

LA324 MultiPrinter Installation Guide

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- Reorient the receiving antenna.
- Relocate the computer or peripheral with respect to the receiver.
- Move the computer or peripheral away from the receiver
- Plug the computer or peripheral into a different outlet so that they are on different branch circuits than the receiver.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the booklet *How to Identify and Resolve Radio/TV Interference Problems*, prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington DC, 20401, Stock No. 004-000-00345-4.

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

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Preface

The LA324 MultiPrinter is a dot-matrix printer designed primarily for business and industrial use. It produces near letter-quality print and has the capacity to accept cut sheets, fanfold (continuous-form) paper, envelopes, labels, and multipart forms up to 6-parts thick. The LA324 MultiPrinter can use a multicolored ribbon cartridge to print in color.

This guide describes how to install the printer. It names the printer parts, shows how to connect the printer to your computer system or video terminal, explains how to load fanfold paper, and how to perform the self-test. Be sure to perform these installation procedures in the order given.

Additional Documentation

Refer to your *LA324 MultiPrinter Operator's Guide* for operation and maintenance instructions, information on accessories and supplies, and specifications for the printer and paper.

The *LA324 MultiPrinter Programmer's Reference Manual* is intended for the applications programmer who needs interface and control function descriptions. The programmer can use the information in the reference manual to design application software or to update existing programs. To order the programmer's reference manual, refer to Appendix B, Section B.1 of the *LA324 MultiPrinter Operator's Guide*.

Conventions

The following terms and conventions are used in this guide:

Term/Convention	Meaning
NOTE	Notes provide general information about the current topic.
CAUTION	Cautions provide information to prevent damage to equipment or software.
Setup	A key name is shown enclosed to indicate that you press that key on the operator panel. For example: 1. After loading paper into the printer, press FF to feed the paper into the printer.
Bullet (•)	A bulleted statement describes the result of a step. For example: 1. Press FF to position the paper in front of the printhead. • The message display reads READY DEC.
Arrow (→)	A statement marked by an arrow indicates a special instruction. For example: 1. Unhook the left side of the chute to remove it from the printer. → Store the paper chute with your other printer supplies.

Chapter 1

The Printer

This section lists some important features of the LA324 MultiPrinter, describes how to prepare your printer for installation, and identifies its major components.

1.1 Features

Listed below are some distinctive features of the LA324 MultiPrinter:

- Compact size makes it suitable for desktop locations.
- A universal power supply with automatic switching supports a range of 110 to 240 volts.
- A demand-document feature ensures economical use of paper and forms.
- It accepts cut-sheet paper, labels, envelopes and multipart forms up to 6 parts thick.
- A paper parking feature allows you to feed paper manually without removing fanfold paper.
- Automatic feeding for fanfold paper simplifies paper loading and perforation alignment.
- A multicolored ribbon cartridge allows color printing.
- Output capabilities include: underline, shadow bold, double width, and color graphics.
- It includes built-in support for printing barcode labels.
- It offers a choice of letter quality (100 char/sec) or draft (300 char/sec) printing modes.
- The LCD menu display is easy to read.

1.2 Before You Install the Printer

Before you install your printer, note the following environmental requirements:

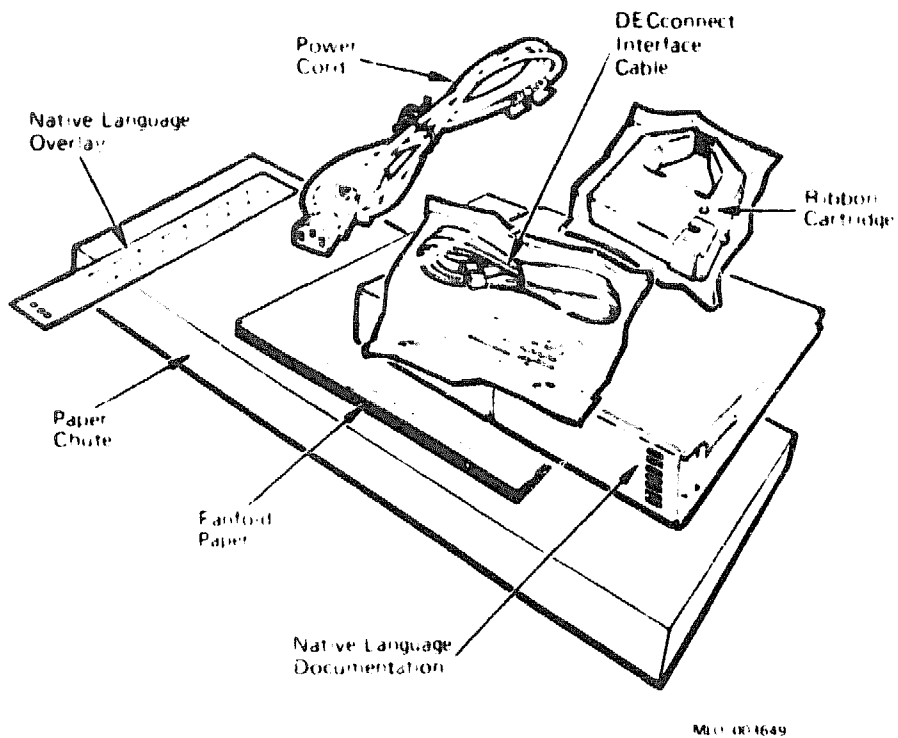
- Install the printer in a draft-free area away from any heat or air conditioning sources.
- Avoid installing the printer in a dusty or humid area.
- Place the printer on a flat, solid, level surface such as a desk or printer stand. An optional pedestal stand is available for the LA324 MultiPrinter.
- Allow enough space around the printer to ensure correct ventilation and easy access to all sides.
- Do not plug other equipment drawing high electrical current—such as coffee pots, office copiers, or air conditioners—into the same wall outlet.

1.3 Inventory

You should find the following items in the shipping carton:

- One LA324 MultiPrinter
- One paper chute (packaged on top of the printer)
- The following items packed in a box, a plastic bag, or both:
 - One power cord
 - One DECconnect interface cable
 - One black ink ribbon cartridge
 - One native language documentation binder
 - One native language operator panel overlay (where applicable)
 - A small amount of fanfold paper

NOTE: *If any item is missing or damaged, immediately contact your sales representative and delivery agent.*

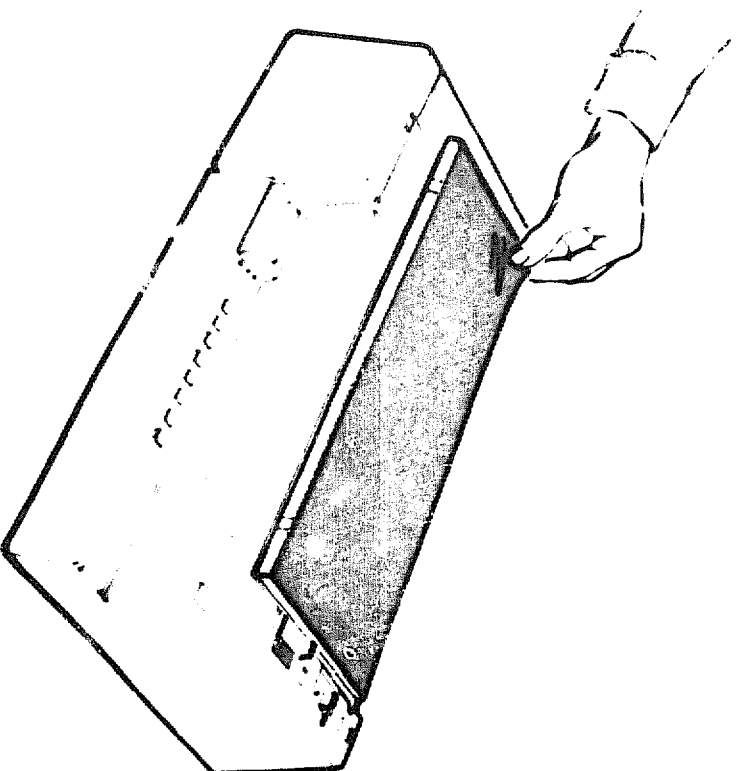


NOTE: *You may want to save the shipping carton and the packing material in case you have to move the printer.*

1.4 Beginning the Installation

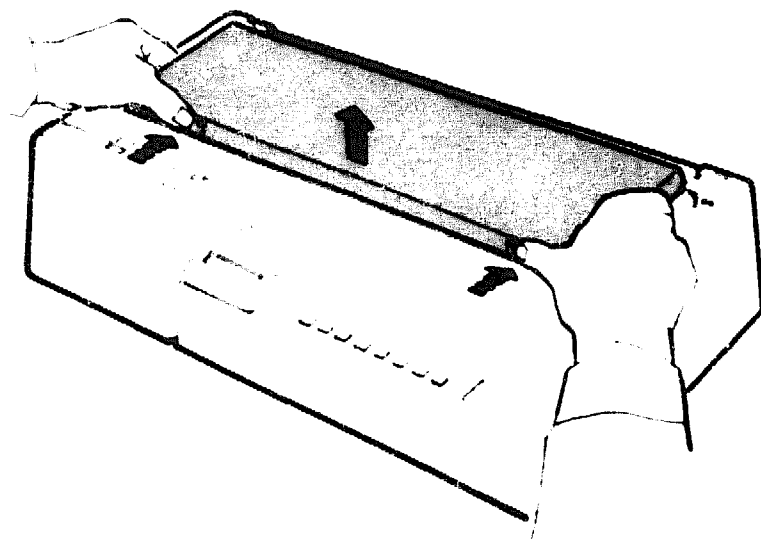
Install your printer by following these instructions.

1. Place the printer on a table, desk, or stand.
2. Remove the plastic film from the access cover.



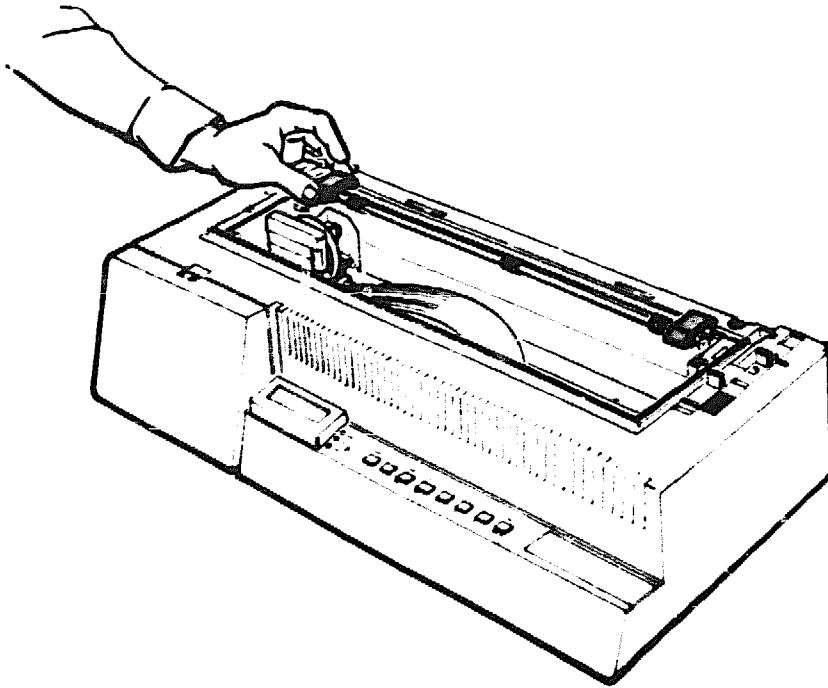
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3. Remove the access cover by pressing in the tabs on the front of the cover and lifting the cover out.



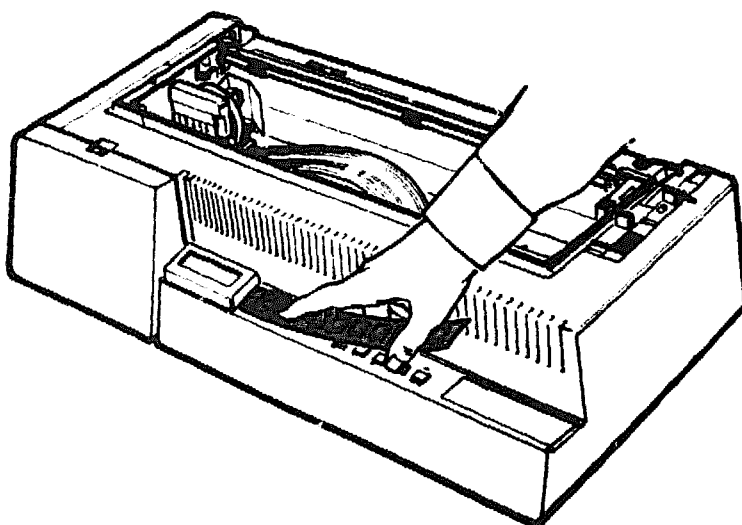
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4. Remove the two restraints on the bail bar.



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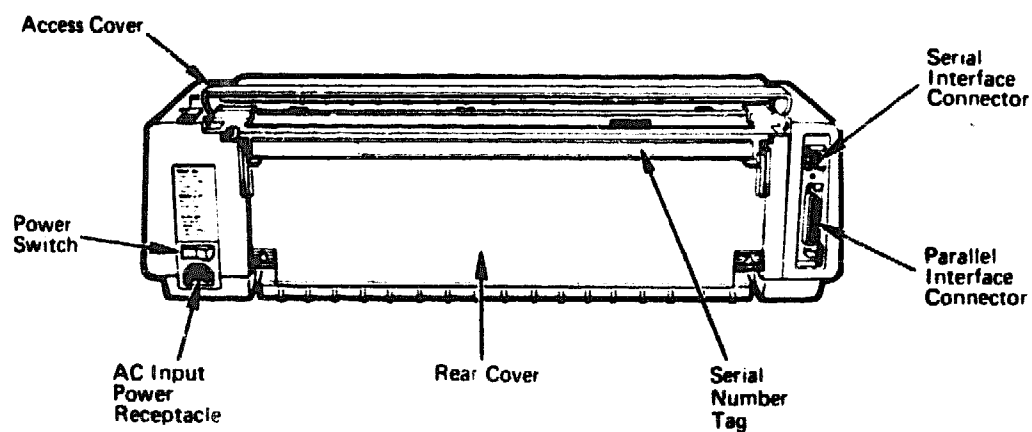
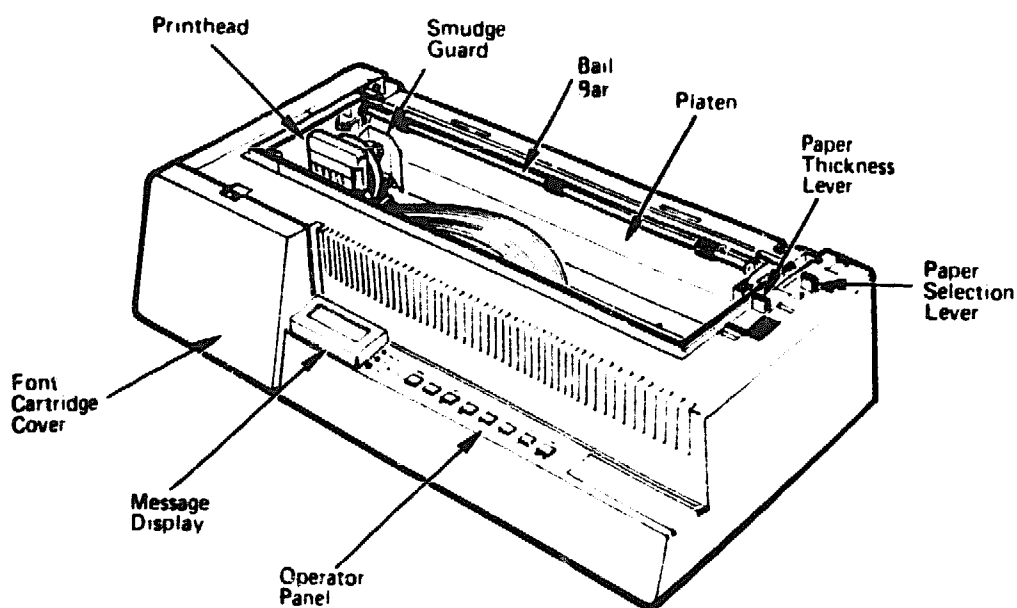
5. If you received a native language operator panel overlay with your printer, install it now by following these instructions:
- Peel the protective strip off the back of the overlay.
 - Align the square holes on the overlay with the square indicator lights on the printer's operator panel.
 - Press the overlay into place making sure it fits over the related buttons on the operator panel.



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1.4.1 A Look at the Printer

Before continuing the installation, take a minute to familiarize yourself with the printer.



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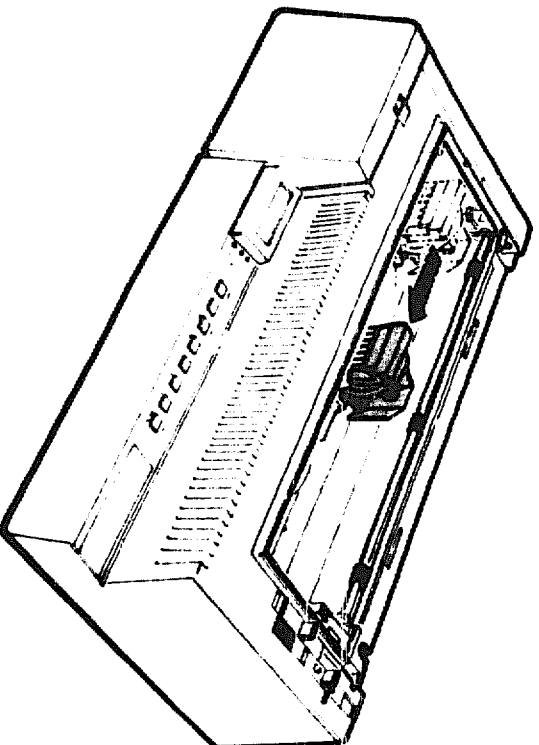
Chapter 2

The Ribbon Cartridge

This chapter explains how to install the ribbon cartridge.

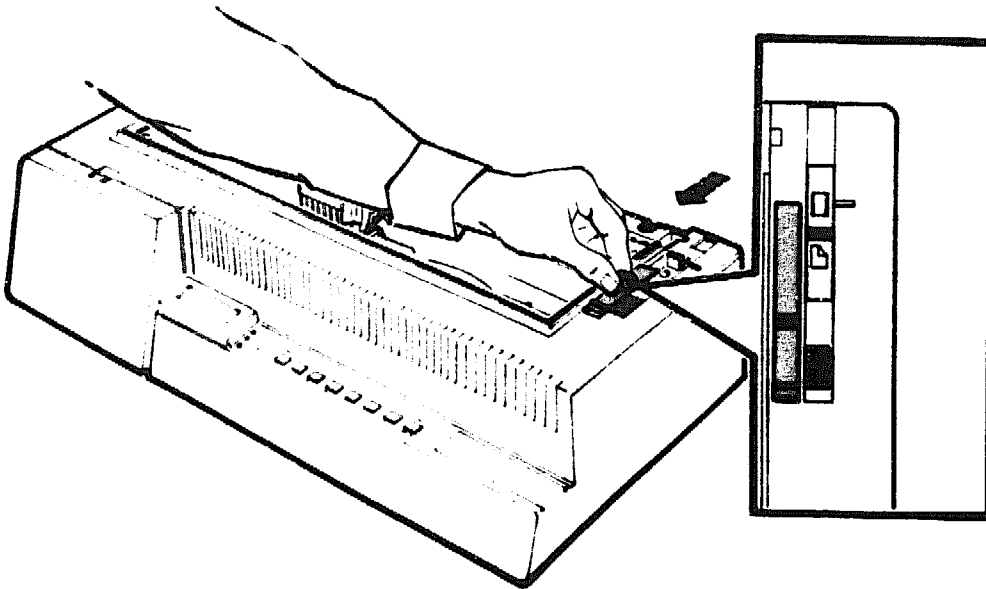
2.1 Installing the Ribbon Cartridge

1. Slide the printhead carriage to the center of the printer.



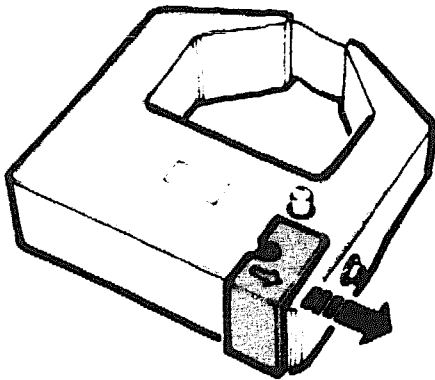
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2. Move the paper thickness lever toward the front of the printer until it stops. This facilitates the installation of the ribbon cartridge.



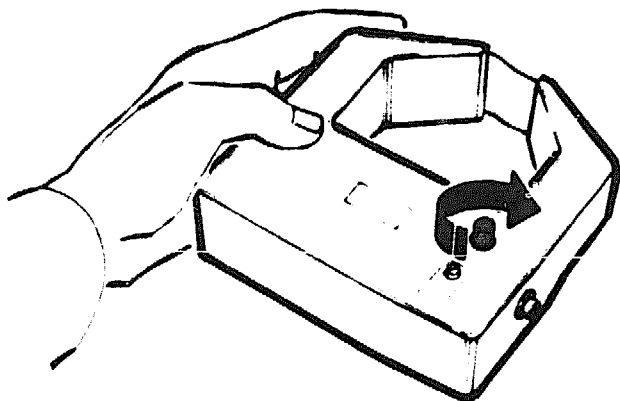
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3. Remove the ribbon cartridge from its bag. Remove the shipping clip from the cartridge by pulling it in the direction of the arrow on the clip, and discard the clip.



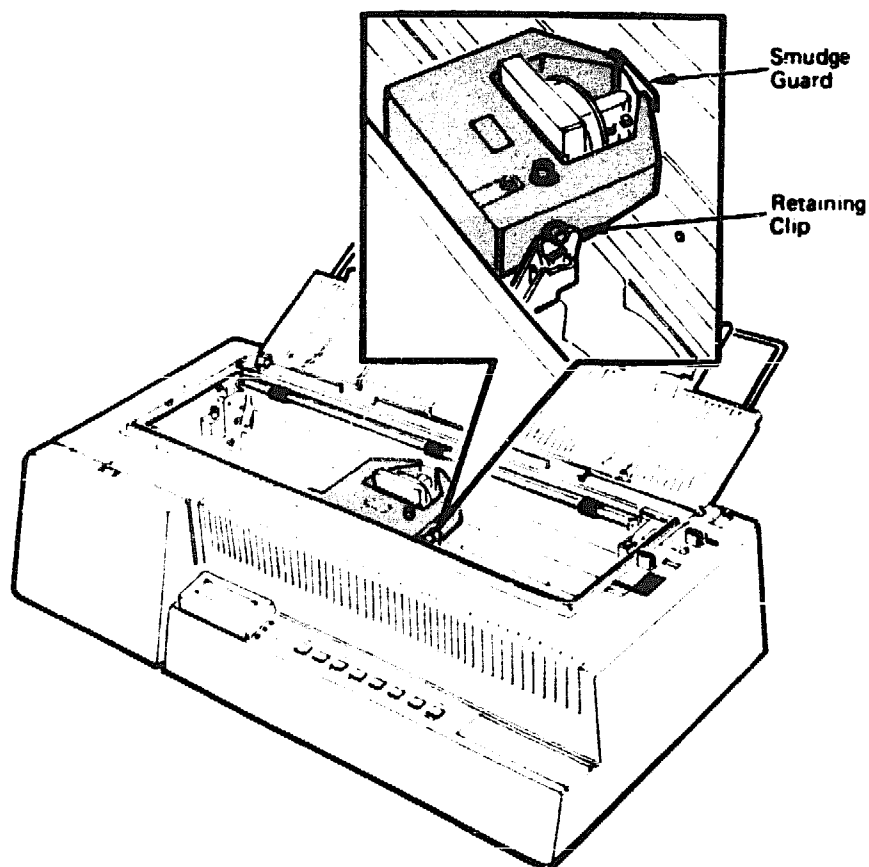
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4. Turn the tension knob on the cartridge in the direction of the arrow to remove any slack in the ribbon.



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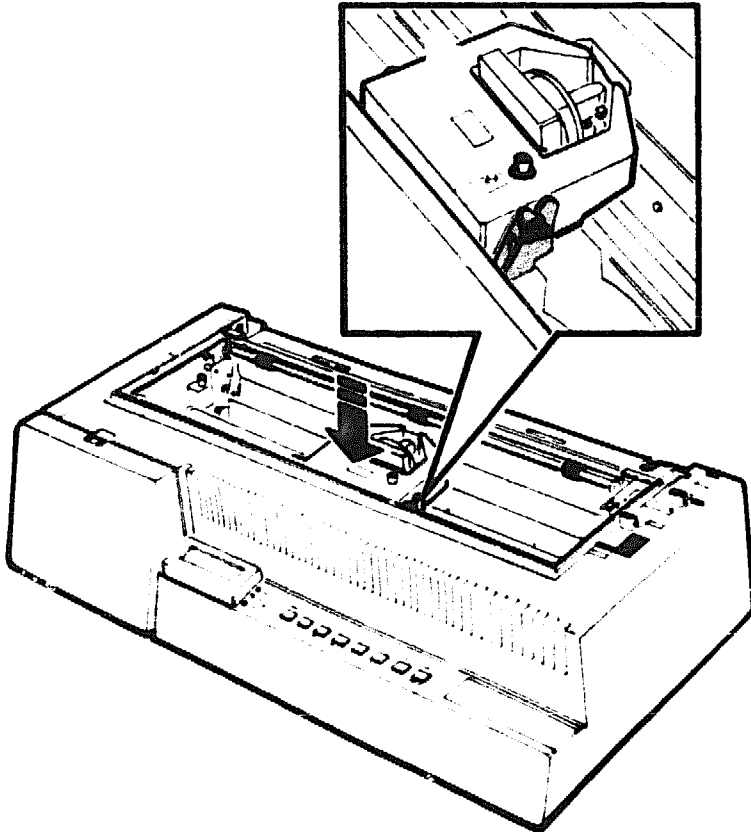
5. Position the cartridge so that the ribbon is between the printhead and the smudge guard, and the pins on each side of the cartridge rest on the cartridge retaining clips.



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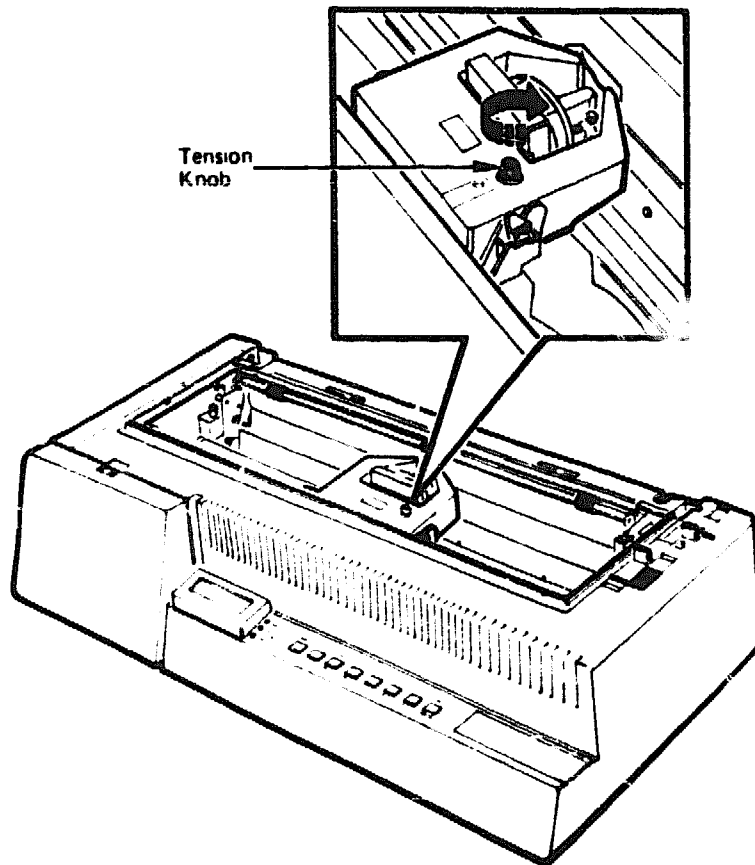
6. Push the ribbon cartridge down gently until the pins are locked into place by the carriage retaining clips.

NOTE: *If the ribbon cartridge does not seat properly, turn the tension knob on the cartridge slowly until the cartridge can be pressed into place.*



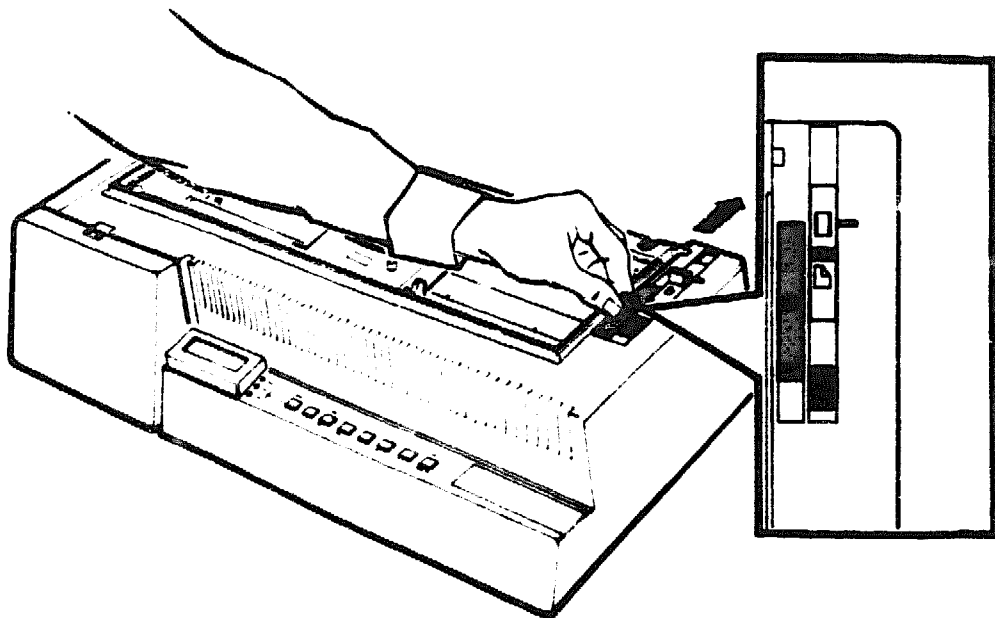
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7. Remove the slack in the ribbon by turning the tension knob in the direction of the arrow on the cartridge.



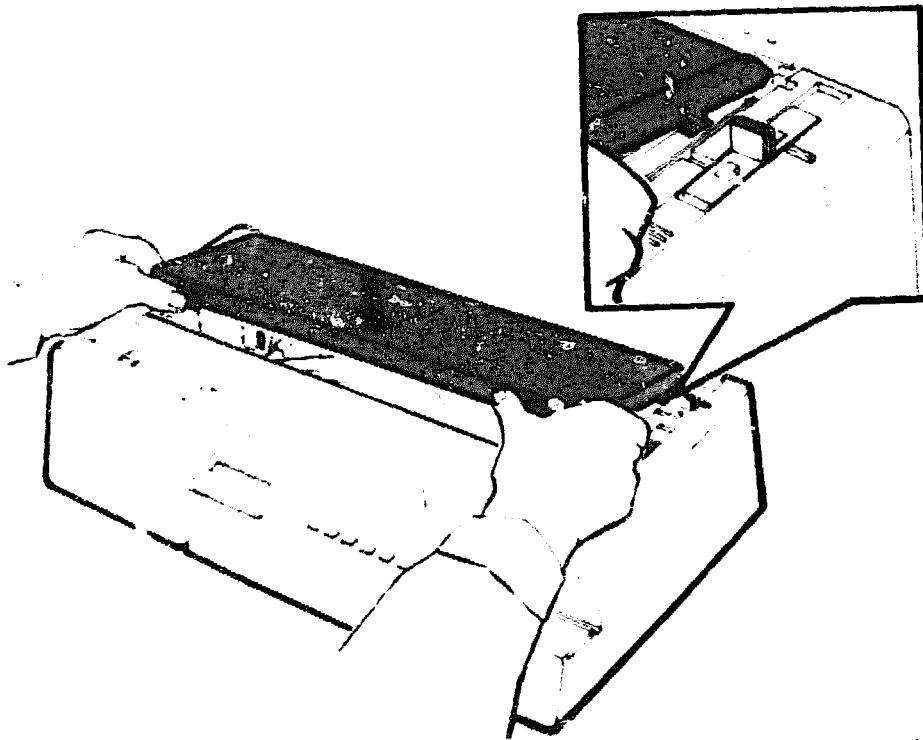
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8. Move the paper thickness lever toward the rear of the printer until it stops.



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9. Install the access cover by inserting the rear end tabs on the cover into the slots on top of the printer and pressing the cover down until it snaps into place.



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CHAPTER 3

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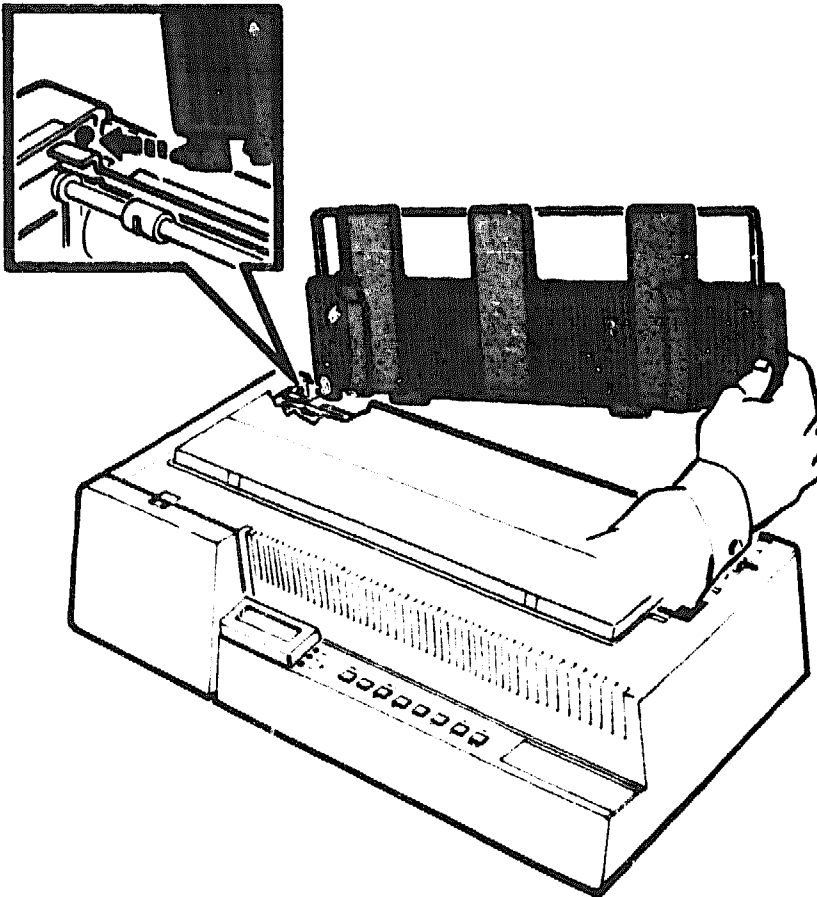
Chapter 3

The Paper Chute

This chapter illustrates how to install the paper chute.

3.1 Installing the Paper Chute

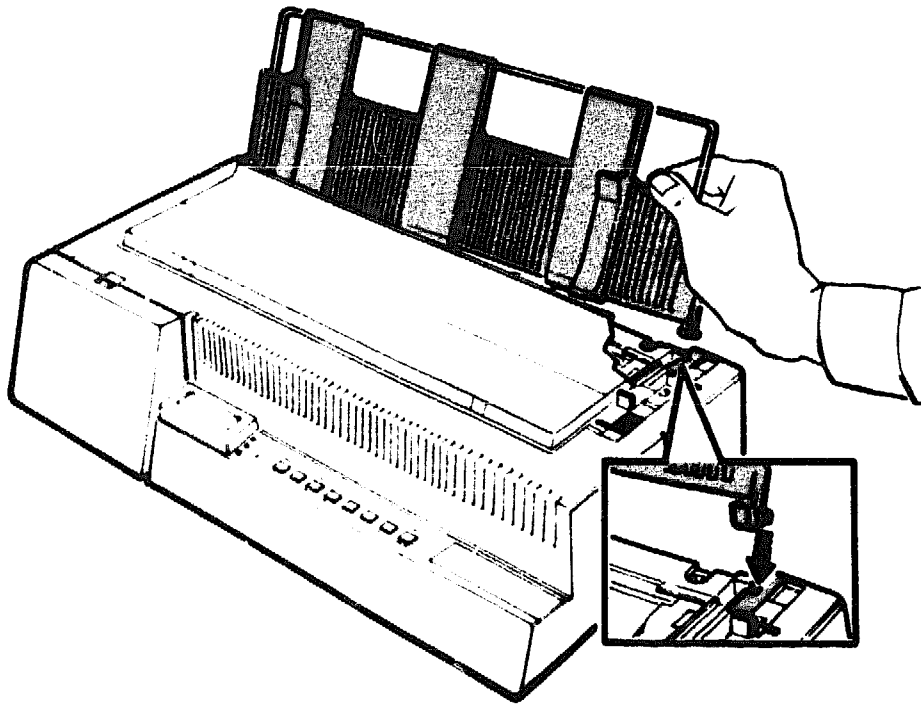
1. Remove the paper chute from its plastic bag.
2. Insert the pin on the left side of the chute into the hole in the left side of the printer.



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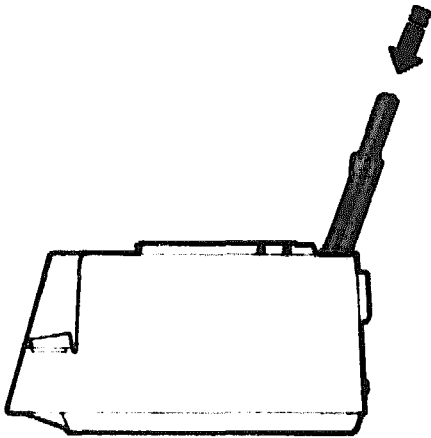
3. Insert the pin on the right side of the chute into the corresponding groove in the right side of the printer.

NOTE: *The paper chute may fit snugly, so some manipulation may be required to position it.*



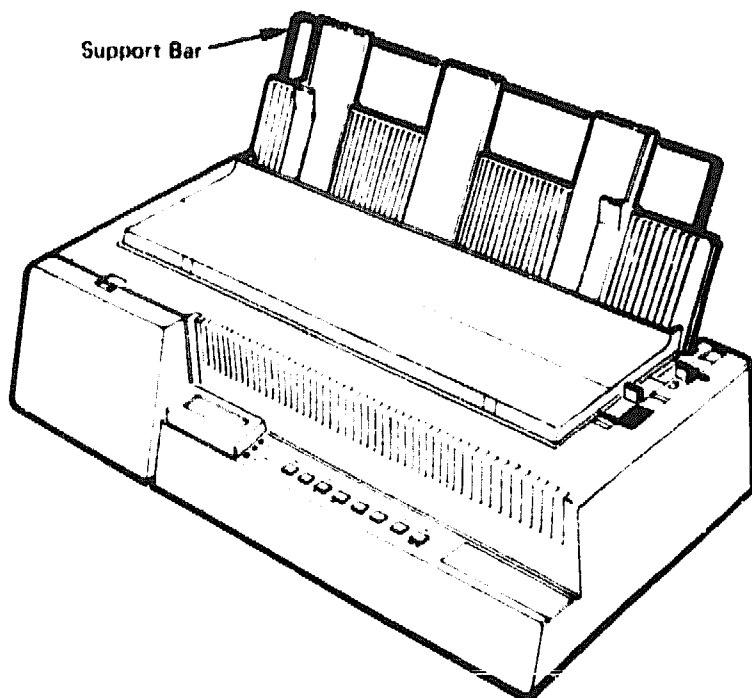
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4. With one hand on each end of the paper chute, press both ends of the chute down to lock the chute in an upright position.



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5. Make sure the paper support bar is in the retracted position, as shown in the following illustration.



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Chapter 4

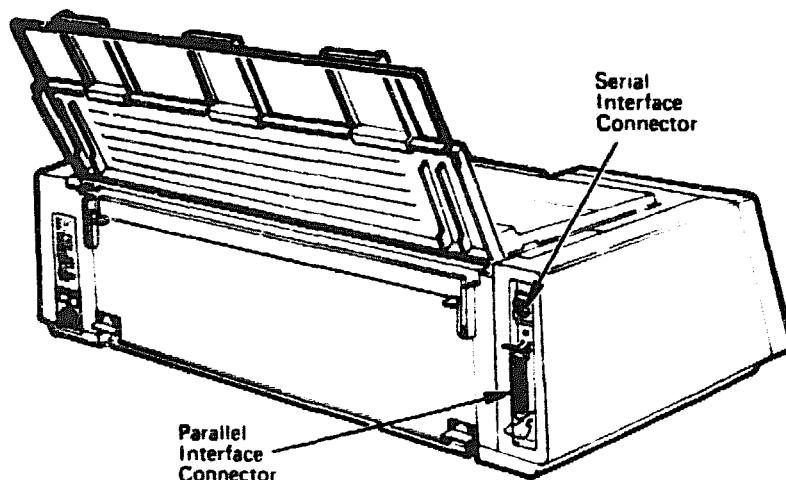
Connecting Your Printer

This section describes how to connect your printer to the host device and a power source.

Refer to Appendix A for details on what cables and adaptors to use with different devices, and for serial flow control and parallel communication connection procedures.

4.1 Connecting to the Host Device

Your printer is equipped with a serial interface connector and a parallel interface connector. This section explains how to connect your printer to each.

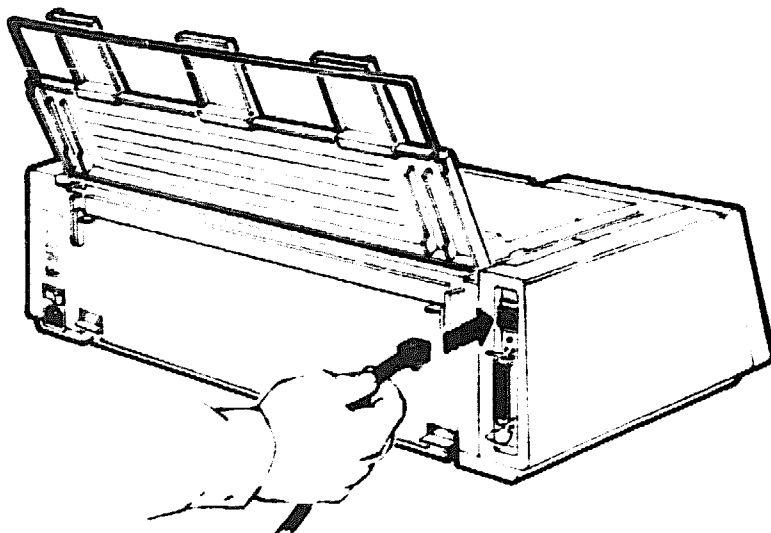


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4.1.1 Serial Interface Connection

If your device requires the serial interface cable, follow these directions:

1. Plug one end of the interface cable into the device and the other end into the MMJ serial interface connector on the back of the printer.
 - The connector clicks into place.



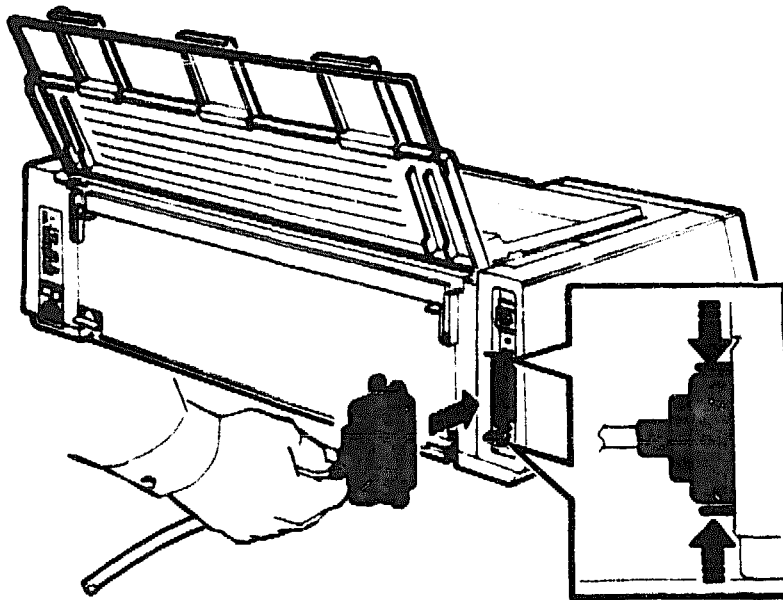
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4.1.2 Parallel Interface Connection

If your device requires the parallel interface cable, follow these directions:

CAUTION: *Before connecting the interface cable, be sure the device you are connecting to is turned off.*

1. Plug the end of the parallel interface cable (BC19M-10) with the two screws attached to it firmly into the device.
2. Tighten the two screws.
3. Plug the other end of the interface cable firmly into the printer.
4. Secure the cable to the printer by pressing the clips over the cable head.



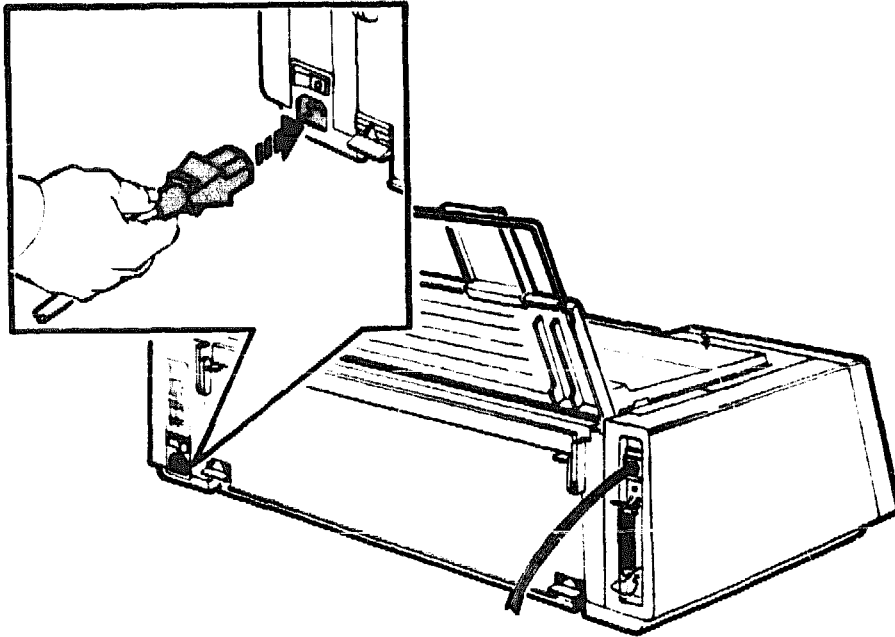
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NOTE: *If you do not have the BC19M-10 cable, refer to Appendix B, Section B.1 of the LA324 MultiPrinter Operator's Guide for ordering instructions.*

4.2 Connecting to the Power Source

The LA324 MultiPrinter has a power supply that works within the following voltage range: 110 to 240 V. If your main power source is outside this range, *do NOT use the printer and seek advice from your supplier.*

1. Make sure the power switch on the back of the printer is in the OFF (O) position.
2. Insert the power cord into the AC input power receptacle on the back of the printer.



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3. Insert the other end of the power cord into a power outlet.

CAUTION: *Do not use an adapter plug on the power cord.*

CAUTION: *Do NOT turn the printer on at this time.*

Chapter 5

Concluding the Installation

This chapter shows how to use the built-in printer stand, how to load fanfold (continuous-form) paper, how to determine if the printer is functioning properly, and how to perform the visual self-test.

5.1 Loading Fanfold Paper

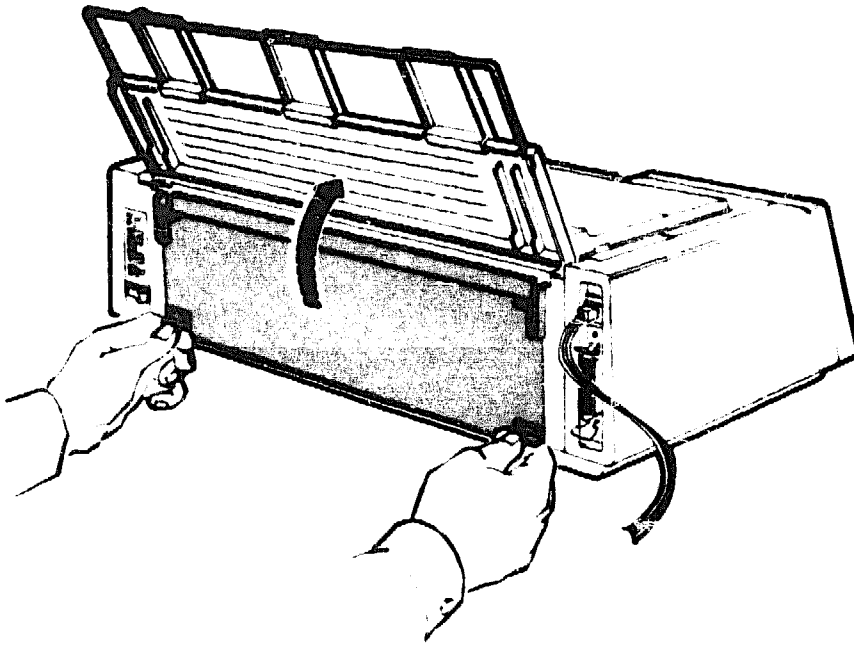
Your printer uses both cut sheets and continuous-form or fanfold paper. The paper packed with your printer is fanfold paper—a continuous form of paper separated into sheets by perforations. This section describes how to load fanfold paper. For more details on loading paper, refer to your *LA324 MultiPrinter Operator's Guide*.

Your printer comes with a built-in stand that raises the rear of the printer in order to feed small amounts of fanfold paper from the top of a table. Do not use more than 400 sheets of paper with the built-in stand. This section describes how to load the small amount of fanfold paper that came with your printer, using the built-in stand.

NOTE: *The built-in stand cannot be used when the printer is attached to a pedestal stand.*

The printer's built-in metal wire stand is located inside the rear of the printer, around the paper feed mechanism. To secure this built-in stand:

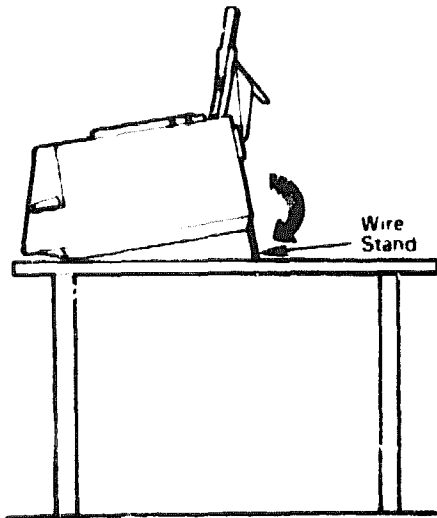
1. Position the printer on a table or desk, allowing enough space behind the printer to stack the paper.
2. Open the rear cover until it locks into place.



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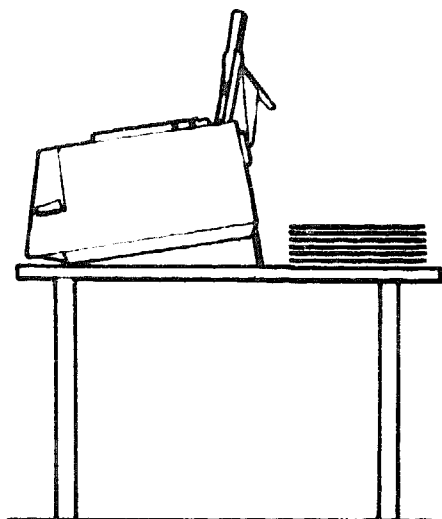
3. Pull the metal wire stand out and then down until it locks into place.

NOTE: *You need to lift the rear of the printer to lock the wire stand in place.*



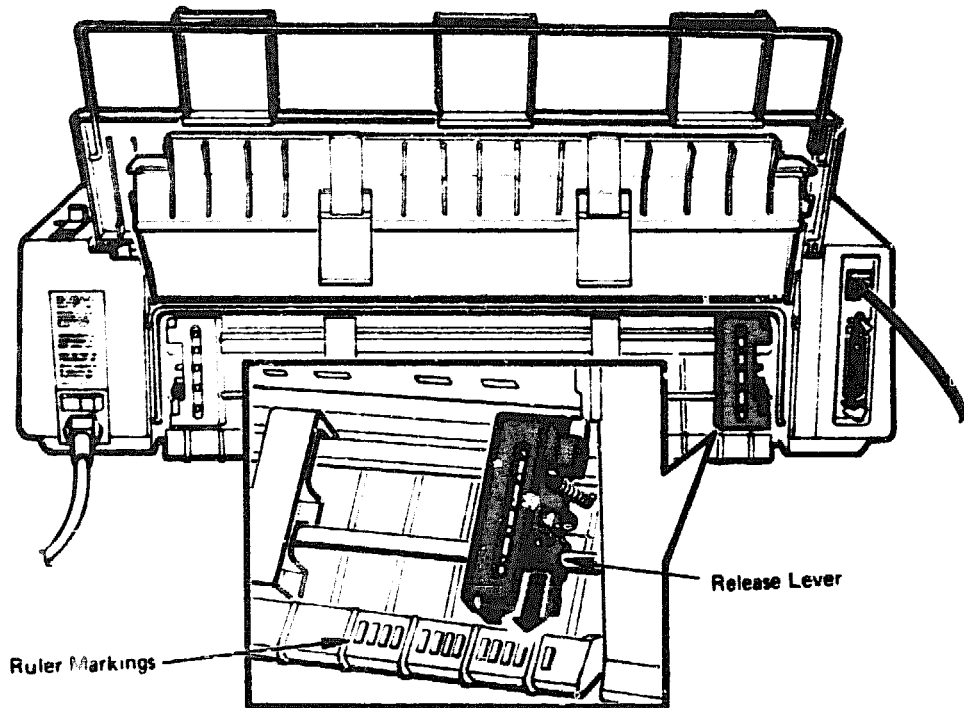
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4. Place the small amount of paper on the table or desk in back of the printer. Do not set the paper on top of the wire stand (under the printer).



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5. Unlock the right tractor feed assembly by pressing its release lever down, and slide the assembly to the right until it stops.

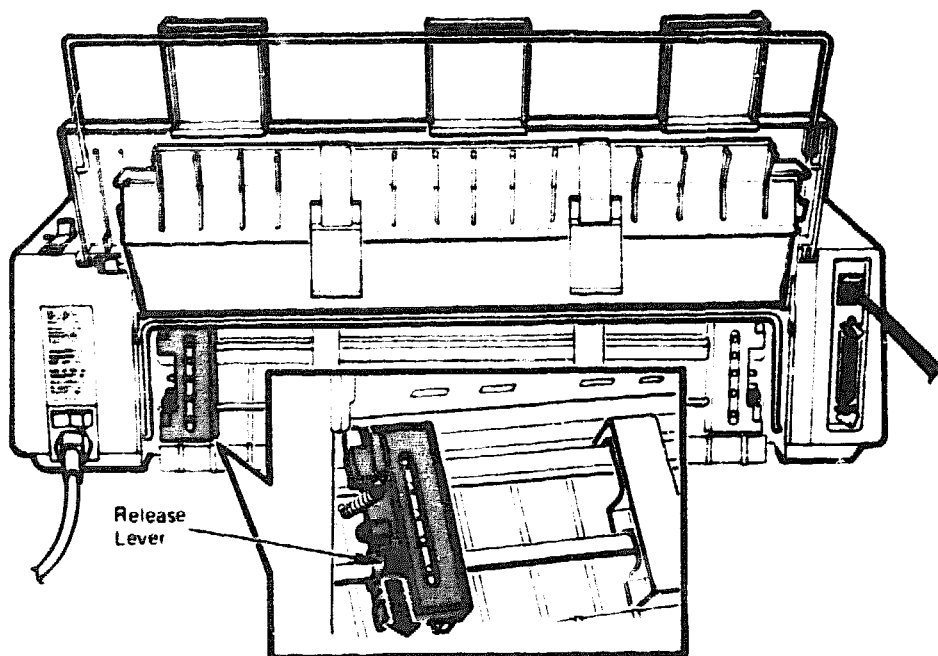


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NOTE: To change the position of the first column (left margin), just slide the tractor feed assembly left or right along the shaft accordingly. Below the assembly are ruler markings spaced $\frac{2}{10}$ of an inch apart to help determine the proper position of the assembly.

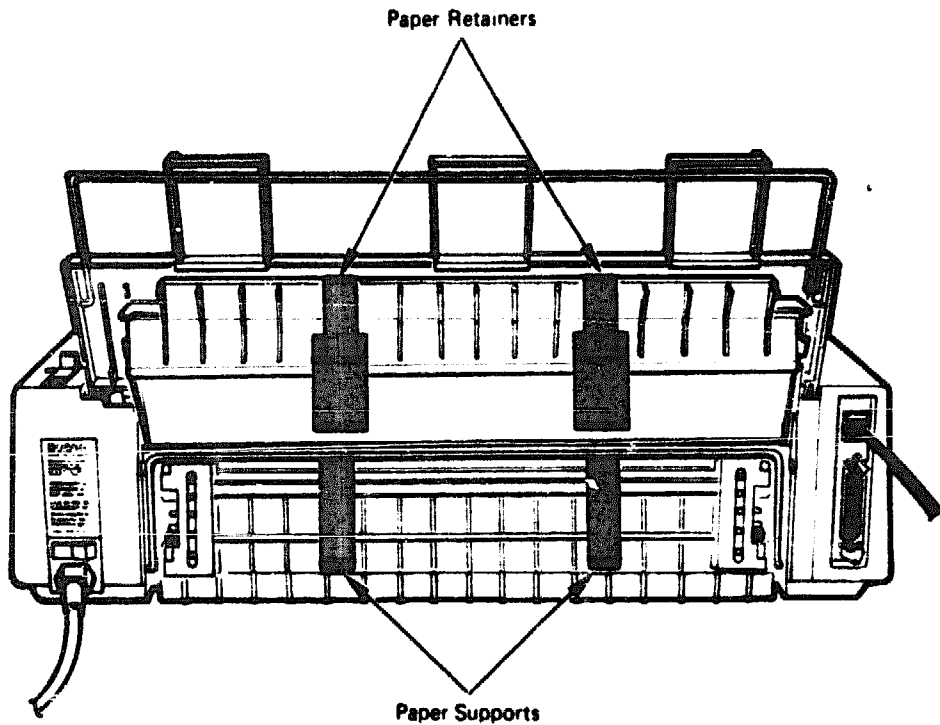
→ Lock the assembly by pushing its release lever up.

6. Unlock the left tractor feed assembly by pressing its release lever down, and slide the assembly to the approximate width of the paper.
- Do not lock the assembly at this time.



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7. Position the two paper supports evenly between the tractor feed assemblies by sliding the paper supports along the shafts.
8. Position the two paper retainers on the rear cover so they are aligned with the paper supports.



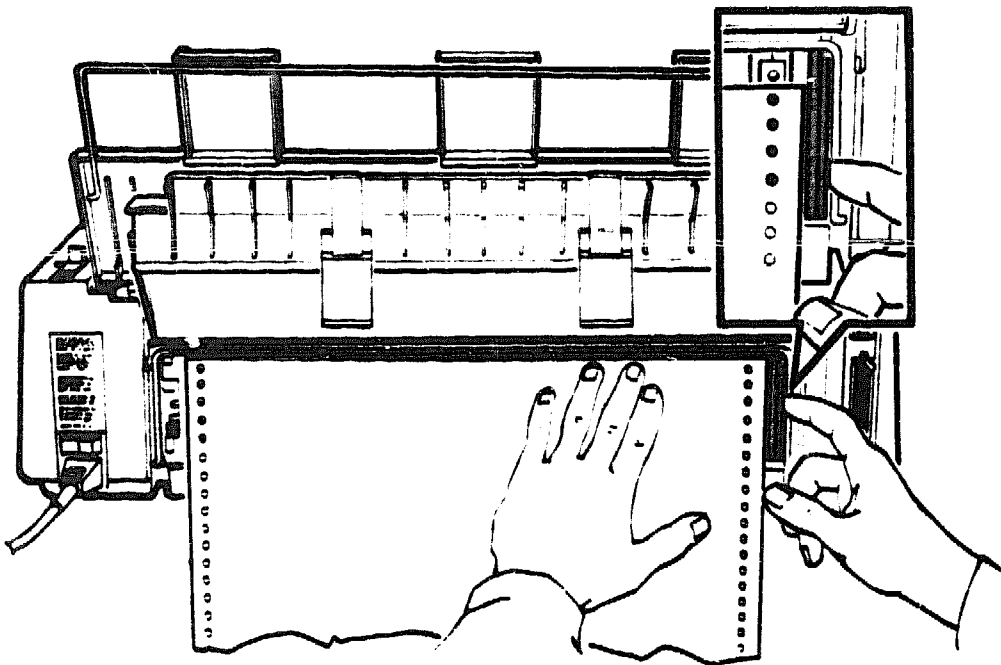
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Your LA324 MultiPrinter automatically feeds the paper through the paper path. To load the paper, align the paper holes over the pins on the tractor feed assemblies.

9. Open the right tractor feed assembly and position the holes in the paper over the tractor pins.

CAUTION: *Be sure the top hole in the fanfold paper is positioned over the tractor pin. Do not allow the edge of the paper to extend past the top of the tractor feed assemblies. Allowing paper to extend too far causes paper jams. The top hole of the paper should be on the same tractor pin on both sides of the printer.*

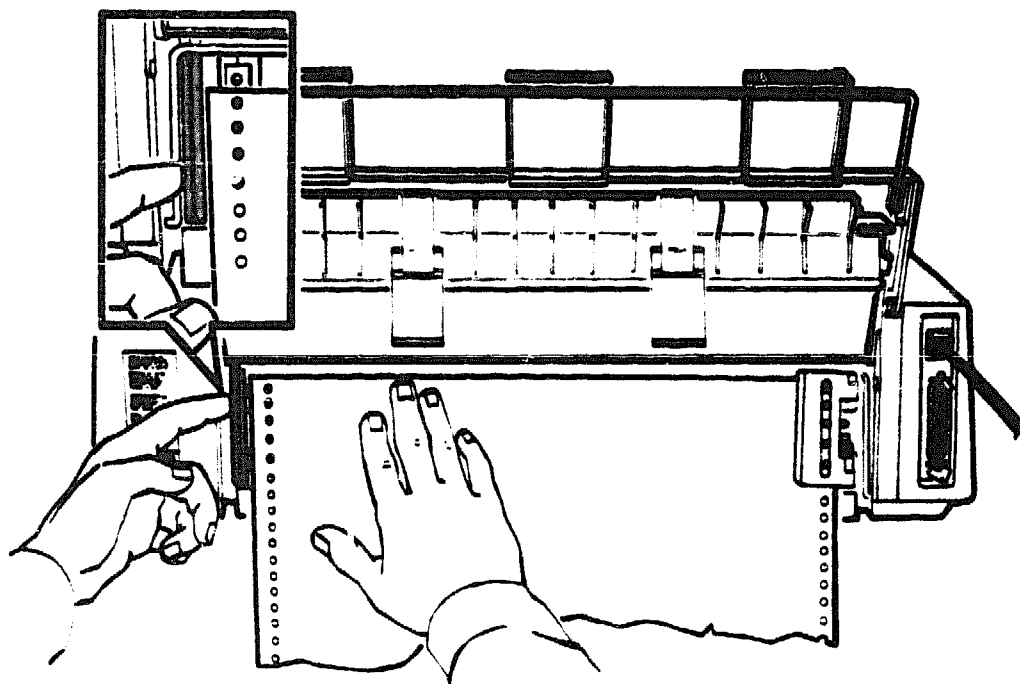
→ Close the tractor feed assembly.



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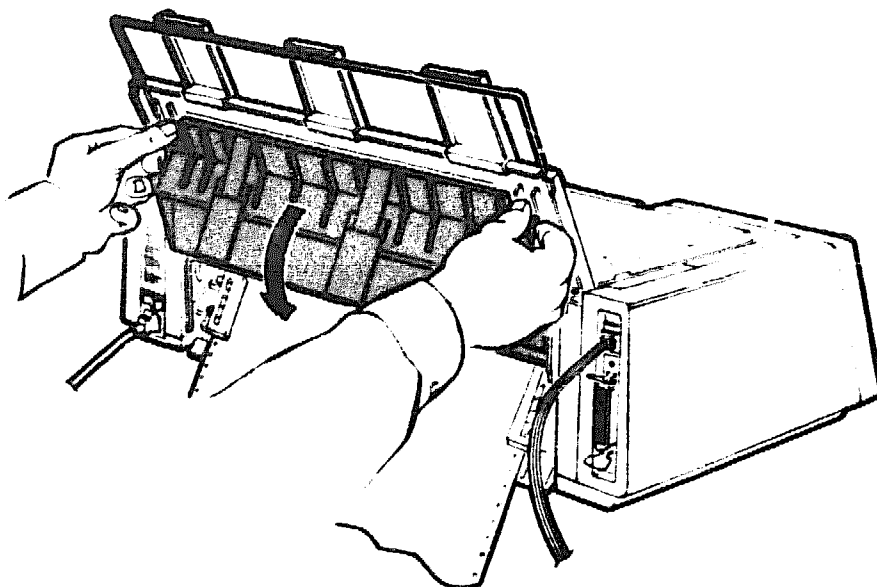
10. Open the left tractor feed assembly and position the top hole in the paper over a pin on the tractor feed assembly.
 - Make sure the top of the paper is level.
 - Close the tractor feed assembly.
11. Slide the left tractor feed assembly to the left until the paper is taut, and push the release lever up to lock the assembly in position.

CAUTION: *Do not stretch the paper too tightly. The side perforations can tear or the tractor pin holes can enlarge and cause misfeeds or paper jams.*



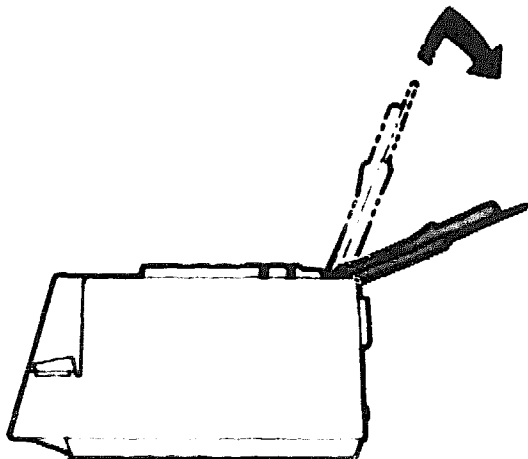
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12. Close the rear cover until it locks into place.



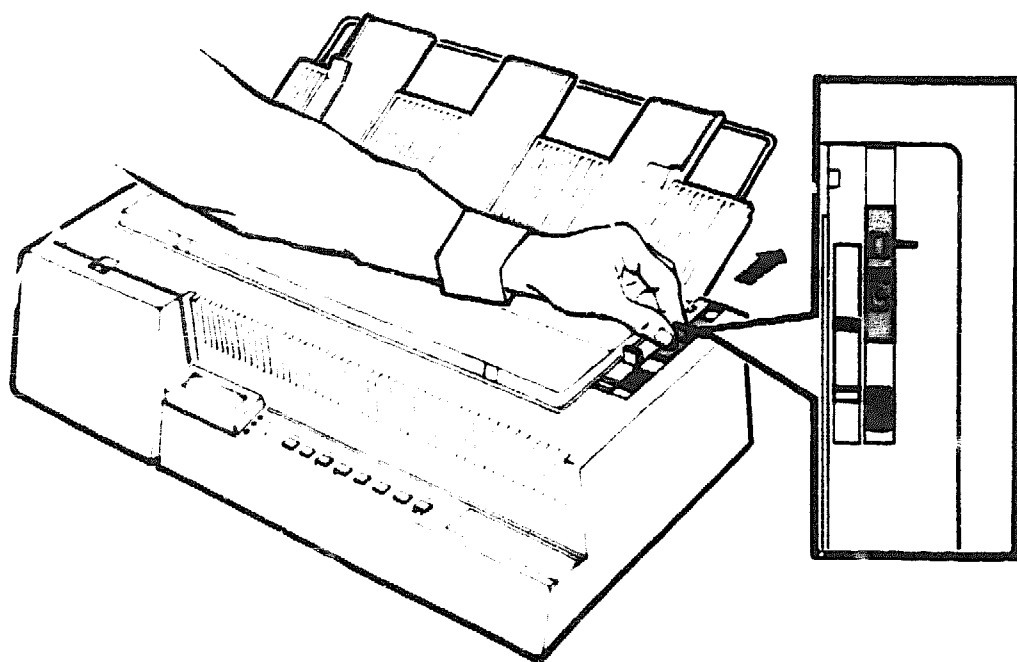
MLO-003683

- 13. Lower the paper chute by lifting it up slightly to unlock it, then pushing it back to its down position.**



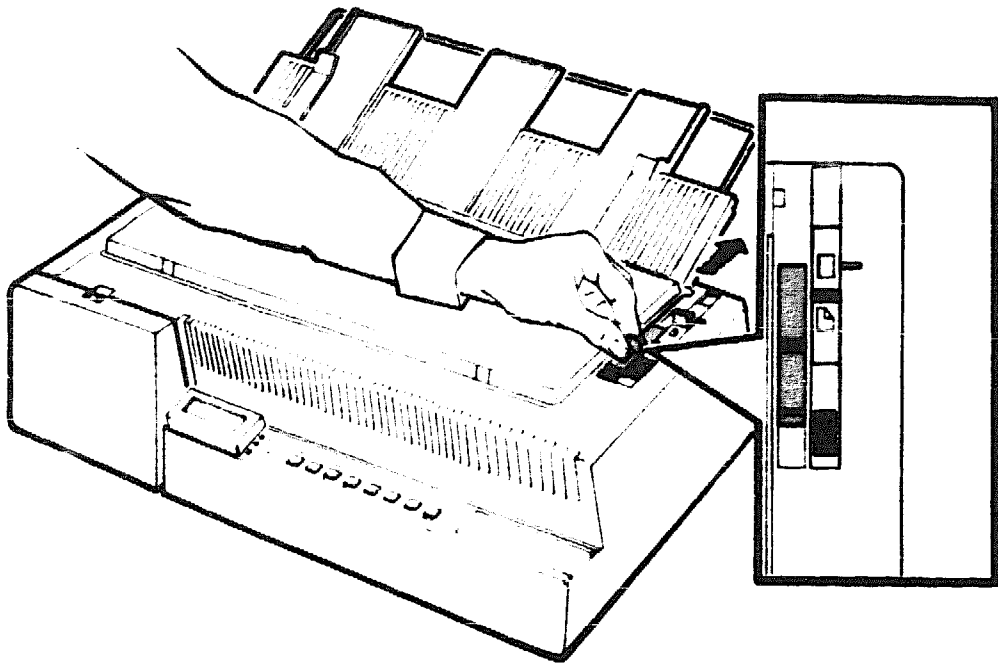
MLO-003694

14. Ensure that the paper selection lever is in the fanfold paper position.



MLP-003688

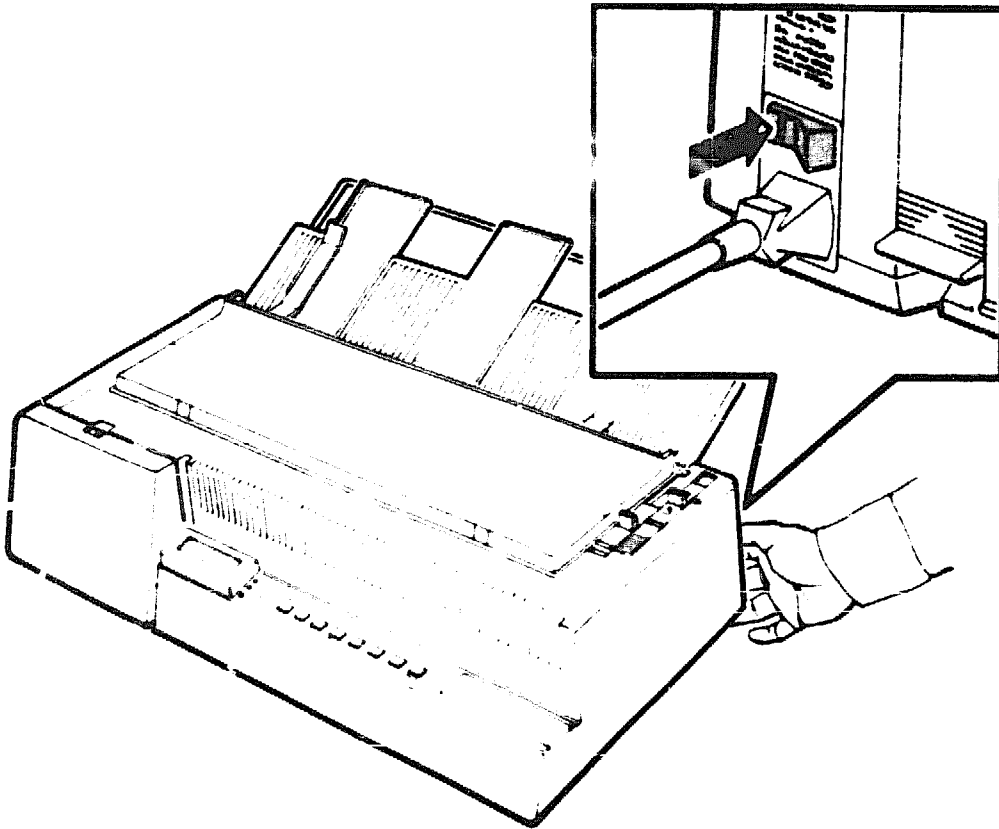
15. Verify that the paper thickness lever is positioned all the way to the rear of the printer to accommodate single-part fanfold paper.



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16. Press the power switch to the ON (I) position.

- The message display reads LOAD PAPER.

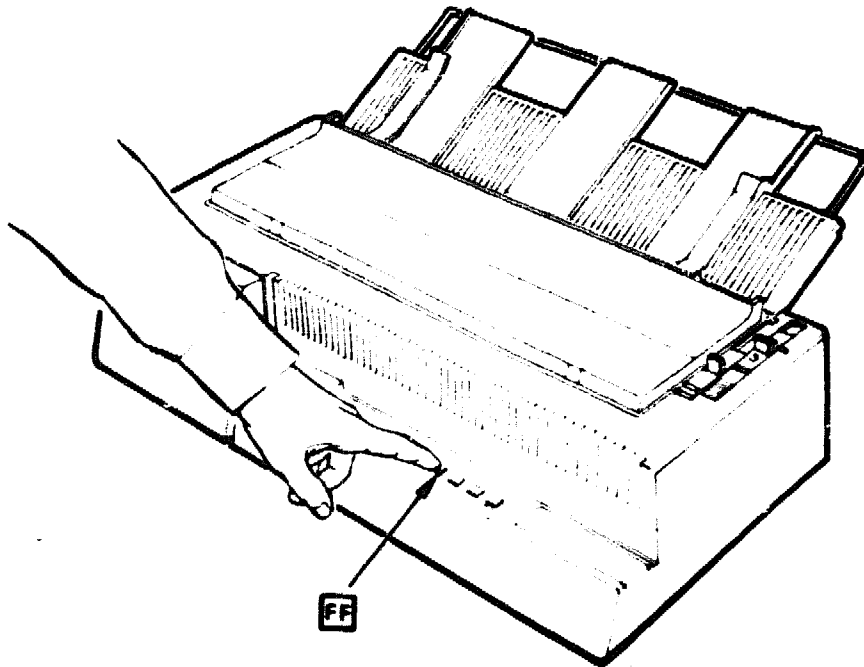


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17. Press **FF** (Form Feed) to position the paper in front of the printhead.

- The printer feeds the paper under the bail bar and positions the printhead at the first printable line on the paper.
- The message display reads **READY DEC**.

If the printer performs as described above, it is functioning properly.



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5.2 Self-Tests

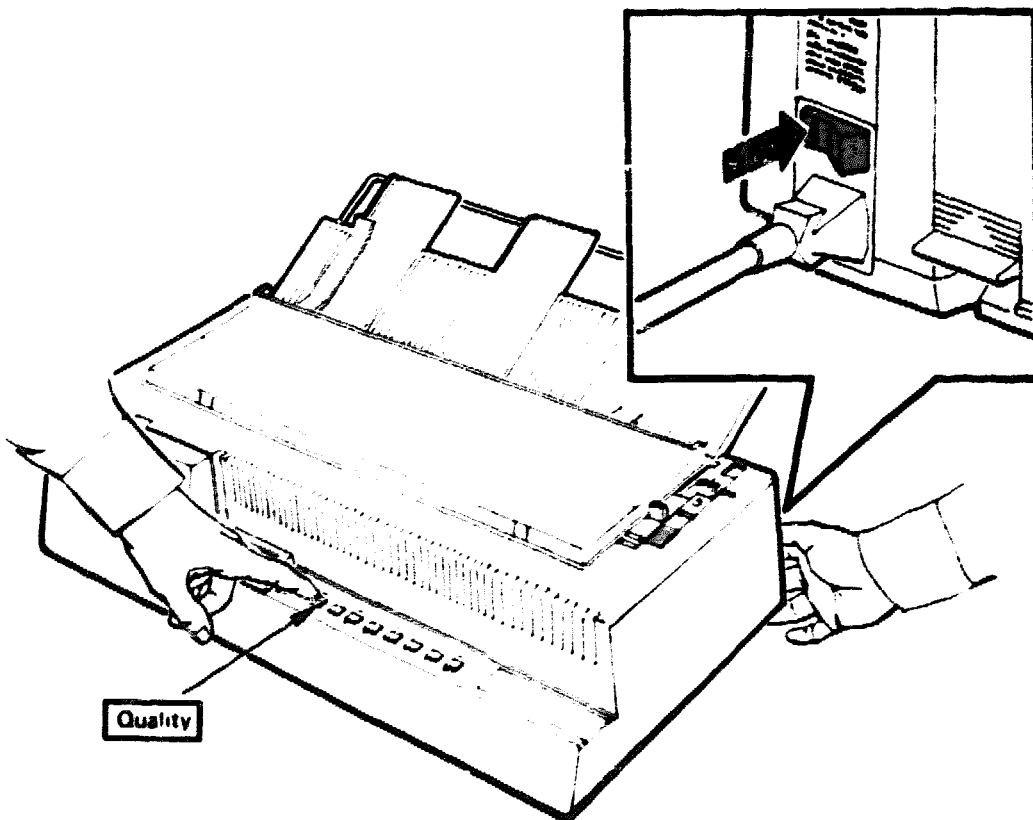
The LA324 performs two self-tests: one internal and one visual. Each time you turn the power on, the internal self-test runs automatically. All LEDs on the operator panel blink if this self-test fails.

This procedure describes the visual self-test and tells how to determine whether or not the printer is functioning properly.

5.2.1 Starting the Visual Self-Test

NOTE: When starting the visual self-test, it is important to remember to press and hold **Quality** until the printing starts.

1. Turn the printer power off.
2. Press and hold **Quality** while pressing the power switch to the ON (I) position.
 - The message display shows SELF TEST.
 - The printer begins to print the self-test pattern.



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- The following shows a sample output from the visual self-test.**

White yellow red magenta green cyan blue black

```

1"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\
1"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
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OPQRSTUVWXYZ[\
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`a
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`ab
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abc
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcd
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcde
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcdef
'()-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcdefg
'()-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcdefgh
'()-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcdefghi
'()-./0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]`_`abcdefghij

```

MIL 003941

NOTE: You must have a color ribbon installed to see the color bar print out on this test pattern.

If the test pattern does not print, take the following steps:

- Check that the ribbon cartridge is installed correctly. See Chapter 2 of this manual.
- Check that there is power in the printer; if the power is on, the LEDs will light.
- Check that the paper selection lever is in the fanfold position.
- Check that the paper thickness lever is at the rear of the printer in the single-part paper position.

- Make sure you press and hold **Quality** until the printing starts.

If the visual self-test still does not print, consult with your system manager before calling your Digital service representative.

5.3 Conclusion

This concludes the installation of your LA324 MultiPrinter. Refer to your *LA324 MultiPrinter Operator's Guide* for detailed instructions on features, maintenance, and troubleshooting.

Appendix A

Cabling Information

This appendix describes the different cable combinations to use for connecting your printer to a host device, and explains serial flow control and parallel communication.

A.1 Cable Combinations

In the first column of Table A-1 the devices you can connect your printer to are grouped by the type of connector required. The second column lists the part numbers of the adapter and the cable required for each device. Determine what device you have and obtain the appropriate adapter. The third column describes how to connect the adapter and/or the cable to the printer.

- For a complete list of accessories and supplies and instructions on how to order them, refer to Appendix B of the *LA324 MultiPrinter Operator's Guide*.

Table A-1: Cable and Adapters for Serial Printer Connections

Connector Type	Adapter and Cable	Instruction
25-Pin Plug Devices		
VAXstation 3200/3500 VT100 Series DECserver 200/MC (DSRVB-AA) CPU RS232 ports	H8571-A and BC16E ¹	Connect one end of the BC16E cable to the H8571-A (25-pin-to-MMJ) adapter on these devices and connect the other end to the LA324 MultiPrinter.
9-Pin Plug Devices (DEC)		
VT200 series DECmate PRO series VAXstation 2000	H8571-B and BC16E ¹	Connect one end of the BC16E cable to the H8571-B (9-pin-to-MMJ) adapter on these devices and connect the other end to the LA324 MultiPrinter.

¹BC16E (DECconnect cable) is included with the LA324 MultiPrinter.

Table A-1 (Cont.): Cable and Adapters for Serial Printer Connections

Connector Type	Adapter and Cable	Instruction
DEC423 (MMJ) Serial Devices		
VAXmate MicroVAX 2000 DECserver 300 DECserver 200/DL (DSRVB-BA) VT300 series CPU DEC423 ports	BC16E ¹	Connect one end of the BC16E cable to the DECserver/terminal and connect the other end to the LA324 MultiPrinter.
25-Pin Socket Devices		
Rainbow Digital modems	H8571-D and BC16E ¹	Connect one end of the BC16E cable to the H8571-D adapter on your Rainbow or Digital modem and connect the other end to the LA324 MultiPrinter.
9-Pin Plug (IBM PC/AT Type) Devices		
DECstation 210, 212 DECstation 316, 320 IBM PC/AT	H8571-J and BC16E ¹	Connect one end of the BC16E cable to the H8571-J adapter on your DECstation or IBM PC/AT and connect the other end of the cable to the LA324 MultiPrinter. Use DTR flow control.
European DECstations Serial Port		
200 Series	Extender (12-27591-01) and H8571-A and BC16E ¹	Connect the socket end of the extender cable to the host device and the plug end of the extender cable to the H8571. Connect the H8571 to the BC16E cable that is connected to the LA324 MultiPrinter.

¹BC16E (DECconnect cable) is included with the LA324 MultiPrinter.

Table A-1 (Cont.): Cable and Adapters for Serial Printer Connections

Connector Type	Adapter and Cable	Instruction
European DECstations Serial Port		
300, 350 Series	H8571-A and BC16E ¹	Connect one end of the BC16E cable to the H8571 on your DECstation and plug the other end of the cable into the LA324 MultiPrinter.
European DECstations Parallel Port		
200, 300, 350 Series	BC19M-10	Connect the BC19M-10 to the LA324 MultiPrinter.
Existing Cable		
BC22D cable (already installed)	H8571-C and BC16E ¹	Connect the H8571-C adapter plug to the socket of your printer's BC22D cable. Connect one end of the BC16E cable to the H8571-C adapter and plug the other end of the cable into the LA324 MultiPrinter. The combination of the H8571-C adapter and the BC16E cable acts as a straight-through cable.
¹ BC16E (DECconnect cable) is included with the LA324 MultiPrinter.		

NOTE: *If only the BC16E cable is listed in Table A-1, no adapter is required.*

A.2 Miscellaneous Cabling Instructions

This section describes various other cabling methods to assist you in connecting your printer.

A.2.1 Serial Flow Control

If you are using an IBM PC or compatible and you want to use the optional serial port on your PC, you can follow these steps:

1. Edit your AUTOEXEC.BAT file by adding the following two lines:

```
mode com1:4800,n,8,1,p
```

```
mode lpt1:=com1:
```

where:

```
mode com1:4800,n,8,1,p
```

specifies that the first serial port (COM1) will be used by the printer, that 4800 baud will be the communication speed, that no parity will be selected, that 8 data bits will be selected, that 1 stop bit will be used, and that the printer will continuously retry on time-out errors.

```
mode lpt1:=com1:
```

reassigns the printer output to COM1, the first serial port.

NOTE: *On IBM personal computers and compatibles, printer output is normally directed to LPT1, the first parallel port.*

2. Connect the H8571-A adapter as described in Table A-1.
3. Refer to the *LA324 MultiPrinter Operator's Guide* for instructions on how to select DTR flow control.

If you are using a 25-pin PC/SA with XON/XOFF, follow these steps:

1. Edit your AUTOEXEC.BAT file to contain the following two lines:

```
mode com1:4800,n,8,1,-,n
```

```
mode lpt1:=com1:
```

where:

```
mode com1:4800,n,8,1,-,n
```

specifies that the first serial port (COM1) will be used by the printer, that 4800 baud will be the communication speed, that no parity will be selected, that 8 data bits will be selected, that 1 stop bit will be used, that the printer will try only once to connect then time-out, and that the type weight will be normal.

```
mode lpt1:=com1:
```

reassigns the printer output to COM1, the first serial port.

NOTE: On IBM personal computers and compatibles, printer output is normally directed to LPT1, the first parallel port.

2. Connect the H8571-A adapter as described in Table A-1.
3. Refer to the *LA324 MultiPrinter Operator's Guide* for instructions on how to select XON/XOFF.

A.2.2 Parallel Communication

If you are using an IBM PC, DECstation PC, or compatible and want to use the parallel port, you must follow these steps:

1. Refer to the *LA324 MultiPrinter Operator's Guide* for instructions on how to select parallel operation.
2. Use Digital's BC19M-10 cable or the industry standard Centronics 25-pin-D-shell cable to make the connection from the PC to the LA324 MultiPrinter.

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From	Call	Write
Alaska, Hawaii, or New Hampshire	603-884-6660	Digital Equipment Corporation P.O. Box CS2008 Nashua NH 03061
Rest of U.S.A. and Puerto Rico ¹	800-DIGITAL	

¹ Prepaid orders from Puerto Rico, call Digital's local subsidiary (809-754-7575)

Canada	800-267-6219 (for software documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order Desk
	613-592-5111 (for hardware documentation)	

Internal orders (for software documentation)	—	Software Supply Business (SSB) Digital Equipment Corporation Westminster MA 01473
Internal orders (for hardware documentation)	DTN: 234-4323 508-351-4323	Publishing & Circulation Services (P&CS) NRO3-1/W3 Digital Equipment Corporation Northboro MA 01532

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LA324 MultiPrinter Operator's Guide

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

- Reorient the receiving antenna.
- Relocate the computer or peripheral with respect to the receiver.
- Move the computer or peripheral away from the receiver
- Plug the computer or peripheral into a different outlet so that they are on different branch circuits than the receiver.

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

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

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Preface

The LA324 MultiPrinter is a dot-matrix printer designed primarily for business and industrial use. It produces near letter-quality print and can accept cut-sheet paper, fanfold (continuous-form) paper, labels, and multipart forms up to 6 parts thick. The LA324 MultiPrinter can use a multicolored ribbon cartridge to print in color.

This guide focuses mainly on the operational aspects of the printer and explains how to use and maintain the LA324 MultiPrinter *hardware*. It describes operating functions such as loading paper, changing the print ribbon, and using the front panel.

Also covered are the proper maintenance procedures to keep your printer operating efficiently, and some basic troubleshooting techniques enabling you to correct some common operating problems. Information on accessories and supplies, printing specifications, paper specifications, and programming information are included in the appendixes to this guide.

This guide is organized as follows:

- **Chapter 1, Operating Information**
This chapter describes the components and features of the LA324 MultiPrinter. It covers operating procedures such as powering on the printer, loading paper, and adjusting the paper thickness lever.
- **Chapter 2, The Operator Panel**
This chapter describes the use of the operator panel keys when the printer is in normal operating mode or in setup mode.
- **Chapter 3, Configuring the Printer**
This chapter explains how to configure the printer so that it can communicate with your computer system. You configure the printer by selecting setup parameters known as features and their associated values.
- **Chapter 4, Maintaining the Printer**
This chapter explains how to care for and maintain the LA324 MultiPrinter. It covers such topics as cleaning the printer and replacing the ribbon cartridge. This chapter also describes printer adjustments and basic testing and troubleshooting techniques that allow you to correct common operating problems.

- **Chapter 5, Service**
This chapter explains how to obtain service if you need the printer repaired.
- **Appendix A, Digital Protocol Quick Reference Guide**
This appendix summarizes the Digital ANSI-compatible Level 2 printing protocol available in the LA324 printer.
- **Appendix B, IBM-Compatible Emulation Quick Reference Guide**
This appendix summarizes IBM Proprinter XL24 emulation in the LA324 printer.
- **Appendix C, Accessories and Supplies**
This appendix describes what accessories and supplies are available for the LA324 printer and tells how to order them.
- **Appendix D, Specifications**
This appendix lists the power requirements, environmental requirements, physical specifications, and pin requirements of the LA324 printer.

Terms and Conventions

The following terms and conventions are used in this guide:

Term/Convention	Meaning
NOTE	Notes provide important additional information.
CAUTION	Cautions provide information for preventing equipment damage.
WARNING	Warnings provide information for preventing personal injury.
Bullet (•)	A bulleted statement describes the result of a step. For example: 1. If the printer is turned off, press the power switch to the ON (I) position. • The message display reads LOAD PAPER.

Term/Convention	Meaning
Arrow (→)	A statement marked by an arrow indicates a special instruction. For example: 1. Open the tractor assembly cover on the right side and position the holes in the paper over the tractor pins. → Close the tractor assembly cover.
Setup	A key name is shown enclosed to indicate that you press that key on the operator panel. For example: 1. Press Setup to enter setup mode.

Software Requirements

Some features of the LA324 MultiPrinter may or may not be available depending on the operating software used by the host computer (the system that the printer is connected to) and the application software that you are using. For information about the printer features you can use with your application program, consult your application program documentation.

About the Documentation Package

This guide does not cover all aspects of printer operation. It focuses on the operation of the LA324 MultiPrinter hardware. For printer installation instructions refer to the *LA324 MultiPrinter Installation Guide* shipped with your printer.

An optional programmer's reference manual is also available. The programmer's reference manual, as well as the programming escape sequences in Appendixes A and B of this guide, are intended for the user with programming experience. A programmer can use this information to design application software programs or to update existing programs. See Appendix C for information about ordering the *LA324 MultiPrinter Programmer's Reference Manual*.

For help in choosing the right software package for your application needs, contact your Digital sales representative.

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CHAPEL

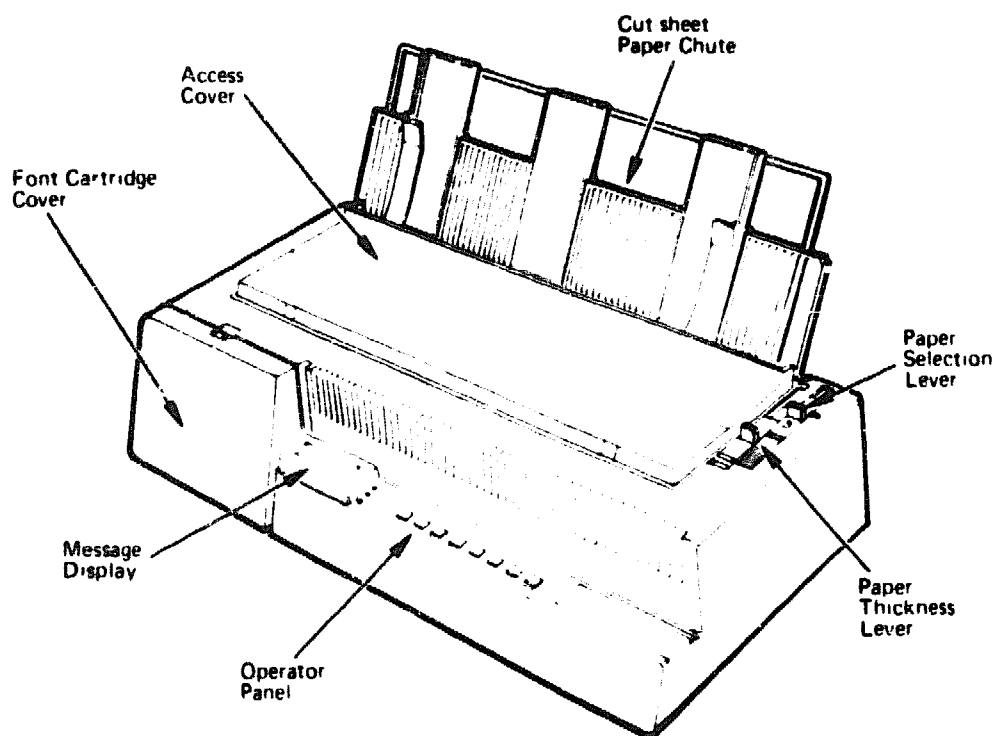
Chapter 1

Operating Information

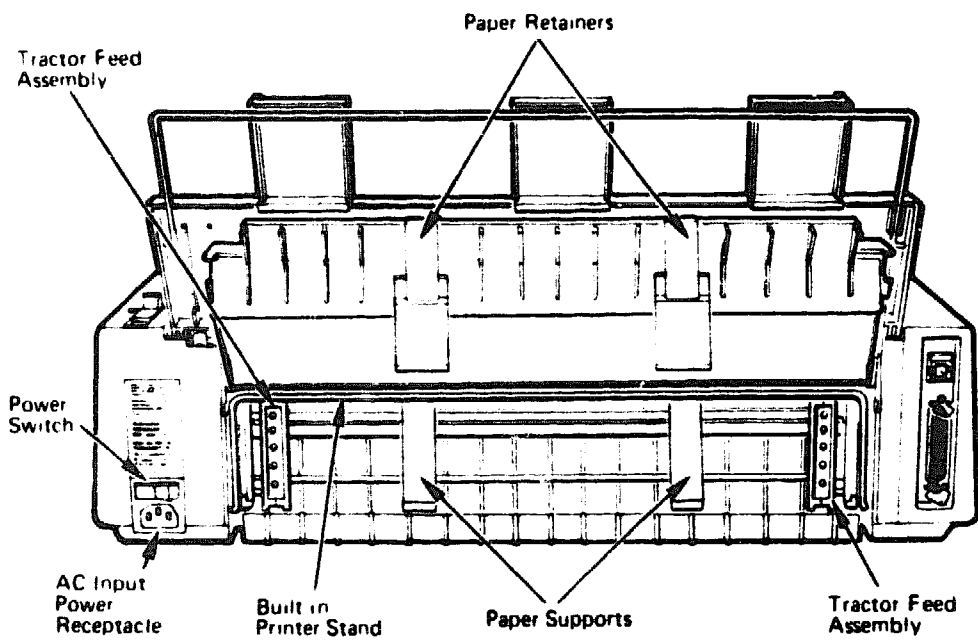
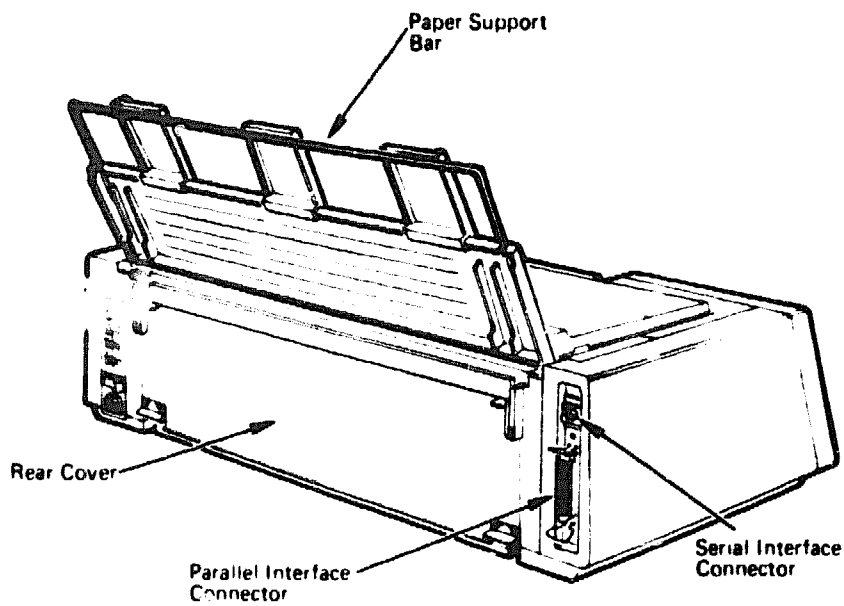
This chapter helps you to become familiar with the functions of the LA324 printer. It describes the components, controls, and indicators on the printer. It also explains general operating procedures such as powering on the printer and loading paper.

1.1 Printer Components

This section shows and describes the printer components and their functions.



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Table 1-1: Printer Components

Component	Function
Cut-Sheet Paper Chute	Used to manually feed cut-sheet paper or forms into the printer. See Section 1.8 for information about manual feeding.
Paper Selection Lever	Selects between fanfold (continuous-feed) paper and cut-sheet paper to engage the proper drive mechanism. Fanfold position = forward (toward the front of the printer) Cut-sheet position = rearward (toward the rear of the printer)
Paper Thickness Lever	Adjusts for various thicknesses of paper media (up to 6 parts thick) by adjusting the distance of the printhead from the platen. Placing the lever forward (toward the front of the printer) positions the printhead further away from the platen, allowing more space for thicker forms. Pushing the lever toward the rear of the printer moves the printhead closer to the platen for thinner forms or paper. See Section 1.9 for information about adjusting the thickness lever to the proper position.
Operator Panel	The operator panel consists of three elements: a message display, indicator lights, and a keypad. See Chapter 2 for additional information about the operator panel features and functions.
Message Display	The liquid-crystal window of the operator panel is used to display printer status when the printer is in operating mode. When the printer is in setup mode this window displays setup features and values.
Font Cartridge Cover	Flips down for access to optional font cartridges. There are also two cartridge holders for storing extra font cartridges.
Access Cover	Can be removed for access to the ribbon cartridge, bail bar, and platen. The access cover has a removable strip of acoustic foam which, when removed, allows viewing of the print area. NOTE: If you repeatedly remove and replace the acoustic foam strip, the foam may not stay securely in place. If the foam strip is removed, the printer may not meet acoustic specifications.

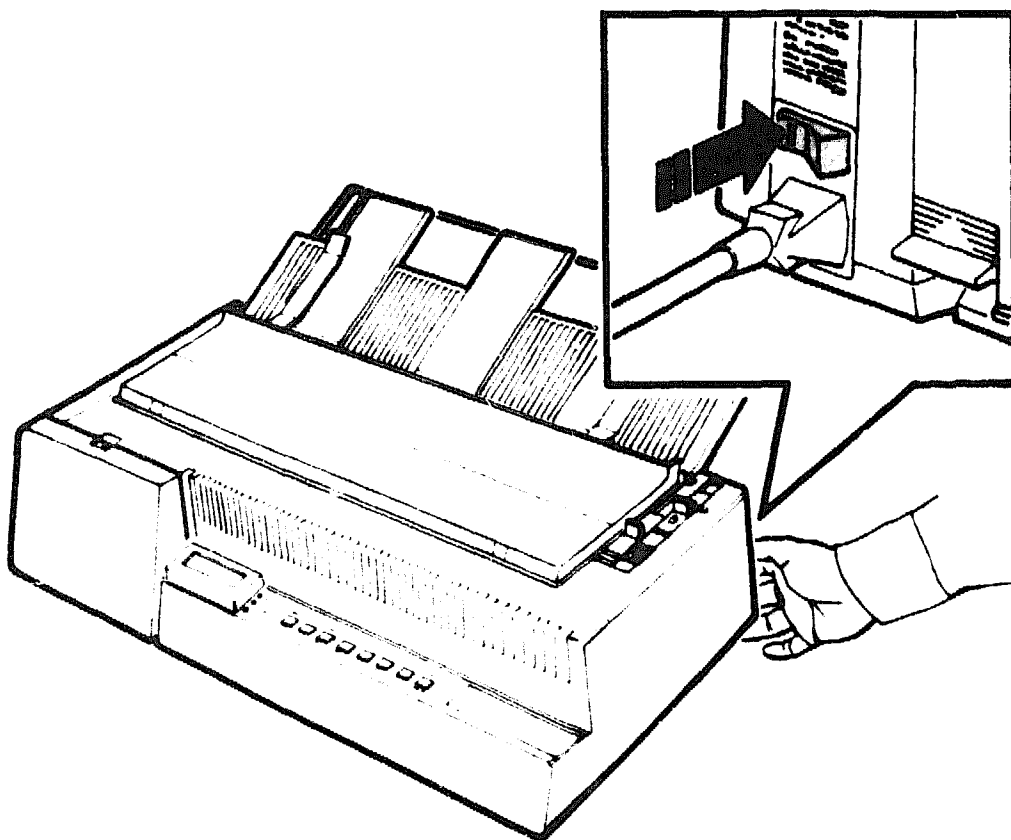
Table 1-1 (Cont.): Printer Components

Component	Function
Paper Support Bar	Can be raised to support paper in sizes longer than 296 mm (11.6 in.) when using the cut-sheet paper chute. The paper support bar should always be in its lowest position when fanfold paper is used.
Serial Interface Connector	Serial connector for interface cable to the host computer.
Parallel Interface Connector	Parallel connector for interface cable to the host computer.
Rear Cover	Opens to load fanfold paper.
Paper Retainers	Keep the paper pressed securely against the paper supports to ensure smooth paper flow.
Tractor Feed Assembly (left and right sides)	Used to feed fanfold paper through the printer.
Built-In Printer Stand	Used when fanfold paper is fed from a desktop or tabletop (Section 1.5.1).
Paper Supports	Used to distribute the paper load evenly across the feed mechanism.
AC Input Power Receptacle	The AC power cord is connected to this receptacle.
Power Switch	Powers the printer on or off. See Section 1.2 to learn how to properly power the printer on and off.

1.2 Powering On the Printer

Use the following procedure to power on the printer.

1. Press the power switch to the ON (|) position.
 - The message display reads **READY** (followed by **DEC** or **EMUL.** depending on the protocol selected). If paper is not loaded in the printer the message display will read **LOAD PAPER** (see Section 1.4).



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NOTE: When you power on the printer, the leading edge of the paper (top-of-form) should be either at the tear bar position (if the Auto Tear feature is set to **ON**) or at the first line to be printed (if the Auto Tear feature is set to **OFF**). If the paper is not at either of these positions or you are unsure of where the top-of-form should be, continue with the following steps to ensure that the leading edge of the paper matches the printer setting.

For additional information about the Auto Tear feature, see Section 1.6 and Section 3.5.4 in Chapter 3.

2. Remove the last printed page cleanly at the perforation line.
3. Press **[Setup]** to enter user setup mode.
 - The Power/Setup light flashes.
 - The message display reads **USER SETUP**.
4. Press **[Park]** to retract the paper.
 - The paper reverses through the paper path to the tractor assemblies.
 - The message display reads **PAPER EMPTY**.
5. Press **[FF]** to advance the paper.
 - The paper will advance to the tear bar if the Auto Tear feature is set to **ON**, or to the printhead if the Auto Tear is set to **OFF**.
 - The message display reads **READY**.

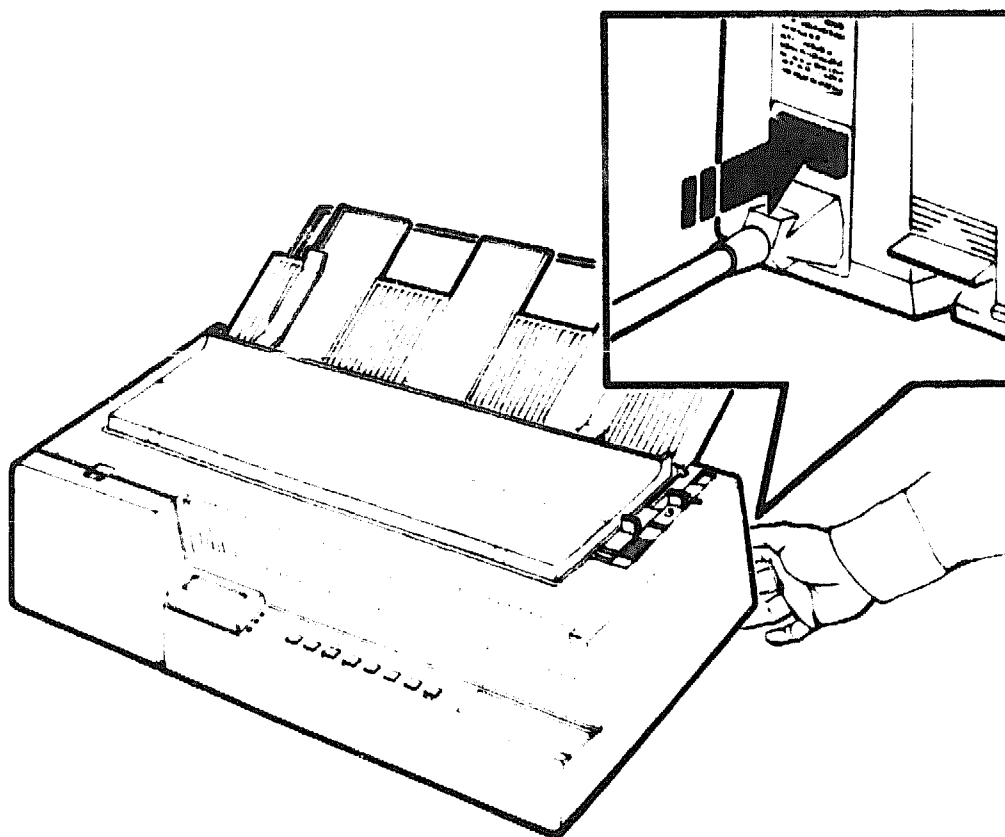
1.3 Powering Off the Printer

Use the following procedure to power off the printer.

1. Check to see that the message display reads **READY** to avoid loss of data.

NOTE: *If you are using the cut-sheet paper chute, the message display reads **LOAD PAPER** after ejecting the last sheet of paper.*

2. Press the power switch to the **OFF (O)** position.



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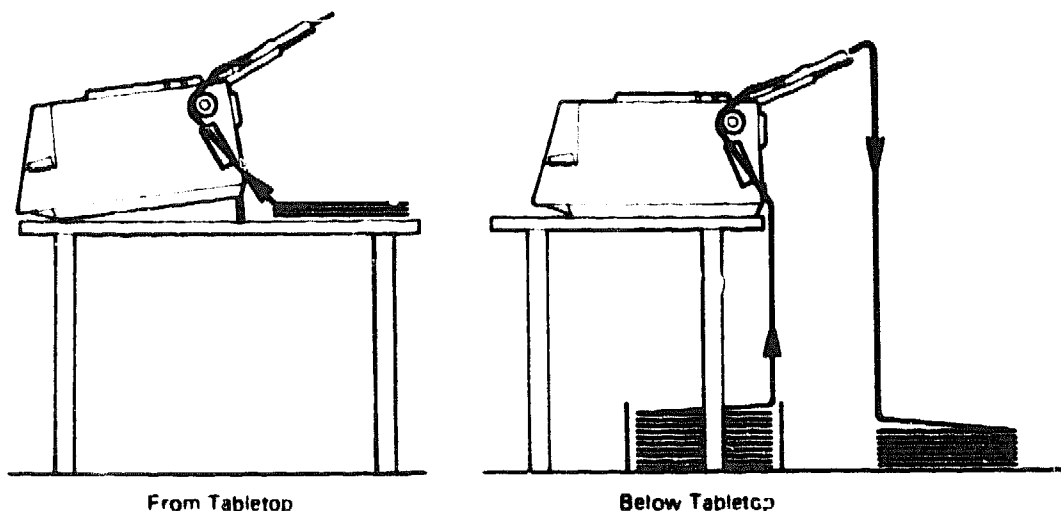
1.4 Loading and Removing Paper

The LA324 MultiPrinter prints on both fanfold paper and cut-sheet paper up to 6 parts thick. Fanfold paper is tractor-fed while cut-sheet paper is fed manually. The printer has a paper parking feature that allows you to feed cut-sheet paper without removing the fanfold paper. See Section 1.5.4 for instructions on parking fanfold paper. For information about manual feeding of cut-sheet paper, see Section 1.8.

Section 1.5.2 describes how to adjust the tractor feed assemblies when loading a new size of fanfold paper, while Section 1.5.3 describes the loading procedure when you are loading the same size fanfold paper.

1.5 Fanfold Paper Operations

The following illustration shows the two basic ways you can position fanfold paper to enter and exit the printer. At left is the correct position when the printer is raised on its metal stand for paper being fed from a tabletop or desktop (see Section 1.5.1). At right is the correct position for paper being fed from below a tabletop or desktop.

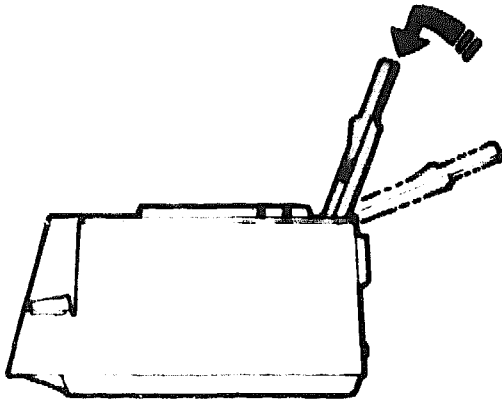


MLO-003894

1.5.1 Using the Built-In Printer Stand

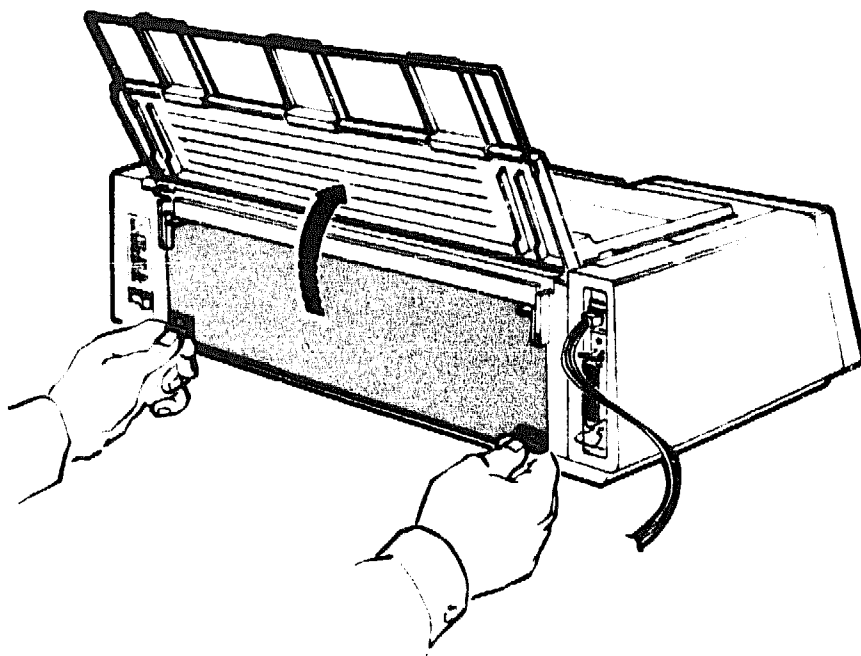
This procedure describes how to use the built-in printer stand when feeding paper to the printer from a tabletop or desktop. This printer stand should not be used when feeding paper from below the desktop (see Section 1.4).

1. Raise the paper chute to the cut-sheet position, and press it down to lock it in place.



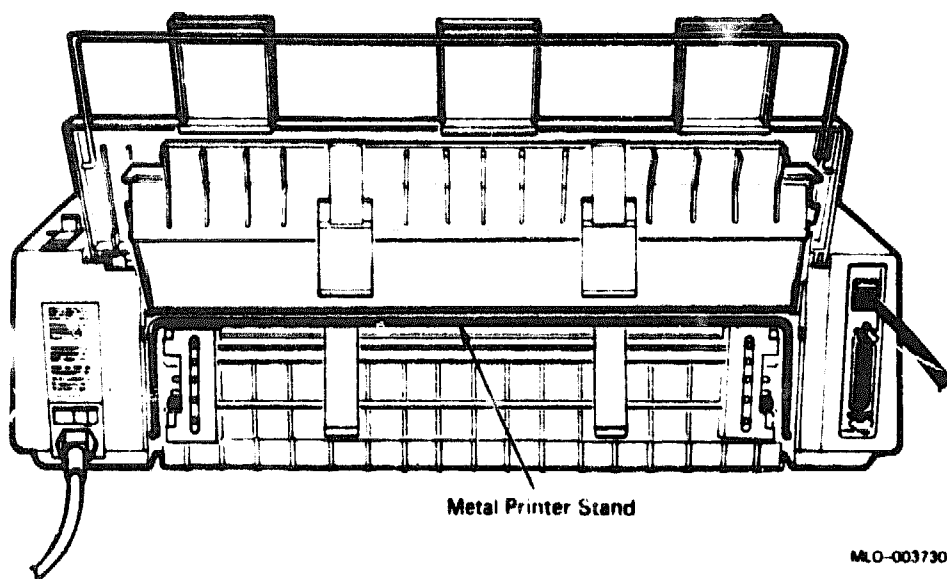
MLO-003695

2. Open the rear cover and lift it until it locks into place.

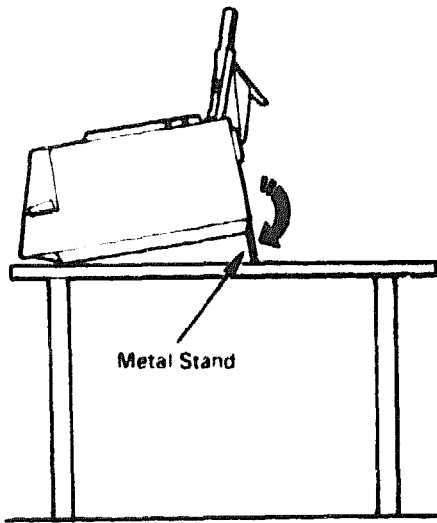


MLO-003896

3. Pull the metal stand out from the rear of the printer.



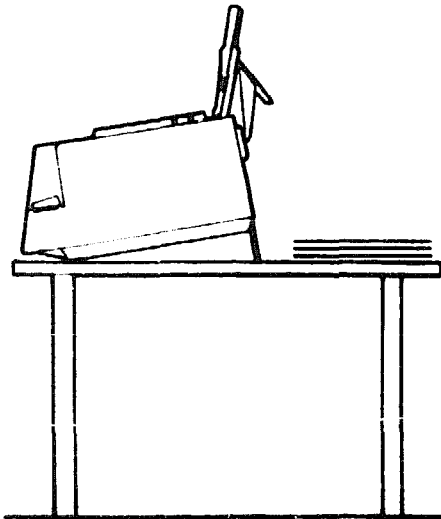
4. Lift the rear of the printer and push the metal stand down until it locks into position under the printer.



MLO-003897

5. Position the printer on the desk or table, allowing enough room to stack paper behind the printer.
6. Place a small amount of fanfold paper on the desktop (not more than 400 sheets) behind the printer.

CAUTION: *To avoid putting stress on the paper feed mechanism, do not place the paper on top of the metal stand (under the printer).*



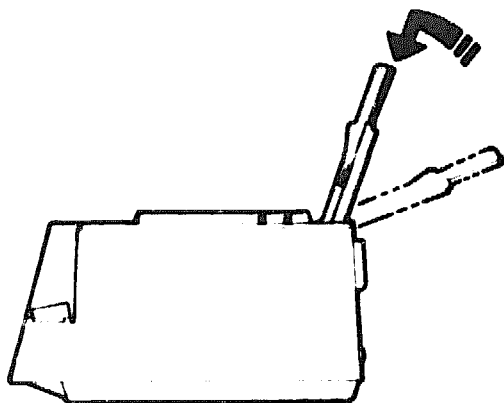
MLO-003698

7. See Section 1.5.2 (beginning with Step 3) for instructions if you are loading a new size of paper, or Section 1.5.3 (beginning with Step 3) if you are loading the same size paper.

1.5.2 Loading Fanfold Paper of a Different Size

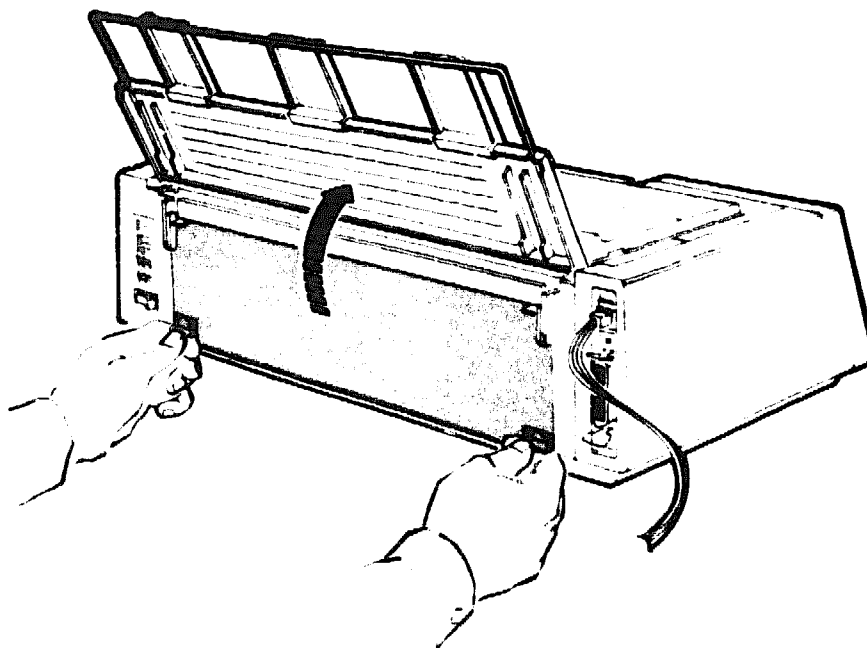
Use the following procedure when you are changing to a different size of paper. To load the same size paper, see Section 1.5.3 for paper loading instructions.

1. Raise the paper chute to the cut-feed position and push it down to lock it in place.



MLO 003695

2. Open the rear cover and lift it until it locks into place.
→ Remove any paper that may be present.

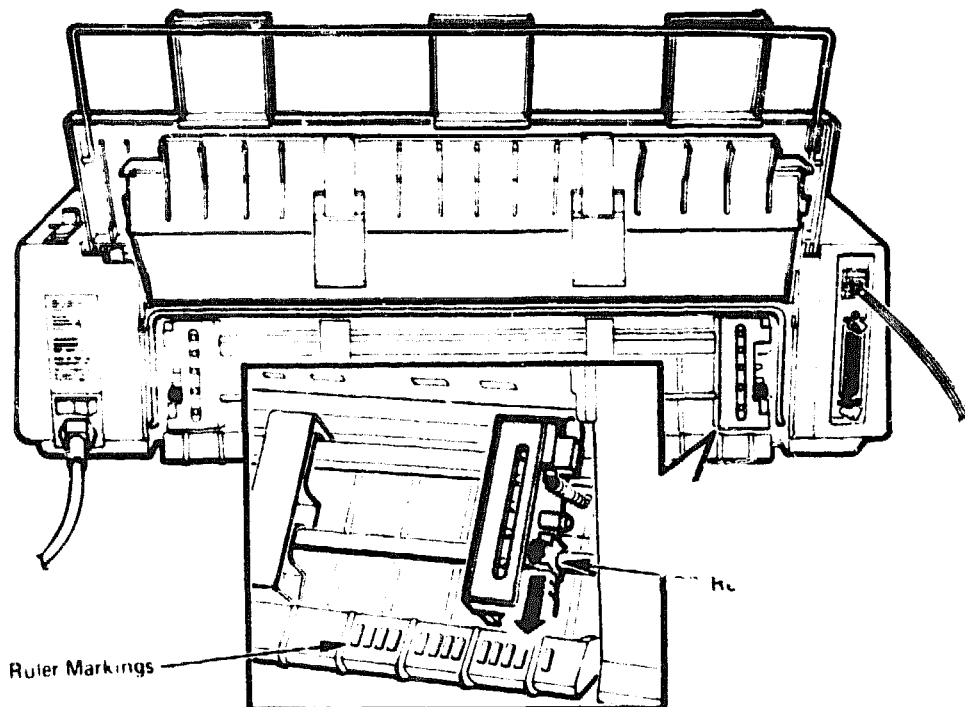


M10 003696

3. Unlock the tractor feed assembly on the right side by pressing its release lever down, and slide the assembly to the right until it stops.

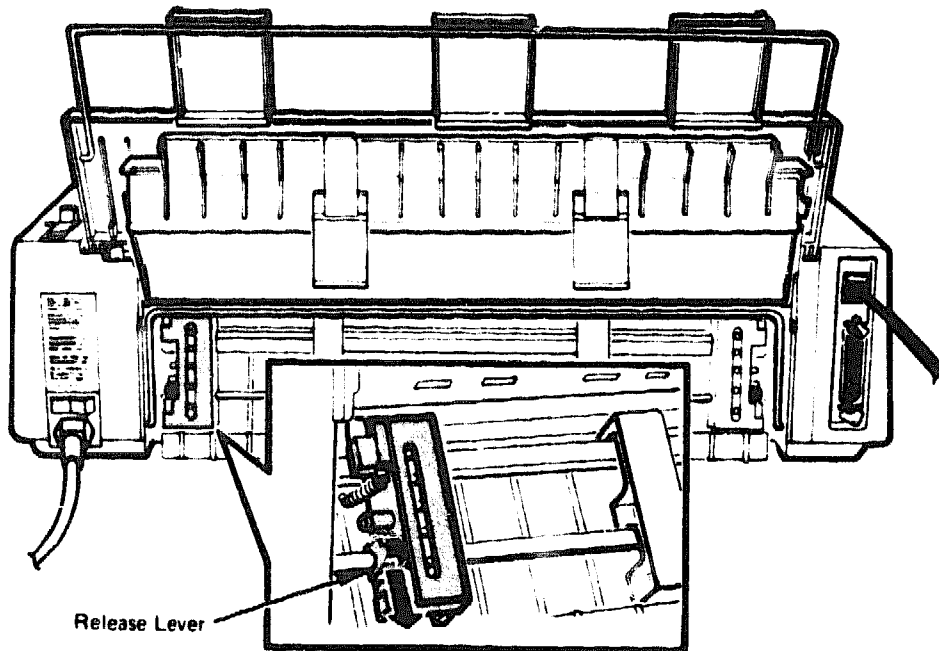
NOTE: To change the position of the first column (left margin), just move the tractor feed assembly to the left or right accordingly. Below the tractor assembly feed there are ruler markings spaced about 5.2 mm (2/10 in.) apart to help determine the proper position of the assembly.

- Lock the assembly in place by pushing its release lever up.



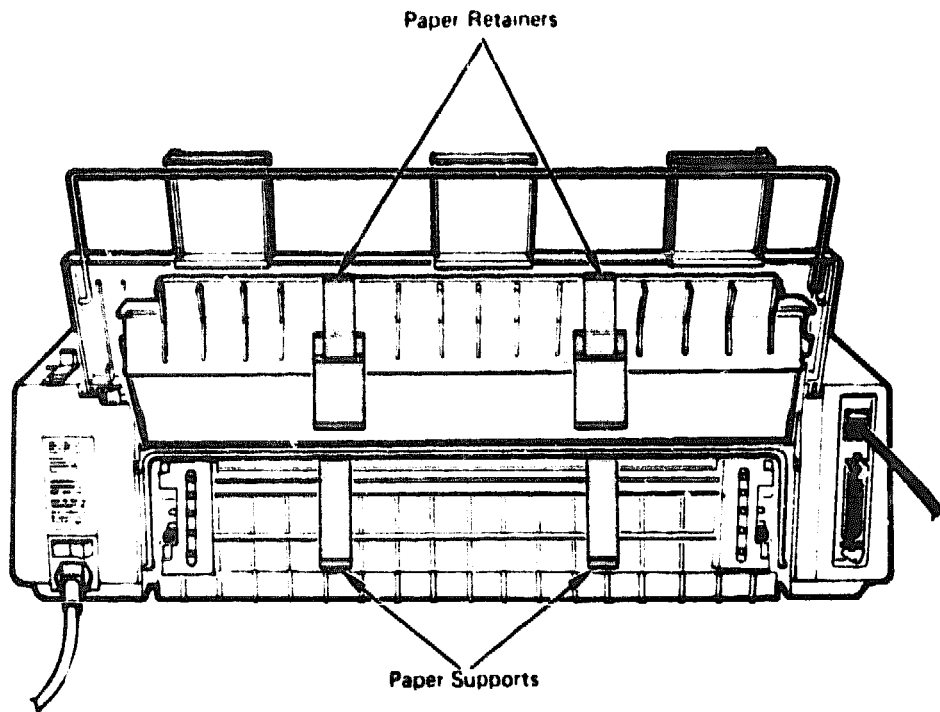
WS 0-003699

4. Unlock the tractor feed assembly on the left side by pressing its release lever down, and slide the assembly to the approximate width of the paper.
 - Do not lock the assembly in place at this time.



MLO-003700

5. Position the two paper supports evenly between the tractor feed assemblies by sliding the supports along the shafts.
6. Position the two paper retainers on the rear cover so they are aligned with the paper supports.

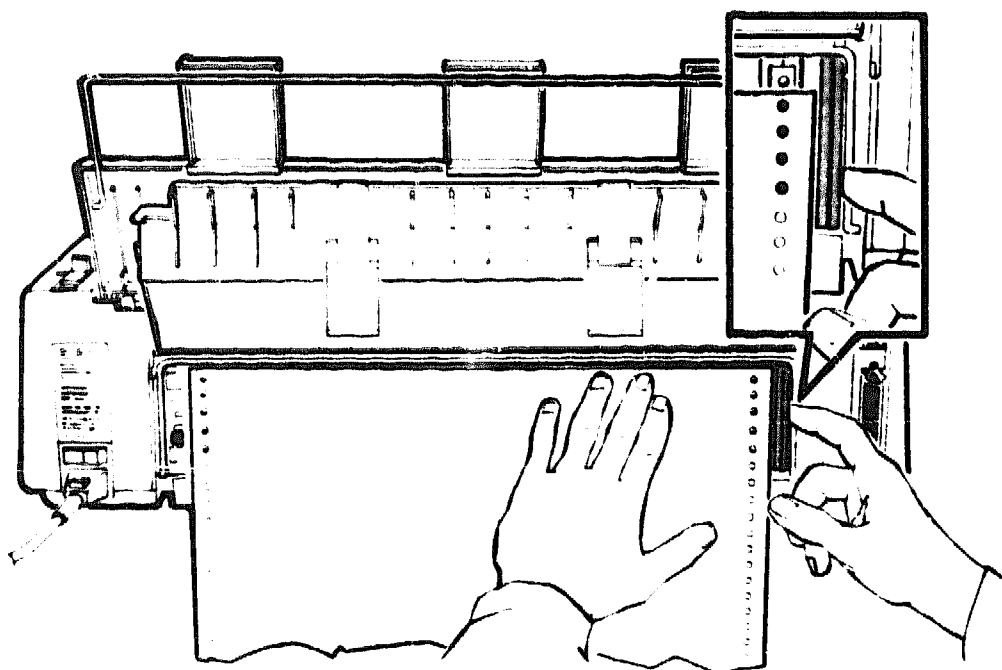


MLO-003701

7. Open the tractor feed assembly on the right side and position the holes in the paper over the tractor pins.

CAUTION: Do not position the top edge of the paper above the top of the tractor feed assembly. Positioning the top edge of the paper above the top of the assembly may cause paper jams. The top hole of the paper should be on the same tractor pin on both sides of the printer to ensure that the paper will feed properly.

- Close the tractor feed assembly.

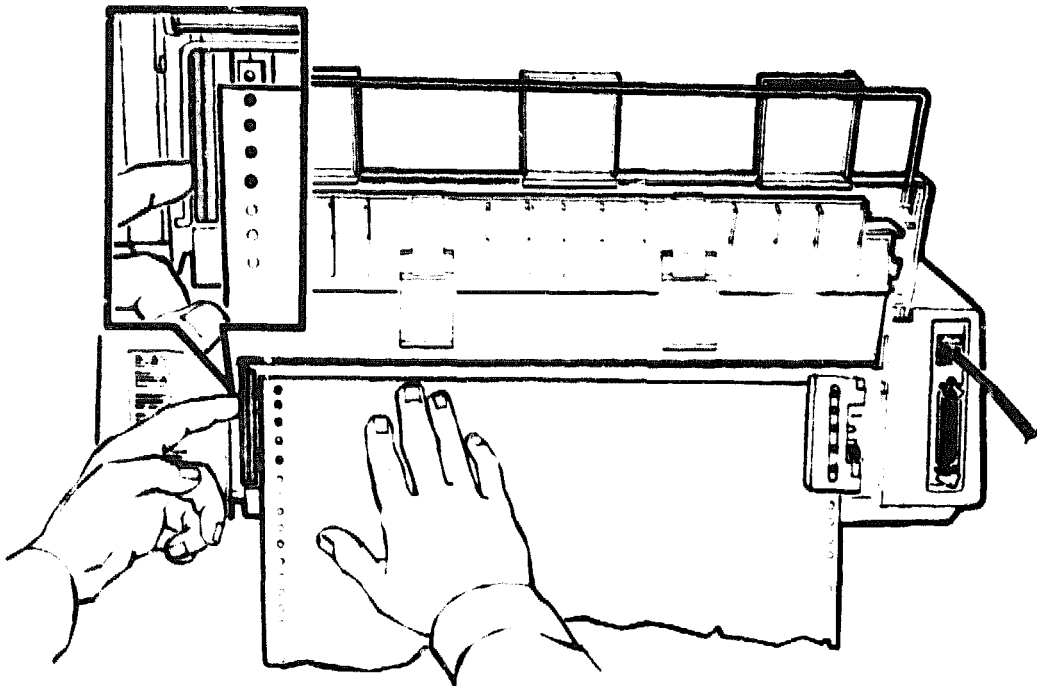


MLC 003702

8. Open the tractor feed assembly on the left side and position the holes in the paper over the tractor pins.

CAUTION: *Do not position the top edge of the paper above the top of the tractor feed assembly. Positioning the top edge of the paper above the top of the assembly may cause paper jams. The top hole of the paper should be on the same tractor pin on both sides of the printer to ensure that the paper will feed properly.*

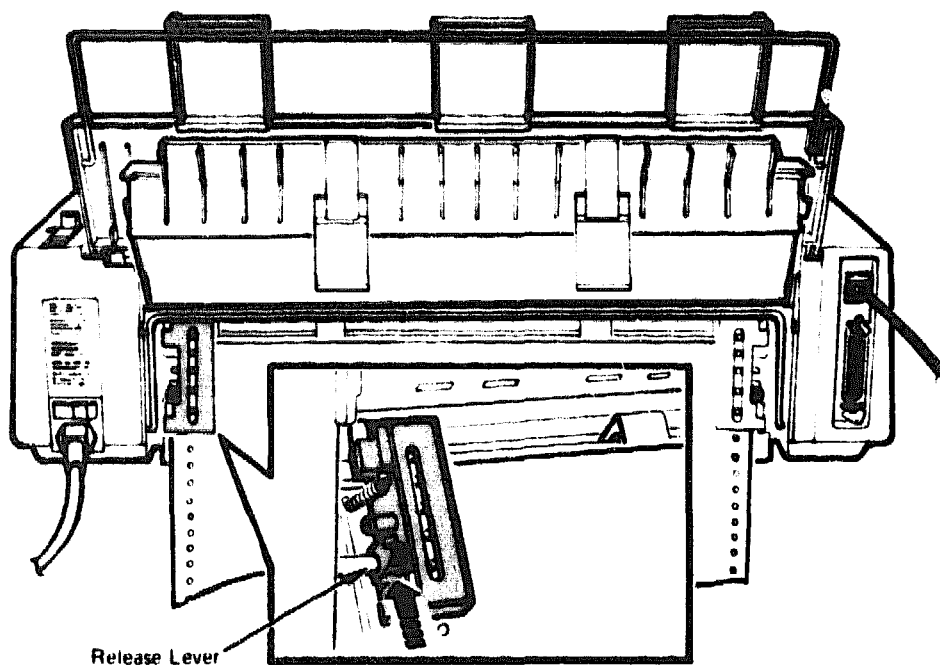
→ Close the tractor feed assembly.



MLG 003703

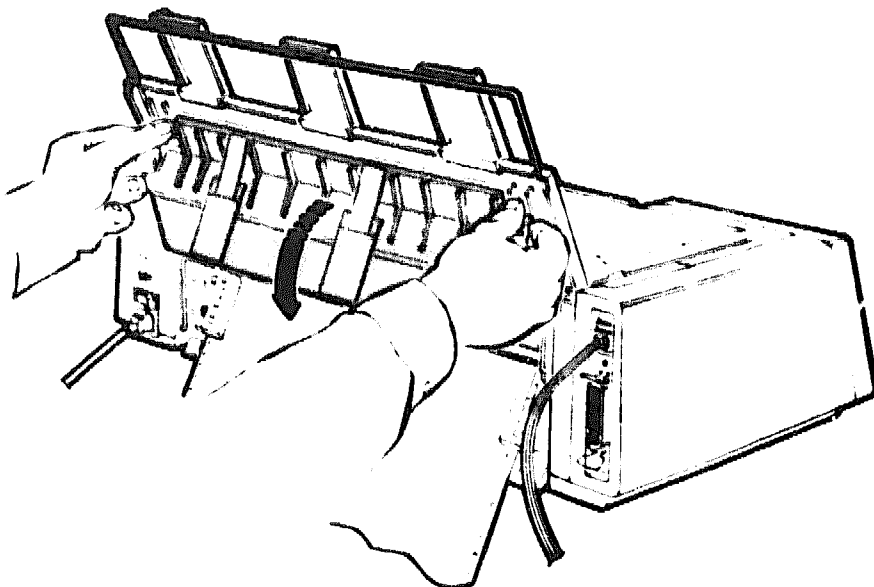
9. Slide the tractor feed assembly to the left until the paper is taut, and push the release lever up to lock it in position.

CAUTION: *Do not stretch the paper too tightly. The side perforations can tear or the tractor pin holes can enlarge and cause misfeeds or paper jams.*



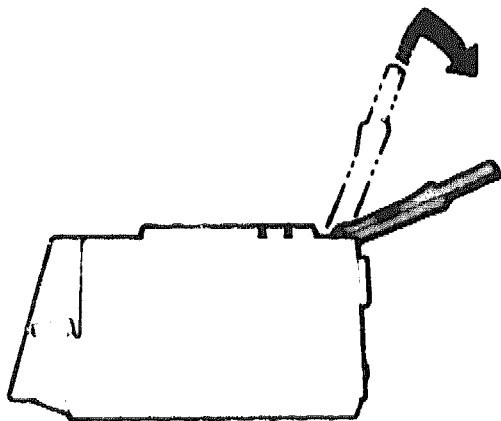
ML0-003704

10. Close the rear cover until it locks in place.



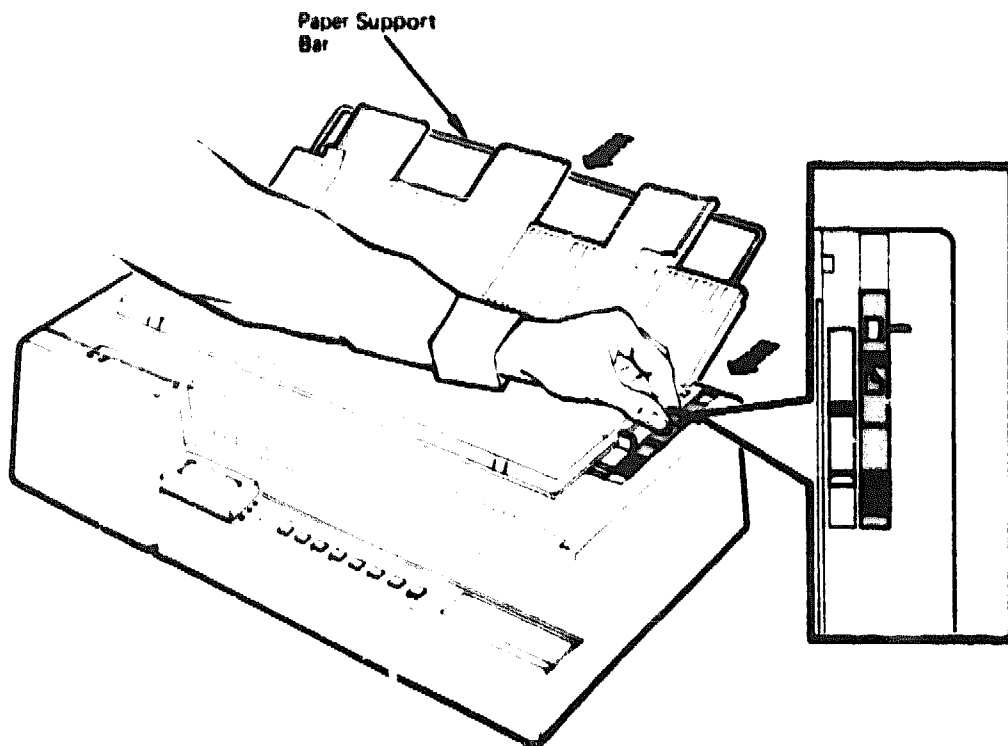
ML0-003706

11. Lift the paper chute up slightly to unlock it, then lower it to the fanfold paper position.



NOTE: 003706

12. Ensure that the paper support bar is in its lowest position and that the paper selection lever is in the fanfold position.



MLO-003707

13. Press **FF** (form feed) to advance the paper.

- The paper advances to the printhead (if the Auto Tear feature is set to OFF), or to the tear bar position (if the Auto Tear feature is set to ON).
- The message display reads READY.

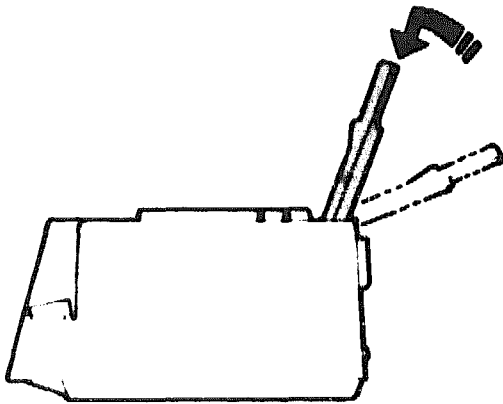
14. Go to Section 1.9 to adjust the paper thickness lever to the correct position for the paper media you are using.

CAUTION: Be sure to adjust the thickness lever to the correct position. The life of the printhead will be reduced if it is not positioned at the correct distance from the platen.

1.5.3 Loading Fanfold Paper of the Same Size

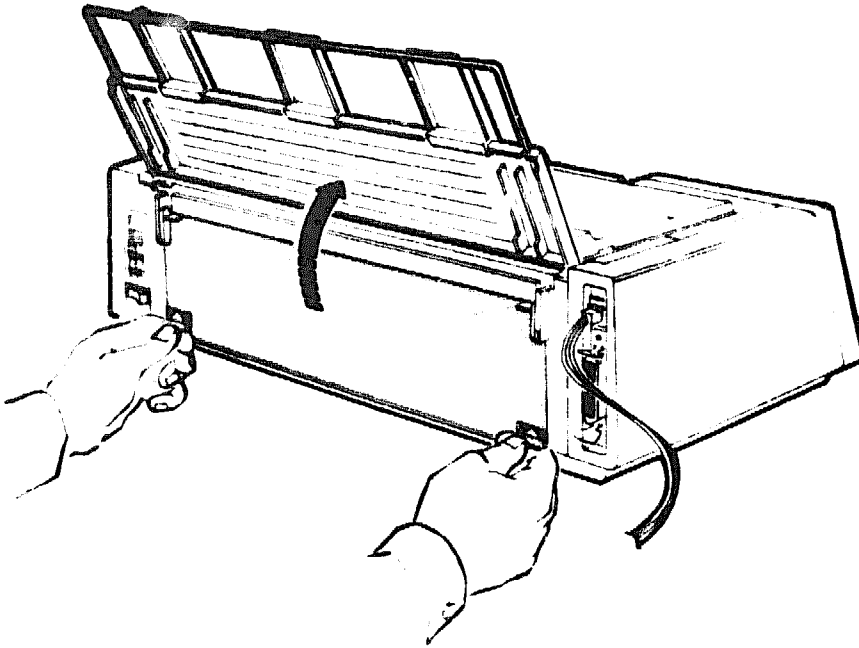
Use the following procedure when you are loading the same paper you have been using. If you are changing the paper size, see Section 1.5.2 for paper loading instructions.

1. Raise the paper chute to the cut-sheet position and press it down to lock it in place.



MLO 003695

2. Open the rear cover and lift it until it locks into place.

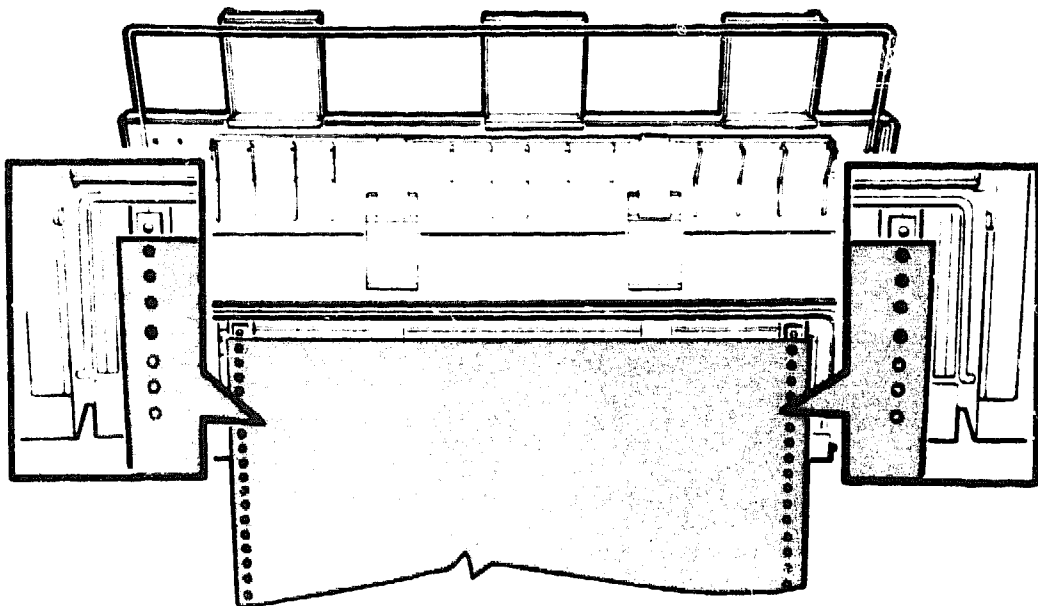


MLO-003696

3. Open the tractor feed assemblies and position the holes in the paper over the tractor pins.

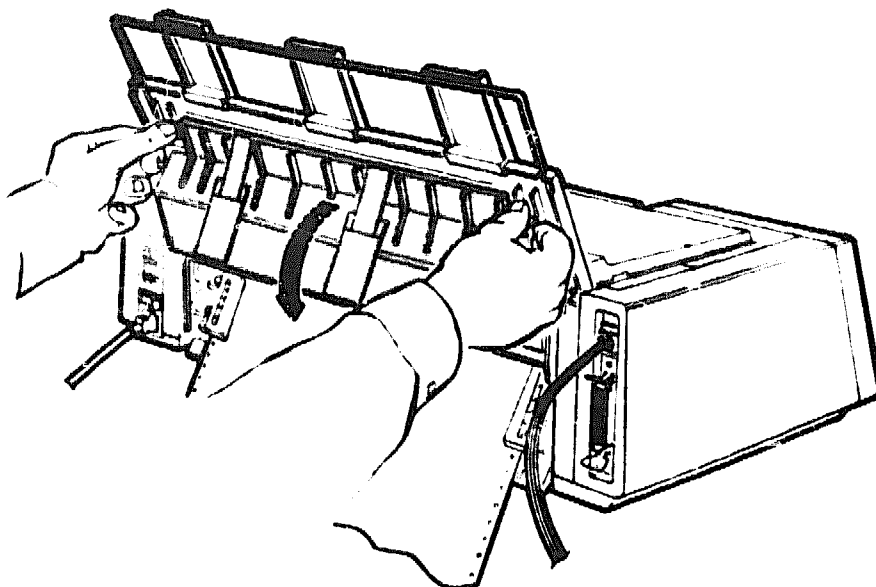
CAUTION: *Do not position the top edge of the paper above the top of the tractor feed assemblies. Positioning the top edge of the paper above the top of the assemblies may cause paper jams. The top hole of the paper should be on the same tractor pin on both sides of the printer to ensure that the paper will feed properly.*

→ Close the tractor feed assemblies.



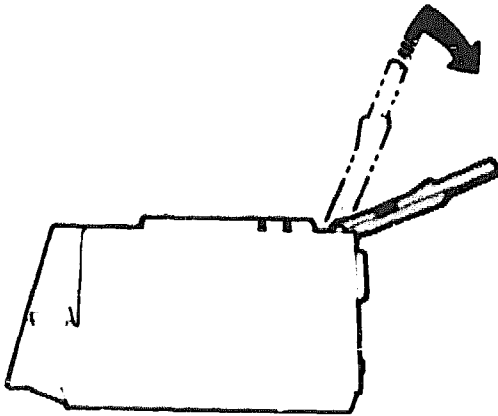
MLO-003708

4. Close the rear cover until it locks in place.



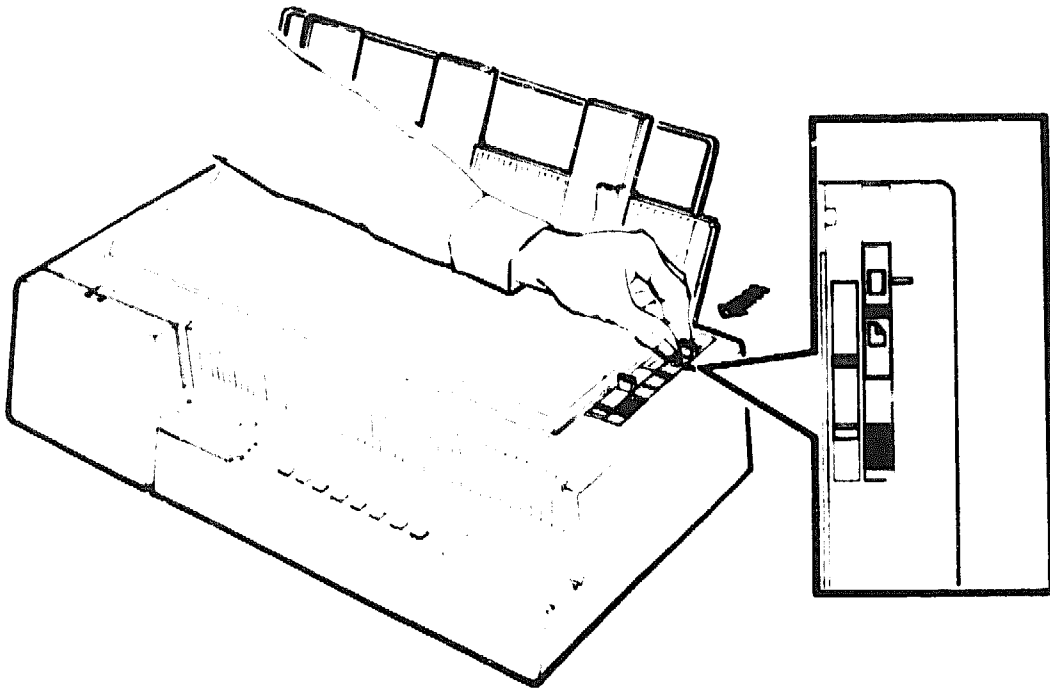
MLO-003706

5. Lift the paper chute up slightly to unlock it, then lower it to the fanfold paper position.



MLC 003706

6. Ensure that the paper selection lever is in the fanfold position.



MU 003811

7. Press **FF** (form feed) to advance the paper.

- The paper advances to the printhead (if the Auto Tear feature is set to OFF), or to the tear bar (if the Auto Tear feature is set to ON).
- The message display reads **READY**.

1.5.4 Parking Fanfold Paper

The LA324 printer has a paper parking feature that retracts fanfold paper, removing it from the paper path. This feature allows you to manually feed cut-sheet paper or forms without removing the fanfold paper from the printer.

Be sure the printer has stopped printing and the message display reads **READY** before parking the paper.

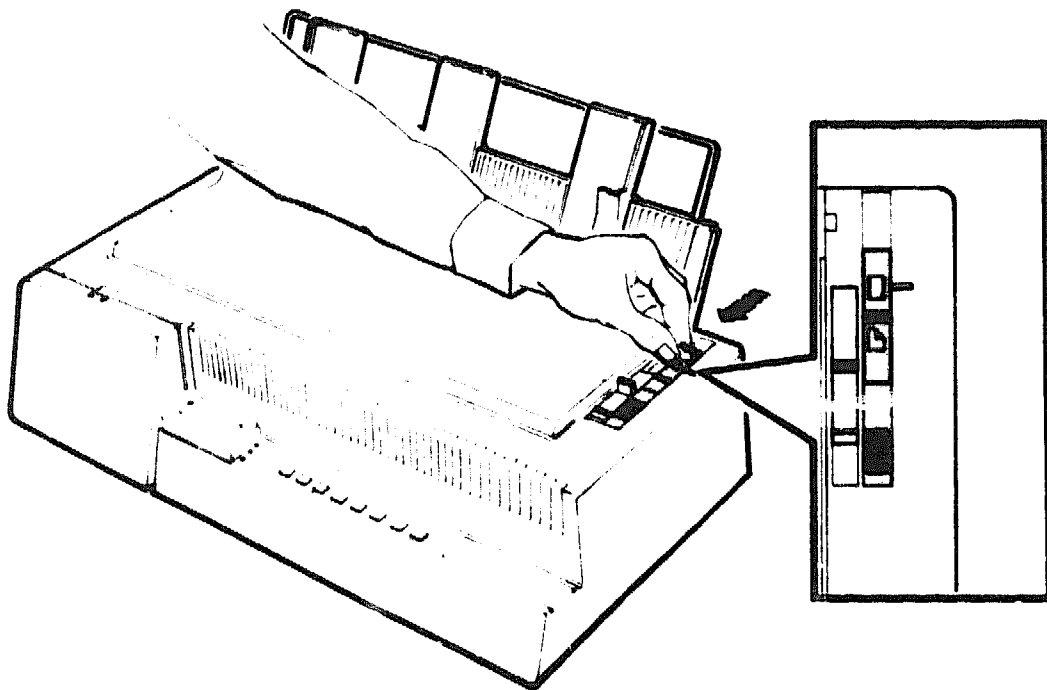
1. Remove the last printed page cleanly at the perforation line.
2. Press **[Setup]** to enter user setup mode.
 - The Power/Setup light flashes.
 - The message display reads **USER SETUP**.
3. Press **[Park]** to retract the paper.
 - The paper reverses through the paper path to the tractor assemblies.
 - The message display reads **PAPER EMPTY**.
 - All the indicator lights flash.
 - The printer exits setup mode.
4. See Section 1.8 for instructions to manually feed cut-sheet paper.

The paper parking feature is used with fanfold paper to set the line counter to correspond with the top-of-form. Press **[FF]** after parking the paper to position the line counter and top-of-form at line 1 of the fanfold paper.

1.5.5 Unparking Fanfold Paper

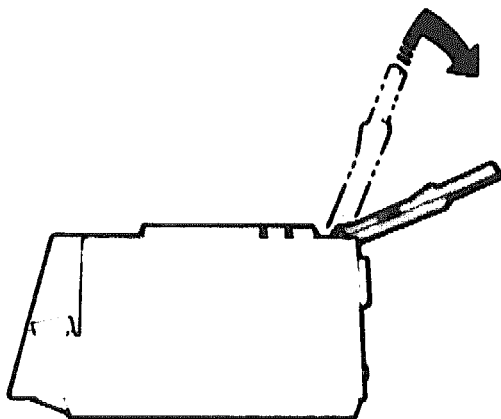
To switch from cut-sheet paper back to fanfold paper, you must "unpark" or advance the fanfold paper to the printing position.

1. Be sure that no paper remains in the paper chute.
 - The message display reads **LOAD PAPER**.
2. Move the paper selection lever to the fanfold position.



MLO 003811

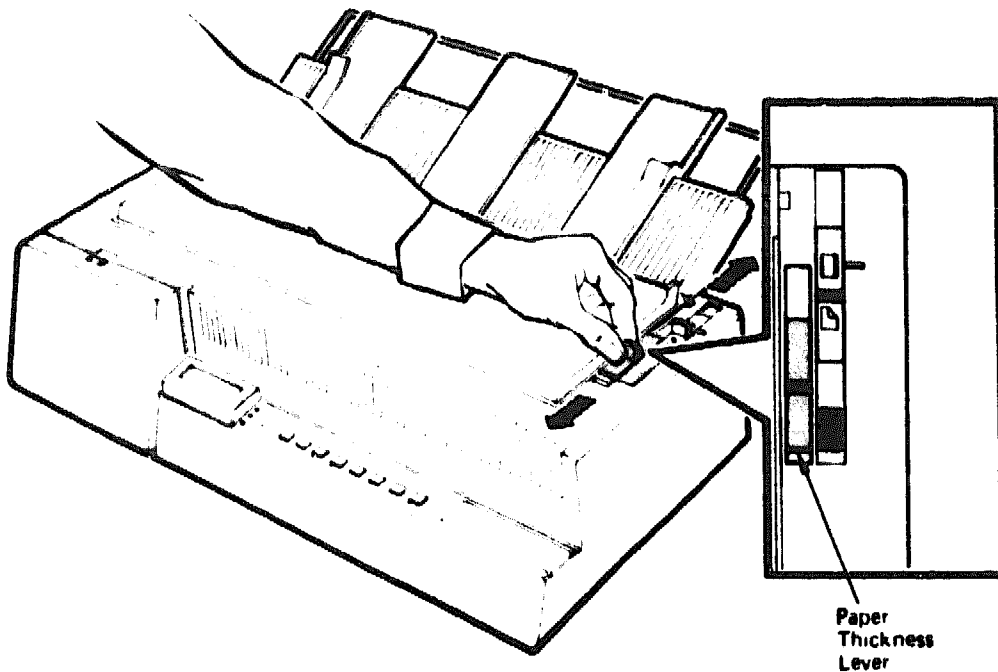
3. Lift the paper chute up slightly to unlock it, then lower it to the fanfold paper position.



MLO 003706

4. Adjust the paper thickness lever for the media you are using.

NOTE: *If you do not remember the proper position of the thickness lever for the fanfold paper you are using, see Section 1.9 for instructions to properly position the thickness lever.*



MLO 003712

5. Press **FF** to advance the paper.
 - The paper advances to the printing position.

1.6 Demand Document Operation

The demand document feature positions the perforation line on the paper in front of the tear bar, which allows the printing and retrieval of a document without wasting paper or forms.

The demand document feature works in conjunction with the Auto Tear feature found in the installation setup menu. The setting of the Auto Tear feature positions the perforation line at the tear bar automatically (when Auto Tear is set to ON), or manually by pressing **Pause** (when Auto Tear is set to OFF). You should tear off the fanfold paper only when the perforation line is positioned at the tear bar.

For information about setting the values for the Auto Tear feature, refer to Section 3.5.4 in Chapter 3.

1.6.1 Document Removal with Auto Tear OFF

When the Auto Tear feature is set to OFF, the new paper or form is always kept (at line 1) in front of the printhead ready to be printed. In order to remove a printed document you must advance the paper to the tear bar so it can be torn along the perforation line.

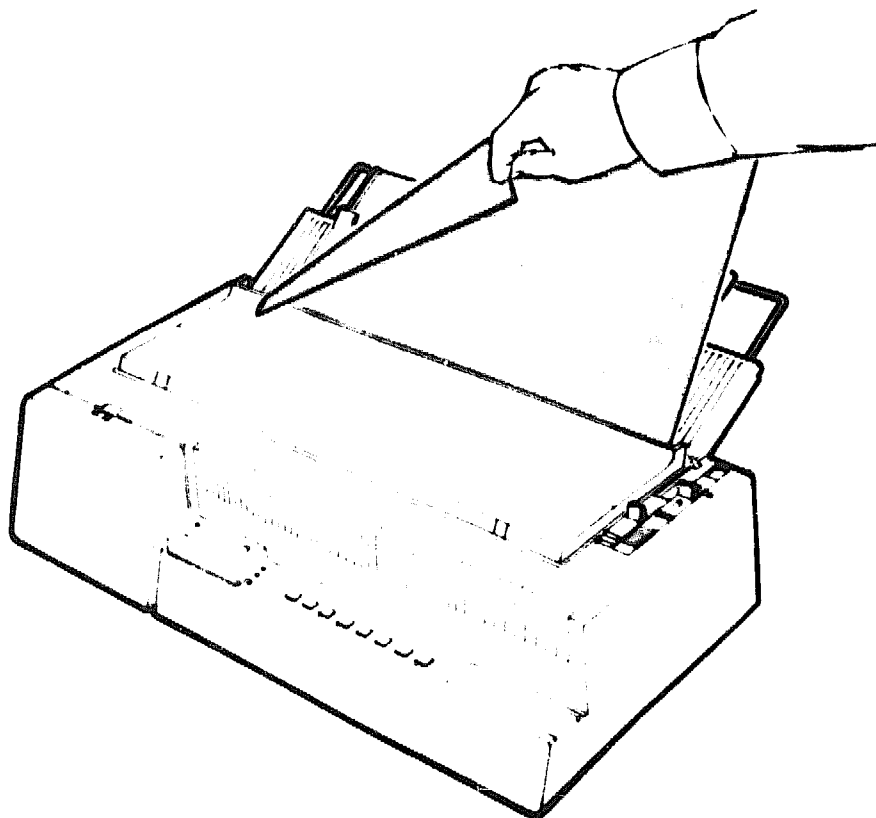
Use the following procedure to remove paper when the Auto Tear feature is set to OFF. Be sure the message display reads **READY** before removing the paper.

1. Press **Pause/Ready**.

- The paper advances to the tear position.
- The message display reads **PAUSE**.

NOTE: *If the paper did not advance to the tear position, it means that a form feed command was not inserted at the end of the file. If this is the case, you must press **FF** to advance the paper to the tear bar position.*

2. Remove the paper by pulling it against the tear bar.



MLU-003710

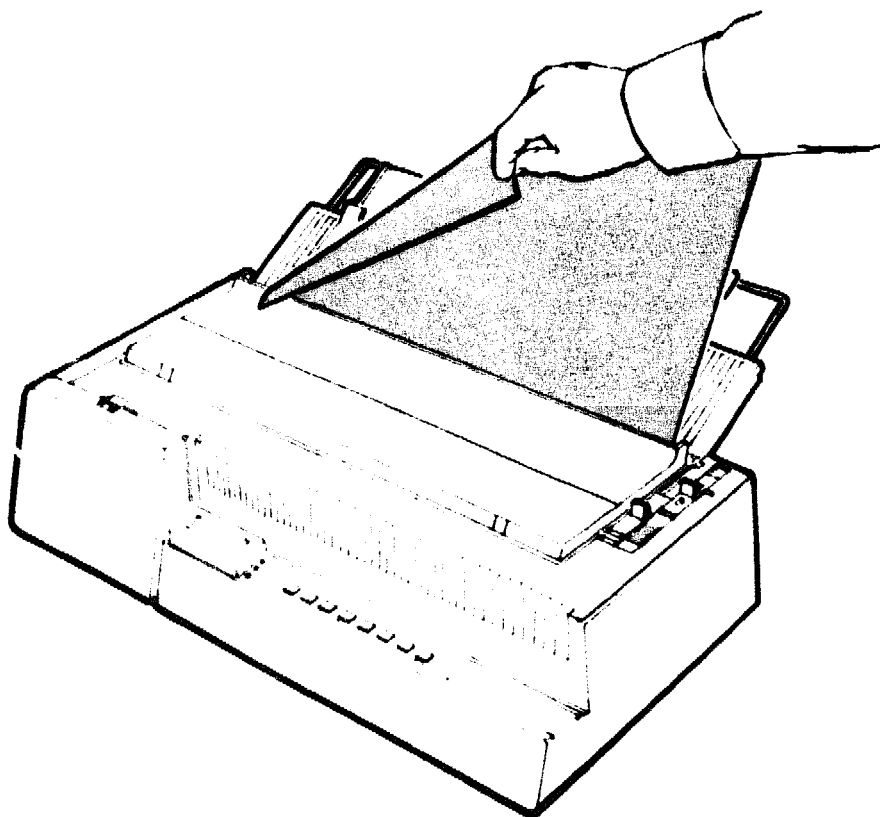
3. Press **Pause/Ready**.
 - The paper reverses (to line 1) in front of the printhead.
 - The message display reads **READY**.

1.6.2 Document Removal with Auto Tear ON

When the Auto Tear feature is set to ON, the printer positions the perforation line in front of the tear bar when the printer is not printing. When a print job begins, the paper automatically reverses to line 1. When a print job is complete, the paper automatically advances to the tear bar position (if a form feed command was properly inserted at the end of the file). Thus, to remove a printed document you simply tear the paper by pulling it against the tear bar.

If a form feed command was not inserted at the end of the file, and the paper is not at the tear bar position, simply press **FF** to advance the paper to the tear bar.

NOTE: *Auto Tear ON is not recommended when you are printing graphic files within the top 2.54 cm (1 in.) of the page. The paper reversing action of Auto Tear may cause a small vertical misalignment, which may appear as a thin horizontal gap within this area of the page.*



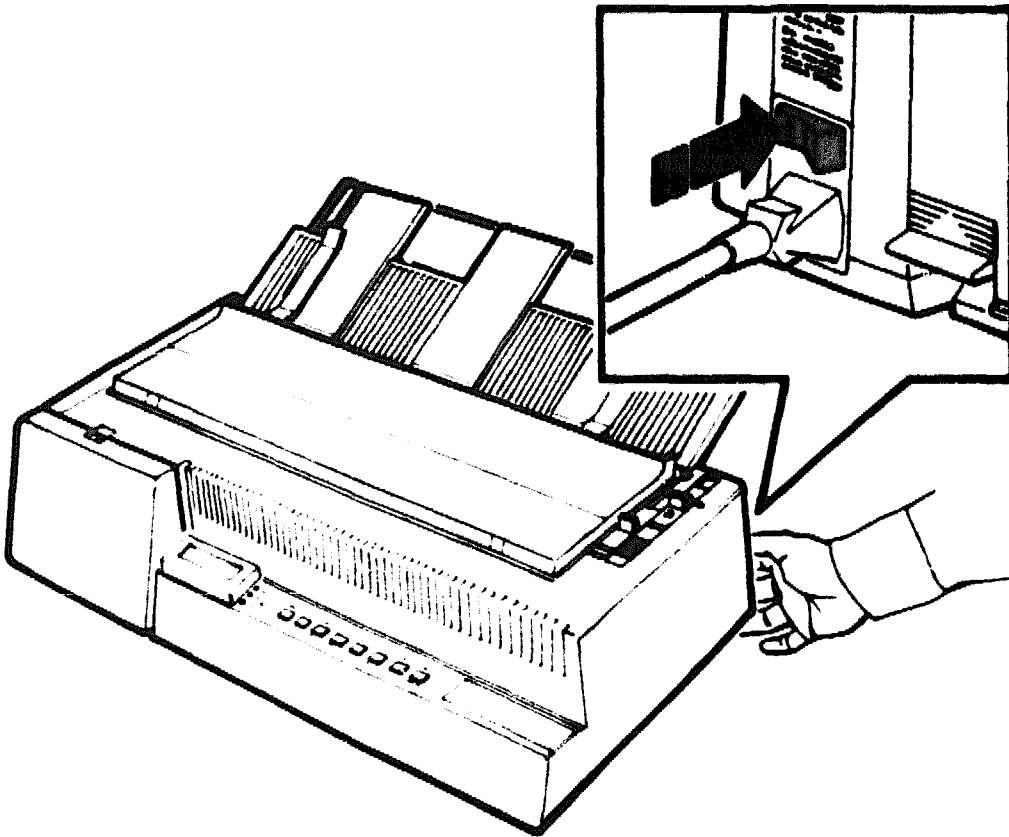
ML0-003710

1.7 Aligning the Perforation Line

In order for fanfold paper or forms to tear off correctly, the perforation line must be aligned properly with the tear bar. The printer is shipped with the perforation alignment value of 0. If your paper is not tearing cleanly at the perforation, use the following procedure to properly align the perforation line.

NOTE: *You cannot align the perforation using the  and  keys because the effects of these keys are not retained in memory. Using these keys will cause paper to be improperly positioned thereafter. The  and  keys are typically used to remove paper when clearing a jam.*

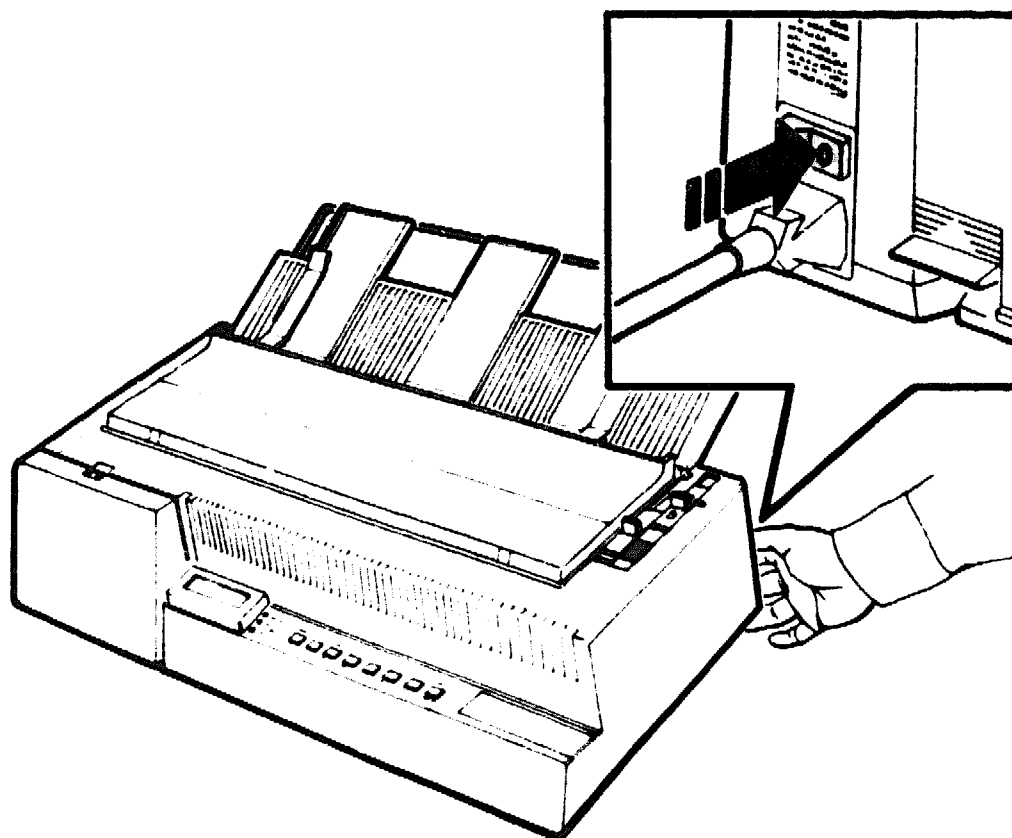
1. Press the power switch to the ON () position.



ML0-003892

2. Tear the fanfold paper cleanly at the perforation.
3. Press **[Setup]** to enter user setup mode.
 - The Power/Setup light flashes.
4. Press **[Park]** to park the paper.
 - The paper reverses through the paper path to the tractor assemblies.
 - The message display reads PAPER EMPTY.
 - All the lights flash.
 - The printer exits setup mode.
5. Press **[FF]** to advance the paper to the tear position.
 - The message display reads READY.
 - If the paper is at line 1, press **[Pause/Ready]**.
 - The paper advances to the tear position.
 - The message display reads PAUSE.
6. Determine if the perforation line needs to be raised (+) or lowered (-) to align it with the tear bar.

7. Power off the printer by pressing the power switch to the OFF (O) position.

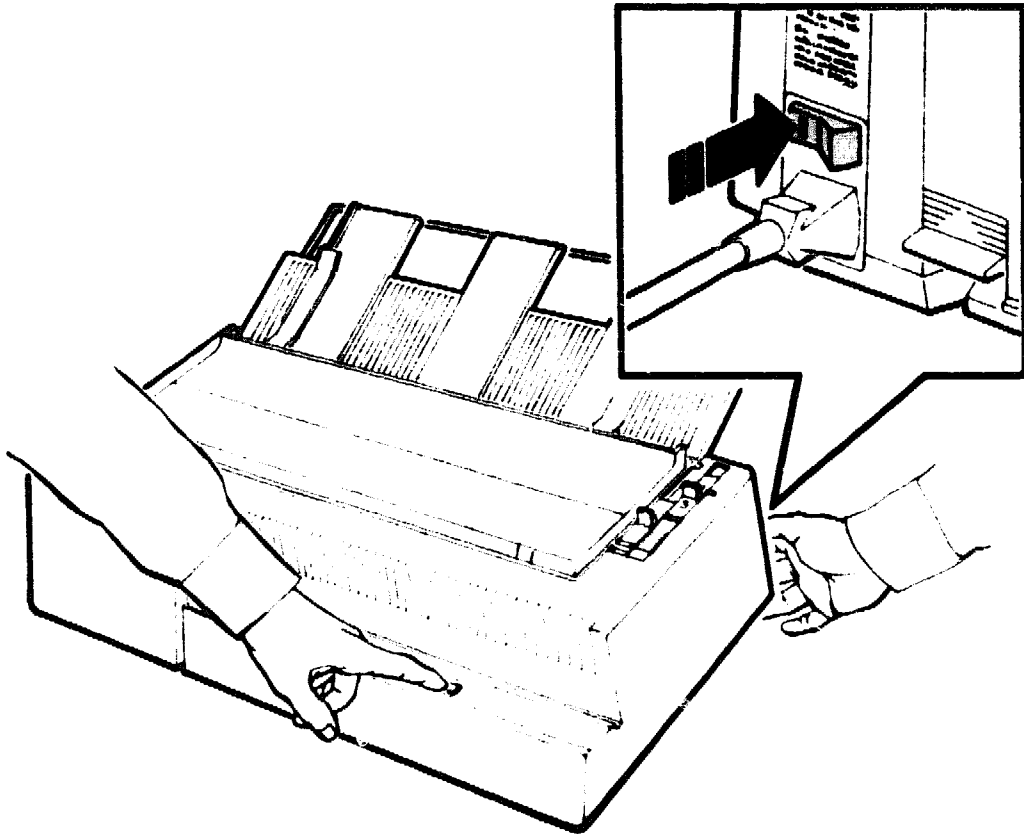


ML0-003883

8. Press and hold down **[Setup]** while pressing the power switch to the ON (I) position.

- The message display reads **INSTALLATION**.

NOTE: You must hold **[Setup]** down until the message display reads **INSTALLATION**.



ML0-003713

9. Press **[↑]** one time to display the Tear Adjustment feature.
- The message display reads Tear Adjustment.
10. Press **[←]** to raise (+) or **[→]** to lower (-) the perforation line to the tear bar.
- The message display scrolls through the values (-5 through +5).

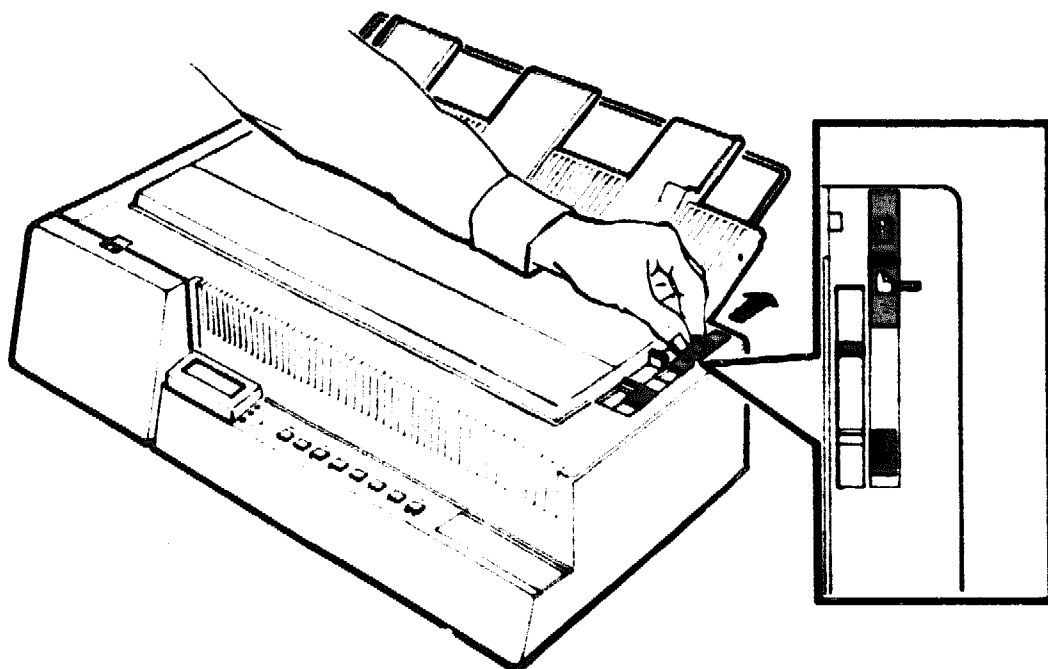
NOTE: *Each setting will raise or lower the paper by .71 mm (1/36 in.).*

11. Press **[Select]** after choosing the new setting.
- An asterisk (*) is displayed next to the chosen value.
12. Press **[Park]** to retract the paper.
- The paper reverses through the paper path to the tractor assemblies.
 - The message display reads LOAD PAPER.
 - All the lights flash.
 - The printer exits setup mode.
13. Press **[FF]** to advance the paper to the tear bar.
- If the paper only advances to the printhead, press **[Pause/Ready]** to advance it to the tear bar.
 - Check the alignment of the perforation line to the tear bar. If the perforation line requires additional adjustment, repeat the procedure beginning at Step 5.

1.8 Cut-Sheet Paper Operation

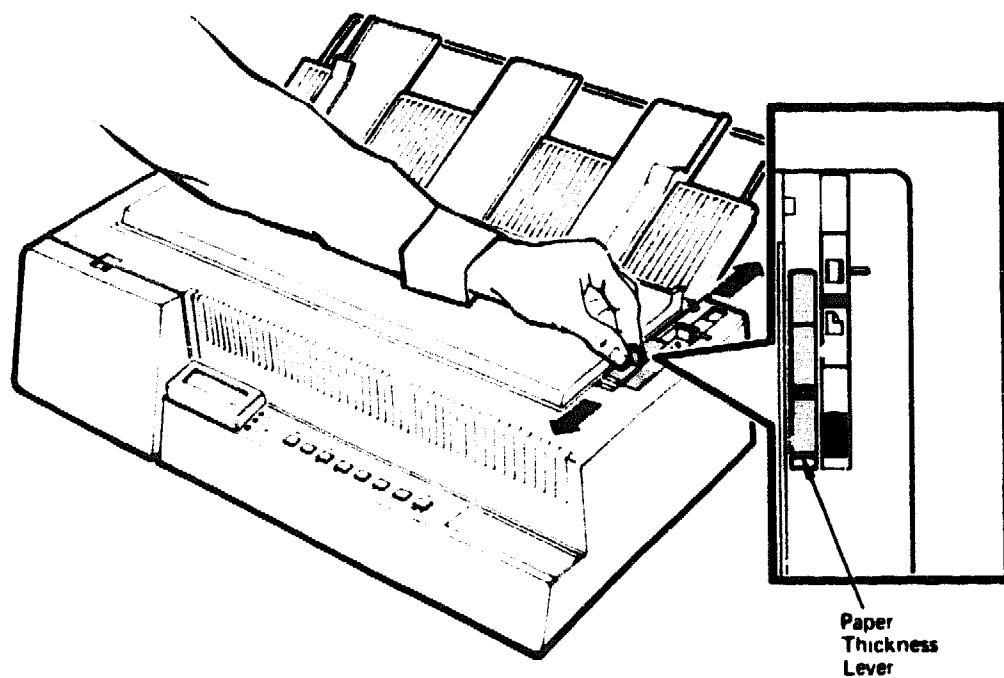
Use the following procedure to manually feed cut-sheet paper media up to 6 parts thick, one sheet at a time, into the printer. If fanfold paper is currently loaded in the printer, see Section 1.5.4 for instructions on parking the paper before manually feeding cut-sheet paper.

1. Move the paper selection lever rearward to the cut-sheet position.



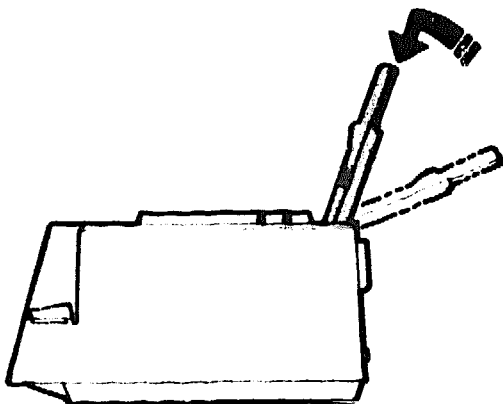
MLO-003729

2. Adjust the paper thickness lever for the type of paper you are using (see Section 1.9).



MLC-033712

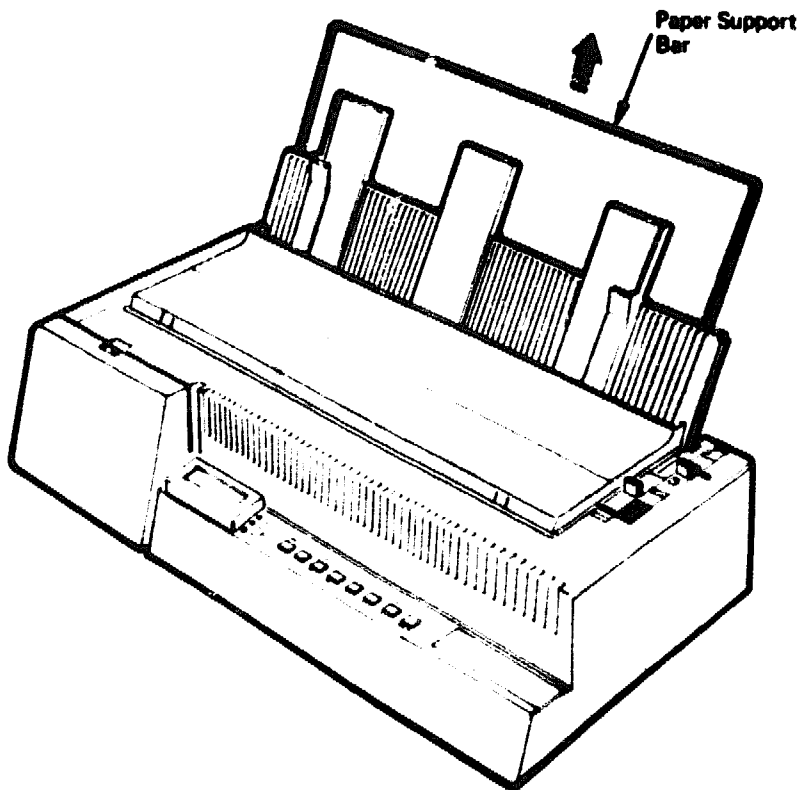
- 3. Raise the paper chute to the cut-sheet position and press it down to lock it in place.**



MLO-003695

- **If you are changing the paper size, continue with the next step. If you are not changing the paper size, go to Step 9.**

4. Raise the paper support bar if you are using paper longer than 296 mm (11.6 in.).



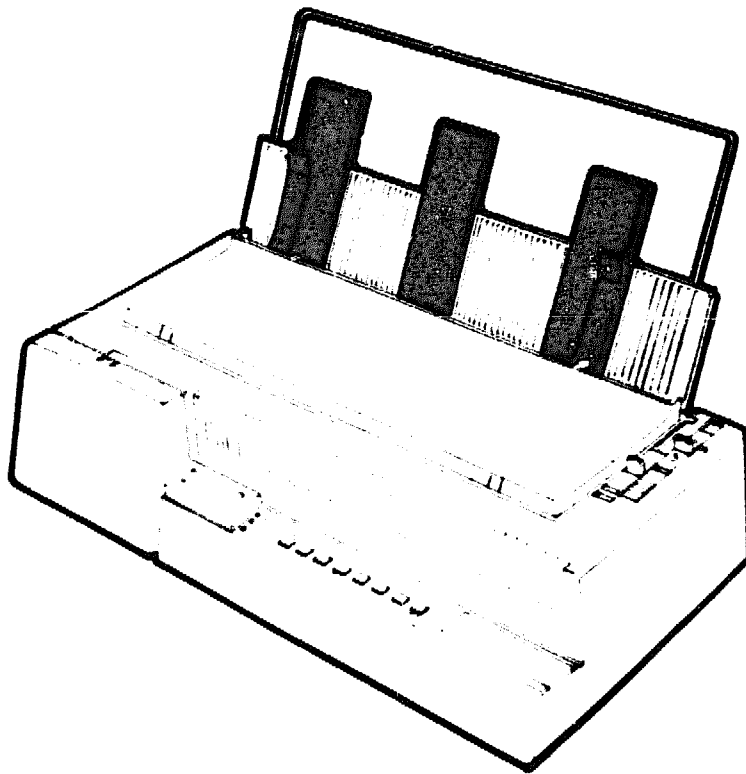
MLO-003714

5. Slide the left paper guide to the left as far as it will go.

NOTE: *This places the first printing column (left margin) 25.5 mm (1 in.) from the edge of the paper. If your printing application requires the first column to be in a different location, just move the paper guide accordingly.*

The paper chute can accommodate cut-sheet paper up to 432 mm (17 in.) wide.

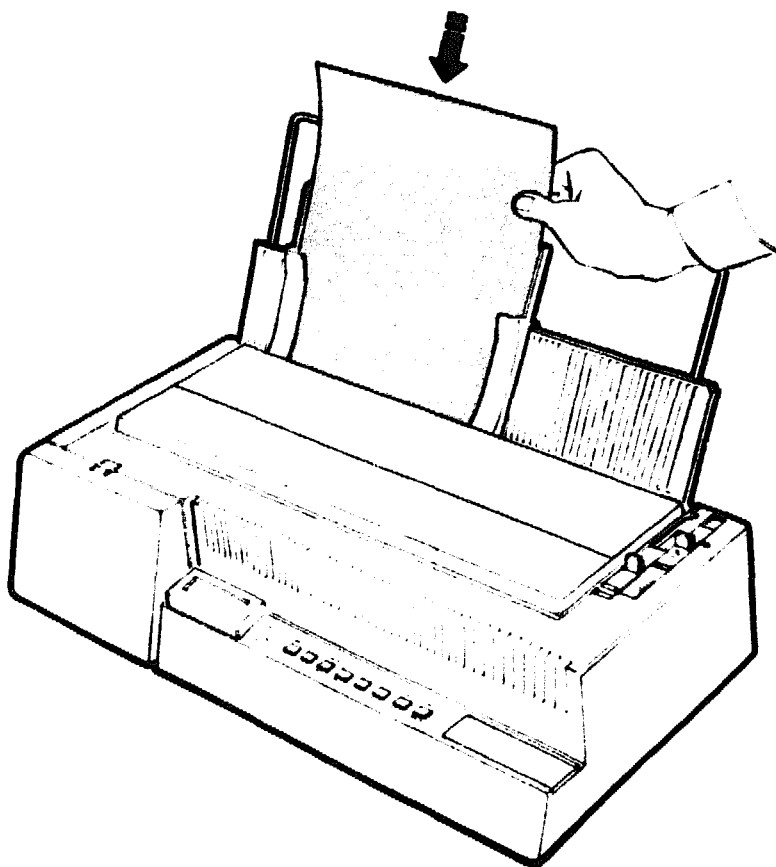
6. Slide the right paper guide left or right to match the size of the paper.
7. Position the center guide evenly between the left and right paper guides.



MLO-003715

8. Insert one sheet of paper into the paper chute.

NOTE: If the fanfold paper is still in the paper path, the printer will automatically reverse the fanfold paper into the park position.



M.O-003718

9. Press **FF** (form feed) to feed the paper.

- The paper automatically advances to the first printable line.
- The message display reads **READY**.

NOTE: *If the paper begins to feed and then reverses back out of the paper path, it means the paper selection lever is not in the manual-feed position. Move the selection lever to the manual-feed position to correctly feed paper.*

Mechanical limitations prevent the printer from printing within the bottom (17 mm) 2/3 inch of a cut-sheet page. For example, on an 11-inch page printed at 6 lines per inch, the printer will not print on lines 63 through 66.

1.9 Adjusting the Paper Thickness Lever

In order to maintain high-quality print and attain the long life designed into the printhead, the paper thickness lever should always be set to match the paper media you are using. Even if the print quality appears acceptable, you may be reducing the operating life of the printhead if it is not positioned the correct distance from the platen. Optimally, the printhead should be positioned as close to the platen as possible without smudging the print.

1.9.1 Thickness Adjustment for Single-Sheet Paper

When you are using single-sheet paper, the correct position for the paper thickness lever is all the way to the rear of the printer in either the first or second position (the lever will "click" as it moves to each position).

1.9.2 Thickness Adjustment for Multipart Forms

Use the following procedure to adjust the paper thickness lever to the correct position. This procedure provides a printout of the printer setup configuration so you can check the print quality.

1. Move the paper thickness lever all the way to the front of the printer (the lever will "click" as it moves to each position).
2. Press **[Setup]** to enter user setup mode.
 - The message display reads **USER SETUP**.
3. Press **[Print]** to print the printer setup configuration.
 - Advance the thickness lever one position toward the rear of the printer.
4. Repeat Step 3 until you see the print start to smudge. At the point where the print starts to smudge, move the paper thickness lever back one position toward the front of the printer. This is the correct paper thickness lever position to assure high-quality print and maximum printhead life.
5. Press **[Exit Setup]** to exit user setup mode.
 - The message display reads **READY**.

1.10 Using the Optional Font Cartridges

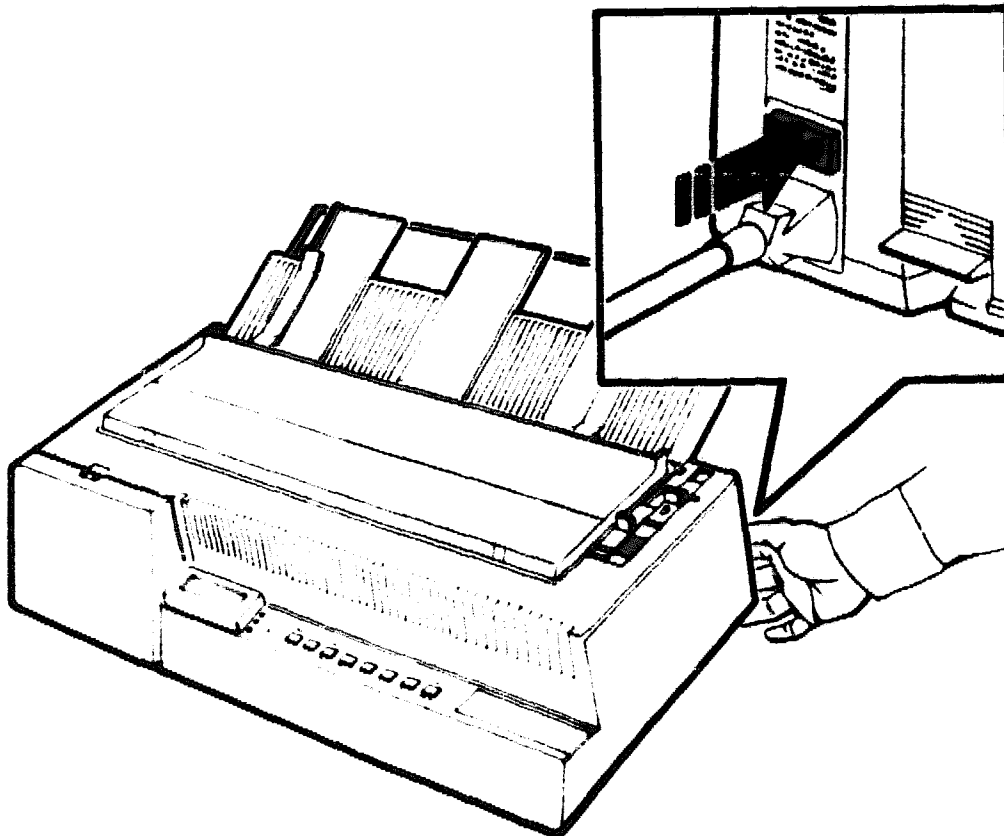
The following procedure describes how to insert and access the optional font cartridges available for the LA324 MultiPrinter.

There are two types of font cartridges: one type of cartridge is used for DEC protocol, and the other type of cartridge is used for Emulation protocol. Make certain that the cartridge type you use matches your application protocol.

NOTE: *The print density must be set to Letter quality when you are using typestyles from the font cartridge. When Draft quality is selected the printer uses the internal draft typestyles. Print density may be selected via software or through the operator panel (see Section 2.2).*

1. Press the power switch to the OFF (O) position to power off the printer.

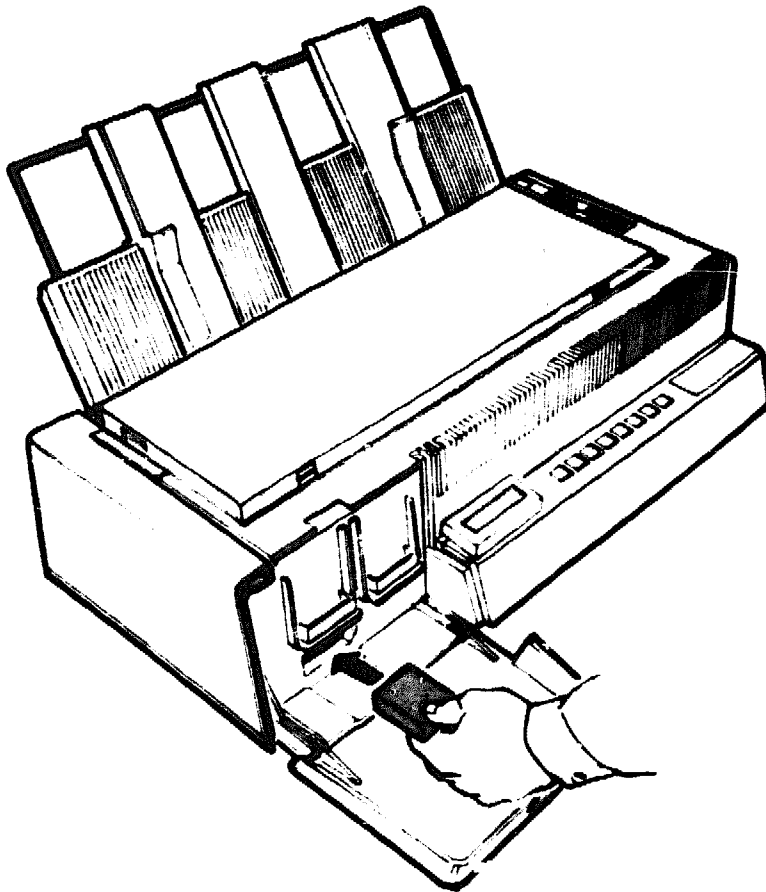
CAUTION: *Failure to power off the printer before inserting the font cartridge can result in damage to the cartridge. Always power off the printer before inserting a font cartridge.*



MLO-003893

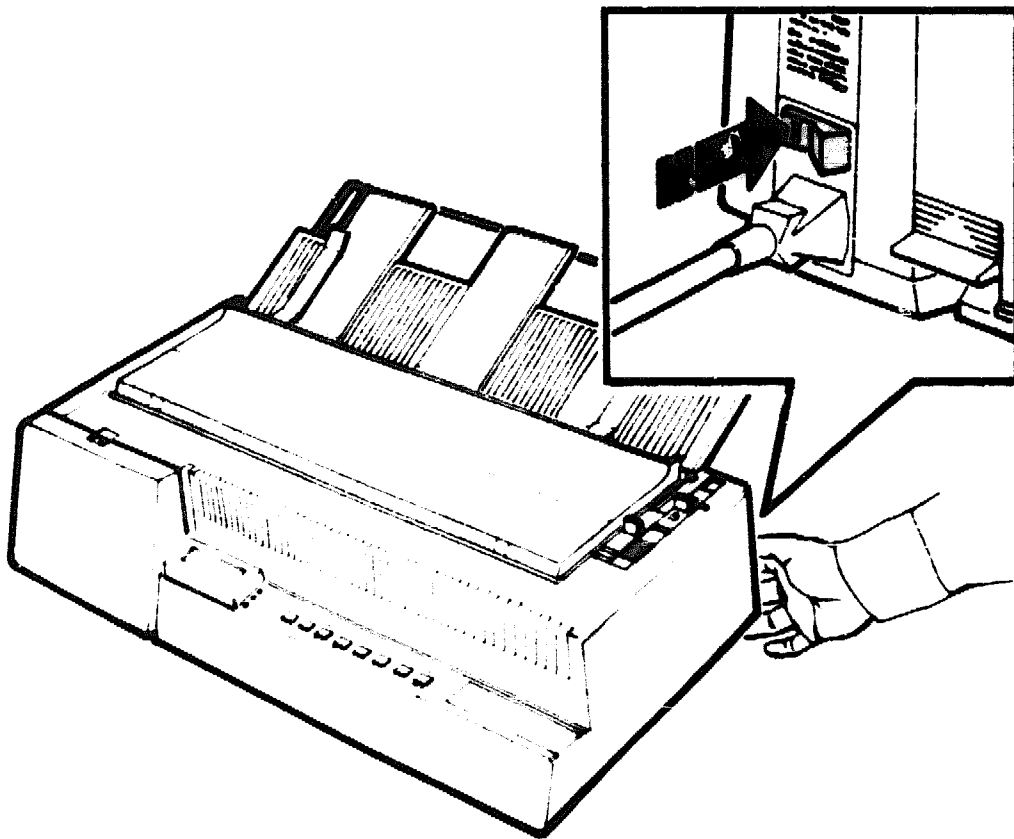
2. Open the font cartridge access cover.
3. Insert the font cartridge by pushing it in until it is firmly seated in place.

CAUTION: *The font cartridge is "keyed" (on the bottom of the cartridge) and can be inserted only one way. Do not try to force the cartridge into place.*



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4. Press the power switch to the ON (I) position to power on the printer.
 - The message display reads **READY**.



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5. Press **[Setup]** to enter the user setup mode.
 - The message display reads **Protocol USER SETUP**.
 - The Power/Setup light flashes.
6. Press **[1]** to select the Protocol feature.
 - The message display reads **Protocol**.
7. Press **[<=>]** to display the value of the Protocol feature that matches the cartridge. For example:
 - If the cartridge is a *DEC Orator*, press **[<=>]** to display **DEC**.
 - If the cartridge is an *OCR-A Emulation*, press **[<=>]** to display **Emulation**.
8. Press **[Select]** to select the value of the protocol.

NOTE: *If you are changing protocols, the new protocol setup is displayed.*
9. Press **[1]** several times to display the Typestyle feature.
 - The message display reads **Typestyle**.
10. Press **[<=>]** until the cartridge value displays.
 - The message display reads **Cartridge**.
11. Press **[Select]** to select the cartridge value.
 - The message display reads *** Cartridge**.
 - If you do not want to save the cartridge selection, go to Step 16.
 - If you want to save the cartridge selection, continue with the next step.
12. Press **[↑]** several times to display the Protocol Defaults feature.
 - The message display reads **Protocol Defaults**.
13. Press **[<=>]** once to display the Save value.
 - The message display reads **Save**.
14. Press **[Select]** to select the Save value.
 - The printer beeps and the message display reads **DONE!**.
 - The cartridge value is now saved in memory, so that the printer defaults to the font cartridge at power-up.

15. Press **Exit Setup** to exit user setup mode.

- The message display reads **READY Protocol**.

1.10.1 Font Cartridge Information

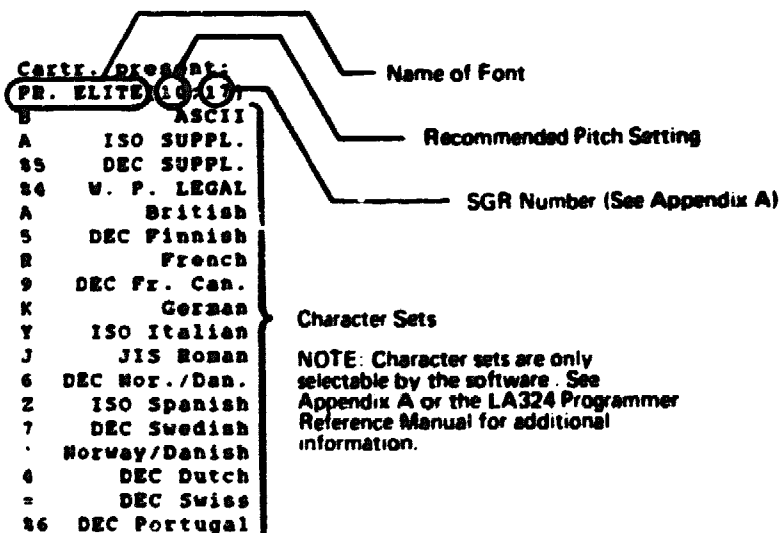
Information about a font style can be viewed on a printout of the setup parameters. Simply install the font cartridge as described in Section 1.10 and print the current setup parameters (Section 3.5). The information about the font style will be listed below the setup parameters. This information is shown in the following illustration.

INSTALLATION SETUP

Setup Language	English	Port Selection	Serial Port
Buffer Control	XON/XOFF	EOT Disconnect	No Disc. on EOT
Baud Rate	4800	DataBite/Parity	8-None
Sheet Feeder	Not Installed	Sail Bar Lift	Lift OFF
Error Beep	One Beep	Auto Tear	Auto Tear OFF
Tear Adjustment	0		

DEC USER SETUP

Protocol	DEC	Form Length	66
Form Width	13.6 inches	Auto LF on CR	No auto LF
Auto CR on LF	No auto CR	Density	Draft
Typestyle	Internal	Horiz. pitch	10 CPI
Vertical Pitch	6 LPI	Autowrap	Truncate
G0 Cset	US ASCII	User Pref. Cset	DEC Supplement
Printer ID	Level 2 Printer	Top Margin	1



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Chapter 2

The Operator Panel

The LA324 MultiPrinter allows you to select certain printer functions and features through the use of a keypad on the operator panel. It also has a message display that shows printer status, and a set of indicators that convey current operating information about the printer. This chapter describes the various functions of the operator panel while the printer is in operating mode (used during normal printer operation) and in setup mode (used for parking fanfold paper and selecting setup features).

2.1 Operator Panel Functions

The operator panel consists of:

- A keypad

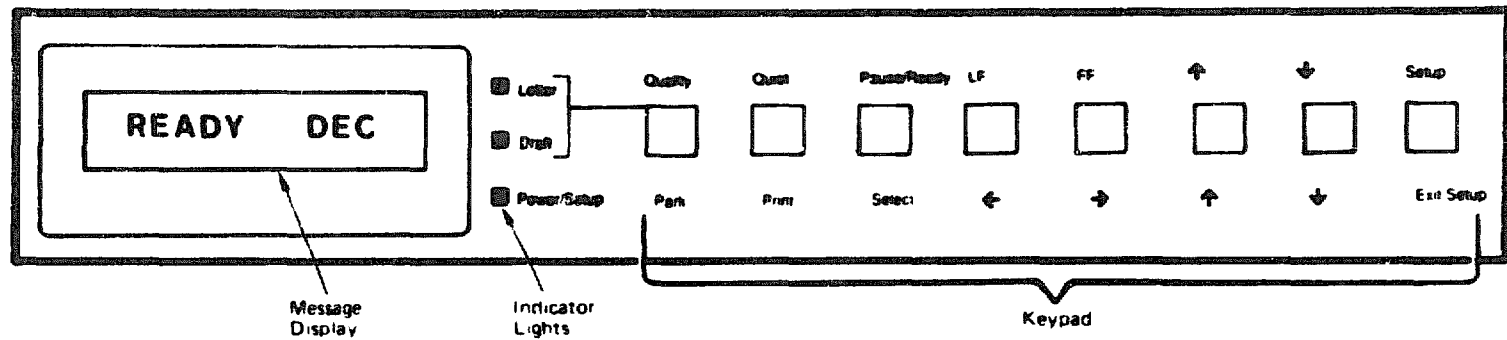
The keypad is the input mechanism that allows you to select and invoke various printer functions. The operator panel keypad functions in three basic modes: operating mode, setup mode, and alignment mode.

- Indicator lights

A set of three lights indicates whether the printer is powered on, whether the printer is in setup or operational mode, and what the selection method for print density is (software control or manual override). When an error condition exists, all three lights flash.

- A message display

The message display shows the current status of the printer: BUSY, READY, or PAUSE, for example. When the printer is in a setup mode, the message display shows the selected features or values from the setup menus. If an error condition occurs, the message display identifies the error, such as paper jam or carriage fault.



2.1.1 Keypad Operation in Operating Mode

The keys on the keypad perform different functions depending on whether the printer is in operating mode or in one of the setup modes.

When a key is pressed during normal printer operation (operating mode), the key performs the function labeled *above* it: Pause/Ready or FF (form feed), for example. Table 2-1 describes the functions of the keypad when the printer is in operating mode.

Table 2-1: Operator Panel Key Functions in Operating Mode

Keypad	Function
Quality	Pressing Quality allows you to manually override the (software-selected) print density by choosing either Letter or Draft print quality. When Letter or Draft quality is selected (with Quality), the corresponding indicator lights. For more information on the indicator lights, see Section 2.2. NOTE: If Quality is pressed while the printer is printing, the change in print density takes place on the next possible line. Each time the key is pressed, the printer cycles through the following three print density selections: • Letter quality, which prints a 30 x 24 dot-matrix character (standard cell) at 100 characters per second. • Draft quality, which prints a 9 x 24 dot-matrix character (standard cell) at 300 characters per second. • Quality indicators off, which means the print density selection is being controlled by the application software. NOTE: The Quality key is disabled in Emulation protocol. In Emulation protocol, print quality is selected with the Typestyle feature in emulation setup. In Emulation protocol, the Letter and Draft indicators report the (software-selected) print density.
Quiet	Pressing Quiet places the printer in the quiet printing mode, which uses fewer impact wires (on the printhead) per pass, resulting in quieter printing. Printing takes longer in quiet mode because twice as many passes must be made. When the printer is printing in quiet mode, the display panel reads BUSY QUIET. If Q is pressed when the printer is READY, the display panel indicates the current status for 2 seconds: QUIET ON or QUIET OFF. NOTE: If Quiet is pressed while the printer is printing, the change in printing mode takes place on the next possible line.

Table 2-1 (Cont.): Operator Panel Key Functions In Operating Mode

Keypad	Function
Pause/Ready	Pressing Pause/Ready toggles the printer between the pause and ready states. When the printer is in the ready state, the message display reads READY followed by DEC or EMUL. to indicate the protocol in use. See Section 3.3.4 for additional information about DEC protocol. See Section 3.4.1 for additional information about Emulation protocol. When the printer is in the pause state, the message display reads PAUSE and printing stops temporarily. No data is lost when printing resumes.
LF	Pressing the line feed key advances the paper one line (at the current pitch setting) if paper is loaded in the printer. If paper is not loaded, the action is ignored.
FF	Pressing the form feed key advances the paper to the printhead (if Auto Tear is OFF), or to the tear bar position (if Auto Tear is ON). See the Auto Tear feature in Section 3.5.4 for additional information. If the optional automatic sheet feeder is installed and a sheet of paper is currently in the printer, pressing FF ejects the sheet. If no paper is in the printer, pressing FF loads a sheet of paper. If the printer is in no-forms mode (if Form Length = 0), pressing FF acts as a line feed.
↑	Pressing ↑ advances the paper in fine increments. This key is used to remove jammed paper. Please refer to Section 4.4 for the proper procedure for clearing paper jams. Hold this key down to move paper at a continuous (faster) rate. The ↑ key is <i>not</i> used to position paper, because the effects of this key are not retained in memory. If you use the ↑ key to position paper, the printer will not be able to keep track of the perforation line. Use the FF or LF key to advance paper.
↓	Pressing ↓ reverses the paper in fine increments. This key is used to remove jammed paper. Please refer to Section 4.4 for the proper procedure for clearing paper jams. Hold this key down to move paper at a continuous (faster) rate. The ↓ key is <i>not</i> used to position paper, because the effects of this key are not retained in memory. If you use the ↓ key to position paper, the printer will not be able to keep track of the perforation line. Use the Park key to reverse paper (see Section 1.5.4).

Table 2-1 (Cont.): Operator Panel Key Functions in Operating Mode

Keypad	Function
Setup	Pressing Setup causes the printer to enter user setup mode. When the printer is in user setup mode, the keypad keys perform the functions labeled <i>beneath</i> them. See Section 2.1.2 for information about using the keypad in a setup mode. Powering on the printer while holding the Setup key down causes the printer to enter installation setup mode. Installation setup mode operates almost the same way as user setup mode. The installation setup menu contains many of the features associated with printer/host communications (such as baud rate and parity) that typically have to be selected only once. It also contains features that relate to options such as the automatic sheet feeder. See Section 3.5.4 for more information about installation setup features.

2.1.2 Keypad Operation In a Setup Mode

When a key is pressed while the printer is in either user setup mode or installation setup mode, the key performs the function labeled *beneath* it: Park or Print, for example. Table 2-2 describes the functions of the keypad when the printer is in a setup mode.

Table 2-2: Operator Panel Key Functions in a Setup Mode

Keypad	Function
Park	Pressing Park causes fanfold paper to reverse through the paper path to the tractor feed assemblies. After parking fanfold paper, the printer automatically exits from setup mode and returns to operating mode. The Park feature is primarily used when switching from fanfold paper to cut-sheet paper and forms. It is also be used with fanfold paper to set the line counter to correspond with the top-of-form. Press FF after parking to position the line counter and top-of-form on line 1 of the fanfold paper. See Section 1.5.4 for additional information about parking fanfold paper.
Print	Pressing Print prints the setup features with their currently selected values. If there is no paper in the printer, the action is ignored. NOTE: An ASCII based character set must be selected in order to print setup features and values.
Select	Pressing Select selects the current value shown on the message display. An asterisk (*) next to the value confirms that it has been selected. When you scroll through the values of a feature, the selected value is always shown first. The way you save selected values depends on the setup menu you are configuring. If you are configuring the installation setup menu, all values are saved in memory automatically when you press Exit Setup to exit the installation setup. For additional information about selecting and saving values from the installation setup menu, see the example in Section 3.5.2. If you are configuring the user setup menu, newly selected values are <i>not</i> automatically saved in memory when you exit setup, and will be lost if the printer receives a Reset escape sequence or the printer is powered off. To save the new selected values you must select the Save value of the DEC Defaults feature before exiting setup (Section 3.3.4). For additional information about selecting and saving values from the user setup menu, see Section 3.3.2.
←	Pressing the left arrow key displays the <i>previous</i> value for the current feature.
→	Pressing the right arrow key displays the <i>next</i> value for the current feature.
↑	Pressing the up arrow key displays the <i>previous</i> feature on the menu.
↓	Pressing the down arrow key displays the <i>next</i> feature on the menu.
Exit Setup	Pressing Exit Setup exits the printer from setup mode back to operating mode.

For information about using the keys to select printer features and values, see Chapter 3.

2.2 Indicator Lights

There are three lights on the operator panel that indicate the current status of the printer. Table 2-3 describes the functions of these indicator lights.

Table 2-3: Indicator Lights

Indicator	Function
Letter	This indicator works in conjunction with Quality (see Table 2-1). When the indicator is on it means that the manual override print quality feature has been invoked (with Quality) and letter-quality print density is selected. In Emulation protocol, this indicator is on when Letter quality is selected: at power-up or through software.
Draft	This indicator works in conjunction with Quality (see Table 2-1). When the indicator is on it means that the manual override print quality feature has been invoked (with Quality) and draft-quality print density is selected. In Emulation protocol, this indicator is on when Draft quality is selected: at power-up or through software.
Power/Setup	When the printer is in operating mode this indicator remains on to indicate that the printer is powered on. This indicator flashes when the printer is in setup mode.
Flashing Indicators	In the event of a printer error, all of the indicator lights flash. The message display identifies the particular error.

Chapter 3

Configuring the Printer

This chapter describes how to configure the LA324 printer by selecting printer parameters that can be stored in the printer's memory. Configuring the printer is necessary so that it can operate properly and communicate with your hardware and software.

Selections are made from the *user* setup menus (DEC or IBM Emulation) or the *installation* setup menu. Selections from the installation setup menu are typically chosen just once and need not be accessed again unless communications or option requirements change. Selections from the user setup menus allow you to configure the printer according to your application and media requirements.

3.1 Setup Modes and the Current State of the Printer

User setup mode and installation setup mode are used to change the values of printer features: baud rate or form length, for example. Some of these values can also be changed with escape sequences sent from the host computer. All of the features selected in setup mode, *together with the features set up from the host via escape sequences*, determine the current state of the printer. This current state is stored in the printer's memory when the Save value is selected under the (DEC or EMUL.) Defaults feature (see Section 3.3.4).

If a value is selected in setup mode and an escape sequence is later sent from the host to change that value, the host selection replaces the previous value in the printer's memory. In other words, the last selection takes precedence regardless of the source.

If you are a programmer and need additional information on using escape sequences to change setup feature values, consult the *LA324 MultiPrinter Programmer's Reference Manual* (see Appendix C for ordering information).

3.2 Using the Menu Keys in a Setup Mode

This table explains how to use the setup menu keys while in a setup mode. Remember that while the printer is in setup mode the keys on the operator panel perform the functions labeled *below* them, such as Park or Print. See Section 2.1.2 if you need additional information about using other keys on the operator panel while in a setup mode.

Table 3-1: Setup Menu Key Definitions

Key	Definition
	Pressing  selects the current value shown on the message display. An asterisk (*) next to the value confirms that it has been selected. When you scroll through the values of a feature, the selected value is always shown first. The way you save selected values depends on the setup menu you are configuring. If you are configuring the installation setup menu, all values are saved in memory automatically when you press  to exit the installation setup. For additional information about selecting and saving values from the installation setup menu, see the example in Section 3.5.2. If you are configuring the user setup menu, newly selected values are <i>not</i> automatically saved in memory when you exit setup, and will be lost if the printer receives a Reset escape sequence or the printer is powered off. To save the new selected values you must select the Save value of the (DEC or EMUL.) Defaults feature before exiting setup (Section 3.3.4). For additional information about selecting and saving values from the user setup menu, see Section 3.3.2.
	Pressing  exits the printer from setup mode back to operating mode.
	Pressing  displays the <i>previous</i> value for the current feature.
	Pressing  displays the <i>next</i> value for the current feature.
	Pressing  displays the <i>previous</i> feature on the menu.
	Pressing  displays the <i>next</i> feature on the menu.

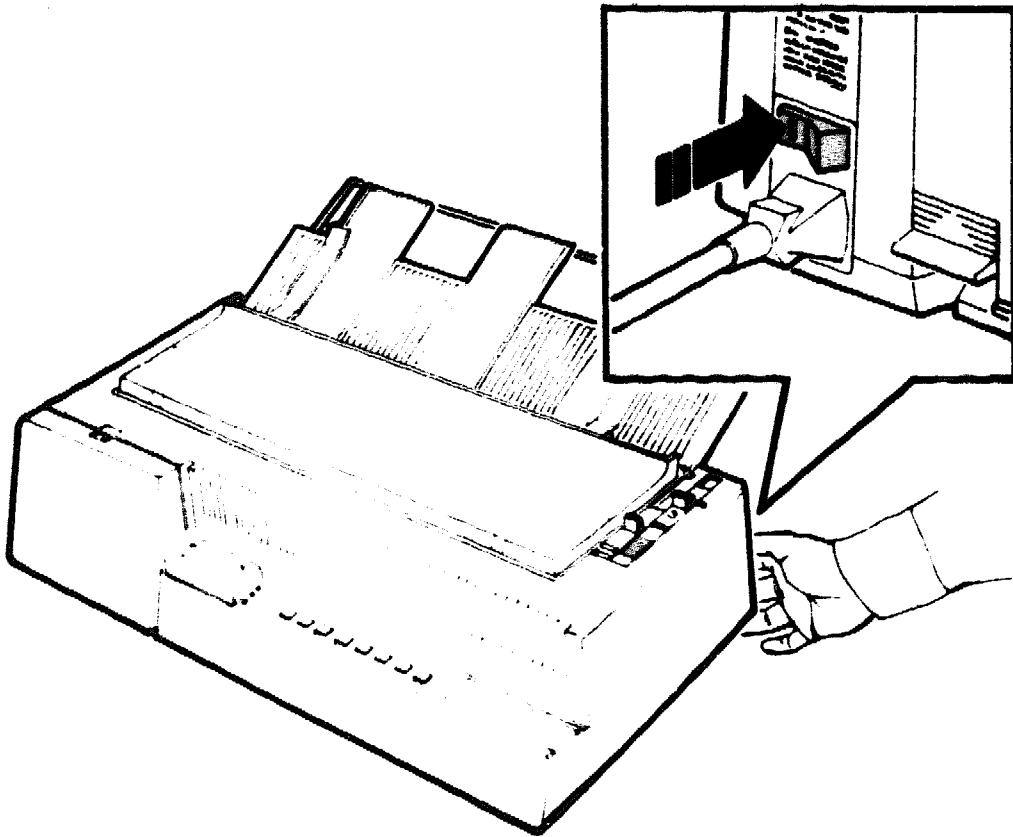
3.3 User Setup Menu

3.3.1 Entering User Setup Mode

User setup mode can be accessed only *after* the printer is powered on.

1. Press the power switch to the ON (|) position to power on the printer.
 - The message display reads **READY**.

NOTE: *If paper is not loaded in the printer, the message display will read **LOAD PAPER** (see Section 1.4).*



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2. Press **[Setup]** to enter the user setup mode.
 - The message display reads Protocol USER SETUP.
 - The Power/Setup light flashes.

3.3.2 How to Select and Save User Setup Menu Values

This section contains an example that shows how to use the setup menu keys to select and save two values from the user setup menu. This example assumes that the printer is using the factory default selections before any changes are made, and the message display reads READY DEC. This example shows how to change the following two factory default settings:

- Form Length (from 66 lines to 70 lines)
- Vertical Pitch (from 6 LPI to 8 LPI)

Once the new values are selected, the example will describe how to save them before exiting setup so they are retained in memory.

1. Press **[Setup]** to enter user setup mode.
 - The message display reads DEC USER SETUP.
 - The Power/Setup light flashes.
2. Press **[↓]** three times to reach the Form Length feature.
 - The message display reads Form Length.
3. Press **[→]** five times to reach the desired form length of 70 lines.
 - The message display reads 70.
4. Press **[Select]** to select the value of 70.
 - The message display reads * 70.

Now that a form length of 70 lines has been selected, continue by changing the vertical pitch setting.

5. Press **[↓]** seven times to reach the Vertical Pitch feature.
 - The message display reads Vertical Pitch.
6. Press **[→]** twice to reach the desired vertical pitch of 8 LPI.
 - The message display reads 8 LPI.
7. Press **[Select]** to select the value of 8 LPI.
 - The message display reads * 8 LPI.

The next step is to save the newly chosen values by selecting the Save value of the DEC Defaults feature.

8. Press **[F1]** seven times to reach the DEC Defaults feature.
 - The message display reads DEC Defaults.
9. Press **[F2]** one time to reach the Save value.
 - The message display reads Save.
10. Press **[Select]** to select the Save value.
 - The printer beeps and the message display reads DONE!.
 - The newly chosen values are now saved in memory.
 - The printer exits user setup mode.

3.3.3 DEC User Setup Menu

This table lists the features and values available in the user setup menu. Column 1 lists the feature as shown on the message display, while column 2 lists the selectable values.

Refer to Section 3.3.4 for a description of the user menu features and associated values.

Table 3-2: DEC User Setup Menu

Feature	Values
Protocol	DEC ¹ Emulation
DEC Defaults	Save Print Restore Recall Factory
Form Length	0 . . 66 lines ¹ . . 255 lines

¹Factory default selection.

Table 3-2 (Cont.): DEC User Setup Menu

Feature	Values
Form Width	13.6 inches ¹ 8 inches
Auto LF on CR	No auto LF ¹ Auto LF on CR
Auto CR on LF	No auto CR ¹ Auto CR on LF
Density	Draft ¹ Letter Quality
Typestyle	Internal ¹ Cartridge ²
Horiz. Pitch	10 CPI ¹ 12 CPI 13.2 CPI 17.1 CPI 18 CPI 5 CPI 6 CPI 6.6 CPI 8.55 CPI 9 CPI
Vertical Pitch	6 LPI ¹ 8 LPI 12 LPI 2 LPI 3 LPI 4 LPI
Autowrap	Truncate ¹ Wrap

¹Factory default selection.

²Appears only when a font cartridge is installed.

Table 3-2 (Cont.): DEC User Setup Menu

Feature	Values
G0 Cset	US ASCII ¹ British DEC Finnish French DEC Fr. Canada German ISO Italian JIS Roman DEC Nor/Dan ISO Spanish DEC Swedish Norway/Danish DEC Dutch DEC Swiss DEC Portuguese JIS Katakana DEC Spec.Graph DEC Technical DEC Supp DEC 7-bit Hebrew DEC Hebrew Supp W.P. Legal ² User Preference
User Pref. Cset	DEC Supplement ¹ ISO Supplement Katakana DEC Hebrew Supp ISO Hebrew Supp
Printer ID	Level 2 Printer ¹ LA120 ID LA210 ID
Top Margin	1 ¹ . . . 255

¹Factory default selection.

²Appears only when a font cartridge is installed.

3.3.4 DEC User Setup Menu: Features and Values

This section describes the features and value selections of the user setup menu. See Table 3-2 for a complete listing of these features and their associated values in the DEC protocol.

Protocol

Protocol determines the data format used for the printer.

Value	Definition
DEC ¹	Uses DEC protocol to communicate with Digital or ANSI-compatible host software.
Emulation	Uses IBM-compatible emulation protocol to communicate with the host software. Refer to Section 3.4.1 for user setup menu features in Emulation protocol.

¹Factory default selection.

DEC Defaults

This determines what features are retained in the printer's memory after you exit setup mode.

Value	Definition
Save	Retains features changed in memory (via software or the operator panel). These features are stored in nonvolatile (stable) memory and retained even after the printer is powered off, or after it has received a <i>Reset</i> escape sequence. NOTE: After saving the feature values, the printer automatically exits setup mode.
Print	Prints the <i>saved</i> setup features and values when you press Select. These values may or may not match what is selected in the current state of the printer. These features are identified on the printout under the heading of DEC DEFAULTS. NOTE: To print the current state of setup features and values, press Print. See Section 2.1.2 for additional information about Print.

Value	Definition
Restore	Returns the printer to the state last saved prior to any changes made in setup or by software.
Print Factory	Recalls the factory default settings for both the user and installation setup menus into the current state. To store these features in memory select the Save value (see above).

Form Length

This feature lets the printer know the length of the paper you are using.

Value	Definition
0	Sets the printer to no-forms mode, in which the LA324 printer emulates a "roll paper" printer. Form feeds are executed as line feeds and there are no top or bottom margins. See the <i>LA324 Programmer's Reference Manual</i> for more information about no-forms mode.
66 ¹	Sets the length of the form to the standard setting for 11-inch paper at 6 lines per inch or 66 lines per page.
X number	Sets the length of the form from 0 to 255 lines long.

¹Factory default selection.

Form Width

This feature lets the printer know the width of the paper you are using.

Value	Definition
13.6 inches ¹	Sets the width of the form to 13.6 inches. Also sets the left margin to 0 and the right margin to 13.6 inches.
8 inches	Sets the width of the form to 8 inches. Also sets the left margin to 0 and the right margin to 8 inches.

¹Factory default selection.

Auto LF on CR

This feature determines whether the printer automatically advances the paper (executes a line feed) each time it receives a carriage return command.

Value	Definition
No auto LF ¹	The printer does not automatically advance the paper a line when it receives a carriage return command.
Auto LF on CR	Automatically advances the paper a line when it receives a carriage return command. Select this value if the printer is printing one line over another when it receives a carriage return command.
¹ Factory default selection.	

Auto CR on LF

This feature determines whether the printer automatically performs a carriage return each time it receives a line feed command.

Value	Definition
No auto CR ¹	The printer does not automatically perform a carriage return when it receives a line feed command.
Auto CR on LF	The printer automatically performs a carriage return when it receives a line feed command. Select this value if you want the print head to return to the left margin each time it receives a line feed command.
¹ Factory default selection.	

Density

This feature defines the quality of print to be used. The print quality determines the number of dots used to print a character; the higher the print quality you choose, the more dots used to print the character. Density also affects the print speed; the more dots used to print a character, the slower the print speed.

NOTE: You can temporarily override this selected value by pressing **Quality** (which lights one of the quality indicator lights on the operator panel). See Table 2-1 for additional information about using **Quality** to override the current selected value.

Value	Definition
Draft ¹	Prints using fewer dots per character. Select this value if you do not require the highest quality print but need the fastest printing speed.
Letter Quality	Delivers the highest quality print but at a lower printing speed.

¹Factory default selection.

Typestyle

Indicates the location of the typestyle (font) in use.

Value	Definition
Internal ¹	Uses the typestyle that is resident in the printer.
Cartridge	Uses the font style that is resident in the optional font cartridge. See Appendix A (Section A.6) for additional information about font cartridge selections. NOTE: This value appears only if a font cartridge is installed.

¹Factory default selection.

Horiz. Pitch

This feature governs the size of printed characters and the amount of space between characters. The fewer the characters per inch (CPI), the larger the horizontal size of the printed character. See Table 3-2 for the listing of available selections.

Vertical Pitch

This feature sets the number of lines printed per inch on a page. When you change the vertical pitch, the amount of white space between lines changes. For example, if you increase the number of lines per inch (LPI), you decrease the amount of white space between the lines. Vertical pitch does not affect character size. See Table 3-2 for the listing of available selections.

Autowrap

This feature determines printer action when text exceeds the right margin of the page.

Value	Definition
Truncate ¹	Printer ignores any characters beyond the right margin. Text beyond the right margin is lost.
Wrap	Text beyond the right margin moves to the left margin of the next line.

¹ Factory default selection.

G0 Cset

Selects the G0 character set to be used. Consult the *LA324 MultiPrinter Programmer's Reference Manual* for detailed information about the G0 character sets. See Table 3-2 for the listing of available selections.

User Pref. Cset

Selects the user preference character set to be used. Consult the *LA324 MultiPrinter Programmer's Reference Manual* for information about the user preference character sets. See Table 3-2 for the listing of available selections.

Printer ID

This feature defines the device name used by the printer when responding to requests from your host computer or application software.

Value	Definition
Level 2 Printer ¹	Allows the printer to respond as a level 2 device (functionally equivalent to an LA75 printer).
LA120 ID	The printer responds as an LA120 printer.
LA210 ID	The printer responds as an LA210 printer.

¹Factory default selection.

Top Margin

Sets the top margin on the page by defining where the first line of print will be. The first line of print may start from line 1 through line 255 depending on paper size and the vertical pitch setting.

3.4 Emulation User Setup Menu

This table lists the features and values available in the Emulation user setup menu. Column 1 lists the feature as shown on the message display, while column 2 lists the selectable values.

Refer to Section 3.4.1 for a description of the user menu features and associated values.

Table 3-3: Emulation User Setup Menu

Feature	Values
Protocol	Emulation DEC ¹
Emul. Defaults	Save Print Restore Recall Factory
Form Length	1 . . 66 lines ¹ . . 255 lines
Right Margin	Column 2 . . Column 136 ¹ . . Column 255
Auto LF on CR	No auto LF ¹ Auto LF on CR
Auto CR on LF	No auto CR ¹ Auto CR on LF
Typestyle	Draft ¹ Letter Quality Cartridge ²

¹Factory default selection.

²Appears only when a font cartridge is installed.

Table 3-3 (Cont.): Emulation User Setup Menu

Feature	Values
Horiz. Pitch	10 CPI ¹ 12 CPI 17.14 CPI Proportional Prop Enlar. Prop. Compr. 5 CPI 6 CPI 8.57 CPI
Emul. Cset	Cset 2 ¹ Cset 1
Alt. Graphics	OFF ¹ ON
Double Height	OFF ¹ ON
Slashed Zero	OFF ¹ ON
Emphasized	OFF ¹ ON

¹Factory default selection.

3.4.1 IBM Emulation User Setup Menu: Features and Values

This section describes the features and value selections of the Emulation user setup menu. See Table 3-3 for a complete listing of these features and their associated values with a Digital host.

Protocol

Protocol determines the data format used for the printer.

Value	Definition
Emulation	Uses IBM-compatible emulation protocol to communicate with the host software.
DEC ¹	Uses DEC protocol to communicate with Digital or ANSI-compatible host software. Refer to Section 3.3.4 for user setup menu features in DEC protocol.

¹ Factory default selection.

Emul. Defaults

This determines what features are retained in the printer's memory after you exit setup mode.

Value	Definition
Save	Retains features changed in memory (via software or the operator panel) after you exit setup mode. These features are stored in a nonvolatile (stable) memory and retained even after the printer is powered off or after it has received a <i>Reset</i> escape sequence. NOTE: After saving the feature values, the printer automatically exits setup mode.
Print	Prints the saved setup features and values when you press Select. These values may or may not match what is selected in the current state of the printer. These features are identified on the printout under the heading EMUL. DEFAULTS. NOTE: To print the current state of setup features and values, press Print. See Section 2.1.2 for additional information.

Value	Definition
Restore	Returns the printer to the state last saved prior to any changes made in setup.
Recall Factory	Recalls the factory default settings for both the user and installation setup menus into the current state. To store these features in memory, select the Save value (see above).

Form Length

This feature identifies the length of the paper you are using.

Value	Definition
1	Sets the length of the form to 1 line at the current pitch.
66¹	Sets the length of the form to 66 lines at the current pitch.
255	Sets the length of the form to 255 lines at the current pitch.

¹ Factory default selection; will result in 11-inch form length (66 lines at 6 LPI).

Right Margin

This feature lets the printer know the number of blank columns from the right edge of the paper by setting the right margin on the page. The first line may start from column 2 through column 255. Column 136 is the factory default.

Auto LF on CR

This feature determines whether the printer automatically advances the paper (executes a line feed) each time it receives a carriage return command.

Value	Definition
No auto LF ¹	The printer does not automatically advance the paper by one line when it receives a carriage return command.
Auto LF on CR	Automatically advances the paper by one line when it receives a carriage return command. Select this value if the printer is printing one line over another when it receives a carriage return command.

¹Factory default selection.

Auto CR on LF

This feature determines whether the printer automatically performs a carriage return each time it receives a line feed command.

Value	Definition
No auto CR ¹	The printer does not automatically perform a carriage return when it receives a line feed command.
Auto CR on LF	The printer automatically performs a carriage return when it receives a line feed command. Select this value if you want the print head to return to the left margin each time it receives a line feed command.

¹Factory default selection.

Typestyle

Indicates the location of the typestyle (font) in use.

Value	Definition
Draft	Uses the Internal Draft font.
Letter Quality	Uses the Internal Letter Quality font.

Value	Definition
Cartridge	Uses the Cartridge font.
NOTE: <i>This value appears only if a cartridge is installed.</i>	

Horiz. Pitch

This feature governs the size of printed characters and the amount of space between characters. The fewer the characters per inch (CPI), the larger the horizontal size of the printed character. See Table 3-3 for the listing of available selections.

Emul. Cset

This feature identifies which character set to use.

Value	Definition
Cset 2 ¹	Printer uses characters and symbols commonly used in the non-English language.
Cset 1	Printer uses character and symbols commonly used in the English language.
¹ Factory default selection.	

Alt. Graphics

This feature identifies the use of high-resolution printing.

Value	Definition
OFF ¹	Printer does not use high-resolution printing.
ON	Printer uses high-resolution printing.
¹ Factory default selection.	

Double Height

This feature causes the printer to print characters twice the height of the CPI setting.

Value	Definition
OFF ¹	Printer does not print double-height characters.
ON	Printer prints double-height characters.
¹ Factory default selection.	

Slashed Zero

This feature causes the printer to print zeros with a slash (/) through the middle.

Value	Definition
OFF ¹	Printer prints zeros without a slash.
ON	Printer prints zeros with a slash.
¹ Factory default selection.	

Emphasized

This feature causes the printer to print bold characters.

Value	Definition
OFF ¹	Characters do not print bold.
ON	Characters print bold.
¹ Factory default selection.	

3.5 Installation Setup Menu

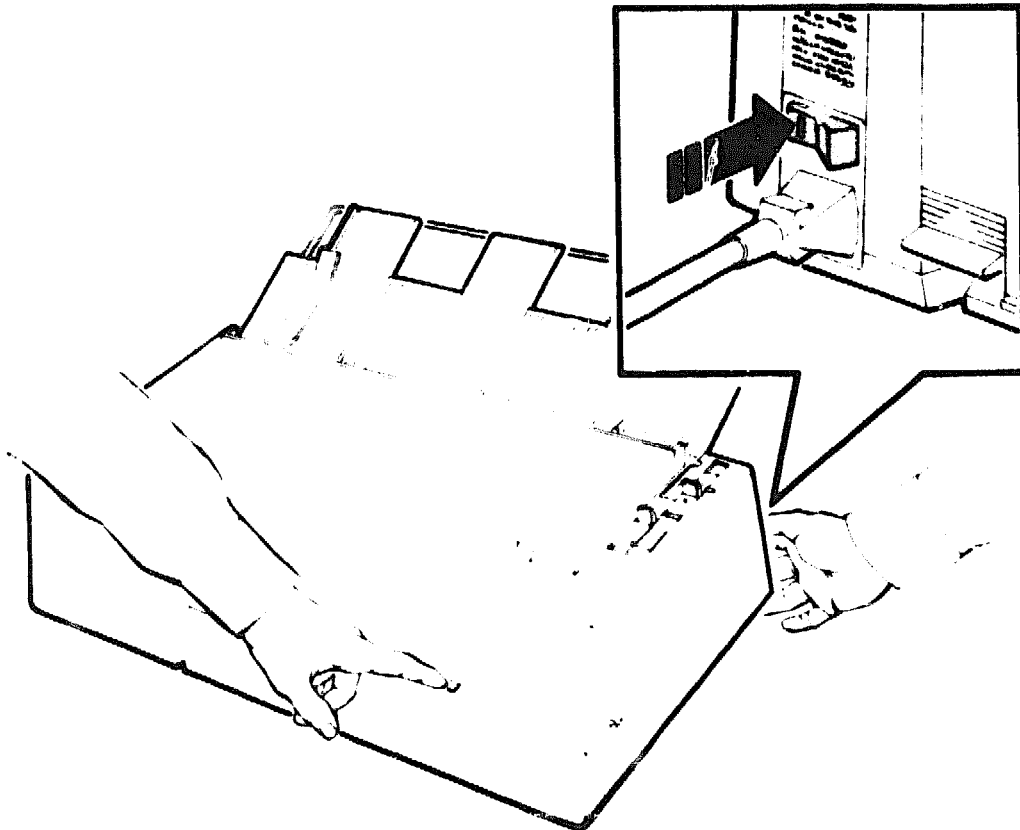
The installation setup menu differs from the user setup menu in that the installation features are common to both DEC and Emulation. protocols and the selected values are saved automatically when you exit setup mode.

3.5.1 Entering the Installation Setup Mode

You enter installation setup mode as you power on the printer.

- 1 Press and hold down **Setup** while pressing the power switch to the ON (|) position.
 - The message display reads INSTALLATION.
 - The Power/Setup light flashes.

NOTE: **Setup** must be held down until the message display reads **INSTALLATION**.



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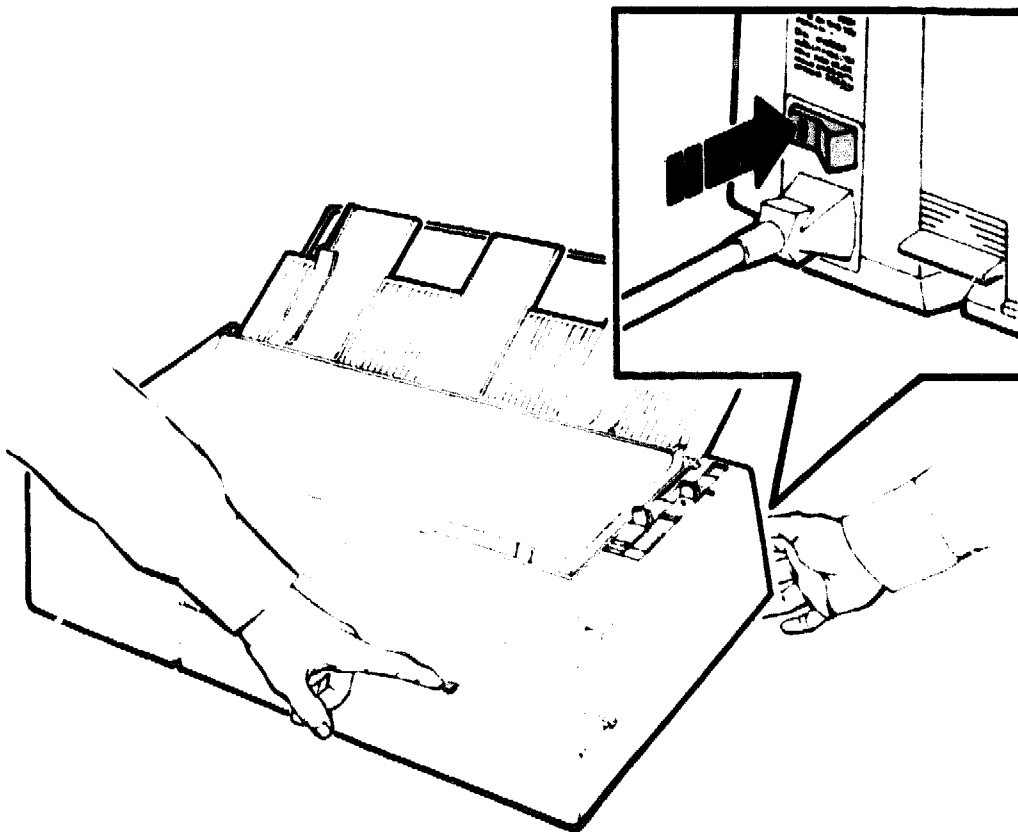
2. See Section 3.2 for information on using the keypad to select features and values while in setup mode.

3.5.2 How to Select and Save Installation Setup Menu Values

This section contains an example that shows how to use the setup menu keys to select and save two values from the installation setup menu. This example assumes that the printer is using the factory default selections before any changes. This example shows how to change the following two factory default settings:

- Baud Rate (from 4800 to 9600)
 - Auto Tear (from OFF to ON)
1. Press and hold down **[Setup]** while pressing the power switch to the ON (I) position.
 - The message display reads INSTALLATION.
 - The Power/Setup light flashes.

NOTE: **[Setup]** must be held down until the message display reads **INSTALLATION**.



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2. Press **[↓]** until you reach the Baud Rate feature.
 - The message display reads Baud Rate.
3. Press **[→]** until you reach the desired value of 9600.
 - The message display reads 9600.
4. Press **[Select]** to select the value of 9600.
 - The message display reads * 9600.

Now that a baud rate of 9600 has been selected, continue by selecting the auto tear setting.

5. Press **[↓]** until you reach the Auto Tear feature.
 - The message display reads Auto Tear.
6. Press **[→]** until you reach the Auto Tear ON value.
 - The message display reads Auto Tear ON.
7. Press **[Select]** to select the Auto Tear ON value.
 - The message display reads * Auto Tear ON.

Now that both the baud rate and auto tear values have been selected, the next step is to save them so they are retained in memory. Saving values in the installation menu is especially easy because all selected values are saved *automatically* when you exit setup. Continue with the next step to save the selected values.

8. Press **[Exit Setup]** to exit installation setup.
 - The message display reads READY DEC.

3.5.3 Installation Setup Menu

This table lists the features and values available in the installation setup menu. Column 1 lists the feature as shown on the message display, while column 2 lists the selectable values.

Refer to Section 3.5.4 for a description of the installation menu features and associated values.

Table 3-4: Installation Setup Menu

Feature	Values
Setup Language	English ¹ Francais Deutsch Espanol Italiano
Recall Factory	Recall install Recall all
Port Selection	Serial Port ¹ Parallel Port
Buffer Control	XON/XOFF ¹ DTR
EOT Disconnect	No Disc. on EOT ¹ Disc. on EOT
Baud Rate	4800 ¹ 9600 19200 200 300 600 1200 2400
Data Bits/Parity	8-None ¹ 8-Even 8-Odd 7-Even 7-Odd 7-Mark 7-Space
Sheet Feeder	Not Installed ¹ Installed

¹Factory default selection.

Table 3-4 (Cont.): Installation Setup Menu

Feature	Values
Bail Bar Lift	Lift OFF ¹ Lift ON
Error Beep	One Beep ¹ Three Beeps Continuous Off
Auto Tear	Auto Tear OFF ¹ Auto Tear ON
Tear Adjustment	0 ¹ +1 +2 +3 +4 +5 -5 -4 -3 -2 -1

¹Factory default selection.

3.5.4 Installation Setup Menu Features and Values

This section explains the features and value selections of the installation setup menu. Refer to Table 3-4 for a complete listing of these features and their associated values.

Setup Language

This feature lets you choose the language used for the installation and user setup menus. See Table 3-4 for the listing of available selections.

Recall Factory

This feature lets you recall factory settings.

Value	Definition
Recall install	Recalls the installation menu default settings only. Does not affect DEC or Emulation protocol default settings.
Recall all	Recalls installation, DEC, and Emulation default settings.

Port Selection

This feature selects the interface used to communicate with the host computer.

Value	Definition
Serial Port ¹	Selects the serial port as the connection to the host computer. Select this value if your host computer has a serial interface.
Parallel Port	Selects the parallel port as the connection to the host computer. Select this value if your host computer uses a parallel interface.

¹Factory default selection.

Buffer Control

This feature selects the method used to regulate the flow of data to the input buffer. XON/XOFF issues control commands to prevent data from overflowing the input buffer. This ensures that data is not lost when the communication speed is greater than the print speed.

Data terminal ready (DTR) regulates data flow by toggling voltage high and low on the DTR line of the serial port.

The buffer control selection must match the setting of your host computer.

Value	Definition
XON/XOFF ¹	Controls data flow to the input buffer using XON/XOFF control codes.
DTR	Controls data flow to the input buffer using DTR high/DTR low voltage signals.

¹Factory default selection.

EOT Disconnect

This feature determines whether a communications line disconnect occurs at the end of data transmission.

Value	Definition
No disc. on EOT ¹	DTR remains high on receipt of the EOT (end of transmission) control code.
Disc. on EOT	DTR is dropped (low voltage) for at least 5 seconds on receipt of the EOT (end of transmission) control code.

¹Factory default selection.

Baud Rate

This feature sets the transmit and receive speed the printer uses to communicate with the host computer. The printer speed must match the speed used by the host computer. See Table 3-4 for the listing of available selections.

Data Bits/Parity

This feature determines the format the printer uses to communicate with the host computer. The first part of the value (7 or 8) is the number of data bits the printer expects to see in each byte it receives. The second part of the value is the type of parity bit the printer looks for in each byte. A parity check is a method used to detect errors when data is sent over a communications line. Some systems use an odd or even parity checking bit to detect errors, while others use a mark or space to indicate the presence of a signal (Mark=1, Space=0). Format for both the data bits and parity bit must match the host computer format in order for the printer and host to communicate.

Value	Definition
8-None ¹	Uses 8 bits with no parity check.
8-Even	Uses 8 bits with an even parity check.
8-Odd	Uses 8 bits with an odd parity check.
7-Even	Uses 7 bits with an even parity check.
7-Odd	Uses 7 bits with an odd parity check.
7-Mark	Uses 7 bits with a mark parity check.
7-Space	Uses 7 bits with a space parity check.

¹Factory default selection.

Sheet Feeder

This selection indicates whether or not an automatic sheet feeder is installed on the printer.

CAUTION: *This selection must be set correctly to prevent paper jams.*

Value	Definition
Not Installed ¹	Informs the printer that an automatic sheet feeder is not installed.
Installed	Informs the printer that an automatic sheet feeder is installed.

¹Factory default selection.

Bail Bar Lift

This feature determines whether the printer lifts the bail bar at every perforation line (determined by the form length). This feature is used when printing labels or very stiff forms to prevent paper jams.

CAUTION: *To avoid excessive wear, it is not recommended that you use the bail bar lift feature if the form is less than 8 cm (3 in.) long.*

Value	Definition
Lift OFF ¹	Bail bar is not lifted at every page.
Lift ON	Bail bar is lifted at every page.

¹Factory default selection.

Error Beep

This feature determines whether the printer sounds an audible beep when an error condition such as a paper jam occurs.

NOTE: *Some serious errors (like carriage fault) cause one fairly long continuous beep regardless of this feature setting.*

Value	Definition
One Beep ¹	Causes the printer to sound one beep for an error condition.
Three Beeps	Causes the printer to sound three beeps for an error condition.
Continuous	Causes the printer to sound continuous beeping for an error condition.
Off	Select this value if you do not want the printer to sound any beeps for an error condition.

¹Factory default selection.

Auto Tear

This feature determines whether fanfold paper or forms are advanced to the tear bar position automatically at the end of a printing job. This feature operates in conjunction with the demand document function (see Section 1.6).

Value	Definition
Auto Tear OFF ¹	Paper remains at line 1 ready to accept a print command.
Auto Tear ON	Automatically advances the perforation on the paper to the tear bar position. When a print command is received the paper automatically reverses to line 1.

¹Factory default selection.

Tear Adjustment

This feature is used to adjust the perforation line on fanfold paper so that it aligns with the tear bar. Each value either raises (+) or lowers (-) the perforation line in increments of .71 mm (1/36 in.). See Table 3-4 for a listing of selectable values, and Section 1.7 for information about the alignment procedure.

3.6 Printing the Current Setup Parameters

The easiest way to know what the currently selected parameters are for both the user and installation setup menus is to print them out. The installation setup features and values are listed on the top portion of the printout, while the user setup features and values are listed on the bottom portion. Use the following procedure to print out the current setup parameters.

1. Press **[Setup]** to enter user setup mode.
 - The Power/Setup indicator flashes.
2. Press **[Print]** to print the setup parameters.

The following illustration shows a printout of factory default setup parameters.

INSTALLATION SETUP

Setup Language	English	Port Selection	Serial Port
Buffer Control	XON/XOFF	EOT Disconnect	No Disc. on EOT
Baud Rate	4800	Data Bits/Parity	8-None
Sheet Feeder	Not Installed	Bail Bar Lift	Lift OFF
Error Beep	One Beep	Auto Tear	Auto Tear OFF
Tear Adjustment	0		

DEC USER SETUP

Protocol	DEC	Form Length	66
Form Width	13.6 Inches	Auto LF on CR	No auto LF
Auto CR on LF	No auto CR	Density	Draft
Typestyle	Internal	Horiz. Pitch	10 CPI
Vertical Pitch	6 LPI	Autowrap	Truncate
GO Cset	US ASCII	User Pref. Cset	DEC Supplement
Printer ID	Level 2 Printer	Top Margin	1

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3. Press **[Exit Setup]** to exit the setup mode.

Chapter 4

Maintaining the Printer

This chapter describes how to properly maintain, adjust, and troubleshoot the LA324 printer. The testing and troubleshooting methods enable you to correct common operating problems and may save you a service call.

Topics discussed in this chapter are:

- General maintenance
- Replacing the ribbon cartridge
- Common operating problems
- Clearing paper jams
- Printing the self-test pattern
- Printer adjustments

4.1 General Maintenance

The only maintenance the LA324 printer requires is cleaning. Use a vacuum to remove bits of paper and paper dust from the internal mechanisms and a clean damp cloth to clean the external surfaces of the printer.

CAUTION. *To prevent possible damage to external surfaces of the printer do not use cleaners or solvents. Use a clean cloth dampened with water only.*

To clean the platen, use a cloth dampened with Digital-recommended cleaner (see Appendix C for ordering information).

CAUTION: *To prevent damage to the platen, do not use isopropyl alcohol to clean the platen.*

4.1.1 Operating Environment

To maintain correct operating temperatures, keep the printer away from direct sunlight, room heaters, and air conditioners. Also, keep items such as paper clips, liquids, and food away from the printer.

4.1.2 Paper

Use only high-quality paper such as the kinds recommended in Appendix C for use with the LA324 printer. Lower grade paper can lead to printer problems due to excessive tearing and paper dust, or poor ink retention (see Appendix D for paper specifications). Always make sure the paper thickness lever is in the proper position for the type of paper you are using (Section 1.9) and be sure to load the paper properly (Chapter 2).

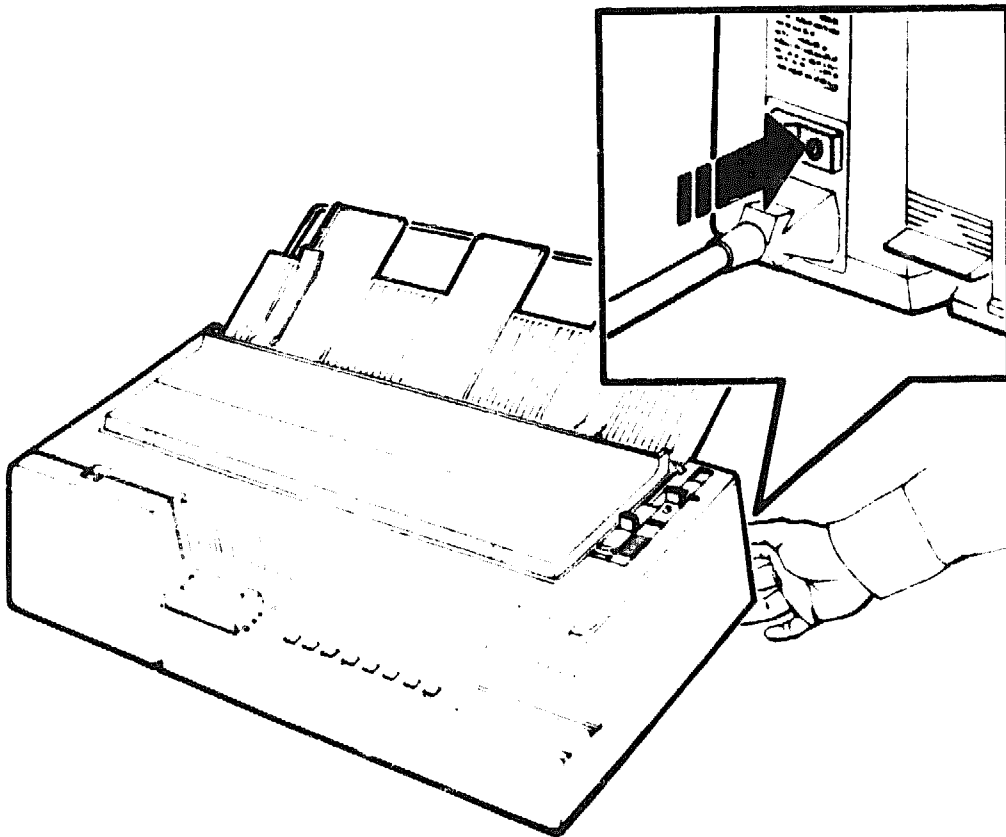
4.1.3 Ribbon Cartridges

Keep samples of early printouts to help you determine when to replace the ribbon cartridge. Use only Digital-recommended cartridges such as those listed in Appendix C. Ribbon cartridges of inferior quality will not perform properly and could damage the printer. Ribbon cartridges should be stored in their containers in the same environment as the printer.

4.2 Replacing the Ribbon Cartridge

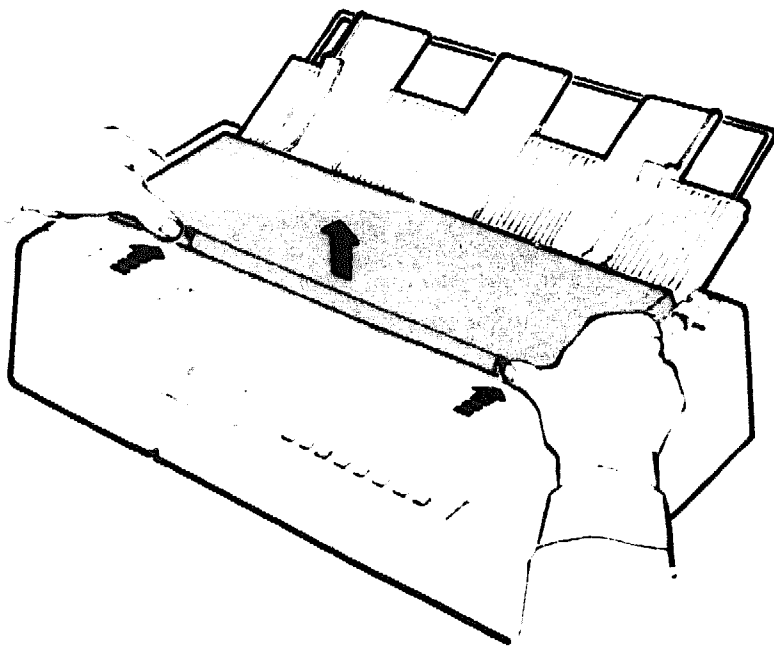
Use the following procedure to replace the ribbon cartridge.

1. Check to see that the message display reads **READY** to avoid loss of data.
2. Press the power switch to the **OFF (O)** position.
 - Allow the printer to remain off for 5 minutes so the printhead can cool down.



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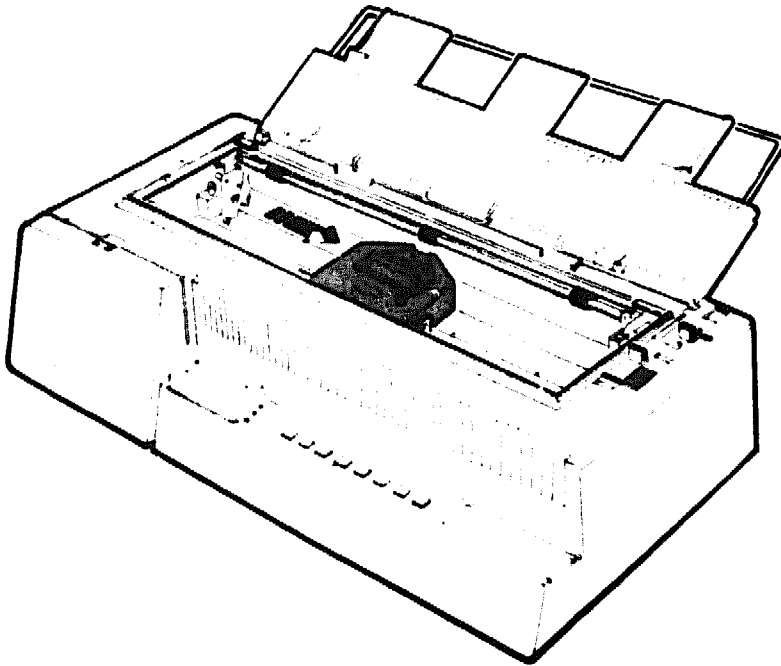
3. Remove the access cover by pressing the two release tabs and lifting the cover up off the printer.



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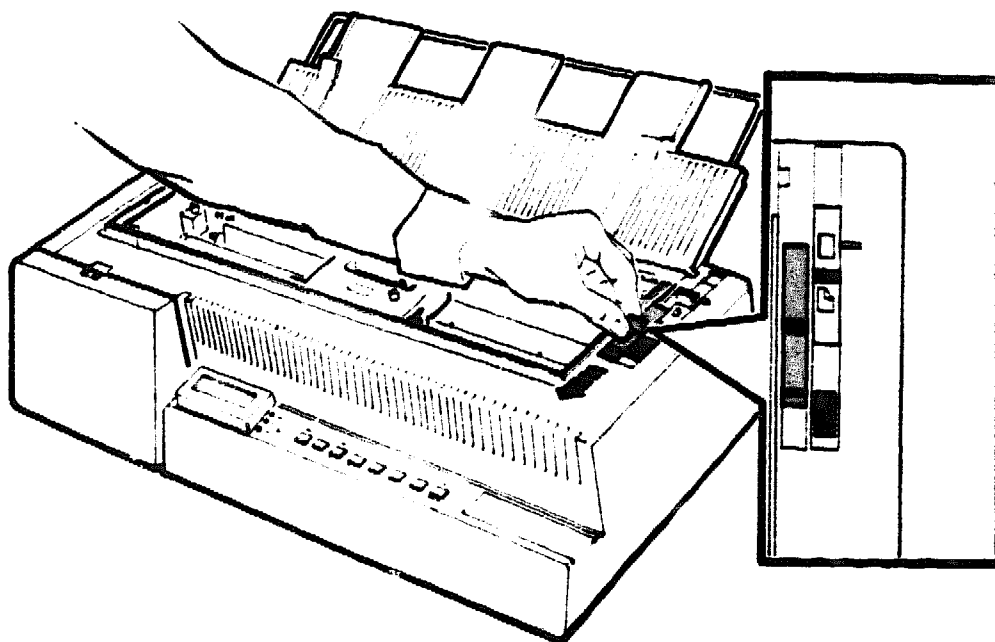
4. Slide the printhead/ribbon cartridge to the center of the printer.

WARNING: *The printhead may be HOT. Be sure printer has remained off long enough for the printhead to cool before touching the cartridge.*



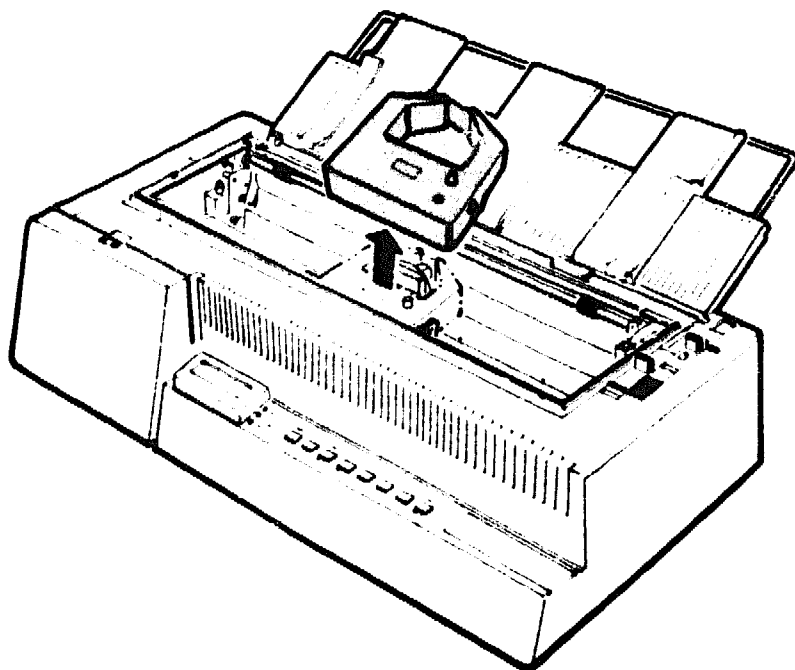
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5. Move the paper thickness lever toward the front of the printer until it stops.
 - The printhead moves away from the platen.



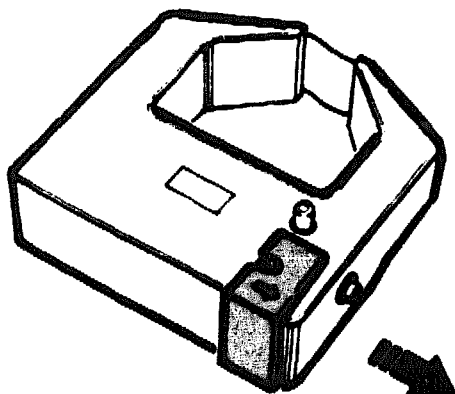
MLO-003721

6. Remove the ribbon cartridge by lifting it straight up.



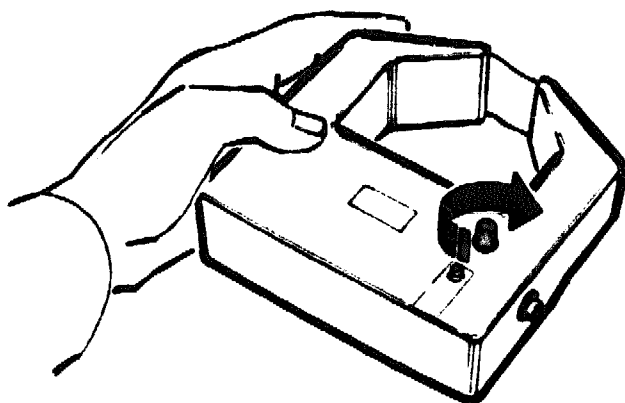
MLO-003720

7. Remove and discard the shipping clip from the new ribbon cartridge by pulling it in the direction of the arrow on the clip.



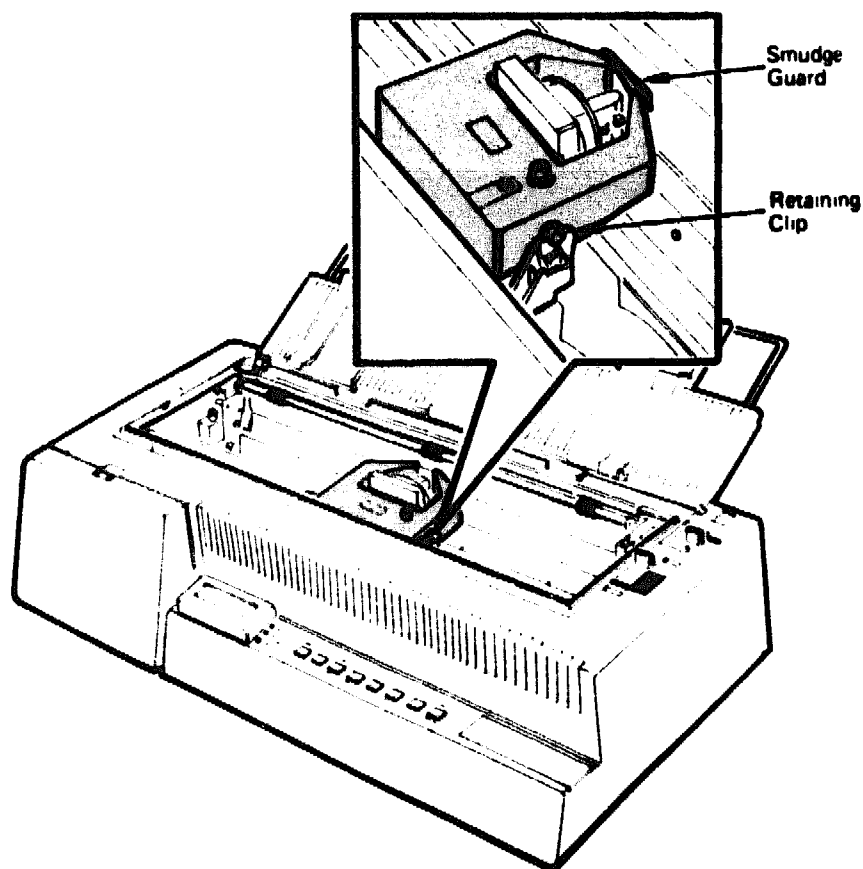
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8. Remove the slack in the ribbon by turning the tension knob in the direction of the arrow on the cartridge.



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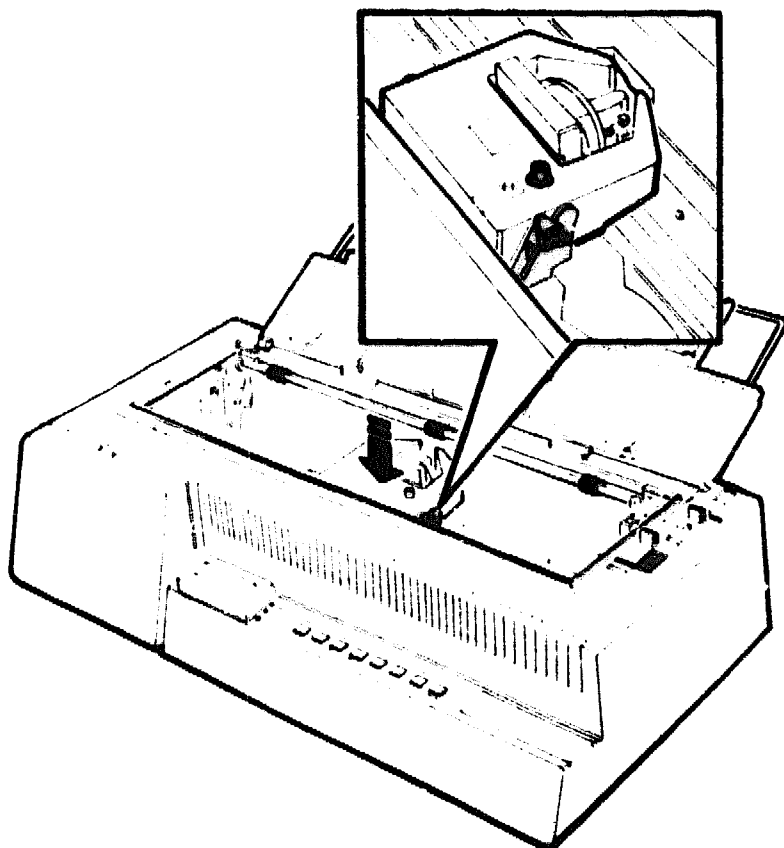
9. Position the ribbon cartridge so that the ribbon is between the printhead and the smudge guard, allowing the pins on each side of the cartridge to rest on the carriage retaining clips.



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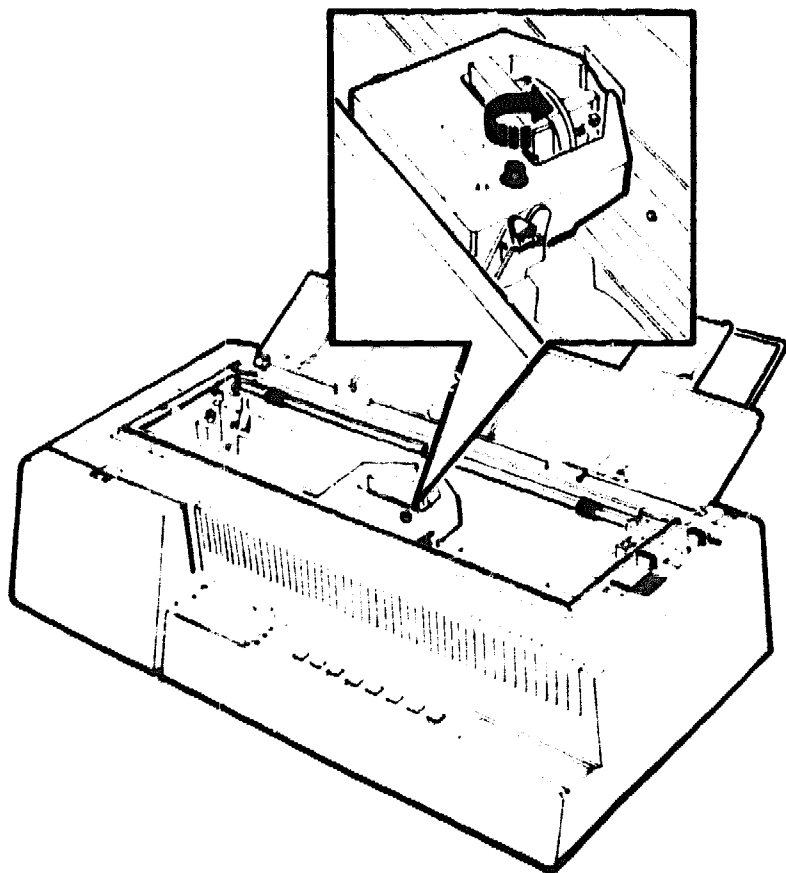
10. Push the ribbon cartridge down gently until the pins are locked into place by the retaining clips.

NOTE: *If the cartridge will not seat properly, try turning its tension knob slightly while pressing the cartridge into place.*



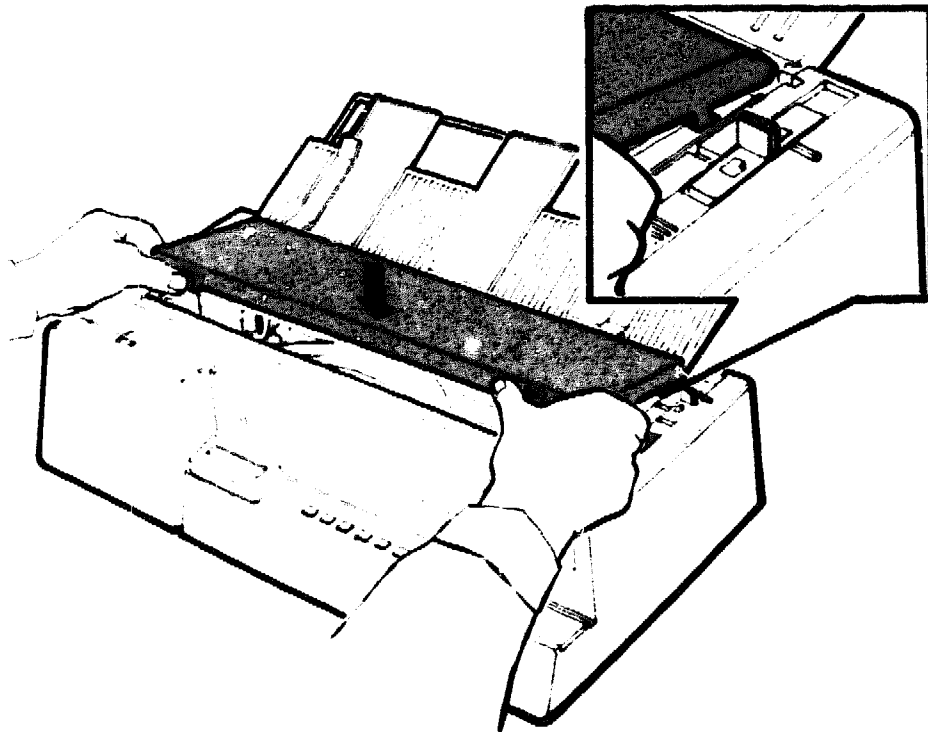
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11. Remove the slack in the ribbon by turning the tension knob in the direction of the arrow on the cartridge.



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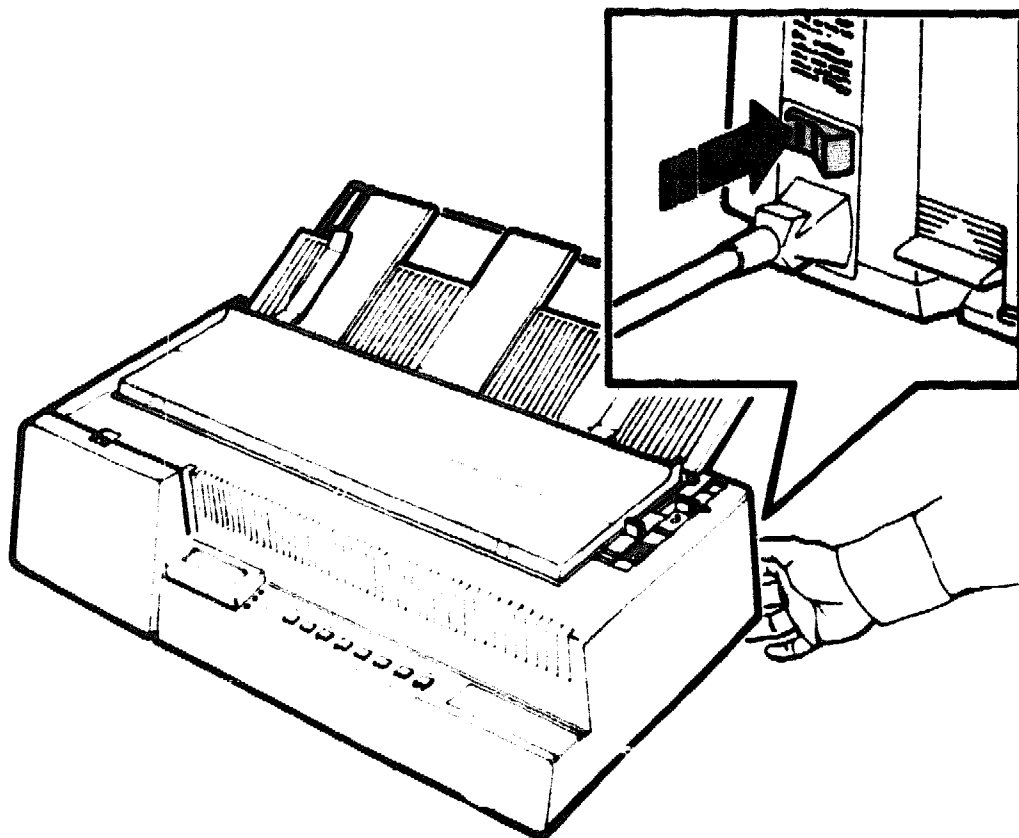
12. Install the access cover by inserting its two rear tabs into the printer slots and lowering it until it snaps into position.



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13. Power the printer back on by pressing the power switch to the ON (I) position.

- The message display reads **READY**.



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14. Go to Section 1.9 and adjust the paper thickness lever for the type of media you are using.

CAUTION: *Be sure to properly adjust the position of the thickness lever. Printhead life will be reduced if the printhead is not positioned the correct distance from the platen.*

4.3 Common Operating Problems

Table 4-1 lists common operating problems and their possible solutions. Solutions are listed in order of probability and should be attempted in that order.

Table 4-1: Common Operating Problems

Problem	Possible Cause	Solution
No Power		
The printer does not power up when you set the power switch to the ON position.	The power source is defective.	Make sure the power cord is plugged into the wall outlet. Check that there is power at the wall outlet by plugging in a lamp to see if it lights. If the lamp does not light, call your building maintenance services to check the circuit supplying power to that outlet.
	Power cord is not connected or is damaged.	Check the power cord for damage and secure connections at the printer and at the wall outlet.
No Printout		
Message display reads READY.	Interface cable to the host is not connected properly.	Check cable connections at the printer and host computer.
	Protocol feature may be set incorrectly.	See Section 3.3.4 for protocol information.
	Port selection, baud rate, or data bits/parity features may not match host settings.	See Section 3.5.4 for information about these features.
Message display reads PAUSE.	Printer is in the pause state.	Press Pause/Ready to place the printer in the ready state.
Carriage moves but printer does not print.	Ribbon is not in front of printhead.	Reinstall ribbon cartridge properly.
	Ribbon cartridge is not installed.	Install ribbon cartridge.
	Printhead is not close enough to the paper.	Adjust paper thickness lever for proper paper thickness (Section 1.9).

Table 4-1 (Cont.): Common Operating Problems

Problem	Possible Cause	Solution
Poor Printing		
Poor print quality.	Paper is not the recommended type.	Use Digital-recommended paper (Appendix C).
	Ribbon cartridge is not the recommended type.	Use Digital-recommended ribbon cartridge (Appendix C).
	Ribbon cartridge is not mounted correctly.	Reinstall or adjust ribbon cartridge.
	Ribbon cartridge is old or defective.	Replace ribbon cartridge (Section 4.2).
	Ribbon is not feeding correctly because it's jammed.	Turn the tension knob on the cartridge to release jammed ribbon. If the tension knob will not turn, replace the ribbon cartridge (Section 4.2).
	Printhead is too close, or not close enough, to the paper.	Adjust paper thickness lever for the proper paper thickness (Section 1.9).
	The printhead is defective.	Printer requires repair service (Chapter 5).
Dark or smudged printing.	Printhead is too close to the paper.	Adjust paper thickness lever for the proper paper thickness (Section 1.9).
Blank spaces or missing dots in characters.	Printer failure.	Printer requires repair service (Chapter 5).
	Printhead is worn.	Printer requires repair service (Chapter 5).
Print lines overlap.	Paper path is obstructed.	Clear paper path of obstruction (torn paper, etc.)
	Incorrect vertical pitch setting.	Correct the vertical pitch setting in the user setup menu.
Printed pages have garbled characters.	Incorrect printer features selected.	Check to see that the baud rate and data bits/parity format in the installation setup menu match the host computer settings.

Table 4-1 (Cont.): Common Operating Problems

Problem	Possible Cause	Solution
Paper Problems		
Paper jam.	Obstruction in the paper path.	See Section 4.4 for instructions on clearing paper jams.
	Cut-sheet paper in the paper chute when the printer is powered on.	Remove paper from paper chute.
	Tractor feed paper holes are not seated properly in tractor assembly.	Clear jam (Section 4.4) and reload paper (Section 1.5.3).
	Paper is too taut or has too much slack.	Clear jam (Section 4.4) and reload paper (Section 1.5.2).
	Dirty platen.	Clear jam (Section 4.4) and clean platen (see Appendix C for information about ordering cleaning supplies).
	Paper supporters and retainers are not properly adjusted.	See Section 1.5.2.
Fanfold paper does not advance properly.	Paper holes are torn.	Remove torn paper and load a new sheet. Check the tension on the paper. If it's too tight, adjust the left tractor assembly to relieve some tension (see Section 1.5.2).
	Paper is not correctly aligned in tractor assemblies.	Reload paper, ensuring that corresponding holes at each side of the paper are correctly aligned on the tractor assemblies (see Section 1.5.6).
	Sheet-feeder value in installation setup menu is not set correctly.	Clear jam (Section 4.4) and set sheet-feeder feature to correct value (Section 3.5.4).
Cut-sheet paper or envelopes do not feed properly	Paper selection set to the fanfold position.	Set paper selection lever to the manual-feed position.
	Paper is curled or corners are creased.	Remove paper and reload with new paper.

Table 4-1 (Cont.): Common Operating Problems

Problem	Possible Cause	Solution
Paper Problems		
	Platen is dirty.	Clean platen. (See Appendix C for information about ordering cleaning supplies.)
Miscellaneous		
Message display reads CARRIAGE FAULT .	A carriage hardware error has occurred.	Power off the printer and turn the tension knob on the ribbon cartridge to be sure it is not jammed. Power the printer back on; if the error is not cleared, the printer requires repair service (Chapter 5).
Indicator lights flash; no message on the message display.	Printer failure.	Power the printer off and then back on again. If the error is not cleared, the printer requires repair service (Chapter 5).
Vertical alignment of characters is off-center in relation to characters immediately above or below a given line.	Printer is out of adjustment.	Perform H-pattern adjustment (Section 4.6).
Characters are printing on the perforation line.	Printer is out of adjustment.	Perform E-pattern adjustment (Section 4.6).
Printer advances only one line when FF is pressed.	The printer is in no-forms mode.	The printer is operating properly. See Section 3.3.4 for information about setting the form length feature, or your application manual for additional information about software functions.

4.4 Clearing Paper Jams

There are several ways to clear paper jams depending on where the paper is accessible and whether you are using fanfold paper or cut-sheet paper. Use one of the following methods to clear jammed paper.

4.4 1 Method 1: Fanfold Paper

Use this method if paper is accessible from the top of the printer.

1. Remove the access cover.
2. Move the paper selection lever to the cut-sheet position to release the tractor feed mechanism.
3. Pull the paper up from the printer and remove the damaged portion.
4. Move the paper selection lever back to the fanfold paper position to engage the tractor feed mechanism.
5. Replace the access cover.
6. Power off the printer.
7. Power on the printer.
8. Press **[Setup]** to enter setup mode.
9. Press **[Park]** to retract the paper to the park position.
10. Press **[FF]** to advance the paper to the printing position.

4.4.2 Method 2: Fanfold Paper

Use this method if the paper is not accessible from the top of the printer.

1. Press **[↓]** to reverse the paper until it stops.
2. Open the rear cover and unload the paper.
3. Tear off the damaged section and reload the paper.
4. Power off the printer.
5. Power on the printer.
6. Press **[Setup]** to enter user setup mode.
7. Press **[Park]** to retract the paper.
8. Press **[FF]** to advance the paper to the printing position.

4.4.3 Method 3: Cut-Sheet Paper Jams

Use this method to clear cut-sheet paper jams.

1. Remove the access cover.
2. Lift paper free from under the bail bar if necessary.
3. Replace the access cover.
4. Press **[↑]** to advance the paper out of the printer.

4.5 Printing the Self-Test Pattern

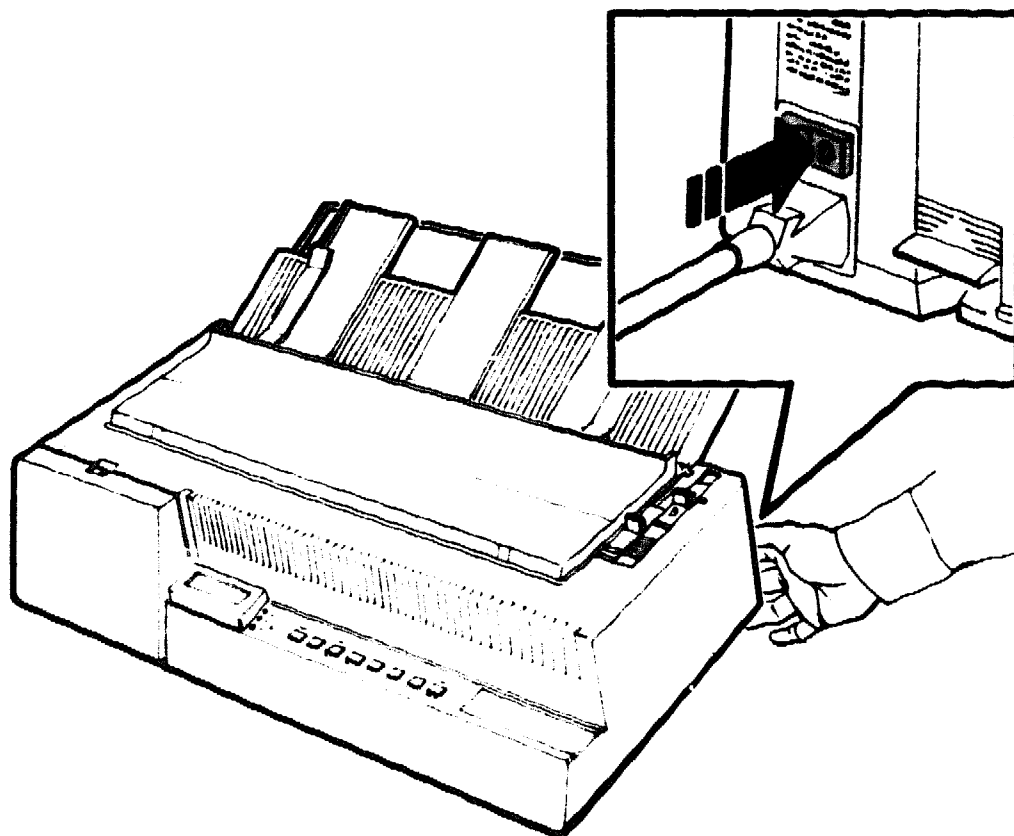
If you are encountering printing problems you may want to determine whether the problem is with the printer, the host, or maybe the application program. One way of determining whether the printer is operating correctly is to print out a self-test pattern. Generally speaking, if the self-test pattern prints, the printer is operating properly and the problem is elsewhere. If the self-test does not print, see the instructions following Step 4 before having the printer serviced.

If you are using a color ribbon, the test blocks in the top left corner of the test pattern will display the various colors listed below them. If you are using a black ribbon, the blocks will print black except for the first block, which will be blank (white).

Use the following procedure to print the self-test page.

NOTE: *The self-test prints according to the form width setting selected. If you have 13.6 inches selected (132 columns), be sure to have wide paper installed in the printer to avoid printing on the platen.*

1. Power off the printer.



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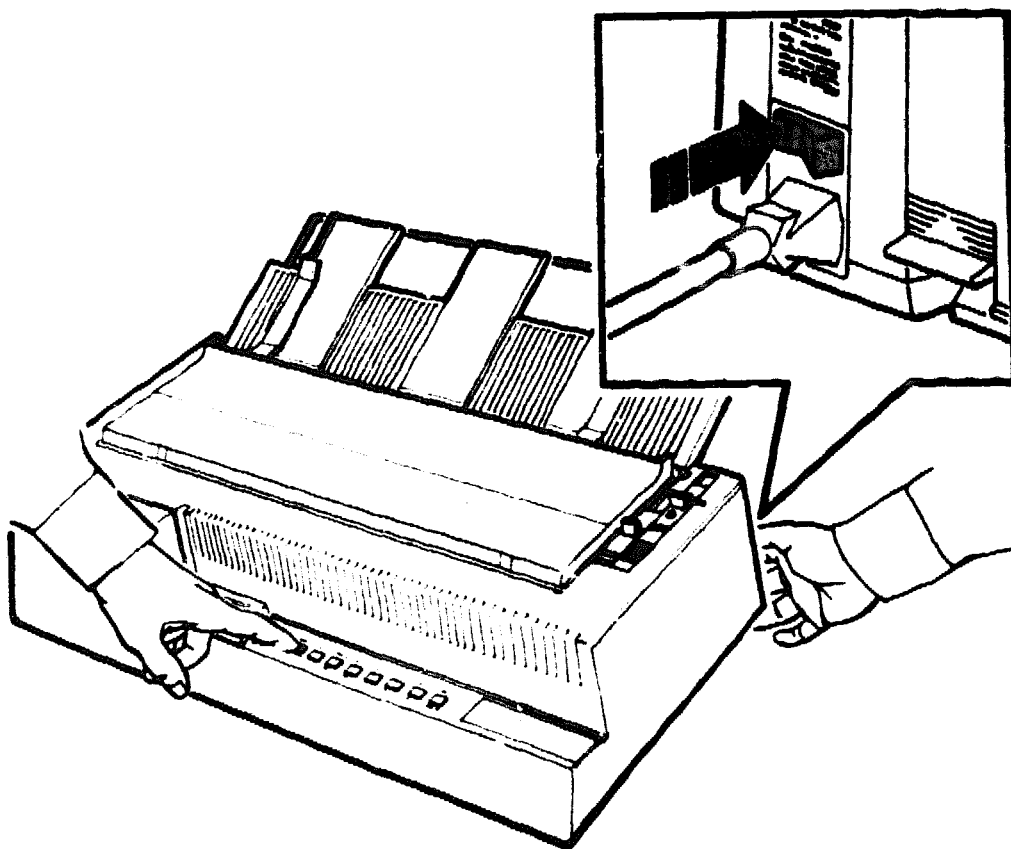
2. Press and hold down **Quality** while pressing the power switch to the ON (I) position.

NOTE: **Quality** must be held down until the printing starts.

*If you are using the manual-feed chute you must insert a sheet of paper and press **FF** to begin printing the self-test pattern.*

- The display reads **SELF TEST**.
- The printer begins to print the self-test pattern.

NOTE: *If the display reads **SELF TEST** but the pattern does not print, it means that paper is not loaded in the printer. Press **FF** to advance paper and start the self-test.*



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- LA324 Code x3.21 : WDA09--- WIF09--- WFN09--- TDOE9---

```

1"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
)+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
+,.-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
.-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
/0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklm
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy

```

Maintaining the Printer 4-23

If the test pattern prints but the quality of the printing is not very good, see the "Poor Print Quality" section in Table 4-1 for a listing of possible causes and solutions.

If the test pattern does not print, check the following to be sure:

- The ribbon cartridge is installed correctly (Section 4.2).
- The printer has power (Section 4.3).
- The paper selection lever is in the fanfold position.
- The paper thickness lever is properly positioned (Section 1.9).
- The **Quality** key is pressed and held down until the printing starts.

If you have checked the above items and the printer still does not print the test pattern, have the printer serviced (Chapter 5).

4.6 Printer Adjustments

There are two adjustments that can be performed on the LA324 printer to fine-tune character alignment and position. These adjustments are known as the E-pattern and H-pattern alignment procedures.

The E-pattern alignment procedure is used to position the print within the vertical boundaries of a line. This procedure prints a 6-character pattern using the letter E to indicate the position of print. This procedure is useful for positioning the first line of print in relation to the perforation line on fanfold paper, or for precisely centering print vertically within a box or pre-printed form.

The H-pattern alignment procedure is used to align characters for bidirectional printing and uses the letter H to form the alignment pattern. The H-pattern alignment is usually performed after several months of use if you notice that printed characters are not aligned vertically.

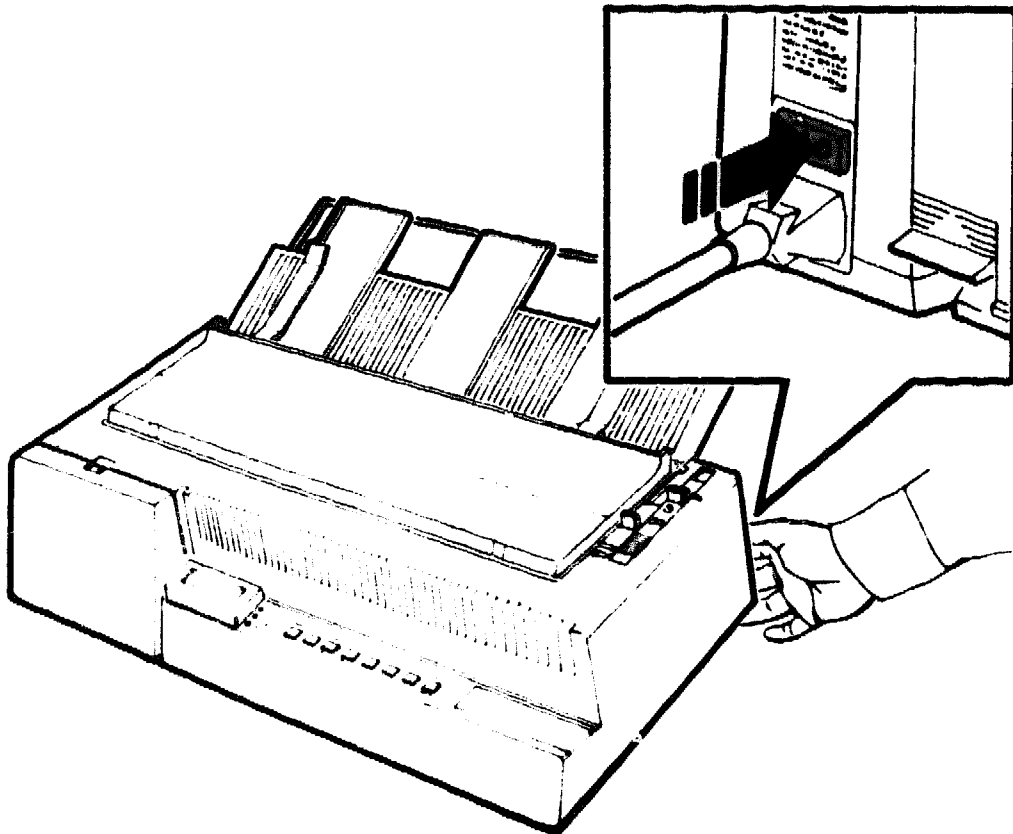
NOTE: *For these alignment procedures the printer must be in a special alignment mode. Any changes made to values while you are in alignment mode are saved automatically when you exit and will be retained in the printer's memory even after the printer is powered off.*

When you enter alignment mode, the printer is no longer in either setup or operational mode. Thus, the legends on the operator panel keypad will not correctly indicate the key functions. But since the keys have to be referred to by some name (and not function), the alignment procedures will use the legend above the keys (operational mode) to indicate which key to press.

4.6.1 E-Pattern Alignment Procedure

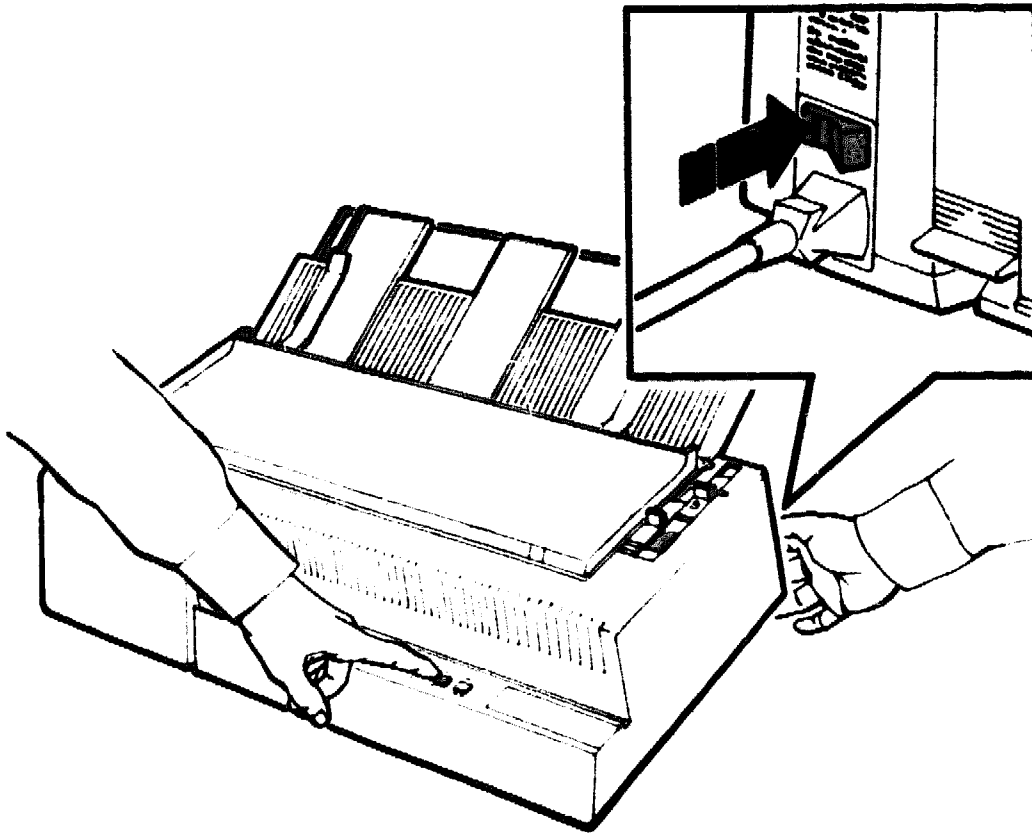
Be sure that fanfold paper is loaded in the printer and use the following procedure to perform the E-pattern alignment.

1. Power off the printer.



MLO-003883

2. Press and hold down  while pressing the power switch to the ON (I) position.
- The message display reads ALIGNMENT ?.

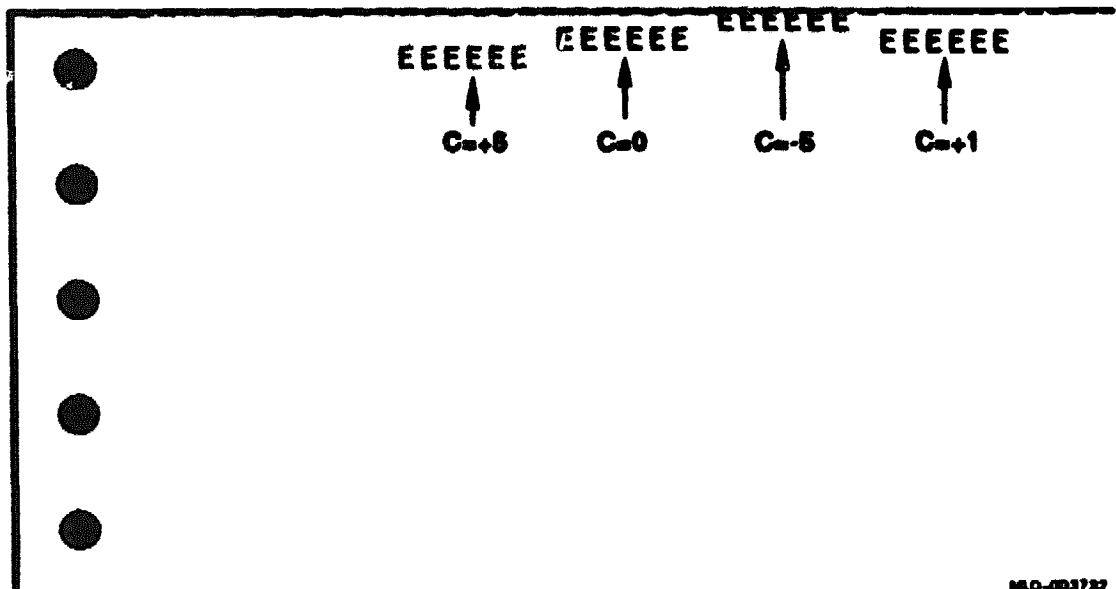


MLO-003847

3. Press **FF** to print the E-pattern.

- The printer prints the E-pattern and advances the paper for viewing.
- The message display reads $C = x$ (where the value of x can range from -5 to +5).

Examine the E-pattern to note its distance from the perforation line. The distance from the perforation line should be about half a character height. If the distance from the perforation line is correct, go to Step 6. If an adjustment is necessary, continue with the next step.



4. Adjust the E-pattern position up or down.

To increase the distance from the perforation line, press .

To decrease the distance from the perforation line, press .

5. Repeat Step 3.

6. Press .

- The message display reads **ALIGNMENT ?**.

7. Press  to exit the alignment mode.

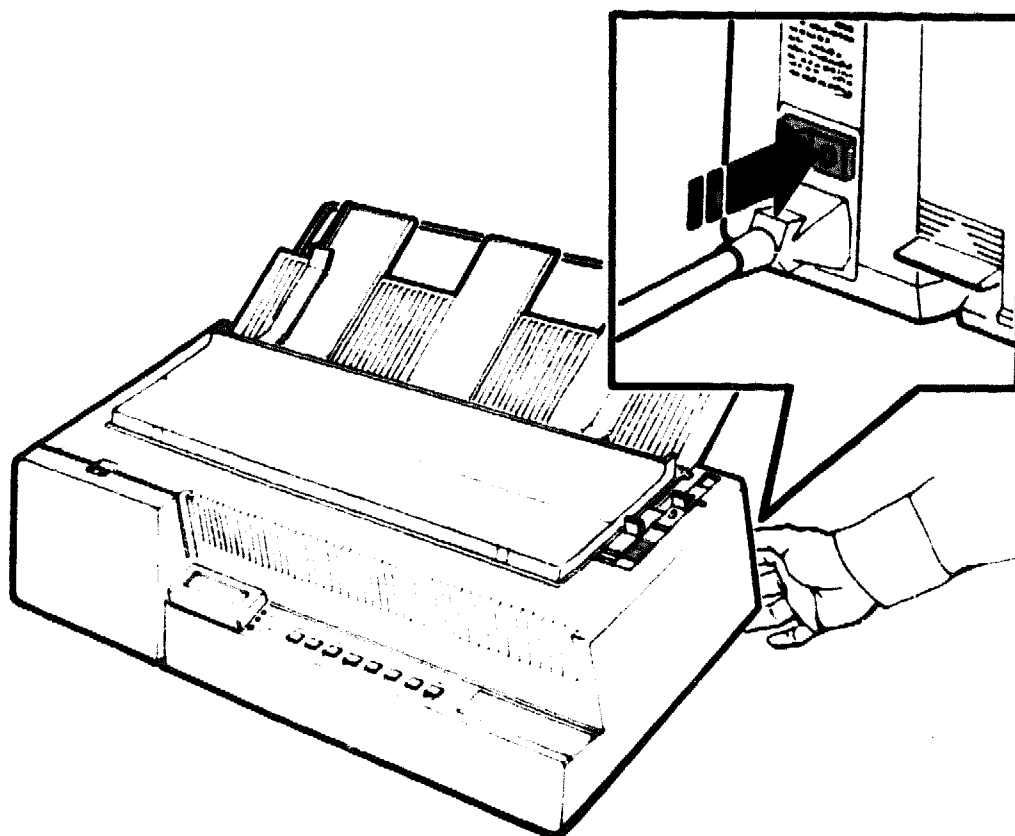
- The message display reads **READY**.

4.6.2 H-Pattern Alignment Procedure

Be sure that 132-column fanfold paper is loaded in the printer and use the following procedure to perform the H-pattern alignment.

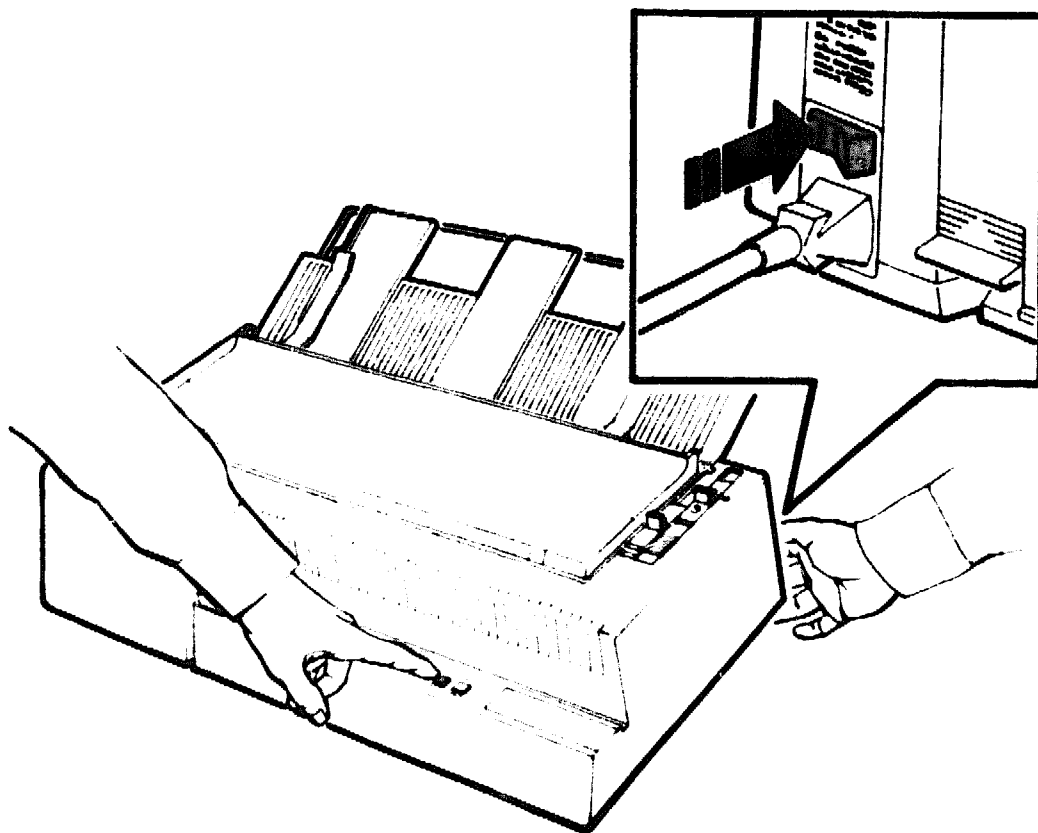
NOTE: *The printer form width (in user setup) must be set to 13.5 inches to run the H-pattern alignment procedure.*

1. Power off the printer.



MLO-003693

2. Press and hold down  while pressing the power switch to the ON (I) position.
- The message display reads **ALIGNMENT ?**.



MLO-003947

3. Press **Quality**.

- The message display reads $A = x$ (where the value of x can range from -5 to +5).

4. Press **FF** to print the H-pattern.

- The printer prints the setting and blocks of the H-pattern, and advances the paper for viewing.

Examine the H-pattern to see if the H's are aligned vertically and are not off-set. As the example in the following figure shows, none of the settings will align the H's *perfectly*. You must choose the best setting ($A = 0$ in the example).

If the alignment is correct, go to Step 7. If an adjustment is necessary, continue with the next step.

$A = -5$



$A = 0$



$A = +5$



$A = +1$



MSO-003731

5. Adjust the H-pattern.

To shift the pattern to the right, press **→**.

To shift the pattern to the left, press **←**.

6. Repeat Step 3.

7. Press **Setup.**

- The message display reads **ALIGNMENT ?**.

8. Press **Pause/Ready to exit the alignment mode.**

- The message display reads **READY**.

Chapter 5

Service

If you cannot correct a problem with the LA324 printer, request servicing by a qualified Digital Customer Services engineer.

5.1 Digital Equipment Corporation Services

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

5.1.1 On-Site Service

Digital Equipment Corporation offers fast, low-cost, high-quality maintenance performed at your site by Digital-trained service specialists. Whether you take advantage of our DECservice or Basic Service Agreement, or our Time and Materials service, you can be sure that your small system, terminal, or printer will receive the best possible maintenance.

5.1.2 Carry-In Service

There are more than 150 Digital carry-in service centers in major cities around the world. These service centers offer convenient, fast, and dependable maintenance at a savings over on-site service.

5.1.3 Mail-In Service

If you prefer self-maintenance, you can mail in your module or subassembly for repair through our fast-turnaround DECmailer repair service.

For more information on any of Digital Equipment Corporation's maintenance services, call the Digital Customer Services office in your area during normal business hours. Refer to the following list of questions before calling the service center.

Table 5-1: Questions to Consider Before You Call

<i>Is the call necessary?</i>	Check Table 4-1. Often you can solve the problem yourself.
<i>Who should call for service?</i>	Typically, the system manager should place the call for service.
<i>Where should you call?</i>	In the continental United States, call Digital at 1-800-272-2001. In Alaska, Hawaii, Canada, and Europe, call your local sales office for service.
<i>What does the service center need to know?</i>	Write down the serial and model numbers located on the back of the printer.
<i>How should you describe the problem?</i>	Summarize the problem. Make a note of: • What you were doing when the printer failed • Any messages on the display panel • Any strange noises Stay by the printer/host system if possible, because the service engineer may ask you to recreate the problem.

Appendix A

Digital Protocol Quick Reference Guide

This appendix summarizes the Digital ANSI-compatible Level 2 printing protocol available in the LA324.

For quick reference use, see these sections:

Category	Section
Horizontal Form Handling	A.1
Vertical Form Handling	A.2
Active Position Control	A.3
Terminal Management	A.4
SCS—Character Set Selection	A.5
Print Attributes	A.6
Control Codes	A.7
Sixel Graphics	A.8
Barcodes	A.9

A.1 Horizontal Form Handling

DECHPWA—Set Page Width Alignment

CSI Pn1 ; Pn2 " s

DECSHORP—Horizontal Pitch

Sequence	Target Pitch	Actual Pitch
CSI w	10 char/inch	Same
CSI 0 w	10 char/inch	Same
CSI 1 w	10 char/inch	Same
CSI 2 w	12 char/inch	Same
CSI 3 w	13.2 char/inch	13.33 char/inch
CSI 4 w	16.5 char/inch	17.1 char/inch
CSI 1 1 w	17.1 char/inch	Same
CSI 1 3 w	18 char/inch	Same
CSI 5 w	5 char/inch (double width)	Same
CSI 6 w	6 char/inch (double width)	Same
CSI 7 w	6.6 char/inch (double width)	6.67 char/inch
CSI 8 w	Default to 8.25 char/inch (double width)	8.67 char/inch
CSI 1 2 w	8.55 char/inch (double width)	Same
CSI 1 4 w	9 char/inch (double width)	Same

DECSHTS—Horizontal Tab Stops

CSI Pn ; ; Pn u

Pn = Column number

DECSLRM—Left and Right Margins

CSI P1 ; Pr s

P1 = Left margin (column number)
Pr = Right margin (column number)

TBC—Tab Clear

CSI 0 g Clear active column tab
CSI 1 g Clear active line tab
CSI 2 or 3 g Clear all horizontal tabs
CSI 4 g Clear all vertical tabs

A.2 Vertical Form Handling

DECCA VT—Clear All Vertical Tabs

ESC 4

DECSLPP—Set Page Length

CSI Pn t

Pn = Page length in lines
Pn = 0 No-forms mode

DECSTBM—Set Top and Bottom Margins

CSI Pt ; Pb r

Pt = Top margin (line number)
Pb = Bottom margin (line number)

DECSVTS—Set Vertical Tab Stops

CSI Pn ; ; Pn v

Pn = Line number

DECVERP—Vertical Pitch

CSI 0 or 10 z	6 lines/inch
CSI 1 or 11 z	6 lines/inch
CSI 2 or 12 z	8 lines/inch
CSI 3 or 13 z	12 lines/inch
CSI 4 or 14 z	2 lines/inch
CSI 5 or 15 z	3 lines/inch
CSI 6 or 16 z	4 lines/inch

PLD—Partial Line Down

ESC K Advance paper 1/12 inch

PLU—Partial Line Up

ESC L Reverse paper 1/12 inch

TBC—Vertical Tab Clear

CSI 1 g Clear vertical tab at current line
CSI 4 g Clear all vertical tabs

A.3 Active Position Control

DECAWM—Autowrap Mode

CSI ? 7 h Set (autowrap mode)
CSI ? 7 l Reset (truncate mode)

DECCRNLM—CR New Line Mode

CSI ? 4 0 h Set (LF with CR)
CSI ? 4 0 l Reset (CR only)

HPA—Horizontal Position Absolute

CSI Pn `

Pn = Column number

HPR—Horizontal Position Relative

CSI Pn a

Pn = Number of columns to advance

LS1R—Locking Shift 1 Right

CSI 2 0 h Set (CR with LF)

CSI 2 0 l Reset (LF only)

LS1R—Locking Shift 1 Right

ESC ~ The G1 character set becomes the active GR character set.

LS2R—Locking Shift 2 Right

ESC) The G2 character set becomes the active GR character set.

LS3R—Locking Shift 3 Right

ESC | The G3 character set becomes the active GR character set.

LS2—Locking Shift 2

ESC n The G2 character set becomes the active GL character set.

LS3—Locking Shift 3

ESC o The G3 character set becomes the active GL character set.

Single and Locking Shifts

ESC N	The character following SS2 is selected from G2 character set.
ESC O	The character following SS3 is selected from G3 character set.

VPA—Vertical Position Absolute

CSI Pn d

Pn = Line number

VPR—Vertical Position Relative

CSI Pn e

Pn = Number of lines to advance

A.4 Terminal Management

C1 Transmit/Receive

ESC SP 6	Processes 7-bit ESC Fe sequences
ESC SP 7	Processes 7-bit ESC Fe sequences and 8-bit C1 control codes
ESC SP F	Transmits C1 control codes as ESC Fe sequences
ESC SP G	Transmits C1 control codes as C1 codes

DA—Device Attributes Request

CSI Ps c Primary DA request

DECASFC—Automatic Sheet Feeder

CSI 0 ! v	Ejects current sheet
CSI 1 ! v	Inserts next sheet from bin 1 to line 1
CSI 2 ! v	Inserts next sheet from bin 2 to line 1
CSI 3 ! v	Inserts next sheet from bin 3 to line 1

DECSCL—Set Conformance Level

CSI Ps " p

Ps = 71,72

Advances to top of form; resets to DEC default state

DECST3—Soft Terminal Reset

CSI ! p

Advances to top-of-form; resets to saved state

DSR—Printer Status Report

Brief:

CSI 0 n

No malfunction.

CSI 3 n

Malfunction.

Extended:

**<brief report>
followed by
ESC [? Ps ; Ps . . . n**

Ps = 2 0

No malfunction

Ps = 2 1

Hardware failure

Ps = 2 2

Communication failure

Ps = 2 3

Input buffer overflow

Ps = 2 4

Printer deselected

Ps = 2 6

Cover open

Ps = 2 7

Paper out

Ps = 3 0

ASF installed

Ps = 3 2

Paper jam or ASF error

Ps = 3 7

Internal firmware error

DSR—Printer Status Request

CSI Ps 5, 0, or none **Sends extended status report**

CSI ? 1 n

Disables all unsolicited status reports

CSI ? 2 n

Enables unsolicited brief status reports and sends extended status report

CSI ? 3 n

Enables unsolicited extended status reports and sends extended status report

ROCS—Return from Other Coding System

ESC @ Returns to DEC-compatible mode

RIS—Reset to Initial State

ESC c Advances to top-of-form; resets to saved state

SOCS—Select Other Coding System

ESC % Selects IBM Proprinter XL24 Emulation mode

A.5 SCS—Character Set Selection

G0	G1	G2	G3	Character Set
ESC (B	ESC) B	ESC * B	ESC + B	ASCII
ESC (A	ESC) A	ESC * A	ESC + A	British NRCS
ESC (5	ESC) 5	ESC * 5	ESC + 5	Finnish NRCS
ESC (R	ESC) R	ESC * R	ESC + R	French NRCS
ESC (9	ESC) 9	ESC * 9	ESC + 9	DEC Canadian NRCS
ESC (K	ESC) K	ESC * K	ESC + K	German NRCS
ESC (Y	ESC) Y	ESC * Y	ESC + Y	ISO Italian NRCS
ESC (J	ESC) J	ESC * J	ESC + J	JIS Roman
ESC (I	ESC) I	ESC * I	ESC + i	JIS Katakana
ESC (6	ESC) c	ESC * 6	ESC + 6	DEC Norwegian/Danish NRCS
ESC (Z	ESC) Z	ESC * Z	ESC + Z	ISO Spanish NRCS
ESC (7	ESC) 7	ESC * 7	ESC + 7	DEC Swedish
ESC (<	ESC) <	ESC * <	ESC + <	User-Preference Supplemental
ESC (0	ESC) 0	ESC * 0	ESC + 0	DEC Special Graphics
ESC (>	ESC) >	ESC * >	ESC + >	DEC Technical
ESC (`	ESC) `	ESC * `	ESC + `	Norwegian/Danish NRCS

G0	G1	G2	G3	Character Set
ESC (4	ESC) 4	ESC * 4	ESC + 4	DEC Dutch NRCS
ESC (=	ESC) =	ESC * =	ESC + =	DEC Swiss NRCS
ESC (% 6	ESC) % 6	ESC * % 6	ESC + % 6	DEC Portuguese NRCS
N/A	ESC - A	ESC . A	ESC / A	ISO Latin-1 Supplemental ¹
ESC (% 5	ESC) % 5	ESC * % 5	ESC + % 5	DEC Supplemental
N/A	ESC - H	ESC . H	ESC / H	ISO Latin-Hebrew Supplemental ¹
ESC (" 4	ESC) " 4	ESC * " 4	ESC + " 4	DEC Hebrew Supplemental
ESC (% =	ESC) % =	ESC * % =	ESC + % =	DEC 7-Bit Hebrew
ESC (% 4	ESC) % 4	ESC * % 4	ESC + % 4	W.P. Legal (cartridge only)

¹This is a 96-character set.

ASCEF—Announce Subset of Code Extension Facilities

ESC SP L or M	ASCII into G0 and invokes into GL. ISC/ Supplemental into GL and invokes into GR.
ESC SP N	ASCII into G0 and invokes into GL only. Software makes no assumptions about GR.

DECAUPSS—Assign User-Preference Supplemental Character Set

DCS	0 or none	!	u	D...D	ST	94-character set
DCS	1	!	u	D...D	ST	96-character set

Possible D...D values:

2/5,3/5	DEC Supplemental	(Ps = 0)
4/1	ISO Latin-1 Supplemental	(Ps = 1)
4/9	JIS Katakana	(Ps = 0)
2/2,3/4	DEC Hebrew Supplemental	(Ps = 0)
4/8	ISO Latin-Hebrew Supplemental	(Ps = 1)

A.6 Print Attributes

DECLEN—Printing Density Selection

CSI 0 or none " z	Defaults to draft print density
CSI 1 " z	Selects draft print density
CSI 2 " z	Selects LQ print density
CSI 3 or 4 " z	Default is to LQ print density

SGR—Select Graphic Rendition (DEC Private Parameters)

CSI ? Ps ; ... Ps m

Ps =	Results
0 or none	Turns off DEC private renditions.
4	Turns on superscripting and turns off subscripting.
5	Turns on subscripting and turns off superscripting.
6	Turns on overline.
2 4	Turns off sub/superscripting.
2 6	Turns off overline.

SGR—Select Graphic Rendition (Public Parameters)

CSI Ps ; ... Ps m

Ps =	Result
0 or none	Turns off all renditions.
1	Turns on bold.
3	Turns on italics.
4	Turns on underline. Also turns off double underline, if selected.
?4	Turns on superscripting and turns off subscripting.
?5	Turns on subscripting and turns off superscripting.
9	Turns on strike-through.

Ps =	Result
1 0	Selects the internal font.
1 7	Selects the cartridge font.
2 1	Turns on double underline. Also turns off underline, if selected.
2 2	Turns off bold.
2 3	Turns off italics.
2 4	Turns off underline and double underline.
2 9	Turns off strike-through.
3 0	Prints in black.
3 1	Prints in red (yellow and magenta).
3 2	Prints in green (yellow and cyan).
3 3	Prints in yellow.
3 4	Prints in blue (magenta and cyan).
3 5	Prints in magenta.
3 6	Prints in cyan.
3 7	Does not print (space).
3 9	Selects default color (black).
5 3	Turns on overline.
5 5	Turns off overline.

SGR—Select Graphics Rendition (Font Cartridge Selection)

CSI Ps m

Ps =	Meaning
10	Selects the internal typestyle (Courier).
17	Selects the cartridge typestyle.

DECUPM—Unidirectional Print Mode

CSI ? 4 1 h Enables unidirectional mode

CSI ? 4 1 l Disables unidirectional mode

A.7 Control Codes

Table A-1: LA324 MultiPrinter C0 Control Codes

Column/ Row	Mnemonic	Function
0/0	NUL	Null
0/4	EOT	Ignore
0/5	ENQ	Ignore
0/7	BEL	Bell
0/8	BS	Backspace
0/9	HT	Horizontal Tab
0/10	LF	Line Feed
0/11	VT	Vertical Tab
0/12	FF	Form Feed (with sheet feeder installed, loads cut-sheet paper from current bin)
0/13	CR	Carriage Return
0/14	SO	Shift Out
0/15	SI	Shift In
1/1	DC1	XON (ignored if received)
1/3	DC3	XOFF (ignored if received)
1/8	CAN	Cancel
1/10	SUB	Substitute
1/11	ESC	Escape
2/0	SP	Space (advance by one HAI)
7/15	DEL	Ignore

This printer ignores all other C0 control codes.

Table A-2: LA324 MultiPrinter C1 Control Codes

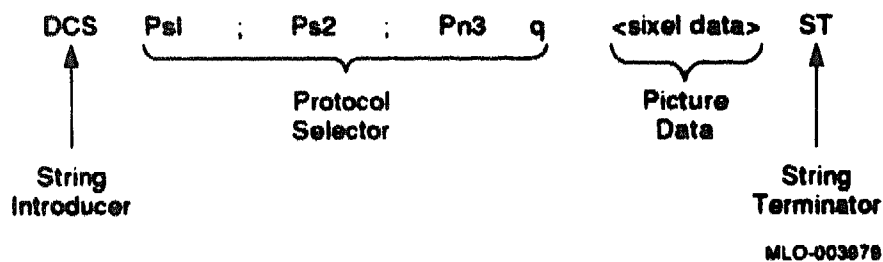
Column/ Row	Mnemonic	ESC FE	Column/ Row	Function
8/4	IND	ESC D	1/11 4/4	Forward Index
8/5	NEL	ESC E	1/11 4/5	Next Line
8/8	HTS	ESC H	1/11 4/8	Horizontal Tab Set
8/10	VTB	ESC J	1/11 4/10	Vertical Tab Set
8/11	PLD	ESC K	1/11 4/11	Partial Line Down
8/12	PLU	ESC L	1/11 4/12	Partial Line Up
9/14	SS2	ESC N	1/11 4/14	Single Shift 2
9/15	SS3	ESC O	1/11 4/15	Single Shift 3
9/0	DCS	ESC P	1/11 5/0	Device Control String
9/11	CSI	ESC [	1/11 5/11	Control Sequence Introducer
9/12	ST	ESC \	1/11 5/12	String Terminator
9/13	OSC	ESC]	1/11 5/13	Operating System Command ¹
9/14	PM	ESC ^	1/11 5/14	Privacy Message ¹
9/15	APC	ESC _	1/11 5/15	Application Pgm Command ¹

¹This printer recognizes the start of this control string but ignores all data that follows until this sequence is either aborted or terminated by ST.

All C1 control codes terminate any ESC sequence, control sequence, or control string that is in progress, then perform the listed function. C1 control codes not listed do the terminations listed above and perform no further action.

A.8 Sixel Graphics

Device Control String (DCS) Envelope



Ps1	HGS (inches)	A/R
0, 1, or none	1/144	2:1
2, 3, or 4	1/180	2.5:1
5, 6, 7, or 8	1/144	2:1
9	1/72	1:1

Ps2 (background select) is not used.

Pn3 Decipoints (1/720")	HGS (inches)
0 or none	No change
1, 2, 3, or 4	1/180
5, 6, or 7	1/144
8 or 9	1/90
10 to 19	1/72
20 and up	1/36

String Terminator

ESC \

Exits sixel mode; enters text mode.

Table A-3: Sixel Control Codes

ASCII	Function
#	Color introducer
\$	Graphic carriage return
.	Graphic new line
0 to 9	Numeric parameters
;	Parameter separator
!	Repeat introducer and sequence
*	Set raster attributes

HLS (Hue/Lightness/Saturation) Color Map

For Saturation = 0 and Hue = 0 to 359

L = 0-49 Black

L = 50-100 White

For Saturation = 1 to 100 and Hue = 0 to 359

L = 0-49 Black

L = 50-100 White

For Lightness 15 to 28 and Saturation 1 to 100

H = 330-359 Blue

H = 90-149 Red

H = 150-269 Green

H = 270-329 Cyan

For Lightness 29 to 42 and Saturation 1 to 49

H = 300-359 Blue

H = 60-179 Magenta

H = 180-299 Green

For Lightness 29 to 42 and Saturation 50 to 100

H = 340-19	Cyan
H = 20-59	Blue
H = 60-99	Magenta
H = 100-139	Red
H = 140-179	Yellow
H = 180-299	Green
H = 300-339	Cyan

For Lightness 43 to 57 and Saturation 1 to 33

H = 360-119	Blue
H = 120-239	Yellow
H = 240-359	Cyan

For Lightness 43 to 57 and Saturation 34 to 66

H = 340-19	Cyan
H = 20-59	Blue
H = 60-99	Magenta
H = 100-139	Red
H = 140-179	Yellow
H = 180-259	Green
H = 260-339	Cyan

For Lightness 43 to 57 and Saturation 67 to 100

H = 345-44	Blue
H = 45-104	Magenta
H = 105-164	Red
H = 165-194	Yellow
H = 195-284	Green
H = 285-344	Cyan

For Lightness 58 to 71 and Saturation 1 to 49

H = 300-59	Cyan
H = 60-179	Magenta
H = 180-299	Green

For Lightness 58 to 71 and Saturation 50 to 100

H = 360-39	Blue
H = 40-119	Magenta
H = 120-199	Yellow
H = 200-239	Green
H = 240-359	Cyan

For Lightness 72 to 85 and Saturation 1 to 49

H = 360-119	Magenta
H = 120-239	Yellow
H = 240-359	Cyan

For Lightness 86 to 100 and Saturation 50 to 100

H = 360-119	Magenta
H = 120-239	Yellow
H = 240-359	Cyan

Table A-4: RGB (Red/Green/Blue) Color Map

Offset	Color	Offset	Color	Offset	Color	Offset	Color
00	Black	01	Blue	02	Cyan	03	Blue
04	Green	05	Cyan	06	Cyan	07	Cyan
08	Green	09	Green	10	Cyan	11	Cyan
12	Green	13	Green	14	Cyan	15	Cyan
16	Red	17	Blue	18	Blue	19	Blue
20	Green	21	Black	22	Blue	23	Cyan
24	Green	25	Green	26	Cyan	27	Cyan
28	Green	29	Green	30	Cyan	31	Cyan
32	Red	33	Magenta	34	Magenta	35	Blue
36	Yellow	37	Magenta	38	Blue	39	Blue
40	Yellow	41	Yellow	42	White	43	Cyan
44	Green	45	Green	46	Green	47	Cyan
48	Red	49	Magenta	50	Magenta	51	Magenta
52	Red	53	Red	54	Magenta	55	Magenta
56	Yellow	57	Yellow	58	Magenta	59	Magenta
60	Yellow	61	Yellow	62	Yellow	63	White

Table A-5: Valid Sixel Control Characters

Column/ Row	ASCII Symbol	Action Performed
2/1	!	Repeat introducer
2/2	"	Set raster attributes
2/3	#	Color introducer
2/4	\$	Graphic carriage return
2/13	-	Graphic new line
2/14, 2/15	. /	(Invalid control code)
3/0 to 3/9	0 to 9	Numeric parameter
3/11	;	Parameter separator

Table A-6: Sixel Printable Characters

Column/ Row	ASCII Symbol	Binary Value	Pixels Activated	Action Performed
3/15	?	000000	none	Advances by a sixel space
4/0	●	000001	top	Prints top pixel only
5/15	-	100000	bottom	Prints bottom pixel only
7/14	~	111111	all	Prints one full column

A.9 Barcodes

DECSBCA—Select Barcode Attributes

CSI 0 ; 9 ; 180 ; 27 ; 18 ; 96 ; 0 ; 0 ; Select barcode 3 of 9 (4.7 pitch)
Ps 'q

Ps	Meaning
0	No human-readable characters
2	Human-readable characters

CSI 0 ; 18 ; 180 ; 54 ; 36 ; 96 ; 0 ; 0 ; Select barcode 3 of 9 (2.3 pitch)
Ps 'q

Ps	Meaning
0	No human-readable characters
2	Human-readable characters

DECBAR—Start Barcoding

Barcodes must be printed repetitively. One-sixth inch is printed per line. Start and stop barcodes on every line. Do not include control codes (such as CR LF) between the start and stop barcode escape sequences.

ESC * SP 0

DECBAR—Stop Barcoding

ESC * @

APPENDIX B

[illegible]

Appendix B

IBM-Compatible Emulation Quick Reference Guide

This appendix summarizes IBM Proprinter XL24 emulation in the LA324 MultiPrinter.

SI

(0/15) starts condensed printing.

SO

(0/14) sets double-wide printing by line.

DC1

(1/1) sets the printer to accept data after deselect.

DC2

(1/2) sets the printer at 10 CPI.

DC3

(1/3) deselects the printer.

DC4

(1/4) cancels double-wide printing by line.

CAN

(1/8) clears data in the preceding print buffer.

ESC [! p

(1/11, 5/11, 2/1, 7/0) Soft Terminal Reset (DECSTR)
resets the printer to power-up state, DEC protocol.

ESC - n

(1/11, 2/13) sets underline mode.

Where:

n = 1 Sets underline

n = 0 Cancels underline

ESC _ n

(1/11, 5/15) sets overline mode.

Where:

n = 1 Sets overline

n = 0 Resets overline

ESC [\1 h m1 m2 m3 m4

(1/11, 5/11, 5/12) sets the vertical units.

Where:

1 equals 4.

h equals 0.

m1 and m2 are ignored.

m3 and m4 are the values of vertical units. Refer to following table.

m3	m4	Vertical Units
0	180	1/180 inch
180	0	1/180 inch
0	216	1/216 inch
216	0	1/216 inch

ESC [@ l h m1 m2 m3 m4

(1/11, 5/11, 4/0) specifies that subsequent text is to be highlighted as double-wide, double-height, or both.

Where:

l equals 4.

h equals 0.

m1 equals 0 (ignored).

m2 equals 0 (ignored).

m3 equals HL, where:

H is high nibble and specifies the line feed multiplier.

H = 0 No change

H = 1 Single spacing

H = 2 Double spacing

L is low nibble and specifies the width multiplier.

L = 0 No change

L = 1 Normal width

L = 2 Double width

m4 is the width multiplier.

m4 = 0 No change

m4 = 1 Normal width

m4 = 2 Double width

ESC [g l h m n1...nk)

(1/11, 5/11, 6/7) sets either an 8-bit or a 24-bit image.

Where:

(h times 256) plus 1 equals the number of data bytes.

m specifies the number of the bit-image mode shown below:

m=	Horizontal Density	Wires	Description
0	60	8	Same as ESC K
1	120	8	Same as ESC L
2	120	8	Same as ESC Y
3	240	8	Same as ESC Z
8	60	24	High resolution for ESC K
9	120	24	High resolution for ESC L
11	180	24	
12	360	24	

ESC \ l h

(1/11, 5/12) specifies that the next characters are to come from the all-characters set. The number of characters to print is defined as (h times 256) plus 1.

ESC]

(1/11, 5/13) spaces the paper down one line at the vertical pitch.

ESC ^ n

(1/11, 5/14) specifies that the next single character n is to come from the all-printable character table.

ESC :

(1/11, 3/10) sets the pitch to 12 CPI.

ESC <

(1/11, 3/12) prints data unidirectionally from left to right for one line.

ESC ●

(1/11, 4/0) reinitializes the printer.

ESC =

(1/11, 3/13) starts character downloading.

ESC 0

(1/11, 3/0) sets vertical pitch to 1/8 inch.

ESC 1

(1/11, 3/1) sets vertical pitch to 7/72 inch.

ESC 2

(1/11, 3/2) sets vertical spacing to the default value.

Entering ESC 2 causes the subsequent line spacing to be set to default value as set by ESC A. If ESC A has not been set, line spacing defaults to 1/6 inch.

ESC 3 n

(1/11, 3/3) sets the vertical spacing to $n/216$ inch, $n/180$ inch in alternate graphics mode (AGM).

ESC 4

(1/11, 3/4) sets the current paper position as the top-of-form.

ESC 5 n

(1/11, 3/5) sets the automatic line feed.

Where:

n = 1 Sets automatic line feed

n = 0 Clears automatic line feed

ESC 6

(1/11, 3/6) selects Character Set 2.

ESC 7

(1/11, 3/7) selects Character Set 1.

ESC b

(1/11, 6/2) selects black in the color ribbon.

ESC c

(1/11, 6/3) selects cyan in the color ribbon.

ESC m

(1/11, 6/13) selects magenta in the color ribbon.

ESC y

(1/11, 7/9) selects yellow in the color ribbon.

ESC [F l h pft fc sd

(1/11, 5/11, 4/6) selects the sheet feeder and bin.

Where:

l equals 3.

h equals 3.

pft = 1 means the printer allows manual feed of single sheets.

pft = 3 means the printer uses the sheet feeder in the normal manner.

fc is ignored.

sd selects the bin; if **sd** = 0, the current bin number is unchanged.

ESC * m l h p1 p2 ... pX

(1/11, 2/10) selects graphics mode when the printer is in AGM.

Where:

m selects the mode according to the following table.

Mode	Horizontal Density	Wires	Description
0	60	8	Same as ESC K
1	120	8	Same as ESC L
2	120	8	Same as ESC Y
3	240	8	Same as ESC Z
4	80	8	CRT I
6	90	8	CRT II
32	60	24	High resolution for ESC K
33	120	24	High resolution for ESC L
38	90	24	CRT III
39	180	24	High resolution triple density
40	360	24	High resolution hex density

l plus (**h** times 256) is the total number of bytes of binary bit-image data to be transferred.

p1 - pX specify which dots in each column are to be printed.

ESC A n

(1/11, 4/1) sets the text line spacing in $n/72$ inches.

Use ESC 2 to activate spacing set by ESC An. In AGM, default vertical spacing is set to $n/60$ inch. Value becomes effective immediately.

ESC B n1 n2 n3 ... nk NUL

(1/11, 4/2) sets vertical tab stops.

Where:

$n1 - nk$ are the line numbers on which to set the tabs.

ESC C n m

(1/11, 4/3) sets the form length in lines or inches.

Where:

n is the number of lines.

m is the number of inches when $n = \text{NUL}$.

ESC D n1 n2 ... nn NUL

(1/11, 4/4) sets the horizontal tab stops.

Where:

$n1 - nn$ are the column numbers on which to set the tabs.

ESC d n m

(1/11, 6/4) moves the printhead forward to the next relative dot position.

Where:

Printhead movement is calculated as $(n + (m \times 256))/120$ inch.

ESC e n m

(1/11, 6/5) moves the printhead backwards to the next relative dot position.

Where:

Printhead movement is calculated as $(n + (m \times 256))/120$ inch.

ESC E

(1/11, 4/5) sets emphasized print mode (double-strike with horizontal offset).

ESC F

(1/11, 4/6) cancels the emphasized print mode set by ESC E.

ESC G

(1/11, 4/7) sets double-strike mode (double printing exactly overlapped).

ESC H

(1/11, 4/8) cancels the double-strike mode set by ESC G.

ESC I n

(1/11, 4/9) selects printing quality and font.

Where:

n=	Meaning
0/0	10 CPI Draft
0/2	10 CPI Quality
0/3	Proportional quality, 10 CPI
0/4	DLL 10 CPI Draft
0/6	DLL 10 CPI Quality
0/7	DLL proportional quality, 10 CPI
0/8	12 CPI Draft
0/10	12 CPI Quality
0/12	DLL 12 CPI Draft
0/14	DLL 12 CPI Quality
1/0	17 CPI Draft
1/2	17 CPI Quality
1/4	DLL 17 CPI Draft
1/6	DLL 17 CPI Quality

ESC J n

(1/11, 4/10) advances paper $n/216$ inch, $n/180$ inch n : AGM.

ESC j

(1/11, 6/10) stops printing.

ESC K n m p1 p2 ... pX

(1/11, 4/11) changes the printer to bit-image mode, normal density, 60 dots per inch (DPI).

Where:

n plus (m times 256) is the total number of bytes of binary bit-image data to be transferred.

p1 - pX specify which dots in each column are to be printed.

Eight dots of data are printed on 20 wires spread over 24 wires.

ESC L n m p1 p2 ... pX

(1/11, 4/12) changes the printer to 8-wire bit-image mode, double density, half speed, 120 DPI.

Where:

n plus (m times 256) is the total number of bytes of binary bit-image data to be transferred.

p1 - pX specify which dots in each column are to be printed.

ESC N n

(1/11, 4/14) makes the printer skip over the perforation on fanfold paper.

Where:

n is the number of lines from the bottom of the paper to skip.

ESC O

(1/11, 4/15) sets the number of lines to skip to 0; any skip perforation set by ESC N is cancelled.

ESC P n

(1/11, 5/0) sets proportional space mode.

Where:

n = 1 Sets proportional space mode

n = 0 Cancels proportional space mode

ESC Q n

(1/11, 5/1) prevents data coming from the host to the printer.

Where:

n = 35

DC1

Resets the printer so that it accepts data from the host.

ESC R

(1/11, 5/2) sets horizontal tabs at every eighth position starting at column 9 and clears all vertical tabs.

ESC r n

(1/11, 5/2) selects color ribbon color.

Where:

n=	Color
0	Black
1	Magenta
2	Cyan
3	Blue
4	Yellow
5	Red
6	Green

ESC S n

(1/11, 5/3) sets the printer in either subscript or superscript mode.

Where:

n = 1 Sets subscript

n = 0 Sets superscript

ESC T

(1/11, 5/4) cancels the superscript or subscript mode set by ESC S n.

ESC U n

(1/11, 5/5) sets the printer in monodirectional printing.

Where:

n = 1 Sets monodirectional printing from left to right

n = 0 Resets bidirectional printing

ESC W n

(1/11, 5/7) sets the printer to print in either normal or double-width mode.

Where:

n = 1 Resets printing at double width

n = 0 Sets printing at normal width

ESC X l r

(1/11, 5/8) sets horizontal margins.

Where:

l is the left margin column position.

r is the right margin column position.

ESC Y n m p1 p2 ... pX

(1/11, 5/9) makes the printer perform bit-image printing at double speed, dual density, 120 DPI.

Where:

n plus (m times 256) is the total number of bytes of binary bit-image data to be transferred.

p1 - pX specify which dots in each column are to be printed.

ESC Z n m p1 p2 ... pX

(1/11, 5/10) makes the printer perform bit-image printing at double speed, quadruple density, 240 DPI.

Where:

n plus (m times 256) is the total number of bytes of binary bit-image data to be transferred.

p1 - pX specify which dots in each column are to be printed.

ESC EM

(1/11, 1/9) ejects a single sheet of paper and selects bin or manual mode.

Where:

n =	Function
0	Manual mode selected
1	Bin 1 selected
2	Bin 2 selected
3	Bin 3 selected
4	ASF enabled and bin previously set selected

ESC EM R

(1/11, 1/9, 5/2) ejects a single sheet of paper. If ASF is not installed, a form feed is performed.

DC1

Resets the printer so that it accepts data from the host.

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Appendix C

Accessories and Supplies

This appendix lists some of the accessories and supplies available for the LA324 MultiPrinter. Contact your local sales representative or reference your latest DEC direct catalog for a complete list of products and the latest pricing information. See Section C.1 for additional ordering information.

Table C-1: LA324 MultiPrinter Accessories and Supplies

Part Number	Description
LA24R-KA ¹	LA324 Ribbon Cartridge, black (6/box)
LA24R-KC ¹	LA324 Ribbon Cartridge, color (6/box)
LA24X-DS	LA324 Desk Stand
LA24X-PS ¹	LA324 Printer Stand (w/paper catcher)
LA24X-AC ¹	LA324 Acoustic Cover
LA24X-CA	DEC Letter Gothic Font Cartridge ²
LA24X-CB	DEC Orator Font Cartridge ²
LA24X-CC	DEC Prestige Elite Font Cartridge ²
LA24X-CD	OCR-A Emulation Font Cartridge
LA24X-CE	OCR-B Emulation Font Cartridge
LA24X-CF	Presenter Emulation Font Cartridge
LA24X-CG	DEC OCR-A Font Cartridge ASCII
LA24X-CH	DEC OCR-B Font Cartridge ASCII
PCXXA-PC	Platen Cleaner (10/box)

¹If purchased in Europe, add the prefix EO- to the beginning of the part number.

²This font cartridge contains the following character sets: ASCII, ISO Supplemental, DEC Supplemental, WP Legal, British, DEC Finnish, French, DEC French Canadian, German, ISO Italian, JIS Roman, DEC Norwegian Danish, ISO Spanish, DEC Swedish, Norwegian Danish, DEC Dutch, DEC Swiss, DEC Portuguese.

Table C-1 (Cont.): LA324 MultiPrinter Accessories and Supplies

Part Number	Description
EC19M-10	Parallel Printer Cable
H9850-PA	Fanfold (continuous-feed) paper (20 lb) 9.5 in. x 11 in. .5 in. perforated edge 2700 sheets per carton
H9850-LR	Fanfold (continuous-feed) paper (20 lb) 9.5 in. x 11 in. .5 in. perforated edge 540 sheets per carton
LN01X-AB	Letter size paper 8.5 in. x 11 in. 5,000 sheets per box
LN01X-AD	A4 size paper 297 mm x 210 mm 5,000 sheets per box
LN01X-AC	Legal size paper 8.5 in. x 14 in. 5,000 sheets per box
H8673-AA	20mA active host mate-n-lock to EIA-423 DECconnect MMJ passive converter
H8673-AB	20mA active host RJ11 (6 pin) to EIA-423 DECconnect MMJ passive converter
EK-LA324-PM	LA324 Programmer's Reference Manual
LA24X-SF	Automatic Triple-Bin Sheet Feeder

C.1 Ordering Information

Use the following mailing addresses and telephone numbers to order products for the LA324 MultiPrinter.

Table C-2: Within the U.S.A.

MAIL	Digital Equipment Corporation PO Box CS2008 Nashua, NH 03061
TELEPHONE	Order toll free 1-800-DIGITAL between the hours of 8:30 AM and 8:00 PM EST

Table C-3: Outside the U.S.A.

MAIL	Digital Equipment Corporation Attention: Accessories & Supplies Business Manager c/o Local Subsidiary or Digital-Approved Distributor
TELEPHONE	
In Canada	Order toll free 1-800-267-6215
In Australia	Outside Sydney Metropolitan Area (toll free): 008-226-363 From Sydney Metropolitan Area: 412-7000
In New Zealand	Auckland (toll free): 09-394-068

Appendix D

Specifications

This appendix lists the basic operating specifications for the LA324 MultiPrinter.

Table D-1: LA324 MultiPrinter Specifications

Technology

Print method	Dot matrix
Printing technique	Bidirectional Unidirectional, left to right Forward and reverse paper motion
Printhead	24-pin dot matrix
Dot size	.2 mm (0.0085 in.) diameter
Dot spacing	180 dots per inch
Buffer control	XON/XOFF protocol DTR high and low signal voltages
Text printing speed	Draft = 300 characters per second Letter = 100 characters per second Horizontal slew rate = 30 inches per second Vertical slew rate = 5 inches per second
Print density (standard cell matrix)	Draft = 9 x 24 dots per character Letter = 30 x 24 dots per character
Print density (full cell matrix)	Draft = 12 x 30 dots per character Letter = 36 x 23 dots per character
Data interface	Serial = 6-pin modular DECconnect-type connector Parallel = 36-pin Amphenol-type connector

Table D-1 (Cont.): LA324 MultiPrinter Specifications

Character Specifications

Character sets	DEC mode:
	ASCII
	DEC Supplemental
	DEC Technical
	ISO 8-bit Supplemental
	DEC Special Graphics
	14 national replacement character (NRC) sets
Color mode	Sixel graphics (DEC mode):
	White (no printing)
	Yellow
	Magenta
	Cyan
	Red
	Green
	Blue
	Black
Character attributes	DEC mode:
	Bold
	Color text
	Underline
	Double underline
	Slant
	Overline
	Strike-through
	Subscript
	Superscript

Table D-1 (Cont.): LA324 MultiPrinter Specifications

Paper

Manual Feed
(single-sheet paper)

Width: 102 mm (4 in.) to 432 mm (17 in.)
Length: 64 mm (2.5 in.) to 432 mm (17 in.)
Weight: 60 g/m² to 90 g/m² basis weight (16 lb to 24 lb)

NOTE: Maximum width for 16 lb paper is 305 mm (12 in.).

Manual Feed
(multiple-part forms)

Width: 102 mm (4 in.) to 432 mm (17 in.)
Length: 64 mm (2.5 in.) to 432 mm (17 in.)
Thickness: 0.5 mm maximum (0.020 in.)

Tractor Feed
(single-part paper)

Width: 108 mm (4.25 in.) to 406 mm (16 in.) including perforations
Weight: 56 g/m² to 90 g/m² basis weight (15 lb to 24 lb)

(multiple-part forms)

Six parts (1 original and 5 copies) with carbon
Weight, first sheet: 60 g/m² to 75 g/m² basis weight (16 lb to 20 lb)
Weight, copies: 45 g/m² to 56 g/m² basis weight (12 lb to 15 lb)
Total thickness: 0.5 mm (.020 in.) maximum

(multiple-part-forms)

Six parts (1 original and 5 copies) without carbon
Weight, first sheet and copies: 54 g/m² to 56 g/m² basis weight (14.5 lb to 15 lb)
Weight, last sheet: 49 g/m² to 56 g/m² basis weight (13 lb to 15 lb)
Total thickness: 0.5 mm (0.020 in.) maximum

Labels

Total thickness of .3 mm (0.012 in.) maximum

NOTE: Continuous paper/forms/labels shall have hole spacing of 13 mm (0.50 in.) +/- .2 mm (0.01 in.), non-accumulative over 51 mm (2.00 in.) with a hole diameter of 3.8 mm (0.15 in.) to 4 mm (0.16 in.).

Table D-1 (Cont.): LA324 MultiPrinter Specifications

Ribbon Cartridges

Black ribbon	Disposable cartridge capable of printing up to five million characters
Color ribbon	Disposable cartridge composed of four color bands: yellow, magenta, cyan, and black

Physical

Dimensions	Height: 170 mm (6.7 in.) Depth: 310 mm (12.2 in.) Width: 615 mm (24.2 in.)
Installed weight	14.5 kg (32.7 lb)

Power

Power requirements	120/240 V AC, 50/60 Hz
Power consumption	170 W maximum
Power receptacle	Nonswitched, 3-prong, grounded

Environmental Requirements

Operating temperature	10°C to 40°C (50°F to 104°F)
Operating humidity	10% to 90% relative humidity
Acoustic noise	Less than 55 dBA

D.1 Serial and Parallel Connectors

Table D-2 and Table D-3 show the pin assignments, signal names, and signal descriptions of the LA324 MultiPrinter interface port connectors.

Table D-2: Serial Connector

Pin Number	Signal Name	Signal Description
1	Data terminal ready (DTR)	Asserted when the printer is in READY mode.
2	Send data (SD)	Indicates that control data is being transmitted to the host computer.
3	Send common (SC)	Originates from the printer.
4	Receive common (RC)	Originates from the host system.
5	Receive data (RD)	Indicates that print and control data is being received from the host computer.
6	Data set ready (DSR)	Indicates that a signal has been received from the host.

Table D-3: Parallel Connector

Pin Number	Signal Direction	Signal Name	Signal Description
1	To printer	Strobe L	When the signal is low, the printer is reading a data byte and is in the busy state.
2	To printer	Data bit 1	Signal bits 1-8 are the data byte bits.
3	To printer	Data bit 2	
4	To printer	Data bit 3	
5	To printer	Data bit 4	
6	To printer	Data bit 5	
7	To printer	Data bit 6	
8	To printer	Data bit 7	
9	To printer	Data bit 8	
10	From printer	ACKNLG L	A low signal acknowledges that the data byte has been received and the printer is ready to receive more data bytes. The signal is sent at power-up or after an initialization sequence.
11	From printer	Busy H	A high signal indicates that no data bytes can be received or the buffer is full. A high signal also occurs during or after an initialization sequence, when the printer is off line, or when an error condition exists.
12	From printer	PE H	A high signal indicates that the printer is out of paper.
13	From printer	SELECT H or SELECT L	A high signal indicates that the printer is in the select state and is ready to receive and print data. A low signal indicates that the printer is in the deselect state, an error condition exists, or the printer is in an initialization sequence.
14	Not used		
15	Not used		
16	0 volts		Logic ground.
17	Chassis ground		

Table D-3 (Cont.): Parallel Connector

Pin Number	Signal Direction	Signal Name	Signal Description
18	Not used		
19-29	0 volts	TWP returns	Logic ground.
30	0 volts	INIT ground	Logic ground.
31	To printer	INIT L	A low signal resets the printer to its initial state and clears the buffer. The printer must see a pulse greater than 50 microseconds.
32	From printer	ERROR L	A low signal indicates that the printer is out of paper or in the deselect state, or that an error condition exists.
33	0 volts		Logic ground.
34	Not used		
35	Not used		
36	Not used		

HOW TO ORDER ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	800-884-6660	Digital Equipment Corporation P.O. Box CS2008 Nashua NH 03061
Rest of U.S.A. and Puerto Rico ¹	800-DIGITAL	

¹Prepaid orders from Puerto Rico, call Digital's local subsidiary (809-754-7575)

Canada	800-267-6219 (for software documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order Desk
	613-592-5111 (for hardware documentation)	

Internal orders (for software documentation)	DTN: 241-3023 503-874-3023	Software Supply Business (SSB) Digital Equipment Corporation Westminster MA 01473
Internal orders (for hardware documentation)	DTN: 234-4323 508-351-4323	Publishing & Circulation Services (P&CS) NRO3-1/W3 Digital Equipment Corporation Northboro MA 01532
