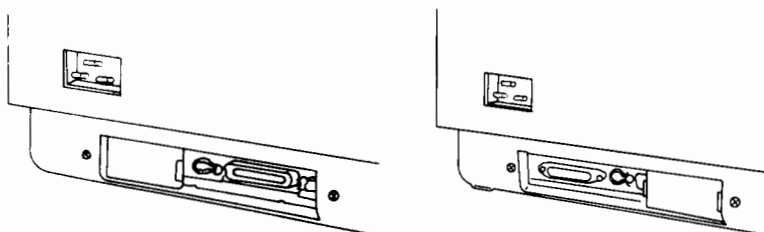


# APPENDIX C

## INTERFACE INFORMATION

### General

This printer can communicate with a computer through either a parallel (Centronics) or serial (RS-232C) interface.



### Interface Connectors

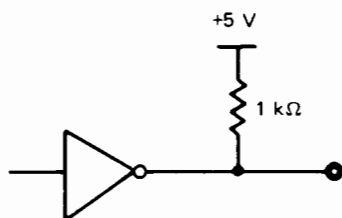


## Parallel Interface

### Hardware Requirements

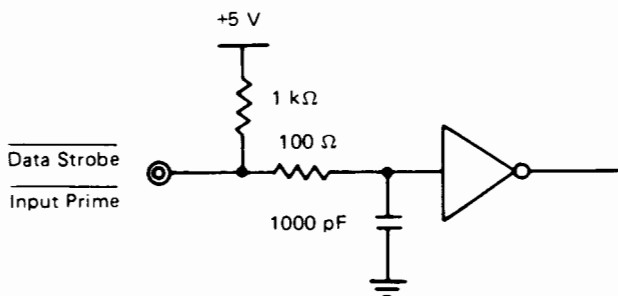
Signal levels: TTL compatible 0.0 to +0.4 V for low level  
+2.4 to +5.0 V for high level

Output circuit: SN74LS06 or equivalent

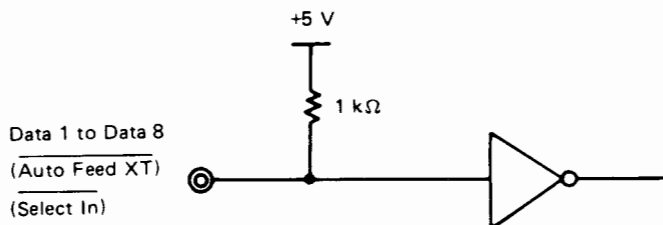


**Parallel Interface Output Circuit**

Input circuit: SN74LS14 or equivalent



Input circuit: LS-TTL or equivalent



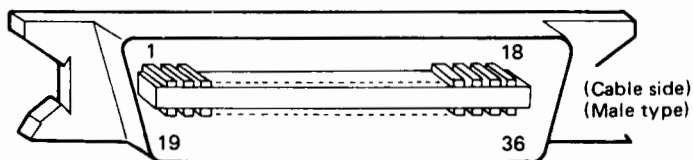
**Parallel Interface Input Circuit**



## Connector Pin Assignment

Connector (cable side): Shielded plug

Amphenol DDK57FE-30360 or equivalent



### Parallel Interface Connector

Signal definition:

#### Parallel Interface Signals

Connector pin number	Return line pin number	Signal name	Direction	Description
1	19	Data Strobe	Input	<ul style="list-style-type: none"><li>- Strobe pulse for reading data (Data 1 to Data 8). The printer reads the data when this signal is low.</li><li>- The pulse width must be 0.5 <math>\mu</math>s or more at the terminal of the printer.</li></ul>



### Parallel Interface Signals - continued

Connector pin number	Return line pin number	Signal name	Direction	Description
2	20	Data 1	Input	<ul style="list-style-type: none"> <li>- The Data 1 to Data 8 signals correspond to parallel data bits 1 to 8.</li> <li>- Data 8 is the most significant bit, but is not used in 7-bit ASCII mode.</li> <li>- All signals must go high at least 0.5 <math>\mu</math>s before the falling edge of the Data Strobe signal and must stay high for at least 0.5 <math>\mu</math>s after the rising edge.</li> </ul>
3	21	Data 2	Input	
4	22	Data 3	Input	
5	23	Data 4	Input	
6	24	Data 5	Input	
7	25	Data 6	Input	
8	26	Data 7	Input	
9	27	Data 8	Input	
10	28	Acknowledge	Output	<ul style="list-style-type: none"> <li>- Pulse signal indicating data receive completed (or data receive enable) status.</li> <li>- It is also issued when the printer switches from offline to online.</li> </ul>
11	29	Busy	Output	Data cannot be received when this signal is high, for example, when the buffer is full or when an error occurs.
12	30	Paper Empty	Output	This signal goes high when the paper runs out.



**Parallel Interface Signals - continued**

Connector pin number	Return line pin number	Signal name	Direction	Description
13	-	Select	Output	High when the printer is online and low when the printer is offline.
14	-	(Auto Feed XT)	Input	(Reserved)*
15	-	-		Not used
16	-	Signal Ground (SG)		Logic ground level (OV)
17	-	Frame Ground (FG)		Printer cabinet ground line.
18	-			Not used
19 to 30	-	Signal Ground (SG)		Twisted pair return lines
31	-	Input Prime	Input	If this signal is low for more than 50 $\mu$ s, the printer is reset to the initial status and placed online.
32	-	Fault	Output	This signal goes low under the following conditions: (1) Offline (2) Paper out (3) Cover open (4) Other printer error



**Parallel Interface Signals - continued**

Connector pin number	Return line pin number	Signal name	Direction	Description
33		-		Not used
34		-		Not used
35		+5V		Pulled up to +5 V thru 3.3 k $\Omega$ .
36		(Select In)	Input	(Reserved)*

**NOTES:**

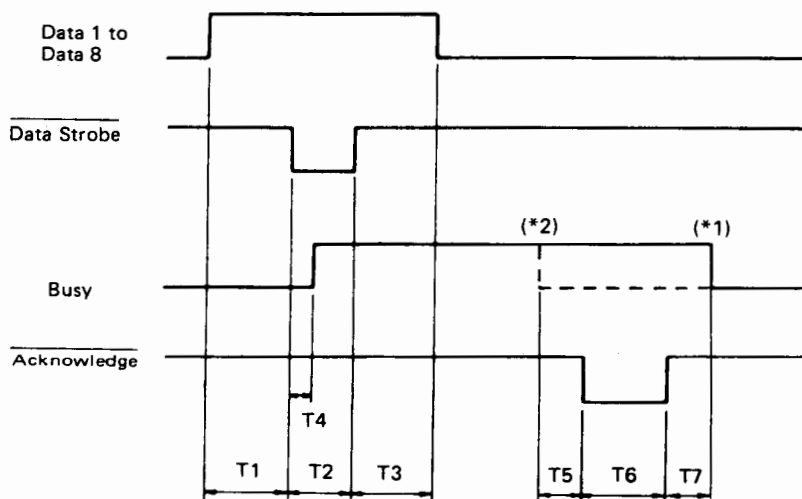
1. Direction:  
"Input" indicates a signal input to the printer.  
"Output" indicates a signal output from the printer.
2. Return line:  
Represents a twisted pair return line, one side of  
which is connected to signal ground.
3. \* means it is assigned as a signal name, but has no  
function.



## Data Transmission Timing

This printer receives data from the host in handshake mode based on the Busy and Acknowledge signals from the printer and the Data Strobe signal from the host.

The timing of the Busy, Data Strobe, and Acknowledge signals must be as shown in the figure below.



$T1, T2, T3 > 0.5 \mu s$

$T4 < 0.5 \mu s$

$T5 = 0 \mu s$

$T6 = 3 \pm 1.0 \mu s$

\*1 Timing 1: HP LaserJet series II emulations.

\*2 Timing 2: Serial printer emulations.

### Data Transmission Timing



# Serial Interface

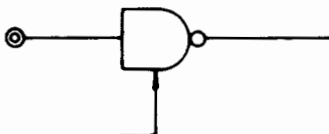
## Hardware Requirements

Signal levels:

- 3 V or lower for a mark condition (logical 1)
- +3 V or higher for a space condition (logical 0)

Input circuit:

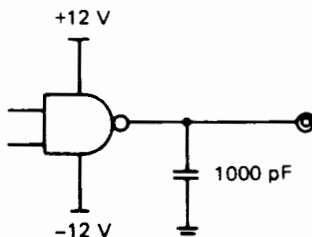
An MC1489AL is used to convert from RS-232C level to TTL level.



**Serial Interface Input Circuit**

Output circuit:

An MC1488L is used to convert from TTL level to RS-232C level. A 1000-pF capacitor suppresses noise on the output signal line.



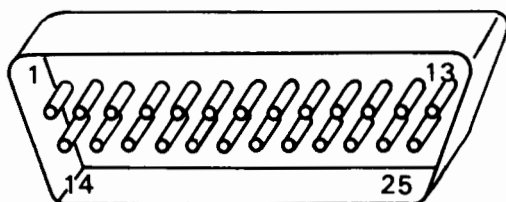
**Serial Interface Output Circuit**



## Connector Pin Assignment

Connector (cable side):

A D-subminiature Cannon or Cinch DB-25 male type or an equivalent connector that conforms to EIA standards



(Cable side)  
(Male type)

### Serial Interface Connector

Signal definition:

#### Serial Interface Signals

Pin number	Designation	Direction	Function
1	FG		Frame/chassis ground Safety/protective ground
2	TD	Output	Transmitted data
3	RD	Input	Received data
4	RTS	Output	Request to send Sends spaces when the printer is ready to transmit data
5	CTS	Input	Clear to send Spaces are sent when the host is ready to receive data
6	DSR	Input	Data set ready The host sends spaces when it is ready to send or receive data.



**Serial Interface Signals - continued**

Pin number	Designation	Direction	Function
7	SG		Signal ground (common return)
8	CD	Input	Carrier detect The printer sends spaces when it can receive data.
11	(RC)	Output	(Reverse channel) Available as a printer ready signal. (Not used for the standard interface)
20	DTR	Output	Data terminal ready The printer sends spaces when it is ready to receive or transmit data

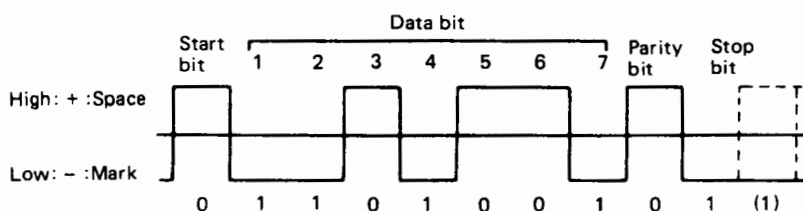
**NOTES:**

1. The space state corresponds to the high level of the interface signal.
2. The direction (output or input) refers to the printer side.



## Serial Data Format

Serial data consists of a start bit, data bits, a parity bit, and one or two stop bits. A bit is in the mark state when not in transmission. The data bits start with the least significant bit (LSB). For example, transmission of the character "K" (hexadecimal 4B) is shown below. (7 data bits, even parity)



Serial Data Format

## Full Duplex 3-wire Control Mode

The printer enables or disables the input control signals for the printer linked with the RS-232C interface. Thus, it enables communication via the RS-232C interface as well as simpler communication.

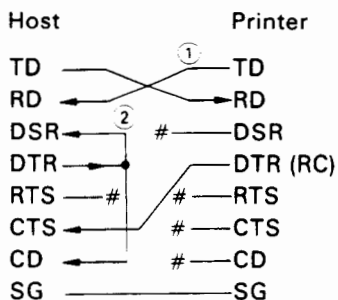
Input control signals DSR, CTS, and CD are always regarded as 'ON', regardless of their actual states.

Therefore, data communication is always enabled even if a computer that does not use any of these input control signals is linked to the terminal.



An example of cable wiring:

This wiring is for IBM PCs or most other personal computers.



### IBM PC Cable Wiring

#### NOTES:

1. Wire ① is unnecessary for the DTR (or RC) protocol.
2. Some hosts may not require wire ② .



## Data Protocols

Different types of protocols are available for the RS-232C serial interface depending on the computer manufacturer.

- X-ON/X-OFF or DC1/DC3
- DTR
- RC
- ETX/ACK

These protocols are provided to prevent the overflow of the print data receive buffer because the interface data transmission speed is faster than the buffer data print speed. Therefore, the printer uses specific character codes or an interface signal for each protocol to inform the host of the buffer status.

### (1) X-ON/X-OFF or DC1/DC3 protocol

With either protocol, the X-OFF (DC3) code (hexadecimal 13) is transmitted from the printer when the remaining space in the buffer is less than 255 bytes. The X-ON (DC1) code (hexadecimal 11) is transmitted when there is less than 255 bytes in the buffer.

Normal processing of data cannot be guaranteed if data is transmitted to the printer when sufficient buffer space is not available after the X-OFF code has been transmitted.

When the printer is first turned on, the DTR signal is set to the space state (ready) and an X-ON (DC1) code is transmitted from the printer. When the printer is placed offline, the X-OFF code is transmitted even if the buffer is not full. The X-ON code is transmitted when the printer is placed online again.

If paper runs out or the cover is opened, a NAK code (hexadecimal 15) is sent from the printer.



## **(2) DTR protocol**

With this protocol, the DTR signal (pin 20) is set off (Low). That is, the Busy signal is issued when the amount of data remaining in the buffer is 255 bytes. When the printer is placed offline, the DTR signal becomes inactive.

The transmitter must stop transmission within 255 bytes after the DTR signal is set off (Low).

Valid data cannot be guaranteed if data exceeding the buffer capacity is transmitted (the DTR signal is ignored).

Buffer-full recovery timing:

Data transmission is suspended when the DTR signal is set OFF (Low). Even in this state, printing continues. When the data length of the available area in the buffer exceeds 255 bytes, the DTR signal goes high. That is, a READY signal is issued.

## **(3) RC protocol**

This protocol is the same as the DTR protocol, except that it uses the Reverse Channel signal (pin 11) instead of the Data Terminal Ready signal (pin 20).

## **(4) ETX/ACK protocol**

With this protocol, the printer sends the ACK (Acknowledge) character (hexadecimal 06) to the computer when it reads out the ETX (End of Text) character (hexadecimal 03) from its print data receive buffer and does not print the ETX character.

The computer transmits fixed-length messages whose length is half of the buffer size or less. Every message ends with the ETX character.



When the first message is transmitted to the printer, the print operation begins and the computer sends the second message to the printer. Then the printer enters the receive buffer full state. The printer sends the ACK character when the ETX character (end of the first message) is detected. The computer stops sending the third message to the printer.

Overflow of the receive buffer can be prevented by this procedure. The computer does not send the next message until it receives the ACK character (except for the first two messages).

Data transmission continues unless the printer finishes printing two messages (enough to fill the receive buffer).

High-efficiency, high-throughput data communication is provided by this protocol.







## APPENDIX D

# CODE CONVERSION TABLE

The following character sets are used in the conversion tables in this section:

Rmn 8 : HP Roman-8 character set  
PC-8 : IBM-PC US character set  
ECMA : ECMA-94 Latin-1 character set  
All : IBM all-printable character set



Rmn8PC-8ECMA	All	Dec	Hex	Binary	Rmn8PC-8ECMA	All	Dec	Hex	Binary
NUL	NUL	0	00	00000000	SP	SP	32	20	00100000
SOH	SOH	1	01	00000001	!	!	33	21	00100001
STX	STX	2	02	00000010	"	"	34	22	00100010
ETX	ETX	3	03	00000011	#	#	35	23	00100011
EOT	EOT	4	04	00000100	\$	\$	36	24	00100100
ENQ	ENQ	5	05	00000101	%	%	37	25	00100101
ACK	ACK	6	06	00000110	&	&	38	26	00100110
BEL	BEL	7	07	00000111	'	'	39	27	00100111
BS	BS	8	08	00001000	(	(	40	28	00101000
HT	HT	9	09	00001001	)	)	41	29	00101001
LF	LF	10	0A	00001010	*	*	42	2A	00101010
VT	VT	11	0B	00001011	+	+	43	2B	00101011
FF	FF	12	0C	00001100	,	,	44	2C	00101100
CR	CR	13	0D	00001101	-	-	45	2D	00101101
SO	SO	14	0E	00001110	.	.	46	2E	00101110
SI	SI	15	0F	00001111	/	/	47	2F	00101111
DLE	DLE	16	10	00010000	0	0	48	30	00110000
DC1	DC1	17	11	00010001	1	1	49	31	00110001
DC2	DC2	18	12	00010010	2	2	50	32	00110010
DC3	DC3	19	13	00010011	3	3	51	33	00110011
DC4	DC4	20	14	00010100	4	4	52	34	00110100
NAK	NAK	21	15	00010101	5	5	53	35	00110101
SYN	SYN	22	16	00010110	6	6	54	36	00110110
ETB	ETB	23	17	00010111	7	7	55	37	00110111
CAN	CAN	24	18	00011000	8	8	56	38	00111000
EM	EM	25	19	00011001	9	9	57	39	00111001
SUB	SUB	26	1A	00011010	:	:	58	3A	00111010
ESC	ESC	27	1B	00011011	;	;	59	3B	00111011
FS	FS	28	1C	00011100	<	<	60	3C	00111100
GS	GS	29	1D	00011101	=	=	61	3D	00111101
RS	RS	30	1E	00011110	>	>	62	3E	00111110
US	US	31	1F	00011111	?	?	63	3F	00111111



Rmn8	PC-8	SECMA	All	Dec	Hex	Binary	Rmn8	PC-8	SECMA	All	Dec	Hex	Binary
@	@	@	@	64	40	01000000	`	`	`	`	96	60	01100000
A	A	A	A	65	41	01000001	a	a	a	a	97	61	01100001
B	B	B	B	66	42	01000010	b	b	b	b	98	62	01100010
C	C	C	C	67	43	01000011	c	c	c	c	99	63	01100011
D	D	D	D	68	44	01000100	d	d	d	d	100	64	01100100
E	E	E	E	69	45	01000101	e	e	e	e	101	65	01100101
F	F	F	F	70	46	01000110	f	f	f	f	102	66	01100110
G	G	G	G	71	47	01000111	g	g	g	g	103	67	01100111
H	H	H	H	72	48	01001000	h	h	h	h	104	68	01101000
I	I	I	I	73	49	01001001	i	i	i	i	105	69	01101001
J	J	J	J	74	4A	01001010	j	j	j	j	106	6A	01101010
K	K	K	K	75	4B	01001011	k	k	k	k	107	6B	01101011
L	L	L	L	76	4C	01001100	l	l	l	l	108	6C	01101100
M	M	M	M	77	4D	01001101	m	m	m	m	109	6D	01101101
N	N	N	N	78	4E	01001110	n	n	n	n	110	6E	01101110
O	O	O	O	79	4F	01001111	o	o	o	o	111	6F	01101111
P	P	P	P	80	50	01010000	p	p	p	p	112	70	01110000
Q	Q	Q	Q	81	51	01010001	q	q	q	q	113	71	01110001
R	R	R	R	82	52	01010010	r	r	r	r	114	72	01110010
S	S	S	S	83	53	01010011	s	s	s	s	115	73	01110011
T	T	T	T	84	54	01010100	t	t	t	t	116	74	01110100
U	U	U	U	85	55	01010101	u	u	u	u	117	75	01110101
V	V	V	V	86	56	01010110	v	v	v	v	118	76	01110110
W	W	W	W	87	57	01010111	w	w	w	w	119	77	01110111
X	X	X	X	88	58	01011000	x	x	x	x	120	78	01111000
Y	Y	Y	Y	89	59	01011001	y	y	y	y	121	79	01111001
Z	Z	Z	Z	90	5A	01011010	z	z	z	z	122	7A	01111010
[	[	[	[	91	5B	01011011	{	{	{	{	123	7B	01111011
\	\	\	\	92	5C	01011100					124	7C	01111100
]	]	]	]	93	5D	01011101	}	}	}	}	125	7D	01111101
^	^	^	^	94	5E	01011110	~	~	~	~	126	7E	01111110
_	_	_	_	95	5F	01011111	DEL	⌘	DEL	⌘	127	7F	01111111



Rmn8PC-8ECMA	All	Dec	Hex	Binary	Rmn8PC-8ECMA	All	Dec	Hex	Binary
Ç	Ç	128	80	10000000	á	á	160	A0	10100000
ü	ü	129	81	10000001	À	í	161	A1	10100001
é	é	130	82	10000010	Â	ó	162	A2	10100010
â	â	131	83	10000011	È	ú	163	A3	10100011
ä	ä	132	84	10000100	Ê	ñ	164	A4	10100100
à	à	133	85	10000101	Ë	Ñ	165	A5	10100101
Å	Å	134	86	10000110	Î	â	166	A6	10100110
ç	ç	135	87	10000111	Ï	ó	167	A7	10100111
ê	ê	136	88	10001000	ˆ	ˆ	168	A8	10101000
ë	ë	137	89	10001001	˘	˘	169	A9	10101001
è	è	138	8A	10001010	˙	˙	170	AA	10101010
ï	ï	139	8B	10001011	˚	˚	171	AB	10101011
î	î	140	8C	10001100	˛	˛	172	AC	10101100
ì	ì	141	8D	10001101	Û	ı	173	AD	10101101
Ä	Ä	142	8E	10001110	Ü	«	174	AE	10101110
Å	Å	143	8F	10001111	£	»	175	AF	10101111
É	É	144	90	10010000	—	—	176	B0	10110000
æ	æ	145	91	10010001	Ÿ	±	177	B1	10110001
Æ	Æ	146	92	10010010	Ź	²	178	B2	10110010
ô	ô	147	93	10010011	°	³	179	B3	10110011
ö	ö	148	94	10010100	Ç	ˆ	180	B4	10110100
ò	ò	149	95	10010101	Ç	μ	181	B5	10110101
û	û	150	96	10010110	Ñ	¶	182	B6	10110110
ù	ù	151	97	10010111	ñ	π	183	B7	10110111
ÿ	ÿ	152	98	10011000	ı	ˆ	184	B8	10111000
Ö	Ö	153	99	10011001	ˆ	ˆ	185	B9	10111001
Ü	Ü	154	9A	10011010	ˆ	ˆ	186	BA	10111010
ç	ç	155	9B	10011011	£	¶	187	BB	10111011
£	£	156	9C	10011100	£	¶	188	BC	10111100
£	£	157	9D	10011101	£	¶	189	BD	10111101
£	£	158	9E	10011110	£	¶	190	BE	10111110
f	f	159	9F	10011111	£	¶	191	BF	10111111



Rmn8PC-8ECMA	All	Dec	Hex	Binary	Rmn8PC-8ECMA	All	Dec	Hex	Binary	
â	À	192	C0	11000000	Á	α	224	E0	11100000	
ê	Á	193	C1	11000001	Â	β	225	E1	11100001	
ô	Â	194	C2	11000010	ã	Γ	226	E2	11100010	
û	Ã	195	C3	11000011	ä	π	227	E3	11100011	
á	Ä	196	C4	11000100	å	Σ	228	E4	11100100	
é	Å	197	C5	11000101	í	σ	229	E5	11100101	
ó	Æ	198	C6	11000110	î	μ	230	E6	11100110	
ú	Ç	199	C7	11000111	ó	τ	231	E7	11100111	
à	È	200	C8	11001000	ô	Φ	232	E8	11101000	
è	É	201	C9	11001001	õ	Θ	233	E9	11101001	
ò	Ê	202	CA	11001010	ö	Ω	234	EA	11101010	
ù	Ë	203	CB	11001011	š	δ	235	EB	11101011	
ä	Ì	204	CC	11001100	š	∞	236	EC	11101100	
ë	Í	205	CD	11001101	ú	φ	237	ED	11101101	
ö	Î	206	CE	11001110	ÿ	ε	238	EE	11101110	
ü	Ï	207	CF	11001111	ÿ	∩	239	EF	11101111	
Å	Ð	208	D0	11010000	þ	≡	240	F0	11110000	
ĩ	Ñ	209	D1	11010001	þ	±	241	F1	11110001	
ø	Ò	210	D2	11010010	·	≥	242	F2	11110010	
æ	Ó	211	D3	11010011	μ	≤	243	F3	11110011	
å	Ô	212	D4	11010100	¶	∫	244	F4	11110100	
í	Õ	213	D5	11010101	¾	∫	245	F5	11110101	
ø	Ö	214	D6	11010110	—	+	246	F6	11110110	
æ	×	215	D7	11010111	¼	≈	247	F7	11110111	
Ä	Ø	216	D8	11011000	½	°	248	F8	11111000	
ì	Ù	217	D9	11011001	¾	•	249	F9	11111001	
ö	Ú	218	DA	11011010	ø	•	250	FA	11111010	
ü	Û	219	DB	11011011	«	√	251	FB	11111011	
é	Ü	220	DC	11011100	■	η	252	FC	11111100	
ÿ	Ý	221	DD	11011101	»	²	253	FD	11111101	
ß	Þ	222	DE	11011110	±	■	254	FE	11111110	
ô	ß	223	DF	11011111	SP	ÿ	SP	255	FF	11111111







# APPENDIX E

## CHARACTER SET TABLES

### Roman-8 (HP LaserJet Series II Emulation)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p				—	â	Å	Á	Þ
1	SOH	DC1	!	1	A	Q	a	q			À	Ý	ê	î	Ã	þ
2	STX	DC2	"	2	B	R	b	r			Â	ý	ô	ø	ä	·
3	ETX	DC3	#	3	C	S	c	s			È	°	û	Æ	Ð	μ
4	EOT	DC4	\$	4	D	T	d	t			Ê	ç	á	à	ò	¶
5	ENQ	NAK	%	5	E	U	e	u			Ë	ç	é	í	Í	¾
6	ACK	SYN	&	6	F	V	f	v			Î	Ñ	ó	ø	Ì	—
7	BEL	ETB	'	7	G	W	g	w			Ï	ñ	ú	æ	Ó	½
8	BS	CAN	(	8	H	X	h	x			ˆ	ı	à	Ä	Ò	¼
9	HT	EM	)	9	I	Y	i	y			˘	ı	è	ì	Õ	¾
A	LF	SUB	*	:	J	Z	j	z			ˆ	ı	ò	Ö	õ	º
B	VT	ESC	+	;	K	[	k	{			ˆ	ı	ù	Ü	Š	«
C	FF	FS	,	<	L	\	l				ˆ	ı	ä	É	š	■
D	CR	GS	-	=	M	]	m	}			ˆ	ı	ë	ı	Ú	»
E	SO	RS	.	>	N	^	n	~			ˆ	ı	ö	ß	ÿ	±
F	SI	US	/	?	O	_	o	DEL			£	¢	ü	Ô	ÿ	



# ECMA94

		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p					°	À	Đ	à	ö
1	SOH	DC1	!	1	A	Q	a	q				i	±	Á	Ñ	á	ñ
2	STX	DC2	"	2	B	R	b	r				ç	²	Â	Ò	â	ò
3	ETX	DC3	#	3	C	S	c	s				£	³	Ã	Ó	ã	ó
4	EOT	DC4	\$	4	D	T	d	t				¤	´	Ä	Ô	ä	ô
5	ENQ	NAK	%	5	E	U	e	u				¥	µ	Å	Õ	å	õ
6	ACK	SYN	&	6	F	V	f	v					¶	Æ	Ö	æ	ö
7	BEL	ETB	'	7	G	W	g	w				§	·	Ç	×	ç	÷
8	BS	CAN	(	8	H	X	h	x				¨	,	È	Ø	è	ø
9	HT	EM	)	9	I	Y	i	y				©	¹	É	Ù	é	ù
A	LF	SUB	*	:	J	Z	j	z				ª	º	Ê	Ú	ê	ú
B	VT	ESC	+	;	K	[	k	{				«	»	Ë	Û	ë	û
C	FF	FS	,	<	L	\	l					¬	¼	Ì	Ü	ì	ü
D	CR	GS	-	=	M	]	m	}				-	½	Í	Ý	í	ý
E	SO	RS	.	>	N	^	n	~				®	¾	Î	Þ	î	þ
F	SI	US	/	?	O	_	o	DEL				—	¿	Ï	ß	ï	ÿ



## PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	►	SP	0	@	P	`	p	Ç	É	á	⋮	L	ll	α	≡
1	☺	◄	!	1	A	Q	a	q	ü	æ	í	⌘	⊥	⊟	β	±
2	●	↕	"	2	B	R	b	r	é	Æ	ó	⌘	⊥	π	Γ	≥
3	♥	!!	#	3	C	S	c	s	â	ô	ú		⊥	π	π	≤
4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	⊥	—	⊥	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⊥	+	F	σ	J
6	♠	—	&	6	F	V	f	v	å	û	a	⊥	⊥	π	μ	÷
7	•	↕	'	7	G	W	g	w	ç	ù	º	⊥	⊥	⊥	τ	≈
8	◼	↑	(	8	H	X	h	x	ê	ÿ	¿	⊥	⊥	⊥	Φ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	⊥	⊥	⊥	⊥	Θ	●
A	◼	→	*	:	J	Z	j	z	è	Ü	⊥	⊥	⊥	⊥	Ω	•
B	♂	←	+	;	K	[	k	{	ï	ç	½	⊥	⊥	⊥	δ	✓
C	♀	⊥	,	<	L	\	l		î	£	¼	⊥	⊥	⊥	∞	η
D	♪	↔	-	=	M	]	m	}	ì	¥	ì	⊥	=	⊥	φ	²
E	♪	▲	.	>	N	^	n	~	Ä	⊥	«	⊥	⊥	⊥	€	■
F	⊙	▼	/	?	O	_	o	⊗	Å	f	»	⊥	±	■	∩	NUL



## PC-8 (D/N)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	►	SP	0	@	P	`	p	Ç	É	á	⋮	L	⋮	α	≡
1	☺	◄	!	1	A	Q	a	q	ü	æ	í	⋈	⊥	⊥	β	±
2	●	↕	"	2	B	R	b	r	é	Æ	ó	⋈	⊥	π	Γ	≥
3	♥	!!	#	3	C	S	c	s	â	ô	ú			⋮	π	≤
4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		-	⊥	Σ	∫
5	♣	§	§	5	E	U	e	u	à	ò	Ñ	‡	+	F	σ	∫
6	♠	-	&	6	F	V	f	v	å	û	õ		†	π	μ	÷
7	•	↕	'	7	G	W	g	w	ç	ù	Õ	π			τ	≈
8	◐	↑	(	8	H	X	h	x	ê	ÿ	¿	‡	‡	‡	Φ	°
9	◑	↓	)	9	I	Y	i	y	ë	Ö	ã	‡	‡	‡	Θ	●
A	◐	→	*	:	J	Z	j	z	è	Ü	Ã		⋮	‡	Ω	•
B	♂	←	+	;	K	[	k	{	ï	ø	ℓ	‡	‡	■	δ	✓
C	♀	⊥	,	<	L	\	l		î	£	'n	‡	‡	■	∞	η
D	♪	↔	-	=	M	]	m	}	ì	Ø	i	‡	=	■	φ	²
E	♪	▲	.	>	N	^	n	~	Ä	L	³	‡	‡	■	ε	■
F	◐	▼	/	?	O	_	o	⋈	Å	l	⋈	‡	±	■	∩	NUL



# IBM Character Set 1

H L	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	NUL	DLE	á	⋮	L	⊥	α	≡
1	SOH	DC1	!	1	A	Q	a	q	SOH	DC1	í	⌘	⊥	⌞	β	±
2	STX	DC2	"	2	B	R	b	r	STX	DC2	ó	⌘	⌞	⌞	Γ	≥
3	ETX	DC3	#	3	C	S	c	s	ETX	DC3	ú		⌞	⌞	π	≤
4	EOT	DC4	\$	4	D	T	d	t	EOT	DC4	ñ	⌞	⌞	⌞	Σ	∫
5	ENQ	NAK	%	5	E	U	e	u	ENQ	NAK	Ñ	⌞	⌞	⌞	σ	∫
6	ACK	SYN	&	6	F	V	f	v	ACK	SYN	æ	⌞	⌞	⌞	μ	÷
7	BEL	ETB	'	7	G	W	g	w	BEL	ETB	ø	⌞	⌞	⌞	τ	≈
8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	⌞	⌞	⌞	Φ	°
9	HT	EM	)	9	I	Y	i	y	HT	EM	⌞	⌞	⌞	⌞	Θ	•
A	LF	SUB	*	:	J	Z	j	z	LF	SUB	⌞	⌞	⌞	⌞	Ω	•
B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	⌞	⌞	■	δ	√
C	FF	FS	,	<	L	\	l		FF	FS	¼	⌞	⌞	■	∞	n
D	CR	GS	-	=	M	]	m	}	CR	GS	í	⌞	=	■	φ	2
E	SO	RS	.	>	N	^	n	~	SO	RS	«	⌞	⌞	■	ε	■
F	SI	US	/	?	O	_	o	DEL	SI	US	»	⌞	⌞	■	∩	SP



# IBM Character Set 2

H L	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	é	P	`	p	ç	É	á	⋮	L	⌌	α	≡
1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	⌘	⊥	⌒	β	±
2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	⌘	⌒	π	Γ	≥
3	♥	DC3	#	3	C	S	c	s	â	ô	ú		⌒	⌌	π	≤
4	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	⌒	-	⌒	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌒	+	⌒	σ	∫
6	♠	SYN	&	6	F	V	f	v	å	û	ä	⌒	⌒	π	μ	÷
7	BEL	ETB	'	7	G	W	g	w	ç	ù	ó	⌒	⌒	⌒	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	⌒	⌒	⌒	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌒	⌒	⌒	⌒	Θ	•
A	LF	SUB	*	:	J	Z	j	z	è	Ü	⌒	⌒	⌒	⌒	Ω	•
B	VT	ESC	+	;	K	[	k	{	ï	ç	½	⌒	⌒	⌒	δ	√
C	FF	FS	,	<	L	\	l		î	£	¼	⌒	⌒	⌒	∞	n
D	CR	GS	-	=	M	]	m	}	ì	¥	¡	⌒	=	⌒	φ	²
E	SO	RS	.	>	N	^	n	~	Ä	⌒	«	⌒	⌒	⌒	€	■
F	SI	US	/	?	O	_	o	DEL	Å	f	»	⌒	±	■	∩	SP



# HP LaserJet Series II ISO Symbol Sets

The ISO symbol sets are valid when the Roman-8 character set is selected.

Dec. Country	35	36	64	91	92	93	94	96	123	124	125	126
US ASCII	#	\$	@	[	\	]	^	`	{		}	~
ISO 2:IRV	#	¤	@	[	\	]	^	`	{		}	~
ISO 4:UK	£	\$	@	[	\	]	^	`	{		}	~
ISO 25:France	£	\$	à	°	ç	§	^	`	é	ù	è	~
ISO 69:France	£	\$	à	°	ç	§	^	μ	é	ù	è	~
Germany	£	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ISO 21:Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ISO 15:Italy	£	\$	§	°	ç	é	^	ù	à	ò	è	ì
ISO 14:JIS ASCII	#	\$	@	[	¥	]	^	`	{		}	~
ISO 57:China	#	¥	@	[	\	]	^	`	{		}	~
ISO 10:Sweden	#	¤	@	Ä	Ö	Å	^	`	ä	ö	å	~
ISO 11:Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Spain	#	\$	@	í	ñ	¿	°	`	{	ñ	}	~
ISO 17:Spain	£	\$	§	í	ñ	¿	^	`	°	ñ	ç	~
ISO 85:Spain	#	\$	·	í	ñ	Ç	¿	`	ñ	ç	~	~
ISO 16:Portugal	#	\$	§	Ã	Ç	Õ	^	`	ã	ç	õ	°
ISO 84:Portugal	#	\$	·	Ã	Ç	Õ	^	`	ã	ç	õ	~
ISO 60:Norway v1	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
ISO 61:Norway v2	\$	\$	@	Æ	Ø	Å	^	`	æ	ø	å	



## Diablo 630 International Character Set

Dec. Country	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	\$	@	[	\	]	^	`	{		}	~
France	£	\$	à	°	ç	§	^	`	é	ù	è	..
Germany	£	\$	ß	Ä	Ö	Ü	^	`	ä	ö	ü	~
UK	£	\$	@	[	\	]	^	`	{		}	~
Denmark	£	\$	@	Æ	Ø	Å	^	`	æ	ø	å	ü
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	£	\$	§	°	ç	é	^	ù	à	ò	è	ì
Spain	£	\$	§	í	Ñ	¿	^	`	°	ñ	ç	~

## Epson FX-85 International Character Set

Dec. Country	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	\$	@	[	\	]	^	`	{		}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	..
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
UK	£	\$	@	[	\	]	^	`	{		}	~
Denmark 1	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
Spain	£	\$	@	í	Ñ	¿	^	`	°	ñ	}	~



## APPENDIX F FONT

This appendix provides printing samples of resident fonts and fonts on optional font cards. It also includes the compatibility information of font cards with HP font cartridges. Contact your dealer for additional information on fonts.

## Resident Fonts

**Courier (12-point,10-pitch, regular, upright, portrait/  
landscape)**

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
0123456789 !"#\$%&'()\*+,-./  
:;<=>?@[\\]^\_`{|}~ÀÂÊËĚİı´  
^¨˘ÜŮÊ°ÇçÑñıŁłƆℱ¥\$ƒ¢âêôúáé  
óùàèòüäëöüÅİøÆåíœǺİÖÜÉİßÔ  
ĂăĐđİıÒòÕõŠšÚýỲþ—¼½¾«■»  
±

**Courier (12-point, 10-pitch, bold, portrait/landscape)**

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
0123456789 !"#%&'()\*+,-./  
:;<=>?@[\\]^\_`{|}~ÀÂÊËĚİı'`  
^~˘ÜŮ£°ÇçÑñıŁłƎƧ\$ƧƧƧƧƧƧƧ  
óúàèòüäëöüÅİøÆáíðæÄìÖÜÉİßÔ  
ĂăǾĐđÍîÓÒÕõŠšŤťŸþ—¼½≡«■»  
±



**Line Printer (8.5-point, 16.66-pitch, regular, upright, portrait/  
landscape)**

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

0123456789 !"# \$%&'()\*+,-./

.;<=>?@[\]^\_`{|}~ÀÂÈÊËÏÏ'

^""ùû£°ççÑñî¿¤¥§ƒâêôûáé

óúàèòùäëöüÅîøÆåíøæÄïÖÜÉÿßÔ

ÁÃäÐðíìóòõõššúÿÿþþ—¼½¾Ω«»

±

**Prestige Elite (12-point, 12-pitch, regular, upright, portrait/  
landscape)**

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

0123456789 !"# \$%&amp;'()\*+,-./

::<=>?@[ \ ] ^ ` { | } ~ À Â È Ê Ë Î Ï ´

^"-ÙÔ£°CcÑñi¿¤£¥§fcâêôûáé

óúàèòùäëöüÅîŒǼǻǿÄïÖÜÉïßÔ

ÁĀāĐđÍìÓòÕōŠšÚÛüǼǻ—¼½¾«■»

+











## Optional Fonts

Font cards generally have several fonts for a type face. Some cards have two or three type faces. Contact your dealer for details on font attributes such as the symbol set, orientation, type face, font size, pitch, weight, and style.


**1. Courier A (DO5B-9009-C010)**

Portrait **ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*

Landscape    **ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*  
 ABCDEFGHIJabcdefghij0123456789

## 2. Courier Legal A (D05B-9009-C011)

Portrait



***ABCDEFGHIJabcdefghij0123456789***  
***ABCDEFGHIJabcdefghij0123456789***  
***ABCDEFGHIJabcdefghij0123456789***  
ABCDEFGHIJabcdefghij0123456789

Landscape

### 3. Courier PC1 (D05B-9009-C012)

Portrait    **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*



**4. Prestige A (D05B-9009-C020)**

Portrait    **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**

**5. Prestige B (D05B-9009-C021)**

Landscape **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**

**6. Prestige PC1 (D05B-9009-C022)**

Portrait    **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**

**7. Prestige PC2 (D05B-9009-C023)**

Landscape **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**

**8. Prestige PC3 (D05B-9009-C024)**

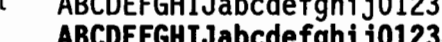
Portrait    **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**

Landscape **ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**  
**ABCDEFGHIJabcdefghij0123456789**



### 9. Letter Gothic A (D05B-9009-C040)

Portrait



ABCDEF GHIJ abcdefghij 0123456789  
**ABCDEF GHIJ abcdefghij 0123456789**  
*ABCDEF GHIJ abcdefghij 0123456789*  
ABCDEF GHIJ abcdefghij 0123456789  
**ABCDEF GHIJ abcdefghij 0123456789**

**10. Letter Gothic PC1 (D05B-9009-C042)**

Portrait      ABCDEFGHIJabcdefghij0123456789  
 ABCDEFGHIJabcdefghij0123456789

**Landscape** ABCDEFGHIJabcdefghij0123456789  
 ABCDEFGHIJabcdefghij0123456789

## 11. HELV A (D05B-9009-C060)

Portrait

ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
4 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

**12. HELV B (D05B-9009-C061)**

Landscape

ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
ABCDEFGHIJabcdefghij0123456789  
4 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



**13. Swiss 721 10A (D05B-9009-C062)**

Portrait    **ABCDEFGHJIJabcdefghij0123456789**  
              **ABCDEFGHJIJabcdefghij0123456789**  
              *ABCDEFGHJIJabcdefghij0123456789*

**14. Swiss 721 12A (D05B-9009-C064)**

Portrait    **ABCDEFGHJIJabcdefghij0123456789**  
              **ABCDEFGHJIJabcdefghij0123456789**  
              *ABCDEFGHJIJabcdefghij0123456789*

**15. Swiss 721 14A (D05B-9009-C066)**

Portrait    **ABCDEFGHJIJabcdefghij0123456789**  
              **ABCDEFGHJIJabcdefghij0123456789**  
              *ABCDEFGHJIJabcdefghij0123456789*

**16. Swiss 721 10PC1 (D05B-9009-C068)**

Portrait    **ABCDEFGHJIJabcdefghij0123456789**  
              **ABCDEFGHJIJabcdefghij0123456789**  
              *ABCDEFGHJIJabcdefghij0123456789*

**17. Dutch 801 10PC1 (D05B-9009-C080)**

Portrait    **ABCDEFGHJIJabcdefghij0123456789**  
              **ABCDEFGHJIJabcdefghij0123456789**  
              *ABCDEFGHJIJabcdefghij0123456789*



## 18. Tms Rmn A (D05B-9009-C082)

Portrait    *ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*  
*ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**

## 19. Tms Rmn B (D05B-9009-C083)

Landscape *ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*  
*ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**

## 20. Dutch 801 12A (D05B-9009-C084)

Portrait    *ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*

## 21. Tms Rmn C (D05B-9009-C086)

Portrait    *ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**  
*ABCDEFGHIJabcdefghij0123456789*  
*ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**

Landscape *ABCDEFGHIJabcdefghij0123456789*

## 22. OCR A/B P (D05B-9009-C100)

Portrait    *ABCDEFGHIJabcdefghij0123456789*  
**ABCDEFGHIJabcdefghij0123456789**  
*ij ij ñ*











## Compatibility with HP Font Cartridges

Many software programs have printer drivers specifically designed for a certain combination of printer fonts—typically a combination available on one of the optional font cartridges for HP LaserJet printers. For full software compatibility, you may wish to have the same fonts available on your printer. The following table shows the HP cartridge (each one is identified by a letter of the alphabet), the fonts included, and the equivalent Fujitsu font card names.

The fonts provided on these font cards are available whenever you use the HP LaserJet Series II emulation or one of the optional emulation cards. They cannot be used if the PostScript interpreter is selected.

HP Fonts	HP cartridge	Fujitsu card
Courier 10 bold Courier 10 italic Line Printer light landscape	A Courier 1	n/a
14.4 Helv bold 10 TmsRmn 10 TmsRmn bold 10 TmsRmn italic 8 TmsRmn Line Printer landscape	B Tms Proportional 1	21. Tms Rmn Compatible C
Courier 10 Courier 10 bold Courier 10 italic Line Printer landscape	C International 1	n/a
Prestige Elite 12 Prestige Elite 12 bold Prestige Elite 12 italic	D Prestige Elite	4. Prestige A
Letter Gothic 12 Letter Gothic 12 bold Letter Gothic 12 italic	E Letter Gothic	9. Letter Gothic A



HP Fonts	HP cartridge	Fujitsu card
14.4 Helv bold 10 TmsRmn 10 TmsRmn bold 10 TmsRmn italic 8 TmsRmn Line Printer	F Tms Proportional 2	18. Tms Rmn Compatible A
Prestige Elite 12 Prestige Elite 12 bold Prestige Elite 12 italic Prestige Elite 16.66 Prestige Elite 16.66 landscape Line Draw 12	G Legal Elite	24. Prestige Legal A
Courier 10 Courier 10 bold Courier 10 italic Prestige Elite 16.66 Prestige Elite 16.66 landscape Line Draw 10	H Legal Courier	2. Courier Legal A
Prestige Elite 12 Prestige Math 12 Prestige Pi Font 12 Prestige bold 12 Prestige italic 12 Prestige Elite 16.66 Prestige Math 16.66	J Math Elite	27. Prestige Math A
10 TmsRmn 10 TmsRmn Math 10 TmsRmn Pi Font 10 TmsRmn bold 10 TmsRmn italic 8 TmsRmn 8 Tms Math	K Math Tms	25. Tms Rmn Compatible D



HP Fonts	HP cartridge	Fujitsu card
Courier 10 bold Courier 10 italic Line Printer Courier 10 bold landscape Courier 10 italic landscape Line Printer landscape	L Courier P&L	1. Courier A
Prestige Elite 12 Prestige Elite 12 bold Prestige Elite 12 italic Prestige Elite 12 landscape Prestige Elite 12 bold landscape Prestige Elite 12 italic landscape	M Prestige Elite P&L	4. Prestige A 5. Prestige B
Letter Gothic 12 Letter Gothic 12 bold Letter Gothic 12 italic Letter Gothic 12 landscape Letter Gothic 12 bold landscape Letter Gothic 12 italic landscape	N Letter Gothic P&L	9. Letter Gothic A 26. Letter Gothic B
10 TmsRmn 10 TmsRmn bold 10 TmsRmn italic 10 TmsRmn landscape 10 TmsRmn bold landscape 10 TmsRmn italic landscape	P TmsRmn P&L	18. Tms Rmn Compatible A 19. Tms Rmn Compatible B



HP Fonts	HP cartridge	Fujitsu card
Courier 10 bold Courier 10 italic Letter Gothic 12 Letter Gothic 12 bold Courier 10 bold landscape Courier 10 italic landscape	Q Memo 1	1. Courier A 9. Letter Gothic A
Presentation 6.5 bold P&L Presentation 8.1 bold P&L Presentation 10 bold P&L Letter Gothic 10 P&L PC Line Bold 10 P&L Line Draw 10 P&L	R Presentations 1	n/a
14 Helv bold 12 Helv bold 10 Helv bold 8 Helv bold 8 Helv 6 Helv Tax Line Draw 10	T Tax 1	30. Helv Compatible C
14 Helv2 bold 12 Helv2 bold 10 Helv2 bold 8 Helv2 6 Helv2 Letter Gothic 16.66 Line Draw 10	U Forms Portrait	11. Helv Compatible A 9. Letter Gothic A



HP Fonts	HP cartridge	Fujitsu card
14 Helv2 bold landscape	V Forms landscape	12. Helv Compatible B
12 Helv2 bold landscape		
10 Helv2 bold landscape		
8 Helv2 landscape		
6 Helv2 landscape		
Letter Gothic 16.66 landscape		
Line Draw 10 landscape		
Letter Gothic 10	W	n/a
Letter Gothic 16.66	3-of-9/OCR A	
OCR A 19		
Barcode 3-of-94.6		
Barcode 3-of-99.3		
Line Draw 10		
12 Barcode EAN/UPC	X	n/a
12 Barcode EAN/UPC bold	EAN/UPC/OCR B	
OCR B 10		
Letter Gothic 10		
Letter Gothic 16.66		
Line Draw 10		
Courier 10	Y	29. Courier PC1
Courier 10 bold	PC Courier 1	23. Line Printer PC
Courier 10 italic		
Line Printer		
Line Printer landscape		



HP Fonts	HP cartridge	Fujitsu card
14 Helv bold	Z Microsoft 1	n/a
12 Helv		
12 Helv bold		
12 Helv italic		
10 Helv		
10 Helv bold		
10 Helv italic		
8 Helv		
14 TmsRmn bold		
12 TmsRmn		
12 TmsRmn bold		
12 TmsRmn italic		
10 TmsRmn		
10 TmsRmn bold		
10 TmsRmn italic		
8 TmsRmn		
Line Printer landscape		



## Summary of Font Compatibility

Font	Compatibility																									
HP cartridge	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	T	U	V	W	X	Y	Z			
Fujitsu card	-	21	-	4	9	18	24	2	27	25	1	4	9	18	1	-	30	9	12	-	-	23	-			
													+	+	+	+		+				+				
													5	26	19	9		11							29	

- : Not available



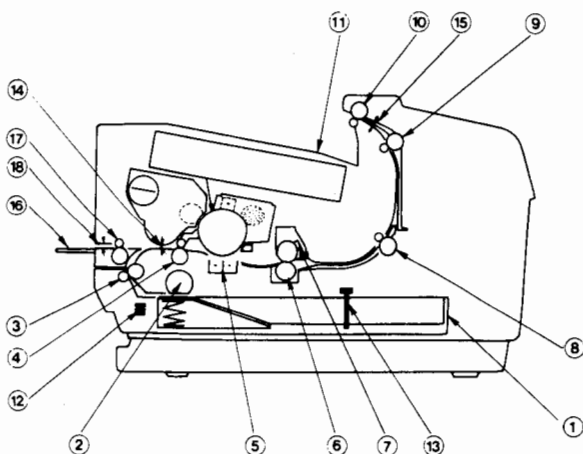
## APPENDIX G

### DESCRIPTION OF OPERATION

This **appendix** explains the principles of printer operation.

## Components of the Device

### Paper feed process



### Paper Feed Process

- |                |   |
|----------------|---|
| 1 Cassette     | Holds 250 of standard-size paper.   |
| 2 Pick roller  | Removes the top sheet from the cassette and sends it to the first roller.                       |
| 3 First roller | The paper is pushed against this roller to correct the slant, and is sent to the second roller. |



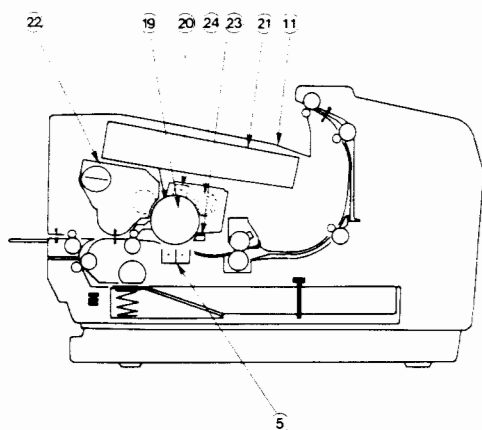
- |    |                     |  |
|----|---------------------|--|
| 4  | Second roller       | Corrects the slant of the paper sent from the first roller or the manual feed roller (see 17) and sends the paper to the transfer unit and then to the fuser unit.   |
| 5  | Transfer unit       | Transfers the image formed on the organic photoconductive drum during the printing process to the paper.   |
| 6  | Fuser unit          | Melts the image to fix to the paper and sends the paper to the third roller.   |
| 7  | Fuser felt          | Removes the toner that remains adhered to the roller in the fuser unit.  |
| 8  | Third roller        | Sends the paper to paper exit roller 1.  |
| 9  | Paper exit roller 1 | Sends the paper to paper exit roller 2.  |
| 10 | Paper exit roller 2 | Sends the paper to the stacker.  |
| 11 | Stacker             | Stacks the printed paper.  |
| 12 | Paper size sensor   | Detects the size of the paper.   |
| 13 | Paper empty sensor  | Detects whether there is paper in the paper cassette.  |
| 14 | Stand-by sensor     | Checks that the paper has passed through the first and second rollers.   |
| 15 | Paper exit sensor   | Checks that the paper is sent from the second roller to the stacker within a certain time. It also counts the number of sheets that pass through the paper exit sensor, and records it in nonvolatile RAM. |



- 16 **Manual feed tray** Used as a paper guide to align the left edge of the paper during manual feed.
- 17 **Manual feed roller** Aligns the paper to the left end when it is inserted into the manual feed tray, and sends it to the second roller.
- 18 **Manual feed sensor** Checks whether paper is inserted in the manual feed tray.



## Print process

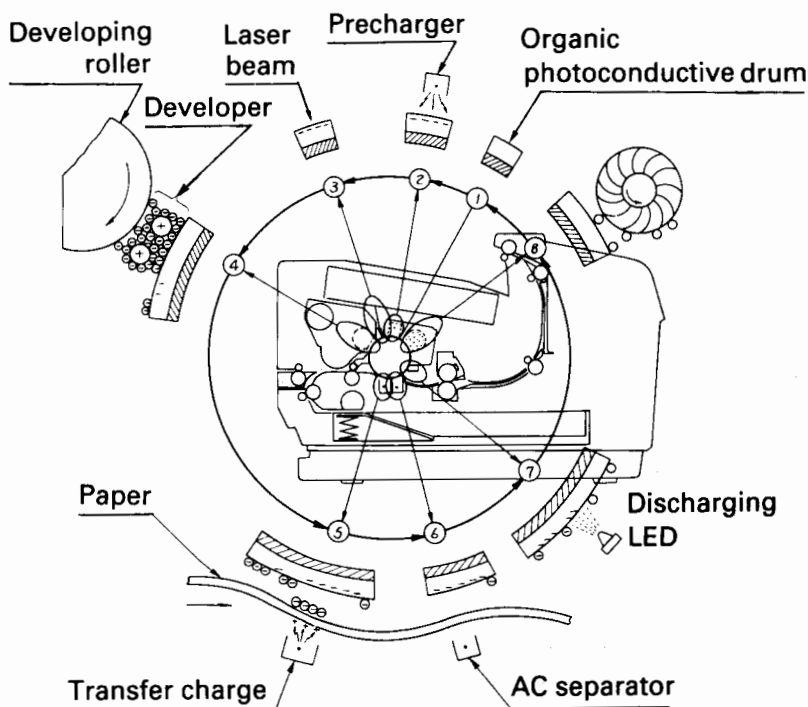


### Print Process

- |                                 |  |
|---------------------------------|--|
| 19 Organic photoconductive drum | An image is formed on the drum, then transferred onto the paper.   |
| 20 Precharger                   | Charges the organic photoconductive surface uniformly.   |
| 21 Optical unit                 | Forms an electrostatic latent image on the uniformly-charged organic photoconductive drum with a laser beam.               |
| 22 Developing unit              | Puts toner onto the latent image to form a visible image.  |
| 23 Discharging LED              | Quenches the static electricity on the organic photoconductive drum after the image is transferred.                        |
| 24 Cleaner                      | Removes the remaining toner from the organic photoconductive drum after the image formed on the drum has been transferred. |



# Print Process Overview



**Print Process Overview**

The flow of the printing process is shown in the figure. The operation overview is indicated below using the figure.

The organic photoconductive drum ① is charged in the dark where its resistance is very high. When the drum is exposed to light, resistance is reduced. Using this characteristic, printing is conducted as follows:

- (1) In the precharger ②, the organic photoconductive drum is charged to high voltage uniformly by corona discharge.
- (2) In the optical unit ③, the semiconductor laser beam is emitted according to the print data, and forms an electrostatic latent image on the drum.

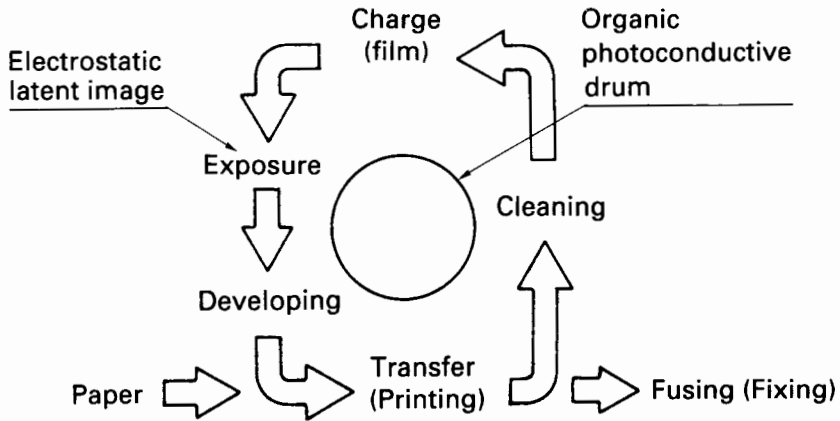


- (3) In the developing unit ④ , the developer is stirred.  
Developer is a mixture of carrier and toner. The stirring charges the carrier positively (+), and the toner negatively (-). The negatively charged toner is attracted to the electrostatic latent image on the organic photoconductive drum and forms the visible image. The carrier remains in the developing unit, because it is attracted by the developing roller.
- (4) In the transfer charge unit ⑤ , the (negatively-charged) toner on the drum is transferred to the paper by electrostatic attraction with a corona discharge of high voltage.
- (5) The paper touching the organic photoconductive drum is removed by corona discharge in the AC separator.
- (6) In the discharging LED unit ⑦ , the charge on the organic photoconductive drum is discharged by exposing its entire surface to light.
- (7) In the cleaner unit ⑧ , the remaining toner is cleaned off with a fur brush.  
The above procedure is done for each photocopy.



# Principle of Operation

## Printing process



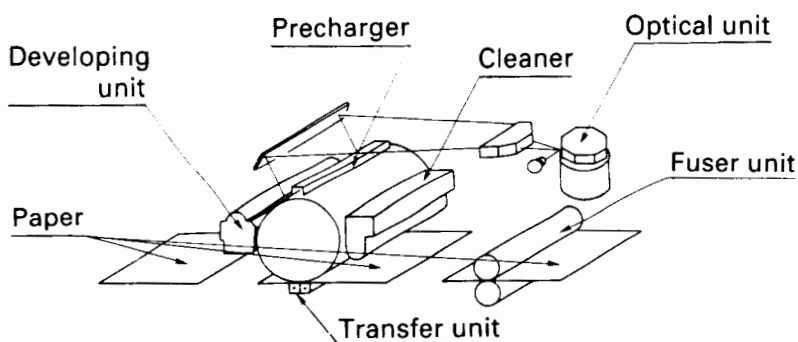
### Printing Process

This laser printer employs the electrophotography method, which is very similar to making a photograph.

The organic photoconductive drum turns at a constant speed counter clockwise throughout the process. The first step is charging, which is the equivalent of putting fresh film in a camera. Then the printer exposes, transfers (like printing), and fuses (like fixing). Finally the printer cleans which has no equivalent in photography. The above is one print cycle.



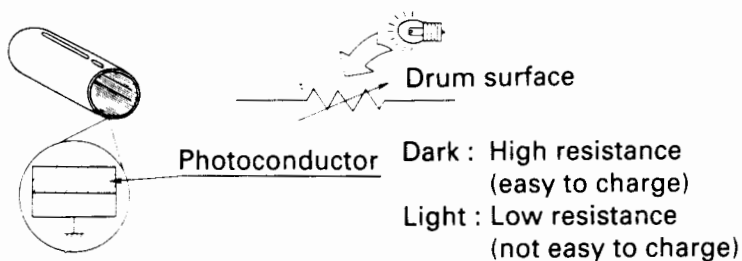
## Print process mechanism



### Print Process Mechanism

The print process mechanism consists of the precharger, the optical unit, the developing unit, the transfer unit, the fuser unit, and the cleaner as shown in the figure above.

## Organic photoconductive drum

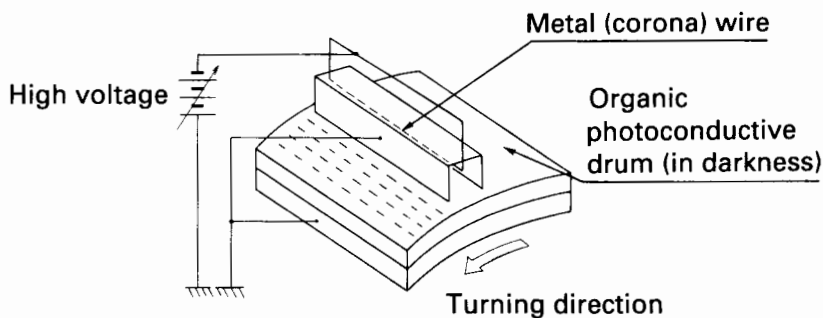


### Organic Photoconductive Drum

The body of the drum is made of aluminum, and an organic photoconductor is deposited on it. The photoconductor has a high resistance (is easy to charge) in the dark, and has a low resistance (is not easy to charge) in light. The organic photoconductive drum makes use of this resistance change caused by incident light.



## Precharger



### Precharger

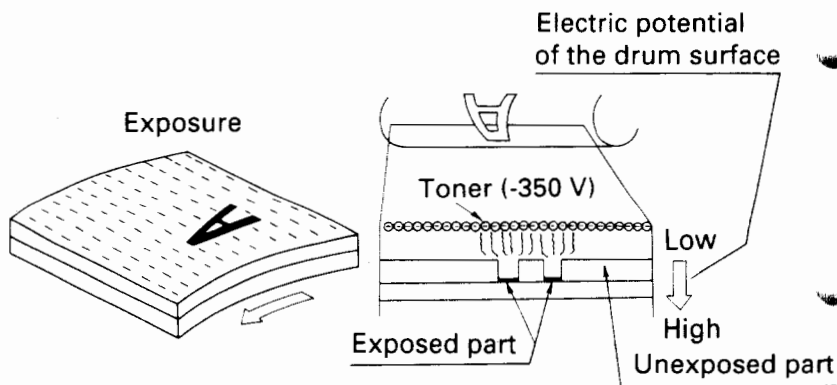
The precharger places a uniform electric potential over the drum's surface by corona discharge.

When a high voltage is applied to the metal wire, positive and negative ions are generated. This is called corona discharge.

The negative ions are neutralized by the wire, while the positive ions go to the frame or the organic photoconductive drum. If the organic photoconductive drum is kept dark, the resistance becomes high. The charge cannot escape and it remains on the drum. In this way, the negative potential is spread uniformly across the surface of the drum.



## Optical unit



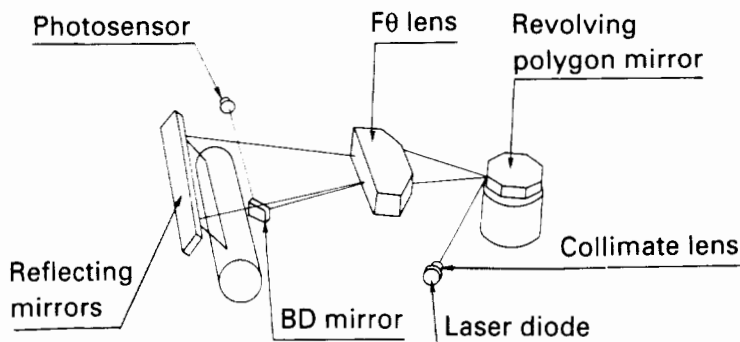
### Optical Unit (exposure)

Electrostatic latent image is formed on the drum by laser beam.

The laser beam strikes only the area where characters or the figures are to be formed.

The resistance of the exposed area is reduced, and the charge is reduced to low voltage. The surface of the drum now consists of high and low potentials.

The distribution of the potentials is called the electrostatic latent image.

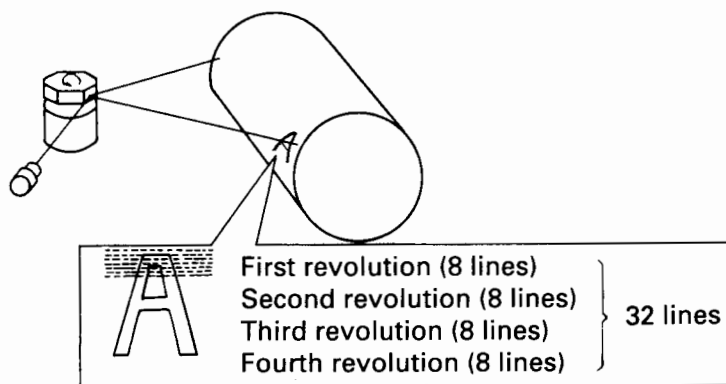


### Optical Unit

The optical unit consists of the parts shown above.



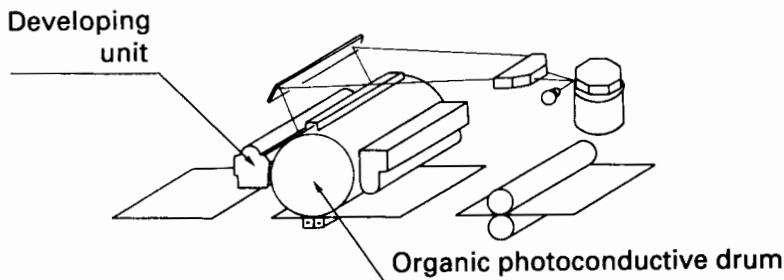
## Revolving polygon mirror



### Revolving Polygon Mirror

The octagonal revolving mirror horizontally scans the laser beam from the collimate lens, as shown in the figure. One face scans one line of dots, so eight lines of dots are scanned in one revolution. Each character is expressed in 32 lines of dots, two of which are for underline and other marks.

## Developing unit

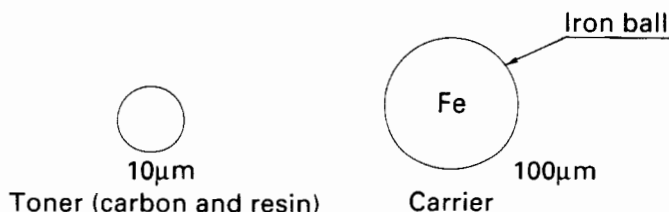


### Developing Unit

In laser printer terminology, developing means to form a visible image by putting black powder, called toner, onto the electrostatic image on the surface of the organic photoconductive drum.



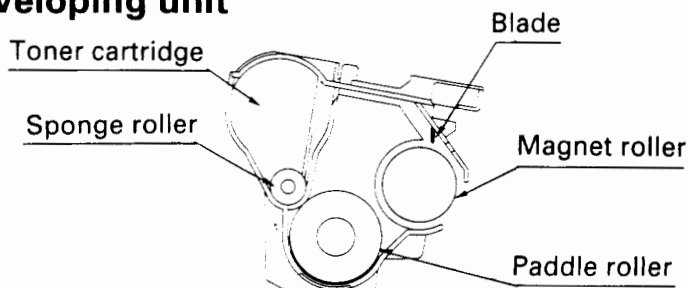
## Two-component developing method



**Toner and Carrier**

The developing power is a mixture of two components. One is "toner", made from carbon and resin and has diameters about 10μm. The other is "carrier", made from iron balls and has diameters about 100μm.

## Developing unit



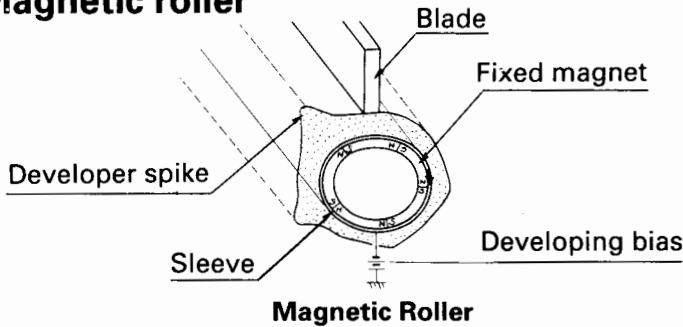
**Developing Unit**

Toner density in the developer can be varied by the sponge roller. It turns and drops the toner into the developing unit. Toner density is constantly monitored by the toner density sensor and, whenever the density becomes too low, more toner is supplied.

In the developing unit, the developer is stirred by the paddle roller and the toner and carrier rub against each other; the toner is negatively charged, and the carrier is positively charged, so the toner sticks to the carrier.

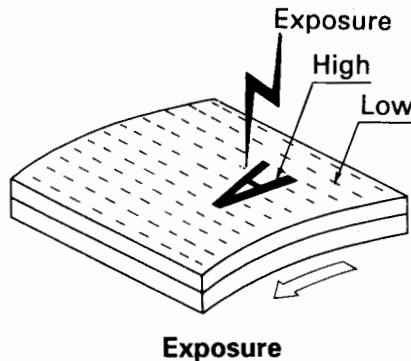


## Magnetic roller



The magnetic roller consists of five fixed magnets and a sleeve revolving clockwise around them. The magnets cause developer spikes to form on the roller as shown in the figure. The sleeve coats the surface with developer by revolving. The height of the developer spikes is fixed by the blade above the magnetic roller. A developing bias voltage is applied to the roller.

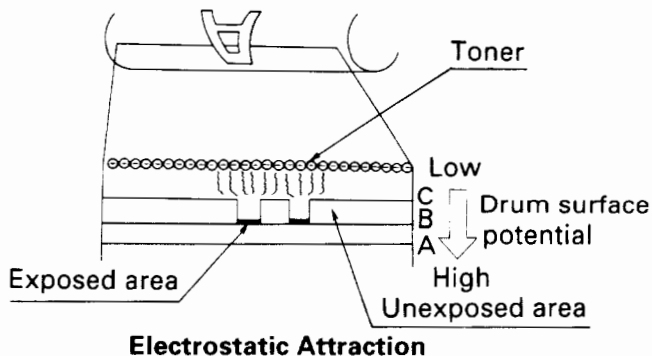
## Exposure



The exposed area of the drum surface has high and low potential, and the unexposed area has low potential. The toner on the magnetic roller has high potential because of the developing bias. When the toner is brought close to the surface of the organic photoconductive drum, it sticks to the exposed areas by the electrostatic attraction.

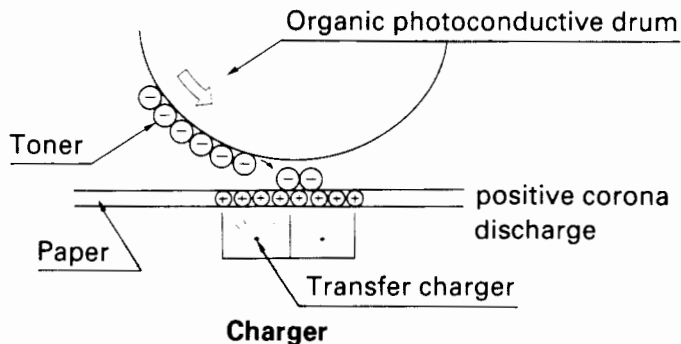


## Electrostatic attraction



As the figure shows, the toner with a developing bias B regards the exposed area with potential A as having a positive potential. The toner, with a negative potential, sticks to the area of positive potential like iron filings to a magnet. This force is called electrostatic attraction. The toner is repelled from the area with the potential C because it is a lower potential.

## Transfer unit (charger)



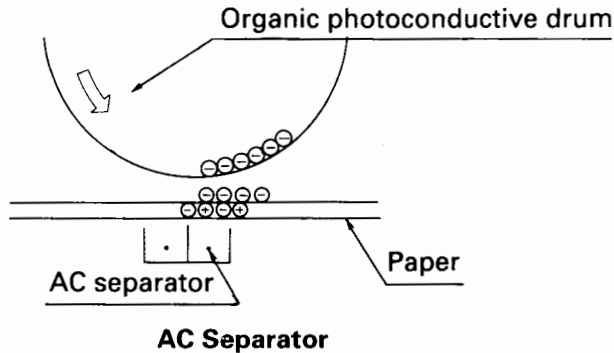
This unit transfers the toner on the organic photoconductive drum to the paper.

It uses corona discharge in the same way as the precharger, but with a positive discharge.

The positive corona discharge behind the paper charges it positively. When this paper approaches the surface of the organic photoconductive drum, the toner, which has a negative potential attracted (transferred) to the paper.

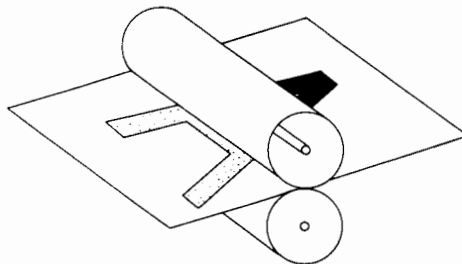


## Transfer unit (AC separator)



The paper positively charged by corona discharge would wrap around the drum if left alone. So AC voltage is run through the wire. The potential of the paper thus becomes unstable, and it does not wrap around the drum. To make the quenching easy, negative bias voltage is applied to the drum surface.

## Fuser unit

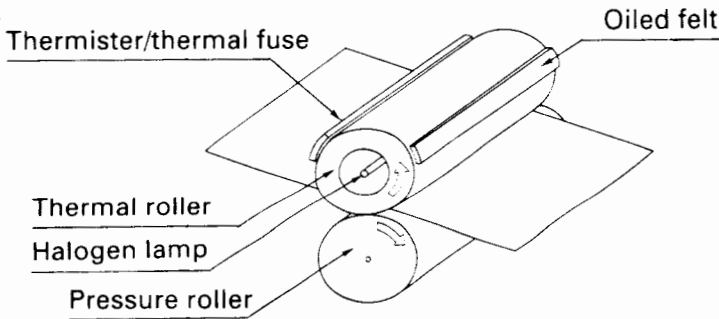


**Fuser Unit**

As this point, only static electricity is holding the toner to the paper, the slightest touch could wipe it away. This unit fixes the toner to the paper by heat and pressure.



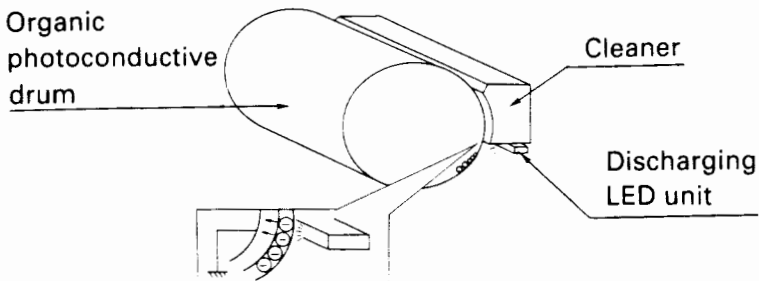
## Fuser unit configuration



**Fuser Unit Configuration**

The fuser unit consists of the thermal and pressure rollers. The toner is fixed to the paper by passing the paper between them. The halogen lamp located inside the thermal roller heats it. The temperature is monitored by the thermister and thermal fuse on the roller. On the top of the thermal roller, there is a felt soaked in silicon oil. The felt puts oil onto the thermal roller to prevent the toner from sticking to it. The pressure roller presses against the thermal roller to uniformly fix the toner to the paper.

## Discharging LED unit and cleaner



**Discharging LED Unit and Cleaner**

The discharging LED unit in front of the cleaner emits light to make it easy to remove the toner remaining on the organic photoconductive drum, and lets the charge on the drum escape to ground. This is called quenching.

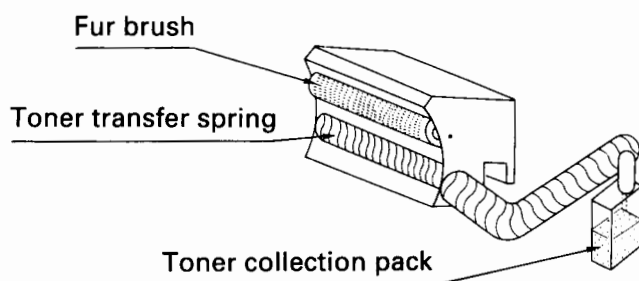
After the transfer, some of the toner remains on the drum.

This toner must be removed or it will mark future

photocopies. The cleaner removes the remaining toner



## Cleaner

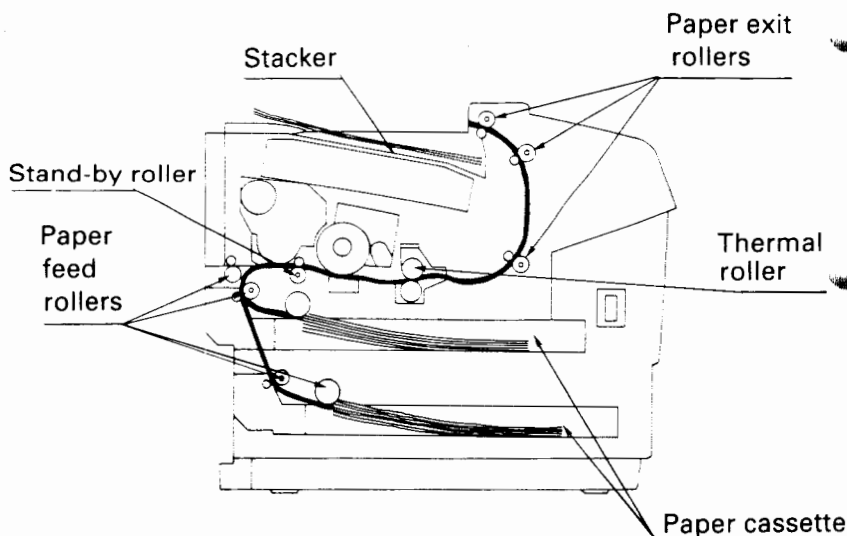


### Cleaner

The cleaner consists of a fur brush and toner transfer gear. The toner is brushed away from the organic photoconductive drum by the fur brush. The toner is then transferred to the toner collection pack by the toner transfer gear.



## Paper path



### Paper Path

The paper is sent from the paper cassette by the paper feed roller to the stand-by roller. If the revolution of the organic photoconductive drum is synchronized with the paper feed timing, the stand-by roller is activated.

The toner on the organic photoconductive drum is transferred to the paper. The paper is fed from the paper cassette or manual paper feed guide to the paper path and passes through the feed roller, thermal roller, and paper exit roller, to the stacker.

The paper cassette holds 250 sheets of paper, which are always pushed upward by the spring. The paper feed roller revolves and feeds the paper one at a time. To prevent double-sheet feeding, each sheet is hooked by the separator and allowed to sag before being fed. The paper is then sent to the stand-by roller. The stand-by roller does not being to revolve immediately, but aligns the top edge of the paper. The stand-by roller waits until it can synchronize with organic photoconductive drum, then it revolves and sends the paper.

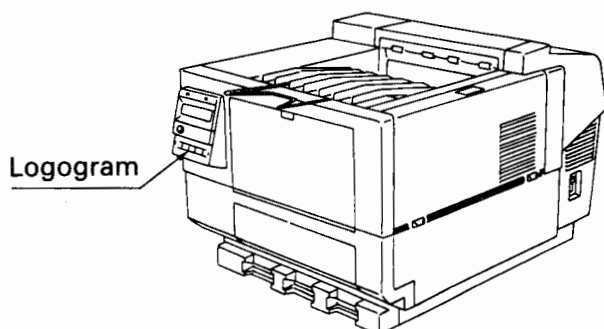


# APPENDIX H

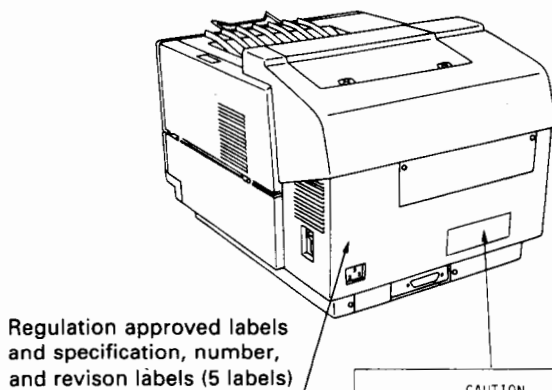
## LABEL INFORMATION

### Exterior Logogram and Label

The logogram is attached to the front of the unit.



The label is attached to the rear of the unit.



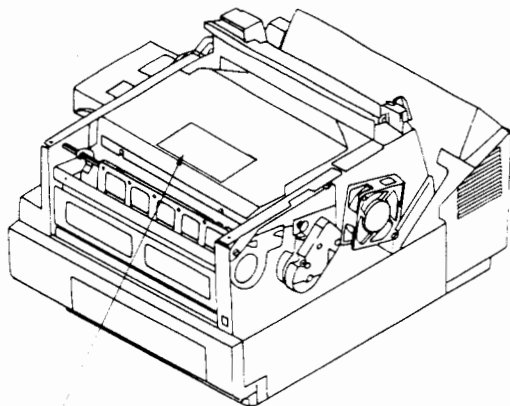
**CAUTION**

SEE THE USER'S MANUAL FOR PROPER  
SELECTION OF THE POWER SUPPLY CORD.

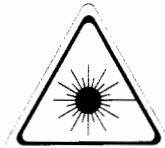


## Interior Label

This product is a Class 1 laser product.  
The warning labels shown are located inside on the optical unit.



- |           |    |  |
|-----------|----|--|
| DANGER    | —— | INVISIBLE LASER RADIATION WHEN OPEN<br>AND INTERLOCK FAILED OR DEFEATED.<br>AVOID DIRECT EXPOSURE TO BEAM                        |
| ATTENTION | —— | EXPOSITION AU LASER INVISIBLE SI OUVERT<br>OU SI LE VERROUILLAGE EST DÉFECTUEUX<br>EVITER L'EXPOSITION DIRECTE AU RAYON DE LASER |
| VORSICHT  | —— | UNSICHTBARE LASERSTRAHLUNG. WENN ABDECKUNG<br>GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.<br>NICHT DEM STRAHL AUSSETZEN     |
| FARA      | —— | Risk för strålning av osynligt<br>laserljus om säkerhetsbrytare är<br>ur funktion då luckan öppnas.                              |





# APPENDIX I

## OPTIONS AND SUPPLIES

The supplies and options below are available. Contact your dealer for details and additional information.

### Supplies and Order Numbers

#### Toner Cartridge Package (B860-2210-T002A)

The toner cartridge package consists of four toner cartridges, two fuser felts, and four toner collection packs.

The toner cartridge lasts for about 2500 sheets of letter size paper.

#### Drum Unit (B860-2210-T302A)

The drum unit lasts for about 20,000 sheets of letter-size paper.

The drum unit has a one year warranty.

#### Developing Unit (B860-2210-T402A)

The developing unit lasts for about 20,000 sheets of letter-size paper.

The developing unit has a one year warranty.

#### Transfer Unit (B860-2210-T602A)

The transfer unit lasts for about 60,000 sheets of letter-size-paper.

The transfer unit has a two-years warranty.

#### Fuser Unit (B860-2210-T202A (for 100V))

(B860-2210-T212A (for 200V))

The fuser unit (heat roller) lasts for about 120,000 sheets of letter-size paper.



**NOTE:**

The life span of consumables varies with the actual condition of use, such as the environment and the number of characters printed.

## Options and Order Numbers

### Font Card

See **Appendix F**.

### Memory Expansion Board

Either can be added to the controller board.

1M bytes (D86B-1166-B301)

2M bytes (D86B-1166-B302)

4M bytes (D86B-1166-B304)



## APPENDIX J

### SOFTWARE APPLICATION NOTES

When you print a document with this printer using an application software package, you usually need to select a printer type available from the list of printer options on the setup menu of the application software, and then select a corresponding emulation from the control panel in the setup mode.

Do not be concerned if this printer is missing from the menu. This is because it has not been on the market for very long, and is not yet well-known. The following table gives possible selections.

**Printer Type and Emulation Selections**

Printer type selection in your application software	Emulation selection from the control panel
HP LaserJet Series II	HP LJ 2
Diablo 630 ECS	DIABLO ECS
IBM Proprinter XL	IBM-PRO
Epson FX-85	FX-85








# GLOSSARY OF TERMS



## A4 Size:

Standard European letter size, 210 mm by 297 mm.

## AC Power Cord:




Provides electricity to the printer (two prongs for power and one plug for ground).

## Application Software:

Program that provides a solution to a particular problem such as maintaining an inventory or creating a report.

## ASCII:



An acronym for American Standard Code for Information Interchange, or the code sent to the printer with a unique binary coded number for each character.

## B5 Size:

Standard Japanese letter size, 182 mm by 257 mm.



## Baud Rate:

The speed of data transmission to the printer. Applies to serial data only. The baud rate is equal to the number of bits transmitted per second.

## Bit:



A bit is the smallest unit of data and has a value of 0 or 1.

## Buffer:

Storage area for data sent from the computer to the printer.



**Byte:**

Eight bits that are considered as one symbol. Used to represent a single character such as a number, a letter, or a special control character.

**Card Slot:**

An opening to install an optional font or emulation card.

**Carriage Return:**

The return of the cursor to the beginning of the next line.

**Character:**

Any letter, number, or symbol.

**Command:**

An instruction that tells the computer what to do. A command usually consists of words, parts of words, or codes. The computer will only respond to those commands that are accepted by the program which the computer is currently running.

**Command Set:**

The series of print or format instructions imbedded in the printer firmware, and actuated by codes sent from the host computer.

**Compatibility:**

The capability of substituting for another printer, including both plug-compatibility and command compatibility.



**Corona Wire:**

A fine wire to impart an electrical charge to the photoconductive drum to make it sensitive to the light (precharger) or impart a negative charge to the paper to make the toner to move from drum to paper (transfer charger).

**Data:**

Another word for information.

**Data Circuit Terminating Equipment (DCE):**

The side of an interface that provides functions necessary for connection or signal transformation between data terminal equipment and data transmission line, usually modems.

**Data Terminal Equipment (DTE):**

The side of an interface that acts as a data source and/or sink, usually computers or computer terminals.

**Default:**

A printer parameter that the printer returns to when power is turned on.

**Developing Unit:**

A unit to put toner onto the latent image to form a visible image.

**Discharging LED unit:**

Light source used in discharging the static electricity on the organic photoconductive drum after the image is transferred.



**Downloading:**

Transferring character font matrix data from the computer to the printer's memory to enable the printer to print specially designed characters.

**Emulation:**

Exactly executing a command set defined for a different printer and producing the identical results.

**Emulation Card:**

Plug-in unit that has memory chips for providing an optional emulation for the printer.

**EEPROM:**

Electrically erasable and programmable read-only memory. A kind of ROM that can be erased and reprogrammed by the user.

**Escape Sequence:**

A command beginning with an ESC code to expand the variety of command sets.

**Font:**

A complete set of type in one size and style of characters.

**Font Card:**

An IC card containing matrix data of characters to enable the printer to print various styles of fonts.

**Form Feed:**

A signal to the printer to advance the cursor to the top of the next page. It starts the printing of data in the buffer.



**Form Length:**

A printer setting for the spacing between top-of-form positions measured in inches.

**Format:**

The shape and appearance of printer output, including page size, character width and spacing, line spacing, etc.

**Function Level:**

One of the three levels in the setup mode branched structure.

**Fuser Felt:**

A felt to remove the toner that adheres to the roller in the fuser unit.

**Fuser Unit:**

A unit to melt the image to fix it on the paper, and send the paper to the next roller.

**Hex Dump:**

Special debugging tool used to analyze printer malfunctions and computer program errors. Control codes and print data are printed as hexadecimal values.

**IC Card:**

Plug-in unit that has memory chips to provide a variety of fonts and emulations for the printer.

**Interface:**

The connection that transfers electrical signals from one part of a system to another, e.g., from the computer to the printer and vice versa.



**International Character:**

Characters or symbols specific to a language.

**Item Level:**

One of the three levels in the setup mode branched structure.

**LCD Display:**

The type of control panel display available with this printer. It uses a 16-character liquid crystal display to show messages.

**Legal Size:**

Standard US legal size, 8 1/2 by 14 in.

**Letter Size:**

Standard US letter size, 8 1/2 by 11 in.

**Line Spacing:**

The vertical spacing between lines, measured in lines per inch.

**Matrix:**

An array of elements; in the case of printers the arrangement of the pins that form the letters through closely spaced dots.

**Nonvolatile Memory:**

A memory that retains information even if power is turned off.



**Normal Mode:**

One of the two printer modes. This mode has general-purpose functions used sometimes during daily printer operation. Messages displayed include online/offline status, paper feed selection, error status, operator prompts, and consumables outages.

**Offline:**

Mode in which printer operations are not performed, but printer parameters, for example, are set.

**Online:**

Mode in which the printer is enabled to print whatever is sent to its buffer.

**OPC Drum:**

Another name for the organic photoconductive drum.

**Optical Unit:**

A unit to form an electrostatic latent image on the uniformly-charged organic photoconductive drum with a laser beam.

**Option level:**

One of the three levels in the setup mode branched structure.

**Organic photoconductive drum:**

Component parallel to the laser beam scan on which patterns are produced as the laser beam lights and the drum rotates.



**Paper Cassette:**

A unit capable of handling cut sheets, or the equivalent, continuously.

**Power Switch:**

The ON/OFF switch located on the right side toward the back of the printer. The switch is labeled with the international designations **I** for ON and **O** for OFF.

**Proportional Spacing:**

Character width differs from one character to another. These characters require variable printhead spacing (proportional).

**RAM:**

Random access memory. A memory that loses the stored information when power is turned off.

**Reset:**

A function performed by turning printer OFF and then ON again.

**ROM:**

Read-only memory. A memory that cannot be changed in normal use.

**Setup Mode:**

One of the two printer modes. This mode is mainly used when the printer is first set up with the computer system, when specific font types and page settings are to be used for a document, and to check printer operation. Messages are displayed on the function, item, and option levels.



**Stacker:**

A unit to stack the printed paper.

**Top cover:**

The cover on the upper part of the print mechanism that is opened during printer maintenance or troubleshooting, for example, to clear a paper jam.

**Toner:**

Particles made from carbon and resin that adhere to charged areas on the organic photoconductive drum to produce a visible image on the drum. The heat roller melts toner transferred to the paper into a permanent image on the paper.

**Top-of-Form:**

The very top of a page of text.

**Transfer Unit:**

A unit to transfer the image formed on the organic photoconductive drum during the printing process to the paper.

**Video Interface:**

Specifications of communication between the printer controller board and the printing mechanism (engine).

**Warmup Time:**

The period required until the printer becomes ready for printing after power is first turned on.







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