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# Introduction

This EPSON® printer combines low price with high quality printing and advanced features.

## Features

In addition to the high performance and reliability you've come to expect from EPSON printers, your printer offers the following features:

- Draft mode for quick printing. The speed of draft printing is 150 characters per second in 10 cpi and 180 in 12 cpi.
- Near Letter Quality (NLQ) mode for top quality printing. When you have perfected a document, you can switch to one of two NLQ fonts—Roman or Sans Serif.
- A variety of print styles, including emphasized, double-strike, condensed, italic, and double-width.
- Selection of typestyles with the control panel.
- User-defined characters so you can create and print your own symbols or characters.
- Dot graphics for charts, diagrams, and illustrations.
- Easy paper loading.
- A ribbon cassette for quick and clean ribbon changing.
- The EPSON Character Graphics set, which includes character graphics that are used on IBM® and compatible computers as well as international characters used by IBM-compatible software.

## **About This Guide**

Chapter 1 gives you step-by-step instructions on setting up your new printer, and Chapters 2 through 6 cover the basic and advanced functions. Chapter 7 contains a summary of the printer's commands and the Appendix contains information on optional interfaces.

## Chapter 1

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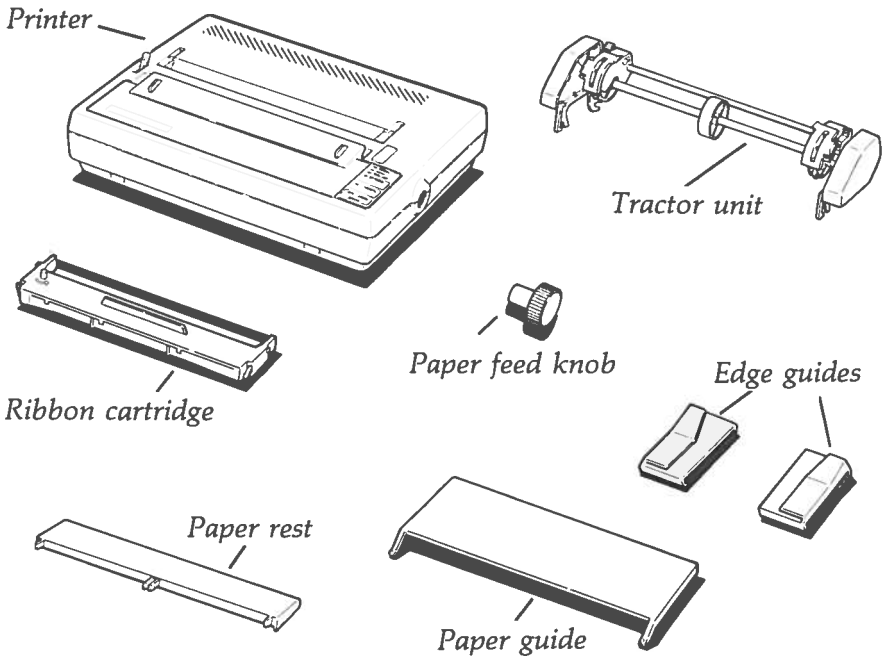
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## Identifying Printer Parts

First, see that you have all the parts you need. In addition to this manual, the printer box should contain the items shown in the illustration below. The paper feed knob is packed into an indentation in the white foam material.



In addition to the items in the box, you need a proper shielded cable to connect the printer to your computer. Though unlikely, you may also need an interface board, which is necessary only for those computers that can't use the Centronics® parallel interface. Your computer manual can tell you which cable you need and whether or not you require a special interface.

**Note:** If you plan to use a printer stand, make sure it meets the following requirements:

- The stand must support at least 22.4 lb or 10.2 kg (twice the weight of the printer).
- The stand must not tilt the printer more than 15 degrees from horizontal. With a cut sheet feeder, the stand must keep the printer level.
- If the paper supply is below the printer stand, make sure that the paper cannot catch on the underside of the stand or on the stand supports.
- Make sure that the power cord and the interface cable do not interfere with paper feeding. If possible, secure them to a printer stand support.

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## Selecting a Place for the Printer

The main consideration in selecting a good location for the printer is placing the printer close enough to your computer for the cable to reach. Also remember the following:

- Plug the printer into a grounded outlet, and do not use an adapter plug. Make sure the power switch on the printer's left side is off before plugging in the printer.
- Avoid using electrical outlets that are controlled by wall switches. Accidentally turning off a switch can wipe out valuable information in your computer's memory and disrupt printing.
- Avoid using an outlet on the same circuit breaker with any large electrical machines or appliances. These can cause disruptive power fluctuations.
- Keep your printer and computer away from base units for cordless telephones.
- Protect the printer from direct sunlight, excessive heat, moisture, and dust. Make sure that it is not close to a heater or other heat source.

If you are going to use the tractor unit and continuous-feed paper, clear enough space around the printer so that the paper has an unobstructed path into and out of the printer. There are three common methods of arranging a printer and continuous-feed paper:

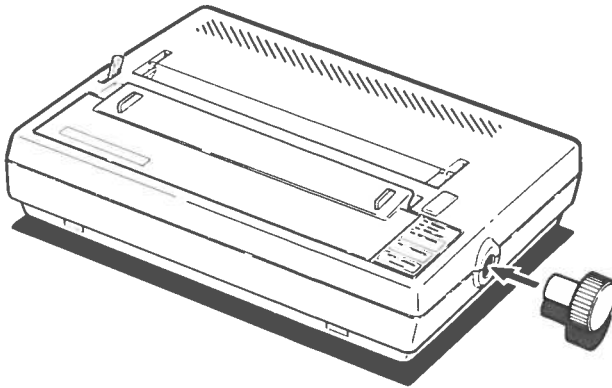
- Using a printer stand with the paper stacked behind it. (Because of the cable, it is usually best for the paper that feeds into the printer to be stacked somewhat behind the printer instead of directly beneath it.)
- Putting the printer on a desk or table and stacking the paper behind the printer.
- Using a desk or table as a stand, with the printer near the back edge and the paper on the floor or on a shelf.

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## Installing the Paper Feed Knob

Now that you have decided where to locate your printer, the first step in setting it up is installing the paper feed knob. Follow these steps:

1. Locate the paper feed knob, which is packed into an indentation in the white foam material.
2. Insert the knob into the hole on the right side of the printer, as shown below. Gently rotate the knob until it fits over the shaft.



3. Push the knob in until it is flush with the printer case.

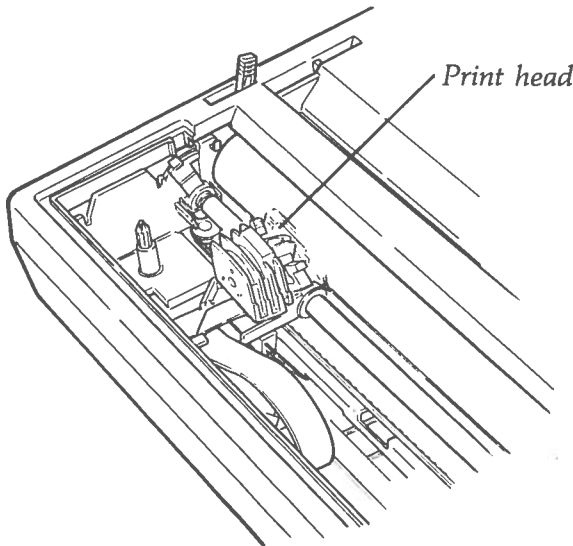
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## Installing and Replacing the Ribbon

The printer uses a continuous-loop, inked fabric ribbon. It is enclosed in a cartridge that makes ribbon installation and replacement a clean and easy job.

To install the ribbon, follow these steps:

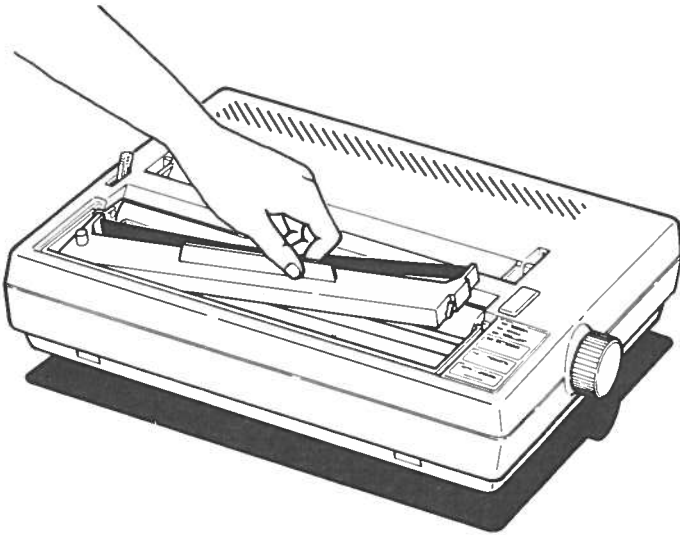
1. Remove the lid at the front of the printer by lifting the handles. Removing the lid enables you to see the print head, which is shown below.



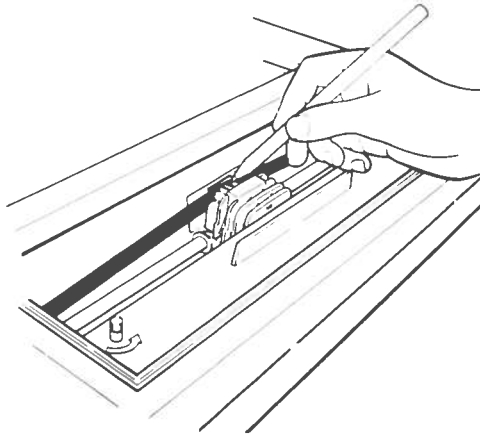
**CAUTION:** The power must be off when you move the print head because moving the print head when the power is on may damage your printer. Also, if you've been using your printer, be careful not to touch the print head because it becomes hot during use. Let it cool for a few minutes.



2. Move the print head by hand to the center of the printer so that the other parts of the printer will not get in your way.
3. Grasp the ribbon cartridge by its handle and hold the cartridge so that the exposed strip of ribbon is facing away from you.
4. Insert the cartridge by placing the black hooks on each side of the cartridge into the slots located inside the printer in the right and left front corners. Push down until the cartridge snaps into place. (See the illustration below.)



5. Turn the knob on the cartridge in the direction of the arrow to tighten the ribbon. As you turn the knob, see that the ribbon slips down into its proper place between the print head and the ribbon guide. You may want to use a pen to direct the ribbon, as shown in the next illustration.



6. Replace the front lid by inserting its legs into the slots near the front corners of the printer. Lay the lid down and press to snap it into place.

### **Replacing the ribbon**

When your printing becomes light and you need to replace the ribbon, follow these steps:

1. Remove the front lid.
2. Grasp the ribbon cartridge handle and pull out the cartridge.
3. Follow the ribbon installation instructions above to insert the new ribbon cartridge.

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## Using Continuous-feed Paper

The following section covers use of continuous-feed paper with your tractor unit. If you plan to use single-sheet paper, skip to the "Removing the tractor unit" section on page 1-17.

The tractor unit for the printer allows you to use paper with pin feed holes along the sides (continuous-feed paper). You can adjust the tractor unit to accommodate widths of paper ranging from 4 to 10 inches, including the pin feed holes.

### Installing the tractor unit

You need to install the tractor unit each time you wish to load continuous-feed paper after using single-sheet paper, which can be loaded only when the tractor unit is removed.

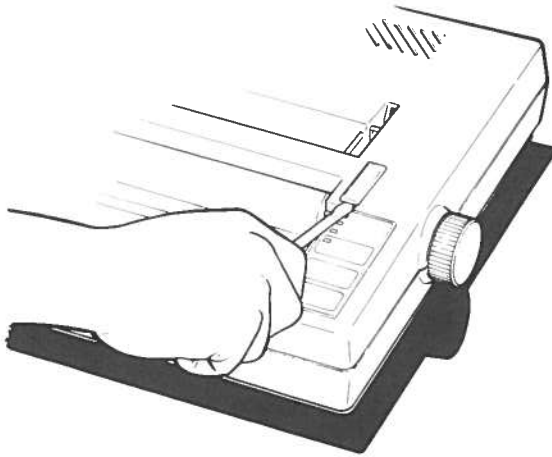
Since your printer comes with the tractor unit installed, simply install the paper rest by fitting it into the slots along the top edge of the back of the printer and snapping it into place. (See the bottom illustration on the following page.) Then see the instructions later in this chapter for loading continuous-feed paper.

To install the tractor unit, follow these steps:

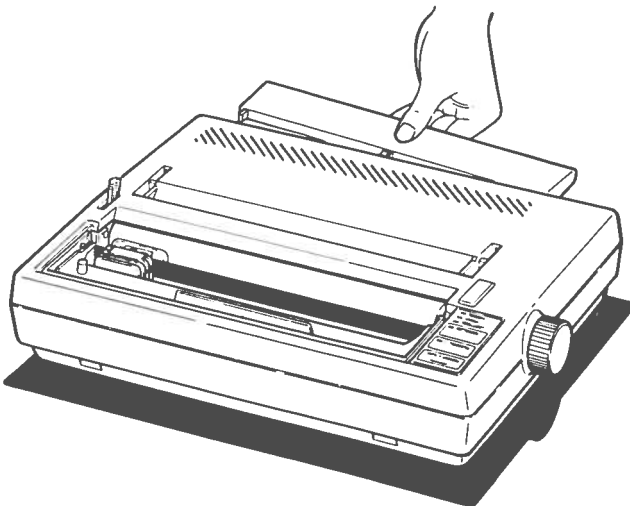
1. If the paper guide is installed, remove it by tipping it toward you and pulling it out.

## Using Continuous-feed Paper

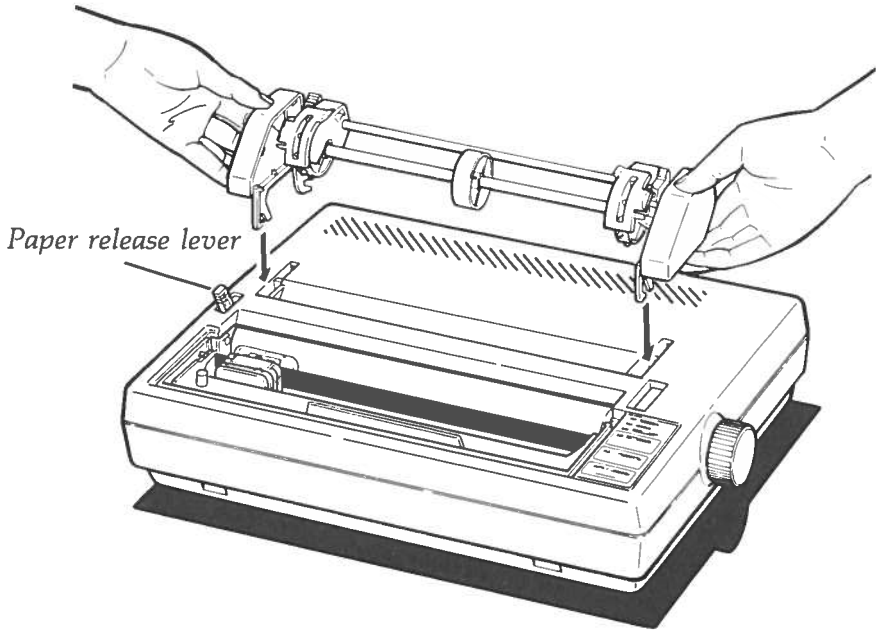
2. Pop out the tractor unit slot cover, which is located above the indicator lights. It may help to use the flat edge of a screwdriver, as shown on the next page. Store the cover in a safe place while you use the tractor unit, and replace it when you remove the tractor unit.



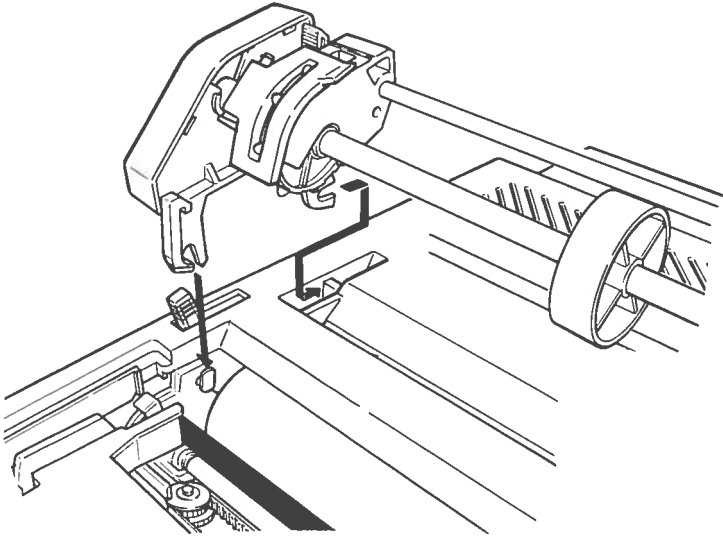
3. Fit the paper rest into the slots along the top edge of the back of the printer and snap it into place, as shown below.



4. Pull the paper release lever forward. (See the illustration below.) The double-arrow icon in front of the lever marks the position the lever should be in for using continuous-feed paper (or for releasing paper).
5. Now install the tractor unit. First, hold the unit so that its black legs are facing downward, as shown below.



6. In each tractor slot, located at each side of the paper slot, is a peg that fits into the notch on each of the rear tractor legs. Tilt the tractor back so that the rear notches fit over these pegs, as shown below.



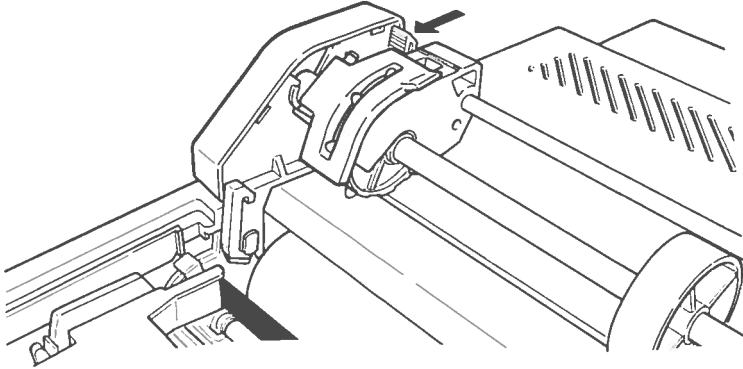
7. Then tilt the unit forward until the front legs snap into place.

### **Loading continuous-feed paper**

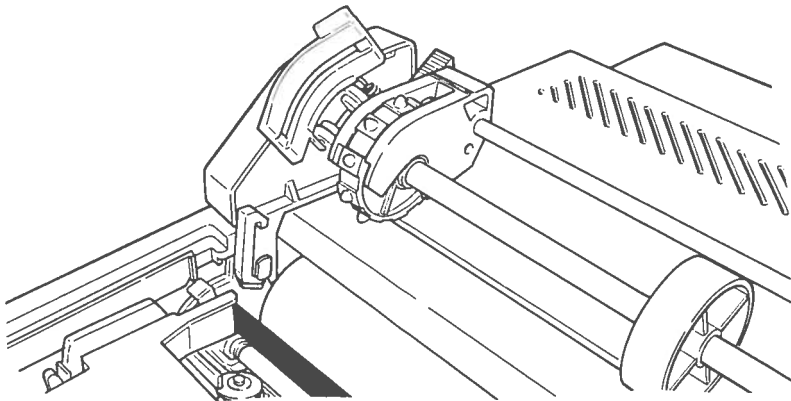
Once the tractor unit is installed, load continuous-feed paper as follows:

1. Make sure that the printer is turned off.
2. Remove the front lid of the printer.
3. Move the print head to the center of the printer. Remember, the printer must be turned off whenever you move the print head. Also, if you've been using the printer, the print head may be hot. Be careful not to touch it unless you let it cool for a few minutes.

- Using the illustration below as a guide, pull the locking levers on each side of the pin feed holders forward so you can move the pin feed holders.

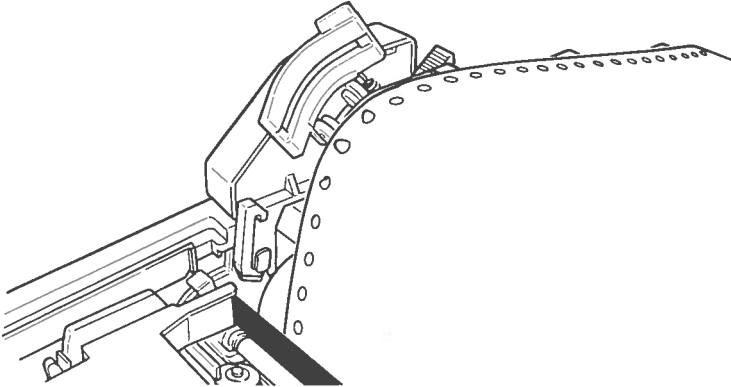


- Place the left holder approximately  $\frac{3}{4}$  of an inch from the far left position and then push the locking lever back to fasten that holder in place. Leave the other holder unlocked.
- Open the pin feed covers as shown below.



- Feed the paper into the paper slot. Push and maneuver the paper through the slot until it comes up between the ribbon guide and the platen (the black roller).

8. Pull the paper up until the top is above the pin feed holders. Fit the holes along the left edge of the paper over the pins in the left holder, as shown below, and close the pin feed cover.



9. Fit the right side of the paper into the right holder, moving the holder as needed to match the width of the paper. Close the second pin feed cover.
10. Make sure that the paper has no dips or wrinkles, then push the locking lever back to lock the right holder in place.

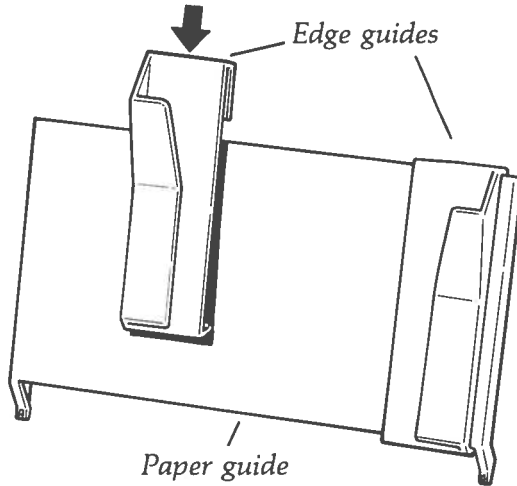
### **Installing the paper guide**

Install the paper guide, which is used here as a paper separator, as described below. Note that the guide is installed in one of two different positions depending on the type of paper you use. It lies flat when you use continuous-feed paper, as described here, and sits upright for loading single-sheet paper.

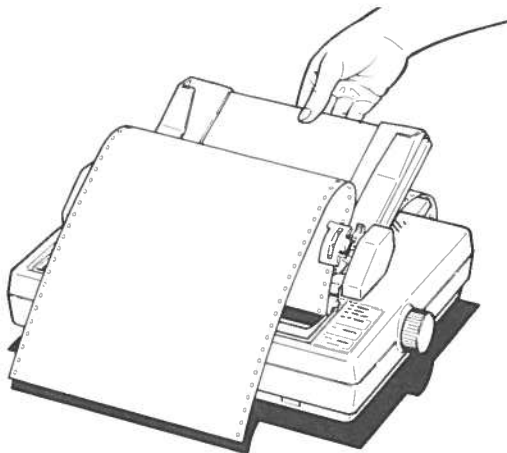
1. If the edge guides are not yet in place, install them by hooking the tab on the back of each guide over the top of the paper guide, as shown in the illustration on the next page. Snap the bottom of each guide into place.



For continuous-feed paper, move the edge guides to the far right and left positions on the paper guide. You won't be inserting paper through the edge guides unless you use single-sheet paper.



2. Insert the legs of the paper guide into the slots behind the tractor unit, keeping the guide tilted backward as you do so. (See the illustration below.)



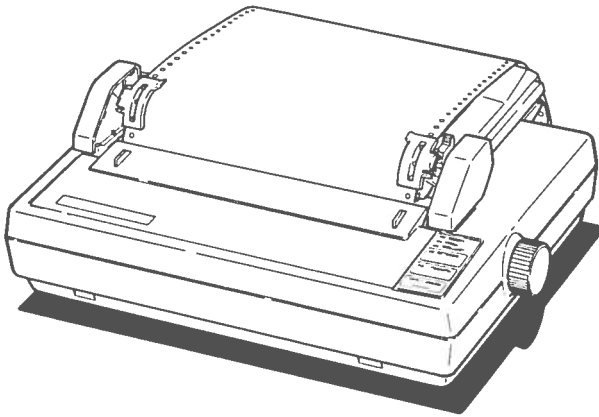
3. When the legs are in the slots, lean the guide all the way back. The guide should rest above the paper entering the printer, separating it from paper exiting the printer.

### **Setting top of form**

Now you are ready to set the top of form position. Follow these steps:

1. Turn the paper feed knob to advance the paper until the perforation between pages is just below the top of the ribbon.
2. Now replace the front lid.

Your printer should now be set up as shown below.



When you turn on your printer, it remembers this top of form setting and uses it when any program tells it to move to the top of the next page. If you later 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 to see that your top of form setting is correct.

Once you have set the top of form, each time you finish printing a document, push the ON/OFF LINE button to put the printer off-line and then push the FORM FEED button once to advance the paper one sheet. This enables you to tear off your just-printed pages and leave the paper in the correct position to begin the next document.

**Note:** Make sure that the front lid is in place whenever you print. (Always snap the lid shut when replacing the lid.) The front lid doubles as a paper bail, holding the paper against the platen.

### **Removing the tractor unit**

It is necessary to remove the tractor unit before you use single-sheet paper. To remove the unit, follow these steps:

1. Remove the front lid.
2. Open the pin feed covers and pull the paper off the pins. Then lay the paper over the front of the printer so you can reach the tractor feed unit.
3. Grasp both sides of the tractor unit and gently lift up the front end. This action unsnaps the front legs of the tractor unit and enables you to lift off the unit.
4. Pull the paper guide toward you until it settles into an upright position for single-sheet paper.
5. Make sure that the paper release lever is forward, and remove the paper.
6. Replace the front lid.

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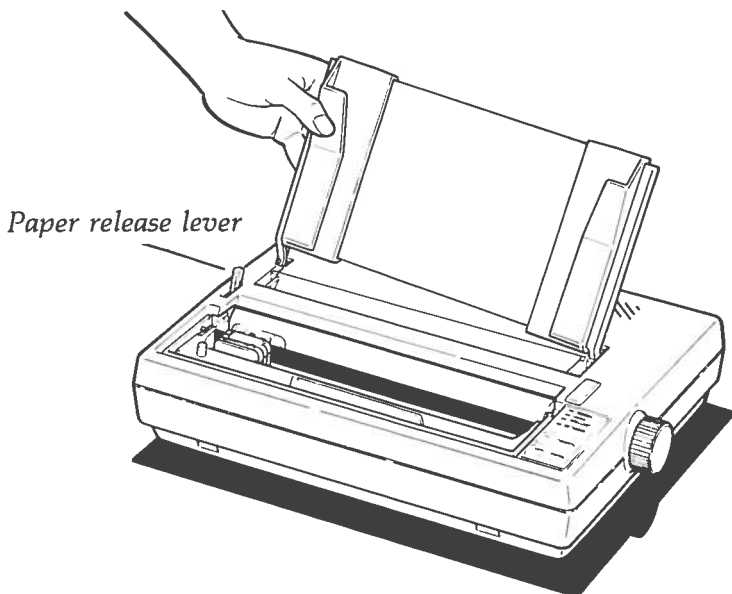
## Using Single-sheet Paper

Before you load single-sheet paper, you must prepare the printer by installing the paper guide in an upright position. If the tractor unit is installed, remove it by following the instructions above. After following those instructions, you can skip the following section on paper guide installation, except for step 3 on aligning the left edge guide.

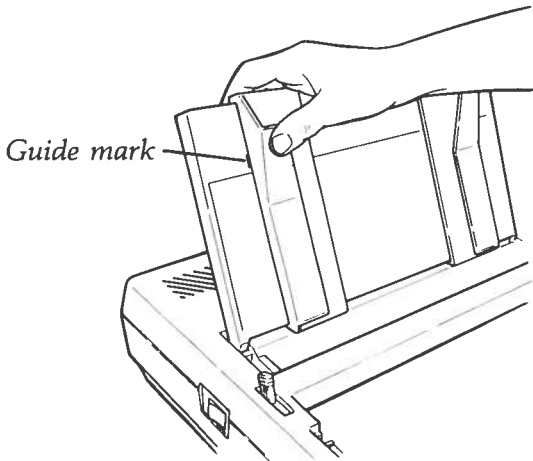
### Installing the paper guide

Install the paper guide as follows:

1. If you have not already done so, install the edge guides on the paper guide by hooking the tab on the back of each guide over the top of the paper guide, as shown on page 1-15. Snap the bottom of each edge guide into place.
2. Hold the paper guide upright and insert the legs of the guide into the slots on either side of the printer, as shown below.



3. Align the left side of the left edge guide with the guide mark on the paper guide as shown below. You may later wish to adjust this edge guide depending on the margin setting in your application program.

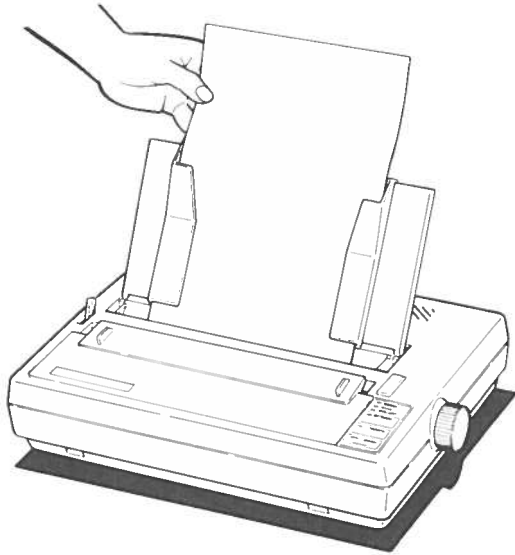


### Automatic paper loading

Now you are ready to load single-sheet paper using the printer's auto load feature.

To load paper automatically, just follow these steps:

1. Push back the paper release lever. (See the illustration on the previous page.) The single-arrow icon behind the lever marks the position the lever should be in for loading single-sheet paper.
2. Turn on the printer.
3. Make sure that the ON LINE indicator is off. If it is not off, press the panel labeled ON/OFF LINE.
4. Adjust the right edge guide to fit the size of the paper.
5. Slide the paper down through the edge guides until it meets resistance. Press down on the paper a bit more to make sure that it is firmly in place, as shown in the following illustration.



6. Press and release the AUTO LOAD button (the same button as the DRAFT/LINE FEED button). The paper is automatically loaded to the top of the page.
7. Push the ON/OFF LINE button so that the printer is ready to print.

**Note:** Make sure the front lid is in place whenever you print. (Always snap the lid shut when replacing the lid.) The front lid doubles as a paper bail, holding the paper against the platen.

8. If the paper is crooked and needs to be reloaded, pull the paper release lever forward, pull out the paper, push the lever back, turn the printer off, and reload by beginning again at step 1 in the "Automatic paper loading" section above. If the paper just requires minor adjustment, then pull the paper release lever forward, open the front lid, adjust the paper, and push the lever back. Then close the front lid.

## **Reloading during printing**

When you print a document more than one page long using single-sheet paper, there are two ways your software can enable you to load a new sheet at the end of a 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 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/OFF LINE button once to turn it off.

Once the ON LINE light is off, remove the sheet that has just been printed and load a new sheet in the same way as before.

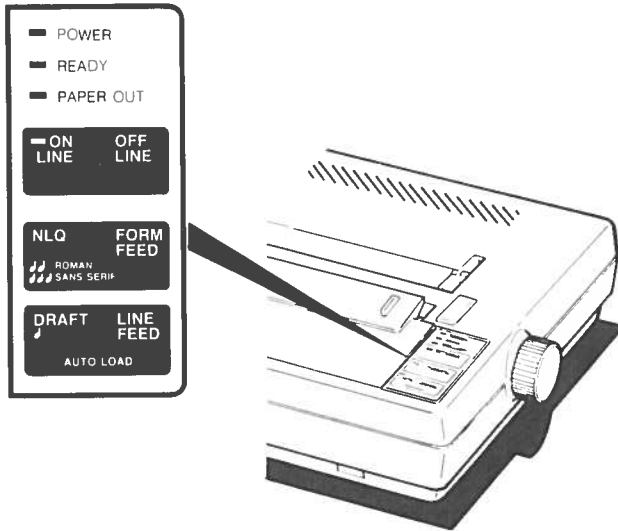
## **Printing multi-part forms and copies**

If you wish to print multi-part forms or carbon copies, use no more than three sheets or parts at a time, with a total thickness of no more than 0.25 mm (0.01 inches). The factory setting for the paper thickness lever, located inside the front lid on the left side, accommodates both single sheets and multiple forms. There is no need to adjust the lever.

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## Operating the Control Panel

Now that your paper is loaded, it is time to see what the indicators and buttons on the control panel do. First, see that the power switch on the left side of the printer is on. Then take a look at the control panel. (See the following illustration.)



There are four indicator lights and three buttons on the control panel.

### Indicator lights

The indicator lights give you information on the printer's status:

- The POWER light glows green when the power is on.
- The READY light glows green when the printer is ready to receive data. This light flickers somewhat during printing.



- The PAPER OUT light glows red to indicate that the printer is out of paper or the paper is loaded incorrectly. If you try to print and the printer does not respond, check to see if this light is on.
- The ON LINE light glows green when the printer can receive data. (The ON LINE light is located on the ON/OFF LINE button.)

## Buttons

The buttons, or touch-sensitive panels, have several functions, including selecting draft or NLQ (Near Letter Quality) printing. Draft is good for quick printing of ordinary work, and NLQ has more fully-formed characters for final copies or special purposes. NLQ is available in both Roman and Sans Serif fonts.

The printout below shows the differences among draft, NLQ Roman, and NLQ Sans Serif so that you can compare the different styles and densities:

Draft printing is extremely fast.  
NLQ Roman is clear and typewriter-like.  
NLQ Sans Serif is crisp and distinctive.

See Chapter 3 for more information on these modes and ways to select them.

- ON/OFF LINE. This button switches the printer between on line and off line status.
- NLQ/FORM FEED. When the printer is off line, pressing this button advances continuous-feed paper to the top of the next form or ejects a single sheet. When the printer is on line, pressing this button selects NLQ (Near Letter Quality) printing.

Pressing the FORM FEED button when the printer is ON LINE alternates the NLQ font between Roman and Sans Serif. When NLQ Roman is selected, the beeper sounds twice. When NLQ Sans Serif is selected, the beeper sounds three times.

- **DRAFT/LINE FEED.** When the printer is off line, pressing this button advances the paper one line. When the printer is on line, pressing this button selects draft printing. When you select draft printing the beeper sounds once. This button also controls the auto load feature.

The control panel buttons also control the SelecType feature. This feature enables you to select among emphasized, double-strike, condensed, and elite typestyles. See Chapter 2 for more information.

### **Performing the self test**

Now you'll see your printer print something even though it's not yet connected to a computer. Follow these steps:

1. Make sure that your printer has paper in it.
2. Turn the power switch off, then hold down the DRAFT button on the control panel while you turn the power back on. The printer begins printing letters, numbers, and other characters that are stored in its ROM (Read Only Memory) in draft mode. (If DIP switch 1-5 has been turned on, the test will be performed in NLQ mode, as in step 4 below.)
3. When printing starts, you can release the DRAFT button; the printing continues until you turn the printer off or until the printer runs out of paper.
4. To perform the same test in the NLQ mode, load another sheet of paper. Turn the printer off, then turn it back on while holding down the NLQ button. Sans Serif and Roman fonts alternate for this test. Partial results of both tests are shown in the following samples.

DRAFT

'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO  
( )\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPF  
) \*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOG  
\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQR  
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRS  
, -./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRST  
-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTU  
. /0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUV  
/0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVW

NLQ

'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO  
( )\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPF  
) \*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOG  
\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQR  
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRS  
, -./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRST  
\_./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTU  
./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUV  
/0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVW

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## Connecting the Printer to Your Computer

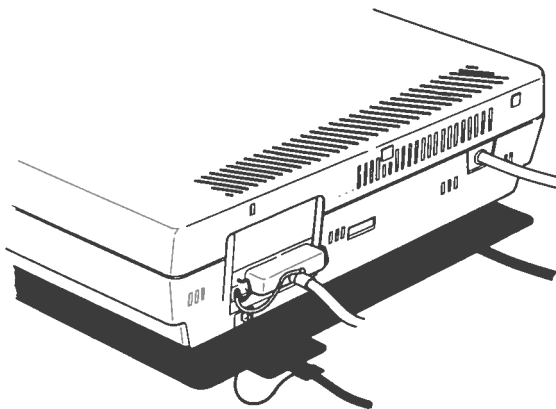
Now that the test pattern has shown that your printer is operational, it's time to hook it up to your computer.

Remember that computer systems communicate with printers in a variety of ways. If your computer expects to communicate through a Centronics parallel interface, all you need is the proper shielded cable. If your computer requires any other kind of interface, you also need an interface board.

If you don't know what a Centronics parallel interface is, your computer manual or your dealer can tell you what you need. Then, once you have plugged your printer cable into your printer and computer, you will probably never think about interfaces again. (If you do want the technical specifications, however, you can find them in Chapter 6.)

Follow these steps and see the illustration below to connect your printer and computer:

1. Make sure that both your printer and computer are turned off.
2. Plug the appropriate end of your printer cable into the cable connector of your printer. The plug is shaped so it fits the connector only one way.



3. Secure the plug to the printer with the wire clips on each side of the connector. Press the clips into the metal clasps at each side of the plug. These clips ensure that your cable will not be loosened or unplugged accidentally.
4. If your cable has a grounding wire, fasten it to the grounding screw below the connector.
5. Connect the other end of the printer cable to your computer. On most computers you can easily find the correct connector for the printer cable, but if you are not sure, consult your computer manual.

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## Printer Selection Menus

Most application programs let you specify the type of printer you're using so that the program can take full advantage of the printer's features. Many programs provide an installation or setup procedure that presents a list of printers to choose from.

### Choosing from a menu

Because the family of EPSON printers shares a great many commands, you can use an application program even if it does not list your printer on its printer selection menu. Choose from the following list (the printers are listed in the order of preference):

LX-400/LX-800

FX-86e/FX-850

LX printer

FX printer

Epson printer

Draft printer

**Note:** If your application program does not list your printer, you may want to contact the manufacturer to find out whether an update is available.

### A quick test

After setting up your application program, print a sample document to be sure the program and the printer are communicating properly. If the document doesn't print correctly, recheck the program's printer selection and installation procedure. If you're still having trouble printing, consult Chapter 4.

Chapter 2

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**SelectType**

SelectType Operation ..... 2-2  
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    Selecting tpestyles ..... 2-3  
SelectType Tips ..... 2-5



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## SelecType Operation

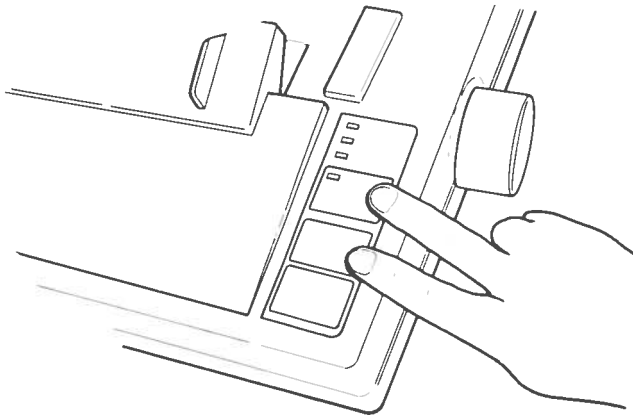
The printer's SelecType feature can produce four special typesyles:

**This is emphasized printing.**  
**This is in the double-strike mode.**  
This is condensed printing.  
This is in the elite mode.

Using SelecType is easy. You turn on SelecType and select a typestyle, then turn off SelecType and print.

### Turning SelecType on

1. Make sure that the printer is on line.
2. Hold down the ON/OFF LINE button and press the FORM FEED button. (See the illustration below.) When you turn on SelecType, a short beep sounds and the ON LINE light blinks to indicate that the printer is in SelecType mode.





## Selecting typestyles

In SelecType, each button has a function:

- ON/OFF LINE selects typestyles.
- FORM FEED sets the styles.
- LINE FEED turns SelecType off.

After turning on SelecType, follow these steps to select a typestyle:

1. Find the typestyle you want in the table below. All of the typestyles listed in the table are available for draft mode. If you are in NLQ mode, only emphasized and elite are available.

Mode	Typestyle
1	Emphasized <b>ABCDEFGHIJKLMnopqrstuvwxyz</b>
2	Double-strike <b>ABCDEFGHIJKLMnopqrstuvwxyz</b>
3	Condensed <b>ABCDEFGHIJKLMnopqrstuvwxyz</b>
4	Elite <b>ABCDEFGHIJKLMnopqrstuvwxyz</b>

2. Press the ON/OFF LINE button the number of times indicated in the mode column. Be sure that the printer beeps each time you press the ON/OFF LINE button.
3. Press the FORM FEED button to set the typestyle.
4. Press the LINE FEED button to turn SelecType off. The control panel returns to its normal functions, but the printer is off line.
5. Press the ON/OFF LINE button, and you are ready to print.

You can combine any of the modes listed in the above table when you are in draft mode, except for emphasized and condensed. In NLQ, the two available modes (emphasized and elite) may be combined.

If you wish to combine two modes, follow steps 1 through 3 above, then return to step 1 and follow the entire sequence (steps 1 through 5). (Do the same thing to combine three modes, but repeat steps 1 through 3 for each of the first two modes you enter.) Always select the lowest mode number first.

## *SelecType Operation*

When you press the ON/OFF LINE button to select an additional mode, start counting again where you left off. That is, if you have selected emphasized and wish to combine that with elite, press the ON/OFF LINE button three more times, not four, to select elite. For example, follow these steps to combine emphasized and elite:

1. Press the ON/OFF LINE button once to select emphasized.
2. Press the FORM FEED button.
3. Press the ON/OFF LINE button three more times to select elite. (The mode is four, but remember that you have already pressed the ON/OFF LINE button once.)
4. Press the FORM FEED button.
5. Press the LINE FEED button.
6. Press the ON/OFF LINE button, and you are ready to print.

**Note:** Some application programs are designed to control all typestyle functions. These programs cancel previous typestyle settings by sending certain printer codes before printing. Because these codes cancel SelecType settings, you have to 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.

---

## SelecType Tips

Once you have learned the simple technique for controlling print styles with SelecType, you can use it whenever you wish. You should be aware of a few points, however.

- SelecType is designed to control the printing of an entire file or document, not an individual line or word.
- If you are using the NLQ mode, remember that the following SelecType modes are not available: double-strike and condensed.
- If there are print codes in the document or file you are printing, those codes will override your SelecType settings. This seldom happens, since you usually won't use SelecType with files that have such codes, but if your printer follows the SelecType instructions for only part of a document, it may be that print codes in the document are conflicting with the SelecType modes.
- After you turn on a mode with SelecType, it stays in effect until the printer is turned off or until you send a software command that overrides it. (In general, software commands override SelecType settings.) If, for example, you use SelecType to print a document in emphasized type, anything you print after that will be emphasized unless you first turn the printer off and back on.



## Chapter 3

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### Printer Features

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---

## Quality and Fonts

The most fundamental changes you can make to printing are in the print quality and NLQ fonts.

The printer has two levels of print quality: draft and NLQ (Near Letter Quality). Draft printing is fast, making it ideal for drafts and other preliminary work. NLQ printing takes a little longer, but it produces more fully-formed characters for presentation-quality documents.

The printout below shows the differences between draft, NLQ Roman, and NLQ Sans Serif so that you can compare the different styles and densities:

```
Draft printing is extremely fast.  
NLQ Roman is clear and typewriter-like.  
NLQ Sans Serif is crisp and distinctive.
```

The buttons on the control panel give you an easy way of changing the print quality and NLQ font, but if you prefer to print in NLQ Roman most of the time, you can select it with a DIP switch (see Chapter 5). You can also choose the print quality and NLQ font with software commands.

---

## Print Size and Character Width

To add greater variety to your documents, the printer has two pitches and condensed printing. All can be selected either with SelecType or a software command, and software commands also offer another option: double-width.

### Pitches

The two pitches are pica and elite. Pica is 10 characters per inch (cpi) and elite is 12 cpi. The printout below shows the difference between the two.

```
Pica: ABCDEFGHIJKLMNOPQRSTUVWXYZ  
Elite: ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

### Double-width and condensed

In addition to the basic pitches, the printer offers two other modes that change the size of your printing. These modes are double-width and condensed.

The double-width mode doubles the width of any size of characters. This mode is useful for such purposes as emphasizing headings in reports and making displays, but is usually not suitable for large amounts of text.

```
Double-wide pica  
Double-wide elite
```

Pica and elite are reduced to about 60% of their normal width with the condensed mode. This mode is particularly useful for printing wide spreadsheets because condensed elite allows you up to 160 characters on an 8-inch line.

Condensed can be selected with SelecType, by setting a DIP switch (see Chapter 5), or with a software command. Even if you turn condensed on with the DIP switch, you can still turn it off with SelecType or the software command.

Condensed pica gives more characters on a line.  
Condensed elite gives you even more.

Widening or narrowing the characters also widens or narrows the spaces between words and letters. Because word processors usually create a left margin by printing spaces, you may need to change the left margin and the number of characters on a line to keep the margins correct if you change widths. For example, a left margin of five pica characters is the same as one of six elite characters.



---

## Special Effects and Emphasis

The printer offers two ways of emphasizing parts of your text and also allows you to use underlining, superscripts, and subscripts. Most of these features can be controlled only by software commands, but many application programs can produce them if they are properly installed.

Emphasized and double-strike modes, both of which can be chosen with SelecType, slow the printer down slightly to produce bolder text. In emphasized mode, the printer prints each character twice as the print head moves across the paper, with the second pass slightly to the right of the first. This produces darker, more fully-formed characters.

In double-strike mode, the printer prints each line twice, with the second pass slightly below the first. This makes the characters bolder. While NLQ is in use, however, double-strike is ignored because NLQ characters are already formed by two passes of the print head.

**This is normal NLQ printing.**

**This is emphasized NLQ printing.**

Superscripts and subscripts are valuable for such purposes as printing footnote numbers or parts of mathematical formulas, and the underline mode provides an automatic way of underlining fully any piece of text. It underlines spaces, subscripts, and superscripts without a break.

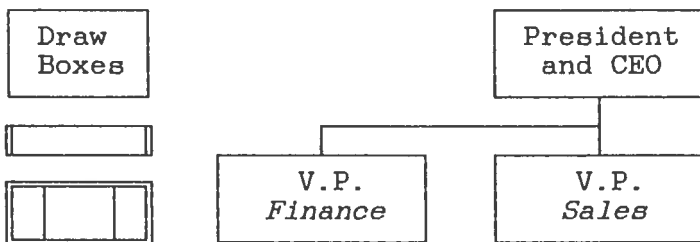
The example below shows underlining combined with subscripts in a mathematical formula.

$$\text{average} = \frac{(a_1 + a_2 + \dots + a_n)}{n}$$

---

## Using Different Character Sets

The printer incorporates a special character set: EPSON Character Graphics. This set allows you to take advantage of the power of the EPSON commands and still print out the character graphics used by IBM and IBM-compatible computers and by much commercial software. For example, if your word processor can include the characters to draw boxes and shade areas, you can produce some very professional effects.



You can select the EPSON Character Graphics set with your software or by setting DIP switch 1-3 ON. For most applications it is best to use the DIP switch instead of the software command because the character graphics are then available as soon as you turn the printer on.

The other important change you can make to the standard character set is to change some characters for ones commonly used in other languages—chiefly European and Scandinavian—such as accented characters and symbols. Eight international character sets can be selected by setting DIP switches 1-6 to 1-8: USA, French, German, UK, Danish, Swedish, Italian, and Spanish. See Chapter 5 for the DIP switch settings.

These eight, and five more, can also be selected by a software command. The additional character sets are the following: Norwegian, a second Danish set, Japanese, a second Spanish set, and Latin American. The table on the next page shows all of these characters.

	35	36	64	91	92	93	94	96	123	124	125	126
0 USA	#	\$	@	[	\	]	^	`	{		}	~
1 France	#	\$	à	°	ç	§	^	`	é	ù	è	..
2 Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3 UK	£	\$	@	[	\	]	^	`	{		}	~
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	Pt	\$	@	;	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

Also, all text characters can be printed in italics. You can use this typestyle for special emphasis or as an alternative typeface.

*Italics give emphasis to words.  
They are an attractive alternative style.*



## Chapter 4

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# Troubleshooting and Maintenance

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Cleaning the Printer .....	4-5
Transporting the Printer .....	4-6

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## Problem/Solution Summary

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### Problem

### Solution

---

*Printer does not print*

Make sure that the printer is turned on and is on line. Both the POWER and ON LINE lights should be on.

Make sure that the printer and computer are connected. Be certain you are using the correct cable and that it is firmly plugged in at both ends.

Turn the printer off and on again to reset it. While the printer is turned off, make sure the paper is loaded correctly.

If the printer still does not print, try the self test procedure described in Chapter 1. If the self test works correctly, the printer is all right and the problem lies elsewhere. If the self test doesn't work, take the printer to a qualified service center.

*Printing is patchy, faint, uneven, or intermittent*

Check that the ribbon is seated correctly.

Check that the ribbon moves freely in the cartridge.

If you have been using the ribbon for a long time or for a large amount of printing, it may need to be replaced.

It is also possible for the print head to wear out if the printer is used frequently and for long periods at a time. Contact an EPSON dealer if you think the print head needs to be replaced.

## Problem

## Solution

---

*All the text is printed on the same line or text is printed with an extra blank line between*

This can usually be corrected by changing the setting of DIP switch 2-4. If that does not solve the problem, you may need a different cable.

*Some of the characters printed do not match those in the file*

If they are international characters, check the settings of DIP switches 1-6 to 1-8. If they are graphics characters, see that your software is correctly installed and that you have correctly set DIP switch 1-3.

See that the printer cable is securely plugged in.

*Can't get condensed print*

Cancel emphasized mode; it has priority over condensed.

Cancel NLQ mode; it has priority over condensed.

---

---

## **Beeper Error Warnings**

When the printer's beeper sounds, it usually indicates that the printer is out of paper. If the printer beeps and stops printing when it is not out of paper, turn the printer off and check to see that the paper is loaded correctly. If the paper is loaded correctly, turn the printer back on and try to print again. If the printer beeps and does not print again, take it to a qualified service person.



---

## Cleaning the Printer

To keep your printer running at its best, you should clean it thoroughly several times a year. Follow the steps below:

1. Make sure the printer is turned off. Then remove the paper guide.
2. Using a soft brush, carefully remove all dust and dirt.
3. If the outer case or paper guide is dirty or dusty, clean it with a soft, clean cloth dampened with a mild detergent solution. Keep the front lid in place to prevent water from getting inside the printer.



### WARNINGS:

- Never use alcohols or thinners to clean the printer; these chemicals can damage the components as well as the case.
- Be careful not to get water on the printer mechanism or electronic components.
- Do not use a hard or abrasive brush.
- Do not spray the inside of the printer with lubricants; unsuitable oils can damage the mechanism. Contact a qualified service person if you think the printer needs lubrication.

---

## Transporting the Printer

Before you transport your printer some distance, carefully repack it in the original box and packing materials as described in the following instructions:

1. Make sure the printer is turned off. Then remove the paper guide and front lid.



**WARNING:** Turn the printer off before unplugging the power cable from the AC outlet.

2. Unplug the power cable from the electrical outlet. Coil the cable and tie it. Then disconnect the interface cable from the printer and computer.
3. Remove the ribbon cartridge and paper feed knob.
4. Replace the packing materials and put the printer in its box.

## Chapter 5

# Defaults and DIP Switches

---

Default and Initialization Settings .....	5-2
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International Character Sets .....	5-5

---

## Default and Initialization Settings

The printer can be initialized (returned to a fixed set of conditions) in three different ways: when it is turned on, when it receives an INIT signal at the parallel interface (pin 31 becomes low), and when it receives the ESC @ command.

The following conditions always occur when the printer is initialized:

- The print head returns to the home position.
- Interface signals are reset, and the printer is put on line.
- The current print line is cleared.
- Margins and vertical tab settings are cleared, line spacing is set to 1/6-inch, horizontal tabs are set at every eighth position and vertical tab channel 0 is selected.
- The page length and skip over perforation are set according to DIP switches 2-1 and 2-3, and the top of form position is set to the current line.
- The ROM characters are selected, and the character table and international character set are reset according to DIP switches 1-3 and 1-6 to 1-8.

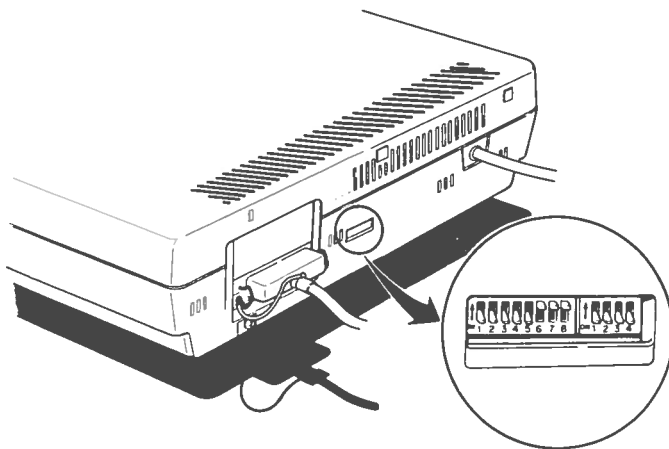
In addition, when the printer is initialized by turning on the power or by an INIT signal, the data buffer is cleared of all text.

ESC @ resets the typestyle to the current SelecType settings, but the other two methods reset the typestyle according to the DIP switches. Also, ESC @ does not check whether any DIP switches have been altered since the printer was turned on; instead, it uses the old settings.

---

## DIP Switch Settings

The printer has twelve DIP switches which allow you to change many of the printer's settings to suit your individual needs. The DIP switches are in two groups, mounted on the back panel, as shown below.



DIP switch 1-1 is the switch at the far left side, and the one at the far right is DIP switch 2-4. You can easily reset the switches with a thin, pointed object such as a small screwdriver or the cap of a ballpoint pen.

**Note:** When you change a DIP switch setting, turn off the power, reset the switch or switches, then turn on the power again. The printer checks and recognizes new settings only at the time the power is turned on.

## DIP Switch Settings

The tables below describe the DIP switch functions.

### DIP Switch 1

Switch number	Function	Action when ON	Action when OFF
1-1	Select condensed or normal characters	Condensed	Normal
1-2	Select slashed or unslashed zero	0	0
1-3	Select character table	Graphics	Italics
1-4	Paper-out detection	Inactive	Active
1-5	Select print quality	NLQ	Draft
1-6 1-7 1-8	Select international character set	See table on page 5-5	

### DIP Switch 2

Switch number	Function	Action when ON	Action when OFF
2-1	Select page length	12 inch	11 inch
2-2	Select cut sheet feeder mode	Selected	Not selected
2-3	Skip over perforation	1 inch	None
2-4	Add line feed after carriage return	CR + LF	CR only

**Note:** The factory setting for all switches except 1-6, 1-7, and 1-8 is OFF.

---

## International Character Sets

Thirteen international character sets are available. Eight of these are selected by DIP switches 1-6 to 1-8, and the remaining five (Japan, Norway, Denmark II, Spain II and Latin America) can be selected with the ESC R command, which is described in the Command Summary (Chapter 7). For the characters available in each character set, see Chapter 3.

The DIP switch settings to select the different character sets are shown below.

Character set	DIP switch settings		
	1-6	1-7	1-8
USA	ON	ON	ON
French	ON	ON	OFF
German	ON	OFF	ON
UK	ON	OFF	OFF
Danish	OFF	ON	ON
Swedish	OFF	ON	OFF
Italian	OFF	OFF	ON
Spanish	OFF	OFF	OFF





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# Technical Specifications

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## Printing

- Printing method:** Impact dot matrix
- Printing speed:** 180 characters per second in draft elite. 150 characters per second in draft pica. 25 characters per second in NLQ pica
- Printing direction:** Bidirectional logic-seeking for text printing. Unidirectional for graphics and by software command for text
- Character sizes:** All except superscript and subscript are 3.1 mm high. The widths and characters per inch (cpi) are given below:

Mode	Width (mm)	CPI
Pica	2.1	10
Elite	1.5	12
Condensed Pica	1.05	17
Condensed Elite	1.05	20

- Line spacing:** 1/6-inch, or programmable in increments of 1/216th of an inch

## Paper

- Number of copies:** One original plus two copies; total thickness not to exceed 0.25 mm (0.01 inch)
- Paper width:** Continuous feed: 4 to 10 inches  
Single-sheet: 7.15 to 8.5 inches

## **Mechanical**

<b>Ribbon:</b>	Cartridge, black #8750 Life expectancy (in characters, at 14 dots/character): 3 million
<b>MCBF:</b>	3 million lines (excluding the print head)
<b>MTBF:</b>	4,000 hours
<b>Print head life:</b>	200 million strokes per wire
<b>Dimensions and Weight:</b>	Height (excluding tractor): 3.5 in. Width (with paper feed knob): 15.7 in. Depth: 12.1 in. Weight (including tractor): 11.2 lbs.

## **Electrical**

<b>Voltage:</b>	120VAC $\pm$ 10% (120V model) 220VAC $\pm$ 10% (220V model) 240VAC $\pm$ 10% (240V model)
<b>Power consumption:</b>	70 VA maximum
<b>Frequency:</b>	49.5 Hz — 60.5 Hz
<b>Insulation resistance:</b>	10 Mohms between AC power line and chassis
<b>Dielectric strength:</b>	Can withstand 1 kV rms applied between AC line and chassis for 1 minute, or 1.20 kV rms for 1 second

## **Environment**

<b>Temperature:</b>	Operation: 5°C to 35°C (41°F to 95°F) Storage: -30°C to 60°C (-22°F to 149°F)
<b>Humidity:</b>	Operation: 10% to 80% without condensation Storage: 5% to 85% without condensation
<b>Shock:</b>	Operation: Up to 1 G within 1 ms Storage: Up to 2 G within 1 ms
<b>Vibration:</b>	Operation: Up to 0.25 G at up to 55 Hz Storage: Up to 0.5 G at up to 55 Hz

## Parallel Interface

Connector pin assignments and a description of respective interface signals are shown below and on the following page.

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

## Technical Specifications

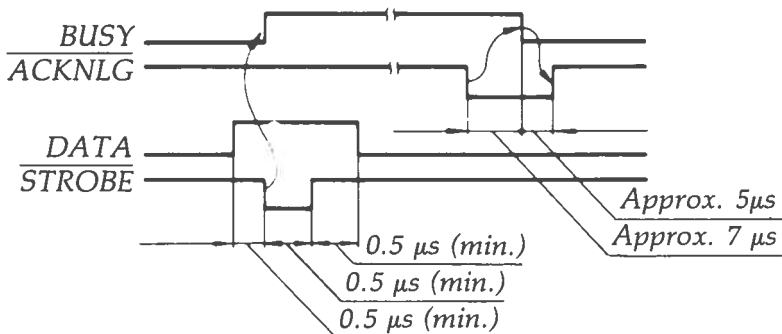
Signal Pin	Return Pin	Signal	Direction	Description
16	—	0V	—	Logic ground level.
17	—	CHASSIS GND	—	Printer's chassis ground, which is isolated from the logic ground.
18	—	NC	—	Unused.
19 - 30	—	GND	—	Twisted-pair return signal ground level.
31	—	$\overline{\text{INIT}}$	IN	When this level becomes LOW, 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 $\mu\text{s}$ at the receiving terminal.
32	—	$\overline{\text{ERROR}}$	OUT	This level becomes LOW when the printer is in: 1) Paper-end state 2) Off line state 3) Error state.
33	—	GND	—	Same as for Pins 19 - 30.
34	—	NC	—	Unused.
35	—	—	—	Pulled up to +5 V through 3.3 K $\Omega$ resistance.
36	—	$\overline{\text{SLCT IN}}$	IN	The DC1/DC3 code is valid only when this signal is HIGH. (Internal fixing can be carried out with DIP switch pin 2-1. The level of this signal is factory-set to LOW.)

- The column heading "Direction" refers to the direction of signal flow as viewed from the printer.
- "Return" denotes the twisted-pair return, to be connected at signal ground level. For the interface wiring, be sure to use a twisted-pair cable for each signal and to complete the connection on the return side. To prevent noise, these cables should be shielded and connected to the chassis of the host computer or the printer but not at both ends.
- All interface conditions are based on TTL level. Both the rise and the fall times of each signal must be less than 0.2 microseconds.
- Data transfer must be carried out by observing the ACKNLG or BUSY signal. (Data transfer to this printer can be carried out only after receipt of the ACKNLG signal or when the level of the BUSY signal is LOW.)

## Data Transfer Sequence

### Interface timing

The illustration 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 (Sw. 2-1/ 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.



## Chapter 7

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### Command Summary

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## Introduction

This summary contains all the commands used by the printer. If a command has no parameters, it is merely listed. If it has parameters, they are explained. The parameters are indicated by lowercase italicized letters, usually *n*. The examples below show how the parameters are indicated.

ESC @ is a command with no parameters.

ESC U 1/0 is a command that uses 1 to turn the feature on and 0 to turn it off.

ESC \$ *n1 n2* is a command with two parameters.

ESC D *nm* is a command with a variable number of parameters.

ASCII	Dec.	Hex.	Description
<b>Printer Operation</b>			
ESC @	64	40	Initialize Printer
DC1	17	11	Select Printer
DC3	19	13	Deselect Printer
DEL	127	7F	Delete Character
ESC s 1/0	115	73	Turn Half-speed Mode On/Off
ESC <	60	3C	Select Unidirectional Mode (one line)
ESC U 1/0	85	55	Turn Unidirectional Mode On/Off
ESC 8	56	38	Disable Paper-out Sensor
ESC 9	57	39	Enable Paper-out Sensor
ESC EM <i>n</i>	25	19	Control Cut Sheet Feeder Mode 4: Turns mode on 0: Turns mode off

Note: For the ESC EM command the variables are the *characters* "0" (48 decimal or 30 hex) and "4" (52 decimal or 34 hex). Do not use 1 decimal, 01 hex, 4 decimal, or 04 hex.

BEL	7	07	Beeper
<b>Data Control</b>			
CR	13	0D	Carriage Return
CAN	24	18	Cancel Line

ASCII	Dec.	Hex.	Description
<b>Vertical Motion</b>			
FF	12	0C	Form Feed
ESC C <i>n</i>	67	43	Set Page Length in Lines <i>n</i> = no. of lines (1-127)
ESC C 0 <i>n</i>	67	43	Set Page Length in Inches <i>n</i> = no. of inches (1-22)
ESC N <i>n</i>	78	4E	Set Skip Over Perforation <i>n</i> = no. of lines (1-127)
ESC O	79	4F	Cancel Skip Over Perforation
LF	10	0A	Line Feed
ESC 0	48	30	Select 1/8-inch Line Spacing
ESC 1	49	31	Select 7/72-inch Line Spacing
ESC 2	50	32	Select 1/6-inch Line Spacing
ESC 3 <i>n</i>	51	33	Set <i>n</i> /216-inch Line Spacing
ESC A <i>n</i>	65	41	Set <i>n</i> /72-inch Line Spacing
ESC J <i>n</i>	74	4A	Perform <i>n</i> /216-inch Line Feed
VT	11	0B	Tab Vertically
ESC B <i>mn</i>	66	42	Set Vertical Tabs Up to 16 tabs; last <i>n</i> should be 0 (1-255)
ESC b <i>mn</i>	98	62	Set Vertical Tabs in Channels Same as ESC B except the first <i>n</i> selects a channel for tabs.
ESC / <i>n</i>	47	2F	Select Vertical Tab Channel <i>n</i> = the vertical tab channel (0-7)

**Horizontal Motion**

ESC l <i>n</i>	108	6C	Set Left Margin <i>n</i> = left margin column
ESC Q <i>n</i>	81	51	Set Right Margin <i>n</i> = right margin column
BS	8	08	Backspace
HT	9	09	Tab Horizontally
ESC D <i>mn</i>	68	44	Set Horizontal Tabs Up to 32 tabs (1-255) entered in ascending order Terminated by 0

## Command Summary

ASCII	Dec.	Hex.	Description
<hr/> <b>Horizontal Motion (continued)</b> <hr/>			
ESC e n s			Set Tab Increments <i>n</i> = 0 for horizontal tabs <i>n</i> = 1 for vertical tabs <i>s</i> = tab setting
ESC f n s			Horizontal/Vertical Skip If <i>n</i> = 0, <i>s</i> = number of spaces If <i>n</i> = 1, <i>s</i> = number of line feeds
<hr/> <b>Overall Printing Style</b> <hr/>			
ESC x n	120	78	Select NLQ or Draft 0: Draft 1: NLQ (Near Letter Quality)
ESC k n	107	6B	Select NLQ Font 0: Roman 1: Sans Serif
ESC ! n	33	21	Master Select To find the value of <i>n</i> add together the numbers of the typestyles you want to combine from the list below: pica: 0 decimal, 00 hex; 12 cpi: 1, 01; condensed: 4, 04; emphasized: 8, 08; double-strike: 16, 10; double-width: 32, 20; italics: 64, 40; underline: 128, 80

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## Print Size and Character Width

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ESC P	80	50	Select 10 cpi
ESC M	77	4D	Select 12 cpi
SI	15	0F	Select Condensed Mode
ESC SI	15	0F	Select Condensed Mode
DC2	18	12	Cancel Condensed Mode
SO	14	0E	Select Double-width Mode (one line)
ESC SO	14	0E	Select Double-width Mode (one line)
ESC W 1/0	87	57	Turn Double-width Mode On/Off
DC4	20	14	Cancel Double-width Mode (one line)

ASCII	Dec.	Hex.	Description
<b>Print Enhancement</b>			
ESC E	69	45	Select Emphasized Mode
ESC F	70	46	Cancel Emphasized Mode
ESC G	71	47	Select Double-strike Mode
ESC H	72	48	Cancel Double-strike Mode
ESC S 0	83	53	Select Superscript Mode
ESC S 1	83	53	Select Subscript Mode
ESC T	84	54	Cancel Superscript/Subscript Mode
ESC - 1/0	45	2D	Turn Underline Mode On/Off
ESC 4	52	34	Select Italic Mode
ESC 5	53	35	Cancel Italic Mode

**Word Processing**

ESC a <i>n</i>	97	61	Select NLQ Justification 0: Left justification 1: Centering 2: Right justification 3: Full justification
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**Character Tables**

ESC T <i>n</i>	116	74	Select Character Tables Selects character table for codes 128-255 0: Italic 1: Extended Graphics
ESC R <i>n</i>	82	52	Select an International Character Set 0: USA 1: France 2: Germany 3: UK 4: Denmark 5: Sweden 6: Italy 7: Spain 8: Japan 9: Norway 10: Denmark II 11: Spain II 12: Latin America

**User-defined Characters**

ESC & <i>nm</i>	38	26	Define User-defined Characters ESC & 0 <i>n1 n2 d data</i> <i>n1</i> = code for first character; <i>n2</i> = code for last character; <i>d</i> = vertical position of character <i>data</i> : 9 bytes required for each draft character, 36 for each NLQ character <i>n1</i> and <i>n2</i> (58-63 decimal)
-----------------	----	----	--

## Command Summary

ASCII	Dec.	Hex.	Description
<b>User-defined Characters (continued)</b>			
ESC : 0 <i>n</i> 0	58	3A	Copy ROM to RAM <i>n</i> = font family 0: Roman 1: Sans Serif
ESC % <i>n</i>	37	25	Select User-defined Set 0: Normal set 1: User-defined set
ESC 6	54	36	Enable Printable Characters With Extended Graphics this command enables the printing of codes 128-159
ESC 7	55	37	Enable Upper Control Codes Cancels ESC 6

## Graphics

ESC K <i>n</i> 1 <i>n</i> 2	75	4B	Select Single-density Graphics Mode
ESC L <i>n</i> 1 <i>n</i> 2	76	4C	Select Double-density Graphics Mode
ESC Y <i>n</i> 1 <i>n</i> 2	89	59	Select High-speed Double-density
ESC Z <i>n</i> 1 <i>n</i> 2	90	5A	Select Quadruple-density Graphics ESC K, L, Y, and Z each select an 8-pin mode Total columns = $n1 + (n2 \times 256)$
ESC * <i>m</i> <i>n</i> 1 <i>n</i> 2	42	2A	Select Graphics Mode Total columns = $n1 + (n2 \times 256)$

Option	Pins	<i>m</i>	Horiz. dots/inch
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	40
Plotter	8	5	80
CRT II	8	6	90

\* Adjacent dots cannot be printed in this mode.

ESC ? <i>s</i> <i>m</i>	63	3F	Reassign Graphics Mode <i>s</i> = K, L, Y, or Z <i>m</i> = mode (0-6)
ESC ^ <i>m</i> <i>n</i> 1 <i>n</i> 2	94	5E	Select 9-pin Graphics Mode <i>m</i> = 0 for single density <i>m</i> = 1 for double density Total columns = $n1 + (n2 \times 256)$

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Error handling .....	A-10

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## Compatible Interfaces

There are two optional interfaces that supplement the built-in parallel interface.

- #8143 Serial interface with baud rate selectable between  
75 and 9600
- #8148 Intelligent serial interface
- #8165 Intelligent IEEE-488 interface



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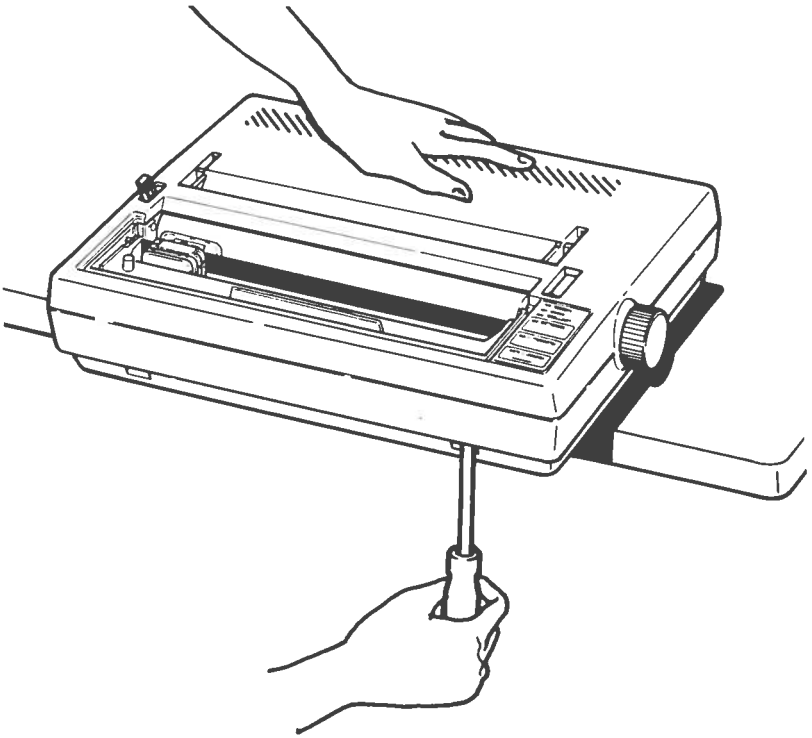
## Installing an Interface

Before installing an interface, you must remove the printer's cover.



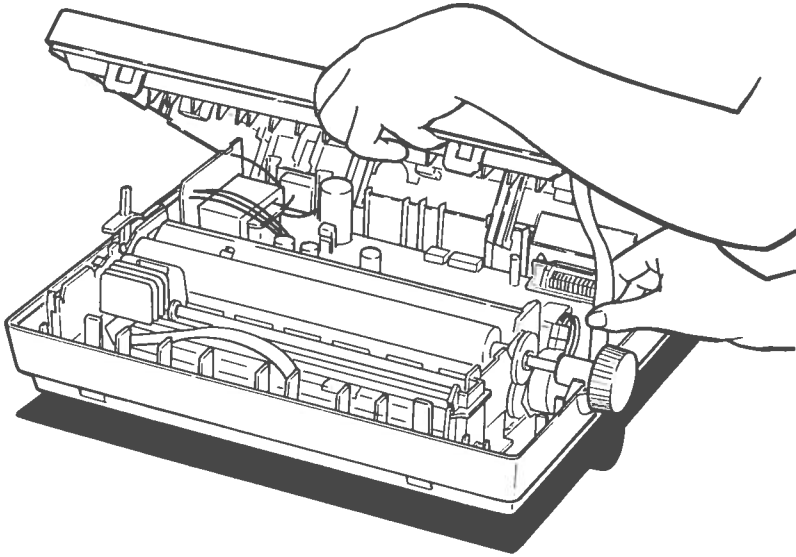
**WARNING:** Do not remove the cover unless the printer is turned OFF and unplugged because high voltages are present inside the printer when the power is on. Also, do not touch contacts on the circuit board of the printer because many of the components can be destroyed by the static electricity charge that may build up on your body.

1. Turn off the power to both the printer and the computer and unplug the power cable and disconnect the interface cable from the printer.
2. Remove the printer lid, tractor unit (if installed), paper rest (if installed), and paper guide.
3. Remove the ribbon.
4. To remove the upper case of the printer, insert a flat-blade screwdriver into each of the two holes at the front of the printer, as shown in the illustration. Gently twist the screwdriver while pushing it up until the upper case is loosened from the bottom.



5. Slightly raise the upper case by its front. As you do this, be careful not to pull the flat cable out of the control panel in the upper case.

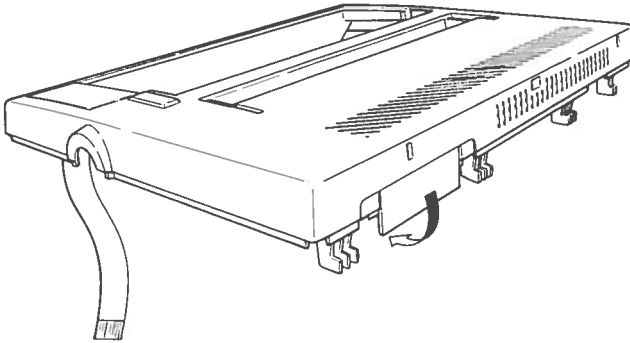
6. Disconnect the other end of the flat control panel cable from the main circuit board connector as shown in the illustration.



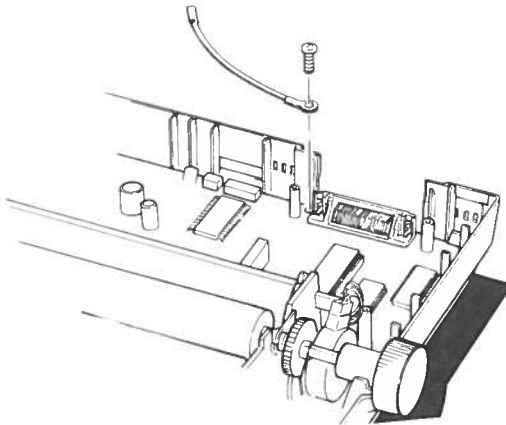
After you remove the case, follow the instructions below to insert the interface board. After you have inserted the board, replace the case by reversing steps 2 through 6.

## Inserting the interface board

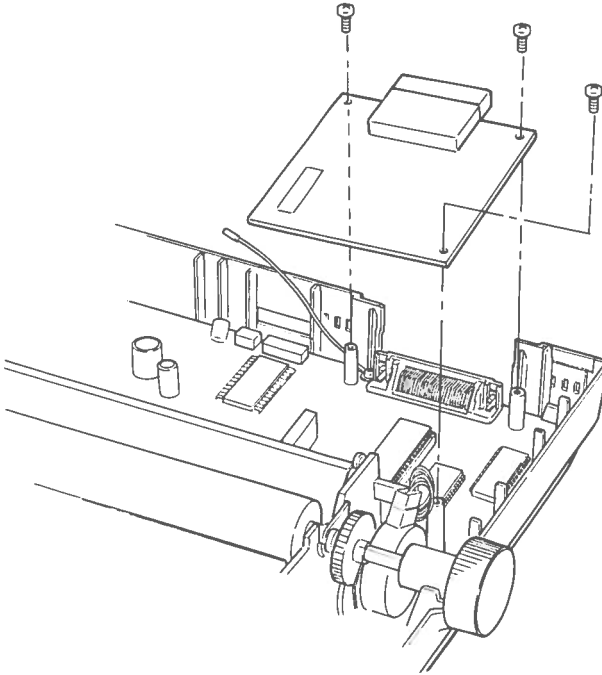
1. Locate the connector cover at the back of the upper case, shown in the illustration below. Push it down and in, toward the inside of the printer, until it clicks. You need to move the cover to allow access to the new interface connector when the case is reassembled.



2. The screw marked CG at the rear of the circuit board is the connection for the frame ground wire. Unscrew it and then use it to connect the frame ground wire as shown below.

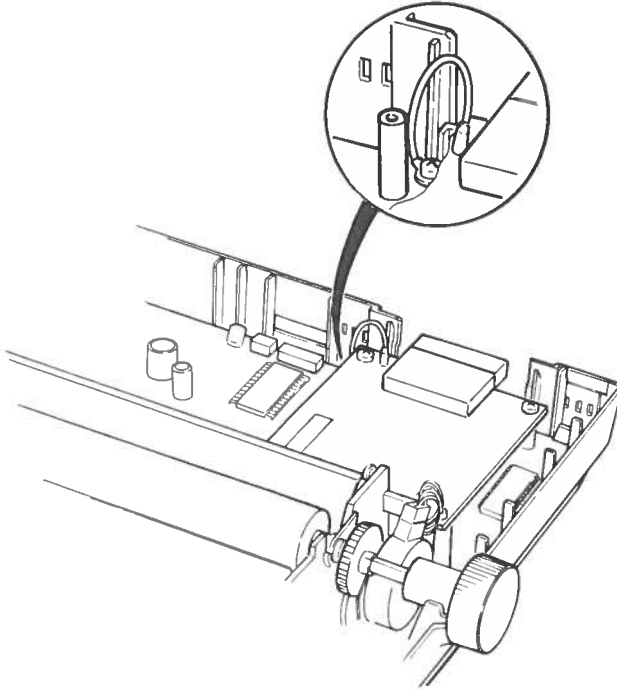


3. Plug the interface board into the connector marked CN2 on the main circuit board of the printer.
4. Secure the board to the three supports with the screws provided, as shown below.



## *Installing an Interface*

5. Connect the frame ground wire to the FG terminal tag on the interface board, as shown below.



6. Reassemble the printer, reversing the procedure described in steps 2 through 6 in the previous section.

---

## #8143 New Serial Interface Board

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

For the #8143 optional interface board, use the DIP switch settings shown below. These switches are on the interface board, not on the printer.

### *#8143 DIP switch settings*

DIP sw	Function	ON	OFF
1-1	Selects baud rate	See following table	
1-2	Selects data length	7 bits	8 bits
1-3	Selects baud rate	See following table	
1-4	Selects baud rate	See following table	
1-5	Selects EVEN ODD parity	EVEN	ODD
1-6	Enables/disables parity check	Enabled	Disabled
1-7	Selects baud rate	See following table	
1-8	Enables/disables #8143 mode	Enabled	Disabled

## #8143 New Serial Interface Board

### #8143 baud rate selection

Baud rate	SW1-7	SW1-1	SW1-4	SW1-3
75	ON	ON	ON	ON
110	ON	ON	ON	OFF
134.5	ON	ON	OFF	ON
150	ON	ON	OFF	OFF
200	ON	OFF	ON	ON
300	ON	OFF	ON	OFF
600	ON	OFF	OFF	ON
1200	ON	OFF	OFF	OFF
1800	OFF	ON	ON	ON
2400	OFF	ON	ON	OFF
4800	OFF	ON	OFF	ON
9600	OFF	ON	OFF	OFF
19200	OFF	OFF	ON	ON
19200	OFF	OFF	ON	OFF
19200	OFF	OFF	OFF	ON
19200	OFF	OFF	OFF	OFF

**Note:** During current loop operation, normal data transfer cannot be guaranteed at a baud rate higher than 1200 bps.

### Error handling

When a parity error is detected, your printer prints an asterisk (\*). All other errors are ignored.



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