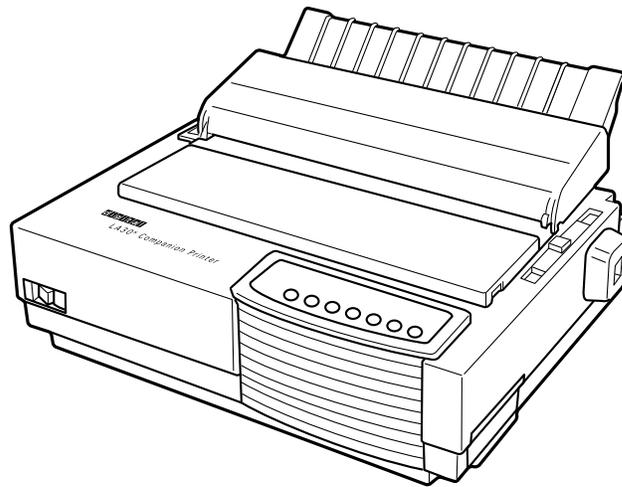




LA30^N/LA30^W Companion Printer



User Guide



Order Number: EK-LA30E-UG-001





LA30N/LA30W Companion Printer

User Guide



Digital Equipment Corporation
Maynard, Massachusetts







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Preface

About this Guide

Thank you for buying a Digital LA30 Companion Printer. You can expect years of reliable service with very little maintenance. The information provided in this guide applies both to the Digital LA30N Companion Printer (80-column printer) and to the Digital LA30W Companion printer (136-column printer). However, illustrations are of LA30N Companion Printer. This guide explains how you can use your printer to full advantage. It is written for both new and experienced printer users.

This guide consists of two parts: *Setting Up Your Printer* and *User Guide*. The former describes how to install and set up your printer. This part is easily identifiable, as each page has a gray border. The latter, this part, describes how to use your printer and printer options, how to keep the printer in good working condition, and what to do should something go wrong. Detailed procedures are provided for first-time users. Experienced users can skip some of the details, using the table of contents and chapter introductions to locate specific information.

This part has several appendixes, a glossary, and an index. Appendix A lists supplies and options available from your dealer or authorized representative of Digital Equipment Corporation.

Printer Models and Options

Model LA30N is an 80-column printer and model LA30W is a 136-column printer. Both models have a dual interface made up of Bitronics parallel and DEC-423 serial. The power supply of the printer is either for 100-120 VAC input or for 220-240 VAC input. You must specify the print line and the power rating when purchasing the printer. Other options include a color print feature which you can add by yourself after purchasing the printer. The configuration is:

LA30N/LA30W

- Basic specifications
 - Print line at 10 cpi*: 80 columns for LA30N
136 columns for LA30W
 - Interfaces: Bitronics parallel and DEC-423 serial
- Alternative specification
 - Power supply: 100–120 VAC or 220–240 VAC
- User add-on options
 - Color Kit

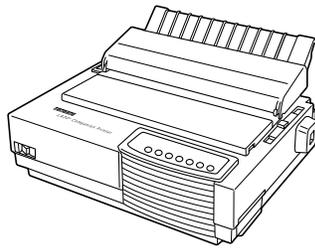
* cpi: characters per inch



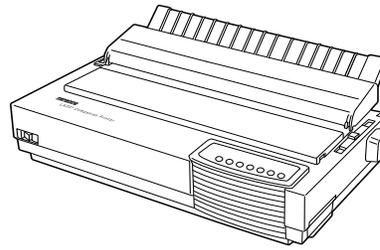
The LA30N and LA30W Model Specifications

The main difference between the LA30N and the LA30W is the “*print span*”.

The LA30N is an 80-column printer and the LA30W a 136-column printer. As shown in the following figure, the physical specifications are thus different (size, weight, ...).



Digital LA30N Companion Printer



Digital LA30W Companion Printer

Some minor differences concern mechanical internal parts that do not impact the general uses of the printer (top cover hinges, bail rollers mechanism, ...). The only visible difference concerns the accurate location of the notch scale of the paper thickness lever.

Specification differences are clearly identified further in this User Guide.

Organization

The user guide is organized as follows:

1 - Introduction

This chapter introduces the printer and identifies key features and options that enhance the printer’s capabilities.

2 - Paper Handling

This chapter explains how to load your printer and use paper with it.

3 - Printing

This chapter covers basic printing operations and provides detailed descriptions of everyday operations from the printer’s control panel, including print feature selection.



4 - Using Set-Up Mode

This chapter describes how to change the printer's optional settings, such as print features, hardware options, and top-of-form. Most settings only affect print features such as the type style and page format. Note that certain settings directly affect hardware and software compatibility. Refer to this chapter as indicated in the part *Setting Up Your Printer* or as required.

5 - Maintenance

This chapter explains basic maintenance procedures for this printer.

6 - Trouble-Shooting

This chapter describes problem-solving techniques. Before you contact your dealer for help, check the list of problems and solutions provided in this chapter.

At the end of this guide, you will find several appendices, a glossary, and an index. Appendix A gives order numbers for printer supplies and options, explaining how to install them. Other appendices provide additional technical information about the printer.

Notes, Cautions and Warnings

The text contains three different types of annotation which should always be read.

Note: This NOTE annotation provides you with additional information, or indicates where you can find it.

Caution: *This CAUTION annotation should catch your attention, advising you of a particular situation/problem which may occur/be avoided as a result of a certain sequence of operations. It may also contain a reminder to execute a particular operation.*

Warning: This WARNING annotation indicates a specific procedure which must be strictly observed. Failure to comply with the instructions given may result in injury to the operator and/or damage to the printer.

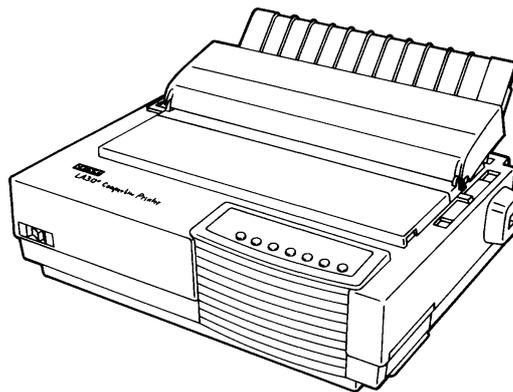




1

Introduction

Congratulations on purchasing a Digital LA30 Companion Printer. This printer is a compact, versatile printer that offers maximum compatibility with today's software packages and personal computers. The 24-wire print head provides crisp, clear printing for business, office, and home environments. This printer is also easy to install and use.



Digital LA30 Companion Printer

Features

Key printer features and options are listed in the next two sections.

- **Software compatibility.** This printer, which operates with the DEC PPL2 protocol, the IBM Proprinter X24E (LA30N) or IBM Proprinter XL24E (LA30W) protocol and the Epson ESC/P2 protocol (for Epson LQ870 or LQ1170 printers or equivalent).
- **Various character sets.** For the DEC PPL2 protocol, 31 character sets (twenty-five 94-character sets and six 96-character sets) are available. For IBM Proprinter X24E and XL24E protocol, set 1, set 2, and 30 default sets (code pages and specific character sets) are available. For Epson ESC/P2 protocol, 15 national character sets and 30 default sets (code pages and specific character sets) are available.



Introduction

- **Multiple fonts.** The printer has eighteen resident fonts: Ten bit-map fonts — Draft, High-speed (HS) Draft, High-impact (Hi) Draft, Courier 10, Pica 10, Prestige Elite 12, Compressed 17, Boldface PS, OCR A, and OCR B; six outline fonts — Timeless and Nimbus Sans, each in upright, italic, and bold; three outline fonts — Courier in upright, italic, and bold (available for the Epson ESC/P2 protocol only); and nine Barcode fonts — Code 3 of 9, Industrial 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, EAN 8, EAN 13, UPC-A, Codabar, and Postnet.
- **High-speed printing.** At 10 cpi, print speed ranges from 100 cps for letter quality to 333 cps for high-speed draft quality.
- **64K bytes of input buffer.** 64K bytes are available for storing input data and downloading custom fonts. A minimum download buffer capacity is available separately.
- **Simple switching of paper types.** The ability to “park” continuous forms makes it easy to switch between continuous forms and single sheets.
- **Bottom feeding capability.** The tractor unit is removable and can be converted to push-feed or pull-feed. Installing the tractor unit on the platen allows the paper to be fed through the slot at the bottom of the printer.
- **Automatic tear-off advancing.** With factory settings of the Set-Up mode, continuous forms’ perforations are automatically advanced up to the tear bar at the end of each job so that forms can be torn off. The tear-off feed can be also activated by pressing the Pause button.
- **Auto viewing.** Paper (continuous forms or single sheets) is automatically advanced at the end of each printing so that the last printed line can be read.
- **Maintenance-free.** The printer only requires periodic cleaning and changing of the ribbon cartridge.
- **Windows printer driver.** Printer drivers for Windows 3.x and Windows 95 are delivered with your printer. The printer driver is a control program to be installed on your computer for controlling document printing on your printer (for example, controlling the page size, the paper orientation, and so on). It receives print data from your application software, converts the data into commands that the printer can execute, and sends the commands to the printer.

Options

Printer add-on options are listed below. For details, see Appendix A “Supplies and Options”.

- **Color kit.** You can turn your monochrome printer into a color printer. Seven-color printing using a color ribbon is possible if supported by your software.



2

Paper Handling

This chapter explains how your printer uses paper. Topics covered are:

- Getting to know the printer's major parts and the control panel
- Selecting paper
- Overview of paper operations
- Adjusting for paper thickness
- Using single sheets
- Using continuous forms (push-tractor feed and pull-tractor feed)
- Feeding and positioning paper
- Switching paper types

Tips for paper handling are given at the end of this chapter. Check that section if you are using multipart forms, envelopes, or labels.

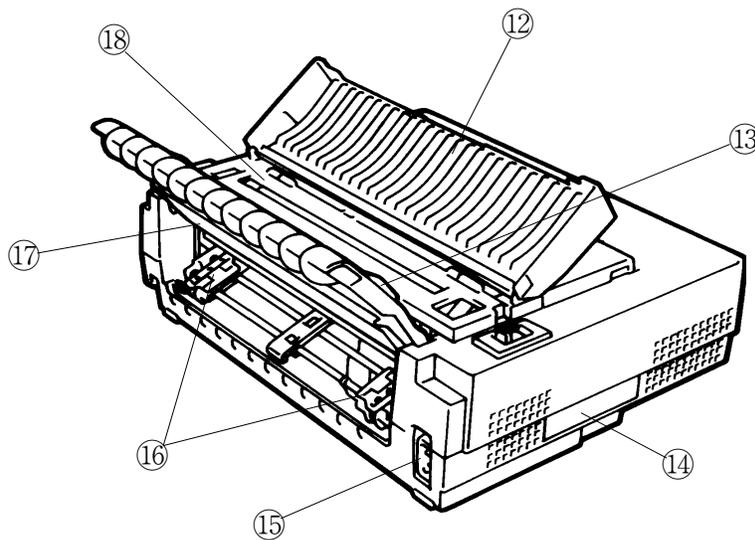
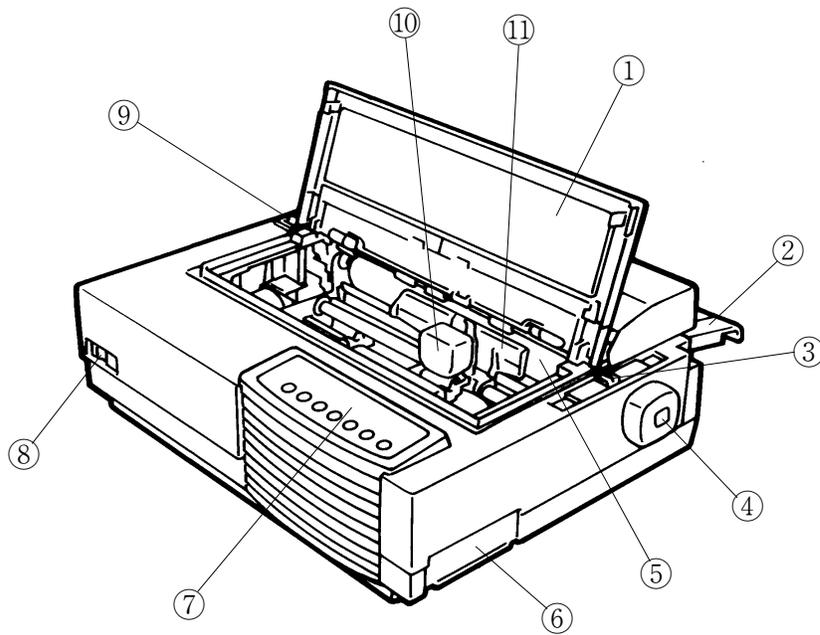
Getting to Know the Printer's Major Parts and the Control Panel

This section describes the major parts and controls of the printer and operations of the control panel. Take a moment to become familiar with the printer.



Paper Handling

Parts of the Printer



Front and Rear Views





Paper Handling

The figures on the previous page show front and rear views of the printer. The following parts are indicated:

Front View

1. Front cover (*to protect the print head*)
2. Cut sheet stand (*to hold printing and printed pages*)
3. Paper thickness lever (*to adjust the print head gap*)
4. Platen knob (*to manually advance the paper*)
5. Platen (*to support the paper*)
6. Interface connector (*to connect the printer to the host system*)
7. Control panel (*to load and feed paper, select print features, or change the printer's optional settings*)
8. Power switch (*to switch the printer on/off*)
9. Paper select lever (*to switch the paper source*)
10. Print head (*to apply ink to the page*)
11. Print guide (*to indicate the print line*)

Rear View

12. Acoustic cover (*to reduce sound noise*)
13. Paper guide (*to insert single sheets and envelopes*)
14. Rating label (*to indicate the printer power specifications*)
15. Power connector (*to connect the printer to the power supply*)
16. Forms tractors (*to hold and feed continuous forms*)
17. Back cover (*to protect forms tractors*)
18. Top cover (*to protect the platen and serve as the tear bar*)



Paper Handling

Operations of the Control Panel

This section summarizes status indications and operations of the control panel in Normal mode. For details on Set-Up mode, see Chapter 4 “Using Set-Up Mode”.

Normal mode operation includes everyday operations, such as paper handling, font selection, macro selection, and protocol selection. The first table lists basic states represented by the Ready and Fault indicators. The second table lists Normal mode operations and required user response. Operations are listed by functions.

Basic States of the Printer

Indicator	Status	Printer Status
Ready	On	The printer is ready for printing or The printer is receiving or printing data.
	Blinking	The printer is not ready and holds printing data.
	Off	The printer is not ready and it does not hold printing data.
Fault	On	The printer is out of paper.
	Blinking slowly	The printer has software errors (paper jam, interface error, carriage error, paper unloading error, etc.).
	Blinking fast	The printer detected diagnostic errors at power-up.

**Control Panel Operations**

— : This operation has no connection with this condition.

N/A : The condition does not apply because this operation is executed before powering on.

Operation	Required Conditions ^{*1}			Required Action
	Ready	Printing ^{*2}	Fault	
Load continuous forms paper	—	Not printing	On	Press FF/Load.
Load single sheet paper	—	Not printing	On	Press FF/Load if single sheet load is switched from AUTO to MANUAL in Set-Up mode.
Feed paper a page	—	Not printing	Off	Press FF/Load.
Feed paper a line	—	Not printing	Off	Press LF.
Advance perforation to tear bar	—	Not printing	Off	Press Pause if the TEAR option is switched from AUTO to MANUAL in Set-Up mode, or press FF/Load.
Advance paper for viewing	—	Not printing	Off	Press Pause if the TEAR option is switched from AUTO to MANUAL in Set-Up mode.
Return paper to previous position	—	Not printing	Off	Press Pause if the TEAR option is switched from AUTO to MANUAL in Set-Up mode, or press FF/Load.
Eject single-sheet paper	—	Not printing	Off	Press FF/Load or Park or turn the printer off and on again.
Unload continuous-forms paper ^{*3}	—	Not printing	Off	Press Park.
Pause printing	On	Printing	Off	Press Pause.
Resume printing	Blinking	Not printing	Off	Press Pause.
Resume printing after a fault	Off	Not printing	On	Clear error and press Pause.
Resume printing after paper-out	Off	Not printing	On	Load paper.
Place printer in Ready state	Off	Not printing	Off	Press Pause.
Place printer in pause state	On	—	Off	Press Pause.
Enter Normal mode	N/A	N/A	N/A	Turn power on without pressing any buttons
Printing test	N/A	N/A	N/A	Turn power on while pressing FF/Load.



Paper Handling

Operation	Required Conditions ^{*1}			Required Action
	Ready	Printing ^{*2}	Fault	
Select a resident font	—	Not printing	Off	Press Font.
Enter Macro selection mode	—	Not printing	Off	Press Macro. (M1 and M2 will turn blinking alternately for 3 seconds.)
Select Macro 1	—	^{*4}	Off	Press M1 within 3 seconds after pressing Macro.
Select Macro 2	—	^{*4}	Off	Press M2 within 3 seconds after pressing Macro.
Switch the protocol	—	Not printing ^{*4}	Off	Press Protocol.
Enter Top-of-Form Adjustment mode	—	Not printing	Off	Press Set-Up/Quit and Top.
Move paper by 1/60 inch	Off	—	Off	Press ↓ or ↑ button.
Use the adjustment temporarily	Off	—	Off	Press Set-Up/Quit.
Use the adjustment permanently	Off	—	Off	Press Exit/Save.
Clear the adjustment	Off	—	Off	Press Top.
Enter Set-Up mode	N/A	N/A	N/A	Turn power on while pressing Set-Up/Quit.
Move cursor to select a Set-Up Function or Value	Off	Not printing	Off	Press → or ← button.
Move cursor to select a Set-Up Option	Off	Not printing	Off	Press ↑ or ↓ button.
Select a Set-Up Function or Value	Off	Not printing	Off	Press ↑ or ↓ button.
Select a Set-Up Value and move cursor to SAVE&EXIT	Off	Not printing	Off	Press Exit/Save.
Quit Set-Up mode without saving values	Off	Not printing	Off	Press Set-Up/Quit.
Clear software-detected errors	—	—	Blinking	Press Pause.
Initialize the printer	—	—	—	Turn power off and on again.

^{*1} In Normal mode operation, all buttons except Pause are inactive in the Busy state in which the printer is receiving or printing data.

^{*2} Not printing includes the following situations: the printer is ready and awaiting data, or the Pause button is pressed and the printer is awaiting data, or the Pause button is pressed during printing.

^{*3} This operation is available in the rear-feeding push-tractor mode.

^{*4} Switching is not done if the printer is holding printing data.





Printer Acoustical Feed-Backs

Except for paper handling and when the factory setting for beep is not changed, the printer beeps in the following ways when you press a control panel button, as follows.

- A short beep indicates that the printer accepts your pressing or specification.
- A longer beep indicates that your specification is invalid.
- In a certain mode, a middle long beep indicates that the specified mode becomes active and a short beep indicates the end of the mode.
- When the Fault indicator lights, the printer also makes a longer beep.

Selecting Paper

The printer can handle either single sheets or continuous forms. Single sheets, also called cut sheets, include envelopes and noncontinuous, multipart forms. Continuous forms include labels and multipart forms fed into the printer using the forms tractors.

For best results, use paper that meets the specifications listed in the following table. (See Appendix B “Printer and Paper Specifications” for detailed specifications.) If you are unsure of the suitability of a particular type of paper, try testing the paper or consult your dealer.

Paper Specifications

Paper Size

		LA30N	LA30W
Continuous forms	Width	102 to 267 mm (4 to 10.5 in)	102 to 420 mm (4 to 16.5 in)
	Length	102 mm (4 in) or greater	102 mm (4 in) or greater
Cut sheets	Width	102 to 267 mm (4 to 10.5 in)	102 to 420 mm (4 to 16.5 in)
	Length	76 to 364 mm (3 to 14.3 in)	76 to 420 mm (3 to 16.5 in)

Paper Thickness and Number of Copies

Description	
Thickness	0.35 mm (0.014 in) maximum total thickness.
Copies	1 to 5 copies, including the original. For carbon-interleaved paper, the carbon counts as a copy.



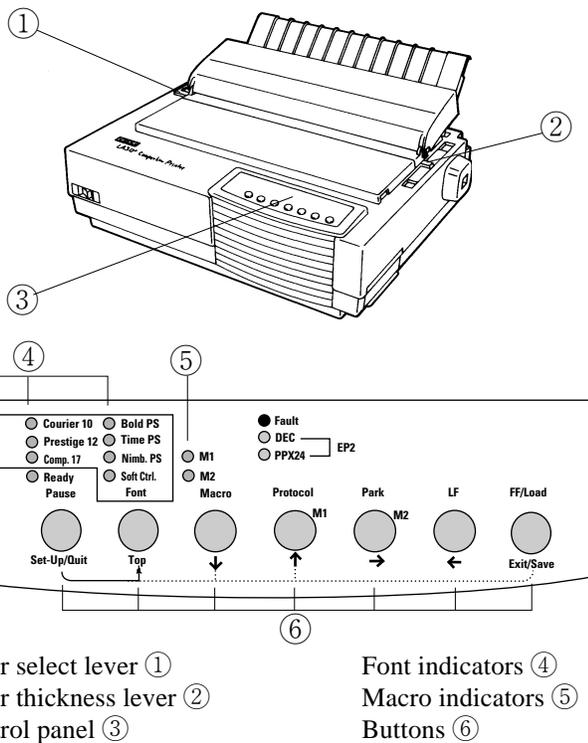
Paper Handling

Overview of Paper Operations

The following levers and buttons are used in paper handling:

- Paper select lever ① at the top left corner of the printer
- Paper thickness lever ② at the top right corner of the printer
- All buttons ⑥ on the control panel ③ (Primary and alternative functions are labelled respectively above and under each button.)

The following figure shows the location of each lever, indicators, and buttons:



Printer Levers and Buttons

The following table summarizes the use of levers and buttons in paper handling. More detailed information is provided later in this chapter.

-
- Caution:** To load or feed paper, the printer must be:
- In the Ready state but not receiving or printing data
 - In the Pause state
-



**Levers and Buttons Used for Paper Handling**

Lever/Button	Purpose	Action	
FF/Load	Form feed	Press FF/Load to execute a form feed. Continuous forms are fed forward by one page. Single sheets are ejected.	
	Load paper	Press FF/Load to feed paper to the top of form position.	
LF	Line feed	Press LF to feed paper forward by one line.	
Park	Unload forms	Press Park to retract continuous forms to the “park position.”	
Set-Up/Quit + Top	Enter Top-of-Form (TOF) Adjustment mode	Press Set-Up/Quit and Top at the same time to enter TOF Adjustment mode where the paper loading position can be adjusted.	
	↑	Increase TOF value by 1/60 inch	Press the ↑ button to feed paper forward by 1/60 inch in TOF Adjustment mode.
	↓	Decrease TOF value by 1/60 inch	Press the ↓ button to feed paper backward by 1/60 inch in TOF Adjustment mode.
	Exit/Save	Save TOF value	Press Exit/Save to permanently store the TOF position adjusted by the ↑ button and the ↓ button in TOF Adjustment mode.
Pause	Advance forms to the tear bar when forms are at Top-of-Form (TOF) position	Press Pause to advance the forms perforation to the tear bar. Tear off the forms, then press Pause again to return the forms to the previous position.	
Paper select lever *	Select paper path	Move the paper select lever forward for single sheets. Move the paper select lever backward for continuous forms.	
Paper thickness lever	Adjust for paper thickness or number of copies	Select the number corresponding to the number of copies (including the original). Vary the setting upward or downward (including A to D) to optimize printing. Select D when replacing ribbon or clearing a paper jam.	

* The following graphics are engraved on the casing.



Continuous forms



Single sheets



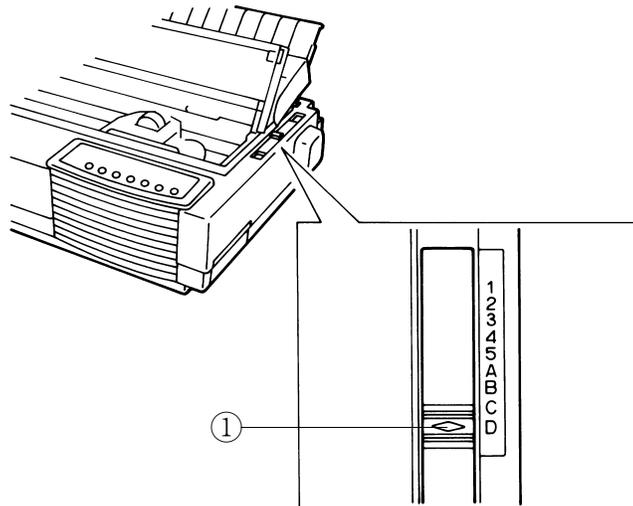
Paper Handling

Adjusting for Paper Thickness

The printer can handle paper with different thicknesses, including multipart forms with up to five parts (original plus four copies). For details on paper thickness specifications, see Appendix B “Printer and Paper Specifications.”

The paper thickness lever, located at the top right corner of the printer, allows you to adjust for different paper thicknesses. Be sure to adjust the paper thickness lever whenever you change the number of copies being printed.

The paper thickness lever ① has nine settings: **1** to **5** and **A** to **D**. Use the following table to determine the appropriate setting for your paper; then, move the paper thickness lever to the appropriate position.



Adjusting the Paper Thickness Lever





Paper Thickness Lever Positions

Number of Copies (Including the Original) *1	Position *2
1 copy	1
2 copies	2
3 copies	3
4 copies	4
5 copies	5
Ribbon replacement	D

*1 For carbon-interleaved paper, the carbon counts as one copy.

*2 Vary the position upward or downward (including **A** to **D**) to optimize printing. Select **D** when replacing a ribbon or clearing a paper jam. For labels and envelopes, use the trial-and-error approach to determine a satisfactory position.

Caution: *If printing is messy, the ribbon misfeeds, or the paper jams, move the lever one position higher.*

Using Single Sheets

This section describes how to load paper in the cut sheet stand. The cut sheet stand allows paper to be loaded manually, one sheet at a time.

Loading a Single Sheet of Paper

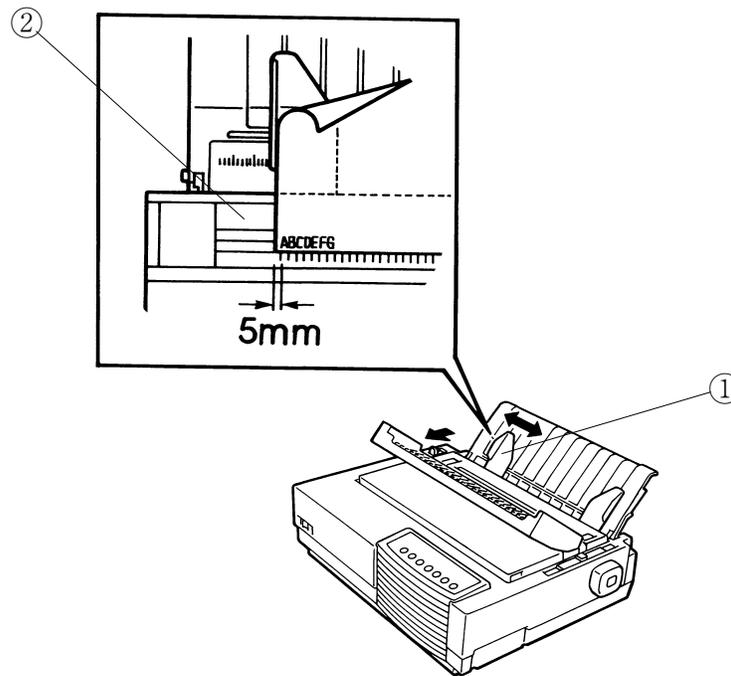
To load a sheet of paper into the cut sheet stand:

1. Make sure that the printer is turned on. Check that rear-fed continuous forms are retracted to the park position. (For details, see the section “Unloading Continuous Forms” later in this chapter.)
2. If necessary, reset the paper thickness lever. (See the section “Adjusting for Paper Thickness” earlier in this chapter.)
3. Move the paper select lever forward. (This lever is at the top left part of the printer.)
4. Raise the cut sheet stand. Position the left paper guide in accordance with the Note below. Note that the movable range of the paper guide is limited.



Paper Handling

Note: Below the left paper guide ①, the cut sheet stand has a scale graduated in units of 0.1 inch. When the left paper guide is positioned all the way to the right, the left margin is 5 mm (0.2 inch). To help align paper, also use the inch-based ruler on the top cover ② of the printer. The gradations on the ruler are for 10 columns per inch.

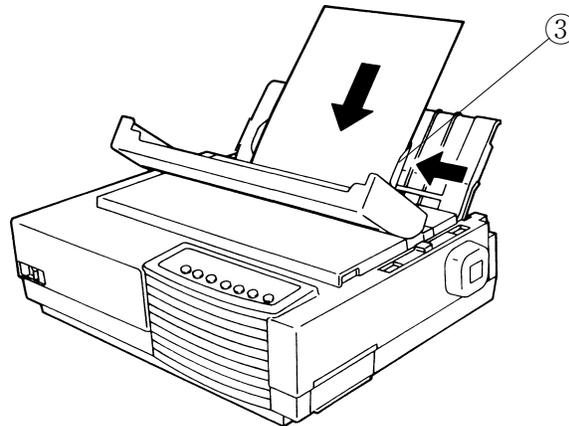


Setting Paper Select Lever and Left Paper Guide

- Adjust the right paper guide ③ to the width of paper. Insert the paper into the cut sheet stand. Make sure that the bottom edge of the paper engages snugly with the platen. The paper will automatically advance to the top-of-form position if the Single Sheet Load option of the Set-Up mode is set to Automatic.

Note: The factory setting for the Single Sheet Load option is automatic loading, two seconds after paper detection. If you set this option to manual, you will have to press FF/Load to feed the paper.





Loading a Sheet of Paper

6. If you want to slightly adjust the Top-of-Form position, the first line on which printing can start, adjust the Top-of-Form position of the paper using control panel buttons. Press the Set-Up/Quit and the Top buttons at the same time. The M1 and M2 indicators flash alternately with the DEC and PPX24 indicators, indicating Top-of-Form Adjustment mode. Press the \uparrow button or the \downarrow button. The paper will move forward or backward in 1/60-inch increments. Press the Set-Up/Quit button after adjusting the position. Note that this adjustment is temporarily saved. It will not be active at next power-up of the printer. For permanent adjustment, see the section “Feeding and Positioning Paper” later in this chapter.
7. Place the printer in the Ready state. Print a sample page and check the page margins. Make the following adjustments, as necessary:
 - Horizontal alignment. Readjust the paper guides if required.
 - Top-of-form setting. Use the printer Set-Up mode (see Chapter 4 “Using Set-Up Mode”) or the TOF Adjustment mode (see the section “Feeding and Positioning Paper” later in this chapter).
 - Margin settings. Use your software or the printer Set-Up mode (see Chapter 4 “Using Set-Up Mode”).

Ejecting Single Sheets

If you print using software, each sheet is ejected automatically upon the completion of the page printing. To manually eject sheets of paper:

- Press the FF/Load button to execute a forward form feed.
- Turn the platen knob.





Paper Handling

Using Continuous Forms

Continuous forms paper, fanfolded at the horizontal perforations, is ideal for printing rough drafts and long files. The paper is fed into the printer using the forms tractor unit. The forms tractor unit, which is removable, can be used in two different ways. If the forms tractor unit is mounted at the rear of the printer, it pushes paper from the rear to the platen. This is called push-tractor feeding. If the forms tractor unit is mounted at the top of the printer, it pulls paper from the bottom or rear of the printer to the platen. This is called pull-tractor feeding.

Caution: *When using continuous forms with the cut sheet stand in up position, always spread the cut sheet stand paper guides to their extreme position before feeding the paper. This will prevent the paper from jamming against the acoustic cover.*





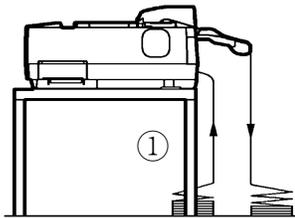
Positioning the Paper Stack

Place the stack of continuous forms paper directly below the rear of the printer ① for push, rear feed or below the bottom slot of the printer ② for pull, bottom feed.

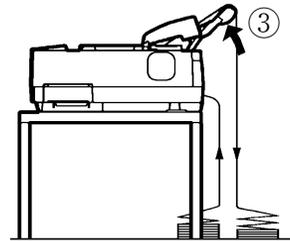
Caution: When using paper-stapled multipart forms in push feed, raise the cut sheet stand ③.

After the paper is installed in the printer, the paper path should look like this:

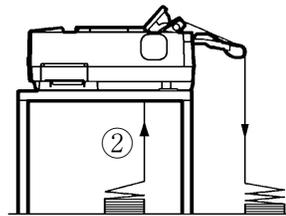
Good placement



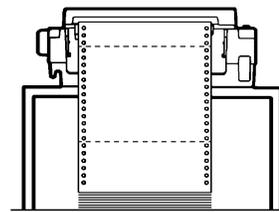
Push-feed, from rear slot



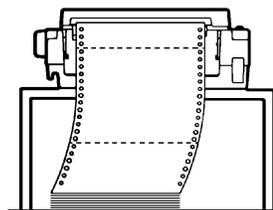
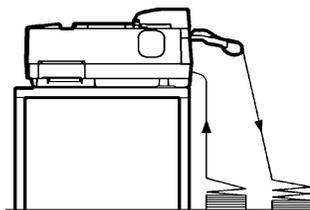
Push-feed, from rear slot with paper-stapled multipart forms



Pull-feed, from bottom slot



Bad placement



Placement of Continuous Forms





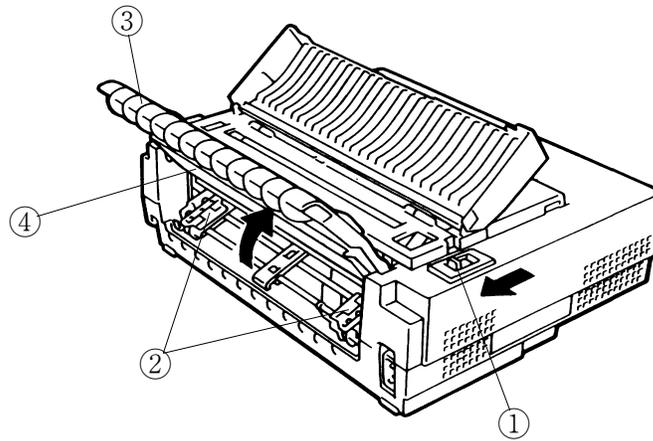
Paper Handling

Loading Continuous Forms (Push Tractor and Rear Feed)

This section explains how to use continuous forms when the tractor unit is installed at the rear of the printer. The tractor unit pushes continuous forms. This condition applies when you first use the printer.

To load continuous forms paper:

1. Make sure that the printer is turned on. Remove any single-sheet paper from the printer.
2. If necessary, readjust the paper thickness lever for continuous forms. (See the section “Adjusting for Paper Thickness” earlier in this chapter.)
3. Move the paper select lever ① to the rear of the printer.



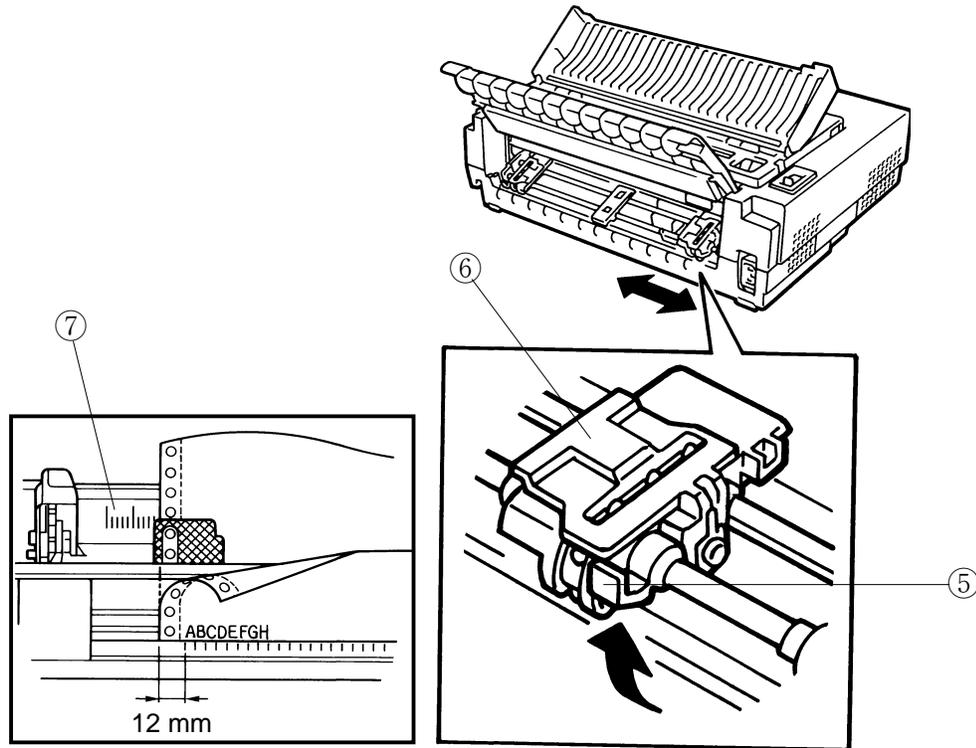
Preparing to Load Continuous Forms Paper

4. To access the forms tractors ②, lock the cut sheet stand ③ and the back cover ④ together and raise them in the *up* position.





- For both forms tractors ②, release the tractor locking levers ⑤ by pulling them up. Open the tractor paper holders ⑥.



Positioning the Tractor Using the Tractor Guide

- Position the right forms tractor (as seen from the rear of the printer) in accordance with the Note below. Push the right locking lever down to secure the tractor. Center the middle forms support.

Note: The tractor guide ⑦ can be found below the right forms tractor, as seen from the back. This tractor guide is a short inch-based ruler graduated in 10 columns per inch. Use this ruler to help position the tractor. When the paper edge is positioned to the leftmost line, the left margin is 12 mm (0.5 inch) including the perforation area.

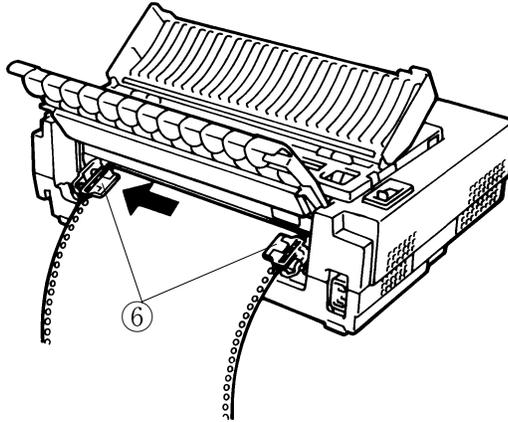
- Once the right forms tractor is positioned, lock it by pushing down its locking lever.





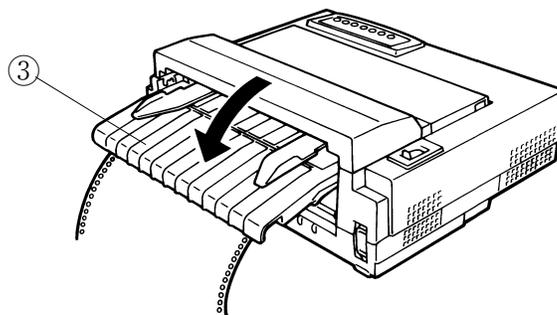
Paper Handling

- Fit the paper feed holes onto the left and right tractor pins. Adjust the left forms tractor (as seen from the rear of the printer) to accommodate the width of the form. Close the paper holders ⑥.



Adjusting Paper Tension

- Pull the left tractor (as seen from the rear) to extend the paper flat. Do not stretch the paper taut. Push the left locking lever down to secure the tractor in place. Unlock the back cover from the cut sheet stand to close it.
- When using paper-stapled multipart forms, leave the cut sheet stand ③ raised in the *up* position. For other continuous forms paper, lower the cut sheet stand to the *down* position.



Lowering the Cut Sheet Stand

- Press the FF/Load button to advance the paper to the top-of-form position from which printing can start. The printer is automatically placed in the Ready state.





12. Print a sample page and check the page margins. Make the following adjustments, as necessary:
 - Horizontal alignment. Move the forms tractors as required.
 - Top-of-form setting. Use the printer Set-Up mode (see Chapter 4 “Using Set-Up Mode”) or the Top-of-Form Adjustment mode (see the section “Feeding and Positioning Paper” later in this chapter).
 - Margin settings. Use your software or the printer Set-Up mode (see Chapter 4 “Using Set-Up Mode”).

Loading Continuous Forms (Pull Tractor and Bottom Feed)

Caution: *When manipulating the tractor unit, always be careful not to pull on plastic parts (below the forms tractors) in order to avoid printing problems (such as printing on the platen at the end of the paper in push-feed). Better manipulate the metallic parts of the tractor unit.*

This subsection explains how to use continuous forms when the forms tractor unit is installed at the top of the printer. The forms tractor unit pulls continuous forms. This is called pull-tractor feed. To use pull-tractor feed, you must remove the forms tractor unit from the rear of the printer and install it on the top of the printer.

For pull-tractor feed, this printer is equipped with a paper path slot at the bottom of the printer to allow for continuous forms feed from under the printer. You must use a desk or rack that has an appropriate paper path slot. For the appropriate paper path, see the section “Positioning the Paper Stack” earlier in this section.

Warning: Turn the printer off before reinstalling the forms tractor unit.

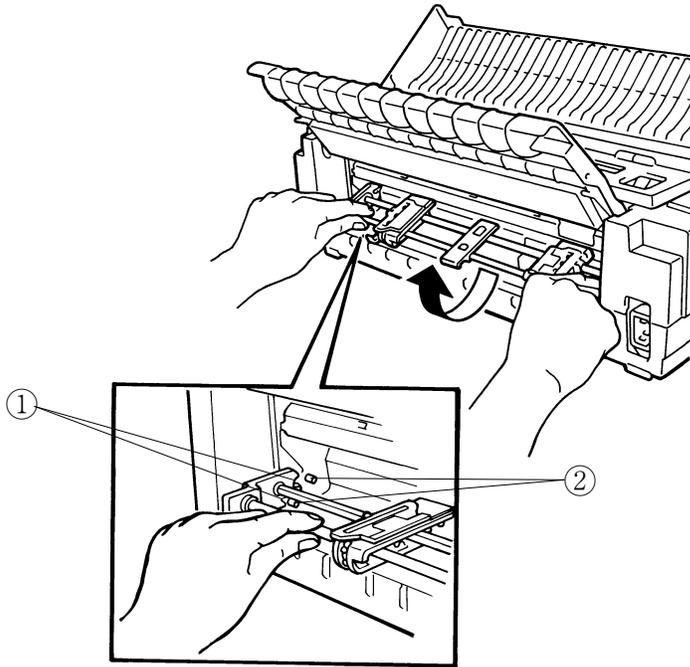
To reinstall the forms tractor unit for pull-tractor feed:

1. Set the cut sheet stand and the back cover together to the *up* position to access the forms tractor unit.



Paper Handling

2. Pull up both ends of the tractor unit to detach the catches ① of the tractor unit from the support studs ②. Then pull the tractor unit.



Removing the Tractor Unit

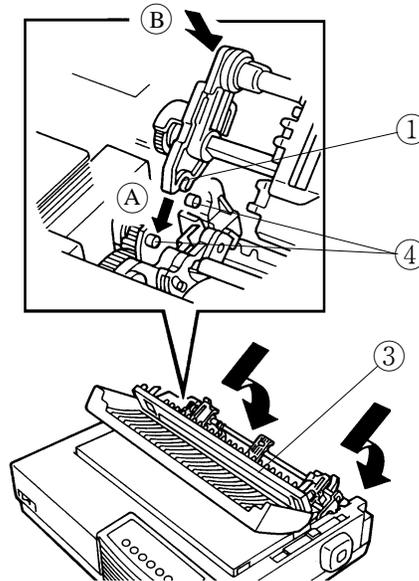
3. Set the cut sheet stand and the back cover to the *down* position.





Paper Handling

4. Open the acoustic cover and the top cover ③ to access the top of the printer.
5. Position the catches ① of the tractor unit on the support studs ④ near the platen shaft.
 - A. Push the forms tractor unit toward the front of the printer.
 - B. Snap down the tractor unit into place so that the catches click on the rear studs.



Installing the Tractor Unit for Pull-tractor Feed

6. Turn the platen knob to make sure that the tractor gear fully engages the platen shaft gear. Lean the top cover and the acoustic cover against the tractor unit.

The following are the procedures to take when you want to feed continuous forms paper from under the printer (bottom feed).

To load continuous forms paper:

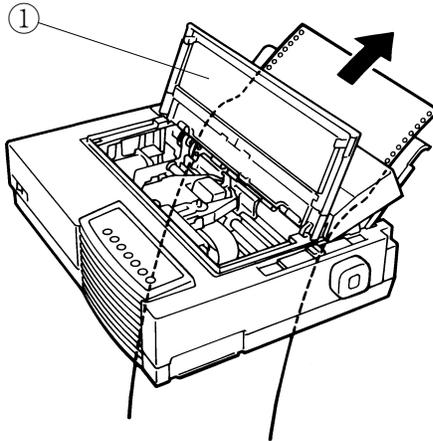
1. Make sure that the bottom slot of the printer is adjusted with the slot of the desk or printer rack.
2. Set the paper thickness lever to position **D** (widest gap).
3. Move the paper select lever to the rear (continuous forms).





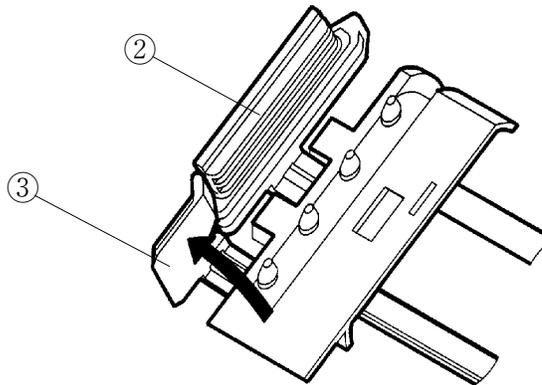
Paper Handling

4. Open the front cover ①, with taking care of not totally removing it.
5. Place the continuous forms paper below the table and pass the paper through the slot of the table then through the bottom slot of the printer up to the platen.



Passing Continuous Forms Paper From Under the Printer

6. Close the front cover ① and open the top cover.
7. Open the two holders of the left and right tractors. (Each tractor has a larger main holder ② and a smaller subholder ③.)



Opening the Two Holders

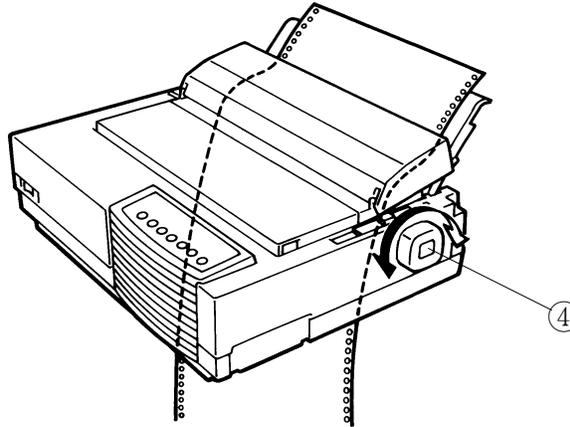
8. Set the continuous forms on the tractors and position the tractors to stretch the forms taut in the same way as described for push-tractor feed.





Paper Handling

- Turn the platen knob ④ to adjust the print start position and turn the printer on. The horizontal embossed rib under the red cursor on the print head carriage corresponds to the base line of the characters to be printed.



Setting Continuous Forms Paper on the Tractors

- Lean the top cover against the tractor unit.
- Adjust the paper thickness lever to the appropriate position.
- Press the Pause button to place the printer in the Ready state. Print a sample page and check the first line and the page margins. Make the following adjustments, as necessary:
 - Horizontal alignment. Move the forms tractors as required.
 - Margin settings. Use your software or the printer Set-Up mode (see Chapter 4 “Using Set-Up Mode”).

Caution: *In the pull-feed mode, reverse feeding is allowed up to 1/3 inch and the print accuracy is lower than the accuracy available with the push-feed mode. Use the pull-feed mode when printing labels and so on that are affected by curling.*



Paper Handling

Unloading Continuous Forms (Push-Feed Mode)

To unload continuous forms:

1. Make sure that the paper select lever is set to the rear position.
2. Press the Park button. The continuous forms paper is retracted to the park position. If the paper cannot be retracted in one operation, continue to press the Park button until the paper is parked.

Note: The printer can retract continuous forms paper a maximum of 50.8 cm (20 inches) per operation.

3. To remove the paper, raise the tractor paper holders and lift out the paper.

Note: To unload continuous forms fed by the pull-tractor, set the paper thickness lever to **D**, then remove the paper manually.

Recovering from an Unexpected Unloading Operation

If you have accidentally pressed the Park button, you can cancel this operation in two ways, **only if this unexpected operation was unsuccessful** (paper not actually parked and Fault indicator blinking).

- Press the Pause button.
The printer switches to the Ready state and the paper moves according to the setting of the TEAR Set-Up option.
- Press the FF/Load button.
The paper moves back to the place it was positioned before you pressed the Park button.

Tearing Off Continuous Forms

Caution: *Continuous forms paper that is fed by the pull-tractor cannot be torn off in the following way.*

Automatic-Tear-Off Advancing

Your printer has a special “tear bar” that allows you to tear off printed pages without wasting paper. The tear bar is located on the top cover.

Your printer is factory-set for automatic tear-off. When a printing job ends (including a form feed command), the bottom perforation of the last printed page is automatically positioned in front of the tear bar. You can change the positioning delay from one to five seconds, using the Set-Up mode. The printer is placed in the Pause state (Ready indicator off).



Note: If the printing job does not include a form feed command, the paper is only automatically fed so that you can see the last printed line. Press on the FF/Load button to position the next paper perforation in front of the tear bar.

The paper is automatically retracted when the printer receives the next data. For tearing off the paper, see the next subsection “Manual Tear-Off Advancing”.

Manual Tear-Off Advancing

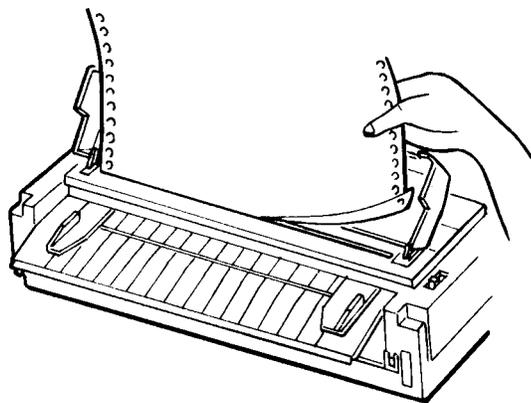
If you have set the TEAR option of the INSTALL function to MANUAL, tear off the paper in the following way when a printing job ends (including a form feed command).

1. Press the Pause button to position the paper perforation in front of the tear bar.

Note: If the printing job does not include a form feed command, after pressing the Pause button the paper is only automatically fed so that you can see the last printed line. Press on the FF/Load button to position the next paper perforation in front of the tear bar.

Caution: *If the paper perforation is not positioned in front of the tear bar, the length of your paper may not be specified correctly in your software or the Set-Up mode. Check that the paper length is specified correctly. For information on specifying page length using the Set-Up mode, see Chapter 4 “Using Set-Up Mode”.*

2. Tear the paper off at the perforation.



Tearing Off Continuous Forms

3. Press the Pause button again to retract the forms back to the top-of-form position.





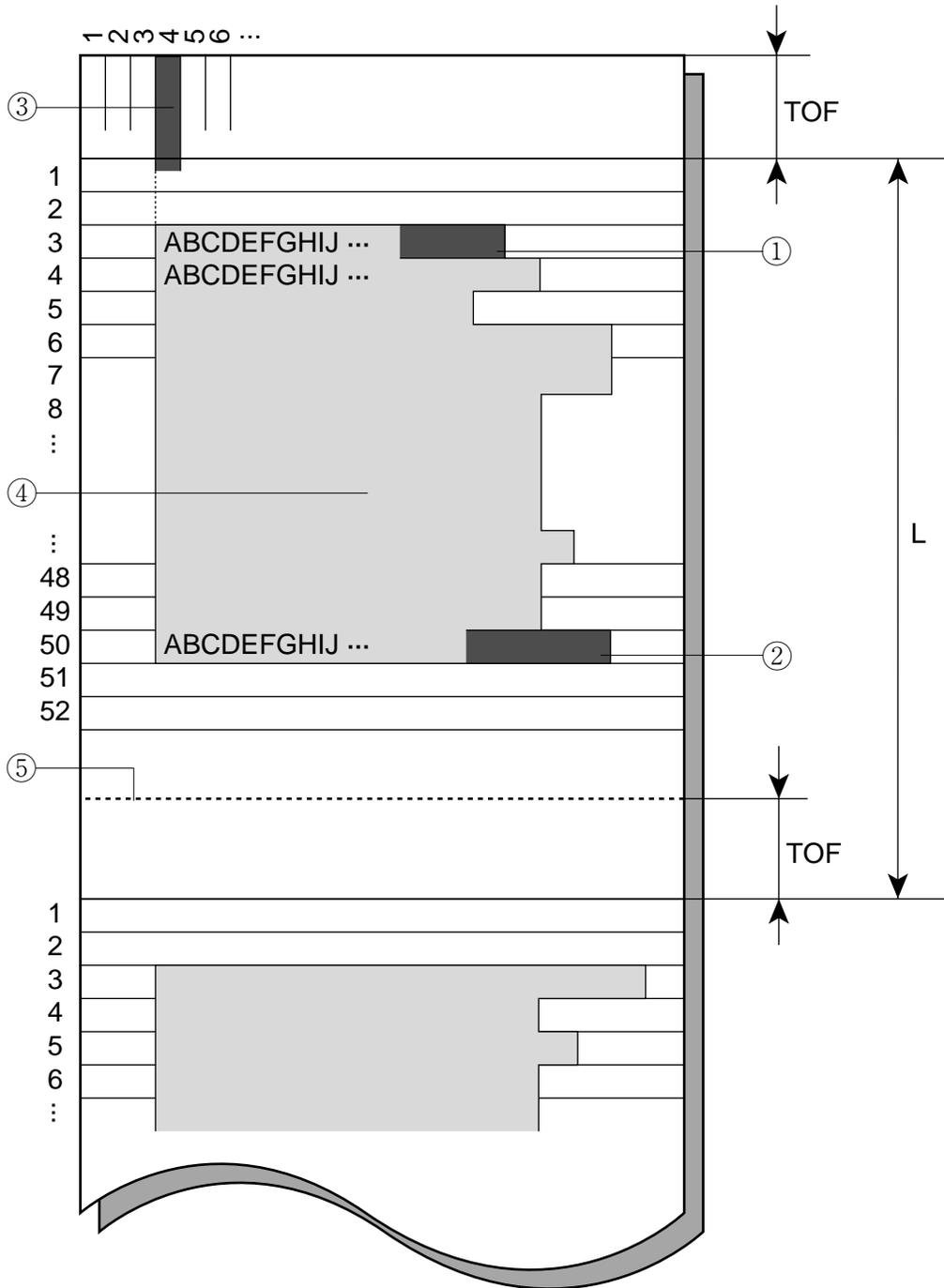
Feeding and Positioning Paper

Print Area Definition

- **TOF (Top-of-Form):**
This value defines the distance between the edge of the paper and the place where you allow the printing to begin (position of line number 1). You can adjust this distance according to the condition of your paper (for example, pre-printed forms). When you load the paper, the printer feeds the paper to this position, waiting for printing commands.
- **L (Form Length):**
Set the corresponding Set-Up option (`FORM LENGH`) according to the actual physical page length (distance between two perforations for continuous forms). This will allow the printer to know exactly where the print head is and to position it at the same position when a form feed occurs.
- **Top line ①:**
This is the line where the printing actually starts. To define a top margin, select the number of this line within Set-Up mode (`TOP MRGN` option). Example: In the following picture, `TOP MRGN` option is set to 3.
- **Bottom line ②:**
This is the line where the printing actually stops. To define a bottom margin, select the number of this line within Set-Up mode (`BOTTOM MRG` option). Example: In the following picture, `BOTTOM MRG` option is set to 50.
- **Left column ③:**
This is the column where the printing actually starts. To define a left margin, select the number of this column within Set-Up mode (`LEFT MARGN` option). Example: In the following picture, `LEFT MARGN` option is set to 4.
- **Print area ④:**
Print area defined by the corresponding Set-Up options: Form Length, Top-of-Form, Top Margin, and Bottom Margin.
- **Paper perforation ⑤:**
The perforation defines the physical page length.



Paper Handling



Print Area Definition





Paper Handling

Line Feed/Form Feed

Use the line feed/form feed function to move paper forward. This function is valid whenever the printer is not receiving or printing data and has no fault. Pressing the LF button advances the paper one line. Pressing the FF/Load button feeds one sheet of paper.

Except using the Park button for unloading paper or using the Top-of-Form Adjustment mode for fine-adjusting the Top-of-Form position, you are not allowed to execute “reverse” feed from the control panel. To feed paper backward, manually rotate the platen knob. Remember that the Top-of-Form will slip from the original setting.

Top-of-Form Adjustment

Note: To know the Top-of-Form definition, see the previous section “Print Area Definition”.

The Top-of-Form adjustment is available for single sheets or continuous forms fed by the push-tractor. The adjustment is reflected to the Top-of-Form setting of Macro 1 or Macro 2 currently selected from the control panel.

Note: This adjustment is not available for continuous forms fed by the pull-tractor.

You can adjust the Top-of-Form value within the range from 0 to 99/60 inches.

Note: The horizontal embossed rib under the red cursor on the print head carriage corresponds to the base line of the characters to be printed.

1. Position the paper at the current Top-of-Form position:
 - For continuous forms, park the paper, then press the FF/Load button.
 - For a single sheet, simply insert the sheet in the cut sheet stand. Paper is automatically fed to the Top-of-Form position, if the Set-Up option S-SHEET LD (Single Sheet Load) is set to AUTO. Otherwise, press the FF/Load button.
2. Enter the Top-of-Form mode by pressing the Set-Up/Quit and Top buttons at the same time. The printer beeps and the M1 and M2 indicators flash alternately with the DEC and PPX24 indicators, indicating the Top-of-Form mode.



3. Adjust the Top-of-Form value:

- To increase the Top-of-Form value of a 1/60 inch, press the ↑ button.
The paper moves forward.
- To decrease the Top-of-Form value of a 1/60 inch, press the ↓ button.
The paper moves backward.
- To reset the Top-of-Form value to 0, press the Top button.
The paper moves to the edge of the page (position 0).

Note: If you reach the limit of the permitted range, the printer beeps and the paper stops moving.

4. Save the Top-of-Form value:

- To permanently save the value, press the Exit/Save button.
The printer returns to Normal mode.
- To temporarily save the value, press the Set-Up/Quit button.
The printer returns to Normal mode. (The new value is lost at next power-off.)

Note: The use of the ↑ and ↓ buttons for micro-feeding is available for some cases of software errors (Fault indicator blinking).

Switching Paper Types

If you have more than one type of job, it is often necessary to switch between continuous forms and single sheets. This section explains how to switch between paper types. It is not necessary to remove the continuous forms paper from the printer.

Caution: This function is not available for continuous forms paper that is fed by the pull-tractor.



Paper Handling

Switching from Continuous Forms to Single Sheets (Push-Feed Mode)

To switch from continuous forms to single sheets:

1. Tear off your printed pages.
2. Retract the forms paper to the park position by pressing the Park button. The Fault indicator turns on.

Caution: *Retracting many pages by using the Park button without tearing off will cause paper jams. To avoid damage to your printed pages, be sure to tear off the printed pages before retracting the continuous forms paper.*

3. Move the paper select lever forward to the single sheet position.
4. Raise the cut sheet stand to the *up* position. (For details, see the section “Using Single Sheets” earlier in this chapter.) Put a sheet of paper on the cut sheet stand with its bottom edge aligned with the platen. The paper automatically advance to the top-of-form position if the option *S-SHEET LD* (Single Sheet Load) is set to *AUTO*. Otherwise, press the *FF/Load* button to advance the single sheet paper to the top-of-form position .

You are now ready to print using single sheets.

Switching from Single Sheets to Continuous Forms (Push-Feed Mode)

To switch from single sheets to continuous forms:

1. If a sheet of paper is loaded, remove the paper by turning the platen knob or pressing the *FF/Load* button.
2. Move the paper select lever to the rear to the continuous forms position.
3. Press the *FF/Load* button. The continuous forms paper advances from the park position to the top-of-form position.

You are now ready to print using continuous forms paper.



Switching between Push-Feed and Pull-Feed

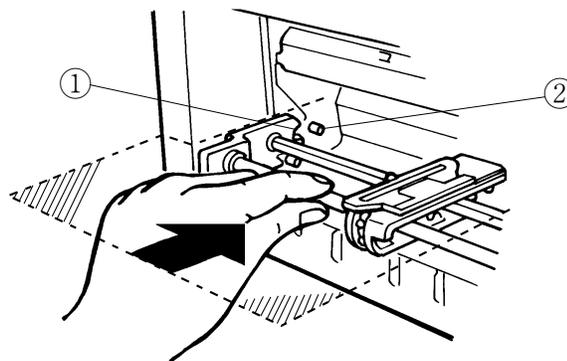
Caution: When manipulating the tractor unit, always be careful not to pull on plastic parts (below the forms tractors) in order to avoid printing problems (such as printing on the platen at the end of the paper in push-feed). Better manipulate the metallic parts of the tractor unit.

To allow the printer to properly detect the switching operation, follow the next procedure:

1. Unload the paper.
2. **Turn the printer off.**
3. Install the tractor unit for the other feed mode.
4. Turn the printer on.
5. Load the paper.

To Reinstall the Tractor Unit for Push-Tractor Feed:

1. Open the acoustic cover and the top cover.
2. Pull up both ends of the tractor unit to detach the catches of the tractor unit from the support studs. Then pull the tractor unit.
3. Set the cut sheet stand and the back cover to the *up* position.
4. Keep the tractor unit horizontally (see the horizontal plane in the figure) so that the top catches ① of the tractor unit are in front of the inner support studs ② of the printer.
5. Push the tractor unit toward the front of the printer until the top catches snap into the inner studs. Then snap down the tractor unit into place.



Installing the Tractor Unit for Push-tractor Feed

6. Close the top cover and the acoustic cover.



Paper Handling

Tips on Paper Handling

General Tips

- Use high-quality paper. Do not use paper that is wrinkled or curled at the edges.
- Do not use paper with staples or metal parts.
- Do not use paper with unpredictable variations in thickness, such as paper with partial multilayers, paper with embossed printing, and labels with the backing sheet exposed.
- Store paper in a clean, dry environment.

Multipart Forms

- Avoid using carbon-interleaved single sheets if possible. Printing tends to become misaligned on the bottom sheet.
- Set the paper thickness lever to best accommodate the multipart form thickness.
- To ensure smoother feeding of paper-stapled, multipart forms, raise the cut sheet stand to support the forms.

Envelopes

When printing envelopes, use the cut sheet stand. Note the following:

- Set the paper thickness lever to best accommodate the envelope thickness.
- When loading envelopes, make sure that the envelope flaps face forward. Otherwise, the envelopes may jam in the printer.

Labels

- Be careful to check operating conditions when using labels. Labels are sensitive to temperature and humidity.
- Only use labels mounted on continuous forms backing sheets. Do not print labels mounted on single sheet backing. Labels mounted on single sheet backing tend to slip and printing becomes crooked.
- Do not leave labels loaded in the printer. If labels curl around the platen, jamming may occur when printing is resumed.
- Set the paper thickness lever to best accommodate the label thickness.
- Test-print labels before running a job. If jams occur, set the paper thickness lever to a wider position. If jamming problems continue, try a different type of label.
- We recommend you to use the pull-tractor feed mode for printing labels. If using the push-tractor feed mode:
 - **Use the NO TEAR value of the TEAR option in the Set-Up mode.**
 - Do not unload labels using the Park button. Jamming may occur during backward feeding.
 - Do not use the printer tear-off feature when printing labels. If the labels are retracted, the backing may peel off and the labels may jam in the printer.



3

Printing

This chapter describes the following everyday printing operations:

- Selecting print features
- Starting, stopping, or resuming printing and viewing last printed lines
- Removing printed pages

The Font button, the Macro, M1, and M2 buttons, the Protocol button, and the Pause button are used for these operations which are described in detail in this section. For a summary of the operation of these buttons, see the section “Getting to Know the Printer’s Major Parts and the Control Panel” in Chapter 2 “Paper Handling”.

Instructions for loading and handling paper are also given in Chapter 2 “Paper Handling”.

Selecting Print Features

The print features you select determine how your printer interprets commands from the computer and how your printed pages will look. For example, print features include the following:

- Protocol
- Font
- Pitch (characters per horizontal inch)
- Line spacing (lines per vertical inch)
- Page length and margins

To select print features, you can use either commercial software or the printer control panel. The method you use depends on the capabilities of your software. If your software has most of the features you require, you may rarely – if ever – have to use the control panel. *In fact, your software often overrides the printer settings.*

If your software has limited values, you can use the printer control panel to select print features. Sometimes, the control panel enables you to select features not available through your software. For example, you can change the top-of-form position or select a character set for printing your document.



Printing

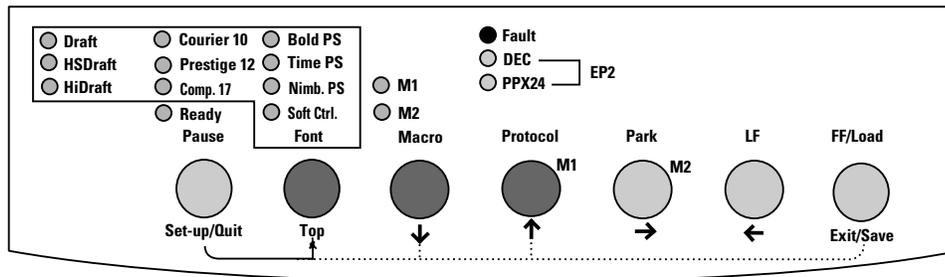
Using Commercial Software

Many commercial software packages offer a wide variety of print features, including some features that are not supported by this printer. For example, software often provides a wider range of font sizes than the printer can accommodate. Software also allows you to specify multiple fonts on a single page and multicolor printing. To determine which features your software supports and how to select them, refer to your software documentation.

Using the Control Panel

This printer can directly select some print features from the control panel. These features, listed on the control panel, are two predetermined sets (macros) of print features, nine resident fonts, and three protocols. Use the Macro, Font, and Protocol buttons as follows:

- Macro to select one of the two sets of print features, Macro 1 (M1) and Macro 2 (M2)
- Font to select one of nine resident fonts (You can access three other fonts in Set-Up mode)
- Protocol to select one of the three protocols



Printer Control Panel

The Macro button specifies Macro 1 or Macro 2, either of which allows you to specify different sets of values in advance. Some of the print features include protocol, font, character pitch, and line spacing. The following table lists the default values of options in Macro 1 and Macro 2. This chapter does not explain how to assign values to options in the macro. *If you haven't already assigned values to Macro 1 and Macro 2, see Chapter 4 "Using Set-Up Mode" now.*





The Font button specifies one of the nine resident fonts defined by font names and pitches on the control panel. The selectable resident fonts are Draft, High-speed (HS) Draft, and High-impact (Hi) Draft, Courier 10, Prestige 12, Compressed 17, Boldface PS, Timeless PS, Nimbus Sans PS. Even if you select a font (excepting Soft Control), the printer will monitor font commands from the computer, but continue to use the font specified by the control panel until another selection is made or the printer is turned off. If you select Soft Ctrl, (Soft Control) the printer will use the font specified by commands from the computer.

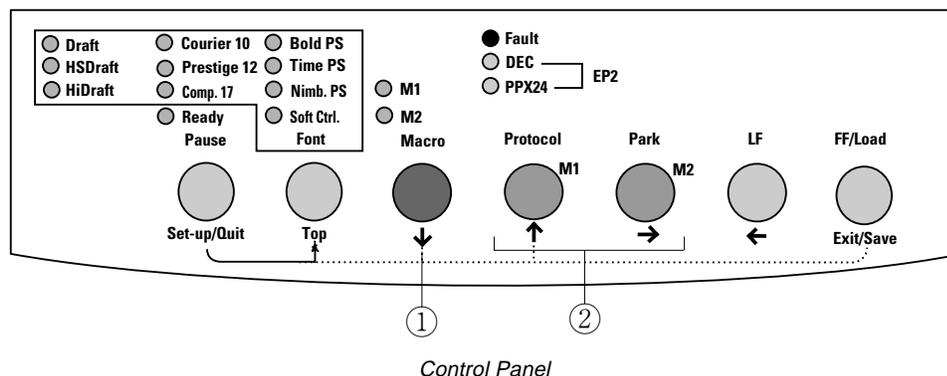
The Protocol button allows you either to choose one of the three resident protocols or to allow the printer to automatically switch to one of the three protocols, according to Set-Up settings. The resident protocols are DEC PPL2, IBM Proprinter X24E, and Epson ESC/P2 protocols.

When you first turn the printer on, the M1 indicator is lit with the DEC and PPX24 indicators flashing alternately, the Soft Ctrl. indicator is lit, and the Ready indicator is lit (the Fault indicator will be lit if no paper is loaded). That is, all of the print features assigned to Macro 1 are enabled; fonts used depend on font commands from the computer but the Draft font is used if no font command is received (because the FONT option is set to DRAFT in Set-Up mode for Macro 1); and the printer assigns the DEC PPL2 protocol to the serial interface port, and the Epson protocol to the parallel interface port. However, you can easily switch to other settings before printing as described below:

Selecting Macro 1 or Macro 2

When you first turn the printer on, Macro 1 is selected. To change to Macro 2 or back to Macro 1, proceed as follows:

1. Press the Macro button ① to place the printer in the macro changeable state. The M1 and M2 indicators blink alternately.
2. Within three seconds, press the M1 or M2 button ②. The lighted indicator (M1 or M2) shows the macro selected. This selection is permanently retained in the printer.





Printing

- To change to a resident font, see the next section. Otherwise, press the Pause button to return the printer to the Ready state. You are ready to print using the selected macro.

Note: The active Macro at power-off remains active at next power-up.

Switching Macros and Selecting Features on the Control Panel

When you switch from a macro to another, each modification you made using the control panel for the Top-of-Form option or the Protocol option is lost, and the values of these options stored in the new macro become active.

This behavior does not apply to the Font selection. If you have changed a font using the control panel before changing the macro, this font will still remain active, overriding the font set in the new macro.

For example, assume that Macro 1 is set to Draft and Macro 2 to Courier. You switch the Font selection of Macro 1 from Draft to Prestige using the Font button. When you switch the Macro selection from Macro 1 to Macro 2, Prestige will remain active, overriding the Courier set in Macro 2.

The following tables list default values of options for print features. The former is for options in Macro 1 and Macro 2 and the latter is for options independent of Macro selection.

Macro 1 and Macro 2 Settings

Print Feature	Factory Settings	
	Macro 1	Macro 2
Protocol	Port dependent	Port dependent
Protocol serial	DEC	DEC
Protocol parallel	EPSON	IBM
Font	Draft	Draft
Horizontal pitch	10 cpi	10 cpi
Vertical pitch	6 lpi	6 lpi
Form length	11 inches (A)	11 inches (A)
Left margin	1 column	1 column
Top of Form ^{*1}	0/60 inch	0/60 inch
Top margin	1 line	1 line
Bottom margin	66 lines	66 lines
Line mode	LF = LF, CR = CR	LF = LF, CR = CR
Paper source ^{*2}	Tractor	Tractor
Print direction	Soft control	Soft control



Printing

Print Feature	Factory Settings	
	Macro 1	Macro 2
DEC mode		
DEC printer ID	PPL2	PPL2
Auto wrap	Wrap	Wrap
EOT disconnect	No disconnect on EOT	No disconnect on EOT
Initial report	No	No
Auto answerback	No	No
Answerback on ENQ	No	No
DEC G0 character set	US ASCII	US ASCII
DEC user preference character set	DEC Supplemental	DEC Supplemental
IBM&Epson mode		
Default Character set	CP 437	CP 437
IBM mode		
IBM set 1 or 2	IBM set 1	IBM set 1
IBM double height	No	No
IBM AGM	No	No
Epson mode		
Epson national character set	USA	USA

- *1 When you change the Macro selection and that the new Top-of-Form value is different from the former, paper is automatically fed to the next page, using the new Top-of-Form value.
- *2 When you change the Macro selection and that the paper source selection is different, the printer automatically parks the continuous forms (in Push-Feed mode only) or ejects the cut sheet. The Fault indicator blinks, indicating you should change the position of the paper select lever.

Note: You cannot attempt to change the Macro selection when the printer is printing, even if you switch to the Pause state.



Printing

Installation Settings

Print Feature	Factory Settings
Language	English
Tear	Auto, 1 second
Single sheet loading	Auto, 2 second
Error beep	One
Buffer	64K bytes
Interface type	Automatic sense
Auto interface switch time	2 seconds
Baud rate	9600 bps
Bits and parity	8 bits and none
Buffer control	XON/XOFF
Disconnected on fault	No

Adjustments Settings

Print Feature	Factory Settings
Fanfold adjust (continuous forms)	0/60 inch
Manual adjust (single sheets)	0/60 inch
Reserved 1	0/60 inch
Reserved 2	0/60 inch

Menu Access Settings

Print Feature	Factory Settings
Menu access	All functions allowed

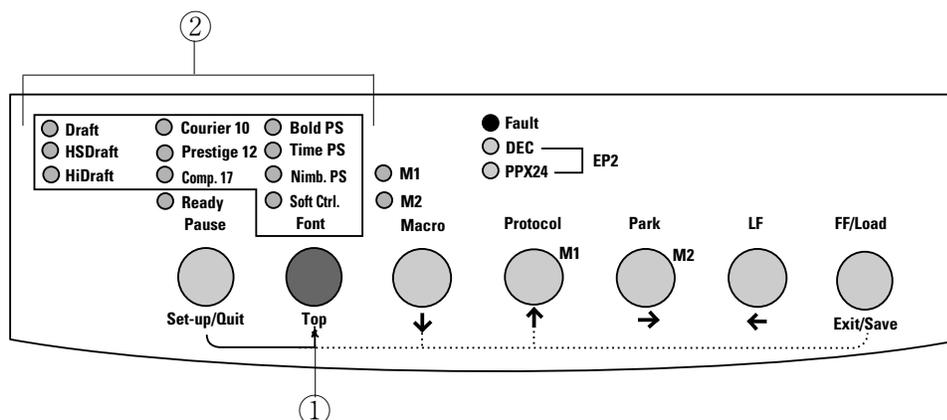


Selecting a Resident Font

You can use the control panel to select a resident font other than the font specified in the selected macro or by commands from the computer.

To select a resident font:

1. Switch the printer to the Pause state if you are currently printing.
2. Repeatedly press the Font button ①. The lighted indicator ② shows the font selected.



Control Panel

- Draft: Draft font at any pitch (last active pitch or software pitch)
- HSDraft: High-speed draft font at any pitch (last active pitch or software pitch)
- HiDraft *: High-impact draft font at any pitch (last active pitch or software pitch)
- Courier 10: Courier font at 10 cpi
- Prestige 12: Prestige Elite font at 12 cpi
- Compress 17: Compressed font at 17 cpi
- Bold PS: Boldface font proportionally spaced
- Time PS: Timeless font proportionally spaced
- Nimb. PS: Nimbus Sans font proportionally spaced
- Soft Ctrl: Font selected by commands from the computer

* The HiDraft font optimizes print quality for multipart forms.

3. Press the Pause button to return the printer to printing, if necessary.





Printing

Changing the Protocol

When you first turn the printer on, the active protocol depends on what port will be used for printing.

For Macro 1: If you use the serial port, the active protocol will be the DEC protocol.

If you use the parallel port, the active protocol will be the Epson protocol.

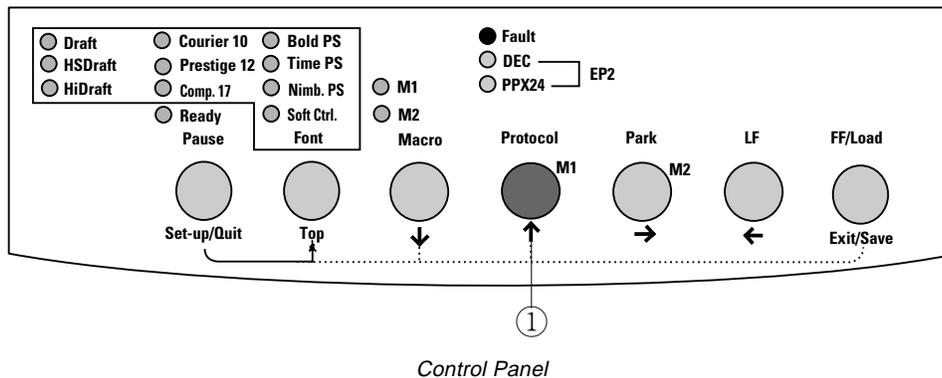
For Macro 2: If you use the serial port, the active protocol will be the DEC protocol.

If you use the parallel port, the active protocol will be the IBM protocol.

This printer has three protocols and allows you to set the protocol mode in one of the following three ways: the printer engages one of the three protocols, automatically determines the active protocol, or assigns different protocols for parallel and serial interfaces.

To change the protocol:

1. Make sure the printer is in the Ready state (no data to be printed).
2. Repeatedly press the Protocol button ①. The DEC and PPX24 indicators turn on and off. The combination of lighted indicators shows the protocol mode selected, according to the next table.



Indicator Status	Active Protocol
DEC lit	DEC PPL2 protocol
PPX24 lit	– IBM Proprinter X24E protocol (LA30N) – IBM Proprinter XL24E protocol (LA30W)
Both lit (EP2)	Epson ESC/P2 protocol
Flashing alternately	According to Set-Up settings, the printer waits for data to switch to a proper protocol.





Starting or Stopping Printing

Starting Printing

Before you start to print, make sure that paper is loaded. Also, verify that the paper thickness lever is set to the appropriate position (**1** to **D**).

To start printing, make sure that the Ready indicator is lit (the printer is ready). If not so, press the Pause button to place the printer in the Ready state. Then start your software.

Stopping and Viewing Printing

To stop printing, press the Pause button to place the printer in the Pause state. The printer stops after printing the current and next lines. You can also use your software to stop printing, but there will be a slight delay before printing stops. After the printer enters the Pause state, it still receives data until the print buffer becomes full of new data. The data in the print buffer will be lost if you turn the printer off.

When the printer stops printing, the paper is advanced to the viewing position so that you can view the last printed lines. This function is valid for single sheets and continuous forms in push-tractor feed mode but not valid for continuous forms in pull-tractor feed mode.

Resuming Printing

To resume printing, press the Pause button again. If the paper is advanced for viewing, it is backed to the previous position before printing. To cancel printing, use the cancel commands provided by your software or computer. To clear the print buffer, turn the printer off. Any data sent to the print buffer before you canceled printing will be lost.

Resuming from a Paper-Out

The printer can “sense” when paper runs out. The printer stops printing and lights the Fault indicator. To resume printing when paper runs out, follow the procedures described below after supplying paper:

1. Install paper on the forms tractor unit or on the cut sheet stand as described in Chapter 2 “Paper Handling”.
2. To load the first sheet of paper, press the FF/Load button for continuous forms. Single sheets are automatically loaded unless you change the factory setting. The Fault indicator will turn off and the printer resumes printing.

Caution: *For continuous forms paper, the page where printing stopped and the page where printing resumes may be incorrectly printed. In this case, wait for the entire job to finish printing. Then reprint the incorrect pages.*



Printing

Removing Printed Pages

This section describes the best methods for removing single sheets or continuous forms paper after printing.

Removing Single Sheets

When you print using software, the printer automatically ejects each sheet of paper when the end of the printed page is reached. To eject sheets manually:

- Press the FF/Load button to execute a form feed.

Removing Continuous Forms

To avoid wasting paper when removing printed continuous forms paper, the printer has the tear-off function.

Depending on the TEAR option value of the Set-Up, the printer automatically feeds the paper so that the perforation faces the tear bar. Tear the paper off. The paper will automatically return to the Top-of-Form position when the printer receives data to print.

If you have set the TEAR option to MANUAL, you have to press the Pause button to move the paper to the tear bar, and then to return the paper to the Top-of-Form position.

Note: See the section “Tearing Off Continuous Forms” in Chapter 2 “Paper Handling”.



4

Using Set-Up Mode

Your Digital LA30 Companion Printer has two operation modes:

- The Normal mode is used for everyday operations, like paper handling and printing as explained in Chapter 2 “Paper Handling” and Chapter 3 “Printing”.
- The Set-Up mode is used to change the printer settings that affect the everyday operations.

Note: For Experienced Users: Once you are familiar with the Set-Up mode, you may want to use the flowchart at the end of this chapter for quick reference. The flowchart lists all printer Set-Up functions, options, and values.

What is Set-Up Mode for?

The Set-Up mode allows you:

- To define two user environments Macro 1 and Macro 2 which prepare two sets of printer operating environments for your application software. Printer operating environments include the protocol, font, horizontal and vertical pitches, page length and margins, line mode, and printing direction. They also include protocol dependent options like the character set.
- To check your settings by printing a list of all the printer’s currently selected values.
- To define general installation parameters related to the integration in your environment (menu language, tear-off control, auto-load control, interface, and so on).
- To fit Top-of-Form adjustments for paper feed control.
- To help diagnose your printer for trouble-shooting by printing test and hexadecimal dump.
- To recall all the factory settings (including both user environments, installation parameters, and adjustment parameters).
- To define what kind of settings modifications are allowed to avoid accidentally changing of Set-Up values.



Using Set-Up Mode

How Set-Up Works

The Set-Up mode consists of Set-Up functions which correspond to printer settings described in the previous page. Each function generally has many options which correspond to print features to be changed. Each option includes many parameters values to be selected. All the Set-Up functions, options and values are printed in a logical sequence on the paper when you enter the Set-Up mode, including the usage of buttons. You can perform all Set-Up operations by using buttons on the control panel in the following order:

- Navigating through the option menu structure.
- Selecting a new value for an option.
- Saving your new printer configuration (permanently or temporarily).

For information on using the printing test and hex dump functions, see the section “Using the Diagnostic Functions” later in this chapter.

Entering the Set-Up Mode

Before entering the Set-Up mode, set continuous forms paper on the tractors as described in the section “Using Continuous Forms” in Chapter 2. Several sheets of paper may be required to make all of your Set-Up mode selections. Of course, you can use single sheets.

Note: We recommend the use of the push-tractor mode in order to avoid any paper jam.

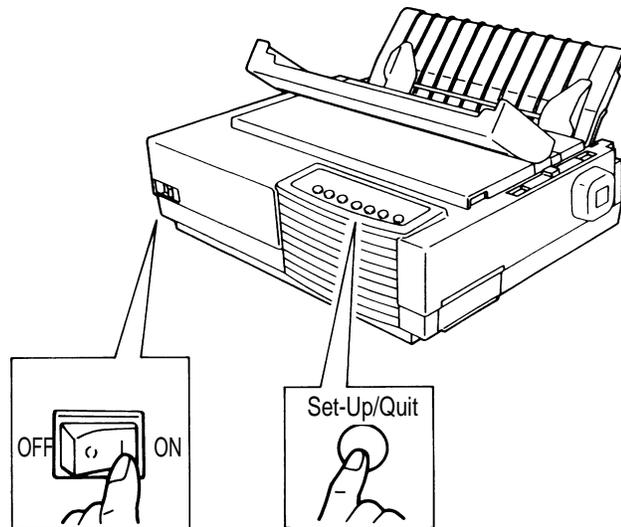
To enter the Set-Up mode:

1. Make sure that continuous forms paper set on the tractors is loaded and that the paper select lever is set backward.
2. Turn the printer off.



Using Set-Up Mode

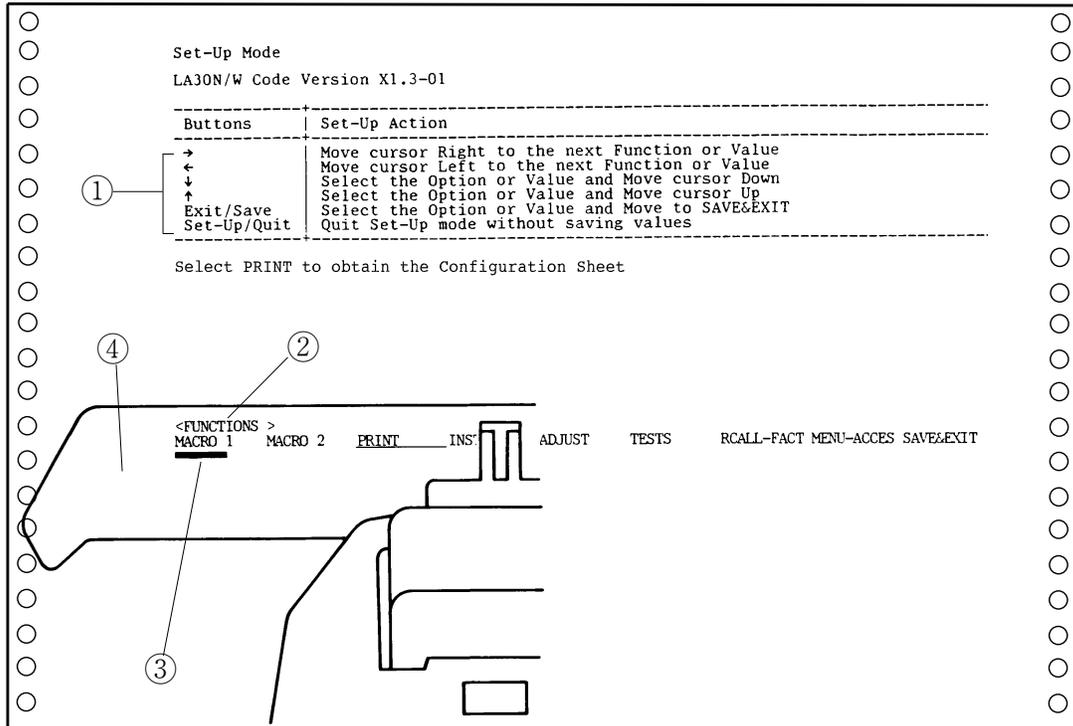
3. Turn the printer back on while pressing the Set-Up/Quit button **until the printer beeps**.
4. Remove the acoustic cover in order to see the printed text.



Entering the Set-Up Mode

Using Set-Up Mode

5. When the printer enters the Set-Up mode, it prints the following information. During the Set-Up mode, the M1 and M2 indicators flash alternately.



Initial Printout in the Set-Up Mode

The initial printout contains a header, help menu ①, and <FUNCTIONS> menu ②. The header tells you that the printer is in the Set-Up mode. The help menu provides a quick summary of how to use buttons in the Set-Up mode.

The <FUNCTIONS> menu ② lists all of the functions available in the Set-Up mode.

Generally speaking, the red cursor ③ on the plastic print guide ④ indicates the function or value to be selected. When entering the Set-Up mode, the red cursor is initially positioned under MACRO 1.



Overview of the Set-Up Mode

When you enter the Set-Up mode, the following <FUNCTIONS> menu is printed:

```
<FUNCTIONS>
MACRO 1 MACRO 2 PRINT  INSTALL ADJUST TESTS  RCALL-FACT MENU-ACCESS SAVE&EXIT
```

The following table summarizes the purpose of each function.

Set-Up Mode Functions

Function	Purpose
MACRO 1 and MACRO 2	Assigns print features to MACRO 1 and MACRO 2.
PRINT	Prints the Printer Configuration.
INSTALL	Changes the Set-Up menu language, computer interface, and paper feed control options.
ADJUST	Changes the top-of-form fine adjustment options.
TESTS	Runs the printing test and hex dumps.
RCALL-FACT	Resets factory settings in MACRO 1, MACRO 2, INSTALL, and ADJUST.
MENU-ACCES	Restricts access to Set-Up functions from the control panel.
SAVE&EXIT	Exits the Set-Up mode and saves any changes made in the Set-Up mode.

To select a function from the <FUNCTIONS> menu:

1. Repeatedly press the ← button or the → button to position the red cursor on the plastic print guide under the function you require.
2. Press the ↓ button or the ↑ button to select the function. If the function has options and values, the printer prints the first option and its values. The MACRO 1, MACRO 2, INSTALL, ADJUST, TESTS, and MENU-ACCES functions contain options that have selectable values. The other functions have neither options nor values.



Using Set-Up Mode

The first four Macro 1 options and their values are shown below. Options are shaded and skipped when they are not objects of selection because of the preceding option setting.

```

<PROTOCOL>
DEC PPL2  IBM PPX24  EPSON-ESCP AUTO  PORT DEPND

<PRTCL SERL>
DEC PPL2  IBM PPX24  EPSON-ESCP

<PRTCL PARL>
DEC PPL2  IBM PPX24  EPSON-ESCP

<FONT>
DRAFT    HIDRAFT  HI-IMPACT  COURIER  PICA  PRESTIGE  COMPRESSED BOLDFACE  TIMELESS
NIMBUS-SAN OCR A  OCR-B
  
```

- Pressing and holding down the ↓ or ↑ button prints options and their current values letting you skip selection of values so that you can reach the desired option quickly.

```

<FUNCTIONS>
MACRO 1  MACRO 2  PRINT  INSTALL  ADJUST  TESTS  RCALL-FACT  MENU-ACCESS  SAVE&EXIT

<PROTOCOL>          PORT DEPND
<PRTCL SERL>        DEC PPL2
<PRTCL PARL>        EPSON-ESCP
<FONT>              DRAFT
<HORZ PITCH>        10  CPI
<VERT PITCH>        6  LPI

<VERT PITCH>
2  LPI  3  LPI  4  LPI  6  LPI  8  LPI  12 LPI  1  LPCM  2  LPCM  4  LPCM
  
```

The current option and its values are reprinted when the ↓ or ↑ button is released.

Options with Pre-determined Values

For some options, you can choose among a limited set of pre-determined values.

To select such a value:

- Repeatedly press the ← button or the → button to position the red cursor on the plastic print guide under the value you require.
- Press the ↓ button to select the value. The printer prints the next option and its values. You can press the ↑ button to select the value. Then, the printer prints the previous option and its values.





3. After selecting the desired values, press the Exit/Save button to reprint the <FUNCTIONS> menu where the red cursor is positioned beneath SAVE&EXIT.

For each option, the bolded value is the current default value (the value currently saved in the printer's permanent memory). In the previous example, the default values are PORT DEPND (Port Dependent) for protocol selection and DRAFT (Draft) for font selection.

Example: Changing the Vertical Pitch

To become familiar with the Set-Up mode, try the following example. This example shows how to change the vertical pitch in Macro 2 from 6 lines per inch to 8 lines per inch.

1. Enter the Set-Up mode.

Turn the printer off and back on while pressing the Set-Up/Quit button until the printer beeps.

2. Select the Macro 2 function.

Wait for the printer to stop printing and press the → button once to position the red cursor on the plastic guide of the print head under MACRO 2. Press the ↓ button or the ↑ button to select the Macro 2 function and print the <PROTOCOL> option and its values.

3. Print the menu of the vertical pitch option.

Since you do not want to change other than the vertical pitch, press the ↓ button to select the current protocol. Bolded PORT DEPND is underlined and the next option <PRTCL SERL> is printed. (Bolded value indicates the current setting and underlined value is the new setting.) Repeatedly press the ↓ button in the same way, until the <VERT PITCH> option and its values are printed.

4. Change the vertical pitch from 6 to 8 lines per inch.

Press the → button once to position the red cursor beneath 8 LPI. Press the ↓ button to select 8 LPI. 8 LPI is underlined and the next option <HORZ PITCH> and its values are printed.

5. Exit the Macro 2 function.

Since you do not want to make any other changes in MACRO 2, press the Exit/Save button. The <FUNCTIONS> menu is then reprinted and the red cursor is positioned beneath SAVE&EXIT.

6. Exit the Set-Up mode, saving or not saving the new vertical pitch.

Press the ↓ button or the ↑ button to save 8 lines per inch as the new power-on defaults in Macro 2 and exit Macro 2. The printer then exits the Set-Up mode and returns ready. These settings remain in effect until the next time they are changed.

Press the Set-Up/Quit button if you do not intend saving these settings in Macro 2.



Using Set-Up Mode

Options with Undetermined Values

For some options, you can choose among a continuous range of many values. These options are identified as follows:

- <XXX-No of INCH>, which means the unit of the range is the Inch.
- <XXX-No of COLM>, which means the unit of the range is the Column.
- <XXX-No of LINE>, which means the unit of the range is the Line.

When you select such an option, only the current value is printed. The numeric range of such an option is from 1 to 256, from 0 to 255, or from 0 to 99.

To select such a value:

1. Press the ← button or the → button (the printer beeps) as many times as you decrease from or increase to the current value. If you change the value by a wide margin, you can keep the button pressed continuously; the printer beeps at intervals of 0.2 second. The number of beeps corresponds to the number of times you press the button.
2. When you stop pressing, the new value is printed at the right of the current value.
3. If this new value is not satisfying, repeat step 1 until the next new value is satisfying.

Range Management for a Wide Range of Values

The permitted range of these values may be limited considering physical range.

If you intend to change a value which would be out of the permitted physical range, the actual current value will be the highest possible value considering other Set-Up dependent values and may not match the value displayed.

See the Options tables further to know the permitted range.

Example: Changing the Left Margin

This example shows how to change the left margin in Macro 2 from column 1 to column 20.

1. Enter the Set-Up mode.

Turn the printer off and back on while pressing the Set-Up/Quit button until the printer beeps.

2. Select the Macro 2 function.

Wait for the printer to stop printing and press the → button once to position the red cursor on the plastic guide of the print head under MACRO 2. Press the ↓ button or the ↑ button to select the Macro 2 function and print the <PROTOCOL> option and its values.

**3. Print the menu of the left margin option.**

Since you do not want to change other than the left margin, press the ↓ button to select the current protocol. Bolded **PORT DEPND** is underlined and the next option <PRTCL SERL> is printed. (Bolded value indicates the current setting and underlined value is the new setting.) Repeatedly press the ↓ button in the same way, until the <LEFT MARGN> option and its value are printed.

4. Change the left margin from column 1 to column 20.

Press and hold the → button until the printer beeps nineteen times. When the button is released, the new value is printed next to the current value. If the new value is not 20 COL, repeat this operation. If it is 20 COL, press the ↓ button to select 20 COL. 20 COL is underlined and the next option <TOP OF FRM> and its value are printed.

5. Exit the Macro 2 function.

Since you do not want to make any other changes in MACRO 2, press the Exit/Save button. The <FUNCTIONS> menu is then reprinted and the red cursor is positioned beneath SAVE&EXIT.

6. Exit the Set-Up mode, saving or not saving the new left margin.

Press the ↓ button or the ↑ button to save 20 columns as the new power-on defaults in Macro 2 and exit Macro 2. The printer then exits the Set-Up mode and returns ready. These settings remain in effect until the next time they are changed.

Press the Set-Up/Quit button if you do not intend saving these settings in Macro 2.

Options with Both Pre-determined and Undetermined Values

Some options include both types of values. Undetermined values appear at the end of the list of pre-determined values, identified by the unit of the corresponding range.

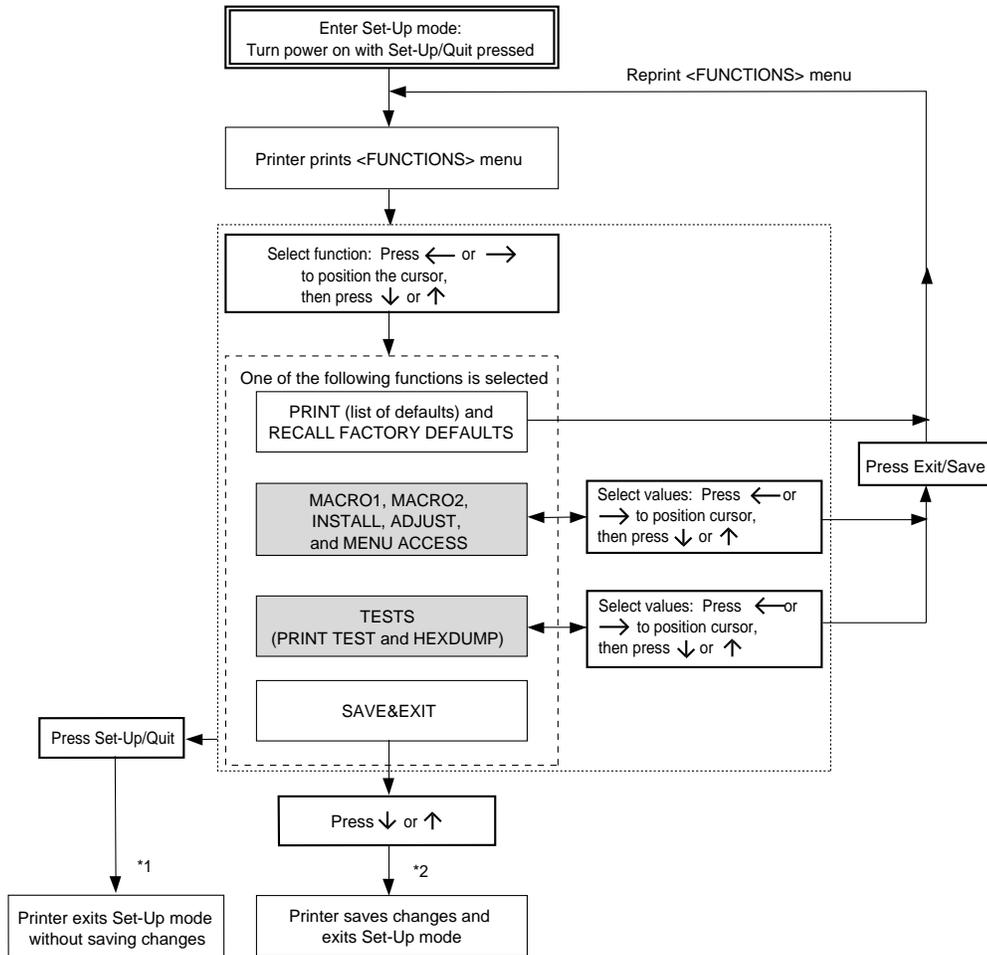
For example, when you select the <FORM LENGH> option (Form Length), the following menu is printed as follows:

```
<FORM LENGH>
3 INCHES 3.5 INCHES 4 INCHES 5.5 INCHES 6 INCHES 7 INCHES 8 INCHES 8.5 INCHES 11 INCHES
11 2/3INCH 12 INCHES 14 INCHES 15 INCHES No of LINE
```

1. Select the No of LINE value.
A new option menu with undetermined values is printed.
2. Change the value according to the previous procedure.

The chart on the next page summarizes how to select options such as protocol and font and how to use the functions that do not have options.

Using Set-Up Mode



■ : Functions having options and/or values

*1 Changes are valid, but will be lost at next power-off.

*2 Changes will remain valid at next power-on.

Summary of the Set-Up Mode



Points to Remember

- We recommend that you use continuous forms paper for printing in the Set-Up mode because it will not end within a single page. To load paper, use the FF/Load button. To adjust the line position of the paper in the Set-Up mode, use the platen knob.
- Whenever you enter the Set-Up mode, short help menus are printed at the top of the page. Help menus are also printed when you select the TESTS function. Use help menus for quick reference while in the Set-Up mode.
- When printing the options and values for each function, you can move either forward or backward in the option list. To move forward (print the next option), press the ↓ button. To move backward (print the previous option), press the ↑ button. You can skip printing the value list for the undesired options by pressing and holding down these buttons.
- While in the <FUNCTIONS> menu or when selecting a function that contains options and selectable values, press the Exit/Save button to reprint the <FUNCTIONS> menu. In this case, the red cursor is positioned beneath SAVE&EXIT.
- A bolded (overprinted) value indicates that it is the current setting. An underlined value indicates a selected setting.
- While in the Set-Up mode, you can use the PRINT function to print out a list of the currently selected values (see the next section for details).
- To exit the Set-Up mode and permanently save your changes, select the SAVE&EXIT function. For details, see the section “Exiting and Saving” later in this chapter
- To exit the Set-Up mode and temporarily use your changes, press the Set-Up/Quit button. Your previous power-on settings are active when you turn the printer on again.

Printing the Printer Configuration

The PRINT function prints a list of all the printer’s currently selected values. This function is useful for checking the printer settings when you first enter the Set-Up mode or just before you exit. To print a list of values, load continuous forms paper, enter the Set-Up mode, and then select the PRINT function. The printer starts to print a list of the currently selected values. The preselected factory settings are shown on the opposite page.

When the printer finishes printing the list of values, it reprints the <FUNCTIONS> menu.

Caution: *To remove the printout, turn the platen knob until the paper can be torn off at the perforation. In the Set-Up mode, you cannot use the printer tear-off feature (Pause button).*

Select another function or exit the Set-Up mode, saving any changes you made. For details about other functions, see the other sections in this chapter. To exit the Set-Up mode and save your changes, make sure that the red cursor is positioned beneath SAVE&EXIT, then press the ↓ button or the ↑ button.

Using Set-Up Mode

Printer Configuration

LA30N/W Code Version V1.0-00

MACRO1

Options	Values
PROTOCOL	PORT DEPND
PRTCL SERL	DEC PPL2
PRTCL PARL	EPSON-ESCP
FONT	DRAFT
HORZ PITCH	10 CPI
VERT PITCH	6 LPI
FORM LENGH	11 INCHES
LEFT MARGN	1 COL
TOP OF FRM	0 /60 IN
TOP MRGN	1 LINES
BOTTOM MRG	66 LINES
LINE MODE	LF=LFCR=CR
PAPER SRC	TRACTOR
PRINT DIR	SOFT CNTRL

<DEC DEFLTS>

DEC PRT ID	PPL2
AUTO WRAP	WRAP
EOT DISCON	NO DISCON
INIT REPRT	NO
AUTO ANSBK	NO
ANSWER ENQ	NO
DEC G0 CST	US ASCII
USER PREF	D-SUPPL

<IBM&EPSON>

DEFLT SET	CP 437
-----------	--------

<IBM DEFLTS>

I-SET 1/2	IBM SET 1
I-DBL HIGT	NO
IBM AGM	NO

<EPSON DFLT>

E-CHR SET	USA
-----------	-----

INSTALL

Options	Values
LANGUAGE	ENGLISH
TEAR	AUTO 1 SEC
S-SHEET LD	AUTO 2 SEC
ERROR BEEP	ONE
BUFFER	64 KBYTE
I/F TYPE	AUTO
AUTO SW	2 SEC
BAUD RATE	9600 BPS
BIT&PARITY	8 NONE
BUFFER CTL	XON/XOFF
DISC FAULT	NO

MACRO2

Options	Values
PROTOCOL	PORT DEPND
PRTCL SERL	DEC PPL2
PRTCL PARL	IBM PPX24
FONT	DRAFT
HORZ PITCH	10 CPI
VERT PITCH	6 LPI
FORM LENGH	11 INCHES
LEFT MARGN	1 COL
TOP OF FRM	0 /60 IN
TOP MRGN	1 LINES
BOTTOM MRG	66 LINES
LINE MODE	LF=LFCR=CR
PAPER SRC	TRACTOR
PRINT DIR	SOFT CNTRL

<DEC DEFLTS>

DEC PRT ID	PPL2
AUTO WRAP	WRAP
EOT DISCON	NO DISCON
INIT REPRT	NO
AUTO ANSBK	NO
ANSWER ENQ	NO
DEC G0 CST	US ASCII
USER PREF	D-SUPPL

<IBM&EPSON>

DEFLT SET	CP 437
-----------	--------

<IBM DEFLTS>

I-SET 1/2	IBM SET 1
I-DBL HIGT	NO
IBM AGM	NO

<EPSON DFLT>

E-CHR SET	USA
-----------	-----

ADJUST

Options	Values
FNFOLD ADJ	0 /60 IN
MNUAL ADJ	0 /60 IN
RESVD 1	0 /60 IN
RESVD 2	0 /60 IN

MENU-ACCES

Option	Values
MENU-ACCES	ALL FUNC

Printout of Factory Settings Using the PRINT Function



Deciding Which Options to Change

The previous page shows a printout of the printer's factory settings. In this printout, options are listed by functional group:

- MACRO 1 and MACRO 2 functions
- INSTALL function
- ADJUST function
- MENU-ACCES function

Most selectable values only alter print features, such as the type style and page format. However, some values must be selected correctly for the printer to work properly with your hardware and software. For each function, the following table lists options whose values must be selected correctly for your system and printer.

Required Options

Function	Option	Value
MACRO 1 MACRO 2	PROTOCOL	<p><i>The protocol selected on the printer must be the same as the protocol selected in your software. If you selected a protocol when you set up the printer, you do not need to change the PROTOCOL option unless you want to change to a different protocol.</i></p> <p>For MACRO 1, the factory setting is PORT DEPND (Port Dependent). This means that the active protocol depends on what port is actually used by the printer. The protocol for the serial port (PRTCL SERL) is factory set to DEC PPL2 and the protocol for the parallel port (PRTCL PARL) is factory set to EPSON-ESCP.</p> <p>For MACRO 2, the factory setting is also PORT DEPND. The protocol for the serial port (PRTCL SERL) is also set to DEC PPL2, but the protocol for the parallel port (PRTCL PARL) is factory set to IBM PPX24.</p> <p>See the section "Changing Macro 1 and Macro 2 Options" later in this chapter.</p>
ADJUST	FNFOLD ADJ MANUAL ADJ	<p>You can separately adjust the origin of the Top-of-Form for both continuous forms and single sheets.</p> <p>See the section "Adjusting Top-of-Form Origin" later in this chapter.</p>



Using Set-Up Mode

Function	Option	Value
INSTALL	BAUD RATE BIT&PARITY BUFFER CTL DISC FAULT	<i>If you have a serial interface, the serial interface options selected on the printer must be the same as the settings you selected using your software or your computer operating system. If the settings are not the same, the printer will not print or will print garbage. See the section “Changing Install Options” later in this chapter.</i>
TESTS	None	See the section “Using Diagnostic Functions” later in this chapter.
MENU-ACCES	None	You can inhibit the Set-Up functions from being accessed from the control panel.

Changing Macro 1 and Macro 2 Options

The MACRO 1 and MACRO 2 functions allow you to use two sets of different print options according to your application software. You can easily switch between MACRO 1 and MACRO 2 in Normal mode as described in Chapter 3 “Printing.”

With the factory setting, MACRO 1 is invoked when you first turn the printer on. The Macro selection changed is permanently retained in the printer.

Select the same protocol on the printer as is selected in your software. If the protocols are not the same, the printer will not work correctly with your software. If you plan to use two different protocols on a regular basis, assign the most frequently used protocol to MACRO 1. Assign the second protocol to MACRO 2. All of the other settings available for MACRO 1 and MACRO 2 are optional. Some of the options and values will vary with the protocol.

To determine which features your software supports, refer to your software documentation.

The following table describes the MACRO 1 and MACRO 2 options and values. Both functions offer the same options and values. The options in the table are listed in the order in which they are printed. Not all options are defined for all protocols and some values vary with the protocol.

For the procedure for changing the MACRO 1 and MACRO 2 options, see the previous sections in this chapter.



Macro 1 and Macro 2 Options List

Protocol	4-16
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Using Set-Up Mode

MACRO 1 and MACRO 2 Options and Values

- Overprinted values are the factory settings.
- Some settings are overridden by commands from the computer.
- Options that differ with protocols are described at the end of the table.

MACRO 1 and MACRO 2 Options Values	Description
<PROTOCOL>	Select the same protocol as is selected in your software. See step 6 “Connecting the Printer to Your Host System” in the <i>Setting Up Your Printer</i> for information on selecting a protocol.
DEC PPL2	DEC PPL2 printers
IBM PPX24	– IBM Proprinter X24E printers (LA30N) – IBM Proprinter XL24E printers (LA30W)
EPSON ESCP	Epson printers using the ESC/P2 protocol
AUTO	Printer automatically senses the active protocol. This is useful when you use various applications in a DOS or network environment and so you cannot determine the protocol. The efficiency of this function relies on the recognition of control sequences that are protocol specific. If such control sequences are not detected in the data string received, the printer may fail to determine the proper protocol, providing an unexpected result.
PORT DEPND	Printer selects a protocol according to the active interface (parallel or serial). See the next options.
<PRTCL SERL> (Protocol Serial)	Select a protocol for the serial interface. This is invalid and skipped when PORT DEPND is not selected for the <PROTOCOL> option.
DEC PPL2	DEC PPL2 printers (factory setting for Macro 1 and Macro 2)
IBM PPX24	– IBM Proprinter X24E printers (LA30N) – IBM Proprinter XL24E printers (LA30W)
EPSON ESCP	Epson printers using the ESC/P2 protocol



MACRO 1 and MACRO 2 Options Values	Description
<PRTCL PARL> (Protocol Parallel)	Select a protocol for the parallel interface. This is invalid and skipped when PORT DEPND is not selected for the <PROTOCOL> option.
DEC PPL2	DEC PPL2 printers
IBM PFX24	– IBM Proprinter X24E printers (LA30N) – IBM Proprinter XL24E printers (LA30W) (Either is selected as factory setting for Macro 1.)
EPSON ESCP	Epson printers using the ESC/P2 protocol (factory setting for Macro 2)
	Select a font to be active when power is turned on. For fixed-spaced fonts, be sure to change the horizontal pitch as well.
DRAFT	Draft font (lower resolution than letter quality, 3 times letter quality speed)
HSDRAFT	High-speed draft font (lower resolution than draft quality, 3.3 times letter quality speed)
HI-IMPACT	High-impact draft font (lower resolution than letter quality, 1.5 times letter quality speed with high capability of copying)
PICA	Pica 10 font
COURIER	Courier 10 font
PRESTIGE	Prestige 12 font
COMPRESSED	Compressed 17 font
BOLDFACE	Boldface PS font
TIMELESS	Timeless PS font
NIMBUS-SAN	Nimbus-Sans PS font
OCR A	OCR A 10 font
OCR B	OCR B 10 font
<HORZ PITCH> ## CPI (Horizontal Pitch)	10, 12, 13.2, 15, 16.5, 17, 18, or 20 (characters per horizontal inch)
<VERT PITCH> ## LPI (Vertical Pitch)	2, 3, 4, 6, 8, or 12 (lines per vertical inch)
## LPCM	1, 2, or 4 (lines per centimeter)



Using Set-Up Mode

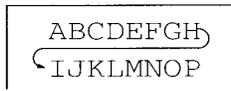
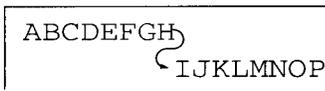
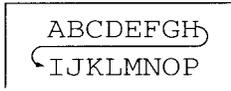
MACRO 1 and MACRO 2 Options Values	Description
<p><FORM LENGH> (Form Length)</p> <p>## INCHES</p> <p>No of LINE</p>	<p>Specify the length of the page in inches or by the number of lines per page.</p> <p>3, 3.5, 4, 5.5, 6, 7, 8, 8.5, 11 (Letter size), 11 2/3 (A4 size), 12, 14, or 15</p> <p>1 to 256 (66)</p> <p>Number of lines per page</p>
<p><LEFT MARGN> (Left Margin)</p> <p>No of COLM</p>	<p>Specify the left margin by the number of the left column (see “Print Area Definition” in Chapter 2 “Paper Handling”).</p> <p>1 to 256</p> <p>Number of the left column</p>
<p><FORM WIDTH></p> <p>8 IN</p> <p>13.2 IN</p> <p>13.6 IN</p>	<p>For LA30W only. Specify the physical right margin.</p> <p>8-inch page width</p> <p>13.2-inch page width</p> <p>13.6-inch page width</p>
<p><TOP OF FRM> (Top-of-Form)</p> <p>## /60 IN</p>	<p>Specify the top of form in 1/60 inches. See “Print Area Definition” in Chapter 2 “Paper Handling”.</p> <p>0 to 99</p> <p>Number of 1/60 inches</p>
<p><TOP MRGN> (Top Margin)</p> <p>## LINES</p>	<p>Specify the number of the top line. See “Print Area Definition” in Chapter 2 “Paper Handling”.</p> <p>1 to 256</p> <p>Number of the top line</p>
<p><BOTTOM MRG> (Bottom Margin)</p> <p>## LINES</p>	<p>Specify the number of the bottom line. See “Print Area Definition” in Chapter 2 “Paper Handling”.</p> <p>1 to 256 (66)</p> <p>Number of the bottom line</p>
<p><LINE MODE></p> <p>LF=LF+CR</p> <p>LF=LF+CR</p> <p>CR=LF+CR</p> <p>LF+CR=LF+CR</p>	<p>Specify the effect of LF (Line Feed) and CR (Carriage Return) codes.</p> <p>CR=CR: No line feed is added to a carriage return.</p>

To be continued

⌂ A B C D E F G H

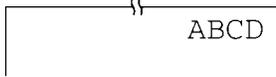
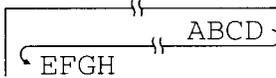




MACRO 1 and MACRO 2 Options Values	Description
<i>Continued</i>	<p>CR=LF+CR: A line feed is added to each carriage return.</p>  <p>LF=LF: No carriage return is added to a line feed.</p>  <p>LF=LF+CR: A carriage return is added to each line feed.</p> 
<p><PAPER SRC> (Paper Source)</p> <p>TRACTOR MANUAL RSVD 1 RSVD 2 RSVD 1/2</p>	<p>Specify the paper input source. This setting is valid immediately after powering on. After that, the paper source follows the setting of the paper select lever.</p> <p>Continuous forms selected Single sheets selected Reserved Reserved Reserved</p>
<p><PRINT DIR> (Print Direction)</p> <p>UNIDIR BIDIR SOFT CNTRL (Software Control)</p>	<p>Unidirectional printing. Unidirectional printing is used for the printing that needs the precise vertical alignment. Unidirectional printing is slower than bidirectional printing.</p> <p>Bidirectional printing. The printer prints in either direction while seeking the next print direction for a shorter print time. The unidirectional command is ignored.</p> <p>The print direction follows a command from the computer. If no command is sent, print direction is bidirectional.</p>



Using Set-Up Mode

MACRO 1 and MACRO 2 Options Values	Description
=DEC DEFLT5===== (DEC Defaults)	The following are the Set-Up options for DEC PPL2 protocol only.
<DEC PRT ID> (DEC Printer ID)	Specify the printer ID to be given in response to DA commands from the computer.
PPL2 LA50 ID LA120 ID LA210 ID	
<AUTO WRAP> TRUNCATE	Characters are received but not stored in the print buffer. 
WRAP	End-of-line wrap. Causes a Carriage Return plus a Line Feed. 
<EOT DISCON> (End of Transmission Disconnect)	Specify whether the DSR signal is controlled by the EOT character. (DEC-423 serial interface only)
NO DISCON	EOT character is ignored.
DISCONNECT	DTR signal turns low for five seconds when the EOT character is detected.
<INIT REPR> (Initialization Report)	Specify whether the status is sent to the computer when the printer is turned on. (DEC-423 serial interface only)
NO	Status is not sent.
YES	Status is sent.
<AUTO ANSBK> (Automatic ANSWERBACK)	Specify whether the ANSWERBACK message is sent to the computer when printer is turned on.
NO	ANSWERBACK message is not sent.
YES	ANSWERBACK message is sent.
<ANSWER ENQ> (ANSWERBACK on ENQ)	Specify whether the ANSWERBACK message is sent to the computer when printer receives an ENQ code.
NO	ANSWERBACK message is not sent.
YES	ANSWERBACK message is sent.





MACRO 1 and MACRO 2 Options Values	Description
<DEC G0 CST>	Select a character set (language) for the G0.
(DEC G0 Character Set)	
US ASCII	American English
BRITISH	British English
D-FINNISH	DEC Finnish
FRENCH	French
D-FRENCH-C	DEC French-Canada
GERMAN	German
I-ITALIAN	ISO Italian
J-ROMAN	JIS Roman
D-NORW/DAN	DEC Norwegian/Danish
I-SPANISH	ISO Spanish
D-SWEDISH	DEC Swedish
NORW/DAN	Norwegian/Danish
D-DUTCH	DEC Dutch
D-SWISS	DEC Swiss
D-PORTGU	DEC Portuguese
LEGAL	Legal
D-SUPPL	DEC Supplemental
D-GRAPHICS	DEC Special Graphics
D-TECH	DEC Technical
D-7 HEBREW	DEC 7-bit Hebrew
D-HEBREW-S	DEC Hebrew Supplement
D-GREEK-S	DEC Greek Supplement
D-7 TURKI	DEC 7-bit Turkish
D-TURKI-S	DEC Turkish Supplement
J-KATAKANA	JIS Katakana



Using Set-Up Mode

MACRO 1 and MACRO 2 Options Values	Description
<USER PREF> (User Preference)	Select a character set (language) for the DEC User Preference supplement.
D-SUPPL	DEC Supplemental
D-GRAPHICS	DEC Special Graphics
D-TECH	DEC Technical
D-7 HEBREW	DEC 7-bit Hebrew
D-HEBREW-S	DEC Hebrew Supplement
D-GREEK-S	DEC Greek Supplement
D-7 TURKI	DEC 7-bit Turkish
D-TURKI-S	DEC Turkish Supplement
J-KATAKANA	JIS Katakana
I-LATIN 1	ISO Latin 1
I-LATIN 2	ISO Latin 2
I-LATIN 5	ISO Latin 5
I-LATIN HB	ISO Latin Hebrew
I-LATIN GK	ISO Latin Greek
I-CYRILLIC	ISO Cyrillic



Using Set-Up Mode

MACRO 1 and MACRO 2 Options Values	Description
=IBM&EPSON =====	The following are the Set-Up options common to IBM Proprinter X24E and XL24E protocol and Epson ESC/P2 protocol.
<DEFLT SET>	Select a basic code page.
(Default Character CP 210	CodePage 210
Set) CP 220	CodePage 220
CP 437	CodePage 437
CP 850	CodePage 850
CP 851	CodePage 851
CP 852	CodePage 852
CP 857	CodePage 857
CP 860	CodePage 860
CP 862	CodePage 862
CP 863	CodePage 863
CP 865	CodePage 865
CP 866	CodePage 866
CP DHN	CodePage DHN
TURKEY	Turkish
ECMA 94	ECMA 94
ISO LATIN1	ISO Latin 1
ISO LATIN2	ISO Latin 2
HUNGARY	Hungarian
SLOVENY	Slovenian
POLAND	Polish
MAZOWIA	Mazowian
KAMENIC	Kamenicky
CYRILLIC	Cyrillic
ELOT927	ELOT 927
ELOT928	ELOT 928
LTN POLISH	Latin Polish
LITHUANY 1	Lithuanian 1
LITHUANY 2	Lithuanian 2
MIK	
MACEDONIAN	Macedonian



Using Set-Up Mode

MACRO 1 and MACRO 2 Options Values	Description
=IBM DEFLT===== (IBM Defaults)	The following are the Set-Up options for the IBM Proprinter X24E or XL24E protocol only.
<I-SET 1/2> (IBM Set 1/2)	Specify a character set of the IBM Proprinter X24E or XL24E.
IBM SET 1	IBM character set 1
IBM SET 2	IBM character set 2
<I-DBL HIGT> (IBM Double Height)	Specify whether the character height is doubled. If specified, change the vertical pitch also.
NO	Standard character height
YES	Double character height
<IBM AGM>	Specify whether the Alternate Graphics Mode (AGM) is used, that is, the printer is compatible with the IBM Graphics printers.
NO	The base of line spacing is 1/72 inch or 1/216 inch.
YES	The base of line spacing is 1/60 inch or 1/180 inch.
=EPSON DFLT===== (Epson Defaults)	The following are the Set-Up options for the Epson ESC/P2 protocol only.
<E-CHR SET> (Epson Character Set)	Select a national character set.
USA	American English
FRANCE	French
GERMANY	German
UK	British English
DENMARK1	Danish 1
SWEDEN	Swedish
ITALY	Italian
SPAIN 1	Spanish 1
JAPAN	Japanese
NORWAY	Norwegian
DENMARK2	Danish 2
SPAIN 2	Spanish 2
LATIN AM	Latin American
KOREA	Korea
LEGAL	Legal





Changing Install Options

The `INSTALL` function defines the printer's installation conditions. You can select a language from five that are used to print menu functions and options during the Set-Up operation . You can adjust the start timing of auto loading or auto tear-off feeding. You can also change the operation of the error beep or allocation of the input buffer. If you are using the DEC-423 serial interface, you must set the serial interface options properly for the printer to function correctly with your system hardware.

The following table describes the `INSTALL` options and values . Options are listed in the order in which they are printed. For the procedure for changing the `INSTALL` options, see the early sections of this chapter.

Install Options List

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Auto Switch	4-27
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Bit & Parity	4-28
Buffer Control	4-28
Disconnect on Fault	4-28



Using Set-Up Mode

INSTALL Options and Values

- Overprinted values are the factory settings.

INSTALL Options	Values	Description
<LANGUAGE>		Specify a language to be used to print the Set-Up menu functions and options.
	ENGLISH	English
	DEUTSCH	German
	ESPANOL	Spanish
	FRANCAIS	French
	ITALIANO	Italian
<TEAR>		Specify the (auto) start timing of tear off feeding.
	AUTO 1 SEC	1 second after data stops from the computer.
	AUTO 2 SEC	2 seconds after data stops from the computer.
	AUTO 3 SEC	3 seconds after data stops from the computer.
	AUTO 4 SEC	4 seconds after data stops from the computer.
	AUTO 5 SEC	5 seconds after data stops from the computer.
	MANUAL	Feed the paper for tear-off when the Pause button is pressed.
NO TEAR	Tear off feeding is inhibited under any conditions. Specify this setting for labels that tend to peel off during backward feeding.	
<S-SHEET LD> (Single Sheet Load)		Specify the (auto) start timing of single sheet loading.
	AUTO 1 SEC	1 second after a single sheet is set on the platen.
	AUTO 2 SEC	2 seconds after a single sheet is set on the platen.
	AUTO 3 SEC	3 seconds after a single sheet is set on the platen.
	AUTO 4 SEC	4 seconds after a single sheet is set on the platen.
	AUTO 5 SEC	5 seconds after a single sheet is set on the platen.
MANUAL	Load a single sheet when the FF/Load button is pressed.	
<ERROR BEEP>		Enable or disable the printer status buzzer when a fault condition occurs.
	ONE	One beep for a period of about 500 ms
	CONTINUOUS	Buzzer on until the fault condition is cleared.
	OFF	Buzzer off under any condition.





INSTALL Options	Values	Description
<BUFFER>		Assign buffer memory as the input buffer.
	2 KBYTE	2K bytes
	8 KBYTE	8K bytes
	16 KBYTE	16K bytes
	32 KBYTE	32K bytes
	64 KBYTE	64K bytes
		Note: The larger the input buffer selected, the smaller the download buffer reduced. Even with 64K bytes of input buffer, a minimal download buffer is provided. If you need a larger capacity for downloading fonts, reduce the input buffer.
<I/F TYPE> (Interface Type)	PARALLEL	Select the type of interface to the computer. Centronics parallel interface
	SERIAL	DEC-423 serial interface
	AUTO	Both interfaces are ready for communication. The printer communicates with the interface from which it first receives data. The interface is active until the input buffer becomes empty.
<AUTO SW> (Auto Switch)		Specify the timing of regarding the selected protocol or interface as being inactive when AUTO is specified in the <PROTOCOL> or <I/F TYPE> option.
	2 SEC	2 seconds elapsed after data stops from the computer.
	4 SEC	4 seconds elapsed after data stops from the computer.
	6 SEC	6 seconds elapsed after data stops from the computer.
	8 SEC	8 seconds elapsed after data stops from the computer.
	10 SEC	10 seconds elapsed after data stops from the computer.
	12 SEC	12 seconds elapsed after data stops from the computer.
	14 SEC	14 seconds elapsed after data stops from the computer.
	16 SEC	16 seconds elapsed after data stops from the computer.
	18 SEC	18 seconds elapsed after data stops from the computer.
	20 SEC	20 seconds elapsed after data stops from the computer.

Using Set-Up Mode

INSTALL Options	Values	Description
<BAUD RATE>		Setting of data transmission speed for DEC-423. The baud rate is in bps (bits per second). Select the same baud rate as that used by your computer or modem.
	600 BPS	
	1200 BPS	
	2400 BPS	
	4800 BPS	
	9600 BPS	
	19200 BPS	
<BIT&PARITY>		Setting of data format for DEC-423.
		Number of data bits Parity bit
	7 EVEN	7 Even
	7 ODD	7 Odd
	7 SPACE	7 Space *
	7 MARK	7 Mark *
	8 EVEN	8 Even
	8 ODD	8 Odd
	8 NONE	8 None
		* The mark is logical 1. The space is logical 0.
<BUFFER CTL> (Buffer Control)	DTR	Setting of data transmission buffer control for DEC-423. The Data Terminal Ready signal is used.
	XON/XOF	The DC1 and DC3 codes are used.
<DISC FAULT> (Disconnect on Fault)	NO	Specify the disconnect control of the interface when a fault condition occurs. DTR is kept as it was.
	DROP DTR	DTR is turned low and fixed.
	PULSE DTR	DTR is turned low for five seconds and returned to the original state.



Adjusting Top-of-Form Origin

Print positions often change gradually when you use the printer over long periods of time. The ADJUST function allows you to adjust these positions by fine-tuning the Top-of-Form origin.

The following table describes the ADJUST options and values. Options are listed in the order they are printed.

ADJUST Options and Values

- Overprinted values are the factory settings.

ADJUST Options	Values	Description
<FNFOLD ADJ> (Fanfold Adjustment)	###/60 IN	Adjust the Top-of-Form origin for continuous forms in increments of 1/60 inch (0.42 mm) from the physical top of the page. -10 to 10 (0) Number of 1/60 inches
<MNUAL ADJ> (Manual Adjustment)	###/60 IN	Adjust the Top-of-Form origin for single sheets in increments of 1/60 inch (0.42 mm) from the physical top of the page. -10 to 10 (0) Number of 1/60 inches
<RESVD 1>		Reserved
<RESVD 2>		Reserved

Changing Menu Access Options

You can restrict the access to the Set-Up functions to avoid accidentally changing the Set-Up options.

MENU ACCESS Option and Values

- Overprinted values are the factory settings.

MENU ACCESS Option	Values	Description
<MENU-ACCES>		Specify the type of access to the Set-Up functions from the control panel or from the <FUNCTIONS> menu.
	ALL FUNC	All functions are accessible.
	MACRO ONLY	Only MACRO 1 and MACRO 2 functions are accessible from the <FUNCTIONS> menu.
	NO ACCESS	Set-Up mode is inaccessible.
	NO PANEL	Font, Macro, and Protocol buttons are disabled even in Normal mode. Set-Up mode is also inaccessible.
		Note: You can return to the All Functions Accessible mode by turning the printer on while pressing the Park, LF and FF/Load buttons at the same time. The printer enters the Set-Up mode with this operation.

Exiting and Saving

This section describes how to exit the set up mode while saving any changes you have made.

To exit the Set-Up mode with the settings saved, select the SAVE&EXIT function and press the ↓ button or the ↑ button.

Any settings changed while in the Set-Up mode are saved as the new power-on defaults for the printer. The new defaults remain active until you change them again.

Caution: *To temporarily use your changes, press the Set-Up/Quit button. These changes are lost at the next power-off.*



Recalling Factory Settings

Factory settings are those settings preselected at the factory. To recall (reset) the factory settings, select the `RCALL-FACT` function and press the `↓` button or the `↑` button.

Options under the `MACRO`, `INSTALL`, and `ADJUST` functions are all initialized to the factory settings.

Using the Diagnostic Functions

The `TESTS` function allows you to diagnose the printer with the following two functions:

- `PRINT-T` (printing test)
- `HEX-DUMP` (hex dump)

These functions are used for checking print quality and diagnosing printer problems. Hex dump also provides useful information for programmers. There are two other options in the `TESTS` function, but they are for service personnel only.

Printing Test

The printing test function prints test pages independently of your computer to check printing operations and quality. It does not check the interface between the computer and the printer.

The printing test prints all of the characters available in the ASCII character set. For color printers having a color ribbon, printing occurs in four colors.

To start the printing test, make sure that continuous forms paper is loaded into the printer. Enter the Set-Up mode and follow these steps:

1. Start the printing test (select the `PRINT-T` option).

Check that the red cursor stands under `PRINT-T`, and then press the `↓` button or the `↑` button. The printer selects (underlines) `PRINT-T` and starts printing. A short help menu is printed at the top of the page. Note that the printer is *not ready for the computer* during printing test.

2. Exit the printing test.

Exit the printing test in either of the following ways after printing a dozen of lines:

- To exit the printing test and return to the `<TESTS>` menu, press the `↓` button or the `↑` button.
- To exit the printing test and return to the `<FUNCTIONS>` menu, press the `Exit/Save` button.
- To exit the printing test and return to the Normal mode (ready), press the `Set-Up/Quit` button. The printer temporarily saves any changes made while in the Set-Up mode and returns to the Ready state.

3. Examine the test page.

A sample test page is shown in step 5 “Testing the Printer” of *Setting Up Your Printer*.



Using Set-Up Mode

Hex Dump Mode

The Hex Dump mode prints data and commands in hexadecimal characters and abbreviated control codes. The ASCII characters are used for printing. No characters are printed for hexadecimal codes 80 to FF. The Hex Dump mode is useful for checking whether your computer is sending the correct commands to the printer and whether the printer is executing the commands correctly. It is also useful for debugging software programs.

To start the Hex Dump mode, make sure that continuous forms paper is loaded into the printer. Enter the Set-Up mode and follow these steps:

1. Start the Hex Dump mode (select the **HEX-DUMP** option).

Repeatedly press the \rightarrow button to position the red cursor under **HEX-DUMP**, and then press the \downarrow button or the \uparrow button. The printer selects (underlines) **HEX-DUMP**, goes *ready* and prints a header at the top of the page.

Note: You cannot switch back to Set-Up mode from Hex Dump mode. Do not change any value before entering Hex Dump mode, because your changes will be lost.

2. Print the hex dump.

To start hex dump printing, send your file or program to the printer. The printer goes online and prints the hex dump.

Press the **Pause** button to pause and resume printing in Hex Dump mode. To resume hex dump printing, press the **Pause** button again.

To print another hex dump, send another file to the printer.

3. Exit the Hex Dump mode

Turn the printer off to exit the Hex Dump mode.

Caution: *If you changed any settings in Set-Up mode before starting Hex Dump mode, these changes are lost.*



Using Set-Up Mode

```

*** Hex dump printing ***
Page 1
      0 1 2 3 4 5 6 7 8 9 A B C D E F
01 48 65 78 20 64 75 6D 70 20 70 72 69 6E 74 69 6E Hex dump printin
02 67 2E 0D 0A 0D 0A 9B 3F 32 37 68 41 42 43 44 45 g.???.?27hABCDE
03 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 FGH IJKLMNO PQRSTU
04 56 57 58 59 5A 0D 0A 61 62 63 64 65 66 67 68 69 VWXYZ? abcdefghi
05 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 jklmnopqrstuvwxy
06 7A 0D 0A 30 31 32 33 34 35 36 37 38 39 0D 0A 9B z? 0123456789?.
07 21 70 !p

```

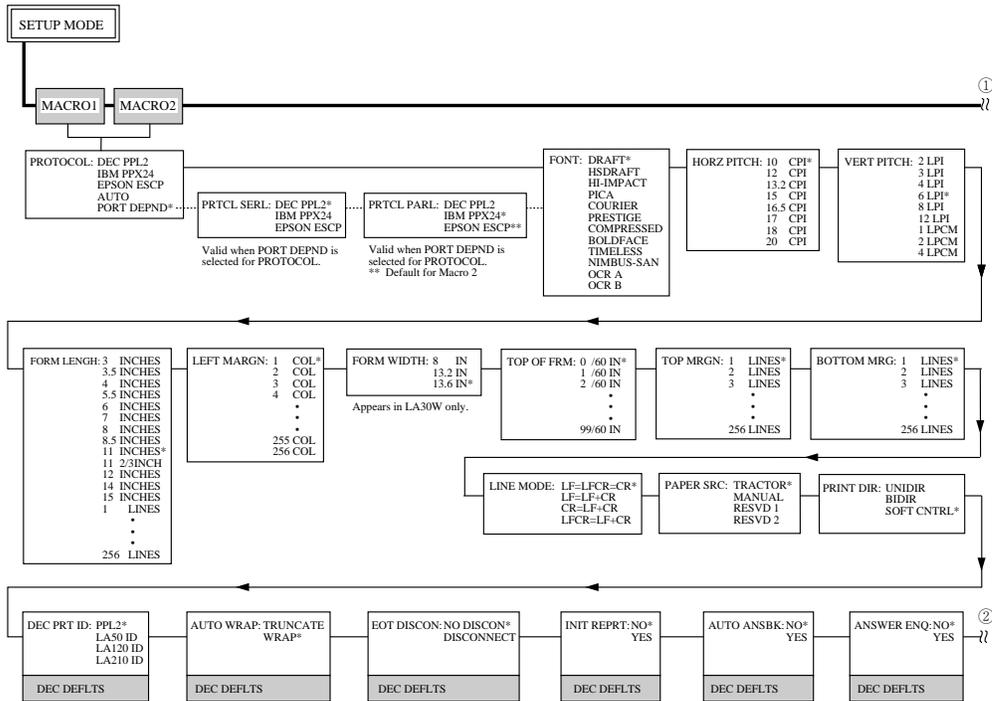
Sample Hex Dump

Using Set-Up Mode

Set-Up Mode Quick Reference

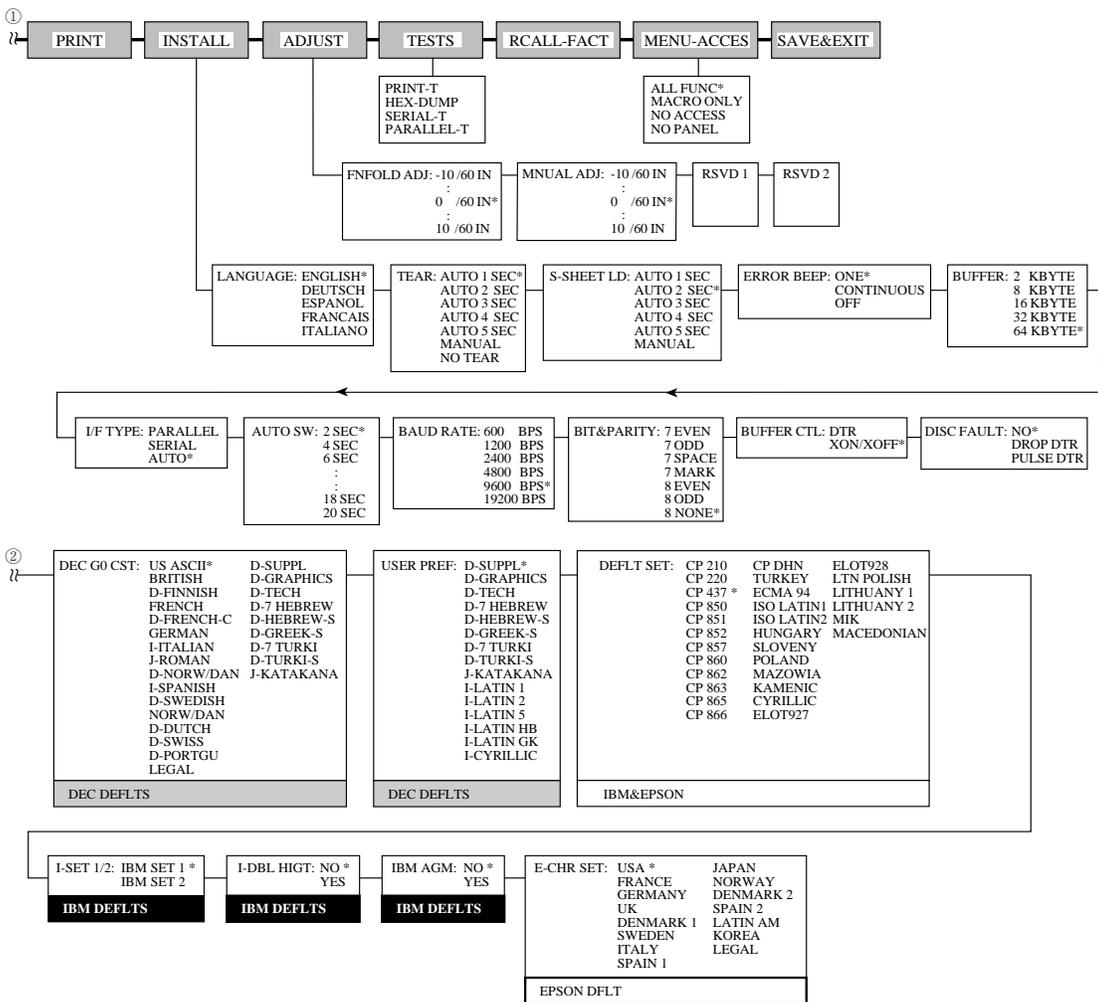
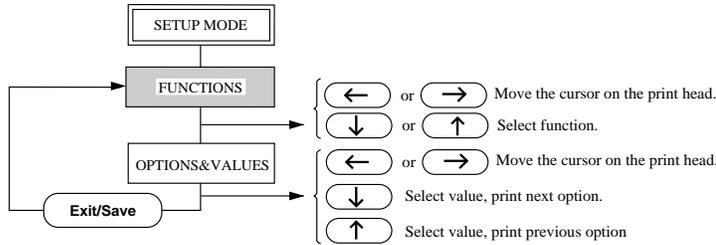
The following flowchart shows how the Set-Up mode is organized.

Note: Asterisks (*) indicate factory settings.





Using Set-Up Mode







5

Maintenance

Your printer requires very little care. Occasional cleaning and replacement of the ribbon cartridge are all that is required.

Lubrication of the printer is not usually necessary. If the print head carriage does not move smoothly back and forth, clean the printer in the manner described in this chapter. If the problem continues, contact your dealer to determine whether lubrication may be necessary.

Cleaning

The front and back covers and the acoustic cover of the printer help protect it against dust, dirt, and other contaminants. However, paper produces small particles that accumulate inside the printer. This section explains how to clean and vacuum the printer and how to clean the platen and paper bail rollers.

It is easier to clean the printer when the front cover and the cut sheet stand and back cover are removed.

Cleaning and Vacuuming the Printer

If the print head carriage does not move smoothly back and forth or paper particles have accumulated in the printer, clean the printer.

Warning: To avoid any possibility of injury, before cleaning the printer, turn off the power to both the printer and the computer, and unplug the printer.

To clean and vacuum the printer:

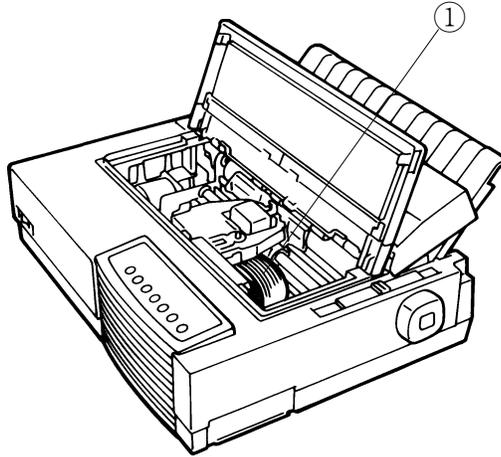
1. Remove any paper from the printer. Make sure that the power is off, and then disconnect the printer power cord.
2. Using a soft vacuum brush, vacuum the exterior of the printer. Be sure to vacuum the air vents at the front, left sides, and bottom of the printer. Also vacuum the cut sheet stand.
3. Use a soft, damp cloth to wipe the exterior of the printer, including the covers. A mild detergent may be used.

Warning: Do not use solvents, kerosene, or abrasive cleaning materials that may damage the printer.



Maintenance

4. Open the front cover of the printer and remove the ribbon cartridge. Using a soft vacuum brush, gently vacuum the platen, the print head carriage and shaft, and surrounding areas. You can easily slide the print head to the left or right when the power is off. Be careful not to press too hard on the flat ribbon cable ① that extends from the print head carriage.



Printer Interior

5. Re-install the ribbon cartridge. Close the front cover.
6. Open the top cover. Vacuum the inside of the top cover, the bail rollers, the cut sheet entry behind the platen, and surrounding areas.
7. Raise the cut sheet stand together with the back cover. Vacuum the forms tractors and surrounding areas.

Cleaning the Platen and Paper Bail Rollers

Clean the platen and paper bail rollers about once a month or if stains or smudges appear on the paper. Use alcohol or water.

To clean the platen and the bail rollers:

1. Apply a small amount of alcohol or water to a soft cloth. Avoid spilling alcohol or water inside the printer.
2. Place the cloth against the platen and manually rotate the platen knob.
3. To dry the platen, place a dry cloth against the platen and manually rotate the platen knob.
4. Gently wipe the paper bail rollers using the cloth moistened with alcohol or water. Dry the rollers using a dry cloth.



Cleaning the Print Head

If the paper is smudged or stained by ink, clean the nose of the print head with a dry cloth. For removing and installing the print head, see the section “Replacing the Print Head” later in this chapter.

Replacing the Ribbon Cartridge

If printing is too light because of ribbon wear, replace the ribbon cartridge. Appendix A lists the order number for the ribbon cartridge.

The replacement is almost the same with the installation except that it involves removing the old ribbon cartridge and unpacking the purchased ribbon cartridge from the carton. The installation of the ribbon cartridge is detailed in the section “Installing the Ribbon Cartridge” in step 3 of *Setting Up Your Printer*. This section describes only the removal of the old ribbon cartridge.

To remove the ribbon cartridge:

1. Turn off the printer.
2. Open the front cover. For easy removal, slide the print head carriage between the second and the third bail rollers (from left to right).

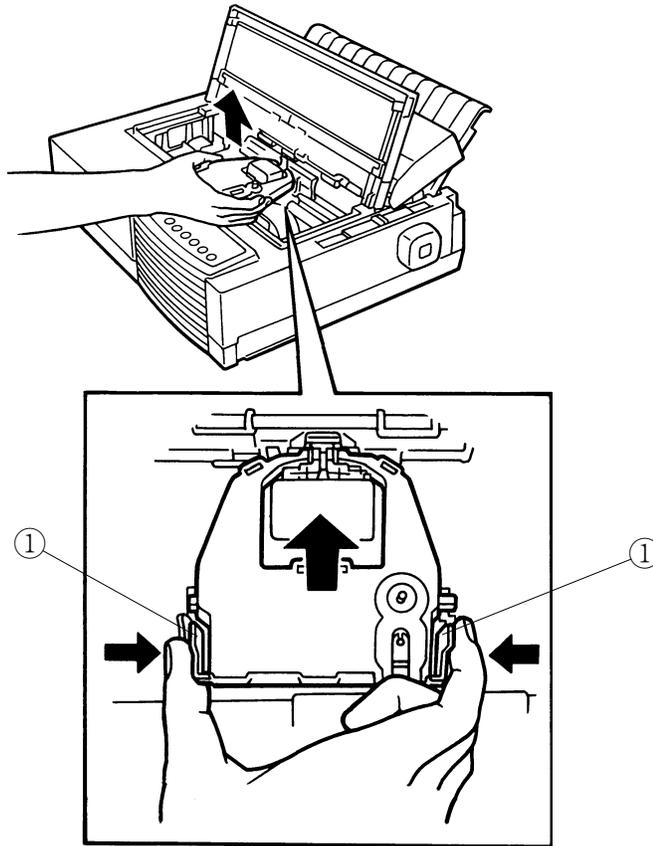
Warning: The print head may be hot if you have been printing recently.

3. Move the paper thickness lever located on the top right of the printer to position **D**.



Maintenance

4. To remove the ribbon cartridge, press the ribbon release levers ① located on the sides of the cartridge and carefully lift the cartridge out of the printer.



Removing the Ribbon Cartridge

5. Remove the new ribbon cartridge from its package.





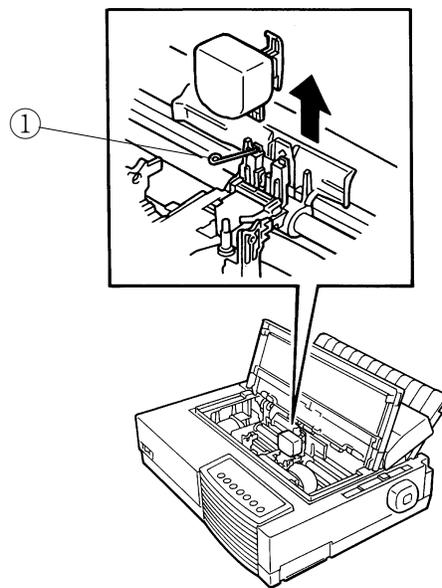
Replacing the Print Head

If a specific dot is not printed for all characters, replace the print head.

Warning: The print head may be hot if you have been printing recently.

To remove the print head:

1. Turn off the printer.
2. Open the front cover and remove the ribbon cartridge.
3. Pull the right end of the head lock wire ① forward to release it from the hook at the right of the print head carriage. Then release the wire from the center hook.
4. Lift the print head to remove it from the connector on the carriage.



Removing the Print Head

To install the print head:

1. Carefully fit the mounting guide grooves of the print head on the locating studs on the carriage.
2. Push the print head into the connector and hook the wire into place in the reverse order of removal.







6

Trouble-Shooting

Your printer is extremely reliable, but occasional problems may occur. You can solve many of these problems yourself, using this chapter. If you encounter problems that you cannot resolve, contact your dealer for assistance.

This chapter is organized as follows:

- Solving problems
- Diagnostic functions
- Returning the printer for maintenance
- Contacting your Digital Service Center

Solving problems

The tables in this section describe common printer problems and their solutions. The following types of problems are considered:

- Print quality problems
- Paper handling problems
- Operating problems
- Printer failure

Print Quality Problems and Solutions

Poor print quality or other printing problems are often caused by incorrect printer set-up or incorrect software settings. A gradual decrease in print quality usually indicates a worn ribbon. The following table identifies common print quality problems and suggests solutions.



Trouble-Shooting

Problem	Solution
Printing is too light or too dark.	<p>Make sure that the ribbon cartridge is properly installed and that the ribbon feeds smoothly.</p> <p>Make sure that the paper thickness lever is set for the thickness of your paper. See the “Paper Thickness Lever Settings” table in Chapter 2, page 2-11.</p> <p>Check ribbon wear. Replace the ribbon if necessary.</p>
Stains or smudges appear on the page.	<p>Make sure that the paper thickness lever is set for the thickness of your paper. See the “Paper Thickness Lever Settings” table in Chapter 2, page 2-11.</p> <p>Check ribbon wear. Replace the ribbon if necessary.</p> <p>Check whether the tip of the print head is dirty. Clean the head with a soft cloth if necessary. For removing the print head, see the section “Replacing the Print Head” in Chapter 5, page 5-5.</p>
The page is blank.	<p>Make sure that the ribbon cartridge is properly installed. See the section “Installing the Ribbon Cartridge” in step 3 <i>Setting Up Your Printer</i>, page 8.</p>
Printing is erratic or the wrong characters are printed. Many “?” or unexpected characters are printed.	<p>Make sure that the interface cable is securely connected to both the printer and computer.</p> <p>Make sure that the printer protocol selected in your software is the same as the protocol selected on the printer. See step 6 “Connecting the Printer to Your Host System” of <i>Setting Up Your Printer</i>, page 17.</p> <p>If you are using an DEC-423 serial interface, make sure that the serial settings required by your software or computer are the same as the settings on the printer. See the section “Changing Install Options” in Chapter 4, page 4-28.</p> <p>If the PROTOCOL option is set to AUTO, the printer may not detect the proper protocol. Force this option according to your need. See the section “Changing Macro 1 and Macro 2 Options” in Chapter 4, page 4-16.</p>
Printing is vertically misaligned (jagged).	<p>Use the printer’s vertical alignment function to check the vertical print alignment. If necessary, adjust the print alignment. See the section “Checking Vertical Alignment” in this chapter, page 6-7.</p>



Problem	Solution
The top margin is wrong.	<p>The top margin is the sum of the printer's top-of-form setting, the software-specified top margin, and the printer's TOP-MRGN setting. Proceed as follows:</p> <ul style="list-style-type: none"> • Make sure that the top-of-form setting is correct. The factory default is 0 mm (0 inch). See the section "Changing Top of Form Origin" in Chapter 4, page 4-29. • Check the software-specified top margin. Refer to your software documentation. • Check the printer's TOP-MRGN setting. See the section "Changing Macro1 and Macro2 Options" in Chapter 4, page 4-18.
Lines are double spaced instead of single spaced.	<p>Check the line spacing setting in your software. Change the LINE MODE setting in the printer Set-Up mode to LF=LF+CR. See the section "Changing Macro1 and Macro2 Options" in Chapter 4, pages 4-18 and 4-19.</p>
The printer overprints on the same line.	<p>Change the LINE MODE setting in the printer Set-Up mode to CR=LF+CR. See the section "Changing Macro1 and Macro2 Options" in Chapter 4, pages 4-18 and 4-19.</p>
The next print line starts where the previous line ended instead of at the left margin.	<p>Change the LINE MODE setting in the printer Set-Up mode to LF=LF+CR. See the section "Changing Macro1 and Macro2 Options" in Chapter 4, pages 4-18 and 4-19.</p>
The printer overprints on the same line while the next print line starts where the previous line ended instead of at the left margin.	<p>Change the LINE MODE setting in the printer Set-Up mode to LF+CR=LF+CR. See the section "Changing Macro1 and Macro2 Options" in Chapter 4, pages 4-18 and 4-19.</p>



Trouble-Shooting

Paper Handling Problems and Solutions

The following table describes common paper handling problems and suggests solutions. See Chapter 2 “Paper Handling” for detailed procedures on loading and using paper.

Problem	Solution
Paper cannot be loaded or fed.	<p>Make sure that the paper select lever located on the top left of the printer is set correctly. Move the lever backward for continuous forms or forward for single sheets.</p> <p>Make sure that the paper covers the paper-out sensor, i.e., the left paper edge is within 52 mm for single sheets or 41 mm for continuous forms from the left edge of the platen. (This problem cannot occur if you use the forms tractor unit or insert a single sheet with its left edge in contact with the left paper guide.)</p> <p>Make sure that the tractor unit is correctly installed and that the tractor shaft gear engages the platen shaft gear. If you are using the tractor unit for rear feeding, open the front cover and make sure that the second stud from the left on the printer bottom frame projects outward.</p>
Paper jams while loading.	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set for the thickness of your paper. See the table “Paper Thickness Lever Settings” in Chapter 2, page 2-11.</p> <p>Make sure that the paper is not folded, creased, or torn.</p> <p>Make sure that the left and right tractors are set so that the continuous forms are stretched taut. See the section “Using Continuous Forms” in Chapter 2, page 2-14.</p>
Paper jams while printing.	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set for the thickness of your paper. See the table “Paper Thickness Lever Settings” in Chapter 2, page 2-11.</p> <p>For continuous forms, make sure that the incoming and outgoing paper stacks are correctly placed. Paper should feed straight. See the subsection “Positioning the Paper Stack” in Chapter 2, page 2-15.</p>





Problem	Solution
Paper slips off the forms tractors or the perforated holes of the paper tear during printing.	Make sure that the forms tractors are positioned correctly for the width of your paper and that the perforated holes of the paper fit directly over the tractor sprockets. See the section “Using Continuous Forms” in Chapter 2, page 2-14.

Operating Problems and Solutions

The following table identifies common operating problems and suggests solutions. If you cannot resolve a problem, contact your dealer.

Problem	Solution
The power does not turn on.	<p>Make sure that the “I” on the printer power switch is depressed.</p> <p>Make sure that the power cord is securely connected to both the printer and the outlet. Make sure that the power outlet is functional.</p> <p>Turn the power off. Wait a minute and then turn the printer on again. If the printer still has no power, contact your dealer.</p>
The printer is on but it will not print.	<p>Make sure that the Ready indicator is lit. See the subsection “Operation of the Control Panel” in Chapter 2, page 2-4.</p> <p>Make sure that the interface cable is securely connected to both the printer and the computer. See step 6 “Connecting the Printer to Your Host System” of <i>Setting Up Your Printer</i>, page 17.</p> <p>If the Fault indicator is lit, load the paper. See Chapter 2 “Paper Handling”, page 2-1.</p> <p>Run the printer printing test. If the printing test executes normally, the problem is being caused by the interface, the computer, incorrect printer settings, or incorrect software settings. See step 5 “Testing the Printer” of <i>Setting Up Your Printer</i>, page 14.</p> <p>Make sure that the printer protocol selected in your software is the same as the protocol selected on the printer. See step 6 “Connecting the Printer to Your Host System” of <i>Setting Up Your Printer</i>, page 17.</p> <p>If you are using an DEC-423 serial interface, make sure that the serial settings required by your software or computer are the same as the settings on the printer. See the section “Changing Install Options” in Chapter 4, page 4-28.</p>





Trouble-Shooting

Printer Failures

A user cannot generally resolve a problem involving defective printer hardware. On detecting a fatal error, the printer will:

- Stop printing
- Beep if it is not disabled by the Set-Up mode
- Turn the Ready indicator off
- Blink the Fault indicator.

The following errors cause the printer to turn off the power:

- Print head error
- Space motor error (print head carriage motor)
- Line feed motor error
- +34 V overvoltage error

No error condition is displayed if any of these errors occurs.

Turn the printer off and back on, then rerun the same job to check if the error was transient. If the error recurs, contact your dealer.

Diagnostic Functions

The printer diagnostic functions are print-test and hex-dump.

- Print-test tells you whether the printer hardware is functioning correctly. It prints the print-test pattern. If the printer hardware is functional, any problems you are having are probably caused by incorrect printer settings, incorrect software settings, the interface, or the computer.
- Hex-dump allows you to determine whether the computer is sending the correct commands to the printer, and whether the printer is executing the commands correctly. This function is useful to programmers or others who understand how to interpret hex dumps.

For details on using these functions, all of which are available in the printer Set-Up mode, see the section “Using the Diagnostic Functions” in Chapter 4, page 4-31.

Besides the above functions, the serial interface loopback test and the parallel interface loopback test are provided in the printer Set-Up mode. These tests are for service engineers.



Checking Vertical Alignment

In bidirectional printing, characters printed from left to right tend to misalign with characters printed from right to left as shown below:

```

This example shows how printing looks
when characters are vertically
misaligned. Note that the left
margin is not straight.

```

The vertical alignment function corrects the vertical character displacement that sometimes occurs with bidirectional printing and results in a poor appearance especially in printing tables. This function is defined as one of the power-on initiated test functions. If you notice misaligned printing, start this function and check and correct the vertical print alignment.

Make sure that continuous forms paper or single sheet paper is loaded in the printer. If possible, use forms at least 216 mm (8.5 inches) wide for LA30N or 356 mm (14 inches) wide for LA30W to avoid printing on the platen. Then proceed as follows:

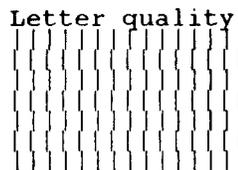
1. Start the vertical alignment test.

Turn the printer on while pressing the Protocol button until the printer beeps. The printer prints the help menu then starts printing rows of parallel bars at Letter quality speed.

Note: Do not press any buttons alone or in combination except for pressing the Protocol or the Set-Up/Quit button alone when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2. Adjust the vertical print alignment at Letter quality speed.

Examine the parallel bars. If the bars are aligned (not jagged), go to step 3. If the bars are offset, repeatedly press the ← button or the → button until the bars are aligned.



Offset of Bars



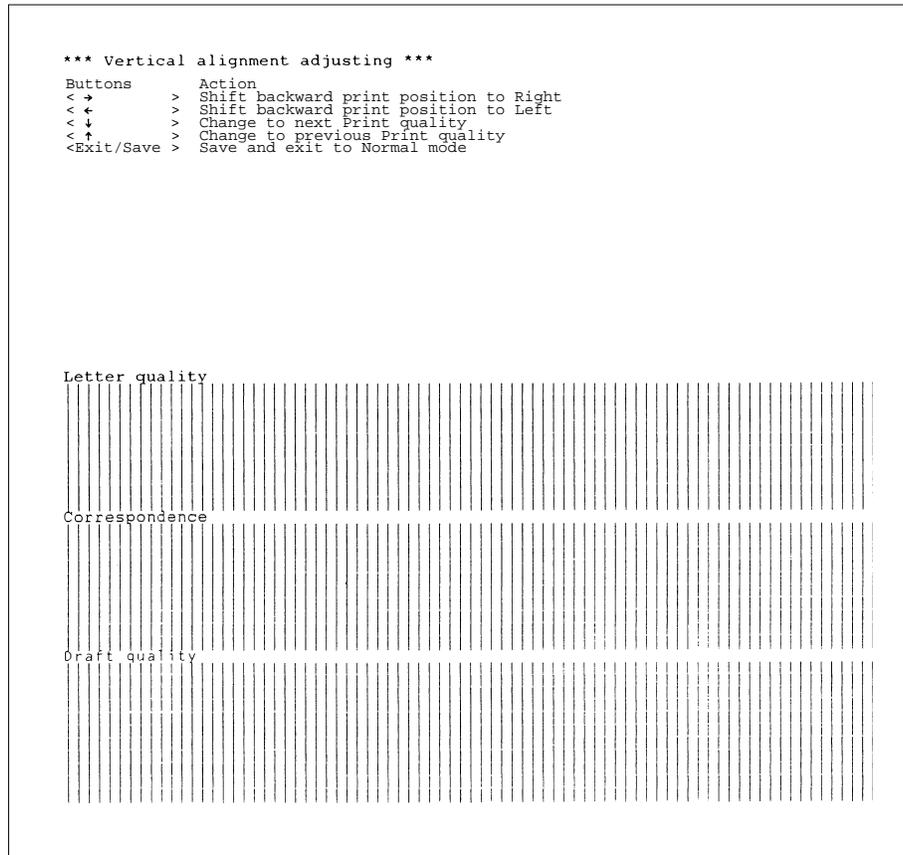


Trouble-Shooting

3. Adjust the vertical print alignment at Correspondence and Draft quality speed.

Press the ↓ button and the ↑ button to switch Letter quality to Correspondence and Draft quality.

Examine the parallel bars and adjust the vertical print alignment as described step 2.



Vertical Alignment

4. Exit the vertical alignment function.

Press the Exit/Save button to save the new vertical alignment settings and exit the vertical alignment function.

Note: To exit the vertical alignment function without saving changes, turn the printer off.





A

Supplies and Options

This appendix lists the accessories and options available for the printer. Contact your dealer for information on ordering any of these items.

Supplies

Supplies	Order Number
Ribbon cartridges	
Black ribbon	LA30R-KA
Color ribbon	LA30R-KC
Print head	LA30X-PH

Options

Option	Order Number	Description
Color kit	LA30X-CK	Color ribbon included
Parallel interface cable	BC19M-10	10 ft, shielded, Centronics
	BC19M-06	6 ft, shielded, Centronics
Serial interface cable	BC16E-10	10 ft, DECconnect cable

Documentation

Documentation	Order Number
DEC PPL2 Programmer Reference Manual	EK-PPLV2-DK



Supplies and Options

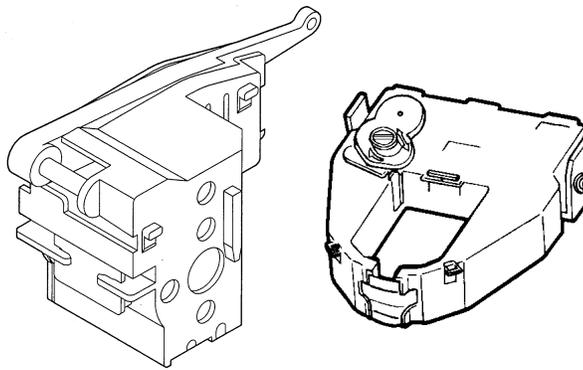
Installing Options

The installation of options allows you to expand the capabilities of your printer.

This section contains an introductory outline of the options available.

Installing the Color Kit

You can turn your monochrome printer into a color printer by installing a color kit on the print head carriage. The ribbon shift unit (shown below) of the color kit vertically swings the color ribbon cartridge to position one of the four colors of ribbon in front of the print head.



Color Kit (Ribbon Shift Unit and Color Ribbon Cartridge)

To install the ribbon shift unit on your printer, turn the printer off and remove the cover from the print head carriage. For details, refer to the instructions shipped with the kit. To install the color ribbon, see the section entitled “Installing the Ribbon Cartridge” in step 3 of *Setting Up Your Printer*. The printer automatically senses the color kit and follows the color commands from your software.

Use the printing test function to check color printing independent of the color command from your software. See step 5 “Testing the Printer” in *Setting Up Your Printer*.



B

Printer and Paper Specifications

This appendix provides the physical, functional, and performance specifications for the printer. It also contains detailed paper specifications.

Physical Specifications

Dimensions	LA30N	LA30W
Height:	133 mm (5.2 in)	130 mm (5.1 in)
Width:	434 mm (17 in)	570 mm (22.4 in)
Depth:	330 mm (13 in)	330 mm (13 in)
Weight	LA30N	LA30W
	7.5 kg (16.5 lb)	8.5 kg (18.7 lb)
AC power requirements	LA30N-A2/LA30W-A2	LA30N-A3/LA30W-A3
	100 to 120 VAC \pm 10% 50/60 Hz	220 to 240 VAC -10% , $+6\%$ 50/60 Hz
Power consumption	Average 120 VA Maximum 240 VA	
Heat generation	Average 65 kcal/h	
Interface (dual)	IEEE 1284 (bidirectional) parallel and DEC-423 serial	
Data buffer size	2K, 8K, 16K, 32K or 64K bytes	
Operating environment	5 to 38°C (41 to 100°F) 30% to 80% RH (no condensation) Wetbulb temperature, less than 29°C (84°F)	
Storage environment	-15 to 60°C (-4 to 140°F) 10% to 95% RH (no condensation)	
Acoustic noise	Less than 55 dBA (ISO 7779)	



Printer and Paper Specifications

Functional Specifications

Print method	Impact dot matrix with a 0.2 mm, 24-wire head	
Print direction	Bidirectional logic-seeking or unidirectional seeking	
Character cell	Horizontal × vertical	
Letter (10 cpi):	36 × 24 dots	
Letter (12 cpi):	30 × 24 dots	
High-impact draft:	24 × 24 dots	
Correspondence *:	18 × 24 dots	
Draft:	12 × 24 dots	
High-speed draft:	9 × 24 dots	
	* Called Near-Letter-Quality in the DEC PPL2 protocol	
Paper handling	Friction or tractors	
Cut sheets:	Friction-feed platen	Paper is loaded automatically or by FF/Load button.
Continuous forms:	Push tractors, rear feed	
	Pull tractors, bottom feed	
	With push tractors:	
	– Paper is loaded by FF/Load button.	
	– Perforations are advanced to tear bar automatically or by Pause button.	
	– Continuous forms are parked while cut sheets are used.	
Paper type	1-to 5-part side-glued or paper-stapled fanfolded continuous forms or label sheets with sprocket holes 1-to 5-part top-glued cut sheets and envelopes	
Paper size	LA30N	LA30W
Continuous	Width: 102–267 mm (4–10.5 in)	102–420 mm (4–16.5 in)
	Length: 102 mm (4 in) or greater	102 mm (4 in) or greater
Cut sheets	Width: 102–267 mm (4–10.5 in)	102–420 mm (4–16.5 in)
	Length: 76–364 mm (3–14.3 in)	76–420 mm (3–16.5 in)
Paper thickness	Up to 0.35 mm (0.014 inch)	
Paper length	Programmable in one line or inch increments	
By software	3, 3.5, 4, 5.5, 6, 7, 8, 8.5, 11 (Letter), 11 2/3 (A4), 12, 14, or 15 inches (Default is 11 inches.)	
By control panel	1 to 256 lines	
Number of copies	Up to 5, including the original	
Command sets (protocols)	Resident only DEC PPL2 IBM Proprinter X24E (LA30N) and XL24E (LA30W) Epson ESC/P2	



Printer and Paper Specifications

Character sets

DEC mode	31 character sets
94-character sets:	25 character sets British, ASCII, DEC Dutch, DEC Finnish, French, DEC French-Canadian, German, DEC Hebrew Supplemental, DEC 7-Bit Hebrew, ISO Italian, Legal, JIS Katakana, JIS Roman, DEC Norwegian/Danish, ISO Spanish, DEC Swedish, DEC Swiss, Norwegian/Danish, DEC Supplemental, DEC Technical, DEC Special Graphics, DEC Portuguese, DEC 7-Bit Turkish, DEC 8-Bit Turkish Supplemental, and DEC 8-Bit Greek Supplemental
96-character sets:	6 character sets ISO Latin-1 Supplemental, ISO Latin-2 Supplemental, ISO Latin-Greek Supplemental, ISO Latin-Hebrew Supplemental, ISO Latin/Cyrillic Supplemental, and ISO Latin-5 Supplemental
IBM mode	32 character sets
Set 1/2:	IBM set 1 IBM set 2
Defaults:	CP 210, 220, 437, 850, 851, 852, 857, 860, 862, 863, 865, 866, CP DHN, Turkish, ECMA 94, ISO Latin 1, ISO Latin 2, Hungarian, Slovenian, Polish, Mazovian, Kamenicky, Cyrillic, ELOT 928, ELOT 927, Latin Polish, Lithuanian 1, Lithuanian 2, MIK, and Macedonian
Epson mode	45 character sets
National set:	USA, France, Germany, UK, Denmark 1, Sweden, Italy, Spain 1, Japan, Norway, Denmark 2, Spain 2, Latin America, Korea, and Legal
Defaults:	CP 210, 220, 437, 850, 851, 852, 857, 860, 862, 863, 865, 866, CP DHN, Turkish, ECMA 94, ISO Latin 1, ISO Latin 2, Hungarian, Slovenian, Polish, Mazovian, Kamenicky, Cyrillic, ELOT 928, ELOT 927, Latin Polish, Lithuanian 1, Lithuanian 2, MIK, and Macedonian

Fonts

Resident	Twelve fonts available
Bit map:	Draft, High-speed Draft, High-impact Draft, Courier 10, Prestige Elite 12, Compressed 17, Boldface PS, Pica 10, OCR A, and OCR B
Outline:	Timeless and Nimbus Sans ®

Barcode

Code 3 of 9, Industrial 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, EAN 8, EAN 13, UPC-A, Codabar, and Postnet



Printer and Paper Specifications

Line spacing	2, 3, 4, 6, 8, or 12 lines per inch. 1, 2, or 4 lines per centimeter.
Character pitch	10, 12, 13.2, 15, 16.5, 17, 18, or 20 cpi. cpi: characters per inch
Characters per line	10 cpi: 80 cpl 12 cpi: 96 cpl 15 cpi: 120 cpl 17 cpi: 136 cpl 18 cpi: 144 cpl 20 cpi: 160 cpl cpi: characters per inch cpl: characters per line

Performance Specifications

Print speed	10 cpi	12 cpi
Letter:	100 cps	120 cps
High-impact draft:	150 cps	180 cps
Correspondence:	200 cps	240 cps
Draft:	300 cps	360 cps
High-speed draft:	333 cps	400 cps
	cpi: characters per inch cps: characters per second	
Line feed speed	60 ms per line at 6 lines per inch	
Form feed speed	5.6 inches per second	
Ribbon service life	Color:	Up to 0.3 million characters per color
	Black:	Up to 2.0 million characters (Draft printing)

Certification

Safety:

Model	Regulation	Country
LA30N-A2/LA30W-A2	UL 1950-D3 (for 100-120 VAC)	United States
	CSA C22.2/950 (for 100-120 VAC)	Canada
LA30N-A3/LA30W-A3	EN 60 950 (for 220-240 VAC)	Germany

RFI regulation:

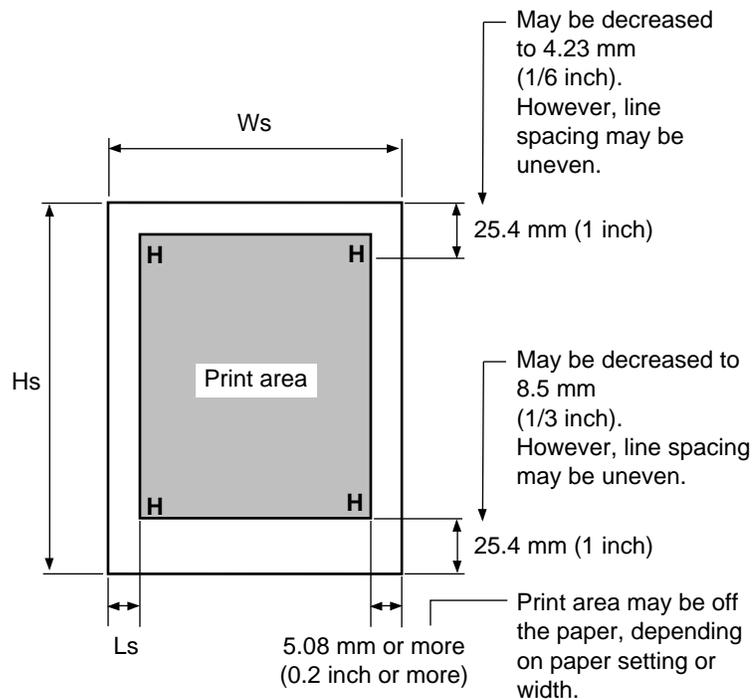
Model	Regulation	Country
LA30N-A2/LA30W-A2	Class B of FCC Part 15B (for 100-120 VAC)	United States
LA30N-A3/LA30W-A3	CE mark (for 220-240 VAC)	European Union



Paper Specifications

Print Area

This section illustrates the recommended print area for single sheets and continuous forms.



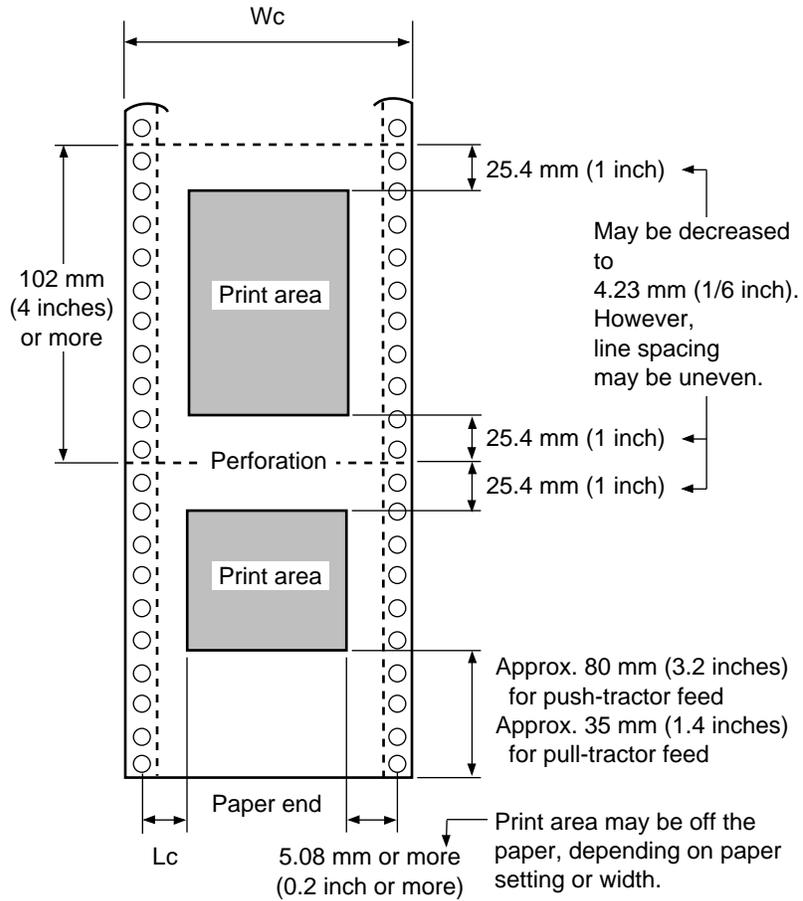
Print Area for Single Sheets

	LA30N	LA30W
Ws	102 to 267 mm (4 to 10.5 in)	102 to 420 mm (4 to 16.5 in)
Hs	76 to 364 mm (3 to 14.3 in)	76 to 420 mm (3 to 16.5 in)
Ls	5.08 to 32 mm (0.2 to 1.26 in)	5.08 to 38 mm (0.2 to 1.5 in)





Printer and Paper Specifications



Print Area for Continuous Forms

	LA30N	LA30W
W_c	102 to 267 mm (4 to 10.5 in)	102 to 420 mm (4 to 16.5 in)
L_c	5.08 to 25.4 mm (0.2 to 1 in)	5.08 to 32 mm (0.2 to 1.3 in)





Printer and Paper Specifications

Paper Thickness

Paper thickness is given by the weight of the paper in either grams per square meter (g/m^2) or in pounds per bond (lbs/bond). The following table shows the allowable paper thickness for one-part paper or for each sheet of multipart paper. The total thickness must not exceed 0.35 mm (0.014 inch).

The weight of carbonless or carbon-backed paper may vary, depending on the paper manufacturer. When using paper of borderline thickness, test the paper before running a job.

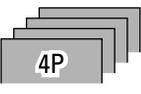
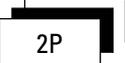
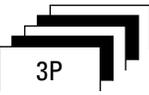
Type of Paper	Number of Parts	Thickness
One-part	Single	47-81 g/m^2 (40-70 kg or 12-22 lb)
Carbonless		
	Top	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m^2 (34-70 kg or 11-22 lb)
	Top	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Middle	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m^2 (34-70 kg or 11-22 lb)
	Top	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Middle	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Middle	40-64 g/m^2 (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m^2 (34-70 kg or 11-22 lb)
	Top	40-52 g/m^2 (34-45 kg or 11-17 lb)
	Middle	40-52 g/m^2 (34-45 kg or 11-17 lb)
	Middle	40-52 g/m^2 (34-45 kg or 11-17 lb)
	Middle	40-52 g/m^2 (34-45 kg or 11-17 lb)
	Bottom	40-64 g/m^2 (34-55 kg or 11-17 lb)

kg: Weight in kilograms of 1000 sheets of 788×1091 mm paper (1.16 g/m^2)

lb: Weight in pounds of 500 sheets of 17×22 inch paper (3.76 g/m^2)



Printer and Paper Specifications

Type of Paper	Number of Parts	Thickness
Carbon-backed	<i>Do not use in high humidity environments.</i>	
	Top	40-64 g/m ² (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m ² (34-70 kg or 11-22 lb)
	Top	40-64 g/m ² (34-55 kg or 11-17 lb)
	Middle	40-64 g/m ² (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m ² (34-70 kg or 11-22 lb)
	Top	40-64 g/m ² (34-55 kg or 11-17 lb)
	Middle	40-64 g/m ² (34-55 kg or 11-17 lb)
	Middle	40-64 g/m ² (34-55 kg or 11-17 lb)
	Bottom	40-81 g/m ² (34-70 kg or 11-22 lb)
	Top	40-52 g/m ² (34-45 kg or 11-14 lb)
	Middle	40-52 g/m ² (34-45 kg or 11-14 lb)
	Middle	40-52 g/m ² (34-45 kg or 11-14 lb)
	Middle	40-52 g/m ² (34-45 kg or 11-14 lb)
	Bottom	40-64 g/m ² (34-55 kg or 11-17 lb)
Carbon-interleaved	<i>Avoid using single sheets format in carbon-interleaved.</i>	
	Top	35-64 g/m ² (30-55 kg or 9-17 lb)
	Carbon	Counted as one sheet
	Bottom	35-81 g/m ² (30-70 kg or 9-22 lb)
	Top	35-52 g/m ² (30-45 kg or 9-14 lb)
	Carbon	Counted as one sheet
	Middle	35-52 g/m ² (30-45 kg or 9-14 lb)
	Carbon	Counted as one sheet
	Bottom	35-64 g/m ² (30-55 kg or 9-17 lb)

kg: Weight in kilograms of 1000 sheets of 788 × 1091 mm paper (1.16 g/m²)

lb: Weight in pounds of 500 sheets of 17 × 22 inch paper (3.76 g/m²)



C

Command Sets

This appendix describes printer commands and their parameters.

This printer has the following three resident command sets (protocols):

- DEC PPL2 (DIGITAL ANSI Printer Protocol Level 2)
- IBM Proprinter X24E (LA30N) and IBM Proprinter XL24E (LA30W)
- Epson ESC/P2

Select the same protocol on the printer and in your software. If your software protocols include DEC PPL2, select DEC PPL2 for optimum performance.





Command Sets

DEC PPL2 Quick Reference Guide

This section contains basic information on the DEC PPL2 commands supported in the LA30 Companion Printer.

The commands are listed by function, in the following order:

- Positioning Controls
- Sheet size and margins
- Type size and spacing, managing implicit cursor motion
- Font management and attribute selection
- Tabs
- Selecting character sets
- Reports
- Miscellaneous
- Barcode printing
- Graphics

This section is intended for use in conjunction with the *Digital Ansi-compliant Printing Protocol Level 2 Programming Reference Manual* and the *Digital Ansi-compliant Printing Protocol Level 2 Programming Supplement*. These are referred to simply as the *Programming Reference Manual* and the *Programming Supplement*, respectively.





Characters used in control functions appear in monospaced type. The following table explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII.

Spaces appear between characters in sequences for clarity; they are not part of the format. Space is designated as “*SP*” when it is part of the format of a command or sequence.

The following conventions are used in the command listings:

Conventions

Code	Description
<i>ESC</i>	Escape (1/11), introduces an escape sequence
<i>CSI</i>	Control Sequence Introducer (9/11), introduces a control sequence. CSI can also be represented by the equivalent escape sequence <i>ESC [</i> (1/11 5/11).
<i>DCS</i>	Device Control String (9/0), introduces a device control string. DCS can also be represented by the equivalent escape sequence <i>ESC P</i> (1/11 5/0).
<i>ST</i>	String Terminator (9/12) indicates the end of a control string. ST can also be represented by the equivalent escape sequence <i>ESC \</i> (1/11 5/12).
<i>Pn</i>	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string.
<i>Ps</i>	Selective parameter, or one which identifies a list of options pertaining to the specif command. If “>” (3/14) or “?” (3/15) occurs at the beginning of a string of parameters, parameters that follow are Digital private parameters. “>” or “?”, if present, must occur only once at the beginning of the parameter string.
<i>I_n</i>	Intermediate character — component of an escape sequence, control sequence or control string
<i>F</i>	Final character — component of an escape sequence, control sequence or control string
<i>SP</i>	Space (2/0)

C0 Control Characters are given in Figure “Standard 8-bit Code Table (Left Half)” and C1 Control Characters are given in Figure “Standard 8-bit Code Table (Right Half)” in an 8-bit environment.

In the 7-bit environment, C1 Control Characters can be sent with an escape sequence provided in the following tables.

Both numeric and selective parameters are interpreted as unsigned decimal integers, with the most significant digit sent first. For instance, the value 16 is coded as “16” (3/1 3/6). Leading zeros are allowed but are ignored. Plus and minus signs are not allowed.



Command Sets

Positioning Controls

Mnemonic	Function	Command	Remarks
BS	Backspace	0/8	<i>C0 Control Code</i>
CR	Carriage Return	0/13	<i>C0 Control Code</i>
FF	Form Feed	0/12	<i>C0 Control Code</i>
HT	Horizontal Tab	0/9	<i>C0 Control Code</i>
LF	Line Feed	0/10	<i>C0 Control Code</i>
VT	Vertical Tab	0/11	<i>C0 Control Code</i>
HTS	Horizontal Tab Set	8/8	<i>C1 Control Code</i> 7-bit environment : <i>ESC H</i>
IND	Index	8/4	<i>C1 Control Code</i> 7-bit environment : <i>ESC D</i>
NEL	Next Line	8/5	<i>C1 Control Code</i> 7-bit environment : <i>ESC E</i>
PLD	Partial Line Down	8/11	<i>C1 Control Code</i> 7-bit environment : <i>ESC K</i> Advance paper 1/12 in.
PLU	Partial Line Up	8/12	<i>C1 Control Code</i> 7-bit environment : <i>ESC L</i> Reverse paper 1/12 in.
VTS	Vertical Tab Set	8/10	<i>C1 Control Code</i> 7-bit environment : <i>ESC J</i>
DECCAHT	Clear All Horizontal Tabs	<i>ESC 2</i>	
DECCAHT	Clear All Vertical Tabs	<i>ESC 4</i>	
DECSHTS	Set Horizontal Tab Stops	<i>CSI Pn ;...; Pn u</i>	Pn = tabstop position
DECSVTS	Set Vertical Tab Stops	<i>CSI Pn ;...; Pn v</i>	Pn = tabstop position
DECHTS	Horizontal Tab Set	<i>ESC 1</i>	
DECVTS	Vertical Tab Set	<i>ESC 3</i>	
HPA	Horizontal Position Absolute	<i>CSI Pn `</i>	Pn = position to move to





Command Sets

Mnemonic	Function	Command	Remarks
HPR	Horizontal Position Relative	<i>CSI Pn a</i>	Pn = number of columns down
VPA	Vertical Position Absolute	<i>CSI Pn d</i>	Pn = position to move to
VPR	Vertical Position Relative	<i>CSI Pn e</i>	Pn = number of lines down

Sheet Size and Margins

Mnemonic	Function	Command	Remarks
DECSLPP	Set Lines per Physical Page	<i>CSI Pn t</i>	Pn = number of lines per pages
DECVPLA	Set Vertical Page Length Alignment	<i>CSI Pn1 ; Pn2 - u</i>	Pn1 = position of the origin from top of form (in 1/720 in.). Pn2 = Paper length in 1/720 in.
DECSLRM	Set Left and Right Margins	<i>CSI Pn1 ; Pn2 s</i>	Pn1 = left margin Pn2 = right margin
DECHPWA	Set Page Width Alignment	<i>CSI Pn1 ; Pn2 " s</i>	Pn1 ⁴ = origin Pn2 ⁴ = paper width
DECSTBM	Set Top and Bottom Margins	<i>CSI Pn1 ; Pn2 r</i>	Pn1 = top margin Pn2 = bottom margin

⁴Units are 1/12 inch.



Command Sets

Type Size and Spacing, Managing Implicit Cursor Motion

Mnemonic	Function	Command	Remarks
DECAWM	Autowrap Mode	<i>CSI ? 7 h</i> <i>CSI ? 7 l</i>	Set autowrap mode Reset autowrap mode
DECCRNLM	Carriage Return /New Line Mode	<i>CSI ? 40 h</i> <i>CSI ? 40 l</i>	CR acts as New Line CR acts as Carriage Return
DECSPSP	Proportional Spacing Mode	<i>CSI ? 27 h</i> <i>CSI ? 27 l</i>	Set proportional spacing mode Reset proportional spacing mode
DECSHORP	Set Horizontal Pitch	<i>CSI Ps w</i>	Ps = 0: Determined by current font. Ps = 8: 8.25 CPI Ps = 1: 10 CPI Ps = 9: 15 CPI Ps = 2: 12 CPI Ps = 11: 17.1 CPI Ps = 3: 13.2 CPI Ps = 12: 8.55 CPI Ps = 4: 16.5 CPI Ps = 13: 18 CPI Ps = 5: 5 CPI Ps = 14: 9 CPI Ps = 6: 6 CPI Ps = 15: 10 CPI Ps = 7: 6.6 CPI Ps = 16: 20 CPI
DECVERP	Set Vertical Pitch	<i>CSI Ps z</i>	Ps = 0: Determined by current font Ps = 1: 6 LPI Ps = 2: 8 LPI Ps = 3: 12 LPI Ps = 4: 2 LPI Ps = 5: 3 LPI Ps = 6: 4 LPI Ps = 21: 4 LPcm ¹ Ps = 22: 2 LPcm Ps = 23: 1 LPcm Ps = 11–16 and 31–33: same as 1–6 and 21–23
LNM	Line Feed/New Line Mode	<i>CSI 20 h</i> <i>CSI 20 l</i>	LF acts as New Line LF acts as line feed

¹LPcm = Lines per centimeter

**Font Management and Attribute Selection**

Mnemonic	Function	Command	Remarks
SGR	Select Graphic Rendition - <i>Selecting Fonts</i>	<i>CSI Ps m</i>	Ps = 10 : Courier Ps = 11 : Timeless PS Ps = 12 : Nimbus Sans Ps = 13 : Prestige Ps = 14 : Pica Ps = 15 : Boldface PS Ps = 16 : Courier Ps = 17 : Compressed Ps = 18 : OCR-A Ps = 19 : OCR-B
SGR	Select Graphic Rendition - <i>Selecting Attributes</i>	<i>CSI Ps m</i>	Ps = 0: Turn off all attributes Ps = 1: Bold on Ps = 3: Slant on Ps = 4: Underline on Ps = 9: Strike-through on Ps = 21: Double underline on Ps = 22: Bold off Ps = 23: Slant off Ps = 24: Any underline off Ps = 29: Strike-through on Ps = 30: Print Text in back Ps = 31: Print Text in red Ps = 32: Print Text in green Ps = 33: Print Text in yellow Ps = 34: Print Text in blue Ps = 35: Print Text in magenta Ps = 36: Print Text in cyan Ps = 37: Print Text in "white" (no printing) Ps = 39: Print Text in black Ps = 53: Overline on Ps = 55: Overline off Ps = ?4: Superscript on Ps = ?5: Subscript on Ps = ?24: Script off
DECDDL	Download Font	<i>DCS parameter_string</i> <i>{ D . . . D ST</i>	See the <i>Programming Reference Manual</i>
DEC DEN	Printing Density Selection	<i>CSI Ps " z</i>	Ps = 0 or 1: Select draft Ps = 2: Select letter quality Ps = 3: Select high speed draft Ps = 4: Select near letter quality (also called correspondence) Ps = 5: Select high impact draft

Command Sets

Tabs

Mnemonic	Function	Command	Remarks
DECCAHT	Clear All Horizontal Tabs	<i>ESC 2</i>	deprecated command
DECAVT	Clear All Vertical Tabs	<i>ESC 4</i>	deprecated command
DECHTS	Horizontal Tab Set	<i>ESC 1</i>	deprecated command
DECSHTS	Set Horizontal Tab Stops	<i>CSI Pn ; . . . ; Pn u</i>	Pn = tab stop
DECSVTS	Set Vertical Tab Stops	<i>CSI Pn ; . . . ; Pn v</i>	Pn = tab stop
DECVTS	Vertical Tab Set	<i>ESC 3</i>	deprecated command
TBC	Tab Clear	<i>CSI Ps ; . . . ; Ps g</i>	Ps = 0: Clear horiz. tab at active position Ps = 1: Clear vert. tab at active position Ps = 2 or 3: Clear all horiz. tabs Ps = 4: Clear all vert. tabs



Selecting Character Sets

See Figure “Designating and Invoking Character Sets” later in this section.

Mnemonic	Function	Command	Remarks
ASCEF	Announce Subset of Code Extension Facilities	<i>ESC SP L</i>	ASCII in G0 and GL. ISO Latin-1 in G1 and GR.
		<i>ESC SP M</i>	Same as <i>ESC SP L</i>
		<i>ESC SP N</i>	ASCII in G0 and GL.
DECAUPSS	Assign User Preference Supplemental Set	<i>DCS Ps ! u</i> <i>D . . . D ST</i>	Ps = 0: 94-char. set Ps = 1: 96-char. set <i>D . . . D</i> : SCS designating sequence.
SS2	Single Shift 2	<i>CI Control Code</i> 7-bit environment : <i>ESC N</i>	Take the next character from G2
SS3	Single Shift 3	<i>CI Control Code</i> 7-bit environment : <i>ESC O</i>	Take the next character from G3
LS0	Locking Shift 0 (or Shift In)	<i>SI</i>	Invoke G0 into GL
LS1	Locking Shift 1 (or Shift Out)	<i>SO</i>	Invoke G1 into GL
LS2	Locking Shift 2	<i>ESC n</i>	Invoke G2 into GL
LS3	Locking Shift 3	<i>ESC o</i>	Invoke G3 into GL
LS1R	Locking Shift 1 Right	<i>ESC ~</i>	Invoke G1 into GR
LS2R	Locking Shift 2 Right	<i>ESC }</i>	Invoke G2 into GR
LS3R	Locking Shift 3 Right	<i>ESC /</i>	Invoke G3 into GR
SCS	Select Character Set	<i>ESC I₁ I₂ F</i>	<i>I₁</i> = “(” : Invoke 94-char. set into G0 <i>I₁</i> = “)” : Invoke 94-char. set into G1 <i>I₁</i> = “*” : Invoke 94-char. set into G2 <i>I₁</i> = “+” : Invoke 94-char. set into G3 <i>I₁</i> = “-” : Invoke 96-char. set into G1 <i>I₁</i> = “.” : Invoke 96-char. set into G2 <i>I₁</i> = “/” : Invoke 96-char. set into G3 <i>I₂ F</i> = final characters from “SCS Final Characters” later in this section



Command Sets

SCS Final Characters

Character Set	I ₂ F Designator Characters	
94-Character Sets		
British	A	4/1
ASCII	B	4/2
DEC Dutch	4	3/4
DEC Finnish	5	3/5
French	R	5/2
DEC French-Canadian	9	3/9
German	K	4/11
DEC Hebrew Supplemental	"4	2/2, 3/4
DEC 7-Bit Hebrew	%=	2/5, 3/13
ISO Italian	Y	5/9
Legal	%4	2/5, 3/4
JIS Katakana	I	4/9
JIS Roman	J	4/10
DEC Norwegian/Danish	6	3/6
ISO Spanish	Z	5/10
DEC Swedish	7	3/7
DEC Swiss	=	3/13
Norwegian/Danish	‘	6/0
DEC Supplemental	%5	2/5, 3/5
DEC Technical	>	3/14
DEC Special Graphics	0	3/0
DEC Portuguese	%6	2/5, 3/6
7-Bit Turkish	%2	2/5, 3/2
DEC 8-Bit Turkish Supplemental	%0	2/5, 3/0
DEC 8-Bit Greek Supplemental	"?	2/2, 3/15
User Preference Supplemental	<	3/12



Command Sets

Character Set	I ₂ F Designator Characters	
96-Character Sets		
ISO Latin-1 Supplemental	A	4/1
ISO Latin-2 Supplemental	B	4/2
ISO Latin-Greek Supplemental	F	4/6
ISO Latin-Hebrew Supplemental	H	4/8
ISO Latin/Cyrillic Supplemental	L	4/12
ISO Latin-5 Supplemental	M	4/13
User Preference Supplemental	<	3/12

Reports

Mnemonic	Function	Command	Remarks
DA	Device Attributes	<i>CSI c</i>	Request Device Attributes Report
DAR	Device Attributes Report	<i>ESC [? ps1 ; Ps2 ; . . . ; Psn c</i> (printer to host)	Ps1 = 72 Ps2–Psn describe extensions. See the Programming Supplement.
DA2	Secondary Device Attributes	<i>CSI > Ps c</i>	Ps must = 0
DA2R	Secondary Device Attributes Report	<i>ESC [> Ps1 ; Ps2 ; Ps3 ; Ps4 ; Ps5 c</i> (printer to host)	Ps1 = 67: model LA30N 68: model LA30W Ps2 = firmware revision x 10 Ps3 = 0 (or 1 reserved) Ps4 = 20 Ps5 = firmware edit revision
DECLANS	Load ANSWERBACK Without Password	<i>DCS Ps v encoded_ message_string ST</i>	Message is Hex. encoded.





Command Sets

Mnemonic	Function	Command	Remarks
DECLANS	Load ANSWERBACK With Password	<i>DCS Ps ; Pn2 ; Pn3 v encoded_message_ string ST</i>	Ps = 1 : No password - Do not store message. Ps = 2 : No password - Store message. Ps = 3 : Password - Store message : Pn2 : Old password Pn3 : New password Default password : 0 Password range : 0 - 9999
ENQ	Send ANSWERBACK Message	0/5	<i>C0 Control Code</i>
DSR	Device Status Request	<i>CSI Ps n</i>	Ps = 0 or 5: Request extended DSR Ps = ?2: Enable brief unsolicited reports, send extended report Ps = ?3: Enable/send extended unsolicited reports
DSR	Device Status Report	Brief: <i>CSI Ps n</i> Extended: brief, fol- lowed by <i>CSI Pn1 ; Pn2 ; . . . ; Pnn n</i>	Ps = 0: No errors Ps = 3: Error See the <i>Programming Supplement</i>

**Miscellaneous**

Mnemonic	Function	Command	Remarks
BEL	Bell	<i>O/7</i>	<i>C0 Control Code</i>
DECSCL	Select Conformance Level	<i>CSI Ps1 " p</i>	Ps = 0: reset - native level Ps = 71: reset - DEC PPL1 Ps = 72: reset - DEC PPL2
DECSTR	Soft Terminal Reset	<i>CSI ! p</i>	Reset to initial state
RIS	Reset to Initial State	<i>ESC c</i>	Reset to initial state
DECIPEM	IBM Proprinter Protocol Mode	<i>CSI ? 58 h</i> <i>CSI ? 58 l</i>	Deprecated function
ROCS	Return from Other Coding System	<i>ESC % @</i>	Return to DEC PPL2 mode
SOCS	Select Other Coding System	<i>ESC % =</i> <i>ESC % SP 2</i>	IBM Proprinter Protocol Epson Protocol
CRM	Control Representation Mode	<i>CSI 3 h</i> <i>CSI 3 l</i>	Print hex representation for all characters Reset
DECASFC	Automatic Sheet Feeder Control	<i>CSI Ps ! v</i>	Ps = 0: No change Ps = n: Tray n (reserved) Ps = 4 : Tractor feeding Ps = 99: Manual feed
DECSITF	Select Input Tray Failover	<i>CSI Ps1 ; Ps2 ; . . . ; Psn SP w</i>	Ps1 = 0: Disable all composite input trays Ps1 = n: Define composite tray <i>n</i> Ps2–Psn = n: Add tray <i>n</i> to the composite definition
DECUPM	Unidirectional Print Mode	<i>CSI ? 41 h</i> <i>CSI ? 41 l</i>	Set unidirectional print mode Reset unidirectional print mode
SnC1R /DEC*C1	C1 Transmit /Receive	<i>ESC SP 6</i> <i>ESC SP 7</i> <i>ESC SP F</i> <i>ESC SP G</i>	Process 7-bit, drop 8th bit Process 7-bit and 8-bit Transmit 8-bit as 7-bit equivalents Transmit 8-bit (not supported)



Command Sets

Barcode Printing

Mnemonic	Function	Command	Remarks
DECBAR	Start or Stop Bar Codes	<i>ESC % SP 0</i> <i>ESC % @</i>	Start barcode Stop barcode
DECSBCA	Select Bar Code Attributes	<i>CSI Ps1 ; Pn2 ; . . . ; Ps9 `q</i>	
Parameters	Description	Values	
Pn1	Bar Code System	0, 2 : Code 39 1 : Interleaved 2 of 5 4 : EAN 8 5 : EAN 13 7 : Codabar a/t 8 : Codabar b/n 9 : Codabar c/* 10 : Codabar d/e 11 : UPC-A 13 : Postnet 14 : Industrial 2 of 5 18 : Matrix 2 of 5	
Pn2	Width of narrow bars in Decipoints	Supported values : 10 (default) - 15 - 20 - 25 - 30. Not applicable to UPC, EAN and Postnet systems.	
Pn3	Width of quiet zones in Decipoints	Supported value : 180	
Pn4	Width of wide bars in Decipoints	Ignored. Set at 2.5 * Pn2.	
Pn5	Ignored		
Pn6	Height of bars in Decipoints	Min = 60 Max = 2400 Default = 120	
Pn7	Ignored		
Pn8	Ignored		
Ps9	Human Readable Characters	0, 1 : No HRC 2, 3, 4 : Print HRC Ignored for Postnet	





Active position after printing a bar code is the same position as before printing bar code.

After printing bar code, appropriate positioning control commands, see “Positioning Controls” earlier in this section, must be sent to print additional barcode strings, text or graphics.

In the following examples, HPA Pn command positions the Active Position at column Pn , VPA Pn command positions the Active Position at line Pn.

- Two barcodes Code 39 on the same line:

```
DECSBCA CSI 0;;;;;;;;;'q
DECBAR(start) data DECBAR(stop) HPA Pn
DECBAR(start) data DECBAR(stop)
```

- Two barcodes Code 39 one above the other:

```
DECSBCA CSI 0;;;;;;;;;'q
DECBAR(start) data DECBAR(stop) VPA Pn
DECBAR(start) data DECBAR(stop)
```

Sixel Graphics Device Control String Envelope

Command	Function	Remarks
<i>DCS</i>	String Introducer	
<i>Ps1 ; Pn2 ; Pn3 q</i>	Protocol Selector	Ps1 : macro parameter, select horizontal grid size and pixel aspect ratio. See “Sixel Graphics Protocol Selector Ps1” later in this section. Ps2 : ignored. Pn3 : horizontal grid size - overrides Ps1 for horizontal grid size - aspect ratio unchanged. See “Sixel Graphics Grid Size defined by Pn3” later in this section.
<i>sixel data</i>	Picture data	Includes sixel printable characters and sixel control codes. See “Sixel Graphics Control Codes” later in this section.
<i>ST</i>	String Terminator	Exit Sixel Graphics mode and return to text mode.



Command Sets

Sixel Graphics Protocol Selector Ps1

Ps1 Value	Horizontal Grid Size (inches)	Aspect Ratio (Vert : Hor) ¹
0, 1 or none	1/144	2
2	1/360	5
3, 4	1/180	2.5
5, 6, 7, 8	1/144	2
9	1/72	1
> 9	1/144	2

¹Vertical Grid size = 1/72 in., unless modified by Pn3 or DECGRA.

Sixel Graphics Grid Size defined by Pn3

Pn3 Value	HGS:VGS (dpi) by Aspect Ratio (defined by Ps1)			
	1:1	2:1	2.5:1	5:1
0 or none	No change to HGS and VGS defined by Ps1			
1, 2	360:360	360:180	360:144	360:72
3, 4	180:180	180:90	180:72	180:36
5, 6, 7	144:144	144:72	180:72	180:36
8, 9	90:90	90:45	90:36	180:36
10 - 15	72:72	72:36	90:36	180:36
16 - 19	45:45	72:36	90:36	180:36
≥ 20	36:36	72:36	90:36	180:36

**Sixel Graphics Control Codes**

Mnemonic	Function	Command	Remarks
DECGRA	Set Raster Attributes	" (2/2)	Defines the pixel aspect ratio. Followed by parameters <i>Pn1 ; Pn2 ; Pn3 ; Pn4</i> Pn1 : Pixel aspect ratio numerator Pn2 : Pixel aspect ratio denominator Pn3 and Pn4 : ignored
DECGRI	Graphics Repeat Introducer	! (2/1)	Followed by a numeric value Pn and a sixel data to be repeated Pn times.
DECGCR	Graphics Carriage Return	\$ (2/4)	Returns active position to graphics left margin.
DECGNL	Graphics Next Line	- (2/13)	Returns active position to graphics left margin and increments to next graphics line.
DECGCI	Graphics Color Introducer	# (2/3)	Assigns a color to a color number or selects a predefined color number. Followed by parameters <i>Pc ; Pu ; Px ; Py ; Pz</i> Pc : Color number (0 - 255) Pu : Universal coordinate system selector : 1 = HLS 2 = RGB Px , Py , Pz : color coordinates
	Parameter Characters	0 - 9 (3/0 - 3/9)	Numeric parameters - used on the above control codes
	Parameter Separator	; (3/11)	Separates parameters - used on the above control codes
	Sixel Data	(3/15 - 7/14)	Sixel printable characters. The printer subtracts the offset (3F hexadecimal) from the received code, assigning each of the remaining low- order six bits to a grid position : LSB = top pixel MSB = bottom pixel Examples : ? (3/15) : blank character @ (4/0) : print only top pixel A (4/1) : print second-from-top pixel ~ (7/14) : print one full column



Command Sets

Standard 8-bit Code Table (Left Half)

Standard Left

C0 Control Set			Graphics Left (GL)							
Column	0	1	2	3	4	5	6	7		
Row 0	NUL 0 0	DLE 16 10								
1	SOH 1 1	DC1 (XON) 21 17 11	SP 40 32 20	0 60 48 30	@ 64 40	P 80 50	' 140 96 60	p 160 112 70		
2	STX 2 2	DC2 18 12	!	1 61 49 31	A 101 65 41	Q 121 81 51	a 141 97 61	q 161 113 71		
3	ETX 3 3	DC3 (XOFF) 23 19 13	" 34 22	2 62 50 32	B 102 66 42	R 122 82 52	b 142 98 62	r 162 114 72		
4	EOT 4 4	DC4 20 14	# 43 23	3 63 51 33	C 103 67 43	S 123 83 53	c 143 99 63	s 163 115 73		
5	ENQ 5 5	NAK 25 21 15	\$ 44 24	4 64 52 34	D 104 68 44	T 124 84 54	d 144 100 64	t 164 116 74		
6	ACK 6 6	SYN 22 16	% 45 25	5 65 53 35	E 105 69 45	U 125 85 55	e 145 101 65	u 165 117 75		
7	BEL 7 7	ETB 27 23 17	& 46 26	6 66 54 36	F 106 70 46	V 126 86 56	f 146 102 66	v 166 118 76		
8	BS 10 8 8	CAN 24 18	' 47 27	7 67 55 37	G 107 71 47	W 127 87 57	g 147 103 67	w 167 119 77		
9	HT 11 9 9	EM 31 25 19	(50 28	8 70 56 38	H 110 72 48	X 130 88 58	h 150 104 68	x 170 120 78		
10	LF 12 10 A	SUB 32 26 1A	) 51 29	9 71 57 39	I 111 73 49	Y 131 89 59	i 151 105 69	y 171 121 79	
11	VT 13 11 B	ESC 33 27 1B	* 52 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	j 152 106 6A	z 172 122 7A		
12	FF 14 12 C	FS 34 28 1C	+ 53 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	k 153 107 6B	{ 173 123 7B		
13	CR 15 13 D	GS 35 29 1D	, 54 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	l 154 108 6C	| 174 124 7C		
14	SO 16 14 E	RS 36 30 1E	- 55 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	m 155 109 6D	}	175 125 7D
15	SI 17 15 F	US 37 31 1F	. 56 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	n 156 110 6E	~ 176 126 7E		
			/ 57 2F	? 77 63 3F	O 117 79 4F	_ 137 95 5F	o 157 111 6F	DEL 177 127 7F		

ASCII Graphic Character Set

LEGEND

	GL	
	4/1	Column/Row
A	101	Octal
	65	Decimal
	41	Hex

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Standard 8-bit Code Table (Left Half)



Standard 8-bit Code Table (Right Half)

Standard Right

C1 Control Set				Graphics Right (GR)															
Column 8				Column 9				Column 10		Column 11		Column 12		Column 13		Column 14		Column 15	
Row 0				200 128 80	DCS	220 144 90	240 160 A0	°	260 176 B0	À	300 192 C0	320 208 D0	à	340 224 E0	360 240 F0				
1				201 129 81	PU1	221 145 91		±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1		
2				202 130 82	BPH	222 146 92		¢	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2		
3				203 131 83	NBH	223 147 93		£	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3		
4				204 132 84	IND	224 148 94		¥	264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4		
5				205 133 85	NEL	225 149 95		µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5		
6				206 134 86	SSA	226 150 96		¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6		
7				207 135 87	ESA	227 151 97		§	267 183 B7	Ç	307 199 C7	œ	327 215 D7	ç	347 231 E7	œ	367 247 F7		
8				210 136 88	HTS	230 152 98		¤	270 184 B8	È	310 200 C8	Ø	328 216 D8	è	350 232 E8	ø	370 248 F8		
9				211 137 89	HTJ	231 153 99		©	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9		
10				212 138 8A	VTS	232 154 9A		ª	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA		
11				213 139 8B	PLD	233 155 9B		«	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB		
12				214 140 8C	PLU	234 156 9C		¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC		
13				215 141 8D	RI	235 157 9D		½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ÿ	375 253 FD		
14				216 142 8E	SS2	236 158 9E		¾	276 190 BE	Î	316 206 CE	ÿ	336 222 DE	î	356 238 EE		376 254 FE		
15				217 143 8F	SS3	237 159 9F		¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF		377 255 FF		

DEC Supplemental Graphic Character Set

LEGEND

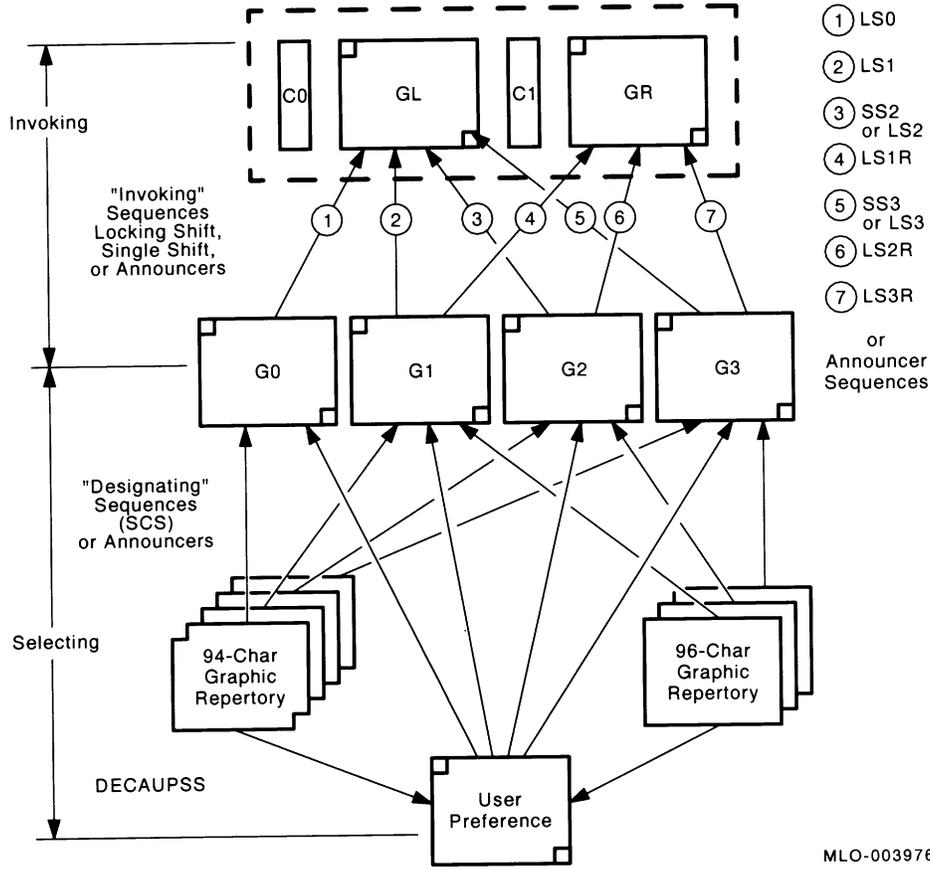
	GR	
	12/1	Column/Row
Á	301	Octal
	193	Decimal
	C1	Hex

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Standard 8-bit Code Table (Right Half)



Designating and Invoking Character Sets



Power-up configuration is as follows:

- GL: G0
- GR: G2
- G0: Value for DEC G0 CST Set-Up option
- G1: ASCII
- G2: User Preference
- G3: User Preference
- User Preference: Value for USER PREF Set-Up option

Designating and Invoking Character Sets



National Replacement Character Sets

Location	National Replacement Character Sets							
	US ASCII	British	DEC Finnish	French	DEC French-Canada	German	ISO Italian	JIS Roman
2/3	#	£		£			£	
4/0	@			à	à	§	§	
5/11	[		Ä	°	â	Ä	°	
5/12	\		Ö	ç	ç	Ö	ç	¥
5/13	]		Å	§	ê	Ü	é	
5/14	^		Û		î			
6/0	‘		é		ô		ù	
7/11	{		ä	é	é	ä	à	
7/12	|		ö	ù	ù	ö	ò	
7/13	}		å	è	è	ü	è	
7/14	~		ü	¨	û	ß	ì	—

Location	National Replacement Character Sets							
	US ASCII	DEC Norwegian-Danish	ISO Spanish	DEC Swedish	Norwegian-Danish	DEC Dutch	DEC Swiss	DEC Portuguese
2/3	#		£			£	ù	
4/0	@	Ä	§	É		3/4	à	
5/11	[	Æ	ı	Ä	Æ	ý	é	Ã
5/12	\	Ø	Ñ	Ö	Ø	1/2	ç	Ç
5/13	]	Å	ı	Å	Å	|	ê	Õ
5/14	^	Û		Û			î	
5/15	_						è	
6/0	‘	ä		é			ô	
7/11	{	æ	°	ä	æ	¨	ä	ã
7/12	|	ø	ñ	ö	ø	f	ö	ç
7/13	}	å	ç	å	å	1/4	ü	õ
7/14	~	ü		ü		,	û	



IBM Proprinter X24E and XL24E Quick Reference Guide

This section describes the printer commands for the IBM Proprinter X24E and XL24E protocol. When there is a difference, it is identified by LA30N (X24E) and LA30W (XL24E). Asterisks in the “Function” column indicate extended commands that are not supported by the original printer. See the *Programmer’s Reference Manual* for detailed information on using these commands.

Function	Command																														
Print Mode Control																															
Double-strike (bold) printing on	ESC G																														
Double-strike (bold) printing off	ESC H																														
Emphasized (shaded) printing on	ESC E																														
Emphasized (shaded) printing off	ESC F																														
Single-line double-width characters on	SO or ESC SO																														
Single-line double-width characters off	DC4																														
Double-width characters on/off (on: $n = 1$, off: $n = 0$)	ESC W (n)																														
Double-height/double-width characters $n_1 = 4, n_2 = 0, m_1 = 0, m_2 = 0$ m_3 controls character height and line spacing:	ESC [@ (n_1) (n_2) (m_1) ... (m_4)																														
<table border="1"> <thead> <tr> <th>m_3</th> <th>Height</th> <th>Spacing</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Unchanged</td> <td>Unchanged</td> </tr> <tr> <td>1</td> <td>Normal</td> <td>Unchanged</td> </tr> <tr> <td>2</td> <td>Double</td> <td>Unchanged</td> </tr> <tr> <td>16</td> <td>Unchanged</td> <td>Single</td> </tr> <tr> <td>17</td> <td>Normal</td> <td>Single</td> </tr> <tr> <td>18</td> <td>Double</td> <td>Single</td> </tr> <tr> <td>32</td> <td>Unchanged</td> <td>Double</td> </tr> <tr> <td>33</td> <td>Normal</td> <td>Double</td> </tr> <tr> <td>34</td> <td>Double</td> <td>Double</td> </tr> </tbody> </table>		m_3	Height	Spacing	0	Unchanged	Unchanged	1	Normal	Unchanged	2	Double	Unchanged	16	Unchanged	Single	17	Normal	Single	18	Double	Single	32	Unchanged	Double	33	Normal	Double	34	Double	Double
m_3	Height	Spacing																													
0	Unchanged	Unchanged																													
1	Normal	Unchanged																													
2	Double	Unchanged																													
16	Unchanged	Single																													
17	Normal	Single																													
18	Double	Single																													
32	Unchanged	Double																													
33	Normal	Double																													
34	Double	Double																													
m_4 controls character width:																															
<table border="1"> <thead> <tr> <th>m_4</th> <th>Width</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Unchanged</td> </tr> <tr> <td>1</td> <td>Normal</td> </tr> <tr> <td>2</td> <td>Double</td> </tr> </tbody> </table>		m_4	Width	0	Unchanged	1	Normal	2	Double																						
m_4	Width																														
0	Unchanged																														
1	Normal																														
2	Double																														
Condensed characters on	SI or ESC SI																														
Condensed and elite characters off	DC2																														
Subscript or superscript printing on (subscript: $n = 1$, superscript: $n = 0$)	ESC S (n)																														
Subscript and superscript printing off	ESC T																														
Underline on/off (on: $n = 1$, off: $n = 0$)	ESC - (n)																														
Overline on/off (on: $n = 1$, off: $n = 0$)	ESC _ (n)																														



Command Sets

Function	Command
Horizontal Control	
Space	SP
Backspace	BS
Carriage return	CR
Elite characters on	ESC :
Proportionally spaced characters on/off (on: $n = 1$, off: $n = 0$)	ESC P (n)
Vertical Control	
Line feed	LF
Form feed	FF
Advance paper $n/216$ inch ($1 \leq n \leq 255$)	ESC J (n)
Advance paper $n/180$ inch (in AG mode) ($1 \leq n \leq 255$)	ESC J (n)
Set line spacing to 1/8 lines	ESC 0
Set line spacing to 7/72 inch	ESC 1
Set line spacing to $n/216$ inch ($0 \leq n \leq 255$)	ESC 3 (n)
Set line spacing to $n/180$ inch (in AG mode) ($0 \leq n \leq 255$)	ESC 3 (n)
Preset line spacing to $n/72$ inch ($1 \leq n \leq 255$)	ESC A (n)
Preset line spacing to $n/60$ inch (in AG mode) ($1 \leq n \leq 255$)	ESC A (n)
Set line spacing to 1/6 inch or to the value preset by line spacing command ESC A (n)	ESC 2
Change graphics line spacing base to 1/216 or 1/180 inch (for ESC J and ESC 3) $m_1 = 4, m_2 = 0$ $0 \leq t_1 \leq 255, 0 \leq t_2 \leq 255, t_3 = 0$ $t_4 = 180$ or 216	ESC [\ (m_1) (m_2) (t_1) ... (t_4)
Tabulation	
Horizontal tab execution	HT
Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 28$)	ESC D (n_1) ... (n_k) NUL
Clear all horizontal tabs	ESC D NUL
Move print position right by $n/120$ inch ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$)	ESC d (n_1) (n_2)



Command Sets

Function	Command
Vertical tab execution	VT
Set vertical tabs The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 64$)	ESC B (n_1) ... (n_k) NUL
Clear all vertical tabs	ESC B NUL
Reset tabs to default values	ESC R
Page Formatting	
Set left margin at column n and right margin at column m ($0 \leq n, m \leq 255$)	ESC X (n) (m)
Set perforation skip by n lines ($1 \leq n \leq 255$)	ESC N (n)
Perforation skip off	ESC O
Set page length to n lines ($1 \leq n \leq 255$)	ESC C (n)
Set page length to n inches ($1 \leq n \leq 22$)	ESC C NUL (n)
Set top of form	ESC 4
Color Selection*	
Select print color* $n = 0$: Black 1: Magenta (red) 2: Cyan (blue) 3: Violet 4: Yellow 5: Orange 6: Green	ESC r (n)
Character Set Control	
Select character set 1	ESC 7
Select character set 2	ESC 6
Print $n_1 + n_2 \times 256$ characters from all-character set (<i>chars.</i> : codes of characters to print, $0 \leq \text{chars.} \leq 255$)	ESC \ (n_1) (n_2) (<i>chars.</i>)
Print a character from all-character set (<i>char.</i> : a code of character to print, $0 \leq \text{char.} \leq 255$)	ESC ^ (<i>char.</i>)



Command Sets

Function	Command
Select code page table n ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$)	ESC [T (n_1) (n_2) 0 0 (c_1) (c_2)
c_1 c_2 Code page ID	
0 0 Ignore command	
1 181 Code page 437	
3 82 Code page 850	
3 92 Code page 860	
3 95 Code page 863	
3 97 Code page 865	
Clear input buffer	CAN
Select printer	DC1
Deselect printer (ignore input)	ESC Q # (for LA30N) ESC Q \$ (for LA30W)
Downloading	
Select resident or downloaded font Ex. $n = 0$: Resident Draft 2: Resident Courier 4: Downloaded Draft 6: Downloaded Courier	ESC I (n)
Create download font	ESC = (n_1) (n_2) ID (m_1) (m_2) ($data$)
Bit Image Graphics	
Single-density graphics	ESC K (n_1) (n_2) ($data$)
Double-density graphics	ESC L (n_1) (n_2) ($data$)
High-speed double-density graphics	ESC Y (n_1) (n_2) ($data$)
Quadruple-density graphics	ESC Z (n_1) (n_2) ($data$)
High-resolution graphics	ESC [g (n_1) (n_2) (m) ($data$)
Select graphics mode (in AG mode only)	ESC * (m) (c_1) (c_2) ($data$)
Cut Sheet Feeder Control*	
Feed a sheet from bin 1*	ESC EM 1
Feed a sheet from bin 2*	ESC EM 2
Feed a sheet from bin 3*	ESC EM E
Eject a page from the printer*	ESC EM R
Miscellaneous	
Sound the bell	BEL
Unidirectional printing on/off (on: $n = 1$, off: $n = 0$)	ESC U (n)
Add a carriage return to all line feeds (on: $n = 1$, off: $n = 0$)	ESC 5 (n)
Printer offline	ESC j
Select default settings	ESC [K (n_1) (n_2) (i) (ID) (p_1) (p_2)



Command Sets

Epson ESC/P2 Quick Reference Guide

This section describes the printer commands for the Epson ESC/P2 protocol. Asterisks in the “Function” column indicate extended commands that are not supported by the original printer. See the *Programmer’s Reference Manual* for detailed information on using these commands.

Function	Command
Print Mode Control	
Double-strike (bold) printing on	ESC G
Double-strike (bold) printing off	ESC H
Emphasized (shadow) printing on	ESC E
Emphasized (shadow) printing off	ESC F
Italic printing on	ESC 4
Italic printing off	ESC 5
Select character style	ESC q (<i>n</i>)
<i>n</i> = 0: Normal	
1: Outlined	
2: Shaded	
3: Outlined and shadowed	
One-line double-width characters on	SO or ESC SO
One-line double-width characters off	DC4
Double-width characters on/off	ESC W (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Double-height characters on/off	ESC w (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Condensed characters on	SI or ESC SI
Condensed characters off	DC2
Subscript or superscript printing on	ESC S (<i>n</i>)
(subscript: <i>n</i> = 1, superscript: <i>n</i> = 0)	
Subscript and superscript printing off	ESC T
Underline on/off	ESC - (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Select line	ESC (- (<i>n</i> ₁) (<i>n</i> ₂) (<i>d</i> ₁) (<i>d</i> ₂) (<i>d</i> ₃)
<i>n</i> ₁ = 3, <i>n</i> ₂ = 0, <i>d</i> ₁ = 1	
<i>d</i> ₂ = 0: Ignore command	
1: Underline	
2: Strike through	
3: Overscore	
<i>d</i> ₃ = 0 or 4: Cancel line selection	
1: Single line	
2 or 3: Double line	
5: Single-dotted line	
6 or 7: Double-dotted line	



Command Sets

Function	Command
Select printing style This command allows you to combine various printing styles. The value of n is the sum of the values of the styles you want to combine. $n = 0$: Pica pitch 1: Elite pitch 2: Proportional spacing 4: Condensed 8: Shadow 16: Bold 32: Double-width 64: Italics 128: Underline	ESC ! (n)
Horizontal Control	
Space	SP
Backspace	BS
Carriage return	CR
Set elite pitch	ESC M
Set pica pitch	ESC P
Set 15 CPI	ESC g
Proportionally spaced characters on/off (on: $n = 1$, off: $n = 0$)	ESC p (n)
Set inter-character space to $n/120$ inch (for draft) or $n/180$ inch (for letter and proportional) ($0 \leq n \leq 127$)	ESC SP (n)
Set character pitch to $(n_1 + n_2 \times 256)/360$ inch ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 4$)	ESC c (n_1) (n_2)
Select character pitch (specify unit of pitch) $n_1 = 1, n_2 = 0$ $d = 10$ to 19 : $10/3600$ inch = $1/360$ inch $d = 20$ to 29 : $20/3600$ inch = $1/180$ inch $d = 30$ to 39 : $30/3600$ inch = $1/120$ inch $d = 40$ to 49 : $40/3600$ inch = $1/90$ inch $d = 50$ to 59 : $50/3600$ inch = $1/72$ inch $d = 60$ to 69 : $60/3600$ inch = $1/60$ inch	ESC (U (n_1) (n_2) (d)



Command Sets

Function	Command
Vertical Control	
Line feed	LF
Form feed	FF
Advance paper $n/180$ inch ($1 \leq n \leq 255$)	ESC J (n)
Set line spacing to $1/8$ inch	ESC 0
Set line spacing to $n/180$ inch ($0 \leq n \leq 255$)	ESC 3 (n)
Set line spacing to $n/60$ inch ($0 \leq n \leq 127$)	ESC A (n)
Set line spacing to $1/6$ inch	ESC 2
Set line spacing to $n/360$ inch ($0 \leq n \leq 255$)	ESC + (n)
Tabulation	
Horizontal tab execution	HT
Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 32$)	ESC D (n_1) ... (n_k) NUL
Move print position $n/120$ inch (for draft) ^(*) or $n/180$ inch (for letter) ^(*) right from left margin ($n = n_1 + n_2 \times 256$)	ESC \$ (n_1) (n_2)
Move print position $n/120$ ^(*) inch (for draft) or $n/180$ ^(*) inch (for letter) left or right from the current position ($n = n_1 + n_2 \times 256$)	ESC \ (n_1) (n_2)
Vertical tab execution	VT
Set vertical tabs The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 16$)	ESC B (n_1) ... (n_k) NUL
Move to dot line $(d_1 + d_2 \times 256)/360$ ^(**) inch $n_1 = 2, n_2 = 0$ ($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$)	ESC (V (n_1) (n_2) (d_1) (d_2)
Vertical relative move by $(d_1 + d_2 \times 256)/360$ ^(**) inch $n_1 = 2, n_2 = 0$ ($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$) $-32768 \leq d_1 + d_2 \times 256 \leq 32768$	ESC (v (n_1) (n_2) (d_1) (d_2)

^{*1} The value depends on the pitch set by the ESC (U command.

^{*2} The value depends on the pitch set by the ESC (U command. The default is $1/360$ inch.





Command Sets

Function	Command
Page Formatting	
Set right margin to column n ($1 \leq n \leq 255$)	ESC Q (n)
Set left margin to column n ($0 \leq n \leq 255$)	ESC l (n)
Set top and bottom margins from top of page $n_1 = 4, n_2 = 0$	ESC (c (n_1) (n_2) (t_1) (t_2) (b_1) (b_2)
• Top margin = $(t_1 + t_2 \times 256)/360^{(*)}$ inch ($0 \leq t_1 \leq 255$) ($0 \leq t_2 \leq 127$)	
• Bottom margin = $(b_1 + b_2 \times 256)/360^{(*)}$ inch ($0 \leq b_1 \leq 255$) ($0 \leq b_2 \leq 127$)	
Set perforation skip by n lines ($1 \leq n \leq 127$)	ESC N (n)
Perforation skip off	ESC O
Set page length to n lines ($1 \leq n \leq 127$)	ESC C (n)
Set page length to n inches ($1 \leq n \leq 22$)	ESC C NUL (n)
Set page length to $(d_1 + d_2 \times 256)/360^{(*)}$ inch $n_1 = 2, n_2 = 0$	ESC (C (n_1) (n_2) (d_1) (d_2)
($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$)	
Color Selection	
Select print color	ESC r (n)
$n = 0$: Black	
1: Magenta (red)	
2: Cyan (blue)	
3: Violet	
4: Yellow	
5: Orange	
6: Green	
Character Set Control	
Select character set 1	ESC 7
Select character set 2	ESC 6
Select character set table	ESC t (n)
$n = 0$: Italics character set	
1: Graphics character set	
2: Downloaded character set	
3: Graphics character set	

*1 The value depends on the pitch set by the ESC (U command. The default is 1/360 inch.



Command Sets

Function	Command
Select international character set $n = 0$: USA 1: France 2: Germany 3: United Kingdom 4: Denmark 1 5: Sweden 6: Italy 7: Spanish 1 8: Japan 9: Norway 10: Denmark 2 11: Spanish 2 12: Latin America 13: Korea 64: Legal	ESC R (n)
Assign a character set to active character set number 0 to 3 $n_1 = 3, n_2 = 0$ $d_1 = 0$: Active character set number 0 1: Active character set number 1 2: Active character set number 2 3: Active character set number 3 $d_2 = 0$: Italic 1: PC 437 (USA) 3: PC 850 (Multilingual) 7: PC 860 (Portugal) 8: PC 863 (Canada-French) 9: PC 865 (Norway) $d_3 = 0$	ESC (t (n_1) (n_2) (d_1) (d_2) (d_3)
Print $n_1 + n_2 \times 256$ characters from all-character set (<i>character codes</i>) $(0 \leq n_1 \leq 255)$ $(0 \leq n_2 \leq 127)$ $(0 \leq n_1 + n_2 \times 256 \leq 255)$ $(0 \leq \text{character codes} \leq 254)$	ESC (^ (n_1) (n_2)
Clear input buffer	CAN
Delete a character	DEL
Force most significant bit to 1	ESC >
Force most significant bit to 0	ESC =
Cancel control over most significant bit	ESC #



Command Sets

Function	Command
Font Selection and Downloading	
Select font <i>n</i> = 0: Resident character set 1: Downloaded character set	ESC % (<i>n</i>)
Select letter or draft quality <i>n</i> = 0: Draft 1: Letter	ESC x (<i>n</i>)
Select type style • Bitmap font: <i>n</i> = 0: Courier 1: Courier 2: Courier 3: Prestige 4: Courier 5: OCR-B 7: Courier 8: Courier 9: Courier • Scalable font: <i>n</i> = 0: Timeless 1: Nimbus Sans ® 2: Courier 3: Timeless 4: Timeless 5: Timeless 7: Timeless 8: Timeless 9: Timeless	ESC k (<i>n</i>)
Set scalable font mode • <i>m</i> sets character pitch. <i>m</i> = 0: Keep previous pitch 1: Set proportional space mode <i>m</i> ≥ 5: Select character pitch (<i>m</i> /360 inch) (Reset proportional space mode) • <i>n</i> ₁ and <i>n</i> ₂ set point size of font. Point size = (<i>n</i> ₁ + <i>n</i> ₂ × 256) × 0.5 point (0 ≤ <i>n</i> ₁ ≤ 255) (0 ≤ <i>n</i> ₂ ≤ 127)	ESC X <i>m</i> (<i>n</i> ₁) (<i>n</i> ₂)
Copy resident character set to download area	ESC : NUL (<i>n</i>) (<i>s</i>)
Create download font	ESC & NUL (<i>n</i> ₁) (<i>n</i> ₂) (<i>d</i> ₀) (<i>d</i> ₁) (<i>d</i> ₂) (<i>data</i>)



Command Sets

Function	Command
Bit Image Graphics	
Graphics type m graphics	ESC * (m) (n_1) (n_2) (<i>data</i>)
Bit image mode definition	ESC ? (s) (n)
Single-density graphics	ESC K (n_1) (n_2) (<i>data</i>)
Double-density graphics	ESC L (n_1) (n_2) (<i>data</i>)
High-speed double-density graphics	ESC Y (n_1) (n_2) (<i>data</i>)
Quadruple-density graphics	ESC Z (n_1) (n_2) (<i>data</i>)
Select raster image graphics	ESC (G (n_1) (n_2) (d)
$n_1 = 1, n_2 = 0$	
$d = 1$: Raster image graphics mode	
Print raster image graphics	ESC . (c) (v) (h) (m) (n_1) (n_2) (<i>data</i>)
Cut Sheet Feeder Control	
Feed a sheet from bin 1	ESC EM 1
Feed a sheet from bin 2	ESC EM 2
Feed a sheet from bin 3 ^(*1)	ESC EM E
Eject a page from the printer	ESC EM R
Miscellaneous	
Sound the bell	BEL
Move print head to home position	ESC <
Unidirectional printing on/off	ESC U (n)
(on: $n = 1$, off: $n = 0$)	
Initialize printer	ESC @

^{*1} This is an extended command not supported by the original protocol.



D

Interface Information

This printer can communicate with a computer through either a DEC-423 serial interface or a Centronics parallel interface. The printer can use both interfaces at the same time when the I/F TYPE option is set to AUTO in the Set-Up mode.

This appendix provides information you may need for wiring your own interface cables or for programming computer-to-printer communications. Most users do not need the information in this appendix. To simply connect your printer to your computer, follow step 6 “Connecting the Printer to Your Host System” in *Setting Up Your Printer*.

Parallel Interface

This printer can communicate with the host in two different modes:

- Unidirectional

In this mode, the printer operates an industry standard 8-bit Centronics parallel interface.

- Bidirectional

This printer supports bidirectional communication per IEEE 1284 Standard Nibble mode. This printer can switch between Compatible Centronics and Nibble modes.

The interface connector is 36-pin Amphenol type with ESD protection.

The first table gives the connector pin assignments in Compatible Centronics mode, and the second table those in Nibble mode.

The data transmission rate reaches 5,000 characters per second at the minimum.

Designations of circuit direction are provided to indicate the source of the signals.

Interface Information

Centronics Compatible signals

Pin	Direction	Signal	Description
1	To printer	STROBE L	STROBE pulse low to read data A strobe low signal will raise BUSY line to high.
2	To printer	DATA BIT 1	These signals are active high for a logical 1.
3	To printer	DATA BIT 2	
4	To printer	DATA BIT 3	
5	To printer	DATA BIT 4	
6	To printer	DATA BIT 5	
7	To printer	DATA BIT 6	
8	To printer	DATA BIT 7	
9	To printer	DATA BIT 8	
10	From printer	ACKNLG L	ACKNLG pulse low indicates data received and ready to receive more data. Sent at power up or after INIT sequence.
11	From printer	BUSY H	BUSY "high" indicates the printer can not receive data (buffer full). BUSY high occurs when paper is out, an INIT is received, the printer is offline, or an error condition exists.
12	From printer	PE H	PAPER END high signal indicates paper out.
13	From printer	SLCT H	A high signal indicates the printer is in the select state.
		SLCT L	Low signal occurs when printer is de selected or an error condition exists.
14			Not used
15			Not used
16			0 volts. Logic ground.
17			Chassis ground.
18			+ 5V. Maximum output current is 50 mA.
19-29		TWP returns	0 volts. All at logic ground.
30		INIT ground	0 volts
31	To printer	INIT L	INIT low resets the printer to its initial state and clears the buffer. Printer must see a pulse > 25 microseconds.
32	From printer	ERROR L	This signal is low when the printer is out of paper, not selected, or in an error state.



Interface Information

Pin	Direction	Signal	Description
33			0 volts. Same as pins 14, 19-30.
34			Not used
35			Not used
36			Not used

IEEE 1284-B Nibble Mode signals

The following table briefly gives connector pin assignments in IEEE 1284 mode.

Pin	Direction	Signal	Description
1	To printer	HostClk	High in reverse data transfer phase
2	To printer	DATA BIT 1	These signals are the 1st to the 8th bits of parallel data.
3	To printer	DATA BIT 2	
4	To printer	DATA BIT 3	
5	To printer	DATA BIT 4	
6	To printer	DATA BIT 5	
7	To printer	DATA BIT 6	
8	To printer	DATA BIT 7	
9	To printer	DATA BIT 8	
10	From printer	PtrClk	Set to low to qualify data on reverse channel
11	From printer	PtrBusy	Reverse channel: Data 3 and 7
12	From printer	AckDataReq	Reverse channel: Data 2 and 6
13	From printer	Xflag	Reverse channel: Data 1 and 5
14	To printer	Host Busy	Set to low to indicate the host can receive data Set to high Host Acknowledge Receipt
15			Not used
16			0 volts. Logic ground
17			Chassis ground
18	From printer	Peripheral Logic High	Set to high to indicate the printer is ON and all signals are in valid state. - Max output current 50 mA
19-29			0 volts. Signal ground
30			0 volts. Signal ground



Interface Information

Pin	Direction	Signal	Description
31	To printer	Init L	Set to high for Reverse Channel operation
32	From printer	DataAvail L	Reverse channel: Data 0 and 4
33			Not used
34			Not used
35			Not used
36	To printer	SelectIn L	Set to high for Reverse Channel

Serial Interface

Use the cable that comes with the printer or the Digital BC16E cable or equivalent. If you prepare a cable separately, the cable connector at the printer side should be a male Modified Modular Jack (MMJ) or the equivalent that conforms to EIA standards.

The following table shows the pin assignments. In the table:

- “Input” denotes a signal from the computer to the printer.
- “Output” denotes a signal from the printer to the computer.
- The signal level for mark state (logical 1) is -5 V to -6 V; for space state (logical 0), it is +5 V to +6 V.

Pin No.	Signal Name	Direction	Description
1	Ready Out	Output	Data Terminal Ready
2	Transmit Data +	Output	This pin carries information from the printer to the computer.
3	Transmit Data -	Output	Common signal level. This pin carries information from the printer to the computer.
4	Receive Data -	Input	Common signal level at the computer side. This pin carries information from the computer to the printer.
5	Receive Data +	Input	This pin carries information from the computer to the printer.
6	Ready In	Input	Optional (available as Data Set Ready)



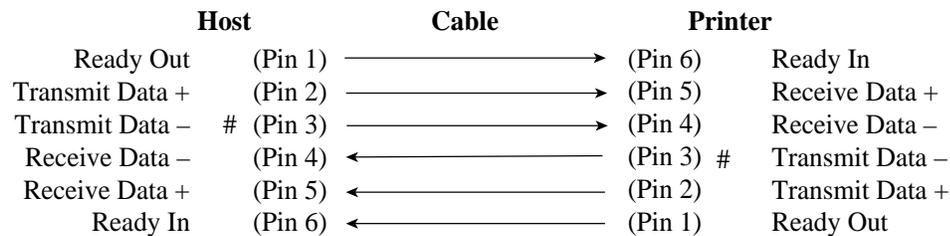
Serial Options

The serial options for the computer and the printer must match. Use the printer control panel, the computer operating system, or your software to change options specified as “selectable.”

Transmission mode:	Asynchronous, full duplex
Speed:	600, 1200, 2400, 4800, 9600, or 19200 baud (selectable)
Data bits:	7 or 8 bits (selectable)
Parity bit:	Even, odd, none, or ignore (selectable)
Start bit:	1 bit
Stop bit:	1 bit
Buffer control:	XON/XOFF (DC1/DC3) or DTR (Data Terminal Ready) (selectable)
Buffer size:	2K, 8K, 16K, 32K, or 64K bytes (selectable)

Cable Wiring

Use a null-modem cable to connect the printer to a computer terminal, as shown below:



indicates grounding.

Buffer Control

Buffer control is a communication protocol used by the computer terminal and the printer to secure data transmission between the two devices. The buffer control ensures that the computer does not send information to the printer faster than the information can be processed in the printer. By telling the computer when the printer can receive data, the buffer control prevents the printer’s buffer from overflowing.

This printer offers a choice of two different buffer controls for connection to a variety of computers: XON/XOFF and DTR. If your computer documentation does not recommend a particular buffer control, try DTR. The following table describes the buffer control.



Buffer Control	Description
XON/XOFF (DC1/DC3)	When the printer is ready to receive data, it sends the XON (DC1) code (hex 11). When fewer than 255 bytes of space remain in the buffer (or when the printer is taken offline), the printer sends the XOFF (DC3) code (hex 13). (When the input buffer is configured for 256 bytes, the buffer limit is reduced from 255 bytes to 63 bytes.) The computer must stop transmitting data within 255 (63) characters of receiving the XOFF code, or information may be lost. If the paper runs out, the printer sends an NAK code (hex 15).
DTR	DTR is a hardware buffer control; that is, the Ready Out signal on interface cable pin 1 (DTR) is used to control the flow of data rather than the transmission of a character code. When the printer is ready to receive data, pin 1 is high. When fewer than 255 (63) bytes of space remain in the buffer (or when the printer is taken offline), pin 1 is low. The computer must stop transmitting data within 255 (63) characters of DTR being low, or information may be lost.





E

Character Sets

This appendix provides character sets available for this printer. Available character sets depend on the protocol selected. They are as follows:

- DEC PPL2 protocol
94-Character sets and 96-Character sets
- Common to IBM Proprinter X24E and XL24E protocol and Epson ESC/P2 protocol
Default sets
- IBM Proprinter X24E and XL24E protocol
Set 1 and set 2
- Epson ESC/P2 protocol
National character sets

These character sets include different characters and symbols that are in accordance with the intended languages or usages. Note that some character sets, even if they have the same character set name, may not have certain characters or symbols, depending on the resident fonts selected. For details, see the table at the end of this appendix. For character set tables, refer to the *Programmer's Reference Manual*.

DEC PPL2 Protocol

The ASCII character set as well as the National Replacement Character sets, and the DEC Supplemental Character set are given at the end of the section “DEC PPL2 Quick Reference Guide” in Appendix C.

- ASCII character set
- National Replacement Character sets
British, DEC Finnish, French, DEC French-Canadian, German, ISO Italian, JIS Roman, DEC Norwegian/Danish, ISO Spanish, DEC Swedish, Norwegian/Danish, DEC Dutch, DEC Swiss, and DEC Portuguese
- DEC Supplemental Character set



Character Sets

Below are listed the other character sets for the DEC PPL2 protocol:

- DEC Special Graphics Character Set
- DEC Technical Character Set
- ISO Latin-1 Supplemental Character Set *
- Legal Character Set
- Hebrew Character Sets
 - DEC 7-Bit Hebrew Character Set
 - DEC Hebrew Supplemental Character Set
 - ISO Latin-Hebrew Supplemental Character Set *
- Greek Character Sets
 - DEC 8-Bit Greek Supplemental Character Set
 - ISO Latin-Greek Supplemental Character Set *
- Turkish Character Sets
 - DEC 7-Bit Turkish Character Set
 - DEC 8-Bit Turkish Supplemental Character Set
 - ISO Latin-5 Supplemental Character Set *
- Eastern European Character Sets
 - ISO Latin-2 Supplemental Character Set *
 - ISO Latin-Cyrillic Supplemental Character Set *
- JIS Katakana Character Set

The above character sets followed by an asterisk (*) are 96-character sets. The others are 94-character sets.



Character Sets

DEC Special Graphics Character Set

Row	GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		Row
	Column	2 10	3 11	4 12	5 13	6 14	7 15								
0			0	60 260 48 176 30 B0	@	100 300 64 192 40 C0	P	120 320 80 208 50 D0	◆	140 340 96 224 60 E0	—	160 360 112 240 70 F0		0	
1	!	41 241 33 161 21 A1	1	61 261 49 177 31 B1	A	101 301 65 193 41 C1	Q	121 321 81 209 51 D1	■	141 341 97 225 61 E1	—	161 361 113 241 71 F1		1	
2	"	42 242 34 162 22 A2	2	62 262 50 178 32 B2	B	102 302 66 194 42 C2	R	122 322 82 210 52 D2	H T	142 342 98 226 62 E2	—	162 362 114 242 72 F2		2	
3	#	43 243 35 163 23 A3	3	63 263 51 179 33 B3	C	103 303 67 195 43 C3	S	123 323 83 211 53 D3	F F	143 343 99 227 63 E3	—	163 363 115 243 73 F3		3	
4	\$	44 244 36 164 24 A4	4	64 264 52 180 34 B4	D	104 304 68 196 44 C4	T	124 324 84 212 54 D4	C R	144 344 100 228 64 E4	┌	164 364 116 244 74 F4		4	
5	%	45 245 37 165 25 A5	5	65 265 53 181 35 B5	E	105 305 69 197 45 C5	U	125 325 85 213 55 D5	L F	145 345 101 229 65 E5	└	165 365 117 245 75 F5		5	
6	&	46 246 38 166 26 A6	6	66 266 54 182 36 B6	F	106 306 70 198 46 C6	V	126 326 86 214 56 D6	o	146 346 102 230 66 E6	┘	166 366 118 246 76 F6		6	
7	'	47 247 39 167 27 A7	7	67 267 55 183 37 B7	G	107 307 71 199 47 C7	W	127 327 87 215 57 D7	±	147 347 103 231 67 E7	┐	167 367 119 247 77 F7		7	
8	(	50 250 40 168 28 A8	8	70 270 56 184 38 B8	H	110 310 72 200 48 C8	X	130 330 88 216 58 D8	N L	150 350 104 232 68 E8	┑	170 370 120 248 78 F8		8
9	)	51 251 41 169 29 A9	9	71 271 57 185 39 B9	I	111 311 73 201 49 C9	Y	131 331 89 217 59 D9	V T	151 351 105 233 69 E9	┒	171 371 121 249 79 F9		9
10	*	52 252 42 170 2A AA	:	72 272 58 186 3A BA	J	112 312 74 202 4A CA	Z	132 332 90 218 5A DA	┓	152 352 106 234 6A EA	└	172 372 122 250 7A FA		10	
11	+	53 253 43 171 2B AB	;	73 273 59 187 3B BB	K	113 313 75 203 4B CB	[	133 333 91 219 5B DB	└	153 353 107 235 6B EB	π	173 373 123 251 7B FB		11
12	,	54 254 44 172 2C AC	<	74 274 60 188 3C BC	L	114 314 76 204 4C CC	\	134 334 92 220 5C DC	┐	154 354 108 236 6C EC	≠	174 374 124 252 7C FC		12	
13	-	55 255 45 173 2D AD	=	75 275 61 189 3D BD	M	115 315 77 205 4D CD	]	135 335 93 221 5D DD	┘	155 355 109 237 6D ED	£	175 375 125 253 7D FD		13
14	.	56 256 46 174 2E AE	>	76 276 62 190 3E BE	N	116 316 78 206 4E CE	^	136 336 94 222 5E DE	+	156 356 110 238 6E EE	·	176 376 126 254 7E FE		14	
15	/	57 257 47 175 2F AF	?	77 277 63 191 3F BF	O	117 317 79 207 4F CF		137 337 95 223 5F DF	—	157 357 111 239 6F EF			15		

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
A	101 65 41	301 193 C1	Octal Decimal Hex

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Character Sets

DEC Technical Character Set

Row	GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		Row				
	Column	2	10	3	11	4	12	5	13	6	14	7	15						
0			}	60 48 30	260 176 B0	∴	100 64 40	300 192 C0	Π	120 80 50	320 208 D0	¬	140 96 60	340 224 E0	π	160 112 70	360 240 F0	0	
1	√	41 33 21	241 161 A1	∖	61 49 31	261 177 B1	α	101 65 41	301 193 C1	Ψ	121 81 51	321 209 D1	α	141 97 61	341 225 E1	ψ	161 113 71	361 241 F1	1
2	┘	42 34 22	242 162 A2	∠	62 50 32	262 178 B2	∞	102 66 42	302 194 C2	▨	122 82 52	322 210 D2	β	142 98 62	342 226 E2	ρ	162 114 72	362 242 F2	2
3	—	43 35 23	243 163 A3	∖	63 51 33	263 179 B3	÷	103 67 43	303 195 C3	Σ	123 83 53	323 211 D3	χ	143 99 63	343 227 E3	σ	163 115 73	363 243 F3	3
4	┘	44 36 24	244 164 A4	/	64 52 34	264 180 B4	Δ	104 68 44	304 196 C4	▨	124 84 54	324 212 D4	δ	144 100 64	344 228 E4	τ	164 116 74	364 244 F4	4
5	J	45 37 25	245 165 A5	┘	65 53 35	265 181 B5	▽	105 69 45	305 197 C5	▨	125 85 55	325 213 D5	ε	145 101 65	345 229 E5	▨	165 117 75	365 245 F5	5
6	I	46 38 26	246 166 A6	┘	66 54 36	266 182 B6	Φ	106 70 46	306 198 C6	√	126 86 56	326 214 D6	φ	146 102 66	346 230 E6	f	166 118 76	366 246 F6	6
7	┘	47 39 27	247 167 A7	┘	67 55 37	267 183 B7	Γ	107 71 47	307 199 C7	Ω	127 87 57	327 215 D7	γ	147 103 67	347 231 E7	ω	167 119 77	367 247 F7	7
8	L	50 42 28	250 168 A8	▨	70 56 38	270 184 B8	~	110 72 48	310 200 C8	E	130 88 58	330 216 D8	η	150 104 68	350 232 E8	ξ	170 120 78	370 248 F8	8
9	┘	51 41 29	251 169 A9	▨	71 57 39	271 185 B9	≈	111 73 49	311 201 C9	T	131 89 59	331 217 D9	ι	151 105 69	351 233 E9	υ	171 121 79	371 249 F9	9
10	J	52 42 2A	252 170 AA	▨	72 58 3A	272 186 BA	⊕	112 74 4A	312 202 CA	C	132 90 5A	332 218 DA	θ	152 106 6A	352 234 EA	ζ	172 122 7A	372 250 FA	10
11	┘	53 43 2B	253 171 AB	▨	73 59 3B	273 187 BB	×	113 75 4B	313 203 CB	∩	133 91 5B	333 219 DB	κ	153 107 6B	353 235 EB	←	173 123 7B	373 251 FB	11
12	┘	54 44 2C	254 172 AC	≡	74 60 3C	274 188 BC	Λ	114 76 4C	314 204 CC	∩	134 92 5C	334 220 DC	λ	154 108 6C	354 236 EC	↑	174 124 7C	374 252 FC	12
13	┘	55 45 2D	255 173 AD	≠	75 61 3D	275 189 BD	↔	115 77 4D	315 205 CD	U	135 93 5D	335 221 DD	▨	155 109 6D	355 237 ED	→	175 125 7D	375 253 FD	13
14	J	56 46 2E	256 174 AE	≡	76 62 3E	276 190 BE	⇒	116 78 4E	316 206 CE	^	136 94 5E	336 222 DE	v	156 110 6E	356 238 EE	↓	176 126 7E	376 254 FE	14
15	{	57 47 2F	257 175 AF	∫	77 63 3F	277 191 BF	≡	117 79 4F	317 207 CF	∨	137 95 5F	337 223 DF	∂	157 111 6F	357 239 EF				15

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
α	101	301	Octal
	65	193	Decimal
	41	C1	Hex

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Character Sets

ISO Latin-1 Supplemental Character Set

Row	Column	GL	GR	GL	GR	Row											
0	2	10		3	11		4	12		5	13		6	14		7	15
0	␣	240 160 A0	°	260 176 B0	À	300 192 C0	Ɔ	320 208 D0	à	340 224 E0	ð	360 240 F0	0				0
1	ı	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	1				1
2	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	2				2
3	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	3				3
4	¤	244 164 A4	'	264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	4				4
5	¥	245 165 A5	μ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5	5				5
6	¦	246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	6				6
7	§	247 167 A7	•	267 183 B7	Ç	307 199 C7	×	327 215 D7	ç	347 231 E7	÷	367 247 F7	7				7
8	¨	250 168 A8	ˆ	270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	8				8
9	©	251 169 A9	ı	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9	9				9
10	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	10				10
11	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	11				11
12	¬	254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	12				12
13	-	255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	13				13
14	®	256 174 AE	¾	276 190 BE	Î	316 206 CE	Þ	336 222 DE	î	356 238 EE	þ	376 254 FE	14				14
15	-	257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF	ÿ	377 255 FF	15				15

LEGEND

	GR	
	12/1	Column/Row
Á	301	Octal
	193	Decimal
	C1	Hex

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Character Sets

DEC 7-Bit Hebrew Character Set

Row	GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		Row				
	Column	2 10	3 11	4 12	5 13	6 14	7 15												
0			0	60 48 30	260 176 B0	@	100 64 40	300 192 C0	P	120 80 50	320 208 D0	ן	140 96 60	340 224 E0	י	160 112 70	360 240 F0	0	
1	!	41 33 21	241 161 A1	1	61 49 31	261 177 B1	A	101 65 41	301 193 C1	Q	121 81 51	321 209 D1	ך	141 97 61	341 225 E1	ו	161 113 71	361 241 F1	1
2	"	42 34 22	242 162 A2	2	62 50 32	262 178 B2	B	102 66 42	302 194 C2	R	122 82 52	322 210 D2	ל	142 98 62	342 226 E2	ו	162 114 72	362 242 F2	2
3	#	43 35 23	243 163 A3	3	63 51 33	263 179 B3	C	103 67 43	303 195 C3	S	123 83 53	323 211 D3	ט	143 99 63	343 227 E3	ף	163 115 73	363 243 F3	3
4	\$	44 36 24	244 164 A4	4	64 52 34	264 180 B4	D	104 68 44	304 196 C4	T	124 84 54	324 212 D4	ה	144 100 64	344 228 E4	צ	164 116 74	364 244 F4	4
5	%	45 37 25	245 165 A5	5	65 53 35	265 181 B5	E	105 69 45	305 197 C5	U	125 85 55	325 213 D5	ו	145 101 65	345 229 E5	כ	165 117 75	365 245 F5	5
6	&	46 38 26	246 166 A6	6	66 54 36	266 182 B6	F	106 70 46	306 198 C6	V	126 86 56	326 214 D6	ז	146 102 66	346 230 E6	ק	166 118 76	366 246 F6	6
7	'	47 39 27	247 167 A7	7	67 55 37	267 183 B7	G	107 71 47	307 199 C7	W	127 87 57	327 215 D7	ח	147 103 67	347 231 E7	ר	167 119 77	367 247 F7	7
8	(	50 40 28	250 168 A8	8	70 56 38	270 184 B8	H	110 72 48	310 200 C8	X	130 88 58	330 216 D8	ט	150 104 68	350 232 E8	ש	170 120 78	370 248 F8	8
9	)	51 41 29	251 169 A9	9	71 57 39	271 185 B9	I	111 73 49	311 201 C9	Y	131 89 59	331 217 D9	ך	151 105 69	351 233 E9	ש	171 121 79	371 249 F9	9
10	*	52 42 2A	252 170 AA	:	72 58 3A	272 186 BA	J	112 74 4A	312 202 CA	Z	132 90 5A	332 218 DA	ך	152 106 6A	352 234 EA	ת	172 122 7A	372 250 FA	10
11	+	53 43 2B	253 171 AB	:	73 59 3B	273 187 BB	K	113 75 4B	313 203 CB	[	133 91 5B	333 219 DB	ך	153 107 6B	353 235 EB	{	173 123 7B	373 251 FB	11
12	,	54 44 2C	254 172 AC	<	74 60 3C	274 188 BC	L	114 76 4C	314 204 CC	\	134 92 5C	334 220 DC	ך	154 108 6C	354 236 EC	|	174 124 7C	374 252 FC	12
13	-	55 45 2D	255 173 AD	=	75 61 3D	275 189 BD	M	115 77 4D	315 205 CD	]	135 93 5D	335 221 DD	ך	155 109 6D	355 237 ED	}	175 125 7D	375 253 FD	13
14	.	56 46 2E	256 174 AE	>	76 62 3E	276 190 BE	N	116 78 4E	316 206 CE	^	136 94 5E	336 222 DE	ך	156 110 6E	356 238 EE	~	176 126 7E	376 254 FE	14
15	/	57 47 2F	257 175 AF	?	77 63 3F	277 191 BF	O	117 79 4F	317 207 CF	_	137 95 5F	337 223 DF	ן	157 111 6F	357 239 EF				15

LEGEND

A	GL GR		Column/Row
	4/1	12/1	
	101	301	Octal
	65	193	Decimal
	41	C1	Hex

MLO-004001



Character Sets

DEC Hebrew Supplemental Character Set

	GL	GR		GL	GR		GL	GR		GL	GR		GL	GR		GL	GR		
Column	2	10		3	11		4	12		5	13		6	14		7	15		
Row 0			°	60 48 30	260 176 B0		100 64 40	300 192 C0		120 80 50	320 208 D0		140 96 60	340 224 E0		160 112 70	360 240 F0	Row 0	
1	i	41 33 21	241 161 A1	±	61 49 31	261 177 B1		101 65 41	301 193 C1		121 81 51	321 209 D1		141 97 61	341 225 E1		161 113 71	361 241 F1	1
2	¢	42 34 22	242 162 A2	2	62 50 32	262 178 B2		102 66 42	302 194 C2		122 82 52	322 210 D2		142 98 62	342 226 E2		162 114 72	362 242 F2	2
3	£	43 35 23	243 163 A3	3	63 51 33	263 179 B3		103 67 43	303 195 C3		123 83 53	323 211 D3		143 99 63	343 227 E3		163 115 73	363 243 F3	3
4		44 36 24	244 164 A4		64 52 34	264 180 B4		104 68 44	304 196 C4		124 84 54	324 212 D4		144 100 64	344 228 E4		164 116 74	364 244 F4	4
5	¥	45 37 25	245 165 A5	µ	65 53 35	265 181 B5		105 69 45	305 197 C5		125 85 55	325 213 D5		145 101 65	345 229 E5		165 117 75	365 245 F5	5
6		46 38 26	246 166 A6	¶	66 54 36	266 182 B6		106 70 46	306 198 C6		126 86 56	326 214 D6		146 102 66	346 230 E6		166 118 76	366 246 F6	6
7	§	47 39 27	247 167 A7	•	67 55 37	267 183 B7		107 71 47	307 199 C7		127 87 57	327 215 D7		147 103 67	347 231 E7		167 119 77	367 247 F7	7
8	¤	50 40 28	250 168 A8		70 56 38	270 184 B8		110 72 48	310 200 C8		130 88 58	330 216 D8		150 104 68	350 232 E8		170 120 78	370 248 F8	8
9	©	51 41 29	251 169 A9	1	71 57 39	271 185 B9		111 73 49	311 201 C9		131 89 59	331 217 D9		151 105 69	351 233 E9		171 121 79	371 249 F9	9
10		52 42 2A	252 170 AA		72 58 3A	272 186 BA		112 74 4A	312 202 CA		132 90 5A	332 218 DA		152 106 6A	352 234 EA		172 122 7A	372 250 FA	10
11	«	53 43 2B	253 171 AB	»	73 59 3B	273 187 BB		113 75 4B	313 203 CB		133 91 5B	333 219 DB		153 107 6B	353 235 EB		173 123 7B	373 251 FB	11
12		54 44 2C	254 172 AC	¼	74 60 3C	274 188 BC		114 76 4C	314 204 CC		134 92 5C	334 220 DC		154 108 6C	354 236 EC		174 124 7C	374 252 FC	12
13		55 45 2D	255 173 AD	½	75 61 3D	275 189 BD		115 77 4D	315 205 CD		135 93 5D	335 221 DD		155 109 6D	355 237 ED		175 125 7D	375 253 FD	13
14		56 46 2E	256 174 AE		76 62 3E	276 190 BE		116 78 4E	316 206 CE		136 94 5E	336 222 DE		156 110 6E	356 238 EE		176 126 7E	376 254 FE	14
15		57 47 2F	257 175 AF	¿	77 63 3F	277 191 BF		117 79 4F	317 207 CF		137 95 5F	337 223 DF		157 111 6F	357 239 EF				15

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
	101	301	Octal
	65	193	Decimal
	41	C1	Hex

MLO-004002



Character Sets

ISO Latin-Hebrew Supplemental Character Set

Row	Column	GL	GR	GL	GR	GL	GR	Row									
0	2	10		3	11		4	12		5	13		6	14		7	15
0	␣	240 160 A0	°	260 176 B0		300 192 C0		320 208 D0	א	340 224 E0	ב		360 240 F0			0	
1		241 161 A1	±	261 177 B1		301 193 C1		321 209 D1	ב	341 225 E1	ג		361 241 F1			1	
2	¢	242 162 A2	2	262 178 B2		302 194 C2		322 210 D2	ג	342 226 E2	ד		362 242 F2			2	
3	£	243 163 A3	3	263 179 B3		303 195 C3		323 211 D3	ד	343 227 E3	ה		363 243 F3			3	
4	¤	244 164 A4	,	264 180 B4		304 196 C4		324 212 D4	ה	344 228 E4	ו		364 244 F4			4	
5	¥	245 165 A5	μ	265 181 B5		305 197 C5		325 213 D5	ו	345 229 E5	ז		365 245 F5			5	
6	¦	246 166 A6	¶	266 182 B6		306 198 C6		326 214 D6	ז	346 230 E6	ח		366 246 F6			6	
7	§	247 167 A7	•	267 183 B7		307 199 C7		327 215 D7	ח	347 231 E7	ט		367 247 F7			7	
8	¨	250 168 A8	¸	270 184 B8		310 200 C8		330 216 D8	ט	350 232 E8	י		370 248 F8			8	
9	©	251 169 A9	1	271 185 B9		311 201 C9		331 217 D9	י	351 233 E9	כ		371 249 F9			9	
10	×	252 170 AA	÷	272 186 BA		312 202 CA		332 218 DA	כ	352 234 EA	ל		372 250 FA			10	
11	«	253 171 AB	»	273 187 BB		313 203 CB		333 219 DB	ל	353 235 EB			373 251 FB			11	
12	¼	254 172 AC	¼	274 188 BC		314 204 CC		334 220 DC	מ	354 236 EC			374 252 FC			12	
13	½	255 173 AD	½	275 189 BD		315 205 CD		335 221 DD	נ	355 237 ED			375 253 FD			13	
14	¾	256 174 AE	¾	276 190 BE		316 206 CE		336 222 DE	ס	356 238 EE			376 254 FE			14	
15	-	257 175 AF		277 191 BF		317 207 CF	=	337 223 DF	ע	357 239 EF			377 255 FF			15	

LEGEND

GL	GR	Column/Row
12/1		Column/Row
301		Octal
193		Decimal
C1		Hex

MLO-004003



Character Sets

ISO Latin-Greek Supplemental Character Set

		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		
Column		2	10	3	11	4	12	5	13	6	14	7	15	Row		0		
0	NBSP	40 32 20	240 160 A0	°	60 48 30	260 176 B0	! ı	100 64 40	300 192 C0	Π	120 80 50	320 208 D0	ÿ	140 96 60	340 224 E0	π	160 112 70	360 240 F0
1	´	41 33 21	241 161 A1	±	61 49 31	261 177 B1	A	101 65 41	301 193 C1	P	121 81 51	321 209 D1	α	141 97 61	341 225 E1	ρ	161 113 71	361 241 F1
2	˘	42 34 22	242 162 A2	2	62 50 32	262 178 B2	B	102 66 42	302 194 C2	▨	122 82 52	322 210 D2	β	142 98 62	342 226 E2	ς	162 114 72	362 242 F2
3	£	43 35 23	243 163 A3	3	63 51 33	263 179 B3	Γ	103 67 43	303 195 C3	Σ	123 83 53	323 211 D3	γ	143 99 63	343 227 E3	σ	163 115 73	363 243 F3
4	▨	44 36 24	244 164 A4	´	64 52 34	264 180 B4	Δ	104 70 44	304 196 C4	T	124 84 54	324 212 D4	δ	144 100 64	344 228 E4	τ	164 116 74	364 244 F4
5	▨	45 37 25	245 165 A5	!´	65 53 35	265 181 B5	E	105 69 45	305 197 C5	Υ	125 85 55	325 213 D5	ε	145 101 65	345 229 E5	υ	165 117 75	365 245 F5
6	ı	46 38 26	246 166 A6	!A	66 54 36	266 182 B6	Z	106 70 46	306 198 C6	Φ	126 86 56	326 214 D6	ζ	146 102 66	346 230 E6	φ	166 118 76	366 246 F6
7	§	47 39 27	247 167 A7	•	67 55 37	267 183 B7	H	107 71 47	307 199 C7	X	127 87 57	327 215 D7	η	147 103 67	347 231 E7	χ	167 119 77	367 247 F7
8	¨	50 40 28	250 168 A8	!E	70 56 38	270 184 B8	Θ	110 72 48	310 200 C8	Ψ	130 88 58	330 216 D8	θ	150 104 68	350 232 E8	ψ	170 120 78	370 248 F8
9	©	51 41 29	251 169 A9	!H	71 57 39	271 185 B9	I	111 73 49	311 201 C9	Ω	131 89 59	331 217 D9	ι	151 105 69	351 233 E9	ω	171 121 79	371 249 F9
10	▨	52 42 30	252 170 AA	!I	72 58 40	272 186 BA	K	112 74 50	312 202 CA	..ı	132 90 5A	332 218 DA	κ	152 106 6A	352 234 EA	ï	172 122 7A	372 250 FA
11	«	53 43 31	253 171 AB	»	73 59 41	273 187 BB	Λ	113 75 51	313 203 CB	..T	133 91 5B	333 219 DB	λ	153 107 6B	353 235 EB	ÿ	173 123 7B	373 251 FB
12	¬	54 44 32	254 172 AC	!O	74 60 42	274 188 BC	M	114 76 52	314 204 CC	ıα	134 92 5C	334 220 DC	μ	154 108 6C	354 236 EC	ıo	174 124 7C	374 252 FC
13	-	55 45 33	255 173 AD	½	75 61 43	275 189 BD	N	115 77 53	315 205 CD	ıε	135 93 5D	335 221 DD	ν	155 109 6D	355 237 ED	ıv	175 125 7D	375 253 FD
14	▨	56 46 34	256 174 AE	!T	76 62 44	276 190 BE	Ξ	116 78 54	316 206 CE	ıη	136 94 5E	336 222 DE	ξ	156 110 6E	356 238 EE	ıw	176 126 7E	376 254 FE
15	—	57 47 35	257 175 AF	!Ω	77 63 45	277 191 BF	O	117 79 55	317 207 CF	ıı	137 95 5F	337 223 DF	ο	157 111 6F	357 239 EF	▨	177 127 7F	377 255 FF

LEGEND

		GL	GR	Column/Row	
		4/1	12/1	Octal	
A	101 65 41	301	193	Decimal	
		C1		Hex	

MLO-006610



Character Sets

DEC 8-Bit Turkish Supplemental Character Set

Row	GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		Row
	Column	2 10	3 11	4 12	5 13	6 14	7 15						
0			°	60 260 48 176 30 B0	À	100 300 64 192 40 C0	Ğ	120 320 80 208 50 D0	à	140 340 96 224 60 E0	ğ	160 360 112 240 70 F0	0
1		ı	±	61 261 49 177 31 B1	Á	101 301 65 193 41 C1	Ñ	121 321 81 209 51 D1	á	141 341 97 225 61 E1	ñ	161 361 113 241 71 F1	1
2		¢	2	62 262 50 178 32 B2	Â	102 302 66 194 42 C2	Ò	122 322 82 210 52 D2	â	142 342 98 226 62 E2	ò	162 362 114 242 72 F2	2
3		£	3	63 263 51 179 33 B3	Ã	103 303 67 195 43 C3	Ó	123 323 83 211 53 D3	ã	143 343 99 227 63 E3	ó	163 363 115 243 73 F3	3
4		▨	▨	64 264 52 180 34 B4	Ä	104 304 68 196 44 C4	Ô	124 324 84 212 54 D4	ä	144 344 100 228 64 E4	ö	164 364 116 244 74 F4	4
5		₺	μ	65 265 53 181 35 B5	Å	105 305 69 197 45 C5	Õ	125 325 85 213 55 D5	å	145 345 101 229 65 E5	õ	165 365 117 245 75 F5	5
6		▨	¶	66 266 54 182 36 B6	Æ	106 306 70 198 46 C6	Ö	126 326 86 214 56 D6	æ	146 346 102 230 66 E6	ö	166 366 118 246 76 F6	6
7		§	•	67 267 55 183 37 B7	Ç	107 307 71 199 47 C7	Ɔ	127 327 87 215 57 D7	ç	147 347 103 231 67 E7	œ	167 367 119 247 77 F7	7
8		¤	▨	70 270 58 184 38 B8	È	110 310 72 200 48 C8	Ø	130 330 88 216 58 D8	è	150 350 104 232 68 E8	ø	170 370 120 248 78 F8	8
9		©	ı	71 271 57 185 39 B9	É	111 311 73 201 49 C9	Ù	131 331 89 217 59 D9	é	151 351 105 233 69 E9	ù	171 371 121 249 79 F9	9
10		ª	º	72 272 58 186 3A BA	Ê	112 312 74 202 4A CA	Ú	132 332 90 218 5A DA	ê	152 352 106 234 6A EA	ú	172 372 122 250 7A FA	10
11		«	»	73 273 59 187 3B BB	Ë	113 313 75 203 4B CB	Û	133 333 91 219 5B DB	ë	153 353 107 235 6B EB	û	173 373 123 251 7B FB	11
12		▨	¼	74 274 60 188 3C BC	Ì	114 314 76 204 4C CC	Ü	134 334 92 220 5C DC	ì	154 354 108 236 6C EC	ü	174 374 124 252 7C FC	12
13		▨	½	75 275 61 189 3D BD	Í	115 315 77 205 4D CD	ÿ	135 335 93 221 5D DD	í	155 355 109 237 6D ED	ÿ	175 375 125 253 7D FD	13
14		î	ı	76 276 62 190 3E BE	Î	116 316 78 206 4E CE	Ş	136 336 94 222 5E DE	î	156 356 110 238 6E EE	ş	176 376 126 254 7E FE	14
15		▨	¿	77 277 63 191 3F BF	İ	117 317 79 207 4F CF	ß	137 337 95 223 5F DF	ï	157 357 111 239 6F EF			15

LEGEND

	GL	GR	Column/Row
	4/1	12/1	Column/Row
Á	101	301	Octal
	65	193	Decimal
	41	C1	Hex

MLO-006606





Character Sets

ISO Latin-5 Supplemental Character Set

		GL	GR		GL	GR		GL	GR		GL	GR		GL	GR		GL	GR	
		2	10		3	11		4	12		5	13		6	14		7	15	
Row	0	NBSP		°	À	Á	Â	Ã	Ä	Å	Ö	Ë	È	É	Ê	Ë	Ü	Û	Ü
		40	240	60	260	100	300	120	320	140	340	160	360						
		32	160	48	176	64	192	80	208	96	224	112	240						
		20	A0	30	B0	40	C0	50	D0	60	E0	70	F0						
1	i	41	241	61	261	101	301	121	321	141	341	161	361						
		33	161	49	177	65	193	81	209	97	225	113	241						
		21	A1	31	B1	41	C1	51	D1	61	E1	71	F1						
2	ç	42	242	62	262	102	302	122	322	142	342	162	362						
		34	162	50	178	66	194	82	210	98	226	114	242						
		22	A2	32	B2	42	C2	52	D2	62	E2	72	F2						
3	£	43	243	63	263	103	303	123	323	143	343	163	363						
		35	163	51	179	67	195	83	211	99	227	115	243						
		23	A3	33	B3	43	C3	53	D3	63	E3	73	F3						
4	¤	44	244	64	264	104	304	124	324	144	344	164	364						
		36	164	52	180	68	196	84	212	100	228	116	244						
		24	A4	34	B4	44	C4	54	D4	64	E4	74	F4						
5	¥	45	245	65	265	105	305	125	325	145	345	165	365						
		37	165	53	181	69	197	85	213	101	229	117	245						
		25	A5	35	B5	45	C5	55	D5	65	E5	75	F5						
6	| |	46	246	66	266	106	306	126	326	146	346	166	366						
		38	166	54	182	70	198	86	214	102	230	118	246						
		26	A6	36	B6	46	C6	56	D6	66	E6	76	F6						
7	§	47	247	67	267	107	307	127	327	147	347	167	367						
		39	167	55	183	71	199	87	215	103	231	119	247						
		27	A7	37	B7	47	C7	57	D7	67	E7	77	F7						
8	¨	50	250	70	270	110	310	130	330	150	350	170	370						
		40	168	56	184	72	200	88	216	104	232	120	248						
		28	A8	38	B8	48	C8	58	D8	68	E8	78	F8						
9	©	51	251	71	271	111	311	131	331	151	351	171	371						
		41	169	57	185	73	201	89	217	105	233	121	249						
		29	A9	39	B9	49	C9	59	D9	69	E9	79	F9						
10	à	52	252	72	272	112	312	132	332	152	352	172	372						
		42	170	58	186	74	202	90	218	106	234	122	250						
		2A	AA	3A	BA	4A	CA	5A	DA	6A	EA	7A	FA						
11	«	53	253	73	273	113	313	133	333	153	353	173	373						
		43	171	59	187	75	203	91	219	107	235	123	251						
		2B	AB	3B	BB	4B	CB	5B	DB	6B	EB	7B	FB						
12	¼	54	254	74	274	114	314	134	334	154	354	174	374						
		44	172	60	188	76	204	92	220	108	236	124	252						
		2C	AC	3C	BC	4C	CC	5C	DC	6C	EC	7C	FC						
13	½	55	255	75	275	115	315	135	335	155	355	175	375						
		45	173	61	189	77	205	93	221	109	237	125	253						
		2D	AD	3D	BD	4D	CD	5D	DD	6D	ED	7D	FD						
14	¾	56	256	76	276	116	316	136	336	156	356	176	376						
		46	174	62	190	78	206	94	222	110	238	126	254						
		2E	AE	3E	BE	4E	CE	5E	DE	6E	EE	7E	FE						
15	-	57	257	77	277	117	317	137	337	157	357	177	377						
		47	175	63	191	79	207	95	223	111	239	127	255						
		2F	AF	3F	BF	4F	CF	5F	DF	6F	EF	7F	FF						

LEGEND

	GR	
12/1		Column/Row
Á	301	Octal
	193	Decimal
	C1	Hex

MLO-006611



Character Sets

ISO Latin-2 Supplemental Character Set

		GL	GR		GL	GR		GL	GR		GL	GR		GL	GR		GL	GR	
		2	10		3	11		4	12		5	13		6	14		7	15	
Row 0	NBSP	40 32 20	240 160 A0	°	60 48 30	260 176 B0	´	100 64 40	300 192 C0	Đ	120 80 50	320 208 D0	´	140 96 60	340 224 E0	đ	160 112 70	360 240 F0	Row 0
1	À	41 33 21	241 161 A1	à	61 49 31	261 177 B1	´	101 65 41	301 193 C1	Ñ	121 81 51	321 209 D1	´	141 97 61	341 225 E1	ñ	161 113 71	361 241 F1	1
2	Ả	42 34 22	242 162 A2	ả	62 50 32	262 178 B2	ˆ	102 66 42	302 194 C2	Ň	122 82 52	322 210 D2	ˆ	142 98 62	342 226 E2	ň	162 114 72	362 242 F2	2
3	Ł	43 35 23	243 163 A3	ł	63 51 33	263 179 B3	ˇ	103 67 43	303 195 C3	Ó	123 83 53	323 211 D3	ˇ	143 99 63	343 227 E3	ó	163 115 73	363 243 F3	3
4	Ř	44 36 24	244 164 A4	ř	64 52 34	264 180 B4	¨	104 68 44	304 196 C4	Ô	124 84 54	324 212 D4	¨	144 100 64	344 228 E4	ô	164 116 74	364 244 F4	4
5	Š	45 37 25	245 165 A5	š	65 53 35	265 181 B5	ˇ	105 69 45	305 197 C5	Œ	125 85 55	325 213 D5	ˇ	145 101 65	345 229 E5	œ	165 117 75	365 245 F5	5
6	Ś	46 38 26	246 166 A6	ś	66 54 36	266 182 B6	˘	106 70 46	306 198 C6	Ö	126 86 56	326 214 D6	˘	146 102 66	346 230 E6	ö	166 118 76	366 246 F6	6
7	Ş	47 39 27	247 167 A7	ş	67 55 37	267 183 B7	Ç	107 71 47	307 199 C7	×	127 87 57	327 215 D7	Ç	147 103 67	347 231 E7	÷	167 119 77	367 247 F7	7
8	ˆ	50 40 28	250 168 A8	ˆ	70 56 38	270 184 B8	ˇ	110 72 48	310 200 C8	Ř	130 88 58	330 216 D8	ˇ	150 104 68	350 232 E8	ř	170 120 78	370 248 F8	8
9	Š	51 41 29	251 169 A9	š	71 57 39	271 185 B9	É	111 73 49	311 201 C9	Û	131 89 59	331 217 D9	É	151 105 69	351 233 E9	û	171 121 79	371 249 F9	9
10	Ş	52 42 2A	252 170 AA	ş	72 58 3A	272 186 BA	Ě	112 74 4A	312 202 CA	Ú	132 90 5A	332 218 DA	Ě	152 106 6A	352 234 EA	ú	172 122 7A	372 250 FA	10
11	Ť	53 43 2B	253 171 AB	ť	73 59 3B	273 187 BB	Ë	113 75 4B	313 203 CB	Ů	133 91 5B	333 219 DB	Ë	153 107 6B	353 235 EB	ů	173 123 7B	373 251 FB	11
12	Ž	54 44 2C	254 172 AC	ž	74 60 3C	274 188 BC	Ě	114 76 4C	314 204 CC	Ü	134 92 5C	334 220 DC	Ě	154 108 6C	354 236 EC	ü	174 124 7C	374 252 FC	12
13	-	55 45 2D	255 173 AD	˝	75 61 3D	275 189 BD	Í	115 77 4D	315 205 CD	Ý	135 93 5D	335 221 DD	Í	155 109 6D	355 237 ED	ý	175 125 7D	375 253 FD	13
14	Ž	56 46 2E	256 174 AE	ž	76 62 3E	276 190 BE	Î	116 78 4E	316 206 CE	ı	136 94 5E	336 222 DE	Î	156 110 6E	356 238 EE	ı	176 126 7E	376 254 FE	14
15	Ž	57 47 2F	257 175 AF	ž	77 63 3F	277 191 BF	Ǿ	117 79 4F	317 207 CF	ß	137 95 5F	337 223 DF	Ǿ	157 111 6F	357 239 EF	˙	177 127 7F	377 255 FF	15

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
´	101	301	Octal
À	65	193	Decimal
	41	C1	Hex

MLO-006608





Character Sets

ISO Latin-Cyrillic Supplemental Character Set

Row	GL		GR		GL		GR		GL		GR		GL		GR		Row							
	Column	2	10		3	11		4	12		5	13		6	14			7	15					
0	NBSP	40 32 20	240 160 A0		А	60 48 30	260 176 B0		Р	100 64 40	300 192 C0		а	120 80 50	320 208 D0		р	140 96 60	340 224 E0		№	160 112 70	360 240 F0	0
1	Ё	41 33 21	241 161 A1		Б	61 49 31	261 177 B1		С	101 65 41	301 193 C1		б	121 81 51	321 209 D1		с	141 97 61	341 225 E1		ё	161 113 71	361 241 F1	1
2	Ђ	42 34 22	242 162 A2		В	62 50 32	262 178 B2		Т	102 66 42	302 194 C2		в	122 82 52	322 210 D2		т	142 98 62	342 226 E2		ђ	162 114 72	362 242 F2	2
3	Ѓ	43 35 23	243 163 A3		Г	63 51 33	263 179 B3		У	103 67 43	303 195 C3		г	123 83 53	323 211 D3		у	143 99 63	343 227 E3		ѓ	163 115 73	363 243 F3	3
4	Є	44 36 24	244 164 A4		Д	64 52 34	264 180 B4		Ф	104 68 44	304 196 C4		д	124 84 54	324 212 D4		ф	144 100 64	344 228 E4		є	164 116 74	364 244 F4	4
5	Ѕ	45 37 25	245 165 A5		Е	65 53 35	265 181 B5		Х	105 69 45	305 197 C5		е	125 85 55	325 213 D5		х	145 101 65	345 229 E5		ѕ	165 117 75	365 245 F5	5
6	І	46 38 26	246 166 A6		Ж	66 54 36	266 182 B6		Ц	106 70 46	306 198 C6		ж	126 86 56	326 214 D6		ц	146 102 66	346 230 E6		і	166 118 76	366 246 F6	6
7	Ї	47 39 27	247 167 A7		З	67 55 37	267 183 B7		Ч	107 71 47	307 199 C7		з	127 87 57	327 215 D7		ч	147 103 67	347 231 E7		ї	167 119 77	367 247 F7	7
8	Ј	50 40 28	250 168 A8		И	70 58 38	270 184 B8		Ш	110 72 48	310 200 C8		и	130 88 58	330 216 D8		ш	150 104 68	350 232 E8		ј	170 120 78	370 248 F8	8
9	Љ	51 41 29	251 169 A9		Й	71 59 39	271 185 B9		Щ	111 73 49	311 201 C9		й	131 89 59	331 217 D9		щ	151 105 69	351 233 E9		љ	171 121 79	371 249 F9	9
10	Ђ	52 42 2A	252 170 AA		К	72 58 3A	272 186 BA		Ъ	112 74 4A	312 202 CA		к	132 90 5A	332 218 DA		ъ	152 106 6A	352 234 EA		ђ	172 122 7A	372 250 FA	10
11	Ђ	53 43 2B	253 171 AB		Љ	73 59 3B	273 187 BB		Ы	113 75 4B	313 203 CB		л	133 91 5B	333 219 DB		ы	153 107 6B	353 235 EB		ђ	173 123 7B	373 251 FB	11
12	Ѓ	54 44 2C	254 172 AC		М	74 60 3C	274 188 BC		Ь	114 76 4C	314 204 CC		м	134 92 5C	334 220 DC		ь	154 108 6C	354 236 EC		ѓ	174 124 7C	374 252 FC	12
13	-	55 45 2D	255 173 AD		Н	75 61 3D	275 189 BD		Э	115 77 4D	315 205 CD		н	135 93 5D	335 221 DD		э	155 109 6D	355 237 ED		ѕ	175 125 7D	375 253 FD	13
14	Ў	56 46 2E	256 174 AE		О	76 62 3E	276 190 BE		Ю	116 78 4E	316 206 CE		о	136 94 5E	336 222 DE		ю	156 110 6E	356 238 EE		ў	176 126 7E	376 254 FE	14
15	Ц	57 47 2F	257 175 AF		П	77 63 3F	277 191 BF		Я	117 79 4F	317 207 CF		п	137 95 5F	337 223 DF		я	157 111 6F	357 239 EF		ц	177 127 7F	377 255 FF	15

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
C	101	301	Octal
	65	193	Decimal
	41	C1	Hex

MLO-006609



Character Sets

JIS Katakana Character Set

Row	GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		GL GR		Row						
	2	10	3	11	4	12	5	13	6	14	7	15									
0			ー	60 48 30	260 176 80	タ	100 64 40	300 192 C0	ニ	120 80 50	320 208 D0			140 96 60	340 224 E0			160 112 70	360 240 F0	0	
1	・	41 33 21	ア	241 161 A1	61 49 31	261 177 B1	チ	101 65 41	301 193 C1	ル	121 81 51	321 209 D1			141 97 61	341 225 E1			161 113 71	361 241 F1	1
2	㇀	42 34 22	イ	242 162 A2	62 50 32	262 178 B2	ツ	102 66 42	302 194 C2	メ	122 82 52	322 210 D2			142 98 62	342 226 E2			162 114 72	362 242 F2	2
3	㇁	43 35 23	ウ	243 163 A3	63 51 33	263 179 B3	テ	103 67 43	303 195 C3	モ	123 83 53	323 211 D3			143 99 63	343 227 E3			163 115 73	363 243 F3	3
4	、	44 36 24	エ	244 164 A4	64 52 34	264 180 B4	ト	104 68 44	304 196 C4	ヤ	124 84 54	324 212 D4			144 100 64	344 228 E4			164 116 74	364 244 F4	4
5	・	45 37 25	オ	245 165 A5	65 53 35	265 181 B5	ナ	105 69 45	305 197 C5	ユ	125 85 55	325 213 D5			145 101 65	345 229 E5			165 117 75	365 245 F5	5
6	㇂	46 38 26	カ	246 166 A6	66 54 36	266 182 B6	ニ	106 70 46	306 198 C6	ヨ	126 86 56	326 214 D6			146 102 66	346 230 E6			166 118 76	366 246 F6	6
7	㇃	47 39 27	キ	247 167 A7	67 55 37	267 183 B7	ヌ	107 71 47	307 199 C7	ウ	127 87 57	327 215 D7			147 103 67	347 231 E7			167 119 77	367 247 F7	7
8	イ	50 40 28	ク	250 168 A8	70 56 38	270 184 B8	ネ	110 72 48	310 200 C8	リ	130 88 58	330 216 D8			150 104 68	350 232 E8			170 120 78	370 248 F8	8
9	ウ	51 41 29	ケ	251 169 A9	71 57 39	271 185 B9	ノ	111 73 49	311 201 C9	ル	131 89 59	331 217 D9			151 105 69	351 233 E9			171 121 79	371 249 F9	9
10	エ	52 42 2A	コ	252 170 AA	72 58 3A	272 186 BA	ハ	112 74 4A	312 202 CA	シ	132 90 5A	332 218 DA			152 106 6A	352 234 EA			172 122 7A	372 250 FA	10
11	オ	53 43 2B	サ	253 171 AB	73 59 3B	273 187 BB	ヒ	113 75 4B	313 203 CB	ロ	133 91 5B	333 219 DB			153 107 6B	353 235 EB			173 123 7B	373 251 FB	11
12	㇄	54 44 2C	シ	254 172 AC	74 60 3C	274 188 BC	フ	114 76 4C	314 204 CC	ワ	134 92 5C	334 220 DC			154 108 6C	354 236 EC			174 124 7C	374 252 FC	12
13	㇅	55 45 2D	ス	255 173 AD	75 61 3D	275 189 BD	ハ	115 77 4D	315 205 CD	ン	135 93 5D	335 221 DD			155 109 6D	355 237 ED			175 125 7D	375 253 FD	13
14	㇆	56 46 2E	セ	256 174 AE	76 62 3E	276 190 BE	ホ	116 78 4E	316 206 CE	ハ	136 94 5E	336 222 DE			156 110 6E	356 238 EE			176 126 7E	376 254 FE	14
15	㇇	57 47 2F	ソ	257 175 AF	77 63 3F	277 191 BF	マ	117 79 4F	317 207 CF	。 (dot)	137 95 5F	337 223 DF			157 111 6F	357 239 EF					15

LEGEND

	GL	GR	
	4/1	12/1	Column/Row
チ	101 65 41	301 193 C1	Octal Decimal Hex

MLO-003983



Character Sets

Common to IBM Proprinter X24E and XL24E Protocol and Epson ESC/P2 Protocol

Default Sets

The following thirty character sets are available.

Code pages 210, 220, 437, 850, 851, 852, 857, 860, 862, 863, 865, and 866, CP DHN, Turkish, ECMA 94, ISO Latin 1, ISO Latin 2, Hungarian, Slovenian, Polish, Mazovian, Kamenicky, Cyrillic, ELOT 927, ELOT 928, Latin Polish, Lithuanian 1, Lithuanian 2, MIK, and Macedonian

Code Page 210

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	ç	É	á	í	ó	ú	ñ	Ñ	À	Á
1		!	1	A	Q	R	b	æ	í	ó	ú	ñ	Ñ	À	Á	Â
2		"	2	B	R	S	c	æ	í	ó	ú	ñ	Ñ	À	Á	Ã
3	♥	#	3	C	S	T	d	æ	í	ó	ú	ñ	Ñ	À	Á	Ä
4	♦	\$	4	D	T	U	e	æ	í	ó	ú	ñ	Ñ	À	Á	Å
5	♦	%	5	E	U	V	f	æ	í	ó	ú	ñ	Ñ	À	Á	Æ
6	♦	&	6	F	V	W	g	æ	í	ó	ú	ñ	Ñ	À	Á	Ç
7		'	7	G	W	X	h	æ	í	ó	ú	ñ	Ñ	À	Á	È
8		(	8	H	X	h	i	æ	í	ó	ú	ñ	Ñ	À	Á	É
9		)	9	I	Y	i	j	æ	í	ó	ú	ñ	Ñ	À	Á	Ê
A		*	:	J	Z	j	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ë
B		+	;	K	I	l	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
C		,<	<	L	\	l	l	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
D		-	=	M	l	l	m	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
E		.	>	N	^	~	n	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
F		/	?/	O	_	o	o	æ	í	ó	ú	ñ	Ñ	À	Á	Ï

Code Page 220

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	ç	É	á	í	ó	ú	ñ	Ñ	À	Á
1		!	1	A	Q	R	b	æ	í	ó	ú	ñ	Ñ	À	Á	Â
2		"	2	B	R	S	c	æ	í	ó	ú	ñ	Ñ	À	Á	Ã
3	♥	#	3	C	S	T	d	æ	í	ó	ú	ñ	Ñ	À	Á	Ä
4	♦	\$	4	D	T	U	e	æ	í	ó	ú	ñ	Ñ	À	Á	Å
5	♦	%	5	E	U	V	f	æ	í	ó	ú	ñ	Ñ	À	Á	Æ
6	♦	&	6	F	V	W	g	æ	í	ó	ú	ñ	Ñ	À	Á	Ç
7		'	7	G	W	X	h	æ	í	ó	ú	ñ	Ñ	À	Á	È
8		(	8	H	X	h	i	æ	í	ó	ú	ñ	Ñ	À	Á	É
9		)	9	I	Y	i	j	æ	í	ó	ú	ñ	Ñ	À	Á	Ê
A		*	:	J	Z	j	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ë
B		+	;	K	I	l	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
C		,<	<	L	\	l	l	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
D		-	=	M	l	l	m	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
E		.	>	N	^	~	n	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
F		/	?/	O	_	o	o	æ	í	ó	ú	ñ	Ñ	À	Á	Ï

Code Page 437

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	ç	É	á	í	ó	ú	ñ	Ñ	À	Á
1		!	1	A	Q	R	b	æ	í	ó	ú	ñ	Ñ	À	Á	Â
2		"	2	B	R	S	c	æ	í	ó	ú	ñ	Ñ	À	Á	Ã
3	♥	#	3	C	S	T	d	æ	í	ó	ú	ñ	Ñ	À	Á	Ä
4	♦	\$	4	D	T	U	e	æ	í	ó	ú	ñ	Ñ	À	Á	Å
5	♦	%	5	E	U	V	f	æ	í	ó	ú	ñ	Ñ	À	Á	Æ
6	♦	&	6	F	V	W	g	æ	í	ó	ú	ñ	Ñ	À	Á	Ç
7		'	7	G	W	X	h	æ	í	ó	ú	ñ	Ñ	À	Á	È
8		(	8	H	X	h	i	æ	í	ó	ú	ñ	Ñ	À	Á	É
9		)	9	I	Y	i	j	æ	í	ó	ú	ñ	Ñ	À	Á	Ê
A		*	:	J	Z	j	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ë
B		+	;	K	I	l	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
C		,<	<	L	\	l	l	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
D		-	=	M	l	l	m	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
E		.	>	N	^	~	n	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
F		/	?/	O	_	o	o	æ	í	ó	ú	ñ	Ñ	À	Á	Ï

Code Page 850

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	ç	É	á	í	ó	ú	ñ	Ñ	À	Á
1		!	1	A	Q	R	b	æ	í	ó	ú	ñ	Ñ	À	Á	Â
2		"	2	B	R	S	c	æ	í	ó	ú	ñ	Ñ	À	Á	Ã
3	♥	#	3	C	S	T	d	æ	í	ó	ú	ñ	Ñ	À	Á	Ä
4	♦	\$	4	D	T	U	e	æ	í	ó	ú	ñ	Ñ	À	Á	Å
5	♦	%	5	E	U	V	f	æ	í	ó	ú	ñ	Ñ	À	Á	Æ
6	♦	&	6	F	V	W	g	æ	í	ó	ú	ñ	Ñ	À	Á	Ç
7		'	7	G	W	X	h	æ	í	ó	ú	ñ	Ñ	À	Á	È
8		(	8	H	X	h	i	æ	í	ó	ú	ñ	Ñ	À	Á	É
9		)	9	I	Y	i	j	æ	í	ó	ú	ñ	Ñ	À	Á	Ê
A		*	:	J	Z	j	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ë
B		+	;	K	I	l	k	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
C		,<	<	L	\	l	l	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
D		-	=	M	l	l	m	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
E		.	>	N	^	~	n	æ	í	ó	ú	ñ	Ñ	À	Á	Ï
F		/	?/	O	_	o	o	æ	í	ó	ú	ñ	Ñ	À	Á	Ï



Character Sets

ISO Latin 2

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																

Hungarian

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																

Slovenian

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																

Polish

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																

Mazowian

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																

Kamenicky

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
2		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
3	♥															
4	♦															
5	♣															
6	♠															
7																
8																
9																
A																
B																
C																
D																
E																
F																





Character Sets

Cyrillic

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		А	Р	а	р	№	
1		!	"	1	2	A	Q	R	Q	а	Р	а	р	№	±	±
2		"	"	2	3	B	R	S	а	б	Б	В	б	с	т	ё
3	♥	#	3	3	C	D	T	S	с	г	Г	У	г	у	ё	ё
4	♦	\$	4	4	D	T	U	d	t	д	Ф	д	ф	е	с	с
5	♦	\$	5	5	E	U	V	e	v	е	Х	е	х	ц	ч	и
6	♦	&	6	6	F	V	W	f	w	ф	Х	ц	ч	и	и	и
7		'	7	7	G	W	X	g	w	г	Ц	ч	ц	ч	и	и
8		(	8	8	H	X	h	x	x	И	Ш	и	ш	щ	ь	ь
9		)	9	9	I	Y	i	y	y	Й	Щ	й	щ	ь	ь	ь
A		*	:	J	Z	j	z	z	z	Ь	К	ь	к	ь	ь	ь
B		+	;	K	I	k	i	i	i	Ъ	Л	ь	л	ь	ь	ь
C		,	<	L	\	l	l	l	l	Ѡ	М	ь	м	ь	ь	ь
D		-	=	M	\	m	n	n	n	ѡ	Н	Э	н	э	Ю	Ю
E		.	>	N	^	n	~	~	~	Ѣ	О	Ю	о	ю	Ю	Ю
F		/	?	O	_	o				ѣ	У	О	у	о	Ю	Ю
F		/	?	O	_	o				ѣ	Ц	О	ц	о	Ю	Ю

ELOT 927

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		Α	Ρ	α	ρ	№	
1		!	"	1	2	A	Q	R	Q	α	Ρ	α	ρ	№	±	±
2		"	"	2	3	B	R	S	α	β	Β	Γ	β	γ	τ	ε
3	♥	#	3	3	C	D	T	S	с	γ	Ε	Τ	γ	τ	υ	η
4	♦	\$	4	4	D	T	U	d	t	δ	Φ	δ	φ	ε	ς	ι
5	♦	\$	5	5	E	U	V	e	v	ε	Χ	ε	χ	ψ	ο	π
6	♦	&	6	6	F	V	W	f	w	φ	Χ	η	θ	ο	π	ρ
7		'	7	7	G	W	X	g	w	γ	Η	θ	η	ο	π	ρ
8		(	8	8	H	X	h	x	x	Η	Θ	Ψ	η	ο	π	ρ
9		)	9	9	I	Y	i	y	y	Ι	Κ	λ	μ	ν	ξ	ο
A		*	:	J	Z	j	z	z	z	Ι	Κ	λ	μ	ν	ξ	ο
B		+	;	K	I	k	i	i	i	Ι	Κ	λ	μ	ν	ξ	ο
C		,	<	L	\	l	l	l	l	Ι	Κ	λ	μ	ν	ξ	ο
D		-	=	M	\	m	n	n	n	Ι	Κ	λ	μ	ν	ξ	ο
E		.	>	N	^	n	~	~	~	Ι	Κ	λ	μ	ν	ξ	ο
F		/	?	O	_	o				Ι	Κ	λ	μ	ν	ξ	ο

ELOT 928

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		Α	Ρ	α	ρ	№	
1		!	"	1	2	A	Q	R	Q	α	Ρ	α	ρ	№	±	±
2		"	"	2	3	B	R	S	α	β	Β	Γ	β	γ	τ	ε
3	♥	#	3	3	C	D	T	S	с	γ	Ε	Τ	γ	τ	υ	η
4	♦	\$	4	4	D	T	U	d	t	δ	Φ	δ	φ	ε	ς	ι
5	♦	\$	5	5	E	U	V	e	v	ε	Χ	ε	χ	ψ	ο	π
6	♦	&	6	6	F	V	W	f	w	φ	Χ	η	θ	ο	π	ρ
7		'	7	7	G	W	X	g	w	γ	Η	θ	η	ο	π	ρ
8		(	8	8	H	X	h	x	x	Η	Θ	Ψ	η	ο	π	ρ
9		)	9	9	I	Y	i	y	y	Ι	Κ	λ	μ	ν	ξ	ο
A		*	:	J	Z	j	z	z	z	Ι	Κ	λ	μ	ν	ξ	ο
B		+	;	K	I	k	i	i	i	Ι	Κ	λ	μ	ν	ξ	ο
C		,	<	L	\	l	l	l	l	Ι	Κ	λ	μ	ν	ξ	ο
D		-	=	M	\	m	n	n	n	Ι	Κ	λ	μ	ν	ξ	ο
E		.	>	N	^	n	~	~	~	Ι	Κ	λ	μ	ν	ξ	ο
F		/	?	O	_	o				Ι	Κ	λ	μ	ν	ξ	ο

Latin Polish

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		Α	Ρ	α	ρ	№	
1		!	"	1	2	A	Q	R	Q	α	Ρ	α	ρ	№	±	±
2		"	"	2	3	B	R	S	α	β	Β	Γ	β	γ	τ	ε
3	♥	#	3	3	C	D	T	S	с	γ	Ε	Τ	γ	τ	υ	η
4	♦	\$	4	4	D	T	U	d	t	δ	Φ	δ	φ	ε	ς	ι
5	♦	\$	5	5	E	U	V	e	v	ε	Χ	ε	χ	ψ	ο	π
6	♦	&	6	6	F	V	W	f	w	φ	Χ	η	θ	ο	π	ρ
7		'	7	7	G	W	X	g	w	γ	Η	θ	η	ο	π	ρ
8		(	8	8	H	X	h	x	x	Η	Θ	Ψ	η	ο	π	ρ
9		)	9	9	I	Y	i	y	y	Ι	Κ	λ	μ	ν	ξ	ο
A		*	:	J	Z	j	z	z	z	Ι	Κ	λ	μ	ν	ξ	ο
B		+	;	K	I	k	i	i	i	Ι	Κ	λ	μ	ν	ξ	ο
C		,	<	L	\	l	l	l	l	Ι	Κ	λ	μ	ν	ξ	ο
D		-	=	M	\	m	n	n	n	Ι	Κ	λ	μ	ν	ξ	ο
E		.	>	N	^	n	~	~	~	Ι	Κ	λ	μ	ν	ξ	ο
F		/	?	O	_	o				Ι	Κ	λ	μ	ν	ξ	ο

Lithuanian 1

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		Α	Ρ	α	ρ	№	
1		!	"	1	2	A	Q	R	Q	α	Ρ	α	ρ	№	±	±
2		"	"	2	3	B	R	S	α	β	Β	Γ	β	γ	τ	ε
3	♥	#	3	3	C	D	T	S	с	γ	Ε	Τ	γ	τ	υ	η
4	♦	\$	4	4	D	T	U	d	t	δ	Φ	δ	φ	ε	ς	ι
5	♦	\$	5	5	E	U	V	e	v	ε	Χ	ε	χ	ψ	ο	π
6	♦	&	6	6	F	V	W	f	w	φ	Χ	η	θ	ο	π	ρ
7		'	7	7	G	W	X	g	w	γ	Η	θ	η	ο	π	ρ
8		(	8	8	H	X	h	x	x	Η	Θ	Ψ	η	ο	π	ρ
9		)	9	9	I	Y	i	y	y	Ι	Κ	λ	μ	ν	ξ	ο
A		*	:	J	Z	j	z	z	z	Ι	Κ	λ	μ	ν	ξ	ο
B		+	;	K	I	k	i	i	i	Ι	Κ	λ	μ	ν	ξ	ο
C		,	<	L	\	l	l	l	l	Ι	Κ	λ	μ	ν	ξ	ο
D		-	=	M	\	m	n	n	n	Ι	Κ	λ	μ	ν	ξ	ο
E		.	>	N	^	n	~	~	~	Ι	Κ	λ	μ	ν	ξ	ο
F		/	?	O	_	o				Ι	Κ	λ	μ	ν	ξ	ο

Lithuanian 2

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p		Α	Ρ	α	ρ	№	
1		!	"	1	2	A	Q	R	Q	α	Ρ	α	ρ	№	±	±
2		"	"	2	3	B	R	S	α	β	Β	Γ	β	γ	τ	ε
3	♥	#	3	3	C	D	T	S	с	γ	Ε	Τ	γ	τ	υ	η
4	♦	\$	4	4	D	T	U	d	t	δ	Φ	δ	φ	ε	ς	ι
5	♦	\$	5	5	E	U	V	e	v	ε	Χ	ε	χ	ψ	ο	π
6	♦	&	6	6	F	V	W	f	w	φ	Χ	η	θ	ο	π	ρ
7		'	7	7	G	W	X	g	w	γ	Η	θ	η	ο	π	ρ
8		(	8	8	H	X	h	x	x	Η	Θ	Ψ	η	ο	π	ρ
9		)	9	9	I	Y	i	y	y	Ι	Κ	λ	μ	ν	ξ	ο
A		*	:	J	Z	j	z	z	z	Ι	Κ	λ	μ	ν	ξ	ο
B		+	;	K	I	k	i	i	i	Ι	Κ	λ	μ	ν	ξ	ο
C		,	<	L	\	l	l	l	l	Ι	Κ	λ	μ	ν	ξ	ο
D		-	=	M	\	m	n	n	n	Ι	Κ	λ	μ	ν	ξ	ο
E		.	>	N	^	n	~	~	~	Ι	Κ	λ	μ	ν	ξ	ο
F		/	?	O	_	o				Ι	Κ	λ	μ	ν	ξ	ο





Character Sets

MIK

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	~	p	A	P	a	p	L	α	≡			
1		!	1	A	Q	R	a	q	r	А	Б	С	Т	⊥	α	β
2		"	2	B	R	b	r	В	Г	В	Г	У	⊥	⊥	π	≥
3	♥	#	3	C	S	c	s	Г	У	Г	У	⊥	⊥	⊥	⊥	⊥
4	♦	\$	4	D	T	d	t	Д	Ф	Д	Ф	⊥	⊥	⊥	⊥	⊥
5	♣	%	5	E	U	e	u	Е	Х	Е	Х	⊥	⊥	⊥	⊥	⊥
6	♠	&	6	F	V	f	v	Ж	Ц	Ж	Ц	⊥	⊥	⊥	⊥	⊥
7		'	7	G	W	g	w	З	Ч	З	Ч	⊥	⊥	⊥	⊥	⊥
8		(	8	H	X	h	x	И	Ш	И	Ш	⊥	⊥	⊥	⊥	⊥
9		)	9	I	Y	i	y	Й	Щ	Й	Щ	⊥	⊥	⊥	⊥	⊥
A		*	A	J	Z	j	z	Ъ	К	Ъ	К	⊥	⊥	⊥	⊥	⊥
B		+	B	;	[	k	{	Л	Ы	Л	Ы	⊥	⊥	⊥	⊥	⊥
C		,	C	<	L	\	|	М	Ь	М	Ь	⊥	⊥	⊥	⊥	⊥
D		-	D	=	M	|	~	Н	Э	Н	Э	⊥	⊥	⊥	⊥	⊥
E		.	E	>	N	^	~	О	Ю	О	Ю	⊥	⊥	⊥	⊥	⊥
F		/	F	?	O	_	~	П	Я	П	Я	⊥	⊥	⊥	⊥	⊥

Macedonian

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	~	p	A	В	Ѓ	Ќ	Љ	Ў	а	њ
1		!	1	A	Q	R	a	q	r	А	Б	Ѓ	Ќ	Љ	а	њ
2		"	2	B	R	b	r	В	Г	В	Г	Ѓ	Ќ	Љ	б	п
3	♥	#	3	C	S	c	s	Г	У	Г	У	Ѓ	Ќ	Љ	г	р
4	♦	\$	4	D	T	d	t	Д	Ф	Д	Ф	Ѓ	Ќ	Љ	д	с
5	♣	%	5	E	U	e	u	Е	Х	Е	Х	Ѓ	Ќ	Љ	е	т
6	♠	&	6	F	V	f	v	Ж	Ц	Ж	Ц	Ѓ	Ќ	Љ	ж	џ
7		'	7	G	W	g	w	З	Ч	З	Ч	Ѓ	Ќ	Љ	з	у
8		(	8	H	X	h	x	И	Ш	И	Ш	Ѓ	Ќ	Љ	и	ф
9		)	9	I	Y	i	y	Й	Щ	Й	Щ	Ѓ	Ќ	Љ	ј	х
A		*	A	J	Z	j	z	Ј	Ц	Ј	Ц	Ѓ	Ќ	Љ	к	ц
B		+	B	;	[	k	{	К	Ч	К	Ч	Ѓ	Ќ	Љ	к	ч
C		,	C	<	L	\	|	Л	Ш	Л	Ш	Ѓ	Ќ	Љ	л	ш
D		-	D	=	M	|	~	М	џ	М	џ	Ѓ	Ќ	Љ	м	џ
E		.	E	>	N	^	~	Н	џ	Н	џ	Ѓ	Ќ	Љ	н	џ
F		/	F	?	O	_	~	О	џ	О	џ	Ѓ	Ќ	Љ	о	џ





Character Sets

IBM Proprinter X24E and XL24E Protocol

IBM Set 1/2

IBM character set 1 and IBM character set 2

IBM Set 1

LH	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL DLE SP	0	@	P	~	p	NUL DLE	á	í	ó	ú	Û	α	≡	±	≥
1	SOH DC1 !	1	A	Q	a	q	SOH DC1	í	ó	ú	Û	α	≡	±	≥	≤
2	STX DC2 "	2	B	R	b	r	STX DC2	ó	ú	Û	α	≡	±	≥	≤	∫
3	ETX DC3 #	3	C	S	c	s	ETX DC3	ú	Û	α	≡	±	≥	≤	∫	∞
4	EDT DC4 \$	4	D	T	d	t	EDT DC4	Û	α	≡	±	≥	≤	∫	∞	²
5	ENQ NAK %	5	E	U	e	u	ENQ NAK	α	≡	±	≥	≤	∫	∞	²	ε
6	ACK SYN &	6	F	V	f	v	ACK SYN	≡	±	≥	≤	∫	∞	²	ε	∅
7	BEL ETB ' 7	7	G	W	g	w	BEL ETB	±	≥	≤	∫	∞	²	ε	∅	∅
8	BS CAN (8	8	H	X	h	x	BS CAN	≥	≤	∫	∞	²	ε	∅	∅	∅
9	HT EM) 9	9	I	Y	i	y	HT EM	≤	∫	∞	²	ε	∅	∅	∅	∅
A	LF SUB * :	J	Z	j	z	LF SUB	∫	∞	²	ε	∅	∅	∅	∅	∅	∅
B	VT ESC + ;	K	[	k	{	VT ESC	∞	²	ε	∅	∅	∅	∅	∅	∅	∅
C	FF FS , <	L	\	l	|	FF FS	²	ε	∅	∅	∅	∅	∅	∅	∅	∅
D	CR GS - =	M	]	m	}	CR GS	ε	∅	∅	∅	∅	∅	∅	∅	∅	∅
E	SO RS . >	N	^	n	~	SO RS	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
F	SI US / ?	O	_	o	DEL	SI US	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅

IBM Set 2

LH	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL DLE SP	0	@	P	~	p	Ç É	á	í	ó	ú	Û	α	≡	±	≥
1	SOH DC1 !	1	A	Q	a	q	ü æ	í	ó	ú	Û	α	≡	±	≥	≤
2	STX DC2 "	2	B	R	b	r	é ë	ó	ú	Û	α	≡	±	≥	≤	∫
3	ETX DC3 #	3	C	S	c	s	â ô	ú	Û	α	≡	±	≥	≤	∫	∞
4	EDT DC4 \$	4	D	T	d	t	ä ö	Û	α	≡	±	≥	≤	∫	∞	²
5	ENQ NAK %	5	E	U	e	u	à ò	α	≡	±	≥	≤	∫	∞	²	ε
6	ACK SYN &	6	F	V	f	v	â û	≡	±	≥	≤	∫	∞	²	ε	∅
7	BEL ETB ' 7	7	G	W	g	w	ç è	±	≥	≤	∫	∞	²	ε	∅	∅
8	BS CAN (8	8	H	X	h	x	é ë	≥	≤	∫	∞	²	ε	∅	∅	∅
9	HT EM) 9	9	I	Y	i	y	è ù	≤	∫	∞	²	ε	∅	∅	∅	∅
A	LF SUB * :	J	Z	j	z	LF SUB	∫	∞	²	ε	∅	∅	∅	∅	∅	∅
B	VT ESC + ;	K	[	k	{	VT ESC	∞	²	ε	∅	∅	∅	∅	∅	∅	∅
C	FF FS , <	L	\	l	|	FF FS	²	ε	∅	∅	∅	∅	∅	∅	∅	∅
D	CR GS - =	M	]	m	}	CR GS	ε	∅	∅	∅	∅	∅	∅	∅	∅	∅
E	SO RS . >	N	^	n	~	SO RS	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅
F	SI US / ?	O	_	o	DEL	SI US	∅	∅	∅	∅	∅	∅	∅	∅	∅	∅



Epson ESC/P2 Protocol

National Character Sets

The following fifteen character sets are available.

USA, France, Germany, UK, Denmark 1, Sweden, Italy, Spain 1, Japan, Norway, Denmark 2, Spain 2, Latin America, Korea, and Legal

Common Characters

The following table shows characters common to the fifteen “national” character sets. NR indicates characters that differ with languages.

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





Character Sets

National Characters

The following table shows “national” characters that differ with languages. Character codes correspond to NRs in the preceding table.

	Character Code(Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
1: USA	#	\$	@	[	\	\]	^	~	{	|	}	~
2: FRANCE	#	\$	à	°	ç	§	^	~	é	ù	è	¨
3: GERMANY	#	\$	§	Ä	Ö	Ü	^	~	ä	ö	ü	ß
4: U.K.	£	\$	@	[	\	\]	^	~	{	|	}	~
5: DENMARK	#	\$	@	Æ	Ø	Å	^	~	æ	ø	å	~
6: SWEDEN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
7: ITALY	#	\$	@	°	\	é	^	ù	à	ò	è	ì
8: SPAIN	℞	\$	@	í	Ñ	¿	^	~	¨	ñ	}	~
9: JAPAN	#	\$	@	[	¥	]	^	~	{	|	}	~
10: NORWAY	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11: DENMARK 2	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
12: SPAIN 2	#	\$	á	í	Ñ	¿	é	~	í	ñ	ó	ú
13: LATIN AM.	#	\$	á	í	Ñ	¿	é	ü	í	ñ	ó	ú
14: KOREA	#	\$	@	[	₩	]	^	~	{	|	}	~
15: LEGAL	#	\$	§	°	'	"	¶	~	©	®	†	™





F

Resident Fonts

This appendix provides print samples of the printer's twelve resident fonts.

Draft	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
High-Speed Draft	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
High-Impact Draft	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
Pica 10	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
Courier 10	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
Prestige Elite 12	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
Compressed 17	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.
Boldface PS	The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

F-1



Resident Fonts

Timeless (outline)

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

Nimbus Sans ® (outline)

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

OCR A

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

OCR B

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.





Glossary

A4 Size

A standard paper size used in Japan and other countries. Paper is 210 × 295 mm (8.25 × 11.6 inches).

Application Software

Software programs that perform tasks on a computer. Such programs include word processing, database management, and accounting, for example.

ASCII

The acronym for American Standard Code for Information Interchange. ASCII is a set of 256 codes (numbered 0 to 255) used to communicate information between a computer and another device such as a printer.

Baud Rate

The speed, in bits per second, at which data is transmitted to a device such as a printer. Baud rates apply to serial data only. 1200 baud equals approximately 120 characters per second.

Bidirectional Printing

Alternate printing of lines from left to right and right to left. Bidirectional printing is faster than unidirectional printing because there are no carriage returns.

Bit

The smallest unit of information in computer memory. A bit is a single digit, either a 1 or a 0, in the binary numbering system. Eight bits equal one byte.

Bottom Feed

Paper feeding through a slot at the bottom of the printer. The forms tractor unit, which must be installed on the top of the printer, pulls paper through the printer. The desk or printer rack, on which the printer sits, must have also a paper feed slot.

Buffer

A storage area for data in the printer or computer. The printer's buffer consists of a print buffer and a download buffer. The print buffer holds the data to be printed. The download buffer holds downloaded data such as download (soft) fonts.

Byte

A byte consists of eight bits that constitute one symbol. A byte represents a single character, such as number, letter, or special control character.



Glossary

Carriage Return (CR)

The return of the print head carriage to the beginning of the next line.

Centronics Interface

A type of parallel interface. See Parallel interface.

Column

A vertical section on a printed page. This printer can print 80-column pages at 10-pitch (10 characters per inch).

Command Set

A set of print and format commands used to control the printer. Each printer has its own resident command sets embedded in the printer firmware. These command sets are actuated by codes sent from the host computer.

Condensed Print

Print that uses “condensed” characters. Condensed characters are narrower than regular characters. Using condensed print increases the number of characters per line.

Continuous Forms

Connected, fan-folded sheets of paper that are fed into the printer using forms tractors. The fan-folded sheets are separated by tearing them at their perforations.

Control Panel

A panel containing the printer indicators and buttons. The control panel is used to control printer operations, such as loading paper, selecting print features, and changing Set-Up options.

cpi

Characters per horizontal inch. Also referred to as pitch. For example, 12-pitch means 12 cpi.

cps

Characters per second.

Cut Sheets

See Single sheets.

Cut Sheet Feeder

A cut sheet feeder allows automatic loading from a stack of paper.

DEC-423 Interface

A type of serial interface. See Serial interface.

**Defaults**

Settings selected automatically by the printer when the power is turned on. Enter the Set-Up mode to change the defaults to ensure compatibility with your system hardware and software.

Dot Matrix

The grid used to print characters on a dot matrix printer. Each dot corresponds to a wire in the print head.

Downloading

Transferring soft fonts from the computer to the printer's memory. Downloading allows you to use fonts not resident in the computer.

dpi

Dots per inch.

Font

A complete set of printable characters having the same size and style. For example, Courier 10 and Prestige Elite 12 are commonly used fonts.

Form Feed (FF)

A signal to the printer to advance the paper forward one page. Form feeds can be executed either by your software or by pressing the FF/Load button on the printer control panel.

Graphics Printing

Controlling the print head wires (dots) individually to produce a picture or an image on the page.

Hexadecimal

A base-16 numbering system (also commonly referred to as hex numbers). Since a base-16 system requires 16 digits, numbers 0 through 9 and letters A through F are used. Expressing binary numbers in hexadecimal uses fewer digits.

Hex Dump

A hexadecimal printout of control codes and data. Hex dumps are used to debug computer programs and to troubleshoot printer malfunctions. To print a hex dump on the printer, use the HEX-DUMP option of the TESTS function in the Set-Up mode.

Interface

A connection that allows communication from one part of a system to another. For example, electrical signals are transferred between the computer and printer over an interface cable.

K Byte

Kilobyte. 1K byte equals 1024 bytes.

Letter Size

A standard paper size used in the United States and other countries. Paper is 8-1/2 × 11 inches (215.9 × 279.4 mm).



Glossary

Line Feed (LF)

A signal to the printer that advances the paper forward one line. Line feeds can be executed either by your software or by pressing the LF button on the printer control panel.

Line Spacing

The vertical spacing between lines, measured in lines per inch.

Ipi

Lines per inch. Used to measure line spacing.

Monospacing

Character spacing in which each printed character has the same width. Also called fixed pitch, monospacing is the opposite of proportional spacing. Typewriter or computer-printed text is typically monospaced.

Nonresident Font

Fonts not present (resident) in the printer's permanent memory. Soft fonts are examples of nonresident fonts. (This printer does not support font cards.)

Normal Mode

One of the printer's two operating modes. In Normal mode, the control panel can be used to perform everyday printer operations, such as loading and unloading paper, feeding paper, and selecting print features. See also Set-Up mode.

Offline

When the printer is offline, it receives commands from the printer control panel rather than from the computer. "Offline" indicates that the printer is not "online" with the computer.

Online

When the printer is online, it is ready to receive or is receiving commands from the computer. The printer must be online to print.

Parallel Interface

A standard computer interface. Information is transferred between devices over separate wires, allowing all of the bits that make up the character to be transmitted simultaneously (in parallel).

Park Position

The position in which continuous forms paper is retracted or "parked" on the rear forms tractors. When continuous forms paper is loaded, it moves forward from the park position to the platen.

Permanent Memory

Memory that retains information even when power is turned off. The printer's permanent memory retains the default settings specified using the printer Set-Up mode.

**Pitch**

Characters per horizontal inch (cpi).

Platen

A hard rubber cylinder that moves paper forward during printing.

Printing Test

A test that determines whether the printer is working correctly. Test pages are printed to show print quality and verify whether all characters print. The printing test only tests the printer. It does not test how the computer works with the printer.

Proportional Spacing

Character spacing in which wide characters occupy more space than do narrow characters. For example, characters such as “W” or “M” occupy more horizontal space than do characters such as “i” or “l.” Many soft fonts are proportionally spaced. Sometimes designated PS, proportional spacing is the opposite of monospacing.

Protocol

A set of instructions that control how data is transmitted between devices such as a computer and a printer. This printer has three resident protocols: DEC PPL2 (native command set), IBM proprinter X24E, and Epson ESC/P2.

Rear Feed

In rear feed, paper is fed from the rear of the printer. The forms tractor unit must be installed at the rear of the printer. The forms tractor unit pushes paper into the printer.

Resident Fonts

Fonts present (resident) in the printer’s permanent memory. For this printer, the resident fonts are Courier 10, Prestige Elite 12, Pica 10, OCR-B 10, Boldface PS, Compressed font, Correspondence, Draft, and High-speed Draft. Unlike soft fonts, resident fonts can always be accessed.

Serial Interface

A standard computer interface. Information is transferred between devices over a single wire (although other wires are used for control). A long cable is often necessary in networking environments, where the printer may be shared. With the DEC-423 serial interface, the length of the interface cable is 600 meters (1970 feet) or less.

Set-Up Mode

One of the printer’s two operating modes. In the Set-Up mode, the control panel can be used to select the printer default settings, such as print features, hardware options, and top-of-form. The Set-Up mode also provides some diagnostic functions. See also Normal mode.

Shadow Printing

Shadow printing prints characters twice for emphasis. Characters printed the second time are shifted slightly to the right.



Glossary

Single Sheets

Single sheets are sheets of paper, envelopes, and noncontinuous multiple forms fed into the printer using the cut sheet stand or optional cut sheet feeder. Single sheets are also called cut sheets.

Soft Fonts

Fonts downloaded from a disk to the printer memory. Soft fonts are also referred to as downloaded fonts. Unlike resident fonts, soft fonts are available only when in the printer memory.

Software

Programs that control the computer and printer to perform specified tasks, such as word processing, database management, and preparation of spreadsheets. Software is sometimes referred to as application software.

Tear Bar

A cutting edge provided on the top cover to tear off continuous forms along the perforation.

Top Margin

The total space at the top of the printed page. The top margin is the sum of the top-of-form setting, the software-specified top margin, and the printer's TOP-MRGN setting in Set-Up mode.

Top-of-Form (TOF)

The logical top of the physical page, as "understood" by the printer when loading paper. The default TOF settings are 0 inch for both cut sheets and continuous forms.

Tractor Feed

A method for feeding continuous forms forward for printing. Holes on the sides of the forms fit over sprockets on two tractors located inside the printer. The forms are pulled for bottom feeding and pushed for rear feeding.

Unidirectional Printing

Printing is performed in one direction only, left to right. Unidirectional printing is slower than bidirectional printing, but the vertical alignment is more accurate. Unidirectional printing is useful when precise vertical alignment is required, as in ruled tables.



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International Standards Conformity

Federal Communications Commission (FCC) Statement:

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

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

FCC warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notes

1. The use of a nonshielded parallel interface cable with the referenced device is prohibited. The length of the parallel interface cable must be 3 meters (10 feet) or less. The length of the serial interface cable must be 600 meters (1970 feet) or less.
2. The length of the power cord must be 3 meters (10 feet) or less.

Notice to Canadian Users

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.

Hinweis für deutsche Benutzer

Schallemissionswerte

Vorläufige Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779:

Schalleistungspegel LwAd,B		Schalldruckpegel LpAm, dBA (Zuschauerpositionen)	
Leerlauf	Betrieb	Leerlauf	Betrieb
—	7,1	—	55

(Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA)

Declaration of Conformity

We, Digital Equipment Corporation, declare under our sole responsibility that this printer is in conformity with the following directives and standards:

- 89/336/EEC on the Electromagnetic Compatibility based on compliance to:
 - EN55022:4.87 Class B radio frequency emissions
 - EN50082-1:1.92 Immunity
- 73/23/EEC on the Safety of Low Voltage Equipment based on compliance to:
 - EN60950 Safety of Information Technology Equipment
- 93/68/EEC on the Labeling of Equipment

