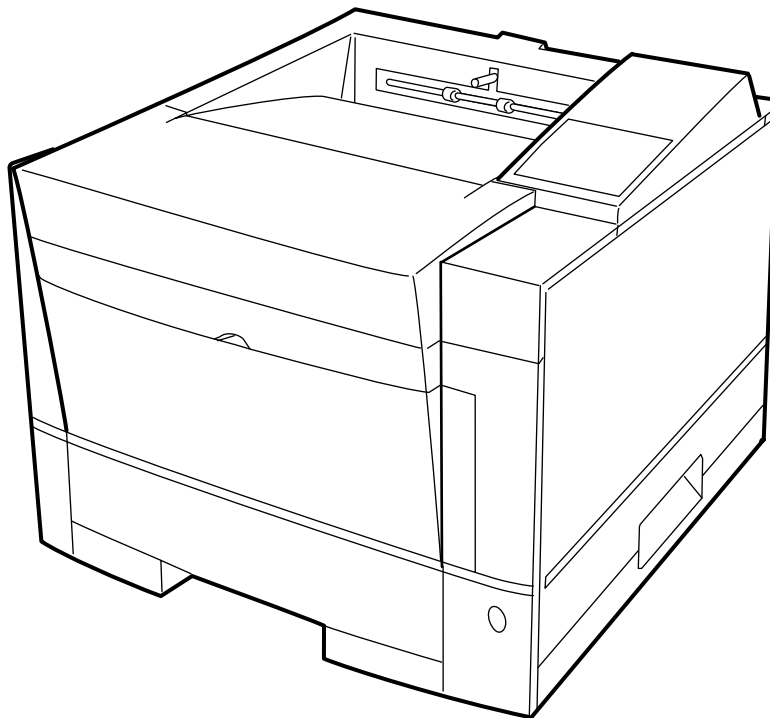


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# DIGITAL Laser Printer LN15

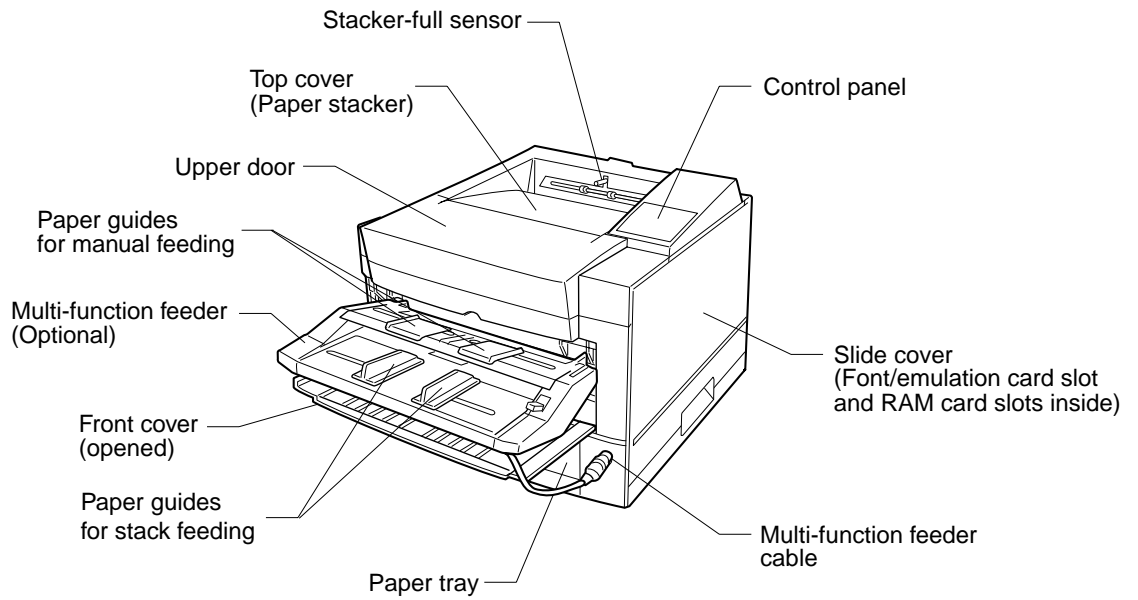
## User Manual

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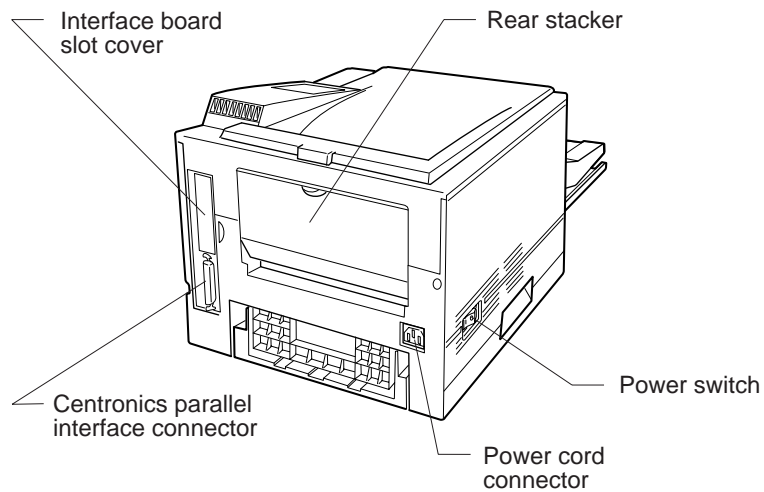


## Getting Acquainted

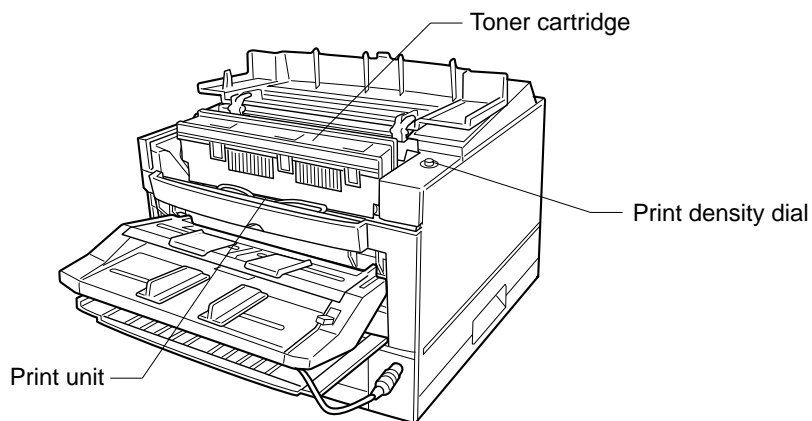
The illustrations on the following pages identify the main parts of the printer and two routes of paper feeding. These parts are referred to throughout the manual, so take some time to become familiar with them.



**Figure 1-1 Front and right side view**

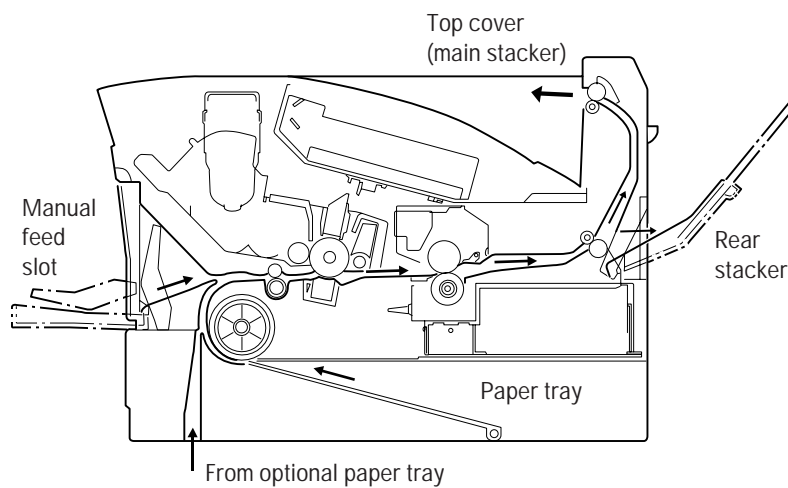


**Figure 1-2 Rear and left side view**



**Figure 1-3 Interior view**

The path from the paper tray to the top cover is for ordinary paper.  
The straight path from the manual feed slot or optional multi-function feeder to the rear stacker is for transparencies and envelopes.



**Figure 1-4 Paper paths**

---

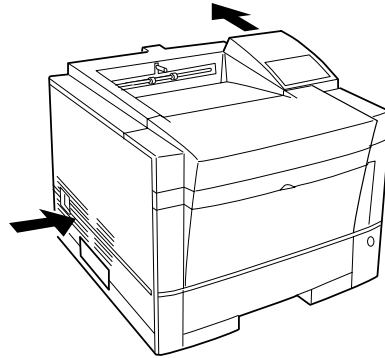
## Getting Ready

This section will help you:

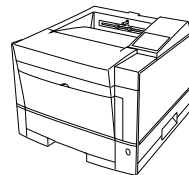
- Choose a suitable location for the printer
- Identify the parts of the printer as you unpack it

### Picking a Suitable Location

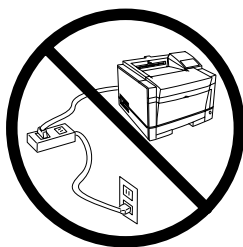
The first step is to pick a suitable location for your printer. For peak performance and usability, follow these guidelines:



- Place the printer on a sturdy, level surface.
- Choose a room that is well ventilated and free of excessive dust. Leave space on either side of the printer for proper ventilation.



- To avoid exposing the printer to extremes of temperature, do not put the printer in direct sunlight or near a heater. Ideal room temperature is from 10°C to 35°C (50°F to 95°F). Humidity should be between 20% and 80% RH (no condensation).
- Use a grounded AC power outlet. Do not use a three-pronged adapter in an ungrounded outlet.



- Use only the power cord furnished with the printer. Do not use an extension cord.



- Do not touch any connector contacts and corona wires to avoid possible electrostatic damage to the printer.



- Do not use a circuit shared with equipment that causes electrical noise, such as motors.
- Do not use a circuit shared with equipment that uses a lot of power, such as a copier or a coffee maker.

## Unpacking and Checking Your Printer

As you unpack the printer, check each item carefully for damage. If you find damage, notify your dealer. Check also that you have received all the items.

This printer comes with everything you need except an interface cable. If you do not yet have a cable, you must purchase one before you can connect the printer to your computer.

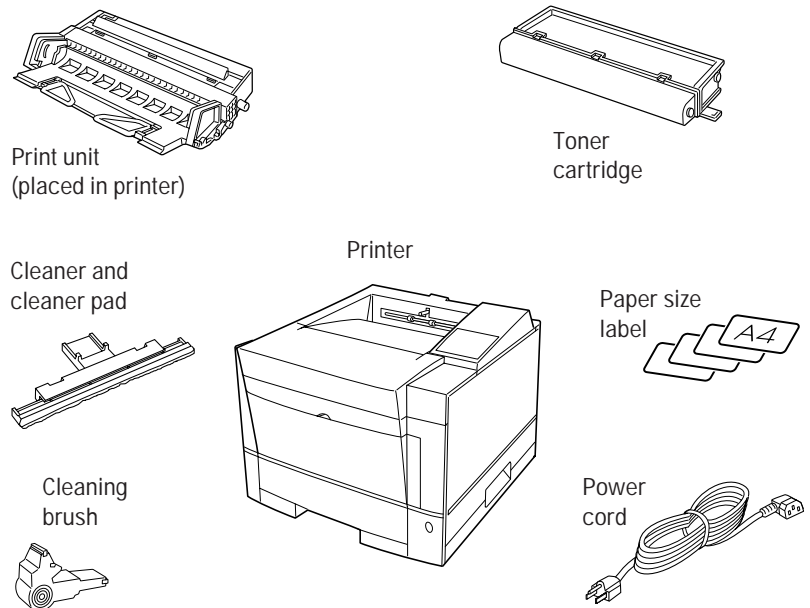


---

### Important:

Save the original carton and packing materials in case you need to store or transport your printer.

---



**Figure 1-5 Printer inventory**

- An interface cable is not a standard accessory. Please purchase an appropriate cable according to the interface you intend to use.
- The power cord may differ slightly from this figure depending on the country where you purchased the printer.

---

## Setting Up

This section describes how to assemble the printer and connect the power cord after choosing a suitable location for the printer and checking that you received all the parts.

### Preparing the Print Unit and Installing the Toner Cartridge

This printer is shipped with the print unit mounted and protective materials attached. Be sure to remove the two protective materials from the print unit. This operation is possible with the print unit mounted. First prepare and install the following two components:

- Print unit (photoconductor drum, developing unit, etc.)
- Toner cartridge

The toner cartridge first installed after you purchase the printer will last about 2,500 printed pages under the condition of 5% coverage on A4 paper. The succeeding toner cartridges last about 5,000 printed pages each.



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**Notice:**

Do not touch any connector contacts and corona wires to avoid possible electrostatic damage to the printer.

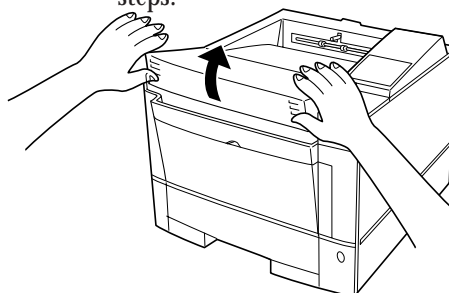
Be careful with the print unit's drum (the green surface). The drum is easily damaged by contamination or by exposure to light for more than three minutes. Follow these guidelines:

- Never touch or scratch the drum surface.
  - When the print unit is not in the printer, store it in a dark place or cover it with a clean sheet of paper.
  - When the print unit is in the printer, keep the printer top cover closed. If you must work inside the printer for more than three minutes, remove the print unit with the toner cartridge mounted and store it in a dark place.
-

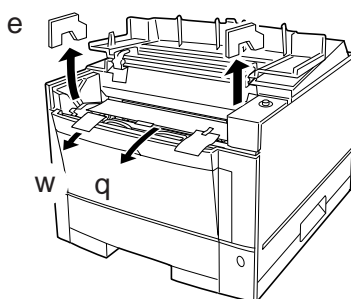


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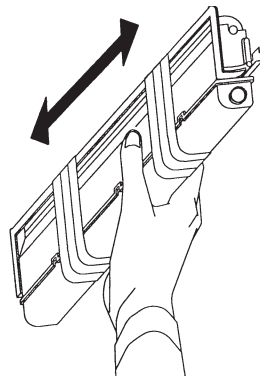
To prepare the print unit and install the toner cartridge, follow these steps:



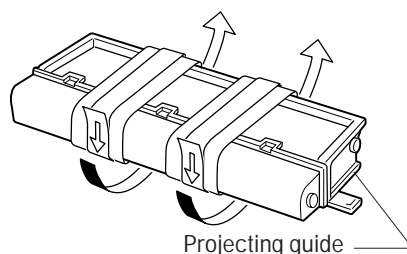
1. **Open the upper door.** Lift the milled portions at the front left and right of the upper door to open it.



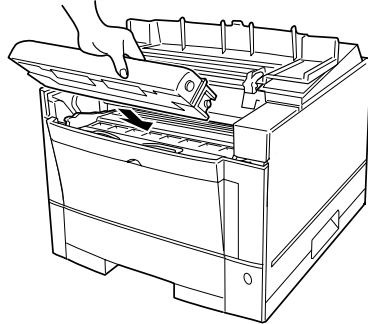
2. **Remove the protective materials from the print unit.** Remove protective sheet q. Pull clear tape w until its blue end is visible and remove it. Remove two restraint cushions e.



3. Remove the toner cartridge from its bag.
4. Shake the toner cartridge by moving it back and forth in a horizontal motion several times.



5. Remove the plastic seal from the toner cartridge. Gently pull off the seal being careful not to spill toner. Handle the seal carefully to avoid staining your hands or clothes.
6. Install toner cartridge. Slide



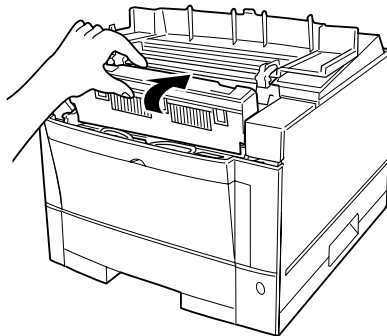
both projecting guides of the toner cartridge into the grooves of the print unit.



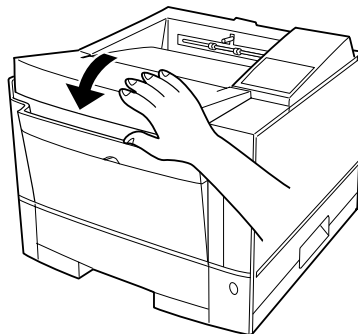
**Notice:**

If you have installed the toner cartridge, do not remove it from the print unit until it is empty. This could cause toner to spill into the printer.

---



7. Lock the toner cartridge. Push the toner cartridge forward until it clicks into place. (The cartridge stands nearly upright when installed correctly.)



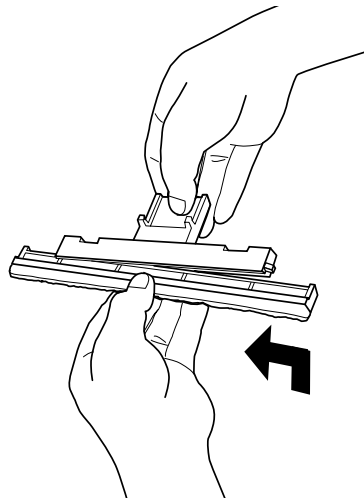
8. Close the printer's upper door. Press down firmly on the front portion of the upper door and make sure the upper door is locked completely.

---

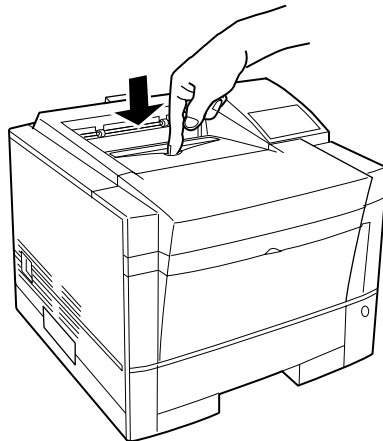
## Installing the Cleaner and Cleaner Pad

This printer is shipped with the cleaner and cleaner pad installed. It removes dirt from the pressure roller in the fuser unit. Make sure that the cleaner and cleaner pad are installed before printing.

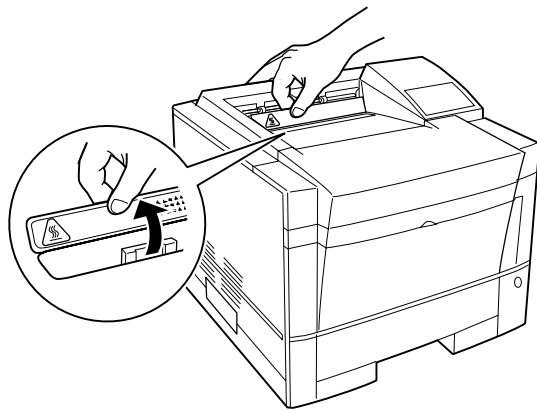
To install the cleaner and cleaner pad, follow these steps:



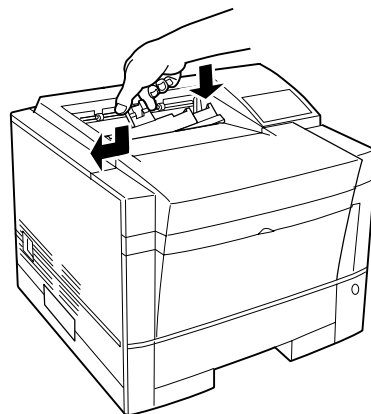
1. Mount the cleaner pad on the cleaner. Put the cleaner pad on the cleaner and slide the cleaner pad into the locked position.



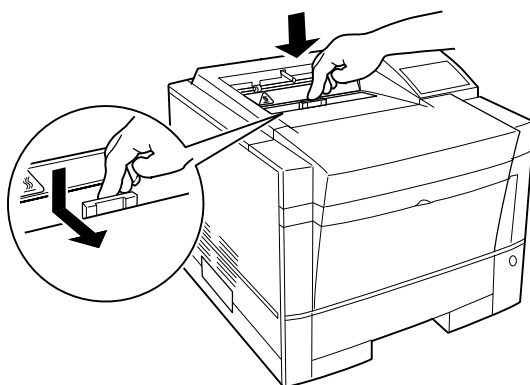
2. Open the cover. Push the engraved portion on the stacker to unlock the cover.



3. Lift the front of the cover to open the cover.



4. Install the cleaner in the printer. Grasp the handle of the cleaner and put the left end of the cleaner into the opening, and then the right end.



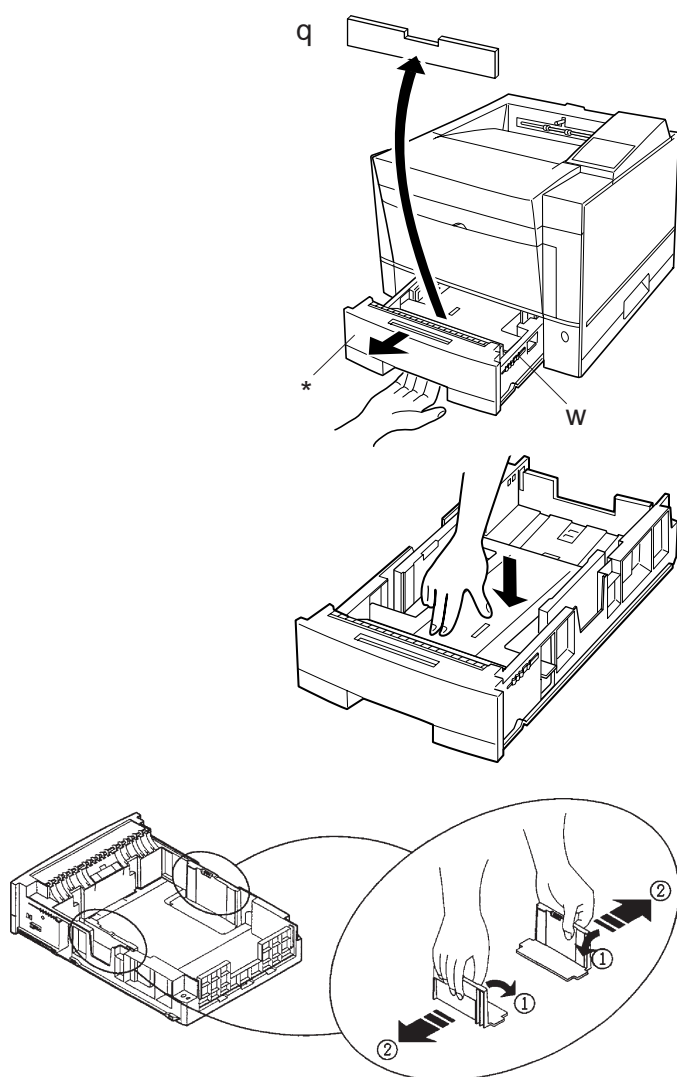
5. Lock the cleaner. Push down the top of the handle and pull it towards you to lock the cleaner.

6. Close the cover.

---

## Loading the paper

This printer has a single paper tray that is preset for letter size (8.5 x 11.0 inches) paper for U.S. customers and to A4 size (210 x 297 mm) paper for European customers. You can adjust the paper tray to a different size paper. You can purchase an optional paper tray. You should load about 50 sheets of copier paper to test the printer.

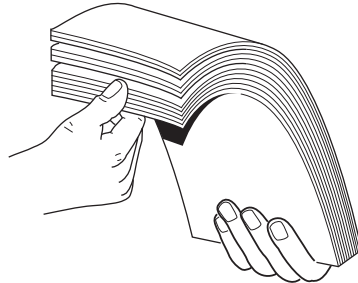


1. Pull the paper tray out of the printer.

2. Prepare the paper tray. Remove restraint card board q and the tape securing the rear paper guide. Check if the green indicator w is positioned according to the tray size label \*.

3. Lock the pressure plate. If the front of the pressure plate is raised, push it down until the pressure plate clicks into place.

4. Widen the side guides. While bending both side guides inward 1, push their inner PUSH marks outward 2.



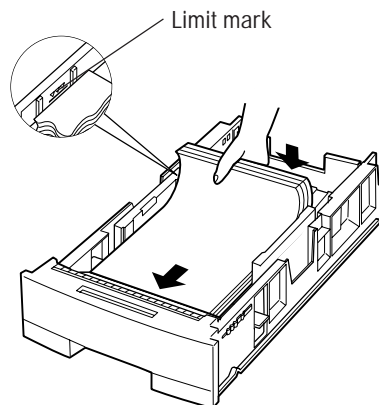
- 5. Prepare a paper stack.**  
Prepare paper of the size indicated by the size label. Fan the paper stack both ways to prevent sheets from sticking together.



**Notice:**

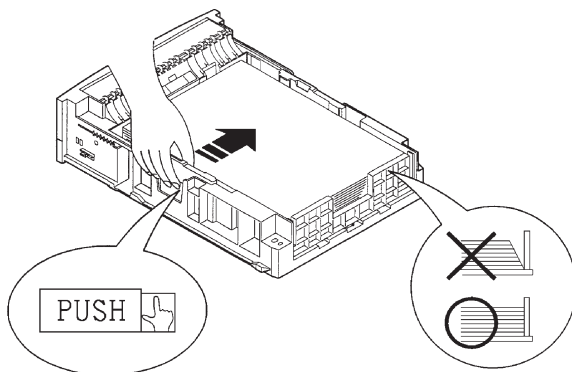
Put the paper stack in the paper tray with the printing side faced down.

If paper is curled, remove the curl.



- 6. Load the paper.** Place the front portion of the paper stack on the tray and slide it backwards so that the stack is placed under the two stoppers. Gather the edges of the stack together to ensure correct positioning of paper in the tray.

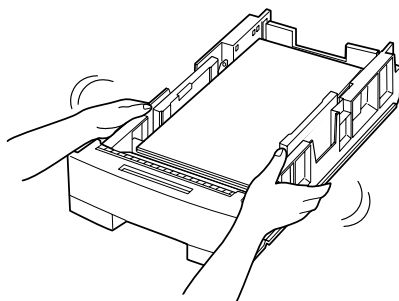
Make sure the stack does not exceed the limit mark.



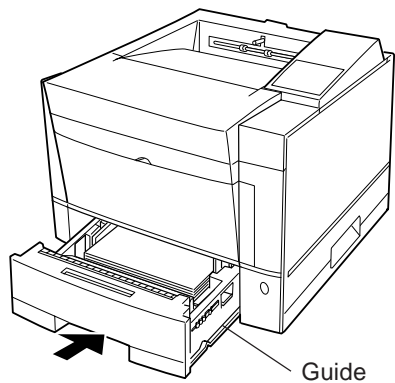
- 7. Adjust the side guides.** Push the outer PUSH mark of either side guide to the width of paper. Align the rear edges of the paper stack.

Bad placement

Good placement



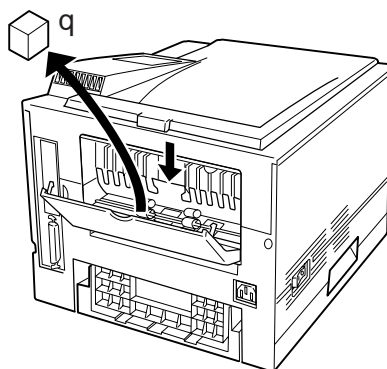
8. **Arrange paper edges.** Rock the paper tray to gather the edges of the stack together to ensure correct positioning of paper in the tray.



9. **Install the paper tray.** Align the sides of the tray with the guide grooves of the tray slot (the left groove is engraved with a arrow) and firmly slide the tray all the way into the slot.



**Notice:**  
You cannot install the paper tray with the pressure plate raised.



10. **Remove the protective material from the rear stacker.** Open the rear stacker and remove restraint cushion q. Make sure the paper guide is pushed down in the locked position. Close the rear stacker.

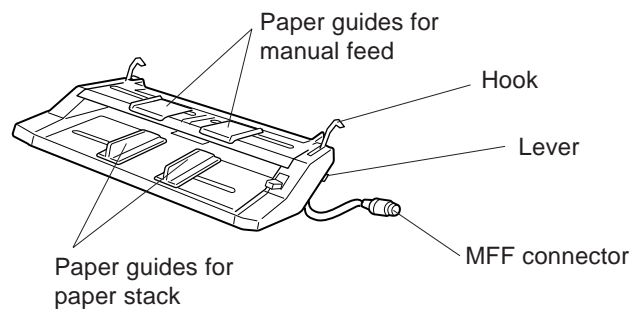


**Notice:**  
If the paper guide is not in the locked position, the printer will not work.

---

## Installing the Optional Multi-function Feeder

The optional multi-function feeder (MFF) is useful to print a lot of envelopes or transparencies. The MFF can hold and deliver 100 sheets of paper or 30 envelopes.



---

### Notice:

When using paper, do not leave the paper in the multi-function feeder for a long time. It may cause waving of paper and dropouts in printing.

Because the MFF does not have a mechanism that detects the physical size of paper in use, you must inform the printer of the paper size. Use the MFF paper size menu to select a paper size which equals the size of paper loaded in the MFF.

---

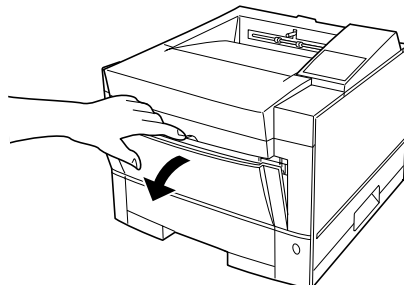
To install the multi-function feeder, follow these steps:



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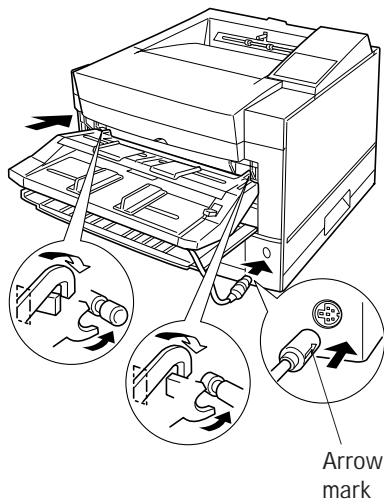
### Notice:

Be sure that the printer is turned off before installing or removing the multi-function feeder.



1. Open the front cover.





2. Fasten the feeder to the printer. Insert the left and right supports and hooks of the multi-function feeder into the corresponding openings at the front of the printer so that the hooks catch the pins firmly.
3. Connect the feeder cable. Connect the feeder cable to the connector at the right side of the printer. Orient the arrow mark of the cable's connector right.



**Notice:**

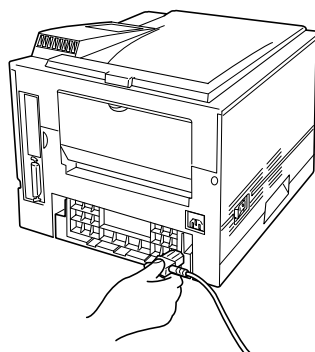
To avoid paper jams or other feeding errors, make sure that each of the left and right hooks securely hangs on the pin.

### Connecting the Power Cord

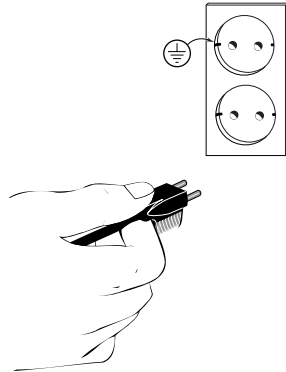
This printer comes equipped with one of the two voltage ratings:

- 120 VAC (such as for the USA)
- 220 to 240 VAC (such as for Europe)

The manufacturer's nameplate on the back of the printer indicates this rating. Confirm that the rated voltage of your printer matches the voltage of your power outlet.



1. Check that the printer is turned off. The "O"-marked side of the switch should be depressed.
2. Plug the female end of the power cord into the connector on the left back of the printer.



3. Plug the male end into a wall outlet.



**Caution:**

For your safety, use only a properly grounded outlet. To avoid possible electromagnetic interference or power supply problems, do not use an extension cord.

## Connecting the Printer to Your Computer

This section explains how to connect the printer to your computer via the parallel interface.



**Notice:**

The following restrictions apply to interface cables:

- To comply with regulations for radio frequency emissions, use only shielded cable for computer-to-printer communications.
- The length of the parallel interface cable must be 3 meters (10 feet) or less.

## About Interfacing

You can connect the printer to your computer using a standard parallel interface. Many computers have a parallel interface port. However, if your computer does not have the parallel interface port, or for printers used in a network, the following optional interfaces are available.

---

- **Serial (RS-232C/422A)**

Use a serial interface if the printer is not near the computer. Many computers have both parallel and serial interface ports. Serial communication can operate up to 15 meters (50 feet). Parallel communication is normally limited to 3 meters (10 feet).

- **LocalTalk**

Use the LocalTalk interface if the printer is connected to a Macintosh computer.

- **Ethernet**

Use the Ethernet interface if the printer is used in a network environment.



**Notice:**

The DIGITAL Laser Printer LN15N-A and LN15N-B are equipped with an Ethernet interface.

---

### Connecting to the Parallel Port

This printer does not come with a parallel interface cable. You can use a standard Centronics interface cable (sold separately) for this purpose. Your dealer can advise you on the cable you require.

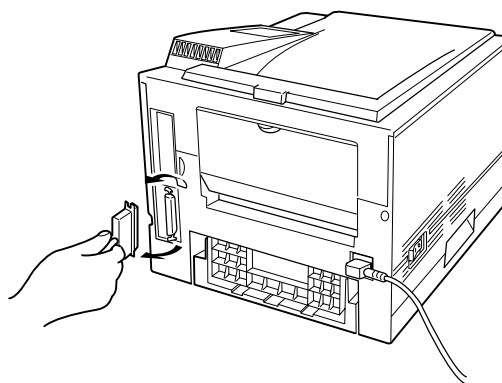


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**Notice:**

Be sure the printer is turned off before connecting the interface.

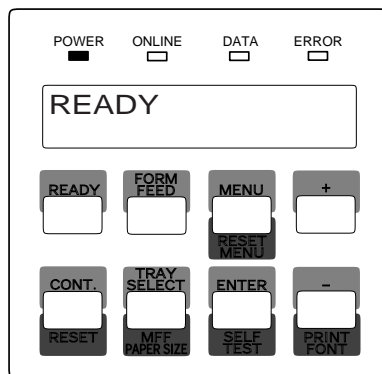
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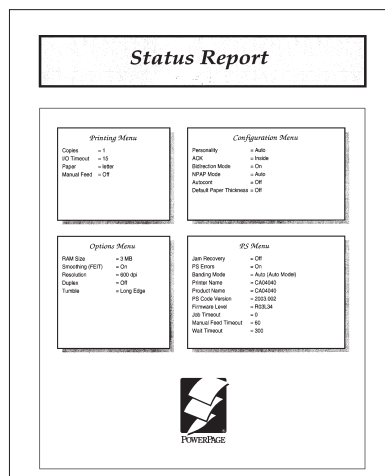
To make the connection, plug the cable connector into the parallel interface port on the back of the printer. Secure the connector with the wire clips. Plug the other connector into your computer's parallel port. Consult your computer documentation if you need help.

## Printing a Test Page Offline

The printer has a status report function which prints a page summarizing printer option settings and showing samples of resident fonts. Use this function to check the printer performance offline.



1. **Turn the printer on.** The printer initializes the mechanism and then enters the ready state. The message display indicates <<<INITIALIZE>>>, WARMING UP, then READY.



2. **Print a test page offline.** Press the **READY** button to put the printer offline (the ONLINE indicator turns off). Press the **SELF TEST** button for more than five seconds. The message display indicates SELF TEST and the DATA indicator flashes. A status report page is printed. Check that the printing is successful.



### Notice:

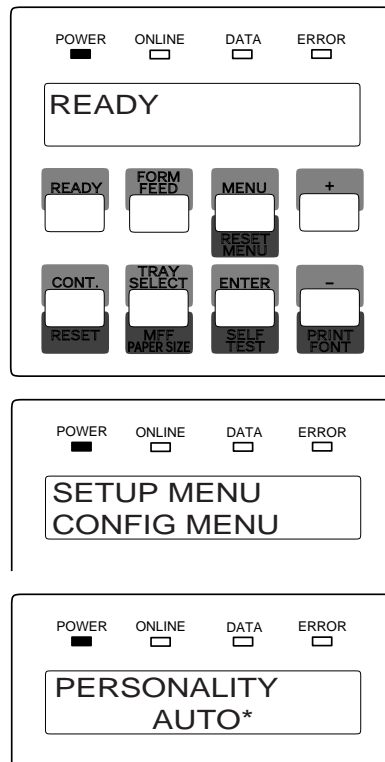
The status report is for either the PCL emulation or the PS emulation depending on the emulation you used for printing the last document; however, the status report is for the PS emulation if it is printed immediately after the printer is turned on. To clearly select the report, use the test menu in setup mode.

---

## Selecting an Emulation

This printer has two emulations (PCL and PS) as a standard feature. You can use these emulations to connect your printer to different computers. PCL emulates HP LaserJet 4 printers and PS emulates PostScript Level 2 compatible printers.

With default settings, the printer automatically selects the active emulation. To specify an emulation, select the emulation using the control panel. Use the Personality menu of the Config menu as shown below.



1. **Enter setup mode.** Press the **READY** button to put the printer offline (the ONLINE indicator turns off). Then, press the **MENU** button briefly six times.

The message display indicates SETUP MENU CONFIG MENU.

2. **Select the Personality menu.** Press the **ENTER** button briefly. The message display indicates PERSONALITY AUTO\*.
3. **Select emulation.** Press the **+** button briefly. The option AUTO changes to PCL, PS, then back to AUTO. Press the **ENTER** button when the desired option is displayed. Press the **READY** button to return to the ready state.

The selected emulation is selected (an asterisk is followed). Once you change the emulation, the other menus automatically change to reflect the options and functions of the new emulation.

---

## Printing Your First Document

Your printer should be set up and connected to your computer. This section explains how to test your installation setup by printing a trial document from an application program under Windows. To test the printer alone, without your computer, you can use the status report printing which does not require the use of a computer.

Turn on your printer and observe the initialization sequence. If no RAM (extra memory) cards have been installed, the sequence lasts about one minute, during which the following events occur:

- The printer conducts a number of self-checks.
- The main motor rotates to check mechanical functions and clean the drum.
- The message display indicates READY, indicating the printer is ready for printing.

To print a trial document, follow these steps:

- 1. Start Windows and a Windows application.**
- 2. Open your trial document.**

Select an existing or start a new document. Choose a small document for the first trial.

- 3. Select the printer as the document printer.**

In most programs, you make the selection in a print menu. Consult your program documentation for the exact procedure.

- 4. If desired, change the font(s) in the document to one of the fonts offered by your application.**
- 5. Check the printer.**

Look in the main window of the Print Manager to make sure the printer is activated.

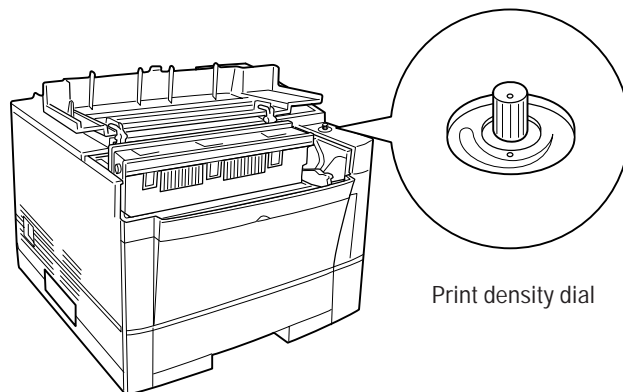
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## 6. Print your document.

Start the program. The default paper size is fixed to A4 (for Europe) or Letter (for the USA). However, you can print a document on a different size of paper using the manual feed slot.

### Adjusting Print Density

If you feel that the printout is too light or too dark, adjust the print density by turning the print density dial. It is located inside the top cover above the control panel. Turning the dial clockwise darkens the print. A counterclockwise adjustment lightens the print. After making the adjustment, close the top cover, print your trial document again, and check the results.



If your document printed successfully, skip the next subsection **If Something Goes Wrong**.

## If Something Goes Wrong

This section briefly discusses the most common problems you might encounter.

Problem	Remedy
No response by printer	Ensure that: <ul style="list-style-type: none"><li>• The printer is turned on and online. The ONLINE indicator should be lit.</li><li>• The cable from the computer to the printer is properly connected at both ends.</li><li>• Your software program has sent the print data to the printer. Many programs have a printer control function that shows print</li></ul>
No printout; DATA indicator on	The printer has received data from the computer but has not printed the page. To print the page, put the printer offline by pressing <b>READY</b> briefly then press <b>FORM FEED</b> .
Unreadable printout	Possible causes and solutions are: <ul style="list-style-type: none"><li>• A wrong printer driver is selected. Select the correct printer driver as the document printer.</li><li>• The document contains unknown printer commands. Remove any setup strings or embedded commands.</li></ul>



---

## Printing and Paper Handling

This chapter provides information you may need for day-to-day printing. The topics are:

- Control panel tutorial

The tutorial describes the indicators, message display, and buttons. It includes an example of how to use the control panel.

- Control panel functions

This section describes the functions by buttons.

- Menu functions

This section describes how to use the control panel for customizing printer defaults.

- Handling paper

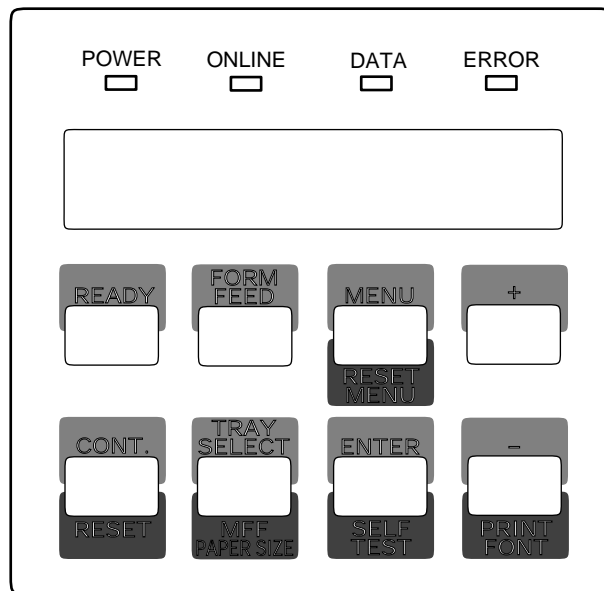
This section describes how to print on various types of paper.

### Control Panel Tutorial

This section introduces the printer's control panel, beginning with a description of the indicators, message display, and buttons. The tutorial describes the use of the buttons in some detail and follows with an example.

#### The Control Panel

The control panel consists of four indicators, a message display, and eight buttons. The physical buttons are beneath the LCD display. The top row of labels represents basic functions. The bottom row of labels represents secondary functions. See later in this section for a list of functions.



*Figure 2-1 Control panel*

## Indicators

The control panel has four labeled LED indicators across the top.

Indicator	Meaning
POWER	Indicates printer power is on.
ONLINE	Indicates the printer is online and ready to print.
DATA	Flashes when data is being sent from your computer. Lights steadily to indicate the printer's buffer contains unprocessed data.
ERROR	Indicates a printer error has occurred. Details are indicated by the message display.

---

## Message Display (LCD)

The message display uses a liquid-crystal display representing status and errors by two lines of sixteen characters. In operating mode, it may show:

- What the printer is doing
- Whether the printer is ready to print
- When paper should be added
- When paper should be manually inserted
- When the toner bottle needs to be replaced
- When the print unit needs to be replaced
- An error message condition such as paper jam



---

### Important:

A "Ready" message means the printer has no data to print without any errors and the **READY** button is not pressed. "Not Ready" means the printer detected an error or the **READY** button was pressed in the Ready state.

---

Error messages inform you of conditions requiring your attention, such as TRAY n PAPER OUT, COVER OPEN, or PAPER JAM n. They also warn you of hardware problems, such as FUSER FAILURE or BD CYCLE ERROR. The TONER LOW message informs you that the toner bottle needs replacement.

In tray select mode or MFF paper size mode, the message display shows the selected tray or the selected paper size respectively. In menu mode, the message display shows menu items and option selections. These modes are explained later in this chapter.

## Buttons

One or two functions are assigned to a button. To use the functions represented by the top labels, simply press the button. To use the functions represented by the bottom labels, press and hold down the button for five or more seconds. The following tables summarizes the functions.

---

### Pressing the button briefly

Except for the **READY** button, the following buttons are also valid when the printer is offline.

Button	Function
READY	Switches the printer between online and offline.
FORM FEED	Performs a form feed to print the remaining data.
CONT.	Clears a recoverable error and continues printing.
TRAY SELECT	Puts the printer in tray select mode which allows you to select the paper tray to be used.
MENU	Puts the printer in setup mode.
ENTER	Selects the displayed option as the printer default. This button and the two buttons below are valid in setup, tray select, or MFF paper size mode.
+	Displays the next option.
-	Displays the previous option.

### Pressing and holding down the button for five or more seconds

The following buttons are also valid when the printer is offline.

Button	Function
RESET	Clears the buffer of any print data and puts the printer through its initialization sequence.
RESET MENU	Besides the above reset function, resets all printer operation options to their factory default values except interface settings (parallel menu, serial menu, and network menu).
MFF PAPER SIZE	Puts the printer in MFF paper size mode, which allows you to select the paper size to be used.
SELF TEST	Prints a status report, which lists printer operation options currently selected.
PRINT FONT	Prints a font report, which lists the fonts currently available.

---

## Control Panel Functions

### Changing Message Language (MENU)

You can select a language used for control panel messages. Selectable languages are English, French, German, Italian, Spanish, and Swedish.

To select a language, follow these steps:

1. Turning the printer on while pressing MENU.  
The message **C.P.LANGUAGE ENGLISH** appears after printer initialization.
2. Press the + or - button until the desired language appears.  
Press the ENTER button.  
The asterisk appears after the language, indicating the language is selected.
3. Save the selection.  
Pressing the READY button saves the new setting and returns the printer to the ready state. The printer will display the selected language for messages.

### Printing Data Remaining in the Buffer (FORM FEED)

Pressing FORM FEED tells the printer to advance to the next page. The practical effect is to print any data remaining in the buffer. For example, the buffer might contain data from an interrupted print job. When the buffer contains residual data, the control panel DATA indicator is steadily lit.

### Clearing an Error Condition to Continue Printing (CONT.)

When a recoverable error occurred, pressing CONT. clears the error condition and continues printing. For example, you can resume printing after adding paper in response to a TRAY1 PAPER OUT message. You can use CONT. to ignore a message such as Load TRAY1 A4. For example, you might want to print a page with A4-size format on a letter-size sheet.

CONT. also allows you to override the INSERT A4 prompt when feeding paper manually. By pressing CONT., the printer prints from tray1 (MFF) instead.

---

## Clearing the Buffer and Reinitializing the Printer (RESET)

Pressing and holding down **RESET** for five or more seconds clears the print buffer and tells the printer to initialize itself. You might use this function if you cancel a print job in the middle and want to clear the printer and start over. In this case, permanently downloaded fonts are removed by the initialization process. You must download the fonts again.

## Printing a Status Report (SELF TEST)

The status report function prints a page that summarizes printer option settings and shows samples of resident fonts.

To print a status report, follow these steps:

1. Make sure that the message display indicates READY with the ONLINE and DATA indicators off.

2. Press the **SELF TEST** button for five or more seconds.

The message changes to SELF TEST with the DATA indicator flashing and the status report begins printing. After printing, the printer returns to the original state. See Figure 2-2.

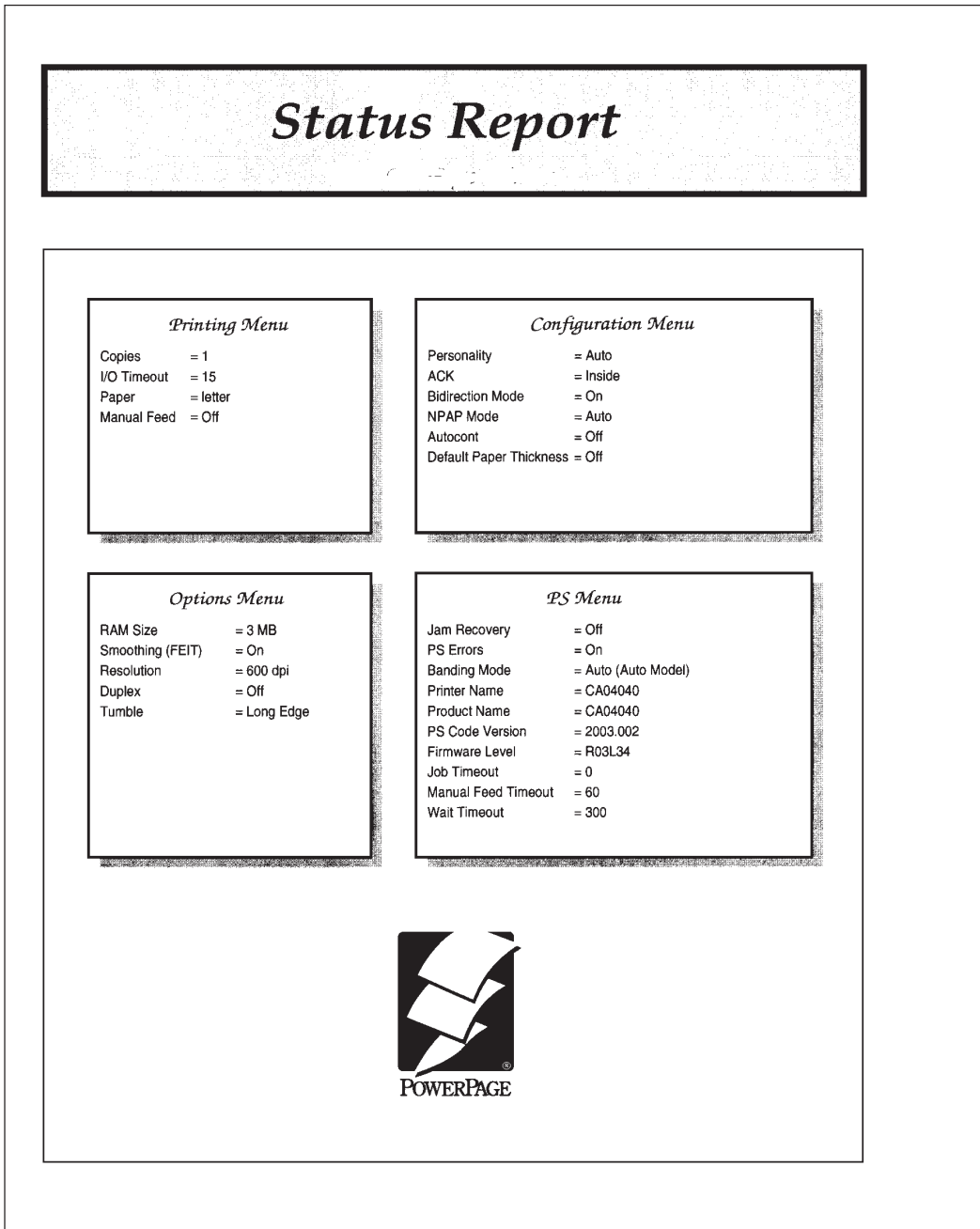


---

### Notice:

The status report is for either the PCL emulation or the PS emulation depending on the emulation you used for printing the last document; however, the status report is for the PS emulation if it is printed immediately after the printer is turned on. To clearly select the report, use the test menu in setup mode.

---



*Figure 2-2 Status report (PS emulation)*

---

## Printing a Font Report (PRINT FONT)

The font report summarizes attribute information on resident and optional fonts currently available and shows samples of these fonts.

To print a font report, follow these steps:

1. Make sure that the message display indicates READY with the ONLINE and DATA indicators off.

2. Press the PRINT FONT button for five or more seconds.

The message changes to PRINT FONT with the DATA indicator flashing, and the status report begins printing. After printing, the printer returns to the original state. See Figure 2-3.



---

### Notice:

The font report is for either the PCL emulation or the PS emulation depending on the emulation you used for printing the last document; however, the font report is for the PS emulation if it is printed immediately after the printer is turned on. To clearly select the report, use the test menu in setup mode.

---



## 35 PostScript Compatible Fonts

Courier	ABCDabcd1234!@#&\$
<b>Courier-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Courier-BoldOblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Courier-Oblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
Helvetica	ABCDabcd1234!@#&\$
<b>Helvetica-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Helvetica-BoldOblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Helvetica-Oblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
Helvetica-Narrow	ABCDabcd1234!@#&\$
<b>Helvetica-Narrow-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Helvetica-Narrow-BoldOblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Helvetica-Narrow-Oblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
Times-Roman	ABCDabcd1234!@#&\$
<b>Times-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Times-BoldItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Times-Italic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
Symbol	ABXΔαβγδ1234!≡#☐
Palatino-Roman	ABCDabcd1234!@#&\$
<b>Palatino-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Palatino-BoldItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Palatino-Italic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
NewCenturySchlbk-Roman	ABCDabcd1234!@#&\$
<b>NewCenturySchlbk-Bold</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>NewCenturySchlbk-BoldItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>NewCenturySchlbk-Italic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
AvantGarde-Book	ABCDabcd1234!@#&\$
<b>AvantGarde-Demi</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>AvantGarde-DemiOblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>AvantGarde-BookOblique</i>	<i>ABCDabcd1234!@#&amp;\$</i>
Bookman-Light	ABCDabcd1234!@#&\$
<b>Bookman-Demi</b>	<b>ABCDabcd1234!@#&amp;\$</b>
<i>Bookman-DemiItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>Bookman-LightItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
<i>ZapfChancery-MediumItalic</i>	<i>ABCDabcd1234!@#&amp;\$</i>
ZapfDingbats	☆†•✦✧✨✩✪✫✬✭✮✯✰✱✲✳✴✵✶✷✸✹✺✻✼✽✾✿

Figure 2-3 Font report (PS emulation)

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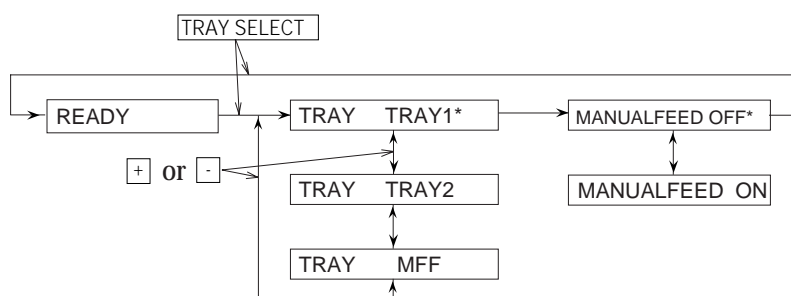
## Selecting Paper Tray, MFF, or Manual Paper Feed (**TRAY SELECT**)

Pressing **TRAY SELECT** puts the printer in tray select mode which allows you to select paper sources to be used. The paper sources are tray 1, tray 2 (if installed), MFF (if installed), and manual feed slot. When a paper source runs out of paper, the printer switches for another one. When the manual feed slot is selected, other paper sources are made invalid.

To select a paper source, follow these steps:

1. Make sure that the message display indicates READY with the ONLINE and DATA indicators off.
2. Press the **TRAY SELECT** button briefly.  
The message changes to TRAY TRAY1\*. The asterisk means that tray 1 is selected.
3. Select or deselect a paper source.  
This step is valid when tray 2 (option) or MFF (option) is installed. Pressing the **ENTER** button in this condition makes the asterisk disappear. Tray 1 is deselected. Pressing the **ENTER** button again makes the asterisk reappear. Tray 1 is selected.
4. Select or deselect other paper sources.  
Press the **+** or **-** buttons briefly to display another paper source. Use the **ENTER** button in the same way as described above.
5. Save the selections.

Press **READY** button to save the new settings and return to the ready state.



---

## Setting MFF Paper Size (MFF PAPER SIZE)

Pressing MFF PAPER SIZE puts the printer in MFF paper size mode which allows you to inform the controller of the physical paper size used in the MFF. You must select the size of paper currently loaded in the MFF. This menu is available when the MFF is installed.

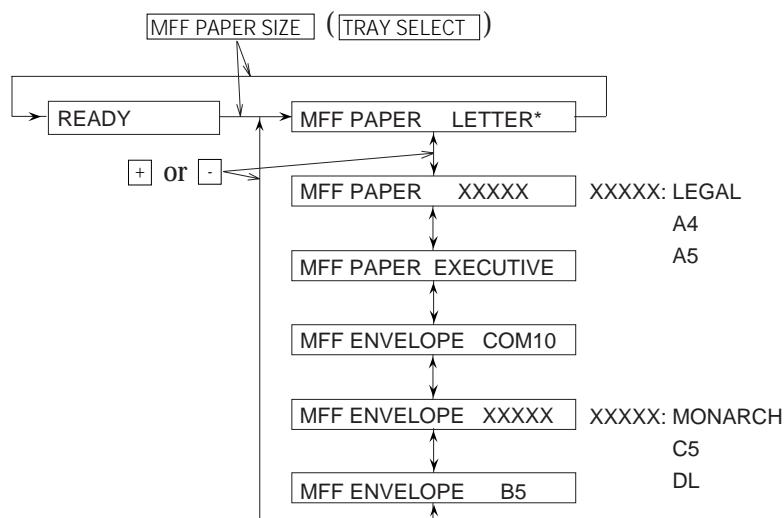
To select a paper size, follow these steps:

1. Make sure that the message display indicates READY with the ONLINE and DATA indicators off.
2. Press the MFF PAPER SIZE button for five or more seconds.  
The message changes to MFF PAPER A4\*. The asterisk means that A4 size is selected for the MFF.
3. Select a desired paper size.

Press the + or - buttons until the desired paper size appears. Press the ENTER button. The asterisk appears and the paper size is selected.

4. Save the selection.

Press the READY button to save the new setting and return to the ready state.



---

## Selecting Menu Option (**MENU**) and Resetting Menu

### (**RESET MENU**)

Pressing **MENU** briefly puts the printer in menu mode which allows you to set up the printer, for example, selecting a paper size, changing a font, and adjusting serial interface parameters. You can select options from the menu by using the four buttons, **MENU**, **+**, **-**, and **ENTER**.

Pressing **RESET MENU** for five or more seconds in menu mode resets all parameters to the factory default values except interface settings (parallel menu, serial menu, and network menu).

The following section explains the menu mode and its operation.

## Menu Functions

The menu mode allows you to change your printer's defaults using the four buttons on the control panel. You can use the control panel's menu mode to configure your printer to suit the requirements of your computer, software, and documents.

## Menu Structure and How to Use Control Panel Buttons

The menu mode is structured as a tree consisting of submenus, items, and options. The following example shows a small portion of the tree and illustrates how the four buttons work.

In the example:

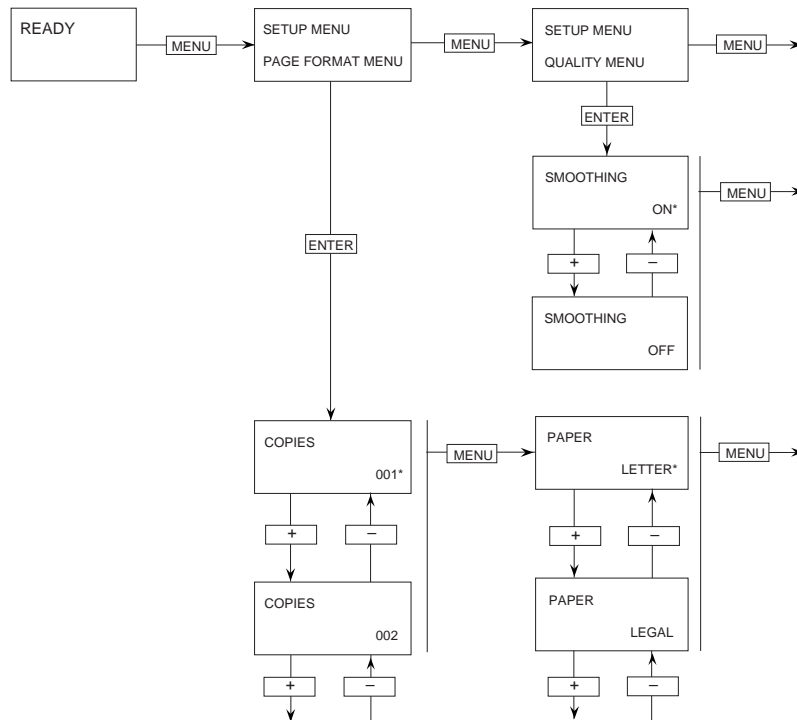
Submenus are PAGE FORMAT MENU and QUALITY MENU. Items are COPIES, PAPER, and SMOOTHING. Options are 001, 002, LETTER, LEGAL, ON, and OFF.

**MENU** selects menu mode when the printer is ready and offline. Once the printer is in menu mode, **MENU** selects the first submenu and moves you right to the next submenu. If you are on the last submenu, pressing **MENU** returns you to the first submenu.

When a submenu is selected, **ENTER** selects the first item of the submenu. Once the first item is selected, **MENU** moves you right to the next item, regardless of an option selected. If you are on the last item, pressing **MENU** returns you to the first item.

Use **[+]** and **[-]** to move up and down the options list.

When an item is displayed, **[ENTER]** selects that option (adds an asterisk after the option indicating that the option is stored in RAM).



### Submenus, Items, and Options

The following table shows all of submenus and items and summary of options displayed on the message display in menu mode. The display initially shows the factory default option followed by an asterisk (underlined in the table).

Submenu (bold)/Item	Options
<b>Page format menu</b>	
Copies	<u>001</u> , 002, 003, ..., 999 (pages)
Paper/Envelope	A4, A5, <u>Letter</u> , Legal, Executive (*1) COM10, Monarch, C5, DL, B5
Orientation	<u>Portrait</u> , Landscape
Form lines	<u>005</u> , 006, 007, ..., <u>060</u> , ..., 128 (lines/page) (*2)
Page protect	<u>Auto</u> , On
Duplex mode	<u>Off</u> , On (*3)
Bind	<u>Long edge</u> , Short edge (*3)
<b>Quality menu</b>	
Smoothing (*4)	<u>On</u> , Off
Resolution	<u>600</u> , 300 (dpi)
Economy mode	<u>Off</u> , On
Thick paper	<u>Off</u> , On
<b>PCL font menu</b>	
Font source	<u>Internal</u> , <i>Soft</i> , <i>SIMM</i> (*5)
Font number	<u>000</u> , 001, 002, 003, ..., N (depending on the font source, max. 999)
Pitch size (*6)	<u>0.44</u> , 0.45, 0.46, ..., 99.99 (characters/inch)
Point size (*7)	<u>4.00</u> , 4.25, 4.50, 4.75, 5.00, ..., 999.75 (point)
Symbol set	<u>Roman8</u> , ISOL1, ISOL2, ISOL3, PC8, PC8-DN, PC850, PC852, PC8TK, ..., WingDings
Compatible mode	<u>On</u> , Off
<b>PCL menu (*8)</b>	
Top offset	-25.0, -24.9, -24.8, ..., <u>00.0</u> , ..., +24.9, +25.0 (mm)
Left offset	-25.0, -24.9, -24.8, ..., <u>00.0</u> , ..., +24.9, +25.0 (mm)
<b>PS menu (*9)</b>	
Jam recovery	<u>Off</u> , On
Print PS errors	<u>On</u> , Off
Job timeout	<u>0</u> , 10, 11, 12, ..., 298, 299, 300 (0: no check)
Wait timeout	0, 10, 11, 12, ..., 298, 299, <u>300</u> (0: no check)
Manual timeout	0, 10, 11, 12, ..., <u>40</u> , ..., 298, 299, 300 (0: no check)
Banding mode	<u>Auto</u> , Off, On (*10)
<b>Config menu</b>	
Personality	<u>Auto</u> , PCL, PS
Auto continue	<u>Off</u> , On
I/O timeout (*11)	5, 6, 7, ..., <u>15</u> , ..., 298, 299, 300 (seconds)
I/O buffers	<u>Auto</u> , 4K, 16K, 32K, 64K (bytes)
NPAP area size	<u>Auto</u> , Large, Medium., Small

---

<b>Submenu (bold)/Item</b>	<b>Options</b>
<b>Parallel menu</b>	
Acknowledge (*12)	<u>I</u> nside, <u>O</u> utside
Bi-direction	<u>O</u> n, Off
NPAP mode	<u>A</u> uto, On, Off
<b>Serial menu (*13)</b>	
Baud rate	1200, 2400, 4800, <u>9600</u> , 19200, 38400, 57600
Format	<u>8</u> Non1, 7Even1, 7Odd1, 8Even1, 8Odd1
Flow control	<u>D</u> TR <u>H</u> i, DTR Low, XOn/Off, ROBUST XOn/Off
<b>Test menu</b>	No option. Pages are printed when an item is selected.
PCL config page	Start
PCL font list	Start
PS config page	Start
PS font list	Start
<b>Clear warning</b>	Shows the printing component to be replaced.
<Clear warning>	Print unit

- \*1 Letter for U.S. customers and A4 for European customers
- \*2 This is for Letter and portrait. It automatically changes depending on paper size and page orientation.
- \*3 Valid when a duplex unit is installed
- \*4 Also called EIT (Enhanced Image Technology) which makes the contours of objects appear smoother than normally possible with the printers standard resolution.
- \*5 Displayed when soft fonts are downloaded or a font SIMM card is installed
- \*6 Displayed when the selected font is a scalable and fixed-spacing one
- \*7 Displayed when the selected font is a scalable and proportional-spacing one
- \*8 Effective when PCL jobs are being executed. These values are used as defaults of top and left offset specifications in PCL mode.
- \*9 Displayed when the PS is selected.
- \*10 If the total capacity of memory is 3M to 9M bytes with banding mode off, the resolution is automatically set to 300 dpi. When intending to print at 600 dpi, select "banding mode on" or install additional memory cards of 6M bytes or more.

- 
- \*11 This is essential for sharing the printer among multiple computers.
  - \*12 This is for the parallel interface.
  - \*13 Displayed when a serial interface board is installed



**Notice:**

The DIGITAL Laser Printer LN15N-A and LN15N-B are equipped with an Ethernet interface. Installation instructions are provided in the DIGITAL Laser Printer LN15 Ethernet Interface User Manual

---

The following explains each item of the menu mode.

**Menu Items**

**Page format menu**

Copies	The number of copies the printer prints from each page
Paper/Envelope	A paper size or envelope size to be used by the printer
Orientation	A printing direction
Form lines	The number of lines printed per page
Page protect	Whether a block of printer memory is reserved exclusively for text and graphics data, especially for printing dense text or complex graphics, to prevent memory overflow errors. However, it reduces the amount of printer memory available for downloadable fonts.
Duplex mode	Two-sided printing mode
Binding	Where an extra area for fastening pages is located, short or long edge of a page



---

### Quality menu

Smoothing	Whether the edge smoothness technology is applied.
Resolution	The number of dots printed per inch
Economy mode	Toner saving mode
Thick paper	Mode for printing thick paper. Be sure to turn this off whenever you are using paper of ordinary thickness.

### PCL font menu

Font source	Where the printer finds the font
Font number	The internal number of a font to be selected
Pitch size	Character width (characters per inch)
Point size	Character height (multiple of 1/72 inch)
Symbol set	A set of characters used in a font, consisting of the standard letters, numbers, and punctuation. It differs in the accented characters, line drawing characters, and special symbols by languages.
Compatible mode	PCL5e compatible font mode

### PCL menu

Top offset	Distance by which the page is virtually shifted from the top edge of physical paper in PCL emulation
Left offset	Distance by which the page is virtually shifted from the left edge of physical paper in PCL emulation

### PS menu

Jam recovery	Whether the jammed page is reprinted
Print PS errors	Whether an error report is printed out
Job timeout	Time interval to be allotted between jobs
Wait timeout	Time interval to be allotted for waiting a job end
Manual timeout	Time interval to be allotted for manual insertion

---

<b>Banding mode</b>	Switching printing control (band/full page)
Auto	Auto mode (standard setting). Switches between reliable printing and fast printing depending on the total amount or RAM available.
Off	Speed mode. Attaches importance to speedup of printing control, thus processing all pages per job.
On	(Virtual) memory mode. Attaches importance to reliable printing rather than speedup, thus processing data per page.

**Config menu**

Personality	Selecting an emulation (personality) without a PJI command which clearly specifies the emulation
Auto continue	Automatic control of continuing recoverable errors
I/O timeout	Time interval allowed for switching the interface
I/O buffers	Size of interface buffer
NPAP area size	Size of work area for NPAP (network printer alliance protocol)

**Parallel menu**

Acknowledge	The timing of the ACK signal against the BUSY signal
Bi-direction	Bi-directional Centronics interface mode
NPAP mode	Whether the NPAP commands are used.

---

**Serial menu**

Baud rate	Data transfer speed on the serial interface
Format	Data format for the serial interface. The first digit indicates the number of data bits. Then comes the parity and the last digit indicates the number of stop bits.
Flow control	Interface protocol

**Test menu**

PCL config page	Print a self-test report using PCL emulation
PCL font list	Print a list of fonts available in PCL emulation
PS config page	Print a self-test report using PS emulation
PS font list	Print a list of fonts available in PS emulation

**Clear warning**

<Clear warning> print unit      Clearing the print unit counter

---

## Handling Paper

Discusses paper selection and paper handling:

- Types and sizes of paper you can use with this printer, including envelopes and transparencies
- Ensuring that both the software program and the printer have compatible paper size settings
- Tips on handling print media
- Adjusting the paper tray to fit a different paper size
- Feeding paper manually

### Paper Types and Sizes

This printer can print on a variety of common office papers in addition to standard photocopier bond. Bond paper can range in basic weight from 60 to 90 g/m<sup>2</sup> (16 to 24 pound) for the paper tray and from 60 to 105 g/m<sup>2</sup> (16 to 28 pound) for the manual feed slot. Smooth paper produces the best print quality, but textured papers usually provide satisfactory results.

The following descriptions also apply to an optional paper tray.



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#### Notice:

When you use thick paper, follow these guidelines:

- When you are using thick paper or special paper and find improper adhering of toner to the paper, turn the thick paper mode on using the control panel. This mode is invalid for envelopes, transparencies, and labels.
  - Turn the mode off when you print on regular paper. Printing regular paper with this mode on may cause a decrease in print quality or reliability of the printer.
-

---

This printer can print on a wide range of paper sizes, but the size is limited when using paper trays.

- When using a paper tray, the size is:

Paper size (physical)	Dimensions
A4 (European letter size)	210 x 297 mm
A5	148 x 210 mm
Letter (US letter size)	8.5 x 11 in
Executive	7.25 x 10.5 in

- When using the manual feed slot, the size is:

Minimum: 100 mm wide x 148 mm long (3.94 x 5.81 inches)

Maximum: 216 mm wide x 360 mm long (8.5 x 14.13 inches)

- When using the MFF (option), the size is:

Paper size (physical)	Dimensions
A4	210 x 297 mm
A5	148 x 210 mm
Letter	8.5 x 11 inches
Legal	8.5 x 14 inches
Executive	7.25 x 10.5 inches
Envelope COM-10	4 1/8 x 9.5 inches
Envelope Monarch	3 7/8 x 7.5 inches
Envelope C5	162 x 229 mm
Envelope DL	110 x 220 mm
Envelope B5	176 x 250 mm



**Notice:**

If a print job stops because of a certain error and the control panel LCD displays MEMORY SHORTAGE, add extra memory to the printer or select "banding mode on" in the PS menu.

---

Although this printer can print on any sheet within the limits stated above, printing area and margin calculations are based on several paper sizes as shown in the table below. Use the control panel to change the supported paper size.

Paper size (logical)	Dimensions
A4	210 x 297 mm
A5	148 x 210 mm
Letter	8.5 x 11 inches
Legal	8.5 x 14 inches
Executive	7.25 x 10.5 inches
Envelope COM-10	4 1/8 x 9.5 inches
Envelope Monarch	3 7/8 x 7.5 inches
Envelope C5	162 x 229 mm
Envelope DL	110 x 220 mm
Envelope B5	176 x 250 mm

When the PCL emulation is used and if the physical paper size (tray size or MFF paper size) is different from the logical paper size (value specified by setup menu of paper size), a paper mismatch error occurs.

### General Tips

Observe the following tips when handling print media.

- Do not use paper that is wrinkled or curled.
- Do not use paper with staples or metal parts.
- When printing both sides of sheets, we recommend you to use an optional duplex unit. If your printer has no duplex unit, use the manual feed slot and remove curls after first printing. Use paper in 105 g/m<sup>2</sup> (28 pound) weight. Paper thinner than this weight may be wrinkled thus causing decrease in print quality.
- Two-sided printing is not allowed for transparencies, envelopes, and labels even if your printer has the duplex unit.

---

## Preprinted Sheets

In general, you can safely print on preprinted sheets such as letterhead. However, letterhead with thermographic (raised) printing, embossing, or foil stamping may not work well. The forces used to create these effects (heat and/or pressure) are also used in the printer's fuser unit. For this reason, the fuser unit may damage the preprinted image.

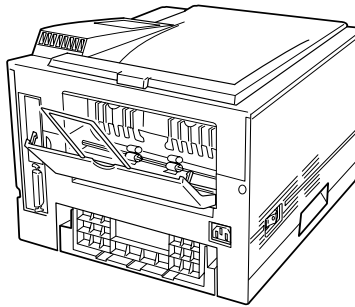
Load preprinted paper with the printed side facing down in the paper tray. When using the manual feed slot, place paper with the printed side facing up. For printing in portrait orientation, the letterhead should be at the front of the tray. For landscape orientation, it should be at the right of the tray. For more information on printing in different orientations, see the later section of this chapter.

## Transparencies

This printer can print on overhead transparency material.

- We recommend you to set up the rear stacker (or that of the duplex unit when your printer has the duplex unit) so that transparencies are ejected straight out the back to minimize curl.

The capacity of the rear stacker is about 20 sheets.



- Use materials specially designed for laser printers or photocopiers.
- Always feed transparency material from the manual feeder or from the (optional) multi-function feeder (MFF).
- To remove curls from printed transparency materials, use correct frames or put a weight on them until they lay flat.
- Be sure to fan the transparency stack to prevent sheets from sticking together.

---

## Envelopes

This printer prints well on envelopes if you carefully follow these guidelines:

- Use envelopes made of paper in 75 to 105 g/m<sup>2</sup> (20 to 28 pound) weight. Printing with envelopes made of paper thinner than this weight may produce wrinkles thus causing decrease in print quality.
- Be sure to set up the rear stacker (or that of the duplex unit when your printer has the duplex unit) so that envelopes are ejected straight out the back to minimize curl.

The capacity of the rear stacker is about 20 sheets.

- Use the envelope sizes shown in the preceding table.
- To avoid damage to the printer, never use envelopes with clasps, snaps, windows, or synthetic materials.
- Feed from the manual feeder or from the (optional) multi-function feeder (MFF).
- Feed the envelopes with the gummed side of the flaps facing downward.
- Do not use “encapsulated” adhesives, which seal by pressure alone.
- To avoid jamming, restrict the minimum paper weight to 64 g/m<sup>2</sup> (17 pound).
- To avoid creasing along the edges, use high-quality envelopes with stiff edges.
- To avoid uneven printing, do not attempt to print on the gummed overlap areas.
- Be sure to feed or load the envelopes with the envelope centered against the manual feed slot. Use the guide of the paper sizes.
- Before attempting large-scale printing on envelopes, consult with your stationery dealer. Also, test the envelopes carefully for consistent, trouble-free printing.

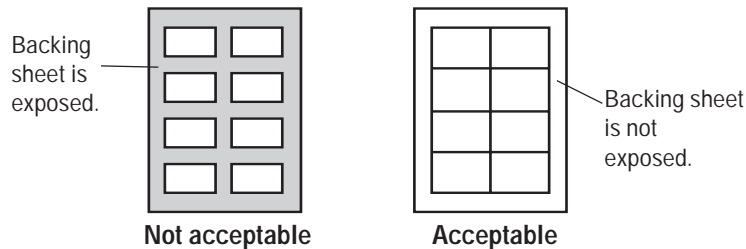


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## Labels

This printer prints well on labels if you carefully follow these guidelines:

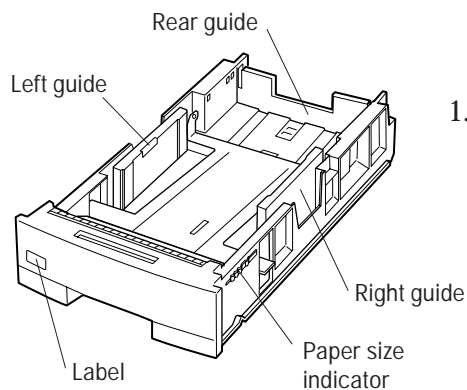
- Be careful to use labels under normal operating conditions. Labels are sensitive to temperature and humidity.
- Use the rear stacker (or that of the duplex unit when your printer has the duplex unit) so that labels are ejected straight out the back to minimize curl.
- Use only labels without backing sheets exposed in the printable area. Labels mounted separately on a backing sheet tend to slip, resulting in crooked print.



- Test-print labels before using them. If jamming problems occur and continue, try a different type of label.

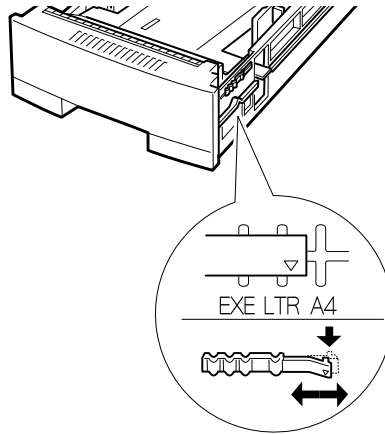
## Changing the Paper Tray Size

The paper tray can be adjusted to one of the three paper sizes: A4, A5, LTR (Letter), and EXE (Executive). To change the size, follow these steps:

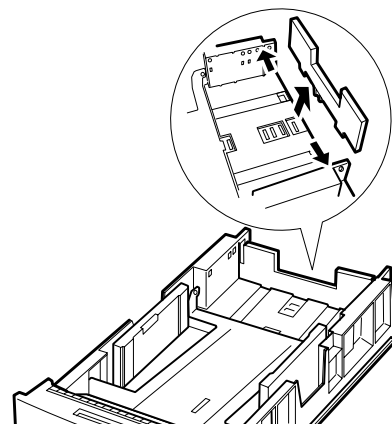


1. **Remove the paper tray from the printer.**

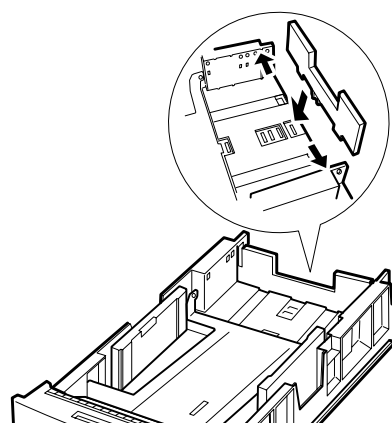
Refer to the illustration for the parts you adjust when changing the size of the tray.



2. **Change the setting of the paper size indicator.** Lift the right end of the indicator and slide it to the desired position, that is, adjust the triangle mark to A4, A5, LTR, or EXE engraved on the tray.

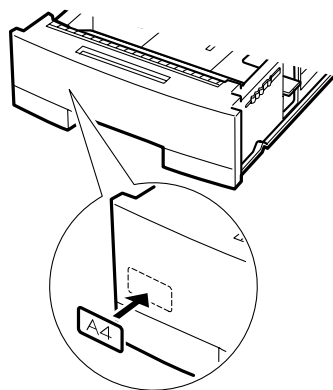


3. **Remove the rear paper guide from the tray.** Push the two catches inward to release the pins from the holes and remove the rear paper guide from the tray.



4. **Attach the rear paper guide to the correct position.** Refer to the label or engraving on the tray to locate the holes of the desired paper size.

Push the two catches inward to put the three projections into the bottom holes then the two pins into the side holes.



5. **Adhere the correct paper size label.**
6. **Load paper and check that the paper fits the tray.** Adjust the both side guides to the width of paper.
7. **Return the paper tray.** Slide the tray back into the printer.

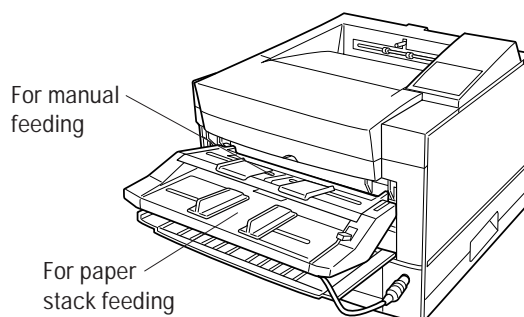


**Notice:**

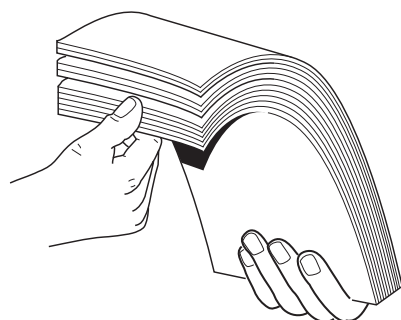
Select the correct paper size on the print menu of your application program, or a paper mismatch error will occur.

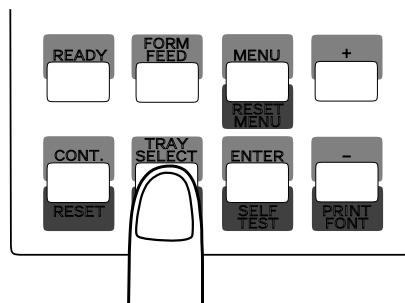
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### Using the Optional Multi-function Feeder



1. **Adjust the left and right paper guides.** The guides are separately provided for the manual feed path and the paper stack path.
2. **Fan the paper stack.** When loading paper, be sure to fan the paper stack to prevent sheets from sticking together.





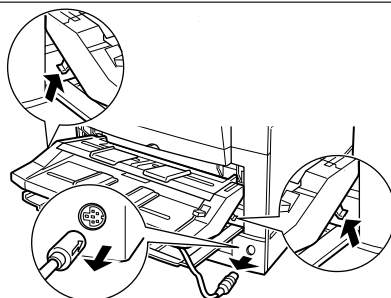
3. Set the physical paper size of the MFF. Use the MFF paper size menu to select the size of paper loaded in the MFF. See the early section in this chapter.

To remove the multi-function feeder, follow these steps:

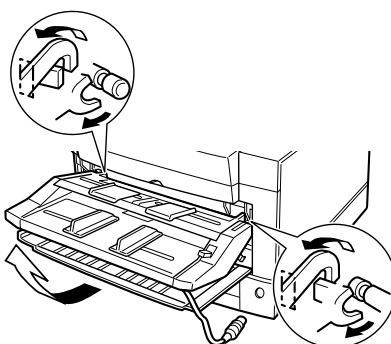


**Notice:**

Be sure that the printer is turned off before installing or removing the multi-function feeder.



1. Disconnect the feeder cable and push the two levers at the bottom of the feeder upwards to unlock the two hooks.



2. Then, lift the feeder aslant toward you to remove it.

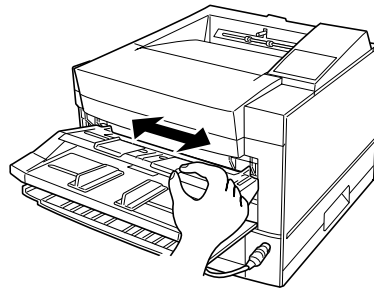
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## Feeding Paper Manually

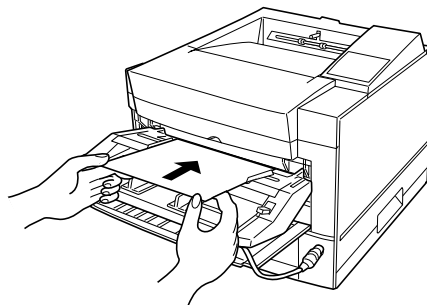
The multi-function of this printer has a slot that allows you to feed sheets manually one by one. Use the manual feed slot to print a document on a different type of paper without unloading your regular paper from the paper tray. You also use manual feed for printing envelopes, overhead transparencies, and labels.

You can also use the manual feed slot built in the printer. The procedure is the same.

To use the manual feed slot, first select MANUALFEED ON using the tray select mode of the control panel. Next, start your software program to print a file. Then follow these steps:



1. Adjust the paper guides. Position the left and right upper guides to the width of the sheet. (Lower two guides are for paper stack.)



2. Place the sheet with print side face up. When the printer is ready to print, it displays the message *Insert size* to prompt you to prepare a sheet of paper. Insert the sheet until it is stopped by the feed rollers. Insufficient insertion prevents paper from being fed or causes skewed feeding.

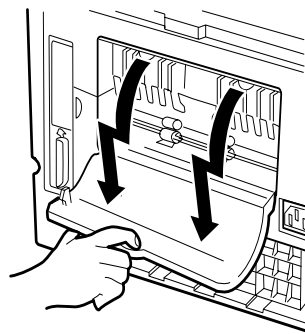
Release the paper once it begins to feed automatically. If your file has additional pages, the printer prompts you for another sheet.

---

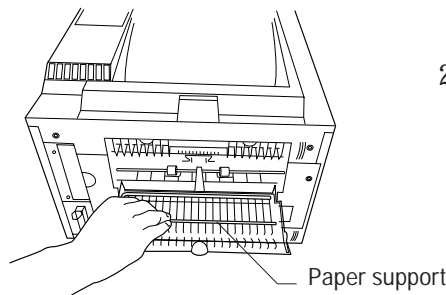
## Setting Up the Rear Stacker

This printer has a rear stacker that allows you to eject sheets straight out the back to minimize curl. Use the rear stacker to print envelopes, overhead transparencies, and labels. For the rear stacker of an optional duplex unit, refer to its manual.

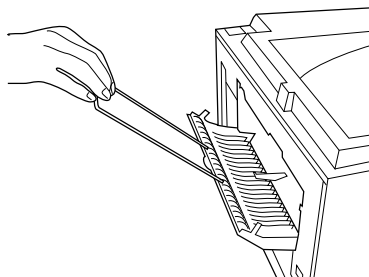
To use the rear stacker, follow these steps:



1. **Open the rear stacker.** Pull the projections at the top of the stacker.



2. **Remove the paper support from inside the stacker.**



3. **Set the paper support in position.** Insert the two ends of the paper support into the mounting grooves of the rear stacker.

---

## **Printing on Nonstandard Size Paper and on Envelopes**

Most of the control over printing on nonstandard size paper must come from your software program. Programs handle page size specifications in many different ways.

This section provides tips on feeding and using non standard paper with your printer.

### **Considerations on Paper Size**

The following considerations apply:

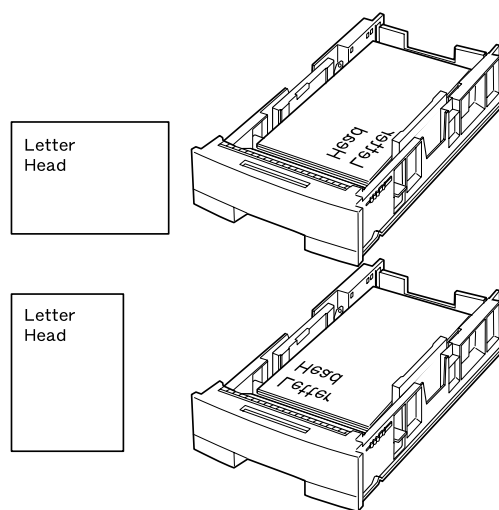
- For envelopes and other nonstandard paper sizes, use the manual feed slot.
- Using the control panel, select a paper size that is equal to or larger than the physical size of the nonstandard size paper. Otherwise, part of the printed image may be cut off.

Selecting a paper size larger than the physical paper may result in data running off the edges of the paper. This can affect print quality and shorten the life of the print unit. To avoid this problem, adjust the page setup in your program so the print data falls within the limits of the physical page and center the paper in the manual feed slot.

---

## Page Orientation

Figure 2-4 illustrates the two orientations and shows the relationship between the loaded paper and the resulting printout. This relationship is important if you want to print on letterhead. In portrait orientation, place the letterhead toward you and face down in the paper tray. In landscape orientation, place the letterhead against the right frame of the tray and face down.



*Figure 2-4 Portrait and landscape orientation*

When using the manual feed slot, place the paper with its letterhead facing up. In portrait orientation, insert the paper with its letterhead away from you. In landscape orientation, insert the paper with its letterhead on the right hand side.

Some software programs allow you to print both portrait and landscape information on a single page. The function that allows you to do this is usually called something like “text rotation.” Consult your software documentation for information.



## Enhancing and Customizing the Printer

This chapter explains the following ways to enhance or customize your printer:

- Add RAM up to a total of 67 megabytes.
- Expand the fonts available from the printer.
- Add an additional interface.
- Add a different size of paper tray.
- Add a paper feeder as the second paper source.
- Add a duplex unit as the two-sided printing mechanism.

You can order these options separately. Contact your dealer for information on the options that are available.

The following gives you brief information and installation instructions for each option.



---

**Notice:**

Be sure that the printer is turned off before installing an option.

Do not touch any connector contacts to avoid possible electrostatic damage to the printer.

---

### Adding RAM

You may need to expand RAM to process more data for either of the following reasons:

- You commonly download several fonts when printing a job
- You print files with complex graphics

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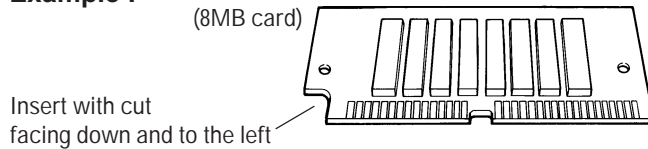
There are two memory expansion slots available. The expansion card can have so called SIMMs (up to two times 32 MB). Together with the controller's board fixed memory of 3MB, these expansion options offer a range of RAM from 3 (no SIMM installed) to 67 MB (both SIMM slots equipped with 32 MB).



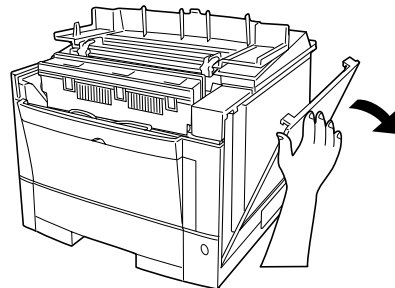
**Notice:**

The DIGITAL Laser Printer LN15P is equipped with one 8 MB SIMM installed. The DIGITAL Laser Printer LN15N-A and LN15N-B are both equipped with two 8 MB SIMMs installed.

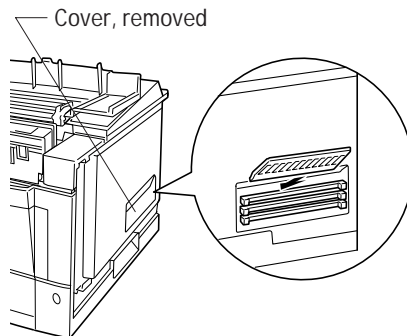
**Example :**



To install the RAM card, first make sure the printer is turned off and follow these steps:



1. Open the upper door and right side cover of the printer. You will see a small cover on the metal plate. Remove the fastening screw and the cover. You can now see three connectors (upper two *ivory* ones for RAM cards).

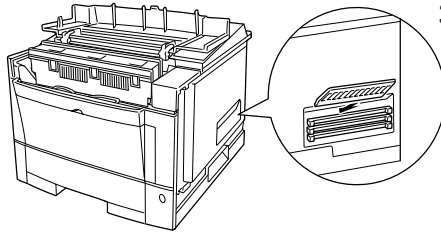


2. **Orient the RAM card.** Hold the card with the cut corner down and facing left and insert the card aslant into connector.



**Notice:**

Do not touch any connector contacts to avoid possible electrostatic damage to the printer.



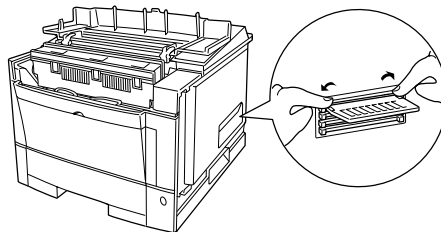
3. Install the RAM card. Push its top edge downwards so that holes of the card align with locating pins of the connector and the card is secured by retaining clips.



**Important:**

When installing two RAM cards, first install the lower one, and then the upper one.

Turn the power on. If necessary, change buffer memory assignment (page protect or jam recovery) using the control panel.



To remove an unsealed RAM card push out the retaining clips. When the card slants outwards pull the card to remove.

---

## Installing an Interface Expansion Board

The printer's standard interface is parallel. The available optional interfaces are serial, LocalTalk, and Ethernet. If your computer cannot use a parallel port for your printer or the location of your printer is distant from the computer, you can use the serial port, LocalTalk port, or Ethernet port of the computer to connect your printer. The optional serial interface (RS-232C/422A) board, LocalTalk board, and Ethernet board are suited for these purposes. Only one interface expansion board can be fitted at a time.

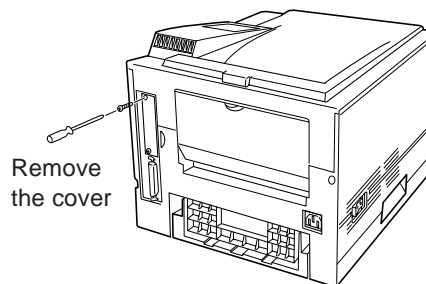


### Notice:

The DIGITAL Laser Printer LN15P is equipped with a Parallel interface only. The interface slot is available for an optional interface. The DIGITAL Laser Printer LN15N-A is equipped with a 10-Base-2 Ethernet interface installed and the DIGITAL Laser Printer LN15N-B is equipped with a 10-Base-T Ethernet interface.

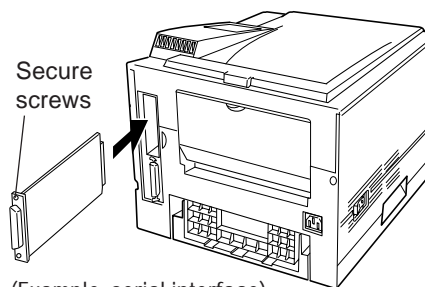
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## Installing an Interface Board



Remove the cover

1. To install an interface board, first make sure the printer is turned off. Remove the interface board slot cover from the back right of the printer.



Secure screws

(Example: serial interface)

2. Hold the board with the parts mounting side left. Slide the board into the empty interface slot using the guides, and push it until it stops. Secure the board by the two screws supplied with it.

---

## Connecting to the Serial Port

Connecting to the serial port involves the following tasks:

- Connect the interface cable to the printer and your computer.
- Print out the status report to check the serial parameter default settings.

## Connecting the Serial Interface Cable

To connect to the serial interface port, you need a cable correctly wired for this printer and your computer. The cable must also have the proper connectors. Your dealer or technical support person can supply you with the proper cable.

The serial interface of this printer requires a null-modem cable with a male DB25 connector at the printer side. Refer to your computer documentation for the type of connector required by its serial port.



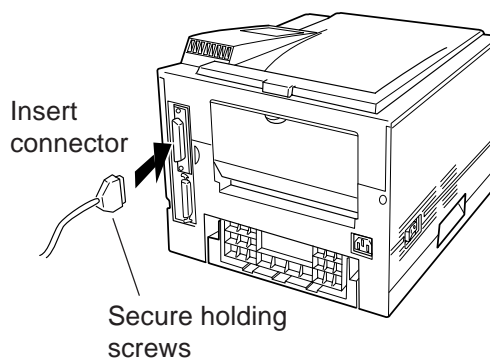
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### Notice:

Be sure that the printer is turned off before connecting the interface cable.

Do not touch any connector contacts to avoid possible electrostatic damage to the printer.

---



To make the connection, plug the cable connector into the serial interface port at the back right of the printer. Secure the connector by tightening the screws in the connector hood. Plug the other connector into your computer's serial port. Consult your computer documentation if you need help.

---

## Selecting the Serial Interface

The printer's standard interface is parallel. When the serial interface board is installed, the printer automatically detects that the computer is using the serial interface.

## Verifying Serial Parameter Settings

Next, you must make sure the serial parameter settings are the same between the computer and the printer. Consult your computer and software documentation to determine the settings your computer uses. Then compare these to the printer's settings in the following table.

Item	Parameter setting (default)
Baud rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow control	DTR HI
Printer port	COM1

---

If the settings match, the installation is complete. If the interface parameters of the printer and the computer do not match, the message display indicates COMM.ERROR. The printer may not respond at all or it may print wrong characters. Change the settings in one of the two ways:

- Change options of the serial menu in setup mode.
- Set permanent defaults in your computer to match the printer's defaults.



---

**Important:**

For information on DOS files and commands, consult your DOS manual or the manual supplied with your computer.

---

Note that you may also be able to specify serial parameters through your software programs. Some software programs allow you to specify the printer port and serial settings from within the program. Consult the documentation supplied with the software.

### **Connecting to the LocalTalk Port**

To connect to the LocalTalk port, simply connect the interface cable between the printer and your computer.

### **Connecting the LocalTalk Interface Cable**

To connect to the LocalTalk interface port, you need a cable correctly wired for this printer and your computer. The cable must also have the proper connectors. Your dealer or technical support person can supply you with the proper cable.

For example, the LocalTalk Locking Connector Kit—DIN-8 (Apple product) is available. Also refer to your computer documentation for the type of connector required by its LocalTalk port.

**Notice:**

Be sure that the printer is turned off before connecting the interface cable.

Do not touch any connector contacts to avoid possible electrostatic damage to the printer.

---

To make the connection, firmly plug the cable connector into the LocalTalk interface port on the back right of the printer. Plug the other connector into your computer's LocalTalk port. Consult your computer documentation if you need help.

**Selecting the LocalTalk Interface**

The printer's standard interface is parallel. While the LocalTalk interface board is installed, the printer automatically detects that the computer is using the LocalTalk interface.

**LocalTalk Specifications**

The table below shows the physical specifications of the LocalTalk interface.

Specification	Description
The span of a single LocalTalk network	Max. 300 meters
Number of devices on a single LocalTalk network	Max. 32 devices
Speed of data transmission	230. 4K bits/second
Protocol	8 bit packet



---

## Connecting to the Ethernet Port

### Selecting the Ethernet Interface

The printer's standard interface is parallel. While the Ethernet interface board is installed, the printer automatically detects that the computer is using the Ethernet interface. For installation instructions, please refer to the DIGITAL Laser Printer LN15 Ethernet User Manual.

### Ethernet Specifications

The table below shows the physical specifications of the Ethernet interface.

Specification	Description
The span of 10BASE-2	Max. 185 meters (coaxial, bus connection)
The span of 10BASE-T	Max. 100 meters (twisted-pair, star connection)
Speed of data transmission	10M bits/second

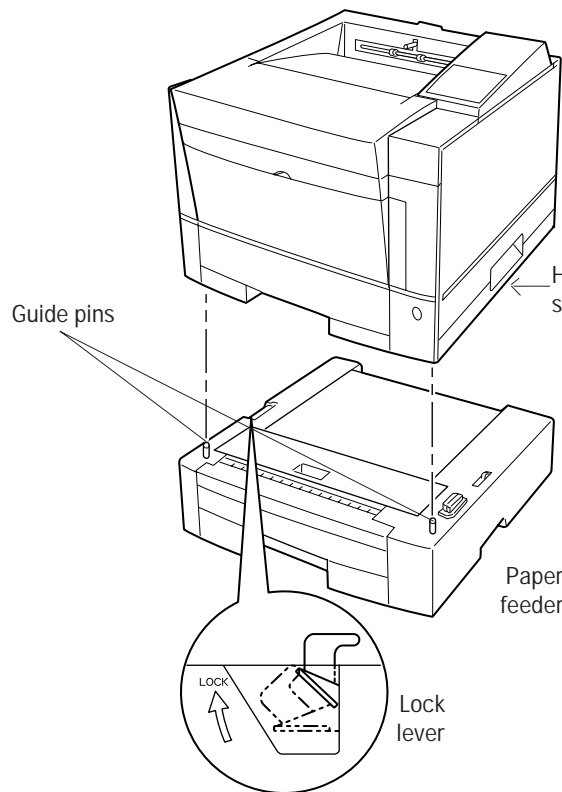
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## Adding Paper Sources

### Paper Feeder

If you switch paper sizes frequently, you may want to add a second paper source. You can easily do this by installing an optional paper feeder which consists of a base frame and a paper tray. The paper tray in the paper feeder is identified as *tray 2* and the one in the basic configuration is identified as *tray 1*. The paper types and sizes used by *tray 2* are the same as those for the standard paper tray.

To install the paper feeder, follow these steps:



1. **Turn off the printer and disconnect the power cord.**
2. **Make sure the lock lever is set to the open side.** Push down the lever at the left side of the paper feeder.

3. **Mount the printer on the paper feeder.** Grip the bottom left and right sides of the printer to lift the printer and place it on the paper feeder. When placing the printer on the paper feeder, be sure you insert the two guide pins of the paper feeder into the two positioning holes at the bottom of the printer.

4. **Set the lock lever to the lock side.** Pull up the lever.

---

#### Notice:

Be careful not to drop the printer on the paper feeder.

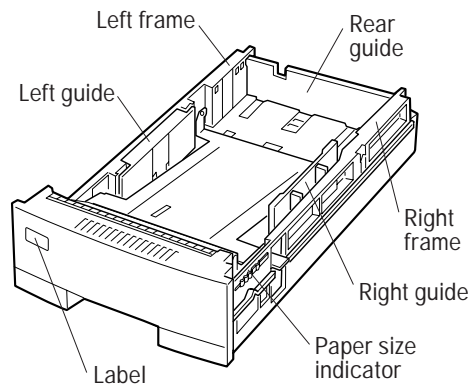
Do not touch any connector contacts to avoid possible electrostatic damage to the printer and paper feeder.

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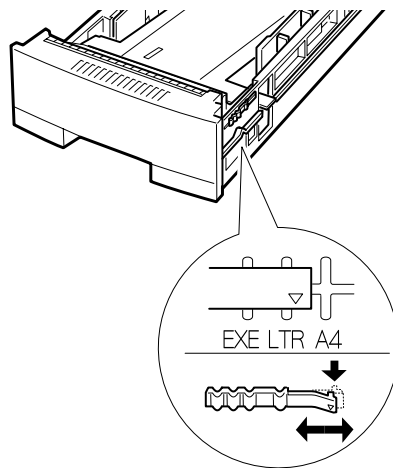
## Changing the Paper Tray Size

The paper tray can be adjusted to one of the four paper sizes: A4, A5, LTR (Letter), and EXE (Executive). To change the size, follow these steps:

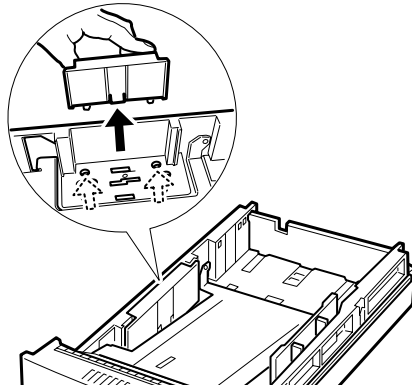


1. **Remove the paper tray from the printer.**

Refer to the illustration for the parts you adjust when changing the size of the tray.

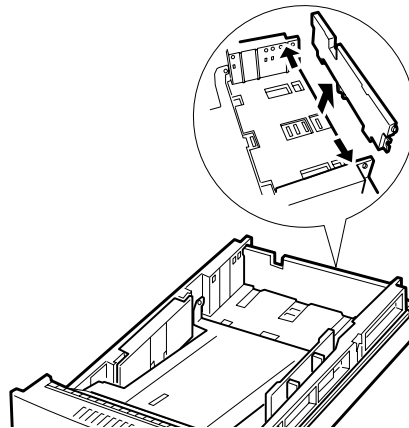


2. **Change the setting of the paper size indicator.** Lift the right end of the indicator and slide it to the desired position, that is, adjust the triangle mark to A4, A5, LTR, or EXE engraved on the tray.

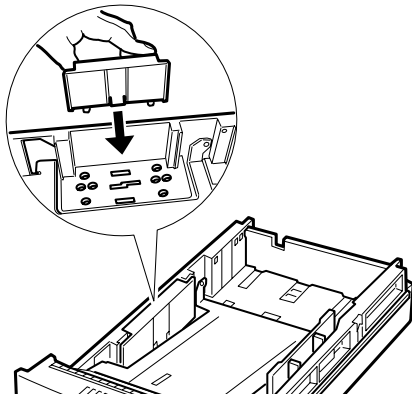


3. **Remove the three paper guides from the tray.** Unlock the guides as follows:

Left and right guides:  
Press the two catches inward.



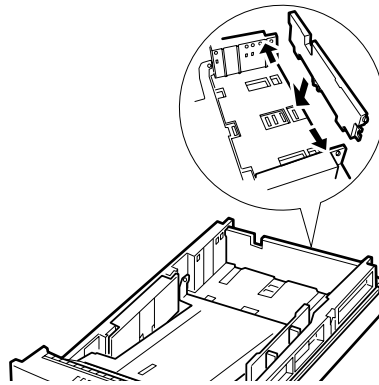
Rear guide:  
Push the end of the left or right frame outward and release the pin of the guide from the hole, then release the other pin.



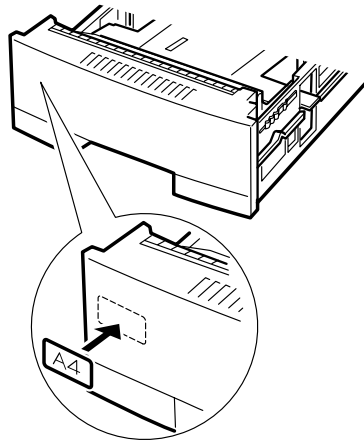
4. **Attach the paper guides to the correct positions.**

Locate the mounting holes of the desired paper size by referring to the label or engraving on the tray.

Left and right guides:  
Put the two catches into the holes.



Rear guide:  
Mount the guides in reverse  
order of the removal.



5. **Adhere the correct paper size label.**

6. **Load paper and check that the paper fits the tray.**

7. **Return the paper tray.**  
Slide the tray back into the printer.



---

**Notice:**

Select the correct paper size on the print menu of your application program, or a paper mismatch error occurs.

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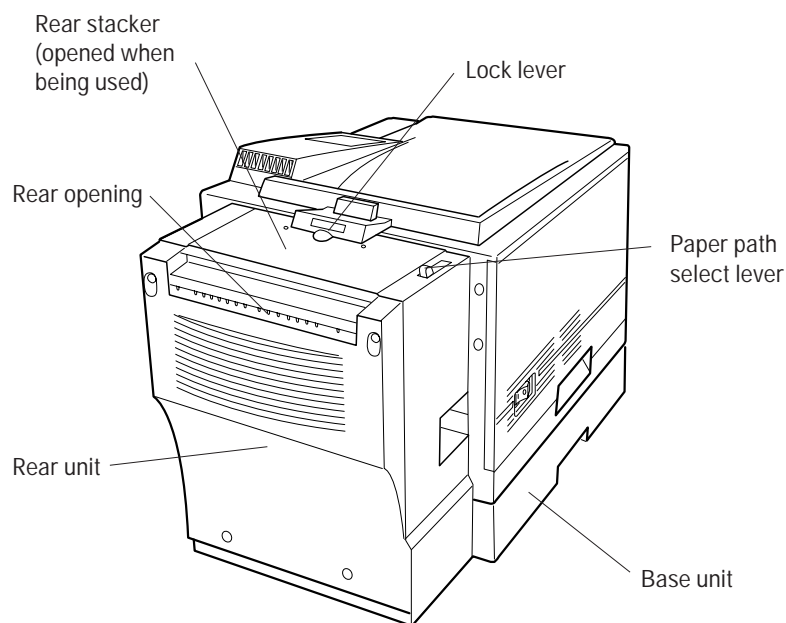
## Different Paper Tray Sizes

The printer or paper feeder is shipped with a fixed size of paper tray. For example, it is the letter size for the USA and the A4 size for Europe. You can add different sizes of paper trays as shown in the following table.

Paper size	Dimensions
Letter (US letter size)	8.5 x 11 inches
Executive	7.25 x 10.5 inches
A4 (European letter size)	210 x 297 mm
A5	148 x 210 mm

## Adding Duplex Unit

The duplex unit allows the printer to print data on both sides of a sheet of paper. It can provide an extra margin for binding as specified by software.



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To install and use the duplex unit, refer to the DIGITAL LN15X-DA Duplexing Unit User Manual.



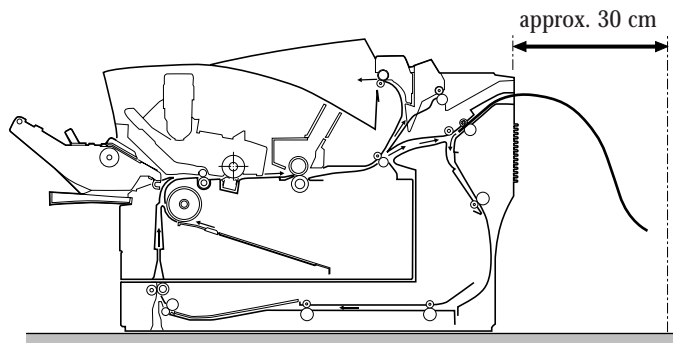
**Caution:**

To avoid possible personal injury or harm to your equipment, cooperate with another person in assembling or disassembling the printer, duplex unit, multi-function feeder, and paper feeder (if installed). Do not lift or move the printer as equipped with other units.



**Notice:**

Be sure to keep the rear opening of the duplex unit away from a wall or another equipment so as to open the rear unit for clearing paper jam or not to block the reverse operation of paper that comes out and in the opening during two-sided printing.



## Maintenance

This chapter covers preventive maintenance, periodic routine maintenance, and repacking the printer for shipment or storage.



---

**Notice:**

Before performing any maintenance, be sure that the printer is turned off.

During maintenance procedures, do not touch any connector contacts to avoid possible electrostatic damage to the printer.

When performing maintenance, do not disassemble or remove any components unless specifically directed in the procedures.

---

### Preventive Maintenance

The following guidelines can help to ensure trouble-free operation:

- To minimize paper jams, store paper under favorable conditions. Do not expose paper to high humidity or moisture, which can cause wavy edges. Do not store paper in direct sunlight or allow it to become very dry, which can impart an electrostatic charge. Store paper flat, not on the edge.
- If you must open the printer's upper door for more than three minutes, remove the print unit with the toner cartridge mounted and store it in a dark place. Exposure of the photoconductor drum to light for more than three minutes can cause damage.
- Make sure small objects such as paper clips do not drop into the printer.
- When the message display indicates REPLACE PARTS, print a status report or display a <CLEAR WARNING> message in menu mode to confirm the cause of the message.
- Replace the toner cartridge as soon as possible to prevent any dust from entering the print unit from the opening.
- Shake the toner cartridge before installation.



---

## Periodic Routine Maintenance

Table 4-1 lists the printer's periodic routine maintenance and indicates when this maintenance should be performed.

*Table 4-1 Periodic Routine Maintenance*

Maintenance	When to perform
Replace toner cartridge and cleaner pad	When the message display indicates TONER LOW or TONER EMPTY, or when printing is too light
Replace print unit	When print quality is bad, even after replacing or cleaning other parts  When the message display indicates <CLEAR WARNING> PRINT UNIT (Replace the print unit at the next replacement of the toner bottle)
Clean corona wire	When replacing the print unit or toner, when printout shows vertical white lines, or when printing is too light
Clean paper path	When replacing the print unit or toner, after clearing a paper jam, or when printouts show toner smudging
Clean precharger wire	When print density is uneven or when printing shows black vertical lines

### Replacing the Toner Cartridge and Cleaner Pad

The toner cartridge and cleaner pad are packaged separately and must be replaced at the same time.

The toner cartridge is designed to last approximately 5,000 printed pages under the condition of 5% coverage on A4 paper or last about one year after unpacking. The first toner cartridge may print slightly fewer pages.

Replace the toner cartridge and the cleaner pad when the message display indicates TONER LOW or TONER EMPTY or when printing becomes lighter than you find satisfactory. After the toner low condition occurs,

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you can only print about 20 more pages. Under the toner empty condition (no toner), the printer will not work.



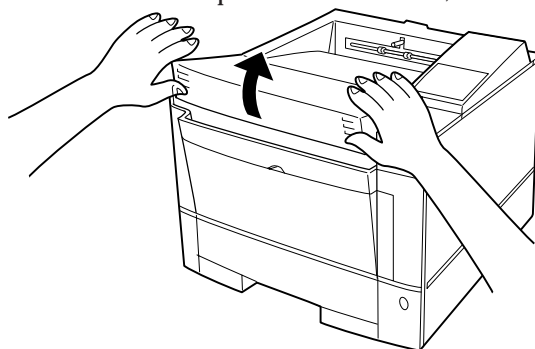
**Important:**

Whenever you replace the toner cartridge, clean the corona wire and the precharger wire to prevent a degradation in print quality.

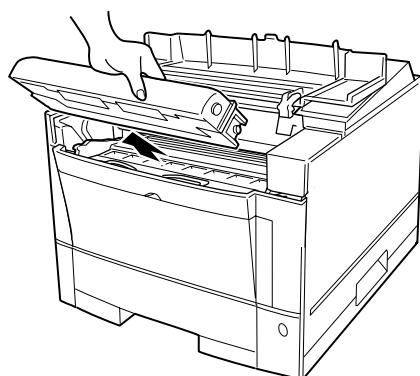
You can continue to print after the toner low status if the print quality is still satisfactory. However, you must at least prepare a new toner cartridge.

---

To replace the toner bottle, follow these steps:



1. Open the upper door.
2. Tap the toner cartridge. Tap the toner case to drop any remaining toner from the toner cartridge into print unit. This avoids the remaining toner from being spilt inside the printer during replacement.



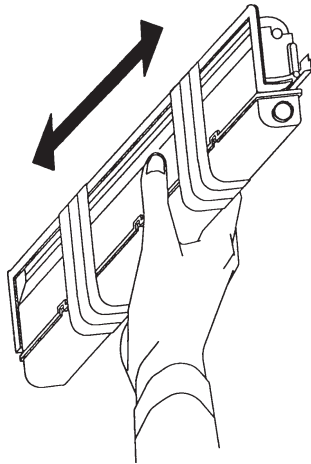
3. Unlock and remove the old toner cartridge. Pull the top of the toner cartridge toward you to swing the cartridge from the upright position to the removable position. Gently remove the cartridge. If necessary, clean toner around the toner hopper entry of the print unit.



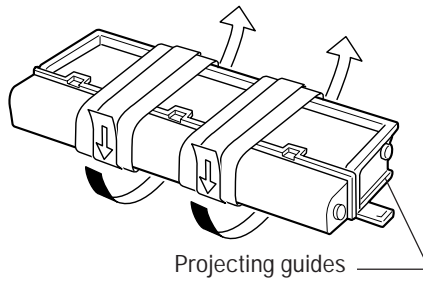
**Notice:**

Be careful not to allow dust or foreign matter into the toner hopper.

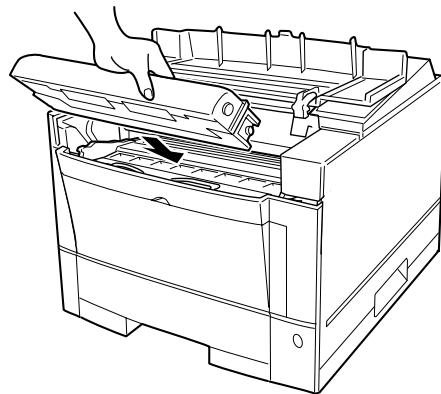
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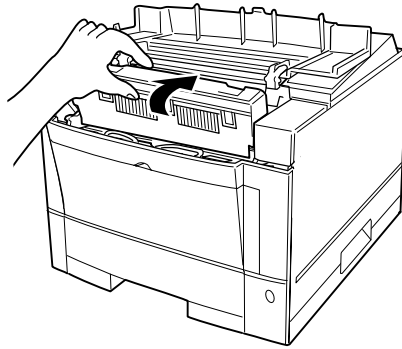
4. Remove the toner cartridge from its envelope.
5. Fully shake the toner cartridge.



6. Remove the plastic seal from the toner cartridge. Pull off the seal as gently as possible to avoid spilling toner. Handle the seal carefully to prevent staining your handles or clothes.



7. Install the toner cartridge. Slide both projecting guides of the toner cartridge along the grooves of the print unit.



8. Lock the toner cartridge. Push the toner cartridge backward until it clicks into place.
9. Close the upper door.

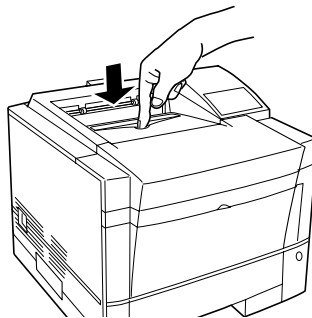


**Notice:**

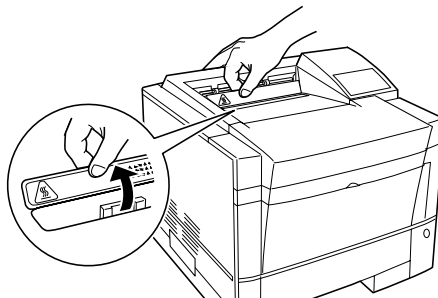
Do not remove the toner cartridge from the print unit until all the toner has been used in order to avoid scattering toner inside the printer.

**The cleaning pad should be replaced every time a new cartridge is replaced. Failure to do this will lead to deterioration in print quality.**

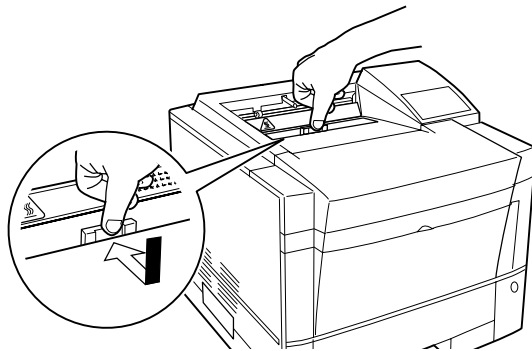
To replace the cleaner pad, follow these steps:



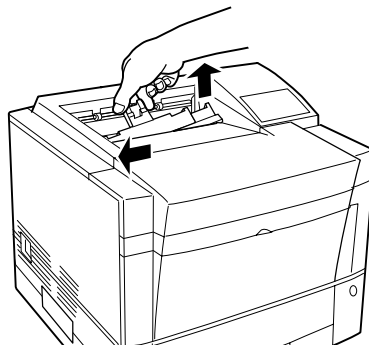
1. Open the cover. Push the engraved portion on the stacker to unlock the cover.



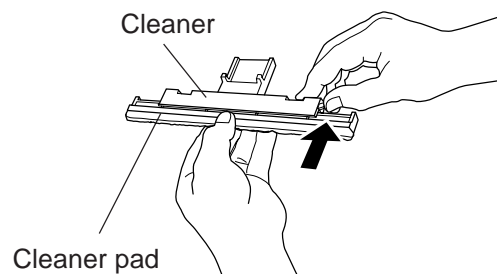
2. Lift the front of the cover to open the cover.



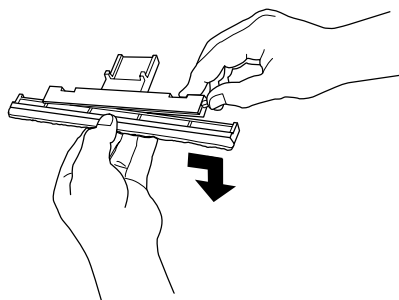
3. Unlock the cleaner. Push down the handle of the cleaner and push forward it to unlock the cleaner.



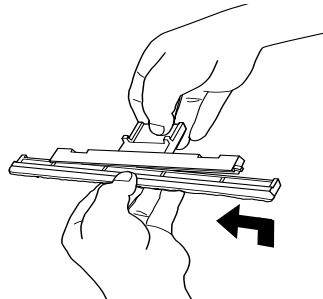
4. Remove the cleaner. Slide the cleaner to the left and take its right end out of the opening, and then the left end.



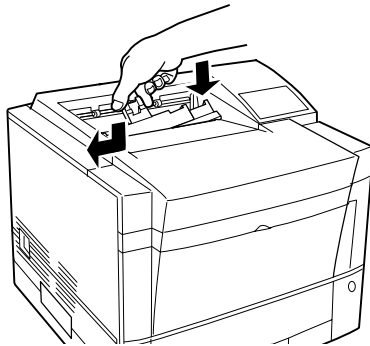
5. Remove the cleaner pad from the cleaner. Push the lock lever to unlock the cleaner pad.



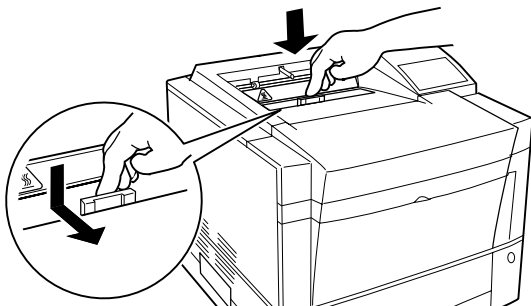
6. Slide the cleaner pad to the right and separate it from the cleaner.



7. Mount a new cleaner pad on the cleaner. Put the new cleaner pad on the cleaner and slide the cleaner pad into the locked position.



8. Install the cleaner in the printer. Grasp the handle of the cleaner and put the left end of the cleaner into the opening, and then the right end.



9. Lock the cleaner. Push down the top of the handle and pull it towards you to lock the cleaner.

10. Close the cover.

### Replacing the Print Unit and Internal Cleaning

The print unit life is designed to last about 30,000 pages of 5% coverage continuous printing on A4 paper or about one year after unpacking, whichever comes first. The print unit life depends on print coverage, paper type, and operating and/or storage conditions. The print unit life ends when background smudge, ghosting, or dropouts occurs. Avoid

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unnecessary high coverage printing to maintain the print unit performance.

For the print unit life, this printer indicates the near end of life only. The message begins displaying 'REPLACE PARTS', when the print unit can still print 3,000 to 5,000 more pages. Prepare a new print unit if you notice this indication.

Even if the print unit reaches its near-end-of-life, use the print unit until its toner runs out (the message display indicates TONER EMPTY) for economy. After replacing the print unit, be sure to reset the print unit counter by using the control panel. For control panel operations, see the end of this section.

Replacing the print unit involves replacing the toner cartridge. It is better to perform the following set of procedures when replacing the print unit:

- Remove the old print unit. (You cannot remove it from the printer after detaching the toner cartridge from it.)
- Clean the paper path.
- Clean the corona wire.
- Install the new print unit, then the new toner cartridge.

The following sections describe these procedures in the order listed.

### **Removing the Print Unit**

Perform this procedure in the following cases:

- To replace the print unit
- To store the print unit in a clean, dark place when working inside the printer for more than three minutes



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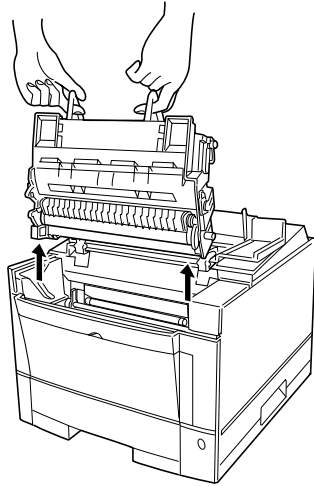
**Caution:**

For safety, turn off the printer and disconnect the power cord before beginning.

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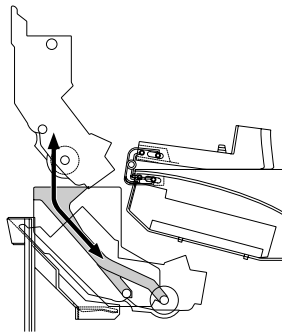
To remove the print unit, follow these steps:



1. Open the upper door.
2. Raise the green handles of the print unit.
3. Remove the print unit. Pull the green handles at a 45° angle toward the front of the printer. This will disengage the print unit, allowing easy removal.

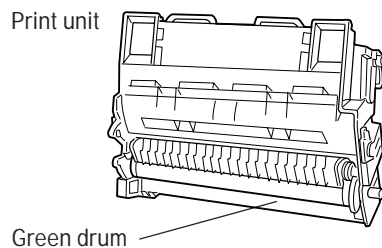
When the print unit begins to move, gently lift it up and out.

If you want to re-use the print unit, be careful not to scratch the green surface of the drum against the printer or its parts.



**Notice:**

If you want to re-use the print unit, do not touch or scratch the green drum surface after removing the print unit.



To avoid spilling toner, be sure to keep the print unit upright and keep the toner cartridge mounted on the print unit.



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## Cleaning the Paper Path

Clean the paper path:

- When replacing the print unit
- After clearing a paper jam
- When printouts show toner smudging



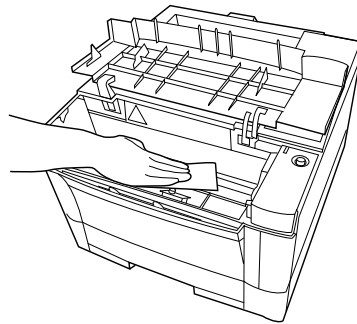
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### Notice:

If the print unit is still installed, complete this procedure quickly. You should avoid exposing the photoconductor drum to light for more than three minutes.

If you think you need more time, remove the print unit and store it in a clean, dark place. To remove the unit, see the preceding section 'Removing the Print Unit'.

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Open the upper door and remove the print unit. Be careful not to damage the green drum surface. Look for spilled toner on the inside of the printer. Use a damp cloth to remove any toner stains.

## Cleaning the Corona Wire

The corona wire is located in the metallic housing (chrome frame) on the base frame inside the printer.

Perform this procedure:

- When replacing the print unit
- When the printout shows vertical white lines or printing is too light



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### Notice:

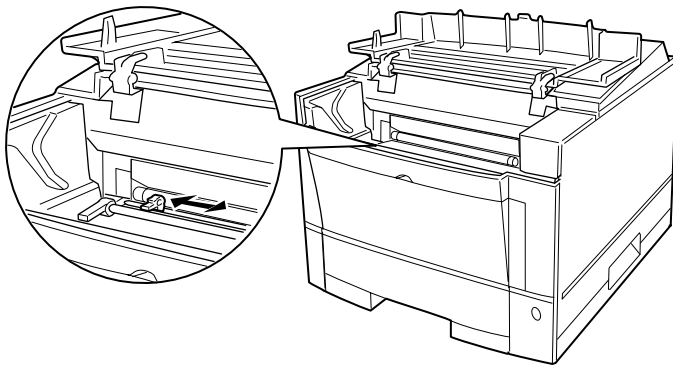
You should avoid exposing the photoconductor drum to light for more than three minutes.

Be careful not to break the corona wire.

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Use the cleaning brush supplied with the printer. This L-shaped tool has two cleaning pads: one for the corona wire and the other for the precharger wire inside the print unit. Use the pad on the shorter branch.

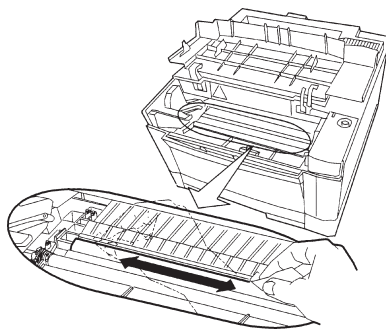


Remove the print unit and store it in a dark, level, steady place. Be careful not to damage the green drum surface. Using the tool as shown in this figure, clean the corona wire. Fit the positioning cut onto the wire housing frame and gently move the tool left and right two or three times along the length of the wire to remove any dirt or other substance. Be careful not to break or otherwise damage the wire.

After you have cleaned the printer, install the print unit and close the upper door.

### **Cleaning the Paper Guide before the Corona Wire**

Perform this procedure when printouts show small spots of toner smudging especially near the top edge of paper.



Open the upper door and remove the print unit. Be careful not to damage the green drum surface. Look for dust on the paper guide before the corona wire. Use a clean, lint free cloth to gently remove any dust from the entire surface of the paper guide.

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## Installing the New Print Unit

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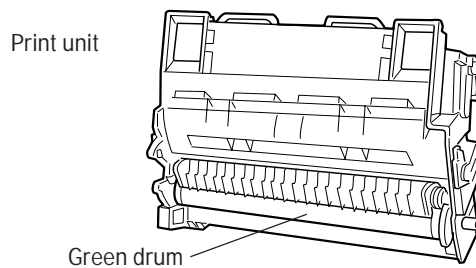
### Notice:

To avoid exposing the photoconductor drum to light or contamination, follow these guidelines:

- Do not remove the print unit from its envelope until you are ready to install it.
- Complete the procedure as quickly as possible to avoid exposing the drum to light for more than three minutes.

To avoid damaging the drum:

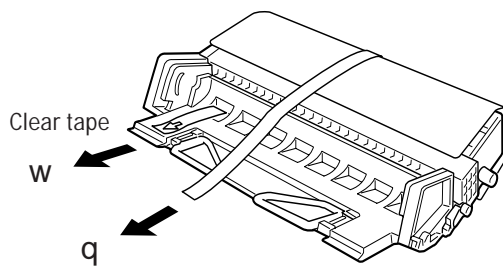
- Be sure to remove the plastic sheets after installing the print unit. Operating the printer without removing the sheets will make the print unit unusable.
- Never touch or scratch the green drum surface.



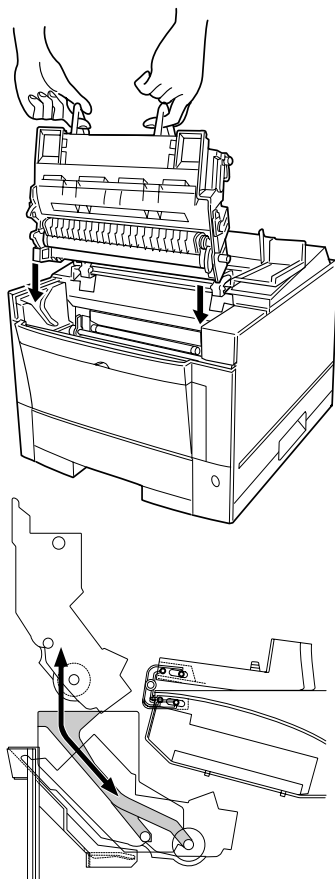
- Be careful not to allow dust or foreign matters into the toner hopper.

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To install the new print unit, follow these steps:



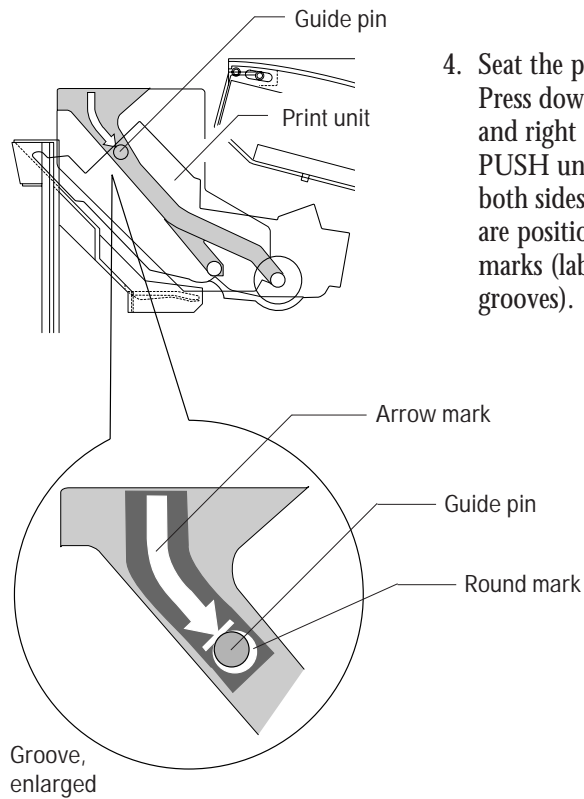
1. Remove the print unit from its envelope. Place the unit on a level, steady place.
2. Remove the protective materials from the print unit. Remove protective sheet **q**. Pull narrow clear tape **w** until its blue end is visible and remove it.



3. Lower the print unit into the printer. Grasp the print unit by its green handles with the green drum surface facing you.

First, slide the print unit straight down the ends of the drum shaft along the grooves on the sides of the printer. Then, slide the print unit at a 45 degree angle toward back of the printer.

**When handling the print unit, never allow its green surface to touch anything, since it can be easily scratched.**



4. Seat the print unit in place. Press down gently on the left and right portions marked PUSH until the guide pins at both sides of the print unit are positioned at the round marks (labeled in the grooves).



**Notice:**

If you do not proceed to the next step immediately, close the printer's top cover to protect the photoconductor drum from light.

After you have installed the print unit, install the toner cartridge. See 'Replacing the Toner Cartridge' described previously in this chapter.

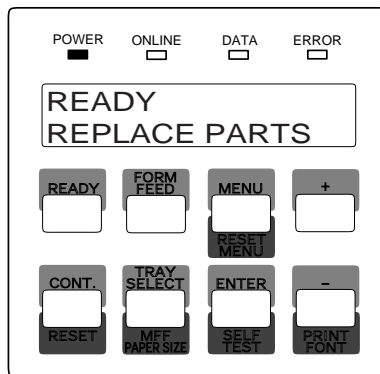
Close the printer's upper door. Press down the top cover until it clicks. Reconnect the power cord and turn on the printer.

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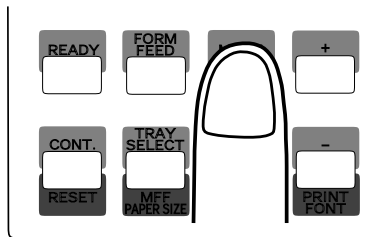
## Resetting the Print Unit Counter

Perform this operation whenever you have replaced the print unit, or the printer continues displaying the warning message REPLACE PARTS.

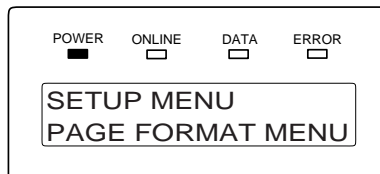
To reset the print unit counter, follow these steps:



1. **Make sure the printer is offline.** If necessary, press the **READY** button to put the printer offline. The ONLINE indicator is off with the REPLACE PARTS message displayed.



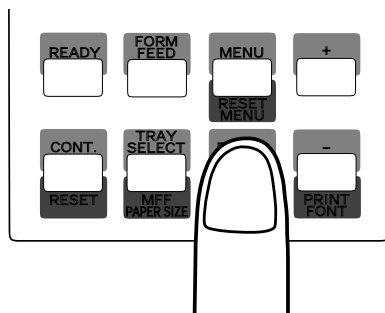
2. Press the **MENU** button to put the printer in menu mode.



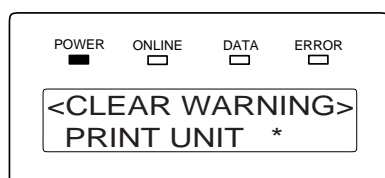
The message changes to SETUP MENU PAGE FORMAT MENU.



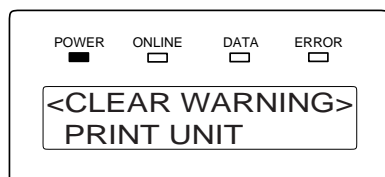
3. Press the **MENU** button repeatedly until the lower message changes to CLEAR WARNING.



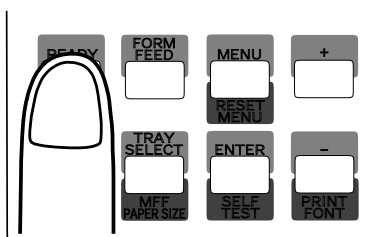
4. Press the **ENTER** button to select this function.



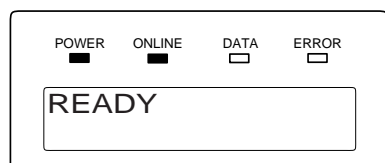
The message changes to <CLEAR WARNING> PRINT UNIT \*. The asterisk means that the print unit is expired.



5. Press the **ENTER** button again to perform the function. The asterisk disappears from the message, indicating the counter is reset.



6. Press the **READY** button to return the printer online.



The ONLINE indicator lights up without the REPLACE PARTS message.



**Important:**

After the reset operation, check the status report to make sure that the Warning Message is cleared.

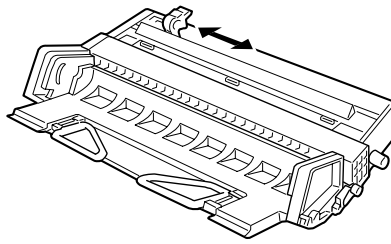
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## Cleaning the Precharger Wire

The precharger wire is on the print unit. Normally you should not need to clean this wire. However, the following conditions may indicate that the wire needs cleaning:

- Your printed pages have dark vertical lines, or the print density is uneven.
- Cleaning the corona wire does not solve the problem.

Use the cleaning brush supplied with the printer. This L-shaped tool has two cleaning pads: one for the precharger wire and the other for the corona wire inside the printer. Use the pad on the longer branch. To clean the precharger wire, follow these steps:



1. Open the upper door of the printer.
2. Remove the print unit from the printer. Place the unit on a level, steady place.
3. Clean the wire. To clean the wire, position the tool as shown in the figure, then gently slide it left and right two or three times along the length of the wire to remove any toner or other particles. Be careful not to break or otherwise damage the wire.



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### Notice:

- Avoid exposing the drum to light for more than three minutes.
  - Do not touch or scratch the drum surface.
-



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## **Repacking the Printer**

If you need to ship your printer or store it for an extended time, protect it by packing it in its original carton.

Store the print unit separately from the printer. Do not remove the toner cartridge from the print unit. Cover the photoconductive drum to avoid exposing the drum to light, wrap the print unit and toner cartridge with a protective material, and store it in a safe place.

To protect the printer from moisture, place it in the plastic bag it was shipped in. Seal the bag with tape.

Place the printer in its carton using the original packing materials to brace and protect the printer.

## Solving Problems

Although this printer is designed to be highly reliable, you may occasionally experience problems. The most common problems are paper jamming and poor print quality. This chapter helps you to identify the cause of the problem and suggests solutions.

This chapter is divided into five sections:

- *Clearing Paper Jams.* This section explains how to locate and clear paper jams.
- *Operational Problems.* Start here if the printer doesn't function properly. You may save yourself a service call.
- *Print Quality Problems.* Check here if the printed pages don't look as they should.
- *Error Indications.* The printer has self-diagnostic tests for a variety of hardware and interface problems. If a test indicates a problem, the printer displays it on the control panel. This section explains these error conditions.
- *Printer Status Indications.* These statuses are not error conditions. Most of them require no action by you. However, explanations are included here for your information.



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**Notice:**

During solution of a problem, do not touch any connector contacts to avoid possible electrostatic damage to the printer.

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### Clearing Paper Jams

The printer has sensors to detect paper jams. If a jam occurs, the printer displays it on the message display. The message is PAPER JAM $n$  ( $n$ : 0 to 4 indicating the jam location). Because the paper path is short and simple, you should have no problem locating the jam.

---

To clear a paper jam, follow these steps:



**Notice:**

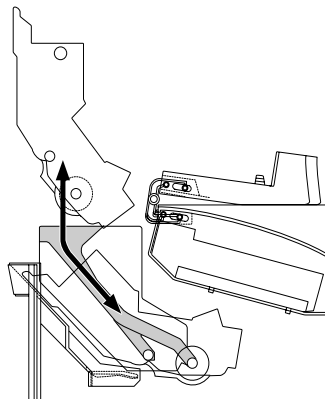
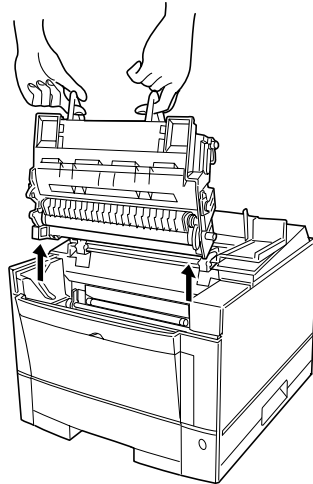
Clear paper jams quickly to avoid problems with the fuser unit.

Do not touch or scratch the green drum surface when clearing the paper jam.

Be careful not to expose the drum to light for more than three minutes.

Take special care when removing a jam from the transfer corona unit to avoid damage to the corona wire.

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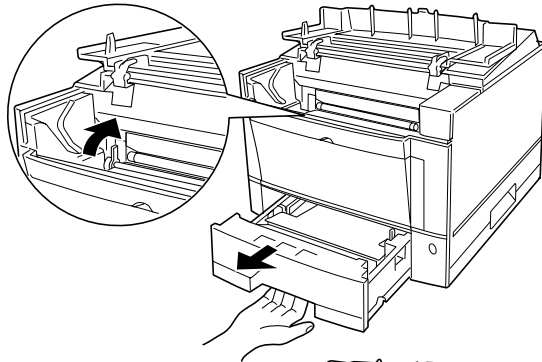


1. **Check the error message PAPER JAM $n$ .**  $n$  indicates the position where the sheet has jammed. Follow the instructions shown below after step 3.

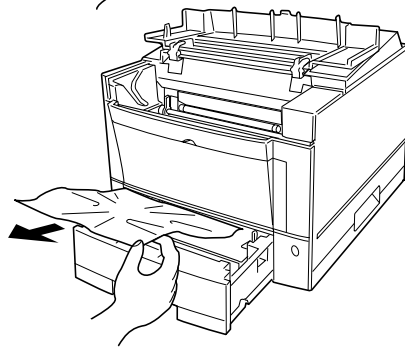
- $n = 0$  or 1, go to step 4a.
- $n = 2$ , go to step 4b.
- $n = 3$ , go to step 4c.
- $n = 4$ , go to step 4d.

$n = 4$  appears when your printer is equipped with an optional duplex unit.

2. **Open the upper door.**
3. **Remove the print unit.**



4a. Pull out the tray and raise the left and right levers of the feed roller.



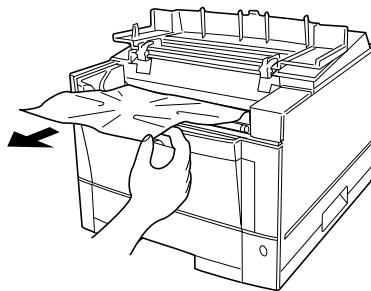
**Remove the sheet.** Pull the jammed sheet gently not so as to remain pieces of paper in the printer.

After removing the sheet, return the two levers to their original positions (pull the levers down toward you).



**Notice:**

Leaving the two levers raised causes damage to the levers when the print unit is installed and pressed down.

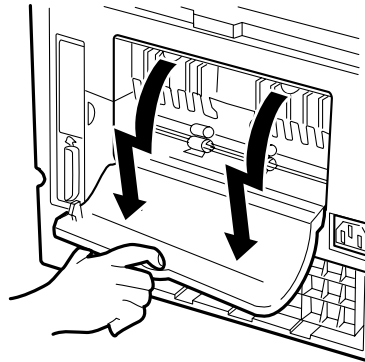


4b. Remove the sheet.

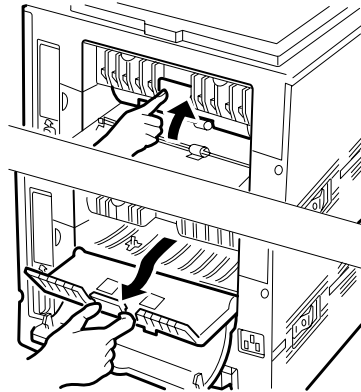


**Caution:**

Do not touch the heat roller. This hot area may burn your hand. See the label attached to the upper door.



4c. Open the rear stacker at the back of the printer.

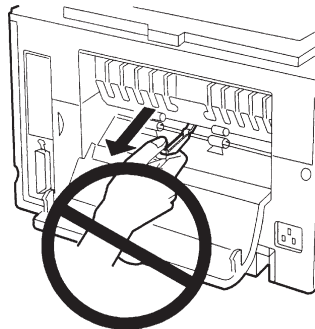


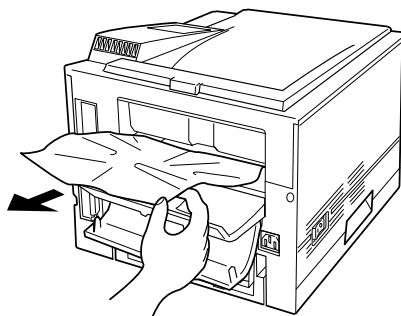
**Draw out the paper guide.**  
First push up the top edge of the paper guide and then pull out the paper guide.



**Caution:**

Do not use the lever to pull out the paper guide. The lever or the paper guide may be damaged.



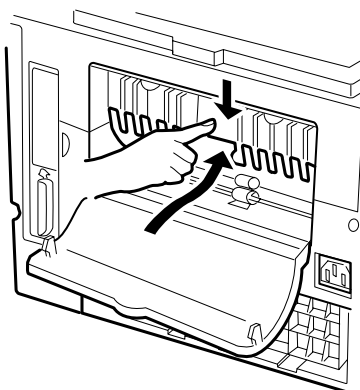


**Remove the sheet.** Pull the jammed sheet gently not so as to remain pieces of paper in the printer.



**Caution:**

Do not touch the heat roller. This hot area may burn your hand. See the label attached to the upper door.



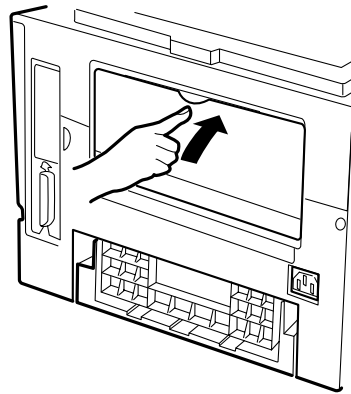
**Return the paper guide to the original position.** Raise the top edge of the paper guide and push it down to lock the paper guide in position.



**Notice:**

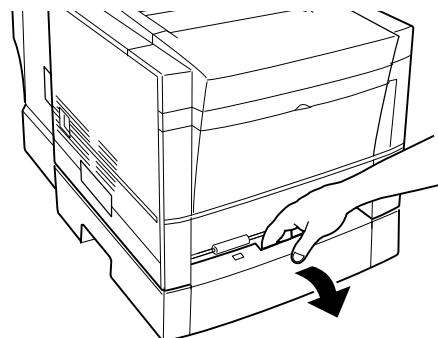
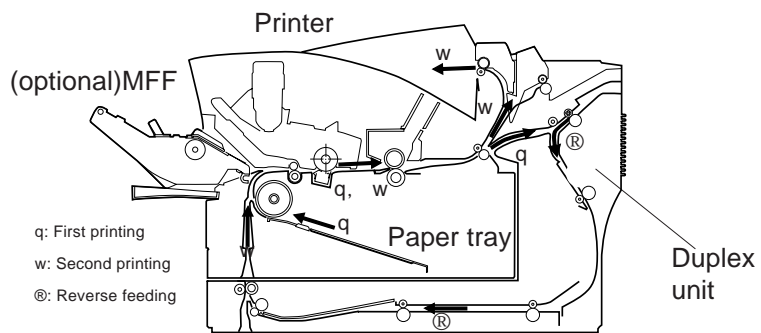
If the paper guide is not in the locked position, the printer will not work.

When your printer is equipped with an optional duplex unit, do not close the rear unit of the duplex unit with the paper guide of the printer drawn out. It may break the paper guide.



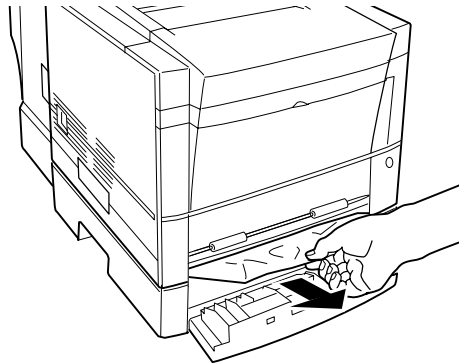
Close the rear stacker.

The following procedure is when your printer is equipped with an optional duplex unit. Be familiar with the paper paths in duplex printing.



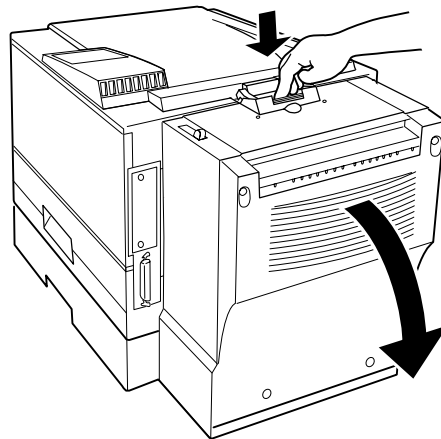
4d. Open the front door of the duplex unit. Pull out tray 1 and grasp center of the front door to unlock the door.

Pull the door towards you to open it.



**Remove the sheet.** Pull the jammed sheet gently not so as to remain pieces of paper in the printer.

After removing the sheet, close the front door.

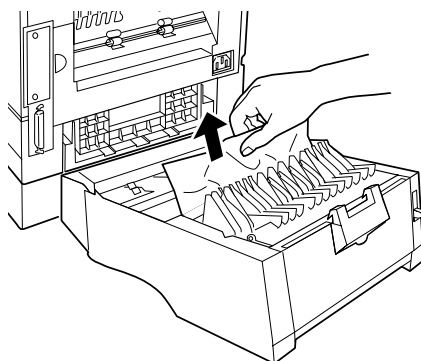


Open the rear unit of the duplex unit. Push down the lock lever of the rear unit and pull the door gently towards you.



**Notice:**

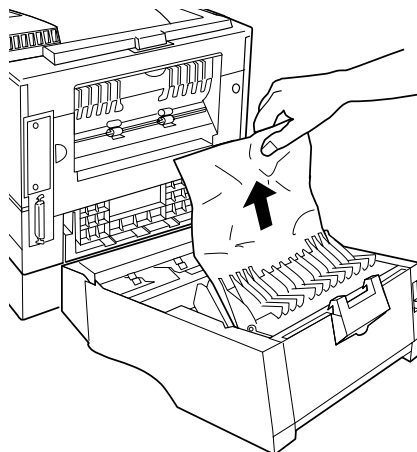
Do not open the rear unit forcibly to avoid damage to the hinge of the duplex unit.



**Remove the sheet.** Pull the jammed sheet gently not so as to remain pieces of paper in the printer or duplex unit.

If necessary, draw out the paper guide of the printer.





**Close the rear unit.** After removing the sheet, close the rear unit until its lock latches. Be sure to return the paper guide to the original position if it is drawn out.



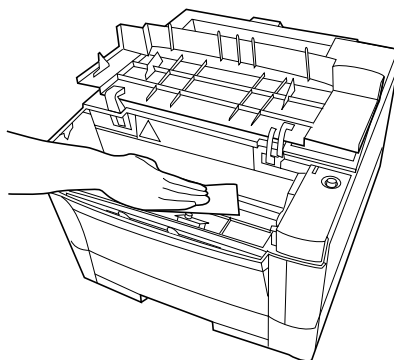
**Notice:**

Do not close the rear unit of the duplex unit with the paper guide of the printer drawn out. It may break the paper guide.

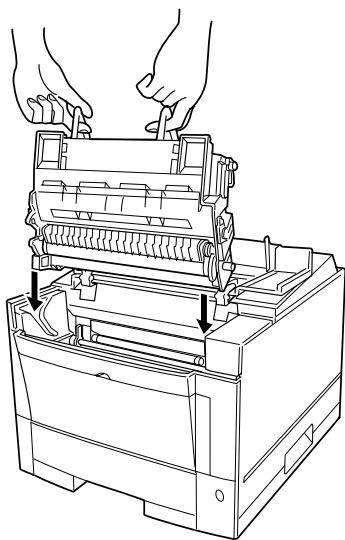


**Caution:**

Be careful that your fingers or hair is not caught between the printer and the duplex unit when closing the rear unit.

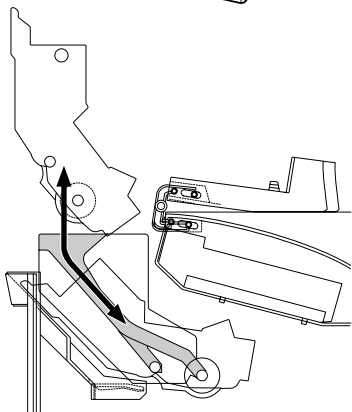


- 5. Clean the inside of the printer.** Look for spilled toner inside the printer. Clean away any toner with a damp cloth.

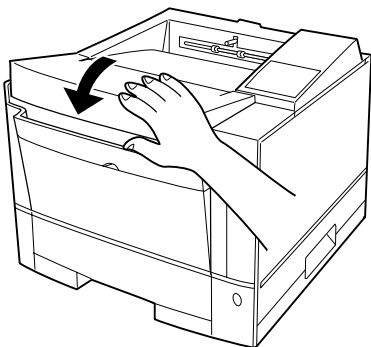


6. **Install the print unit.** Grasp the print unit by its green handles with the green drum surface facing you.

First, slide straight down the ends of the drum shaft along the grooves on the sides of the printer. Then, slide the print unit at a 45 degree angle towards the back of the printer.



Press down gently on the left and right portions marked **PUSH** until the print unit snaps into position.



7. **Close the upper door.** Before closing the door, make sure the print unit is seated properly. Press down the door until it clicks into place.

The table below contains advice on dealing with repeated paper feed problems.

Problem	Causes and solutions
Paper does not feed cleanly from paper tray	<p>Top edge of paper stack may be deformed (wavy or bent sheets). Try turning the paper stack around.</p> <p>Paper stack may not be aligned properly. Pull out the tray, straighten the paper stack against the paper guides, and re-insert the tray.</p> <p>Too many sheets in the paper stack. Make sure the stack is level with or below the limit mark on the left paper guide.</p> <p>The paper pressure plate may not be released. Pull out the tray and insert the tray again until it clicks up.</p>

## Operational Problems

Problem	Solutions
No power when you turn on the printer	Check that the power cord is plugged in at both ends and that the power outlet has power.
Printer does not initialize	Close the upper door completely. Push down (lock) the paper guide (inside the rear stacker) in position.
Printer initializes, but does not online	Install a print unit. Insert the paper tray all the way.
Printer initializes, but the settings are wrong	Use the control panel to select the desired settings.

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## Print Quality Problems

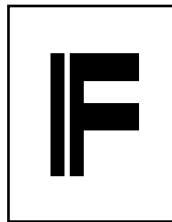
The most common cause of poor print quality is the dirty corona wire or precharger wire. A rare cause is the expired fuser unit. The figures below show the typical appearances.

### Due to dirty corona wire

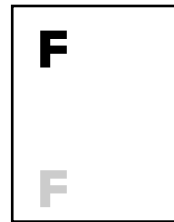
Too light



White vertical line

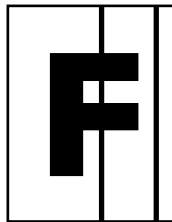


Ghost printing



### Due to dirty precharger wire

Clear black vertical line

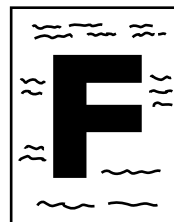


Toner stains (back)



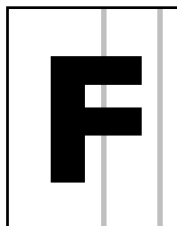
Due to both

Smudging



### Due to expired fuser unit

Blurred black vertical line



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<b>Problem</b>	<b>Solutions</b>
Printing is too light	Turn the print density dial clockwise. Check to see if your paper is wet. Remove the print unit and rock it to distribute the toner evenly. Clean the corona wire.
Printing is too dark	Turn the print density dial counter-clockwise.
Page is black	Clean the precharger wire. Replace the print unit.
Page is blank	Clean the corona wire. Replace the print unit.
Vertical density is uneven	Clean the corona wire. Clean the precharger wire.
Vertical white lines appear	Remove the print unit and rock it to distribute the toner evenly, or replace the print unit. Clean the corona wire.
Vertical clear black lines appear	Clean the precharger wire.
Vertical blurred black lines appear	Clean the precharger wire. Contact your dealer if the fuser unit is damaged.
Ghost printing	Print several pages if this problem occurs after a paper jam. Clean the corona wire. Check to see if your paper is wet. Contact your dealer if the fuser unit is damaged.

Problem	Solutions
Pages have toner stains or smudging	<p>If this problem occurs after a paper jam, print several pages.</p> <p>Clean the paper path.</p> <p>Clean the paper guide before the corona wire.</p> <p>Clean the corona wire.</p> <p>Replace the cleaner pad.</p> <p>If the fuser unit is damaged, contact your dealer.</p>
Toner insufficiently adheres to or easily comes off paper when you are printing thick or special paper.	Turn the thick paper mode on using the control panel .
Vertical lines appear in solid black printing, stains appear in the back of a page, or paper is wrinkled or curled.	Check if the thick paper mode is on by using the control panel; if the mode is on, turn it off.

## Error Indications

Errors refer to a problem or condition which requires you to take action. The printer shows errors by using the ERROR indicator and the message display of the control panel. The following table lists the error indications, explains causes, and suggests solutions.

Message	Causes and solutions
BD CYCLE ERROR	<p><b>Cause:</b> Malfunction in the laser unit</p> <p><b>Solution:</b> If the error recurs, consult your dealer for service.</p>
COMM.ERROR	<p><b>Cause:</b> Communication error</p> <p><b>Solution:</b> Press the <b>[CONT.]</b> button and select the correct settings of the serial interface using the control panel setup mode.</p>

Message	Causes and solutions
COVER OPEN	<p><b>Cause:</b> The following occurred:</p> <ul style="list-style-type: none"> <li>• Incomplete closing of upper door</li> <li>• Incomplete locking of paper guide inside the rear stacker</li> <li>• Incomplete closing of rear unit of the optional duplex unit</li> </ul> <p><b>Solution:</b> Perform the following.</p> <ul style="list-style-type: none"> <li>• Close the upper door.</li> <li>• Lock the paper guide.</li> <li>• Close the rear unit of the duplex unit.</li> </ul> <p><b>Note:</b> See <b>caution following in this table.</b></p>
FUSER FAILURE	<p><b>Cause:</b> Malfunction in the fuser unit</p> <p><b>Solution:</b> If the error recurs, consult your dealer for service.</p>
INVALID SIMM	<p><b>Cause:</b> Incorrect SIMM card (optional emulation or font) installed</p> <p><b>Solution:</b> Press the [CONT.] button.</p>
JOB TIMEOUT	<p><b>Cause:</b> PS job timeout.</p> <p><b>Solution:</b> Press the [CONT.] button.</p>
LOAD MFF <i>size</i> LOAD TRAY <i>n size</i>	<p><b>Cause:</b> Paper mismatch occurred.</p> <p><b>Solution:</b> Set the specified tray to the correct paper size specified.</p>
MANUAL TIMEOUT	<p><b>Cause:</b> Paper was not inserted into the manual feed slot in the prescribed time.</p> <p><b>Solution:</b> Press the [CONT.] button.</p>
MEMORY OVER FLOW	<p><b>Cause:</b> Memory overflow error</p> <p><b>Solution:</b> Press the [CONT.] button.</p>
MEMORY SHORTAGE	<p><b>Cause:</b> Insufficient memory</p> <p><b>Solution:</b> Add RAM board.</p>
MFF NOT INSTALL	<p><b>Cause:</b> No MFF installed</p> <p><b>Solution:</b> Install the MFF.</p>

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Message	Causes and solutions
MOTOR FAILURE <i>n</i>	<b>Cause:</b> Malfunction in the feed motor, etc. <b>Solution:</b> If the error recurs, consult your dealer for service.
NO PROCESS UNIT	<b>Cause:</b> No print unit is installed. <b>Solution:</b> Install the print unit.
OVERRUN ERROR	<b>Cause:</b> Incomplete in extracting compressed data <b>Solution:</b> Press the <input type="button" value="CONT."/> button.
PAPER JAM <i>n</i>	<b>Cause:</b> Paper jam in the specified position <b>Solution:</b> Clear the jammed paper from the following area: 0: Pick roller, 1: Entry to paper path 2: Paper path, 3: Ejection from paper path 4: Duplex unit
PS ERROR <i>mn</i>	<b>Cause:</b> A PostScript error <b>Solution:</b> If the error recurs, consult your dealer for service.
Source PAPER OUT	<b>Cause:</b> Paper out in the specified paper source <b>Solution:</b> Supply paper.
STACKER FULL	<b>Cause:</b> Paper stacker full <b>Solution:</b> Remove paper from the paper stacker.
SYSTEM ERROR <i>n</i>	<b>Cause:</b> A system error on the controller board <b>Solution:</b> If the error recurs, consult your dealer for service.
TRAY <i>n</i> MISS SET	<b>Cause:</b> Paper tray installed incorrectly <b>Solution:</b> Install the paper tray.
TONER EMPTY	<b>Cause:</b> Toner runs out. <b>Solution:</b> Replace toner cartridge and heat roller cleaner.



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## Action-required Status Indications

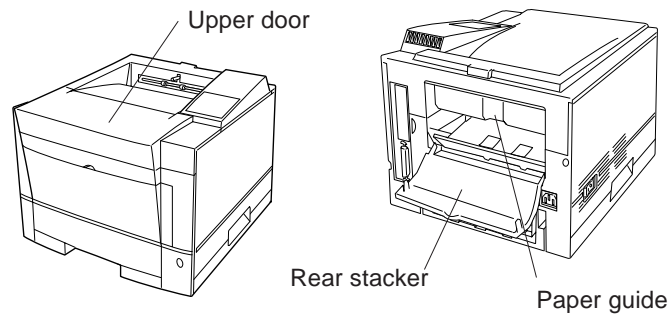
These conditions, not errors, require you to take action. The following table lists the message indications, explains causes, and suggests solutions.

Message	Causes and solutions
INSERT <i>size</i>	<b>Cause:</b> Printer is ready for paper. <b>Solution:</b> Put paper into manual feed slot.
READY TONER LOW	<b>Cause:</b> Toner runs short. <b>Solution:</b> Prepare new toner cartridge.
READY REPLACE PARTS	<b>Cause:</b> Print unit is near end. <b>Solutions:</b> Replace print unit. <b>Note:</b> Enter menu mode and select Clear Warning. After replacement, be sure to press <b>[ENTER]</b> to perform Clear Warning.



### Important:

If the upper door is not firmly closed or the paper guide is not in the locked position, the printer does not work.



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## Printer Status Indications

Printer statuses refer to conditions which generally require no action by you. The following table lists the printer statuses and explains their meaning. It does not include messages in menu mode.

Message	Meaning
FORM FEED	The printer displays this message when you press <b>FORM FEED</b> with the DATA indicator off. The printer is printing data remaining in buffer.
<<<INITIALIZE>>>	The printer is initializing. This message appears whenever you turn on the printer, close the upper door, or lock the paper guide.
MENU RESET	The printer displays this message when you press <b>RESET MENU</b> for five or more seconds. This reset returns parameter settings in the menu to their factory defaults except for interface settings as well as clears error latches, buffered data, and temporary soft fonts.
PRINT FONT	The printer displays this message when you press <b>PRINT FONT</b> for five or more seconds. The printer is printing the font report.
READY	The printer is ready to print.
RESET	The printer displays this message when you press <b>RESET</b> for five or more seconds. This reset clears error latches, buffered data, and temporary soft fonts.
SELF TEST	The printer displays this message when you press <b>SELF TEST</b> for five or more seconds. The printer is printing the status report.
WARMING UP	The printer is warming up to its operating temperature.

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## Warning Messages

This printer counts the number of the printed sheets to estimate the life of the consumables (print unit). The printer indicates the following warning message when and after the count reaches a predetermined value.

READY REPLACE PARTS

When the warning message is indicated, press the **READY** button to put the printer offline and press the **MENU** button to enter menu mode. The Clear Warning message appears, indicating the expired unit by an asterisk. When the print unit is expired, the message is:

<CLEAR WARNING> PRINT UNIT\*

However, depending on the print quality, you may not have to replace the print unit because you may still be satisfied with the print quality.

## Font Samples

This appendix provides scanned print samples of the fonts resident in this printer. Resident fonts are provided separately for two emulation modes:

- PCL mode
- PS mode

### PCL Mode

#### Bitmapped Font

Line Printer

#### Scalable Intellifonts

Courier

CG Times

**CG Times Bold**

*CG Times Ital*

***CG Times Bd.Ital***

CG Omega

**CG Omega Bold**

*CG Omega Ital*

***CG Omega Bd.Ital***

*Caronol*

**Clarendon Cond.**

Univers

**Univers Bold**

*Univers Ital*

***Univers Bd.Ital***

Univers Cond.

**Univers Bd Cond.**

*Univers Cond.Itl*

***Univers Bd Cd It***

Antique Olive

**Antique Olive Bd**

*Antique Olive It*

Garamond Antiqua

**Garamond Halbfet**

*Garamond Kursiv*

***Garmnd Krsv Hbft***

*Marigold*

Albertus

**Albertus Extr Bd**

**Courier Bold**

*Courier Italic*

***Courier Bd Ital***

Letter Gothic

**Letter Gothic Bd**

*Letter Goth Itl*

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### Scalable TrueType Fonts

Arial

**Arial Bold**

*Arial Italic*

***Arial Bold Ital***

Times New

**Times New Bold**

*Times New Italic*

***Times New Bd Itl***

Συμβολ

⌘ ⌘ ■ ⌘ ⌘ ⌘ ⌘ ⌘ ⌘ ⌘ ⌘

### PS Mode

Courier

**Courier-Bold**

***Courier-BoldOblique***

*Courier-Oblique*

Helvetica

**Helvetica-Bold**

***Helvetica-BoldOblique***

*Helvetica-Oblique*

Helvetica-Narrow

**Helvetica-Narrow-Bold**

***Helvetica-Narrow-BoldOblique***

*Helvetica-Narrow-Oblique*

Times-Roman

**Times-Bold**

***Times-BoldItalic***

*Times-Italic*

Symbol

Palatino-Roman

**Palatino-Bold**

***Palatino-BoldItalic***

*Palatino-Italic*

NewCenturySchlbk-Roman

**NewCenturySchlbk-Bold**

***NewCenturySchlbk-BoldItalic***

*NewCenturySchlbk-Italic*

AvantGarde-Book

**AvantGarde-Demi**

***AvantGarde-DemiOb***

*AvantGarde-BookOb*

Bookman-Light

**Bookman-Demi**

***Bookman-DemiItalic***

*Bookman-LightItalic*

*ZapfChancery-MediumItalic*

ZapfDingbats

## Supplies and Accessories

This appendix provides ordering information on supplies required for periodic maintenance as well as optional accessories.

Contact your dealer to order or obtain additional information about the supplies and accessories listed here.

### Supplies

Part name (order number)	Description
Toner bottle pack (LN15X-AA)	The toner pack contains two toner bottles.
Imaging unit (LN15X-AB)	The print unit consists of a photoconductor drum, a developing unit, and a drum cleaner in a single module.
Cleaning Pad (LN15X-AC)	The cleaning pad pack consists of two cleaning pads to be replaced at the same time as the toner bottles.

### Accessories

Part name (order number)	Description
Memory expansion cards (LNXXM-AE) (LNXXM-AF) (LNXXM-AG)	Allows RAM expansion by one of the following: 8 megabytes 16 megabytes 32 megabytes

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Part name (order number)	Description
Serial interface board (LN15X-SI)	RS-232C/422A
LocalTalk board (LN15X-AT)	LocalTalk
Ethernet board 10-Base-2 (LN15X-NA)	Ethernet with 10-Base-2 connector
Ethernet board 10-Base-T (LN15X-NB)	Ethernet with 10-Base-T connector
Paper feeder (LN15X-TA)	Adjustable for a different size 500 sheets (for LN15X-TA)
(LN15X-TB)	1: A4, 2: Letter, 3: Legal 450 sheets (for LN15X-TB)
	1: A4, 2: Letter, 3: Legal 4: Executive, 6: A5
Paper feeder (LN15X-TC)	Feeder unit with a paper tray adjustable for a different size
Duplex unit (LN15X-DA)	Two-sided printing mechanism
Multi Function Feeder (LN15X-MF)	Optional feeder for 100 sheets or 30 envelopes
Fuser unit (LN15X-AD)	

## Specifications

Specification	Description
Printing technology	Semiconductor laser + electrophotography
Emulations	Standard: Hewlett-Packard LaserJet 4 (PCL5e) PostScript level-2 compatible Switching: Automatic or by the control panel
Dimensions	Width: 376.5 mm (14.8 inches) Depth: 640 mm (25.2 inches) with MFF Height: 289 mm (11.4 inches) Weight: 18 kg (39.7 pounds) with MFF
Power requirements	120 VAC , 50 or 60 Hz (USA) 220 to 240 VAC , 50 or 60 Hz (Europe) Consumption: Maximum 600 W (full option) Average during operating 450 W or less 30W or less during sleep mode
Environmental	Temperature: 10° to 35°C (50° to 95°F) during requirements operating 0° to 40°C (32° to 104°F) during storage Humidity: 20% to 80% relative humidity (non-condensing) during operating and storage Max. wet bulb 29°C (84°F)
Acoustic noise	Sound pressure level (front, bystander, pos.) Printing: 48 dBA without duplex unit 51 dBA with duplex unit Sleep mode: Background noise level Declared noise emissions in accordance with ISO9296 and ISO7779



Specification	Description	
Safety and EMC certification or compliance	Safety: Models	Meets or complies with
	M3878SA14AV	UL 1950 CSA C22.2 No. 950 21 CFR 1040.10, Class I
	M3878SB14AV	EN 60950 EN 60825, Class 1
	EMC: Models	Meets or complies with
	M3878SA14AV	FCC Part 15B, Class B (Class A for Ethernet) DOC, Class B (Class A for Ethernet)
	M3878SB14AV	EN 55022, Class B (Class A for Ethernet) EN 50082-1
Performance	<p>Print resolution: 600 dots per inch</p> <p>Smoothing: Advanced enhanced Imaging technology (EIT)</p> <p>Printing speed: For character printing on A4 size paper from first tray 10 or 14 pages per minute</p> <p>Warm-up time: At 25°C (77°F) 60 seconds or less</p> <p>Recommended duty cycle: 5,000 pages per month (up to 35,000 pages per month)</p> <p>Toner bottle life: 5,000 pages at 5% coverage continuous printing</p> <p>Print unit life: 30,000 pages at 5% coverage continuous printing</p>	

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Specification	Description
Computer interface	Standard: Parallel (Centronics), conforming to IEEE 1284 (Compatible and Nibble modes) Optional: Serial (RS-232C/422A) LocalTalk Ethernet Switching: Automatic sensing
Controller	Processor: Fujitsu MB86936, 40 MHz RAM: DIGITAL Laser Printer LN15P : 11MB DIGITAL Laser Printer LN15N-A : 19 MB DIGITAL Laser Printer LN15N-B : 19 MB
Fonts	Resident: PCL mode 46 fonts available <i>Bitmapped</i> Line Printer <i>Scalable Intellifonts</i> CG Times, Univers, Univers Condensed, Courier, Letter Gothic, Albertus, Antique Olive, Clarendon Condensed, Coronet, Garamond, Marigold, CG Omega <i>Scalable TrueType</i> Arial, Times New Roman, Symbol, Wingdings PS mode 35 fonts available Courier, Helvetica, Helvetica Narrow, Times, Symbol, Palatino, New Century Schoolbook, Avant Garde, Bookman, Zapf Chancery, Zapf Dingbats Soft fonts: Available from independent vendors

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Specification	Description
Paper	
<i>Type</i>	Single sheet photocopy paper (equivalent to Xerox 4024), bond paper, overhead transparencies (equivalent to 3M 731), and envelopes.
<i>Size</i>	<p>Tray: A4 (210 x 297 mm) A5 (148 x 210 mm) Letter (8.5 x 11 inches) Executive (7.25 x 10.5 inches)</p> <p>Manual feed slot and MFF: Minimum: 100 mm wide x 148 mm long (3.94 x 5.81 inches) Maximum: 216 mm wide x 360 mm long (8.5 x 14.13 inches)</p>
<i>Weight</i>	<p>60 to 90 g/m<sup>2</sup> (16 to 24 pound bond) in tray 60 to 105 g/m<sup>2</sup> (16 to 28 pound bond) in manual feed slot</p>
<i>Input</i>	<p>Tray 1: 500 sheets of paper Manual feed slot: 1 sheet Tray 2: 450 sheets of paper (option) MFF: 100 sheets of paper or 30 envelopes</p>
<i>Output</i>	<p>Stacker: Face down (top cover) 250 sheets of paper (possible to decrease depending on paper types and paper curl conditions)</p> <p>Rear stacker: Face up 20 sheets of paper</p> <p>Rear stacker: Face up (duplex unit) 20 sheets of paper</p>

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## Glossary

### Application software

A program that performs a particular task on a computer. Examples are word processing, spreadsheet, and database programs.

### Baud

The speed of data transmission measured in bits per second. Baud rates apply to data transmission through the printer's serial interface. Baud is also called baud rate.

For example, 1200 baud is approximately equal to 120 characters per second.

### Bit

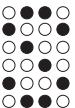
A binary digit, or bit, is the smallest unit of information in a computer's memory. A bit can have the value 0 or 1, which represents the OFF and ON state in a computer's memory. Eight bits equals one byte.

### Bit map

An image representation in which each point in the image is separately defined. For monochrome images, each point is defined by a single unit of information. For color images, each point is defined by several units of information, representing the different color elements.

The characters produced by a dot matrix printer are a kind of bit map. Each character image is created by defining the points in the dot matrix as either on or off.

**Example:**



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### **Bitmapped font**

A font in which the character images are defined by bit maps. With bitmapped fonts, a separate set of definitions is required for each point size. For example, Times 10 point and Times 12 point are considered separate fonts. *See also* Scalable font.

### **Configuration**

A combination of settings that allows your computer and printer to work together. Some of the necessary settings are in the computer or application software, while other settings are in the printer. For example, the interface setting must be set the same in both the computer and the printer.

### **Corona wire**

A fine wire in the printer that gives a charge to the paper. This charge causes the toner on the drum to transfer to the paper.

### **Default**

A setting automatically used when you or your application software do not make a selection. The settings in effect when you turn on or reset the printer are called power-on defaults. *See also* Factory default.

### **Density**

The darkness of the image as it appears on the page. If the density is too dark, the small white areas inside letters and numbers will be filled in. If the density is too light, pinholes appear in black areas. Print density can be adjusted with the print density dial.

### **Downloadable font**

A font that is transferred (downloaded) to the printer's memory when or before it is needed. Before they are transferred, downloadable fonts are stored on font cards, floppy disks, or the computer's hard disk. Downloadable fonts are also called soft fonts.

### **Emulation**

The ability of one printer to understand the command set of another printer. Emulations may be built into a printer's memory or may be supplied on optional plug-in emulation cards or cartridges.

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**Ethernet**

A communication hardware for a high-speed network: developed by Xerox Corporation.

**Factory default**

The settings that are programmed into a printer at the factory. The printer uses these settings unless they are replaced by user selected settings entered from the control panel or through application software.

**Flow control**

*See* Serial protocol.

**Font**

A complete set of characters and symbols in one size, typeface, and style. Size refers to the character height, and is usually measured in points (1/72 inch). Typeface refers to the character design, such as Courier, Times, or Helvetica. Style refers to the character appearance, such as Italic or Bold. Typical examples of fonts are 12-point Courier Bold, and 10-point Times Italic.

**Fuser unit**

One of the internal parts of a page printer. The fuser unit bonds the toner to the paper. It consists of a heat roller and a pressure roller that the paper passes under after toner has been applied.

**Hex dump**

A special printout used for troubleshooting. A hex dump shows all data sent by the computer to the printer, including control characters. The data in a hex dump is expressed in hexadecimal format.

**Initialization**

Resets the printer to its power-on defaults. Initialization clears the print buffer of any data and places the printer online. *See also* Reset.

**Interface**

The means by which information is transferred from one part of a system to another. For example, the cable between the printer and the computer is an interface.

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### ISO symbol set

ISO stands for “International Organization for Standardization”. An ISO symbol set contains special international characters that replace the following twelve ASCII characters: #, \$, @, [, \, ], ^, 9, {, |, }, and ~. ISO symbols sets are available for most European languages, Chinese, and Japanese.

### LocalTalk

A protocol for an easy AppleTalk that connects devices and computers in a Macintosh system, developed by Apple Computer.

### Margin

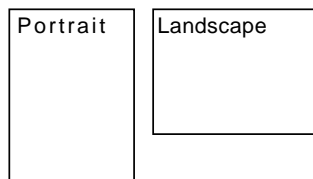
The space at the edges of a page in which no printing occurs. There are four margins: left, right, top, and bottom. In application software, margins are usually expressed in inches, centimeters, or points. In printer commands, left and right margins are specified as columns, while top and bottom margins are specified as lines.

Page printers have a minimum margin, typically of about .2 inch (5 mm), on all four sides, called the nonprint margin. No printing occurs in this margin. If the application software specifies a margin of 0, actual printing begins at the edge of the nonprint margin. *See also* Printable area.

### Orientation

The direction of print on a page. Printing such that the shorter edges of the paper are at the top and bottom is called portrait orientation. Printing such that the longer edges of the paper are at the top and bottom is called landscape orientation.

#### Example:



### Page description language

A set of codes that describe the placement of text and graphics on a page. Page Control Language (PCL), the language used by HP LaserJet printers, and Postscript are examples of page description languages.

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**Page protect**

A printer feature that reserves a block of printer memory exclusively for text and graphics data. Page protect prevents memory overflow errors when printing very dense text or complex graphics. However, page protect also reduces the amount of printer memory available for downloadable fonts.

**Parallel interface**

A connection between the computer and printer in which data is transferred simultaneously through multiple wires. A parallel interface is faster than a serial interface, but the distance over which it can send data is limited. The Centronics interface is a type of parallel interface. *See also* Serial interface.

**Photoconductive drum**

The part inside a page printer on which the image is created before it is transferred to the paper.

**Postscript**

*See* Page description language.

**Precharger wire**

A fine wire in the printer's process cartridge that imparts an electrical charge to the photoconductive drum. The charge makes the drum sensitive to light.

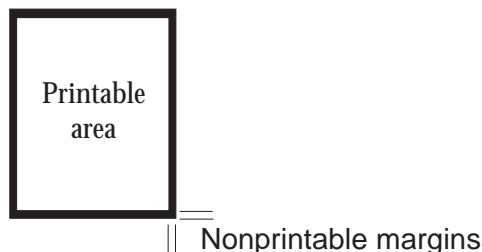
**Printable area**

The area of the physical page in which the printer is able to print. Page printers have a nonprint margin, typically about .2 inch (5 mm) wide, at each edge of the paper. The printable area is the space within these margins. *See also* Margin.



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**Example:**



**Printer driver**

A set of instructions in application software that translates formatting choices into printer commands. When installing the application, the user identifies the type of printer being used so the application knows which printer driver to use.

**Print unit**

A maintenance package consisting of the photoconductive drum, developing unit, toner, and drum cleaner.

**Reset**

Clears the print buffer and places the printer online. Unlike initialization, reset leaves the currently selected settings in effect. That is, reset does not restore the power-on defaults. *See also* Initialization.

**Resolution**

The fineness of the printing. Resolution depends on the number of dots per inch. High resolution (with more dots) is finer and more precise than low resolution, which is coarser with rougher edges.

**Scalable font**

A font capable of printing in any point size. Scalable fonts are stored on the computer's hard disk. Each font consists of character templates that are used by the accompanying font utility software to create the characters in the desired point size.

Some font utilities create a complete set of characters in the desired size and send the complete set to the printer. Other utilities create and send only the individual characters as they are needed, which conserves printer memory.

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### **Serial interface**

A connection between the computer and printer in which data is transmitted sequentially over a single wire. A serial interface is slower than a parallel interface, but it can send data over a much greater distance. The RS-232C interface is a type of serial interface. *See also* Parallel interface.

### **Serial protocol**

A set of rules used by the computer and the printer to regulate the flow of data between them.

### **Symbol set**

The set of characters used in a font. Most symbol sets contain standard letters, numbers, and punctuation. Symbol sets differ in the accented characters, line drawing characters, and special symbols they contain. ASCII, Roman-8 and PC-8 and examples of symbol sets.

Symbol sets are also called character sets, which is the term usually used with dot matrix printer fonts. *See also* ASCII character set; ISO symbol set.

### **Toner**

Electrically charged carbon particles that adhere to charged areas on the photoconductive drum to produce an image pattern. The carbon pattern is transferred to the paper and melted by the fuser unit to form a permanent image on the paper.

### **Transfer unit**

The part inside a page printer that transfers the image from the photoconductive drum to the paper.