



## USERS MANUAL

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# NX-2480 RAINBOW COLOUR

## **Federal Communications Commission Radio Frequency Interference Statement**

The 120V version 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, which can be determined by turning 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 220V version equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

*The above statement applies only to printers marketed in Canada.*

### **Trademark acknowledgments**

**NX-2480 Rainbow/Colour, NX-2420 Rainbow/Colour, NX-2420, SF-10DW, SPC-8K:** Star Micronics Co. Ltd.

**LQ850, LQ860, LQ1050, LQ1060:** Seiko Epson Corporation

**IBM PC, IBM Proprinter X24E, IBM Proprinter XL24E, IBM Proprinter X24,**

**IBM Proprinter XL24:** International Business Machines Corporation.

**TrueType Macintosh:** Apple Computer Inc.

**PostScript:** Adobe Systems Incorporated.

**MS-DOS, Microsoft Windows, Windows 3.1:** Microsoft Corporation

**Grappler:** Orange Micro Inc.

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- The above notwithstanding, STAR can assume no responsibility for any errors in this manual.

## **Guide to this manual**

Even though the NX-2480 Rainbow/Colour is basically a very simple printer to use, it is also capable of many complex functions. We have grouped this manual into two main sections, divided into seven chapters and an appendix.

For normal everyday use, you may never need to refer to Section II at all. We strongly recommend however that you read through Section I (Chapters 1, 2 and 3) before connecting and using the printer for the first time.

<b>Section I</b>	<b>Chapter 1</b>	Features and parts
	<b>Chapter 2</b>	Unpacking and setting up the printer, including setting up your computer software
	<b>Chapter 3</b>	Using the printer, including loading paper, using the display and control panel, and printing
<b>Section II</b>	<b>Chapter 4</b>	Printer reference, containing more detailed information on all the printer's capabilities
	<b>Chapter 5</b>	Information on the optional automatic sheet feeder, and serial-to-parallel converter
	<b>Chapter 6</b>	Troubleshooting guide
	<b>Chapter 7</b>	Information on the software commands that the printer can accept from your computer (useful for programmers)
	<b>Appendix</b>	Further technical information.
	<b>Glossary</b>	Simple explanations of printer and computer jargon

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# Chapter 1

# Introduction

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Thank you for buying a STAR NX-2480 Rainbow/Colour printer. We are confident that it will provide you with years of reliable, high-quality printing. We think we have made the NX-2480 Rainbow/Colour one of the fastest, quietest, and easiest to use dot matrix printers ever. We hope you agree with us.

## **Features**

**Color:** You only need to add a color ribbon cartridge to print vibrant, full-color documents. You can choose from up to 256 colors, depending on your computer software.

**Fast:** The NX-2480 Rainbow/Colour speeds through drafts at 330 characters per second (15 pitch). When printing in its 360 dpi letter-quality mode (that's more dots per inch than some laser printers!), it turns out beautifully-finished work at up to 100 characters per second.

**Easy to use:** With clearly labeled buttons, an informative LCD screen, and easy paper loading, the NX-2480 Rainbow/Colour can be used by anyone, even without previous computer or printer experience.

With the NX-2480 Rainbow/Colour's Electronic DIP Switch feature, you can change the printer's default power-on settings from the front panel.

*LCD screen:* You can see your printer's settings at a glance by looking at the informative LCD screen. It shows what font you are using, how big it is (the font pitch) and other useful information (this feature does not apply when you use the printer with Windows 3.1 or later).

*Fonts:* The NX-2480 Rainbow/Colour is a multi-font printer, which means that it can print text in a variety of different type styles (fonts)—10 in all.

These include:

Draft	Roman
Sanserif	Courier
Prestige	Script
ORATOR	Orator-2
H-Gothic	SLQ Roman

You can print these fonts in different styles, such as emphasized, bold, shadow, and outline, as well as being able to change the size of the font.

*Graphics:* The advanced 24-pin print head can print up to 360 dots per inch (and in color too!) making it an ideal printer for graphics programs, and for programs running under Windows 3.1 and later.

*Zooming:* You can print documents at 50% or 67% of their actual size. As a result, you need only use a single sheet of paper to print large documents, such as spreadsheets.

*Paper types:* You can print on a wide variety of different paper types and sizes; from fanfold computer paper, to single sheets and stationery, to multi-part forms. Even when fanfold paper is loaded, the NX-2480 Rainbow/Colour allows

you to print on single sheets, saving you time and effort. A tear-off function allows you to tear off single printed fanfold paper sheets from the printer without wasting paper. You can feed fanfold paper from either the rear or the bottom of the printer.

An optional automatic sheet feeder is also available, which holds up to 50 sheets of paper.

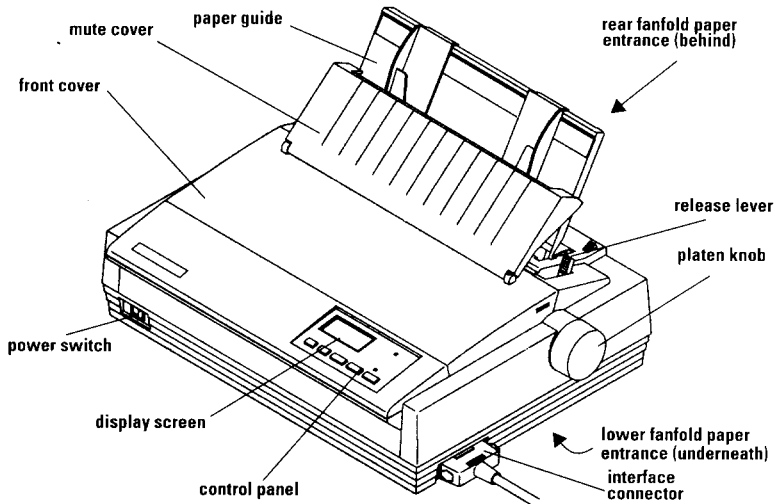
*Compatibility:* By emulating the industry-standard Epson and IBM printers, the NX-2480 Rainbow/Colour allows you to print just about anything your computer software can generate. The NEC graphics command set is also supported for even better graphics compatibility.

The Automatic Emulation Change feature means that the printer can automatically change to the appropriate printer emulation for the application software, depending on the data received.

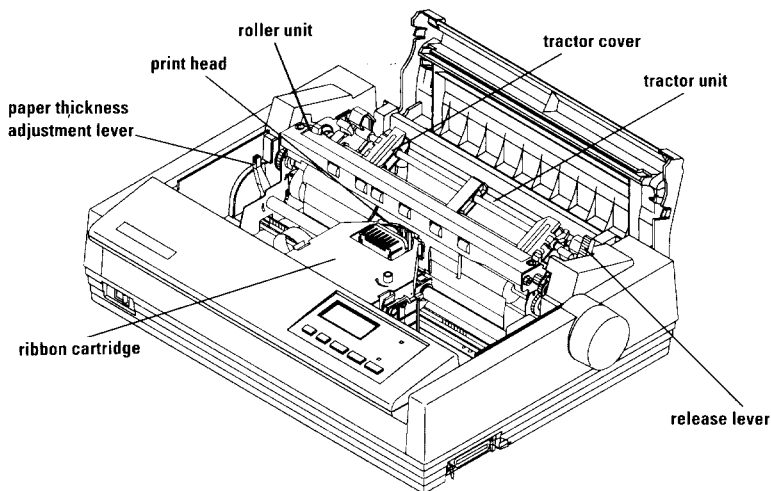
Special drivers and scalable fonts are included to allow you to produce high-quality printout from Windows 3.1 and later applications.

## Parts

This is what your new printer looks like. These diagrams may be useful in the next few sections to identify the different parts mentioned.



The printer (with interface cable connected)



The printer with the front and rear covers removed and no interface cable connected

## Parts – an explanation

The **paper guides** hold single sheets and sets their position so that they are fed into the printer correctly.

The **paper entrances** are where paper feeds into the printer. There is one for single sheets, and two for computer (fanfold) paper—rear and bottom.

The **release lever** grips single sheets as they are fed in. The lever should be pushed towards the back of the printer to hold single sheets properly, and released (pulled forward) when fanfold paper is in use.

The **platen knob** lets you feed paper through the printer manually. Usually, though, you will find that the **PAPER FEED** button (see “Feeding paper through the printer” on page 34) is the most efficient way of doing this.

The **front cover** protects internal components and reduces printing noise.

The **mute cover** further reduces printing noise.

The **display screen** shows information about the printer’s current setting.

The **control panel** has buttons to control the printer.

The **power switch** turns the printer on and off.

The **interface connector** accepts the cable connector that links the printer to the host computer.

The **print head** transfers the image to the paper.

The **ribbon cartridge** contains the ribbon which the head uses to mark the paper.

The **paper thickness adjustment lever** lets you adjust the position of the print head for different paper thicknesses and for multi-part forms.

The **roller unit** helps to grip paper and pull it through the printer.

The **tractor unit** grips the sides of fanfold computer paper. When you use the tractor unit, the **tractor covers** must be closed.

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## Chapter 2

# Unpacking and setting up

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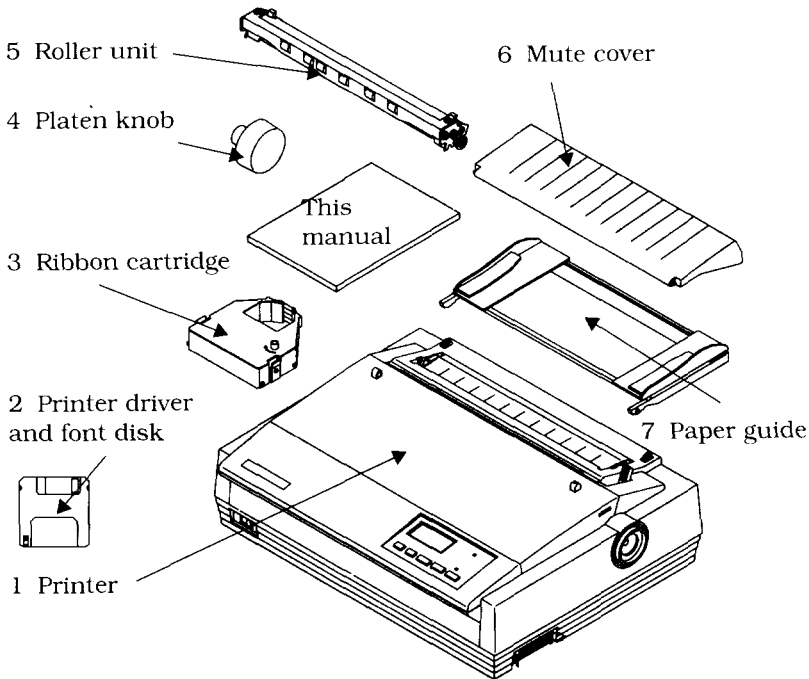
### ***Choosing a place for the printer***

Before you start unpacking and setting up your printer, make sure that you have a suitable place to put it. By a "suitable place", we mean:

- A firm, level surface where the printer will be stable, and vibration-free.
- Away from any heaters.
- Away from direct sunlight.
- Not in an excessively humid area.
- Somewhere that is clean, dry and dust-free. Basically, computer equipment works best in the same kind of temperature and humidity as you do.
- Allow 6" (15cm) of free space either side of the printer and adequate space for paper behind the printer, if you want to use fanfold (computer) paper.
- If you want to use the bottom feed for fanfold (computer) paper, you should locate the pile of paper at least one page length (about 12" (30cm)) below the printer.
- Make sure the printer is connected to a steady power supply. It should not be on the same electric circuit as appliances like copiers or refrigerators that cause power spikes and surges.
- Use a power supply of the correct voltage as specified on the printer's identification plate.

## Unpacking the printer

As you unpack the printer from the box, make sure that you have all the following items:



If any of these are missing, please contact your supplier. Optional accessories that you may have purchased are:

- Serial-Parallel converter (SPC-8K)
- Automatic sheet feeder (SF-10DW)

For details of how to install these optional accessories, see Chapter 5.

You will also need a cable to connect the printer to your computer (available separately). For IBM or IBM-compatible computers, this will generally be a parallel cable, with a 25-pin 'D' connector at one end and a 36-pin Amphenol-type (Centronics) connector at the other end (a "Centronics" printer cable). This cable should be no longer than about 6' (2m).



If your computer has no parallel port available, you will need to use the Serial-Parallel converter (SPC-8K) and a cable to connect your computer to the printer. See "The SPC-8K serial/parallel converter" on page 67 for full details.

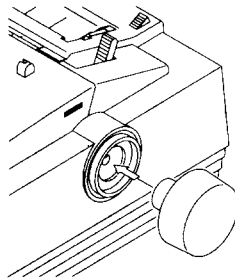
### **Setting up your printer**

Remove the printer and all supplied parts from the packing material. Put the printer on the place you have prepared for it. Save the packing material and carton in case you need to move the printer in the future.

### **Fitting the platen knob**

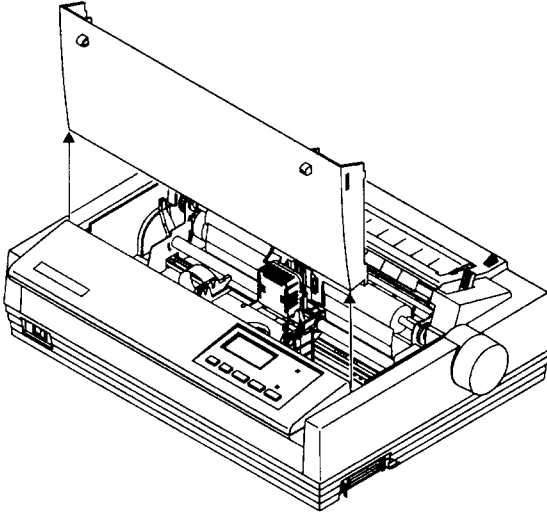
This knob is packed into a recess of the packaging material in the printer box.

To fit the knob, rotate the knob on the shaft (lining up the flattened side of the shaft with the flattened part of the hole on the knob). After you have lined up these flattened sides, push the knob firmly onto the shaft.



## Removing the front cover

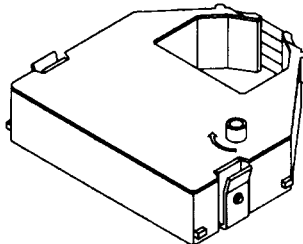
You will need to remove the front cover (the smoked plastic cover on the top of the printer) to install and change ribbon cartridges. Lift the cover from the rear using the grips on the sides, then lift up to remove the cover from the body of the printer.



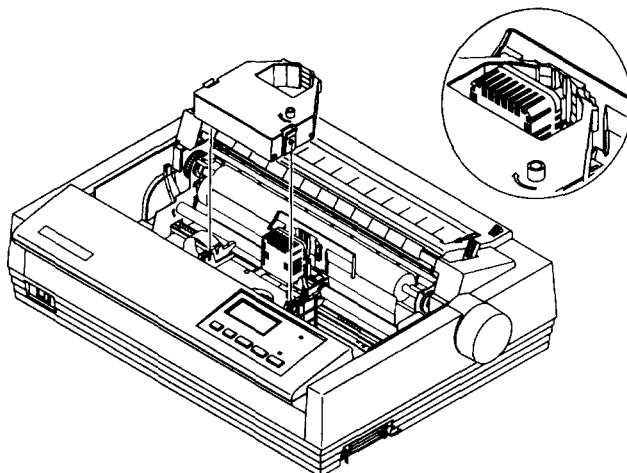
## Installing the ribbon cartridge

You have the choice of using a color or a black ribbon with the NX-2480 Rainbow/Colour. Both ribbons are installed and removed in the same way.

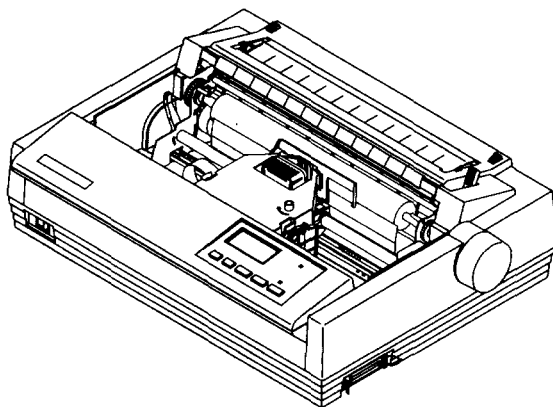
- Take the slack out of the ribbon by turning the knob on the ribbon cartridge clockwise (as shown by the arrow).



- Place the cartridge on the cartridge carrier inside the printer. Make sure that the ribbon is between the print head and the print head shield. Press the cartridge so that it “clicks” into place. If the cartridge does not “click” into position on both sides, you may need to turn the cartridge knob about 1/4 of a turn clockwise.



- Once the cartridge is in the carrier, tighten the ribbon again by turning the cartridge knob clockwise (about 1/2 a turn). Check once more to make sure that the ribbon is between the print head and print head shield (if it isn't, take the cartridge out, and try again).

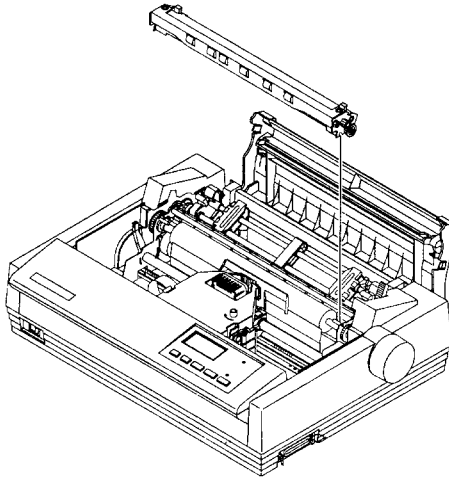


## Removing the ribbon cartridge

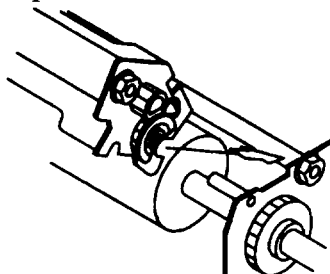
- To remove the ribbon cartridge, press the cartridge grips inward and lift the cartridge upward out of the printer.

## Installing the roller unit

- Open the rear cover by pushing the cover grips backward and upward.
- Pick up the roller unit so that the small illustration is on top of the roller unit, and the smoked plastic side (with six small black rollers) is facing you.



- Hold the roller unit so that the top is tilted slightly away from you. Slide the hooks on either side of the back of the roller unit over the platen (the large black roller) and under the silver bar behind and above the platen. The hooks should both be between the metal plates at either end of the silver bar.



- Push the front of the roller unit down firmly, so that the unit “clicks” into place. If it does not fit properly, remove it and try again.

### Removing the roller unit

- Pull both gray locking tabs towards you and lift the front of the roller unit slightly to remove the roller unit. Pull the roller unit out of the printer towards you.

### Replacing the front cover

Once you have fitted the ribbon and roller unit, you should replace the front cover.

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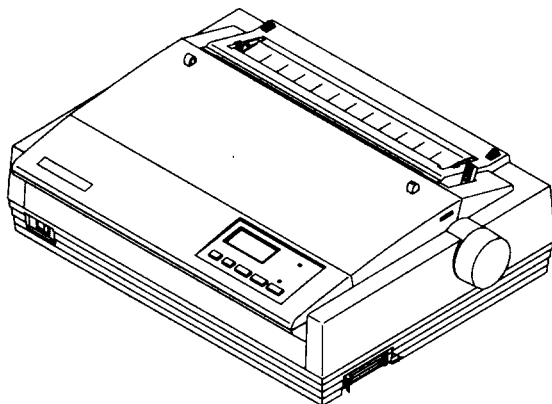
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**Note:** Even though you can operate the printer with the front cover removed, we do not suggest that you do this. The printer will be noisy and it is also possible to drop things into the printer, which may damage the mechanism.

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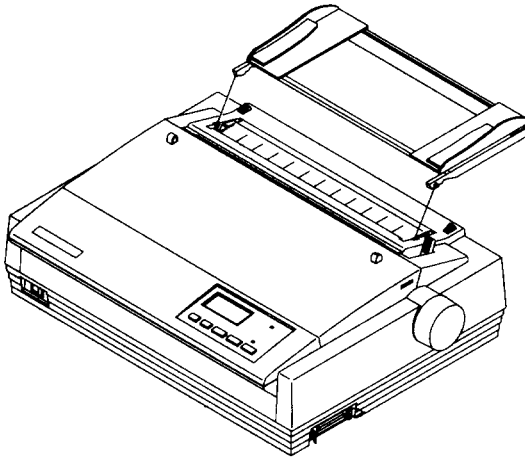
- Hold the cover by the grips, so that the grips are on the side of the cover furthest from you. Tilt the top of the cover towards you a little.
- Insert the tabs into the slots in the case.
- Lower the rear of the cover into position.



## Installing the paper guide

You can set the paper guide on the NX-2480 Rainbow/Colour in one of two positions: horizontal for fanfold paper and vertical for single sheets.

- Hold the paper guide, either horizontally, or vertically, depending on the type of paper used.
- Fit the tabs into the slots on the printer body to install the paper guide.

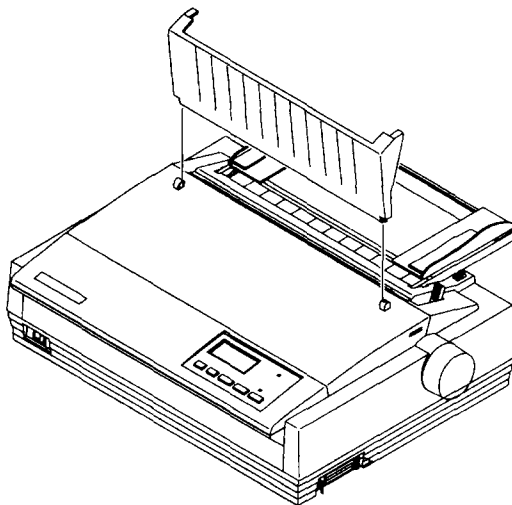


- Make sure the guide is firmly in position.

## Installing the mute cover

The mute cover helps reduce the noise from your printer when you are printing.

- Hold the mute cover upright so that the ridges on the cover are towards you and at the top.



- Slide the left tab on the mute cover into the left hole on the front cover.
- Drop the right tab on the mute cover into the right slot on the front cover. Close the mute cover by swinging it down.

### ***Connecting the printer to the computer***

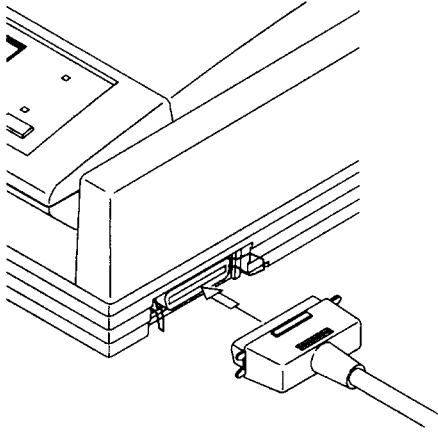
We assume here that you are connecting the printer to an IBM or IBM-compatible computer, using the parallel interface. If you are connecting using a serial interface, or connecting to any other type of computer, read Chapter 5.

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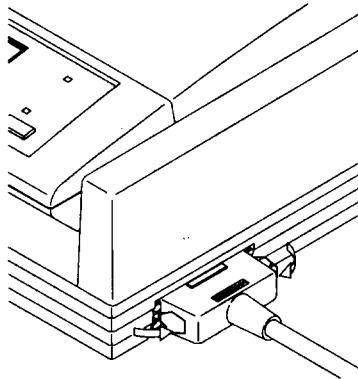
**Note:** Before connecting or disconnecting the printer and the computer, make sure that the power to both the printer and the computer is turned OFF. If the power is on when you make or break these connections, there is a risk that you will damage the circuitry of the computer and/or the printer. Repairs can be expensive!

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- Press the cable plug into the printer socket:



- Clip the cable into the socket using the wire clips on either side of the socket.



- Connect the 'D' connector on the other end of the cable to the parallel (printer) port on your computer. This will probably be labelled **Printer, Parallel, PRN, LPT1** or something similar. Refer to your computer's instruction manual for details of how to secure the cable.
- Now you can turn on your printer and computer.



## **Setting up your printer with your computer**

In this section, you will learn to set up your printer with two different computer environments: MS-DOS or Microsoft Windows 3.1 (or a later version of Windows). If your computer uses a different operating system, you should refer to Chapter 5 for details of setting up your printer. Refer to your computer operating system manuals for details of configuring the operating system.

### **Setting up with MS-DOS**

Every program that you use with MS-DOS must be “told” separately what printer is connected to your computer. This is usually done in an INSTALL or SETUP program or menu option within your application software (word-processor, spreadsheet, or whatever).

Look for an option called “Add printer”, “Install printer” or “Configure printer” in your application software. If you can’t find this option easily, read your software manual to find out how to do it.

### **MS-DOS**

MS-DOS needs no specific commands to make it work. To test that the printer is connected properly to the computer, try entering the following command from the C> prompt:

```
PRINT \AUTOEXEC.BAT 
```

If the computer answers with:

```
Name of list device [PRN]:
```

hit  again. The printer should then print the contents of the file AUTOEXEC.BAT. If the file AUTOEXEC.BAT does not exist, you will get an error message on your computer. Most MS-DOS computers do have a file called AUTOEXEC.BAT, however.

### **MS-DOS application software**

The NX-2480 Rainbow/Colour can emulate (pretend to be) a member of one of two printer families: Epson or

IBM. When you open the box containing your NX-2480 Rainbow/Colour, the printer is set to Epson emulation. This is commonly supported by most software. If your software package gives you a list of printers to choose from, choose one printer from the following list (in order of preference):

Star NX-2480 Rainbow/Colour
Star NX-2420 Rainbow/Colour
<b>Star NX-2420</b>
Epson LQ-860/1060
<b>Epson LQ-850/1050</b>

The shaded printers are not color printers, so if you select one, you will not be able to print in color.

If none of the printers above is listed, choose one of the following, in order of preference:

<b>IBM ProPrinter X24E/XL24E</b>
<b>IBM ProPrinter X24/XL24</b>

These two printers are not color printers, so if you select either, you will not be able to print in color.

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**Note:** The printers in shaded boxes do not support color. If you select them, all output will be in black only, regardless of the ribbon installed or the software settings.

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If you select either of these IBM Proprinter models, you may need to change your printer emulation. The Auto Emulation feature (page 56) of the NX-2480 Rainbow/Colour should take care of this for you. See "A1- Emulation" on page 56 on how to change the emulation if you have trouble with your printer.

If your software doesn't list printer names, but asks you questions about your printer, you should answer "Yes" to the following two questions:

- "Can your printer perform a backspace?"
- "Can your printer do a hardware form feed?"

The answers to any other questions are not so important. Answer these using the default settings in the software.

When you've set up your software, try a few test prints, using features like bold, italic, etc. to see how it works. If you find you have problems making your software work with your hardware, the best source of help is usually your software supplier.

### **Setting up the printer in Windows**

The NX-2480 Rainbow/Colour is ideally suited for use with computers running Microsoft Windows system software. It works best with Windows version 3.1 or later. If you are running an earlier version of Windows, we recommend you upgrade your computer to the latest version. In particular, this will allow you to use the 15 TrueType fonts included on the floppy disk packaged with this printer.

To use the printer with Windows, you need to install a file known as the printer driver file onto your computer. This file is supplied on the floppy disk packaged with the printer.

The following description assumes that you are using a mouse. (*Click* and *double-click* refer to the action of using the mouse to point at an item with the on-screen pointer, and then pressing the left mouse button either once, or twice in quick succession.)

If you are not using a mouse, you can still carry out the installation. Refer to the *Microsoft Windows User's Guide* to find out how to use the keyboard instead of a mouse to operate Windows.

To install the printer driver under Windows 3.1, do the following:

- Turn on the printer and start up your computer.
- If Windows does not start up automatically, type WIN and then press **ENTER** or **RETURN**.
- Double-click the *Control Panel* icon in the *Main* window.
- Double-click the *Printers* icon
- If you have never previously installed a printer on your system under Windows, a list of supported printers is displayed. (If you have already installed one or more printers, select the *Add* button to display the list of supported printers.)
- Click on *Install Unlisted or Updated Printer* in the list, so that this option is highlighted.
- Click *Install*. A window prompts you to put in the floppy disk supplied with the printer.
- Insert the disk with the printer driver file on it and click *OK*. A new list of printers appears. (If you have inserted the disk into a drive other than drive A, you must type in the drive letter followed by a colon and a backslash, e.g. "B:\ " before selecting *OK*.)
- Select **NX-2480 Rainbow/Colour** from the new list of printers.
- Click *OK*. The list of installed printers appears, including the NX-2480 Rainbow/Colour.
- Click on *Set As Default Printer*.
- Click on *Close* to return to the *Control Panel* window.

For instructions on how to configure the printer, see the section of the *Microsoft Windows User's Guide* called *Control Panel*.

If you cannot print from your applications programs after installing the driver, refer to the section "In Windows" on page 89.

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**Note:** Unless the user chooses a different printer from within the application, Windows applications always print to the currently selected default printer.

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### ***Installing TrueType fonts (for Windows)***

To install the TrueType fonts that are on the floppy disk accompanying this printer, follow the procedure below.

- Double click the *Control Panel* in Windows.
- Double click on *Fonts*. The *Fonts* dialog box appears.
- Click *Add*. The *Add Fonts* dialog box appears.
- Insert the disk in your computer's floppy disk drive.
- Select the drive by letter (this is usually "A:", sometimes "B:"). The names of the fonts stored on the disk are displayed in the *List of Fonts* window. Each font name is followed by the word "TrueType"
- Select the fonts you wish to install. If you want to install all of them, click *SelectAll*.
- Click *OK*. The *Fonts* dialog box reappears and installation is carried out. The names of the newly installed fonts are automatically added to the *Installed Fonts* list.
- Within your application program, select *Printer Setup* from the application's *File* menu, and reselect the printer. The application can now display text on-screen and print text on your printer using the new fonts.

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**Note:** The TrueType fonts that are supplied can only be used on IBM PC compatible computers running Windows 3.1 or higher.

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### **Selecting different fonts**

If you are running applications software under Windows, you will select fonts from within your application (refer to your application's manual for details).

Your application software manual will tell you the various ways in which you can type-set your text on-screen so that it is ready to print out on the printer.

Your Windows system already includes several fonts, such as Arial, Times New Roman and Symbol. You can also use the 15 TrueType fonts included with the printer. If you have installed Adobe Type Manager software on your computer, you can also display and print Adobe PostScript fonts.

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# Chapter 3      Using your printer

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## ***Loading paper***

The NX-2480 Rainbow/Colour can print on a variety of paper types, as explained below:

## ***Cut sheet paper***

The NX-2480 Rainbow/Colour can use single sheets of paper (cut sheets) or letterheaded stationery. Use the friction feed or the optional SF-10DW automatic sheet feeder.

## ***Fanfold paper***

It can also accept fanfold (continuous) computer stationery. Fanfold stationery has the sheets joined together, with perforations between sheets, and holes ("sprocket holes") along each edge to help the printer grip the paper. You should not print too close to the sprocket holes. Otherwise, you run the risk of jamming the paper in the printer.

## ***Multi-part forms***

You can print continuous multi-part forms which are either carbon backed or pressure-sensitive carbonless (NCR), with up to five copies (including the top copy). If you use multi-part forms, we suggest that you feed them through the bottom paper feed slot, as this will help to prevent premature separation of the forms. There should be a difference in thickness of not more than 0.05mm between the side edges.

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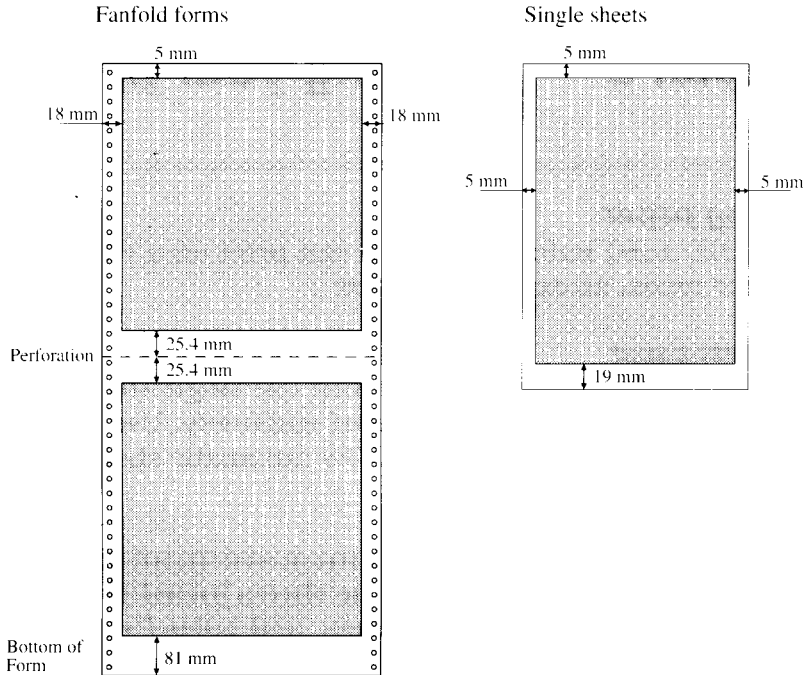
---

**Note:** If you use multi-part sets, set up the Multi-Part setting using the Electronic DIP switches as described in "B5 and B6 – Multi-part mode" on page 58.

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## Where you can print on each kind of paper



If you print outside these limits, you run the risk of damaging the printer mechanism (and tearing the paper or jamming it as it goes through the printer).

## Adjusting the print gap

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**Note:** Important. If you do not adjust the print gap properly, you run the risk of shortening the life of the print head.

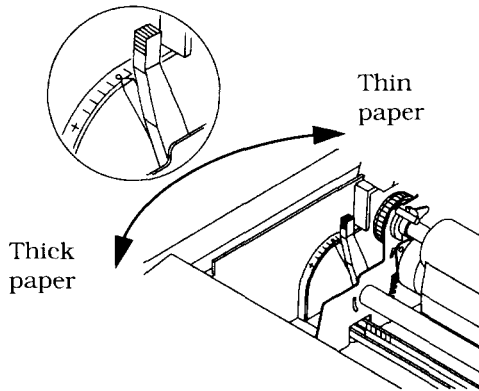
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Different paper thicknesses need a different gap between the print head and the paper. The NX-2480 Rainbow/Colour allows you to make six different settings, using the adjustment lever at the left of the printer. If you push this lever towards the back of the



printer, the gap is narrowed (thin paper), and if you pull it towards the front, the gap is widened (thick paper).



As you move the lever, you can feel it click between the six different positions. Position number 2 (starting from the rearmost position) is the one you will generally use for single sheets of paper (fanfold or cut sheet). Here is a table for the adjustment lever when you use multi-part sets.

Paper type	Weight of each sheet	Thickness (total in mm)	Recommended lever position (1 = rearmost)
Single	14 to 24 lbs (52 to 90 gsm)	0.07 to 0.12	2 or 3
2-part	11 to 14 lbs (40 to 52 gsm)	0.12 to 0.14	2 or 3
3-part	11 to 14 lbs (40 to 52 gsm)	0.18 to 0.21	3 or 4
4-part	11 to 14 lbs (40 to 52 gsm)	0.24 to 0.28	4 or 5
5-part	11 to 14 lbs (40 to 52 gsm)	0.30 to 0.35	5 or 6

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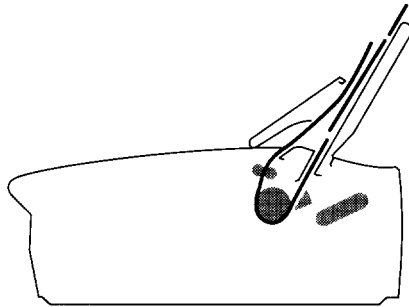
**Note:** If you use multi-part sets, set up the Multi-Part setting using the Electronic DIP switches as described in "B5 and B6 – Multi-part mode" on page 58.


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## Loading cut sheet paper

This procedure shows you how to load cut sheet paper using the paper guide. If you are using the SF-10DW automatic sheet feeder, please refer to "Using the SF-10DW" on page 65.

- This is how cut sheet paper is fed through the printer:



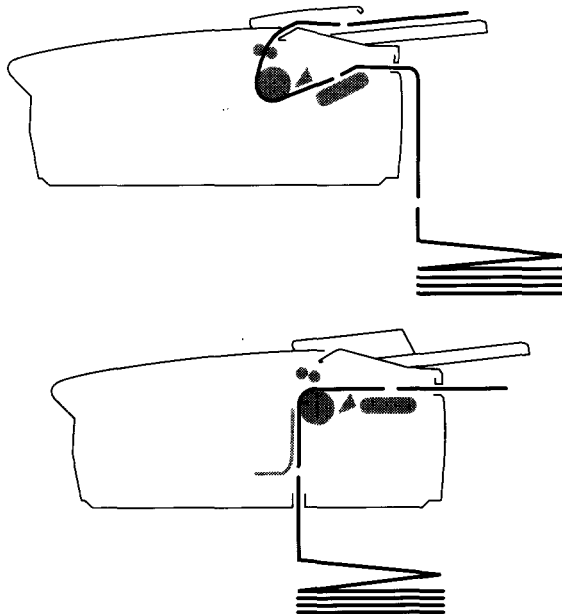
- Make sure that the paper guide is in the vertical position. See "Installing the paper guide" on page 14.
- If no fanfold paper has been loaded, and no cut sheet paper has been loaded, the display will show "PE" alternating with the character pitch when the printer is turned on. The printer will also beep.
- Make sure that the release lever is at the back position (  ).
- Adjust the left and right paper guides to the position you want. Allow the paper to feed through the guides smoothly, but without allowing it to move from side to side while feeding through. A gap of less than a millimeter (0.04") is ideal.
- Place a sheet of paper in the guides (upside down, and printing side towards the rear of the printer), and gently push it down between the guides until you feel it stop.

- Press the **SET/EJECT** button. This should make the printer feed the paper round the platen until it is in a position suitable for printing. The ON LINE indicator should come on. If this does not happen, you have probably not loaded the paper correctly. Take the sheet out and try loading it again.
- If the paper is at the wrong place to start printing (for instance, if the address printed on the top of your letterhead takes up a lot of space), put the printer **not-ready** mode (press the **ON LINE** button) and use the micro-feed function, as described in Chapter 4.
- You can now start printing.

### **Loading and parking fanfold paper**


You can use fanfold paper up to 25cm (10") wide with this printer. You can feed this paper from the bottom or the rear of the printer.

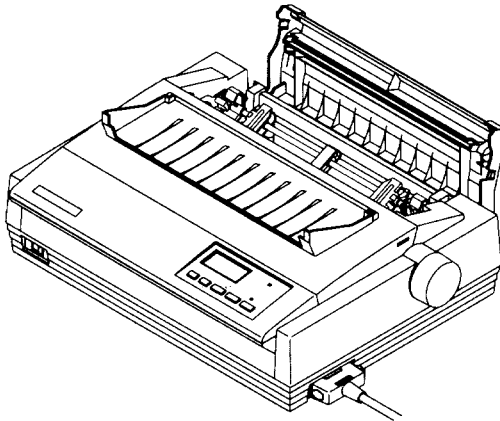
These are the ways in which fanfold paper is fed through the printer:



### **Loading paper from the rear of the printer**

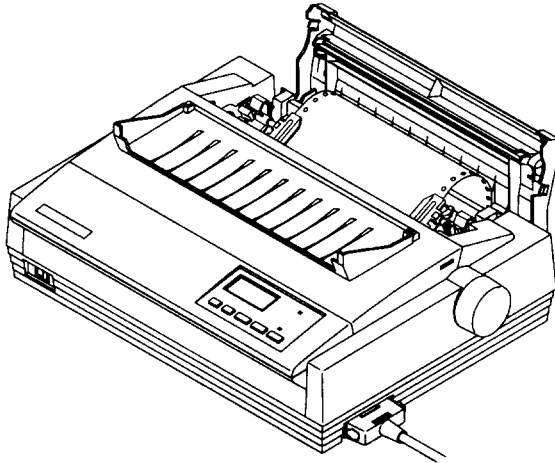
Always load fanfold paper with the printer's power turned OFF.

- Place the stack of fanfold paper behind and below the printer.
- Pull the release lever at the right of the printer towards you (  ). This releases the paper from the platen and allows it to feed through the tractor rollers.
- Open the mute cover and the rear cover
- Grip the gray tractor position locking levers on both sides of the tractor unit and rotate the tractor unit as far as it will go (about 20 degrees) so that the top is tilted slightly towards you:



- Open the tractor pin covers and align the holes in the fanfold paper with the pins on the tractor unit. You will probably need to slide the tractor pin units left and right to align the paper properly. Use the gray locking levers on each tractor pin unit to allow the unit to slide left and right along the rail. Remember to

lock each tractor pin unit in place again when you have finished moving it.



- Close the pin unit covers after you have made sure that the paper holes are properly lined up with the tractor pins. If the holes and pins are not correctly lined up, you may find that the paper tears and jams.

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**Note:** If the paper is too tightly stretched or too loose between the pin holders, the paper will tear or jam as it is fed through the printer. You may need to experiment to find the ideal tension.

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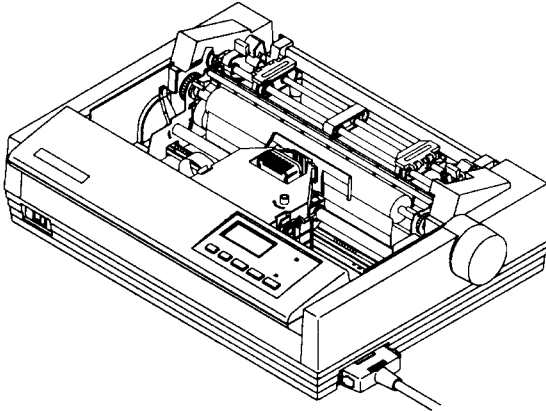
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- Close the rear and mute covers, and insert the paper guide in the horizontal position. See “Installing the paper guide” on page 14.
- When you turn on the printer (using the switch at the front), the display will show “PE” alternating with the character pitch. The printer will also beep.
- Press the **SET/EJECT** button to load the paper into the printer. The printer will go into **ready** mode.
- If you want to adjust the paper position, put the printer into **not-ready** mode (use the **ON LINE** button) and use the micro-feed function (described in Chapter 4).

### ***Loading paper from the bottom of the printer***

Always load fanfold paper into the printer with the printer's power turned OFF.

- Remove the front cover and the roller unit. See "Removing the front cover" on page 10 and "Removing the roller unit" on page 13 for details.
- Grip the gray tractor position locking levers on both sides of the tractor unit. Rotate the front of the tractor unit upward so that the top is horizontal.



- With a stack of fanfold paper below the printer, feed the top sheet of the stack through the feed slot at the bottom of the printer and pass it over the platen.
- Open the tractor pin covers and align the holes in the fanfold paper with the pins on the tractor unit. You will probably need to slide the tractor pin units left and right to align the paper properly. Use the gray locking levers on each tractor pin unit to allow the unit to slide left and right along the rail. Remember to lock each tractor pin unit in place again when you have finished moving it.
- Close the pin unit covers after you have made sure that the paper holes are properly lined up with the

tractor pins. If the holes and pins are not correctly lined up, you may find that the paper tears and jams.

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---

**Note:** If the paper is too tightly stretched or too loose between the pin holders, the paper will tear or jam as it is fed through the printer. You may need to experiment to find the ideal tension.

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- Replace the roller unit (see “Installing the roller unit” on page 12).
- Replace all the covers that you have removed.
- Turn on the printer.
- Put the printer into **not-ready** mode (use the **ON LINE** button) and use the **PAPER FEED** button to advance the paper so that the print head is just below a perforation. Put the printer into **ready** mode again.

### **Parking paper**

Paper parking allows you to print single cut sheets even when fanfold paper is loaded. The fanfold paper is temporarily “parked” out of the way while the cut sheet is fed through the printer.


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**Note:** You can only use the paper parking function when fanfold paper is loaded from the rear. You cannot use it when you are feeding fanfold paper from the bottom slot.

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- The power should be ON. The release lever should be pulled forward (  ) and the fanfold paper loaded.
- Put the printer into **not-ready** mode (use the **ON LINE** button).
- Tear off the last page of the fanfold paper. If the paper is not in a suitable position to be torn off, use the **PAPER FEED** button to feed the paper forwards to a suitable position.

- Press the **SET/EJECT** button. The printer will feed the fanfold paper back until it is out of the way.
- Move the release lever to the back (  ) position.
- Place the paper guide in the upright position.

Load single sheets as described in “Loading cut sheet paper” on page 26.

### ***Unparking the paper***

When you have finished printing on cut sheet paper and you want to start printing again on fanfold paper, here's how you do it:

- Remove any cut sheets which may still be in the printer.
- Place the paper guide in the horizontal position.
- Move the release lever to the front (  ) position. The printer will beep if you move the lever while paper is still loaded ready for printing.
- Press the **SET/EJECT** button. The parked fanfold paper will be fed into the correct position ready for printing again.



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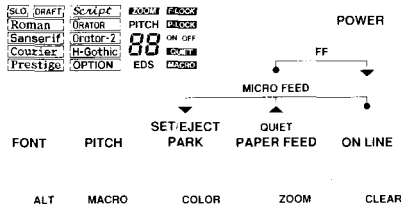
# Chapter 4

# Using the control panel

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The NX-2480 Rainbow/Colour control panel has five buttons, which have white labels above them to indicate their primary functions. Other functions are available as alternative functions (labelled in brown) or by pressing combinations of buttons (labelled in yellow).



There are two indicators: the POWER indicator shows that power is supplied to the printer. When steadily lit, it means that paper is correctly positioned for printing. When flashing, it means that paper is not correctly positioned for printing.

## Ready and not-ready modes

When the ON LINE indicator is lit, it means that the printer is ready to accept data to be printed from the computer. If it is not lit, the printer is in **not-ready** mode, and it will not be able to accept data from the computer. You can usually only make changes to the printer's settings using the front panel when this indicator is not lit. You set the printer **ready** and **not-ready** with the **ON LINE** button.

## Pausing printing

You can make the printer **not-ready** if you want to pause in the middle of a printing job. Printing will

restart from the point where it left off when you make the printer **ready** again.

## Feeding paper through the printer

There are a number of ways in which you can feed paper through the printer.

### *One line or several lines at a time*

Make the printer **not-ready** by pressing the **ON LINE** button, and press the **PAPER FEED** button. This will feed the paper forward one line. If you continue to hold down the **PAPER FEED** button, the printer will continue to feed the paper one line at a time.

Make the printer **ready** again to continue printing.

### *A page at a time*

This will either eject a cut sheet or feed fanfold paper to the top of the next sheet. To determine where the top of a sheet should be, see "Setting the top of a form" on page 35.

- If you want to feed a page of paper through the printer, make the printer **not-ready**. Press and hold down the **PAPER FEED** button.
- While holding down the **PAPER FEED** button, press the **ON LINE** button.
- Release both buttons at the same time. The paper will feed through.

### *Individual form tear-off*

You can tear off individual sheets (for instance, sales invoices) from fanfold paper.

- While the printer is in **ready** mode, press and hold down the **ON LINE** button.
- Press the **PAPER FEED** button. The paper will move forward about 2 inches (50mm), so that you can tear off the sheet.

- When you press the **ON LINE** button again, the paper will move back to its original position.

### **Loading paper**

For the most part, paper loading is described in Chapter 3. However, one important point to note is that if paper has not been loaded, the printer will indicate that it is **not-ready**. Pressing the **SET/EJECT** button will start loading paper, and automatically enter the **ready** mode.

### **Micro-feeding paper (backwards and forwards)**

It is often useful to be able to feed the paper backwards or forwards in the printer by very small amounts. For example, to get the correct printing position on pre-printed stationery.

- Put the printer in **not-ready** mode.
- Press and hold down the **ON LINE** button.
- While holding down the **ON LINE** button, press the **PAPER FEED** button to advance the paper in a series of small steps.
- While holding down the **ON LINE** button, press the **SET/EJECT** button to move the paper backwards in a series of small steps.
- Release both buttons (the **ON LINE** and the **PAPER FEED** or **SET/EJECT** buttons) when the paper reaches the place you want.
- Put the printer back into **ready** mode.

### **Setting the top of a form**

Very often, when feeding fanfold paper through a page at a time (see “A page at a time” on page 34), the printer’s top of a page does not correspond with the actual top of a page. This is how you “tell” the printer about the top of a page:

- Put the printer in **not-ready** mode.

- Set the paper position to the top of a page (where you want the printing to start on each page) using the micro-feed functions (page 35).
- Press and hold down the **ON LINE** button.
- While holding down the **ON LINE** button, press the **PITCH** button.
- Release both buttons. The display will show "--", which means that the top of the form has been set.
- Put the printer back into **ready** mode.

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**Note:** The printer now "knows" the top of a page, but it doesn't know the exact page unless you tell it, which means that when you do a page feed, the printer will not necessarily move to the correct position on the next page. You must set the page length using the Electronic DIP Switch mode described on page 53.

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## Changing the autoloading position

When you load cut sheet paper, the printer automatically loads the paper so that printing starts one line from the top of the paper, unless you tell it otherwise. This is how you tell it otherwise (for example, if you're printing a lot of letters on letterhead paper):

- With the printer in **not-ready** mode, load cut sheet paper using the **SET/EJECT** button.
- Use the micro-feed functions (page 35) to alter the print position. Notice that a number will appear in the LCD window. This means you can remember that, for instance, "we should print starting from 67 steps down on headed invoices". If the value goes over 99 steps, the display changes from "99" to "--".
- Set the printer back in **ready** mode.
- All cut sheet paper loaded from now on will be loaded so that printing starts at this position, until you

change the position again using this procedure, or until the power to the printer is turned off.

- If you want to save this value for future use (after the printer has been turned off and on again), you must save it as a macro. See “Saving Macros” on page 42.

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**Note:** This function will only work if you use it immediately after you have loaded paper as described above. If paper has already been fed into the printer, this function will not work.

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### Eject and park

If paper has already been loaded, and the printer is **not-ready**, the **SET/EJECT** button has two different functions, depending on the setting of the release lever.

- If the release lever is set to the back position for cut sheet paper (  ), pressing the **SET/EJECT** button will eject the sheet.
- If the release lever is set to the forward position for fanfold paper (  ), pressing the **SET/EJECT** button will park the fanfold paper to allow you to print on cut sheets. See “Parking paper” on page 31.

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**Note:** If you are feeding fanfold paper through the bottom slot of the printer, this button will have no effect.

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### Quiet printing

Even though the NX-2480 Rainbow/Colour is a quiet printer, it also has a “quiet” mode, which allows it to print at a reduced noise level. Setting the quiet mode requires that the printer is in **ready** mode. This is an exception to the general rule that settings are made when the printer is in **not-ready** mode.

- Press the **PAPER FEED** button. The printer will beep once and **QUIET** will appear on the display.
- To cancel quiet mode, the printer must be in the **ready** mode. Press the **PAPER FEED** button. The printer will beep twice and **QUIET** will disappear from the display.

## Changing the way your printout looks

The following section describes how you can change the look of the printout from your printer.

### Selecting the different fonts

The NX-2480 Rainbow/Colour has a range of different fonts, which can be selected using the front panel controls. The display highlights the currently-selected font by enclosing the font name with lines:

The Prestige font  
has been selected

SLO DRAFT	<i>Script</i>	
Roman	ORATOR	PITCH
Sanserif	Orator-2	<b>10</b>
Courier	H-Gothic	
<b>Prestige</b>	OPTION	

- Set the printer to **not-ready**.
- Press the **FONT** button. The printer will highlight the font names in the display in the following order:

Font name	Display highlights
Draft	<b>DRAFT</b>
Roman	<b>Roman</b>
Sans-serif	<b>Sanserif</b>
Courier	<b>Courier</b>
Prestige	<b>Prestige</b>
Script	<b><i>Script</i></b>
Orator	<b>ORATOR</b>
Orator-2	<b>Orator-2</b>

Font name	Display highlights
H-Gothic	H-Gothic
Super Letter Quality Roman	SLQ + Roman

- When you have highlighted the font you want to use, press **ON LINE** again to make the printer in **ready** mode again.

### **Changing the pitch of the font**

The font “pitch” means “how many characters can be printed in one inch”. 10-pitch, for instance, means “10 characters can be printed in one inch across the page.” There are two special modes on the NX-2480 Rainbow/Colour: Proportional and Condensed proportional. In these modes, you cannot say exactly how many characters will fit into one inch, because each character takes up a different amount of space. The opposite of “proportional” is “fixed-pitch” or “monospaced”. Look at these two examples:

Proportional	Fixed-pitch
MMMMMMMMMMMM IIIIIIIIII	MMMMMMMMMMMM IIIIIIIIII

Even though there are 10 characters in each line, the “M”s in the proportional column take up more space overall than the “I”s. The space between letters is proportional to the letter itself.

However, in the fixed-pitch column, although each “M” also takes up more space than each “I”, the space between letters is fixed, no matter what the letter, so that a row of 10 “I”s takes up the same amount of space as 10 “M”s.

Usually, it is easier to read proportional text than text which is fixed-pitch. However, if you are trying to line up columns of figures, fixed-pitch has definite advantages.

To change the pitch:

- Put the printer into the **not-ready** mode.
- When you press the **PITCH** button, the pitch will change in the following way:

Pitch	Display
Pica (10 cpi)	<i>10</i>
Elite (12 cpi)	<i>12</i>
Semi-condensed (15 cpi)	<i>15</i>
Condensed pica (17 cpi)	<i>17</i>
Condensed elite (20 cpi)	<i>20</i>
Super-condensed (24 cpi)*	<i>24</i>
Proportional	<i>PS</i>
Condensed proportional	<i>PE</i>

\*. Only available in IBM emulation mode

- Make the printer **ready** again.

### **Changing the zoom size**

The zoom feature allows you to print at 100% (full-size), 67% (two-thirds size) or 50% (half-size) of the normal size. The “normal size” is the size that the computer “thinks” the printout will be.



This is a useful way of printing, for example, wide spreadsheet results on a narrow piece of paper. To change the zoom level:

- Put the printer into **not-ready** mode.
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, press the **PAPER FEED** button.
- Each time you press the **PAPER FEED** button, the display will change:

Zoom size	Display
50%	<b>ZOOM 50</b> ON
67%	<b>ZOOM 67</b> ON
100%	<b>ZOOM 00</b> OFF

- When you've selected the zoom scale you want, make the printer **ready** again.

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**Note:** Changing the zoom size will reset the printer.

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### **Selecting the print color**

The NX-2480 Rainbow/Colour will always print in black, unless you tell it otherwise, even if the multi-color ribbon is installed. Here's how you set the print color from the front panel:

- Put the printer into **not-ready** mode.
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, press the **SET/EJECT** button.

- With each press of the **SET/EJECT** button, the print color will change:

Color	Display
Black	c1
Magenta	c2
Cyan	c3
Violet	c4
Yellow	c5
Orange	c6
Green	c7

- When you make the printer **ready** again, printing will restart in the color you have just chosen.

### Controlling the printer's memory

The following two functions allow you to change the memory in the printer.

#### **Saving Macros**

It is obviously a nuisance to have to set up a particular font, color, etc. every time you turn on the printer. If you want the printer to remember and recall these settings every time you turn it on, you can use a "macro" to store them.

This what you store when you make a macro:

- Current font. See "Selecting the different fonts" on page 38.
- Current pitch. See "Changing the pitch of the font" on page 39.
- Current zoom size. See "Changing the zoom size" on page 40.

- Current color. See “Selecting the print color” on page 41.
- The current auto-load position for cut sheets, fanfold paper and use with the automatic sheet feeder. See “Changing the autoloading position” on page 36. Also see the section on the automatic sheet feeder on page 63.

This is how you store a macro:

- Put the printer in **not-ready** mode.
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, press the **PITCH** button, and hold them both down until “**MACRO**” appears on the display. The printer will beep twice.
- Release both buttons after the “**MACRO**” message appears.
- Make the printer **ready** again.

### **Removing the macro**

If the “**MACRO**” message is shown on the display and you want to remove it, do the following:

- Put the printer in **not-ready** mode.
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, press the **PITCH** button, and hold them both down until “**MACRO**” disappears from the display. The printer will beep three times.
- Release both buttons after the “**MACRO**” message goes away.
- Make the printer **ready** again.

### **Clearing the buffer**

When the printer takes data from the computer, it stores the data in a buffer before it prints it. This means that it

can accept data from the computer faster than it can print it. This allows the computer to finish sending data before the print job is finished, freeing up the computer for the next job.

This is usually useful, but there may be times when you want to stop the print job halfway through (e.g. you're printing the wrong file, or printing on the wrong kind of paper). In this case, halting the print job on the computer may not be enough – the printer may still continue to print the data stored in its buffer.

You can clear the buffer by switching the printer off and on again, but that's a bit drastic. Here's a better way:

- Put the printer in **not-ready** mode.
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, press, and hold down the **ON LINE** button. Continue holding both buttons down for about one second, until the printer beeps.
- The display will show "bc" (buffer cleared). Release both buttons. If you hold them down for a little longer, the printer will beep three times and will be reset to default settings (not necessarily what you want!).
- If you need to make any control setting changes (maybe you were printing in the wrong font or the wrong color), make them now.
- If you haven't already stopped the computer print job, stop it now. Otherwise you'll continue the print job where it was interrupted, not from the beginning.
- Now make the printer **ready** again.

### **Setting the printer back to default settings**

As mentioned above ("Clearing the buffer" on page 43), if you clear the buffer and continue to hold down the **FONT** and **ON LINE** buttons together for about three sec-

onds after you clear the buffer, the printer will beep three times. The printer's default settings will be restored.

## **Locking the printer**

It's sometimes useful to be able to lock settings using the front panel. If your computer sends unwanted commands, they won't accidentally change settings. Here's how.

### **Font lock**

This stops you from accidentally changing the font with software commands.

- Turn the printer OFF (front switch).
- Press and hold down the **FONT** button.
- While holding down the **FONT** button, turn the printer on again.
- Keep holding down the **FONT** button until the printer beeps, and the display shows **F-LOCK**.

You can make the printer **not-ready** and change fonts using the **FONT** button ("Selecting the different fonts" on page 38), but any software commands from your computer that try to change the font will be ignored by the printer.

### **Font unlock**

Reset the printer. See "Setting the printer back to default settings" on page 44. This will also reset the pitch lock (see below).

### **Pitch lock**

This stops you from accidentally changing the pitch with software commands.

- Turn the printer OFF (front switch).
- Press and hold down the **PITCH** button.

- While holding down the **PITCH** button, turn the printer on again.
- Keep holding down the **PITCH** button until the printer beeps, and the display shows **P-LOCK**.

You can put the printer in **not-ready** mode and change the pitch using the **PITCH** button (“Changing the pitch of the font” on page 39). Any software commands from your computer that try to change the pitch will be ignored by the printer.

### **Pitch unlock**

Reset the printer. See “Setting the printer back to default settings” on page 44. This will also reset the font lock (see above).

### **Pitch and font lock**

This stops you from accidentally changing the font and/or the pitch with software commands.

- Turn the printer OFF (front switch).
- Press and hold down the **FONT** button and the **PITCH** button.
- While holding down the **FONT** button and the **PITCH** button, turn the printer on again.
- Keep holding down the **FONT** and **PITCH** buttons until the printer beeps, and the display shows both **F-LOCK** and **P-LOCK**.

You can put the printer in **not-ready** mode and change fonts and pitch using the **FONT** button and the **PITCH** button (“Selecting the different fonts” on page 38). Any software commands from your computer that try to change the pitch or font will be ignored by the printer.

### **Pitch and font unlock**

Reset the printer. See “Setting the printer back to default settings” on page 44. This will reset the pitch lock and the font lock.



- Make sure the printer is loaded with fanfold paper, and that it is turned OFF.
- Press and hold down the **PAPER FEED** button.
- While holding down the **PAPER FEED** button, turn on the printer.
- Release the **PAPER FEED** button. The test pattern will start printing. The display will show "P2". When the pattern comes to the end, it will start from the beginning again.
- To stop the test pattern, turn off the printer, wait a few seconds, and then turn it on again.

### **Print area test mode**

This function allows you to see how long the printer "thinks" the paper is. This works best with cut sheet paper.

- Make sure that there is paper in the printer and turn the printer OFF.
- Press and hold down the **SET/EJECT** button.
- While holding down the button, turn the printer on again.
- The display will show "P3", and will print

\*\*\* This is first line\*\*\*

at the top of the paper.

- If you are using cut sheet paper, the paper will feed to the bottom of the paper (or where the printer "thinks" is the bottom of the paper) and print (for example):

\*\*\* This is line 068. \*\*\*

- This number of lines is based on the figure of 6 lines to the inch. In this case:

$$\text{length of paper} = \frac{\text{number of lines}}{6} = \frac{68}{6} = 11.333$$



- We can guess from this that the paper is probably international A4 size.
- If you use this feature with fanfold paper, only the top message will be printed.
- The printer is ready to start printing normally after it has printed the bottom message.

### Hexadecimal dump mode

This feature is most useful for programmers and support staff who need to check that the printer is really receiving the expected data. In this mode, the printer does not act on so-called “control codes”; codes which cause the printer to perform an action such as feeding paper. Characters are printed in the following way:

A space is printed with its hexadecimal value (20).

49 66 20 79 6F 75 20 61	72 65 20 77 72 69 74 69	If you are writing your own program to send output to the printer, it is sometimes useful to print out the raw data that the printer is receiving. When you perform a hexadecimal dump, all codes (character codes and control codes) are printed out in hexade
6E 67 20 79 6F 75 72 20	6F 77 6E 20 70 72 6F 67	
72 61 6D 73 20 74 6F 20	73 65 6E 64 20 6F 75 74	
70 75 74 20 74 6F 20 74	68 65 20 70 72 69 6E 74	
65 72 2C 20 69 74 20 69	73 20 73 6F 6D 65 74 69	
6D 65 73 20 75 73 65 66	75 6C 20 74 6F 20 70 72	
69 6E 74 20 6F 75 74 20	74 68 65 20 72 61 77 20	
64 61 74 61 20 74 68 61	74 20 74 68 65 20 70 72	
69 6E 74 65 72 20 69 73	20 72 65 63 65 69 76 69	
6E 67 2E 0A 57 68 65 6E	20 79 6F 75 20 70 65 72	
66 6F 72 6D 20 61 20 68	65 78 61 64 65 63 69 6D	
61 6C 20 64 75 6D 70 2C	20 61 6C 6C 20 63 6F 64	
65 73 20 28 63 68 61 72	61 63 74 65 72 20 63 6F	
64 65 73 20 61 6E 64 20	63 6F 6E 74 72 6F 6C 20	
63 6F 64 65 73 29 20 61	72 65 20 70 72 69 6E 74	
65 64 20 6F 75 74 20 69	6E 20 68 65 78 61 64 65	

Non-printable (control) characters are shown as periods, and printed with their hexadecimal values.

Printable characters are printed with their hexadecimal values on the left, and the characters on the right. This kind of format is familiar to anyone who has used the MS-DOS DEBUG command.

To enter the hexadecimal dump mode, make sure paper is loaded into the printer.

- Turn the printer OFF.
- Press and hold down the **PAPER FEED** and the **SET/EJECT** buttons.
- While holding down the **PAPER FEED** and the **SET/EJECT** buttons, turn on the printer.
- Release the buttons. The display will show “Hd” (hexadecimal dump), and the printer will continue to print in hexadecimal dump mode until you turn it off and on again in the usual way.

## Adjusting the dot alignment

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**Note:** You may never need to use this function. Use it only if graphics printouts appear strange (as in the illustrations below).

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After you have owned and been using your printer for some time, you may find that when you print graphics, the printed dots are slightly out of line with each other. For instance, what you intend to look like this:



may come out like this:



or like this:



This is due to the mechanical parts of the printer working slightly out of alignment. It happens very rarely – you may never see this symptom. However, if it does occur, it is nothing to worry about, and you can cure it in the following way:

- Load a sheet of paper (or load fanfold paper) into the printer, and turn the printer OFF.



- The display will now show “-2”. The bars are more aligned now. Keep using the **PAPER FEED** button and **SET/EJECT** button until the two rows are aligned.

You have now aligned the printer in Letter Quality (LQ) mode. By pressing the **ON LINE** button, you can now correct the dot alignment of the draft mode.

There are six modes where the dot alignment may need to be corrected: LQ, DRAFT A, DRAFT B, DRAFT COND (condensed), GRAPHICS A and GRAPHICS B. Cycle around these modes by pressing **ON LINE** (“cycling” here means that if you are in the last mode; GRAPHICS B, and you press **ON LINE**, the printer will go back to LQ). The different modes may have different alignments because of the way that the printer’s electronics drive the moving parts.

- When you have adjusted all the dot alignments, exit from the mode by pressing **PITCH**. The printer will print “\*\*\* END \*\*\*” and go into **ready** mode.
- Eject the paper and continue with normal printing.

## **Electronic DIP switches**

Conventional printers have a set of small 2-way switches (Dual In-line Package, hence “DIP”) which you use to set up various features of the printer which you want to use every time you turn on the printer. The list of settings that you can change is given on page 55.

Although the NX-2480 Rainbow/Colour has a Macro function to allow you to set up some of these “power-on default settings”, (see “Saving Macros” on page 42). However, when it comes to DIP switches, it is not a conventional printer – it makes your life much easier.

Instead of poking around with small switches and a screwdriver, all “switch” settings are made from the front panel – hence “Electronic DIP switches”. Here’s how they work:

## Using the Electronic DIP switches

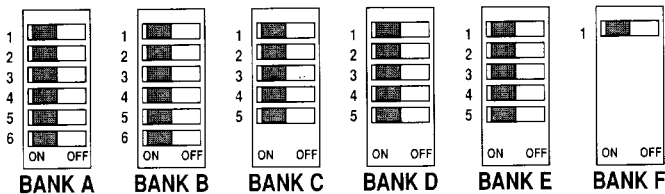
- To use the Electronic DIP Switch mode, turn the printer OFF.
- Press and hold down the **SET/EJECT**, the **PAPER FEED** and the **ON LINE** buttons.
- Turn the printer on while holding down these buttons. Wait a few seconds and release them.
- The display will show:

**A1** ON  
EDS

- This means that we are in Electronic DIP Switch mode, that switch number 1 of bank A (switch "A1") has been selected, and it is now ON.

## Banks and numbers

Conventional DIP switches are arranged in banks. Each bank contains a number of different switches. If the NX-2480 Rainbow/Colour had conventional DIP switches, this is how they would look:



As it is, the NX-2480 Rainbow/Colour switches are represented on the front panel.

## Selecting the switch bank

To select a switch bank in Electronic DIP Switch mode, press the **FONT** button. With each press of the **FONT** button, the display will change from "A" to "B", through "F", and back to "A" again. If you have selected a switch number other than "1", the number will be changed to "1" when you go to the next bank.

### **Selecting the switch number**

To select a switch number, press the **PITCH** button. With each press of the **PITCH** button, the display will change from "1", round the number of switches in the currently-selected bank (only one switch in bank F).

### **Changing a switch's value**

When you have chosen the bank and switch you want to change, press the **SET/EJECT** button to toggle the switch's value from ON to OFF or OFF to ON (as the display shows you).

### **An example**

Suppose you have just turned on the printer in Electronic DIP Switch mode and you want to change switch 5 in bank C from "ON" to "OFF". Here's how you do it:

- Press the **FONT** button twice. You are now in bank C.
- Press the **PITCH** button four times. You have now selected switch 5 of bank C.
- Press the **SET/EJECT** button once. The display should show:

**C5** OFF  
EDS

And that's it!

### **Exiting Electronic DIP Switch mode**

Press the **ON LINE** button to save the "switch" settings and exit the Electronic DIP Switch mode. The printer will now operate in the mode you have just set up with the Electronic DIP Switch mode.

## What you can change with the Electronic DIP Switch mode

BANK	Switch #	Function	Meaning when ON	Meaning when OFF
A	1	Emulation	Standárd (Epson)	IBM
A	2	AEC mode	Enabled	Disabled
A	3	RAM usage	Input buffer	Download buffer
A	4	Color and zoom	Enabled	Disabled
A	5	Auto LF with CR	Disabled	Enabled
A	6	Auto sheet feeder	Not installed	Installed
B	1	Graphics direction	Bi-directional	Uni-directional
B	2	Paper-out	Enabled	Disabled
B	3	Tear-off	Disabled	Enabled
B	4	Reserved	Leave this switch ON	
B	5	Multi-part mode	See page 58	
B	6			
C	1	Print mode	See page 59	
C	2			
C	3	Page length	See page 59	
C	4			
C	5			
D	1	Character table		
		In standard mode	Graphics	Italics
		In IBM mode	IBM #1	IBM #2
D	2	Code page (international character set)	See page 60	
D	3			
D	4			

<b>BANK</b>	<b>Switch #</b>	<b>Function</b>	<b>Meaning when ON</b>	<b>Meaning when OFF</b>
D	5	CR centering	Disabled	Enabled
E	1	LQ font selection	See "E1 through E5 – LQ Font selection" on page 61.	
E	2			
E	3			
E	4			
E	5			
F	1	Electronic DIP Switch setting	User settings	Default (factory) settings

Note that:

- All "switches" are ON when they leave the factory. Setting F1 to OFF will set all switches to ON.
- If switch F1 is set to OFF, the changes made to other switches will have no effect. All switches will be reset to factory settings.
- You should not change the setting of switch B4.

## Meanings of the switches

### **A1– Emulation**

This switch determines what printer the NX-2480 Rainbow/Colour emulates (pretends to be). When ON, the NX-2480 Rainbow/Colour emulates an Epson LQ-860, and when OFF, the NX-2480 Rainbow/Colour emulates an IBM Proprinter X24E.

### **A2 – Auto Emulation Change (AEC) mode**

If this switch is ON, the NX-2480 Rainbow/Colour will automatically change between the two emulations above, depending on the data received. If this switch is OFF, the printer will stay in whatever emulation you have selected with A1.



### **A3 – RAM usage**

The printer's internal memory can be set as either buffer memory (ON) – the printer accepts data from the computer faster than it can print it, or download memory (OFF) – you can invent your own character symbols and download them using software into the printer.

### **A4 – Color and zoom**

If this switch is ON, both color printing and zooming (page 40) are enabled. If OFF, you can do neither color printing nor zoom printing. If you have set a zoom level and stored it as a macro (page 42), and turn this switch OFF, the zoom size will be cancelled.

### **A5 – Auto LF with CR**

If A5 is ON, your computer needs to send both a line feed code and a carriage return code at the end of each line. If A5 is set to OFF, the printer will automatically perform a line feed each time it receives a carriage return. As a result, your software only needs to send a carriage return at the end of a line.

- If your output is double-spaced when it should not be, you may need to set this setting to ON.
- If the lines of your output are being printed on top of one another, you should set this setting to OFF.

### **A6 – Auto sheet feeder**

If you have installed the optional automatic sheet feeder (SF-10DW), you should turn this switch OFF. Otherwise, simply leave it ON.

### **B1 – Graphics direction**

When you are printing graphics, you can print bi-directionally (left-to-right and right-to-left) for speed (ON). Uni-directional graphics printing (OFF) means that the print head prints from left-to-right, returns to the left without printing, and prints from left-to-right again.

This is a little more accurate than bi-directional printing, but for most purposes, you'll probably find that bi-directional printing is accurate enough.

### ***B2 – Paper-out***

When ON, the printer takes note of its internal paper sensor. It prints to the bottom edge of the paper and then stops, waiting for a new sheet. If this switch is OFF, the printer ignores its sensor and will continue printing, even if there is no paper to print on.

### ***B3 – Tear-off***

If you set this switch to OFF, this allows you to use the fanfold tear-off function (page 34). If you this switch is ON, the function is disabled.

### ***B4 – Reserved***

Leave this switch on.

### ***B5 and B6 – Multi-part mode***

When using multi-part forms, there are three settings you can make, depending on the number of sheets you are feeding through the printer at one time:

<b>Multi-part mode</b>	<b>B5</b>	<b>B6</b>
Normal mode (one sheet)	ON	ON
Multi-part 1 (up to 3 sheets)	ON	OFF
Multi-part 2 (up to 5 sheets)	OFF	ON

### **C1 and C2 – Print mode**

You choose the default pitch and font settings with these switches:

<b>Print mode</b>	<b>C1</b>	<b>C2</b>
10 cpi draft	ON	ON
17 cpi draft	OFF	ON
10 cpi LQ	OFF	OFF

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**Note:** Any pitch and font settings you have stored in a macro (page 42) will be erased if you change these switch settings.

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### **C3 through C5 – Page length**

If you are using US letter paper or 11-inch fanfold paper, leave all these switches ON. You should set the switches as follows for different sizes of paper:

<b>Page Length</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>
7.25 inches (sideways US executive)	OFF	OFF	OFF
8 inches	OFF	ON	ON
8.5 inches (sideways US letter)	ON	ON	OFF
10.5 inches (US executive)	ON	OFF	OFF
11 inches (US letter)	ON	ON	ON
11.7 inches (international A4)	ON	OFF	ON
12 inches	OFF	OFF	ON
14 inches (US legal)	OFF	ON	OFF

### **D1 – Character table**

In each emulation mode, the NX-2480 Rainbow/Colour can use one of two character tables. The character table

which you select with this switch depends on the emulation set at the time (“A1- Emulation” on page 56).

When the printer is in standard (Epson) emulation, setting C1 to ON selects the IBM Character Set #2 (confusing, but true). When OFF, this switch selects an italic character table.

When the printer is in IBM emulation, setting this switch ON selects IBM Character set #2 (box-drawing graphic characters, international accented characters (for example “é”, “ñ” and “Ü”), as well as common mathematical and technical symbols such as “Ω” and “μ”). Setting this switch to OFF selects a smaller set of characters for use if your computer only sends 7-bit data to the printer. If you’re not sure what this means, you probably won’t need to use this setting.

### **D2 through D4 – character code tables**

Again, these switches perform different functions, depending on the emulation (“A1- Emulation” on page 56) and the character table selected (“D1 – Character table” on page 59). Use these switches to pick a character code table which contains the characters you need.

In all modes *except* Standard (Epson) emulation (A1 ON) with the Italic character set selected (D1 OFF), the switches select the following code pages (character tables):

	<b>Code page</b>	<b>D2</b>	<b>D3</b>	<b>D4</b>
#437	U.S.A.	ON	ON	ON
#850	Multi-lingual	OFF	ON	ON
#860	Portuguese	ON	OFF	ON
#861	Icelandic	OFF	OFF	ON
#863	Canadian French	ON	ON	OFF
#865	Nordic	OFF	ON	OFF

In the following mode *only*: Standard (Epson) emulation (A1 ON) with the Italic character set selected (D1 OFF), the switches select the following:

Country	D2	D3	D4
U.S.A.	ON	ON	ON
France	OFF	ON	ON
Germany	ON	OFF	ON
England	OFF	OFF	ON
Denmark I	ON	ON	OFF
Sweden	OFF	ON	OFF
Italy	ON	OFF	OFF
Spain I	OFF	OFF	OFF

### **D5 – CR centering**

With this switch OFF, when the printer feeds fanfold paper past the perforations, the print head moves to the center of the paper. This will improve print quality. Obviously, for this function to work, you must set the page length to work with the actual length of each fanfold page (page 59).

When this switch is ON, the print head does not move when fanfold paper is being fed.

### **E1 through E5 – LQ Font selection**

These switches allow you to set the default font used when you select LQ mode.

Font name	E1	E2	E3	E4	E5
Roman	ON	ON	ON	ON	ON
Sanserif	OFF	ON	ON	ON	ON
Courier	ON	OFF	ON	ON	ON
Prestige	OFF	OFF	ON	ON	ON

Font name	E1	E2	E3	E4	E5
Script	ON	ON	OFF	ON	ON
Orator	OFF	OFF	OFF	ON	ON
Orator-2	ON	ON	ON	OFF	ON
H-Gothic	ON	ON	OFF	OFF	ON
SLQ Roman	ON	ON	ON	OFF	OFF

**F1 – Electronic DIP switch settings**

If you set this switch OFF, all switch settings will be set to factory settings (all ON except for A5).

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# Chapter 5

# Optional accessories

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## **Accessories available**

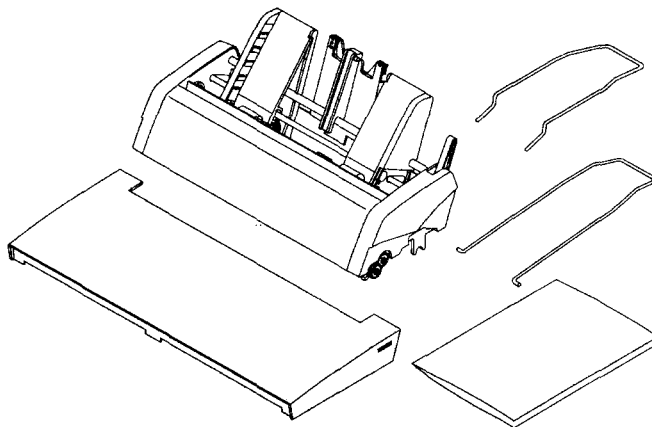
The NX-2480 Rainbow/Colour has two optional accessories available for it: the SF-10DW Automatic sheet feeder, and the SPC-8K Serial/Parallel converter.

## **The SF-10DW**

The SF-10DW allows you to load cut sheet paper, which will be automatically fed, one sheet at a time, for printing.

## **Unpacking**

Make sure that you have the following when you unpack the SF-10DW:



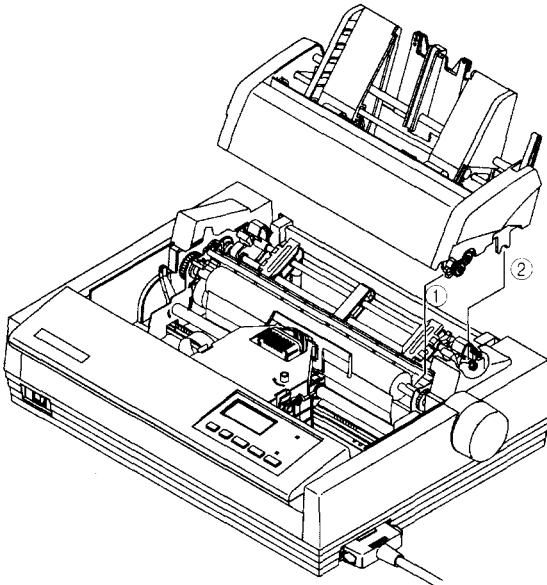
- Sheet feeder
- Hopper attachment
- Stacker attachment
- Printer cover
- SF-10DW User's manual

If any of these items is missing, contact your supplier.

The SF-10DW is protected by packing material and tape when it is shipped from the factory. Make sure that you remove all packing material and tape before you start to use the SF-10DW.

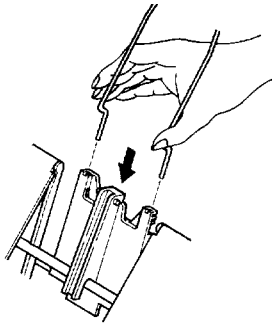
### **Installing the SF-10DW ASF**

- Use the EDS function to set the Automatic sheet feeder to “Installed”. See the section on “Using the Electronic DIP switches” on page 53, especially “A6 – Auto sheet feeder” on page 57.
- Open and remove the front cover of the printer. Lift the cover from the rear using the grips on the sides. Lift up to remove the cover from the body of the printer (see page 10).
- Remove the roller unit (see page 13).
- Tip the SF-10DW forward slightly, and put it into place behind the printer platen roller (①).
- Lower the back of the SF-10DW, and attach it to the holder shaft (②):

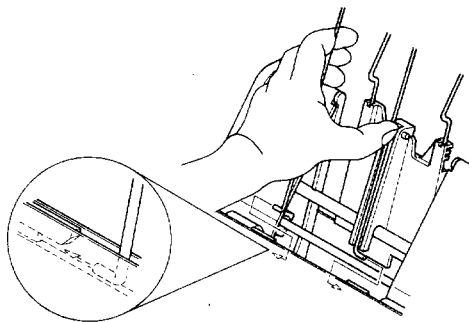




- Make sure that the mounting brackets on both sides of the SF-10DW are properly mounted on the printer. If they have been properly mounted, you can use the platen knob to turn the ejection roller on the SF-10DW.
- Install the printer cover supplied with the SF-10DW .
- Install the hopper attachment on top of the SF-10DW hopper support section.




- Fit the stacker attachment into the fixing groove in the front of the sheet feeder. You may need to squeeze the stacker attachment a little to fit it.

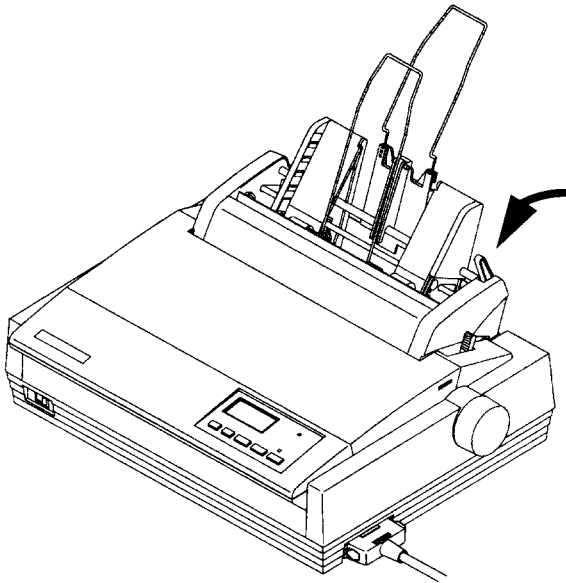


- Keep the printer's front cover, mute cover, roller unit and paper guide together for possible future use.

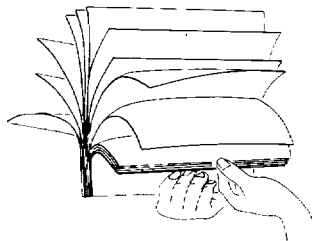
### **Using the SF-10DW**

- If you have already loaded fanfold paper, park the paper (page 31).

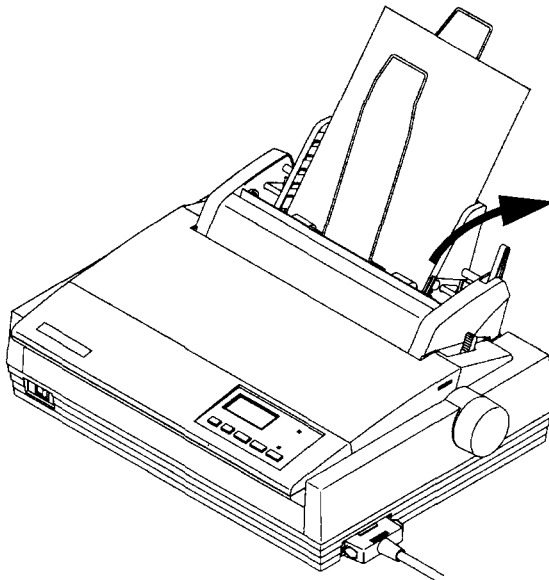
- Push the paper release lever to the back position (  ).
- Pull the SF-10DW paper loading lever forward to pull the hopper forward.



- Adjust the left paper guide to the position at which you want the left edge of the paper.
- Take about 50 sheets of paper (about 20 lb weight), fan them and square them off before putting them into the SF-10DW. By doing this, you separate the sheets. This stops the sheets from sticking together and jamming as they are fed through the feeder into the printer.



- Insert the paper into the SF-10DW. Do not attempt to force sheets into the feeder. If the stack of paper does not fit easily into the feeder, remove some sheets and try again.
- Adjust the right paper guide to allow the paper to go through the feeder smoothly, without allowing it to move from side to side. A gap of less than a millimeter (0.04") is ideal.
- Push the paper loading lever towards the rear of the printer.



- You are now ready to start printing with the SF-10DW Automatic sheet feeder.

### **The SPC-8K serial/parallel converter**

The SPC-8K serial/parallel converter takes serial signals from your computer, and converts them to parallel signals which can be understood by the printer.

The SPC-8K has one bank of eight DIP switches which must be set *before* you connect the SPC-8K to the printer and computer.

These switches control the way in which the SPC-8K expects the data to come from your computer, and will return data to your computer when necessary. You must also make sure your computer's serial ports match the settings you make on the SPC-8K.

You will need a serial cable in addition to the SPC-8K (see page 71).

### ***Baud rate***

You must "tell" the SPC-8K the baud rate of your computer's serial port (how fast it can expect to receive data from your computer).

Use switches 6 through 8 for this purpose. Set them as described in the table below:

<b>Baud rate</b>	<b>Sw 6</b>	<b>Sw 7</b>	<b>Sw 8</b>
150	OFF	OFF	OFF
300	OFF	OFF	ON
600	OFF	ON	OFF
1200	OFF	ON	ON
2400	ON	OFF	OFF
4800	ON	OFF	ON
9600	ON	ON	OFF
19200	ON	ON	ON

### ***Number of bits in a word***

Set switch 1 to ON for 8 data bits in a serial word (this will be the most commonly-used setting). Set Switch 1 to OFF for 7-bit use.

### ***Parity***

A "parity bit" can be added to each word to make the total value of bits to be odd or even. This allows for error checking of the data as it is transmitted over the serial line. Use switches 2 and 5 to set this.

Set switch 2 ON if you don't want parity checking, and set it to OFF if you want parity checking.

If you have set switch 2 to OFF, you must choose whether you are going to use even or odd parity. If switch 5 is ON, the SPC-8K will use odd parity, and if this switch is OFF, the SPC-8K will use even parity. If switch 2 is ON, switch 5 will have no effect.

### **Handshaking**

"Handshaking" is the term used to describe the way in which serial devices "say" to each other:

"Are you ready for me to give you more data?"

"No, I'm not – wait a moment." (*thinks and processes data*) "OK – I'm ready now. More data, please."

Obviously, computer devices don't use these words – there are two ways in which they have these "conversations". One way is by changing the voltage along one of the serial lines (hardware or DTR handshaking). The other way is by special codes which cannot be printed, but are interpreted by computer devices along the lines of the conversation above (software handshaking). An older, less frequently-used method is called ETX/ACK, and the other main method (more common than ETX/ACK) is called XON/XOFF (sometimes called DC1/DC3).

Use switches 3 and 4 to set the handshaking method (usually called "protocol"):

<b>Protocol</b>	<b>Sw 3</b>	<b>Sw 4</b>
DTR (hardware) handshake	ON	ON
XON/XOFF	ON	OFF
ETX/ACK	OFF	ON

### **Connecting the SPC-8K converter**

- Turn the printer and the computer OFF using their power switches.

- Disconnect the parallel interface cable from the printer (if connected).
- Connect the parallel connector of the SPC-8K (the connector on the cable) to the printer's parallel connector. Move both clips on the printer connector inside the clips on the SPC-8K connector until they click into place.
- Connect the 25-pin 'D' connector on the SPC-8K to the 25-pin end of a suitable serial cable. See "The serial connector on the SPC-8K" on page 71 for details of the kind of cable you will need.
- Connect the other end of cable to the computer's serial port (often labeled COM1 or COM2).

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**Note:** Some computers use a 9-pin rather than a 25-pin serial connector. If this is the case with your computer, you will have to make or buy a 25-to-9-pin adaptor. See page 71 for details.

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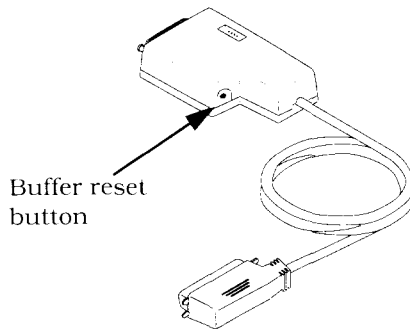
- Make sure that the main body of the SPC-8K is resting on a table or flat surface. If it is left hanging in mid-air, this will put strain on the cables, possibly resulting in damage.
- Make that the computer's serial port settings match the settings you have made with the SPC-8K's DIP switches (see below).

### ***Using the SPC-8K***

When you use the SPC-8K with your computer and printer, you must remember that you are printing through the serial, not the parallel port on your computer.

The only other thing to remember is the buffer memory. The NX-2480 Rainbow/Colour contains memory which can be used as a print buffer (page 57) which must be cleared ("Clearing the buffer" on page 43) if a print job is to be halted. The SPC-8K also contains a buffer, which must also be cleared if you are to halt a print job successfully.

You clear the SPC-8K's print buffer by pressing the button recessed in the body of the SPC-8K.



### ***The serial connector on the SPC-8K***

The following information is provided for use if your computer does not have a standard 25-pin serial connector. If your computer does have a standard 25-pin serial connector, you can use a "straight-through" 25-pin cable.

If you need to use the SPC-8K with any other computer, you will either have to buy or make your own cable. If you are in doubt, show the chart below to your computer supplier or to friends who have experience with serial cables.

Pin #	Signal name	In or Out	Function
1	GND	-	Printer chassis ground
2	TXD	OUT	Data from the printer

Pin #	Signal name	In or Out	Function
3	RXD	IN	Data to the printer
4	RTS	OUT	Always space
5	CTS	-	Space when computer is ready to send data. The printer does not check this pin.
6	NC		Unused
7	GND	-	Signal ground
8 - 10	NC		Unused
11	RCH	OUT	Turned to Space when printer ready to receive (echoes DTR (20)).
12 - 19	NC		Unused
20	DTR	OUT	Turned to Space when printer ready to receive.
21 - 25	NC		Unused

### **Setting up an MS-DOS computer**

If you are using an IBM PC or compatible running MS-DOS, edit the AUTOEXEC.BAT file to include a line that reads:

**MODE LPT1:=COM $n$ :**

( $n$  is the number of the serial port; either 1 or 2).

The line above will send printer output to the COM $n$  serial port. Next, include the line:

**MODE COM $n$ :*baud, parity, data length, stopbits, p***

to set up the COM $n$  port to match the DIP switch settings on the serial-to-parallel converter. For example



**MODE COM2:9600,N,8,1,p**

will set up COM2 to run at 9600 baud, with no parity, a data length of 8 bits, and 1 stop bit (an MS-DOS byte-terminating convention). The 'p' indicates that the printer will continually try to re-transmit data, should an error occur.

### ***Setting up a Windows computer***

- Double-click the *Control Panel* icon in the *Main* window.
- Double-click the *Printers* icon
- Make sure that **NX-2480 Rainbow/Colour** is selected in the *Installed Printers* list.
- Click on *Connect*
- Click on the serial port (COMn) to which the serial-to-parallel converter is connected.
- Click *OK* to return to the *Printers* window.
- Click *Close* to return to the *Control Panel* window.
- Double-click on *Ports*. The *Ports* dialog box appears.
- Click on the name of the port to which the serial-to-parallel converter is connected.
- Click on *Settings*.
- For each setting (*Baud Rate*, *Data Bits*, *Parity*, *Stop Bits* and *Flow Control* (protocol)) select the appropriate setting from the pull-down menu (alternatively, you can type in your selections directly).
- Click *OK* to return to the *Ports* window.
- Click *Close* to return to the *Control Panel* window.



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# Chapter 6

# Troubleshooting

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Your NX-2480 Rainbow/Colour printer should perform without any problem most of the time. However, things will go wrong from time to time. A list of common problems and corresponding suggestions for solving them is given below.

A further section, *Checking system software settings*, suggests ways for you to check whether your system software (MS-DOS or Windows) is correctly set up for printing.

If the suggested remedies do not cure the problem, consult the store where you purchased your printer for assistance.

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**Note:** The printer contains high voltages. Do not try any repair operation other than those described in this chapter. You could receive an electric shock or cause damage to the printer. This will also invalidate the warranty.

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## Common problems and solutions

<b>Power switch is on, but POWER indicator is neither lit nor flashing</b>	
<b>Possible cause</b>	<b>Action</b>
Printer is not receiving power.	Check whether the power cord is correctly connected. If it is, try a different power cord.
	Check whether the power source is working by unplugging the printer and plugging in another device.

<b>Printer sounds as if it is printing, but is not OR Printing is weak</b>	
<b>Possible causes</b>	<b>Action</b>
The ribbon is jammed, twisted or not set properly between the print head and the print head shield.	Make sure that the ribbon cartridge is correctly installed. See "Installing the ribbon cartridge" on page 10.
The print gap is not set correctly.	Use the adjustment lever to set the print gap. Move the lever to a lower (darker) setting. See "Adjusting the print gap" on page 24.

**Printer tests work, but printer will not print out data from attached computer**

<b>Possible causes</b>	<b>Action</b>
The wrong emulation is selected.	Check the emulation selection. See "A1-Emulation" on page 56. Change it if necessary.
The wrong printer has been selected by your application program or system software.	Check the printer selection in your application or system software. See "Checking system software settings" on page 89.
The computer system software is not set up properly for the printer or for the type of interface cable that you are using.	Check the system software settings. See "Checking system software settings" on page 89.
The interface cable is incorrectly connected, or damaged.	Check that the printer interface cable is correctly connected. If it is, try a different cable.

**Font selection changes unexpectedly**

<b>Possible cause</b>	<b>Action</b>
Your application software is overriding the control panel font selection. This does not apply to systems running Windows.	Use the control panel to lock font selection by application software. See "Font lock" on page 45.

### **Printer will not feed paper properly**

<b>Possible causes</b>	<b>Action</b>
The release lever is in the wrong position.	Make sure that the lever is pushed back if you are printing on single sheets, or pulled forward if you are using fanfold stationery.
Paper is jamming.	Remove paper from the printer. Reload paper. Refer to page 26 and page 27.
The print gap is not set correctly.	Check the print gap. If necessary, use the adjustment lever to set the print gap. See "Adjusting the print gap" on page 24.

### **The printer will not print in color**

<b>Possible causes</b>	<b>Action</b>
A monochrome ribbon cartridge is installed.	Install a color ribbon cartridge.
A printer that does not support color has been selected (either in Windows or in your application program).	Select a different printer driver. See "Setting up the printer in Windows" on page 19.
Electronic DIP Switch settings prevent use of color.	Check the settings. See "A4 - Color and zoom" on page 57.

<b>Line spacing is incorrect</b>	
<b>Possible causes</b>	<b>Action</b>
Paper is jamming.	Check the print gap. If necessary, use the adjustment lever to set the print gap. See "Adjusting the print gap" on page 24.
The wrong line spacing or leading has been selected from your application program.	Choose a different setting in your application.
Auto line feed with carriage return is selected.	The CR/LF setting is wrong. See "A5 – Auto LF with CR" on page 57.

<b>Over-printing occurs</b>	
<b>Possible causes</b>	<b>Action</b>
Auto line feed with carriage return is not selected.	The CR/LF setting is wrong. See "A5 – Auto LF with CR" on page 57.
Paper is jamming.	Check the print gap. If necessary, use the adjustment lever to set the print gap. See "Adjusting the print gap" on page 24.

**Incorrect number of lines per page**

<b>Possible causes</b>	<b>Action</b>
Printing is starting from the wrong place on the page.	Adjust the auto load position. See "Setting the top of a form" on page 35.
Auto line feed with carriage return is selected.	The CR/LF setting is wrong. See "A5 - Auto LF with CR" on page 57.
The wrong line spacing or leading has been selected from your application program.	Choose a different setting in your application.

**Malformed text or graphics  
OR  
Poor printing quality**

<b>Possible causes</b>	<b>Action</b>
The print gap is not set correctly.	Use the adjustment lever to alter the print gap. See "Adjusting the print gap" on page 24.
The print head is damaged.	Return the printer to your dealer for repair.



<b>Forms are smudged OR Printing is too dark</b>	
<b>Possible causes</b>	<b>Action</b>
The print gap is not set correctly.	Use the adjustment lever to set the print gap. Move the lever to a higher (lighter) setting. See "Adjusting the print gap" on page 24.
The ribbon is jammed, twisted or not set properly between the print head and the print head shield.	Make sure that the ribbon cartridge is correctly installed. See "Installing the ribbon cartridge" on page 10.
Print head shield is damaged or missing.	Return the printer to your dealer for repair.

<b>Printer case is hot</b>	
<b>Possible cause</b>	<b>Action</b>
The printer's air vents are blocked or obstructed.	Switch off the printer and allow it to cool down. Check the air vents on the underside of the printer to see if they are clogged or obstructed in any way. Remove the obstruction or clogging material if possible. If the problem persists, return the printer to your dealer for repair.

<b>Printer makes excessive noise</b>	
<b>Possible causes</b>	<b>Action</b>
The front cover and mute covers are off.	Replace the covers.
The printer is vibrating.	Move any unrelated objects that are touching the printer. Make sure that the printer is on a level, steady surface.

<b>Printer prints beyond the edge of the paper</b>	
<b>Possible causes</b>	<b>Action</b>
The paper guides are positioned incorrectly.	Remove the paper, adjust the position of the paper guides. Reload the paper.
The ribbon is jammed, causing the print head to jam.	Make sure that the ribbon cartridge is correctly installed. See "Installing the ribbon cartridge" on page 10.

### **Printer prints beyond the edge of the paper**

The paper is jamming, causing the print head to jam.	Remove all paper from the printer. Reload paper. Check the print gap. If necessary, use the adjustment lever to set the print gap. See "Adjusting the print gap" on page 24.
Inappropriate margin settings have been selected from your application program.	Choose different margin settings in your application.

### **Left margin moves towards the right during printing**

<b>Possible causes</b>	<b>Action</b>
The ribbon cartridge is incorrectly installed, causing the print head to jam.	Make sure that the ribbon cartridge is correctly installed. See "Installing the ribbon cartridge" on page 10.
The paper is not loaded properly, causing the print head to jam.	Remove all paper from the printer. Reload paper.
The print gap is not set correctly.	Use the adjustment lever to set the print gap. See "Adjusting the print gap" on page 24.

### **Left margin moves towards the right during printing**

Static electricity caused by interference from nearby electrical devices or by a low level of humidity is affecting the printer's operation.	Make sure the printer is not too close to any devices with electric motors, or raise the humidity level.
Inappropriate settings have been selected from your application program.	Choose different settings in your application.

### **Some incorrect characters are being printed**

<b>Possible causes</b>	<b>Action</b>
The wrong emulation is selected.	Check the emulation selection. See "A1-Emulation" on page 56.
The wrong character table, code page or international character set is selected.	Check Electronic DIP Switch settings. See "D2 through D4 - character code tables" on page 60.
Static electricity caused by interference from nearby electrical devices or by a low level of humidity is affecting the printer's operation.	Make sure that the printer is not too close to any devices with electric motors, or raise the humidity level.
Inappropriate settings have been selected from your application program.	Choose different settings in your application.
There are wires missing from the print head.	Return the printer to your dealer for repair.

<b>Printer behaves erratically OR Printing ceases</b>	
<b>Possible causes</b>	<b>Action</b>
The interface cable is incorrectly connected, or damaged	Check that the printer interface cable is correctly connected. If it is, try a different cable.
Static electricity caused by interference from nearby electrical devices or by a low level of humidity is affecting the printer's operation.	Make sure that the printer is not too close to any devices with electric motors, or raise the humidity level.

### Display messages (non-error)

The following messages do not indicate an error in the printer, but this table provides a quick lookup to determine the meaning of messages:

<b>Message</b>	<b>Meaning</b>
<b>DRAFT</b>	Draft mode has been selected. You cannot select proportional pitch
<b>Roman</b>	Roman LQ font has been selected
<b>Roman</b> <b>SLQ</b>	Roman SLQ font has been selected
<b>Sanserif</b>	Sans-serif LQ font has been selected
<b>Courier</b>	Courier LQ font has been selected
<b>Prestige</b>	Prestige LQ font has been selected
<b>Script</b>	Script LQ font has been selected
<b>ORATOR</b>	Orator LQ font has been selected
<b>Orator-2</b>	Orator-2 LQ font has been selected

Message	Meaning
<b>H-Gothic</b>	H-Gothic LQ font has been selected
<b>ZOOM</b>	The zoom mode has been selected. The message below indicates the current size.
<b>PITCH</b>	The current pitch size. The message below indicates the current size.
<b>EDS</b>	The electronic DIP switch mode is selected (see page 53)
<b>F-LOCK</b>	Font changes cannot be made from application programs. See "Font lock" on page 45.
<b>P-LOCK</b>	Changes to the font pitch cannot be made from application programs. See "Pitch lock" on page 45.
<b>ON</b>	Displayed in Electronic DIP Switch mode to show the status of the currently-selected switch. See "Changing a switch's value" on page 54.
<b>OFF</b>	
<b>QUIET</b>	The quiet print mode is selected. See "Quiet printing" on page 37.
<b>MACRO</b>	The front panel settings have been saved as a macro. See "Saving Macros" on page 42.
<i>P1</i>	The short test mode has been selected. See "Short test" on page 47.
<i>P2</i>	The long test mode has been selected. See "Long test" on page 47.
<i>Pd</i>	The print area test mode has been selected. See "Print area test mode" on page 48.
<i>Hd</i>	The hexadecimal test dump mode has been selected. See "Hexadecimal dump mode" on page 49.
--	Top of form is being set manually with the control panel. See "Setting the top of a form" on page 35.
<i>bc</i>	The buffer has been cleared manually with the control panel. See "Clearing the buffer" on page 43.
<i>dR</i>	Dot adjustment mode has been selected. See "Adjusting the dot alignment" on page 50.

## Display messages (error)

The following messages all show that some error has occurred in the printer

Message	Meaning
<i>PE</i>	No paper loaded in the printer. Load paper ("Loading cut sheet paper" on page 26 and "Loading and parking fanfold paper" on page 27)
<i>Er</i>	The release lever has been moved while the paper is in printing position. Park the paper and try again ("Parking paper" on page 31)
<i>E1</i>	Print head error. Turn off the printer, wait a few seconds and try printing again.
<i>E2</i>	Carriage home position error. Turn off the printer, wait a few seconds and try printing again
<i>E3</i>	Paper handling error. Turn off the printer, wait a few seconds and try printing again
<i>E4</i>	S.W.I error. Turn off the printer, wait a few seconds and try printing again
<i>E5</i>	EEPROM or RAM (memory) error. Turn off the printer, wait a few seconds and try printing again
<i>E7</i>	"Watchdog" (internal software error). Turn off the printer, wait a few seconds and try printing again

If any of these errors persist, consult your supplier.

## Beep tones

In addition to the display, the printer also uses its internal beeper to alert you of problems and internal conditions. Here's a summary of the different tones:

<b>Beep tones</b>	<b>Meaning</b>
2-second tone	The printer has detected an error condition. Turn off the printer, wait a few seconds and try printing again.
One long tone	The printer has detected an error condition. Turn off the printer, wait a few seconds and try printing again.
Four short tones, repeated twice	The printer is out of paper.
One short tone	The buffer has been cleared. See "Clearing the buffer" on page 43. The top of form has been set. See "Setting the top of a form" on page 35. The quiet mode has been selected. See "Quiet printing" on page 37. The zoom size has been changed. See "Changing the zoom size" on page 40. The Electronic DIP Switch mode has been selected. See "Using the Electronic DIP switches" on page 53.
Two short tones	The macro definition has been selected. See "Saving Macros" on page 42. The quiet mode has been cancelled. See "Quiet printing" on page 37.
Three short tones	The macro definition has been cancelled. See "Removing the macro" on page 43. The printer has been reset. See "Setting the printer back to default settings" on page 44.
One shorter tone	Hexadecimal dump mode has been selected. See "Hexadecimal dump mode" on page 49. Pitch lock mode has been selected. See "Pitch lock" on page 45. Font lock mode has been selected. See "Font lock" on page 45.



Beep tones	Meaning
Two shorter tones	Pitch and font lock have been selected together. See "Pitch and font lock" on page 46.
Intermittent tone	The release lever has been moved while the fanfold paper is not parked. See "Parking paper" on page 31.

## Checking system software settings

### In Windows

If you cannot print from your Windows application, there are three things that you can check. You may also wish to refer to the *Microsoft Windows User's Guide*.

Firstly, check that the printer has been set as the *Default Printer*.

- Double-click the *Control Panel* icon in the *Main* window.
- Double-click the *Printers* icon
- Click on **NX-2480 Rainbow/Colour** in the list of installed printers.
- Make sure that *Set As Default Printer* is checked. If it is not, click on the check box, and try printing from your application again.
- Click on *Close* to return to the *Control Panel* window.

Secondly, check that the printer is correctly selected in your application.

- Select *Print* from the application's *File* menu. A dialog box appears listing available printers.
- Make sure that **NX-2480 Rainbow/Colour** is highlighted. If it is not, click on it and try printing again.

Thirdly, check that the correct port is selected.

- Double-click the *Control Panel* icon in the *Main* window.
- Double-click the *Printers* icon

- Click on **NX-2480 Rainbow/Colour** in the list of installed printers.
- Click *Connect*.
- Make sure that your cable is connected to the port highlighted in the list of ports. If you are using a parallel cable, you will probably be using LPT1. If you are using the SPC-8K serial-to-parallel converter, you will be using COM1 or COM2. Click on the appropriate port name.
- Click *OK*.
- Click on *Close* to return to the *Control Panel* window.

If you still cannot print successfully, consult your software dealer for assistance.

## In MS-DOS

If you cannot print a text file using the MS-DOS **PRINT** command, check the AUTOEXEC.BAT file to see whether it contains any of the following statements:

```
MODE LPT1:=COM1:
```

or

```
MODE LPT1:=COM2:
```

These indicate that the computer is set up to print to a printer via a serial cable, not a parallel cable. So, if you are using a parallel cable, delete the line from AUTOEXEC.BAT. Resave AUTOEXEC.BAT, and restart your computer. Try printing again.

Conversely, if you are using the SPC-8K serial-to-parallel converter, make sure that a statement is included in AUTOEXEC.BAT. See "Setting up an MS-DOS computer" on page 72. If you still cannot print, refer to the *MS-DOS User's Guide*, or consult your software dealer.

If you can print from MS-DOS but cannot print from your application, check to see which printer driver is selected in the application. Check the application's manual for details of printer selection.

If you still cannot print, consult your software dealer.

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# Chapter 7      Software commands

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## ***Introduction***

The NX-2480 Rainbow/Colour has two emulation modes: Standard/Epson mode and IBM mode.

In the Standard/Epson mode, the printer emulates the Epson LQ-860/850, and can also recognize the graphics commands of NEC 24-wire printers. In IBM mode, the printer emulates the IBM Proprinter X24E. Some additional command codes, which are a superset of these emulations, are also supported.

The emulation can be changed by changing Electronic DIP Switch (EDS) setting A1. When A1 is ON, the printer is in Standard/Epson mode; when it is OFF, the printer is in IBM mode (see Chapter 4).

In addition, when EDS switch A2 is ON, the printer can automatically sense which emulation is required and will change emulation as necessary.

This chapter describes the printer's control commands. Some commands are common to both Standard and IBM modes. All commands will grouped by function. The name of each command is followed by a table like the one below:

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "x" <1>	27 120 1	1B 78 01

**MODE:**    Indicates the mode in which the command is recognized.

**Std.**        Standard/Epson mode (EDS switch A1 is ON)

**IBM**        IBM mode (EDS switch A1 is OFF)

Both Both Standard/Epson and IBM modes

ASCII: Indicates the ASCII coding of the command. Control characters are enclosed in angle brackets: For example, <1> means character code 1.

Decimal: Gives the command in decimal character codes.

Hexadecimal: Gives the command in hexadecimal character codes.

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

## Font control commands

### Select print quality

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "x" <i>n</i>	27 120 <i>n</i>	1B 78 <i>n</i>

Changes the print quality according to the value of *n*, as shown below:

<i>n</i>	Print quality
0	Draft
1	Letter quality

Ignored if the FONT LOCK mode was selected during power-up.

### Select print quality

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "[" "d" <1> <0> <i>n</i>	27 91 100 1 0 <i>n</i>	1B 5B 64 01 00 <i>n</i>

Changes the print quality according to the value of *n*, as shown below:

<i>n</i>	Print quality
0	Unchanged
1 - 127	Draft
128 - 254	Letter quality
255	Draft

Ignored if the FONT LOCK mode was selected during power-up.

### Select LQ font

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "k" <i>n</i>	27 107 <i>n</i>	1B 6B <i>n</i>

Selects an LQ font according to the value of *n*. In draft mode, this command remains dormant and takes effect later when LQ is selected. Ignored if the FONT LOCK mode was selected during power-up or the corresponding font is not installed.

<i>n</i>	Font
0	Roman
1	Sanserif
2	Courier
3	Prestige
4	Script
7	Orator
8	Orator 2
12	H-Gothic
32	SLQ Roman

### Select italic characters

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "4"	27 52	1B 34

Causes subsequent characters (except IBM block graphic characters) to be printed in italics.

### **Select upright characters**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "5"	27 53	1B 35

Cancels italic printing and causes subsequent characters to be printed upright.

### **Emphasized printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "E"	27 69	1B 45

Causes subsequent characters to be emphasized by adding extra thickness to horizontal strokes.

### **Cancel emphasized printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "F"	27 70	1B 46

Cancels emphasized printing.

### **Double-strike printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "G"	27 71	1B 47

Causes subsequent characters to be printed in double-strike mode with a slight horizontal motion in between, causing a thickening of vertical strokes.

For bold print, use of double-strike is recommended in LQ mode, and combined use of emphasized and double-strike is recommended in draft mode.

### **Cancel double-strike printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "H"	27 72	1B 48

Cancels double-strike printing.

## Underlining

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> “_” <i>n</i>	27 45 <i>n</i>	1B 2D <i>n</i>

Causes subsequent characters to be underlined when *n* is 1, and cancels underlining when *n* is 0. Block graphics characters and spaces skipped by horizontal tabulation are not underlined.

## Overlining

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> “_” <i>n</i>	27 95 <i>n</i>	1B 5F <i>n</i>

Causes subsequent characters to be overlined when *n* is 1, and cancels overlining when *n* is 0. Spaces skipped by horizontal tabulation are not overlined.

## Select score

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> “(” “_” <3> <0> <1> <i>n1</i> <i>n2</i>	27 40 45 3 0 1 <i>n1</i> <i>n2</i>	1B 28 2D 03 00 01 <i>n1</i> <i>n2</i>

Start score according to the values of *n1* and *n2*, as shown below.

<i>n1</i>	Function	<i>n2</i>	Function
1	Underlining	0	Cancel score
2	Strike-through	1	Single continuous line
3	Overlining	2	Double continuous line
		5	Single broken line
		6	Double broken line



### Select ornament character

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "q" <i>n</i>	27 113 <i>n</i>	1B 71 <i>n</i>

Selects an ornament character according to the value of *n*, as shown below.

<i>n</i>	Character
0	Normal
1	Outline
2	Shadow
3	Shadow and outline

### Superscript

MODE	ASCII	Decimal	Hexadecimal
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

MODE	ASCII	Decimal	Hexadecimal
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

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "T"	27 84	1B 54

Cancels printing superscripts or subscripts and returns to normal printing.

## Character set commands

### Select character table

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "t" <i>n</i>	2/ 116 <i>n</i>	1B 74 <i>n</i>
Std.	<ES> "I" <i>n</i>	28 73 <i>n</i>	1C 49 <i>n</i>

Selects a character table according to the value of *n* as shown below:

<i>n</i>	Character table
0	Standard character set
1	IBM character set
2	Shift download character area (Standard mode only)

### Select character set #1

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "7"	27 55	1B 37

Selects character set #1.

### Select character set #2

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "6"	27 54	1B 36

Selects character set #2.

### Select international character set

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "R" <i>n</i>	27 82 <i>n</i>	1B 52 <i>n</i>

Selects an international character set according to the value of *n*.

<i>n</i>	Character set	<i>n</i>	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

Any one of the first eight of these character sets (from U.S.A. to Spain I) can be selected as the power-up default using EDS switches D2 to D4.

International character set variations are shown in the Appendix.

## Select IBM code page

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> “ [” “T”	27 91 84	1B 5B 54
	<4> <0> <0>	4 0 0	04 00 00
	<0> n1 n2	0 n1 n2	00 n1 n2

Changes the code page of the current IBM character set according to the values of *n1* and *n2*, as shown below.

<i>n1</i>	<i>n2</i>	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 the power-up default using EDS switches D2 to D4.

The various code pages are shown in the Appendix.

### ***Enable printing of all character codes***

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<FS> “\” <i>n1 n2</i>	28 92 <i>n1 n2</i>	1C 5C <i>n1 n2</i>
IBM	<ESC> “\” <i>n1 n2</i>	27 92 <i>n1 n2</i>	1B 5C <i>n1 n2</i>

Enables printing of all characters in the IBM character set, including those characters which are normally considered control codes. This command remains in effect for the next  $n1 + n2 \times 256$  characters, where *n1* and *n2* are between 0 and 255. During this time 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***

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<FS> “^” <i>n</i>	28 94 <i>n</i>	1C 5E <i>n</i>
IBM	<ESC> “^” <i>n</i>	27 94 <i>n</i>	1B 5E <i>n</i>

This command operates like the previous command, *Enable printing of all character codes*, except that it remains in effect for only one character.

## Character size and pitch commands

### *Pica pitch*

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "P"	27 80	1B 50
IBM	<DC2>	18	12

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).

Ignored if the PITCH LOCK mode was selected during power-up.

### *Elite pitch*

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "M"	27 77	1B 4D
IBM	<ESC> ":",	27 58	1B 3A

In Standard mode, changes from either pica or semi-condensed to elite pitch (12 cpi) or from condensed pica to condensed elite (20 cpi). In IBM mode, changes from pica or condensed to elite (12 cpi).

Ignored if the PITCH LOCK mode was selected during power-up.

### *Semi-condensed pitch*

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "g"	27 103	1B 67

Changes from either pica or elite to semi-condensed pitch (15 cpi).

Ignored if the PITCH LOCK mode was selected during power-up.

### **Condensed printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<SI>	15	0F
	<ESC> <SI>	27 15	1B 0F

In Standard mode, changes from pica to condensed pica (17 cpi) or from elite to condensed elite (20 cpi). In IBM mode, changes from pica to condensed pica.

Ignored if the PITCH LOCK mode was selected during power-up.

### **Cancel condensed printing**

MODE	ASCII	Decimal	Hexadecimal
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.

Ignored if the PITCH LOCK mode was selected during power-up.

### **Proportional spacing**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "p" <i>n</i>	27 112 <i>n</i>	1B 70 <i>n</i>
IBM	<ESC> "P" <i>n</i>	27 80 <i>n</i>	1B 50 <i>n</i>

Causes subsequent characters to be proportionally spaced when *n* is 1, and cancels it when *n* is 0.

Ignored if the PITCH LOCK mode was selected during power-up.

## Select font and pitch

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "I" <i>n</i>	27 73 <i>n</i>	1B 49 <i>n</i>

Changes the print font and pitch according to the value of *n*, as shown below:

<i>n</i>	Font	Pitch
0	Draft	Pica
2	Letter Quality	Pica
3	Letter Quality	Proportional
4	Draft Download	Pica
6	Letter Quality Down-load	Pica
7	Letter Quality Down-load	Proportional
8	Draft	Elite
10	Letter Quality	Elite
12	Draft Download	Elite
14	Letter Quality Down-load	Elite
16	Draft	Pica condensed
18	Letter Quality	Pica condensed
20	Draft Download	Pica condensed
22	Letter Quality Down-load	Pica condensed

Ignored if the PITCH LOCK mode was selected during power-up.



## Select print mode

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "[" "I" <2> <0> n1 n2	27 91 73 2 0 n1 n2	1B 5B 49 02 00 n1 n2

Changes the print mode according to the values of *n1* and *n2*, as shown below:

<i>n1</i>	<i>n2</i>	Font	Mode	Pitch
0	11	Courier	Normal	Pica
0	12	Prestige	Normal	Pica
0	18	Courier	Italic	Pica
0	46	Courier	Emphasized	Pica
0	57	Courier	Italic emphasized	Pica
0	60	Prestige	Emphasized	Pica
0	85	Courier	Normal	Elite
0	86	Prestige	Normal	Elite
0	92	Courier	Italic	Elite
0	108	Courier	Emphasized	Elite
0	111	Prestige	Emphasized	Elite
0	112	Prestige	Italic	Elite
0	116	Courier	Italic emphasized	Elite
0	164	Prestige	Normal	Proportional
0	171	Courier	Normal	Proportional
0	172	Courier	Italic	Proportional
0	184	Courier	Emphasized	Proportional
0	185	Courier	Italic emphasized	Proportional
0	221	Prestige	Normal	Semi-condensed
0	253	Courier	Emphasized	Pica condensed
0	254	Courier	Normal	Pica condensed

<i>n1</i>	<i>n2</i>	Font	Mode	Pitch
1	1	Prestige	Normal	Pica condensed
1	201	Prestige	Normal	Pica condensed
1	202	Prestige	Normal	Elite condensed
1	235	Courier	Normal	Elite
1	236	Courier	Normal	Semi-condensed
1	237	Courier	Normal	Pica condensed
1	238	Courier	Normal	Elite condensed
1	239	Prestige	Normal	Elite
1	240	Prestige	Normal	Semi-condensed

### ***Expanded printing***

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "W" <i>n</i>	27 87 <i>n</i>	1B 57 <i>n</i>

Causes subsequent characters to be expanded to double width when *n* is 1, and cancels it when *n* is 0.

### ***Expanded printing for one line***

MODE	ASCII	Decimal	Hexadecimal
Both	<S0>	14	0E
	<ESC> <S0>	27 14	1B 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.

### **Cancel one-line expanded printing**

MODE	ASCII	Decimal	Hexadecimal
Both	<DC4>	20	14

Cancels one-line expanded printing set with <SO> or <ESC> <SO>. Does not cancel expanded printing set with <ESC> "W" 1.

### **Select character width**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ES> "E" <i>n</i>	28 69 <i>n</i>	1C 45 <i>n</i>

Selects a character width according to the value of *n* as shown below.

<i>n</i>	Character width
0	Normal-wide
1	Double-wide
2	Triple-wide

### **Select master print mode**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "!" <i>n</i>	27 33 <i>n</i>	1B 21 <i>n</i>

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.

Function	<i>n</i> value	Function	<i>n</i> value
Underline	128	Emphasized	8
Italic	64	Condensed	4
Expanded	32	Proportional	2
Double strike	16	Elite	1

### ***Increase character spacing***

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> <SP> <i>n</i>	27 32 <i>n</i>	1B 20 <i>n</i>

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***

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> "w" <1>	27 119 1	1B 77 01
	<FS> "V" <1>	28 86 1	1C 56 01

Prints subsequent characters double height without moving the base line and without changing the line spacing.

### ***Return to normal height***

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> "w" <0>	27 119 0	1B 77 00
	<FS> "V" <0>	28 86 0	1C 56 00

Cancels double-height printing and prints subsequent characters normal height.

### Select character height, width and line spacing

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> “ [ “ @”	27 91 64	1B 5B 40
	<4> <0> <0>	4 0 0	04 00 00
	<0> n m	0 n m	00 n m

Selects a combination of character height, width and line spacing according to the values of *n* and *m*, as shown below. Does not move the base line.

<i>n</i>	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

<i>m</i>	Character width
0	Unchanged
1	Single width (same as <ESC> “W” 0)
2	Double width (same as <ESC> “W” 1)

## Vertical position commands

### *Set line spacing to 1/8 inch*

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "0"	27 48	1B 30

Sets the distance the paper advances or reverses in subsequent line feeds to 1/8 inch.

### *Set line spacing to 1/6 inch*

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "2"	27 50	1B 32

Sets the distance the paper advances or reverses in subsequent line feeds to 1/6 inch.

### *Set line spacing to n/360 inch*

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "+" n	27 43 n	1B 2B n
	<FS> "3" n	28 51 n	1C 33 n

Sets the distance the paper advances or reverses in subsequent line feeds to  $n/360$  inch, where  $n$  is between 0 and 255.

### Set base unit for line spacing

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "[" "\" <4> <0> <0> <0> n1 n2	27 91 92 4 0 0 0 n1 n2	1B 5B 5C 04 00 00 00 n1 n2

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

This command becomes effective only after <ESC> "3" or <ESC> "J" is received. The default base unit is set to 1/216".

### Set line spacing

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "3" n	27 51 n	1B 33 n

Sets the distance the paper advances or reverses in subsequent line feeds to  $n/180$  inch (STD and IBM mode),  $n/216$  inch or  $n/360$  inch (IBM mode only) 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 the command is ignored.

## Set line spacing to $n/60$ inch or $n/72$ inch

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "A" $n$	27 65 $n$	1B 41 $n$

In Standard mode, sets the distance the paper advances or reverses in subsequent line feeds to  $n/60$  inch, where  $n$  is between 0 and 255. If  $n = 0$ , the line spacing is set to 0.

In IBM mode, this command defines the distance the paper advances or reverses 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"

MODE	ASCII	Decimal	Hexadecimal
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.

## Line feed

MODE	ASCII	Decimal	Hexadecimal
Both	<LF>	10	0A

Prints the current line and advances the paper to the next line. The line spacing is set by one of the commands listed previously.



### ***Reverse line feed***

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> <LF>	27 10	1B 0A
IBM	<ESC> "]"	27 93	1B 5D

Prints the current line and moves the paper in the reverse direction to the preceding line. Ignored when the printer is in friction feed mode.

The line spacing is set by one of the commands listed previously.

### ***Select forward feed mode***

MODE	ASCII	Decimal	Hexadecimal
Std.	<FS> "F"	28 70	1C 46

Cancels the reverse feed mode and selects forward feed mode. This is the default setting at power-on.

### ***Select reverse feed mode***

MODE	ASCII	Decimal	Hexadecimal
Std.	<FS> "R"	28 82	1C 52

Selects reverse feed mode. Reverses the direction of all vertical movements. Ignored when friction feed is used.

### ***Perform one-time line feed***

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "J" <i>n</i>	27 74 <i>n</i>	1B 4A <i>n</i>

Feeds the paper once by *n* times the defined base unit (*n*/180 inches in Standard mode). The value of *n* is between 0 and 255. If *n* = 0, the line-feed distance is set to 0. Does not move the print position right or left. Does not change the line-spacing setting.

### **Perform one $n/180$ -inch reverse line feed**

MODE	ASCII	Decimal	Hexadecimal
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 0 and 255. If  $n = 0$ , the line-feed distance is set to 0. Does not move the print position right or left. Does not change the line-spacing setting.

### **Set page length to $n$ lines**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "C" $n$	27 67 $n$	1B 43 $n$

Sets the page length to  $n$  lines at the current line spacing, where  $n$  is between 1 and 127.

Changing the line spacing later does not alter the physical page length. The current line becomes the first line of a new page.

### **Set page length to $n$ inches**

MODE	ASCII	Decimal	Hexadecimal
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 32 in Standard mode or between 1 and 64 in IBM mode. The current line becomes the first line of a new page.

### **Set top of page at current position**

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "4"	27 52	1B 34

Sets the current position as the top-of-page (top-of-form) position.

### **Set bottom margin**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> "N" <i>n</i>	27 78 <i>n</i>	1B 4E <i>n</i>

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**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> "O"	27 79	1B 4F

Cancels the bottom margin.

### **Form feed**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
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 automatic sheet feeder (ASF) is selected with EDS switch A6, this command ejects the current page.

### **Set vertical tab stops**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> "B" <i>n1</i> <i>n2</i> ... <0>	27 66 <i>n1</i> <i>n2</i> ... 0	1B 42 <i>n1</i> <i>n2</i> ... 00

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.

### **Set vertical tab stops in channel**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> "b" $n0$ $n1$ $n2$ ... <0>	27 98 $n0$ $n1$ $n2$ ... 0	1B 62 $n0$ $n1$ $n2$ ... 00

Cancels all current vertical tab stops in channel  $n0$ , (where  $n0$  is between 0 and 7) and sets new vertical tab stops in this channel. (A channel is a set of vertical tab stops selected with the <ESC> "/" command.) See the <ESC> "B" command for parameters  $n1$ ,  $n2$ , ... <0>.

### **Select vertical tab channel**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> "/" $n0$	27 47 $n0$	1B 2F $n0$

Selects a set of vertical tab stops designated by a channel number ( $n0$ ) from 0 to 7. The tab stops in each channel are set by <ESC> "b".

### **Vertical tab**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
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, such 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

### Set left margin

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "1" <i>n</i>	27 108 <i>n</i>	1B 6C <i>n</i>

Sets the left margin at column *n* (where *n* is between 0 and 255) at 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 given below:

Pica	$0 \leq n \leq 76$	Expanded pica	$0 \leq n \leq 38$
Elite	$0 \leq n \leq 91$	Expanded elite	$0 \leq n \leq 45$
Semi-condensed	$0 \leq n \leq 114$	Expanded semi-condensed	$0 \leq n \leq 57$
Condensed pica	$0 \leq n \leq 130$	Expanded condensed pica	$0 \leq n \leq 64$
Condensed elite	$0 \leq n \leq 152$	Expanded condensed elite	$0 \leq n \leq 76$

### Set right margin

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "Q" <i>n</i>	27 81 <i>n</i>	1B 51 <i>n</i>

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	$4 \leq n \leq 80$	Expanded pica	$2 \leq n \leq 40$
Elite	$5 \leq n \leq 96$	Expanded elite	$3 \leq n \leq 48$
Semi-condensed	$6 \leq n \leq 120$	Expanded semi-condensed	$3 \leq n \leq 60$
Condensed pica	$7 \leq n \leq 137$	Expanded condensed pica	$4 \leq n \leq 68$
Condensed elite	$8 \leq n \leq 160$	Expanded condensed elite	$4 \leq n \leq 80$

## ***Set left and right margins***

MODE	ASCII	Decimal	Hexadecimal
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***

MODE	ASCII	Decimal	Hexadecimal
Both	<CR>	13	0D

Prints the current line and sets the print position to the left margin. If EDS switch A5 is set to OFF, this command also performs a line feed.

## ***Set automatic line feed***

MODE	ASCII	Decimal	Hexadecimal
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 overrides EDS switch A5.

## ***Cancel automatic line feed***

MODE	ASCII	Decimal	Hexadecimal
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 A5.

## ***Backspace***

MODE	ASCII	Decimal	Hexadecimal
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**

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "D" <i>n1</i> <i>n2</i> ... <0>	27 68 <i>n1</i> <i>n2</i> ... 0	1B 44 <i>n1</i> <i>n2</i> ... 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 28 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**

MODE	ASCII	Decimal	Hexadecimal
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**

MODE	ASCII	Decimal	Hexadecimal
Both	<HT>	9	09

Moves the print position to the next horizontal tab stop. Ignored if there is no next horizontal tab stop on the current line. Note that when underlining is selected, spaces skipped by horizontal tabulation are not underlined.

### **Relative horizontal tab**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
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 formula for the distance and direction are as follows:

If  $n2$  is between 0 and 63, the print head moves right by  $(n1 + n2 \times 256)$  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 1/120 inch in draft mode and 1/180 inch in LQ mode.

### **Relative horizontal tab in inches**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
IBM	<ESC> “d” $n1\ n2$	27 100 $n1\ n2$	1B 64 $n1\ n2$

Sets the next print position to  $(n1 + n2 \times 256)/120$  inches from the current position.

Ignored if this position is beyond the right margin.

The maximum tab position is 8 inches.

### **Absolute horizontal tab in inches**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Std.	<ESC> “\$” $n1\ n2$	27 36 $n1\ n2$	1B 24 $n1\ n2$

Sets the next print position to  $(n1 + n2 \times 256)/60$  inches from the left margin on the current line. Ignored if this position is beyond the right margin.



## Graphics commands

### Print normal-density 8-bit graphics

MODE	ASCII	Decimal	Hexadecimal
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  $(n1 + n2 \times 256)$  dots wide. Maximum width is 8 inches (480 dots).  $m1, m2, \dots$  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  $n1 + n2 \times 256$ . Dots beyond the right margin are ignored. On completion of bit-image printing the printer returns automatically to character mode.

### Print double-density 8-bit graphics

MODE	ASCII	Decimal	Hexadecimal
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 the <ESC> "K" command for other information.

### Print double-density, double-speed 8-bit graphics

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "Y" n1 n2 m1 m2 ...	27 89 n1 n2 m1 m2 ...	1B 59 n1 n2 m1 m2 ...

Prints bit-image graphics at 120 dots per inch horizontally (maximum 960 dots wide), skipping every second dot in the horizontal direction. See the <ESC> "K" command for other information.

### Print quadruple-density 8-bit graphics

MODE	ASCII	Decimal	Hexadecimal
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 the <ESC> "K" command for other information.

### Print hex-density 24-bit graphics

MODE	ASCII	Decimal	Hexadecimal
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  $n1 + n2 \times 256$  dots wide. Maximum width is 8 inches (2880 dots). In the data  $m1$ ,  $m2$ ,  $m3$  ... each three bytes represent 24 vertical dots. In the leftmost 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 the data is organized in the same way. The number of data bytes must be  $3 \times (n1 + n2 \times 256)$ . Dots beyond the right margin are ignored. On completion of dot graphics printing, the printer returns automatically to character mode.

## Select graphics mode

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "*" n0 n1 n2 m1 m2 ...	27 42 n0 n1 n2 m1 m2 ...	1B 2A n0 n1 n2 m1 m2 ...

Selects one of eleven graphics modes depending on the value of *n0* and prints bit-image graphics in this mode. See the <ESC> "K" command (for 8-bit graphics) or the <FS> "Z" command (for 24-bit graphics) for information on *n1*, *n2*, *m1*, *m2*, etc.

<i>n0</i>	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, double-speed	(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)

## Select graphics mode

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> “[ “g” n1 n2 m0 m1 m2 ...	27 91 103 n1 n2 m0 m1 m2 ...	1B 5B 67 n1 n2 m0 m1 m2 ...

Selects one of eight graphics modes depending on the value of *m0* and prints bit-image graphics in this mode. The graphics image is  $(n1 + n2 \times 256) - 1$  dots wide. See the <ESC> “K” command (for 8-bit graphics) or the <FS> “Z” command (for 24-bit graphics) for information on *m1*, *m2*, etc.

<i>m0</i>	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, double-speed (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 (180 dots per inch)
12	24-bit Hex-density (360 dots per inch)

## Convert graphics density

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> “?” n m	27 63 n m	1B 3F n' m

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> “\*.”

## Download character commands

### Define download characters

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "&" <0> n1 n2 m0 m1 m2 d1 d2 ... dx	27 38 0 n1 n2 m0 m1 m2 d1 d2... dx	1B 26 00 n1 n2 m0 m1 m2 d1 d2... dx

Defines one or more new characters and stores them in RAM for later use. EDS switch A3 must be set to OFF; otherwise RAM is used as an input buffer only, not for storing downloaded characters, and this command is ignored.

*n1* is the character code of the first character to be defined and *n2* is the character code of the last character to be 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 of the character; the second byte, *m1*, specifies the character width; the third byte, *m2*, specifies the right of the character.

These values must not exceed the following maximum limits:

Character mode	<i>m1</i>	<i>m0 + m1 + m2</i>
Draft	9	12
LQ pica	31	36
LQ elite	27	30
LQ semi-condensed	19	24
LQ proportional	37	42
Draft super/subscript	7	12
LQ super/subscript	19	36
LQ prop. super/subscript	37	42

Next comes the dot data. Normal character height is 24 dots, so there must be  $3 \times m1$  bytes of dot data. If the printer is in super/subscript mode, however, the character height is 16 dots, so there must be  $2 \times m1$  bytes of dot data.

Each data byte represents eight vertical dots, with the most significant bit representing the top dot, and the least significant bit representing the bottom dot.

### Define download characters

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "=" $n1$ $n2$ "#" $n3$ $n4$ <O> $n5$ $m1$ $m2$ ... $m9$ $d1$ $d2$ ... $dx$	27 61 $n1$ $n2$ 35 $n3$ $n4$ 0 $n5$ $m1$ $m2$ ... $m9$ $d1$ $d2$ ... $dx$	1B 3D $n1$ $n2$ 23 $n3$ $n4$ 00 $n5$ $m1$ $m2$ ... $m9$ $d1$ $d2$ ... $dx$

Defines new characters and stores them in RAM for later use. EDS switch A3 must be OFF; otherwise RAM is used as an input buffer, not downloading characters, and this command is ignored.

Downloading characters in IBM mode requires Dot Pattern data and Character Index Table data. Dot Pattern data controls which pins fire when printing a character. Index Table data is placed in a "lookup table" that provides information on where Dot Pattern data is stored in memory and defines certain attributes of the character.

$(n1 + n2 \times 256)$  gives the number of bytes to be downloaded.

$n3$  and  $n4$  indicate the low order and high order addresses in which data is to be stored.  $n3$  should be 15 and  $n4$  should be 128 for this printer.

$n5$  determines the character mode to be downloaded, as shown below:

$n5$	Character mode	Character width
0	Draft	9
1	LQ pica	35
2	LQ proportional	17 to 41
3	LQ elite	29

$m1$  through  $m9$  indicate Index Table data.

$m1$  and  $m2$  indicate the address where Dot Pattern is stored.  $m1$  is the high-order byte.  $m3$  indicates the number of columns in the character memory, and  $m4$  indicates the number of columns in the character.

$m5$  through  $m9$  are compression mask bits. Data compression allows the efficient use of memory in storing downloaded characters providing space for more characters than would be available without compression. The printer repeats the previous dot column in the current column when the current column compression mask bit is set to 1.

It is necessary to define all of Index Table data before the Dot Pattern data to download many characters.

$d1, d2, \dots, dx$  is the Dot Pattern data being downloaded.

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.

### **Copy character set from ROM into RAM**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> ":" <0> $n$ <0>	27 58 0 $n$ 0	1B 3A 00 $n$ 00

Copies the character set selected by  $n$ , as shown below, to the corresponding download character RAM area.

overwriting any downloaded data already there. Ignored when EDS switch A3 is set to ON.

<i>n</i>	Font
0	Roman
1	Sanserif
2	Courier
3	Prestige
4	Script
7	Orator
8	Orator 2
12	H-Gothic
32	SLO Roman

**Select download character set**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> “%” <1>	27 37 1	1B 25 01

Selects the download character set. Ignored when EDS switch A3 is ON.

**Select ROM character set**

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> “%” <0>	27 37 0	1B 25 00

Stops using the download character set and returns to the built-in ROM character set. Ignored when EDS switch A3 is ON.



## Other printer commands

### Select print color

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "r" <i>n</i>	27 114 <i>n</i>	1B 72 <i>n</i>

Selects the printing color according to the value of *n* as shown below. Ignored if EDS switch A4 is OFF or if a color ribbon is not installed.

<i>n</i>	Color	<i>n</i>	Color
0	Black	4	Yellow
1	Magenta	5	Orange
2	Cyan	6	Green
3	Violet		

### Set MSB to 1

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> ">"	27 62	1B 3E

Sets the most significant bit of each subsequent byte received to 1, allowing users with a 7-bit interface to access characters with ASCII codes greater than 127.

### Set MSB to 0

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "="	27 61	1B 3D

Sets the most significant bit of each subsequent byte received to 0.

### Accept MSB as is

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "#"	27 35	1B 23

Cancels the preceding commands and accepts the most significant bit as it is when it is sent to the printer.

### Delete last character sent

MODE	ASCII	Decimal	Hexadecimal
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 part of a command.

### Cancel last line

MODE	ASCII	Decimal	Hexadecimal
Both	<CAN>	24	18

Deletes the last line currently in the print buffer.

### Set printer off-line

MODE	ASCII	Decimal	Hexadecimal
Std.	<DC3>	19	13
IBM	<ESC> "Q" "S"	27 81 36	1B 51 24

Sets the printer off-line (into **not-ready mode**). The printer disregards all subsequent characters and commands except <DC1>, which puts it back on-line (into **ready mode**). The printer's ON LINE indicator will not go off.

### Set printer on-line

MODE	ASCII	Decimal	Hexadecimal
Both	<DC1>	17	11

Puts the printer back on-line (into **ready mode**), allowing it to receive and process all subsequent characters and commands. This command is ignored if the printer was set off-line (into **not-ready mode**) by pressing the **ON LINE** button on the control panel.

## Stop printing

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "j"	27 106	1B 6A

Prints the entire contents of the input buffer, then sets the printer off-line (into **not-ready mode**). The ON LINE indicator on the control panel will go off.

## Bell

MODE	ASCII	Decimal	Hexadecimal
Both	<BEL>	7	07

Sounds a brief beep tone on the printer.

## Bi-directional printing

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "U" <0>	27 85 0	1B 55 00

Causes subsequent printing to be performed in the normal bi-directional mode, which is faster than uni-directional printing.

## Uni-directional printing

MODE	ASCII	Decimal	Hexadecimal
Both	<ESC> "U" <1>	27 85 1	1B 55 01

Causes subsequent printing to be performed uni-directionally, ensuring maximum vertical alignment precision.

## One-line uni-directional printing

MODE	ASCII	Decimal	Hexadecimal
Std.	<ESC> "<"	27 60	1B 3C

Immediately returns the print head to the left margin, then prints the remainder of the line from left to right. Normal bi-directional printing resumes on the next line.

### **Manual feed**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> <EM> <0>	27 25 0	1B 19 00

Selects manual sheet feeding even when the sheet feeder is used. Ignored if EDS switch A6 is ON (ASF is not installed).

### **Auto feed**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> <EM> <4>	27 25 4	1B 19 04

Selects the automatic sheet feeder. Ignored if EDS switch A6 is ON (ASF is not installed).

### **Eject paper**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> <EM> "R"	27 25 82	1B 19 52

Ejects the current page. Ignored if EDS switch A6 is ON (ASF is not installed).

### **Set print start position on ASF**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> <EM> "T" <i>n</i>	27 25 84 <i>n</i>	1B 19 54 <i>n</i>

Skips  $n/6$  inches at the top of the page, where  $n$  is equal to or greater than 1. Ignored if EDS switch A6 is ON (ASF is not installed).

### **Reset printer**

<b>MODE</b>	<b>ASCII</b>	<b>Decimal</b>	<b>Hexadecimal</b>
Both	<ESC> "@"	27 64	1B 40
Std.	<FS> "@"	28 64	1C 40

Re-initializes the printer. Clears the print buffer and returns settings to their power-up values. Does not clear the input buffer or change ASF selections.

## Set initial conditions

MODE	ASCII	Decimal	Hexadecimal
IBM	<ESC> "[" "K" <3> <0> <0> <3> <i>n</i>	27 91 75 3 0 0 3 <i>n</i>	1B 5B 4B 03 00 00 03 <i>n</i>

Re-initializes the printer to the initial conditions determined by the value of *n*.

The value of *n* is the sum of the values given below for the desired characteristics.

Function	<i>n</i> value	Function	<i>n</i> value
Disable alarm	32	12-inch forms	4
Auto CR with LF	16	Slashed zero	2
Auto LF with CR	8	Character set #2	1



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# Appendix

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## **Specifications**

Printing system	Serial Impact Dot-matrix		
Printing speed	10 cpi (Pica)	12 cpi (Elite)	15 cpi (Semi- condensed)
Draft	220 cps	264 cps	330 cps
Letter Quality	67 cps	80 cps	100 cps
Print direction	Bi-directional, logic-seeking Uni-directional, logic-seeking (selectable)		
Print head	24 pins		
Life	200 million dots/pin		
Line spacing	1/6, 1/8, n/60, n/72, n/180, n/216, n/360 inches		
Typeface families	Draft, Roman, Sanserif, Courier, Prestige, Script, Orator, Orator-2, H-Gothic, SLQ Roman		

Characters	ASCII	96
	International	16 sets (*)
	IBM special	111
	IBM block graphic	50
	IBM code page	6 sets (**)
	Download	256

\* USA, France, Germany, England, Denmark I, Sweden, Italy, Spain I, Japan, Norway, Denmark II, Spain II, Latin America, Korea, Irish, Legal

\*\* #437 (USA), #850 (Multi-Lingual), #860 (Portuguese), #861 (Icelandic), #863 (Canadian 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	Draft	LQ
Pica	24 × 9	24 × 31
Elite	24 × 9	24 × 27
Semi-condensed	16 × 7	16 × 21
Condensed pica	24 × 9	24 × 16
Condensed elite	24 × 9	24 × 16
Proportional		24 × n



### Bit image dot-matrix

8-pin normal (60 DPI)	8 × 480
8-pin double (120 DPI)	8 × 960
8-pin high-speed double (120 DPI)*	8 × 960
8-pin quadruple (240 DPI)*	8 × 1920
8-pin CRT I (80 DPI)	8 × 640
8-pin CRT II (90 DPI)	8 × 720
24-pin normal (60 DPI)	24 × 480
24-pin double (120 DPI)	24 × 960
24-pin CRT III (90 DPI)	24 × 720
24-pin Triple (180 DPI)	24 × 1440
24-pin Hex (360 DPI)*	24 × 2880

- \*. It is impossible to print adjacent dots in modes marked with an asterisk (\*).

### Paper feed

Standard	Friction feed with paper guide Push tractor feed from the rear of the printer Pull tractor feed from the bottom of the printer
Option	Friction feed with SF-10DW automatic sheet feeder

Paper feed speed            3.4 inches/second maximum

## Paper specifications

### Cut sheet

Width	5.5" - 11.0" (139.7 - 279.4 mm)
Length	5.5" - 14.0" (139.7 - 355.6 mm)
Thickness	0.07 - 0.12 mm
Weight	14 - 24 lb, 52 - 90 g/m <sup>2</sup> , 45 - 77 kg
Fanfold (continuous)	
Width	4.0" - 10.0" (101.6 - 254.0 mm)
Length	Minimum 5.5" (139.7 mm)
Thickness	Single-ply paper 0.07 - 0.12 mm Total for multi-part forms 0.35 mm
Weight	14 - 22 lb, 52 - 82 g/m <sup>2</sup> , 45 - 70 kg
Copies	Original + 4 copies

### Maximum buffer size

Without Download	46.7 kB
With Download	256 bytes

### Emulations

Standard mode	Epson LQ-860, NEC 24-wire graphics commands
IBM mode	IBM Proprinter X24E

Interface	Centronics parallel (standard) RS-232C serial (option)
-----------	---

Ribbon type	On-carriage, dedicated
	Monochrome (black only)
	Color (black, magenta, cyan, violet, yellow, orange, green)

## Ribbon life

Monochrome (Z24HD)	3 million characters (draft pica)
Long life Monochrome (LZ24HD)	4.5 million characters (draft pica)
Color (X24CL)	1 million characters/color (draft pica)

## Dimensions and Weight

Width	473 mm (18.6")
Depth	371 mm (16.6")
Height	174 mm (6.8")
Weight	7.6 kg (16.7 lb)

Power supply 120VAC, 220VAC, 230VAC, 240VAC, 50/60 Hz  
(varies according to the country of purchase)

Options Automatic sheet feeder (SF-10DW)  
Serial-Parallel Converter (SPC-8K)

## Parallel interface

Pin	Name	Function
1	$\overline{\text{STROBE}}$	Goes low for $\geq 0.5\mu\text{s}$ when active
2	DATA0	High when active
3	DATA1	High when active
4	DATA2	High when active
5	DATA3	High when active
6	DATA4	High when active
7	DATA5	High when active
8	DATA6	High when active
9	DATA7	High when active
10	$\overline{\text{ACK}}$	10 $\mu\text{s}$ to acknowledge receipt of data
11	BUSY	Printer sets line low when ready to receive data.
12	PAPER	High when paper runs out. Can be disabled with EDS setting.
13	SELECT	High when printer is on-line
<b>14-15</b>	<b>Not connected</b>	
16	SIGNAL GND	Signal ground
17	CHASSIS	Chassis ground
18	+5V	+5V DC output from printer
19-30	GND	Twisted pair ground return
31	$\overline{\text{RESET}}$	When this signal is set low, the printer is reset.
32	$\overline{\text{ERROR}}$	Low when printer cannot continue due to an error
33	EXT GND	External ground
<b>34 - 35</b>	<b>Not connected</b>	
36	$\overline{\text{SELECT IN}}$	Always high

## **Character sets**

The following tables show the Standard and IBM character sets. Also shown are the IBM code pages (international variations of IBM character set #2) and the standard (Epson) mode international character sets (international variations of the Epson Standard character set).

The decimal character code for each character is shown in an inset at the bottom right of the character.

The hexadecimal character code for a character can be found by reading the hexadecimal column and row numbers, which are at the top and on the left of the table. For example, the character "A" is in column 4 and row 1, so its hexadecimal character code is 41. This is equivalent to decimal 65 ( $4 \times 16 + 1 = 65$ ), which is the decimal number shown in the inset.

Control codes are indicated by abbreviations in angle brackets, e.g. <LF>.

# Standard character set #2

	0	1	2	3	4	5	6	7	
0	<NUL> 0	16	32	48	@	P	`	p	
1	<DC1> 1	17	33	49	A	Q	a	q	
2	<DC2> 2	18	34	50	B	R	b	r	
3	<DC3> 3	19	35	51	C	S	c	s	
4	<DC4> 4	20	36	52	D	T	d	t	
5	5	21	37	53	E	U	e	u	
6	<SYN> 6	22	38	54	F	V	f	v	
7	<BEL> 7	23	39	55	G	W	g	w	
8	<BS> 8	<CAN> 24	(	40	56	H	X	h	x
9	<HT> 9	<EM> 25	)	41	57	I	Y	i	y
A	<LF> 10	*	:	42	58	J	Z	j	z
B	<VT> 11	<ESC> 27	+	43	59	K	[	k	{
C	<FF> 12	<FS> 28	,	44	60	L	\	l	
D	<CR> 13	29	-	45	61	M	]	m	}
E	<SO> 14	30	.	46	62	N	^	n	~
F	<SI> 15	31	/	47	63	O	_	o	<DEL>

Standard character set #2 (continued)

	8	9	A	B	C	D	E	F
0	à 128	š 144	160	ó 176	@ 192	P 208	224	240
1	é 129	ß 145	! 161	ì 177	À 193	Q 209	á 225	q 241
2	û 130	Æ 146	" 162	2 178	B 194	R 210	b 226	r 242
3	ò 131	æ 147	# 163	3 179	C 195	S 211	c 227	s 243
4	ì 132	ø 148	\$ 164	4 180	D 196	T 212	d 228	t 244
5	° 133	ø 149	% 165	5 181	E 197	U 213	e 229	u 245
6	£ 134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	í 135	À 151	' 167	7 183	G 199	W 215	g 231	w 247
8	í 136	Ö 152	( 168	8 184	H 200	X 216	h 232	x 248
9	Ë 137	Û 153	) 169	9 185	I 201	Y 217	i 233	y 249
A	ñ 138	ä 154	* 170	: 186	J 202	Z 218	j 234	z 250
B	α 139	ö 155	+ 171	; 187	K 203	[ 219	k 235	{ 251
C	Ĥ 140	ü 156	, 172	< 188	L 204	\ 220	l 236	252
D	À 141	ß 157	- 173	= 189	M 205	] 221	m 237	} 253
E	á 142	é 158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	ç 143	¥ 159	/ 175	? 191	O 207	_ 223	o 239	255

## International character sets

The character codes are shown in decimal.

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	À	Ö	Ü	^	`	ä	ö	ü	ß
ENGLAND	£	\$	@	X	Z	[	\	]	^	`	{		}	~
DENMARK I	#	\$	@	X	Z	Æ	Ø	Å	^	`	æ	ø	å	~
SWEDEN	#	¤	É	X	Z	À	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	#	\$	@	X	Z	°	\	é	^	ù	à	ò	è	ì
SPAIN I	₧	\$	@	X	Z	í	ñ	¿	^	´	¨	ñ	}	~
JAPAN	#	\$	@	X	Z	[	¥	]	^	`	{		}	~
NORWAY	#	¤	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
DENMARK II	#	\$	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
SPAIN II	#	\$	á	X	Z	í	ñ	¿	é	´	í	ñ	ó	ú
LATIN AMERICA	#	\$	á	X	Z	í	ñ	¿	é	ü	í	ñ	ó	ú
KOREA	#	\$	@	X	Z	[	₩	]	^	`	{		}	~
IRISH	#	\$	@	Ú	´	[	\	]	^	`	À	É	Ó	~
LEGAL	#	\$	§	X	Z	°	'	"	¶	`	©	®	†	™



**IBM character set #2**  
**Code page #437 (U.S.A.)**

	0	1	2	3	4	5	6	7
0	<NUL> 0	16 1	32 2	48 3	@ 4	P 5	` 6	p 7
1	1 8	<DC1> 17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2 18	<DC2> 18	" 34	2 50	B 66	R 82	b 98	r 114
3	♥ 3	<DC3> 19	# 35	3 51	C 67	S 83	c 99	s 115
4	♦ 4	<DC4> 20	\$ 36	4 52	D 68	T 84	d 100	t 116
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117
6	♠ 6	<SYN> 22	& 38	6 54	F 70	V 86	f 102	v 118
7	<BEL> 7	23 8	' 39	7 55	G 71	W 87	g 103	w 119
8	<BS> 8	<CAN> 24	( 40	8 56	H 72	X 88	h 104	x 120
9	<HT> 9	<EM> 25	) 41	9 57	I 73	Y 89	i 105	y 121
A	<LF> 10	26 9	* 42	: 58	J 74	Z 90	j 106	z 122
B	<VT> 11	<ESC> 27	+ 43	; 59	K 75	[ 91	k 107	{ 123
C	<FF> 12	<FS> 28	, 44	< 60	L 76	\ 92	l 108	 124
D	<CR> 13	29 10	- 45	= 61	M 77	] 93	m 109	} 125
E	<SO> 14	30 11	. 46	> 62	N 78	^ 94	n 110	~ 126
F	<SI> 15	31 12	/ 47	? 63	O 79	_ 95	o 111	<DEL> 127

Code page #437 (U.S.A.) – continued

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	Á 160	☐ 176	Ł 192	⋈ 208	α 224	≡ 240
1	Û 129	æ 145	í 161	☐ 177	⊥ 193	⸮ 209	β 225	± 241
2	é 130	Æ 146	ó 162	☐ 178	⸮ 194	π 210	Γ 226	¿ 242
3	à 131	ò 147	ú 163	 179	† 195	⋈ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	Ł 212	Σ 228	∫ 244
5	á 133	ò 149	ñ 165	‡ 181	† 197	F 213	σ 229	J 245
6	â 134	û 150	æ 166	‡ 182	† 198	π 214	μ 230	+ 246
7	ç 135	ù 151	ω 167	π 183	‡ 199	‡ 215	τ 231	≈ 247
8	è 136	ÿ 152	¿ 168	‡ 184	⋈ 200	‡ 216	Φ 232	° 248
9	ë 137	ö 153	ƒ 169	‡ 185	ƒ 201	∫ 217	Θ 233	• 249
A	ê 138	Û 154	ƒ 170	‡ 186	⋈ 202	ƒ 218	Ω 234	• 250
B	ï 139	¢ 155	¼ 171	ƒ 187	⸮ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	½ 172	⋈ 188	‡ 204	■ 220	∞ 236	∞ 252
D	ï 141	¥ 157	í 173	⋈ 189	= 205	■ 221	∅ 237	² 253
E	Ë 142	℞ 158	« 174	‡ 190	‡ 206	■ 222	ε 238	■ 254
F	À 143	f 159	» 175	ƒ 191	⋈ 207	■ 223	∩ 239	■ 255

### Code page #850 (Multi-lingual)

The other characters are the same as in code page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	• 176	Ł 192	ö 208	ó 224	- 240
1	ü 129	æ 145	í 161	• 177	ł 193	ð 209	β 225	± 241
2	é 130	Æ 146	ó 162	• 178	Ť 194	È 210	Ô 226	= 242
3	à 131	ò 147	ú 163	 179	† 195	È 211	ò 227	⌘ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	È 212	ö 228	¶ 244
5	à 133	ò 149	Ñ 165	À 181	† 197	ı 213	Ö 229	§ 245
6	ä 134	û 150	æ 166	À 182	ä 198	ı 214	μ 230	+ 246
7	ç 135	ù 151	ø 167	À 183	Ä 199	ı 215	þ 231	• 247
8	e 136	ý 152	ı 168	• 184	Ł 200	ı 216	þ 232	° 248
9	ë 137	ö 153	• 169	† 185	Ť 201	ı 217	ú 233	•• 249
A	e 138	ú 154	¬ 170	 186	Ł 202	ı 218	ú 234	• 250
B	ı 139	ø 155	½ 171	¶ 187	Ť 203	■ 219	ú 235	¹ 251
C	ı 140	£ 156	⌘ 172	¶ 188	† 204	■ 220	ý 236	³ 252
D	ı 141	Ø 157	ı 173	¢ 189	= 205	ı 221	Ÿ 237	² 253
E	À 142	× 158	« 174	≠ 190	Ł 206	ı 222	- 238	■ 254
F	À 143	f 159	» 175	¬ 191	Ł 207	■ 223	• 239	255

**Code page #860 (Portuguese)**

The other characters are the same as in code page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	Ë 144	á 160	☼ 176	Ł 192	⋈ 208	α 224	≡ 240
1	ú 129	À 145	í 161	☼ 177	⊥ 193	⌒ 209	β 225	± 241
2	é 130	Ë 146	ó 162	☼ 178	⌒ 194	π 210	Γ 226	≥ 242
3	à 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	â 133	ò 149	ñ 165	‡ 181	† 197	ƒ 213	σ 229	∫ 245
6	Á 134	Û 150	ã 166	‡ 182	‡ 198	π 214	μ 230	+ 246
7	ç 135	ù 151	ó 167	π 183	‡ 199	‡ 215	τ 231	≈ 247
8	e 136	ı 152	ı 168	‡ 184	⋈ 200	‡ 216	Φ 232	° 248
9	ê 137	ö 153	ö 169	‡ 185	ƒ 201	∟ 217	θ 233	• 249
A	è 138	ü 154	ı 170	‡ 186	⋈ 202	ƒ 218	Ω 234	• 250
B	í 139	ç 155	½ 171	‡ 187	⌒ 203	■ 219	ø 235	√ 251
C	ó 140	£ 156	¼ 172	⋈ 188	‡ 204	■ 220	∞ 236	n 252
D	ì 141	Û 157	ı 173	⋈ 189	= 205	■ 221	∅ 237	² 253
E	Á 142	Ř 158	« 174	‡ 190	‡ 206	■ 222	ε 238	■ 254
F	À 143	Ó 159	» 175	‡ 191	≠ 207	■ 223	∩ 239	

**Code page #861 (Icelandic)**

The other characters are the same as in code page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	È 144	Á 160	⋯ 176	Ł 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	π 210	Γ 226	≥ 242
3	à 131	ø 147	ú 163	† 179	‡ 195	⋈ 211	κ 227	≤ 243
4	ä 132	ö 148	À 164	‡ 180	— 196	Ł 212	Σ 228	† 244
5	á 133	þ 149	Í 165	‡ 181	‡ 197	F 213	σ 229	J 245
6	â 134	û 150	Ó 166	‡ 182	‡ 198	π 214	μ 230	+ 246
7	ç 135	ÿ 151	Û 167	π 183	‡ 199	‡ 215	τ 231	≈ 247
8	ê 136	ý 152	Ł 168	‡ 184	⋈ 200	‡ 216	Φ 232	° 248
9	ë 137	ÿ 153	ƒ 169	‡ 185	π 201	J 217	Θ 233	• 249
A	è 138	Û 154	ƒ 170	‡ 186	⋈ 202	ƒ 218	Ω 234	• 250
B	Ð 139	ø 155	½ 171	π 187	⌒ 203	■ 219	δ 235	√ 251
C	ð 140	£ 156	¾ 172	⋈ 188	‡ 204	■ 220	∞ 236	n 252
D	Þ 141	Ø 157	ı 173	⋈ 189	= 205	■ 221	ø 237	² 253
E	Ä 142	Ř 158	« 174	‡ 190	‡ 206	■ 222	ε 238	■ 254
F	Å 143	f 159	» 175	ƒ 191	⋈ 207	■ 223	∩ 239	

**Code page #863 (Canadian French)**

The other characters are the same as in code page #437.

	8	9	A	B	C	D	E	F
0	Ç [128]	È [144]	Ì [160]	Ï [176]	Ĺ [192]	Ț [208]	Α [224]	≡ [240]
1	Û [129]	É [145]	Í [161]	Ï [177]	Ł [193]	Ț [209]	Β [225]	± [241]
2	É [130]	È [146]	Ó [162]	Ï [178]	Ŧ [194]	Π [210]	Γ [226]	≥ [242]
3	À [131]	Ô [147]	Û [163]	Ï [179]	Ŧ [195]	Ț [211]	Π [227]	≤ [243]
4	À [132]	È [148]	Ï [164]	Ï [180]	— [196]	Ł [212]	Σ [228]	ƒ [244]
5	À [133]	Ï [149]	· [165]	ƒ [181]	† [197]	F [213]	σ [229]	Ƶ [245]
6	Ŧ [134]	Ô [150]	ˆ [166]	Ŧ [182]	ƒ [198]	π [214]	μ [230]	† [246]
7	Ç [135]	Û [151]	— [167]	π [183]	Ŧ [199]	Ŧ [215]	τ [231]	≈ [247]
8	È [136]	α [152]	ƒ [168]	Ŧ [184]	Ł [200]	ƒ [216]	Φ [232]	° [248]
9	È [137]	Ó [153]	Ŧ [169]	Ŧ [185]	Ŧ [201]	Ŧ [217]	Θ [233]	· [249]
A	È [138]	Ŧ [154]	Ŧ [170]	Ŧ [186]	Ł [202]	Ŧ [218]	Ω [234]	· [250]
B	Ï [139]	Ç [155]	½ [171]	Ŧ [187]	Ŧ [203]	■ [219]	δ [235]	√ [251]
C	ƒ [140]	£ [156]	¾ [172]	Ŧ [188]	Ŧ [204]	■ [220]	∞ [236]	n [252]
D	= [141]	Ô [157]	¾ [173]	Ŧ [189]	= [205]	■ [221]	∅ [237]	² [253]
E	À [142]	Ô [158]	« [174]	Ŧ [190]	Ŧ [206]	■ [222]	€ [238]	■ [254]
F	Š [143]	ƒ [159]	» [175]	Ŧ [191]	± [207]	■ [223]	∩ [239]	

**Code page #865 (Nordic)**

The other characters are the same as in code page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	Ž 144	á 160	☐ 176	Ł 192	⌌ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	☐ 177	Ł 193	⌌ 209	β 225	± 241
2	é 130	Æ 146	ó 162	☐ 178	Ŧ 194	Π 210	Γ 226	≥ 242
3	à 131	ø 147	ú 163	 179	† 195	⌌ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	Ł 212	Σ 228	† 244
5	â 133	ò 149	ñ 165	‡ 181	† 197	F 213	σ 229	J 245
6	â 134	û 150	æ 166	 182	‡ 198	π 214	μ 230	+ 246
7	ç 135	ù 151	ω 167	π 183	 199	 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	‡ 184	⌌ 200	≠ 216	Φ 232	° 248
9	ë 137	ÿ 153	ƒ 169	 185	‡ 201	⌌ 217	Θ 233	• 249
A	è 138	Û 154	ƒ 170	 186	⌌ 202	ƒ 218	Ω 234	• 250
B	ï 139	ø 155	½ 171	π 187	⌌ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	⌌ 188	‡ 204	■ 220	∞ 236	n 252
D	ì 141	Ø 157	ı 173	⌌ 189	= 205	■ 221	ø 237	² 253
E	Å 142	Ř 158	« 174	‡ 190	⌌ 206	■ 222	ε 238	■ 254
F	À 143	f 159	α 175	ƒ 191	⌌ 207	■ 223	∩ 239	

## Character set #1

The other characters are the same as in each version of character set #2

	0	1
0	<NUL> 0	16
1	<DC1> 1	17
2	<DC2> 2	18
3	<DC3> 3	19
4	<DC4> 4	20
5	5	21
6	<SYN> 6	22
7	<BEL> 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	<DC1> 129	145
2	<DC2> 130	146
3	<DC3> 131	147
4	<DC4> 132	148
5	133	149
6	<SYN> 134	150
7	<BEL> 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 that can be printed using software commands.

	0	1
0	∅ 0	▶ 16
1	⊕ 1	◀ 17
2	● 2	↑ 18
3	♥ 3	!! 19
4	♦ 4	¶ 20
5	♣ 5	S 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



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# Glossary

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This section gives a brief explanation of some of the terms used in this manual.

<b>Adobe Type Manager</b>	Software for Windows and Macintosh which allows you to print PostScript fonts.
<b>Adjustment lever</b>	Lever which lets you adjust the position of the print head for differing paper thicknesses.
<b>AEC mode</b>	See Automatic Emulation Change mode.
<b>Application</b>	Software program, such as a word-processor, from which you can print out documents.
<b>Auto line feed</b>	Printer function in which the printer automatically performs a carriage return and line feed whenever it receives a carriage return control code.
<b>Auto load position</b>	Position of the print head after paper is loaded, relative to the physical top of the page.
<b>AUTOEXEC.BAT</b>	MS-DOS set-up file containing statements which determine to which port the printer output is to be sent.

**Automatic Emulation Change mode**

Printer mode in which the printer automatically senses which emulation mode (Standard or IBM) the computer requires, and changes mode accordingly.

**Automatic Sheet Feeder**

An optional device which allows a number of cut sheets to be stacked into a hopper, and fed one at a time through the printer.

**Bi-directional printing**

Mode in which the printer prints graphics both from left to right and from right to left.

**Bit**

Short for "binary digit". The smallest unit of information ("On" or "Off" - "1" or "0").

**Bitmap fonts**

Fonts that can only be printed at a particular size. The fonts which you can select from the printer's control panel are bitmap fonts.

**Bottom feed**

The way in which fanfold paper is fed upward through the bottom of the printer (as opposed to the way in which it is fed from the back of the printer).

**Carriage return**

An instruction from the printer which tells the printer to move the print position to the start of the current line. See auto line feed.

**Centronics connector**

The type of connector which plugs into the printer's interface connector socket.

<b>Character code</b>	A number which stands for a letter, digit or symbol. A computer sends text to the printer in the form of character codes.
<b>Character set</b>	A fixed set of printable characters. A character set normally includes upper and lower case letters, the digits 0-9 punctuation symbols and various other characters, for example accented characters for foreign languages or block graphic characters.
<b>Character table</b>	See character set.
<b>Code page</b>	A variant of the IBM character set with characters for a particular country or region, for example, code page #860 - Portuguese.
<b>Compatible</b>	See IBM compatible.
<b>Computer paper</b>	See fanfold paper.
<b>Control code</b>	A code number which instructs the computer to perform a particular operation. For example, the computer sends the printer a form feed control code (12) to make it eject the current page.
<b>Control panel</b>	<ol style="list-style-type: none"> <li>1) Panel on the printer that displays information about the printer's current working and allows you to operate the printer.</li> <li>2) Windows utility which allows you to make system settings, such as printer selection and port set-up.</li> </ol>

<b>Cut sheets</b>	Single sheets of paper.
<b>Default Printer</b>	The printer which is automatically used by Windows applications.
<b>Default setting</b>	Feature setting adopted if no user setting has been made (sometimes called "factory setting").
<b>DOS</b>	See MS-DOS
<b>Dot adjustment mode</b>	Mode in which you can realign the print head in bi-directional graphics mode.
<b>Double-spacing</b>	Printing text with a blank line between each printed line.
<b>Downloaded character</b>	User-defined character, created on the computer. Sent to and stored in the printer for later printing.
<b>Draft</b>	Printing mode in which only the Draft font is used. The printer can print more quickly in Draft mode than in Letter Quality mode.
<b>Electronic DIP Switch settings</b>	Printer settings which take effect when you switch on the printer. You can make these settings using the control panel.
<b>Emulation</b>	Imitation by one type of printer of the functions of another type of printer.
<b>Epson LQ-860</b>	Dot matrix printer which the NX-2480 Rainbow/Colour can emulate.

<b>Epson emulation mode</b>	See Standard mode.
<b>Factory settings</b>	See Default settings
<b>Fanfold paper</b>	Sheets of paper joined by perforations. Fanfold paper has small holes at the edges.
<b>Fixed pitch font</b>	See monospaced font.
<b>Font</b>	A set of characters of a particular typeface, which you can select for printing.
<b>Font lock mode</b>	Mode in which font selection can only be made from the printer's control panel.
<b>Form feed</b>	Printer operation which ejects the current page and feeds the next sheet into position, ready for printing.
<b>Forward micro feed</b>	Control panel operation which feeds paper through the printer in small steps.
<b>Graphics direction</b>	The printer's method of printing graphics. See bi-directional and uni-directional printing.
<b>Handshaking</b>	See protocol.
<b>Hexadecimal dump</b>	A printout of all character codes and control codes as they are received by the printer, along with their hexadecimal (base 16) values.
<b>IBM emulation mode</b>	Mode in which the printer emulates an IBM Proprinter X24E.

<b>IBM compatible</b>	A personal computer that can run the same system and applications software as an IBM PC.
<b>IBM PC</b>	Personal computer made by IBM capable of running MS-DOS and Windows system software. See also IBM compatible.
<b>IBM Proprinter X24E</b>	Dot matrix printer which the NX-2480 Rainbow/Colour printer can emulate.
<b>Icon</b>	On-screen symbol in Windows or Macintosh which represents a program or document. You can double-click on an icon to start the program or open the document.
<b>Interface</b>	Physical link between the printer and the computer.
<b>International character set</b>	Variant of the Standard character set containing characters for a particular country or region.
<b>Landscape</b>	Landscape mode is when a document is printed on paper with the longest sides of the paper at the top and bottom.
<b>Letter Quality</b>	Printing mode in which the built-in fonts are used to produce high-quality (suitable for correspondence) text output.
<b>Line feed</b>	An instruction from the computer which tells the printer to advance the paper by one line.



**Long test**

Repetitive printer test showing every available font and pitch setting, all characters sets, current vertical alignment and current Electronic DIP switch settings.

**Macintosh**

Easy-to-use personal computer which allows you to print using TrueType and PostScript fonts (to use PostScript fonts you must have installed Adobe Type Manager). To use the printer with a Macintosh, you need an additional interface cable.

**Macro**

Printer function which allows you to save the font, pitch, zoom resolution, single-sheet auto load position and fanfold auto load position. Macro settings come into effect each time the printer is switched on.

**Micro feed**

See forward micro feed and reverse micro feed.

**MODE statement**

Statement in an MS-DOS AUTOEXEC.BAT file that determines to which port the computer should send printer output.

**Monospaced font**

Font in which all characters are of the same width.

**MS-DOS**

The most common operating system software for the IBM PC and compatible machines.

<b>Multi-part form</b>	Forms (such as invoices) consisting of several sheets, one on top of another, enabling several copies to be made simultaneously.
<b>NCR sets</b>	“No Carbon Required” – multi-part forms which use pressure-sensitive chemicals to mark the lower copies.
<b>Not-ready mode</b>	Printer mode in which you can change printer settings using the control panel. The printer cannot print in not-ready mode.
<b>Orientation</b>	The rotation in which paper is loaded. See landscape orientation and portrait orientation.
<b>Over-printing</b>	Printing text on top of existing text. This may be caused by an incorrect auto line feed setting.
<b>Paper feed</b>	Control panel operation which allows you to feed paper through the printer one line at a time.
<b>Paper guides</b>	Devices which hold single sheets so that they are fed into the printer correctly.
<b>Paper out</b>	Printer function which automatically detects when the paper has run out and stops printing.
<b>Parallel cable</b>	Standard cable for connecting the printer to a computer.
<b>Parallel interface</b>	An interface which transfers data between the computer and the printer 8 bits at a time.

<b>Parity checking</b>	A way of checking that information sent over a serial interface has been received correctly.
<b>Parking paper</b>	Printer function that allows you to print on single sheets without removing fanfold paper.
<b>Pitch</b>	The number of characters in a one-inch line of text.
<b>Pitch lock mode</b>	Mode in which font selection can only be made from the printer's control panel.
<b>Platen</b>	Roller that guides paper through the printer and provides a solid surface against which the print head can make an impression on the paper.
<b>Platen knob</b>	Printer wheel that allows you to advance paper manually.
<b>Port</b>	Socket in the back of a computer through which a computer communicates with other devices, such as the printer.
<b>Portrait</b>	Portrait mode is when a document is printed on paper with the longest sides of the paper at the sides.
<b>PostScript font</b>	Type of scalable font similar to TrueType fonts. PostScript fonts can be printed if you have installed the Adobe Type Manager program on your computer.

<b>Print gap</b>	The distance between the print head and the platen. This distance can be adjusted to suit different thicknesses of paper.
<b>Print head</b>	Printer part that transfers the image to the paper.
<b>Print head shield</b>	A thin metal plate between the print head and the platen.
<b>Print pitch</b>	See pitch.
<b>Printable area</b>	The part of the page on which the printer can print.
<b>Printer driver</b>	Computer file which enables system or application software to print to a particular printer.
<b>Proportionally spaced font</b>	Font in which different characters can be of different widths.
<b>Protocol</b>	Method of regulating information transfer between the computer and the printer. Sometimes called "handshaking".
<b>Quiet mode</b>	Mode in which the printer prints more quietly (and slightly more slowly).
<b>Ready mode</b>	Printer mode in which the printer can receive and print data from the computer.
<b>Release lever</b>	Lever that grips single sheets as they are fed into the printer.
<b>Reverse micro feed</b>	Control panel operation which to feeds paper backwards through the printer in small steps.

<b>Ribbon cartridge</b>	Cartridge that contains the ribbon which the head uses to mark the paper.
<b>Scalable fonts</b>	Fonts which you can print at any size. TrueType fonts are scalable.
<b>Serial interface</b>	A computer interface which transfers data one bit at a time.
<b>Serial-to-parallel interface converter</b>	Optional accessory that allows you to connect the printer to a serial port on your computer.
<b>Short test</b>	Printer test in which seven lines of characters are printed. If you have fitted a color ribbon, each line will be printed in a different color.
<b>Standard mode</b>	Mode in which the printer emulates an Epson LQ-860 printer.
<b>System software</b>	Software that runs on your computer to control basic computer functions (screen display, keyboard input, disk access and printer output).
<b>Tear-off function</b>	Printer function which allows you to remove fanfold output without altering the current position of the fanfold paper.
<b>Tractor</b>	Part of the unit which grips the fanfold paper.
<b>TrueType font</b>	Type of scalable font which you can install on your computer and print on the printer (provided you are using Windows 3.1 or later).

<b>Typeface</b>	The design style of a font. Common typefaces are Times and Helvetica.
<b>Uni-directional printing</b>	Mode in which the printer prints graphics from left to right only.
<b>Vertical alignment</b>	See dot adjustment mode.
<b>Weight</b>	The thickness of the lines which make up a font's characters. Common weights are Medium, Bold and Black.
<b>Windows</b>	System software for the IBM PC which has an easy-to-use interface.
<b>Zoom mode</b>	Printer mode that allows you to print documents scaled to 50% or 67%.

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## Customer service information

If you experience some technical difficulty with your Star printer, please refer to “Common problems and solutions” on page 78. 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
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### **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

## **Customer response**

Star Micronics Co., Ltd. invites your suggestions and comments on your printer and this manual. Please address your correspondence to:

### **Worldwide Headquarters**

STAR MICRONICS CO., LTD.  
20-10 Nakayoshida  
Shizuoka, Japan 422-91  
Attn. Product Manager

### **North and South America Markets**

STAR MICRONICS AMERICA, INC.  
70- D Ethel Road West  
Piscataway, NJ 08854  
Attn. Product Manager

### **European Market**

STAR MICRONICS DEUTSCHLAND GMBH  
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D-60489 Frankfurt  
F.R. of Germany  
Attn. Product Manager

### **U.K. Market**

STAR MICRONICS U.K., LTD  
Star House  
Peregrine Business Park  
Gomm Road, High Wycombe  
Bucks. HP13 7DL, U.K.  
Attn. Product Manager

### **French Market**

STAR MICRONICS FRANCE S.A.R.L.  
25, rue Michaël Faraday  
F-78182 St-Quentin en Yvelines Cedex  
Attn. Product Manager

### **Asian Market**

STAR MICRONICS ASIA LTD.  
18/F Tower 2, Enterprise Square  
9 Sheung Yuet Road, Kowloon Bay, HONG KONG  
Attn. Product Manager



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