

LG^{plus} Series

Text and Graphics Printer



Setup Guide

Order Number: EK-LGPLS-SG, Rev. A

Digital Equipment Corporation

FCC Notice

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

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Installing this equipment in an FCC Level B composite system results in an FCC Level A Composite System as defined in the FCC Rules and Regulations.

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Contents

1 Overview

About This Guide	1-2
How to Locate Information	1-2
Warnings and Special Information	1-2
Printing Conventions in this Guide	1-2
Related Documents	1-3
The LG ^{plus} Series Line Matrix Printer	1-4
Standard Features	1-6
Host Computer Interface	1-6
Printer Emulations	1-6
Text Formatting and Language Options	1-6
Graphics and Vertical Formatting	1-7
Built-in Diagnostic Tools	1-7
Graphics Enhancement Options	1-8
Protocols and Emulations	1-8
Line Matrix Printing	1-9
Printing Speed	1-11

2 Setting Up the Printer

Before You Begin	2-2
Power Requirements	2-2
Select a Site	2-3
Remove the Shipping Restraints	2-5
Remove the Bubble Wrap and Protective Film	2-6
Remove the Cardboard Packing	2-7
Remove the Platen Protective Foam	2-8

Remove the Hammer Bank Protective Foam	2-9
Release the Paper Chains	2-10
Connect the Interface and Power Cables	2-11
Install the Ribbon	2-14
Load the Paper	2-16
Power On the Printer	2-21
Set the Top-of-Form	2-22
Test the Printer	2-25

3 Configuring the Printer

Overview	3-2
Changing and Saving Parameter Settings	3-6
Default and Custom Configurations	3-7
Operating Modes	3-7
Control Panel Keys	3-8
Factory Default Configuration Values	3-10
Changing Parameters	3-12
Saving Your New Configuration	3-15
Printing the Current Configuration	3-17
Loading Configuration Values	3-19
The Power-Up Configuration	3-21

4 The Configuration Menus

Overview	4-5
Configuration Main Menu	4-7
CONFIG. CONTROL Menu	4-8
Load Config.	4-9
Save Config.	4-9
Print Config.	4-9
Delete Config.	4-9
Power-Up Config.	4-9
Protect Configs.	4-10

ACTIVE EMULATION Menu	4-11
EMULATION Menu	4-12
LG Emulation	4-13
Font Submenu	4-14
Vert. Forms	4-15
Horiz. Forms	4-15
Autowrap	4-15
CR (Carriage Return)	4-16
LF (Line Feed)	4-16
Unsolicited Rpt.	4-16
LinePrinter+ Menu Overview	4-19
Proprinter XL Emulation (LinePrinter Plus)	4-20
Define CR Code	4-20
Auto LF	4-21
Define LF Code	4-21
FF Valid at TOF	4-22
Character Set	4-22
20 CPI Condensed	4-22
Epson FX Emulation (LinePrinter Plus)	4-23
Define CR Code	4-24
Auto LF	4-24
Define LF Code	4-24
Printer Select	4-24
Character Set	4-25
20 CPI Condensed	4-25
P-Series Emulation (LinePrinter Plus)	4-26
Control Code 06	4-28
Control Code 08	4-28
Define CR Code	4-28
Auto LF	4-28
Overstrike	4-29
Define LF Code	4-29
Select SFCC (Special Function Control Character)	4-29

EVFU (Electronic Vertical Format Unit) Select	4-30
Alt. Set 80-9F	4-30
Character Set	4-30
LinePrinter Plus Formatting Options	4-31
CPI/LPI Select	4-32
Font Attributes	4-33
Page Format	4-33
MAINT / MISC Menu	4-34
Hex Dump Mode	4-34
Power-Up State	4-35
Display Language	4-35
HOST INTERFACE Menu	4-36
Serial Submenu	4-38
Interface Type	4-39
Data Protocol	4-39
Baud Rate	4-40
Word Length	4-40
Stop Bits	4-40
Parity	4-40
Data Terminal Ready	4-40
Request to Send	4-41
Buffer Size in K	4-41
Parallel Submenu	4-41
Centronics Options	4-42
Data Bit 8	4-43
Data Polarity	4-43
Strobe Polarity	4-43
Response Polarity	4-43
Busy on Strobe	4-43
Latch Data On	4-44
Prime Signal	4-44
TOF Action	4-44
Buffer Size in K	4-44

Bidirectional (IEEE–1284 Parallel) Submenu	4–47
Dataproducts Submenu	4–45
Data Bit 8	4–46
PI Ignored	4–46
Data Polarity	4–46
Data Request Polarity	4–46
Strobe Polarity	4–46
Buffer Size in K	4–46
PRINTER CONTROL Menu	4–48
Unidirectional	4–48
PMD (Paper Motion Detection) Fault	4–49
Open Platen @BOF (Bottom of Form)	
NO TAG	
Slow Paper Slew	4–49
Power Saver Time	4–49
DIAGNOSTICS Menu	4–51
Printer Tests	4–53
Test Width	4–54
Paper Out Dots	4–54
System Memory	4–54
Print Statistics	4–54

5 Interfaces

Overview	5–2
Dataproducts Parallel Interface	5–3
Dataproducts Parallel Interface Signals	5–4
Dataproducts Parallel Interface Configuration	5–5
Centronics Parallel Interface	5–6
Centronics Interface Signals	5–7
Centronics Parallel Interface Configuration	5–8
IEEE 1284 Parallel Interface	5–9
Operating Modes	5–9
The Negotiation Phase	5–10

Signals	5-10
Configuration	5-12
Terminating Resistor Configurations	5-13
RS-232 and RS-422 Serial Interfaces	5-15
RS-232 and RS-422 Serial Interface Signals	5-16
RS-232 and RS-422 Serial Interface Protocol	5-17
RS-232 and RS-422 Serial Interface Error Handling	5-17
RS-232 and RS-422 Serial Interface Configuration	5-18
Interface Configuration with the VMS Operating System	5-19

6 Routine Service and Diagnostics

Routine Service	6-2
Cleaning Requirements	6-2
Exterior Cleaning	6-3
Interior Cleaning	6-3
Printer Self-Tests	6-6
Printing a Hex Dump	6-9
Fault Messages	6-11

Appendixes

- A Printer Specifications**
- B ASCII Character Set**

Glossary

Index

1 Overview

Contents

About This Guide	1-2
How to Locate Information	1-2
Warnings and Special Information	1-2
Printing Conventions in this Guide	1-2
Related Documents	1-3
The LG ^{plus} Series Line Matrix Printer	1-4
Taking Care of Your Printer	1-5
Standard Features	1-6
Host Computer Interface	1-6
Printer Emulations	1-6
Text Formatting and Language Options	1-6
Graphics and Vertical Formatting	1-7
Built-in Diagnostic Tools	1-7
Graphics Enhancement Options	1-8
Protocols and Emulations	1-8
Line Matrix Printing	1-9
Printing Speed	1-11

About This Guide

The *Setup Guide* is designed so that you can quickly find the information you need to install and configure your Digital Equipment Corporation (DEC®) LG^{plus} Series printer.

How to Locate Information

- Use the Table of Contents at the front of the manual and on the first page of every chapter.
- Use the Glossary to look up computer terms and acronyms.
- Use the alphabetical Index at the back of the manual.

Warnings and Special Information

Read and comply with all information highlighted under special headings:

WARNING

Conditions that could harm you as well as damage the equipment.

CAUTION

Conditions that could damage the printer or related equipment.

IMPORTANT

Information vital to proper operation of the printer.

NOTE: Information affecting printer operation.

Printing Conventions in This Guide

UPPERCASE print indicates control panel keys.

Example: Press the CLEAR key, then press the ON LINE key.

Quotation marks (“”) indicate messages on the Liquid Crystal Display (LCD).

Example: Press the ON LINE key. “OFFLINE” appears on the LCD.

The + (plus) symbol represents key combinations.

Example: “Press ▲ + ▼” means press the ▲ (UP) key and the ▼ (DOWN) key at the same time.

Related Documents

Following is a list of related documentation for the *LG^{plus} Series* printer.

- *LG^{plus} Series Text and Graphics Printer Maintenance Manual* (P/N EK–LGPLE–MM) – Explains how to maintain and repair the *LG^{plus} Series* line matrix printer at the field service level of maintenance. This manual covers alignments and adjustments, preventive and corrective maintenance, troubleshooting, and basic principles of operation.
- *LG^{plus} Series Text and Graphics Printer Operator’s Guide* (P/N EK–LGPLE–OG) – Describes the keys on the operator panel and provides quick reference information on daily printer operations such as loading paper and replacing ribbons.
- *LG^{plus} Series LinePrinter Plus™ Programmer’s Reference Manual* (P/N EK–LGPLE–RM) – Covers the host control codes and character sets for the three LinePrinter Plus emulations.
- *LG^{plus} Series (LG) Emulation Programmer’s Reference Manual* (P/N EK–LGPLP–RM) – Explains the host control codes and character sets for the Digital LG emulations.
- *LG^{plus} Series PGL Programmer’s Manual* (P/N EK–LGPGL–PM) — Provides information used with the optional IGP Printronix emulation enhancement feature. The IGP Printronix emulation allows you to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.
- *LG^{plus} Series VGL Programmer’s Manual* (P/N EK–LGVGL–PM) — Provides information used with the optional Code V Printronix® emulation enhancement feature. The Code V Printronix emulation allows you to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.

The LG^{plus} Line Matrix Printer

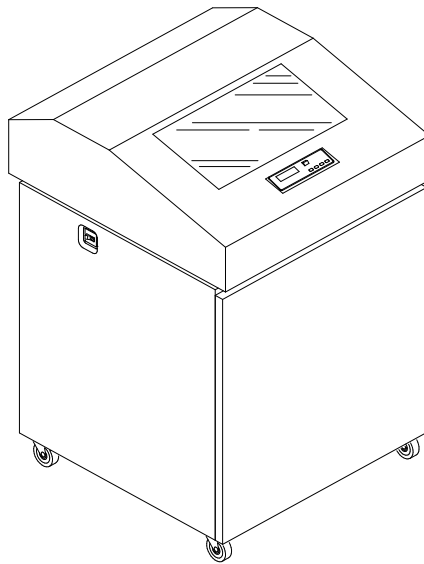


Figure 1–1. The LG^{plus} Series Printer

The LG^{plus} printer offers software versatility and the latest refinements in line matrix printing technology.

Most line matrix printers have specialized architectures, which enable the printer to emulate, or behave like, another printer. These specialized architectures are restricted. Your printer, however, introduces an open architecture concept that is not available on any other line matrix printer.

Digital LG is the standard emulation; the Proprinter XL, Epson FX–1050, and Printronix P–Series emulations are also available as part of the LinePrinter Plus group of emulations. The IGP®/PGL and IGP®/VGL graphics enhancement emulations are available as optional upgrades. No matter what emulation is installed, your printer is very easy to use. The message display and lights on the control panel communicate with you directly and clearly. You can select every function on your printer at the control panel, or you can send commands from the host computer.

In addition, the LG^{plus} Series printer uses flash memory to store its operating software and the custom configurations that you may select from the control panel. Flash memory allows the printer to initialize much faster than a

diskette-based printer during a power-up or reset sequence. In addition, you may download operating software to the printer's flash memory from a diskette loaded onto an attached host system. This allows you to upgrade the software resident in the printer very simply, without having to install replacement EPROMs on a PCBA. The default amount of flash memory installed on the printer can be added to for additional performance enhancement, up to 30 Mbytes of flash.

The print mechanisms are housed in sound-insulated floor cabinets that make the LG^{plus} among the quietest impact printers in the world.

Taking Care of Your Printer

Your printer will produce high print quality jobs if it is well taken care of. Periodic cleaning, handling the printer properly, and using the correct consumables, such as paper and ribbons, will ensure optimum performance. Chapter 6 explains how to clean the printer, and consumables are listed in Appendix A.

Whenever it is necessary to service the printer, remember these important maintenance concepts:

- Use only the ribbons specified in Appendix A. Use of incorrect ribbons can lead to ink migration problems, degraded print quality, and expensive damage to the printer.
- Incorrect closure of the forms thickness lever can lead to smearing, degraded print quality, paper jams, and damage to the platen and shuttle assembly. Never close the forms thickness lever too tightly.

Standard Features

The LG^{plus} printer offers a wide range of horizontal and vertical dot densities, operates quietly, and can load an emulation very easily. Other features are specified in the following sections.

Host Computer Interfaces

The following host computer interface choices are available:

- Dataproducts parallel interface
- Centronics parallel interface
- IEEE 1284 parallel interface
- RS-232 serial interface
- RS-422 serial interface

Printer Emulations

You may select the following printer emulations (or protocols) at the control panel:

- Digital LG
- P-Series
- Epson FX
- Proprinter XL
- IGP/PGL (optional upgrade)
- IGP/VGL (optional upgrade)

Each emulation provides a different set of configuration menus, control codes, and character sets.

Text Formatting and Language Options

The LG^{plus} Seires printer has the following output control features:

- Three modes for printing text:
 - 1) Correspondence
 - 2) Data Processing (DP)
 - 3) Draft (high speed)

- Selectable horizontal and vertical dot densities that enable you to tailor output to a wide variety of printing requirements.
- Selectable forms length and width
- Character attribute specification:
 - 1) Selectable pitch: normal, expanded, and compressed
 - 2) Bold (double-strike) printing
 - 3) Emphasized (shadow) printing
 - 4) Automatic underlining and overscoring
 - 5) Superscript and subscript printing
 - 6) Double high and wide printing
- Resident multinational character sets

Graphics and Vertical Formatting

Several graphics and vertical formatting features are available:

- Four built-in graphics generators:
 - 1) IBM Proprinter III XL bit-image graphics
 - 2) Epson FX dot graphics mode
 - 3) P-Series Plot
 - 4) LG Sixel Graphics
- Programmable electronic vertical formatting provides rapid vertical paper movement to specified lines for printing repetitive and continuous forms. You can choose from the following methods:
 - 1) Vertical tabbing in Proprinter III XL and Epson FX emulation modes
 - 2) Electronic Vertical Format Unit (EVFU) in P-Series emulation mode

Built-in Diagnostic Tools

The following diagnostic tools are provided with the printer:

- Comprehensive diagnostic self-tests permanently stored in the printer
- Configuration printout
- Data stream hex code printout

Graphics Enhancement Options

The IGP/PGL and IGP/VGL Printronix emulations allow you to create and store forms, generate logos, bar codes, expanded characters, and create other graphics. Alphanumeric and bar code data are added as the form is printed.

These emulations are available as factory–installed or field–installed options. For more information, contact your authorized Digital service representative.

Protocols and Emulations

A *protocol* is a set of rules governing the exchange of information between the printer and its host computer. These rules consist of codes that manipulate and print data and allow for machine-to-machine communication. A printer and its host computer must use the same protocol. As used in this manual, *protocol* and *emulation* mean the same thing.

Most impact printers use single ASCII character codes to print text, numbers, and punctuation marks. Some characters, both singly and in groups of two or more, are defined as control codes. Control codes instruct the printer to perform specific functions, such as underlining text, printing subscripts, setting page margins, etc. The main difference between most printer protocols is in the characters used to create control codes and the ways in which these characters are formatted.

When the printer executes the character and control codes of a particular printer protocol, it is “emulating” that printer. If the printer uses the Proprinter XL protocol, for example, it is emulating an IBM Proprinter XL printer. If the printer is using the Epson FX printer protocol, for example, we can also say it is in Epson FX emulation mode.

Line Matrix Printing

Your printer is an impact printer; it creates characters by printing ink dots on paper. The dots are printed on an invisible matrix mapped in printer memory. (See Figure 1–2.) Dot impressions are made by an array of steel hammers mounted on a rapidly oscillating shuttle. The hammers strike the paper through a moving ink ribbon.

Unlike serial dot matrix printers, which form whole characters one at a time with a moving printhead, the printer divides every printable line into horizontal dot rows. The printer then prints a dot row of the entire line with every lateral sweep of the shuttle.

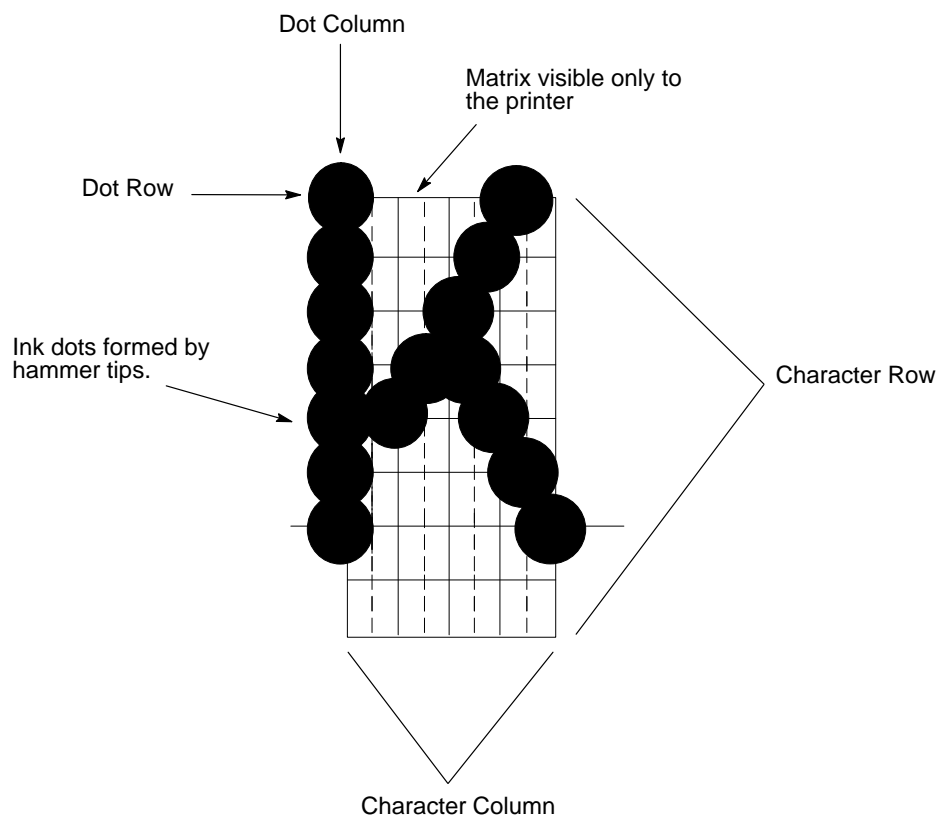
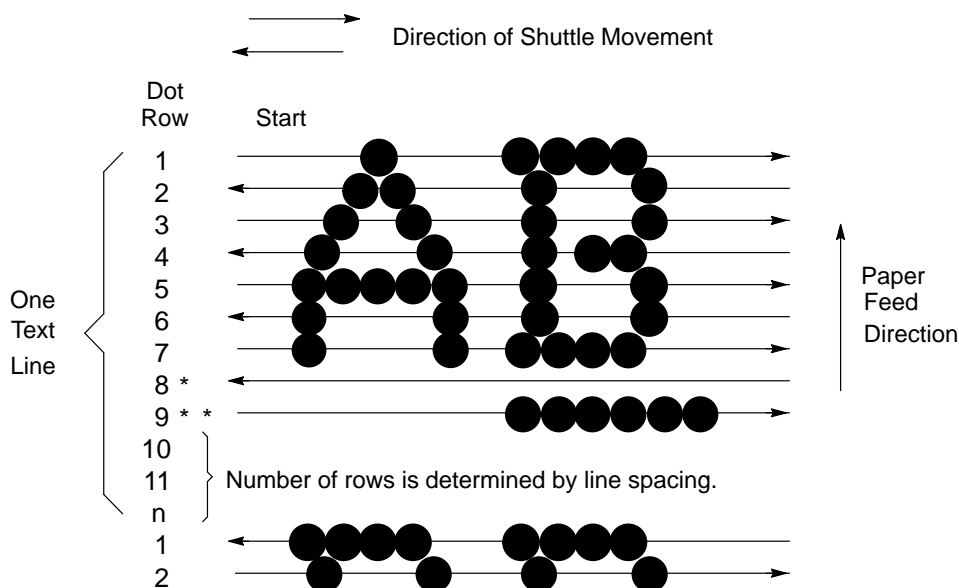


Figure 1–2. Dot Matrix Character Formation

During each sweep of the shuttle, the hammers print dots at the required positions in the dot row. When the shuttle reaches the end of a sweep, it reverses direction, the paper is advanced one dot row, and the hammers print the next row of dots as the shuttle sweeps in the opposite direction. (See Figure 1–3.)

After a line of characters is printed, hammer action stops while the paper is advanced to the first dot row of the next print line. The number of rows allowed for line separation depends on the line spacing you select.



* This row is used only for lowercase descenders.

** This row is used for underlining and lowercase descenders.

Figure 1–3. Dot Matrix Line Printing

Printing Speed

The speed at which text prints is measured in lines per minute (lpm). This speed is inversely proportional to the number of dot rows required to produce a character line, regardless of the number of characters in the line. More dot rows are required to print lowercase characters with descenders; consequently, those character lines print at a fractionally lower rate.

The printer also prints dot-addressable graphic images. The speed at which graphics are plotted is measured in inches per minute (ipm). Unidirectional plotting produces slightly better print quality and takes about twice as long as bidirectional plotting. You can select either plotting mode from the control panel.

Printing and plotting rates also vary according to the print mode you select. Print mode refers to the way you instruct the printer to create characters. If, for example, you select near letter quality (NLQ) mode, the printer uses more dot rows to form characters than if you choose high speed (HS) mode. Character formation and print speed are faster in HS mode because the printer prints fewer dot rows to form characters. Vertical dot density is a factor in printing speed.

Nominal printing rates are charted in Appendix A.

2 Setting Up the Printer

Contents

Before You Begin	2-2
Power Requirements	2-2
Select a Site	2-3
Remove the Shipping Restraints	2-5
Remove the Bubble Wrap and Protective Film	2-6
Remove the Cardboard Packing	2-7
Remove the Platen Protective Foam	2-8
Remove the Hammer Bank Protective Foam	2-9
Release the Paper Chains	2-10
Connect the Interface and Power Cables	2-11
Install the Ribbon	2-14
Load the Paper	2-16
Power On the Printer	2-21
Set the Top-of-Form	2-22
Test the Printer	2-25

Before You Begin

Read this chapter carefully before installing and operating the LG^{plus} Series printer.

The printer is easy to install, but for your safety, and to protect valuable equipment, perform all the procedures in this chapter in the order presented.

Power Requirements

IMPORTANT

It is recommended that printer power be supplied from a separate AC circuit protected at 10 amperes for 120 volts or 5 amperes for 230 volts at 50 or 60 Hertz.

The printer must be connected to a power outlet that supplies 88 to 135 Volts AC or 178 to 270 Volts AC at 47 to 63 Hz. The printer automatically senses and adjusts itself to conform to the correct voltage range.

Primary circuit protection is provided by the power switch, which is also a circuit breaker. Consult an electrician if printer operation affects local electrical lines. See Appendix A for additional power specifications.

This equipment is designed to operate with IT power systems.

Select a Site

Printer dimensions are shown in Figure 2–1. Select a printer site that meets the following requirements:

- Permits complete opening of the printer cover and both doors of the floor cabinet.
- Allows at least three feet of clearance behind the printer. (This permits air to circulate freely around the printer and provides access to the paper stacking area.)
- Has a standard power outlet that supplies 100–120 Volts AC or 200–240 Volts AC power, at 47 to 63 Hz. The printer automatically senses and adjusts itself to conform to the correct voltage range. (For the 100–120 Volt outlet, power may fluctuate between 88 and 135 Volts AC. For the 200–240 Volt outlet, power may fluctuate between 178 and 270 Volts.)
- Is relatively dust-free.
- Has a temperature range of 10° C to 40° C (50° F to 104° F), and a relative humidity from 10% to 90%.
- Is located within the maximum allowable cable length to the host computer. This distance depends on the type of interface you plan to use, as shown in the following table:

Interface Type	Maximum Cable Length
Centronics Parallel	5 meters (15 feet)
Dataproducts Parallel	12 meters (40 feet)
IEEE 1284 Parallel	10 meters (32 feet)
Serial RS–232	15 meters (50 feet)
Serial RS–422	1220 meters (4000 feet)

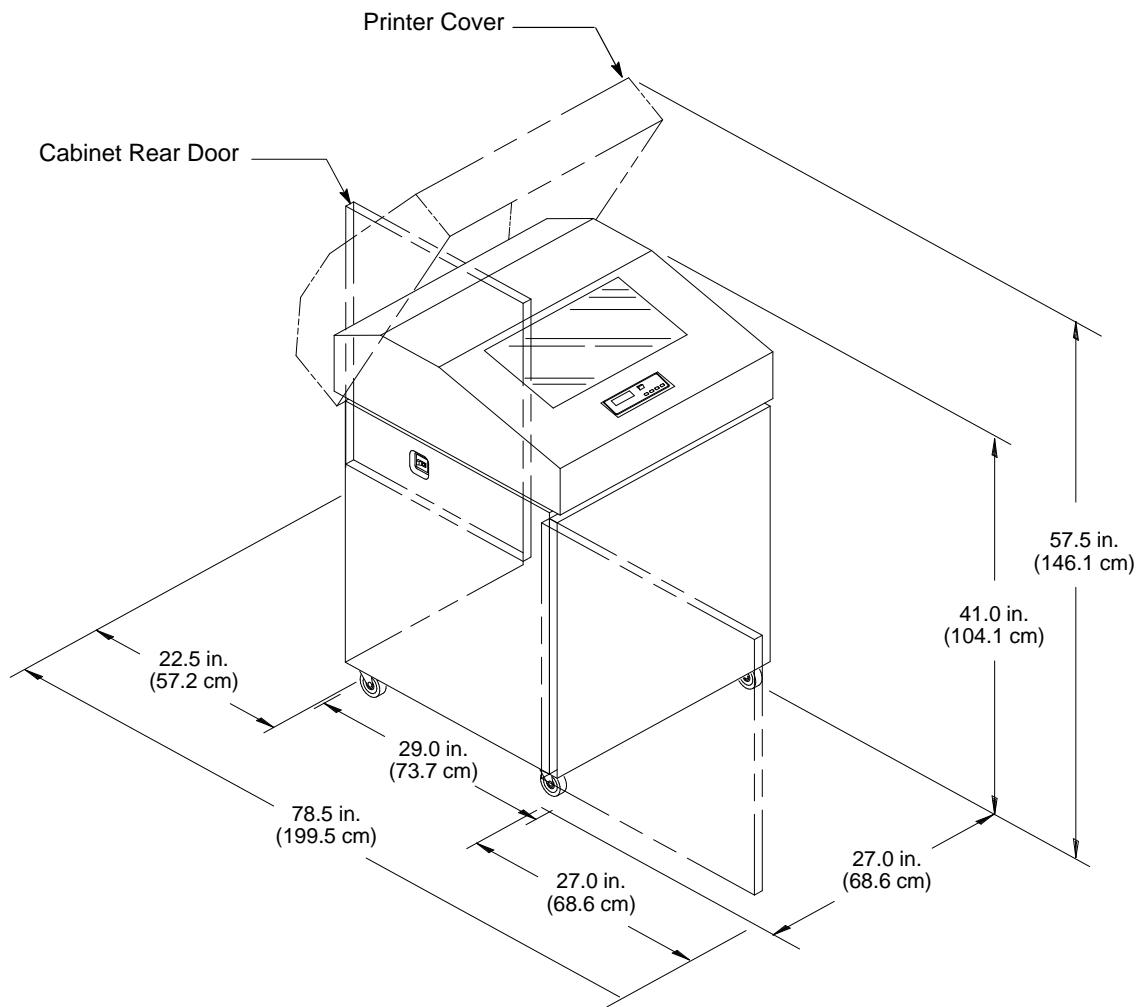


Figure 2-1. LG^{plus} Series Printer Dimensions

Remove the Shipping Restraints

Cardboard packing, protective foam, and tie wraps protect printer mechanisms from damage during shipment. This section describes how to remove these shipping restraints before you operate the printer.

Save the cardboard packing, foam blocks, and bubble wrap, along with the other packing materials, since you may need to reinstall them.

To reinstall the shipping restraints if it is necessary to move the printer, simply reverse the steps in this section.

WARNING

To prevent possible injury, do not connect the AC power source before removing the shipping restraints. If the power source has already been connected, disconnect it before performing the shipping restraint removal procedures. To avoid shipping damage, reinstall the shipping restraints whenever you move or ship the printer.

WARNUNG

Um mögliche Verletzungen zu vermeiden, darf die Netzverbindung erst nach dem Entfernen der Transportbefestigungen hergestellt werden. Um Versandschäden zu verhindern, die Versand-Einspannungen wieder einbauen, wenn der Drucker versetzt oder versandt wird.

ATTENTION

Pour éviter tout danger, ne branchez pas le cordon d'alimentation avant d'avoir ôté les cales de transport. Si l'alimentation est déjà raccordée, débranchez-la avant d'effectuer les procédures d'enlèvement des cales. Pour éviter tout dégât lors du transport, remettez les cales en place chaque fois que l'imprimante est déplacée ou transportée.

Remove the Bubble Wrap and Protective Film

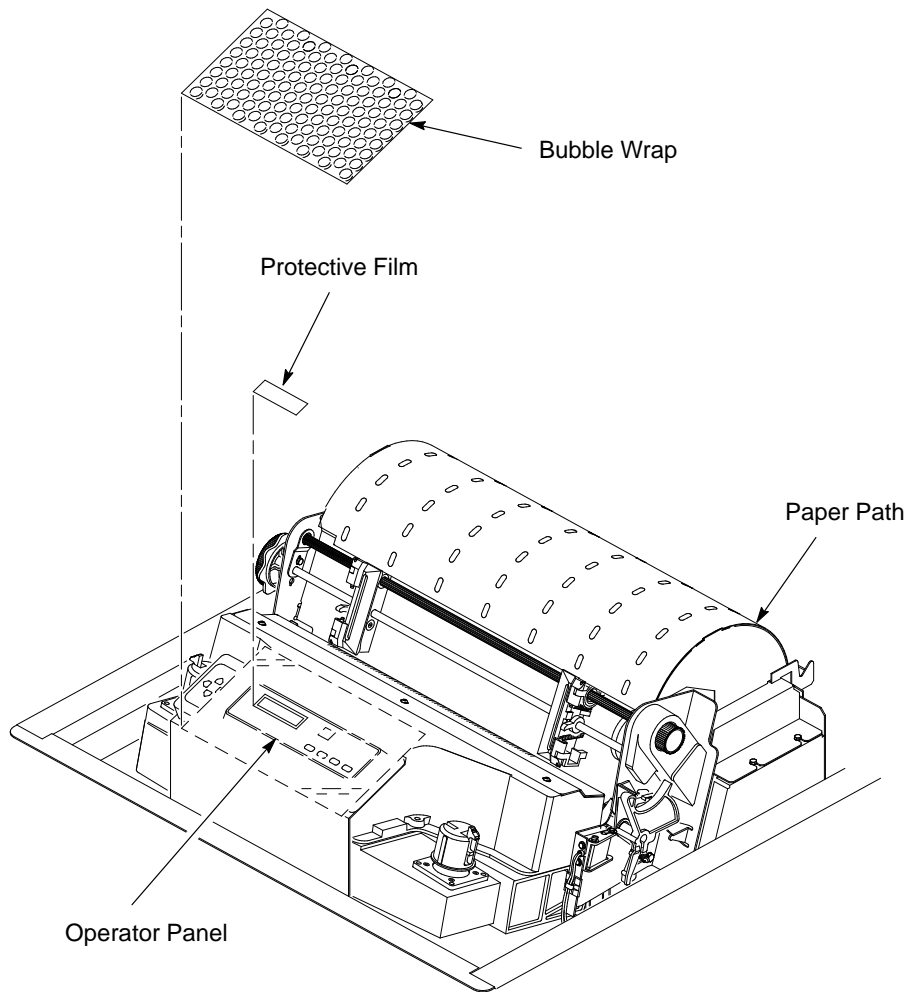


Figure 2–2. Removing the Bubble Wrap and Protective Film

1. Raise the printer cover.
2. Carefully remove the bubble wrap off the operator panel.
(See Figure 2–2.)
3. Slowly peel the protective film off the LCD display.

Remove the Cardboard Packing

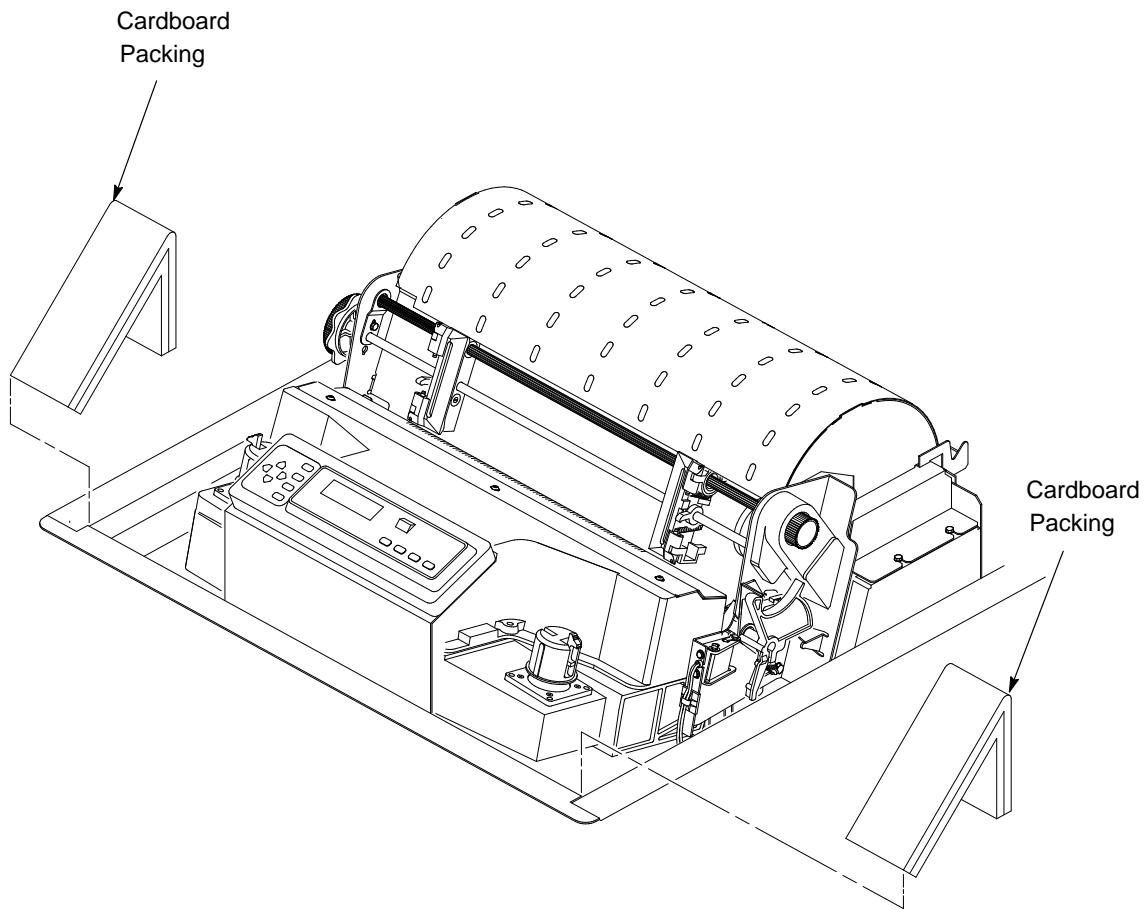


Figure 2-3. Removing the Cardboard Packing

1. Remove the cardboard packing. (See Figure 2-3.)

Remove the Platen Protective Foam

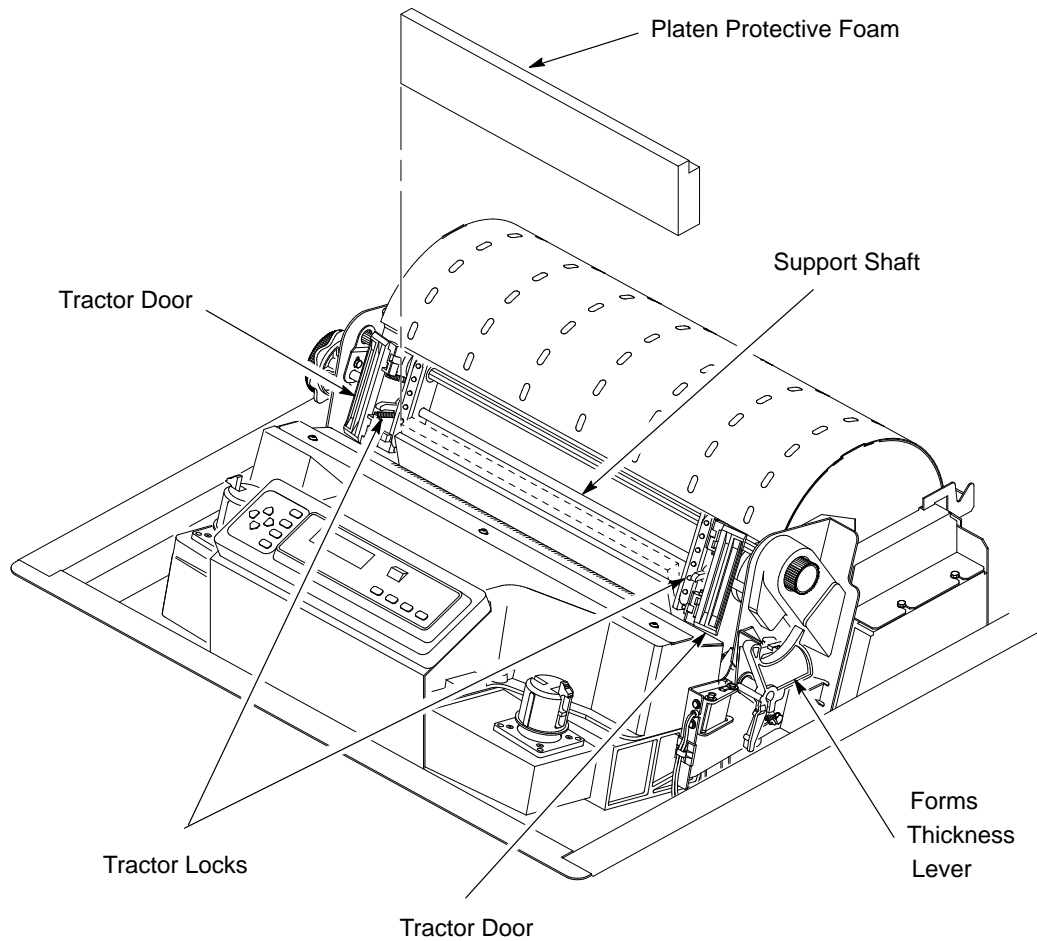


Figure 2–4. Removing the Platen Protective Foam

1. Open the tractor doors. Push the tractor locks down. Slide the tractors outward as far as they will go. (See Figure 2–4.) The forms thickness lever should be in the fully open position.
2. Rotate the platen protective foam toward the front of the printer and out from under the support shaft. Remove the platen protective foam.
3. Remove the envelope that contains the sample configuration printout. Store this in the pouch that is attached to the right interior side of the cabinet.

Remove the Hammer Bank Protective Foam

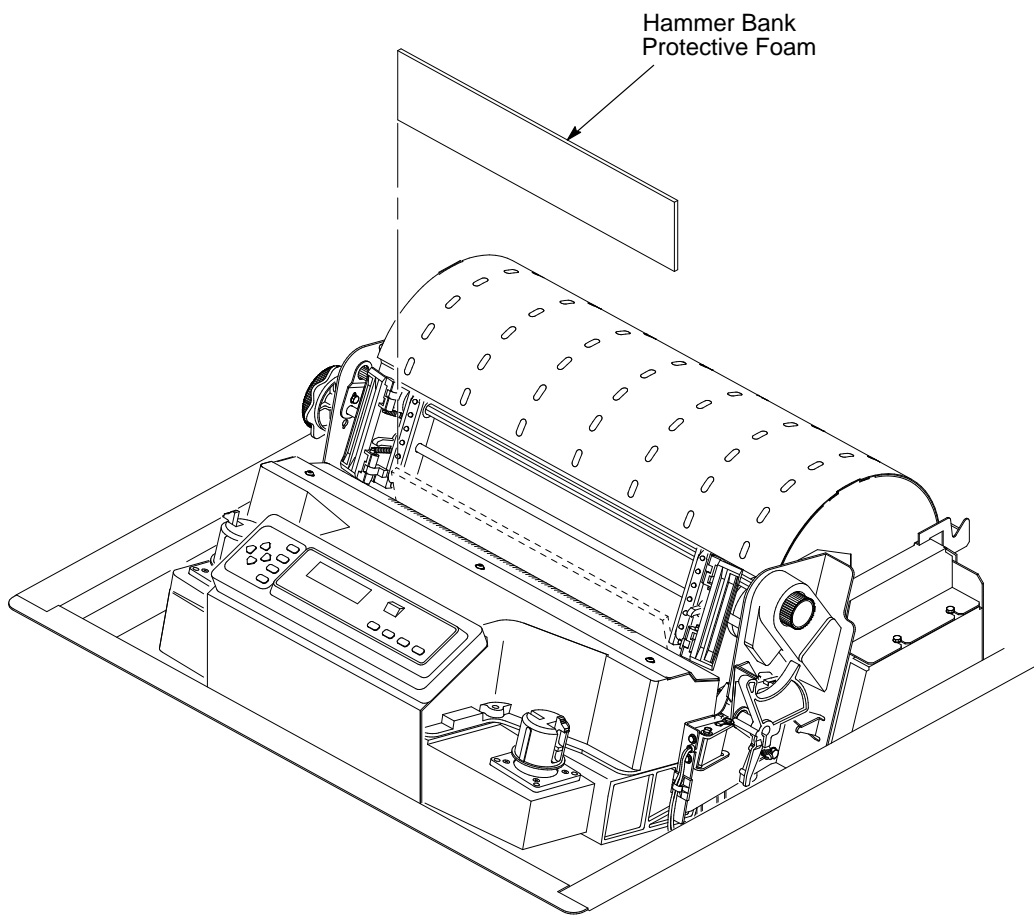


Figure 2–5. Removing the Hammer Bank Protective Foam

1. Rotate the hammer bank protective foam toward the front of the printer and remove it from between the ribbon mask and the platen. (See Figure 2–5.)

Release the Paper Chains

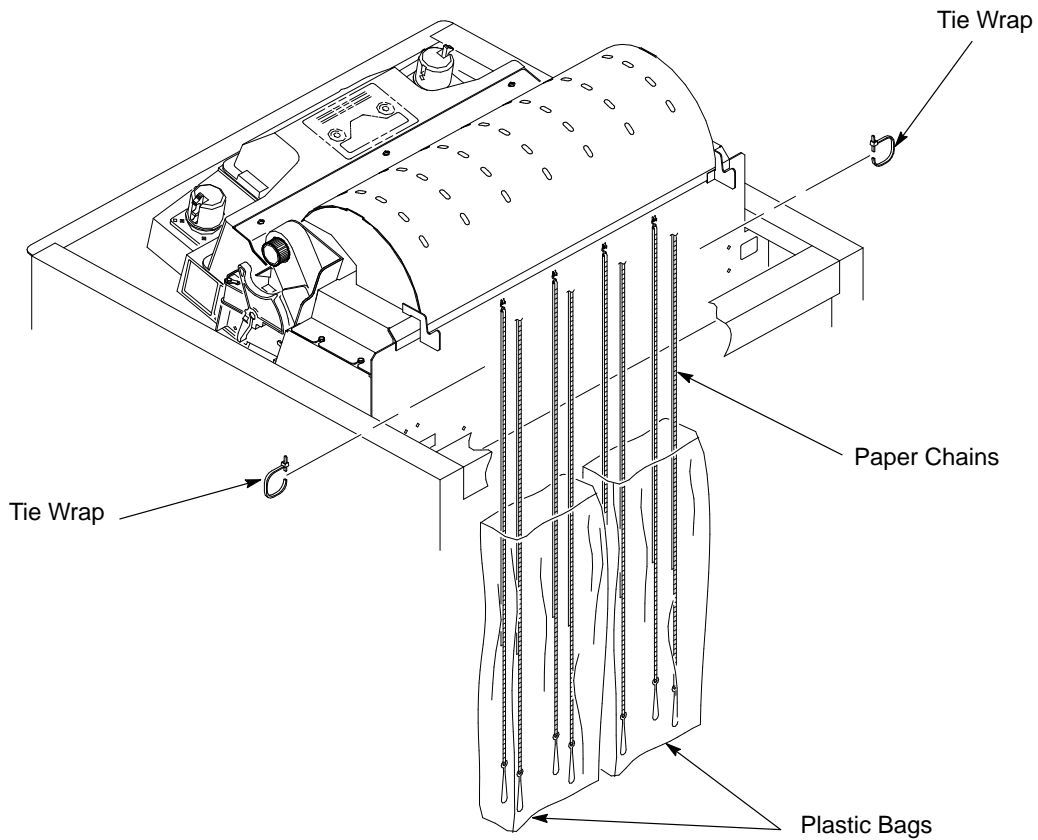


Figure 2–6. Releasing the Paper Chains

1. Open the rear cabinet door.
2. Cut the tie wraps and release the paper chains from the bags at the top rear of the printer frame. Remove the tie wraps and bags. (See Figure 2–6.)
3. Make sure each chain hangs freely, with no kinks or knots.
4. Close the rear cabinet door.

Connect the Interface and Power Cables

Before you connect the interface and power cables, verify that the voltage source at the printer site conforms to the requirements specified on page 2–3. Make sure that the printer power switch is set to Off (see Figure 2–7).

WARNING

To prevent serious personal injury from electrical shock when connecting or disconnecting the host interface (signal) cable, make sure that the printer is powered off and the power cable is unplugged.

WARNUNG

Um ernstliche körperliche Verletzungen durch Stromschlag beim Anschließen oder Trennen des Signalton-Kabels zu vermeiden, muß der Drucker auf jeden Fall ausgeschaltet und der Netzstecker herausgezogen werden.

ATTENTION

Afin d'éviter tout risque de blessure par électrocution lors du branchement ou du débranchement du câble de signal, mettre l'imprimante hors tension et débrancher le câble d'alimentation.

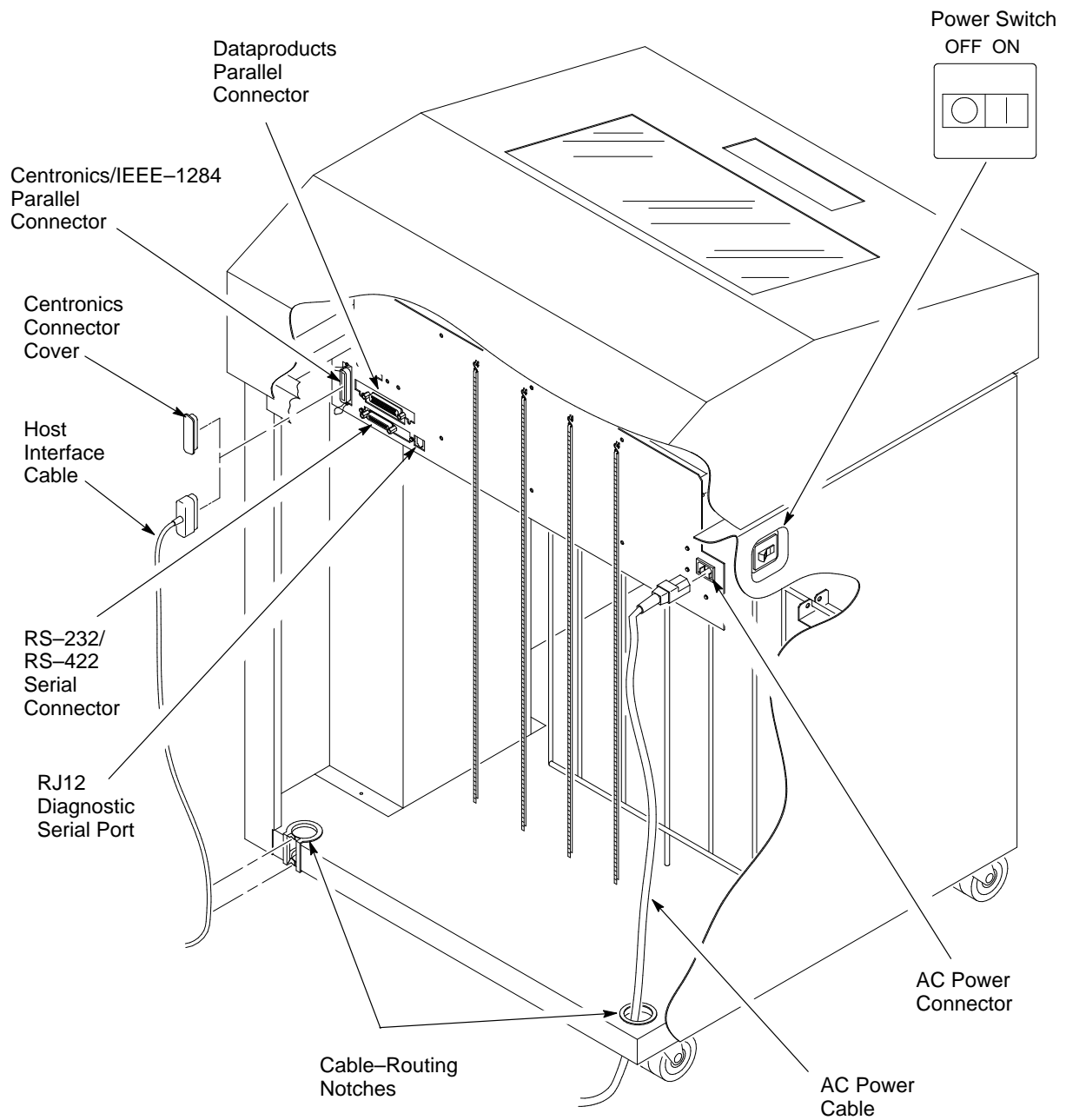


Figure 2-7. LG^{plus} Series Interface and Power Cable Connections

A procedure for installing the cables follows.

1. Connect the (customer-supplied) interface cable from the host computer to the appropriate printer interface connector (see Figure 2–7). Refer to Chapter 5, *Interfaces*, for descriptions of the connectors and their pin assignments.
 - a. Open the rear cabinet door, and remove the cover from the I/O connector you have selected.
 - b. Locate the notch in the lower left corner of the back of the cabinet. Hold the I/O cable below its connector, and gently push the cable through the diagonal openings in the two plastic grommets seated in the notch.
 - c. Pull the cable up through the notch until it reaches the I/O plate; attach the cable connector to the printer interface connector.
2. Open the cabinet's front door, and remove the box containing the power cable, printer ribbon, and operator panel overlay labels. Documentation is stored in a pouch container on the right interior side of the cabinet.
3. Thread the power cable connector up through the notch in the lower right back corner of the cabinet (see Figure 2–7). Plug the power cord into the printer's AC power connector, then into the AC power outlet.

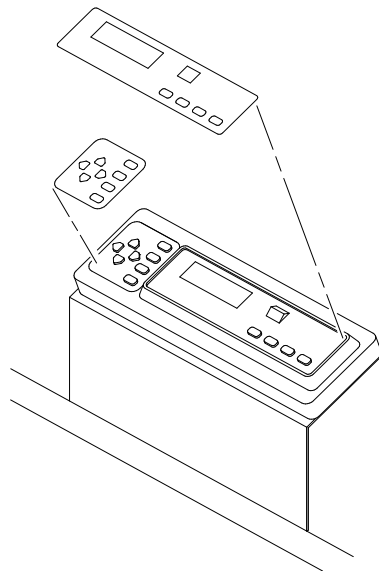


Figure 2–8. The Operator Panel Overlay Label

4. Attach the overlay labels by adhering them to your operator panel. (See Figure 2–8.)

Install the Ribbon

Follow these instructions to install the ribbon provided with your printer.

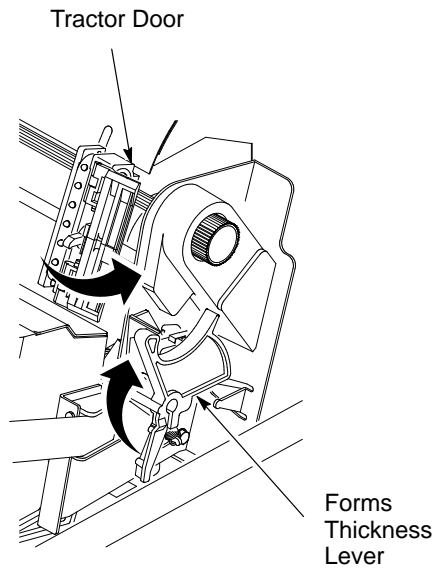


Figure 2-9. The Forms Thickness Lever and Tractor doors

1. Open the printer top cover.
2. Raise the forms thickness lever as far as it will go. Swing open the tractor doors.

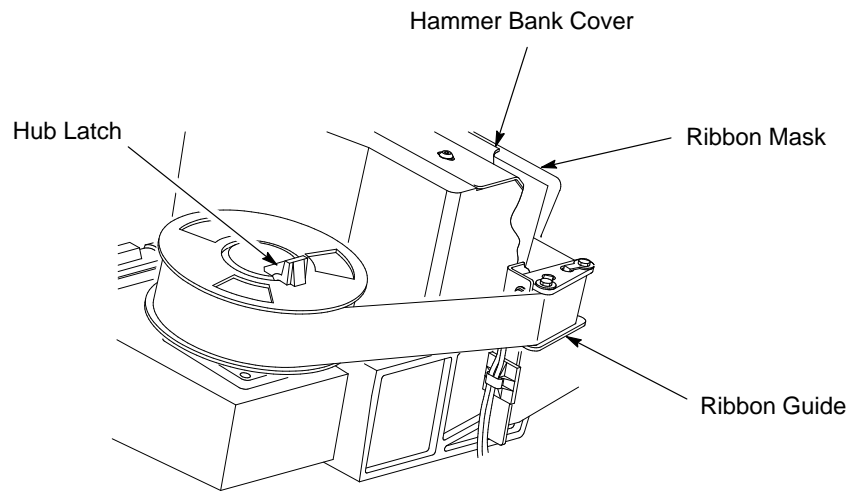


Figure 2–10. Installing the Ribbon

3. With the ribbon to the outside, place the right spool on the right hub. Press down on the spool until the hub latch snaps in place.
4. Thread the ribbon around the ribbon guide and along the ribbon path. (Refer to the ribbon path diagram on the shuttle cover.) Be sure to thread the ribbon between the hammer bank cover and the ribbon mask.

CAUTION

The ribbon must not be twisted. A twisted ribbon can lower print quality, shorten ribbon life, and cause paper jams.

5. Place the left spool on the left hub. Press down on the spool until the hub latch snaps in place. Hand–turn the right spool to make sure the ribbon tracks correctly in the path and ribbon guides.
6. Continue on to the next section to load paper in the printer.

Load the Paper

This section explains how to load paper for the first time.

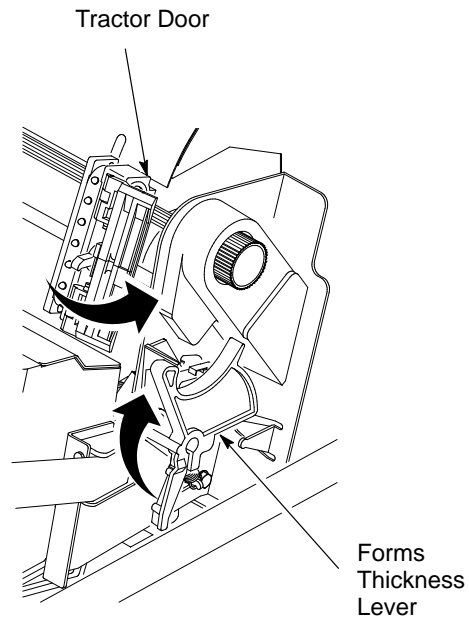


Figure 2–11. The Forms Thickness Lever and Tractor doors

1. When you start this procedure, verify that the printer cover is open, the forms thickness lever is raised, and the tractor doors are open.

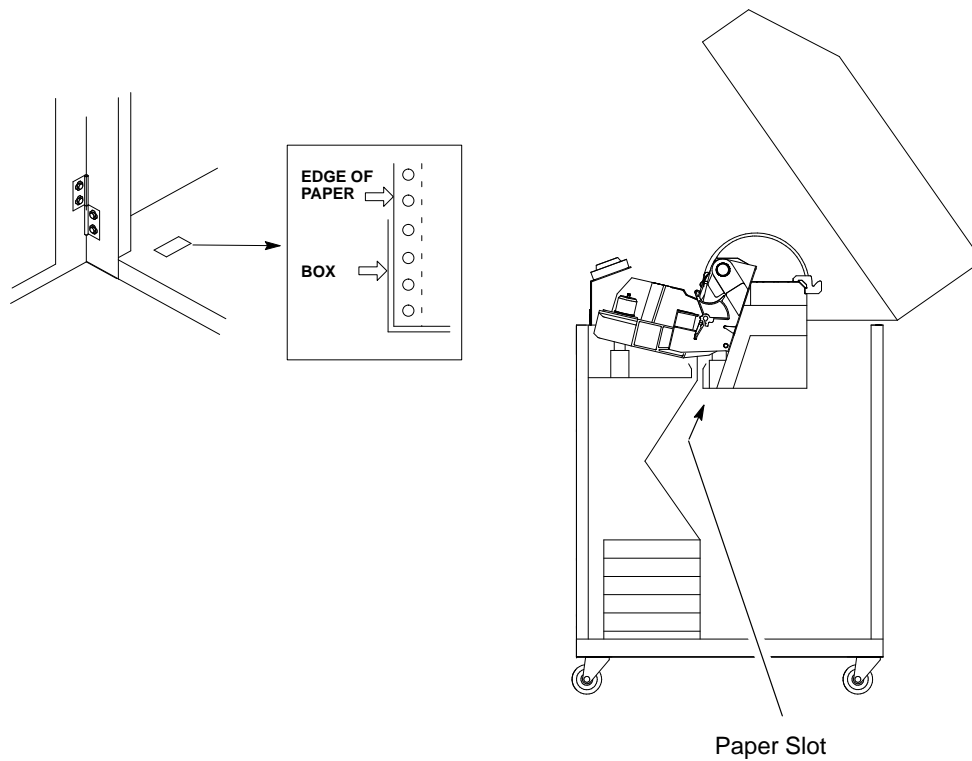


Figure 2–12. Aligning and Feeding the Paper

2. Open the front door of the cabinet. Align the paper supply with the label on the floor. Ensure that the paper pulls freely from the box.
3. Feed the paper up through the paper slot inside the cabinet. Hold the paper to prevent it from slipping down through the paper slot.

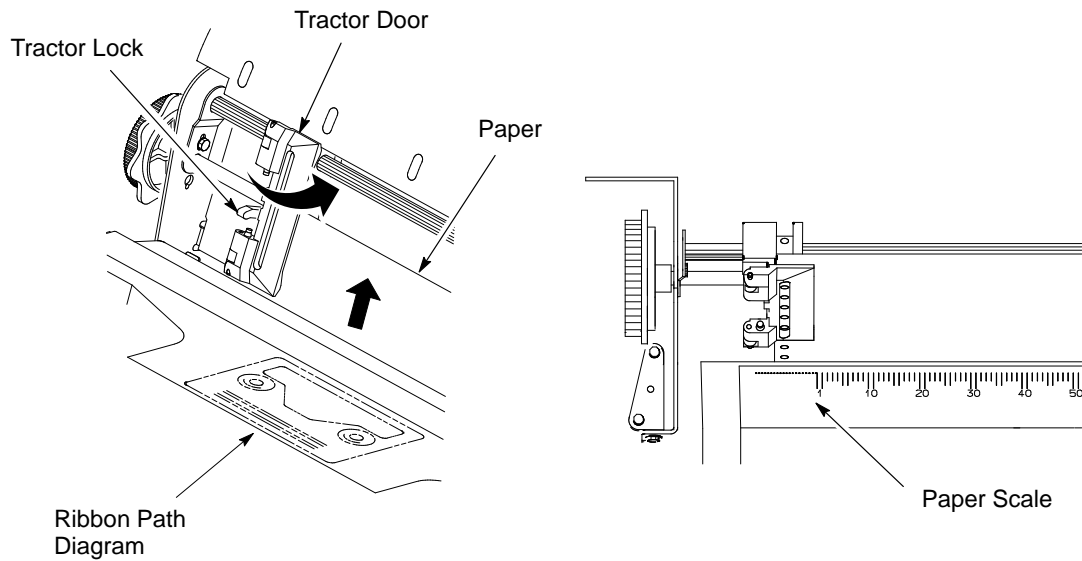


Figure 2-13. The Left Tractor

4. Pull the paper above and behind the ribbon mask. (Refer to the ribbon path diagram on the shuttle cover.) Load the paper on the left tractor sprockets and close the tractor door. Normally, you should not need to adjust the position of the left tractor.
5. If adjustment is necessary, unlock the left tractor. Slide the tractor until it is directly to the left of the number “1” on the paper scale and lock it. (You can also use the paper scale to count columns.)

CAUTION

To avoid damage to the printer caused by printing on the platen, always position the left tractor unit directly to the left of the “1” mark on the paper scale.

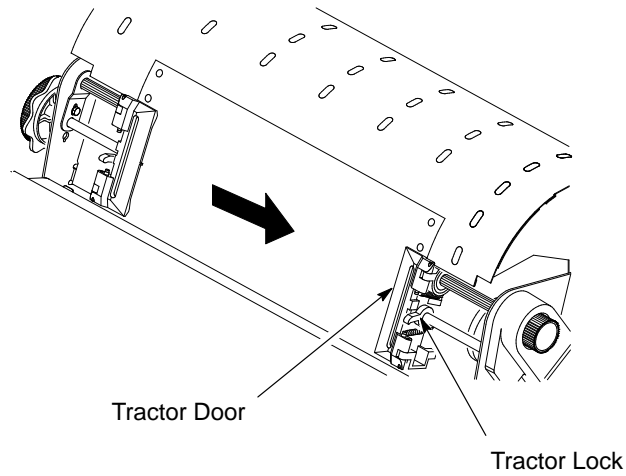


Figure 2–14. The Right Tractor

6. Unlock the right tractor. Load the paper onto the sprockets and close the tractor door. If necessary, slide the right tractor to remove paper slack or to adjust for various paper widths. Then lock the tractor.

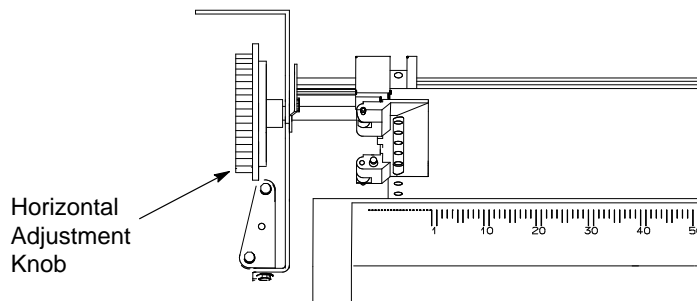


Figure 2–15. The Horizontal Adjustment Knob

7. After both tractors are secured, you may use the horizontal adjustment knob to make fine horizontal paper adjustments.

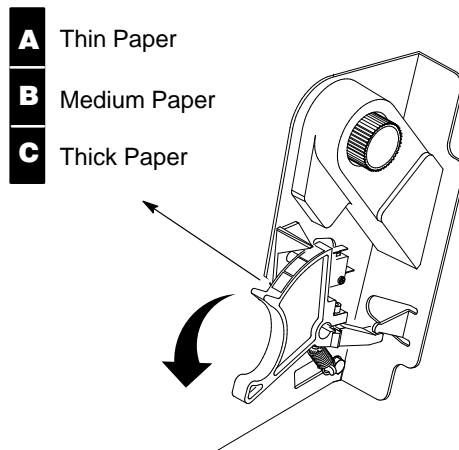


Figure 2–16. Lowering the Forms Thickness Lever

8. Lower the forms thickness lever. Set it to match the paper thickness.

(The A–B–C scale corresponds approximately to 1–, 3–, and 6–part paper thickness. Adjust until you have the desired print quality.)

NOTE: Do not set the forms thickness lever too tightly; excessive friction can cause paper jams, ribbon jams with potential for ribbon damage, smeared ink, or wavy print.

9. Close the cabinet front door.
10. Continue on to the next section to power on the printer.

Power on the Printer

Following are instructions for powering on the printer after you have installed the ribbon and loaded paper.

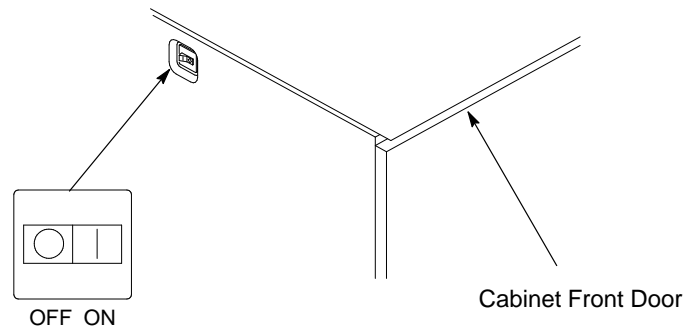


Figure 2–17. The Power Switch

1. When you start this procedure, verify that paper and ribbon are installed, the forms thickness lever is lowered, and the tractor doors are closed. This prevents a “LOAD PAPER” or “CLOSE PLATEN” error message from displaying after the printer is powered on.
2. Set the power switch to the ON position (see Figure 2–17). The printer initializes and runs several self-tests. The messages “TESTING HARDWARE / PLEASE WAIT” and “DIAGNOSTIC PASSED” will each display briefly. When the self-tests complete and the software has initialized successfully, the status lamps light to indicate the printer is online, and the message “ONLINE / LG” appears on the LCD.

If the status lamps flash and a fault message displays, this indicates a fault condition; refer to the fault messages section in Chapter 6, *Routine Service and Diagnostics*.

Set the Top-of-Form

Following are instructions for setting the top-of-form after you have powered on the printer.

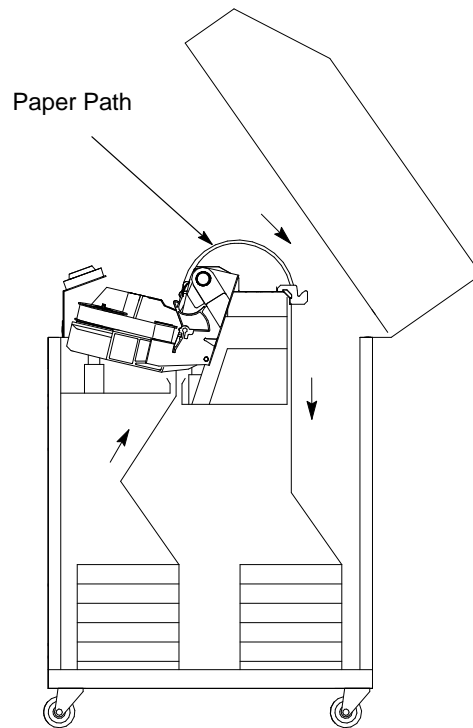


Figure 2-18. The Lower Paper Guide

1. When you start this procedure, verify that the printer is in online mode, with the printer cover open and the forms thickness lever lowered.
2. Press ON LINE to place the printer in offline mode. The LCD will then display "OFFLINE / CONFIG. CONTROL."
3. Press FF several times to ensure the paper feeds properly beyond the tractors and over the lower paper path. Ensure the paper folds in the same way in the stacking area as it does in the supply area.

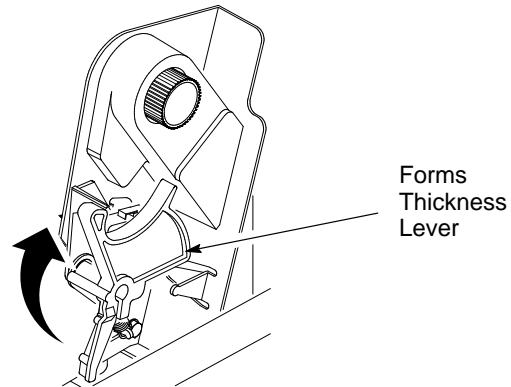


Figure 2–19. Raising the Forms Thickness Lever

4. Raise the forms thickness lever as far as it will go. This allows you to turn the vertical position knob freely in order to align the top-of-form.

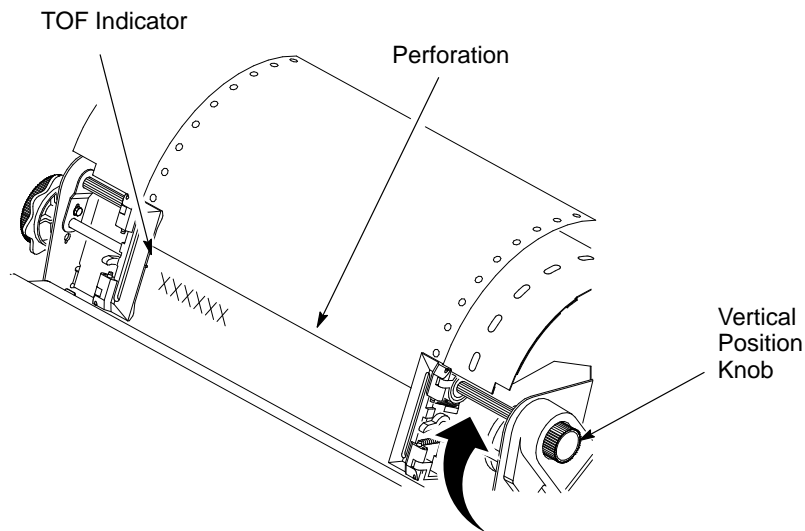


Figure 2–20. Aligning the Top-of-Form

5. Locate the TOF indicator on the left tractor. The TOF indicator is the small tab located on the left tractor door.
6. Turn the vertical position knob to align the top of the first print line with the TOF indicator.

NOTE: The first print line on the form should be 1/2 inch or more from the perforation for best print quality.

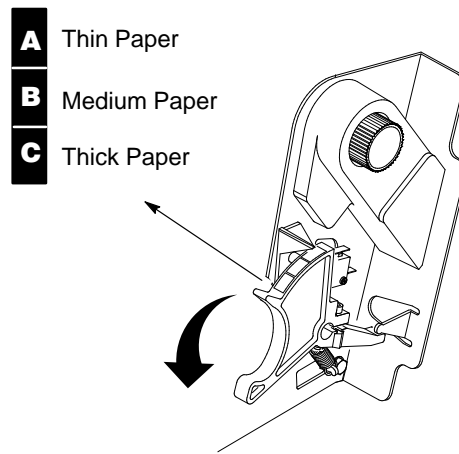


Figure 2–21. Lowering the Forms Thickness Lever

7. Lower the forms thickness lever. Set it to match the paper thickness.

(The A–B–C scale corresponds approximately to 1–, 3–, and 6–part paper thickness. Adjust until you have the desired print quality.).

NOTE: Do not set the forms thickness lever too tightly; excessive friction can cause paper jams, ribbon jams with potential for ribbon damage, smeared ink, or wavy print.





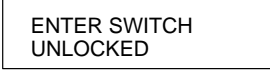




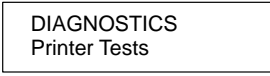

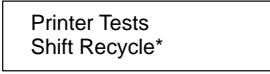

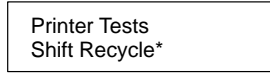

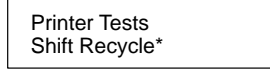


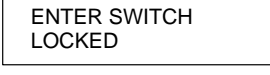


8. Press SET TOF. The top–of–form position that you have set moves down to the print position.

IMPORTANT

The forms thickness lever must be closed; otherwise, there will be no paper movement when you press SET TOF.

9. Go on to the next procedure to run a simple printer test.

Test the Printer

Step	Key	Result	Notes
1.	Make sure that the printer top cover is open and the forms thickness lever is closed.		
2.	Press: ON LINE 		The printer must be off-line to test the printer.
3.	 + 	 	Allows you to make configuration changes.
4.	 UNTIL		
5.			
6.			
7.	To start test: R/S 		The printer outputs a sliding alphabet pattern.
8.	To stop test: R/S 		Stops test.
9.	 + 		Locks the configuration parameters.
10.	CLEAR 		Moves the printer out of the menus to offline.
11.	Examine the print quality. The characters should be fully formed and of uniform density. If the test does not run or characters appear malformed, contact your Digital Customer Service Engineer.		
12.	If the print quality is good, close the printer cover; press ON LINE to enable printing. To select an emulation and configure the printer with the control panel, go to Chapter 3.		

3

Configuring the Printer

Contents

Overview	3-2
Changing and Saving Parameter Settings	3-6
Default and Custom Configurations	3-7
Operating Modes	3-7
Control Panel Keys	3-8
Factory Default Configuration Values	3-10
Changing Parameters	3-12
Saving Your New Configuration	3-15
Printing the Current Configuration	3-17
Loading Configuration Values	3-19
The Power-Up Configuration	3-21

Overview

In order to print data, the printer must respond correctly to signals and commands received from the host computer. Configuration is the process of matching the printer's operating characteristics to those of the host computer and to specific tasks, such as printing labels, or printing on different sizes of paper. The characteristics that define the printer's response to signals and commands received from the host computer are called configuration parameters.

You can configure the printer using the configuration menus and the control panel, or by sending control codes in the data stream from a host computer attached to the printer. This chapter provides a tutorial introduction to configuring the LG^{plus} Series printer using the configuration menus stored in the printer's memory, and the control panel display and keys. Figure 3-1 shows an overview of the LG^{plus} Series configuration menus.

Immediately following the menu overview illustration is background information on topics such as changing and saving parameters, custom configurations, and operating modes. Several step-by-step procedures are also provided that show how to change configuration parameters, save configurations, print configurations, and load configurations from printer memory. For details on the entire set of configuration menu options, see Chapter 4.

IMPORTANT

Configuration directly affects printer operation. Do not change the configuration of your printer until you are thoroughly familiar with the procedures in this chapter.

The host control codes for the LinePrinter Plus emulations are described in the *LG^{plus} Series LinePrinter Plus™ Programmer's Reference Manual*. The host control codes for the LG emulation are provided in the *LG^{plus} Series (LG) Programmer's Reference Manual*. The host control codes for the IGP/PGL graphics emulation are described in the *LG^{plus} Series PGL Programmer's Manual*. The host control codes for the IGP/VGL graphics emulation are described in the *LG^{plus} Series VGL Programmer's Manual*.

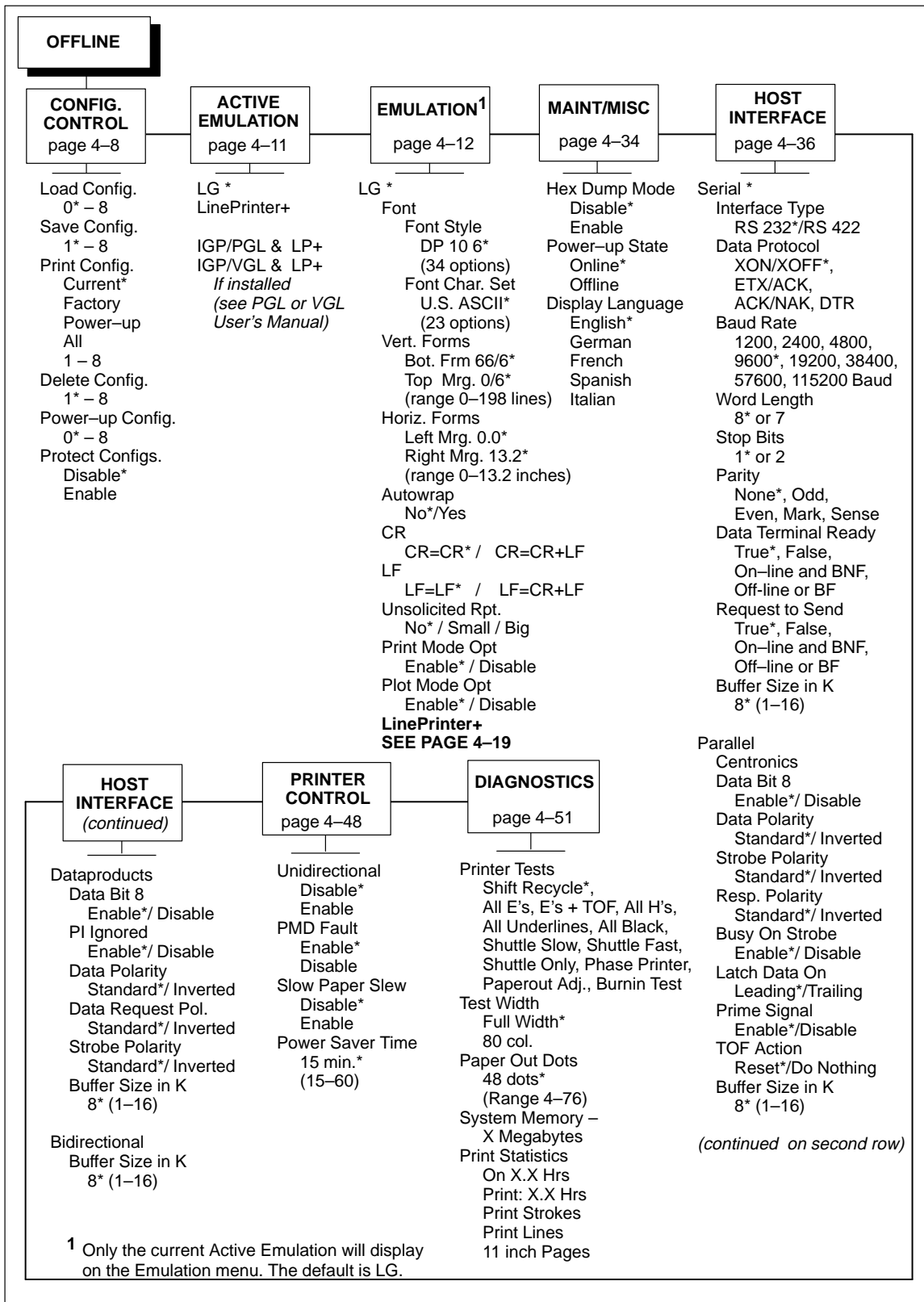


Figure 3-1. Configuration Menu Overview

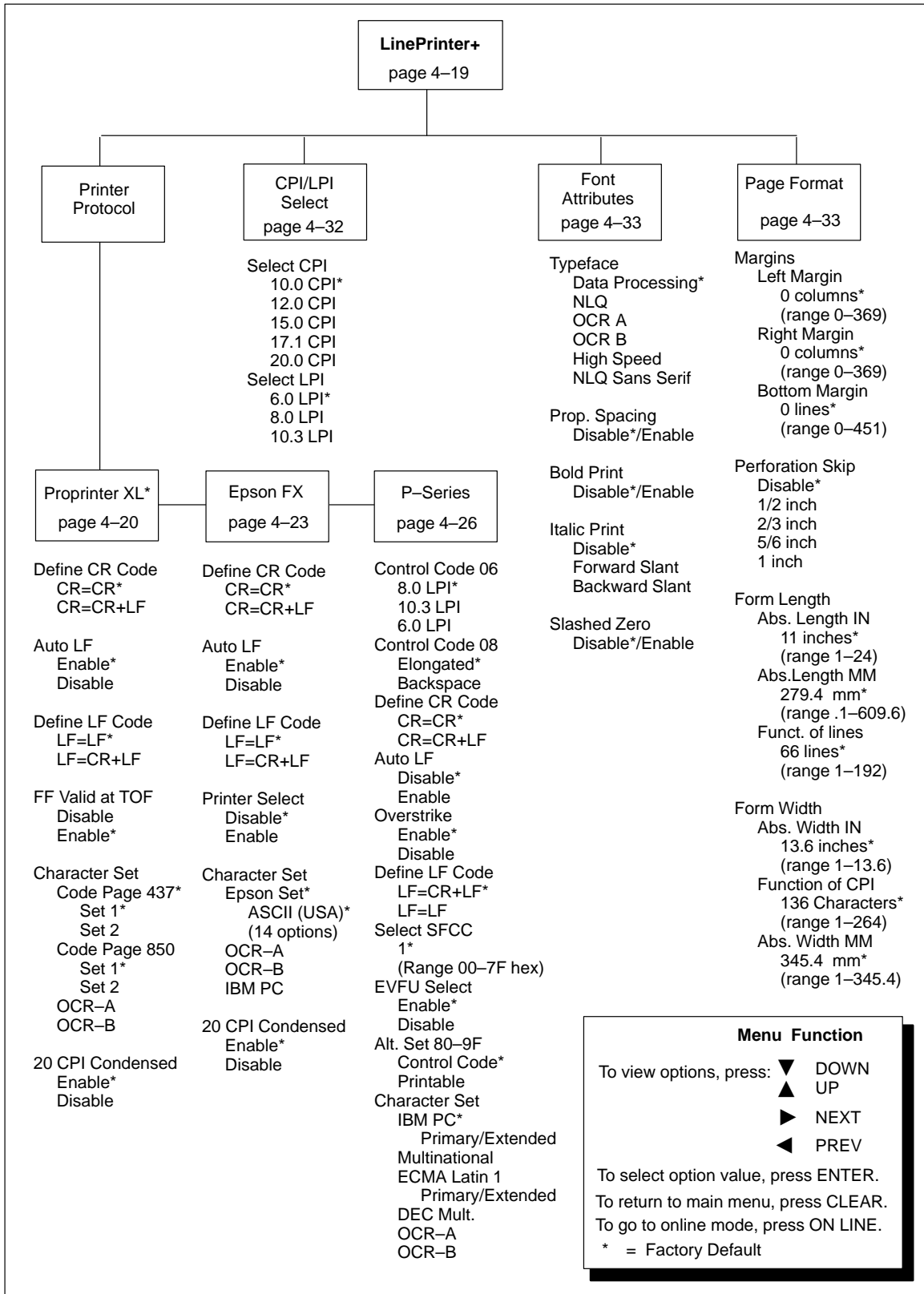


Figure 3-1. Configuration Menu Overview (continued)

Changing and Saving Parameter Settings

You may change a printer parameter setting, such as line spacing or forms length, either by pressing keys on the control panel to configure the printer's resident set of configuration menus, or by sending emulation control codes from a host attached to the printer (the host data stream). Page 3–12 provides an example procedure for using the control panel to change parameter settings.

When control codes are sent from a host attached to the printer, they override control panel settings. For example, if you set the line spacing to 6 lpi with the control panel, and application software later changes this to 8 lpi with a control code, the control code overrides the control panel setting.

The parameter settings that you have changed using the menus and control codes can be permanently stored in the printer's memory if you save them to printer memory using the "Save Config." menu option. If you do not save your changes, they will be lost when the printer is powered off.

There are no host control codes that allow you to save a parameter as a custom configuration.

Default and Custom Configurations

A configuration consists of a group of parameter settings, such as line spacing, forms length, etc. Your printer provides a fixed default configuration and also allows you to define several custom configurations for use with particular print jobs.

- The factory default configuration (configuration 0) can be loaded, but it cannot be altered. Page 3–10 lists all of the factory default parameter values.
- Eight configurations can be modified for unique print job requirements. The “Save Config.” option allows you to save eight groups of parameter settings in memory as custom configurations numbered from 1 to 8. Page 3–15 explains how to save a set of parameter values as a custom configuration using the “Save Config.” menu option..

Operating Modes

The printer has three operating modes: online mode, offline mode, and fault mode.

- Online mode – when the printer is online, it is controlled by the host computer and prints data sent by the host computer.
- Offline mode – in offline mode, communication with the host is interrupted so that you can load paper, change ribbons, or test and configure the printer.
- Fault mode – when the printer is in fault mode, it has encountered an error condition, and printing stops until the error condition is cleared.

Control Panel Keys

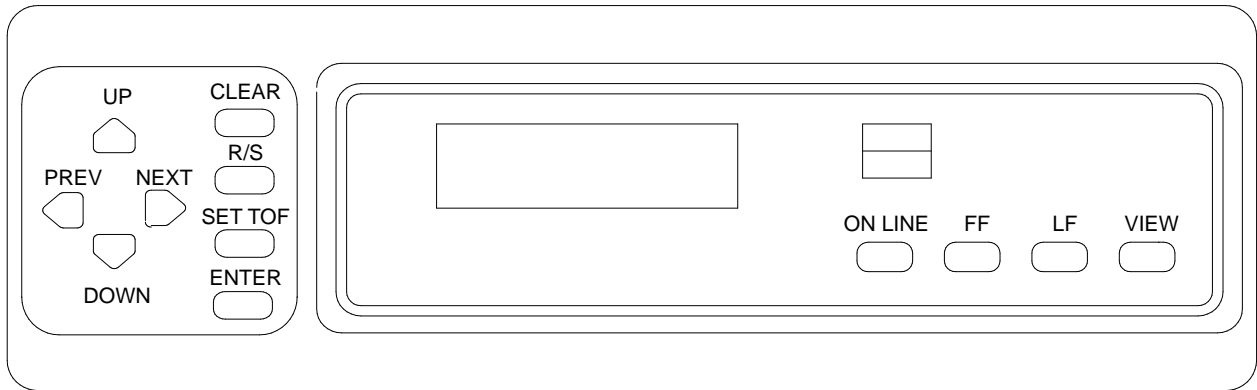


Figure 3–2. Control Panel Keys

When you are navigating within the configuration menus (in offline mode), several of the control panel keys have specialized functions, as follows:

- **UP** – Press this key to move up to a higher level in the menus. If “CONFIG.CONTROL/Load Config.” displays, pressing UP will move back up to the OFFLINE/CONFIG.CONTROL main menu option.
- **DOWN** – Press this key to move down to a lower level in the menus. If “OFFLINE/CONFIG.CONTROL” displays, press DOWN to display the CONFIG. CONTROL submenu options (Load Config., Save Config., Print Config., etc.).
- **NEXT** – Press this key to move forward through the options at the same level within a menu. If “OFFLINE/CONFIG.CONTROL” displays, press NEXT to move forwards within the main menu selections (ACTIVE EMULATION, EMULATION, MAINT/MISC, etc.).
- **PREV** – Press this key to move backwards through the options at the same level within a menu. If “OFFLINE/CONFIG.CONTROL” displays, press NEXT to move backwards within the main menu selections (DIAGNOSTICS, PRINTER CONTROL, etc.).
- **CLEAR** – Press this key to return from anywhere within the configuration menus to the top of the main menu, i.e. “OFFLINE/CONFIG. CONTROL.
- **R/S** – Press this key to start and stop printer tests. (The ENTER key handles the same function.)

- **ENTER** – this key selects an option value as the current active value. Once a new value has been selected, an asterisk (*) will display after it on the LCD to show that it is now the active value.
(If you press ENTER and there is no result, then you may be trying to select an option or menu name, rather than an actual option value. Continue to press DOWN until an option value displays.)
- **ON LINE** – Press this key to move from anywhere within the configuration menus directly to online mode.

Unlocking and Locking the ENTER Key


The ENTER key is locked by default, to prevent you from accidentally changing the printer configuration. You should generally unlock the ENTER key directly before you begin configuration using the menus; once the changes are made, relock the ENTER key, to secure your new settings.

To unlock the ENTER key, place the printer in the offline mode, then raise the printer cover and press UP and DOWN simultaneously. The following message will display briefly:



ENTER SWITCH
UNLOCKED

To lock the ENTER key, place the printer in offline mode, then raise the printer cover and press UP and DOWN simultaneously. The following message will display briefly:



ENTER SWITCH
LOCKED

Factory Default Configuration Values

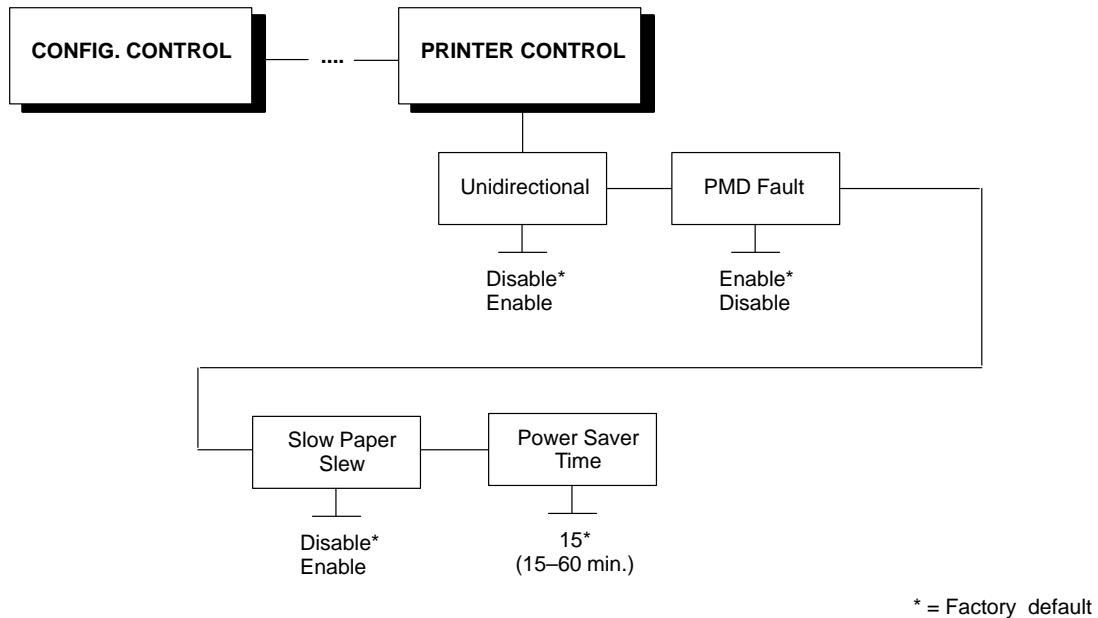
The factory default values are permanently stored in memory as a configuration. They cannot be modified or erased.

ACTIVE EMULATION	LG
LG	
Font	
Style	DP 10 6
Character Set	U.S. ASCII
Vert. Forms	
Bot Frm	66/6
Top Mrg	0/6
Bot Mrg	66/6
Horiz. Forms	
Left Mrg	00.0
Right Mrg	13.2
Autowrap	No
CR	= CR
LF	= LF
Unsolicited Rpt	No
Print Mode Opt	Enable
Plot Mode Opt	Enable
LinePrinter+	
Printer Protocol	
Proprinter	
Define CR code	CR=CR
Auto LF	Disable
Define LF code	LF = LF
FF Valid at TAF	Enable
Character Set	
Code Page 437	Set 1
20 CPI Condensed	Enable
CPI/LPI Select	
Select CPI	10.0 CPI
Select LPI	6.0 LPI
Font Attributes	
Typeface	Data Processing
Prop. Spacing	Disable
Bold Print	Disable
Italic Print	Disable
Slashed Zero	Disable
Page Format	
Margins	
Left Margin	0 columns
Right Margin	0 columns
Bottom Margin	0 lines
Perforation Skip	Disable

continued next page

Form Length	
Abs. Length IN	11.0 inches
Abs. Length MM	279.4 mm
Function of lines	66 lines
Form Width	
Abs. Width IN	13.6 inches
Abs. Width MM	345.4 mm
Function of CPI	136 characters
MAINT / MISC	
Hex Dump Mode	Disable
Power-up State	Online
Display Language	English
HOST INTERFACE	
Serial	
Interface Type	RS-232
Data Protocol	XON/XOFF
Baud Rate	9600 Baud
Word Length	8
Stop Bits	1
Parity	None
Data Term Ready	True
Request to Send	True
Buffer Size	8 Kbyte
PRINTER CONTROL	
Unidirectional	Disable
PMD Fault	Enable
Slow Paper Slew	Disable
Power Saver Time	15 min.
DIAGNOSTICS	
Printer Tests	Shift Recycle
Test Width	Full Width
Paper Out Dots	40 dots
System Memory	3 Megabytes
Print Statistics	
On:	0 Hrs
Print:	0 Hrs
Print Strokes	0
Print Lines	0
11 inch Pages	0

Changing Parameters








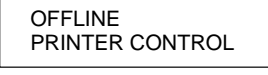

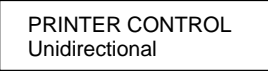

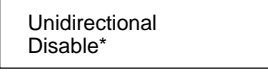


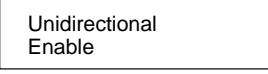

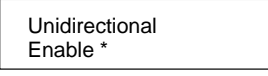

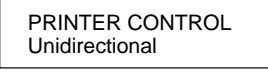







A configuration consists of several parameters. The default factory configuration has a starting set of parameters. Your print jobs may require different parameter settings from the default that is provided. This section provides an example procedure for changing and saving individual parameter values.

The following procedure shows how to change and save the settings for the Unidirectional option. Use these basic guidelines to navigate the configuration menus and change other parameters.

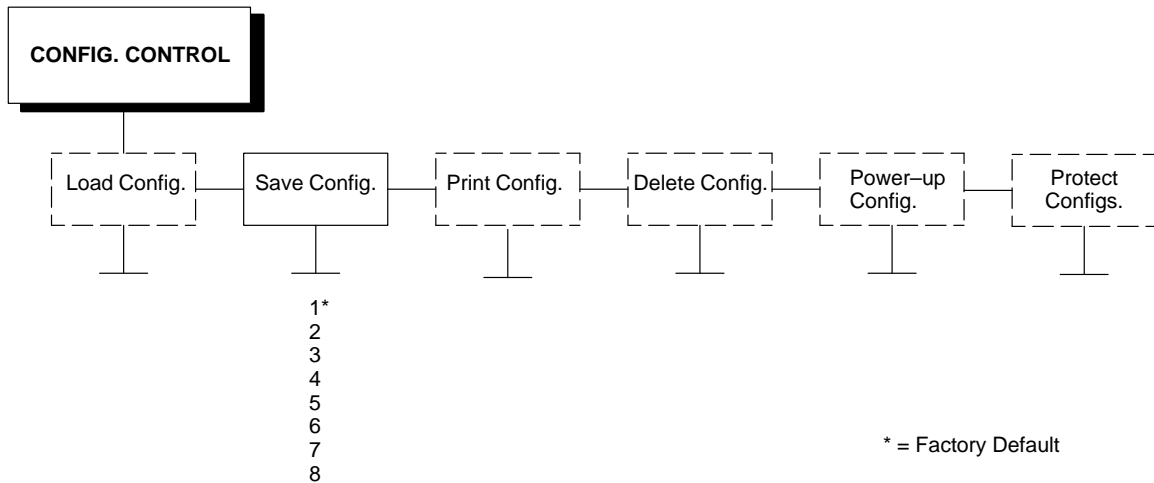
If you think that the configuration for your printer has already been changed from the default, you should load the default configuration before starting this procedure (see page 3-19).

NOTE: If you are going to change and save parameters for both the LG and the LinePrinter Plus emulations, remember to save your changes for the LG emulation before you select LinePrinter Plus as the active emulation (or vice versa). Once you change active emulations, any changes to the previously selected emulation will be gone unless they have been saved.

Step	Key	Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.	Press: ON LINE 		
3.	 + 	 	Allows you to make configuration changes.
4.	 UNTIL		
5.			
6.			
7.	 OR 		Cycle through the choices.
8.	ENTER 		Asterisk (*) indicates this choice is active.
9.	 UNTIL		
10.	Continue pressing the Next, Prev, Up and Down keys to move within the menu and press Enter to save the parameters. All changes stay in memory until you turn off the printer. Figure 3-1 on page 3-4 shows the first level of the configuration menu.		

Step	Key	Result	Notes
TO SAVE YOUR CHANGES AS A CONFIGURATION THAT IS STORED IN MEMORY:			
11.	 UNTIL	OFFLINE (MAIN MENU OPTION)	The main menu option can be CONFIG. CONTROL, ACTIVE EMULATION, EMULATION, MAINT/MISC, HOST INTERFACE, PRINTER CONTROL, or DIAGNOSTICS, depending where you are in the configuration menu.
12.	 UNTIL	OFFLINE CONFIG. CONTROL	
13.	Go to the CONFIG. CONTROL submenu Save Config. option, as described on page 3-16, step 4.		
TO USE THE CURRENT CONFIGURATION WITHOUT SAVING:			
14.	 + 	ENTER SWITCH LOCKED	Locks the configuration parameters.
15.	ON LINE 	ONLINE LG	
16.	Close the printer cover. You may resume printing. All parameters are effective as long as the printer is on. When you turn off the printer, the parameters will be erased from memory unless you have saved them.		

Saving Your New Configuration







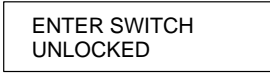









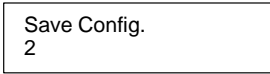

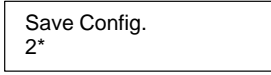


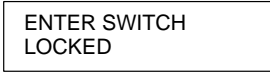

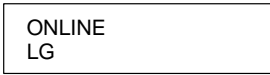
Once you have changed all of the necessary parameters, it is recommended you save them as a configuration that can be stored and loaded later for future use. If you do not save your configuration before you power off the printer, all of your parameter changes will be erased. The Save Config. option allows you to save up to eight configurations to meet different print job requirements. (Configurations 1 to 8 are empty until you save values to them using the Save Config. option.) For example:

- Config 1: Selects DP typeface, 10 cpi, 6 lpi
- Config 2: Selects NLQ typeface, 12 cpi, 8 lpi

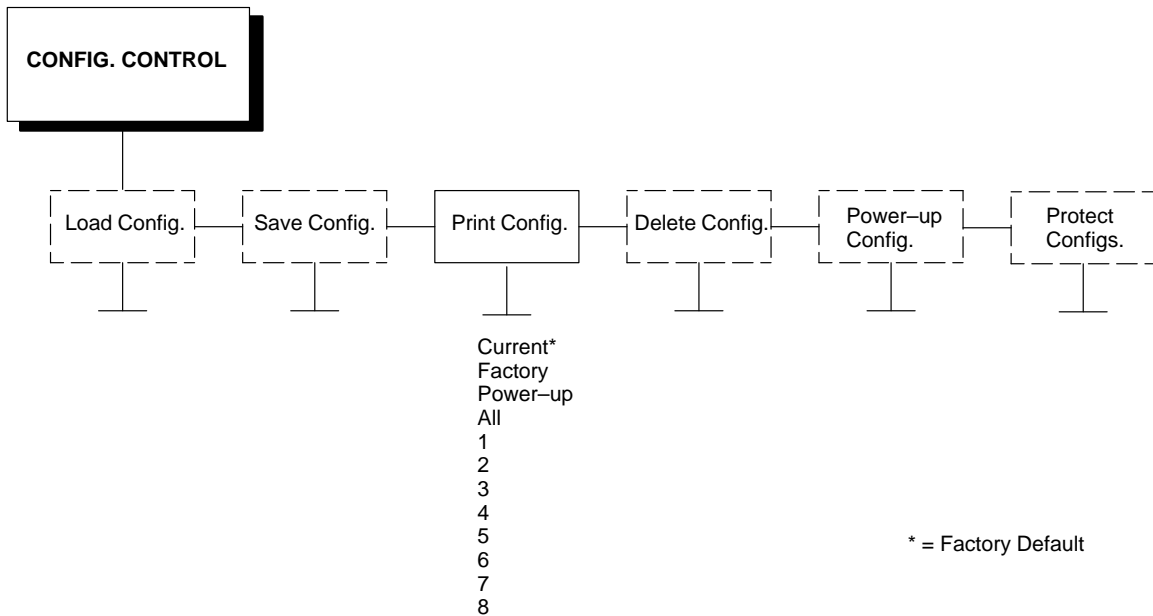
Once you have saved a custom configuration using this option, it will not be lost if you power off the printer. You can load a configuration for a specific print job (see page 3–19). You can also modify and resave it. You may want to print your configurations and store them in a safe place, such as inside the printer cabinet (see page 3–17).

If the Protect Configs. parameter is enabled, and you try to resave an existing configuration, the new configuration will not be saved until the existing configuration has been deleted (see page 4–10).

NOTE: If you are going to change and save parameters for both the LG and the LinePrinter Plus emulations, remember to save your changes for the LG emulation before you select LinePrinter Plus as the active emulation (or vice versa). Once you change active emulations, any changes to the previously selected emulation will be gone unless they have been saved.





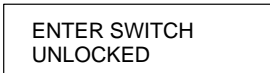


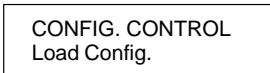

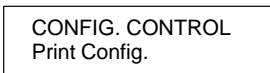

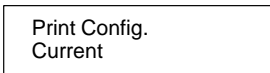


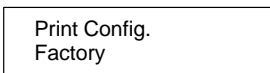

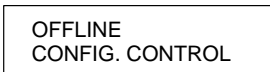


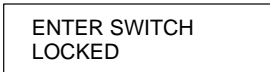


Step	Key	Result	Notes
1.	If you are already in the configuration menu, go to step 5.		
2.	Press: ON LINE 		
3.	 + 	 	Allows you to make configuration changes.
4.			
5.	 UNTIL		
6.			
7.	 OR 		Press until a desired number (1–8) displays.
NOTE: Do not power off the printer while save is in progress (you might lose your configuration).			
8.	ENTER 		The configuration is now saved in memory. (In this case, config. 2.)
9.	It is recommended you print the configuration. Go to page 3–18, step 5. If you decide not to print the configuration, then continue with the following steps.		
10.	 + 		Locks the ENTER key.
11.	ON LINE 		
12.	Close the printer cover. You may resume printing.		

Printing the Current Configuration

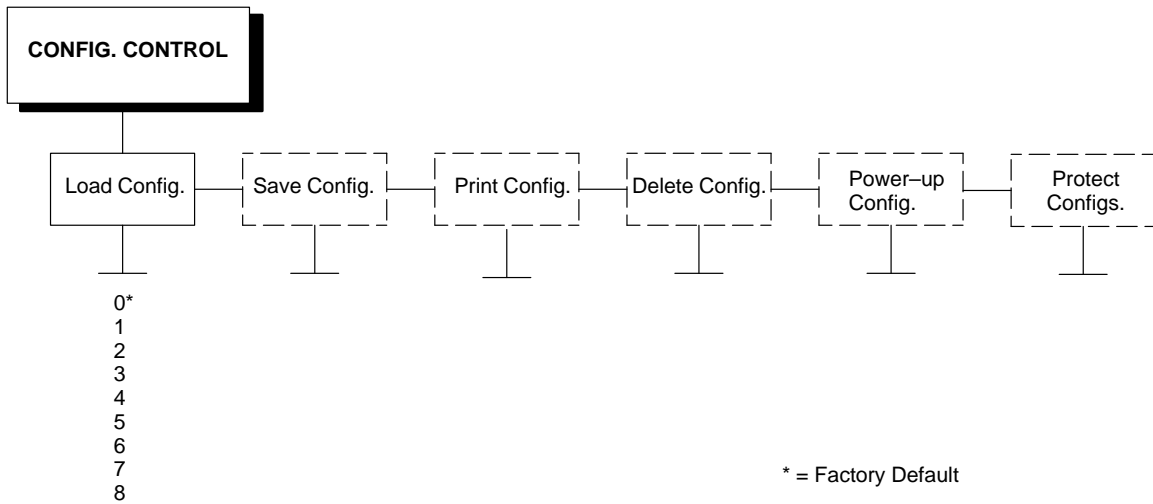


The configuration printout lists the stored parameters. You can print any or all of the configurations shown above. Configurations 1–8 are the customized configurations.

To print a configuration, follow the procedure on the next page.

Step	Key	Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.	Press: ON LINE 		
3.	 + 	 	Allows you to make configuration changes.
4.			
5.	 UNTIL		
6.			
7.	 OR 		Press until the desired option displays.
8.	ENTER 		The configuration listing begins printing.
9.	Carefully tear off the configuration printout.		
10.	 + 		Locks the ENTER key.
11.	ON LINE 		
12.	Close the printer cover. Store the printout in a safe place. You may resume printing.		

Loading Configuration Values







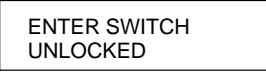

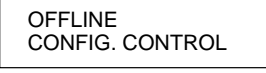



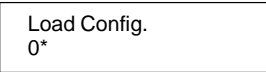


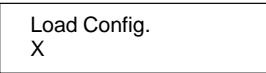



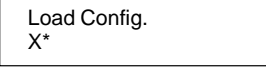




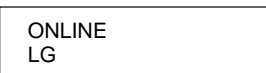
You can load any of the eight customized configurations or the factory default configuration. (Its list of parameters is shown on page 3–10.)

The loaded configuration remains active as long as the printer is on. If you power off the printer, the power-up configuration will load.

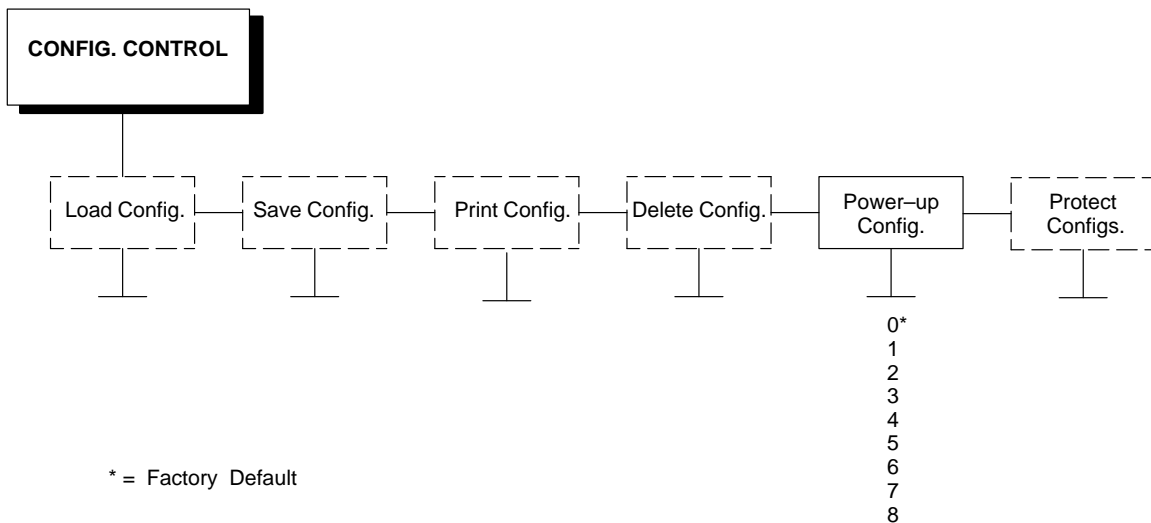
Page 3–21 explains how to select the power-up configuration. If you do not set a power-up configuration, the factory default configuration will load if you power the printer off and then back on.

NOTE: A configuration must be saved before you can load it.

NOTE: Changes made to the currently loaded configuration will not be transferred to the next loaded configuration. Make all configuration changes as required.

Step	Key	Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.	Press: ON LINE 		
3.	 + 		Allows you to make configuration changes.
			
4.			
5.			0* = factory default configuration.
6.	 OR 		X = configuration that you want to load.
7.	ENTER 		Displays for about a second.
			The printer has loaded the configuration.
8.	 + 		Locks the ENTER key.
9.	ON LINE 		
10.	Close the printer cover. You may resume printing.		

The Power-Up Configuration








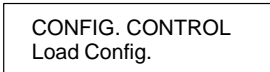



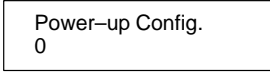


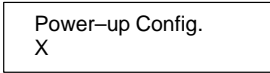

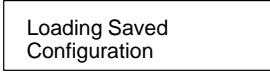
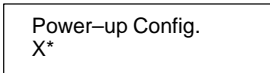


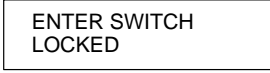




When you power on the printer for the first time, it loads configuration 0, the factory default configuration.

If you save a configuration, such as configuration 1, and turn the power off and then back on, the printer will load the designated power-up configuration, not the last saved configuration.

For your convenience, you can specify which configuration (0–8) should be the power-up configuration.

NOTE: When you change from LG to LinePrinter Plus (or from LinePrinter Plus to LG) as your active emulation, the power-up configuration is loaded for the new active emulation. (If no power-up configuration has been defined, the factory default configuration is loaded as the new active emulation.)

Step	Key	Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.	Press: ON LINE 		
3.	 + 	 	Allows you to make configuration changes.
4.			
5.	 UNTIL		
6.			
7.	 OR 		X = configuration that you want to load.
8.	ENTER 	 	Displays for about a second. The printer has loaded the configuration.
9.	 + 		Locks the ENTER key.
10.	ON LINE 		
11.	Close the printer cover. You may resume printing.		

4

The Configuration Menus

Contents

Overview	4-5
Configuration Main Menu	4-7
CONFIG. CONTROL Menu	4-8
Load Config.	4-9
Save Config.	4-9
Print Config.	4-9
Delete Config.	4-9
Power-Up Config.	4-9
Protect Configs.	4-10
ACTIVE EMULATION Menu.	4-11
EMULATION Menu	4-12
LG Emulation	4-13
Font Submenu	4-14
Vert. Forms	4-15
Horiz. Forms	4-15
Autowrap	4-15
CR (Carriage Return)	4-16
LF (Line Feed)	4-16
Unsolicited Rpt.	4-16
Print Mode Opt	4-17

Plot Mode Opt	4-17
LinePrinter Plus Menu Overview	4-19
Proprietary XL Emulation (LinePrinter Plus)	4-20
Define CR Code	4-20
Auto LF	4-21
Define LF Code	4-21
FF Valid at TOF	4-22
Character Set	4-22
20 CPI Condensed	4-22
Epson FX Emulation (LinePrinter Plus)	4-23
Define CR Code	4-24
Auto LF	4-24
Define LF Code	4-24
Printer Select	4-24
Character Set	4-25
20 CPI Condensed	4-25
P-Series Emulation (LinePrinter Plus)	4-26
Control Code 06	4-28
Control Code 08	4-28
Define CR Code	4-28
Auto LF	4-28
Overstrike	4-29
Define LF Code	4-29
Select SFCC (Special Function Control Character)	4-29
EVFU (Electronic Vertical Format Unit) Select	4-30
Alt. Set 80-9F	4-30
Character Set	4-30

LinePrinter Plus Formatting Options	4-31
CPI/LPI Select	4-32
Font Attributes	4-33
Page Format	4-33
MAINT / MISC Menu	4-34
Hex Dump Mode	4-34
Power-Up State	4-35
Display Language	4-35
HOST INTERFACE Menu	4-36
Serial Submenu	4-38
Interface Type	4-39
Data Protocol	4-39
Baud Rate	4-40
Word Length	4-40
Stop Bits	4-40
Parity	4-40
Data Terminal Ready	4-40
Request to Send	4-41
Buffer Size in K	4-41
Parallel Submenu	4-41
Centronics Options	4-42
Data Bit 8	4-43
Data Polarity	4-43
Strobe Polarity	4-43
Response Polarity	4-43

Busy on Strobe	4-43
Latch Data On	4-44
Prime Signal	4-44
TOF Action	4-44
Buffer Size in K	4-44
Dataproducts Options	4-45
Data Bit 8	4-46
PI Ignored	4-46
Data Polarity	4-46
Data Request Polarity	4-46
Strobe Polarity	4-46
Buffer Size in K	4-47
Bidirectional (IEEE-1284 Parallel) Options	4-47
Buffer Size in K	4-47
PRINTER CONTROL Menu	4-48
Unidirectional	4-48
PMD (Paper Motion Detection) Fault	4-49
Slow Paper Slew	4-49
Power Saver Time	4-49
DIAGNOSTICS Menu	4-51
Printer Tests	4-53
Test Width	4-54
Paper Out Dots	4-54
System Memory	4-54
Print Statistics	4-54

Overview

Once you have familiarized yourself with the configuration process using the tutorial information in Chapter 3, you are ready to complete your configuration of the printer.

This chapter provides descriptions for each parameter provided by the configuration menus. Figure 4–1 shows the configuration main menu and its first level parameters. The remainder of this chapter includes illustrations of many additional submenus and parameters nested beneath each of the main menu options.

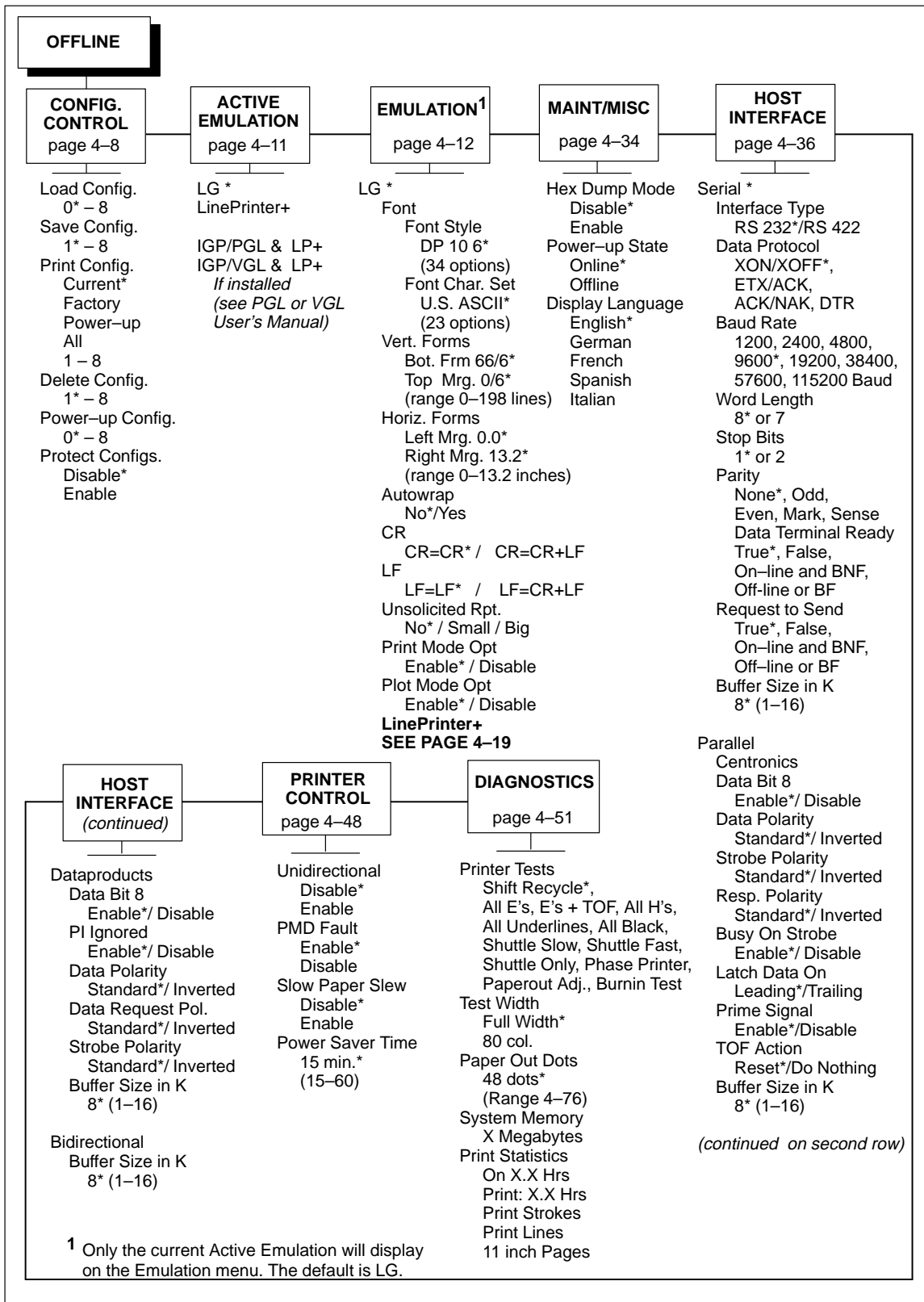


Figure 4-1. Configuration Menu Overview

Configuration Main Menu

Brief descriptions follow for the first-level configuration menu options:

- **CONFIG. CONTROL** – These options allow you to save, print, load, and delete entire sets of configuration parameters. These options are described briefly in this chapter, and covered in detail in Chapter 3.
- **ACTIVE EMULATION** – This menu allows you to select either the LG (Digital) emulation or the LinePrinter Plus emulation as the current operating emulation for your printer. If the IGP/PGL or IGP/VGL optional upgrade is installed, then IGP/PGL & LP+ or IGP/VGL & LP+ will be the active emulation.
- **EMULATION** – This menu allows you to configure the options that are available for the current operating (active) emulation. For example, if LG is the active emulation, then the LG emulation options can be configured using this menu.
- **MAINT / MISC** – These options provide miscellaneous functions, such as printing a hex dump, selecting a display language, and choosing whether the printer will power up as offline or online.
- **HOST INTERFACE** – These options allow you to select either the Serial RS-232, Serial RS-422, Centronics parallel, Dataproducts parallel, or IEEE 1284 parallel interface for the printer (which must match the interface cabling you installed while setting up your printer, described in Chapter 2). In addition to selecting an active interface, this menu also allows you to configure several parameters for each interface.
- **PRINTER CONTROL** – These options allow you to select several operating parameters for the printer, such as the speed at which paper will advance when FF (Form Feed) is pressed.
- **DIAGNOSTICS** – These options include the printer's diagnostic tests, system memory, and statistics.

CONFIG. CONTROL Menu

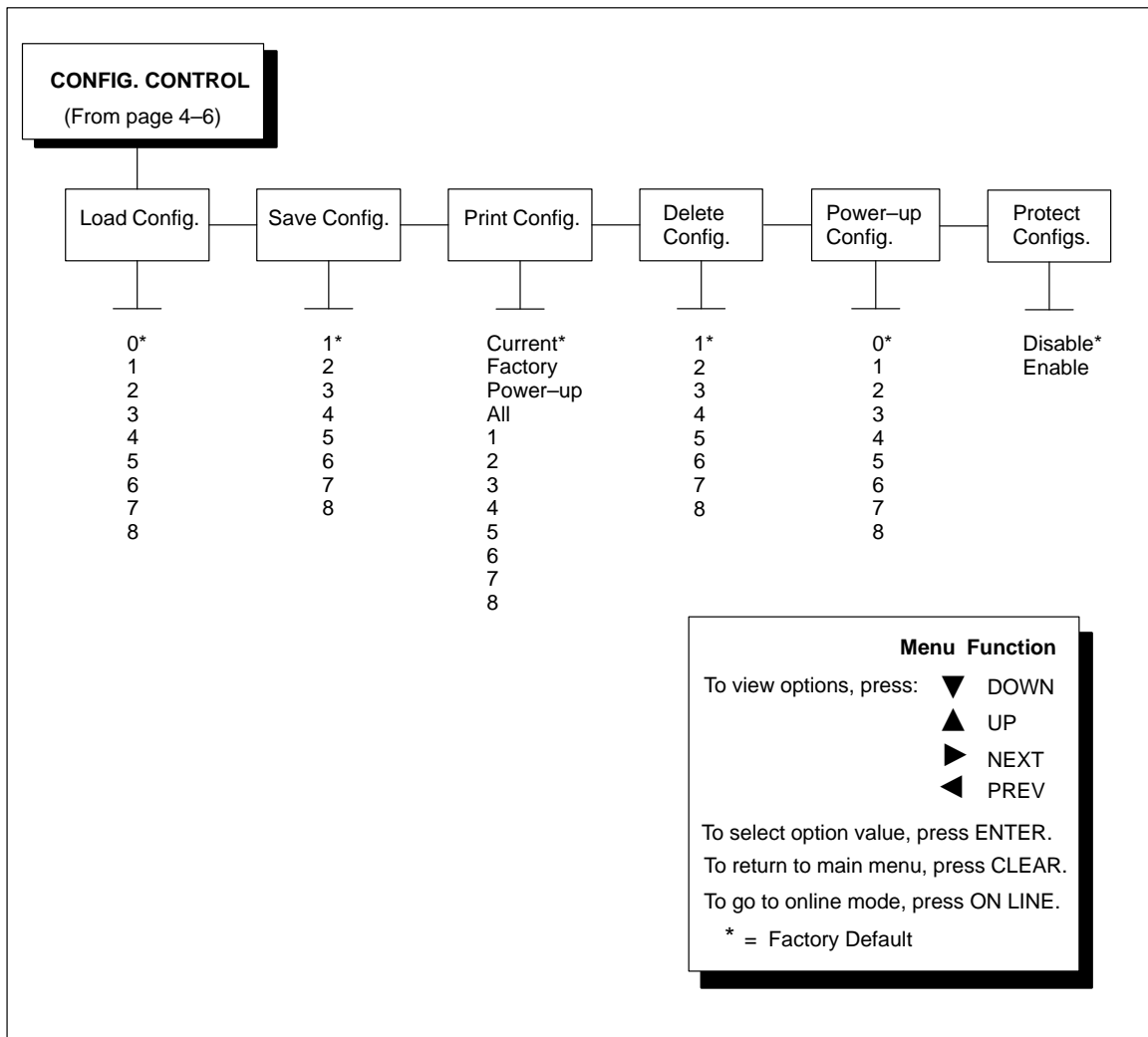


Figure 4-2. Configuration Control Menu Diagram

The CONFIG. CONTROL menu manages configurations, which are groupings of parameter values that can be stored in printer memory. Brief descriptions follow for each option. (More detailed descriptions for several of these options are provided in Chapter 3.)

Load Config.

The printer can store numerous configurations in memory. This parameter allows you to select and load a specific configuration.

Configuration 0 is the factory default; its parameters cannot be changed. It is always available for loading. Page 3–19 provides a fuller description and sample procedure for using this option.

Save Config.

This option allows you to save up to eight unique configurations to meet different print job requirements. This eliminates the need to change the parameter settings for each new job.

The configurations are stored in memory—they will not be lost if you turn off the printer. Configuration 0 is a factory–preset configuration, which can not be changed or saved. See page 3–15 for a fuller description and sample procedure.

NOTE: If the Protect Configs. parameter is enabled, the new configuration will not be saved unless the existing configuration has been deleted.

Print Config.

This option is used to output a listing of various stored printer configurations. It is recommended you store the configurations in a safe place for quick referral. See page 3–17 for a fuller description and sample procedure.

Delete Config.

You can delete one or all of your eight customized configurations. Configuration 0 is a factory–preset configuration and cannot be changed or deleted.

Power–Up Config.

You can specify which of the nine configurations (0–8) will be the power–up configuration. The factory default for power–up is configuration 0. See page 3–21 for a fuller description and sample procedure.

Protect Configs.

You can specify whether or not a new configuration should overwrite an existing configuration when you activate the Save Configs. parameter.

When disabled (default), the new configuration will overwrite the existing configuration.

When enabled, the new configuration will *not* overwrite the existing configuration, and the message “CONFIG. EXISTS / Delete First” displays. You must delete the existing configuration (1–8) before trying to save the new configuration.

ACTIVE EMULATION Menu

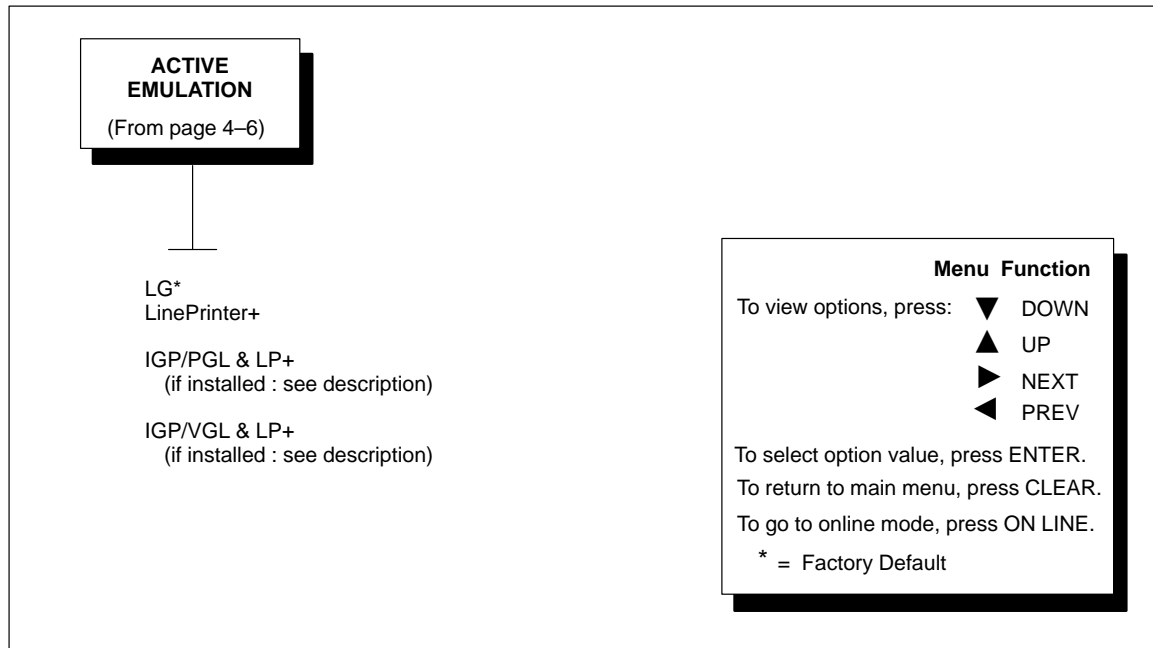


Figure 4-3. Active Emulation Menu Diagram

The ACTIVE EMULATION menu allows you to select the emulation to be used with your LG^{plus}. Digital LG is the default active emulation. You can also select LinePrinter Plus as the active emulation for your printer. The Proprinter XL, Epson FX, and P-Series emulations are all part of LinePrinter Plus. You may configure options for the active emulation via the EMULATION menu, described starting on the next page.

If the IGP/PGL or IGP/VGL graphics upgrade option is installed, the display will look somewhat different, as follows:

- If IGP/VGL is installed, only the following option will display:
“IGP/VGL & LP+” .
- If IGP/PGL is installed, only the following option will display:
“IGP/PGL & LP+”.

NOTE: When you change from LG to LinePrinter Plus (or from LinePrinter Plus to LG) as your active emulation, the power-up configuration (or the default configuration if no power-up configuration has been defined) is loaded for the new active emulation.

EMULATION Menu

The EMULATION menu is the gateway to configuring the six emulations available with the *LG^{plus}*.

NOTE: Only the emulation currently selected from the ACTIVE EMULATION menu can be selected and configured on the EMULATION menu.

- **LG** – If LG is the active emulation, then the options for this emulation can be selected and configured. The LG emulation is provided for compatibility with the Digital LG printer control language.
- **LinePrinter+** – If LinePrinter+ is the active emulation, then the options for the following emulations can be selected and configured:

Proprinter XL emulation – This LinePrinter Plus emulation is provided for compatibility with the IBM® Proprinter III XL printer control language.

Epson FX emulation – This LinePrinter+ emulation is provided for compatibility with the Epson® FX-1050 printer control language.

P-Series emulation – This LinePrinter Plus emulation is the Printronix P-Series printer control language.

Three additional LinePrinter Plus submenus may be configured that are used with the Epson FX, Proprinter XL, and P-Series emulations: CPI/LPI Select, Font Attributes, and Page Format.

- **IGP/VGL & LP+** – If you have installed the IGP/VGL optional upgrade, then the options for this emulation can be selected and configured. The IGP/VGL emulation is fully described in the *LG^{plus} Series VGL Programmer's Manual*.
- **IGP/PGL & LP+** – If you have installed the IGP/PGL optional upgrade, then the options for this emulation can be selected and configured. The IGP/PGL emulation is fully described in the *LG^{plus} Series PGL Programmer's Manual*.

The following pages provide detailed descriptions for the LG and LinePrinter+ emulation submenus. Host control codes for these emulations are provided in the *LG^{plus} Series (LG) Programmer's Reference Manual* and the *LG^{plus} Series LinePrinter Plus™ Programmer's Reference Manual*.

LG Emulation

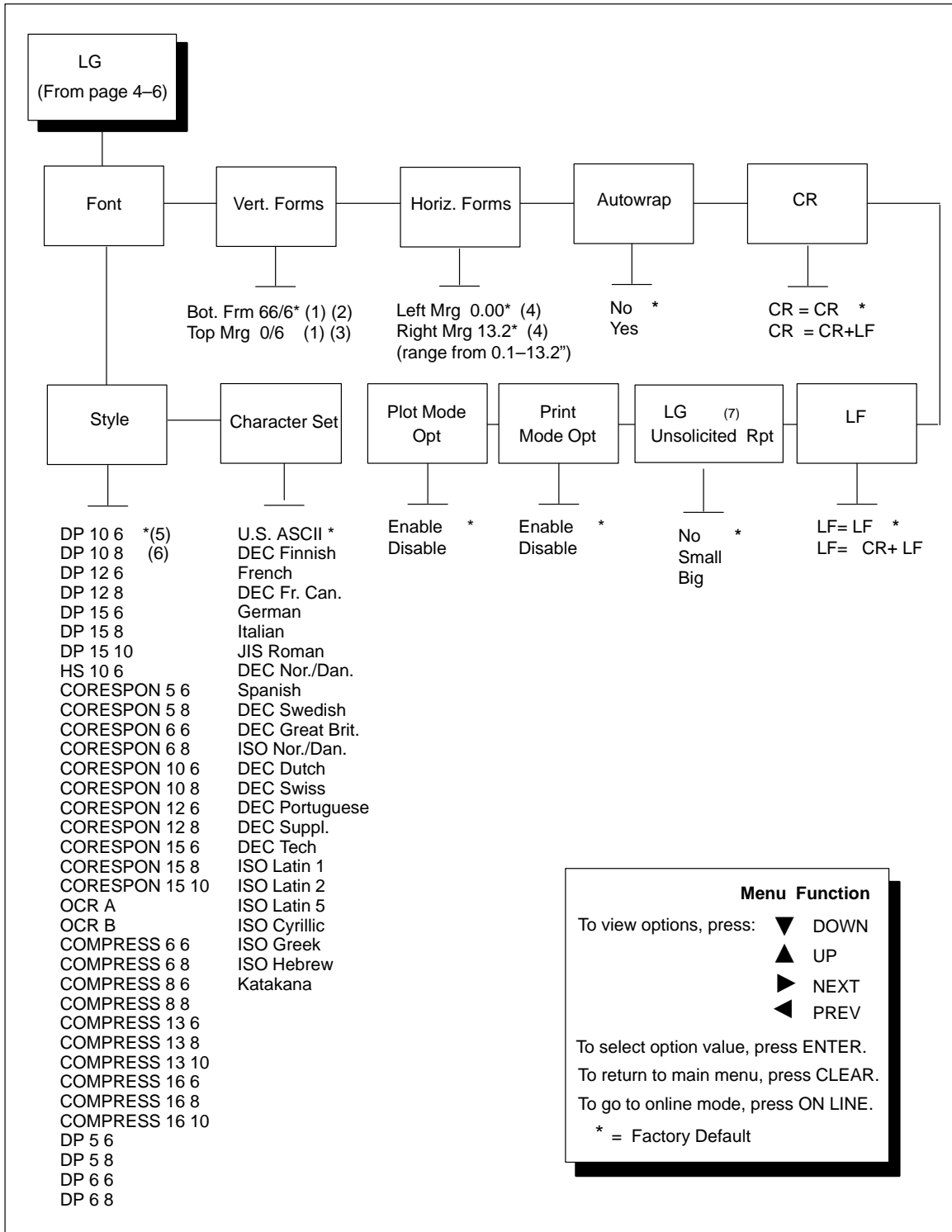


Figure 4-4. LG Emulation Menu

NOTES FOR LG MENU DIAGRAM

- (1) Vertical margins are specified in lines from 0–198 lines, assuming 6 lines per inch (LPI), or 0–33 inches. (Press DOWN to change units: NEXT increases, PREV decreases.)
- (2) Setting the bottom margin value (LINES/LPI) automatically resets the top margin to zero. Setting the top margin (LINES/LPI) does not affect the bottom margin.
- (3) Margins will automatically adjust so that left/right and top/bottom margins can not cross one another.
- (4) n = 0 to 13.2 inch in increments of 0.1 inch. (Press DOWN to change units : NEXT increases, PREV decreases.)
- (5) DP = Data Processing
CORESPON = Correspondence
COMPRESS = Compressed
OCR = Optical Character Recognition
HS = High Speed
- (6) First number is characters per inch (cpi). Second number is lines per inch (lpi). For example, DP 10 6 is Data Processing font at 10 cpi and 6 lpi.
- (7) Status reports are only sent when the serial interface is selected.

LG Font Submenu

This options for this submenu select a default font style and character set for the LG emulation, as follows:

- **Font Style.** This option allows you to specify a print quality that includes a characters per inch (cpi) and lines per inch (lpi) setting, in the format *Type cpi lpi*. The default setting is DP 10 6. The print quality types you may choose from are as follows:

DP = Data Processing (standard quality)

CORESPON = Correspondence (near letter quality)

COMPRES = Compressed (vertically compressed for printing
long graphs and charts)

OCR A & OCR B = Optical Character Recognition, sets A and B

HS = High Speed (Draft quality for high speed printing)

- **Font Character Set.** This option allows you to select a character set. The character set you select can be any of the Digital Multinational sets, which include the U.S. ASCII set and several foreign language and special character sets (listed in Figure 4–4).

Vert. Forms

This option defines the bottom and top form margins.

- **Bot. Frm.** This sets the bottom margin for the forms. You must specify the bottom margin in lines (at 6 lines per inch), ranging from 0 to 198 lines (33 inches). The default setting is 66. Press NEXT to increase the value, PREV to decrease the value, and DOWN to change units. Selecting a value for this option resets the top margin to 0, so the top margin must be redefined after this option is selected.
- **Top Mrg.** This sets the top margin for the forms. You must specify the top margin in lines (at 6 lines per inch), ranging from 0 to 198 lines (33 inches). The default setting is 0. Press NEXT to increase the value, PREV to decrease the value, and DOWN to change units. The margins will automatically adjust so that the top and bottom margins do not cross each other.

Horiz. Forms

- **Left Mrg.** This sets the left margin for the forms. You must specify the left margin in 1/10 inch increments, from 0 to 13.2 inches. The default value is 0. Press NEXT to increase the value, PREV to decrease the value, and DOWN to change units. The margins will automatically adjust so that the left and right margins do not cross each other.
- **Right Mrg.** This sets the right margin for the forms. You must specify the right margin in 1/10 inch increments, from 0.1 to 13.2 inches. The default value is 13.2. Press NEXT to increase the value, PREV to decrease the value, and DOWN to change units. The margins will automatically adjust so that the left and right margins do not cross each other.

Autowrap

This option defines the printer actions when print data is received past the forms width setting.

- No (the default) discards any data past the forms width.
- Yes performs an automatic carriage return and line feed when data is received past the forms width.

CR (Carriage Return)

The LG CR option controls the action of the printer when it receives a Carriage Return code (0Dh) from the host computer.

- CR = CR (the default) No line feed is added to a carriage return.
- CR = CR + LF. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (0Ah) into the data stream. (Do not use this feature if the host computer sends Line Feeds to the printer with each Carriage Return.)

LF (Line Feed)

The LG LF option controls the action of the printer when it receives a Line Feed code (0Ah) from the host computer.

- LF = LF (the default). No Carriage Return is added to a Line feed.
- LF = CR + LF. Each time the printer receives a Line Feed, it inserts an additional Carriage Return code (0Dh) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

Unsolicited Rpt.

This option enables or disables Printer Device Status Reports to be sent to the host when a reportable status or error condition condition has occurred. For further information on Device Status Reports, refer to the “Printer Status Requests and Reports” section in the Digital Emulation chapter of the *LG^{plus} Series (LG) Programmer’s Reference Manual*.

NOTE: This option will work properly only if the printer has the serial interface selected, and the RTS option on the host interface serial menu is set to True (see page 4–41).

- No (the default). Disables all unsolicited status reports from the printer.
- Small. Enables brief unsolicited status reports and sends an extended status report to the host.
- Big. Enables extended, unsolicited status reports and sends an extended status report to the host.

Print Mode Opt

When enabled, this option affects the SPI, SHS, and DECASHORP commands. The printer will no longer be forced into these commands and print speed improves significantly when in portrait orientation. For SHS and DECASHORP, the character size will change with the selected pitch. In addition, SGR attributes such as bold, crossed-out, and italics, will be done in print mode with greater efficiency.

- Enable (the default). Enables the print mode option.
- Disable. Disables the print mode option. This provides compatibility with older LG printer products.

Plot Mode Opt

When enabled, this option will plot with greater efficiency, particularly with respect to the Postnet barcode. Postnet is printed in the same density as the current print mode font so that reverse motion will be inhibited when possible.

- Enable (the default). Enables the print mode option.
- Disable. Disables the print mode option. This provides compatibility with older LG printer products.

LinePrinter Plus Emulations

The following sections describe the printer protocols (emulations) and formatting options that are included when LinePrinter+ is selected as the active emulation. (LinePrinter Plus is also available when the PGL or VGL graphics upgrade is installed.)

Figure 4–5 shows an overview of the LinePrinter Plus menus.

LinePrinter Plus Menu Overview

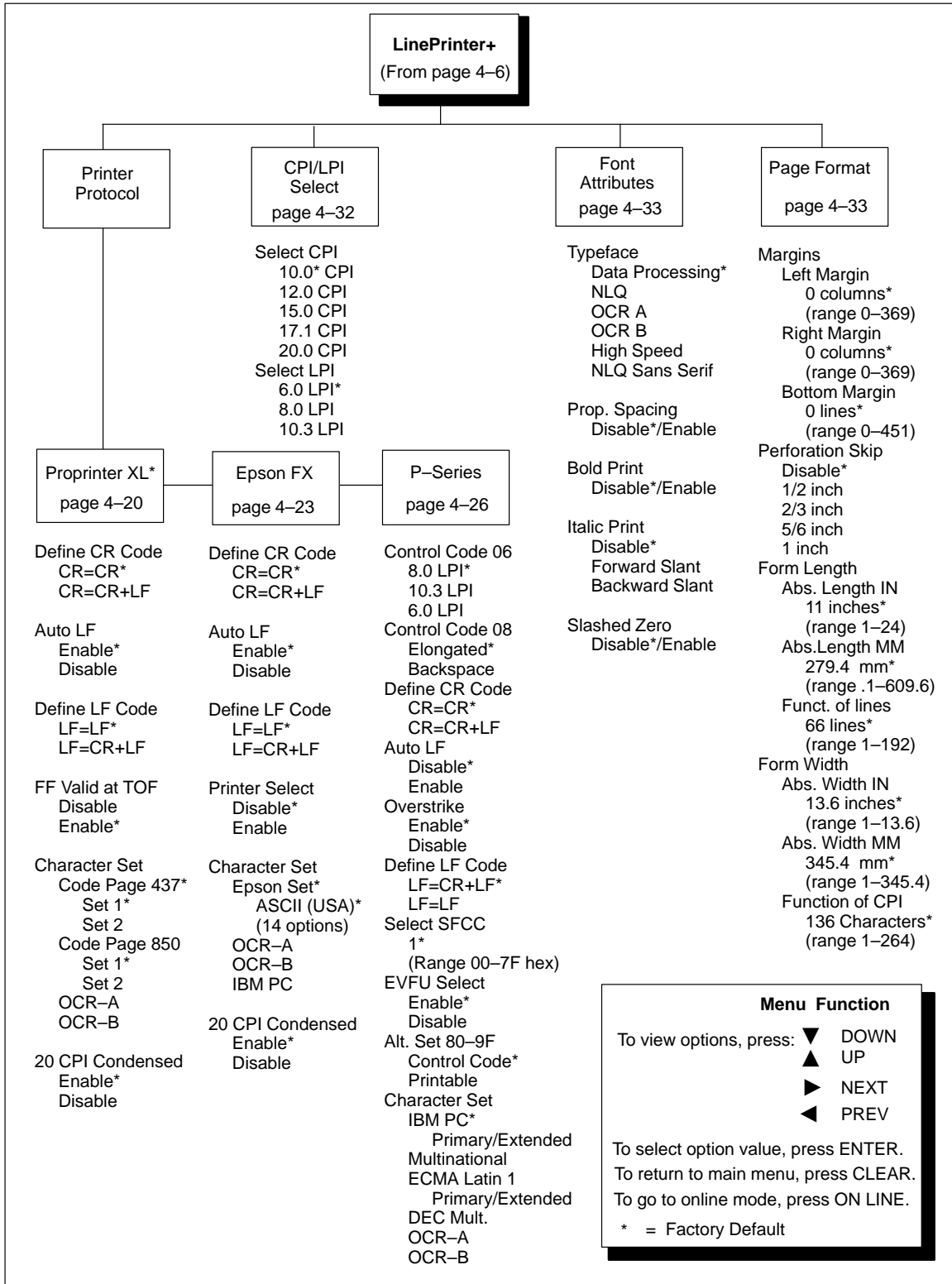


Figure 4-5. LinePrinter Plus Menu

Proprinter XL Emulation (LinePrinter Plus)

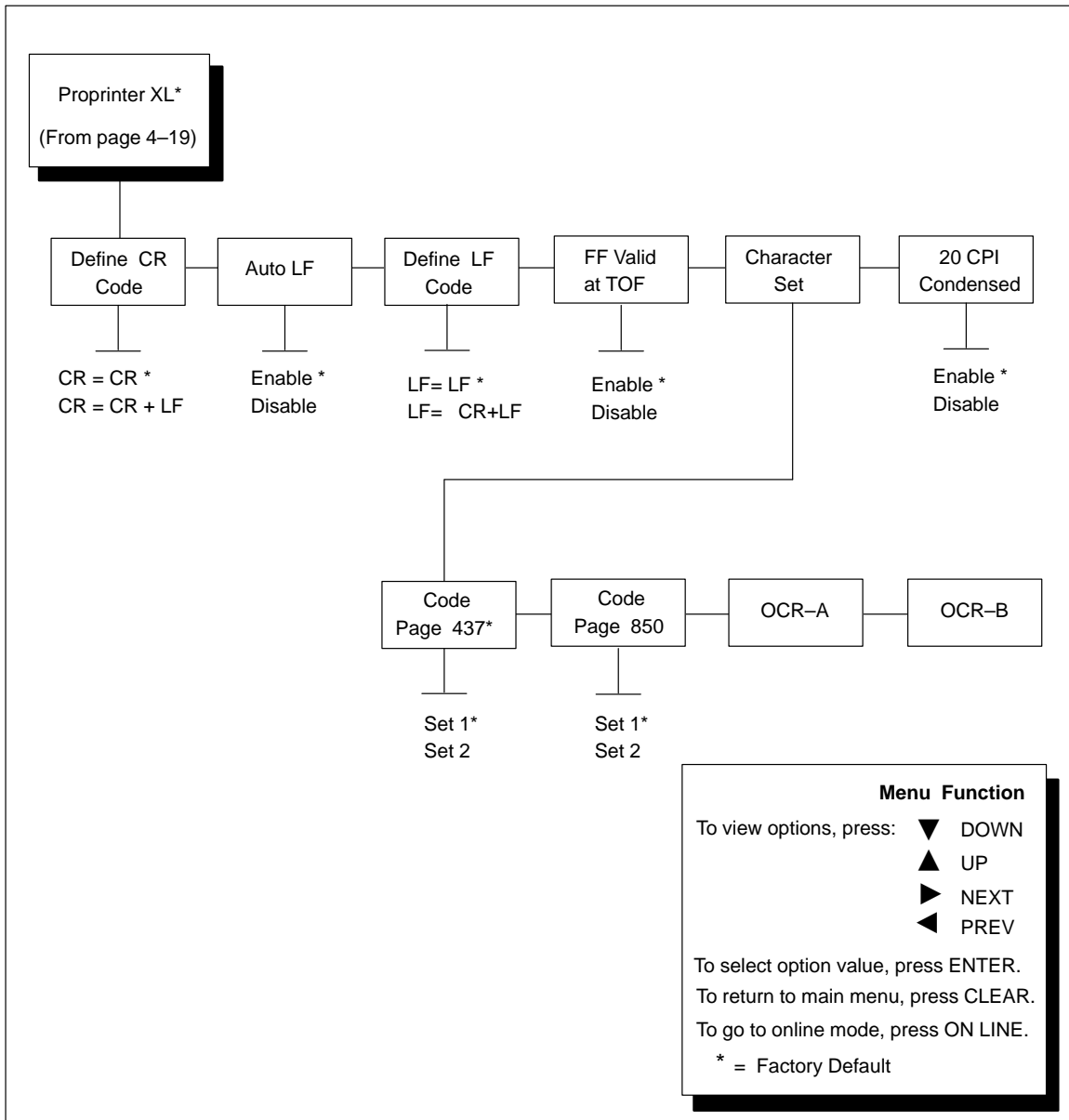


Figure 4-6. Proprinter XL Emulation Menu

Define CR (Carriage Return) Code

The Define CR Code option controls the action of the printer when it receives a Carriage Return code (0D hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts

an additional Line Feed code (0A hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR is the default.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return.

Auto LF (Line Feed)

This option defines the printer actions when print data is received past the forms width setting.

- Enable (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- Disable discards any data past the forms width.

Define LF (Line Feed) Code

The Define LF Code option controls the action of the printer when it receives a Line Feed code (0Ah) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (0Dh) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- LF = LF (the default)
- LF = CR + LF adds an extra Carriage Return with each Line Feed.

FF Valid at TOF

The FF Valid at TOF option determines whether the printer will perform a Form Feed when the host sends a Form Feed command, if the printer is at the Top of Form. The printer will perform a Form Feed when the control panel FF (Form Feed) key is pressed, regardless of this option setting.

- Disable will not perform a form feed when the host sends a Form Feed command and the printer is at the Top of Form.
- Enable (the default) performs a form feed when the host sends a Form Feed command and the printer is at the top of form.

Character Set

Selects from four character sets; Code Page 437 (the default), Code Page 850, OCR A, and OCR B.

20 CPI Condensed

Compressed print characters are narrower than the normal character set. This is helpful for applications where you need to print the maximum amount of information on a page.

- Enable (the default) prints characters about 60 percent the width of normal characters when compressed print is chosen by the host computer. For example, a 12 CPI Draft font will compress to 20 CPI.
- Disable will not compress print widths, even if condensed print is chosen by the host.

Epson FX Emulation (LinePrinter Plus)

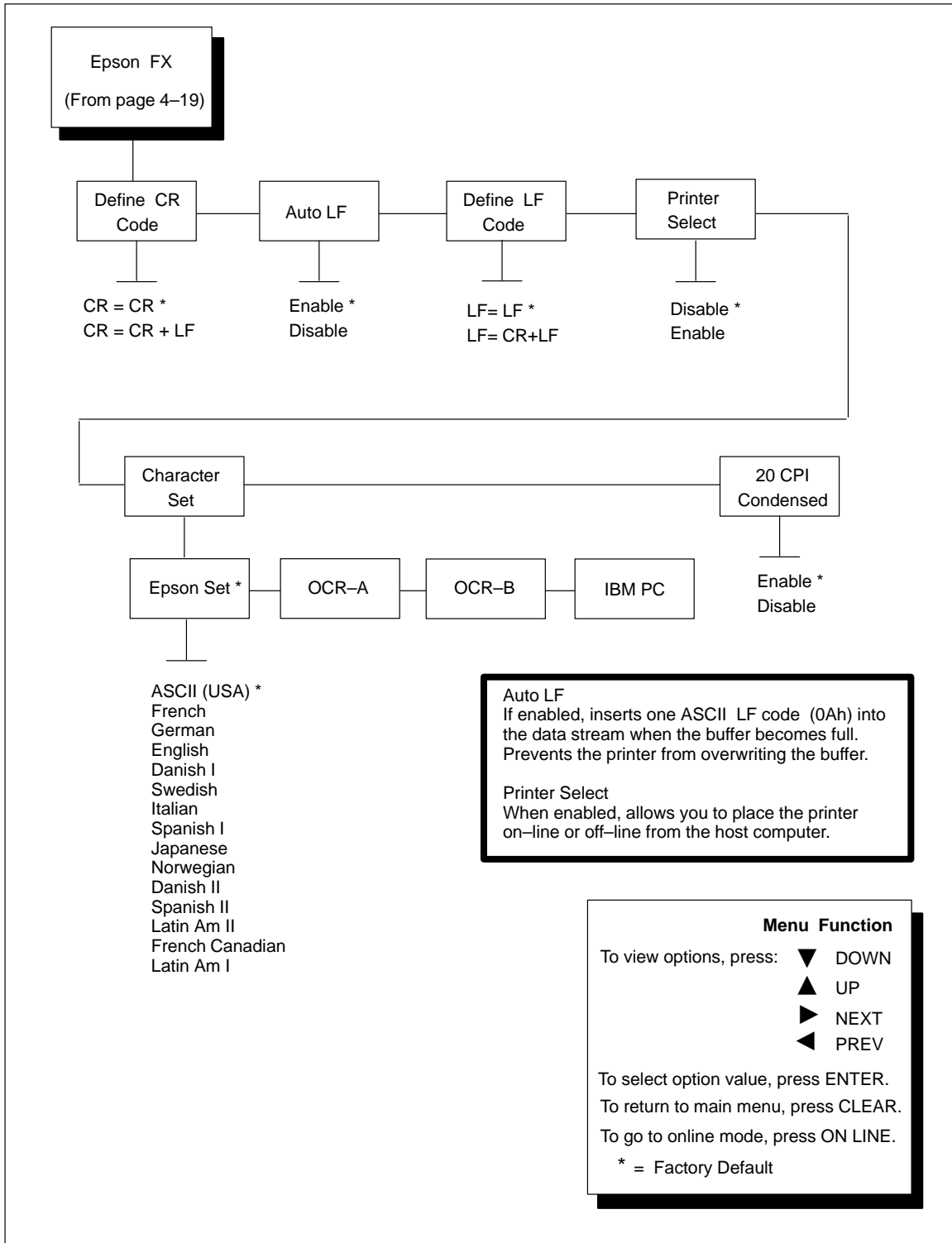


Figure 4-7. Epson FX Emulation Menu

Define CR Code

The Define CR Code option controls the action of the printer when it receives a Carriage Return code (0Dh) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (0Ah) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR is the default.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return.

Auto LF

This option defines the printer actions when print data is received past the forms width setting.

- Enable (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- Disable discards any data past the forms width.

Define LF Code

The Define LF Code option controls the action of the printer when it receives a Line Feed code (0Ah) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (0Dh) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- LF = LF (the default) does not add a Carriage Return with a Line Feed.
- LF = CR + LF adds an extra Carriage Return with each Line Feed.

Printer Select

This option determines if the ASCII DC1 and DC3 control codes can be used to disable and enable the printer.

- Disable (the default) ignores the DC1 and DC3 control codes.
- Enable disables the printer when a DC1 control code is received, and enables the printer when a DC3 control code is received.

Character Set

This parameter selects a character set for the Epson emulation. Note that when OCR A or OCR B is selected as the print language, the Font Attribute Typeface option is changed to OCR A or OCR B, respectively.

20 CPI Condensed

Compressed print characters are narrower than the normal character set. This is helpful for applications where you need to print the maximum amount of information on a page.

- Enable (the default) prints about 60 percent of the width of normal characters when compressed print is chosen by the host computer. For example, a 12 CPI Draft font will compress to 20 CPI.
- Disable will not compress print widths, even if condensed print is chosen by the host.

P-Series Emulation (LinePrinter Plus)

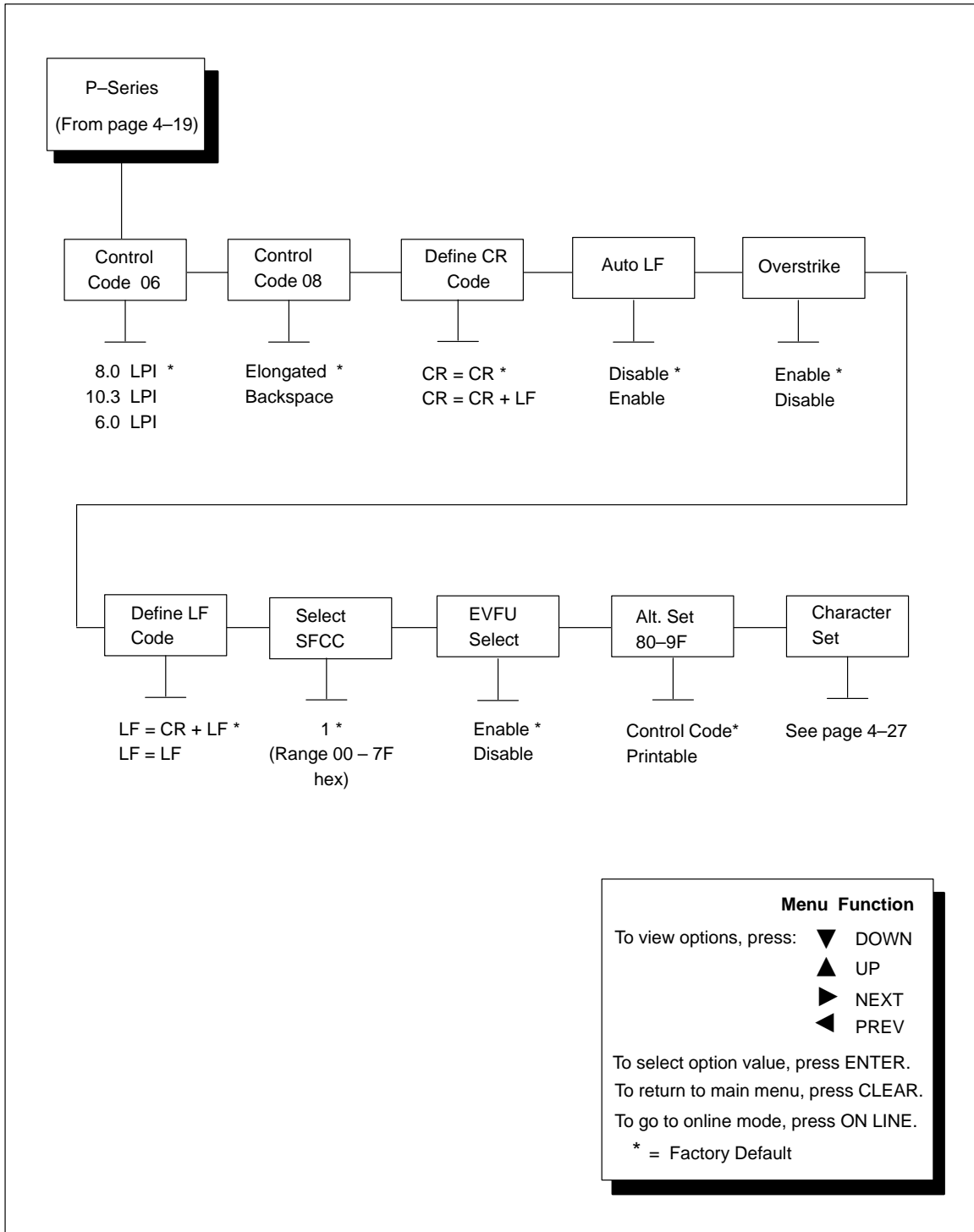


Figure 4-8. P-Series Emulation Menu

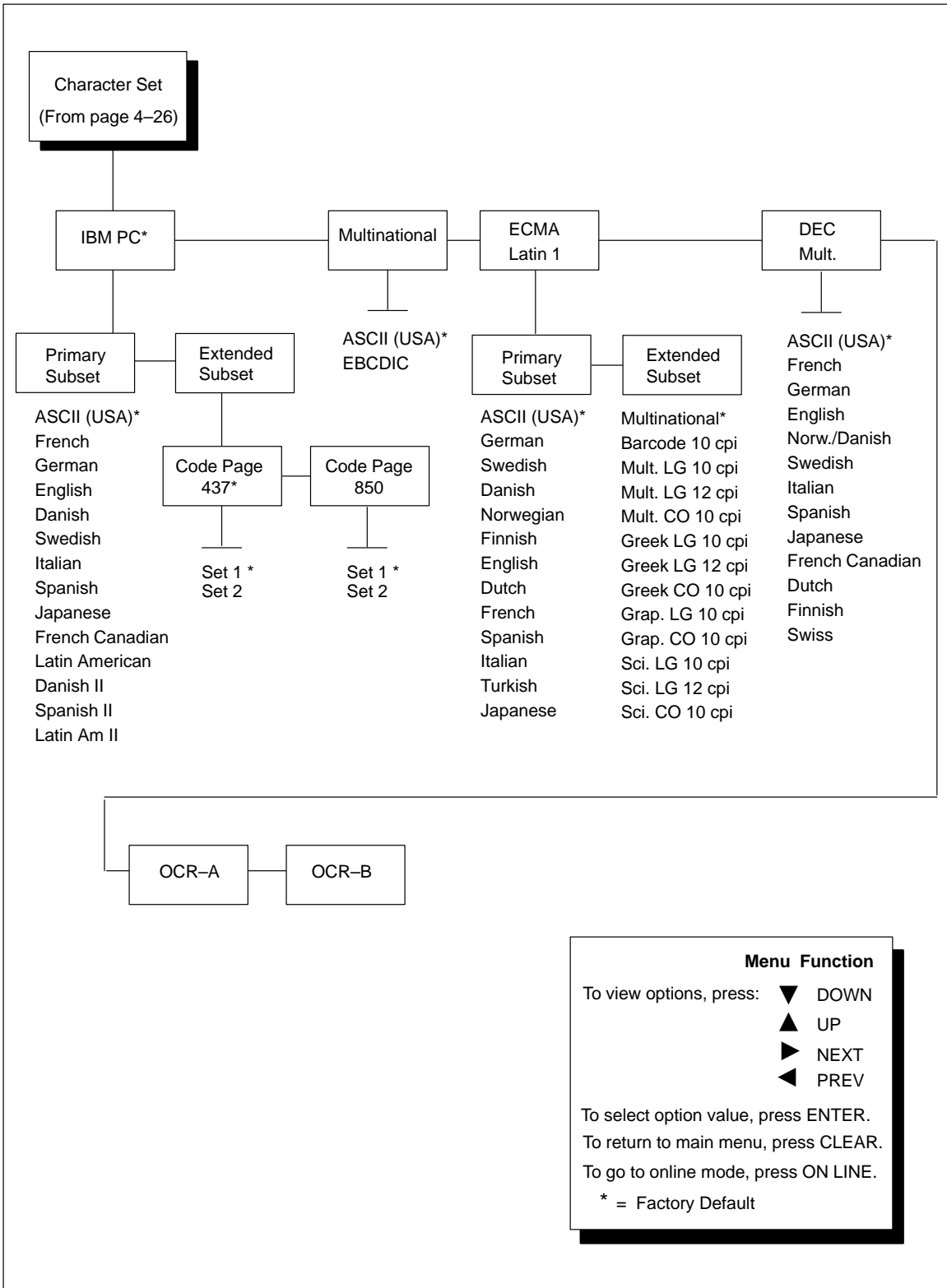


Figure 4-9. P-Series Emulation Character Set Menu

Control Code 06

Control Code 06 defines the function of ASCII code 06h (ACK). You can select an alternate line spacing of 6, 8 or 10.3 LPI. 8 LPI is the default.

Control Code 08

Control Code 08 defines the function of ASCII code 08h (BS). You can define the code to output an elongated character or to output a backspace. Elongated is the default.

Define CR Code

The Define CR Code option controls the action of the printer when it receives a Carriage Return code (0Dh) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (0Ah) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR is the default.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return.

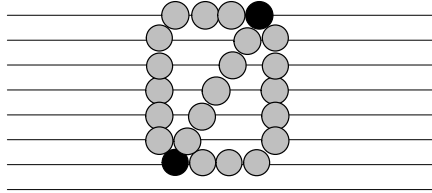
Auto LF

This option defines the printer actions when print data is received past the forms width setting.

- Enable (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- Disable discards any data past the forms width.

Overstrike

When overstrike is enabled, common dots appear darker in characters that are printed over each other, as shown below. The print position moves one-half dot to the right.



NOTE: If you are using overstrike for bolding and if overstrike is disabled, no bolding will occur. Overstrike printing occurs at a Decreased speed.

Define LF Code

The Define LF Code option controls the action of the printer when it receives a Line Feed code (0Ah) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (0Dh) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- LF = CR + LF (the default) adds an extra Carriage Return with each Line Feed.
- LF = LF.

Select SFCC (Special Function Control Character)

This parameter allows you to select which ASCII codes will function as the command delimiter. Options include the following:

- ESC (1Bh)
- SOH (01h)
- CIRCUMFLEX (5Eh) — also called carat (^)
- ETX (03h)
- TILDE (7Eh) — (~)

NOTE: SOH, ETX and ESC are non-printables. The characters (^) and (~) are printable; however, do not use them as printables in the host data stream if either is chosen as a delimiter, or print errors will occur.

EVFU Select

The Electronic Vertical Format Unit (EVFU) allows you to set vertical tabs for slewing. Enable is the default.

Alt. Set 80–9F

This feature determines whether the printer processes ASCII codes 80h through 9Fh as control codes or as printable characters.

Character Set

You can specify IBM PC, Multinational, ECMA Latin 1, DEC Multinational, OCR–A, or OCR–B as the character set. As Figure 4–9 shows, several language and special character set choices are available as submenu options under IBM PC, ECMA Latin 1, and DEC Multinational. IBM PC, Primary Subset, ASCII (USA) is the default character set.

LinePrinter Plus Formatting Options

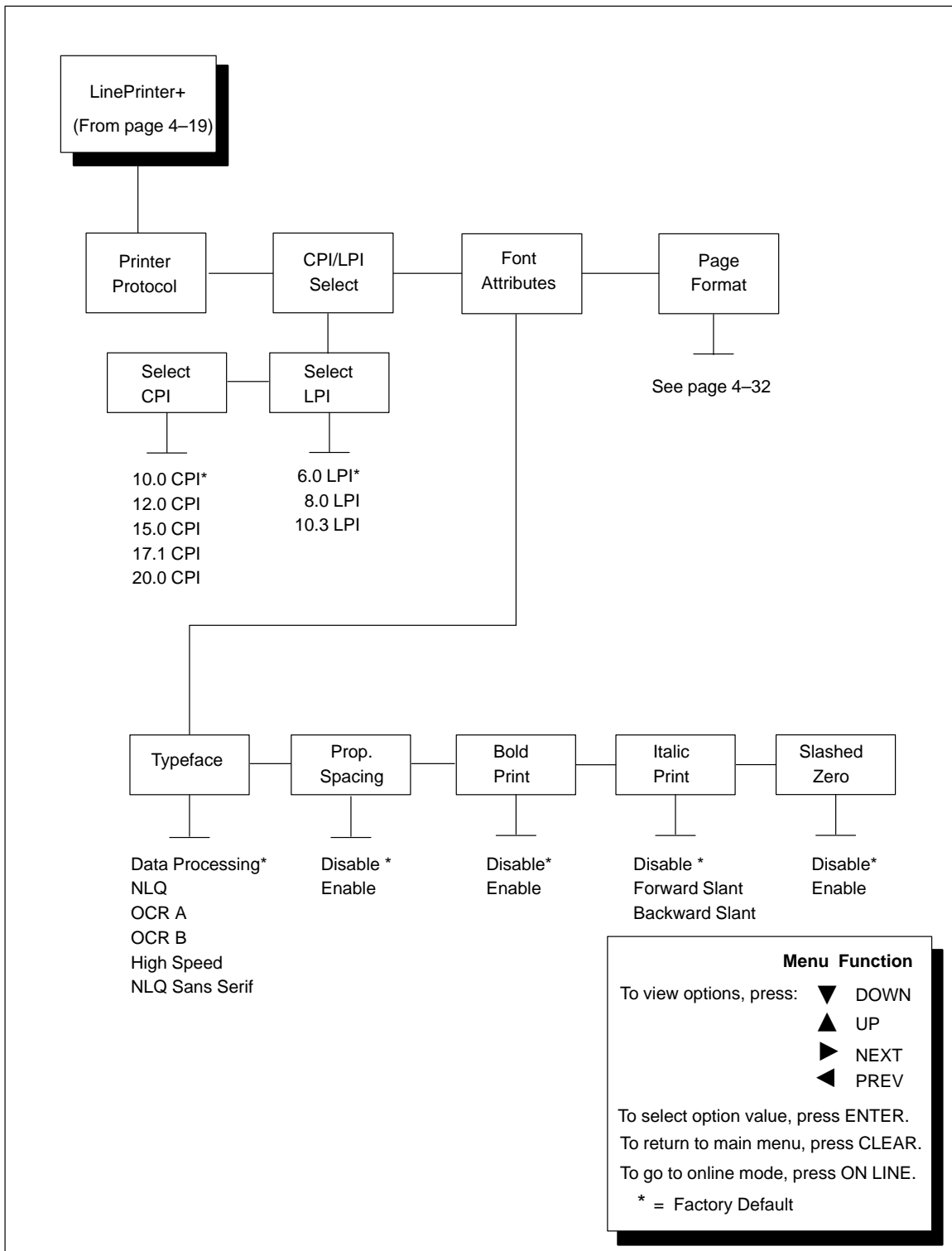


Figure 4-10. LinePrinter Plus Formatting Options Menu

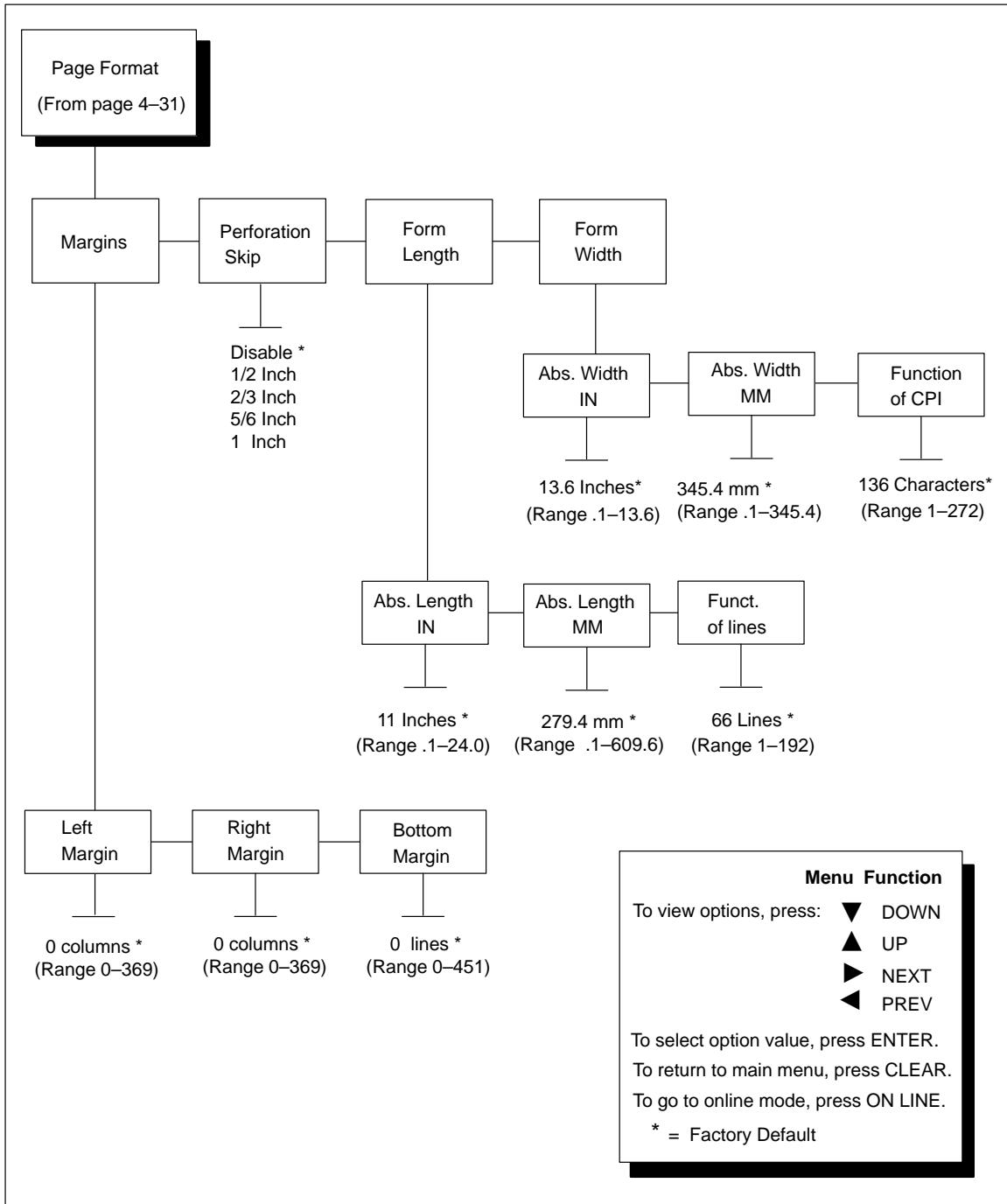


Figure 4-11. LinePrinter Plus Page Format Options

CPI/LPI Select

This parameter lets you specify the characters per inch (cpi) and lines per inch (lpi) values.

Font Attributes

This submenu allows you to define the following font attributes: typeface, proportional spacing, bold print, and italic print. You can also specify if the zero character will print with a slash.

Page Format

Margins

- The right margin is set in columns; column zero is defined as the far right edge of the page, and column numbering increments from right to left.
- The left margin is also set in columns; however, column zero is defined as the far left edge of the page, and column numbering increments from left to right.
- The bottom margin is defined in lines, starting from line zero at the bottom of the page.

Perforation Skip

Perforation Skip allows or prevents printing on page perforation. When enabled, it sets up a *total* skip-over margin of 1/2", 2/3", 5/6", or 1". For example, a skip-over margin of 1" allows a 1/2" margin on each side of the page perforation. The default is Disable.

Form Length

Forms length is the number of lines that can be printed on a page. You can set forms length in inches, millimeters (mm), or as a function of the current LPI (lines per inch).

Form Width

The forms width can be specified in inches, millimeters, or as a function of the current CPI (characters per inch). The forms width set should not exceed the actual paper width. For example, when using paper which is 8 1/2 inches wide, selecting an 8-inch print width prevents printing beyond the right margin and damaging the hammer tips and platen.

MAINT / MISC Menu

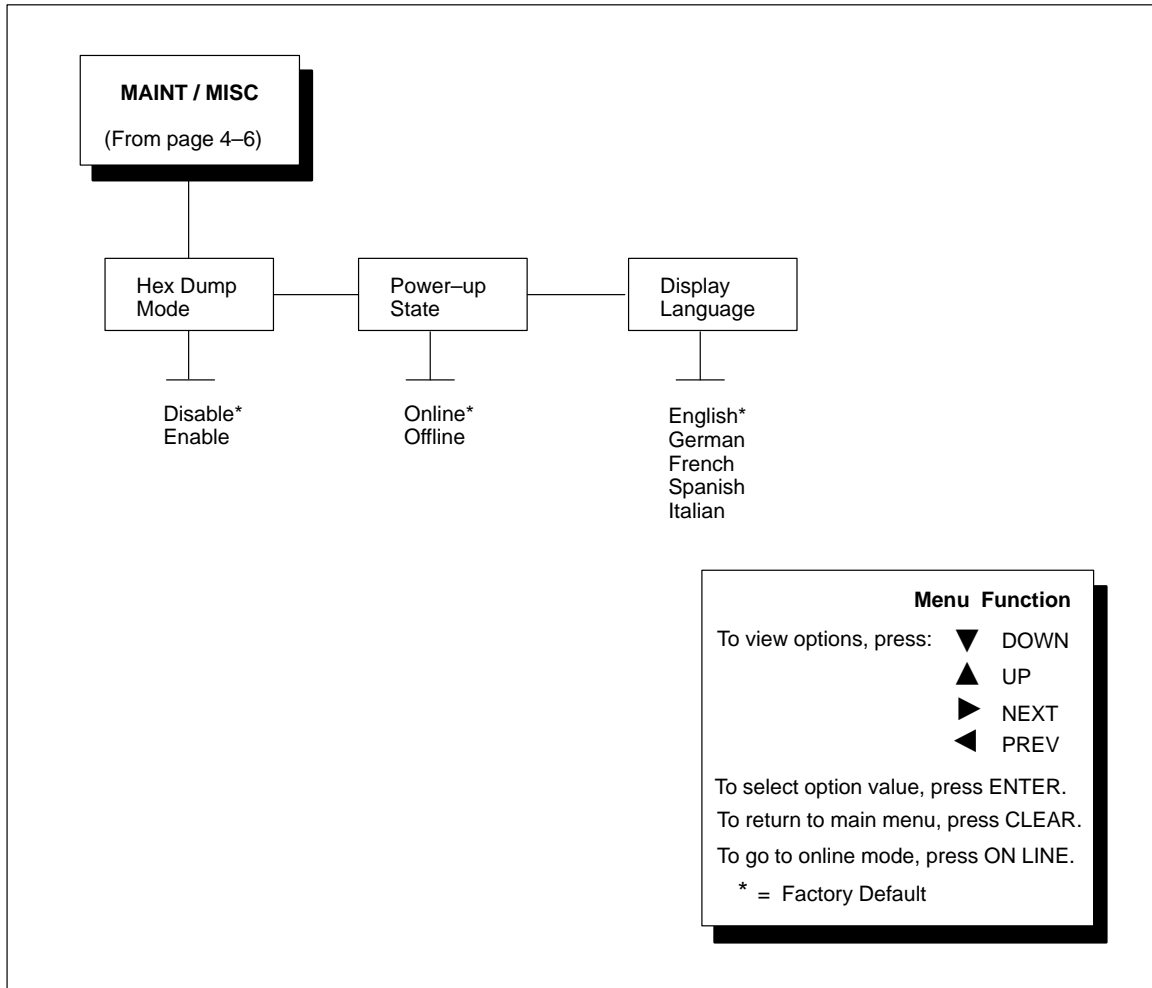


Figure 4-12. Maintenance / Miscellaneous Menu Diagram

Hex Dump Mode

A hex code printout (or hex dump) translates all incoming data to hexadecimal equivalents. A hex dump lists each ASCII data character received from the host computer, together with its corresponding two-digit hexadecimal code. Hex dumps can be used to troubleshoot some types of printer data reception problems. Figure 6-2 on page 6-9 shows a hex dump sample.

Power-Up State

This parameter allows you to configure the printer to power-up in the offline or online state.

Display Language

This parameter chooses the language that will appear on the LCD – English, German, French, Spanish and Italian.

HOST INTERFACE Menu

IMPORTANT

The printer will not work online unless the type of interface selected from the Host Interface Menu matches the type of interface in your host computer. (The interface in your host computer is the one that connects to the data cable of the printer.) For example, if the interface in your computer is a serial interface, then the serial interface must be selected from the Host Interface Menu in the printer.

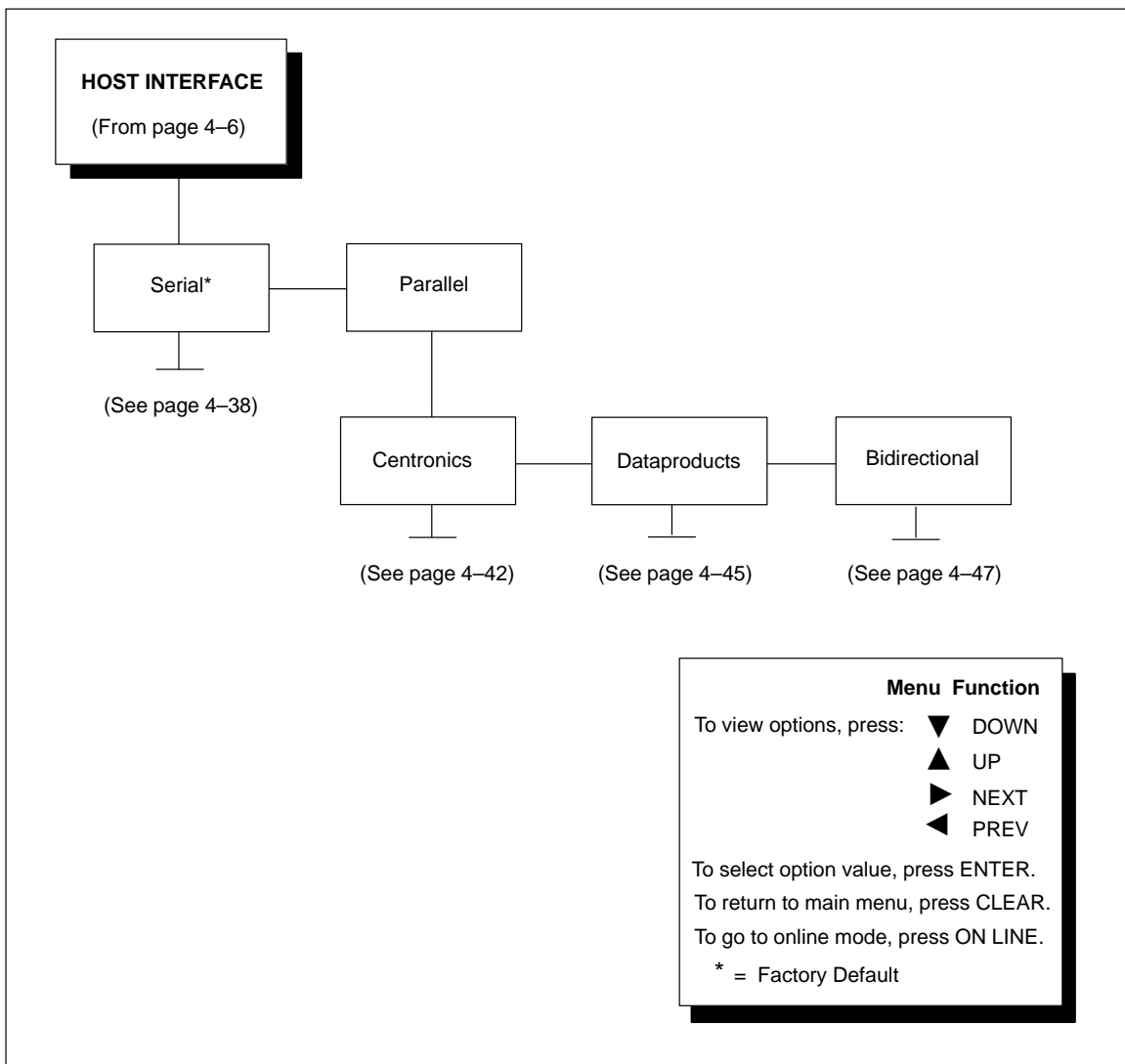


Figure 4-13. Host Interface Menu Diagram

The Host Interface Menu enables you to select and configure one of five types of interface between the printer and your host computer:

- Serial RS-232 (factory default)
- Serial RS-422
- Centronics Parallel
- Dataproducts Parallel
- Bidirectional IEEE-1284 Parallel

The currently selected interface is indicated with an asterisk on the control panel message display. Each interface has its own submenu, with the set of associated interface parameters that you may configure. The host interface and its associated parameters control the interface between the printer and your host computer. Diagrams and descriptions follow for each of the host interface submenus.

Serial Submenu

IMPORTANT

The serial parameters in the printer must be set the same as the serial interface in the host computer (to which the printer is attached via cable). Otherwise, the printer might not work online, and data characters from the computer might not print or might print as “garbled” text.

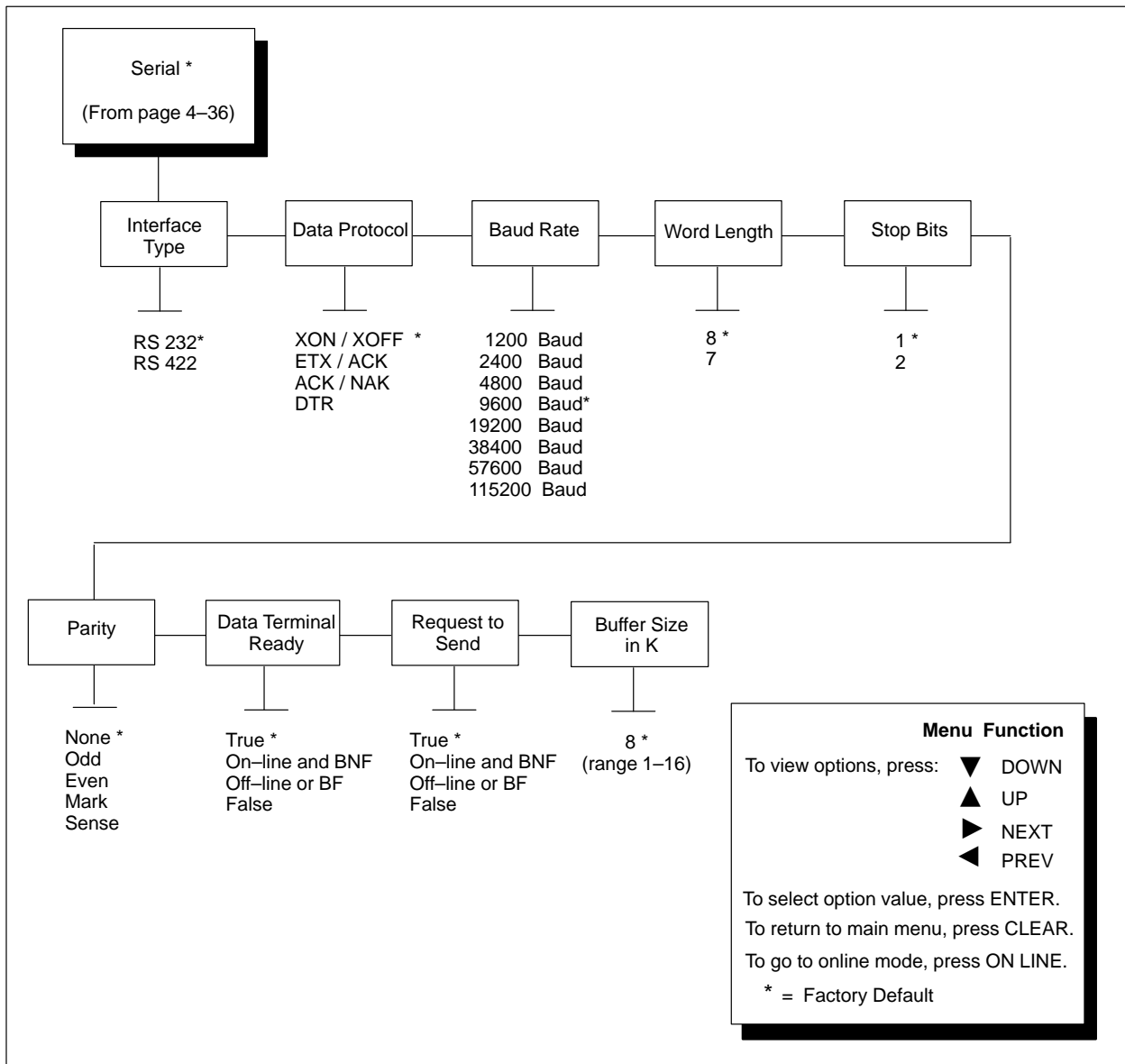


Figure 4-14. Serial Interface Menu

The serial submenu allows you to choose either the Serial RS–232 or the Serial RS–422 host interface type, as shown in Figure 4–14. Several other serial parameters are included on this menu, as shown below and described in the following pages.

Interface Type

This parameter allows you to select either the RS–232 or RS–422 serial port interface.

Data Protocol

You may select one of the following serial interface protocols to meet the host interface requirements.

- XON / XOFF (the default) – The printer controls the flow of communication from the host by telling the host to turn the transmission on and off. This is the factory default serial protocol.
- ETX / ACK – End of Text / Acknowledge. The host controls the flow of communication to the printer by sending a block of data and ending the block with an End of Text (ETX) signal. When the printer receives the ETX signal, it will acknowledge it has received the entire block of data.
- ACK / NAK – ACK means acknowledge; the device acknowledges it has accepted a transmission. NAK means a negative acknowledge; the device did not receive the transmission.
- DTR – (DTE Ready). The printer controls the data flow by asserting or de–asserting this hardware signal to the host. If there is enough room in the printer buffer, the printer will send a high signal; if the buffer is full the printer will send a low signal. DTR tells the host if it is safe to send more data. (If the host sends data during an unsafe condition, data will be lost.)

Baud Rate

This parameter sets the baud rate of the serial interface in the printer. Baud rate is the speed at which serial data is transferred between the host computer and the printer. The choices for the RS-232 interface are 1200, 2400, 4800, 9600, and 19200 Baud. The choices for the RS-422 interface are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115K Baud.

NOTE: If you select a baud rate that is 19200 or greater, you may need to increase the Buffer Size in K parameter from the default (8 Kbyte), to improve performance.

Word Length

The Data Bits parameter sets the length of the serial data word. The length of the data word can be set to 7 or 8 bits, and must match the corresponding data bits setting in the host computer. The default is 8 bits.

Stop Bits

The Stop Bits parameter sets the number of stop bits in the serial data word. Either one or two stop bits can be selected. The setting must match the corresponding stop bit setting in the host computer. The default is 1 bit.

Parity

The Parity parameter can be set for odd parity, even parity, mark, sense, or no parity. The setting must match the corresponding parity setting in the host computer. The default is None.

Data Terminal Ready

This configuration is part of hardware flow control and determines when the Data Terminal Ready (DTR) signal is generated. This signal indicates whether or not the printer is ready to receive data.

- True (the default) continuously asserts the DTR signal.
- False never asserts the DTR signal.
- On-Line and BNF asserts the DTR signal when the printer is online and the internal serial buffer is not full.
- Off-Line or BF asserts the DTR signal when the printer is offline or the internal serial buffer is full.

Request to Send

This configuration is part of hardware flow control and determines when the Request to Send (RTS) signal is generated. This signal indicates whether or not the printer is ready to receive data.

- True (the default) continuously asserts the RTS signal.
- False never asserts the RTS signal.
- On-Line and BNF asserts the RTS signal when the printer is online and the internal serial buffer is not full.
- Off-Line or BF asserts the RTS signal when the printer is offline or the internal serial buffer is full.

NOTE: The RTS option must be set to True (the default) for the LG emulation Unsolicited Rpt. option and the Digital emulation Device Status Reports function to work properly (see page 4-16).

Buffer Size in K

This option configures the amount of memory allocated for the serial port buffer. The default is 8 Kbyte, but you may specify between 1 and 16 Kbytes, in 1-Kbyte increments.

NOTE: If you select a baud rate that is 19200 or greater, you may need to increase the Buffer Size in K parameter from the default to 16 Kbytes, to improve performance.

Parallel Submenu

The parallel submenu allows you to choose the Centronics, Dataproducts, or Bidirectional parallel host interface type, as shown in Figure 4-15. Several parameters are included for each of the parallel interface types, as described in the following pages.

Centronics Options

IMPORTANT

The Centronics parameters in the printer must be set the same as the Centronics interface in the host computer (at the other end of the data cable of the printer). Otherwise, the printer might not work online, and data characters from the computer might not print or might print as “garbled” text.

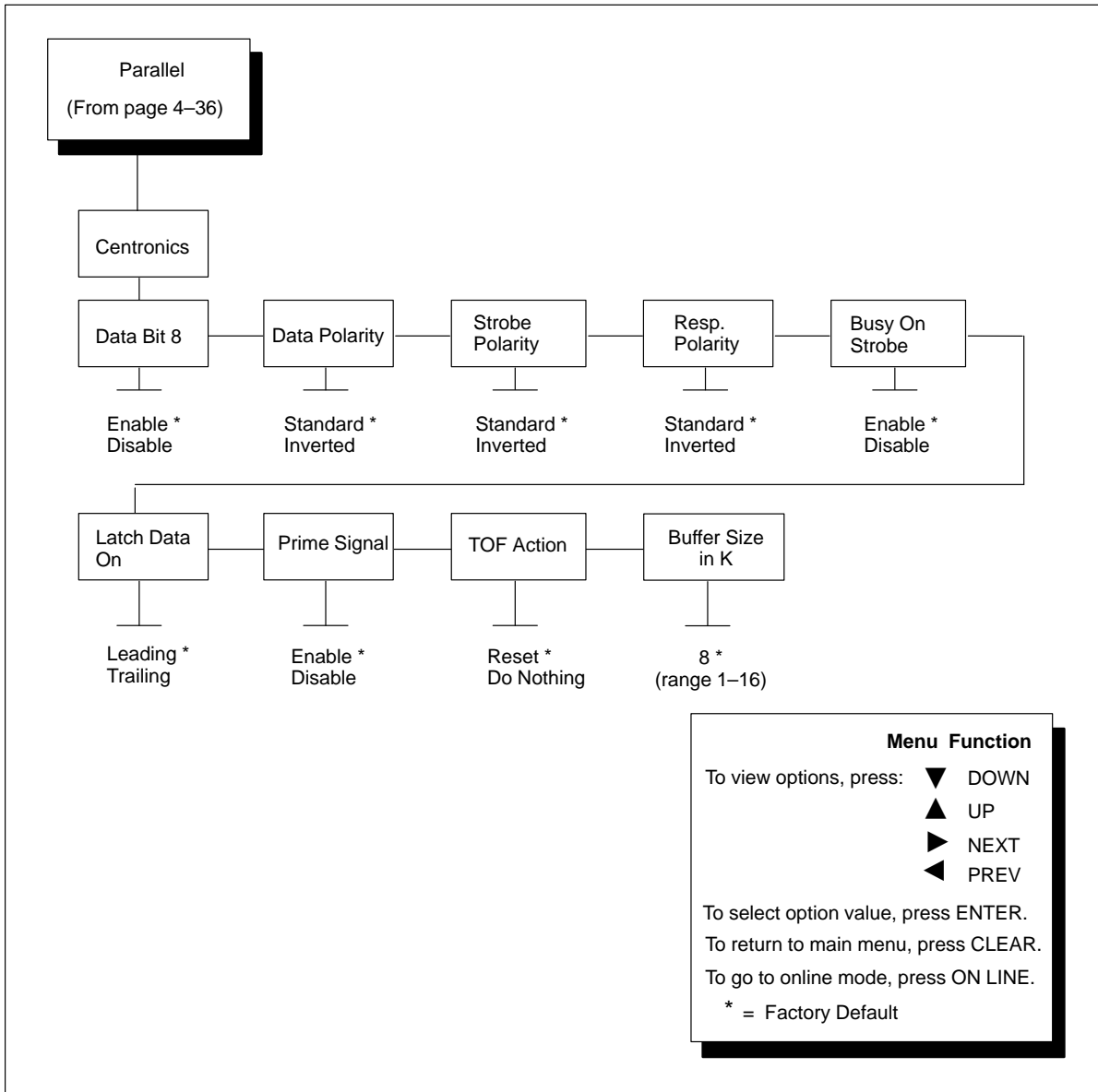


Figure 4-15. Centronics Menu

Data Bit 8

The Data Bit 8 parameter allows access to the extended ASCII character set. Normally, this parameter is enabled. When this parameter is disabled, the printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

The extended ASCII character set is shown in your *LinePrinter PlusTM Programmer's Reference Manual*

Data Polarity

The Data Polarity parameter must be set to match the data polarity of your host computer.

- Standard (the default) does not invert the data.
- Inverted inverts the data received on the data lines from the host computer. Ones become zeros, and vice-versa.

Strobe Polarity

The Strobe Polarity must be set to match the data strobe polarity of your host computer. When the host computer sends a data strobe signal to the printer, this enables the printer to read the data bus.

- Standard (the default) does not expect the data strobe signal to be inverted.
- Inverted expects the host computer to invert the data strobe signal.

Response Polarity

The Response Polarity parameter must be set to match the response polarity of your host computer.

- Standard (the default) does not invert the response signal.
- Inverted inverts the response signal sent to the host computer.

Busy on Strobe

Busy on Strobe determines when the Busy signal is asserted.

- Enable (the default) asserts a busy signal after each character is received.
- Disable asserts a busy signal only when the print buffers are full.

Latch Data On

The Latch Data On parameter specifies whether the data is read on the leading or trailing edge of the data strobe signal.

- Leading (the default)
- Trailing

Prime Signal

Determines whether the parallel port will perform a warm start if the host asserts the Prime Signal.

- Enable (default, a warm start will occur)
- Disable (a warm start will not occur)

TOF Action

TOF (Top-of-Form) Action determines whether or not a form feed is performed before a warm start when the prime signal is asserted from the host. This setting is used only if the Prime Signal parameter is enabled.

- Reset (the default, form feed on reset)
- None (no form feed on reset)

Buffer Size in K

This option configures the amount of memory allocated for the Centronics parallel port buffer. The default is 8 Kbyte, but you may specify between 1 and 16 Kbytes, in 1-Kbyte increments.

Dataproducts Options

IMPORTANT

The Dataproducts parameters in the printer must be set the same as the Dataproducts interface in the host computer (at the other end of the data cable of the printer). Otherwise, the printer might not work online, and data characters from the computer might not print or might print as “garbled” text.

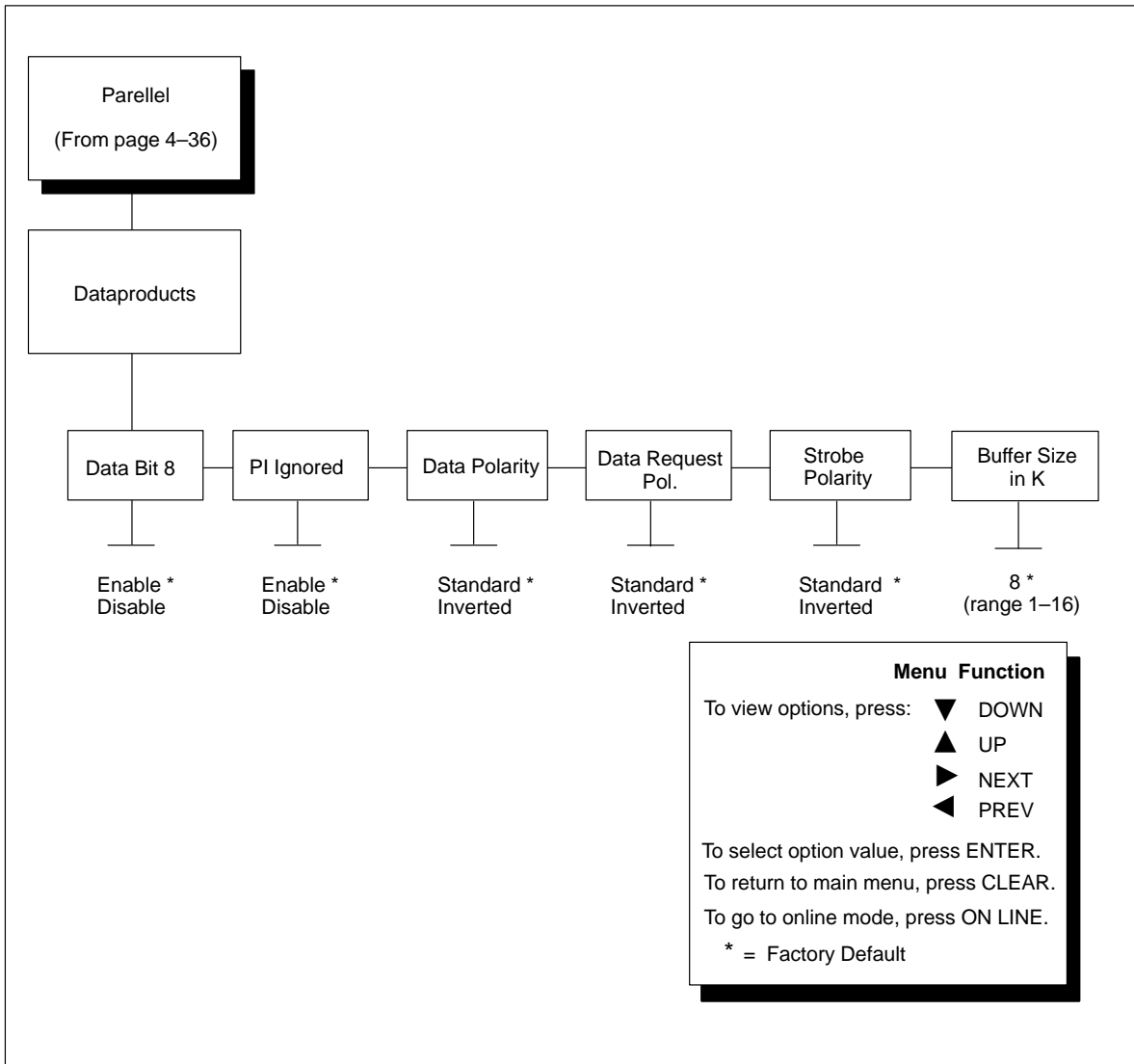


Figure 4-16. Dataproducts Menu

Data Bit 8

The Data Bit 8 parameter allows access to the extended ASCII character set. Normally, this parameter is enabled. When this parameter is disabled, the printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

PI Ignored

The PI (Paper Instruction) signal is used to control vertical paper motion. When the PI Ignored parameter is set to Enable it determines how the printer interprets the PI signal.

- Enable (the default) causes the printer to interpret the associated data character as a vertical motion command value Refer to the *LG^{plus} Series LinePrinter PlusTM Programmer's Reference Manual* (P/N EK-LGPLE-RM) for more information on programming and using the EVFU.
- Disable causes the printer to ignore the PI signal and interpret the associated data character as text.

Data Polarity

The Data Polarity parameter must be set to match the data polarity of your host computer.

- Standard (the default) does not invert the data.
- Inverted inverts the data received on the data lines from the host computer. Ones become zeros, and vice-versa.

Data Request Polarity

The Data Request Polarity parameter must be set to match the data request polarity of your host computer.

- Standard (the default) does not invert the request signal.
- Inverted inverts the request signal sent to the host computer.

Strobe Polarity

The Strobe Polarity must be set to match the data strobe polarity of your host computer. When the host computer sends a data strobe signal to the printer, this enables the printer to read the data bus.

- Standard (the default) does not expect the data strobe signal to be inverted.
- Inverted expects the host computer to invert the data strobe signal.

Buffer Size in K

This option configures the amount of memory allocated for the Dataproducts port buffer. The default is 8 Kbyte, but you may specify between 1 and 16 Kbytes, in 1-Kbyte increments.

Bidirectional (1284-IEEE Parallel) Options

The 1284 IEEE interface is faster and more versatile than Centronics and supports bidirectional communication. Chapter 5 discusses the available modes (Compatibility, Nibble, and Byte) in more detail. Configuration of this interface is configured and controlled from the host.

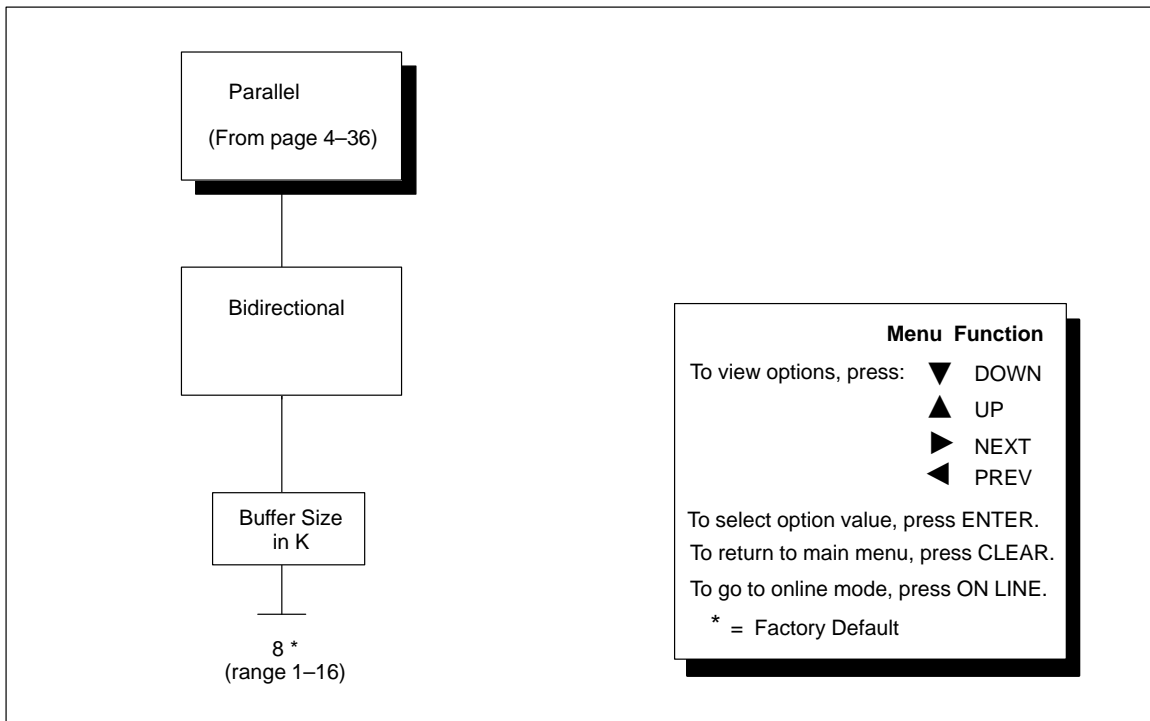


Figure 4-17. Bidirectional Parallel Interface Menu Diagram

Buffer Size in K

This option configures the amount of memory allocated for the Bidirectional (1284-IEEE) parallel port buffer. The default is 8 Kbyte, but you may specify between 1 and 16 Kbytes, in 1-Kbyte increments.

PRINTER CONTROL Menu

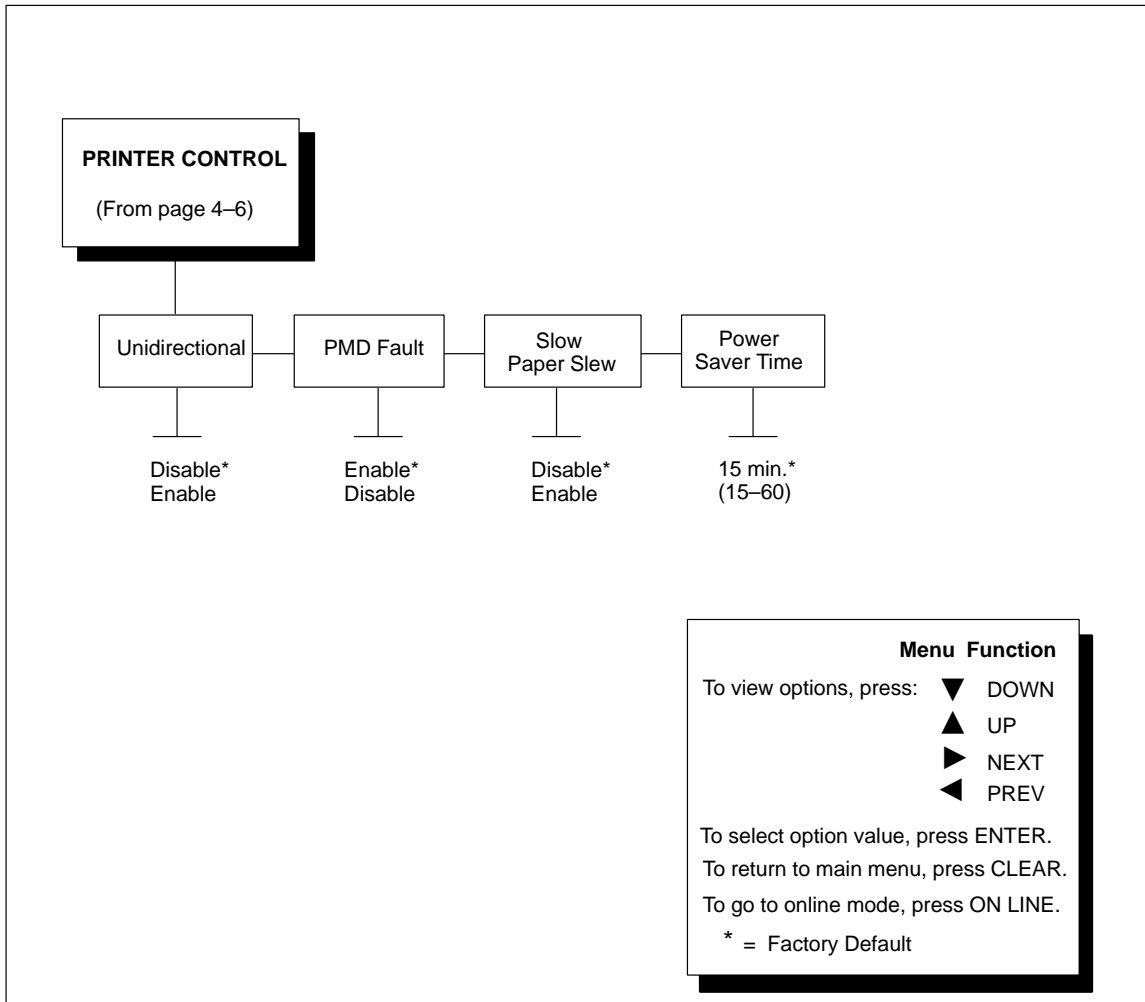


Figure 4-18. Printer Control Menu Diagram

Unidirectional

The Unidirectional feature affects both print quality and printing speed. By setting this feature, you can configure the printer to print in both directions of the shuttle sweep (bidirectional), or to print in one direction only (unidirectional).

You might want to enable this feature when printing bar codes, high quality text and graphics, or other printing that requires precise vertical alignment.

Although enabling this feature reduces print speed, it enhances the vertical alignment of dots and produces cleaner, sharper bar codes and text. Choices include the following:

- **Disable:** The default. The printer will print all data in both directions of the shuttle sweep (bidirectional printing). This choice produces higher printing speed.
- **Enable:** The printer will print all data in only one direction of the shuttle sweep (unidirectional printing). This choice produces higher print quality.

PMD (Paper Motion Detection) Fault

The PMD, or Paper Motion Detection, feature can be enabled or disabled. If PMD is enabled and a paper jam occurs, an audible alarm beeps three times, “CLEAR PAPER JAM” appears on the message display, and the printer stops printing. The default for this parameter is Enable. Disable PMD only if special paper requires it.

CAUTION

Once PMD is disabled, paper motion is not monitored. If a paper jam occurs, the printer ignores the condition and continues to print, possibly causing severe damage to the printer.

Slow Paper Slew

This parameter affects the speed at which paper advances into the stacking area of the printer. The speed may be slowed down by enabling this feature.

- **Disable:** The default. The printer will slew and stack paper at maximum speed.
- **Enable:** Causes the paper to stack at a slower pace. This ensures that certain forms will stack more neatly.

Power Saver Time

This parameter allows the printer to lower electricity usage while it stays idle. The time interval you specify for this parameter sets the number of minutes of idle time before the printer goes into power saver mode. The default setting is 15 minutes, but you may specify a range between 15 and 60 minutes.

DIAGNOSTICS Menu

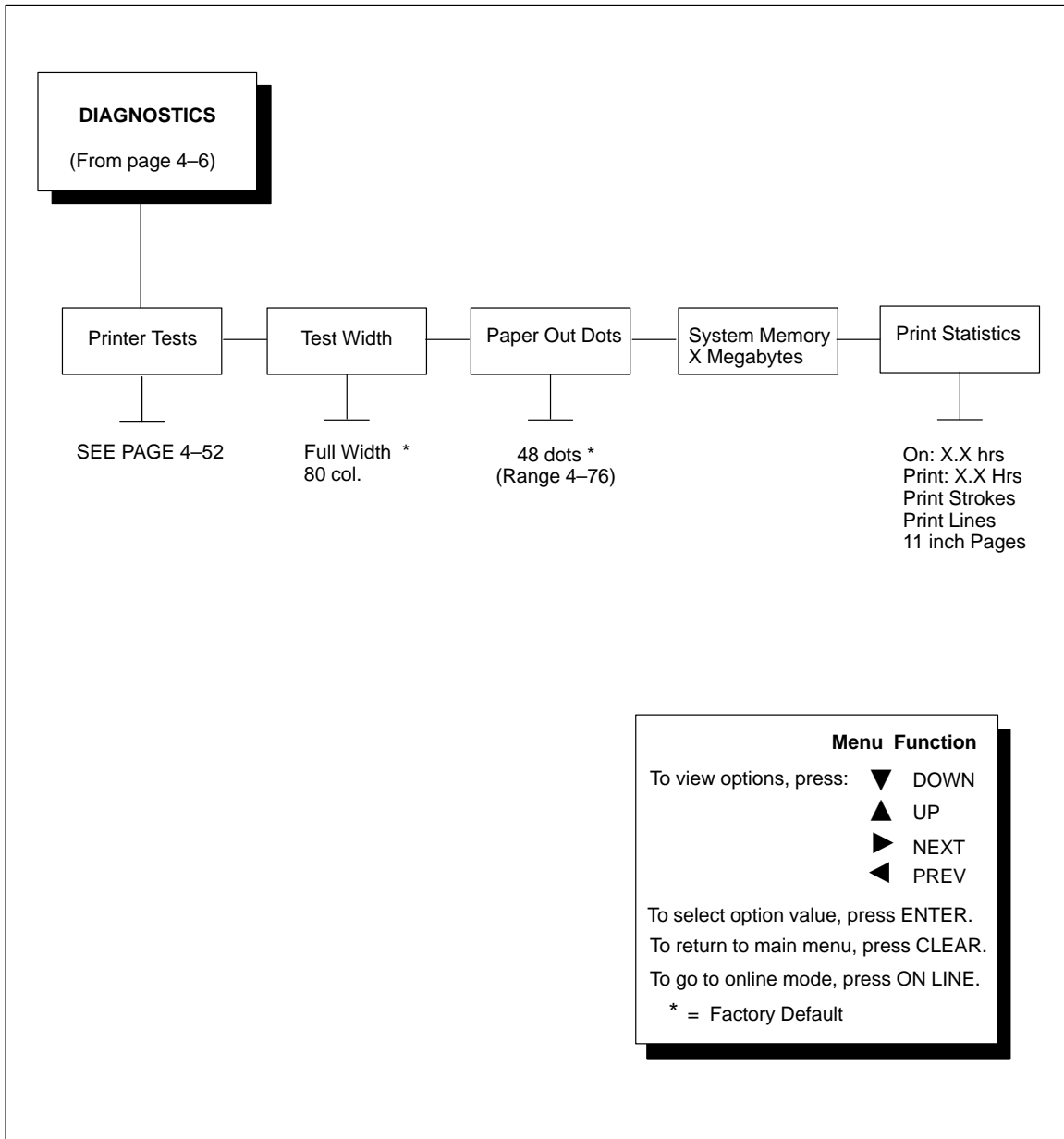


Figure 4-19. Diagnostics Menu Diagram

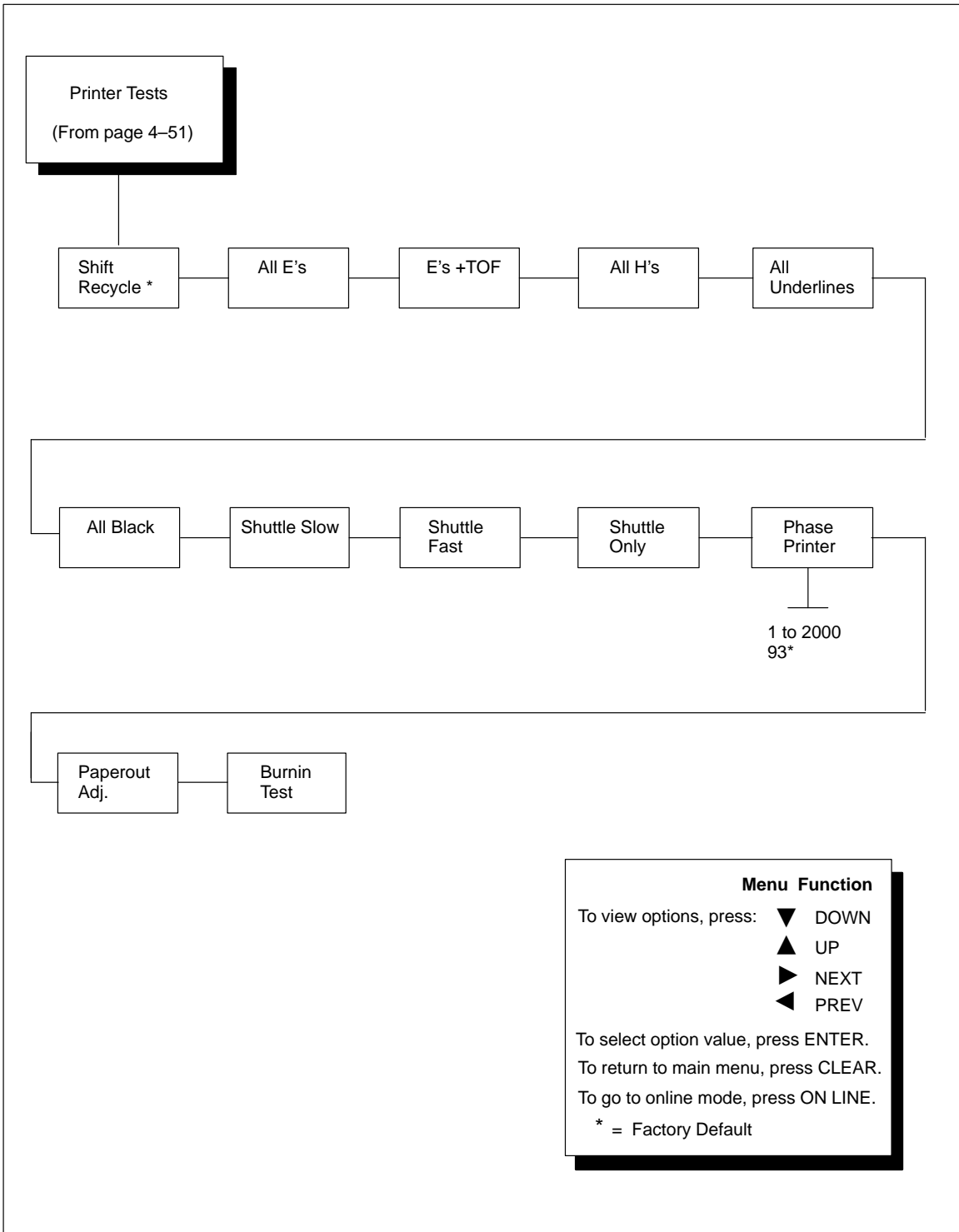


Figure 4-20. Printer Tests Menu Diagram

Printer Tests

The printer tests are used to check the print quality and operation of your printer. See page 6–7 for a procedure for running printer tests.

NOTE: Your Customer Service Engineer will typically run these tests. They are described in more detail in the *LG^{plus} Series Maintenance Manual*.

Brief descriptions for the printer tests follow:

- **Shift Recycle** – A sliding alphanumeric pattern that identifies missing or malformed characters, improper vertical alignment, or vertical compression.
- **All E's** – A pattern of all uppercase E's that identifies missing characters, misplaced dots, smeared characters, improper phasing problems, or light/dark character variations.
- **E's plus TOF** – A pattern of all E's followed by a form feed to the next page top of form, that identifies paper motion or feeding problems.
- **All H's** – A pattern of all uppercase H's used to detect missing characters, misplaced dots, smeared characters, or improper phasing.
- **All Underlines** – An underline pattern useful for identifying hammer bank misalignment.
- **All Black** – A condition where all dot positions are printed, creating a solid black band.
- **Shuttle Slow** – Verifies proper operation by exercising shuttle and ribbon motion at low speed.
- **Shuttle Fast** – Verifies proper operation by exercising shuttle and ribbon motion at fast speed.
- **Shuttle Only** – Exercises only the shuttle at fast speed.
- **Phase Printer** – Checks for wavy print. The initial phase value is set in the factory. Only Customer Service Engineers should run this test.
- **Paperout Adjust** – This test verifies the current Paper Out Dots setting (see page 4–54), which determines where the last line of text will print when there is a paper out condition. The *LG^{plus} Series Maintenance Manual* describes in detail how to run this test.
- **Burnin Test** – Reserved for factory use.

Test Width

This parameter permits you to run the self-tests at full width or 80 columns.

Paper Out Dots

This parameter is used to adjust the paper out distance from the perforation; you can specify where the last line on the page will print when there is a paper out condition. Setting this parameter prevents printing on the platen.

Only Customer Service Engineers should set this parameter.

System Memory

This parameter displays the amount of RAM installed. (This value cannot be changed.)

Print Statistics

You can view various printer statistics, such as hours of usage, and refer to these figures for preventive maintenance purposes. Printer statistics accumulate continuously; they do not reset when you turn off the printer. All of the printer statistics are set to zero at the factory after burn-in testing.

- | | |
|-----------------------|---|
| On : | The cumulative time in hours the printer has been powered on. The range is 0 to 30,000 hours. |
| Print : | The cumulative time in hours the printer has actually been printing. The range is 0 to 30,000 hours. |
| Print Strokes: | The cumulative number of back-and-forth shuttle strokes the printer has printed during normal printer operation. The range is 0 to 2,147,483,648 shuttle strokes. |
| Print Lines: | The cumulative number of lines the printer has printed. The range is 0 to 2,147,483,648 print lines. |
| 11 inch Pages: | The cumulative number of pages the printer has printed. The range in print pages is 0 to 2,147,483,648 total inches of paper movement divided by 11. |

5 Interfaces

Chapter Contents

Overview	5-2
Dataproducts Parallel Interface	5-3
Dataproducts Parallel Interface Signals	5-4
Dataproducts Parallel Interface Configuration	5-5
Centronics Parallel Interface	5-6
Centronics Interface Signals	5-7
Centronics Parallel Interface Configuration	5-8
IEEE 1284 Parallel Interface	5-9
Operating Modes	5-9
The Negotiation Phase	5-10
Signals	5-10
Configuration	5-12
Terminating Resistor Configurations	5-13
RS-232 and RS-422 Serial Interfaces	5-15
RS-232 and RS-422 Serial Interface Signals	5-16
RS-232 and RS-422 Serial Interface Protocol	5-17
RS-232 and RS-422 Serial Interface Error Handling	5-17
RS-232 and RS-422 Serial Interface Configuration	5-18
Interface Configuration with the VMS Operating System	5-19

Overview

This chapter describes the interfaces provided with the *LG^{plus}* printer. The printer interface is the point where the data line from the host computer plugs into the printer. The interface processes all communications signals and data to and from the host computer. It consists of a printed circuit board assembly (PCBA) and a connector for the data cable from the host computer. Communication signals and data may be sent over parallel or serial lines.

IMPORTANT

The *LG^{plus}* is equipped with three parallel interfaces and two serial interfaces. Only one interface can be used at a time, and it must be selected via the control panel configuration menu. (Refer to Chapter 4, “Host Interface Menu.”) Only one data input cable can be plugged in at any time.

The host interfaces provided for the *LG^{plus}* are:

- Dataproducts parallel
- Centronics parallel
- IEEE 1284 parallel bidirectional
- RS-232 serial
- RS-422 serial

In addition to descriptions for each interface, this chapter also provides instructions for configuration of terminating resistors for the parallel interfaces.

Dataproducts Parallel Interface

The Dataproducts parallel interface allows the printer to operate with a 50-pin Amplimite (AMP) HDH-20 data cable connector. The length of the data cable from the host computer to the printer must not exceed 40 feet (12 meters).

**Table 5–1. Dataproducts Parallel Interface Connector Pin Assignments
(with a 50-pin AMP HDH-20 Data Cable Connector)**

Input Signals		Output Signals		Miscellaneous	
Signal	Pin	Signal	Pin	Signal	Pin
DATA LINE 1	19	READY	22	CABLE VERIFY	45, 46
Return	3	Return	6		
DATA LINE 2	20	ONLINE	21	GROUND	39
Return	4	Return	5		
DATA LINE 3	1	DEMAND/Data Request	23		
Return	2	Return	7		
DATA LINE 4	41				
Return	40				
DATA LINE 5	34				
Return	18				
DATA LINE 6	43				
Return	42				
DATA LINE 7	36				
Return	35				
DATA LINE 8	28				
Return	44				
DATA STROBE	38				
Return	37				
PAPER INSTRUCTION	30				
Return	14				

Note: Pins not listed are not connected.

Dataproducts Parallel Interface Signals

Dataproducts-compatible interface signals between the host computer and the printer are defined as follows:

Data Lines 1 through 8 — Provides eight standard or inverted levels from the host that specify character data, plot data, or a control code. Data Line 8 allows access to the extended ASCII character set. You may enable or disable this line via the Data Bit 8 parameter on the Dataproducts submenu (see Chapter 4).

Data Strobe — Carries a high true pulse from the host when data is ready. The data strobe remains high until the Data Request line goes false. The active edge of the strobe signal can be configured as leading (default) or trailing.

Paper Instruction (PI) — Carries a DAVFU signal from the host with the same timing and polarity as the data lines.

Ready — Carries a high true signal from the printer when AC power and DC voltages are present, paper is loaded properly, and the printer is not in a check condition.

Online — Carries a high true signal from the printer when the Ready Line is true and the ON LINE key on the control panel has been pressed. When the printer is in Online mode, it may accept data from the host.

Demand/Data Request — Carries a high true signal from the printer when the printer is ready to accept character data from the host. This signal changes to false shortly after the leading edge of the data strobe signal.

Cable Verify — Two pins on the interface connector are jumpered together to allow the user to verify proper installation of the interface connector.

Dataproducts Parallel Interface Configuration

Your printer is configured at the factory to match the interface you specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, *The Configuration Menus*, for Dataproducts parameter descriptions and information on selecting values for the following parameters:

- Data Bit 8 (enable or disable)
- PI Ignored (enable or disable)
- Data Polarity (standard or inverted)
- Data Request Polarity (standard or inverted)
- Strobe Polarity (standard or inverted)

Some application programs require a unique configuration. If the printer is not working properly in the configuration you have selected, contact a Digital service representative.

Centronics Parallel Interface

The Centronics interface enables the printer to operate with controllers designed for buffered Centronics printers. The length of the data cable from the host computer to the printer must not exceed 15 feet (5 meters).

Table 5–2. Centronics Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	Pin	Signal	Pin	Signal	Pin
DATA LINE 1	2	ACKNOWLEDGE	10	CHASSIS GROUND	17
Return	20	Return	33		
DATA LINE 2	3	ONLINE/SELECT	13	GROUND	30
Return	21	FAULT	32		
DATA LINE 3	4	PAPER EMPTY	12	Spares	14, 18, 31
Return	22	Return	16		
DATA LINE 4	5	BUSY	11		
Return	23	Return	28		
DATA LINE 5	6				
Return	24				
DATA LINE 6	7				
Return	25				
DATA LINE 7	8				
Return	26				
DATA LINE 8	9				
Return	27				
DATA STROBE	1				
Return	19				
PAPER INSTRUCTION	15				
Return	29				

Centronics Interface Signals

The Centronics interface signals between the host computer and the printer are defined as follows:

Data Lines 1 through 8 — Provide eight standard or inverted levels from the host that specify character data, plot data, or a function code. Data Line 8 allows access to the extended ASCII character set. You may enable or disable this line via the Data Bit 8 parameter on the Centronics submenu (see Chapter 4).

Data Strobe — Carries a low true, 100 ns minimum pulse from the host that clocks data into the printer.

Paper Instruction (PI) — Carries a VFU control signal from the host with the same timing as the data lines.

Acknowledge — A low true pulse from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

Online — A high true level from the printer to indicate the printer is ready for data transfer and the **ON LINE** key on the operator panel has been activated. When the printer is in Ready mode, it may accept data from the host.

Paper Empty (PE) — A high true level from the printer to indicate the printer is in a fault condition.

Busy — A high true level from the printer to indicate the printer cannot receive data.

Centronics Parallel Interface Configuration

Your printer is configured at the factory to match the interface specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, *The Configuration Menus*, for Centronics parameter descriptions and information on selecting values for the following parameters:

- Data Bit 8 (enable or disable)
- Data Polarity (standard or inverted)
- Strobe Polarity (standard or inverted)
- Response Polarity (standard or inverted)
- Busy on Strobe (enable or disable)
- Latch Data On Leading or Trailing Edge of Strobe
- Prime Signal (enable or disable)
- TOF Action at Prime Signal (do nothing or form feed)

Some application programs require a unique configuration. If the printer is not working properly in the configuration you have selected, contact a DEC service representative.

IEEE 1284 Parallel Interface

The IEEE 1284 is a parallel interface with bidirectional capabilities. Features include the following:

- Faster data transmission. Timing of the signals has been reduced.
- Bidirectional communication. Both the host and the printer can send data.
- Versatility. If a device cannot send data along particular lines, the 1284 can circumvent this and send data via other operating modes, such as Nibble Mode which is discussed later.
- Less user interaction. The host can ask the printer about printing status and supported features, such as fonts and internal errors. For example, instead of having to physically check if the printer has run out of paper, you can create a program to query this from the host. The printer will respond and a message will display on the host.

Operating Modes

The 1284 supports three operating modes, which are determined by negotiation between the printer and the host.

Compatibility Mode

This mode provides compatibility with Centronics-like host I/O. Data is transferred from the host to the printer in 8-bit bytes over the data lines.

Compatibility Mode can be combined with Nibble and Byte Modes to provide bidirectional communication.

Nibble Mode

Eight bits equals one byte. When a byte of data is sent to the printer, the eight bits are sent over eight data lines.

Some devices cannot send data over their eight data lines. To bypass this, the 1284 permits data to be sent as half a byte over four status lines. (Half a byte equals one nibble.) Two sequential four-bit nibbles are sent over the lines.

Data is transferred from printer to host in four-bit nibbles over the status lines, and the host controls the transmission.

Byte Mode

The printer and host send data to each other along eight data lines (one bit per line).

If bidirectional communication is supported by the printer and the host, the host will take control of the data transfer.

The Negotiation Phase

The negotiation phase determines which operating mode will be used. At this time, the host and the printer will sense what devices are attached, the supported signals available, and which mode to use. The selected mode, in turn, defines the pins on the 1284 connector.

There are 36 pins on the parallel interface. Each one sends a different signal. Pin 1, for example, can send a nStrobe signal or a HostClk signal, depending on the mode selected. Table 5–1 on page 5–11 shows the different definitions.

Signals

1284 interface signals between the host and the printer are defined below.

Host Clock / nWrite – Driven by host. Data transferred from host to printer. When printer sends data, two types are available. If Nibble Mode, signal is set high. If Byte Mode, signal is set low.

Data 1 through Data 8 – These pins are host-driven in Compatibility Mode and bidirectional in Byte Mode. They are not used in Nibble Mode. Data 1 is the least significant bit; Data 8 is the most significant bit.

Printer Clock / Peripheral Clock / Interrupt – Driven by the printer. A signal from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

Printer Busy / Peripheral Acknowledge / nWait – Driven by the printer. Indicates the printer cannot receive data. (Data bits 4 and 8 in Nibble Mode.)

Acknowledge Data Request / nAcknowledge Reverse – Driven by the printer. Indicates the printer is in a fault condition. (Data bits 3 and 7 in Nibble Mode.)

Xflag – Driven by the printer. A high true level indicating the printer is ready for data transfer and the printer is on-line. (Data bits 2 and 6 in Nibble Mode.)

Host Busy / Host Acknowledge / NDStrobe – Driven by the host. Activates auto–line feed mode.

Peripheral Logic High – Driven by the printer. When pulsed high, the printer indicates all of its signals are in a valid state. When pulsed low, the printer indicates its power is off or its signals are in an invalid state.

nReverse Request – Driven by the host. Resets the interface and forces a return to Compatibility Mode idle phase.

nData Available / nPeripheral Request – Driven by the printer. Indicates the printer has encountered an error. (Data bits 1 and 5 in Nibble Mode.)

1284 Active / nAStrobe – Driven by the host. A peripheral device is selected.

Host Logic High – Driven by the host. When set to high, the host indicates all of its signals are in a valid state. When set to low, the host indicates its power is off or its signals are in an invalid state.

nInit – Resets init interface from the host.

Note that the length of the data cable from the host computer to the printer should not exceed 10 meters (32 feet).

Table 5–1. 1284 Signals

Pin	Source of Data	Type of Mode		
		Compatible	Nibble	Byte
1	Host	nStrobe	HostClk	Host/Clk
2	Host/Printer	Data 1 (LSB)		
3	Host/Printer	Data 2		
4	Host/Printer	Data 3		
5	Host/Printer	Data 4		
6	Host/Printer	Data 5		
7	Host/Printer	Data 6		
8	Host/Printer	Data 7		
9	Host/Printer	Data 8 (MSB)		
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy	PtrBusy
12	Printer	PError	AckDataReq	AckDataReq
13	Printer	Select	Xflag	Xflag
<i>(continued next page)</i>				

Table 5–1. 1284 Signals (continued)

Pin	Source of Data	Type of Mode		
		Compatible	Nibble	Byte
14	Host	nAutoFd	Host Busy	HostAck
15		Not Defined		
16		Logic Gnd		
17		Chassis Gnd		
18	Printer	Peripheral Logic High		
19		Signal Ground (nStrobe)		
20		Signal Ground (Data 1)		
21		Signal Ground (Data 2)		
22		Signal Ground (Data 3)		
23		Signal Ground (Data 4)		
24		Signal Ground (Data 5)		
25		Signal Ground (Data 6)		
26		Signal Ground (Data 7)		
27		Signal Ground (Data 8)		
28		Signal Ground (PErrror, Select, nAck)		
29		Signal Ground (Busy, nFault)		
30		Signal Ground (nAutoFd, nSelectIn, nInit)		
31	Host	nInit		
32	Printer	NFault	nDataAvail	aDataAvail
33		Not Defined		
34		Not Defined		
35		Not Defined		
36	Host	nSelectIn	1284 Active	1284 Active

Configuration

The printer is configured at the factory to default settings, but you can also configure the printer with the control panel. Refer to your programming reference manual, which lists parameters and values.

Some application programs may require a unique configuration. If the printer is not working properly in the configuration you selected, contact your Hewlett Packard representative.

Terminating Resistor Configurations

The factory equips the printer with several resistors that are used for parallel interface configurations and are suitable for most applications. These 470 ohm pull-up and 1K ohm pull-down terminating resistors are located at RP1 and RP2, shown in Figure 5–1.

If the values of these terminating resistors are not compatible with the particular interface driver requirements of your host computer, you may need to install resistors with different pull-up and pull-down values.

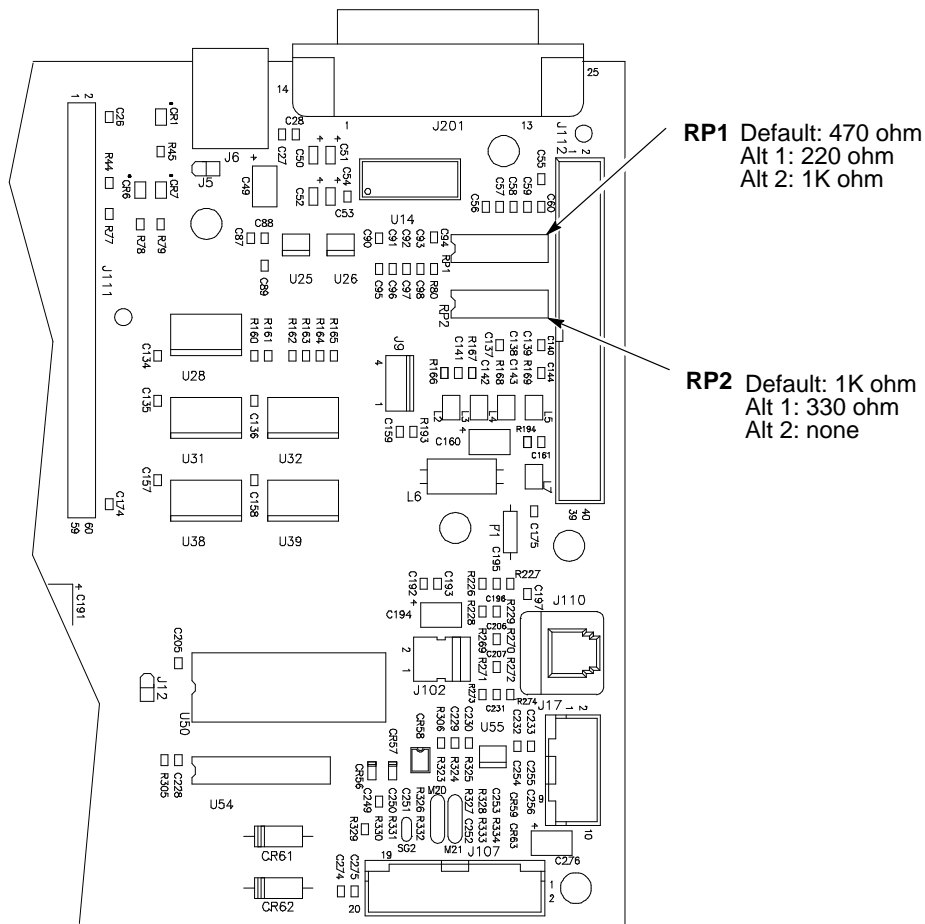


Figure 5–1. Resistor Locations

The shipping kit for this printer includes 220 ohm pull-up and 330 ohm pull-down alternate terminating resistors. If you install the 220 ohm pull-up resistor, you must also install the 330 ohm pull-down resistor. The following table lists the three terminating resistor configurations you may install:

Configuration	Pull-Up (RP1)	Pull-Down (RP2)
Factory Default	470 ohm	1K ohm
Alternate 1	220 ohm	330 ohm
Alternate 2	1K ohm	none

Removal and Installation

IMPORTANT

This is an involved maintenance procedure; only a trained technician should perform this procedure.

The procedure for removing and installing terminating resistors is provided in Chapter 5 (“Removal and Replacement Procedures”) of your *LG^{plus} Series Maintenance Manual*.

RS-232 and RS-422 Serial Interfaces

The RS-232 and RS-422 serial interface circuit characteristics are compatible with the Electronic Industry Association Specifications EIA-232-D and EIA-422-A.

The RS-232 and RS-422 serial interfaces enable the printer to operate with bit serial devices that are compatible with an RS-232 controller. The input serial data transfer rate (in baud) is selectable from the printer's operator panel. Baud rates of 1200, 2400, 4800, 9600, and 19,200 are available for RS-232. If you have the RS-422 interface, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115K baud rates are available.

The input format consists of a single start bit, 7 or 8 data bits, and one or two stop bits. The number of data bits is determined by printer configuration. The data bits are interpreted with the least significant bit first. Parity checking is determined by printer configuration options selected from the operator panel.

The printer interface uses a first-in/first-out buffer. The asynchronous interface accepts data as it is provided by the host. The length of the data cable from the host computer to the printer must not exceed 50 feet (15 meters) for RS-232, or 4000 feet (1220 meters) for RS-422.

Table 5-2. RS-232 Serial Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	Pin	Signal	Pin	Signal	Pin
Receive Data (RD)	3	Transmit Data (TD)	2	Chassis Ground	1
Clear To Send (CTS)	5	Request To Send (RTS)	4	Signal Ground	7
Data Set Ready (DSR)	6	Data Terminal Ready (DTR)	20		
Data Carrier Detect (DCD)	8				

Table 5-3. RS-422 Serial Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	Pin	Signal	Pin	Signal	Pin
- Receive Data (RD)	15	- Transmit Data (TD)	19	Chassis Ground	1
+ Receive Data	17	+ Transmit Data (TD)	25	Signal Ground	7

RS-232 and RS-422 Serial Interface Signals

The RS-232/RS-422 connector mounted on the printer is a 25-pin DB-25S type. The mating connector is a DB-25P. RS-232 and RS-422 compatible serial interface signals are defined as follows:

An adapter and cable (H8585-AE and BN26X-xx) are required for signal interface when using the RapidPrint 200 Network Interface box.

RS-232

Received Data (RD) — Serial data stream to the printer.

Transmitted Data (TD) — Serial data stream from the printer for transmitting status and control information to the host. Subject to protocol selection.

Request To Send (RTS) — Control signal from the printer. Subject to configuration.

Clear To Send (CTS) — Status signal to the printer indicating the host is ready to receive data/status signals from the printer.

Data Set Ready (DSR) — Status signal to the printer indicating the host is in a ready condition.

Data Carrier Detect (DCD) — Status signal to the printer. The ON condition is required for the printer to receive data.

Data Terminal Ready (DTR) — Control signal from the printer. Subject to configuration.

RS-422

+RD, -RD — Serial data stream differentially received by printer.

+TD, -TD — Differentially driven serial data stream for transmitting status and control information to the host. Subject to protocol selection.

NOTE: **+RD** and **+TD** form signal and return paths of a differential line signal.

RS-232 and RS-422 Serial Interface Protocol

X-ON/X-OFF — The printer transmits an X-ON character (hex 11) when entering the Ready mode or when the buffer is almost empty. The printer transmits an X-OFF character (hex 13) when entering the Not Ready mode or when the buffer is almost full.

RS-232 and RS-422 Serial Interface Error Handling

NOTE: All serial errors are treated as faults that require operator intervention.

Parity Error Handling — Parity error checking is a configuration option selected from the operator panel.

With odd or even parity checking selected, a character with a parity error is replaced with a question mark (?) character.

When parity checking is not selected (“NONE” on the operator panel), parity errors are ignored and the characters are printed as received.

Framing Error Handling — Framing error checking is always in effect for the serial interface.

When a framing error occurs, an exclamation point (!) is printed. If 20 successive errors are received, a line feed is added to force printing to occur.

Overflow Error Handling — Overflow error checking is always in effect for the serial interface.

When a data overrun error occurs, an asterisk (*) is printed. If 20 successive errors are received, a line feed is added to force printing to occur.

RS-232 and RS-422 Serial Interface Configuration

Your printer is configured at the factory to match the interface you specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, *Configuration Menus*, for RS-232 and RS-422 parameter descriptions and information on selecting values for the following parameters:

RS-232 and RS-422

- Baud Rate (data rate selected from the operator panel)
- Data Bits (7 or 8 Bits)
- Stop Bits (1 or 2 Bits)
- Parity (None, Odd, Even, Mark, or Sense)

RS-232 only

- Data Terminal Ready logic
- Request to Send logic

Some application programs require a unique configuration. If the printer is not working properly with the configuration you selected, contact a DEC service representative.

NOTE: When using Digital Equipment Corporation's RapidPrint 200™ LAN product, DTR must be disabled from the RapidPrint.

Interface Configuration with the VMS Operating System

When using the parallel interface with the VMS operating system, configure the printer with the SET PRINTER command, as shown below:

Printer LCA0:, device type unknown, is on-line, allocated record-oriented device, carriage control, device is spooled through an intermediate device, error logging is enabled.

Error count	0
Owner process	“SYMBIONT_0001”
Owner process ID	00000087
Reference Count	2
Page width	132
Carriage return	Formfeed
No passall	No Wrap
No Fallback	Tab
Intermediate device:	DUA1
Associated queue:	LCA0
Operations completed	1
Owner UIC	[0, 0]
Dev Prot	S:RWLP, 0:RWLP, W:RWLP
Default buffer size	132
Page length	66
Lowercase	
Printall	
No Truncate	

When using the serial interface with the VMS operating system, configure the terminal characteristics with the SET TERM command, as shown below:

Terminal: _TXA3: Device_Type: Unknown Owner: SYMBIONT_0001
Username: SYSTEM

Input: 9600* LFill: 0 Width: 136 Parity: None
Output: 9600* CRfill: 0 Page: 66

Terminal Characteristics:

Interactive	Echo	Type_ahead	No_Escape
No_Hostsync	TTsync	Lowercase	Tab
No_Wrap	Scope	No_Remote	No_Eightbit
No_Broadcast	No_Readsync	Form	Fulldup
No_Modem	No_Local_echo	No_Autobaud	No_Hangup
No_Brdcstambx	No_DMA	No_Altypeahd	Set_speed
Line_Editing	Overstrike_editing	No_Fallback	No_Dialup
No_Secure_server	No_Disconnect	No_Pasthru	No_Syspassword
No_SIXEL_Graphics	No_Soft_Characters	No_Printer_Port	Numeric_Keypad
No_ANSI_CRT	No_Regis	No_Block_mode	No_Advanced_video
No_Edit_mode	No_DEC_CRT	No_DEC_CRT	

Device spooled to _DUAL:

* Match baud rate to printer settings.

6

Routine Service and Diagnostics

Contents

Routine Service	6-2
Cleaning Requirements	6-2
Exterior Cleaning	6-3
Interior Cleaning	6-3
Printer Self-Tests	6-6
Running the Self-Tests	6-7
Printing a Hex Dump	6-9
Fault Messages	6-11
Fault Messages Requiring Field Service Attention	6-11

Routine Service

Periodic cleaning is the only maintenance your printer requires. If print quality deteriorates even after cleaning, contact your Digital Customer Service Engineer.

Cleaning Requirements

Periodic cleaning ensures efficient operation and clear print quality.

If the printer is located in a dusty area or is used for heavy duty printing, clean it more often.

WARNING

Disconnect the power source before cleaning the printer.

WARNUNG

Vor dem Säubern des Druckers ist die Netzverbindung zu unterbrechen.

ATTENTION

Débranchez l'alimentation avant de nettoyer l'imprimante.

Exterior Cleaning

Clean the outside of the cabinet with a soft, lint-free cloth and mild detergent soap. (Dishwashing liquid works well.) Do not use abrasive powders or chemical solvents. Clean the windows with plain water or mild window cleaner. Always apply the cleaning solution to the cloth; never pour cleaning solution directly onto the printer.

Interior Cleaning

Over time, particles of paper and ink accumulate inside impact printers. This is normal. Paper dust and ink build-up must be periodically removed to avoid degraded print quality. Most paper dust accumulates around the ends of the platen and ribbon path.

To clean the interior of the printer, perform the following steps and refer to Figure 6-1.

1. Power off the printer power and unplug the printer power cord.
2. Open the printer cover. Fully raise the forms thickness lever. Unload paper. Refer to the *Operator's Guide*.
3. Unlatch both ribbon spools and carefully lift them off the hubs. Raise the ribbon out of the ribbon path.

4. Using a soft-bristled, non-metallic brush (such as a toothbrush), brush paper dust and ribbon lint off the tractors, shuttle cover assembly, base casting, and ribbon guides. Vacuum up the residue.

CAUTION

Vacuum carefully around the hammer bank and surrounding area to avoid damage.

5. Wipe the splined shaft with a soft cloth.
6. Check the ribbon mask and hammer bank cover for bits of torn paper or ribbon lint.

CAUTION

To avoid corrosion damage, use only alcohol when cleaning printer mechanical elements. Make sure the cleaning solution contains no water.

7. Using a soft cloth lightly moistened with anhydrous alcohol, remove dust and ink from the platen. (The platen is the thick silver bar behind the hammer bank cover that rotates when the forms thickness lever is rotated.) Clean the ribbon guides.
8. Brush and vacuum up dust or residue that has accumulated inside the lower cabinet.
9. Wipe the lower cabinet interior with a clean, lint-free cloth dampened (not wet) with water and mild detergent, or spray the surfaces lightly with window cleaning solution. Dry the lower cabinet interior by wiping it with a clean, lint-free cloth.
10. Reinstall the ribbon and load paper. Refer to the *Operator's Guide*.

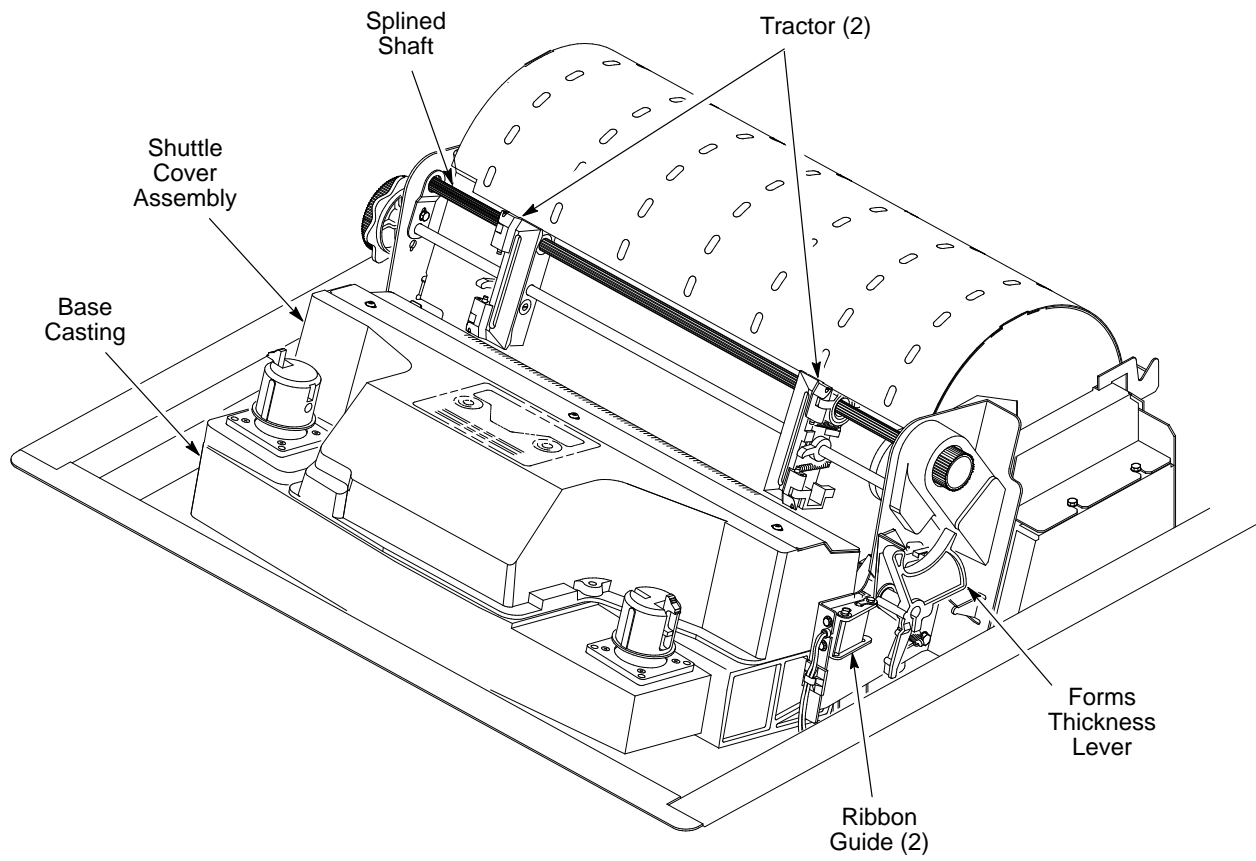


Figure 6-1. Cleaning the Print Mechanism

Printer Self-Tests












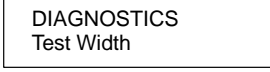

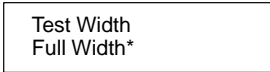


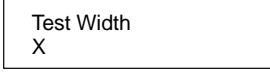

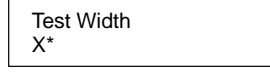

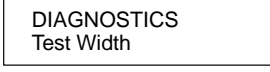
The following printer self-tests are used to check the print quality and operation of your printer. (See the procedure on the next page.)

NOTE: *Your Digital Customer Service Engineer will typically run these tests.*










- **Shift Recycle** – A sliding alphanumeric pattern that identifies missing or malformed characters, improper vertical alignment, or vertical compression.
- **All E's** – A pattern of all uppercase E's that identifies missing characters, misplaced dots, smeared characters, improper phasing problems, or light/dark character variations.
- **E's plus TOF** – A pattern of all E's followed by a form feed to the next page top of form, that identifies paper motion or feeding problems.
- **All H's** – A pattern of all uppercase H's used to detect missing characters, misplaced dots, smeared characters, or improper phasing.
- **Underline Only** – An underline pattern useful for identifying hammer bank misalignment.
- **All Black** – A condition where all dot positions are printed, creating a solid black band.
- **Shuttle Slow** – Verifies proper operation by exercising shuttle and ribbon motion at low speed.
- **Shuttle Fast** – Verifies proper operation by exercising shuttle and ribbon motion at fast speed.
- **Shuttle Only** – Exercises only the shuttle at fast speed.
- **Phase Printer** – Checks for wavy print. The initial phase value is set in the factory. Run the test and check the quality. Only Digital Customer Service Engineers should run this test.
- **Paperout Adjust Test**– This test allows you to test the current Paper Out Dots setting (see page 4-54), which determines where the last line of text will print when there is a paper out condition. The *LG^{plus} Series Maintenance Manual* describes in detail how to run this test.
- **Burnin Test** – Reserved for factory use.

Running the Self Tests

Following is a procedure for running a printer test to determine whether print quality is acceptable.

Step	Key	Result	Notes
1.	Load full-width (132-column) computer paper. Install the ribbon. Set top-of-form. See Chapter 2 or your <i>Operator's Guide</i> .		
2.	Press: 		The printer must be offline to test the printer.
3.	 + 	 	Allows you to make configuration changes.
4.	 UNTIL		
5.			
6.	 UNTIL		
7.			
8.	 OR 		Cycle through the choices. X = Full Width or X = 80 columns.
9.	ENTER 		Test width selected.
10.	 UNTIL		

continued next page

Step	Key	Result	Notes
11.	 UNTIL	DIAGNOSTICS Printer Tests	
12.		Printer Tests Shift Recycle*	
13.	 OR 	Printer Tests All E's	Cycle through the choices. Refer to page 6–6.
14. To start test:	R/S 	Printer Tests All E's*	The test runs.
15. To stop test:	R/S 	Printer Tests All E's*	Stops tests.
16.	 + 	ENTER SWITCH LOCKED	Locks the configuration parameters.
17.	CLEAR 	OFFLINE CONFIG. CONTROL	Moves the printer out of the menus to offline.
18.	Examine the print quality. The characters should be fully formed and of uniform density. If the test does not run or characters appear malformed, contact your DEC Customer Service Engineer.		
19.	If the print quality is good, close the printer cover; press ON LINE to enable printing.		

Printing a Hex Dump

A hex code printout (or hex dump) is basically a translation of all host interface data to its hexadecimal equivalent. A hex dump lists all ASCII character data received from the host computer with their corresponding two-digit hexadecimal codes. Hex dumps are used to troubleshoot printer data reception problems.








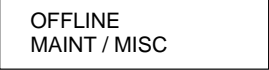



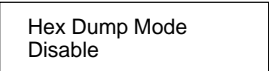


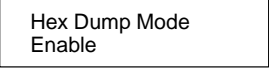

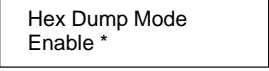


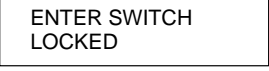


Printable characters print as the assigned symbol; nonprintable characters are indicated by a period (.).

```

!"#%&'()*+,-./ 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F
0123456789:;<=>? 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F
@ABCDEFGHIJKLMNO 40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F
PQRSTUVWXYZ[\]^_ 50 51 52 53 54 55 56 57 58 59 5A 5B 5C 5D 5E 5F
`abcdefghijklmno 60 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E 6F
pqrstuvwxyz{|}~ 70 71 72 73 74 75 76 77 78 79 7A 7B 7C 7D 7E 20
!"#%&'()*+,-./ 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F 30
123456789:;<=>?@ 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F 40
ABCDEFGHIJKLM.!"#%& 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50
'()*+,-./0123456 27 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34 35 36
789:;<=>?@ABCDEF 37 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44 45 46
GHIJKLMNOPQRSTU 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56
WXYZ[\]^_`abcdef 57 58 59 5A 5B 5C 5D 5E 5F 60 61 62 63 64 65 66
ghijklmnopqrstu 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76
vwxyz{|}~!"#%&' 77 78 79 7A 7B 7C 7D 7E 20 21 22 23 24 25 26 27
()*+,-./01234567 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34 35 36 37
89:;<=>?@ABCDEF 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44 45 46 47
HI.!"#%&'()*+,- 48 49 0D 0A 22 23 24 25 26 27 28 29 2A 2B 2C 2D
./0123456789:;<= 2E 2F 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D
>?@ABCDEFGHIJKLM 3E 3F 40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D
NOPQRSTUVWXYZ[\ 4E 4F 50 51 52 53 54 55 56 57 58 59 5A 5B 5C 5D
^_`abcdefghijklm 5E 5F 60 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D
nopqrstuvwxyz{|} 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 7B 7C 7D
~!"#%&'()*+,- 7E 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E
/0123456789:;<= 2F 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E
?@ABCDEFGHIJ.## 3F 40 41 42 43 44 45 46 47 48 49 4A 0D 0A 23 24
%&'()*+,-./01234 25 26 27 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34
56789:;<=>?@ABCD 35 36 37 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44
EFGHIJKLMNOPQRST 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54
UVWXYZ[\]^_`abcd 55 56 57 58 59 5A 5B 5C 5D 5E 5F 60 61 62 63 64
efghijklmnopqrst 65 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74
uvwxyz{|}~!"#% 75 76 77 78 79 7A 7B 7C 7D 7E 20 21 22 23 24 25
&'()*+,-./012345 26 27 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34 35
6789:;<=>?ABCDE 36 37 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44 45
FGHIJK. %&'()*+ 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54
,-./0123456789: 2C 2D 2E 2F 30 31 32 33 34 35 36 37 38 39 3A 3B
<=>?@ABCDEFGHIJK 3C 3D 3E 3F 40 41 42 43 44 45 46 47 48 49 4A 4B
LMNOPQRSTUVWXYZ 4C 4D 4E 4F 50 51 52 53 54 55 56 57 58 59 5A 5B
\]^_`abcdefghijk 5C 5D 5E 5F 60 61 62 63 64 65 66 67 68 69 6A 6B
lmnopqrstuvwxyz{ 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 7B
}|}~!"#%&'()*+ 7C 7D 7E 20 21 22 23 24 25 26 27 28 29 2A 2B 2C

```

Figure 6–2. Hex Dump Sample

Step	Key	Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.	Press: 		
3.	 + 	 	Allows you to make configuration changes.
4.	 UNTIL		
5.			
6.			
7.	 OR 		Cycle through the choices.
8.			Asterisk (*) indicates this choice is active.
9.	 + 		Locks the configuration parameters.
10.			
11.	Go to the host computer and send a file. The printer outputs a hex dump. Refer to the ASCII chart in Appendix B.		
12.	Once the hex dump is complete, change the Hex Dump Mode back to Disable. Follow the steps outlined above and select Disable.		

Fault Messages

If a fault condition occurs in the printer, the status lamps on the control panel flash on and off and the message display indicates the specific fault. Fault messages are summarized in Table 6–1.

Displayed faults fall into one of two categories:

- Operator correctable
- Field service required

For the operator–correctable faults, follow the suggested corrective action in the fault message description. After correcting the displayed fault, press the CLEAR key to clear the error message and status lamps, then press ONLINE to resume printing. If the fault message reappears, contact your Digital Customer Service Engineer.

NOTE: The *LG^{plus} Series Maintenance Manual* provides more detailed information and procedures for resolving fault conditions. However, many of the procedures described should be performed only by your Digital Customer Service Engineer.

Fault Messages Requiring Field Service Attention

For more serious faults that are not correctable by an operator, the fault message is followed by an asterisk (*). This indicates that a Digital Customer Service Engineer will probably be needed. You may try two steps to clear the fault before you call your Digital Customer Service Engineer:

1. Set the printer power switch to O (off), wait 15 seconds, then turn the printer on again. Run your print job again. If the message does not appear, it was a false indication and no further attention is required.
2. If the message reappears, press the CLEAR key, then the ONLINE key. If the message goes away, it was a false indication and no further attention is required. If the message reappears, call your Digital Customer Service Engineer.

Table 6–1. LCD Message Troubleshooting Table

Displayed Message	Operator Can Correct?	Explanation	Solution
8.5V PWR FAIL*	No	Internal power failure.	Contact your Digital Customer Service Engineer. ¹
15V CTL FAIL*	No	Controller voltage failure.	Contact your Digital Customer Service Engineer. ¹
23.5V CTL FAIL*	No	Controller voltage failure.	Contact your Digital Customer Service Engineer. ¹
48V PWR FAIL*	No	Internal power failure.	Contact your Digital Customer Service Engineer. ¹
ACCESS NULL PTR*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
A TO D OVERUN*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
BAD VFU CHANNEL	Yes	Error in channel assignment for a Vertical Format Unit (VFU), for one of the LinePrinter Plus emulations.	Refer to the <i>LinePrinter Plus Programming Reference Manual</i> chapter on “Vertical Formatting” for further information.
BUFFER OVERFLOW	Yes	Host sends data after the printer buffer is full. (Serial interface.)	Check your serial host interface parameter settings; if necessary, adjust them so that they match the settings of the attached host.
CLEAR PAPER JAM	Yes	No paper motion.	Clear jam and reload paper (see <i>Operator’s Guide</i>). If this message recurs, contact your Digital Customer Service Engineer. ¹
CLOSE PLATEN	Yes	The forms thickness lever is open.	Close the forms thickness lever (see page 2–20.)
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR then ONLINE. If the fault message still displays, then contact the Customer Service Engineer.</p> <p style="text-align: right;"><i>continued next page</i></p>			

Table 6–1. LCD Message Troubleshooting Table (continued)

Displayed Message	Operator Can Correct?	Explanation	Solution
COIL HOT *	No	One or more hammer coils are overheating.	Contact your Digital Customer Service Engineer. ¹
CTL VOLT FAIL*	No	Controller voltage failure.	Contact your Digital Customer Service Engineer. ¹
DRVR CIR BAD*	No	Hammer coil count test failed.	Contact your Digital Customer Service Engineer. ¹
ENERGY STAR	N/A	Status message: printer is in low–energy idle state, all fans and higher voltages are off, only +5Vdc logic circuits are active.	No action required.
EXHAUST FAN FLT	Yes	Sensors cannot detect current in fan circuit.	Power off the printer and remove the paper path. Check that the fan cable connector is connected. Check for obstruction of vents and fan airway, and remove any obstructions. Check for items beneath the printer blocking cabinet vents. Power back on the printer. If this message recurs, contact your Digital Customer Service Engineer. ¹
FRAMING ERROR	Yes	Serial framing error. (Serial interface.)	Check your serial host interface parameter settings; if necessary, adjust them so that they match the settings of the attached host.
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR then ONLINE. If the fault message still displays, then contact the Customer Service Engineer.</p> <p style="text-align: right;"><i>continued next page</i></p>			

Table 6–1. LCD Message Troubleshooting Table (continued)

Displayed Message	Operator Can Correct?	Explanation	Solution
HAM. COIL OPEN*	No	Electrical malfunction of one or more hammer coils.	Contact your Digital Customer Service Engineer. ¹
HB NOT INSTALLD*	No	Self–test does not detect hammer coils.	Contact your Digital Customer Service Engineer. ¹
HMR BANK FAN FLT	Yes	Sensors cannot detect current in fan circuit.	Power off printer and remove paper path. Check that fan cable is connected. Check for obstruction of vents and fan airway; remove any obstructions. Check for items beneath the printer blocking cabinet vents. Power back on the printer. If this message recurs, contact your Digital Customer Service Engineer. ¹
ILL EXT BUS ACC*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
ILLGL OPR ACCSS*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
ILL INST ACCSS*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
INTAKE FAN FAULT	Yes	Sensors cannot detect current in fan circuit.	See description for HMR BANK FAN FLT.
LO DRV. SHORT *	No	Circuit(s) on the hammer bank or in the hammer bank power cable shorted to ground.	Contact your Digital Customer Service Engineer. ¹
LOAD PAPER	Yes	Printer is out of paper.	Load paper.
PAP BAD TABLE*	No	Fatal firmware error on CMX controller board.	Contact Digital Customer Service Engineer. ¹
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR then ONLINE. If the fault message still displays, then contact the Customer Service Engineer.</p> <p style="text-align: right;"><i>continued next page</i></p>			

Table 6–1. LCD Message Troubleshooting Table (continued)

Displayed Message	Operator Can Correct?	Explanation	Solution
PAP BSY TOO LNG*	No	Fatal firmware error on CMX controller board.	Contact Digital Customer Service Engineer. ¹
PAP FIFO OVERFL*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP FIFO UNDRFL*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP ILLGL ST*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP INCMPL ENER*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP INVLD CMD*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP INVLD PARM*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP NOT SCHED*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP NT AT SPEED*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PAP UNEXP INT*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PARITY ERROR	Yes	Parity error (serial interface)	Check your serial host interface parameter settings; if necessary, adjust them so that they match the settings of the attached host.
PLAT INV CMD*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PLAT INV PARM*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR then ONLINE. If the fault message still displays, then contact the Customer Service Engineer.</p> <p style="text-align: right;"><i>continued next page</i></p>			

Table 6–1. LCD Message Troubleshooting Table (continued)

Displayed Message	Operator Can Correct?	Explanation	Solution
PLAT INV STATE*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
POWER SUPPLY HOT	No	Circuits are overheating on the power supply board.	Contact your Digital Customer Service Engineer. ¹
PRINTER HOT	No	Controller board sensors report high temperatures on the board.	Contact your Digital Customer Service Engineer. ¹
PROTECTED INSTR*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
PWR SUPP VOLT *	No	Power supply failed.	Replace power supply board.
RIB INVLD CMD*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
RIB INVLD STATE*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
RIBBON DRIVE	No	CMX controller does not detect ribbon drive motor.	Contact your Digital Customer Service Engineer. ¹
SECURITY VIOLATION	No	Security code of PAL on controller board does not match code of firmware on the CMX controller board.	Contact your Digital Customer Service Engineer. ¹
SHUTL INV CMD*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
SHUTL INV PARM*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR then ONLINE. If the fault message still displays, then contact the Customer Service Engineer.</p> <p style="text-align: right;"><i>continued next page</i></p>			

Table 6–1. LCD Message Troubleshooting Table (continued)

Displayed Message	Operator Can Correct?	Explanation	Solution
SHUTTLE JAM	Yes	No shuttle movement or shuttle moving at wrong speed.	Check for obstruction to shuttle, a twisted ribbon, or forms thickness lever closed too tightly. If fault source is not apparent, contact your Digital Customer Service Engineer.
SOFTWARE ERROR * Cycle power	No	Application software tried to perform illegal printer function, or damaged logic circuits found on controller board.	Contact your Digital Customer Service Engineer. ¹
STACK OVERFLOW*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
STACK UNDERFLOW*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
TCB CORRUPTED*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
UNDEF INTERRUPT*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
UNDFNED OPCODE*	No	Fatal firmware error on CMX controller board.	Contact your Digital Customer Service Engineer. ¹
UP DRV. SHORT *	No	Hammer driver circuits on the CMX boards shorted to ground.	Contact your Digital Customer Service Engineer. ¹
<p>¹ Before contacting a Digital Customer Service Engineer, power off the printer, wait 15 seconds, then power it back on and rerun your print job. If the message reappears, press CLEAR. If the fault message still displays, then contact the Customer Service Engineer.</p>			

A Printer Specifications

Contents

Duty Cycle	A-2
Ribbon Specifications	A-2
Paper Specifications	A-3
Paper	A-3
Labels	A-3
Printer Dimensions	A-4
Environmental Characteristics	A-4
Temperature	A-4
Relative Humidity	A-4
Acoustic Noise Level	A-4
Energy Star (Power Saver)	A-4
Electrical Characteristics	A-5
Input Power	A-5
Power Rating	A-5
Radio Frequency Interference (RFI)	A-5
Interfaces	A-6
Printing Rates	A-7

Duty Cycle

The LG^{plus} Series printer will print 75,000 pages per month under the following conditions:

- Uppercase only
- 6 lines/inch
- 10 characters/inch
- 63% character density or 83 characters per line
- 63% line density or 42 lines/11-inch page
- Single part (18 lb) paper
- Printer is installed in accordance with this *Setup Guide*
- Printer is maintained in accordance with the *LG^{plus} Series Maintenance Manual*.

Ribbon Specifications

NOTE: Use only the Digital Equipment Corporation ribbons listed below:

Part Number	Description
LGxxR-SR	Carton of 1 OCR Application ribbon Length: 60 yards (54.84 m) Width: 1 inch (2.54 cm) Thickness: .0039 inches (.009906 cm)
LGxxR-LR	Carton of 1 OCR Application ribbon Length: 100 yards (91.4 m) Width: 1 inch (2.54 cm) Thickness: .0039 inches (.009906 cm)

Paper Specifications

Paper

Type:	Edge-perforated, fan-fold, 3 to 17 inches edge to edge (7.62 to 43.18 cm), 1 to 12 inches long (2.54 to 30.48 cm)
Thickness:	Single-part: 15 to 100 lb. (6.80 to 45.36 kg.) stock; forms with all approved interleaf edge attachments except those using metallic or other hard devices. Multi-part: Max. 12 lb [5.44 kg] ply of upper plies; 1- to 6-part continuous carbon forms; 1- to 4-part continuous carbonless forms
Sheet Thickness:	0.025 inch (0.0635 cm) maximum
Drive:	Adjustable tractors (6-pin engagement)
Slew Rate:	16 in/sec (40.64 cm/sec) maximum (Slew: rapid vertical paper movement)

Labels

On Backing:	One-part continuous perforated fanfold back form. Labels must be placed at least 1/6 inch (0.42 cm) from the fan-fold perforation. Backing adhesive must not be squeezed out during printing.
Sheet Size:	3 to 17 inches (7.62 to 43.18 cm) wide, including the two standard perforated tractor feed strips. A maximum sheet length of 12 inches (30.48 cm) between top and bottom perforations.
Thickness:	Not to exceed 0.025 inch (0.064 cm) (including backing sheet)

Printer Dimensions

Height:	42.5 inches (108 cm)
Width:	27 inches (68.6 cm)
Depth:	29 inches (73.7 cm)
Weight:	225 pounds unpacked (102.1 kg) 285 lbs. packaged (129.3 kg)

Environmental Characteristics

Temperature

Operating	41° to 104° F (5° to 40° C) up to 5000 feet (1524 meters) 41° to 90° F (5° to 32° C) up to 8000 feet (2438 meters)
Storage	-40° to 158° F (-40° to 70° C)

Relative Humidity

Operating	10% to 90% (noncondensing)
Storage	5% to 95% (noncondensing)

Acoustic Noise Level

52 dBA (tested per ISO 7779)

Energy Star

The LG^{plus} Series printers comply with the requirements of the Energy Star Computers Program of the U.S. Environmental Protection Agency.

Electrical Characteristics

Input Power

Voltage (RMS)	100–120 VAC, or 200–240 VAC (for the 100–120 VAC outlet – Actual voltage may fluctuate between 88 to 135 VAC; for the 200–240 VAC outlet – Actual voltage may fluctuate between 178 and 270 VAC)
Phase	Single
Frequency	47 – 63 Hz
Max RMS Current	6A @ 100–120 V; 3A @ 200–240 V

Power Rating

Standby	121 Watts
Operating	400 Watts

Radio Frequency Interference (RFI)

Radio Frequency Interference tested/certified to RFI standards FCC Part 15, Subpart B, Class A; VDE 0871 Class B; CSA C108.8–M1983 Class A, EN 55022 Class B.

Interfaces

Type:	Three resident parallel host interfaces, Centronics, Dataproducts, and IEEE-1284; One resident serial host interface (RS-232/RS-422); One resident serial diagnostic port.
Logic Levels:	TTL/EIA-232-D/EIA-422A
Data Format:	ASCII or EBCDIC
Compatibility:	Centronics parallel, Dataproducts parallel, IEEE 1284 parallel, and RS-232/RS-422.
Maximum	Centronics: 200,000 characters (200 KB) per second.
Transfer Rates:	Up to 200 Kilobytes on parallel interfaces; Up to 115K baud on serial interface (RS-232/RS-422).

Printing Rates

The printer throughput, in lines per minute, is a function of the selected print mode (font and vertical dot density). Typical printing rates are charted in Table A-1. These printing rates assume that the print mechanism is the limiting factor for throughput, not the host data source.

The printing speed is independent of the number of characters printed per line and the number of characters configured in the character set repertoire. Print lines that contain shadow printing, bold, superscript, subscript or double high attributes will print at no less than half the rate shown. The exact print rate of lines containing these attributes is dependent upon the specific case; software maximizes the throughput by dynamically determining which dot rows contain adjacent dots and must be printed in two strokes.

Reverse paper feed capability allows the printing of multiple densities on a single line. This feature enhances paper handling as well by enabling the platen to open slightly over the perforation in thick forms, then return to the correct platen thickness. Printing multiple densities on a line is useful in printing forms and text together or mixing different fonts on a print line.

NOTE: Throughput is reduced when printing with the Platen Open feature.

Table A-1. Nominal Printing Rates

PRINT QUALITY DOT DENSITY (DPI) NOTE 1	CHARACTERS PER INCH	DOT MATRIX NOTE 2	PERFORMANCE		
			UPPERCASE ONLY LPM	DESCENDERS & UNDERLINE LPM	PLOT MODE IPM
CORRESPONDENCE 90 (180) X 96	10 12 15	7 (13) X 9 + 3 6 (11) X 9 + 3 (9) x 9 + 3	187	144	19
DATA PROCESSING 60 (120) X 72	10 12 13.3 15 17.1	5 (9) X 7 + 2 4 (7) X 7 + 2 4 (7) X 7 + 2 3 (5) X 7 + 2 3 (5) X 7 + 2	350	280	39
HIGH SPEED 60 (120) X 48	10 12 13.3	5 (9) X 5 + 1 4 (7) X 5 + 1 (7) x 5 + 1	475	400	58

NOTE 1 A (B) X C, where:

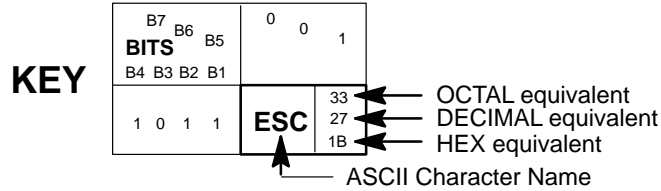
A is maximum horizontal dot density
B is horizontal dot placement density
C is vertical dot density

NOTE 2 D (E) X F + G, where:

D is maximum number of dots that may be placed on
E horizontal dot positions
F is number of vertical dots for uppercase symbols
G is number of dots available for descenders

B

ASCII Character Set



BITS		COLUMN		0		1		2		3		4		5		6		7	
B7	B6	B5	B4	B3	B2	B1	ROW	0	1	2	3	4	5	6	7	8	9	A	F
0	0	0	0	0	0	0	0	NUL	DLE	SP	0	@	P	\	p				
0	0	0	0	0	1	1	1	SOH	DC1 (XON)	!	1	A	Q	a	q				
0	0	0	1	0	0	0	2	STX	DC2	"	2	B	R	b	r				
0	0	0	1	1	0	0	3	ETX	DC3 (XOFF)	#	3	C	S	c	s				
0	1	0	0	0	0	0	4	EOT	DC4	\$	4	D	T	d	t				
0	1	0	0	1	0	0	5	ENQ	NAK	%	5	E	U	e	u				
0	1	0	1	0	0	0	6	ACK	SYN	&	6	F	V	f	v				
0	1	0	1	1	0	0	7	BEL	ETB	'	7	G	W	g	w				
1	0	0	0	0	0	0	8	BS	CAN	(	8	H	X	h	x				
1	0	0	0	1	0	0	9	HT	EM	)	9	I	Y	i	y				
1	0	0	1	0	0	0	10	LF	SUB	*	:	J	Z	j	z				
1	0	0	1	1	0	0	11	VT	ESC	+	;	K	[	k	{				
1	1	0	0	0	0	0	12	FF	FS	,	<	L	\	l	|				
1	1	0	0	1	0	0	13	CR	GS	-	=	M	]	m	}				
1	1	0	1	0	0	0	14	SO	RS	.	>	N	^	n	~				
1	1	1	1	1	0	0	15	SI	US	/	?	O	_	o	DEL				

Glossary

A

- active column** The horizontal location on the paper where the next character will print.
- active line** The vertical location on the paper where the next character will print.
- active position** The position on the paper where the next character will print. The intersection of the active column and the active line.
- ASCII** *Abbrev. for American Standard Code for Information Interchange.* A standard character encoding scheme introduced in 1963 and used widely on many computers and printers. It is a 7-bit code with 128 different bit patterns. There is no parity recommendation.
- attributes, print** Operations performed on text that alter its appearance but do not change the font. Examples: underlining, superscripting, bold, etc.

B

- bar code** A printed code consisting of parallel bars of varied width and spacing and designed to be read by a one-dimensional scanning device.
- baud** A unit of speed that measures the rate at which information is transferred. Baud rate is the reciprocal of the length in seconds of the shortest pulse used to carry data. For example, a system in which the shortest pulse is 1/1200 second operates at 1200 baud. On RS-232 serial lines, the baud rate equals the data flow rate in bits per second (bps). To communicate properly, a printer must be configured to operate at the same baud rate as its host computer.
- bold** A print attribute specifying text of a heavy line thickness.
See also character weight.

buffer A reserved area in memory where data is written and read during data transfers.

bus A circuit for the transfer of data or electrical signals between two devices.

C

character cell The invisible rectangular space occupied by a character, including the white space around the character. The height of a cell remains constant even with changes in the current line spacing, and the width is equal to the current character spacing. Used as a unit of spacing.

character proportion The ratio of character height to character width.
See also **compressed** and **expanded**.

character set A set of codes, each of which represents a printable character, including symbols, punctuation, numbers, diacritical markings, and alphabet characters. Each character is assigned a unique code value.

character weight The degree of lightness and thickness of printed text. For example: **“Bold”** refers to a heavy or thick character weight. “Medium,” “normal,” or “book weight” refer to the character weight used in this sentence.

checksum A stored or transmitted numerical value used to verify data integrity.

command sequence Two or more bytes that instruct the printer to perform a special function. The first character in the sequence is a special function control character (SFCC), which alerts the printer that the string is a command sequence.
See also **escape sequence**, **SSCC**, and **SFCC**.

compatibility The ability of one printer to accept and properly process commands meant for a different printer.
See also **emulation** and **protocol**.

compressed	Refers to a typeface with a font width approximately 60% smaller than normal. Character height is not changed.
configuration	Refers to the operating properties that define how the printer responds to signals and commands received from the host computer at the printer interface. These properties are called configuration parameters and must be set to match the operating characteristics of the host computer system.
controller	An independent logic unit in a data processing system that controls data paths between the central processing unit and one or more units of peripheral equipment.
cpi	<i>Abbrev. for</i> characters per inch. A measurement of monospaced fonts indicating the horizontal character density. For example, 10 cpi means 10 characters can be printed in one horizontal inch. <i>See also</i> pitch .
cps	<i>Abbrev. for</i> characters per second. A measurement of the print speed of a serial (character) printer.
D	
decipoint	One tenth of a point. A unit of length equal to 1/720 inch. <i>See also</i> point .
default	A value, parameter, attribute, or option assigned by a program or system if another is not specified by the user.
descender	The portion of a printed, lowercase character that appears below the base line. For example, “g,” “j,” “p,” “q,” and “y” all are characters with lowercase descenders.
diagnostic	Pertains to the detection and isolation of printer malfunctions or mistakes.
disable	To deactivate, make “false” (0), or set to OFF.
DP	<i>Abbrev. for</i> data processing font (see HS).

E

EIA/TIA	Electronics Industries Association.
Elite	A name indicating a monospaced font with a pitch of 12 cpi (and usually 10 points in height).
em	A unit of measure in typesetting: the width of a piece of type about as wide as it is tall. (Derived from uppercase M, usually the widest character in a set.)
emulation	Refers to the ability of a printer to execute the commands of another printer language (protocol). <i>See also compatibility and protocol.</i>
en	A unit of measure in typesetting equal to half the width of an em.
enable	To activate, make “true” (1), or set to ON.
escape sequence	A command sequence in which the first byte is always the ASCII ESC character. <i>See also command sequence, SSCC, and SFCC.</i>
expanded	Refers to a typeface with a font width larger than normal. Character height is not changed.

F

family (or type)	A set of all variations and sizes of a type style.
fixed-pitch fonts	<i>See font, monospaced.</i>
font	The complete set of a given size of type, including characters, symbols, figures, punctuation marks, ligatures, signs, and accents. To fully describe a font, you must specify seven characteristics: <ol style="list-style-type: none">1) typeface (Courier, Helvetica, Swiss, etc.)2) spacing (proportional or monospaced)3) type size (12 point, 14 point, etc.)4) scale factor (character height/width ratio)

- 5) type style (Roman or italic)
- 6) character weight (bold, normal, etc.)
- 7) character proportion (normal, compressed, expanded).

font, monospaced	Also called fixed-pitch font and mono-font. Every character, regardless of horizontal size, occupies the same amount of font pattern space. All monospaced fonts use specific pitch size settings. Monospaced fonts are sometimes used when strict character alignment is desired (tables, charts, spreadsheets, etc.).
font name	<i>See typeface.</i>
font pattern	A font pattern is the matrix of pixels which represents a character, symbol, or image.
font, proportional	A font in which the width of a character cell varies with the width of the character. For example, [i] takes less space to print than [m]. Using proportional fonts generally increases the readability of printed documents, giving text a typeset appearance.
font weight	The thickness of the lines making up a character. For example, “ bold ” and “light” are different font weights.
font width	The measurement of the width of a character cell in dots.
H	
hex codes	Codes based on a numeral system with a radix of 16.
host computer	The computer that stores, processes, and sends data to be printed, and which communicates directly with the printer. The term “host” indicates the controlling computer, since modern printers are themselves microprocessor-controlled computer systems.
HS	<i>Abbrev. for high speed font.</i>
Hz	<i>Abbrev. for Hertz. Cycles per second, a measure of frequency.</i>

I

IEEE	Institute of Electrical and Electronic Engineers, Inc.
IGP	Intelligent Graphics Processor. An interface that converts graphics commands received from the host computer to binary plot data that is usable by the printer.
initialization	A series of processes and self-tests to set power-up default conditions and parameters.
interface	The hardware components used to link two devices by common physical interconnection, signal, and functional characteristics.
invoke	To put into effect or operation.
ipm	<i>Abbrev. for</i> inches per minute. A measurement of the speed of a printer printing in graphics print mode (plotting speed).
italic	A slanted type style. <i>This is an italic type style.</i>

L

landscape	Printed perpendicular to the paper motion.
LCD	<i>Abbrev. for</i> liquid-crystal display. The LCD is located on the control panel. Its purpose is to communicate information to the operator concerning the operating state of the printer.
LED	<i>Abbrev. for</i> light-emitting diode. The printer control panel has LEDs that indicate the status of the printer to the operator.
logical link	The parameters that specify data transfer, control, or communication operations.

lpi *Abbrev. for* lines per inch. A measurement indicating the vertical spacing between successive lines of text. For example, 8 lpi means eight lines of text for every vertical inch.

lpm *Abbrev. for* lines per minute. A measurement of the print speed of a line printer printing in text print mode.

M

monospaced *See font, monospaced.*

N

NLQ *Abbrev. for* near letter quality font.

O

OCR *Abbrev. for* optical character recognition. A process by which a machine can “read” characters printed in a special standardized font. Data are read by a photoelectric optical scanner and can be recorded on magnetic tape or disk. OCR-A and OCR-B are two widely used OCR fonts.

P

parity (check) Parity checking is the addition of non-data bits to data, resulting in the number of bits that are set to a “1” being either always even or always odd. Parity is used to detect data errors.

PCBA *Abbrev. for* printed circuit board assembly.

pica A name indicating a monospaced font with a pitch of 10 cpi (and usually 12 points in height). Pica is also used in typography as a unit of measurement equal to 1/6 inch .

pitch	The number of text characters printed per horizontal inch. Specified in characters per inch (cpi). <i>See also cpi.</i>
pixel	<i>Derived from picture (PIX) ELe ment.</i> The smallest displayable picture element on a video monitor or printable unit. In printing, a pixel is a dot.
point	A unit of length in printing and typography, used to specify type sizes, heights of font characters, etc. There are 72 points in a vertical inch; thus, one point equals 1/72 inch, or approximately 0.0139 inch. Some examples of point sizes are: This is 8 point type. This manual is printed in 11 point type. This is 14 point type.
port	A channel used for receiving data from or transmitting data to one or more external devices.
portrait	Printed parallel to the short edge of a page.
print mode	Font.
proportion, character	<i>See character proportion.</i>
proportional	<i>See font, proportional.</i>
protocol	A set of rules or conventions governing the exchange of information between computer systems, or between a printer and a host computer. For computer printers, a protocol is the coding convention used to convey and print data. A printer protocol includes codes for printing text and graphics, as well as codes instructing the printer to perform special operations, and machine-to-machine communication codes. <i>See also compatibility and emulation.</i>

R

- RAM** *Acronym for random-access memory. Also called “main memory” or “working memory.” RAM is the active memory of a printer, into which programs are loaded. This memory can be read from or written to at any time. RAM is also termed “volatile” because whatever information is in RAM is lost when power is turned off or interrupted.*
See also ROM.
- read** To retrieve data from memory (RAM) or from mass storage (hard disk, floppy diskette, etc.).
- reset** To turn off, deactivate, disable, or return to a previously determined state.
- resolution** A measure expressing the number of component units in a given range used to create an image. In printing, this is expressed as the number of dots per inch (dpi) horizontally and vertically.
- ROM** *Acronym for read-only memory. Programs, instructions, and routines permanently stored in the printer. Information in ROM is not lost when power is turned off. ROM cannot be written to—hence the term “read-only.”*
See also RAM.
- roman** A type style in which the characters are upright. This sentence is printed in a roman type style.

S

- serial communications** The sequential transmission of data, in which each element is transferred in succession.
- set** To turn on, activate, invoke, or enable.
- SFCC** *Abbrev. for special function control character. The first character in a printer command sequence. In P-Series emulation mode, you can select one of five characters as the SFCC. In Epson FX and Proprinter emulation mode, the SFCC must always be the ASCII*

ESC character.
See also **command sequence** and **escape sequence**.

size, type

See **point**.

slewing

Rapid vertical paper movement.

spacing

See **font, proportional** and **font, monospaced**.

start bits

In serial data transfer, a signal indicating the beginning of a character or data element.

stop bits

In serial data transfer, a signal indicating the end of a character or data element.

string

Two or more bytes of data or code treated as a unit.

style, type

See **type style**.

symbol set

See **character set**.

T

type family

See **typeface**.

type size

See **point**.

type style

Refers to either the upright or italic character style in a specific font family. Roman is upright, *italic is slanted*.

typeface

A descriptive name or brand name that identifies a particular design of type. Examples are: Courier, Helvetica, and Swiss. Also called type family.

typographic font

See **font, proportional**.

V

VFU *Abbrev. for vertical format unit.*

W

weight *See character weight.*

write To store data to memory (RAM) or to mass storage (hard disk, floppy diskette, etc.).

Index

Numbers

1284 Parallel interface, 5–9

15V PWR FAIL *, 6–12

20 CPI condensed parameter

 Epson emulation, 4–25

 Proprinter XL emulation, 4–22

23.5V PWR FAIL *, 6–12

48V PWR FAIL *, 6–12

8.5V PWR FAIL *, 6–12

A

A TO D OVERUN *, 6–12

ACCESS NULL PTR *, 6–12

Acknowledge signal, Centronics parallel interface, 5–7

Adapter H8585–AE, 5–16

All black test, 6–6

All E's test, 6–6

All H's test, 6–6

Architecture, LGplus Series Overview, 1–4

ASCII Character Set chart, B–1

ASCII code, 4–29

Auto LF parameter

 Epson emulation, 4–24

 Proprinter XL emulation, 4–21

Auto Line Feed, 4–23

Autowrap parameter, LG emulation, 4–15

B

Baud Rate parameter, 4–40

Bidirectional parallel interface menu, Buffer Size in Kbytes, 4–47

Bidirectional printing, 4–48

BUFFER OVERFLOW, 6–12

Buffer Size in Kbytes

 Bidirectional parallel interface menu, 4–47

 Centronics parallel interface menu, 4–44

 Dataproducts parallel interface menu, 4–47

 serial interface menu, 4–41

Burnin test, 6–6

Busy on Strobe parameter, Centronics (parallel) submenu, 4–43

Busy signal, Centronics parallel interface, 5–7

Byte mode, 5–10

C

Cable connections, 2–11

Cable verify signal, Dataproducts parallel interface, 5–4

Carriage Return, configuration menu, 4–23

Caution notice description, 1–2

Centronics parallel interface, 5–6

 configuration, 5–8

 configuring, 4–42

 pin assignments, 5–6

Centronics parallel interface menu, Buffer Size in Kbytes, 4–44

Centronics parallel interface signals, 5–7

 acknowledge, 5–7

 busy, 5–7

 data lines 1 through 8, 5–7

- data strobe, 5–7
- online, 5–7
- paper empty, 5–7
- paper instruction (PI), 5–7
- Centronics parallel menu, 4–42
- Chains, paper, 2–10
- Changing parameters, 3–12
- Character Set, U.S. ASCII, B–1
- Character sets, Epson emulation, 4–25
- Cleaning requirements, 6–2
- CLEAR PAPER JAM, 6–12
- Clear to send (CTS) signal, RS–232 serial interface, 5–16
- CLOSE PLATEN, 6–12
- Code chart, U.S. ASCII, B–1
- COIL HOT, 6–13
- Communication, bidirectional (1284), 5–9
- Communication, Dataproducts parallel, 5–3
- Compatibility mode, 5–9
- Configuration
 - Centronics parallel interface, 5–8
 - changing parameters, 3–12
 - Dataproducts parallel interface, 5–5
 - factory default values, 3–10
 - loading configuration values, 3–19
 - menu, top level, 3–4, 3–5, 4–6, 4–19
 - power–up selection, 3–21
 - printout, 3–17
 - RS–232 serial interface, 5–18
 - RS–422 serial interface, 5–18
 - saving, 3–15
 - saving parameters, 3–6
 - terminating resistors, 5–13
- Configuration menus
 - Centronics parallel, 4–42
 - Dataproducts, 4–45

- serial interface, 4–38
- Configurations, types of, 3–7
- Configuring printer, 3–2
- Connections, cable, 2–11
- Connectors for host interface cables, 2–12
- Control codes, overview description, 1–8
- Control codes and control panel changes, 3–6
- Control panel keys, 3–8
- CR = CR, 4–23
- CR = CR + LF, 4–23
- CTL VOLT FAIL *, 6–13

D

- Data Bit 8 parameter
 - Centronics submenu, 4–43
 - Dataproducts, 4–46
- Data Bits parameter, 4–40
- Data carrier detect (DCD) signal, RS–232 serial interface, 5–16
- Data lines 1 through 8 signal
 - Centronics parallel interface, 5–7
 - Dataproducts parallel interface, 5–4
- Data Polarity parameter, Centronics (parallel) submenu, 4–43
- Data polarity parameter, Dataproducts, 4–46
- Data protocol, 4–39
- Data Request polarity parameter, 4–46
- Data set ready (DSR) signal, RS–232 serial interface, 5–16
- Data strobe signal
 - Centronics parallel interface, 5–7
 - Dataproducts parallel interface, 5–4
- Data terminal ready (DTR) signal, RS–232 serial interface, 5–16
- Data Terminal Ready parameter, 4–40

- Dataproducts interface, configuring, 4-45
- Dataproducts menu, 4-45
 - Data Bit 8, 4-46
 - data polarity, 4-46
 - Data Request polarity, 4-46
 - PI ignored, 4-46
 - Strobe Polarity, 4-46
- Dataproducts parallel interface, 5-3
 - configuration, 5-5
 - pin assignments, 5-3
- Dataproducts parallel interface menu, Buffer Size in Kbytes, 4-47
- Dataproducts parallel interface signals, 5-4
 - cable verify, 5-4
 - data lines 1 through 8, 5-4
 - data strobe, 5-4
 - demand, 5-4
 - online, 5-4
 - paper instruction (PI), 5-4
 - ready, 5-4
- DC1/DC3, Printer Select, 4-23
- Default configuration parameters, 3-10
- Define CR Code, 4-23
- Define CR code parameter
 - Epson emulation, 4-16, 4-24
 - Proprinter XL emulation, 4-20
- Define LF code parameter
 - Epson emulation, 4-16, 4-24
 - Proprinter XL emulation, 4-21
- Define Line Feed code, 4-23
- Delete Configuration parameter, 4-9
- Demand signal, Dataproducts parallel interface, 5-4
- Diagnostic capabilities, 1-7
- Diagnostic tests, 6-6
- Diagnostics main menu option, 4-51

- Dimensions, printer, A-4
- Direction, printing, 4-48
- Display Language parameter, 4-35
- Distance required from host, printer installation, 2-3
- Documentation list for the LGplus Series, 1-3
- Dot matrix character formation, 1-9
- DRVR CIR BAD *, 6-13
- Duty cycle, A-2

E

- E's plus TOF test, 6-6
- Electrical characteristics, A-5
- Emulation, menu, 4-8, 4-11, 4-12
- Emulations, overview definition, 1-8
- ENERGY STAR, 6-13
- ENTER switch
 - locking, 3-9
 - Unlocking, 3-9
- Environmental characteristics, A-4
- Epson emulation menu
 - 20 CPI condensed, 4-25
 - auto LF, 4-24
 - character sets, 4-25
 - define CR code, 4-16, 4-24
 - define LF code, 4-16, 4-24
 - printer select, 4-24
- Error handling
 - RS-232 serial interface, 5-17
 - RS-422 serial interface, 5-17
- Error messages. *See* Fault messages
- EXHAUST FAN FLT, 6-13

F

Factory default parameters, 3–10

Fault messages, 6–11

- 15V PWR FAIL *, 6–12
- 23.5V PWR FAIL *, 6–12
- 48V PWR FAIL *, 6–12
- 8.5V PWR FAIL *, 6–12
- A TO D OVERUN *, 6–12
- ACCESS NULL PTR *, 6–12
- BUFFER OVERFLOW, 6–12
- CLEAR PAPER JAM, 6–12
- CLOSE PLATEN, 6–12
- COIL HOT, 6–13
- CTL VOLT FAIL *, 6–13
- DRVR CIR BAD *, 6–13
- ENERGY STAR, 6–13
- EXHAUST FAN FLT, 6–13
- FRAMING ERROR, 6–13
- HAM. COIL OPEN *, 6–14
- HB NOT INSTALLED *, 6–14
- ILL EXT BUS ACC *, 6–14
- ILL INST ACCSS *, 6–14
- ILLGL OPR ACCSS *, 6–14
- LO DRV. SHORT *, 6–14, 6–16
- LOAD PAPER, 6–14
- PAP BAD TABLE *, 6–14
- PAP BSY TOO LNG *, 6–15
- PAP FIFO OVERFL *, 6–15
- PAP FIFO UNDRFL *, 6–15
- PAP ILLGL ST *, 6–15
- PAP INCMPL ENER *, 6–15
- PAP INVLD CMD *, 6–15
- PAP INVLD PARM *, 6–15
- PAP NOT SCHED *, 6–15
- PAP NT AT SPEED *, 6–15
- PAP UNEXP INT *, 6–15
- PARITY ERROR, 6–15
- PLAT INV CMD *, 6–15

- PLAT INV PARM *, 6–15
- PLAT INV STATE *, 6–16
- PROTECTED INSTR *, 6–16
- RIB INVLD CMD *, 6–16
- RIB INVLD STAT *, 6–16
- RIBBON DRIVE, 6–16
- SECURITY VIOLATION, 6–16
- SHUTL INV CMD *, 6–16
- SHUTL INV PARM *, 6–16
- SHUTTLE JAM, 6–17
- SOFTWARE ERROR *, 6–17
- STACK OVERFLOW *, 6–17
- STACK UNDERFLOW *, 6–17
- TCB CORRUPTED *, 6–17
- UNDEF INTERRUPT *, 6–17
- UNDFNED OPCODE *, 6–17
- UP DRV. SHORT *, 6–17

Features list

- diagnostic tools, 1–7
- host interfaces supported, 1–6
- LGplus Series printer, 1–6
- printer emulations supported, 1–6
- text and graphics formatting, 1–6

FF valid at TOF parameter, 4–22

Format conventions

- control panel keys, 1–2
- Key combinations, 1–3
- LCD messages, 1–2

Forms, slewing, speed, 4–50

FRAMING ERROR, 6–13

Framing error handling, 5–17

G

Graphics enhancement options, 1–8

H

- H8585–AE Adapter, 5–16
- HAM. COIL OPEN *, 6–14
- Handshaking, IEEE 1284 interface, 5–10
- Hardware installation, unpacking instructions
 - cardboard packing removal, 2–7
 - control panel film removal, 2–6
 - hammer bank foam removal, 2–9
 - paper chains release, 2–10
 - platen protective foam removal, 2–8
- HB NOT INSTALLED *, 6–14
- Hex code printout, 6–9
- Hex Dump Mode parameter, 4–34
- Host Interface, Menu options, 4–36
- Host interface cable connectors, 2–12
- Host interface menu, 4–36, 4–47
- Host Interface menu options
 - Centronics, Data Bit 8, 4–43
 - Centronics parallel
 - Busy on Strobe, 4–43
 - Data Polarity, 4–43
 - Latch Data On, 4–44
 - Prime Signal, 4–44
 - Response Polarity, 4–43
 - Strobe Polarity, 4–43
 - TOF Action, 4–44
- Humidity requirements, 2–3

I

- IEEE 1284 interface, 5–9
 - configuration, 5–12
 - operating modes, 5–9
 - pinout signals, 5–11, 5–12
 - signals, 5–10
- IGP/PGL upgrade option, 1–8

- IGP/VGL upgrade option, 1–8
- ILL EXT BUS ACC *, 6–14
- ILL INST ACCSS *, 6–14
- ILLGL OPR ACCSS *, 6–14
- Important notice description, 1–2
- Installation
 - cable connections, 2–11
 - power requirements, 2–2
 - ribbon, 2–14
 - shipping restraints removal, 2–5
 - site requirements, 2–3
 - testing printer, 2–25

Interface, Centronics parallel, 5–6

Interface specifications, A–6

Interfaces

- Centronics parallel, 4–42
 - Dataproducts, 4–45
 - Dataproducts parallel, 5–3
 - Definition, 5–2
 - IEEE 1284, 5–9
 - VMS configuration, 5–19
- Interfaces, host, menu, 4–36

K

- Keys on control panel, 3–8

L

- Latch Data On parameter, Centronics (parallel) submenu, 4–44
- LCD language, selecting, 4–35
- LF = CR + LF, 4–23
- LF = LF, 4–23
- LG Emulation
 - plot mode opt, 4–17
 - print mode opt, 4–17
- LG emulation
 - Digital Multinational Character Sets, 4–14

- LG Autowrap option, 4–15
- LG Font submenu, 4–14
- LG Horiz. Forms option, 4–15
- LG Unsol. Reports, 4–16
- LG Vert. Forms option, 4–15
- U.S. ASCII Character Set, 4–14

LG Font Submenu

- Digital Multinational Character Sets, 4–14
- LG emulation, 4–14
- U. S. ASCII Character Set, 4–14

LG Unsol. Reports, LG Emulation, 4–16

LG Vert. Forms option, LG emulation, 4–15

LG. Horiz. Forms option, LG emulation,
4–15

LGplus Series Documentation Summary, 1–3

LGplus Series Overview Description, 1–4

Line Feed, configuration menu, 4–23

Line feed, 4–23

Line matrix printing overview, 1–9

LinePrinter+ menu overview, 4–19

LO DRV. SHORT *, 6–14, 6–16

Load Configuration parameter, 4–9

LOAD PAPER, 6–14

Loading configuration values, 3–19

Loading emulations, 4–11, 4–12

Loading paper, 2–16

Locking the ENTER switch, 3–9

M

Maintenance, 6–2

Maintenance / Miscellaneous menu, 4–34

Menu Options, Host Interface, 4–36

Menu, configuration, 3–4, 3–5, 4–6, 4–19

Index–6

N

Negotiation phase, 5–10

Network Interface, 5–16

Nibble mode, 5–9

O

Online signal

- Centronics parallel interface, 5–7

- Dataproducts parallel interface, 5–4

Operating modes

- fault mode, 3–7

- offline mode, 3–7

- online mode, 3–7

Operating state upon power–up, configuring,
4–35

Optional emulations, loading, 4–11, 4–12

Otions, Centronics, 4–42

Output control features

- automatic underlining and overscoring, 1–7

- bold printing, 1–7

- double high and wide printing, 1–7

- resident multinational character sets, 1–7

- selectable dot densities, 1–7

- selectable forms length and width, 1–7

- selectable pitch, 1–7

- super and subscript printing, 1–7

Overrun error handling, 5–17

Overwriting an existing configuration, 4–10

P

PAP BAD TABLE *, 6–14

PAP BSY TOO LNG *, 6–15

PAP FIFO OVERFL *, 6–15

PAP FIFO UNDRFL *, 6–15

PAP ILLGL ST *, 6–15

PAP INCMPL ENER *, 6–15

- PAP INVLD CMD *, 6–15
- PAP INVLD PARM *, 6–15
- PAP NOT SCHED *, 6–15
- PAP NT AT SPEED *, 6–15
- PAP UNEXP INT *, 6–15
- Paper
 - jams, 6–12
 - specifications, A–3
- Paper chains, releasing, 2–10
- Paper empty (PE) signal, Centronics parallel interface, 5–7
- Paper instruction (PI) signal
 - Centronics parallel interface, 5–7
 - Dataproducts parallel interface, 5–4
- Paper motion detection. *See* PMD Fault parameter
- Paper out condition, specifying last line of text, 4–54
- Paper Out Dots parameter, 4–54
- Paper, loading, 2–16
- Parallel interface, 4–41
 - Centronics parallel, 5–6
- Parallel interface menu
 - Centronics, 4–42
 - Dataproducts, 4–45
- Parameters
 - changing, 3–12
 - printing the configuration, 3–17
- Parameters, saving, 3–6
- PARITY ERROR, 6–15
- Parity error handling, 5–17
- Parity parameter, 4–40
- Phase value parameter, 4–53, 6–6
- PI ignored parameter, 4–46
- Pin assignments
 - Centronics parallel interface, 5–6
 - Dataproducts parallel interface, 5–3
 - RS–232 serial interface, 5–15
 - RS–422 serial interface, 5–15
- Pinout signals, IEEE 1284 interface, 5–11, 5–12
- PLAT INV CMD *, 6–15
- PLAT INV PARM *, 6–15
- PLAT INV STATE *, 6–16
- Plot, rates, A–7
- Plot Mode Opt, LG emulation, 4–17
- PMD Fault parameter, 4–49
- Power rating, A–5
- Power requirements, 2–2
- Power Saver Time, 4–50
- Power–up configuration, 3–21
- Power–up Configuration parameter, 4–9
- Power–Up State parameter, 4–35
- Powering on the printer, 2–21
- Predefined configurations, 3–7
- Prime Signal parameter, Centronics (parallel) submenu, 4–44
- Print Configuration parameter, 4–9
- Print Mode Opt, LG emulation, 4–17
- Print Statistics parameter, 4–54
- Printer
 - dimensions, A–4
 - duty cycle, A–2
 - humidity requirements, 2–3
 - Interface configuration with the VMS operating system, 5–19
 - Interfaces, 5–1
 - specifications, A–1
 - temperature requirements, 2–3
- Printer control menu, 4–48

- Printer installation, distance required from host, 2–3
- Printer Select, 4–23
- Printer select parameter, 4–24
- Printer settings, changing, 3–2
- Printer tests menu, 4–53
- Printing direction, 4–48
- Printing last line of text, paper out condition, 4–54
- Printing speed, graphics and text, 1–11
- Printout, generating hex dump, 4–34
- Printouts
 - configuration, 3–17
 - hex code, 6–9
- Proprinter XL emulation menu
 - 20 CPI condensed, 4–22
 - auto LF, 4–21
 - define CR code, 4–20
 - define LF code, 4–21
 - FF valid at TOF, 4–22
- Protect Configs., 4–10
- PROTECTED INSTR *, 6–16
- Protocol, serial interface, 4–39
- Protocols
 - overview definition, 1–8
 - RS–232 serial interface, 5–17
 - RS–422 serial interface, 5–17

R

- RAM, displaying, 4–54
- Ready signal, Dataproducts parallel interface, 5–4
- Received data (RD) signal
 - RS–232 serial interface, 5–16
 - RS–422 serial interface, 5–17

- Request to send (RTS) signal, RS–232 serial interface, 5–16
- Request to Send parameter, 4–41
- Requirements, printer, power, 2–2
- Resistors
 - configuration, 5–13
 - installation, 5–14
 - removal, 5–14
- Response Polarity parameter, Centronics (parallel) submenu, 4–43
- RIB INVLD CMD *, 6–16
- RIB INVLD STATE *, 6–16
- Ribbon, specifications, A–2
- RIBBON DRIVE, 6–16
- Ribbon, installing, 2–14
- RS–232 serial interface
 - clear to send (CTS), 5–16
 - configuration, 5–18
 - data carrier detect (DCD), 5–16
 - data set ready (DSR), 5–16
 - error handling, 5–17
 - framing error handling, 5–17
 - overflow error handling, 5–17
 - parity error handling, 5–17
 - pin assignments, 5–15
 - protocol, 5–17
 - request to send (RTS), 5–16
 - X–ON/X–OFF signal, 5–17
- RS–232 serial interface signals, 5–16
 - data terminal ready (DTR), 5–16
 - received data (RD), 5–16
 - transmitted data (TD), 5–16
- RS–422 serial interface
 - configuration, 5–18
 - error handling, 5–17
 - framing error handling, 5–17
 - overflow error handling, 5–17
 - parity error handling, 5–17

- pin assignments, 5–15
- protocol, 5–17
- X–ON/X–OFF signal, 5–17

RS–422 serial interface signals

- received data (RD), 5–17
- transmitted data (TD), 5–17

Running self–tests, 6–7

S

Save Configuration parameter, 4–9

Saving a configuration, 3–15

Saving parameters, 3–6, 3–15

- See also* Locking/unlocking Enter switch

SECURITY VIOLATION, 6–16

Selecting, power–up configuration, 3–21

Selecting language for LCD, 4–35

Self–tests, 6–6

- running, 6–7
- test width, 4–54

Serial interface, 4–38

Serial interface menu, 4–38

- Buffer Size in Kbytes, 4–41
- Data Terminal Ready, 4–40
- Request to Send, 4–41

Service, routine, 6–2

Setting TOF, 2–22

Shift recycle test, 6–6

Shipping restraints, removal (new printer), 2–5

SHUTL INV CMD *, 6–16

SHUTL INV PARM *, 6–16

Shuttle fast test, 6–6

SHUTTLE JAM, 6–17

Shuttle only test, 6–6

Shuttle slow test, 6–6

Signals

- Centronics parallel interface, 5–7
- Dataproducts parallel interface, 5–4
- IEEE 1284 interface, 5–10
- RS–232 serial interface, 5–16

Site requirements, printer, 2–3

Slewing paper, speed, 4–50

SOFTWARE ERROR *, 6–17

Specifications

- dimensions, printer, A–4
- duty cycle, A–2
- electrical, A–5
- environmental, A–4
- interfaces, A–6
- paper, A–3
- printing rates, A–7
- ribbon, A–2

Speed, printing, A–7

Stack enhance parameter, 4–50

STACK OVERFLOW *, 6–17

STACK UNDERFLOW *, 6–17

Standard printer features, 1–6

Statistics, printer, viewing, 4–54

Stop Bits parameter, 4–40

Strobe Polarity parameter

- Centronics (parallel) submenu, 4–43
- Dataproducts, 4–46

System Memory parameter, 4–54

T

TCB CORRUPTED *, 6–17

Temperature requirements, printer

- installation, 2–3

Terminating resistor configuration, 5–13

Test Width parameter, 4–54

Testing the printer, 6–6

TOF Action parameter, Centronics (parallel)
submenu, 4-44

Top-of-form, setting, 2-22

Transmitted data (TD) signal
RS-232 serial interface, 5-16
RS-422 serial interface, 5-17

U

U.S. ASCII Character Set, B-1

UNDEF INTERRUPT *, 6-17

Underline only test, 6-6

UNDFNED OPCODE *, 6-17

Unidirectional parameter, 4-48

Unlocking the ENTER switch, 3-9

Unpacking a new printer, 2-5

UP DRV. SHORT *, 6-17

V

Vertical formatting features
electronic vertical formatting, 1-7
EVFU for Epson mode, 1-7
vertical tabbing (Proprinter and Epson),
1-7

VMS interface configuration, 5-19

W

Warning notice description, 1-2

X

X-ON/X-OFF signal
RS-232 serial interface, 5-17
RS-422 serial interface, 5-17