star

Full color and monochrome laser quality printer

SJ-144

Users Manual

Federal Communications Commission Radio Frequency Interference Statement

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

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

Unauthorized modifications of this product by the user will void his authority to operate the equipment unless expressly approved by the party responsible for compliance.
For compliance with the Federal Noise Interference Standard, this equipment requires a shielded cable.
The above statement applies only to printers marketed in the U.S.A.

Statement of The Canadian Department of Communications Radio Interference Regulations

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

Le présent appareil numérique n'émen pas de bruits radioélectiques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le minisère des Communications du Canada.
The above statement applies only to printers marketed in Canada.

VDE Statement

This device carries the VDE RFI protection mark to certify that it meets the radio interference requirements of the Postal Ordinance No. 243/1991. The additional marking "Vfg.243/P" expresses in short form that this is a peripheral device (not operable alone) which only individually meets the Class B RFI requirements in accordance with the DIN VDE 0878 part 3/11.89 and the Postal Ordinance 243/1991.
If this device is operated in conjunction with other devices within a set up, in order to take advantage of a "General (Operating) Authorization" in accordance with the Postal Ordinance 243/1991, the complete set-up must comply with the Class B limits in accordance with the DIN VDE 0878 part 3/11.89, as well as satisfy the preconditions in accordance with § 21 and the prerequisites in accordance with § 3 of the Postal Ordinance 243/1991.
As a rule, this is only fulfilled when the device is operated in a set-up which has been type-tested and provided with a VDE RFI protection mark with the additional marking "Vfg 243".
Machine Noise Information Ordinance 3. GSGV, January 18, 1991: The sound pressure level at the operator position is equal or less than 70 dB (A) according to ISO 7779.
The above statement applies only to printers marketed in Germany.

Trademark Acknowledgements

Introduction

Thank you for purchasing the SJ-144 Laser-Quality Printer. This Users manual has been organized into nine chapters and an index to help you learn the proper operation your printer. The first five chapters explain the basic functions and operation of the printer, while the remaining chapters are intended as a reference guide for programming. The later chapters, therefore, assume a degree of knowledge of computers. The following describes the contents of each chapter.

Chapter 1 Setting up your printer

This chapter details the proper way to set up your printer. It includes how to plug in the AC adapter and connector to your computer and the installation of the paper support and ribbon cassette.

Chapter 2 Paper handling

This chapter explains the paper limits for printing and the three paper paths and their restrictions.

Chapter 3 Control panel operation

This chapter takes you step-by-step through each of the control panel's operations so that you can soon put the printer's basic functions to use.

Chapter 4 Electronic Dip Switch settings

This chapter explains how to make your own default settings using the printers bank of electronic dip switches.

Chapter 5 Printing

This chapter explains how to prepare your software for printing with Windows 3.1.

Chapter 6 Maintenance and troubleshooting

This chapter provides brief checklists on several areas of the printer functions. It also includes information on routine cleaning which you can carry out on your own. Please note that this chapter is not intended to be an exhaustive service manual. Should you be unsure of your ability to perform any maintenance or servicing by yourself, call a qualified service technician.

Chapter 7 Printer control commands

This chapter explains the emulations of which your printer is capable and the software commands used to drive them. You can use this chapter if you are writing or modifying programs to take advantage of the printer's features.

Chapter 8 Download characters

This chapter explains how to create your own download characters and symbols.

Chapter 9 Reference information

This chapter lists the printer's specifications. It also contains character tables and customer service phone numbers.

Index

This lists, in alphabetical order, terms which appear in this manual. It also contains command summaries.

How to use this manual

Each chapter provides you with simple explanations of the operation of this printer. Illustrations have also been included wherever space allowed. One particular feature of this manual, however, deserves some attention. We have also included in Chapter 3 a tool for quick reference which summarizes the explanations provided on each page. (See Example Summary below.) Each numbered step corresponds directly to the explanation provided in the text. The shaded portions of the key illustrations show which keys are used for each particular operation. As this is intended as only a reference tool, you are strongly urged to read the entire explanation to fully understand the operation.

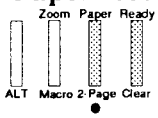
Example Summary

In Summary

Paper feed

Steps:

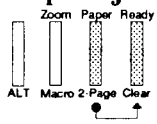
1. Press **Ready**: Not Ready mode
2. Press and release **Paper** or press or hold **Paper**



Paper eject

Steps:

1. Press **Ready**: Not Ready Mode
2. Press **Ready** while holding **Paper**



Features of the printer

This printer is capable of many useful and high quality printing functions ranging from color printing to overhead projection (OHP) film and label sheet printing.

The main features of this printer:

- The ability to print sharp, crisp laser-quality text and graphics.
- The ability to print vibrant, glossy full color documents from a pallette of up to 256 colors (depending on your software).
- High speed throughput due to Star's unique 2.5 line 144 element multi-line print head.
- 360 DPI for high resolution graphics output.
- Small, compact size.
- Color, overhead projection (OHP) film and label printing capabilities are standard.
- Three paper feed paths which include the standard paper tray and front and rear feeding.
- Zoom and the 2-Page function which is a great paper saving device.
- The newly developed thin ribbon process allows you to produce larger quantities of documents.
- Compressed Data Mode for Windows 3.1 applications.
- TrueType fonts disk containing 35 scalable fonts for Windows 3.1 applications.

Printer components

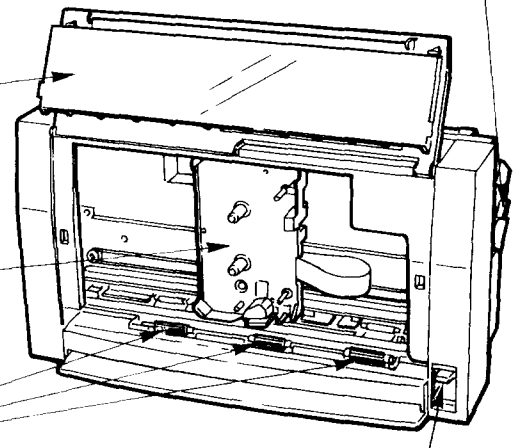
This page shows and explain various printer components.

Paper tray lever

This releases pressure on the paper.
This lever must be forward to release paper and back to feed paper.

Front Cover

This covers the internal workings of the printer. This cover should be closed at all times, unless cleaning the printer, removing paper jams or changing ribbons.



Ribbon carriage

This carries the ribbon across the print area. Never push or pull on it directly with your hands.

Friction rollers

These pull paper through the print area.

Paper release lever

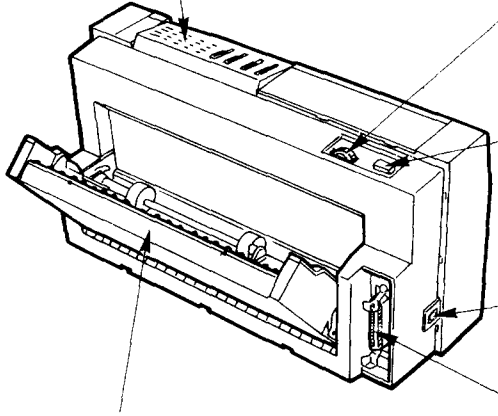
This releases pressure on the paper.
This lever must be down to feed paper and up to release paper.

Control panel

This indicates the status of the printer and makes control over the printer's various functions easy and convenient.

Print density dial

This changes the print density. It is set at 100% in the factory set-up.



Power switch

This turns power to the printer ON and OFF.

AC adapter cable connector

This connects the plug of the AC adapter.
Do not remove the plug when the printer is on.

Paper tray

The paper tray can hold up to 30 sheets of paper for automatic paper feed.

Interface connector

This connects the computer to the printer.

Contents

Chapter 1 Setting up your printer

This chapter explains how to get your new printer set up and operating. While the explanations in this chapter are easy to follow, they should, nonetheless, be read by every owner before starting up the printer.

Setting up your printer

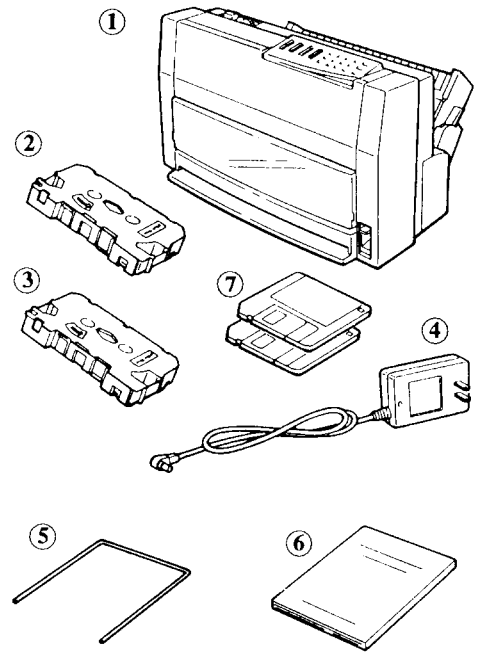
Your printer is a reliable and quality precision instrument. It is every owner's responsibility to make sure that their equipment is properly placed and sensibly used. If the following conditions are met, you can expect your printer to perform at its finest and to last a long time.

Unpacking and confirming the package contents

When you open the box, you will find the items in the list below included. Remove all of the packing materials, such as the cardboard piece to stabilize the ribbon carriage inside the printer cover, etc. Check to make sure, when removing the contents of the carton, that each item has been included. There should be a total of seven items. If you are missing any of them, contact your dealer immediately.

Items:

1 SJ-144 printer
2 Black ribbon cassette
3 Color ribbon cassette
4 AC adapter
5 U-shaped paper support
6 User's manual
7 Printer and font driver disks



We recommend that you save the box and all of the packing materials for this printer. They are useful should you ever need to transport it to a new location.

Warning: Never push or pull on the ribbon carriage directly with your hands.

Placing the printer

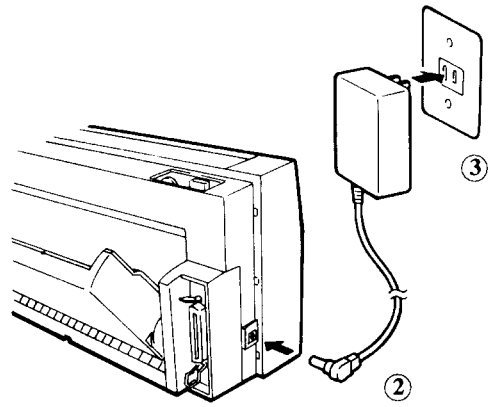
For prolonged and proper use, your printer should be placed and used in an area which meets the following conditions.

- A firm, level surface which is free from vibration.
- An area free from excessive heat such as direct sunlight or heaters.
- A dust free environment.
- A steady power supply. Do not connect it to items which use the same circuit as refrigerators or air conditioners.
- Only the line voltage specified on the identification plate should be used.
- The printer should be positioned relatively close to the computer. The maximum recommended length of the parallel interface cable (not supplied) is 2 meters or 6 feet.

Plugging in the AC adapter

Warning: Use only the AC adapter included with this printer. Using a different adapter could result in damage to the printer or personal injury.

The power button is located on the top left hand side of the printer. When it is protruding outward, the printer is OFF. When the button is pressed inward, the printer is ON and the power lamp will be lit. Make certain that this printer button is turned OFF before plugging in the AC adapter.

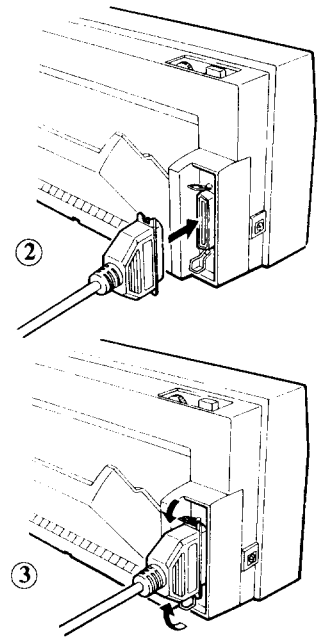


Steps:

1. Confirm that the power button is in the OFF position.
2. Insert the AC adapter into the socket located on the printer's lower left side. (See the illustration at right.)
3. Plug the AC adapter into a properly grounded AC outlet.

Connecting the printer to your computer

Use a standard Centronics parallel interface cable (not supplied). For PS/2 or PC/AT type computers use the 25 pin D-type connector for the computer port, and Amphenol-type 36 pin connector for the printer's port.



Steps:

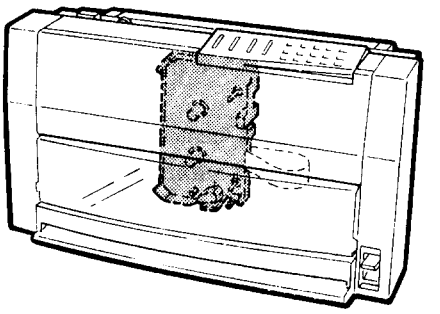
1. Turn OFF the power to the printer and computer.
2. Insert the plug into the interface connector of the printer. Make sure that the connector fit is snug.
3. Fit the interface clips into the extended prongs of the connector. (See illustration at right.)
4. Connect the interface cable (not supplied) to the computer. Refer to your computer instruction manual for installation.

Installing the ribbon cassette

Steps:

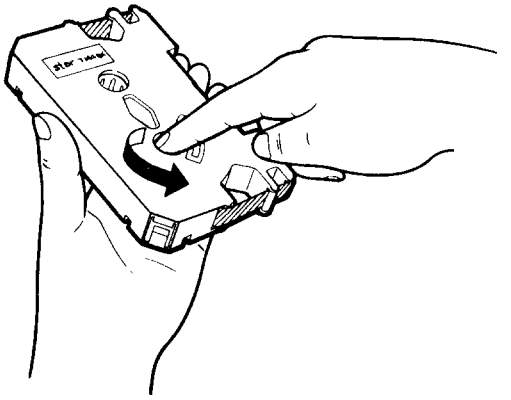
1. Turn ON power to the printer.
   Confirm that the printer is in the Not Ready mode. The **Ready** lamp should not be lit. If the **Ready** lamp is lit, the printer is in the Ready mode. Press the **Ready** key to enter the Not Ready mode. The carriage will move automatically to the center of the printing area. Keep the cover closed when turning ON the printer.

①

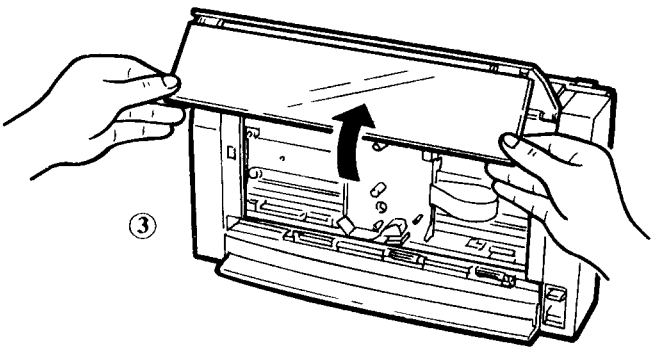


2. Remove the accessory ribbon cassette from its box. Hold it vertically between your thumb and index and middle fingers so that the name seal is upright and is facing you. Turn the ribbon tension knob in the direction of the arrow to take up any slack in the ribbon. (See the illustration at right.)

②

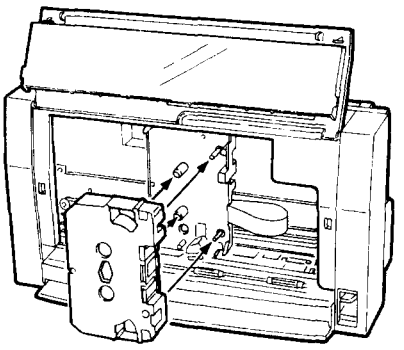


3. Open the front cover of the printer. Fold the cover in half when opening.



③

4. Insert so that the holes in the ribbon cassette fit onto the four spindles. The ribbon, itself, should be between the print head and the platen.
   When the ribbon is properly in place, the appropriate ribbon lamp will light. (ie: Color/OHP/Label)
   (See the illustration at right.)



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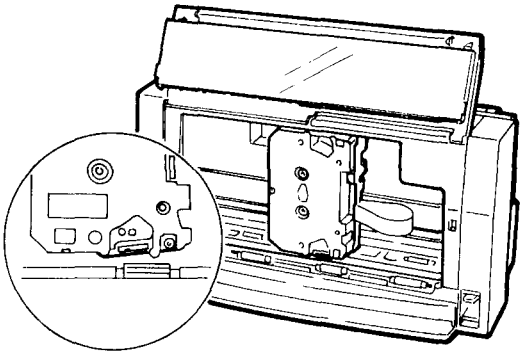
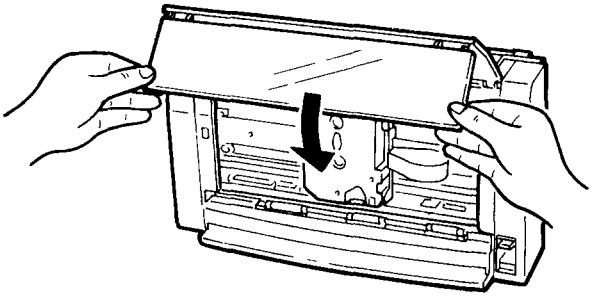


⑤

5. Close the cover of the printer.
   Press the **Ready** key to enter to the Ready mode. The **Ready** lamp will illuminate.

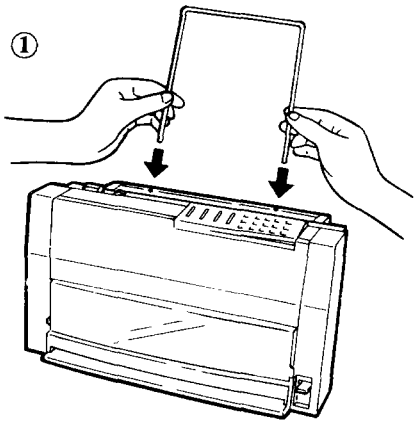


Warning: Never put your fingers into the printer when turning the power ON because the carriage moves automatically to the center when the power is turned ON.

Note: This ribbon has been created using a new technology which allows it to be almost half of the thickness of current ribbons. Take special care not to tear or damage the ribbon when installing or changing ribbons.
Do not use the ribbon more than once.

Installing the paper support

The ends of the U-shaped paper support fit into the holes located in the top of the paper tray. Using the paper support will keep your paper from falling out of the paper tray and it will help prevent paper jams.



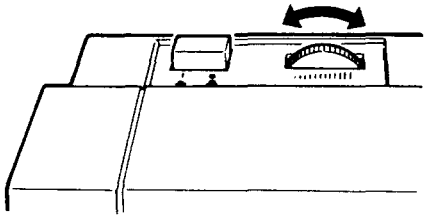
Steps:

1. Insert the ends of the U-shaped paper support all the way into the two holes on the top of the paper tray. (See the illustration at right.)

Warning: Never place your fingers into the internal workings of the printer.

Setting the print density

This printer uses a heat fusion process for printing onto a wide variety of print media. You can change the density of the final print by using the density dial located on the top left hand side of the printer, next to the power switch. This dial is set to the full density position when shipped. You can lower the density by rotating the dial in the counter-clockwise direction.



Chapter 2 Paper handling

There are three convenient feeding methods from which you can choose with this printer. They are the standard feeding from the paper tray, and the front and rear feeding methods. This chapter explains the types of paper you can use and how to load and feed paper from each of these three paths.

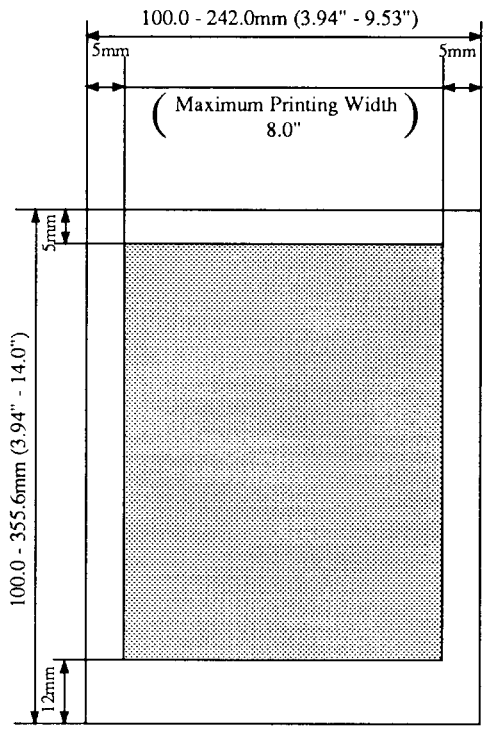
Paper handling

Your printer can print paper from three different directions. You can select which one you want to meet your specific requirements. It can handle differing sizes of paper and types, but we suggest that you read this section which explains the paper types which you can use.

Selecting paper types

Use only good quality paper equivalent to Xerox 4024 for all three feed paths. Use the following information to determine the size of paper you can use.

Width:	100.0 - 242.0mm/3.94 - 9.53 in.
Length:	100.0 - 355.6mm/3.94 - 14.0 in.
Thickness:	0.06 - 0.10mm/0.00236 - 0.00394 in.
Surface:	Xerography - quality sheet paper such as Xerox 4024 or smoother. Laser-quality, overhead projection (OHP) film, post cards and label sheets can also be used.



Caution: Do not use paper thicker than that indicated in this manual.
Do not use perforated or stapled paper, nor paper attached with paper clips.
Always use the appropriate ribbon and paper path for either overhead projection (OHP) film or label printing when using the special overhead projection (OHP) or label printing features.

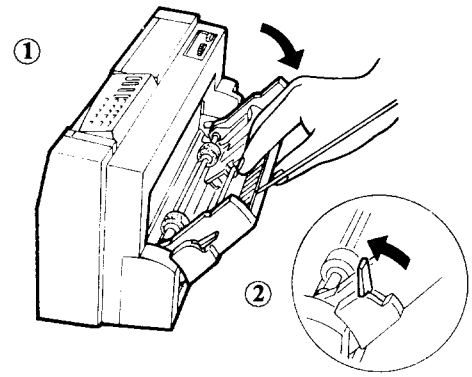
Loading paper from the paper tray

The convenient paper tray can load and print up to 30 sheets of paper at a time. With this paper feeding method, you can print both color graphics and text. You can use paper widths of 100.0 to 242.0mm (3.94 - 9.53in.) and lengths of 100.0 to 355.6mm (3.94 - 14.0 in.). It can also handle paper thickness of 0.06 to 0.10mm (0.00236 - 0.00394 in.).

Steps:

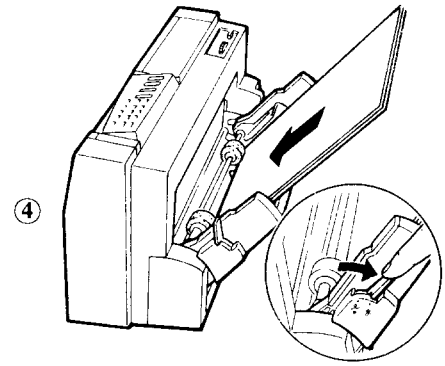
Make certain that the power is OFF.

1. Recline the paper tray on the back of the printer.



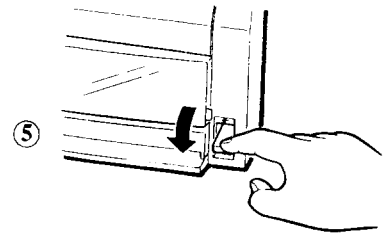
2. Move the paper tray lever, located on the right side of the paper tray, to the forward position.

3. Adjust the paper guides to the paper size you will use. Never move the inner, card sized paper guide.

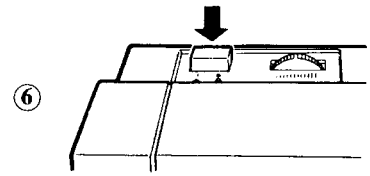


4. Fan approximately 30 sheets of paper and stack them in the paper tray. Move the paper tray lever to the rear position. (See illustration)

5. Move the paper release lever, located on the front side of the printer, to the lower position.



6. Turn ON the printer's power. Paper will feed when the print command is given.



Note: Use the micro-feed functions to adjust the top of form. See Chapter 3 for details.

Loading paper from the rear path

The rear feed path is the best way to print those thicker sheets. Use this path for printing on post cards, overhead projection (OHP) film. This feed path can handle widths of 100.0 to 242.0mm (3.94 - 9.53in.) and lengths of 100.0 to 355.6mm (3.94 - 14.0 in.). It can also handle paper thickness of 0.06 to 0.23mm (0.00236 - 0.00906 in.).

Steps:

Make certain that the power is ON.

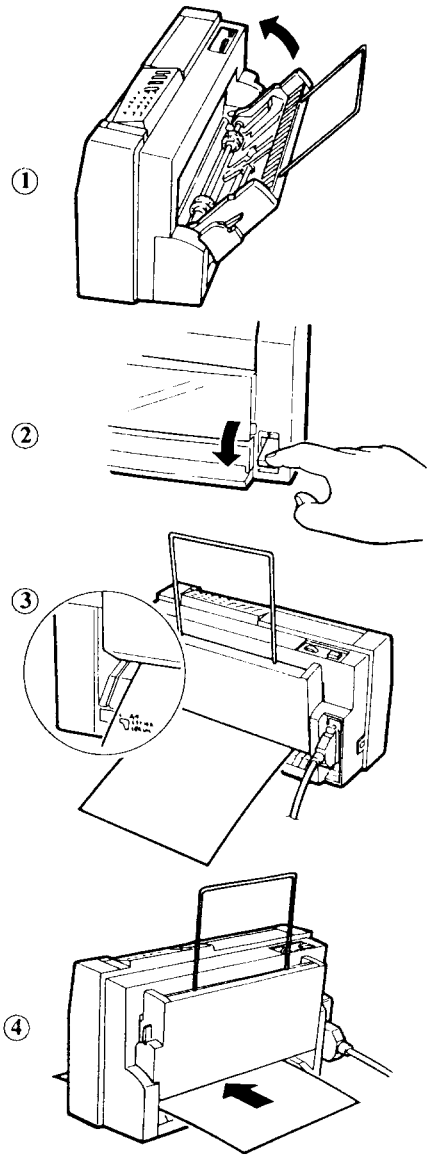
1. Place the paper tray in its vertical position.
   The printer will automatically enter the Not Ready mode. The **Ready** lamp will not be lit.

2. Move the paper release lever, located on the front side of the printer, to the lower position.

3. Align the paper to the size of paper you will use with the page markers on the printer.

4. Paper will automatically feed to the top of form position. (See the illustration at right.)

5. When you have confirmed that the paper has been fed to the top of form correctly, press the **Ready** key to enter the Ready mode. The **Ready** lamp will illuminate.



Note: You can use paper thicknesses of 0.06mm to 0.23mm with the rear feed path.
Allow a one second interval between paper feeds. Paper will be fed automatically to the top of form position when inserted.
If paper is being fed incorrectly, clear the problem and start again.
See Clearing paper jams on page 12.

Caution: Always use the rear path when using overhead projection (OHP) film.

Loading paper from the front path

The front feed path feeds paper one sheet at a time. When using this path, paper will exit the machine from the paper exit, which is above this path, in the same direction from where it was inserted. Use this paper path only for printing text or graphics on single sheets. This feed path can handle widths of 100.0 to 242.0mm (3.94 - 9.53in.) and lengths of 100.0 to 355.6mm (3.94 - 14.0 in.). It can also handle paper thickness of 0.06 to 0.10mm (0.00236 - 0.00394 in.).

Steps:

Make certain that the power is ON.

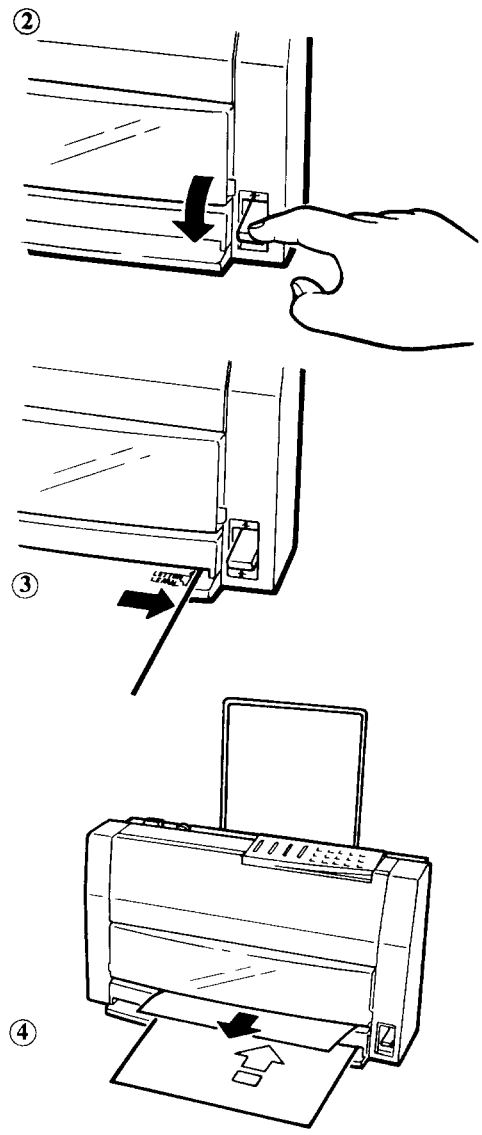
1. Place the paper tray in its vertical position.
   The printer will automatically enter the Not Ready mode. The **Ready** lamp will not be lit.

2. Move the paper release lever, located on the front side of the printer, to the lower position.

3. Align the right edge of the paper with the proper page marker on the printer.

4. Paper will automatically feed to the top of form position. (See the illustration at right.)
   When printing, paper will return with the print face up.

5. When you have confirmed that the paper has been fed to the top of form properly, press the **Ready** key to enter the Ready mode. The **Ready** lamp will illuminate.



Note: Use the micro-feed functions to adjust the top of form. See Chapter 3 for details.

Caution: Always insert paper with the side on which you want to print facing downward when printing with the front path.

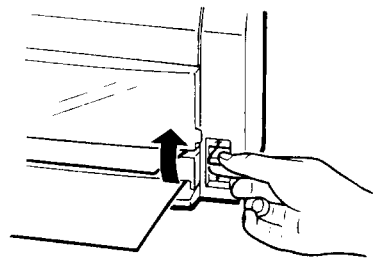
Note: Allow a one second interval between paper feeds. Paper will be fed automatically to the top of form position when inserted.
If paper is being fed incorrectly, clear the problem and start again.
See Clearing paper jams on page 12.

Clearing paper jams

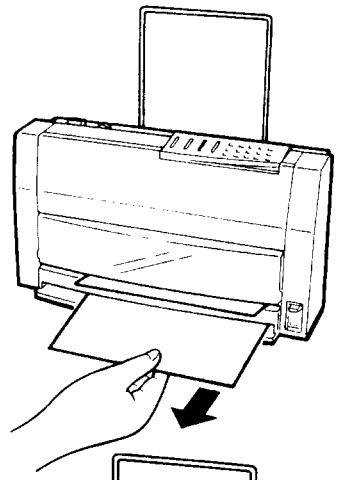
If paper becomes jammed, the **Paper** lamp on the control panel will flash and the printer will enter the Not Ready mode. When this happens, remove the jammed paper according to the following steps.

Steps:

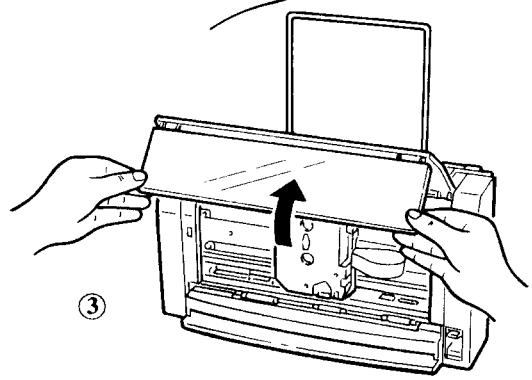
1. Lift up on the paper release lever, located on the front side of the printer.



2. Remove the jammed paper carefully by pulling on the end of the paper.



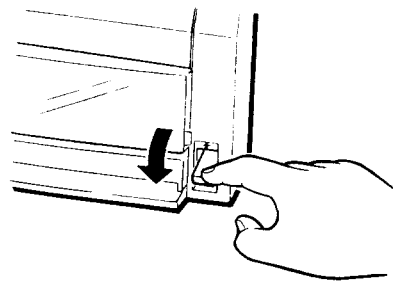
3. Open the front cover and confirm that there is no more paper jammed inside.



4. Pull down the release lever.

5. Confirm that there is no slack in the ribbon.
   If there is slack, see page 5, "Installing the ribbon," for details.

6. Close the front cover.



7. Load a new sheet of paper and press the **Ready** key to enter the Ready mode. The **Ready** lamp will illuminate.

Other printing functions

This section explains the other printing functions of which the printer is capable. Their operation is basically the same as the regular printing function, although you should adhere to the following points for optimum printing quality.

Printing with color ribbons

When printing with color ribbons, you can perform printing just as you would with the monochrome ribbon. Just remember the following points.

- When you insert a color ribbon, the **Color** lamp will light.
- You may insert paper from any of the three feed paths.
- Be aware that if you use large amounts of one particular color at one time, the ribbon life will be shortened. Always try to create color documents which use a relatively even spread of color choices in order to use the full capacity of the color ribbon.

Printing with overhead projection (OHP) film

When printing on overhead projection (OHP) film you should remember the following points.

- Always use the ribbon especially made for overhead projection (OHP) film. When you insert this ribbon, the **OHP** lamp will light.
- Always feed overhead projection (OHP) film from the rear feed path.

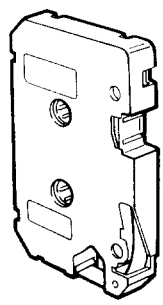
Printing with strip labels

The maximum printing length, when using strip labels, is 7.2 inches. The following explains the steps when using strip labels.

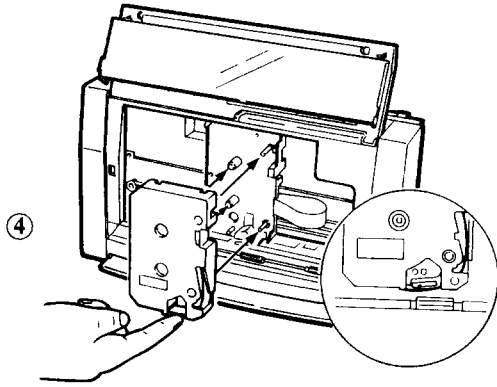
> Caution: Always use either the Windows label driver, which is included with the diskette, or the strip label program (S-LABEL.EXE) when printing labels. Failure to do so may result in damage to the mechanism.

Steps:

1. Turn the printer OFF.
2. Remove all paper from the printer. Open the front cover and remove the ribbon cassette. See Chapter 1 "Installing the ribbon cassette" for details. Place the paper tray in the vertical position.
3. Confirm that the tip of the strip label is sticking out from the slit in the cassette. If the tip is not sticking out from the cassette, gently pull it out with your fingers. Make certain that the label strip fits through the cassette slit as shown in the illustration at right.



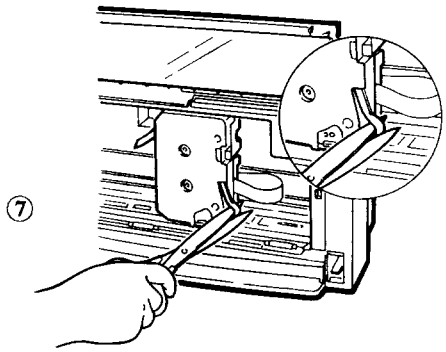
4. While gently lifting up on the protruding portion of the strip label, mount the Label cassette onto the carriage. Make sure that the ribbon and the label are between the print head and the platen.



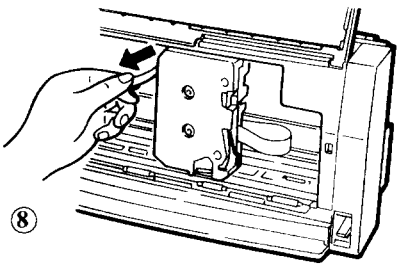
5. Close the front cover.

6. Turn ON the power to the printer. The **Label** lamp will light.

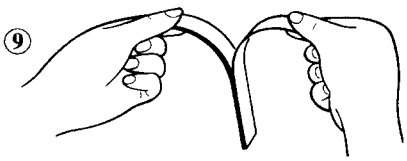
7. When label printing is complete, open the front cover and cut the end of the label using a scissors, as shown in the illustration at right. Be careful not to touch the ribbon.



8. Grasp the other end of the cut strip label with your fingers and pull the label through the cassette as shown in the illustration at right. If the printed label is not long enough to go to exit side of the cassette, you can pull the label back through the opening where it was cut.



9. Peel off the backing of the cut strip label before attaching it.



Caution:	Always use genuine Star supplies to ensure optimum print quality. We do not guarantee printing quality when using ribbons by other manufacturers. Always use either the Windows label driver, which is included with the diskette, or the strip label program (S-LABEL.EXE) when printing labels. Failure to do so may result in damage to the mechanism.

Chapter 3 Control panel operation

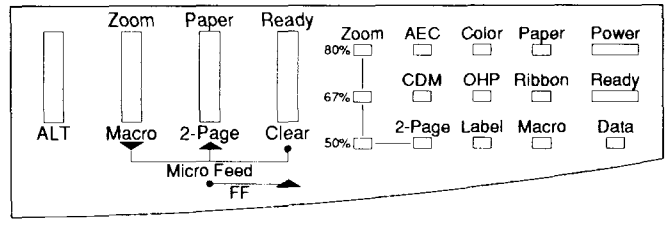
This chapter will lead you step by step through each type of key operation so that you will soon be able to put your printer to its most effective use.

Control panel operation

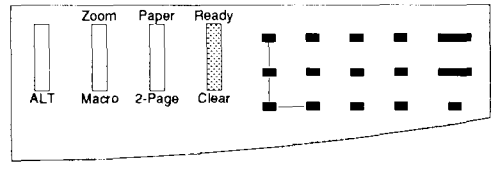
The control panel is equipped with 15 lamps and four keys which, when used correctly, will allow you to print many file types in both color and black. Before you begin, however, you should become familiar with the arrangement and meanings of the keys on the front control panel.

Key and lamp explanation

The four keys are, from left to right: **ALT**, **Zoom**, **Paper** and **Ready**. The following section is a brief explanation of the general use of the four keys and their corresponding lamps.



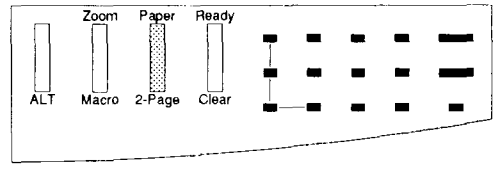
Ready/Clear Key



- **Ready** sets the printer to the Ready or Not Ready mode with each press. This allows the printer to be ready to receive and print data. The Ready mode is indicated by the **Ready** lamp.
- The printer will power-up in the Ready mode if paper is loaded.
- **Clear** clears the buffer when used with the **ALT** key. When there is data in the buffer, the **Data** lamp will light.

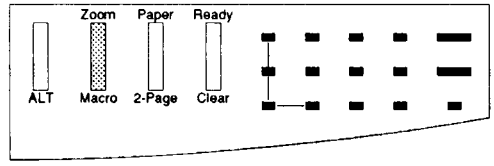
Note: Always press **Ready** before and after any operation.
Press **Ready** to pause printing. Printing will resume when pressed again.

Paper/2-Page Key



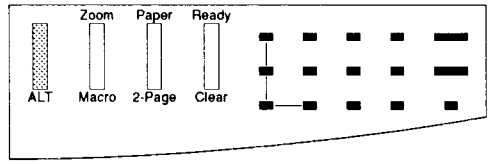
- **Paper** feeds paper one line at a time.
- Consecutive line feeds will occur if this key is held down.
- **2-Page** selects a paper saving device when this key is used with the **ALT** key. This unique feature reduces the data of two screens to fit onto one sheet of paper. This is indicated by the **2-Page** lamp.

Zoom/Macro Key



- **Zoom** allows you to print documents at 80%, 67% or 50% of their actual size.
  This is indicated by any of the **Zoom** lamps.
- **Macro** is used to save your control panel key settings when this key is used with the **ALT** key.
  When Macro is set, it is indicated by the **Macro** lamp.

ALT Key



- **ALT** is used in combination with the other three keys to allow use of each key's other function, namely, saving a **Macro**, selecting the **2-Page** mode or to **Clear** the buffers of data coming from computer.

Conditions indicated by the lamps

This table explains the meanings of the lamps on the control panel.

Lamp	Meaning
Power	Illuminates whenever the power is turned ON.
Ready	Illuminates when the printer is ready to receive data. Flashes three times when the printer is reset with the control panel.
Data	Illuminates when the printer is receiving data into its buffer. Flashes when print data remains in the buffer.
Paper	Illuminates when paper is not loaded in the printer or when paper is jammed inside the printer.
Ribbon	Illuminates when the printer detects the end of a ribbon.
Macro	Illuminates when the macro function is selected.
Color	Illuminates when a color ribbon is installed.
OHP	Illuminates when a ribbon for overhead projection (OHP) film is installed.
Label	Illuminates when a label ribbon is installed. Flashes when the label ribbon and sheet are intalled.
AEC	Illuminates when the Auto Emulation Change mode (AEC) is selected with the Electronic Dip Switch (EDS) mode.
CDM	Illuminates when your application software sends data in the Compressed Data mode (CDM).
2-Page	Illuminates when the 2-Page mode is selected with the control panel.
Zoom 80% 67% 50%	Illuminates when the Zoom function is selected with the control panel.
All lamps flashing	An error has occured.

Caution: If all lamps are flashing, turn OFF the power to the printer, check Chapter 6 "Maintenance and troubleshooting" or contact your nearest service representative.

Control panel operations

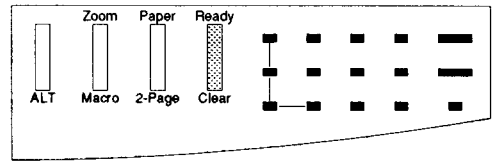
Your printer is capable of many functions, such as top of form adjustment, and line and form feed. You perform all operations by either using the control panel keys individually or in different combinations under any of the following three conditions. These conditions are often called: Power-on, Ready and Not Ready. The following is a brief explanation of their meaning.

Power-on

Power-on is the time when you turn the power to the printer ON using the power switch. You can perform several operations by pressing a key while turning the printer's power ON.

Ready/Not Ready

Ready is the state where the printer is ready to receive printing information from the computer. This is sometimes referred to as ON LINE. The printer is set in either the Ready or Not Ready mode by pressing the **Ready** key. As mentioned above, you can perform various operations by pressing certain key combinations while the printer is in either the Ready or Not Ready mode.



Note: Always press **Ready** before and after any operation.
Press **Ready** to pause printing. Printing will resume when pressed again.

Paper feed

Normally, the printer will load paper automatically from the paper tray when print data is received from the computer. However, you can load paper manually using the control panel.

Steps:

1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press and release the **Paper** key and paper will feed forward one line.
3. Holding the **Paper** key down will feed paper in consecutive lines.

Caution: Do not use paper feed to set the printer's top of form adjustment.

Paper eject

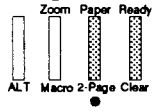
Paper will be ejected when the printer receives the form feed command from the computer. However, you can eject paper manually by using the control panel keys.

In Summary

Paper feed

Steps:

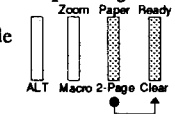
1. Press **Ready**: Not Ready mode
2. Press and release **Paper**
   or press or hold **Paper**



Paper eject

Steps:

1. Press **Ready**: Not Ready mode
2. Press **Ready** while holding
   Paper



Steps:

1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. While holding down the **Paper** key, press the **Ready** key and paper will eject from the printer. Paper can also be ejected by pressing the **Paper** key, if the **Data** lamp is not lit and the **Ready** lamp is lit.

Note: When using the **2-Page** mode, this function feeds paper to the second page position on the first page.

Warning: Never feed paper from the front or rear paths of the printer when paper is loaded in the paper tray because this will cause paper to become jammed.

Forward micro-feed

Forward micro-feed advances paper in very small increments which allows you to make fine adjustments in order to set the top of form position.

Steps:

1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press the **Ready** key again and hold it down. While holding down the **Ready** key, press the **Paper** key. Paper will advance in very small increments. To stop: release both keys.

Reverse micro-feed

You can use reverse micro-feed to retreat paper in very small increments which allows you to return to a higher position on the page in order to set the top of form position.

Steps:

1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press the **Ready** key again and hold it down. While holding down the **Ready** key, press the **Zoom** key. Paper will retreat in very small increments. To stop: release both keys.

Caution: You cannot use Reverse micro-feed when using the paper tray. If you need to use the Reverse micro-feed function, use either the front or the rear feed paths.

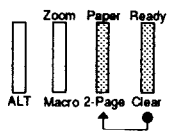
Note: Set the top of form using either the Forward or Reverse micro-feed while feeding paper from either the front or rear feed paths.

In Summary

Forward micro-feed

Steps:

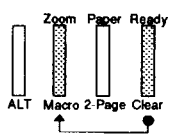
1. Press **Ready**: Not Ready mode
2. Press **Paper** while holding **Ready**



Reverse micro-feed

Steps:

1. Press **Ready**: Not Ready mode
2. Press **Zoom** while holding **Ready**



Changing the auto-load position

The printer automatically loads paper to a preset or previously saved position. This function allows you to change that position.

Steps:

1. Load paper into the front or rear paper path.
2. Change the position using the micro-feed function.
3. Press the **Ready** key to save the position's value.
   This position will be effective until you turn OFF the power to the printer. If you want to store this position, use the **Macro** function which is described below.

> **Caution:** You can only change this value immediately after loading paper. You can not change the auto-load position if you use the Paper feed function.

> **Note:** We recommend that you use the front or the rear feed path for this operation because the Reverse micro-feed function can not be used with the paper tray.

Saving macro definition

Saving the current settings is called "macro definition" which allows you to save those settings for later use.

Steps:

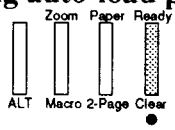
1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press the **ALT** key and hold it down.
3. Press the **Zoom/Macro** key while holding down the **ALT** key.
4. Release both keys at the same time after the **Macro** lamp lights and your settings will be saved. If you release those keys after the lamp is no longer lit, the macro has been cleared.

> **Note:** You can only store the following settings with this procedure.
>
> Current auto-load position
> **2-page** mode
> Current zoom function size

In Summary

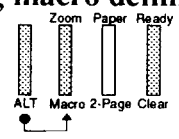
Changing auto-load position

Steps:
1. Load paper
2. Use micro-feed
3. Press **Ready**



Saving macro definition

Steps:
1. Press **Ready**: Not Ready mode
2. Press and hold **ALT**
3. Press **Zoom/Macro** while holding **ALT**



Clearing the buffer/All reset

Print data is received and stored in the printer's memory buffer. The buffer can be cleared by turning the power OFF or by canceling the printing program on the computer. (Printing should stop shortly and the **Data** lamp should extinguish.) If printing does not stop:

Steps:

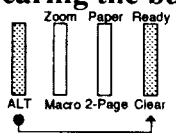
1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish. Printing will stop, but there may still be data in the buffer.
2. Press and hold down the **ALT** key.
3. While pressing the **ALT** key, press the **Ready/Clear** key.
   The **Data** lamp will extinguish. Holding these keys down longer will cause the **Data** lamp to flash three times. This indicates the printer has been initialized to the power-on default settings.
4. Release these keys, make any control panel setting changes that you may require and press the **Ready** key to return to the Ready mode.

> **Caution:** Always cancel printing on the computer. If you fail to do so before going to the Not Ready mode, the printer will resume printing from where the buffer was cleared when you re-enter the Ready mode.

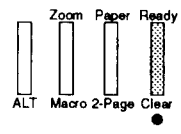
In Summary

Clearing the buffer/All reset

Steps:
1. Press **Ready**: Not Ready mode
2. Press and hold **ALT**
3. Press **Ready/Clear** while holding **ALT**



Steps:
4. Release both, make control panel setting changes
   Press **Ready**: Ready mode



Zoom mode

The **Zoom** key selects the **Zoom** mode. **Zoom** allows you to print documents at **80%, 67%** and **50%** of their normal print size.

Steps:

1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press the **Zoom** key.
   The **Zoom** lamp will illuminate in the following order with each press of the key. (When no lamp is lit, 100% is selected.)

Zoom size	Lamp
100%	Zoom OFF
80%	Zoom 80%
67%	Zoom 67%
50%	Zoom 50%

```
This line is Original Size.
This line is Original Size.
This line is Original Size.

This line is 80% ZOOM.
This line is 80% ZOOM.
This line is 80% ZOOM.

This line is 67% ZOOM.
This line is 67% ZOOM.
This line is 67% ZOOM.

This line is 50% ZOOM.
This line is 50% ZOOM.
This line is 50% ZOOM.
```

2-Page mode

The **2-Page** mode uses the **Zoom** mode, mentioned before. However, this mode prints 2 pages on one single sheet of paper, allowing you to save paper.

Steps:

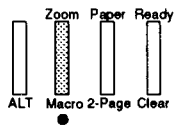
1. Press the **Ready** key to enter the Not Ready mode. The **Ready** lamp will extinguish.
2. Press the **ALT** key and hold it down.
3. While pressing the **ALT** key, press and hold the **Paper/2-Page** key.
   The **2-Page** and **Zoom 50%** lamps will light.
4. Release these keys while the **2-Page** lamp is ON.
   Releasing after the **2-Page** lamp is no longer lit will cancel the **2-Page** mode, but the **Zoom 50%** mode will remain effective.
5. Press the **ALT** and **Paper/2-Page** keys to cancel the **2-Page** mode. Then cancel the **Zoom** mode by pressing the **Zoom** key until all **Zoom** lamps are extinguished.

Caution: If you change the **Zoom** size while in the **2-Page** mode, the **2-Page** mode will be cancelled. If you change to the **2-Page** mode, the **Zoom** mode will enter **50%**.

In Summary

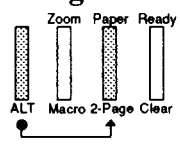
Zoom

Steps:
1. Press **Ready**: Not Ready mode
2. Press **Zoom**



2-Page mode

Steps:
1. Press **Ready**: Not Ready mode
2. Press and hold **ALT**
3. Press **Paper/2-Page** while holding **ALT**
4. Release both keys while lamp is ON.



The test modes

There are two tests which can be performed by pressing keys on the control panel while turning ON the power to the printer. In this section we will take you step-by-step through both of these test modes to help you get the most out of this printer.

The color test mode

The color test mode is used to print the printer's ROM version number which is followed by seven lines of the character set in color. Each line is offset one character from the one before it.

Step:

1. Make sure that the printer is turned OFF.
2. Install a color ribbon into the printer.
3. Press and hold the **Ready** key while turning ON the printer's power.
   The printer will enter the Ready mode after 7 lines have been printed.
   If the **Ready** key is pressed while printing this test, it will print an additional 7 lines.

> **Caution:** We recommend that you use the widest paper possible to avoid damage to the print head and/or the platen because this test prints across the full width of the carriage. Always use a color ribbon for this test.

Color test mode sample

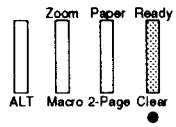
```
ROM Version      : 0334A2  335B2
Revision         : 1.0

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
```

In Summary

Steps:

1. Power OFF
2. Install color ribbon
3. Press **Ready** while turning ON the power.

Color test mode



The long test mode

The long test mode is used to print the printer's ROM version number, the current Electronic Dip Switch (EDS) settings and the entire character set in each font and pitch available.

Step:

1. Make sure that the printer is turned OFF.
2. Press and hold the **Paper** key while turning ON the printer's power.
   After printing 2 pages, the printer will enter the Ready mode.

> **Caution:** We recommend that you use the widest paper possible to avoid damage to the print head and/or the platen because this test prints across the full width of the carriage. This test prints a considerable number of lines - more than can be printed on a single sheet of paper, so we recommend that you feed paper from the paper tray for this test.

Long test mode sample

First page

```
ROM Version      : 0334A2  335B2
Revision         : 1.0

EDS SETTINGS      ( Current settings are Emphasized )
 BANK: Switch : Function                 :  Set ON          :  Set OFF
 ----+--------+--------------------------+------------------+-----------------
  A  :    1   : Emulation                 : Standard/Epson   : IBM
     :    2   : AEC Mode                  : Enabled          : Disabled
     :    3   : RAM Usage                 : Input Buffer     : Download Buffer
     :    4   : Ribbon Save Mode          : Enabled          : Disabled
     :    5   : Time Out Paper Eject      : Enabled          : Disabled
     :    6   : Page Length               : Letter / 11"     : A4 / 11.7"
 ----+--------+                          -+------------------+-----------------
                                               abled         : Enabled
                                                             : --------
```

Second page

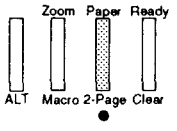
```
  < Roman >

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒ
áíóúñÑªº¿⌐¬½¼¡«»
≡±≥≤⌠⌡÷≈°∙·√ⁿ²
```


```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^
áíóúñÑªº¿
≡±≥
```

In Summary

Steps:
1. Power OFF
2. Press **Paper** while turning ON the power.

Long test mode



Optimizing print quality

You can precisely tune your printer's paper feed system to optimize graphic and text print quality to adjust an effect known as *banding*. The illustration below shows, for your reference, the two types of *banding* which may occur, and the optimum print quality.

Optimized Print Quality

White Line Banding

Dark Line Banding

Print quality adjustment mode

The print quality adjustment mode allows you to optimize this printer's print quality by either advancing or retreating paper in precise increments of 1/720 of an inch, after each printing pass. The following explains the steps.

Steps:

1. Turn the power to the printer OFF.
   Recline the paper tray and load several sheets of paper. The paper release lever must be set to the lower position and either a color or monochrome ribbon should be installed for this mode.
2. Turn the printer ON while holding down the **Zoom** and **Ready** keys. Paper will automatically load and the printer will print a test pattern.
   If your print sample has *white lines*, see Step 3. If your print sample has *dark lines*, see Step 4.
3. Press the **Zoom** key once. Paper will retreat 1/720 of an inch and another sample will be printed.
4. Press the **Paper** key once. Paper will advance 1/720 of an inch and another sample will be printed.
   Repeat either Step 3 or Step 4 until you have fine tuned your printer for optimum print quality. Remember that a sample will be printed each time you press either the **Zoom** or **Ready** key while using this mode. Paper will automatically feed whenever a new sheet is required.

   After you have adjusted your printer's print quality, save this setting and exit using steps 5 and 6.
5. Press and hold the **ALT** key until the **Macro** lamp blinks three times.
6. Turn the printer OFF.

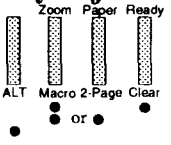
> Caution: Always press and hold the **ALT** key until the **Macro** lamp blinks three times before turning OFF the printer. If you fail to do this before turning OFF the printer, the print quality adjustment mode will not take effect.

In Summary

Print quality adjustment mode

Steps:

1. Power OFF
   Recline paper tray/load paper/use color or monochrome ribbon
2. Power ON while holding down **Zoom** and **Ready**.



3. Press **Zoom** to retract paper
4. Press **Paper** to advance paper.
5. Press and hold **ALT**. **Macro** lamp flashes 3 times
6. Turn the printer OFF.

Hexadecimal dump mode

This function will allow the programmer to see the actual codes the printer is receiving from the computer which is useful when debugging printing programs. (Some computers change the codes the programmer intended.) In this mode, all data received will be printed in hexadecimal format, rather than control codes being acted on as command codes.

Steps:

1. Make sure that the printer is turned OFF.
2. Turn ON the power to the printer while pressing and holding the **Zoom** key.
3. Start a printing program.
   The printer will print a formatted dump of exactly what data the printer is receiving in place of the usual printout. Each line represents sixteen characters with their hexadecimal codes on the left and printable characters on the right.
4. When the hexadecimal dump is completed, press the **Ready** key to enter the Not Ready mode. This will print the last line.

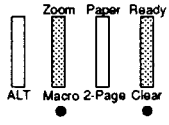
Hexadecimal dump mode print sample

```
0000  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F  ................
0010  10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F  ................
0020  20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F   !"#$%&'()*+,-./
0030  30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F  0123456789:;<=>?
0040  40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F  @ABCDEFGHIJKLMNO
0050  50 51 52 53 54 55 56 57 58 59 5A 5B 5C 5D 5E 5F  PQRSTUVWXYZ[\]^_
0060  60 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E 6F  `abcdefghijklmno
0070  70 71 72 73 74 75 76 77 78 79 7A 7B 7C 7D 7E 7F  pqrstuvwxyz{|}~.
0080  80 81 82 83 84 85 86 87 88 89 8A 8B 8C 8D 8E 8F  ................
0090  90 91 92 93 94 95 96 97 98 99 9A 9B 9C 9D 9E 9F  ................
00A0  A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB AC AD AE AF  ................
00B0  B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 BA BB BC BD BE BF  ................
00C0  C0 C1 C2 C3 C4 C5 C6 C7 C8 C9 CA CB CC CD CE CF  ................
00D0  D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 DA DB DC DD DE DF  ................
00E0  E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 EA EB EC ED EE EF  ................
00F0  F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 FA FB FC FD FE FF  ................
0100  0D 0A                                            ..
```

In Summary

Hexadecimal dump

Steps:
1. Press **Zoom** while turning power ON
2. Start print program
3. Press **Ready** when done.



Chapter 4 Electronic Dip Switch settings

This chapter explains how to set the Electronic Dip Switches (EDS) settings in the EDS mode and it describes the Electronic Dip Switches (EDS) functions equipped with this printer. The information put forth in this chapter, therefore, requires a certain level of understanding of computers.

Electronic Dip Switch settings

Your printer is equipped with a bank of electronic dip switches on the control panel which you can use to change the parameters that define how your printer works when you turn your printer ON. This is known as its power-on settings. We will explain where they are and how to set them. This chapter also contains a list of the meanings of each setting.

What and where are they?

The bank of Electronic Dip Switches (EDS) is a part of the printer's lamp system on the control panel. The EDS switches are arranged from A to C and from 1 through 6. The function of each key and lamp is explained below. See the illustration below.

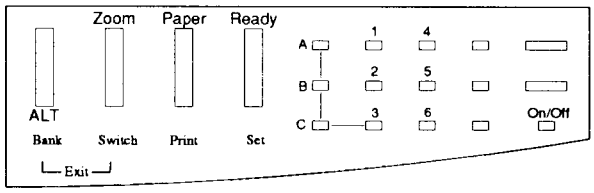
Entering the Electronic Dip Switch mode

This printer has 12 EDS functions which you can set as the power-on default. The following explains how to set the EDS mode and the function of the keys when using this mode.

Step:

1. Turn the printer ON while holding down the **ALT** key.
   One of the **Zoom** lamps will blink to indicate that you have entered the EDS mode.

Electronic Dip Switch controls



- The **ALT** key is used to select the bank letter.
- Use the **Zoom** key to select the switch number.
- The **Data** lamp indicates whether the current setting is ON or OFF. When the lamp is flashing, the setting is ON. Use the **Ready** key to turn the **Data** lamp ON and OFF.
- Press the **Paper** key to print the current settings. Make certain that paper is loaded in the paper tray before printing.
- Press the **Zoom** key while holding down the **ALT** key to save and exit the EDS mode.
- The illustration above at right shows the key and lamp functions when in EDS mode.

Lamp	Meaning
Zoom 80%	Bank A
Zoom 67%	Bank B
Zoom 50%	Bank C
AEC lamp	Switch number 1
CDM lamp	Switch number 2
2-Page lamp	Switch number 3
Color lamp	Switch number 4
OHP lamp	Switch number 5
Label lamp	Switch number 6

Electronic Dip Switch functions

The printer stores the parameters that you have selected in the printer's memory while in the EDS mode. A default setting is the setting that the printer uses if no other has been specifically selected by a program. When you turn ON your printer, or later reset it, these default settings take effect. Changing the settings allows you to use the printer's various functions to match your specific needs. The following table will help you select the settings you need.

Bank Switch	Function	ON	OFF
A-1	Emulation	Standard/Epson	IBM
A-2	Auto Emulation Change (AEC) mode	Enabled	Disabled
A-3	RAM usage	Input buffer	Download buffer
A-4	Ribbon save mode	Enabled	Disabled
A-5	Time out paper eject	Enabled	Disabled
A-6	Page length	Letter/11"	A4/11.7"
B-1	Auto LF with CR	Disabled	Enabled
B-2	(Not used)		
B-3	(Not used)		
B-4	Font selection	Roman	H-Gothic
B-5	Epson character table	Graphics	Italics
B-6	IBM character table	IBM #2	IBM #1
C-1	International character set	(See page 31 for details)	
C-2			
C-3			
C-4	IBM code page	(See page 31 for details)	
C-5			
C-6			

Note: The factory default is ON for all functions.

The following explains the meaning of each function.

Switch A-1: Emulation

This selects the mode that is compatible with your computer and software. In the Standard/Epson mode, the printer operates like the Epson LQ-860 or most NEC graphic dot matrix printers. In the IBM mode, it operates like the IBM Proprinter X24E. The ON position selects Standard/Epson mode. The OFF position selects the IBM mode.

Switch A-2: Auto Emulation Change (AEC) mode

This selects the Auto Emulation Change mode. When this mode is enabled, the **AEC** lamp is lit and the printer automatically switches its emulation to either Standard/Epson or IBM, depending on the emulation that your application program uses.

Switch A-3: RAM usage

In order to download characters, this switch must be in the OFF position. The printer then uses its RAM memory for storing character patterns. If you leave this switch ON, the printer uses its RAM memory as an input buffer, allowing the computer to send data faster than the printer prints.

Switch A-4: Ribbon save mode

When this is ON, the printer's ribbon does not advance when printing spaces for more than 2 inches. This is useful in prolonging the ribbon's printing life, especially when using color ribbons. When this switch is set OFF, the ribbon always advances.

Switch A-5: Time out paper eject

The printer stores data in its buffer and prints them with the form feed command. This is different from typical dot matrix printers. (Wire dot matrix printers print data each time they receive the line feed command.) If this setting is ON, the printer waits for the 30 second time out period after the data is received. If data is not received after the time out period, the printer prints out that data and ejects the current page. If this setting is OFF, the printer will not print until it receives the Form Feed command.

Switch A-6: Page length

Leave this switch ON if you will be using 11 inch or letter-size forms. Turn this OFF to use A4 size paper.

Switch B-1: Auto LF with CR

If you leave this switch ON, a separate line-feed code is required from the computer to obtain a line feed. If you turn it OFF, the printer performs both a carriage return and line feed each time it receives a carriage return code.

Most computer systems send a line feed code, or both a carriage return and line feed code at the end of each line, so this switch should be left ON. If you get double line spacing when you are expecting single spacing, or if lines overprint each other, try changing the setting of this switch.

Switch B-4: Font selection

There are two resident font families: Roman and H-Gothic. When this switch is ON, the printer selects the Roman font family. When it is OFF, the printer selects the H-Gothic font family.

Switch B-5: Epson character table

The Epson printer supports both the Graphics table and the Italic character table. Turn this switch OFF to select the Italic character table. If you leave this switch ON, you will get graphic characters, international characters and mathematical symbols of IBM character set #2 instead of italics.

Switch B-6: IBM character table

The IBM printer supports both character sets #1 and #2.
ON selects character set #2 which has international characters and fewer control words. OFF selects character set #1, for computers with a 7-bit interface.

Switch C-1 to C-3: International character set

International character sets differ in their assignment of 14 character codes in the Epson Italic character table. With these switches, you can select one of eight character sets. They are:

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

Switch C-4 to C-6: IBM code page

Except in the Epson Italic character table, these switches select the default character code page as shown below.

Code Page	C-4	C-5	C-6	Code Page	C-4	C-5	C-6
#437 U.S.A.	ON	ON	ON	#861 Icelandic	OFF	OFF	ON
#850 Multi-lingual	OFF	ON	ON	#863 Canadian French	ON	ON	OFF
#860 Portuguese	ON	OFF	ON	#865 Nordic	OFF	ON	OFF

Chapter 5 Printing

This chapter explains how to prepare your software to print with Windows 3.1 applications.

Printing

When using your printer with an IBM PS/2, PC-AT or compatible, you will probably be using PC-DOS or MS-DOS as an operating system. We will explain to you some useful software tricks here. We will also explain how to use your printer with Windows 3.1 application software.

Preparing your application software

When installing application software, you may find that your printer is not specifically mentioned in the lists of printers provided for installation. This will not cause any trouble for you. Read this section and the guidelines provided with your software on printer installation. There are only a few steps you will have to go through before being able to print with this printer.
Select one of the following, according to your preference, to be your selected Emulation mode.

#	Standard (Epson) mode	IBM mode
1	Star SJ-144	* Proprinter X24E
2	* Star SJ-48	* Proprinter X24
3	Star NX-2420 Rainbow/Colour Star LC24-200 Colour	
4	* Star NX-2430/LC24-20	
5	Epson LQ-860	
6	* Epson LQ-850	

Note: Items marked with an asterisk (*) do not support color printing.

You can also select one of NEC's 24-wire dot printers to print graphics in the Standard emulation mode.
Some software packages may not specifically ask for your printer by name. Instead they will ask you questions such as: "Can your printer perform a backspace?" and "Can it do a hardware form feed?" You should answer "Yes" to both questions.
Other software packages may ask you to install specific features. Spreadsheet programs will often ask for the maximum number of columns to be printed. This is given below.

	CPI	Number of columns
Pica	10	80
Elite	12	96
Semi-condensed	15	120
Condensed pica	17.1	137
Condensed elite	20	160
Proportional		Variable

Somtimes software installation will ask you for an initializing sequence to return to the default settings. The command for this printer is <ESC> @.
Make certain that the Electronic Dip Switches (EDS) are set for the correct printer emulation and that you have selected the appropriate character set using the EDS.

Note: If you are in doubt about the configuration of your application software, seek the advice of an expert. Your software supplier will probably be your most qualified reference.

Printing with Windows 3.1

The disks that were included with your Star printer contain the Printer Driver and 35 TrueType fonts which you can use with Windows 3.1.

Installing the Star SJ-144 printer driver in Windows 3.1

The following explains how to install the printer driver.

Steps:

1. Start Microsoft Windows 3.1.
2. Choose the <Control Panel> icon in the Main group.
3. Choose the <Printers> icon in the Control Panel.
   The Printers dialog box will appear. If you have never installed a printer, the dialog box expands to display a list of printers available in Windows version 3.1 package and the <Add> button is unavailable. Go to step 5.
4. Choose the <Add> button.
   The dialog box will expand to display the List Of Printers.
5. In the <List Of Printers> box, select <Install Unlisted or Updated Printer>.
6. Choose the <Install> button.
   A dialog box will appear, instructing you to insert the disk that has the printer-drive file in it.
7. If the disk is in your A: drive, select the <OK> button.
   If the disk is in a different drive, type the drive name and then select the <OK> button. Example: if the disk is in the B: drive, type ' B:\', without the quotes, then select the <OK> button.
8. In the <List Of Printers> box, select Star SJ-144.
9. Choose the <OK> button.
   The <Printers> dialog box will appear. The Star SJ-144 is now listed in the <Installed Printers> list.
10. Select the <Set As Default Printer> box.
11. For instruction on how to configure your printer, please see Chapter 5, "Control Panel" in the Microsoft Windows User's Guide.
12. Choose the <Close> button.

Installing TrueType fonts in Windows 3.1

The following explains how to install the TrueType fonts.

Steps:

1. Start Microsoft Windows 3.1.
2. Open the Windows Control Panel.
3. Double-click <Fonts>. The Fonts dialog box will appear.
4. Click the <Add> button. The Add Fonts dialog box will appear.
5. Put the TrueType fonts disk into the disk drive.
6. Select the appropriate drive (Drives list box) for the fonts on the TrueType disk. The fonts appear in the List of Fonts box. Note that "TrueType" follows the font name.
7. Select the fonts you want to add. To select all the fonts, click the <Select All> button.
8. Click <OK>. The Fonts dialog box will appear. When installation is complete, the fonts will appear in the Installed Fonts list box.
9. To make the typefaces appear in your application, reselect your printer in Printer Setup in the application file menu.

Printing Sample

American Text
Broadway
Brush 445
Caslon Openface
Cloister Black
Commercial Script
Cooper Black
DAVIDA
Dom Casual
ENGRAVERS' ROMAN
Exotic 350 Demi-Bold
Freeform 721
Freehand 521
Handel Gothic
Hobo
Humanist 521 Extra Bold
Impress
Kaufmann
OCR
Old Dreadful No.7
Onyx
Orbit-B
Parisian
Park Avenue
Playbill
P.T. Barnum
Raleigh Demi Bold
Schadow Black Condensed
Seagull Heavy
SHOTGUN
Tango
University Roman
VAG Rounded
Vineta
Windsor

Chapter 6 Maintenance and troubleshooting

We will explain, in this chapter, how to maintain your printer and how to deal with problems that may arise over time. Keep in mind that your printer is a reliable, precision instrument and should rarely need any adjustment if used with common sense and care.

Maintenance and troubleshooting

Your printer is a solid state instrument, but it should, nonetheless, be treated with care to maintain its high performance. If you abide by these few rules you can expect your printer to perform well for a long time.

Requirements

- Always keep your printer in a comfortable environment. (See chapter 1 for details.)
- Do not subject your printer to jarring or vibration.
- Avoid setting your printer in a dusty environment.
- Periodically clean you printer. (See the following page.)
- Never allow liquid to get inside of the printer.
- The interior of the printer may be cleaned with a small vacuum cleaner or compressed air-aerosol which is sold for this purpose. Take special care not to bend or damage any of the cable connections or electronic components when cleaning.
- Always use the AC adapter provided with this printer. Using an AC adapter from another source may cause electrical malfunction.

Cleaning the printer

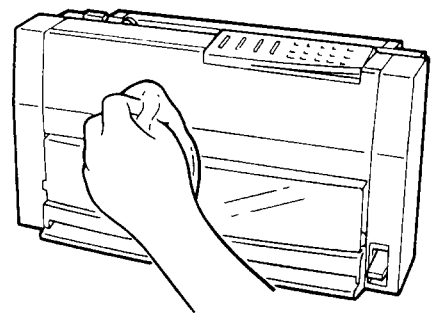
You can keep your printer in fine working condition if you periodically clean your printer using these procedures.

Warning: Always turn OFF the power to the printer when cleaning.
Always remove the AC adapter from the wall outlet.
Always read the directions of all cleaners before use.
Be especially careful of fires when using alcohol to clean your printer.
Never touch the print head with your hands as this may degrade the printing quality.

Cleaning dirt from the printer

- Wipe off all dirt and dust from the printer case and cover with soft cloth. If some dirt is particularly difficult to wipe away, apply a small amount of isopropyl alcohol to the cloth.
  Be especially careful not to allow any liquid to get inside of the printer.

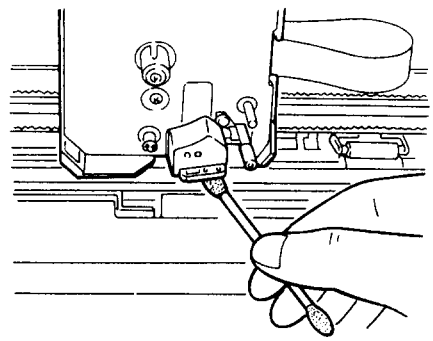
- Use a soft brush to sweep any dust and dirt away from the inside of the printer. Be careful not to damage any of the electronic circuits or wiring.



Cleaning the print head

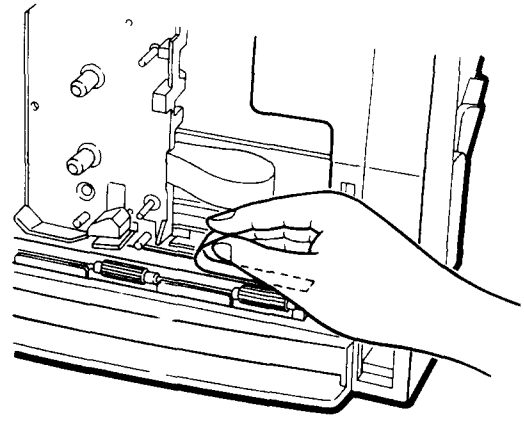
When the print head becomes dirty, printing quality will not be stable even if printing intensity is adjusted. Follow the directions below to clean the print head.

- Prepare: cotton swabs and isopropyl alcohol.
- Turn OFF the power to the printer.
- Open the front cover and remove the ribbon cassette.
- Insert an Overhead Projection Film sheet between the print head and the platen to ensure that the platen is not exposed to the isopropyl alcohol when cleaning.
- Apply the isopropyl alcohol to the cotton swab and lightly wipe the head.
- Perform a test (described in Chapter 3) to confirm the printing quality.



Cleaning the platen

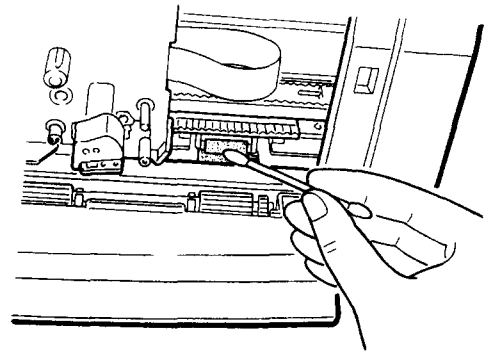
If the platen becomes dirty (e.g. from having been directly printed on) the paper may not feed correctly or the print quality of your document may be poor.



- Prepare: cellophane tape.
- Turn OFF the power to the printer and open the front cover.
- Remove the ribbon cassette.
- Place a piece of cellophane tape over the area on the platen that needs to be cleaned.
- Firmly rub your finger along the length of the tape.
- Slowly peel the tape off the platen.
- Repeat the process until the platen is clean.
- Replace the ribbon cassette.
- Load paper and confirm that it feeds correctly.

Cleaning friction rollers

Clean the rollers when paper does not feed correctly.



- Prepare: isopropyl alcohol and cotton swabs.
- Turn OFF the power to the printer.
- Open the front cover.
- Apply the isopropyl alcohol to the cotton swabs and wipe the rollers.
- Load paper and confirm that it feeds correctly.

Troubleshooting

Your printer is a reliable, precision instrument and should not cause you any trouble if it is used and treated sensibly. However, we are providing you with this section devoted to troubleshooting should you encounter any problems with your printer. Remember that your printer is a highly sophisticated device and that this section is intended to be only a brief guide. As with many other precision instruments, this printer contains high voltage. We request that you perform only the operations which are explained here.

Warning: Any attempt to perform troubleshooting operations other than those described here may result in electric shock or damage to the printer.

The following table is provided to give you an idea of where to find a solution to the type of problem you have encountered.

Region of fault	Description
Power supply	Power is not being supplied to the printer (See page: 42)
Printing	The printer does not print, or it stops printing. (See page: 42) The print is faint or uneven. (See page: 42) While using application software, fonts or characters cannot be printed. (See page: 43) The print-out is not what you expected. (See page: 43) The print shows evenly spaced rows of dark lines. (See page: 43) The print shows evenly spaced rows of white lines. (See page: 43)
Paper feeding	The paper tray is not operating or is not feeding paper properly. (See page: 44) Paper does not feed properly with the front and rear feed paths. (See page: 44) Text is being printed all on one line, or with extra blank lines. (See page: 44)

Power Supply

If the **Power** lamp does not illuminate or flash, check the following.

Check	Possible Remedy
Is the AC adapter cable properly plugged into the electrical outlet?	Turn the printer OFF. Ensure that the AC adapter cable is securely connected and turn the printer back ON.
Is power being supplied to the outlet?	Turn the printer OFF. Unplug the AC adapter and try another electrical appliance to determine if electricity is being supplied to the same outlet.
Is the printer voltage correct?	Always use the AC adapter which came with this printer.

Printing

If your printer does not print, or it suddenly stops printing, check the following.

Check	Possible Remedy
Is the interface cable connected securely?	Check both ends of the cable - printer and computer to make sure that the connector is firmly in position.
Is the **Ready** lamp illuminated?	If it is not illuminated, press the **Ready** key to set the printer to the Ready mode.
Is paper jammed?	If it is, remove it and replace the paper to continue printing. Make sure that the loading edge of the paper is smooth and is not creased.
Is the software you are using properly installed for your printer?	Check the installation settings in your software and re-install it if necessary.
Can the printer perform self tests?	Turn the printer OFF and turn it back ON while holding down one of the keys to perform the self test. If this does not work, contact your dealer.
Is the ribbon depleted or broken?	If the ribbon is depleted or broken, replace it with a new one.

If the print is faint, or uneven, check the following.

Check	Possible Remedy
Is the print density knob turned down?	If it is, turn it back to your desired darkness. The factory setting is maximum.
Is the ribbon cassette installed properly?	Turn OFF the power. Check to make sure that the ribbon is sitting properly on the cassette carriage.
Is the ribbon worn out?	Replace the ribbon.
Are you using a Star Micronics ribbon?	Always use genuine Star Micronics supplies.

If your application software cannot print the fonts or characters selected, check the following.

Check	Possible Remedy
Is your application software properly installed?	Check the software installation, and re-install the software if necessary.
Are fonts not being selected properly?	This printer only supports the Roman and H-Gothic font families. Check the software installation, and insert the commands necessary for font changes into the software.
Are characters other than those you expect being printed?	Either you are using the wrong International Character Set (reset with EDS or software commands), or you have the wrong character set selected (such as if characters other than IBM block graphic characters are being printed). Correct this with EDS or the appropriate software sequences.

If the print-out is not what you expected.

Check	Possible Remedy
Is the printer installed correctly?	Your software may think that it is driving a different emulation to the one actually set. Check the EDS settings to make sure you have the right emulation.
Is the printer not printing anything that you are expecting?	Use the Hexadecimal dump mode to analyze the output from the computer to the printer. This will enable you to determine if the correct escape sequence, etc. is being executed.

If the print shows evenly spaced rows of dark lines, check the following.

Check	Possible Remedy
Are you printing graphics?	Optimize the printer's print quality by using the Print Quality Adjustment Mode.

If the print shows evely spaced rows of white lines, check the following.

Check	Possible Remedy
Are you printing graphics?	Optimize the printer's print quality by using the Print Quality Adjustment Mode.
Are you printing text?	Optimize the printer's print quality by using the Print Quality Adjustment Mode.

Paper feeding

If the paper tray is not operating or is not feeding paper correctly, check the following.

Check	Possible Remedy
Are the levers set properly?	Set the paper tray lever to the rear position, and the paper release lever to the lower position.
Is paper jammed near the print head?	Stop printing, remove the jammed sheet and continue printing.
Are the left and right paper guides too close together?	If the guides are too close together, the paper will not feed smoothly. Move them a little further apart to allow the paper to feed freely.
Is there too much paper in the paper tray?	The paper tray can hold up to 30 sheets of paper at a time. Make sure that there is no more than that in the tray.
Was the paper fanned before being fed by the paper tray?	If this is not done, paper jams may occur. Remove the stack of paper from the paper tray and fan it before re-inserting.
Has the paper been used before or is it creased?	Only new, uncreased paper should be used with the paper tray.
Are you trying to feed paper using the front panel key while the **Ready** lamp is ON?	You can only feed paper in this way when the printer is in the Not Ready mode. Set the printer to the Not Ready mode (**Ready** lamp is not lit) and then feed paper.
Is the paper too thick or too thin?	There are limits to the thickness of the paper. Try different paper.

If paper is not feeding smoothly with the front and rear feed paths, check the following.

Check	Possible Remedy
Is the paper release lever pushed down?	Set the release lever to the downward position.
Are you trying to feed paper through the rear while the paper tray is still engaged?	Remove paper from the paper tray and place it in the vertical position.
Is the paper too thick?	There are limits to the thickness of paper that can be fed. Try different paper.

If the text is being printed all on one line, or with extra blank lines, check the following.

Check	Possible Remedy
Is the text all on the same line?	Carriage returns are not being expanded to <CR> + <LF> pairs. Check the Electronic Dip Switch setting and correct.
Is text being printed with extra blank lines?	Two line feeds are being printed. Either make sure your software prints just a carriage return (if this is not possible) or, set the AUTO LF to OFF using the Electronic Dip Switch setting.

Chapter 7 Printer control commands

This chapter explains the various emulations of which your printer is capable and the software commands used to drive them. You can use the information in this chapter for writing or modifying programs to take advantage of the printer's features.

Printer control commands

This printer has two emulation modes: Standard/Epson mode and IBM mode. In Standard/Epson mode, the printer emulates the functions of the Epson LQ-860, and the graphics commands for NEC 24-wire printers. In IBM mode, the printer emulates the IBM Proprinter X24E. Additional command codes are included as a superset of these emulations.

The emulation is changed by means of EDS switch A-1. When it is ON, the printer will be in Standard/ Epson mode, and when OFF, the printer will be in IBM mode (see Chapter 4).

In addition, when the EDS switch A-2 is ON, the printer automatically changes the emulation by means of software control.

This chapter describes the printer's control commands. Some commands are common to both the Standard and IBM modes. In the descriptions of the commands, all commands will be given by functions. The name of each command is followed by a table like the one below:

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Select font	Both	<ESC> k *n*	27 107 *n*	1B 6B *n*	Selects a font according to the value of *n*. *n* **Font** 0 Roman 12 H-Gothic
	Std.	<FS> C *n*	28 67 *n*	1C 43 *n*	

Command: Gives the name of each command.

Mode: Indicates the mode in which the command is recognized.
- Std. Standard/Epson mode (EDS switch A-1 is ON)
- IBM IBM mode (EDS switch A-1 is OFF)
- Both Both Standard/Epson and IBM modes

ASCII: Indicates the ASCII coding of the command. Control characters are enclosed in pointed brackets: For example, <0> means character code 0.

Decimal: Gives the command in decimal character codes.

Hexadecimal: Gives the command in hexadecimal character codes.

Description: Describes the contents of the command.

Parameters for which values must be supplied are indicated by italic letters such as *n*, *m* or *d*.

Font control commands

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Select font	Both	<ESC>	k	*n*	27	107	*n*	1B	6B	*n*	Selects a font according to the value of *n*. *n* Font 0 Roman 12 H-Gothic
	Std.	<FS>	C	*n*	28	67	*n*	1C	43	*n*	
Select italic characters	Std.	<ESC>	4		27	52		1B	34		Causes subsequent characters except IBM block graphics to be printed in italics.
Select upright characters	Std.	<ESC>	5		27	53		1B	35		Stops italic printing and causes subsequent characters to be printed upright.
Emphasized printing	Both	<ESC>	E		27	69		1B	45		Causes subsequent characters to be emphasized by adding extra thickness to horizontal strokes.
Cancel emphasized printing	Both	<ESC>	F		27	70		1B	46		Cancels emphasized printing.
Underlining	Both	<ESC>	–	*n*	27	45	*n*	1B	2D	*n*	Causes subsequent characters to be underlined when *n* is 1, and stops underlining when *n* is 0. Block graphics characters and spaces skipped by horizontal tabulation are not underlined.
Overlining	IBM	<ESC>	_	*n*	27	95	*n*	1B	5F	*n*	Causes subsequent characters to be overlined when *n* is 1, and stops overlining when *n* is 0. Spaces skipped by horizontal tabulation are not overlined.
Select ornament character	Std.	<ESC>	q	*n*	27	113	*n*	1B	71	*n*	Selects an ornament character according to the value of *n*, as shown below. *n* Character *n* Character 0 Normal 2 Shadow 1 Outline 3 Shadow and outline
Superscript	Both	<ESC>	S	<0>	27	83	0	1B	53	00	Causes subsequent characters to be printed as superscripts. Does not change the character pitch.
Subscript	Both	<ESC>	S	<1>	27	83	1	1B	53	01	Causes subsequent characters to be printed as subscripts. Does not change the character pitch.
Cancel superscript or subscript	Both	<ESC>	T		27	84		1B	54		Stops printing superscripts or subscripts and returns to normal printing.

Character set commands

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Select character table	Both	<ESC>	t	*n*	27	116	*n*	1B	74	*n*	Selects a character table according to the value of *n* as shown below: *n* Character table 0 Epson character table 1 IBM character table 2 Shift download character area (Standard mode only)
	Std.	<FS>	I	*n*	28	73	*n*	1C	49	*n*	
Select character set #1	Both	<ESC>	7		27	55		1B	37		Selects character set #1.
Select character set #2	Both	<ESC>	6		27	54		1B	36		Selects character set #2.
Select international character set	Std.	<ESC>	R	*n*	27	82	*n*	1B	52	*n*	Selects an international character set in the Epson character table according to the value of *n*. *n* Character set — *n* Character set 0 U.S.A. — 8 Japan 1 France — 9 Norway 2 Germany — 10 Denmark II 3 England — 11 Spain II 4 Denmark I — 12 Latin America 5 Sweden — 13 Korea 6 Italy — 14 Irish 7 Spain I — 64 Legal
Select IBM code page	Both	<ESC> <4> <0>	[<0> *n1*	T <0> *n2*	27 4 0	91 0 *n1*	84 0 *n2*	1B 04 00	5B 00 *n1*	54 00 *n2*	Changes the code page of the current IBM character table according to the values of *n1* and *n2*, as shown below. *n1* *n2* Code page 1 181 #437 U.S.A 3 82 #850 Multi-Lingual 3 92 #860 Portuguese 3 93 #861 Icelandic 3 95 #863 Canadian French 3 97 #865 Nordic One of these code pages can be selected as power-up default by EDS switches C-4 to C-6.

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Enable printing of all character codes	IBM	<ESC>	\	*n1* *n2*	27	92	*n1* *n2*	1B	5C	*n1* *n2*	Enables printing of all characters in the IBM character table, including those assigned to character codes which are normally considered control codes. This command remains in effect for the next *n1* + *n2* × 256 characters, where *n1* and *n2* are numbers between 0 and 255. During this interval no control functions are executed. If a code with no assigned character is received, the printer prints a space.
Enable printing of all character codes on next character	IBM	<ESC>	^	*n*	27	94	*n*	1B	5E	*n*	This command operates like <ESC> "\" except that it remains in effect for only one character.

Character size and pitch commands

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Pica pitch (10 cpi)	Std.	<ESC> P	27 80	1B 50	In Standard mode, changes from either elite or semi-condensed to pica pitch (10 cpi) or from condensed elite to condensed pica (17 cpi). In IBM mode, changes from elite or condensed to pica (10 cpi).
	IBM	<DC2>	18	12	
Elite pitch (12 cpi)	Std.	<ESC> M	27 77	1B 4D	Changes from either pica or semi-condensed to elite pitch (12 cpi) or from condensed pica to condensed elite (20 cpi).
	IBM	<ESC> :	27 58	1B 3A	
Semi-condensed pitch (15 cpi)	Std.	<ESC> g	27 103	1B 67	Changes from either pica or elite to semi-condensed pitch (15 cpi).
Condensed printing (17 cpi)	Both	<SI>	15	0F	Changes from pica to condensed pica (17 cpi) or from elite to condensed elite (20 cpi).
		<ESC> <SI>	27 15	1B 0F	
Cancel condensed printing	Both	<DC2>	18	12	In Standard mode, changes from condensed pica to normal pica or from condensed elite to normal elite. In IBM mode, always changes to normal pica.
Proportional spacing	Std.	<ESC> p *n*	27 112 *n*	1B 70 *n*	Causes subsequent characters to be proportionally spaced when *n* is 1, and cancels it when *n* is 0.
	IBM	<ESC> P *n*	27 80 *n*	1B 50 *n*	
Select pitch	IBM	<ESC> I *n*	27 73 *n*	1B 49 *n*	Changes the print pitch according to the value of *n*, as shown below: *n* **Pitch** *n* **Pitch** 2 Pica (10 cpi) 10 Elite (12 cpi) 3 Proportional 18 Pica condensed (17 cpi)
Expanded printing	Both	<ESC> W *n*	27 87 *n*	1B 57 *n*	Causes subsequent characters to be expanded to double width when *n* is 1, and cancels it when *n* is 0.
	Std.	<FS> E *n*	28 69 *n*	1C 45 *n*	
Expanded printing for one line	Both	<SO>	14	0E	Causes subsequent characters in the current line to be expanded to double width. Characters return to normal width after the next line feed (<LF>). The <DC4>, <VT>, <FF>, and <ESC> "W" 0 commands also cancel expanded printing.
		<ESC> <SO>	27 14	1B 0E	

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Cancel one-line expanded printing	Both	<DC4>	20	14	Stops one-line expanded printing set with <SO> or <ESC> <SO>. Does not cancel <ESC> "W" 1.
Select master print mode	Std.	<ESC> ! *n*	27 33 *n*	1B 21 *n*	Selects a combined print mode according to the value of *n*. The value of *n* is the sum of the values given below for the desired characteristics. Underline 128, Italic 64, Expanded 32, Emphasized 8, Condensed 4, Proportional 2, Elite 1
Increase character spacing	Std.	<ESC> <SP> *n*	27 32 *n*	1B 20 *n*	Increases the space between characters by *n* dots, where *n* is a number from 0 to 127. Used in micro-justification.
Print double-height characters	Std.	<ESC> w <1>	27 119 1	1B 77 01	Prints subsequent characters at double height without moving the base line, and without changing the line spacing.
		<FS> V <1>	28 86 1	1C 56 01	
Return to normal height	Std.	<ESC> w <0>	27 119 0	1B 77 00	Terminates double-height printing and prints subsequent characters at normal height.
		<FS> V <0>	28 86 0	1C 56 00	
Select character height, width, and line spacing	IBM	<ESC> [@ <4> <0> <0> <0> *n* *m*	27 91 64 4 0 0 0 *n* *m*	1B 5B 40 04 00 00 00 *n* *m*	Selects a combination of character height, width, and line spacing according to the value of *n* and *m*, as shown below. Does not move the base line. *n* — Line spacing — Character height 0 Unchanged Unchanged 1 Unchanged Single height 2 Unchanged Double height 16 Single line Unchanged 17 Single line Single height 18 Single line Double height 32 Double line Unchanged 33 Double line Single height 34 Double line Double height *m* — Character width 0 Unchanged 1 Single width (same as <ESC> "W" 0) 2 Double width (same as <ESC> "W" 1)

Vertical position commands

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Set line spacing to 1/8 inch	Both	<ESC>	0		27	48		1B	30		Sets the distance the paper advances in subsequent line feeds to 1/8 inch.
Set line spacing to 1/6 inch	Std.	<ESC>	2		27	50		1B	32		Sets the distance the paper advances in subsequent line feeds to 1/6 inch.
Set line spacing to *n*/360 inch	Std.	<ESC>	+	*n*	27	43	*n*	1B	2B	*n*	Sets the distance the paper advances in subsequent line feeds to *n*/360 inch, where *n* is between 0 and 255.
		<FS>	3	*n*	28	51	*n*	1C	33	*n*	
Set base unit for line spacing	IBM	<ESC>	[	\	27	91	92	1B	5B	5C	Sets the base unit for the line spacing commands, <ESC> "3" and <ESC> "J", as shown below: *n1* *n2* **Line spacing unit** 0 180 1/180 inch 0 216 1/216 inch 1 104 1/360 inch If otherwise specified, this command is ignored. This command becomes effective only after <ESC> "3" or <ESC> "J" is received. The default base unit is set to 1/216".
		<4>	<0>	<0>	4	0	0	04	00	00	
		<0>	*n1*	*n2*	0	*n1*	*n2*	00	*n1*	*n2*	
Set line spacing	Both	<ESC>	3	*n*	27	51	*n*	1B	33	*n*	Sets the distance the paper advances in subsequent line feeds to *n*/180 inch, *n*/216 inch (IBM mode) or *n*/360 inch (IBM mode) according to the preceding base unit. The value of *n* is between 0 and 255. If *n* = 0, in Standard mode the line-feed distance is set to 0, but in IBM mode this command is ignored.
Set line spacing to *n*/60 inch or *n*/72 inch	Both	<ESC>	A	*n*	27	65	*n*	1B	41	*n*	In Standard mode, sets the distance the paper advances in subsequent line feeds to *n*/60 inch, where *n* is between 0 and 127. If *n* = 0, the line spacing is set to 0. In IBM mode, this command defines the distance the paper advances in subsequent line feeds to *n*/72 inch, where *n* is between 1 and 85. The new line spacing does not take effect until the next <ESC> "2" command.
Execute <ESC> "A"	IBM	<ESC>	2		27	50		1B	32		Sets the line spacing to the value defined by the last preceding <ESC> "A" command. Sets the line spacing to 1/6 inch if there is no preceding <ESC> "A" command.

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Line feed	Both	<LF>	10	0A	Feeds the paper to the next line. See the preceding commands for the line spacing.
Perform one time line feed	Both	<ESC> J *n*	27 74 *n*	1B 4A *n*	Feeds the paper once by *n* times of the defined base unit (*n*/180 inches for the Standard mode). The value of *n* is between 1 and 255. Does not move the print position right or left. Does not change the line-spacing setting.
Perform one *n*/180-inch reverse line feed	Std.	<ESC> j *n*	27 106 *n*	1B 6A *n*	Feeds the paper once by *n*/180 inches in the reverse direction, where *n* is between 1 and 12. Does not move the print position right or left. Does not change the line-spacing setting.
Set page length to *n* lines	Both	<ESC> C *n*	27 67 *n*	1B 43 *n*	Sets the page length to *n* lines in the current line spacing, where *n* is between 1 and 127 in Standard mode or between 1 and 64 in IBM mode. Changing the line spacing later does not alter the physical page length. The current line becomes the top of the page.
Set page length to *n* inches	Both	<ESC> C <0> *n*	27 67 0 *n*	1B 43 00 *n*	Sets the page length to *n* inches, where *n* is between 1 and 22 in Standard mode or between 1 and 64 in IBM mode. The current line becomes the top of the page.
Set top of page at current position	IBM	<ESC> 4	27 52	1B 34	Sets the current position as the top-of-page position.
Set bottom margin	Both	<ESC> N *n*	27 78 *n*	1B 4E *n*	Sets the bottom margin to *n* lines, where *n* is between 1 and 127 in Standard mode or between 1 and 255 in IBM mode. The bottom margin is reset when you change the page length.
Cancel bottom margin	Both	<ESC> O	27 79	1B 4F	Cancels the bottom margin.
Form feed	Both	<FF>	12	0C	Feeds the paper to the top of the next page according to the current page length, and moves the print position to the left margin. When the paper tray feeding is selected, this command ejects the current page. Note: If the printer is in the **2-Page** mode, the paper will feed to the center of the current page.

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Set vertical tab stops	Both	<ESC>	B	*n1*	27	66	*n1*	1B	42	*n1*	Cancels all current vertical tab stops and sets new vertical tab stops at lines *n1*, *n2*, etc., where *n1*, *n2*, etc. are numbers between 1 and 255. A maximum of 16 vertical tab stops can be set. The tab stops must be specified in ascending order; any violation of ascending order terminates the tab stop list. Standard termination is by the <0> control code. The vertical tab stops are set in terms of the current line spacing and do not move if the line spacing is changed later.
		n2	...	<0>	*n2*	...	0	*n2*	...	00	
Vertical tab	Both	<VT>			11			0B			Feeds the paper to the next vertical tab stop and moves the print position to the left margin. Performs a line feed if no vertical tabs are set, as at power-up. Feeds to the top of the next page if vertical tabs are set but the current line is at or below the last vertical tab stop.

Horizontal position commands

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Set left margin	Std.	<ESC> 1 *n*	27 108 *n*	1B 6C *n*	Sets the left margin at column *n* (where *n* is between 0 and 255) in the current character pitch (pica pitch if proportional spacing is selected). The left margin does not move if the character pitch is changed later. The left margin must be at least two columns to the left of the right margin and within the limits below: Pica $0 \leqq n \leqq 76$ Elite $0 \leqq n \leqq 91$ Semi-condensed $0 \leqq n \leqq 114$ Condensed pica $0 \leqq n \leqq 130$ Condensed elite $0 \leqq n \leqq 152$ Expanded pica $0 \leqq n \leqq 38$ Expanded elite $0 \leqq n \leqq 45$ Expanded semi-condensed $0 \leqq n \leqq 57$ Expanded condensed pica $0 \leqq n \leqq 64$ Expanded condensed elite $0 \leqq n \leqq 76$ This command must be sent at the top of a line. Otherwise, the preceding text on that line may be cancelled.
Set right margin	Std.	<ESC> Q *n*	27 81 *n*	1B 51 *n*	Sets the right margin at column *n* in the current character pitch (pica pitch if proportional spacing is currently selected). Column *n* becomes the last character position in the line. The right margin does not move if the character pitch is changed later. The right margin must be within the limits below: Pica $4 \leqq n \leqq 80$ Elite $5 \leqq n \leqq 96$ Semi-condensed $6 \leqq n \leqq 120$ Condensed pica $7 \leqq n \leqq 137$ Condensed elite $8 \leqq n \leqq 160$ Expanded pica $2 \leqq n \leqq 40$ Expanded elite $3 \leqq n \leqq 48$ Expanded semi-condensed $3 \leqq n \leqq 60$ Expanded condensed pica $4 \leqq n \leqq 68$ Expanded condensed elite $4 \leqq n \leqq 80$ This command must be sent at the top of a line. Otherwise, the preceding text on that line may be cancelled.

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Set left and right margins	IBM	<ESC> X *n1* *n2*	27 88 *n1* *n2*	1B 58 *n1* *n2*	Sets the left margin at column *n1* and the right margin at column *n2*. See the preceding commands for margin restrictions and other notes.
Carriage return	Both	<CR>	13	0D	Returns the next print positon to the left margin. If EDS switch B-1 is set to OFF, also performs a line feed.
Set automatic line feed	IBM	<ESC> 5 <1>	27 53 1	1B 35 01	Causes the printer to perform both a carriage return and line feed each time it receives a <CR> code. This command takes priority over EDS switch B-1.
Cancel automatic line feed	IBM	<ESC> 5 <0>	27 53 0	1B 35 00	Causes the printer to perform only a carriage return when it receives a <CR> code. This command takes priority over EDS switch B-1.
Backspace	Both	<BS>	8	08	Moves the print position one column to the left. Ignored if the print position is at the left margin. This command can be used to overstrike or combine characters.
Set horizontal tab stops	Both	<ESC> D *n1* *n2* ... <0>	27 68 *n1* *n2* ... 0	1B 44 *n1* *n2* ... 00	Cancels all current horizontal tab stops and sets new tab stops at columns *n1*, *n2*, etc. in the current character pitch (pica pitch if proportional spacing is currently selected), where *n1*, *n2*, etc. are numbers between 1 and 255. The maximum number of horizontal tab stops allowed is 32 in Standard mode and 64 in IBM mode. The tab stops must be specified in ascending order; any violation of ascending order terminates the tab stop list. Standard termination is by the <0> control code. To clear all tab stops, specify <ESC> "D" <0>.
Reset all tab stops	IBM	<ESC> R	27 82	1B 52	Resets the horizontal tab stops to their power-up values in which a tab stop is set every 8 columns starting at column 9. Also clears all vertical tab stops.
Horizontal tab	Both	<HT>	9	09	Moves the print position to the next horizontal tab stop. Ignored if there is no next horizontal tab stop in the current line. Note that when underlining is selected, spaces skipped by horizontal tabulation are not underlined.

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Relative horizontal tab	Std.	<ESC> \ *n1* *n2*	27 92 *n1* *n2*	1B 5C *n1* *n2*	Moves the print position right or left a specified distance. Ignored if the resulting position is beyond the right or left margin. The formulas for the distance and direction are as follows: If *n2* is between 0 and 63, the print head moves right by (*n1* + *n2* × 256) dots. If you want to move the print head to the left, *n1* and *n2* are obtained by subtracting the value from 65536, and dividing the result into high and low bytes. The unit of movement is fixed at 1/180 inch.
Relative horizontal tab in inches	IBM	<ESC> d *n1* *n2*	27 100 *n1* *n2*	1B 64 *n1* *n2*	Sets the next print position to (*n1* + *n2* × 256)/120 inches from the current position. Ignored if this position is beyond the right margin. The maximum position is 8 inches.
Absolute horizontal tab in inches	Std.	<ESC> $ *n1* *n2*	27 36 *n1* *n2*	1B 24 *n1* *n2*	Sets the next print position to (*n1* + *n2* × 256)/60 inches from the left margin on the current line. Ignored if this position is beyond the right margin.

Graphics commands

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Print normal density 8-bit graphics	Both	<ESC> K *n1* *n2* *m1* *m2* ...	27 75 *n1* *n2* *m1* *m2* ...	1B 4B *n1* *n2* *m1* *m2* ...	Prints bit-image graphics at 60 dots per inch horizontally. The graphic image is 8 dots high and *n1* + *n2* × 256 dots wide. Maximum width is 8 inches (480 dots). *m1*, *m2*, ... are the dot data, each a 1-byte value from 0 to 255 representing 8 vertical dots, with the most significant bit at the top and the least significant bit at the bottom. The number of data bytes must be *n1* + *n2* × 256. Dots beyond the right margin are ignored. At the end of bit-image printing the printer returns automatically to character mode.
Print double-density 8-bit graphics	Both	<ESC> L *n1* *n2* *m1* *m2* ...	27 76 *n1* *n2* *m1* *m2* ...	1B 4C *n1* *n2* *m1* *m2* ...	Prints bit-image graphics at 120 dots per inch horizontally (maximum 960 dots wide). See <ESC> "K" for other information.
		<ESC> Y *n1* *n2* *m1* *m2* ...	27 89 *n1* *n2* *m1* *m2* ...	1B 59 *n1* *n2* *m1* *m2* ...	
Print quadruple-density 8-bit graphics	Both	<ESC> Z *n1* *n2* *m1* *m2* ...	27 90 *n1* *n2* *m1* *m2* ...	1B 5A *n1* *n2* *m1* *m2* ...	Prints bit-image graphics at 240 dots per inch horizontally (maximum 1920 dots wide), skipping every second dot in the horizontal direction. See <ESC> "K" for other information.
Print hex-density 24-bit graphics	Std.	<FS> Z *n1* *n2* *m1* *m2* *m3* ...	28 90 *n1* *n2* *m1* *m2* *m3* ...	1C 5A *n1* *n2* *m1* *m2* *m3* ...	Prints 24-bit dot graphics at 360 dots per inch horizontally. The graphics image is 24 dots high and *n1* + *n2* × 256 dots wide. Maximum width is 8 inches (2880 dots). In the data *m1*, *m2*, *m3* ... each three bytes represent 24 vertical dots. In the left most position, the most significant bit of *m1* is the top dot; the least significant bit of *m1* is the eighth dot from the top; the most significant bit of *m2* is the ninth dot; the least significant bit of *m2* is the sixteenth dot from the top; the most significant bit of *m3* is the seventeenth dot from the top; the least significant bit of *m3* is the bottom dot. The rest of data is similar. The number of data bytes must the 3 × (*n1* + *n2* × 256). Dots beyond the right margin are ignored. At the end of dot graphics printing, the printer returns automatically to character mode.

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Print hex-density 48-bit graphics	Std.	<ESC> l * *n1* *n2* *m1* *m2* *m3* ...	28 124 42 *n1* *n2* *m1* *m2* *m3* ...	1B 7C 2A *n1* *n2* *m1* *m2* *m3* ...	Prints 48-bit dot graphics at 360 dots per inch horizontally. The graphics image is 48 dots high and *n1* + *n2* × 256 dots wide. Maximum width is 8 inches (2880 dots). In the data *m1*, *m2*, *m3* ... each six bytes represent 48 vertical dots. In the left most position, the most significant bit of *m1* is the top dot; the least significant bit of *m1* is the eighth dot from the top; the most significant bit of *m2* is the ninth dot; the least significant bit of *m2* is the sixteenth dot from the top, and so on. The rest of data is similar. The number of data bytes must be 6 × (*n1* + *n2* × 256). Dots beyond the right margin are ignored. At the end of dot graphics printing, the printer returns automatically to character mode.
Select graphics mode	Std.	<ESC> * *n0* *n1* *n2* *m1* *m2* ...	27 42 *n0* *n1* *n2* *m1* *m2* ...	1B 2A *n0* *n1* *n2* *m1* *m2* ...	Selects one of fifteen graphics modes depending on the value of *n0* and prints bit-image graphics in this mode. See <ESC> "K" (for 8-bit graphics), <FS> "Z" (for 24-bit graphics) or <ESC> "l" "*" (for 48-bit graphics) for information on *n1*, *n2*, *m1*, *m2*, ... ***n0*** **Graphics mode** 0 8-bit Normal-density (60 dots per inch) 1 8-bit Double-density (120 dots per inch) 2 8-bit Double-density (120 dots per inch) 3 8-bit Quadruple-density (240 dots per inch) 4 8-bit CRT graphics, mode I (80 dots per inch) 6 8-bit CRT graphics, mode II (90 dots per inch) 32 24-bit Normal-density (60 dots per inch) 33 24-bit Double-density (120 dots per inch) 38 24-bit CRT graphics (90 dots per inch) 39 24-bit Triple-density (180 dots per inch) 40 24-bit Hex-density (360 dots per inch) 64 48-bit Normal-density (60 dots per inch) 65 48-bit Double-density (120 dots per inch) 70 48-bit CRT graphics (90 dots per inch) 71 48-bit Triple-density (180 dots per inch) 72 48-bit Hex-density (360 dots per inch)

Command	Mode	ASCII			Decimal			Hexadecimal			Description
Select graphics mode	IBM	<ESC>	[	g	27	91	103	1B	5B	67	Selects one of eight graphics modes depending on the value of *m0* and prints bit-image graphics in this mode. The graphics image is (*n1* + *n2* × 256) – 1 dots wide. See <ESC> "K" (for 8-bit graphics) or <FS> "Z" (for 24-bit graphics) for information on *m1*, *m2*, ... *m0* **Graphics mode** 0 8-bit Normal-density (60 dots per inch) 1 8-bit Double-density (120 dots per inch) 2 8-bit Double-density (120 dots per inch) 3 8-bit Quadruple-density (240 dots per inch) 8 24-bit Normal-density (60 dots per inch) 9 24-bit Double-density (120 dots per inch) 11 24-bit Triple-density (180dots per inch) 12 24-bit Hex-density (360 dots per inch)
		n1	*n2*	*m0*	*n1*	*n2*	*m0*	*n1*	*n2*	*m0*	
		m1	*m2*	...	*m1*	*m2*	...	*m1*	*m2*	...	
Convert graphics density	Std.	<ESC>	?		27	68		1B	3F		Converts graphics defined by subsequent <ESC> "K", <ESC> "L", <ESC> "Y" or <ESC> "Z" commands to a density mode defined by <ESC> "*". *n* is "K", "L", "Y" or "Z", indicating the mode to be converted. *m* is a code from <0> to <4> or <6> indicating one of the modes of <ESC> "*".
			n	*m*		*n*	*m*		*n*	*m*	

Download character commands

<table>
<tr><th>Command</th><th>Mode</th><th>ASCII</th><th>Decimal</th><th>Hexadecimal</th><th>Description</th></tr>
<tr><td>Define download characters</td><td>Std.</td><td><ESC> & <0>
n1 n2 m0
m1 m2 d1
d2 ... dx</td><td>27 38 0
n1 n2 m0
m1 m2 d1
d2 ... dx</td><td>1B 26 00
n1 n2 m0
m1 m2 d1
d2 ... dx</td><td>Defines one or more new characters and stores them in RAM for later use. EDS switch A-3 must be set OFF; otherwise RAM is used as an input buffer, not downloading characters, and this command is ignored.

n1 is the character code of the first character defined and n2 is the character code of the last character defined. n1 must be equal to or less than n2.

The data for each character starts with three bytes specifying proportional spacing attributes: the first byte, m0, specifies the left space of the character; the second byte, m1, specifies the character width; the third byte, m2, specifies the right space of the character. These values must not exceed the following maximum limits:

<u>Character mode</u> | <u>m1</u> | <u>m0 + m1 + m2</u>
Pica | 31 | 36
Elite | 27 | 30
Semi-condensed | 19 | 24
Proportional | 37 | 42
Super/subscript | 19 | 36
Proportional
Super/subscript | 37 | 42

Next comes the dot data. Normal character height is 24 dots, so there must be 3 × m1 bytes of dot data. If the printer is in super/subscript mode, however, the character height is 16 dots, so there must be 2 × m1 bytes of dot data. Each data byte indicates eight vertical dots, with the most significant bit being the top dot, and the least significant bit being the bottom dot.</td></tr>
<tr><td>Copy character set from ROM into RAM</td><td>Std.</td><td><ESC> : <0>
n <0></td><td>27 58 0
n 0</td><td>1B 3A 00
n 00</td><td>Copies the selected character set with n, as shown below, to the corresponding download character RAM area, overwriting any download data already present. Ignored when EDS switch A-3 is set ON.
<u>n</u> <u>Font</u>
0 Roman
12 H-Gothic</td></tr>
<tr><td>Select download character set</td><td>Std.</td><td><ESC> % <1></td><td>27 37 1</td><td>1B 25 01</td><td>Selects the download character set. Ignored when EDS switch A-3 is set ON.</td></tr>
<tr><td>Select ROM character set</td><td>Std.</td><td><ESC> % <0></td><td>27 37 0</td><td>1B 25 00</td><td>Stops using the download character set and returns to the built-in ROM character set. Ignored when EDS switch A-3 is set ON.</td></tr>
</table>

Other printer commands

Command	Mode	ASCII	Decimal	Hexadecimal	Description
Select print color	Both	<ESC> r *n*	27 114 *n*	1B 72 *n*	Selects the printing color according to the value of *n* as shown below. Ignored if the color ribbon is not installed. *n* Color *n* Color 0 Black 4 Yellow 1 Magenta 5 Orange 2 Cyan 6 Green 3 Violet
Delete last character sent	Std.	<DEL>	127	7F	Deletes the last character received. Ignored if the last character received has already been printed, or if the last character received was all or part of a command.
Cancel last line	Both	<CAN>	24	18	Deletes the last line currently present in the print buffer.
Set printer off-line	Std.	<DC3>	19	13	Sets the printer off-line. The printer disregards all subsequent characters and commands except <DC1>, which returns it to on-line. The printer's **Ready** lamp does not extinguish.
Set printer on-line	Std.	<DC1>	17	11	Returns the printer on-line state, allowing it to receive and process all subsequent characters and commands. This command is ignored if the printer was set off-line by pressing the **Ready** key on the control panel.
Stop printing	IBM	<ESC> j	27 106	1B 6A	Prints the entire contents of the input buffer, then sets the printer off-line. The **Ready** lamp on the control panel extinguishes.
Eject paper	Both	<ESC> <EM> R	27 25 82	1B 19 52	Ejects the current page.
Reset printer	Both	<ESC> @	27 64	1B 40	Reinitializes the printer. Clears the print buffer and returns settings to their power-up values. Does not clear the input buffer or downloaded characters.
		<FS> @	28 64	1C 40	

Chapter 8 Download characters

This chapter provides you with information on how to create your own download characters.

Download Characters

In this chapter we will show you how you can create new characters and symbols, download their dot data and print them in place of selected characters in the regular character set with this printer. You can generate characters that range from simple but useful icons, like a check mark to complicated Chinese characters.

How to define your own characters

Regular characters are permanently stored in your printer's ROM, but characters you design are downloaded and stored in RAM for use. Before you start to define you own characters, you must set the EDS A-3 to OFF. If you do not, the RAM is used to store the input buffer and the download characters are ignored. Designing and printing your own characters includes two basic operations: 1) designing the shape of the character, calculating the data needed to create the shape and sending that data to the printer; 2) sending the command to print the download characters instead of the regular characters. You should observe the following restrictions for download characters.

- The width of the matrix, or grid, on which you design your characters depends on the print mode shown below.

Character Mode	Horizontal	Vertical
Pica	31	24
Elite	27	24
Semi-condensed	19	16
Proportional	37	24
Super/subscribt	19	16
Proportional super/subscript	37	16

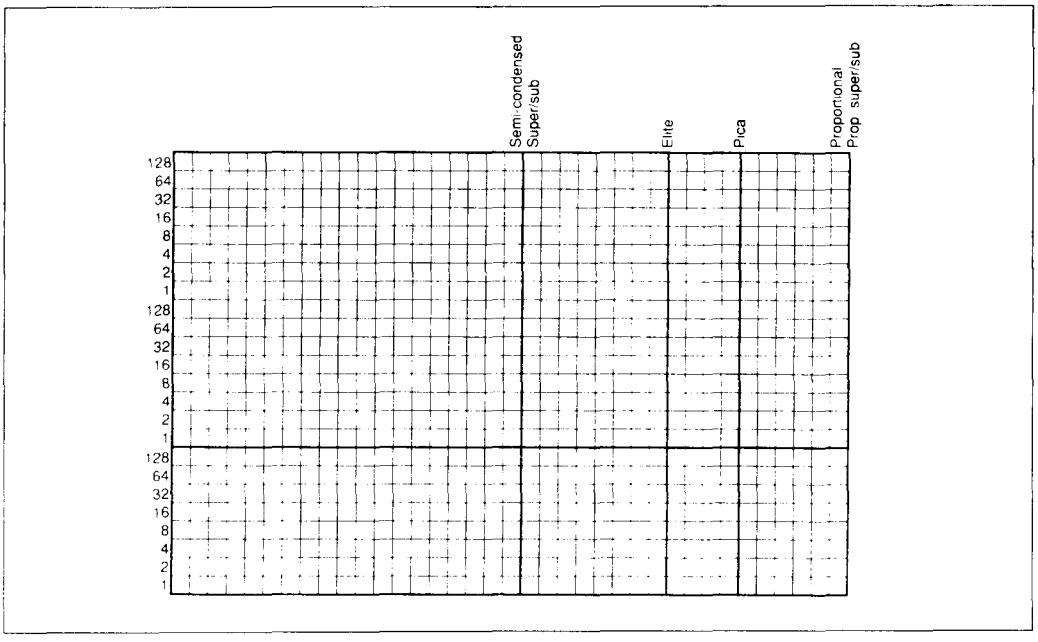
- The minimum width of characters is five dots.
- Dots must not overlap.
- You may define any position in the ASCII table up to 128 characters.

We suggest that you construct or photocopy the grid on the following page. It is helpful in designing your own characters.

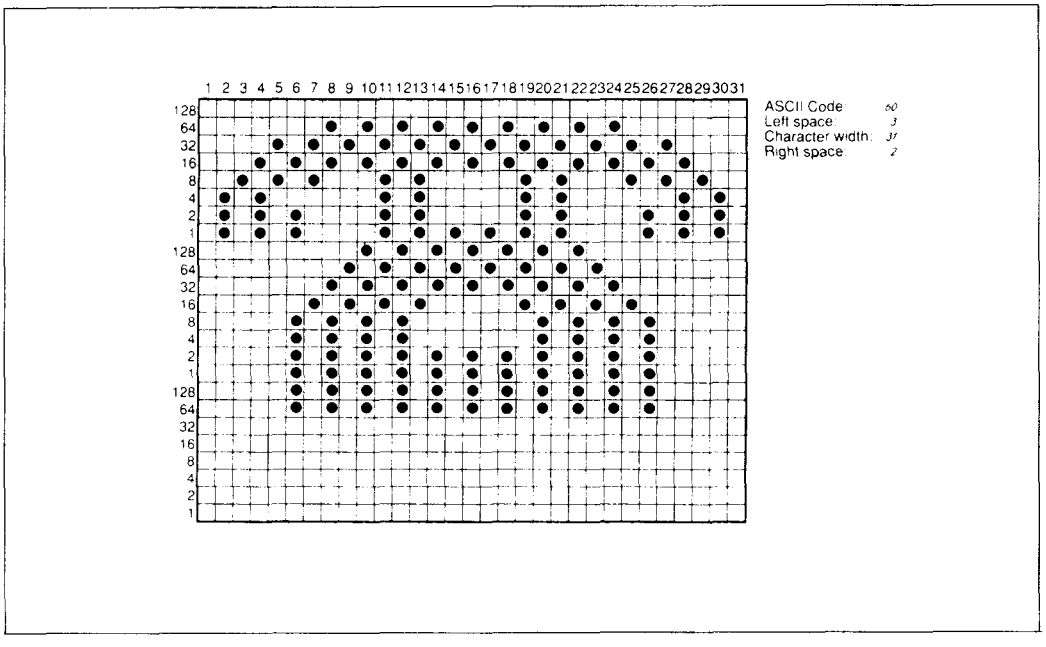
Assigning character data

We will use Pica to define a telephone in this example. The grid on which we will create the new character consists of rows and columns of squares. These squares are called dots. Each dot is equal to one bit. The grid is divided vertically into 3 groups of eight dots and each vertical group of eight dots is equivalent to 1 byte. The entire grid, then, is composed of 3 groups of eight dots or 24 bits.
Notice that there is a number corresponding to each horizontal row of dots and that each number is twice the number below it. This makes it possible to assign unique values to the vertical columns in any combination.

Sample grid



Telephone example



Assigning the value of the character and spaces

This printer allows you to specify the position in the standard grid where the character will be printed as well as specifying the actual width of the character. Keep in mind that you must always indicate the dot column from where the printed character starts and the dot column where the printed character ends. By centering your character in the grid, even narrow characters will print well even though you may not be using proportional printing.

We use the three bytes to define the spaces on either side of it and the actual width of the character. This is expressed in the three bytes as: Left space: *m0* Character width in dots: *m1* Right space: *m2*

The entire width available in Pica pitch is 36, so, in our example, we will instruct the printer to leave 3 spaces open on the left and 2 spaces open on the right. The entire character width is 31.

When you define characters, the sum of the number of printed columns (*m1*) and the left and right spaces (*m0, m2*) cannot exceed the values shown below.

Character mode	*m1*	*m0+m1+m2*
Pica characters	31	36
Elite characters	27	30
Semi-condensed	19	24
Proportional	37	42
Super/subscript	19	36
Proportional super/subscript	37	42

Sample program

Let's use the telephone character and another user-defined character (in this case a representation of an automobile) to demonstrate how to use the download character. The following program will print a graph showing "DIFFUSION RANGES OF CARS AND TELEPHONES."

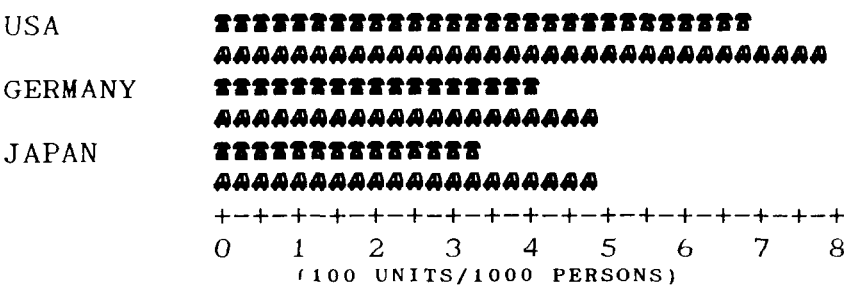
This program list is printed with **Zoom 80%**.

> **Note:** Before you run this program, set the EDS switch A-3 to OFF. Otherwise, you cannot print the download characters.

```
1000 WIDTH "LPT1:",255
1010 LPRINT CHR$(27);":";CHR$(0);CHR$(0);CHR$(0)
1020 LPRINT CHR$(27);"&";CHR$(0);
1030 LPRINT CHR$(60);CHR$(61);
1040 FOR N=60 TO 61
1050 READ LS :LPRINT CHR$(LS);
1060 READ CW :LPRINT CHR$(CW);
1070 READ RS :LPRINT CHR$(RS);
1080 FOR M=1 TO CW*3
1090 READ MM
1100 LPRINT CHR$(MM);
1110 NEXT M
1120 NEXT N
1130 LPRINT CHR$(27);"D";CHR$(11);CHR$(0)
1140 LPRINT CHR$(27);"k";CHR$(12);CHR$(27);"4";
1150 LPRINT CHR$(27);"W";CHR$(1);CHR$(27);"w";CHR$(1);
```

```
1160 LPRINT "  DIFFUSION RANGES OF"
1170 LPRINT
1180 LPRINT "   CARS & TELEPHONES"
1190 LPRINT CHR$(27);"W";CHR$(0);CHR$(27);"w";CHR$(0)
1200 LPRINT CHR$(27);"k";CHR$(0);CHR$(27);"5";
1210 LPRINT CHR$(27);"%";CHR$(1);
1220 LPRINT "USA";CHR$(9);
1230 FOR I=0 TO 681 STEP 25   :LPRINT CHR$(60);  :NEXT I
1240 LPRINT
1250 LPRINT CHR$(9);
1260 FOR I=0 TO 781 STEP 25   :LPRINT CHR$(61);  :NEXT I
1270 LPRINT
1280 LPRINT "GERMANY";CHR$(9);
1290 FOR I=0 TO 412 STEP 25   :LPRINT CHR$(60);  :NEXT I
1300 LPRINT
1310 LPRINT CHR$(9);
1320 FOR I=0 TO 488 STEP 25   :LPRINT CHR$(61);  :NEXT I
1330 LPRINT
1340 LPRINT "JAPAN";CHR$(9);
1350 FOR I=0 TO 347 STEP 25   :LPRINT CHR$(60);  :NEXT I
1360 LPRINT
1370 LPRINT CHR$(9);
1380 FOR I=0 TO 493 STEP 25   :LPRINT CHR$(61);  :NEXT I
1390 LPRINT
1400 LPRINT CHR$(9);"+-";
1410 SCALE$="+-+-"
1420 FOR I=2 TO 8   :LPRINT SCALE$;    :NEXT I
1430 LPRINT "+-+"
1440 LPRINT CHR$(9);"0 ";
1450 FOR I=1 TO 8
1460 LPRINT " ";I;
1470 NEXT I
1480 LPRINT CHR$(27);"%";CHR$(0)
1490 LPRINT CHR$(27);"M";
1500 LPRINT CHR$(27);"S";CHR$(0);
1510 LPRINT CHR$(9);"     (100 UNITS/1000 PERSONS)"
1520 LPRINT CHR$(27);"T";
1530 LPRINT CHR$(27);"@"
1540 END
1550 ' DATA
1560 ' Telephone Symbol
1570 DATA   3, 31,  2
1580 DATA   0,  0,  0,  7,  0,  0,  8,  0,  0, 23,  0,  0, 40,  0,  0
1590 DATA  19, 15,192, 40, 16,  0, 80, 47,192, 32, 80,  0, 80,175,192
1600 DATA  47, 80,  0, 80,175,192, 47, 80,  0, 80,163,192, 33, 64,  0
1610 DATA  80,163,192, 33, 64,  0, 80,163,192, 47, 80,  0, 80,175,192
1620 DATA  47, 80,  0, 80,175,192, 32, 80,  0, 80, 47,192, 40, 16,  0
1630 DATA  19, 15,192, 40,  0,  0, 23,  0,  0,  8,  0,  0,  7,  0,  0
1640 DATA   0,  0,  0
1650 ' Car Symbol
1660 DATA   3, 31,  2
1670 DATA   0,  0,  0,  0, 30,  0,  0,  0,  0,  0, 60,  0,  0,  3,  0
1680 DATA   0,252,128,  0,  3, 64,  1,252,128,  2,  3, 64,  5,124,128
1690 DATA  10,  3,  0, 20,124,  0, 40,  0,  0, 80,126,  0, 32,  0,  0
1700 DATA  64,126,  0, 63,128,  0, 64,126,  0, 63,128,  0, 64,124,  0
1710 DATA  32,  3,  0, 64,124,128, 32,  3, 64, 64,124,128, 48,  3, 64
1720 DATA  76,124,128, 51,  3,  0, 12,252,  0,  3,  0,  0,  0,254,  0
1730 DATA   0,  0,  0
```

DIFFUSION RANGES OF CARS & TELEPHONES



Chapter 9 Reference information

This chapter provides you with technical specifications and with the various character sets equipped on your printer.

Specifications

Printing system	Plain paper, Heat fusion process	
Resolution	360 × 360 dots per inch	
Print speed	At 7.5 lines per inch	At 6 lines per inch
Pica (10 CPI)	306 cps	255 cps
Elite (12 CPI)	367 cps	306 cps
Semi-condensed (15 CPI)	459 cps	382 cps
Condensed pica (17 CPI)	520 cps	433 cps
Condensed elite (20 CPI)	612 cps	510 cps
	Note: 50% speed reduction in Color, OHP, and Label modes.	
Printing direction	Uni-directional logic seeking	
Printing head	144 elements Distance between elements: 1/360 inch Life: 50 million pulse/element	
Line spacing	1/6", 1/8", *n*/60", *n*/180", *n*/216", *n*/360"	
Font styles		
Built-in bitmapped fonts	Roman, Roman Bold, Roman Italic, Roman Italic Bold, H-Gothic, H-Gothic Bold, H-Gothic Italic, H-Gothic Italic Bold	
TrueType fonts (Supplied on diskette)	American Text, Broadway, Brush 445, Caslon Openface, Cloister Black, Commercial Script, Cooper Black, DAVIDA, Dom Casual, Engravers' Roman, Exotic 350 Demi Bold, Freeform 721, Freehand 521, Handel Gothic, Hobo, Humanist 521 Extra Bold, Impress, Kaufmann, OCR, Old Dreadful No. 7, Onyx, Orbit-B, Parisian, Park Avenue, Playbill, P.T. Barnum, Raleigh Demi Bold, Schadow Black Condensed, Seagull Heavy, Shotgun, Tango, University Roman, VAG Rounded, Vineta, Windsor **Note: TrueType fonts are supplied on diskette for use with Windows 3.1 applications**	
Characters		
ASCII	96	
International	16 sets (*)	
IBM special	111	
IBM block graphics	50	
IBM code page	6 sets (**)	
Download	128	

(*) U.S.A., France, Germany, England, Denmark I, Sweden, Italy, Spain I, Japan, Norway, Denmark II, Spain II, Latin America, Korea, Irish, Legal

(**) #437 (U.S.A.), #850 (Multi-lingual), #860 (Portuguese), #861 (Icelandic), #863 (Candadian French), #865 (Nordic)

Number of columns	
Pica (10 CPI)	80
Elite (12 CPI)	96
Semi-condensed (15 CPI)	120
Condensed pica (17 CPI)	137
Condensed elite (20 CPI)	160
Proportional	Variable
Character matrix (360 dots per inch)	
Pica (10 CPI)	48 × 36
Elite (12 CPI)	48 × 30
Semi-condensed (15 CPI)	48 × 24
Condensed pica (17 CPI)	48 × 21
Condensed elite (20 CPI)	48 × 18
Proportional	48 × *n*
Bit image dot-matrix	
8-bit	60, 80, 90, 120, 240 dots per inch
24-bit	60, 80, 90, 180, 360 dots per inch
48-bit	60, 80, 90, 180, 360 dots per inch
144-bit	60, 80, 90, 180, 360 dots per inch
Raster graphics	360 dots per inch
Paper feed	Single bin paper tray with 30 sheet capacity Friction roller feed from the front of the printer Friction roller feed from the rear of the printer
Paper feed speed	380 ms (line feed at 144/360 inch)
Paper specifications	
Width	3.94" - 9.53" (100.0 - 242.0mm)
Length	3.94" - 14.0" (100.0 - 356mm)
Thickness	Paper tray: 0.00236" - 0.00394" (0.06 - 0.10mm) Rear path: 0.00236" - 0.00906" (0.06 - 0.23mm)
Surface	Xerography-quality or smoother (Such as Xerox 4024) Laser-quality, overhead projection (OHP) film, post cards and label sheets can also be used.
Maximum buffer size	
Without Download	35 KB + 3 line buffer (176 KB)
With Download	16 KB + 3 line buffer (176 KB)

Emulations		
Standard mode	Epson LQ-860, NEC 24-wire Graphic commands	
IBM mode	IBM Proprinter X24E	
Interface	Centronics parallel	
Environment		
Temperature	Stand-by:	+5 to +35° C (41 to 95° F)
	Operating:	+5 to +35° C (41 to 95° F)
		+10 to +30° C (50 to 86° F) for Color, OHP, Label
	Storage:	−25 to +60° C (−13 to +140° F)
Humidity:	Stand-by:	30 to 90 % RH (No condensation)
	Operating:	30 to 70 % RH (No condensation)
	Storage:	30 to 90 % RH (No condensation)
Reliability		
Mean-time between failure (MTBF)	10,000 hours	
Maximum recommended duty cycle	2,000 power-on hours per year	
Print head life	50 million pulses per element	
Dimensions and Weight		
Width	325mm (12.8")	
Depth	140mm (5.5")	
Height	175mm (6.9")	
Weight	2.5 Kg (5.5lbs)	
AC adapter power supply	120VAC, 220VAC, 230VAC, 240VAC, 50/60Hz (varies according to the country of purchase)	
Features	Full color and monochrome laser quality printer Speed: up to 382 CPS (15 CPI) in laser quality mode 3 paper feed paths with 30 sheet paper tray Ability to print on a wide variety of print media including: Laser-quality plain paper, recycled paper, post cards, OHP film, etc. Zoom function 2-Page mode 35 scalable TrueType fonts for Windows 3.1 applications.	

Printer supply options

Ink ribbon cassette for plain paper

T144BK

Type: Monochrome ribbon (one time use)
Life: 345,000 characters (12CPI, 6 LPI)
180 pages/cassette (1500 characters per page)
Length: 340 m
Width: 12.7mm

T144CL

Type: Color ribbon (one time use)
Life: 8.0 pages per cassette (8.0" × 9.6" Full graphics per page.)
Length: 193 cycles, 210 m
Width: 12.7mm

Ink ribbon cassette for overhead projection (OHP) film

T144BKO

Type: Monochrome ribbon (one time use)
Life: 200,000 characters (10CPI, 6LPI)
100 pages/cassette (1500 characters per page)
Length: 200 m
Width: 12.7mm

T144CLO

Type: Color ribbon (one time use)
Life: 10.5 pages per cassette (8.0" × 9.6" Full graphics per page.)
Length: 257 cycles, 270 m
Width: 12.7mm

Ink ribbon cassette for strip labels

Strip Label Cassette

Type: Single color printing on single color background
125 labels per cassette (1.8 inches per label)
Maximum label length: 7.2" (printable)
Strip label height: 0.5"

Model #	Background Color	Printing Color
T01SL	Transparent	Black
T02SL	White	Black
T03SL	Red	Black
T04SL	Blue	Black
T05SL	Green	Black
T06SL	Yellow	Black
T07SL	Gold	Black
T08SL	Silver	Black
T31SL	Transparent	Red
T32SL	White	Red
T41SL	Transparent	Blue
T42SL	White	Blue

Pinout of interface connector

The following describes the pinout of the interface connector (signals which are low when active are overlined).

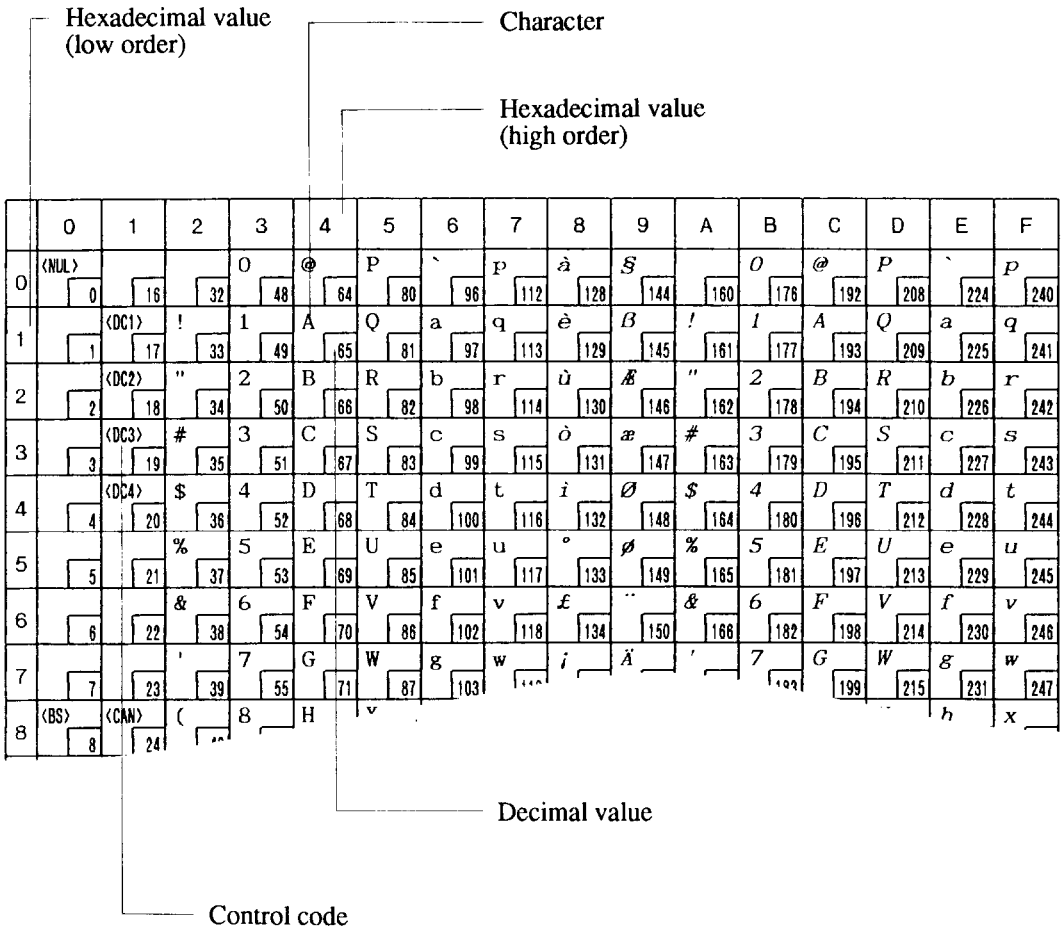
Pin	Name	Function
1	$\overline{\text{STROBE}}$	Goes from high to low (for $\geqq 0.5\ \mu s$) when active
2	DATA 0	High when active
3	DATA 1	High when active
4	DATA 2	High when active
5	DATA 3	High when active
6	DATA 4	High when active
7	DATA 5	High when active
8	DATA 6	High when active
9	DATA 7	High when active
10	$\overline{\text{ACK}}$	4 μs low pulse acknowleges receipt of data
11	BUSY	Low when printer ready to receive data
12	PAPER	High when paper out
13	SELECT	High when printer is on-line
14, 15	N/C	
16	SIGNAL GND	Signal ground
17	CHASSIS	Chassis ground (isolated from signal ground)
18	+5V	+5V DC output from printer
19 - 30	GND	Twisted pair ground return
31	$\overline{\text{RESET}}$	When this input is low, printer is reset
32	$\overline{\text{ERROR}}$	Outputs low when printer cannot continue, due to an error
33	EXT GND	External ground
34 - 36	N/C	

Character tables

The following tables show the Epson and the IBM character tables. The decimal code of each character is shown in an inset to the lower right of the character.

The hexadecimal code can be found by reading the entries at the top and left edges of the table. For example, the character "A" is in column 4, row 1, so its hexadecimal character code is 41. This is equivalent to decimal 65 (4 × 16 + 1 = 65), which is the number in the inset.

Control codes recognized by this printer are indicated by abbreviations inside pointed brackets.



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	<NUL> 0	16	32	0 48	@ 64	P 80	` 96	p 112	à 128	Ş 144	160	ο 176	@ 192	P 208	` 224	p 240
1	1	<DC1> 17	! 33	1 49	A 65	Q 81	a 97	q 113	è 129	ß 145	! 161	ı 177	A 193	Q 209	a 225	q 241
2	2	<DC2> 18	" 34	2 50	B 66	R 82	b 98	r 114	ù 130	Æ 146	" 162	2 178	B 194	R 210	b 226	r 242
3	3	<DC3> 19	# 35	3 51	C 67	S 83	c 99	s 115	ò 131	æ 147	# 163	3 179	C 195	S 211	c 227	s 243
4	4	<DC4> 20	$ 36	4 52	D 68	T 84	d 100	t 116	ì 132	Ø 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117	° 133	ø 149	% 165	5 181	E 197	U 213	e 229	u 245
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	£ 134	¨ 150	& 166	6 182	F 198	V 214	f 230	v 246
7	7	23	' 39	7 55	G 71	W 87	g 103	w	¡	Ä	'	7	G 199	W 215	g 231	w 247
8	<BS> 8	<CAN> 24	(	8	H										h	x

Epson character table #2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	<NUL> 0	16	32	0 48	@ 64	P 80	` 96	p 112	à 128	§ 144	160	*0* 176	*@* 192	*P* 208	` 224	*p* 240
1	1	<DC1> 17	! 33	1 49	A 65	Q 81	a 97	q 113	è 129	*ß* 145	*!* 161	*1* 177	*A* 193	*Q* 209	a 225	*q* 241
2	2	<DC2> 18	" 34	2 50	B 66	R 82	b 98	r 114	ù 130	*Æ* 146	" 162	*2* 178	*B* 194	*R* 210	b 226	*r* 242
3	3	<DC3> 19	# 35	3 51	C 67	S 83	c 99	s 115	ò 131	*æ* 147	*#* 163	*3* 179	*C* 195	*S* 211	c 227	*s* 243
4	4	<DC4> 20	$ 36	4 52	D 68	T 84	d 100	t 116	ì 132	*Ø* 148	*$* 164	*4* 180	*D* 196	*T* 212	d 228	*t* 244
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117	° 133	*ø* 149	*%* 165	*5* 181	*E* 197	*U* 213	e 229	*u* 245
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	£ 134	¨ 150	*&* 166	*6* 182	*F* 198	*V* 214	f 230	*v* 246
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119	*ì* 135	*Ä* 151	*'* 167	*7* 183	*G* 199	*W* 215	g 231	*w* 247
8	<BS> 8	<CAN> 24	(40	8 56	H 72	X 88	h 104	x 120	¿ 136	Ö 152	*(* 168	*8* 184	*H* 200	*X* 216	h 232	*x* 248
9	<HT> 9	<EM> 25	) 41	9 57	I 73	Y 89	i 105	y 121	Ñ 137	Ü 153	*)* 169	*9* 185	*I* 201	*Y* 217	i 233	*y* 249
A	<LF> 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	*ñ* 138	*ä* 154	*** 170	*:* 186	*J* 202	*Z* 218	j 234	*z* 250
B	<VT> 11	<ESC> 27	+ 43	; 59	K 75	[91	k 107	{ 123	*Ø* 139	ö 155	*+* 171	*;* 187	*K* 203	*[* 219	k 235	*{* 251
C	<FF> 12	<FS> 28	, 44	< 60	L 76	\ 92	l 108	¦ 124	*Ł* 140	ü 156	*,* 172	*<* 188	*L* 204	\ 220	*l* 236	*¦* 252
D	<CR> 13	29	− 45	= 61	M 77	] 93	m 109	} 125	*Å* 141	*É* 157	− 173	*=* 189	*M* 205	*]* 221	*m* 237	*}* 253
E	<SO> 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	*å* 142	é 158	*.* 174	*>* 190	*N* 206	^ 222	*n* 238	~ 254
F	<SI> 15	31	/ 47	? 63	O 79	_ 95	o 111	<DEL> 127	ç 143	¥ 159	*/* 175	*?* 191	*O* 207	_ 223	*o* 239	255

International character sets

When an international character set is selected by a command from software, the following changes are made in the Epson Italic character table.

Country	35	36	64	88	90	91	92	93	94	96	123	124	125	126
U.S.A.	#	$	@	X	Z	[	\	]	^	`	{	¦	}	~
FRANCE	#	$	à	X	Z	°	ç	§	^	`	é	ù	è	¨
GERMANY	#	$	§	X	Z	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ENGLAND	£	$	@	X	Z	[	\	]	^	`	{	¦	}	~
DENMARK 1	#	$	@	X	Z	Æ	Ø	Å	^	`	æ	ø	å	~
SWEDEN	#	¤	É	X	Z	Ä	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	#	$	@	X	Z	°	\	é	^	ù	à	ò	è	ì
SPAIN 1	₧	$	@	X	Z	¡	Ñ	¿	^	´	¨	ñ	}	~
JAPAN	#	$	@	X	Z	[	¥	]	^	`	{	¦	}	~
NORWAY	#	¤	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
DENMARK 2	#	$	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
SPAIN 2	#	$	á	X	Z	¡	Ñ	¿	é	´	í	ñ	ó	ú
LATIN AMERICA	#	$	á	X	Z	¡	Ñ	¿	é	ü	í	ñ	ó	ú
KOREA	#	$	@	X	Z	[	₩	]	^	`	{	¦	}	~
IRISH	#	$	@	Ú	´	[	\	]	^	`	Á	É	Ó	~
LEGAL	#	$	§	X	Z	°	'	"	¶	`	©	®	†	™

The command for selecting the international character set is: <ESC> "R" *n*

Where *n* means character code *n*, ie. CHR$ (*n*) in BASIC. The values of *n* are:

0 U.S.A.
1 France
2 Germany
3 England
4 Denmark I
5 Sweden
6 Italy
7 Spain I
8 Japan
9 Norway
10 Denmark II
11 Spain II
12 Latin America
13 Korea
14 Irish
64 Legal

IBM character set #2

Code page #437 (U.S.A.)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	⟨NUL⟩ 0	16	32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	1	⟨DC1⟩ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	2	⟨DC2⟩ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	♥ 3	⟨DC3⟩ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	♦ 4	⟨DC4⟩ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	♠ 6	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	⟨BS⟩ 8	⟨CAN⟩ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	⟨HT⟩ 9	⟨EM⟩ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	⟨LF⟩ 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	⟨VT⟩ 11	⟨ESC⟩ 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
C	⟨FF⟩ 12	⟨FS⟩ 28	, 44	< 60	L 76	\ 92	l 108	¦ 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ω 236	n 252
D	⟨CR⟩ 13	29	− 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	z 253
E	⟨SO⟩ 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	⟨SI⟩ 15	31	/ 47	? 63	O 79	_ 95	o 111	⟨DEL⟩ 127	Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	255

Code page #850 (Multi-lingual)

Other characters are identical to Code Page #437

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	ð 208	Ó 224	- 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	Ð 209	ß 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	= 242
3	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245
6	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
D	ì 141	Ø 157	¡ 173	¢ 189	= 205	¦ 221	Ý 237	² 253
E	Ä 142	× 158	« 174	¥ 190	╬ 206	ì 222	¯ 238	■ 254
F	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	255

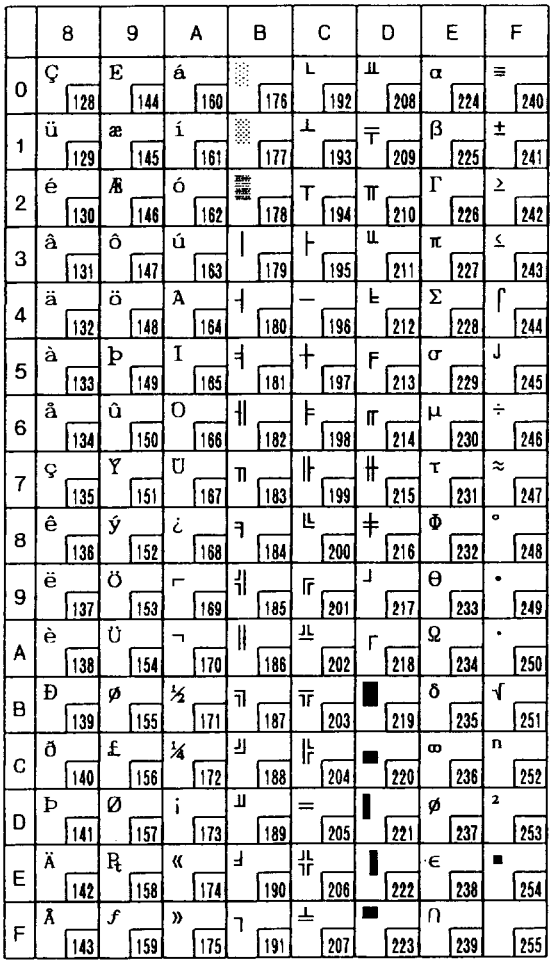
Code page #860 (Portuguese)

Other characters are identical to Code Page #437

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	À 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241
2	é 130	È 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ã 132	õ 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	Á 134	Ú 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	Ì 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	Ê 137	Õ 153	Ò 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
C	Ô 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	ì 141	Ù 157	¡ 173	╜ 189	= 205	▌ 221	ø 237	² 253
E	Ã 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	Â 143	ó 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	255

Code page #861 (Icelandic)

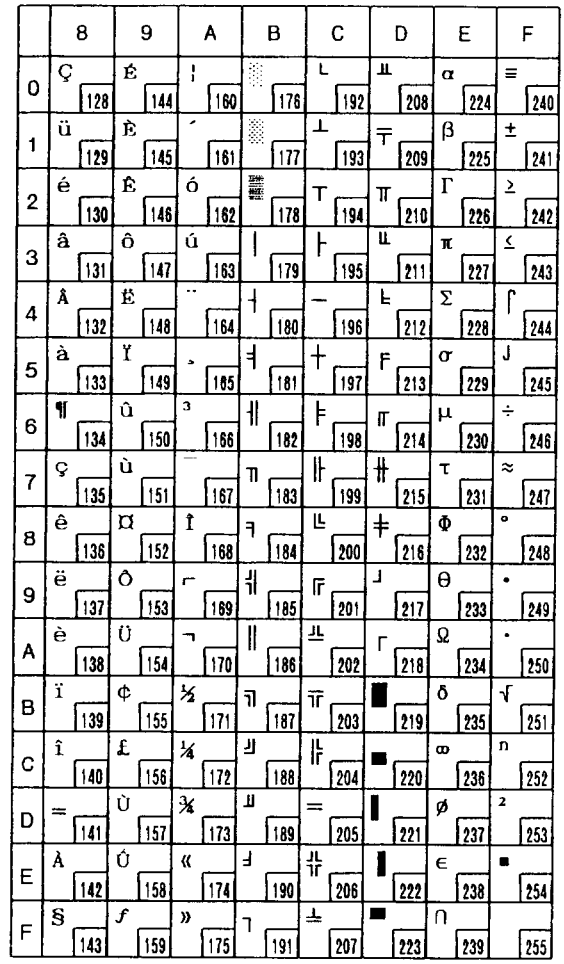
Other characters are identical to Code Page #437



	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	░ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ä 132	ö 148	Ð 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	þ 149	Í 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	å 134	û 150	Ó 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ý 151	Ú 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	Ý 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	Đ 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	ð 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	Þ 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	255

Code page #863 (Canadian French)

Other characters are identical to Code Page #437



	8	9	A	B	C	D	E	F
0	Ç 128	É 144	¦ 160	░ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	È 145	´ 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Ê 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	Â 132	Ë 148	¨ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	Ï 149	¸ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	¶ 134	û 150	³ 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	¯ 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	¤ 152	Î 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ô 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	‗ 141	Ù 157	¾ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	À 142	Û 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	255

Code page #865 (Nordic)

Other characters are identical to Code Page #437

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▀ 220	∞ 236	n 252
D	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▄ 223	∩ 239	255

Character set #1

Other characters are identical to character set #2

The duplication of control codes enables systems with a 7-bit interface to obtain control functions.

	0	1
0	⟨NUL⟩ 0	16
1	1	⟨DC1⟩ 17
2	2	⟨DC2⟩ 18
3	3	⟨DC3⟩ 19
4	4	⟨DC4⟩ 20
5	5	21
6	6	22
7	7	23
8	⟨BS⟩ 8	⟨CAN⟩ 24
9	⟨HT⟩ 9	⟨EM⟩ 25
A	⟨LF⟩ 10	26
B	⟨VT⟩ 11	⟨ESC⟩ 27
C	⟨FF⟩ 12	⟨FS⟩ 28
D	⟨CR⟩ 13	29
E	⟨SO⟩ 14	30
F	⟨SI⟩ 15	31

	8	9
0	⟨NUL⟩ 128	144
1	129	⟨DC1⟩ 145
2	130	⟨DC2⟩ 146
3	131	⟨DC3⟩ 147
4	132	⟨DC4⟩ 148
5	133	149
6	134	150
7	135	151
8	⟨BS⟩ 136	⟨CAN⟩ 152
9	⟨HT⟩ 137	⟨EM⟩ 153
A	⟨LF⟩ 138	154
B	⟨VT⟩ 139	⟨ESC⟩ 155
C	⟨FF⟩ 140	⟨FS⟩ 156
D	⟨CR⟩ 141	157
E	⟨SO⟩ 142	158
F	⟨SI⟩ 143	159

IBM special character set

Additional characters can be printed by special commands.

	0	1
0	Ø 0	► 16
1	☺ 1	◄ 17
2	☻ 2	↕ 18
3	♥ 3	‼ 19
4	♦ 4	¶ 20
5	♣ 5	§ 21
6	♠ 6	▬ 22
7	• 7	↨ 23
8	◘ 8	↑ 24
9	○ 9	↓ 25
A	◙ 10	→ 26
B	♂ 11	← 27
C	♀ 12	∟ 28
D	♪ 13	↔ 29
E	♫ 14	▲ 30
F	☼ 15	▼ 31

Customer service information

In the event that you are experiencing some technical difficulty with your Star printer, please refer to Chapter 6 - "Maintenance and troubleshooting." This chapter provides you with easy methods to diagnose and resolve problems which you may encounter.

For further technical support, you should first contact your Authorized Star Dealer. If you require additional support, Star Micronics offers a wide variety of technical support services. Please use the phone numbers listed below based on the country which your Star printer was purchased.

Star Micronics Technical Hotline:

North America: 1-908-572-3300
Hong Kong: 852-795-2335
Australia: 61-2-748-4300
New Zealand: 64-9-570-1470

Star Micronics FaxBack (Document Retrieval) System:

Requires access to a facsimile machine or board with receive capability
North America: 1-908-572-4004

Star Micronics Bulletin Board Service:

Requires a computer modem
North America: 1-908-572-5010
United Kingdom: 44-494-461395
France: 33-1-305807
Germany: 49-69-780929
Netherlands: 31-73-424485
Australia and New Zealand: 61-2-748-2960

Index

This index is arranged in alphabetic order. The page number of where each item appears in this manual is listed to the right of each entry.

Command Summary

Standard mode

The following commands take effect when in the Standard mode.

Control code	Function	Page
<BS>	Backspace	56
<HT>	Horizontal tab	56
<LF>	Line feed	53
<VT>	Vertical tab	54
<FF>	Form feed	53
<CR>	Carriage return	56
<SO>	Expanded printing for one line	50
<SI>	Condensed printing	50
<DC1>	Set printer on-line	62
<DC2>	Cancel condensed printing	50
<DC3>	Set printer off-line	62
<DC4>	Cancel one-line expanded printing	51
<CAN>	Cancel last line	62
<ESC> <SO>	Expanded printing for one line	50
<ESC> <SI>	Condensed printing	50
<ESC> <EM> "R"	Eject paper	62
<ESC> <SP> *n*	Increase character spacing	51
<ESC> "!" *n*	Select master print mode	51
<ESC> "$" *n1 n2*	Absolute horizontal tab in inches	57
<ESC> "%" 0	Select ROM character set	61
<ESC> "%" 1	Select download character set	61
<ESC> "&" <0> *n1 n2 m0 m1 m2 d1 d2 ... dx*	Define download characters	61
<ESC> "*" *n0 n1 n2 m1 m2 ...*	Select graphics mode	59
<ESC> "+" *n*	Set line spacing to *n*/360 inch	52
<ESC> "—" *n*	Underlining	47
<ESC> "0"	Set line spacing to 1/8 inch	52
<ESC> "2"	Set line spacing to 1/6 inch	52
<ESC> "3" *n*	Set line spacing to *n*/180 inch	52
<ESC> "4"	Select italic characters	47
<ESC> "5"	Select upright characters	47
<ESC> "6"	Select character set #2	48
<ESC> "7"	Select character set #1	48
<ESC> ":" <0> *n* <0>	Copy character set from ROM into RAM	61
<ESC> "?" *n m*	Convert graphics density	60
<ESC> "@"	Reset printer	62
<ESC> "A" *n*	Set line spacing to *n*/60 inch	52
<ESC> "B" *n1 n2 ...* <0>	Set vertical tab stops	54
<ESC> "C" <0> *n*	Set page length to *n* inches	53
<ESC> "C" *n*	Set page length to *n* lines	53
<ESC> "D" *n1 n2 ...* <0>	Set horizontal tab stops	56

Control code		Function	Page
<ESC>	"E"	Emphasized printing	47
<ESC>	"F"	Cancel emphasized printing	47
<ESC>	"J" *n*	Perform one time line feed	53
<ESC>	"K" *n1 n2 m1 m2...*	Print normal-density 8-bit graphics	58
<ESC>	"L" *n1 n2 m1 m2...*	Print double-density 8-bit graphics	58
<ESC>	"M"	Elite pitch	50
<ESC>	"N" *n*	Set bottom margin	53
<ESC>	"O"	Cancel bottom margin	53
<ESC>	"P"	Pica pitch	50
<ESC>	"Q" *n*	Set right margin	55
<ESC>	"R" *n*	Select international character set	48
<ESC>	"S" 0	Superscript	47
<ESC>	"S" 1	Subscript	47
<ESC>	"T"	Cancel superscript or subscript	47
<ESC>	"W" *n*	Expanded printing	50
<ESC>	"Y" *n1 n2 m1 m2...*	Print double-density 8-bit graphics	58
<ESC>	"Z" *n1 n2 m1 m2...*	Print quadruple-density 8-bit graphics	58
<ESC>	"[" "T" <4> <0> <0> <0> *n1 n2*	Select IBM code page	48
<ESC>	"\" *n1 n2*	Relative horizontal tab	57
<ESC>	"g"	Semi-condensed pitch	50
<ESC>	"j" *n*	Perform one *n*/180-inch reverse line feed	53
<ESC>	"k" *n*	Select font	47
<ESC>	"l" *n*	Set left margin	55
<ESC>	"p" *n*	Proportional spacing	50
<ESC>	"q" *n*	Select ornament character	47
<ESC>	"r" *n*	Select print color	62
<ESC>	"t" *n*	Select character table	48
<ESC>	"w" 0	Return to normal height	51
<ESC>	"w" 1	Print double-height characters	51
<ESC>	"|" "*" *n1 n2 m1 m2 m3..*	Print hex-density 48-bit graphics	59
<FS>	"3" *n*	Set line spacing to *n*/360 inch	52
<FS>	"@"	Reset printer	62
<FS>	"C" *n*	Select font	47
<FS>	"E" *n*	Expanded printing	50
<FS>	"I" *n*	Select character table	48
<FS>	"V" 0	Return to normal height	51
<FS>	"V" 1	Print double-height characters	51
<FS>	"Z" *n1 n2 m1 m2 ...*	Print hex-density 24-bit graphics	58
<DEL>		Delete last character sent	62

IBM mode

The following commands take effect when in the IBM mode.

Control code	Function	Page
<BS>	Backspace	56
<HT>	Horizontal tab	56
<LF>	Line feed	53
<VT>	Vertical tab	54
<FF>	Form feed	53
<CR>	Carriage return	56
<SO>	Expanded printing for one line	50
<SI>	Condensed printing	50
<DC2>	Pica pitch	50
<DC4>	Cancel one-line expanded printing	51
<CAN>	Cancel last line	62
<ESC> <SO>	Expanded printing for one line	50
<ESC> <SI>	Condensed printing	50
<ESC> <EM> "R"	Eject paper	62
<ESC> "—" *n*	Underlining	47
<ESC> "0"	Set line spacing to 1/8 inch	52
<ESC> "2"	Execute <ESC> "A"	52
<ESC> "3" *n*	Set line spacing	52
<ESC> "4"	Set top of page at current position	53
<ESC> "5" <0>	Cancel automatic line feed	56
<ESC> "5" <1>	Set automatic line feed	56
<ESC> "6"	Select character set #2	48
<ESC> "7"	Select character set #1	48
<ESC> ":"	Elite pitch	50
<ESC> "@"	Reset printer	62
<ESC> "A" *n*	Set line spacing to *n*/72 inch	52
<ESC> "B" *n1 n2* ... <0>	Set vertical tab stops	54
<ESC> "C" <0> *n*	Set page length to *n* inches	53
<ESC> "C" *n*	Set page length to *n* lines	53
<ESC> "D" *n1 n2* ... <0>	Set horizontal tab stops	56
<ESC> "E"	Emphasized printing	47
<ESC> "F"	Cancel emphasized printing	47
<ESC> "I" *n*	Select pitch	50
<ESC> "J" *n*	Perform one time line feed	53
<ESC> "K" *n1 n2 m1 m2...*	Print normal-density 8-bit graphics	58
<ESC> "L" *n1 n2 m1 m2...*	Print double-density 8-bit graphics	58
<ESC> "N" *n*	Set bottom margin	53
<ESC> "O"	Cancel bottom margin	53
<ESC> "P" *n*	Proportional spacing	50
<ESC> "R"	Reset all tab stops	56
<ESC> "S" 0	Superscript	47
<ESC> "S" 1	Subscript	47
<ESC> "T"	Cancel superscript or subscript	47

Control code	Function	Page
<ESC> "W" *n*	Expanded printing	50
<ESC> "X" *n1 n2*	Set left and right margins	56
<ESC> "Y" *n1 n2 m1 m2...*	Print double-density 8-bit graphics	58
<ESC> "Z" *n1 n2 m1 m2...*	Print quadruple-density 8-bit graphics	58
<ESC> "[" "@" <4> <0> <0> <0> *n m*	Select character height, width and line spacing	51
<ESC> "[" "T" <4> <0> <0> <0> *n1 n2*	Select IBM code page	48
<ESC> "[" "\" <4> <0> <0> <0> *n1 n2*	Set base unit for line spacing	52
<ESC> "[" "g" *n1 n2 m0 m1 m2...*	Select graphics mode	60
<ESC> "\" *n1 n2*	Enable printing of all character codes	49
<ESC> "^" *n*	Enable printing of all character codes on next character	49
<ESC> "_" *n*	Overlining	47
<ESC> "d" *n1 n2*	Relative horizontal tab in inches	57
<ESC> "j"	Stop printing	62
<ESC> "k" *n*	Select font	47
<ESC> "r" *n*	Select print color	62
<ESC> "t" *n*	Set character set	48

Customer response

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