

star[☆]

LaserPrinter 4

OPERATIONS MANUAL

Safety Notices

This printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products marketed in the United States. The label on the printer indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

Caution-use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For compliance with the Federal Noise Interference Standard, this equipment requires a shielded cable.

The above statements apply only to printers marketed in the U.S.A.

Self Declaration

Radio interference regarding this equipment has been eliminated according to Vfg 1056/1984 announced by the DBP.

DBP has been informed of the introduction of this special equipment and has been granted the right to examine the whole series.

It is the user's responsibility to see that his own assembled system is in accordance with the technical regulations under Vfg 1046/1984.

To conform to FTZ-regulations it is necessary to make all connections to the printer with shielded cable.

The equipment may only be opened by qualified service representatives.

The above statement applies only to printers marketed in Germany.

**Statement of
The Canadian Department of Communications
Radio Interference Regulations**

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

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

The above statement applies only to printers marketed in Canada.

Trademark Acknowledgements

LaserPrinter 4: Star Micronics Co., Ltd.

FX-850: Seiko Epson Corporation

HP LaserJet IIP: Hewlett Packard Company

IBM PC/XT, IBM Proprinter: International Business Machines Corporation

Lotus 1-2-3: Lotus Development Corporation

Microsoft Word, Microsoft Windows: Microsoft Corporation

PageMaker: Aldus Corporation

WordPerfect: WordPerfect, Inc.

NOTICE

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- All efforts have been made to ensure the accuracy of the contents of this manual at the time of press. However, should any errors be detected, STAR would greatly appreciate being informed of them.
- The above notwithstanding, STAR can assume no responsibility for any errors in this manual.

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TABLE OF CONTENTS

1. How to Use This Manual	1
1.1 Laser Printing	2
1.2 The Star LaserPrinter 4 — An Introduction	4
2. Setting Up the STAR LaserPrinter 4	7
2.1 Unpacking	8
2.1.1 Unpacking the Printer	8
2.1.2 Checking the Parts	10
2.1.3 Unpacking the EP-L Cartridge	10
2.1.4 Optional Items	11
2.1.5 Carrying the Printer	11
2.1.6 Opening and Closing the Printer	12
2.2 Installing the EP-L Cartridge	16
2.3 Loading Paper	22
2.3.1 About Paper	22
2.3.2 Loading Paper Into the Multi-purpose Tray	22
2.4 Selecting Paper Delivery	25
2.5 Connecting the Power Cord	27
2.6 Connecting the Interface Cable	28
2.7 Adjusting Print Quality	30
3. Initial Operation	33
3.1 Front Panel	33
3.1.1 Powering Up	34
3.1.2 The Buttons	35
3.1.3 Light Indicators	39
3.1.4 Hex Dump	40
3.2 Self Test	40
3.2.1 Printing Test Sheets	40
3.2.2 Status Sheet Description	41
3.3 Programming from the Control Panel	43
4. Quick Start with the Star LaserPrinter 4: A Tutorial	49
4.1 Preliminaries	49
4.2 Control Panel	50
4.3 Connecting the Printer to the Computer	52
4.3.1 Selecting the Serial Interface	53
4.3.2 Activating the Parallel Interface	55
4.3.3 Saving the Setting	56
4.3.4 Returning to Factory Settings	56

4.4 Manual Feed	57
4.5 Paper Size	58
4.6 Printing in Landscape Orientation	59
4.7 Changing Character Set	59
4.8 Selecting Display Language	60
5. Setting Up A Page	61
6. Font Selection	63
6.1 Hewlett Packard LaserJet IIP	65
6.2 Epson FX-850	66
7. Interfacing With Applications Programs	67
7.1 Lotus 1-2-3 Release 2	68
7.2 WordPerfect Version 5	70
7.3 Microsoft Word 4.0	71
7.4 Microsoft Windows	71
8. Maintaining the Star LaserPrinter 4	75
8.1 Replacing the EP-L cartridge	75
8.2 Storage and Handling Precautions for the EP-L cartridge	75
8.3 Cleaning the Fixing Assembly	76
8.4 Cleaning the Exterior of the Printer	77
9. Troubleshooting	79
9.1 Error Messages Displayed on the Screen	79
9.2 Service Call Messages	80
9.2.1 Engine Service Call Messages	80
9.2.2 Controller Service Call Messages	80
9.3 Operator Call Messages	82
9.3.1 Engine Problems	82
9.3.2 Font/Emulation Cartridge Problems	83
9.3.3 Optional Hardware	83
9.3.4 Change Paper Size	84
9.3.5 Manual Paper Feed	86

9.4 Operator Information Messages	87
9.4.1 Host Communication problem	87
9.4.2 Function or Size Incompatibility	87
9.4.3 Font/Emulation Cartridge	88
9.5 Status Messages	89
9.6 Paper Jamming	91
9.6.1 Clearing paper jams	91
9.7 Streaky Prints	97
9.7.1 White Streaks	97
9.7.2 Stains on Transparency Films	99
10. Options	101
10.1 Paper Feeder and Cassettes	101
10.2 Expansion RAM Board	102
10.3 Font Cartridge.....	103
11. Specifications	105
11.1 Specifications	105
11.2 Reliability	108
11.3 Pin Functions on Interfaces	109
Glossary	111

How to Use This Manual

CHAPTER 1

Congratulations on purchasing a Star LaserPrinter 4. You will be delighted with both the quality of the printed images and the ease of operation. With your computer and this printer, you can create professional-looking documents.

This Operations Manual is one of two that explore the entire range of printing possibilities of the Star LaserPrinter 4. This manual is for beginners and for those who plan to concentrate on the basics. Advanced users and those interested in programming should refer to the Applications Manual.

Chapter 2 begins with an overview of the manual and of the Star Laser printer. This chapter explains how to unpack your new printer and prepare it for initial operation. Chapter 3 explains how to operate the printer's control panel and display screen.

Some people like to skip the preliminary explanations and begin using the printer immediately. Chapter 4 provides the information for such a fast start. If you begin with Chapter 4, at some later time you should read the rest of the manual in sequence, for a more complete picture of your printer and its operations.

Chapter 5 explains how to set up a page, while Chapter 6 describes the type characteristics that will enable you to give your printed pages that professional look.

The Star LaserPrinter 4 emulates the operation of the following widely-used printers:

- **HP LaserJet IIP**, a laser printer
- **Epson FX-850**, a dot-matrix printer

With this capability, the Star LaserPrinter 4 will operate with a wide range of applications programs on the market, both old and new. Chapter 7 provides the information that will allow you to use your printer with four popular applications programs: Lotus 1-2-3, WordPerfect, Microsoft Word, and Microsoft Windows.

Chapter 8 and 9 describe the maintenance and troubleshooting operations to keep your Star LaserPrinter 4 working in “perfect” condition.

1.1 LASER PRINTING

Before you begin learning about your new Star LaserPrinter 4, you may find it helpful to know something about laser printing itself.

A laser is actually a beam of light of just one wavelength (Laser is an acronym for Light Amplification by Stimulated Emission of Radiation). Such a beam of light, described as “highly coherent”, can be focused very sharply. Lasers, generated by gases, liquids or semiconductors, are widely used in applications ranging from surgery to the visual arts.

Laser printing is a process that uses a laser beam — in this case, generated by a semiconductor — to activate portions of an electrically charged surface. These activated parts represent the words, numbers, or graphics being sent from the computer for printing. Other parts of the printer transfer this image to paper, then clean the surface and prepare it to receive more information to be printed.

In other words, this process is a type of laser-activated temporary engraving.

In the Star LaserPrinter 4, two interconnected units produce the complete printing process: the toner cartridge and the printer body.

The toner cartridge contains the drum, which is the rotating surface. In the darkness of the toner cartridge, the drum holds a negative charge placed on it by the primary corona wire in the printer. Shutters on the bottom of the toner cartridge assure that no unwanted light penetrates its interior.

When text or graphics are sent by the computer to the printer, laser beam is generated by a semiconductor laser diode. This beam is focused by special scanning mirrors that turn the light beam into a tool that “writes” or “prints” on the surface of the drum. The areas of the drum touched by the laser beam lose their negative charge and contain a reverse image of the information sent from the computer. As the drum rotates, it passes a developer unit that is also rotating, but in the opposite direction. The surface of the developer unit is covered with toner (“ink”) which has a negative charge. The neutralized portions of the drum, containing the information to be printed, pick up negatively charges toner from the developer unit.

At this point, paper fed from the paper cassette moves through the transfer unit, from which it receives a positive charge. As the drum rotates, the negatively charged particles of toner are attracted to the positively charged surface of the paper.

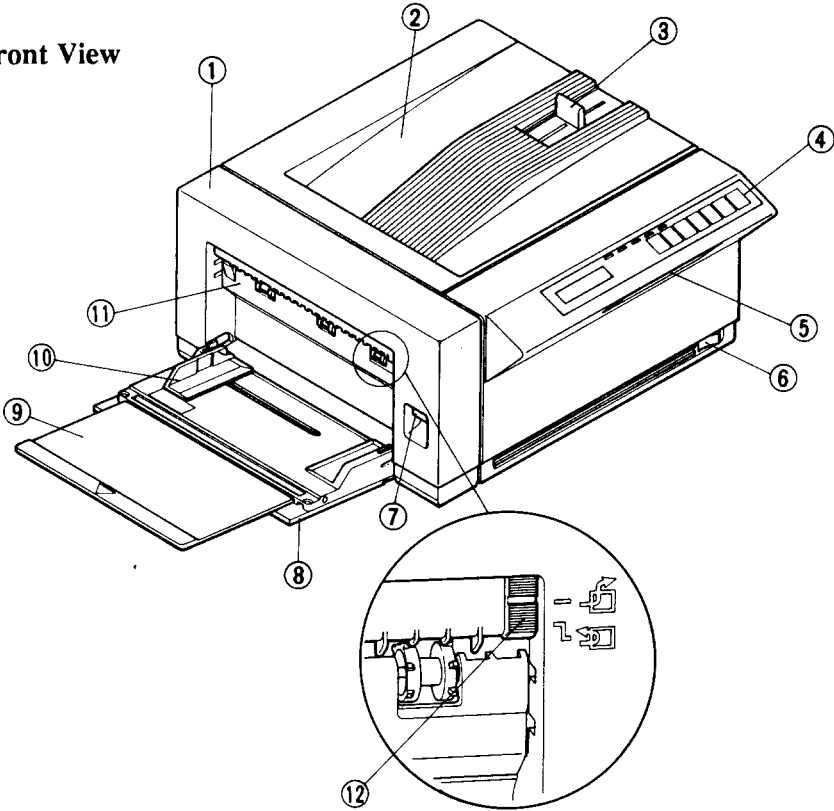
A combination of heat and pressure fuse the image to the paper. The paper is then ejected from the printer.

Finally, a cleaning mechanism in the toner cartridge cleans excess toner from the drum, and a special light beam neutralizes its entire surface. Then the entire process can begin again.

1.2 THE STAR LASERPRINTER 4 — AN INTRODUCTION

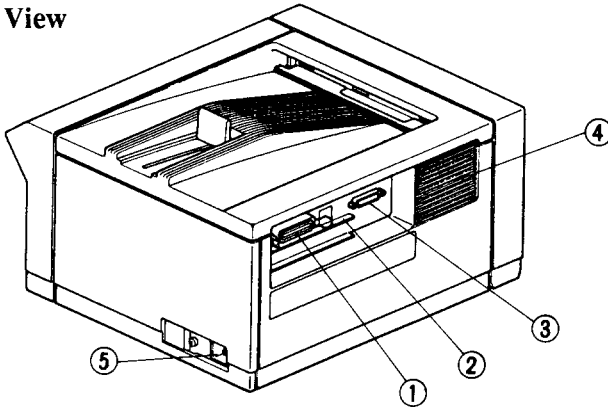
You will meet each portion of your Star LaserPrinter 4 as you read this manual, but a brief introduction is in order here. The following figures show the front, rear and inside views of the printer.

Front View



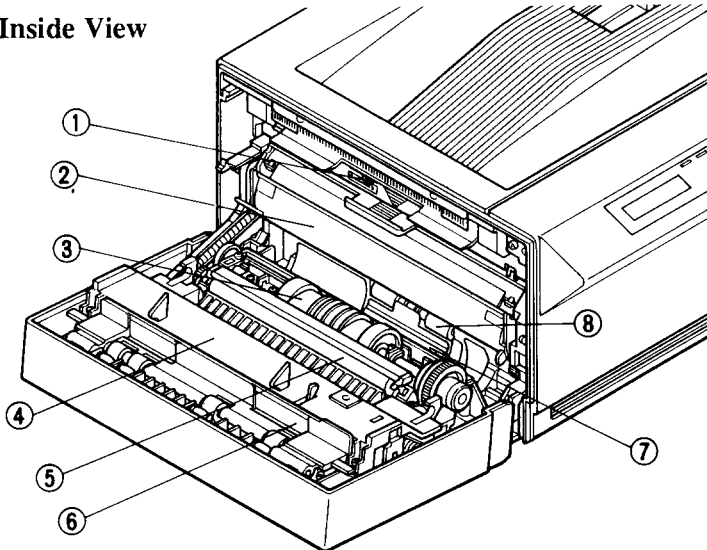
- ① Side Cover
- ② Face-down Tray
- ③ Paper Stop
- ④ Control Panel
- ⑤ Cartridge Slot
- ⑥ Power Switch
- ⑦ Release Button
- ⑧ Multi-purpose Tray (MP Tray)
- ⑨ Extension Tray
- ⑩ Paper Guide
- ⑪ Front Upper Door
- ⑫ Paper Delivery Selector

Rear View



- ① Parallel Interface Connector
- ② AppleTalk Interface Connector
- ③ Serial Interface Connector
- ④ Air Vent
- ⑤ Power Receptacle

Inside View



- ① Density Adjustment Lever
- ② EP-L Cartridge
- ③ Pick-up Roller
- ④ Fixing Assembly Cover
- ⑤ Transfer Roller
- ⑥ Paper Access Door
- ⑦ Separation Pad
- ⑧ Feed Roller

MEMO

Setting Up the STAR LaserPrinter 4

CHAPTER 2

The fact that you're now reading this manual shows that you've got at least as opening the carton containing your new Star LaserPrinter 4. This chapter will help you to unpack the printer, set it up, and get it running.

First, though, you should make some preparations. You may already have decided on the printer's new location. Whether you have or have not, run through this checklist of requirements:

- **Environmental control**

The printer and toner cartridge should never be exposed to strong sunshine or other direct heat sources. It should also be located away from air conditioning ducts, dust and fumes. Excessive moisture should be avoided, such as humidity in excess of 80% or less than 20%. If it is comfortable for you, then it will be comfortable for your printer.

- **A large, strong table or stand**

The printer weighs approx. 22.5lbs (10kg) and must be firmly supported. Also, the printer will need more room than it takes up in the shipping carton, because the paper tray will extend forward from the front; so plan for a space at least 2 x 3.2 ft (0.6m²).

- **A three-pronged outlet**

The outlet should be no more than 8 feet (2.5m) from the printer (the length of the power cord), preferably one shielded from power fluctuations. In any case, no motor-driven appliance should be connected to the same outlet, to avoid interface with the printer's operations.

- **A fresh toner cartridge (product #EP-L)**

- **Paper**

A package of 16-20lb (60-135g/m²) photocopier paper is best to start with; however, the printer can use thicker paper, as well as special media, such as envelopes and transparent sheets.

- **Someone to help you lift the printer from the carton to its new location.**

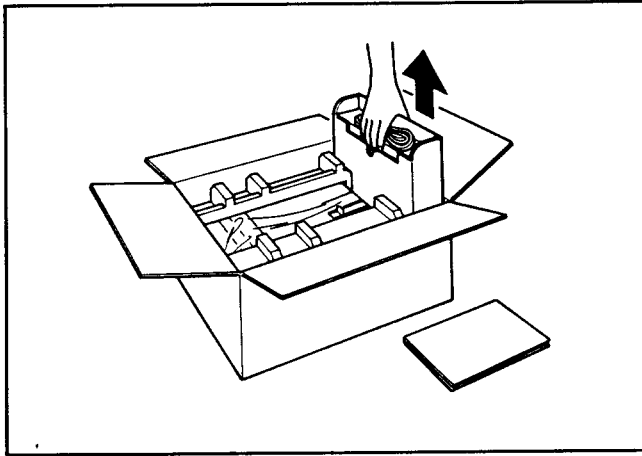
2.1 UNPACKING

The printer comes in two boxes. The large box contains the printer and its accessories, and the smaller one contains the EP-L cartridge. Follow these instructions when unpacking.

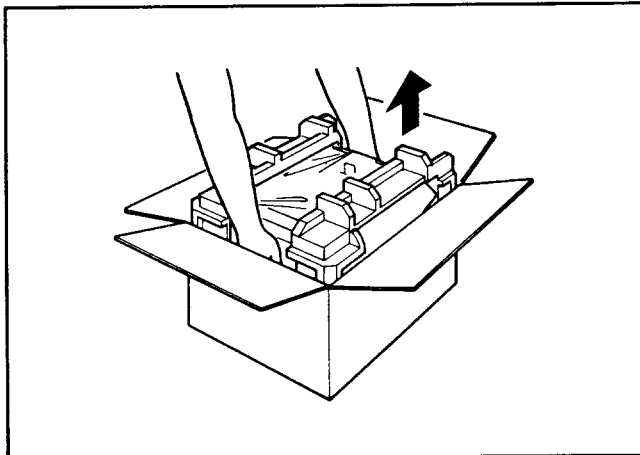
2.1.1 Unpacking the Printer

Follow the instructions below to unpack the printer.

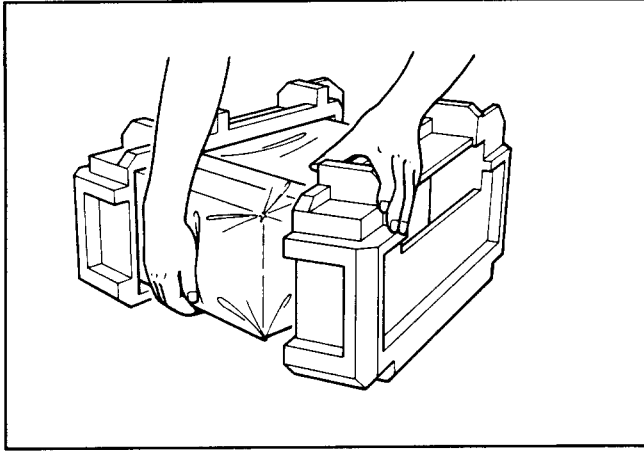
1. Open the large box, and remove the accessories box.



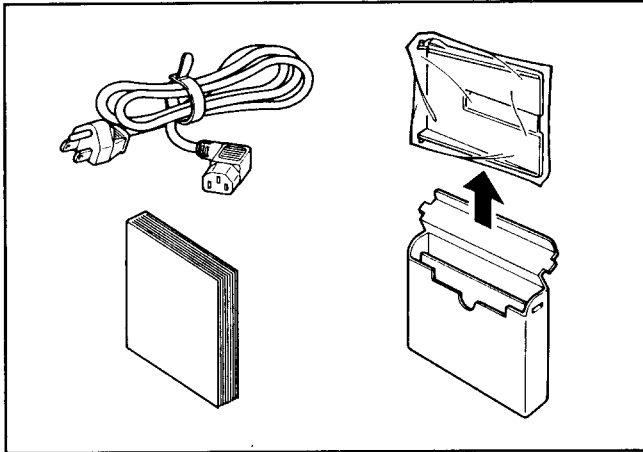
2. Remove the printer from the box.



3. Remove the packing material from round the printer.



4. Open the accessories box. Remove the face-up tray, power cord, Operations Manual and Applications Manual.

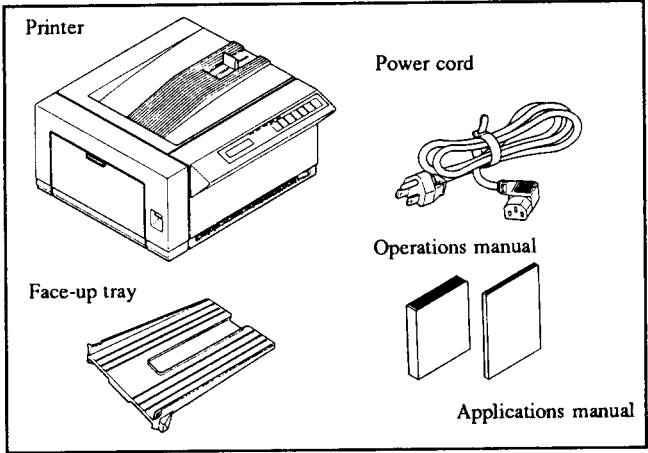


NOTE: Save the packing boxes and materials. If you need to move the printer (for new location or service etc.), use these materials to protect the printer from damage.

2.1.2 Checking the Parts

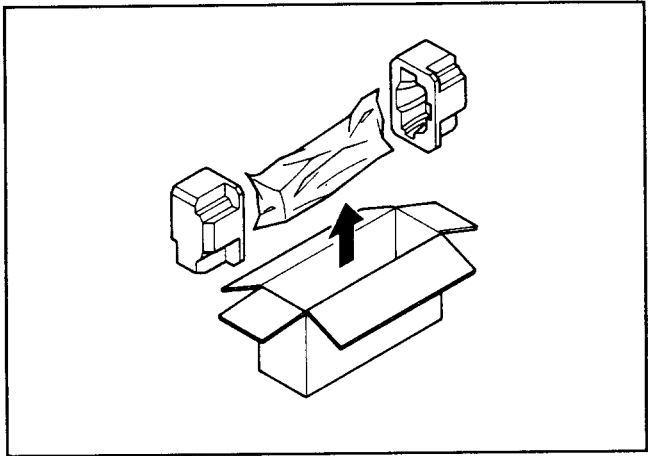
Before setting up the printer, make sure that all standard items shown below are provided and they are free from damage. If any of these items are missing or damaged, contact your supplier.

Standard Items



2.1.3 Unpacking the EP-L Cartridge

Open the small box (see the illustration below) and remove the packing material from the EP-L cartridge.



CAUTION: 1) Do not open the aluminum bag containing the cartridge until you are ready to install it in the printer.

2) Do not lean the cartridge against anything or turn it upside down.

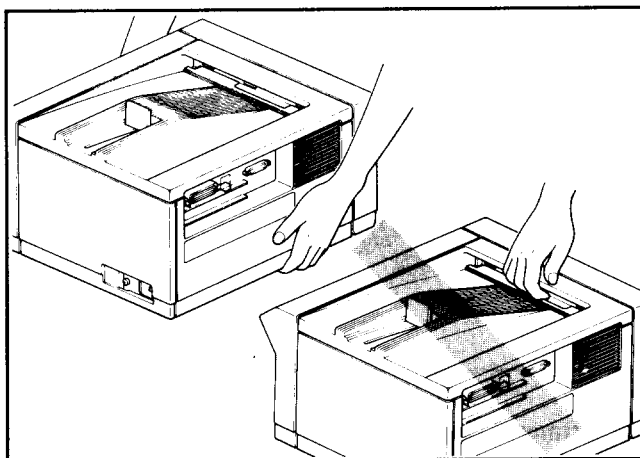
2.1.4 Optional Items

Some of the following items may have been ordered. Unpack them. For details, refer to Chapter 10. Options.

- Paper feeder
- Cassette (A4, Letter, Legal, Executive size)
- RAM board (1, 2 or 4MB)
- Emulation cartridge

2.1.5 Carrying the Printer

Whenever moving the printer from one place to another, always make sure the multi-purpose tray is closed, and carry the printer firmly at the bottom with two hands.



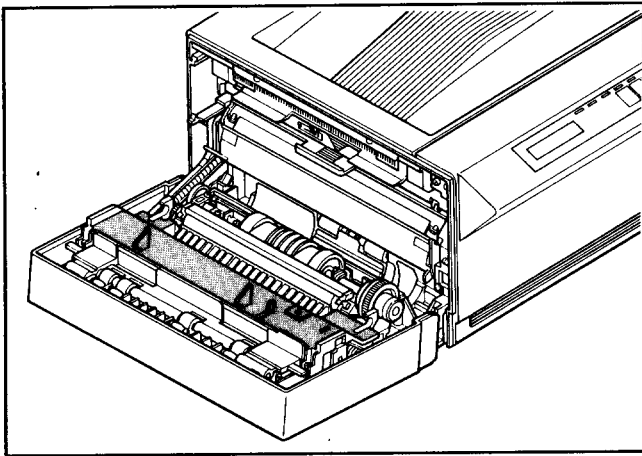
CAUTION: Never attempt to carry the printer using the face-down slot.

NOTE: When moving the printer, remove the EP-L cartridge from the printer. After removing the cartridge from the printer, replace it in the aluminum bag in which it was originally packed, or cover it with a thick cloth to protect it from direct light.

2.1.6 Opening and Closing the Printer

- When opening the printer's side cover, do not stop it in the half-way. This will open the protective shutter of the drum, and light will permanently damage the drum.
- Do not place anything beside the printer. It may damage the multi-purpose tray when the tray is opened.
- Do not put anything in or on the multi-purpose tray except paper, and do not press the tray downward.

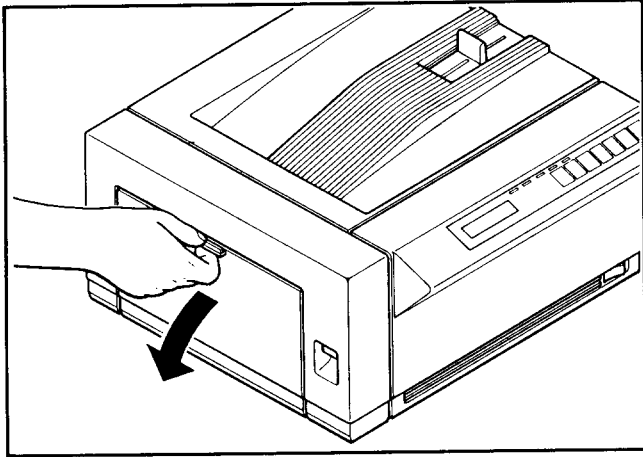
CAUTION: The parts of the printer shaded in the illustration below become extremely hot when the printer is used. To avoid any personal injury, do not touch these parts when the printer is open.



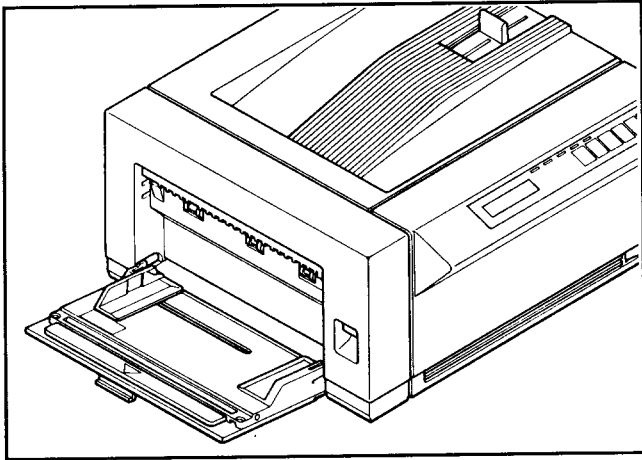
Although the printer's cover is closed while printing, it will need to be opened when replacing the EP-L cartridge when clearing paper jams. Open or close the cover in the following way:

Opening the Cover

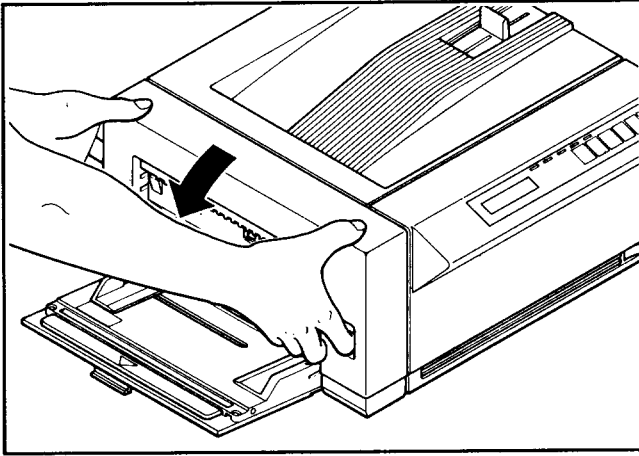
1. Hold the knob of the multi-purpose tray and pull it to open the tray.



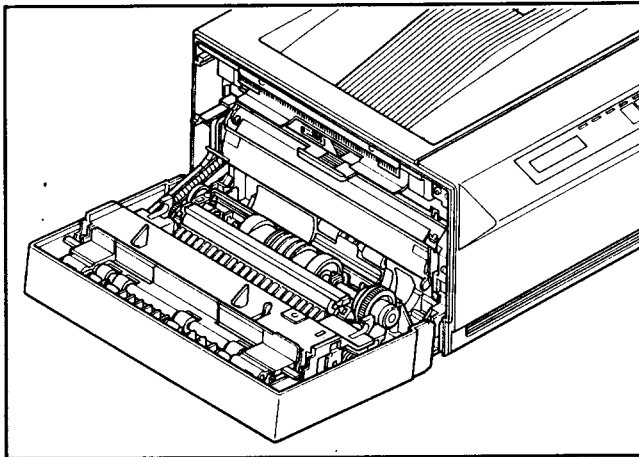
2. The tray opens to about 80 degrees.



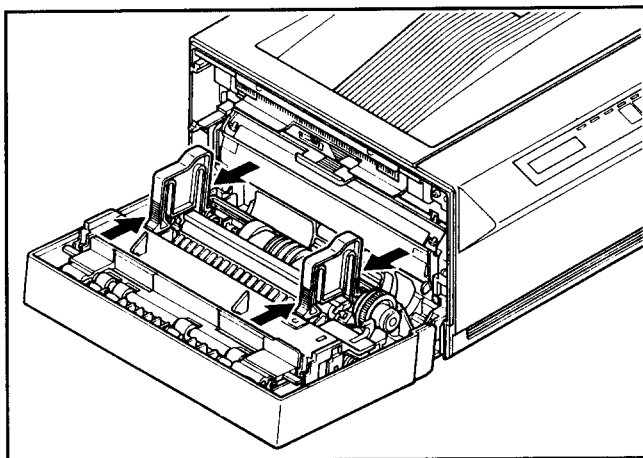
3. Press the release button (at the right) upwards and open the cover.



The cover opens to about 80 degrees (the multi-purpose tray then opens to about 90 degrees.).

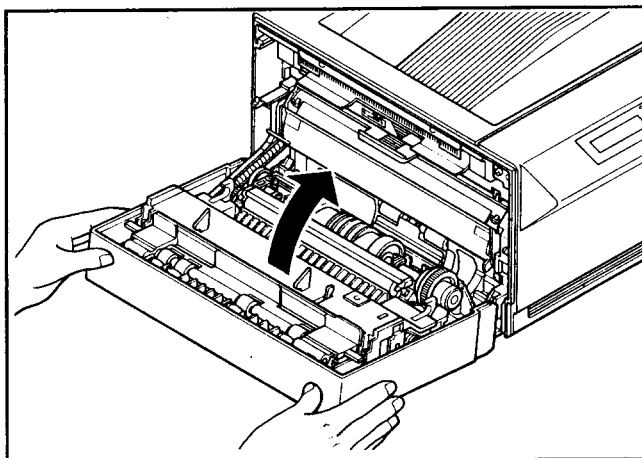


NOTE: Remove the two orange stoppers by pushing the lower part of the stoppers upwards and removing it (as shown in the illustration below).

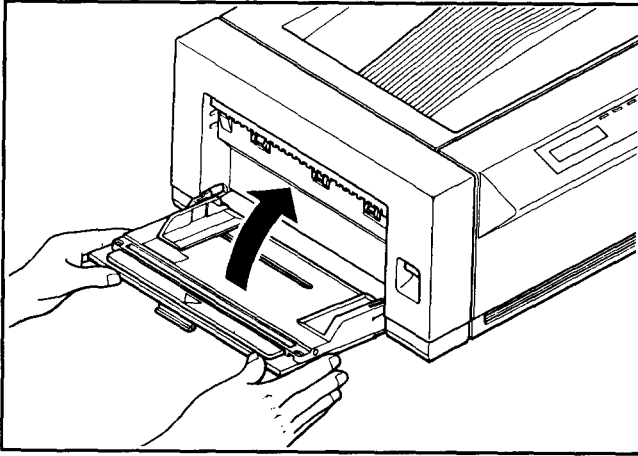


Closing the Cover

1. Using both hands, lift the cover and close it gently until it latches.



2. Lift the multi-purpose tray and close it until it latches on both sides.



2.2 INSTALLING THE EP-L CARTRIDGE

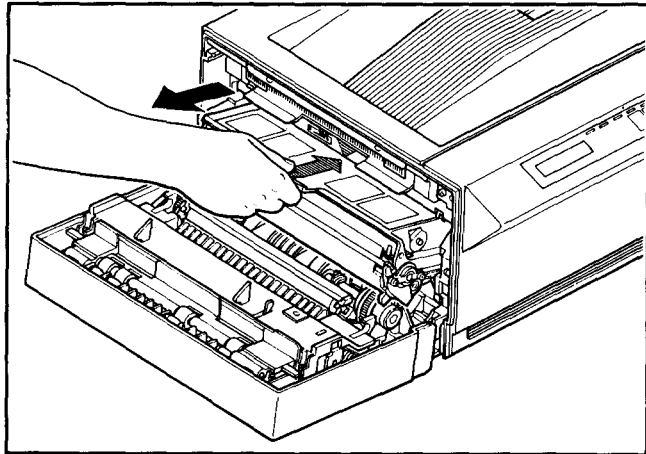
Important Notice

- Install the EP-L cartridge immediately after opening the aluminum bag. Permanent damage can be caused by light to the photosensitive drum. NEVER expose the cartridge to the strong light (more than 15000 lux) or room lighting (1000 lux) for more than five minutes.
- Do not open the drum protective shutter on the EP-L cartridge.
- Keep the cartridge away from CRTs, disk drives, diskettes, etc. Otherwise, CRTs and disk drives can be damaged, and data on diskettes can be destroyed by the magnet inside the cartridge.
- When handling the cartridge, do not touch the bottom of the EP-L cartridge. Print quality will be adversely affected if the protective shutter is open and the drum is damaged. The drum can also be damaged if it is exposed to light.

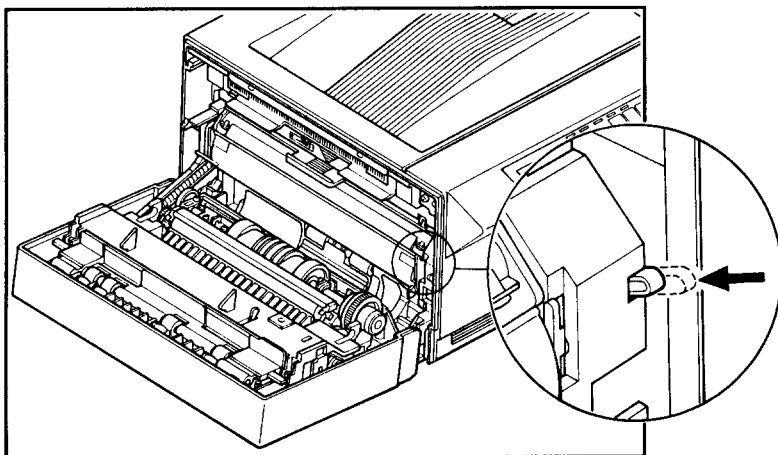
- Always keep the EP-L cartridge with the label facing up. Do not turn it upside down or stand it on end. The toner may become caked, and this causes print quality to deteriorate.
- Use the cartridge before the expiry date printed on the carton. Otherwise, print quality may deteriorate.
- Use only genuine EP-L cartridges as recommended by your supplier.

Follow the instructions below to install the EP-L cartridge for the first time, or replace an used one.

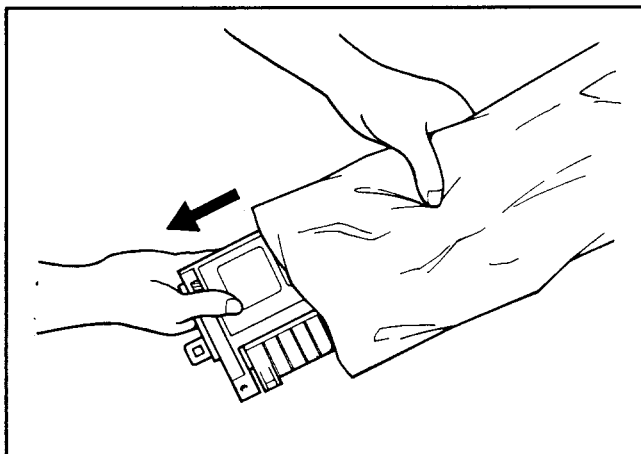
1. Open the multi-purpose tray and the side cover as described in “2.1.6 Opening and Closing the Printer”.
2. If you are installing the EP-L cartridge for the first time, skip to step 3. If you are replacing the old EP-L cartridge, remove it by pulling it by the tab.



NOTE: If it is difficult to remove the EP-L cartridge, press the green lever located at the right, and try again.

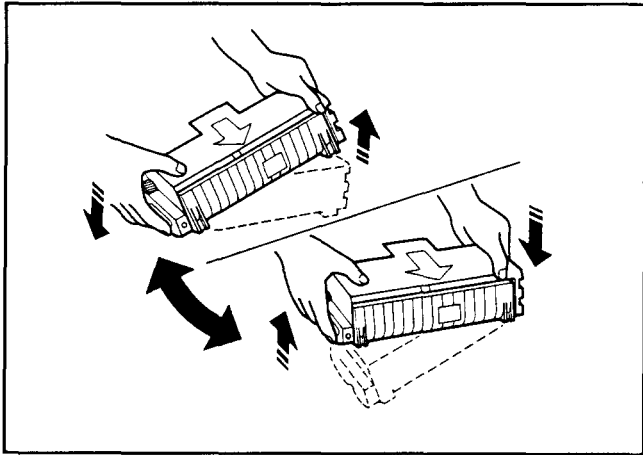


3. Open the aluminum bag containing the EP-L cartridge and remove it.

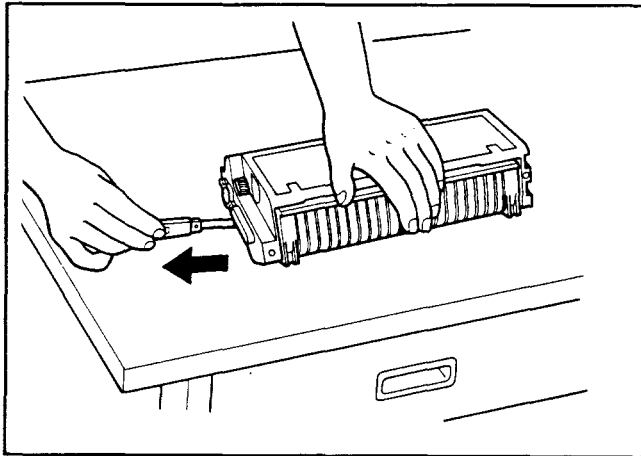


NOTE: Save the aluminum bag, as you may need it for storing the cartridge when you move the printer to another place in the future.

4. Holding the cartridge with both hands, rock it gently from end to end, 5 or 6 times, to distribute the toner evenly. If the toner is not distributed evenly in the cartridge, it may adversely affect print quality.

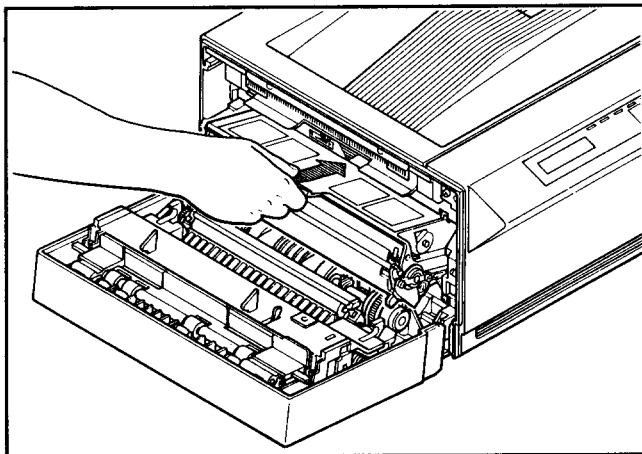


5. Place the cartridge on a flat surface. While holding down the cartridge with one hand, use the other hand to pull the orange tab to remove the seal.

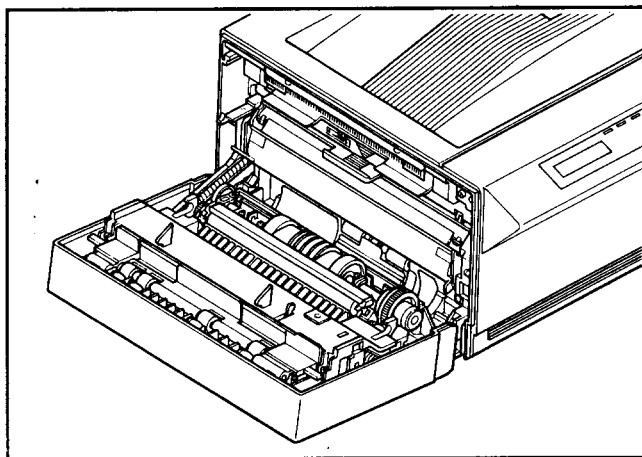


Make sure that the tab is pulled smoothly in a direction parallel to the flat surface. Otherwise, the tape may break or snap, making the cartridge unusable.

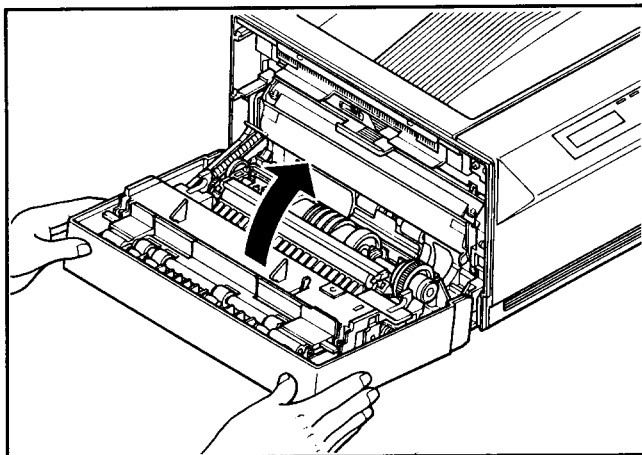
6. Holding the cartridge by the tab, align the arrow on the cartridge with the ▼ mark on the printer.



7. Slide the cartridge into the printer gently.



8. Make sure that the cartridge is securely seated, then close the cover gently.



- NOTE:** 1) If you have purchased optional accessories, install them in accordance with their installation manuals.
- 2) When replacing the cartridge, clean the fixing assembly, as described in “8.3 Cleaning the Fixing Assembly”.

2.3 LOADING PAPER

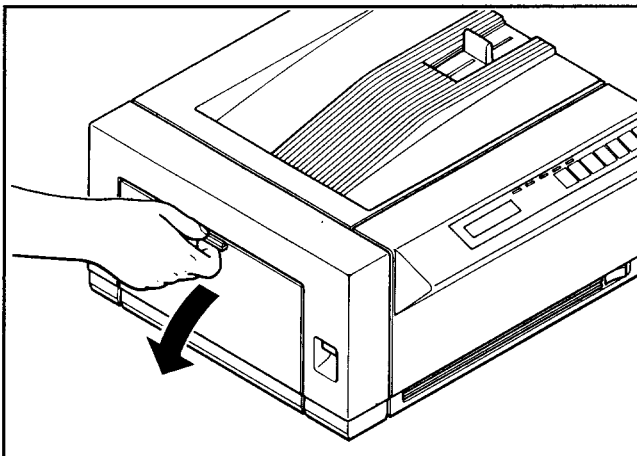
2.3.1 About Paper

Print quality and printer life are greatly affected by the paper used. Paper can be fed into the printer either from the multi-purpose tray or paper cassette (if cassette is installed). Types and sizes of paper can be used with the multi-purpose tray are listed below.

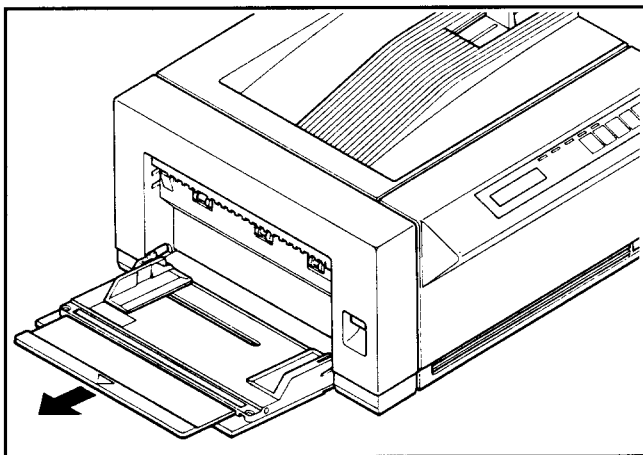
Type	Size	Weight	Print delivery
Plain paper	97 × 148 - 216 × 356mm (Letter, Legal, A4, B5, Executive)	60 - 105g/m ²	Face-down/up
Transpar- ency films	Letter, A4		Face-up
Labels	Letter, A4		Face-up
Envelopes	97 × 148 - 216 × 356mm	60 - 90g/m ²	Face-up

2.3.2 Loading Paper Into the Multi-purpose Tray

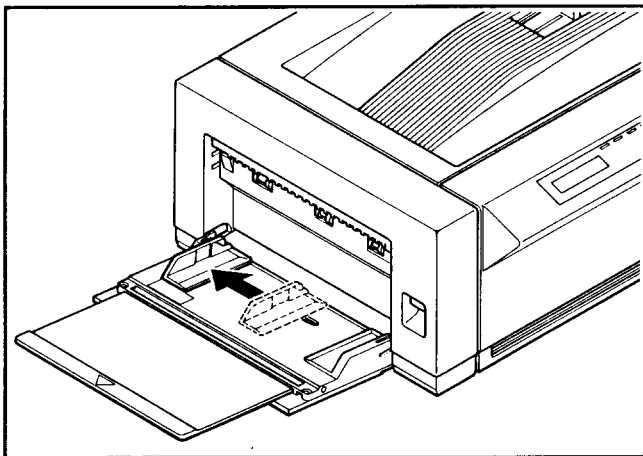
1. If the multi-purpose tray is not open, open it by unlatching and bringing it forward.



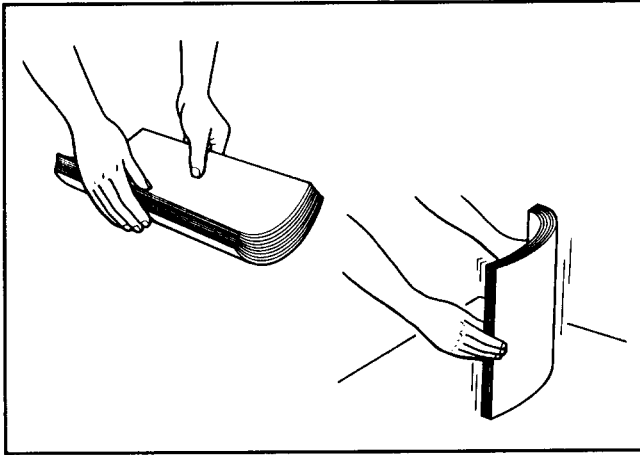
2. Hold the arrow at the center of the multi-purpose tray, then pull out the extension tray.



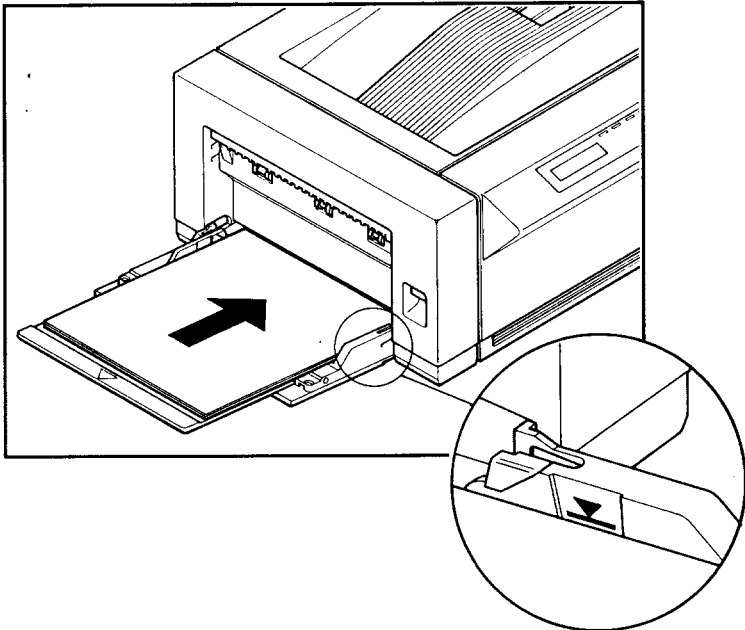
3. Slide the paper guide to the left.



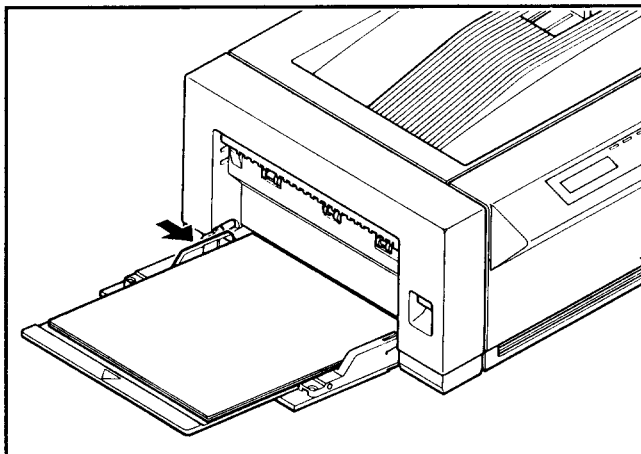
4. Take a small stack of paper and align the edges by tapping it on a flat surface.



5. Align the right side of the stack of paper with the right-hand paper guide. Slide the paper stack gently into the printer as far as it will go. Make sure that the height of the paper stack does not exceed the mark on the paper guide.



6. Slide the left-hand paper guide so that it touches the left side of the paper stack. Make sure that the paper guide does not press too tightly or fit too loosely against the paper stack. Otherwise, this can cause paper jams or other problems.



2.4 SELECTING PAPER DELIVERY

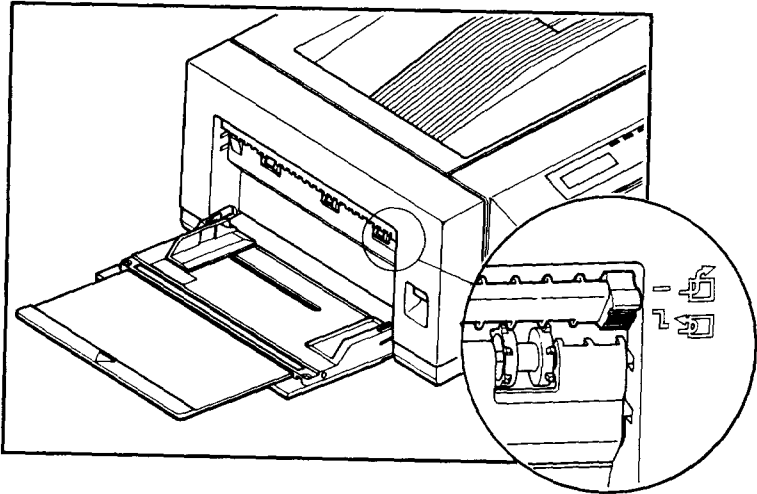
The printer provides two types of paper delivery; face-up and face-down. With face-down delivery, the paper is ejected from the printer with the printed side facing downward. With face-up delivery, the paper is ejected with the printed side facing upward.

Selecting Face-down Delivery

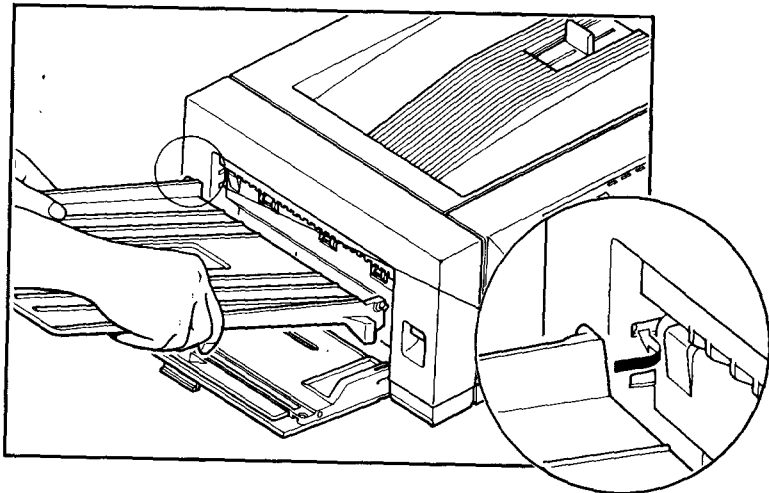
1. Open the multi-purpose tray by unlatching and bringing it forward.
2. For face-down delivery, simply open the multi-purpose tray.
3. Adjust the paper stop located on the top of the printer to the position which matches the paper size.

Selecting Face-up Delivery

1. Open the multi-purpose tray by unlatching and bringing it forward.
2. Switch the paper delivery selector for the face-up position.



3. Attach the face-up print tray to the side cover of the printer. Fit the pegs at the sides of the tray into the holes in the printer.

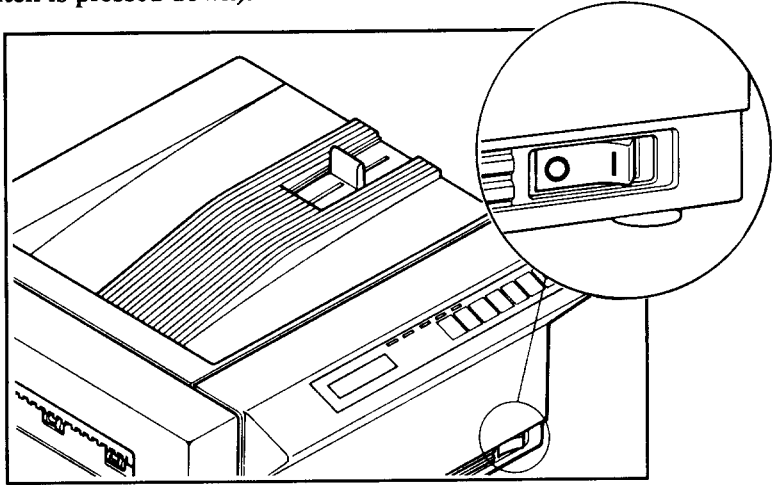


When face-up printing is finished and the multi-purpose tray is closed, the printer automatically switches back to face-down delivery.

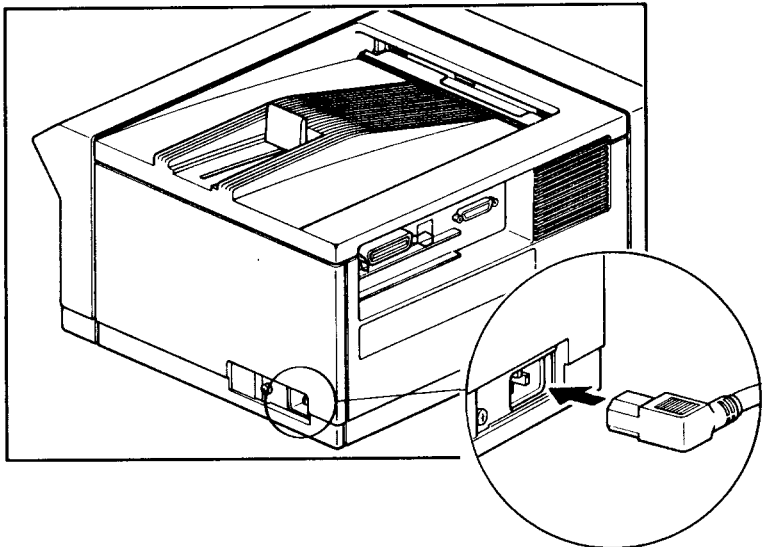
2.5 CONNECTING THE POWER CORD

Make sure that the power switch on the printer is set to OFF, then connect the power cord to the printer and a AC power outlet as shown below:

1. Make sure that the power switch of the printer is off (that the "O" side of the switch is pressed down).



2. Plug the power cord into the power connector, then plug the other end into the AC outlet.



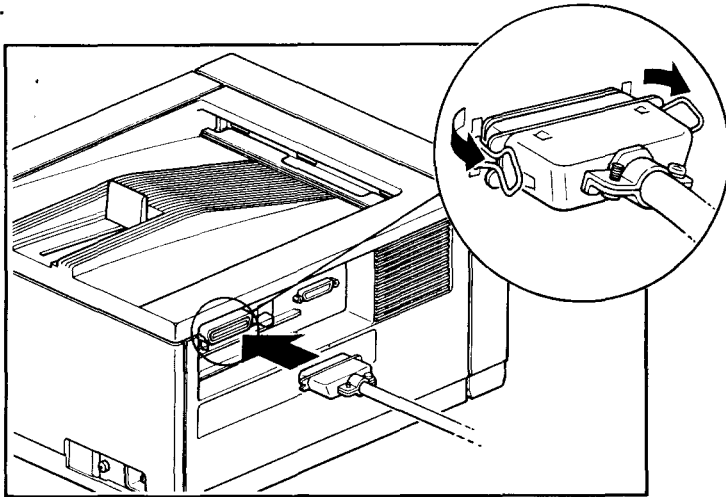
Only use the power cable supplied with the printer. Note that this power cable is fitted with a ground pin. This grounding is an important safety feature and should not be ignored. If a suitable grounded socket is not available, contact a qualified electrician to rectify the situation.

2.6 CONNECTING THE INTERFACE CABLE

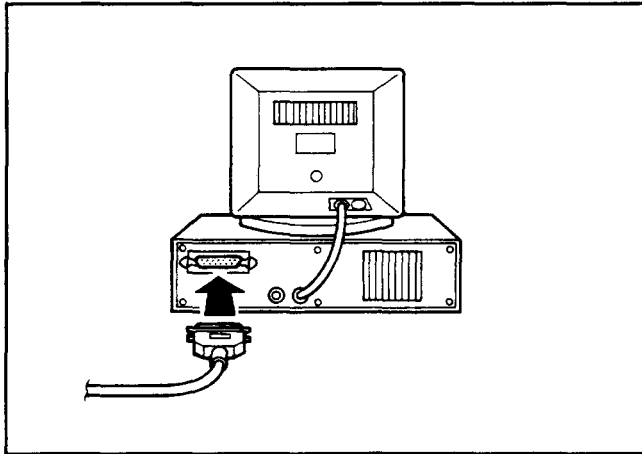
The host computer transmits information to the printer along an interface cable. The printer is provided with three types of interface (serial, parallel and AppleTalk).

No interface cable is supplied as standard with the printer. Determine the kind of interface cable (serial, parallel or AppleTalk) you want to use, and purchase the appropriate cable from your supplier.

1. Before connecting the interface cable, make sure that the power to the printer and the computer is turned off.
2. Plug one end of the interface cable into the appropriate connector on the rear side of the printer.
3. For parallel (Centronics) interface, secure the cable connector using connector clips. For serial interface, fasten the cable connector using screws.



4. Connect the other end of the cable to the appropriate interface on the host computer.

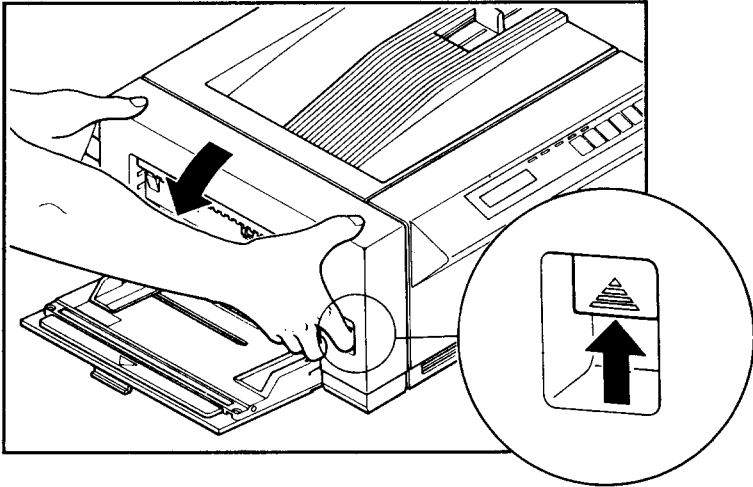


NOTE: The printer's factory setting is for a parallel interface. If the serial interface is to be used, you need to select the interface on the control panel. See "4.3.1 Selecting the Serial Interface" for selecting the type of interface.

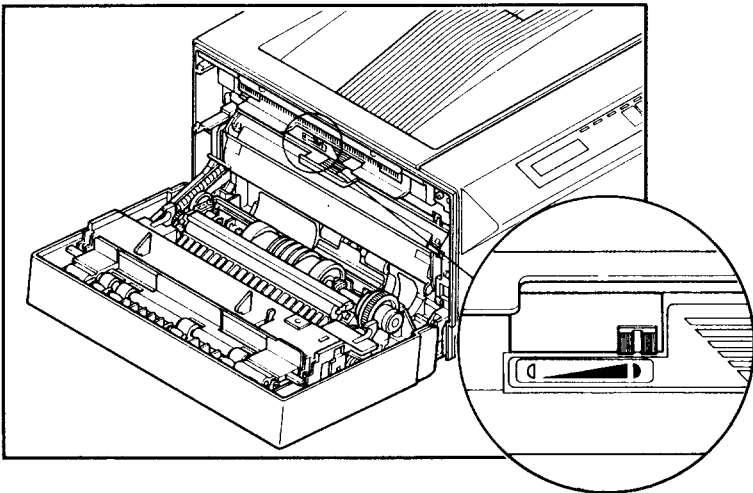
2.7 ADJUSTING PRINT QUALITY

At some time you may find that the quality of the printing is not what you want. You may run test prints and then make the printing lighter or darker by adjusting the the print density adjustment lever located inside the printer.

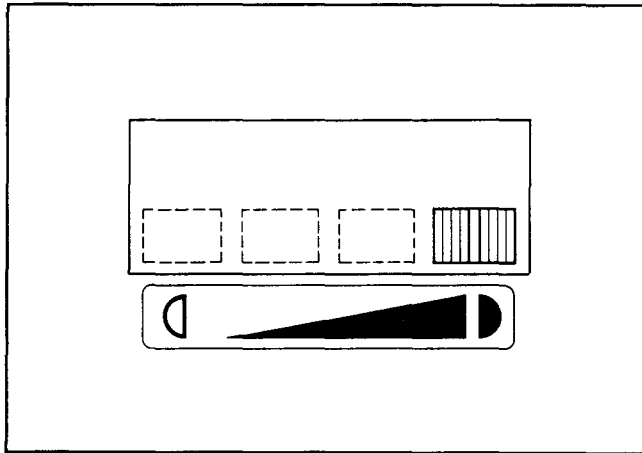
1. Hold the knob of the multi-purpose tray and pull it to open the tray.
2. Press the release button (at the right) upwards and open the cover.



3. To increase print density, move the density adjustment lever to the right.
To reduce the density, move the lever to the left.



NOTE: The density adjustment lever has four settings from left to right. As you move the lever, it clicks at each of the two positions in the middle.



MEMO

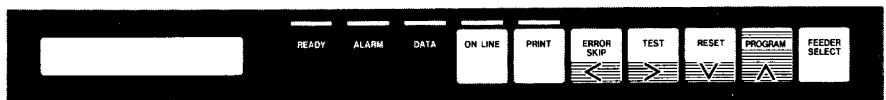
3.1 FRONT PANEL

The front panel of the Star LaserPrinter 4 is a combination control board and interactive message center. The panel consists of:

- a 1 line, 16 character LCD display screen
- 5 LED lights, 1 orange and 4 green
- 7 momentary contact buttons

The momentary contact buttons permit you to instructions to the printer. In turn, the printer uses the display screen and the light indicators to convey information to you.

The screen display is the primary way the printer communicates with the operator. It informs the operator about the machine's state, the printer's status, alarm conditions that require some action by the operator, "soft" errors, and messages when selecting current, initial and default printer parameters. The LEDs provide an "at glance" summary of the printer's status.



The printer operates in two main modes when the printer is Off Line:

1. Normal Mode (white buttons) - performs function labeled on the button.
2. Program Mode (brown buttons) - press the [PROGRAM] button to enter menu selections.

The meaning and use of the panel buttons depends on the mode in which the printer is operating.

3.1.1 Powering Up

Take note of the following points when turning on or off.

- When the printer is connected directly to a computer:
 - Power on: First turn on the computer, and then turn on the printer.
 - Power off: First turn off the printer, and then turn off the computer.
- When the printer is connected to a computer through other devices:
 - Power on: First turn on the computer, then other devices, and finally turn on the printer.
 - Power off: First turn off the printer, then other devices, and finally turn off the computer.

CAUTION: Always wait at least three seconds between turning off and turning on again.

Turn on the printer by pressing the “I” side of the power switch. The printer will begin its internal diagnostics and warming up, displaying a series of message on the screen as follows.

1. All LEDs are lit and the LCD display screen turns black.
2. The screen displays “LaserPrinter 4”.
3. Then the screen displays “Memory Test 1 MB”.

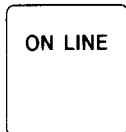
If an optional 1MB RAM board has been installed, the message will display “Memory Test 2 MB”. The actual value will depend on the size of the RAM board installed (1, 2 or 4 megabytes).

4. After a short while, the screen displays “EEPROM LOAD DONE” for a moment. This means that default parameters have been read from the EEPROM and the EEPROM CRC has been checked.
5. “PRINTER WARMUP” is displayed, the READY indicator starts blinking and the ON LINE lights up.
6. When the printer is ready, the screen displays “PRINTER READY” and the READY indicator is now continuously lit.

3.1.2 The Buttons

This section explains the various meaning and uses of the buttons, including their light indicators, where present. Keep in mind that the buttons' functions depend on the mode the printer is in: the Normal Mode and Program Mode.

[ON LINE]

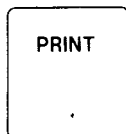


Pressing this button switches the printer from Off Line to On Line or vice versa. When the printer is On Line (ON LINE LED is lit), the printer is able to receive information from the computer and print it. All other buttons (except for the **ERROR SKIP** button under certain conditions) are inactive when the printer is On Line. When the printer is Off Line, the printer is unable to receive information and print, but the other switches can be used. If the printer is in the Program Mode, pressing this button exits from the Program Mode, and enters to the Normal Mode.

When the printer is On Line, the LED is on.

When the printer is Off Line, the LED is off.

[PRINT]



This button is active only when the printer is Off Line. Pressing the switch will print any page. If there is no page, the depression of the switch will be ignored. When printing is in operation, the LED is on.

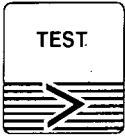
[ERROR SKIP/<]



This button is basically active only when the printer is Off Line. In the Normal Mode, a depression of this button has no effect if no alarm condition exists. However, if an alarm or warning condition exists, pressing this switch causes the printer to return to the previous state after corrective action has been taken.

When the printer is Off Line and in the Program Mode, this key is called **NEXT**. During programming, pressing this button displays the various items under a category for the operator to select next in the sequence.

[TEST/➤]



This button has two functions when the printer is Off Line.

- Pressing this button when the printer is in the Non-menu Mode will operate in the following sequence:

- 1) Pressing this button displays “HOLD FOR TEST”. If the button is released while this message is displayed, the printer returns to the previous state.
 - 2) If the button is held down for three seconds, the screen will display “STATUS SHEET”. Whether pressing the button or not within one second after “STATUS SHEET” is displayed will alter the printer operation.
 - 3) If the button is released without being pressed within one second, the printer will print a status sheet (see 3.2.1 Printing Test Sheets).
 - 4) If the button is pressed once within one second, the screen will display “FONT LIST”, and a font list will be printed (see 3.2.1 Printing Test Sheets).
 - 5) If the button is pressed twice within one second, “CLEANING PAPER” will be displayed and a cleaning paper will be printed (see 3.2.1 Printing Test Sheets).
 - 6) If the button is held down for more than 6 seconds after “STATUS SHEET” is displayed, the screen will display “TEST PRINT MODE”. If the button is released while this message is displayed, the printer will print a test print mode (see 3.2.1 Printing Test Sheets).
- In the Program Mode, pressing the [TEST] button as PREVIOUS presents the available items in reverse sequence.

[RESET/▼]



This button has three functions when the printer is Off Line.

- Pressing and holding this button when the printer is in the Normal Mode displays “HOLD FOR RESET”. If this button is held for more than three seconds, “REINITIALIZE” message is displayed and the printer is reinitialized to the initial settings of the emulation currently selected. This will also clear the input buffer, any page in composition, and composed pages queued up.

- When the printer is in the Program Mode, this button is called ENTER. Pressing the button selects the value with a @.
- Turning on the power while holding down the button causes the printer to enter the display language selection mode. (See “4.8 Selecting Display Language”.)

[PROGRAM/▲]



To start using the Program Mode, you must first set the printer Off Line, then press the [PROGRAM] button. Within a programming sequence, pressing the [PROGRAM] button takes the programming Menu to the next higher level, or exits from the Program Mode and displays “PRINTER READY”. For details, refer to 3.3 Programming from the Control Panel.

[FEEDER SELECT]



This button controls from where the printer will expect paper when printing. To change from one source to another, the printer must be Off Line, press the **ON LINE** button if the ON LINE LED is on, then hold down the **FEEDER SELECT** button for a while. The screen will display “FEEDER SELECT”.

- 1) If the button is released while this message is displayed, the screen displays the current feeder selection (e.g. multi-purpose tray). Further presses will cycle through the options below:

Cassette Only

Auto Selection

Cassette

MP Tray

Manual Feed

Cassette Only

NOTE:

- (1) The screen display will indicate only available selection. If the LC Cassette unit is not installed, only MP TRAY and MANUAL FEED are displayed.
 - (2) The Factory Setting is MP Tray. However, when the LC Cassette unit is installed, the Factory Setting will be changed to CASSETTE ONLY.
 - (3) If the DATA LED is lit or blinking, the new selection will be stored in Initial Setting and issued at the top of the first page stored in the printer.
- 2) Holding down this button for more than 2 seconds causes the screen to display "MP TRAY SIZE". If the button is released while this message is displayed, the screen will display the current multi-purpose tray size. Further presses will cycle through the options below:

Paper: Letter

Paper: Legal

Paper: A4

Paper: Executive

Paper: B5

ENV: Monarch

ENV: COM-10

ENV: Intntnl DL

ENV: Intntnl C5

Paper: Letter

NOTE:

- (1) The paper size selected by this button will be stored in Current and Initial Settings.
- (2) This option is available in all feeder selections except Cassette Only.

To exit from this mode, press the [ON LINE], [TEST], [RESET] or [PROGRAM] button.

3.1.3 Light Indicators

[READY]



READY

The READY LED indicates that the printer is ready for use when it is lit. This LED flashes the printer is warming up, then lights continuously.

[ALARM]



ALARM

The ALARM LED will light up in the event of an error which requires operator to take action (e.g. paper out). The bell will sound for 2 seconds whenever this LED lights up.

[DATA]



DATA

The DATA LED shows the data status of the printer. It is continuously lit when data has been received and not printed yet, and it flashes when the printer is waiting for more data. The DATA LED will go out when all received data has been processed. Do not turn the printer off while the DATA LED is lit, otherwise data will be lost.

[ON LINE]



ON LINE

The ON LINE LED shows that the printer is ready to receive data (the printer is set On Line when this LED is lit. This LED is off when the printer is not ready for receiving data (the printer is set Off Line). The LED flashes when the printer is printing a page or when the printing is switching from On Line to Off Line.

[PRINT]



PRINT

This LED is continuously lit while a page is being transferred through the printer. Otherwise, the LED is always off. The LED reflects the state of the third bit of the engine status 0 word.

3.1.4 Hex Dump

The Star LaserPrinter 4 can also operate in the hexadecimal mode. This means that it will print information sent to it in its equivalent hexadecimal notation (in base 16 numbers). This mode is useful in correcting communication incompatibilities between some computers and Star LaserPrinter 4, that can result in incorrect text or formatting. For information on performing a Hex Dump, see “9. Troubleshooting”.

3.2 SELF TEST

The Star LaserPrinter 4’s test print provides a complete summary of what it is currently capable doing for you. It shows the quality of the printing of text. It summarizes the printer’s configuration, including amount of memory and which fonts are installed or available. It explains how the printed page will look at the current settings. This includes paper size and page layout. It tells whether the parallel or serial interface is active.

3.2.1 Printing Test Sheets

There are four stages to the self test. Also refer to TEST/> of 3.1.2 The Buttons.

1) Printing a status sheet

Hold the [TEST] button until the screen displays “HOLD FOR TEST” then “STATUS SHEET”.

Releasing the button will print the 1 page status sheet.

2) Printing a font list (This operation is effective only in HP mode.)

Hold the [TEST] button until the screen displays “HOLD FOR TEST” then “STATUS SHEET”

Press the [TEST] button “once” within one second after “STATUS SHEET” is displayed. The screen displays “FONT LIST”.

When you release the button, the printer will produce a multipage font list.

3) Printing a cleaning paper

Hold the [TEST] button until the screen displays “HOLD FOR TEST” then “STATUS SHEET”.

Press the [TEST] button “twice” within one second after “STATUS SHEET” is displayed. The screen displays “CLEANING PAPER”.

When you release the button, the printer will produce a cleaning paper. This paper is used to clean the fixing assembly (see 8.3 Cleaning the Fixing Assembly).

4) Printing a test print mode paper

Keep holding down the [TEST] button until the screen displays “HOLD FOR TEST”, “STATUS SHEET” then “TEST PRINT MODE”.

When you release the button, the printer will produce multi-page “barber pole”. Pressing the button again will display “TEST PRINT STOP” and stop Printing.

3.2.2 Status Sheet Description

You can tell several things about the printer’s settings by just looking at the print, without reading any of it. First (and obviously) the printer is operating. Second, the page is printed in the portrait orientation. That is, the printing runs on the page the way portraits are usually painted, higher than they are wide. When the printed area is wider than it is high, the orientation is referred to as landscape. If the printer is set for landscape orientation, the sample is printed that way.

The status sheet is divided into two sections. The first section summarizes your printer’s basic configuration, identifying the version of its operating system (Firmware rev.) and specifying the amount of total RAM (memory) and the amount of RAM available for your use. If your printer has an optional RAM expansion board, its memory size will also be listed here.

The latter portion of the status sheet provides information on the options for printer operation that are currently active, in the order you are most likely to need the information. You can change any of these by programming from the front panel.

Two sets of selected (or default) options are listed:

- **Initial** - the settings that were selected when the printer was first turned on.

- **Power-up** - the settings that are stored in EEPROM (see Glossary).

The function of the EMULATION GROUP is:

- **Emulation** - the printer whose functions the Star LaserPrinter 4 is set to emulate.

The NUMBER OF COPIES GROUP function includes;

- **Number of copies** - the number of copies of each page to be printed.

The function of CHARACTER GROUP is:

- **Character** - character set, pitch, table

The function of JOB SIZE GROUP is:

- **Job Size** - the size of paper.

The functions of the LAYOUT are:

- **Orientation** - portrait or landscape.
- **Margin settings** - left, right and top in relation to the available page area, and page (text) length in number of lines.
- **VMI** - Vertical Motion Index. VMI refers to the smallest increment that can be made in the vertical or y axis. Line spacing is a multiple of VMI.
- **End of line** - whether auto wrap function is on or off.
- **Auto line feed** - whether there is an automatic carriage return (CR) at a paragraph break, an automatic line feed (LF) at the end of each line, and a form feed (FF) after each page.

The PAPER FEED GROUP includes:

- **Feeder** - whether the paper will be fed from the cassette or manually.
- **MP tray size** - the size of paper to be used by the multi-purpose tray.

The PAGE MODE GROUP function includes:

- **Page Mode** - partial or full

The INPUT BUFFER GROUP function includes:

- **Input Buffer** - memory capacity of the input buffer

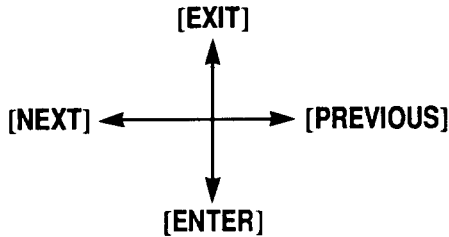
The function of the INTERFACE GROUP is:

- **Interface** - parallel or serial

3.3 PROGRAMMING FROM THE CONTROL PANEL

As the status report indicates, the various functions that you can select from the control panel are arranged in an outline form, or a hierarchy. This means there are main groups and several levels within each one.

Remember: you enter (by pressing [v]) or exit (by pressing [A]) a Level to select the previous (by pressing [>]) or next (by pressing [<]) Item within a Group.



To get into the Program Mode, you must perform two actions:

- Press [ON LINE] to go off the light, then
- Press [PROGRAM]. This will cause the screen to respond by displaying the phrase "NUMBER OF COPIES".

The order of the main categories within Program Mode is:

CHARACTER
JOB SIZE
LAYOUT
PAPER FEED
EMULATION
PAGE MODE
INPUT BUFFER
INTERFACE
SET POWER-UP
LOAD FACTORY SET

You move from one item to the next in this level by pressing [**<**]. Pressing [**v**] displays the next item of the next higher level. If no such item exists, [**v**] displays the value that is to be selected with @ added. [**ON LINE**] ends the Program Mode. Pressing [**>**] returns the display to the previous item at the same level you are currently in. Pressing [**^**] displays the next lower (previous) level.

Here's how this works in real life, using a portion of the EMULATION group hierarchy. Set the printer Off Line and press [**PROGRAM**] so the screen reads "NUMBER OF COPIES".

Then press [**<**] until the screen displays "EMULATION".

Pressing [**v**] will display one of the following:

HP LaserJet IIP
Epson FX-850
Hex Dump

Pressing [**<**] continuously will list all the available emulations.

Suppose you want to select Epson FX-850 as the emulation.

First get into the Program Mode,

- Press [**ON LINE**], so that the light is off
- Press [**PROGRAM**], after which the screen displays "NUMBER OF COPIES":
- Now press [**<**]. The screen responds with "CHARACTER".
- Pressing [**<**] four times displays, in order

JOB SIZE
LAYOUT
PAPER FEED
EMULATION

- Pressing [v] here displays “HP LaserJet IIP” as the default emulation. You want to stay in this level of the hierarchy, so this time
- Press [←], giving you “Epson FX-850” which is the emulation you want. To select it,
- Press [v]. This displays “REINITIALIZE” which means that the printer is being initialized for Epson FX-850 emulation. After a while, the screen displays “Epson FX-850@”.
- Press [ON LINE] to exit the Program Mode.

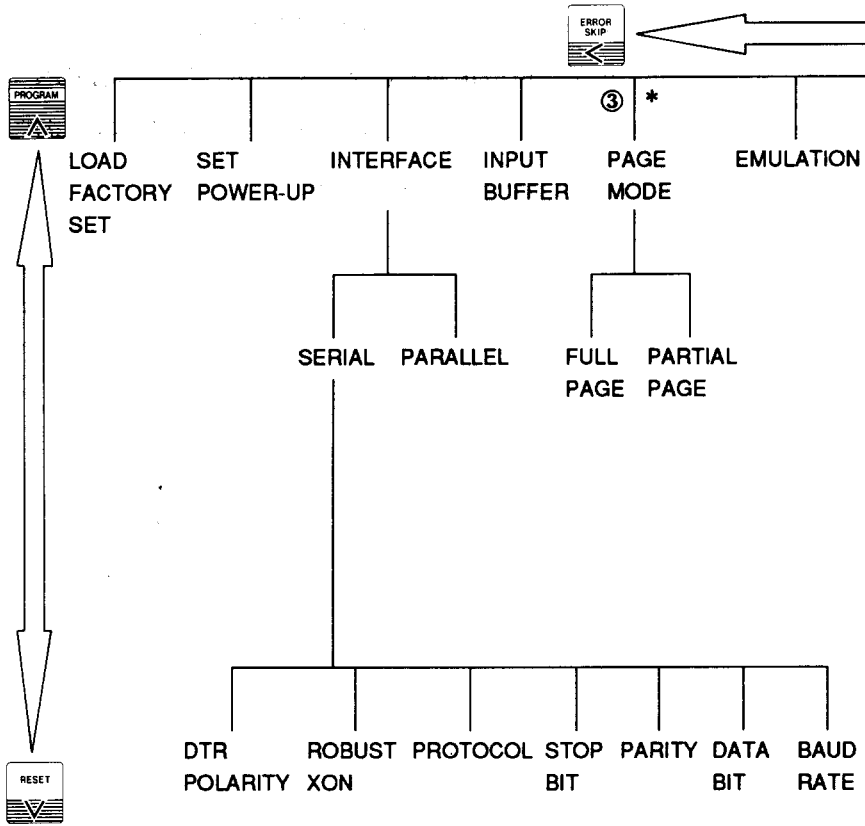
To see if the printer has been set for Epson FX-850 emulation.

- Carry out the same operation until the screen displays “EMULATION”.
- Then press [v]. The screen will display as the default “Epson FX-850 @”.
- The entire hierarchy is shown on the next pages.

STAR LASERPRINTER 4 CONTROL PANEL HIERARCHY

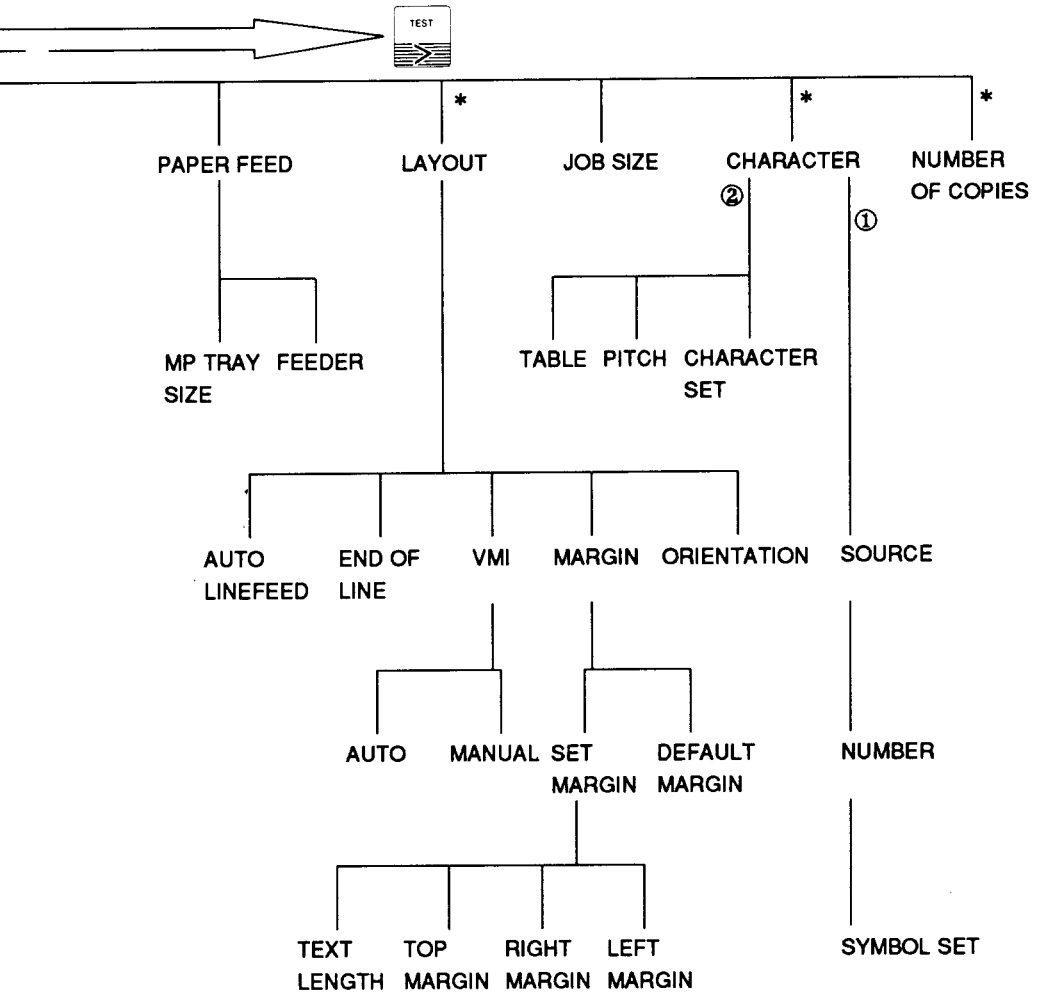
To enter program mode:

1. Take the printer off line by pressing the ONLINE button.
2. Enter program mode by pressing the PROGRAM button.
3. Follow the charts below, moving with the buttons indicated.



NOTE:

- ① HP LaserJet IIP mode only
- ② Epson FX-850 mode only
- ③ Skip without Expansion RAM Board
- * Skip in Hex Dump mode



MEMO

Quick Start with the Star LaserPrinter 4: A Tutorial

CHAPTER 4

This chapter is designed for dual use, since most computer users fall into one of two categories. Some people like to read the documentation through from beginning to end. Others like to plunge right into the hands-on mode, using documentation as a quick reference, at most.

This chapter is for both groups. It can be read in sequence with the rest of the book, or it can be used as a stand-alone aid.

4.1 PRELIMINARIES

Your Star LaserPrinter 4 comes in two basic parts:

- **the printer body**
- **the EP-L cartridge**

When you place your printer for use with your computer, be sure that:

- **it sits on a strong, stable table**
- **there is circulation on all sides, including the bottom**
- **you remove all the packing material before you use the printer.**

If you are just setting up your Star LaserPrinter 4, and have not read the material in Chapter 2, please take the time to read the section “2.2 Installing the EP-L Cartridge”. It is very vital that you handle and install this component precisely, because it contains important laser printing devices, as well as the toner (“ink”) that actually prints on the paper.

In addition to the multi-purpose tray that is provided as a standard feature, various types of paper can be fed into the printer using an optional paper feeder unit. Five different cassettes are available for use with the feeder unit; A4, Letter, Legal, Executive and Envelop. For installing the feeder unit and cassettes, see separate manuals.

The printer’s on-off switch is located at the front.

4.2 CONTROL PANEL

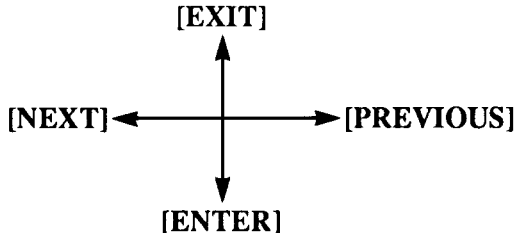
The front panel of the printer provides information about the printer's internal and operating status. It also allows you to program it for your (and your computer's) specific needs. The Star LaserPrinter 4 works in two basic modes when the printer is off line:

Normal mode—using the white buttons

Program mode—using the brown buttons

The buttons have different functions in each mode:

BUTTON	FRONT PANEL MODE (WHITE BUTTONS)	PROGRAM MODE (BROWN BUTTONS)
[ON LINE]	When light is on printer can print. When light is off all other buttons are enabled	Fast exit (termination) of Program Mode (returns to Printer Ready)
[PRINT]	Print information in memory	No function
[ERROR SKIP/<]	Continue printing or display error code	Display next item within current level of menu selections
[TEST/>]	Initiate tests	Display previous item within current level of menu selections
[RESET/v]	Discard information	Display next level within current item of menu selection. When in last level of current item, executes function
[PROGRAM/A]	Enter program mode	Display previous level within current item of menu selection
[FEEDER SELECT]	Select paper source for printing	No function



Remember: you enter (by pressing [▼]) or exit (by pressing [▲]) a Level to select the previous (by pressing [➤]) or next (by pressing [➤]) Item within a Group.

The front panel also has some lights. When lit they mean:

READY (green) — the printer is ready for printing or for programming

ALARM (orange) — an error condition exists and the printer is Off Line

DATA (green) — information received, not yet printed

ON LINE (green) — the printer is ready for printing

PRINT (green) — the printer is printing information

4.2.1 Basic operations

There are four basic operations performed from the panel:

- **On Line and Off Line** — The printer can receive information from the computer and print it only when it is On Line. When the printer is On Line, the light on the [ON LINE] button will be lit. For all other functions, the printer must be Off Line. This is accomplished by pressing the [ON LINE] button until its light is *out*.
- **Form feed** — The printer may have unprinted information in its memory. This is indicated by the lighted DATA light. To clear it from the printer, take the printer Off Line. Then press [PRINT]. When all the remaining information is printed, the paper will be ejected and the DATA light will go *out*.
- **Error Skip** — In case of an error, the printer will go Off Line and stop printing. If the error is minor, it is possible to continue printing. To do this, press [ERROR SKIP], then [ON LINE] until its light is *on*. If the error was minor, printing will resume. If the error was more serious, the panel will provide information on how to handle it.
- **Reset** — To clear the printer memory and restore settings to emulation defaults, press [RESET].

Before you begin printing, at any time, but especially when you are new to the process, it is a good idea to run a test or sample print. To do this, take the printer Off Line. Then press and hold [TEST] until the display reads Status Sheet. The printer will provide a status sheet showing.

- its configuration
- the quality of its text printing, and
- a summary of its settings — initial and power-up preset.

4.3 CONNECTING THE PRINTER TO THE COMPUTER

The Star LaserPrinter 4 comes equipped with both a standard Centronics parallel interface and an RS-232 serial interface. Both can be connected simultaneously, though only one can be active at any one time.

The printer comes from the factory pre-set with the Centronics parallel interface active. You can confirm this by looking at the Interface Group portion of the sample print.

	Auto wrap Off CR=CR	
PAPER FEED	Auto selection	Auto selection
Feeder	Paper: A4	Paper: A4
MP tray size	Partial page	Partial page
PAGE MODE	1K bytes	1K bytes
INPUT BUFFER	Parallel	Parallel
INTERFACE		
Error History		

This means that the Centronics parallel interface is active. If the serial port were active, that line would state serial.

If you are going to use a Centronics interface, you don't need to make any changes. If you want to use an RS-232 interface, you must perform a programming sequence. Programming will involve pressing various panel keys and following the information provided on the display screen. The control panel indicates the selected function with the @ symbol following the function displayed.

4.3.1 Selecting the Serial Interface

Note that when you have completed the selection sequence, the settings must be stored in EEPROM (see 4.3.3 Saving Settings).

- Take the printer Off Line by pressing the [ON LINE] button until the button's light is *off*
- Then press [PROGRAM].
- Press [<] until the display screen reads

INTERFACE

- Press [v]. Now the screen will read

PARALLEL @

- Now press [<]. The screen will change to

SERIAL

- With the display reading SERIAL, this time press [v]. The screen will show

BAUD RATE

- Pressing [v] now displays

9600 baud

- Press [<] to display a series of options, from 300 to 19200. Keep pressing until the one you want appears on the screen.

- Pressing [v] now displays

9600 baud @

- Then press [▲] displays BAUD RATE. Pressing [◀] displays these options:

DATA BIT

PARITY

STOP BIT

PROTOCOL

ROBUST-XON

DTR POLARITY

The settings from the factory for these options are:

8 bit

no parity

1 stop bit

DTR

High

Whenever you want to change any of the serial parameters, follow the same sequence as for selecting the baud rate. For example, to change the data bit, at SERIAL press [v] then [◀] until DATA BIT is displayed on the screen. Pressing [v] will display the first option, and [◀] will give the rest of them. Press [v] when your choice appears on the screen. Finally, press [ON LINE], which readies the Star LaserPrinter 4 for printing.

If your applications program requires an X_{ON}/X_{OFF} handshake (“software” rather than DTR “hardware”), set it from the SERIAL menu by

- Pressing [v] then [◀] until you see

PROTOCOL

- Pressing [v] displays

DTR

- Pressing [▲] until the display reads X_{ON}/X_{OFF}. Press [v] to execute.

The next step is to activate your choice to the printer.

- Press [◀] 3 times to display

INTERFACE

- Press [◀] to display

SET POWER-UP

- Press [v] to store the current settings into EEPROM.
- Press [ON LINE], which allows the Star LaserPrinter 4 to begin printing through the serial interface.

4.3.2 Activating the Parallel Interface

To return to a parallel interface, do this:

- Take the printer Off Line by pressing the [ON LINE] button until the button's light is *off*
- Then press [PROGRAM].
- Press [◀] until the screen displays

INTERFACE

- Press [v], which displays

SERIAL @

- Press [◀] which gives

PARALLEL

- Press [v] to select parallel.
- Press [▲] once to display

INTERFACE

- Press [◀] to display

SET POWER-UP

- Press [v] to store the current settings into EEPROM.
- Pressing [ON LINE] will allow the Star LaserPrinter 4 to begin printing through the parallel interface.

4.3.3 Saving the Setting

The new setting will remain in the printer's RAM memory until it is turned *off*. To understand why, you should realize that there are four different types of settings stored in the printer's memories.

- The **FACTORY SETTINGS**, which are those put into the printer's unchangeable ROM memory at the factory.
- The **POWER-UP SETTINGS**, which the user can create, then store in a permanent memory called EEPROM, even when the power is turned off at the end of the session in which they are created. These settings will then override the Factory Settings, being activated when the printer is turned off, then on again.
- The **INITIAL SETTINGS**, which the user can create and use as long as the printer is not turned off. These are stored in temporary or volatile RAM memory. They override the Power-up Settings.
- The **CURRENT SETTINGS**, which are those stored in temporary RAM memory. These may be issued by software commands that override all other settings.

To make the setting permanent, you must save it in EEPROM! Perform this programming sequence, after taking the printer Off Line.

- Press [**PROGRAM**].
- Press [**<**] until the screen displays
SET POWER-UP
- Press [**v**], after which the screen will display
EEPROM LOAD DONE
- Finally, press [**ON LINE**]. Your new settings are now saved, and you can continue with other printing, if desired.

4.3.4 Returning to Factory Settings

If for some reason you want to start from the beginning, with the original factory settings, follow this procedure:

- In the Program mode, press [**<**] until the screen reads
LOAD FACTORY SET

- Press [v]. The screen will display
EC Set @
- Pressing [<] display the other option:
US Set
Select the one you want.
- Press [v]. The screen will display briefly
LOAD FROM ROM OK
then
LOAD FACTORY SET

The factory settings are now restored, and you can go On Line for other activities.

4.4 MANUAL FEED

The Star LaserPrinter 4 can feed paper automatically using an optional cassette. If an optional cassette is installed, the factory default of feeder is Cassette Only. To change this setting from the control panel, put the printer Off Line, and press [PROGRAM].

- Press [<] until the screen displays:
PAPER FEED
- Press [v], and the screen will now display:
FEEDER
- Press [v], which will display
Cassette Only@
- Pressing [<] displays these options:
MP Tray
Manual Feed
Auto Selection
- Press [<] to display
Mp Tray or Manual Feed

- Pressing [**v**] confirms the change.
- Finally, press the [**ON LINE**] button to make the Star LaserPrinter 4 ready for printing.

Manual paper feeding should always be done from the multi-purpose tray (MP tray). If OHP transparencies, label sheets or envelopes are to be fed manually, the face-up tray should be used.

If during either manual or automatic feed, you get a paper jam, refer to the chapter on “Troubleshooting,” for ways to clear the machine.

4.5 PAPER SIZE

The factory default of MP TRAY SIZE is A4 paper. If you want to use other size of paper or envelopes, you must first instruct the printer. After going Off Line and pressing [**PROGRAM**]:

- Press [**<**] until the screen reads
PAPER FEED
- Press [**v**], which will display
FEEDER
- Pressing [**<**] displays
MP TRAY SIZE
- Press [**v**], which will display
Paper : A4 (for EC set) or Letter (for US set)@
- Pressing [**NEXT**] repeatedly will list the other choices,

```

Paper : Letter
Paper : Legal
Paper : A4
Paper : Executive
Paper : B5
Env.   : Monarch
Env.   : COM-10
Env.   : Intntrl DL
Env.   : Intntrl C5

```


- Press [v] when the required paper/envelope size is displayed on the screen.
- Finally, press [ON LINE], which readies the Star LaserPrinter 4 for printing.

Before you start printing, refill the cassette with the appropriate paper.

4.6 PRINTING IN LANDSCAPE ORIENTATION

If you want to change from portrait to landscape orientation for your printed page, follow this procedure, after going Off Line and pressing [PROGRAM]:

- Press [◀] until you get
LAYOUT
- Press [v], which will display
ORIENTATION
- Press [v] for
Portrait@
- Pressing [◀] gives
Landscape
- Pressing [v] selects Landscape.

4.7 CHANGING CHARACTER SET

If you want to use a character set other than that provided at the factory, follow this procedure:

- After going Off Line and pressing [PROGRAM]
- Press [◀] until you see
CHARACTER
- Press [v], which displays, in case of the HP LaserJet IIP emulation
SOURCE R (or SOURCE C or SOURCE S)@
(SOURCE R means Resident, SOURCE C for Cartridge, and SOURCE S for Soft font)

- Press [**v**] displays
NUMBER 1@
- Pressing [**v**] again gives various options for SYMBOL SET.
- Pressing [**<**] until you see the desired one.
- Then press [**v**].
- Press [**ON LINE**].

4.8 SELECTING DISPLAY LANGUAGE

The language for display can be selected from English, French, German, Italian or Spanish. To select the display language, turn off the printer then follow the procedure below.

1. Hold down [**RESET/v**] and turn on the printer (make sure that [**RESET/v**] is held at least until the screen displays “SELECT LANGUAGE”). The screen displays

SELECT LANGUAGE

Memory Test X MB

ENGLISH@

2. Pressing [**ERROR SKIP/<**] or [**TEST/>**] changes the language as displayed in the screen.
3. Press [**ON LINE**] after selecting new language. The language will be saved and the printer goes On Line.

If [**RESET/v**] is released before “SELECT LANGUAGE” message is displayed, the printer will not enter the display language mode (i.e. normal startup operation will be carried out). The factory setting of display language is English.

Setting Up A Page

CHAPTER 5

As the sample print shows, your Star LaserPrinter 4 can fill a sheet of paper with text and/or graphics to within $3/16 - 1/2$ in (8 - 12mm) of the margins. Some of the choices are made for you by the printer. But most of them are under your control, either from the front panel of the printer, or through your computer and the application software you are using on it.

Some of the choices may be limited. Printer emulation and the page orientation are examples. Your application software may not support an available command, or it may not permit a change in page orientation. Whether you are printing business letters, charts or other graphics, or brochures and newsletters, you should keep these choices and their limitations in mind.

What follows is a list of the elements that go into a printed page. They may be selected through the front panel of the Star LaserPrinter 4 or through your application software.

Format:

- Orientation
- Form size
- Text length
- Margins
- Line spacing

Text:

- Character set/symbol set
- Typeface
- Character spacing
- Pitch
- Point size
- Style
- Stroke weight

If you are a beginner, you may want to limit the amount of computer programming you do for page set-up. Remember: you can print a very nice-looking page with very little manipulation, by relying on the default settings in your printer and application program. By using the programming available from the front panel of the printer, you have a wide variety of options.

The next chapter outlines your choices, both for Star LaserPrinter 4 programming and for making choices from the computer.

Font Selection

CHAPTER 6

The style of printing that appears in your finished work consists of five elements:

- **the symbol/character set** — the letters, numbers, and symbols available for use
- **the fonts present in the Star LaserPrinter 4** — some fonts come as standard equipment, while others are available in cartridges that are installed in the cartridge slot of the printer; you may also purchase fonts on a disk and load them down (downloading) from the computer to the Star LaserPrinter 4's RAM (for more information consult a software dealer)
- **font attributes** — consisting of character spacing, pitch, point size, style, stroke weight, and typeface
- **the printer you select to emulate** — the Star LaserPrinter 4 can emulate two widely available printers, the *Hewlett Packard LaserJet IIP* (a laser printer) and *Epson FX-850* (a dot-matrix printer).
- **the capabilities of your applications software.**

The Star LaserPrinter 4 comes equipped with two families of fonts: Courier and LinePrinter. Any one of them can be selected from the control panel for use as the base font in any emulation.

6.1 HEWLETT PACKARD LASERJET IIP

Default Values, primary and secondary fonts:

Character number: 1 (Courier, 10cpi, 12point, Medium)
Symbol set: Roman-8

Available Values, primary and secondary fonts:

Character number: 1* (Courier, 10cpi, 12point, Medium)
2 (Courier, 10cpi, 12point, Bold)
3 (Courier, 10cpi, 12point, Italic)
4 (Courier, 12cpi, 10point, Medium)
5 (Courier, 12cpi, 10point, Bold)
6 (Courier, 12cpi, 10point, Italic)
7 (LinePrinter, 16.66cpi, 8.5point, Medium)

Symbol set: Roman-8*
ECMA94
IBM PC
IBM DN
PC-850
ISO 2: IRV
ISO 4: UK
ISO 6: USASCII
ISO 10: Swedish
ISO 11: Swedish
ISO 14: JIS ASCII
ISO 15: Italian
ISO 16: Portug
ISO 17: Spanish
ISO 21: German
ISO 25: French
ISO 57: Chinese
ISO 60: Norweg
ISO 61: Norweg
ISO 69: French

ISO 84: Portug
ISO 85: Spanish
HP German
HP Spanish

6.2 EPSON FX-850

Default Values:

Character set: USA
Pitch: 10 cpi
Table: Italic

Available Values:

Character set: USA*
French
Germany
UK
Denmark I
Sweden
Italy
Spain
Japan
Norway
Denmark II
Pitch: 10 cpi*
12 cpi
17 cpi
20 cpi
Proportional
Table: Italic*
Graphics Set #1
Graphics Set #2

Interfacing With Applications Programs

CHAPTER 7

If this were the best of all possible computer worlds, every software application would run automatically on the Star LaserPrinter 4 or any other printer. The fact is that software applications—word processing, spreadsheets, databases, or others—are designed to work with a specific printer or a limited group of printers.

Some very popular software applications were written before laser printers became common, and require a dot-matrix or daisy-wheel printer. Some software is linked to a particular brand of computer and printer. And some can be used on only one brand of laser printer.

As you have read, some of the commands needed for printing are resident in the Star LaserPrinter 4. Some can be programmed from the control panel. And some must be issued by the computer, from within a program. Some applications programs allow the user to specify a printer or printers, either by name or by type. Once the selection is made, it becomes part of the program file. As a result, printing usually requires nothing more than issuing a one or two keystroke command.

In this chapter you will learn how to specify the Star LaserPrinter 4 for four popular applications programs for IBM-compatible computers: Lotus 1-2-3, WordPerfect, Microsoft Word, and Microsoft Windows. The Star LaserPrinter 4 will print graphics as well as words and numbers, emulating Hewlett Packard graphics, all densities of the Epson dot matrix printers. It can also be used with the two popular desktop publishing programs, Aldus PageMaker, and Xerox Ventura Publisher, which uses the GEM desktop environment. Both are compatible with the HP LaserJet IIP. For further information consult the Applications Manual.

Before you begin printing, be sure your Star LaserPrinter 4 is correctly configured for your computer by having either the parallel or serial interface selected and the correct cabling. Prior to printing, make sure that you have selected the same emulation from the front panel as the one you specified in the application.

7.1 LOTUS 1-2-3 RELEASE 2

This section explains how to installing Lotus 1-2-3 for use with your Star LaserPrinter 4. For detailed information, refer to the Lotus Getting Started manual.

First, add the following commands to the AUTOEXEC.BAT file, depending on parallel or serial interface used.

Parallel: If your printer is connected to the computer's parallel port LPT1, add the following command to the AUTOEXEC.BAT file:

```
MODE LPT1:,,P
```

Serial: If your printer is connected to the computer's serial port COM1, add the following command to the AUTOEXEC.BAT file:

```
MODE COM1:9600,N8,1,P
```

```
MODE LPT1:=COM1
```

- Installing the Lotus 1-2-3 INSTALL Program

If the Lotus 1-2-3 has not been installed, you must install it before proceeding. At the DOS prompt, type LOTUS and press [RETURN]. This causes the computer to display the 1-2-3 Access System.

Move the cursor to "Install", then press [RETURN] to run the INSTALL program. Lotus may ask you to insert the UTILITY disk. This will display the MAIN MENU. You can select your printer following the procedure below.

- 1) Select "Change Selected Equipment" and press [RETURN], which displays the Selected Equipment screen.
- 2) Select "Test Printer(s)" and press [RETURN], which displays the Text Printer(s) screen.
- 3) Select "HP" and press [RETURN]. This displays the Text Printer(s) screen.
- 4) Select "2686 LaserJet or LaserJet+" and press [RETURN].

The printer type for texts has been selected. To select the printer type for graphics, go back to the Selected Equipment screen.

- 5) Select "Graphics Printer(s)" and press [RETURN], which displays the Graphics Printer(s) screen.
- 6) Select "HP" and press [RETURN] to display the Graphics Printer(s) screen.
- 7) For 150 or 300DPI, select "LaserJet+" and press [RETURN]. For 75DPI, select "LaserJet" and press [RETURN].

When you have completed the selection of a graphics printer, press [F10]. Your current selections will be displayed. Make sure that the selections are correct. If not, repeat the installation process.

To save your selections, press [Esc] to return to the Selected Equipment screen.

- 1) Select "Save Changes" and press [RETURN], which displays the Saving Changes screen.
- 2) Read message and press [RETURN].
- 3) Now, you have saved the changes you made. Press [F9] to go to the Main Menu, or press [RETURN] to leave the install program. The EXIT screen will be displayed.
- 4) Select "YES" and press [RETURN].

- Selecting Default Settings

After running the INSTALL program, you must select printer defaults.

At the DOS prompt, type LOTUS and press [RETURN] to display the 1-2-3 Access System. Move the cursor to "1-2-3", then press [RETURN] to run the 1-2-3 program. Lotus may ask you to insert the SYSTEM disk.

At the opening screen, press [/] to access the spreadsheet menu. Then, type [W]orksheet, [G]lobal, [D]efault and [P]rinter. The configuration menu will be displayed. Now you are ready to make some selections about the configuration of your Star LaserPrinter 4.

- 1) Type [I] Interface and select the number which corresponds to the interface for your printer.

For parallel, type "1", and for serial, type "2" (for example).

- 2) Select appropriate settings for auto linefeed, left margin, right margin, top margin, bottom margin, page length, wait, setup and name.

3) When you have completed, type [Q]uit, then [U]pdate. The 1-2-3 will save your selections and use these defaults when printing.

Now, you are ready to use your Star LaserPrinter 4.

You can also use the Star LaserPrinter 4's Epson FX-850 emulation, following the same routine from the Lotus Menus.

7.2 WORDPERFECT VERSION 5.0

WordPerfect must be installed before you can select a printer. Refer to the "Installation" section in your WordPerfect Manual. Once this is done, follow the procedure below to select a printer.

- 1) Press [Shift] and [F7], then select [S] Select Printer.
- 2) Select [2] Additional Printers, which displays the Select Printer screen.
- 3) From the list of defined printers, select either HP LaserJet IIP (or HP LaserJet II), Epson FX-850, then press [RETURN].
- 4) Press [RETURN] to accept the displayed printer filename or enter a new name, then press [F7] Exit. The Select Printer: Edit screen will be displayed.
- 5) Now you must specify the interface connection. Select [2] Port at the Select Printer: Edit menu, which displays a list of ports.
- 6) If you are using a parallel interface, for LPT1, type "1".
- 7) If you are using a serial interface, for COM1, type "4". The WordPerfect will display the Select Printer: COM port menu.

You must now specify the serial parameters, including baud rate, parity, stop bits, character length and X_{ON}/X_{OFF} function. Be sure that you specify the same values in WordPerfect as you do for the Star LaserPrinter 4. To save your WordPerfect selections, press [F7] to exit the program.

7.3 MICROSOFT WORD 4.0

To use Microsoft Word with your Star LaserPrinter 4, appropriate Printer Descriptions (PRDs) must be installed. PRDs are found on Supplemental Printer Diskettes. These PRDs provide (1) internal and cartridge fonts in both orientations and (2) Hewlette-Packard soft fonts. Install them following the procedure described in Microsoft Word manuals.

In Microsoft Word, you can make your printer selections through the Print Menu.

- 1) At the text screen, type [E]sc and [P]rint.
- 2) In the resulting menu, select OPTIONS by typing [O]ptions.

A list of available printers appears at the top of the screen. Each of these printers is the subject of a Printer Description (PRD) file.

7.4 MICROSOFT WINDOWS

Microsoft Windows is a program that coordinates the use of various programs that might not otherwise be compatible on the screen. Windows can be configured for your printer, but you should also be aware that any applications program that you use may have its own printer requirements, which must be taken into consideration.

To choose a printer for Windows, at the initial Menu select
CONTROL PANEL.

From the resulting Menu, select the
INSTALLATION

Menu, then

ADD A PRINTER.

The screen will display a box that reads:

Add printer

Insert the disk with the printer file

you wish to add into drive A, or choose

an alternative drive/directory:

A:\ _____

OK CANCEL

Insert the Utilities disk in drive A and press

OK

Now the screen displays this box:

Available Printers Printer File: _____

Epson FX-80

NEC 3550

HP LaserJet

HP LaserJet Plus

HP 7470A

Add Cancel

Highlight HP LaserJet Plus or Epson and select

ADD

Another box appears in response:

Copy associated printer file HPLASERP.DRV

to drive/directory:

C:\Windows (if you have a hard disk)

Yes No Cancel

selecting YES confirms your printer choice and returns you to the CONTROL PANEL Menu.

If you are just starting with Windows, you should select SETUP from the CONTROL PANEL Menu. This will present a Menu with three options.

You should first select PRINTER and from the list choose the printer you wish to use.

Next, from SETUP select CONNECTIONS. This will let you designate the parallel or serial port for the printer, clicking OK to confirm it.

If you are using a serial printer, go to SETUP once again, and select **COMMUNICATIONS**

After you indicate the active port you have already chosen, Windows will present a series of settings options. Type in the desired baud rate and “push the button” for your selection of word (bit) length, parity, stop bits, handshake, and port.

Select **HARDWARE** handshake and 1 stop bit.

Be sure that the other selections match the printer settings shown under Interface Group on the Star LaserPrinter 4's sample print.

MEMO

Maintaining the Star LaserPrinter 4

CHAPTER **8**

The LaserPrinter 4 does not require much care and maintenance. However, it is important to perform a few cleaning tasks to maintain your printer in good condition. This chapter will explain procedures for replacing the EP-L cartridge, handling the EP-L cartridge and printer, and cleaning the printer.

8.1 REPLACING THE EP-L CARTRIDGE

Replace the EP-L cartridge in the following cases:

- If print quality is still low, even after you have redistributed the toner by removing the cartridge and rocking it gently from end to end about five or six times.
- If transparency films show stain problem at either the top or bottom of the films.

NOTE: For directions on replacing the EP-L cartridge, refer to "2.2 Installing the EP-L cartridge".

8.2 STORAGE AND HANDLING PRECAUTIONS FOR THE EP-L CARTRIDGE

The EP-L cartridge contains both the photosensitive drum and toner used for printing. Since the drum is extremely sensitive to the light, it may be permanently damaged if it is exposed to the direct sunlight or strong light. Caked or unevenly distributed toner may result in poor print quality. Therefore, always observe the following rules:

- Always keep the EP-L cartridge in the aluminum bag in which it was originally packed. And do not open the bag until you are ready to install it in the printer.

- Do not store the cartridge where it will be exposed to direct sunlight.
- Store the cartridge with the lable facing up. Do not turn it upside down or stand it on end.
- Store the cartridge at a temperature of between 0°C and 35°C (32°F and 95°F).
- Do not store the cartridge in salty air, or where there are corrosive gases such as ammonia.
- Keep the cartridge away from CRTs, disk drives and floppy disks. The magnet in the cartridge can adversely affect them.
- Always keep the cartridge away from children.
- Be sure to use the cartridge before its expiration date. Otherwise, print quality will be affected.

When handling the EP-L cartridge, also pay attention to the following points, in addition to the above.

- Do not touch the bottom of the cartridge when handling the cartridge.
- Do not open the drum protective shutter. If it is opened, print quality may be affected.

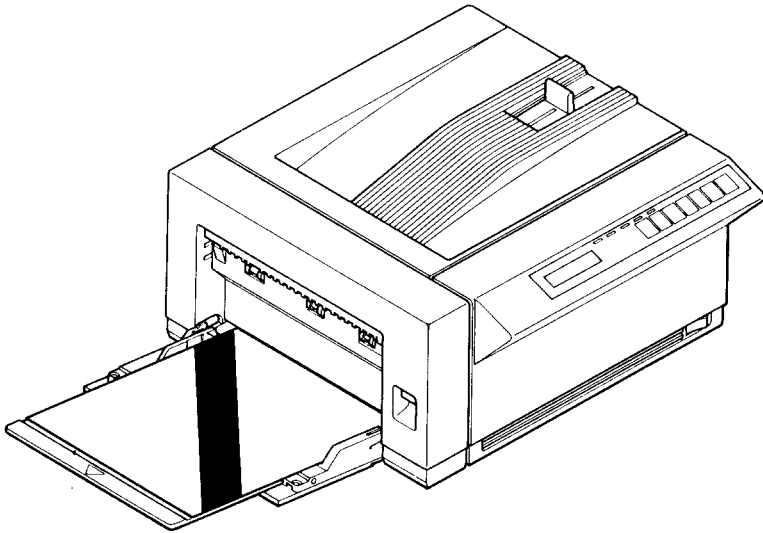
8.3 CLEANING THE FIXING ASSEMBLY

Transparency films may sometimes show stain problem at either the top or bottom of the films. This problem may be caused by a dirty paper path or the flaw on the EP-L cartridge. In this case, clean the fixing assembly, and replace the EP-L cartridge if necessary. Regular cleaning of the fixing assembly will reduce the possibility of paper jam and will prolong the life of the printer. The fixing assembly can be cleaned using cleaning paper.

First print a sheet of “CLEANING PAPER” on letter, A4, or legal size paper according to the following procedure (see “3.2.1 Printing Test Sheets”).

- 1) Hold the [TEST] button until the screen displays “HOLD FOR TEST” then “STATUS SHEET”.
- 2) Press the [TEST] button “twice” within one second after “STATUS SHEET” is displayed. The screen displays “CLEANING PAPER”.

- 3) Releasing the button will produce a cleaning paper. When the cleaning paper is produced, the screen displays "MP LOAD THE PAP".
- 4) Now place the cleaning paper face up in the multi-purpose tray, inserting it as far as it will go without forcing it. Make sure that the paper guides are aligned with the paper.
- 5) Press the [TEST] button. The printer will feed the paper and the screen displays "NOW CLEANING".
- 6) When cleaning is done, the screen will display "CLEANING DONE" for one second.



8.4 CLEANING THE EXTERIOR OF THE PRINTER

Before cleaning, make sure that the power cord is removed.

Use only water and neutral detergent to remove marks and spots from the printer, then wipe the printer dry with a soft dry cloth. Use of any other cleaning solution may damage the printer.

The printer does not require lubrication. Never attempt to lubricate any internal or external parts of the printer. Otherwise, lubrication may affect the operation of the printer and damage the printer.

MEMO

An important key to reliable operation of your Star LaserPrinter 4 is knowing how to respond when trouble occurs. Some problem conditions can be handled on the spot by the printer operator. Others require servicing by trained personnel. This chapter will explain when to do what. It will also help you deal with the paper jamming and other operational problems.

9.1 ERROR MESSAGES DISPLAYED ON THE SCREEN

The control panel screen may display a variety of messages during the course of operation of the Star LaserPrinter 4. You are already familiar with the display sequence during power-up, and when programming the printer. Some messages provide information about the paper supply in the cassette or the condition of the EP-L cartridge. Others have to do with fonts or emulations.

Another way of considering errors is that some of them result from failures in hardware or software. Other errors are functional, meaning that either the printer operator or the host computer has commanded the controller to perform an operation that is beyond its designed capabilities.

If the printer malfunctions for some reason, warning messages will appear on the screen, recommending what action you should take. The most serious are messages that tell you to call for repair service. Some messages concern less serious conditions that can be handled by the printer operator. Information messages relate a communication problem with the host computer, but do not affect the printer's operation. These messages are summarized here.

9.2 SERVICE CALL MESSAGES

9.2.1 Engine Service Call Messages

Engine service call messages are related to the interface with engine. They can result from either a communication failure, or a halt in the engine's ready level.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CALL SERVICE 01	fixing assembly; status 2, bit 2	processing stops; alarm beeps; press [ERROR SKIP] to reset engine and recheck
CALL SERVICE 02	faulty BD; status 2, bit 3	processing stops; alarm beeps; press [ERROR SKIP] to reset engine and recheck
CALL SERVICE 03	scanner motor malfunction, status 2, bit 4	processing stops; alarm beeps; press [ERROR SKIP] to reset engine and recheck
CALL SERVICE 04	improper communication	processing stops; alarm beeps; turn off the power then on to reset engine and recheck

9.2.2 Controller Service Call Messages

Controller error messages result from failure in either hardware or software. Some controller error messages occur during startup tests. The messages mean that the controller is malfunctioning, but is still able to display the error message. Certain conditions can also be detected during controller reset, on insertion of a cartridge, and at other times after the completion of power-up initialization. An error stops the test sequence, the unit goes off line, and the alarm sounds. The controller will attempt to recover, if possible. If the problem is not found during initialization, but recurs during operation, most likely the fault is in the hardware.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CALL SERVICE 05	CRC error in controller main ROM program	program halts; fatal
CALL SERVICE 06	CRC error in resident font ROM	program halts; fatal
CALL SERVICE 07	read/write test error in on-board RAM	program halts; fatal
CALL SERVICE 08	read/write test error in expansion RAM (if installed)	sequence stops; alarm beeps; shut off power and fix problem; or press [ERROR SKIP] to continue, in which case the expansion RAM will be ignored
CARTRIDGE BAD	CRC error in Cartridge (if installed)	sequence stops; alarm beeps; shut off power and fix problem; or press [ERROR SKIP] to continue, in which case the cartridge will be ignored
CALL SERVICE 10	CRC error in EEPROM	sequence stops; alarm beeps; shut off power and fix problem; or press [ERROR SKIP] to continue, in which case program uses factory settings as power-up settings
NO FONT PRESENT	no font present	program halts; fatal
TIMER ERROR	counter-timer error	program halts; fatal

9.3 OPERATOR CALL MESSAGES

Whenever the screen displays operator call messages, the printer goes off line and the alarm sounds. The problem is one that the operator should be able to resolve. After making any corrections, you should press [ERROR SKIP] to recheck the status. If the error message is not displayed again, you may continue printing straight away (if the error was one of the Engine Problems below). If the error message was of any other type, you should press [ON LINE] before continuing the print job.

9.3.1 Engine Problems

These are mechanical problems that prevent the engine from being ready to print.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CASS: REFILL X (X means the current job size)	cassette is current feeder; out of paper	printing stops; refill paper
TRAY: REFILL X (X means the current job size)	no paper in the multi-purpose tray	printing stops; refill paper
LOAD X CASS (X means the current job size)	cassette is current feeder; no cassette in LC slot	printing stops; install the cassette
PAPER JAMMING	paper is jammed within; status 1, bit 5	follow printer procedure in "9.7 Paper Jamming"
SET EP/CLOSE	side cover is open or no EP-L cartridge	close the side cover or install the EP-L cartridge

9.3.2 Font/Emulation Cartridge Problems

The font and emulation cartridge are plugged into the printer. They can should not be inserted or withdrawn while the DATA LED is continuously lit. If someone does this, the screen will indicate "CARTRIDGE ERROR". The printer must be reinitialized by turning off the power and then on again.

If an emulation cartridge is removed while it is being accessed, the screen will indicate "CARTRIDGE ERROR" until the printer is re-powered up. If a font cartridge is removed while the DATA LED is blinking, the screen will display "REINSERT CART". In this case, the operator must insert the font cartridge or press [ERROR SKIP]. If [ERROR SKIP] is pressed, the printer will select the closest font.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CARTRIDGE ERROR	emulation or font cartridge is removed while DATA LED is on	Turn the power off then on again to initialize the printer
CARTRIDGE ERROR	emulation cartridge is removed while emulation	Turn the power off then on again to initialize the printer
REINSERT CART	font cartridge is removed while DATA LED is blinking	insert the cartridge or press [ERROR SKIP]

9.3.3 Optional Hardware

The following messages will be displayed if necessary optional hardwares (e.g. RAM expansion board) have been removed.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
INSUFFICIENT RAM	full page mode as power-up setting; no expansion RAM installed	repower-up with expansion RAM board, or press [ERROR SKIP]
NO EMULATION CART	cartridge emulation mode as power-up setting; no emulation cartridge installed	repower-up with the emulation cartridge, or press [ERROR SKIP]

9.3.4 Change Paper Size

Certain emulations permit job size to be specified by the host computer. Also, job size can be selected from the menu. If a change in job size is required, the screen will display a message to that effect. The alarm will beep and the printer will go Off Line. You may have the printer ignore such a message by pressing [ERROR SKIP]. (In this case, the printer will print the job size image on the different size paper.) If the current feeder is cassette, inserting the correct paper cassette causes the printer to start printing automatically. If the current feeder is the multi-purpose tray, changing the multi-purpose tray size via panel starts printing automatically.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CASS: CHANGE A4	A4 size is required; cassette	follow procedure above
TRAY: CHANGE A4	A4 size is required; multi-purpose tray	follow procedure above
CASS: CHANGE LTR	Letter size is required; cassette	follow procedure above
TRAY: CHANGE LTR	Letter size is required; multi-purpose tray	follow procedure above
CASS: CHANGE LGL	Legal size is required; cassette	follow procedure above
TRAY: CHANGE LGL	Legal size is required; multi-purpose tray	follow procedure above
CASS: CHANGE EXE	Executive size is required; cassette	follow procedure above
TRAY: CHANGE EXE	Executive size is required; multi-purpose tray	follow procedure above
CASS: CHANGE B5	B5 size is required; cassette	follow procedure above
TRAY: CHANGE B5	B5 size is required; multi-purpose tray	follow procedure above

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
CASS: CHANGE MON	Monarch size is required; cassette	follow procedure above
TRAY: CHANGE MON	Monarch size is required; multi-purpose tray	follow procedure above
CASS: CHANGE COM	Com-10 size is required; cassette	follow procedure above
TRAY: CHANGE COM	Com-10 size is required; multi-purpose tray	follow procedure above
CASS: CHANGE DL	DL size is required; cassette	follow procedure above
TRAY: CHANGE DL	DL size is required; multi-purpose tray	follow procedure above
CASS: CHANGE C5	C5 size is required; cassette	follow procedure above
TRAY: CHANGE C5	C5 size is required; multi-purpose tray	follow procedure above

9.3.5 Manual Paper Feed

Certain emulations permit specifying manual paper feed from the host computer. Also, you may select manual feed from the menu. The following message tell you to hand feed paper of a specific size. The alarm beeps and the printer goes Off Line. When you feed the appropriate paper into the multi-purpose tray and press [ON LINE], the message will be turned off and printing will continue. The operator has the option of pressing [ERROR SKIP], which turns off the message and causes the printer to continue printing.

If there is no paper in the multi-purpose tray, pressing [ERROR SKIP] turns off the message and causes the printer to feed paper from cassette and then displays the message again.

<i>Message</i>	<i>Meaning</i>	<i>Action</i>
M-FEED A4	A4 paper to be hand fed	follow procedure above
M-FEED LETTER	Letter paper to be hand fed	follow procedure above
M-FEED LEGAL	Legal paper to be hand fed	follow procedure above
M-FEED EXEC.	Exec. paper to be hand fed	follow procedure above
M-FEED B5	B5 paper to be hand fed	follow procedure above
M-FEED MONARCH	Monarch paper to be hand fed	follow procedure above
M-FEED COM-10	COM-10 size paper to be hand fed	follow procedure above
M-FEED DL	DL size paper to be hand fed	follow procedure above
M-FEED C5	C5 paper to be hand fed	follow procedure above

9.4 OPERATOR INFORMATION MESSAGES

Certain problems with communication with the host computer may be detected. Messages listed below provide information, but do not halt the printing process. The printer uses a default value if necessary. You may remove the message by pressing [ERROR SKIP]. Note that if there are multiple errors, the last one detected is displayed.

9.4.1 Host Communication problem

<i>Message</i>	<i>Meaning</i>	<i>Action/Status</i>
LINE ERROR	parity error in host data	follow procedure above
INPUT OVERFLOW	input buffer overflow	follow procedure above
BAD FONT DATA	downloaded font bad	downloaded font ignored
BAD FONT CODE	downloaded font in error	downloaded font ignored
BAD CHAR CODE	loaded character outside of index	downloaded font ignored

9.4.2 Function or Size Incompatibility

There are problems that occur when the host computer requests a function not provided or a function that requires more memory than is available.

<i>Message</i>	<i>Meaning</i>	<i>Status</i>
PAGE OVERFLOW	page buffer memory overflow	partial page currently composed is printed and ejected; remaining data for page is printed on next sheet
CANNOT ROTATE	insufficient memory to rotate font	font rotation aborted; printing continues using closest available font
CANNOT DOWNLOAD	insufficient memory to download font	font download is aborted; printing continues using closest available font
CHAR NOT IN FONT	received character not in currently selected font	blank space is printed for that character

9.4.3 Font/Emulation Cartridge

The font and emulation cartridge are plugged into the printer. The operator may insert or withdraw a cartridge only when the DATA LED is off or blinking. The following messages acknowledge the change.

<i>Message</i>	<i>Meaning</i>	<i>Status</i>
CART. CHANGED	font cartridge is inserted or removed when DATA LED is off	message will remain for one second
CART. CHANGED	font cartridge is inserted when DATA LED is blinking	message will remain for one second
CART. CHANGED	emulation cartridge is inserted when DATA LED is off or blinking	message will remain for one second
CART. CHANGED	emulation cartridge is removed when DATA LED is off or blinking or when the printer is not in cartridge emulation	message will remain for one second

9.5 STATUS MESSAGES

Status messages are low priority messages that either indicate normal conditions or provide warnings that need not be acted upon immediately. These conditions should not occur when the printer is On Line. If they do, however, the alarm will beep and the printer will go Off Line. For some conditions however, there is the possibility of a condition occurring when the printer is On Line. If it does, the alarm will not sound and the printer will remain On Line.

<i>Message</i>	<i>Meaning</i>	<i>Action/Status</i>
PRINTER WARMUP	printer is warming up but service call not necessary	—
ENGINE TEST	operator has initiated a test of the printing	test in progress
ENGINE RESET	engine is being reset	—
REINITIALIZE	controller soft initialization	occurs when [RESET] is pressed or emulation is changed; may also occur when printer is on line if emulation is changed or reset is sent from host
STATUS SHEET	status sheet printout	occurs when [TEST] is held for at least 3 but less than 6 seconds
FONT LIST	font list printout	occurs when [TEST] is held at least 3 seconds and pressed within one second
CLEANING PAPER	cleaning paper printout	occurs when [TEST] is held for at least 3 seconds and pressed twice
MP LOAD THE PAP	waiting for cleaning paper	occurs after printing the cleaning paper
NOW CLEANING	feeding cleaning paper	occurs when the cleaning paper is being fed
CLEANING DONE	finished cleaning	occurs after cleaning; remaining for one second

<i>Message</i>	<i>Meaning</i>	<i>Action/Status</i>
TEST PRINT MODE	test pattern printout	occurs when [TEST] is held for more than six seconds and terminating switch nor pressed
TEST PRINT STOP	test pattern stop	occurs when test print terminating switch pressed
REPRINT LOST PGS	retransmission of lost sheets	may occur after paper jamming
ROTATING FONT	wait for font rotation	may occur when on line
PRINTER READY	all condition normal and proper but printer is not operation; no unused data in controller or pages in printing	
PRINTER ACTIVE	all condition normal and proper; printer is in operation; no unused data in controller or pages in printing	

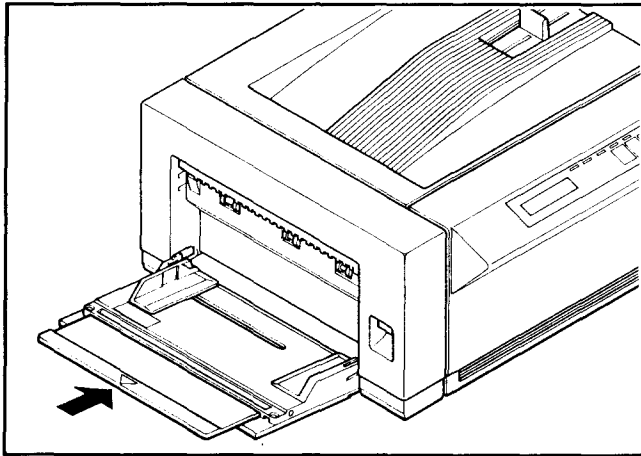
9.6 PAPER JAMMING

As paper travels from the multi-purpose tray (or cassette if installed) through the printing area and is ejected, it can jam at the following locations:

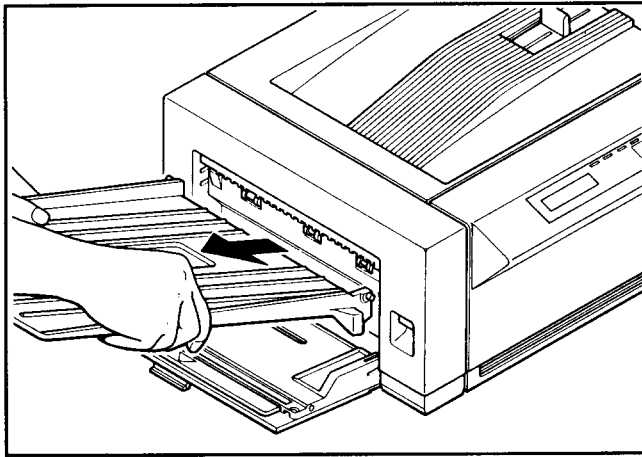
- A :Paper pick-up area (multi-purpose tray)
- B :Paper pick-up area with optional cassette paper feeder
- C :Fixing assembly area
- D :Face-up print delivery area
- E :Paper access door

9.6.1 Clearing paper jams

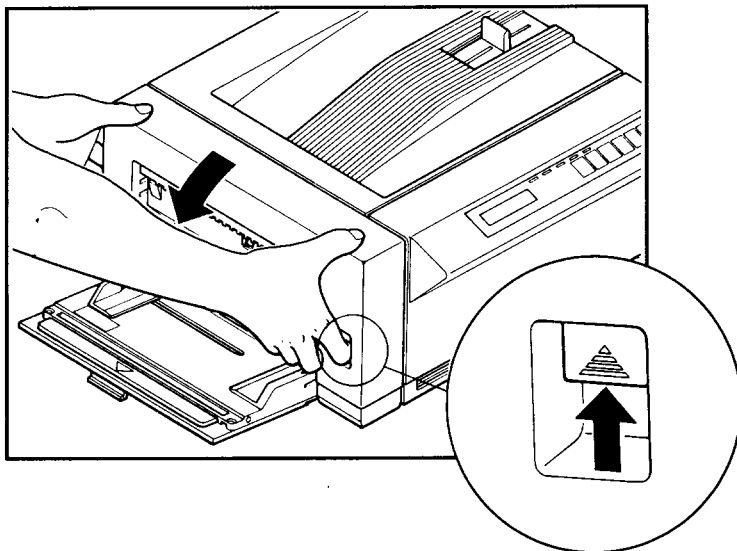
- 1) Remove any paper from the multi-purpose tray and close the extension tray. Leaving paper in the tray causes the paper position to shift during disposal of jam, resulting in further paper jams when printing is restarted.



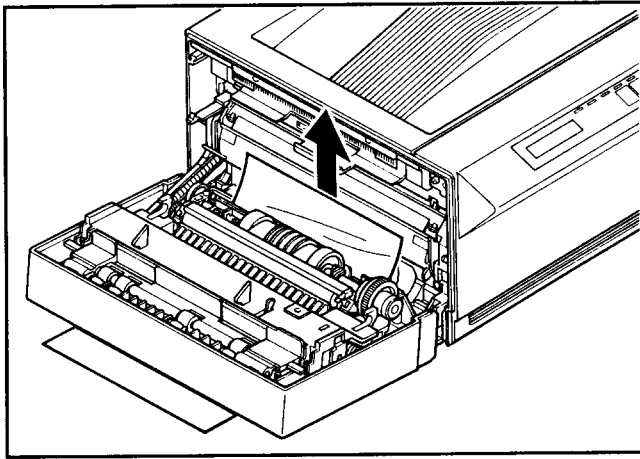
2) If the face-up tray is installed, remove it.



3) Open the side cover by pressing the release button upwards.

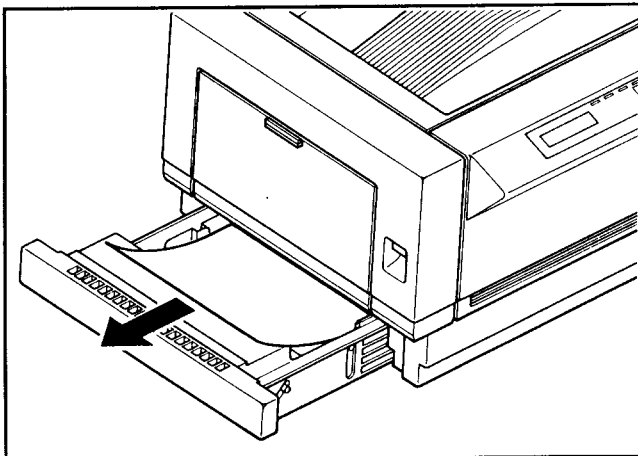


- 4) If you have been printing with the multi-purpose tray, check the paper pick-up area first. If there is a paper jam here, remove the paper by pulling it in the direction of the arrow.

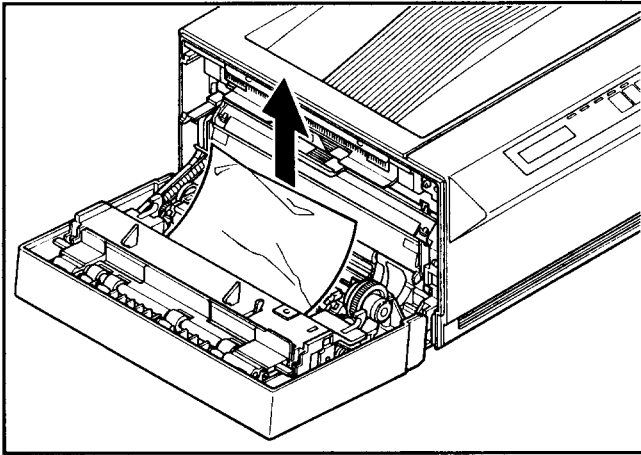


CAUTION: The fixing assembly area becomes extremely hot when the printer has been operated for some time. Never touch this area when the printer is open. Otherwise, personal injury may result.

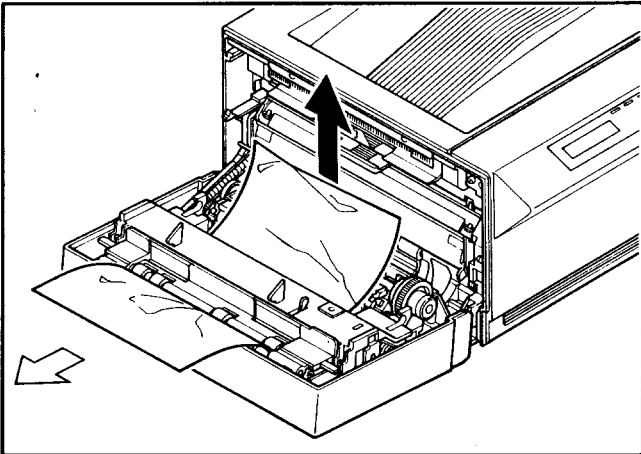
- 5) If you are using the cassette paper feeder, pull out the cassette and check the paper pick-up area. If there is a paper jam here, remove the jammed paper before replacing the cassette.



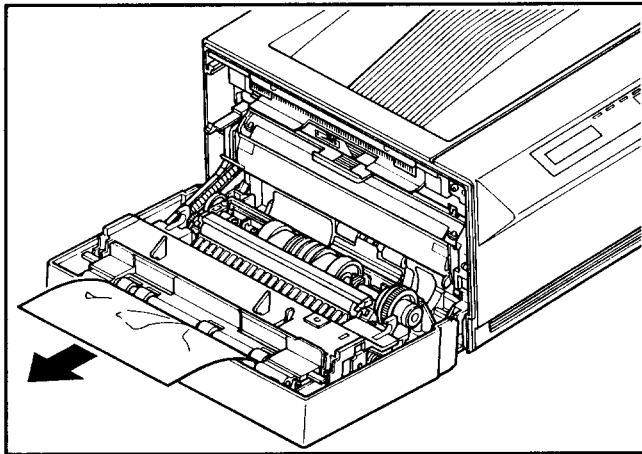
- 6) If paper is jammed in the fixing assembly area, pull the paper back into the printer and remove it.



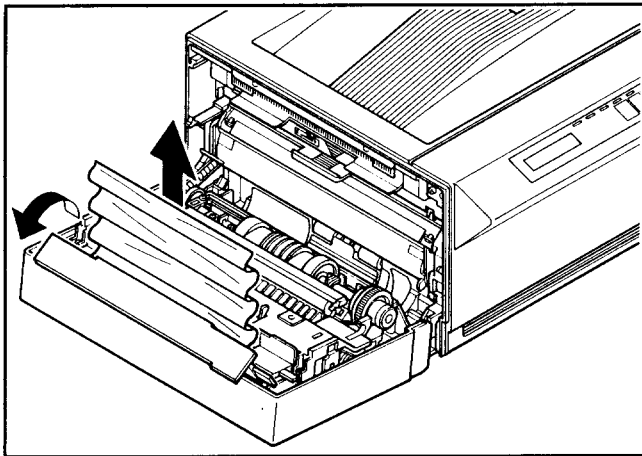
- 7) If the paper does not extend from the side of the fixing assembly area, pull it in the direction of the black arrow. If the paper is extracted in the opposite direction, infused toner can be deposited inside the printer, staining the back of subsequently printed pages.



- 8) If the paper has passed completely through the fixing assembly area, pull it out in the direction of the arrow.

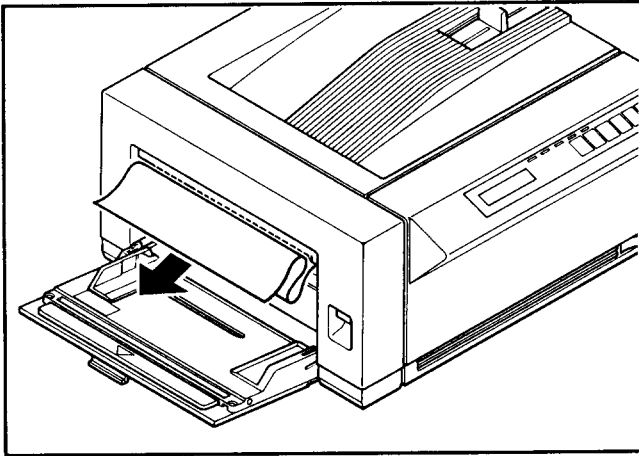


- 9) If a paper jam has occurred in the face-up delivery area, put the paper straight upwards to remove it.



- 10) After checking all the areas described here, close the side cover, replace the face-up tray (if it is being used), pull out the extension tray and refill the multi-purpose tray. Printing will restart.

11) If the jam is still present, a small torn piece of paper may be remaining inside the printer. Check the side upper door for any such paper.

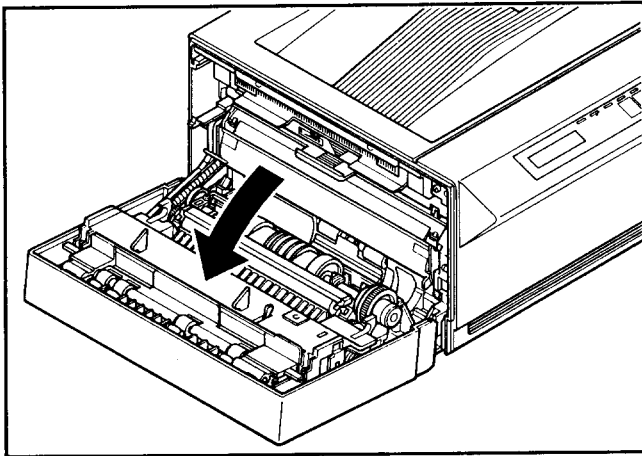


9.7 STREAKY PRINTS

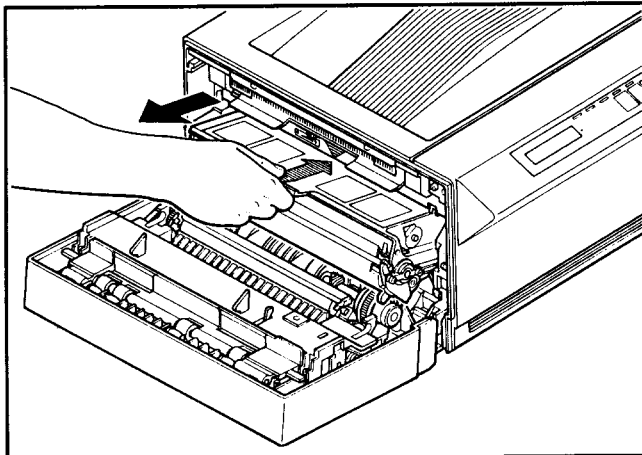
9.7.1 White Streaks

White streaks occur if the toner level is low and the toner inside the EP-L cartridge is not distributed evenly. They can be eliminated by re-distributing the toner.

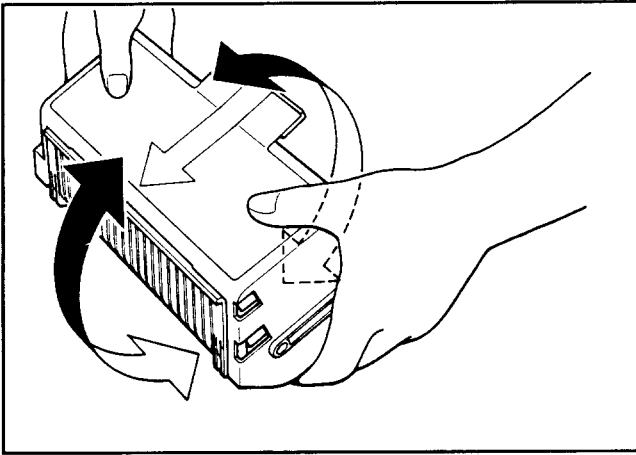
- 1) Leave the printer power on to prevent data corruption during a print operation. Remove any paper in the multi-purpose tray and close the extension tray. Press the release button upwards to open the side cover.



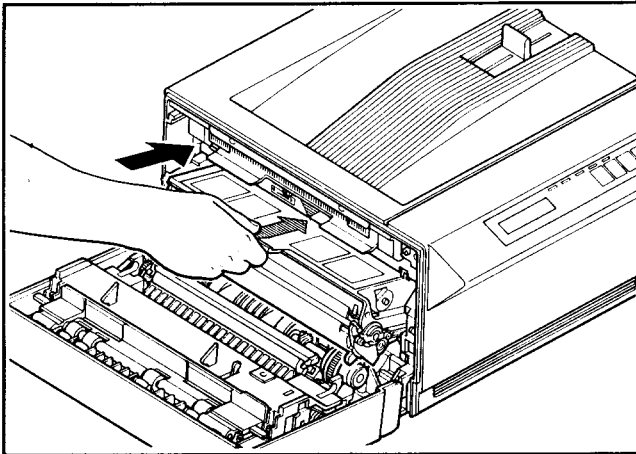
- 2) Remove the EP-L cartridge by pulling the tab.



- 3) Hold the EP-L cartridge as shown below, then rock it gently back and forth about 45 degrees in each direction, about 5 or 6 times. This will re-distribute the toner inside the cartridge.



- 4) Replace the EP-L cartridge in the printer, then close the side cover.



If vertical white streaks still appear after the toner inside the cartridge has been re-distributed, the cartridge needs to be replaced. See “2.2 Installing the EP-L cartridge” for replacing the cartridge.

9.7.2 Stains on Transparency Films

Transparency films may sometimes show stains at either the top or bottom of the films. These stains may be caused by a dirty paper path or the flaw on the EP-L cartridge.

- Clean the fixing assembly. The fixing roller inside the fixing assembly may have been stain with toner. For cleaning, refer to “8.3 Cleaning the Fixing Assembly”. If the stains still appear, use a different type of transparency film.
- Replace the EP-L cartridge. The photosensitive drum in the cartridge may have been damaged due to exposure to the bright light. For replacing the cartridge, see “Installing the EP-L cartridge”.

MEMO

The following options are available for the printer. This chapter provides brief explanation for these options. For details on installation and maintenance, please refer to their own manuals.

- Paper feeder
- Cassette (A4, Letter, Legal, Executive and Envelope)
- Expansion RAM board (1, 2 or 4MB)
- Font cartridge
- IBM emulation cartridge

10.1 PAPER FEEDER AND CASSETTES

The optional paper feeder is used with one of optional paper cassettes, to feed paper from the paper cassette into the printer. The paper feeder can be attached easily to the bottom of the printer using screws.

Cassettes are available following paper sizes: A4, Letter, Legal, Executive and Envelope. Once the paper feeder is installed, paper size can be changed easily by replacing the cassette.

Each cassette can hold up to 250 sheets of plain paper (paper weight: 80 g/m²), and the envelope cassette holds about 25mm stack of envelopes or about 20 envelopes.

Types and sizes of paper can be used with the cassettes are listed below.

Type	Size	Weight	Print delivery
Plain paper	Letter, Legal, A4, B5, Executive	60 - 105g/m ²	Face-down/up
Transparency films	Letter, A4	Face-up	
Labels	Letter, A4	Face-up	
Envelopes	98 × 190 - 162 × 250mm	60 - 90g/m ²	Face-up

10.2 EXPANSION RAM BOARD

Three kinds of memory expansion board are available for the printer: a 1 MB RAM board, a 2 MB RAM board and a 4 MB RAM board. These RAM board permit printing of full page graphics. To tell whether a board is installed in your printer, watch the printer display screen during power-up. If no board has been installed, the display will read:

Memory Test 1 MB

If a memory board has been already installed, the display will give the total amount of memory available (for example):

Memory Test 5 MB

10.3 FONT CARTRIDGE

Fonts can be added to the printer by installing an optional font cartridge. The font cartridge is installed in the slot beneath the control panel of the Star LaserPrinter 4.

Insert the font cartridge with the arrow label facing up. If the font cartridge is inserted upside down, the cartridge and/or printer may be damaged.

CAUTION: The Font Cartridges for LaserPrinter 8 cannot be used with this printer.

MEMO

11.1 SPECIFICATIONS

- Type
Laser beam page printer
- Engine
Resolution: 300 x 300 dots per inch
Speed: 4 pages per minute (A4)
Warm up: under 1 minute (at 68°F or 20°C)
- Emulation
Resident: HP LaserJet series IIP
Epson FX-850
Optional: IBM Proprinter
- RAM
Resident : 1 megabyte
Optional: 1, 2, or 4 megabytes on RAM Expansion Board
- Host Interface (Standard)
Standard: Serial RS-232C
Parallel: Centronics
Optional: AppleTalk (when an optional PDL board is installed)
- Default Settings : Changeable using the control panel
- Fonts
Resident: Courier
LinePrinter
Option: Font cartridges

- Paper

Manual feed: 97 x 148mm - 216 x 356mm

Cassette feed (Option)

Legal/Letter/Executive/A4/B5/Envelop

Output Face down: approx. 50 sheets

Face up: approx. 20 sheets

Weight: 60 - 105g/m² (plain paper)

Special: OHP film

Adhesive labels

Postal cards

Envelopes

- Printing Area: top and left margins: 2.5mm

bottom margin: 4.5mm

right margin: 4.0mm

- Acoustic noise: stand by: max. 43dB

printing: max. 53dB

- Environment

Operating: 50°F to 90°F (10°C to 32.5°C)

20 to 80% relative humidity, no condensation

Standby: 32°F to 95°F (0°C to 35°C)

10 to 80% relative humidity, no condensation

Storage: -4°F to 140°F (-20°C to 60°C)

10 to 95% relative humidity, no condensation

- Power Source: 100/115V (50/60Hz) for North America and Japan

200/240V (50Hz) for Europe, Asia and

Oceania

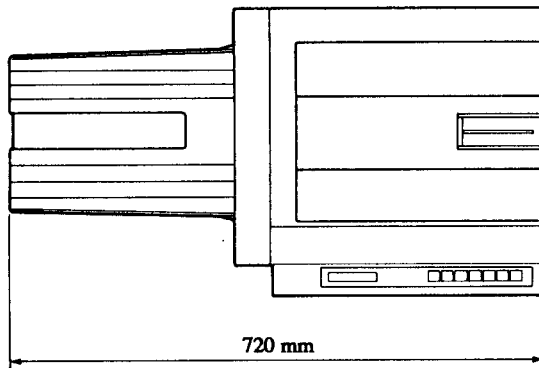
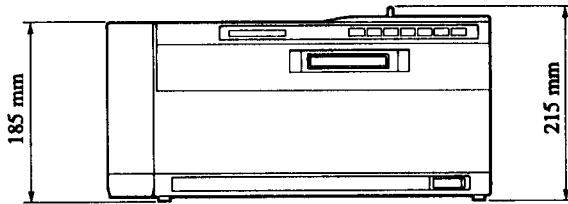
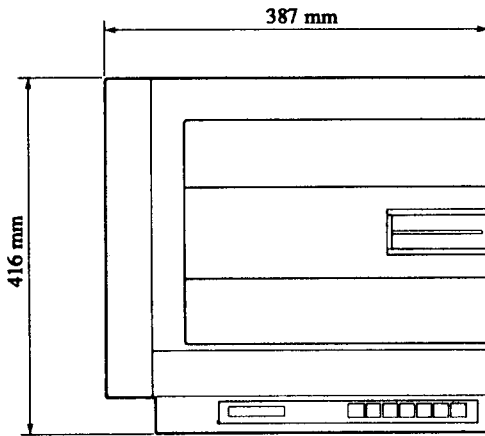
- Power Consumption: max. 550W (when operating)

- Weight : Print engine 10kg

Cassette 2.4kg

EP-L cartridge 1kg (toner and drum cartridge)

- Dimensions



11.2 RELIABILITY

- Suggested monthly print volume
2500 prints
- Definition of failure
Any loss of operation that requires calling a service person.
Operation errors and installation failures are not included.
- Product life
Five years or 150,000 prints, whichever comes first.
- Mean time between failures
4,000 hours or less
- Mean time to repair
30 minutes or less
- Paper feed reliability

Type	Frequency
Paper	1/2000 or less
Multifeed	1/1000 or less
Others	1/2000 or less
- Toner cartridge life (EP-L cartridge)
3,500 prints at 5% print duty (A4/Letter size)

11.3 PIN FUNCTIONS ON INTERFACES

- Parallel Interface

Pin No.	Signal Name	Direction	Function
1	$\overline{\text{STROBE}}$	IN	Goes from High to Low (for at least 0.5 microseconds) when data are valid.
2	DATA1	IN	Eight-bit character data. DATA8 is the most significant bit; DATA1 is the least significant bit. High is logic 1 and Low is logic 0.
3	DATA2	IN	
4	DATA3	IN	
5	DATA4	IN	
6	DATA5	IN	
7	DATA6	IN	
8	DATA7	IN	
9	DATA8	IN	
10	ACK	OUT	A low pulse acknowledges receipt of data.
11	BUSY	OUT	Low when the printer is ready to accept data.
12	PAPER OUT	OUT	Goes High if the printer runs out of paper.
13	SELECTED	OUT	High when the printer is on line
14-15	N/C		Unused
16	SIGNAL GND		Signal ground.
17	CHASSIS GND		Printer's chassis ground, isolated from signal ground.
18	+5VDC	OUT	External supply of +5VDC
19-30	GND		Twisted pair return signal ground level.
31	RESET	IN	Low input resets the printer to its power-on condition.
32	$\overline{\text{ERROR}}$	OUT	Goes low to signal that the printer cannot print due to an error condition.
33-36	N/C		Unused

- Serial interface

Pin No.	Signal Name	Direction	Function
1	GND	—	Chassis ground.
2	TXD	OUT	Carries data from the printer.
3	RXD	IN	Carries data to the printer.
4	RTS	OUT	On when the printer is ready to receive data.
5-6	N/C		Unused.
7	GND	—	Signal ground.
8-19	N/C		Unused.
20	DTR	OUT	On when the printer is ready to receive data.
21-25	N/C		Unused.

Glossary

ASCII (as' kee) — a standardized and commonly accepted numerical code that represents letters, numbers, and symbols, as well as command sets. ASCII stands for *American Standard Code for Information Interchange*.

Baud — a measure of the speed at which information is transmitted. The baud rate, which is set for serial transmissions, is approximately the number of characters transmitted per second multiplied by 10.

Byte — a series of 8 bits that represents one character.

Centronics interface — a standard wiring configuration for parallel data transmission. *Centronics* is often used as a synonym for the parallel standard developed by Centronics Inc.

Character Set — the complete set of characters available in a font.

Data Bits — the number of bits in a transmitted byte that actually contains data.

EEPROM — Electrically Erasable Programmable Read Only Memory. It has an internal switch to permit a user to erase the contents and write new contents into it by means of electrical signals.

EP-L Cartridge — A disposable type of process cartridge which contains the photosensitive drum and toner.

Emulation — behaving like something else. The Star LaserPrinter 4 can emulate, or behave like two other printers, the Epson EX-850 and the HP LaserJet IIP laser printer.

Expansion RAM board — An available option that is easily attached to the LaserPrinter 4 to expand its RAM to a maximum of 5 MB. Three kinds of memory expansion board are available: a 1MB RAM board, a 2MB RAM board and a 4MB RAM board.

Face-down delivery — A type of paper delivery in which the paper is ejected from the printer with the printed side facing downward.

Face-up delivery — A type of paper delivery in which the paper is ejected from the printer with the printed side facing upward. Face-up delivery is used for printing envelopes, transparency films and labels.

Fixing assembly — The assembly used to fix the toner on to the paper or other material using heat and pressure in printing process. It is located inside the printer and it gets extremely hot during the operation.

Font — a set of letters, numbers, and symbols of the same typeface design.

Font cartridge — Font cartridges contain fonts which can supplement the available resident fonts of the printer to increase the variety of typefaces.

Glyph — a graphic symbol that conveys information.

Handshaking — in data communication, the automatic acknowledging by the receiving device of information that has been sent to it, either by signals and the interface (“hard”) or by software control (“soft”).

Hex dump — conversion by the printer of ASCII symbols into their hexadecimal (base 16) equivalent. This is useful for programmers or other users who want to troubleshoot the communications between the computer and the printer.

HMI (Horizontal Motion Index) — refers to dot spacing in the smallest increment that can be made in the horizontal or *x* axis.

Interface — a hardware plug that allows cable connections of two devices. For instance, a cable from a computer parallel port to a printers parallel port.

Landscape — printing on paper across its wider dimension, such as a spreadsheet that is 11 in. wide and 8.5 in. high; landscape pictures are usually wider than they are tall.

NV RAM — NV(Non-volatile) Random Access Memory is the permanent storage by the Star LaserPrinter 4 of settings programmed from the front panel, even when the power is turned off. When the printer is turned on again, these settings become the current settings.

- Parallel** — a communications interface that sends or receives 8 bits of information plus control signals at a time.
- Parity** — a bit in a serial information that allows a computer and printer to automatically check for errors in transmission.
- Pitch** — the width of a typeface measured in characters per inch.
- Point** — the height of a type font, measured in points, or 1/72 of an inch.
- Portrait** — printing on paper across its narrower dimension, such as a letter on paper that is 8.5 in. wide and 11 in. high; portrait pictures are usually taller than they are wide.
- Proportional type** — a typeface in which some letters take up more room on a printed line than others, such as *W* taking more space than *I*. The spacing of the letters is also intended to enhance the esthetic quality of the printed page.
- RAM** — Random Access Memory, or memory that can be used to store information temporarily, such as text or printing configurations. RAM-stored information is erased when the power is turned off.
- ROM** — Read Only Memory, or memory in which information can be stored permanently, whether the power is on or off.
- RS-232** — a wiring configuration for sending and receiving serial transmissions, including data and acknowledgments between sending and receiving equipment (“handshaking”).
- Serial** — a communications interface that sends or receives 1 bit of information at a time at a specified baud rate.
- Stop Bit** — 1 or 2 bits used by the computer for the timing of a transmission of information.
- Stroke weight** — the intensity of a printed character, such as *light*, *medium*, or *bold*. Normal printing is medium weight.
- Symbol Set** — the entire list of ASCII letters, numbers, and symbols used with a particular language, such as English or Spanish.
- VMI (Vertical Motion Index)** — refers to line spacing, the smallest increment that can be made in the vertical or y axis.

MEMO

Index

A

ALARM light, 39
ASCII code, 111

B

BAD CHAR CODE message, 87
BAD FONT CODE message, 87
BAD FONT DATA message, 87
BAUD rate, 53
Buttons, control panel, 33, 35-38

C

CALL SERVICE message, 80-81
CANNOT ROTATE message, 87
CANNOT DOWNLOAD message, 87
CARTRIDGE BAD message, 81
CART. CHANGED message, 88
CARTRIDGE ERROR message, 83
CASS CHANGE message, 84
CASS REFILL message, 82
Centronics connector, 105
Character set, 59
CHAR NOT IN FONT message, 87
CLEANING DONE message, 89
CLEANING PAPER message, 41, 89
Control panel (front panel), 4, 33,
35-39, 43-45, 50-51
Courier typeface, 64
Current settings, 56

D

Data bit, 54
DATA light, 39
Display screen, 33
DTR message, 54

E

EEPROM, 34, 111
Emulation modes, 42, 63, 65-66
ENGINE TEST message, 89
ENGINE RESET message, 89
EP-L Cartridge, 16-21, 111
Epson FX-850 emulation mode, 66
ERROR SKIP/< button, 35, 50

F

Face-down delivery, 25
Face-down tray, 4
Face-up delivery, 26
Factory settings, 56-57
Fixing assembly, 76, 111
Font, 63-66
Font cartridges, 103
FONT LIST message, 40, 89

H

Hex dump, 40
HOLD FOR TEST message, 40
Host communication problems, 87
HP LaserJet IIP emulation mode, 65

I

Initial settings, 56
INPUT OVERFLOW message, 87
INSUFFICIENT RAM message, 83
INTERFACE group, 42
INTERFACE message, 43, 53-55

L

LANDSCAPE message, 59
Landscape orientation, 42, 59
Laser, 2
Laser printing, 2-3
LAYOUT group, 42
LAYOUT message, 45, 59
LINE ERROR message, 87
LinePrinter typeface, 64
LOAD CASS message, 82
LOAD FACTORY SET message, 43, 56
Lotus 1-2-3, 68-70

M

Maintenance, 79-99
MEMORY TEST 1MB message, 34
M-FEED message, 86
Microsoft Windows, 71-73
Microsoft Word, 71
Multi-purpose tray (MP tray), 4,
MP LOAD THE PAP message, 89

N

NO EMULATION CART message, 83
NO FONT PRESENT message, 81
NOW CLEANING message, 89

O

ON LINE button, 35, 50
ON LINE light, 39, 51
Operator call messages, 82-86
Operator information messages, 87-88

Optional font cartridges, See font cartridges
ORIENTATION message, 59

P

PAGE OVERFLOW message, 87
Page setup, 61-62
Paper, 22, 102
Paper cassette, 11, 101-102
PAPER FEED group, 42
PAPER JAMMING message, 82
Paper loading, 22-25
Parallel interface, 5, 28-29, 52-55
Parallel interface pin function, 109
PARITY message, 54
Pitch, 42, 62
Portrait orientation, 42
Power receptacle (connector), 5, 27
Power switch, 5, 27
Power outlet, 7
Power-up settings, 56
PRINT button, 35, 50
Print density, 30
PRINTER ACTIVE message, 90
PRINTER READY message, 90
PRINTER WARMUP message, 89
PRINT light, 39, 51
Print quality, 30
Program mode, 33, 35-37
PROGRAM/▲ button, 33, 37, 50

R

RAM expansion board, 11, 102
READY light, 39, 51
REINITIALIZE message, 89
REINSERT CARTRIDGE message, 83
REPRINT LOST PGS message, 90
Release button, 4, 14, 30, 92
RESET/▼ button, 36, 50
Resident font, 64

ROTATING FONT message, 90
RS-232C connector, See serial connector

S

Self test, 40-42
Self test status sheet, 40
Serial interface, 52-55
Serial interface connector, 5, 28-29
Serial interface pin function, 110
SET EP/CLOSE message, 82
Specifications, 105-107
Status messages, 89-90
STATUS SHEET message, 40, 89
STOP BIT message, 54
Stains, 99
Streaky prints, 97-98

T

TEST/> button, 36, 50
TEST PRINT MODE message, 41, 90
TEST PRINT STOP message, 41, 90
TIMER ERROR message, 81
TRAY REFILL message, 82
TRAY CHANGE message, 84

U

Unpacking, 8-16

W

WordPerfect, 70

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