LA310 MultiPrinter

Installation and User Guide

Order Number: EK-LA310-IN. A01

FCC NOTICE

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods.

— Reorient the receiving antenna.

— Relocate the computer or peripheral with respect to the receiver.

— Move the computer or peripheral away from the receiver.

— Plug the computer or peripheral into a different outlet so that they are on different branch circuits than the receiver.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the booklet *How to Identify and Resolve Radio/TV Interference Problems*, prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington DC, 20402, Stock No. 004-000-00345-4.

To meet FCC requirements, a shielded parallel cable is required to connect the device to a personal computer or other Class B device.

NORMENKONFORMITÄT UND ZULASSUNGEN
Funkentstörung:
DBP-Verfügung 1046/84 und VDE 0871 - Klasse B

Dieses Gerät trägt als Nachweis, daß es den Funk-Entstöranforderungen der DBP-Verfügung 1046/1984 entspricht, das VDE-Funkschutzzeichen. Der Zusatz "0871-B/P" soll in Kurzform ausdrücken, daß es sich um ein peripheres (nicht selbständig betreibbares) Gerät handelt, das nur einzeln den Funk-Entstöranforderungen der Grenzwertklasse B nach DIN VDE 0871/6.78 und der DBP-Verfügung 1046/1984 entspricht.

Wird das Gerät innerhalb einer Anlage zusammen mit anderen Geräten betrieben, so muß bei Inanspruchnahme der "Allgemeinen (Betriebs-) Genehmigung" nach der DBP-Verfügung 1046/1984 die gesamte Anlage der Grenzwertklasse B nach DIN VDE 0871/6.78 sowie den Voraussetzungen nach Paragraf 3 der DBP-Verfügung 1046/1984 entsprechen.

Dies ist in der Regel nur dann erfüllt, wenn das Gerät in einer Anlage betrieben wird, die typgeprüft und mit dem VDE-Funkschutzzeichen mit dem Zusatz "0871-B/P" gekennzeichnet ist.

NETZLEITUNG

Netzleitung muß geprüftem Typ HO5VV entsprechen.

Schallemissionswerte—Vorläufige Werteangaben nach ISO 9296 und ISO 7779/DIN45635-19:

	Schalleistungspegel L_{WAd}, B(A)	Schalldruckpegel L_{pAm}, dB(A) (Zuschauerpositionen)
Leerlauf	Keine meßbaren Geräuschemissionen	Keine meßbaren Geräuschemissionen
Betrieb	7,1 bels	58 dBA

[Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 bel = 10dBA.]

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3 Loading the Paper

4 Configuring the Printer

5 Maintaining the Printer

H   DEC PPL2 Quick Reference

I   IBM Proprinter III Quick Reference

J   Epson FX-1050 Quick Reference

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Preface

About This Guide

The *LA310 MultiPrinter Installation and User Guide* explains how to install and operate the LA310 MultiPrinter. This guide is written for someone with little or no computer experience. Even if you are familiar with this kind of desktop printer, you should read at least Chapter 3, Loading the Paper, to familiarize yourself with the LA310 MultiPrinter's new features.

The guide is divided into five chapters and ten appendixes.

Chapter 1, Installing the Printer describes how to unpack and install the printer. It names the printer parts, shows you how to test the printer, and how to connect your printer to your computer system, personal computer, or video terminal. *Read this chapter completely before you begin the installation procedure.*

Chapter 2, Using the Operator Control Panel describes how to use the printer's operating controls.

Chapter 3, Loading the Paper provides a detailed explanation of the different ways to load paper.

Chapter 4, Configuring the Printer explains how to configure the printer so that it can communicate with your computer system.

Chapter 5, Maintaining the Printer describes how to keep the printer clean. The chapter also suggests how you can identify and solve simple problems, and so avoid having to contact your local Digital office.

Appendix A, Reference Information contains general user reference material, including a summary of the printer's set-up features, and printer and paper specifications.

Appendix B, Using Font and Character Set Cartridges describes how to insert and access the optional font cartridges available for the LA310 MultiPrinter.

Appendix C, Defining Form Settings describes how to set User Form Length and Top of Form settings.

Appendix D, Printing Control Characters explains how to print printer control codes and escape sequences.

Appendix E, Internal Console explains buttons that are used in the internal console.

Appendix F, Horizontal Line Adjustment provides a procedure to check and adjust the alignment between lines in bidirectional mode.

Appendix G, Set-up Menu Structure contains details of the Set-up menus structure.

Appendix H, DEC PPL2 Quick Reference contains basic information on using DEC PPL2 control codes and escape sequences.

Appendix I, IBM Proprinter III Quick Reference contains basic information on using IBM Proprinter III control codes and escape sequences.

Appendix J, Epson FX-1050 Quick Reference contains basic information on using Epson FX-1050 control codes and escape sequences.

Conventions Used in This Guide

Warnings, Cautions, and Notes

The warnings, cautions, and notes in this guide have the following specific purposes:

WARNING: Contains information about preventing personal injury.

CAUTION: Contains information about preventing damage to equipment.

NOTE: Contains general information of which you should be aware.

Associated Documentation

The optional Pull Tractor is documented separately in the *LA310 MultiPrinter Pull Tractor Guide*, which is included with the Pull Tractor kit.

The *LA310 MultiPrinter Programmer Reference Manual*, part number EK-PPLV2-DK, consists of the following two volumes:

- *Digital ANSI Printing Protocol Level 2 Programming Reference Manual*: this is generic for the DEC PPL2 protocol.

- *Digital ANSI Printing Protocol Level 2 Programming Supplement*: this documents the specific protocol details for the LA310 MultiPrinter and other Digital printers that support the DEC PPL2 protocol.

Software Requirements

The LA310 MultiPrinter has many features. The features you can use depend on the following conditions:

- The computer system (also known as the host) to which the printer is connected

- The operating software used by your computer

- The software program you are using

Check the documentation for the software you are using to determine which printer features you can use. Some software programs may allow insertion of printer control codes and escape sequences. The escape sequences are listed in Appendix H, Appendix I, and Appendix J. Refer to your software documentation for information about how to insert escape sequences.

The correct use of the LA310 MultiPrinter requires your application package to have the Digital LA310 driver. If this driver is not available, choose between the IBM Proprinter driver or the Epson FX-1050 driver, and select the corresponding protocol on the LA310 MultiPrinter. For more information, refer to Section 1.6.

If you need help choosing the correct computer software for your application needs, contact your local Digital office.

About the Printer

The LA310 MultiPrinter is a wide-carriage, impact dot-matrix printer, designed for general business applications. It has flexible paper handling, and is capable of printing on continuous pinfeed paper, single sheets, multiple-part forms, and envelopes. A Pull Tractor is available as an option. The print quality is suitable for word processing in a small-to-medium computer environment.

The following are the major features of the LA310 MultiPrinter:

*   The LA310 MultiPrinter is a 9-pin printer.

*   The printer has a Document on Demand capability (automatic or manual) which prevents you from wasting forms or paper between printing jobs.

*   The printer has an Automatic Viewing capability, which allows you to see the last printed line after a job has finished.

*   The printer can be connected to both serial and parallel ports, and will read automatically from them when data is received.

*   The printer has protocol switching. The protocol can be switched from the front panel or by software. Also, different protocols can be assigned to the serial and parallel ports. The printer will switch to the assigned protocol when a port is selected.

*   The printer is compatible with Digital ANSI-Compliant Printing Protocol Level 2 (DEC PPL2). It is also compatible with the LA210 Letterprinter.

*   The printer is compatible with the IBM Proprinter III, and with the Epson FX-1050 printer.

*   The printer has a slot for optional cartridges for one of the following:

    -   Optional emulation

    -   Fonts

    -   Additional character sets

1
Installing the Printer

1.1 Checking the Contents of the Box

Unpack the LA310 MultiPrinter and make sure you have all the items shown in Figure 1–1. If any items are missing or damaged, contact your Digital office.

Please complete the installation procedure in sequence. After you install the LA310 MultiPrinter, keep this guide near the printer for easy reference.

Installing the Printer
1.1 Checking the Contents of the Box

Figure 1–1   Box Contents
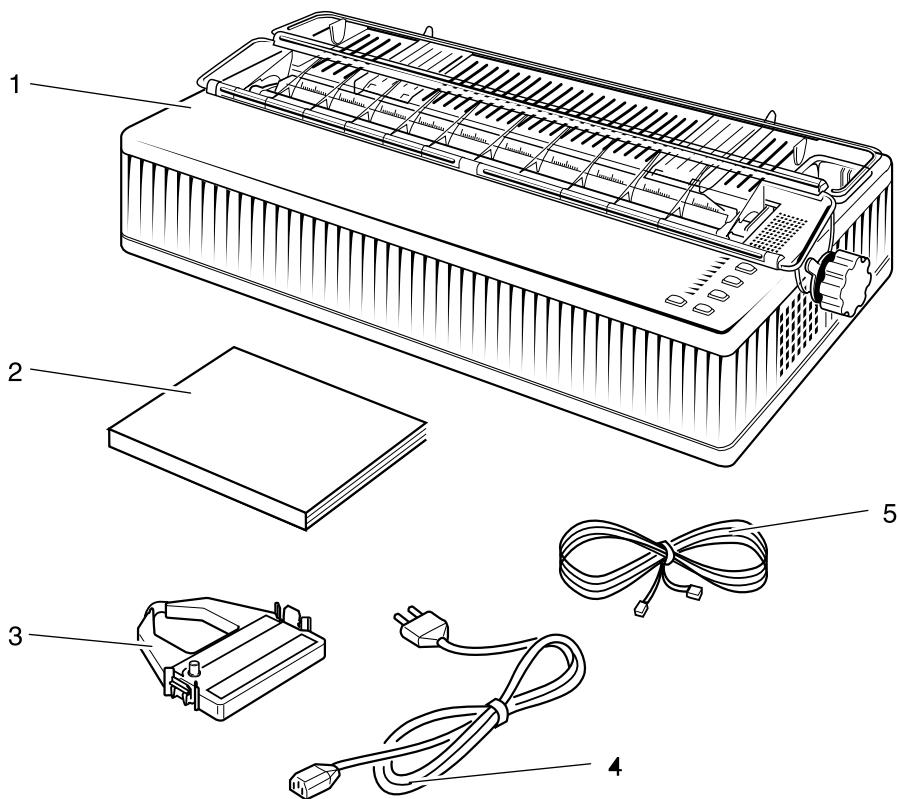
1. Printer
2. Documentation
3. Ribbon Cartridge
4. Power Cord
5. Serial Interface Cable

1.2 Site Considerations

The LA310 MultiPrinter can be installed in a variety of locations—for example, your office, school, or home. The LA310 MultiPrinter has the following requirements:

Environmental Conditions

- Install the printer in an area away from a heater or other heat source, and away from an air conditioner or strong drafts.

- Avoid installing the printer in a dusty or humid environment.

Work Location

- Place the printer on a flat, solid, level area such as a desk or printer stand.

- Allow enough space around the printer to ensure correct ventilation and easy access to all sides of the printer.

Power Requirements

WARNING: This equipment must be grounded.

- The printer must be reliably connected to ground, using the supplied detachable three-pin power cord, but otherwise no special wiring is required. A typical grounded household or office wall outlet is sufficient.

- Do not plug other equipment such as coffee pots, office copiers, or air conditioners into the same wall outlet.

Handling

- The printer weighs 10kg. If you are not accustomed to handling such weights, obtain assistance.

- Make sure that the printer is handled carefully to avoid damage.

See Appendix A for more detailed specifications.

1.3 A First Look at the Printer

Before installing the LA310 MultiPrinter, spend a little time familiarizing yourself with the printer.

Table 1–1 A First Look at the Printer

Item Number	Item Name
1.	Rear Cover (paper support) with guides
2.	Paper Selection Lever
3.	Platen Knob
4.	Operator Control Panel
5.	Prop (for holding paper support in sloping position)
6.	Push Tractor
7.	Paper Present Switch on Tractor
8.	Power Cord Socket
9.	Electrical Data Plate
10.	Ruler
11.	Plastic Guide with Red Arrow Head
12.	Internal Console
13.	Metallic Antismudge Plate
14.	Printhead Carriage
15.	Printhead
16.	Platen
17.	Bail Bar and Rollers
18.	Parallel Cable Socket
19.	Serial cable socket
20.	Slot for Optional Card
21.	Printhead Adjustment Lever
22.	ON/OFF Switch
23.	Front Cover
24.	Transparent Cover

Figure 1–2 A First Look at the Printer
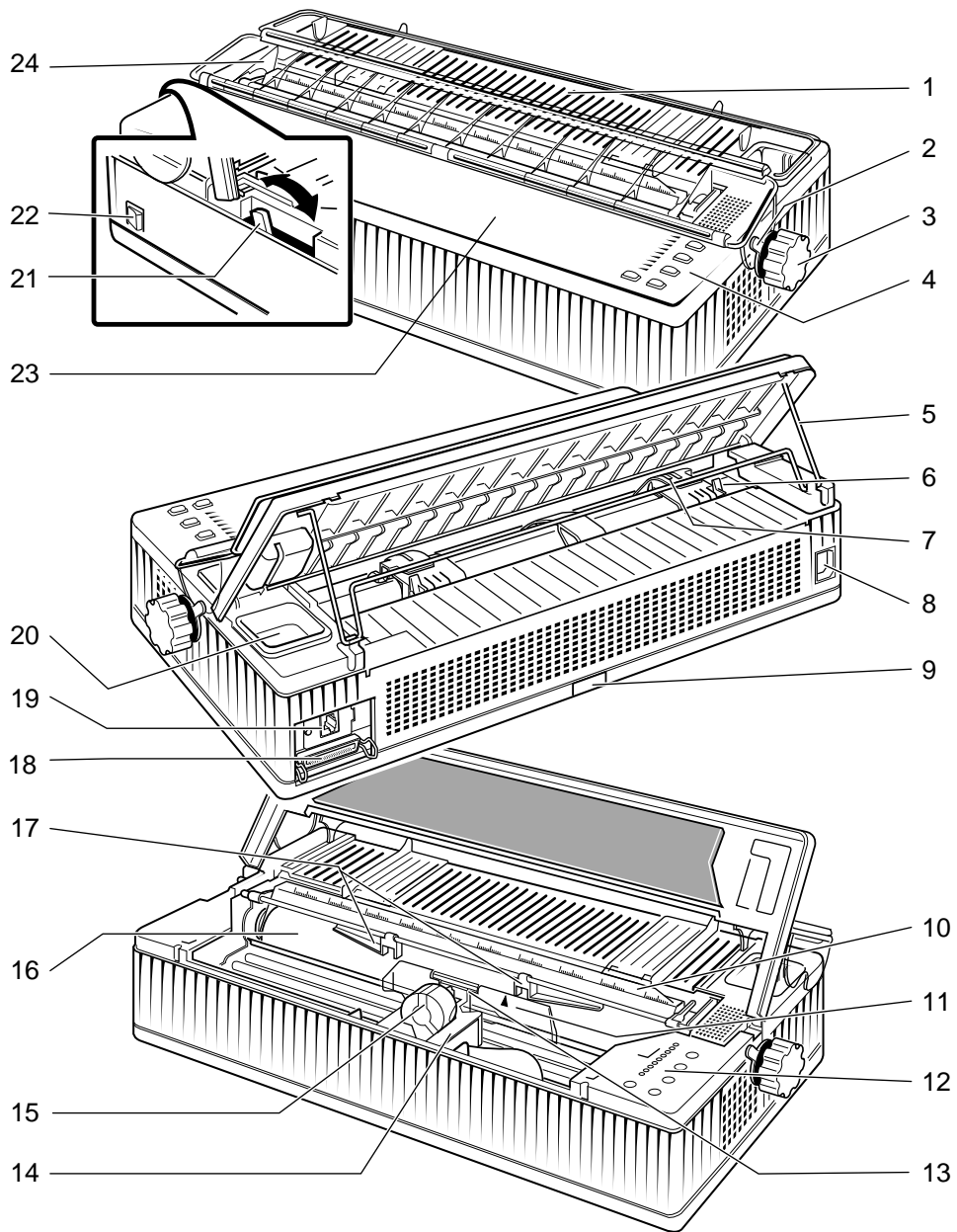
1.3.1 Removing the Packing Material

1. Remove the adhesive film from the transparent covers on the front of the printer.

2. Open the front cover (see Figure 1–3), raise it, and tip it back towards the rear of the printer.

3. Remove the strip of cardboard blocking the printhead and the bail bar (see Figure 1–3).

Figure 1–3   Removing the Packing
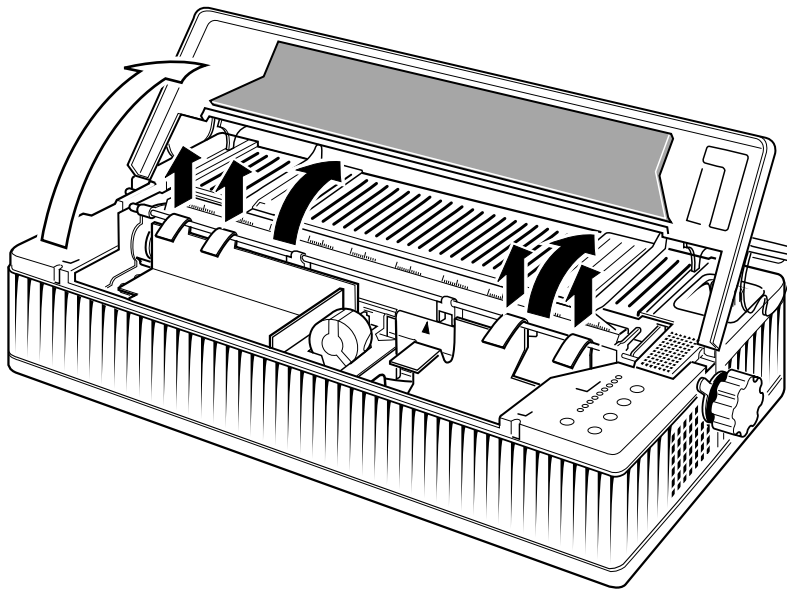
1.3.2 Installing the Power Cord

1. Set the power switch to OFF (0).

2. Check that the voltage of the printer (marked on the printer's electrical data plate) matches the voltage supplied through the wall outlet.

3. Plug the power cord into the inlet at the back of the printer (see Figure 1–4).

4. Plug the other end of the cord into the wall outlet.

Figure 1–4 Plugging in the Power Cord
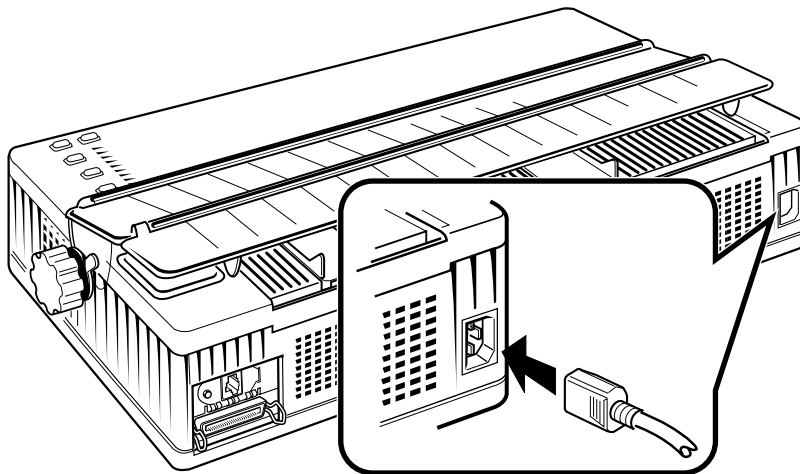
1.3.3 Installing the Ribbon Cartridge

1. The ribbon cartridge is packed separately from the printer. Remove the ribbon cartridge from its wrapper. Remove the red plastic plug (provided for shipping purposes only) from the ribbon cartridge (see Figure 1–5, part 1). If the ribbon is slack, turn the ribbon adjustment knob in the direction indicated on the cartridge (see Figure 1–5, part 2).

Figure 1–5 Preparing the Cartridge
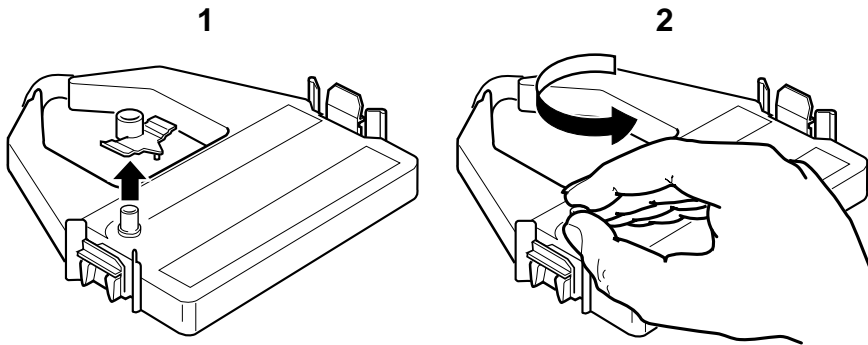
2. Set the printhead adjustment lever to the position marked with the ribbon icon.

3. Position the ribbon cartridge on the printhead carriage, and press it downwards (see Figure 1–6). Listen for a click, then check that both sides of the cartridge are secure.

Figure 1–6 Installing the Cartridge
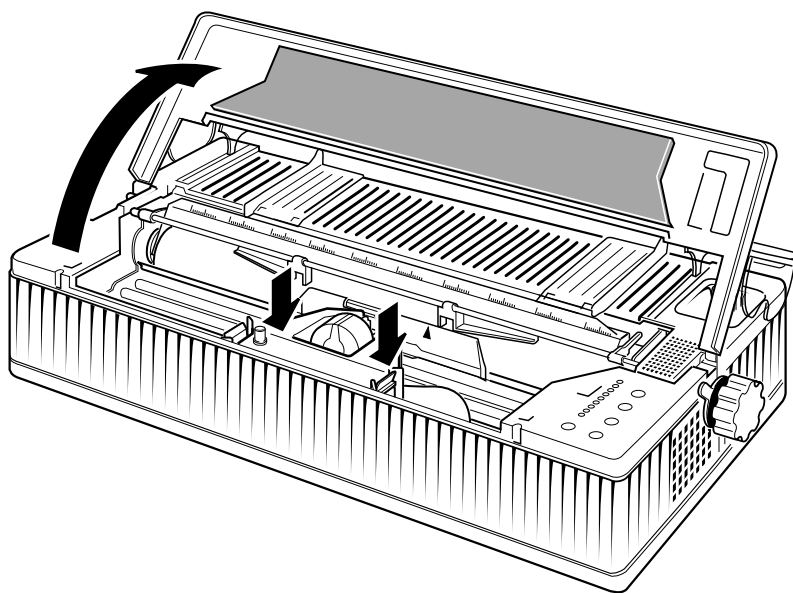
NOTE: To make sure that the ribbon is able to feed correctly, turn the ribbon adjustment knob counter-clockwise a short distance. If the ribbon adjustment knob turns easily, the ribbon path is free.

4. Reset the printhead adjustment lever to the original position (position 1).

1.3.3.1 Removing and Replacing a Ribbon Cartridge

To remove an old ribbon cartridge:

1. Set the power switch to OFF (0).

2. Open the front cover of the printer. Raise the front cover, and tip it back as far as you can (see Figure 1–6).

3. If the printhead carriage is not centered, you can move the carriage to the center by hand.

4. Set the printhead adjustment lever to the position marked with the ribbon icon.

5. Push the ribbon cartridge notches inward, and remove the ribbon cartridge by pulling it upwards. Discard the old cartridge.

6. To install a new ribbon cartridge, follow the instructions in Section 1.3.3.

1.4 Testing the Printer

The printer self-test allows the printer to check its operations independently. To load paper into the printer and run the self-test, perform the following steps:

1. Open the front cover, and check that the printhead adjustment lever is in position 1 (see Figure 1–7).

   NOTE: For paper other than single sheet originals, you must adjust the printhead adjustment lever to a different position. See Section 3.3.

Figure 1–7   Opening the Front Cover and Setting the Printhead Adjustment Lever
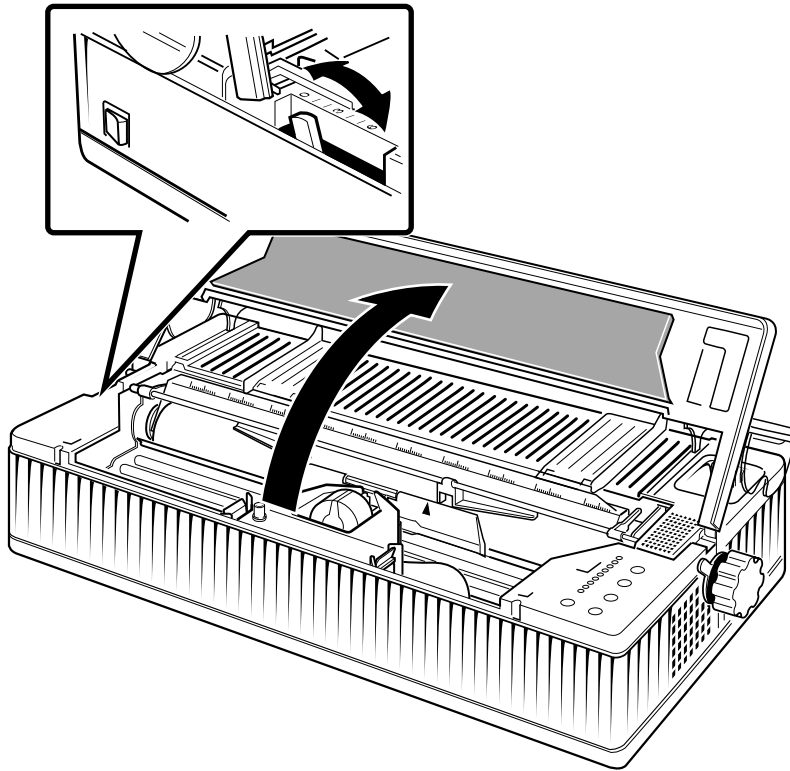
2. Make sure the rollers on the bail bar are fixed in their correct grooves (see Figure 1–8), and close the front cover.

   The bail rollers should be fixed as follows:

   • In most circumstances, the left bail roller must be fixed at the groove in front of ruler position 40, and the right bail roller at the groove in front of ruler position 90. See Figure 1–8, part B.

   • When the paper width is set to 1"–8" in Set-up, use the other two grooves marked on the platen, located in front of ruler positions 20 and 60. See Figure 1–8, part A.

   NOTE: If you set the rollers in the incorrect grooves, there is high risk of a paper jam. For more information on paper width configuration, refer to Section 3.4.

Figure 1–8   Fixing the Rollers

A   B
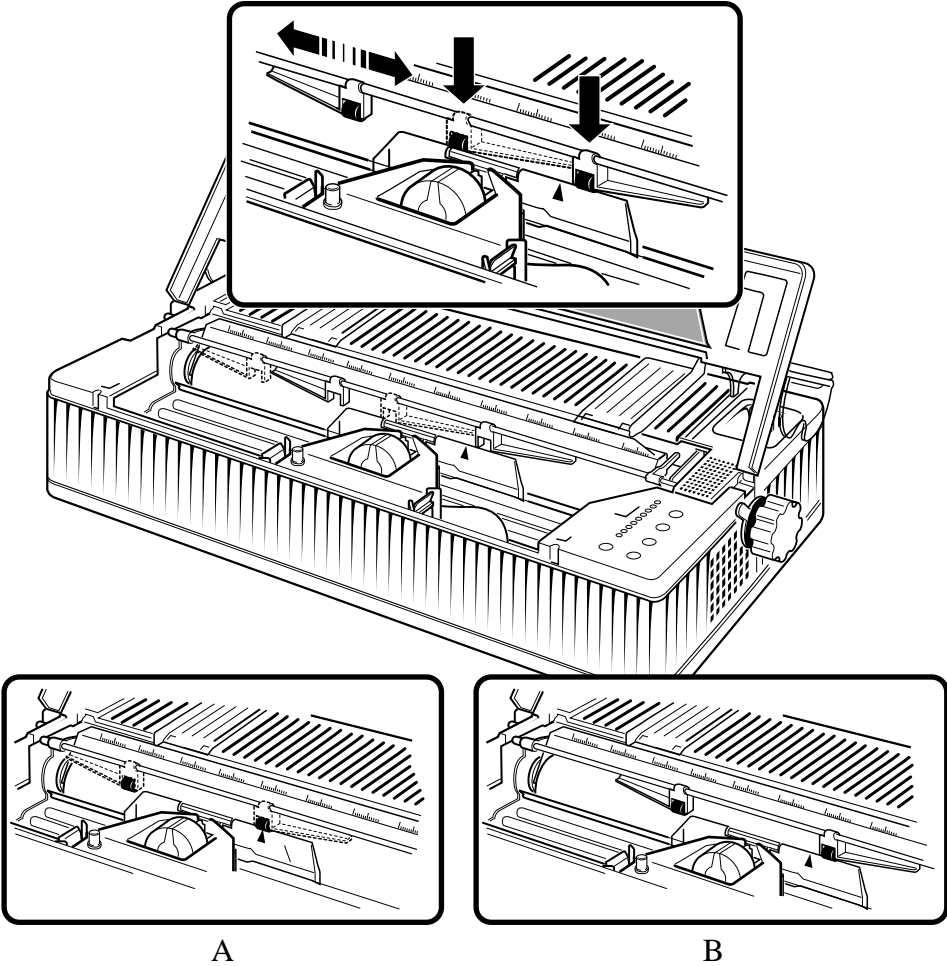
3. Close the front cover.

4. Raise the rear cover (paper support), and fix it in its sloping position with the prop (see Figure 1–9).

Figure 1–9 Fixing the Rear Cover in Sloping Position
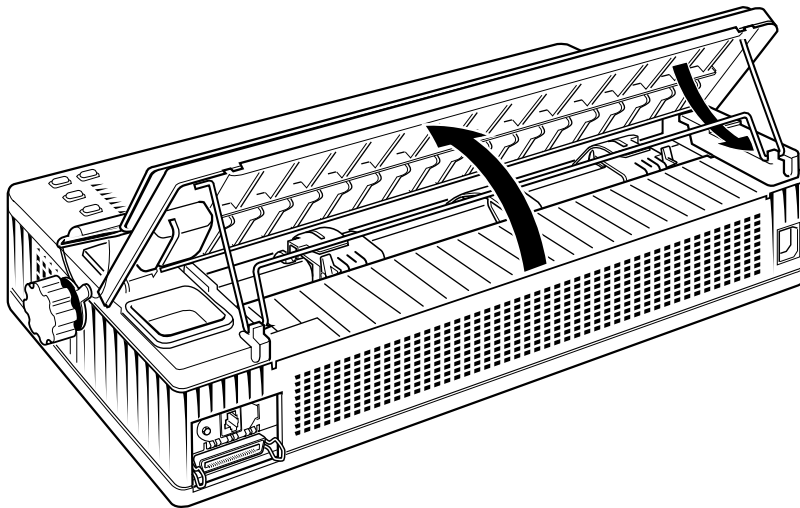
5. Set the paper selection lever so that it points to the front of the printer (see Figure 1–10), enabling the printer to print on a cut sheet of paper.

Figure 1–10   Setting the Paper Selection Lever
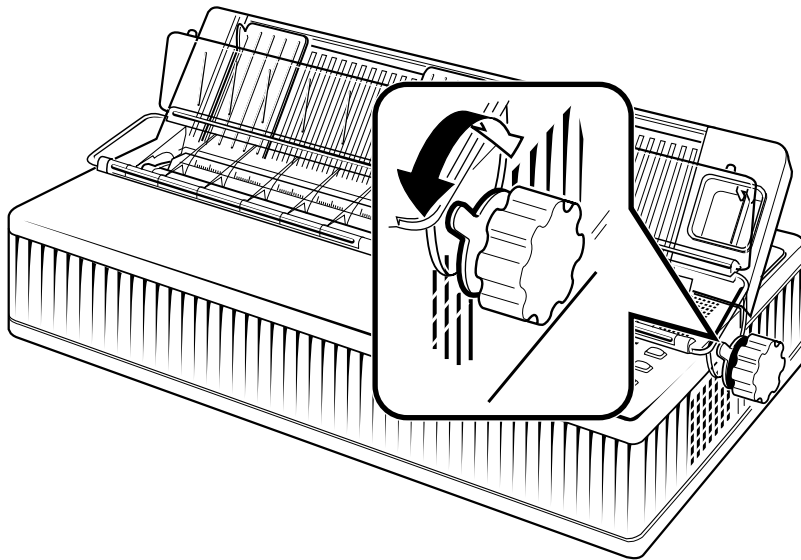
6. Fold down the upper part of the transparent cover so that you can adjust the position of the paper guides on the rear paper support.

   i The number 1 on the ruler behind the platen marks the position of the left margin of the printed text. Adjust the left paper guide in accordance with this left margin mark.

   ii Adjust the right paper guide according to the paper width (see Figure 1–11).

Figure 1–11   Adjusting the Paper Guides and Repositioning the Front Cover
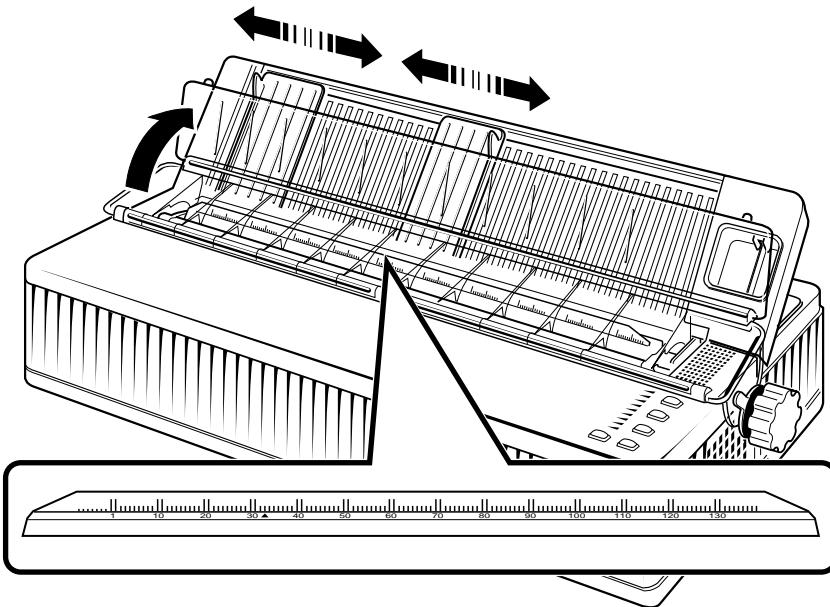
7. Reposition the upper part of the transparent cover so that it is leaning against the rear paper support (see Figure 1–11).

8. Insert a sheet of paper that is Letter size (U.S.A.) or A4 size (Europe) between the guides, and let it slide into the printer until it comes to rest behind the platen (see Figure 1–12).

    NOTE: Do **not** turn the platen knob to manually advance the paper. Only turn the platen knob to manually clear a paper jam.

Figure 1–12 Inserting Paper
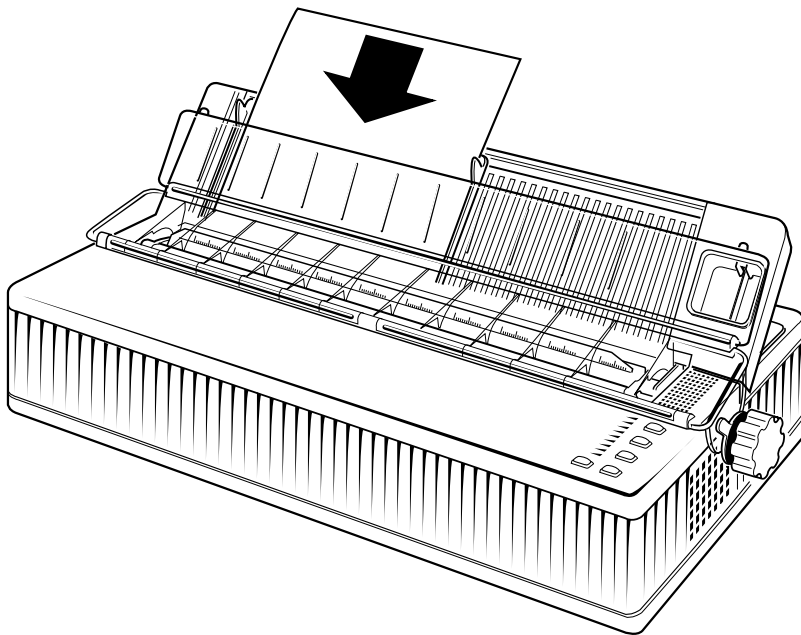
9. Hold down the QUIET key, and keep holding it down while you switch the printer ON and until the mechanical reset has completed. The mechanical reset is completed when the print head has moved and recentered itself. Release the QUIET key as soon as the mechanical reset has completed.

10. Press the FF key. The printer feeds the paper in to the first print line. The Fault indicator turns off.

The printer produces the following pattern:

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

When the bottom of the paper is detected, the sheet is automatically ejected. You can use the FF button to load another sheet.

This test can be initiated with the cover open by pressing the PRINT TEST switch on the internal console while switching the power ON, but the print test will not start until the cover is closed and paper is loaded. See Appendix E, Internal Console.

This test can also be performed with continuous paper in tractor mode (with the paper selection lever in the rear position). If the printer test fails, refer to Section 5.2.2.

NOTE: As you are using paper that is less than 13.5" wide, the printer will print over the edge of the paper onto the platen. To prevent too many lines printing onto the platen, you can interrupt the test at any point by switching the printer OFF. The test is continuous and continues printing until you switch the printer off.

1.5 Connecting the Printer to a Computer System

You need to consider the following elements when connecting LA310 MultiPrinter to a computer system:

- Physical connection
- Communication modes
- Protocols
- Protocol selection

1.5.1 Physical Connection to a Computer System

To connect the printer to a computer system:

1. Plug the interface cable into the back of the printer.

   To connect the LA310 MultiPrinter to your Digital PC or PC-compatible machine through parallel communication, use the parallel data cable BC19M-10. See Figure 1–13, part A.

   To connect the LA310 MultiPrinter to your Digital VAX system, Digital PC or PC compatible, or video terminal, through serial communication, use one of the following:

   - the non-shielded serial data cable BC16E-10. See Figure 1–13, part B.
   - the shielded serial cable DD16E-10, and attach the grounding hook – see Figure 1–13, part C.

Figure 1–13   Interface Cable

2. Plug the other end of the interface cable directly into your host computer. If you use an adapter, first plug the interface cable into the appropriate adapter, and then to your host computer or video terminal (with printer port).

Figure 1–14 Plugging the Interface Cable into Your Terminal

NOTE: For specific information on cables, see Section A.2.

1.5.2 Communication Modes

The LA310 MultiPrinter has three different communication modes for sending data that you can select. These communication modes affect the way in which you connect to a computer system. The modes are:

- Communication through the serial port.

- Communication through the parallel port.

- Automatic port selection (the default setting). Under this setting, the printer senses which interface is active, and automatically processes data from the active port.

1.5.3 Protocols

The LA310 MultiPrinter supports the following protocols (each labeled on the printer):

- DEC PPL2 (labeled DEC)

- IBM Proprinter III (labeled PP III)

- Epson FX-1050 (labeled FX), or an optional emulation protocol through a cartridge

The protocol that you choose depends on the host software program that you are using.

NOTE: The optional emulation protocol is not supplied with the printer.

1.5.4 Protocol Selection

There are different ways in which protocols are selected:

- By Set-up:

  - One of the available protocols is forced, regardless of the communications port used.

  - Protocol selection is port-dependent, with one of each of the available protocols assigned to each port. By default, DEC PPL2 is assigned to the serial port, and IBM PP III is assigned to the parallel port (although this is the default setting, it can be configured differently through Set-up).

- By manual selection, using the front panel.

- By software selection.

Refer to Section 2.1.2 for details about the protocol indicators.

1.5.5 Printing a File

Refer to your computer system documentation for information about operating the printer with your computer. Your computer or terminal may require printer set-up before it can operate with the printer.

If your computer does not require printer set-up, you can print a file as follows:

1. Turn your computer or video terminal on.

2. Turn the power switch to 1 (on). The printer is ready to print.

3. Make sure there is paper in the printer, and, if necessary, that you have advanced the paper (by pressing the FF switch) to the print position.

    Do not turn the platen knob to manually advance the paper. Only turn the platen knob to manually clear a paper jam.

4. Follow the instructions in your computer system's documentation on printing a file.

WARNING: Make sure that all printer covers are in place before you begin printing.

NOTE: When the LA310 MultiPrinter is connected to two computer systems at the same time, the printer can accept data to print from the second port only if it has been idle for two seconds. If the same port is used for two consecutive jobs, no idle time is needed.

1.5.6 If You Have Difficulties Printing a File

The LA310 MultiPrinter configuration is factory set with default settings. These settings are:

*   If data is sent through the serial port:

    –   DEC PPL2 protocol, for Digital VAX computer systems, at 4800 baud.

*   If data is sent through the parallel port:

    –   IBM Proprinter III, for IBM PC systems and PC-compatible machines.

If you have difficulties printing your files correctly, you may need to change the printer's configuration. Some suggestions follow.

1. Check that the printer features match the host computer configuration, in particular, the communication mode. If the printer is connected to the serial port, check the printer's baud rate, data bits and parity. See Section 4.4 for information on these features. Also check your computer system's documentation.

2. If you have to change the printer's configuration to match that of the host computer, see Chapter 4.

3. If your printer still does not print your files correctly, see Section 5.2.

4. If you are not sure of how to correct the problem, contact your Digital sales representative.

NOTE: You can check whether the file is actually received by the printer by checking the indicator lights. When the file is being received through the serial port, the Serial indicator is on and steady, and the Data indicator is on or blinking. When the file is being received through the parallel port, the Parallel indicator is on and the Data indicator is on or blinking.

1.6 Matching Printer Protocol to Your Computer Application

To get the most out of your printer, you need to set the correct protocol on your printer, and set the correct driver on your host system, depending on the application that you are running.

1.6.1 Matching Printer Protocol on Digital VMS Systems

For applications running on a Digital VMS system, select the DEC PPL2 protocol on the LA310 MultiPrinter (this is the default setting if you are using the serial port), and specify LA310 printer to your software. If the LA310 cannot be specified to your software, specify any of the following if available: LA75, LA70, LA210.

1.6.2 Matching Printer Protocol on a Personal Computer

The matching of the printer protocol on a Personal Computer or PC-compatible machine depends on the driver. This table provides settings in a recommended order.

Table 1–2   Matching Printer Protocol on a Personal Computer

PC With Driver For:	Action:
Digital LA310	Select the LA310 driver on the application software, and select the DEC PPL2 protocol on the LA310 MultiPrinter (default setting if using serial port).
Digital LA75	Select the LA75 driver on the application software, and select the DEC PPL2 protocol on the LA310 MultiPrinter (default setting if using serial port).
Digital LA70	Select the LA70 driver on the application software, and select the DEC PPL2 protocol on the LA310 MultiPrinter (default setting if using serial port).
Digital LA210	Select the LA210 driver on the application software, and select the DEC PPL2 protocol on the LA310 MultiPrinter (default setting if using serial port).
Epson FX-1050 or FX-850	Select the FX-1050 driver on the application software, and select the FX-1050 protocol on the LA310 MultiPrinter.
Epson FX-105, FX-85, FX-100+, FX-80+, FX100, FX-80, FX, or EPSON	Select one of those drivers on the application software, and select the FX-1050 protocol on the LA310 MultiPrinter.
IBM Proprinter III or III XL or IBM 4202/4203 machines	Select the appropriate IBM driver on the application software, and select the PP III protocol on the LA310 MultiPrinter (default setting if using parallel port).
IBM Proprinters	Select the IBM Proprinter driver on the application software, and select the PP III protocol on the LA310 MultiPrinter (default setting if using parallel port).

2

Using the Operator Control Panel

2.1 About the LA310 MultiPrinter Control Panel

This chapter describes how to use the printer's operating controls. When the cover is closed, the control panel switches perform the functions that appear above the switches.

Using the Operator Control Panel
2.1 About the LA310 MultiPrinter Control Panel

Figure 2–1   Operator Control Panel
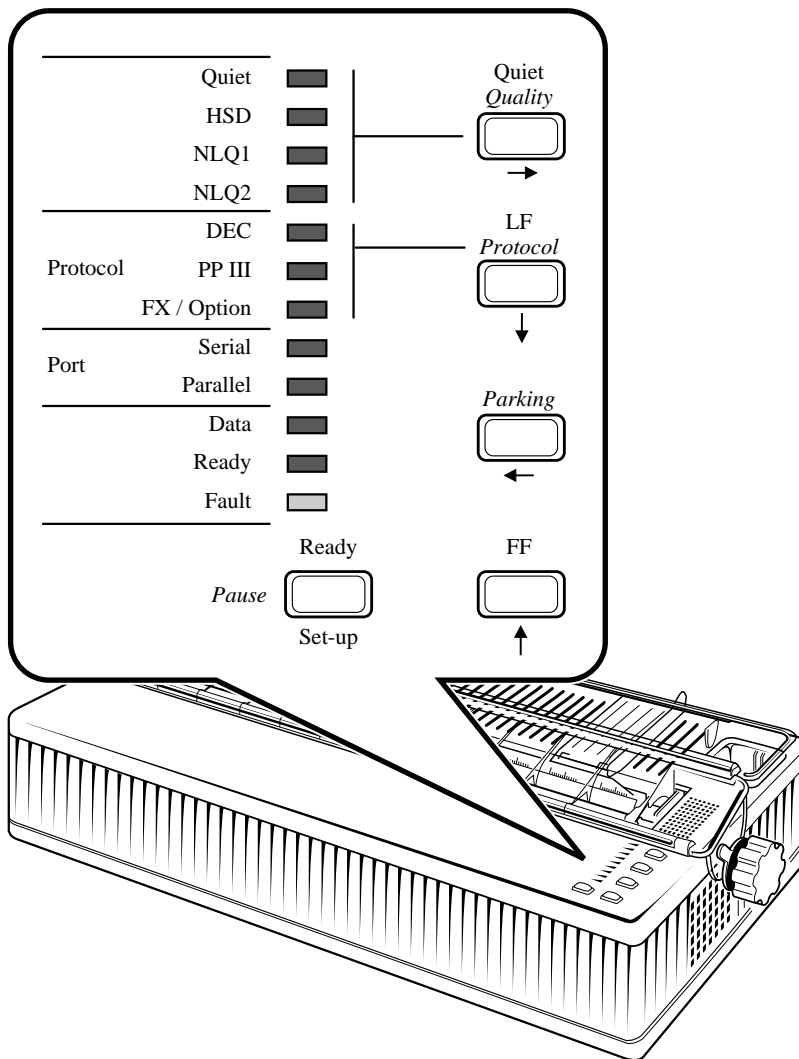
NOTE: The functions on the control panel that appear below the switches are Set-up switches, and are explained in Chapter 4, Configuring the Printer. The functions on the internal console, which you use when the front cover is open, are explained in Appendix E, Internal Console.

2.1.1 Printer Operating Buttons

Ready/Pause Button

Pressing and releasing this button toggles the printer between Pause and Ready states.

In normal operation, when the printer is ready, the Ready indicator is on. When the printer is in Pause, the Ready indicator blinks.

If you press this button while the printer is printing, the indicator changes immediately, but allows the printer to complete to the end of the line.

LF/Protocol Button

The effect of this button depends on the state that the printer is in:

- **When the printer is in the Ready state**, pressing this button advances the paper by one line.

- **When the printer is in the Pause state**, pressing this button toggles the protocol selection mode between the port-dependent mode and the various other modes (DEC PPL2, PP III, FX/Option; see the heading Protocol Indicators in Section 2.1.2).

  The Protocol indicators reflect the current selection, and the following sequence is used when you press the LF/Protocol button:

  1. Port-dependent mode: the protocol indicators that are assigned to a port blink in phase with the related port indicators.

  2. DEC PPL2 Protocol selected: DEC indicator is on.

  3. IBM PP III protocol selected: PPIII indicator is on.

  4. The resident Epson FX-1050 emulation or the optional card emulation selected: FX/Option indicator is on.

  Protocol change can only take place if the input buffer is empty (the data indicator is off).

Parking Button

When the printer is paused, in Push Tractor mode, pressing this button puts the paper into a parking position. Parking enables you to switch between rear loading and single-sheet loading of the printer.

FF Button

Pressing the FF button advances the paper to the top of the form, ready for printing.

Quiet/Quality Button

The effect of this button depends on the state that the printer is in:

- **When the printer is in the Ready or busy state**, pressing this button toggles the print mode between normal and quiet print modes.

- **When the printer is in the Pause state**, pressing this button forces one of the four print quality settings:

    High Speed Draft—HSD indicator on.
    NLQ 1—NLQ1 indicator on.
    NLQ 2—NLQ2 indicator on.
    Software control—all print quality indicators off.

2.1.2 Printer Operating Indicators

Fault Indicator

The Fault indicator is amber. The indicator is lit when the printer is in a Paper Out condition. The indicator blinks at one-second intervals when the front cover is open, when the printer detects a paper jam, or when there is a carriage error.

The indicator blinks at half-second intervals when an internal diagnostic error occurs. (See Section 5.2.3 to find the probable cause of the problem, as well as suggestions for correcting the problem.)

Ready Indicator

The Ready indicator is lit when the printer is in the Ready or Busy states. The indicator blinks when the printer is in the Pause state.

Data Indicator

The Data indicator blinks at one-second intervals when the printer is receiving data through one of the ports.

The Data indicator is lit if the input buffer is not empty and no communication port is active. It is unlit when the input buffer is empty and no communication port is active.

Port Indicators

There are two port indicators:

1. Serial indicator

   The Serial indicator lights up when the serial port is active or selected.
   It may be active automatically because data is flowing through the serial
   port, or the serial port may have been selected in Set-up Mode.

2. Parallel indicator

   The Parallel indicator lights up when the parallel port is active or selected.
   It may be active automatically because data is flowing through the parallel
   port, or the parallel port may have been selected in Set-up Mode.

The Serial and Parallel indicators blink when the communication port is
automatic (the default setting), and when they are not currently receiving or
processing data.

Protocol Indicators

There are three protocol indicators:

1. DEC

   The DEC indicator is on when the DEC PPL2 protocol is selected or active.

2. PP III

   The PP III indicator is on when the IBM Proprinter III protocol is selected
   or active.

3. FX/Option

   The behavior of the indicator depends on the type of emulation:

   - When the resident Epson FX-1050 emulation is enabled, the FX/Option
     indicator is on when the Epson FX-1050 is selected or active.

   - When the optional emulation through a cartridge is enabled, the
     FX/Option indicator is on when the optional emulation is selected or
     active.

When the protocol is driven by the active port, provided no communications
port is active at that time, the protocol indicators blink in phase with the port
indicators, to reflect which protocol is assigned to which port. For example, the
default setting is:

1. Serial indicator blinks in phase with the DEC indicator.

2. Parallel indicator blinks in phase with the IBM indicator.

NOTE: This is the default setting and can be reconfigured to suit your needs.

Using the Operator Control Panel
2.1 About the LA310 MultiPrinter Control Panel

Print Quality Indicators

There are three print quality indicators, colored green on the control panel:

1. HSD

    This indicator is on when the print quality mode is specifically set to HSD (High Speed Draft) by yourself or by Set-up.

2. NLQ1

    This indicator is on when the print quality mode is specifically set to NLQ1 (Near Letter Quality 1) by yourself or by Set-up.

3. NLQ2

    This indicator is on when the print quality mode is specifically set to NLQ2 (Near Letter Quality 2) by yourself or by Set-up. You must set NLQ2 when you are using typestyles from a font cartridge.

NOTE: All of the print quality indicators are off when the print quality is under software control.

Quiet Indicator

The Quiet indicator is green. It lights up when the printer is turned to Quiet mode (for the quietest mode of printing).

3

Loading the Paper

3.1 Paper Controls

The levers and controls described in this section are used for loading and positioning paper in the printer.

**Loading the Paper
3.1 Paper Controls**

Figure 3–1 Paper Controls
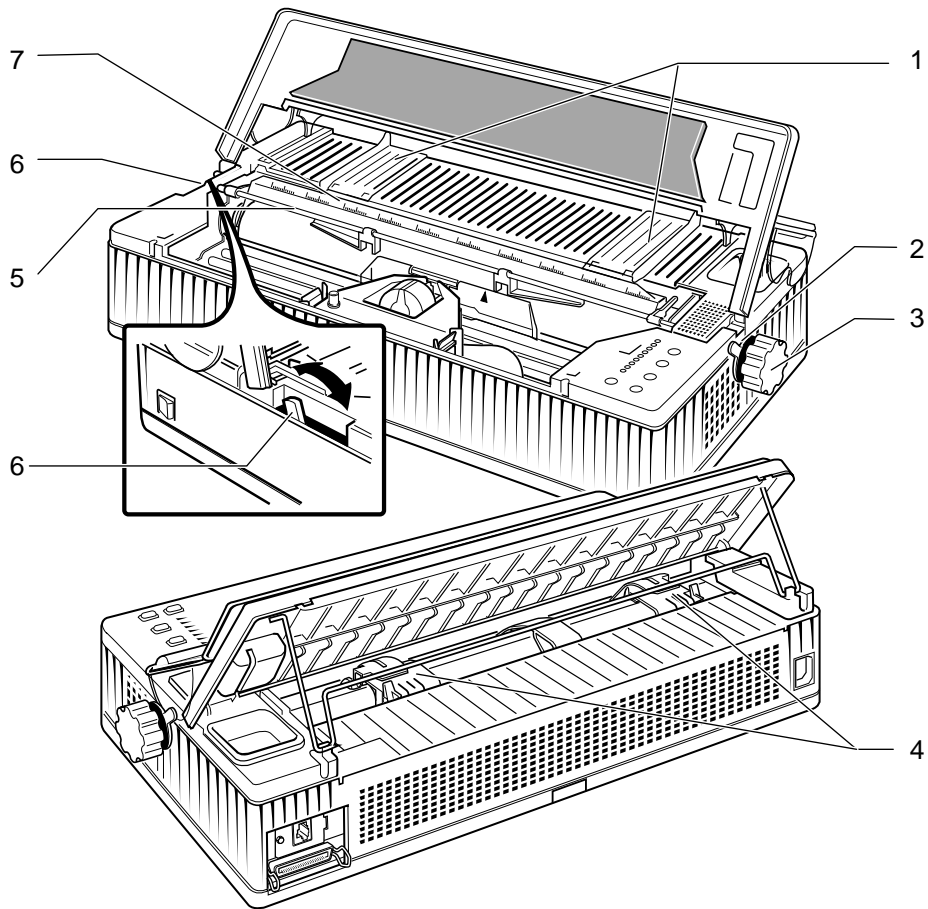
Table 3–1 Paper Controls

Control	Description
1. Paper Guides	The paper guides help to position cut-sheet paper in the correct position for printing. The guides are attached to the rear cover/paper support, and must be adjusted according to the width and type of paper that you are using.
2. Paper Selection Lever	This lever is positioned depending on whether you are using continuous pinfeed or single-sheet stationery. For continuous pinfeed stationery, position the lever towards the rear of the printer. For single sheets, position the lever towards the front of the printer.
3. Platen Knob	The platen knob is used to clear paper jams. Do not use it to put paper in the correct position under the printhead (this is an automatic process on the LA310 MultiPrinter.)
4. Push Tractor	The push tractor feeds single or multiple-copy continuous pinfeed stationery (see Table 3–2). The left tractor has a microswitch that detects when there is no paper left in the printer. An optional pull tractor is available to enable you to use continuous pinfeed stationery paper of an original and up to four carbon or chemical copies.
5. Bail Bar	The bail bar holds the paper against the platen as it is fed through the printer. Before you load paper, check that the rollers on the bail bar are positioned in the correct grooves on the bail. Two settings are provided for the bail bar rollers, depending on the paper width you are using. See Section 3.4.1.
6. Printhead Adjustment Lever	The printhead adjustment lever changes the printhead position to allow for different thicknesses of paper, forms, or envelopes. The lever can be moved to eight positions to vary the distance between the printhead and the platen. See Section 3.3 for more information.
7. Ruler	The ruler is embossed on the printer between the platen and the push tractor. It simplifies the alignment of paper and paper guides. The triangle marked on the ruler marks the position of the paper sensor. Paper must fall under this mark to be detected by the printer.

3.2 Loading Paper

There are three ways to load paper for the LA310 MultiPrinter:

- Load pinfeed paper using the push tractors at the back of the printer (factory default).

- Hand feed single sheets from the rear of the printer carriage.

- Using the optional pull tractor. Refer to the *LA310 MultiPrinter Pull Tractor Guide.*

These methods are illustrated in the cross-section diagrams later in this section. Table 3–2 contains information on the recommended paper for each of the three methods.

Table 3–2 Loading Methods and Types of Paper

Method	Type of Paper
Push Tractor	Pinfeed Paper Labels on continuous media Multipart Forms (one original and three copies)
Single-sheet Loading	Single Sheets Envelopes
Pull Tractor option	Pinfeed Paper Multipart Forms (one original and four copies) Labels on continuous media

Loading Methods

In Figure 3–2, Diagram A1 shows the Push Tractor method with the back cover in the sloping position (for multipart forms, single continuous pinfeed forms, and for Document on Demand feature); Diagram A2 shows the Push Tractor method with the back cover in the horizontal position (for single continuous pinfeed forms, and lowest noise configuration); Diagram B shows the Single-sheet Loading method, and Diagram C shows the optional Pull Tractor option (see also the *LA310 MultiPrinter Pull Tractor Guide*).

Figure 3–2 Loading Methods—Push Tractor (sloping) (A1), Push Tractor (horizontal) (A2), Single-sheet (B), Pull Tractor (C)
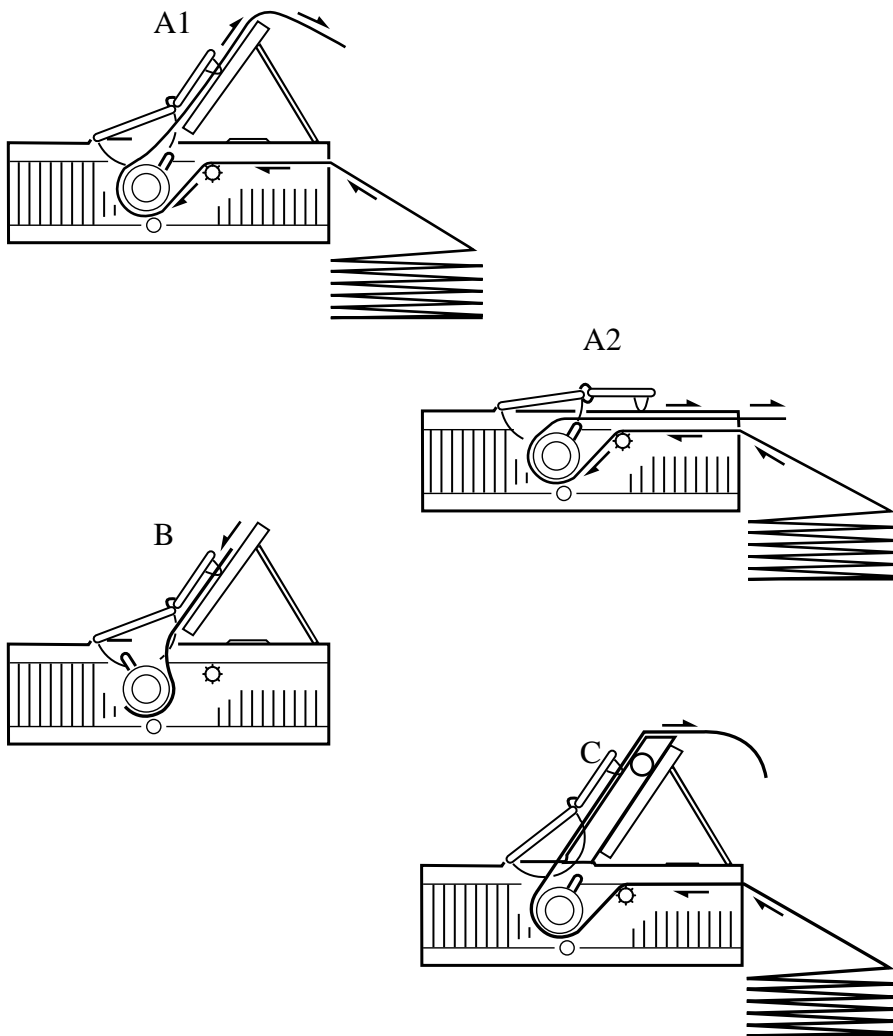
3.2.1 Tractor Feeding

1. Set the paper selection lever towards the rear of the printer.

   NOTE: If you try to set the paper selection lever and paper is detected under the platen, all indicators flash simultaneously, except the Ready indicator which is lit when in the Ready state. You must clear the paper path and set the paper selection lever again before you proceed.

2. Raise the transparent cover, and tip the entire cover towards the front of the printer, so that it rests on the front of the printer.

3. Raise the rear cover, and remove it.

Figure 3–3 Setting the Paper Selection Lever and Removing Rear Cover
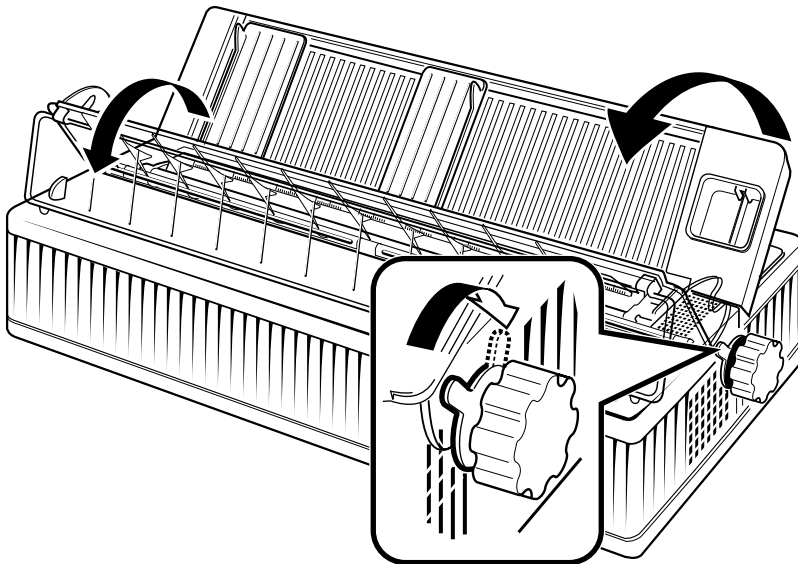
4. Unlock the two tractor clamps, and position them according to the width of the stationery that you are using. Center the paper guide on the shaft so that it is in the center of the stationery.

Figure 3–4   Unlocking and Adjusting the Tractor Clamps
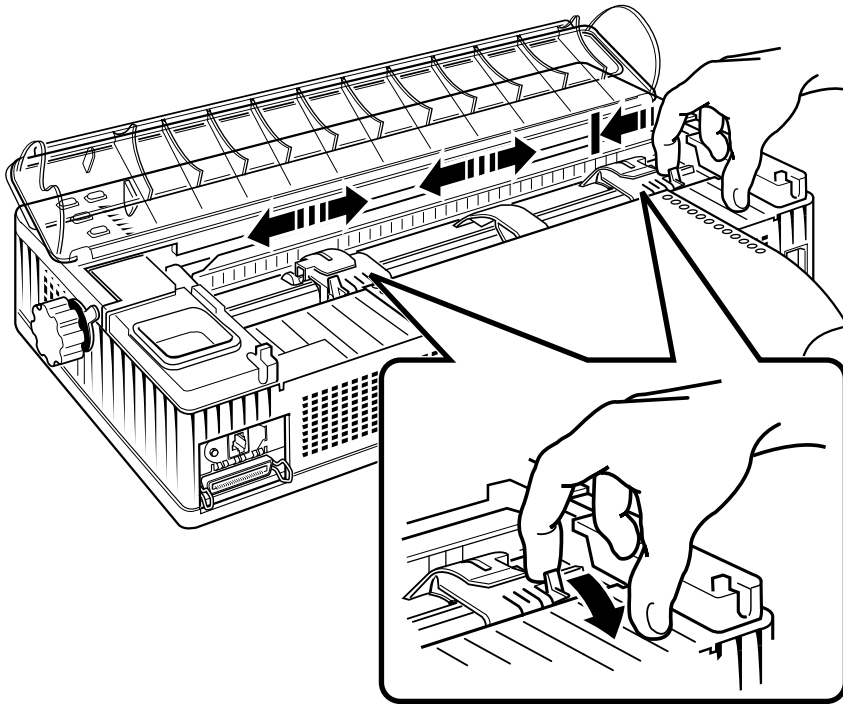
5. Open both tractor doors, and thread the pinfeed perforations onto the tractors. Make sure that the paper covers the paper sensor on the left tractor, and that at least two pins on each tractor are fed with paper.

Figure 3–5 Opening the Tractor Doors and Threading Pinfeed Paper
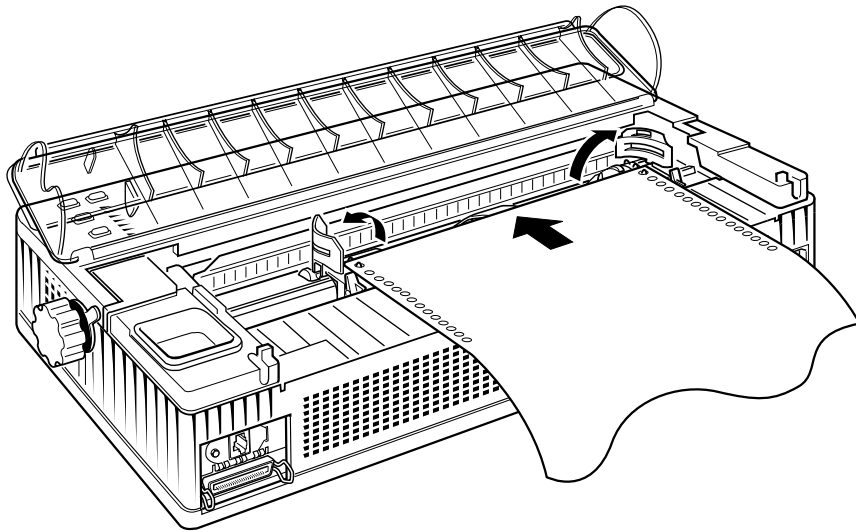
6. Close the tractor doors, and adjust the tension between the two tractors.
   Do not over-tension the paper so that the pinfeed holes are stretched out of
   shape.

Figure 3–6   Closing the Tractor Doors and Adjusting Tension
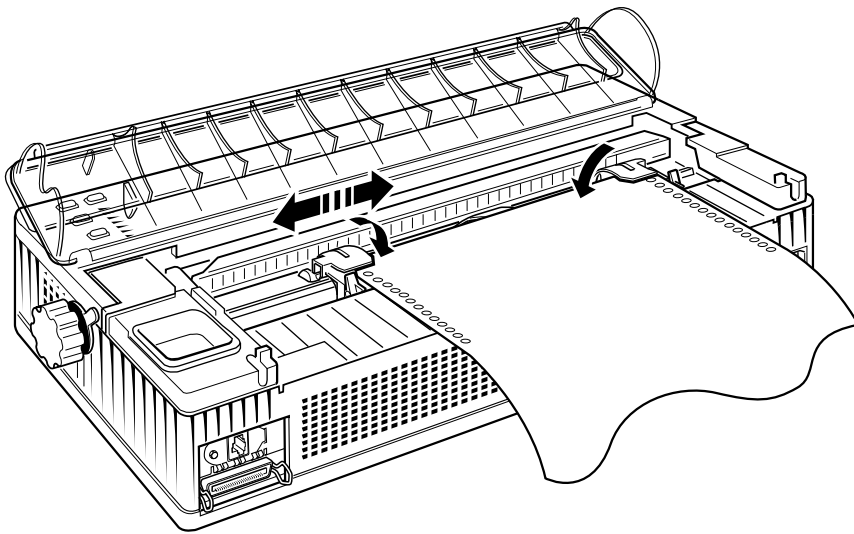
7. When the tension has been adjusted so that the paper is taut without being overstretched, lock the tractors into position.

8. Make sure that:

   - the paper falls in front of the triangle marked on the the ruler.

   - the default left margin is set at position 1 on the ruler.

   - the paper width is correct (see also Section 3.4).

Figure 3–7 Locking the Tractors into Position
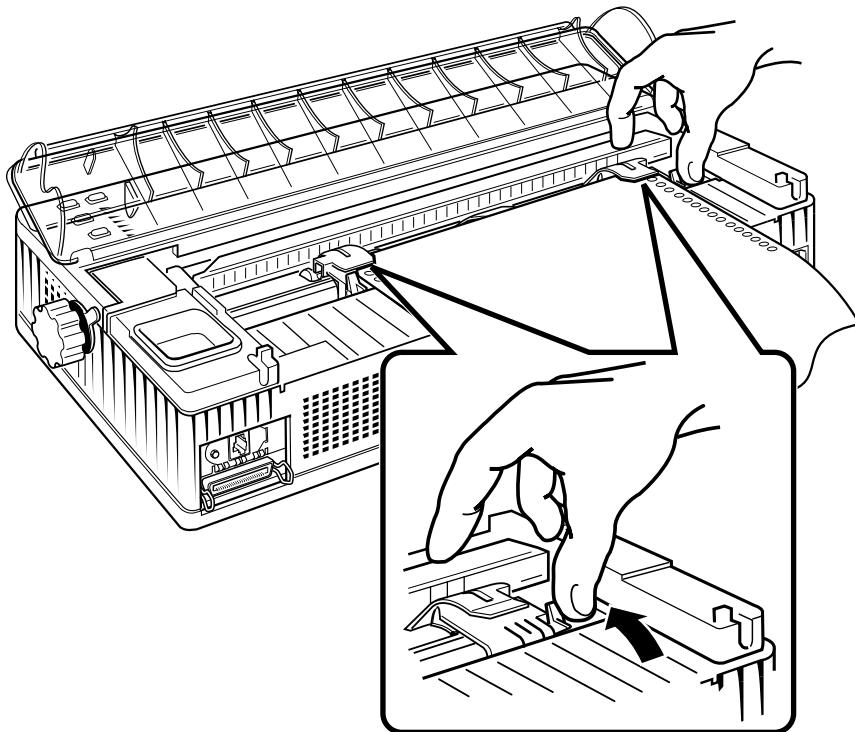
9. Remount the rear paper support.

10. Reposition the rear paper support and the transparent covers according to the type of continuous pinfeed stationery that you are using:

    • If you are using multicopy stationery (original plus up to three copies), or want to use Document on Demand (see Section 3.2.1.3), fix the rear paper support in its sloping position, with the transparent covers leaning against it.

    NOTE: If you have two copies or less, the paper support can be flat or sloping.

    NOTE: To prevent paper misfeeding, it is important to position the input stack of paper lower than the rear of the printer (see Figure 3–2).

Figure 3–8 Positioning the Rear Paper Support in Sloping Position
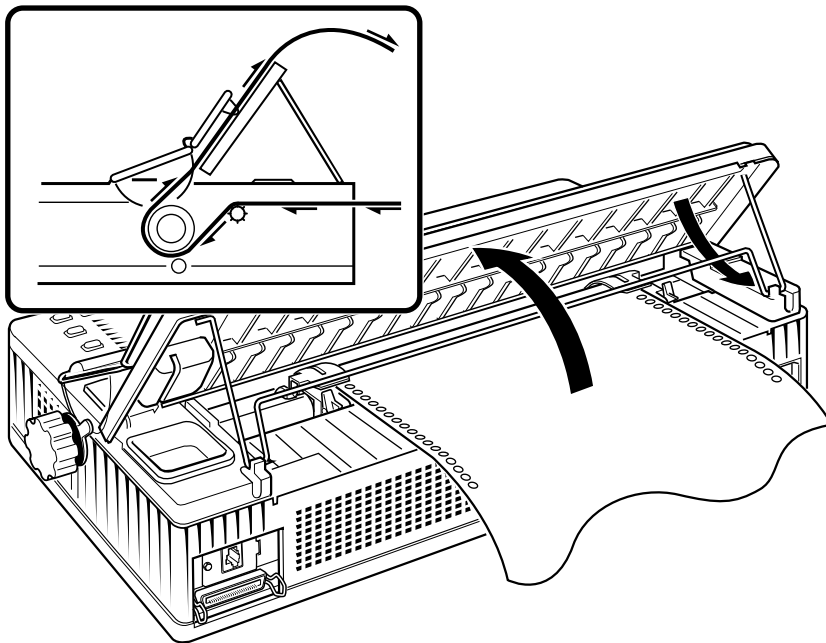
11. If you are using originals (no carbon or carbonless copies), or originals plus
    not more than one carbon or carbonless copy, you can position the rear
    paper support horizontally so that the tractor is completely covered. Close
    the transparent covers so that they lie flat against the paper support.

Figure 3–9 Positioning the Rear Paper Support Horizontally
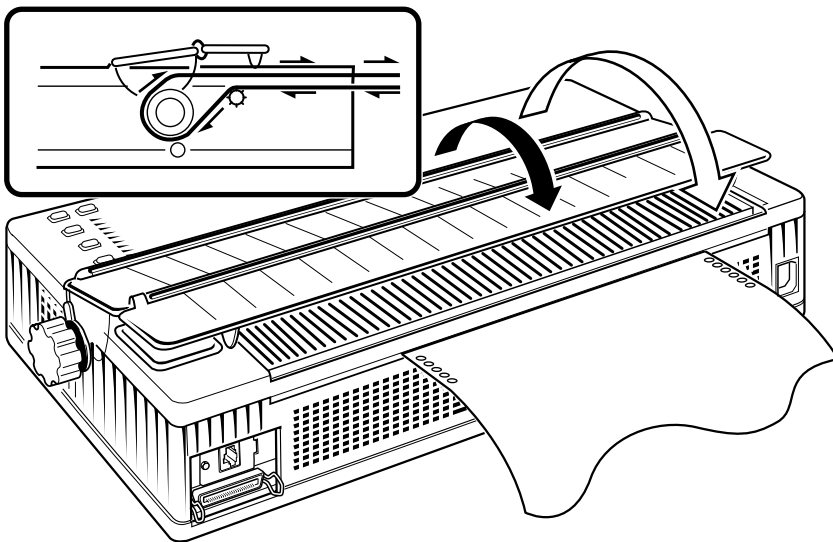
3.2.1.1 Automatic Paper Feed

You can now advance the paper to the print position by activating the
automatic paper feed as follows:

- Set the power switch to ON (1).

  All the indicators light up on the Control Panel.

  For tractor-fed paper, the printhead moves to the center, and the paper
  moves under the platen to the print position.

- If the power was already ON, press FF to load the paper.

When paper is loaded to the print position, the Fault indicator turns off.

You are now ready to print.

3.2.1.2 Viewing the Last Printed Line (Tractor-Fed Paper Only)

This section and Section 3.2.1.3 describe two LA310 MultiPrinter features that are available using tractor-fed paper.

There are three methods to advance the paper to see the last printed line. To ease readability, place the paper support in the raised position.

A. When printing has ended and the printer is in the Ready state:

1. Press the Ready switch.

    The paper advances so that the last printed line can be seen above the bail bar (if the printer is not at the top of form), or above the tear-off line (if the printer is at the top of form).

2. Press the Ready switch again.

    The paper returns to the previous printing position and Ready state.

B. When the printer is printing:

1. Press the Ready switch.

    The printing stops after it has finished the current line, and the paper advances so that the last printed line can be seen above the bail bar.

2. Press the Ready switch again.

    The printer moves back, and printing continues from the next line

C. If you select Auto Advance from the GENERAL Set-up menu, the paper will advance for viewing if no data is received for two seconds. The paper will move back as soon as the next data is received.

NOTE: You cannot view the last printed line if the end of the paper has been detected.

3.2.1.3 Document on Demand (Tractor-Fed Paper Only)

If the last character received by the printer was a Form Feed, or if you pressed FF at the end of the last printed job, you can make use of the Document on Demand feature and so avoid wasting paper before the next printed job.

You can only use this feature for rear-loaded paper, and if the Backward Motion set-up feature is set to ENABLED (this is the default setting).

For this feature to work correctly, the rear cover should be in the sloping position. (See part A1 of Figure 3–2.) With the rear cover not in the sloping position, the tear line will be misaligned.

Document on Demand works in the same way as Viewing the Last Printed Line. To use Automatic Document on Demand, you need to set Auto Advance to Selected in the GENERAL Set-up menu (the default setting is Not Selected):

- Automatic Document on Demand (Auto Advance Selected)

  When two seconds have elapsed since the printer received the last piece of data (FF), the paper perforation moves on to the tear blade. Make sure that the top part of the transparent cover is folded down, then tear off the paper (see Figure 3–10). On the receipt of new data, the paper moves back to its previous position (the first printable line).

Figure 3–10 Tearing Off Paper at the Tear Blade
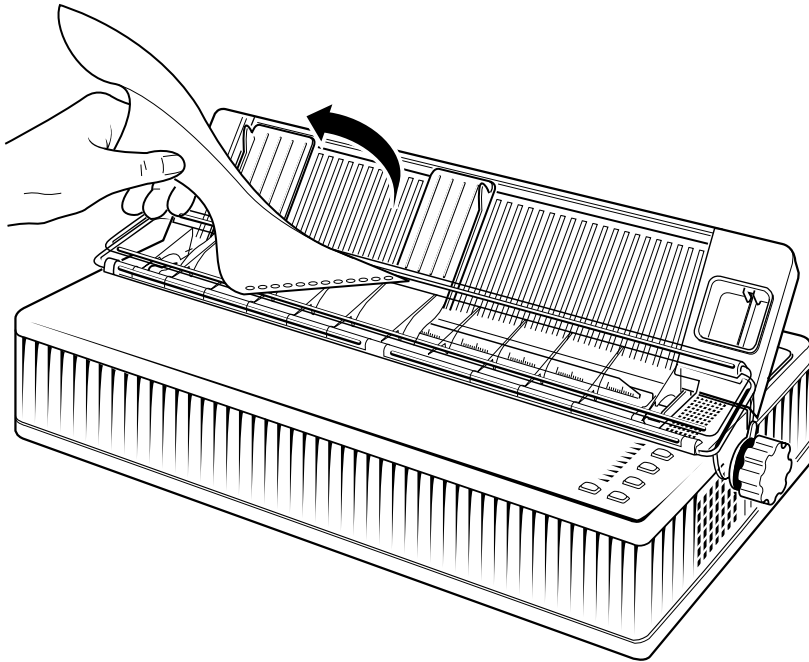
- Manual Document on Demand (Auto Advance Not Selected)

Press the Ready switch to move the paper perforation on to the tear blade. Make sure that the top part of the transparent cover is folded down, and tear off the paper. Press the Ready switch again to move the paper back to its previous position (the first printable line).

NOTE: To use Document on Demand correctly, make sure that the value of the printer's form length matches the physical paper size. For selecting form length, see Section A.1, Specifications.

3.2.2 Single-sheet Loading

1. Check that there is no paper loaded under the platen and in the print position. If there is paper in that position, put the paper into the Parking position (see Section 3.2.3).

2. Raise the rear paper support, and set it in the sloping position with the prop.

Figure 3–11   Raising the Rear Paper Support and Setting the Paper Selection Lever
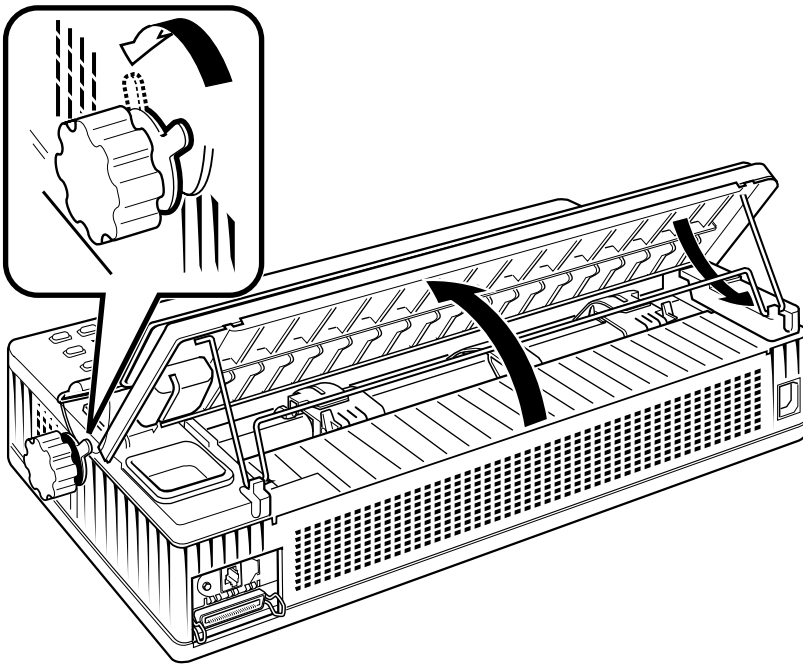
3.   Set the paper selection lever towards the front of the printer.

4. Set the power switch to ON (1).

   All indicators light up on the Control Panel. The printhead moves to the center. All indicators turn off, except for the Fault indicator.

5. Raise the upper half of the transparent cover, and fold it towards the front of the printer, so that you can access the paper guides.

6. Position the left paper guide so that the left margin is at position 1 on the ruler. Adjust the right guide according to the width of the paper.

   NOTE: You must make additional specific adjustments for narrow paper. See Section 3.4.

Figure 3–12 Adjusting the Paper Guides
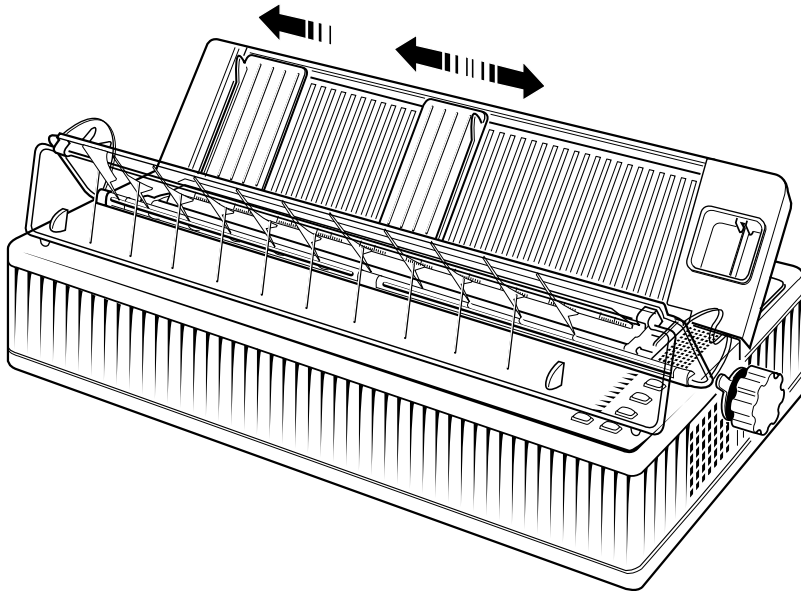
7. Replace the upper half of the transparent cover so that it leans against the rear paper support.

8. Insert the sheet of paper between the guides, and let it come to rest behind the platen. Do **not** use the platen knob to manually advance the paper, except to clear paper jams.

Figure 3–13 Inserting a Sheet of Paper
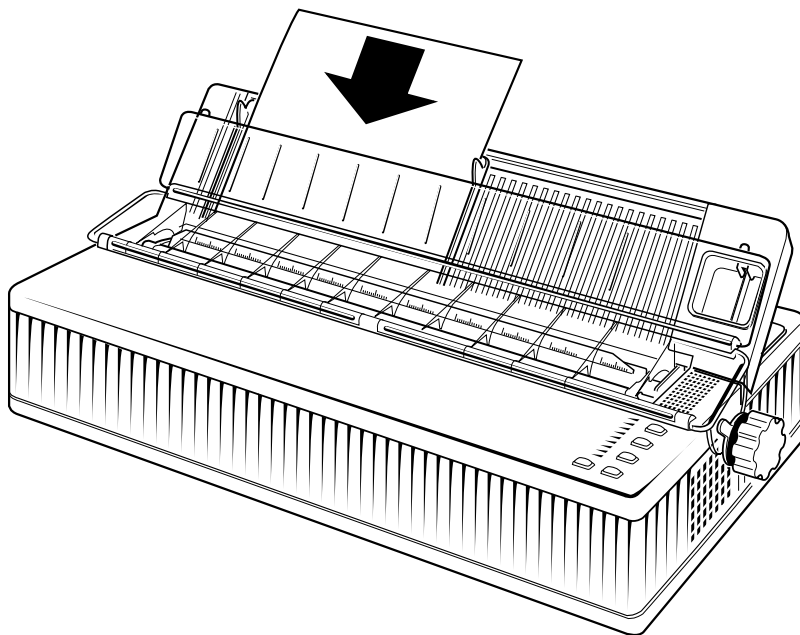
9. Press FF. The printer feeds the paper to the first line at which it will print. The Fault indicator turns off. If the Ready indicator is blinking, press the Ready button so that the Ready indicator is lit continuously.

    You are now ready to print on the single sheet.

3.2.3 Parking Continous Stationery

You can switch from rear loading continous stationery to single-sheet loading even if you already have continuous pinfeed stationery loaded in the printer. If you have stationery already loaded, you must tear off any completed forms.

To switch from rear loading to single-sheet loading (this switching is called the Park function):

1. Press PAUSE to pause the printer. The Ready indicator should blink. (You must tear off any completed forms.)

2. Press PARKING. The paper feeds back to the parking position, and the Fault indicator lights.

3. Set the paper selection lever to the front of the printer.

4. You can now load single-sheet paper.

NOTE: When you use the Park function, backward paper motion is limited to two forms. If paper is still detected under the platen after two forms, it is fed forward to ensure that the paper is positioned in front of the printhead.

NOTE: Parking does not function if you have disabled Backward Motion in Set-up (under the General menu).

3.3 Adjusting the Printhead for Paper Thickness

You must adjust the printhead to the setting appropriate for the stationery you are using. You adjust the printhead by using the printhead adjustment lever (see Figure 3–14). The following table shows the settings:

Table 3–3 Adjusting the Printhead for Paper Thickness

Lever Position	Housing Marking	Number of Copies	Maximum Thickness
0	0	Needle wear recovery only	0.125mm
1	-	Original only	0.125mm
2	-	Original + 1 copy	0.200mm
3	3	Original + 2 copies	0.280mm
4	-	Original + 3 copies	0.360mm
5	-	Original + 4 copies[1]	0.360mm
6	6	Non-printing position	
7	Cartridge symbol	Changing the ribbon cartridge position	

[1]You must use the Pull Tractor when the lever is in this position.

Figure 3–14   Adjusting the Printhead for Paper Thickness
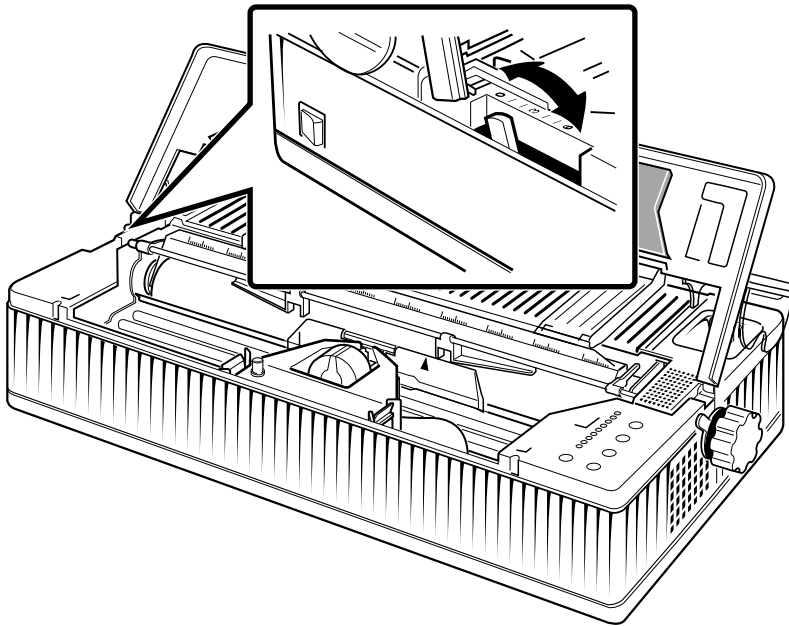
3.4 Adjusting for Paper Width

Paper must fall in front of the mark on the ruler (the paper sensor).

The default left margin is numbered 1 on the ruler. The only way to change the left margin is by sending the appropriate protocol-specific software sequence.

The right margin setting is set by the Paper Width set-up feature:

Paper Width set-up selection	Right margin column (number on ruler)
1–8 inches	80
8 inches	80
13.6 inches	136

The right margin can be modified by software sequences.

3.4.1 Paper Width—Recommended Settings

There are a number of recommended settings for different widths of paper – refer to Figure 3–15 for positioning:

Width of paper used	Recommended settings
8 inches	Set Paper Width Set-up feature to 8". Put the rollers on the bail bar in the grooves on the bar that are marked at ruler positions of approximately 40 and 90. This centers the printhead plastic guide on the rollers. See Figure 3–15, part B.
More than 8 inches	Set Paper Width Set-up feature to 13.6". Put the rollers on the bail bar in the grooves on the bar that are marked at ruler positions of approximately 40 and 90. This centers the printhead plastic guide on the rollers. See Figure 3–15, part B.
Less than 8 inches	Set the Paper Width Set-up feature to 1–8". This causes the default printhead to be aligned with the paper sensor mark. Put the rollers on the bail bar in the grooves on the bar that are marked at ruler positions of approximately 20 and 60. See Figure 3–15, part A.

NOTE: If you do not use the correct settings, there is a high risk of the printer causing the paper to jam.

Figure 3–15 Bail Bar Settings

A   B
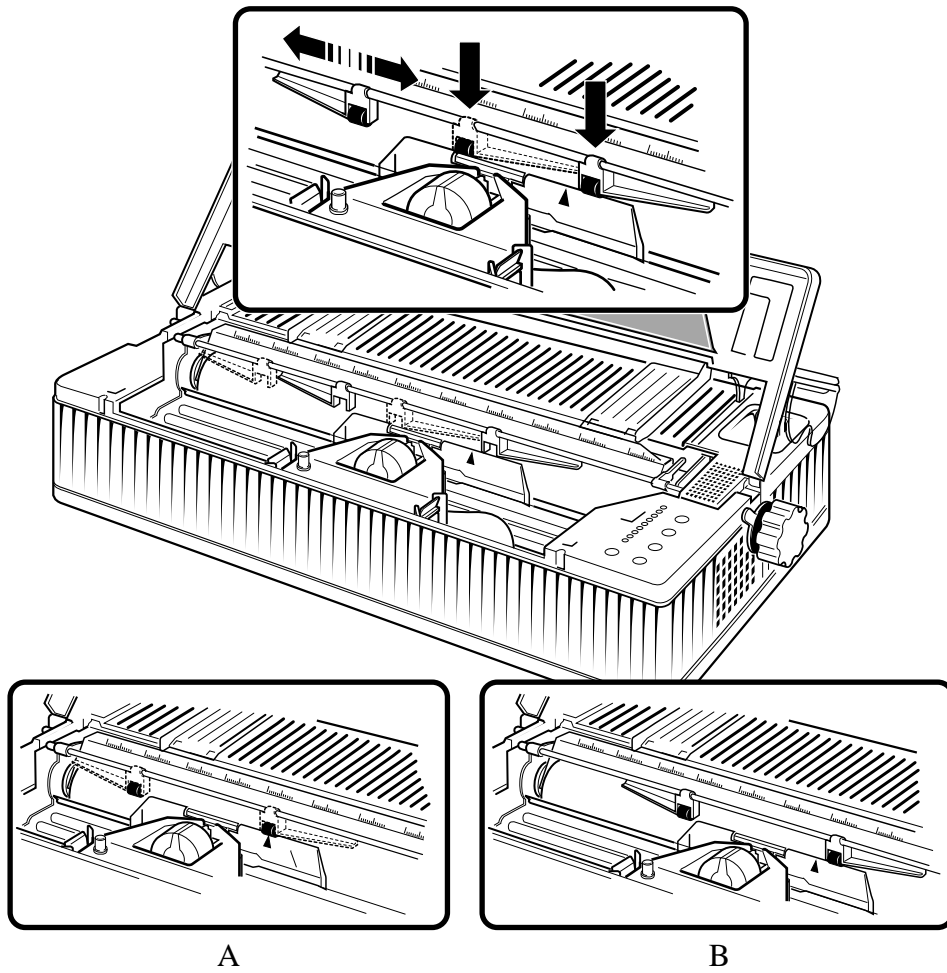
3.5 Error Conditions During Operation

When the printer detects an error condition, the following applies:

- Paper-out conditions at power-up:

  - At power-up in Push Tractor mode, if paper is not loaded under the platen and is not installed in the push tractors, the printer beeps and the Fault indicator lights.

    In order to start printing, you must install paper into the tractors (see Section 3.2.1), then press the FF button. As a result, paper is loaded under the platen to the print position and the Fault indicator turns off.

  - At power-up in single-sheet mode, if paper is not loaded under the platen, the printer beeps and the Fault indicator lights.

    In order to start printing, you must insert a sheet of paper as decribed in Section 3.2.2, then press the FF button. As a result, paper is loaded under the platen to the print position and the Fault indicator turns off.

- Paper-out conditions when printing:

  - In Push tractor mode, if the printer detects no more paper when printing, it beeps and the Fault indicator turns on. Printing stops, and will not resume (or new job will not start) until the paper out condition is fixed.

    In order to resume or start printing, you must install paper into the tractors (see Section 3.2.1), then press the FF button. As a result, paper is loaded under the platen to the print position, the Fault indicator turns off, and printing resumes, or the printer moves automatically to the Ready state at which a new job can be printed.

  - In single-sheet mode, when the bottom of the sheet is detected during printing, the sheet is ejected, the printer beeps, and the Fault indicator turns on. Printing stops and cannot resume, or a new job cannot start, until the paper out condition is fixed.

    In order to start or resume printing, you must insert a sheet of paper as described in Section 3.2.2, then press the FF button. As a result, paper is loaded under the platen to the print position, the Fault indicator turns off, and printing resumes or the printer moves automatically to the Ready state at which a new job can be printed.

- Moving the paper selection lever when paper is in the printing position:

  - If you move the paper selection lever in an attempt to toggle from one loading method to another (for example, from the Push Tractor method to the Single-sheet method), when paper is in the printing position, all indicators blink simultaneously, with the exception of the Ready indicator.

    You must move the paper selection lever back to the previous position (causing all indicators to stop blinking), unload the inserted paper, and set the paper selection lever as required.

- Cover open at power-up:

  - If the front cover is open at power-up, all indicators light, the printer beeps, and no carriage motion or paper feeding can take place. However, you can initiate some tests or modes with the cover open — see Appendix E. In these cases, most of the tests or modes commence when you close the cover.

    In order to make the printer ready for operation, close the front cover.

- Cover open during operation:

  - When the front cover is open during operation, the printer beeps. The printer also interrupts any carriage motion or paper feeding, the Fault and Ready indicators blink, and no further operations are possible.

    In order to resume operation, you must close the cover and press the Ready button. As long as the printer detects no further error condition, closing the cover causes the Fault indicator to turn off, and pressing the Ready button causes the Ready indicator to light.

- Carriage fault:

  - The printer checks the position of the carriage at regular intervals. When it detects an error in carriage position, the printer beeps, the Ready and Fault indicators blink, and printing is interrupted.

    To resume printing, open the front cover, clear the carriage fault (see Chapter 5), close the cover, and press the Ready button. The Fault indicator turns off, the Ready indicator lights, and normal operation continues.

4

Configuring the Printer

4.1 What is Configuration?

This chapter describes how to set up or configure the LA310 MultiPrinter, so that the printer and your computer system can communicate correctly with each other, and so that the printer suits your requirements.

Communication between the printer and computer requires each to have the same communication settings or features. The most important of these are protocol, baud rate, data bits, parity and communication port. You may also need to change some of the printer's other features depending on your hardware and software requirements. (See Section 4.4 for a complete list of printer features.)

For further details on the structure of the Set-up menus, refer to Appendix G, Set-up Menu Structure.

4.2 Structure of the Set-up Menus

When you enter Set-up mode, the **Set-up Directory** menu is displayed. From the Set-up Directory menu, you can enter the **Main Menu** for each option that is displayed on the Set-up Directory menu. At each main menu there are several levels of submenus.

Set-up mode allows you to access the LA310 MultiPrinter's configuration memory. The memory stores a list of all values, both factory defaults and user-defined settings. The Set-up controls, which are discussed in Section 4.3, allow you to access Set-up mode.

Configuring the Printer
4.2 Structure of the Set-up Menus

At each main menu or submenu, the item that was selected prior to entering this menu is printed in bold type, and the red triangle on the printhead guide is automatically positioned underneath the item.

Figure 4–1 provides an example of the location of the red triangle on the printhead plastic guide against the main menu entry COMMUNICATIONS.

Figure 4–1 Positioning of Red Triangle against Main Menu Entry COMMUNI-CATIONS
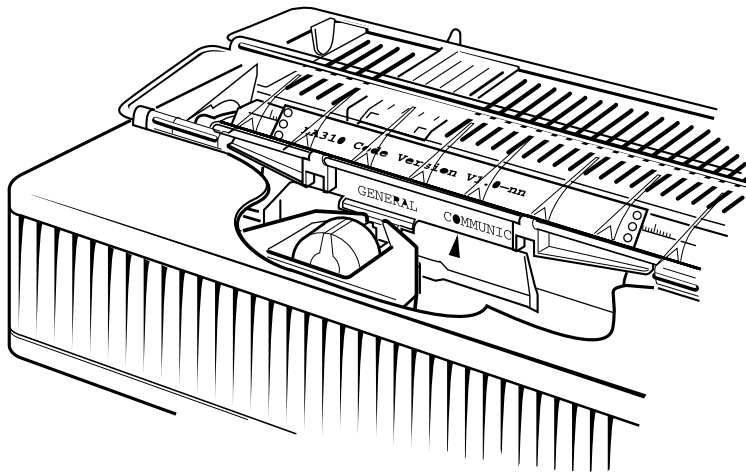
In each main menu there are items to be selected or other submenus that you can move to. You can select these items or submenus by pressing the ← and → keys to move to the item you want to select, and then pressing ↓.

4.3 Set-up Mode Buttons and Indicators

There are five buttons on the control panel that perform functions in Set-up mode.

Normal mode function	Set-up mode function	Set-up function
Ready	Set-up	Enter/Exit Set-up mode
Quiet/Quality	→	Next Item
LF/Protocol	↓	Select item at red triangle
Parking	←	Previous Item
FF	↑	Return to previous menu level

4.3.1 Entering Set-up Mode

Digital recommends that you enter Set-up mode in tractor-feeding mode, and not cut sheet mode.

NOTE: You must not run Set-up mode with the Pull Tractor option installed.

To enter Set-up mode:

1. Press and hold down the Set-up button while setting the power switch to ON (1). If you have put paper in the parking position and use tractor feeding, paper is loaded automatically.

    Do not release the Set-up button until the printhead has started moving.

    The printer automatically prints the first part of the Set-up directory:

```
LA310  Code  Version  V1.0-nn

SET-UP  DIRECTORY  :

        PRINT   GENERAL   PROTOCOL SELECTION   COMMUNICATIONS >>
```

The symbol > > indicates that there are additional items at this level, which you can move to by pressing → when the rightmost item is above the red triangle.

NOTE: If an option cartridge is installed, the type of cartridge is displayed before you enter the Set-up directory, with information about the contents of the cartridge.

4.3.2 Printing the Printer's Current Configuration

To examine the printer's current configuration, you can print all current settings.

To print the current configuration:

1. At the Set-up directory, the red triangle points to PRINT, which is the initial default entry. Select PRINT by pressing ↓.

The printer then prints its current settings.

The factory-set configuration for the LA310 MultiPrinter begins printing as follows:

```
LA310 Code Version V1.0-nn

CONFIGURATION  LIST.

ANSWERBACK MESSAGE:          NULL MESSAGE
USER FORM LENGTH:            132 (/12)

GENERAL.

FORM LENGTH:                 11"(A)
PAPER WIDTH:                 13.6"
PRINT QUALITY:               SOFT/CONTROL
TYPESTYLE:                   INTERNAL
NLQ DIRECTION:               BIDIRECTIONAL
BACKWARD MOTION:             ENABLED
AUTO ADVANCE:                NOT SELECTED
BOTTOM OF FORM:              0
INPUT BUFFER:                16 K
ERROR BEEP:                  ONE BEEP
PAPER OUT:                   SELECTED
```

4.3.3 Changing the Printer's Configuration

At each menu or submenu beyond the Set-up menu, the item that was selected prior to entering this menu is printed in bold type, and the red triangle on the printhead is automatically positioned underneath the item.

The symbol > > indicates that there are additional items at this level, which you can move to by pressing →.

To change the printer's configuration from the Set-up menu:

1. Use ← or → to move to the menu that you want to change.

    Press ↓ to select the menu.

    The entries at the menus are either items that you can set, or submenus (with items you can set) that you can move to. Refer to Section 4.4 for details of all submenus and items.

2. Use ← or → to move the red triangle to the item that you want to change. The red triangle moves to the item that you want to select.

3. To select the item at the red triangle, press ↓. The printer underlines the item that you selected.

Example:

For example, to change the Error Beep on the printer to three beeps:

1. Refer to Section 4.4 to find the menu on which you can find the Error Beep setting. Section 4.4 shows that the Error Beep setting appears on the GENERAL menu.

2. Press and hold down the Set-up switch while setting the power switch to ON (1). The first part of the Set-up Directory is printed.

    Using ← and →, move the red triangle to GENERAL.

    Press ↓ to select the General menu. The entry GENERAL is underlined, and the first part of the General menu is displayed:

```
○  SET-UP DIRECTORY :

○
            PRINT    GENERAL     PROTOCOL SELECTION     COMMUNICATIONS > >
○

○  GENERAL :

○
            FORM LENGTH          PAPER WIDTH  > >
○
```
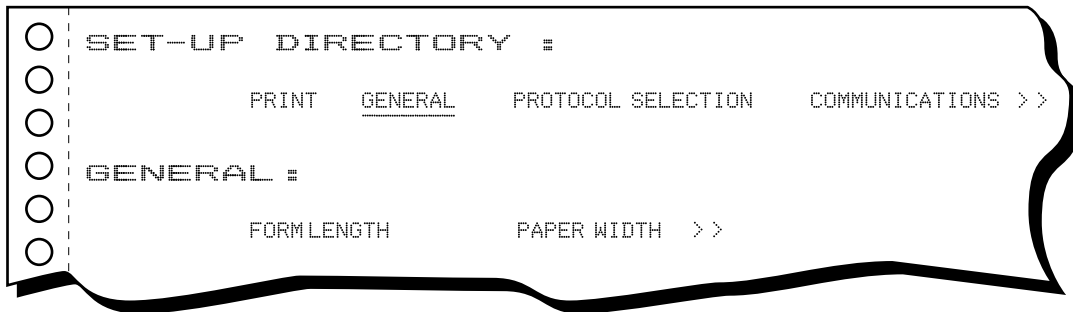
3. As the Error Beep setting is not listed, press → as many times as necessary to move to the final line of the menu, which is displayed as follows:

```
○  GENERAL :

○
            FORM LENGTH          PAPER WIDTH  > >
○
            PRINT QUALITY        TYPESTYLE      NLQ DIRECTION  > >
○
            BACKWARD MOTION      AUTO ADVANCE   BOTTOM OF FORM   > >
○
            INPUT BUFFER         ERROR BEEP     PAPER OUT
○
```
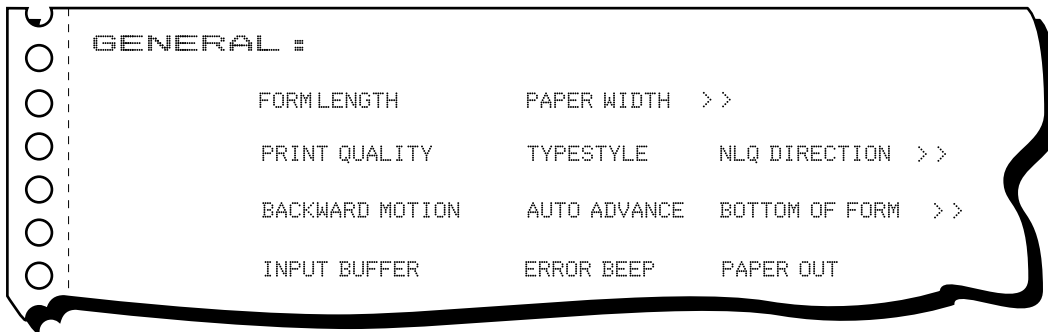
4. Press → to move to the Error Beep setting, and press ↓ to select it. The printer underlines ERROR BEEP and displays the Error beep values:
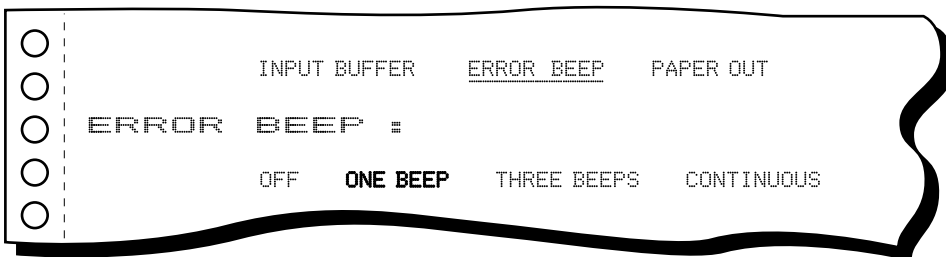
```
○           INPUT BUFFER     ERROR BEEP     PAPER OUT

○  ERROR BEEP :
○
            OFF    ONE BEEP    THREE BEEPS    CONTINUOUS
○
```

The entry ONE BEEP is bolded as it is the default setting.

5. Press → to move to the THREE BEEPS setting, and press ↓ to select it. The selected item is underlined, the printer enters the GENERAL menu, and the red triangle points to the ERROR BEEP submenu:

```
 ○
 ○              INPUT BUFFER    ERROR BEEP    PAPER OUT
 ○
 ○   ERROR  BEEP :
 ○
 ○              OFF    ONE BEEP    THREE BEEPS    CONTINUOUS
 ○
 ○   GENERAL :
 ○
 ○              FORM LENGTH        PAPER WIDTH   >>
 ○
 ○              PRINT QUALITY      TYPESTYLE      NLQ DIRECTION  >>
 ○
 ○              BACKWARD MOTION    AUTO ADVANCE   BOTTOM OF FORM  >>
 ○
 ○              INPUT BUFFER       ERROR BEEP     PAPER OUT
 ○
```
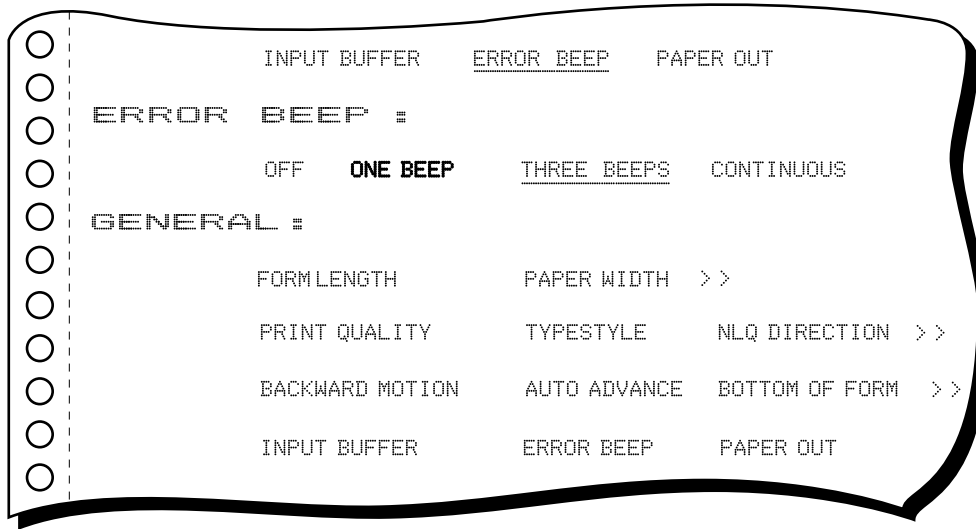
4.3.4 Saving New Values and Exiting Set-up Mode

Pressing the Set-up switch once while in Set-up mode stores your set-up changes in the printer's memory, exits Set-up mode, and automatically returns the printer to print mode.

NOTE: If you switch off the printer, or if the power is otherwise interrupted before you press the Set-up switch, no changes are stored in the printer's memory.

4.3.5 Recalling the Factory Defaults

To recall factory default settings, from the Set-up Directory:

1. Use ← or → to move the red triangle to the FACTORY DFLT setting.

2. Press ↓.

   Refer to the table of factory set-up defaults in Appendix A for full details of all factory defaults.

4.3.6 Optional Emulation Selection Set-up

Optional emulation can be the resident EPSON FX-1050 emulation, or emulation provided by a cartridge installed in the printer. To determine which optional emulation you want to use, you must define the emulation using optional emulation set-up.

To enter the optional emulation selection set-up:

1. Set the power switch to OFF (0).

2. Press and hold simultaneously the SET-UP and PROTOCOL buttons.

3. Set the power switch to ON (1).

   If tractor mode is set, and paper has not already been inserted, the printer loads paper automatically.

4. The printer enters Optional Emulation Selection Set-up.

```
OPTIONAL   EMULATION   SELECTION   SET-UP :

        CARTRIDGE      EPSON FX-1050      MAIN SET-UP
```

All indicators (except the Fault indicator) flash simultaneously.

5. Use ← or → to move the red triangle to the EPSON FX-1050 or CARTRIDGE setting.

6. Press ↓ to select the setting you require.

7. Press → to move to the MAIN SET-UP option, and press ↓ to move back to the Main Set-up menu.
   OR
   Press the Set-up key to exit this set-up and save the new setting

4.3.7 Error Conditions in Set-up Mode

When the printer detects that there is no paper, or that the printer cover is open, the following applies:

1. Paper-out condition in Set-up mode:

   - In cut sheet mode, the FF switch is active to load a sheet and resume set-up automatically.

   - In tractor mode, as soon as paper is detected in the left tractor, the FF switch is active to load paper and resume set-up automatically.

2. Cover-open condition in Set-up mode:

   - When the cover is closed after a Cover-open condition, all indicators remain off with the exception of the Ready indicator which blinks. Only the Ready switch is active.

     When you press the Ready switch, Set-up mode is resumed by re-entering the submenu that was selected prior to the Cover-open condition

4.4 Summary of Set-up Features

The following tables list the Set-up menu features and reflect the Set-up architecture.

In the Menu Items column, the main menu items are bolded.

In the Parameter column, the default setting of each parameter is bolded. This is the factory setting and is automatically reset when the FACTORY DFLT feature is selected, with the exception of the Optional Emulation Selection.

Table 4–1 SET-UP DIRECTORY menu

PRINT, GENERAL, PROTOCOL SELECTION,
COMMUNICATIONS, DEC PPL2, IBM PP III, *EPSON FX-1050 or Optional Emulation*[1], FACTORY DFLT

[1]This item depends on the Optional Emulation Selection. Factory setting is EPSON FX-1050. When an optional emulation card is used and is selected, the actual optional emulation name is printed here.

Table 4–2 GENERAL Menu

Menu Item	Parameter
FORM LENGTH	3, 3.5, 4, 5.5, 6, 7, 8, 8.5, **11 (A)**, 11 2/3 (A4), 12, 14, 15 INCHES and USER
PAPER WIDTH	1"-8", 8", **13.6"**
PRINT QUALITY	FORCED HSD, FORCED NLQ1, FORCED NLQ2, **SOFT/CONTROL**
TYPESTYLE	**INTERNAL**, "Card style 1", "Card Style 2"
NLQ DIRECTION	**BIDIRECTION** (prints 2-pass modes in two directions), UNIDIRECTION (prints 2-pass modes in one direction)
BACKWARD MOTION	**ENABLED**, DISABLED (no viewing and parking functions)
AUTO ADVANCE	**NOT SELECTED**, SELECTED
BOTTOM OF FORM	**0**, 1 INCH (an automatic feed to next top of form is executed at 1 inch from the bottom of the form)
INPUT BUFFER	**16K**, 32 K (no downloaded font capability in IBM PP III and EPSON FX-1050 modes)
ERROR BEEP	**ONE BEEP**, THREE BEEPS, CONTINUOUS, OFF
PAPER OUT	**SELECTED**, NOT SELECTED (no error beep on paper out)

Table 4–3 PROTOCOL SELECTION menu

Menu Item	Parameter
	PORT DEPENDENT, DEC PPL2, IBM PP III, *EPSON FX-1050 or Optional Emulation*[1]
PORT DEPENDENT	
SERIAL PORT	**DEC PPL2**, IBM PP III, *EPSON FX-1050 or Optional Emulation*[1]
PARALLEL PORT	DEC PPL2, **IBM PP III**, *EPSON FX-1050 or Optional Emulation*[1]

[1]This item depends on the Optional Emulation Selection. Factory setting is EPSON FX-1050. When an optional emulation card is used and is selected, the actual optional emulation name is printed here.

Table 4–4 COMMUNICATIONS Menu

Menu Item	Parameter
PORT SELECTION	SERIAL PORT, PARALLEL PORT, **AUTOMATIC**
SERIAL COMM	
BAUD RATE	150, 300, 600, 1200, 2400, **4800**, 9600
DATA FORMAT	7-SPACE, 7-MARK, 7-NONE, 7-EVEN, 7-ODD, **8-NONE**, 8-EVEN, 8-ODD
BUFFER CONTROL	**XON/XOFF**, DTR
MONITOR DSR	**NOT SELECTED**, SELECTED (received data ignored from serial line and data not sent to host when DSR is low)
DISCON/FAULT	**NOT SELECTED**, DROP DTR[2] (on any fault, the DTR signal is dropped until the fault is cleared), PULSE DTR[2] (on any fault, the DTR signal is dropped for 5 seconds), BREAK SIGNAL (break signal sent on any fault ; a break signal is a space condition transmitted for 0.275 seconds)

[2] These features are disabled if BUFFER CONTROL is set to DTR.

Table 4–5   DEC PPL2 Menu

Menu Item	Parameter
CHARACTER SETS	
G0 CHAR SET	**ASCII**, BRITISH, DEC FINNISH, FRENCH, DEC FRENCH-CAN, GERMAN, ISO ITALIAN, JIS ROMAN, DEC NORW/DAN, ISO SPANISH, DEC SWEDISH, NORWEG/DANISH, DEC DUTCH, DEC SWISS, DEC PORTUGUESE, LEGAL, DEC 7 HEBREW, DEC HEBREW SUPP, DEC GREEK SUPP, DEC 7 TURKISH, DEC 8 TURKISH, JIS KATAKANA, DEC SUPPLEMENT, DEC SPEC GRAPH, DEC TECHNICAL, USER PREF SET, Not Present[3], *Cartridge character sets (labeled EXT)*[4]
USER PREF	**DEC SUPPLEMENT**, ISO LATIN 1, DEC 8 TURKISH, ISO LAT-HEBREW, ISO LAT-GREEK, DEC GREEK SUPP, ISO LATIN-5, JIS KATAKANA, DEC 7 HEBREW, DEC HEBREW SUP, DEC TECHNICAL, Not Present[3], *Cartridge character sets (labeled EXT)*[4]
HORIZ. PITCH	5 cpi, 6 cpi, 6.6 cpi, 8.25 cpi, 8.55 cpi, 9 cpi, **10 cpi**, 12 cpi, 13.2 cpi, 15 cpi, 16.5 cpi, 17.1 cpi, 18 cpi
VERTICAL PITCH	2 lpi, 3 lpi, 4 lpi, **6 lpi**, 8 lpi, 12 lpi, 1 lpcm, 2 lpcm, 4 lpcm (lines per cm)
PRINTER ID[5]	LA50, LA120, LA210, **DEC PPL2**
DISCON/EOT[6]	**NOT SELECTED**, SELECTED (The DTR signal is dropped for 5 seconds when the control code EOT (0/4) is received.)
INIT.REPORT[6]	**NOT SELECTED**, SELECTED (at power-up an initialization message is sent to the host)
AUTO ANSWERBACK[6]	**NOT SELECTED**, SELECTED (at power-up the Answerback message is sent to the host at completion of the internal diagnostic test if no error is detected.)
ANSWER-BACK/ENQ[6]	**NOT SELECTED**, SELECTED (When the control code ENQ (0/5) is received, the Answerback message is sent to the host.)
AUTO WRAP	NOT SELECTED (truncate), **SELECTED** (wrap)
LF ON CR	**NOT SELECTED** (no auto LF on CR), SELECTED (auto LF on CR)
CR ON LF	**NOT SELECTED** (no auto CR on LF), SELECTED (auto CR on LF)

[3]The item **Not Present** is printed and bolded when the selected character set is not found in the list of built-in or cartridge character sets.

[4]The cartridge character sets are listed if an optional cartridge with additional character sets is installed.

[5]The PRINTER ID sub-menu defines the Device Attributes Report (DAR) response returned by the printer in DEC PPL2 emulation.

[6] These features are active only if the serial port is active.

Table 4–6   IBM PP III Menu

Menu Item	Parameter
CHARACTER SETS	
C-SET 1/2	**C-SET 1** (selects Character Set 1), C-SET 2 (selects Character Set 2)
NATIONAL SET	**USA (437)**, MULTI (850), PORTUG (860), NORWAY (865), SPAIN (220), GREECE (210), CAN-FR (863), TURKEY (857), HEBREW (862), Not Present [3], *Cartridge character sets (labeled EXT)*[4]
HORIZ. PITCH	5 cpi, 6 cpi, 8.55 cpi, **10 cpi**, 12 cpi, 17.1 cpi, PROPORTIONAL, Proportional Enlarged
VERTICAL PITCH	2 lpi, 3 lpi, 4 lpi, **6 lpi**, 8 lpi, 72/7 lpi, 1 lpcm, 2 lpcm and 4 lpcm (lines per cm)
12CPI/COND	12 CPI (12 CPI and Condensed commands set 12 CPI), **20 CPI** (12 CPI and Condensed commands set 20 CPI)
SLASHED 0	**NORMAL 0**, SLASHED 0
LF ON CR	**NOT SELECTED** (no auto LF on CR), SELECTED (auto LF on CR)
CR ON LF	**NOT SELECTED** (no auto CR on LF), SELECTED (auto CR on LF and any vertical motion function)

[3]The item **Not Present** is printed and bolded when the selected character set is not found in the list of built-in or cartridge character sets.

[4]The cartridge character sets are listed if an optional cartridge with additional character sets is installed.

Table 4–7   Epson FX-1050 Menu

Menu Item	Parameter
CHARACTER SETS	
GRAPHIC/ITALIC	GRAPHIC 1[7], **GRAPHIC 2**[7], ITALIC 1[8], ITALIC 2[8]
NATIONAL ASCII[9]	**USA**, FRANCE, GERMANY, U.K., DENMARK 1, SWEDEN, ITALY, SPAIN 1, JAPAN, NORWAY, DENMARK 2, SPAIN 2, LATIN AMERICA, Not Present [3], *Cartridge character sets (labeled EXT)*[4]
CODE PAGE[10]	**USA (437)**, MULTI (850), PORTUG (860), NORWAY (865), SPAIN (220), GREECE (210), CAN-FR (863), TURKEY (857), HEBREW (862), *Cartridge character sets (labeled EXT)*[4]
HORIZ. PITCH	5 cpi, 6 cpi, 8.55 cpi, **10 cpi**, 12 cpi, 17 cpi, 20 CPI, PROPORTIONAL, Proportional Enlarged
VERTICAL PITCH	2 lpi, 3 lpi, 4 lpi, **6 lpi**, 8 lpi, 72/7 lpi, 1 lpcm, 2 lpcm and 4 lpcm (lines per cm)
SLASHED 0	**NORMAL 0**, SLASHED 0
LF ON CR	**NOT SELECTED** (no auto LF on CR), SELECTED (auto LF on CR)

[3]The item **Not Present** is printed and bolded when the selected character set is not found in the list of built-in or cartridge character sets.

[4]The cartridge character sets are listed if an optional cartridge with additional character sets is installed.

[7] GRAPHIC 1 and GRAPHIC 2 select the Graphic character set table defined by the Code Page and the National ASCII set selected. If GRAPHIC 1 is selected, decimal positions 128 to 159 are control codes.

[8]ITALIC 1 and ITALIC 2 select the Italic charater set table defined by the National ASCII set selected. If ITALIC 1 is selected, decimal positions 128 to 159 are control codes.

[9]The National ASCII selection affects the Graphic character set and the Italic character sets as specified in Appendix J.

[10]The Code Page selection affects the Graphic character set only.

Table 4–8   OPTIONAL EMULATION Menu

CARTRIDGE, **EPSON FX-1050**[11], MAIN SET-UP

[11]This selection is not affected by the FACTORY DFLT function.

5

Maintaining the Printer

5.1 General Maintenance

The printer does not need preventive maintenance.

The casing of the printer and the platen will need cleaning from time to time. Digital's computer-accessories catalog, DECdirect, lists suitable cleaners for these tasks.

Always use the cleaners in accordance with the instructions on the cleaners.

Paper

Select the correct kind of paper for the job. Always make sure to position paper squarely and set it tightly around the platen. Also make sure that the printhead adjustment lever is in the correct position (See Section 3.3 and Section 3.4). See Section A.1 for paper specifications. To remove paper from the printer, press the FF switch.

Ribbon Cartridge and Printhead

Keep samples of early printouts to help you know when to replace the ribbon cartridge and printhead. Use only Digital-approved ribbon cartridges in the printer. (Other cartridges may not give the same performance and may shorten the life of the printhead.) See Section 1.3.3.1 for information on how to replace the ribbon cartridge, See Section 5.2 for tips on recognizing when to replace the ribbon cartridge and printhead, or when to contact your service representative.

5.2 Correcting Simple Problems

This section lists possible fault symptoms and suggests tests and actions to help you clear those symptoms.

How to Use This Section

1. Find the category in which your problem occurs. The problem categories are:

    – Power-related Problems

    – No Printout

    – Operation-related Problems

    – Print-related Problems

    – Ribbon or Carriage-related Problems

    For example, if the print appears very light on the paper, look at Section 5.2.4, Print-related Problems.

2. Find the symptom description that most closely matches the printer symptom. In this example you would look at the symptom "Print faint or of poor quality."

3. Try the first suggestion under that heading.

4. If the suggestion does not cure the problem, try the next suggestion.

5. If none of the suggestions enable you to continue printing, or if the fault is not listed, contact your Digital office.

Each time the printer is switched On, the indicators turn on while the internal self-tests are run. Look at all the indicators to make sure that they are all working. If an internal fault is detected, the Fault indicator will flash.

If any indicators are faulty, or if the Fault indicator flashes, contact your Digital sales representative.

5.2.1 Power-related Problems

- **No indicators come On when power is switched On.**

    ⇒ Check that the power cord and plug are securely fitted to the printer and to an electrical outlet.

    ⇒ Ask for the power connector connections (and fuse, if fitted) to be verified.

    ⇒ Ask for the building electrical supply to be verified.

- **Ready indicator is flashing; Fault indicator is flashing (1 second period), and does not respond when the Ready switch is pressed**.

  ⇒ Is the access cover fitted and seated correctly?

    Closing it and pressing the Ready switch should light the Ready indicator.

- **When the power is On, the carriage does not move.**

  ⇒ Make sure that the access cover is seated correctly.

  ⇒ Make sure that you have removed all packing material from the printer. Refer to Section 1.3.1.

5.2.2 No Printout

- **Printer self-test does not start.**

  ⇒ Make sure that you press the Quiet key when you turn the power on.

  ⇒ Make sure that you have closed the cover.

  ⇒ Make sure that pinfeed paper is against the pressure-sensitive switch on the left tractor. Refer to Table 1–1.

  ⇒ Make sure that paper is loaded in the printer.

- **Printing does not start.**

  ⇒ Make sure that the Ready indicator is On. If not, press the Ready switch. Printing should start when you send data from the host computer.

  ⇒ Make sure that the printer is connected to the host computer. (Refer to Section 1.5). Make sure that connectors are properly fixed at both ends.

  ⇒ Make sure that the printer is receiving data from the host computer. When data is being sent, the Data indicator flashes. When data is in the buffer but flow is not active, the Data indicator is on.

  ⇒ Make sure that the correct protocol is enabled. (Refer to Section 4.3.)

  ⇒ Make sure that you have selected the correct port (if the automatic feature has not been selected). (Refer to the Set-up Mode information in Section 4.3.)

  ⇒ Make sure that paper is loaded.

- **No response to computer commands. Ready indicator is On.**

  ⇒ Examine and, if necessary, reseat the data cable connections.

⇒ Check the condition of the data cable. Replace it if necessary.

⇒ Examine the features set-up for a communications mismatch. Do the features match those of the host computer?

⇒ Check data flow with the Data indicator.

- **Carriage moves, but there is no printout during Printing Self-test.**

  ⇒ Make sure that the ribbon is installed.

  ⇒ Examine the ribbon path. Does the ribbon pass in front of the whole printhead? Adjust the ribbon if necessary. (See Section 1.3.3).

- **Pinfeed paper does not advance.**

  ⇒ Make sure that pinfeed paper is depressing the switch on the left tractor. See Chapter 3.

  ⇒ Push the paper selection lever towards the back of the printer for tractor feed.

- **Single sheet paper does not advance.**

  ⇒ Pull the paper selection lever towards the front of the printer for friction feed.

- **Paper not detected by printer even though it is loaded.**

  ⇒ Check that the paper falls in front of the triangle marked on the plastic guide.

5.2.3 Operation-related Problems

- **Power/Ready indicator is flashing; Fault indicator is On.**

  ⇒ This is an "out of paper" response. Make sure that the tractor/friction feed lever is in the position needed by your application. Load paper; the Fault indicator will turn Off, and the Power/Ready indicator will either turn On or flash. If it flashes, press the Ready switch to turn On the Power/Ready indicator.

- **The LA310 MultiPrinter stops printing; Fault indicator is On.**

  ⇒ This is an "out of paper" response. Load paper; if the Ready indicator is flashing, press the Ready switch. The LA310 MultiPrinter should resume printing.

  ⇒ Make sure that the paper is not torn or otherwise damaged.

- **No reverse paper feed**.

  ⇒ Make sure that you are not at the end of the paper.

  ⇒ Make sure that the printer is in the pause state.

  ⇒ Make sure that the paper is not damaged.

  ⇒ Make sure that you have set the printer for tractor feeding.

  ⇒ Make sure that the backward motion feature (in Set-up) is enabled.

- **Paper is not positioned at perforation for tear-off feature**.

  ⇒ Make sure that the printer is in the Pause state. If the Ready indicator is On, press the Ready switch.

  ⇒ If the platen has been moved by hand, reload the paper. Make sure that you use a complete form for the first sheet.

  ⇒ Select the correct form length using the Set-up feature.

  ⇒ Reset top of form by performing a Parking function.

  ⇒ Check that the rear paper cover is in the raised position with the prop correctly set.

- **Printhead carriage does not move smoothly**.

  ⇒ Examine the paper pathway. Remove any obstructions.

  ⇒ Check that all packaging material has been removed.

  ⇒ Examine the printhead carriage bar (the round bar on which the printhead moves). Is it dirty? If so, clean it with an oil-lubricated soft cloth. Do not use water or cleaners containing solvents.

  ⇒ Examine the carriage area for obstructions. Remove, where necessary.

- **Carriage does not move; Fault indicator flashes**.

  ⇒ Examine the paper pathway. Remove any obstructions. Press the Ready switch when the paper pathway is cleared.

- **Feeding mode cannot be switched (all lights flash, and Fault light is off).**

  ⇒ Unload paper (Fault light must be on).

- **Specific continuous media causes paper jam when feeding is reversed.**

  ⇒ Disable the Backward Motion feature in Set-up.

- **Narrow paper hits bail bar on top of form, or jams.**

  ⇒ Refer to Section 3.4.

  ⇒ Check the paper width setting in Set-up.

  ⇒ Adjust the bail rollers.

- **Cut sheet paper is skewed.**

  ⇒ Adjust cut sheet paper guides.

5.2.4 Print-related Problems

- **Printed characters are smudged.**

  ⇒ Adjust the paper thickness lever.

- **Print faint or of poor quality.**

  ⇒ Is the paper thickness control set correctly for the paper you are using? Adjust as necessary. See Section 3.3.

  ⇒ Have you used the correct paper? See Section A.1 which contains a full specification of the paper you can use. Replace the paper if it does not match the specification.

  ⇒ Make sure that the ribbon is tensioned correctly.

  ⇒ Make sure that the ribbon is of the correct type. (See Section A.2).

  ⇒ Does the ribbon need changing? Replace it with a new ribbon if necessary.

  ⇒ Is the ribbon cartridge properly seated? Reseat as necessary.

- **Character or characters do not print evenly or are not uniform in pitch.**

  ⇒ Examine the paper pathway for dirt or other obstruction that may cause the gap between printhead and platen to vary. Remove the obstruction.

- **Print lines overlap.**

  ⇒ Examine the paper pathway for dirt or other obstruction that may prevent the platen from rotating freely. Remove the obstruction.

  ⇒ Make sure that the paper selection lever is set fully to the front or to the rear and not in an intermediate position.

⇒ Make sure that the platen can rotate freely by moving the platen knob. The platen can only rotate freely when the printer is in the Pause state.

⇒ Make sure that the paper stack is free.

- **In bidirectional printing mode, characters are not well-aligned vertically between two consecutive lines.**

  ⇒ Check and adjust the Horizontal Line Adjustment, as described in Appendix F.

- **NLQ1 or NLQ2 print mode produces poor quality printing.**

  ⇒ Check and adjust the Horizontal Line Adjustment, as described in Appendix F.

- **On multipart preprinted forms, the printing on the copies is not aligned with the preprinted matter.**

  ⇒ Check the paper stack adjustment against the tractors.

  ⇒ Use the optional Pull Tractor.

- **Characters printed at a slant; paper tears or jams.**

  ⇒ Make sure that the paper selection lever is set fully to the front or to the rear and not in an intermediate position.

  ⇒ Examine the paper pathway; remove any obstructions.

  ⇒ Is the paper too loose or too taut between the tractors?
  If the holes in the paper are deformed at their outer edges, the paper is too taut.
  If the paper rises between the tractors, it is too loose.
  Readjust the tractor spacing so that the paper lies smoothly but without any tension.
  Ensure that the paper is horizontally aligned on the pins.

- **Part of printed text is missing (loss of data).**

  ⇒ If you are using Serial communications, check the buffer control setting in Set-up.

  ⇒ Check the data flow control setting on the host computer.

- **Error reports or characters printed; Ready indicator is On.**

  ⇒ Examine and, if necessary, reseat the data cable connections.

  ⇒ Examine the features set-up; there may be a communications mismatch. Do the features match those of the host computer?

- **Printer does not stop when out of paper.**

  ⇒ Printer circuits do not detect that there is no paper. Examine the paper pathway. Remove any obstructions. Press the Ready switch when the paper pathway is cleared.

- **Font cartridge has been installed, but the printer is still using internal fonts.**

  ⇒ Power OFF the printer and check that the font cartridge has been correctly inserted.

  ⇒ Check that the font cartridge has been selected in the printer Set-up (see Appendix B).

5.2.5 Ribbon or Carriage-related Problems

- **Ribbon Problems.**

  ⇒ Make sure that the ribbon is:

  - Tensioned correctly

  - Not worn thin or dry

  - Not torn or damaged in any other way

  - Not jammed

  - The correct type as recommended by Digital (See Section A.2).

- **Carriage does not move smoothly.**

  ⇒ Examine the paper pathway. Remove any obstructions. Check that all packing material is removed.

  ⇒ Examine the printhead carriage bar (the round bar on which the printhead moves.) Is it dirty? If so, clean it with a soft cloth.

  ⇒ Examine the carriage area for obstructions. Remove where necessary.

5.3 Service

If you cannot correct a problem with the printer, contact your local Digital office.

5.4 Digital Equipment Corporation Services

Digital Equipment Corporation provides a wide range of maintenance programs that cover small systems, terminals, and printers. These include on-site, carry-in, and mail-in maintenance services. You can use these programs to select a plan that meets your service needs, from complete Digital support to self-maintenance.

On-Site Service	Choose from three fast, low-cost, high quality, on-site maintenance options: OPENcare+, OPENcare, or Time and Materials service.
Carry-In Service	More than 150 Digital service centers in major cities around the world offer convenient, fast, and dependable DECreturn maintenance.
DECmailer	For those capable of self-maintenance, a fast turnaround module and sub-assembly repair service.

For more information on any of Digital Equipment Corporation's Maintenance Services, call the Digital Customer Services office in your area during normal business hours.

5.5 Calling the Service Center

Refer to the following advice before calling the service center.

Before calling for service, check the problem yourself.	Check Section 5.2; you may be able to solve the problem yourself.
Who should call for service?	Typically, the system manager should place the call for service.
What the service center needs to know.	Write down the serial and model numbers of the LA310 MultiPrinter. These are located on the back of the printer.

Maintaining the Printer
5.5 Calling the Service Center

Be ready to answer questions when you call.	Summarize the problem. Make a note of:
	• What you were doing when the printer failed
	• Any indications on the control panel
	• Any strange noises
	Stay by the printer/host system if possible; the service engineer may ask you to recreate the problem.
Where you should call.	In the continental United States, call DIGITAL at 1–800–272–2001. In Alaska, Hawaii, Canada and Europe, call your local sales office for service.

A

Reference Information

A.1 Specifications

Printer Specifications

Feature	Range
Printing Method:	Impact Dot Matrix, 9 pin
Protocols:	Digital's Conformance Level-2 (for sixel graphics) IBM Proprinter III (4201/4202-III) Epson FX-1050
Interfaces:	Serial, via 6 pin DECconnect type connector Parallel, via 36 pin Centronics type connector
Selectable Baud Rates:	150, 300, 600, 1200 2400, 4800, 9600
Selectable Data Bits and Parity:	7-Even, 7-Odd, 7-Space, 7-Mark, 7-None 8-Even, 8-Odd, 8-None
Print Modes:	Normal Quiet (double passes)

Reference Information
A.1 Specifications

Feature	Range

Average Print Speeds:

Print	Speed
HSD	300 CPS
Draft	240 CPS
NLQ1	55 CPS
NLQ2	55 CPS

Throughput Performance:

Standard ECMA 132, continuous form

Print	Speed (pages per hour)
Draft Letter	271 pph
HSD Letter	298 pph
NLQ1/2 Letter	97 pph
Graphics	38 pph

Text Printing Pitches:

—Horizontal:	from 5 cpi to 20 cpi
—Vertical:	from 2 lpi to 12 lpi, and 1, 2, or 4 lines per centimeter

Graphic Resolutions:

—Horizontal:	1/60", 1/72", 1/80", 1/90", 1/120", 1/144", 1/180", 1/240"
—Vertical:	1/72", 1/144"

Feature	Range
Character Sets:	**DEC PPL2**

ASCII
DEC Supplemental
DEC VT100 Special Graphics
DEC Technical
ISO Latin-1 Supplemental
National Replacement Character (NRC) Sets:

    British
    DEC Finnish
    French
    DEC French/Canadian
    German
    ISO Italian
    JIS Roman
    DEC Norway/Denmark
    ISO Spanish
    DEC Swedish
    Norway/Denmark
    DEC Dutch
    DEC Swiss
    DEC Portuguese

Legal
DEC Hebrew Character Sets:

    DEC 7-bit Hebrew
    DEC 7-bit Hebrew Supplemental
    ISO Latin Hebrew Supplemental

Greek Character Sets:

    DEC Greek Supplemental
    ISO Latin Greek Supplemental

Turkish Character Sets:

    DEC 7-bit Turkish
    DEC 8-bit Turkish Supplemental
    ISO Latin-5 Supplemental

JIS Katakana

Reference Information
A.1 Specifications

Feature	Range
Character Sets:	**IBM PP III and Epson FX** USA (Code Page 437) Multilingual (Code Page 850) Portugal (Code Page 860) Norway (Code Page 865) National Spain (Code Page 220) Greece (Code Page 210) Canada - French (Code Page 863) Hebrew (code Page 862) Turkey (Code Page 857)
Input Buffer:	16K characters with down-loadable character set capability 32K characters with no down-loadable character set capability in IBM PP III and EPSON FX-1050 modes.
Serial Communications Features:	Data flow control: Xon/Xoff or DTR Disconnect on Fault: Drop DTR or Pulse DTR or Break **DEC PPL2 specifics:** Auto answerback message, Answerback on ENQ, Disconnect on EOT, Initialization report
Optional Cards:	Character set cartridge Font cartridge Optional emulation
Resident Typestyles:	High Speed Draft Draft Sans Serif NLQ1 Sans Serif NLQ2 Serifed
Print Attributes:	Underline Double underline Overline Italic Strike-through Shadow bold Double width

Feature	Range
Dimensions:	Width= 605 mm, Depth = 378 mm, Height = 110 mm.
Weight:	10 kg
Power Requirements:	120 V @ 1.6 Amps, 50/60 Hz, 50 W 220 V @ 1.0 Amps, 50/60 Hz, 50 W 240 V @ 1.0 Amps, 50/60 Hz, 50 W

Noise Level:
—Average Acoustic noise per ISO 7779[1]

Mode	LwA (bels)	LpA (dB)
Draft	6.8	55
Draft Quiet	6.6	53
NLQ	6.6	53
NLQ Quiet	6.4	51

Safety and Regulatory Approvals

Geography	Approval
North America	UL1950 Listed CSA C22-2 FCC Class B CSA 108-8
UK and Australia	VDE 871 and VDE 875 FCC Class B EN 60950, IEC 950, ZH 1/618
Mainland Europe	VDE 871 and VDE 875 FCC Class B EN 60950, IEC 950, ZH 1/618, NEMKO, DEMKO, FEI

[1]LwA = A-weighted sound power level measured in bels re 1 pw; LpA = A-weighted sound power pressure in dB at bystander position

Reference Information
A.1 Specifications

Paper Specifications

Feature	Range
Paper Types:	Pinfeed (tractor media) Single sheets Up to 4 part forms (with no pull tractor) Envelopes
Continuous Paper (Tractor Media):	1. Single part continuous paper up to 16" (40.6 cm) wide including perforations is supported. The allowable weight for these forms is 56 to 90 g/m² (15 to 24 pounds per ream). 2. Multiple part forms: up to 16" wide including perforation. • 4 parts (1 original and 3 copies) with carbon: 150 to 270g/m² Total thickness: .013" maximum (0.4 mm) • 4 parts (1 original and 3 copies) without carbon: 130 to 220g/m² Total thickness: .013" maximum (0.4 mm) • **NOTE** **Hole spacing should be 12.7 mm +/- 0.25 mm (0.50" +/- 0.01") non-accumulative over 50.8 mm (2.00") with a hole diameter of 3.8 mm to 4.1 mm (0.15" to 0.16").**
Single-sheet Paper (Hand-fed Media):	Single-sheet plain bond, typewriter quality paper between 60 and 100 g/m². Hand-fed multiple-part forms (0.013" max. thickness) and up to 16.5" (42cm) in width. Minimum form length: 2.5" (63.5 mm).

A.2 Printer Accessories

Description	Part Number
Ribbon Cartridges	
Black Ribbon Cartridges (six in a box)	LA31R-06
Optional Cartridge	
ISO Latin-2/Cyrillic character sets	LA31X-CA
Cables	
Serial Data Cable	BC16E-10
Parallel Data Cable	BC-19M-10
Shielded Serial Data Cable	DD-16E-10
Accessories	
Pull Tractor	LA31X-PT
Acoustic Cover	See current edition of DECdirect
Desk Stand	See current edition of DECdirect
Printer Table	See current edition of DECdirect
Dust Cover	See current edition of DECdirect
Paper Basket	See current edition of DECdirect
Cleaning Materials	See current edition of DECdirect
Paper	See current edition of DECdirect

Interface/System Cable and Adapters

Connector Type	Adapter and Cable
25-Pin Male	
VAXstation 3200/3500	H8571-A and BC16E[1]
VT100 Series	H8571-A and BC16E[1]
DECserver 200/MC (DSRVB-AA)	H8571-A and BC16E[1]
CCITT V.24/CCITT V.28	H8571-A and BC16E[1]
DECpc 222, 320, 325, 333, 425, 433 (Serial Port)	H8571-A and BC16E[1]
DECstation 316, 320, 325, 425 (Serial Port)	H8571-A and BC16E[1]
9-Pin Male	
VT200-Series	H8571-B and BC16E[1]
DECmate	H8571-B and BC16E[1]
Pro-Series	H8571-B and BC16E[1]
VAXstation 2000	H8571-B and BC16E[1]
DECpc 433 Workstation, 433T, 400ST series, 320sx Notebook, 333 Portable	H8571-J and BC16E[1]
DEC423 Serial	
VAXmate	BC16E[1]
MicroVAX 2000	BC16E[1]
DECserver 200/DL (DSRVB-BA)	BC16E[1]
VT300-Series	BC16E[1]
CPU DEC423 ports	BC16E[1]
VT 420	BC16E[1]

[1]The BC16E cable is included with the LA310 MultiPrinter. If the BC16E cable is listed on its own, no adapter is required.

Connector Type	Adapter and Cable
25-Pin Female	
Rainbow	H8571-D and BC16E[1]
25-Pin Female Parallel Port	
DECpc and DECstation machines	BC19M-10

[1]The BC16E cable is included with the LA310 MultiPrinter. If the BC16E cable is listed on its own, no adapter is required.

B

Using Font and Character Set Cartridges

This appendix contains details on the following:

- Font cartridges and character set cartridges that you can use with the LA310 MultiPrinter.

  Font and character set cartridges provide support for additional typestyles or additional character sets that apply to all resident protocols.

- Installing the font and character set cartridges.

- Checking the contents of the font or character set cartridge you have installed.

- Using font cartridges (including selection through Set-up and selection through software commands in DEC PPL2 mode).

- Using character set cartridges (including selection through Set-up and selection through software commands in DEC PPL2 mode).

All cartridges are optional. Only one cartridge can be used at a time.

B.1 Types of Cartridges

There are three types of cartridges supported by the LA310 MultiPrinter:

1. Font cartridges

2. Character set cartridges

3. Protocol emulation cartridges

This appendix contains details of font and character set cartridges only. For details of selecting the optional emulation provided by the protocol emulation cartridges, refer to Section 4.3.6, Optional Emulation Selection Set-up.

Using Font and Character Set Cartridges
B.1 Types of Cartridges

B.1.1 Font Cartridges

A font cartridge provides one or two typestyles in addition to the NLQ2 style that is resident in the LA310. Most of the resident character sets are covered with these typestyles. See Section B.3 to check the contents of the cartridge installed.

In all resident emulations, these typestyles can be selected by Set-up. In DEC PPL2 mode, these typestyles can also be selected by software commands.

B.1.2 Character Set Cartridges

Character set cartridges add new character sets to those resident in the printer.

See Section B.3 for details of how to check the list of available character sets for each resident emulation. For all characters, these cartridges contain the same print qualities as the resident characters.

In all resident emulations, these character sets can be selected by Set-up. In addition in DEC PPL2 mode, these character sets can be selected by software commands.

In IBM PP III mode, the Code Page numbers required for the software selection are also provided.

B.2 Installing a Cartridge

To install a cartridge (see also Figure B–1):

1. Set the power to OFF (0).

   CAUTION: The printer *must* be powered off to install cartridges.

2. Hold the cartridge with the side containing the insertion direction arrow facing the platen knob.

3. Insert the cartridge into the slot on the right rear side of the printer. When the cartridge is fully inserted, it clicks as it connects to a board inside the printer.

4. Set the power to ON (1).

Figure B–1   Inserting the cartridge
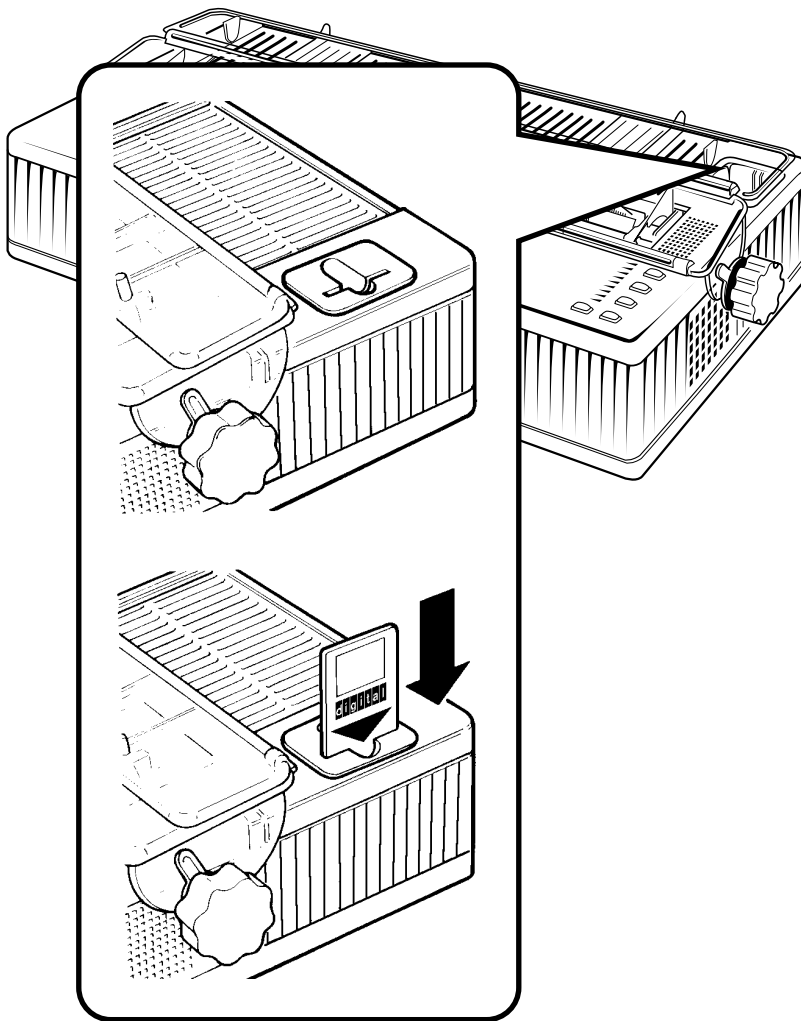
B.3 Checking the Contents of the Cartridge

When you enter Set-up mode with a cartridge installed, the printer lists the contents of the cartridge, before you can make any selection.

In DEC PPL2 mode, the data needed for the software selection of the character sets or the typestyles is also provided. For detailed information on the control commands for selecting the character set cartridges, refer to the *DEC PPL2 Programming Reference Manual*.

B.3.1 Manual Selection of Cartridges

Manual selection of cartridges depends on whether the cartridge is a font cartridge or a character set cartridge.

Refer to Chapter 4 for details of entering Set-up mode and selecting a new configuration.

B.3.1.1 Manual Selection of Font Cartridges

You can select one of the typestyles provided by the cartridge by moving to the TYPESTYLE submenu under the GENERAL main menu.

B.3.1.2 Manual Selection of Character Set Cartridges

You can select a character set for a protocol from the character sets provided by the cartridge by moving to the CHARACTER SETS submenus under the related protocol main menu.

C

Defining Form Settings

There are two important form settings that you might need to define:

- The User Form Length setting, which enables you to store, in the printer's memory, the length of a form you want to use.

- The Top of Form setting, which enables you to adjust the position of the printed text on the physical page.

C.1 User Form Length Mode

User form length mode allows you to define a form length that is not already defined in the set of form lengths in Set-up mode (see Appendix A for details of available form lengths).

NOTE: You cannot set a user-defined form length if the form is over 21 inches.

You can set the form length in one of two ways: automatic or manual.

C.1.1 Setting User Form Length Automatically

To set a form length automatically, the LA310 MultiPrinter measures a sample form. The sample form must be fed in single-sheet mode. Even if you plan to use continuous stationery in the printer, you must feed a single sheet of this stationery into the printer in order for the printer to measure it.

To set the form length automatically:

1. Set the power to OFF (0).

2. Unload any paper that you have loaded.

3. Set the printer to single-sheet mode (see Figure 3–2).

4. Press the FF button, and hold while setting the power to ON (1).

   All indicators, except the Fault indicator, turn on.

5. Load the paper you want to measure:

   a. Put the paper in the position to be loaded.

Defining Form Settings
C.1 User Form Length Mode

      b.   Press the FF button.

          The printer aligns the top of the form with the top of the printhead plastic guide.

      c.   Press the FF button again.

          The printer measures the length of the form automatically. The form is then ejected.

6.   Press the Ready button to store the measured form in the printer's memory. The form length setting in the printer's configuration memory is automatically set to the value measured.

     All indicators switch off for approximately one second, and the printer resets automatically to normal operation.

C.1.2 Setting User Form Length Manually

You can set the form length manually in tractor mode or in single-sheet mode.

To enter the form length manually:

1.   Set the power switch to OFF (0), and unload any paper.

2.   Prepare the printer depending on the mode you are using:

     •   In tractor mode, put continuous paper in the Park position.

     •   In single-sheet mode, do not load paper yet.

3.   Press FF, and hold as you set the power switch to ON (1).

4.   Load paper:

     •   In tractor mode, press FF.

     •   In single sheet mode, put the paper in the position to be loaded and press FF.

     The printer aligns the top of the form with the top of the printhead plastic guide.

5.   Press Quiet, either step-by-step, or continously, until you reach the length you require for the form. Each step is 1/12 inch long. Use the top of the printhead plastic guide as a reference to determine the form length you need.

     NOTE: In single sheet mode, the form length entered must be at least 30mm (1.17") less than the length of the paper.

6.   Press READY to store the form length in the printer's memory. The form length setting in the printer's configuration memory is automatically set to the value measured.

C–2 Defining Form Settings

All indicators switch off for approximately one second, and the printer resets automatically to normal operation.

In single-sheet mode, the current sheet is ejected before the printer returns to normal operation.

C.1.3 Checking the Form Length Value Store

As the form length setting is set automatically, you may want to check its value.

To check the value:

1. Enter Set-up.

2. Print the configuration list.

    The entry FORM LENGTH in the GENERAL menu is set to USER. The entry USER FORM LENGTH contains the length previously entered in one-twelfths of an inch. For example, 132 (the default setting) indicates a form length of 132 twelfths of an inch, or 11 inches.

Through Set-up mode from the GENERAL main menu, you can change the form length setting to any of the available values; the User Form Length value determined by the above procedures is not altered as a result of your selection of a value.

When recalling the factory default settings for all parameters (entry FACTORY DFLT), the User Form Length is not altered, but the form length setting under the GENERAL main menu is reset to the default setting (11 inches).

C.2 Top of Form Setting

The Top of Form setting allows you to adjust the position of the printed text on the page within a range of ±0.25 inches, with no impact on tear-off operations, and can be set at any line on the form.

The Top of Form setting can be entered either

- With the front cover closed using the front panel buttons, or

- With the front cover open using the internal console buttons

To enter a Top of Form setting, you use a number of buttons that have specific meanings in this setting. These are:

Table C–1   Top of Form Setting Buttons

Front Panel Button	Internal Console Button	Function
Quiet	LINE	Line down
LF	T.O.F. ↑	Change adjustment 2/216" closer to top of page
Parking	T.O.F. ↓	Change adjustment 2/216" closer to bottom of page
FF	SET T.O.F.	Print previous setting
Ready	SAVE	Store last setting and perform Form Feed

To enter a Top of Form setting:

1. Set the power to OFF (0).

2. Prepare and install paper for automatic loading at power-up, either for push tractor mode or single-sheet mode.

3. Press Parking (T.O.F. ↓ in the internal console) while setting the power to ON (1).

   Paper loads automatically.

4. Press Quiet (LINE) to position the paper to the line at which the adjustment is needed. If you do not use this button, the printer makes the adjustment at the first line in the page.

5. Press FF (SET T.O.F).

   The following line is printed at the current line first column:

   HHHHHHHH

   and the paper is advanced to enable you to read the printed line.

   The printer disables the LINE and SET T.O.F. keys.

6. Change the current setting using the LF (T.O.F ↑) and Parking (T.O.F. ↓) keys to the position you require.

   Each time you press the LF (T.O.F ↑) and Parking (T.O.F.↓) keys, the printer prints the following at the new setting:

   HHHHHHHH

   and advances the paper to enable you to read the printed line.

   If you reach the lowest point at which you can set the Top of Form setting, you hear a beep, and there is no printing or advancing of the paper.

7. Press Ready (SAVE) to save the setting you require.

NOTE: When you recall the factory default settings for all parameters (entry FACTORY DFLT), the Top of Form setting is not affected.

D

Printing Control Characters

This appendix contains information on printing control characters. Printing control characters can help the user who is debugging software, as it translates a graphic token for each byte. While printing control characters, each control character is not active but is printed by the LA310 MultiPrinter, with the exception of:

- Line Feed, which executes a carriage return/line feed in addition to printing **<LF>**.

- Form Feed, which prints **<FF>**, then executes a form feed.

D.1 Entering Control Rendition Mode

To print control characters, you must be in Control Rendition mode, also known as DUMP mode. To enter Control Rendition Mode:

1. Set the power switch to OFF (0).

2. Hold the LF button, and at the same time, set the power switch to ON (1).

3. To begin printing, load the printer with paper, and close the cover.

4. To stop printing, set the power switch to OFF (0).

The LA310 MultiPrinter prints all printable characters using the character set selection determined by Set-up, in normal mode, draft at 10 cpi and 6 lpi, except the following:

- Control characters, such as **<FF>**, are printed in bold.

- Control characters without acronyms are printed in hexadecimal, in the format **<Xnn>** where **nn** is the hexadecimal code—for example, 8/0 is printed as **<X80>**.

E

Internal Console

This appendix provides information on operations that use buttons on the internal console.

Internal Console

Figure E–1 Internal Console
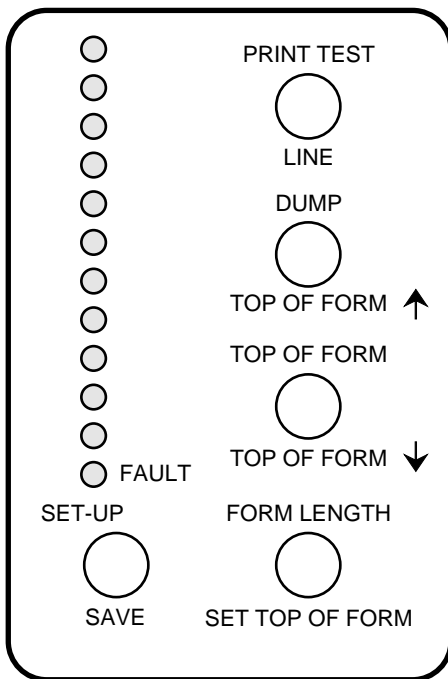
The following modes can be initiated at power-up with the front cover open, by pressing a button on the internal console:

- **Printing self-test**

  Pressing the PRINT TEST key at power-up causes the printer to enter the printing self-test, as described in Section 1.4, Testing the Printer. The test begins when the front cover is closed and the paper is successfully loaded.

- **DUMP printing**

  Pressing the DUMP key at power-up causes the printer to enter the DUMP mode (or Printing Control Characters mode) as described in Appendix D. The test begins when the front cover is closed and the paper is successfully loaded.

- **Top of Form setting**

Pressing the T.O.F key at power-up causes the printer to enter the Top of Form Setting mode as described in Section C.2, which also provides the meaning of each key on the internal console in this mode.

- **User Form Length mode**

  Pressing the FORM LENGTH key at power-up causes the printer to enter the User Form Length mode, as described in Section C.1. The two modes, automatic and manual, can be run by using the following keys:

Key	Function
FORM LENGTH	Load paper (both modes) Automatic form length adjustment (automatic mode)
LINE	Enter the required number of lines (manual mode)
SET-UP/SAVE	Store the measured form length (automatic mode) Store the number of lines entered (manual mode)

- **Set-up mode**

  Pressing the SET-UP key at power-up causes the printer to enter Set-up mode, as described in Chapter 4. The Set-up mode begins when the front cover is closed and the paper is successfully loaded.

F

Horizontal Line Adjustment

The LA310 MultiPrinter processes text printing in bidirectional mode by default. It also processes NLQ1 and NLQ2 print modes in two passes in bidirectional mode (provided that the set-up feature NLQ DIRECTION is set to BIDIRECTIONAL).

The horizontal line adjustment is optimized before the printer leaves the factory, so that the two passes are horizontally aligned. During the life of the printer, it may be necessary to improve this adjustment.

The following procedure allows you to check the horizontal line adjustment and to improve it if necessary:

1. Set the power to OFF (0).

2. Load paper into the printer (preferably in Push Tractor mode).

3. Press the QUIET and FF buttons *simultaneously* while setting the power to ON (1).

4. After the printer has finished its initialization procedure, and if the paper has been loaded successfully, the following pattern is printed:

Horizontal Line Adjustment

Figure F–1 Horizontal Line Adjustment Pattern

LEVEL 1

LEVEL 2

LEVEL 3

LEVEL 4

LEVEL 5

LEVEL 6

LEVEL 7

Selection : 4
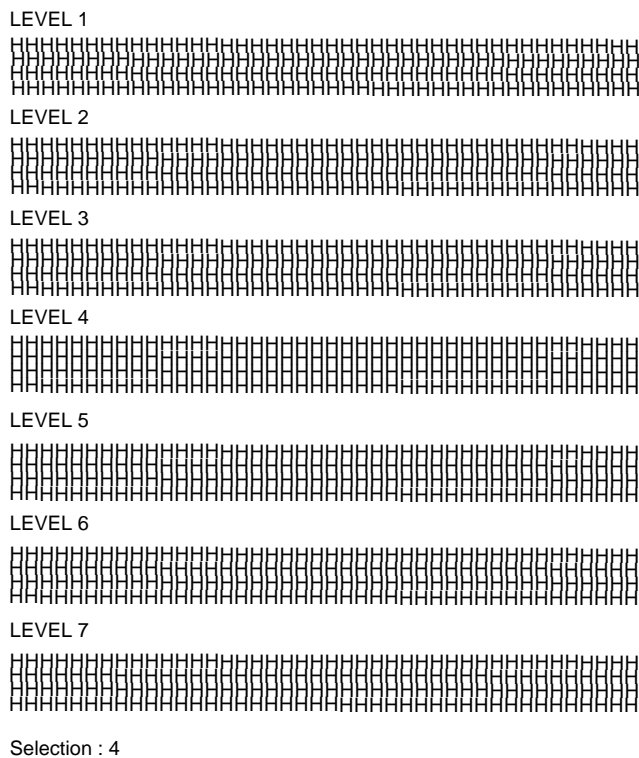
The horizontal line adjustment allows you to select one of the seven possible settings that are given in the pattern.

The last line of the printed pattern shows the pattern that was selected last. For example, in Figure F–1, the selected setting is displayed as `Selection: 4`.

5. To list the next setting, press the LF button. To choose a setting, press LF as many times as you need to display the selection you require. Pressing the FF button causes the latest setting to be saved in non-volatile memory, and a printhead pattern to be printed.

Horizontal Line Adjustment

6. To leave this mode, switch the power to OFF (0). You can switch the power off at any time during the printhead test.

G

Set-up Menu Structure

G.1 Set-up Menu Structure

Set-up mode enables you to customize the printer for your specific use.
This appendix shows the structure of the Set-up menus, and can be used in
conjunction with Chapter 4. In the following figures, bolded items are the
default settings.

```
                        ┌─────────────────────────┐
                        │    Set-up Directory      │
                        └─────────────────────────┘

 ┌──────────────────────────────────────────────────────────────────────────┐
 │  PRINT   GENERAL   PROTOCOL    COMMUN-    DEC     IBM    OPTIONAL   FACTORY │
 │                    SELECTION   ICATIONS   PPL2   PP III  EMULATION  DEFAULT │
 └──────────────────────────────────────────────────────────────────────────┘

              ┌──────────┐         ┌──────────┐    ┌──────────┐      ┌──────────┐
              │ GENERAL  │         │  COMMS   │    │ IBM PP III│     │  Recall  │
              │Main Menu │         │Main Menu │    │ Main Menu │     │ Factory  │
              └──────────┘         └──────────┘    └──────────┘      │ Defaults │
                                                                     └──────────┘

   ┌──────────┐    ┌──────────┐         ┌──────────┐  ┌──────────┐   ┌──────────┐
   │  PRINT   │    │ PROTOCOL │         │   DEC    │  │  EPSON   │   │   CARD   │
   │Configura-│    │SELECTION │         │   PPL2   │  │ FX-1050  │   │EMULATION │
   │  tion    │    │Main Menu │         │Main Menu │  │Main Menu │   │Main Menu │
   │  List    │    └──────────┘         └──────────┘  └──────────┘   └──────────┘
   └──────────┘
```

Set-up Menu Structure
G.1 Set-up Menu Structure

General Main Menu

| Form Length | Paper Width | Print Quality | Typestyle | NLQ Direction | Backward Motion | Auto Advance | Bottom of form | Input Buffer | Error Beep | Paper Out |

3"
3.5"
4"
5.5"
6"
7"
8"
8.5"
11" (A)
11 2/3" (A4)
12"
14"
15"
USER

1"–8"
8"
13.6"

Forced HSD
Forced NLQ1
Forced NLQ2
Soft/Control

Internal
Card Style 1
Card Style 2

Bidirectional
Unidirectional

Enabled
Disabled

Not Selected
Selected

0
1 inch

16 k
32 k

1 Beep
3 Beeps
Continuous
Off

Selected
Not Selected

G.1 Set-up Menu Structure

```
                    ┌─────────────────────────────────┐
                    │ Protocol Selection Main Menu     │
                    └─────────────────────────────────┘
                                      │
  ┌───────────────────────────────────────────────────────────────────┐
  │ PORT-DEPENDENT    DEC PPL2      IBM PP III    EPSON FX-1050 OR      │
  │                                               CARD EMULATION         │
  └───────────────────────────────────────────────────────────────────┘
        │                    │            │              │
        │             ╭─────────────╮ ╭─────────────╮ ╭─────────────────╮
        │             │ DEC PPL2    │ │ IBM PP III  │ │ EPSON FX-1050    │
        │             │ Protocol    │ │ Protocol    │ │ or Card Emulation│
        │             │ Selected    │ │ Selected    │ │ Selected         │
        │             ╰─────────────╯ ╰─────────────╯ ╰─────────────────╯
  ┌─────────────────────────────┐
  │ SERIAL PORT   PARALLEL PORT  │
  └─────────────────────────────┘
        │               │
  ╭─────────────╮ ╭─────────────────╮
  │ DEC PPL2    │ │ DEC PPL2         │
  │ IBM PP III  │ │ IBM PP III       │
  │ EPSON FX-1050 OR │ EPSON FX-1050 OR │
  │ CARD EMULATION │ │ CARD EMULATION   │
  ╰─────────────╯ ╰─────────────────╯
```

Set-up Menu Structure
G.1 Set-up Menu Structure

Communications Main Menu

PORT SELECTION   SERIAL COMMUNICATIONS

Automatic
Serial Port
Parallel Port

| BAUD RATE | DATA FORMAT | BUFFER CONTROL | MONITOR DSR | DISCONNECT ON FAULT |

Xon/Xoff
DTR

Not Selected
Drop DTR
Pulse DTR
Break Signal

150
300
600
1200
2400
4800
9600

7-Space
7-Mark
7-None
7-Even
7-Odd
8-None
8-Even
8-Odd

Not Selected
Selected

```
                              ┌─────────────────────┐
                              │ DEC PPL2 Main Menu   │
                              └─────────────────────┘
```

Character Sets	Horizontal Pitch	Vertical Pitch	Printer ID	Disconnect on EOT	Init. Report	Auto Answerback	Answerback on ENQ	Auto Wrap	LF on CR	CR on LF

```
┌──────────────┐  ┌──────────────┐  ┌──────────┐  ┌───────────┐   ┌───────────┐   ┌──────────┐   ┌──────────┐   ┌───────────┐
│ GO    User   │  │ 5     cpi    │  │ 2   lpi  │  │ Not Selected │ │ Not Selected │ │ Not Selected │ │ Not Selected │ │ Not Selected │
│ Char  Pref.  │  │ 6     cpi    │  │ 3   lpi  │  │ Selected     │ │ Selected     │ │ Selected     │ │ Selected     │ │ Selected     │
└──────────────┘  │ 6.6   cpi    │  │ 4   lpi  │  └───────────┘   └───────────┘   └──────────┘   │ Selected     │   └───────────┘
                  │ 8.25  cpi    │  │ 6   lpi  │                                                 └──────────┘
                  │ 8.55  cpi    │  │ 8   lpi  │                 ┌───────────┐   ┌──────────┐   ┌──────────┐
                  │ 9     cpi    │  │ 12  lpi  │                 │ Not Selected │ │ Not Selected │ │ Not Selected │
                  │ 10    cpi    │  │ 1   lpcm │                 │ Selected     │ │ Selected     │ │ Selected     │
                  │ 12    cpi    │  │ 2   lpcm │                 └───────────┘   └──────────┘   └──────────┘
                  │ 13.2  cpi    │  │ 4   lpcm │
                  │ 15    cpi    │  └──────────┘
                  │ 16.5  cpi    │
                  │ 17.1  cpi    │  ┌──────────┐
                  │ 18    cpi    │  │ LA50     │
                  └──────────────┘  │ LA120    │
                                    │ LA210    │
                                    │ DEC PPL2 │
                                    └──────────┘
```

Character Sets submenus:

ASCII	DEC Supplement
British	ISO Latin-1
French	DEC 8 Turkish
DEC Finnish	ISO Lat-Hebrew
DEC French-Can	ISO Lat-Greek
German	DEC Greek Sup
ISO Italian	ISO Latin-5
JIS Roman	JIS Katakana
DEC Norw/Dan	DEC 7 Hebrew
ISO Spanish	DEC Hebrew Sup
DEC Swedish	DEC Technical
Norweg/Danish	.
DEC Dutch	.
DEC Swiss	.
DEC Portug	
Legal	
DEC 7 Hebrew	
DEC Hebrew Sup.	
DEC Greek Sup.	
DEC 7 Turkish	
DEC 8 Turkish	
JIS Katakana	
DEC Supplement	
DEC Spec Graph	
DEC Technical	
User Pref Set	
.	
.	
.	

Set-up Menu Structure
G.1 Set-up Menu Structure

```
                         ┌──────────────────────┐
                         │ IBM PP III Main Menu  │
                         └──────────────────────┘
                                     │
   ┌─────────┬─────────────┬──────────────┬──────────┬──────────┬──────────┬──────────┐
 Character   Horizontal    Vertical      12 cpi     Slashed      LF         CR
   Sets        Pitch         Pitch       /Cond.        0        on CR      on LF
   │             │             │            │          │           │          │

 C-Set  National   5    cpi   2    lpi    12 cpi    Not Selected  Not Selected
 1/2    Set        6    cpi   3    lpi    20 cpi     Selected      Selected
   │               8.55 cpi   4    lpi
                   10   cpi   6    lpi
 C-Set 1           12   cpi   8    lpi    Normal 0   Not Selected
 C-Set 2           17.1 cpi   72/7 lpi    Slashed 0   Selected
   │               Proport.   1    lpcm
                   Prop. Enl  2    lpcm
 USA  (437)                   4    lpcm
 Multi (850)
 Portug (860)
 Norway (865)
 Spain (220)
 Greece (210)
 Can-Fr (863)
 Turkey (857)
 Hebrew (862)
 .
 .
```

Epson FX-1050 Main Menu

Character Sets	Horizontal Pitch	Vertical Pitch	Slashed 0	LF on CR

Character Sets:

Graphic /Italic	National ASCII	Code Page

Graphic 1
Graphic 2
Italic 1
Italic 2

National ASCII:

USA
France
Germany
U.K.
Denmark 1
Sweden
Italy
Spain 1
Japan
Norway
Denmark 2
Spain 2
Latin America

Code Page:

USA (437)
Multi (850)
Portug (860)
Norway (865)
Spain (220)
Greece (210)
Can-Fr (863)
Turkey (857)
Hebrew (862)
.
.

Horizontal Pitch:

5	cpi
6	cpi
8.55	cpi
10	**cpi**
12	cpi
17.1	cpi
20	cpi
Proport.	
Prop. Enl	

Vertical Pitch:

2	lpi
3	lpi
4	lpi
6	**lpi**
8	lpi
72/7	lpi
1	lpcm
2	lpcm
4	lpcm

Slashed 0:

Normal 0
Slashed 0

LF on CR:

Not Selected
Selected

H

DEC PPL2 Quick Reference

This appendix contains basic information on the DEC PPL2 commands that are supported in the LA310 MultiPrinter. It also contains the character set code tables supported by the LA310 MultiPrinter in the DEC PPL2 protocol.

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

This guide should be used 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* (EK–PPLV2–DK).

Characters used in control functions appear in monospaced type. Table H–1 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:

DEC PPL2 Quick Reference

Table H–1 Conventions

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

NOTE: 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.

Table H–2 Positioning Controls

DECCAHT	Clear All Horizontal Tabs	`ESC 2`	
DECCAVT	Clear All Vertical Tabs	`ESC 4`	
DECSHTS	Set Horizontal Tab Stops	`CSI Pn ;...; Pn u`	Pn = tab stop position
DECSVTS	Set Vertical Tab Stops	`CSI Pn ;...; Pn v`	Pn = tab stop position
DECHTS	Horizontal Tab Set	`ESC 1`	
DECVTS	Vertical Tab Set	`ESC 3`	
HPA	Horizontal Position Absolute	`CSI Pn '`	Pn = position to move to
HPR	Horizontal Position Relative	`CSI Pn a`	Pn = number of columns right
VPA	Vertical Position Absolute	`CSI Pn d`	Pn = position to move to
VPR	Vertical Position Relative	`CSI Pn e`	Pn = number of lines down

Table H–3 Sheet size and margins

DECSLPP	Set Lines per Physical Page	`CSI Pn t`	Pn = number of lines per page
DECSLRM	Set Left and Right Margins	`CSI Pn1 ; Pn2 s`	Pn1 = left margin Pn2 = right margin
DECHPWA	Set Page Width Alignment	`CSI Pn1 ; Pn2 " s`	Pn1[1] = origin Pn2[1] = paper width
DECSTBM	Set Top and Bottom Margins	`CSI Pn1 ; Pn2 r`	Pn1 = top margin Pn2 = bottom margin

[1]Units are 1/12 inch.

DEC PPL2 Quick Reference

Table H–4 Type size and spacing, managing implicit cursor motion

DECAWM	Autowrap Mode	`CSI ? 7 h` `CSI ? 7 l`	Set autowrap mode Reset autowrap mode
DECCRNLM	Carriage Return/ New Line Mode	`CSI ? 40 h` `CSI ? 40 l`	CR acts as New Line CR acts as Carriage Return
DECSHORP	Set Horizontal Pitch	`CSI Ps w`	Ps = 0: Determined by current font Ps = 1: 10 CPI Ps = 2: 12 CPI Ps = 3: 13.2 CPI Ps = 4: 16.5 CPI Ps = 5: 5 CPI Ps = 6: 6 CPI Ps = 7: 6.6 CPI Ps = 8: 8.25 CPI Ps = 9: 15 CPI Ps = 11: 17.1 CPI Ps = 12: 8.55 CPI Ps = 13: 18 CPI Ps = 14: 9 CPI Ps = 15: 10 CPI
DECVERP	Set Vertical Pitch	`CSI Ps z`	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	`CSI 20 h` `CSI 20 l`	LF acts as New Line LF acts as Line Feed

[1]LPcm = Lines per centimeter

Table H–5 Font management and attribute selection

SGR	Select Graphic Rendition - *Selecting Fonts*	CSI Ps m	Ps = 10: Built in Typestyle Ps = 11–19: Cartridge Typestyle or Downloaded font
SGR	Select Graphic Rendition - *Selecting Attributes*	CSI Ps ; . . . ; Ps m	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 off Ps = 53: Overline on Ps = 55: Overline off Ps = ?4: Superscript on Ps = ?5: Subscript on Ps = ?24: Script off
DECDEN	Printing Density Selection	CSI Ps " z	Ps = 0 or 1: Select High Speed Draft Ps = 2: Select Near Letter Quality 2 Ps = 3: Select Draft Ps = 4: Select Near Letter Quality 1
DECDLD	Download Font	DCS parameter_string { D . . . D ST	See the *Programming Reference Manual*

Table H–6 Tabs

TBC	Tab Clear	CSI Ps ; . . . ; Ps g	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

DEC PPL2 Quick Reference

Table H–7 Selecting character sets

ASCEF	Announce Subset of Code Extension Facilities	`ESC SP L`	ASCII in G0 and GL. ISO Latin-1 Supplemental in G1 and GR.
		`ESC SP M`	Same as `ESC SP L`
		`ESC SP N`	ASCII in G0 and GL.
DECAUPSS	Assign User Preference Supplemental Set	`DCS Ps ! u` `D . . . D ST`	$Ps = 0$: 94-char. set $Ps = 1$: 96-char. set `D . . . D`: SCS designating sequence.
SS2	Single Shift 2	`ESC N`	Take the next character from G2
SS3	Single Shift 3	`ESC O`	Take the next character from G3
LS0	Locking Shift 0 (or Shift In)	`SI`	Invoke G0 into GL
LS1	Locking Shift 1 (or Shift Out)	`SO`	Invoke G1 into GL
LS2	Locking Shift 2	`ESC n`	Incoke G2 into GL
LS3	Locking Shift 3	`ESC o`	Invoke G3 into GL
LS1R	Locking Shift 1 Right	`ESC ~`	Invoke G1 into GR
LS2R	Locking Shift 1 Right	`ESC }`	Invoke G2 into GR
LS3R	Locking Shift 1 Right	`ESC |`	Invoke G3 into GR
SCS	Select Character Set	`ESC I₁ I₂ F`	I_1 = "(": Invoke 94-char. set into G0 I_1 = ")": Invoke 94-char. set into G1 I_1 = "*": Invoke 94-char. set into G2 I_1 = "+": Invoke 94-char. set into G3 I_1 = "-": Invoke 96-char. set into G1 I_1 = ".": Invoke 96-char. set into G2 I_1 = "/": Invoke 96-char. set into G3 I_2 F = additional characters from Table H–11, at the end of this appendix.

Figure H–1   Designating and Invoking Character Sets

MLO-003976
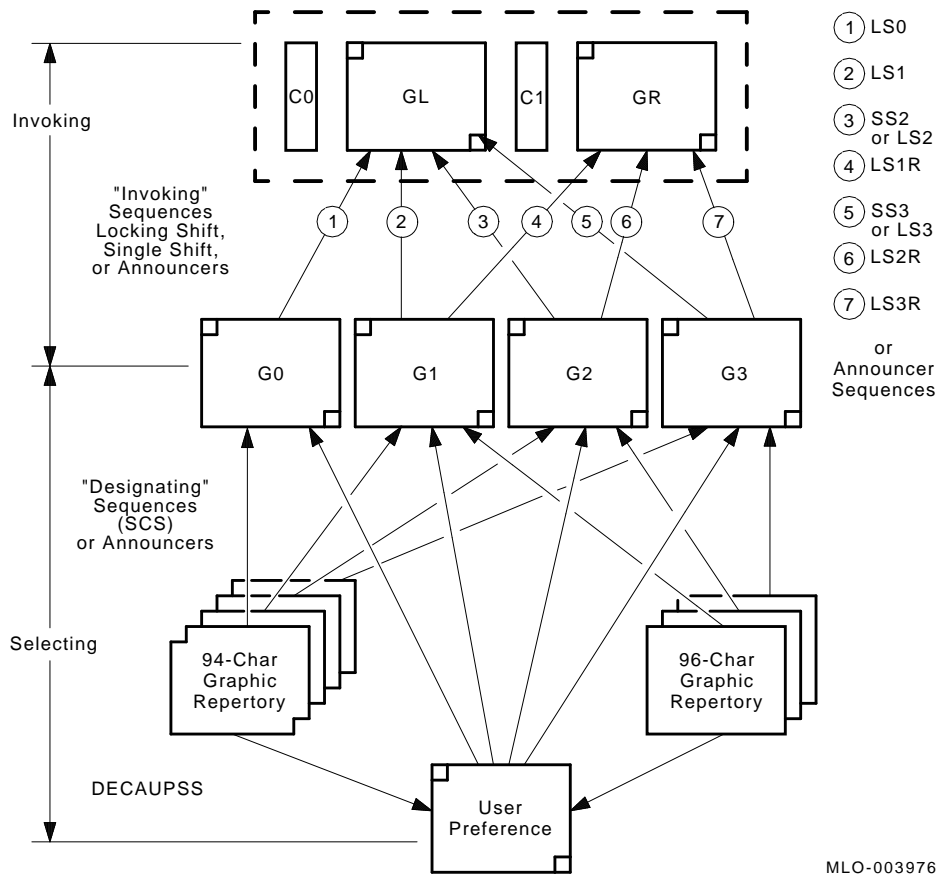
DEC PPL2 Quick Reference

Table H–8 Character Sets Power-up Settings

Character Set	Power-up Setting
G0 CHAR SET	Defined by Set-up feature G0 CHAR SET
G1	ASCII
G2 and G3	User Preference Character Set
GL	G0
GR	G2
User Preference Supplemental	Defined by Set-up feature USER PREF SET

Table H–9 Reports

DA	Device Attributes	`CSI c`	Request Device Attributes Report
DAR	Device Attributes Report	`ESC [ ? Ps1 ; Ps2 ; . . . ; Psn c` (printer to host)	Ps1 = 72 Ps2–Psn describe extensions. See the *Programming Supplement.*
DA2	Secondary Device Attributes	`CSI > Ps c`	Ps must = 0
DA2R	Secondary Device Attributes Report	`ESC [ > Ps1 ; Ps2 ; 0 ; Ps4 ; Ps5 c` (printer to host)	Ps1 = 59 Ps2 = firmware revision x 10 Ps4 = 20 (IBM and EPSON emulations) Ps5 = firmware edit revision
DECFSR	Font Status Report	`ESC P 3 " { D . . . D ST` (printer to host)	D . . . D = type_style (intended_pitch ; SGR_parameter) ; CR LF . . .
DECRFS	Request Font Status	`CSI Ps " {`	Ps must = 0 or 3
DSR	Device Status Request	`CSI Ps n`	Ps = 0 or 5: Request extended DSR Ps = ?1: Disable all unsolicited reports Ps = ?2: Enable brief unsolicited reports, send extended report Ps = ?3: Enable/send extended unsolicited reports

(continued on next page)

Table H–9 (Cont.)   Reports

DSR	Device Status Report	Brief: `ESC [ Ps n` Extended: brief, followed by `ESC [ Pn1 ; Pn2 ; . . . ; Pnn n`	Ps = 0: No errors Ps = 3: Error See the *Programming Supplement* for extended report

Table H–10   Miscellaneous

DECSCL	Select Conformance Level	`CSI Ps1 " p`	Ps = 0: reset - native level Ps = 71: reset - DEC PPL1 Ps = 72: reset - DEC PPL2
DECSTR	Soft Terminal Reset	`CSI ! p`	Reset to initial state
RIS	Reset to Initial State	`ESC c`	Reset to initial state
DECIPEM	IBM Proprinter Emulation Mode	`ESC [ ? 58 h` `CSI ? 58 l`	Deprecated function
ROCS	Return from Other Coding System	`ESC % @`	Return to DEC PPL2 mode
SOCS	Select Other Coding System	`ESC % =`	IBM Proprinter Emulation
SOCS	Select Other Coding System	`ESC % SP 2`	EPSON Emulation

CRM	Control Representation Mode	`CSI 3 h`
		
		`CSI 3 l`
			Print hex representation for all characters
			Print text normally

DECASFC	Automatic Sheet Feeder Control	`CSI Ps ! v`	Performs Conditional Sheet Feed (The LA310 MultiPrinter has no sheet feeder)
DECUPM	Unidirectional Print Mode	`CSI ? 41 h` `CSI ? 41 l`	Set unidirectional print mode Reset unidirectional print mode

DEC PPL2 Quick Reference

Table H–10 (Cont.) Miscellaneous

DECTC1/	C1 Receive	ESC SP 6	Process 7-bit, drop 8th bit
DECAC1		ESC SP 7	Process 7-bit and 8-bit
DECLANS	Load Answerback	DCS Ps v D...D ST	Ps = 1: load message, do not store in NVRAM Ps = 2: load message, store in NVRAM D...D: hex-encoded message
DECLANS	Load Answerback and Protect	DCS 3 ; Pn2; Pn3 v D...D ST	Pn2: old numeric password (default is "0", maximum is "9999") Pn3: new numeric password D...D: hex-encoded message

Table H–11 SCS Final Characters

Character Set	I₂ F Designator Characters	Code
94-Character Sets		
British[1]	A	4/1
ASCII	B	4/2
DEC Dutch[1]	4	3/4
DEC Finnish[1]	5	3/5
French[1]	R	5/2
DEC French-Canadian[1]	9	3/9
German[1]	K	4/11
DEC Hebrew Supplemental	"4	2/2, 3/4
DEC 7-Bit Hebrew	%=	2/5, 3/13
ISO Italian[1]	Y	5/9
Legal	%4	2/5, 3/4
JIS Katakana	I	4/9
JIS Roman[1]	J	4/10
DEC Norwegian/Danish[1]	6	3/6
ISO Spanish[1]	Z	5/10
DEC Swedish[1]	7	3/7

[1]These character sets are National Replacement Character (NRC) sets. See Table H–12.

Table H–11 (Cont.)   SCS Final Characters

Character Set	I_2 F Designator Characters	Code
DEC Swiss[1]	=	3/13
Norwegian/Danish[1]	'	6/0
DEC Supplemental	%5	2/5, 3/5
DEC Technical	>	3/14
DEC Special Graphics	0	3/0
DEC Portuguese[1]	%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[2]
96-Character Sets		
ISO Latin-1 Supplemental	A	4/1
ISO Latin-2 Supplemental[3]	B	4/2
ISO Latin-Greek Supplemental	F	4/6
ISO Latin-Hebrew Supplemental	H	4/8
ISO Latin/Cyrillic Supplemental[3]	L	4/12
ISO Latin-5 Supplemental	M	4/13

[1]These character sets are National Replacement Character (NRC) sets. See Table H–12.

[2]For compatibility with older devices, set the User Preference Supplemental character set to the DEC Supplemental character set.

[3]These character sets are supported by an optional cartridge.

DEC PPL2 Quick Reference

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

Standard Right

C1 Control Set		Graphics Right (GR)					
Column 8	**9**	**10**	**11**	**12**	**13**	**14**	**15**

Row 0	200 128 80	DCS 220 144 90	240 160 A0	○ 260 176 B0	` A 300 192 C0	320 208 D0	à 340 224 E0	360 240 F0
1	201 129 81	PU1 221 145 91	¡ 241 161 A1	± 261 177 B1	´ A 301 193 C1	Ñ 321 209 D1	á 341 225 E1	ñ 361 241 F1
2	BPH 202 130 82	PU2 222 146 92	¢ 242 162 A2	2 262 178 B2	Â 302 194 C2	` O 322 210 D2	â 342 226 E2	` o 362 242 F2
3	NBH 203 131 83	STS 223 147 93	£ 243 163 A3	3 263 179 B3	Ã 303 195 C3	´ O 323 211 D3	ã 343 227 E3	ó 363 243 F3
4	IND 204 132 84	CCH 224 148 94	244 164 A4	264 180 B4	Ä 304 196 C4	Ô 324 212 D4	ä 344 228 E4	ô 364 244 F4
5	NEL 205 133 85	MW 225 149 95	¥ 245 165 A5	µ 265 181 B5	Å 305 197 C5	Õ 325 213 D5	å 345 229 E5	õ 365 245 F5
6	SSA 206 134 86	SPA 226 150 96	246 166 A6	¶ 266 182 B6	Æ 306 198 C6	Ö 326 214 D6	æ 346 230 E6	ö 366 246 F6
7	ESA 207 135 87	EPA 227 151 97	§ 247 167 A7	• 267 183 B7	Ç 307 199 C7	Œ 327 215 D7	ç 347 231 E7	œ 367 247 F7
8	HTS 210 136 88	SOS 230 152 98	¤ 250 168 A8	270 184 B8	` E 310 200 C8	Ø 330 216 D8	` e 350 232 E8	ø 370 248 F8
9	HTJ 211 137 89	231 153 99	© 251 169 A9	1 271 185 B9	É 311 201 C9	` U 331 217 D9	é 351 233 E9	` u 371 249 F9
10	VTS 212 138 8A	SCI 232 154 9A	ª 252 170 AA	º 272 186 BA	Ê 312 202 CA	Ú 332 218 DA	ê 352 234 EA	ú 372 250 FA
11	PLD 213 139 8B	CSI 233 155 9B	« 253 171 AB	» 273 187 BB	Ë 313 203 CB	Û 333 219 DB	ë 353 235 EB	û 373 251 FB
12	PLU 214 140 8C	ST 234 156 9C	254 172 AC	¼ 274 188 BC	` I 314 204 CC	Ü 334 220 DC	` i 354 236 EC	ü 374 252 FC
13	RI 215 141 8D	OSC 235 157 9D	255 173 AD	½ 275 189 BD	´ I 315 205 CD	¨ Y 335 221 DD	í 355 237 ED	ÿ 375 253 FD
14	SS2 216 142 8E	PM 236 158 9E	256 174 AE	276 190 BE	Î 316 206 CE	336 222 DE	î 356 238 EE	376 254 FE
15	SS3 217 143 8F	APC 237 159 9F	257 175 AF	¿ 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
301	Octal
Á 193	Decimal
C1	Hex

MLO-003974

DEC PPL2 Quick Reference

The following tables provide a list of positions from the National Replacement Character (NRC) sets which differ from the U.S. ASCII Character Set. All other positions of these NRC sets are the same as in the U.S. ASCII character set.

Table H–12   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	^		Ü		î			
6/0	'		é		ô		ù	
7/11	{		ä	é	é	ä	à	
7/12	|		ö	ù	ù	ö	ò	
7/13	}		à	è	è	ü	è	
7/14	~		ü	¨	û	ß	ì	—

Table H–12 (Cont.)   National Replacement Character sets

Location	US ASCII	DEC Norwegian-Danish	ISO Spanish	DEC Swedish	Norwegian-Danish	DEC Dutch	DEC Swiss	DEC Portuguese
				National Replacement Character Sets				
2/3	#		£			£	ù	
4/0	@	Ä	§	É		3/4	à	
5/11	[	Æ	¡	Ä	Æ	ÿ	é	Ã
5/12	\	Ø	Ñ	Ö	Ø	½	ç	Ç
5/13	]	Å	¿	Å	Å			ê	Õ
5/14	^	Ü		Ü			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	}	à	ç	à	à	¼	ü	õ
7/14	~	ü		ü		'	û	

DEC PPL2 Quick Reference

Figure H–4 DEC Special Graphics Character Set

DEC Special Graphics Character Set

Row	Col 2 / 10 (GL/GR)	Col 3 / 11 (GL/GR)	Col 4 / 12 (GL/GR)	Col 5 / 13 (GL/GR)	Col 6 / 14 (GL/GR)	Col 7 / 15 (GL/GR)
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	— (SCAN 3) — 160/360 · 112/240 · 70/F0
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	— (SCAN 5) — 161/361 · 113/241 · 71/F1
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	HT — 142/342 · 98/226 · 62/E2	— (SCAN 7) — 162/362 · 114/242 · 72/F2
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	FF — 143/343 · 99/227 · 63/E3	— (SCAN 9) — 163/363 · 115/243 · 73/F3
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	CR — 144/344 · 100/228 · 64/E4	├ — 164/364 · 116/244 · 74/F4
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	LF — 145/345 · 101/229 · 65/E5	┤ — 165/365 · 117/245 · 75/F5
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	° — 146/346 · 102/230 · 66/E6	┴ — 166/366 · 118/246 · 76/F6
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
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	NL — 150/350 · 104/232 · 68/E8	│ — 170/370 · 120/248 · 78/F8
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	VT — 151/351 · 105/233 · 69/E9	≤ — 171/371 · 121/249 · 79/F9
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
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
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
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
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
15	**/** — 57/257 · 47/175 · 2F/AF	**?** — 77/277 · 63/191 · 3F/BF	**O** — 117/317 · 79/207 · 4F/CF	_ (SCAN 1) — 137/337 · 95/223 · 5F/DF	─ — 157/357 · 111/239 · 6F/EF	

LEGEND

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

MLO-003984

Figure H–5 DEC Technical Character Set

DEC Technical Character Set

LEGEND

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

α

MLO-003985

DEC PPL2 Quick Reference

Figure H–6   ISO Latin-1 Supplemental Character Set

ISO Latin-1 Supplemental Character Set

	GL 2 / GR 10	GL 3 / GR 11	GL 4 / GR 12	GL 5 / GR 13	GL 6 / GR 14	GL 7 / GR 15	
Row 0	NBSP 240/160/A0	° 260/176/B0	À 300/192/C0	Ð 320/208/D0	à 340/224/E0	ð 360/240/F0	Row 0
1	¡ 241/161/A1	± 261/177/B1	Á 301/193/C1	Ñ 321/209/D1	á 341/225/E1	ñ 361/241/F1	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
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
4	¤ 244/164/A4	´ 264/180/B4	Ä 304/196/C4	Ô 324/212/D4	ä 344/228/E4	ô 364/244/F4	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
6	¦ 246/166/A6	¶ 266/182/B6	Æ 306/198/C6	Ö 326/214/D6	æ 346/230/E6	ö 366/246/F6	6
7	§ 247/167/A7	• 267/183/B7	Ç 307/199/C7	× 327/215/D7	ç 347/231/E7	÷ 367/247/F7	7
8	¨ 250/168/A8	¸ 270/184/B8	È 310/200/C8	Ø 330/216/D8	è 350/232/E8	ø 370/248/F8	8
9	© 251/169/A9	¹ 271/185/B9	É 311/201/C9	Ù 331/217/D9	é 351/233/E9	ù 371/249/F9	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
11	« 253/171/AB	» 273/187/BB	Ë 313/203/CB	Û 333/219/DB	ë 353/235/EB	û 373/251/FB	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
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
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
15	¯ 257/175/AF	¿ 277/191/BF	Ï 317/207/CF	ß 337/223/DF	ï 357/239/EF	ÿ 377/255/FF	15

LEGEND

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

MLO-004000

Figure H–7 Legal Character Set

Legal

Row	Ch (2/10)	GL(2)	GR(10)	Ch (3/11)	GL(3)	GR(11)	Ch (4/12)	GL(4)	GR(12)	Ch (5/13)	GL(5)	GR(13)	Ch (6/14)	GL(6)	GR(14)	Ch (7/15)	GL(7)	GR(15)	Row
0				0	60 48 30	260 176 B0	@	100 64 40	300 192 C0	P	120 80 50	320 208 D0	=	140 96 60	340 224 E0	p	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	a	141 97 61	341 225 E1	q	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	b	142 98 62	342 226 E2	r	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	c	143 99 63	343 227 E3	s	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	d	144 100 64	344 228 E4	t	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	e	145 101 65	345 229 E5	u	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	f	146 102 66	346 230 E6	v	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	g	147 103 67	347 231 E7	w	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	h	150 104 68	350 232 E8	x	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	i	151 105 69	351 233 E9	y	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	j	152 106 6A	352 234 EA	z	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	k	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	l	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	m	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	n	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	o	157 111 6F	357 239 EF				15

LEGEND

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

MLO-003982

Figure H–8 DEC 7-bit Hebrew Character Set

DEC 7-Bit Hebrew Character Set

Row	Col 2 (GL) / 10 (GR)	Col 3 (GL) / 11 (GR)	Col 4 (GL) / 12 (GR)	Col 5 (GL) / 13 (GR)	Col 6 (GL) / 14 (GR)	Col 7 (GL) / 15 (GR)
0		0 — 60 48 30 | 260 176 B0	@ — 100 64 40 | 300 192 C0	P — 120 80 50 | 320 208 D0	א — 140 96 60 | 340 224 E0	— 160 112 70 | 360 240 F0
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	— 141 97 61 | 341 225 E1	— 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	R — 122 82 52 | 322 210 D2	— 142 98 62 | 342 226 E2	— 162 114 72 | 362 242 F2
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	— 143 99 63 | 343 227 E3	— 163 115 73 | 363 243 F3
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	— 144 100 64 | 344 228 E4	— 164 116 74 | 364 244 F4
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	— 145 101 65 | 345 229 E5	— 165 117 75 | 365 245 F5
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	— 146 102 66 | 346 230 E6	— 166 118 76 | 366 246 F6
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	— 147 103 67 | 347 231 E7	— 167 119 77 | 367 247 F7
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	— 150 104 68 | 350 232 E8	— 170 120 78 | 370 248 F8
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	— 151 105 69 | 351 233 E9	— 171 121 79 | 371 249 F9
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	— 152 106 6A | 352 234 EA	— 172 122 7A | 372 250 FA
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	— 153 107 6B | 353 235 EB	{ — 173 123 7B | 373 251 FB
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	— 154 108 6C | 354 236 EC	| — 174 124 7C | 374 252 FC
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	— 155 109 6D | 355 237 ED	} — 175 125 7D | 375 253 FD
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	— 156 110 6E | 356 238 EE	~ — 176 126 7E | 376 254 FE
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	— 157 111 6F | 357 239 EF	

LEGEND

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

MLO-004001

Figure H–9 DEC Hebrew Supplemental Character Set

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	א	140 96 60	340 224 E0	‎	160 112 70	360 240 F0	Row 0
1	¡	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	ª	52 42 2A	252 170 AA	º	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

DEC PPL2 Quick Reference

Figure H–10 ISO Latin-Hebrew Supplemental Character Set

ISO Latin-Hebrew Supplemental Character Set

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

LEGEND

GR	
12/1	Column/Row
301	Octal
193	Decimal
C1	Hex
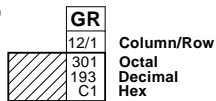
MLO-004003

Figure H–11 ISO Latin-Greek Supplemental Character Set

ISO Latin-Greek Supplemental Character Set

Row	Col 2/10	GL (oct/dec/hex)	GR (oct/dec/hex)	Col 3/11	GL	GR	Col 4/12	GL	GR	Col 5/13	GL	GR	Col 6/14	GL	GR	Col 7/15	GL	GR
0	NBSP	40/32/20	240/160/A0	°	60/48/30	260/176/B0	ΐ	100/64/40	300/192/C0	Π	120/80/50	320/208/D0	ΰ	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	Α	101/65/41	301/193/C1	Ρ	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	Β	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	104/68/44	304/196/C4	Τ	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	Ε	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	¦	46/38/26	246/166/A6	Ά	66/54/36	266/182/B6	Ζ	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	Η	107/71/47	307/199/C7	Χ	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	Έ	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	Ή	71/57/39	271/185/B9	Ι	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	▨	52/42/2A	252/170/AA	Ί	72/58/3A	272/186/BA	Κ	112/74/4A	312/202/CA	Ϊ	132/90/5A	332/218/DA	κ	152/106/6A	352/234/EA	ϊ	172/122/7A	372/250/FA
11	«	53/43/2B	253/171/AB	»	73/59/3B	273/187/BB	Λ	113/75/4B	313/203/CB	Ϋ	133/91/5B	333/219/DB	λ	153/107/6B	353/235/EB	ϋ	173/123/7B	373/251/FB
12	¬	54/44/2C	254/172/AC	Ό	74/60/3C	274/188/BC	Μ	114/76/4C	314/204/CC	ά	134/92/5C	334/220/DC	μ	154/108/6C	354/236/EC	ό	174/124/7C	374/252/FC
13	-	55/45/2D	255/173/AD	½	75/61/3D	275/189/BD	Ν	115/77/4D	315/205/CD	έ	135/93/5D	335/221/DD	ν	155/109/6D	355/237/ED	ύ	175/125/7D	375/253/FD
14	▨	56/46/2E	256/174/AE	Ύ	76/62/3E	276/190/BE	Ξ	116/78/4E	316/206/CE	ή	136/94/5E	336/222/DE	ξ	156/110/6E	356/238/EE	ώ	176/126/7E	376/254/FE
15	—	57/47/2F	257/175/AF	Ώ	77/63/3F	277/191/BF	Ο	117/79/4F	317/207/CF	ί	137/95/5F	337/223/DF	ο	157/111/6F	357/239/EF	▨	177/127/7F	377/255/FF

LEGEND

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

MLO-006610

Figure H–12 DEC Greek Supplemental Character Set

DEC Greek Supplemental Character Set

Each cell shows the character glyph and its code values. For each block: top line = octal (GL / GR), middle line = decimal (GL / GR), bottom line = hex (GL / GR). (▨ = reserved/undefined.)

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

LEGEND

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

MLO-006607

Figure H–13 ISO Latin-5 Supplemental Character Set

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

LEGEND

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

MLO-006611

DEC PPL2 Quick Reference

Figure H–14 DEC Turkish 7-bit Character Set

DEC Turkish 7-bit Character Set

Row		GL 2	GR 10		GL 3	GR 11		GL 4	GR 12		GL 5	GR 13		GL 6	GR 14		GL 7	GR 15	Row
0	0			0	60 48 30	260 176 B0	İ	100 64 40	300 192 C0	P	120 80 50	320 208 D0	Ğ	140 96 60	340 224 E0	p	160 112 70	360 240 F0	0
1	ı	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	a	141 97 61	341 225 E1	q	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	b	142 98 62	342 226 E2	r	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	c	143 99 63	343 227 E3	s	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	d	144 100 64	344 228 E4	t	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	e	145 101 65	345 229 E5	u	165 117 75	365 245 F5	5
6	ğ	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	f	146 102 66	346 230 E6	v	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	g	147 103 67	347 231 E7	w	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	h	150 104 68	350 232 E8	x	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	i	151 105 69	351 233 E9	y	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	j	152 106 6A	352 234 EA	z	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	Ş	133 91 5B	333 219 DB	k	153 107 6B	353 235 EB	ş	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	Ö	134 92 5C	334 220 DC	ı	154 108 6C	354 236 EC	ö	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	Ç	135 93 5D	335 221 DD	m	155 109 6D	355 237 ED	ç	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	Ü	136 94 5E	336 222 DE	n	156 110 6E	356 238 EE	ü	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	o	157 111 6F	357 239 EF				15

LEGEND

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

MLO-006605

Figure H–15 DEC Turkish 8-bit Supplemental Character Set

DEC Turkish 8-bit Supplemental Character Set

MLO-006606

DEC PPL2 Quick Reference

Figure H–16 ISO Latin-Cyrillic Supplemental Character Set

ISO Latin-Cyrillic Supplemental Character Set

Row	GL 2 / GR 10	GL 3 / GR 11	GL 4 / GR 12	GL 5 / GR 13	GL 6 / GR 14	GL 7 / GR 15
0	**NBSP** — GL 40/32/20, GR 240/160/A0	A — GL 60/48/30, GR 260/176/B0	P — GL 100/64/40, GR 300/192/C0	a — GL 120/80/50, GR 320/208/D0	р — GL 140/96/60, GR 340/224/E0	N° — GL 160/112/70, GR 360/240/F0
1	Ë — GL 41/33/21, GR 241/161/A1	Ђ — GL 61/49/31, GR 261/177/B1	C — GL 101/65/41, GR 301/193/C1	δ — GL 121/81/51, GR 321/209/D1	с — GL 141/97/61, GR 341/225/E1	ё — GL 161/113/71, GR 361/241/F1
2	Ђ — GL 42/34/22, GR 242/162/A2	B — GL 62/50/32, GR 262/178/B2	T — GL 102/66/42, GR 302/194/C2	в — GL 122/82/52, GR 322/210/D2	т — GL 142/98/62, GR 342/226/E2	ђ — GL 162/114/72, GR 362/242/F2
3	Ѓ — GL 43/35/23, GR 243/163/A3	Г — GL 63/51/33, GR 263/179/B3	У — GL 103/67/43, GR 303/195/C3	г — GL 123/83/53, GR 323/211/D3	у — GL 143/99/63, GR 343/227/E3	ѓ — GL 163/115/73, GR 363/243/F3
4	Є — GL 44/36/24, GR 244/164/A4	Д — GL 64/52/34, GR 264/180/B4	Ф — GL 104/68/44, GR 304/196/C4	д — GL 124/84/54, GR 324/212/D4	ф — GL 144/100/64, GR 344/228/E4	є — GL 164/116/74, GR 364/244/F4
5	Ѕ — GL 45/37/25, GR 245/165/A5	E — GL 65/53/35, GR 265/181/B5	X — GL 105/69/45, GR 305/197/C5	e — GL 125/85/55, GR 325/213/D5	х — GL 145/101/65, GR 345/229/E5	ѕ — GL 165/117/75, GR 365/245/F5
6	І — GL 46/38/26, GR 246/166/A6	Ж — GL 66/54/36, GR 266/182/B6	Ц — GL 106/70/46, GR 306/198/C6	ж — GL 126/86/56, GR 326/214/D6	ц — GL 146/102/66, GR 346/230/E6	і — GL 166/118/76, GR 366/246/F6
7	Ї — GL 47/39/27, GR 247/167/A7	З — GL 67/55/37, GR 267/183/B7	Ч — GL 107/71/47, GR 307/199/C7	з — GL 127/87/57, GR 327/215/D7	ч — GL 147/103/67, GR 347/231/E7	ї — GL 167/119/77, GR 367/247/F7
8	Ј — GL 50/40/28, GR 250/168/A8	И — GL 70/56/38, GR 270/184/B8	Ш — GL 110/72/48, GR 310/200/C8	и — GL 130/88/58, GR 330/216/D8	ш — GL 150/104/68, GR 350/232/E8	ј — GL 170/120/78, GR 370/248/F8
9	Љ — GL 51/41/29, GR 251/169/A9	Й — GL 71/57/39, GR 271/185/B9	Щ — GL 111/73/49, GR 311/201/C9	й — GL 131/89/59, GR 331/217/D9	щ — GL 151/105/69, GR 351/233/E9	љ — GL 171/121/79, GR 371/249/F9
10	Њ — GL 52/42/2A, GR 252/170/AA	K — GL 72/58/3A, GR 272/186/BA	Ъ — GL 112/74/4A, GR 312/202/CA	к — GL 132/90/5A, GR 332/218/DA	ъ — GL 152/106/6A, GR 352/234/EA	њ — GL 172/122/7A, GR 372/250/FA
11	Ћ — GL 53/43/2B, GR 253/171/AB	Л — GL 73/59/3B, GR 273/187/BB	Ы — GL 113/75/4B, GR 313/203/CB	л — GL 133/91/5B, GR 333/219/DB	ы — GL 153/107/6B, GR 353/235/EB	ћ — GL 173/123/7B, GR 373/251/FB
12	Ќ — GL 54/44/2C, GR 254/172/AC	M — GL 74/60/3C, GR 274/188/BC	Ь — GL 114/76/4C, GR 314/204/CC	м — GL 134/92/5C, GR 334/220/DC	ь — GL 154/108/6C, GR 354/236/EC	ќ — GL 174/124/7C, GR 374/252/FC
13	- — GL 55/45/2D, GR 255/173/AD	H — GL 75/61/3D, GR 275/189/BD	Э — GL 115/77/4D, GR 315/205/CD	н — GL 135/93/5D, GR 335/221/DD	э — GL 155/109/6D, GR 355/237/ED	§ — GL 175/125/7D, GR 375/253/FD
14	Ў — GL 56/46/2E, GR 256/174/AE	O — GL 76/62/3E, GR 276/190/BE	Ю — GL 116/78/4E, GR 316/206/CE	о — GL 136/94/5E, GR 336/222/DE	ю — GL 156/110/6E, GR 356/238/EE	ў — GL 176/126/7E, GR 376/254/FE
15	Џ — GL 57/47/2F, GR 257/175/AF	П — GL 77/63/3F, GR 277/191/BF	Я — GL 117/79/4F, GR 317/207/CF	п — GL 137/95/5F, GR 337/223/DF	я — GL 157/111/6F, GR 357/239/EF	џ — GL 177/127/7F, GR 377/255/FF

LEGEND

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

MLO-006609

Figure H–17 ISO Latin-2 Supplemental Character Set

ISO Latin-2 Supplemental Character Set

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

LEGEND

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

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DEC PPL2 Quick Reference

Figure H–18   JIS Katakana Character Set

JIS Katakana

	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	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	Row 0
1	・	41 33 21	241 161 A1	ア	61 49 31	261 177 B1	チ	101 65 41	301 193 C1	ム	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	イ	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	243 163 A3	ウ	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	244 164 A4	エ	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	245 165 A5	オ	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	ヲ	46 38 26	246 166 A6	カ	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	ァ	47 39 27	247 167 A7	キ	67 55 37	267 183 B7	ヌ	107 71 47	307 199 C7	ラ	127 87 57	327 215 D7	/////	147 103 67	347 231 E7	/////	167 119 77	367 247 F7	7
8	ィ	50 40 28	250 168 A8	ク	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	ゥ	51 41 29	251 169 A9	ケ	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	ェ	52 42 2A	252 170 AA	コ	72 58 3A	272 186 BA	ハ	112 74 4A	312 202 CA	レ	132 90 5A	332 218 DA	/////	152 106 6A	352 234 EA	/////	172 122 7A	372 250 FA	10
11	ォ	53 43 2B	253 171 AB	サ	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	ャ	54 44 2C	254 172 AC	シ	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	ュ	55 45 2D	255 173 AD	ス	75 61 3D	275 189 BD	ヘ	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	ョ	56 46 2E	256 174 AE	セ	76 62 3E	276 190 BE	ホ	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	ッ	57 47 2F	257 175 AF	ソ	77 63 3F	277 191 BF	マ	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

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IBM Proprinter III Quick Reference

This appendix contains basic information on the Proprinter III Emulation commands supported in the LA310 MultiPrinter. It also contains the character set code tables supported by the LA310 MultiPrinter in Proprinter III emulation mode. In addition Table I–9 provides a list of differences between the LA310 MultiPrinter in Proprinter III emulation mode, and the IBM Proprinter III machine.

The IBM Proprinter III emulation commands are fully detailed in the *IBM Proprinter Family Technical Reference (SC31-2587)*. Refer to this manual for further information.

Characters used in control functions appear in monospaced type. Table I–1 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.

The following conventions are used in the command listings:

Table I–1 Conventions

ESC	Escape (1/11), introduces an escape sequence
n1 n2	A 2 byte number of data beginning with the next byte, low byte followed by high byte. This number indicates the number of parameters in the escape sequence, excluding these two bytes.
Pn	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence.
v1 ... vn	A series of parameters pertaining to the escape sequence, control function or control string. The number of parameters is determined by n1 n2.

IBM Proprinter III Quick Reference

Table I–2 Control Characters

Control Character[1]	Location		Description
	in Character Set 1	in Character Set 2	
NUL	0/0 or 8/0	0/0	Null
BEL	0/7 or 8/7	0/7	Beeper
BS	0/8 or 8/8	0/8	Backspace
HT	0/9 or 8/9	0/9	Horizontal Tab
LF	0/10 or 8/10	0/10	Line Feed
VT	0/11 or 8/11	0/11	Vertical Tab
FF	0/12 or 8/12	0/12	Form Feed
CR	0/13 or 8/13	0/13	Carriage Return
SO	0/14 or 8/14	0/14	Double-Wide Printing By Line
SI	0/15 or 8/15	0/15	Condensed Printing (17 cpi)
DC1	1/1 or 9/1	1/1	Select Printer
DC2	1/2 or 9/2	1/2	10 Characters-per-Inch Print
DC3	1/3 or 9/3	1/3	Deselect Printer
DC4	1/4 or 9/4	1/4	Cancel Double-Wide Printing By Line
CAN	1/8 or 9/8	1/8	Cancel Data
ESC	1/11 or 9/11	1/11	Initiate Escape Sequence
SP	2/0 or 15/15	2/0 or 15/15	Space

[1]These Control Characters are not available when the *All Characters Set* is addressed.

Table I–3 Terminal Management

Escape Sequence	Description
ESC [? 5 8 h	Enter Proprinter III mode. (From DEC PPL2 mode. Deprecated function.) *Ignored in IBM PP III mode.*
ESC [? 5 8 l	Return to DEC PPL2 mode. (Deprecated function.)
ESC % =	Enter Proprinter III mode (from DEC PPL2 mode). *Ignored in IBM PP III mode.*

Table I–3 (Cont.)   Terminal Management

Escape Sequence	Description
ESC % @	Return to DEC PPL2 mode
ESC @	Reset Printer
ESC Q 1/6	Deselect Printer
ESC [! p	Reset Printer to DEC PPL2 mode
ESC [K n1 n2 init id P1 P2	Set Initial Condition. id = 1/6
ESC [T n1 n2 NUL NUL P1 P2	Code Page Switching. P1 P2 for Code Page number, most significant byte first. The requested Code Page number is searched in the resident character sets and in the installed optional cartridge.

Table I–4   Vertical Form Handling

Escape Sequence	Description
ESC 0	1/8-Inch Line spacing
ESC 1	7/72-Inch Line spacing
ESC 2	Start Text Line spacing defined by ESC A
ESC 4	Set Top of Form at current vertical position
ESC 5 Pn	Automatic Line Feed Pn = 0/1: set automatic line feed on CR, Pn = 0/0: cancel automatic line feed on CR
ESC A Pn	Set Text Line spacing at 72/Pn lines per inch. Maximum value for Pn is 255.
ESC B P1 P2 ... Pn NUL	Set Vertical Tabs Stops. Tab stops are given in ascending order. ESC R or ESC B NUL clears vertical tab stops.
ESC C Pn	Set Form Length in Lines
ESC C NUL Pn	Set Form Length in Inches
ESC N Pn	Set Automatic Perforation Skip Pn is the number of lines from bottom of paper to skip
ESC O	Cancel Automatic Perforation Skip

IBM Proprinter III Quick Reference

Table I–5   Horizontal Form Handling and Printing Modes

Escape Sequence	Description
ESC :	Set Horizontal Spacing to 12 CPI
ESC - Pn	Continuous Underline Printing Pn = 0/1 : set Underline Printing, Pn = 0/0 : cancel Underline Printing
ESC _ Pn	Continuous Overscore Printing Pn = 0/1 : set Overscore Printing, Pn = 0/0 : cancel Overscore Printing
ESC D P1 P2 ... P28 NUL	Set Horizontal Tab Stops. Tab stops are given in ascending order. ESC D NUL clears horizontal tab stops.
ESC E	Begin Emphasized Printing (Bold)
ESC F	End Emphasized Printing
ESC G	Begin Double-Strike Printing
ESC H	End Double-Strike Printing
ESC I Pn	Select Print Mode Pn = 0/0: Draft resident Pn = 0/1: Fastfont (12cpi) resident Pn = 0/2: NLQ1 resident Pn = 0/3: NLQ2 resident Pn = 0/4: Downloaded Draft Pn = 0/5: Downloaded Fastfont (12cpi) Pn = 0/6: Downloaded NLQ1 Pn = 0/7: Downloaded NLQ2 Pn = 0/11: Italic NLQ2 resident Pn = 0/15: Downloaded Italic NLQ2
ESC P Pn	Proportional Printing Pn = 1 set Proportional printing, Pn = 0 disable Proportional printing
ESC R	Set All Horizontal and Vertical Tabs to Default
ESC S Pn	Script Printing Pn = 0/1 : set Subscript Printing, Pn = 0/0 : set Superscript Printing
ESC T	Cancel Script Printing
ESC U Pn	Bidirectional Printing, Pn = 0/0 : set Bidirectional printing, Pn = 0/1 : set Unidirectional printing

(continued on next page)

Table I–5 (Cont.)   Horizontal Form Handling and Printing Modes

Escape Sequence	Description
ESC W Pn	Continuous Double-Wide Printing Pn = 0/1 : set Double-Wide printing, Pn = 0/0 : cancel Double-Wide printing
ESC SO	Double-Wide Printing by Line. This command is cancelled by DC4
ESC X P1 P2	Set Horizontal Margins P1 is Left Margin, P2 is Right Margin
ESC [@ n1 n2 NUL NUL P1 P2	Double-Wide/Double-High Mode P1 controls line spacing and character height : P1 = 0/0: no change P1 = 0/1: Single-High Character P1 = 0/2: Double-High character P1 = 1/0: Character height unchanged, Single Line Feed P1 = 1/1: Single-High Character, Single Line Feed P1 = 1/2: Double-High Character, Single Line Feed P1 = 2/0: Character height unchanged, Double Line Feed P1 = 2/1: Single-High Character, Double Line Feed P1 = 2/2: Double-High Character, Double Line Feed P2 controls character width : P2 = 0/0: no change P2 = 0/1: Single-Wide Character P2 = 0/2: Double-Wide character

Table I–6   Print-Mode Priority Chart

Print-Mode Combinations	Resulting Mode[1]
Condensed, 12 cpi	12 cpi or 20 cpi (if selected by the 12CPI/COND set-up feature)
Condensed, 12 cpi, NLQ1 or NLQ2	12 cpi-NLQ1 or 12 cpi-NLQ2 or 20 cpi-Draft (if selected by the 12CPI/COND set-up feature)
Condensed, Emphasized	Emphasized
Condensed, NLQ1 or NLQ2	Condensed, Draft
Condensed, Emphasized, NLQ1 or NLQ2	Emphasized, NLQ1 or NLQ2
Emphasized, High Speed Draft	Emphasized, Draft

[1]Graphics commands suspend any text printing command. ESC I Pn (Select Print Mode) cancels any existing conflicting combinations.

IBM Proprinter III Quick Reference

Table I–6 (Cont.) Print-Mode Priority Chart

Print-Mode Combinations	Resulting Mode[1]
Double-Strike, Draft	NLQ1
Double-Strike, NLQ1	NLQ1
Super/Subscript, NLQ1 or NLQ2	Super/Subscript, Draft
Block Graphics (176-223,244), Overscore or Underline	Block Graphics, no Over/Underline
Double-High, Draft, Emphasized	Double-High, NLQ1, Emphasized
Double-High, 12 cpi	Double-High, 10 cpi
Double-High, Condensed	Double-High, 10 cpi
Double-High, NLQ2	Double-High, NLQ1
Double-High, Super/Subscript	Double-High
NLQ2 12 cpi, Emphasized	NLQ2 12cpi
Double-Wide, NLQ2	Double-Wide, NLQ1
NLQ2, Proportional spacing	NLQ1, Proportional spacing

[1]Graphics commands suspend any text printing command. ESC I Pn (Select Print Mode) cancels any existing conflicting combinations.

Table I–7 Graphics Modes

Escape Sequence	Description[1]
ESC 3 Pn	Graphics Line spacing, 216/Pn lines per inch
ESC J Pn	Graphics Variable Line spacing, 216/Pn lines per inch
ESC K n1 n2 v1 ... vn	Normal-Density Bit-Image Graphics. Horizontal density: 60 dpi.[1]
ESC L n1 n2 v1 ... vn	Dual-Density Bit-Image Graphics, half-speed. Horizontal density: 120 dpi.[1]
ESC Y n1 n2 v1 ... vn	Dual-Density Bit-Image Graphics, normal-speed. Horizontal density: 120 dpi. Second consecutive horizontal dot is ignored.[1]
ESC Z n1 n2 v1 ... vn	High-Density Bit-Image Graphics. Horizontal density: 240 dpi. Second consecutive horizontal dot is ignored.[1]

[1]Vertical dot density is 72 dpi in all modes.

Table I–8   Character Set Selection

Escape Sequence	Description
ESC 6	Select Character Set 2 [3]
ESC 7	Select Character Set 1 [2]
ESC \ n1 n2 v1 ... vn	Select All Characters Set [1]
ESC ^	Print Single Character from All Characters Set [1]
ESC = n1 n2 ID v1 ... vn	Downloading Printer Characters ID = 1/4 for Draft printing Downloading ID = 1/5 for NLQ2 printing Downloading

[1]All Characters Sets charts are given starting from Figure I–1.

[2]Character Set 1 is based on the All Characters Set with the exception of the following:

The characters in columns 0, 1, 8, and 9 are not printed.
The control characters as specified in the second column of Table I–2 are applicable.

[3]Character Set 2 is based on the All Characters Set with the exception of the following:

The characters in columns 0, and 1 are not printed.
The control characters as specified in the third column of Table I–2 are applicable.

Table I–9   Emulation Differences between the LA310 MultiPrinter in IBM PP III mode and the IBM Proprinter III/III-XL

LA310 MultiPrinter	IBM Proprinter III/III-XL
Resident Code Pages	
437, 850, 210, 220, 857, 860, 862, 863, 865.	437, 850.
ESC I Pn **— Select Print Mode**	
Sequence does not reset the Code Page selection.	Sequence resets Code Page to 437.
Sequence with an illegal parameter is ignored.	Sequence with an illegal parameter is NOT ignored and is unpredictable.
ESC [T **—Code Page Switching**	
Applicable.	Not applicable.

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Table I–9 (Cont.)   Emulation Differences between the LA310 MultiPrinter in IBM PP III mode and the IBM Proprinter III/III-XL

LA310 MultiPrinter	IBM Proprinter III/III-XL
High Speed Draft print density (HSD)	
Applicable if set by the front panel or setup. When HSD on, the following attributes cause the print mode to be forced to Draft: *Emphasized*, *Proportional Spacing*, *Double High*, *Fast Font*, *Italic*, *Full Cell*.	HSD not applicable.
HSD or NLQ1 or NLQ2 indicators On	
Sequence `ESC I Pn` to change print mode is ignored when a mode is forced through the front panel or setup.	Print mode is not forced by front panel.
Sequence `ESC I 0/11` *Italic NLQ2* produces italic printing with an algorithm applied to the forced print density.	Italic printing applies to the NLQ2 font only.
Downloading character at location 3/0	
Downloaded character 3/0 is printed whenever *Slashed Zero* is set or not.	Downloaded character 3/0 is printed only if *Slashed Zero* is not set.
Sequences : `ESC [ ? 5 8 l` — `ESC % @` — `ESC [ ! p`	
Return to DEC PPL2 mode.	Ignored.
`ESC @` – Reset	
Reset Printer to IBM PP III mode.	Ignored.
Full cell characters in script printing	
Script algorithm is applied to the whole character cell (12-dot high).	Script algorithm is applied to the top 8 dots of the character font.

(continued on next page)

Table I–9 (Cont.) Emulation Differences between the LA310 MultiPrinter in IBM PP III mode and the IBM Proprinter III/III-XL

LA310 MultiPrinter	IBM Proprinter III/III-XL
Underlining Full Cell characters	
Full Cell characters cannot be underlined in any printing mode.	Full Cell characters may be underlined in NLQ2 mode.
`ESC A Pn` **— Set Text Line spacing at 72/Pn lines per inch**	
Maximum value for Pn is 255.	Maximum value for Pn is 85. If Pn greater than 85, result is unpredictable.
Fastfont printing	
All characters from the *All Characters Set* may be printed in Fastfont mode (12cpi).	Some characters from the *All Characters Set* are not printed in Fastfont mode.

IBM Proprinter III Quick Reference

Figure I–1 All Characters Set, All Code-pages, Left Side

IBM All Character Set (1)

Row	GL 0	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7
0	Ø (0/0/0)	► (20/16/10)	SP (40/32/20)	0 (60/48/30)	@ (100/64/40)	P (120/80/50)	` (140/96/60)	p (160/112/70)
1	☺ (1/1/1)	◄ (21/17/11)	! (41/33/21)	1 (61/49/31)	A (101/65/41)	Q (121/81/51)	a (141/97/61)	q (161/113/71)
2	☻ (2/2/2)	↕ (22/18/12)	" (42/34/22)	2 (62/50/32)	B (102/66/42)	R (122/82/52)	b (142/98/62)	r (162/114/72)
3	♥ (3/3/3)	‼ (23/19/13)	# (43/35/23)	3 (63/51/33)	C (103/67/43)	S (123/83/53)	c (143/99/63)	s (163/115/73)
4	♦ (4/4/4)	¶ (24/20/14)	$ (44/36/24)	4 (64/52/34)	D (104/68/44)	T (124/84/54)	d (144/100/64)	t (164/116/74)
5	♣ (5/5/5)	§ (25/21/15)	% (45/37/25)	5 (65/53/35)	E (105/69/45)	U (125/85/55)	e (145/101/65)	u (165/117/75)
6	♠ (6/6/6)	▬ (26/22/16)	& (46/38/26)	6 (66/54/36)	F (106/70/46)	V (126/86/56)	f (146/102/66)	v (166/118/76)
7	• (7/7/7)	↨ (27/23/17)	' (47/39/27)	7 (67/55/37)	G (107/71/47)	W (127/87/57)	g (147/103/67)	w (167/119/77)
8	▪ (10/8/8)	↑ (30/24/18)	((50/40/28)	8 (70/56/38)	H (110/72/48)	X (130/88/58)	h (150/104/68)	x (170/120/78)
9	○ (11/9/9)	↓ (31/25/19)	) (51/41/29)	9 (71/57/39)	I (111/73/49)	Y (131/89/59)	i (151/105/69)	y (171/121/79)
10	◉ (12/10/A)	→ (32/26/1A)	* (52/42/2A)	: (72/58/3A)	J (112/74/4A)	Z (132/90/5A)	j (152/106/6A)	z (172/122/7A)
11	♂ (13/11/B)	← (33/27/1B)	+ (53/43/2B)	; (73/59/3B)	K (113/75/4B)	[(133/91/5B)	k (153/107/6B)	{ (173/123/7B)
12	♀ (14/12/C)	∟ (34/28/1C)	, (54/44/2C)	< (74/60/3C)	L (114/76/4C)	\ (134/92/5C)	l (154/108/6C)	| (174/124/7C)
13	♪ (15/13/D)	↔ (35/29/1D)	– (55/45/2D)	= (75/61/3D)	M (115/77/4D)	] (135/93/5D)	m (155/109/6D)	} (175/125/7D)
14	♫ (16/14/E)	▲ (36/30/1E)	. (56/46/2E)	> (76/62/3E)	N (116/78/4E)	^ (136/94/5E)	n (156/110/6E)	~ (176/126/7E)
15	☼ (17/15/F)	▼ (37/31/1F)	/ (57/47/2F)	? (77/63/3F)	O (117/79/4F)	— (137/95/5F)	o (157/111/6F)	◇ (177/127/7F)

LEGEND

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

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Figure I–2 All Characters Set, Code-page 437 U.S.A. , Right Side

IBM All Character Set (1B)

Column	GR 8		GR 9		GR 10			GR 11		GR 12		GR 13		GR 14		GR 15	Row
Row 0	Ç	200 128 80	É	220 144 90	á	240 160 A0	(light)	⌐	260 176 B0	└	300 192 C0	⊥⊥	320 208 D0	α	340 224 E0	≡	360 240 F0	Row 0
1	ü	201 129 81	æ	221 145 91	í	241 161 A1	(med)	⌐	261 177 B1	┴	301 193 C1	╤	321 209 D1	β	341 225 E1	±	361 241 F1	1
2	é	202 130 82	Æ	222 146 92	ó	242 162 A2	(dark)	⌐	262 178 B2	┬	302 194 C2	╥	322 210 D2	Γ	342 226 E2	≥	362 242 F2	2
3	â	203 131 83	ô	223 147 93	ú	243 163 A3	│	⌐	263 179 B3	├	303 195 C3	╙	323 211 D3	Π	343 227 E3	≤	363 243 F3	3
4	ä	204 132 84	ö	224 148 94	ñ	244 164 A4	┤	─	264 180 B4	─	304 196 C4	╘	324 212 D4	Σ	344 228 E4	∫	364 244 F4	4
5	à	205 133 85	ò	225 149 95	Ñ	245 165 A5	╡	┤	265 181 B5	┼	305 197 C5	╒	325 213 D5	σ	345 229 E5	∫	365 245 F5	5
6	å	206 134 86	û	226 150 96	ª	246 166 A6	╢	┤	266 182 B6	╞	306 198 C6	╓	326 214 D6	μ	346 230 E6	÷	366 246 F6	6
7	ç	207 135 87	ù	227 151 97	º	247 167 A7	╖	┐	267 183 B7	╟	307 199 C7	╫	327 215 D7	τ	347 231 E7	≈	367 247 F7	7
8	ê	210 136 88	ÿ	230 152 98	¿	250 168 A8	╕	┐	270 184 B8	└	310 200 C8	╪	330 216 D8	Φ	350 232 E8	°	370 248 F8	8
9	ë	211 137 89	Ö	231 153 99	⌐	251 169 A9	╣	┤	271 185 B9	┌	311 201 C9	┘	331 217 D9	Θ	351 233 E9	●	371 249 F9	9
10	è	212 138 8A	Ü	232 154 9A	¬	252 170 AA	║	│	272 186 BA	┬	312 202 CA	┌	332 218 DA	Ω	352 234 EA	•	372 250 FA	10
11	ï	213 139 8B	¢	233 155 9B	½	253 171 AB	╗	┐	273 187 BB	┴	313 203 CB	█	333 219 DB	δ	353 235 EB	√	373 251 FB	11
12	î	214 140 8C	£	234 156 9C	¼	254 172 AC	╝	┘	274 188 BC	┬	314 204 CC	█	334 220 DC	∞	354 236 EC	ⁿ	374 252 FC	12
13	ì	215 141 8D	¥	235 157 9D	¡	255 173 AD	╜	┘	275 189 BD	═	315 205 CD	█	335 221 DD	φ	355 237 ED	²	375 253 FD	13
14	Ä	216 142 8E	P	236 158 9E	«	256 174 AE	╛	┤	276 190 BE	┼	316 206 CE	█	336 222 DE	ε	356 238 EE	■	376 254 FE	14
15	Å	217 143 8F	ƒ	237 159 9F	»	257 175 AF	┐	┘	277 191 BF	┴	317 207 CF	█	337 223 DF	∩	357 239 EF	SP	377 255 FF	15

LEGEND

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

MLO-004009

IBM Proprinter III Quick Reference

Figure I–3 All Characters Set, Code-page 850 Multilingual, Right Side

Code Page 850 (Multilingual)

Row	GR 8	GR 9	GR 10	GR 11	GR 12	GR 13	GR 14	GR 15
0	Ç 200/128/80	É 220/144/90	á 240/160/A0	░ 260/176/B0	└ 300/192/C0	ð 320/208/D0	Ó 340/224/E0	— 360/240/F0
1	ü 201/129/81	æ 221/145/91	í 241/161/A1	▒ 261/177/B1	┴ 301/193/C1	Đ 321/209/D1	ß 341/225/E1	± 361/241/F1
2	é 202/130/82	Æ 222/146/92	ó 242/162/A2	▓ 262/178/B2	┬ 302/194/C2	Ê 322/210/D2	Ô 342/226/E2	‗ 362/242/F2
3	â 203/131/83	ô 223/147/93	ú 243/163/A3	│ 263/179/B3	├ 303/195/C3	Ë 323/211/D3	Ò 343/227/E3	¾ 363/243/F3
4	ä 204/132/84	ö 224/148/94	ñ 244/164/A4	┤ 264/180/B4	─ 304/196/C4	È 324/212/D4	õ 344/228/E4	¶ 364/244/F4
5	à 205/133/85	ò 225/149/95	Ñ 245/165/A5	Á 265/181/B5	┼ 305/197/C5	ı 325/213/D5	Õ 345/229/E5	§ 365/245/F5
6	å 206/134/86	û 226/150/96	ª 246/166/A6	Â 266/182/B6	ã 306/198/C6	Í 326/214/D6	µ 346/230/E6	÷ 366/246/F6
7	ç 207/135/87	ù 227/151/97	º 247/167/A7	À 267/183/B7	Ã 307/199/C7	Î 327/215/D7	þ 347/231/E7	¸ 367/247/F7
8	ê 210/136/88	ÿ 230/152/98	¿ 250/168/A8	© 270/184/B8	╚ 310/200/C8	Ï 330/216/D8	Þ 350/232/E8	° 370/248/F8
9	ë 211/137/89	Ö 231/153/99	® 251/169/A9	╣ 271/185/B9	╔ 311/201/C9	┘ 331/217/D9	Ú 351/233/E9	¨ 371/249/F9
10	è 212/138/8A	Ü 232/154/9A	¬ 252/170/AA	║ 272/186/BA	╩ 312/202/CA	┌ 332/218/DA	Û 352/234/EA	· 372/250/FA
11	ï 213/139/8B	ø 233/155/9B	½ 253/171/AB	╗ 273/187/BB	╦ 313/203/CB	█ 333/219/DB	Ù 353/235/EB	¹ 373/251/FB
12	î 214/140/8C	£ 234/156/9C	¼ 254/172/AC	╝ 274/188/BC	╠ 314/204/CC	▄ 334/220/DC	ý 354/236/EC	³ 374/252/FC
13	ì 215/141/8D	Ø 235/157/9D	¡ 255/173/AD	¢ 275/189/BD	═ 315/205/CD	¦ 335/221/DD	Ý 355/237/ED	² 375/253/FD
14	Ä 216/142/8E	× 236/158/9E	« 256/174/AE	¥ 276/190/BE	╬ 316/206/CE	Ì 336/222/DE	¯ 356/238/EE	■ 376/254/FE
15	Å 217/143/8F	ƒ 237/159/9F	» 257/175/AF	┐ 277/191/BF	¤ 317/207/CF	▀ 337/223/DF	´ 357/239/EF	SP 377/255/FF

LEGEND

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

MLO-007427

Figure I–4 All Characters Set, Code-page 210 Right Side

Code Page 210 (Greece)

Row	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	Row
0	A 200/128/80	P 220/144/90	ι 240/160/A0		260/176/B0	⌐ 300/192/C0	⊥ 320/208/D0	ω 340/224/E0	ʹΩ 360/240/F0	0
1	B 201/129/81	Σ 221/145/91	κ 241/161/A1		261/177/B1	⊥ 301/193/C1	═ 321/209/D1	ʹα 341/225/E1	± 361/241/F1	1
2	Γ 202/130/82	T 222/146/92	λ 242/162/A2		262/178/B2	⊤ 302/194/C2	⊤ 322/210/D2	ʹε 342/226/E2	≥ 362/242/F2	2
3	Δ 203/131/83	Y 223/147/93	μ 243/163/A3		263/179/B3	⊢ 303/195/C3	323/211/D3	ή 343/227/E3	≤ 363/243/F3	3
4	E 204/132/84	Φ 224/148/94	ν 244/164/A4	─ 264/180/B4	── 304/196/C4	⊢ 324/212/D4	ϊ 344/228/E4	∫ 364/244/F4	4
5	Z 205/133/85	X 225/149/95	ξ 245/165/A5	═ 265/181/B5	┼ 305/197/C5	╞ 325/213/D5	ί 345/229/E5	∫ 365/245/F5	5
6	H 206/134/86	Ψ 226/150/96	o 246/166/A6	⊣ 266/182/B6	╞ 306/198/C6	326/214/D6	ó 346/230/E6	÷ 366/246/F6	6
7	Θ 207/135/87	Ω 227/151/97	π 247/167/A7	╗ 267/183/B7	╟ 307/199/C7	327/215/D7	ú 347/231/E7	≈ 367/247/F7	7
8	I 210/136/88	α 230/152/98	ρ 250/168/A8	╕ 270/184/B8	╚ 310/200/C8	╪ 330/216/D8	ü 350/232/E8	° 370/248/F8	8
9	K 211/137/89	β 231/153/99	σ 251/169/A9	╣ 271/185/B9	╔ 311/201/C9	╝ 331/217/D9	ʹω 351/233/E9	£ 371/249/F9	9
10	Λ 212/138/8A	γ 232/154/9A	ς 252/170/AA	╤ 272/186/BA	╦ 312/202/CA	332/218/DA	ʹA 352/234/EA	• 372/250/FA	10
11	M 213/139/8B	δ 233/155/9B	τ 253/171/AB	╛ 273/187/BB	╬ 313/203/CB	█ 333/219/DB	ʹE 353/235/EB	√ 373/251/FB	11
12	N 214/140/8C	ε 234/156/9C	υ 254/172/AC	╜ 274/188/BC	╠ 314/204/CC	334/220/DC	ʹH 354/236/EC	n 374/252/FC	12
13	Ξ 215/141/8D	ζ 235/157/9D	φ 255/173/AD	╝ 275/189/BD	═ 315/205/CD	335/221/DD	ʹI 355/237/ED	2 375/253/FD	13
14	O 216/142/8E	η 236/158/9E	χ 256/174/AE	╛ 276/190/BE	╬ 316/206/CE	336/222/DE	ʹO 356/238/EE	■ 376/254/FE	14
15	Π 217/143/8F	θ 237/159/9F	ψ 257/175/AF	╗ 277/191/BF	⊥ 317/207/CF	337/223/DF	ʹY 357/239/EF	SP 377/255/FF	15

LEGEND

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

MLO-007431

Figure I–5 All Characters Set, Code-page 220 Right Side

Code Page 220 (National Spain)

Column	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	Row
Row 0	Ç 200/128/80		´É 220/144/90		´á 240/160/A0		260/176/B0	⌐	└ 300/192/C0	╨	∝ 320/208/D0	≡	340/224/E0	≡	360/240/F0	0
1	ü 201/129/81		´Í 221/145/91		´í 241/161/A1		261/177/B1	⌐	┴ 301/193/C1	═	β 321/209/D1	±	341/225/E1	±	361/241/F1	1
2	´é 202/130/82		´Ó 222/146/92		´ó 242/162/A2		262/178/B2	┬	302/194/C2	╥	Γ 322/210/D2	≥	342/226/E2	≥	362/242/F2	2
3	â 203/131/83		ô 223/147/93		ú 243/163/A3		263/179/B3	├	303/195/C3	╙	Π 323/211/D3	≤	343/227/E3	≤	363/243/F3	3
4	ä 204/132/84		ö 224/148/94		ñ 244/164/A4		264/180/B4	─	304/196/C4	╞	Σ 324/212/D4	∫	344/228/E4	∫	364/244/F4	4
5	à 205/133/85		ò 225/149/95		Ñ 245/165/A5		265/181/B5	┼	305/197/C5	╟	σ 325/213/D5		345/229/E5		365/245/F5	5
6	À 206/134/86		û 226/150/96		ª 246/166/A6		266/182/B6	┤	306/198/C6	┌	µ 326/214/D6	÷	346/230/E6	÷	366/246/F6	6
7	ç 207/135/87		ù 227/151/97		º 247/167/A7		267/183/B7	┐	307/199/C7	┼	τ 327/215/D7	≈	347/231/E7	≈	367/247/F7	7
8	ê 210/136/88		´A 230/152/98		¿ 250/168/A8		270/184/B8	┘	310/200/C8	╫	Φ 330/216/D8	°	350/232/E8	°	370/248/F8	8
9	ë 211/137/89		Ö 231/153/99		I· 251/169/A9		271/185/B9	╣	311/201/C9	╪	Θ 331/217/D9	•	351/233/E9	•	371/249/F9	9
10	è 212/138/8A		Ü 232/154/9A		L· 252/170/AA		272/186/BA	║	312/202/CA	┐	Ω 332/218/DA	·	352/234/EA	·	372/250/FA	10
11	ï 213/139/8B		ò 233/155/9B		½ 253/171/AB		273/187/BB	╗	313/203/CB	■	δ 333/219/DB	√	353/235/EB	√	373/251/FB	11
12	î 214/140/8C		£ 234/156/9C		¼ 254/172/AC		274/188/BC	╝	314/204/CC	■	∞ 334/220/DC	ⁿ	354/236/EC	ⁿ	374/252/FC	12
13	ì 215/141/8D		´U 235/157/9D		¡ 255/173/AD		275/189/BD	═	315/205/CD	■	φ 335/221/DD	2	355/237/ED	2	375/253/FD	13
14	Ä 216/142/8E		Pt 236/158/9E		« 256/174/AE		276/190/BE	╬	316/206/CE	■	ε 336/222/DE	■	356/238/EE	■	376/254/FE	14
15	`È 217/143/8F		Ï 237/159/9F		» 257/175/AF		277/191/BF	┘	317/207/CF	■	∩ 337/223/DF	SP	357/239/EF	SP	377/255/FF	15

LEGEND

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

MLO-007430

Figure I–6 All Characters Set, Code-page 852 Right Side

Code Page 852 (Latin 2)

	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	
Column	8		9		10		11		12		13		14		15	Row
Row 0	Ç (200/128/80)	É (220/144/90)	á (240/160/A0)	░ (260/176/B0)	└ (300/192/C0)	ð (320/208/D0)	Ó (340/224/E0)	─ (360/240/F0)	0
1	ü (201/129/81)	Ĺ (221/145/91)	í (241/161/A1)	▒ (261/177/B1)	┴ (301/193/C1)	Đ (321/209/D1)	β (341/225/E1)	˝ (361/241/F1)	1
2	é (202/130/82)	ĺ (222/146/92)	ó (242/162/A2)	▓ (262/178/B2)	┬ (302/194/C2)	Ď (322/210/D2)	Ô (342/226/E2)	˛ (362/242/F2)	2
3	â (203/131/83)	ô (223/147/93)	ú (243/163/A3)	│ (263/179/B3)	├ (303/195/C3)	Ë (323/211/D3)	Ń (343/227/E3)	ˇ (363/243/F3)	3
4	ä (204/132/84)	ö (224/148/94)	Ą (244/164/A4)	┤ (264/180/B4)	─ (304/196/C4)	ď (324/212/D4)	ń (344/228/E4)	˘ (364/244/F4)	4
5	ů (205/133/85)	Ľ (225/149/95)	ą (245/165/A5)	Á (265/181/B5)	┼ (305/197/C5)	Ň (325/213/D5)	ň (345/229/E5)	§ (365/245/F5)	5
6	ć (206/134/86)	ľ (226/150/96)	Ž (246/166/A6)	Â (266/182/B6)	Ă (306/198/C6)	Í (326/214/D6)	Š (346/230/E6)	÷ (366/246/F6)	6
7	ç (207/135/87)	Ś (227/151/97)	ž (247/167/A7)	Ě (267/183/B7)	ă (307/199/C7)	Î (327/215/D7)	š (347/231/E7)	¸ (367/247/F7)	7
8	ł (210/136/88)	ś (230/152/98)	Ę (250/168/A8)	Ş (270/184/B8)	└ (310/200/C8)	ě (330/216/D8)	Ŕ (350/232/E8)	° (370/248/F8)	8
9	ë (211/137/89)	Ö (231/153/99)	ę (251/169/A9)	╣ (271/185/B9)	┌ (311/201/C9)	┘ (331/217/D9)	Ú (351/233/E9)	¨ (371/249/F9)	9
10	Ő (212/138/8A)	Ü (232/154/9A)	¬ (252/170/AA)	║ (272/186/BA)	┴ (312/202/CA)	┌ (332/218/DA)	ŕ (352/234/EA)	• (372/250/FA)	10
11	ő (213/139/8B)	Ť (233/155/9B)	ź (253/171/AB)	╗ (273/187/BB)	╦ (313/203/CB)	█ (333/219/DB)	Ű (353/235/EB)	ű (373/251/FB)	11
12	î (214/140/8C)	ť (234/156/9C)	Č (254/172/AC)	╝ (274/188/BC)	╠ (314/204/CC)	▄ (334/220/DC)	ý (354/236/EC)	Ř (374/252/FC)	12
13	Ź (215/141/8D)	Ł (235/157/9D)	ş (255/173/AD)	Ż (275/189/BD)	═ (315/205/CD)	Ţ (335/221/DD)	Ý (355/237/ED)	ř (375/253/FD)	13
14	Ä (216/142/8E)	× (236/158/9E)	« (256/174/AE)	ż (276/190/BE)	╬ (316/206/CE)	Ů (336/222/DE)	ţ (356/238/EE)	■ (376/254/FE)	14
15	Ć (217/143/8F)	č (237/159/9F)	» (257/175/AF)	¤ (277/191/BF)	¤ (317/207/CF)	█ (337/223/DF)	´ (357/239/EF)	SP (377/255/FF)	15

LEGEND

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

MLO-007434

Note: Available with an option cartridge, ref: LA31X-CA.

Figure I–7 All Characters Set, Code-page 857 Right Side

Code Page 857 (Turkish)

Column	8 (GR)		9 (GR)		10 (GR)		11 (GR)		12 (GR)		13 (GR)		14 (GR)		15 (GR)	Row
Row 0	Ç 200/128/80	´E 220/144/90	á 240/160/A0		(shade) 260/176/B0	└ 300/192/C0	º 320/208/D0	´O 340/224/E0	— 360/240/F0	0
1	ü 201/129/81	æ 221/145/91	í 241/161/A1	(shade) 261/177/B1	┴ 301/193/C1	ª 321/209/D1	β 341/225/E1	± 361/241/F1	1
2	´e 202/130/82	Æ 222/146/92	ó 242/162/A2	(shade) 262/178/B2	┬ 302/194/C2	Ê 322/210/D2	Ô 342/226/E2	362/242/F2	2
3	â 203/131/83	ô 223/147/93	ú 243/163/A3	263/179/B3	├ 303/195/C3	Ë 323/211/D3	`O 343/227/E3	¾ 363/243/F3	3
4	ä 204/132/84	ö 224/148/94	ñ 244/164/A4	─ 264/180/B4	── 304/196/C4	`E 324/212/D4	õ 344/228/E4	¶ 364/244/F4	4
5	à 205/133/85	ò 225/149/95	Ñ 245/165/A5	´A 265/181/B5	┼ 305/197/C5	325/213/D5	Õ 345/229/E5	§ 365/245/F5	5
6	å 206/134/86	û 226/150/96	G 246/166/A6	Â 266/182/B6	ã 306/198/C6	Í 326/214/D6	µ 346/230/E6	÷ 366/246/F6	6
7	ç 207/135/87	ù 227/151/97	ğ 247/167/A7	À 267/183/B7	Ã 307/199/C7	Î 327/215/D7	347/231/E7	₃ 367/247/F7	7
8	ê 210/136/88	İ 230/152/98	¿ 250/168/A8	© 270/184/B8	└ 310/200/C8	Ï 330/216/D8	× 350/232/E8	° 370/248/F8	8
9	ë 211/137/89	Ö 231/153/99	® 251/169/A9	╣ 271/185/B9	┌ 311/201/C9	┘ 331/217/D9	Ú 351/233/E9	•• 371/249/F9	9
10	è 212/138/8A	Ü 232/154/9A	¬ 252/170/AA	║ 272/186/BA	╩ 312/202/CA	┌ 332/218/DA	Û 352/234/EA	• 372/250/FA	10
11	ï 213/139/8B	ø 233/155/9B	½ 253/171/AB	╗ 273/187/BB	╦ 313/203/CB	(block) 333/219/DB	`U 353/235/EB	1 373/251/FB	11
12	î 214/140/8C	£ 234/156/9C	¼ 254/172/AC	╝ 274/188/BC	╠ 314/204/CC	(block) 334/220/DC	ì 354/236/EC	3 374/252/FC	12
13	ı 215/141/8D	Ø 235/157/9D	¡ 255/173/AD	¢ 275/189/BD	═ 315/205/CD	¦ 335/221/DD	ÿ 355/237/ED	2 375/253/FD	13
14	Ä 216/142/8E	Ş 236/158/9E	« 256/174/AE	¥ 276/190/BE	╬ 316/206/CE	`I 336/222/DE	¯ 356/238/EE	■ 376/254/FE	14
15	Å 217/143/8F	ş 237/159/9F	» 257/175/AF	¤ 277/191/BF	(block) 317/207/CF	(block) 337/223/DF	´ 357/239/EF	SP 377/255/FF	15

LEGEND

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

MLO-007433

Figure I–8 All Characters Set, Code-page 860 Right Side

Code Page 860 (Portugal)

Row	Col 8 (GR)	Col 9 (GR)	Col 10 (GR)	Col 11 (GR)	Col 12 (GR)	Col 13 (GR)	Col 14 (GR)	Col 15 (GR)
0	Ç 200/128/80	É 220/144/90	á 240/160/A0	260/176/B0	└ 300/192/C0	╨ 320/208/D0	∝ 340/224/E0	≡ 360/240/F0
1	ü 201/129/81	À 221/145/91	í 241/161/A1	261/177/B1	┴ 301/193/C1	╤ 321/209/D1	β 341/225/E1	± 361/241/F1
2	é 202/130/82	È 222/146/92	ó 242/162/A2	262/178/B2	┬ 302/194/C2	╥ 322/210/D2	Γ 342/226/E2	≥ 362/242/F2
3	â 203/131/83	ô 223/147/93	ú 243/163/A3	│ 263/179/B3	├ 303/195/C3	╙ 323/211/D3	Π 343/227/E3	≤ 363/243/F3
4	ã 204/132/84	õ 224/148/94	ñ 244/164/A4	┤ 264/180/B4	─ 304/196/C4	╘ 324/212/D4	Σ 344/228/E4	∫ 364/244/F4
5	à 205/133/85	ò 225/149/95	Ñ 245/165/A5	╡ 265/181/B5	┼ 305/197/C5	╒ 325/213/D5	σ 345/229/E5	∫ 365/245/F5
6	Á 206/134/86	Ú 226/150/96	ª 246/166/A6	╢ 266/182/B6	╞ 306/198/C6	╓ 326/214/D6	µ 346/230/E6	÷ 366/246/F6
7	ç 207/135/87	ù 227/151/97	º 247/167/A7	╖ 267/183/B7	╟ 307/199/C7	╫ 327/215/D7	τ 347/231/E7	≈ 367/247/F7
8	ê 210/136/88	Ì 230/152/98	¿ 250/168/A8	╕ 270/184/B8	╚ 310/200/C8	╪ 330/216/D8	Φ 350/232/E8	° 370/248/F8
9	Ê 211/137/89	Õ 231/153/99	⌐ 251/169/A9	╣ 271/185/B9	╔ 311/201/C9	┘ 331/217/D9	Θ 351/233/E9	● 371/249/F9
10	è 212/138/8A	Ü 232/154/9A	¬ 252/170/AA	║ 272/186/BA	╩ 312/202/CA	┌ 332/218/DA	Ω 352/234/EA	· 372/250/FA
11	Í 213/139/8B	¢ 233/155/9B	½ 253/171/AB	╗ 273/187/BB	╦ 313/203/CB	█ 333/219/DB	δ 353/235/EB	√ 373/251/FB
12	Ô 214/140/8C	£ 234/156/9C	¼ 254/172/AC	╝ 274/188/BC	╠ 314/204/CC	▄ 334/220/DC	∞ 354/236/EC	ⁿ 374/252/FC
13	ì 215/141/8D	Ù 235/157/9D	¡ 255/173/AD	╜ 275/189/BD	═ 315/205/CD	▌ 335/221/DD	φ 355/237/ED	² 375/253/FD
14	Ã 216/142/8E	Pt 236/158/9E	« 256/174/AE	╛ 276/190/BE	╬ 316/206/CE	▐ 336/222/DE	ε 356/238/EE	■ 376/254/FE
15	Â 217/143/8F	Ó 237/159/9F	» 257/175/AF	┐ 277/191/BF	╧ 317/207/CF	▀ 337/223/DF	∩ 357/239/EF	SP 377/255/FF

LEGEND

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

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Figure I–9 All Characters Set, Code-page 862 Right Side

Code Page 862 (Hebrew)

Column	**8** GR	**9** GR	**10** GR	**11** GR	**12** GR	**13** GR	**14** GR	**15** GR	Row
Row 0	א 200 128 80	⊐ 220 144 90	á 240 160 A0	░ 260 176 B0	⌐ 300 192 C0	⊥⊥ 320 208 D0	α 340 224 E0	≡ 360 240 F0	0
1	⊐ 201 129 81	▽ 221 145 91	í 241 161 A1	▒ 261 177 B1	⊤ 301 193 C1	321 209 D1	β 341 225 E1	± 361 241 F1	1
2	ג 202 130 82	∪ 222 146 92	ó 242 162 A2	▓ 262 178 B2	⊢ 302 194 C2	322 210 D2	Γ 342 226 E2	≥ 362 242 F2	2
3	⊤ 203 131 83	223 147 93	ú 243 163 A3	263 179 B3	303 195 C3	323 211 D3	Π 343 227 E3	≤ 363 243 F3	3
4	204 132 84	224 148 94	ñ 244 164 A4	⊣ 264 180 B4	304 196 C4	⊢ 324 212 D4	Σ 344 228 E4	∫ 364 244 F4	4
5	ו 205 133 85	225 149 95	Ñ 245 165 A5	⊨ 265 181 B5	⊥ 305 197 C5	⊢ 325 213 D5	σ 345 229 E5	365 245 F5	5
6	ז 206 134 86	226 150 96	ᵃ 246 166 A6	266 182 B6	⊨ 306 198 C6	326 214 D6	μ 346 230 E6	÷ 366 246 F6	6
7	⊓ 207 135 87	⊓ 227 151 97	° 247 167 A7	267 183 B7	307 199 C7	327 215 D7	τ 347 231 E7	≈ 367 247 F7	7
8	ט 210 136 88	230 152 98	¿ 250 168 A8	270 184 B8	⊦ 310 200 C8	330 216 D8	Φ 350 232 E8	° 370 248 F8	8
9	כ 211 137 89	∪ 231 153 99	251 169 A9	271 185 B9	311 201 C9	331 217 D9	Θ 351 233 E9	• 371 249 F9	9
10	⌐ 212 138 8A	⊓ 232 154 9A	⌐ 252 170 AA	272 186 BA	312 202 CA	⌐ 332 218 DA	Ω 352 234 EA	· 372 250 FA	10
11	⊐ 213 139 8B	¢ 233 155 9B	½ 253 171 AB	273 187 BB	313 203 CB	███ 333 219 DB	δ 353 235 EB	√ 373 251 FB	11
12	⊐ 214 140 8C	£ 234 156 9C	¼ 254 172 AC	274 188 BC	314 204 CC	███ 334 220 DC	∞ 354 236 EC	ⁿ 374 252 FC	12
13	⊓ 215 141 8D	¥ 235 157 9D	¡ 255 173 AD	275 189 BD	⊨ 315 205 CD	███ 335 221 DD	φ 355 237 ED	² 375 253 FD	13
14	⊓ 216 142 8E	Pts 236 158 9E	« 256 174 AE	276 190 BE	⊨ 316 206 CE	███ 336 222 DE	ε 356 238 EE	■ 376 254 FE	14
15	ן 217 143 8F	ƒ 237 159 9F	» 257 175 AF	⌐ 277 191 BF	⊨ 317 207 CF	⊓ 337 223 DF	∩ 357 239 EF	SP 377 255 FF	15

LEGEND

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

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Figure I–10 All Characters Set, Code-page 863 Right Side

Code Page 863 (Canada-French)

Row	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15		Row
0	Ç	200 128 80	É	220 144 90	|	240 160 A0	░	260 176 B0	└	300 192 C0	╨	320 208 D0	α	340 224 E0	≡	360 240 F0	0
1	ü	201 129 81	È	221 145 91	´	241 161 A1	▒	261 177 B1	┴	301 193 C1	╤	321 209 D1	β	341 225 E1	±	361 241 F1	1
2	é	202 130 82	Ê	222 146 92	ó	242 162 A2	▓	262 178 B2	┬	302 194 C2	╥	322 210 D2	Γ	342 226 E2	≥	362 242 F2	2
3	â	203 131 83	ô	223 147 93	ú	243 163 A3	│	263 179 B3	├	303 195 C3	╙	323 211 D3	Π	343 227 E3	≤	363 243 F3	3
4	Â	204 132 84	Ë	224 148 94	¨	244 164 A4	┤	264 180 B4	─	304 196 C4	╘	324 212 D4	Σ	344 228 E4	∫	364 244 F4	4
5	à	205 133 85	Ï	225 149 95	¸	245 165 A5	╡	265 181 B5	┼	305 197 C5	╒	325 213 D5	σ	345 229 E5	∫	365 245 F5	5
6	¶	206 134 86	û	226 150 96	3	246 166 A6	╢	266 182 B6	╞	306 198 C6	╓	326 214 D6	μ	346 230 E6	÷	366 246 F6	6
7	ç	207 135 87	ù	227 151 97	-	247 167 A7	╖	267 183 B7	╟	307 199 C7	╫	327 215 D7	τ	347 231 E7	≈	367 247 F7	7
8	ê	210 136 88	¤	230 152 98	Î	250 168 A8	╕	270 184 B8	╚	310 200 C8	╪	330 216 D8	Φ	350 232 E8	°	370 248 F8	8
9	ë	211 137 89	Ô	231 153 99	┌	251 169 A9	╣	271 185 B9	╔	311 201 C9	┘	331 217 D9	Θ	351 233 E9	•	371 249 F9	9
10	è	212 138 8A	Ü	232 154 9A	┐	252 170 AA	║	272 186 BA	╩	312 202 CA	┌	332 218 DA	Ω	352 234 EA	·	372 250 FA	10
11	ï	213 139 8B	¢	233 155 9B	½	253 171 AB	╗	273 187 BB	╦	313 203 CB	█	333 219 DB	δ	353 235 EB	√	373 251 FB	11
12	î	214 140 8C	£	234 156 9C	¼	254 172 AC	╝	274 188 BC	╠	314 204 CC	▄	334 220 DC	∞	354 236 EC	n	374 252 FC	12
13	‗	215 141 8D	Ù	235 157 9D	¾	255 173 AD	╜	275 189 BD	═	315 205 CD	▌	335 221 DD	φ	355 237 ED	²	375 253 FD	13
14	À	216 142 8E	û	236 158 9E	«	256 174 AE	╛	276 190 BE	╬	316 206 CE	▐	336 222 DE	ε	356 238 EE	■	376 254 FE	14
15	§	217 143 8F	ƒ	237 159 9F	»	257 175 AF	┐	277 191 BF	╧	317 207 CF	▀	337 223 DF	∩	357 239 EF	SP	377 255 FF	15

LEGEND

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

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Figure I–11 All Characters Set, Code-page 865 Right Side

Code Page 865 (Norway)

Column	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	Row
Row 0	Ç 200/128/80	´	É 220/144/90	´	á 240/160/A0		260/176/B0	└	300/192/C0	╨	320/208/D0	α	340/224/E0	≡	360/240/F0	Row 0
1	ü 201/129/81	æ	221/145/91	í	241/161/A1		261/177/B1	┴	301/193/C1	╤	321/209/D1	β	341/225/E1	±	361/241/F1	1
2	é 202/130/82	Æ	222/146/92	ó	242/162/A2		262/178/B2	┬	302/194/C2	╥	322/210/D2	Γ	342/226/E2	≥	362/242/F2	2
3	â 203/131/83	ô	223/147/93	ú	243/163/A3		263/179/B3	├	303/195/C3	╙	323/211/D3	Π	343/227/E3	≤	363/243/F3	3
4	ä 204/132/84	ö	224/148/94	ñ	244/164/A4	─	264/180/B4	──	304/196/C4	╘	324/212/D4	Σ	344/228/E4	∫	364/244/F4	4
5	à 205/133/85	ò	225/149/95	Ñ	245/165/A5	═	265/181/B5	┼	305/197/C5	╒	325/213/D5	σ	345/229/E5		365/245/F5	5
6	å 206/134/86	û	226/150/96	ª	246/166/A6	┤	266/182/B6	╞	306/198/C6	╓	326/214/D6	µ	346/230/E6	÷	366/246/F6	6
7	ç 207/135/87	ù	227/151/97	º	247/167/A7	╕	267/183/B7	╟	307/199/C7	╫	327/215/D7	τ	347/231/E7	≈	367/247/F7	7
8	ê 210/136/88	ÿ	230/152/98	¿	250/168/A8	╗	270/184/B8	└	310/200/C8	╪	330/216/D8	Φ	350/232/E8	°	370/248/F8	8
9	ë 211/137/89	Ö	231/153/99	┌	251/169/A9	╣	271/185/B9	┌	311/201/C9	┘	331/217/D9	Θ	351/233/E9	●	371/249/F9	9
10	è 212/138/8A	Ü	232/154/9A	¬	252/170/AA	║	272/186/BA	╩	312/202/CA	┌	332/218/DA	Ω	352/234/EA	·	372/250/FA	10
11	ï 213/139/8B	ø	233/155/9B	½	253/171/AB	╗	273/187/BB	╦	313/203/CB	█	333/219/DB	δ	353/235/EB	√	373/251/FB	11
12	î 214/140/8C	£	234/156/9C	¼	254/172/AC	╝	274/188/BC	╠	314/204/CC	█	334/220/DC	∞	354/236/EC	ⁿ	374/252/FC	12
13	ì 215/141/8D	Ø	235/157/9D	¡	255/173/AD	╜	275/189/BD	═	315/205/CD	█	335/221/DD	φ	355/237/ED	²	375/253/FD	13
14	Ä 216/142/8E	Pt	236/158/9E	«	256/174/AE	╛	276/190/BE	╬	316/206/CE	█	336/222/DE	ε	356/238/EE	■	376/254/FE	14
15	Å 217/143/8F	ƒ	237/159/9F	¤	257/175/AF	┐	277/191/BF	╧	317/207/CF	█	337/223/DF	∩	357/239/EF	SP	377/255/FF	15

LEGEND

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

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Figure I–12 All Characters Set, Code-page 866 Right Side

Code Page 866 (Cyrillic)

Column	GR 8		GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	Row
Row 0	А 200 128 80	Р 220 144 90	а 240 160 A0	(shade) 260 176 B0	⌐ 300 192 C0	⊥ 320 208 D0	ρ 340 224 E0	Ё 360 240 F0	̈	0
1	Б 201 129 81	С 221 145 91	δ 241 161 A1	(shade) 261 177 B1	⊥ 301 193 C1	═ 321 209 D1	с 341 225 E1	ё 361 241 F1	̈	1
2	В 202 130 82	Т 222 146 92	в 242 162 A2	(shade) 262 178 B2	⊤ 302 194 C2	⊤ 322 210 D2	т 342 226 E2	Є 362 242 F2		2
3	Г 203 131 83	У 223 147 93	г 243 163 A3	│ 263 179 B3	├ 303 195 C3	├ 323 211 D3	у 343 227 E3	є 363 243 F3		3
4	Д 204 132 84	Ф 224 148 94	д 244 164 A4	─ 264 180 B4	─ 304 196 C4	├ 324 212 D4	ф 344 228 E4	Ї 364 244 F4	̈	4
5	Е 205 133 85	Х 225 149 95	е 245 165 A5	═ 265 181 B5	┼ 305 197 C5	├ 325 213 D5	х 345 229 E5	ї 365 245 F5	̇	5
6	Ж 206 134 86	Ц 226 150 96	ж 246 166 A6	┤ 266 182 B6	├ 306 198 C6	├ 326 214 D6	ц 346 230 E6	ў 366 246 F6	̆	6
7	З 207 135 87	Ч 227 151 97	з 247 167 A7	┐ 267 183 B7	│ 307 199 C7	┼ 327 215 D7	ч 347 231 E7	ў 367 247 F7	̆	7
8	И 210 136 88	Ш 230 152 98	и 250 168 A8	┐ 270 184 B8	└ 310 200 C8	═ 330 216 D8	ш 350 232 E8	° 370 248 F8		8
9	Й 211 137 89	Щ 231 153 99	й 251 169 A9	┤ 271 185 B9	├ 311 201 C9	┘ 331 217 D9	щ 351 233 E9	● 371 249 F9		9
10	К 212 138 8A	Ъ 232 154 9A	к 252 170 AA	┴ 272 186 BA	┴ 312 202 CA	┌ 332 218 DA	ъ 352 234 EA	· 372 250 FA		10
11	Л 213 139 8B	Ы 233 155 9B	л 253 171 AB	┐ 273 187 BB	┬ 313 203 CB	█ 333 219 DB	ы 353 235 EB	√ 373 251 FB		11
12	М 214 140 8C	Ь 234 156 9C	м 254 172 AC	┘ 274 188 BC	┬ 314 204 CC	█ 334 220 DC	ь 354 236 EC	Nᵉ 374 252 FC		12
13	Н 215 141 8D	Э 235 157 9D	н 255 173 AD	┘ 275 189 BD	═ 315 205 CD	█ 335 221 DD	э 355 237 ED	☼ 375 253 FD		13
14	О 216 142 8E	Ю 236 158 9E	о 256 174 AE	┘ 276 190 BE	┼ 316 206 CE	█ 336 222 DE	ю 356 238 EE	■ 376 254 FE		14
15	П 217 143 8F	Я 237 159 9F	п 257 175 AF	┐ 277 191 BF	┴ 317 207 CF	█ 337 223 DF	я 357 239 EF	SP 377 255 FF		15

LEGEND

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

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Note: Available with an option cartridge, ref: LA31X-CA.

J

Epson FX-1050 Quick Reference

dir

This appendix contains basic information on the Epson FX-1050 Emulation commands supported in the LA310 MultiPrinter. In addition, Table J–11 provides a list of differences between the LA310 MultiPrinter in Epson FX-1050 emulation mode, and the Epson FX-1050 machine.

The Epson FX-1050 emulation commands are fully detailed in the *Epson ESC/P™ Reference Manual*. Refer to this manual when more instructions are needed.

Characters used in control functions appear in monospaced type. Table J–1 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.

The following conventions are used in the command listings:

Table J–1 Conventions

`ESC`	Escape (1/11), introduces an escape sequence
`n1 n2`	A 2 byte number of data beginning with the next byte, low byte followed by high byte. This number indicates the number of parameters in the escape sequence.
`n`	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. Unless specified, maximum value is 255.
`d1 ... dn`	A series of parameters pertaining to the escape sequence, control function or control string. The number of parameters is determined by `n1 n2`.
	When `d1 d2` make a 16-bit word, `d2` is the most significant byte, and it gives a signed 16-bit value.

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Table J–2 Printer Management

Command	Description	Notes
ESC @	Reset Printer	FX-1050 emulation reset.
ESC % @	Return to DEC PPL2 mode	
ESC [! p	Reset printer to DEC PPL2 mode	
DC1	(1/1) Select Printer	
DC3	(1/3) Deselect Printer	
ESC s n	Select Draft or High-Speed-Draft	n = 0/0 or 3/0 : Select High-Speed-Draft mode. n = 0/1 or 3/1 : Select Draft mode. Ignored if NLQ1 or NLQ2 selected.
ESC <	Unidirectional Printing on one line	
ESC U n	Bidirectional Printing	n = 0/0 or 3/0 : Select Bidirectional Printing n = 0/1 or 3/1 : Select Unidirectional Printing
ESC 8	Disable paper-out detector	
ESC 9	Enable paper-out detector	
ESC =	Set MSB to 0	
ESC >	Set MSB to 1	
ESC #	Cancel MSB control	
BEL	Beeper	

Table J–3 Data Control

Control Character	Description	Notes
NUL	(0/0) Null	
SP	(2/0) Space	
CR	(0/13) Carriage Return	Print all data in line buffer.
CAN	(1/8) Delete Line	All printable characters and bit-image data on the current line are cleared.
DEL	(7/15) Delete Character	Delete only printable characters. Ignored when received after commands ESC $, ESC \ , HT.

Table J–4 Character Table Selection

Command	Description	Notes
ESC 6	Enable Printing of Upper Control Codes	Codes at locations 8/0 to 9/15 are treated as printable characters. This command applies to both Character Table Selections (ESC t n) : Italic or Graphic. This setting is addressed by *GRAPHIC 2* or *ITALIC 2* in the Set-up Epson menu.
ESC 7	Enable Upper Control Codes	Codes at locations 8/0 to 9/15 are treated as control codes. This setting is addressed by *GRAPHIC 1* or *ITALIC 1* in the Epson Set-up menu.
ESC t n	Character Table Selection	n = 0/0 : Select Italic Character Table, see Figure J–1. This setting is addressed by *ITALIC 1* or *ITALIC 2* in the Epson Set-up menu. n = 0/1 : Select Graphic Character Table defined by the Code Page[1] Selection. This setting is addressed by *GRAPHIC 1* or *GRAPHIC 2* in the Epson Set-up menu.
ESC R n	Select National ASCII Set See Figure J–2	n = 0/0 : U.S.A n = 0/1 : France n = 0/2 : Germany n = 0/3 : U.K. n = 0/4 : Denmark 1 n = 0/5 : Sweden n = 0/6 : Italy n = 0/7 : Spain 1 n = 0/8 : Japan n = 0/9 : Norway n = 0/10 : Denmark 2 n = 0/11 : Spain 2 n = 0/12 : Latin America
ESC I n	Printable Characters Extension[2]	n = 0/0 : locations 0/0 to 1/15 and 8/0 to 9/15 are not treated as printable characters. n = 0/1 : codes from locations 0/0 to 1/15 and 8/0 to 9/15 that are not control characters are treated as printable characters.

[1]All Code Page tables can be found in the IBM PP III Quick Reference; these tables are the same for both emulations.

[2]This command applies only if the character table selection is set to *GRAPHIC 1* or *ITALIC 1* in set-up or if the sequence *ESC 7* is received.

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Table J–5 User-Defined Characters

Command	Description	Notes
ESC & NUL n m a1 d1 ... dk	Draft User-Defined Characters (8-dot h. x 11-dot w.)	n and m : first and last characters defined (0-255) a1 : attribute : bit 7 (MSB) 1 : upper 8 pins ; 0 : lower 8 pins bits 6-4 : start column number (0-7) bits 3-0 : end column number (1-11) d1 ... d11 : character matrix data. Each character is defined by a sequence ai di1 ... di11. NLQ1 characters are built from the Draft user-defined characters.
ESC : NUL n NUL	Copy ROM Generator to RAM (Italic Character table)	Clears previous user-defined characters. n = 0/0 : Resident NLQ2 n = 0/1 : Resident NLQ1
ESC % n	User-Defined Characters selection	n = 0/0 : Select the standard character set n = 0/1 : Select the user-defined character set

Table J–6 Graphics

Command	Description
In the following sequences, n1 and n2 define the number of horizontal dots, maximum value for n2 is 31 ; d1 ... dk are the bit-image data. Vertical density is 72 dpi for all modes.	
ESC K n1 n2 d1 ... dk	Normal-Density Bit-Image Graphics; Horizontal density: 60 dpi.
ESC L n1 n2 d1 ... dk	Dual-Density Bit-Image Graphics, half-speed ; Horizontal density: 120 dpi.
ESC Y n1 n2 d1 ... dk	Dual-Density Bit-Image Graphics, normal-speed ; Horizontal density: 120 dpi ; Second consecutive horizontal dot is ignored.
ESC Z n1 n2 d1 ... dk	High-Density Bit-Image Graphics ; Horizontal density: 240 dpi ; Second consecutive horizontal dot is ignored.

Table J–6 (Cont.)   Graphics

Command	Description	
ESC * m n1 n2 d1 ... dk	8-wire BIM mode selection	m: Horizontal density: 0/0 : 60 dpi (Normal density) 0/1 : 120 dpi (Double density, Half speed) 0/2 : 120 dpi (Double density, Normal speed) 0/3 : 240 dpi (Quadruple density) 0/4 : 80 dpi (Graphics CRT I) 0/5 : 72 dpi (Plotter 1:1) 0/6 : 90 dpi (Graphics CRT II) 0/7 : 144 dpi (Plotter, double density)
ESC ? n m	Redefines BIM command	n = K, L, Y, Z. m is same as in command ESC * .
ESC ^ m n1 n2 d1 ... dk	9-wire BIM mode selection	m = 0/0 : Select normal density (60 dpi) m = 0/1 : Select double density (120 dpi)

Table J–7   Horizontal Form Handling

Command	Description	Notes
ESC l n	Set Left Margin	n : Column number for left margin
ESC Q n	Set Right Margin	n : Column number for right margin
BS	(0/8) Backspace	
ESC $ d1 d2	Absolute Horizontal positioning	d1 and d2 define the absolute position in 1/60" from left margin
ESC \ d1 d2	Relative Horizontal positioning	d1 and d2 define the relative position in 1/120" , left or right from current position.
HT	(0/9) Horizontal Tab	
ESC D d1 ... dk NUL	Set Horizontal Tabs	di : column numbers. di values must be in ascending order. ESC D NUL clears previous tab setting. Maximum number of tabs is 32.
ESC a n	Line Justification mode	n = 0/0 or 3/0 : Line Left-justified to left margin n = 0/1 or 3/1 : Line Centered between margins n = 0/2 or 3/2 : Line Right-justified to right margin n = 0/3 or 3/3 : Both margins justified

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Table J–8   Vertical Form Handling

Command	Description	Notes
FF	(0/12) Form Feed	Horizontal position is reset to left margin. Print all data in line buffer.
ESC C NUL n	Set Form Length in Inches	Maximum form length is 22". Cancel bottom-margin setting and set Top of Form.
ESC C n	Set Form Length in Lines	Line spacing must be selected first. Maximum value for n is 127 ; maximum form length is 22 inches.
ESC N n	Set Automatic Perforation Skip	n : number of lines to skip. On fanfold paper only. Maximum value for n is 127.
ESC O	Cancel Automatic Perforation Skip	
LF	(0/10) Line Feed	Horizontal position is reset to left margin. Print all data in line buffer.
ESC 0[1]	Select 1/8-inch Line spacing	
ESC 1[1]	Select 7/72-inch Line spacing	
ESC 2[1]	Select 1/6-inch Line spacing	
ESC 3 n[1]	Set n/216-inch Line Spacing	
ESC A n[1]	Set n/72-inch Line Spacing	
ESC J n	Advance paper n/216 inches	This command does not affect the horizontal print position.
ESC j n	Back paper motion n/216 inches	
VT	(0/11) Vertical Tab	Horizontal position is reset to left margin.
ESC B d1 ... dk NUL	Set Vertical Tabs	di : line number position. di values must be in ascending order. This command defines the vertical format unit (VFU) channel 0. ESC B NUL clears previous tab settings. Maximum number of tabs is 16.
ESC b n d1 ... dk NUL	Multiple Vertical Tab Programs	n : channel number of the vertical format unit (VFU). n range is : 0, 7. di : line number position in ascending order. ESC b n NUL cancels all tabs in channel n.
ESC / n	Select Vertical Tab Program	n : Selection of the VFU channel

[1]These commands do not affect the form length setting.

Table J–9 Printing Attributes and Styles

Command	Description	Notes
ESC E	Emphasized Printing	(Also called Bold Printing.)
ESC F	Cancel Emphasized Printing	
ESC G	Double-Strike Printing	Double-Strike Printing disabled when NLQ1 or NLQ2 selected.
ESC H	Cancel Double-Strike Printing	
ESC S n	Script Printing:	n = 0/1 or 3/1 : Select Subscript Printing n = 0/0 or 3/0 : Select Superscript Printing Applies only if Double-Height Printing canceled. Graphics Characters are not script.
ESC T	Cancel Script Printing	
ESC 4	Italic Printing	
ESC 5	Cancel Italic Printing	
ESC – n	Underline Printing:	n = 0/0 or 3/0 : Cancel Underline Printing n = 0/1 or 3/1 : Select Underline Printing Underlining does not apply to HT, ESC $ commands and ESC \ command for left motion. Graphics Characters are not underlined.
ESC x n	Select Printing mode (Draft or NLQ)	n = 0/0 or 3/0 : Select Draft mode n = 0/1 or 3/1 : Select NLQ1 or NLQ2, depending on ESC k n. Double-Strike printing is disabled when NLQ1 or NLQ2 selected.
ESC k n	Select Print Style (Sans Serif or Roman)	n = 0/0 : Select NLQ2 n = 0/1 : Select NLQ1 Applies if ESC x 1 received. Ignored if user-defined characters selected.
ESC ! n	Select Printing Attribute Combination (Master Select)	n split in 8 bits n0 to n7 (MSB): n0 = 0 : 10 cpi ; 1 : 12 cpi n1 = 0 : Cancel Proportional ; 1 : Select Proportional n2 = 0 : Cancel Condensed ; 1 : Select Condensed n3 = 0 : Cancel Emphasized ; 1 : Select Emphasized n4 = 0 : Cancel Double-Strike ; 1 : Select Double-Strike n5 = 0 : Cancel Double-Width ; 1 : Select Double-Width n6 = 0 : Cancel Italics ; 1 : Select Italics n7 = 0 : Cancel Underline ; 1 : Select Underline

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Table J–10 Character Size and Pitch

Command	Description	Notes
ESC P[1]	Set Horizontal Spacing to 10 CPI	
ESC M[1]	Set Horizontal Spacing to 12 CPI	
ESC p n	Proportional Spacing	n = 0/0 or 3/0 : Cancel Proportional Spacing n = 0/1 or 3/1 : Select Proportional Spacing
SI[1]	(0/15) Condensed Printing	10 cpi condensed to 17.14 cpi 12 cpi condensed to 20 cpi. Applies only if Double-Height Printing canceled.
ESC SI[1]	Condensed Printing	Same as SI command.
DC2	(1/2) Cancel Condensed Printing	
ESC SP n	Pitch modification	Increase the selected pitch by n/120 in. Maximum value for n : 127.
SO	(0/14) Double-Width Printing By Line	Canceled by the commands CR, LF, FF, VT, DC4, ESC W 0.
ESC SO	Double-Width Printing By Line	Same as SO.
DC4	(1/4) Cancel Double-Width Printing By Line	
ESC W n	Continuous Double-Width Printing	n = 0/0 or 3/0 : Cancel Double-Width n = 0/1 or 3/1 : Select Double-Width
ESC w n	Double-Height Printing	n = 0/0 or 3/0 : Cancel Double-Height n = 0/1 or 3/1 : Select Double-Height Overrides Script, Condensed and High Speed Draft Printing.

[1]These commands apply only if Proportional Spacing is canceled.

Table J–11 Emulation Differences Between the LA310 MultiPrinter in EPSON FX-1050 mode and the Epson FX-1050 Machine

LA310 MultiPrinter	Epson FX-1050
Resident Code Pages	
437, 850, 210, 220, 857, 860, 862, 863, 865.	Machines produced starting from 1991 have 437, 850, 860, 863, 865.

Table J–11 (Cont.)   Emulation Differences Between the LA310 MultiPrinter in EPSON FX-1050 mode and the Epson FX-1050 Machine

LA310 MultiPrinter	Epson FX-1050
Default Character Tables	
Available settings: *GRAPHIC 1, GRAPHIC 2, ITALIC 1, ITALIC 2*.	Available settings: *GRAPHIC 1, ITALIC 1*.
Text Printing Densities	
HSD (equivalent to the FX-1050 *Draft*) This density is active when the HSD indicator is on, or selected by ESC s 0.	**Draft** (default density)
Draft (default density). This density is active when the following combinations are selected: *HSD-Italic, HSD-Proportional-Spacing*, or when Full-Cell characters are in the same line as a text.	The print density that is equivalent to the LA310 *Draft* is not selectable by software. It is active when the following combinations are selected: *Draft-Italic, Draft-Slow-Printing, Draft-Proportional-Spacing*, or when Full-Cell characters are in the same line as a Draft character.
NLQ1 (= Sans Serif). When the NLQ1 indicator is on, any software command to change the printing density is ignored.	**Sans Serif**
NLQ2 (= Roman) When the NLQ2 indicator is on, any software command to change the printing density is ignored.	**Roman**
User-Defined Characters	
User-Defined characters are not saved when the power is switched off.	User-Defined characters are saved when the power is switched off.
Sequences: ESC [? 5 8 l — ESC % @ — ESC [! p	
Return to DEC PPL2 mode.	Ignored.
Sequence ESC EM **—Control Cut-Sheet Feeder**	
Ignored. No Cut-Sheet Feeder available.	Control Cut-Sheet Feeder.

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Figure J–1   Italic Table

CODE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	*à*	*Ş*		*0*	*@*	*P*	*`*	*p*
1			!	1	A	Q	a	q	*é*	*ß*	*!*	*1*	*A*	*Q*	*a*	*q*
2			"	2	B	R	b	r	*ù*	*Æ*	*"*	*2*	*B*	*R*	*b*	*r*
3			#	3	C	S	c	s	*ò*	*æ*	*#*	*3*	*C*	*S*	*c*	*s*
4			$	4	D	T	d	t	*ì*	*Ø*	*$*	*4*	*D*	*T*	*d*	*t*
5			%	5	E	U	e	u	*°*	*ø*	*%*	*5*	*E*	*U*	*e*	*u*
6			&	6	F	V	f	v	*£*	*"*	*&*	*6*	*F*	*V*	*f*	*v*
7			'	7	G	W	g	w	*¡*	*Ä*	*'*	*7*	*G*	*W*	*g*	*w*
8			(	8	H	X	h	x	*¿*	*Ö*	*(*	*8*	*H*	*X*	*h*	*x*
9			)	9	I	Y	i	y	*Ñ*	*Ü*	*)*	*9*	*I*	*Y*	*i*	*y*
A			*	:	J	Z	j	z	*ñ*	*ä*	***	*:*	*J*	*Z*	*j*	*z*
B			+	;	K	[	k	{	*¤*	*ö*	*+*	*;*	*K*	*[*	*k*	*{*
C			,	<	L	\	l	¦	*Pt*	*ü*	*,*	*<*	*L*	**	*l*	*¦*
D			-	=	M	]	m	}	*Å*	*É*	*-*	*=*	*M*	*]*	*m*	*}*
E			.	>	N	^	n	~	*å*	*é*	*.*	*>*	*N*	*^*	*n*	*~*
F			/	?	O	_	o		*ç*	*¥*	*/*	*?*	*O*	*_*	*o*	*Ø*

Note: Characters in boxes (for example: $) are modified by the National ASCII selection. See Figure J–2. The above figure illustrates the USA setting.

Figure J–2 National ASCII Table

Character Code (Hex)

	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
GRAPHIC& ITALIC	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
ITALIC ONLY	A3	A4	CO	DB	DC	DD	DE	EO	FB	FC	FD	FE
USA	#	$	@	[	\	]	^	'	{	¦	}	~
France	#	$	à	°	ç	§	^	'	é	ù	è	"
Germany	#	$	§	Ä	Ö	Ü	^	'	ä	ö	ü	ß
U.K.	£	$	@	[	\	]	^	'	{	¦	}	~
Denmark	#	$	@	Æ	Ø	Å	^	'	æ	ø	ȧ	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	ȧ	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain	Pt	$	@	¡	Ñ	¿	^	'	"	ñ	}	~
Japan	#	$	@	[	¥	]	^	'	{	¦	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	ȧ	ü
Denmark 2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	ȧ	ü
Spain 2	#	$	á	¡	Ñ	¿	é	'	í	ñ	ó	ú
Latin Am.	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

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