EPSON
# SQ – 850
SQ – 2550
24-NOZZLE INK JET PRINTER
USER'S GUIDE
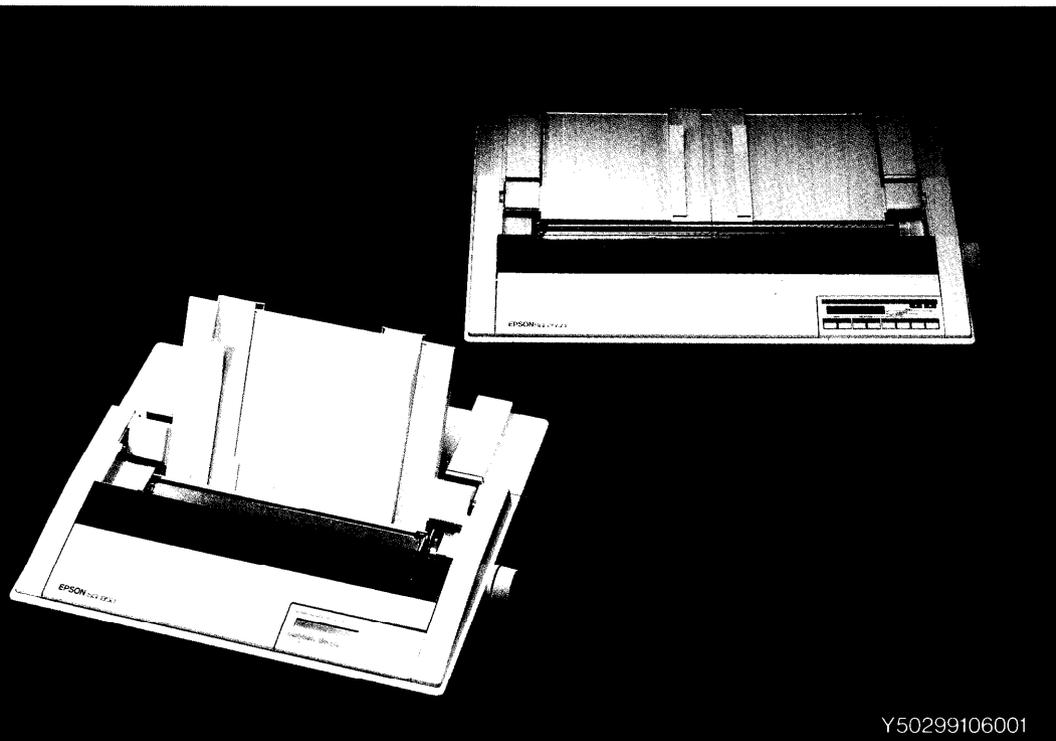
<u>FCC COMPLIANCE STATEMENT FOR AMERICAN USERS</u>

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

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

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

<div align="center">"Television Interference Handbook"</div>

This booklet is available from the U.S. Government Printing Office, Washington DC 20402. Stock No. 004-000-00450-7.

<div align="center">WARNING</div>

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels that exceed the limits established by the FCC for this equipment. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

EPSON
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User's Guide

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About This Guide

This user's guide provides fully-illustrated, step-by-step instructions for setting up and operating the SQ-850 and SQ-2550 printers.

Finding your way around

- Chapter 1 contains information on unpacking, setting up, testing and connecting the printer, so be sure to read and follow the instructions in this chapter first.

- Chapters 2 and 3 include important information on paper handling and general printer operation. This information is necessary for the day-to-day operation of your printer.

- Chapter 4 contains information designed to help you get the most from your printer. This chapter includes advice on the use of software commands, graphics, and user-defined characters. Also, see Chapter 9 for a summary of printer commands.

- If the printer does not operate properly or the printed results are not what you expect, see Chapter 7 for a list of possible solutions.

- Other chapters contain information on general maintenance, use of the printer options, and specifications. You will also find a glossary of printer terms and an index.

- At the back of this guide is a Quick Reference Card with the information you are most likely to need.

> **Note:** The SQ-850 and SQ-2550 are basically the same printer except that the SQ-2550 can accept wider paper. Therefore, the illustrations in this guide show only the SQ-2550.

Conventions used in this guide

WARNINGS must be followed carefully to avoid damage to your printer and computer.

CAUTIONS should be followed carefully to ensure that your printer operates correctly.

Notes contain important information and useful tips on the operation of your printer.

Introduction

The SQ-850 and SQ-2550 are the latest in EPSON's advanced line of 24-nozzle ink jet printers, combining high performance and reliability with a wide range of exciting features.

Features

In addition to the high-quality printing and ease of operation you have come to expect from EPSON printers, the SQ-850 and SQ-2550 offer the following:

- An improved control panel design that allows you direct selection of all of the printer's main features, such as character font and pitch as well as a choice of normal or condensed printing.

- An advanced paper handling system that allows you to easily switch between single sheets and continuous paper by pressing the appropriate panel buttons. You can use single sheets without removing the continuous paper, or you can use continuous paper even while the optional Cut Sheet Feeder is installed.

- A short tear-off feature that saves paper. After you tear off the latest sheet printed on continuous paper, the printer feeds the paper back to the loading position so that you can use all of the next sheet.

- The ability to print on labels and envelopes.

- A micro-adjustment feature that allows you to feed the paper forward or backward in 1/180th of an inch increments to finely adjust the top of form, loading, and short tear-off positions.

- The following nine built-in Letter Quality fonts are provided for producing high-quality documents:

    Roman, Sans Serif, Courier, Prestige, Script, OCR-A, OCR-B, Orator, Orator-S

- Draft mode with fast, whisper-quiet printing of up to 500 characters per second in 10 cpi (10 characters per inch).

- Compatibility with the EPSON ESC/P commands used by the LQ-1500, LQ-800, LQ-1000, LQ-2500, LQ-2500+, LQ-850, LQ-1050, LQ-500, LQ-2550, and SQ-2500 printers.

Options

A variety of printer options is available for use with your SQ-850 or SQ-2550 printer. For detailed information on the installation and use of these options, see Chapter 5.

Single-bin and Double-bin Cut Sheet Feeders (C806081/C806091/C806101/C806111)

These cut sheet feeders give you easier and more efficient handling of single sheet paper or envelopes. Up to 150 sheets of standard bond paper can be stored in a bin and fed automatically into the printer without reloading.
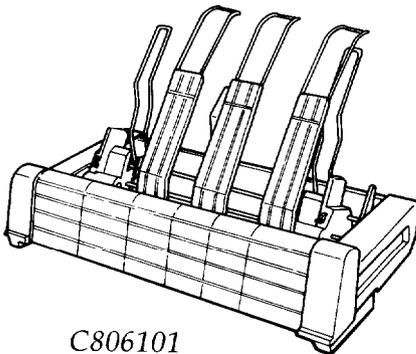
C806101
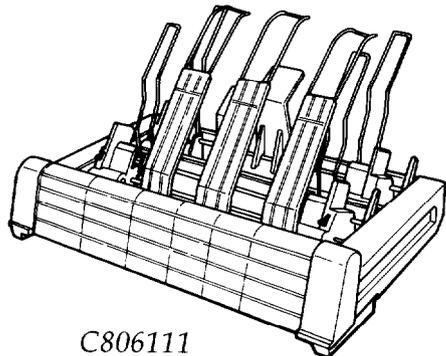
C806111

Pull Tractor Unit (C800032/C800042)

The pull tractor option improves the performance of continuous paper handling. It is especially useful when printing graphics, labels, or continuous preprinted forms.
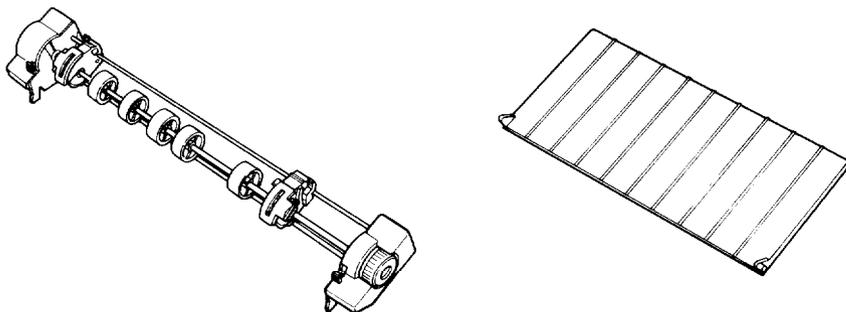
Optional Interface Boards

A number of optional interface boards can be used to supplement the printer's built-in parallel and serial interfaces. Guidelines for choosing the right interface and instructions on installing the boards are given in Chapter 5.
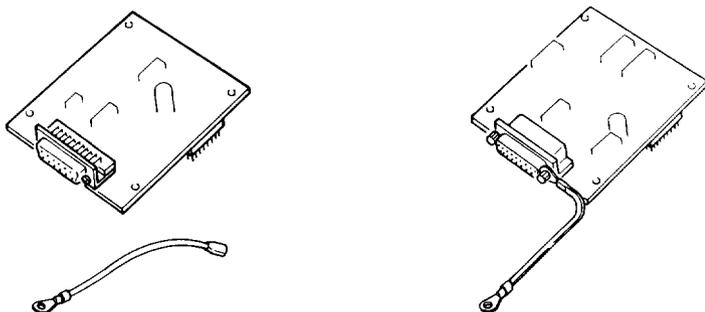
Chapter 1
Setting Up the Printer

Ink Jet Precautions

Because the SQ-850 and SQ-2550 are the ink jet printers, certain precautions are necessary to ensure their safe and efficient operation. Even if you are familiar with other types of printers, be sure to read through this list of precautions.

- Make sure that the ink does not come in contact with your skin or eyes. If it does get on your skin, wash it off with soap and water. If it gets in your eyes, flush them with plenty of water and contact a physician.

- Do not dismantle the ink cartridges; they cannot be refilled.

- Keep the cartridges out of the reach of children.

- Do not use an ink cartridge beyond its rated life expectancy. Ink cartridges are good up to the date printed on the cartridge.

- See that the print head is capped before the printer is turned off. To cap the head, simply push the **ON LINE** button to set the printer off line. The head caps automatically when it enters the off line state. Then turn off **the** printer.

- Never remove the ink cartridge when the printer is on line or when it is printing.

- Do not turn the printer on and off **when** the ink cartridge is not installed.

- Do not put your hand inside the printer when it is printing.

- Before you transport the printer, make sure that the head is capped and that the ink cartridge is removed.

- If ink accidentally gets **on** the platen (the black roller), wipe it off with a clean rag or with tissue paper.

Unpacking the Printer

Checking the parts

As you unpack the printer, check that you have all of the parts shown below and that none have been damaged during transportation.
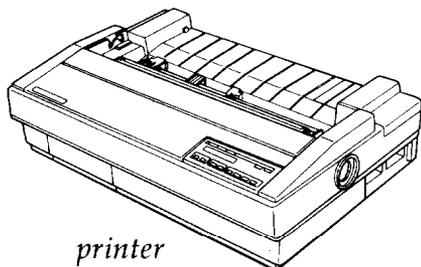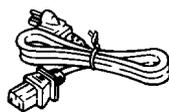
power cable

platen knob
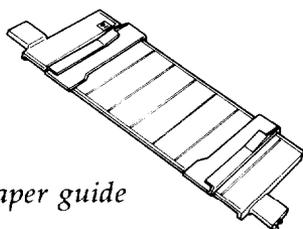
printer

paper guide
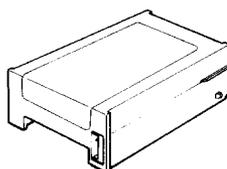
ink cartridge

cross-head screwdriver

optional screw locks

> CAUTION: Different versions of the printer are designed for different electrical standards. The power supply type is shown on the label on the back of the printer. If it does not show the correct voltage for your country, contact your EPSON dealer. It is not possible to adjust the printer for use on another voltage.

Removing the protective materials

The printer is protected during shipping by screws, locking tabs, a notice sheet, and a white packing material. These protective items must be removed before you turn on the printer. After removing these items, store them with the other packaging material in case you ever need to transport your printer.

1. Insert the platen knob into the hole on the printer's side and rotate it until it slips onto the shaft.
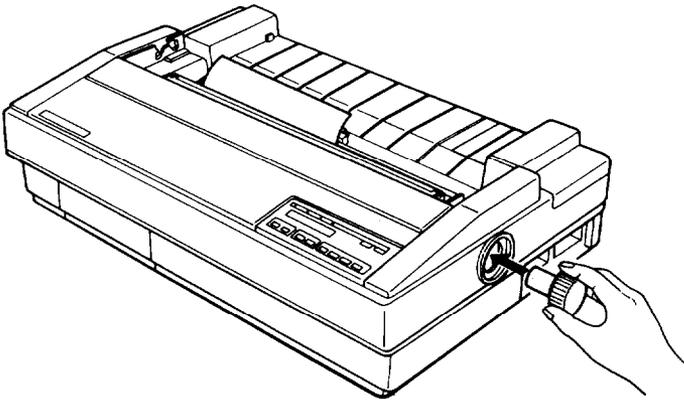
2. Press firmly on the knob until it fits against the printer case.
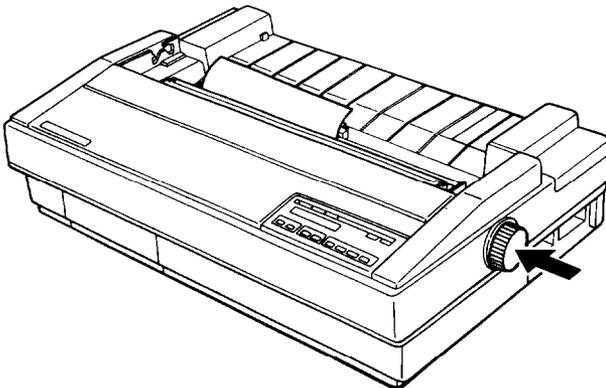
> **CAUTION:** Using the platen knob to adjust the position of the paper interferes with the automatic paper loading system and may cause a paper jam. Before using the platen knob, always turn off the power. If you need to adjust the position of the paper after it is loaded, use the micro-adjustment feature described in the section on setting the loading position in Chapter 3.

3. Remove the printer cover.
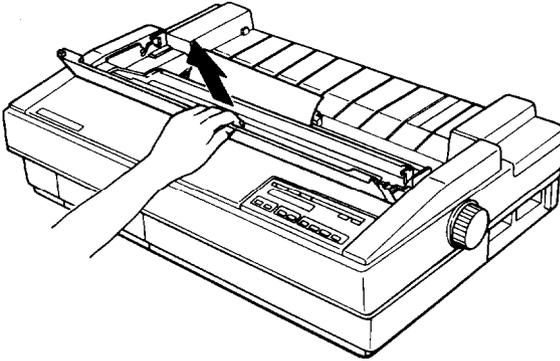
4. Remove the white packing material, and remove the notice sheet by using the platen knob. Then push the **paper bail toward the platen.**
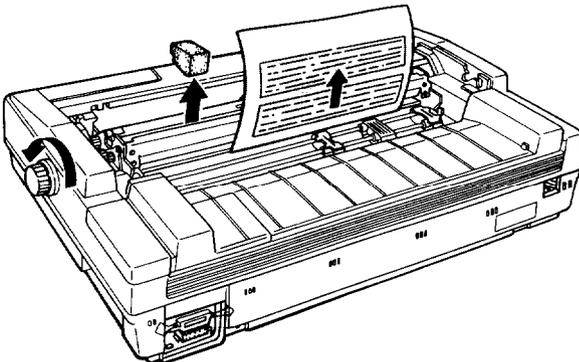
5. Using the enclosed cross-head screwdriver, remove the transport screws and locking brackets as shown below. (SQ-850 only has two screws and single locking bracket.)
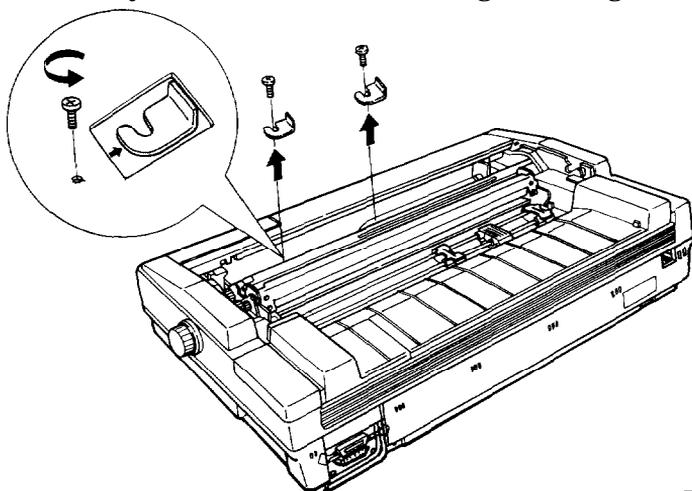
CAUTION: Never leave the transport screw in the printer because of it can damage the print head.

6. Reattach the printer cover.
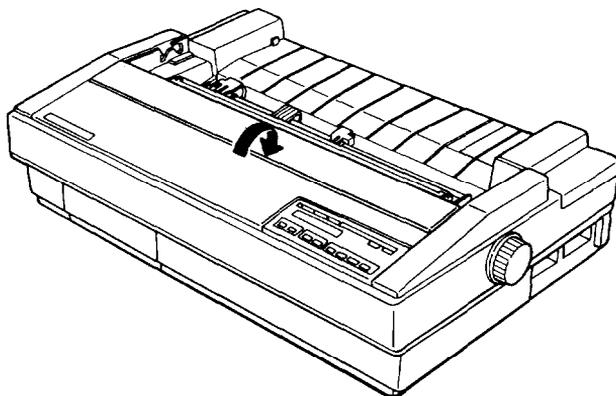
Choosing a Place for the Printer

There are several important things to consider when selecting a location for your printer. Make sure to keep the following in mind.

- Place the printer on a flat, stable surface.

- Place the printer close enough to the computer for its cable to reach.

- Leave adequate room around the printer to allow easy printer operation and maintenance.

- Use a grounded outlet; do not use an adapter plug.

WARNING:
- Avoid locations that are subject to direct sunlight, excessive heat, moisture or dust.
- Avoid using electrical outlets that are controlled by wall switches or automatic timers. Accidental disruption of power can wipe out information in your computer's and printer's memory.
- Avoid using outlets on the same circuit with **large** motors or other appliances that might disturb the power supply.
- Keep the entire computer system away from potential sources of interference such as loudspeakers or the base units of cordless telephones.

The illustrations below show several good printer and computer arrangements.
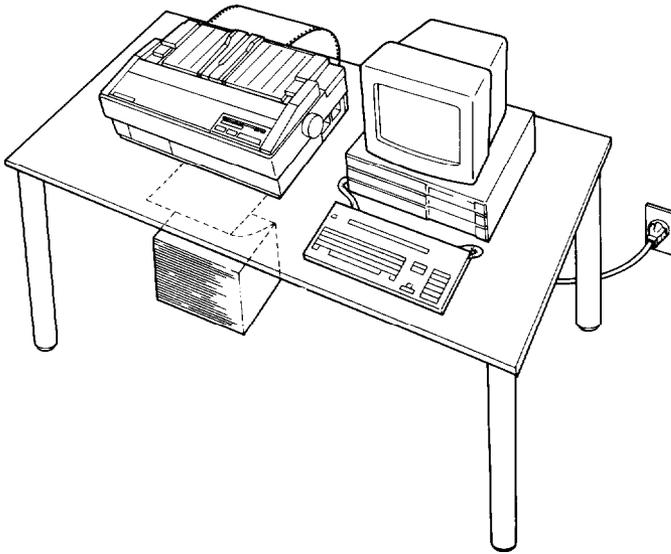
Note: If you plan to use a printer stand, read through the list of requirements and suggestions below to ensure that you have the right stand for your printer.
• The stand should be able to support at least twice the weight of your printer (24.0kg for the SQ-850 or 28.8kg for the SQ-2550).
• Never use a stand that supports the printer at an angle. The printer should always be kept level.
• If your paper supply is positioned below the printer stand, make sure that there is enough clearance to keep the paper from catching on the underside of the stand. Also, check to see that the distance between the stand supports is wide enough to accommodate the width of your paper.
• Position your printer's power and interface cables so that they do not interfere with paper feeding. If possible, secure the cables to the printer stand supports.

1-8   Setting Up the Printer

Assembling the Printer

After you have decided on a suitable location for your printer, it is necessary to install the paper guide, and the ink cartridge. Before assembling the printer, make sure that all protective materials have been removed. Installation instructions for these components are given below.

Attaching the paper guide

To install the paper guide, follow these steps:

1. Fit the pins of the paper guide into the slots in the printer as shown below.
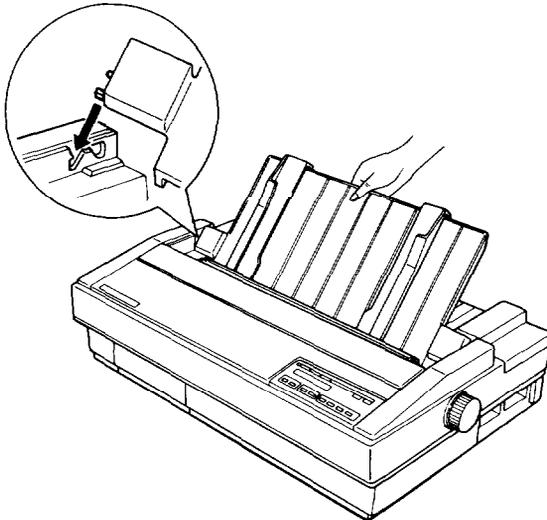
2. Make sure that the guide is in its upright position. If not, raise the guide slightly until it locks into position.
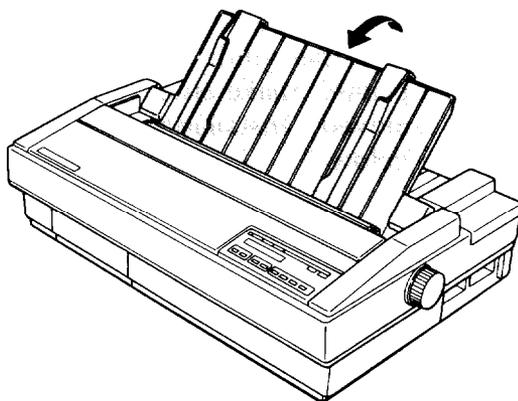
Installing the ink cartridge

Your printer's ink cartridge is completely self contained and allows for easy installation and removal. Replacement ink cartridges (S020002) are available from your EPSON dealer.

Each SQ ink cartridge contains enough ink for about 4000 double-spaced pages in draft mode or about 2000 pages in Letter Quality mode. Also keep in mind that the first ink cartridge you install may print fewer pages because some of the ink is used to fill up the ink delivery system.

> Note: On one end of the cartridge is an ink indicator lever that registers whether the cartridge is full or empty; the lever is up when full and down when empty (there's an F and E marked on the case). When replacing an empty cartridge with a new one, this lever gives you a quick way of checking the status of the ink cartridge. See the section on replacing the ink cartridge in Chapter 6 for more information.

WARNING: Skin and Eye Irritant
This ink contains potassium hydroxide and may cause irritation on contact with skin and eyes. Please take the following precautions:
• Avoid contact with skin and eyes. If ink gets into eyes, flush immediately with water and contact a physician. Wash all traces of ink from your skin thoroughly with soap and water after handling the cartridge. If irritation occurs, contact a physician.
• Do not dismantle the cartridge.
• Keep the cartridge out of reach of children.

Install the ink cartridge as follows:

1. Open the ink cartridge compartment cover by pressing once on the area marked by the three grooves.
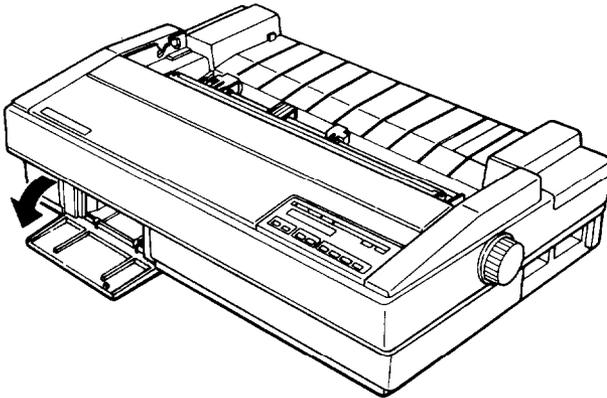
WARNING: Never install or remove the ink cartridge when the power is on line. Always set the printer off line, and be sure the print head is capped at the left of the printer before removing or replacing the ink cartridge.

2. Insert the end of the cartridge with the foil plug into the ink compartment as shown in the illustration below. Then gently push the cartridge all the way into the compartment until you hear the click of the cartridge meeting the back of the ink compartment.
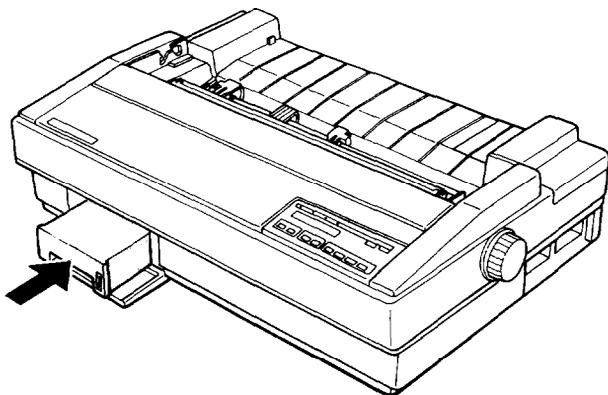
3. Close the ink cartridge compartment cover-
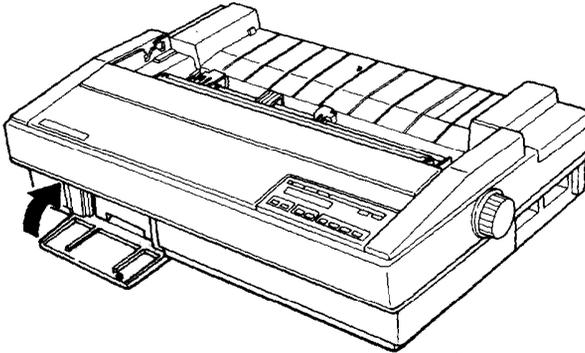
Testing the Printer

Now that your printer is fully assembled, you can use the built-in self test function to see that the printer is working correctly even though it is not connected to a computer.

Be sure to perform this test to make sure that your printer was not damaged during shipping and to ensure that the ink cartridge is correctly installed.

Before running the self test, you need to connect your printer to a power supply, charge the ink, and load a sheet of paper.

Connecting to a power supply

Before plugging in your printer, make sure that all packing materials are removed and the ink cartridge is installed.

1. Check to see that the printer is turned off (the circle (0) on the switch should be visible).
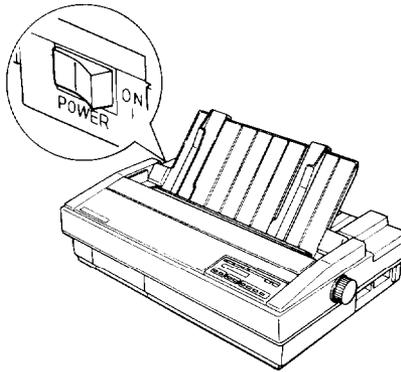
2. Check the printer's label to make sure that the power rating required by the printer matches that of your electrical outlet.
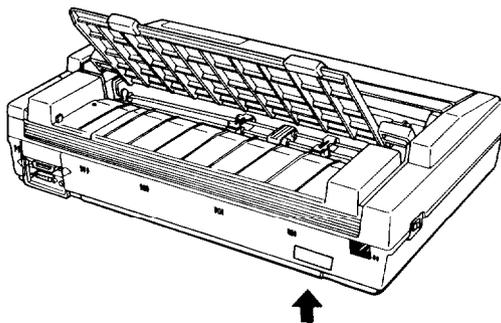
WARNING: If they do not match, contact your EPSON dealer without connecting the power cable.

3. Connect the power cable to the AC inlet on the printer's rear panel.
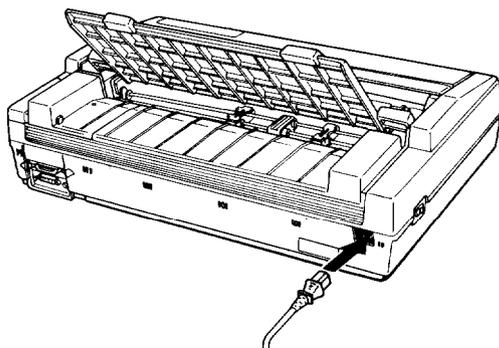
WARNING: Before turning on the printer, be absolutely sure that you have removed all of the protective materials. Turning on the printer while the print head cannot move may seriously damage the mechanism.

4. Plug the power cable into a properly grounded electrical outlet.
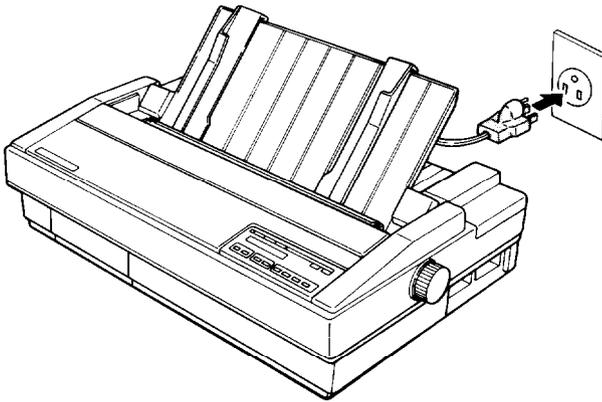
Note: Although the shape of the power cable provided with your printer may differ from the one shown above, the steps for connecting it are the same.

Charging the ink cartridge

Before operating your printer, you need to charge the ink delivery system with ink. You do not need to perform this step again even when after transport the printer.

Note: You do not need to charge the ink every time you replace the ink cartridge.

Before charging the ink, make sure that the ink cartridge is installed and the printer is turned off.

1. While holding down both the **ON LINE** and **LINE FEED** buttons, turn on the printer. This initiates a three-minute cleaning and set up cycle that prepares the ink system for operation. During this cycle, the LCD (Liquid Crystal Display) on the control panel displays INK **CHARGE** and a count down of the time needed to complete the cycle.
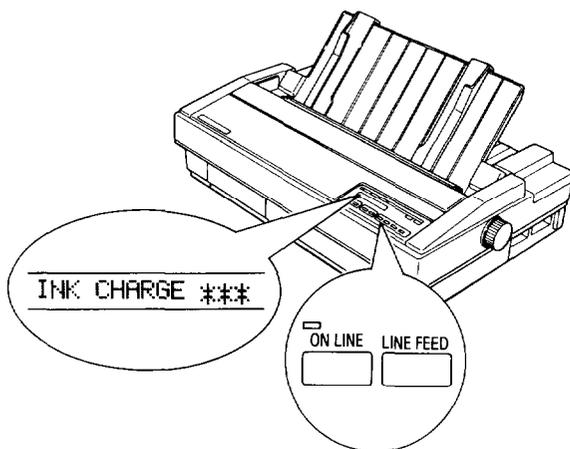
2. When the set up cycle is completed, the display shows INK **CHARGE 0.**
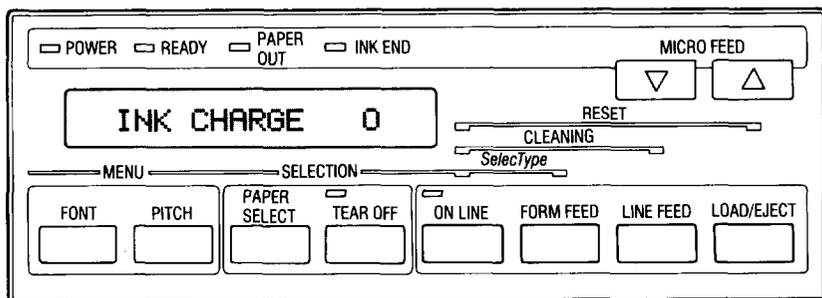
WARNING:
• Do not turn the printer off while the message INK **CHARGE** *** is displayed.
• Do not start printing before **the** ink charge is completed. Printing without charging the ink delivery system can damage the printer.

3. Turn off the printer.
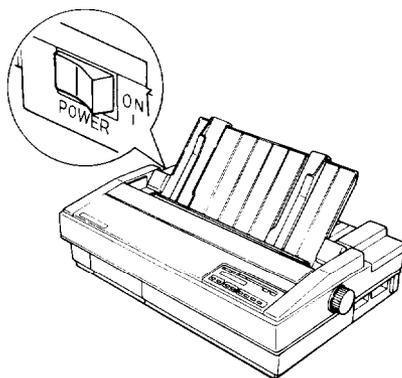
WARNING: After you turn off the printer, always wait at least five seconds before turning it back on. Rapid switching of the power on and off can damage the printer.

After completing the ink charging cycle, you are ready to run the printer's self test.

Running the self test

The self test can be run in either draft mode or Letter Quality mode, depending on which button you hold down as you turn on the printer.

> **Note:** For the purposes of setting up and testing your printer, most types of paper can be used. When choosing your paper supply, however, you should always test it before regular use. See the section in Chapter 2 on choosing paper.

> CAUTION: Run the self test using paper that is at least as wide as 217 mm (8.27 inches) if you have an SQ-850, or 364 mm (14 inches) if you have an SQ-2550.

Before running the self test, make sure that the power cable is connected to a properly grounded electrical outlet and the printer is turned off.

1. While holding down the **LINE FEED** button (draft mode) or the **FORM FEED** button (Letter Quality mode), turn on the printer. The printer beeps three times and the **POWER** and **PAPER OUT** lights come on.
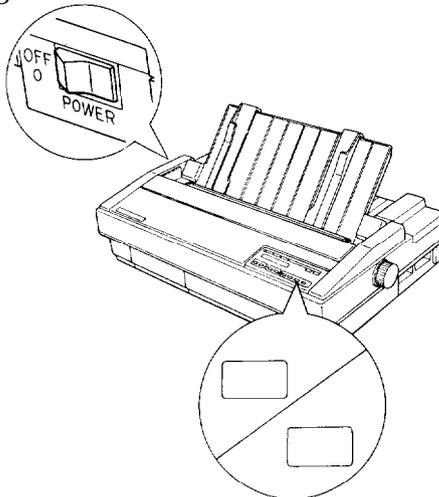
2. Press the **PAPER SELECT** button on the control panel until the message on the LCD shows **Friction.**
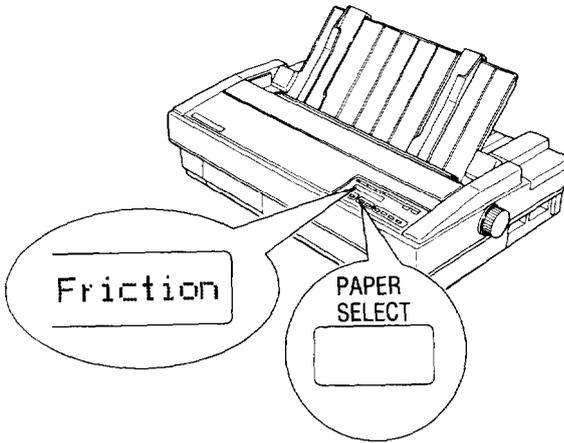
3. Move the left edge guide until it rests against the guide mark.
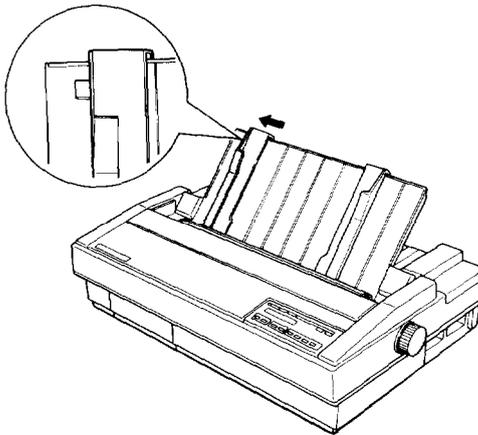
4. Adjust the right edge guide to match the width of your paper. Next, slide a sheet down between the edge guides until it meets resistance.
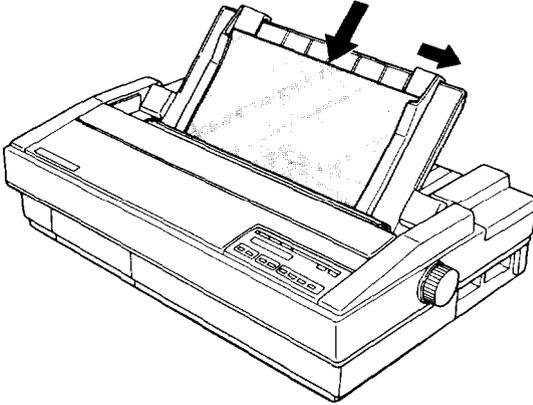
5. Press the **LOAD/EJECT** button once to automatically load the paper.
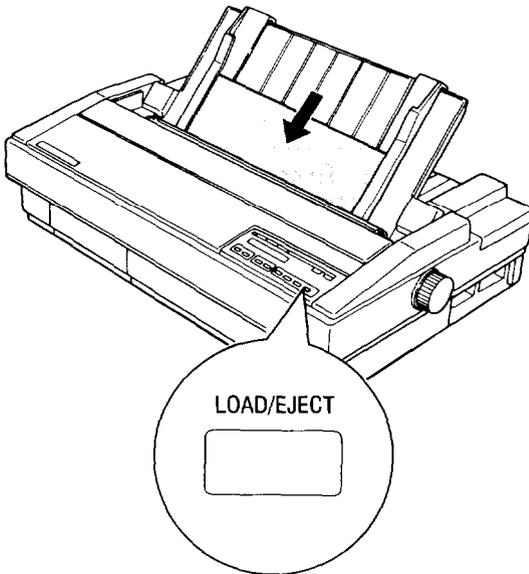
6. Press the **ON LINE** button to start **the** self test.
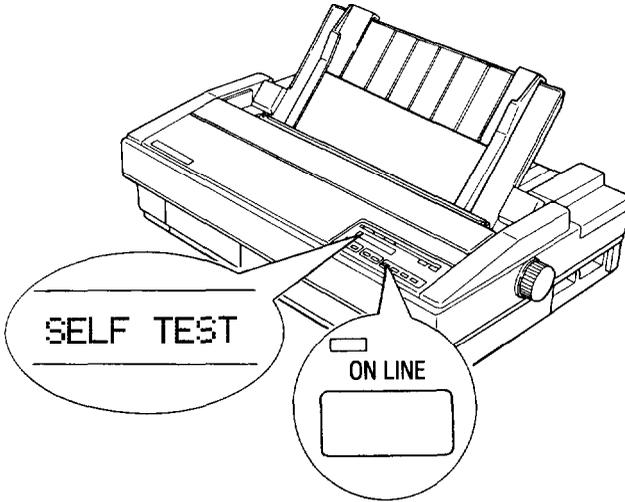
7. A list of your printer's current settings are printed first, followed by a series of characters. The self test continues until the paper runs out or you press the **ON LINE** button. If the self test results are satisfactory and you wish to stop the test, press the **ON LINE** button. (To resume the self test, press the **ON LINE** button once more.)

Note: To clear a paper jam, first set the printer off line and use the **FORM FEED** or **LINE FEED** button. If it is necessary to use the platen knob to clear **the** jam, be sure to turn the printer off first.

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8. If paper is still loaded, press the **LOAD/EJECT** button to eject it. Then reset the printer by pressing both **the ON LINE** and **LOAD/EJECT** buttons.

Parts of typical draft and Letter Quality self tests are shown below.

Draft mode

FONT	Draft	Roman	Sans Serif
	Script	OCR-B	OCR-A
PITCH	10CPI	12CPI	15CPI
	Propo.		
LINE SPACING	1/6inch	1/8inch	
PAGE TRACTER	66LINE		
PAGE CSF BN1	132LINE		
PAGE CSF BN2	132LINE		
1" SKIP	Off	On	
AUTO TEAR OFF	Off	On	
LEFT MARGIN	0		
RIGHT MARGIN	80		
		Graphic	Down
		France	

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()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
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0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
```

> **Note:**
> • When the optional cut sheet feeder is installed, the self test printout is slightly different. For details, see the section on the cut sheet feeder in Chapter 5.
> • Factory settings differ slightly according to country.

Letter Quality mode

FONT	Draft	Roman	Sans Serif
	Script	OCR-B	OCR-A
PITCH	10CPI	12CPI	15CPI
	Propo.		
LINE SPACING	1/6inch	1/8inch	
PAGE TRACTER	66LINE		
PAGE CSF BN1	132LINE		
PAGE CSF BN2	132LINE		
1" SKIP	Off	On	
AUTO TEAR OFF	Off	On	
LEFT MARGIN	0		
RIGHT MARGIN	80		
	lic	Graphic	Downlo
	x ()*+,-./0	France	G

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=$%&'()*+,-./0123456                          KLM
$%&'()*+,-./0123456789:;                    HIJKLMN
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP
Sans Serif
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()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
Courier
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
/0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

Checking the operation

If the self test does not print properly, check the points below.

The points that need to be checked are **the** print head area and the control panel operation. If paper is jammed, turn off the printer. Then remove the paper using **the** platen knob, and load a **new** sheet.

Problem	Solution
The printer does not print or stops printing.	
The **INK END** *light is* o n .	The ink cartridge may be empty or the cartridge may not be installed. Install a new ink cartridge. Refer to 6-6.
The "COVER OPEN" *message is displayed on the control panel.*	The printer cover is open. Close the printer cover and resume printing.
The test did not print when you pressed the **ON LINE** *button.*	Turn off the printer and repeat the previous section. Make sure you hold down longer on the **FORM FEED** or **LINE FEED** button while you turn on the printer.
	The interface cable may be connected to your printer. Make sure to disconnect the interface cable.
The print head does not move.	The protective materials may not be removed. Remove all the protective materials from the printer. Refer to l-4.

Problem	Solution
The print head moves, but nothing is printed.	The printer may not have been charged with ink. Turn off **the** printer, and then turn the printer on again while holding down both the **ON LINE** and **LINE FEED** buttons to start the ink charging cycle. Refer to l-16.
The print is faint or uneven.	
Dots are missing in the printed characters or graphics. A B C D	The print head nozzles may be clogged. Press the **ON LINE** button to set the printer off line. Then press both the **ON LINE** and **LINE FEED** buttons to start the print head cleaning cycle.
The printout has a blurred appearance. **ABCD**	Your may not be using the correct type of paper for your printer. Make sure the surface of the paper is not too rough or too smooth. Although most types of business correspondence quality paper works well with the SQ, you should always test the paper you **want to** use before buying it in large quantities. You may not be printing on the correct side of your paper. Test both sides of your paper to determine which gives you the best print quality.

If the printer still does not print the self test correctly, contact your EPSON dealer.

Connecting the Printer to Your Computer

Your SQ-850 or SQ-2550 has two separate interface connections: a parallel interface and an RS-232C compatible serial interface. If you are not sure which one is required by your computer, check your computer manual for this information.

If you have a suitable shielded cable, you should be able to connect to most computers immediately. If you have one of the few computers that requires a different type of interface, you should be able to use one of the optional interfaces described in Chapter 5.

The parallel interface is the printer's default setting. If you need to use the built-in serial interface, be sure to change the SelecType setting followed steps in Chapter 3.

The parallel interface

Connect the parallel interface cable as described below. Before connecting the parallel interface cable, make sure that both the printer and your computer are turned off.

1. Plug the connector of the cable securely into the printer.
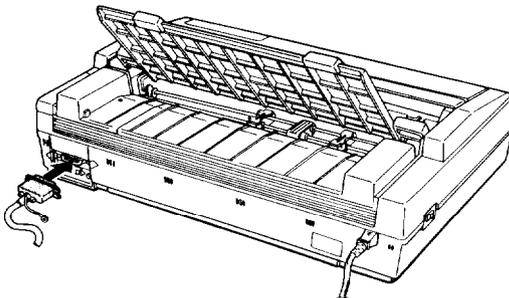
WARNING: Do not plug more than one interface cable into the printer at one time. This may damage the printer.

2. Squeeze the wire clips together until they lock in place on both sides of the connector. (If you do not lock these clips into place, the printed results may be incorrect.1
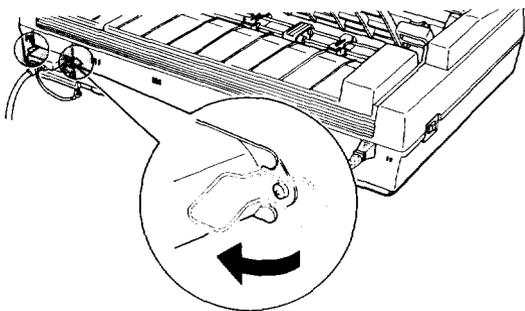
3. If your cable has a ground wire, attach it to the ground connector beneath the interface connector.
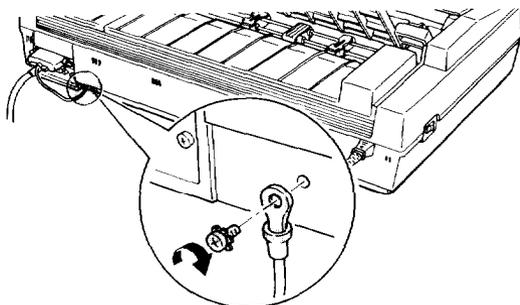
4. Plug the other end of the cable into the computer. If there is a ground wire at the computer end of the cable, attach it to the ground connector of the computer.

The serial interface

Connect the serial interface cable as described in this section. Before connecting the serial **interface** cable, make sure that both the printer and your computer are turned off.

1. Plug the connector of the cable securely into the printer-
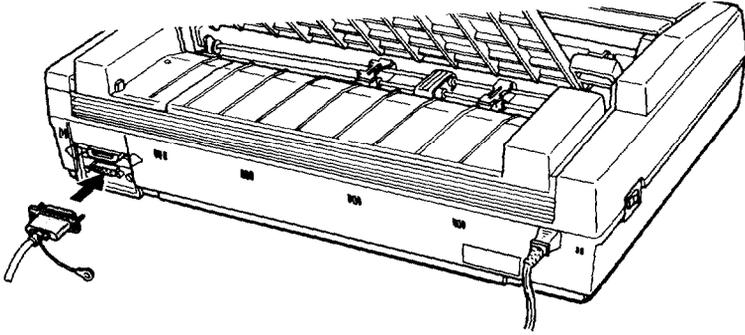
⚠ **WARNING:** Do not plug more than one interface cable into the printer at one time. This may damage the printer.

2. Use a screwdriver to secure the cable **by tightening** the screw on each side of the connector.
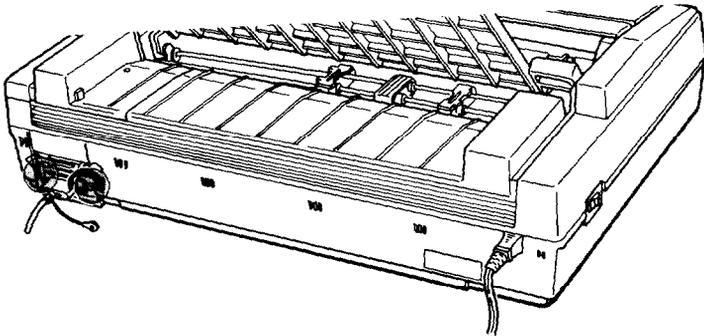
> **Note:** If the screws that come with the cable do not fit into the connector screw locks on the interface, you need to replace these screw locks with the optional **ones** provided with the printer.

3. If your cable has a ground wire, attach it to the ground connector beneath the interface connector.
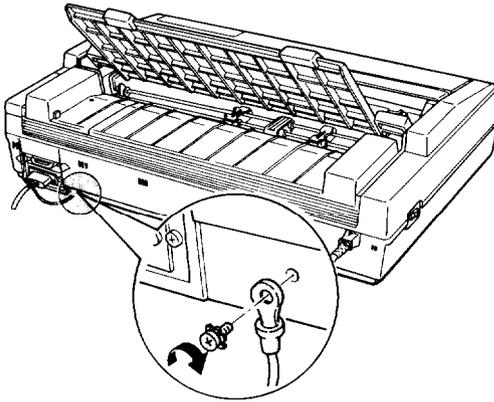
4. Plug the other end of the cable into the computer. If there is a ground wire at the computer end of the cable, **attach** it to **the** ground connector of the computer.

Setting Up Your Application Software

Now that you have set up and tested your printer you should make sure that it works with the application programs you want to **use.** Most application programs let you specify the type of printer you are using so that the program can take full advantage of the printer's features. Many of these programs provide an installation or setup section that presents a list of printers to choose from.

Choosing from a menu

Because the family of EPSON printers shares a great many commands, you can use an application program even if it does not list the SQ-850 or SQ-2550 on its printer selection menu. If the SQ-850 or SQ-2550 is not listed, select the first printer from the following list. The printers are listed in order of preference:

SQ-2550	**SQ-850**
LQ-1050	**LQ-850**
LQ-2550	
SQ-2500	
LQ-1000	LQ-800
LQ-2500+	
LQ-1500	

If none of these printers is listed, select the first one available on the following list:

> **LQ**
> EX
> FX
> LX
> RX
> MX
> EPSON printer
> Standard printer
> Draft printer

To use all the features of the SQ-850 or SQ-2550, however, it is best to use a program with the SQ-850 or SQ-2550 on its menu. If your program does not list your printer, contact the software manufacturer to see if an update is available. For more information on using software, see Chapter 4.

Chapter 2
Paper Handling

Choosing paper

Because the SQ-850 and SQ-2550 are ink jet printers, paper absorbency is especially important. With paper **that** is too absorbent, the ink can spread slightly, causing characters to blur. However, with paper that is not absorbent enough, the ink may take too long to dry and can be smeared easily.

The finish and thickness of the paper is also important. Avoid paper that has a rough finish or a slick, coated finish. Also avoid paper that is too thick or too thin. See the paper specifications section in Chapter 8 for more information.

Most correspondence quality paper works in the SQ-850 or SQ-2550 without problems. It is, however, a good practice to test the paper in your printer before buying in large quantities. Also, you should test envelopes, preprinted forms, and labels.

To test a supply of paper, take a single sheet from the package and load it in the printer. Perform the self test described in the last chapter and check **the** results. (You can also run this test with continuous paper.) You should also test both sides of the paper to determine which gives you the best quality printing.

If the ink does not bleed or smear, the paper should be suitable for use with your printer.

Using Single Sheets

Your printer can handle a wide range of paper size up to a maximum width of 257 mm (10.1 inches) on the SQ-850 and 364 mm (14.3 inches) on the SQ-2550.

Loading a sheet

To load a single sheet of paper, follow these steps.

1. Turn on **the** printer. The **POWER** and **PAPER OUT** lights come on and the printer beeps three times.
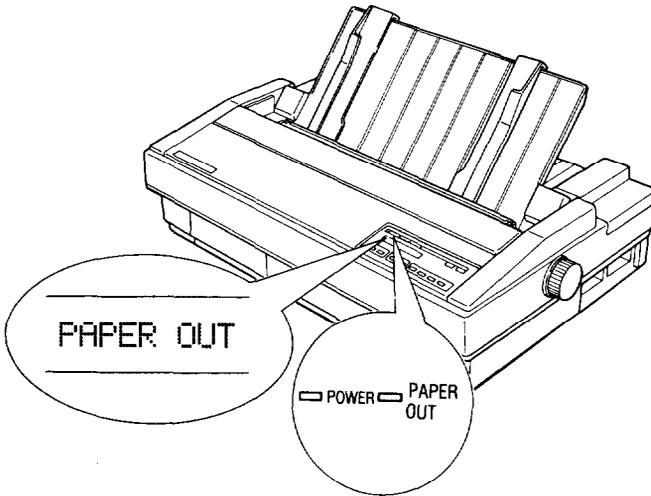
2. Press the **PAPER SELECT** button until the LCD panel shows Friction.
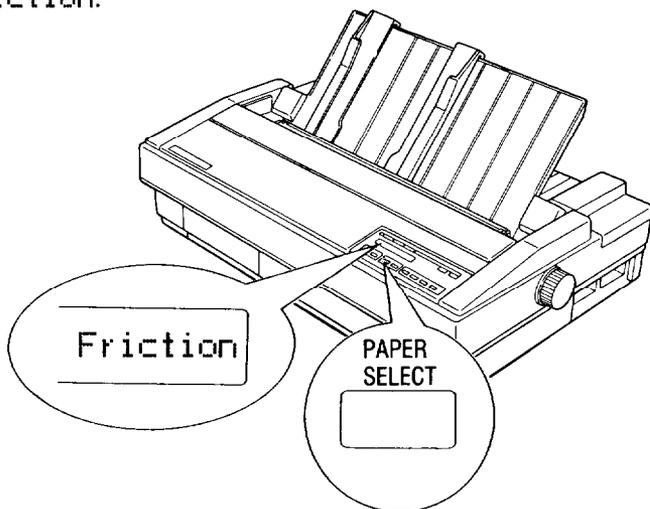
3. Move the left edge guide until it rests against the guide mark.
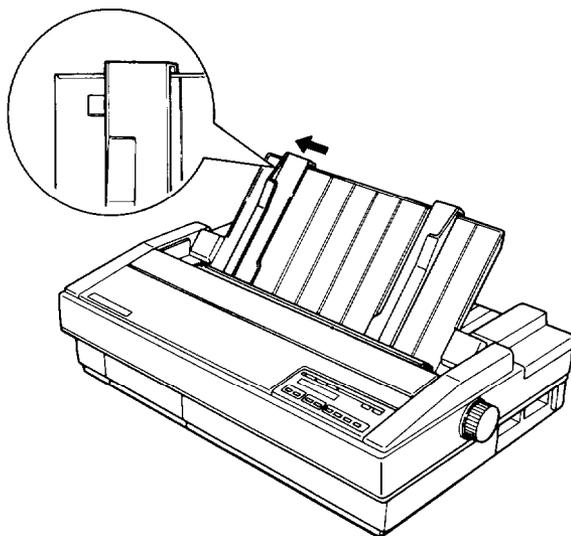
4. Adjust the right edge guide to match the width of your paper.
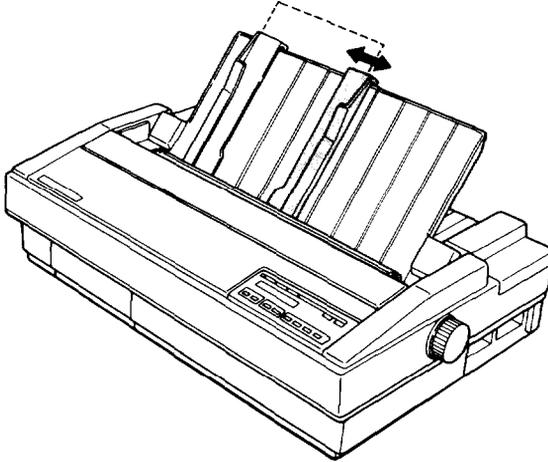
5. Slide a sheet of paper down between the edge guides until it meets resistance.
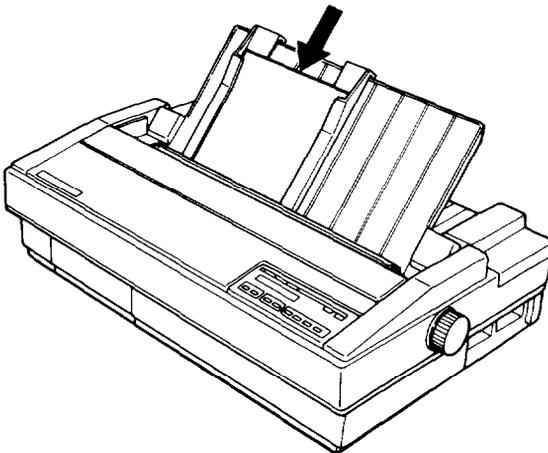
6. Press the **LOAD/EJECT** button once to load the paper.
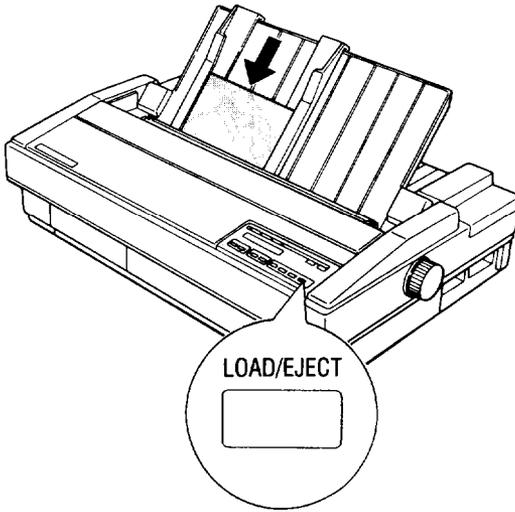
Note: If the platen turns without loading the paper, remove the paper and re-insert it more firmly; then press the **LOAD/EJECT** button again.

7. Press the **ON LINE** button to set the printer on line.
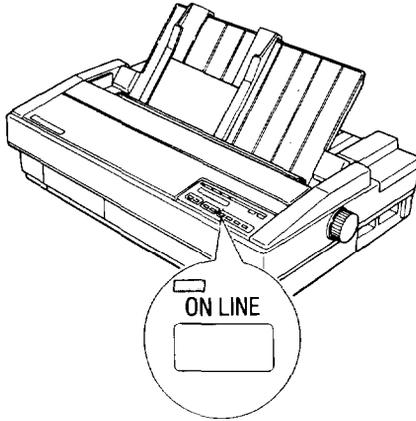
ON LINE

> **WARNING:** Never use the platen knob for paper feeding except in case of a paper jam or other paper feeding problem. Use of the platen knob may affect the loading and short tear-off positions. If you need to adjust the position of the paper after it is loaded, use the micro-adjustment feature described in the section on adjusting the loading position in Chapter 3.

Reloading during printing

When you print a document more than one page long using single sheet paper, the printer stops printing when it reaches the bottom of the paper. When this happens, either the **ON LINE** light goes off automatically or it may remain on, depending on your application software. If the **ON LINE** light remains on, the first thing you should do is press the **ON LINE** button to take the printer off line.

Once the **ON LINE** light *is* off, remove the **sheet** that has just been printed (if necessary, press the **FORM FEED** button to eject the page) and load **a** new **sheet.** Press the **ON LINE** button to start printing the next page and follow any additional prompts from your software.

Using Continuous Paper

The tractor built into the SQ-850 and SQ-2550 is remarkably easy to load and operate. Its low-profile design takes up little space and can handle a wide variety of paper widths (up to maximum of 279 mm (11.0 inches) on the SQ-850, and 406 mm (16.0 inches) on the SQ-2550.

Positioning your continuous paper supply

An important consideration for achieving smooth and accurate paper feeding is the position of your continuous paper supply.

Three ways of positioning your printer and continuous paper supply are shown below.
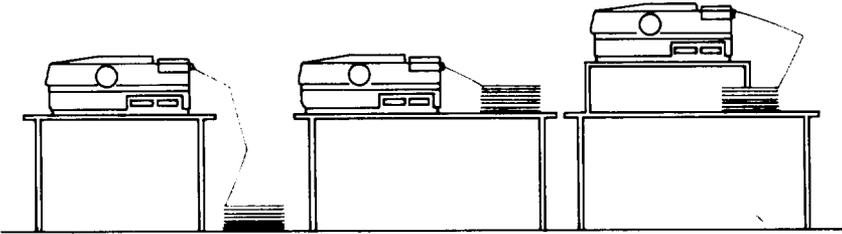
Make sure that you align the paper supply with the paper loaded in the tractor so that the paper feeds smoothly into the printer.
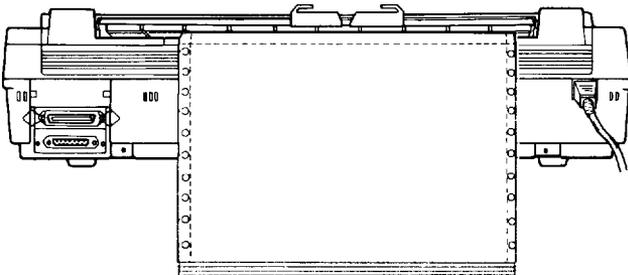
Loading continuous paper

Before loading continuous paper, make sure that the printer is turned off.

1. Remove the paper guide by tilting it up and lifting it off of the printer.
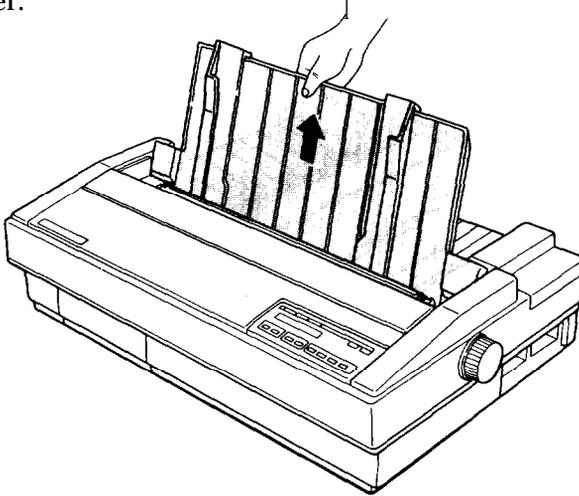
2. Turn on the printer, and press the **PAPER SELECT** button to changes the display to Tractor .
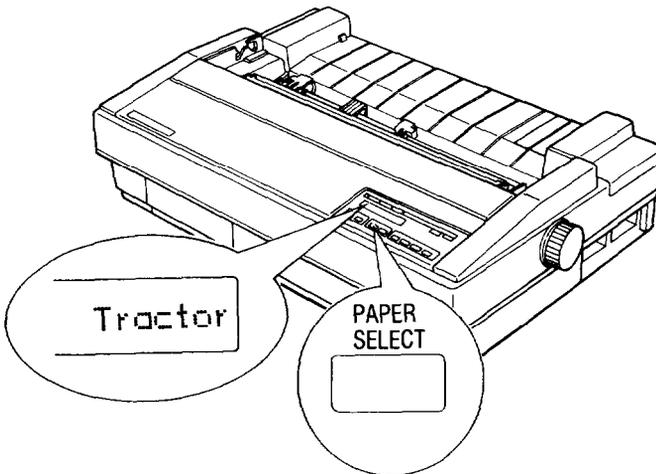
3. Release the left and right sprocket lock levers by pushing them back.
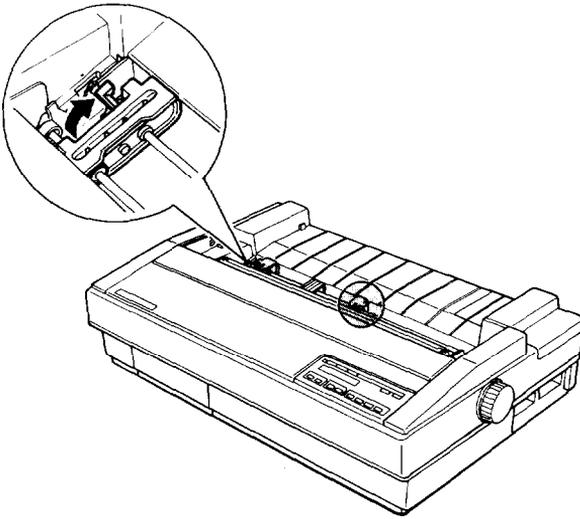
Slide the left sprocket unit until it stops at the ring and lock it in place. Next, slide the right sprocket unit to roughly match the width of your paper, but do not lock it.
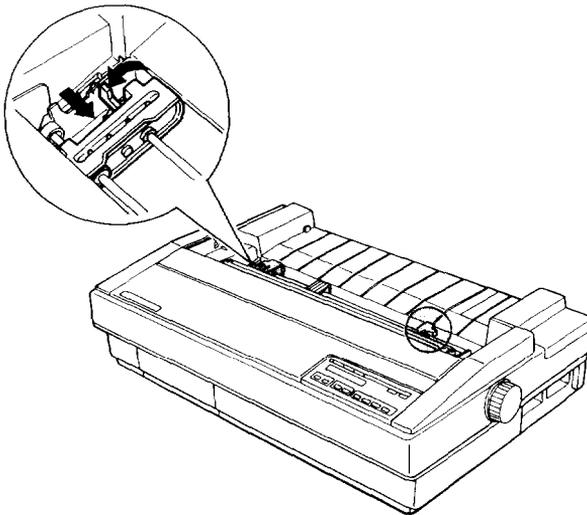
5. Slide the paper support to a point midway between the sprocket units.
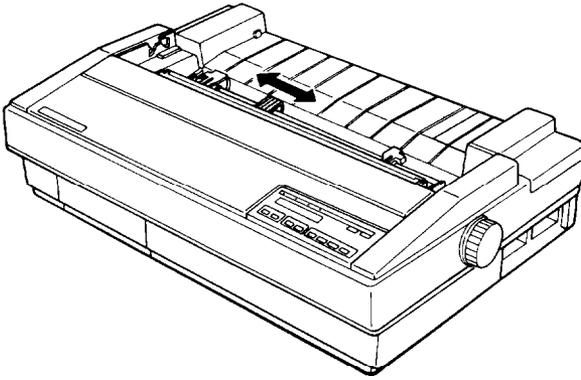
6. Open the sprocket covers.
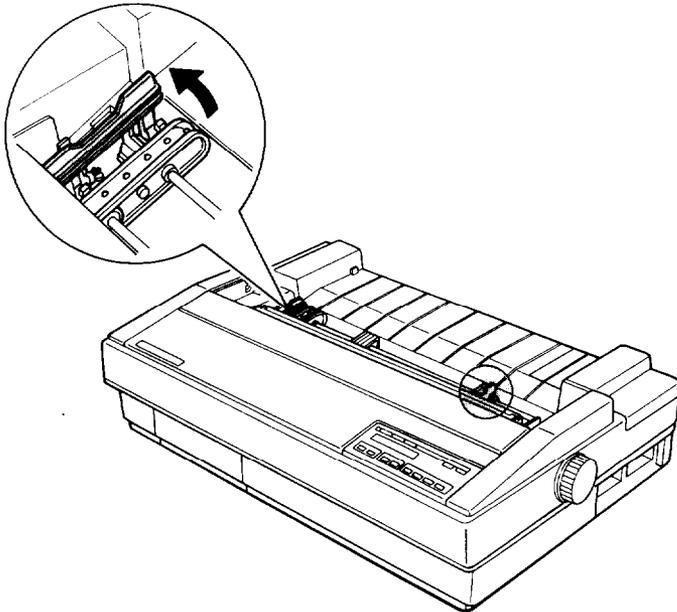
7. Fit the first four holes in the continuous paper over the pins of the sprocket units.
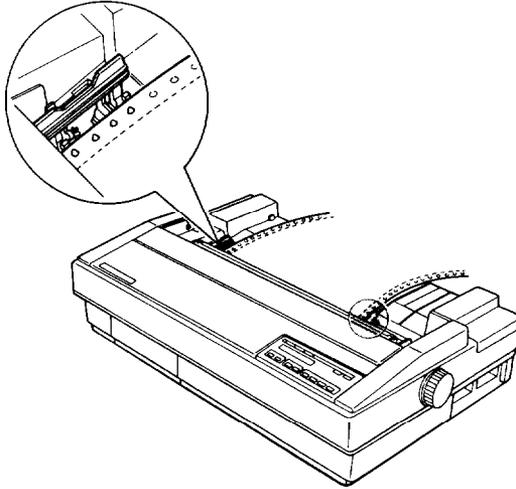
8. Close the sprocket covers.
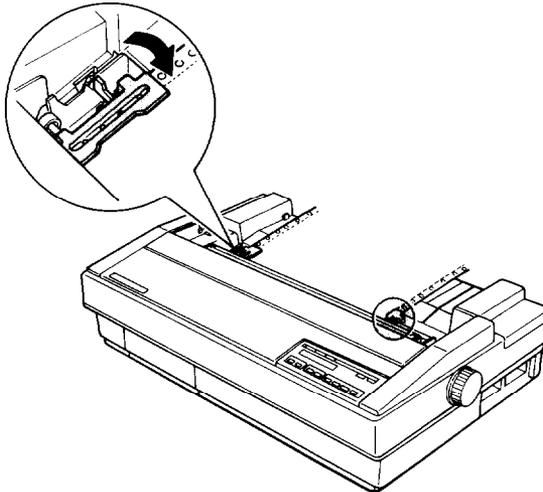
Note: Make **sure** the first sheet of paper has a clean, straight edge so that paper can feed smoothly into the printer.

9. Slide the right sprocket unit to a position where the paper is straight and has no wrinkles, and then lock it into place.
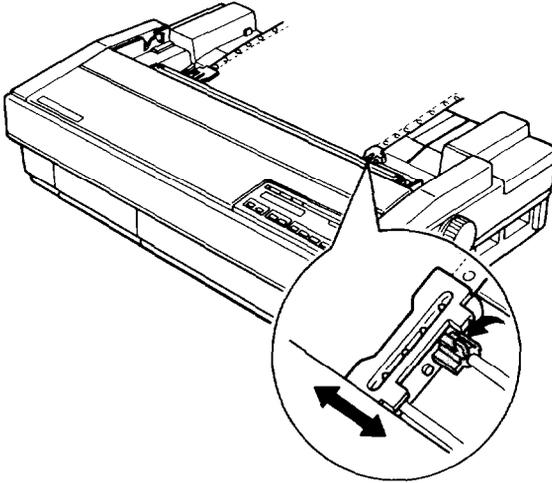
10. Reattach the paper guide laid down onto the back of the printer. Then slide the edge guides together so that they meet at about the middle of the paper's width.
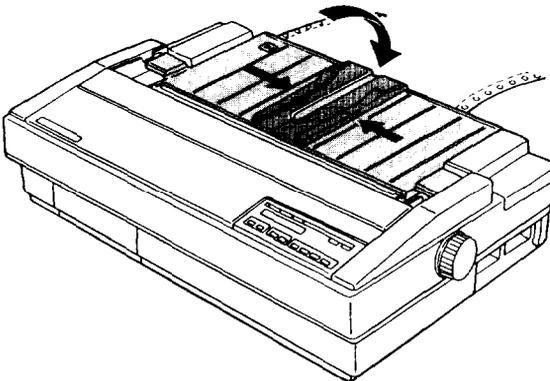
11. Press the **LOAD/EJECT** button to feed paper to the loading
position.
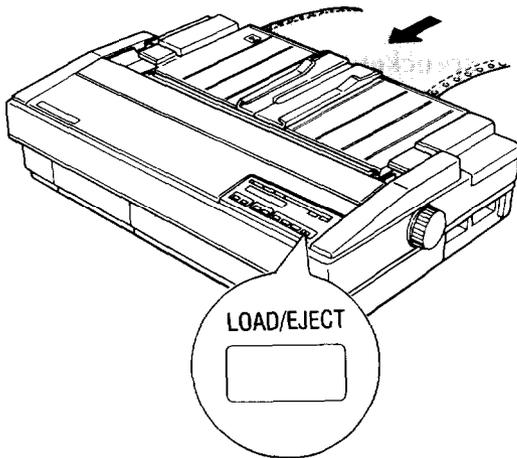
Note: If you press the **LOAD/EJECT** button when continuous
paper is already loaded, the paper is reverse fed to **the**
standby position.

12. Press the **ON LINE** button to set the printer on line.
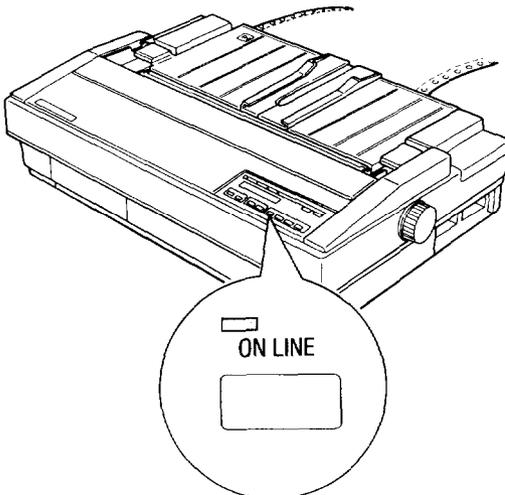
The printer remembers this loading position and advances each page to the same position. Never adjust the loading position using the platen knob. Use of the platen knob may affect the loading and short tear-off positions. If you need to adjust this position, you can use the micro-adjustment feature. See the section on setting the loading position in Chapter 3.

> **Note:** Before you begin printing, make sure you check the page length and skip over perforation settings, and readjust the settings if necessary. See the sections on page length and skip over perforation in Chapter 3.

Switching between Continuous and Single Sheets

Even with continuous paper loaded in the printer, you can easily switch to single sheet printing without removing the continuous paper from the tractor.

Switching to single sheets

To switch from continuous paper to single sheets, follow the steps below.

1. After printing on the continuous paper, press the **ON LINE** button to set the printer off line.
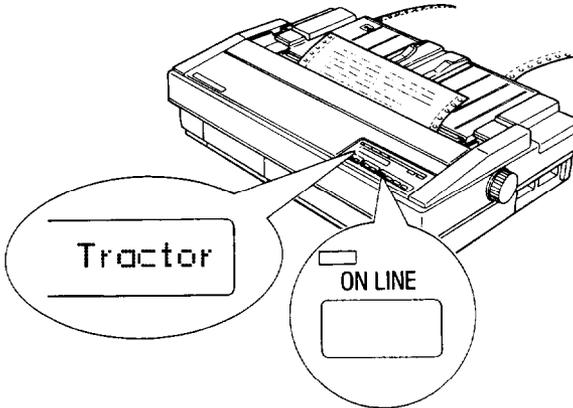
2. Tear off any printed sheets or extra blank sheets. If you are not using the short tear-off feature, press the **FORM FEED** button to advance your document to a point where it can be removed.
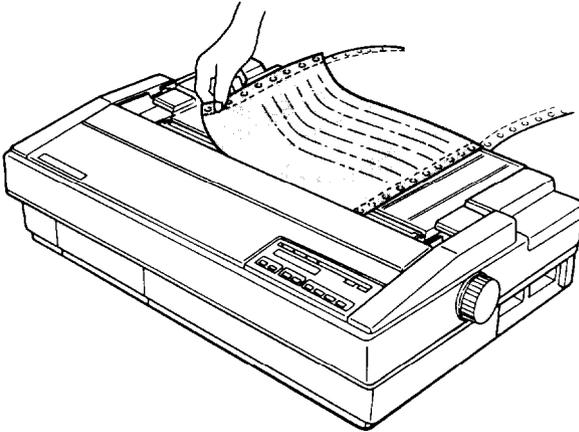
Note: If the perforation of the page is not fed past the edge of **the** paper bail the first time, press **the FORM FEED** button again. Do not use the platen knob to feed the paper while the printer is turned on.

WARNING:
- Make sure you tear off your printed document before pressing the **LOAD/EJECT** button. Reverse feeding several pages at a time may result in a paper jam. This is especially true for narrow paper between 102 and 152 mm (between 4 and 6 inches).
- Never feed labels backward through the printer. Labels can easily come off the backing sheet and jam the printer.

3. Press the **PAPER SELECT** button to change the display on the LCD to Friction. The continuous paper is fed backward automatically to its standby position. The paper is still attached to the tractor, but is no longer in the paper path.

Friction
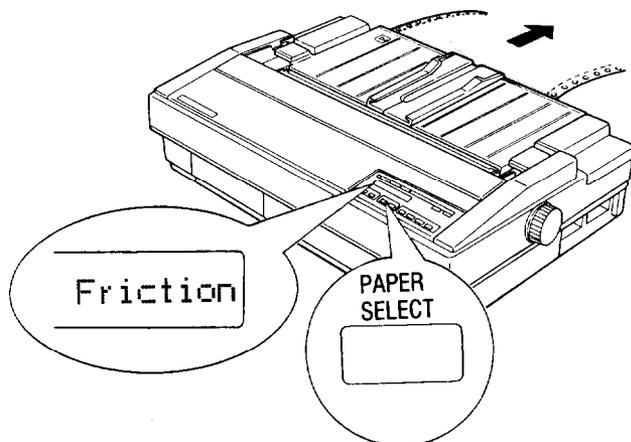
PAPER
SELECT

4. Raise the paper guide until it locks into place.
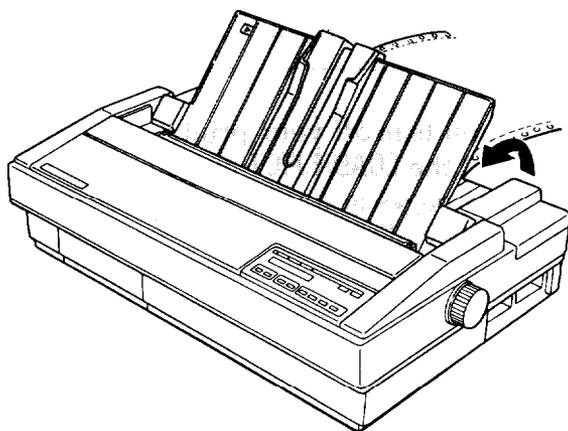
5. SIide the left edge guide until it rests against the guide mark. Next, adjust the right edge guide to match the width of your paper.
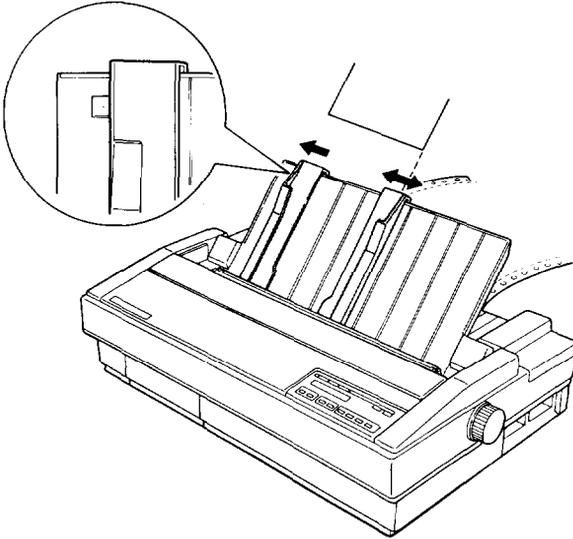
6. Slide a sheet of paper down between the edge guides until it meets resistance.
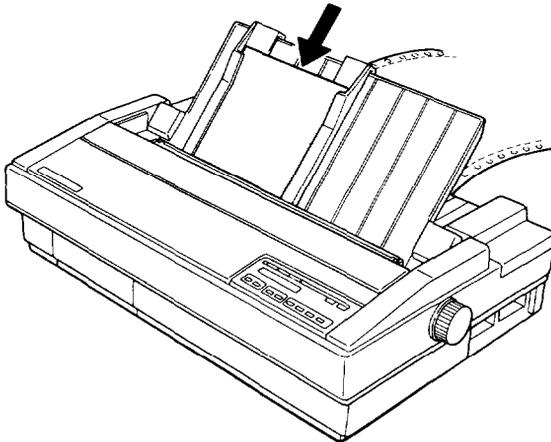
7. Press the **LOAD/EJECT** button once to automatically load the paper.
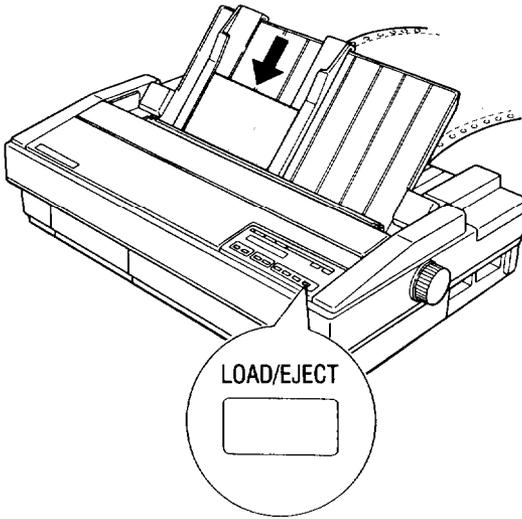
8. Press the **ON LINE** button to set the printer on line.
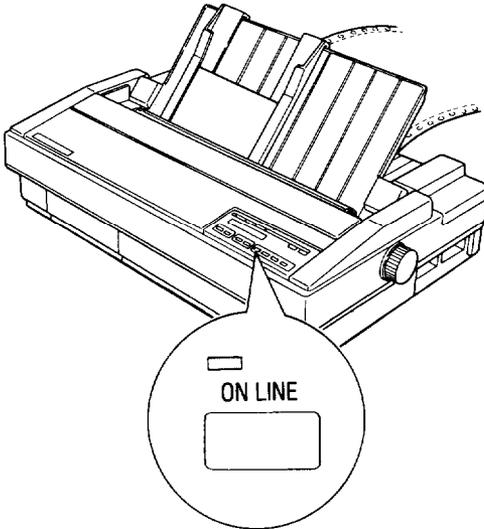
Switching back to continuous paper

It is also easy to switch back to printing with continuous paper.

Before switching back to continuous paper, make sure that the printer is off line.

1. Press the **PAPER SELECT** button until **the** display shows Tractor. If a single sheet is loaded, it is ejected automatically and continuous paper is fed to the loading position. Remove the ejected single sheet from the printer.
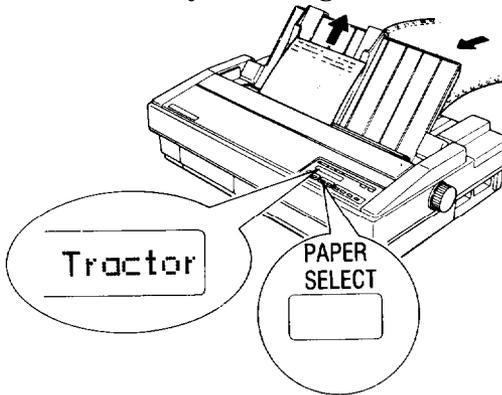
2. Slide the edge guides together so that they meet at about the middle of the paper's width.
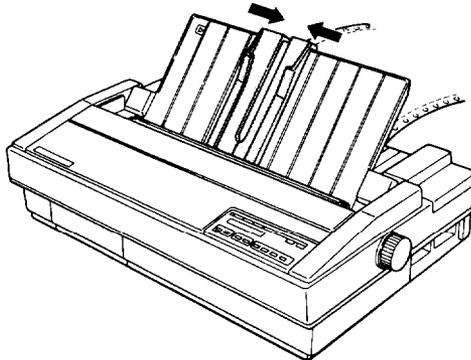
Note: When using continuous paper, always make sure that the edge guides are pushed together.

3. Lift the paper guide slightly and lower it onto the back of the printer.
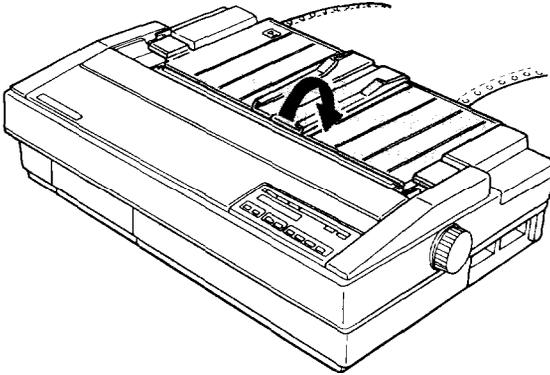
4. Press the **ON LINE** button to set the printer on line.
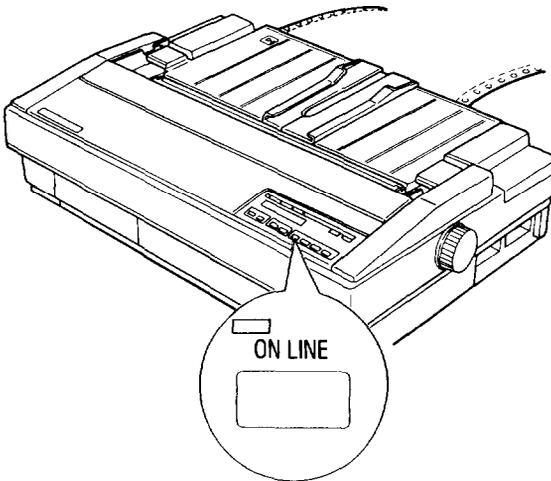
Printing on Special Paper

In addition to using single sheets and continuous paper, your printer can also print on a wide variety of paper types, including labels and envelopes.

> **Note:** If you are printing graphics, preprinted forms, or labels, it is recommended that you use the optional pull tractor to print. See the pull tractor section in Chapter 5.

Also, when you print on forms, labels, or envelopes, be sure that your application program settings keep the printing entirely within the printable areas. That is, you should not print any closer that 12.7 mm (one-half inch) from either side of the paper for labels or envelopes. For information on the printable area for envelopes, see page 2-29.

The paper thickness lever

Your printer has a paper thickness lever that allows you to adjust for thicker than normal paper, such as envelopes. For normal printing jobs, keep the lever in its raised position. When printing labels or envelopes, set the lever to its lowered position.

Before changing the lever position, set the printer off line and then turn off the printer.

1. Remove the printer cover.

2. Set the paper thickness lever position by pulling down as you may need.
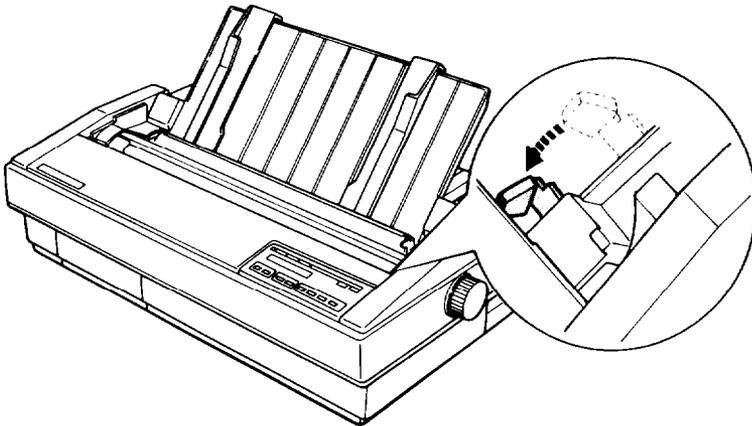
3. Reattach the printer cover.
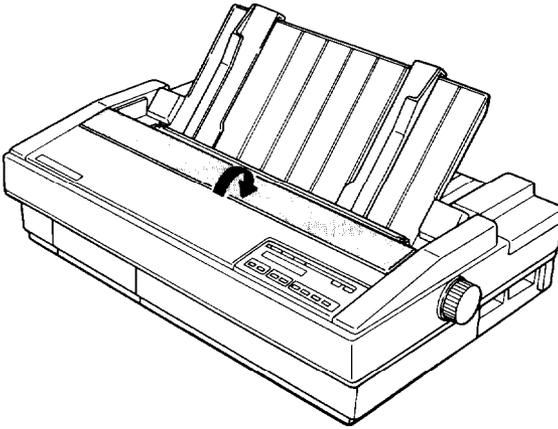
⚠ **CAUTION:** Always return the lever to its upright position when you go back to printing on ordinary paper.

Labels

If you need to print labels, choose the type that is mounted on a continuous backing sheet with sprocket holes for use with the tractor. Do not use single sheet labels on a shiny backing sheet because they almost always slip a little if fed by friction alone.

You load labels the same way that you load continuous paper. See the section on loading continuous paper in this chapter for more information.

> **WARNING:** Never feed labels backward through the printer. Labels can easily come off the backing and jam the printer. Also, never use the tear-off function or the **LOAD/EJECT** button to eject labels. If a label does become stuck in **the** printer mechanism, refer the problem to your dealer.

To eject **the** labels from the printer follow these steps.

1. Remove **the** paper guide.
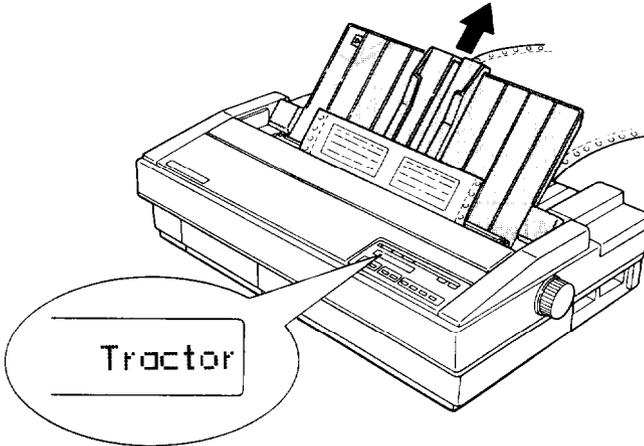
2. Tear off the sheet of labels at the perforation behind the push tractor.
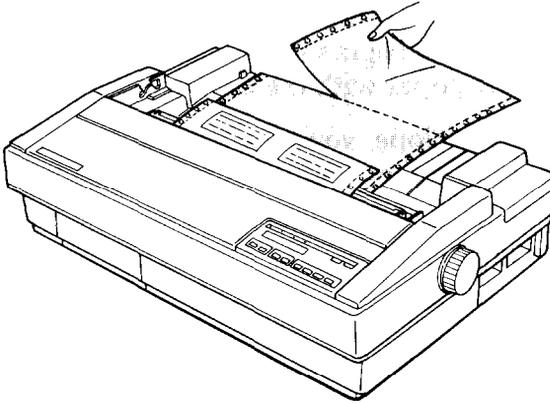
Note: Since labels are especially sensitive to temperature and humidity, always use them under normal operating conditions.

3. Press the **ON LINE** button to set the printer off line. Then press the **FORM FEED** button to eject the labels forward. (Remember not to use the **LOAD/EJECT** button to eject labels.)

FORM FEED

Paper Handling 2-27
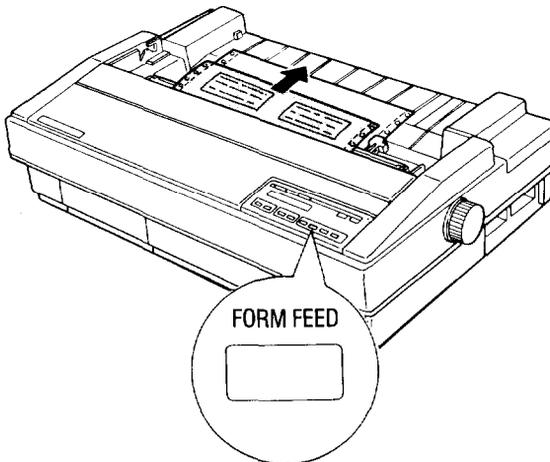
Envelopes

You can print on a variety of envelopes -- including air mail, plain, or bond envelopes -- using the single sheet loading feature described in the beginning of this chapter. Chapter 5 describes using envelopes with the cut sheet feeder.

When loading an envelope, you may have to push down on it slightly while pressing the **LOAD/EJECT** button.
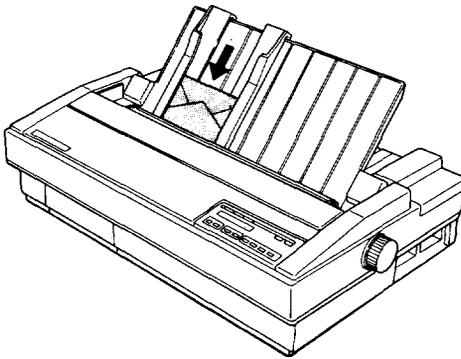
If it is necessary to eject the printed envelope, press the **ON LINE** button to set the printer off line. Then press the **LOAD/EJECT** button.

LOAD/EJECT
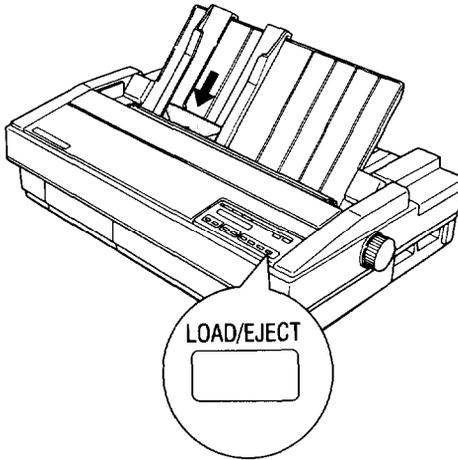
CAUTION: When printing on envelopes, be sure that your application program settings keep the printing entirely within the printable area as shown below.

8.5 mm (0.33") or more

25 mm (0.98") or more

3 mm (0.12") or more
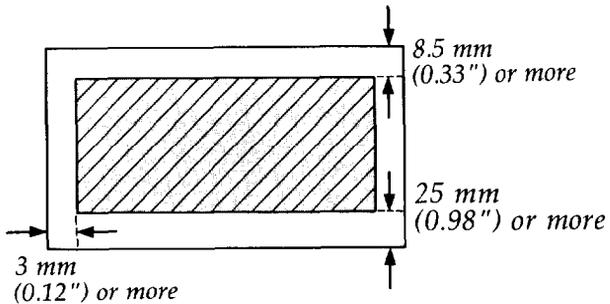
Note: If the printed results are faint, you can use the paper thickness lever to adjust the distance between the print head and the platen. See the section on the paper thickness lever on page 2-23.

Chapter 3
Using the Printer

Operating the Control Panel

The SQ-850 or SQ-2550 control panel is made up of three elements: the Liquid Crystal Display (LCD), indicator lights, and the buttons (six flush mount buttons and four raised buttons). The indicator lights and display let you monitor the current status of the printer, and the buttons let you control all of the main printer settings and paper handling functions.

The display
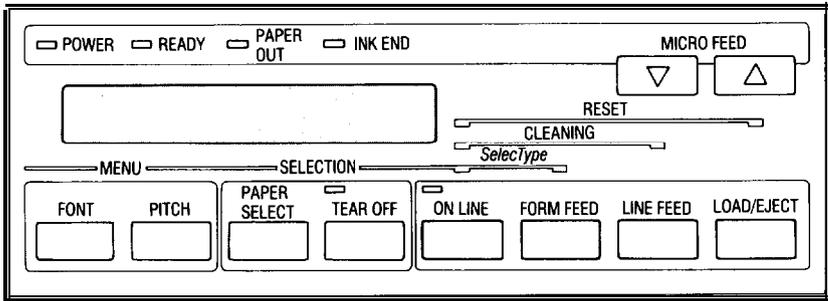
The display shows the current status of the printer. If any of the following states occur, the display shows the corresponding message.

SelecType messages and operation are described later in this chapter.

PAPER OUT   The printer is out of paper.

I NK END   The ink supply is low or the ink cartridge is removed.

COVER OPEN   The printer cover is open.

3-2 Using the Printer

The lights
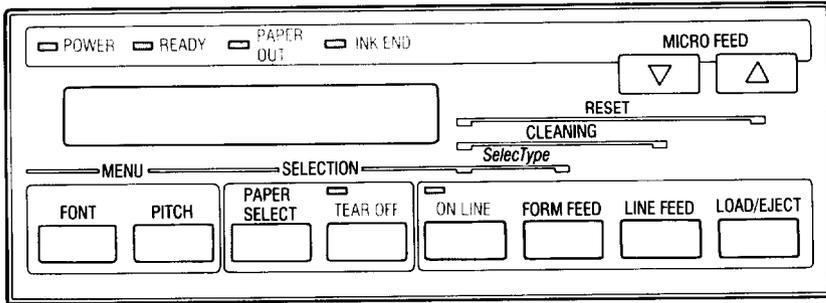
POWER (green):	On when the printer is turned on and power is supplied.
READY (green):	On when the printer is ready to accept input data. This light flickers while data is received.
PAPER OUT (red):	On when the paper-out sensor detects that the printer is out of paper.
INK END (red):	On when the ink cartridge is low.
ON LINE (green):	On when the printer can receive and print data from the computer.
TEAR OFF (orange):	On when short tear-off mode is selected.

The buttons
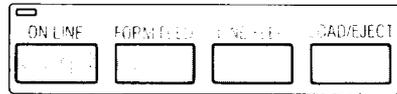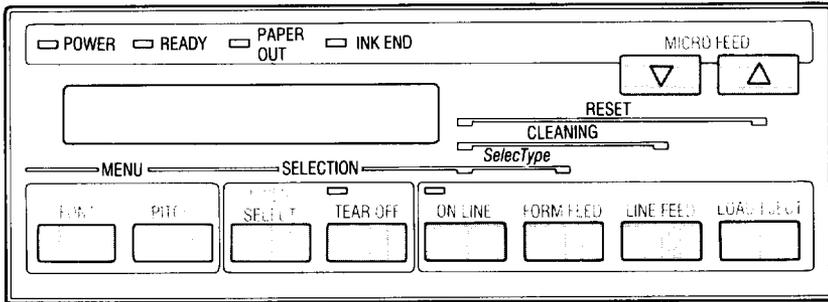
ON LINE:	This button controls the printer's on line/off line status. When the printer is on line, the **ON LINE** light is on and the printer can receive and print data from the computer.
FORM FEED:	When the printer is off line, press this button to eject a single sheet of paper or to advance continuous paper to the top of the next page.
LINE FEED:	When the printer is off line, press this button to feed the paper one line, or hold it down to feed the paper continuously.
LOAD/EJECT:	When the printer is off line, press this button to load or eject the paper.

3-4 Using the Printer
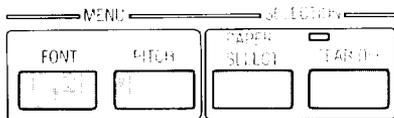
FONT:

Press this button to select a character font. The selected font is shown on the display. Pressing this button displays fonts in the following order:

Draft, Roman, S Serif (Sans Serif), Courier, Prestige, Script, OCR-B, OCR-H, Orator Orator-S

See the section on fonts in this chapter for more information.

When the printer is in SelecType mode, this button is used to change **the** SelecType settings **as a MENU** button.

PITCH: Press this button to select the character spacing. You can choose 10, 12, 15, 17 or 20 cpi (characters per inch) or I'S (Proportional). The selected character spacing is shown on **the** display. See the section on character spacing in this chapter for more information.

           When the printer is in SelecType mode, this button is used to change the SelecType settings as a **MENU** button.

PAPER SELECT: When the printer is off line, press this button to select the paper handling system. The selected system is shown on the display. The paper handling system is selected in the following order:

             Troctor, Friction, CSF bin1, CSF bin2

           Select CSF bin 1 or CSF bin 2 only if using the optional cut sheet feeder. When the printer is in SelecType mode, this button is used to change the SelecType settings as a **SELECTION** button.

TEAR OFF:

Press this button to feed the perforation of continuous paper to the tear-off edge of the printer. After tearing off the paper, press this button again to feed the paper backward to the loading position. See the short tear-off section in this chapter for more information. When the printer is in SelecType mode, this button is used to change the SelecType settings as a **SELECTION** button.
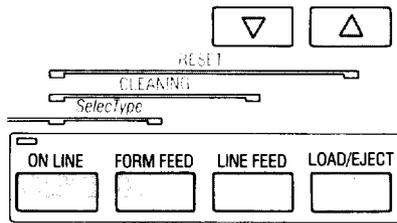
MICRO FEED:

The A button is used to feed the paper slightly forward and the ▼ button is used to feed the paper slightly backward. This feature is used to adjust the top of form position, short tear-off position, or loading position.

Using the Printer 3-7

SelecType: Press both the **ON LINE** and **FORM FEED** buttons at the same time to enter the SelecType mode. In the SelecType mode, the **FONT, PITCH, PAPER SELECT,** and **TEAR OFF** buttons can be used as SelecType panel buttons. The display lets you monitor the SelecType settings. See the section on SelecType in this chapter for details.

CLEANING: When the printer is off line, press both the **ON LINE** and **LINE FEED** buttons at the same time to perform print head cleaning. These buttons also used to initiate a one time ink charging routine during printer setup.

RESET: Press both **the ON LINE** and **LOAD/EJECT** buttons at the same time to initialize the printer. This cancels printer settings to defaults. See the section on initializing the settings in this chapter for more information.

Other control panel features

Self test:
By holding down the **LINE FEED** button (for draft) or **FORM FEED** button (for Letter Quality) while you turn on the printer, you can start the printer's self test. The self test printout lets you check the current settings and operating status of the printer. See the section on testing the printer in Chapter 1 for more information.

Data dump:
By holding down both the **LINE FEED** and **FORM FEED** buttons while you turn on the printer, you turn on the data dump mode. This feature allows advanced users to find the cause of communication problems between the computer and printer. See the section on **the** data dump mode in this chapter for details.

SelecType Settings

SelecType

SelecType on the SQ-850 or SQ-2550 brings a new dimension to printing. With SelecType you can control almost every aspect of printer operation.

SelecType lets you:

- Set up to 16 printer settings
- Choose among **the** printer's ten built-in fonts
- Monitor the printer's settings with the LCD display
- Change the printer's default settings without DIP switches

Using SelecType

To enter SelecType mode, press both the **ON LINE** and **FORM FEED** buttons at the same time.
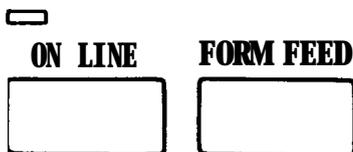
Note: You can exit the SelecType by pressing these two buttons once more.

When the printer is in SelecType mode, you can use four buttons **(FONT, PITCH, PAPER SELECT,** and **TEAR OFF** buttons) to change the printer settings: **the MENU** items are selected by the **FONT** or **PITCH** button and the **SELECTION** options are selected by the **PAPER SELECT** or **TEAR OFF** button.

The possible settings are listed below.

FONT	Draft, Roman, Sans Serif, Courier, Prestige, Script, OCR-B, OCR-H, Orator, Orator-S
PITCH	10CPI, 12CPI, 15CPI*, I7CPI, 20CPI, Propo.(Proportional)* * Some fonts cannot be printed in 15 CPI and/or proportional spacing. In such case, the pertinent pitch is not displayed.
LINE SPACING	1/6inch, 1/8 inch
PAGE Tracror*	24 to 132 LINE
PAGE CSF BN1*	**24 to 132 LINE**
PAGE CSF BN2*	**24 to 132 LINE** * The line spacing is in 1/6th of an inch units.
1' SKIP	**On, Off**
AUTO TEAR OFF	**On, Off**
LEFT MARGIN	**0** to 45 columns (SQ-850) **0** to 80 columns (SQ-2550)
RIGHT MARGIN	1 to 80 columns (SQ-850) 1 to 136 columns (SQ-2550) * The column spacing is based on a pitch of 10 cpi.
CG TABLE	Italic, Graphic, Download

COUNTRY	USA, France, Germany, UK Denmark 1, Sweden, Italy, Spain 1, Japan, Norway, Denmark 2, Spain 2, Latin America, Korea, Legal
PRINT DIR	Bi-D, Uni-D
INTERFACE	Parallel, Serial
BAUD RATE*	300BPS, 600BPS, 1200BPS, 2400BPS, 4800BPS, 9600BPS, 19200BPS * This option is displayed only when the INTERFACE option is set to Serial.
PARITY*	**None**, Even, **Odd**, **Ignore** * This option is displayed only when the INTERFACE option is set to Serial.
AUTO LINE FEED	**On**, **Off**
DC1/DC3	Enable, Disable

The SQ comes with preset default values, which can be printed out using the self test.

- INTERFACE: If your computer has a serial interface, you need to change the interface setting to Serial. If you are using an optional interface board, be sure that the interface setting is Parallel, regardless of the actual type of interface you installed. See the section on interface boards in Chapter 5 for more information.

- BAUD RATE, PARITY: Set these only if you are using the serial interface. These options do not display in SelecType unless the interface is set to Serial. Check your computer manual for the correct baud rate and parity settings. Your computer and printer must have the same baud rate and parity in order to communicate properly.

- AUTO LINE FEED: This setting should remain at its default value (Off) in most cases. Most applications send automatic line feeds at the end of every line. If all of the lines are printing on top of each other, then set AUTO LINE FEED to On.

- DC1/DC3: This setting should also be left at its default value (Disable) in most cases. See the explanation of these codes in Chapter 9 for more information.

Changing the SelecType settings

The following example describes the procedure for changing the CG TABLE option, but the other options can also be changed in the same manner.

1. Press the **ON LINE** and **FORM FEED** buttons at the same time to enter SelecType so that the display **shows FONT xxx (xxx** is the current selected font).
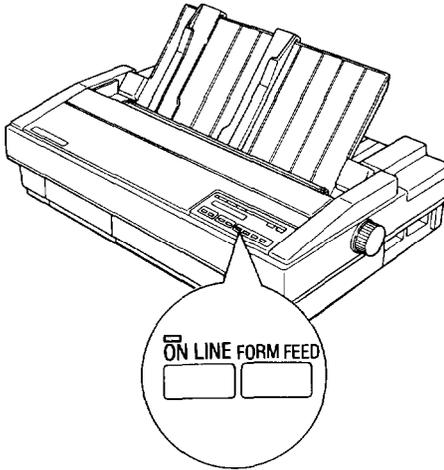
2. Press the **FONT** button (or **PITCH** button) until the dispaly on the LCD changes to **CG TABLE Italic.**
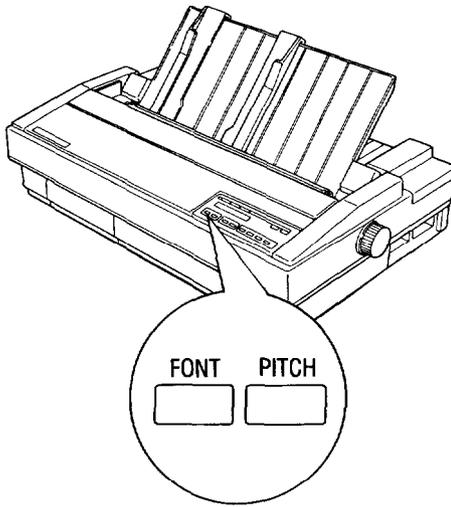
3. Press the **PAPER SELECT** or **TEAR OFF** button several times until the right half of display changes to Graphic.
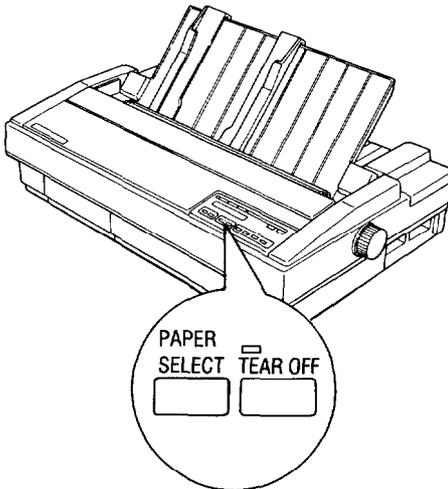
> **Note:**
> • The settings changed by SelecType do not come into effect until the printer is initialized. Initialize (reset) the printer after changing any of the settings with SelecType.
> • The following options are described in more detail later in this chapter: PAGE LENGTH, 1" SKIP, AUTO TEAR OFF, FONT, PITCH, COUNTRY, and CG TABLE.

Initializing the settings

To make your new SelecType settings effective, the printer needs to be initialized before printing. Your printer has a special control panel feature that allows you to initialize the printer's settings without having to turn off the printer. It also allows you to conserve your ink supply, because it does not activate the print head cleaning cycle.

After changing the SelecType settings, press both the **ON LINE** and **LOAD/EJECT** buttons at the same time.
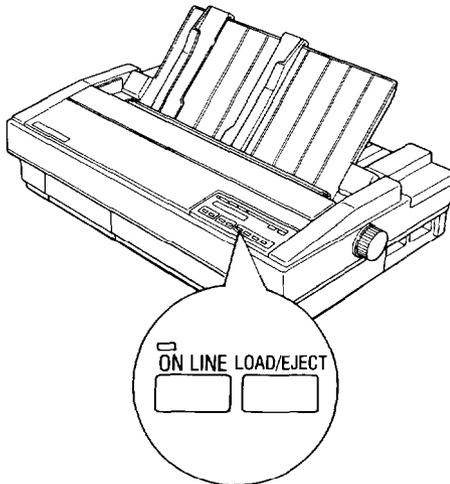
You can also initialize the printer by using the software command (ESC @) or by turning off the printer. See the section on initialization in Chapter 7 for more information.

Page Length

The SelecType function also enables you to set the page length of paper used with the tractor feeding system or the cut sheet feeder. The page length can be set in 1/6th of an inch units within a range of 24 lines to 132 lines. Be sure that the page length is correctly set for the type of paper you are using. If you are using the cut sheet feeder, the page length is automatically set and memorized when you run the printer's built-in self test. However, you can use this SelecType feature to override this setting.

To set the page length using SelecType, follow the steps in the Using SelecType section earlier in this chapter.

Skip Over Perforation

By adjusting the SelecType 1" SKIP option, you can set skip over perforation to ON or OFF. If this feature is ON when you use continuous paper, a one-inch margin is provided between the last printed line on one page and the initial printable line on the next page so that the printer skips over the perforation. This feature is very convenient if your application program does not provide top and bottom margins.

If you adjust your loading position to the proper point, you can get half of the margin at the bottom of one page and half at the top of the next page as shown in the following illustration.

1" SKIP Off (Skip over perforation OFF)

```
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'a
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'ab
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abc
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abcd
```

1" SKIP On (Skip over perforation ON)

```
●   23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
    3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]

●

●

    456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
●   56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
    6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'
```

To set skip over perforation to provide a one-inch margin using SelecType, turn on the 1" SKIP option by following the steps in the Using SelecType section earlier in this chapter.

Note: Most application programs take care of top and bottom margins. Therefore, do not turn on skip over perforation unless your program does not provide these margins.

Adjusting the Loading Position

The Loading Position

The loading position is the position of the paper when it has been automatically loaded by the printer.

The loading position is important because it determines where the printing begins on each page. If the printing is too high or too low on the page, change the loading position using the micro-adjustment feature described below.

Separate loading positions can be set for single sheets, continuous paper, and sheets loaded by the cut sheet feeder.

> **WARNING:** Never use the platen knob for paper feeding except in case of a paper jam or other paper feeding problem. Use of the platen knob while the printer is on may affect the loading and short tear-off positions. If you need to adjust the loading position, always use the micro-adjustment feature.

Until this loading position is reset, the printer remembers this loading position and uses it as a reference point for feeding the paper.

The micro-adjustment feature moves the paper 1/180th of an inch at a time to make fine adjustments of the loading position. Once you have used micro-adjustment to change the loading position of continuous paper, the printer remembers that position even after you turn off or initialize the printer. However, the printer does not remember the loading position for friction or cut sheet feeder mode.

Adjusting the loading position

To adjust the loading position, follow these steps:

1. Load your paper.

2. Press the **MICRO FEED** button (the A button or▼ button). The display shows **TOF ADJUST** (TOF stands for top of form).
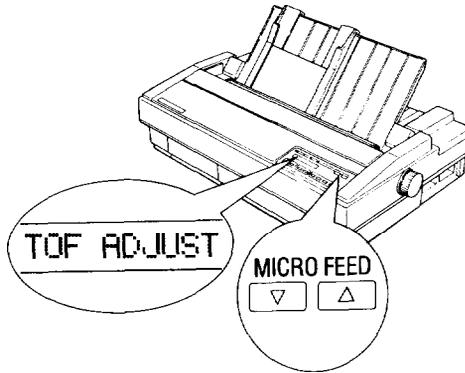
3. Press the button A to feed **the** paper forward or the button ▼ to feed the paper backward.

Note: The printer beeps when the paper reaches a position that is approximately 8.5 mm from the top edge of the paper. You can use this position as a reference point when adjust the printer's loading position.

Short Tear-off

What happens in short tear-off mode

There are two ways of operating the short tear-off feature. One way is to set the AUTO TEAR OFF option with SelecType. When you have finished printing and if the perforation is at the top of form position, the printer automatically feeds the perforation of the continuous paper to the tear-off edge of the paper bail so you can tear off the last printed sheet. When you resume printing, the paper automatically feeds back to the loading position. See the SelecType section in this chapter for instructions on setting the AUTO TEAR OFF option.

The other way of operating the short tear-off feature is by using the **TEAR OFF** button on the control panel to feed the perforation of your continuous paper to the tear-off edge of the printer. After tearing off the paper, press the **TEAR OFF** button again to feed the paper backward to the loading position.

> **WARNING:** Do not use the tear-off feature when you print labels. Make sure that the SelecType AUTO TEAR OFF setting is off. Otherwise, labels may come off the backing and jam the printer.

The short tear-off feature operated by the **TEAR OFF** button is described below.

1. When you have finished printing, press the **TEAR OFF** button once to feed the perforation of your page forward to the tear-off edge of the paper bail.
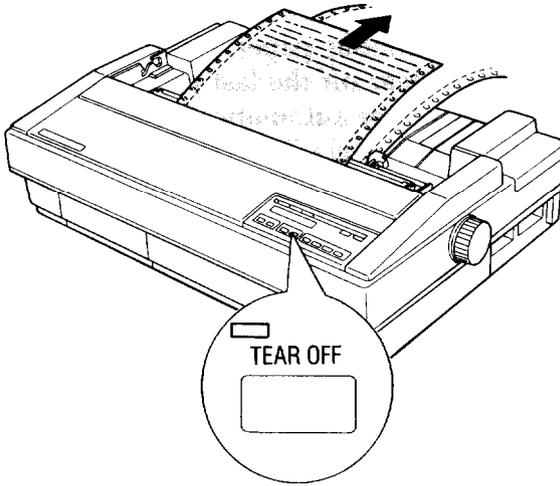
TEAR OFF

2. Tear off the page using **the** tear-off edge of the paper bail.
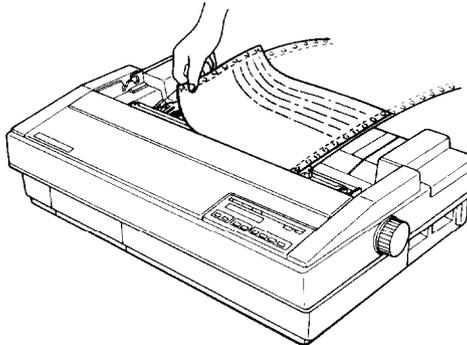
Note: If the perforation of the paper does not meet the tear-off edge, adjust the tear-off position of the paper with the micro-adjustment feature described on the next page.

3. Press the **TEAR OFF** button again to reverse-feed the paper to its loading position.
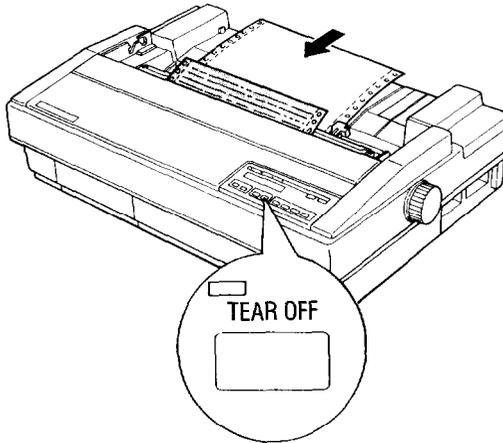
TEAR OFF

Adjusting the tear-off position

If you need to adjust the tear-off position of the perforation to meet the tear-off edge, use the micro-adjustment feature. The same procedure can be used regardless of whether you set the tear-off position using SelecType or with the **TEAR OFF** button.

1. Be sure that **the TEAR OFF** light is on, then press the **MICRO FEED** button(▲ or ▼). The display shows **TEAR OFF ADJUST.**
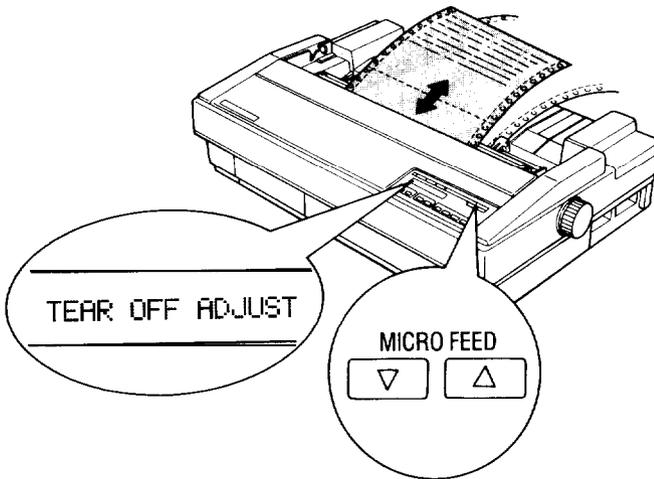
2. Adjust the tear-off position in 1/180th of an inch increments by pressing the button A to feed the paper forward or the button ▼ to feed it backward.

> ⊘ | **CAUTION:** The short tear-off feature can only be used with the built-in tractor feeding system.

When you press the **TEAR OFF** button or resume printing after tearing off the sheet, the paper automatically feeds backward to the loading position before printing begins.

Once you use the micro-adjustment feature to set **the** tear-off position, the printer remembers that position even after it is turned off.

Selecting Typestyles

Your printer can produce a wide range of typestyles by using different character fonts, character spacings, widths, and other print variations. You can select typestyles in three different ways: by using software commands, by using SelecType, or by using other features available on the control panel.

This section describes how to select a typestyle using the **FONT** and **PITCH** buttons on the control panel. The settings you select using these buttons do not remain valid once the printer is turned off. Also, commands from your application program temporarily override these control panel settings.

Character fonts

Your printer has ten built-in character fonts. To select a font, hold down the **FONT** button until the display shows the desired font.

FONT

The following samples show the character set available for each font.

DRAFT

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_'abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»

    We've just seen your excellent ad for
miniature zebras in a recent back issue of
Trader's Times. What is the price schedule
for quantities over one gross?

ROMAN

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_'abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»

    We've just seen your excellent ad for
miniature zebras in a recent back issue of
<u>Trader's Times</u>. What is the price schedule
for quantities over one gross?

SANS SERIF

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_'abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»

    We've just seen your excellent ad for
miniature zebras **in a recent back issue of**
<u>**Trader's Times**</u>**. What is the price schedule**
for quantities over one gross?

COURIER

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

        We've just seen your excellent ad for
miniature zebras in a recent back issue of
Trader's Times. What is the price schedule
for quantities over one gross?

PRESTIGE

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

        We've just seen your excellent ad for
miniature zebras in a recent back issue of
Trader's Times. What is the price schedule
for quantities over one gross?

SCRIPT

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

        We've just seen your excellent ad for

miniature zebras in a recent back issue Of
Trader's Times. What is the price schedule
for quantities over one gross?

OCR-A

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^¥₁abcdefghijklmnopqrstuv
wxyz{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»

        We've just seen your excellent ad for miniature **zebras in a recent back issue of Trader's Times. What** is **the price schedule for quantities over one gross?**

OCR-B

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»

        We've just seen your excellent **ad for** miniature zebras **in a recent back issue of Trader's Times. What is the price schedule for '** quantities **over one gross?**

ORATOR

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]_ABCDEFGHIJKLMNOPQRSTUV
WXYZ{¦}ÇÜÉÂÄÀÅÇÊËÈÏÎÌÄÅÉÆÆÔÖÒÛÙŸÖÜ¢£¥₧ƒÁÍÓÚ
ÑÑAOₓ⌐¬½¼¡«»

MINIATURE ZEBRAS IN A RECENT BACK ISSUE OF TRADER'S TIMES. WHAT IS THE PRICE SCHEDULE FOR QUANTITIES OVER ONE GROSS?

ORATOR-S

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]_`abcdefghijklmnopqrstuv
wxyz{¦}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

> We've just seen your excellent ad for miniature zebras in a recent back issue of <u>Trader's Times</u>, What is the price schedule for quantities over one gross?

Draft mode uses fewer dots per character for high-speed printing, which makes it ideal for rough drafts.

The other fonts are printed in Letter Quality (LQ) mode. Letter Quality fonts take a little longer to print, but produce fully formed characters for presentation-quality documents.

The use of the OCR-A or OCR-B font permits printouts to be read by an optical reader (also known as a document reader) for input into another computer.

The sample printouts of OCR-A and OCR-B are useful as a comparison with other font samples. However, print enhancements such as bolding and underlining cannot be read by an actual optical reader.

Character spacing

For most of the ten built-in fonts, you can choose a character spacing of 10, 12, 15, 17, 20 characters per inch (cpi), or proportional spacing.

To select a spacing, press the **PITCH** button until the display shows the desired spacing.

PITCH

Some of the fonts do not offer all character spacings. See the table below.

Draft	10. 12, 15, 17, 20,
Roman	10, 12, 15, 17, 20, Proportional
Sans Serif	10, 12, 15, 17, 20, Proportional
Courier	I0, 12, 15, 17, 20, Proportional
Prestige	10, 12, 15, 17, 20, Proportioanl
Script	IO, 12, 15, 17, 20, Proportional
OCR-A	10, 12, 17, 20, Proportional
OCR-B	10, 12, 17, 20, Proportional
Orator	10, 12, 17, 20,'Proportional
Orator-S	10, 12, 17, 20, Proporitonal

The following printout compares the fixed character spacing settings.

```
This is 10 cpi printing.
This is 12 cpi printing.
This is 15 cpi printing.
This is 17 cpi printing,
This is 20 cpi printing,
```

For the fixed pitch settings (10, 12, 15, 17 and 20 cpi), each character is given an equal amount of space. For proportional spacing, character width varies from one character to the next. For example, a narrow letter like i receives less space than a wide letter like W.

The following printout compares 10 cpi (a fixed spacing) printing with proportional spacing.

```
This is 10 cpi printing.
This is proportional spacing.
```

Selecting an International Character Set

The capability to select an international character set provides you with a range of characters and symbols used in other languages. By using the SelecType COUNTRY option, you can select one of fifteen international character sets.

International character set

Country	ASCII code (hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0 U.S.A.	#	$	@	[	\	]	¨	`	{	¦	}	~
1 France	#	$	à	°	ç	§	^	`	é	ù	è	¨
2 Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3 U.K.	£	$	@	[	\	]	^	`	{	¦	}	~
4 Denmark 1	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5 Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6 Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7 Spain 1	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8 Japan	#	$	@	[	¥	]	^	`	{	¦	}	~
9 Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10 Denmark 2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11 Spain 2	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
12 Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13 Korea	#	$	@	[	₩	]	^	`	{	¦	}	~
64 Legal	#	$	§	°	'	"	¶	`	©	®	†	™

To select the desired international character set using SelecType, set the COUNTRY option by following the steps in the SelecType section earlier in this chapter.

Choosing a Character Table

The SelecType CG TABLE setting lets you select the italics character table, the EPSON Extended Graphics character table, or the download character table. (CG stands for Character Generator.)

The EPSON Extended Graphics character table contains graphics characters (for printing lines, corners, and shaded area), international accented characters, Greek characters, and mathematic symbols.

If you have an IBM® or compatible computer, select the EPSON Extended Graphics table when you wish to print the graphics characters as they are displayed on the screen. Since the character table setting only affects the upper half of the character table, you can still print text if you have selected the EPSON Extended Graphics character table.

To print the user-defined characters that you have defined previously., select the download character table. Also, you can still print italics if you use the proper software command (refer to the ESC t and ESC 4 commands in Chapter 9).

Note: See the Appendix for more information on character tables.

Sample printouts of the italic characters and the EPSON
Extended Graphics characters are shown below.

Italics

> *!"#$%&'( )*+,-./0123456789:;<=>?@ABCDEFG*
> *HIJKLMNOPQRSTUVWXYZ[\]^_'abcdefghijklmno*
> *pqrstuvwxyz{¦}~*

EPSON Extended Graphics

To select the italic character table, EPSON Extended Graphics
character table, or Download character table using SelecType,
set the CG TABLE option by following the steps in the
SelecType section earlier in this chapter.

Data Dump Mode

Your printer has a special feature to make it easy for experienced users to find the cause of communication problems between the printer and application programs. In data dump mode, an exact printout of the codes reaching the printer is produced.

1. To enter the data dump mode, hold down the **FORM FEED** and **LINE FEED** buttons at the same time while you turn on the printer.
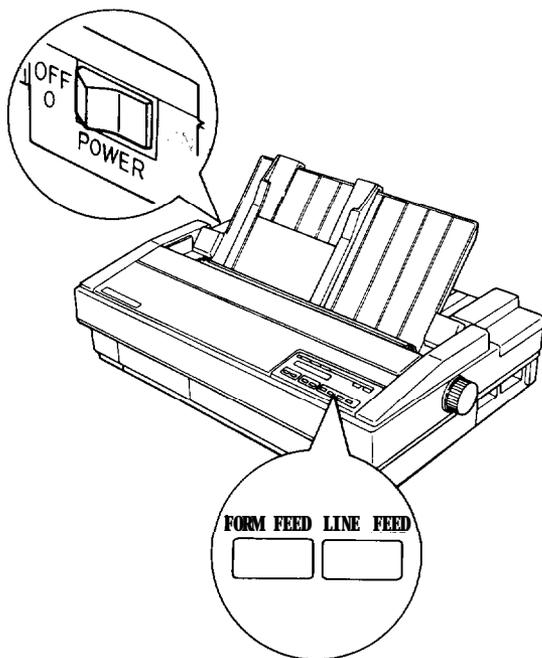
2. Run either an application program or one you have written
in any programming language. Your printer prints all the
codes sent to the printer in hexadecimal format as shown
below.

```
1B 40 1B 74 01 1B 36 1B 4D 1B 70 30 1B 19 31 1B    .@.t..6.M.p0..1.
32 0D 20 20 20 20 20 20 20 20 20 20 20 20 20 20    2.
20 20 54 68 69 73 20 69 73 20 61 6E 20 65 78 61      This is an exa
6D 70 6C 65 20 6F 66 20 61 20 64 61 74 61 20 64    mple of a data d
75 6D 70 20 70 72 69 6E 74 6F 75 74 2E 20 54 68    ump printout. Th
69 73 20 66 65 61 74 75 72 65 0A 20 20 20 20 20    is feature.
20 20 6D 61 68 65 73 20 69 74 20 65 61 73 79 20       makes it easy
```

3. To turn off the data dump mode, press the **ON LINE** button to
take the printer off line, and then turn off the printer. (The
data dump mode can also be cancelled by sending an INIT
signal from the computer.)
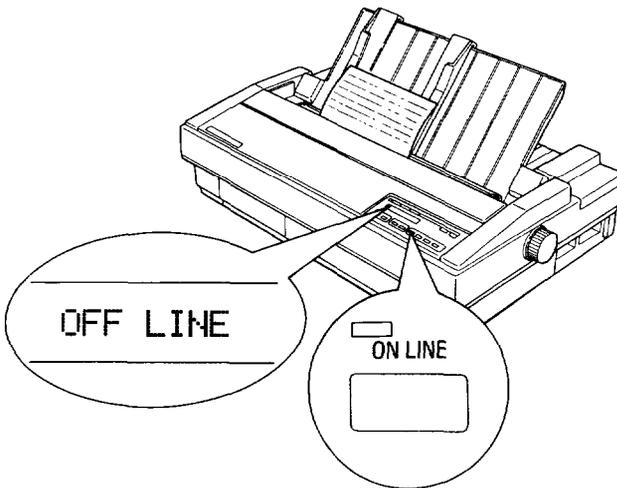
Look at the data dump printout shown in Step 2. By comparing the characters printed in the right column with the printout of hexadecimal codes, you can check what codes are being sent to the printer. If characters are printable, they appear as their true ASCII characters. Nonprintable codes, such as control codes, are represented by dots.

As an example of how to interpret a data dump printout, look at the first three hexadecimal codes on the third line of the printout sample (20 20 54). Each hexadecimal code (20) represents a space, while the hexadecimal code (54) represents the letter T. Check the third line of the right column and you will find the letter T preceded by two spaces.

The chart below interprets part of the first line of codes:

Hex codes	Command	Function
1B 40	ESC @	Initialize printer
1B 5200	ESC R0	Select USA character set
1B 7401	ESC t 1	Select EPSON Extended Graphics character
1B 36	ESC 6	Enable printable characters
12	DC2	Cancel condensed mode
IB 50	ESC P	Select 1O cpi
1B 7000	ESC p 0	Cancel proportional mode

Chapter 4
Software and Graphics

Enhancing Your Printing

You can obtain a wide variety of printing effects with the SQ-850 or SQ-2550, from changing the number of characters printed per inch to using special effects or adding emphasis to selected words and phrases. This section gives you a sampling of the features you may want to select with your software.

For software control of these features, see the instructions for your application program or look up their specific commands in the Command Summary in Chapter 9.

Character spacing

To add greater variety to your documents, the SQ-850 and SQ-2550 have five pitches as well as proportional spacing. All six can be selected with a software command, or by SelecType or panel setting (see Chapter 3).

For many of the built-in fonts, you can choose a character spacing of 10, 12, 15, 17 or 20 characters per inch (cpi), or proportional spacing. The printout below compares the five pitches.

```
This is 10 cpi printing.
This is 12 cpi printing.
This is 15 cpi printing.
This is 17 cpi printing,
This is 20 cpi printing,
```

As shown above, 15 cpi characters are only about two-thirds the height of 10 and 12 cpi characters. This makes 15 cpi particularly useful when you want to separate certain material from the main text.

In 10, 12, and 15 cpi, each character is given the same amount of space. The width of proportional spacing, however, varies from character to character. Therefore, a narrow letter like i receives less space than a wide letter like W. The width of each proportional character is given in the Appendix.

The following printout compares 10 cpi spacing with proportional spacing.

```
This is 10 cpi printing.
This is proportional spacing.
```

Proportional spacing is not available in draft mode.

Character size

In addition to the basic pitches and proportional spacing, the SQ-850 and SQ-2550 offer three other modes that can change the size of your printing. These modes are double-width, double-height, and condensed.

Double-width and double-height

The double-width mode doubles the width of any size character, while the double-height mode doubles the height of any size character. These modes are useful for emphasizing headings in reports and making displays, but are usually not suitable for large amounts of text. These modes can also be combined to obtain even more impressive printing results.

```
This is normal 10 cpi printing.
T h i s   i s   d o u b l e - w i d t h
```

This is double-height,

This is double-width and double-height.

Condensed

Both 10 and 12 cpi printing can be reduced to about 60% of their normal width using the condensed mode. This mode is particulary useful for printing wide spreadsheets because condensed 12 cpi allows you to print up to 272 characters on an 13.6-inch line.

Condensed can be selected with a software command.

>   Condensed 10 cpi gives you characters an a line,
>   Condensed 12 cpi gives even more,

Widening or narrowing the characters also widens or narrows the space between words and letters. Because word processors usually create a left margin by printing spaces, you may need to change the number of characters on a line to keep the margins correct if you change width.

Note: 15 cpi, 17 cpi and 20 cpi can not be condensed.

Special effects and emphasis

The SQ-850 and SQ-2550 have a number of features for those extra effects required either for emphasis or for special printing requirements. These features can be controlled directly by software commands. Many application programs can also produce these effects. Refer to your application program for detail.

Emphasized and double-strike printing

Emphasized and double-strike give your printing added emphasis. In emphasized mode, the SQ-850 and SQ-2550 print each character twice as the print head moves across the paper, with the second character offset slightly to the right of the first. This process produces darker, more fully formed characters.

In double-strike mode, the print head goes over each line twice, making the text bolder. For even greater boldness, emphasized and double-strike can be combined. The following samples show the different effects you can achieve both alone and in combination.

> This is ROMAN printing.
> **This is ROMAN, emphasized.**
> **This is ROMAN, double-strike.**
> **This is ROMAN, with both.**

Italic printing

You can select the italic character table by SelecType setting or select the italic mode by using the ESC 4 software command. A sample of italic printing is shown below.

> This is ROMAN printing.
> *This is ROMAN italics.*

Overlining, strike-through, and underlining
The overline, strike-through, and underline modes are useful for highlighting selected text. This feature can be used to score text, spaces, subscripts, and superscripts without a break. You can choose from a variety of line styles including: single, double, broken, or continuous. Many word processors may not be able to take advantage of all these features. If this is the case, see the ESC (- command in Chapter 9 for more information.

This is continuous underlining.
~~This is double strike-through.~~
This-is-broken-overlInlng.

Superscripts and Subscripts
Superscripts and subscripts can be used for printing footnote numbers and mathematical formulas. The example below shows underlining, superscripts, and subscripts combined in a mathematical formula.

$$\text{average} \quad = \quad \frac{(a1 \ + \ a2 \ + \ . \ . \ . \ . \ . \ . \ . \ . \ + \ an \ )}{n}$$

Outline and shadow
The outline and shadow features are useful for adding variation and emphasis to text that you wish to stand out, such as headings. The following samples show the shadow and outline features individually, plus a combination of outline with shadow.

This is outline style.
This is shadow style.
This is outline with shadow.

Selecting typestyles with Master Select

Your printer has a special ESCape code called Master Select that allows you to choose many possible combinations of nine different modes: 10 cpi, 12 cpi, proportional, condensed, emphasized, double-strike, double-width, italics, and underline. For more information on sending ESCape codes to your printer, refer to Chapter 9.

The format of the Master Select code is shown below:

ASCII code:	ESC	!	n
Decimal:	27	33	*n*
Hexadecimal:	1B	21	n

The variable n is a number that identifies the mode or combination of modes. To find the value of n, use the table below to add up either the decimal or hexadecimal numbers for the features you want.

Feature	Dec.	Hex.
10 cpi	0	00
12 cpi	1	01
proportional	2	02
condensed	4	04
emphasized	8	08
double-strike	16	10
double-width	32	20
italics	64	40
underline	128	80

For example, to print a title, you may want to use double-width 12 cpi characters and print them in double-strike mode. You would add three numbers together to calculate the value of n:

12 cpi	1
Double-strike	16
Double-width	32
	n = 49

After calculating the value of n, you would use the Master Select command to send the value to the printer.

ASCII code:	ESC	!	1
Decimal:	27	33	49
Hexadecimal:	1B	21	31

The print quality and font must be set separately, either using SelecType or the ESC x and ESC k commands. There are two more things to consider when using the Master Select command:

- Master Select cancels any of the listed features that you do not try to set. For example, if you have already set a character width other than 10 cpi, and you use Master Select to set emphasized double-strike, the character width is reset to 10 cpi.

- Proportional overrides 10, 12, and 15 cpi.

Graphics

The dot graphics mode allows your printer to produce pictures, graphs, charts, or almost any other graphics you can think of. Because many commercial software programs use graphics, you may be able to print pictures and graphs like the ones on this page and the next by simply giving your software a few instructions.

The quickest and easiest way to print graphics on your printer is to use a commercial graphics program. With such programs you usually create an image on your monitor and then give a command to send the image to the printer.

If you use commercial software that produces graphics, all you need to know about dot graphics is how to use the software. If, on the other hand, you wish to do your own programming or merely wish to understand how the printer prints graphics, read on.

Income Breakdown

Marketing and Advertising — Profit — Salaries and Production — Future Development
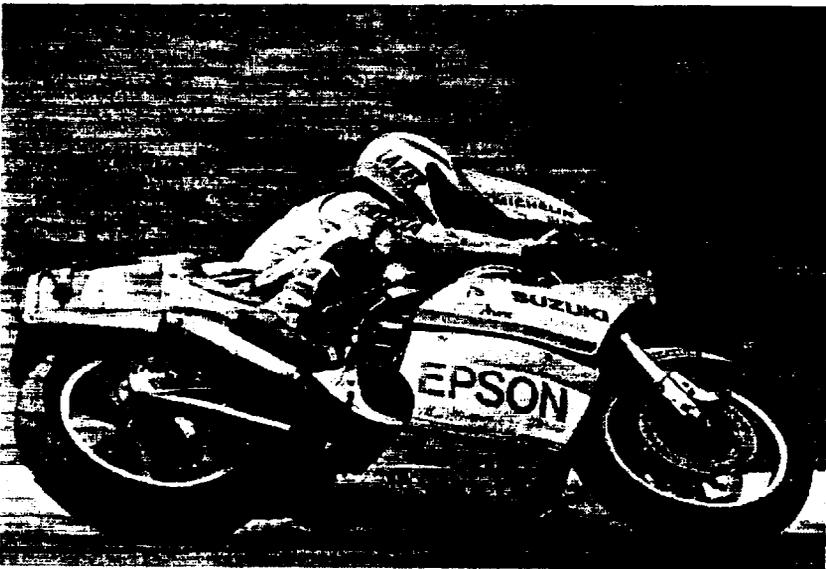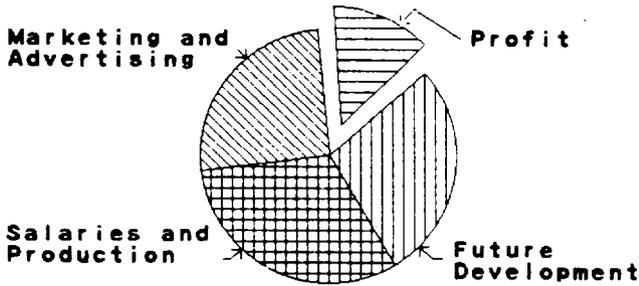
The print head

To understand dot graphics you need to know a little about **how** your printer's print head works.

The printer has a 24-element print head. On the SQ, these elements are ink nozzles. Electrical impulses cause the nozzles to transfer ink to the paper to produce a pattern of small dots. As the head moves across the paper, the nozzles fire time after time in different patterns to produce letters, numbers, or symbols.

Because the dots overlap each other both horizontally and vertically in the Letter Quality mode, it is difficult to see individual dots. Instead, the letters and symbols seem to be made of unbroken lines.

In order for the dots to overlap vertically, the nozzles in the print head are in more than one column, but the intelligence of the printer handles the timing of nozzle firings so that the effect is **that** of 24 nozzles arranged in a single vertical column.

Dot patterns

Your printer's print head is able to print graphics as well as text because graphic images are formed on the printer about the same **way that** pictures in newspapers and magazines are printed. If you look closely at a newspaper photograph, you can see that it is made up of many small dots. Your printer also forms its images with patterns of dots, as many as 360 dot positions per inch horizontally and 180 dots vertically. The images printed by the printer can, therefore, be as finely detailed as **the** ones at the beginning of this section.

Eight-element graphics

So that it is compatible with the **many** programs written for such printers such as the EPSON FX, RX, LX, and EX series, the printer has an S-element graphics mode with six densities. Although this mode uses only one third of the printer's nozzles, it produces good quality graphics and allows you to use the many programs written for 8-element graphics.

Twenty-four-element graphics

The graphics mode **that** takes full advantage of **the** printer's print head is 24-element graphics. It has five densities, but for simplicity this explanation will begin with only one of them, triple-density.

Triple-density prints up to 180 dots per inch horizontally. As the print head moves across the paper, every 1/180th of an inch it must receive instructions about which of its 24 nozzles to fire. At each position it can fire any number of nozzles from none to' 24. This means **that** the printer must receive 24 bits of information for each column it prints. Since **the** printer uses 8-bit bytes of information in its communication with a computer, it needs three bytes of information for each position.

Labeling the nozzles

To tell the printer which nozzles to fire in each column, you first divide each of the vertical columns into three sections of eight nozzles each and consider each section separately. Since there are 256 possible combinations of the eight nozzles in each section, you need a numbering system that allows you to use a single number to specify which of the 256 possible patterns you want. This numbering system is shown below:

```
128 ○
 64 ○
 32 ○
 16 ○
  8 ○
  4 ○
  2 ○
  1 ○
```
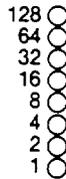
To fire any one nozzle, you send its number. To fire more than one nozzle at the same time, add up the numbers of the nozzles and send the sum to the printer. With these labels for the nozzles, you fire the top nozzle by sending 128. To fire the bottom nozzle, you send 1. If you want to fire only the top and bottom nozzles, you simply add 128 and 1, then send 129.

By adding the appropriate label numbers together, you can fire any combination of nozzles. Shown below are three examples of how to calculate the number that will fire a particular pattern of nozzles.

```
128 ● 128     128 ○         128 ● 128
 64 ○          64 ● 64        64 ○
 32 ● 32       32 ○           32 ○
 16 ○          16 ○           16 ○
  8 ● 8         8 ● 8          8 ○
  4 ○           4 ○            4 ● 4
  2 ● 2         2 ● 2          2 ● 2
  1 ○           1 ○            1 ○
   ─────         ────           ─────
    170           74            134
```
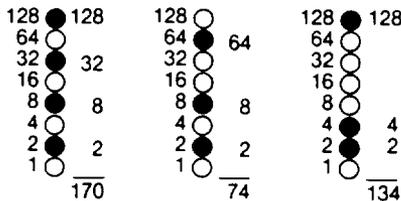
With this numbering system, any combination of the eight
nozzles adds up to a decimal number between 0 and 255, and
no numbers are duplicated.

Since there are 24 nozzles in each column, you must make a
calculation for each of the three sections in each column. As
you can see, this method of planning and printing dot graphics
requires considerable calculation. Because triple-density uses
180 columns per inch, printing a single line of triple-density
graphics only one inch long requires 540 numbers. Fortunately,
commercial software can do the calculations for you.

Before you can put these numbers in a graphics program,
however, you need to know the format of the graphics
command.

The graphics command

The graphics mode command is quite different from the other
commands used by the printer. For most of the other printer
modes, such as emphasized and double-width, one ESCape
code turns the mode on and another turns it off. For graphics,
the command is more complicated because the code that turns
on a graphics mode also specifies how many columns it will
use. After the printer receives this code, it interprets the next
numbers as nozzle patterns and prints them on the paper.

Your printer has one command that allows you to use any of
the 11 graphics options. The format of the command is:

ESC * m n1 n 2 data

In this command, *m* selects the graphics option and nl and n2 specify the number of columns to reserve for graphics. The available graphics options are listed below.

Option	Elements	*m*	Horiz.density dots/in.
Single-density	8	0	60
Double-density	8	1	120
High-speed double-density*	8	2	120
Quadruple-density*	8	3	240
CRT I	8	4	80
CRT II	8	6	90
Single-density	24	32	60
Double-density	24	33	120
CRT III	24	38	90	1
Triple-density	24	39	180
Hex-density*	2 4	40	360

* Adjacent dots cannot be printed in this mode

Column reservation numbers

The graphics command requires more than **one** number to specify how many columns to reserve because one line can use thousands of columns, but the printer does not use numbers larger than 255 decimal. Therefore, the graphics mode command uses two numbers for reserving columns.

To figure nl and n2, divide the total number of columns by 256. The result is n2; the remainder is nl. Since the command is set up for two numbers, you must supply two even if you need only one. When you need fewer than 256 columns, just make nl the number of columns you are reserving and make n2 a zero.

For example, if you wish to send 1632 columns of graphics data, nl should be 96 and n2 should be 6 because 1632 = 96 + 6 x 256.

The printer will interpret the number of bytes determined by nl and n2 as graphics data, no matter what codes they are. This means that you must be sure to supply enough bytes of graphics data or the printer will stop and wait for more data and will seem to be locked. If, on the other hand, you supply too much graphics data, the excess will be interpreted and printed as regular text.

A simple graphics program

This first program is just a simple example to show you how the graphics command, column reservation numbers, and data can be used in a BASIC program.

Type in and run the following program; be especially careful to include both semicolons. The program produces the printout you see below it.

```
10 WIDTH "LPT1:",255
20  LPRINT  CHR$(27)"*"CHR$(32)CHR$(40)CHR$(0) ;
30 FOR X=1 TO 120
40 LPRINT CHR$(170);
50 NEXT X
```

Line 20 selects single-density 24-element graphics mode 32 and also reserves 40 columns for graphics. Since 24-element graphics requires three bytes of data for each column, line 30 begins a loop to supply 120 bytes of data. Line 40 contains the number 170, which produces the first element pattern shown in the section on nozzle labels, and line 50 finishes the loop.

Using hand-calculated data to print graphics

With what you know now, you can use the simplest application
of graphics - using hand-calculated data to print graphic
images. While this method is the most tedious, it helps you
understand dot graphics. Also, it is useful for small graphic
elements that are used many times.

The illustration below shows how you can use a grid to plan
where you want dots to be printed. This grid is for a single
line of graphics 42 columns long. Since each line of 24-element
graphics is approximately 1/8th of an inch high and since
triple-density graphics prints 180 dots per inch horizontally, a
design planned on this figure will be about 1/8th of an inch
high and less than 1/4th of an inch wide.
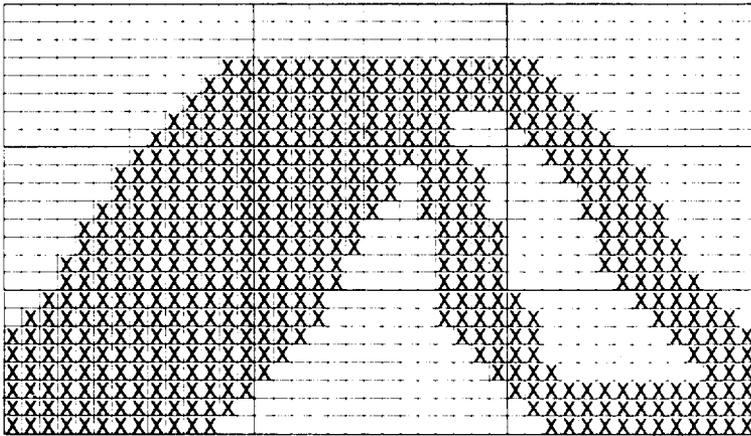
The actual pattern that the printer prints on the paper is, of
course, made up of dots that overlap each other both vertically
and horizontally. The reason the planning grid uses an X for
each dot is that using an accurate representation of the dots
makes calculating the data numbers difficult because they cover
each other. Therefore, remember that each X represents the
center of a dot, and the dots actually overlap each other.

Write the assigned values of the nozzles next to your design and then total the values for each column of dots. These totals are the values that will be sent to the printer as graphics data to print the design.

Below is shown the same grid divided into three sections to make the data calculation easier. At the bottom of each section of each column is the total of the nozzle numbers for that section. This gives you a total of 126 data numbers necessary to print this small figure.
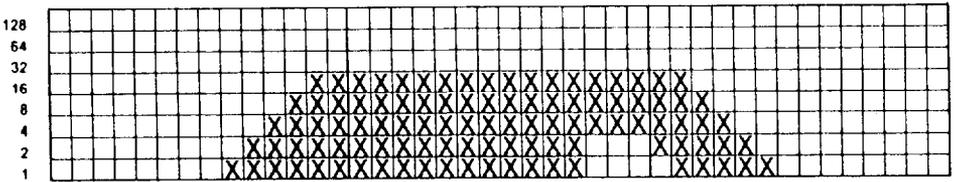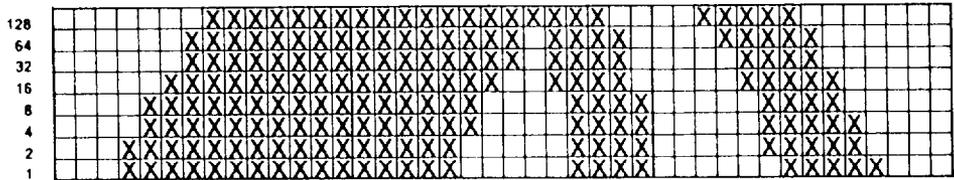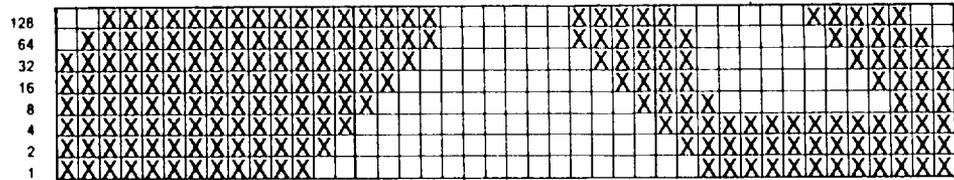
Here is the BASIC program **that** prints the design shown on the previous pages. Notice that the data numbers in lines 80-140 are the same numbers that you see in the last illustration. Also note that the WIDTH statement in line 10 is for IBM PC BASIC; the format may be different for your system.

```
10 WIDTH "LPT1:",255
20  LPRINT  CHR$(27)"*"CHR$(39)CHR$(42)CHR$(0);
30 FOR X=1 TO 126
40 READ N
50 LPRINT CHR$(N);
60 NEXT X
70 LPRINT
80  DATA  0,0,63,0,0,127,0,0,255,0,3,255,0,15,255,0,31~255
90 DATA 0,127,255,0,255,255,1,255,255,3,255,255,7,255,255,15,
   255,255
100  DATA  31,255,254,31,255,252,31,255,248,31,255,240,31,255,
   224,31,255,192
110  DATA  31,255,0,31,252,0,31,240,0,31,224,0,31,128,0,31,240,0
120  DATA  31,255,192,28,255,224,28,127,240,28,15,248,30,0,252,
```

In this program, line 20 assigns the graphics option (24-element triple-density) with code 39. Code 42 sets the number of nozzle columns at 42. Lines 80-140 contain 126 bytes of data (42 nozzle columns X 3 bytes) for each nozzle column. Lines 30-60 print the design that you see below.

A

Notice that the dots overlap quite a bit. This design was printed using the triple-density 24-element graphics option because the density is **the** same 180 dots to the inch in both directions.

Adding the following lines to the preceding program will cause the pattern to print 10 times in a row as shown below.

```
15 FOR  C=l TO 10: RESTORE
65 NEXT  C
```

Individual graphics option commands

As previously mentioned, your printer responds to commands that are used by EPSON FX, RX, LX, and EX series printers. There are four individual graphics option commands that are very much the same as the ESC * command, but each one works for only one graphics option. All these commands are g-element graphics options. Note that these commands contain one less variable than the ESC * command because they don't need to select a graphics option.

They are shown below:

Command	Function	ESC * Format
ESC K	Single-density	ESC * 0
ESC L	Double-density	ESC * 1
ESC Y	Double-density, high-speed	ESC * 2
ESC Z	Qluadruple-density	1 ESC * 3

The reassigning command

The SQ has a command that allows you to change the graphics
option assigned to any of the four individual graphics options
commands.

The command looks like this:

ESC ? s m

The letter s represents the command that you wish to change
the assignment for (K, L, Y, or Z) and m is the number of the
graphics option that you **want** to assign to it. For example, to
change the ESC K command to use the CRT I graphics option,
the command in BASIC is:

LPRINT CHR$(27>;"?";"K";CHR(4)

This is a quick way to change the aspect ratio of the design that
you are printing. Changing the graphics option will change the
width without changing the height. You should, however,
make this change with caution.

If you change one of the S-element graphics options to a
24-element graphics option without changing the program that
supplies the graphics data, you will print garbage if the
program prints at all. Remember, the 24-element graphics
options require three times as much graphics data as the
S-element graphics options.

User-defined Characters

With this printer, it is possible to define and print characters of your own design. You can design an entirely new alphabet or typeface, create characters for special applications such as mathematical or scientific symbols, or create graphic patterns with user-defined characters to serve as building blocks for larger designs.

Below you can see samples of typefaces created with the user-defined character function.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ

You can make the task of defining characters easier by using a commercial software program that assists you in creating characters or simply supplies you with sets of characters already created. Also, some popular commercial software programs take advantage of the printer's user-defined character function to enhance printouts. (These characters are called download characters in some programs.)

The standard characters are stored in the printer's Read Only Memory (ROM), and the user-defined characters are stored in the printer's Random Access Memory (RAM).

Designing your characters

User-defined characters are like dot graphics because you send the printer precise instructions on where you want each dot printed. In fact, planning a user-defined character is like planning a small dot graphics pattern.

Design grids

To design a character you use a grid that is 24 dots high - one dot for each nozzle on your printer's print head. The width of the character matrix is dependent upon the character set in use. For draft characters, the grid is nine dots wide. For Letter Quality it is 29 dots wide, and for proportional characters it is 37 dots wide maximum, with the dots fot both Letter Quality and proportional spaced more closely together than those for draft.

The illustration below shows two grids for designing normal height draft characters and proportional characters. The line at the side labelled cap height indicates the top of a standard capital letter, and the line labelled baseline indicates the baseline for all letters except those with descenders (the bottom parts of such letters as j and y). The bottom row is usually left blank because it is used for underlining.

Draft pica **Letter quality / Proportional**
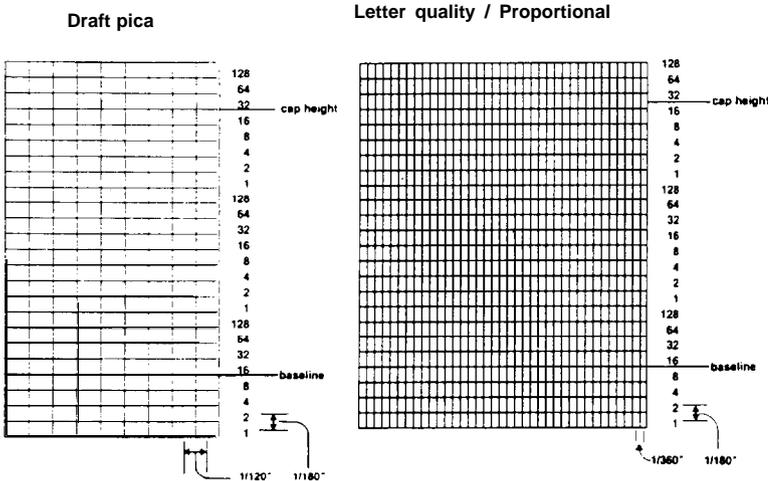
The grid on the right side can be used for either Letter Quality or proportional characters. For Letter Quality you do not use all the columns.

There is one restriction in designing characters. Dots in the same row may not print in adjacent columns. That is, there must be an empty dot position to the left and to the right of each dot that prints. This is true in draft, Letter Quality, and proportional.

Defining your characters

The first step in defining characters is to place the dots on a grid just as you want them to print. The examples here, like the ones in the graphics section, use an X to represent each dot.

In the illustration below, you see a draft grid with a simple user-defined character planned on it.
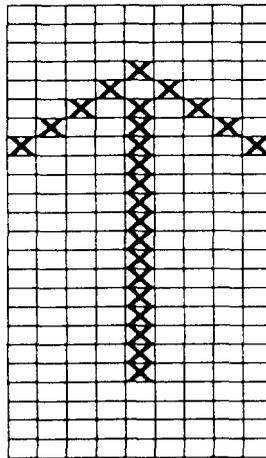
Now you translate the dot pattern you've created on paper to a numeric format so you can send the information to your printer. Every dot has an assigned value. Each vertical column which has a maximum of 24 dots is first divided into three groups of eight dots. Each group of eight dots is represented by one byte, which consists of eight bits. Hence, one bit represents one dot.

Data numbers

The bits within each byte have **values** of 1, 2, 4, 8, 16, 32, 64, **and** 128. In the vertical column of dots, the bits are arranged so that the most significant bit (which has a value of 128) is at the top and the least significant bit (which has a value of 1) is at the bottom.

The next illustration shows how to use this method to calculate the data numbers for the example character. On the left side of the figure, the data numbers are calculated for the middle column. The value of each byte is calculated by adding the values of the rows where dots appear. The right side of the figure shows the whole character with the three data numbers for each column indicated at the bottom.

This manual uses decimal numbers because the example programs in this manual are written in BASIC and everyone is familiar with decimals. The data you send to your printer, however, can be in any form (binary, decimal, hexadecimal) that you can use with your programming language.
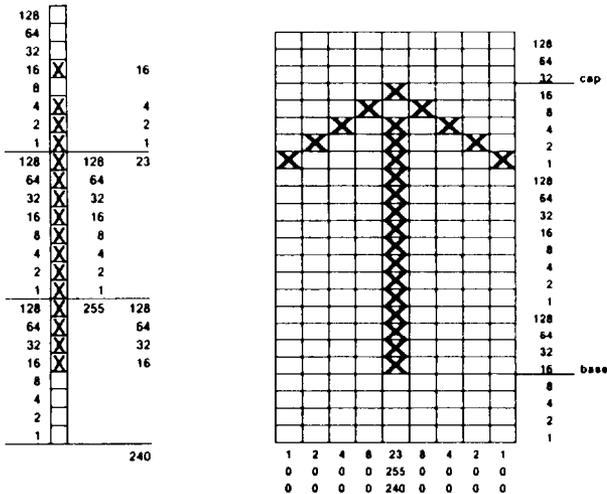
Now you have seen how to design a character by placing dots on a grid and translating the dots to decimal equivalents. The last step in defining a character is to send this information to the printer.

Sending information to your printer

The printer loads characters in the print style (Letter Quality, draft, or proportional) that the printer is currently using. It also records whether italic or script (either superscript or subscript) is turned on. This means that if you want to print a character in the italic mode, for example, you must have the italic mode turned on when you define the character.

The command your printer uses to define characters is one of the most complex in its repertoire. The format of the command is this:

ESC & 0 nl n2 d0 *dl d2* data

The ESC & is simple enough. The 0 (which is ASCII code 0, not the numeral zero in quotation marks) allows for future enhancements. At this time, it is always ASCII 0.

With your printer, you can define many characters with a single command. The values nl and n2 are the ASCII codes of the first and last characters you are defining. If you are defining only one character, n1 and n2 are the same. You can use any codes between 0 and 127 decimal for *nl* and *n2,* but it is best not to define decimal 0 to 32, which are the codes for control codes. Also, you can use letters in quotation marks instead of ASCII numbers for nl and n2.

An example will show how to specify *nl* and n2. If, for instance, you wanted to redefine the characters A through Z, nl would be A (or ASCII code 65) and *n2* would be Z (or ASCII code 90). So the command ESC & 0 AZ (followed by the appropriate data) would replace the entire alphabet of capital letters.

Following the specification of the range of characters to be defined in this command are three data bytes *(d0-d2)* that specify the width of the character and the space around it. The left space (in dot columns) is specified by *d0,* and the right space is specified by *d2.* The second byte *(dl)* specifies the number of columns of dots that are printed to make up the character. By varying the width of the character itself and the spaces around it, you can create proportional-width characters that print at draft speed. The table below shows the maximum values for these bytes.

Mode	d1 (maximum)	d0 + d1 + d2 (maximum)
Draft	9	12
Letter Quality 10 cpi	29	36
Letter Quality 12 cpi	23	30
Proportional	37	42

The last part of the character definition is the actual data that defines the dot patterns for each character. Since it takes three bytes to specify the dots in one vertical column of dots, your printer expects *dl* x 3 bytes of data to follow *d2.*
An example character definition program should make this clear:

```
10 LPRINT  CHR$(27)"X0"
20 LPRINT  CHR$(27)"&"CHR$(0);
30 LPRINT  "@@";
40 LPRINT  CHRS(1)CHRS(9)CHRS(1);
50 FOR I=1 TO 27
```

```
 60 READ A: LPRINT CHR$(A);
 70 NEXT I
 80 LPRINT "@@@@@"
 90 LPRINT CHR$(27)"%"CHR$(1);
100 LPRINT "@@@@@"
110 LPRINT CHR$(27)"%"CHR$(~);
120 LPRINT "@@@@@"
130 END
140 DATA 1,0,0,2,0,0,4,0,0
150 DATA 8,0,0,23,255,240,8,0,0
160 DATA 4,0,0,2,0,0,~0,0
```

In line 10, the ESC x0 command selects draft style printing. The actual character definition starts in line 20. The two at signs (@) in line 30 represent nl and n2, the range of characters being defined (in this case, a range of one). Line 40 contains d0, dl, and d2.

The information about the actual character design which is contained in the data statements at the end of the program is sent to the printer in the loop between lines 50 and 70.

Note: When defining Letter Quality or proportional characters in BASIC, put a WIDTH statement in your program to prevent carriage return and line feed codes from interfering with your definitions.

Printing user-defined characters

If you entered the example program above, you defined an arrow and placed it in the RAM location for ASCII code 64 (replacing the at sign). You can now print out a three-line sample of your work. The first and third lines (printed by lines 80 and 120 of the program) print the normal at sign; the second line (line 100) prints the arrow that you defined.

Run the program to see the printout below:

As you can see, both sets of characters (the original **ROM** characters that the printer normally uses and the user-defined character set) remain in the printer available for your use. The command to switch between the two sets is used in line 90 and 110. It is:

ESC % n

If n is equal to 0, the normal ROM character set is selected (this is the default). If n is equal to 1, the user-defined character set is selected. If you select the user-defined character set before you have defined any characters, the command is ignored and the ROM characters will still be in use.

You may switch between character sets at any time - even in the middle of a line. To try it, place semicolons at the end of lines 80 and 100 in the program above.

Copying ROM characters to RAM

After running the program above, if you select the user-defined character set and try to print other characters, the only one that will print is the arrow. Since no other characters are in the printer's user-defined RAM area, nothing else prints. Other characters sent to the printer do not even print as spaces; it is as if they were not sent at all.

In many cases, you may want to redefine only a few of the characters to suit your needs; the rest of the alphabet will work fine as it is. As you have seen, it is possible to switch back and forth at will between the normal character set and the user-defined character set. It is, however, rather inconvenient.

Therefore, your printer has a command which allows you to copy all of the standard characters from ROM to the user-defined character set.

The command format is as follows, where the value of n represents the font family:

<div align="center">ESC: 0 n 0</div>

Note: This command will cancel any user-defined characters you have created. You must send this command to the printer before you define characters.

If you use this command at the beginning of a program, **then** define your special characters and select the user-defined character set, you can print with the user-defined set as your normal character set. You'll never need to switch back and forth between sets.

Letter Quality characters

If you select Letter Quality printing with the ESC xl command, you can design user-defined characters using up to 29 columns of the Letter Quality/Proportional grid. The dot columns are spaced closer together horizontally than draft style dot columns **(the** horizontal dot spacing is 1/360th of an inch as opposed to 1/120th of an inch for draft characters).

Proportional mode characters

Selecting the proportional character mode will yield user-defined characters of the highest resolution. Characters can be designed using all 37 columns of the Letter Quality/Proportional grid.

Remember that in Letter Quality and proportional modes, as in draft, you cannot place dots in adjacent columns. There must be an empty dot position to the left and right of each dot that prints.

Superscripts and subscripts
You can also create superscript and subscript user-defined characters. Just as Letter Quality characters are defined when the Letter Quality mode is selected, super/subscript characters are created when either superscript or subscript is selected.

These super/subscript characters can be used either as superscripts or as subscripts. The characters are exactly the same; it is only their placement that differs. The difference between super/subscript characters and regular characters is that they are smaller. They are a maximum of 16 dots high and their width in dot columns is shown in the table below:

Mode	d_1 (maximum)	$d_0 + d_1 + d_2$ (maximum)
Draft	7	12
Letter Quality	23	36
Proportional	23	42

Since super/subscript characters are smaller, they do not require as much information when you define them. When you define super/subscript characters, you need only two bytes of data for each vertical row of dots. Design grids for these characters are shown in the figure below.
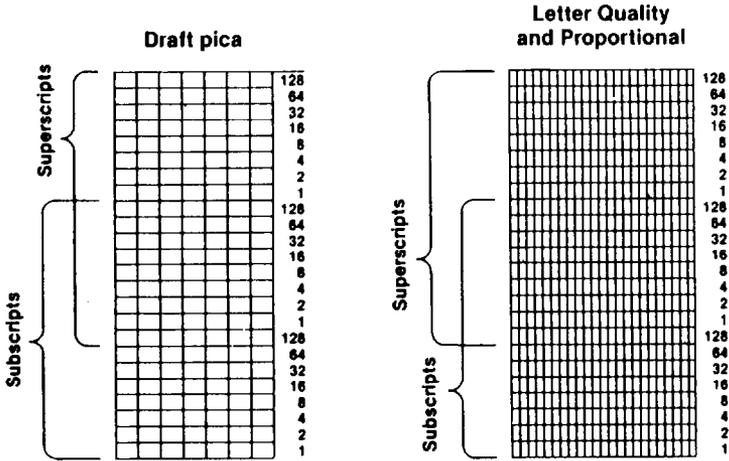
Mixing print styles

Each of the three user-defined character modes (draft, Letter Quality, and proportional) **can** be used in combination with most of your printer's various print styles. For instance, emphasized works with user-defined characters. The characters you design are enhanced to give this printing effect.

Mixing the types of user-defined character sets is not permitted. If, for example, you select draft and define some characters, **then** select proportional and define some more, the first character definitions will be destroyed. Only one type of character definition may be stored in RAM at **any** time.

If you define characters in one mode, then switch to another mode and select the user-defined character set, the command will not be effective and **the** character in ROM will printed. The user-defined character definitions, however, remain unaffected. If you switch back to the mode in which they were defined, you can then select and print them.

Keep in mind that user-defined characters are stored in RAM, which is not permanent. Whenever the printer power is turned off, or the printer is initialized with the INIT signal, the user-defined characters are lost. (Some computers do this each time BASIC is loaded.) ESC @, however, does not destroy user-defined characters.

Chapter 5
Using Printer Options

The Cut Sheet Feeder

The optional cut sheet feeders give you easier and more efficient handling of single sheet paper.

Printer	Single-bin	Double-bin
SQ-850	C806081	C806091
SQ-2550	C806101	C806111

You can use the cut sheet feeder without removing continuous paper. Up to 150 sheets of standard bond paper can be stacked in each cut sheet feeder bin at one time, and a new sheet is loaded automatically whenever required.

Installation

First, assemble the cut sheet feeder by following the instructions provided in its accompanying manual.

The illustrations used in the following steps are of the C806111 double-bin cut sheet feeder. However, all cut sheet feeders available for use with the SQ-850 and SQ-2550 install and operate the same way.

1. Make sure that the printer is turned off. Then, remove the paper guide and open the printer cover.
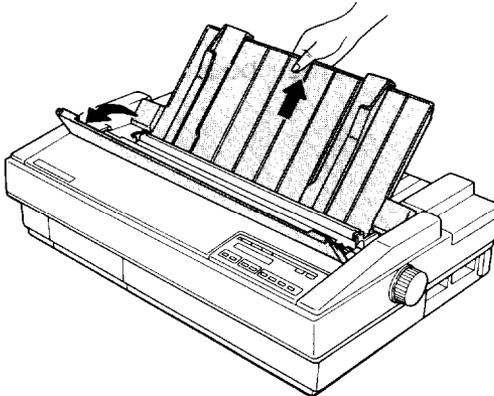
> **Note:** If you plan to switch between cut sheet feeder use and continuous paper, load continuous paper as described in Chapter 2.

2. Hold the assembled cut sheet feeder in both hands and fit its notches over the pins of the printer. Then lower the cut sheet feeder unit onto the printer.
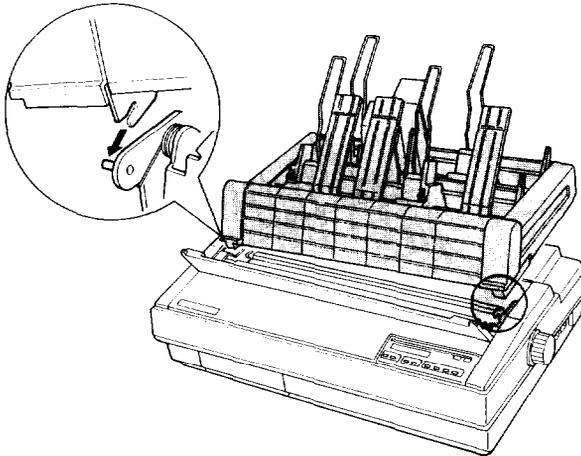
3. Close the printer cover.
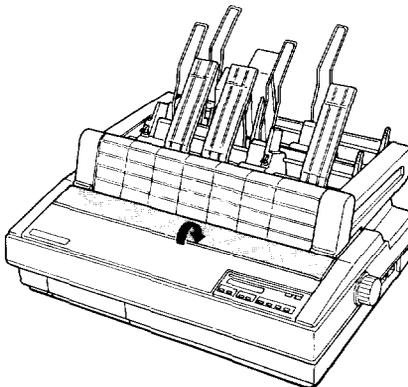
Paper handling

No matter which cut sheet feeder **(CSF)** bin you select, the paper is loaded in the same way. The procedure for loading CSF bin 1 (the front bin) is used in the following example. (The C806081 and C806101 have only one bin.)

1. Slide the left paper guide until it stops at the ring shown in the figure below.
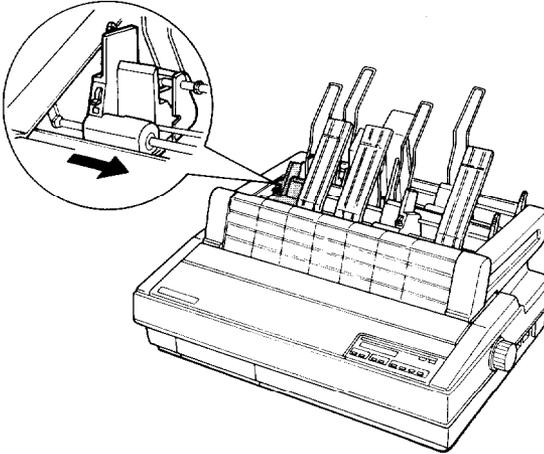
2. Slide the right paper guide to roughly match the width of your paper.
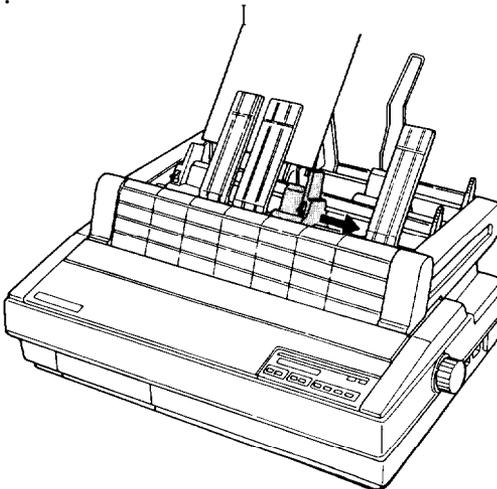
3. Pull the left and right paper set levers of the selected bin forward until the paper guides retract and lock open to allow for paper loading. Then pull up the two small levers on the paper guides.
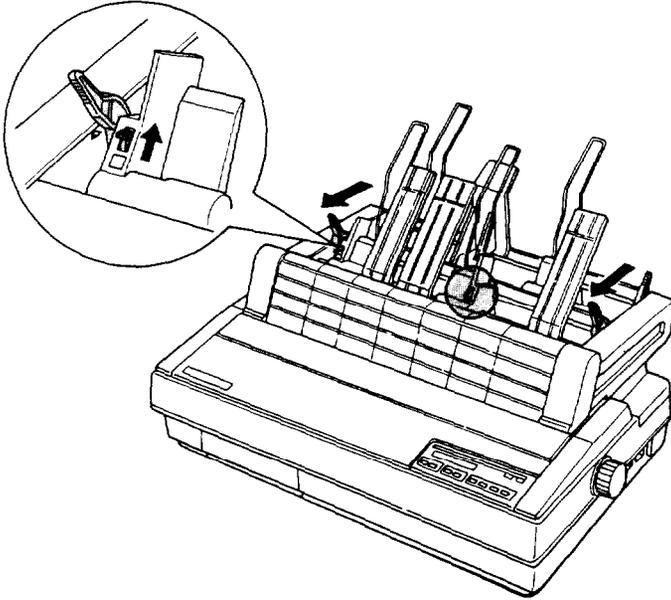
4. Take a stack of paper and fan it. Next, tap the paper on a flat surface to even up the stack.
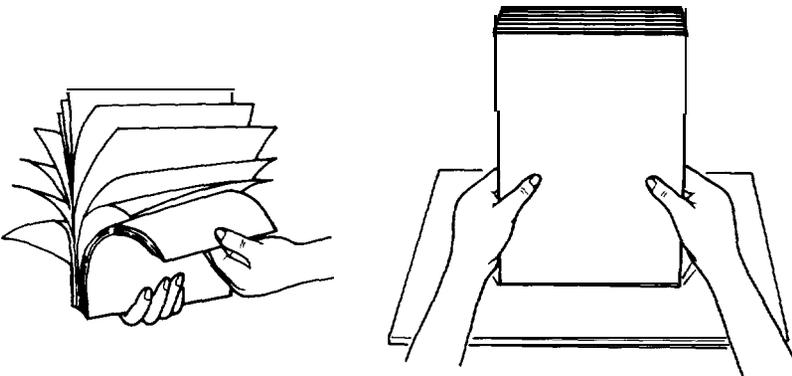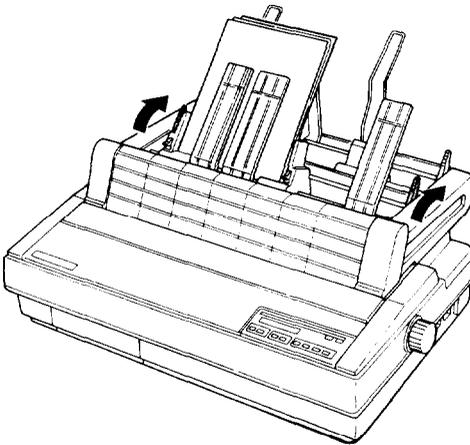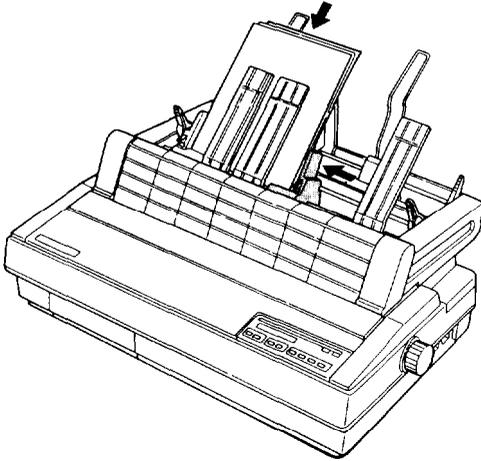
7. Turn on the printer.
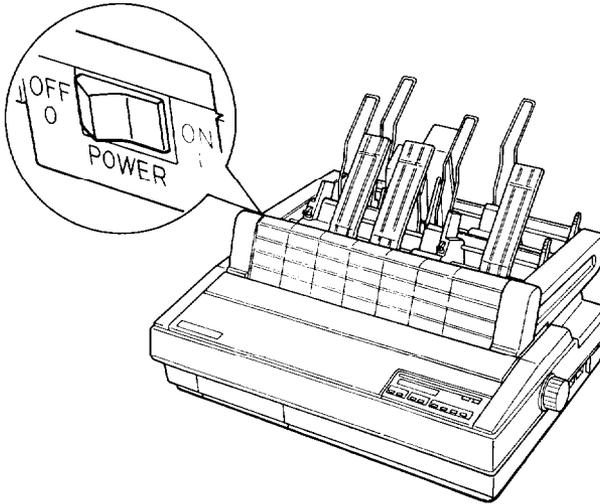
8. Press the **ON LINE** button to set the printer off line.

9. Press the **PAPER SELECT** button to change the display on the LCD to CSF bin **1.** Press **the PAPER SELECT** button again if you wish to select **CSF** bin 2. If continuous paper is loaded, **the** paper is reverse-fed.

Using Printer Options 5-7
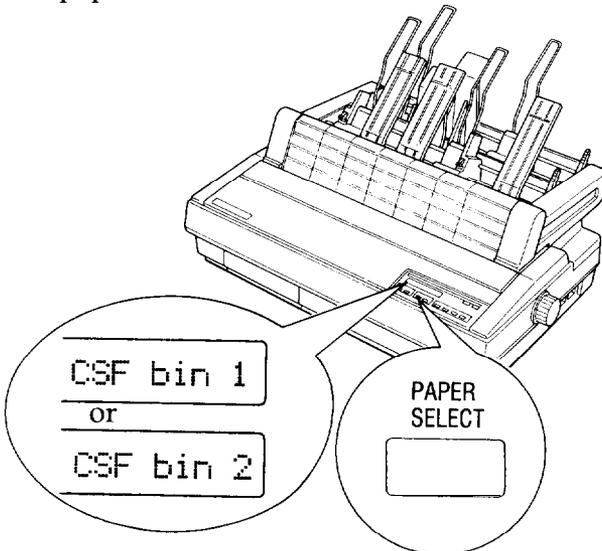
Testing the printer in the cut sheet feeder mode

When you perform the cut sheet feeder self test, the printer counts the number of lines on the page and prints out this number at the bottom of the first page, as shown on the next page. The number of lines counted by the printer becomes the default page length setting. This setting, however, can be overridden by SelecType or by software commands.

The procedure for running the self test is the same as when the cut **sheet** feeder mode is off.

1. Be sure a stack of paper is inserted in the selected bin of the cut sheet feeder and that the printer is turned off.

2. While holding down the **LINE FEED** button (draft mode) or **FORM FEED** button (LQ mode), turn on the printer.
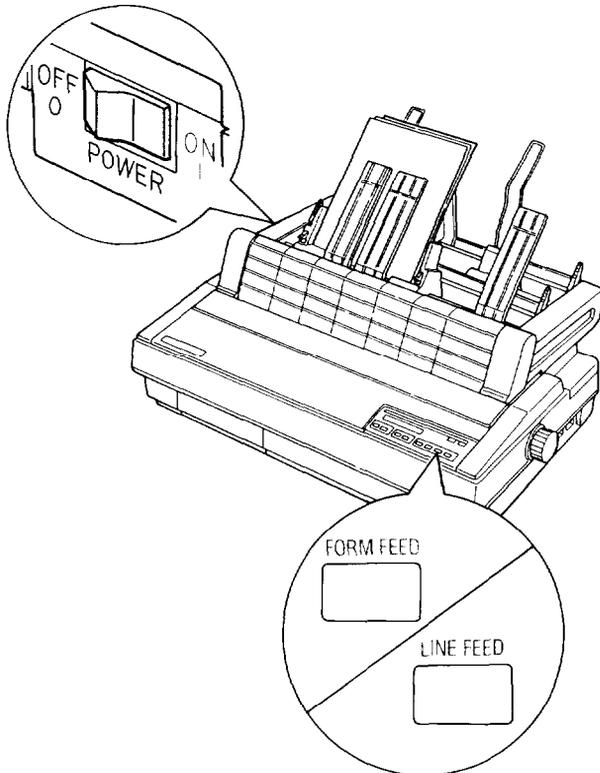
The following figure shows part of the printout for the first sheet of the draft mode self test. The printout of the second sheet is similar to the original self test described in Chapter 1.

This is the first line.

This is line XX.
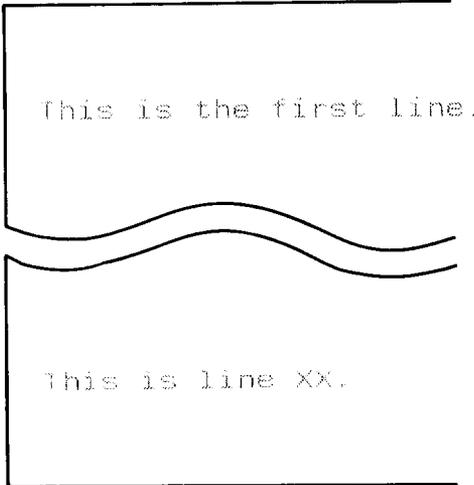
3. The self test continues until the paper runs out or until you press the **ON LINE** button. To stop the test, press the **ON LINE** button.
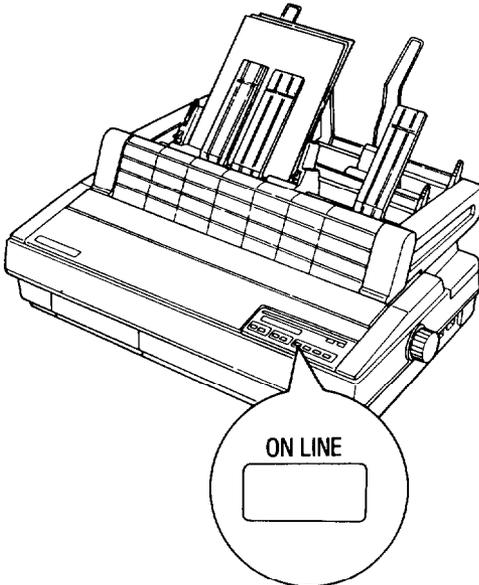
ON LINE

Note: To resume the test, press the **ON LINE** button once more.

---

4. To end the self test, if paper is loaded, press the **FORM FEED** button to eject it. Then, turn off the printer.

Loading envelopes

Envelopes are loaded in much the same way as regular paper.

CAUTION: When printing envelopes using the C806091 or C806111 cut sheet feeder, make sure to load them into bin 1, never into bin 2.

1. Be sure that CSF bin 1 is selected by paper select, then slide the left paper guide until it stops at the ring in the figure below.
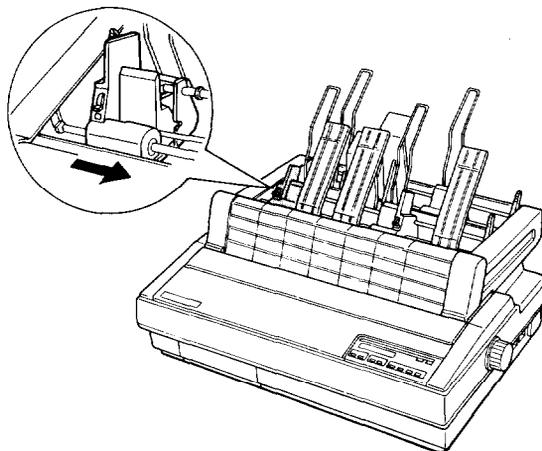
2. Slide the right paper guide to match the width of your envelopes.
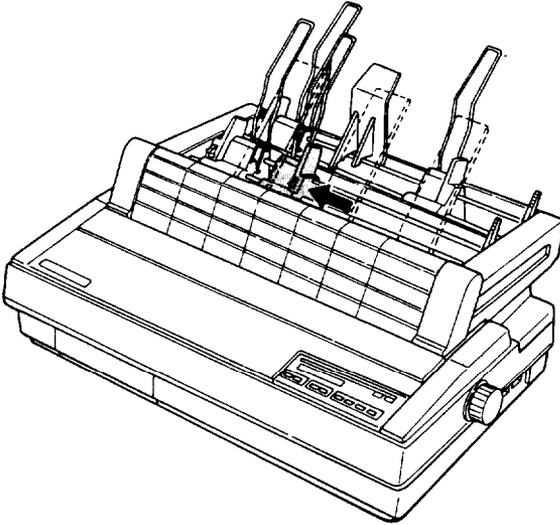
3. Pull the left and right paper levers forward and push down on the two small levers until they lock into position.
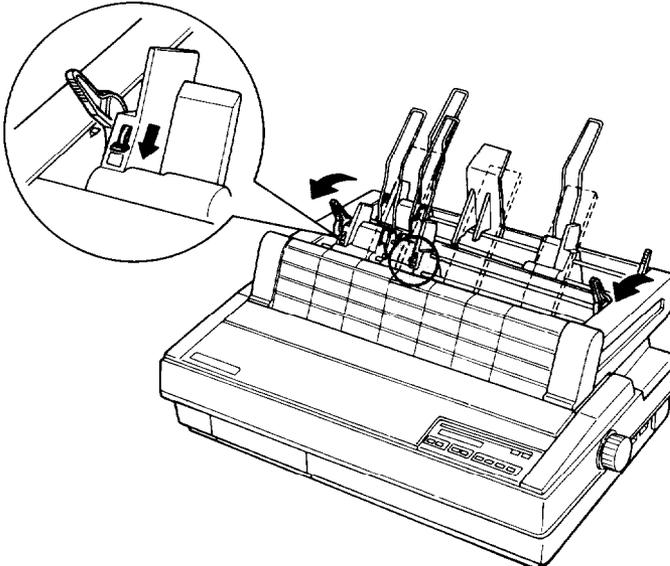
4. Take a stack of envelopes and fan it; then tap the stack on a flap surface to even it up. Insert the envelopes into the front bin. (You can stack up to 25 standard envelopes into **the** bin. See the printer specifications section for more information.)
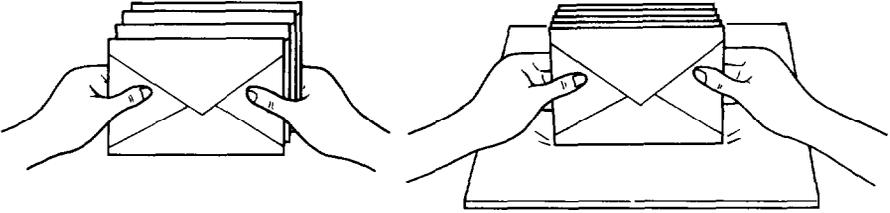
5. Press the **LOAD/EJECT** button to load an envelope. Then press the **ON LINE** button to start printing.
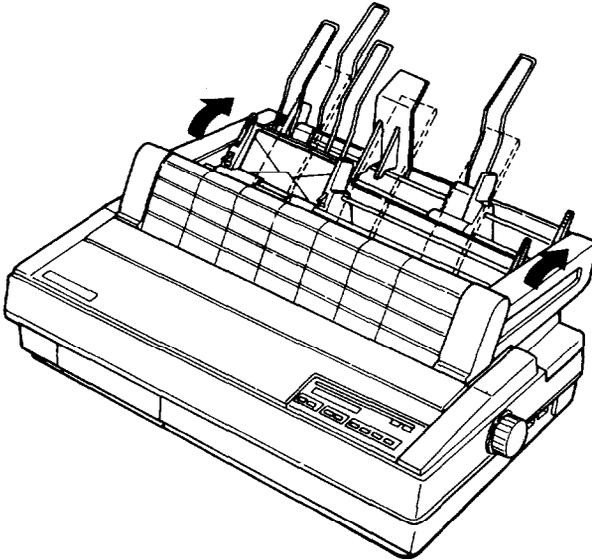
Using the cut sheet feeder

After stacking paper in the cut sheet feeder, be sure that the **ON LINE** light is lit. When the printer is on line, a new sheet of paper loads automatically whenever a printable character or line feeding command is sent to the printer. Subsequent sheets are automatically loaded as needed.

> **Note:** Be sure that you run the self test described earlier in this chapter the first time you **use** the cut sheet feeder and whenever you change to a different paper size.

Paper out condition

In the cut sheet feeder mode, the **PAPER OUT** light goes off while the next sheet of paper is being fed, but the printer remains on line.

When the selected paper bin is empty, the printer automatically goes off line and the **PAPER OUT** light goes on. To resume printing, stack more paper, then press the **ON LINE** button.

> **Note:** If you turn off your printer during a paper out or paper jam condition, any data remaining in the printer's buffer is discarded.

Control panel operation

To operate the cut sheet feeder from the control panel when the printer is in cut sheet feeder mode, be sure that the printer is off line.

LINE FEED: Press this button to feed the paper one line, or hold it down to feed the paper continuously.

FORM FEED: When there is no paper in the printer and you wish to load paper manually, press this button to load the paper. (However, note that paper loads automatically when you print.) When there is paper in the printer, press this button to eject the sheet without loading the next sheet.

LOAD/EJECT: When there is no paper in the printer and you wish to load paper manually, press this button to load the paper. (However, note that paper loads automatically when you print.) When there is paper in the printer, press this button to eject the sheet without loading the next sheet.

Software operation

The following commands cause the printer to eject the sheet in the printer without loading the next sheet.

FF: Form Feed
ESC EM R: Ejects a sheet in the cut sheet feeder mode

Note: The ESC EM command is a software command used to control the operation of the cut sheet feeder. For more information about this command, see the summary of commands in Chapter 9.

If the paper reaches the bottom of the print area when any of the following line feeding commands is used, the sheet in the printer is automatically ejected and the next sheet is loaded.

LF: Line Feed; advances the paper by one line
VT: Vertical Tab; advances the paper to the next
                  vertical tab position
ESC J: Perform line feed by n/l80th of an inch

Software does not come into effect while the printer is off line. Be sure that the printer is on line if you wish to control the cut sheet feeder using software commands.

Switching between the cut sheet feeder and continuous paper

The SQ-850 and SQ-2550 allow you to easily switch between the cut sheet feeder and the tractor feeding system without having to remove either the feeder or the continuous paper supply.

1. Be sure that the continuous paper is loaded, then attach the continuous paper guides to the paper supports.
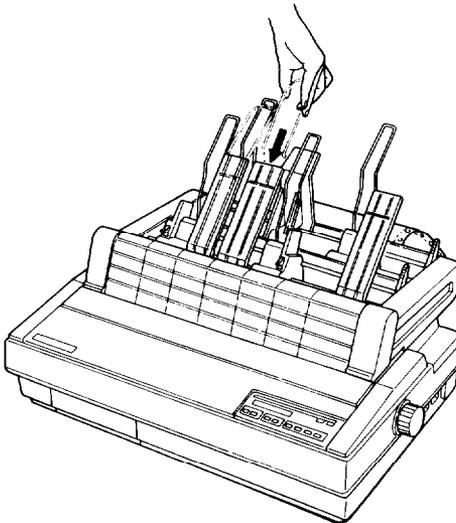
2. To switch from cut sheet feeder operation to continuous paper, press the **PAPER SELECT** button until the display shows Tractor. Continuous paper is fed to its loading position.
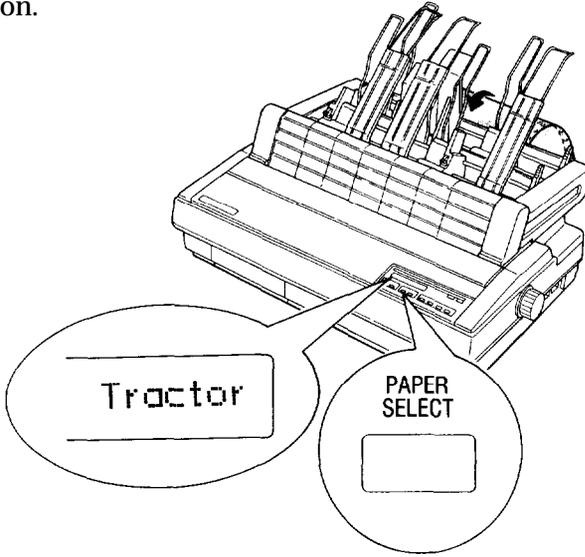
3. Press the **ON LINE** button to set the printer on line.
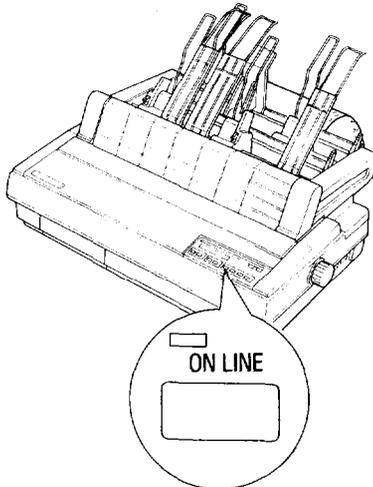
If you want to use the short tear-off feature, you can tear off the perforation of the continuous paper at the cut sheet feeder's edge. See the section on short tear-off (page 3-23) for more information.

WARNING: Never attempt to print on labels when the cut sheet feeder is installed.

Note: To clear a paper jam at the exit point of continuous paper, you may need to open the cut sheet feeder's front cover. **To** do this, first open the printer cover and then raise the cut sheet feeder's cover. Clear the jammed paper and then close the cover. Do not operate the printer with this cover open.

Single sheet insertion

Your cut sheet feeder also has a single sheet loading feature. This feature is especially useful because it allows you to switch to a different type or size of paper without replacing the supply of paper already in your cut sheet feeder.

Before using this feature, make sure that the cut sheet feeder is selected with paper select.

1. Align the single sheet with the marking on the front of the
    cut sheet feeder's cover; then insert the sheet into the paper
    path until you feed resistance.
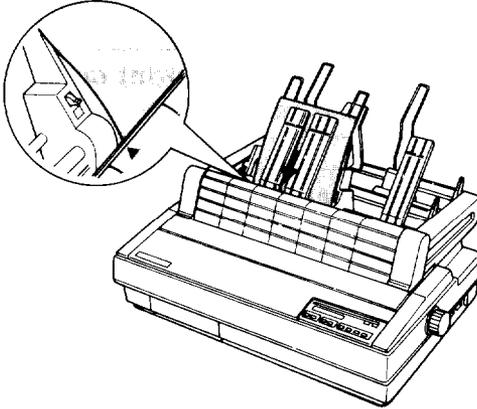
2. Press the **LOAD/EJECT** button to load the sheet. (If your
    document is more than one page, the next sheet will be
    automatically loaded from the cut sheet feeder's paper
    supply.)
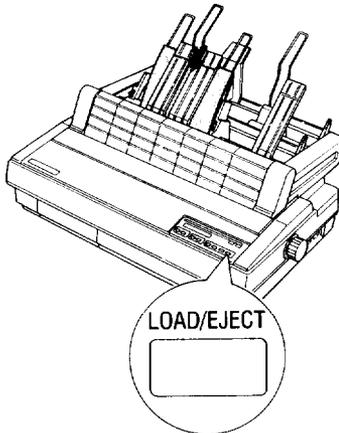
3. Press the **ON LINE** button put the printer on line.

5-18 Using Printer Options

Removing the cut sheet feeder

1. Remove the paper stacked in the cut sheet feeder.
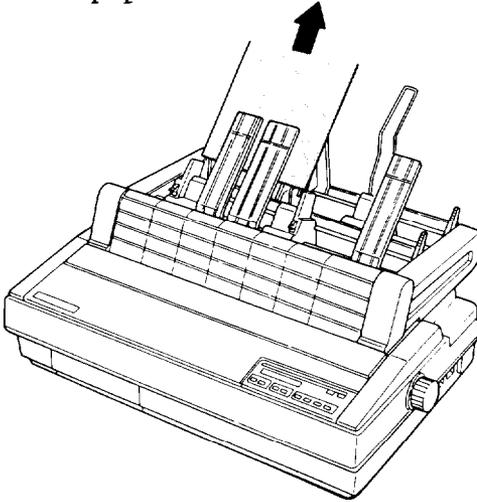
2. Tilt the back section of the cut sheet feeder forward to release its notches from the printer's pins and lift off the cut sheet feeder.
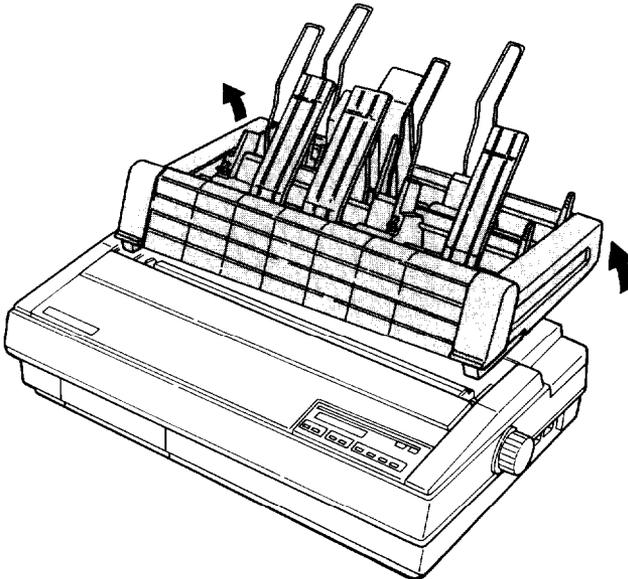
After removing the cut sheet feeder, be sure to store the cut sheet feeder in its original box and packing materials.

The Pull Tractor

The optional pull tractor (C800032 for the SQ-850 and C800042 for the SQ-2550) provides optimum continuous paper handling. The pull tractor is especially useful for printing continuous preprinted forms and labels. Use of the pull tractor is also recommended for obtaining the highest quality graphics. For best results, use the pull tractor along with the built-in push tractor, as described in this section.

Installation
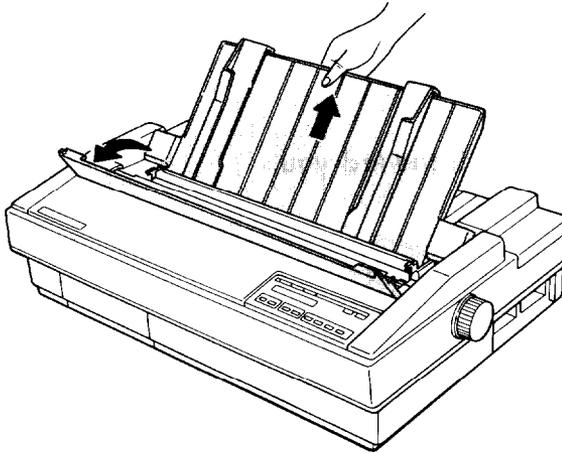
1. Remove the paper guide and open the printer cover.

2. Set continuous paper in the built-in push tractor as described in steps 3 to 9 in the section on loading continuous paper in Chapter 2.
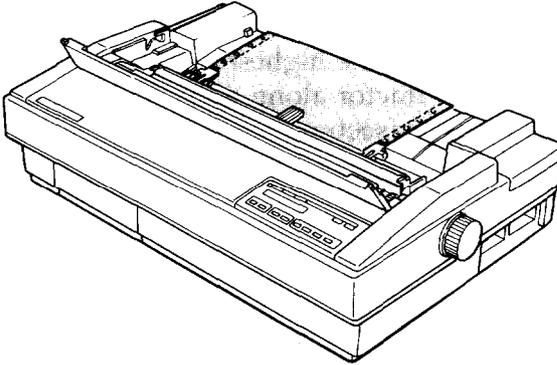
3. Pull the paper bail toward you.
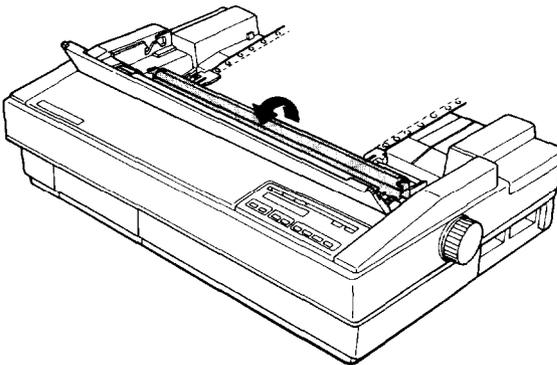
4. Holding the pull tractor with the gears to the right, fit the rear notches onto the rear mounting pins.
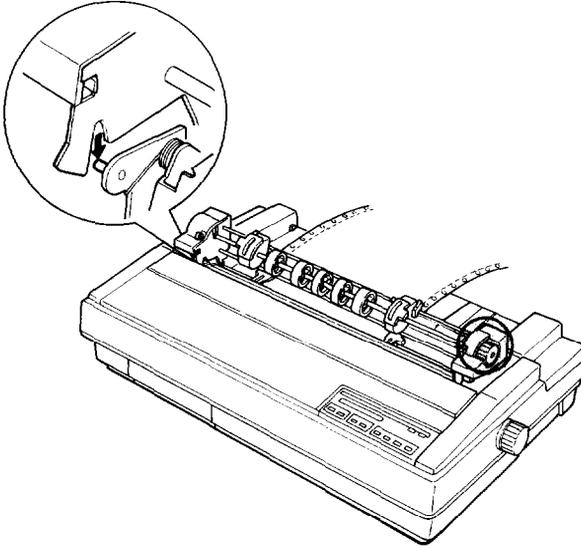
5. Tilt the tractor unit toward you until the front latches click over the front pins.
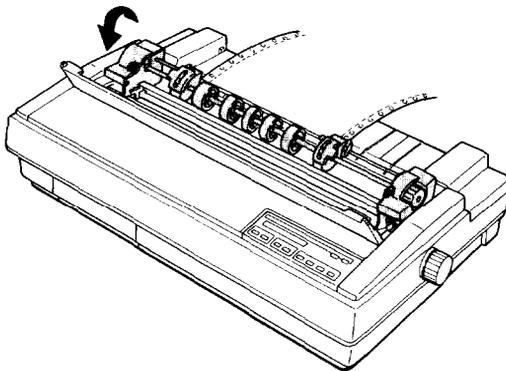
6. Push the paper bail toward the platen and close the printer cover.
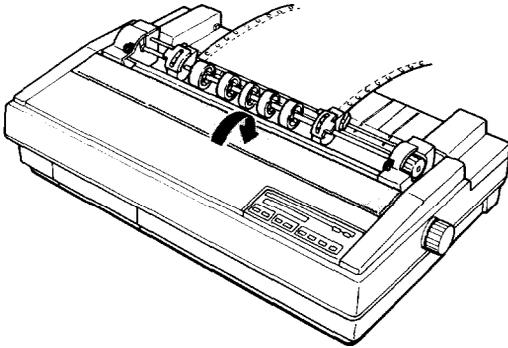
CAUTION: Never use the platen knob to feed the paper while the printer is turned on. If you need to adjust the loading position, be sure to use the micro-adjustment feature described in Chapter 3.

Paper handling

Before loading continuous paper with the pull tractor, make sure that the pull tractor is installed, and then follow these steps:

CAUTION: The short tear-off function cannot be used with the pull tractor. Before you start printing with the pull tractor, make sure that the AUTO TEAR OFF

1. Be sure the display on the control panel shows Tractor and the paper is loaded in the push tractor.
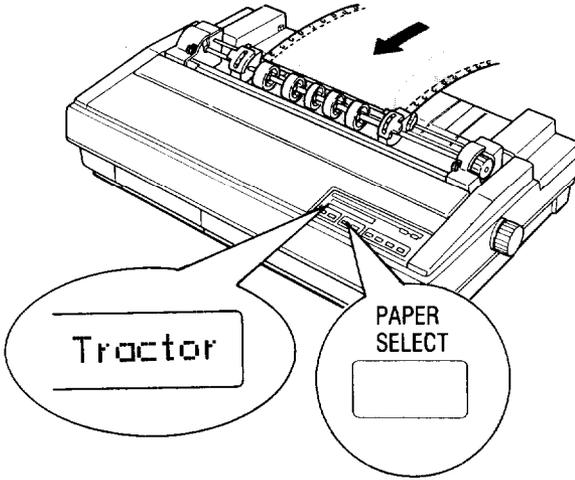
2. Take the printer to off line. Then press the **FORM FEED** button to advance the paper one page so that you can fit the paper onto the pull tractor.
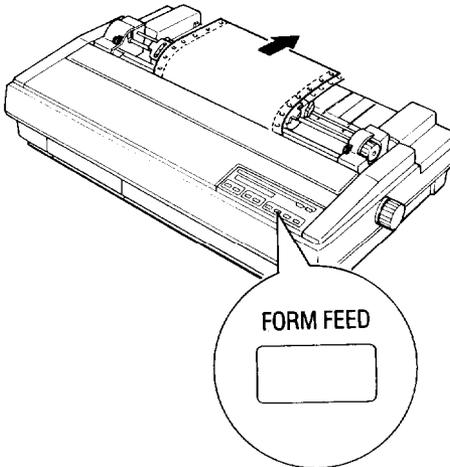
3. Release the sprocket lock levers and position the sprocket units to match the width of the paper. Then adjust the paper support so that they are spaced evenly between the sprocket units.
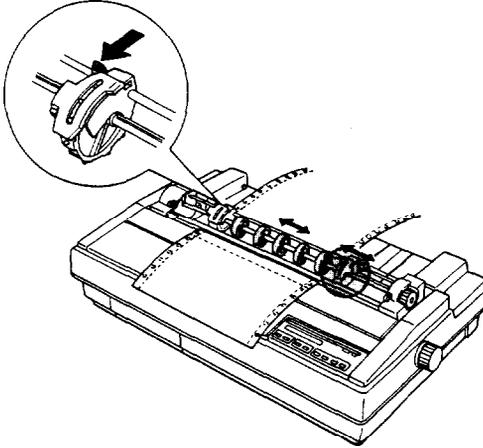
4. Open the pull tractor's sprocket covers.
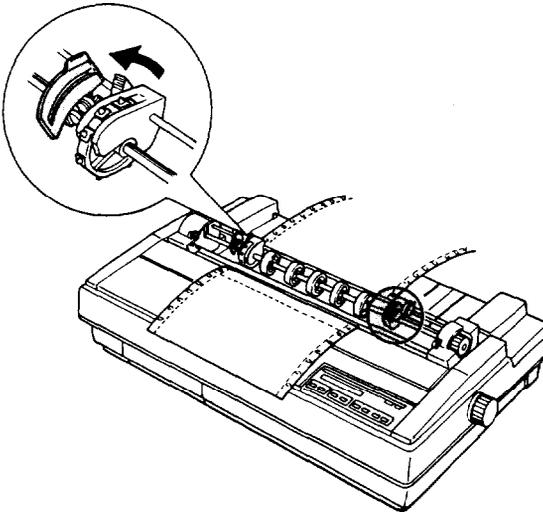
5. Fit the holes in the paper over the tractor pins on the sprocket units and close the sprocket covers.
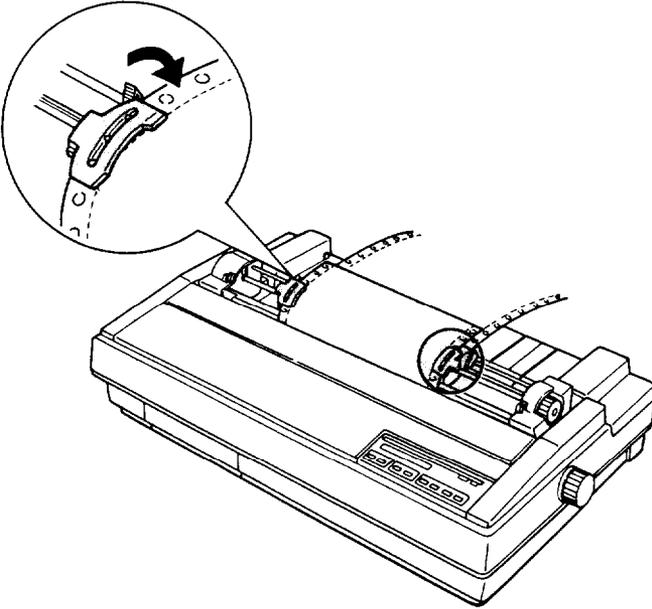
6. See that the paper is not crooked or wrinkled and lock the sprocket units in place.
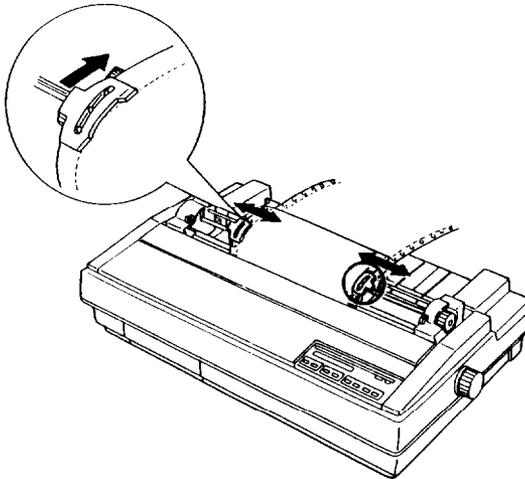
7. Press in on the pull tractor knob and turn it slightly to remove any slack from the paper.
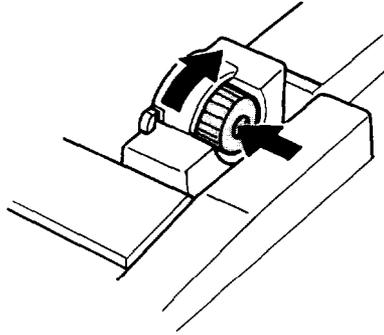
8. Attach the paper separator designed for use with the pull tractor unit.
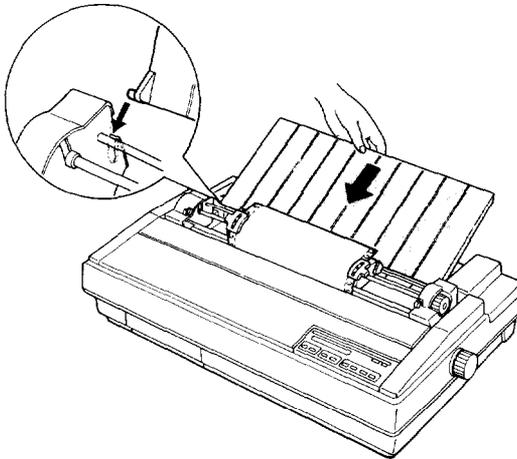
9. Press the **ON LINE** button to set the printer on line.

Removing the **pull** tractor

1. Be sure the printer is turned off, then remove the paper separator.
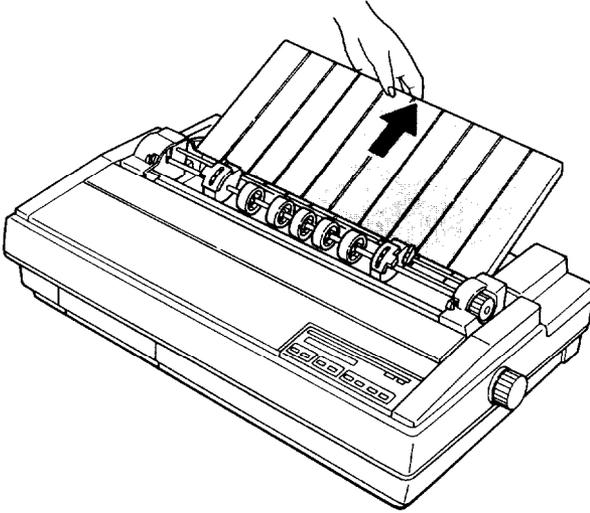
2. Open the printer cover and pull the paper bail toward you.
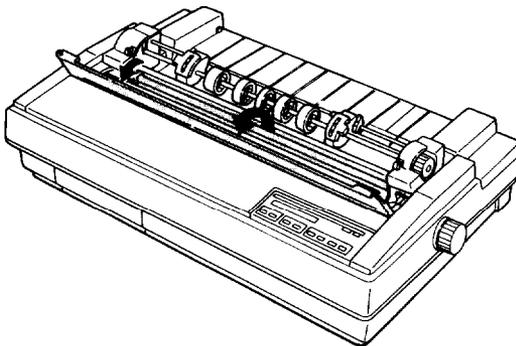
3. Press the levels on the pull tractor. Then tilt the tractor back and lift it off the printer.
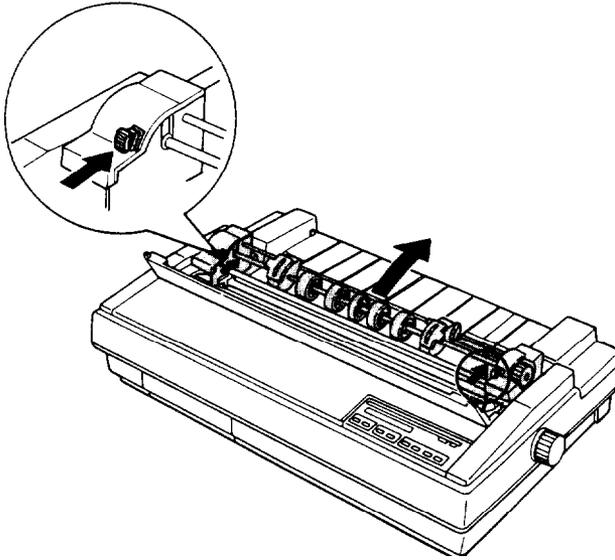
4. Push the paper bail back and close the printer cover.
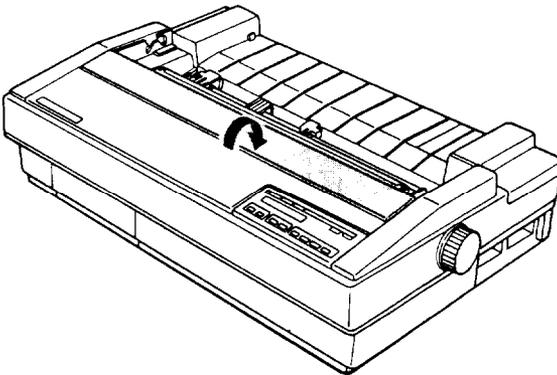
After removing the pull tractor, be sure to store the pull tractor in its original packing materials and box.

Interface Boards

There are a number of optional interfaces that can be used to supplement the capabilities of your printer's built-in serial and parallel interfaces.

Choosing an interface

The following information should give you a general idea of the features provided by these optional interface boards. Optional interfaces can be divided into two main categories:

- The IEEE-488 interface, which offers standardized connections, trouble-free operation, and the ability to connect computers, printers and other devices on the same line so that they may share data freely.

- Serial interfaces, which are necessary if your computer is no equipped with a parallel interface or if you need an interface that comforms to the Current Loop standard instead of the RS-232C. In addition, the available serial interface boards provide user selectable baud rates and data word structures. These interfaces also offer some combination of the following features: X-on/X-off data communication protocol, loopback self-test modes, and data buffers that increase the printer's buffering capacity.

If you are still unsure whether you need an optional interface, or would like to know more about interfaces, check with your EPSON dealer.

Compatible interfaces

The following is a list of EPSON interfaces that are compatible with the SQ-850 and SQ-2550 printers. Note that some of these interfaces may not be available in all contries.

Interface number	Name
#8143	New serial interface
#8148	Intelligent serial interface
#8165	Intelligent IEEE-488 interface
#8641	Coax interface
#8642	Twinax interface

All EPSON interfaces have the EPSON name printed on them. If the board has an identification code printed on it, it will be a four-digit number beginning with 8, and should correspond to one of the numbers listed in the table above.

Make sure you set the DIP switch and jumper settings on the interface board according to the instructions in your computer manual and your interface board manual before installing the board.

Installing the interface board

The optional interface boards available for your printer are easy to install, and the only tool needed is a cross-head screwdriver.

Turn off your printer and computer. Then disconnect the interface cable from the printer and the computer.
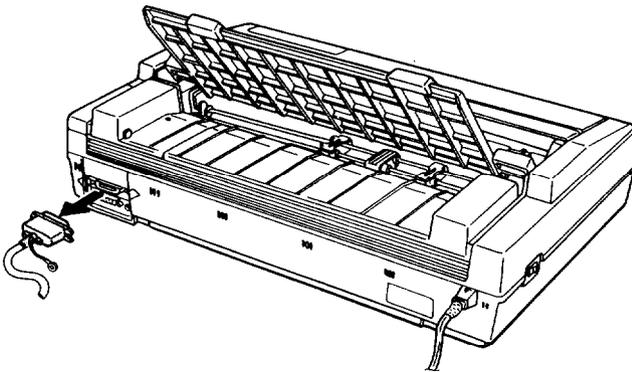
Removing the interface board cover

1. Unplug the power cable from the electrical outlet. Then unplug the cable from the rear of the printer.
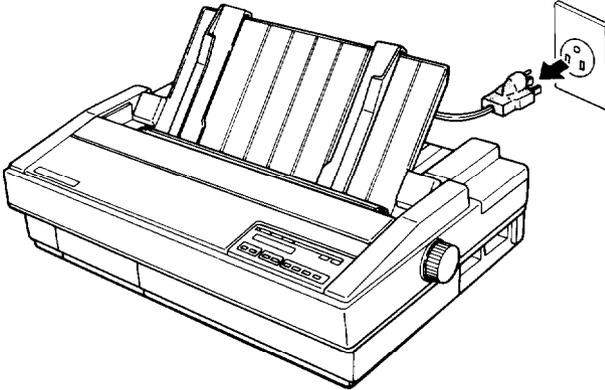
WARNING: High voltages are present inside the printer when the power is on. NEVER attempt to install or remove an interface board without first turning off the printer and unplugging it from the electrical outlet. Also, try not to touch contacts on the circuit board of the printer because many of the components can be destroyed by the static electricity that may build up in your body.

2. Remove the paper guide.
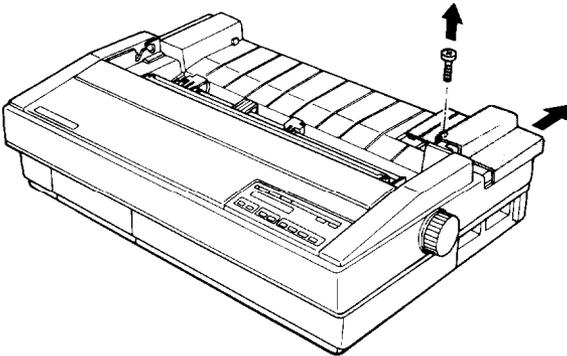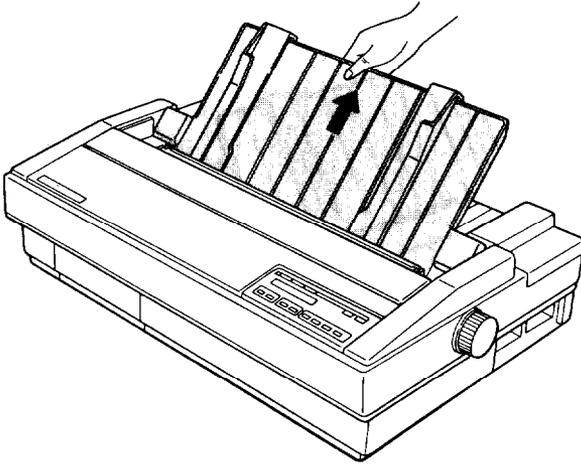
Installing the board

There are two basic interface board designs, which differ with respect to how the frame ground (FG) wire is attached. This slight difference does not affect the operation of the interface in any way.
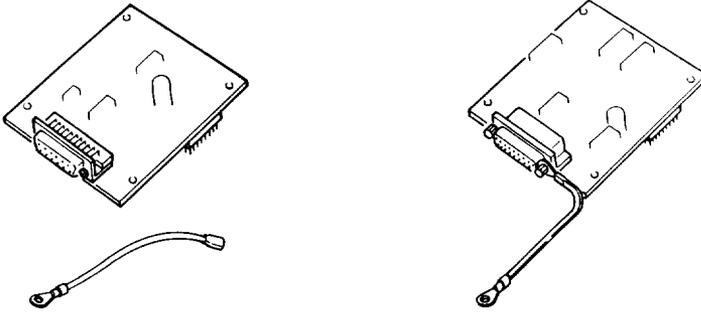
1. If the FG wire is not attached to the interface board, attach the plug end of the wire onto the FG pin located on the board.
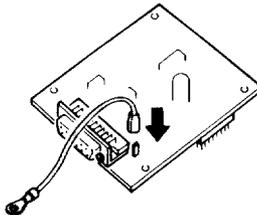
2. Remove the shield plate above the parallel interface connector by pressing in on the plastic clips located at the back of the plate.
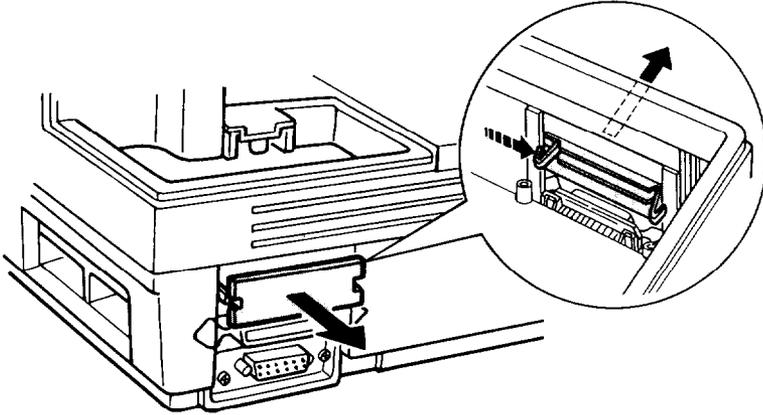
3. Position the interface board inside the printer as shown below, making sure the board does not catch on any of the wires inside the compartment.
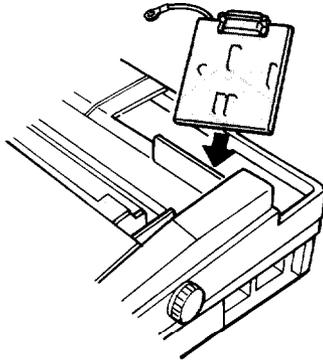
4. Carefully align the pins on the optional interface board with the mating connector on the main board; then plug the board into the connector.
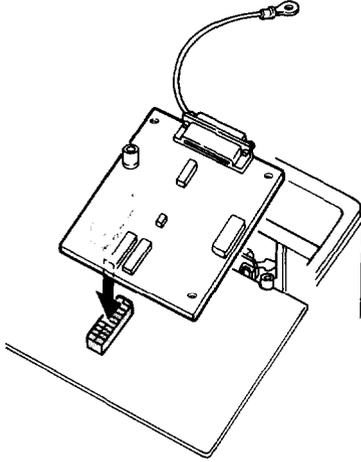
5. Secure the board with three of the screws provided.
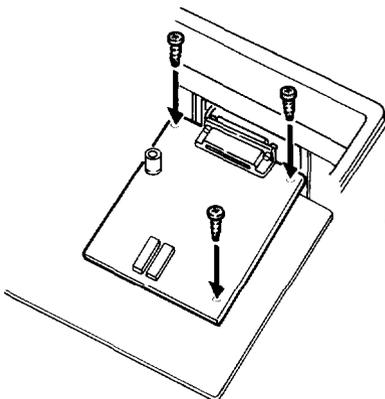
6. **Use** the FG wire retaining screw to attach the round end of the **FG** (frame ground) wire to the ground connector beneath the interface connector.
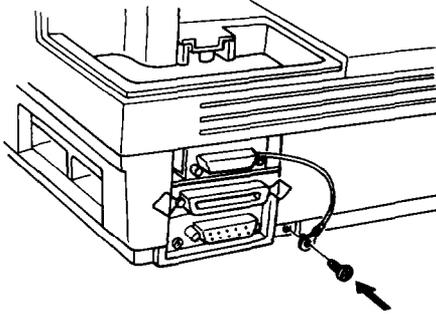
7. Replace the interface board cover and secure it with the retaining screw.
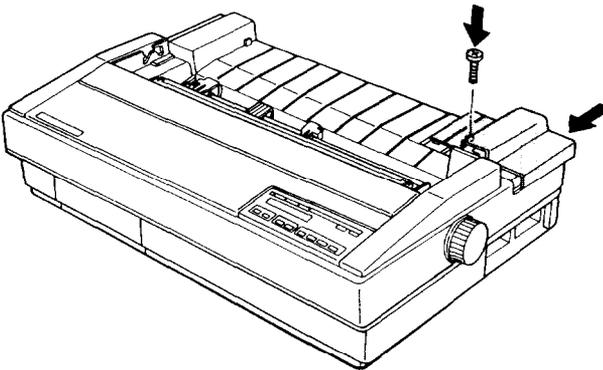
WARNING: Always disconnect the printer cable from the printer's built-in parallel or serial interface before connecting a cable to an optional interface. Two interface cables must not be installed at the same time.

8. Before you use the interface board, be sure to use SelecType to set the INTERFACE option to Parallel. (For details, see the SelecType setting section in Chapter 3.) This is necessary even if the interface is serial, because the board uses the parallel connections. However, serial conversion is performed.

The #8143 new serial interface board

If you are using an optional interface, it may be necessary for you to alter the communications protocol of the printer or the computer so that they can communicate properly. In most cases, you should use the information in your optional interface manual or your computer's manual to match the computer with the interface.

If you are using the #8143 optional board with the SQ printer, make sure that you read through the section below on baud rate selection. You may also want to refer to the sections on handshaking timing and error handling for interface information specific to the SQ printer.

For all other data transfer conventions, such as word structure or communications protocol, use the information in the manual supplied with your #8143 optional interface.

Baud rate selection

You can select from the following baud rates: 300, 600, 1200, 2400, 4800, 9600, or 19200 bits per second (BPS). When setting the baud rate, make sure you use the bit rate selection table below.

BPS	SW1-7 (JB4)	SW1-1 (PB3)	SW1-4 (JB2)	SW1-3 (JB1)
300	ON	OFF	ON	OFF
600	ON	OFF	OFF	ON
1,200	ON	OFF	OFF	OFF
2,400	OFF	ON	ON	OFF
4,800	OFF	ON	OFF	ON
9,600	OFF	ON	OFF	OFF
19,200	OFF	OFF	ON	ON
19,200	OFF	OFF	ON	OFF
19,200	OFF	OFF	OFF	ON
19,200	OFF	OFF	OFF	OFF

Handshaking timing

When the vacant area for data in the input buffer drops to 256 bytes, the printer outputs an X-off code or sets the DTR flag to "1" (MARK) indicating that it cannot receive data.

Once the vacant area for data in the buffer recovers to 512 bytes, the printer outputs an X-on code or set the DTR flag to "0" (SPACE) indicating that it is again ready to receive data.

Error handling

When a parity error is detected, your printer prints an asterisk (*). All other errors, including framing and overrun, are ingnored.

Chapter 6
Maintenance

Cleaning the Printer

To keep your printer operating at its best, you should clean it thoroughly several times a year.

1. Turn off the printer and remove the cut sheet feeder **or** pull tractor, if installed.
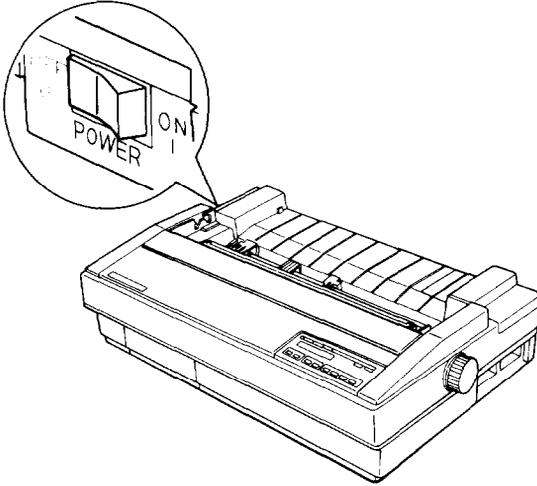
2. Use a soft brush to carefully clean away all dust and dirt.
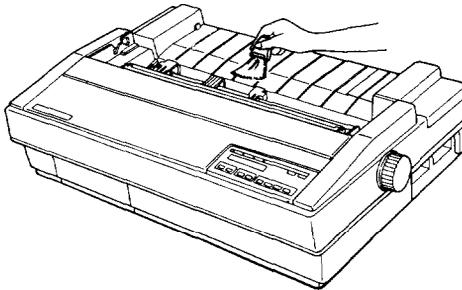
3. If the outer case, printer cover or paper guide are dirty or dusty, clean them with a soft, clean cloth dampened with mild detergent dissolved in water. Keep the printer cover in place to prevent water from getting inside the printer.
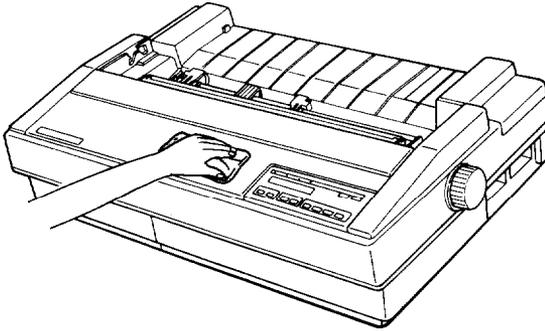
> **WARNING:**
> - Never use alcohols or thinners to clean the printer; these chemicals can damage the components as well as the case.
> - Be careful not to get water on the printer mechanism or electronic components.
> - Do not use a hard or abrasive brush.
> - Do not spray the inside of the printer with lubricants; unsuitable oils can damage the mechanism. Contact your EPSON dealer if you think lubrication is needed.

Cleaning the Print Head

If print quality should diminish, use the printer's built-in cleaning function. To ensure proper operation, you should use the **ON LINE** and **LINE FEED** buttons if printing becomes inconsistent. The cleaning cycle ensures that all the nozzles are delivering ink properly.

To run the cleaning cycle, follow these steps.

1. Turn on the printer and press the **ON LINE** button to take the printer off line.
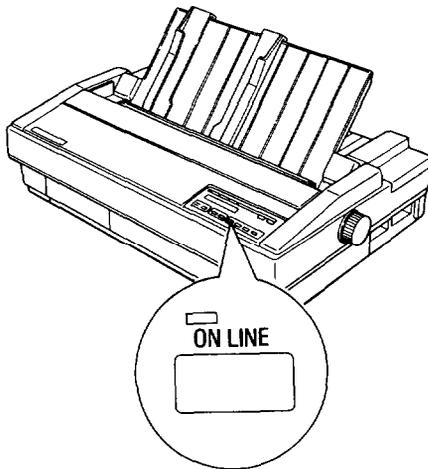
2. Press both the **ON LINE** and **LINE FEED** buttons to start the print head cleaning cycle. The display **shows** CLEANING for about 30 seconds. When the cleaning cycle is finished, press the **ON LINE** button to place the printer on line and resume printing.

CLEANING

ON LINE   LINE FEED
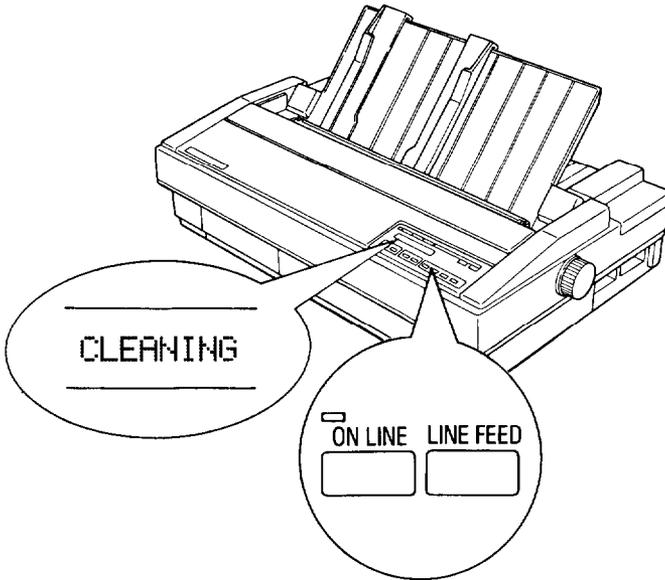
Replacing the Ink Cartridge

When the **INK END** light comes on, it indicates that there is very
little ink left in the cartridge. The printer will, however,
continue to print until it is completely out of ink. How long
this takes depends upon what you are printing. Once the
cartridge is completely empty, the INK END message is
displayed and the printer is set off line. The printer cannot be
set back on line until the cartridge is replaced. Also, if you turn
off the printer when the **INK END** light is on, you must replace
the cartridge before you can print again.

Note: The **INK END** light is also lit whenever the ink cartridge
is removed.

Always replace the old ink cartridge with the exclusive SO20002
EPSON ink cartridge. Otherwise the printer will not work.

WARNING - **Skin and Eye Irritant**
This ink contains potassium hydroxide and may cause
irritation on contact with skin and eyes. Please take
the following precautions:
- Avoid contact with skin and eyes. If ink gets into
  eyes, flush immediately with water and contact a
  physician. Wash all traces of ink from skin
  thoroughly with soap and water after handling
  cartridge. If irritation occurs, contact a physician.
- Do not dismantle the cartridge.
- Keep the cartridge out of reach of children.

Follow these steps to replace the ink cartridge.

1. Open the ink cartridge compartment cover located at the front of the printer by pressing once on the area marked by the three grooves. Then carefully remove the used ink cartridge from the printer.
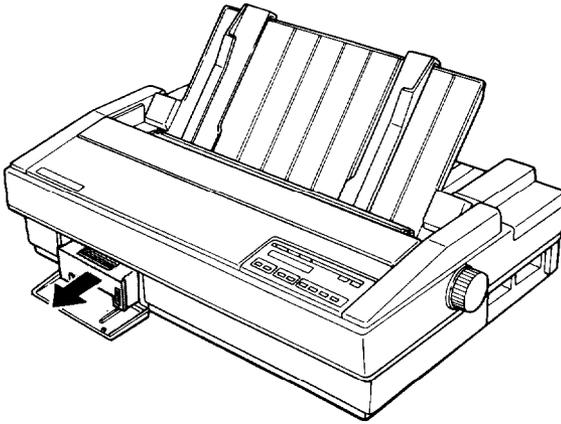
Note: On one end of the cartridge is an ink indicator lever that registers whether the cartridge is full or empty. When replacing an empty cartridge with a new one, you can check this lever to avoid confusion. After replacing the cartridge, dispose of the empty cartridge immediately since it cannot be refilled.

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2. Insert the end of the cartridge with the foil seal into the ink
    compartment as shown below. Gently push the cartridge all
    the way into the compartment.
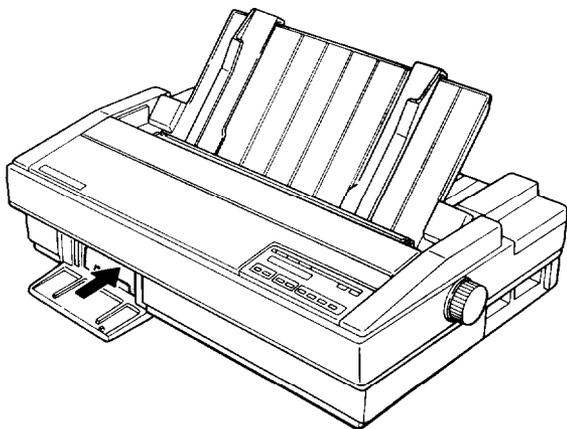
3. Close the cartridge compartment cover as shown below and
    press the **ON LINE** button to place the printer on line and
    resume printing.
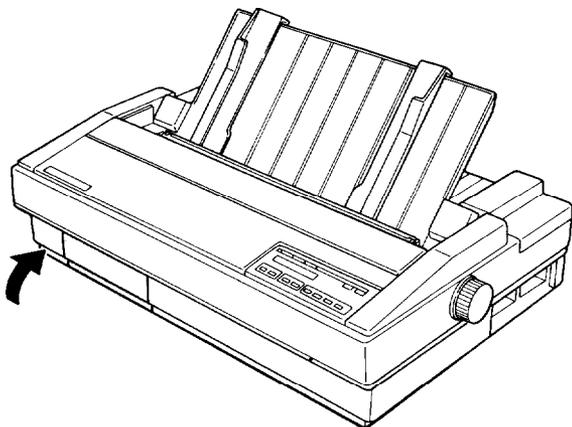
Transporting the Printer

If you need to transport your printer some distance, carefully repack the printer using the original box and packing materials.

> **CAUTION: When repacking the printer for transportation, press the PAPER SELECT button until the display shows Tractor. and then follow the steps below.**

1. Take the printer off line before turning it off so that the ink nozzles are properly capped.

2. Remove the optional cut sheet feeder or pull tractor, if installed. (See Chapter 5 for option removal instructions.)

3. Unplug the power cable from the electrical outlet; then disconnect the interface cable and power cable from the printer. Next, remove the paper guide.

4. Open the ink cartridge compartment cover and remove the ink cartridge by pulling it straight out of the printer. (Place the cartridge in a plastic bag and store separately.) Then close the ink cartridge compartment cover.
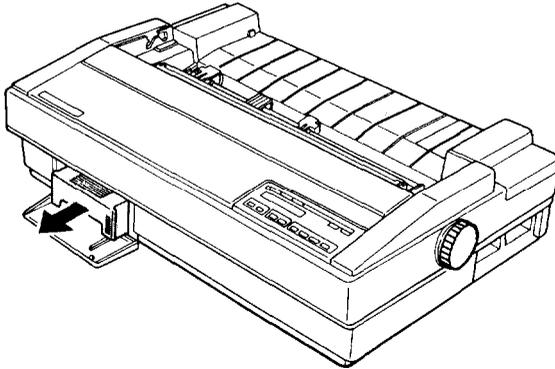
5. **Insert** the notice sheet **by rotating the platen knob.**
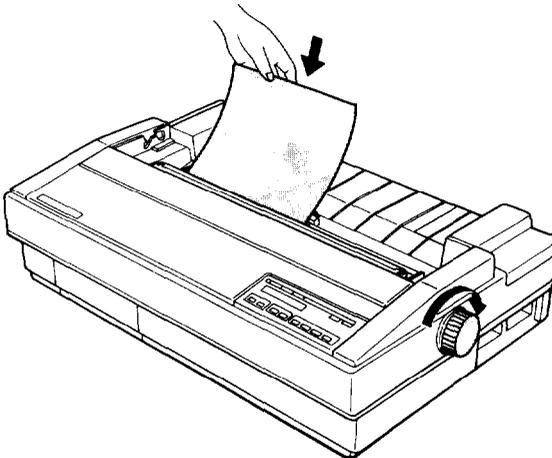
6. Remove the printer cover and pull the paper bail open, then insert the white packing material between the paper bail and platen as shown below.
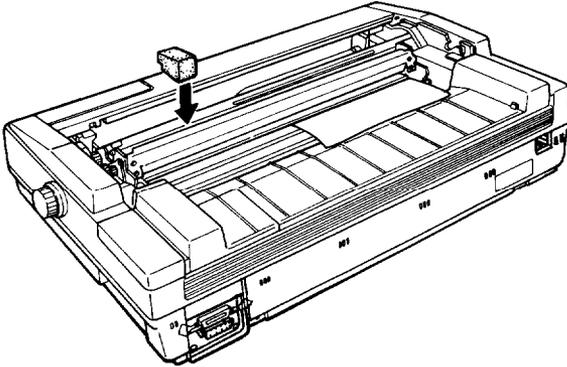
7. Reattach the printer cover. Then remove the platen knob.
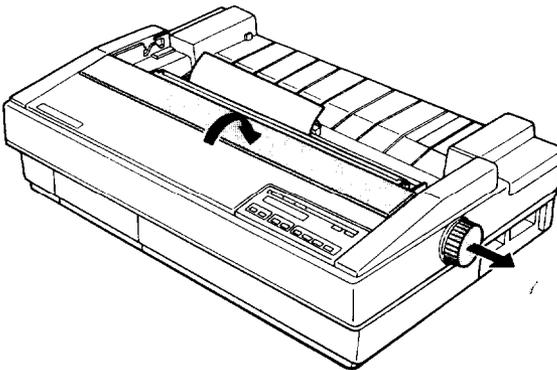
8. Pack the printer in its original foam packing supports and box.

Chapter 7
Troubleshooting

Problems and Solutions

This chapter discusses problems you may encounter while operating your printer and their likely solutions. If you are having difficulty achieving the desired printing result, first locate the problem in the table below and refer to the appropriate page for the solution.

Power supply
- Power is not being supplied.   Refer to 7-3

Printing
- The printer does not print or stops printing.   Refer to 7-4
- The print is faint or uneven.   Refer to 7-6
- The printout is not what you expected.   Refer to 7-7
- The position of the printout is not what
  you expected.   Refer to 7-10

Paper handling
- Single sheets do not feed properly.   Refer to 7-13
- Continuous paper does not feed properly.   Refer to 7-16

Options
- Using the cut sheet feeder, the paper does not feed preperly.
         Refer to 7-21
- Using the pull tractor in combination with the push tractor,
  continuous paper does not feed properly.   Refer to 7-24
- Using an optional interface, the printer does not operate
  properly.   Refer to 7-26

Power Supply

Problem	Solution
Power is not being supplied to the printer.	
The **POWER** *light does not go on.*	The power cable may be disconnected to may not be completely plugged into the electrical outlet. Turn off the printer and check the power cable connections between the printer and the electrical outlet. Refer to l-15.
	The power switch may be off. Turn on the power switch.
	The problem may lie with the electrical outlet. Make sure that the electrical outlet is not controlled by an outside source such as a wall switch. Refer to l-16.
	Power is not being supplied to the electrical outlet. Connect another electrical device to the outlet to check whether the outlet is operating properly.
The **POWER** *light comes on briefly and then goes off. The light stays* off even *when the power is switched* off *and on again.*	The voltage may not be correct for your printer. Make sure that the voltage of your electrical outlet matches the rating indicated on the label at the back of the printer. If the voltages do not match, unplug the printer and contact your EPSON dealer immediately. Do not reconnect the power cable to an electrical outlet. Refer to l-16.

Printing

Problem	Solution
The printer does not print or stops printing.	
The **ON LINE** *light is on but nothing is printed.*	The software may not be installed properly for your printer. Use your application program's setup (or install) procedure to check the printer settings on your computer's display, then reset the values correctly.
	The interface cable may not be plugged in securely. Check both ends of the cable **between** the printer and the computer. If you are using a parallel interface, secure the connector using the wire retaining clips.
	You may not be using the correct interface cable. Make sure your interface cable meets the specifications for the printer and the computer. Refer to l-29.
The **ON LINE** *light is* off *(the printer is* off *line).*	The printer may be off line and cannot receive data. Check the on line status at the printer's control panel. If it is not **on,** press the **ON LINE** button once to set the printer on line (the **ON LINE** light will go on). Refer to 3-3.

Problem	Solution
The **PAPER OUT** *light is on.*	The printer may be out of paper. Load more paper into the printer. Refer to 2-3.
	The paper may be set too far to the right. If this is the case, the paper out detector cannot sense the paper. Move the paper to the left until the **PAPER OUT** light goes out.
The **INK END** *light is on.*	The ink cartridge may be empty or the cartridge may not be installed. Install a new ink cartridge. Refer to 6-6.
The "COVER OPEN" *message is displayed on the control panel.*	The printer cover is open. Close the printer cover and resume printing.
The printer makes a strange noise, the buzzer sounds, and the printer stops abruptly.	This indicates an error in printer operation. Turn off the printer, check for paper jamming or other problems, then turn the printer back on. If the printer still does not print correctly, **contact** your EPSON dealer.
The print head moves, but nothing is printed.	The printer may not **have** been charged with ink. Turn off the printer, and then turn the printer on again while holding down both the **ON LINE** and **LINE FEED** buttons to start the ink charging cycle. Refer to 1-16.

Problem	Solution
The print is faint or uneven.	
Rots are missing in the printed characters or *graphics.* **A B C D**	The print head nozzles may be clogged. Press the **ON LINE** button to set the printer off line. Then press both the **ON LINE** and **LINE FEED** buttons to start the print head cleaning cycle. You may need to repeat this cycle more than once. If printed results are still missing specific dots after cleaning the print head several times, the print head may be damaged.
The printing on envelopes in either faint or too dark.	The gap between the print head and the platen may not be correct. Adjust the gap between the platen and print head using the paper thickness lever. Refer to 2-23.
The printout has a blurred appearance. **ABCD**	You may not be using the correct type of paper for your printer. Make sure the surface of the paper is not too rough or too smooth. Although most types of business correspondence quality paper works well with the SQ, you should always test the paper you want to use before buying it in large quantities. You may not be printing on the correct side of your paper. Test both sides of your paper to determine which gives you the best quality.

7-6 Troubleshooting

Problem	Solution
The printout is not what you expected.	
The typestyle *or characters that are set by software cannot be printed.*	The software may not be correctly installed for your printer. Use the program's setup (or install) procedure to check the printer settings on your computer's display, then reset as needed.
The printer prints a series of *strange characters.*	Your printer and the computer may not be communicating correctly. Make sure that you are using the correct interface cable and that the communication protocol is correct. See your computer's manual for more information. You can also use your printer's data dump mode to check the data being sent from the computer. (In data dump mode, an extra printout of the codes reaching the pritner is produced.)
Italic characters are printed instead of *the selected graphic "line" characters.*	The wrong character table may be selected. If your application program is capable of sending control codes, specify the EPSON Extended Graphics character table using ESC t 1. If settings cannot be performed using control codes, set the CG TABLE option of SelecType to Graphic. Refer to 3-14.

Problem	Solution
The printout is not what you expected. (continued)	
Graphic characters (line, ect.) being printed instead of *the selected italic characters.*	The wrong character table may be selected. If your application program is capable of sending control codes, specify the Italic character table using ESC t 0. If settings cannot be performed using control codes, set the CG TABLE option of SelecType to Italic. Refer to 3-14.
Characters not belonging to the selected international character set being printed.	The wrong international character set is selected. If your application program is capable of sending control codes, specify the desired international character set using ESC R **n.** If settings cannot be performed using control codes, set the COUNTRY option of SelecType to the desired character set. Refer to 3-35.
The character font *or character spacing* selected by *SelecType cannot be printed.*	Your software may be overriding your SelecType settings. Use the program's setup (or install) procedure to check the printer settings on your computer's display, then reset the values correctly.

Problem	Solution
	The changes made with SelecType may not have been initialized. After changing the printer's default settings, check the SelecType settings and then press both the **ON LINE** and **LOAD/EJECT** buttons before trying to print. New default settings do not take effect unless you initialize the printer by pressing the buttons or by turning the printer off and on. Refer to 3-16.
The characters printed are smaller than expected.	The condensed mode may be set. If your application program is capable of sending control codes, you can cancel the condensed mode by sending the DC2 code to the printer. Refer to 9-27.

Problem	Solution
The position of the printout is not what you expected.	
Text is printed on the *same line.*	A line feed signal is not being sent at the end of each line of text. Check the AUTO LINE FEED setting in SelecType, and set it to on. Refer to 3-11.
Text is printed with an extra blank line in between.	Two line feed signals are probably being sent. Check the AUTO LINE FEED setting in SelecType and sent it to off. Refer to 3-11.
Text is printed with an extra blank line in between, even after setting the auto line feed setting to off.	Your interface cable may not be configured correctly. Disable the $\overline{\text{AUTO}}$ $\overline{\text{FEED XT}}$ signal of your interface.
Printing starts too high or too low on the Page.	The loading position may be set up incorrctly. Use micro-adjustment to adjust the loading position. Refer to 3-21. If the problem persists, check the top margin set by your application software are adjust it if necessary.

Problem	Solution
The position of the printout is not what you expected. (continued)	
Line spacing is not correct.	Your software may be set up incorrectly. Use your programs setup (or install) program to check the settings on the computer's display. If your application program is capable of sending control codes, use the line spacing commands listed in Chapter 9, The Command Summary.
One line of *printing has taken up two lines.*	The margin settings may not be set correctly. Use your application program settings to change the margins. If your program allow it, you can also set the left and right margins using the ESC I n and ESC Q n commands. Refer to 9-20. If you are using BASIC, enter either of the following statements: WIDTH LPRINT 255 WIDTH "LPTI" 255

Problem	**Solution**
Regular gaps appear in the printout.	The skip over perforation may be set with SelecType. Enter SelecType and turn off the skip over perforation feature. Refer to 3-19.
Skip over perforation is set, but the perforation does not fall in the center of the skip.	The page length for continuous paper may not be set correctly. Change the page length with your software program. You can **also** use the ESC C n or ESC C 0 n command to specify the page length.
	The loading position of the paper **may** be too high or too low. Use the micro-adjustment feature to reset the loading position **so that** the perforation is centered within the skip area.
	Your application program may be setting the top and bottom margins. If this is the case, use SelecType to turn off skip over perforation feature.
Vertical lines in graphics are not aligned.	Slight misalignment may occur during bidirectional printing. When precise printing of vertical lines in necessary the unidirectional print mode with SelecType or send the ESC Ul command to the printer. Unidirectional printing increases printing accuracy, but reduces printing speed slightly. Refer to 9-10.

Note: Use data dump mode to check the data being sent from the computer. In the data dump mode, data is printed in hexadecimal notation and in ASCII characters.

7-12 Troubleshooting

Paper Handling

The following section guides you through problems in handling single sheets and continuous paper. If you are having problems using the optional cut sheet feeder or the pull tractor, refer to the section on Options starting on page 7-21.

Problem	Solution
Single sheets do not feed properly.	
The **LOAD/EJECT** *buttons was pressed, but the platen did* not *move and paper was not fed.*	You may be tring to feed paper using one of the control panel buttons while the printer is on line **(ON LINE** light is on). Press the **ON LINE** button once to set the printer off line, then feed the paper. After feeding the paper, press the **ON LINE** button again to set the printer on line. Refer to 3-4.
	The paper may be set too far to the right. If this is the case, the paper end detector cannot sense the paper. Move the left edge guide to its proper position, and reinsert the paper between the edge guides. Refer to 2-4.

Problem	**Solution**
Single sheets do not feed properly. (continued)	
The **LOAD/EJECT** button *was* pressed and *the* platen *rotated, but paper did not feed.*	The left and right edge guides may be placed too close together, preventing the paper from feeding smoothly. Adjust the position of the edge guides so that the paper can move up and down freely. Refer to 2-5.
	The paper may not be firmly inserted into the paper path. When feeding thicker than normal paper, push down lightly on the paper while you press the **LOAD/EJECT** button.
	Paper select may not be set to Friction. Make sure that the display on the control panel shows Friction. If not, set the pritner off line and press the **PAPER SELECT** button until the Friction is displayed on the panel.
	The dimensions of the paper you are trying to use may exceed the specified limitations of the printer. Make sure that the paper sizes that are within the specified range.

Problem	Solution
The paper feed is crooked.	The paper guide may not be attached or it may not be in the correct position. When printing on single sheets, use the paper guide in its upright position. Refer to 2-18.
	The left and right edge guides may be placed too far apart. Adjust the edge guides to match the width of your paper.
The paper does not fully eject.	You may be trying to eject the paper using the **FORM FEED** button. The paper may not be fully ejected if you use the **FORM FEED** button. Always press the **LOAD/EJECT** button to eject the paper.

Problem	Solution
Continuous paper does not feed properly.	
The **LOAD/EJECT** *button was pressed and the platen rotated, but paper did not feed.*	Paper select may not be set to Tractor. Take the printer off line and press the **PAPER SELECT** button until the display shows Tractor. Refer to 2-9. The paper may not have been set correctly in the push tractor. Set the paper again to the tractor.
The paper feed is crooked or the paper jams.	The paper guide may be in the upright position. When using continuous paper, make sure that the paper guide is lowered so that it can act as a paper separator. Refer to 2-13.
	The paper may be caught on the edge guides. When using continuous paper, make sure that the paper guide is closed and the edge guides are positioned at the center of the paper's width. Refer to 2-13.
	The holes on either side of the paper may not be aligned. Reposition the paper on the tractor pins. Refer to 2-12.

7-16 Troubleshooting

Problem	Solution
	The position of the sprocket units may not match the width of the paper. Position the right sprocket unit to remove any excess slack across the paper. **Refer to 2-13.**
	The sprocket levers may be unlocked or the sprocket covers may be open. Position the sprocket units to match the width of your paper then lock them in place by pressing the sprocket lock levers **forward.** Refer to 2-13.
	Something may be obstructing your paper supply. Make sure that the paper can feed smoothly into the printer. Refer to 2-8.
	The position of your paper supply may be preventing it from feeding straight into the printer. Position the stack of incoming new paper and outgoing printed paper so that the paper feeds straight. Refer to 2-8.
	The supply of paper may be too far from the printer. Position the paper supply so that it is less than a meter away. Refer to **2-8.**

Problem	Solution
Continuous paper does not feed properly. (continued)	You may have pressed the **LOAD/EJECT** button with continuous paper already set at the loading position. Pressing the **LOAD/EJECT** button with continuous paper already loaded in the printer causes the paper to be ejected. If this happens, press the **LOAD/EJECT** button once more to reload the paper. Refer to **2-14.**
Regular gaps appear in the printout.	The skip over perforation may be set with SelecType. Enter SelecType and turn off the skip over perforation feature. Refer to 3-19.
Skip over perforation is set, but the perforation does not fall in the center of *the skip.*	The page length for continuous paper may not be set correctly. Change the page length with your software program. You can also use the ESC C n or ESC C 0 n command to specify the page length.
	The loading position of the paper may be too high or too low. Use the micro-adjustment feature to reset the loading position so that the perforation is centered within the skip area.

Problem	Solution
	Your application program may be setting the top and bottom margins. If this is the case, use SelecType to turn off skip over perforation feature.
The loading position of the paper shifts slightly while printing several pages.	The paper you are trying to feed may be too heavy for the built-in push tractor. When highly accurate paper feeding is necessary, such as when printing on preprinted forms, it is recommended that you use the optional pull tractor.
After printing stops, the continuous paper feeds forward automatically.	The short tear-off function may be selected. When you resume printing the paper feeds backward to its loading position. If you do not need this function, use SelecType to turn it off. Refer to 3-23.
The short tear-off feature does not operate properly.	The AUTO TEAR OFF option may not be on. Check the AUTO TEAR OFF setting in SelecType. (Make sure it is on.) Refer to 3-11.
	All of the data in the buffer may not have been printed. The short tear-off feature feeds the page forward only after all of the data in the buffer has been printed and the paper is at the top of form position. If short tear-off does not work even when AUTO TEAR OFF is on, send an FF (Form Feed command) to the printer. Refer to 3-23.

Problem	Solution
Continuous paper does not feed properly. (continued)	
The **LOAD/EJECT** button is *pressed to eject the paper, but* the *paper does not fully eject or it jams.*	You may have tried to back feed too many pages. Before ejecting the paper, always remove the last printed page. Refer to 2-17.

Options

Problem	Solution
Using the cut sheet **feeder, the paper does not feed properly.**	
The **LOAD/EJECT** *button is pressed, but the platen does not move and the paper does not feed.*	You may be pressing the **LOAD/EJECT** button while the printer is on line. Always put the printer off line before feeding the paper. Paper feeds automatically when the cut sheet feeder receives a print command from the computer (only while the printer is on line).
After a print command is sent from the computer, the platen does not move *and the paper does not feed.*	The printer may be off line. Press the **ON LINE** button to put the printer on line.
After a print command is sent *from the computer, the platen rotates, but paper does not feed. The* **PAPER OUT** *light is on.*	The paper select may not be set to the cut sheet feeder. Use the paper select button to select the cut sheet feeder (CSF bin 1 or CSF bin 2). If you are using a double-bin cut sheet feeder, make sure that the correct bin number displays on the display panel. Refer to 5-7.

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly. (continued)	

The cut sheet feeder may be incorrectly installed on the printer. Remove and reinstall the cut sheet feeder making sure that the mounting notches are properly mated with the pins on the printer. Refer to 5-3.

The cut sheet feeder may be out of paper. Load more paper in the cut sheet feeder's bin.

The paper set levers of the cut sheet feeder may not be pushed back. After loading a stack of paper in the cut sheet feeder, make sure to push the paper set levers back. Refer to 5-6.

The two small levers on the paper guides may not be set correctly. When printing envelopes, push down on the two small levers until they lock into position.

The left and right paper guides may be placed too close together and are preventing the paper from feeding smoothly. Adjust the position of the paper guides so that the paper can move up and down freely. Refer to 5-6.

Problem	Solution
Two or more sheets feed *at the same time.*	There may be too many sheets of paper in the cut sheet feeder's bin. The bin can hold a maximum of 150 sheets of paper ($82g/m^2$). Remove some of the excess sheets. Refer to 5-2.
	The stack of paper may not have been loosened sufficiently. Before loading a stack of paper, be sure to fan it sufficiently and align the edges of the stack. Refer to 5-5.
The paper feed is crooked.	The paper may be old or creased. Discard it and load new, clean sheets of paper.
	You may not be using the proper size paper. Make sure to use paper sizes that are within the range specified in Chapter 8. Refer to 8-16.
You tried to manually insert a single sheet, but the sheet was not fed.	The single sheet may have been inserted in the wrong place. Check the triangle mark and insert the sheet again. Refer to 5-17.

Problem	Solution
Using the pull tractor in combination with the push tractor, continuous paper does not feed properly.	
The **FORM FEED** *or* **LINE FEED** *button was pressed, but the paper does not feed at all. (Platen does not move.)*	The printer may be on line. Before using the control panel buttons to feed the paper, always put the printer off line **(ON LINE** light is out.)
Paper feed is crooked or the paper jams.	Something may be obstructing your paper supply. Make sure that the paper can feed smoothly into the printer. Refer to 2-8.
	The supply of paper may be too far from the printer. Position the paper supply so that it is less than a meter away. Refer to 2-8.
	The pull tractor and push tractor sprocket units may not be aligned. Align both tractors and resume printing.
	The paper may be slack. Adjust the position of the sprocket units to take up any slack across the width of the paper. Remove slack lengthwise by pressing in and rotating the knob on the right of the pull tractor. Refer to 5-28.

Problem	Solution
	You may not be using the proper paper. Make sure to use the paper within the specified range. Refer to 8-3.
*Several lines **of** space **occur** in the printout.*	Skip over perforation may be set. Turn off the skip over perforation feature by SelecType. Refer to 3-10.
Skip over perforation is set, but the skip has shifted from the perforation, or the perforation does not fall in the center of the skip.	The page length for one page of the continuous paper may be set incorrectly. Set the page length correctly by using the Selectype. You can also use the ESC C n or ESC C 0 n command to specify the page length.
	The loading position of the paper may be too high or too low. Use the micro-adjustment feature to reset the loading position so that the perforation is centered within the skip area.
After printing stops, the continuous paper feeds forward automatically.	The short tear-off function may be selected. The short tear-off function cannot be used with the pull tractor. Use SelecType to turn off this function. Refer to 3-10.
*When **LOAD/EJECT** button was pressed to eject paper, the paper paper comes off the pull tractor sprocket units.*	When **the** paper select is set to Tractor, the paper feeds backward to eject. When using the pull tractor, press the **FORM FEED** button fo feed the paper forward to eject.

Problem	Solution
Using an optional interface, the printer does not operate properly.	
The printer does not print or the printout is not what you expected.	The interface may not be installed correctly. Turn off the printer and check that the interface board is correctly inserted into the connector on the main board.
	You may be using the wrong interface. Check the specifications to make sure that you can use the interface with this printer.
	The DIP switches or jumpers on the interface board may be set wrong. See the interface manual for the correct settings. Before changing the settings, however, make sure the printer is turned off and the power cable is unplugged.
	The interface may not be configured correctly to operate with the computer. See your computer manual for the correct settings.
	The computer and interface settings may not match. Make sure to match the settings for each condition.

If the printer still does not operate properly after checking the above points, run a self test of the interface to make sure that there are no on-board defects. If any abnormality is found, contact your dealer.

Chapter 8
Technical Specifications

Printer specifications

Printing

Printing method: 24-nozzle dot matrix
Printing speed: See table below.

Quality	Characters per inch	Characters/second/line
Draft	10	500
	12	600
Letter Quality	10	165
	12	198

Printing direction: Bidirectional logic-seeking for both text and graphic printing. Unidirectional available through SelecType or software command.

Line spacing: l/6-inch, l/8-inch or programmable in increments of 1/60th, 1/18Oth or 1/360th of an inch.

Printable columns: See table below.

Character size	Maximum printed characters	
	W-850	SQ-2550
IO cpi	80	136
IO cpi double-width	40	68
10 cpi condensed	137	233
12cpi	96	163
12 cpi double-width	48	81
12 cpi condensed	160	272
15 cpi	120	204
15 cpi double-width	60	102
Proportional		
(maximum width character)	68	116
(minimum width character)	160	272

Buffer: 8K bytes

Character fonts:

Font		Available sizes (characters per inch)
EPSON	Draft	10, 12, 15, 17, 20
EPSON	Roman	IO, 12, 15, 17, 20, Proportional
EPSON	Sans Serif	10, 12, 15, 17, 20, Proportional
EPSON	Courier	10, 12, 15, 17, 20, Proportional
EPSON	Prestige	10, 12, 15, 17, 20, Proportional
EPSON	Script	IO, 12, 15, 17, 20, Proportional
EPSON	OCR-A	IO, 12, 17, 20, Proportional
EPSON	OCR-B	10, 12, 17, 20, Proportional
EPSON	Orator	10, 12, 17, 20, Proportional
EPSON	Orator-S	10, 12, 17, 20, Proportional

Character tables: 96 standard ASCII characters.
15 international character sets
EPSON Extended Graphics characters

Paper

Paper feed methods: Friction
Built-in push feed tractor
Pull tractor (optional)
Single-bin cut sheet feeder (optional)
Double-bin cut sheet feeder (optional)

Paper width:	**SQ-850**	**SQ-2550**
Single sheets	**182** to 257 mm	**182** to 364 mm
	(7.2 to 10.1 inches)	(7.2 to 14.3 inches)
Continuous	101 to 279 mm	101 to 406 mm
	(4.0 to 16.0 inches)	(4.0 to 11 .0 inches)

Envelope	No.6 (165 x 92 mm)
	(6.5 inches x 3.625 inches)
	No.10 (241 x 105 mm)
	(9.5 inches x 4.125 inches)
Label	63.5 x 23.8 mm (2.5 x 0.94 inches)
	101.6 x 23.8 mm (4.0 x 0.94 inches)
	101.6 x 36.5 mm (4.0 x 1.44 inches)

Paper length:
Single sheets   94 to 364 mm (3.7 to 14.3 inches)

Printable area:
Single sheet

8.5 *mm (0.33 ") or more*

3 mm (0.12 ")
or more-   *3 mm (0.12")*
or more

Printable area

25 *mm (0.98") or more*

8-4 Technical Specifications

Continuous paper

8.5 mm (0.33 ")
or more
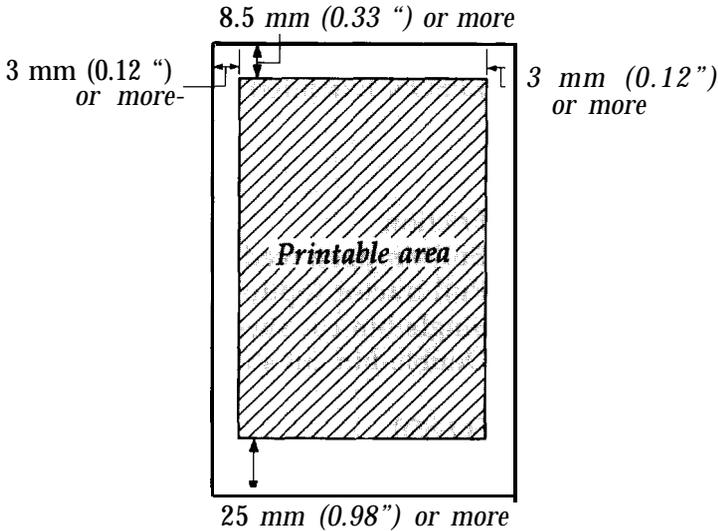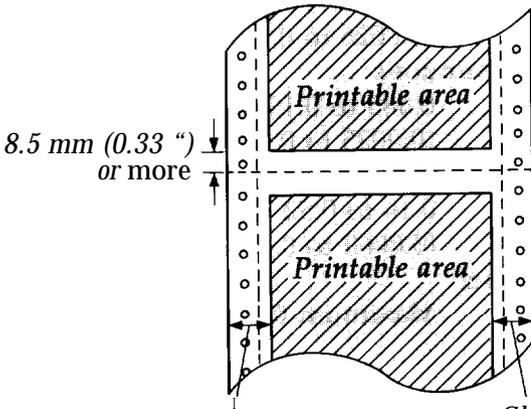
SQ-850
101 to 228 mm (0.4 to 9.0") paper width
13 mm (0.51") or more
254 mm (10") paper width
21 *mm (0.82 ") or more*
279 mm (11") paper width
46 mm (1.81") or more

Sh-2550
101 to 382 mm (4.0 to 15.0")
paper width
13 mm (0.511 ") or more
406 mm (16 ") paper width
31 mm (1.22 ") or more

Envelope

8.5 mm
(0.33") or more

25 mm
(0.98") or more

3 mm
(0.12") or more
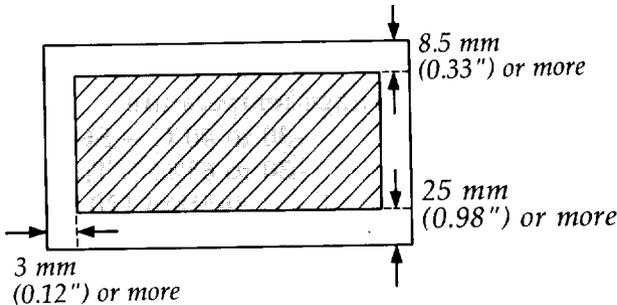
Paper feed *speed:*   Approximately 62 ms/line at l/6 inch
line spacing;
4.0 ips (continuous)

Paper thickness:	Single sheets
	0.065 to 0.10 mm
	(0.0026 to 0.004 inches)

Paper thickness: Single sheets
        0.065 to 0.10 mm
        (0.0026 to 0.004 inches)
Continuous
        0.065 to 0.10 mm
        (0.0025 to 0.004 inches)
Envelope
        0.16 to 0.52 mm
        (0.0063 to 0.0205 inches)
Label
        Maximum 0.19 mm (0.0075 inches)

Mechanical

Ink Cartridge: Print capacity (depending on number of cleaning operations)
        Draft: 6 million characters
        Letter Quality: 3 million characters
Color and type
        Black ink, exclusive to the
        SQ-850/2550 (SO20002)
Ink capacity
        105 to 115 cc
Ink life
        2 years from production date
Storage temperature
        -30 to 40°C -- Storage
        -30 to 65°C -- Transit
            (within 120 hours at 65°C)
            (within a month at 40°C)

 WARNING -- **Skin and Eye Irritant**
This ink contains potassium hydroxide, and may cause
irritation on contact with skin and eyes. Please take
the following precautions.
- Avoid contact with skin and eyes. Should ink get
  into eyes, flush immediately with water and contact
  a physician. Wash all traces of in from skin
  thoroughly with soap and water after handling the
  cartridge. If irritation occurs, contact a physician.
- Do not dismantle the cartridge.
- Keep out of reach of children.

Reliability: MCBF:
           For all components excluding
           print head: 5 million lines
       MTBF:
           SQ-850   4000 power-on hours
                       (at 25% duty)
           SQ-2550 6000 power-on hours
                       (at 25% duty)
       Print head life:
           2000 million dots/nozzle

External Dimensions: SQ-850   SQ-2550
       Height: 177 mm   177 mm
       Width :   537 mm   664 mm
       Depth :   449.6 mm   449.6 mm
       Weight: approx. 12.0 kg   approx. 14.4 kg

Electrical

Voltage:	120V AC ±10% (120V model)
	220V AC ±10% (220V model)
	240V AC ±10% (240V model)
Power *consumption:*	35W (draft self-test printing)
Frequency:	50 ± 0.5 Hz
	60 ± 0.5 Hz
Insulation resistance:	10 M ohms between AC power line and chassis.
Dielectric strength (between AC line and shassis):	120 V model can withstand 1.25 kV rms applied for one minute. 220/240 V model can withstand 3.75 kV rms applied for one minute.

Environment

Temperature:	Operation:	5°C to 35°C
	Storage:	-30°C to 40°C
		-30°C to 65°C (with shipment container)
		(within 120 hours at 65°C)
		(within a month at 40°C)
Humidity:	Operation:	10% to 80% without condensation
	Storage:	5% to 85% without condensation

8-8 Technical Specifications

Shock:	Operation:	Up to 1 G within 1 ms
	Storage:	Up to 2 G within 1 ms
Vibration:	Operation:	Up to 0.15 G at 10 to 55 Hz
	Storage:	Up to 0.50 G at 10 to 55 Hz

Interface Specifications

Parallel interface

Your printer is equipped with both a parallel and a serial interface.

Connector pin assignments and a description of their respective interface signals are shown in the following table.

Signal Pin	Return Pin	Signal	Direction	Description
1	19	STROBE	IN	STROBE pulse to read data. Pulse width must be more than 0.5 microseconds at the receiving terminal.
2	20	DATA 1	IN	These signals represent information of the 1st to 8th bits of parallel data, respectively. Each signal is at HIGH level when data is logical 1 and LOW when it is logical 0.
3	21	DATA 2	IN	
4	22	DATA 3	IN	
5	23	DATA 4	IN	
6	24	DATA 5	IN	
7	25	DATA 6	IN	
8	26	DATA 7	IN	
9	27	DATA 8	IN	
10	28	ACKNLG	OUT	About a 12-microsecond pulse. LOW indicates that data has been received and that the printer is ready to accept more data.
11	29	BUSY	OUT	A HIGH signal indicates that the printer cannot receive data. The signal goes HIGH in the following cases: 1) During data entry (ea. char. time) 2) During printing 3) When off line 4) During printer-error state
12	30	PE	OUT	A HIGH signal indicates that the printer is out of paper.
13	—	SLCT	OUT	Pulled up to +5 volts through 3.3K ohm resistance.

8-10 Technical Specifications

Signal Pin	Return Pin	Signal	Direction	Description
14	—	AUTO FEED XT	IN	When this signal is LOW, the paper is automatically fed 1 line after printing. (The same effect can be achieved by setting SelecType.)
15	—	NC	—	Unused.
16	—	GND	—	Logic ground level.
17	—	CHASSIS GND	—	Printer's chassis ground, which is isolated from the logic ground.
18	—	NC	—	Unused.
19-30	—	GND	—	Twisted-pair return signal ground level.
31	—	INIT	IN	When this level becomes LOW, the printer controller is reset to its power-up state and the print buffer is cleared. This level is usually HIGH; its pulse width must be more than 50 microseconds at the receiving terminal.
32		ERROR	OUT	This level becomes LOW when the printer is: 1) in paper out state. 2) off line. 3) in error state.
33	-	GND		Same as for Pins 19-30.
34		NC		Unused.
35			OUT	Pulled up to +5V through 3.3K ohm resistance.
36		SLCT IN	IN	The DCI/DCS code is valid only when this signal is HIGH. (The same effect can be achieved by setting SelecType.)

The column heading "Direction" refers to the direction of signal flow as viewed from the printer.

"Return" denotes the twisted-pair return, to be connected at signal ground level. For the interface wiring, be sure to use a twisted-pair cable for each signal and to complete the connection on the return side.

All interface conditions are based on TTL level. Both the rise and the fall times of each signal must be less than 0.2 microseconds.

Data transfer must be carried out by observing the $\overline{\text{ACKNLG}}$ or BUSY signal. (Data transfer to this printer can be carried out only after receipt of the $\overline{\text{ACKNLG}}$ signal or when the level of the BUSY signal is LOW.)

Interface timing
The figure below shows the timing for the parallel interface.

8-12 Technical Specifications
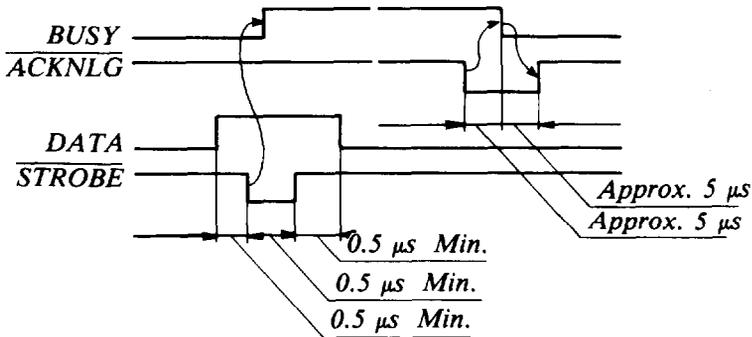
Printing enabledldisabled signals and control conditions
The table below shows the relationship between printing being
enabled or disabled, the on line/off line status, the printer
select signal ($\overline{\text{SLCT IN}}$), and the receipt of data on/off control
characters, DC1 /DC3.

ON LINE (Indicator on)	SLCT IN	DCI/DC3 (Data on/off control)	ERROR	BUSY	ACKNLG	Printing (Disabled, enabled)
on line	Low	DCI/DC3 (no effect)	High	High/Low	Pulsed ea. char.	Enabled (normal cond.)
on line	High	DC1 ** Recv'd	High	High/Low	Pulsed ea. char.	Enabled
on line	High	DC3 ** Recv'd	High	High/Low	Pulsed ea. char.	Disabled*
off line	High/Low (no effect)	DCI/DC3 (no effect)	Low	High	Not generated	Disabled

* While printing is disabled, data characters are received and
acknowledged so that the printer can look for another DC1
character, which allows it to resume printing.
** Enable only when the SelecType DCl/DC3 setting is On.

Serial interface

The built-in serial interface is an RS-232C asynchronous
interface with the following characteristics:

Data format

Start bit: lbit
Data word length: 8 bit
Parity bit: Odd, even or no parity
Stop bit: 1 bit or more
Baud rate   300, 600, 1200, 2400, 4800, 9600, 19200
                        bits per second.

Signal level

Mark (1)	3V to 27V
Space (0)	+3V to +27V

Handshaking

Handshaking by DTR signal or X-on/X-off. The DTR signal changes to mark - meaning the printer is not ready to receive data - when the number of bytes free in the input buffer drops to 256. The signal changes to space - meaning that the printer is now ready - when the number of bytes in the input buffer rises to 512.

Error handling

A * character is printed if a parity error is detected.
All other errors are ignored.

Connector

D-SUB 25-pin connector

In the table below, the direction of signals is given relative to the printer.

Pin number	Signal	Signal direction	Description
2	TXD	out	Transmits data for X-on/X-off
20	DIR	out	Whether or not the printer is ready to receive data
3	RXD	in	Receives data
7	SG	-	Signal ground level
1	FG	-	Printer chassis ground

Other pins are not used.

Options Specifications

Cut sheet feeders

Dimensions and weight:

	Width	Depth	Hight	Weight
C80608 1	537 mm	508 mm -	470 mm	approx. 2.6 kg
C806091	664 mm	508 mm	470 mm	approx. 3.2 kg
C806101	537 mm	608 mm	470 mm	approx. 3.5 kg
C806111	664 mm	608 mm	470 mm	approx. 5.6 kg

*Dimensions are mesured in mounting on the printer.

Bin capacity:

bin 1   Single sheet: Up to 150 sheets of 82 **g / m2**
Up to 185 sheets of 64 **g / m2**
(Total thickness should not exceed 15 mm)

Envelope*: Up to 25 (plain and bond type)
Up to 30 (airmail)

bin 2   Single sheet: Up to 150 sheets of 82 **g / m2**
Up to 185 sheets of 64 **g / m2**
(Total thickness should not exceed 15 mm>

* Envelopes can only be used in bin 1.

Stacker capacity:

Single sheet: Up to 100 sheets
Envelope: Up to 10 (plain, bond type and airmail)

Realiability: MCBF (Mean Cycle Between Failures):
100,000 cycles

**Environmental
condition:**

Temperature	Operation:	+5°C to +35°C
	Storage:	-30°C to +7O°C
Humidity	Operation:	15% to 80% without condensation
		15% to 70% (with envelopes)
	Storage:	5% to 90% without condensation
		5% to 70% (with envelopes)

Paper:

		Single sheet bin 1 and bin 2	Envelope bin 1
Width	C806081 C806091	182mm to 216mm (7.17" to 8.50")	166 to 241 mm (6.54" to 9.49")
	C806101 C806111	182 mm to 364 mm (7.17" to 14.33")	166 to 241 mm (6.54" to 9.49")
Length		210 mm to 305 mm (8.27" to 12.00")	92mm to 104mm (3.62" to 4.09")
Thickness		0.07 mm to 0.1 mm (0.0028" to 0.0039")	0.25 mm to 0.5 mm (0.0098" to 0.0195")
Weight		64 g/m^2 to 82 g/m^2 (17 lb to 22 lb)	45 g/m^2 to 91 g/m^2 (12 lb to 24 lb)

Printable area:

Single sheet

8.5 mm (0.33") or more

3 mm (0.12")
or more

3 mm (0.12")
or more

Printable area

25 mm (0.98") or more

Envelope

8.5 mm
(0.33") or more

25 mm
(0.98") or more
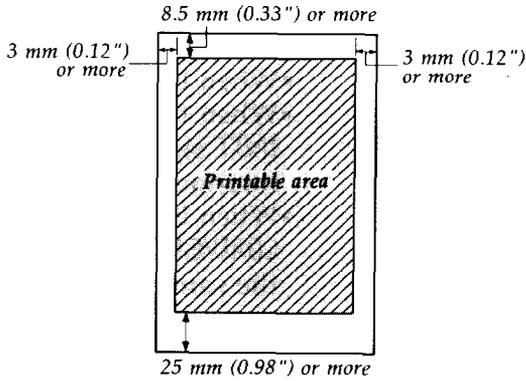
3 mm
(0.12") or more
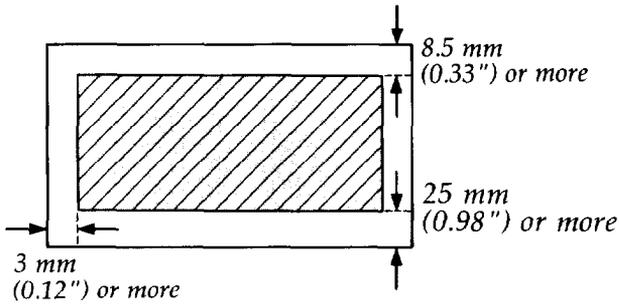
Storage condition: Temperature : 2
Humidity: **40%** to 60%

Initialization

There are four ways that the printer can be initialized (returned to a fixed set of conditions).

Hardware initialization
- When the power is turned on.
- When the printer receives an $\overline{\text{INIT}}$ signal at the parallel interface (pin 31 goes LOW).
- When both the **ON LINE** and **LOAD/EJECT** button is pressed at the same time.

Software initialization   &Software sends the ESC @ (initialize the printer) command.

These four kinds of initialization have slightly different effects. In particular, ESC @ does not initialize the printer mechanism, clear the input data buffer, or clear the user-defined character set.

Default settings

The table below shows the default conditions that become valid when the printer is turned on.

Item	Reset to.
Top of form position	Current paper position
Left and right margins	SelecType setting
Line spacing	SelecType setting
Vertical tab position	Cleared
Horizontal tab positions	Every eight characters
VFU channel	Channel 0
Font selection	SelecType setting
Justification	Left justification
Character spacing	SelecType setting
Special printing effects	Cancelled
User-defined characters	Hardware: Cleared Software: Deselected only
Graphic mode assignment	ESC K = ESC * 0,&C L = ESC * 1 ESC Y = ESC * 2, ESC Z = ESC * 3

In addition, when the printer is initialized by turning on its power, using an $\overline{\text{INIT}}$ signal, or resetting the printer with panel buttons, the data buffer is cleared of all text data.

Technical Specifications 8-19

Chapter 9
Command Summary

Using the Command Summary

This chapter lists and describes all the commands available on your printer.

The first part of this chapter lists all commands in numerical order and gives the page number where each is fully described. If you know which command you are looking for, consult the numerical list to find the number of the page where it is described.

Note: The Quick Reference Card at the end of this book contains a list of the commands divided by topic, with page references that direct you to full explanations of the commands.

The second part of this chapter lists and describes each command separately; the commands are divided into the following subjects:

Printer operation	Print enhancement
Data control	Word processing
Vertical motion	Character tables
Horizontal motion	User-defined characters
Overall printing style	Graphics
Print size and character width	

Each command has a format section and a comments section. The format section gives the ASCII, decimal, and hexadecimal codes for this command. The comments section describes the effect of the command and gives any additional information necessary for using it.

The format section includes:
    ASCII: the sequence in standard ASCII characters
    Decimal: the sequence in decimal numbers
    Hexadecimal: the sequence in hexadecimal numbers

All three formats are equivalent, and it should be easy to pick the one most suited to your purpose. For instance, a BASIC programmer might refer to the first and second formats, a word processor might **use** the second, and a machine code programmer would use the third format. Variables are represented by italicized letters such as n, nl, and m. The valiables are explained in the comments section.

> **Note:** Some application programs can use control key sequences to send commands to the printer. See the Control Key chart on page 9-4 for more information.

The simplest type of command consists of sending a single character to the printer. For instance, to print in condensed mode, you send the code 15. The code format is:

ASCII code: SI
Decimal: 15
Hexadecimal: OF

More complex commands consist of two or more character codes. For example, to print in proportional mode the code format is:

ASCII code: ESC p n
Decimal: 27   112 n
Hexadecimal: 1B   70   n

In this case, n can be either 1 (ON) or 0 (OFF), to begin or end proportional printing. To turn ON proportional printing from BASIC, the command is:

LPRINT CHR$(27);CHR$(112);CHR$(l)

For the following commands that use only 0 or 1 for the variable, either the ASCII codes 0 and 1 or the ASCII characters 0 and 1 can be used:

ESC U, ESC x, ESC p, ESC W, ESC S, ESC -,
ESC %, and ESC w.

For example, in BASIC you can turn on double-width with either of these statements:
LPRINT CHR$(27);"W";CHR$(l) ------ ASCII code
LPRINT CHR$(27);"W";"l" ------------ ASCII character

These BASIC commands correspond to the printer commands below:
ESC W SO or ESC Wl

Control key chart

Some application programs can use control key codes for decimal values 0 through 27. The table below gives you the proper values. The Control Key column indicates that you press the control key at the same time you press the key for the letter or symbol in that column. For example, you press the control key and A at the same time to send the value 1.

> **Note:** Many programs use the control keys for other purposes. Also, some programs do not use all of these keys.

Dec.	Hex.	Ctrl. Key	Dec.	Hex.	Ctrl. Key
0	00	@	14	0E	N
1	01	A	15	0F	0
2	02	B	16	10	
3	03	C	17	11	i
4	04	D	18	12	R
5	05	E	19	13	S
6	06	F	20	14	T
7	07	G	21	15	U
8	08	H	22	16	V
9	09		23	17	W
10	0A	5	24	18	X
11	0B	K	25	19	Y
12	0C	L	26	1A	Z
13	0D	**M**	27	1B	[

Commands in Numerical Order

The following list shows control codes and ESC sequences (with their decimal and hexadecimal values), and the page number where the complete command can be found.

ASCII	Dec.	Hex.	Description	Page
BEL	7	07	Beeper	9-12
BS	8	08	Backspace	9-20
HT	9	09	Tab Horizontally	9-22
LF	10	0A	Line Feed	9-15
VT	11	0B	Tab Vertically	9-17
FF	12	0C	Form Feed	9-13
CR	13	0D	Carriage Return	9-12
SO	14	0E	Select Double-width Mode (one line)	9-27
SI	15	0F	Select Condensed Mode	9-26
DC1	17	11	Select Printer	9-8
DC2	18	12	Cancel Condensed Mode	9-27
DC3	19	13	Deselect Printer	9-9
DC4	20	14	Cancel Double-width Mode (one line)	9-28
CAN	24	18	Cancel Line	9-12
DEL	127	7F	Delete Character	9-9
ESC SO	14	0E	Select Double-width Mode (one line)	9-28
ESC SI	15	0F	Select Condensed Mode	9-27
ESC EM	25	19	Cut Sheet Feeder Control	9-10
ESC SP	32	20	Set Intercharacter Space	9-35
ESC !	33	21	Master Select	9-24
ESC #	35	23	Cancel MSB Control	9-11
ESC $	36	24	Set Absolute Print Position	9-21
ESC %	37	25	Select User-defined Set	9-39
ESC &	38	26	Define User-defined Characters	9-38

ASCII	Dec.	Hex.	Description	Page
ESC (-	40	28	Select Line	9-33
ESC *	42	2A	Select Graphics Mode	9-42
ESC +	43	2B	Set n/360-inch Line Spacing	9-16
ESC -	45	2D	Turn Underlining Mode On/Off	9-31
ESC /	47	2F	Select Vertical Tab Channel	9-19
ESC 0	48	30	Select 1 /&inch Line Spacing	9-15
ESC 2	50	32	Select l/6-inch Line Spacing	9-16
ESC 3	51	33	Set n/180-inch Line Spacing	9-16
ESC 4	52	34	Select Italic Mode	9-36
ESC 5	53	35	Cancel Italic Mode	9-37
ESC 6	54	36	Enable Printable Characters	9-39
ESC 7	55	37	Enable Upper Control Codes	9-40
ESC :	58	3A	Copy ROM into RAM	9-38
ESC <	60	3C	Select Unidirectional Mode (one line)	9-9
ESC =	61	3D	Set MSB to 0	9-11
ESC >	62	3E	Set MSB to 1	9-11
ESC ?	63	3F	Reassign Graphics Mode	9-42
ESC @	64	40	Initialize Printer	9-8
ESC A	65	41	Set n/GO-inch Line Spacing	9-17
ESC B	66	42	Set Vertical Tabs	9-18
ESC C	67	43	Set Page Length in Lines	9-13
ESC C 0	67	43	Set Page Length in Inches	9-14
ESC D	68	44	Set Horizontal Tabs	9-22
ESC E	69	45	Select Emphasized Mode	9-29
ESC F	70	46	Cancel Emphasized Mode	9-29
ESC G	71	47	Select Double-strike Mode	9-30
ESC H	72	48	Cancel Double-strike Mode	9-30
ESC J	74	4A	Perform n/180-inch Line Feed	9-17
ESC K	75	4B	Select Single-density Graphics Mode	9-40
ESC L	76	4C	Select Double-density Graphics Mode	9-41

9-6 Commend Summary

ASCII	Dec.	Hex.	Description	Page
ESC M	77	4D	Select 12 cpi	9-25
ESC N	78	4E	Set Skip Over Perforation	9-14
ESC 0	79	4F	Cancel Skip Over Perforation	9-15
ESC I'	80	50	Select 10 cpi	9-25
ESC Q	81	51	Set Right Margin	9-20
ESC R	82	52	Select an International Character Set	9-37
ESC SO	83	53	Select Superscript Mode	9-30
ESC Sl	83	53	Select Subscript Mode	9-31
ESC T	84	54	Cancel Superscript/Subscript Mode	9-31
ESC U	85	55	Turn Unidirectional Mode On/Off	9-10
ESC W	87	57	Turn Double-width Mode On/Off	9-28
ESC Y	89	59	Select High-speed Double-density Graphics Mode	9-41
ESC Z	90	5A	Select Quadruple-density Graphics Mode	9-41
ESC \	92	5C	Set Relative Print Position	9-21
ESC a	97	61	Select Justification	9-35
ESC b	98	62	Set Vertical Tabs in Channels	9-18
ESC g	103	67	Select 15 cpi	9-25
ESC k	107	6B	Select Typestyle Family	9-23
ESC 1	108	6C	Set Left Margin	9-19
ESC p	112	70	Turn Proportional Mode On/Off	9-26
ESC q	113	71	Select Character Style	9-32
ESC t	116	74	Select Character Table	9-36
ESC w	119	77	Turn Double-height Mode On/Off	9-29
ESC x	120	78	Select Letter Quality or Draft	9-23

Commands Arranged by Topic

The following section lists and describes all the commands by topic. See the Quick Reference Card at the end of the book for the list of the commands by topic.

Printer Operation

ESC 63   Initialize Printer

Format:

```
ASCII code: ESC @
Decimal:       27   64
Hexadecimal: 1B  40
```

Comments:

Resets the printer mode and clears the current print line preceding the command. See initialization in Chapter 8.

DC1   Select Printer

Format:

```
ASCII code: DC1
Decimal:       17
Hexadecimal: 11
```

Comments:

Returns the printer to the selected state if it has been deselected by the printer deselect code (DC3). Does not select the printer if it has been switched off line by pressing the **ON LINE** button. The selected state can also be fixed using a SelecType setting.

DC3   Deselect Printer

Format:

ASCII code: DC3
Decimal: 19
Hexadecimal: 13

Comments:

Puts the printer into the deselected state until the select
printer code (DCl) is received. The printer cannot be
reselected with the ON LINE button. If the selected state has
been fixed by SelecType, this code is ignored.

DEL   Delete Character

Format:

ASCII code: DEL
Decimal: 127
Hexadecimal: 7F

Comments:

Removes the last text character on the print line but does not
affect control codes.

ESC <   Select Unidirectional Mode (one line)

Format:

ASCII code: ESC <
Decimal: 27   60
Hexadecimal: 1B 3C

Comments:

Printing is normally bidirectional. This command selects
unidirectional printing for one line only. (It is cancelled by a
carriage return.) The print head moves to the extreme left
(home) position and printing takes place from left to right.

<u>ESC U</u>   Turn Unidirectional Mode On/Off

Format:

```
ASCII   code:   ESC   U   n
Decimal:        27    85  n
Hexadecimal: 1B 55 n
```

Comments:

The following values can be used for n:

1: Mode is turned ON.

0: Mode is turned OFF.

Printing is normally bidirectional. This command selects unidirectional printing for more accurate positioning during text printing. This setting can also be performed by SelecType.

<u>ESC EM</u>   Cut Sheet Feeder Control

Format:

```
ASCII code:   ESC   EM   n
Decimal:      27    25   n
Hexadecimal: 1B 19 n
```

Comments:

The following values can be used for n:

1: Loads sheet from bin 1.

2: Loads sheet from bin 2.

R: Ejects a sheet. (No paper is loaded).

The command should not be used unless the cut sheet feeder is installed. It is ignored if any value other than 1, 2, or R is used for n.

The ON/OFF status of the cut sheet feeder mode and the selection of bin 1 or 2 can also be selected by the **PAPER SELECT** button.

MSB Control

MSB is the Most Significant Bit. MSB control (ESC =, ESC >, and ESC #) does not work for graphics or user defined characters.

ESC = (equal)   Set MSB to 0

Format:

  ASCII code: ESC =
  Decimal: 27   61
  Hexadecimal: 1B 3D

Comments:

  Sets the MSB of all incoming data to 0. Some computers always send data with the MSB set to 1, which means that italics or character graphics will always be printed. ESC = can overcome this problem.

ESC >   Set MSB to 1

Format:

  ASCII code: ESC >
  Decimal: 27   62
  Hexadecimal: 1B 3E

Comments:

  Sets the MSB bit of all incoming data to 1.

ESC #   Cancel MSB Control

Format:

  ASCII code: ESC #
  Decimal: 27   35
  Hexadecimal: 1B 23

Comments:

  Cancels the MSB control set by ESC = or ESC >.

BEL   Beeper

Format:

    ASCII code: BEL
    Decimal: 7
    Hexadecimal: 07

Comments:
    Sounds the printer's beeper.

Data Control

CR   Carriage Return

Format:

    ASCII code: CR
    Decimal: 13
    Hexadecimal: **OD**

Comments:
    Prints the data in the buffer and returns the print position to
    the left margin. A line feed may be added if the $\overline{\text{AUTO FEED}}$
    XT line on the parallel interface is held LOW. This can also
    be performed by the SelecType **AUTO LINE FEED** setting.

CAN   Cancel Line

Format:

    ASCII code: CAN
    Decimal: 24
    Hexadecimal: 18

Comments:
    Removes all text on the print line, but does not affect control
    codes.

Vertical Motion

FF   **Form Feed**

Format:

  ASCII code: FF
  Decimal: 12
  Hexadecimal: OC

Comments:

  Prints the data in the print buffer and advances the paper to the top of the next form according to the current page length. Page length can be changed with ESC C. In the cut sheet feeder mode, an FF ejects a sheet but does not load one.

ESC C   **Set Page Length in Lines**

Format:

  ASCII   code: ESC   C   *n*
  Decimal: 27   67   *n*
  Hexadecimal: 1B 43 *n*

Comments:

  Sets the page length to *n* lines in the current line spacing. The value of n must be from l-127 lines. The top of form position is set to the current line. Overrides the SelecType PAGE TRACTOR, PAGE CSF BN1, or PAGE CSF BN2 setting.

ESC C 0   Set Page Length in Inches

Format:

```
ASCII    code:  ESC   C   0   n
Decimal:        27    67  0   n
Hexadecimal:    1B    43  00  n
```

Comments:

Sets the page length to n inches. The value of n must be froml-22. The top of form position is set to the current line. Overrides the SelecType PAGE TRACTOR, PAGE CSF BN1 , or **PAGE CSF BN2 setting.**

ESC N   Set Skip Over Perforation

Format:

```
ASCII   code:  ESC  N  n
Decimal:       27   78  n
Hexadecimal:   1B  4E  n
```

Comments:

The variable n is the number of lines skipped between the last line printed on one page and the first line on the next page. For example, with the standard settings for line spacing (l/6-inch) and page length (66 lines), ESC N 6 prints 60 lines and then skips 6. This setting is cancelled by ESC 0, ESC C or ESC C 0. The value of n must be from 1-127. Overrides the SelecType 1' SKIP setting.

ESC 0   Cancel Skip Over Perforation

Format:

```
ASCII code: ESC 0
Decimal:     27   79
Hexadecimal: 1B  4F
```

Comments:

Cancels the skip over perforation set by ESC N. Overrides the SelecType 1' SKIP setting.

LF   Line Feed

Format:

```
ASCII code: LF
Decimal:     10
Hexadecimal: 0A
```

Comments:

When this command is received, the data in the print buffer is printed and the paper advances one line in the current line spacing.

ESC 0   Select 1 /S-inch Line Spacing

Format:

```
ASCII code: ESC 0
Decimal:     27   48
Hexadecimal: 1B  30
```

Comments:

Sets the line spacing to l/8th of an inch for subsequent line feed commands. The 0 is the character zero and not decimal code 0. Overrides the SelecType LINE SPACING setting.

ESC 2   Select l/6-inch Line spacing

Format:

```
ASCII code: ESC 2
Decimal:     27  50
Hexadecimal: 1B 32
```

Comments:

Sets the line spacing to 1/6th of an inch for subsequent line feed commands. The 2 is the character two and not decimal code 2. This is the default at power on. Overrides the SelecType LINE SPACING setting.

ESC 3   Set n/180-inch Line Spacing

Format:

```
ASCII   code:  ESC   3    n
Decimal:        27   51    n
Hexadecimal: 1B 33 n
```

Comments:

Sets the line spacing to n/180th of an inch for subsequent line feed commands. The 3 is the character three and not decimal code 3. The value of n must be from O-255.

ESC +   Set n/360-inch Line Spacing

Format:

```
ASCII   code:  ESC   +    n
Decimal:        27   43    n
Hexadecimal: 1B 2B n
```

Comments:

Sets the line spacing to n/360th of an inch for subsequent line feed commands. The value of *n* must be from O-255.

ESC A   Set *n/60-inch* Line Spacing

Format:

  ASCII code: ESC A n
  Decimal: **27 65** *n*
  Hexadecimal: 1B 41 *n*

Comments:

  Sets the line spacing to n/60th of an inch for subsequent line
  feed commands. The value of n must be from O-85.

ESC J   Perform n/180-inch Line Feed

Format:

  ASCII code: ESC J *n*
  Decimal: **27 74** *n*
  Hexadecimal: 1B 4A *n*

Comments:

  Advances the paper n/180th of an inch. The value of n must
  be from O-255. This command produces an immediate line
  feed but does not affect subsequent line spacing and does not
  produce a carriage return.

VT   Tab Vertically

Format:

  ASCII code: VT
  Decimal: 11
  Hexadecimal: 0B

Comments:

  Advances the paper to the next tab setting in the channel
  selected by ESC /. If no channel has been selected, channel 0
  is used. If no vertical tabs have been set, the paper advances
  one line.

ESC B   Set Vertical Tabs

Format:

ASCII   code: ESC   B   *nl n2 . . . 0*
Decimal: *27   66   nl   n2 . . . 0*
Hexadecimal: 1B   *42   nl   n2 . . . 00*

Comments:

Sets up to 16 vertical tabs in the current line spacing. Tab
settings are not affected by subsequent changes in line
spacing. The tab settings are entered as *nl, n2,* etc., all from
l-255, in ascending order. The 0 character indicates the end
of the command. All settings are stored in channel 0 (see
ESC b). ESC B 0 clears the tab settings.

ESC b   Set Vertical Tabs in Channels

Format:

ASCII   code: ESC   b   c   *nl n2 . . . 0*
Decimal: *27   98   c   nl   n2 . . . 0*
Hexadecimal: 1B   62   c   *nl n2 . . . 00*

Comments:

Functions the same as ESC B, except that the variable c selects
a channel for the vertical tabs, which must be between O-7.
Therefore, up to eight sets of vertical tabs can be set. The
channels are selected by ESC ∕. To clear the tabs in channel c
use ESC b c 0.

ESC /   Select Vertical Tab Channel

Format:

```
ASCII   code:  ESC  /   c
Decimal:       27   47  c
Hexadecimal: 1B 2F c
```

Comments

This command is used to select the vertical tab channel, with the value of *c* from 0-7. All subsequent VT commands use the channel selected by this command.

Horizontal Motion

ESC 1   Set Left Margin

Format:

```
ASCII   code:  ESC  1   n
Decimal:       2 7  1 0 8 n
Hexadecimal: 1B 6C n
```

Comments:

Set the left margin to *n* columns in the current character size. Settings made in the proportional mode are treated as 10 cpi. This command clears previous tab settings and all previous characters in the print line. Use lowercase 1 (as in left), not the numeral one. The minimum space between the margins is the width of one double-width 10 cpi character.

This setting can also be performed by SelecType. Overrides the SelecType LEFT MARGIN setting.

ESC Q Set Right Margin

Format:

ASCII   code: ESC   Q   *n*
Decimal: 27   81   *n*
Hexadecimal: 18 51 *n*

Comments:

Sets the right margin to n columns in the current character
size. Settings made in the proportional mode are treated as
10 cpi. This command clears previous tab settings and all
previous characters in the print line. The minimum space
between the margins is the width of one double-width 10 cpi
character. Overrides the SelecType RIGHT MARGIN setting.

BS Backspace

Format:

ASCII code: BS
Decimal: 8
Hexadecimal: 08

Comments:

Prints out data in the print buffer, then moves the print
position one space to the left. Backspacing can be performed
up to, but not beyond, the left margin setting. Do not use BS
with the ESC a command.

ESC $ Set Absolute Print Position

Format:

   ASCII   code: ESC $ *nl*   *n2*
   Decimal: 27   36   *n1*   *n2*
   Hexadecimal: 1B   24   *nl*   *n2*

Comments:

   This sequence specifies the distance from the left margin that
   subsequent characters are to be printed, using this formula:
   total number of dots = *nl + (n2 x 256).* Each unit equals
   1/60th of an inch. The sequence is ignored and the previous
   setting remains effective if the position specified is beyond
   the right margin.

ESC \   Set Relative Print Position

Format:

   ASCII   code: ESC   \   *nl*   *n2*
   Decimal: 27   92   *nl*   *n2*
   Hexadecimal: 1B 5C *nl* *n2*

Comments:

   Determines the position (relative to the current position) at
   which printing of following data will start. To find nl and
   n2, first calculate the displacement required in dots. If the
   displacement is to the left, subtract it from 65536. Send the
   resulting number using this formula: total number of dots =
   nl + (256 x *n2).*

   The command is ignored if it would move the print position
   outside the current margins. A unit is l/120th of an inch in
   draft, and 1/180th of an inch in Letter Quality or
   proportional.

HT   Tab Horizontally

Format:

    ASCII code: HT
    Decimal: 9
    Hexadecimal: 09

Comments:

    Advances the print position to the next horizontal tab setting.
    The default settings are at intervals of eight characters in the
    currently selected character spacing. Tab positions are not
    affected by subsequent changes in character spacing.

ESC D   Set Horizontal Tabs

Format:

    ASCII code: ESC   D   *nl n2 . . .   0*
    Decimal: *27 68 nl n2 . . .   0*
    Hexadecimal: 1B   44   *nl n2 . . . 00*

Comments:

    This command allows setting of up to 32 horizontal tabs,
    which are entered as *nl, n2,* n3, etc. (from l-255) with the 0
    character terminating the command. The tab settings must be
    entered in ascending order. ESC D 0 clears all tabs. The
    settings on power up or after an ESC @ command are every
    eight characters. The tab settings do not change if the
    character spacing is changed, and for proportional printing
    the size of 10 cpi characters determines the tab positions.

Overall Printing Style

ESC x   Select Letter Quality or Draft

Format:

    ASCII code: ESC x *n*
    Decimal: 27 120 *n*
    Hexadecimal: 1B 78 *n*

Comments:

   The following values can be used for *n:*
   0: Selects the draft mode.
   1: Selects the Letter Quality (LQ) mode.

   Overrides the SelecType and control panel settings.

ESC k   Select Typestyle Family

Format:

    ASCII code: ESC k *n*
    Decimal: 27 107 *n*
    Hexadecimal: 1B 6B *n*

Comments:

   This command affects only the Letter Quality typestyle, not
   draft. If *n* = 0, the Roman typestyle in the printer is used. To
   select one of the eight other typestyles, use the family
   number of the font shown on the next page. For example, to
   choose the Prestige font, use 3 for n.

The following values can be used for n:
0: Roman
1: Sans Serif
2: Courier
3: Prestige
4: Script
5: OCR-B
6: OCR-A
7: Orator
8: Orator-S

Overrides the SelecType **FONT** and control panel settings.

ESC !   Master Select

Format:

ASCII   code: **ESC ! ** n
Decimal: **27   33**   *n*
Hexadecimal: 1B 21 *n*

Comments:

Selects any valid combination of **the** following modes: 10 cpi,
12 cpi, proportional, condensed, emphasized, double-strike,
double-width, italic, and underline. For details on how to set
n, see the section on selecting typestyles with Master Select in
Chapter 4.

Print Size and Character Width

ESC P   Select 10 cpi

Format:

  ASCII code: ESC P
  Decimal: 27   80
  Hexadecimal: 1B 50

Comments:
  Selects 10 cpi (10 characters per inch). Because 10 cpi is the
  default pitch, this command is normally used to cancel 12 cpi
  or 15 cpi. Overrides the SelecType PITCH and control panel
  settings.

ESC M   Select 12 cpi

Format:

  ASCII code: ESC M
  Decimal: 27   77
  Hexadecimal: 1B 4D

Comments:
  Selects 12 cpi (12 characters per inch). Overrides the
  SelecType **PITCH** and control panel settings.

ESC g   Select 15 cpi

Format:

  ASCII code: ESC g
  Decimal: **27 103**
  Hexadecimal: 1B 67

Comments:
  Selects 15 cpi (15 characters per inch), and cancels 10 cpi or
  12 cpi. 15 cpi cannot be combined with condensed.
  Overrides the SelecType PITCH and control panel settings.

ESC p   Turn Proportional Mode On/Off

Format:

```
ASCII   code:  ESC  p  n
Decimal:       27  112  n
Hexadecimal: 1B 70 n
```

Comments:
  The following values can be used for *n:*
  1: Mode is turned ON.
  0: Mode is turned OFF.

  The width of proportional characters varies from character to
  character. Therefore, a narrow letter like i receives less space
  than a wide letter like W. The proportional widths are given
  in the character tables, which appear in Appendix A.
  Overrides the SelecType **PITCH** and control panel settings.

SI   Select Condensed Mode

Format:

```
ASCII code: SI
Decimal:       15
Hexadecimal: 0F
```

Comments:
  Prints characters at about 60 percent of their normal width.
  For example, the condensed 10 cpi mode has 17 characters
  per inch. The 15 cpi mode cannot be condensed. Overrides
  the SelecType PITCH and control panel settings.

ESC SI   Select Condensed Mode
_____

Format:

   ASCII code: ESC SI
   Decimal: 27   15
   Hexadecimal: 1B OF

Comments:
   Duplicates the SI command and the function of SelecType
   and control panel settings.

DC2   Cancel Condensed Mode
_____

Format:

   ASCII code: DC2
   Decimal: 18
   Hexadecimal: 12

Comments:
   Cancels condensed printing set by SI, ESC SI or the SelecType
   and control panel settings.

SO   Select Double-width Mode (one line)
_____

Format:

   ASCII code: SO
   Decimal: 14
   Hexadecimal: 0E

Comments:
   Double-width mode doubles the width of all characters. This
   mode is cancelled by a carriage return or DC4. ESC SO
   duplicates this command.

ESC SO   Select Double-width Mode (one line)

Format:

  ASCII code: ESC SO
  Decimal: 27   14
  Hexadecimal: 1B 0E

Comments:
  Duplicates the SO command.

DC4   Cancel Double-width Mode (one line)

Format:

  ASCII code: DC4
  Decimal: 20
  Hexadecimal: 14

Comments:
  Cancels one-line double-width printing selected by SO or
  ESC SO, but not double-width printing selected by ESC W or
  ESC !.

ESC W   Turn Double-width Mode On/Off

Format:

  ASCII code: ESC W *n*
  Decimal: 27   87   *n*
  Hexadecimal: 1B 57 *n*

Comments:
  The following values can be used for *n:*
  1: Mode is turned ON.
  0: Mode is turned OFF.

  Double-width mode doubles the width of all characters.

ESC w   Turn Double-height Mode On/Off

Format:

  ASCII code: ESC w *n*
  Decimal: 27 119 *n*
  Hexadecimal: 1B 77 *n*

Comments:
  The following values can be used for n:
  1: Mode is turned ON.
  0: Mode is turned OFF.

  Double-height mode doubles the height of all characters.

Print Enhancement

ESC E   Select Emphasized Mode

Format:

  ASCII code: ESC E
  Decimal: 27   69
  Hexadecimal: 1B 45

Comments:
  Makes text bolder by printing each dot twice.

ESC F   Cancel Emphasized Mode

Format:

  ASCII code: ESC F
  Decimal: 27   70
  Hexadecimal: 1B 46

Comments:
  Cancels the emphasized mode selected by ESC E.

ESC G   Select Double-strike Mode

Format:

    ASCII code: ESC G
    Decimal: 77   71
    Hexadecimal: 1B 47

Comments:
    Makes text bolder by printing each line twice.

ESC H   Cancel Double-strike Mode

Format:

    ASCII code: ESC H
    Decimal: 27   72
    Hexadecimal: 1B 48

Comments:
    Cancels the double-strike mode selected by ESC G.

ESC SO   Select Superscript Mode

Format:

    ASCII code: ESC S 0
    Decimal: 27   83   0
    Hexadecimal: 1B 53 0

Comments:
    Prints characters about two-thirds of the normal character
    height in the upper part of the character space.

ESC Sl   Select Subscript Mode

Format:

```
ASCII   code:   ESC   S   1
Decimal:        27    83  1
Hexadecimal:    1B    53  1
```

Comments:

Prints characters about two-thirds of the normal character
height in the lower part of the character space.

ESC T   Cancel Superscript/Subscript Mode

Format:

```
ASCII code: ESC T
Decimal:        27    84
Hexadecimal: 1B 54
```

Comments:

Cancels either superscript or subscript.

ESC -   Turn Underlining Mode On/Off

Format:

```
ASCII code: ESC - n
Decimal:        2 7  4 5 n
Hexadecimal: 1B 2D n
```

Comments:

The following values can be used for n:
1: Mode is turned ON.
0: Mode is turned OFF.

This mode provides continuous underlining including spaces.

ESC q	Select Character Style

Format:

```
ASCII   code:   ESC   q   n
Decimal:        27   113   n
Hexadecimal: 1B  71  n
```

Comments:

The following values can be used for *n:*

0: Select normal style
1: Select outline style
2: Select shadow style
3: Select outline with shadow

This command is valid for all characters, with the exception
of character codes B0H to DFH, F4H, and F5H in the EPSON
Extended Graphics character table.

Format:

ASCII code:	ESC	(	-	nl	n2	m	dl	d2
Decimal:	27	40	45	nl	n2	m	*dl*	*d2*
Hexadecimal:	1B	28	2D	nl	*n2*	*m*	*dl*	*d2*

Comments:

Use decimal or hexadecimal values for all variables, not ASCII characters.

Use the following values for the first 3 variables:
nl must be 3
n2 must be 0
m must be 1

The value of *dl* determines the location of the score:
dl = 1 for underline
dl = 2 for strike through
dl = *3* for overscore

The value of *d2* determines whether the score line is single, double, broken, or continuous:
d2 = 0 Cancel the score line selected by *dl*
d2 = 1 Single continuous line
d2 = 2 Double continuous line
d2 = 5 Single broken line
d2 = 6 Double broken line

The last three bits of *d2* determine the characteristics of the score line as shown below:

	Bit 2	Bit 1	Bit 0
On (1)	Broken line	Double line on	Single line on
Off (0)	Continuous line	Double line off	Single line off

Note: If Bit 1 and Bit 0 are both off, the selected score is cancelled. Double line and single line scores cannot be combined at the same score position.

Word Processing

ESC a   Select   Justification

Format:

```
ASCII code: ESC a n
Decimal:       27   97   n
Hexadecimal: 1B 61 n
```

Comments:

The following values can be used for n:

0: Selects left justification.

1: Selects centering.

2: Selects right justification.

3: Selects full justification.

The default setting is n = 0. Full justification *(n* = 3) is performed when the buffer becomes full; HT and BS are invalid except in n = 0 mode. For *n* = 3 there must be no carriage returns within a paragraph.

ESC SP (space)   Set Intercharacter Space

Format:

```
ASCII code: ESC SP n
Decimal:       27   32   n
Hexadecimal: 1B 20 n
```

Comments:

Sets the amount of space added to the right of each character, in addition to the space already allowed in the design of the character. The number of dots is determined by n, which should be from O-127. Each unit of space is 1/120th of an inch in draft and l/180th of an inch in Letter Quality and proportional.

Character Tables

ESC t   Select Character Table

Format:

ASCII code: ESC t *n*
Decimal: 27 116 *n*
Hexadecimal: 1B 74 *n*

Comments:

Selects the character table used by codes 128-255. Selecting
EPSON Extended Graphics does not disable italic printing.
Italic printing can still be selected by ESC 4. The following
values can be used for *n:*
0: Selects Italics character table.
1: Selects EPSON Extended Graphics character table.
2: Selects user-defined character table.

The values 0, 1, and 2 override the function of SelecType CG
TABLE setting. Note that the value of *n* must equal 00 hex, 01
hex or 02 hex.

ESC 4   Select Italic Mode

Format:

ASCII code: ESC 4
Decimal: 27   52
Hexadecimal: 1B 34

Comments:

Causes italic characters to be printed. This command is valid
even if the EPSON Extended Graphics set has been selected
by **ESC** t or the SelecType **CG TABLE** setting, but character
graphics are not italicized.

ESC 5   Cancel Italic Mode
Format:

  ASCII code: ESC 5
  Decimal: 27   53
  Hexadecimal: 1B 35

Comments:
  Cancels the mode selected by ESC 4.

ESC R   Select an International Character Set
Format:

  ASCII code: ESC R n
  Decimal: 27   82   n
  Hexadecimal: 1B 52 *n*

Comments
  The following values can be used for *n:*
  0: USA   8: Japan
  1: France   9: Norway
  2: Germany   10: Denmark 2
  3: UK   11: Spain 2
  4: Denmark 1   12: Latin America
  5: Sweden   13: Korea
  6: Italy   64: Legal
  7: Spain 1

  Overrides the SelecType COUNTRY setting.

User-defined   Characters

See Chapter 4 for sample programs and full information on this topic.

ESC &   Define User-defined Characters

Format:

ASCII   code: ESC   &   0   *n l*   *n2*   *d0*   *dl*   *d2 data*
Decimal: *27   38   0   nl   n2   d0   dl   d2 data*
Hexadecimal: 1B   *26   00* nl   *n 2   d0   dl   d2 data*

Comments:
This command allows characters to be redefined in the currently selected mode.

ESC :   Copy ROM into RAM

Format:

ASCII code: ESC   :   0   *n*   *0*
Decimal: *27   58   0   n   0*
Hexadecimal: 1B   3A   00   *n*   *00*

Comments:
This code copies the characters in the ROM into RAM so that specific characters can be redefined. The variable n represents the font family.
0: Roman
1: Sans Serif
2: Courier
3: Prestige
4: Script
5: OCR-B
6: OCR-A
7: Orator
8: Orator-S

ESC %   Select User-defined Set

Format:

ASCII   code: ESC   %   *n*
Decimal: 27   37   *n*
Hexadecimal: 1B 25 n

Comments:
This code is used to print the characters of the user-defined
download set. ESC & is required to define the character set.
The following values can be used for *n:*
0: Selects the normal set.
1: Selects the user-defined set.

ESC 6   Enable Printable Characters

Format:

ASCII code: ESC 6
Decimal: 27   54
Hexadecimal: 1B 36

Comments:
When the EPSON Extended Graphics character table is
selected, this code enables the printing of codes 128 through
159 (decimal) as characters, not control codes.

ESC 7   Enable Upper Control Codes

Format:

ASCII code: ESC 7
Decimal: 27   55
Hexadecimal: 1B 37

Comments:

When the EPSON Extended Graphics character table is
selected, this code causes codes 128 through 159 to be treated
as control codes. This is the default.

Graphics

See Chapter 4 for sample graphics programs. Also see the table
under ESC * for graphics modes.

ESC K   Select Single-density Graphics Mode

Format:

ASCII code: ESC   K   *nl   n2*
Decimal: *27   75* nl   *n 2*
Hexadecimal: 1B 4B *nl n2*

Comments:

Turns on eight-element, single-density graphics mode. The
total number of columns = *nl + (n2 x 256).*

ESC L   Select Double-density Graphics Mode

Format:

  ASCII   code: ESC   L   *nl   n2*
  Decimal: 27   76   nl   n2
  Hexadecimal: 1B 4C *nl n2*

Comments:
  Turns on eight-element, low-speed, double-density graphics
  mode. The total number of columns = nl + *(n2 x 256).*

ESC Y   Select High-speed Double-density Graphics Mode

Format:

  ASCII   code: ESC   Y   nl   *n 2*
  Decimal: 27   89   *nl   n2*
  Hexadecimal: 1 B   59   *nl   n2*

Comments:
  Turns on eight-element, high-speed, double-density graphics
  mode. The total number of columns = *nl + (n2 x 256).*

ESC Z   Select Quadruple-density Graphics Mode

Format:

  ASCII   code: ESC   Z   nl   *n 2*
  Decimal: 27   90   *nl   n2*
  Hexadecimal: 1B 5A nl *n 2*

Comments:
  Turns on eight-element, quadruple-density graphics mode.
  The total number of columns = nl + (n2 x 256).

ESC *   Select Graphics Mode

Format:

ASCII   code: ESC   *   m   nl   n2
Decimal: 27   42   m   nl   n2
Hexadecimal: 1B   2A   m   nl   n2

Comments:

Turns on graphics mode m. See the table below for details on the available modes. The total number of columns = $nl + (n2 \times 256)$.

Option	Elements	m	Horiz.density dots/in.
Single-density	8	0	60
Double-density	8	1	120
High-speed double-density*	8	2	120
Quadruple-density*·	8	3	240
CRT I	8	4	80
CRT II	8	6	90
Single-density	24	32	60
Double-density	24	33	120
CRT III	24	38	90
Triple-density	24	39	180
Hex-density*	24	40	360

* Adjacent dots cannot be printed in this mode.

ESC ?   Reassign Graphics Mode

Format:

ASCII   code: ESC   ?   s   n
Decimal: 27   63   s   n
Hexadecimal: 1B   3F   s   n

Comments:

Changes one graphics mode to another. The variable s is a character (K, L, Y or Z), which is reassigned to a mode n (O-6, 32-33, 38-40).

9-42 Commend Summary

Appendix

Proportional Width Table

This table lists the widths of your printer's proportional characters. The values given are in 360ths of an inch. (For example, a value of 36 is 36/360ths of an inch.) You may need to enter these widths into a special table for your processing program so it can calculate the number of proportional characters that will fit on a line.

The characters with no code indicated are international characters or graphics. See the table on page 3-35 for the relevant codes for the international characters. Also, see the descriptions of the ESC R and ESC t commands on page 9-37 and 9-36 for information on how to use these characters.

The following width table shows each character, its ASCII code (hexadecimal), and its width. If there are two numbers in the width column, the second one is for the superscript/subscript version of the character.

Code	CHR	Width	Code	CHR	Width
20		30/20	30	0	30/20
21	!	18/12	31	1	30/20
22	"	30/20	32	2	30/20
23	#	30/20	33	3	30/20
24	$	30/20	34	4	30/20
2.5	%	36/24	35	5	30/20
26	&	36/24	36	6	30/20
27	'	18/12	37	7	30/20
28	(	24/16	38	8	30/20
29	)	24/16	39	9	30/20
2A	*	30/20	3A	:	18/12
2B	+	30/20	3B	;	18/12
2C	,	18/12	3C	<	30/20
2D	–	30/20	3D	=	30/20
2E	.	18/12	3E	>	30/20
2F	/	30/20	3F	?	30/20

Code	CHR	Width	Code	CHR	Width
40	@	36/24	64	d	36/24
41	A	36/24	65	e	30/20
42	B	36/24	66	f	24/16
43	C	36/24	67	g	36/24
44	D	36/24	68	h	36/24
45	E	36/24	69	i	18/12
46	F	36/24	6A	j	24/16
47	G	36/24	6B	k	36/24
48	H	36/24	6C	l	18/12
49	I	24/16	6D	m	42/28
4A	J	30/20	6E	n	36/24
4B	K	36/24	6F	o	30/20
4C	L	36/24	70	p	36/24
4D	M	42/28	71	q	36/24
4E	N	36/24	72	r	30/20
4F	0	36/24	73	s	30/20
50	P	36/24	74	t	24/16
51	Q	36/24	75	u	36/24
52	R	36/24	76	v	36/24
53	S	36/24	77	w	42/28
54	T	36/24	78	x	30/20
55	U	42/28	79	y	36/24
56	v	36/24	7A	z	30/20
57	w	42/28	7B	{	24/16
58	X	36/24	7C	¦	18/12
59	Y	36/24	7D	}	24/16
5A	Z	30/20	7E	~	30/20
5B	[	24/16		Ç	36/24
5C	\	30/20		ü	36/24
5D	I	24/16		é	30/20
5E		30/20		â	30/20
5F	_	30/20		ä	30/20
60	'	18/12		à	30/20
61	a	30/20		å	30/20
62	b	36/24		ç	30/20
63	c	30/20		ê	30/20

Appendix A-3

Proportional Width Table

Code	CHR	Width		Code	CHR	Width
	ë	30/20			«	30/20
	è	30/20			»	30/20
	ï	18/12		B0		30
	î	18/12		B1		30
	ì	18/12		B2		30
	Ä	36/24		B3		30
	Å	36/24		B4	┤	30
	É	36/24		B5		30
	æ	42/28		B6		30
	Æ	42/28		B7		30
	ô	30/20		B8		30
	ö	30/20		B9		30
	ò	30/20		BA	║	30
	û	36/24		BB		30
	ù	36/24		BC		30
	ÿ	36/24		BD	┘	30
	Ö	36/24		BE	┘	30
	Ü	42/28		BF	┐	30
	¢	30/20		C0	└	30
	£	30/20		C1	┴	30
	¥	36/24		C2	┬	30
	Pt	42/28		C3	├	30
	ƒ	30/20		C4	─	30
	á	30/20		C5	┼	30
	í	18/12		C6		30
	ó	30/20		C7		30
	ú	36/24		C8		30
	ñ	36/24		C9		30
	Ñ	36/24		CA		30
	ª	30/20		CB		30
	º	30/20		CC		30
	¿	30/20		CD	═	30
	⌐	30/20		CE		30
	¬	30/20		CF		30
	½	30/20		D0	╨	30
	¼	30/20		D1		30
	¡	30/20		D2		30

Code	CHR	Width
D3	⊥	30
D4	⊢	30
D5	⊩	30
D6	⫤	30
D7	╫	30
D8	╪	30
D9	⌐	30
DA	⌐	30
DB	■	30
DC	▐	30
DD	▌	30
DE	▐	30
DF	▄	30
E0	α	30/20
E1	ß	30/20
E2	Γ	30/20
E3	π	30/20
E4	Σ	30/20
E5	σ	30/20
E6	μ	30/20
E7	τ	30/20
E8	Φ	30/20
E9	θ	30/20
EA	Ω	30/20
EB	δ	30/20
EC	∞	30/20
ED	ø	30/20
EE	∈	30/20
EF	∩	30/20
F0	≡	30
F1	±	30
F2	≥	30
F3	≤	30
F4	⌠	30
F5	⌡	30
F6	÷	30
F7	≈	30

Code	CHR	Width
F8	°	30
F9	•	30
FA	·	30
FB	√	30
FC	n	30
FD	2	30
FE	■	30
	°	24/16
	¤	30/20
	ß	36/24
	Ø	36/24
	ø	30/20
	¨	30/20
	§	30/20

Character Tables

These character tables are selected by SelecType CG TABLE setting or using the ESC t software command. For the EPSON Extended Graphics character table, use of the ESC 6 or ESC 7 software command lets you select whether to print hex codes 80 to 9F as characters (ESC 6) or control codes (ESC 7).

Italic Character Table

CODE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	'	p				*0*	*@*	*P*	*'*	*p*
1			!	1	A	Q	a	q				*!*	*1*	*A*	*Q*	*a*	*q*
2			"	2	B	R	b	r				*"*	*2*	*B*	*R*	*b*	*r*
3			#	3	C	S	c	s				*#*	*3*	*C*	*S*	*c*	*s*
4			$	4	D	T	d	t				*$*	*4*	*D*	*T*	*d*	*t*
5			%	5	E	U	e	u				*%*	*5*	*E*	*U*	*e*	*u*
6			&	6	F	V	f	v				*&*	*6*	*F*	*V*	*f*	*v*
7			'	7	G	W	g	w				*'*	*7*	*G*	*W*	*g*	*w*
8			(	8	H	X	h	x				*(*	*8*	*H*	*X*	*h*	*x*
9			)	9	I	Y	i	y				*)*	*9*	*I*	*Y*	*i*	*y*
A			*	:	J	Z	j	z				***	*:*	*J*	*Z*	*j*	*z*
B			+	;	K	[	k	{				*+*	*;*	*K*	*[*	*k*	*{*
C			,	<	L	\	l	¦				*,*	*<*	*L*	**	*l*	*¦*
D			–	=	M	]	m	}				*–*	*=*	*M*	*]*	*m*	*}*
E			.	>	N	^	n	~				*.*	*>*	*N*	*^*	*n*	*~*
F			/	?	O	_	o					*/*	*?*	*O*	*_*	*o*	

EPSON Extended Graphics Character Table

CODE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1			!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	ß	±
2			"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3			#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4			$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5		§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	θ	•
A			*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B			+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C			,	<	L	\	l	¦	î	£	¼	╝	╠	▄	∞	ⁿ
D			–	=	M	]	m	}	ì	¥	¡	╜	═	▌	ø	²
E			.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F			/	?	O	_	o		Å	ƒ	»	┐	╧	▀	∩	

Appendix A-7

Glossary

Note that these definitions apply specifically to printers. If a word is italicized, see that topic for more information.

application program
A program that helps you carry out a particular task, such as word processing or financial planning.

ASCII
American Standard Code for Information Interchange.
A standardized coding system for assigning numerical codes to letters and symbols.

auto line feed
When this feature is enabled using the SelecType setting, each carriage return code (CR) is automatically accompanied by a line feed (LF) code.

baud rate
A measure of the speed of data transmission. Usually equivalent to bits per second.

bidirectional printing
Printing in which the print head goes from left to right only on every other line. On the other lines, it goes from right to left. This increases the speed of printing because the print head prints in both directions.

binary
See number systems.

bit
A binary digit (0 or l), which is the smallest unit of information used by a printer or computer. See also number systems.

buffer
See memory.

byte
A unit of information consisting of eight bits.

carriage return
The control code that returns the print position to the left margin. In bidirectional printing, the print head may not actually move to the left margin.

CG table
The SQ has three Character Generator (CG) tables: Italic, Graphic, and Download. These tables contain the characters printed by the printer.

characters per inch (cpi)
A measure of the size of text characters, often referred to as pitch. 10 cpi is the standard or default setting.

condensed
Printing in which each character is approximately 60% of the width of standard characters. Useful for fitting wide tables or spreadsheets onto the printer.

continuous paper
Paper which has sprocket-feed holes on each side and is perforated between pages. Also called fanfold paper.

control code
Besides the codes for printable characters, the ASCII standard also includes 33 other codes which are called control codes. These control codes perform such functions as sounding the beeper and performing a carriage return or line feed.

cut sheet feeder
An optional, detachable device that automatically feeds single sheets of paper into the printer.

data dump
A troubleshooting feature. When the printer is in data dump mode, each code that is receives is printed in hexadecimal notation as well as ASCII codes that stand for the characters. Sometimes called hex dump.

decimal
See number systems.

default
A value or setting that takes effect when the equipment is turned on, reset, or initialized.

dot graphics
A graphic design formed by patterns of dots.

dot matrix
A method of printing in which each letter or symbol is formed by a pattern (matrix) of individual dots.

double-height printing
Printing in which each character is twice as high as normal.

double-strike printing
A way of producing bolder characters. Each character is printed twice in a single pass of the print head: the second time, the dots are printed slightly below the original dots. Can only be used in draft mode.

draft
One of two print qualities available on your printer. Draft uses a minimum number of dots per character for high-speed printing. See also Letter Quality.

emphasized printing
A way of producing darker characters. Each character of a line is printed in two passes of the print head; the second time, the dots are printed slightly to the right of the original dots.

EPSON Extended Graphics character table
A table containing international accented characters, Greek characters, and character graphics for printing lines, corners, and shaded areas.

ESC **(escape)**
A special control code used to begin most printer commands.

ESC/P
Abbreviation for EPSON Standard Code for Printers. This system of commands lets you perform software control of your printer from your computer. It is standard for all EPSON printers and supported by most applications software for personal computers.

font
A font is a style of type designated by a family name.

form feed
A control code and a panel button that advances the paper to the top of the next page.

hexadecimal (hex)
See number systems.

initialize
To establish the initial default status of the printer by turning the printer on or sending an $\overline{\text{INIT}}$ signal.

interface
The connection between the computer and the printer. A parallel interface transmits data one character or code at a time, and a serial interface transmits data one bit at a time.

italic
A typestyle in which the characters slant. *This sentence is italicized.*

Letter Quality (LQ)
One of two print qualities available on your printer. Letter Quality reduces the print speed and increases the number of dots per character to increase the print quality.

line feed
A control code and a panel button that advances the paper one line space.

liquid crystal display (LCD)
The display on the control panel that shows SelecType messages and the current status of the printer.

loading position
The position to which the paper is automatically loaded. It can be adjusted with the micro-adjustment feature.

memory
The printer, like a computer, has a memory. When you print a file from a computer, the contents of the file are transferred quickly from the computer's memory to the printer's memory. The printer then prints information from its own memory at a much slower rate. This way of printing frees the computer to do other work while the printer is still working. The printer memory is sometimes called the buffer.

micro adjustment
A feature **that** adjust the loading and short tear-off positions in 1/180th of an inch units. This feature can be used immediately after loading paper.

micro feed
See micro adjustment.

number systems
Three number systems are commonly used with printers:

decimal is base 10 and uses the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. (This is **the** most familiar system.)

hexadecimal (hex) is base 16 and uses the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F. This is frequently used by programmers. Any decimal number between 0 and 255 can be expressed by a two-digit hex number.

binary is base 2 and uses only the digits 0 and 1. All information in computer systems is handled in binary form to represent electrical signals that are ON or OFF. A binary digit is often called a bit; any decimal number between 0 and 255 can be expressed by an eight-bit decimal number.

on line
When the printer is on line, it is in communication with the computer connected to it.

paper-out sensor
A small switch behind the platen that sends a signal when it is not in contact with paper, causing the **PAPER OUT** light to go on.

parallel interface
See interface.

parity
Parity is a method for a computer and printer to check the reliability of data transmission.

pitch
Indicates the number of characters per inch (cpi). The standard is 10 pitch.

platen
The black roller that provides a backing for the printing.

print quality
Your printer has two types of print quality: draft and Letter Quality. Draft is for high-speed, draft quality jobs; Letter Quality is for final, polished documents.

proportional spacing
Printing in which the width if the character varies from character to character. For example, a capital W receives much more space than a lower case i. The result looks more like a typeset book than a typewritten draft.

pull tractor
An optional, detachable device that moves continuous paper through the printer.

push tractor
A built-in device that moves continuous paper through the printer.

RAM
Random Access Memory. The portion of the printer's memory used as a buffer and for storing user-defined characters. All data stored in RAM is lost when the printer is turned off.

reset
To return a printer to its defaults, by either a command, an $\overline{\text{INIT}}$ signal, or by turning the printer off and on.

SelecType setting
A feature that lets you set up various printer settings or change default settings at the control panel.

self test
A method of checking the operation of the printer. When the self test is run, the printer prints out its SelecType settings and the characters that are stored in its ROM.

serial interface
See interface.

short tear-off
A feature that automatically feeds the perforation of continuous paper to the tear-off position and then advances the paper back to the loading position. This position can be adjusted with the micro-adjustment feature. See micro adjustment.

skip over perforation
A function that causes the printer to stop printing, skip over a perforation in continuous paper, then resume printing again. Most application programs handle this task, but it may be useful when listing programs.

unidirectional printing
Printing in one direction only. Allows more precise vertical alignment than bidirectional printing. Often used for printing graphics.

user-defined characters
Characters that are defined and stored in the printer by the user. Also known as download characters.

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User-defined characters,
    4-21-31, 9-38-39, GL-9

V
Voltage, 1-3
    power supply, 8-8

To enter SelecType.

ON LINE   FORM FEED
[ ]   [ ]   ──────────▶

* To exit the SelecType
  mode, press the ON LINE
  and FORM FEED buttons
  once more.
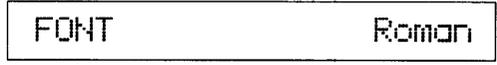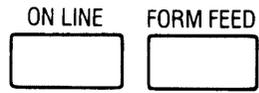
FONT   Roman

To enable the new settings.

ON LINE   LOAD/EJECT
[ ]   [ ]

FONT
[ ]
↓

↑
PITCH
[ ]

MENU	SELECTION
FONT	Draft, Roman, Sans Serif, Courier, Prestige, Script, OCR-B, OCR-A, Orator, Orator-S
PITCH	10CPI, 12CPI, 15CPI, 17CPI, 20CPI, Propo.
LINE SPACING	1/6inch, 1/8inch
PAGE TRACTOR	24 LINE to 132 LINE
PAGE CSF BN1	24 LINE to 132 LINE
PAGE CSF BN2	24 LINE to 132 LINE
1" SKIP	On, Off
AUTO TEAR OFF	On, Off
LEFT MARGIN	0 to 45 columns (SQ-850) 0 to 80 columns (SQ-2550)
RIGHT MARGIN	1 to 80 columns (SQ-850) 1 to 136 columns (SQ-2550)
CG TABLE	Italic, Graphic, Download
COUNTRY	USA, France, Germany, UK, Denmark 1, Sweden, Italy, Spain 1, Japan, Norway, Denmark 2, Spain 2, L.America, Korea, Legal
PRINT DIR.	Bi-D, Uni-D
INTERFACE	Parallel, Serial
BAUD RATE	300BPS, 600BPS, 1200BPS, 2400BPS, 4800BPS, 9600BPS, 19200BPS
PARITY	None, Even, Odd, Ignore
AUTO LINE FEED	On, Off
DC1/DC3	Enable, Disable

PAPER
SELECT
[ ]
──────────▶

TEAR OFF
[ ]
◀──────────
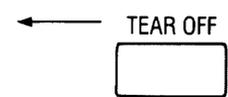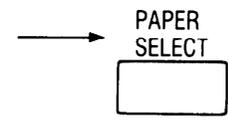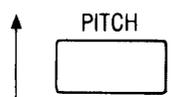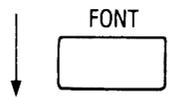
Control Codes by Function

The following control codes are listed briefly for quick reference. For a more detailed explanation, see the page reference in Chapter 9. Variables are not included in this quick reference due to their complexity. For those codes that contain variables, such as ESC Q n for setting the right margin, see Chapter 9.

Printer Operation/Data Control

Code	Dec	Hex	Function	Page
ESC @	64	40	Initialize Printer	9-8
DC1	17	11	Select Printer	9-8
DC3	19	13	Deselect Printer	9-9
DEL	127	7F	Delete Character	9-9
ESC <	60	3C	Select Unidirectional Mode (one line)	9-9
ESC U	85	55	Turn Unidirectional Mode On/Off	9-10
ESC EM	25	19	Cut Sheet Feeder Control	9-10
ESC =	61	3D	Set MSB to 0	9-11
ESC >	62	3E	Set MSB to 1	9-11
ESC #	35	23	Cancel MSB Control	9-11
BEL	7	07	Beeper	9-12
CR	13	0D	Carriage Return	9-12
CAN	24	18	Cancel Line	9-12

Vertical Motion/Horizontal Motion

Code	Dec	Hex	Function	Page
FF	12	0C	Form Feed	9-13
ESC C	67	43	Set Page Length in Lines	9-13
ESC C 0	67	43	Set Page Length in Inches	9-14
ESC N	78	4E	Set Skip Over Perforation	9-14
ESC O	79	4F	Cancel Skip Over Perforation	9-15
LF	10	0A	Line Feed	9-15
ESC 0	48	30	Select 1/8-inch Line Spacing	9-15
ESC 2	50	32	Select 1/6-inch Line Spacing	9-16
ESC 3	51	33	Set n/180-inch Line Spacing	9-16
ESC +	43	2B	Set n/360-inch Line Spacing	9-16
ESC A	65	41	Set n/60-inch Line Spacing	9-17
ESC J	74	4A	Perform n/180-inch Line Feed	9-17
VT	11	0B	Tab Vertically	9-17
ESC B	66	42	Set Vertical Tabs	9-18

Code	Dec	Hex	Function	Page
ESC b	98	62	Set Vertical Tabs in Channels	9-18
ESC /	47	2F	Select Vertical Tab Channel	9-19
ESC l	108	6C	Set Left Margin	9-19
ESC Q	81	51	Set Right Margin	9-20
BS	8	08	Backspace	9-20
ESC $	36	24	Set Absolute Print Position	9-21
ESC \	92	5C	Set Relative Print Position	9-21
HT	9	09	Tab Horizontally	9-22
ESC D	68	44	Set Horizontal Tabs	9-22

Overall Printing Style/Print Size

Code	Dec	Hex	Function	Page
ESC x	120	78	Select Letter Quality or Draft	9-23
ESC k	107	6B	Select Typestyle Family	9-23
ESC !	33	21	Master Select	9-24
ESC P	80	50	Select 10 cpi	9-25
ESC M	77	4D	Select 12 cpi	9-25
ESC g	103	67	Select 15 cpi	9-25
ESC p	112	70	Turn Proportional Mode On/Off	9-26
SI (ESC SI)	15	0F	Select Condensed Mode	9-26
DC2	18	12	Cancel Condensed Mode	9-27
SO (ESC SO)	14	0E	Select Double-width Mode (one line)	9-27
DC4	20	14	Cancel Double-width Mode (one line)	9-28
ESC W	87	57	Turn Double-width Mode On/Off	9-28
ESC w	119	77	Turn Double-height Mode On/Off	9-29

Print Enhancement/Word Processing

Code	Dec	Hex	Function	Page
ESC E	69	45	Select Emphasized Mode	9-29
ESC F	70	46	Cancel Emphasized Mode	9-29
ESC G	71	47	Select Double-strike Mode	9-30
ESC H	72	48	Cancel Double-strike Mode	9-30
ESC S0	83	53	Select Superscript Mode	9-30
ESC S1	83	53	Select Subscript Mode	9-31
ESC T	84	54	Cancel Superscript/Subscript Mode	9-31
ESC –	45	2D	Turn Underlining Mode On/Off	9-31
ESC q	113	71	Select Character Style	9-32
ESC (–	40	28	Select Line	9-33
ESC a	97	61	Select Justification	9-35
ESC SP	32	20	Set Intercharacter Space	9-35

Character Tables

Code	Dec	Hex	Function	Page
ESC t	116	74	Select Character Table	9-36
ESC 4	52	34	Select Italic Mode	9-36
ESC 5	53	35	Cancel Italic Mode	9-37
ESC R	82	52	Select an International Character Set	9-37

User-defined Characters/Graphics

Code	Dec	Hex	Function	Page
ESC &	38	26	Define User-defined Characters	9-38
ESC :	58	3A	Copy ROM into RAM	9-38
ESC %	37	25	Select User-defined Set	9-39
ESC 6	54	36	Enable Printable Characters	9-39
ESC 7	55	37	Enable Upper Control Codes	9-40
ESC K	75	4B	Select Single-density Graphics Mode	9-40
ESC L	76	4C	Select Double-density Graphics Mode	9-41
ESC Y	89	59	Select High-speed Double-density Graphics Mode	9-41
ESC Z	90	5A	Select Quadruple-density Graphics Mode	9-41
ESC *	42	2A	Select Graphics Mode	9-42
ESC ?	63	3F	Reassign Graphics Mode	9-42

paper guide

edge guides

printer cover

interface board
cover

slot

ink cartridge
compartment caver

platen knob

control panel

push tractor

paper support

parallel interface

print head

ground connector

power switch

serial interface

AC inlet
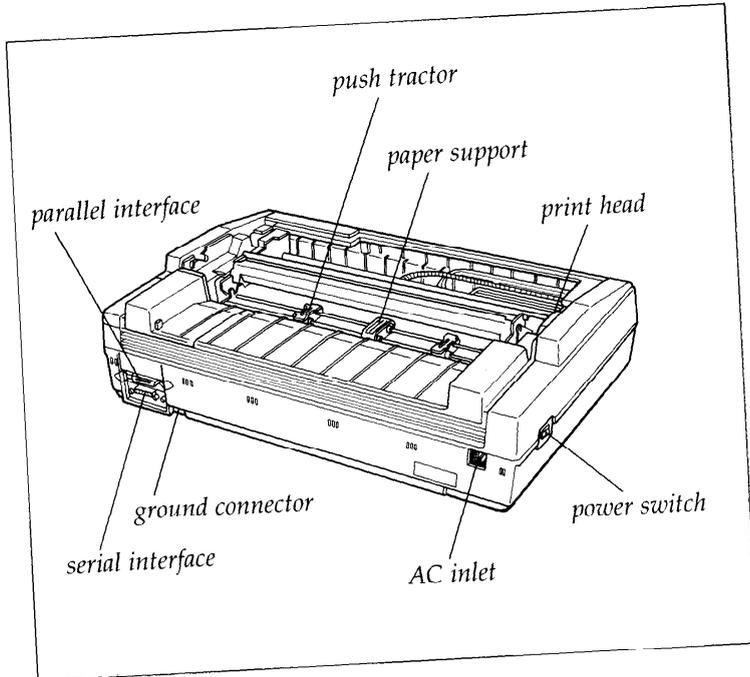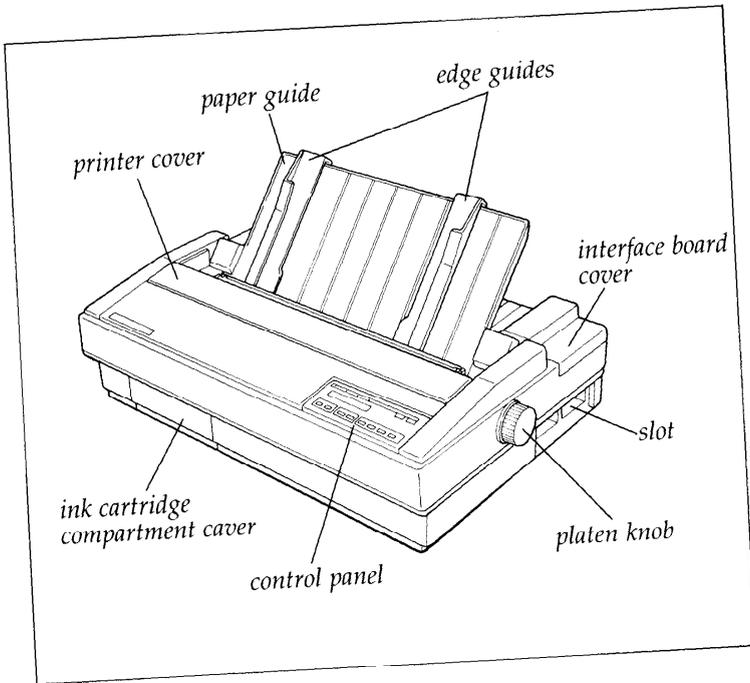
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USER'S GUIDE