PRINTRONIX®

Setup Guide

P4280 Line Matrix Printer

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US and CANADA Radio Interference Note

Note: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. The manufacturer is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

The input/output (I/O) cable must be shielded for the printer to comply with FCC rules and regulations Part 15 governing the radiation limits for Class "A" equipment.

This Class A digital apparatus meets all requirements of the Canadian Interference–Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Trademark Acknowledgements

IBM is a registered trademark of International Business Machines Corporation.
IGP is a trademark of Printronix, Inc.
RibbonMinder is a trademark of Printronix, Inc.
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Code V is a trademark of QMS, Inc.

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1 Introduction

Chapter Contents

About This Setup Guide

This *Setup Guide* is designed so you can quickly install and configure your P4280 printer.

How to Locate Information

- Use the **Table of Contents** at the front of this guide.
- Use the **Chapter Contents** listed on the first page of each chapter.
- Use the **Glossary** to learn the printer terms and acronyms in this Setup Guide. The Glossary is located just before the Index at the back of this guide.
- Use the alphabetical **Index** at the back of this guide.

Warnings and Special Information

For your safety and to protect valuable equipment, it is very important that you 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 and helpful tips about printer operation.

Keys and Display Messages

Keys and indicators that are labeled on the printer are printed in uppercase.

Example: Press the ON LINE key.

Messages that appear on the Liquid Crystal Display (LCD) are enclosed in quotation marks and printed with initial capital letters.

Example: The message "Save Config" appears on the display.

Related Documents

For more information about your printer, refer to the following documents:

- *P4280 Line Matrix Printer Operator's Guide.* Includes step-by-step instructions on daily printer operations.
- *Impact Printers Programmer's Reference Manual.* Describes printer codes and character sets for various printer emulation modes. This manual will assist users who wish to create and send custom data streams to the printer.

The P4280 Line Matrix Printer

The P4280 printer incorporates the latest refinements in line matrix printing technology, yet is very easy to use. The LCD and Light Emitting Diodes (LED) status indicators on the control panel communicate with you directly and clearly. You can select every function on your printer at the control panel or by sending commands from the host computer. The print mechanism is housed in an insulated floor cabinet that makes this printer one of the quietest impact printers in the world.
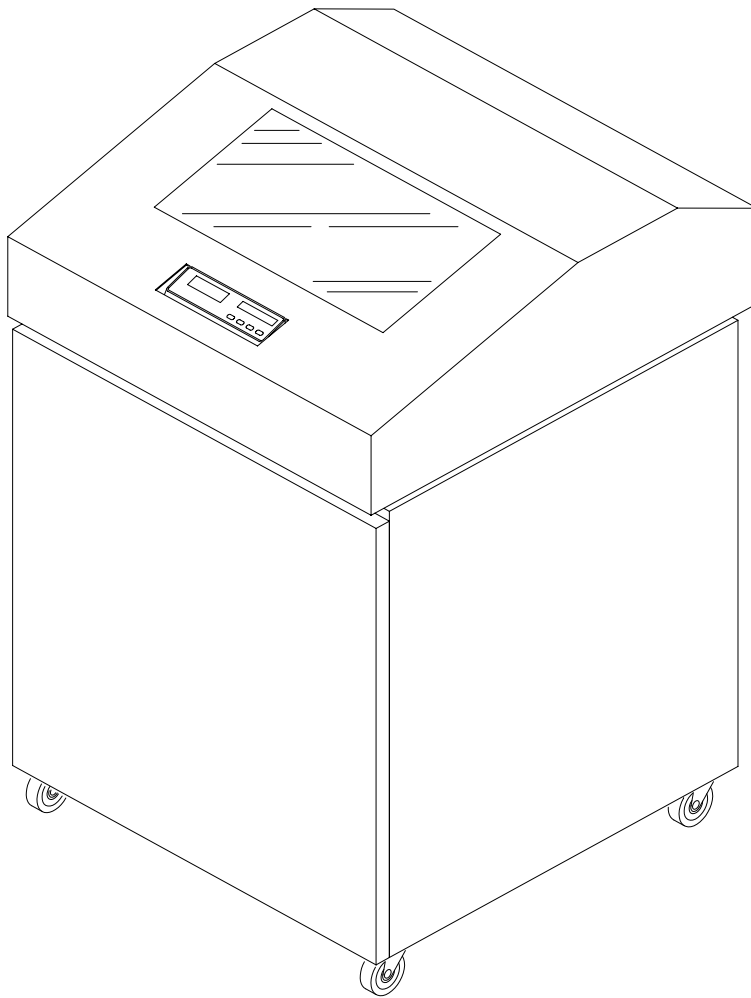
Figure 1–1. The P4280 Line Matrix Printer

Standard Features

General

- Quiet operation
- Print speeds of up to 800 lines per minute (lpm)

Host Computer Interface

- Dataproducts-compatible parallel interface
- Centronics-compatible parallel interface
- RS-232 serial interface

Printer Command and Control

- Three printer emulations are selectable at the control panel and controlled by software:

    1) Printronix P-Series emulation
    2) Printronix P-Series XQ emulation
    3) Serial Matrix printer emulation (similar to the IBM Graphic Printer, but with more features)

- All emulation software, fonts, and character sets are permanently stored in printer Read–Only Memory (ROM).

Output Control

- Five modes for printing text:

    1) Near-Letter Quality (NLQ)
    2) Data Processing (DP)
    3) High Speed (HS), with a choice of three vertical densities
    4) Optical Character Recognition Font A (OCR-A)
    5) Optical Character Recognition Font B (OCR-B)

- Selectable alternate horizontal and vertical dot densities enable you to tailor output to a wider variety of printing requirements.
- Selectable forms length

- Character attribute specification:

    1) Selectable pitch: normal, expanded, and compressed
    2) Emphasized ("shadow") printing
    3) Double strike (bold) printing
    4) Automatic underlining
    5) Superscript and subscript printing
    6) Double high printing

- Resident multinational character sets

- Downloadable character sets and international languages. You can add international languages to the font library and access them in both P-Series and Serial Matrix emulations.

- RibbonMinder™, a ribbon ink–life indicator

Graphics and Vertical Formatting

Several graphics and vertical formatting features are available:

- Two built-in graphics generators:

    1) P-Series odd-even dot Plot Mode
    2) Bit-image graphics (serial matrix printer emulation)

- Programmable electronic vertical formatting provides rapid vertical paper movement to specified lines for printing repetitive and continuous forms. You can choose from a variety of methods:

    1) EVFU: Printronix Electronic Vertical Format Unit
    2) DAVFU: Dataproducts-compatible Direct Access Vertical Format Unit
    3) NVFU: Printronix New direct access Vertical Format Unit
    4) CVFU: Centronics-compatible direct access Vertical Format Unit
    5) Vertical tabbing in Serial Matrix emulation mode

Built-in Diagnostic Tools

Several diagnostic tools are provided with the printer:

- Comprehensive series of diagnostic self-tests permanently stored in ROM
- Configuration printout
- Test pattern printout
- Data stream hex code printout

Optional Features

We offer a variety of options that enable you to fine-tune your printer to nearly any printing application:

- Intelligent Graphics Processor (IGP–200 and IGP–210). The IGP processes and plots all graphics, freeing the host computer for other tasks. You can create forms, bar codes, logos, expanded characters, and other graphics. You can print sideways or upside down. You can print forms with graphic components overlayed with alphanumeric and bar code data, all in a single pass.

- Coaxial/Twinaxial option: Allows the printer to emulate IBM 3287, 5225, and 4234 printers.

For more information, contact your sales representative.

Protocols and Emulations

Protocols

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 the its host computer must use the same protocol.

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 principal difference between most printer protocols is in the characters used to create control codes and the ways in which these characters are formatted.

You can select the protocol at the control panel. The printer stores three protocols in ROM:

- Printronix P-Series
- Serial Matrix
- P-Series XQ

Emulations

When the printer executes the character and control codes of another printer protocol, we say that it emulates that printer. If the printer uses the P-Series protocol, for example, it is emulating a Printronix P-Series printer.

As used in this manual, *protocol* and *emulation* mean the same thing. If the printer is using the Serial Matrix printer protocol, for example, we can also say it is in Serial Matrix emulation mode.

For additional information, refer to the *Impact Printers Programmer's Reference Manual*.

2 **Setting Up the Printer**

Chapter Contents

Before You Begin

Read this chapter carefully before installing and operating the 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.

Select a Site

Select a printer site that meets the following requirements:

- Has a power outlet that supplies either 50 or 60 Hz power, with a voltage range of either 100 to 120 VAC or 200 to 240 VAC. The printer automatically senses the power line voltage and adjusts itself to conform to the correct voltage range.

  Primary circuit protection is built-in; the power switch is also a circuit breaker.

IMPORTANT

It is recommended that printer power be supplied from a separate 50 or 60 Hertz AC circuit. This circuit must have the proper overcurrent protection (fuse or circuit breaker). Refer to page A–5 for the maximum current requirements of the printer and other printer power specifications.

- 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.)
- 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 distance to the host computer, as shown below:

Type of Interface	Maximum Distance to Host Computer
Dataproducts-compatible parallel interface	12 meters (40 feet)
Centronics-compatible parallel interface	5 meters (15 feet)
RS-232 serial interface	15 meters (50 feet)

Printer dimensions are shown in Figure 2–1 on page 2–4.

Printer Cover

Cabinet Rear Door

146.1 cm
(57.5 in.)

104.1 cm
(41.0 in.)

57.2 cm
(22.5 in.)

73.7 cm
(29.0 in.)

191.5 cm
(75.4 in.)

68.6 cm
(27.0 in.)

68.6 cm
(27.0 in.)
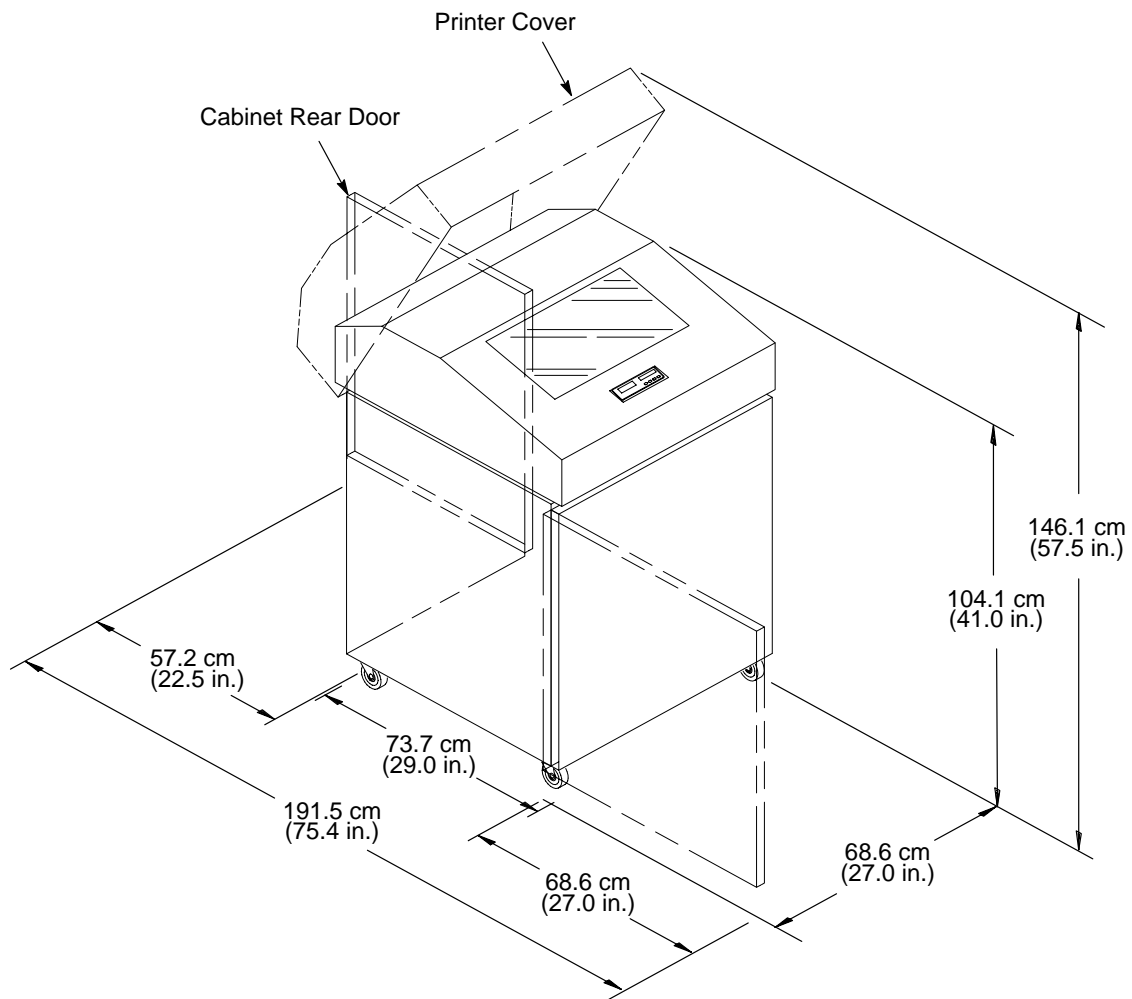
Figure 2–1. Printer Dimensions

Remove the Shipping Restraints

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.

WARNUNG

Um mögliche Verletzungen zu vermeiden, darf die Netzverbindung erst nach dem Entfernen der Transportbefestigungen hergestellt werden.

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.

CAUTION

To avoid shipping damage, reinstall the shipping restraints whenever you move or ship the printer.

VORSICHT

Um Versandschäden zu verhindern, die Versand–Einspannungen wieder einbauen, wenn der Drucker versetzt oder versand wird.

PRÉCAUTIONS

Pour éviter tout dégât lors du transport, remettez les cales en place chaque fois que l'imprimante est déplacée ou transportée.

Tie wraps and foam pads protect the platen and tractors from damage during shipment. You must remove these shipping restraints before you operate the printer.

Save the foam pads and extra tie wraps with the other packing materials.

To reinstall the shipping restraints, simply reverse the steps in this section.

Remove the Tie Wraps and Cardboard Packing

1. Raise the printer cover.

2. Cut and remove the tie wraps securing the upper paper guide.
   (See Figure 2–2.)

3. Remove the cardboard packing.
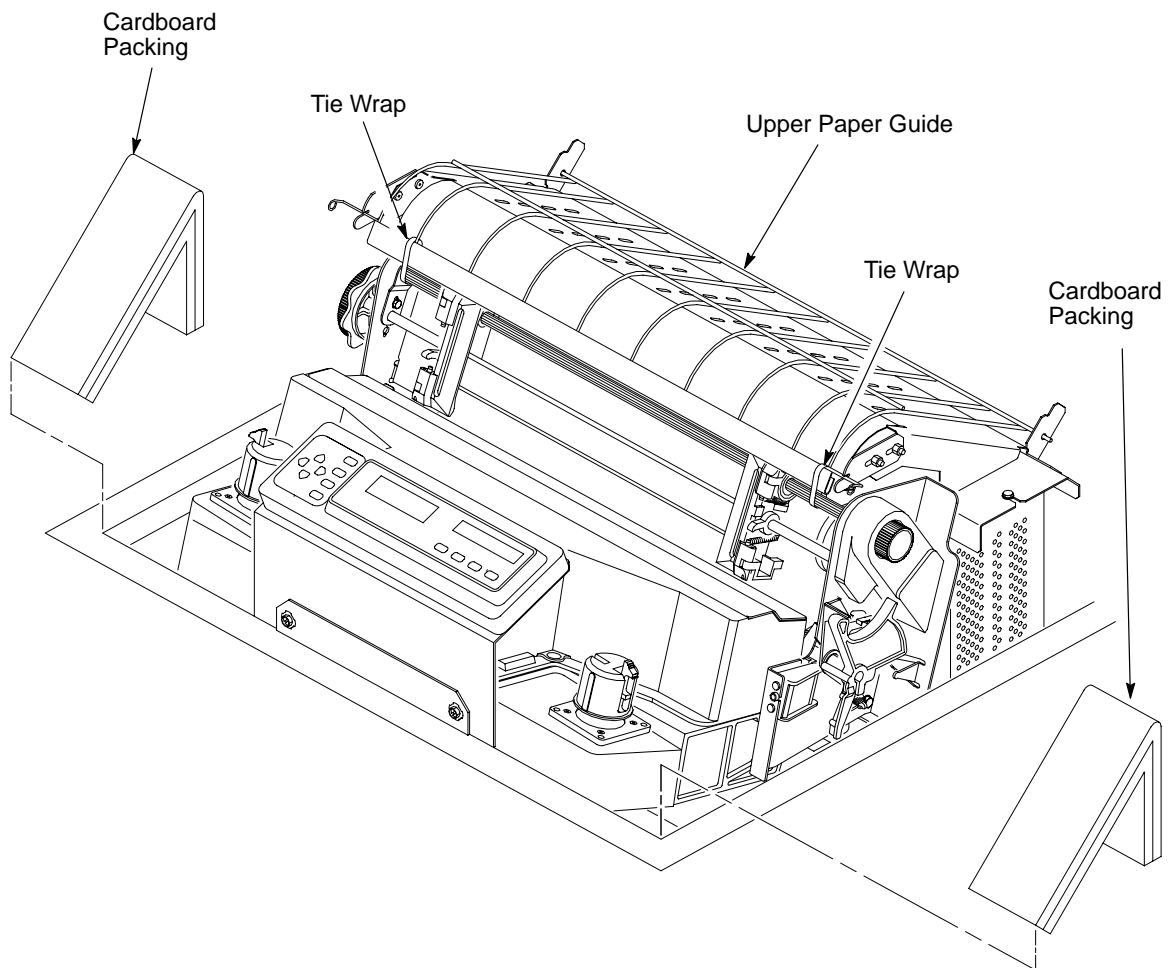
Figure 2–2. Tie Wraps and Cardboard Packing

Remove the Protective Film

Carefully peel the protective film off the control panel. (See Figure 2–3.)
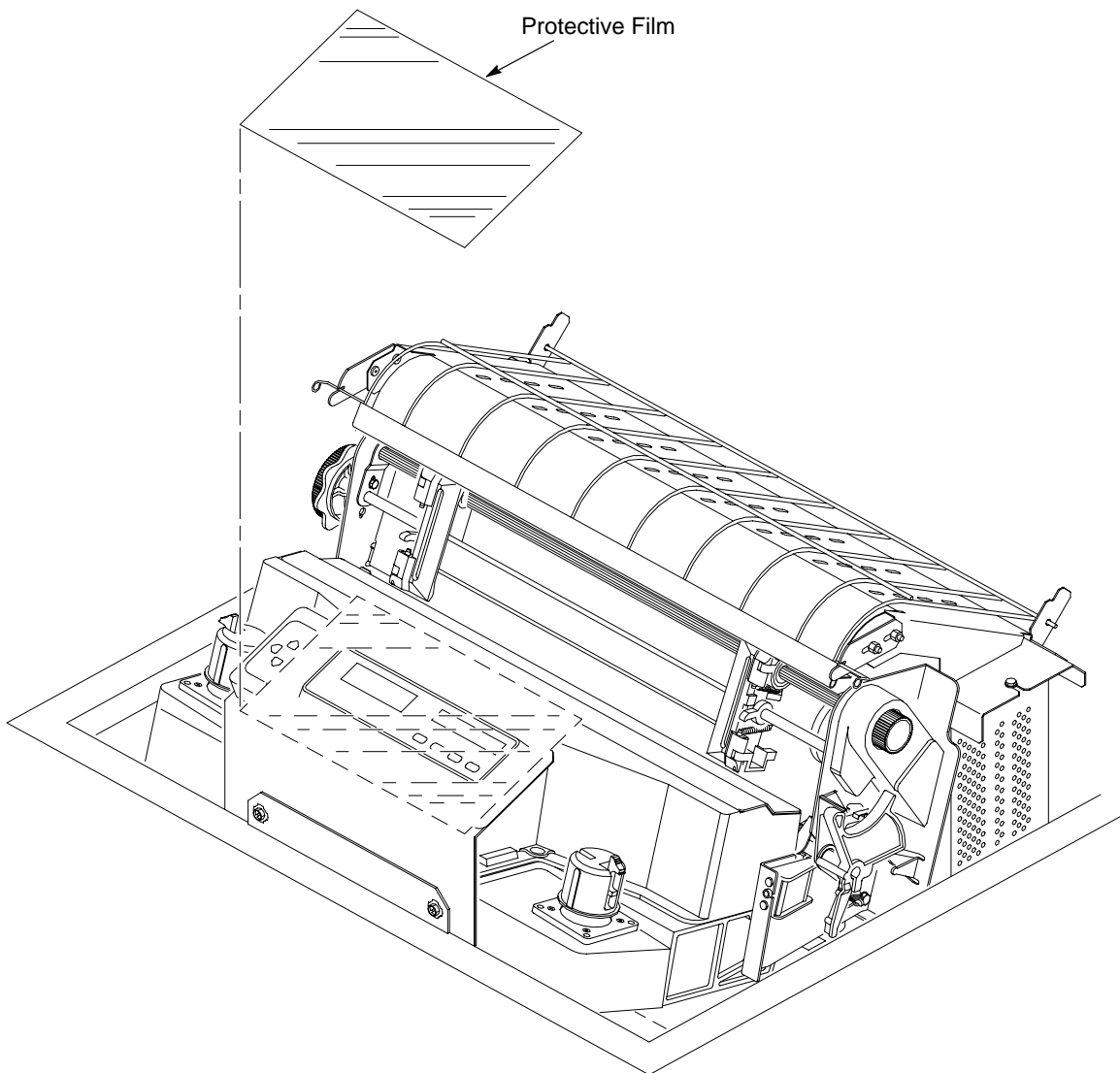
Figure 2–3. Protective Film

Remove the Platen Protective Foam

1. Open the left and right tractor gates. Push the tractor locks down. Move the tractors outward as far as they will go. (See Figure 2–4.)

2. Rotate the forms thickness lever away from you as far as it will go; this is the fully open position.

3. Rotate the platen protective foam toward the front of the printer and remove it from under the tractor support shaft.
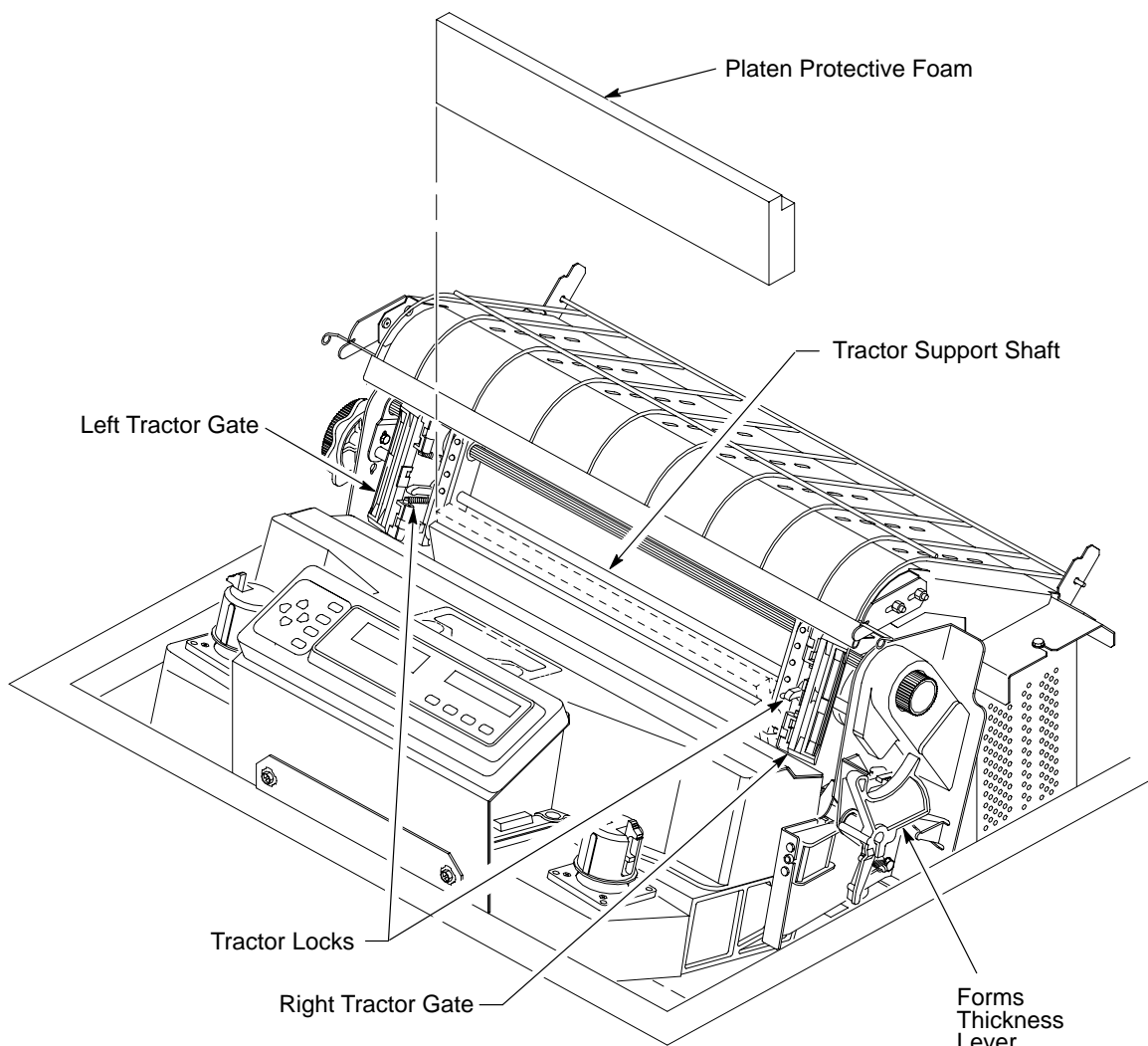
Figure 2–4. Platen Protective Foam

Remove the Hammer Bank Protective Foam

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

Hammer Bank
Protective Foam
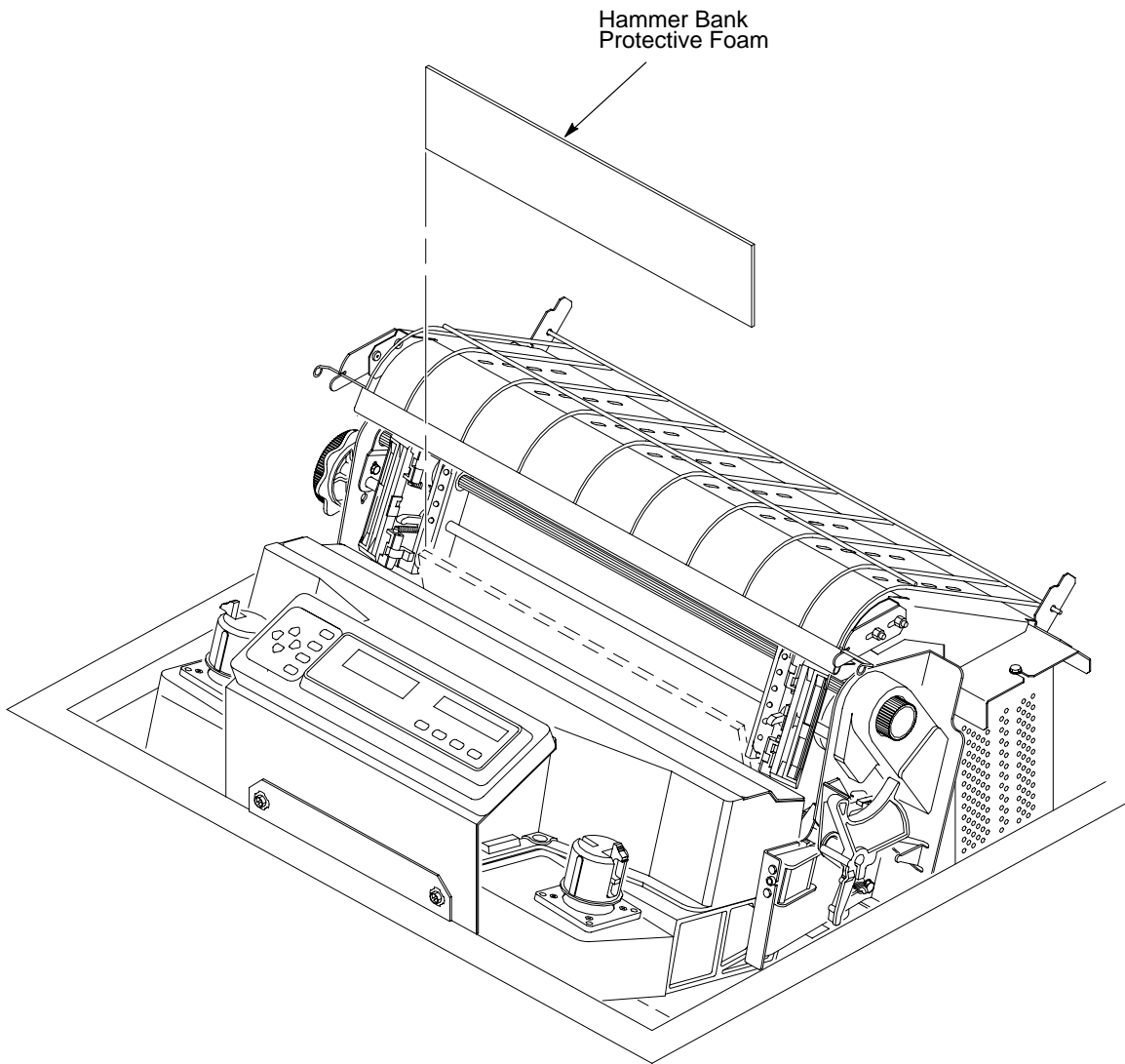
Figure 2–5. Hammer Bank Protective Foam

Release the Paper Chains

1. Open the rear cabinet door.

2. Cut the tie wraps and release the paper chains from the bags at the 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.
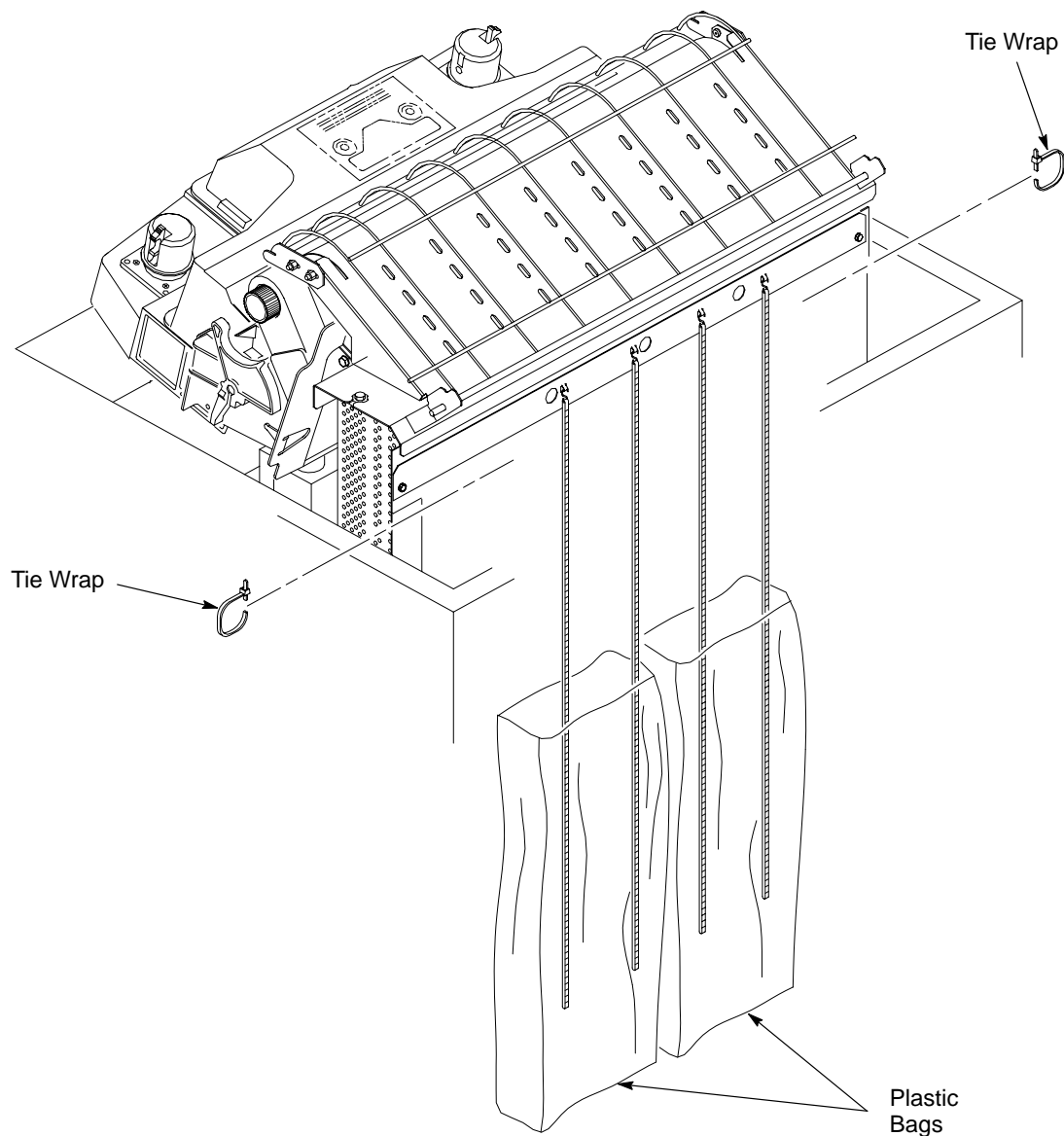
Figure 2–6. Paper Chains

Connect the Power Cord

1. Make sure the printer power switch is set to O (off). (See Figure 2–7.)

2. Connect the printer power cord to the printer AC power connector.

3. Plug the printer power cord into the AC line receptacle.

Power Switch
(Off=0)

AC Power
Connector

ON   OFF
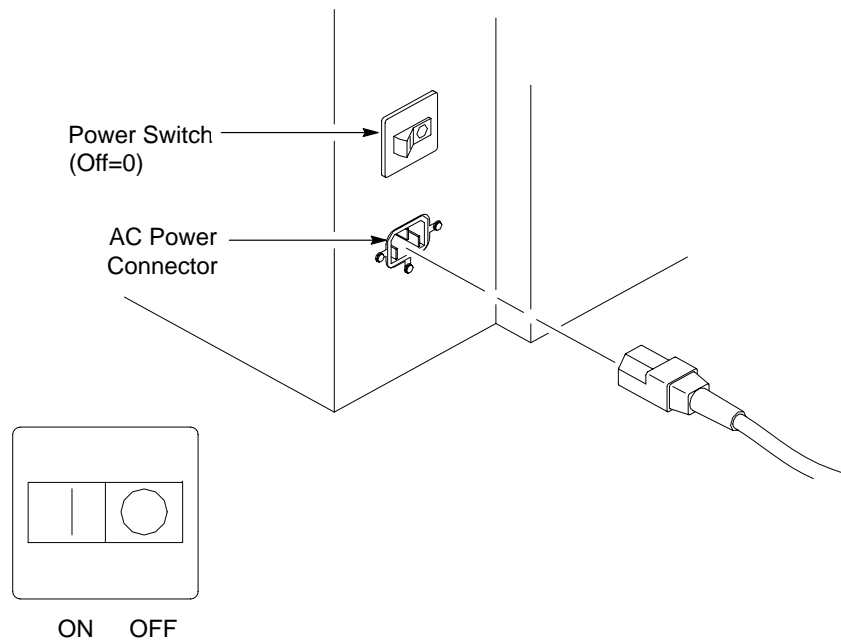
Figure 2–7. Power Cable Connection

Connect the Interface Cable

1. Connect the interface cable (customer supplied) to the appropriate printer interface connector and to the host computer.

2. Install the supplied connector covers over the unused connectors.

NOTE: Refer to Chapter 4, *Printer Interfaces*, for descriptions of the connectors and the pin assignments.
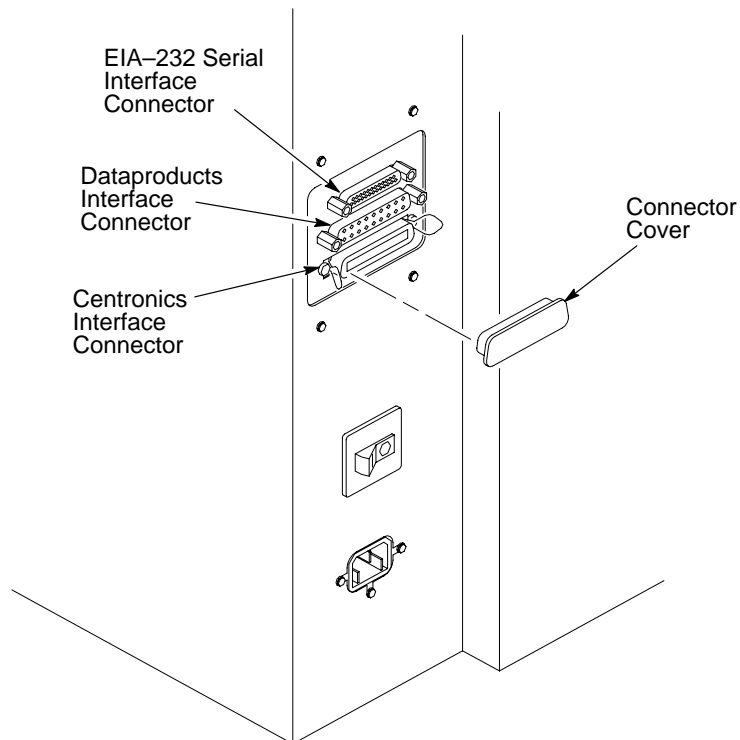
Figure 2–8. Interface Cable Connections

Load the Paper

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

1. Open the printer top cover.

2. Raise the forms thickness lever as far as it will go. (See Figure 2–9.)

3. Swing open both tractor gates.

4. Lift the upper paper guide.
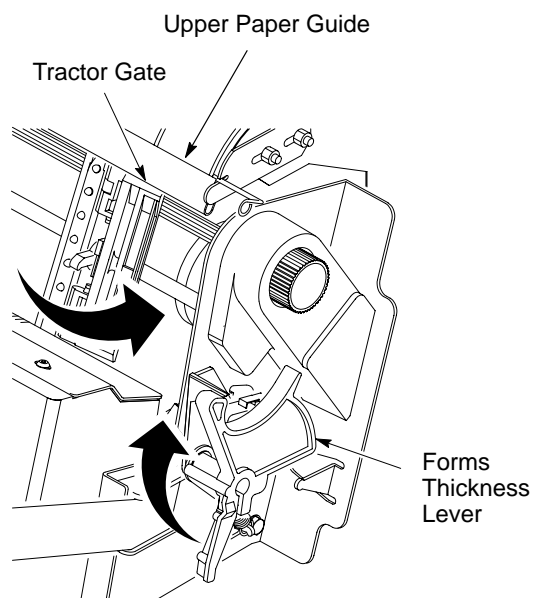
Figure 2–9. Opening the Tractor Gates

5. Open the front door of the cabinet. Align the paper supply with the label on the floor of the printer. If possible, use full-width (132-column) paper.

6. Feed the paper up through the paper slot inside the cabinet. Hold the paper to prevent it from slipping down through the paper slot.

EDGE
OF
PAPER

BOX
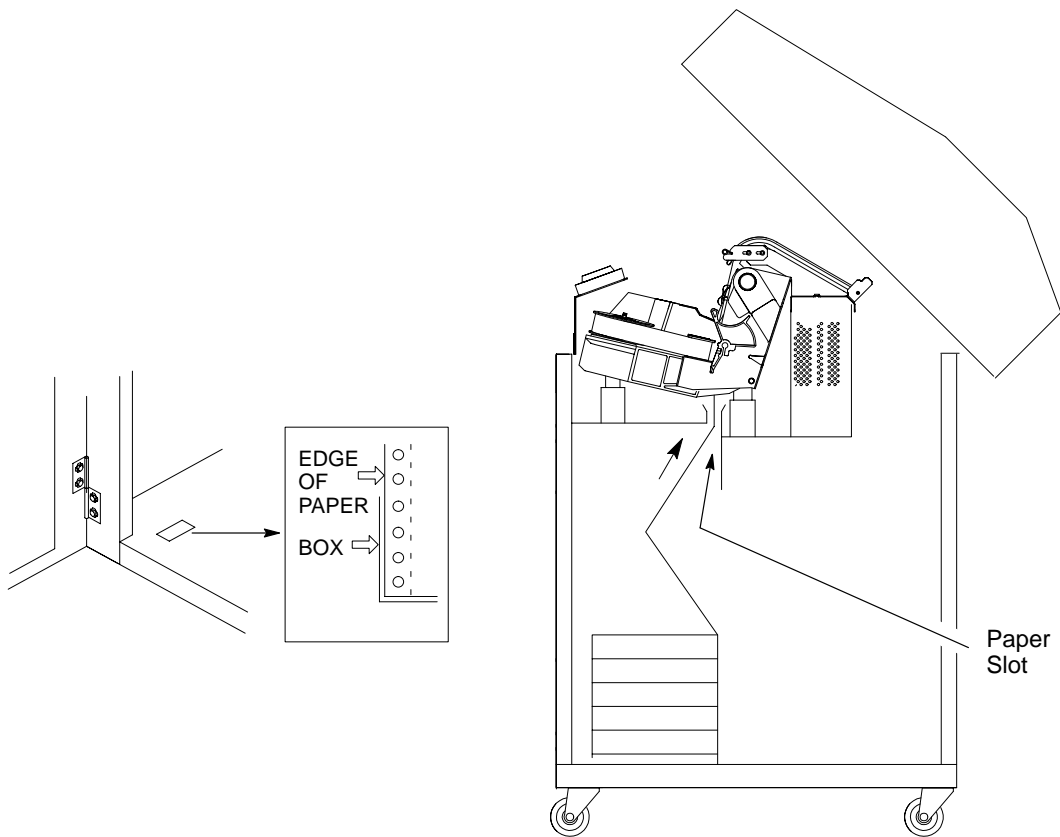
Paper
Slot

Figure 2–10. Aligning and Feeding the Paper

7. Pull the paper above and behind the ribbon mask, which is a silver-colored metal strip. (See the ribbon path diagram on the shuttle cover.) Load the paper onto the left tractor and close the tractor gate.
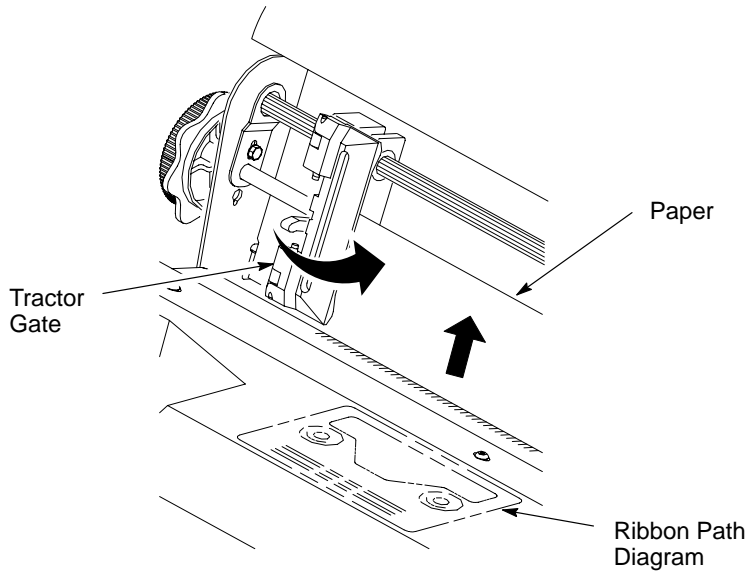
Figure 2–11. The Left Tractor

8. Unlock the right tractor. Load the paper onto the right tractor and close the tractor door. Slide the right tractor horizontally to remove any paper slack, then lock it in place.
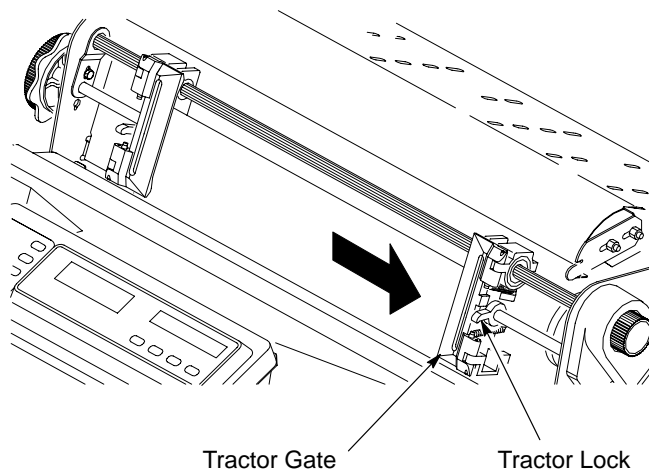
Figure 2–12. The Right Tractor

9. Align the paper according to the paper scale on the shuttle cover by turning the horizontal adjustment knob until the left tractor is aligned with the number "1" on the paper scale.

    (You can also use the paper scale to count columns.)

Horizontal
Adjustment
Knob
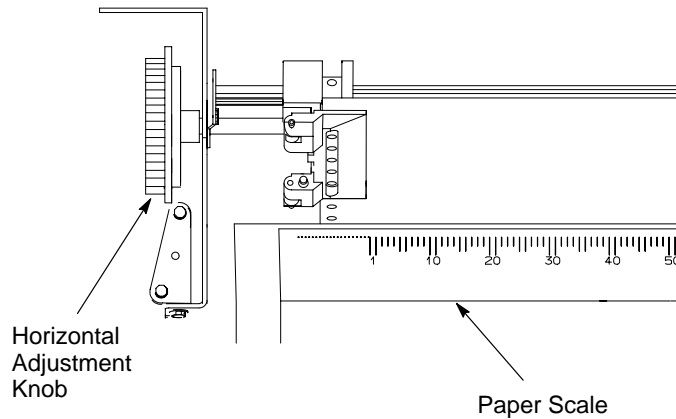
Paper Scale

Figure 2–13. Aligning the Paper

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.

VORSICHT

Damit der Drucker nicht durch Drucken auf die Druckwalze beschädigt wird, muß der linke Traktor immer mit der Markierung direkt neben der Zahl "1" auf der Papierskala ausgerichtet sein.

PRÉCAUTIONS

Positionnez toujours le mécanisme d'entraînement gauche à gauche de la marque "1" du guide-marge, car l'impression sur la platine risque d'endommager l'imprimante.

10. Set the printer power switch to | (on). (See Figure 2–7, page 2–11.) The printer warms up and tests itself. The message "Diagnostic Test In Progress" displays on the control panel. (If there is a fault, the status indicators will flash and a fault message will display.) After initialization, the printer displays "On-Line."

11. Press ON LINE. "Off-Line Ready" displays on the control panel.

12. Press FORM FEED several times to ensure that the paper feeds properly beyond the tractors and into the paper guide assembly. Ensure the paper folds in the same way in the stacking area as it does in the supply area.

13. Lower the upper paper guide. Close the cabinet front door.

14. Continue with the next procedure to set the top–of–form.

Upper Paper Guide
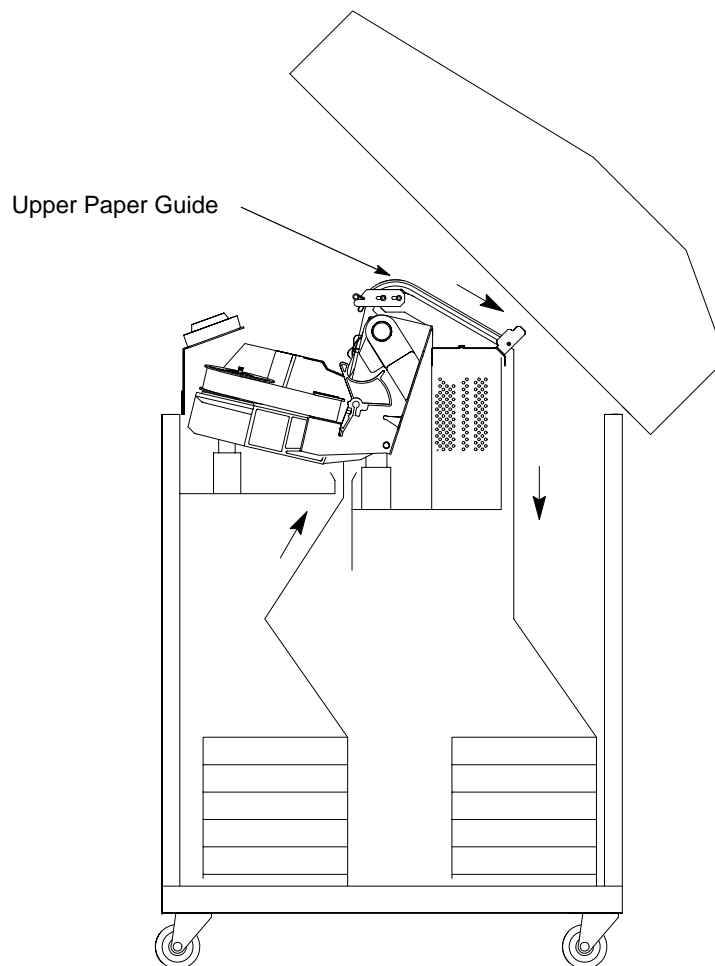
Figure 2–14. Checking the Paper Feed

Set the Top of Form

1. Make sure the forms thickness lever is raised as far as it will go.

Forms
Thickness
Lever
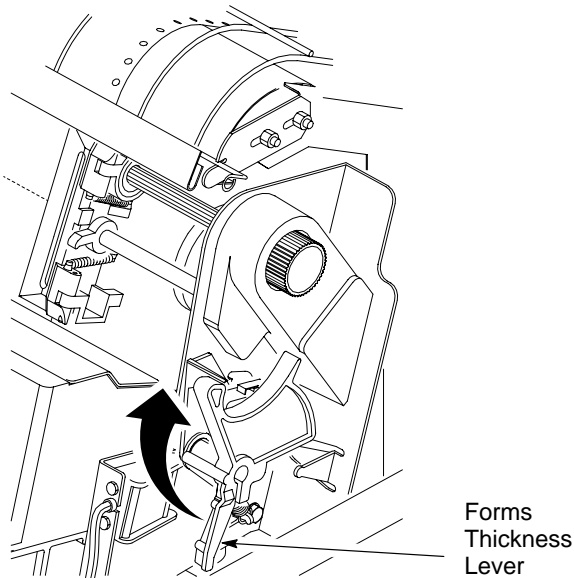
Figure 2–15. The Forms Thickness Lever

2. Align the paper perforation with the TOF indicator on the tractor door by rotating the vertical position knob up and down. The TOF indicator is located on the tractor gate.

TOF
Indicator

XXXXXX

Perforation

Vertical
Position
Knob
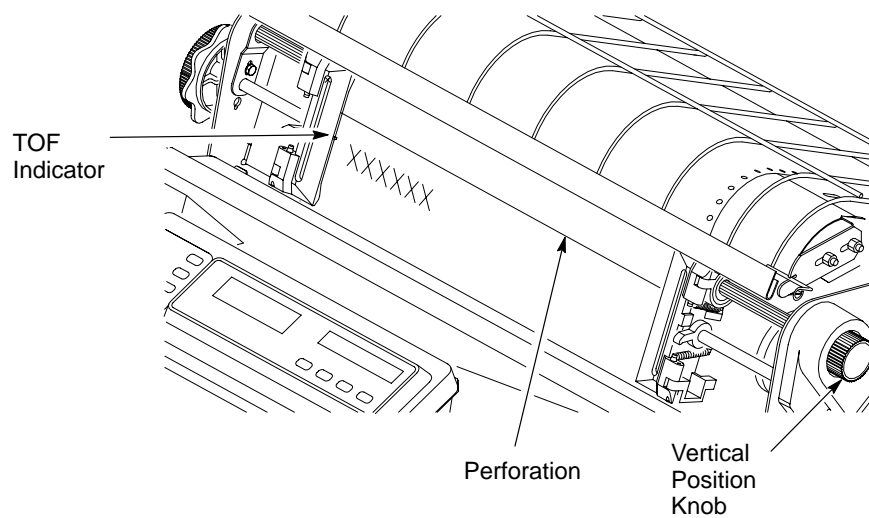
Figure 2–16. Setting TOF

3. Lower the forms thickness lever. Set it to match the paper thickness. If you are using single-part forms, set the forms thickness lever so that "A" is next to the indicator. (See Figure 2–17.)

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

A Thin

B Medium
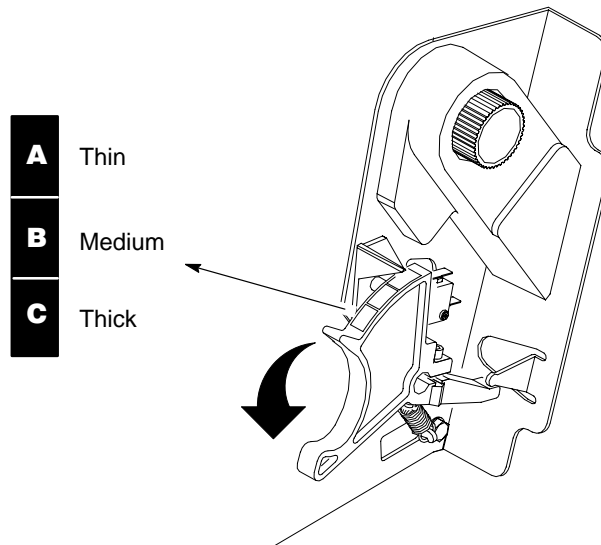
C Thick

Figure 2–17. The Forms Thickness Scale

4. Press CLEAR to clear the "Platen Open" fault.

5. Press SET TOF. The paper moves downward to the top-of-form print position.

6. Continue with the next section to install the ribbon.

Install the Ribbon

1. Raise the forms thickness lever as far as it will go.

Forms
Thickness
Lever
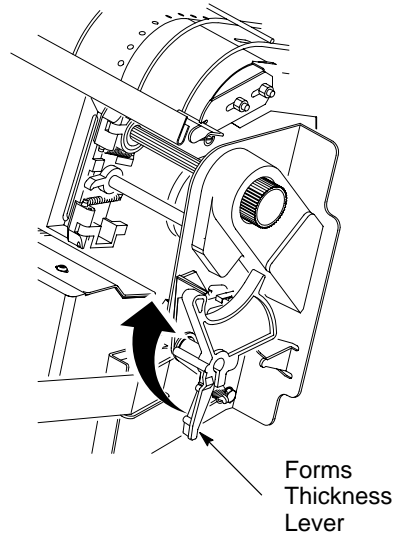
Figure 2–18. The Forms Thickness Lever

2. If the alarm is enabled, press the CLEAR key on the control panel to silence the alarm.

3. Remove the ribbon spools from the package. 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.

Hammer Bank Cover

Ribbon Mask

Hub Latch
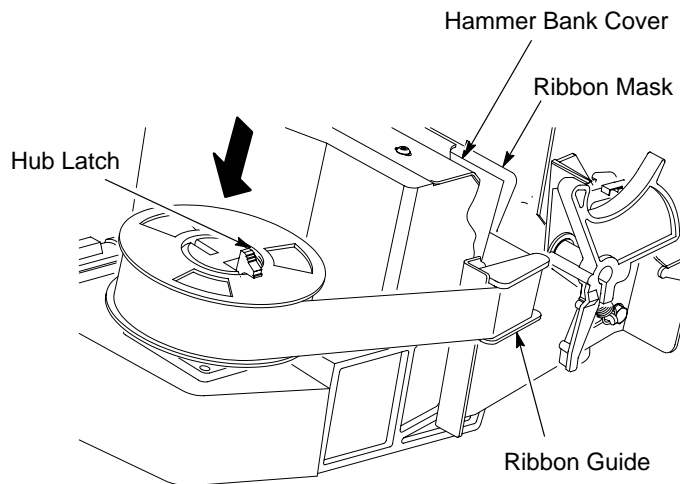
Ribbon Guide

Figure 2–19. Installing the Ribbon

4. Refer to Figure 2–19 and to the ribbon path diagram on the shuttle cover, and thread the ribbon as follows: Starting from the right ribbon spool, thread the ribbon around the right ribbon guide, under the right tractor gate, between the hammer bank cover and ribbon mask, and along the ribbon path to the left ribbon guide.

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

5. Place the left spool on the left hub. Press down on the spool until the hub latch snaps into place. Hand-turn the right spool and check to make sure the ribbon tracks correctly in the path and around the ribbon guides.

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

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

7. Press CLEAR to clear the "Platen Open" fault.

8. Press ONLINE to place the printer on–line.

9. Continue with the next section to test the printer.

Test the Printer

Step	Press	Result	Notes
1.	The printer should be turned on and loaded with paper and ribbon. The top cover should be raised and the control panel display should read "Off-Line Ready."		
2.	Press: △ + ▽	ENTER Switch Not Locked	Press both keys at the same time. Unlocking the ENTER key allows you to test your printer.
3.	▽	Ribbon Life	
4.	◁	Diagnostics	
5.	▽	Configuration Printout	
6.	▷ UNTIL	Printer Test Full Width OR Printer Test 8 Inch Width	Press ▶ until you reach the appropriate test, for wide paper (132 columns) or for narrow paper (80 columns).
7.	▽	Printer Test Shift Recycle	
8.	To start the test, press: ENTER	Running Test Shift Recycle	Prints shifted lines of the current character set across the paper (either 80 or 132 columns).

Step	Press	Result	Notes
9.	To stop the test, press: ENTER	Printer Test Shift Recycle	Stops printing.
10.	Examine the print quality of the characters. They should be fully formed and of uniform density. If the test does not run or if text characters do not appear correctly formed, contact your service representative.		
11.	CLEAR	Off–Line Ready 1	
12.	△ + ▽	ENTER Switch Locked	Re-locks the ENTER key.
13.	Close the printer top cover.		
14.	ON LINE	On–Line (Current Font) 1	
15.	The printer is ready for configuration. Continue with Chapter 3, *Configuring the Printer.*		

3 Configuring the Printer

Chapter Contents

Overview

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

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.

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 by pressing keys on the control panel or by sending control codes in the data stream from the host computer.

This chapter shows you how to configure the printer by using the control panel, which is shown below.

Figure 3–2 shows the top level of the configuration menu. (All of the keys on the control panel are described in detail in your *Operator's Guide*.)

To configure the printer with control codes, refer to the *Programmer's Reference Manual*.
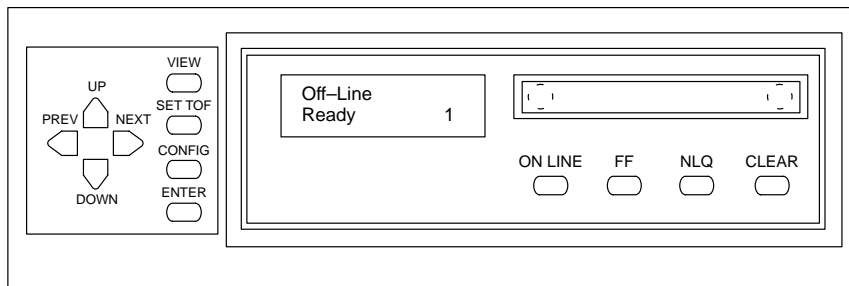
Figure 3–1. The Control Panel

Off–Line
Ready

Ribbon Life	Font	Character Set
Page 3–26	Page 3–29	Page 3–30

New Ribbon
Set Job Rate
Analyze Job
Set Ribbon Size
When Worn Action
Enable/Disable

See page 3–29 for
font options.

Select Set
   IBM PC
   Multinational
   ECMA–94 Latin 1
   DEC Multinat.

Application Compatibility	Paper Format	Host Interface	Load Parameters	Save Parameters
Page 3–33	Page 3–42	Page 3–50	Page 3–63	Page 3–66

Printer Protocol
Buffer Size
Uppercase Select [1,2]
Printer Select [1,3]
Paper Advance Sw
Power On State
Alarm On Fault
Shuttle Timeout
Unidirectional
Select SFCC [2,3]
80–9F Hex
Control Code 06 [2]
Control Code 08 [2,3]
Overstrike
Compress Print [1,2]
Draft Print [1,2]
Font Select Elongated [1,2]
View
Display Language

Line Spacing
Form Length Set
Auto Line Feed
Define CR Code
Define LF Code
VFU Select [2]
VFU Table [2]
Perforation Skip
Paper Out
Paperout Adjust
PMD Fault
Slew Relative [1,2]
Set Platen @BOF
Print Width
Slow Paper Slew

Centronics
Dataproducts
Serial RS–232

Load Saved Parameters 1
Load Saved Parameters 2
Load Saved Parameters 3
Load Saved Parameters 4
Load IGP Parameters
Load IBM 3287 Parameters
Load IBM 5225 Parameters
Load Factory Parameters

Press ENTER to save

Diagnostics
Page 3–67

Configuration Printout
Print Datastream in Hex Code
Printer Test 8 Inch Width
Printer Test Full Width
Print Statistics

To view options, press: ▼ DOWN
   ▲ UP
   ▶ RIGHT
   ◀ LEFT
To select an option, press ENTER
To exit configuration (returning to
   Off–Line Ready), press CLEAR
* = Factory Default

Notes:
[1] Not available when P–Series protocol is selected.
[2] Not available when Serial Matrix protocol is selected.
[3] Not available when P–Series XQ protocol is selected.

Figure 3–2. Configuration Main Menu

Operating States

The printer has two operating states: on-line and off-line. When the printer is on-line, it is controlled by the host computer and prints data sent by the host computer. In the off-line state, communication with the host is interrupted so that you can load paper, change ribbons, or test and configure the printer.

NOTE: When the printer is on-line, it may display an "L" in the lower right corner of the message display, or an "E" in the upper right corner. See page 3–45 for information on the VFU Select parameter.

The Configurations

A configuration consists of a group of parameters, such as line spacing, forms length, etc. Your printer contains the following configurations:

- The factory default configuration. It can be loaded, but it cannot be altered. Table 3–1 on page 3–10 lists all of the parameters and their values.
- IGP, IBM 3287, and IBM 5225. Any one of the three can be loaded, but not altered. Appendix D lists all of the parameters and their values.
- Four configurations that you can customize for unique print job requirements. Page 3–14 explains how to create customized configurations.

Unlocking the ENTER Key

To change a parameter, such as line spacing, you must unlock the ENTER key. With the printer off-line, raise the printer cover and press the ▲ and ▼ keys at the same time. The following control panel message appears for about a second:

```
ENTER Switch
Not Locked
```

Although all menus and settings are accessible in the off-line state, the printer is in "Configuration Mode" only when the ENTER key is unlocked.

Locking the ENTER Key

When you lock the ENTER key, your configuration settings cannot be altered. Locking secures your settings.

With the printer off-line, raise the printer cover and press the ▲ and ▼ keys at the same time to lock the ENTER key. The following control panel message appears for about a second:

```
ENTER Switch
Locked
```

Saving Parameters

You can change a parameter, such as line spacing or form length, by pressing keys on the control panel or by sending control codes from the host data stream. Your programming reference manual provides information about control codes.

Once you change a parameter, it is active as long as the printer is on. This is true whether you use the control panel or send a control code from the host.

If you use the control panel, you can save the parameters as a customized configuration that is stored in non-volatile random access memory (NVRAM). A configuration consists of a group of parameters. The configuration will *not* be lost if you turn off the printer.

There are no control codes that allow you to save a parameter in NVRAM.

However, control codes override control panel parameters. For example, if you set the line spacing to 6 lines per inch (LPI) with the control panel, and application software later changes this to 8 LPI with a data stream command, the data stream setting overrides the control panel setting.

The 8 LPI parameter is effective as long as the printer is on. If you turn off the printer, the 8 LPI parameter will be erased. To save the parameter, you must use the control panel and save it as a configuration.

Factory Default Configuration Values

The printer is configured at the factory as shown in Table 3–1. All of the values are permanently stored in ROM and are easily reloaded. To load the factory default values, use the Load Parameters menu (page 3–19), or reset the printer (page 3–23) if the Factory Default is the designated power–up.

Table 3–1. Factory Default Configuration Values

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Ribbon Life		**Application Compatibility (Continued)**	
Job Rate	Currently 150	Font Select / Elongated[1]	Font Select = 0E Elongated = 08
Ribbon Size	Currently 60	View	Lines
When Worn Action	To Stop Printer	Display Language	English
Enable/Disable	Disable Action		
		Paper Format	
Font		Line Spacing	Set at 6 LPI
Font	DP AT 10 CPI	Form Length Set	At 11 Inches
		Auto Line Feed	After Full Line
Character Set		Define CR Code	CR = CR
Select Set	IBM PC	Define LF Code	LF = CR + LF
Select Subset	IBM PC GRAPHICS	VFU Select[4]	EVFU[5]
Select Language	ASCII	Perforation Skip	Disable
		Paper Out	End of Paper
Application Compatibility		Paperout Adjust	113 Dot Rows[6]
Printer Protocol	P-Series	PMD Fault	Enable
Buffer Size	2048 Characters	Slew Relative[1]	1 to 16
Uppercase Select[1]	Upper & Lower	Set Platen @ BOF	Disable
Printer Select[2]	Disable	Print Width	13.2 Inches
Paper Advance SW	Print + Pap Adv	Slow Paper Slew	Disable
Power On State	On-Line		
Alarm On Fault	Enable	**Host Interface**	**Centronics**
Shuttle Timeout	4 Seconds	Data Bit 8	Enable
Unidirectional	Disable	PI Line	Disable[7]
Select SFCC[3]	01 SOH	Data Polarity	Standard
80–9F Hex.	Control Codes	Resp. Polarity	Standard

Table 3–1. Factory Default Configuration Values (Continued)

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Application Compatibility		**Host Interface**	**Centronics**
Control Code 06[4]	8.0 LPI	Fast Busy	Enable
Control Code 08[3]	Double High	Strobe Polarity	Standard
Overstrike	Enable	Latch Data On	Leading Edge
Compress Print[1]	01 SOH		
Draft Print[1]	02 STX		
Host Interface Dataproducts		**Host Interface Serial RS-232**	
Data Bit 8	Enable	Data Protocol	X-ON/X-OFF
PI Line	Enable[7]	Data Rate	9600 BAUD
Data Polarity	Standard	Word Length	8 Bits
Resp. Polarity	Standard	Stop Bit	One
Strobe Polarity	Standard	Parity	None
Latch Data On	Leading Edge	Bit 8 Function	Font Select
		Data Term Ready	On-Line and BNF
		Request To Send	On-Line and BNF
		Reverse Channel	On-Line and BNF

Notes:

1. This parameter is displayed only if P-Series XQ printer protocol is selected.

2. This parameter is displayed only if Serial Matrix printer protocol is selected.

3. This parameter is displayed only if P-Series printer protocol is selected.

4. This parameter is displayed only if P-Series or P-Series XQ printer protocol is selected.

5. For P-Series printer protocol, the factory default parameter value is "EVFU". For P-Series XQ protocol, the value is "Enable". For Serial Matrix protocol, the parameter is not displayed.

6. The paper out adjust value is not affected by loading, saving, or clearing NVRAM. Its value may only be explicitly changed in the menu.

7. If P-Series XQ or Serial Matrix printer protocol is selected, the factory default parameter value is "Not Applicable".

Printing the Current Configuration

```
┌─────────────────────────┐
│  Diagnostics            │──┐
│                         │  │
└─────────────────────────┘  │
          │                  │
          │
   ┌──────────────┐
   │ Configuration│
   │ Printout     │
   └──────────────┘
```
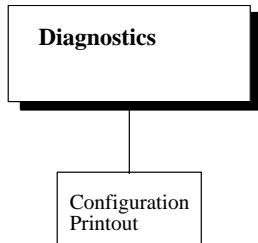
The configuration printout lists the configuration parameters currently stored and in use. The printout lists the main menus and submenu parameters in the same order as they occur when you use the control panel to configure the printer. Refer to the following steps to obtain a printout.

NOTE: It is recommended you print your configuration after you save it.

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	The printer must be off-line to print the configuration.
2.	Raise the printer cover.		
3.	+	ENTER Switch Not Locked	Unlocking the ENTER key allows you to print the configuration.
4.		Ribbon Life	
5.		Diagnostics	
6.		Configuration Printout	

Step	Press	Result	Notes
7.	ENTER	Configuration Printing	The configuration listing begins printing.
8.	Wait until the printer stops printing.	Configuration Printout	
9.	CLEAR	Off–Line Ready 1	
10.	⬠ + ⬡	ENTER Switch Locked	Prevents settings from being changed.
11.	FF		Advances the paper.
12.	Carefully tear off the configuration printout.		
13.	FF		Advances the paper.
14.	Close the printer cover. Store the printout in a safe place; write the date and other identifiable information on the printout.		
15.	ON LINE	On–Line (Current Font) 1	Places the printer on-line, ready for normal operation.

Changing Configuration Values

```
┌─────────────────┐   ┌─────────────────┐
│ Application     │───│ Paper Format    │
│ Compatibility   │   │                 │
└─────────────────┘   └─────────────────┘
                              │
                              │
              ┌───────────┐  ┌───────────┐  ┌───────────┐
              │Line Spacing│──│Form Length│──│Auto Line  │──→
              │           │  │  Set      │  │  Feed     │
              └───────────┘  └───────────┘  └───────────┘
                    │
                    │
              Set at 6 LPI
              Set at 8 LPI
              Set at 10.3 LPI
```
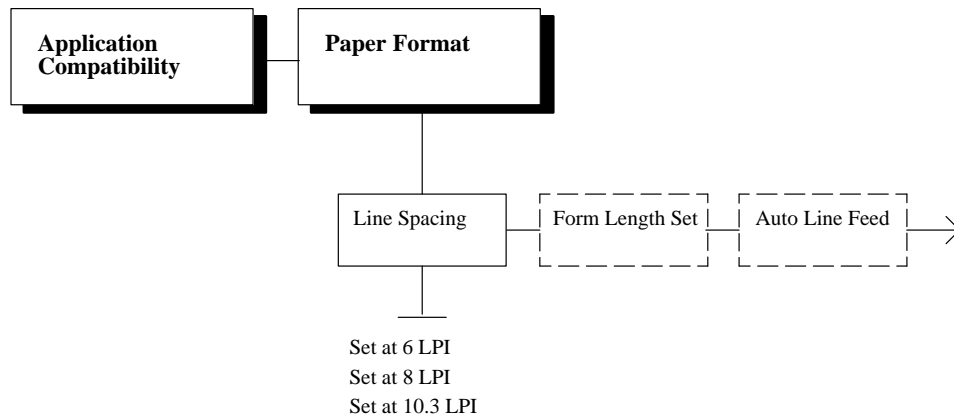
A configuration consists of several parameters.

The printer contains four predefined configurations (IGP, IBM 3287, IBM 5225, and the factory default), which cannot be altered.

However, you can change the four customized configurations to meet different print job requirements.

Changing the value of the Line Spacing parameter is provided as an example. Use these basic guidelines to move throughout the configuration menu and change other parameters. Page 3–6 shows the top level of the configuration menu.

IMPORTANT

You can change the parameters at any time. However, if you intend to SAVE the changes, be sure the current configuration is the one you want to revise.

NOTE: You can press CLEAR at any time to return to off-line.

Step	Press	Result	Notes
1.	Make a configuration printout. Refer to "Printing the Current Configuration" on page 3–12. You may skip this step.		
2.	Determine which parameters you want to change, and what their new values should be. (In this example, we are changing the value of the Line Spacing parameter from "Set at 6 LPI" to "Set at 8 LPI".)		
3.	Press: ON LINE	Off–Line Ready 1	The printer must be off-line to change the configuration.
4.	Raise the printer cover.		

IMPORTANT

If you intend to save your changes, they will be saved into the *current* configuration. To ensure you have the correct Configuration selected and loaded, do the following step.

Step	Press	Result	Notes
5.	CONFIG UNTIL	Load Saved Completed X	Selects and loads X (Configuration 1, 2, 3, or 4).
6.	◇ + ▽	ENTER Switch Not Locked	Unlocking the ENTER key allows you to make configuration changes.
7.	▽	Ribbon Life	
8.	▷ UNTIL	Paper Format	
9.	▽	Line Spacing	
10.	▽	Line Spacing Set at 6 LPI *	Asterisk (*) indicates this is the current setting. (6 LPI is also the factory default.)

Step	Press	Result	Notes
11.	◁ OR ▷	Line Spacing Set at X LPI *	Cycle through the values (6, 8, or 10.3 LPI).
12.	ENTER	Line Spacing Set at 8 LPI *	Selects the displayed value. Asterisk (*) appears, indicating this value is active.
13.	Continue this pattern to make other changes.		
14.	All changes remain in memory until you turn the printer off. If you want to save these changes as a configuration that is stored in memory and can later be loaded, go to page NO TAG. If you want to use—but not save—these settings, continue with the following steps.		
15.	CLEAR	Off–Line Ready 1	
16.	△ + ▽	ENTER Switch Locked	Prevents settings from being changed.
17.	Close the printer cover.		
18.	ON LINE	On–Line (Current Font) 1	Places the printer on-line, ready for normal operation.

Configuring the Printer

Saving Your New Configuration

```
┌─────────────────────────┐
│ Save Parameters         │
│ X                       │
│                         │
└─────────────────────────┘
            │
      ┌──────────────────┐
      │ Save Parameters  │
      │ Values Saved     │
      └──────────────────┘
```

X = Current 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. You can save up to four configurations to meet different print job requirements. For example:

      Config 1:   Selects DP font, 10 CPI, 6 LPI

      Config 2:   Selects NLQ font, 12 CPI, 8 LPI

The configurations are stored in non-volatile memory (NVRAM), so they are not lost if you turn off the printer. NVRAM is divided into four blocks, each of which stores a different setup (group of configuration settings).

If you know you will be printing up to four different types of jobs and each job has different requirements (line spacing, pitch, form size, character set, etc.), save each configuration as a different number. This eliminates the need to change the parameter settings for each new job.

The last saved configuration will load when the printer is turned off and then on again.

Step	Press	Result	Notes
1.	Verify you have made all of the necessary changes to your current configuration. Return to the top of the menu.		
2.	(down arrow key)	Ribbon Life	
3.	(left arrow key) UNTIL	Save Parameters X	X = the current configuration.
4.	ENTER	Save Parameters Values Saved	Displays for about one second. The printer has stored the new parameters in NVRAM as power-up default values.
5.	CLEAR	Off–Line Ready X	X = the current configuration.
6.	To make a printout of your configuration, go to page 3–12, step 4. If you decide not to print the configuration, then continue with the following steps.		
7.	(up arrow key) + (down arrow key)	ENTER Switch Locked	Prevents settings from being changed.
8.	Close the printer cover.		
9.	ON LINE	On–Line (Current Font) X	Places the printer on-line, ready for normal operation.

Configuring the Printer

Loading Predefined Configurations

```
┌──────────────────────┐
│  Load Parameters     │──┐
│                      │  │
└──────────────────────┘  │
          │
   ┌ ─ ─ ─ ─ ─ ┐  ┌ ─ ┐ ┌ ─ ─ ─ ┐ ┌ ─ ┐ ┌ ─ ─ ─ ─ ─ ┐ ┌ ─ ┐ ┌ ─ ─ ─ ─ ─ ┐
   │ Load Saved │  │   │ │       │ │   │ │           │ │   │ │           │──┐
   │ Parameters 1│ │   │ │       │ │   │ │           │ │   │ │           │  │
   └ ─ ─ ─ ─ ─ ┘  └ ─ ┘ └ ─ ─ ─ ┘ └ ─ ┘ └ ─ ─ ─ ─ ─ ┘ └ ─ ┘ └ ─ ─ ─ ─ ─ ┘  │
          │                                                                 │
   ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
   │ Load IGP     │──│ Load IBM 3287 │──│ Load IBM 5225 │──│ Load Factory │
   │ Parameters   │  │ Parameters    │  │ Parameters    │  │ Parameters   │
   └──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
```
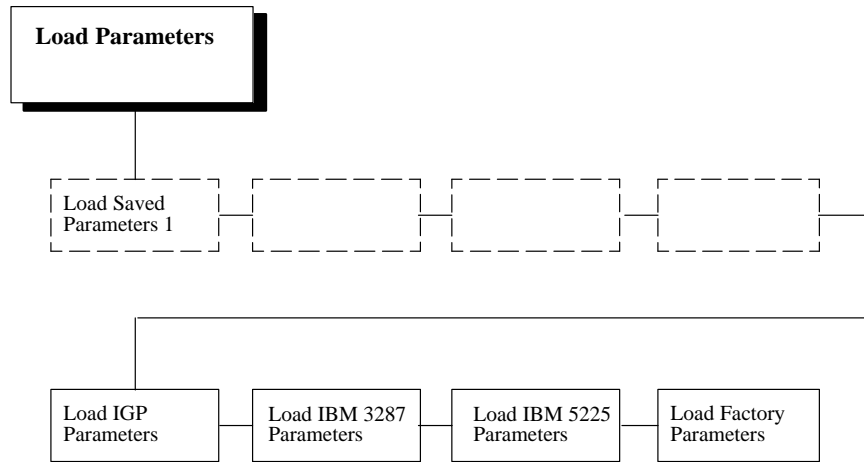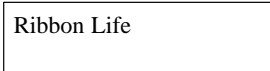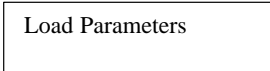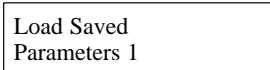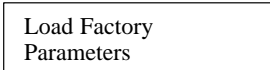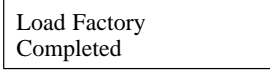
Use this procedure to load the factory, IGP, IBM 3287, or IBM 5225 configurations. These configurations are stored on ROM and cannot be altered. See Appendix D.
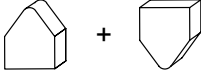
Although you can use this procedure to load one of the customized configurations, it is recommended you use the CONFIG key (page 3–22). It selects and loads a configuration—this configuration is the one that will be overwritten whenever you save a new setting.

When you load a configuration, it loads all of the stored parameters *into* the current configuration. For example, Configuration 1 is selected and loaded and "1" appears on the LCD. If you load configuration 4 using the menu and not the CONFIG key, all of its values are temporarily active, but configuration 4 is not selected. If you change a value and then save it, Configuration 1 is changed because it is the one that is selected.

To change the current configuration from 1 to 4 and modify 4, you must use the CONFIG key.

NOTE: The *last saved* configuration values will load when the printer is turned off and then on again.

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	The printer must be off-line to load a configuration.
2.	Raise the printer cover.		
3.	△ + ▽	ENTER Switch Not Locked	Unlocking the ENTER key allows you to load a configuration.
4.	▽	Ribbon Life	
5.	◁ UNTIL	Load Parameters	
6.	▽	Load Saved Parameters 1	First of series.
7.	◁ UNTIL	Load Factory Parameters	Press the key until you reach the appropriate parameter set (IGP, IBM 3287, IBM 5225, or Factory).
8.	ENTER	Load Factory Completed	Displays for about one second (message varies, depending on the parameter set you are loading). The printer loads the requested parameters.

IMPORTANT

Factory parameters are loaded only into Configuration 1, not saved. If you turn the printer off and then on, the saved Configuration 1 values will be restored.

Step	Press	Result	Notes
9.	CLEAR	Off–Line Ready 1	

Configuring the Printer

Step	Press	Result	Notes
10.	△ + ▽	ENTER Switch Locked	Prevents settings from being changed.
11. Close the printer cover.			
12.	ON LINE	On–Line (Current Font) 1	Places the printer on-line, ready for normal operation.

Loading Customized Configurations
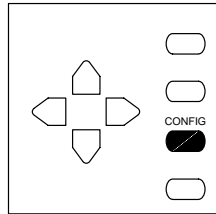
Figure 3–3. The CONFIG Key

A configuration contains a group of parameters that are set to particular values. You can customize up to four unique configurations to meet specific job requirements.

Pressing the CONFIG key allows you to select and load one of the four customized configurations quickly.

Each time you press CONFIG, it selects and loads a configuration. For example, if Configuration 1 is loaded and you press CONFIG, Configuration 2 is selected and loads. "2" appears on the LCD.

Any changes you make and save will override the existing values.

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	
2.	CONFIG	Load Saved Completed Off–Line Ready X	X = Configuration 1, 2, 3, or 4. It becomes the current configuration. Each time you press CONFIG, it selects and loads the next configuration.
3.	If you intend to use the configuration, go to step 4. If you plan to revise the configuration, raise the printer cover. Go to page 3–15, step 6.		
4.	ON LINE	On–Line (Current Font) 1	
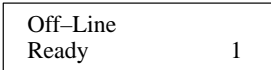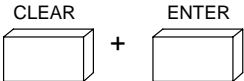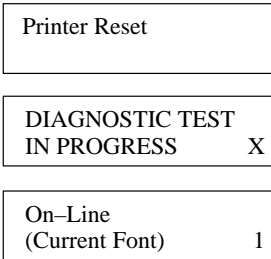
Resetting the Printer to Default or Saved Parameters

Printer reset is also called initializing the printer. This procedure clears RAM and loads either the factory configuration parameters or a set of parameters you have saved previously.

Factory parameters are permanently stored in ROM. However, if you have saved a set of configuration parameters, your *most recently saved set* loads when you reset the printer.

NOTE: You can reset the printer any time the power is on: While it is on-line, off-line, even while it is printing. However, to prevent losing data, reset the printer *only* when it is off-line and the printer's internal input buffer does not contain data.

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	Takes the printer off-line. This step can be skipped, but doing so might cause loss of data.
2.	Raise the printer cover.		

IMPORTANT

In the next step, make sure you press and release CLEAR and ENTER together. If you hold down the CLEAR key after pressing both keys, NVRAM is erased (including print statistics) and *all* printer parameters are reset to the factory defaults.

Step	Press	Result	Notes
3.	CLEAR + ENTER	Printer Reset DIAGNOSTIC TEST IN PROGRESS X On–Line (Current Font) 1	Press and release CLEAR and ENTER simultaneously.
4.	Close the printer cover.		

Configuration Menu Diagrams

The Configuration Menu diagrams on the following pages show the structure of the configuration menus and the parameters available in each menu. The diagrams list the menus and options in the order they appear on the control panel.

NOTE: In the following descriptions, hexadecimal (hex) values are shown for some ASCII codes, such as command delimiters. To verify your host computer is sending the correct delimiters or other codes to the printer, generate a hex code printout and look for the hex value of the delimiter in the printout. For details, see "Printing Hex Code" on page 5–13.

Off–Line Ready

Ribbon Life	Font	Character Set
Page 3–26	Page 3–29	Page 3–30

New Ribbon
Set Job Rate
Analyze Job
Set Ribbon Size
When Worn Action
Enable/Disable

See page 3–29 for font options.

Select Set
    IBM PC
    Multinational
    ECMA–94 Latin 1
    DEC Multinat.

Application Compatibility	Paper Format	Host Interface	Load Parameters	Save Parameters
Page 3–33	Page 3–42	Page 3–50	Page 3–63	Page 3–66

Printer Protocol
Buffer Size
Uppercase Select
Printer Select
Paper Advance Sw
Power On State
Alarm On Fault
Shuttle Timeout
Unidirectional
Select SFCC
80–9F Hex
Control Code 06
Control Code 08
Overstrike
Compress Print
Draft Print
Font Select Elongated
View
Display Language

Line Spacing
Form Length Set
Auto Line Feed
Define CR Code
Define LF Code
VFU Select
VFU Table
Perforation Skip
Paper Out
Paperout Adjust
PMD Fault
Slew Relative
Set Platen @BOF
Print Width
Slow Paper Slew

Centronics
Dataproducts
Serial RS–232

Load Saved Parameters 1
Load Saved Parameters 2
Load Saved Parameters 3
Load Saved Parameters 4
Load IGP Parameters
Load IBM 3287 Parameters
Load IBM 5225 Parameters
Load Factory Parameters

Press ENTER to save

Diagnostics

Page 3–67

Configuration Printout
Print Datastream in Hex Code
Printer Test 8 Inch Width
Printer Test Full Width
Print Statistics

To view options, press: ▼ DOWN
                            ▲ UP
                            ▶ RIGHT
                            ◀ LEFT
To select an option, press ENTER

To exit configuration (returning to
    Off–Line Ready), press CLEAR

* = Factory Default

Figure 3–4. Configuration Main Menu

Ribbon Life Menu Options

RibbonMinder™ monitors ink consumption to ensure quality printing. Chapter 6 explains how to use this feature in more detail.

```
┌─────────────────┐
│ Ribbon Life      │
│                  │
│ (From page 3–25) │
└─────────────────┘
```

New Ribbon	Set Job Rate	Analyze Job	Set Ribbon Size	When Worn Action

New Ribbon: Press ENTER to reset ribbon life to 100%. A new ribbon must be installed after setting the ribbon life to 100%.

Set Job Rate: Currently xxx New Rate yyy — Press ▶ or ◀ to increase or decrease New Rate by 1

Analyze Job: Press ENTER to enter the Analyze Job mode.

Set Ribbon Size: Currently xxx New Size yyy — Press ▶ or ◀ to increase or decrease New Size by 10

When Worn Action: * To Stop Printer / Aud/Vis Alarm / Visual Alarm

Enable/Disable: * Disable Action / Enable Action

To view options, press: ▼ DOWN / ▲ UP / ▶ RIGHT / ◀ LEFT
To select an option, press ENTER
To exit configuration (returning to Off–Line Ready), press CLEAR
* = Factory Default

Figure 3–5. Ribbon Life Menu

New Ribbon

Whenever you install a new ribbon, you must reset the ribbon life to 100%.

Set Job Rate

The job rate describes the rate at which a particular print job wears out the ribbon. Values can range from 0 (no wear) to 1000 (the highest possible rate of ink usage). The factory default setting is 150. You can change job rates without affecting print quality.

Press ▶ and ◀ to select the new job rate, then press ENTER to make the change effective.

Analyze Job

The "Analyze Job" mode allows you to analyze a print job to determine its job rate. The job rate describes the rate at which a particular print job wears out the ribbon.

Press the ENTER key to enter the "Analyze Job" mode. To clear the "Analyze Job" mode, set the job rate.

Set Ribbon Size

The standard ribbon size is 60 yards long; this is the factory default setting. You can specify the length in increments of 10 yards. Press ▶ and ◀ to select the new ribbon size, then press ENTER to make the change effective.

When Worn Action

When RibbonMinder detects zero percentage of ink left on the ribbon, you can set it to do one of the following:

• Stop the printer (and enable a visual and/or audible alarm).

• Initiate a visual and audible alarm that causes the printer to beep and flash its status lights, but the printer continues to print.

• Initiate a visual-only alarm that causes the printer to flash its status lights, but the printer continues to print.

Enable/Disable

Turns RibbonMinder on or off. Even with RibbonMinder off, the printer continues to calculate ink consumption. It is possible to enable and disable RibbonMinder while still on the same ribbon and to retain to accurate ink consumption (ribbon life) percentages.

Font Menu Options

The printer is capable of printing the following fonts:

- **DP:**   Data Processing; medium print resolution.

- **NLQ:**   Near Letter Quality (correspondence); high print resolution.

- **HS:**   High Speed; low print resolution. Three speeds are available: High Speed Draft A (HS), High Speed Draft B (HSB), and High Speed Draft C (HSC).

- **OCR-A:**   Optical Character Recognition Font A; print quality suitable for optical character readers.

- **OCR-B:**   Optical Character Recognition Font B; print quality suitable for optical character readers.

Pitch is the number of text characters printed per horizontal inch. It is specified in characters per inch (cpi). Most of the fonts in the printer have several pitch choices; the available choices are shown in Figure 3–6 on page 3–29.

As examples, selecting "HSC AT 12 CPI" sets up the printer to print at 12 characters per inch in the High Speed Draft C mode, while selecting "NLQ AT 10 CPI" sets up the printer to print at 10 characters per inch in the Near Letter Quality mode.

See page A–7 for horizontal and vertical dot densities.

Configuring the Printer

```
┌─────────────────────┐
│ Font                │
│                     │
│  (From page 3–25)   │
└─────────────────────┘
         │
    *DP AT 10 CPI
     DP AT 12 CPI
     DP AT 13 CPI
     DP AT 15 CPI
     DP AT 17 CPI
     DP AT 20 CPI
     NLQ AT 10 CPI
     NLQ AT 12 CPI
     NLQ AT 12.9 CPI
     NLQ AT 15 CPI
     NLQ AT 16.4 CPI
     HS AT 10 CPI
     HS AT 12 CPI
     HS AT 13 CPI
     HS AT 15 CPI
     HS AT 17 CPI
     HSB AT 10 CPI
     HSB AT 12 CPI
     HSB AT 13 CPI
     HSB AT 15 CPI
     HSB AT 17 CPI
     HSC AT 10 CPI
     HSC AT 12 CPI
     HSC AT 13 CPI
     HSC AT 15 CPI
     HSC AT 17 CPI
     OCR–A AT 10 CPI
     OCR–B AT 10 CPI
```

┌──────────────────────────────────────┐
│ To view options, press: ▼ DOWN   │
│   ▲ UP   │
│   ▶ RIGHT   │
│   ◀ LEFT   │
│ To select an option, press ENTER   │
│   │
│ To exit configuration (returning to │
│   Off–Line Ready), press CLEAR   │
│   │
│ * = Factory Default   │
└──────────────────────────────────────┘

Figure 3–6. Font Menu

Character Set Menu Options

Character Set

(From page 3–25)

Select Set

| IBM PC | MULTINATIONAL | ECMA–94 LATIN 1 | DEC MULTINAT. |

IBM PC:

Select Subset

Primary   Extended

Select Language

*ASCII
FRENCH
GERMAN
ENGLISH
DANISH
SWEDISH
ITALIAN
SPANISH
JAPANESE
FRENCH CANADIAN
LATIN AM
NORWEGIAN
DANISH II
SPANISH II
LATIN AM II

Extended:
*IBM PC GRAPHICS
CODE PAGE 850

MULTINATIONAL:

Select Language

*ASCII
EBCDIC

ECMA–94 LATIN 1:

Select Subset

Primary   Extended

Select Language (Primary):

*ASCII
GERMAN
SWEDISH
DANISH
NORWEGIAN
FINNISH
ENGLISH
DUTCH
FRENCH
SPANISH
ITALIAN
TURKISH
JAPANESE

Select Language (Extended):

*MULTINATIONAL
BAR CODE DP10
MULTINAT. DP10
MULTINAT. DP12
MULTINAT. NLQ10
GREEK DP10
GREEK DP12
GREEK NLQ10
GRAPHICS DP10
GRAPHICS NLQ10
SCIENT. DP10
SCIENT. DP12
SCIENT. NLQ10

DEC MULTINAT.:

Select Language

*ASCII
FRENCH
GERMAN
ENGLISH
NORW./DAN.
SWEDISH
ITALIAN
SPANISH
JAPANESE
FRENCH CANADIAN
DUTCH
FINNISH
SWISS

To view options, press: ▼ DOWN
▲ UP
▶ RIGHT
◀ LEFT
To select an option, press ENTER
To exit configuration (returning to
Off–Line Ready), press CLEAR
* = Factory Default

Figure 3–7. Character Set Menu

Figure 3–7 shows the Character Set Menu. This menu defines which character code or symbol set the printer uses, including bar code character sets.

There are four possible character sets from which to choose: IBM PC, Multinational, ECMA-94 Latin 1, and DEC Multinational. Each of these character sets has several additional choices for language. In addition, the language choices for the IBM PC character set and for the ECMA-94 Latin 1 character set are further subdivided into a primary and an extended subset, as shown in the figure.

As an example, pressing the ▼ key from the Character Set menu will display "Select Set IBM PC". Pressing ▶ twice selects the ECMA-94 Latin 1 set. If you then press the ▼ key, your choices will be either the "Primary" or "Extended" subset. If you press ▶ to select "Extended", followed by the ▼ key, your choices will be: "Multinational", "Barcode DP 10", and so on, through "Scient. NLQ 10". Press the ▶ and ◀ keys until the display shows the choice you want, then press ENTER to select that choice.

Refer to the *Programmer's Reference Manual* for character set charts.

NOTE: DOWNLOADED is displayed when a downloaded substitution table is active.

Application Compatibility Menu Options

The Application Compatibility parameters, shown in Figure 3–8, control the overall operation of the printer:

- **Printer Protocol**
- **Buffer Size**
- **Uppercase Select**
- **Printer Select**
- **Paper Advance SW**
- **Power On State**
- **Alarm On Fault**
- **Shuttle Timeout**
- **Unidirectional**
- **Select SFCC**

- **80–9F Hex.**
- **Control Code 06**
- **Control Code 08**
- **Overstrike**
- **Compress Print**
- **Draft Print**
- **Font Select / Elongated**
- **View**
- **Display Language**

For definitions of terminology used in this section, refer to the Glossary at the end of this manual. For more detailed information, refer to the *Programmer's Reference Manual*.

NOTE: In the following descriptions, hexadecimal (hex) values are shown for some ASCII codes, such as command delimiters. If you want to verify that your host computer is sending the correct delimiters or other codes to the printer, you can obtain a hex code printout and look for the hex value of the delimiter in the printout. For details, see "Printing Hex Code" on page 5–13.

Application Compatibility
(From page 3–25)

Printer Protocol	Buffer Size	Uppercase Select	Printer Select	Paper Advance SW	Power On State

* P–Series
Serial Matrix
P–Series XQ

* 2048 Characters
512 Characters
1024 Characters

* Upper & Lower
Uppercase Only

* Disable
On=DC1/Off=DC3

* Print + Pap Adv
Move Paper Only

* On–Line
Off–Line

Alarm On Fault	Shuttle Timeout	Unidirectional	Select SFCC	80–9F Hex.	Control Code 06

* Enable
Disable

* 4 Seconds
10 Seconds
.
.
300 Seconds (Timeouts range from 10 to 300 in increments of 5 seconds.)

* Disable
P–Series Plot
Enable

* 01   SOH
03   ETX
1B   ESC
5E   Circumflex
7E   Tilde
7E   5D Tilde]

* Control Codes
Printable

* 8.0 LPI
10.3 LPI

Control Code 08	Overstrike	Compress Print	Draft Print	Font Select Elongated	View

* Double High
Backspace

* Enable
Disable

* 01 SOH
03 ETX
09 HT

* 02 STX
03 ETX
09 HT

* Font Select = 0E
Elongated = 08

Font Select = 08
Elongated = 0E

* Lines
Labels

Display Language

* English
Deutsch
Français
Español
Italiano

To view options, press: ▼ DOWN
▲ UP
► RIGHT
◄ LEFT
To select an option, press ENTER

To exit configuration (returning to Off–Line Ready), press CLEAR

* = Factory Default

Figure 3–8. Application Compatibility Menu

Printer Protocol

The Printer Protocol parameter enables you to set the desired printer emulation.

- **P-Series:** Standard Printronix P-Series emulation. The command delimiter is an ASCII code that is configured from the control panel via the Select SFCC parameter. (The ASCII Code SOH (01 hex) is the default command delimiter. See the description of the Select SFCC parameter on page 3–38.)

- **Serial Matrix:** IBM Graphics Printer emulation; uses ASCII Code ESC (1B hex) as a command delimiter.

- **P-Series XQ:** Printronix P300 or P600 printer emulation; uses no command delimiters.

Buffer Size

The Buffer Size parameter allows you to select the number of characters that the printer internal input buffer can contain, including non-printable characters. You can change the buffer size, depending on your host computer's requirements.

- **2048 characters**
- **512 characters**
- **1024 characters**

Uppercase Select

The Uppercase Select parameter controls how the printer handles lowercase characters it receives from the host computer.

- **Upper & Lower:** The printer prints lowercase characters received from the host computer as lowercase, and uppercase characters received from the computer as uppercase.

- **Uppercase Only:** The printer prints lowercase characters received from the host computer as their corresponding uppercase equivalents; uppercase characters received from the computer are printed as uppercase.

NOTE: The Uppercase Select parameter is available only when the P-Series XQ Printer Protocol has been selected.

Printer Select

The Printer Select parameter allows you to use control codes DC1 (on) and DC3 (off) to cause the printer to interpret or ignore data sent from the host computer.

- **Disable:** Turns off the Printer Select feature. DC1 and DC3 control codes have no effect on the printer.

- **On=DC1/Off=DC3:** Turns on the Printer Select feature. When the printer receives a DC3 control code from the host computer, the printer discards all host data following the DC3 until it receives a DC1 control code. When the printer receives a DC1 from the host, the printer processes all host data following the DC1 until it receives a DC3.

NOTE: The Printer Select parameter is available only when the Serial Matrix Printer Protocol has been selected.

Paper Advance SW (Switch)

The Paper Advance SW parameter controls the action of the Form Feed (FF) key on the printer's control panel when the printer is off-line.

- **Print + Pap Adv:** If there is *no* data in the printer's internal input buffer and you press the FF key, the paper immediately advances to top-of-form. If there *is* unprinted data in the buffer when you press the FF key, the printer first prints the data and then advances the paper only to the next print line. In this case, if you press the FF key again, the paper will then advance to top-of-form.

- **Move Paper Only:** When you press the FF key, the paper immediately advances to top-of-form; any unprinted data in the printer's internal input buffer is left undisturbed.

NOTE: When the printer is on-line, the Paper Advance SW parameter has no effect.

If the printer is on-line, and there is *no* data in the printer's internal input buffer, pressing the FF key causes the paper to advance to top-of-form.

If the printer is on-line, and there *is* unprinted data in the buffer, pressing the FF key has no effect.

Power On State

The Power On State parameter determines the operating state when the printer is powered on.

- **On-Line:** When the printer is turned on, it will go into the on-line state and will be ready to receive and print data.

- **Off-Line:** When the printer is turned on, it will go into the off-line state. You can configure the printer via the control panel or do other mechanical operations, such as loading paper, installing ribbon, etc.

Alarm On Fault

The Alarm On Fault parameter determines whether or not the audible alarm sounds on a printer fault, such as an out-of-paper condition. If Alarm On Fault is enabled, the alarm sounds when a printer fault occurs. You can enable or disable this parameter.

Shuttle Timeout

The shuttle timeout parameter determines the amount of time the shuttle will continue running after printing stops. This allows the shuttle to continue moving during the time between print jobs when the print jobs arrive at frequent intervals (less than five minutes apart). Time is saved if the shuttle is still moving when a print job arrives at the printer, since the printer does not have to wait for the shuttle to reach its operating speed.

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 or high quality text. Although enabling this feature reduces print speed, it enhances the vertical alignment of dots and produces cleaner, sharper bar codes and text.

- **Disable:** The printer will print all data in both directions of the shuttle sweep (bidirectional printing). This choice produces higher printing speed.
- **P-Series Plot:** The printer will print all P-Series plot dots in only one direction of the shuttle sweep. All other data are printed bidirectionally.
- **Enable:** The printer will print all data in only one direction of the shuttle sweep (unidirectional printing). This choice produces higher print quality.

Select SFCC

The Select SFCC feature allows you to select which ASCII codes will function as the command delimiter (Special Function Control Character).

- **SOH** (01 hex)
- **ETX** (03 hex)
- **ESC** (1B hex)
- **CIRCUMFLEX** (5E hex) — also called caret or "hat" (^)
- **TILDE** (7E hex) — (~)
- **TILDE, RIGHT BRACKET** (7Eh 5D hex) — (~])

NOTE: SOH, ETX and ESC are non-printable (control) characters. The characters (^), (~),and (~]) are printable characters; however, if you choose any of these as the command delimiter, do not use them as printable characters in the host data stream, or print errors will occur.

NOTE: The Select SFCC parameter is available only when the P-Series Printer Protocol has been selected.

80–9F Hex

The 80–9F Hex feature determines whether the printer processes ASCII codes 80h through 9F hex as control codes or as printable characters. (Refer to the *Programmer's Reference Manual*.)

Control Code 06

The Control Code 06 feature defines the function of ASCII code 06 hex (ACK). You can select alternate line spacing of either 8 LPI or 10.3 LPI.

NOTE: The Control Code 06 parameter is available only when the P-Series Printer Protocol or P-Series XQ Printer Protocol has been selected.

Configuring the Printer

Control Code 08

The Control Code 08 feature defines the function of ASCII code 08 hex (BS). You can select a Backspace function or a Double High (elongated) print function.

NOTE: The Control Code 08 parameter is available only when the P-Series Printer Protocol has been selected.

Overstrike

When the overstrike feature is enabled, common dots appear darker in characters that are printed over each other, as shown in the example below, where a zero character (0) is overstruck with a slash character (/):
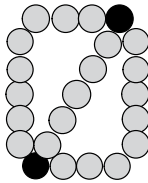
When the overstrike feature is disabled, common dots blend together in characters that are printed over each other.

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

Compress Print

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.

The Compress Print parameter controls which host command sets compressed printing.

- SOH (01 hex)
- ETX (03 hex)
- HT (09 hex)

NOTE: The Compress Print parameter is available only when the P-Series XQ Printer Protocol has been selected.

Draft Print

The Draft Print parameter controls which host command sets draft printing.

- STX (02 hex)
- ETX (03 hex)
- HT (09 hex)

NOTE: The Draft Print parameter is available only when the P-Series XQ Printer Protocol has been selected.

Font Select / Elongated

The Font Select / Elongated parameter controls how the printer interprets the hex codes 08 and 0E.

- **Font Select = 0E and Elongated = 08:** The printer interprets the code 0E hex in the data stream from the host computer as a Font Select command; it interprets 08 hex as an Elongated Print command.

- **Font Select = 08 and Elongated = 0E:** The printer interprets the code 08 hex from the host as a Font Select command; it interprets 0E hex as an Elongated Print command.

NOTE: The Font Select / Elongated parameter is available only when the P-Series XQ Printer Protocol has been selected.

View

The View parameter determines how far the paper will move when the VIEW key is pressed.

- **Lines:** Pressing the VIEW key advances the paper far enough that you can see the last line printed.

- **Labels:** Pressing the VIEW key advances the paper far enough that you can remove all labels that have been printed.

Display Language

The Display Language feature controls the language in which messages are displayed on the control panel. Messages can be displayed in one of five languages.

- **ENGLISH** (English; the factory default)
- **DEUTSCH** (Austrian/German)
- **FRANÇAIS** (French)
- **ESPAÑOL** (Spanish)
- **ITALIANO** (Italian)

Paper Format Menu Options

Paper Format

(From page 3–25)

Line Spacing
* Set at 6 LPI
  Set at 8 LPI
  Set at 10.3 LPI

Form Length Set

In Inches
* 11.0 Inches
  (Value range is
  from 1.0 to 24.0
  inches in 0.5 inch
  increments.)

In 6 LPI Lines
* 66 Lines
  (Value range is
  from 1 to 192
  lines in 1 line
  increments.)

In 8 LPI Lines
* 88 Lines
  (Value range is
  from 1 to 192
  lines in 1 line
  increments.)

Auto Line Feed
* After Full Line
  Disable

Define CR Code
* CR = CR
  CR = CR + LF

Define LF Code
* LF = CR + LF
  LF = LF

VFU Select
* EVFU
  DVFU
  NVFU
  CVFU
  Disable

VFU Table
* Clear
  Save

Perforation Skip
* Disable
  1/2 Inch
  2/3 Inch
  5/6 Inch
  1 Inch

Paper Out
* End of Paper
  Immediate

Paperout Adjust
* 81 Dot Rows (range
  is 63 to 99)
  in increments of 1.

PMD Fault
* Enable
  Disable

Slew Relative
* 1 to 16
  1 to 15

Set Platen @ BOF
* Disable
  Enable

Print Width
* 13.2 Inches
  13.7 Inches
  8.0 Inches

Slow Paper Slew
* Disable
  Enable

To view options, press: ▼ DOWN
▲ UP
▶ RIGHT
◀ LEFT

To select an option, press ENTER

To exit configuration (returning to
Off–Line Ready), press CLEAR

* = Factory Default

Note: Paper Format parameters vary, depending on
the Printer Protocol setting (P–Series, Serial Matrix,
or P–Series XQ). All parameters are listed here.

Figure 3–9. Paper Format Menu

Line Spacing

The Line Spacing feature sets the number of lines to be printed per inch (lpi). At 6 lpi, for example, print lines are spaced 1/6-inch apart.

- Set At 6 LPI

- Set At 8 LPI

- Set At 10.3 LPI

Form Length Set

The Form length feature sets the number of lines that can be printed on a page. You can set form length in inches or in print lines per page, at either 6 or 8 lines per inch (lpi).

You should set only one of the following three values, as changing one value automatically changes the other two:

- **In Inches:** Set this value to the length of the form in inches, but only if the length is evenly divisible by 1/2 inch. You can choose from 1 to 24 inches in 1/2 inch increments (for example, select 11 for 8 1/2" X 11" paper).

- **In 6 LPI Lines:** Set this value to the number of lines to be printed on each form. The form length must be evenly divisible by 1/6 inch. You can choose from 1 to 192 lines (for example, select 66 lines for an 11-inch form).

- **In 8 LPI Lines:** Set this value to the number of lines to be printed on each form. The form length must be evenly divisible by 1/8 inch. You can choose from 1 to 192 lines (for example, select 88 lines for an 11-inch form).

Auto Line Feed

The Auto Line Feed feature may be enabled to prevent data from being "lost" beyond the right margin. When the right margin is reached, a Line Feed code (0A hex) is inserted into the data stream, causing the remaining data to print on the next line.

- **After Full Line:** The feature is enabled; the printer inserts an extra Line Feed after each full line of text.
- **Disable:** The feature is disabled.

Define CR (Carriage Return) Code

The Define CR Code feature 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:** The feature is disabled.
- **CR = CR + LF:** The feature is enabled; the printer inserts an extra Line Feed after each Carriage Return.

Define LF (Line Feed) Code

The Define LF Code feature controls the action of the printer when it receives a Line Feed code (0A hex) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (0D hex) 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 feature is enabled; the printer inserts an extra Carriage Return before each Line Feed.
- **LF = LF:** The feature is disabled.

VFU (Vertical Format Unit) Select

The VFU Select feature controls how the printer handles vertical formatting.

- **EVFU:** Enables the VFU and selects Printronix P-Series compatible Electronic Vertical Format Unit (EVFU).

- **DVFU:** Enables the VFU and selects Dataproducts-compatible Direct Access Vertical Format Unit (DAVFU).

- **NVFU:** Enables the VFU and selects Printronix P-Series compatible New direct access Vertical Format Unit (NVFU).

- **CVFU:** Enables the VFU and selects Centronics-compatible direct access Vertical Format Unit (CVFU).

- **Disable:** Disables all VFU processing.

The *Programmer's Reference Manual* discusses the VFU in more detail.

NOTE: When the host computer has sent VFU data to the printer, and the printer is on-line, it displays an "L" (for "Loaded") in the lower right corner of the message display. When the host has cleared the VFU data (or has not sent any), no "L" is displayed.

When the VFU Select parameter is set to enable the VFU, and the printer is on-line, the printer displays an "E" (for "Enabled") in the upper right corner of the message display. When the VFU is disabled, no "E" is displayed.

NOTE: The choices above are available when the P-Series printer protocol has been selected.

When the P-Series XQ printer protocol has been selected, only two choices are available for the VFU Select feature: Enable and Disable. In this case, with the VFU Select feature enabled, the vertical formatting is the same as the EVFU choice above.

When the Serial Matrix printer protocol has been selected, the VFU Select feature is not available.

VFU (Vertical Format Unit) Table

The VFU Table feature controls how the printer handles the VFU formatting information, which is stored in RAM. Either the VFU information can be cleared or it can be saved to NVRAM.

- **Clear:** With "Clear" displayed, press ENTER to discard the loaded VFU data.

- **Save:** With "Save" displayed, press ENTER to save the current VFU data in NVRAM. This data will be loaded into the VFU when the printer is reset or turned on.

NOTE: The VFU Table feature is available only when the P-Series Printer Protocol or P-Series XQ Printer Protocol has been selected.

Perforation Skip

The Perforation Skip feature allows or prevents printing on page perforations. 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 above the page perforation, and a 1/2" margin below the page perforation.

When this feature is disabled, the printer will not automatically skip over vertical page margins; in this case, printing can occur on page perforations.

Paper Out

The Paper Out feature determines whether an out-of-paper condition should be processed immediately or delayed for 2 vertical inches, allowing printing to continue to the end of the page.

- **End of Paper:** The printer delays processing of an out-of-paper condition by 2 vertical inches; printing can continue to the end of the page.

- **Immediate:** The printer processes an out-of-paper condition immediately.

Configuring the Printer

Paperout Adjust

The Paperout Adjust feature allows you to adjust the Paper Out distance from the perforation; that is, the last dot row on the page that will print when there is a Paper Out condition.

CAUTION

If the printer runs out of paper and this parameter is set incorrectly, the printer may print on the platen.

VORSICHT

Falls das Druckpapier ausgeht und dieser Parameter falsch eingestellt ist, kann es vorkommen, daß der Drucker auf die Druckwalze druckt.

PRÉCAUTIONS

Si l'imprimante est à court de papier, elle risque d'imprimer sur le cylindre.

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 sounds (if the alarm is also enabled), "PAPER JAM" appears on the message display, and the printer stops printing. Normally, this feature should be enabled; only disable PMD 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.

VORSICHT

Nach dem Ausschalten des PMD wird der Papiervorschub nicht mehr überwacht. Wenn ein Papierstau auftritt, ignoriert der Drucker die Bedingung und druckt weiter, was möglicherweise zu Schäden führt.

Slew Relative

The Slew Relative feature determines the number of lines slewed when an EVFU Slew Relative command is received.

For further information, refer to the EVFU information in the *Programmer's Reference Manual.*

> **NOTE:** The Slew Relative feature is available only when the P-Series XQ Printer Protocol has been selected.

Set Platen @ BOF

This feature is used to open the platen when the paper moves past the bottom of the form. This is useful for thick forms with perforations which may jam or inadvertently force open the platen.

- **Enable**. Opens the platen.
- **Disable**. The platen remains closed.

Print Width

The Print Width feature controls the maximum physical width of the print line; the printer will not print beyond this point.

- 13.2 inches
- 13.7
- 8 inches

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.

Slow Paper Slew

When enabled, the Slow Paper Slew option slows the rate at which paper advances into the stacking area of the printer. This option may be used if the paper slew speed is too fast to allow the paper to stack properly.

- **Enable**. Causes the printer to advance the paper at a slower speed.
- **Disable**. The default. The printer advances the paper at the maximum speed.

Host Interface Menu Options

Figure 3–10 shows the Host Interface Menu. From this menu, you can select one of three types of interface between the printer and your host computer:

- **Centronics:** Selects a Centronics parallel interface.

- **Dataproducts:** Selects a Dataproducts parallel interface.

- **Serial RS-232:** Selects an EIA-232 (EIA RS-232) serial interface.

Each of the three types of interfaces has its own set of parameters. These parameters control the interface between the printer and your host computer.

IMPORTANT

The printer will not work on-line 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 printer data cable.)

For example, if the interface on your computer is Dataproducts, then Dataproducts must be selected from the Host Interface Menu in the printer.
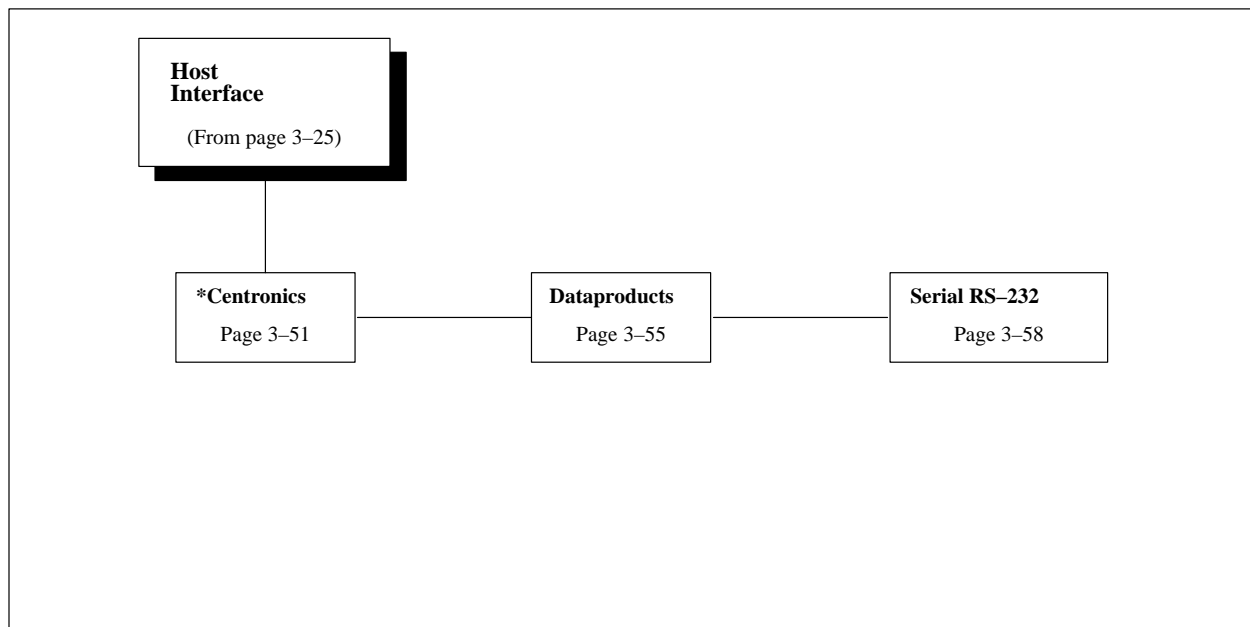
Figure 3–10. Host Interface Menu

Centronics Menu Options
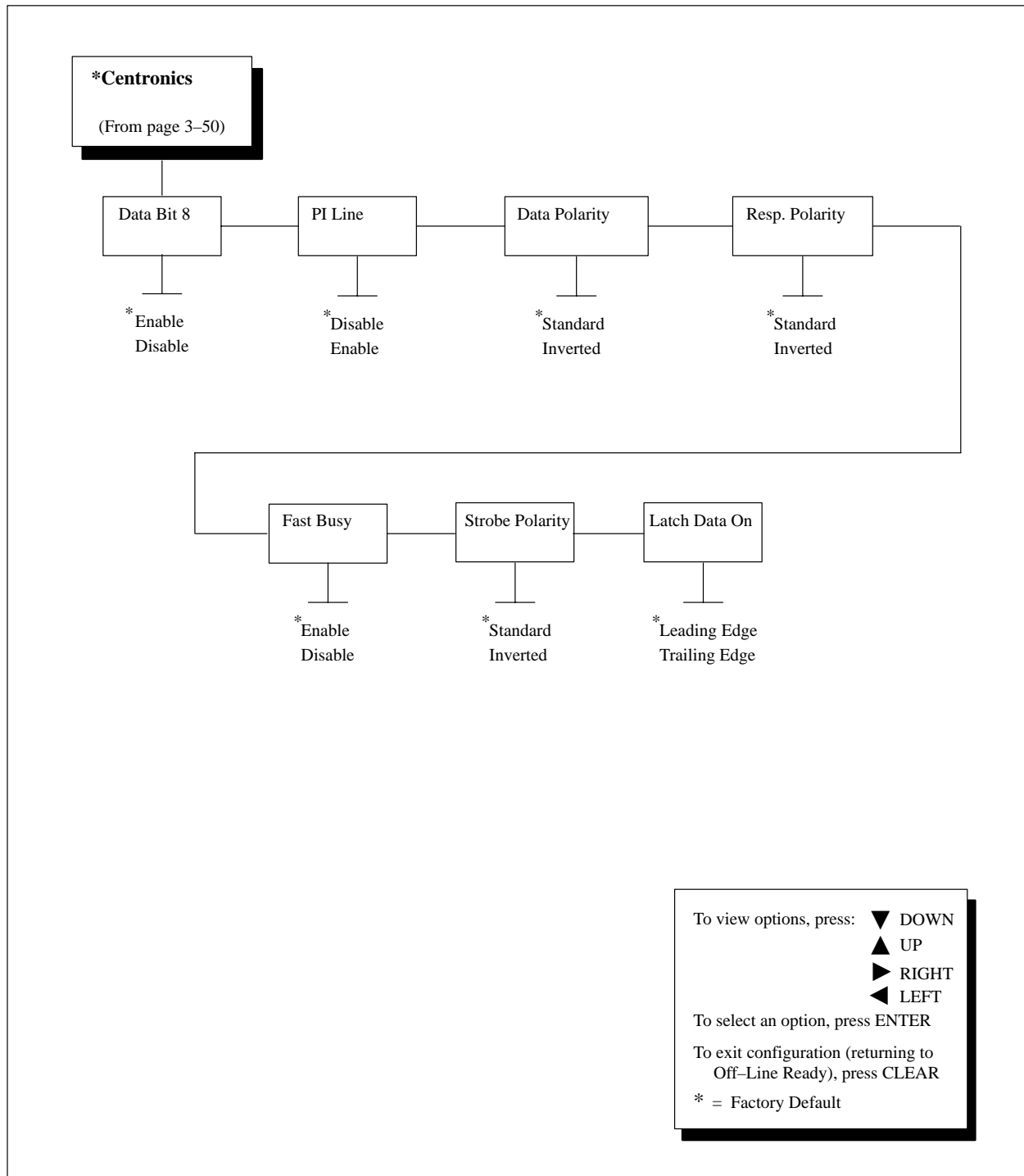
Figure 3–11. Centronics Menu

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.

PI (Paper Instruction) Line

The Paper Instruction Line parameter controls how the printer interprets the PI line on the Centronics parallel interface from the host computer. The PI line is a signal from the host that controls vertical paper motion. The setting of the PI Line parameter is dependent on your host computer.

- **Disable:** The printer always ignores the PI line and does not interpret the data lines as a paper instruction (PI); it treats them as ordinary data.
- **Enable:** When the PI line is asserted, the printer interprets the data lines as a paper instruction. When the PI line is de-asserted, the printer does not interpret the data lines as a paper instruction; it treats them as ordinary data.

NOTE: The PI Line parameter must be disabled if the host computer does not drive or control the PI signal on the interface. If the PI signal on the interface is not controlled by the host, and the PI Line parameter is enabled, rapid vertical paper movement ("slewing") will occur.

NOTE: The PI Line parameter is available only when the P-Series Printer Protocol has been selected.

Data Polarity

The Data Polarity parameter can be set to Standard or Inverted. It must be set to match the Data Polarity of your host computer.

- **Standard:** The printer does not invert the data.
- **Inverted:** The printer inverts the data it receives on the data lines from the host computer. Ones become zeros, and vice-versa.

Response Polarity

The Response Polarity parameter can be set to Standard or Inverted. It must be set to match the Response Polarity of your host computer.

- **Standard:** The printer does not invert the response signal.
- **Inverted:** The printer inverts the response signal it sends to the host computer.

Fast Busy

The Fast Busy parameter can be Enabled or Disabled. It must be set to match your host computer. The printer sends a busy signal to the host when it cannot receive more data (usually because its internal input buffer is full).

- **Enable:** The printer asserts the Busy signal to the host computer after each character it receives from the host.
- **Disable:** The printer asserts the Busy signal to the host only when the printer cannot accept more data from the host.

Strobe Polarity

The Data Strobe Polarity parameter can be set to Standard or Inverted. It 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 printer does not expect the data strobe signal to be inverted.

- **Inverted:** The printer expects the host computer to invert the data strobe signal.
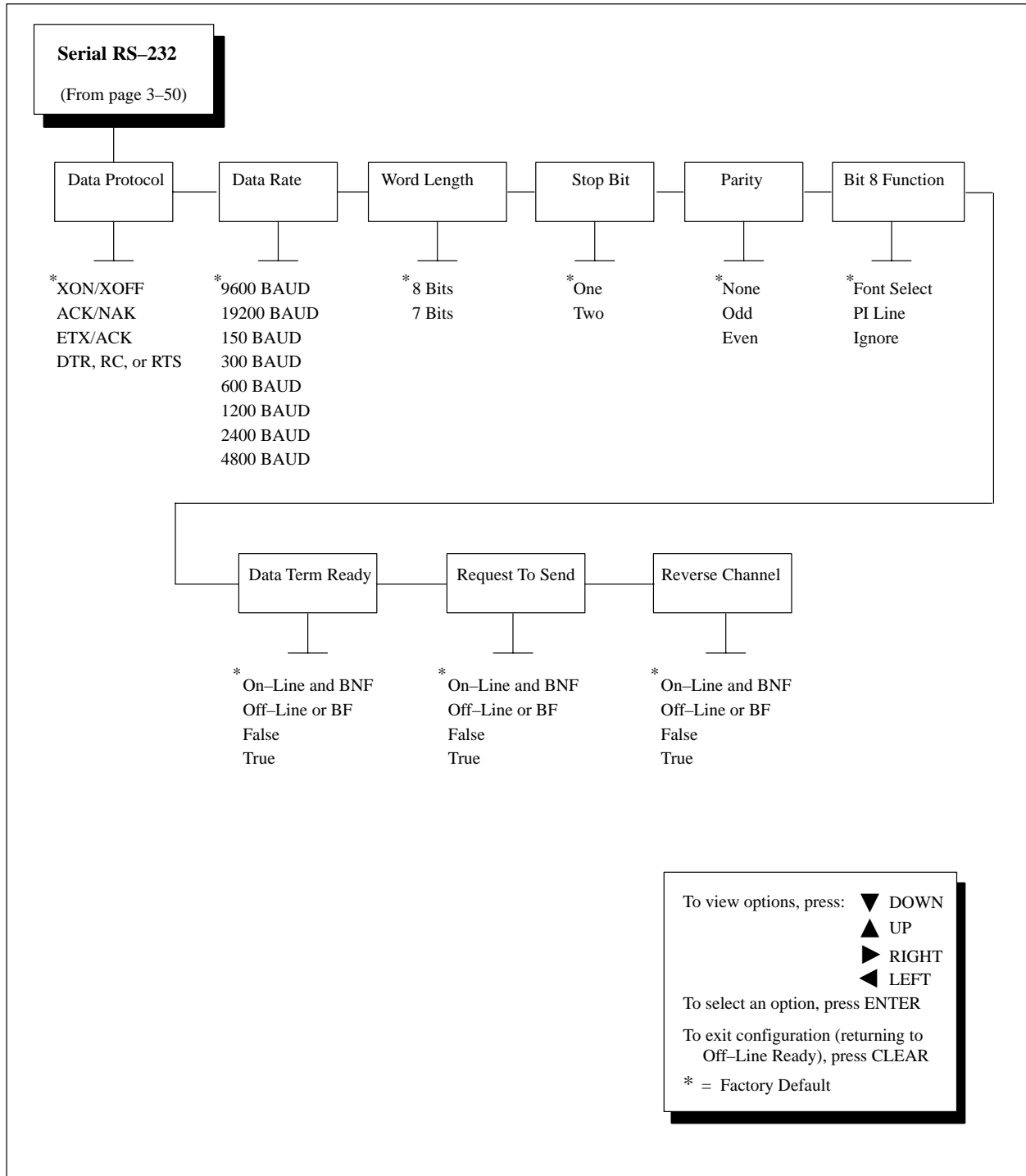
Latch Data On

The Latch Data On parameter can be set to Leading Edge or Trailing Edge, and is dependent on your host computer. To latch data means to read the data bus. This feature determines whether data on the bus will be read at the leading or the trailing edge of the data strobe.

Leading edge refers to the time at which an electronic signal changes from a "false" to a "true" condition.

Trailing edge refers to the time at which an electronic signal changes from a "true" to a "false" condition.

Configuring the Printer

Dataproducts Menu Options
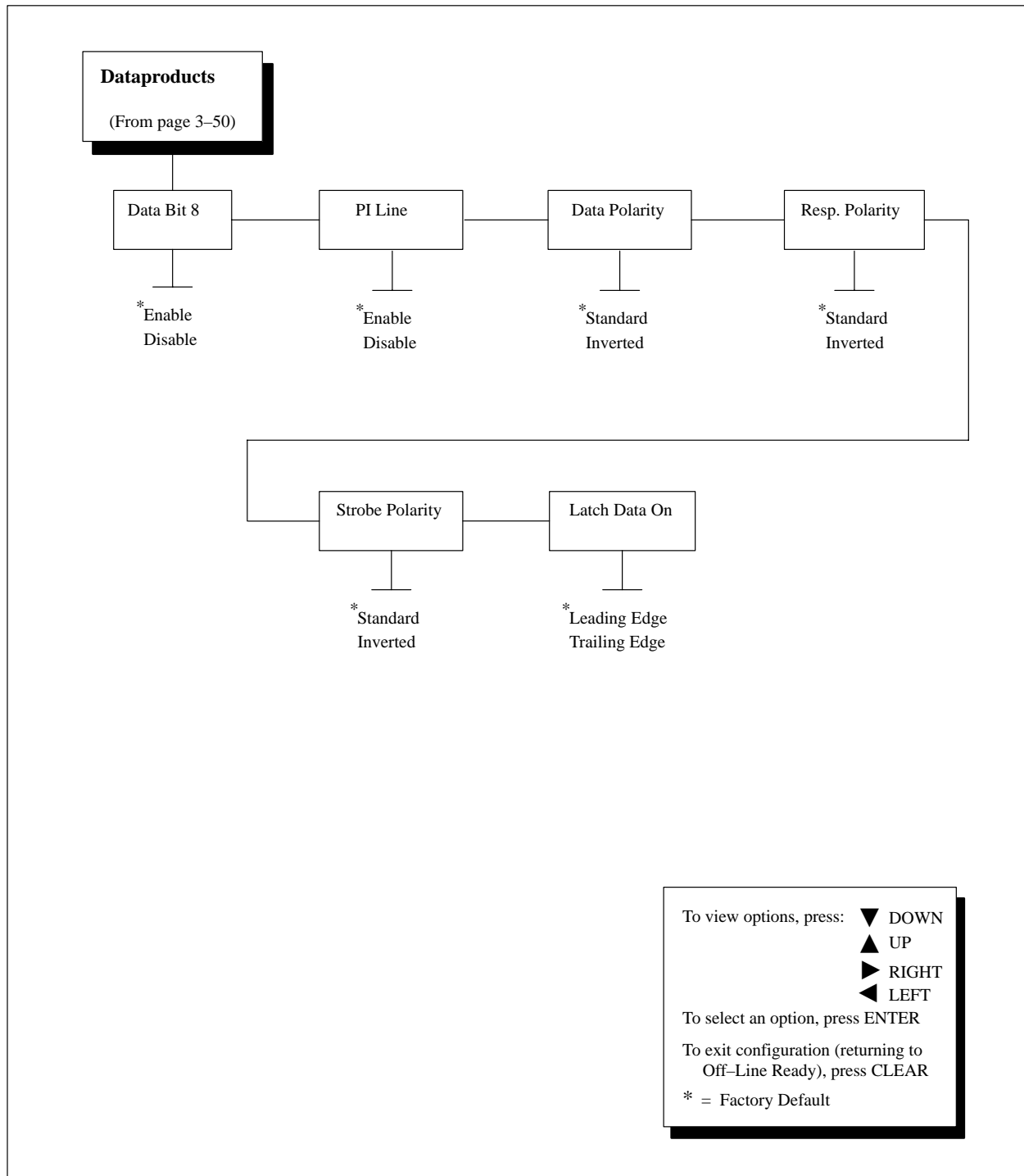
Figure 3–12. Dataproducts Menu

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 (Paper Instruction) Line

The Paper Instruction Line parameter controls how the printer interprets the PI line on the Dataproducts parallel interface from the host computer. The PI line is a signal from the host that controls vertical paper motion. The setting of the PI Line parameter is dependent on your host computer.

- **Enable:** When the PI line is asserted, the printer interprets the data lines as a paper instruction (PI). When the PI line is de-asserted, the printer does not interpret the data lines as a paper instruction; it treats them as ordinary data.

- **Disable:** The printer always ignores the PI line, and it does not interpret the data lines as a paper instruction; it treats them as ordinary data.

NOTE: The PI Line parameter must be disabled if the host computer does not drive or control the PI signal on the interface. If the PI signal on the interface is not controlled by the host, and the PI Line parameter is enabled, rapid vertical paper movement ("slewing") will occur.

NOTE: The PI Line parameter is available only when the P-Series Printer Protocol has been selected.

Data Polarity

The Data Polarity parameter can be set to Standard or Inverted. It must be set to match the Data Polarity of your host computer.

- **Standard:** The printer does not invert the data.

- **Inverted:** The printer inverts the data it receives on the data lines from the host computer. Ones become zeros, and vice-versa.

Response Polarity

The Response Polarity parameter can be set to Standard or Inverted. It must be set to match the Response Polarity of your host computer.

- **Standard:** The printer does not invert the response signal.
- **Inverted:** The printer inverts the response signal it sends to the host computer.

Strobe Polarity

The Data Strobe Polarity parameter can be set to Standard or Inverted. It 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 printer does not expect the data strobe signal to be inverted.
- **Inverted:** The printer expects the host computer to invert the data strobe signal.

Latch Data On

The Latch Data On parameter can be set to Leading Edge or Trailing Edge, and is dependent on your host computer. To latch data means to read the data bus. This feature determines whether data on the bus will be read at the leading or the trailing edge of the data strobe.

Leading edge refers to the time at which an electronic signal changes from a "false" to a "true" condition.

Trailing edge refers to the time at which an electronic signal changes from a "true" to a "false" condition.

Serial RS-232 Menu Options

```
┌─────────────────┐
│ Serial RS–232   │
│                 │
│ (From page 3–50)│
└─────────────────┘
        │
   ┌────┴──────┬──────────┬──────────┬──────────┬──────────┬─────────────┐
┌──┴────────┐ ┌┴────────┐ ┌┴────────┐ ┌┴────────┐ ┌┴──────┐ ┌┴──────────────┐
│Data Protocol│ │Data Rate│ │Word Length│ │Stop Bit │ │Parity │ │ Bit 8 Function │
└──┬────────┘ └┬────────┘ └┬────────┘ └┬────────┘ └┬──────┘ └┬──────────────┘
   │           │           │           │           │         │
*XON/XOFF    *9600 BAUD   *8 Bits     *One       *None     *Font Select
 ACK/NAK      19200 BAUD   7 Bits      Two        Odd        PI Line
 ETX/ACK      150 BAUD                            Even       Ignore
 DTR, RC, or RTS 300 BAUD
              600 BAUD
              1200 BAUD
              2400 BAUD
              4800 BAUD
```

```
      ┌───────────────┬───────────────┐
┌─────┴─────────┐ ┌───┴───────────┐ ┌─┴─────────────┐
│Data Term Ready│ │Request To Send│ │Reverse Channel│
└─────┬─────────┘ └───┬───────────┘ └─┬─────────────┘
      │               │               │
*                *                *
 On–Line and BNF  On–Line and BNF  On–Line and BNF
 Off–Line or BF   Off–Line or BF   Off–Line or BF
 False            False            False
 True             True             True
```

```
┌──────────────────────────────────────┐
│ To view options, press:   ▼ DOWN      │
│                           ▲ UP        │
│                           ▶ RIGHT     │
│                           ◀ LEFT      │
│ To select an option, press ENTER      │
│ To exit configuration (returning to   │
│   Off–Line Ready), press CLEAR        │
│ *  =  Factory Default                 │
└──────────────────────────────────────┘
```

Figure 3–13. Serial RS-232 Menu

Configuring the Printer

Data Protocol

The Data Protocol parameter selects one of several different serial interface protocols. These protocols provide for flow control and other host interface requirements. These are discussed on page 4–11 in Chapter 4, *Printer Interfaces*.

- **X-ON/X-OFF**
- **ACK/NAK**
- **ETX/ACK**
- **DTR, RC, or RTS**

IMPORTANT

When the Data Protocol parameter is set either to the ACK/NAK protocol or to the ETX/ACK protocol, the protocol consumes all ETX characters. Because of this, if you are using ACK/NAK or ETX/ACK, you cannot use the ETX character for other control functions.

Data Rate

The Data Rate 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.

IMPORTANT

The Data Rate parameter in the printer must be set to the same baud rate as the serial interface in the host computer (at the other end of the printer's data cable). Otherwise, the printer might not work on-line, and data characters from the computer might not print or might print as "garbled" text.

Word Length

The Word Length 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 word length setting in the host computer.

Stop Bit

The Stop Bit 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.

Parity

The Parity parameter can be set for odd parity, even parity, or no parity. The setting must match the corresponding parity setting in the host computer. Parity error handling is discussed further on page 4–12 in Chapter 4, *Printer Interfaces*.

Bit 8 Function

The Bit 8 Function parameter controls how the printer interprets data bit 8 in the serial data characters it receives from the host computer. You should set this parameter according to the manner in which the host computer uses data bit 8.

- **Font Select:** This setting allows access to the extended ASCII character set.

- **PI Line:** This setting allows the host computer to use data bit 8 to control vertical paper motion.

- **Ignore:** This setting causes the printer to ignore data bit 8.

NOTE: Do not select the PI line setting of the Bit 8 Function parameter unless the host computer uses bit 8 for paper control. Otherwise, rapid vertical paper movement ("slewing") might occur.

Data Term Ready

The Data Term Ready parameter selects how the printer controls the Data Terminal Ready (DTR) signal. DTR is a control signal from the printer to the host computer indicating whether or not the printer is ready to receive data. You should set this parameter according to the manner in which the host computer uses DTR.

- **On-Line and BNF:** The printer asserts DTR whenever it is on-line and its internal input buffer is not full (BNF).
- **Off-Line or BF:** The printer asserts DTR whenever it is off-line or its buffer is almost full (BF).
- **False:** The printer continuously de-asserts DTR.
- **True:** The printer continuously asserts DTR.

Request To Send

The Request to Send parameter selects how the printer controls the Request to Send (RTS) signal. RTS is a control signal from the printer to the host computer indicating whether or not the printer is ready to receive data. You should set this parameter according to the manner in which the host computer uses RTS.

- **On-Line and BNF:** The printer asserts RTS whenever it is on-line and its internal input buffer is not full (BNF).
- **Off-Line or BF:** The printer asserts RTS whenever it is off-line or its buffer is almost full (BF).
- **False:** The printer continuously de-asserts RTS.
- **True:** The printer continuously asserts RTS.

Reverse Channel

The Reverse Channel parameter selects how the printer controls the Reverse Channel (RC) signal. RC is a control signal from the printer to the host computer indicating whether or not the printer is ready to receive data. You should set this parameter according to the manner in which the host computer uses RC.

- **On-Line and BNF:** The printer asserts RC whenever it is on-line and its internal input buffer is not full (BNF).

- **Off-Line or BF:** The printer asserts RC whenever it is off-line or its buffer is almost full (BF).

- **False:** The printer continuously de-asserts RC.

- **True:** The printer continuously asserts RC.

Load Parameters Menu Options

You can load one of four sets of previously-saved parameters, one of three sets of permanently-stored factory-set parameters, or the permanently-stored factory-set default parameters, as needed, into the currently-selected configuration (1, 2, 3, or 4). (Also see "Loading Configuration Values" on page 3–19.)

```
┌─────────────┐
│ Load        │
│ Parameters  │
│             │
│ (From page 3–25) │
└─────────────┘
      │
  ┌───────────┬───────────┬───────────┬───────────┐
  │           │           │           │
┌────────┐ ┌────────┐ ┌────────┐ ┌────────┐
│ Load   │ │ Load   │ │ Load   │ │ Load   │
│ Saved  │ │ Saved  │ │ Saved  │ │ Saved  │
│ Param 1│ │ Param 2│ │ Param 3│ │ Param 4│
└────────┘ └────────┘ └────────┘ └────────┘
```

Load Saved Parameters 1	Load Saved Parameters 2	Load Saved Parameters 3	Load Saved Parameters 4
Press ENTER to load the parameters	Press ENTER to load the parameters	Press ENTER to load the parameters	Press ENTER to load the parameters

Load IGP Parameters	Load IBM 3287 Parameters	Load IBM 5225 Parameters	Load Factory Parameters
Press ENTER to load the parameters	Press ENTER to load the parameters	Press ENTER to load the parameters	Press ENTER to load the parameters

To view options, press: ▼ DOWN
▲ UP
▶ RIGHT
◀ LEFT
To select an option, press ENTER

To exit configuration (returning to Off–Line Ready), press CLEAR

* = Factory Default

Figure 3–14. Load Parameters Menu

Load Saved Parameters (1, 2, 3, or 4)

> **NOTE:** Although you can use this menu to load customized configurations, it is recommended you use the CONFIG key. See page 3–22.

Pressing ENTER when this message displays loads the first (or second, third, or fourth) set of parameters you saved previously.

After you press ENTER, the message "Load Saved Completed" will display for about one second. Then, the display returns to the "Load Saved Parameters" menu.

Load IGP Parameters

Pressing ENTER when this message displays loads the permanently-stored factory-set parameters for the IGP.

After you press ENTER, the message, "Load IGP Completed" will display. for about one second. Then, the display returns to the "Load IGP Parameters" menu.

Load IBM 3287 Parameters

Pressing ENTER when this message displays loads the permanently-stored factory-set parameters for the IBM 3287.

After you press ENTER, the message, "Load IBM 3287 Completed" will display for about one second. Then, the display returns to the "Load IBM 3287 Parameters" menu.

Load IBM 5225 Parameters

Pressing ENTER when this message displays loads the permanently-stored factory-set parameters for the IBM 5225.

After you press ENTER, the message, "Load IBM 5225 Completed" will display for about one second. Then, the display returns to the "Load IBM 5225 Parameters" menu.

Load Factory Parameters

Pressing ENTER when this message is displayed loads the permanently-stored factory-set default parameters (also called the "factory default" parameters).

After you press ENTER, the message, "Load Factory Completed" will be displayed for about one second. Then, the display returns to the "Load Factory Parameters" menu.

Save Parameters Menu Options

You can save up to four configurations to meet different print job requirements. A configuration consists of several parameters. They will be saved into the currently loaded configuration (1, 2, 3, or 4). (Also see "Saving Your New Configuration" on page 3–17.)

The parameters are stored in non-volatile memory (NVRAM), so they are not lost if you turn off the printer. NVRAM is divided into four blocks, each of which stores a different configuration.

Save Parameters 1

(From page 3–25)

Press ENTER
to save the
parameters

To view options, press: ▼ DOWN
▲ UP
▶ RIGHT
◀ LEFT
To select an option, press ENTER

To exit configuration (returning to
Off–Line Ready), press CLEAR

* = Factory Default
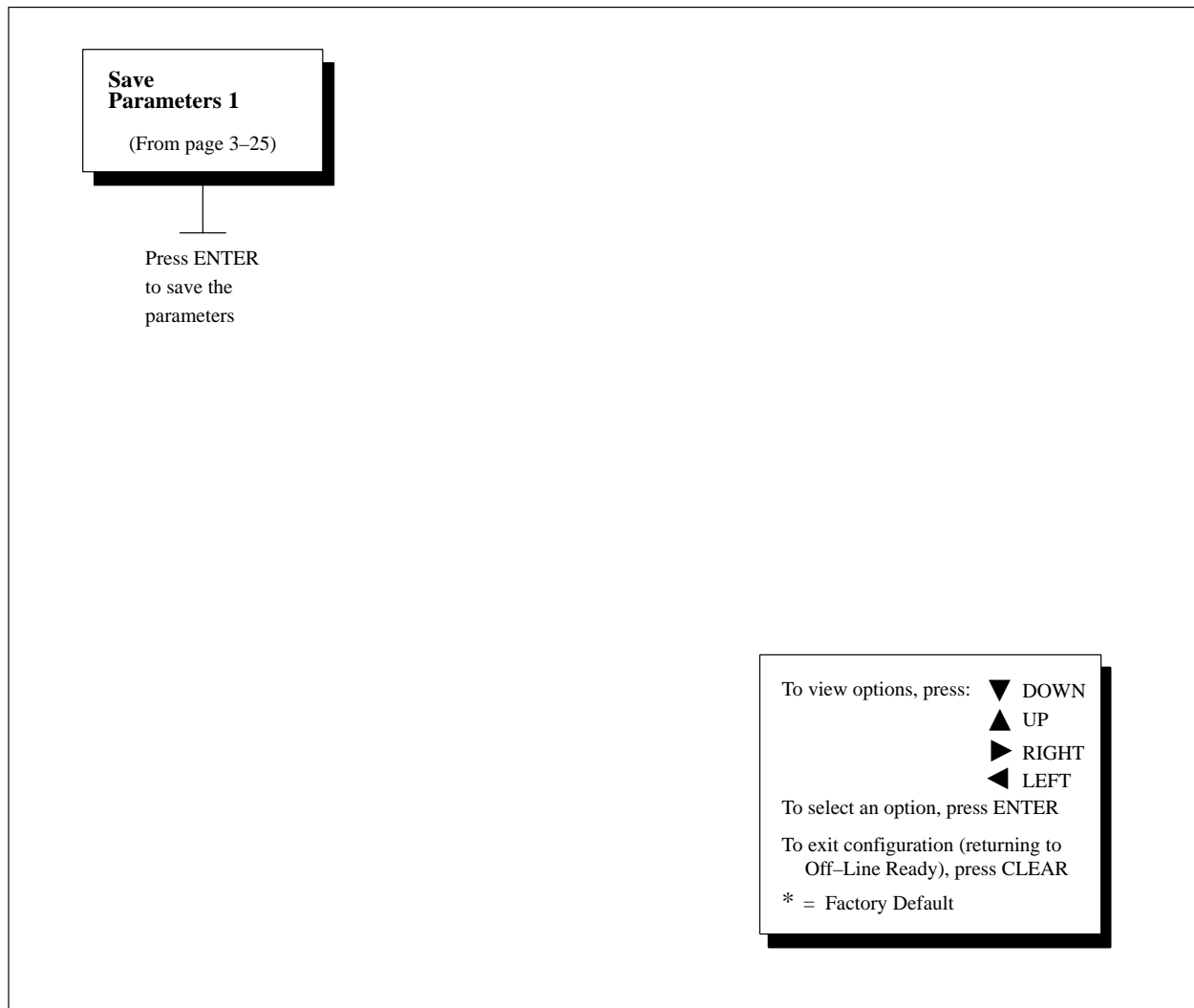
Figure 3–15. Save Parameters Menu

Configuring the Printer

Diagnostics Menu Options

Diagnostics

(From page 3–25)

Configuration Printout	Print Datastream in Hex. Code	Printer Test 8 Inch Width	Printer Test Full Width

Press ENTER
to print the
configuration

Off–Line Hex Dump
On–Line Hex Dump

Press ENTER to start a test:
Shift Recycle
All E's
E Plus TOF
All H's
Underline Only
Black Plot
Shut/Ribbon Fast
Paperout Adjust
Demo
Phase Adjustment

Press ENTER to start a test:
Shift Recycle
All E's
E Plus TOF
All H's
Underline Only
Black Plot
Shut/Ribbon Slow
Paperout Adjust
Demo
Phase Adjustment

Print
Statistics

Power–on Time 99999.9 Hours
Print Time 99999.9 Hours
Shuttle Strokes 2147483648
Print Lines 2147483648
Print Pages 2147483648

To view options, press: ▼ DOWN
▲ UP
▶ RIGHT
◀ LEFT
To select an option, press ENTER

To exit configuration (returning to
Off–Line Ready), press CLEAR

* = Factory Default

Figure 3–16. Diagnostics Menu

The Diagnostics Menu allows you to do the following:

- Print out a listing of the current printer configuration.

- Print out the hexadecimal code values of characters received from the host computer.

- Run various printer tests.

- View certain printer statistics on the printer's control panel message display.

For information on Diagnostics Menu options, see Chapter 5, *Routine Service and Diagnostics.* Qualified maintenance personnel can also refer to the *Maintenance Manual.*

4 Printer Interfaces

Chapter Contents

Overview

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. The printer interface consists of a printed circuit board assembly (PCBA) and a cable connector for the data line. Communication signals and data may be sent over parallel or serial lines.

The printer is equipped with two parallel interfaces and a serial interface. Only one interface can be used at a time, and it is selected via control panel configuration. (Refer to Chapter 3, *Configuring the Printer.*) Only one parallel host computer can be connected to the printer at a time.

The Coaxial/Twinaxial option is available as a factory-installed or field-installed option. This option allows the printer to emulate IBM 3287, 5225, and 4234 printers. Contact your authorized service representative for details.

Dataproducts Parallel Interface

The Dataproducts parallel interface allows the printer to operate with a 50-pin AMP Ampilite 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). An adapter cable to accept the 50-pin Winchester MRAC50P connector is also available from your authorized service representative.

**Table 4–1. Connector Pin Assignments for
Dataproducts Interface with AMP 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	40		
DATA LINE 2	20	ONLINE	21	GROUND	39
Return	4	Return	42		
DATA LINE 3	1	Data Request	23		
Return	5	Return	37		
DATA LINE 4	41				
Return	6				
DATA LINE 5	34				
Return	7				
DATA LINE 6	43				
Return	14				
DATA LINE 7	36				
Return	18				
DATA LINE 8	28				
Return	35				
DATA STROBE	38				
Return	2				
PAPER INSTRUCTION	30				
Return	44				
Note: Pins not listed are not connected.					

Dataproducts Parallel Interface Signals

Table 4–1 lists the Dataproducts interface connector pin assignments. Dataproducts-compatible interface signals between the computer and the printer are defined as follows:

Data Lines 1 through 8 — Eight standard or inverted levels from the host that specify character data, plot data, or a control code. Sensing Data Line 8 is controlled by printer configuration.

Data Strobe — A high true pulse from the host to indicate that 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) — Optional standard or inverted level EVFU or DAVFU signal from the host with the same timing and polarity as the data lines. PI line sensing is controlled by printer configuration.

NOTE: The PI line must be disabled (a configuration option selected from the control panel) if the host computer does not drive or control the PI line. If the line is not controlled by the host, and sensing is enabled, rapid vertical paper movement ("slewing") will occur.

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

Online — A high true signal from the printer indicating the Ready Line is true and the ON LINE key on the control panel has been activated. The printer is ready to accept data from the host.

Demand — A high true signal from the printer to indicate that the printer is ready to accept character data from the host. The signal changes to false shortly after the leading edge of the data strobe signal.

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

Dataproducts Parallel Interface Configuration

The printer is configured at the factory to match the interface specified by the customer. You can also configure the printer via its control panel. You can verify or change the following interface parameters as necessary to meet specific application requirements:

- Data Bit 8 (enable or disable)
- PI Line (enable or disable)
- Data Polarity (standard or inverted)
- Response Polarity (standard or inverted)
- Strobe Polarity (standard or inverted)
- Latch Data On Leading or Trailing Edge of Strobe

NOTE: The PI line must be disabled if the host computer does not drive or control the PI line. If the line is not controlled by the host, and sensing is enabled, rapid vertical paper movement ("slewing") will occur.

These parameters are under the Host Interface/Dataproducts submenu and are described in Chapter 3, *Configuring the Printer*.

Some applications programs require a unique configuration. If the printer is not working properly in the configuration you selected, contact your authorized service representative.

Centronics Parallel Interface

The Centronics parallel 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 4–2. 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	13, 32	GROUND	14
Return	21				
DATA LINE 3	4	PAPER EMPTY	12	Spares	18, 30, 31
Return	22	Return	16		
DATA LINE 4	5	BUSY	11	No connection	34, 35, 36
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 Parallel Interface Signals

Table 4–2 lists the Centronics interface connector pin assignments. Centronics-compatible interface signals between the computer and the printer are defined as follows:

Data Lines 1 through 8 — Eight standard or inverted levels from the host that specify a character or function code. Sensing Data Line 8 is controlled by printer configuration.

Data Strobe — A low true, 100 ns min. pulse from the host that clocks data into the printer.

Paper Instruction (PI) — Optional EVFU or DVFU control signal from the host with the same timing as the data lines. Sensing the PI line is controlled by printer configuration.

NOTE: The PI line must be disabled (a configuration option selected from the control panel) if the host computer does not drive or control the PI line. If the line is not controlled by the host, and sensing is enabled, rapid vertical paper movement ("slewing") will occur.

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 ONLINE key has been activated.

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

The printer is configured at the factory to match the interface specified by the customer. You can also configure the printer via its control panel. You can verify or change the following interface parameters as necessary to meet specific application requirements:

- Data Bit 8 (enable or disable)
- PI Line (enable or disable)
- Data Polarity (standard or inverted)
- Response Polarity (standard or inverted)
- Fast Busy (enable or disable)
- Strobe Polarity (standard or inverted)
- Latch Data On Leading or Trailing Edge of Strobe

NOTE: The PI line must be disabled if the host computer does not drive or control the PI line. If the line is not controlled by the host, and sensing is enabled, rapid vertical paper movement ("slewing") will occur.

These parameters are under the Host Interface/Centronics submenu and are described in Chapter 3, *Configuring the Printer.*

Some applications programs require a unique configuration. If the printer is not working properly in the configuration you selected, contact your authorized service representative.

Alternate Terminating Resistors

The factory equips the printer with 470 ohm pull-up and 1K ohm pull-down terminating resistors, located at coordinates 12C and 12D respectively on the Common Controller Board (CCB). These resistors are used for parallel interface configurations and are suitable for most applications.

If the values of these terminating resistors are not compatible with the particular interface driver requirements of your host computer, other values of pull-up and pull-down resistors might be required

Accordingly, the shipping kit for this printer also 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. Possible terminating resistor combinations are shown in the table below:

Pull-up at 12C	470 ohm	220 ohm	1K ohm
Pull-down at 12D	1K ohm	330 ohm	none

Removal and Installation

IMPORTANT

This is an involved maintenance procedure and should be performed only by a trained technician.

The Common Controller Board (CCB) must be removed from the card cage in order to remove or install terminating resistors.

The procedures for removing and installing the CCB and terminating resistors are in the *Maintenance Manual*.

RS-232 Serial Interface

The RS-232 Serial interface enables the printer to operate with bit serial devices compatible with an RS-232D controller. The interface circuit characteristics are compatible with the Electronic Industry Association Specification EIA-232-D.

Input serial data transfer rates of 150, 300, 600, 1200, 2400, 4800, 9600, and 19200 baud are selectable at the control panel. 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 control 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).

Table 4–3. 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	Reverse Channel (RC)	14		
Data Carrier Detect (DCD)	8	Data Terminal Ready (DTR)	20		

RS-232 Serial Interface Signals

The RS-232 connector mounted on the printer is a 25 pin DB-25S type. The mating connector is a DB-25P. Signal Pin assignments are listed in Table 4–3. RS-232 compatible serial interface signals are defined as follows:

Received Data — Serial data stream to the printer.

Transmitted Data — 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. This signal is ignored in the printer.

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

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

Reverse Channel (RC) — Control signal from the printer. Subject to configuration.

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

RS-232 Serial Interface Protocols

You can select the following serial interface protocol parameters from the control panel to meet host interface requirements.

X-ON/X-OFF — The printer controls the flow of communication from the host by turning the transmission on and off.
In some situations, such as the buffer is full or the timing of signals is too slow or too fast, the printer will tell the host to stop transmission by sending an XOFF character. If the host continues to send data, the printer will send an XOFF character after additional characters are received.

ACK/NAK — With ACK/NAK protocol selected, the printer responds as described for ETX/ACK protocol except the printer monitors the received data for parity error. If a parity error is detected, a NAK character is transmitted to the host upon receipt of the ETX character. The host is expected to repeat the data transmission.

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, it will acknowledge the ETX, thereby acknowledging it has received the entire block of data.

DTR (Data Terminal Ready), RC (Reverse Channel), or RTS (Request to Send) — Control signals from the printer to the host computer. (Subject to configuration.) Configurations include: always true, always false, true if on-line and buffer not full, and true if off-line or buffer almost full. In the factory default condition, when the printer is off-line or when its buffer is almost full, these signals are false. When the printer is ready to receive data, they are true.

This protocol sends no characters to the host; instead, it uses (hardware) control signals for flow control and other host interface requirements.

RS-232 Serial Interface Error Handling

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

With odd or even parity checking selected, a character with a parity error is replaced with a question mark (?) character. If a parity error is detected and the ACK/NAK protocol is selected, a NAK character (hex 15) is transmitted to the host.

When parity checking is not selected ("NONE" on the control 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 which forces printing to occur.

Overrun Error Handling — Overrun 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 which forces printing to occur.

RS-232 Serial Interface Configuration

The printer is configured at the factory to match the interface specified by the customer. You can also configure the printer via its control panel. You can verify or change the following interface parameters as necessary to meet specific application requirements:

- Data Protocol of hardware (DTR, Reverse Channel, or RTS), or X-ON/X-OFF, ACK/NAK or ETX/ACK
- Data Rate (BAUD rate selected from the control panel)
- Data Word Length (7 or 8 Bits)
- Stop Bits (1 or 2 Bits)
- Parity (Odd, Even, or None)
- Bit 8 Function (Font Select, PI Line, or Ignore)
- Data Terminal Ready logic
- Request to Send logic
- Reverse Channel logic

These parameters are under the Host Interface/Serial RS-232 submenu and are described in Chapter 3, *Configuring the Printer.*

NOTE: Do not select the *PI line* setting of the *Bit 8 Function* parameter unless the host computer uses bit 8 for paper control. Otherwise, rapid vertical paper movement ("slewing") may occur.

Some applications programs require a unique configuration. If the printer is not working properly in the configuration you selected, contact your authorized service representative.

5 Routine Service and Diagnostics

Chapter Contents

Overview

This chapter discusses general cleaning, running diagnostic tests, and understanding fault messages.

The printer requires no routine maintenance beyond regular cleaning. Periodically remove excess paper chaff and dust from the ribbon and paper paths. If print quality or paper motion deteriorates seriously even after cleaning, contact your authorized field service representative for prompt attention.

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.

IMPORTANT

Disconnect the AC power cord before cleaning the printer.

Cleaning Outside the Cabinet

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.

IMPORTANT

Always apply the cleaning solution to the cloth; never pour cleaning solution directly onto the printer.

Cleaning Inside the Cabinet

Over time, particles of paper and ink accumulate inside impact printers. This is normal. Paper dust and ink build–up must be removed periodically 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, refer to the following steps:

1. Power off the printer and unplug the printer power cord.

2. Unload the paper (explained in the *Operator's Guide*).

3. Unlatch both ribbon spools and carefully lift them off the hubs. Raise the ribbon out of the ribbon path.
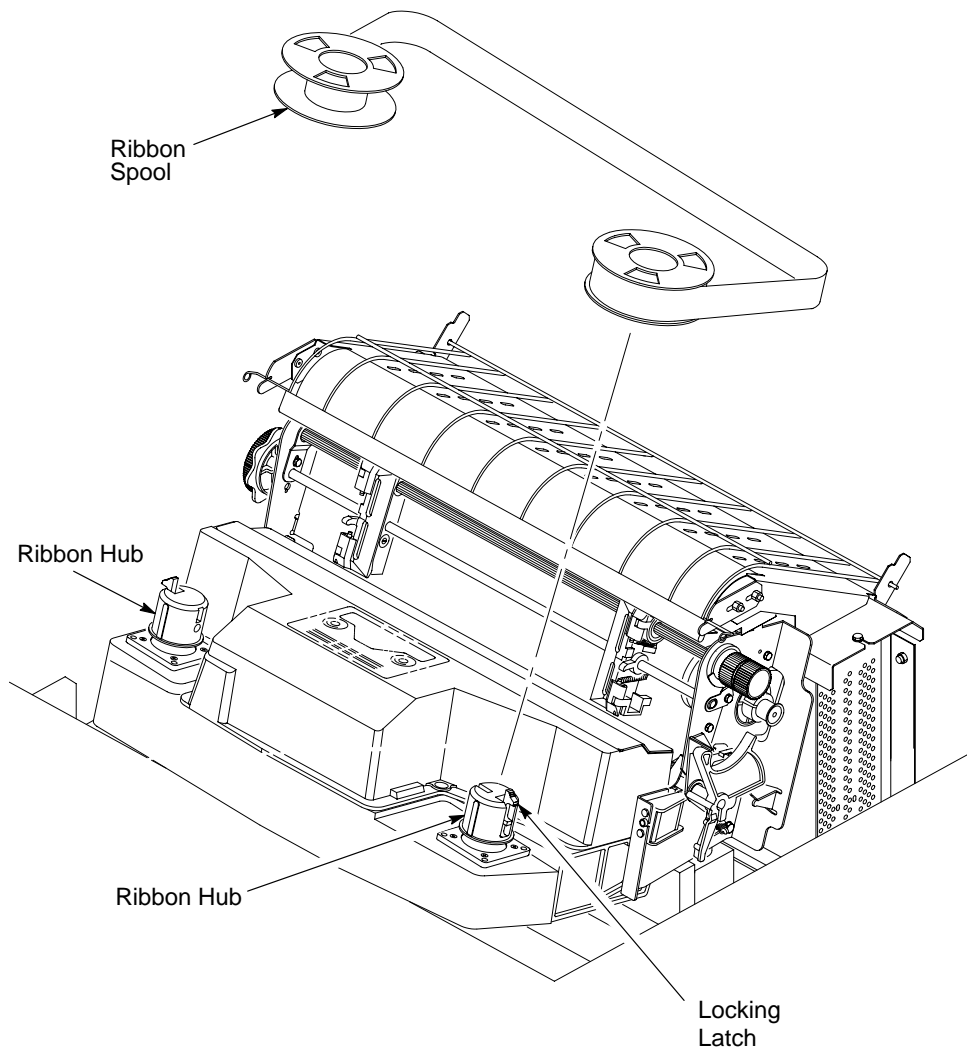
Figure 5–1. Removing the Ribbon Spool

4. Using a soft–bristled brush and vacuum cleaner, brush and vacuum paper and dust particles from the paper path, ribbon guides, ribbon path, and base pan.

IMPORTANT

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

5. Check the ribbon mask and hammer bank cover for pieces of torn paper or ribbon lint. Check the holes in the ribbon mask surrounding each hammer tip. Gently remove paper or lint particles with a wooden stick or pair of tweezers. (Do not pry or apply force to the hammer tips.)

6. Using a soft cloth lightly moistened with alcohol, remove dust and ink from the platen and the ribbon guides. (The platen is the thick silver bar behind the hammer bank cover that rotates when the forms thickness lever is rotated.) Do not let alcohol drip into the hammer bank.

7. Brush and vacuum up dust or residue that has accumulated inside the lower cabinet.

8. Wipe the lower cabinet interior with a clean, lint–free cloth dampened with water and mild detergent. Dry the lower cabinet interior by wiping it with a clean, dry, lint–free cloth.

9. Load the paper, set the top-of-form, and install the ribbon (explained in Chapter 2, *Setting Up the Printer*).

Splined Shaft

Tractor

Shuttle Cover Assembly

Tractor

Forms Thickness Lever

Ribbon Guide (2)

Base Pan
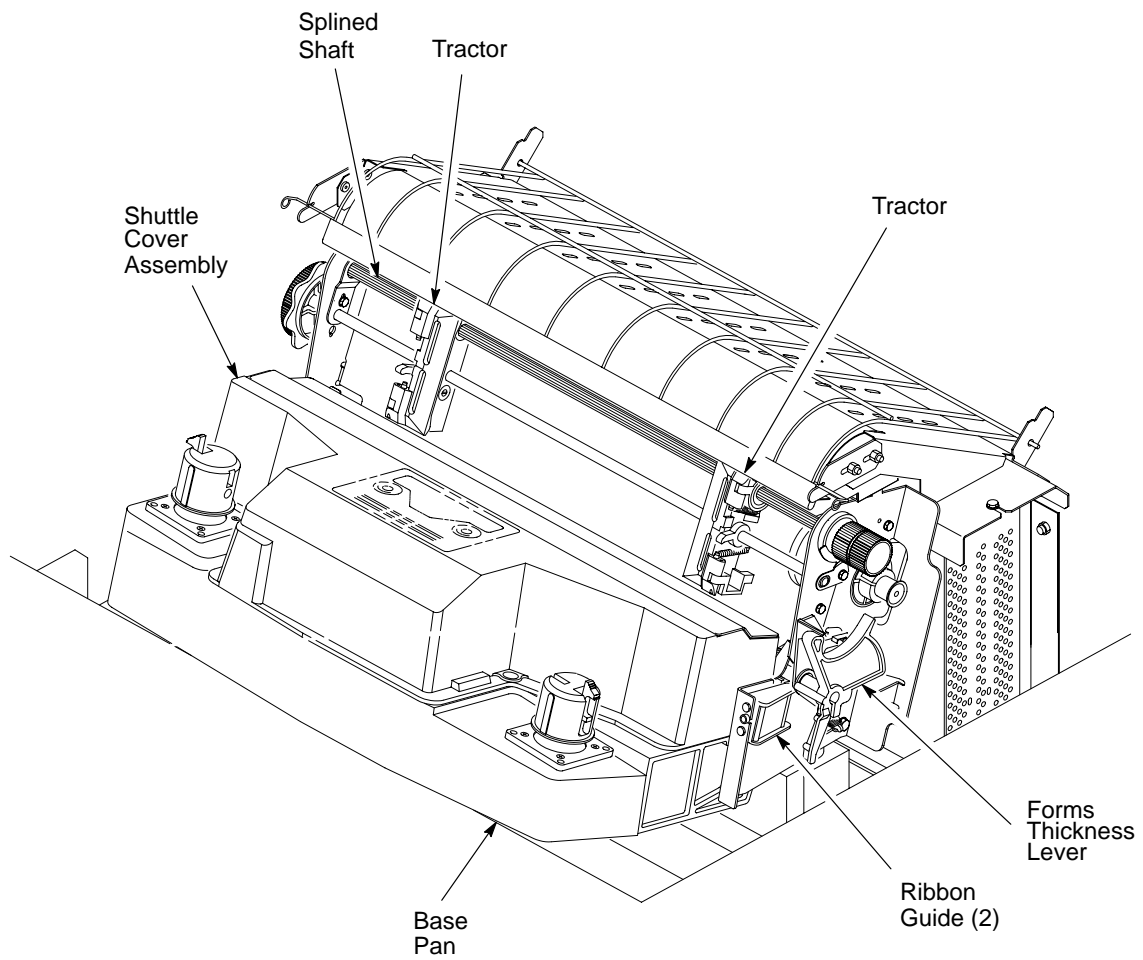
Figure 5–2. Cleaning the Printer

Diagnostic Tests

With the exception of testing the interface between the printer and the host computer (and the associated data cable), you do not need to send data from the host computer to the printer to test printer operation. You can use the printer built-in diagnostic tests to check many of the functions of your printer, including print quality and overall operation.

Diagnostics

(From page 3–25)

Configuration Printout	Print Datastream in Hex. Code	Printer Test 8 Inch Width	Printer Test Full Width

Press ENTER to print the configuration

Off–Line Hex Dump
On–Line Hex Dump

Press ENTER to start a test:
    Shift Recycle
    All E's
    E Plus TOF
    All H's
    Underline Only
    Black Plot
    Shut/Ribbon Fast
    Shuttle
    Paperout Adjust
    Demo
    Phase Adjustment

Press ENTER to start a test:
    Shift Recycle
    All E's
    E Plus TOF
    All H's
    Underline Only
    Black Plot
    Shut/Ribbon Slow
    Shuttle
    Paperout Adjust
    Demo
    Phase Adjustment

Print Statistics

Power–on Time 30000.0 Hours
Print Time 30000.0 Hours
Shuttle Strokes 2147483648
Print Lines 2147483648
Print Pages 2147483648
(statistical sample)

To view options, press: ▼ DOWN
    ▲ UP
    ▶ RIGHT
    ◀ LEFT
To select an option, press ENTER

To exit configuration (returning to Off–Line Ready), press CLEAR

* = Factory Default

Figure 5–3. Diagnostics Menu

The following diagnostic tests are available:

- **Shift Recycle**

  A "sliding" alphanumeric pattern used to identify missing or malformed characters, improper vertical alignment, or vertical compression.

- **All E's**

  A pattern of all uppercase letter E's used to identify missing characters, misplaced dots, smeared characters, improper phasing, or light/dark character variations.

- **E plus TOF**

  A pattern of all E's repeated for ten lines and followed by a form feed to the next page top of form, used to identify paper motion or feeding problems, such as paper path obstruction or improper forms.

- **All H's**

  A pattern of all uppercase letter H's used to detect missing characters or dots, smeared characters, or improper phasing.

- **Underline Only**

  An underline pattern useful for identifying hammer bank misalignment.

- **Black Plot**

  All dot positions are printed, creating a solid black band. This test exercises the shuttle and the hammer bank at their maximum capacity. This test can also be used to identify misaligned hammers, which show up as vertical white streaks or lines.

- **Shut/Ribbon Fast**

  Verifies proper operation by exercising shuttle and ribbon motion at fast speed. This test can also be used to check that the ribbon tracks correctly through the ribbon path. In addition, the test can be used to check that the ribbon reverses direction properly.

- **Shut/Ribbon Slow**

  Verifies proper operation by exercising shuttle and ribbon motion at low speed. This test can also be used to check that the ribbon tracks correctly through the ribbon path. In addition, the test can be used to check that the ribbon reverses direction properly.

- **Shuttle**

  Verifies proper operation by exercising shuttle motion.

- **Paperout Adjust**

  A pattern used to determine the number of dot rows from the completion of a paper out fault to the end of the paper.

- **Demo**

  A text and graphics pattern that illustrates many of the printer's features. This test can also be used to identify phasing problems within different character pitches and font styles.

- **Phase Adjustment**

  A timing test used by qualified service personnel to adjust vertical alignment of dots in character printing.

IMPORTANT

The phase adjustment test should be performed only by qualified service personnel. This test is a part of the hammer phasing adjustment procedure. This adjustment procedure is described in the *Maintenance Manual;* refer to it for details.

Configuration Printout

Pressing ENTER when this message is displayed prints the configuration. The printout lists the printer's configuration parameters that are currently in use. For convenience, the printout lists the main menus and submenu parameters in the same order as they occur when you use the control panel to configure the printer.

While the configuration is printing, the message "Configuration Printing" displays. You can wait for the printer to stop by itself or press ENTER again to stop the printing. The display returns to the "Configuration Printout" menu.

NOTE: Once you have determined the correct configuration, be sure to print it and save it for future reference. Printing the configuration is also recommended if you have changed any parameters.

For more information, see the section titled "Printing The Current Configuration" on page 3–12.

Print Data Stream in Hex Code

From the menu "Print Datastream in Hex. Code," pressing the ▼ key selects "Off-Line Hex Dump". From this point, pressing the ON LINE key on the control panel toggles the display between "On-Line Hex Dump" and "Off-Line Hex Dump".

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.

For more information, see the section titled "Printing the Hex Code" on page 5–13.

Printer Test 8 Inch Width

Tests listed under this parameter are for 8–inch wide paper. To run a test, see the procedure on page 5–11.

Printer Test Full Width

Tests listed under this parameter are for full–width paper. To run a test, see the procedure on page 5–11.

Print Statistics

The Print Statistics menu allows you to view various printer statistics on the control panel display. These printer statistics also appear on your configuration printout. Printer statistics accumulate continuously and provide a record of certain printer operations. They do not reset when you turn off the printer. Printer statistics are useful in determining hours of usage for preventative maintenance purposes.

All of the printer statistics are set to zero at the factory after burn-in testing.

Power-on Time: The cumulative time, in hours, that the printer has been powered on. The range is 0 to 30,000 hours.

Print Time: The cumulative time, in hours, that the printer has actually been printing. The range is 0 to 30,000 hours.

Shuttle Strokes: The cumulative number of back-and-forth shuttle strokes that the printer has performed during normal printer operation. The range is 0 to 2,147,483,648 shuttle strokes.

Print Lines: The cumulative number of lines that the printer has printed. The range is 0 to 2,147,483,648 print lines.

Print Pages: The cumulative number of pages that the printer has printed. The range, in print pages, is 0 to 2,147,483,648 total inches of paper movement divided by 11.

Running the Diagnostic Tests

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	The printer must be off-line to select and run diagnostics.
2.	Raise the printer cover.		
3.	⬡ + ⬡	ENTER Switch Not Locked	Press both keys at the same time. Unlocking allows you to run diagnostics.
4.	⬡	Ribbon Life	
5.	⬡	Diagnostics	
6.	⬡	Configuration Printout	
7.	⬡ UNTIL	Printer Test Full Width OR Printer Test 8 Inch Width	Press ▶ until you reach the appropriate test, for wide paper (132 columns) or for narrow paper (80 columns).
8.	⬡	Printer Test Shift Recycle	
9.	⬡ UNTIL	Printer Test (Name of desired test)	

Step	Press	Result	Notes
10. To start the test, press:	ENTER	Running Test (Name of test)	The test starts. "Running Test (name)" appears. Or, for phase adjustment test, "Phase Adjustment (number)" appears.
		OR	
		Phase Adjustment (Phasing Adj. Number)	
11. To stop the test, press:	ENTER	Printer Test (Name of test)	The test stops.
12. Examine the print quality of the characters. They should be fully formed and of uniform density. If the test does not run or if text characters do not appear correctly formed, contact your service representative.			
13.	CLEAR	Off–Line Ready 1	
14.	△ + ▽	ENTER Switch Locked	Locking prevents settings from being changed.
15. Close the printer cover.			
16.	ON LINE	On–Line (Current Font) 1	Places the printer on-line, ready for normal operation.

Printing Hex Code

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.

To convert an ASCII character to its corresponding hex code (or vice-versa), refer to the ASCII code chart in Appendix C.
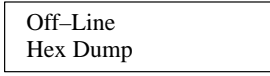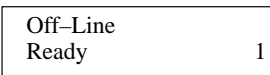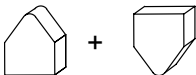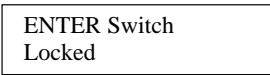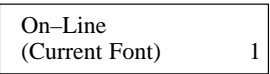
Figure 5–4 shows a few lines of a hex dump printout as a sample. Each printable character prints both as its assigned ASCII symbol and as its hex equivalent. Each non–printable (ASCII control) character prints both as a period (.) and as its hex equivalent.

The letter "p" before a hex code indicates an active Paper Instruction (PI) line. A blank space before a hex code indicates an inactive PI line.

```
Chapter Summary.   43  68  61  70  74  65  72  20  53  75  6D  6D  61  72  79  0A
.i..The computer   0A  31  2E  09  54  68  65  20  63  6F  6D  70  75  74  65  72
 industry has de   20  69  6E  64  75  73  74  72  79  20  68  61  73  20  64  65
veloped into one   76  65  6C  6F  70  65  64  20  69  6E  74  6F  20  6F  6E  65
 of the four.lar   20  6F  66  20  74  68  65  20  66  6F  75  72  0D  6C  61  72
gest industries    67  65  73  74  20  69  6E  64  75  73  74  72  69  65  73  20
in the world...2   69  6E  20  74  68  65  20  77  6F  72  6C  64  2E  0A  0A  32
..Dr. John W. Ma   2E  09  44  72  2E  20  4A  6F  68  6E  20  57  2E  20  4D  61
uchly and J. Pre   75  63  68  6C  79  20  61  6E  64  20  4A  2E  20  50  72  65
sper Eckert, Jr.   73  70  65  72  20  45  63  6B  65  72  74  2C  20  4A  72  2E
 designed and.bu   20  64  65  73  69  67  6E  65  64  20  61  6E  64  0D  62  75
ilt the ENIAC, t   69  6C  74  20  74  68  65  20  45  4E  49  41  43  2C  20  74
he first largefs   68  65  20  66  69  72  73  74  20  6C  61  72  67  65  A9  73
cale electronic    63  61  6C  65  20  65  6C  65  63  74  72  6F  6E  69  63  20
digital.computer   64  69  67  69  74  61  6C  0D  63  6F  6D  70  75  74  65  72
...3..ENIAC, put   2E  0A  0A  33  2E  09  45  4E  49  41  43  2C  20  70  75  74
 into operation    20  69  6E  74  6F  20  6F  70  65  72  61  74  69  6F  6E  20
in 1946, was pro   69  6E  20  31  39  34  36  2C  20  77  61  73  20  70  72  6F
```

Figure 5–4. Sample Hex Code Printout

Step	Press	Result	Notes
1.	Press: ON LINE	Off–Line Ready 1	The printer must be off-line to place it in hex dump mode.
2.	Raise the printer cover.		
3.	◇ + ◇	ENTER Switch Not Locked	Press both keys at the same time. Unlocking allows you to place the printer in hex dump mode.
4.	◇	Ribbon Life	
5.	◇	Diagnostics	
6.	◇	Configuration Printout	
7.	◇ UNTIL	Print Datastream In Hex. Code	
8.	◇	Off–Line Hex Dump	
9.	ON LINE	On–Line Hex Dump	The display indicates that the printer is on-line in hex dump mode.

Step	Press	Result	Notes
10.	To start the hex dump: Send the data from the host computer to the printer. The data will print in hex dump format. (Any data remaining in the printer's internal input buffer will print before the hex code printout starts.) Figure 5–4 shows a few lines of a hex dump printout as a sample.		
11.	To stop the hex dump, press: ON LINE	Off–Line Hex Dump	Printing stops.
12.	CLEAR	Off–Line Ready 1	
13.	△ + ▽	ENTER Switch Locked	Locking prevents settings from being changed.
14.	Close the printer cover.		
15.	ON LINE	On–Line (Current Font) 1	Places the printer on-line, ready for normal operation.

Fault Messages

If a fault condition occurs in the printer, the status lamps on the control panel flash on and off, and the first line of the control panel message display indicates "Fault Condition." The second line of the message display indicates the specific fault. Fault messages are summarized in Table 5–1.

Faults fall into one of two categories:

- Operator correctable.
- Field service required—indicated by an asterisk [*] after the fault message.

To clear correctable errors, refer to Table 5–1 and follow the instructions. After clearing the error, press CLEAR to resume printing. The printer assumes the error to be cleared.

If the error was not actually cleared, the printer will attempt to print again but will then display another error message until the error is finally cleared.

IMPORTANT

After correcting a displayed fault, press the CLEAR key on the control panel to continue printing. If the fault message reappears, contact your authorized field service representative.

To clear errors displayed with an asterisk [*] on the control panel, call your service representative. However, before calling for service, you should power off the printer, wait *at least* 15 seconds, then power on the printer again. Run your print job again. If the message does not appear, it was a false indication and no further attention is required.

Table 5–1. Fault Messages

Fault Message	Operator Correctable?	Explanation	Solution
48 Volt Failed *	No	Internal power failure.	Contact your authorized field service representative.
Address Error *	No	Failure in printer's internal microprocessors or related IC chips.	Contact your authorized field service representative.
Bus Error *	No	Failure in printer's internal microprocessors or related IC chips.	Contact your authorized field service representative.
Change Ribbon	Yes	RibbonMinder message indicating it is time to change the ribbon.	Replace the ribbon. See the *Operator's Guide*. See also page 2–20 in this Setup Guide.
Dynamic RAM Fault *	No	Failure in printer's internal microprocessors or related IC chips.	Contact your authorized field service representative.
Ham. Bank Hot *	No	One or more hammer coils are overheating.	Allow printer to cool. If fault reoccurs, contact your authorized field service representative.
Ham. Coil Open *	No	Electrical malfunction of one or more hammer coils. You may continue to print with degraded print quality.	Contact your authorized field service representative.
Ham. Coil Short *	No	Electrical malfunction of one or more hammer coils.	Contact your authorized field service representative.
Ham. Drv. Short *	No	Electrical malfunction of hammer driver system.	Contact your authorized field service representative.
Mech. Dr. Link *	No	Electronic fault between controller board and mechanism driver board.	Contact your authorized field service representative.
Mech Driver Hot *	No	Mechanism driver board is overheating.	Allow printer to cool. If fault reoccurs, contact your authorized field service representative.

* Power off the printer. Wait 15 seconds. Power on the printer. If message reappears contact your authorized field service representative.

Continued on next page

Table 5–1. Fault Messages (Continued)

Fault Message	Operator Correctable?	Explanation	Solution
NOVRAM *	No	Non-volatile memory fault. The NOVRAM battery is probably exhausted.	Contact your authorized field service representative. NOTE: You can still print, but you cannot save configuration changes.
Paper Jam	Yes	No paper motion.	Clear paper jam. See the *Operator's Guide*. Reset forms thickness lever.
Paper Out	Yes	Printer out of paper.	Load paper. See the *Operator's Guide*.
Platen Open	Yes	Forms thickness lever is raised to open position.	Close the forms thickness lever.
Prog. Error *xxxy* *	No	Problem in the printer's internal software. "*xxx*" = letters "*y*" = a numeral	Write down the message. Power off the printer. Wait 15 seconds, then power on the printer. If problem persists, contact your authorized field service representative.
Ribbon Stall	Yes	No ribbon movement or ribbon moving at wrong speed.	Reset forms thickness lever. Check for obstruction to ribbon or ribbon hub. Replace ribbon if necessary. If fault continues, contact an authorized field service representative.
Shttl Cover Open	Yes	Shuttle cover open.	Reinstall the shuttle cover. Make sure the cover lies flat and the two captive screws are fully seated.
Shuttle Fan *	No	Shuttle assembly is overheating.	Contact your authorized field service representative.
Shuttle Jam	Yes	No shuttle movement or shuttle moving at wrong speed.	Check for shuttle obstruction, a twisted ribbon, or forms thickness lever closed too tightly. If fault source is not apparent, contact an authorized field service representative.

* Power off the printer. Wait 15 seconds. Power on the printer. If message reappears contact your authorized field service representative.

6 **RibbonMinder** ™

Chapter Contents

Overview

This chapter explains how RibbonMinder works and how to configure it to meet your specific print job requirements. RibbonMinder is a user–definable software feature that determines when a ribbon should be changed. It monitors ink consumption and alerts you when the print quality falls below a level that you designate. This is especially important if you are printing bar codes to be scanned.

NOTE: RibbonMinder does not use any hardware within the printer to detect print density problems.

Like the fuel gauge in your car, RibbonMinder indicates how much usable ink remains in the ribbon. The "gauge" for RibbonMinder is the message display on the operator panel. The following message is typical for a new ribbon (100% full):

```
On–Line            100%
DP AT 10 CPI *        1
```

As printing continues, the percentage of usable ink in the ribbon decreases (percentage rate ranges from 100% to –99%):

```
On–Line             74%
DP AT 10 CPI *        1
```
Ribbon ink being consumed

```
On–Line              8%
DP AT 10 CPI *        1
```
Ribbon life approaching end

When RibbonMinder detects 0% useable ink left on the ribbon, you can set the printer to stop printing and to display a message indicating it is time to change the ribbon:

```
Fault Condition
Change Ribbon
```

Running a Job

Once you have set up your parameters for RibbonMinder, it works without attention. Normally, you only need to select the RibbonMinder configuration menu to install a new ribbon, change job rates or ribbon size, or to disable/enable RibbonMinder.

When you begin printing with RibbonMinder enabled, the message display shows a ribbon life value of 100%. The ribbon life value decreases as the ink is consumed.

You can use the RibbonMinder feature to run more than one job on the same ribbon. To do this, you must know the job rate for each job *before* you print it. Then, at the completion of each job, change the job rate before starting a new job. Refer to your log of print jobs and their job rates. (Refer to page 6–14 for information on analyzing print jobs to determine job rates.)

Configuring the RibbonMinder

The following procedures explain how to set each RibbonMinder parameter and either exit the configuration menu or continue to the next parameter. Parameters are presented in the order in which they are usually configured the first time.

NOTE: When you make changes to RibbonMinder parameters, your changes are saved automatically in NVRAM (Non–Volatile Random Access Memory).

As you perform the following steps, refer to the RibbonMinder Menu Diagram shown in Figure 6–1.

Ribbon Life

(From page 3–25)

New Ribbon	Set Job Rate	Analyze Job	Set Ribbon Size	When Worn Action

Press ENTER to reset ribbon life to 100%. A new ribbon must be installed after setting the ribbon life to 100%.

Currently xxx
New Rate yyy

Press ENTER to enter the Analyze Job mode.

Currently xxx
New Size yyy

* To Stop Printer
  Aud/Vis Alarm
  Visual Alarm

Press ▶ or ◀ to increase or decrease New Rate by 1

Press ▶ or ◀ to increase or decrease New Size by 10

Enable/Disable

*
Disable Action
Enable Action

To view options, press: ▼ DOWN
                       ▲ UP
                       ▶ RIGHT
                       ◀ LEFT
To select an option, press ENTER

To exit configuration (returning to Off–Line Ready), press CLEAR

* = Factory Default

Figure 6–1. Ribbon Life Menu

Setting Up a New Ribbon

The New Ribbon parameter allows you to reset the ribbon life after replacing a worn ribbon. Also follow this procedure when first setting up RibbonMinder parameters. Note that it may be necessary to replace ribbons *before* the ink has been depleted. This may occur with ribbons that have been snagged, folded, or otherwise damaged.

NOTE: If the message display indicates the need to install a new ribbon and your print job is one page short of completion, press ON LINE to print the last page before performing this procedure. Otherwise, you may continue your print job at the end of this procedure.

Step	Press	Result	Notes
1.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
2.	Raise the printer cover.		
3.	◇ + ▽	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
4.	▽	Ribbon Life xxx%	
5.	▽	Ribbon Life xxx% New Ribbon	
6.	ENTER	Ribbon Life 100% Change Ribbon	
7.	◇ UNTIL	Ribbon Life xxx%	
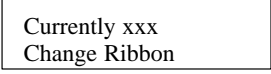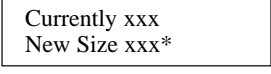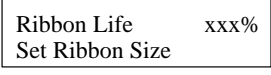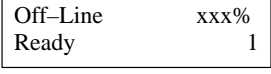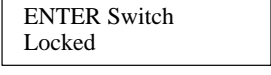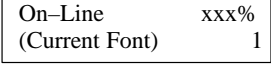
Step	Press	Result	Notes
8.	Remove the old ribbon and install a new one (see the *Operator's Guide*). If you try to print before changing the ribbon, the printer displays the fault message, "Fault Condition, Change Ribbon".		
9.	To set or change the ribbon size, go to page 6–8, step 4. Otherwise, continue with this procedure to exit.		
10.	CLEAR	Off–Line xxx% Ready 1	
11.	△ + ▽	ENTER Switch Locked	Locking prevents settings from being changed.
12.	Close the printer cover.		
13.	ON LINE	On–Line xxx% (Current Font) 1	Places the printer on-line, ready for normal operation.

Setting Ribbon Size

Follow this procedure when first setting up RibbonMinder parameters or if you are changing the ribbon to a *different* length of ribbon.

Changing the ribbon size always resets the new Ribbon Life value to 100%.

Step	Press	Result	Notes
1.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
2.	Raise the printer cover.		
3.	◁ + ▽	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
4.	▽	Ribbon Life xxx%	
5.	▽	Ribbon Life xxx% New Ribbon	
6.	▷ UNTIL	Ribbon Life xxx% Set Ribbon Size	
7.	▽	Currently xxx New Size xxx*	
8.	▷ UNTIL	Currently xxx New Size (Desired value)	Press ▶ or ◀ until you reach the appropriate ribbon size (standard ribbon is 60 yards long).

Step	Press	Result	Notes
9.	ENTER	Currently xxx Change Ribbon	Selects the displayed value.
10.	AND THEN	Currently xxx New Size xxx*	To ensure that you selected the proper ribbon size, verify that the current ribbon size is now the same as the new ribbon size.
11.		Ribbon Life xxx% Set Ribbon Size	
12.	To enable the RibbonMinder, go to page 6–10, step 6. Otherwise, continue with this procedure to exit.		
13.	CLEAR	Off–Line xxx% Ready 1	
14.	+	ENTER Switch Locked	Locking prevents settings from being changed.
15.	Close the printer cover.		
16.	ON LINE	On–Line xxx% (Current Font) 1	Places the printer on-line, ready for normal operation.
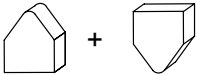
Enabling and Disabling RibbonMinder

The Enable/Disable parameter allows you to enable or disable RibbonMinder. You may want to disable RibbonMinder when it is not necessary to monitor print quality (for example, to print rough drafts).

NOTE: While the RibbonMinder is disabled, the ribbon life value will not be displayed (whether on–line or off–line, or in any configuration menu). However, the printer will continue to calculate ribbon ink consumption. It is possible to enable and disable RibbonMinder while still using the same ribbon and to return to accurate ink consumption (ribbon life) percentages.

Step	Press	Result	Notes
1.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
2.	Raise the printer cover.		
3.	+	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
4.		Ribbon Life xxx%	
5.		Ribbon Life xxx% New Ribbon	
6.	UNTIL	Ribbon Life xxx% Enable/Disable	
7.		Ribbon Life xxx% Disable Action	

Step	Press	Result	Notes
8.		Ribbon Life　　　xxx% Enable Action	Toggles between Enable and Disable Action.
9.	ENTER	Ribbon Life　　　xxx% Enable Action *	Enables (or disables) RibbonMinder.
10.		Ribbon Life　　　xxx% Enable/Disable	
11.	To set "When Worn Action," go to page 6–13, step 6. Otherwise, continue with this procedure to exit.		
12.	CLEAR	Off–Line　　　　xxx% Ready　　　　　　　1	
13.	＋	ENTER Switch Locked	Locking prevents settings from being changed.
14.	Close the printer cover.		
15.	ON LINE	On–Line　　　　xxx% (Current Font)　　1	Places the printer on-line, ready for normal operation.

When Worn Action

This parameter allows you to choose what the printer will do when the ribbon life reaches 0%. The following options are available:

- **To Stop Printer** (the default) causes the printer to stop printing at the next top of page when Ribbon Life reaches 0%. Pressing ON LINE allows the printer to print another page.

- **Aud/Vis Alarm** causes the printer beeper to sound and the control panel status lamps to flash alternately when Ribbon Life reaches 0%. The printer will not stop printing.

- **Visual Alarm** causes the control panel status lamps to flash alternately when Ribbon Life reaches 0%. No audible alarm is sounded. The printer will not stop printing.

The ribbon life will continue to decrease through negative values until –99% is reached. It will remain at –99% until you change the ribbon.

In the following example, the When Worn Action parameter is changed from stopping the printer to setting the visual alarm.

Step	Press	Result	Notes
1.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
2.	Raise the printer cover.		
3.	+	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
4.		Ribbon Life xxx%	
5.		Ribbon Life xxx% New Ribbon	

Step	Press	Result	Notes
6.	UNTIL	Ribbon Life xxx% When Worn Action	
7.		When Worn Action To Stop Printer *	
8.	UNTIL	When Worn Action Visual Alarm	Press ▶ or ◀ to cycle through the options.
9.	ENTER	When Worn Action Visual Alarm *	
10.		Ribbon Life xxx% When Worn Action	
11.	To set "Job Analyze Mode," go to page 6–15, step 6. Otherwise, continue with this procedure to exit.		
12.	CLEAR	Off–Line xxx% Ready 1	
13.	+	ENTER Switch Locked	Locking prevents settings from being changed.
14.	Close the printer cover.		
15.	ON LINE	On–Line xxx% (Current Font) 1	Places the printer on-line, ready for normal operation.

Analyzing Jobs

The Analyze Job parameter allows you to enter the job analysis mode to determine job rates for various print jobs. The job rate is the rate at which a particular print job or collection of jobs wears out the ribbon.

To determine the rate for a new print job using analyze mode, you must install a new ribbon, analyze the job, and set the job rate.

NOTE: You may set the job rate without using analyze mode. Refer to page 6–18.

Note the following points:

- Be sure the following RibbonMinder parameters (discussed separately) have already been set up:

    — Enable/Disable (set to "Enable")
    — When Worn Action
    — Ribbon Size

- Always use a new ribbon when analyzing a job, in order to start with a ribbon life of 100%.

- You can analyze various print jobs to determine their specific job rates. Job rate values can range from 0 (no wear) to 1000 (the highest possible rate of ink usage).

- You only need to analyze each print job *once*, provided that you record its job rate in a log for future use.

- You can run analyze mode for each bar code job by running the print job and marking the job rate on the listing as the job is printing. Later, the printout can be scanned; when the bar codes become unreadable, set the job rate with the next higher job rate that is marked on the listing.

NOTE: If the printer is in the analyze job mode and the power is cycled, the printer will exit the analyze job mode. However, a print job can be stopped and restarted without losing track of its job rate data.

Setting Analyze Job Mode

Step	Press	Result	Notes
1.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
2.	Raise the printer cover.		
3.	△ + ▽	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
4.	▽	Ribbon Life xxx%	
5.	▽	Ribbon Life xxx% New Ribbon	
6.	▷ UNTIL	Ribbon Life xxx% Analyze Job	
7.	ENTER	Ribbon Life 1000 Change Ribbon	Pressing ENTER sets the "Analyze Job" mode. A message to change the ribbon appears.
8.	Verify that a new ribbon has been installed. Refer to the section "Setting Up a New Ribbon" on page 6–6 if necessary.		
9.	CLEAR	Off–Line xxx% Ready 1	
10.	Close the printer cover.		

Step	Press	Result	Notes
11.	ON LINE	On–Line 1000A (Current Font) 1	Places the printer on-line. The printer must be on-line to analyze a job. The message display shows the analyze rate instead of the "Ribbon Life" percentage.
12.	Begin printing a job. The analyze job rate number begins at 1000 and decreases as the ribbon becomes worn. With a new 60–yard ribbon, the rate begins decreasing when more than 200 pages are printed.		
13.	The same job can be printed repeatedly to compute a job rate. Use the ribbon until you decide it should be replaced (if the print quality or any part of the page is unacceptable). A typical message would display "ANALYZE RATE 400."		
14.	When print quality is no longer acceptable, stop the printer and record the job rate in a log for future use (e.g., "400").		
15.	Finish the job analysis by doing the following: • Set the job rate, using the rate in the log as the new job rate. (See the next topic on page 6–18.) • Disable analyze mode. • Set the New Ribbon parameter (page 6–6).		

Analyzing Jobs Quickly

To analyze a job without running the entire ribbon, follow these steps:

1. Generate a sample printout of the job.

2. Find the vertical dot column with the most printed dots. Count the number of dots printed in the dot column.

3. Compute the total number of dots that *could* have been printed in the dot column. Do not count the horizontal dot rows that are not printed due to paper movement (horizontal dot rows without dots). From this number, compute the percentage of printed area for the dot column.

4. Multiply the percentage by 10. This is the job rate.

Setting the Job Rate

The Job Rate parameter describes the rate at which a particular print job wears out the ribbon. Values can range from 0 (no wear) to 1000 (the highest possible rate of ink usage). The job rate must be set in order for the RibbonMinder to work correctly.

When setting the job rate, remember:

- Job rates must always be determined prior to running a job.
- Job rates do not change when the ribbon size changes. (The Ribbon Size parameter must be reset when the size of the ribbon changes.)
- Job rates can be changed without affecting print quality.
- Job rates can be set either from the printer's control panel or by sending a control code sequence from the host computer to the printer. (Refer to page 6–21.)

NOTE: You may set the job rate without using analyze mode. For example, you may set the job rate to 500 and visually check print quality. If print quality is still good when the ribbon life is at 0%, set the job rate to a lower rate (e.g., 300) for the next ribbon. However, if print quality begins to decrease before reaching 0%, set the job rate to a higher rate (e.g., 700) for the next ribbon.

Step	Press	Result	Notes
1.	Verify that the job rate has been recorded in "Analyze Job" mode. Refer to the previous section, "Analyzing Jobs."		
2.	ON LINE	Off–Line xxx% Ready 1	The printer must be off-line to change the configuration.
3.	Raise the printer cover.		
4.	+	ENTER Switch Not Locked	Press both keys at the same time. Unlocking permits configuration changes.
5.		Ribbon Life xxx%	
6.		Ribbon Life xxx% New Ribbon	
7.	UNTIL	Ribbon Life xxx% Set Job Rate	
8.		Analyze Job New Rate yyy (A) — OR — Currently xxx New Rate xxx * (B)	If the printer is in "Analyze Job" mode, message (A) appears. If the printer is not in "Analyze Job" mode, message (B) appears.
9.	If the printer is in "Analyze Job" mode, and if you want to enter the analyze mode rate as the job rate, go to step 11. Otherwise, continue with step 10.		

Step	Press	Result	Notes
10.	UNTIL	Currently xxx New Rate (Desired value)	Press ▶ or ◀ to cycle through the job rates until you reach the appropriate rate. If you have used the job analysis feature, refer to your log book of print jobs and their rates.
11.	ENTER	Currently xxx New Rate xxx *	Selects the displayed value.
12.	CLEAR	Off–Line xxx% Ready 1	
13.	+	ENTER Switch Locked	Locking prevents settings from being changed.
14.	Close the printer cover.		
15.	ON LINE	On–Line xxx% (Current Font) 1	Places the printer on-line, ready for normal operation.

RibbonMinder Host Data Stream Commands

In addition to controlling the RibbonMinder feature from the printer's control panel, you can also control RibbonMinder from the host computer by sending control code sequences to the printer.

NOTE: The host commands "Set Job Rate," "When Worn Action," and "Enable/Disable" supply values to the RibbonMinder features. For proper operation, if you are using these commands, you must send them to the printer *prior* to printing data. You can either send these commands directly from the host computer, or you can embed them in your print job before the print data.

Following are brief descriptions of the host commands that control RibbonMinder. For more information, refer to the *Impact Printers Programmer's Reference Manual*.

NOTE: If your printer is set to Serial Matrix emulation, substitute ESC for the Special Function Control Character (SFCC) in the control code sequences below.

Set Job Rate

Command: **SFCC r J NNNN E**

where — NNNN is the JOB RATE value between 0 and 1000 expressed as a decimal number having between one and four digits. Each individual digit of the value is represented by the corresponding hex code. For example, if the JOB RATE value is 341, **NNNN** will be the ASCII characters 3 (33 hex), 4 (34 hex), and 1 (31 hex). The control code sequence will be CHR$(1);"rJ341E";

Examples of ASCII Hex values: 01 72 4A 33 34 31 45

When Worn Action

Command: **SFCC r A x**

where — the value of **x** determines the printer action as follows:

STOP PRINTER	**S**	(Hex 53)
AUD/VIS ALARM	**A**	(Hex 41)
VISUAL ALARM	**V**	(Hex 56)

Examples of ASCII Hex values: 01 72 41 53

Enable/Disable

ENABLE printer action

Command: **SFCC r E**

DISABLE printer action

Command: **SFCC r D**

A Printer Specifications

Contents

Ribbon Specifications

NOTE: Use only the ribbons listed below. Each kit contains six ribbons.

Extended Life Text Ribbon Kit   P/N 107675–001

Bar Code Ribbon Kit   P/N 107675–005

Paper Specifications

NOTE: The following are general paper specifications. Test paper stocks with your applications before ordering large quantities.

Paper

Type	Edge-perforated, fanfold, 3 to 16 inches wide (7.62 to 40.64 cm), 1 to 12 inches long (2.54 to 30.48 cm)
Thickness	Single-part: 15 to 100 pound stock (6.80 to 45.36 kg) Multi-part: 1- to 6-part forms. Maximum 12 lb. (5.44 kg) ply of upper plies
Form Thickness	0.025 inches maximum (0.635 mm)
Drive	Adjustable tractors (6-pin engagement)
Slew Rate	*Slow Paper Slew Enabled:* 15.8 inches/second maximum (40.1 cm/sec) for the first 3.3 inches/second (8.38 cm/sec), then 8 inches/second (20.32 cm/sec) thereafter. (Intentionally slowed to improve paper stacking.) *Slow Paper Slew Disabled:* 15.8 inches/second maximum (40.1 cm/sec).

Labels

On Backing	One-part continuous perforated fanfold back form. Labels must be placed at least 1/6 inch from the fanfold perforation. Backing adhesive must not be squeezed out during printing.
Sheet Size	3- to 16-inches (7.62 to 40.64 cm) wide, including the two standard perforated tractor feed strips. Maximum sheet size is 12 inches (30.48 cm) between top and bottom perforations.
Thickness	Not to exceed 0.025 inch (0.635 mm), including backing sheet.

Printer Dimensions and Weight

Height	42.5 inches (108 cm)
Width	27 inches (68.6 cm)
Depth	28.7 inches (72.9 cm)
Weight	Unpackaged: approximately 225 lbs. (102 kg) Packaged: approximately 285 lbs (129 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 Levels

52 dBA (tested per ISO 7779)

Electrical Characteristics

Input Power

Voltage (RMS)	100 to 120 VAC or 200 to 240 VAC
Phase	Single
Frequency	50 or 60 Hz
Max RMS Current	6 A at 100 V; 3 A at 200 V

Power Rating

Standby	160 Watts
Operating	400 Watts

Data Input Rate (maximum)

Dataproducts Interface	Up to 512,820 characters per second (max. specified)
Centronics Interface	Up to 222,222 characters per second (max. specified)

> **NOTE:** Host computers that interrupt per character of parallel data *must* complete the character transfer before enabling interrupts; otherwise, stack overflow can occur.

RS-232 Interface	Up to 19.2K baud (2133 char/sec at the fastest possible rate, with 7 bits, one stop bit, no parity)

Radio Frequency Interference (RFI)

Radio Frequency Interference Tested/Certified to RFI Standards FCC 15 Class A; VDE 0871 Class B; CSA C108.8–M1983 Class A.

Interfaces

Type	Resident parallel (two) and serial (one)
Logic Levels	TTL (parallel interfaces) RS-232 (serial interface)
Data Format	ASCII
Compatibility	Centronics Dataproducts EIA RS-232-D
Buffer Size	Approximately 4096 bytes parallel, serial handshake at 1516 bytes (3/4 of 2048), plus six lines for all interfaces.

Printing Rates

Printer throughput, in lines per minute (LPM), is a factor of the selected font. These rates assume that the printing mechanism is the limiting factor, not the data source. Printing speed is independent of the number of characters in the character set repertoire. Print lines containing bold/emphasized ("shadow") printing, superscripts, subscripts, or elongated (double high) attributes will print at not less than half the rates shown below.

Plotting speed for graphics is measured in inches/minute, and is calculated as follows:

$$\frac{1}{\text{Shuttle Speed} \quad x \quad \text{Vertical Density}} \quad x \quad 60{,}000 \quad = \quad \text{Plot Speed in} \quad \frac{\text{inches}}{\text{minute}}$$

The hammer bank contains a thermal sensing feature that prevents damage from overheating. When graphics plotting greater than 70% black is done over extended periods of time, the thermal sensing feature reduces the print rate to prevent damage.

Nominal print rates for the printer are charted in Table A–1.

Table A–1. Nominal Print Rates

Print Dimensions			Performance		
Dot Density (DPI) NOTE 1	Characters per Inch (CPI)	Dot Matrix NOTE 2	Uppercase Only LPM*	Descenders & Underline LPM*	Plot Mode NOTE 3 IPM**
OCR 90 (180) X 144	10	9 (17) X 14 + 2	110	96	22
Near Letter Quality 90 (180) X 96	10 12 12.9 15 16.4	7 (13) X 9 + 3 6 (11) X 9 + 3 6 (11) X 9 + 3 5 (9) X 9 + 3 5 (9) X 9 + 3	320	245	33
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	600	480	66
High Speed Draft A (HS) 60 (120) X 48	10 12 13.3 15 17.1	5 (9) X 5 + 1 4 (7) X 5 + 1 4 (7) X 5 + 1 3 (5) X 5 + 1 3 (5) X 5 + 1	800	685	100
High Speed Draft B (HSB) 60 (120) X 72	10 12 13.3 15 17.1	5 (9) X 6 + 1 4 (7) X 6 + 1 4 (7) X 6 + 1 3 (5) X 6 + 1 3 (5) X 6 + 1	685	600	66
High Speed Draft C (HSC) 60 (120) X 72	10 12 13.3 15 17.1	5 (9) X 6 + 2 4 (7) X 6 + 2 4 (7) X 6 + 2 3 (5) X 6 + 2 3 (5) X 6 + 2	685	533	66

NOTE 1   A (B) X C, where: A is maximum horizontal dot density.
                                                 B is horizontal placement resolution.
                                                 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.

NOTE 3   The Plot Mode graphics described here are provided for IGP or Code V
                  emulations. Plot speeds are obtained if the dot count per row does not exceed
                  85% of the maximum dots allowed for that mode, and the steps per dot row do
                  not exceed the vertical density of that mode.

* LPM = Lines Per Minute
** IPM = Inches Per Minute

B A Quick Look at Line Matrix Printing

Contents

Character Formation

The P4280 is an impact printer: It creates characters by printing ink dots on paper. Dots overlap to produce a solid-appearing character of uniform density. The dots are made by an assembly of steel hammers mounted on a rapidly oscillating shuttle. The hammers strike the paper through a moving ink ribbon. The dot patterns of characters are mapped in printer memory on invisible matrixes, as shown in Figure B–1.
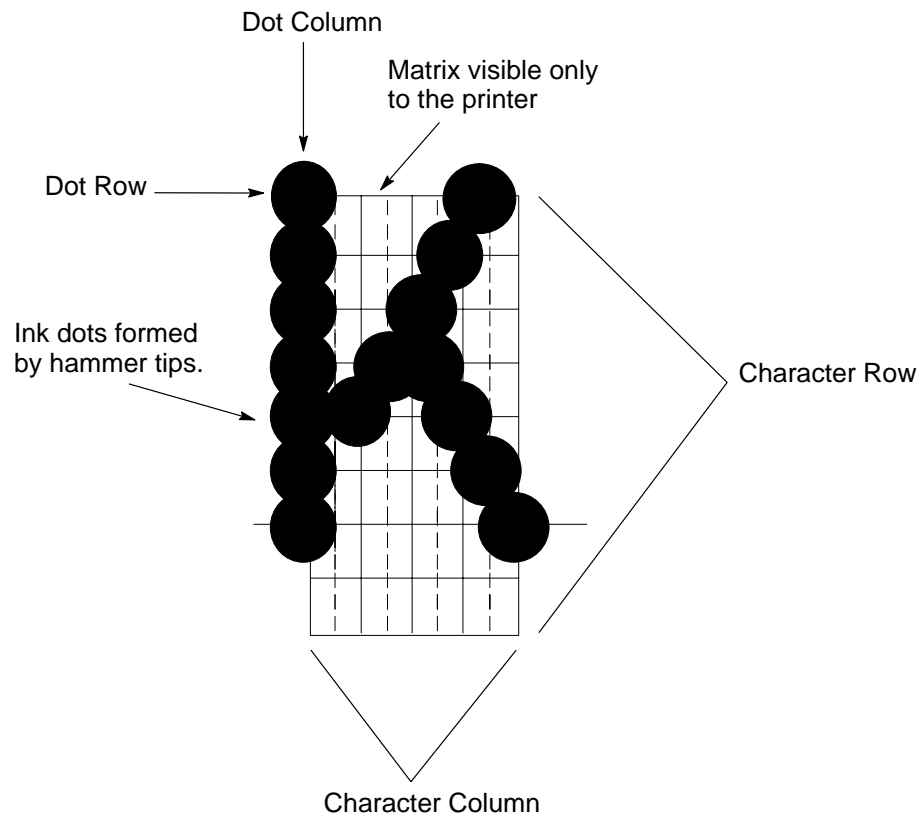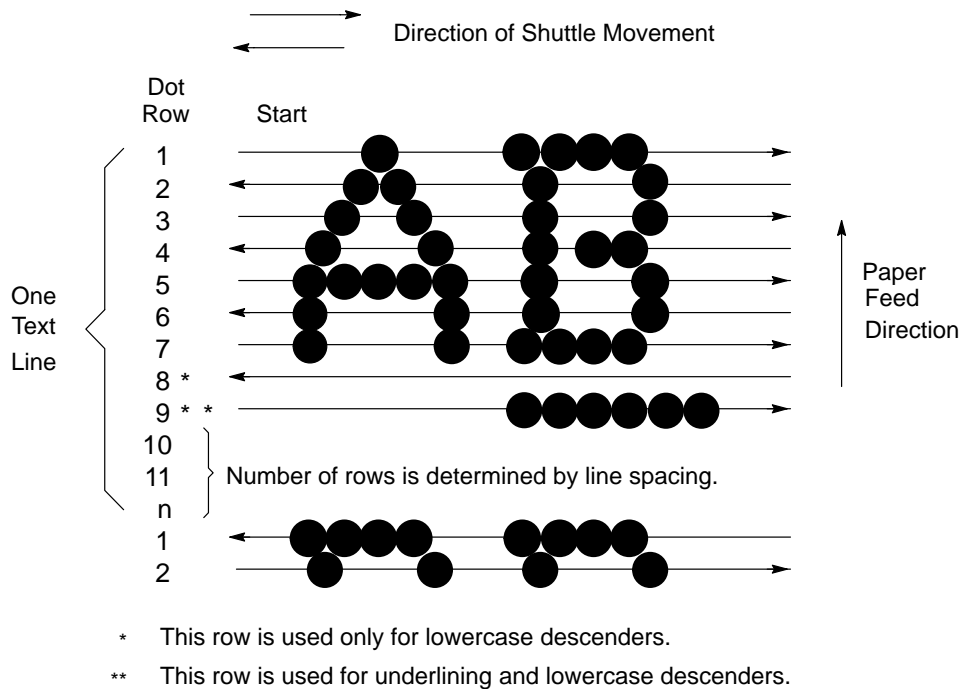

Figure B–1. Typical Character Formation

Serial matrix printers use a moving printhead with pins to form single characters sequentially along the printed line. Unlike serial matrix printers, the P4280 is a *line* matrix printer. Line matrix printers divide every printable line into *horizontal* dot rows, then print a dot row of the entire line at every lateral sweep of the shuttle.

During each sweep of the shuttle, hammers are activated to print dots at the required positions in the dot row. When the shuttle reaches the end of a sweep, it reverses direction, the paper advances one *dot* row, and the hammers print the next row of dots as the shuttle sweeps in the opposite direction, as shown in Figure B–2.

After a line of characters is printed, the paper advances to the first dot row of the next print line. This creates a number of blank rows between lines of characters, depending on the print mode and line spacing you selected.

* This row is used only for lowercase descenders.

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

Figure B–2. Line Matrix Printing

Printing Speed

The speed of text printing is measured in lines per minute (lpm). This speed is dependent upon the number of dot rows required to produce a line of characters, regardless of the number of characters in the line. Because more dot rows are required to print lowercase characters with descenders, those character lines will print at a fractionally lower rate.

In addition to character printing, the printer can plot dot-addressable graphic images. The speed of graphics plotting is measured in inches per minute (ipm). See page A–6 to determine plot speed.

Unidirectional plotting can produce better print quality and takes about twice as long as bidirectional plotting. You can select either plotting mode from the control panel or from the host computer.

Printing rates also vary according to the print font you select. For example, if you select the Near Letter Quality (NLQ) option, the printer uses more dot rows and slower print strokes to form characters than if you choose the High Speed draft (HS) option. Character formation and print speed are faster in High Speed because the printer uses fewer dot rows to form characters. Horizontal dot density is thus a factor in printing speed.

Printing rates are listed in Appendix A, *Printer Specifications.*

NOTE: Print speed depends on the print font option.
Plot speed depends on horizontal resolution only.

C ASCII Character Set

KEY

BITS B7 B6 B5	0 0 1
B4 B3 B2 B1	ESC → 33 OCTAL equivalent / 27 DECIMAL equivalent / 1B HEX equivalent
1 0 1 1	ASCII Character Name

Table columns are indexed by B7 B6 B5 (COLUMN 0–7); rows by B4 B3 B2 B1 (ROW 0–15). Each cell shows the character with its octal / decimal / hex equivalents.

ROW (B4 B3 B2 B1)	COLUMN 0	1	2	3	4	5	6	7
0 (0 0 0 0)	NUL 0/0/0	DLE 20/16/10	SP 40/32/20	0 60/48/30	@ 100/64/40	P 120/80/50	` 140/96/60	p 160/112/70
1 (0 0 0 1)	SOH 1/1/1	DC1 (XON) 21/17/11	! 41/33/21	1 61/49/31	A 101/65/41	Q 121/81/51	a 141/97/61	q 161/113/71
2 (0 0 1 0)	STX 2/2/2	DC2 22/18/12	" 42/34/22	2 62/50/32	B 102/66/42	R 122/82/52	b 142/98/62	r 162/114/72
3 (0 0 1 1)	ETX 3/3/3	DC3 (XOFF) 23/19/13	# 43/35/23	3 63/51/33	C 103/67/43	S 123/83/53	c 143/99/63	s 163/115/73
4 (0 1 0 0)	EOT 4/4/4	DC4 24/20/14	$ 44/36/24	4 64/52/34	D 104/68/44	T 124/84/54	d 144/100/64	t 164/116/74
5 (0 1 0 1)	ENQ 5/5/5	NAK 25/21/15	% 45/37/25	5 65/53/35	E 105/69/45	U 125/85/55	e 145/101/65	u 165/117/75
6 (0 1 1 0)	ACK 6/6/6	SYN 26/22/16	& 46/38/26	6 66/54/36	F 106/70/46	V 126/86/56	f 146/102/66	v 166/118/76
7 (0 1 1 1)	BEL 7/7/7	ETB 27/23/17	' 47/39/27	7 67/55/37	G 107/71/47	W 127/87/57	g 147/103/67	w 167/119/77
8 (1 0 0 0)	BS 10/8/8	CAN 30/24/18	(50/40/28	8 70/56/38	H 110/72/48	X 130/88/58	h 150/104/68	x 170/120/78
9 (1 0 0 1)	HT 11/9/9	EM 31/25/19	) 51/41/29	9 71/57/39	I 111/73/49	Y 131/89/59	i 151/105/69	y 171/121/79
10 (1 0 1 0)	LF 12/10/0A	SUB 32/26/1A	* 52/42/2A	: 72/58/3A	J 112/74/4A	Z 132/90/5A	j 152/106/6A	z 172/122/7A
11 (1 0 1 1)	VT 13/11/0B	ESC 33/27/1B	+ 53/43/2B	; 73/59/3B	K 113/75/4B	[133/91/5B	k 153/107/6B	{ 173/123/7B
12 (1 1 0 0)	FF 14/12/0C	FS 34/28/1C	, 54/44/2C	< 74/60/3C	L 114/76/4C	\ 134/92/5C	l 154/108/6C	| 174/124/7C
13 (1 1 0 1)	CR 15/13/0D	GS 35/29/1D	– 55/45/2D	= 75/61/3D	M 115/77/4D	] 135/93/5D	m 155/109/6D	} 175/125/7D
14 (1 1 1 0)	SO 16/14/0E	RS 36/30/1E	. 56/46/2E	> 76/62/3E	N 116/78/4E	^ 136/94/5E	n 156/110/6E	~ 176/126/7E
15 (1 1 1 1)	SI 17/15/0F	US 37/31/1F	/ 57/47/2F	? 77/63/3F	O 117/79/4F	_ 137/95/5F	o 157/111/6F	DEL 177/127/7F

ASCII Character Set

D Predefined Configuration Values

Overview

The printer contains four predefined configurations. A configuration is a group of parameters that are set at particular values.

The configurations include the following: the factory default, IGP, IBM 3287, and IBM 5225. All of these configurations are permanently stored in ROM; their values cannot be altered.

Table D–1. Factory Default Configuration Values

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Ribbon Life		**Application Compatibility (Continued)**	
Job Rate	Currently 150	Font Select / Elongated[1]	Font Select = 0E Elongated = 08
Ribbon Size	Currently 60	View	Lines
When Worn Action	To Stop Printer	Display Language	English
Enable/Disable	Disable Action		
		Paper Format	
Font		Line Spacing	Set at 6 LPI
Font	DP AT 10 CPI	Form Length Set	At 11 Inches
		Auto Line Feed	After Full Line
Character Set		Define CR Code	CR = CR
Select Set	IBM PC	Define LF Code	LF = CR + LF
Select Subset	IBM PC GRAPHICS	VFU Select[4]	EVFU[5]
Select Language	ASCII	Perforation Skip	Disable
		Paper Out	End of Paper
Application Compatibility		Paperout Adjust	113 Dot Rows[6]
Printer Protocol	P-Series	PMD Fault	Enable
Buffer Size	2048 Characters	Slew Relative[1]	1 to 16
Uppercase Select[1]	Upper & Lower	Set Platen @ BOF	Disable
Printer Select[2]	Disable	Print Width	13.2 Inches
Paper Advance SW	Print + Pap Adv	Slow Paper Slew	Disable
Power On State	On-Line		
Alarm On Fault	Enable	**Host Interface**	**Centronics**
Shuttle Timeout	4 Seconds	Data Bit 8	Enable
Unidirectional	Disable	PI Line	Disable[7]
Select SFCC[3]	01 SOH	Data Polarity	Standard
80–9F Hex.	Control Codes	Resp. Polarity	Standard
Control Code 06[4]	8.0 LPI	Fast Busy	Enable
Control Code 08[3]	Double High	Strobe Polarity	Standard
Overstrike	Enable	Latch Data On	Leading Edge
Compress Print[1]	01 SOH		
Draft Print[1]	02 STX		
			Continued on next page

Table D–1. Factory Default Configuration Values (Continued)

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Host Interface Dataproducts		**Host Interface Serial RS-232**	
Data Bit 8	Enable	Data Protocol	X-ON/X-OFF
PI Line	Enable[7]	Data Rate	9600 BAUD
Data Polarity	Standard	Word Length	8 Bits
Resp. Polarity	Standard	Stop Bit	One
Strobe Polarity	Standard	Parity	None
Latch Data On	Leading Edge	Bit 8 Function	Font Select
		Data Term Ready	On-Line and BNF
		Request To Send	On-Line and BNF
		Reverse Channel	On-Line and BNF

Notes:

1. This parameter is displayed only if P-Series XQ printer protocol is selected.

2. This parameter is displayed only if Serial Matrix printer protocol is selected.

3. This parameter is displayed only if P-Series printer protocol is selected.

4. This parameter is displayed only if P-Series or P-Series XQ printer protocol is selected.

5. For P-Series printer protocol, the factory default parameter value is "EVFU". For P-Series XQ protocol, the value is "Enable". For Serial Matrix protocol, the parameter is not displayed.

6. The paper out adjust value is not affected by loading, saving, or clearing NVRAM. Its value may only be explicitly changed in the menu.

7. If P-Series XQ or Serial Matrix printer protocol is selected, the factory default parameter value is "Not Applicable".

Table D–2. IGP Configuration Values

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Ribbon Life		**Paper Format**	
Job Rate	Currently 150	Line Spacing	Set at 6 LPI
Ribbon Size	Currently 60	Form Length Set	At 11 Inches
When Worn Action	To Stop Printer	Auto Line Feed	Disable
Enable/Disable	Disable Action	Define CR Code	CR = CR
		Define LF Code	LF = CR + LF
Font		VFU Select	EVFU
Font	DP AT 10 CPI	Perforation Skip	Disable
		Paper Out	End of Paper
Character Set		Paperout Adjust	113 Dot Rows[1]
Select Set	MULTINATIONAL	PMD Fault	Enable
Select Subset	MULTINATIONAL	Set Platen @ BOF	Disable
Select Language	ASCII	Print Width	13.2 Inches
		Slow Paper Slew	Disable
Application Compatibility			
Printer Protocol	P-Series		
Buffer Size	2048 Characters		
Paper Advance SW	Print + Pap Adv		
Power On State	On-Line		
Alarm On Fault	Enable	**Host Interface**	**Dataproducts**
Shuttle Timeout	4 Seconds	Data Bit 8	Enable
Unidirectional	Disable	PI Line	Enable
Select SFCC	01 SOH	Data Polarity	Standard
80–9F Hex.	Printable	Resp. Polarity	Standard
Control Code 06	8.0 LPI	Strobe Polarity	Standard
Control Code 08	Double High	Latch Data On	Leading Edge
Overstrike	Enable		
View	Lines		
Display Language	English		

Notes:

1. The paper out adjust value is not affected by loading, saving, or clearing NVRAM. Its value may only be explicitly changed in the menu.

Table D–3. IBM 3287 and 5225 Configuration Values

Configuration Parameter	Factory Default Value	Configuration Parameter	Factory Default Value
Ribbon Life		**Paper Format**	
Job Rate	Currently 150	Line Spacing	Set at 6 LPI
Ribbon Size	Currently 60	Form Length Set	At 11 Inches
When Worn Action	To Stop Printer	Auto Line Feed	Disable
Enable/Disable	Disable Action	Define CR Code	CR = CR
		Define LF Code	LF = CR + LF
Font		VFU Select	EVFU
Font	DP AT 10 CPI	Perforation Skip	Disable
		Paper Out	End of Paper
Character Set		Paperout Adjust	113 Dot Rows[1]
Select Set	MULTINATIONAL	PMD Fault	Enable
Select Subset	MULTINATIONAL	Set Platen @ BOF	Disable
Select Language	ASCII	Print Width	13.2 Inches
		Slow Paper Slew	Disable
Application Compatibility			
Printer Protocol	P-Series		
Buffer Size	2048 Characters		
Paper Advance SW	Print + Pap Adv		
Power On State	On-Line		
Alarm On Fault	Enable	**Host Interface**	**Centronics**
Shuttle Timeout	4 Seconds	Data Bit 8	Enable
Unidirectional	Disable	PI Line	Disable (3287) Enable (5225)
Select SFCC	01 SOH	Data Polarity	Standard
80–9F Hex.	Printable	Resp. Polarity	Standard
Control Code 06	8.0 LPI	Fast Busy	Enable
Control Code 08	Double High	Strobe Polarity	Standard
Overstrike	Enable	Latch Data On	Leading Edge
View	Lines		
Display Language	English		

Notes:

1. The paper out adjust value is not affected by loading, saving, or clearing NVRAM. Its value may only be explicitly changed in the menu.

Predefined Configuration Values

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 is equal to 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	An instruction, such as a form feed command, sent from a computer to the printer (sometimes called a control code or non–printable character). Opposed to data, which is printed.
command delimiter	An ASCII character used to begin a command string (same as SFCC). Commonly used command delimiters are ESC (1B hex) and SOH (01 hex).
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** 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   *Abbrev. for* 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.

See also **pitch**.

cps   *Abbrev. for* 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.

See also **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.

DIP   *Acronym for* dual in-line package. A method of packaging semiconductor components in rectangular cases with parallel rows of electrical contacts (pins).

DIP switch	A DIP equipped with switches. A typical DIP switch has from four to ten individual switches mounted in its package. The individual switches are typically toggle, rocker, or slide switches.
disable	To deactivate, make "false" (0), or set to OFF.
DP	*Abbrev. for* data processing or draft print.

E

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).
	See also **compatibility** and **protocol**.
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.
	See also **command sequence** and **SFCC**.
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	*See* **font, monospaced**.

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:

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	*See* **typeface**.
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	*Abbrev. for* high speed
Hz	*Abbrev. for* Hertz. Cycles per second, a measure of frequency.

I

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	*Abbrev. for* inches per minute. A measurement of the speed of a printer printing in graphics print mode (plotting speed).
italic	A slanted type style. *This is an italic type style.*

L

landscape	Printed parallel to the long edge of a page.
LCD	*Abbrev. for* 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	*Abbrev. for* 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 8 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.

NVRAM   *Abbrev. for* nonvolatile random-access memory. A type of RAM in which stored data are not lost when the power is interrupted or turned off. A battery supplies power to NVRAM when the system does not. Unlike ROM (another type of nonvolatile memory), the contents of NVRAM can be altered.

See also **RAM** and **ROM**.

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).

See also **cpi**.

pixel	*Derived from* picture (PIX) ELement. 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.
Postnet	A bar code standard defined by the U. S. Postal Service.
print mode	Font.
proportion, character	*See* **character proportion**.
proportional	*See* **font, proportional**.
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. *See also* **compatibility** and **emulation**.

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* **NVRAM** and **ROM**.

read	To retrieve data from memory (RAM, NVRAM) 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." ROM-resident fonts are fonts that are permanently stored in a printer and available at any time via software commands to the printer. *See also* **NVRAM** and **RAM**.
Roman	A type style in which the characters are upright. This is 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 sequence	*Abbrev. for* Special Function Control Character. The first byte in a printer command sequence. In P-Series emulation mode, you can select one of five characters as the SFCC. In serial matrix 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, NVRAM) or to mass storage (hard disk, floppy diskette, etc.).

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