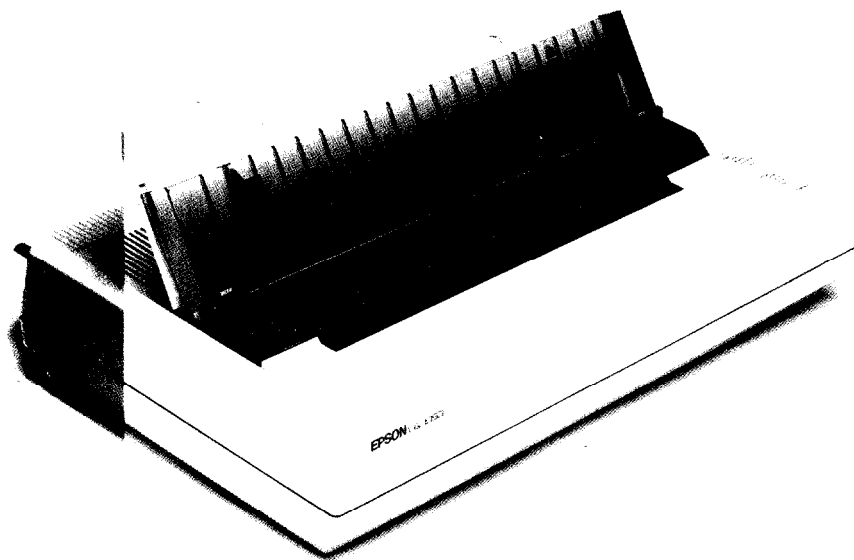# User's Manual

EPSON®
LQ-850/950/1050

User's Guide

FCC COMPLIANCE STATEMENT
FOR AMERICAN USERS

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 or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the printer with respect to 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:

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

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

WARNING

The connection of a non-shielded printer interface cable to this printer will invalidate the FCC Certification of this device and may cause interference levels which 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.

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Chapter 4 Software and Graphics

Chapter 5 Maintenance

Chapter 6 Troubleshooting

Chapter 7   Using Printer Options

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About This Guide

This User's Guide provides step-by-step instructions on setting and operating the LQ-850, LQ-950, and LQ-1050 printers.

Finding your way around

Chapter 1 contains information on unpacking, setting up, and testing the printer, so be sure to read and follow the instructions in this chapter first. Inside the back flap of the guide are illustrations of the printer with all of the major parts identified.

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 section includes advice on the use of applications software, graphics, and user-defined characters.

Other chapters include information on troubleshooting, printer options, and general maintenance. You will also find a glossary of printer terms and an index.

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

The LQ-850, LQ-950, and LQ-1050 are basically the same printer except for their widths. Therefore, the illustrations in this guide show only the LQ-1050.

Conventions used in this Guide

Warnings must be followed to avoid damage to your equipment.

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 LQ-850, LQ-950, and LQ-1050 are advanced 24-pin impact dot matrix printers, combining high performance and reliability with a wide range of features.

Features
In addition to the high quality printing and ease of operation you've come to expect from Epson printers, the LQ-850, LQ-950, and LQ-1050 offer the following:

- An advanced paper handling system that lets you use single sheets of paper without removing the continuous paper. This system allows you to use continuous paper even while the optional cut sheet feeder is attached.

- A new short tear-off feature that saves paper. After you tear off the last sheet printed on continuous paper, the printer reverses the paper so that you can use all of the next sheet.

- 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 loading and short tear-off positions.

- Reduced noise levels.

- An improved control panel design that allows direct selection of character fonts and pitch, as well as a choice of normal or condensed printing.

- Draft mode with fast printing of up to 264 characters per second in 12 cpi.

- A Letter Quality mode for producing high quality documents.

- The ability to handle a wide range of paper types. The optional cut sheet feeder can automatically feed single sheets and envelopes.

Options

A variety of printer options are available for use with the LQ printers. For detailed information on the installation and use of these options, see Chapter 7.

Single-Bin and Dual-Bin Cut Sheet Feeders

The cut sheet feeders give you easier and more efficient handling of single sheet paper. Up to 150 sheets of standard bond paper can be fed automatically into the printer without reloading. These units also can automatically feed envelopes.

Pull Tractor Unit

This option improves the performance of continuous paper handling. It is especially useful with continuous multi-part forms.

Optional Interface Boards

A number of optional interfaces can be used to supplement the LQ's built-in parallel and serial interfaces. Guidelines for choosing the right interface and instructions on installing the boards are given in the section on interface boards in Chapter 7.

Multi-Font Module

The optional Multi-Font Module adds to the number of character fonts available in Letter Quality mode. See the section on the font module in Chapter 7 for more information.

Emulation Module

The optional Emulation Module for IBM®ProPrinter X/XL24 allows you to use programs designed to be used with an IBM ProPrinter.

Checking the parts

As you unpack the printer, make sure you have all the parts shown below and that none have been damaged during transportation.
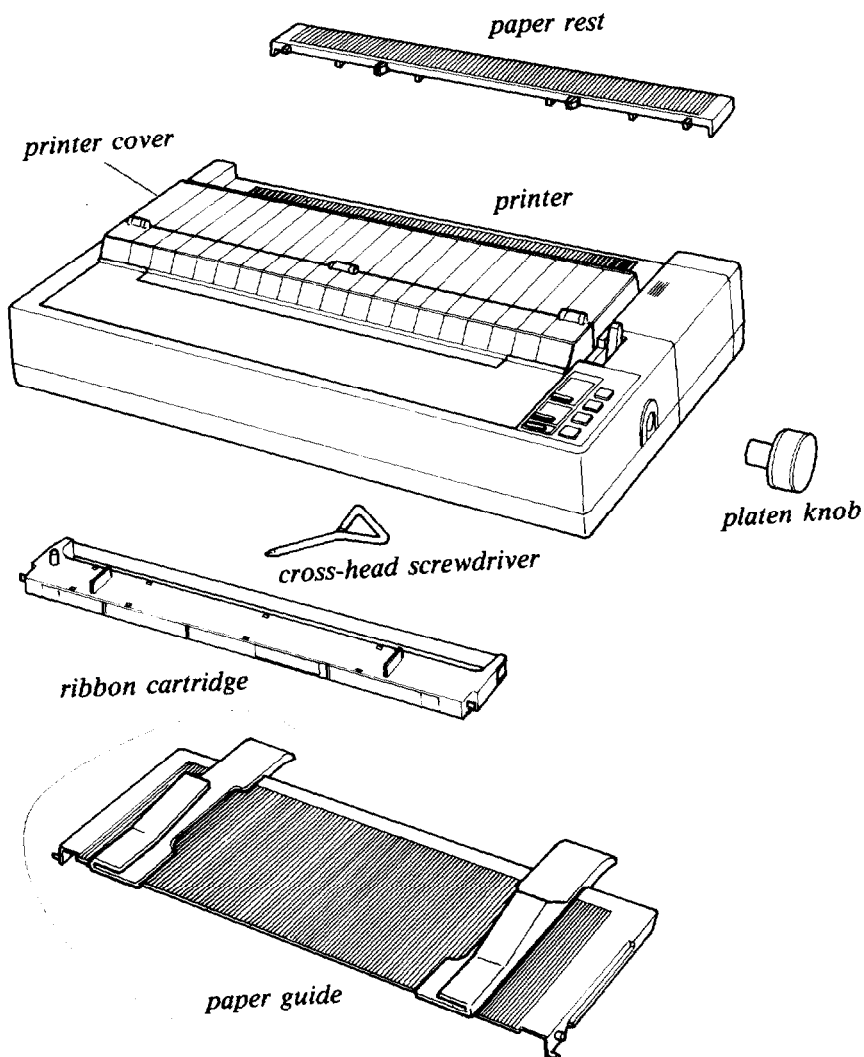
In some locations the power cable is a separate item.

Removing the protective materials

The printer is protected during shipping by two brackets, two locking tabs, and a print head protector. 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.

To remove the packing materials, follow these steps:

1. Remove the printer cover; then use the enclosed cross-head screwdriver to unscrew and remove the two transport locking brackets.
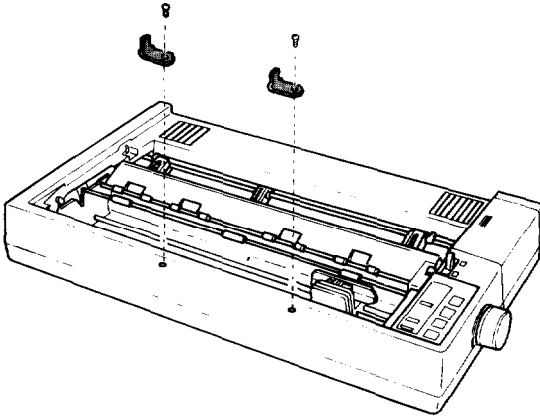
2. Remove the print head protector.

3 Slide the print head to the middle of the printer. Then, remove the left and right locking tabs.
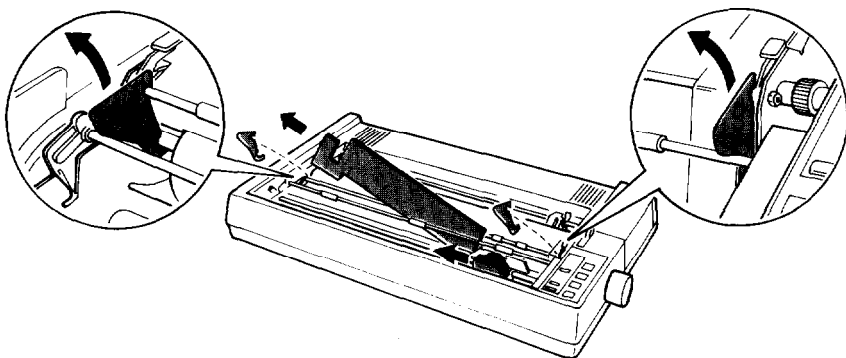
🚫 Be sure to remove all protective materials before you turn on the printer.

Choosing a Place for the Printer

There are several considerations in selecting a location for your printer. Be sure to keep the following in mind:

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

- Place the printer on a flat, stable surface.

- Leave room for easy printer operation and maintenance.

- Avoid locations that are subject to direct sunlight, excessive heat, moisture, or dust.

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

- 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 and the base units of cordless telephones.

The illustration below shows a good printer location.
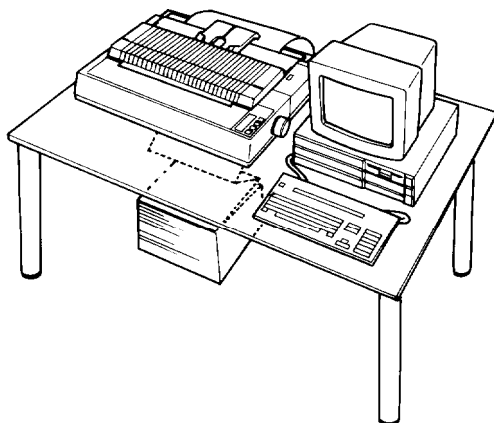
Assembling the Printer

Installing the platen knob

After you've decided on a location for your printer, the first step in setting it up is to install the platen knob. You will find the knob packed in an indentation in the white foam packing material.

1. Insert the knob into the hole on the right side of the printer. Rotate the knob until it slips onto the shaft.

2. Push firmly on the knob until it fits against the printer case.
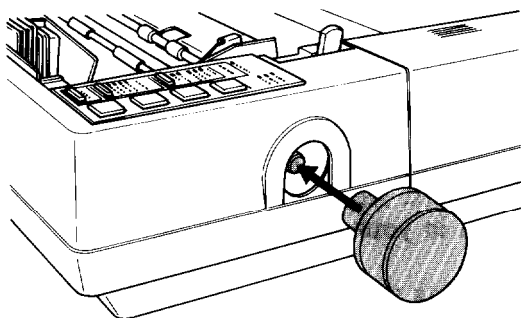
> ⚠️ Using the platen knob to adjust the position of the paper interferes with the automatic paper loading system and may cause a paper jam.

The LQ printers have a new paper loading system that uses both a paper tension unit and a paper bail to hold paper against the platen (black roller). Because this system handles all paper loading automatically, it is important that you do not use the platen knob except in the case of a paper jam or other paper feeding problems.

If you need to adjust the position of the paper after it is loaded, use the micro-adjustment feature, which is described on page 3-12.

Installing the ribbon

To install the ribbon cartridge, follow these steps:

1. Make sure that the printer is not connected to an electrical outlet.

2. Remove the printer cover.

3. Slide the print head to the middle of the printer.
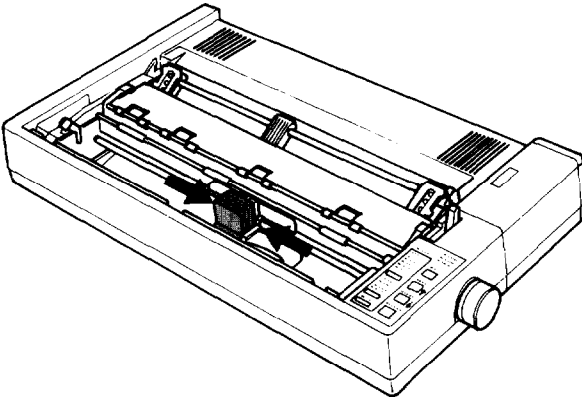
4. Turn the ribbon-tightening knob in the direction of the arrow to tighten the ribbon. This step removes excess slack in the ribbon and makes it easier to install.
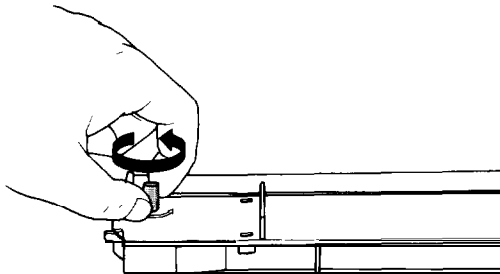
5. Hold the ribbon cartridge by its black, fin-like handles with the exposed ribbon away from you. (The LQ-850 ribbon cartridge has only one handle.) Push the cartridge firmly into position, making sure that the black plastic hooks fit into the slots inside the printer.
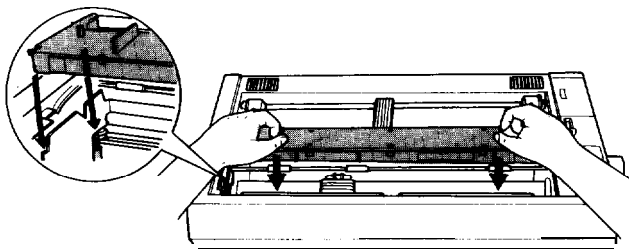
6. Use a pointed object, such as the tip of a pencil, to guide the ribbon between the print head and the ribbon guide. At the same time turn the ribbon-tightening knob in the direction of the arrow to help feed the ribbon into place.
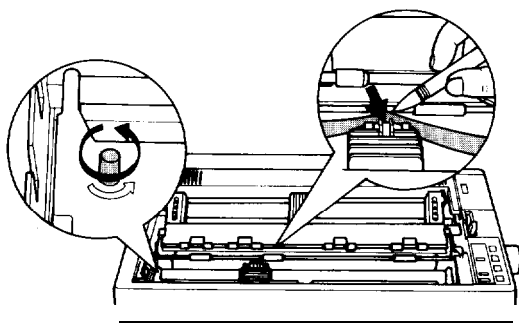
Attaching the paper guide

To install the paper guide, follow the steps listed below:

1. Place the paper guide on the printer as shown, making sure that the back edge of the guide is even with the back of the printer.
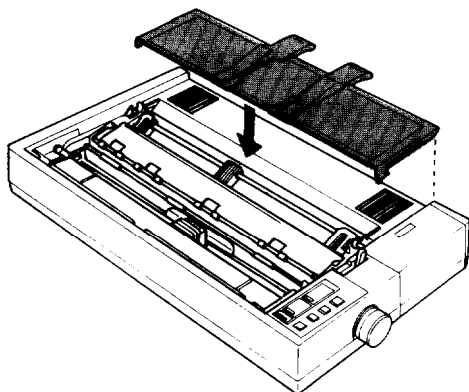
2. Raise the paper guide up until it locks in place.
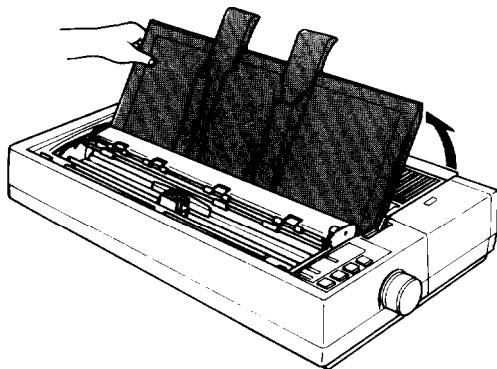
To lower the paper guide, lift up slightly to release it from its locked position and gently lower it down onto the printer.

3. Attach the printer cover.
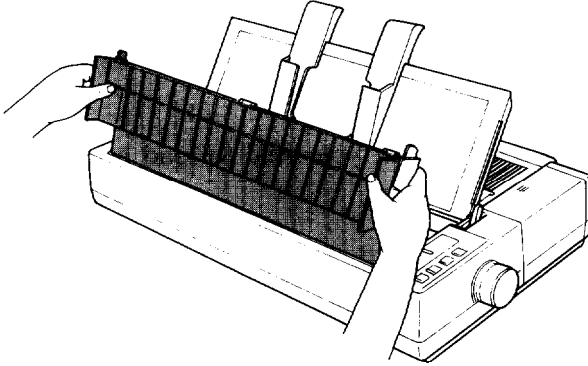
4. Close the paper guide cover.
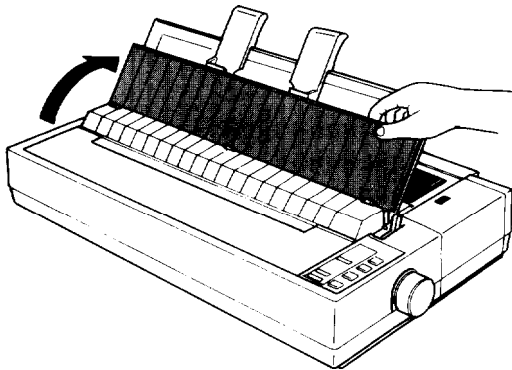
Testing the Printer

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.

You should perform this test to make sure the printer was not damaged during shipping and to ensure that the ribbon has been installed correctly.

Before carrying out the test, you need to load a sheet of paper into the printer.

Ⓧ Before turning on your printer, be absolutely sure you have removed all protective materials. Turning on the printer while the print head cannot move may seriously damage the mechanism.

Loading a sheet of paper

1. Make sure that the power switch is turned off. Next, plug the power cord into a properly grounded electrical outlet.

With certain models, the power cord is not attached to the printer. If so, connect the power cord to the printer before plugging it into an electrical outlet.
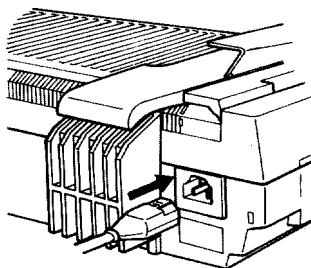
2. Turn on the printer. The green POWER light and the red PAPER OUT light come on.
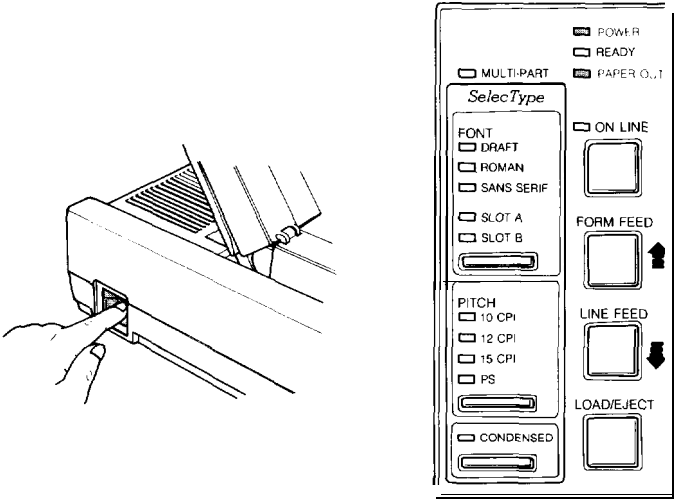
🚫 After turning the printer off, always wait at least five seconds before turning it back on. Rapid switching of the power on and off can damage the printer.

3. Push the paper release lever back to the single sheet position.

1-13
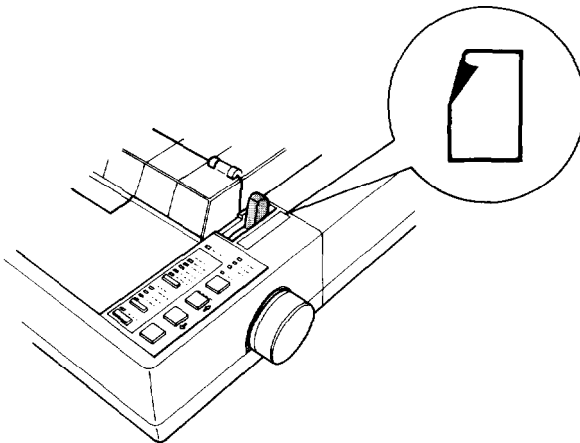
4. Move the right and left edge guides of the paper guide to match the width of the platen (black roller), and insert a sheet of paper the same width.
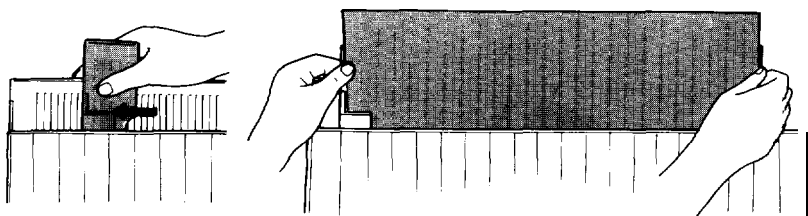
Never perform the self test on envelopes.

5. Push the LOAD/EJECT button to load the paper.
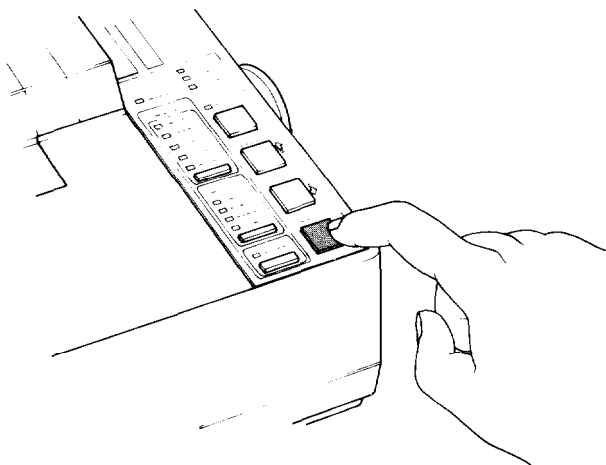
If the platen turns without loading the paper, remove the paper and try the procedure once more, but press the paper a bit more firmly into place.

Running the self test

You are now ready to start the printer's self test. This prints out the settings of the printer's DIP switches and the characters in the printer's memory. The DIP switch settings are explained later in this guide. This test can be performed in either of the LQ's two printing modes: draft or LQ (Letter Quality). No matter which printing mode you run the test in, the DIP switch settings are always printed in draft. The self test is 11 inches wide on the LQ-950 and 14 inches wide on the LQ-1050. Be sure to use wide paper.

To run the self test in draft mode follow these steps:

1. See that the printer is turned off.

2. While holding down the LINE FEED button, turn on the printer. After printing starts, release the LINE FEED button.

3. The self test does not stop until the printer runs out of paper or you press the ON LINE button. After checking to see that everything is operating correctly, press the ON LINE button to stop the test.

   Part of a typical draft self test is shown below:

```
Country          SW1-1 1-2 1-3    Page Length      SW2-
  USA              on  on  on         11"             o
 France            on  on  off        12"             o
 Germany           on  off on      1"Skip            SW2-
 U.K.              on  off off       Invalid          o
 Denmark           off on  on        Valid            o
 Sweden            off on  off     Interface         SW2-
 Italy             off off on        Parallel         o
 Spai            ff off off         Serial even       o
CG        &'()*+,-./             Serial odd        o
   #$%&'()*+,-./0123            Serial none
 '#$%&'()*+,-./0123456          Baud Rate
#$%&'()*+,-./012345678           9600 BPS         NOP
$%&'()*+,-./0123456789:;<            JKLMNOPQ
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

4. Press the LOAD/EJECT button to eject the page.

When using the optional cut sheet feeder, the self test print out is slightly different. See the section on the cut sheet feeder in Chapter 7 for more information.

5. To perform this test in the **LQ** (letter quality) mode, load another sheet of paper.

6. Turn off the printer, then turn it on again while holding down the FORM FEED button. You need only hold the button down until printing begins. As before, the self test ends when the printer runs out of paper or when you press the ON LINE button.

    Part of a typical LQ self test is shown below:

```
Country           SW1-1 1-2 1-3    Page Length    SW2-
  USA               on  on  on       11"           o
  France            on  on  off      12"           o
  Germany           on  off on     1"Skip          SW2-
  U.K.              on  off off      Invalid        o
  Denmark           off on  on       Valid          o
  Sweden            off on  off    Interface        SW2-
  Italy             off off on       Parallel        o
  Spai          ff off off           Serial even     o
CG          &'()*+,-./              Serial odd       o
     #$%&'()*+,-./012               Serial none
   "#$%&'()*+,-./012345             Baud Rate
  #$%&'()*+,-./012345678              9600 BPS        MNOP
  $%&'()*+,-./0123456789:;<        JKLMNOPQ
  %&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
  &'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
  '()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
  ()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
  )*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
  *+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
  +,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
  ,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
  -./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

Connecting the Printer to Your Computer

Your LQ printer has two separate interface connections: a Centronics® compatible 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.

The printer is set up for parallel data communication at the factory. If you need to use a serial interface, be sure to adjust the DIP (Dual In-line Package) switch settings as shown in the section on DIP switches in Chapter 3.

The few computers requiring other types of interfaces can probably use one of the optional interfaces described in the section on interfaces in Chapter 7.

Do not plug more than one interface cable into the printer at one time. This may damage the printer.

serial interface   *parallel interface*
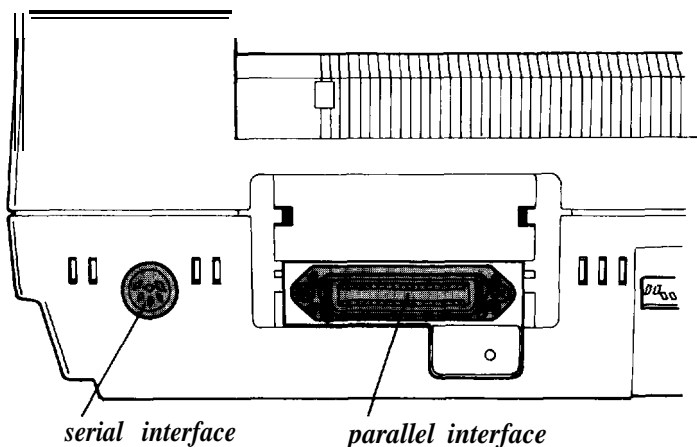
The parallel interface

When connecting your computer to the parallel interface, follow these steps:

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

2. Plug the cable connector into the printer as shown below. Next squeeze the wire clips together until they lock onto either side of the connector.
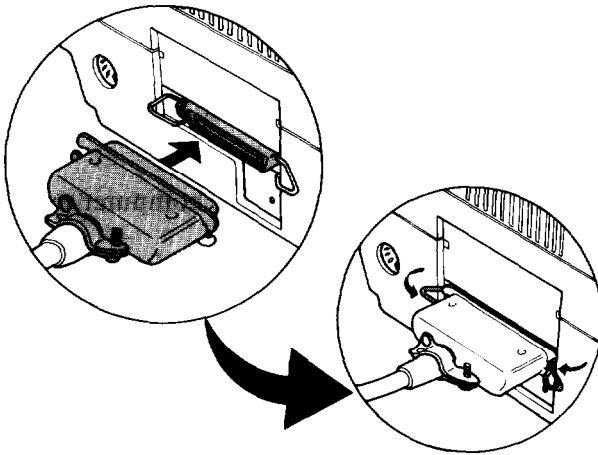
If your cable has a ground wire, attach this wire to the ground connector of the printer.

3. Plug the other end of the interface cable into the computer. (If there is a ground wire at the computer end of the cable, attach it to the ground connector at the back of the computer.)

The serial interface

If you are going to use a serial interface, it is best to choose an Epson serial interface cable. The following is a list of interface cables and the computers they are designed to work with:

Computer	Epson cable
Apple® IIc	#8239
IBM® PC and compatibles	**#8297**
Most other computers	**#8293**

When connecting your computer to the serial interface, follow these steps:

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

2. Connect the interface cable to the serial interface of the printer as shown **below.**
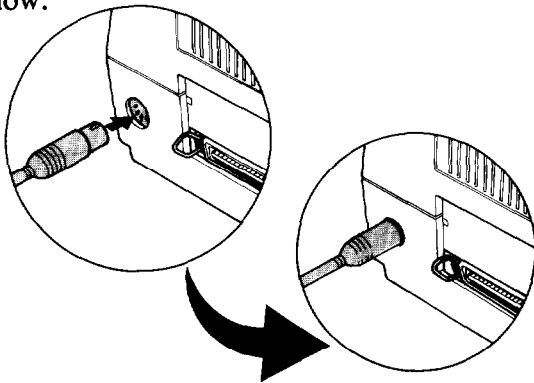
3. Plug the other end of the interface cable into the computer.

Since your printer is set up at the factory to use parallel communication, you will need to change the DIP switch settings to select serial communication. Two other serial interface settings, baud rate and parity, may need to be set before your printer and computer can communicate properly. See the section on setting DIP switches in Chapter 3 for more information.

Using Single Sheets

Your printer can handle a wide range of paper sizes up to a maximum width of 10.1 inches on the LQ-850, 13.0 inches on the LQ-950, or 14.4 inches on the LQ-1050.

Always make sure that your printing is confined to the size of paper you are using. Avoid printing on the platen (black roller) at all times.

If you do most of your printing on single sheets, you may find it more convenient to install the optional cut sheet feeder. This option automatically inserts a new sheet whenever required and can hold up to 150 pages. For more details, see Chapter 7.

To load a single sheet of paper follow these steps:

1. See that the printer is turned on.

2. Push the paper release lever back to the single sheet position.
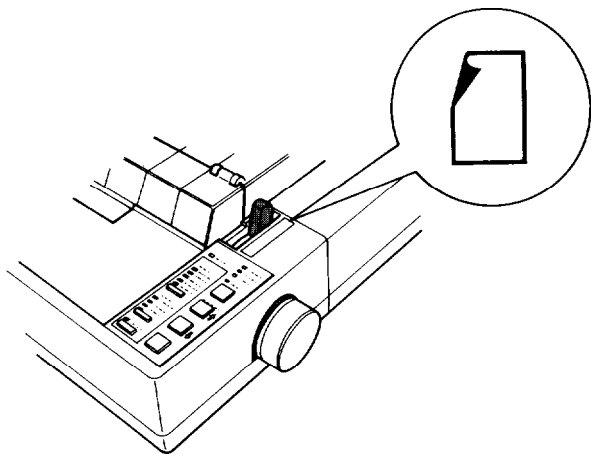
3. Stand the paper guide in an upright position and align the left edge guide with the arrow on the paper guide. (You may want to change this position later, depending on the margin settings of your application program.)
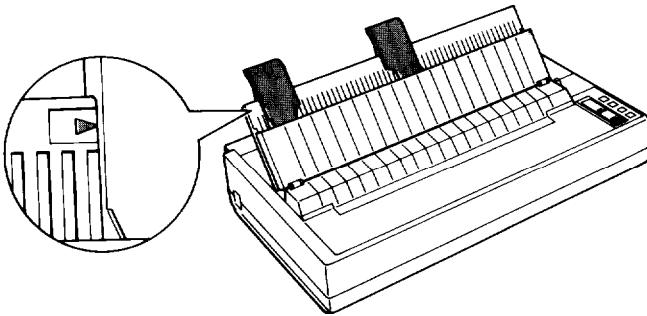
4. Adjust the right edge guide to fit the size of the paper.

5. Slide the paper down between the edge guides until it meets resistance. At this point, the PAPER OUT light turns off.
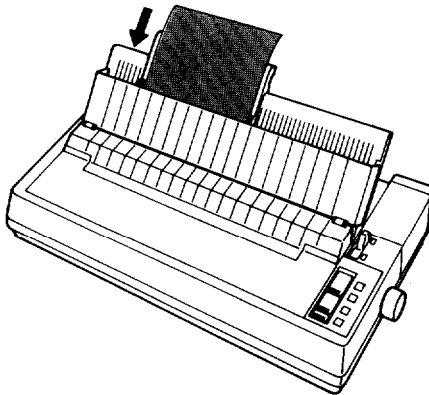
6. Press the LOAD/EJECT button to automatically feed the paper to the loading position.

⊘   Never advance the paper using the platen knob while the printer is turned on.

7. Press the ON LINE button so that the ON LINE indicator lights up. When the printer is on line it can accept data from your computer.

If the platen (black roller) turns but the sheet does not load, remove the sheet from the printer and try again. Make sure that the paper release lever is pushed back and then press the paper a bit more firmly into place.

Reloading during printing

When you print a document more than one page long using single-sheet paper, there are two ways your software can *allow you to load a new sheet at the end of a printed page:

- If your software sends characters in a continuous stream, the printer stops printing when it reaches the bottom of the paper. When this happens, the page ejects and the ON LINE light goes off automatically.

- If your software handles printing page by page, it probably stops sending characters at the end of a page and prompts you to insert more paper. In this case, the ON LINE light may remain on. If it does, the first thing you should do is press the ON LINE button once to take the printer off line.

In either case, once the ON LINE light is off, remove the sheet that has just been printed and load a new sheet as before. Press ON LINE to start printing the next page.

Using Continuous Paper

The tractor built into the LQ is remarkably easy to load and operate. Its low-profile design takes up little space and can handle a wide variety of paper widths.

To load continuous paper, follow these steps:

1. See that the printer is turned off.

2. Pull the paper release lever forward to the continuous paper position.
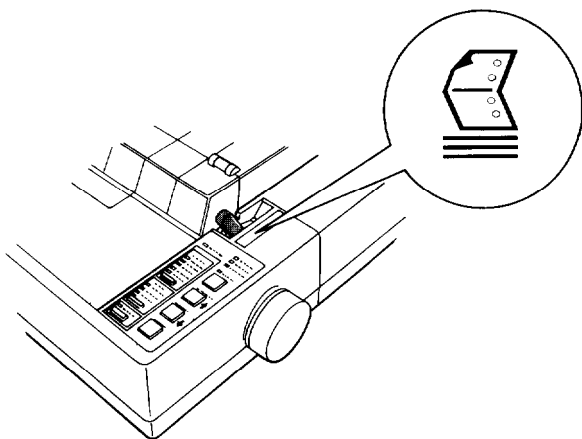
3. Open the paper guide cover and remove the paper guide.
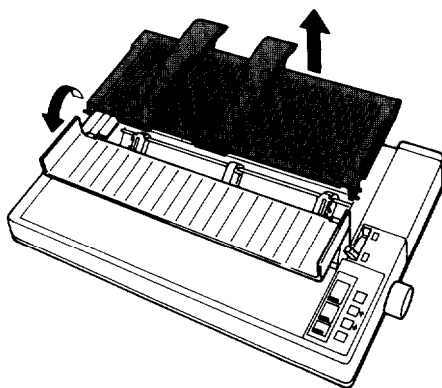
4. Attach the paper rest.
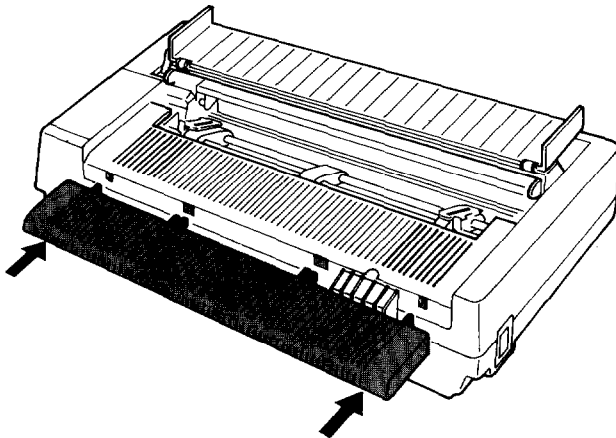
5. Release the sprocket lock levers and slide the left sprocket unit all the way to the left and lock it in place. Next, slide the right sprocket unit to roughly match the width of your paper.
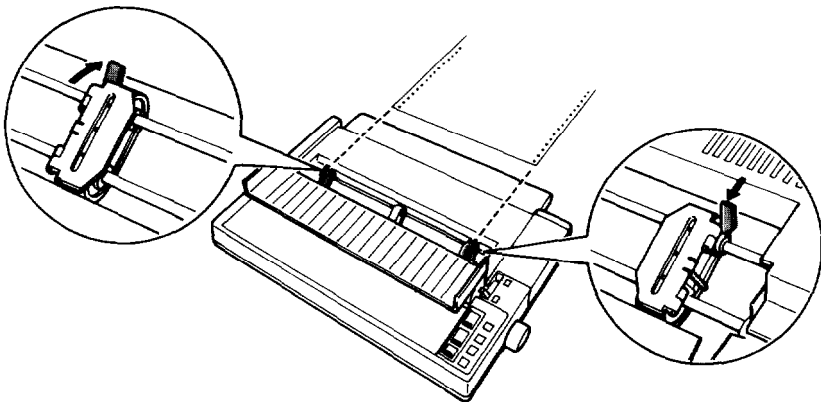
6. Slide the paper support to a point midway between the sprocket units.
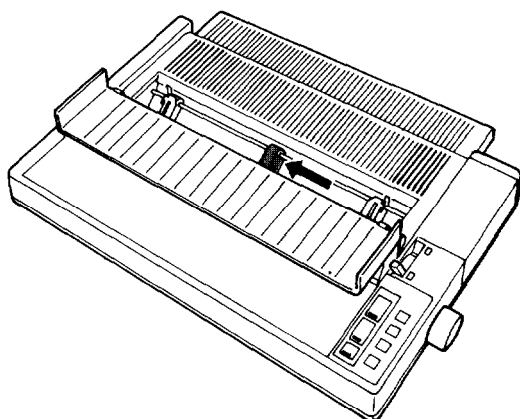
7. Open the sprocket covers.
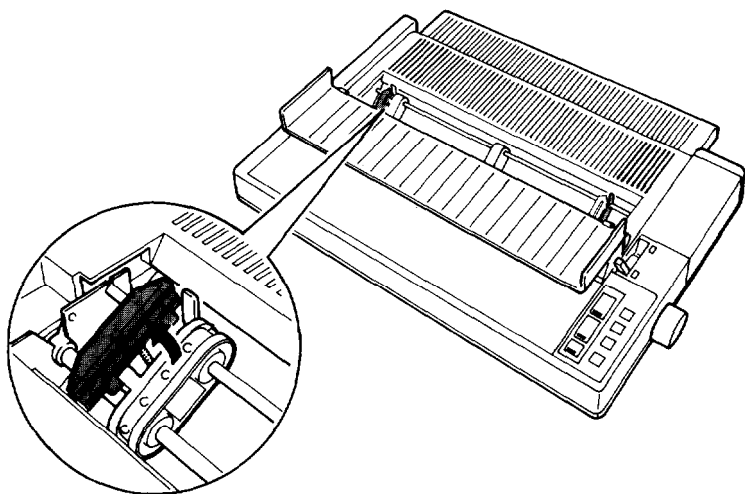
8. Fit the first four holes in the paper over the pins of each sprocket unit making sure the paper is under the silver edge ; then close the sprocket covers. Slide the right sprocket unit to a position where the paper is straight and has no wrinkles; then lock it in place.

Make sure the first sheet of paper has clean, straight edge and feeds under the silver edge to in sure correct paper feeding.
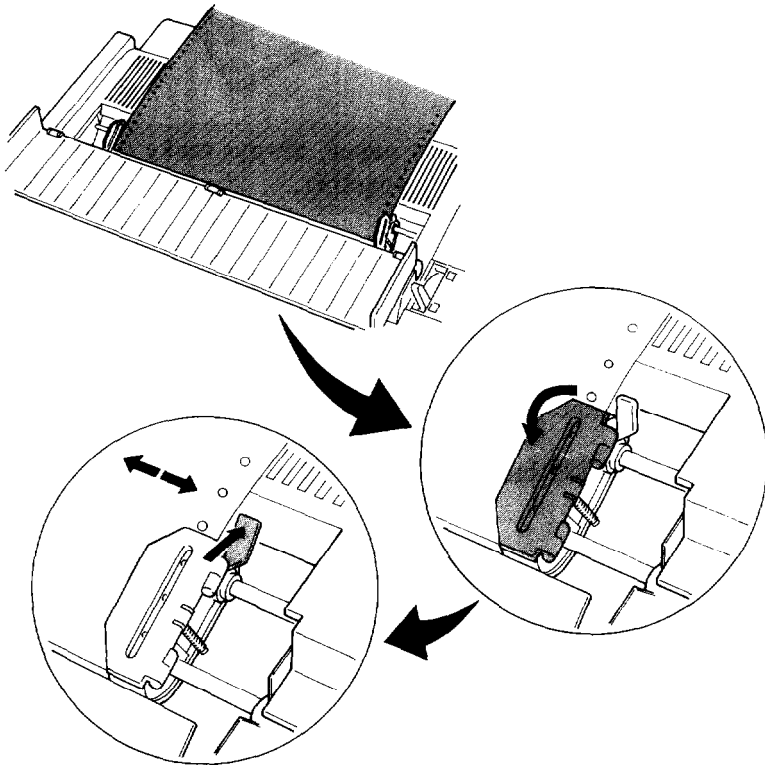
9. Reattach the paper guide as shown below; then slide the edge guides together so that they meet at about the middle of the paper's width.
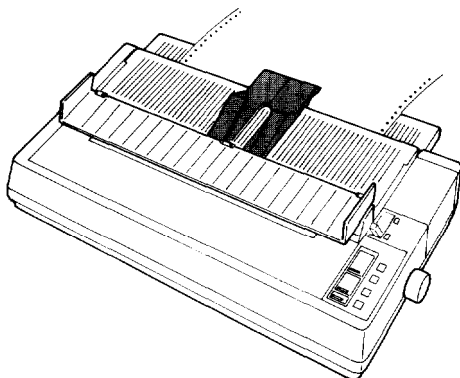
⚠️ When using continuous paper, always make sure that the edge guides are pushed together.

10. Close the paper guide cover and turn on the printer.

11. Press the LOAD/EJECT button to feed the paper to the loading position. The printer remembers this position and advances each page to the same position.

12. Press the ON LINE button to set the printer on line so that it can accept data.

If you find that your word processing or other application program prints too high or too low on the page or is printing on the perforations, check the loading position.

If you need to adjust this setting, you can use the micro-adjustment feature. This feature gives you precise control over the position of your paper by allowing you to feed the paper either forward or back in 180th of an inch increments. For more information see the section on the micro-adjustment feature in Chapter 3.

When using continuous paper, you can also choose the short tear-off feature to give you added paper-handling capabilities. When this feature is selected, the printer automatically feeds the paper forward so that you can tear it off at its perforation. Then, it feeds the paper backward when data is received so you can resume printing at the loading position.

This feature makes it easier to detach printed pages and saves the blank pages that are usually lost between printing jobs. See the section on short tear off in Chapter 3 for details.

⚠️ Do not advance the paper using the platen knob while the printer is turned on. If you need to adjust the loading position, always use the micro-adjustment feature.

Positioning your continuous paper supply

Three common ways of positioning your printer and continuous paper supply are shown below.
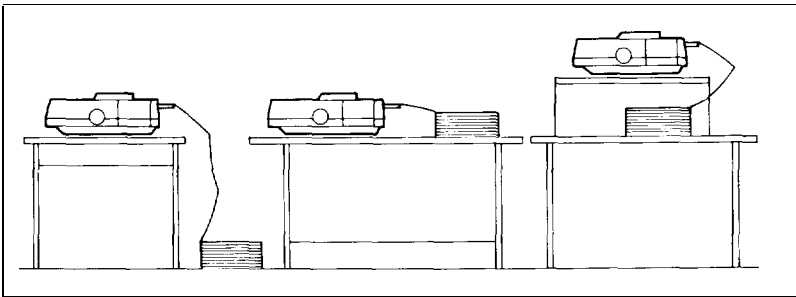
It's important to keep your paper supply aligned with the tractor so that the paper feeds smoothly into the printer.
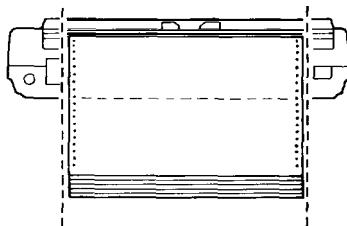
Switching Between Continuous and Single Sheets

Even with continuous paper loaded in the printer, you can easily switch to single-sheet printing without removing the continuous paper from the tractor. To switch from continuous paper to single sheets, follow the steps below.

1. Open the paper guide cover and press the ON LINE button to set the printer off line. Then, remove your printed document. If you are not using the short tear-off function, you need to press the FORM FEED button to advance your document to a point where it can be removed.
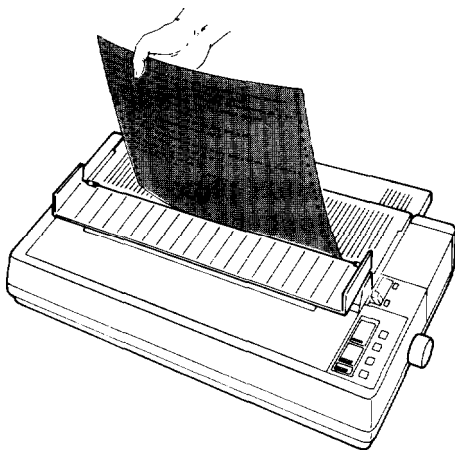
To avoid feeding your continuous paper backward more than is necessary, always make sure that you tear off the printed document before pressing the LOAD/EJECT button.

2. Press the LOAD/EJECT button to feed the continuous paper backward out of the printer and into a standby position. The paper is still attached to the tractor, but no longer in the paper path. The PAPER OUT light comes on when the paper is completely out of the paper path.
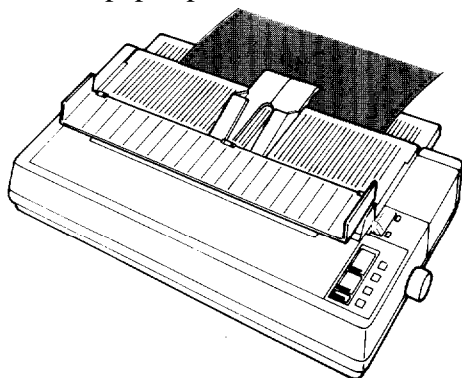
Pressing the LOAD/EJECT button once may not feed the paper back enough to reach a standby position. If the PAPER OUT light does not come on, you need to press the LOAD/EJECT button again. With normal width continuous paper, you can press the LOAD/EJECT button up to three times. If, however, you are using narrow paper (between 4 and 6 inches) you should only press the LOAD/EJECT button once. Also, do not use this button to eject labels.

3. Push the paper release lever back to the single sheet position.

4. Stand the paper guide upright, and adjust the edge guides to roughly match the width of your paper.
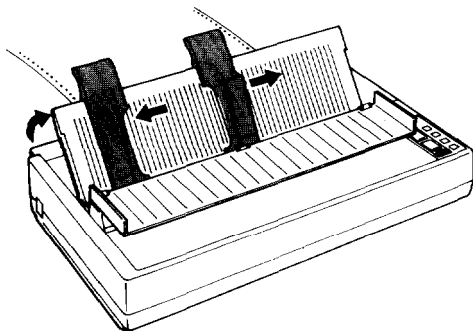
5. Close the paper guide cover. Next, insert the paper between the edge guides.
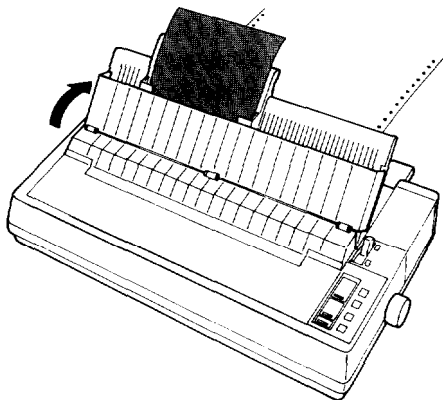
6. Press the LOAD/EJECT button to automatically feed the page to the loading position.

7. Press the ON LINE button to set the printer on line so that it is ready to print.

Switching back to continuous paper

To switch back to printing with continuous paper, first see that the single sheet has ejected.

1. Open the sheet guide cover. Next, lower the paper guide onto the back of the printer and slide the edge guides together so that they meet at about the middle of the paper's width.
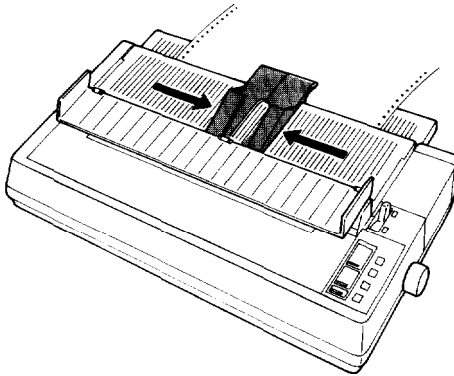
2. Pull the paper release lever toward you.

3. Press the LOAD/EJECT button to feed the paper to the loading position.

4. Press the ON LINE button to set the printer on line so that it can accept data.

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 multi-part forms and labels. You can even feed envelopes manually or with the optional cut sheet feeder. Before printing on these special types of paper you need to adjust the paper thickness setting. Never use reverse feed with labels.

The paper thickness lever

To accommodate various thicknesses of paper, the LQ printer is equipped with a paper thickness lever that can be set to one of eight positions. These positions are identified by a scale on the printer frame next to the lever. For normal use, the lever should always be set to position 2 on the scale.
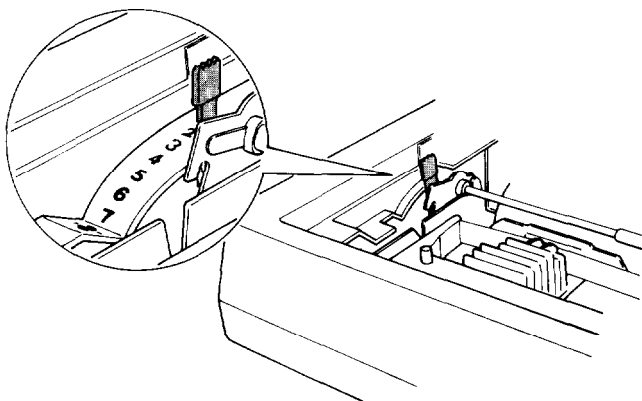
Before changing the paper thickness setting, first make sure the power is off and then open the printer cover.

If you've been using the printer just before opening the printer cover, be careful not to touch the print head because it may be hot.

For printing on special types of paper, see the table below. When the paper thickness lever is set to position 4 or higher, the MULTI-PART light comes on and the printing speed is reduced.

The following table gives you general guidelines for selecting the right paper thickness lever position to match your paper:

Paper Type	Lever Position
Paper (single sheets or continuous)	2
Thin paper	2 or 1
Multi-part paper	
2-sheet	3
3-sheet	4
4-sheet	5
Labels	4
Envelopes	
Air mail	4 or 5
Plain	6
Bond (20 lb.)	6
Bond (24 lb.)	7

Always return the lever to position 2 when you go back to printing on ordinary paper.

🚫 Continuous printing with the lever set at a position higher than 2 can shorten the life of the print head.

To help you check the position of the paper thickness lever, the orange MULTI-PART light on the control panel comes on if the lever is set to position 4 or higher.

🚫 Printing past the edge of envelopes, multi-part forms, labels, or thicker than normal paper can damage the print head.

When you print on anything thicker than normal paper, such as envelopes or multi-part forms, be absolutely sure that your printing stays within the printable area of the paper. See pages 2-20 and 8-3 for more about printable area.

Multi-part forms

Your printer can also use continuous multi-part forms. These multiple forms should have no more than four parts including the original.

Multi-part forms should not be used with the single-sheet feeding system or the cut sheet feeder.

You load continuous multi-part paper the same way that you load continuous paper. See the section on loading continuous paper in this chapter for details. The only difference is that you need to adjust the paper thickness lever to suit the thickness of your paper before loading. When you set the paper thickness lever to position 4 or above, the MULTI-PART light comes on and the printing speed is reduced. See the table on the previous page for the correct paper thickness setting.

Labels

If you need to print labels, always choose the type mounted on a continuous base sheet provided with sprocket holes for use with the tractor. If you attempt to print labels using the single-sheet feeding system, labels on a shiny base sheet almost always slip a little.

You load labels the same way that you load continuous paper. See the section on loading continuous paper in this chapter for details. The only difference is that you need to adjust the paper thickness lever to match the thickness of your labels. See the table on page 2-17 for the correct paper thickness setting.

To remove labels, tear off at a perforation *behind* the push tractor. Then, set the printer off line and use the FORM FEED button to eject the labels.

🚫 Never feed the labels backward through the printer.
Labels can easily come off the backing and jam the
printer. Also, never use the LOAD/EJECT button to eject
labels or to feed labels backward to the standby position.
If a label does become stuck in the printer mechanism,
refer the problem to your dealer. Since labels are
especially sensitive to temperature and humidity, always
use them under normal operating conditions.

Envelopes

With the optional cut sheet feeder installed, you can print on a
variety of envelopes, including air mail, plain, or bond. See the
section on the cut sheet feeder in Chapter 7. Before loading
envelopes into the cut sheet feeder, you need to adjust the paper
thickness lever. See the table showing envelope types and
recommended lever positions on page 2-17.

You can also feed envelopes individually, using the single sheet
loading feature. First, set the paper-thickness lever as indicated in
the table on page 2-17. Then, follow the single sheet loading
instructions at the beginning of this chapter. Because of the
thickness of envelopes, however, you may have to press down
slightly on the envelope at the same time you press the LOAD/EJECT
button.
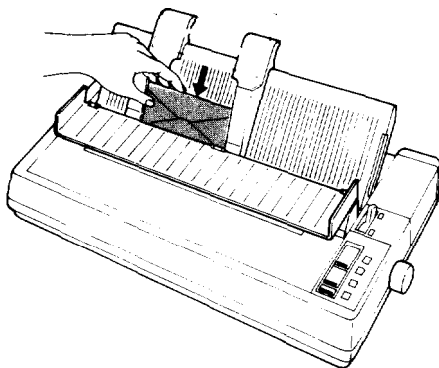
When printing on envelopes, be sure that your application program settings keep the printing entirely within the printable area of the envelopes as shown below.

0.33" or more

printable area

0.87" or more

0.12" or more
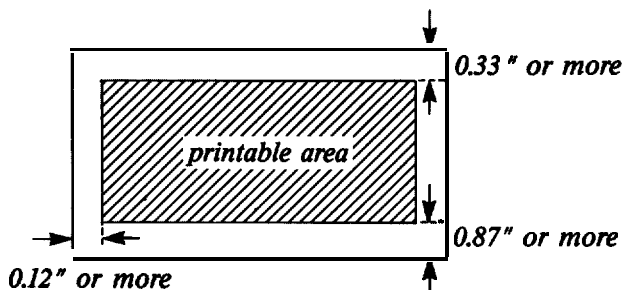
To make sure that the printing fits within this area, always perform a sample printing test using a normal single sheet of paper before printing on envelopes.

Operating the Control Panel

The buttons on the control panel let you control the majority of the printer settings. The control panel also has indicator lights so you can check the current status of the various settings of the printer.

Lights
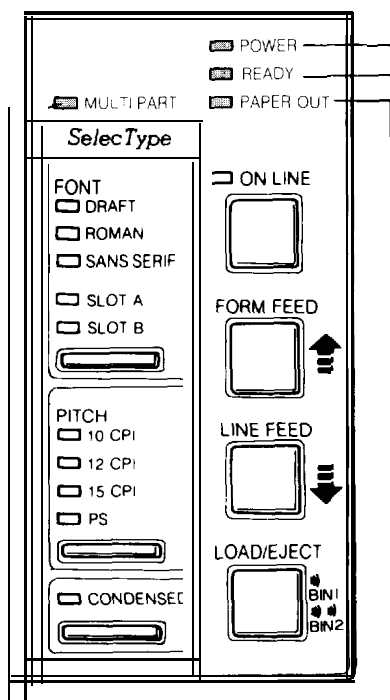
POWER (green)
On when the power switch is on, and power is supplied.

READY (green)
On when the printer is ready to accept input data. Flickers during printing.

PAPER OUT (red)
On when the printer is out of paper.

-MULTI-PART (orange)
On when the paper thickness lever is set to position 4 or higher. (For regular paper, this light should not be on.)

When this light flashes, you can use the micro-adjustment feature. See the section on micro adjustment in this chapter for details.

Buttons
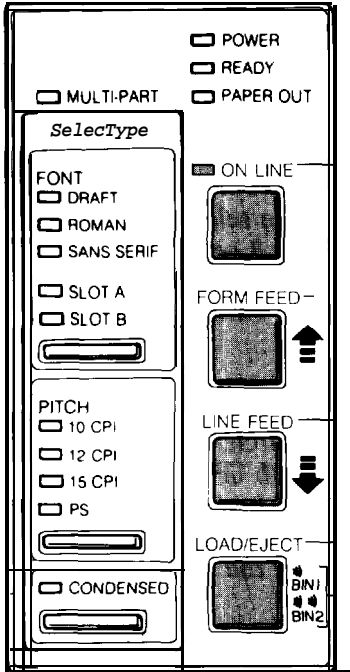
ON LINE
This button controls the printer's
on line/off line status. When the
printer is on line, the indicator
light is on and the printer can
receive and print data from the
computer.

FORM FEED
When the printer is off line, press
this button to eject a single sheet
of paper or 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 paper if paper
is not loaded, or to eject it if
paper is loaded.

-BIN 1/BIN 2
When the printer is on line, press
this button to change between bin 1
and bin 2 on the optional dual bin
cut sheet feeder.

SelecType

The settings you select using the SelecType panel remain valid even after you turn off, reset, or initialize the printer.
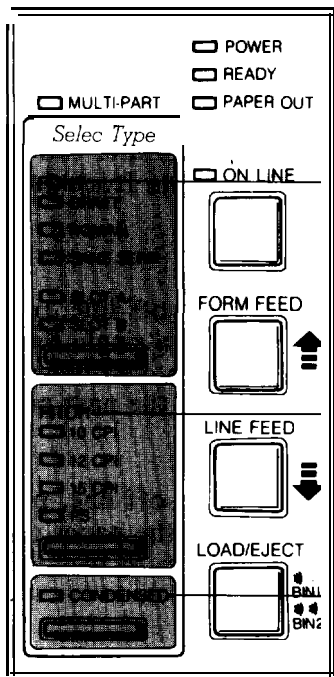
FONT
Press this button to select a character font. The orange indicator lights show which font has been selected. If optional font modules have been installed, these fonts can be selected by choosing either SLOT A or SLOT B. See the section on selecting fonts in this chapter for further information.

PITCH
Press this button to select the character pitch. You can choose 10, 12, or 15 CPI (character per inch) or PS (proportional spacing). The orange indicator light shows the selected pitch.

CONDENSED
Press this button to select either condensed or normal printing. The orange light is on when the printer is in condensed mode. In this mode, all characters are printed at approximately 60% of their normal width. This mode cannot be combined with 15 CPI.

Two combinations do **not** work: draft proportional and condensed 15 cpi. If you try to choose one of these, the printer **beeps** three times.

3-4

Other control panel features

The control panel of the LQ also gives you access to several special functions.

Self test

By holding down the FORM FEED or LINE FEED button while you turn on the printer, you can start the LQ's self test. This prints out the DIP switch settings and the characters in the printer's ROM (Read Only Memory). See the section on the self test in Chapter 1 for further information.

Micro adjustment

By pressing the FORM FEED and **LINE FEED** buttons immediately after loading paper and when the printer is on line and the orange indicator light is flashing, you can move the paper 1/180th of an inch at a time for fine adjustments to the loading and short tear-off positions. See the section on micro adjustment in this chapter for further 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 diagnose many problems. See the section on the data dump mode in Chapter 6 for further information.

Setting the DIP Switches

By adjusting the settings of the two groups of DIP switches (SW1 and SW2) in the back of the printer, you can control various features such as character set and page length.

To change the setting of a DIP switch, first turn off the printer. Using a pencil, pen, or other pointed instrument, change the setting as shown below. Then, turn the printer back on.
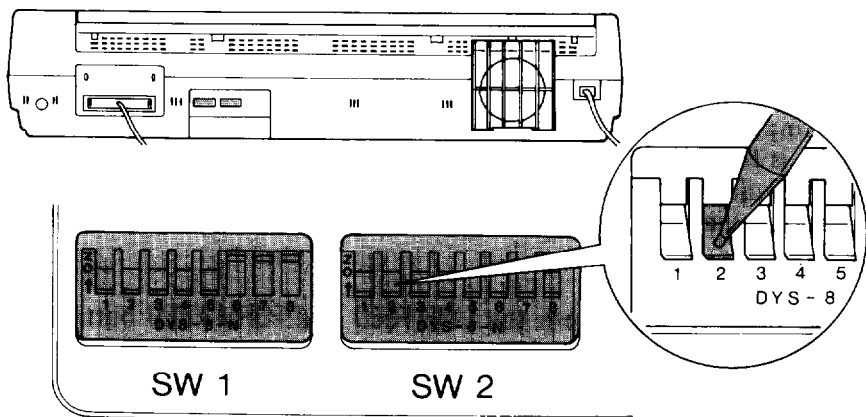
⚠ Your new settings will not become effective unless the printer is turned off and on, or reset.

The tables below describe the functions of the DIP switches.

DIP Switch 1

Switch	Description	ON	OFF
1-1			
1-2	International character set	See the table below.	
1-3			
1-4	Character table	Graphics	Italics
1-5	Print direction for graphics	Unidir.	Bidir.
1-6	Not used		
1-7	Cut sheet feeder mode	Valid	Invalid
1-8	6 Kbytes receive buffer	0 bytes	6 Kbytes

DIP Switch 2

Switch	Description	ON	OFF
2-1	Page length	12 inches	11 inches
2-2	Skip over perforation	ON	OFF
2-3	Interface/Parity	See the table below.	
2-4			
2-5	Baud rate	See the table below.	
2-6			
2-7	Short tear-off mode	ON	OFF
2-8	Auto line feed	ON	OFF

represents the DIP switch settings that have been preset at the factory.

The factory settings for International character sets (**DIP** switches 1-1 to 1-3), the Character table (**DIP** switch 1-4), and Page length (**DIP** switch 2-1) vary depending on the country, and are not shown in the tables above.

International character set selection

1-1	1-2	1-3	Country
ON	ON	ON	U.S.A.
ON	ON	OFF	France
ON	OFF	ON	Germany
ON	OFF	OFF	U.K.
OFF	ON	ON	Denmark 1
OFF	ON	OFF	Sweden
OFF	OFF	ON	Italy
OFF	OFF	OFF	Spain 1

* See page 3-20 for other character sets.

Interface/parity selection

2-3	2-4	Interface Type	Parity
OFF	OFF	Parallel	
OFF	ON	Serial	Odd
ON	OFF	Serial	Even
ON	ON	Serial	None

Baud rate selection

2-5	2-6	Baud Rate
OFF	OFF	9600 bps
ON	OFF	4800 bps
OFF	ON	1200 bps
ON	ON	300 bps

Print direction for graphics

With unidirectional printing, the print head prints in one direction only to eliminate any possible deviation in the dot positions, making it ideal for printing graphics such as lines or boxes. When DIP switch 1-5 is ON, unidirectional is valid; when it is OFF, bidirectional is valid. Either one can be overridden by a software command.

Auto Line Feed

When auto line feed is ON (DIP switch 2-8 ON), each carriage return code (CR) is automatically accompanied by the line feed code (LF).

Page Length

By setting DIP switch 2-1, you can select a page length of 11 or 12 inches. By turning the switch on, you set the page length at 12 inches. When you turn the switch off, you set the page length at 11 inches.

To change the setting of a DIP switch, first turn off the printer. Next, change the DIP switch; then turn the printer back on.
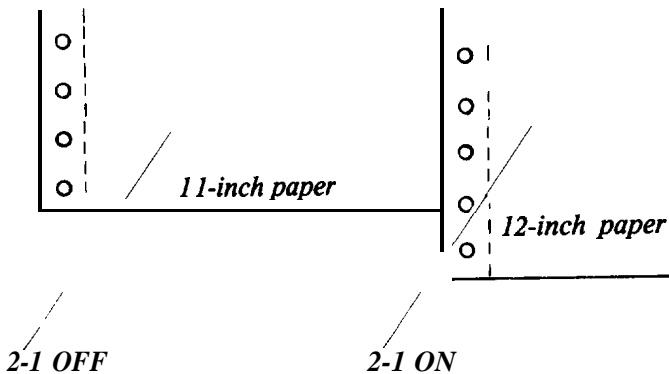
11-inch paper

12-inch paper

2-1 OFF   *2-1 ON*

Your new settings will not become effective unless the printer is turned off and on, or reset.

Skip Over Perforation

When skip over perforation is on, a one-inch margin is provided between the last line printed on one page and the first line printed on the next page. This feature may be useful when using continuous paper because it will cause the printer to stop printing, skip over the perforation, then resume printing.

If you adjust your loading position correctly, you can get half of the margin at the bottom of one page and half at the top of the next page, as shown below.

2-2 OFF *(Skip over perforation off)*

```
      0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
  ●   123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
      23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
  ●   3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
  _ _ 456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
      56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'
  ●   6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'a
      789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'ab
      89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abc
  ●   9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abcd
      :;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abcde
```

2-2 ON *(Skip over perforation on)*

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

  ●

  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

  ●


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

⚠ Most application programs take care of the top and
bottom margins. Therefore, do not turn skip over
perforation on 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 the page. If the printing is too high or too low on the page, change the loading position using the micro-adjustment feature described below.

⊘ Never use the platen knob for paper feeding except in case of a paper jam or other paper feeding problem. 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.

Micro adjustment
The micro-adjustment feature moves the paper 1/180th of an inch at a time to make fine adjustments to the loading or short tear-off positions. Once you have used micro adjustment to change the loading position of *continuous paper,* the printer remembers that position even after it is turned off.

However, when you use micro adjustment to change the loading position of *single sheet* paper, the printer does not remember this position after the power is turned off. When the power is turned back on, the loading position returns to its factory setting.

This section describes using micro adjustment to change the loading position, but you can adjust the short tear-off position the same way. See the short tear-off section in this chapter for more information.

To perform micro adjustment of the loading position, first load your paper, and then press the ON LINE button to set the printer on line. The MULTI-PART indicator light starts to flash. While this light is flashing, you can use the FORM FEED and LINE FEED buttons for micro adjustments.

Now press the FORM FEED button to feed the paper forward or the LINE FEED button to feed the paper backward.
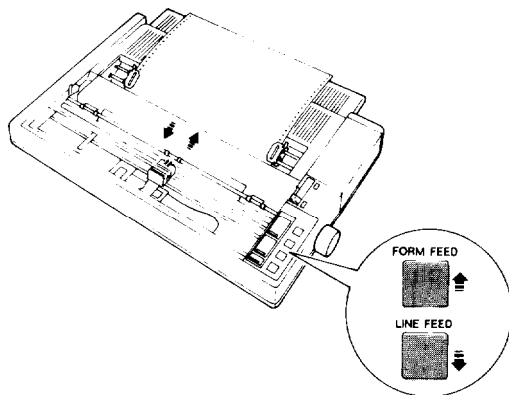
Each time you press the button, the paper moves 1/180 of an inch. If you hold the button down, the paper moves continuously in 1/180 of an inch increments.

When the paper reaches the factory set loading position, the printer beeps and micro-adjustment feeding pauses for a moment before continuing. You can use this factory setting as a reference point when adjusting the printer's loading position.

⚠ Micro adjustment can be used to adjust the loading position immediately after loading paper only. Using micro adjustment on continuous paper establishes a new loading position that remains valid even after the printer is turned off, reset, or initialized. When using micro adjustment on single sheet paper, the new loading position does not remain valid after the printer is turned off or reset. When the paper reaches either the minimum or maximum top margin, the printer beeps and the paper stops moving.

Short Tear Off

When you are finished printing, the short tear-off feature automatically feeds the perforation of the continuous paper to the tear-off edge of the sheet guide cover so that you can tear off the last sheet. When you resume printing, the paper feeds back to the loading position.

To use this feature, first turn off the printer and turn DIP switch 2-7 on. Then, load continuous paper in the normal way, but leave the paper guide cover open so that you can use the guide's tear-off edge.

The short tear-off function operates as follows:

1. The perforation at the end of the last printed page feeds to the tear-off edge of the sheet guide cover.

2. You tear off the page using the tear-off edge.
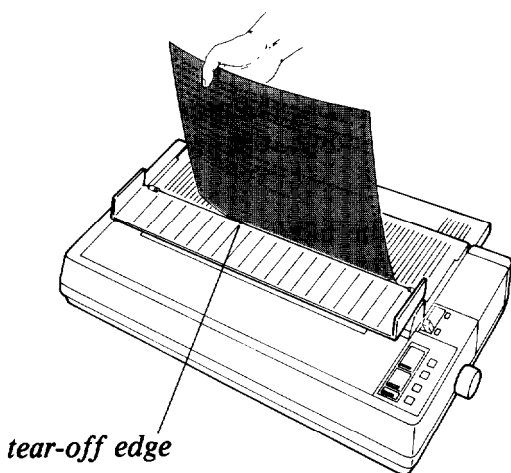
tear-off edge

3. If you need to adjust the position of the perforation to meet the tear-off edge, use micro adjustment. First, see that the printer is on line and the MULTI-PART indicator light is flashing. Then, adjust the position in 1/180 of an inch increments by pressing the FORM FEED button to feed the paper forward or the LINE FEED button to feed it backward.
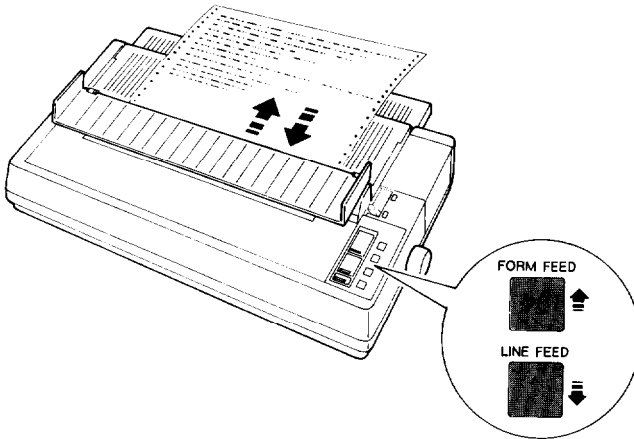
⚠️ Use micro adjustment to adjust the tear-off position immediately after the operation of the short tear-off function. After micro adjustment, the new tear-off position is reset and remains valid even after the printer is turned off, reset, or initialized. Never use the short tear off feature with labels.

4. When you resume printing after tearing off the sheet, the paper automatically feeds backward to the loading position before printing begins.

You can leave the short tear-off feature turned on (DIP switch 2-7 on) even when you are using single sheets. When you move the paper release lever to the single sheet position, short tear-off is disabled.

Selecting Typestyles

Your printer can produce a wide range of typestyles by combining different fonts, pitches, widths, and other enhancements. You can select the typestyles in two different ways: by using software commands, and by pressing SelecType buttons on the control panel.

The settings you select using the SelecType panel remain valid even after the printer is turned off, reset, or initialized. However, commands from your software application program temporarily override the SelecType setting.

This chapter describes only the features controlled by SelecType. To use software commands, see the instructions for your application program or Chapter 9, Command Summary.

You can use the SelecType section of the control panel to choose fonts, pitches, and condensed printing. Orange lights indicate which features you have chosen.

Character fonts

To select a font, press the FONT button until the font's orange indicator light comes on. Note that font selection skips over SLOT A or SLOT B if no optional font module is installed in that slot.

The character sets of the three built-in fonts are shown below. To expand your range of typestyles, you can use four optional font modules. For details on their installation and use, see the section on font modules in Chapter 7.

Draft mode uses fewer dots per character for high-speed printing.

DRAFT

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

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

The Roman and Sans Serif Letter Quality (LQ) fonts use a larger
number of dots for higher print quality at a lower speed.

ROMAN

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

Character pitch

For each of the three built-in fonts, you can choose a character pitch of 10, 12, or 15 characters per inch (CPI), and for all except draft you can choose proportional spacing (PS).

To select a pitch, press the PITCH button until the indicator light of the desired pitch comes on. Note that some font modules **do not** offer all pitches. See the section on font modules in Chapter 7.

The following printout compares the three pitches:

This is 10 CPI printing.

This is 12 CPI printing.

This is 15 CPI printing.

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 following printout compares IO-pitch spacing with proportional spacing:

This is 10 CPI spacing.

This is proportional spacing.

Condensed mode

In addition to the three pitches and proportional spacing, you can also use the condensed mode to change the character size. In condensed mode, characters are approximately 60% of the width of normal characters; so it is very useful for spreadsheets and other applications where you need to print the maximum amount of information on a page. Both 10 and 12 CPI and proportional can be condensed; 15 CPI cannot.

To select condensed mode, simply press the **CONDENSED** button so that the orange indicator light comes on. To turn off condensed mode, press the button again.

The following printout compares normal 10 and 12 CPI with condensed 10 and 12 CPI.

This is 10 CPI printing.

This is condensed 10 CPI printing,

This is 12 CPI printing.

This is condensed 12 CPI printing,

If SelecType does not work

Some application programs are designed to control all typestyle functions. These programs cancel all previous typestyle settings by sending certain software commands before printing. Because these commands cancel SelecType settings, you should use the program's print options function instead of SelecType to select your typestyles. Therefore, if SelecType does not work with a particular application program, consult its manual on how to select typestyles.

Selecting Character Sets

By changing the setting of the DIP switches, you can select one of eight international character sets and one of two character tables. Once you have set the DIP switches for a certain character set, that set is the default character set; it remains valid even after the printer is turned off, reset, or intialized. Software commands however, override DIP switch settings until they are cancelled or the printer is turned off, reset, or intialized.

To change the setting of a DIP switch, first turn off the printer. Set the DIP switch, and then turn the printer back on.

Choosing a character set

Selection of a character set provides you with the characters used in other languages or with legal symbols. To obtain the desired character set, set switches l-l, 1-2, and l-3 according to the DIP switch table on page 3-8.

The following table shows the characters in each character set.

Character sets

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 I	#	$	@	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 I	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8 Japan	#	$	@	[	¥	]	^	`	{	¦	}	~
9 Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10 Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11 Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
12 Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
64 Legal	#	$	§	°	´	¨	¶	´	©	®	†	™

The sets numbered 8 through 12 and 64 are available only through a software command. See page 9-3 1.

Choosing a character table

DIP switch l-4 selects the italics character table or the Epson
Extended Graphics character table. The Epson Extended Graphics
character table contains international accented characters, Greek
characters, and character graphics for printing lines, corners, and
shaded areas. Since the character table setting affects only the upper
half of the character table, you can still print text if you have
selected the Extended Graphics set. Also, you can still print italics if
you use the proper software command.

To change the setting of a DIP switch, first turn off the printer.
Then change the DIP switch, and turn the printer back on.

Turning DIP switch 1-4 on selects the Epson Extended Graphics
character table; turning l-4 off selects the italics table.

The tables on the following pages show what characters are
printed in each of the character tables. The values across the top of
the tables are the first hexadecimal value of the two-digit code for
each character, and the values down the left side of the table are
the second hexadecimal value.

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	░	L	⊥	α	≡
1			!	1	A	Q	a	q	ü	æ	í	▒	⊥	T	ß	±
2			"	2	B	R	b	r	é	Æ	ó	▓	T	T	Γ	≥
3			#	3	C	S	c	s	â	ô	ú	│	⊢	L	π	≤
4			$	4	D	T	d	t	ä	ö	ñ	⊣	—	L	Σ	⌠
5		§	%	5	E	U	e	u	à	ò	Ñ	⊣	+	r	σ	⌡
6			&	6	F	V	f	v	å	û	ª	⊣	⊢	r	µ	÷
7			'	7	G	W	g	w	ç	ù	º	⊓	⊢	+	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⊓	L	+	Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌐	⊣	r	⌐	θ	•
A			*	:	J	Z	j	z	è	Ü	¬	│	⊥	r	Ω	·
B			+	;	K	[	k	{	ï	¢	½	⊓	T	■	δ	√
C			,	<	L	\	l	¦	î	£	¼	⌐	⊢	■	∞	ⁿ
D			-	=	M	]	m	}	ì	¥	¡	⌐	—	■	ø	²
E			.	>	N	^	n	~	Ä	₧	«	⌐	+	■	∈	■
F			/	?	O	_	o		Å	ƒ	»	⌐	⊥	■	∩	

Italics 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*	

Software

Now that you have set up and tested the LQ, 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 from which to choose.

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 LQ-850, LQ-950, or LQ-1050 on its printer selection menu. Choose from the following list:

LQ-850/950/1050
LQ-2500
LQ-800/1000
LQ- 1500

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

EX
FX
LX
RX
MX
Epson printer
Standard printer
Draft printer

To use all the features of the LQ-850, LQ-950, and LQ-1050, however, it is best to use a program with the LQ-850, LQ-950, or LQ-1050 on its menu. If your program does not list these printers, contact the manufacturer to see if an update is available.

A quick test

After you set up your application program for your printer by following the instructions in the application program manual and the instructions above, print a sample document to make sure that the program and the printer are communicating properly. If the document does not print the way you think it should, re-check the program's printer selection and installation routine. If you are still having trouble printing, consult Chapter 6.

Computer-printer   communications

Computers and printers communicate by using numerical codes to represent characters and commands. To be sure that the two devices translate the characters in the same way, a standard code has been developed-the ASCII (American Standard Code for Information Interchange). Many application programs specifically ask for ASCII codes to send printer commands.

The ASCII standard includes codes for printable characters (letters, punctuation marks, numerals, and mathematical symbols) and 33 other codes called control codes. The control codes are for such functions as sounding the beeper and performing carriage returns. Because the 33 control codes are not enough to control all possible printer functions, most printer commands are actually a sequence of two or more codes.

One of the 33 control codes, the escape code, signals the beginning of a sequence of codes. Therefore, most printer commands are sequences of codes, the first of which is the escape code. This manual uses the ASCII abbreviation ESC for this code.

When using control codes to select printer functions for an application program or programming language, check the manual for the program or language to find the appropriate method of inserting the code into the program. Further details on the methods to use are in the rest of this chapter.

Naming and using commands

In order to use printer commands, you should know how they are recognized by your software program. The most common way of naming codes or commands is with one of two numbering systems, decimal or hexadecimal.

The decimal system is the standard numbering system based on units of ten, using the numerals 0-9.

The hexadecimal, or hex, system is based on units of 16, and is often used by programmers. Instead of using only the numerals 0 through 9, the hex system also uses the letters A through F. For example, the decimal numbers 9, 10, 11, and 12 are 09, 0A, 0B, and 0C in hex.

Since the most frequently used hexadecimal numbers are between 0 and FF hex (0 to 255 in decimal), it's common to write hexadecimal numbers that are less than 16 with a zero in front, as shown above.

In this book, hex numbers are distinguished from decimal numbers by the word hex after them (for example, 1B hex). Other common ways of denoting a hexadecimal number are the following:

   IBH   **$1B**   &1B   &H1B   < 1 B > H

The Command Summary and the Quick Reference Card give both the decimal and hex numbers for each command.

Unidirectional printing

The LQ printers have the advanced capability of printing text and graphics bidirectionally. For exact alignment of some graphic images you may want to select unidirectional printing. See ESC U in the command summary.

Word processors

In many ways, word processors demand the most from your printer. When you create and print a document, you may use many print styles and fonts, reformat pages, add headers and footers, and use bold, italic, and other effects.

Once you have installed your word processor by using the lists on page 4-2, you can ordinarily use a fixed set of printer features by using a word processor command to place markers around the text to be altered. When the document is printed, the markers are recognized and translated into suitable commands for your printer. On your screen, some programs show the markers in a distinctive way, while others display the text as it will appear-for example, in bold or italics.

This method is normally restricted to features that can be found on almost all printers, such as bold and underlining.

Some programs also provide a way of placing complete printer commands in the text. These commands may or may not be visible on your screen. This method has the advantage of allowing you to use any printer command, not just a limited set. To make use of it, however, you need to understand how to use the printer's commands.

Check the manual for your word processor to see if you can place printer commands in your text. If this is possible, use the Command Summary in this manual to find the command, and use the manual for your word processor to find how to assign the command.

If your LQ is not printing correctly, check both the LQ and your word processor and review this checklist:

□ Make sure you've selected the correct printer.

□ Carefully read the printer setup and installation information in your word processor's manual.

□ Check the printer options that may be part of the installation or setup section (line feeds, interface).

□ Make sure your word processor is capable of sending the proper commands to your printer.

☐ If you're still having difficulty printing, check the
troubleshooting section in your word processor's manual and
Chapter 6 of this manual.

Spreadsheets

Although spreadsheets seldom use as many printing styles as word
processors, they do have some very specific requirements.

Installation and column width

If your spreadsheet program provides a list of printers, use the
list on page 4-2 to find the proper selection. If your spreadsheet
doesn't have a printer setup routine, carefully read the program's
manual for information on printing.

A major concern for printing spreadsheets is the width of the
printer. The LQ-850 is an 80 column printer, the LQ-950 is a 110
column printer, and the LQ-1050 is a 136 column printer, but by
using condensed 12 cpi you can print up to 160 columns on the
LQ-850, 220 columns on the LQ-950, and 272 on the LQ-1050.
Therefore, if your spreadsheet asks the number of columns your
printer can print, you can specify up to 160, 220, or 272.

Printer commands

Unlike word processors, spreadsheet programs don't usually let
you change printer commands within a spreadsheet. Instead, one
style or mode of printing is used for the whole spreadsheet. With
the LQ, there are two main ways of sending commands to control
the printing of a spreadsheet.

First, almost all spreadsheets have the capability of sending
commands to a printer. Look in the manual for your spreadsheet to
find out how to send printer commands. Then look in the
Command Summary in this manual to find the proper codes to
send.

For example, your spreadsheet might use a "setup string" to send
printer commands. To prepare a setup string for condensed 12 cpi,
you would look up the proper command in the Command
Summary.

The command for 12 cpi is ESC M, and the command for condensed is SI. Because most spreadsheets use the decimal equivalent for the commands, (also given in the Command Summary), a setup string for condensed 12 cpi might look like this:

/027/077/015

The number 027 is for the escape code, 077 is for M, and 015 is for SI (condensed).

The second method is SelecType, a feature described in Chapter 3. This feature allows you to choose print styles with buttons on the control panel.

If your spreadsheet is not printing correctly, check both the LQ and your spreadsheet program and review this checklist:

☐ If the program asks you to select a printer, be sure you have selected the correct one.

❑ If you're using the program's print facility, recheck the LQ's Command Summary to make sure you're sending the correct commands.

☐ If you're still having difficulty printing, check the troubleshooting section in your spreadsheet program's manual or Chapter 6 of this manual.

Graphics programs

The LQ is capable of producing finely detailed graphic images. A later section of this chapter gives specific information on the graphics commands, but the easiest way to take advantage of the LQ's capabilities is with one of the many graphics programs available.

When buying graphics software, always make sure it has a suitable option to allow printouts on an LQ printer. Any program with an option for an LQ printer should give excellent results.

Most graphics programs have a printer selection procedure. Check the lists on page 4-2 to find the proper selection.

Graphics

The dot graphics mode allows your LQ to produce pictures, graphs, charts, or almost any other pictorial material you can devise.

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 LQ 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 LQ prints graphics, read on.

I ncome Breakdown

Marketing and Advertising

Profit

Salaries and Production

Future Development
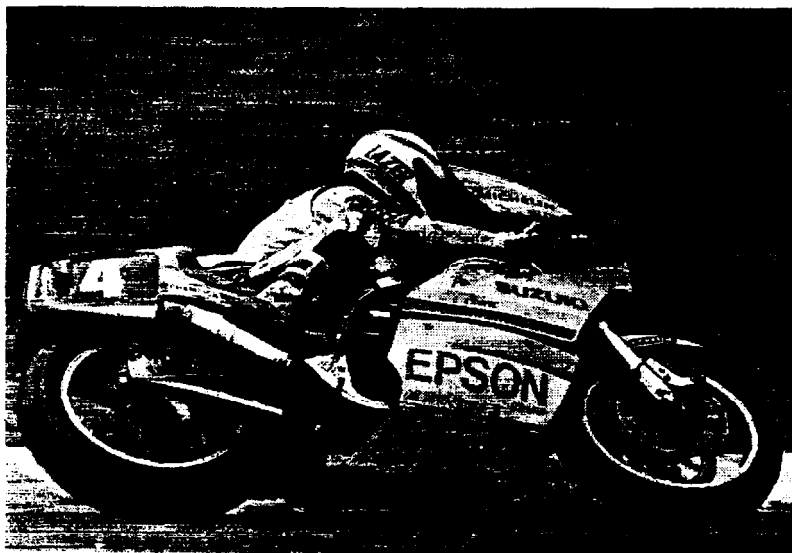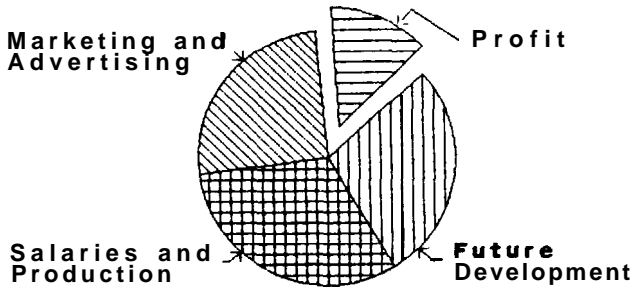
The print head

To understand dot graphics you need to know a little about how the LQ's print head works.

The LQ's print head has 24 pins. As it moves across the page, electrical impulses cause the pins to fire. Each time a pin fires, it strikes the inked ribbon and presses it against the paper to produce a small dot. As the head moves across the paper, the pins 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 pins in the print head are in more than one column, but the intelligence of the printer handles the timing of pin firings so that the effect is that of 24 pins arranged in a single vertical column.

Dot patterns

The LQ's print head is able to print graphics as well as text because graphic images are formed on the LQ 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. The LQ 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 LQ can, therefore, be as finely detailed as the ones at the beginning of this section.

Eight-pin graphics

The LQ has an 8-pin graphics mode with six densities. Although this mode uses only one third of the LQ's pins, it produces good quality graphics.

Twenty-four-pin graphics

The graphics mode that takes full advantage of the LQ's print head is 24-pin 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 pins to fire. At each position it can fire any number of pins from none to 24. This means that the printer must receive 24 bits of information for each column it prints. Since the LQ uses 8-bit bytes of information in its communication with a computer, it needs three bytes of information for each position.

Pin labels

To tell the printer which pins to fire in each column, you first divide each of the vertical columns into three sections of eight pins each and consider each section separately. Since there are 256 possible combinations of the eight pins 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 ○
```
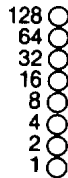
To fire any one pin, you send its number. To fire more than one pin at the same time, add up the numbers of the pins and send the sum to the printer. With these labels for the pins, you fire the top pin by sending 128. To fire the bottom pin, you send 1. If you want to fire only the top and bottom pins, you simply add 128 and 1, then send 129.

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

```
128 ● 128      64 ○          128 ○ 128
 64 ●           32 ● 64        64 ●
 32 ●  32       16 ○           32 ●
 16 ●  16        8 ● 8         16 ●
  8 ●  8         4 ○            8 ●
  4 ○            2 ● 2          4 ○  4
  2 ●  2         1 ○            2 ●  2
  1 ○          123 ○            1 ○
      ‾‾‾          ‾‾‾             ‾‾‾
      170           74            134
```
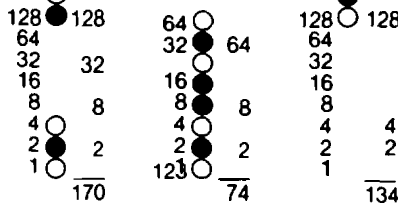
With this numbering system, any combination of the eight pins adds up to a decimal number between 0 and 255, and no numbers are duplicated.

Since there are 24 pins 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 LQ. For most of the other LQ modes, such as emphasized and double-wide, 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 LQ receives this code, it interprets the next numbers as pin patterns and prints them on the paper.

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

$$\text{ESC } * m \; n1 \; n2 \text{ data}$$

In this command, *m* selects the graphics option and *n1* and *n2* specify the number of columns to reserve for graphics. The available graphics options are listed on the next page.

Option	Pins	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.

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 LQ does not use numbers larger than 255 (decimal). Therefore, the graphics mode command uses two numbers for reserving columns.

To figure $n1$ and $n2$, divide the total number of columns by 256. The result is $n2$; the remainder is $n1$. 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 $n1$ the number of columns you are reserving and make $n2$ a zero.

For example, if you wish to send 1632 columns of graphics data, **n1** should be 96 and **n2** should be 6 because 1632 = 96 + (6 x 256).

The LQ will interpret the number of bytes determined by **n1** 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 LQ 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-pin graphics (mode 32) and also reserves 40 columns for graphics. Since 24-pin 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 pin pattern shown in the section on pin 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-pin **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.
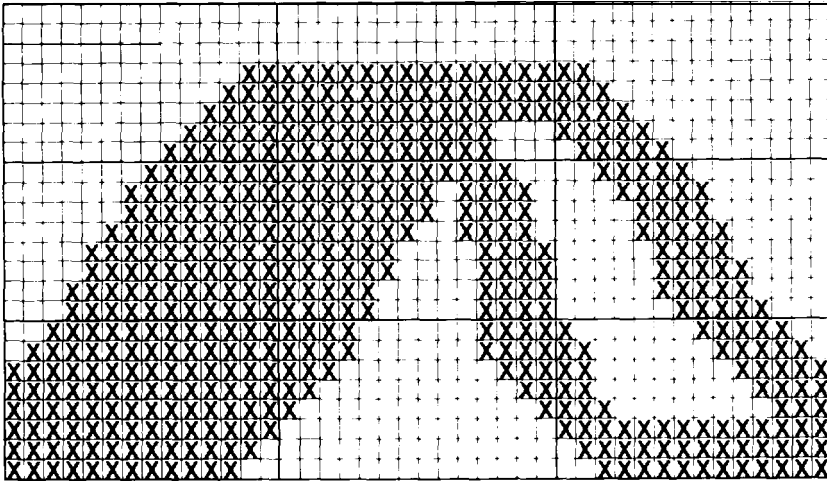
The actual pattern that the LQ prints on the paper is, of course, made up of dots that overlap each other both vertically and horizontally. The reason the planning grid uses an x for each dot is that using an accurate representation of the dots makes calculating the data numbers difficult because they cover up 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 pins 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 the bottom of each section of each column is the total of the pin numbers for that section. This gives you a total of 126 data numbers necessary to print this small figure.
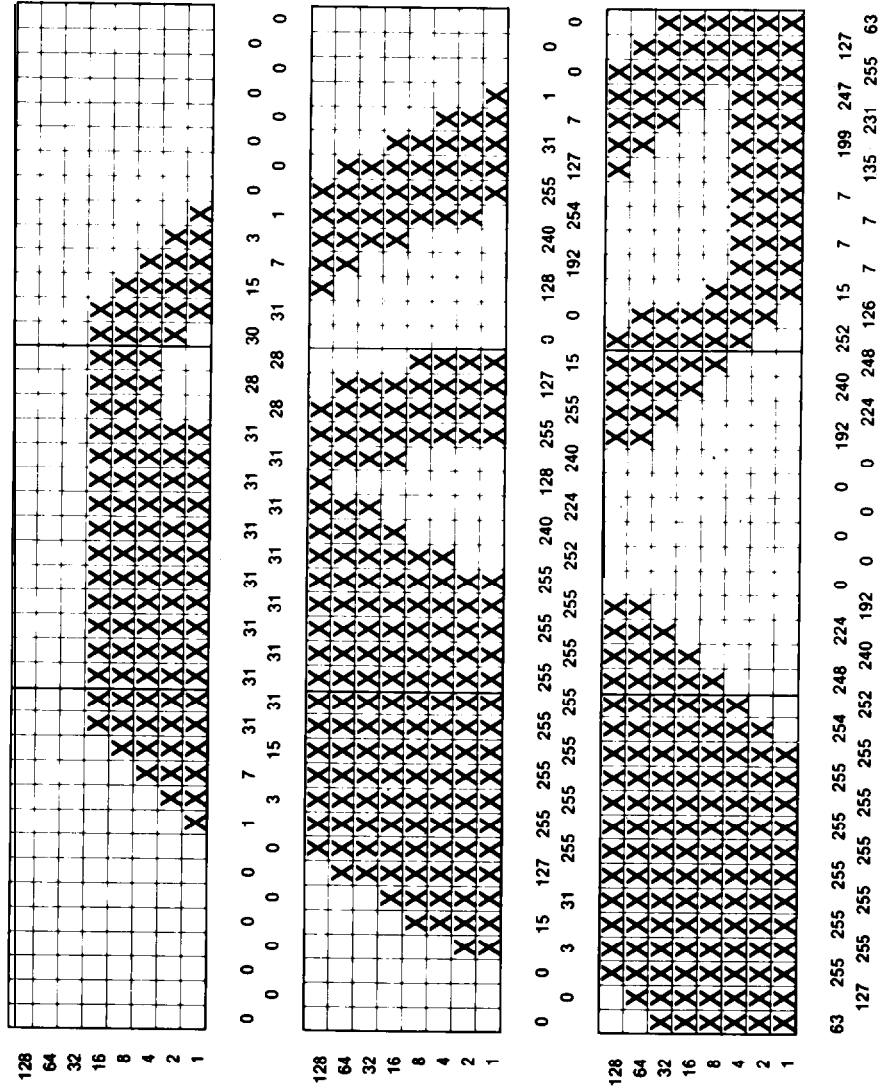
Here is the BASIC program that prints the design shown on the previous pages. Notice that the data numbers in lines 80-140 are the same numbers that you see in the last illustration. Also note that the WIDTH statement in line 10 is for IBM PC BASIC; the format may be different for your system.

```
10 WIDTH "LPT1:",255
20 LPRINT CHR$(27)"*"CHR$(39)CHR$(42)CHR$(Ø);
30 FOR X=1 TO 126
40 READ N
50 LPRINT CHR$(N);
60 NEXT X
70 LPRINT
80 DATA Ø,Ø,63,Ø,Ø,127,Ø,Ø,255,Ø,3,255,Ø,15,255,Ø,31,255
90 DATA Ø,127,255,Ø,255,255,1,255,255,3,255,255,7,255,255,15,
   255,255
100 DATA 31,255,254,31,255,252,31,255,248,31,255,24Ø,31,255,
   224,31,255,192
110 DATA 31,255,Ø,31,252,Ø,31,24Ø,Ø,31,224,Ø,31,128,Ø,31,24Ø,Ø
120 DATA 31,255,192,28,255,224,28,127,24Ø,28,15,248,3Ø,Ø,252,
   31,Ø,126
130 DATA 15,128,15,7,192,7,3,24Ø,7,1,254,7,Ø,255,7,Ø,127,135
140 DATA Ø,31,199,Ø,7,231,Ø,1,247,Ø,Ø,255,Ø,Ø,127,Ø,Ø,63
```

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

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

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

```
15 FOR C=1 TO 1Ø: RESTORE
65 NEXT C
```

Individual graphics options commands

As previously mentioned, the LQ responds to commands that are used by Epson FX and RX series printers. There are four individual graphics options commands that are very much the same as the ESC * command, but each one works for only one graphics option. All these commands are 8-pin 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	Quadruple-density	ESC *3

Because of a difference in line spacing increments, the shape of graphics figures produced on the LQ with an 8-pin option is different from the output from the same program on a 9-pin printer.

The reassigning command

The LQ 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 screen 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 8-pin graphics options to a 24-pin graphics option without changing the program that supplies the graphics data, you will print garbage (if the program prints at all). Remember, the 24-pin graphics options require three times as much graphics data as the 8-pin graphics options.

User-Defined Characters

With the LQ, 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 LQ's user-defined character function to enhance printouts. (These characters are called download characters in some programs.)

The standard characters are stored in the LQ's Read Only Memory (ROM), and the user-defined characters are stored in the LQ's Random Access Memory (RAM).
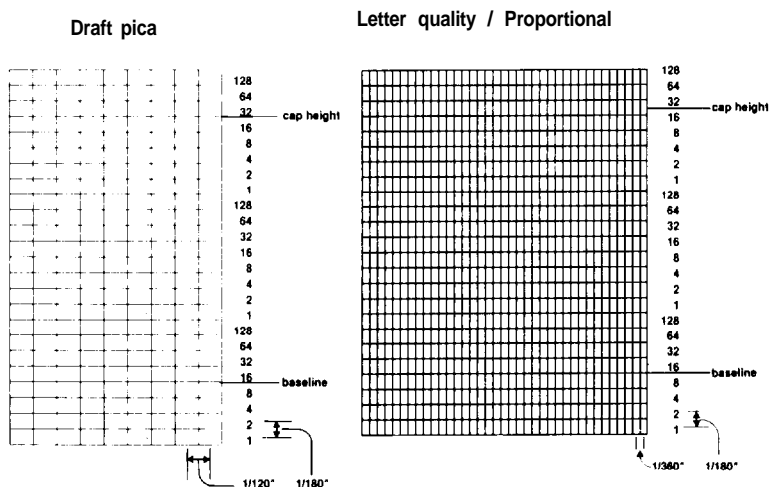
Designing your characters
User-defined characters are like dot graphics because you send the printer precise instructions on where you want each dot printed. In fact, planning a user-defined character is like planning a small dot graphics pattern.

Design grids

To design a character you use a grid that is 24 dots high-one dot for each pin on the LQ 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, with the dots for both Letter Quality and proportional spaced more closely together than those for draft.

The illustrations below show the two design grids. The line at the side labelled cap indicates the top of a standard capital letter, and the line labelled base 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 Own 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.
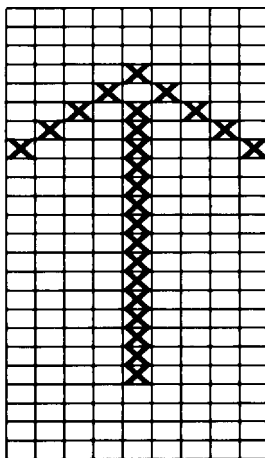

Now you translate the dot pattern you've created on paper to a numeric format so you can send the information to the LQ. Every dot has an assigned value. Each vertical column (which has a maximum of 24 dots) is first divided into three groups of eight dots. Each group of eight dots is represented by one byte, which consists of eight bits. Hence, one bit represents each 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 the LQ, however, can be in any form (binary, decimal, hexadecimal) that you can use with your programming language.
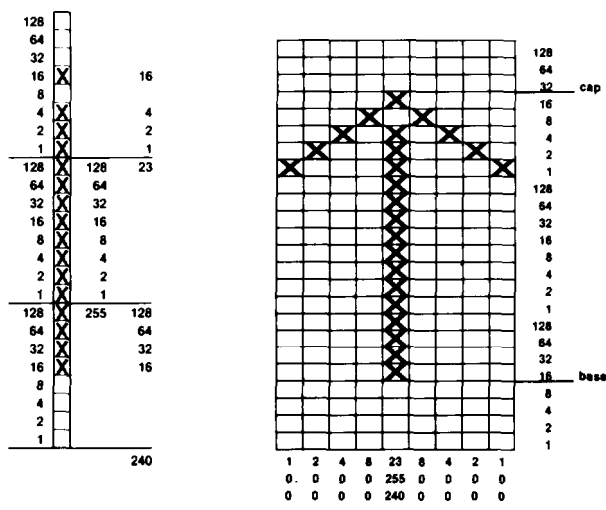
You've seen how to design a character by placing dots on a grid and translating the dots to decimal equivalents. The last step in defining a character is to send this information to the printer.

Sending information to the LQ

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

ESC & 0 *n1 n2 d0 d1 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 the LQ, you can define many characters with a single command. The values *n1* 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 *n1* and *n2*, but it is best not to define decimal 32, which is the code for a space. Also, you can use letters in quotation marks instead of ASCII numbers for *n1* and *n2*.

An example will show how to specify *n1* and *n2*. If, for instance, you wanted to redefine the characters A through Z, *n1* 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 (*d1*) 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.

	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, the LQ expects *d1* x 3 bytes of data to follow *d2* .

An example character definition program should make this clear:

```
10 LPRINT CHRS(27)"x0"
20 LPRINT CHRS(27)"&"CHRS(0);
30 LPRINT "@@";
40 LPRINT CHRS(1)CHRS(9)CHRS(1);
50 FOR I=1 TO 27
60 READ A: LPRINT CHRS(A);
70 NEXT I
80 LPRINT "@@@@@"
90 LPRINT CHRS(27)"%"CHRS(1);
100 LPRINT."@@@@@"
110 LPRINT CHRS(27)"%"CHRS(0);
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 4,0,0,2,0,0,1,0,0
```

In line 10, the ESC x command selects draft style printing.

The actual character definition starts in line 20. The two at signs (@) in line 30 represent *n1* and *n2,* the range of characters being defined (in this case, a range of one). Line 40 contains *d0, d1,* 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.

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:

<div align="center">

@@@@@

↑↑↑↑↑

@@@@@

</div>

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 lines 90 and 110.
It is:

<div align="center">

ESC % n

</div>

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; 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 don't even print as spaces; it's as if they were not sent at
all.

In many cases, you will 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, the LQ 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:

$$\textbf{ESC : 0 } n \textbf{ 0}$$

If the variable $n = 0$, Roman is selected. If $n = 1$, Sans Serif is selected.

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, 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:

	$d1$ (maximum)	$d0 + d1 + d2$ (maximum)
Draft	7	12
Letter Quality	23	36
Proportional	23	42

Since super/subscript characters are smaller, they don't 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.

Draft pica

Letter Quality and Proportional
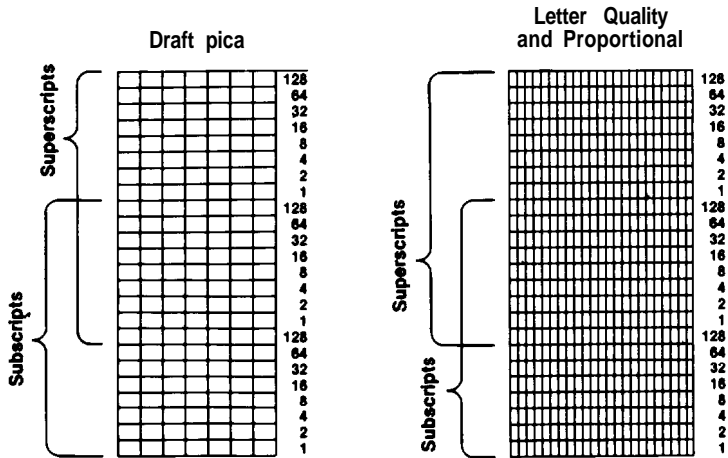
Mixing print styles

Each of the three user-defined character modes (draft, Letter Quality, and proportional) can be used in combination with most of the LQ'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 three types of user-defined characters 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 be ignored and nothing will print. 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 intialized with the (INIT) signal, the user-defined characters are lost. (Some computers do this each time BASIC is loaded.) ESC @ does not destroy user-defined characters.

Replacing the Ribbon

When your printing becomes too faint you need to replace the ribbon. Use the following Epson replacement ribbons:

Printer	Standard ribbon	Film ribbon
LQ-850	#7753	#7768
LQ-950	#7767	#7769
LQ-1050	#7754	#7770

To replace the ribbon, turn off the power to the printer and remove the printer cover.

> If the printer has been used recently, the print head may be hot. Let it cool before attempting to replace the ribbon.

1. Remove the old ribbon by grasping the black fin-like handles (only one on the LQ-850) and lifting the ribbon straight up and out of the printer.
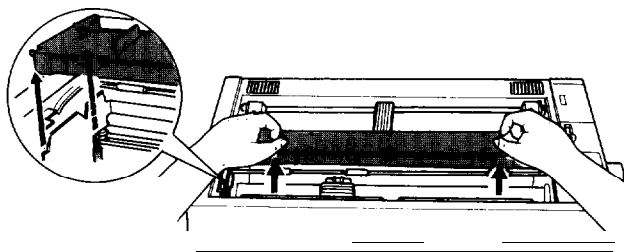

2. Slide the print head to the middle of the printer.
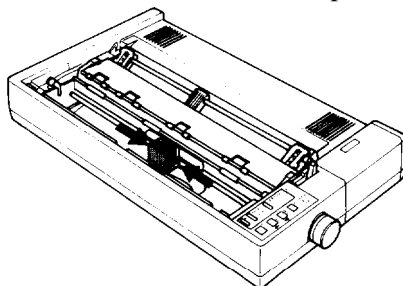
3. Unwrap the new ribbon, and turn the ribbon-tightening knob in the direction of the arrow to remove excess slack.

4. Hold the new ribbon cartridge by its handles, and firmly insert it into position, making sure that the plastic hooks fit into the slots as shown below. (The LQ-850 ribbon cartridge has only one handle.)
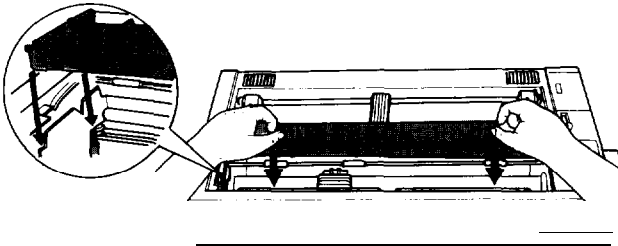
5. Use a pointed object, such as the tip of a pencil, to guide the ribbon between the print head and the ribbon guide. At the same time, turn the ribbon-tightening knob in the direction of the arrow to help guide the ribbon into place.
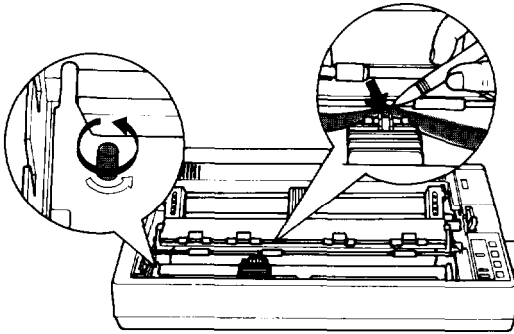

6. Check to see that the ribbon is not twisted or creased. You can check the installation by sliding the print head from side to side along the carriage. Reattach the printer cover.

Transporting the printer

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

1. Remove the printer cover, platen knob, paper guide, and any installed options.

2. Slide the print head to the middle of the printer. While holding the paper bail open, reattach the left and right locking tabs. Then, slide the print head all the way to the right, and insert the print head protector between the paper bail and platen as shown below.
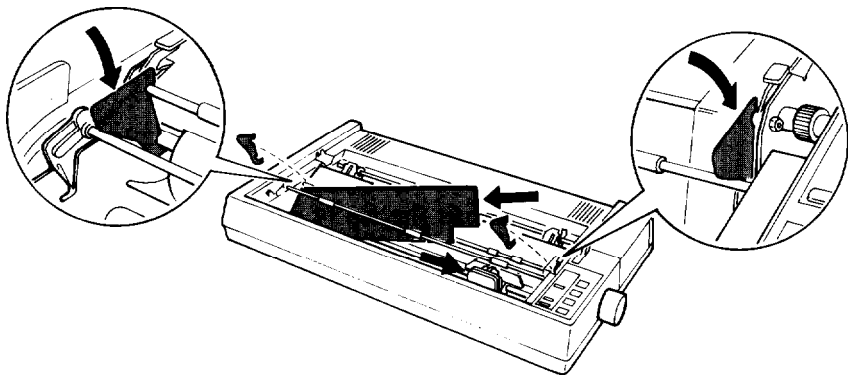
3. Then, using a cross-head screwdriver, reattach the two transport locking brackets.
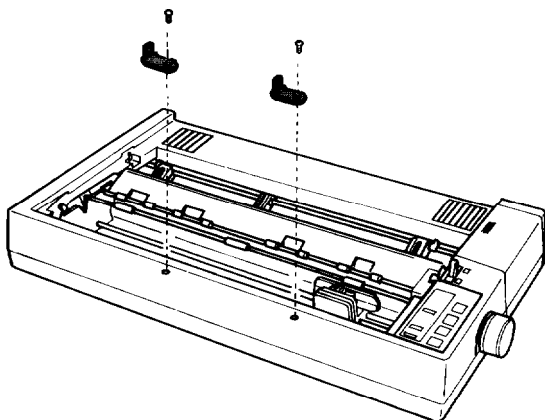
4. Fit the printer back into the foam packaging material and then
back into its original box.

⊘ When you carry the printer, never hold it by the option
compartment cover. This cover could come off and cause
you to drop the printer.

Cleaning the Printer

To keep your printer operating at its best, you should clean it thoroughly several times a year. To do this, unplug it from the power, remove any options that may be installed, as well as the ribbon cartridge. Carefully clean the printer using a soft brush and a vacuum cleaner with a small nozzle. Clear away all dust and dirt. Slide the print head to one side in order to clean beneath it. Be careful not to damage any of the parts inside the printer.

If the outer case is dirty or dusty, clean it with a soft, clean cloth dampened with mild detergent dissolved in water. Keep the printer cover in place to prevent any water from getting inside the printer.
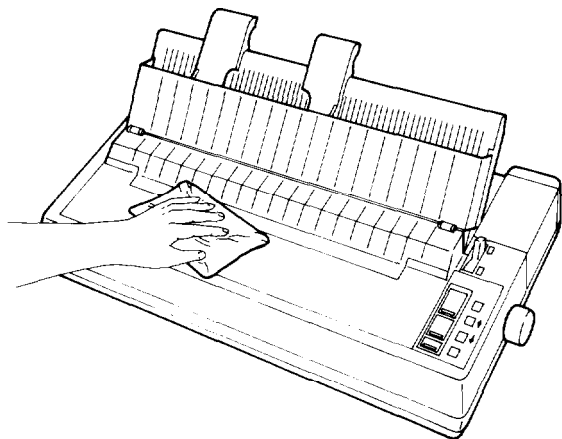
Do not use a hard or abrasive brush or cloth. Never use alcohol or thinners to clean the printer, since these chemicals can damage components as well as the case.

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.

Troubleshooting

   This chapter discusses problems you may encounter, and their
likely solution. At the back of the chapter, is a section on the data
dump mode. This mode helps more experienced users determine the
causes of communication problems between the printer and
application programs.

Problems and solutions
   This section lists possible problems and likely solutions.

The printer does not print
- Make sure that the printer is turned on and the POWER light is
  on. If the printer is turned on and the POWER light is not on,
  see that the printer is fully plugged in and that the electrical
  outlet is also turned on.

- See that the ON LINE light is on. If it is not on, press the ON LINE
  button.

- Make sure that the printer is connected to the computer. Check
  both ends of the cable between the printer and the computer.

If the printer still does not print, try the self test described in
Chapter 1. If the self test works properly, the printer is all right,
and the problem probably lies in the computer, the software or the
cable. If the self test does not work, contact your Epson dealer.

The printout is faint or uneven
- See that the ribbon is properly installed. See the section on
  ribbon installation in Chapter 1.

- The ribbon may be worn out. See the section on replacing the
  ribbon in Chapter 5.

- The paper thickness lever may be in the wrong position. See the
  section on the paper thickness lever in Chapter 2.

- The print head may be worn out. This is especially likely if
  parts of printed characters are missing. Contact your dealer to
  have the head replaced. Never attempt to replace the head
  yourself because other parts of the printer should be checked at
  the same time.

The printer stops printing
- The printer may be out of paper. Check the paper supply.

- The paper may be jammed. See the section on the self test in Chapter 1.

- The ribbon may be jammed. See the section on the self test in Chapter 1.

- If the READY light is off and the ON LINE light is flickering, the LQ has stopped to allow the print head to cool. Printing resumes soon; you do not have to do anything to re-start it.

- If the printer stops, the beeper sounds, and the ON LINE light does not flicker, turn the printer off and then turn it back on and try to print again. If the printer beeps again and does not print, take it to a qualified service person.

Single sheets do not feed properly
- The position of the paper release lever may be wrong. Push it back to the single sheet position.

- You may have tried to load the paper with the LOAD/EJECT button while the printer was ON LINE. Be sure that the printer is off line when you use the LOAD/EJECT button.

- The paper may be too large or too small. See the paper specifications in Chapter 8.

- The paper guide may not be installed properly. See the section on installing the paper guide in Chapter 2.

- The cut sheet feeder mode may be selected by the DIP switch. See the section on setting DIP switches in Chapter 3.

Continuous paper does not feed properly
* The position of the paper release lever may be wrong. Pull it forward to the continuous paper position.

* See that the sprocket holes of the paper fit correctly over the sprockets.

* The paper guide may not be installed properly. See the section on continuous paper in Chapter 2.

* The paper supply may be stacked too far from the printer, not aligned with tractor, or there may be some obstacle in the way of the paper. See Chapter 2 for instructions on the proper placement of the paper supply.

* If the short tear-off mode is turned on by the DIP switch setting, the paper advances part of a page at the end of each print job. This is not an error; it allows you to tear off the page at the perforations. See the section on short tear off in Chapter 3.

The printout is not what you expect
* The wrong international character set may be selected. See the section on international character sets in Chapter 3.

* The wrong character set (italics or Epson Extended Graphics) may be selected.

* The font or pitch or size may not be selected properly. See the section on SelecType in Chapter 3.

* The software setting may not be correct. See that your software is correctly set up for your printer.

* The application program is changing your SelecType settings. Use the program's setup (or install) procedure to remove the codes that interfere with your SelecType settings. Another solution is to use the print control codes for your application program instead of SelecType to control your printing. The manual for your program tells you how to change the printing style.

Cut sheet feeder does not load paper correctly

- The cut sheet feeder mode has not been selected with the DIP switch.

- The position of the paper release lever is wrong. Push the paper release lever back to the single sheet position.

- The cut sheet feeder is not installed properly.

- The paper supply is not loaded properly.

- The paper set lever of the cut sheet feeder is not pushed back.

- The page length is not set correctly. See the section on setting the page length in Chapter 3.

See the section on the cut sheet feeder in Chapter 7 for more information on all these problems.

Data dump mode

This 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. Use paper at least 11 inches wide on the LQ-950 and 14 inches wide on the LQ- 1050.

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. Next, 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 52 00 1B 74 01 1B 36 12 1B 50 1B 70 00    .@.R..t...6..P.p.
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 20 6D 61 6B 65 73    is feature makes
0A 20 20 20 20 20 69 74 20 65 61 73 79 20 66 6F            it easy fo
```

3. To turn off the data dump mode, press the ON LINE button to stop the printing and set the printer off line, then turn off the printer. (It can also be cancelled by sending an $\overline{\text{INIT}}$ signal from the computer .)

The data dump shown in Step 2 was made while writing this section. By comparing the characters printed in the right column with the printout of hex codes, you can check what codes are being sent to the printer. If characters are printable, they appear as their true ASCII characters. Non-printable 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 hex codes on the second line of the printout sample (20 20 54). Each hex code (20) represents a space; while the hex code (54) represents the letter T. Check the second line of the right column and you will find the letter T preceded by two spaces.

The chart below interprets the first seven non-printable codes:

| Hex codes	Command	Function
1B 40	ESC @	Initialize printer
1B 52 00	ESC R0	Select USA character set
1B 74 01	ESC t1	Select Epson Extended Graphics
1B 36	ESC 6	Printable code expansion
12	DC2	Cancel condensed mode
1B 50	ESC P	Select pica
1B 70 00	ESC p0	Cancel proportional

The Cut Sheet Feeder

The optional cut sheet feeders give you easier and more efficient handling of single sheet paper. Up to 150 sheets of standard bond paper can be fed automatically into the printer without reloading. These units can also automatically feed envelopes.

Printer	Single bin	Dual bin
LQ-850	#7339	#7346
LQ-950	#7345	#7347
LQ-1050	#7340	#7348

The illustrations in this chapter show the single bin feeder for the LQ-1050, but the others work in the same way. For the dual bin feeders, see the manual that comes with them for assembly instructions. You can select the second bin with a software command (ESC EM) or the control panel.

paper support   paper feeder rests
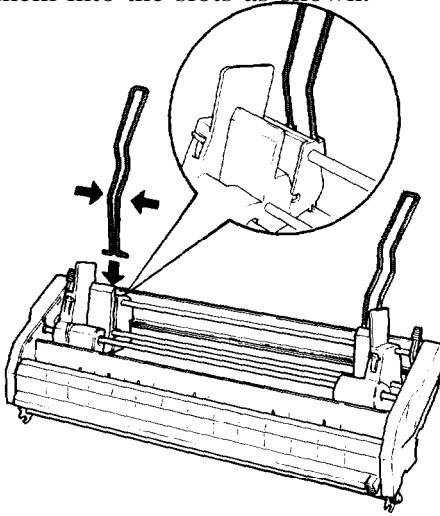
front stacker supports

cut sheet feeder
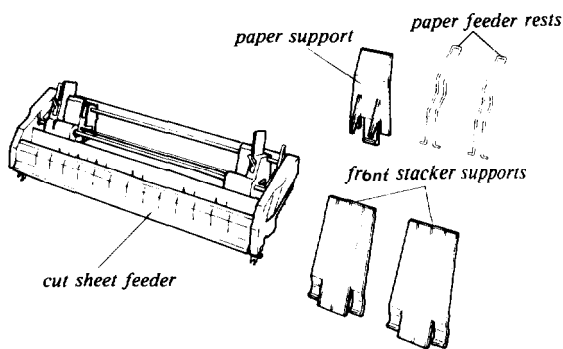
After checking to see that you have all of the parts shown in the figure above, remove the foam packaging from between the paper rests and rollers. Keep the packing materials in the original box in case you need to store or transport the cut sheet feeder.
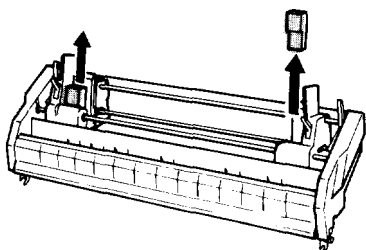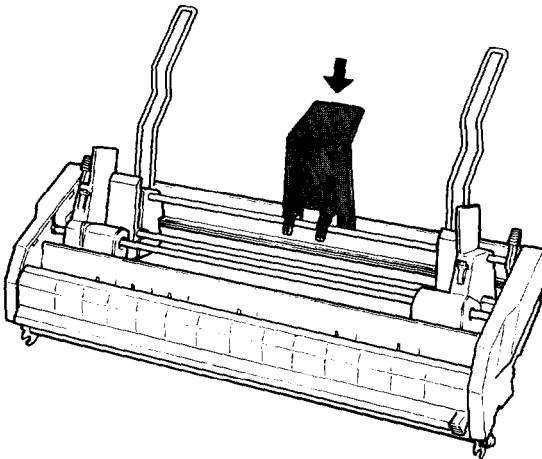
Assembly

ends together

1. Attach the paper feeder rests by squeezing the free and inserting them into the slots as shown.

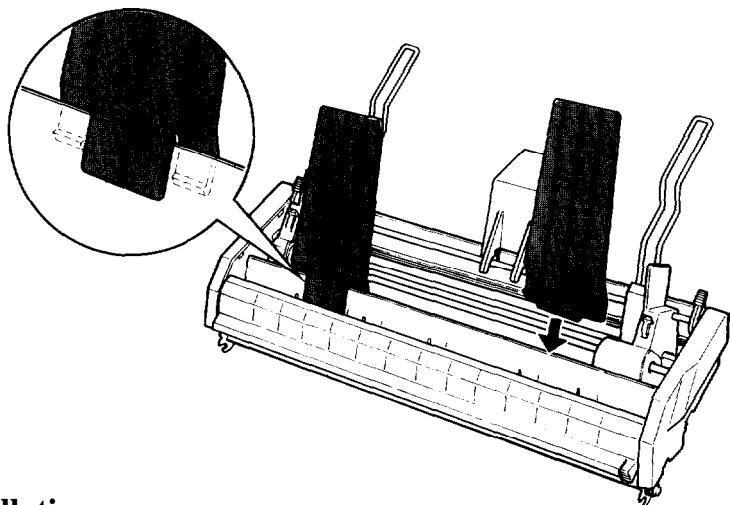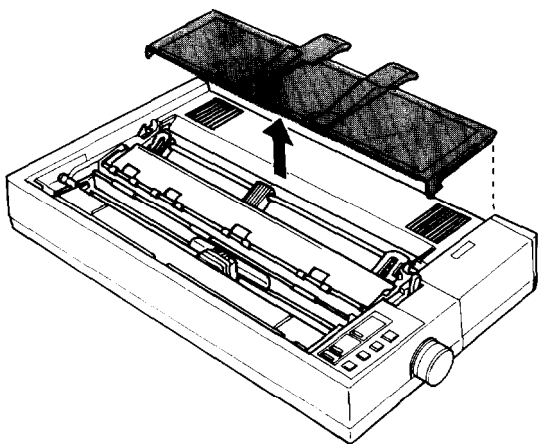2. Insert the paper support over the back edge of the feeder.

3. Attach the two front stacker supports as shown. (There is only one front paper support on the cut sheet feeder designed for the LQ-850   printer.)
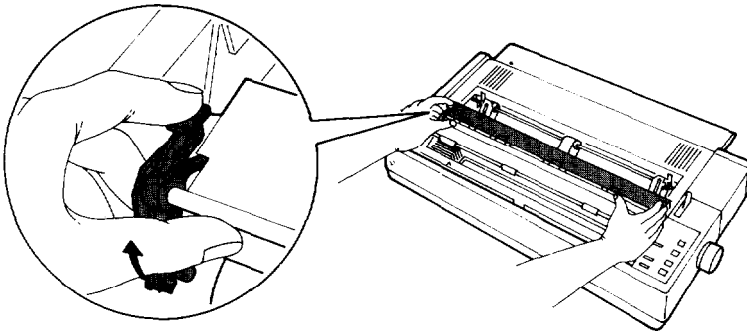

Installation

Attach the assembled cut sheet feeder as follows.

1. Remove the printer cover and the paper guide.
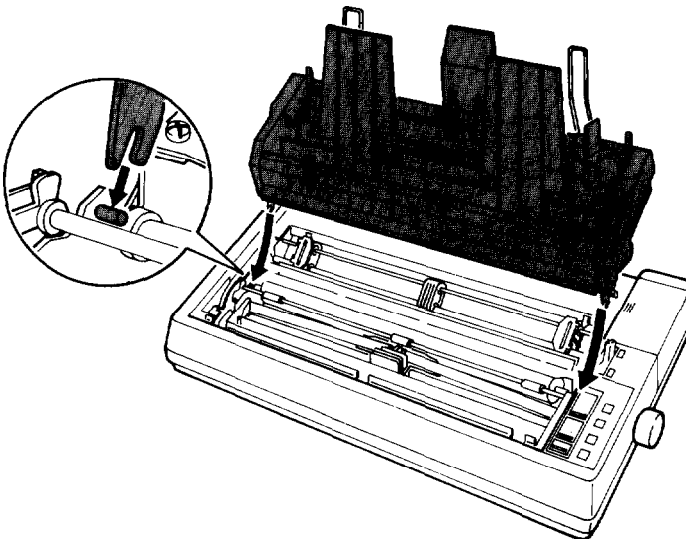

2. Make sure the paper release lever is pushed all the way back.

7-4

3. Remove the paper tension unit by pressing open the release levers and, at the same time, lifting up on the front of the unit.
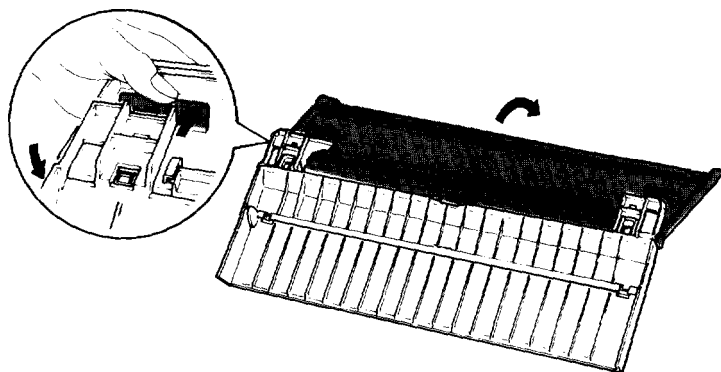

4. Tilt the feeder forward slightly to fit the notches at the base of the unit over the pins on the printer; then tilt the unit back until its rests on top of the printer.
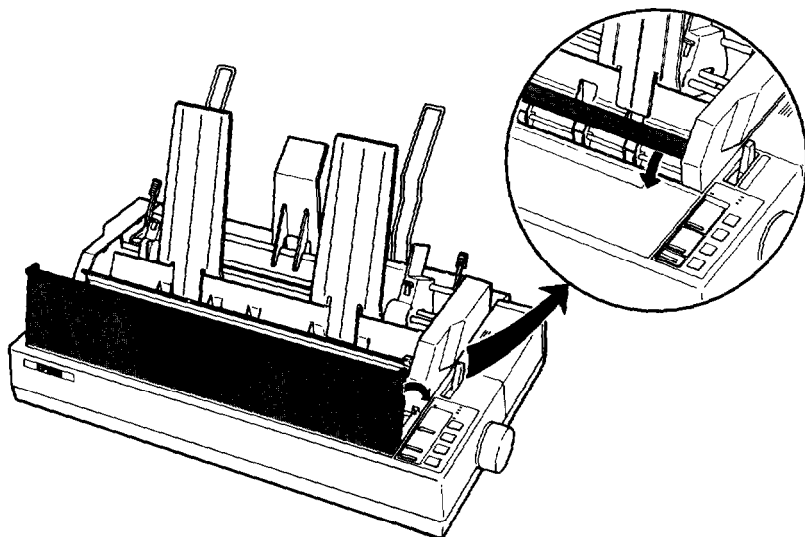
5. Detach the front section of the printer cover.

6. After raising the cut sheet feeder's paper path guide, attach the front cover; then close the paper path guide.

Setting the sheet feeder mode

To allow your printer to use the cut sheet feeder you will need to set DIP switch 1-7 to on. If you need more information on how to do this, see the section on DIP switch setting in Chapter 3. To set the printer into the cut sheet feeder mode, you should do the following:

- Turn the printer off
- Set DIP switch 1-7 to the on position using a pointed object, such as the tip of a pencil.
- Turn the printer back on.

All changes of DIP switch settings should be made with the printer power turned off. The printer checks and recognizes new settings only at the time the power is turned on.

Recommended paper

Paper: For best results, use typewriter quality paper. If you plan to use paper with a glossy or textured surface, you should test it before regular use. Do not use multiple-part forms or labels.

Envelopes: You can print on air mail, plain, or bond envelopes. Before printing on envelopes, you need to set the paper thickness lever according to the thickness of the envelope. For specific information on paper thickness settings, see the section on printing with special paper in Chapter 2.

🚫 Printing past the edge of envelopes, multi-part forms or thicker than normal paper can damage the print head.

When you print on anything thicker than normal paper, be absolutely sure that none of the printing is closer than 1/4 of an inch to the edges.

Paper loading

To load paper, follow the steps below.

1. Pull the paper set lever all the way forward until the paper supports retract and lock open to allow for paper loading. Make sure that the two small front levers are up when using normal paper.
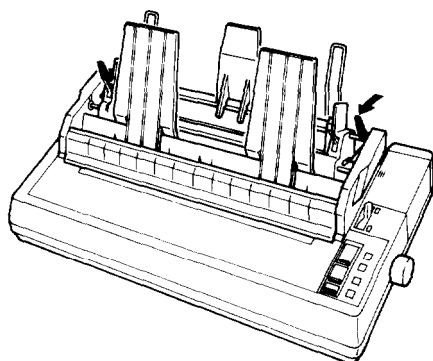
2. Slide the left paper guide so that the fin on the edge guide matches the arrow on the metal; then slide the right paper guide to roughly match the width of your paper.

3. Take a stack of paper and fan it as shown. This keeps the paper
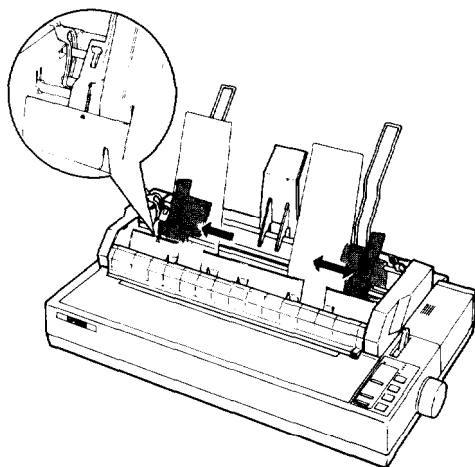   from sticking so that only one sheet feeds at a time. Tap the
    side and bottom of the paper on a flat surface to even up the
    stack.
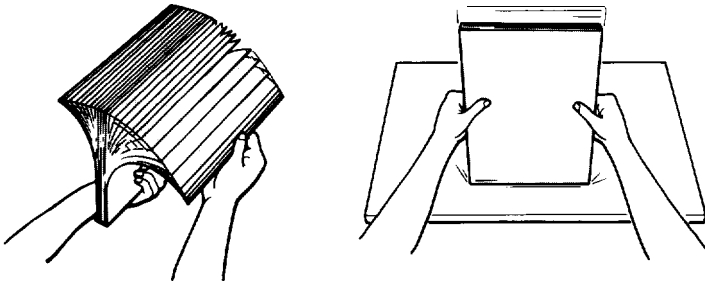
4. Insert the paper between the paper guides, aligning it with the
    left edge of the guide. Then, adjust the right paper guide until
    the paper is held firmly, but not so tightly that it causes the
    paper to bunch.
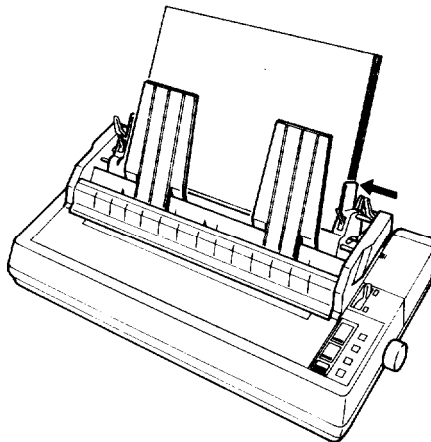
5. Push the paper set lever back until it clicks into place and clamps the paper against the guide rollers. The lever will not close completely if too much paper is used. If this happens, remove some paper from the stack and try again.
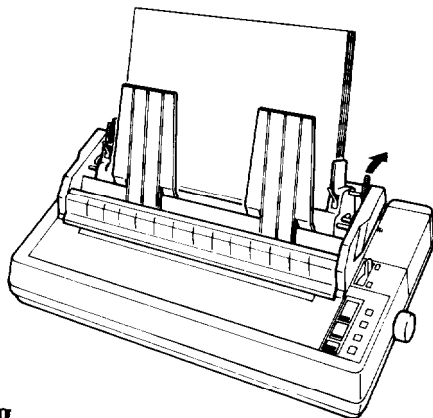
Envelope loading

Envelopes are loaded in much the same way as regular paper. To load envelopes, you need to do the following:

1. Set the paper thickness lever to match the thickness of your envelopes.

2. Follow steps 1 through 5 of the paper loading section to load envelopes.

3. Push down on the two front levers until they lock into position.
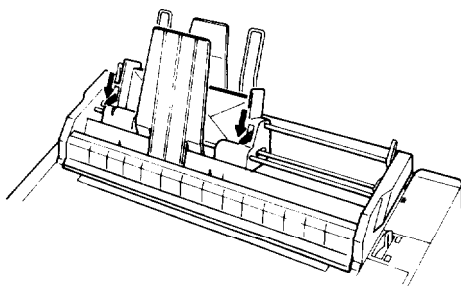
Using the cut sheet feeder

After loading paper into the cut sheet feeder, make sure that the ON LINE light is on. Once the printer is in the sheet feeder mode, a new sheet of paper loads automatically whenever a printable character or line feeding command is sent to the printer.

When the printer finds that it cannot load a sheet of paper because the paper bin is empty, it stops paper feeding and the PAPER OUT light comes on. To start printing again, load more paper, then press the ON LINE button. The printer starts printing again from the point at which it was stopped.

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

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 sheet feeder mode

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   performs line feed by 1/180 of an inch

Setting up your software

When you switch between continuous paper and cut sheet feeder fed paper you usually need to change the settings of your software program. Because of the physical requirements of feeding a single sheet of paper, sheet feeders always create an unprintable top and bottom margin on each sheet. To work properly, your software program needs to know how many printable lines are available on the page.

Paper comes in many different sizes and it is sometimes difficult to know exactly how many printable lines per page you have. The LQ-850, LQ-950, and LQ-1050 automatically count and print out the number of lines that are available on any size of paper. This is the number of lines you should use as the page length in your software setup. See the following section on the Self Test in cut sheet feeder mode for more details.

In addition to the number of printable lines, which your software may refer to as Page Length or Form Length, you may need to set the Top Margin, the Bottom Margin, and the actual number of lines to be printed on the page. The cut sheet feeders for the LQ-850, LQ-950, and LQ-1050 normally create a two line unprintable top margin. Therefore, if you want a total top margin of six lines (one inch), you should set the Top Margin in your software to four lines. The sheet feeders usually create an unprintable bottom margin of about three lines, so to create a total bottom margin of six lines (one inch) you should set the Bottom Margin in your software to an additional three lines. With a total Page Length of 61 printable lines, for example, the number of printed lines per page would be 54 (9 inches).

Some software designed only for printing on continuous forms will not use the Form Feed or ESC EM commands recommended for proper sheet feeder operation. This type of software may not have a sheet feeder setup mode or allow for margin settings, and it may only use Line Feeds to advance to the next form. Your sheet feeder can still work with most of these applications without any problems. Simply insert the paper you will be using into the sheet feeder, use the Self Test to print out the number of printable lines, then use that number of lines as the Page Length setting in your software. If you change paper sizes, repeat this process. Your sheet feeder will work as if it were feeding a continuous form. If your software does not allow you to set the Page Length, consult your software manufacturer.

The following is a typical example of a software setup required for proper operation of your cut sheet feeder. Not all software is set up the same, so you may find that a bit of experimentation is required before you find the best equivalent settings to use.

To maintain 54 printed lines per page:

	Continuous form settings		Cut sheet feeder settings
Change Page Length from	66	to	61
Change Top Margin from	6	to	4
Change Bottom Margin from	6	to	3

Many word processors and other software give you two ways to change these settings:

- You can change the settings in each individual file you print or;

- You can change the program's default settings so that every time you use the program, these new settings are in effect.

If your program has additional features, such as headers and footers, you have to compensate accordingly.

Control panel operation

All of the functions from the control panel are available in cut sheet feeder mode. Micro adjustment of the loading position is available immediately after loading a sheet using the **LOAD/EJECT** button and pushing the **ON LINE** button. Micro adjustment sets a new sheet loading position for as long as the power remains on. If the power is turned off, the loading position is returned to the factory setting. Changing the loading position with micro adjustment affects the number of lines per page. You may need to change your software margin settings again for this new page length.

Testing the printer in the cut sheet feeder mode

When performing the printer's built-in self test in the cut sheet
feeder mode, the print out is slightly different from that of the original
self test. Load the paper you will be using into the paper bin. Hold
down the **LINE FEED** or **FORM FEED** button and turn the power switch
on as described in Chapter 1.

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 below. The number of
lines counted by the printer becomes the default page length setting.
This setting, however, is overridden by software commands.

The self test is especially useful when you want to change the page
length settings of your application program, because it gives you a
quick count of the number of lines on the page.

This is the first line.

This is line XX.
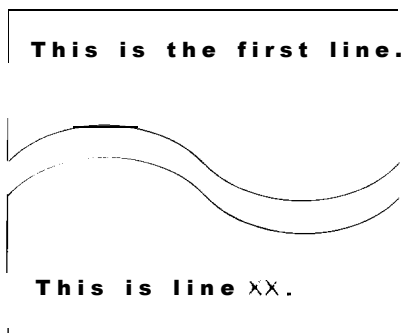
The remainder of the self test is similar to the original self test
described in Chapter 1.

Never perform the self test on envelopes.

Switching between cut sheet feeder and continuous paper

The LQ printer allows you to easily switch between cut sheet
feeder and continuous paper feeding without having to remove
either the feeder or the continuous paper supply. To switch between
these two paper feeding methods, follow the steps below.

1. Make sure that the continuous paper is already loaded and in a standby position as explained in Chapter 2.

2. Install the cut sheet feeder as described in this section, making sure that DIP switch 1-7 is set to on, and that the paper release lever is pushed all the way back.

3. To switch from cut sheet feeder operation to continuous paper, pull the paper release lever all the way forward. You will not need to change the DIP switch setting.

4   Raise the paper path guide until it clicks open, as shown below. This guide directs the flow of continuous paper out the front of the printer.
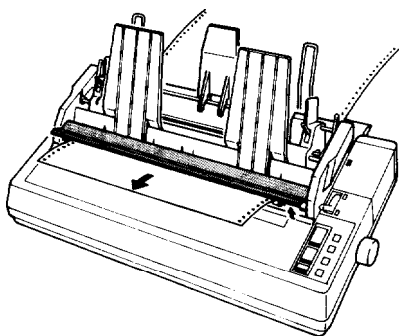
5. Continuous paper can now be loaded. With the paper release lever forward, the control panel functions normally, allowing you to use the micro-adjustment feature to finely adjust the loading position of your paper.

6. To switch back to cut sheet feeder operation, push the LOAD/EJECT button until the continuous paper feeds backward out of the paper path and into a standby position. Then, push the paper release lever back to put the printer into the sheet feeder mode.

7. Close the paper path guide.

The Pull Tractor

The optional pull tractor (#7311 for the LQ-850, #7313 for the LQ-950, or #7312 for the LQ-1050) provides optimum continuous paper handling. The pull tractor is especially useful1 with continuous multi-part forms and labels. For best results, use the pull tractor along with the built-in push tractor, as described in this section.

After making sure that you have both parts of the pull tractor option as shown below, remove the packing material and save it in case you need to ship the unit later.

pull tractor   *pull tractor cover*
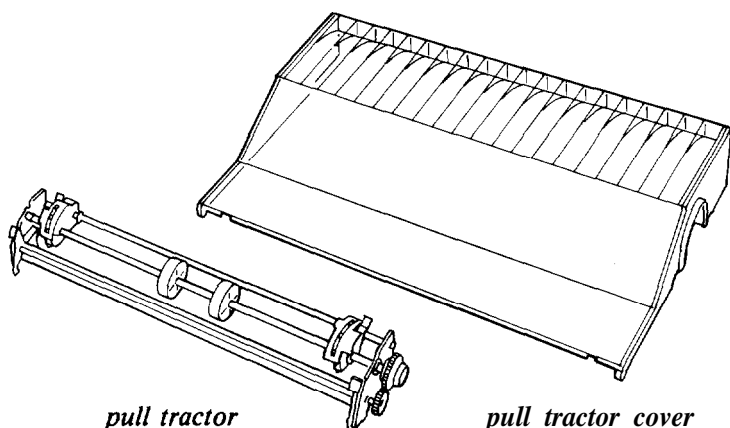
The short tear-off function cannot be used with the pull tractor. Before you start printing with the pull tractor, make sure that DIP switch 2-7 is set to off. (See the section on setting DIP switches in Chapter **3.)**

Installation and use

After making sure that the printer is turned off, install and use the pull tractor as follows:

1. Remove the printer cover and the paper guide and install the paper rest if you haven't already. (See page 2-7.)

2. Remove the paper tension unit by pressing open the release levers and lifting up the front of the unit at the same time.
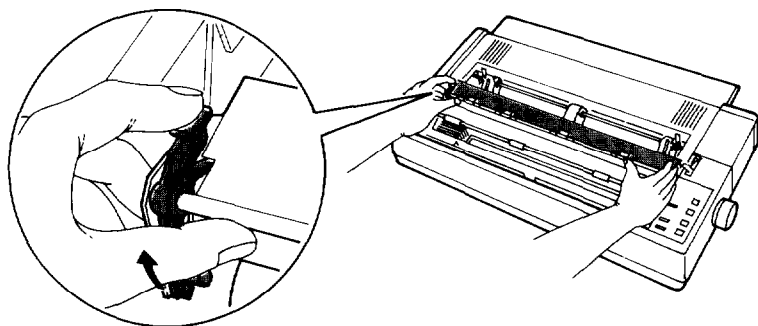
3. Hold the pull tractor with the gears to the right and fit the rear notches on the tractor over the rear mounting pins on the printer as shown below.
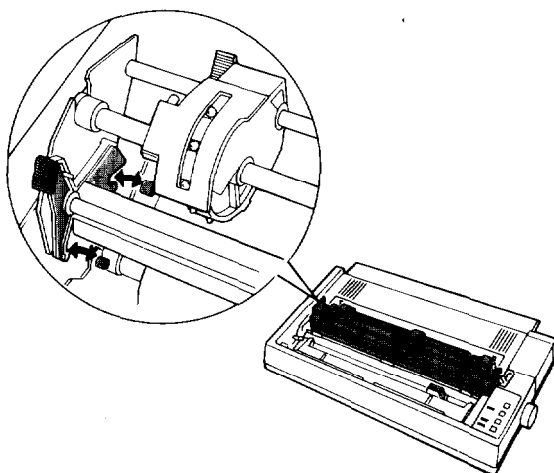
4. Then, tilt the tractor unit toward you until the front latches click in place over the front mounting pins of the printer.

5. Now load continuous paper as described on pages 2-6 to 2-10. However, in Step 5, position the left sprocket unit about 1/4 of an inch from the left before locking it in place.

6. After the paper is loaded in the push tractor, see that the printer is off line and press the FORM FEED button. This advances the paper one page so that you can fit the paper onto the pull tractor.

> . 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 function described in Chapter 3.

7. Open the sprocket covers, and release the sprocket lock levers.

   tne noles oi tne paper over tne tractor pins oi tne sprocke
   nes, adjusting the position of the sprocket units as necessa

8. Adjust the sprocket frames to match the width of the paper and adjust the paper supports so they are evenly placed between the sprocket units. (There is only one paper support on the LQ-850.)
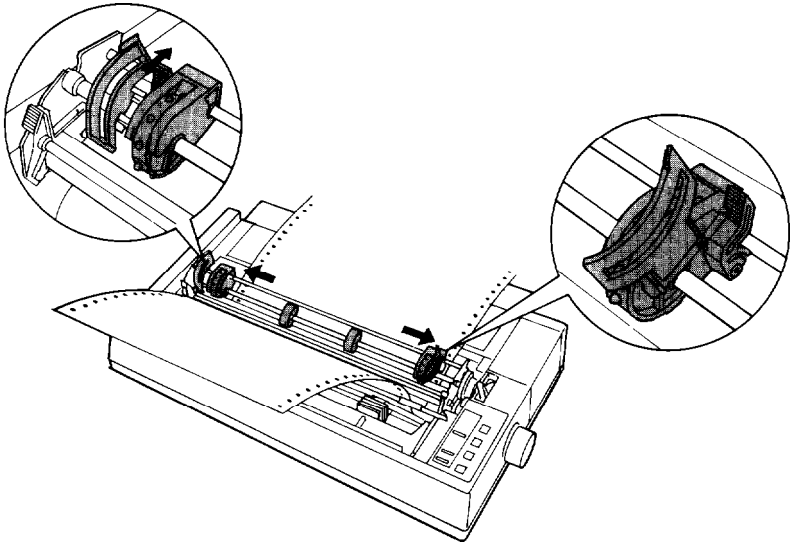
9. Fit the holes of the paper over the tractor pins of the sprocket frames, adjusting the position of the sprocket units as necessary.
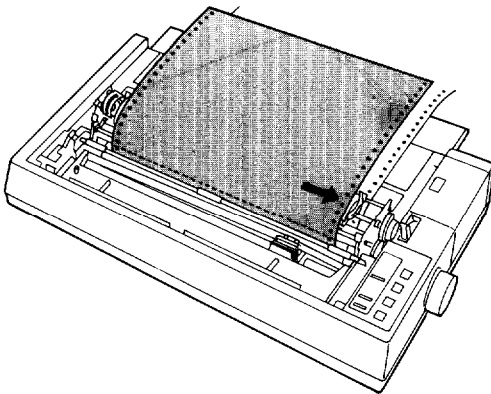
10. If the paper does not fit exactly onto the tractor pins, press in
    on the pull tractor feed knob and turn it in the desired
    direction.
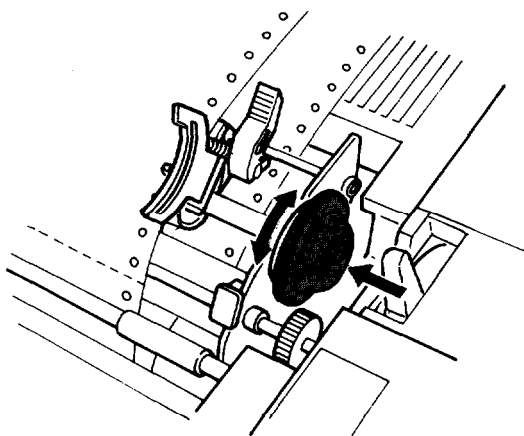
11. Close the sprocket covers.
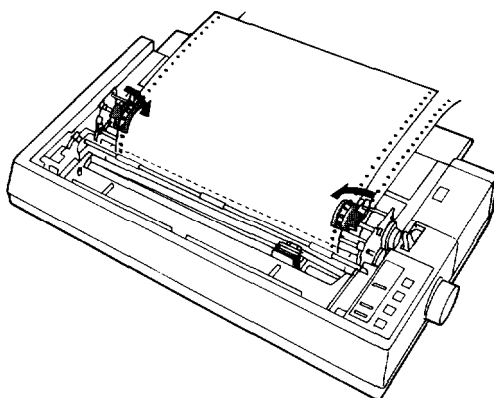
12. See that the paper is not crooked or wrinkled and lock the sprocket units in place.
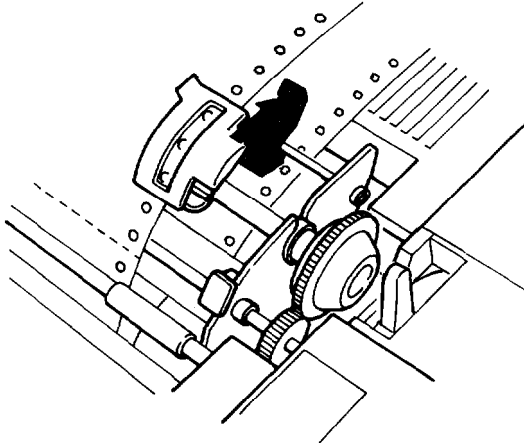
13. Slide the rollers on the paper bail so they are evenly distributed across the width of your paper. Also, make sure that the right and left rollers are at the both edges of your paper.
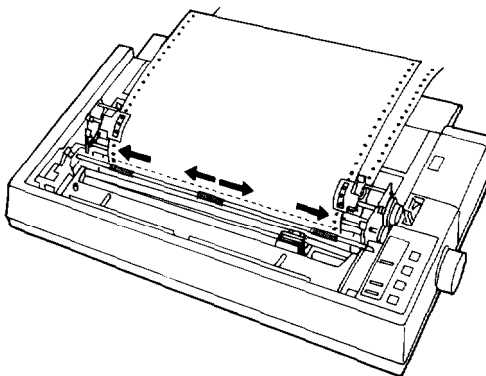
14. Re-install the paper guide; then slide the edge guides together so they meet at about the middle of the paper's width.

15. Install the pull tractor cover as shown below.
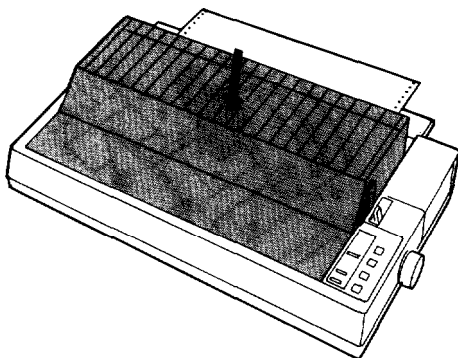
16. Press the ON LINE button to set the printer on line. Now you are ready to begin printing.

When you are finished printing

The short tear-off function cannot be used with the pull tractor. If you want to tear off the last printed page at its perforation, press the ON LINE button to set the printer off line and press the FORM FEED button to feed the paper forward an additional page before tearing off the paper.

Using the pull tractor alone

If you wish, you can use the pull tractor without using the push tractor. If you choose to do this, feed the paper from the rear above the metal guide and then load it. Be sure to pull the paper release lever forward to the continuous paper position after you load the paper.

Removing the pull tractor

After turning off the printer and removing the pull tractor cover, remove the pull tractor as follows:

1. Press the tabs on the pull tractor and tilt it back and lift it off the printer.
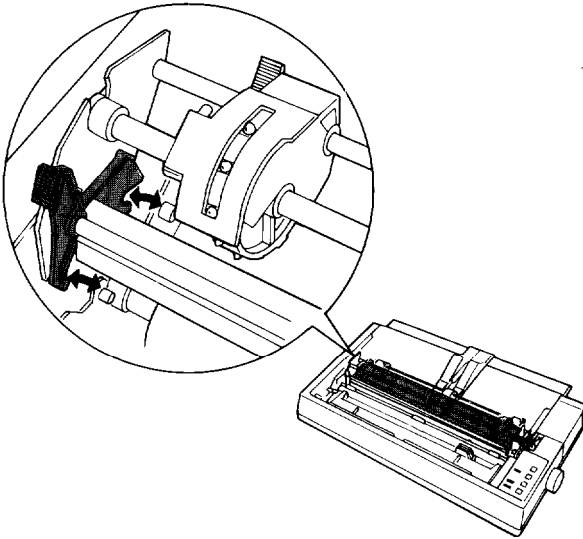
2. Replace the paper tension unit as shown below.
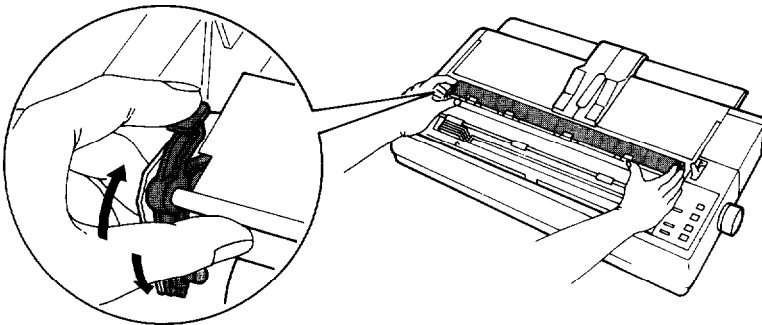
3. Now you are ready to use either single sheets or the push tractor.

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.

If you are 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 your LQ printer.

interface number	name
#8143	Optional serial interface
#8148	Intelligent serial interface
#8165	Intelligent IEEE-488 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.

Installing the interface board

This section describes how to install the optional interface boards available for use with your LQ printer. Installation is easy, and the only tool you need is a cross-head screwdriver.

> 🚫 High voltages are present inside the printer when the power is on. Do not attempt to remove the cover unless the minter is turned off and the power cord is unplugged. 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 on your body.

1. Turn off the power to the printer and the computer. Next, unplug the power cord and disconnect the interface cable from the printer.

2. Remove any installed printer options such as a pull tractor or cut sheet feeder; then remove the printer cover, the paper guide, and the platen knob.

3. Using a cross-head screwdriver, remove the two retaining screws: one located at the front of the printer, the other at the back near the printer's fan.
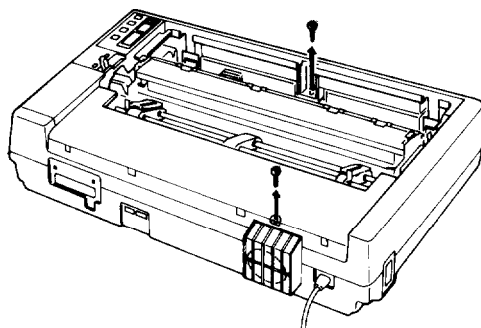
4. Detach the upper case by pressing in on the two retaining clips inside the front of the printer.
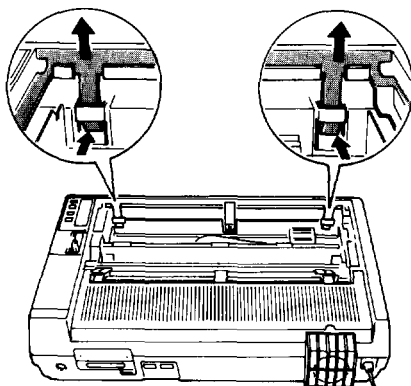
5. Partially raise the upper case; then reach under and detach the control panel by releasing the front clip.
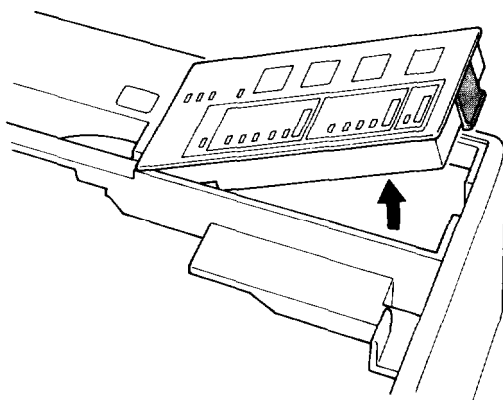
6. Slip the control panel back through the upper case. With the control panel free of the upper case, tilt the case straight back to detach the rear hinges, and then lift it off.
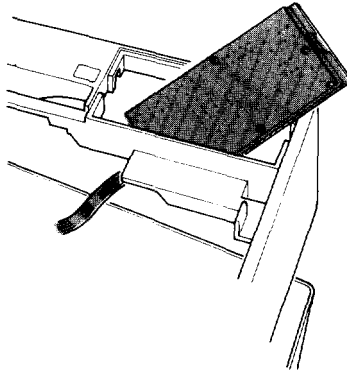
7. Remove the shield plate at the back of the printer to allow access to the optional interface connector.
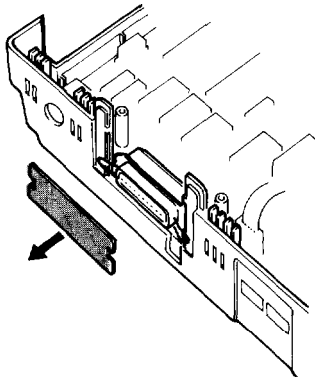
8. Remove the power cable attached to the main board. To remove, grasp the clip at its base and pull gently, but firmly, straight up. You may need to move the clip back and forth slightly as you pull upward to free it from-the board.
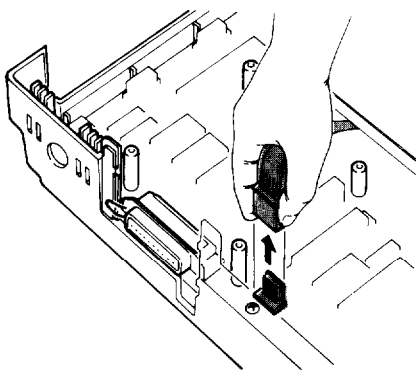
9. Remove the screw labelled CG from the main board. This ground connector screw is located next to the power cable connector.
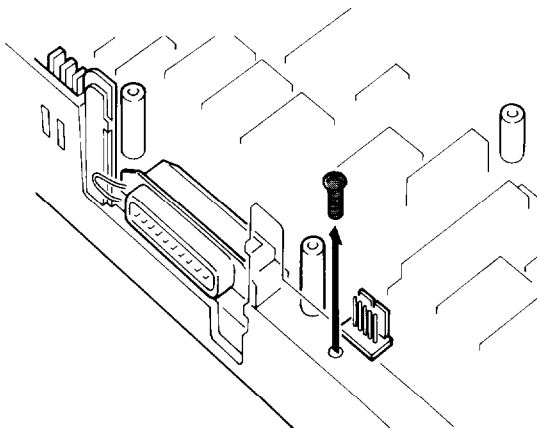
There are two basic interface designs. Each is installed slightly differently. Both installation procedures are described below. The difference in design does not affect the operation of the interface in any way.

Pictured below are the two basic designs. Check to see which one you have.
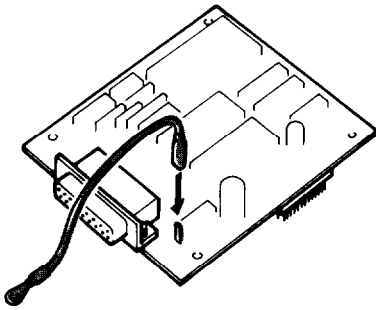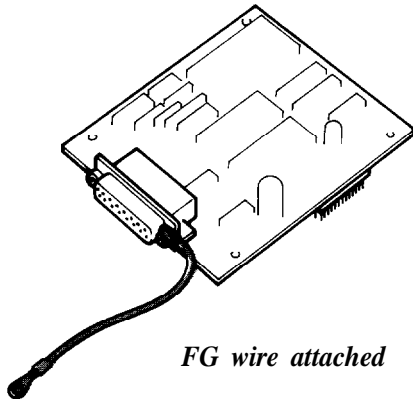
FG wire not attached   *FG wire attached*

FG wire not attached
The following section describes installation procedures for an interface board without the FG (frame ground) wire attached.

If your interface comes packaged with the FG wire attached, skip to the next section for installation instructions.

1. Using the CG screw, attach the round end of the FG (frame ground) wire to the main board. Position the other end of the wire as shown.
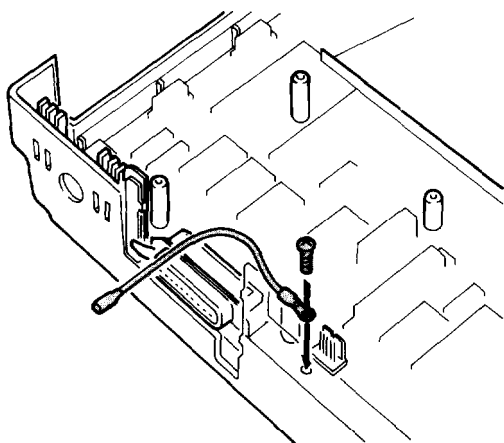
2. Reattach the power cable, making sure that the small fins on the white plastic clip are on the side away from you. Take extra care to see that the holes of the clip are aligned with the pins of the connector.
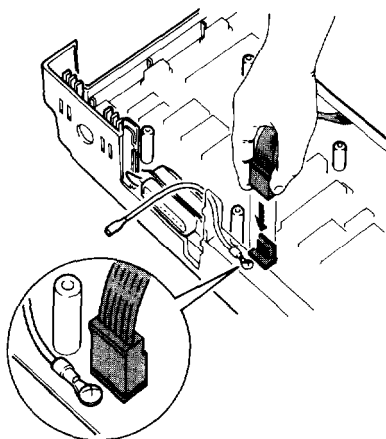
3. Fit the interface board under the built-in tractor as shown in the illustration. Next, carefully insert the pins on the optional interface board into the mating connector on the main board. Secure the board with the screws provided.
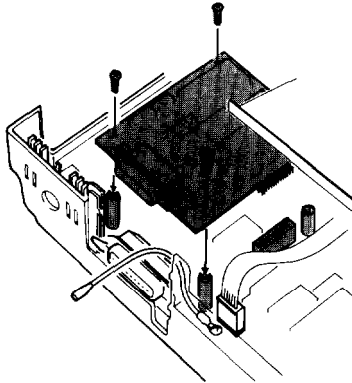
4. Attach the plug end of the FG wire onto the FG pin located on top of the interface board.
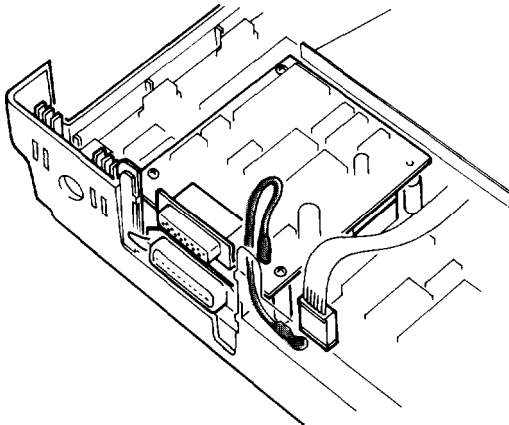
5. Reassemble the printer, taking care not to pinch the FG wire between the upper and lower sections of the case.

FG wire attached

   This section describes how to install an interface board that has
an FG (frame ground) wire attached.

1. Carefully place the interface board next to the printer as shown
   below. Using the CG screw, connect the round end of the FG
   wire to the main board.
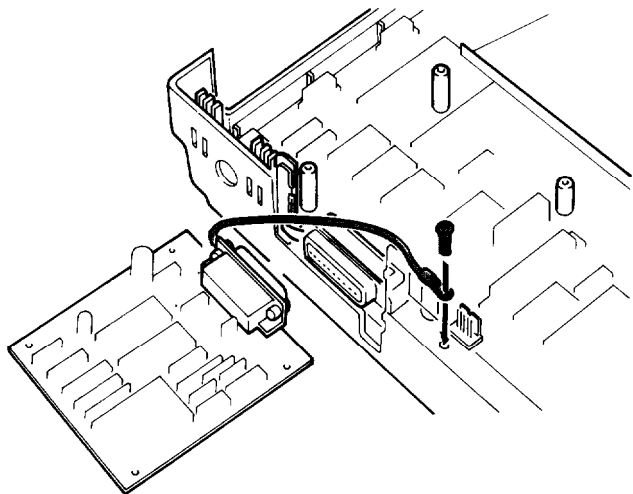
2. Reattach the power cable, making sure that the small fins on the
   white plastic clip are on the side away from you. Take extra
   care to see that the holes of the clip are aligned with the pins of
   the connector.
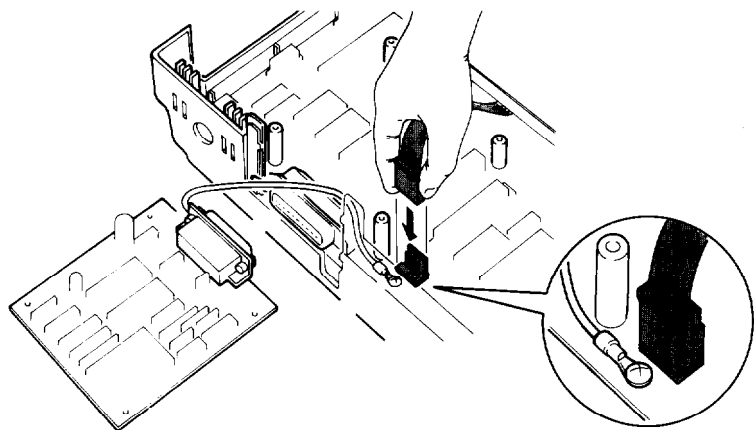
3. Holding the interface board level, rotate it clockwise into position and attach it to the main board. Make sure that the connector pins are properly inserted into the mating connector.
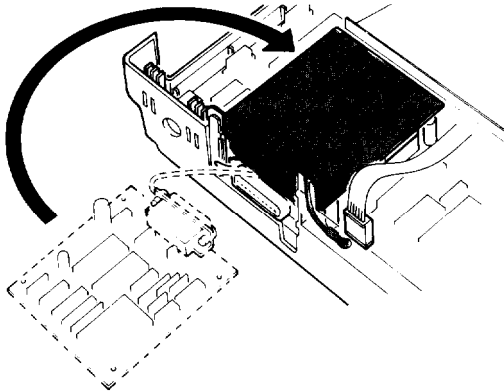
4. Secure the board with the screws provided.

5. Reassemble the printer, taking care not to pinch the FG wire between the upper and lower sections of the case.

The Multi-Font Module

The optional Multi-Font Module (#7407) gives you seven additional fonts for your LQ printer. Once you install it in either slot A or slot B, the following fonts are available: Courier, Prestige, Script, OCR-A, OCR-B, Orator, and Orator-S.

The Multi-Font Module is installed in one of the slots (A or B) in the printer. See the manual that comes with the module for full information on using the font module.

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

Courier

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

Prestige

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

Script

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

OCR-A

The OCR-A and OCR-B fonts can be read by an optical character reader (also known as a document reader or image scanner) for input into another computer.

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

OCR-B

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

Orator

!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`ABCDEFGHIJKLMNOPQRSTUV
WXYZ{¦}˜ÇÜÉÂÄÀÅÇÊËÈÏÎÌÄÅÉÆÆÔÖÒÛÙŸÖÜ¢£¥₧ƒÁÍÓ
ÚÑÑ⁴º¿⌐¬½¼¡‹›

Orator-S

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

Using the Multi-Font Module

To install a font module, follow these steps:

1. Make sure the printer is turned off.

2. Open the font compartment cover. Inside the compartment are two connectors labelled A and B.
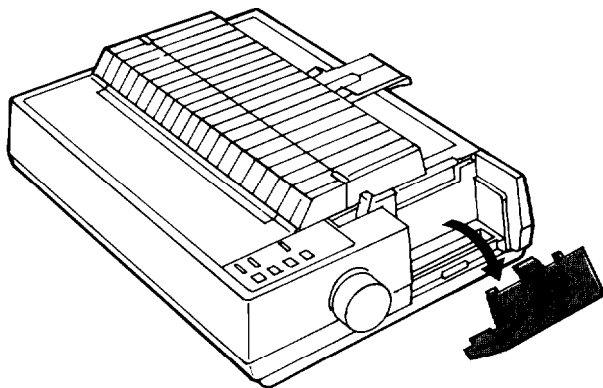
3. Insert the font module securely into SLOT A or B so that the arrow symbols on the font module and the slot are facing each other. If you install only one font module, be sure to insert it into SLOT A.
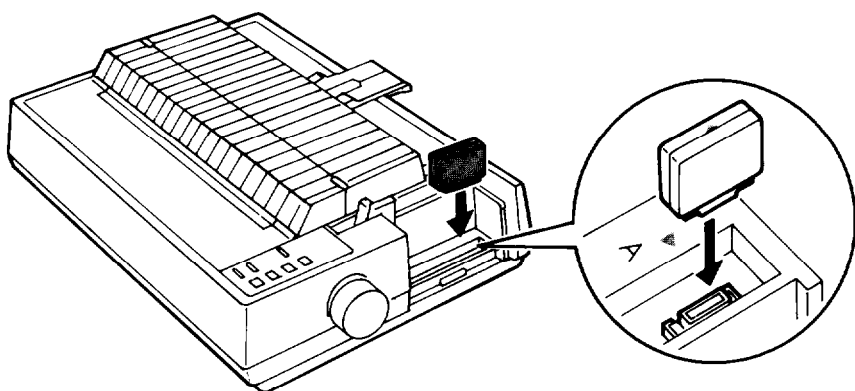
4. Close the font compartment cover.

5. After you have turned on the printer and are ready to print, select SLOT A or B by pressing the FONT button on the SelecType panel.

   This font module selection remains valid even after the printer is turned off, reset, or initialized.

6. You can use SelecType to select any available pitch for the fonts in the font modules.

The Emulation Module

The optional Emulation Module for IBM ProPrinter X/XL allows you to use programs designed to be used with an IBM ProPrinter.

See the manual that comes with the Emulation Module for full instructions on using it.

Printer Specifications

Printing
Printing method
24-pin impact dot matrix

Printing speed

Pitch	Quality	Characters/second/line
10	draft	220
10	LQ	73
12	draft	264
12	LQ	88

Printing direction
Bi-directional with logic-seeking. User can select unidirectional printing (left to right).

Line spacing
1/6 inch, or programmable in increments of 1/360th of an inch

Buffer
6 Kbytes or 0 Kbytes (DIP switch selectable)

Fonts
Epson New Draft
Epson Roman 10 CPI
Epson Roman 12 CPI
Epson Roman 15 CPI
Epson Roman proportional
Epson Sans Serif 10 CPI
Epson Sans Serif 12 CPI
Epson Sans Serif 15 CPI
Epson Sans Serif proportional

Optional fonts

Courier 10 CPI, 12 CPI, 15 CPI
Prestige 10 CPI, 12 CPI, 15 CPI
Script 10 CPI, 12 CPI, 15 CPI
OCR-A 10 CPI
OCR-B 10 CPI
Orator 10 CPI
Orator-S 10 CPI

Character tables

96 standard ASCII characters
13 international character sets
Epson Extended Graphics set

Paper

Paper feed methods

Friction
Built-in push feed tractor with paper tension unit
Single-bin or dual-bin cut sheet feeder (optional)
Pull tractor (optional)

Paper width

Type of paper	LQ-850	LQ-950	LQ-1050
Single sheets	7.2 to 10.1 inches	7.2 to 13.0 inches	7.2 to 14.4 inches
Continuous	4.0 to 10.0 inches	4.0 to 12.0 inches	4.0 to 16.0 inches
Envelopes	No. 6, No. 10	No. 6, No. 10	No. 6, No. 10

Printable area

Single sheet   Continuous paper

0.33" or more   *0.12" or more*

0.35" or more

Printable area

Printable area

Printable area

0.53" or more

0.47" (LQ-850: 4" to 9 1/2" width paper)
(LQ-950: 4" to 12" width paper)
(LQ-1050: 4" to 14 7/8" width paper)
0.97" (LQ-850: 10" width paper)
(LQ-1050: 15" to 16" width paper)

Paper feed speed
Approximately 60 ms/line at 1/6 inch line spacing

Paper thickness
Up to 0.004 inches for single sheets; up to 0.0126 inches for continuous paper

Number of copies
With continuous, multi-part, no-carbon paper only; one original plus up to three copies, maximum thickness: 0.0126 inches

Mechanical
Ribbon
Cartridge ribbon, available in black only. Do not use ribbons for 9-pin printers.

Printer	Standard ribbon	Film ribbon
LQ-850	#7753	#7768
LQ-950	#7767	#7769
LQ-1050	#7754	#7770

Life expectancy (in Letter Quality characters, at 48 dots/character): 2 million for standard ribbon and 0.2 million for film ribbon

MCBF
For all components excluding print head: 5 million lines.

MTBF
LQ-850: 4000 power on hours (at 25% duty)
LQ-950: 5000 power on hours (at 25% duty)
LQ-1050: 6000 power on hours (at 25% duty)

Print head life
200 million strokes per wire

Dimensions and weight

LQ-850	LQ-950	LQ-1050
Height: 5.6 in.	Height: 5.6 in.	Height: 5.6 in.
Width: 17.0 in.	Width: 20.5 in.	Width: 23.8 in.
Depth: 14.2 in.	Depth: 14.2 in.	Depth: 14.2 in.
Weight: 19.8 lbs	Weight: 22.0 lbs	Weight: 26.4 lbs

Electrical
Voltage
120 VAC, ± 10% (USA)
220 VAC, ± 10% (Europe)
Non-switchable

Power consumption
120 Watts maximum

Frequency
49.5 to 60.5 Hz

Insulation resistance
10 MΩ between AC power line and chassis

Dielectric strength
120 V model can withstand 1.25 kV rms applied between AC
line and chassis for 1 minute, or 1.5 kV rms for 1 second

Environment
Temperature
Operation: 41° F to 95° F (5" C to 35° C)
Storage: − 22° F to 150° F (− 30° C to 65° C)

Humidity
Operation: 10% to 80% without condensation
Storage: 5% to 85% without condensation

Shock
Operation: Up to 1 G within 1ms
Storage: Up to 2 G within 1ms

Vibration
Operation: Up to 0.25 G at up to 55 Hz
Storage: Up to 0.5 G at up to 55 Hz

Interface Specifications

The LQ is equipped with both a parallel and a serial interface.

🚫 Do not plug more than one interface cable into the printer at one time. This may damage your printer.

Parallel 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 3 4 5 6 7 8 9	20 21 22 23 24 25 26 27	DATA 1 DATA 2 DATA 3 DATA 4 DATA 5 DATA 6 DATA 7 DATA 8	IN IN IN IN IN IN IN IN	These signals represent information of the 1st of 8th bits of parallel data, respectively. Each signal is at HIGH level when data is logical 1 and LOW when it is logical 0.
10	28	ACKNLG	OUT	About an 11 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

Signal Pin	Return Pin	Signal	Direction	Description
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.
14	—	AUTO FEED XT	IN	When this signal is LOW, the paper is automatically fed 1 line after printing. (The signal level can be fixed to this by setting DIP switch 2-8 to ON.)
15	—	NC	—	Unused.
16	—	0V	—	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 in: 1) Paper-end state. 2) Off-line 3) Error state
33	—	GND	—	Same as for Pins 19-30.
34	—	NC	—	Unused.
35	—	—	—	Pulled up to +5V through 3.3K ohm resistance
36	—	SLCT IN	IN	The DC1/DC3 code is valid only when this signal is "HIGH" (Internal fixing can be carried out with Jumper J9. The level of this signal is factory-set to "LOW".)

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

2. "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.

3. 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.

4. 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.
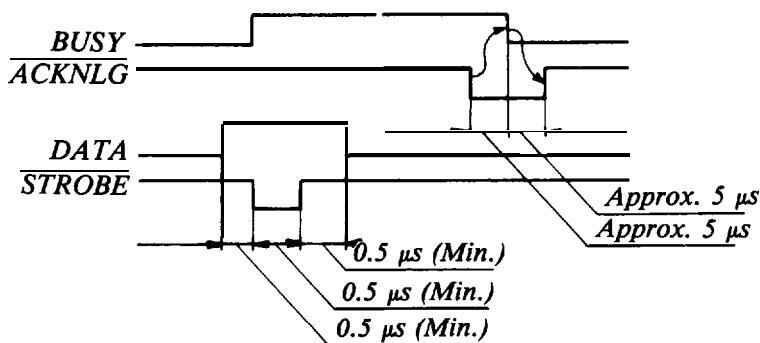
Printing enabled/disabled signals and control conditions
    The table below shows the relationship between printing being
enabled or disabled, and the on-line/off-line condition, the printer
select signal (SLCT IN), and the receipt of data on/off control
character, DC1/DC3.

On-line (Indicator on)	SLCT IN	DC1/DC3 (Data on/off control)	ERROR	BUSY	ACKNLG	Printing (Disabled/ enabled)
ON-LINE	Low (J9/ interface)	DC1/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)	DC1/DC3 (no effect)	Low	High	Not generated	Disabled

***Even though printing is disabled, data characters are received and acknowledged, since the
    printer is looking for another DC1 character, which would allow it to resume printing.**

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

Data format
    1 start bit
    Data word length: 8 bits
    Odd, even or no parity
    1 stop bit

Signal level
    Mark (1) - 3V to - 27V
    Space (0) + 3V to + 27V

Band rate
    300, 1200, 4800, 9600 BPS

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 goes
   down to 256. The signal changes to space-meaning that the
   printer is now ready-when the number of bytes free in the
   input buffer rises to 528.

Error handling

   All errors are ignored.

Connector

   6-pin DIN connector.

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

Pin number	Signal	Signal direction	Description
1	TXD	out	Transmits data for X-on/X-off
2	DTR	out	Whether or not the printer is ready to receive data
3	RXD	in	Receives data
4	NC		Not used
5	SG	—	Signal ground level
6	FG	—	Printer chassis ground

   The pins are arranged as shown below.

The Command Summary

This chapter lists and describes all the commands available on the LQ-850, LQ-950, and LQ-1050. This summary is divided by topics, but there is a list of the commands in numerical order beginning on page 9-4. If you know which command you are looking for, consult this list to find the page number where it is described.

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

The commands described in this appendix 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 the command. The comments section describes the effect of the command and gives any additional information necessary for using it.

The format section includes:

ASCII code:	the sequence in standard ASCII characters
Decimal:	the sequence in decimal numbers
Hexadecimal:	the sequence in hexadecimal numbers

All three formats are equivalent, so you can pick the one best 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,n1,* m. The variables are explained in the comments section.

Some application programs make use of control key sequences. See the Control key chart on page **9-4** of this chapter.

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-wide with either of these statements:

LPRINT CHR$(27);"W";CHR$(1) -ASCII Code
LPRINT CHR$(27);"W";"1"—ASCII Character

These correspond to:

ESC W SOH or ESC W1

Examples

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 or 0, to begin or end proportional printing. To turn ON proportional printing from BASIC the command is:

LPRINT CHR$(27);CHR$(112);CHR$(1)

Control key chart

Some application programs can use control key codes for decimal values O-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.

Some programs **that** use this system cannot use control-@, and many programs use the control keys for other purposes.

Dec.	Hex.	Cntl. Key	Dec.	Hex.	Cntl. Key
0	00	@	14	0E	N
1	01	A	15	0F	O
2	02	B	16	10	P
3	03	C	17	11	Q
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	I	23	17	W
10	0A	J	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.

Commands Arranged by Topic

The following section lists and describes all the commands.

Printer Operation

ESC @ **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.

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.
DC1 and DC3 will not work if pin 36 on the parallel interface is low (for example, on IBM and some compatible computers).

DC3

Format:
    ASCII code: DC3
    Decimal: 19
    Hexadecimal: 13

Comments:
    Puts the printer into the deselected state until select printer code
    (DC1) is received. The printer cannot be reselected with the **ON
    LINE** button.

DEL

Format:
    ASCII code: DEL
    Decimal: 127
    Hexadecimal: 7F

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

Printing direction

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.

ESC 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 and graphics printing. Unidirectional is the default for graphics printing.

| ESC EM | | | Turn **Cut Sheet Feeder Mode On/Off** |

Format:

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

Comments:

The following values can be used for n:

4: Mode is turned ON.

1: Selects bin 1.

2: Selects bin 2.

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

0: Mode is turned OFF.

The command should not be used unless the cut sheet feeder is installed. It is ignored if any value other than 0, 1, 2, R, or 4 is used for *n.*

See the Cut Sheet Feeder section in Chapter 7 for details.

MSB control

Note: 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 from the upper half of the ASCII table 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 al! incoming data as 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 >.

Beeper

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: 0D

Comments:
  Prints the data in the buffer and returns the print position to the
  left margin. A line feed may be added if the AUTO FEED XT line
  on the parallel interface is held LOW or if DIP switch 2-8 is on.

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

Form feeding

FF   Form Feed

Format:
  ASCII code: FF
  Decimal: 12
  Hexadecimal : 0C

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. The
  default page length is 66 lines, but the page length can be changed
  with ESC C. In CSF mode, an FF ejects a sheet, but will not load.

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 1-127 lines. The top of form position is set to the current line.

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 from l-22. The top of form position is set to the current line.

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 C or ESC C 0. The value of n must be from 1-127.

ESC O   Cancel Skip Over Perforation

Format :
    ASCII code: ESC   O
    Decimal: 27   79
    Hexadecimal: 1B   4F

Comments:
    Cancels the skip over perforation set by ESC N. Overrides the
    DIP switch skip over perforation setting.

Line feeding

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 1/8-inch Line Spacing

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

Comments:
    Sets the line spacing to 1/8 of an inch for subsequent line feed
    commands. The 0 is the character zero and not code 0 or the
    uppercase letter 0.

ESC 2   **Select 1/6-inch Line Spacing**

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

Comments:
  Sets the line spacing to 1/6 of an inch for subsequent line feed
  commands. The 2 is the character two and not code 2. This is the
  default at power on.

ESC 3   **Select 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*/180 of an inch for subsequent line feed
  commands. The 3 is the character three and not code 3. The
  value of *n* must be from O-255.

ESC A   **Select 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/60 of an inch for subsequent line feed
  commands. The value of *n* must be from 0-85.

ESC +   **Select 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/360 of an inch for subsequent line feed commands. This value of n must be from O-255.

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*/180 of an inch. The value of *n* must be from 0-255. This command produces an immediate line feed but does not affect subsequent line spacing and does not produce a carriage return.

Vertical tabbing

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 selected, the paper advances one line.

ESC B   Set Vertical Tabs

Format:

ASCII code:	ESC	B	*n1*	*n2*	.	.	.	0
Decimal:	27		66	*n1*	*n2*	.	.	.	0
Hexadecimal:			1B 42 *n1* *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 *n1,n2*, etc., all from 1-255, 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   9-17 tab settings.

ESC b   Set Vertical Tabs in Channels

Format:

ASCII code:	ESC	b	*c*	*n1*	*n2*	.	.	.	0
Decimal:	27	98	*c*	*n1*	*n2*	.	.	.	0
Hexadecimal:	1B	62	*c*	*n1*	*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 O-7. All subsequent VT commands use the
channel selected by this command.

Horizontal Motion

Margins

ESC1   Set Left Margin

Format:

ASCII code:	ESC	l	*n*
Decimal:	27	108	*n*
Hexadecimal:	1B	6C	*n*

Comments:

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

ESC Q Set Right Margin

Format:

ASCII code:	ESC	Q	*n*
Decimal:	27	81	*n*
Hexadecimal:		1B 51	*n*

Comments:

Sets the right margin to *n* columns in the current pitch. Settings made in the proportional mode are treated as 10 pitch. 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-wide 10 pitch character.

Print head movement

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. The BS code should not be used with ESC a 2 or ESC a 3.

ESC $ Set Absolute Print Position

Format:

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

Comments:

This sequence specifies the distance from the left margin that subsequent characters are to be printed, using this formula: total number of dots = $n1 + (n2 \times 256)$. 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 Position

Format:

ASCII code:	ESC		\	$n1$	$n2$
Decimal:	27	92		$n1$	$n2$
Hexadecimal:	1B	5C		$n1$	$n2$

Comments:

Determines the position (relative to the current position) at which printing of following data will start. To find $n1$ 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 = $n1 + (256 \times n2)$. The command is ignored if it would move the print position outside the current margins. A unit is 1/120th of an inch in draft, and 1/180th of an inch in Letter Quality or proportional.

Horizontal tabbing

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 pitch.

ESC D   **Set Horizontal Tabs**

Format:
  ASCII code: ESC   D   *n1 n2* . . .   0
  Decimal :   27   68   *n1 n2* . . .   0
  Hexadecimal: **1B**   **44**   *n1 n2* . . . 00

Comments:
  This command allows setting of up to 32 horizontal tabs, which
  are entered as *n1,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 pitch is changed, and
  for proportional printing the size of 10 pitch 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.

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 four other typestyles, use the family number of the font shown below. 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   Available only if the
4 = script   appropriate font
5 = OCR-B   module is installed,
6 = OCR-A   such as the Multi-
7 = Orator   Font Module
8 = Orator-S

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

Comments:
  Selects any valid combination of the following modes: 10 pitch,
  12 pitch, proportional, condensed, emphasized, double-strike,
  double-wide, italic, and underline. To determine *n,* add the
  values of the desired modes from the table below:

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

Print Size and Character Width

ESC P   **Select 10 Pitch**

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

Comments:
  Selects 10 pitch (10 characters per inch). Because 10 pitch is the
  default pitch, this command is normally used to cancel 12 pitch
  or 15 pitch.

ESC M   **Select 12 Pitch**

Format:
  ASCII code: ESC   M
  Decimal: 27   77
  Hexadecimal: 1B 4D
Comments: 9-23

  Selects 12 pitch (12 characters per inch).

ESC g **Select 15 Pitch**

Format:

ASCII code:	ESC	**g**
Decimal:	27	**103**
Hexadecimal:	1B	6 7

Comments:

Selects 15 pitch (15 characters per inch), and cancels 10 pitch or
12 pitch. Fifteen cannot be combined with condensed.

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. This command can be used with the resident
Roman and Sans Serif fonts but should not be used with fonts in
the optional font modules.

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 pitch mode has 17 characters per
inch.

ESC SI   **Select Condensed Mode**

Format:
  ASCII code: ESC   SI
  Decimal: 27   15
  Hexadecimal: 1B   0F

Comments:
  Duplicates the SI command.

DC2   **Cancel Condensed Mode**

Format:
  ASCII code: DC2
  Decimal: **18**
  Hexadecimal: **1 2**

Comments:
  Cancels condensed printing set by SI, ESC SI, or SelecType.

SO   **Select Double-wide Mode (one line)**

Format:
  ASCII code: SO
  Decimal: **14**
  Hexadecimal : 0E

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

ESC w   **Select Double High Mode**

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

Comments:
  Double high doubles the height of all characters. If *n* = **1**, the
  mode is turned on. If *n* = 0, the mode is turned off. You need to
  adjust the line spacing to compensate for the height of these
  characters.   **9-25**

DC4   **Cancel Double-wide Mode (one line)**

Format:
  ASCII code: DC4
  Decimal: 20
  Hexadecimal: 14

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

ESC W   **Turn Double-wide 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-wide mode doubles the width 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, with the second
  dot slightly to the right of the first.

ESC F **Cancel Emphasized Mode**

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

Comments:
  Cancels emphasized, the mode selected by ESC E.

ESC G **Select Double-strike Mode**

Format:
  ASCII code: ESC   G
  Decimal: 27   71
  Hexadecimal: **1B   47**

Comments:
  Makes text bolder by printing each line twice, with the second
  printing slightly below the first.

ESC H **Cancel Double-strike Mode**

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

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

ESC S0 **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 S1 _____   **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**

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: 27   45 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.
  However, spaces skipped by horizontal tabs are not underlined.

Format :
  ASCII code: ESC   (- *n1* *n2* *m* *d1* *d2*
  Decimal: *27*   *40*   *45*   *n1* *n2*   *m*   *d1* *d2*
  Hexadecimal: 1B   28   2D   *n1* *n2* *m*   *d1* *d2*

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

  Use the following values for the first 3 variables:
    n1 must be *3*
    n2 must be 0
    m must be 1

  The value of *d1* determines the location of the score:
    d1 = 1 for underline
    d1 = 2 for   strikethrough
    d1 = 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 *d1*
    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

  Notes: 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.

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 (cancels previous settings)
  1: Select outline style
  2: Select shadow style
  3: Select outline with shadow

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 Graphic set has been selected by ESC t or a DIP
  switch, 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.

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 BS and spacing commands should not be used with justification. 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 0-127. Each unit of space is 1/120th of an inch in draft and 1/180th of an inch in Letter Quality and proportional. Double-wide doubles the unit of space.

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 Character 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 Graphic character table.

2: See below.

Duplicates the function of DIP switch l-4. Note that the value of *n* must equal 00 hex or 01 hex.

The value 2 re-maps any downloaded characters from the positions 0-127 to the positions 128-255.

ESC 6   Enable Printable Characters

Format:

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

Comments:

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

ESC R   **Select a 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	7 = Spain I
1 = France	8 = Japan
2 = Germany	9 = Norway
3 = England	10 = Denmark II
4 = Denmark I	11 = Spain II
5 = Sweden	12 = Latin America
6 = Italy	64 = Legal

User-defined Characters

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

ESC &   **Define User-defined Characters**

Format:

ASCII code:	ESC	&	0	*d1*	*d2*	. . .	*dn*
Decimal :	*27*	*38*	0	*d1*	*d2*	. . .	*dn*
Hexadecimal:	1B	26	00	*d1*	*d2*	. . .	*dn*

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. Roman = *0;* Sans Serif = **1.**

| ESC % | Select User defined Set |

Format:

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

Comments:

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.

Graphics

Note: See Chapter 4 for sample graphics programs.
See the table under ESC* for graphics modes.

ESC K   **Select Singledensity Graphics Mode**

Format:
ASCII code: ESC   K   *n1 n2*
Decimal: 27   75   *n1 n2*
Hexadecimal: 1B   4B   *n1 n2*

Comments:
Turns on eight-pin, single-density graphics mode. The total
number of columns $= n1 + (n2$ X $256)$.

ESC L   **Select Double-density Graphics Mode**

Format:
ASCII code: ESC   L   *n1 n2*
Decimal: 27   76   *n1 n2*
Hexadecimal: 1B   4C   *n1 n2*

Comments:
Turns on eight-pin, low-speed, double-density graphics mode.
The total number of columns $= n1 + (n2$ X $256)$.

ESC Y   **Select High-speed Double-density Graphics Mode**

Format:
ASCII code: ESC   Y   *n1 n2*
Decimal: 27   89   *n1 n2*
Hexadecimal: 1B   59   *n1 n2*

Comments:
Turns on eight-pin, high-speed, double-density graphics mode.
The total number of columns $= n1 + (n2$ X $256)$.

ESC Z   **Select Quadruple-density Graphics Mode**

Format:
  ASCII code: ESC   Z   *n1 n2*
  Decimal :   27   90   *n1 n2*
  Hexadecimal: 1B   5A   *n1 n2*

Comments:
  Turns on eight-pin, quadruple-density graphics mode. The total
  number of columns = *n1* + (*n2* X *256).*

ESC *   **Select Graphics Mode**

Format:
  ASCII code: ESC   *   *m*   *n1 n2*
  Decimal: 27   42   *m*   *n1 n2*
  Hexadecimal: 1B   2A   *m*   *n1 n2*

Comments:
  Turns on graphics mode *m*. See the table below for details on the
  available modes. The total number of columns = *n1* + (*n2* X
  256).

Option	Pins	*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
Single-density			
Double-density			120
CRT III			
Triple-density	24	39	180
Hex-density*	24	40	360

*Adjacent dots cannot be printed in this mode.

Format:

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

Comments:

Changes one graphics mode to another. The variable *s* is a character (K, L, Y or Z), which is reassigned to a mode *m* **(0-6).**

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

Application program
Software designed to perform a specific task, such as word processing or accounting.

ASCII
American Standard Code for Information Interchange. A standardized coding system for letters and symbols used by nearly all manufacturers of computers, printers, and software.

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 the printing because the head prints in both directions.

Binary
See Number systems

Bit
A binary digit (0 or 1). The smallest unit used by a printer or computer. See also Number systems.

Carriage return
A 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.

Condensed
A print width approximately 60% of the width of standard characters. For example, condensed 10 pitch has 17 characters per inch (cpi).

Continuous paper
This paper has pin-feed holes on each side and is perforated between pages. Also called fan-fold paper.

Control code
The ASCII standard includes codes for printable characters and 33 other codes, which are called control codes. These are the codes for such functions as sounding the beeper and performing a carriage return.

Cut sheet feeder
An optional device that automatically feeds single sheets of paper into the printer.

Data dump
A trouble-shooting feature. When the printer is in the data dump mode, each code that it receives is printed in hexadecimal notation. Sometimes called hex dump.

Decimal
See Number systems.

Default
Values or settings that take effect when the equipment is turned on, reset, or initialized. These can be changed by DIP switches or by SelecType.

DIP switches
Small switches in a printer that control various printer functions. DIP stands for Dual In-line Package.

Dot graphics
A graphic design formed by patterns of dots.

Dot matrix
A method of printing in which letters and symbols are formed by patterns of individual dots.

Double width
A print width in which each character is twice as wide as normal characters.

Draft
One of two print qualities available on the LQ. Draft uses a minimum number of dots per character for high-speed printing. *See* also *Letter Quality.*

Escape (ESC)
A special control code used to begin most printer commands.

ESC/P
Abbreviation for Epson Standard Code for Printers, a set of commands developed by Epson and supported by almost all application software for personal computers.

Extended Graphics set
Epson Extended Graphics set contains international accented characters, Greek characters, and character graphics for printing lines, corners, and shaded areas.

15 pitch
A pitch with fifteen characters per inch.

Font
A font is a style of type designated by a family name.

Font modules
Options that plug into the LQ-850 and LQ-1050 to add character fonts available in Letter Quality mode.

Form
In printer terminology this term is usually equivalent to a page.

Form feed
A control code or a button that advances the paper to the top of the next page.

Hexadecimal (hex)
   See *Number systems.*

Hex dump
   See Data dump.

Initialize
   Return the printer to its defaults.

Interface
   The connection between the computer and the printer. A serial
   interface transmits data one bit at a time and a parallel interface
   transmits data one character or code at a time.

Italic
   A typestyle in which the characters slant. *This sentence is
   italicized.*

Letter Quality (LQ)
   One of two methods of printing on the LQ. Letter Quality
   reduces the print speed and increases the number of dots per
   character to increase the print quality. Draft uses a minimum
   number of dots per character for high-speed printing.

Line feed
   A control code or button that advances the paper one line
   space.

Loading position
   The position to which the paper is automatically loaded. It can
   be adjusted with the micro-adjustment feature.

Micro adjustment
   A feature that adjusts the loading and short tear-off positions in
   1/180 of an inch units, This feature can be used immediately
   after loading paper when the MULTI-PART indicator light on the
   control panel is flashing.

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 representing 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 binary number.

Paper bail
The part of the printer that holds the paper against the platen.

Paper-out sensor
A small switch behind the platen that sends a signal when it is not in contact with paper.

Paper tension unit
The part of the printer that fits on top of the platen to assure proper paper-feed tension.

Parallel interface
An interface is the connection between the computer and the printer. There are two types: a parallel interface transmits data one character or code at a time, and a serial interface transmits data one bit at a time.

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) For example, 10 pitch printing is 10 cpi.

Platen
The black roller that provides a backing for the printing.

Print quality
The LQ has two types of print quality: draft and Letter Quality. Draft is for high-speed, draft quality jobs; Letter Quality is for final, polished correspondence.

Proportional printing
Printing in which the width of the character varies from character to character. Therefore, a capital W, for example, receives much more space than a lowercase i.

RAM
Random Access Memory. The portion of the printers 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
Returning a printer to its defaults, with either a command, an INIT signal, or by turning the printer off and on.

Self **test**
A method of checking the operation of the printer. When the self test is turned on, the printer prints the characters that are stored in its ROM.

Serial interface
An interface is the connection between the computer and the printer. There are two types: a serial interface transmits data one bit at a time, and a parallel interface transmits data one character or code at a time.

Short tear-off
A feature that automatically feeds the perforation of continuous paper to the tear-off position and then feeds the paper back to the loading position. This position can be adjusted with the micro-adjustment feature. See *Micro adjustment.*

10 pitch
A pitch with 10 characters per inch. This is often the standard or default character width.

Tractor

The part of the printer that moves continuous paper through the printer.

12 pitch

A pitch with 12 characters per inch.

User-defined characters

Characters defined and stored temporarily in the printer by the user. Also known as download characters.

Index

Command descriptions and definitions of terms are not indexed here. For page references for specific commands, see pages 9-8-35 or the Quick Reference Card. For definitions of terms, see the Glossary.

A

B

C

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LQ-850/950/1050

Quick Reference

DIP Switch 1

Switch	Description	ON	OFF
1-1			
1-2	International character set	See the table below.	
1-3			
1-4	Character table	Graphics	Italics
1-5	Print direction for graphics	Unidirec.	Bidirec.
1-6	Not used		
1-7	Cut sheet feeder mode	Valid	Invalid
1-8	6 Kbytes receive buffer	0 bytes	6 Kbytes

DIP Switch 2

Switch	Description	ON	OFF
2-1	Page length	12 inches	11 inches
2-2	Skip Over Perforation	ON	OFF
2-3	Interface/Parity	See the table below.	
2-4			
2-5	Baud rate	See the table below.	
2-6			
2-7	Short tear off mode	ON	OFF
2-8	Auto line feed*	ON	OFF

*When auto line feed is ON (DIP switch 2-8 ON), each carriage return code (CR) is automatically accompanied by the line feed code (LF).

International character set selection

1-1	1-2	1-3	Country
ON	ON	ON	U.S.A.
ON	ON	OFF	France
ON	OFF	ON	Germany
ON	OFF	OFF	U.K.
OFF	ON	ON	Denmark 1
OFF	ON	OFF	Sweden
OFF	OFF	ON	Italy
OFF	OFF	OFF	Spain 1

Interface/parity selection

2-3	2-4	Interface type	Parity
OFF	OFF	Parallel	
OFF	ON	Serial	Odd
ON	OFF	Serial	Even
ON	ON	Serial	None

Baud rate selection

2-5	2-6	Baud Rate
OFF	OFF	9600 bps
ON	OFF	4800 bps
OFF	ON	1200 bps
ON	ON	300 bps

The following control codes are listed briefly for quick reference. For a more detailed explanation, see the page reference in Chapter 4 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 Qperation/Data Control

Code	Dec	Hex	Function	Pg
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)	9-10
ESC U	85	55	Turn Unidirectional Mode On/Off	9-10
ESC EM	25	19	Turn Cut Sheet Feeder On/Off	9-11
ESC =	61	3D	Set MSB to 0	9-11
ESC 〉	62	3E	Set MSB to 1	9-12
ESC #	35	23	Cancel MSB Control	9-12
BEL	7	07	Beeper	9-12
CR	13	0D	Carriage Return	9-13
CAN	24	18	Cancel Line	9-13

Vertical Motion / Horizontal Motion

Code	Dec	Hex	Function	Pg
FF	12	0C	Form Feed	9-13
ESC C	67	43	Select Page Length in Lines	9-14
ESC C 0		43	Select Page Length in Inches	9-14
ESC N	78	4E	Select Skip Over Perforation	9-14
ESC O	79	4F	Cancel Skip Over Perforation	9-15
LF		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		33	Select *n*/180-inch Line Spacing	9-16
ESC A	65		Select *n*/60-inch Line Spacing	9-16
ESC +	43	2B	Select *n*/360-inch Line Spacing	9-16
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	9-17
ESC b	98	62	Set Vertical Tabs in Channels	9-18
ESC /	47	2F	Select Vertical Tab Channel	9-18
ESC I	108	6C	Set Left Margin	9-18
ESC Q	81	51	Set Right Margin	9-19
BS	8	08	Backspace	9-19
ESC $	36	24	Select Absolute Print Position	9-20
ESC \	92	5C	Set Relative Position	9-20
HT	9	09	Tab Horizontally	9-21
ESC D	68	44	Set Horizontal Tabs	9-21

〉

Overall Printing Style/Print Size

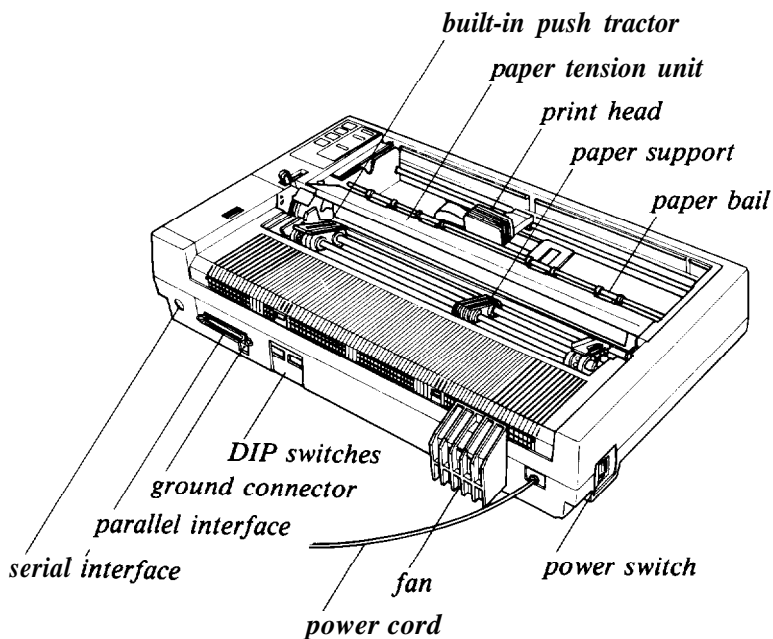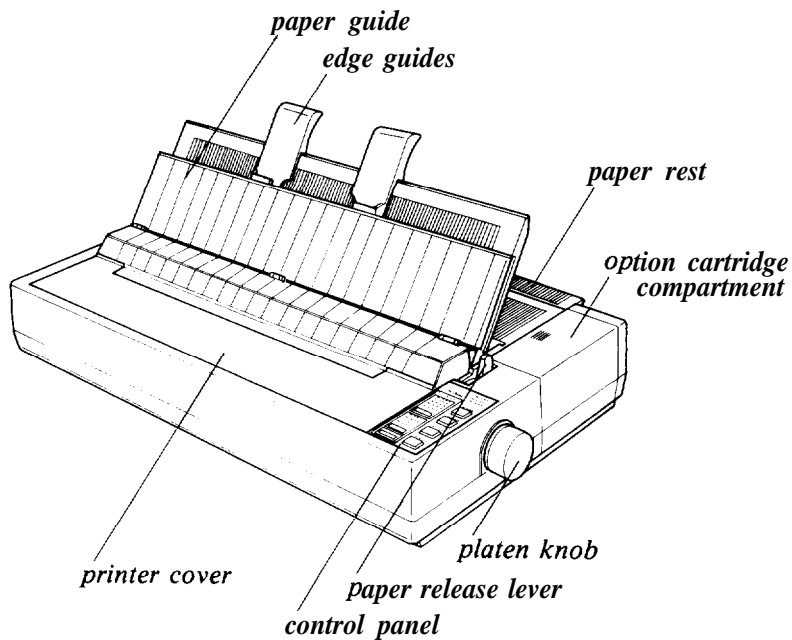| Code	Dec	Hex	Function	Pg
ESC x	120	78	Select Letter Quality or Draft	9-22
ESC k	107	6B	Select Typestyle Family	9-22
ESC !	33	21	Master Select	9-23
ESC P	80	50	Select 10 Pitch	9-23
ESC M	77	4D	Select 12 Pitch	9-23
ESC g	103	67	Select 15 Pitch	9-24
ESC p	112	70	Turn Proportional Mode On/Off	9-24
SI	15	0F	Select Condensed Mode	9-24
ESC SI	15	0F	Select Condensed Mode	9-25
DC2	18	12	Cancel Condensed Mode	9-25
SO	14	0E	Select Double-wide Mode (one line)	9-25
ESC w	119	77	Select Double High Mode	9-25
DC4	20	14	Cancel Double-wide Mode (one line)	9-26
ESC W	87	57	Turn Double-wide Mode On/Off	9-26

Print Enhancement/Word Processing

Code	Dec	Hex	Function	Pg
ESC E	69	45	Select Emphasized Mode	9-26
ESC F	70	46	Cancel Emphasized Mode	9-27
ESC G	71	47	Select Double-strike Mode	9-27
ESC H	72	48	Cancel Double-strike Mode	9-27
ESC S 0	83	53	Select Superscript Mode	9-27
ESC S 1	83	53	Select Subscript Mode	9-28
ESC T	84	54	Cancel Superscript/Subscript	9-28
ESC –	45	2D	Turn Underlining On/Off	9-28
ESC (–	40	28	Select/Cancel Score	9-29
ESC q	113	71	Select Character Style	9-30
ESC 4	52	34	Select Italic Mode	9-30
ESC 5	53	35	Cancel Italic Mode	9-30
ESC a	97	61	Select Justification	9-31
ESC (space)	32	20	Select Intercharacter Space	9-31

Character Tables

Code	Dec	Hex	Function	Pg
ESC t	116	74	Select Character Table	9-32
ESC 6	54	36	Enable Printable Characters	9-32
ESC 7	55	37	Enable Upper Control Codes	9-32
ESC R	82	52	Select a Character Set	9-33

User-defined Characters/Graphics

Code	Dec	Hex	Function	Pg
ESC &	38	26	Define User-defined Characters	9-33
ESC :	58	3A	Copy ROM into RAM	9-34
ESC %	37	25	Select User-defined Set	9-34
ESC K	75	4B	Select Single-density Graphics Mode	9-35
ESC L	76	4C	Select Double-density Graphics Mode	9-35
ESC Y	89	59	Select High-speed Double-density Graphics	9-35
ESC Z	90	5A	Select Quadruple-density Graphics Mode	9-36
ESC *	42	2A	Select Graphics Mode	9-36
ESC ?	63	3F	Reassign Graphics Mode	9-37

paper guide

edge guides

paper rest

option cartridge
compartment

platen knob

printer cover

paper release lever

control panel

built-in push tractor

paper tension unit

print head

paper support

paper bail

DIP switches

ground connector

parallel interface

serial interface

fan

power cord

power switch

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