

4232 Printer  
Model 302

SA24-4386-01

## **User's Guide**



4232 Printer  
Model 302

SA24-4386-01

**User's Guide**



**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page ix.

**| Second Edition (September 1994)**

| This major revision obsoletes and replaces SA24-4386-00 and Technical Newsletter  
| SN24-2028-00. Changes or additions to the text and illustrations are indicated by a  
| vertical line to the left of the change.

Changes are made occasionally to the information herein; any such changes will be reported in subsequent revisions or Technical Newsletters.

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This equipment is approved under approval number NS/G/23/J/100003 for indirect connections to the public telecommunications systems in the United Kingdom.

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**If this machine is connected to an outlet that has been incorrectly connected to the building wiring, serious electric shock could result.**

For continued protection against the risk of electric shock and personal injury:

- Connect the machine only to a properly grounded outlet of the correct voltage. The voltage your machine will accept is indicated on the machine.
- Make sure the machine is turned Off (O) before you connect or disconnect the power cord or other cables.
- If the machine has cables other than the power cord, you must connect them before you plug the power cord into an outlet. You must first unplug the power cord from the outlet when you remove the other cables.
- Do not use the machine in an area where it can become wet.
- Keep hair and personal articles away from moving parts in the machine to avoid the possibility of getting them caught.
- Refer service or repairs to qualified personnel.
- There may be some increased risks of electric shock and personal injury during disassembly and servicing of this machine. Professional service personnel should understand this and take necessary precautions.

- The safety features of some parts may not always be obvious. Therefore, replacement parts must have the identical or equivalent characteristics as the original parts.
- The maintenance information for this machine has been written for the professional service person and is not intended to be used by others.



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## Preface

This guide describes the basic operating procedures for the IBM\* 4232 Printer Model 302 and should be read and used by those who install or operate the printer, or supervise printer operations.

You need only basic operating experience to use the printer. This experience includes an understanding of how a printer works, how to connect cables, and how to select items from an operator panel menu.

You can use the printer for many different types of applications. This guide includes the procedures necessary for you to put together step-by-step instructions tailored to your operation.

A training outline in the Appendix gives the experienced IBM 4232 Printer Model 302 operator a guideline for teaching others how to use the printer.

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## How to Use This Guide

The following list describes the contents of each chapter and the appendixes in more detail:

- Chapter 1, "Setting Up the 4232 Printer Model 302," provides information on setting up the printer and connecting it to the host computer.
- Chapter 2, "Getting to Know Your Printer," gives locations, descriptions of parts, a checklist of things you need to do to start a print job, and general information about the care and use of your printer.
- Chapter 3, "Replacing Your Ribbon," describes the removal and replacement of damaged or worn ribbons.
- Chapter 4, "Using the Operator Print Tests," describes procedures for testing and adjusting the printer.
- Appendix A, "Training Guideline" describes the tasks an operator needs to learn to operate the printer.

- Appendix B, “Problem Solving,” describes how to diagnose and solve printer problems.
- Appendix C, “Forms Information,” describes the types of forms needed for each forms device.
- Appendix D, “Declaration of IBM Product Noise Emission Values,” provides the noise emission values for the printer.
- | • Appendix E, “Cabling Information,” contains parallel and serial  
| cable information.

You will use the *IBM 4232 Printer Model 302 User's Guide* with the *IBM 4232 Printer Model 302 Operator Panel Instructions*. Topics in the *IBM 4232 Printer Model 302 Operator Panel Instructions* include:

- The operator panel
- Configuration options.

See “Publications” on page xvii for a complete list of publications.

**Note:** If you plan to install the Auto Sheet Feeder feature, see *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* for additional setup and operation procedures.

This guide uses color to help you identify parts of the printer. The blue color in this guide shows parts of the printer that are actually blue in the printer.

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## Publications

The following publications provide information on the 4232 Printer Model 302.

For planning, setup, and operating information, see:

- *IBM 4232 Printer Model 302 User's Guide*, SA24-4386. This guide describes the operating procedures for the printer (with special emphasis on using the forms devices).
- *IBM 4232 Printer Model 302 Operator Panel Instructions*, SA24-4387. This manual describes how to operate the printer control panel.
- *IBM 4232 Printer Model 302 Quick Reference Guide*, SA24-4388. This card shows the key functions and the available configuration values and the process for setting them.
- *IBM 4232 Printer Model 302 Planning and Site Preparation Guide*, GA24-4390. This guide contains detailed information to help you plan for and prepare the site for installation.
- *IBM 4232 Printer Model 302 Product and Programming Description*, GA24-4385. This manual describes the printer and programming functions specific to the 4232 Printer Model 302 that attaches to the IBM Personal Computer, IBM Personal System/2, IBM RISC System/6000, IBM AS/400 with ASCII controller, and the IBM 4033 LAN Adapter.
- *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information*, SA24-4391. This manual describes the setup and use of the Auto Sheet Feeder with the printer.
- *IBM 4230 and 4232 Printers Safety Information*, SA40-0575.

For service information, see:

- *IBM 4230 and 4232 Printers Maintenance Analysis Procedures*, SA40-0571. This manual is a guide for servicing the IBM 4230 and 4232 Printers. It is the primary maintenance tool for trouble analysis and repair of the 4230 and 4232 Printers.
- *IBM 4230 and 4232 Printers Maintenance Information Manual*, SA40-0572. This manual provides detailed maintenance procedures for the 4230 and 4232 Printers.
- *IBM 4230 and 4232 Printers Illustrated Parts Catalog*, SA40-0573. This parts catalog contains listings and illustrations of all replacement assemblies and detail parts for the 4230 and 4232 Printers.
- *IBM 4230 and 4232 Printers Safety Information*, SA40-0575.

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## Introduction

Your IBM 4232 Printer Model 302 is a wire-matrix printer with many features to help you perform your work efficiently. Your printer combines excellent print quality along with the ability to print in several print styles and graphics.

Your printer receives some instructions from you and some instructions from the *computer system*. The computer does the *processing*; the printer prints the result. It is important that you communicate with the people who operate and program the computer so that you know when any changes are made that could affect your printer.

The printer can use one of four different *forms devices* to move paper through the printer. Each device does a different type of print job, depending on the type of forms you use: continuous forms for large printouts, tear-off forms such as retail invoices, or cut sheet forms. See “Forms Handling Devices” on page 2-16 for more information.

The printer has four different *print quality* settings:

- DP (Data Processing) Quality
- Fast Draft Quality
- DP Text Quality
- Near Letter Quality.

You can set the *character spacing* on the printer to the following characters per inch (CPI):

- | • 20 (Fast Draft and DP Quality only).
- | • 17.1 (Fast Draft and DP Quality only).
- 16.7 (Fast Draft and DP Quality only).
- 15
- 12
- 10

You can set *line spacing* to the following lines per inch (LPI) from the operator panel. LPI represents the number of lines to be printed per vertical inch.

- 6
- 8.

For more information, see “Using Print Format and Quality Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions* or “Introducing the 4232 Printer Model 302” in *IBM 4232 Printer Model 302 Product and Programming Description*.

---

## Chapter 1. Setting Up the 4232 Printer Model 302

The following sections describe how to install the IBM\* 4232 Printer Model 302. The installation procedure includes:

- Installing the ribbon
- Installing the forms device
- Attaching the printer to your computer.

Included with the printer are several manuals that can help you get started:

- *IBM 4232 Printer Model 302 User's Guide*  
Use this guide to setup and test the printer (as well as to perform simple maintenance and error checking). This guide also contains error codes and a symptoms list.
- *IBM 4232 Printer Model 302 Operator Panel Instructions*  
Use this manual to learn how to have the printer perform each function available through the operator panel.
- *IBM 4232 Printer Model 302 Quick Reference Guide*  
Use the guide as a reference when operating the printer. The guide should be posted near the printer.

If you are installing an Auto Sheet Feeder (ASF), see "Setting Up Your 4232 Printer Model 302 with ASF" in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* for the setup procedure.

### Do Each Step in Order

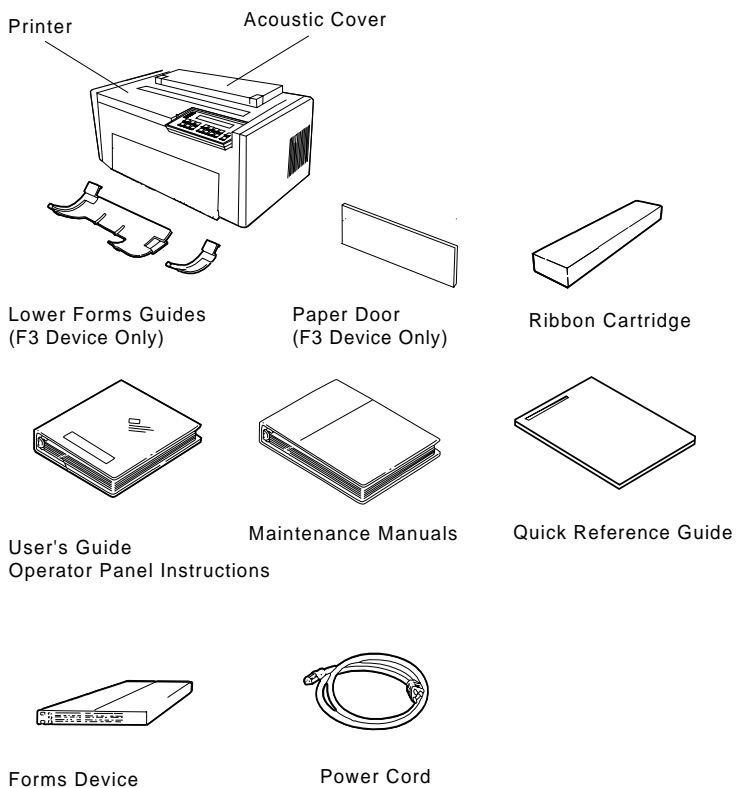
**Complete each step before you start the next one. If you cannot successfully complete all of the following steps, call your place of purchase.**

---

## Beginning Printer Installation

To install the printer, follow these steps:

1. Be sure that you have the following items:



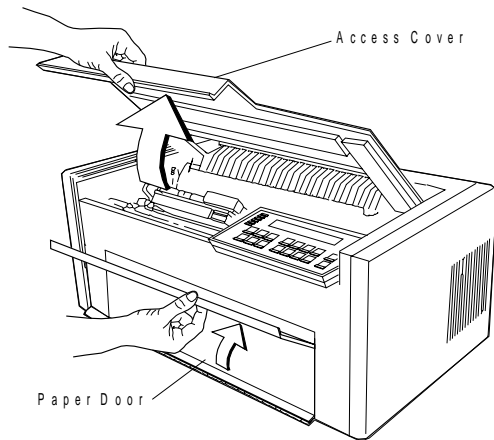
### Notes:

- a. Contact your place of purchase if any of the items shown above are missing.
- b. The Document Insertion Device (F3) is shipped with a long and short lower forms guide and a paper door. If you ordered the F3 forms device, be sure that you find the guides and paper door and set them aside.

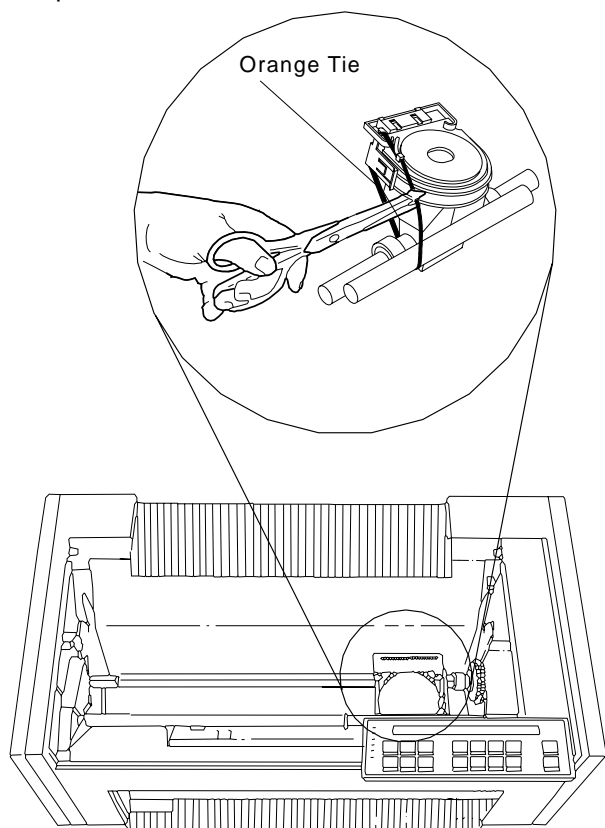
**Note:** The printer weighs approximately 20.4 kg (45 lb). Do not lift it by yourself.



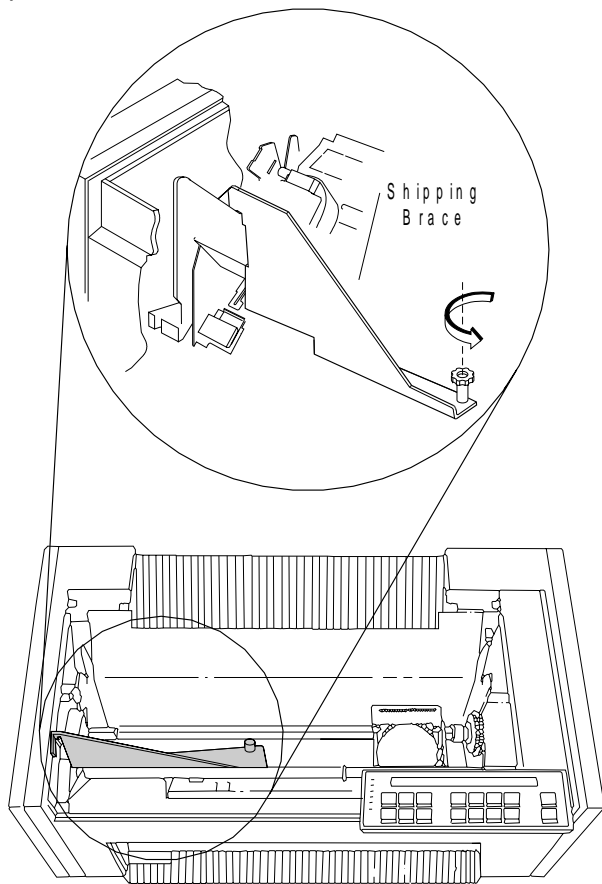
2. Place the printer at the workstation (printer stand or table of your choice). Be sure that you have access to both the front and the rear of the printer.
3. Remove the protective film from the access cover window and discard it.
4. Remove the packaging material, if present, from under the acoustic door.
5. Open the *access cover*. Then open the front paper door as follows:
  - a. Pull the door up until it will not go any higher.
  - b. Push the door back slightly to lock it in the open position.



6. Find the *orange tie* on the right side of the printer to the left of the *print head*. Carefully cut the *orange tie* and remove it from the printer.



7. Consult the following figure and then find the large *orange knob* and *orange shipping brace* in the center of the printer. Unscrew the knob and remove the knob and shipping brace from the printer.



**Note:** Save the shipping brace in case you relocate the printer.

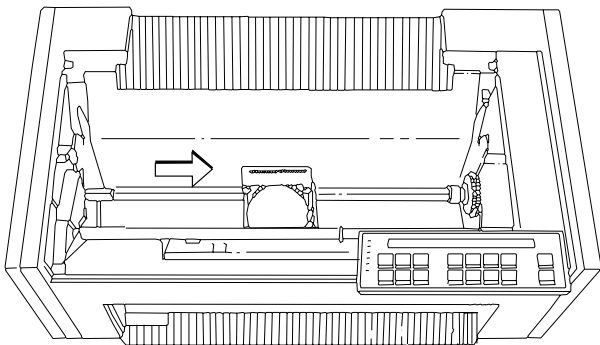
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## Installing the Ribbon Cartridge and Guide

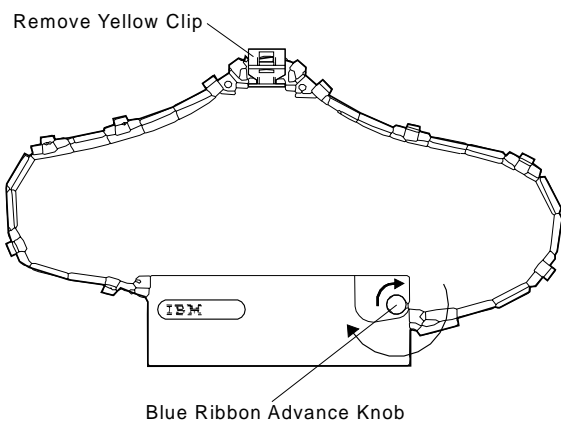
The following sections describe preparation, installation, and verification of the ribbon cartridge.

To install a new ribbon cartridge, follow these steps:

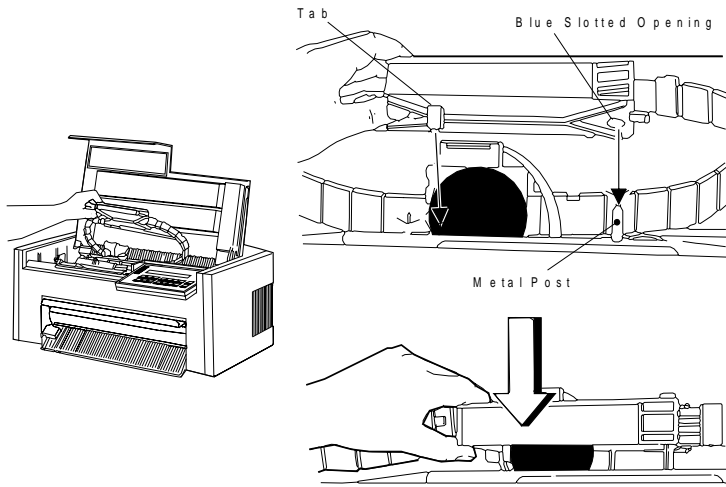
1. Slide the print head to the center of the printer.



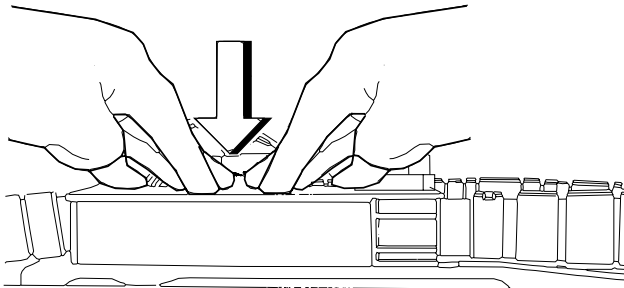
2. Remove the ribbon cartridge from the package.
3. Remove the yellow clip from the ribbon.
4. Turn the **blue ribbon advance knob** clockwise to take up slack in the ribbon. If the ribbon does not move, contact your place of purchase and replace the ribbon cartridge.



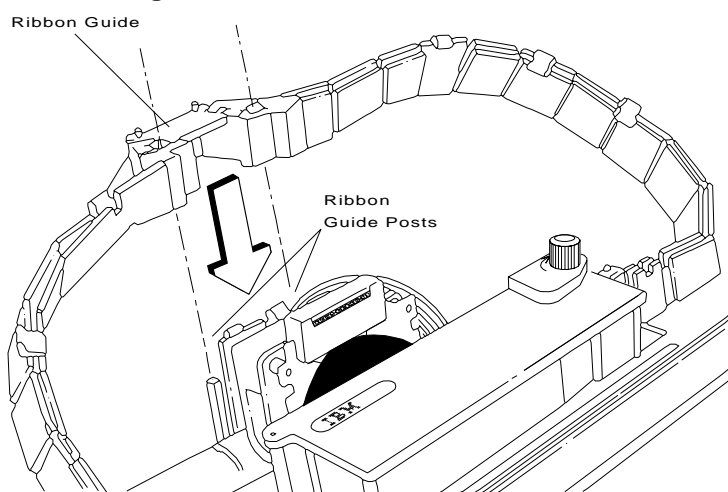
5. Align the **blue slotted opening** on the bottom of the ribbon cartridge with the *metal post*. You may need to turn the **blue ribbon advance knob** to align the slots. Lower the ribbon cartridge onto the *metal post*. Be sure that the *plastic tab* on the bottom of the ribbon cartridge aligns with the hole in the printer casting.



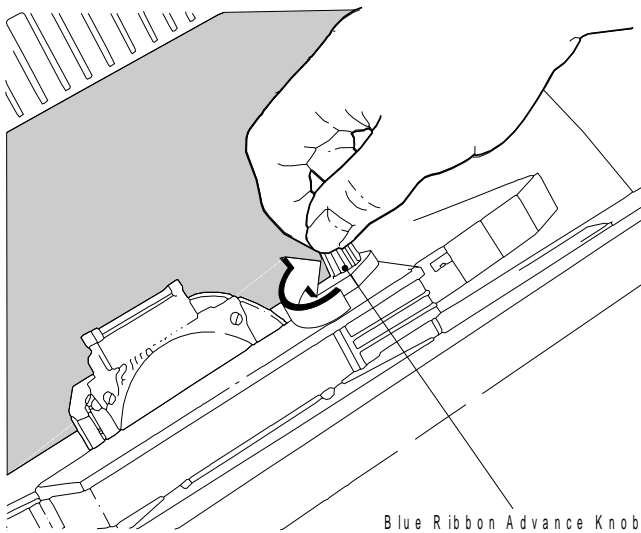
6. Press the cartridge down firmly to snap it into place.



7. Align the holes in the ribbon guide with the *ribbon guide posts* on the *print head carrier*. **Press the guide all the way down on the posts until the tops of the posts are even with the top of the ribbon guide.**



8. To be sure you have installed the ribbon cartridge correctly, check that:
- a. The left side of the ribbon cartridge is securely snapped onto the printer. The right side fits over the ribbon drive post but does not latch down.
  - b. There are no twists or folds in the ribbon.
  - c. The ribbon is not catching on the print head.
  - d. The ribbon moves when you turn the **blue ribbon advance knob** clockwise. If the ribbon does not move, replace the ribbon cartridge.



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## Preparing for Forms Device Installation

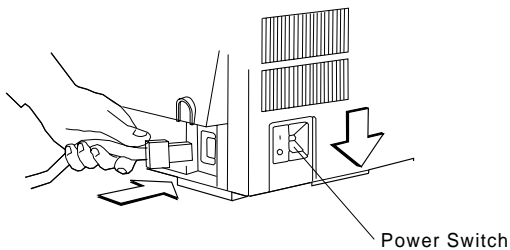
To prepare for installing the forms device, follow these steps:

### CAUTION:

The construction of this machine provides extra protection against the risk of electric shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded outlet. This machine has a grounding-type (3-wire) power cord because grounding is necessary. It is the responsibility of the customer or the person installing the machine to connect it to a properly grounded outlet. Seek professional assistance before using an adapter or extension cord; such a device could interrupt the grounding circuit.

If this machine is connected to an outlet that has been incorrectly connected to the building wiring, serious electric shock could result.

1. Make sure the *power switch* is Off (O). Connect the *power cord* to the rear of the printer. Press firmly to be sure that the plug is securely seated.



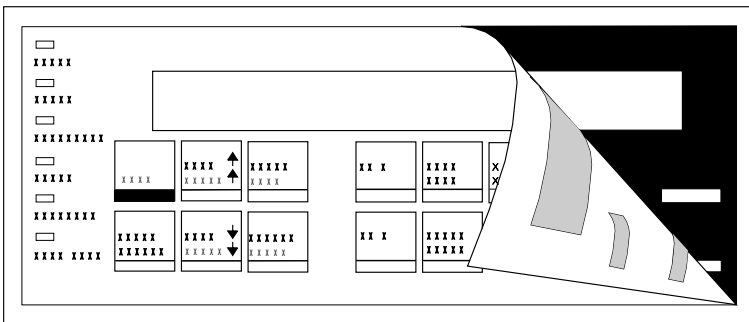
Plug the power cord into the electrical outlet.



2. If you received your printer without an operator panel template installed, you must install the template shipped with the printer.

To install the template, do the following:

- a. Remove the paper from the back of the template.
- b. Press the template into place on the operator panel, as shown in the following figure.



To change the language shown on the operator panel display, see “Using Printer Setup Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.

3. Use the following figure to learn the location of keys and indicators on the operator panel.

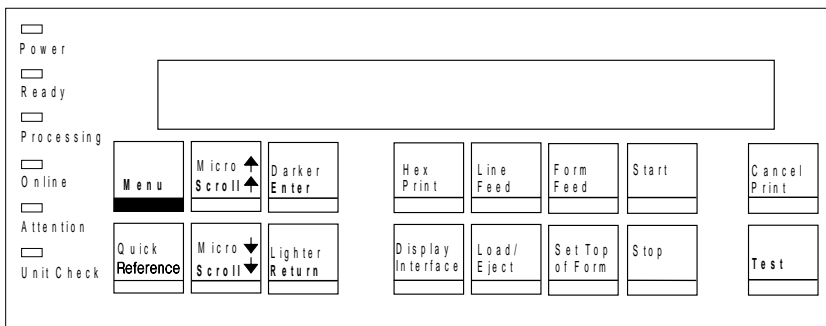


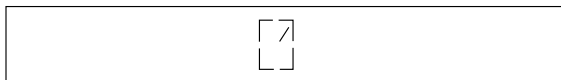
Figure 1-1. 4232 Printer Model 302 Operator Panel

4. Turn the power On (I).

**Note:** Do **not** turn the printer power Off (O) during setup unless instructed to do so.

The printer does the following:

- a. All indicators and blocks on the display light, and the alarm beeps. Then the printer displays

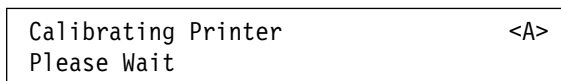


The printer then displays



- b. The print head and ribbon move.

- c. The printer displays



and then



followed by



The **Attention** indicator also blinks and the alarm beeps. This status code appears because forms have not been loaded.

d. Press **Stop**.

The printer may display

090 COVER/DOOR OPEN PRINT SPEED REDUCED
--------------------------------------------

and then

029 LINK ERROR
----------------

Ignore these messages until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

5. If the printer operated correctly, go to Step 6 on page 1-14, otherwise, check the following:

**Operator Note**

If you turned the power Off (O) and back On (I) in *less than 10 seconds*, the display may be blank or a message may appear.

If the power-on messages do not appear in your language, see "Using Printer Setup Parameters" in *IBM 4232 Printer Model 302 Operator Panel Instructions* to change the Display Language.

a. Did the printer come on after you turned the power On (I) in Step 4 on page 1-12?

If *Yes*, go to Step 5b on page 1-14.

If *No*, perform Steps 5a1 through 5a6 on page 1-14.

- 1) Turn the power Off (O).
- 2) Unplug the printer power cord from the electrical outlet.
- 3) Be sure that the power cord is firmly connected to the rear of the printer.

4) Try another electrical device (such as a lamp) in the outlet.

5) If the outlet is working, connect the printer to the outlet again. Return to Step 4 on page 1-12 and try again.

6) If the printer still fails to come on, call your service representative.

b. Did the printer display a code or message and did the same code or message remain on the display after approximately 30 seconds?

If *Yes*, go to Appendix B, "Problem Solving," find the status code or message the printer displayed, and follow the instructions.

If *No*, go to Step 5c.

c. Did the indicators or display not respond, or did you have an alarm problem?

If *Yes*, then call for service.

If *No*, go to Step 6.

6. The shipping box for the forms device has printing on the side to help you identify what type of forms device you have. Note which forms device is checked off, then remove the forms device from the shipping box.

**Note:** If you have forms device **F3**, the shipping box also contains the lower forms guides and **F3** paper door.

7. Press **Menu**.

The printer displays

CONFIGURATION MENU Print Format and Quality
------------------------------------------------

8. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

CONFIGURATION MENU Printer Setup
-------------------------------------

9. Press **Enter** to select this category.
10. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

Printer Setup Forms Device
-------------------------------

11. Press **Enter** to select this parameter.
12. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays the desired forms device.
13. Press **Enter** to set the device.  
An asterisk (★) appears beside your choice of device.
14. You now need to save this change to the power-on custom set (Custom Set A), so the printer will have the correct device setting the next time it is turned on.
  - a. Press **Return** twice to get back to the category level of the Configuration Menu.

CONFIGURATION MENU Printer Setup
-------------------------------------

- b. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

CONFIGURATION MENU Configuration Storage
---------------------------------------------

- c. Press **Enter**.

The printer displays

Configuration Storage Save Current Values
----------------------------------------------

d. Press **Enter**.

The printer displays

Save Current Values  
Custom Set A

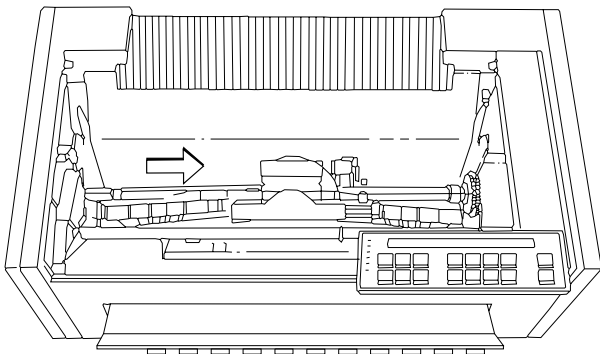
e. Press **Enter** to save the configuration changes.

The printer displays

Save Current Values  
Custom Set A Saved

15. Turn the power Off (O).

16. Slide the print head to the center of the printer.



17. You are now ready to install the forms device. Go to "Selecting the Forms Device Installation Procedure" on page 1-17.

---

## Selecting the Forms Device Installation Procedure

Select the forms device installation procedure you will use:

- Go to “Installing and Using the Continuous Forms Device (F1)” on page 1-18 to install the F1 forms device.
- Go to “Installing and Using the Dual Purpose Forms Device (F2)” on page 1-53 to install the F2 forms device.
- Go to “Installing and Using the Document Insertion Device (F3)” on page 1-85 to install the F3 forms device.
- See “Setting Up Your 4232 Printer Model 302 with ASF” in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* to install the F4 forms device.

---

## Installing and Using the Continuous Forms Device (F1)

The following sections describe how to install and use the Continuous Forms Device (F1).

**Note:** Make sure that the proper forms device is configured. See “Preparing for Forms Device Installation” on page 1-10 for the exact steps.

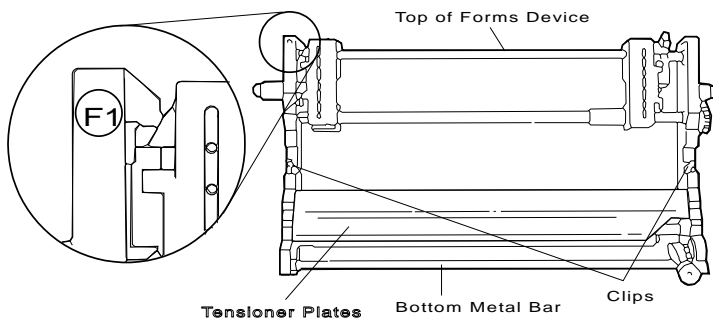
### Installing the Continuous Forms Device (F1)

To install the F1 forms device, follow these steps:

1. Hold the forms device so that the *device number F1* is in the upper left corner facing you. Note the *bottom metal bar* and the *clips*; they will be important later.
2. Remove the orange shipping clip, if installed.

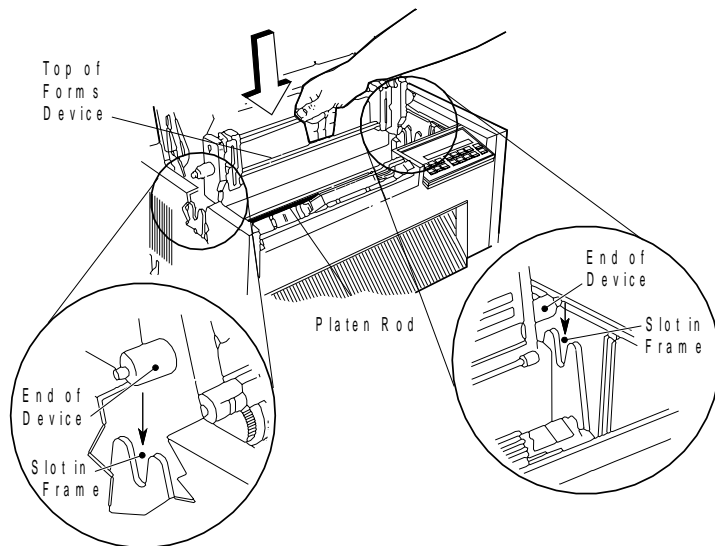
#### Important

The F1 forms device for the 4232 Printer Model 302 has a circle around the F1 emblem. Use only these forms devices in the printer.

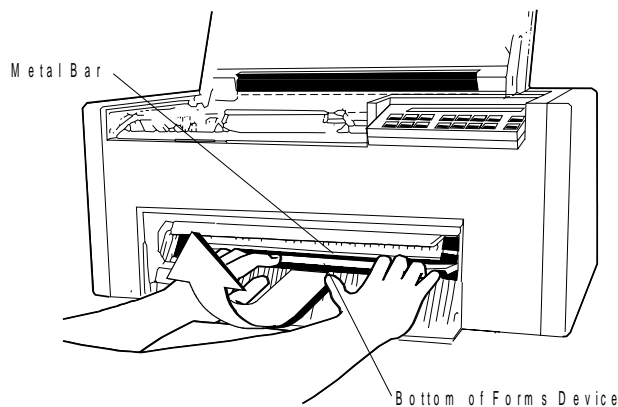




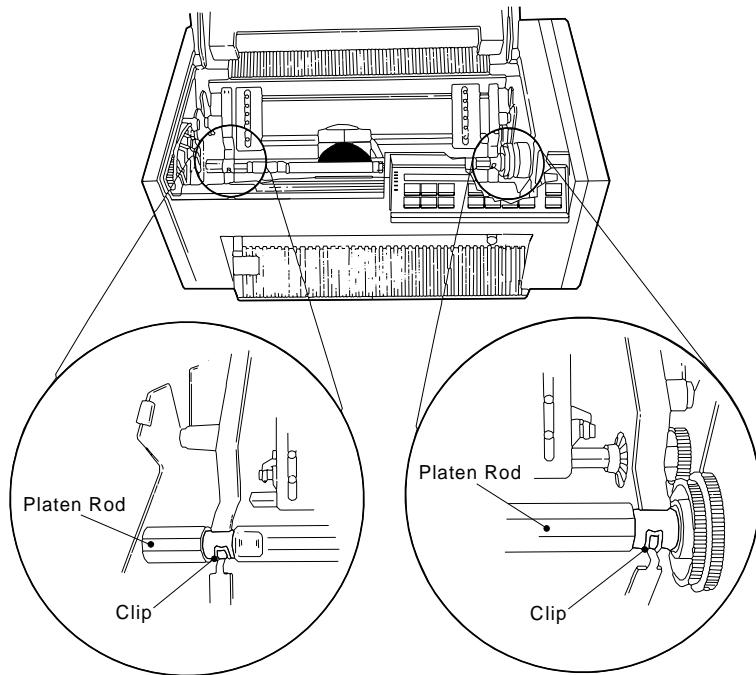
3. Lower the forms device into the printer behind the *platen rod* so that the *bottom metal bar* enters the printer first. Align the ends of the forms device with the slots in the frame. Continue to lower the forms device until the device rests in the slots of the frame.



4. Look through the front bottom opening in the printer and find the *metal bar* at the bottom of the forms device.
5. Grasp the *metal bar* with BOTH hands and pull firmly toward you and then upward until both ends LOCK into place.



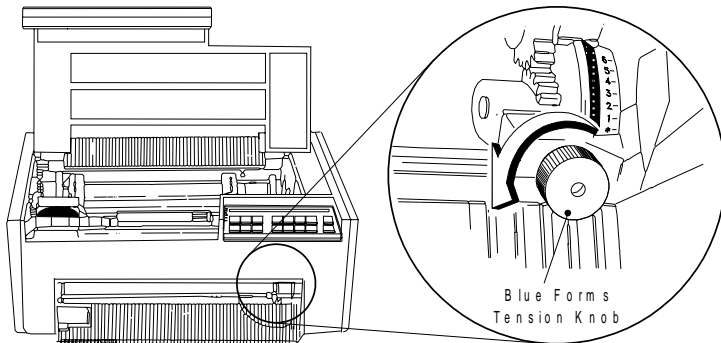
6. To be sure that you have installed the forms device correctly, look at the following figure and compare it to your printer. Check both the left and right sides. Are the *clips* around the *platen rod* as shown? If so, you installed the forms device correctly. If not, repeat Steps 3 through 5.



## Preparing to Load Forms

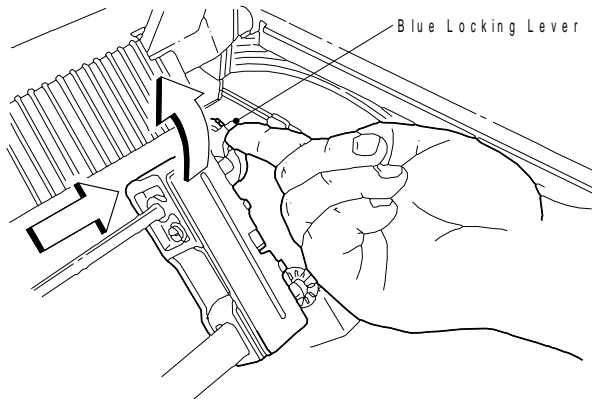
To prepare to load forms in the F1 forms device, follow these steps:

1. Slide the print head to the far left side of the printer.
2. Loosen the **blue forms tension knob** by turning it counterclockwise, and then move the **blue forms tension knob** towards the bottom of the printer until you see the ✱ below the number 1.

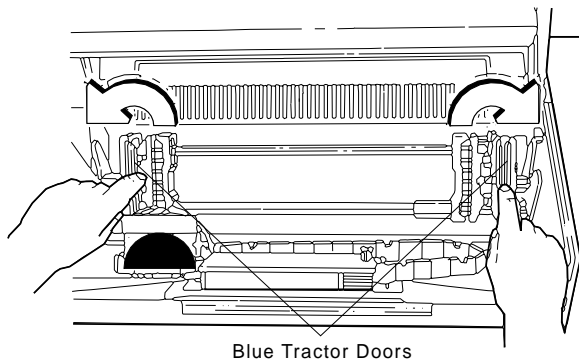


**Note:** Moving the **blue forms tension knob** to the ✱ position lets you load forms.

3. Unlock the **blue locking lever** on the *right tractor*. Slide the tractor to the extreme right.



4. Open both of the **blue tractor doors**.

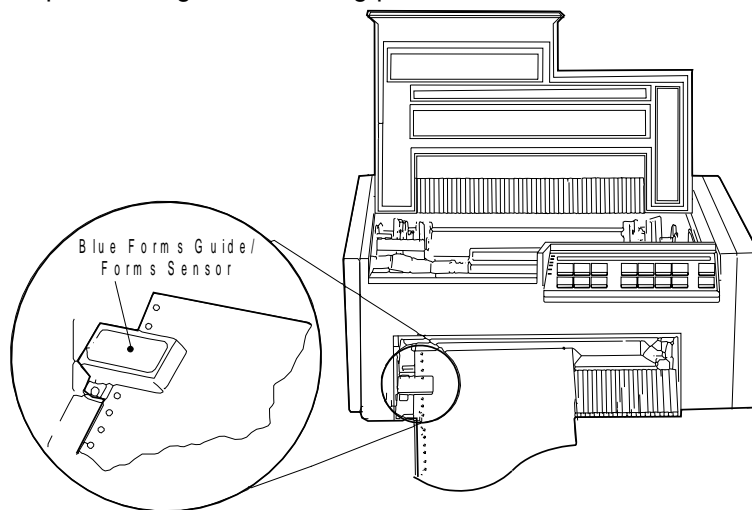


5. Get continuous forms paper that is at least 203.2 mm (8 in.) wide.

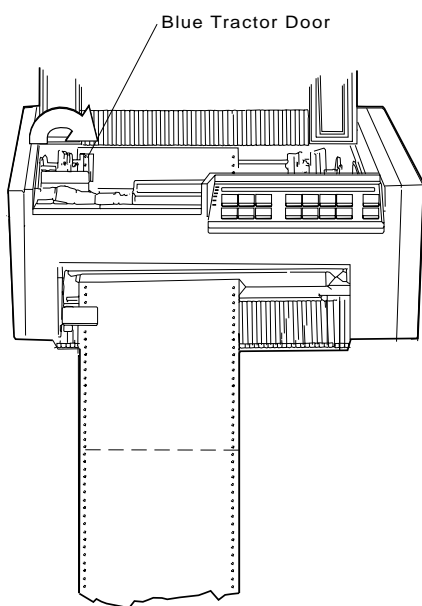
## Loading Forms in the F1 Forms Device

To load forms in the F1 forms device, follow these steps:

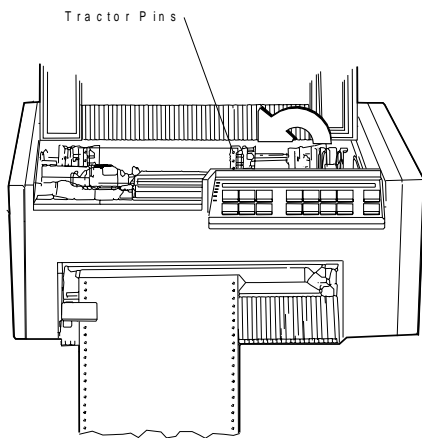
1. Feed the form into the bottom front of the printer. Be sure that the form goes **under** the **blue forms guide/forms sensor** and between the tensioning plates. See the figure on page 1-18 for help in locating the tensioning plates.



2. Align and put the **left paper holes** of the form over the *left tractor pins*. Close the left **blue tractor door**.

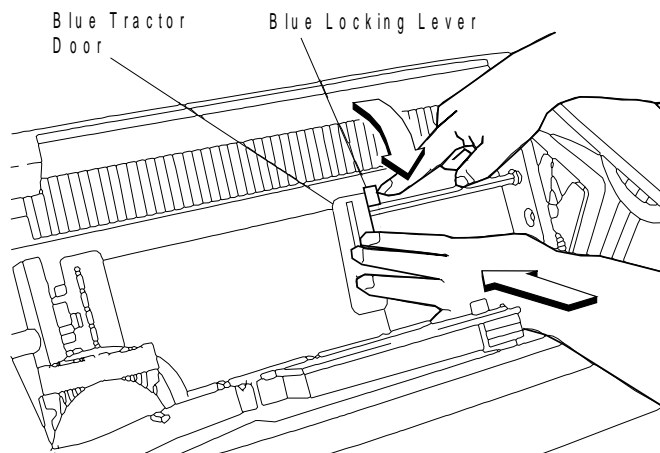


3. Move the *right tractor* until the **right paper holes** of the form fit on the *right tractor pins*. Be sure that the forms are straight.

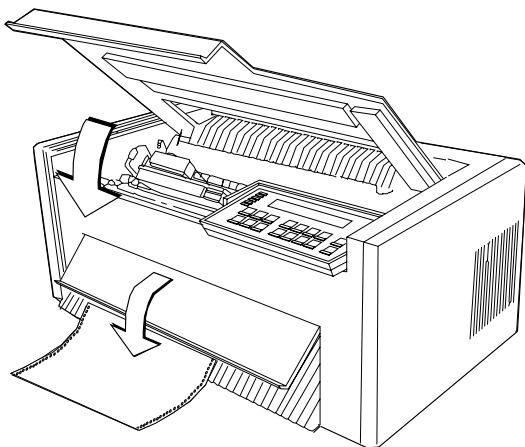


4. Close the right **blue tractor door**. Hold the tractor in place and lock the **blue locking lever**.

**Note:** If necessary, unlock the tractor and adjust it so that the forms are not buckled or stretched too tightly.



5. Close the access cover. Then close the paper door by pulling it out and pushing it down until it latches.



6. To align the top of form position, follow these steps:
  - a. Turn the power On (I) and wait for the power-on sequence to complete (see "Power-On Test" on page 2-3).
  - b. Press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

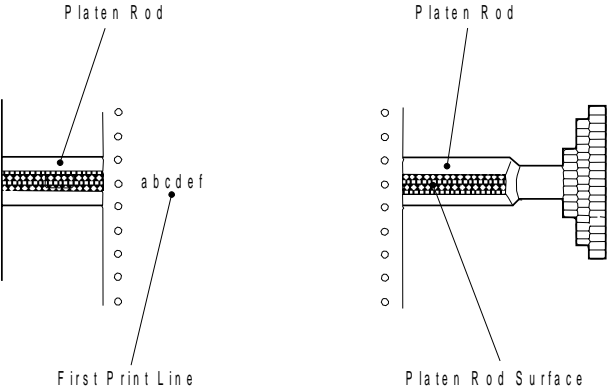
and then may display

029 LINK ERROR
----------------

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)



- c. Press **Micro** ↑, **Micro** ↓, or **Line Feed** to move the form so that the position of the first line you want to print is in the center of the flat platen rod surface.



- d. If you pressed **Micro** ↓, you might have slack in the forms. Pull lightly downward on the forms at the bottom of the printer to remove the slack.
- e. Press **Set Top of Form** to establish the first print line.

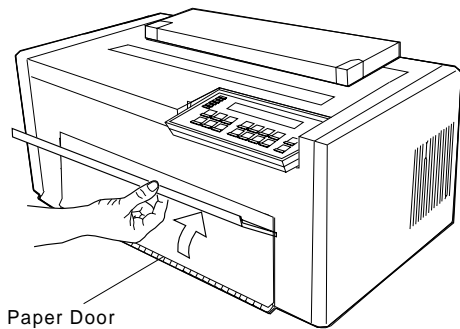
**Note:** The **Set Top of Form** key establishes the first line at which printing is to start on each form. The alarm beeps each time you press the **Set Top of Form** key, and the printer displays

TOP OF FORM SET

7. To adjust the forms tension:

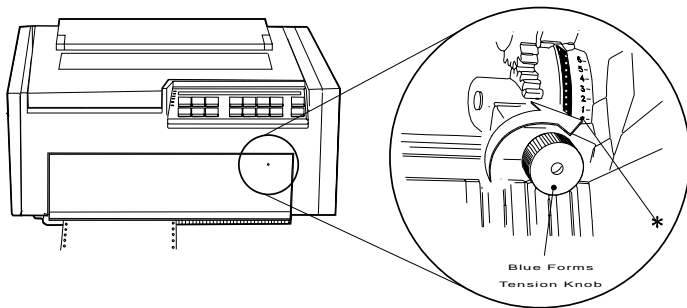
a. Open the front paper door as follows:

- 1) Pull the door up until it will not go any higher.
- 2) Push the door back slightly to lock it in the open position.



- b. Move the **blue forms tension knob** upward to the number of form copies you are using. Make sure you do not unlatch the forms device. For example, if you are using single-part forms, set the lever to **1**. If you are using two-part forms, set the lever to **2**.

Tighten the **blue forms tension knob** by turning it clockwise. Close the paper door by pulling it out and pushing it down until it latches.



c. Press **Start**.

The printer displays

READY	<A>
-------	-----

and then may display

029 LINK ERROR
----------------

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

## Using the Printer Verification Test for the F1 Forms Device

To run the printer verification test, follow these steps:

1. Turn the power On (I) if not already on.
2. Wait until the printer displays

READY	<A>
-------	-----

3. Press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

and then may display

029 LINK ERROR
----------------

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

4. Press **Test**.

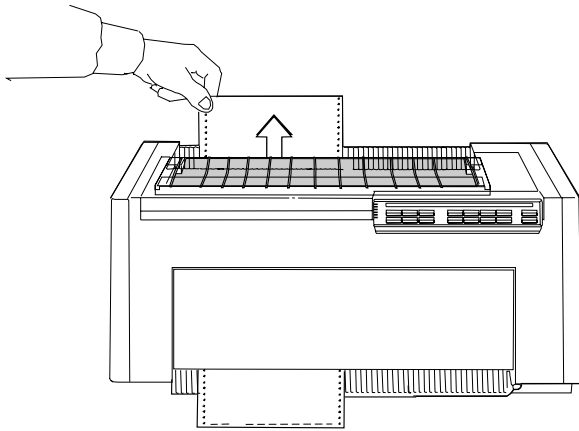
The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

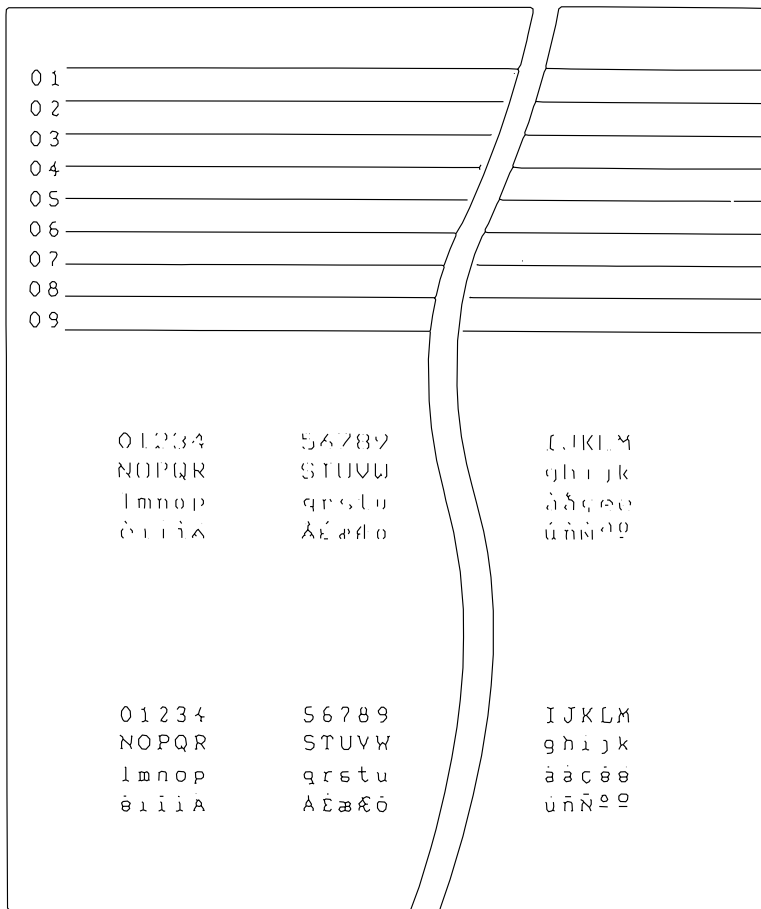
5. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

OPERATOR PRINT TESTS Printer Verification
----------------------------------------------

6. Press **Enter** or **Start** to print this test. The **Ready** indicator comes on and printing begins.
7. Wait for the printer to stop printing and the **Ready** indicator to go off.
8. Press **Form Feed** until you can remove the printout.



The lines numbered 1 through 9 should print as shown on the sample printout on page 1-31, and the remainder of the printout should be clear and readable.



9. Compare your printout with the sample printout.

Did the lines print and is the remainder of the printout clear and readable?

If *YES*, go to Step 10.

If *NO*, do the following:

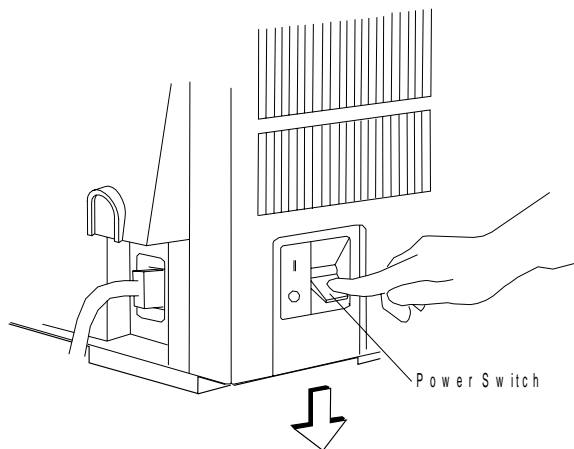
- a. If any of the following items are not installed correctly, the printer can experience forms jamming, ribbon jamming, or an incorrect printer verification printout:

- Forms device
- Ribbon cartridge
- Forms.

Repeat the Setup Instructions from page 1-6 if you suspect a ribbon, forms, or forms device installation problem.

- b. Be sure that enough forms are loaded and press **Enter** or **Start** to get another printout.
- c. If the second printout is not similar to the sample printout, go to Appendix B, "Problem Solving."
- d. Once you get a good printout, go to Step 10.

10. Turn the power Off (O).



### Setup and Checkout Complete

You have completed a simple setup and checkout of the printer. IBM recommends that you print your power-on custom set (Custom Set A) factory defaults and save this printout for future reference. You are ready to attach the printer to your computer. Go to "Attaching the 4232 Printer Model 302 to Your Computer" on page 1-116.

**Note:** See pages 1-35 through 1-51 for making adjustments, unloading forms, and removing the forms device.



## Adjusting the Print Quality

After the printer prints a few lines, press **Stop** and verify that the print quality is satisfactory. Good print quality includes:

- Clear, legible print
- Satisfactory darkness or lightness of output.

It is up to you to decide if the print quality is satisfactory.

Adjustments you can make that affect print quality include:

- **Tractor Tension**

Incorrect tension on the right tractor can cause the paper holes on the forms to tear, wrinkle, or jam in the printer. To adjust the tractor tension, see “Adjusting the Tractor Tension” on page 1-37.

- **Forms Thickness Setting**

This setting can affect the darkness or lightness of output.

The printer will normally sense the forms thickness and adjust itself automatically. However, if this setting is not correct, it can be adjusted. To adjust the forms thickness, see “Adjusting the Forms Thickness Setting” on page 1-38.

**Note:** The Automatic Forms Thickness Adjustment (AFTA) mechanism automatically measures the forms thickness and adjusts the gap from the print head to the platen rod based on the measured value. See “Automatic Forms Thickness Adjustment (AFTA)” on page 2-8 for information on how the printer sets the forms thickness.

- **Forms Tension**

Incorrect tension on the forms can cause forms to tear, wrinkle, or buckle and can affect the appearance of the output. To adjust the forms tension, see “Adjusting the Forms Tension” on page 1-40.

- **Left Margin and Top of Form Position**

The adjustment of the first print position can affect the appearance of the output, especially if you are using preprinted forms. To adjust the position of the first print character, see “Adjusting the Left Margin” on page 1-42. To adjust the position of the first print line, see “Adjusting the Top of Form Position” on page 1-44.

- **Print Alignment**

This adjustment can affect the character formation and dot mixing on those characters that are printed with two passes of the print mechanism. To adjust the print alignment, see “Adjusting the Print Alignment” on page 1-46.

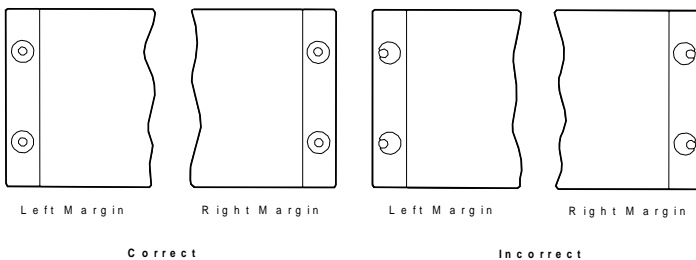
### Adjusting the Tractor Tension

The tractor tension adjustment controls the amount of buckle the forms have after they are loaded in the printer. Since the left tractor does not move, you make this adjustment by moving the right tractor.

The ideal adjustment is to center the right and left paper holes of the forms on the tractor pins without stretching or tearing the holes.

To adjust the tractor tension on the F1 forms device, follow these steps:

1. Feed several forms through the printer.
2. Observe the left and right paper holes of the forms:
  - If the paper holes are stretched or torn on the outside edges, the tractor tension is too tight (not enough buckle in the forms).
  - If the forms twist or wrinkle as they move through the printer, the tractor tension is too loose (too much buckle in the forms).
3. Adjust the right tractor as necessary:
  - Unlock and move the tractor toward the left side of the printer to loosen the tension on the forms.
  - Unlock and move the tractor toward the right side of the printer to tighten the tension on the forms.



4. Lock the tractor.

### Adjusting the Forms Thickness Setting

To adjust the lightness or darkness of the print, you must increase or decrease the gap between the print head and the platen rod. This distance is automatically set for you by the Automatic Forms Thickness Adjustment (AFTA), but you can make corrections to the distance if the print output is not as you desire. It is up to you to decide if the print is dark (or light) enough to meet your requirements.

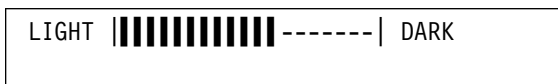
To adjust the forms thickness setting with the F1 forms device, follow these steps:

1. The forms thickness setting must be adjusted when the printer is printing or has printed and is *ready*. Press **Start**, if needed, to have the printer display



2. To make the print darker, press **Darker**.

The printer displays

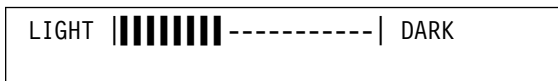


The print head moves closer to the paper, and the print becomes darker.

**Note:** The print may not get darker if the ribbon is worn or if there is a problem with the print head.

3. To make the print lighter, press **Lighter**.

The printer displays



The print head moves farther away from the paper, and the print becomes lighter.



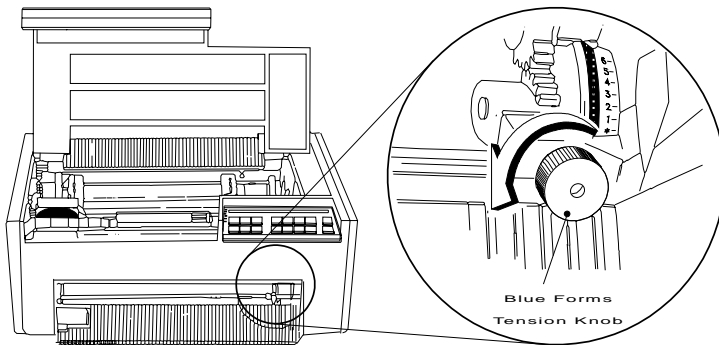
### Adjusting the Forms Tension

The forms tension lever controls the tension on the forms. The **blue forms tension knob** lets you adjust the setting of the forms tension lever. The forms tensioner is a metal plate with a row of metal fingers that applies tension to the form according to the setting of the forms tension lever.

Settings range from \* to 6. The \* setting puts no tension on the form and allows forms to pass freely while loading. The 1 setting puts the least amount of tension on the form. Settings 2 through 6 vary the amount of tension on the form and approximately relate to the number of sheets in the form you use. Set the tension lever to the number of sheets in the form being used.

**Note:** Higher numbers are toward the top and lower numbers are toward the bottom of the printer.

When you adjust the forms tension, be sure that the forms are not held too tightly or too loosely. If too much tension is on the forms, the forms can tear, the paper holes of the form can stretch, and forms can jam. If too little tension is on the forms, the forms can wrinkle or buckle, causing the forms to jam.



**Decreasing Forms Tension:** To decrease tension on the forms, follow these steps:

1. Loosen the **blue forms tension knob** by rotating the knob counterclockwise.
2. Move the knob to a lower number setting.  
For example, if the knob was set at 3, move the knob to 2.
3. Tighten the **blue forms tension knob** by rotating the knob clockwise. Be sure to avoid unlatching the F1 forms device when adjusting the forms tension.
4. Press **Start** to print.
5. Observe the forms.

If the form paper holes are still tearing or stretching, press **Stop** and repeat Steps 1 through 5 of this procedure.

If the forms are buckling, there is too little tension on the forms.

If the tension is satisfactory, continue to print.

**Increasing Forms Tension:** To increase tension on the forms, follow these steps:

1. Loosen the **blue forms tension knob** by rotating the knob counterclockwise.
2. Move the knob to a higher number setting.  
For example, if the knob was set at 2, move the knob to 3.
3. Tighten the **blue forms tension knob** by rotating the knob clockwise. Be sure to avoid unlatching the F1 forms device when adjusting the forms tension.
4. Press **Start** to print.
5. Observe the forms.

If the forms are still buckling, press **Stop** and repeat Steps 1 through 5 of this procedure.

If the forms are tearing or jamming, there is too much tension on the forms.

If the tension is satisfactory, continue to print.

### Adjusting the Left Margin

You can print a single line of text to help in setting the left margin position using the Left Margin Alignment Test. You can also change the current left margin position using this test.

You can set the left margin position from 1 to 66 units (where each unit is 0.686 mm [0.027 in.]). The factory default setting is 10. The margin is measured starting at 1.27 mm (0.05 in.) from the center of the tractor pins for continuous forms and from the left edge of a cut form.

To align the left margin position, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

```
NOT READY                <A>
```

2. Enter the Operator Print Tests by pressing **Test**.

The printer displays

```
OPERATOR PRINT TESTS  
Printer Demonstration
```

3. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

```
OPERATOR PRINT TESTS  
Left Margin Alignment
```

4. Press **Enter** or **Start** to begin the test.

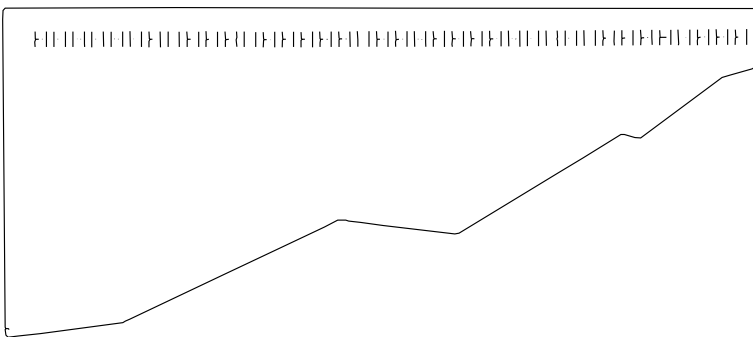
The printer displays

```
Left Margin Position  
* xxx
```

where xxx is the current value of the left margin position.



The printer also prints a single line of *H*'s.



5. If the *H*'s do not start where you want your left margin, press **Scroll** ↑ or **Scroll** ↓ until the printer displays the desired value for the left margin position.
6. Press **Enter**.  
An asterisk (✱) appears in front of the selected value. The forms advance one line and the row of *H*'s prints again. This value is now the current left margin position.
7. Repeat Steps 5 and 6 until the left margin is correctly positioned. (You can press **Line Feed** or **Form Feed** to move the forms between printing the rows of *H*'s.)
8. Press **Stop** or **Cancel Print** to exit the test.

**Note:** If you want the new left margin position saved when you turn off the printer, you must save it in a Custom Set. See "Storing Configuration Parameters" in *IBM 4232 Printer Model 302 Operator Panel Instructions* for information on saving configurations.

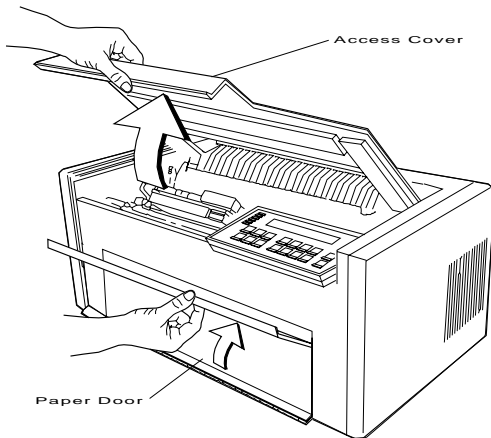
You may also adjust the left margin position without printing the row of *H*'s by changing the Left Margin Position in the Configuration Menu. (See "Using Print Format and Quality Parameters" in *IBM 4232 Printer Model 302 Operator Panel Instructions*.)

### Adjusting the Top of Form Position

The **Micro** ↑ and **Micro** ↓ keys control fine vertical movement. Each time you press these keys, the printer moves the form in 0.355 mm (0.014 in.) increments.

Open the access cover. Then open the front paper door as follows:

1. Pull the door up until it will not go any higher.
2. Push the door back slightly to lock it in the open position.



Next load forms, if necessary (see “Loading Forms in the F1 Forms Device” on page 1-23 for more information). Complete the following steps to make fine vertical adjustments to the top of form position.

To set the top of form position, follow these steps:

1. Press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

2. If the first print line is not where you want it to be, press **Micro** ↑, **Micro** ↓, or **Line Feed** until it reaches the desired line.

**Note:** If you need to adjust the paper downward, adjust at least five steps beyond where you want the top of form position; then make your final adjustment in the up direction. You can also use the Top of Form Alignment Test (see “Top of Form Alignment” on page 4-4) to print a line of characters to determine more accurately where you have set the top of form position.

3. When the form is in the correct position, press **Set Top of Form**. The alarm beeps and the printer displays

TOP OF FORM SET

4. Advance the form by pressing **Form Feed**, and decide if the form is on the desired line. If necessary, repeat Steps 1 through 4 of this procedure until the first print line is correctly aligned.

### Adjusting the Print Alignment

You can adjust dot registration and print quality for characters created using bidirectional printing. The bidirectional alignment may need periodic adjustment to maintain print quality.

To change the bidirectional alignment, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

2. Press **Test**.

The printer displays

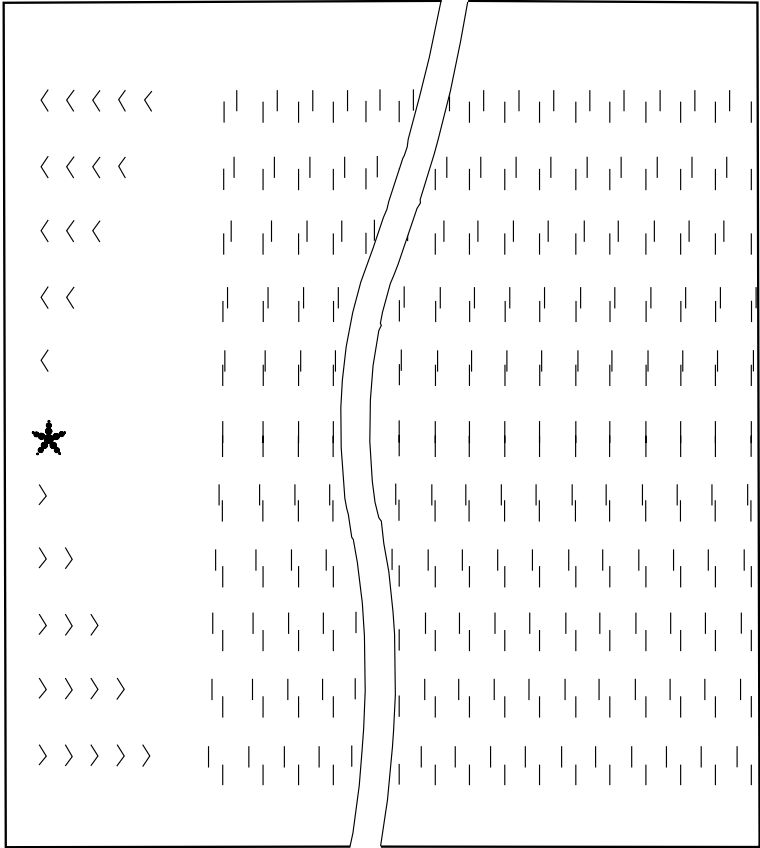
OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

3. Press **Scroll** ↓ or **Scroll** ↑ until the printer displays

OPERATOR PRINT TESTS Bidirectional Adjustment
--------------------------------------------------

4. Press **Enter** or **Start** to print this test.

The **Ready** indicator goes on and printing begins. The test prints samples using alignment values higher and lower than the default value. The print sample using the default value is indicated with an asterisk (\*). The alignment printout is complete when the **Ready** indicator goes off.



The printer displays

Bidirectional Adjustment  
\*

5. If the default value does not give the best print sample, press **Scroll** ↓ or **Scroll** ↑ until the printer displays the same number of arrows that were printed beside the *best* print sample line. Press **Enter** to set this as the new default value. The printer then prints another line to demonstrate the new default value, and the test is complete.

or

Press **Stop** to end the test without changing anything and return to the Operator Print Tests menu.

or

Press **Cancel Print** to end the test, exit test mode, perform a partial reset, and have the printer display

READY	<A>
-------	-----

**Note:** See Chapter 4, “Using the Operator Print Tests” for more information.

## Unloading Forms

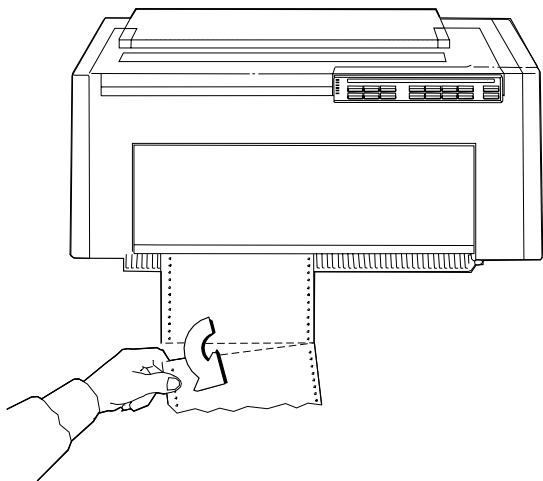
To unload forms from the F1 forms device, follow these steps:

1. Press **Stop**.

The printer displays

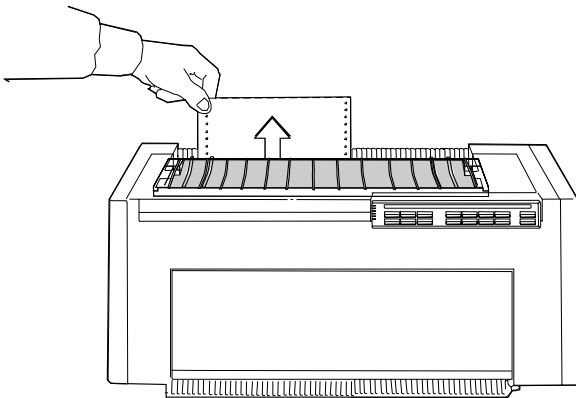


2. Open the acoustic cover.
3. Grasp the form below the printer and tear along the perforation.



4. Press **Form Feed** as many times as needed to advance and remove the remaining form or forms.

5. Remove the form or forms from the top of the printer.



**Warning:** Do not remove forms by pulling them out from the bottom. Damage to the forms device can result.

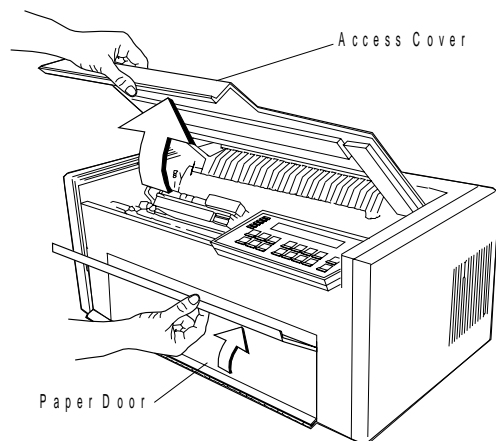


## Removing the Continuous Forms Device (F1)

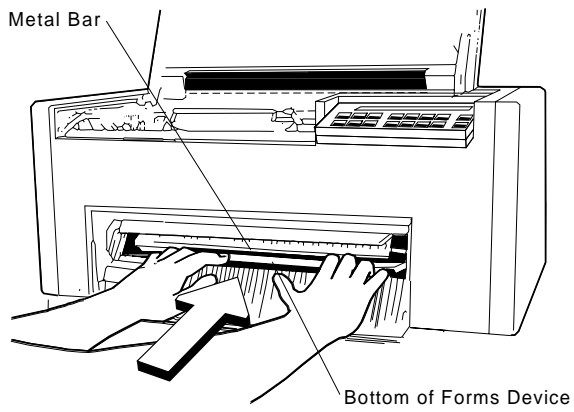
**Note:** If you are removing this forms device to install a different forms device, make sure you change the selected forms device in the Configuration Menu.

To remove the F1 forms device, follow these steps:

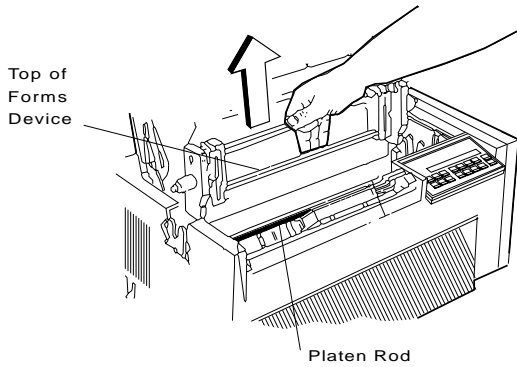
1. If forms are in the printer, unload them (see “Unloading Forms” on page 1-49); then continue with Step 2 of this procedure.
2. Turn the power Off (O).
3. Open the access cover. Then open the front paper door as follows:
  - a. Pull the door up until it will not go any higher.
  - b. Push the door back slightly to lock it in the open position.



4. Push the metal bar at the bottom of the device toward the rear of the printer until the forms device unlocks.



5. Grasp the top of the forms device and lift it out.



---

## Installing and Using the Dual Purpose Forms Device (F2)

The following sections describe how to install and use the Dual Purpose Forms Device (F2).

**Note:** Make sure that the proper forms device is configured. See “Preparing for Forms Device Installation” on page 1-10 for the exact steps.

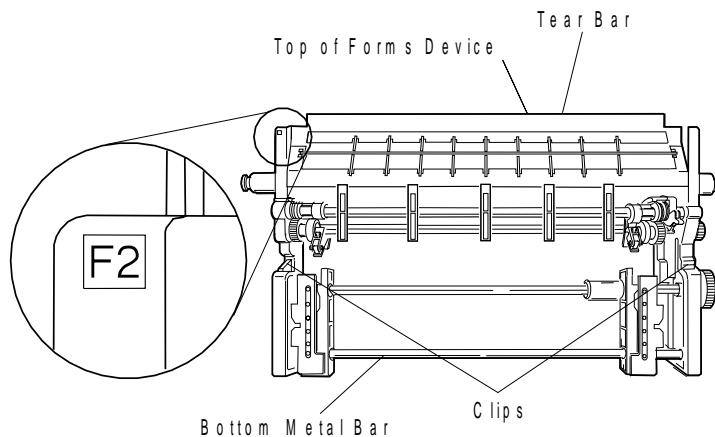
### Installing the Dual Purpose Forms Device (F2)

To install the F2 forms device, follow these steps:

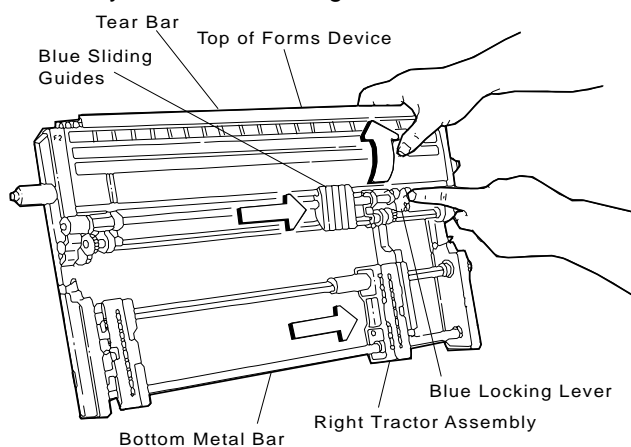
1. Hold the forms device so that the *device number F2* is in the upper left corner facing you. Note the bottom *metal bar* and the *clips*; they will be important later.

#### Important

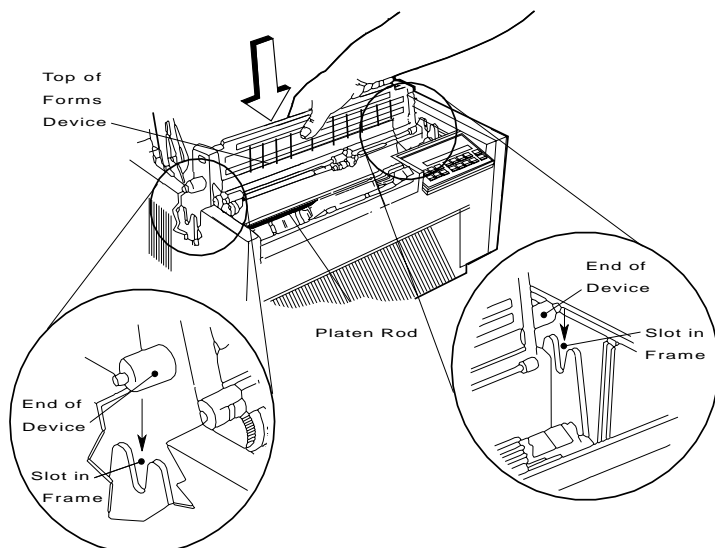
The F2 forms device for the 4232 Printer Model 302 has a box around the F2 emblem. Use only these forms devices in the printer.



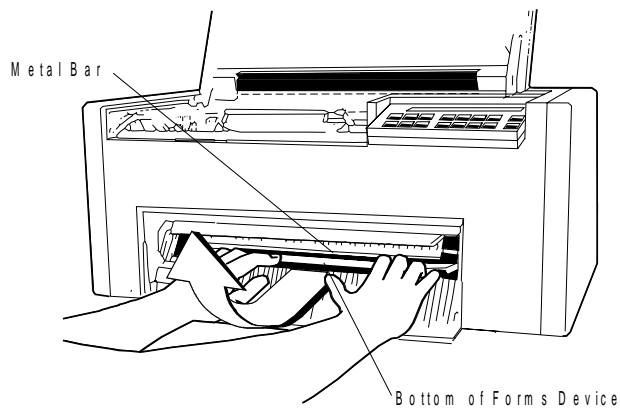
2. Unlock the right **blue locking lever** and move the right tractor assembly to the extreme right.



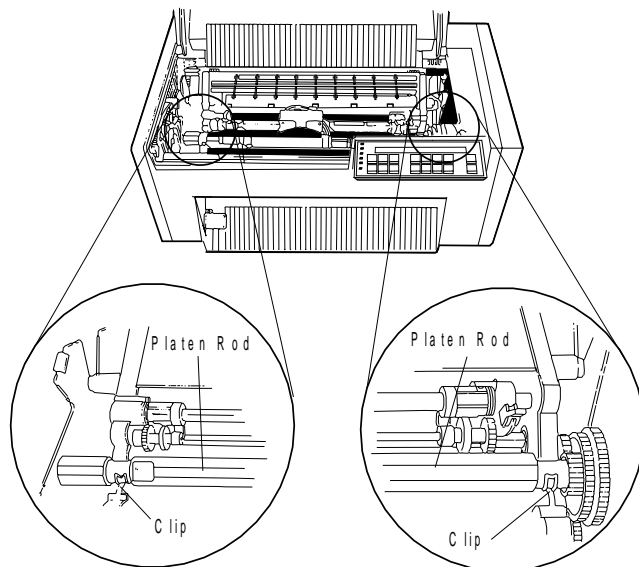
3. Lower the forms device into the printer behind the *platen rod*. Be sure that **F2** is in the upper left corner facing you and the **blue tractor doors** at the bottom of the device enter the printer first. Align the ends of the device with the slots in the frame. Continue to lower the frame until the ends of the device rest in the slots of the frame.



4. Look through the front bottom opening in the printer and find the *metal bar* at the bottom of the forms device.
5. Grasp the *metal bar* with BOTH hands and pull firmly toward you and then upward until both ends LOCK into place.



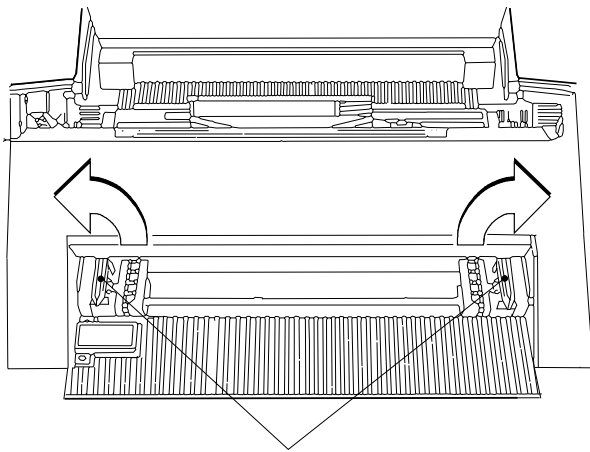
6. To be sure that you have installed the forms device correctly, look at the following figure and compare it to your printer. Check both the left and right sides. Are the *clips* around the *platen rod* as shown? If so, you installed the forms device correctly. If not, repeat Steps 3 on page 1-54 through 5.



## Preparing to Load Forms

To prepare to load forms in the F2 forms device, follow these steps:

1. Slide the print head to the far left side of the printer.
2. Open both of the **blue tractor doors**.



Blue Tractor Doors

3. Get continuous forms paper that is at least 203.2 mm (8 in.) wide.

## Loading Forms in the F2 Forms Device

To load forms in the F2 forms device, follow these steps:

1. Turn the power On (I) (see "Power-On Test" on page 2-3).
2. Wait until the printer displays

001 END OF FORMS  
LOAD FORMS

3. Press **Stop**.

The printer displays

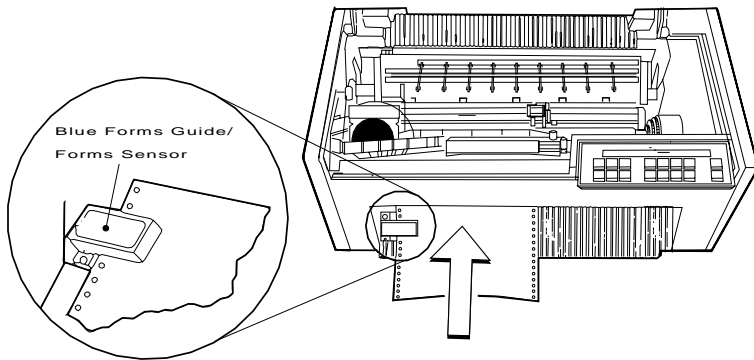
NOT READY <A>

and then may display

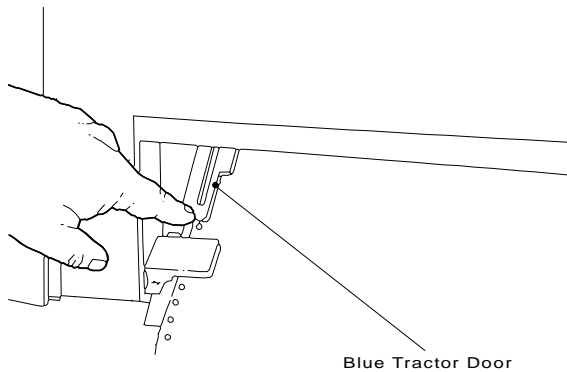
029 LINK ERROR

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

4. Feed the form into the printer until the paper is on at least two tractor pins on each side. Be sure that the form goes **under** the blue forms guide/forms sensor.

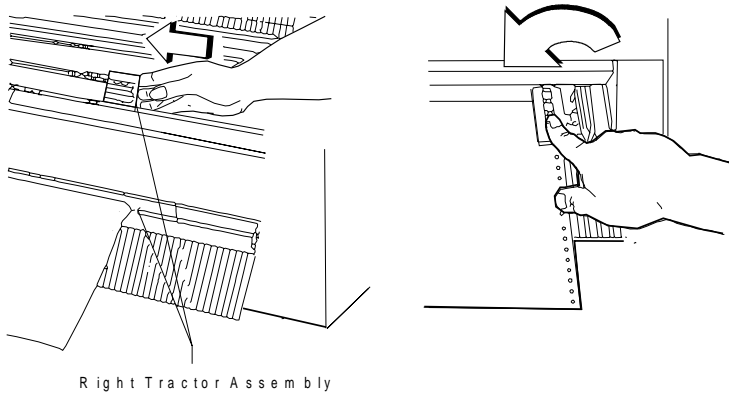


5. Put the *left paper holes* over the *left tractor pins*. Close the left **blue tractor door**.

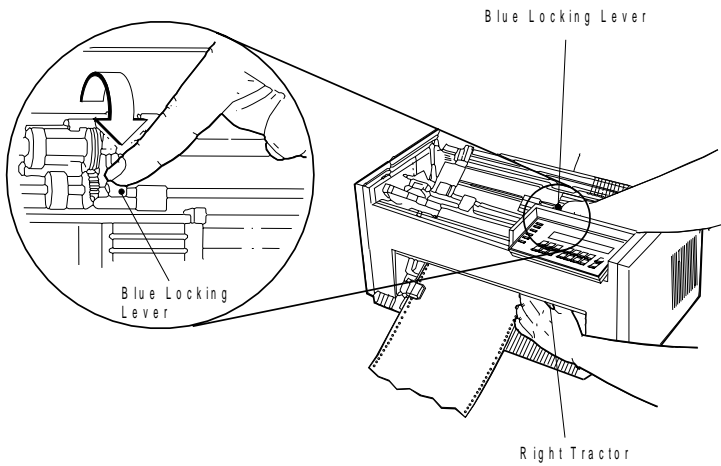




6. Move the right tractor assembly and **blue sliding guides** until the **right paper holes** of the form fit on the *right tractor pins*. Be sure that the forms are straight. Close the right **blue tractor door**.

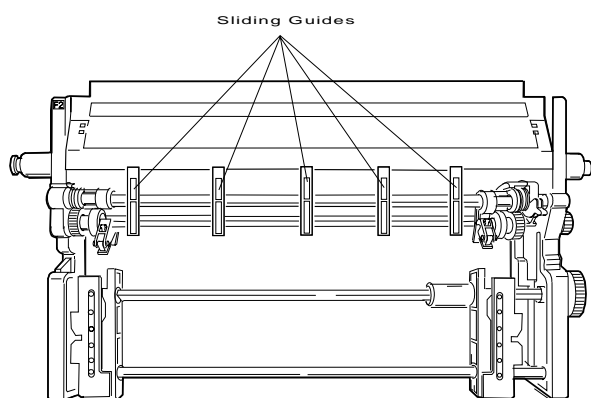


7. Hold the *right tractor* in place and lock the **blue locking lever**.



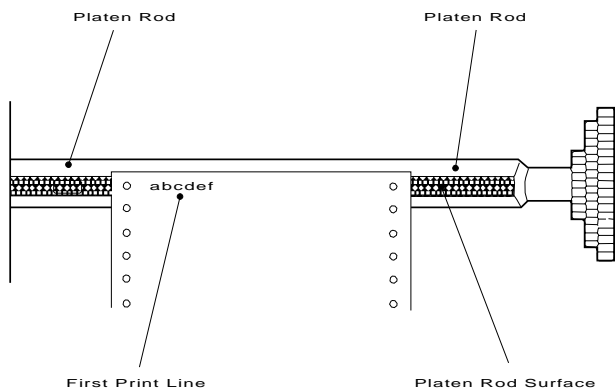
**Note:** If necessary, unlock the tractor and adjust it so that the forms are not buckled or stretched too tightly. Be sure that you lock the locking lever when you are finished adjusting.

8. Evenly space the **blue sliding guides** between the tractors.



9. Perform an autoload by pressing **Load/Eject**, and the form will automatically move to the load position. For more information, see "Adjusting the Load Position" on page 1-78.

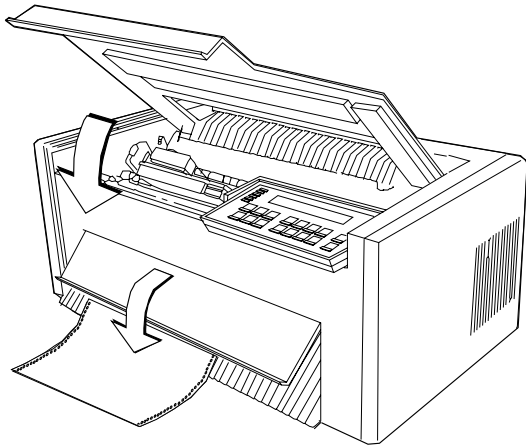
**Note:** You can adjust the load position by using the **Micro** ↑, **Micro** ↓, or **Line Feed** keys. If you plan to use the Document on Demand feature, see "Adjusting the Tear-off Position" on page 1-76 for more information.



10. If you adjusted the load position, press **Set Top of Form** to keep the load position consistent with the top of form position. Pressing **Set Top of Form** establishes the first print line at which printing is to start on each form. The alarm beeps each time you press the **Set Top of Form** key and the printer displays

TOP OF FORM SET

11. Close the access cover. Then close the paper door by pulling it out and pushing it down until it latches.



**Note:** If you load forms on the tractors before turning on the power, the printer will automatically load forms to the load position.

## Using the Printer Verification Test for the F2 Forms Device

To run the printer verification test, follow these steps:

1. Turn the power On (I) if not already on.
2. Wait until the printer displays

READY	<A>
-------	-----

3. Press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

and then may display

029 LINK ERROR
----------------

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

4. Press **Test**.

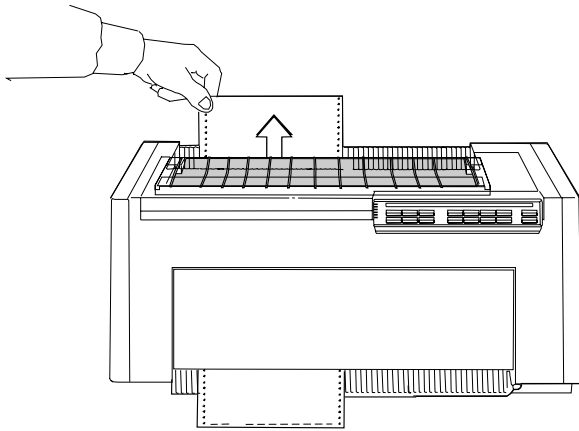
The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

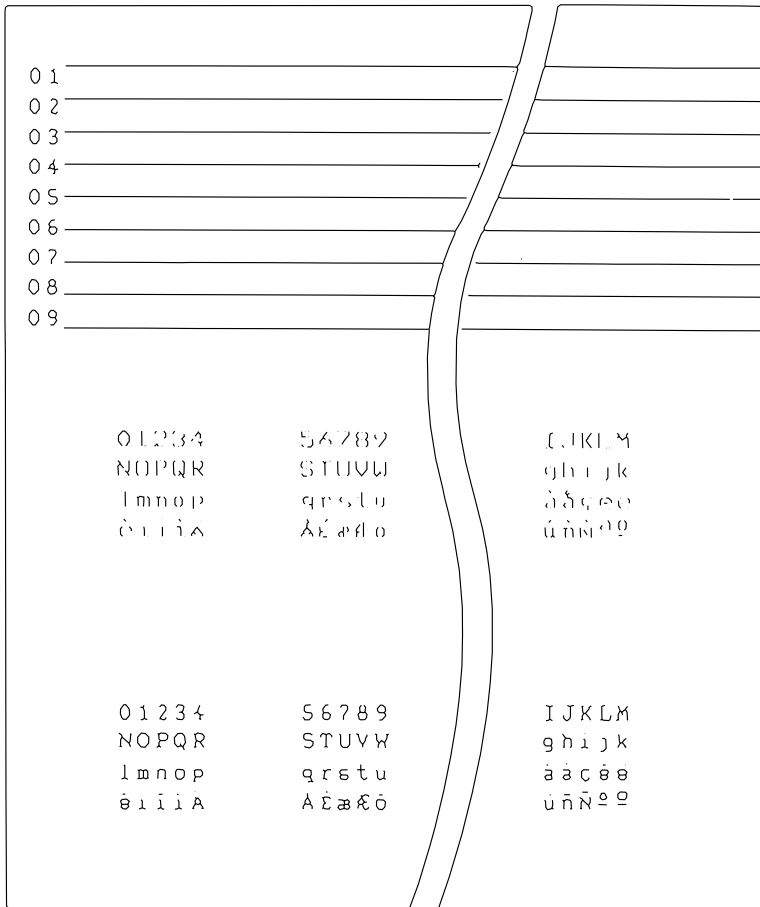
5. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

OPERATOR PRINT TESTS Printer Verification
----------------------------------------------

6. Press **Enter** or **Start** to print this test. The **Ready** indicator comes on and printing begins.
7. Wait for the printer to stop printing and the **Ready** indicator to go off.
8. Press **Form Feed** until you can remove the printout.



The lines numbered 1 through 9 should print as shown on the sample printout on page 1-64, and the remainder of the printout should be clear and readable.



9. Compare your printout with the sample printout.

Did the lines print and is the remainder of the printout clear and readable?

If *YES*, go to Step 10.

If *NO*, do the following:

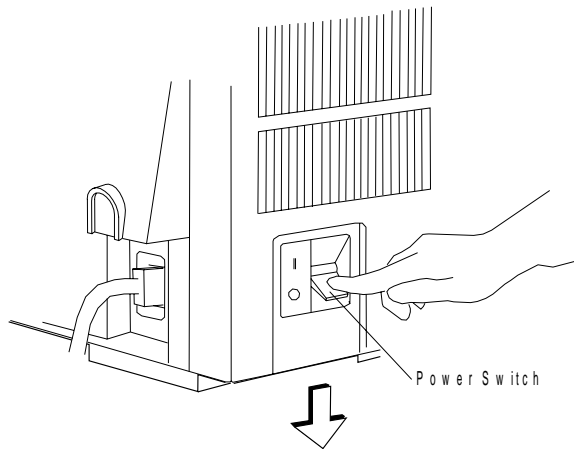
- a. If any of the following items are not installed correctly, the printer can experience forms jamming, ribbon jamming, or an incorrect printer verification printout:

- Forms device
- Ribbon cartridge
- Forms.

Repeat the Setup Instructions on page 1-6 if you suspect a ribbon, forms, or forms device installation problem.

- b. Be sure that enough forms are loaded and press **Enter** or **Start** to get another printout.
- c. If the second printout still is not similar to the sample printout, go to Appendix B, "Problem Solving."
- d. Once you get a good printout, go to Step 10.

10. Turn the power Off (O).



### Setup and Checkout Complete

You have completed a simple setup and checkout of the printer. IBM recommends that you print your power-on custom set (Custom Set A) factory defaults and save this printout for future reference. You are ready to attach the printer to your computer. Go to "Attaching the 4232 Printer Model 302 to Your Computer" on page 1-116.

**Note:** See pages 1-67 through 1-83 for making adjustments, unloading forms, and removing the forms device.



## Adjusting the Print Quality

After the printer prints a few lines, press **Stop** and verify that the print quality is satisfactory. Good print quality includes:

- Clear, legible print
- Satisfactory darkness or lightness of output.

It is up to you to decide if the print quality is satisfactory.

Adjustments you can make that affect print quality include:

- **Tractor Tension**

Incorrect tension on the right tractor can cause the paper holes on the forms to tear, wrinkle, or jam in the printer. To adjust the tractor tension, see “Adjusting the Tractor Tension” on page 1-68.

- **Forms Thickness Setting**

This setting can affect the darkness or lightness of output.

The printer will normally sense the forms thickness and adjust itself automatically. However, if this setting is not correct, it can be adjusted. To adjust the forms thickness, see “Adjusting the Forms Thickness Setting” on page 1-70.

**Note:** The Automatic Forms Thickness Adjustment (AFTA) mechanism automatically measures the forms thickness and adjusts the gap from the print head to the platen rod based on the measured value. See “Automatic Forms Thickness Adjustment (AFTA)” on page 2-8 for information on how the printer sets the forms thickness.

- **Left Margin and Top of Form Position**

The adjustment of the first print position can affect the appearance of the output, especially if you are using preprinted forms. To adjust the position of the first print character, see “Adjusting the Left Margin” on page 1-72. To adjust the position of the first print line, see “Adjusting the Top of Form Position” on page 1-74.

- **Tear-off Position**

By moving the perforations in continuous forms close to the tear bar, you can separate the forms more easily. To adjust the tear position, see “Adjusting the Tear-off Position” on page 1-76.

- **Load Position**

By using the operator panel, you can adjust the load position. To adjust the load position, see “Adjusting the Load Position” on page 1-78.

- **Print Alignment**

This adjustment can affect the character formation and dot mixing on those characters that are printed with two passes of the print mechanism. To adjust the print alignment, see “Adjusting the Print Alignment” on page 1-78.

### **Adjusting the Tractor Tension**

The tractor tension adjustment controls the amount of buckle that the forms have after they are loaded in the printer. Since the left tractor does not move, you make this adjustment by moving the right tractor.

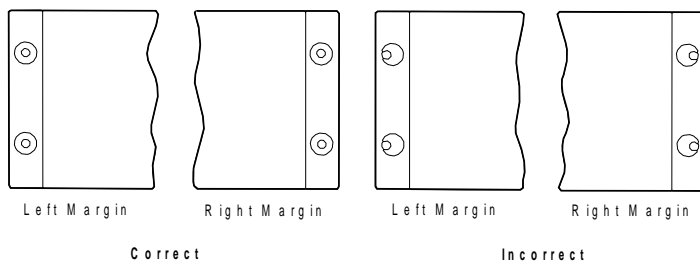
The ideal adjustment is to center the right and left paper holes of the forms on the tractor pins without stretching or tearing the holes.

To adjust the tractor tension on the F2 forms device, follow these steps:

1. Feed several forms through the printer.
2. Observe the left and right paper holes of the forms:
  - If the paper holes are stretched or torn on the outside edges, the tractor tension is too tight (not enough buckle in the forms).
  - If the forms twist or wrinkle as they move through the printer, the tractor tension is too loose (too much buckle in the forms).

3. Adjust the right tractor as necessary:

- Unlock and move the tractor toward the left side of the printer to loosen the tension on the forms.
- Unlock and move the tractor toward the right side of the printer to tighten the tension on the forms.



4. Lock the tractor.

### Adjusting the Forms Thickness Setting

To adjust the lightness or darkness of the print, you must increase or decrease the gap between the print head and the platen rod. This distance is automatically set for you by the Automatic Forms Thickness Adjustment (AFTA), but you can make corrections to the distance if the print output is not as you desire. It is up to you to decide if the print is dark (or light) enough to meet your requirements.

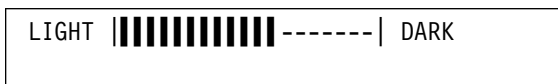
To adjust the forms thickness setting with the F2 forms device, follow these steps:

1. The forms thickness setting must be adjusted when the printer is printing or has printed and is *ready*. Press **Start**, if needed, to have the printer display



2. To make the print darker, press **Darker**.

The printer displays

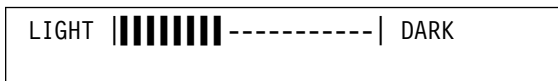


The print head moves closer to the paper, and the print becomes darker.

**Note:** The print may not get darker if the ribbon is worn or if there is a problem with the print head.

3. To make the print lighter, press **Lighter**.

The printer displays



The print head moves farther away from the paper, and the print becomes lighter.

4. When you release the key, the printer automatically saves the current value.

**Note:** The █'s indicate the position of the print head relative to the limits.

As long as you press **Darker** or **Lighter**, the printer displays an increasing amount of darkness or lightness until one of the limits of the gap is reached. The printer displays either

```
LIGHT ██████████ | DARK
DARKNESS LIMIT REACHED
```

or

```
LIGHT █----- | DARK
LIGHTNESS LIMIT REACHED
```

As you adjust the gap, you may also see the printer display

```
LIGHT ██████████----- | DARK
DEFAULT DARKNESS
```

This message tells you that the forms thickness setting is at the automatically set value.

See "Understanding the Operator Panel" in *IBM 4232 Printer Model 302 Operator Panel Instructions* for more information on this setting.

### Adjusting the Left Margin

You can print a single line of text to help in setting the left margin position using the Left Margin Alignment Test. You can also change the current left margin position using this test.

You can set the left margin position from 1 to 66 units (where each unit is 0.686 mm [0.027 in.]). The factory default setting is 10. The margin is measured starting at 1.27 mm (0.05 in.) from the center of the tractor pins for continuous forms and from the left edge of a cut form.

To align the left margin position, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

2. Enter the Operator Print Tests by pressing **Test**.

The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

3. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

OPERATOR PRINT TESTS Left Margin Alignment
-----------------------------------------------

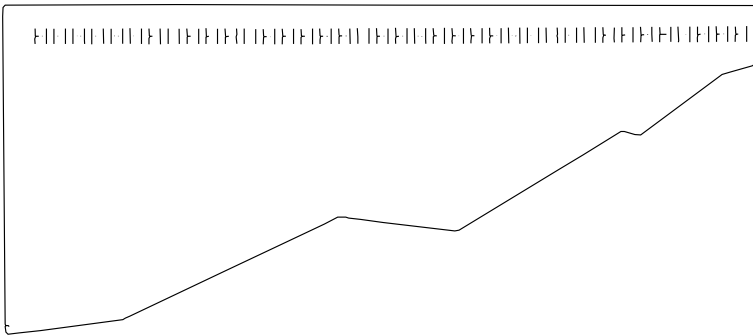
4. Press **Enter** or **Start** to begin the test.

The printer displays

Left Margin Position * xxx
-------------------------------

where xxx is the current value of the left margin position.

The printer also prints a single line of *H*'s.



5. If the *H*'s do not start where you want your left margin, press **Scroll** ↑ or **Scroll** ↓ until the printer displays the desired value for the left margin position.
6. Press **Enter**.  
An asterisk (∗) appears in front of the selected value. The forms advance one line and the row of *H*'s prints again. This value is now the current left margin position.
7. Repeat Steps 5 and 6 until the left margin is correctly positioned. (You can press **Line Feed** or **Form Feed** to move the forms between printing the rows of *H*'s.)
8. Press **Stop** or **Cancel Print** to exit the test.

**Note:** If you want the new left margin position saved when you turn off the printer, you must save it in a Custom Set. See “Storing Configuration Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions* for information on saving configurations.

You may also adjust the left margin position without printing the row of *H*'s by changing the Left Margin Position in the Configuration Menu. (See “Using Print Format and Quality Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.)

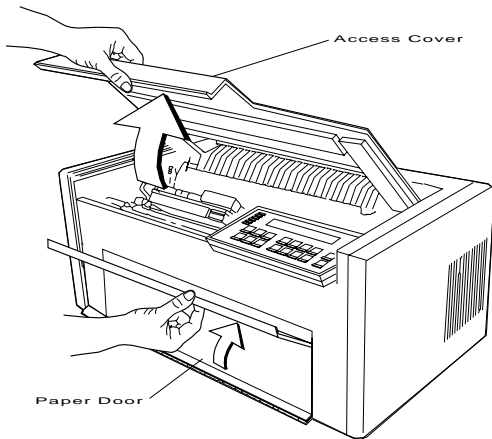
### Adjusting the Top of Form Position

The **Micro** ↑ and **Micro** ↓ keys control fine vertical movement. Each time you press these keys, the printer moves the form in 0.355 mm (0.014 in.) increments.

**Note:** If you use the **Micro** ↑, **Micro** ↓, or **Line Feed** keys to adjust the print position, you may need to reprint the page.

Open the access cover. Then open the front paper door as follows:

1. Pull the door up until it will not go any higher.
2. Push the door back slightly to lock it in the open position.

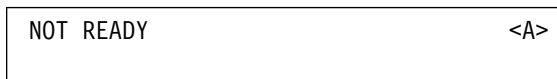


Next load forms, if necessary (see "Loading Forms in the F2 Forms Device" on page 1-57 for more information). Complete the following steps to make fine vertical adjustments to the top of form position.

To set the top of form position, follow these steps:

1. Press **Stop**.

The printer displays





2. If the first print line is not where you want it to be, press **Micro** ↑, **Micro** ↓, or **Line Feed** until it reaches the desired line.

**Note:** If you need to adjust the paper downward, adjust at least five steps beyond where you want the top of form position; then make your final adjustment in the up direction. You can also use the Top of Form Alignment Test (see “Top of Form Alignment” on page 4-4) to print a line of characters to determine more accurately where you have set the top of form position.

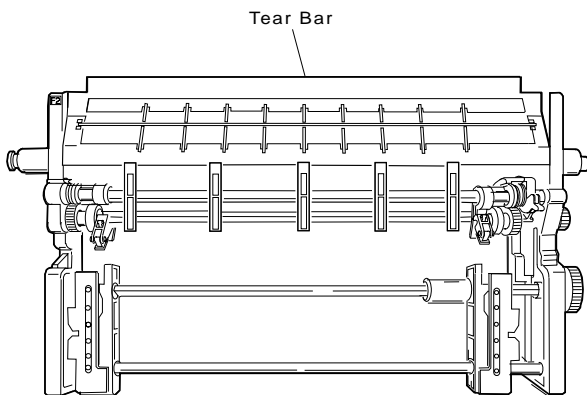
3. When the form is in the correct position, press **Set Top of Form**. The alarm beeps and the printer displays

TOP OF FORM SET

4. Advance the form by pressing **Form Feed**, and decide if the form is on the desired line. If necessary, repeat Steps 1 through 4 of this procedure until the top of form position is correctly aligned.
5. If you plan to use the Document on Demand feature, see “Adjusting the Tear-off Position” on page 1-76. Since you have changed the position of the first print line, you need to adjust the eject distance using the procedure given in that section.

### Adjusting the Tear-off Position

The Dual Purpose Forms Device Document on Demand features allow you to tear off a form using the tear bar upon completing a print job. You can then prepare the printer to print the next print job.



To change the tear-off position of a form, follow these steps:

1. Make sure the printer is at the top of form position. Press **Load/Eject** one time.

The printer displays

003 FORMS EJECTED PRESS LOAD
---------------------------------

and the **Ready** indicator goes off. The paper quickly advances to the tear-off position. You can also use the Automatic Eject or Automatic Restore options to change the tear-off position of a form. See *IBM 4232 Printer Model 302 Operator Panel Instructions* for more information on these options.

2. Open the acoustic cover.
3. If the perforation on the form is not at the tear-off position, use the **Micro** ↑, **Micro** ↓, and **Line Feed** keys to adjust the form position until the perforation is exactly in line with the tear-off bar. The limits for the Tear-off Position Adjustment from the default position is ±19.05 mm (0.75 in.).

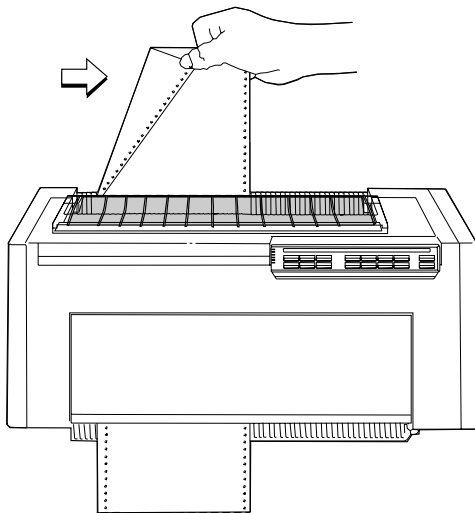
**Note:** If the last page of the form feeds past the forms sensor, the printer displays

001 END OF FORMS LOAD FORMS
--------------------------------

and pressing **Load/Eject** ejects the paper.

To remove the form, follow these steps:

1. Tear off the paper toward the front of the printer.



2. Press **Load/Eject** to position the next form back to the top of form position.

The **Ready** indicator comes on, and you are ready to print the next print job.

### Adjusting the Load Position

The load position can only be adjusted following an operator initiated load or eject (F2 forms device only) function from the operator panel.

You can adjust the load position using the **Micro** ↑, **Micro** ↓, or **Line Feed** keys. The limits for the position adjustment from the default position are +38 and -30.5 mm (+1.5 and -1.2 in.). If you plan to use the Document on Demand feature (F2), see “Adjusting the Tear-off Position” on page 1-76.

**Note:** Press **Set Top of Form** to keep the load position consistent with the top of form position. Pressing **Set Top of Form** establishes the first print line at which printing is to start on each form. The alarm beeps and the printer displays

TOP OF FORM SET

### Adjusting the Print Alignment

You can adjust dot registration and print quality for characters created using bidirectional printing. The bidirectional alignment may need periodic adjustment to maintain print quality.

To change the bidirectional alignment, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

NOT READY <A>

2. Press **Test**.

The printer displays

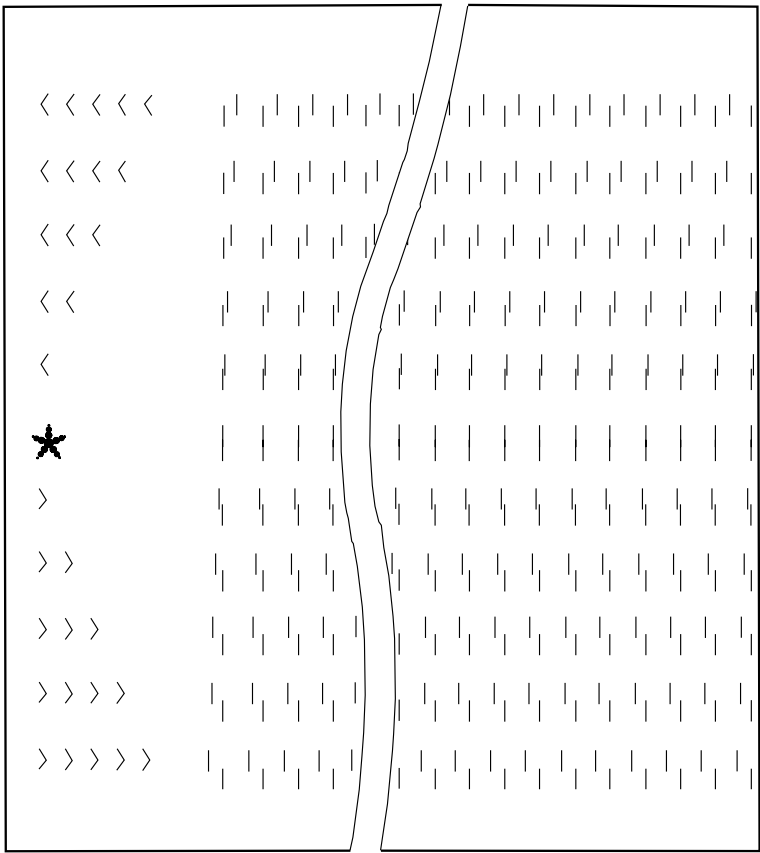
OPERATOR PRINT TESTS  
Printer Demonstration

3. Press **Scroll** ↓ or **Scroll** ↑ until the printer displays

OPERATOR PRINT TESTS Bidirectional Adjustment
--------------------------------------------------

4. Press **Enter** or **Start** to print this test.

The **Ready** indicator goes on and printing begins. The test prints samples using alignment values higher and lower than the default value. The print sample using the default value is indicated with an asterisk (\*). The alignment printout is complete when the **Ready** indicator goes off.



The printer displays

Bidirectional Adjustment *
-------------------------------

5. If the default value does not give the best print sample, press **Scroll** ↓ or **Scroll** ↑ until the printer displays the same number of arrows that were printed beside the *best* print sample line. Press **Enter** to set this as the new default value. The printer then prints another line to demonstrate the new default value, and the test is complete.

or

Press **Stop** to end the test without changing anything and return to the Operator Print Tests menu.

or

Press **Cancel Print** to end the test, exit test mode, perform a partial reset, and have the printer display

READY	<A>
-------	-----

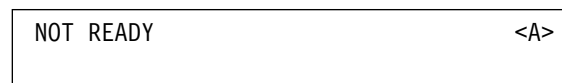
**Note:** See Chapter 4, “Using the Operator Print Tests” for more information.

## Unloading Forms

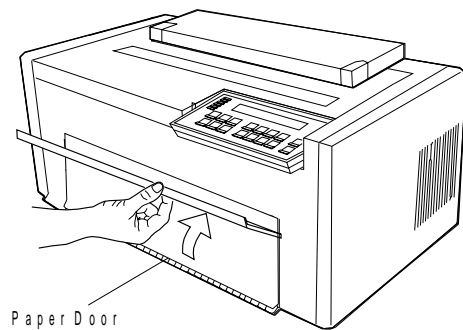
To unload forms from the F2 forms device, follow these steps:

1. Open the acoustic cover.
2. Tear off the forms at the tear bar. See "Adjusting the Tear-off Position" on page 1-76 for the procedure.
3. Press **Stop**.

The printer displays

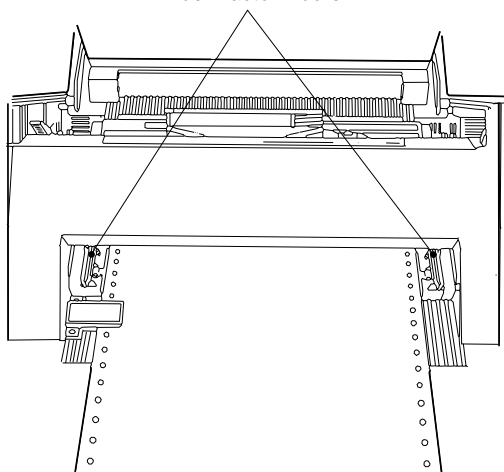


4. Open the front paper door as follows:
  - a. Pull the door up until it will not go any higher.
  - b. Push the door back slightly to lock it in the open position.



5. Open both of the **blue tractor doors**.

Blue Tractor Doors



6. Lift the form off the tractor pins and pull the form out from the bottom of the printer.

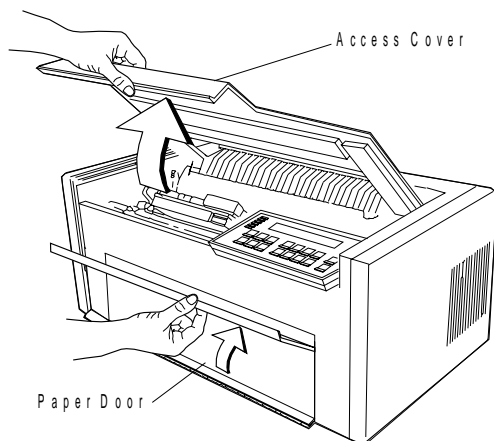


## Removing the Dual Purpose Forms Device (F2)

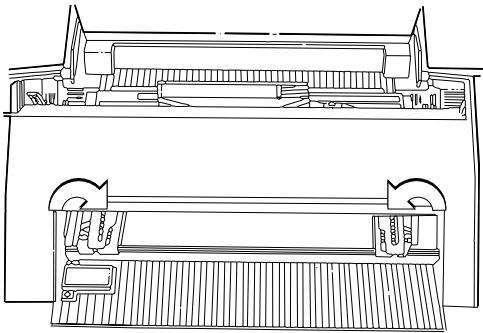
**Note:** If you are removing this forms device to install a different forms device, make sure you change the selected forms device in the Configuration Menu.

To remove the F2 forms device, follow these steps:

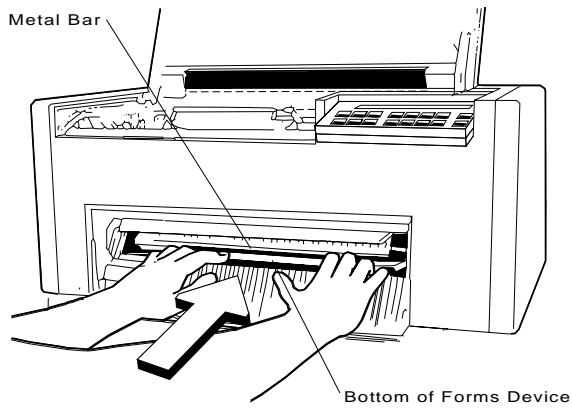
1. If forms are in the printer, unload them (see “Unloading Forms” on page 1-81), then continue with Step 2 of this procedure.
2. Turn the power Off (O).
3. Open the access cover. Then open the front paper door as follows:
  - a. Pull the door up until it will not go any higher.
  - b. Push the door back slightly to lock it in the open position.



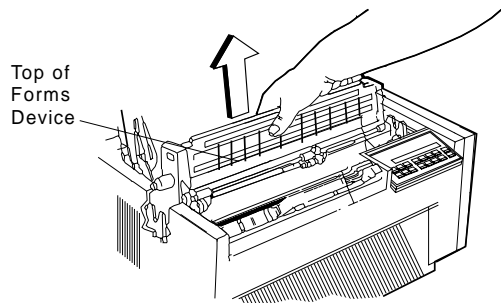
4. Close the **blue tractor doors**.



5. Push the metal bar at the bottom of the device toward the rear of the printer until the forms device unlocks.



6. Grasp the top of the forms device and lift it out.



---

## Installing and Using the Document Insertion Device (F3)

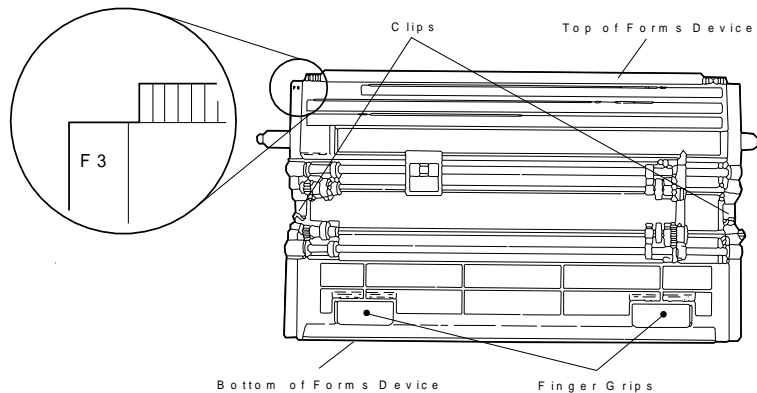
The following sections describe how to install and use the Document Insertion Device (F3).

**Note:** Make sure that the proper forms device is configured. See “Preparing for Forms Device Installation” on page 1-10 for the exact steps.

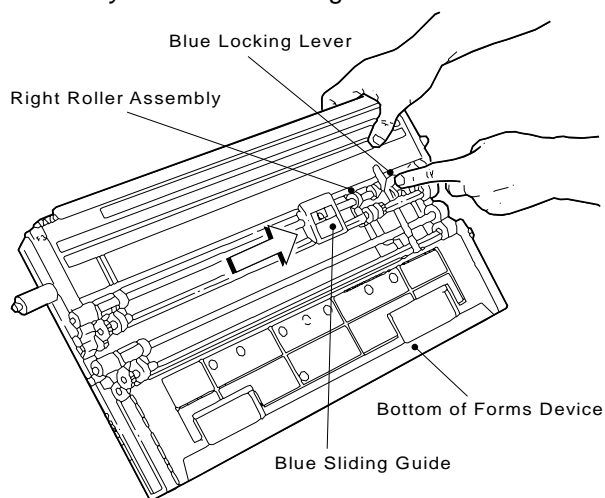
### Installing the Document Insertion Device (F3)

To install the F3 forms device, follow these steps:

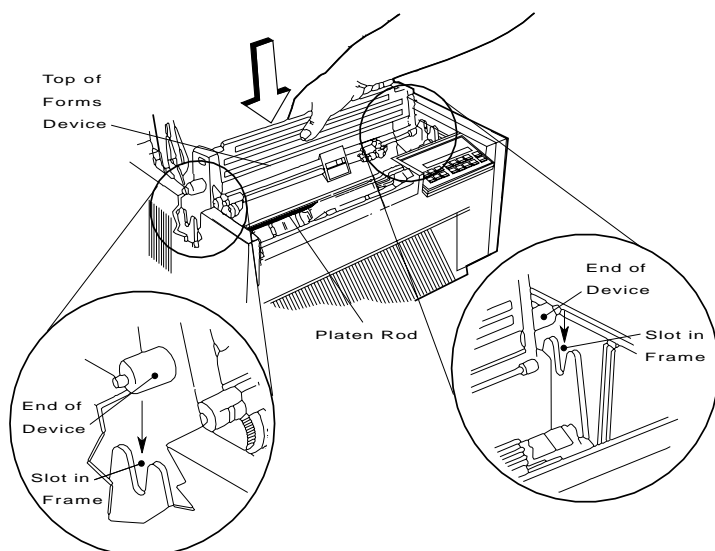
1. Hold the forms device so that the *device number F3* is in the upper left corner facing you. Note the bottom of the device, the *finger grips*, and the *clips*; they will be important later.



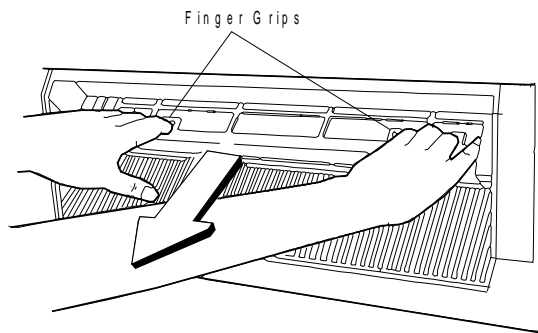
2. Unlock the **blue locking lever** and move the *right roller assembly* to the extreme right.



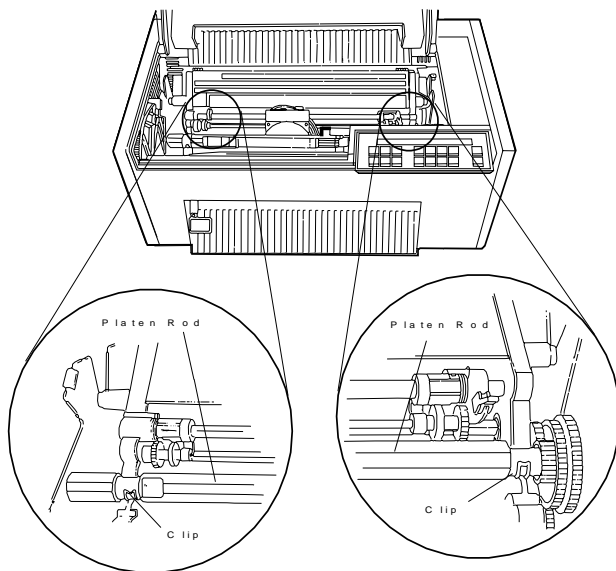
3. Hold the device at the top with the **F3** in the upper left corner facing you. The *finger grips* should be at the bottom and should enter the printer first. Lower the device into the printer behind the *platen rod* and align the ends of the device with the slots in the frame. Continue to lower the device until the ends of the device rest in the slots of the frame.



4. Look through the front bottom opening in the printer and find the *finger grips* at the bottom of the forms device.
5. Grasp the *finger grips* with BOTH hands and pull firmly toward you and then upward until both ends LOCK into place.



6. To be sure that you have installed the forms device correctly, look at the following figure and compare it to your printer. Check both the left and right sides. Are the *clips* around the *platen rod* as shown? If so, you installed the forms device correctly. If not, repeat Steps 3 on page 1-86 through 5.

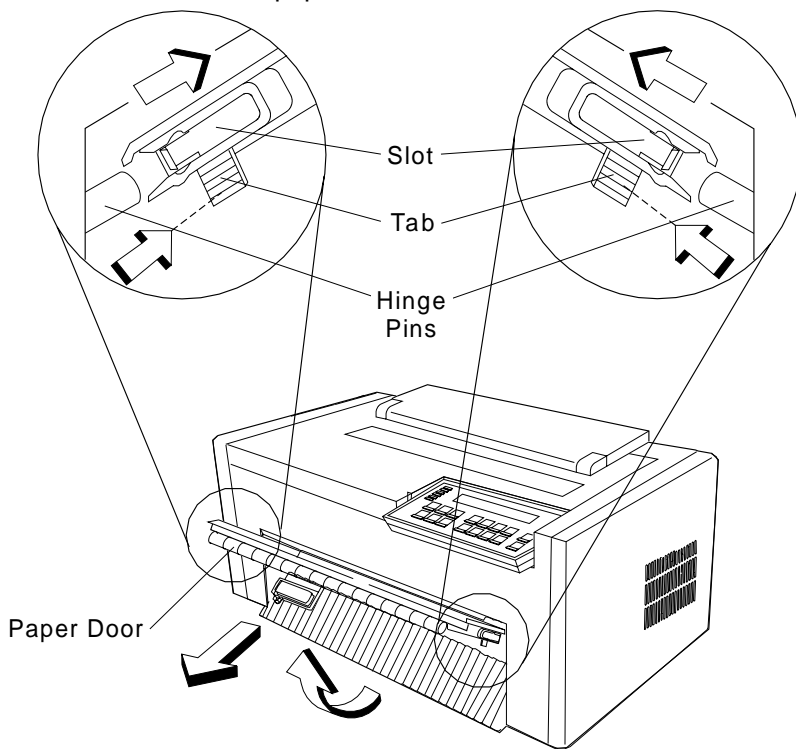


## Changing the Paper Door

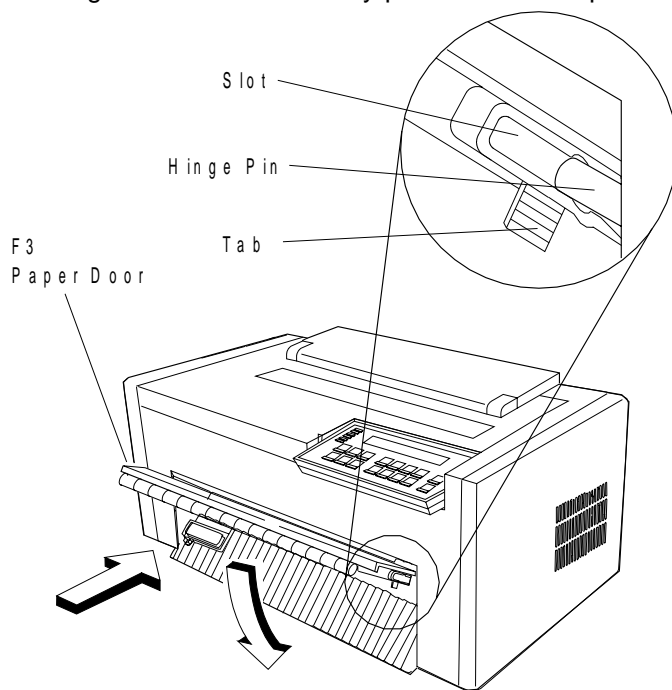
The printer must have a different paper door installed to be used with the F3 forms device. If you have ordered the F3 forms device, your shipment includes an F3 forms device paper door.

To change paper doors, follow these steps:

1. Open the standard paper door to the position shown. Press the two tabs to release the door and slowly pull the door toward you. Remove the standard paper door.



2. Grasp the lower section of the F3 paper door with both hands. Then align the grooves at the top of the door with the hinge pins on each side of the printer. Be sure that you align the door at the angle shown. Then slowly push the door in place.

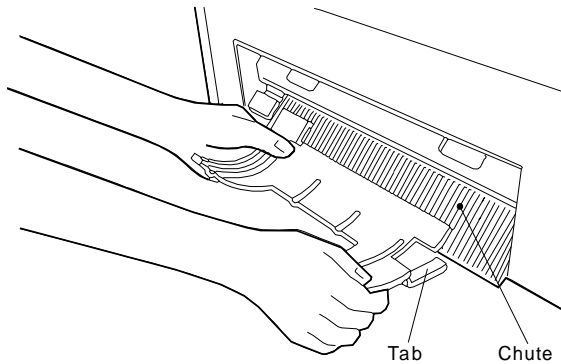


The F3 paper door locks in the open position similar to the standard door.

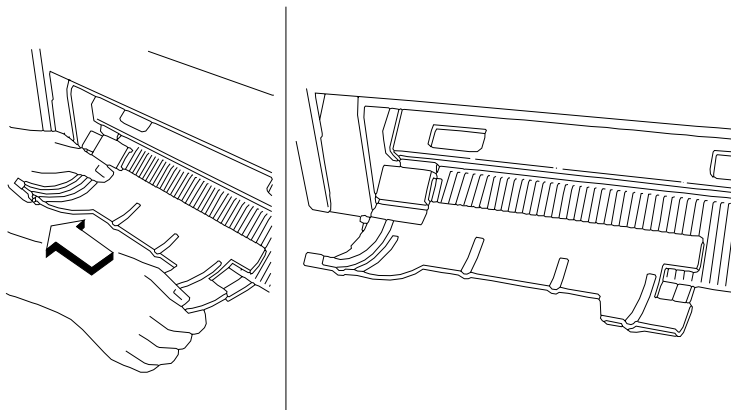
## Preparing to Load Forms

To prepare to load forms in the F3 forms device, follow these steps:

1. Install one of the lower forms guides (if not already installed).
  - a. Place the *lower forms guide* in front of the forms chute so that the tab is under the chute.



- b. Align the lower forms guide beside the **blue forms guide/forms sensor**. Then slide the lower forms guide to the left until it locks on.



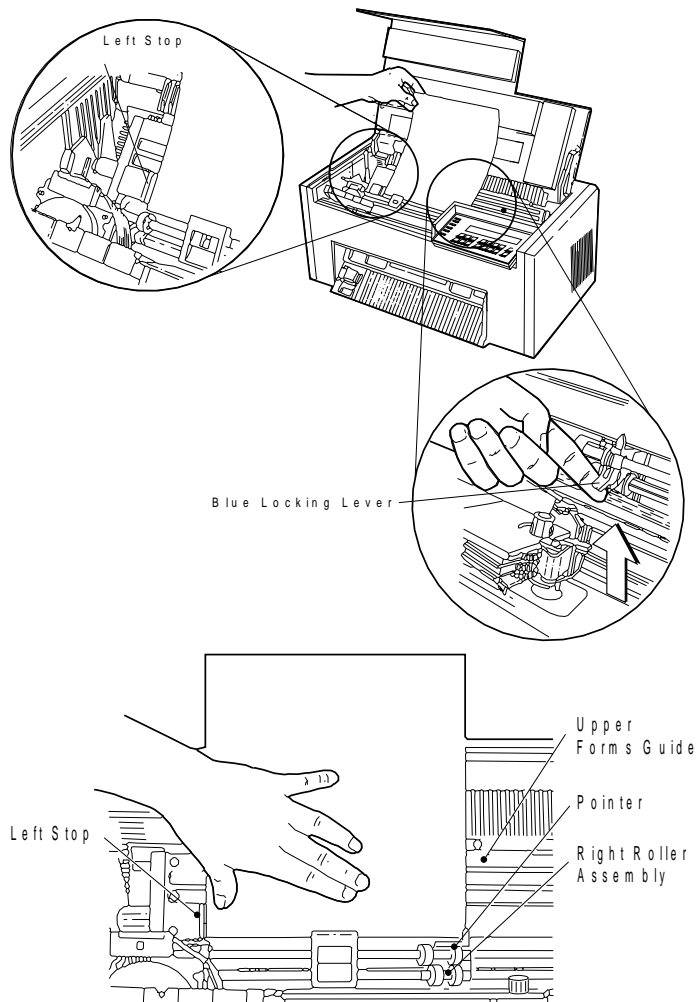
2. Get cut forms that are at least 203.2 by 279.4 mm (8 by 11 in.).



## Loading Forms in the F3 Forms Device

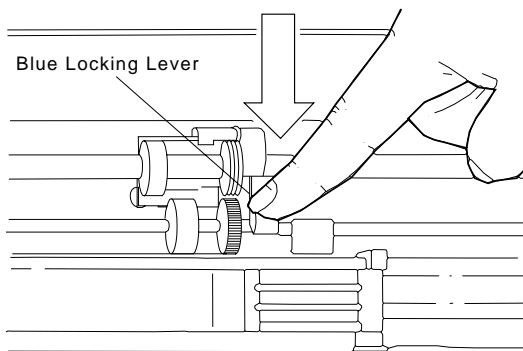
To load forms in the F3 forms device, follow these steps:

1. Adjust for the width of the form. Hold a form in front of the *upper forms guide* and against the *left stop*. Unlock the **blue locking lever** and move the *right roller assembly* so that the *pointer* lines up with the right edge of the form.

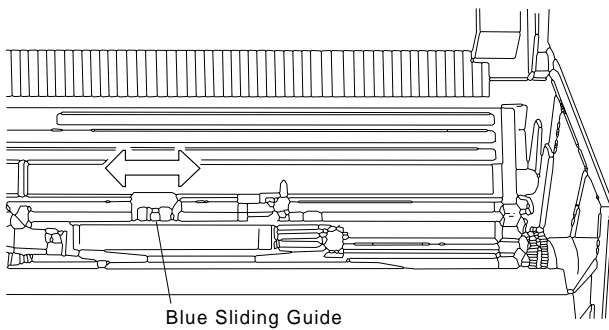


If needed, use the white writing surface near the blue sliding guides to make pencil marks to help you line up the form.

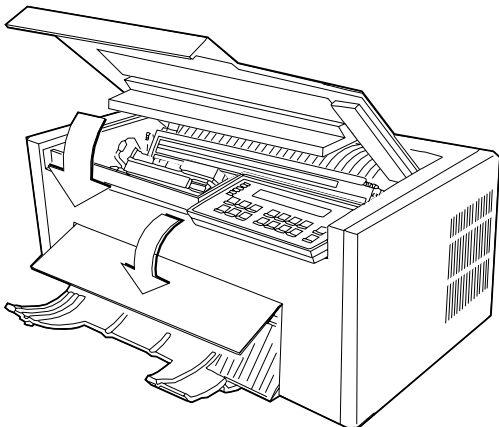
2. Lock the **blue locking lever**.



3. Center the **blue sliding guide** between the roller assemblies.



4. Close the access cover. Then close the paper door by pulling it out and pushing it down until it latches.



## Using the Printer Verification Test for the F3 Forms Device

To run the printer verification test, follow these steps:

1. Turn the power On (I), if not already on.
2. Wait until the printer displays

READY	<A>
-------	-----

3. Press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

and then may display

029 LINK ERROR
----------------

Ignore this message until you have attached the printer to your computer. (Press **Stop** to turn off the alarm, if necessary.)

4. Press **Test**.

The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

5. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

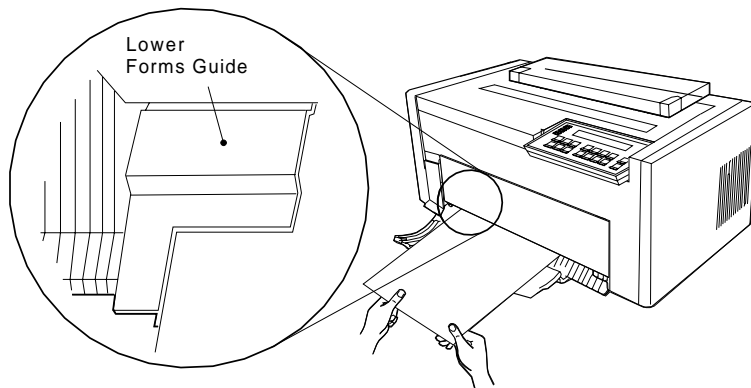
OPERATOR PRINT TESTS  
Printer Verification

6. Press **Enter** or **Start** to begin this test.

The printer displays

013 DATA TO PRINT  
LOAD FORMS

7. Carefully feed the form **under** the **lower forms guide**. Use the left edge of the **lower forms guide** to help feed the form in straight. Feed the form until the top edge touches both the *left* and *right feed rollers*. Continue to hold the form.

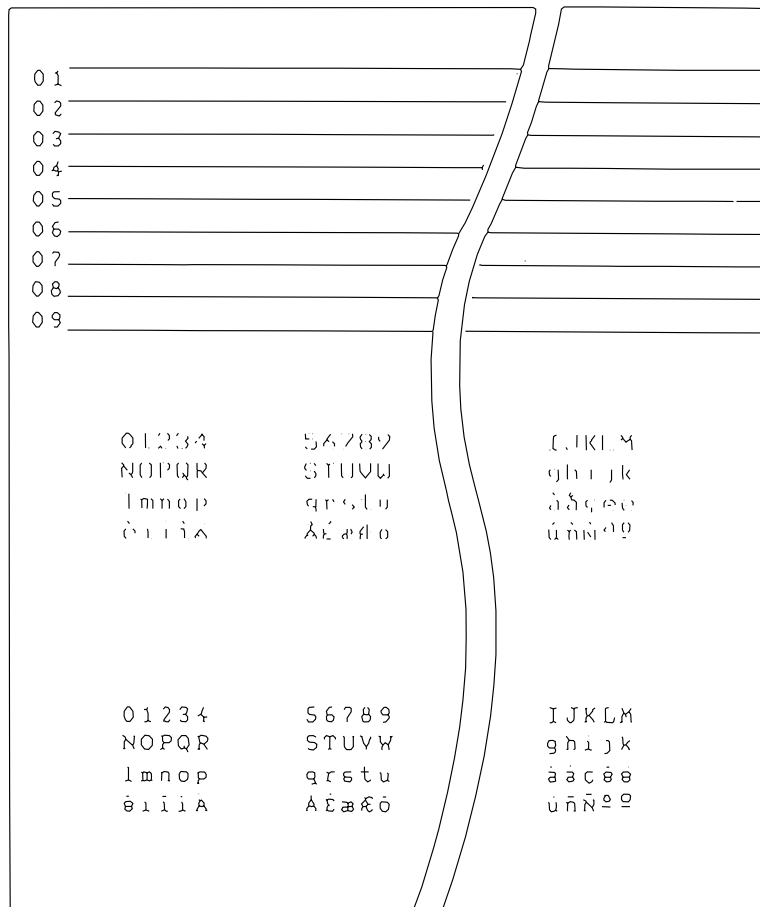


The printer displays

004 PRESS LOAD

8. Press **Load/Eject**. As the printer begins to pull in the form, release the form. The **Ready** indicator comes on, and printing begins.

9. Wait for the printer to stop printing and the **Ready** indicator to go off.
10. The lines numbered 1 through 9 should print as shown on the sample printout, and the remainder of the printout should be clear and readable.



11. Compare your printout with the sample printout.

Did the lines print and is the remainder of the printout clear and readable?

If *YES*, go to Step 12.

If *NO*, do the following:

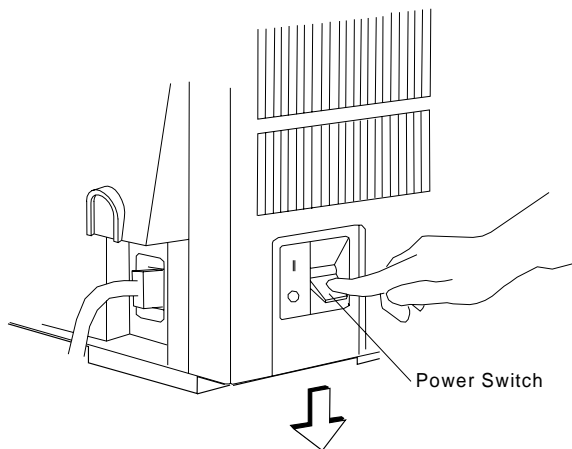
- a. If any of the following items are not installed correctly, the printer can experience forms jamming, ribbon jamming, or an incorrect printer verification printout:

- Forms device
- Ribbon cartridge
- Forms.

Repeat the Setup Instructions from page 1-6 if you suspect a ribbon, forms, or forms device installation problem.

- b. Press **Enter** or **Start**, load another form, and press **Load/Eject** to get another printout.
- c. If the second printout is still not similar to the sample printout, go to Appendix B, "Problem Solving."
- d. Once you get a good printout, go to Step 12.

12. Turn the power Off (O).



### Setup and Checkout Complete

You have completed a simple setup and checkout of the printer. IBM recommends that you print your power-on custom set (Custom Set A) factory defaults and save this printout for future reference. You are ready to attach the printer to your computer. Go to "Attaching the 4232 Printer Model 302 to Your Computer" on page 1-116.

**Note:** See pages 1-98 through 1-111 for making adjustments, unloading forms, and removing the forms device.

## Adjusting the Print Quality

After the printer prints a few lines, press **Stop** and verify that the print quality is satisfactory. Good print quality includes:

- Clear, legible print
- Satisfactory darkness or lightness of output.

It is up to you to decide if the print quality is satisfactory.

Adjustments you can make that affect print quality include:

- **Forms Thickness Setting**

This setting can affect the darkness or lightness of output.

The printer will normally sense the forms thickness and adjust itself automatically. However, if this setting is not correct, it can be adjusted. To adjust the forms thickness, see “Adjusting the Forms Thickness Setting” on page 1-99.

**Note:** The Automatic Forms Thickness Adjustment (AFTA) mechanism automatically measures the forms thickness and adjusts the gap from the print head to the platen rod based on the measured value. See “Automatic Forms Thickness Adjustment (AFTA)” on page 2-8 for information on how the printer sets the forms thickness.

- **Left Margin and Top of Form Position**

The adjustment of the first print position can affect the appearance of the output, especially if you are using preprinted forms. To adjust the position of the first print character, see “Adjusting the Left Margin” on page 1-101. To adjust the position of the first print line, see “Adjusting the Top of Form Position” on page 1-104.

- **Print Alignment**

This adjustment can affect the character formation and dot mixing on those characters that are printed with two passes of the print mechanism. To adjust the print alignment, see “Adjusting the Print Alignment” on page 1-106.




### Adjusting the Forms Thickness Setting

To adjust the lightness or darkness of the print, you must increase or decrease the gap between the print head and the platen rod. This distance is automatically set for you by the Automatic Forms Thickness Adjustment (AFTA), but you can make corrections to the distance if the print output is not as you desire. It is up to you to decide if the print is dark (or light) enough to meet your requirements.

To adjust the forms thickness setting with the F3 forms device, follow these steps:

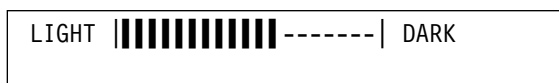
1. The forms thickness setting must be adjusted when the printer is printing or has printed and is *ready*. Press **Start**, if needed, to have the printer display



A rectangular display box containing the word "READY" on the left and the symbol "<A>" on the right.

2. To make the print darker, press **Darker**.

The printer displays



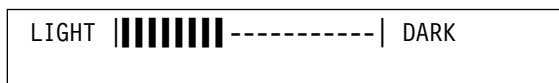
A rectangular display box showing a scale from "LIGHT" to "DARK". Between the words are ten vertical bars of varying heights, followed by a dashed line and a vertical bar. The bars are tallest on the left and decrease in height towards the right.

The print head moves closer to the paper, and the print becomes darker.

**Note:** The print may not get darker if the ribbon is worn or if there is a problem with the print head.

3. To make the print lighter, press **Lighter**.

The printer displays



A rectangular display box showing a scale from "LIGHT" to "DARK". Between the words are ten vertical bars of varying heights, followed by a dashed line and a vertical bar. The bars are tallest on the left and decrease in height towards the right.

The print head moves farther away from the paper, and the print becomes lighter.

4. When you release the key, the printer automatically saves the current value.

**Note:** The █'s indicates the position of the print head relative to the limits.

As long as you press **Darker** or **Lighter**, the printer displays an increasing amount of darkness or lightness until one of the limits of the gap is reached. The printer displays either

```
LIGHT |██████████████████████████████| DARK
DARKNESS LIMIT REACHED
```

or

```
LIGHT |█-----| DARK
LIGHTNESS LIMIT REACHED
```

As you adjust the gap, you may also see the printer display

```
LIGHT |██████████-----| DARK
DEFAULT DARKNESS
```

This message tells you that the forms thickness setting is at the automatically set value.

See "Understanding the Operator Panel" in *IBM 4232 Printer Model 302 Operator Panel Instructions* for more information on this setting.

### Adjusting the Left Margin

You can print a single line of text to help in setting the left margin position using the Left Margin Alignment Test. You can also change the current left margin position using this test.

You can set the left margin position from 1 to 66 units (where each unit is 0.686 mm [0.027 in.]). The factory default setting is 10. The margin is measured starting at 1.27 mm (0.05 in.) from the center of the tractor pins for continuous forms and from the left edge of a cut form.

To align the left margin position, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

NOT READY	<A>
-----------	-----

2. Enter the Operator Print Tests by pressing **Test**.

The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

3. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

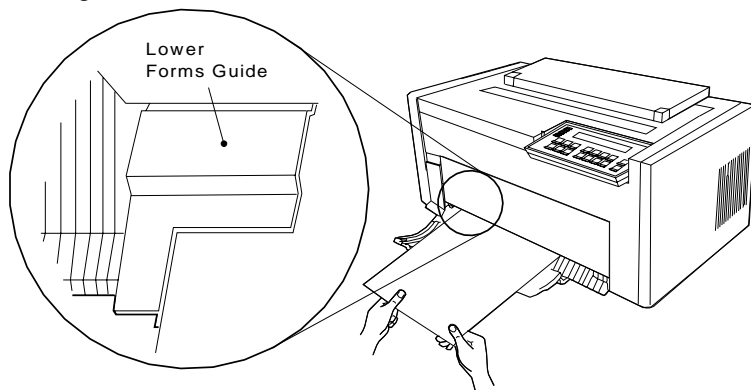
OPERATOR PRINT TESTS Left Margin Alignment
-----------------------------------------------

4. Press **Enter** or **Start** to begin the test.

The printer displays

013 DATA TO PRINT LOAD FORMS
---------------------------------

5. Carefully feed the form **under** the **lower forms guide**. Use the left edge of the **lower forms guide** to help feed the form in straight. Feed the form until the top edge touches both the *left* and *right feed rollers*. Continue to hold the form.



The printer displays

004 PRESS LOAD

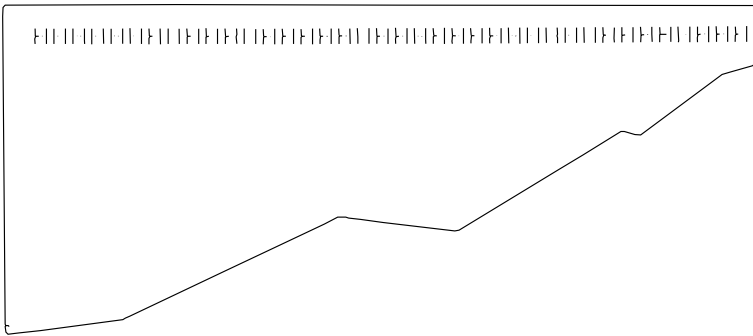
6. Press **Load/Eject**.

The printer then displays

Left Margin Position  
\* xxx

where xxx is the current value of the left margin position.

The printer also prints a single line of *H*'s.



7. If the *H*'s do not start where you want your left margin, press **Scroll** ↑ or **Scroll** ↓ until the printer displays the desired value for the left margin position.
8. Press **Enter**.  
An asterisk (∗) appears in front of the selected value. The forms advance one line and the row of *H*'s prints again. This value is now the current left margin position.
9. Repeat Steps 7 and 8 until the left margin is correctly positioned. (You can press **Line Feed** or **Load/Eject** to move the forms between printing the rows of *H*'s.)
10. Press **Stop** or **Cancel Print** to exit the test.

**Note:** If you want the new left margin position saved when you turn off the printer, you must save it in a Custom Set. See “Storing Configuration Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions* for information on saving configurations.

You may also adjust the left margin position without printing the row of *H*'s by changing the Left Margin Position in the Configuration Menu. (See “Using Print Format and Quality Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.)

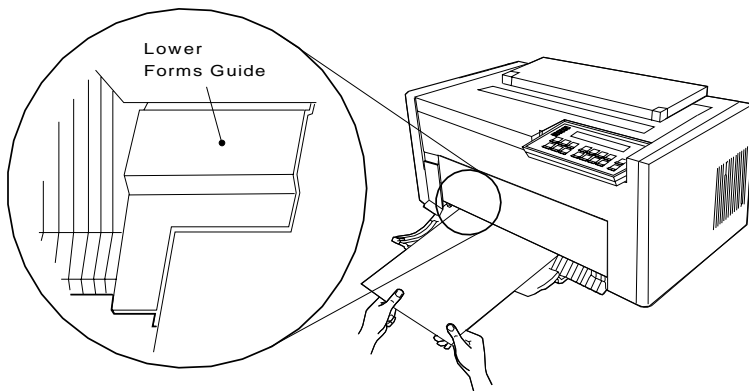
### Adjusting the Top of Form Position

The **Micro** ↑ and **Micro** ↓ keys control fine vertical movement. Each time you press these keys, the printer moves the form in 0.355 mm (0.014 in.) increments.

**Note:** If you use the **Micro** ↑, **Micro** ↓, or **Line Feed** keys to adjust the print position, you may need to reprint the page.

To set the top of form position, follow these steps:

1. Carefully feed the form **under** the **lower forms guide**. Use the left edge of the **lower forms guide** to help feed the form in straight. Feed the form until the top edge touches both the *left* and *right feed rollers*. Continue to hold the form.



2. Press **Load/Eject**.

As the printer begins to pull in the form, release the form. The form loads to the top of form position.

3. If the first print line is not where you want it to be, press **Micro** ↑, **Micro** ↓, or **Line Feed** until it reaches the desired line.

**Note:** If you need to adjust the paper downward, adjust at least five steps beyond where you want the top of form position; then make your final adjustment in the up direction. You can also use the Top of Form Alignment Test (see “Top of Form Alignment” on page 4-4) to print a line of characters to determine more accurately where you have set the top of form position.

4. When the form is in the correct position, press **Set Top of Form**.  
The alarm beeps and the printer displays

TOP OF FORM SET

**Note:** The limits for the top of form position adjustment from the default position is +101.6 and -8.47 mm (+4 and -0.34 in.).

5. Press **Load/Eject** to eject the form.
6. Repeat Steps 1 and 2 on page 1-104 and decide if the form is loading to the desired position. If necessary, repeat this procedure again until the top of form position is correctly aligned.

### Adjusting the Print Alignment

You can adjust dot registration and print quality for characters created using bidirectional printing. The bidirectional alignment may need periodic adjustment to maintain print quality.

To change the bidirectional alignment, follow these steps:

1. If the printer is *ready*, press **Stop**.

The printer displays

```
NOT READY                <A>
```

2. Press **Test**.

The printer displays

```
OPERATOR PRINT TESTS  
Printer Demonstration
```

3. Press **Scroll** ↓ or **Scroll** ↑ until the printer displays

```
OPERATOR PRINT TESTS  
Bidirectional Adjustment
```

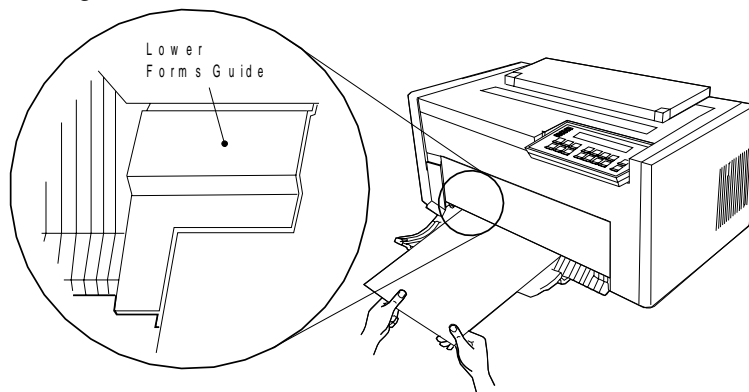
4. Press **Enter** or **Start** to begin this test.

The printer displays

```
013 DATA TO PRINT  
LOAD FORMS
```



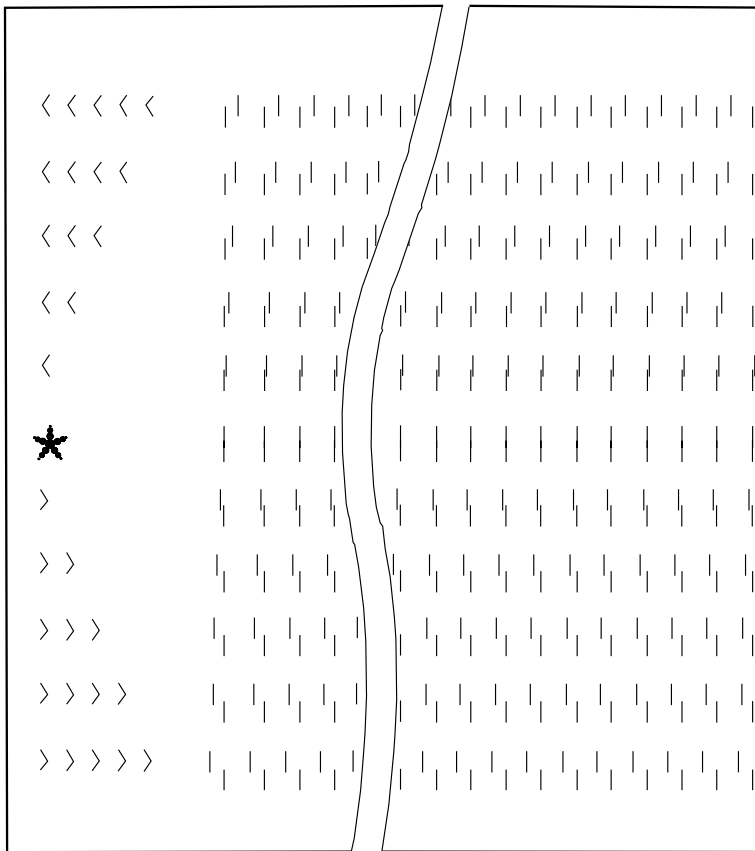
- Carefully feed the form **under** the **lower forms guide**. Use the left edge of the **lower forms guide** to help feed the form in straight. Feed the form until the top edge touches both the *left* and *right feed rollers*. Continue to hold the form.



The printer displays

004 PRESS LOAD

- Press **Load/Eject**.  
As the printer begins to pull in the form, release the form. The **Ready** indicator goes on, and printing begins. The test prints samples using alignment values higher and lower than the default value. The print sample using the default value is indicated with an asterisk (\*). The alignment printout is complete when the **Ready** indicator goes off.



The printer displays

Bidirectional Adjustment  
\*

7. If the default value does not give the best print sample, press **Scroll** ↓ or **Scroll** ↑ until the printer displays the same number of arrows that were printed beside the *best* print sample line. Press **Enter** to set this as the new default value. The printer then prints another line to demonstrate the new default (you will need to load another form), and the test is complete.

or

Press **Stop** to end the test without changing anything and return to the Operator Print Tests menu.

or

Press **Cancel Print** to end the test, exit test mode, perform a partial reset, and have the printer display

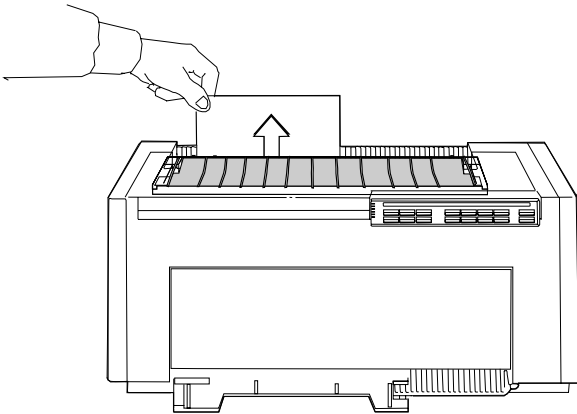
READY	<A>
-------	-----

**Note:** See Chapter 4, "Using the Operator Print Tests" for more information.

## Unloading Forms

To unload forms from the F3 forms device:

1. Press **Load/Eject**.
2. Open the acoustic cover.
3. Remove the form from the top of the printer.

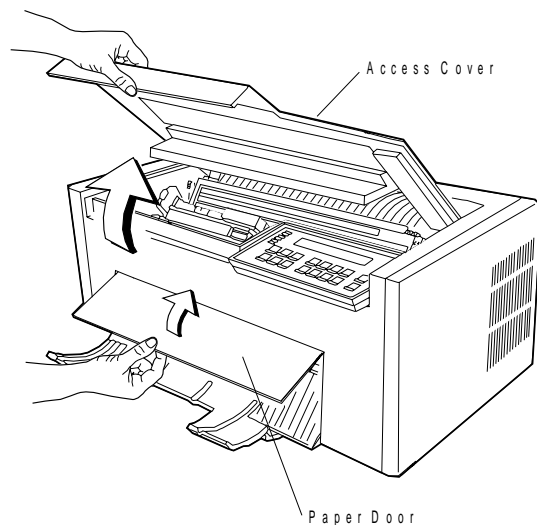


## Removing the Document Insertion Device (F3)

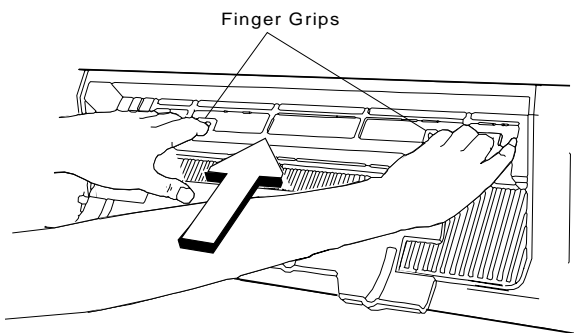
**Note:** If you are removing this forms device to install a different forms device, make sure you change the selected forms device in the Configuration Menu.

To remove the F3 forms device, follow these steps:

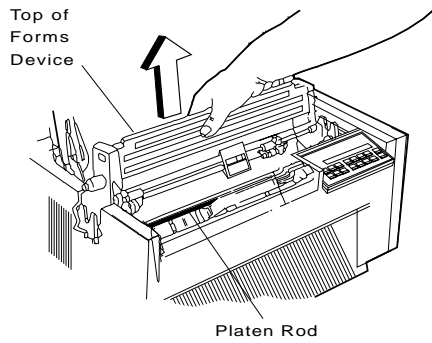
1. If forms are in the printer, unload them (see “Unloading Forms” on page 1-110); then continue with Step 2 of this procedure.
2. Turn the power Off (O).
3. Open the access cover. Then open the front paper door as follows:
  - a. Pull the door up until it will not go any higher.
  - b. Push the door back slightly to lock it in the open position.



4. Push the bottom of the device toward the rear of the printer until it unlocks.

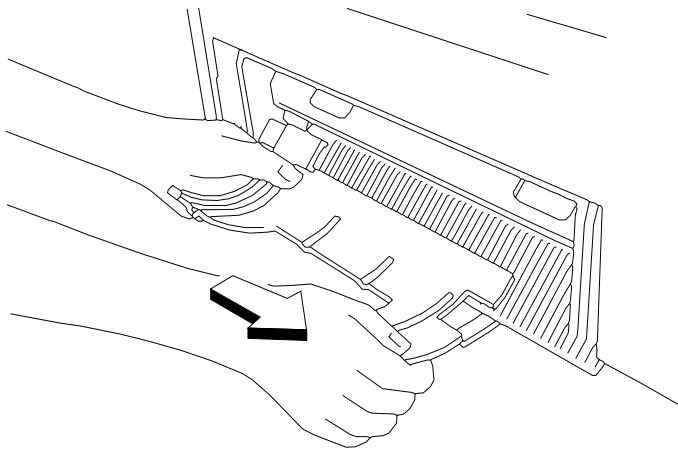


5. Grasp the top of the forms device and lift it out.



6. If you are removing the F3 forms device to install a different forms device, you must remove the lower forms guide.

With a firm grasp, slide the lower forms guide to the right off the **blue forms guide/forms sensor**. Be sure that the tab clears the bottom of the chute before pulling the lower forms guide away from the printer. Store the lower forms guide with your F3 forms device.



7. If you are removing the F3 forms device to install a different forms device, remove the F3 front paper door and install the standard front paper door.

---

## Using the Acoustic Cover

The following sections describe how to remove and reinstall the acoustic cover.

### Removing the Acoustic Cover

If you need to remove the acoustic cover for any reason from the paper exit area, follow these steps:

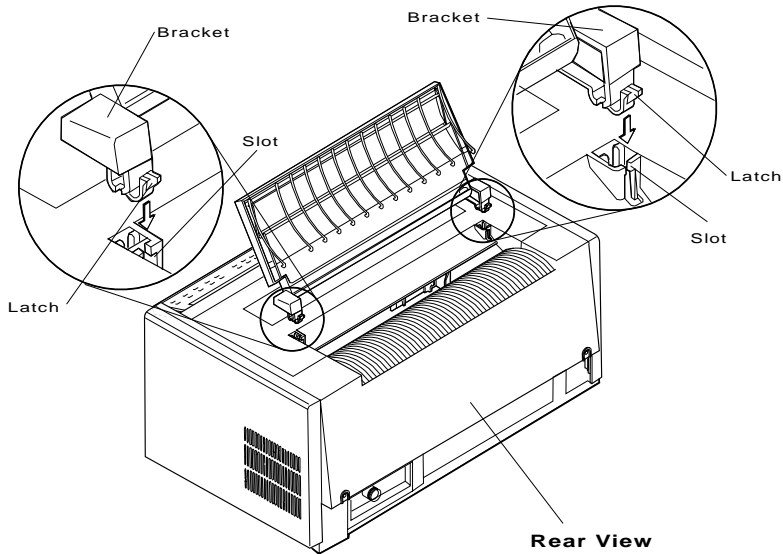
1. Pivot the acoustic cover open until it is vertical.
2. Locate the latch release tabs on both brackets.
3. Depress the latch tabs while lifting the acoustic cover.

### Reinstalling the Acoustic Cover

To reinstall the *acoustic cover* over the paper exit area, follow these steps:

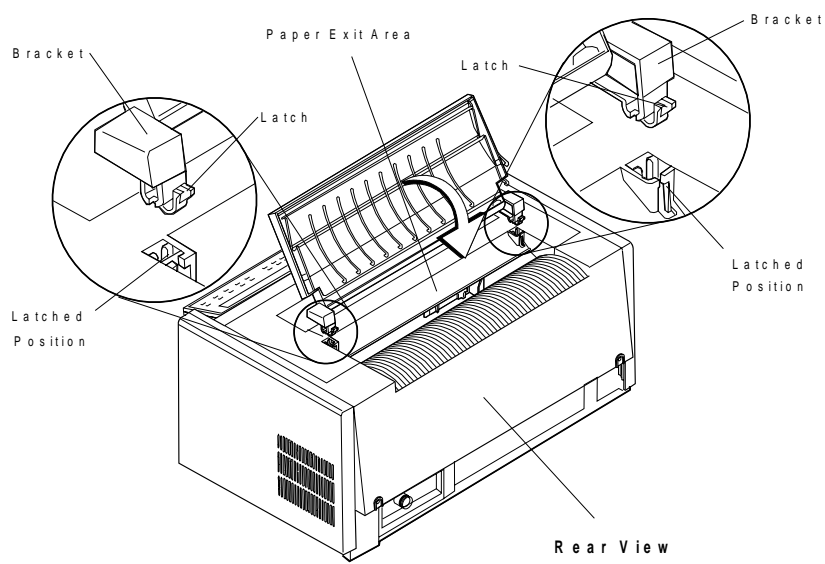
**Note:** The figure in this section shows the *rear* of the printer.

1. Locate the slots near the paper exit area of the access cover.





2. Grasp the brackets of the acoustic cover and insert them into the slots until they latch securely.



3. Pivot the acoustic cover until it is closed over the paper exit area.

---

## Attaching the 4232 Printer Model 302 to Your Computer

This section provides specific instructions on attaching the printer to your computer. Supported devices include:

- IBM Personal Computer
- IBM Personal System/2\*
- IBM RISC System/6000\*
- IBM AS/400\* with ASCII controller
- IBM 4033 LAN Adapter.
- IBM System/390

## Connecting to the Parallel or Serial Interface

Parallel or serial cables are not shipped with your printer. If you do not have a cable, contact your IBM marketing representative. The following table provides the information you need to purchase the correct cable.

Interface	Part Name	Part Number	Cable Length
Parallel	Parallel Cable	1525612	1.8 m (6 ft)
Serial RS-232C	Serial Cable	8509386	6 m (20 ft)
Serial RS-422A	Serial Cable	70X8652	15.2 m (50 ft)

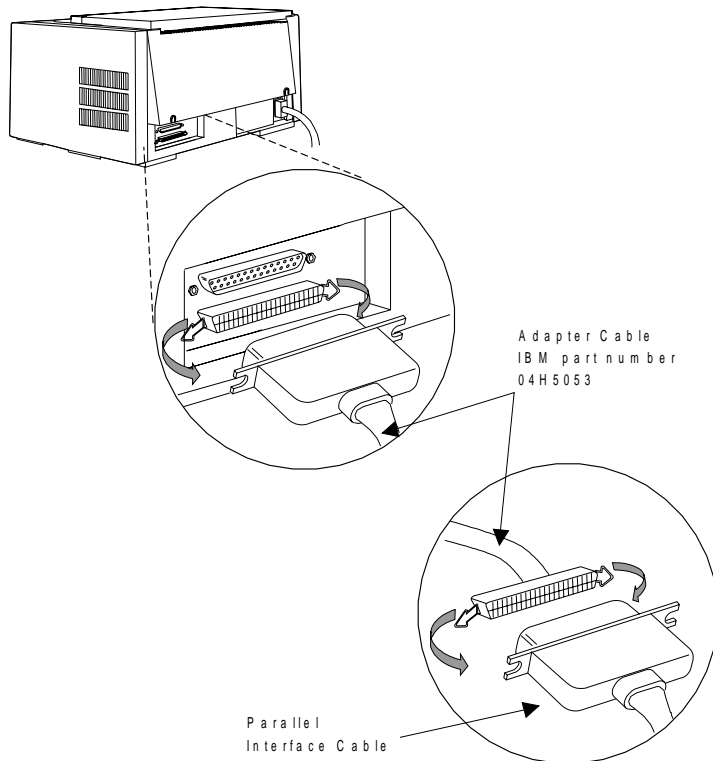
## Attaching a Parallel Cable

### CAUTION:

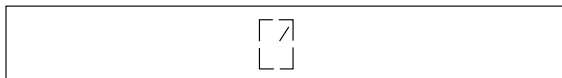
- **Make sure the machine is turned Off (O) before you connect or disconnect the power cord or other cables.**
- **If the machine has cables other than the power cord, you must connect them before you plug the power cord into an outlet. You must first unplug the power cord from the outlet when you remove the other cables.**

To attach a parallel cable:

- | 1. Attach the adapter cable (IBM part number 04H5053) by pushing the cable connector into the printer port.
- | 2. Push the clips at each end of the connector into the notches on the adapter cable.
- | 3. Then attach the parallel interface cable to the end of the adapter cable.
- | 4. Push the clips at each end of the connector into the notches on the parallel cable.



5. Connect the power cord to the printer and to the electrical outlet.
6. Turn the power On (I). All indicators and blocks on the display light, and the alarm beeps. The printer then displays



DIAGNOSTICS IN PROGRESS <A>

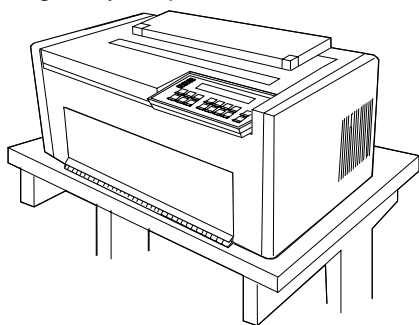
DIAGNOSTICS COMPLETE <A>

and

READY <A>

**Note:** If the printer does not show the correct display sequence, go to the status code section of Appendix B, "Problem Solving."

7. You no longer need to have access to the rear of the printer. Position the printer so that the front edge aligns with the front edge of your printer stand or table.



8. Refer to your computer system documentation for information on attaching the cable to your computer.

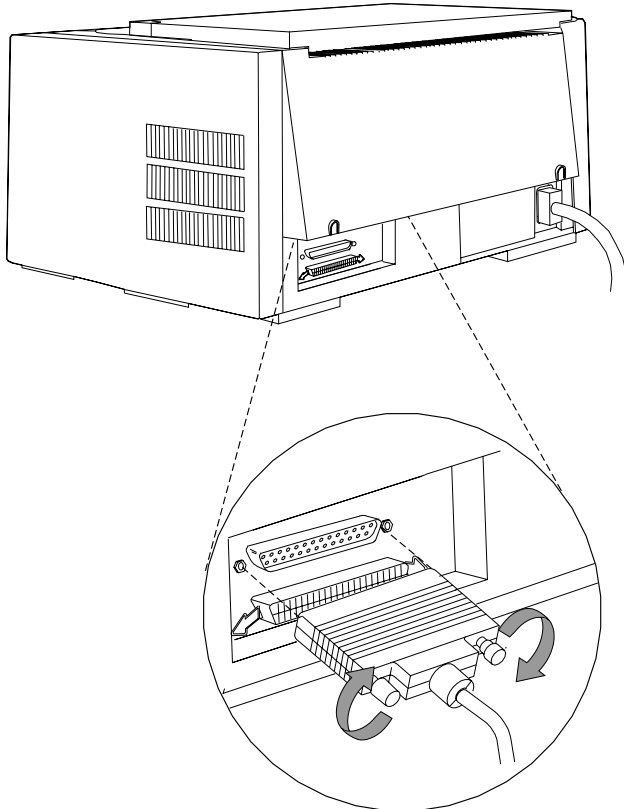
## Attaching a Serial Cable

### CAUTION:

- Make sure the machine is turned Off (O) before you connect or disconnect the power cord or other cables.
- If the machine has cables other than the power cord, you must connect them before you plug the power cord into an outlet. You must first unplug the power cord from the outlet when you remove the other cables.

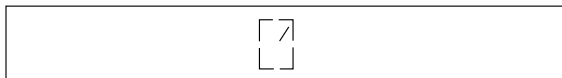
To attach a serial cable:

1. Attach the serial interface cable by pushing the connector into the printer port.



2. Tighten the two locking screws to hold the cable in place.

3. Connect the power cord to the printer and to the electrical outlet.
4. Turn the power On (I). All indicators and blocks on the display light, and the alarm beeps. The printer then displays



DIAGNOSTICS IN PROGRESS <A>

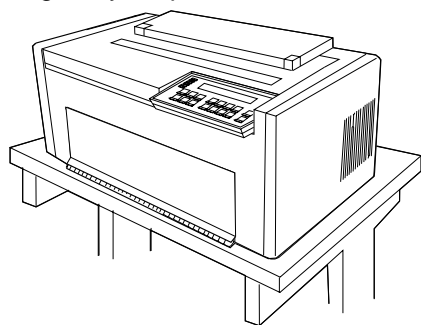
DIAGNOSTICS COMPLETE <A>

and

READY <A>

**Note:** If the printer does not show the correct display sequence, go to the status code section of Appendix B, "Problem Solving."

5. You no longer need to have access to the rear of the printer. Position the printer so that the front edge aligns with the front edge of your printer stand or table.



6. Refer to your computer system documentation for information on attaching the cable to your computer.

---

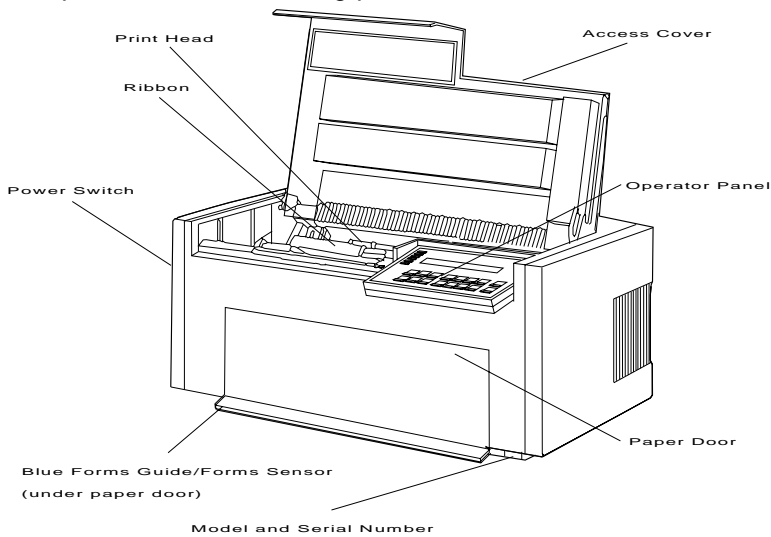
## **Chapter 2. Getting to Know Your Printer**

This chapter introduces you to your IBM 4232 Printer Model 302. It describes the various parts of your printer and shows you their locations. This chapter also includes general information about the different forms devices that are available and instructions about caring for your new printer.

---

## Parts of the Printer

The printer has the following parts:



## Model Identification

Figure 2-1 is an enlargement of a plate on the bottom-front area of the printer.

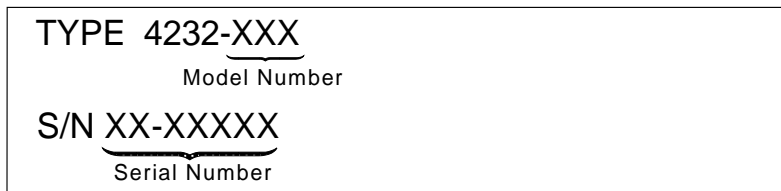


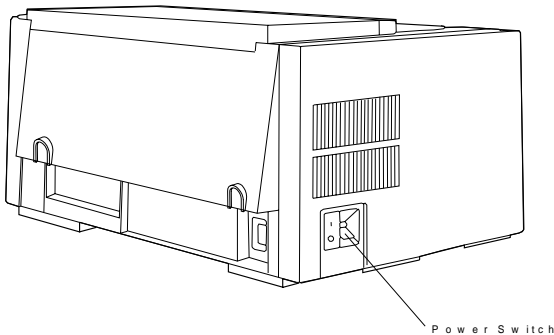
Figure 2-1. 4232 Printer Model 302 Model Identification Plate

Record the model and serial numbers of your printer. You will need this information as you use this and other 4232 Printer Model 302 manuals.



## Power Switch

The power switch supplies electricity to the printer. It has two positions: On (I) and Off (O).



### Notes:

1. When you turn the power On (I), a power-on test runs. For the description of the power-on test, see "Power-On Test."
2. Always **wait 10 seconds** after turning the power from Off (O) to On (I).
3. Anytime you turn the power On (I), you should verify the top of form position before running a job. See Chapter 1, "Setting Up the 4232 Printer Model 302" for adjusting the top of form position for your forms device.

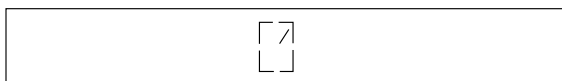
**Warning:** If you turn the power Off (O) while data is in the printer *buffer* (a temporary storage area) or coming from the computer to the printer, you will lose data.

### Power-On Test

Whenever you turn the power On (I), a power-on test runs. An error-free power-on test goes through these steps:

1. All indicators light briefly.
2. The alarm beeps.

- Two rows of boxes fill the display.
- The printer displays the following messages



DIAGNOSTICS IN PROGRESS <A>

- The print head and ribbon move. You will hear some sounds from these movements. If no paper is loaded, the printer displays

Calibrating Printer <A>  
Please Wait

Next, the printer displays

DIAGNOSTICS COMPLETE <A>

- Finally, the printer displays the message

READY <A>

**Note:** If the power-on test stops at any point or the printer displays a three-digit code and error message before the test is complete, a power-on error has occurred. If you have not loaded any forms or the printer is not communicating with the host, the printer may display an error. If an error appears, follow the instructions for “Using the Status Code and Problem Listings” on page B-2.

## Acoustic Cover

The acoustic cover reduces the noise level of the printer while it is printing.

### Notes:

1. Do not open or close the access cover by holding only the acoustic cover. Open and close the acoustic cover separately from the access cover.
2. If you have installed the F2 forms device, you must open the acoustic cover to use the tear bar.

## Access Cover

Opening the access cover:

- Gives you access to the top of the printer for:
  - Cleaning
  - Changing ribbon cartridges
  - Loading or changing forms devices
- Causes printing and forms movement to slow down.

**Note:** The printer may also display status code 090. See “Status Codes” on page B-3 for more information.

## Front Paper Door

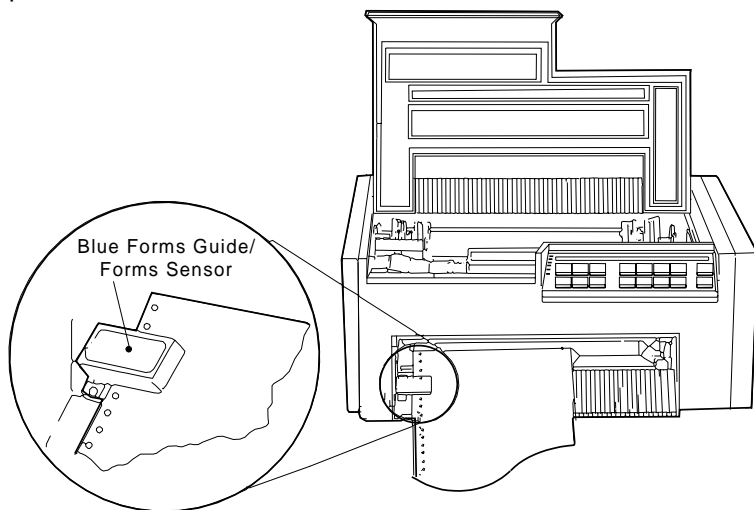
Opening the front paper door:

- Gives you access to the front area of the printer where paper is loaded
- Provides access for loading forms devices
- Causes printing and forms movement to slow down.

**Note:** The printer may also display status code 090. See “Status Codes” on page B-3 for more information.

## Forms Guide/Forms Sensor

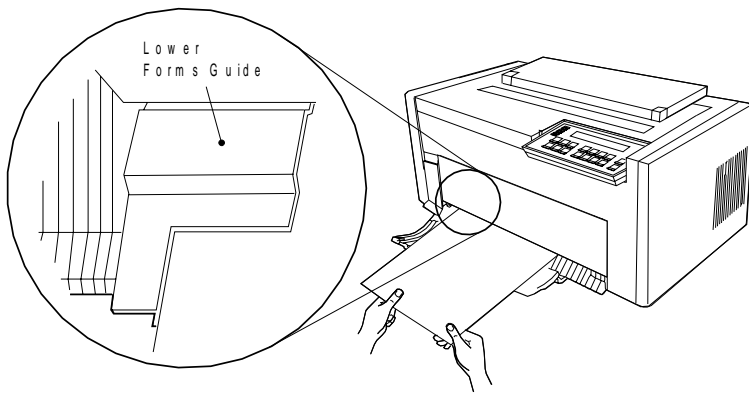
The **blue forms guide/forms sensor** works in several ways. The way it works depends on the type of forms device installed in the printer.



With a Continuous Forms Device (F1) or a Dual Purpose Forms Device (F2) installed, the **sensor** works as:

- A **forms guide** for aligning the left edge of the form.
- A **forms sensor** for detecting the last form fed past it. The printer stops printing after it prints the last line on the last form.
- A **forms sensor** for detecting the presence of a form and activating the **Load/Eject** key for the Automatic Load feature with the Dual Purpose Forms Device (F2).
- A paper jam detector.

The Document Insertion Device (F3) has an additional guide called a **lower forms guide** that fits over the sensor.



The **lower forms guide** works as:

- A **guide** for aligning the cut sheet form.

The **sensor** works as:

- A **sensor** for detecting the presence of a form and activating the **Load/Eject** key.

## Automatic Forms Thickness Adjustment (AFTA)

The Automatic Forms Thickness Adjustment (AFTA) mechanism performs the following tasks:

- Automatically measures the forms thickness and adjusts the gap from the print head to the platen rod based on the measured value.
- Measures the form thickness whenever printing is to occur. When you replace the paper, the thickness is automatically remeasured.

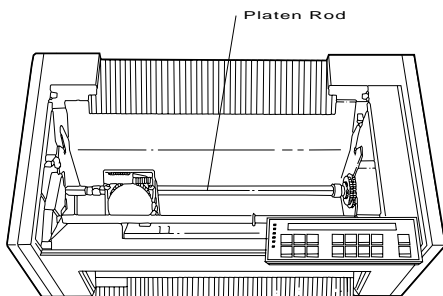
For the Document Insertion Device (F3), AFTA measures the first document after you turn the printer On (I) or after you press **Stop** and then **Start**.

For the Auto Sheet Feeder Device (F4), AFTA measures the first sheet of each bin after you turn the printer On (I) and after you press **Stop** and then **Start**.

The operator may adjust the AFTA by pressing **Darker** and **Lighter**. Locate the information on your forms device and follow the procedure for adjusting the print darkness in Chapter 1, "Setting Up the 4232 Printer Model 302."

## Platen Rod

The platen rod is a metal bar with a flat surface. The platen rod is part of the base printer and is easy to identify when no forms device is installed. You need to know the location of the platen rod for installing the forms device, loading forms, and aligning the first print line.



## Operator Panel

The operator panel includes a 2-line by 40-character display, 6 indicators, 16 keys, and an audible alarm.

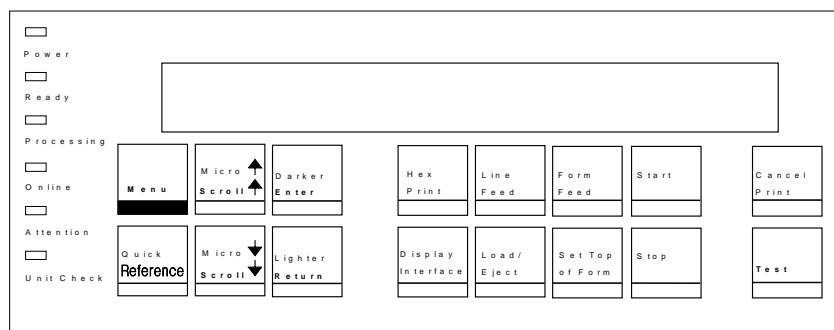


Figure 2-2. 4232 Printer Model 302 Operator Panel

This section describes each part of the operator panel. For a detailed description on using the operator panel, see *IBM 4232 Printer Model 302 Operator Panel Instructions*. *IBM 4232 Printer Model 302 Quick Reference Guide* also provides a brief description of panel functions.

## Alarm

The printer alarm beeps to let you know of a printer status condition or an error. Pressing **Stop** turns the alarm off.

You can set the alarm to beep at high or low volume or not to beep by following the procedure in “Using Printer Setup Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.

**Note:** When you press **Set Top of Form**, the alarm beeps even if you have it disabled.

## Display

The display is a liquid crystal display (LCD) of 2 lines of 40 characters. The display shows a number of different types of messages: status codes and information, error codes and messages, and Configuration and Operator Print Tests Menus.

| Status information helps you identify a problem or a condition that | requires some action on your part.

<i>For help with...</i>	<i>See...</i>
Understanding status and error codes	“Using the Status Code and Problem Listings” on page B-2
Using the Configuration Menu	“Checking and Changing Configuration Parameter Values” in <i>IBM 4232 Printer Model 302 Operator Panel Instructions</i>
Setting Display Language	“Using Printer Setup Parameters” in <i>IBM 4232 Printer Model 302 Operator Panel Instructions</i>
Using Operator Print Tests	Chapter 4, “Using the Operator Print Tests.”



**Power Indicator**

The **Power** indicator has two operating conditions:

- On**        The printer is receiving power.
- Off**        The printer is not receiving power.

**Ready Indicator**

The **Ready** indicator has two operating conditions:

- On**        The printer is *ready* to print.
- Off**        The printer is *not ready* to print.

**Processing Indicator**

The **Processing** indicator has three operating conditions:

- On**        The printer is currently processing data.
- Off**        There is no data to be processed and no data is buffered in the printer.
- Blinking** The printer has data buffered, but it cannot currently be printed.

**Online Indicator**

The **Online** indicator has two operating conditions:

- On**        The printer is communicating with the computer.
- Off**        The printer is not communicating with the computer.

**Attention Indicator**

The **Attention** indicator has two operating conditions:

- Off**        The printer has not detected any conditions requiring operator intervention.
- Blinking** The printer has detected a condition requiring immediate operator intervention. The alarm also beeps (if not disabled). If the printer also displays a status code, go to “Using the Status Code and Problem Listings” on page B-2.

### **Unit Check Indicator**

The **Unit Check** indicator has two operating conditions:

- Off**            The printer has not detected any printer errors.
- Blinking**     The printer has detected a printer error. The alarm beeps (if not disabled). If the printer also displays a status code, go to “Using the Status Code and Problem Listings” on page B-2.

### **Operator Panel Keys**

The operator panel has the following keys:

#### Menu/Adjustment Group

- Darker/Enter
- Lighter/Return
- Menu
- Micro ↑/Scroll ↑
- Micro ↓/Scroll ↓
- Quick Reference.

#### Operation Group

- Cancel Print
- Display Interface
- Form Feed
- Hex Print
- Line Feed
- Load/Eject
- Set Top of Form
- Start
- Stop
- Test.

For a detailed description of each key, see “Understanding the Operator Panel” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.

---

## Configuration Parameter Values

Parameter values are settings that the printer recognizes to do the following:

- Format the printed page
- Set printing and performance options
- Set character sets for different languages
- Modify the alarm volume or disable the alarm.

The printer can use the parameter values set by the factory, or you can change them. The new values you set from the operator panel become the new parameter values.

### Important

Changes to these values will **not** be saved when you turn the printer Off (O) unless you choose to save them in a Custom Default Set. In other words, all configuration changes are online—only changes until they are saved using the Save Current Values parameter in the Configuration Menu under Configuration Storage. For detailed information on saving configuration changes, see “Storing Configuration Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.

Some of the values you can change from the Configuration Menu on the operator panel are:

- Characters per inch (CPI)
- Lines per inch (LPI)
- Maximum print position (MPP)
- Maximum page length (MPL)
- Print language
- Display language
- System interface
- Print quality
- Alarm setting.

See *IBM 4232 Printer Model 302 Operator Panel Instructions* for the procedures to check or change each of the parameter values.

---

## Operating States

**Online** – The printer is *online* when the **Online** indicator is on, power is On (I), the power-on tests complete, and the printer is able to communicate with the computer.

**Offline** – The printer is *offline* when the **Online** indicator is Off, the power-on tests are running, or the printer is in test mode (Operator Print Tests).

---

## Ready and Not Ready

**Ready** – The printer is *ready* when you press **Start** and there are no error conditions. The printer can be *ready* and online or offline.

*Ready* is indicated when the **Ready** indicator is On. See “Ready Indicator” on page 2-11 for more information.

The printer displays

READY	<A>
-------	-----

unless an information message overrides *ready* or the printer is offline.

**Not Ready** – The printer is *not ready* when you press **Stop** or when an error or operator intervention condition occurs. The printer can be *not ready* and online or offline.

The printer displays

NOT READY	<A>
-----------	-----

or a status code and message, and the **Ready** indicator is Off. See “Ready Indicator” on page 2-11 for more information.

---

## Forms

You can use two types of forms (paper) in your printer:

- Continuous forms (F1 and F2 forms devices)
- Cut forms (F3 and F4 forms devices).

The forms may be blank or preprinted. The forms may be single-part or multiple-part, with or without carbon paper.

Keep in mind the following as you work with forms:

- Inspect all forms for damage.
- Do not use stapled, torn, or wrinkled forms.
- When you use forms directly from a box, remove the box tops; or, preferably, remove the forms from the box. Rough box-top edges can damage the forms or cause the forms to jam.
- All multiple-part cut forms must be glued at the top edge.
- A maximum of four-part forms is recommended for the best registration, feeding, and stacking. You might be able to use five- or six-part forms, but test them before ordering large quantities.
- Humidity affects forms feeding and stacking. Keep all forms in a cool, dry place. If the forms are exposed to high humidity, allow them to adjust to the humidity level of the printer area for approximately 24 hours before you use them.

See Appendix C, “Forms Information” on page C-1 for more information.

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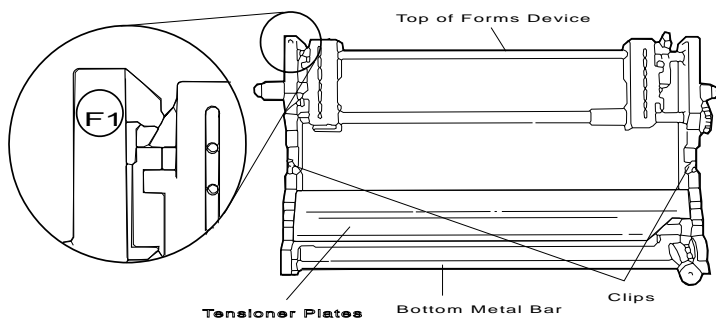
## Forms Handling Devices

The optional forms handling devices available for your printer are:

- Continuous Forms Device (F1)
- Dual Purpose Forms Device (F2)
- Document Insertion Device (F3)
- Auto Sheet Feeder (F4).

Each forms device is described on the following pages.

### Continuous Forms Device (F1)

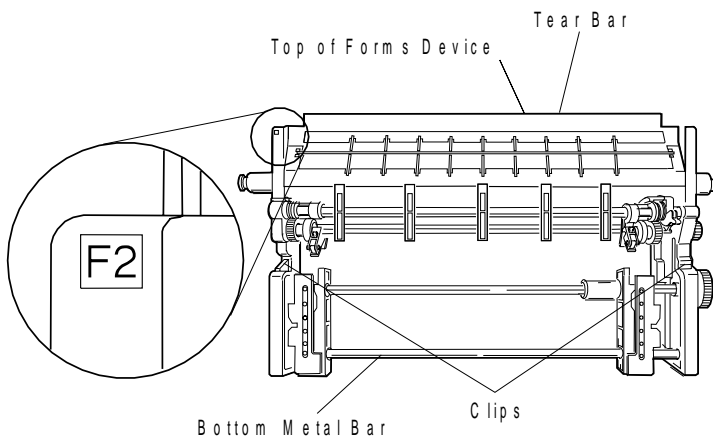


The device has an *F1* surrounded by a circle in the upper left corner of the device.

Use this device when you are printing large volume work (especially with very thin forms) or work that requires minimum operator intervention.

See “Installing and Using the Continuous Forms Device (F1)” on page 1-18 for information on installing and removing the forms device, loading and unloading forms, and adjusting the device.

## Dual Purpose Forms Device (F2)

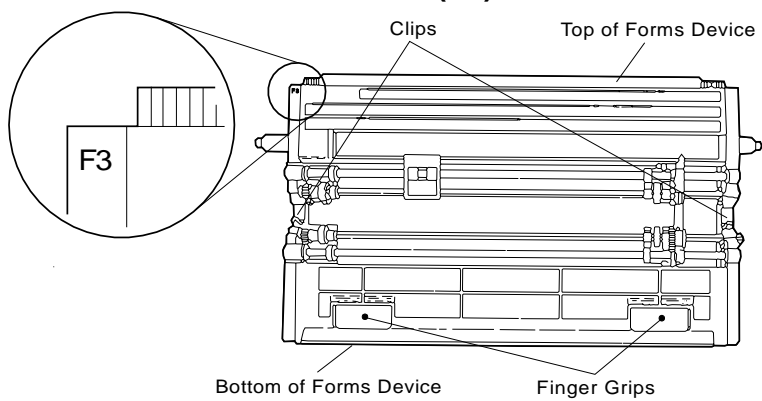


The device has an *F2* surrounded by a square in the upper left corner of the device.

Use this device when printing work that requires you to separate the continuous forms between transactions and for most general printing requirements on continuous forms. Use the *tear bar* to separate the printed forms. Also, the automatic loading feature (*autoload*) is enabled for this device.

See “Installing and Using the Dual Purpose Forms Device (F2)” on page 1-53 for information on installing and removing the forms device, loading and unloading forms, and adjusting the device.

## Document Insertion Device (F3)



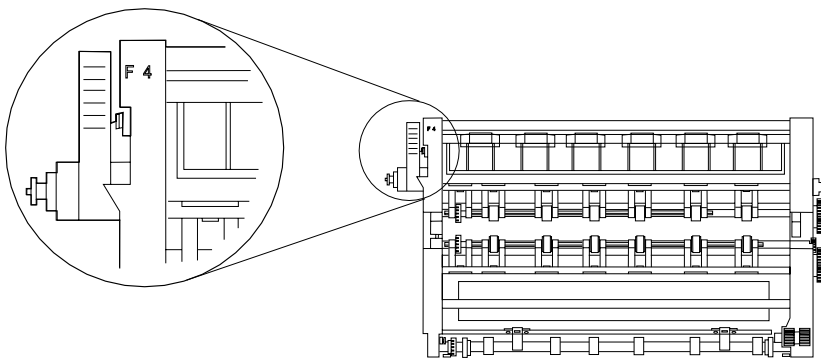
The device has an *F3* by itself in the upper left corner of the device.

Use this device for printing cut forms for correspondence, individual invoice forms, and so on.

See “Installing and Using the Document Insertion Device (F3)” on page 1-85 for information on installing and removing the forms device, loading and unloading forms, and adjusting the device.



## Auto Sheet Feeder Device (F4)



The device has an *F4* by itself in the upper left corner of the device.

This device is used for automatic feeding and printing of cut forms. It can feed paper from one of three bins or a manual insertion slot.

The Auto Sheet Feeder Device (F4) consists of two parts: (1) a *forms transport device* (shown above) that mounts inside your printer, and (2) a *sheet feeder* that sits in front of the printer on the same table.

See “Setting Up Your 4232 Printer Model 302 with ASF” in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* for information on setting up and operating this device.

---

## **Ribbons**

Two ribbon cartridges are available for use in the 4232 Printer Model 302: one with a black multiple purpose ink (IBM part 1040580) with an average ribbon life of 15 million DP characters, and one with a black general purpose ink (IBM part 1040440) with an average ribbon life of 6 million DP characters. Call Lexmark\*\* at 1-800-438-2468 to order ribbons.

See "Installing the Ribbon Cartridge and Guide" on page 1-6 and Chapter 3, "Replacing Your Ribbon" for more information.

---

## **Print Head**

Your printer has a 9-wire print head. The print head is bidirectional (prints left to right and right to left).

If there is a problem with the print head, contact your IBM service representative.

---

## **Problem Determination**

Appendix B, "Problem Solving" has codes and problem information. The most probable cause of a printer problem is listed first. There is also an inspection procedure for the forms devices to help you find and remove paper jams. If you cannot resolve the problem using this information, contact your service representative.

---

## **Relocation Instructions**

Be sure that you tape or tie down the print head and use foam or some other material as padding. Reinstall the shipping brace if possible (see page 1-5).

---

## Caring for Your Printer

Your printer requires very little care, but the following suggestions are helpful to prevent damage and to keep it clean.

- Be sure that you use the correct IBM ribbon cartridge (IBM part 1040580 or IBM part 1040440).
- Do not place liquid containers near the printer.
- Keep the access cover closed except when replacing the ribbon or changing the forms.
- Do not let objects (rubber bands, paper clips, and so on) drop into the printer.
- Do not block the air vents on the printer sides. Obstructions could restrict airflow and cause the printer to overheat.
- Clean or vacuum the printer as necessary to remove dust or lint from the forms feed path. Be sure that the power switch is turned Off (O).
- Use a cloth dampened with mild soap and warm water to clean the printer exterior.

---

## Starting a Print Job

To start a print job, follow this checklist:

- \_\_\_ 1. Be sure a ribbon cartridge is installed (see “Installing the Ribbon Cartridge and Guide” on page 1-6 or Chapter 3, “Replacing Your Ribbon”).
- \_\_\_ 2. Be sure the desired forms device is installed.
  - See “Installing and Using the Continuous Forms Device (F1)” on page 1-18, or
  - See “Installing and Using the Dual Purpose Forms Device (F2)” on page 1-53, or
  - See “Installing and Using the Document Insertion Device (F3)” on page 1-85, or
  - See “Setting Up Your 4232 Printer with ASF” in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* for information on using the Auto Sheet Feeder.
- \_\_\_ 3. Be sure that the parameter values agree with the application you are to print.

See the procedures for setting your parameter values in *IBM 4232 Printer Model 302 Operator Panel Instructions*.
- \_\_\_ 4. Load forms.

When you load forms, be sure that you use the correct forms loading procedure and do all of the following:

  - a. Set the correct forms device setting.
  - b. Set the top of form position.
  - c. Adjust the left margin (if needed).
  - d. Adjust the forms tension (Continuous Forms Device [F1] only).
- \_\_\_ 5. Verify that the computer is ready to send information to the printer.

- \_\_\_ 6. Press **Start** to make the printer ready to print.

The printer starts printing as soon as the computer sends the data and the printer finishes processing the data.

- \_\_\_ 7. If necessary, repeat adjustments to improve print quality.

**Note:** You may have to check with the programmer or computer operator if the printed results do not appear the way you expect.

---

## Stopping or Canceling a Print Job

To *stop* the current print job, follow these steps:

1. Press **Stop**.

The printer stops printing.

2. To continue printing the same print job, press **Start**.

To *cancel* the current print job, follow these steps:

**Warning:** Canceling a print job by using **Cancel Print** sends a message to the computer and will cause data in the printer to be cleared.

1. Press **Stop**.
2. Press **Cancel Print**.

The printer stops printing.

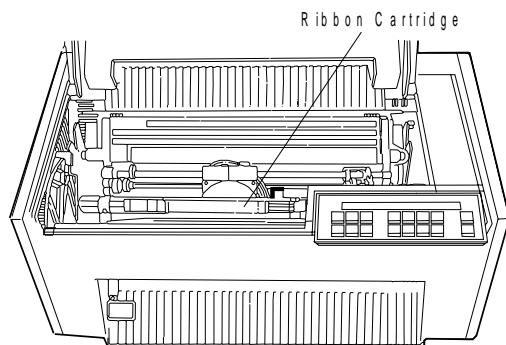


---

## Chapter 3. Replacing Your Ribbon

This chapter describes how to remove and replace the ribbon cartridge and how to make ribbon adjustments.

**Warning:** Damage to the printer can occur if you do not use IBM ribbons (IBM part 1040580 or 1040440) especially designed for the 4232 Printer Model 302. Call Lexmark at 1-800-438-2468 to order ribbons.



---

## Removing the Ribbon Cartridge

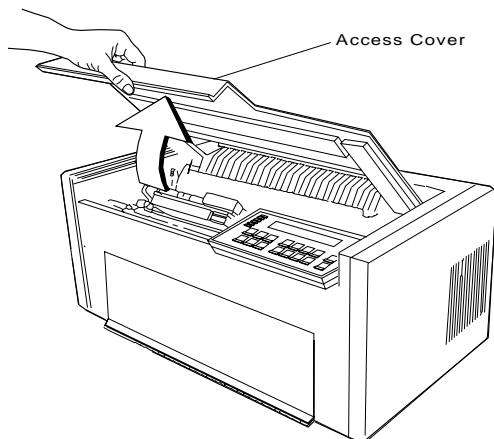
To remove an existing ribbon cartridge, follow these steps:

1. If the power is Off (O), go to Step 3.
2. If the power is On (I), press **Stop**.

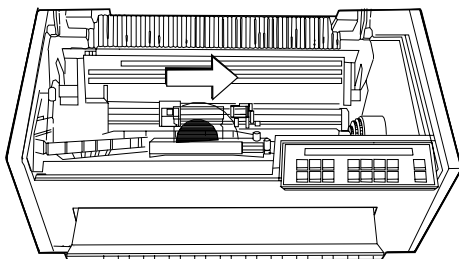
The printer displays

NOT READY	<A>
-----------	-----

3. Open the access cover.



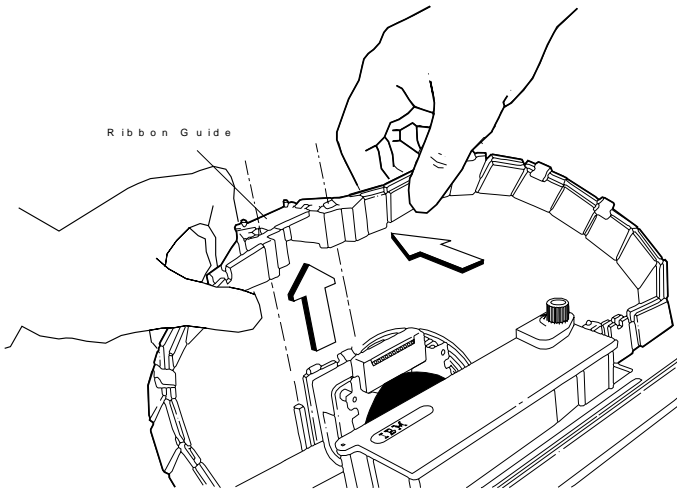
4. Slide the print head to the center of the printer.





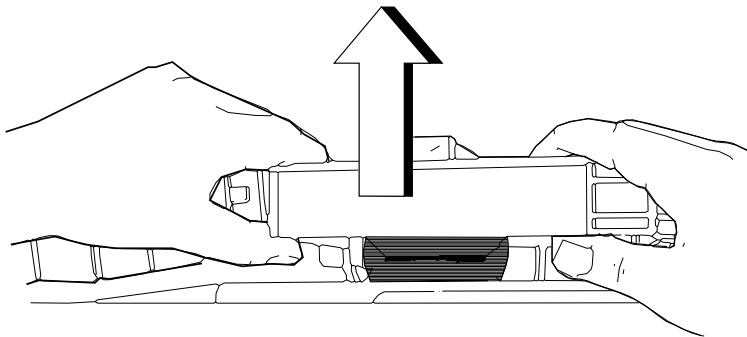
5. Push the ribbon guide toward the back of the printer and lift the ribbon guide up.

**Note:** You may find it easier to remove the ribbon guide by lifting the right side of the guide first and then pulling up the left side of the guide.



6. Pull the ribbon cartridge up until it snaps free. Remove the ribbon cartridge from the printer.

**Note:** You may find it easier to remove the ribbon cartridge by lifting the right side of the cartridge first and then pulling up the left side of the cartridge.

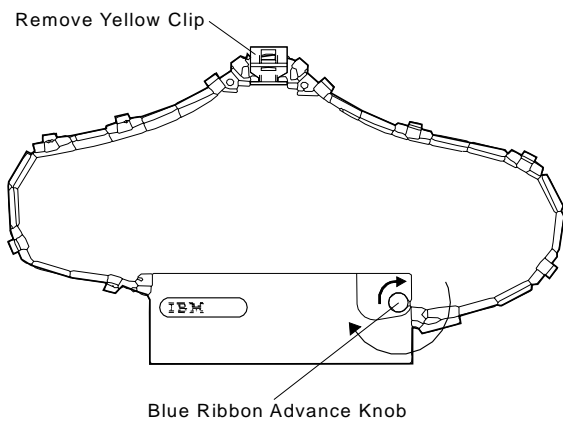


---

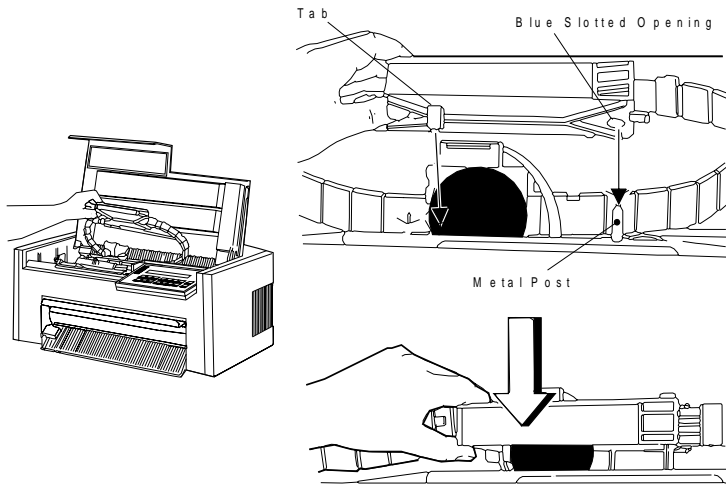
## Installing the Ribbon Cartridge

To install a new ribbon cartridge, follow these steps:

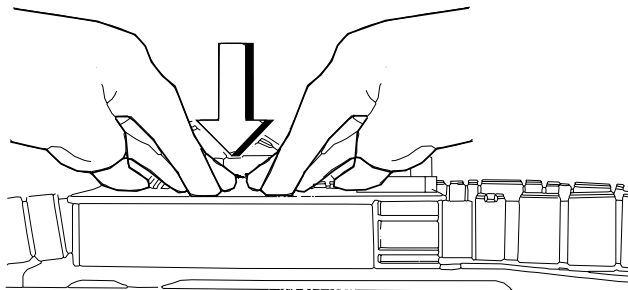
1. Get a new ribbon cartridge and remove it from the package.
2. Remove the yellow clip from the ribbon.
3. Turn the **blue ribbon advance knob** clockwise to take up slack in the ribbon. If the ribbon does not move, contact your place of purchase and replace the ribbon cartridge.



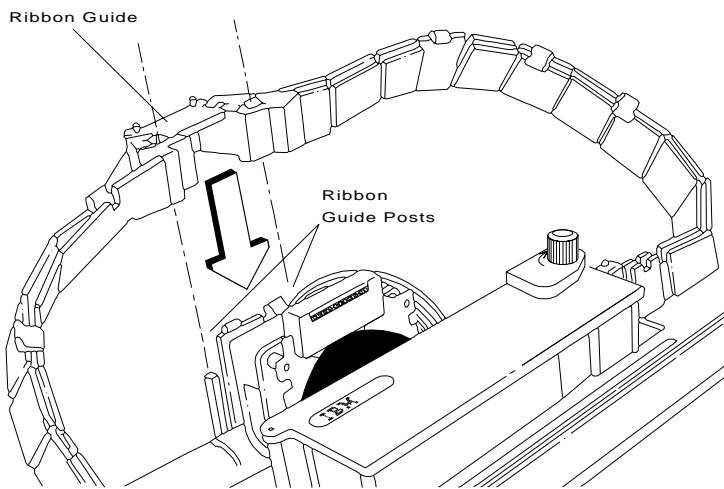
4. Align the **blue slotted opening** on the bottom of the ribbon cartridge with the metal post. You may have to turn the **blue ribbon advance knob** to align the slots. Lower the ribbon cartridge onto the metal post. Be sure that the plastic tab on the bottom of the ribbon cartridge aligns with the hole in the printer casting.



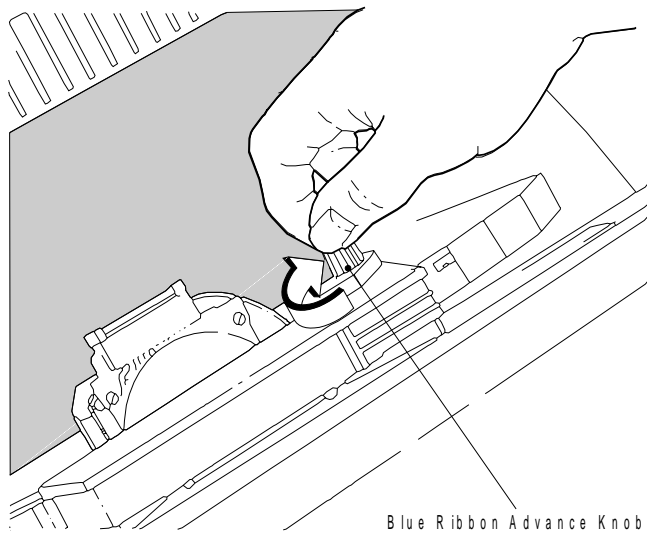
5. Press the cartridge down *firmly* to snap it into place.



6. Align the holes in the ribbon guide with the ribbon guide posts on the print head carrier. **Press the guide all the way down on the ribbon guide posts until the tops of the posts are even with the top of the ribbon guide.**



7. To be sure that you have installed the ribbon cartridge correctly, check that:
- a. The left side of the ribbon cartridge is securely snapped onto the printer. The right side fits over the ribbon drive post but does not latch down.
  - b. There are no twists or folds in the ribbon.
  - c. The ribbon is not catching on the print head.
  - d. The ribbon moves when you turn the **blue ribbon advance knob** clockwise. If the ribbon does not move, replace the ribbon cartridge.



8. If necessary, load or reload forms (see the appropriate section in Chapter 1, "Setting Up the 4232 Printer Model 302," depending on your forms device).
9. Be sure that the power is On (I).
10. If there is data in the printer to be printed:
  - a. Leave the access cover open.
  - b. Press **Start**.
  - c. Observe the printer as it prints.

**Note:** If your printing results in partial characters, be sure that the ribbon guide is correctly in place on the print head and no folds are in the ribbon.
  - d. When printing is satisfactory, close the access cover and continue with your print jobs.

You have completed installing a ribbon cartridge. If you have any printing problems, see Appendix B, "Problem Solving" to determine the probable cause.

---

## Chapter 4. Using the Operator Print Tests

This chapter describes the print tests you can perform to:

- Demonstrate printing capabilities
- Adjust printer operations
- Check the printer configuration
- Check printer operation.

Any of these tests can be performed at anytime. However, all tests should be performed when there is no print data buffered in the printer processing. When you go into test mode, the printer goes offline. When you exit test mode, the printer performs a *partial reset* before going back online. This partial reset clears any buffered print data and anything stored in printer storage, such as downloaded fonts or overlays.

Entering the Operator Print Tests may cause the forms configuration settings to be adjusted. If the current settings are less than a maximum print position of 72 or a maximum page length of 66, the printer will adjust the settings to a standard 8.5 x 11 inch page. This is done to ensure correct formatting of all offline customer tests. The original settings will be reset when the printer returns to the online state. If the settings are larger than the required page dimensions, the settings are not changed.

---

### General Test Instructions

To enter the Operator Print Tests menu, press **Test** when the printer is *not ready*. The printer displays

OPERATOR PRINT TESTS  
Printer Demonstration

The Printer Demonstration test is the first test in the Operator Print Tests menu. From this display, press **Scroll** ↑ or **Scroll** ↓ to view the other tests.

When a test is not running, pressing **Return** or **Cancel Print** tells the printer to exit test mode and perform a partial reset. If you press **Return**, the printer goes to online *not ready*; if you press **Cancel Print**, the printer goes to online *ready*.

Pressing **Enter** or **Start** begins a test. Some of the tests print and then exit back to the Operator Print Tests menu automatically, while other tests require you to give input using the operator panel keys to complete the test. See the individual test descriptions on the following pages for specific instructions.

While a test is running, pressing **Stop** or **Cancel Print** halts the test. If you press **Stop**, the display returns to the Operator Print Tests menu. If you press **Cancel Print**, the printer exits test mode, performs a partial reset, and becomes online *ready*.



---

## Printer Demonstration

You can print samples of all the available print qualities, representative charts, bar codes, and bit image graphics, by using the Printer Demonstration test. This test can also be used to verify parts of the printer mechanism.

**Note:** The printer can perform this test without being connected to a computer.

To begin the printer demonstration:

1. Enter the Operator Print Tests (see “General Test Instructions” on page 4-1).

The printer displays

OPERATOR PRINT TESTS Printer Demonstration
-----------------------------------------------

2. Press **Enter** or **Start** to begin the test.

The printer displays

OPERATOR PRINT TESTS Please Wait
-------------------------------------

while the demonstration data is being loaded. After the data is loaded, the **Ready** indicator goes on and printing begins. The demonstration automatically repeats until **Stop** or **Cancel Print** is pressed.

3. Press **Cancel Print** to exit the test and make the printer *ready* (see “General Test Instructions” on page 4-1). Press **Stop** to exit the test and return to the Test Menu.

---

## Top of Form Alignment

You can print a single line of text to help in setting the top of form position using the Top of Form Alignment test. The test prints a row of *H*'s, and lets you adjust the top of form position and to print another row of *H*'s until the top of form position is set where you want it.

To adjust top of form position, follow these steps:

1. Enter the Operator Print Tests (see "General Test Instructions" on page 4-1).

The printer displays

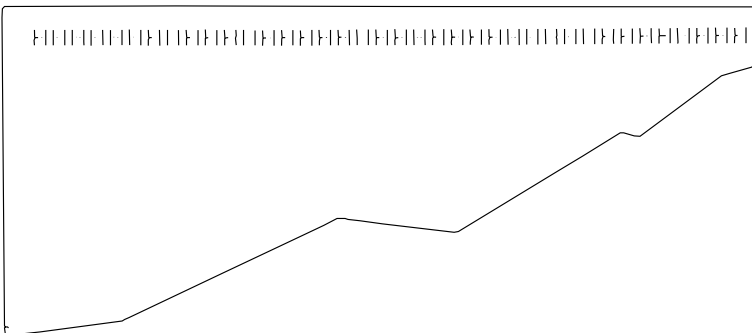
```
OPERATOR PRINT TESTS
Printer Demonstration
```

2. Press **Scroll** ↓ or **Scroll** ↑ until the printer displays

```
OPERATOR PRINT TESTS
Top of Form Alignment
```

3. Press **Enter** or **Start** to begin the test.

The printer prints a single line of *H*'s.



The printer then displays

Top of Form Alignment  
Press ENTER to Reprint

4. If the *H*'s do not print where you want your top of form position, you can adjust the setting with the following keys:

**Line Feed** Advance form 4.23 mm (0.17 in.)

**Micro** ↑ Advance form 0.35 mm (0.0139 in.)

**Micro** ↓ Move form backward 0.35 mm (0.0139 in.).

5. After you have made an adjustment, press **Enter** to print the *H*'s again on the same page, or press **Form Feed (Load/Eject)** for the F3 or F4 forms devices) and then **Enter** to print the *H*'s at the new top of form position on the next page.
6. Repeat Steps 4 and 5 until the top of form position is where you want it.
7. Press **Set Top of Form** to set the new top of form position. The alarm beeps and the printer displays

TOP OF FORM SET

8. Press **Cancel Print** to exit the test and make the printer *ready*. Press **Stop** to exit the test and return to the Test Menu (see "General Test Instructions" on page 4-1).

**Note:** The top of form position can be adjusted without printing the row of *H*'s. See the appropriate section for your forms device on setting the top of form position.

---

## Left Margin Alignment

You can print a single line of text to help in setting the left margin position using the Left Margin Alignment Test. You can also change the current left margin position using this test.

You can set the left margin position from 1 to 66 units (where each unit is 0.686 mm [0.027 in.]). The factory default setting is 10. The margin is measured starting at 3.81 mm (0.15 in.) from the center of the tractor pins for continuous forms and from the left edge of a cut form.

To align the left margin position, follow these steps:

1. Enter the Operator Print Tests (see “General Test Instructions” on page 4-1).

The printer displays

```
OPERATOR PRINT TESTS
Printer Demonstration
```

2. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

```
OPERATOR PRINT TESTS
Left Margin Alignment
```

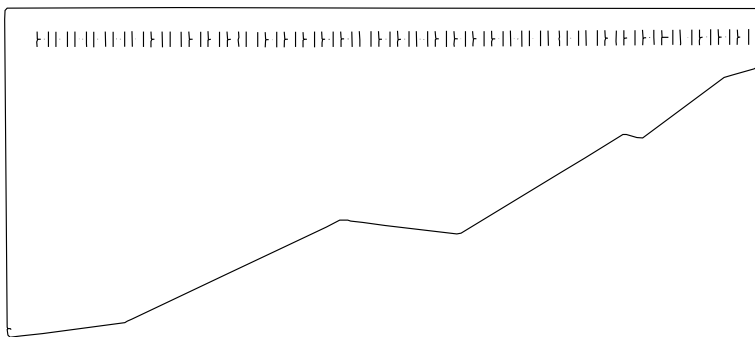
3. Press **Enter** or **Start** to begin the test.

The printer displays

```
Left Margin Position
* xxx
```

where xxx is the current value of the left margin position.

The printer also prints a single line of *H*'s.



4. If the *H*'s do not start where you want your left margin, press **Scroll** ↑ or **Scroll** ↓ until the printer displays the desired value for the left margin position. For each change in value, the left margin is changed 0.686 mm (0.027 in.).
5. Press **Enter**.  
An asterisk (★) appears in front of the selected value. The forms advance one line and the row of *H*'s prints again. This value is now the current left margin position.
6. Repeat Steps 4 and 5 until the left margin is correctly aligned.  
(You can press **Line Feed** or **Form Feed [Load/Eject]** for F3 or F4 forms devices] to move the forms between printing the rows of *H*'s.)

7. Press **Cancel Print** to exit the test and make the printer *ready*. Press **Stop** to exit the test and return to the Test Menu (see “General Test Instructions” on page 4-1).

**Note:** If you want the new left margin position saved when you turn off the printer, you must save it in a Custom Set. See “Storing Configuration Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions* for information on saving configurations.

You may also adjust the left margin without printing the row of *H*s by changing the left margin position in the Configuration Menu. (See “Using Print Format and Quality Parameters” in *IBM 4232 Printer Model 302 Operator Panel Instructions*.)

---

## Printer Configuration

You can print the current values for each parameter. Each parameter is shown with its corresponding value printed to the right. The category and parameter names are printed in the current Display Language used on the operator panel. See Figure 4-1 on page 4-10 and Figure 4-2 on page 4-11 for sample printouts.

Printer configurations can be checked by entering the configuration menus.

To print the printer configuration:

1. Enter the Operator Print Tests (see “General Test Instructions” on page 4-1).

The printer displays

```
OPERATOR PRINT TESTS
Printer Demonstration
```

2. Press **Scroll** ↑ or **Scroll** ↓ until the printer displays

```
OPERATOR PRINT TESTS
Printer Configuration
```

3. Press **Enter** or **Start** to begin the test.

The **Ready** indicator goes on and printing begins. The printout shows the current configuration. The configuration printout is complete when the **Ready** indicator goes off.

4. The printer returns to the Operator Print Tests menu automatically when the configuration printout is complete.
5. Press **Cancel Print** to make the printer *ready* or **Return** to make the printer *not ready* (see “General Test Instructions” on page 4-1).

<b>Printer Configuration</b>	<A>
<b>Print Format and Quality</b>	
Characters Per Inch	10
Lines Per Inch	6
Maximum Print Position	136
Maximum Page Length	066
Print Quality	DP Quality
Host Fast Draft	Disabled
Left Margin Position	010
<b>Printer Setup</b>	
Print Language	437 PC Character Set 1
Display Language	000 English
Alarm Control	High Volume
Forms Device	Dual Purpose Forms (F2)
Form Feed Mode	Not Active In Ready State
SPA Emulation Mode	4202 Proprinter II XL
System Interface	Parallel
Power-On Reset	Yes
<b>Auto Sheet Feeder</b>	
Bin Select	Bin 1
Bin Priority Selection	Data Stream Accepted
<b>Performance</b>	
Bar Code and Graphics Mode	High/High
F2 Eject Mode	Immediate Eject
F3 Eject Mode	Top Of Form Option
NLQ Print Direction	Bidirectional
Graphics Print Direction	Bidirectional
Bar Code Print Direction	Bidirectional
<b>Configuration Storage</b>	
Save Current Values	Saved
Recall Custom Set Values	Recalled
Change Power-On Set	Custom Set A
Recall Factory Defaults	Factory Defaults Recalled
<b>Printer Compatibility</b>	
Compatibility Option 01	Standard
Compatibility Option 02	Standard
Compatibility Option 03	Standard
Compatibility Option 04	Standard
Compatibility Option 05	Standard
Compatibility Option 06	Standard
Condensed Print	15
Compatibility Option 07	Standard
Compatibility Option 09	Standard
Automatic Eject	Standard
Automatic Restore	Disabled
<b>Vital Product Data</b>	
Serial Number	0000000
Device Specific Information	0000000000000000
<b>Quit from Menu</b>	
Restore Previous Values	

| Figure 4-1. Sample Printer Configuration Printout — Parallel Attached



```

Printer Configuration          <B>
Print Format and Quality
Characters Per Inch          10
Lines Per Inch              6
Maximum Print Position      136
Maximum Page Length        066
Print Quality                DP Quality
Host Fast Draft             Disabled
Left Margin Position       010
Printer Setup
Print Language              437 PC Character Set 1
Display Language           000 English
Alarm Control              High Volume
Forms Device               Dual Purpose Forms (F2)
Form Feed Mode             Not Active In Ready State
SPA Emulation Mode        4202 Proprinter II XL
System Interface           RS-232C
Baud Rate                  9600
Pacing Protocol            DTR
Parity                     None
Stop Bits                  1
Data Bits                  8
Status Reporting           Disabled
Power-On Reset             Yes
Auto Sheet Feeder
Bin Select                 Bin 1
Bin Priority Selection      Data Stream Accepted
Performance
Bar Code and Graphics Mode High/High
F2 Eject Mode              Immediate Eject
F3 Eject Mode              Top Of Form Option
NLQ Print Direction        Bidirectional
Graphics Print Direction  Bidirectional
Bar Code Print Direction  Bidirectional
Configuration Storage
Save Current Values        Saved
Recall Custom Set Values   Recalled
Change Power-On Set       Custom Set A
Recall Factory Defaults    Factory Defaults Recalled
Printer Compatibility
Compatibility Option 01    Standard
Compatibility Option 02    Standard
Compatibility Option 03    Standard
Compatibility Option 04    Standard
Compatibility Option 05    Standard
Compatibility Option 06    Standard
Condensed Print           15
Compatibility Option 07    Standard
Compatibility Option 09    Standard
Automatic Eject           Standard
Automatic Restore         Disabled
Vital Product Data
Serial Number              0000000
Device Specific Information 0000000000000000
Quit from Menu
Restore Previous Values

```

| Figure 4-2. Sample Printer Configuration Printout — Serial Attached

---

## Printer Verification

You can test general print quality and the wires in the print head by using the Printer Verification test. This test prints nine horizontal lines using each wire on the print head. After these nine lines have printed, several lines of data processing (DP) characters are printed followed by several lines of near letter quality (NLQ) characters.

To test print quality, follow these steps:

1. Enter the Operator Print Tests (see “General Test Instructions” on page 4-1).

The printer displays

OPERATOR PRINT TESTS  
Printer Demonstration

2. Press **Scroll**↓ or **Scroll**↑ until the printer displays

OPERATOR PRINT TESTS  
Printer Verification

3. Press **Enter** or **Start** to begin the test.

The **Ready** indicator goes on and printing begins. The verification printout is complete when the **Ready** indicator goes off.

The printout should look similar to:

01			
02			
03			
04			
05			
06			
07			
08			
09			
	01234	56789	IJKLM
	NOPQR	STUVW	ghijkl
	lmnop	qrstuv	àâçèé
	òíîïà	ÀÉæËó	úñÑº
	01234	56789	IJKLM
	NOPQR	STUVW	ghijkl
	lmnop	qrstuv	àâçèé
	òíîïà	ÀÉæËó	úñÑº

4. Compare your printout with the sample printout.

Did the lines print and is the remainder of the printout clear and readable?

If *YES*, go to Step 5.

If *NO*, do the following:

- a. If any of the following items are not installed correctly, the printer can experience forms jamming, ribbon jamming, or an incorrect print verification printout:

- Forms device
- Ribbon cartridge
- Forms.

Repeat the setup instructions in Chapter 1, "Setting Up the 4232 Printer Model 302" if you suspect a ribbon, forms, or forms device installation problem.

- b. Be sure that enough forms are still loaded and press **Enter** to get another printout.
- c. If the second printout is not similar to the sample printout, go to Appendix B, "Problem Solving."
- d. Once you get a good printout, go to Step 5.

5. Press **Cancel Print** to make the printer *ready* or **Return** to make the printer *not ready* (see "General Test Instructions" on page 4-1).

---

## Bidirectional Adjustment

You can adjust dot registration and print quality for characters created using bidirectional printing. The bidirectional alignment may need periodic adjustment to maintain print quality.

To change the bidirectional alignment, follow these steps:

1. Enter the Operator Print Tests (see “General Test Instructions” on page 4-1).

The printer displays

```
OPERATOR PRINT TESTS
Printer Demonstration
```

2. Press **Scroll** ↓ or **Scroll** ↑ until the printer displays

```
OPERATOR PRINT TESTS
Bidirectional Adjustment
```

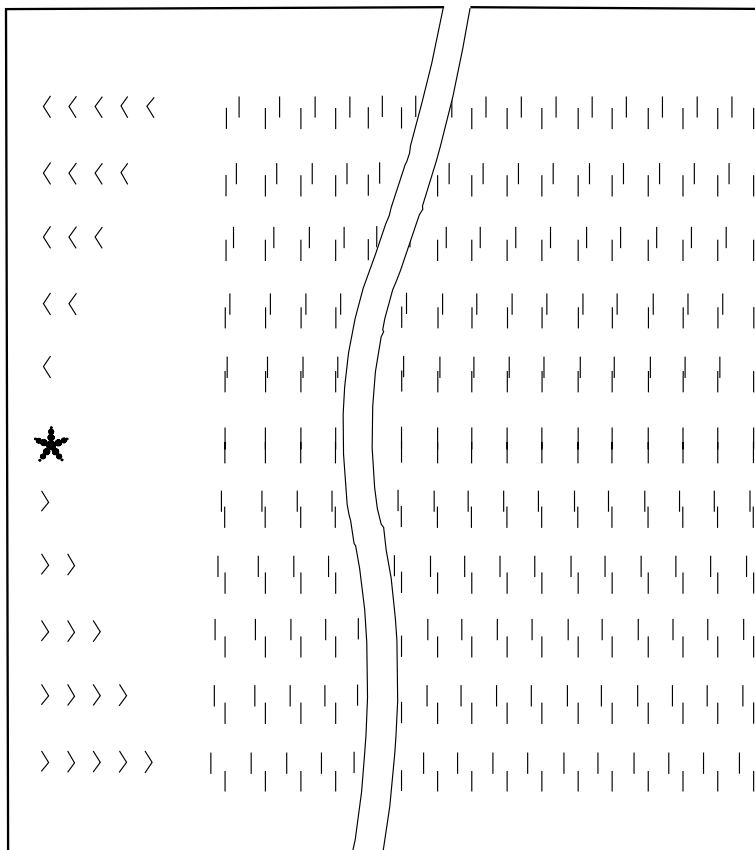
3. Press **Enter** or **Start** to begin the test.

The **Ready** indicator goes on and printing begins. The test prints samples using alignment values higher and lower than the default value. The print sample using the default value is indicated with an asterisk (\*). The alignment printout is complete when the **Ready** indicator goes off.

The printer displays

```
Bidirectional Adjustment
*
```

The sample printout appears as follows:



4. If the default value does not give the best print sample, press **Scroll** ↑ or **Scroll** ↓ until the printer displays the same number of arrows that were printed beside the *best* print sample line. Press **Enter** to set this as the new default value. The printer then prints another line to demonstrate the new default value, and the test is complete.

or

Press **Stop** to end the test without changing anything and return to the Operator Print Tests menu.

or

Press **Cancel Print** to end the test, exit test mode, perform a partial reset, and have the printer display

READY	<A>
-------	-----

5. If you changed the value, check the last line printed for acceptable quality and alignment.  
If the quality is not acceptable, return to Step 3 on page 4-15, otherwise, go to Step 6.
6. Press **Cancel Print** to make the printer *ready* or **Return** to make the printer *not ready* (see “General Test Instructions” on page 4-1).





---

## **Appendix A. Training Guideline**

This appendix is a guideline for operator training. Those more familiar with the IBM 4232 Printer Model 302 operations can use this guideline to help teach a new operator about the printer.

---

## Introduction

All operators should know the following:

- Locations of printer parts
- The use and functions of the operator panel keys
- Forms loading and unloading
- Ribbon changing
- Problem solving
- Model number and attachment type identification.

In addition, some operators might be responsible for the following tasks:

- Forms device installation and checkout
- All operator panel functions and operation (including checking and changing parameter values)
- Print tests.

---

## Guideline for Training

To introduce a new operator to the printer, use the following steps as a guideline. Change the steps, as needed, to suit your working environment and the operator's level of responsibility.

1. Show the operator this guide and discuss the contents of Chapter 1, "Setting Up the 4232 Printer Model 302."
2. Show the operator
  - *IBM 4232 Printer Model 302 Quick Reference Guide*
  - *IBM 4232 Printer Model 302 Operator Panel Instructions*and discuss the contents of each.
3. The power cord should be unplugged before connecting or disconnecting the signal cable. See Chapter 1, "Setting Up the 4232 Printer Model 302" for the proper sequence.
4. Show the operator how to install the forms device with emphasis on identifying the type of forms device (F1, F2, F3, or F4). Show the operator where the procedures are in Chapter 1, "Setting Up the 4232 Printer Model 302" or in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* (depending on the forms device installed).
5. Show the operator how to set the forms device number. Show the operator where the procedures are in Chapter 1, "Setting Up the 4232 Printer Model 302" or in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* (depending on the forms device installed).

6. Show the operator how to load forms with emphasis on:

**Continuous Forms Device (F1):**

- a. Location and function of the blue tractor locking lever and adjustment for width of form
- b. Forms tensioner location and location of forms tension knob and adjustment
- c. Platen rod location and use as a reference
- d. Top of form and left margin alignment
- e. Forms movement keys
- f. Unloading forms, with emphasis on unloading from top of printer.

See “Installing and Using the Continuous Forms Device (F1)” on page 1-18 for more information.

**Dual Purpose Forms Device (F2):**

- a. Location and function of tear bar
- b. Location of blue tractor locking lever and adjustment for width of form
- c. Platen rod location and use as a reference
- d. Auto load feature demonstration
- e. Top of form and left margin alignment
- f. Forms movement keys
- g. Ready the printer for the next transaction, with emphasis on the proper method for setting the tear off position and for tearing off the form at the tear bar toward the front of the printer
- h. Unloading forms, with emphasis on removing forms from the bottom of the printer.

See “Installing and Using the Dual Purpose Forms Device (F2)” on page 1-53 for more information.

**Document Insertion Device (F3):**

- a. Location and function of feed rollers
- b. Location and function of right roller assembly locking lever
- c. Location and function of lower forms guide
- d. Location of upper forms guide and function (including use of white writing surface)
- e. Location and function of left stop on the upper forms guide
- f. Loading a form, with emphasis on feeding forms straight
- g. Top of form and left margin alignment
- h. Unloading a form
- i. Removal of lower forms guide if another type of forms device is to be installed.

See "Installing and Using the Document Insertion Device (F3)" on page 1-85 for more information.

**Auto Sheet Feeder (F4):**

*See IBM 4232 Printer Model 302 Auto Sheet Feeder General Information* for more information.

7. Show the operator the location of information on changing ribbon cartridges (see Chapter 3, "Replacing Your Ribbon").
8. Show the operator how to remove and replace the ribbon cartridge. Emphasis should be on how to tell if the ribbon guide is properly seated and how to check for twists or folds. See Chapter 3, "Replacing Your Ribbon" for more information.

9. Show the operator how to adjust the forms thickness setting to adjust print quality. Emphasize obtaining a smudge-free top copy and legibility on back copies for multiple-part forms and smudge-free legibility single-part forms.
10. Show the operator how to run Operator Print Tests, and describe when and how to use them. See Chapter 4, "Using the Operator Print Tests" for more information.
11. Show the operator how to use the problem-solving information in "Using the Status Code and Problem Listings" on page B-2. Give examples of status code displays, such as

001 END OF FORMS LOAD FORMS
--------------------------------

Describe how to call for service if you cannot solve the problem using the procedures.

12. Show the operator how to do the forms device inspection procedure. See "Forms Device Inspection" on page B-24 for more information.
13. Show the operator "Checking and Changing Configuration Parameter Values" in *IBM 4232 Printer Model 302 Operator Panel Instructions* on parameter values. Show how to check and change parameter values.

---

## Customer Responsibility

Discuss the importance of the operator knowing what is and what is not *customer responsibility*. The customer *is* responsible for maintaining, removing, installing, and ordering the following:

- Ribbon cartridges
- Paper.

Also, the customer is responsible for following the instructions in the problem solving sections of Appendix B, "Problem Solving" before calling for service. For example, if the characters in a printout have missing dots, the customer should look up the problem in this chapter.





---

## **Appendix B. Problem Solving**

When the printer displays a status code, you need to know what action to take to recover from the displayed condition. This chapter lists the status codes and recovery actions and gives a list of problems, probable causes, and recovery actions for problems that do not display a status code.

---

## Using the Status Code and Problem Listings

When a problem with the printer occurs, the printer displays a status code and message. The message on the display identifies the problem and gives a recommended action.

**Status Code and Message Displays:** Find the code listed in numeric order on the following pages and perform the steps to fix the problem. Only codes on which an operator can take action are included.

**Note:** If you get a code that you cannot find on this table, record the code and run the job or test again. If you get the same code, call for service.

If the recommended recovery action does not fix your problem, see “Problem List Index” on page B-23 and then go to the page identified. If you still cannot fix the problem, call for service.

**No Status Code Displays:** Scan the “Problem List Index” on page B-23 and go to the page listed beside the problem. Find your problem in the chart, read down the page to the “Solution,” and do the recommended recovery action. If you still cannot fix the problem, call for service.

**Note:** A plus sign (+) in any error messages indicates that the printer has the Extended Memory feature installed.

---

## Status Codes

001 END OF FORMS LOAD FORMS
--------------------------------

### Continuous Forms Device (F1) and Dual Purpose Forms Device (F2):

1. Press **Stop**.
2. Load forms.
3. Be sure that the forms are loaded correctly and that they are under the **blue forms guide/forms sensor**.
4. Be sure that nothing blocks the **blue forms guide/forms sensor**.
5. Reset the top of form position.
6. Press **Start**.

### Document Insertion Device (F3) and Auto Sheet Feeder Device (F4):

1. Press **Stop**.
2. Press **Load/Eject**.
3. Load the correct form size, or
4. Check the maximum page length setting and correct it; then reload the form and restart the print job (see "Introducing the 4232 Printer Model 302" in *IBM 4232 Printer Model 302 Product and Programming Description* for more information on the maximum page length setting).

---

002 FORMS JAMMED CLEAR JAM AND RELOAD FORMS
------------------------------------------------

**Continuous Forms Device (F1) and Dual Purpose Forms Device (F2):**

1. Press **Stop**.
2. Be sure that the forms device is correctly installed.
3. Clear the jam.
4. Be sure that nothing blocks the **blue forms guide/forms sensor**.
5. Reset the top of form position. (See Chapter 1, "Setting Up the 4232 Printer Model 302.")
6. Press **Start**.
7. Verify the printed output; if pages are damaged or data is lost, follow your local operating procedures.

**Note:** If this error occurs during the power-on test:

1. Turn the power Off (O).
2. Clear the jam.
3. Wait for 10 seconds and turn the power On (I).
4. Make sure the Forms Device parameter value is correct.

---

003 FORMS EJECTED PRESS LOAD
---------------------------------

**Dual Purpose Forms Device (F2):**

This is not an error condition. Press **Load/Eject** to position the form back to the top of form position and enable printing.

**Continuous Forms Device (F1), Document Insertion Device (F3), and Auto Sheet Feeder (F4):**

The operator panel setting for the forms device does not match the device installed. Be sure that the forms device setting is correct (see Chapter 1, "Setting Up the 4232 Printer Model 302").

---

004 PRESS LOAD

**Document Insertion Device (F3):**

This is not an error condition. Press **Load/Eject** to position the form to the top of form position and enable printing.

---

005 MARGIN ERROR  
ADJUST MARGIN OR LINE LENGTH

1. Press **Stop**.

The left margin automatically resets to 20 units. See Chapter 1, "Setting Up the 4232 Printer Model 302."

2. Press **Start**.

---

009 INVALID KEYPRESS

009 INVALID MULTIPLE KEYPRESS

009 INVALID KEYPRESS  
PRESS STOP FIRST

The operator panel function is invalid or the computer is overriding the request.

1. Check the operator panel function.

2. Reenter the correct operation.
  3. See *IBM 4232 Printer Model 302 Operator Panel Instructions* for more information.
- 

010 LOAD MANUAL BIN  
PRESS STOP THEN START

010 LOAD MANUAL BIN  
PRESS STOP THEN ENTER

010 LOAD MANUAL BIN  
PRESS START TO CONTINUE

#### **Auto Sheet Feeder (F4):**

1. Press **Stop** (only if the message indicates to press **Stop**).
  2. Place paper in the manual bin.
  3. Press **Start** or **Enter** as specified.
- 

011 CHECK/LOAD BIN

#### **Auto Sheet Feeder (F4):**

1. Press **Stop**.
2. If there is paper in the bin, remove it from the bin and “fluff” it.  
Then, place paper back in the bin.  
If there is not any paper in the bin, add paper.
3. Press **Start**.

---

012 CHECK PAPER PATH

**Dual Purpose Forms Device (F2) and Document Insertion Device (F3):**

1. Press **Stop**.
2. Remove the paper from the printer.
3. Place paper in the load position.
4. Press **Load/Eject** to load paper.
5. Press **Start**.

**Note:** If this error occurs during the power-on test:

1. Turn the power Off (O).
2. Remove the paper.
3. Wait for 10 seconds and turn the power On (I).
4. Make sure the Forms Device parameter value is correct.

---

013 DATA TO PRINT  
LOAD FORMS

**Document Insertion Device (F3):**

1. Place paper in the load position.

The printer displays

004 PRESS LOAD

2. Press **Load/Eject** to load paper.

Printing continues.

---

014 INVALID FORMS SELECT  
SELECT NEW DEVICE

### **Continuous Forms Device (F1) and Dual Purpose Forms Device (F2):**

The computer has requested a cut form. The forms device installed does not handle cut forms.

1. Press **Stop**.
2. Install either the F3 or F4 forms device and set that device through the Configuration Menu (see Chapter 1, "Setting Up the 4232 Printer Model 302" for the appropriate procedure or see "Setting Up Your 4232 Printer with ASF" in *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information*).

**Note:** If you do not have an F3 or F4 forms device, see your programmer.

3. Press **Start**.
4. Resubmit the print job.

---

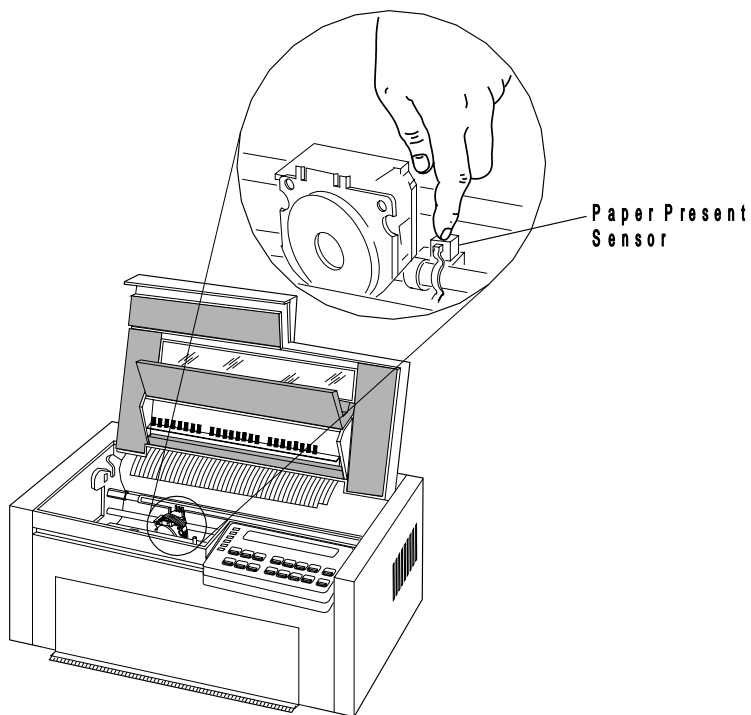
016 PRESS STOP THEN LOAD

### **Dual Purpose Forms Device (F2):**

Inserting paper under the blue tractor doors and pressing **Start** will display the 016 message. Press **Stop**, then **Load/Eject** to advance the paper under the print head.

This message could also display if the **paper present sensor** becomes dirty.





To clean this sensor:

1. Turn the power Off (O).
2. Remove the ribbon.
3. Hold the sensor in place by pushing it down with a finger.
4. Clean the front surface, opposite the wires and closest to the paper, with a cotton swab or a piece of cloth.
5. Replace the ribbon.
6. Turn the power On (I).

If this does not correct the false reading, call for service.

---

019 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, or if the printer displays

066 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

call for service.

---

021 RECEIVE BUFFER OVERRUN  
PRESS STOP THEN CANCEL PRINT

023 TRANSMIT BUFFER OVERRUN  
PRESS STOP THEN CANCEL PRINT

024 PARITY ERROR  
PRESS STOP THEN CANCEL PRINT

025 FRAMING ERROR  
PRESS STOP THEN CANCEL PRINT

1. Press **Stop**.
2. Press **Cancel Print**.
3. Check that the serial configuration parameters are set correctly.
4. Press **Start**.
5. If the status code occurs again, call for service.

---

026 HEX PRINT MODE ACTIVE

This is an informational message. The printer displays this message after you press **Hex Print**. Press **Start**. All data will print in hexadecimal code until you press **Stop**.

---

029 LINK ERROR

1. Press **Stop**.
2. Check that the cable is connected to the printer and to the computer.
3. Check that the computer is powered on.
4. Check that the serial configuration parameters are set correctly.
5. Press **Start**. If the printer displays this status code again, try sending a print job.
6. If the status code still displays, call for service.

---

042 MACHINE CHECK  
SEE USER'S GUIDE

043 MACHINE CHECK  
SEE USER'S GUIDE

044 MACHINE CHECK  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays the message again, call for service.

---

050 MACHINE CHECK  
SEE USER'S GUIDE

051 MACHINE CHECK  
SEE USER'S GUIDE

052 MACHINE CHECK  
SEE USER'S GUIDE

053 MACHINE CHECK  
SEE USER'S GUIDE

055 MACHINE CHECK  
SEE USER'S GUIDE

056 MACHINE CHECK  
SEE USER'S GUIDE

058 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Press **Stop**.
2. Be sure that the print head movement is not blocked.
3. Press **Start** to resume printing.
4. If the printer displays any of these status codes again:
  - a. Turn the power Off (O).
  - b. Wait 10 seconds, then turn the power On (I).
  - c. Run the Printer Verification Test (see "Printer Verification" on page 4-12).
  - d. If the printer displays this status code again, call for service.

---

064 MACHINE CHECK  
SEE USER'S GUIDE

065 NO ATTACHMENT CARD  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

066 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again or if the printer displays

019 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

call for service.

---

072 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

074 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

075 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

076 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the power-on test is successful, resubmit the print job.
4. If the printer displays this status code again, call for service.

---

089 RIBBON JAM  
CHECK RIBBON

1. Turn the power Off (O).
2. Remove the ribbon cartridge.
3. Turn the **blue ribbon advance knob** to be sure that the ribbon is advancing correctly.
4. If the ribbon does not advance correctly, replace the ribbon cartridge.
5. If the ribbon cartridge advances correctly:
  - a. Turn the power On (I) without the ribbon cartridge.
  - b. If the printer displays this status code again, call for service.
6. If you try again with a new ribbon cartridge and have the same problem, call for service.

---

090 COVER/DOOR OPEN PRINT SPEED REDUCED
--------------------------------------------

This is an informational message. The access cover and front paper door should be closed while the printer is printing. If the access cover or front paper door is open, the printer slows printing and forms movement for safety reasons.

---

093 EJECT PENDING
-------------------

This is an informational message. The printer displays this message after you press **Load/Eject** to eject the forms when F2 Eject Mode is set to Delayed Eject. See "Selecting Performance Parameters" in *IBM 4232 Printer Model 302 Operator Panel Instructions*.

The printer displays

003 FORMS EJECTED PRESS LOAD
---------------------------------

after the forms are ejected.

---

095 OPTION NOT AVAILABLE  
Change Print Language

The OCR-A and OCR-B print languages have fixed CPI and Print Quality settings. For these print languages, the CPI must be set to 10 CPI and the Print Quality must be set to NLQ. While the Configuration Menu allows scrolling through the various selections, this message is displayed if either the CPI or Print Quality is changed when the print language is set to OCR-A or OCR-B.

**Note:** When the print language is changed to any language other than OCR-A or OCR-B, these options become enabled. They are, however, left at 10 CPI and NLQ and require reconfiguring if these settings are not suitable.

---

096 NOT READY  
COVER/DOOR OPEN

This message is displayed when either the access cover or the paper door is opened and the printer is in the *not ready* state. The *not ready* state is reached when **Stop** is pressed from the *ready* state. If the printer is made ready and a print job is started, the printer runs at a reduced speed if either the access or the paper door cover is left open.

---

097 FUNCTION NOT AVAILABLE  
MENU LOCKED

| This message is displayed when **Menu** is pressed when the Menu  
| Lock feature is enabled. Contact your system programmer.



---

0A1 MACHINE CHECK  
SEE USER'S GUIDE

0A2 MACHINE CHECK  
SEE USER'S GUIDE

0A3 MACHINE CHECK  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

0A4 MACHINE CHECK  
SEE USER'S GUIDE

1. Install a new ribbon.
2. Turn the power Off (O).
3. Wait 10 seconds, then turn the power On (I).
4. If the printer displays this status code again, call for service.

---

0A9 FUNCTION NOT AVAILABLE  
USE DURING PRINTING

The printer displays this message only while **Darker** or **Lighter** is held down. These key functions are valid only after the printer is *ready* and the automatic forms thickness adjustment (AFTA) measurement has been made. It is best to use these keys only when the printer is printing.

---

300 PANEL DIAGNOSTICS FAILURE  
SEE USER'S GUIDE

310 PANEL COMMUNICATION FAILURE  
SEE USER'S GUIDE

312 PANEL COMMUNICATION FAILURE  
SEE USER'S GUIDE

314 PANEL COMMUNICATION FAILURE  
SEE USER'S GUIDE

316 PANEL COMMUNICATION FAILURE  
SEE USER'S GUIDE

320 PANEL COMMUNICATION FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

7C0 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7C1 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7D0 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7D1 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7E0 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7F0 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

7F1 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

997 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

998 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

999 PRINTER CONFIGURATION INVALID  
PRESS START TO SET FACTORY DEFAULTS

| Press **Start** to set the factory defaults. The printer should follow the  
| usual power-on sequence. You then need to reconfigure the printer  
and save the values. (See "Storing Configuration Parameters" in  
*IBM 4232 Printer Model 302 Operator Panel Instructions*.)

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.

---

Axx APPLICATION CHECK  
SEE USER'S GUIDE

1. Press **Stop**.
2. Press **Start**.
3. Contact the system programmer and report the data stream error.

---

FE3 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE4 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE5 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE6 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE7 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE8 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FE9 PRINTER BOARD FAILURE  
SEE USER'S GUIDE

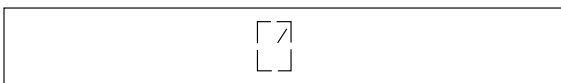
FFB NO ATTACHMENT  
SEE USER'S GUIDE

FFD PRINTER BOARD FAILURE  
SEE USER'S GUIDE

FFE PRINTER BOARD FAILURE  
SEE USER'S GUIDE

1. Turn the power Off (O).

2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays this status code again, call for service.



DIAGNOSTICS IN PROGRESS <A>

DIAGNOSTICS IN PROGRESS <A>

Calibrating Printer  
Please Wait <A>

DIAGNOSTICS COMPLETE <A>

These status messages are correct display sequences during power-on, but they should not remain on.

If they remain on more than 30 seconds:

1. Turn the power Off (O).
2. Wait 10 seconds, then turn the power On (I).
3. If the printer displays the same message for more than 30 seconds, call for service.

---

## Problem List Index

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## **Forms Device Inspection**

If you have form feeding problems and the printer does not display a status code, do the following procedure before calling for service.

See Figure B-1 on page B-25 and Figure B-2 on page B-26 to determine the forms device you are using.

To check the forms device, follow these steps:

1. Observe the way the forms are loaded. Be sure that they are loaded correctly. If necessary, review the forms loading procedures for the type of forms device you are using. If forms are loaded correctly and they are still jamming, go to the next step.

**Note:** The procedures for unloading forms and removing the forms device can be found in the appropriate forms device section in Chapter 1, "Setting Up the 4232 Printer Model 302."

2. Remove the device. Look for any obstacles such as torn pieces of paper or foam that could be jamming the device. On the F2, F3, or F4 forms devices, check the upper set of rollers on the device. Clear the jam. If clearing the jam does not fix the problem, go to the next step.

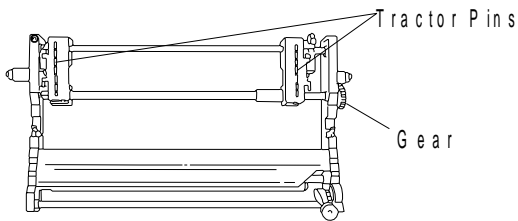


3. Locate the gears on the forms device and turn them while checking for noticeable binds.
  - For the F1 and F2 forms devices, check that the tractor pins move when you turn the gear.
  - For the F2, F3, and F4 forms devices, be sure that the feed rolls also move when you turn the gear.

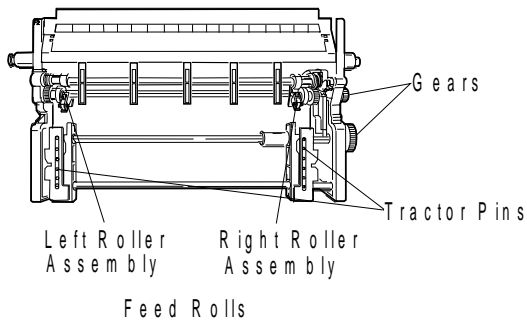
If manually turning the gears or rollers does not fix the problem, go to the next step.

4. If you see damage to the device, if the gears or rollers continue to bind, or if the device still does not operate properly, call for service.

**Continuous Forms Device (F1)**

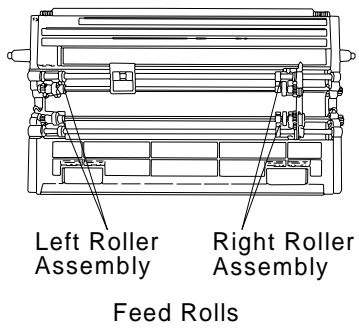


**Dual Purpose Forms Device (F2)**

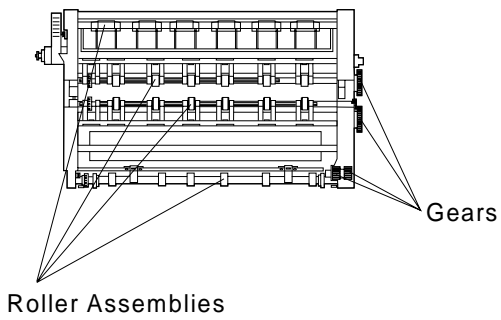


*Figure B-1. F1 and F2 Forms Devices*

**Document Insertion Device (F3)**



**Auto Sheet Feeder (F4)**



*Figure B-2. F3 and F4 Forms Devices*

## Problem List

**Warning:** When using a Continuous Forms (F1) Device, never pull or unload forms in the downward direction, or you may damage the device. Always unload forms from the top of the printer.

Causes are listed for each problem in order of priority.

---

### Problem: Forms do not advance or overprint occurs

---

1: The forms device is defective.

**Solution:** Inspect the forms device (see "Forms Device Inspection" on page B-24).

2: The forms device is not snapped in.

**Solution:** Check the installation of the forms device.

3: The ribbon is getting caught on a form.

**Solution:** Check the ribbon for twists or folds.

4: The printer is failing.

**Solution:** Turn the power Off (O), wait 10 seconds, and turn the power On (I). If you get a status code, go to "Status Codes" on page B-3. If no code displays, press **Micro** ↑ several times. If forms do not feed each time you press **Micro** ↑, call for service.

---

### Problem: Overprint occurs at top or bottom line of page

---

1: There is a problem with the application program.

**Solution:** See your programmer.

---

**Problem: Forms buckle, twist, jam, or paper holes tear**

---

- 1: The right tractor is adjusted incorrectly.  
**Solution:** Move the right tractor to obtain the correct form width. The tractor pins should be in the center of the paper holes. See Chapter 1, "Setting Up the 4232 Printer Model 302" for help on adjusting the tractor tension.
- 2: The forms device is installed incorrectly.  
**Solution:** Check the forms device installation (see Chapter 1, "Setting Up the 4232 Printer Model 302").
- 3: The printer is not at the edge of the table.  
**Solution:** Move the printer to the front edge of the table.
- 4: The forms tension (F1 only) is not set correctly.  
**Solution:** Check the forms tension adjustment. See Chapter 1, "Setting Up the 4232 Printer Model 302" for help on adjusting the forms tension.
- 5: The forms supply is not aligned with the printer.  
**Solution:** Reposition the forms supply so that the forms feed evenly. See the information on loading and unloading forms in Chapter 1, "Setting Up the 4232 Printer Model 302."
- 6: The forms are catching on the carton edge.  
**Solution:** Remove the uneven carton edges, or remove the forms from the carton.  
**Note:** As the forms reach the bottom of the box, this problem can occur more often.
- 7: The ribbon is twisted or folded.  
**Solution:** Check the ribbon for folds or twists.
- 8: The forms contain excessive moisture.  
**Solution:** Keep the forms in a cool, dry place before using them, or place the forms in the printer area for 24 hours.

9: The forms are defective.

**Solution:** Try unloading the forms and then reloading forms (see the forms loading procedures in Chapter 1, "Setting Up the 4232 Printer Model 302"). Forms should meet the requirements specified in Appendix C, "Forms Information."

10: The forms device is defective.

**Solution:** See the "Forms Device Inspection" on page B-24.

---

**Problem: Forms jam or do not feed into printer**

---

1: The forms device is installed incorrectly.

**Solution:** Check the forms device installation (see Chapter 1, "Setting Up the 4232 Printer Model 302").

2: The ribbon is twisting or folding.

**Solution:** Check the ribbon for twists or folds.

3: The wrong forms device code is entered.

**Solution:** See Chapter 1, "Setting Up the 4232 Printer Model 302" for the correct forms device code and check the entry.

4: Continuous Forms Device (F1) only: the forms tension setting is at too high a number.

**Solution:** Move the forms tension lever to a lower number setting.

5: Dual Purpose Forms Device (F2): Forms jamming in feed roller assembly when using the Document on Demand feature.

**Solution:** Make sure the perforation of the form is aligned with the top of the tear bar when the **Load/Eject** is pressed. Also make sure that the forms are being torn off toward the front of the printer. This will assist in providing clean tear off. See pages 1-53 and 1-54 for location of the tear bar.

6: The forms device is defective.

**Solution:** See "Forms Device Inspection" on page B-24.

---

**Problem: Forms do not feed past print head**

---

**1:** The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.

**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

**2:** The forms device is not properly installed.

**Solution:** Check the forms device installation (see Chapter 1, "Setting Up the 4232 Printer Model 302").

**3:** The ribbon is twisting or folding.

**Solution:** Replace the ribbon.

**4:** The forms device is defective.

**Solution:** See "Forms Device Inspection" on page B-24.

**5:** The ribbon shield is damaged.

**Solution:** Replace the ribbon.

---

**Problem: Forms do not stack correctly**

---

1: The forms do not stack correctly on the table behind the printer.

**Solution:** Use the recommended table (see *IBM 4232 Printer Model 302 Planning and Site Preparation Guide*).

**Note:** Up to 101.6 mm (4 in.) of forms may stack on the table behind the printer without decreasing the ability of the forms to stack correctly.

2: The forms do not stack correctly in the output rack on the table.

**Solution:** Check for obstructions to the paper path (cables, cords, or other items). If you find an obstruction, remove or relocate it.

3: The forms are specified incorrectly.

**Solution:** The forms may be outside nominal specifications. See Appendix C, "Forms Information."

4: The forms contain excessive moisture.

**Solution:** Store the forms in a cool, dry place before using them or leave in the printer for 24 hours.

**Note:** Forms stack best when the forms are 203.2 to 304.8 mm (8 to 12 in.) long. If the forms length is outside this range, operator aid may be needed.

---

**Problem: Erratic or intermittent forms movement**

---

1: The forms device is defective or the printer is failing.

**Solution:** See "Forms Device Inspection" on page B-24.

---

**Problem: Printing off the form or out of the desired area with the Document Insertion Device (F3) only**

---

1: The form is skewed or the vertical adjustments are not correct.

**Solution:** Be sure that the forms are straight and making contact with both the right and left feed rollers.

2: The right roller assembly is adjusted incorrectly.

**Solution:** Unlock and move the right tractor to obtain proper form width.

3: The characters per inch (CPI) or lines per inch (LPI) settings are incorrect.

**Solution:** Check with your system operator for the correct CPI and LPI settings.

4: The forms size is too small.

**Solution:** Use the correct size forms.

---

**Problem: Characters are off registration**

---

1: The first print position is adjusted incorrectly.

**Solution:** Check your settings for the left margin and the top of form position. See Chapter 1, "Setting Up the 4232 Printer Model 302" for information on adjusting these settings.

---

If none of the previous problems apply to your forms problem, or if the solution does not solve your problem, be sure that you do the forms device inspection steps (see "Forms Device Inspection" on page B-24).



## Print Quality and Ribbon Problems

---

### Problem: Unreadable characters

---

- 1: The ribbon is dry or worn.  
**Solution:** Check the ribbon and replace it if it is dry or worn.
- 2: The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.  
**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

### Problem: Missing dots or irregular characters

---

- 1: The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.  
**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."
- 2: The ribbon is worn.  
**Solution:** Check the ribbon for wear; replace it if necessary.
- 3: The ribbon is twisted or folded.  
**Solution:** Straighten the ribbon.
- 4: The forms device is not seated correctly.  
**Solution:** Check the forms device installation. See Chapter 1, "Setting Up the 4232 Printer Model 302."
- 5: The print head or printer is failing.  
**Solution:** Do the printer test. See Chapter 4, "Using the Operator Print Tests." If your print head is defective, call for service.

---

**Problem: Ribbon smudging forms**

---

1: The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.

**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

2: The ribbon cartridge is defective.

**Solution:** Replace the ribbon cartridge. See Chapter 3, "Replacing Your Ribbon."

3: The ribbon is twisted.

**Solution:** Remove the ribbon, straighten it, and reinstall it (see Chapter 3, "Replacing Your Ribbon").

4: The ribbon is over-inked.

**Solution:** Replace the ribbon. See Chapter 3, "Replacing Your Ribbon."

---

**Problem: Printing is too light or partial characters print**

---

1: The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.

**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

2: The ribbon guide is seated incorrectly.

**Solution:** Press down on the ribbon guide. See Chapter 3, "Replacing Your Ribbon."

3: The print head is defective.

**Solution:** Do the printer tests. If there is still a problem, call for service.

---

**Problem: Wavy print lines**

---

**1:** Continuous Forms Device (F1) only: the forms tension setting is incorrect.

**Solution:** Check the tension setting. See Chapter 1, "Setting Up the 4232 Printer Model 302" for more information.

**2:** The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.

**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

**3:** The forms are loaded incorrectly.

**Solution:** Check to see that the forms are properly loaded.

---

**Problem: Ribbon snagging or tearing**

---

**1:** The ribbon is worn.

**Solution:** Replace the ribbon cartridge. See Chapter 3, "Replacing Your Ribbon."

**2:** The Automatic Forms Thickness Adjustment (AFTA) setting needs to be changed.

**Solution:** See the procedure for adjusting the forms thickness setting through the operator panel (based on your forms device) in Chapter 1, "Setting Up the 4232 Printer Model 302."

**3:** The print head is catching on the ribbon.

**Solution:** Call for service.

---

**Problem: Ribbon not moving**

---

1: The ribbon cartridge is not properly installed.

**Solution:** Remove and then reinstall the same ribbon. See Chapter 3, "Replacing Your Ribbon." If the ribbon still does not move, replace the ribbon.

---

**Problem: Ribbon moves continuously**

---

1: The ribbon drive circuit is failing.

**Solution:** Call for service.

## Miscellaneous Problems

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**Problem: Wrong language set**

---

1: Wrong language set selected.

**Solution:** See "Using Printer Setup Parameters" in *IBM 4232 Printer Model 302 Operator Panel Instructions* for information on selecting language sets.

---

**Problem: First print character in wrong place**

---

1: Left margin or top of form is not properly aligned.

**Solution:** Check the left margin and top of form position adjustments. See the appropriate forms device in Chapter 1, "Setting Up the 4232 Printer Model 302."

---

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## **Appendix C. Forms Information**

The following chapter describes the forms specifications, quality, and restrictions needed for use with the 4232 Printer Model 302.

### **Forms Specifications**

The printer operates with continuous forms and cut sheet forms. If your printer is equipped with either the F1 or F2 form feed device, you can use continuous forms. If your printer is equipped with either the F3 or F4 form feed device, you can use cut sheet forms. See the following information on the physical characteristics of forms for each type of device.

**Continuous Forms — F1 or F2**  
**Dimensions**

<b>Forms</b>	<b>Maximum</b>	<b>Minimum</b>
Width	381 mm (15 in.)	76.2 mm (3 in.)
Length	355.6 mm (14 in.)	76.2 mm (3 in.)

**Thickness**

The thickness of all forms should be a minimum of 0.08 mm (0.003 in.) and a maximum of 0.64 mm (0.025 in.).

Acceptable print quality will be provided on up to six-part forms. If you use forms having more than four parts, you should test them for forms handling, print registration, and print quality.

**Weight**

Minimum weight for single-part forms is 56 g/m<sup>2</sup> (15 lb). Maximum weight for single-part forms is 150 g/m<sup>2</sup> (40 lb). The best range is 60 to 90 g/m<sup>2</sup> (16 to 24 lb). Paper weights outside the functional range should be tested by the user. For multiple-part forms, the paper weight of individual sheets can be as low as 45 g/m<sup>2</sup> (12 lb). Individual sheets below this limit should be tested by the user.

**Performance Considerations**

For optimum performance, printing should be restricted to 6.4 mm (0.25 in.) from all edges, holes, or folds on the forms.

Forms are available from IBM or any forms supplier.

**Cut Sheet Forms — F3**  
***Dimensions***

<b>Forms</b>	<b>Maximum</b>	<b>Minimum</b>
Width	381 mm (15 in.)	76.2 mm (3 in.)
Length	355.6 mm (14 in.)	177.8 mm (7 in.)

***Thickness***

The thickness of all forms should be a minimum of 0.08 mm (0.003 in.) and a maximum of 0.25 mm (0.010 in.).

Acceptable print quality will be provided when using single-part forms. If you use forms having more than one part, you should test them for forms handling, print registration, and print quality.

***Weight***

Minimum weight for single-part forms is 56 g/m<sup>2</sup> (15 lb). Maximum weight for single-part forms is 150 g/m<sup>2</sup> (40 lb). The best range is 75 to 90 g/m<sup>2</sup> (20 to 24 lb). Paper weights outside the functional range should be tested by the user.

***Performance Considerations***

When using the F3 device, you can use a width of up to 381 mm (15 in.). However, for optimum feeding and print registration, a maximum width of 330 mm (13 in.) is recommended. For optimum performance, printing should be restricted to 12.7 mm (0.5 in.) from all edges of the form.

Forms are available from IBM or any forms supplier.

### Cut Sheet Forms — F4

All paper used in the Auto Sheet Feeder should be new and without packaging damage. The papers defined below are considered acceptable for use in the F4 device. Any others should be operationally tested before regular use.

### Dimensions

The paper sizes shown in the following table include both single-part and multiple-part cut sheets. Note that the term *Length* applies to the paper dimension parallel to the paper motion.

Bin Number	Length and Width	Capacity
Bin 1	Length: 127 - 355.6 mm (5 - 14 in.) Width: 101.6 - 355.6 mm (4 - 14 in.)	80 g/m <sup>2</sup> (220 sheets)
Bin 2	Length: 203.2 - 355.6 mm (8 - 14 in.) Width: 101.6 - 355.6 mm (4 - 14 in.)	80 g/m <sup>2</sup> (220 sheets)
Bin 3	Length: 279.4 - 355.6 mm (11 - 14 in.) Width: 101.6 - 355.6 mm (4 - 14 in.)	80 g/m <sup>2</sup> (220 sheets)
Bin 4	Length: 127 - 355.6 mm (5 - 14 in.) Width: 101.6 - 355.6 mm (4 - 14 in.)	1

### Thickness

Single sheet paper thickness should be a minimum of 0.086 mm (0.0034 in.) and a maximum of 0.177 mm (0.0046 in.).



## **Weight**

The basis weight for the paper should be 60 to 100 g/m<sup>2</sup> (16 to 27 lb).

## **Composition**

Plain bond paper of one of the following compositions should be acceptable for regular use:

- No. 1 sulphite (100% chemical wood pulp)
- 25% to 100% cotton content

## **Performance Considerations**

For optimum performance:

- Use 75 to 80 g/m<sup>2</sup> (20 to 24 lb), 25% or 50% cotton content plain paper.
- Restrict printing to 6.35 mm (0.25 in.) from the left and right margins and 6.35 mm (0.25 in.) from the top and bottom edges.
- Keep at least three sheets in the selected input bin (paper load error frequency increases otherwise).

All input bins are capable of handling multiple-part forms.

Multiple-part forms present special considerations because of their complexity. There are many different types of multiple-part forms available. Use only snap-out or top-glued multiple-part forms on the ASF. Form sets should be operationally tested before regular use. For specific information about multiple-part forms, see *IBM 4232 Printer Model 302 Auto Sheet Feeder General Information*.

Some forms such as highly embossed papers (many stock certificates), coated papers, and multiple-part forms that do not conform to specifications will not feed reliably by the ASF.

Forms are available from IBM or any forms supplier.

## Additional Forms Restrictions

For best results when printing, the following forms restrictions apply:

- Fastening recommendations:
  - Form plies must not be fastened with any staples and must be fastened securely enough to prevent partial forms separation.
  - For the F3 forms device, multiple-part forms must be glued only at the top edge and fastened securely enough to prevent forms separation.
  - For the F4 forms device, only top-glued or snap-out multiple-part forms should be used.
  - If crimp fasteners are used, you should consider the following:
    - Crimps should not project significantly above the surface of the first form to avoid ribbon interference.
    - Crimps should not add significantly to the total forms thickness.
    - The protruding tail of the crimp should be opposite the direction of forms motion so that the forms motion tends to compress and tighten the crimp. The crimp should also be away from the surface of the forms where printing is occurring to avoid ribbon interference.
    - Excessively hard or stiff crimps can interfere with proper ribbon and forms processing operation.
- Forms stacking:
  - For best stacking efficiency, the distance between folds should be 152.4 to 317.5 mm (6 to 12.5 in.).
- Feed holes should be free of chads and crimps to avoid false form jam errors.
- Forms should be strong enough to prevent tearing of feed holes.
- Label forms should be tested for satisfactory forms handling, print registration, and print quality.
- Do not use forms that have started to come apart.

- For the F3 forms device:
  - You should design forms so that no printing takes place within 12.7 mm (0.5 in.) of either the left edge or the right edge of the form. This makes certain that the feed rollers do not press on fresh print and cause smearing.
  - Do not use forms with holes.
- For the F4 forms device:
  - Do not mix or interleave paper of different sizes or compositions in the same input bin.
  - Do not use forms with holes, cut-outs, or windows.
  - Do not use envelopes or card stock.

## Positioning Forms

When you design the forms layout for your printer, keep the physical dimensions and forms quality in mind. See Figure C-1 on page C-10 and Figure C-2 on page C-11 and the following information to obtain best results when printing.

### **A** Form Width

Maximum: 381 mm (15 in.) for F1, F2, or F3  
356 mm (14 in.) for F4  
Minimum: 76.2 mm (3 in.) for F1, F2, or F3  
127 mm (4 in.) for F4

### **B** Form Length

Maximum: 356 mm (14 in.)  
Minimum: 76.2 mm (3 in.) for F1 and F2  
Minimum: 177.8 mm (7 in.) for F3  
Minimum: 127 mm (5 in.) for F4 (Bin 1)  
Minimum: 203 mm (8 in.) for F4 (Bin 2)  
Minimum: 279 mm (11 in.) for F4 (Bin 3)  
Minimum: 127 mm (5 in.) for F4 (Bin 4)

### **C** First Print Position

For continuous forms:

- The minimum distance between the center of the margin holes and the start of the first print position used is 1.27 mm (0.05 in.).
- The maximum distance between the center of the margin holes and the start of the first print position used is 48.5 mm (1.91 in.).

For cut forms:

- The minimum distance between the left edge of the form and the start of the first print position used is 1.27 mm (0.05 in.).
- The maximum distance between the left edge of the form and the start of the first print position used is 48.5 mm (1.91 in.).

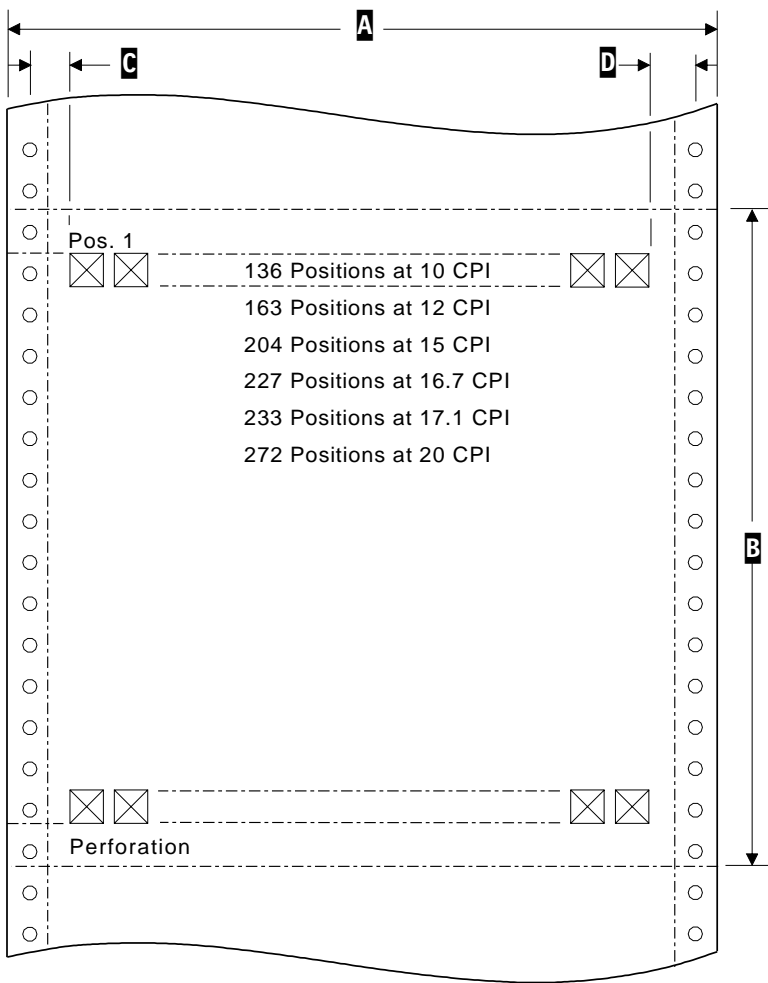
## **D** Last Print Position

For continuous forms:

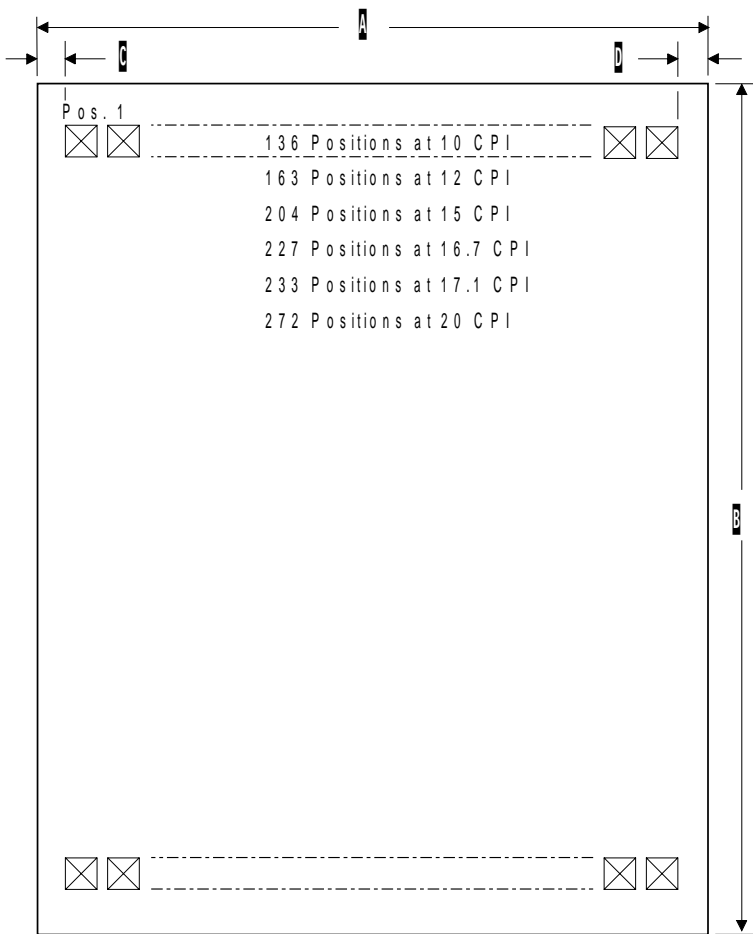
- The minimum distance between the center of the right margin holes and the end of the last print position used should be 6.4 mm (0.25 in.).

For cut forms:

- The minimum distance between the right edge of the form and the end of the last print position used should be 6.4 mm (0.25 in.).



| Figure C-1. Form Design Considerations - Continuous Forms



| Figure C-2. Form Design Considerations - Cut Forms





## Appendix D. Declaration of IBM Product Noise Emission Values

The following tables show the noise emission values for the 4232 Printer Model 302.

<i>Table D-1. 4232 Printer Model 302</i>	
<b>Impulsive Noise</b>	<b>Prominent Discrete Tones</b>
No	No

<i>Table D-2. Sound Emission Levels - 4232 Standard Covers</i>		
<b>Sound Emission Category</b>	<b>Operating</b>	<b>Idling</b>
LWAd	7 bels	4.5 bels
<LpA>m	53 dB	30 dB

<i>Table D-3. Sound Emission Levels - 4232 ASF Covers</i>		
<b>Sound Emission Category</b>	<b>Operating</b>	<b>Idling</b>
LWAd	7 bels	4.5 bels
<LpA>m	55 dB	30 dB

### Notes:

1. LWAd is the declared sound power emission level for a production series of machines.
2. <LpA>m is the mean value of the space-averaged sound pressure emission levels at the one-meter positions for a production series of machines.

All measurements are made in accordance with the American National Standards Institute (ANSI) S12.10 and reported in conformance with the International Organization for Standardization (ISO) 9296.



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## Appendix E. Cabling Information

### Serial Attachment

The printer attaches to a host or controller by one of two serial interfaces, RS-232C or RS-422A. A single 25-pin D connector mounted directly on the adapter card allows attachment to either interface.

The RS-232C interface uses a standard serial cable up to 15.2 m (50 ft) in length with transmission rates up to 19.2 Kbps.

The RS-422A interface uses a serial cable up to 1219 m (4,000 ft) in length with transmission rates up to 38.4 Kbps.

### RS-232C Connector Pin Assignments

Pin Number	Signal Name	Description
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request to Send
5	CTS	Clear to Send
6	DSR	Data Set Ready
7	SG	Signal Ground
20	DTR	Data Terminal Ready

### RS-422A Connector Pin Assignments

Pin Number	Signal Name	Description
15	- RXD	Receive Data
17	+ RXD	Receive Data
19	- TXD	Transmit Data
25	+ TXD	Transmit Data

**Recommended Attachment Cables for PCs and Compatible Serial Ports**

Interface Type	Cable Part Number	Feature Number	Bulk Cable Part Number	IBM Standard Length
RS-232C	8509386	9386	60X8685	6.1 m (20 ft)
RS-422A	70X8652	8652	4716743	15.2 m (50 ft)

**Recommended Attachment Cables for AS/400 Workstation Controllers**

Interface Type	Cable Part Number	Feature Number	IBM Standard Length
RS-232C	21F4342	4342	12.2 m (40 ft)
RS-422A	21F4346	4346	30.5 m (100 ft)

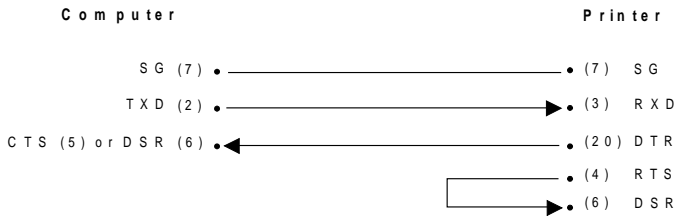
**| Cable Configurations**

| Cable configurations depend on the computer or devices and machines in the controlling system.

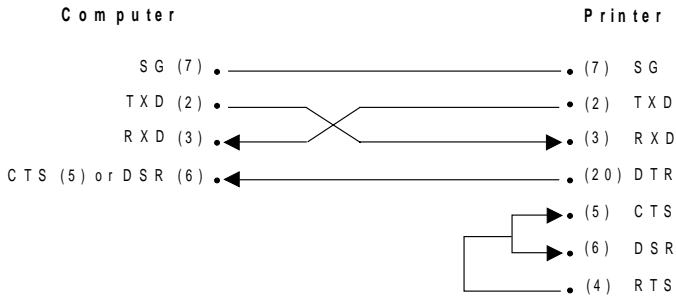
| The following diagrams show some of the possible configurations for the RS-232C and RS-422A connection.

**| RS-232C**

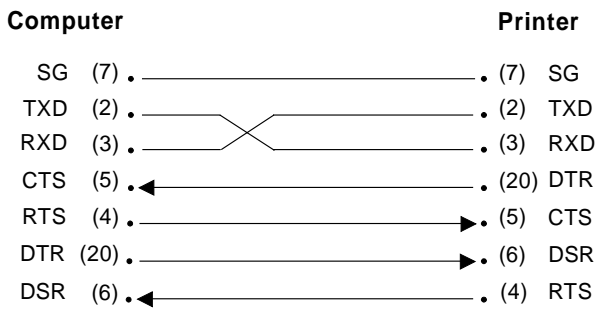
**| Local Simplex — DTR Pacing, No Status Reporting**



**| Local Duplex — DTR or XON/XOFF Pacing, Status Reporting**

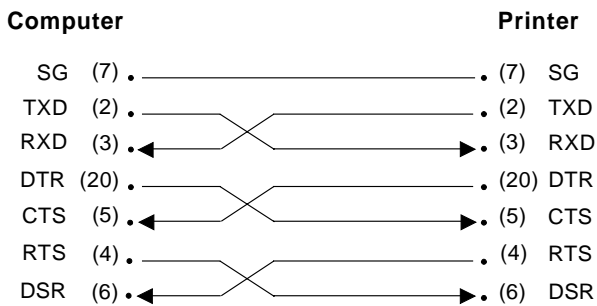


**| Local Duplex — DTR or XON/XOFF Pacing, Status Reporting**

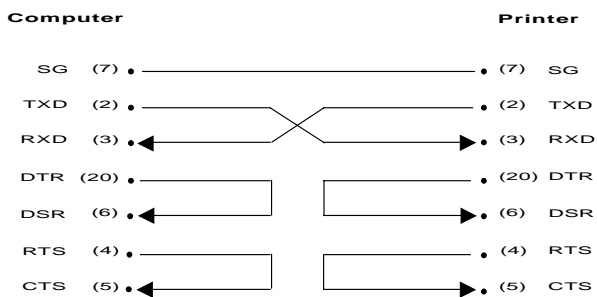


**| Note:** This configuration is compatible with cable IBM part 8509386.

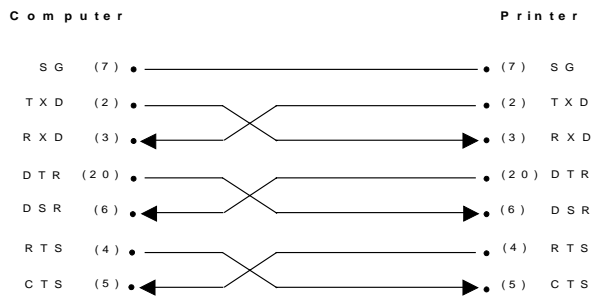
**| Local Duplex — XON/XOFF Pacing, Status Reporting**



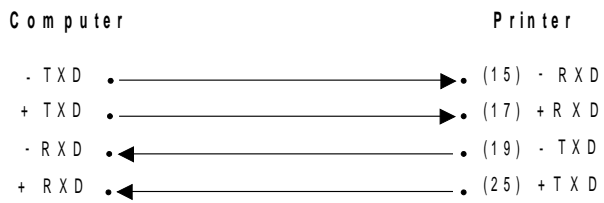
**| Local Duplex — XON/XOFF Pacing, Status Reporting**



| **Local Duplex — XON/XOFF Pacing, Status Reporting**



| **RS-422A**



## | **Parallel Attachment**

| The 4232 supports the IBM Parallel Printer Interface. A single 36-pin connector is mounted on the adapter card.

| The PC-parallel interface attaches to the host with a standard PC Parallel Printer cable (IBM part 1525612) up to 1.8 m (6 ft) in length.

### | ***IBM Parallel Connector Pin Assignments***

Pin Number	Signal Name	Description
1	-STROBE	Strobe
2 - 9	DATA	Eight Data Lines
10	-ACKNLG	Acknowledge
11	BUSY	Busy
12	PE	Out of Paper
13	SLCT	Printer Selected
14	Unused	
15	Unused	
16	LOGIC GND	Logic Ground
17	CHASSIS GROUND	Chassis Ground
18	Unused	
19 - 30	GROUND	Ground
31	-INIT	Initialize Printer
32	-ERROR	Printer Error
33	GROUND	Ground
34, 35	Unused	
36	Unused	



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## Glossary

This glossary defines important 4232 Printer Model 302 abbreviations and terms. It includes information from the *IBM Dictionary of Computing*, SC20-1699.

It also includes terms and definitions from:

- The *American National Dictionary for Information Processing Systems*, copyright 1982 by the Computer and Business Equipment Manufacturers Association (CBEMA). Copies may be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018. Definitions are identified by an asterisk (\*).
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Committee (ISO/IEC JTC1/SC1). Definitions from published segments of the vocabularies are identified by the symbol **(ISO)**; definitions from draft international standards, draft proposals, and working papers in development by the ISO/IEC JTC1/SC1 vocabulary subcommittee are identified by the symbol **(TC97)**, indicating final agreement has not yet been

reached among participating members.

For abbreviations, the definition usually consists only of the words represented by the letters; for complete definitions, see the entries for the words.

### A

**access cover.** Provides access to the top of the printer for cleaning, changing ribbon cartridges, and loading or changing forms devices.

**acoustic cover.** A cover bonded with a material that reduces operating noise from a machine.

**audible alarm.** An alarm that is activated when predetermined events occur that require operator attention or intervention for system operation.

**autoload.** The automatic forms loading feature on the F2 forms device.

**automatic forms thickness adjustment (AFTA).** A printer mechanism that measures the forms thickness and adjusts the gap from the print head to the platen rod accordingly.

**Auto Sheet Feeder (ASF) (F4).** A mechanically operated device, made up of two major components: the Auto Sheet Feeder mechanism,

made up of three automatically operated input bins and a bin designed for manual sheet insertion, and an F4 forms device.

## B

**baud.** The rate at which data is being sent to or from the computer through the serial interface, in bits per second (bps).

**bezel.** A surrounding or retaining part such as the cable connector support.

**bidirectional.** Printing in either direction, right to left or left to right.

**blue forms guide/forms sensor.** See *forms guide/forms sensor*.

**blue forms tension knob.** See *forms tension knob*.

**blue ribbon advance knob.** See *ribbon advance knob*.

**blue slotted opening.** See *slotted opening*.

**blue tractor doors.** See *tractor doors*.

**buffer.** A portion of storage used to hold input or output data temporarily.

## C

**Centronics\* parallel interface.** A standard for connecting printers and other peripheral devices to a computer. It defines the plug, socket, and electrical signals that

are used for controlling the transmission of data.

**characters per inch (CPI).** The number of alphanumeric characters that fit into one inch of printed text.

**command.** A request from a terminal for the performance of an operation or the execution of a particular program.

**continuous forms.** A series of connected paper forms that feed continuously through a printing device. The connection between the forms is perforated to allow the user to tear them apart.

**Continuous Forms Device (F1).** A forms feed device that allows printing of continuous forms in an unattended mode of operation.

**cut forms.** A single form, not connected to other forms. The form may have more than one part; that is, it may have an original and one or more copies.

## D

**data bits.** The number of data bits sent in each transmission frame using the serial interface.

**data stream.** Print data and control information flowing from host system (computer) to the printer, from beginning to end without interruption.

**Document Insertion Device (F3).** A forms device used for most

general printing requirements on cut sheet forms.

**Document on Demand feature.** A feature that moves continuous forms within the printer so that a blank form is not ejected when separating forms.

**Dual Purpose Forms Device (F2).** A forms feeding option which, when selected, automatically stops continuous forms at the perforation. This enables the printed form to be torn off before the next sheet begins to be printed.

## F

**feature.** A particular part of an IBM product that a customer can order separately.

**feed roller.** See *right roller assembly*.

**form.** The area between perforations on continuous printer paper.

**form feed (FF).** Paper movement used to bring an assigned part of a form to the printing position.

**forms device.** One of four mechanical paper handling devices that can be installed in the 4232 Printer Model 302s.

**forms guide/forms sensor.** Blue guide used to align the left edge of a form, detecting the last form feed past it, and detecting paper jams.

**forms tension knob.** Blue knob used to adjust the setting on the forms tension lever on the F1 forms device.

**forms tension lever.** Used to control the tension on paper loaded in the F1 forms device. Settings range from \* (no tension) to 6 (maximum tension).

**F1.** See *Continuous Forms Device*.

**F2.** See *Dual Purpose Forms Device*.

**F3.** See *Document Insertion Device*.

**F4.** See *Auto Sheet Feeder*.

## I

**interface.** The connection between the computer and the printer.

## L

**left margin (LM).** The area between the left edge of the display or paper and the leftmost character position.

**lines per inch (LPI).** The number of lines of text or graphics that can be placed in one inch.

**lower forms guide.** Used with the F3 forms device and the forms guide/forms sensor to detect and align cut sheet forms and to activate the **Load/Eject** key.

## M

**Maintenance Analysis Procedures (MAP).** A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of the problem.

**Maintenance Information Manual (MIM).** A maintenance document that gives an IBM service representative a step-by-step procedure for installing, removing, and servicing components of the product.

**maximum page length (MPL).** The total number of print lines from one top margin line to the next.

**maximum print position (MPP).** The total number of horizontal positions that can be printed.

## N

**near letter quality (NLQ).** One of the print modes available for the 4232 Printer Model 302. Provides printouts that are similar to laser printing output in quality.

**not ready.** A state where you have pressed **Stop** or an error or operator intervention condition is occurring. The printer can be *not ready* and online or offline. See also *offline* and *online*. Contrast with *ready*.

## O

**offline.** Pertaining to equipment or devices not under control of a control unit or host processor. Contrast with *online*.

**online.** (1) Stored in a computer and accessible from a terminal. (2) Pertaining to equipment or devices under the direct control of a control unit or host processor. Contrast with *offline*.

**operator panel.** A functional unit containing switches used to control a printer or other data processing units, or a portion of these devices that may contain indicators giving information on the functioning of the system.

## P

**paper door.** Used to provide access to the printer for loading paper and forms devices.

**paper jam.** A condition in which paper forms have not fed properly during printing and have become wedged in the feeding or printing mechanism, thus preventing the correct forward movement of the forms. A paper jam usually causes one line to be printed over one or more other printed lines.

**parallel interface.** An interface where data is exchanged between the computer and the printer one byte at a time.

**partial reset.** An action that returns the printer to the current configuration values.

**platen.** A backing, usually cylindrical, against which printing mechanisms strike or otherwise deposit ink to produce an image.

**power cord.** Cable that carries the main power supply between a room outlet and a machine.

**power-on custom set.** The custom set containing the values used to set the printer parameters when the printer is turned on.

**power-on self test.** A series of diagnostic tests that are run automatically by a device when the power is turned On (I).

**power switch.** A device that makes and breaks the contact between equipment and the main electricity supply.

**print head.** That part of the printer that prints data.

**print head carrier.** Used to hold the print head and ribbon guide posts as they slide along the platen.

**print quality.** The quality of printed output relative to existing standards and in comparisons with jobs printed earlier.

**print speed.** The number of characters printed per unit of time.

**problem determination.** The process of identifying the source of a problem; for example, a program component, a machine error, telecommunication facilities, user or contractor-installed programs or equipment, an environmental condition, such as a power loss, or a user error.

## R

**ready.** A state where you press **Start** and there are no error conditions. The printer can be *ready* and online or offline. See also *offline* and *online*. Contrast with *not ready*.

**remote.** Concerning the peripheral parts of a network not centrally linked to the host processor and generally using telecommunication lines with public right-of-way. Synonymous with *link-attached*.

**ribbon advance knob.** Blue knob used to move the ribbon within the cartridge and around the print head to take up slack and improve print quality.

**ribbon cartridge.** The housing holding the ribbon and containing the ribbon advance knob.

**ribbon guide.** A device that positions the ribbon as it moves from a full spool to an empty one.

**right roller assembly.** Used to guide the right side of cut forms through the F3 forms device. Also known as *feed roller*.

## S

**serial interface.** An interface where data is exchanged between the computer and the printer one bit at a time.

**slotted opening.** A space on the bottom of the ribbon cartridge used to align the cartridge with the metal post on the printer frame.

| **SPA.** Serial/Parallel Attachment

## T

**tear bar.** A bar that has an edge used to separate continuous forms after they have printed.

**tear off position.** The location on continuous forms where they can be

separated using the tear bar on the F2 forms device.

**top of form.** A horizontal print line, near the top of the paper, above which the printer will not print.

**tractor.** The mechanism that controls movement of continuous forms paper by using the paper holes in the margins.

**tractor doors.** Blue doors used to hold continuous forms against the tractor pins.

**tractor pins.** Used to move continuous forms up or down.

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## Index

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