S4M™

Industrial/Commercial Printer

User Guide

Part Number: 13290L-002 Rev. A

Contents

About This Document

This section provides you with contact information, document structure and organization, and additional reference documents.

Contents

Who Should Use This Document

This User Guide is intended for use by any person who needs to operate or troubleshoot problems with the printer.

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
Introduction on page 7	This section shows the operational controls and location of major components used when loading media and ribbon. Other features of the printer are discussed.
Printer Setup on page 15	This section provides the tasks that you must complete and the issues that you must consider before you load and configure your printer.
Operations on page 31	This section provides the procedures for loading and calibrating the printer.
Configuration on page 53	This section discusses printer configuration settings and instructs you how to view or change printer parameters through the control panel.
Routine Maintenance on page 79	This section provides routine cleaning and maintenance procedures.
Troubleshooting on page 87	This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.
Specifications on page 109	This section provides the features of and specifications for the printer.
ZPL II Commands on page 115	This section provides the ZPL II commands that were added or changed for the S4M.

Contacts

You can contact Zebra Technologies Corporation at the following.

Web Site

http://www.zebra.com

Technical Support via the Internet is available 24 hours per day, 365 days per year. Go to http://www.zebra.com/support.

The Americas

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Document Conventions

The following conventions are used throughout this document to convey certain information.

Alternate Color (online only) Cross-references contain hot links to other sections in this guide. If you are viewing this guide online in .pdf format, you can click the cross-reference (blue text) to jump directly to its location.

LCD Display Examples Text from a printer's Liquid Crystal Display (LCD) appears in **Bubbledot ICG** font.

Command Line Examples Command line examples appear in `Courier New` font. For example, type `ZTools` to get to the Post-Install scripts in the `bin` directory.

Files and Directories File names and directories appear in `Courier New` font. For example, the `Zebra<version number>.tar` file and the `/root` directory.

Icons Used

Caution • Warns you of the potential for electrostatic discharge.

Caution • Warns you of a potential electric shock situation.

Caution • Warns you of a situation where excessive heat could cause a burn.

Caution • Advises you that failure to take or avoid a specific action could result in physical harm to you.

Caution • (No icon) Advises you that failure to take or avoid a specific action could result in physical harm to the hardware.

Important • Advises you of information that is essential to complete a task.

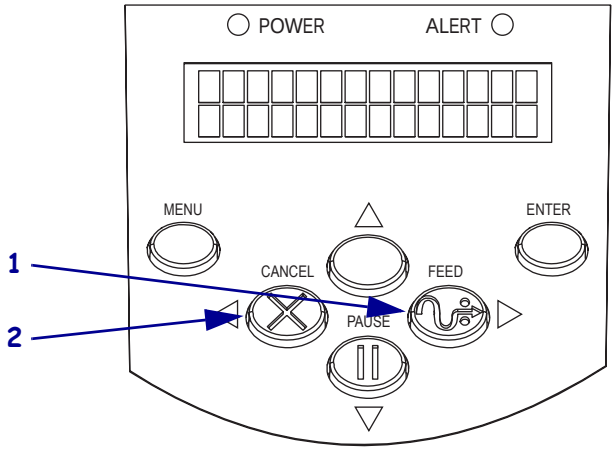
Note • Indicates neutral or positive information that emphasizes or supplements important points of the main text.

Example • Provides an example, often a scenario, to better clarify a section of text.

Tools • Tells you what tools you need to complete a given task.

Illustration Callouts Callouts are used when an illustration contains information that needs to be labeled and described. A table that contains the labels and descriptions follows the graphic. Figure 1 provides an example.

Figure 1 • Sample Figure with Callouts



1	FEED button
2	CANCEL button

Notes • _____

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1 Introduction

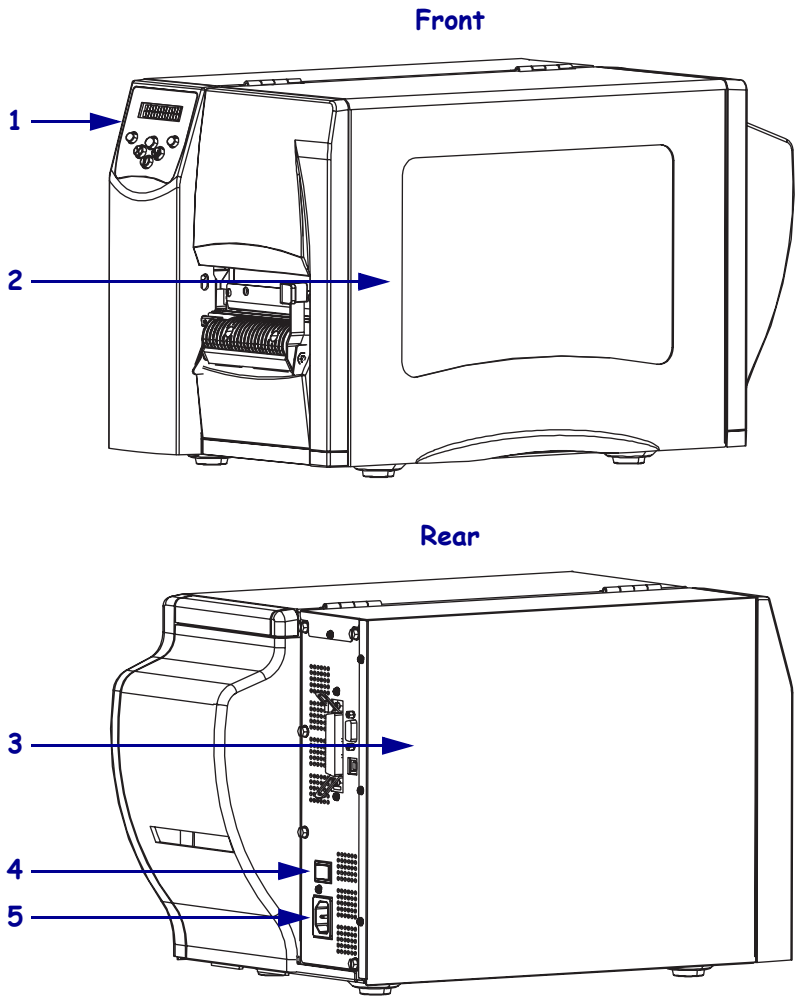
This section shows the operational controls and location of major components used when loading media and ribbon. Other features of the printer are discussed.

Contents

External View

Figure 2 shows the outside of the printer.

Figure 2 • Exterior of Printer



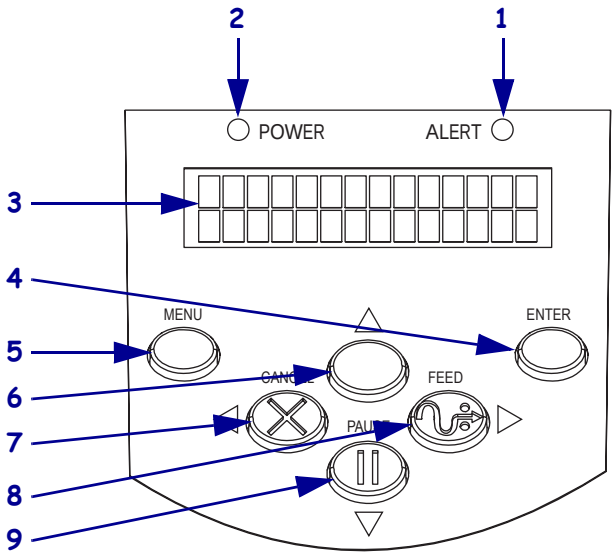
1	Control panel
2	Media door
3	Electronics cover
4	Power switch (**O** = Off, **I** = On)
5	AC power connector

Control Panel

All controls and indicators for the printer are located on the control panel (Figure 3).

- The **control panel Liquid Crystal Display (LCD)** shows the operating status and printer parameters.
- The **control panel buttons** are used to control the printer operations and to set parameters.
- The **control panel lights (LEDs)** show the printer's operating status or indicate which control panel buttons are active.

Figure 3 • Location of Control Panel Buttons and Lights



1	ALERT light
2	POWER light
3	LCD
4	ENTER button
5	MENU button
6	Up arrow button
7	CANCEL or Left Arrow button
8	FEED or Right Arrow button
9	PAUSE or Down Arrow button

Control Panel LCD

The control panel LCD functions differently in different printer modes.

- In **Operating mode**, the LCD displays the printer's status, sometimes in conjunction with a control panel light (see *Control Panel Lights* on page 12). When the printer is receiving data, the control panel shows the word DATA and cycles through a series of dots and spaces.
- In **Pause mode**, the printer stops printing temporarily.
- In **Setup mode**, you can use the control panel LCD to view or modify printer parameters (see *Control Panel LCD Display* on page 62).
- In **Error mode**, the LCD may display an alert or error message (see *LCD Error Messages* on page 89).

Control Panel Buttons

The printer has six basic control buttons on the control panel. Some of these buttons also function as navigational keys when the printer is in Setup mode. The current function of a particular button is determined by which light is illuminated next to it (Figure 4).

Figure 4 • Example of Active Control Panel Buttons

1	FEED active
2	Right arrow active

Table 1 describes the function of each button. The MENU, PAUSE, and FEED buttons are active when the printer is in normal operating mode.

Table 1 • Control Panel Buttons

Button	Appearance	Function/Description
MENU		Enters and exits Setup mode.
ENTER		If a parameter or option in Setup mode needs to be selected, pressing ENTER selects the item. This button is active only when necessary.
CANCEL		CANCEL functions only in Pause mode. Pressing CANCEL once has these effects: • Cancels the label format that is currently printing. • If no label format is printing, the next one to be printed is canceled. • If no label formats are waiting to be printed, CANCEL is ignored. To clear the printer's entire label format memory, press and hold CANCEL.
FEED		Advances a blank label. • If the printer is idle or paused, the label is fed immediately. • If the printer is printing, the label is fed after printing finishes.
PAUSE		Stops and restarts the printing process or removes error messages and clears the LCD. When the printer is paused, the PAUSE light blinks. • If the printer is idle, it enters Pause mode immediately. • If the printer is printing, the label is completed before the printer pauses.
Left Arrow		When in Setup mode, scrolls the LCD to the previous parameter.
Right Arrow		When in Setup mode, scrolls the LCD to the next parameter.
Up Arrow		When in Setup mode, increases values or scrolls to the next option.
Down Arrow		When in Setup mode, decreases values or scrolls to the previous option.

Control Panel Lights

Table 2 describes lights on the control panel that indicate different printer conditions.

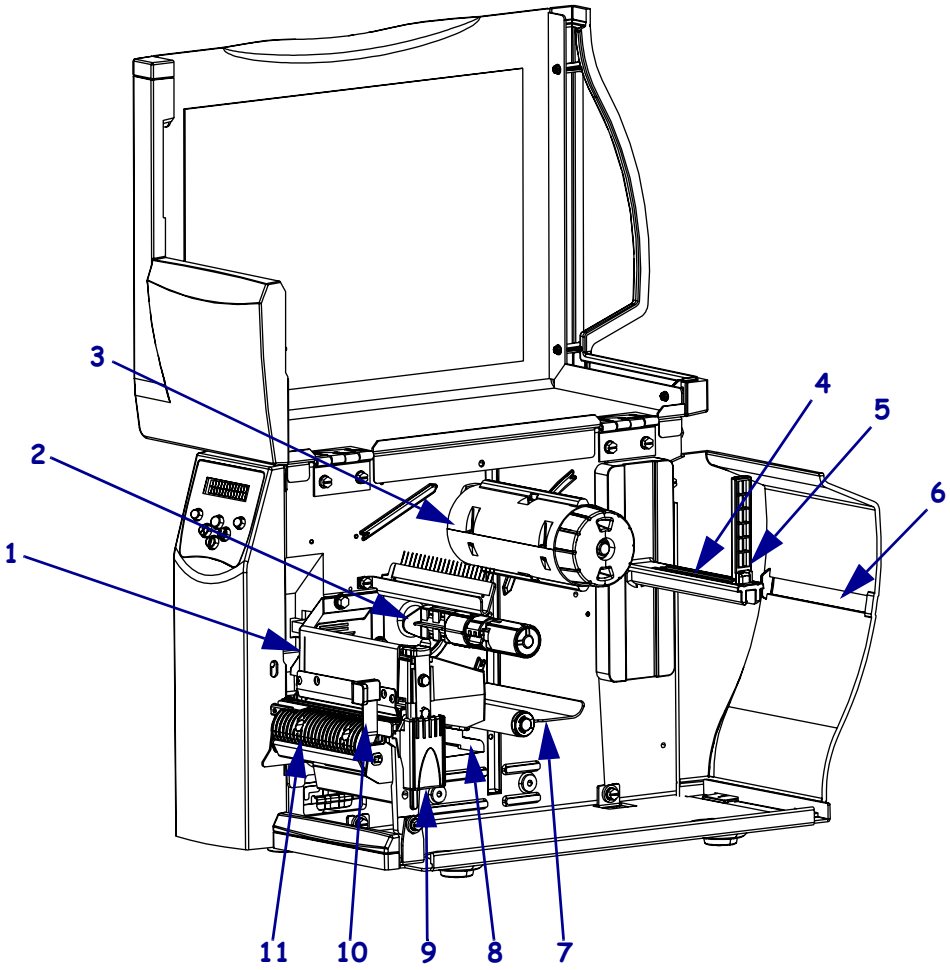
Table 2 • Control Panel Lights

Light	Appearance	Function/Description
POWER	POWER	Indicates that the printer is on.
ALERT	ALERT	In an error or alert situation, the ALERT light operates as follows: • Remains on (solid) when the printer requires operator attention, such as when the print mechanism is open. • Flashes when the ribbon or media is out.
PAUSE (part of the PAUSE **button)**	PAUSE 	Flashes when the printer is in Pause mode unless the printer enters Setup mode and the down arrow becomes active.
FEED (part of the FEED **button)**	FEED 	On during normal printer operation, indicating that the printer can feed a blank label.
CANCEL (part of the CANCEL **button)**	CANCEL 	On when canceling a label format is a valid option.

Printer Media Compartment

Figure 5 shows a simplified view of the media compartment of your printer. Depending on installed options, your printer may look slightly different.

Figure 5 • Media Compartment



1	Printhead assembly
2	Ribbon supply spindle*
3	Ribbon take-up spindle*
4	Media supply hanger
5	Media supply guide
6	Fanfold media slot
7	Dancer assembly
8	Media guide
9	Printhead release latch
10	Peel release lever**
11	Peel assembly**

* Present only on printers that have the Thermal Transfer option installed.

** Present only on printers that have the Peel option installed.

Printer Language Modes

Depending on how your printer was ordered, it came from the factory with firmware that operates in or allows you to use certain commands for one of the following printer languages:

- Zebra Programming Language (ZPL®)
- Eltron® Programming Language (EPL™)
- Datamax® Programming Language (APL-D™)
- Intermec® Printer Language (APL-I™)

Firmware Downloads

You may download S4M firmware to the printer at any time to change from one printer language to another. For the latest firmware versions and instructions for downloading them, go to http://www.zebra.com/firmware.

Note • When the printer changes from one printer language to another, error messages may appear on the LCD, and some control panel lights may activate in error mode. You may ignore these error messages and lights. When the firmware download is complete, reboot the printer and load printer defaults to return the printer to Operating mode.

New or Modified Commands

See *ZPL II Commands* on page 115 for ZPL II commands that changed or that were added specifically for this printer.

Additional Printer Language Information

The following manuals contain specific information about the different printer language modes. Copies of these manuals are on the CD that came with your printer and at http://www.zebra.com/manuals.

- ZPL II® Programming Guide, volumes 1 and 2
- EPL2™ Programming Guide
- APL-D™ Reference Guide
- APL-I™ Reference Guide

2

Printer Setup

This section provides the tasks that you must complete and the issues that you must consider before you load and configure your printer.

Contents

Before You Begin

Review this checklist, and resolve any issues before you set up or use your printer.

- ❑ **Unpack and Inspect the Printer** Have you unpacked the printer and inspected it for damage? If you have not, see *Unpack and Inspect the Printer* on page 17.
- ❑ **Select a Site** Have you selected an appropriate location for the printer? If you have not, see *Select a Site for the Printer* on page 18.
- ❑ **Attach a Power Cord** Do you have the correct power cord for your printer? If you are unsure, see *Power Cord Specifications* on page 25. To attach the power cord and connect the printer to a power source, see *Connect the Printer to a Power Source* on page 24.
- ❑ **Connect to a Data Source** Have you determined how the printer will connect to a data source (usually a computer)? For more information, see *Select a Communication Interface* on page 19.
- ❑ **Select Media** Do you have the correct media for your application? If you are unsure, see *Types of Media* on page 26.
- ❑ **Select Ribbon** Do you need to use ribbon, and is the appropriate ribbon available, if needed? If you are unsure, see *Ribbon Overview* on page 28.

Handling the Printer

This section describes how to handle your printer.

Unpack and Inspect the Printer

When you receive the printer, immediately unpack it and inspect for shipping damage.

- Save all packing materials.
- Check all exterior surfaces for damage.
- Raise the media door, and inspect the media compartment for damage to components.

If you discover shipping damage upon inspection:

- Immediately notify the shipping company and file a damage report.
- Keep all packaging material for shipping company inspection.
- Notify your authorized Zebra reseller.

Important • Zebra Technologies Corporation is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.

Store the Printer

If you are not placing the printer into immediate operation, repackage it using the original packing materials. You may store the printer under the following conditions:

- Temperature: –40°F to 140°F (–40°C to 60°C)
- Relative humidity: 5% to 85%, non-condensing

Ship the Printer

If you must ship the printer:

- Remove any media or ribbon from the printer to avoid damaging the printer.
- Carefully pack the printer into the original container or a suitable alternate container to avoid damage during transit. A shipping container can be purchased from Zebra if the original packaging has been lost or destroyed.

Recycle the Printer

This printer is recyclable. If you must dispose of the printer, do not do so in unsorted municipal waste. Please recycle according to your local standards. For more information, see http://www.zebra.com/environment.

Select a Site for the Printer

Consider the following when selecting an appropriate location for your printer.

Select a Surface

Select a solid, level surface of sufficient size and strength to accommodate the printer and other equipment (such as a computer), if necessary. The choices include a table, countertop, desk, or cart.

Provide Proper Operating Conditions

This printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. For more information on the required conditions, see *General Specifications* on page 110.

Table 3 shows the temperature and relative humidity requirements for the printer when it is operating.

Table 3 • Operating Temperature and Humidity

Mode	Temperature	Relative Humidity
Thermal Transfer	40° to 104°F (5° to 40°C)	20 to 85% non-condensing
Direct Thermal	32° to 104°F (0° to 40°C)	20 to 85% non-condensing

Allow Proper Space

The printer should have enough space around it for you to be able to open the media door. To allow for proper ventilation and cooling, leave open space on all sides of the printer.

Caution • Do not place any padding or cushioning material behind or under the printer because this restricts air flow and could cause the printer to overheat.

Provide a Data Source

If the printer will be located away from the data source, the selected site must provide the appropriate connections to that data source. For more information on the types of communication interfaces, see *Select a Communication Interface* on page 19.

Provide a Power Source

Place the printer within a short distance of a power outlet that is easily accessible.

Select a Communication Interface

The way that you connect your printer to a data source depends on the communication options installed in the printer. You may use any available connection to send commands and label formats from a host computer to the printer.

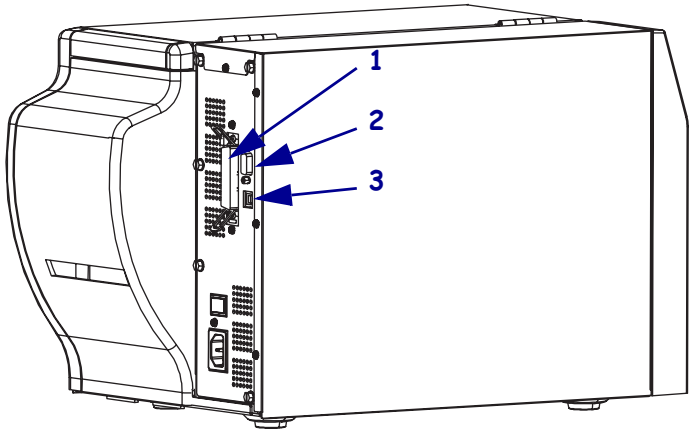
Caution • Turn off (**O**) the printer power before connecting data communications cables. Connecting a data communications cable while the power is on (**I**) may damage the printer.

Note • You must supply all interface cables for your application. Refer to *Data Cable Requirements* on page 23 for specific cable requirements.

Connector Locations

Refer to Figure 6. The printer comes standard with an Electronics Industries Association (EIA) RS-232 serial interface (DB-9 connector), an IEEE 1284 bidirectional parallel interface (unless replaced with an optional print server port), and a USB 1.1 port. You may use any of these interface methods to send commands and label formats from a host to the printer.

Figure 6 • Cable Connections



1	Parallel interface connector (not available on units that have an optional print server port)
2	DB-9 serial interface connector
3	USB 1.1 connector

Types of Connections

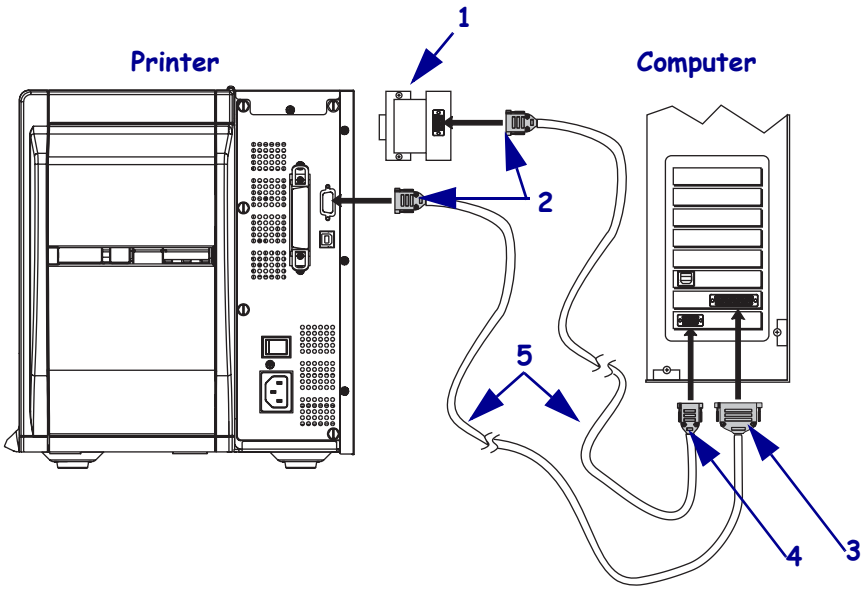
The method of connecting the printer to a data source depends on the communication options installed in the printer and the host. This section provides basic information about common interfaces.

When communicating via the serial data port (RS-232), the baud rate, number of data and stop bits, the parity, and the XON/XOFF or DTR control should be set to match those of the host computer. See *Password Level 3 Parameters* on page 67 to configure these parameters. When communicating via the parallel port or the USB port, the previously mentioned parameters do not apply.

RS-232 Serial A serial communication method consisting of data and control signals; available as a standard feature on most PCs and other hosts.

- *Advantages:* Cables and connectors are readily available from computer equipment stores and suppliers; easy to connect; two-way communication between the host and the printer.
- *Disadvantages:* Slower than the parallel connection; limited to 50 feet (15.24 m) of cable.

Figure 7 • Communicating Using a Serial Data Port

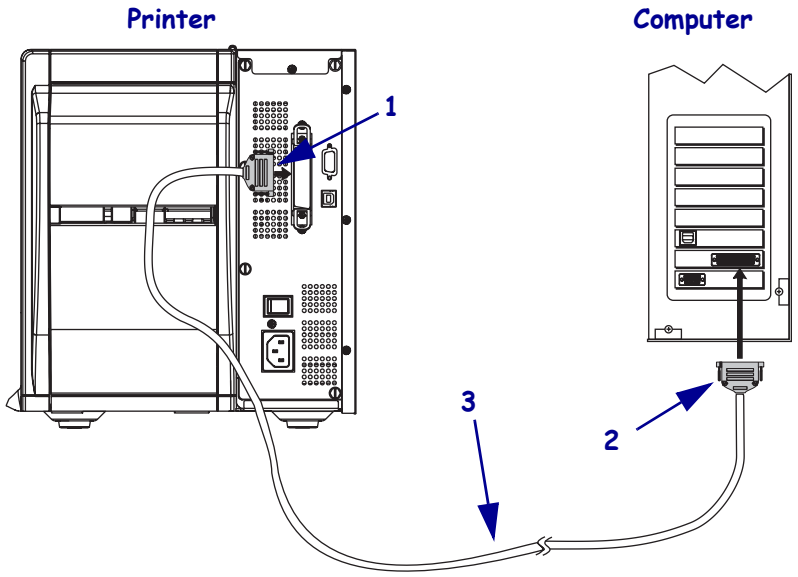


1	Null-modem adaptor (if using a standard modem cable)
2	9-pin male connector, connected to printer or null-modem adaptor
3	25-pin female connector, connected to computer
4	9-pin female connector, connected to computer
5	Maximum cable length = 50 ft. (15 m)

IEEE 1284 Bidirectional Parallel A common communication method available on most PCs and other hosts.

- *Advantages:* Fastest of the communication interfaces; cables and connectors are readily available from computer equipment stores and suppliers; two-way communication between the host and the printer; easy to connect.
- *Disadvantages:* Shorter recommended cable length of 6 feet (1.83 m) with a maximum of length 10 ft (3 m); many computers are equipped with only one parallel port, allowing only one IEEE 1284 bidirectional device to be connected at a time.

Figure 8 • Communicating Using a Parallel Port

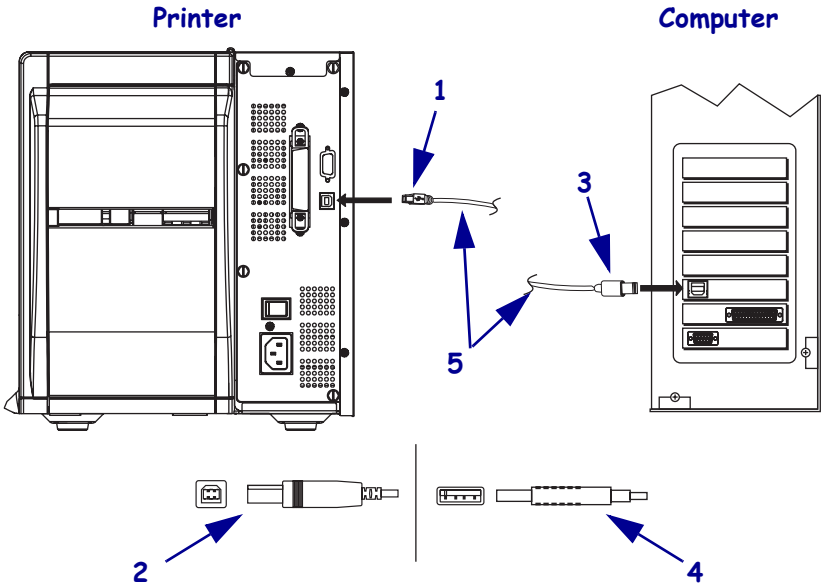


1	36-pin male connector, attaching to printer
2	25-pin male connector, attaching to computer
3	Maximum cable length = 10 ft. (3 m)

USB 1.1 Port Communicating using the USB port (see Figure 9) does not require special settings.

- *Advantages:* Many computers are equipped with more than one USB port, allowing multiple USB devices to be connected at one time; cables and connectors are readily available from computer equipment stores and suppliers; two-way communication between the host and the printer; easy to connect.
- *Disadvantages:* Cable length limited to 16.4 ft. (5 m).

Figure 9 • Communicating Using a USB Port



1	“B” male connector, attaching to printer
2	“B” male connector, detail
3	“A” male connector, attaching to computer
4	“A” male connector, detail
5	Maximum cable length = 16.4 ft. (5 m)

Optional Print Servers Ethernet-based print servers also are available to connect your printer to a data source. Both wired and wireless options are available.

- With the ZebraNet Wireless Print Server board installed, a wireless PCMCIA card can be used to communicate with a network. For more information on this option, see the *ZebraNet Wireless Print Server User Guide*.
- ZebraNet 10/100 Print Server (10/100 PS). For more information on 10/100 PS, see the *ZebraNet 10/100 Print Server User and Reference Guide*.

Data Cable Requirements

Data cables must be fully shielded and fitted with metal or metallized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

Note • Zebra printers comply with FCC Rules and Regulations, Part 15 for Class B Equipment using fully shielded, 6.5 ft. (2 m) data cables. Use of unshielded cables may increase radiation above the Class B limits.

Connect the Printer to a Power Source

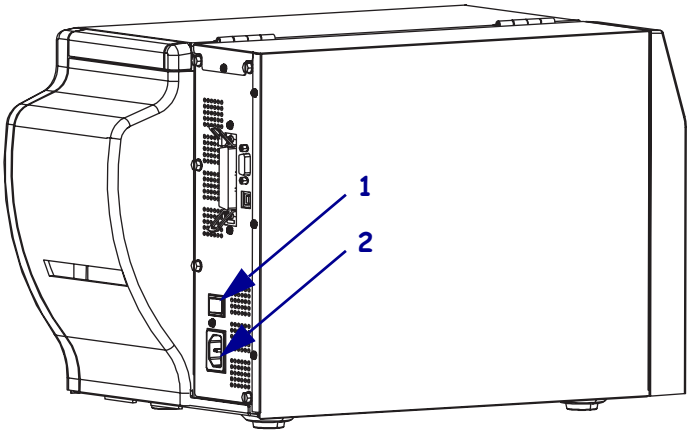
The AC power cord must have a three-prong female connector on one end that plugs into the mating AC power connector at the rear of the printer. If a power cable was not included with your printer, refer to *Power Cord Specifications* on page 25.

Caution • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific three-conductor grounded plug configuration.

To connect the printer to a power source, complete these steps:

1. Turn the printer power switch to the off (**O**) position.
2. Refer to Figure 10. Plug the power cord into the AC power connector on the rear of the printer.
3. Plug the other end of the power cord into a power outlet near the printer.
4. Turn on (**I**) the printer.

Figure 10 • Power Connection



1	Power switch
2	AC power connector

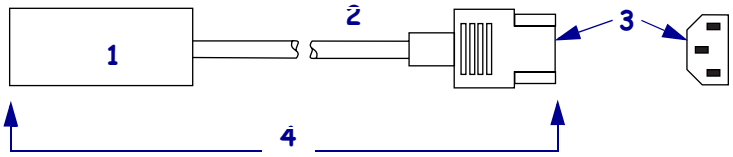
Power Cord Specifications

Caution • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific, three-conductor grounded plug configuration.

Depending on how your printer was ordered, a power cord may or may not be included. If one is not included or if the one included is not suitable for your requirements, refer to the following guidelines:

- The overall cord length must be less than 9.8 ft. (3.0 m).
- The cord must be rated for at least 10 A, 250 V.
- The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference. The third wire in the power cord grounds the connection (Figure 11).

Figure 11 • Power Cord Specifications



1	AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 12).
2	3-conductor HAR cable or other cable approved for your country.
3	IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 12).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp, 250 VAC.

Figure 12 • International Safety Organization Certifications

Types of Media

The printer can use various types of media (Table 4). Zebra strongly recommends the use of Zebra-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to prevent premature printhead wear.

Table 4 • Types of Media

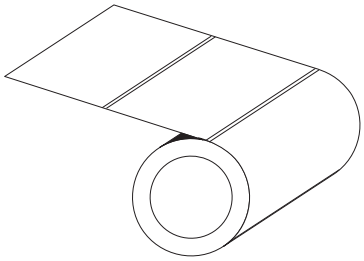
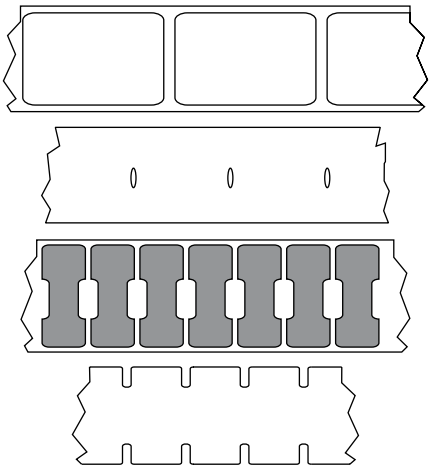
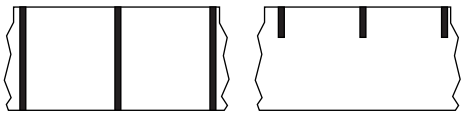
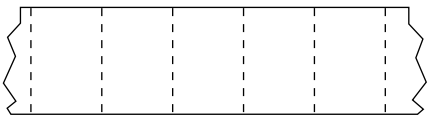
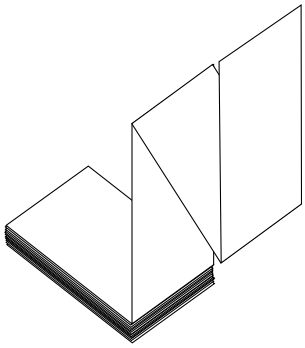
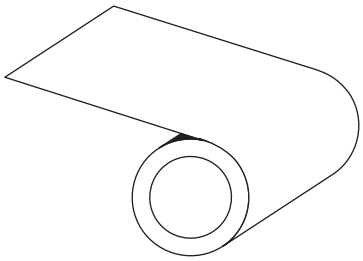
Media Type	How It Looks	Description
Non-Continuous Roll Media		Roll media is wound on a core that can be 1 in. to 3 in. (25 to 76 mm) in diameter. Labels have adhesive backing that sticks them to a liner, and they are separated by gaps, holes, notches, or black marks. Tags are separated by perforations. **Figure 13 • Non-Continuous Web Media**  **Figure 14 • Black Mark Media**  **Figure 15 • Tag Stock** 

Table 4 • Types of Media (Continued)

Media Type	How It Looks	Description
Non-Continuous Fanfold Media		Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label divisions as non-continuous roll media. The divisions would fall on or near the folds.
Continuous Roll Media		Continuous media is wound on a core and is without gaps, holes, notches, or black marks. This allows the image to be printed anywhere on the label. With continuous media, use the transmissive sensor so the printer can detect when the media runs out.

Ribbon Overview

Note • This section applies only to printers that have the Thermal Transfer option installed.

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin, which is transferred to the media during the thermal transfer process. The media determines whether you need to use ribbon and how wide the ribbon must be.

When ribbon is used, it must be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear.

When to Use Ribbon

Thermal transfer media requires ribbon for printing while direct thermal media does not. To determine if ribbon must be used with a particular media, perform a media scratch test.

To perform a media scratch test, complete these steps:

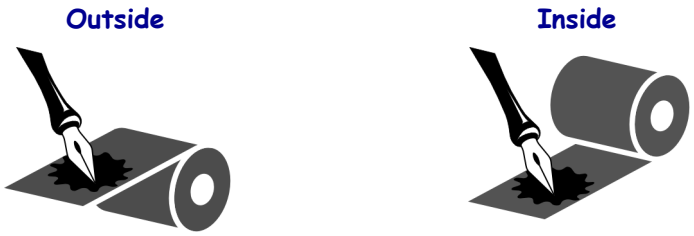
1. Scratch the print surface of the media rapidly with your fingernail.
2. Did a black mark appear on the media?

If a black mark...	Then the media is...
Does not appear on the media	**Thermal transfer**. A ribbon is required.
Appears on the media	**Direct thermal**. No ribbon is required.

Coated Side of Ribbon

Ribbon can be wound with the coated side on the inside or outside (Figure 16). This printer can only use ribbon that is coated on the outside. If you are unsure which side of a particular roll of ribbon is coated, perform an adhesive test or a ribbon scratch test to determine which side is coated.

Figure 16 • Ribbon Coated on Outside or Inside



Adhesive Test

If you have labels available, perform the adhesive test to determine which side of a ribbon is coated. This method works well for ribbon that is already installed.

To perform an adhesive test, complete these steps:

1. Peel a label from its liner.
2. Press a corner of the sticky side of the label to the outer surface of the roll of ribbon.
3. Peel the label off of the ribbon.
4. Observe the results. Did flakes or particles of ink from the ribbon adhere to the label?

If ink from the ribbon...	Then...
Adhered to the label	The ribbon is coated on the **outer** surface.
Did not adhere to the label	The ribbon is coated on the **inner** surface and cannot be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon.

Ribbon Scratch Test

Perform the ribbon scratch test when labels are unavailable.

To perform a ribbon scratch test, complete these steps:

1. Unroll a short length of ribbon.
2. Place the unrolled section of ribbon on a piece of paper with the outer surface of the ribbon in contact with the paper.
3. Scratch the inner surface of the unrolled ribbon with your fingernail.
4. Lift the ribbon from the paper.
5. Observe the results. Did the ribbon leave a mark on the paper?

If the ribbon...	Then...
Left a mark on the paper	The ribbon is coated on the **outer** surface.
Did not leave a mark on the paper	The ribbon is coated on the **inner** surface and cannot be used in this printer. To verify this, repeat the test on the other surface of the roll of ribbon.

Notes •

3

Operations

This section provides the procedures for loading and calibrating the printer.

Note • Complete the tasks and resolve the issues in *Printer Setup* on page 15 before operating the printer.

Contents

Media Loading Overview

The printer can print on roll or fanfold media and use different print modes for label removal.

Print Modes

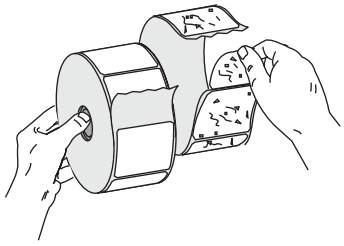
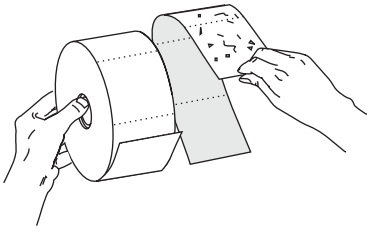
The methods for loading media for each print mode follow in this section. Use a print mode that matches the media being used and the printer options available (Table 5). For more information on the types of media, see *Types of Media* on page 26.

Table 5 • Print Mode Options

Mode	When to Use	Printer Action
Tear-Off (default setting)	Use for most applications. See *Load Media in Tear-Off Mode* on page 35.	Each label or strip of labels can be torn off after printing.
Peel-Off	Use only if printer has the Peel-Off option. See *Load Media in Peel-Off Mode* on page 38.	The liner is peeled away from the label during printing. When the printed label is removed, the next label prints.

Start a Roll of Media

Exposed media may become dirty when handled or stored. To start a roll of media, remove and discard one full revolution of labels or tags and any liner.

Labels	Tag Stock
Remove all labels that are held by adhesives or tape. 	Detach all exposed tags. 

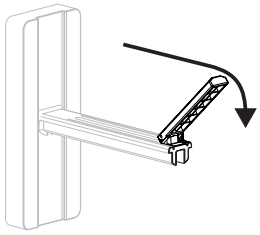
Insert Media into the Printer

This section shows how to insert roll or fanfold media into the printer. Fanfold media is loaded the same way as roll media, except the media is stored outside of the printer. See Figure 17 on page 35 for an illustration.

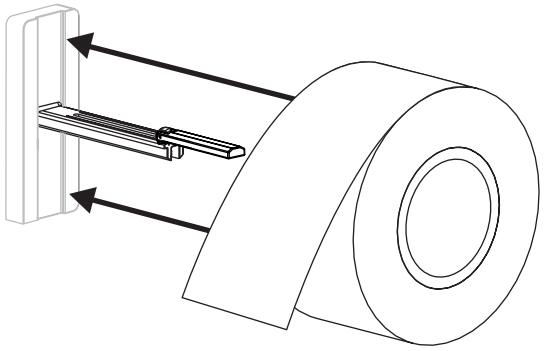
Roll Media

To insert roll media, complete these steps:

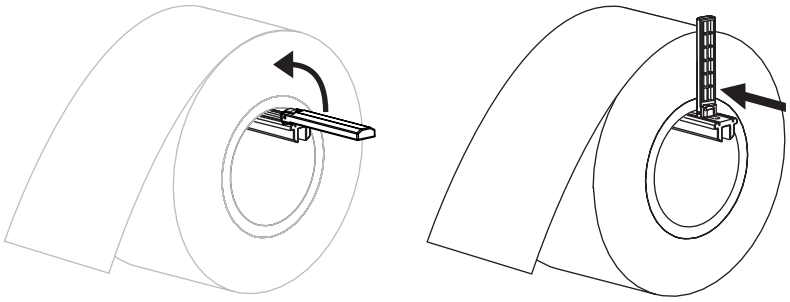
1. Flip down the media supply guide.



2. Place the roll of media on the media supply hanger. Push the roll as far back as it will go.



3. Flip up the media supply guide, and then slide it in until it touches, but does not restrict, the edge of the roll.

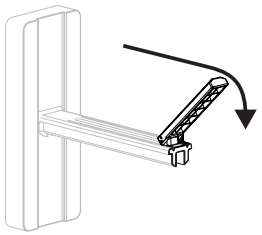


4. Continue with the media loading procedure for the desired print mode.

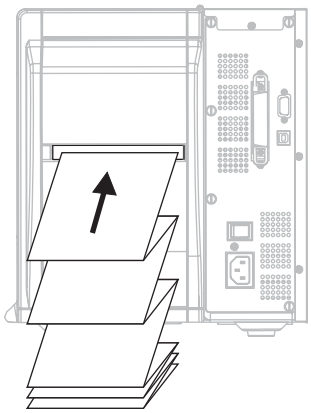
Fanfold Media

To insert fanfold media, complete these steps:

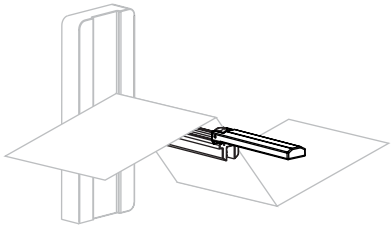
1. Flip down the media supply guide.



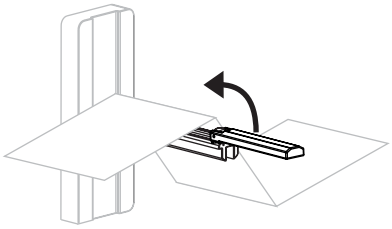
2. Insert the fanfold media through the fanfold media slot on the rear of the printer.

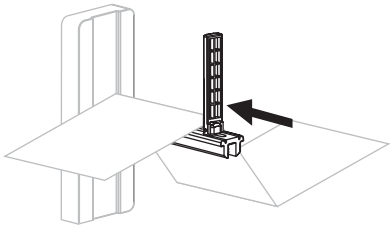


3. Drape the media over the media supply hanger.



4. Flip up the media supply guide, and then slide it in until it touches, but does not restrict, the edge of the media.



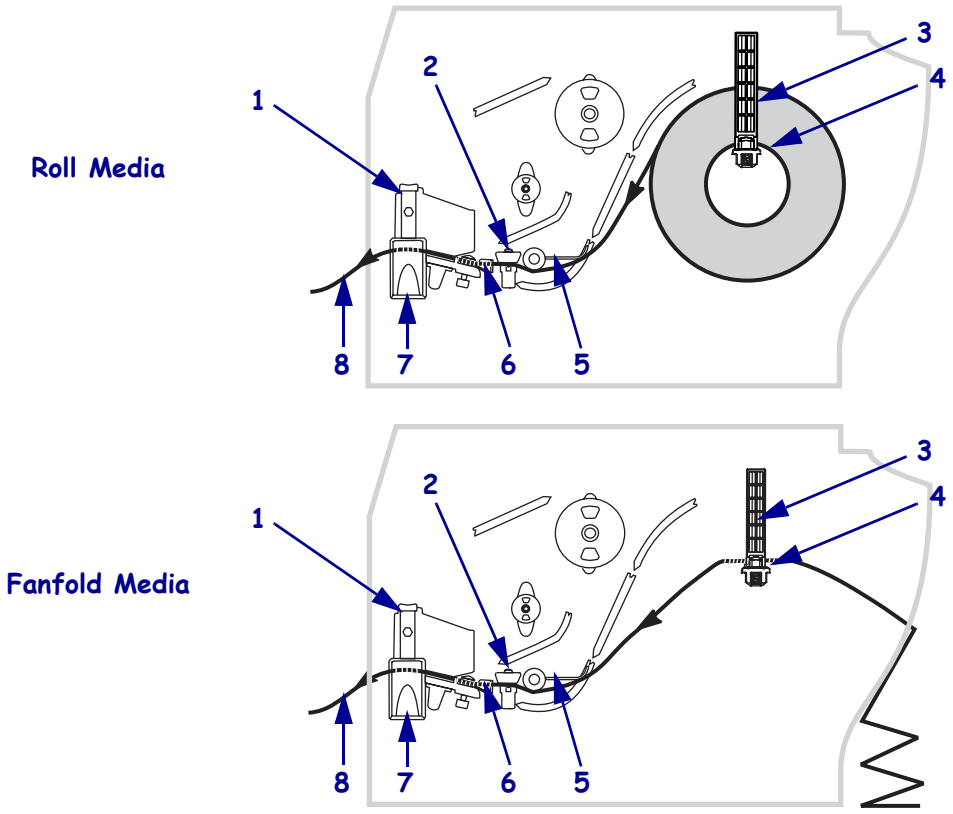


5. Continue with the media loading procedure for the desired print mode.

Load Media in Tear-Off Mode

Figure 17 shows roll and fanfold media loaded in Tear-Off mode, which is the default print mode.

Figure 17 • Tear-Off Mode

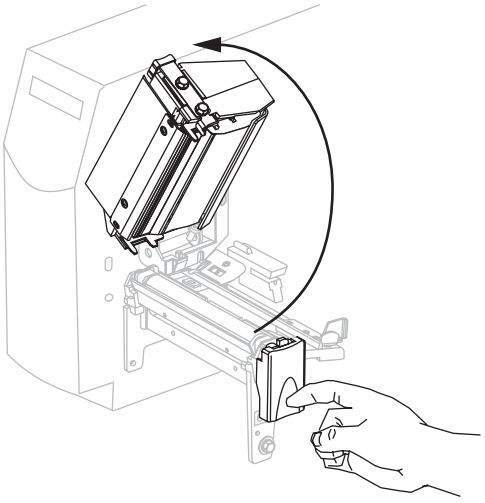


1	Printhead assembly	**5**	Dancer
2	Transmissive sensor	**6**	Media guide
3	Media supply guide	**7**	Printhead release latch
4	Media supply hanger	**8**	Printed label

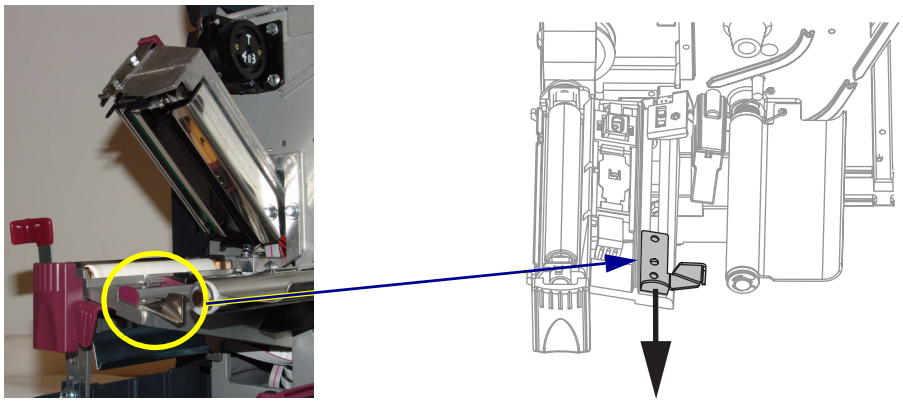
To load media in Tear-Off Mode, complete these steps:

1. Set the printer to Tear-Off mode. See *Select the Label Removal Method* on page 64 for instructions.
2. Insert media into the printer. See *Insert Media into the Printer* on page 33 for instructions.

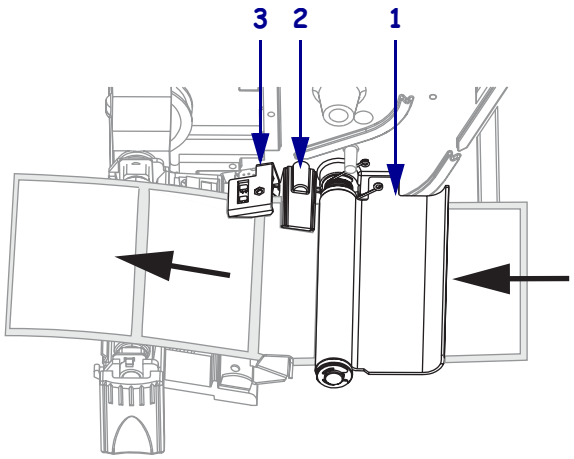
3. Press the printhead release latch to open the printhead assembly. Lift the printhead until it latches open.



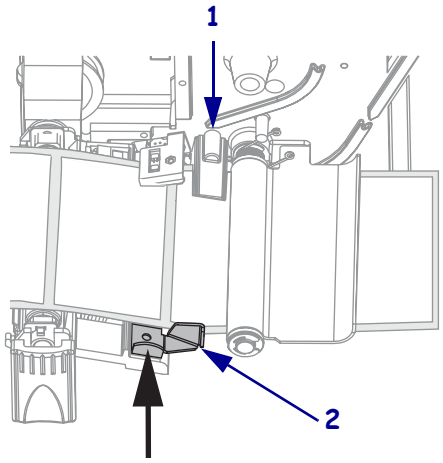
4. Slide out the media guide.



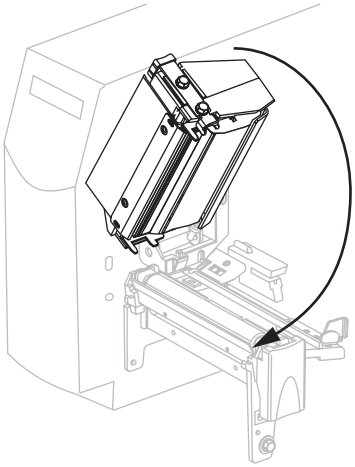
5. Feed the media under the dancer assembly (**1**), through the slot in the transmissive sensor (**2**—standard transmissive sensor shown), and under the ribbon sensor (**3**).



6. Push the media to the back of the transmissive sensor (**1**). Slide in the media guide (**2**) until it just touches the edge of the media.



7. Close the printhead assembly.



8. If the printer is paused (the PAUSE light is blinking), press PAUSE to enable printing.

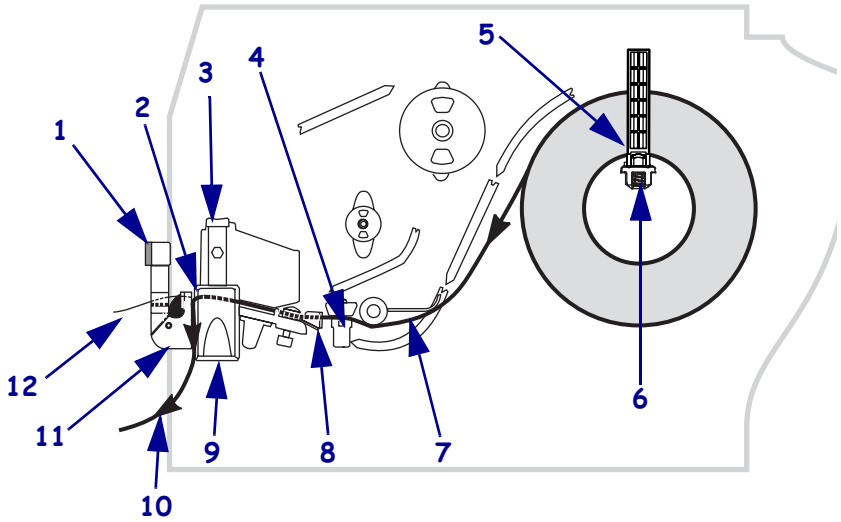
Load Media in Peel-Off Mode

This section applies only if the Peel-Off option is installed (Figure 18).

The peel assembly consists of several spring-loaded rollers to ensure the proper roller pressure. Use the peel release lever and your right hand to open and close the peel assembly. Doing this will keep your fingers away from the rollers.

Caution • Do not use your left hand to assist in closing the peel assembly. The top edge of the peel roller/assembly could pinch your fingers.

Figure 18 • Peel-Off Mode

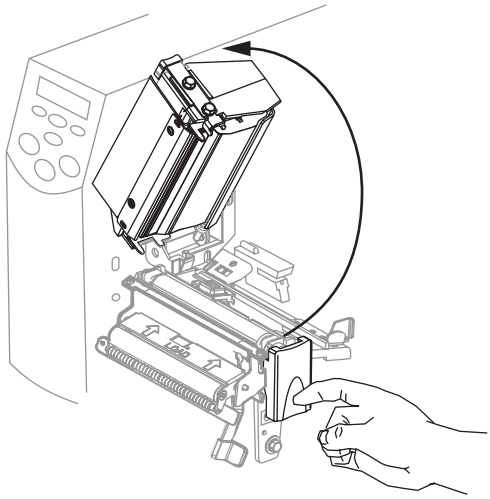


1	Peel lever	7	Dancer
2	Tear-off/peel-off bar	8	Media guide
3	Printhead assembly	9	Printhead release latch
4	Transmissive sensor	10	Label liner
5	Media supply guide	11	Peel assembly
6	Media supply hanger	12	Label

To load media in Peel-Off mode, complete these steps:

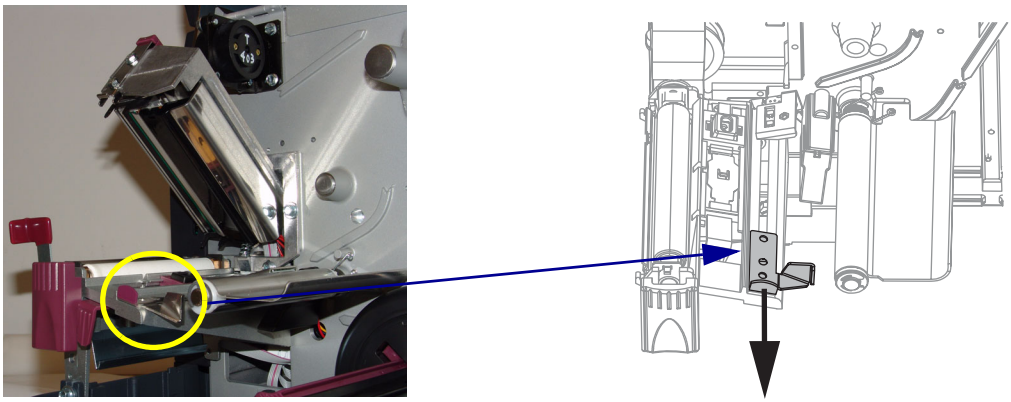
1. Set the printer to Peel-Off mode. See *Select the Label Removal Method* on page 64 for instructions.
2. Insert media into the printer. See *Insert Media into the Printer* on page 33 for instructions.

3. Press the printhead release latch to open the printhead assembly.

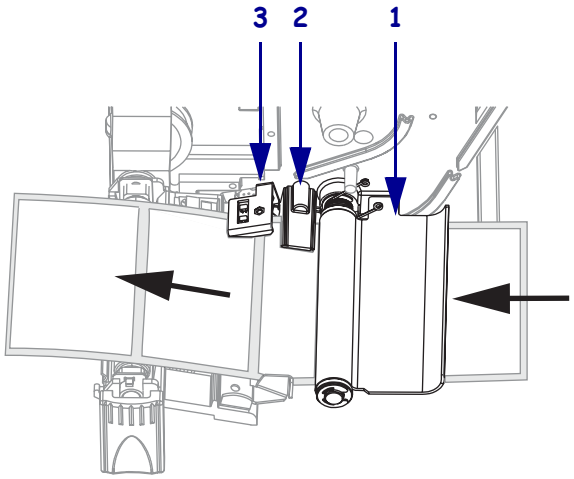


4. Lift the printhead until it latches open.

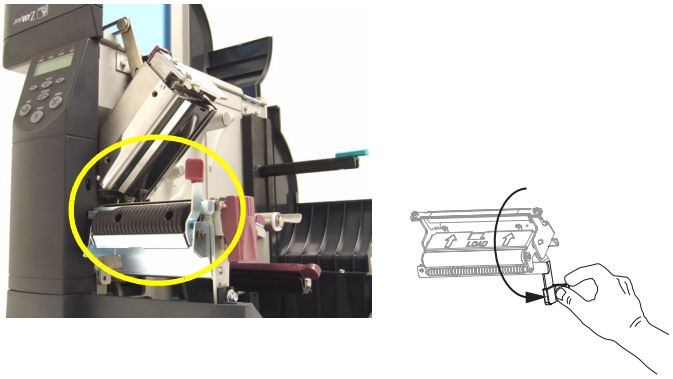
5. Slide out the media guide.



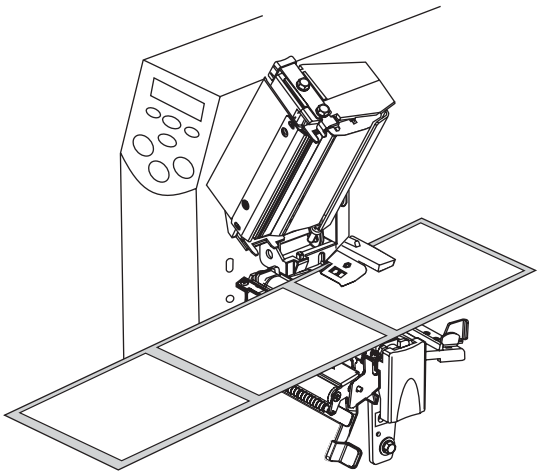
6. Feed the media under the dancer assembly (**1**), through the slot in the transmissive sensor (2—standard transmissive sensor shown), and under the ribbon sensor (**3**).



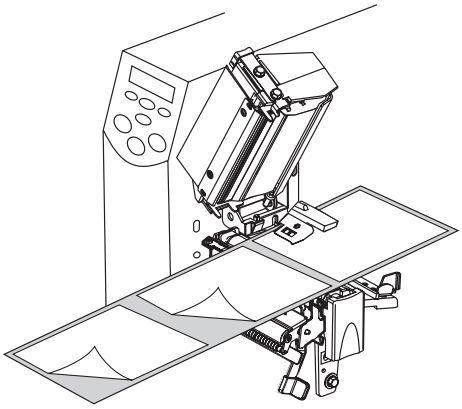
7. Push down the peel-off mechanism release lever to open the peel assembly.



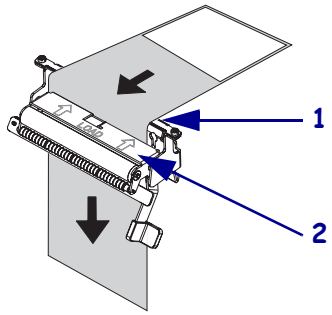
8. Pull approximately 18 in. (500 mm) of media through the front of the printer.



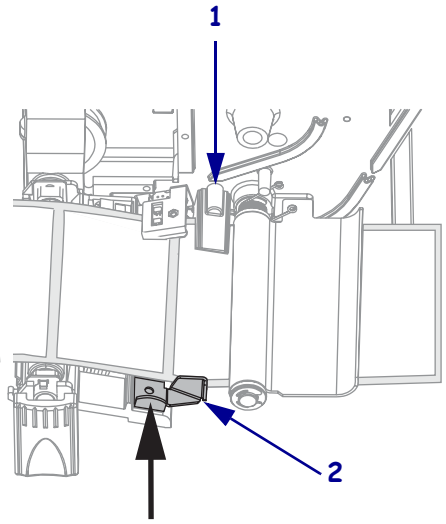
9. Remove the exposed labels so that only the liner remains.



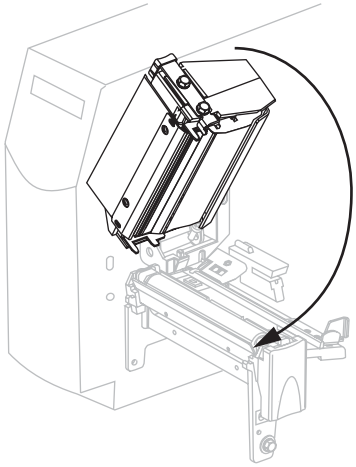
10. Feed the liner over the tear-off/peel-off bar (**1**) and behind the peel assembly (**2**). Make sure that the end of the liner falls outside of the printer.



11. Push the media to the back of the transmissive sensor (**1**). Slide in the media guide (**2**) until it just touches the edge of the media.

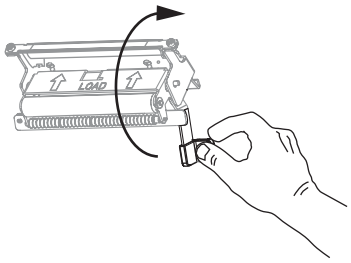


12. Close the printhead assembly.



13. **Caution •** Use the peel release lever and your right hand to close the peel assembly. Do not use your left hand to assist in closing. The top edge of the peel roller/assembly could pinch your fingers.

    Close the peel assembly using the peel-off mechanism release lever.



14. If the printer is paused (the PAUSE light is blinking), press PAUSE to enable printing. Peeling starts automatically.

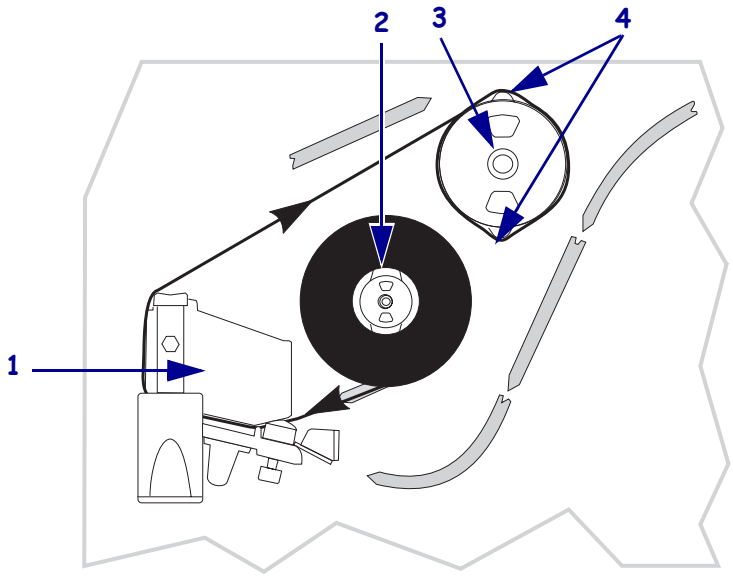
Load Ribbon

Note • This section applies only to printers that have the Thermal Transfer option installed.

The ribbon supply spindle in your printer is a dual-tension variety. Most applications require the spindle to be in the normal position. The low tension position is recommended only when a narrow ribbon is used or if normal tension hampers the ribbon movement.

Always use ribbon that is wider than the media to protect the printhead from wear. For direct thermal printing, do not load ribbon in the printer.

Figure 19 • Ribbon Path

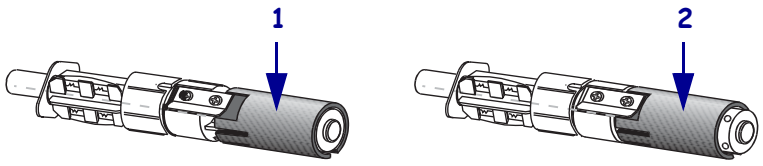


1	Printhead assembly
2	Ribbon supply spindle
3	Ribbon take-up spindle
4	Tension blades

To load ribbon, complete these steps:

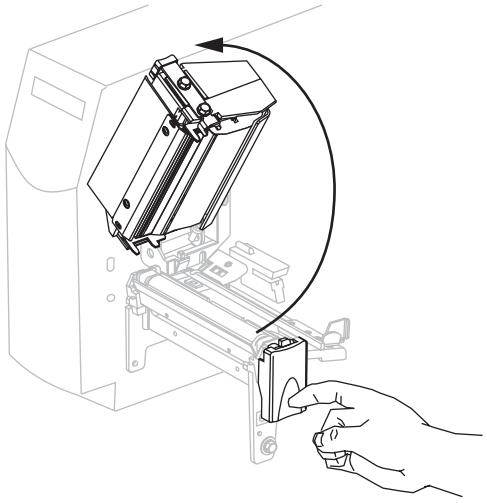
1. Set the ribbon supply spindle for normal or low tension.
   - To place the ribbon supply spindle in the **normal position**, firmly pull out the spindle end cap until it extends and clicks in place, as shown in Figure 20. Use this setting for most applications.
   - To place the ribbon supply spindle in the **low-tension position**, firmly push in the end cap until it retracts and clicks in place, as shown in Figure 20. Use this setting when using a narrow ribbon or if normal tension hampers ribbon movement.

Figure 20 • Ribbon Spindle—Normal and Low Tension

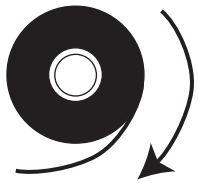


1	Normal Position (Spindle End Cap Extended)
2	Low-Tension Position (Spindle End Cap Retracted)

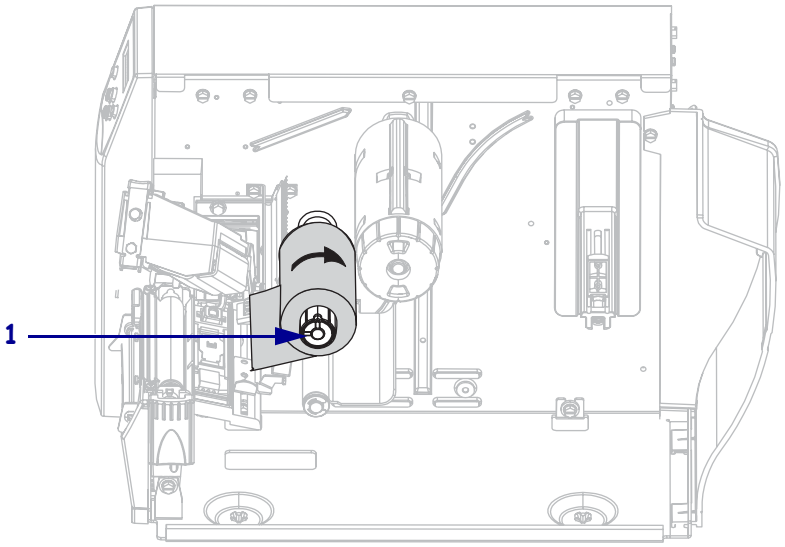
2. Press the printhead release latch to open the printhead assembly. Lift the printhead until it latches open.



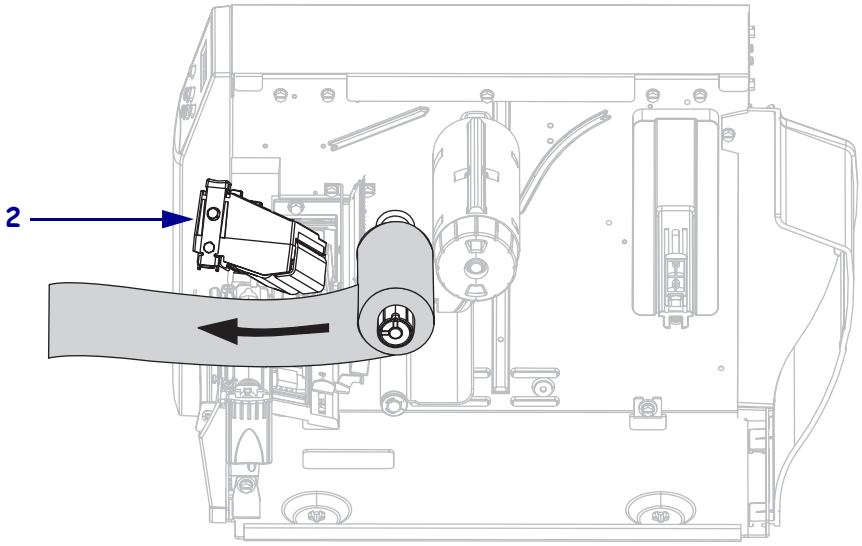
3. Orient the ribbon with the loose end unrolling clockwise.



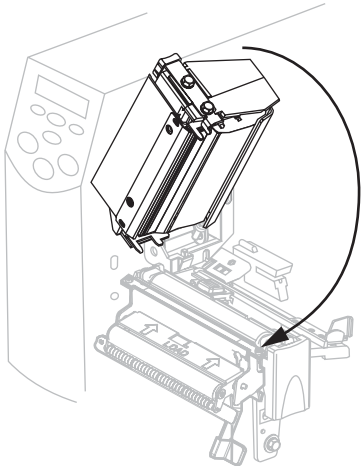
4. Place the roll of ribbon on the ribbon supply spindle (**1**) and push it all the way back.



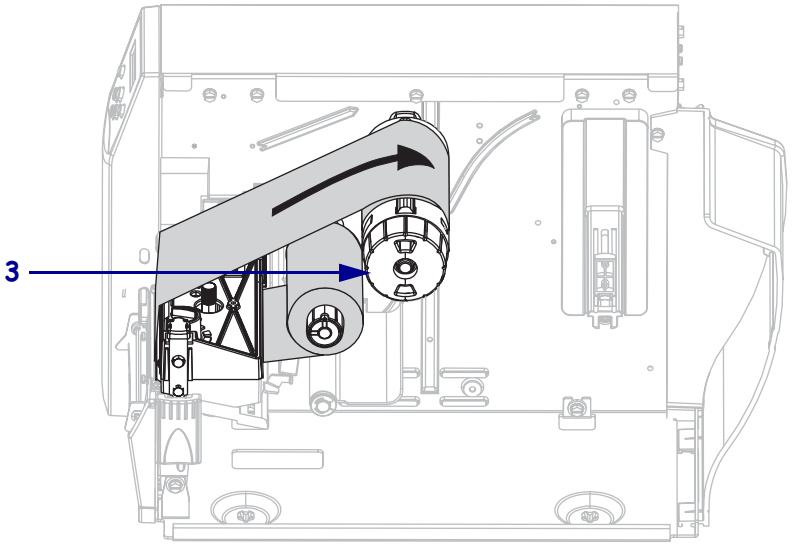
5. Pull the end of the ribbon under the printhead assembly (**2**) and out the front of the printer.



6. Close the printhead assembly.



7. Wind the ribbon clockwise onto the ribbon take-up spindle (**3**).



Remove Used Ribbon

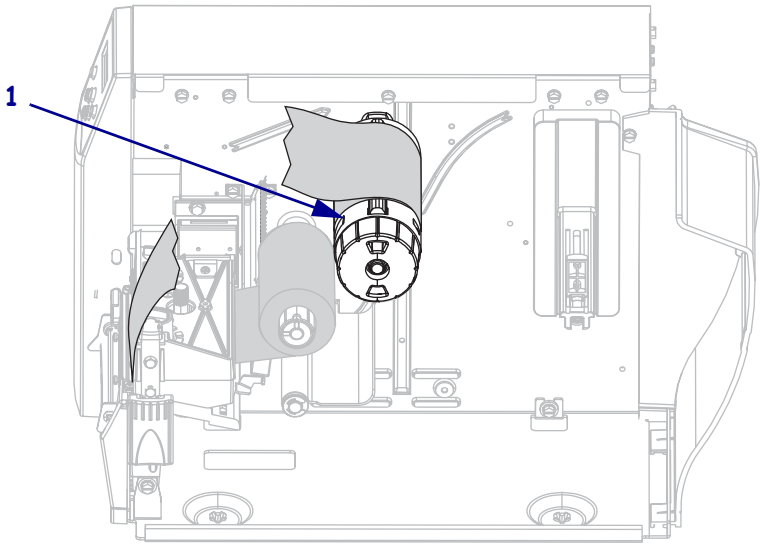
Remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon.

Remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon or when switching from thermal transfer mode to direct thermal mode.

To remove used ribbon, complete these steps:

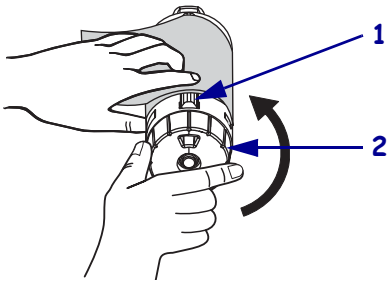
1. **Caution** • Do not cut the ribbon directly on the ribbon take-up spindle. Doing so may damage the spindle.

   If the ribbon has not run out, cut or break it before the ribbon take-up spindle (**1**).

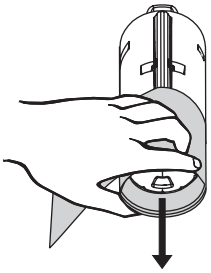


2. To loosen the ribbon, squeeze it against the ribbon take-up spindle tension blades (**1**). At the same time, turn the ribbon take-up spindle release knob counterclockwise (**2**).

   The tension blades collapse into the ribbon take-up spindle, loosening the ribbon.



3. Slide the used ribbon off of the ribbon take-up spindle and discard.



Calibrate the Printer

Auto Calibration

By default, the printer automatically calibrates on power up or when the printhead is closed. During auto calibration, the printer determines the label length and sensor settings.

The results of the auto calibration are stored in the printer's memory and are retained even if printer power is removed. These parameters remain in effect until the next calibration is performed.

Manual Calibration

Perform a media and ribbon sensor calibration to reset the sensitivity of the sensors so the media and ribbon are detected more accurately. If you change the type of ribbon or media, your printer may operate better if you perform this calibration.

For instructions, refer to *Calibrate Media and Ribbon Sensors* on page 75.

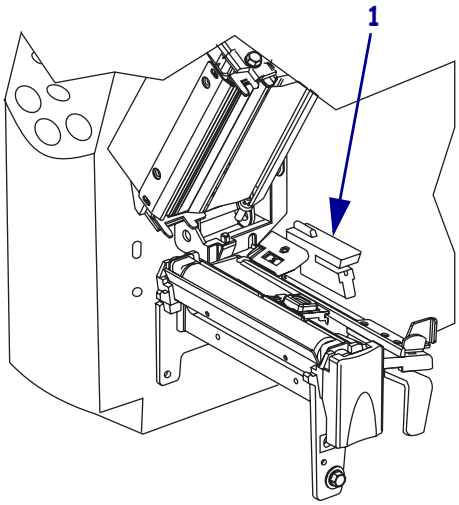
Select or Adjust the Media Sensors

This printer uses two types of media sensors: transmissive and reflective.

Select the Transmissive Sensor

The standard transmissive sensor (Figure 21) is in a fixed position and enabled from the control panel. For more information about the operation of this sensor, see *Select the Media Sensor* on page 64.

Figure 21 • Transmissive Sensor



1	Standard transmissive sensor

Adjust the Reflective Sensor

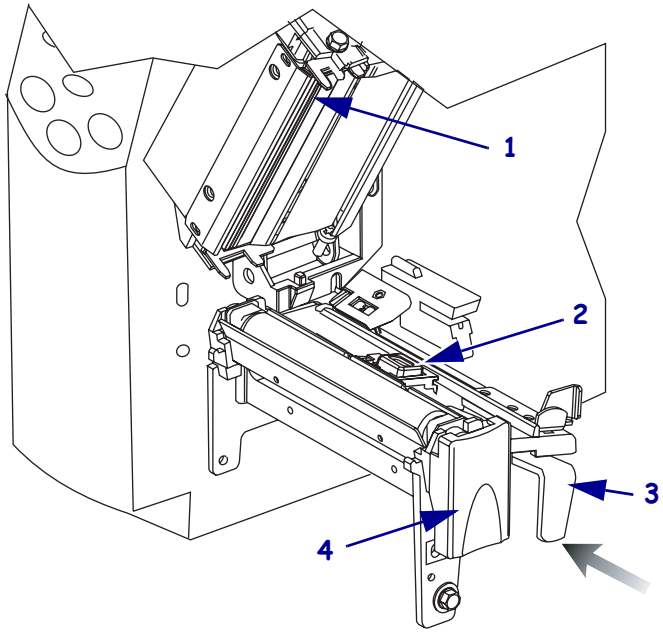
The reflective sensor is compatible with most types of media. With non-continuous media, the reflective sensor detects the start-of-label indicator (the notch, hole, black mark, or gap between die-cut labels). With both continuous media and non-continuous media, the sensor detects an out-of-paper condition. If you have difficulties with calibration while using this sensor, use the transmissive sensor (see *Select the Media Sensor* on page 64).

Position the reflective sensor in the following way:

- directly under the notch, hole, or black mark with these types of labels
- anywhere along the width of the media if there is a gap between labels
- anywhere under the media for continuous media

The glow of the red light through the media may help you accurately position the sensor.

Figure 22 • Adjusting the Reflective Sensor



1	Printhead assembly
2	Reflective sensor
3	Reflective sensor positioning lever
4	Printhead release latch

To adjust the reflective sensor, complete these steps:

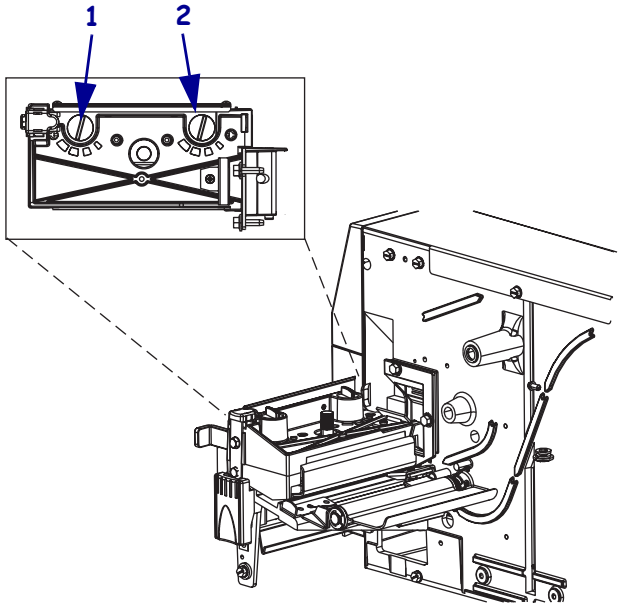
1. See Figure 22. Press the printhead release latch.
2. Lift the printhead until it latches open.
3. Locate the reflective sensor positioning lever.
4. Move the reflective sensor positioning lever across the width of the media until the reflective sensor aligns with the gap or notch.
5. Close the printhead assembly.

Adjust Printhead Pressure

You may need to adjust printhead pressure if printing is too light on one side or if you use thick media.

See Figure 23. The pressure adjustment dials have four possible settings designated by blocks of increasing size embossed on the print mechanism. The smallest block (fully counterclockwise) is considered position 1, and the largest block (fully clockwise) is considered position 4.

Figure 23 • Printhead Pressure Adjustment Dials



1	Outside dial
2	Inside dial

To set printhead pressure, complete these steps:

1. Use Table 6 to select the initial dial settings for your media.

Table 6 • Printhead Pressure

Media Width	Inside Dial	Outside Dial
1 in. (25.4 mm)	3	1
2 in. (51 mm)	4	1
3 in. (76 mm)	3	2
3.5 in. and up (89 mm and up)	3	3

2. If necessary, adjust the pressure adjustment dials as follows:

If the media...	Then...
Requires higher pressure to print well	Increase both dials one position.
Shifts left while printing	Increase the outside dial setting one position, or decrease the inside dial setting one position.
Shifts right while printing	Increase the inside dial setting one position, or decrease the outside dial setting one position.
Prints too lightly on the left side of the label.	Increase the inside dial setting one position.
Prints too lightly on the right side of the label.	Increase the outside dial setting one position.

4

Configuration

This section discusses printer configuration settings and instructs you how to view or change printer parameters through the control panel.

Contents

Setup Mode

After you have installed the media and ribbon and the Power-On Self Test (POST) is complete, the control panel displays **PRINTER READY**. You may now set printer parameters for your application using the control panel LCD and the buttons directly below it. If it becomes necessary to restore the initial printer defaults, see *FEED and PAUSE Self Test* on page 107.

Important • Certain printing conditions may require that you adjust some printing parameters, such as print speed or darkness. These conditions include (but are not limited to):

- printing at high speeds
- peeling the media
- the use of extremely thin, small, synthetic, or coated labels

Because these and other factors affect print quality, run tests to determine the best combination of printer settings and media for your application. A poor match may limit print quality or print rate, or the printer may not function properly in the desired print mode.

Enter Setup Mode

To enter Setup mode, complete these steps:

1. Press MENU.
2. Use the left or right arrow to scroll through the parameters.

Leave Setup Mode

You can leave Setup mode at any time. As you leave Setup mode, you may choose to save or discard changes that you made, or you may return to where you were in Setup mode.

To exit Setup mode, complete these steps:

1. Press MENU.

   The printer displays **SAVE CHANGES** and activates the ENTER button.
2. Do you wish to save changes that were made since you entered Setup mode?

If you wish to...	Then...
Save changes	Press ENTER. The printer saves changes and exits Setup mode.

If you wish to...	Then...
Discard changes	**a.** Press the up or down arrow to select NO. **b.** Press ENTER. The printer discards changes and exits Setup mode.
Return to Setup mode	Press MENU or any arrow button. • MENU returns you to the same parameter. • The left arrow takes you to the previous parameter. • The right arrow takes you to the next parameter. • The up or down arrow scrolls to other options in the same parameter.

Password Protection of Parameters

The printer has four levels of passwords. When you enter Setup mode on the control panel, only those parameters that are not password-protected are displayed. To see more parameters, you must enter an appropriate password at the **ADVANCED SETUP** prompt. After you enter a password correctly, you do not have to enter it again until you leave and reenter Setup mode.

When you are prompted for a password, enter the password for the level displayed or for a higher level. Entering a higher level password will unprotect the parameters for that level and for all levels below it (for example, unprotecting level 4 parameters also unprotects levels 1, 2, and 3).

The password levels and default passwords are shown in Table 7. To change the password for any level, use the ^KP ZPL II command. For more information, see *^KP, Define Password* on page 116.

Table 7 • Password Levels and Defaults

Password Level	Features Controlled	Default Password
4	All features, including sensor adjustments and other sensitive parameters	For advanced use only. See the *Maintenance Manual* or contact technical support.
3	Installation and reconfiguration. The printer web-page interface also uses this password.	1234
2	Label configuration operations (media type, label removal method, label length)	0000 (unprotected)
1	Darkness, Tear-Off position, label top	0000 (unprotected)

To enter a password when prompted, complete these steps:

1. When the printer displays **ADVANCED SETUP X**, press ENTER.
   The printer displays **PASSWORD** and the number **0000**.
2. Enter the four-digit password for the password level displayed or for a higher level.
   - The left and right arrows change the selected digit position.
   - The up and down arrows change the value of the selected digit.
3. After entering the password, press ENTER.
   If you entered a valid password, additional parameters are displayed.

Note • When you enter a password at an **ADVANCED SETUP** prompt, the first parameter that you see is determined in part by whether you pressed the right arrow or the left arrow to get to the **ADVANCED SETUP** prompt:

- If you used the right arrow, the first parameter that you see is based on the password level that the printer prompted for (see Table 8).
- If you used the left arrow, the first parameter that you see is based on which password you enter at the prompt, regardless of which password level the printer prompted for (see Table 9).

Table 8 • Right Arrow Used to Reach ADVANCED SETUP Prompt

Advanced Setup Level Prompted	Password Level Entered	First Parameter Seen
1	1, 2, 3, or 4	**DARKNESS** (top of level 1)
2	2, 3, or 4	**MEDIA TYPE** (top of level 2)
3	3 or 4	**PRINT OUT** (top of level 3)
4	4	**LABEL LEVEL** (top of level 4)

Table 9 • Left Arrow Used to Reach ADVANCED SETUP Prompt

Advanced Setup Level Prompted	Password Level Entered	First Parameter Seen
1	1	**LABEL TOP** (ZPL, EPL, APL-D) (bottom of level 1) **Y FORMS ADJUST** (APL-I) (bottom of level 1)
1, 2	2	**LENGTH** (bottom of level 2)
1, 2, 3	3	**LANGUAGE** (bottom of level 3)
1, 2, 3, or 4	4	**LANGUAGE** (bottom of level 4; **LANGUAGE** parameter appears in both level 3 and 4)

Printing Configuration Labels

After you load the media and ribbon (if necessary), print a printer configuration label and a network configuration label as records of your printer's current settings. Keep the labels to use when troubleshooting printing problems. The options to print these labels are located in password level 3.

A configuration label lists the printer settings that are stored in configuration memory. A network configuration label lists the print server settings. For the correct settings, print a network configuration label after the printer connects to the network.

Note • If the printer is paused when you enter Setup mode, these labels will print after you exit Setup mode and resume printing.

To print a printer configuration label or a network configuration label, complete these steps:

1. On the control panel, press MENU.

   The printer enters Setup mode and displays **DARKNESS**.

2. Press the left arrow.

   If a password is set for any levels, the printer displays **ADVANCED SETUP** with the level number, and the ENTER button is enabled. If no passwords are set, the printer displays **LANGUAGE**.

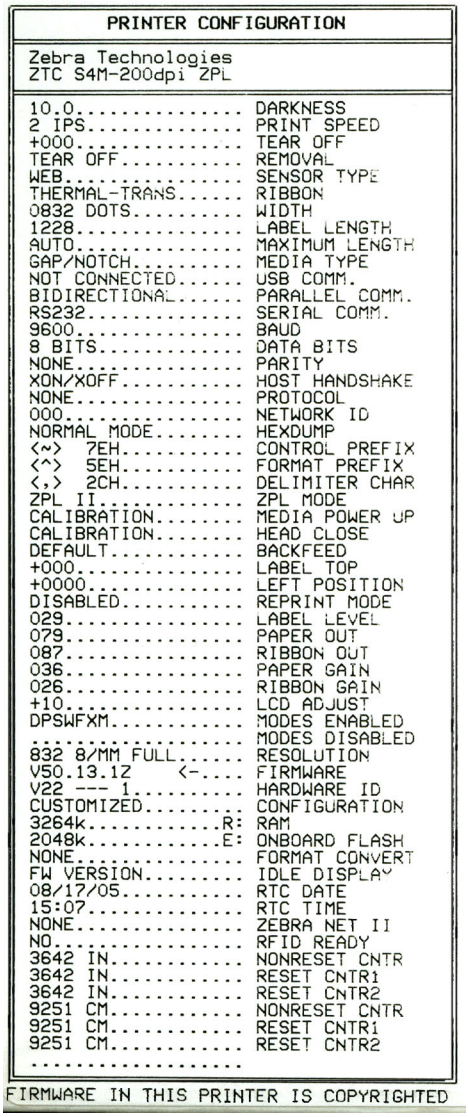
3. What does the printer display?

If the printer displays...	Then...
ADVANCED SETUP 1 **ADVANCED SETUP 2** **ADVANCED SETUP 3**	**a.** Press ENTER. The printer displays **PASSWORD 0000**. **b.** Use the left and right arrows to enter the password for level 3 or 4. **c.** Press ENTER. The printer displays **LANGUAGE**. **d.** Use the left or right arrow to scroll through the parameters until you reach **PRINT OUT**.
ADVANCED SETUP 4	You do not need to enter a password to access this parameter. Use the left or right arrow to scroll through the parameters until you reach **PRINT OUT**.
LANGUAGE	Use the left or right arrow to scroll through the parameters until you reach **PRINT OUT**.

4. Select the type of label to print.

To print a...	Then...
Printer configuration label	**a.** Scroll to **SETTINGS**. **b.** Press ENTER. A printer configuration label prints (Figure 24).

Figure 24 • Printer Configuration Label



```
PRINTER CONFIGURATION

Zebra Technologies
ZTC S4M-200dpi ZPL

10.0............... DARKNESS
2 IPS.............. PRINT SPEED
+000............... TEAR OFF
TEAR OFF........... REMOVAL
WEB................ SENSOR TYPE
THERMAL-TRANS...... RIBBON
0832 DOTS.......... WIDTH
1228............... LABEL LENGTH
AUTO............... MAXIMUM LENGTH
GAP/NOTCH.......... MEDIA TYPE
NOT CONNECTED...... USB COMM.
BIDIRECTIONAL...... PARALLEL COMM.
RS232.............. SERIAL COMM.
9600............... BAUD
8 BITS............. DATA BITS
NONE............... PARITY
XON/XOFF........... HOST HANDSHAKE
NONE............... PROTOCOL
000................ NETWORK ID
NORMAL MODE........ HEXDUMP
<~>  7EH........... CONTROL PREFIX
<^>  5EH........... FORMAT PREFIX
<,>  2CH........... DELIMITER CHAR
ZPL II............. ZPL MODE
CALIBRATION........ MEDIA POWER UP
CALIBRATION........ HEAD CLOSE
DEFAULT............ BACKFEED
+000............... LABEL TOP
+0000.............. LEFT POSITION
DISABLED........... REPRINT MODE
029................ LABEL LEVEL
079................ PAPER OUT
087................ RIBBON OUT
036................ PAPER GAIN
026................ RIBBON GAIN
+10................ LCD ADJUST
DPSWFXM............ MODES ENABLED
.................. MODES DISABLED
832 8/MM FULL...... RESOLUTION
V50.13.1Z    <-.... FIRMWARE
V22 --- 1.......... HARDWARE ID
CUSTOMIZED......... CONFIGURATION
3264k.............R: RAM
2048k.............E: ONBOARD FLASH
NONE............... FORMAT CONVERT
FW VERSION......... IDLE DISPLAY
08/17/05........... RTC DATE
15:07.............. RTC TIME
NONE............... ZEBRA NET II
NO................. RFID READY
3642 IN............ NONRESET CNTR
3642 IN............ RESET CNTR1
3642 IN............ RESET CNTR2
9251 CM............ NONRESET CNTR
9251 CM............ RESET CNTR1
9251 CM............ RESET CNTR2
.................

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

To print a...	Then...
Network configuration label	**a.** Scroll to **NETWORK**. **b.** Press ENTER. A network configuration label prints (Figure 25). An asterisk designates whether the wired or wireless print server is active. If no wireless print server is installed, the wireless portion of the label does not print.

Figure 25 • Network Configuration Label

```
Network Configuration

Zebra Technologies
PRINTER MODEL XXXdpi
USER-DEFINED TEXT

NO.................. WIRED PS CHECK?
Printer............. LOAD LAN FROM?

Wired
ALL................. IP PROTOCOL
000.000.000.000.... IP ADDRESS
000.000.000.000.... SUBNET MASK
000.000.000.000.... DEFAULT GATEWAY
000.000.000.000.... WINS SERVER IP
YES................. TIMEOUT CHECKING
0300................ TIMEOUT VALUE
0000................ ARP INTERVAL
9100................ BASE RAW PORT

Wireless*
ALL................. IP PROTOCOL
010.003.015.089.... IP ADDRESS
255.255.255.000.... SUBNET MASK
010.003.015.001.... DEFAULT GATEWAY
010.003.001.015.... WINS SERVER IP
YES................. TIMEOUT CHECKING
0300................ TIMEOUT VALUE
0000................ ARP INTERVAL
9100................ BASE RAW PORT
YES................. CARD INSERTED
015FH............... CARD MFG ID
000AH............... CARD PRODUCT ID
000e83df3bc7........ MAC ADDRESS
YES................. DRIVER INSTALLED
INFRASTRUCTURE..... OPERATING MODE
vh-CTC-PRD......... ESSID
100................. TX POWER
ON.................. 1 Mb/s
ON.................. 2 Mb/s
ON.................. 5.5 Mb/s
ON.................. 11  Mb/s
11  Mb/s........... CURRENT TX RATE
DIVERSITY........... RECEIVE ANTENNA
DIVERSITY........... XMIT ANTENNA
OPEN................ AUTH. TYPE
OFF................. LEAP MODE
128-bit............. ENCRYPTION MODE
1................... ENCRYPT. INDEX
020................. POOR SIGNAL
LONG................ PREAMBLE
YES................. ASSOCIATED

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```

Select a Display Language

The LANGUAGE parameter is included in password level 3 and level 4 so you can easily reach the parameter to select a familiar language if you cannot read the one being displayed.

To change the language displayed, complete these steps:

1. On the control panel, press MENU.

   The printer enters Setup mode.

2. Press the left arrow.

   If a password is set for level 3 or 4, the printer displays ADVANCED SETUP with the level number, and the ENTER button is enabled. If no passwords are set for level 3 or 4, the printer displays LANGUAGE.

3. What does the printer display?

If the printer displays...	Then...
ADVANCED SETUP 1* ADVANCED SETUP 2* ADVANCED SETUP 3* ADVANCED SETUP 4*	**a.** Press ENTER. The printer displays PASSWORD 0000*. **b.** Use the left and right arrows to enter the password for level 3 or 4. **c.** Press ENTER. The printer displays LANGUAGE*.
LANGUAGE*	Continue with the next step.

* Displays in the last language selected.

4. Use the up and down arrows until you reach the language of your choice.

5. Press MENU.

   The printer prompts you to accept changes.

6. Press ENTER to accept the language that you selected.

Control Panel LCD Display

Use the LCD display on the control panel to adjust printer settings.

Password Level 1 and 2 Parameters

Table 10 shows parameters in the order in which they appear when you press the right arrow after entering Setup mode. Throughout this process, press the right arrow to continue to the next parameter or the left arrow to return to the previous parameter in the cycle.

Table 10 • Printer Parameters, Password Levels 1 and 2 (Page 1 of 5)

Parameter	Explanation
DARKNESS **(ZPL, APL-D, and APL-I modes)** DENSITY **(EPL mode only)**	**Adjust Print Darkness** The best darkness setting depends on a variety of factors, including ribbon type, labels, and the condition of the printhead. You may adjust the darkness for consistent high-quality printing. **Important** • Set the darkness to the lowest setting that provides good print quality. If the darkness is set too high, the ink may smear, the ribbon may burn through, or the printhead may wear prematurely. **Note** • The printer applies and saves the darkness setting immediately. Exiting Setup mode without saving changes does not restore the previous value. If printing is too light or if there are voids in the printed areas, increase the darkness. If the printing is too dark or if there is spreading or bleeding of printed areas, decrease the darkness. Darkness settings also may be changed by the driver or software settings. The *FEED Self Test* on page 104 can be used to determine the best darkness setting. Because the darkness setting takes effect immediately, you can see the results on labels that are currently printing. *Range (ZPL, APL-D, APL-I):* 0.0 to +30.0 *Default Value (ZPL, APL-D, APL-I):* +10.0 *Range (EPL):* 7 *Default Value (EPL):* 0 to 15 **To modify this parameter:** • Press the up arrow to increase value. • Press the down arrow to decrease value.

Table 10 • Printer Parameters, Password Levels 1 and 2 (Page 2 of 5)

Parameter	Explanation
TEAR OFF	**Adjust Tear-Off Position** This parameter establishes the position of the labels over the tear-off/peel-off bar after printing. Each press of a button adjusts the tear-off position by one dot row. **Note •** The printer applies and saves the tear-off setting immediately. Exiting Setup mode without saving changes does not restore the previous value. *Range (ZPL, EPL, APL-I):* -120 to +120 *Default Value (ZPL, EPL, APL-I):* 0 *Range (APL-D):* +00i to +999i (inches), 0m to 2537m (metric) *Default Value (APL-D):* +128i **Note •** The APL-D default value does not position the label over the tear-off/peel-off bar. This is done to work with existing DPL label formats that account for this positioning. **To modify this parameter:** • Press the up arrow to increase value. • Press the down arrow to decrease value.
LABEL TOP **(ZPL, EPL, and APL-D modes)** X FORMS ADJUST **(APL-I mode only)**	**Adjust Label Top Position** The label top position adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead), and negative numbers adjust the position up the label (toward the printhead). The displayed value represents dots. *Range (ZPL, EPL, and APL-I):* -120 to +120 *Default Value (ZPL, EPL, and APL-I):* 0 *Range (APL-D):* -0.64i to 0.64i (when printer is set to operate in inches) *Default Value (APL-D):* 0 **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
Y FORMS ADJUST **(APL-I mode only)**	**Adjust Label Left Position** The label left position adjusts the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected while negative numbers shift the left edge of the image toward the left edge of the label. *Range:* -120 to +120 *Default Value:* 0 **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.

Table 10 • Printer Parameters, Password Levels 1 and 2 (Page 3 of 5)

Parameter	Explanation
MEDIA TYPE	**Set Media Type** Tells the printer which type of media you are using. *Selections:* • GAP/NOTCH—Use for non-continuous web media, non-continuous fanfold media, and tag stock. • CONTINUOUS—Use for media that does not have divisions between labels. • MARK—Use for non-continuous black mark media. *Default Value:* GAP/NOTCH **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
SENSOR SELECT	**Select the Media Sensor** Use the setting that gives the best results. You can use the reflective sensor for most media. • REFLECTIVE—Use with black mark media and most other media types. • TRANSMISSIVE—Use with any media (other than black mark media) that does not work well with the reflective sensor. To use the transmissive sensor with media that has holes or notches, verify that the holes or notches pass through the sensor so that the sensor can detect them. If the holes or notches do not pass through the sensor, use the reflective sensor. *Default Value:* REFLECTIVE **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
REMOVAL	**Select the Label Removal Method** The label removal must correspond to the print mode (see *Print Modes* on page 32). Be sure to select a label removal mode that your hardware configuration supports because some of the selections displayed are for optional printer features. *Selections:* TEAR, PEEL, CUTTER, REWIND, DELAYED CUT *Default Value:* TEAR **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 10 • Printer Parameters, Password Levels 1 and 2 (Page 4 of 5)

Parameter	Explanation
PRINT SPEED	**Adjust Print Speed** Adjusts the speed for printing a label (given in whole numbers of inches per second). Slower print speeds typically yield better print quality. Print speed changes take effect upon exiting Setup mode. *Range:* 2 to 6 IPS *Default Value (ZPL, APL-I):* 2 IPS *Default Value (EPL, APL-D):* 6 IPS **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
PRINT WIDTH **(ZPL mode only)**	**Set Print Width** Print width determines the printable area across the width of the label. **Important** • Setting the width too narrow can result in portions of the label not being printed on the media. Setting the width too wide wastes formatting memory and can cause printing off the label and on the platen roller. This setting can affect the horizontal position of the label format if the image was inverted using the **^POI** ZPL II command. *Range:* 2 to 832 for 8 dots/mm, 2 to 1248 for 12 dots/mm *Default Value:* 832 for 8 dots/mm, 1248 for 12 dots/mm **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
COMPAT. MODE **(APL-D mode only)**	**Set APL-D Compatibility Mode** Sets compatibility with DPL printers. *Selections:* ON, OFF *Default Value:* OFF **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
CONTROL CODES **(APL-D mode only)**	**Set APL-D Control Codes** *Selections:* STANDARD, MAINFRAME *Default Value:* STANDARD **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 10 • Printer Parameters, Password Levels 1 and 2 (Page 5 of 5)

Parameter	Explanation
RESOLUTION **(APL-I mode only)**	**Set Printer Resolution for APL-I** Sets the dot size for backward compatibility with some older APL-I printers. *Selections:* 5 MIL, 10 MIL, 15 MIL *Default Value:* 5 MIL **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
LENGTH	**Set Maximum Label Length** Maximum label length is used in conjunction with the calibration procedure. The value of this setting is the maximum label length that is used during the media portion of the calibration process. Only a few labels are required to set media sensors. Always set the value that is at least 1 in. (25.4 mm) longer than the longest label to be used on the printer. *Selections:* AUTO, < 1 INCH (25.4 mm) to < 39 INCH (991 mm) *Default Value:* AUTO **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.

Password Level 3 Parameters

Table 11 shows parameters in the order in which they appear when you press the right arrow after entering the Level 3 password. Throughout this process, press the right arrow to continue to the next parameter or the left arrow to return to the previous parameter in the cycle.

Table 11 • Printer Parameters, Password Level 3 (Page 1 of 10)

Parameter	Explanation
PRINT OUT	**Print Selected Labels** This parameter allows you to print certain types of labels with information about the printer. *Selections:* • SETTINGS—Prints a printer configuration label. See *Printing Configuration Labels* on page 58. • FONTS (ZPL, EPL, APL-D)—Prints a label that lists the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM, Flash memory, optional memory cards, or font cards. • FORMATS (ZPL, EPL, APL-D)—Prints a label that lists the available formats stored in the printer's RAM, Flash memory, or optional memory card. • BARCODES (ZPL only)—Prints a label that lists the available bar codes in the printer. • ALL (ZPL, EPL)—Prints labels that list the available fonts, bar codes, images, formats, and the current printer and network configurations. • IMAGES (ZPL, EPL, APL-D)—Prints a label that lists the images currently stored in the printer's RAM, Flash memory, or optional memory cards. • NETWORK (ZPL only)—Prints a network configuration label. See *Printing Configuration Labels* on page 58. • APLI SW SETUP (APL-I only) • APLI HW SETUP (APL-I only) • APLI PRT QUAL (APL-I only) • APLI PITCH (APL-I only) **To print labels:** 1. Press the up or down arrow to display label choices. 2. Press ENTER to print the desired label.
MODULE A **(APL-D mode only)**	**Set Module A Storage Device for APL-D** *Selections:* NONE, RAM 1, RAM 2, FLASH 1, FLASH 2 *Default Value:* NONE **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 11 • Printer Parameters, Password Level 3 (Page 2 of 10)

Parameter	Explanation
MODULE B **(APL-D mode only)**	**Set Module B Storage Device for APL-D** *Selections:* NONE, RAM 1, RAM 2, FLASH 1, FLASH 2 *Default Value:* NONE **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
PARALLEL COMM.	**Set Parallel Communications** Select the communications port that matches the one being used by the host computer. *Selections:* UNIDIRECTIONAL, BIDIRECTIONAL *Default Value:* UNIDIRECTIONAL **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
PRINT PAGE **(APL-I mode only)**	**Print Stored APL-I Page** Up to 20 pages can be stored and printed. *Selections:* 0 through 19 *Default Value:* 0 **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
PRINT FORMAT **(APL-I mode only)**	**Print Stored APL-I Format** Up to 100 formats can be stored and printed. *Selections:* 0 through 99 *Default Value:* 0 **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
BAUD	**Set Baud** The baud setting of the printer must match the baud setting of the host computer for accurate communications to take place. Select the value that matches the one being used by the host computer. *Selections:* 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 *Default Value:* 9600 **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 11 • Printer Parameters, Password Level 3 (Page 3 of 10)

Parameter	Explanation
DATA BITS	**Set Data Bits** The data bits of the printer must match the data bits of the host computer for accurate communications to take place. Set the data bits to match the setting being used by the host computer. **Note •** Code Page 850 requires the data bits to be set to 8 bits. *Selections:* 7 BITS, 8 BITS *Default Value:* 8 BITS **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
STATUS RESPONSE **(APL-I mode only)**	**Send APL-I Status Response** Determines if a response is sent after inquiry commands. The format is set with the RESPONSE FORMAT parameter. *Selections:* ON, OFF *Default Value:* ON **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
RESPONSE FORMAT **(APL-I mode only)**	**Select APL-I Response Format** If STATUS RESPONSE is set to ON, this parameter determines the format of the response. *Selections:* ASCII, BINARY *Default Value:* ASCII **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
PARITY	**Set Parity** The parity of the printer must match the parity of the host computer for accurate communications to take place. Select the parity that matches the one being used by the host computer. *Selections:* NONE, ODD, EVEN *Default Value:* NONE **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 11 • Printer Parameters, Password Level 3 (Page 4 of 10)

Parameter	Explanation
HOST HANDSHAKE	**Set Host Handshake** The handshake protocol of the printer must match the handshake protocol of the host computer for proper communications to take place. Select the handshake protocol that matches the one being used by the host computer. *Selections (ZPL, APL-D):* XON/XOFF, DSR/DTR, RTS/CTS *Selections (EPL):* DTR & XON/XOF, DTR, XON/XOFF *Selections (APL-I):* XON/XOFF, DSR/DTR, RTS/CTS, APL-I *Default Value:* XON/XOFF **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
CONTROL CHAR **(ZPL mode only)**	**Set Control Character** The printer looks for this two-digit hexadecimal character to indicate the start of a ZPL/ZPL II control instruction. **Note •** Do not use the same hexadecimal value for the control, command, and delimiter character. The printer must see different characters to work properly. *Range*: 00 to FF *Default Value:* 7E (tilde—displayed as an arrow) **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
COMMAND CHAR **(ZPL mode only)**	**Set Command Character** The command prefix is a two-digit hexadecimal value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this two-digit hexadecimal character to indicate the start of a ZPL/ZPL II format instruction. See the *ZPL II Programming Guide Volume I* for more information. **Note •** Do not use the same hexadecimal value for the control, command, and delimiter character. The printer must see different characters to work properly. *Range:* 00 to FF *Default Value:* 5E (caret) **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.

Table 11 • Printer Parameters, Password Level 3 (Page 5 of 10)

Parameter	Explanation
DELIM. CHAR **(ZPL mode only)**	**Set Delimiter Character** The delimiter character is a two-digit hexadecimal value used as a parameter place marker in ZPL/ZPL II format instructions. See the *ZPL II Programming Guide Volume I* for more information. **Note •** Do not use the same hexadecimal value for the control, command, and delimiter character. The printer must see different characters to work properly. *Range:* 00 to FF *Default Value:* 2C (comma) **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
HEXDUMP **(ZPL, EPL, APL-D modes)**	**Hex Dump** The hexadecimal dump mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. When YES is selected, all data sent from the host computer to the printer prints as straight ASCII characters, with the hexadecimal value below the ASCII text. The printer prints all characters received, including control codes, such as CR (carriage return). A sample printout is shown in *Communications Diagnostics Test* on page 107. *Selections:* NO, YES *Default Value:* NO **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
CHANGE RTC DATE	**Set RTC (Real-time clock) Date** If RTC is installed, this parameter allows you to set the RTC date. **Note •** The printer saves the RTC date immediately. **To modify this parameter:** **1.** Press ENTER. The printer displays the current RTC date. **2.** Modify the values as follows: • Press the right arrow to move to the next digit position. • To increase the value, press the up arrow. • To decrease the value, press the down arrow. **3.** Press ENTER to accept the value shown.

Table 11 • Printer Parameters, Password Level 3 (Page 6 of 10)

Parameter	Explanation
CHANGE RTC TIME	**Set RTC (Real-time clock) Time** If RTC is installed, this parameter allows you to set the RTC time. **Note •** The printer saves the RTC time immediately. **To modify this parameter:** 1. Press ENTER. The printer displays the current RTC time. 2. Modify the values as follows: • Press the right arrow to move to the next digit position. • To increase the value, press the up arrow. • To decrease the value, press the down arrow. 3. Press ENTER to accept the value shown.
LOAD DEFAULTS	**Load Factory Defaults** Sets all parameters back to factory defaults. **Important •** Use care when using this command. All printer parameters are reset to factory values with this command. If possible, print a configuration label to have as a record of the printer's settings before loading defaults. **How to select this parameter:** 1. Press ENTER. The printer asks ARE YOU SURE? 2. To load factory defaults, press ENTER to select YES. To cancel, press any other key.
INIT FLASH MEM	**Initialize Flash Memory** This parameter allows you to erase the printer's Flash memory. **Important •** The internal Flash memory is entirely erased with this command. **To select this parameter:** 1. Press ENTER to select YES. The printer asks ARE YOU SURE? 2. To initialize Flash memory, press ENTER. To cancel, press any other key.

Table 11 • Printer Parameters, Password Level 3 (Page 7 of 10)

Parameter	Explanation
RIBBON	**Set Ribbon Use** **Note •** This parameter appears only for printers that have the Thermal Transfer option installed. Specifies the printing method: thermal transfer (using ribbon) or direct thermal (no ribbon). *Selections:* • YES (thermal transfer mode, with ribbon) • NO (direct thermal mode, no ribbon) *Default Value:* YES **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
ZPL OVERRIDE **(ZPL mode only)**	**Override Certain ZPL Commands** Allows the following ZPL commands to override the user (printer) settings: • ^MM (media mode) • ^MT (media type direct thermal or thermal transfer) • ^MN (media non-continuous or continuous) *Selections:* • NO—tells the printer to ignore the listed ZPL commands. • YES—allows the printer to accept the listed ZPL commands. *Default Value:* YES **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
EPL OVERRIDE **(EPL mode only)**	**Override Certain EPL Commands** Prevents the printer from accepting certain EPL commands. *Selections:* • DISABLED—allows the printer to accept the listed EPL commands. • ENABLED—tells the printer to ignore the listed EPL commands. *Default Value:* DISABLED **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

Table 11 • Printer Parameters, Password Level 3 (Page 8 of 10)

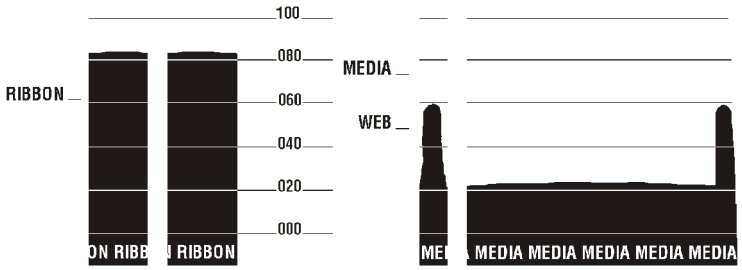
Parameter	Explanation
SENSOR PROFILE	**Print Sensor Profile** Use the sensor profile (Figure 26) to troubleshoot registration problems that may occur if the media sensor detects preprinted areas on the media or if it experiences difficulty in determining web location. To adjust the sensitivity of the media and/or ribbon sensors, use *Calibrate Media and Ribbon Sensors* on page 75. **Note •** The ribbon portion of the label appears only for printers that have the Thermal Transfer option installed. **Figure 26 • Sensor Profile**  **To select this parameter:** 1. Press ENTER to start this standard calibration procedure and print a media sensor profile.

Table 11 • Printer Parameters, Password Level 3 (Page 9 of 10)

Parameter	Explanation
MEDIA/RIBBON CALIBRATE **(Thermal Transfer only)** MEDIA CALIBRATE **(Direct Thermal only)**	**Calibrate Media and Ribbon Sensors** Use this procedure to adjust the sensitivity of the printer's sensors. In a printer that has the Thermal Transfer option installed, both media and ribbon sensors are adjusted. In a Direct Thermal printer (no Thermal Transfer option installed), only media sensors are adjusted, and the LCD displays for ribbon do not appear in this procedure. **Important •** This procedure must be followed exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press the left arrow at any step in this procedure to cancel the procedure. **How to select this parameter:** **1.** Press ENTER to start the calibration procedure. The LOAD BACKING/REMOVE RIBBON prompt displays. **2.** Open the printhead. **3.** Remove approximately 8 in. (203 mm) of labels from the backing, and pull the media into the printer so that only the backing is between the media sensors. **4.** Remove the ribbon (if used). **5.** Press the right arrow to continue. The message CALIBRATING PLEASE WAIT displays. The printer adjusts the scale (gain) of the signals that it receives from the media and ribbon sensors. On the sensor profile, this essentially corresponds to moving the peak of the graph up or down to optimize the readings for your application. RELOAD ALL displays. **6.** Reload the media and ribbon (if used). **7.** Close the printhead. **8.** Press the right arrow to continue. The message CALIBRATING PLEASE WAIT displays. The printer does a calibration; during this process, the printer determines the label length. To see the new readings on the new scale, print a sensor profile.

Table 11 • Printer Parameters, Password Level 3 (Page 10 of 10)

Parameter	Explanation
LANGUAGE	**Select the Display Language** This parameter allows you to display the control panel in the language of your choice. As soon as you select a language, all parameters are displayed in that language. Save changes as you exit Setup mode to save the language setting. *Selections:* English (**ENGLISH**), Spanish (**ESPANOL**), French (**FRANCAIS**), German (**Deutsch**), Italian (**ITALIANO**), Norwegian (**NORSK**), Portuguese (**PORTUGUES**), Swedish (**SVENSKA**), Danish (**DANSK**), Spanish2 (**ESPANOL2**), Dutch (**NEDERLANDS**), Finnish (**SUOMI**), and Japanese. *Default Value:* ENGLISH **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

ZebraNet® Wired and Wireless Print Server LCD Displays

The menu options shown in Table 12 display only if you have the ZebraNet PrintServer II, or 10/100 PrintServer, or Wireless Print Server installed and are operating in ZPL or EPL mode. These parameters are considered part of Level 3.

Table 12 • Print Server LCD Displays

Parameter	Explanation
OBTAIN IP ADDRESS	**Obtain an IP Address** Selects the method by which an IP address will be assigned to the printer. *Selections:* AUTO SELECT (dynamic), PERMANENT (user-specified) *Default Value:* AUTO SELECT **To modify this parameter:** • Press the up or down arrow to scroll through the selections.
CHANGE IP ADDRESS	**Change the Printer's IP Address** This parameter can be modified only when PERMANENT is selected for OBTAIN IP ADDRESS. *Selections:* 0 to 255 for each field *Default Value:* 0.0.0.0 **Note •** Leading zeroes are not shown in the address. If an IP address contains more digits than can be displayed at one time, use the left or right arrows to scroll through the digits. **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
CHANGE SUBNET	**Change the Subnet** This parameter can be modified only when PERMANENT is selected for OBTAIN IP ADDRESS. *Selections:* 0 to 255 for each field *Default Value:* 0.0.0.0 **Note •** Leading zeroes are not shown in the address. If an IP address contains more digits than can be displayed at one time, use the left or right arrows to scroll through the digits. **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.

Table 12 • Print Server LCD Displays

Parameter	Explanation
CHANGE GATEWAY	**Change the Gateway** This parameter can be modified only when PERMANENT is selected for OBTAIN IP ADDRESS. *Selections:* 0 to 255 for each field *Default Value:* 0.0.0.0 **Note •** Leading zeroes are not shown in the address. If an IP address contains more digits than can be displayed at one time, use the left or right arrows to scroll through the digits. **To modify this parameter:** • To increase the value, press the up arrow. • To decrease the value, press the down arrow.
CHANGE IP PROTOCOL	**Change the IP Protocol** Determines the method(s) by which the print server (wired or wireless) receives the IP address from the server. This parameter can be modified only when AUTO SELECT is selected for OBTAIN IP ADDRESS. *Selections:* ALL, GLEANING ONLY, RARP, BOOTP, DHCP, DHCP AND BOOT *Default Value:* ALL **To modify this parameter:** • Press the up or down arrow to scroll through the selections.

5

Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

Lubrication

No lubrication is needed for this printer.

Caution • Some commercially available lubricants will damage the finish and the mechanical parts if used on this printer.

Cleaning Procedures

Important • Zebra is not responsible for damage caused by the use of cleaning fluids on this printer.

Specific cleaning procedures are provided on the following pages. Table 13 shows the recommended cleaning schedule.

Table 13 • Recommended Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*	**Direct Thermal Mode:** After every roll of media (or 500 feet of fanfold media). **Thermal Transfer Mode:** After every roll of ribbon or three rolls of media. These intervals are intended as guidelines only. You may have to clean more often, depending upon your application and media.
Platen roller	Solvent*	
Media sensors	Air blow	
Ribbon sensor	Air blow	
Media path	Solvent*	
Ribbon path	Solvent*	
Pinch roller. (part of Peel-Off option)	Solvent*	
Tear-off/peel-off bar	Solvent*	Once a month.
Take-label sensor	Air blow	Once every six months.

* Zebra recommends using Preventive Maintenance Kit (part number 47362). In place of this kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%).

Clean the Exterior

You may clean the exterior surfaces of the printer with a lint-free cloth and a small amount of a mild detergent, if necessary. Do not use harsh or abrasive cleaning agents or solvents.

Clean the Printhead and Platen Roller

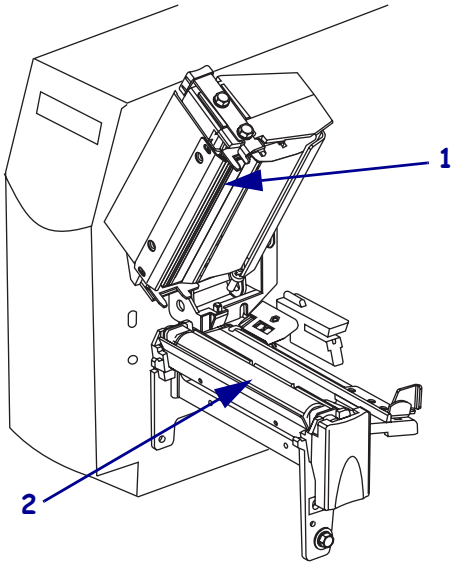
You can minimize printhead wear and maintain print quality with regular preventive measures. Over time, the movement of media or ribbon across the printhead wears through the protective ceramic coating, exposing and eventually damaging the print elements (dots). To avoid abrasion:

- Clean the printhead frequently, and use well-lubricated thermal transfer ribbons with backings optimized to reduce friction.
- Minimize printhead pressure and burn temperature settings by optimizing the balance between the two.
- Ensure that the thermal transfer ribbon is as wide or wider than the label media to prevent exposing the elements to the more abrasive label material.

For best results, clean the printhead after changing every roll of ribbon. Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead.

Note • The printer can remain on while you are cleaning the printhead. In this way, all label formats, images, and all temporary parameter settings stored in the printer's internal memory are saved. In addition, keep the peel engaged while cleaning the platen roller (media must be unloaded to do this) to reduce the risk of bending the tear-off/peel-off bar.

Figure 27 • Cleaning the Printhead and Platen Roller



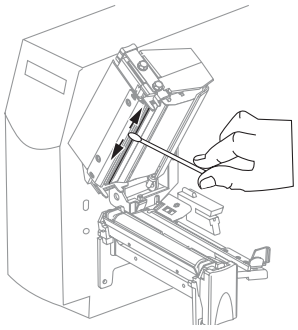
1	Printhead assembly
2	Platen roller

Caution • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

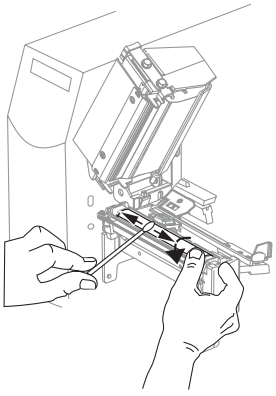
Caution • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an anti-static wriststrap and mat.

To clean the printhead and platen roller, complete these steps:

1. Open the printhead assembly.
2. Remove the media and ribbon.
3. Using the swab from the Preventive Maintenance Kit (part number 47362), wipe along the brown strip on the printhead assembly from end to end. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



4. While manually rotating the platen roller, clean it thoroughly with the swab. Allow the solvent to evaporate.



5. Reload media and ribbon, and close the printhead assembly.

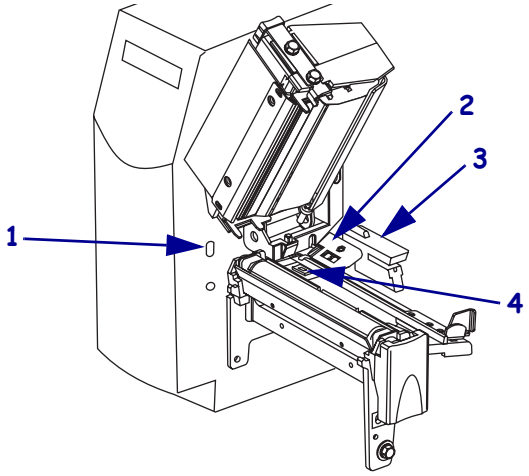
Note • If performing this procedure does not improve print quality, try cleaning the printhead with *Save-A-Printhead* cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller for more information.

Clean the Media Compartment and Sensors

To clean the media compartment and sensors, complete these steps:

1. Brush or vacuum any accumulated paper lint and dust away from the media and ribbon paths.
2. Brush or vacuum any paper lint and dust away from the sensors (see Figure 28).

Figure 28 • Cleaning the Sensors



1	Take-label sensor
2	Ribbon sensor
3	Transmissive sensor
4	Reflective sensor

Clean the Peel Assembly

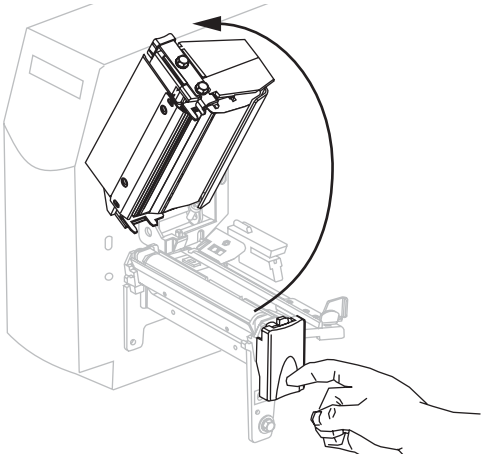
The peel assembly, which is part of the Peel-Off option, consists of several spring-loaded rollers to ensure the proper roller pressure. Clean the pinch roller and tear-off/peel-off bar if adhesive buildup begins to affect peel performance.

Caution • Do not use your left hand to assist in closing the Peel assembly. The top edge of the Peel roller/assembly could pinch your fingers.

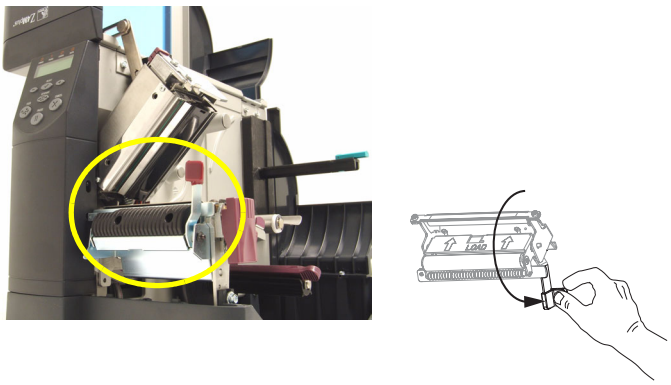
Caution • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

If adhesive buildup affects peel-off performance, complete these steps:

1. Press the printhead release latch to open the printhead assembly.

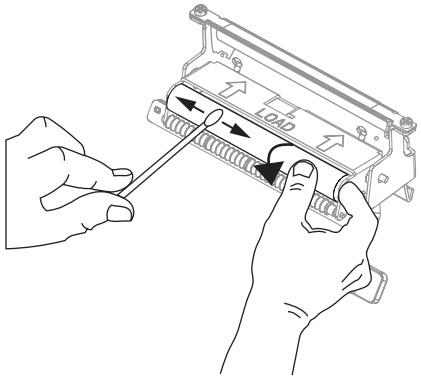


2. Lift the printhead until it latches open.
3. Open the peel assembly by pivoting the module toward you.



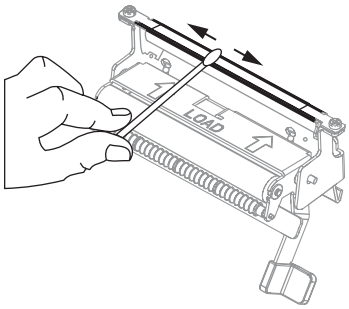
4. Remove any media backing to expose the pinch roller.

5. While manually rotating the pinch roller, clean it thoroughly with the swab from the Preventive Maintenance Kit (part number 47362). In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

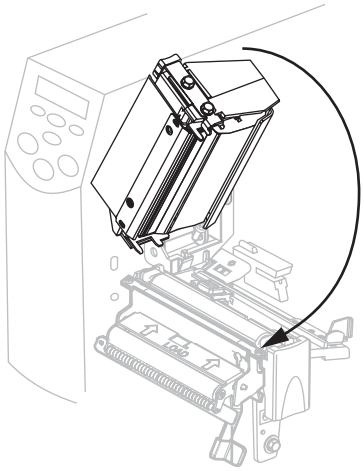


6. Use the swab to remove excess adhesive from the tear-off/peel-off bar. Allow the solvent to evaporate.

Important • Apply minimum force when cleaning the tear-off/peel-off bar. Excessive force can cause the tear-off/peel-off bar to bend, which could have a negative effect on peel performance.

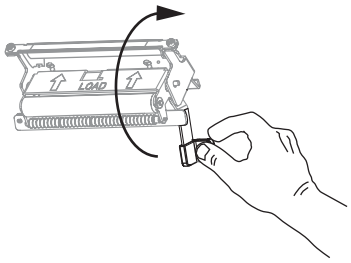


7. Close the printhead assembly.



8. **Caution •** Use the peel release lever and your right hand to close the peel assembly. Do not use your left hand to assist in closing. The top edge of the peel roller/assembly could pinch your fingers.

   Close the peel assembly using the peel-off mechanism release lever.



9. Close the media door.

   The printer is ready to operate.

6

Troubleshooting

This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.

Contents

Troubleshooting Checklists

If an error condition exists with the printer, review this checklist:

- ❑ Is there an error message on the LCD? If yes, see *LCD Error Messages* on page 89.
- ❑ Are noncontinuous labels being treated as continuous labels? If yes, see *Calibrate Media and Ribbon Sensors* on page 75.
- ❑ Is the CHECK RIBBON light on when ribbon is loaded properly, or are noncontinuous labels being treated as continuous labels? If yes, see *Calibrate Media and Ribbon Sensors* on page 75.
- ❑ Are you experiencing problems with print quality? If yes, see *Print Quality Problems* on page 93.
- ❑ Are you experiencing communications problems? If yes, see *Communications Problems* on page 97.

If the labels are not printing or advancing correctly, review this checklist:

- ❑ Are you using the correct type of labels? Review the types of label in *Types of Media* on page 26.
- ❑ Does the printhead need to be adjusted? See *Adjust Printhead Pressure* on page 51 for more information.
- ❑ Do the sensors need to be calibrated? See *Calibrate Media and Ribbon Sensors* on page 75 for more information.

If none of the above suggestions correct the problem, review this checklist:

- ❑ Perform one or more of the self-tests given in *Printer Diagnostics* on page 101. Use the results to help identify the problem.
- ❑ If you are still having problems, see *Contacts* on page 3 for customer support information.

LCD Error Messages

The LCD displays messages when there is an error. See Table 14 for LCD errors, the possible causes, and the recommended solutions.

Table 14 • LCD Error Messages

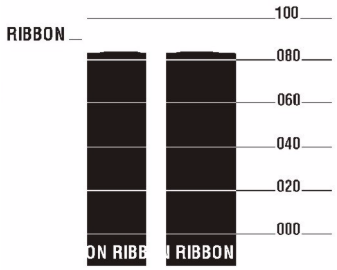
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
ALERT RIBBON OUT The printer stops and the ALERT light flashes.	In thermal transfer mode, ribbon is not loaded or incorrectly loaded.	Load ribbon correctly.
	In thermal transfer mode, the ribbon sensor is not detecting ribbon that is loaded incorrectly.	1. Load ribbon correctly. 2. Calibrate the sensors. See *Calibrate Media and Ribbon Sensors* on page 75.
	In thermal transfer mode, media is blocking the ribbon sensor.	1. Load media correctly. 2. Calibrate the sensors. See *Calibrate Media and Ribbon Sensors* on page 75.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	1. Print a sensor profile. See *Print Sensor Profile* on page 74. The ribbon out threshold (marked by the word RIBBON) is likely too high, above the black area that indicates where the ribbon is detected.  2. Calibrate the sensors or load printer defaults. See *Calibrate Media and Ribbon Sensors* on page 75 or *Load Factory Defaults* on page 72.
	If you are using direct thermal media, the printer is waiting for ribbon to be loaded because it is incorrectly set for thermal transfer mode.	Set the printer for Direct Thermal mode. See *Set Ribbon Use* on page 73.

Table 14 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
WARNING RIBBON IN The ALERT light flashes.	Ribbon is loaded, but the printer is set for direct thermal mode.	Ribbon is not required with direct thermal media. If you are using direct thermal media, remove ribbon unless you are using it to protect the printhead. This error message will not affect printing.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See *Set Ribbon Use* on page 73.
ALERT PAPER OUT The printer stops and the ALERT light flashes.	Media is not loaded or is loaded incorrectly.	Load media correctly.
	Misaligned media sensor.	Check position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	Install proper media type, or reset printer for current media type and perform calibration.
ALERT HEAD OPEN The printer stops and the ALERT light flashes.	The printhead is not fully closed.	Close printhead completely.
	The head open sensor is not working properly.	Call a service technician.
WARNING HEAD TOO HOT The printer stops and the ALERT light flashes.	 **Caution** • The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.

Table 14 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
WARNING HEAD COLD The printer stops and the ALERT light flashes.	**Caution** • An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead is under temperature.	Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the printer to a warmer area.
	The printhead data cable is not properly connected.	**Caution** • Turn off (**O**) the printer before performing this procedure. Failure to do so can damage the printhead. 1. Turn off (**O**) the printer. 2. Disconnect and reconnect the data cable to the printhead. 3. Ensure that the cable connector is fully inserted into the printhead connector. 4. Turn on (**I**) the printer.
HEAD ELE. BAD The printer stops.	**Caution** • The printhead may be hot enough to cause severe burns. Allow the printhead to cool. **Caution** • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an anti-static wriststrap and mat.	
	The printhead is not installed. The printhead data cable is not connected. The printhead is bad.	**Caution** • Turn off (**O**) the printer before performing this procedure. Failure to do so can damage the printhead. 1. Turn off (**O**) the printer. 2. Disconnect and reconnect the data cable to the printhead. 3. Ensure that the cable connector is fully inserted into the printhead connector. 4. Turn on (**I**) the printer. 5. If the problem persists, replace the printhead.

Memory Errors

The memory errors in Table 15 indicate that the printer does not have enough memory to perform the function shown on the second line of the LCD.

Table 15 • Memory Errors

Problem/LCD Display	Possible Cause	Recommended Solution
OUT OF MEMORY CREATING BITMAP	**Creating Bitmap** The bitmap size (label length/width) does not fit in available memory.	You may do any of the following: • Press PAUSE. Send a **~HM** ZPL command to the printer to display the amount of free memory. Then redesign the graphic/format to fit available memory, or remove items from memory to create more space. • Press PAUSE to skip the formatting step in process and proceed to the next step. With the printer paused, press **CANCEL**. The printer skips the current label formatting process and goes to the next label. • Turn the printer off (**O**) and then on (**I**) to clear the printer's memory.
OUT OF MEMORY STORING BITMAP	**Storing Bitmap** Not enough memory is available to store the bitmap created.	
OUT OF MEMORY BUILDING FORMAT	**Building Format** Label is too complex.	
OUT OF MEMORY STORING FORMAT	**Storing Format** Format is too large to fit in available memory.	
OUT OF MEMORY STORING GRAPHIC	**Storing Graphic** The graphic image is too large to fit in available memory.	
OUT OF MEMORY STORING FONT	**Storing Font** Not enough memory available to store the font.	

Print Quality Problems

Table 16 identifies problems with print quality, the possible causes, and the recommended solutions.

Table 16 • Print Quality Problems

Problem	Possible Cause	Recommended Solution
General print quality issues	The printer is set at the incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. See *Adjust Print Speed* on page 65. You may wish to perform the *FEED Self Test* on page 104.
	You are using an incorrect combination of labels and ribbon for your application.	1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	The printer is set at an incorrect darkness level.	For optimal print quality, set the darkness to the lowest possible setting for your application via the control panel, the driver, or the software. See *Adjust Print Darkness* on page 62. You may wish to perform the *FEED Self Test* on page 104 to determine the ideal darkness setting.
	The printhead is dirty.	See *Clean the Printhead and Platen Roller* on page 81.
Wrinkled ribbon	Ribbon fed through the machine incorrectly.	See *Load Ribbon* on page 43.
	Incorrect burn temperature.	Set the darkness to the lowest possible setting for good print quality. See *Adjust Print Darkness* on page 62.
	Incorrect or uneven pressure.	Set the pressure to the minimum needed for good print quality. See *Adjust Printhead Pressure* on page 51.
	Media not feeding properly; “walking” from side to side.	Make sure that media is snug by adjusting the media guide, or call a service technician.
Long tracks of missing print on several labels	Print element damaged.	Call a service technician.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in this table.
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in this table.

Table 16 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Printing too light or too dark over the entire label	Media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
	You are using an incorrect combination of labels and ribbon for your application.	1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	You are using ribbon with direct thermal media.	Direct thermal media does not require ribbon. To check if you are using direct thermal media, perform the label scratch test in *When to Use Ribbon* on page 28. If you are using ribbon intentionally with direct thermal media, increase the darkness level, but note that high darkness levels may decrease printhead life. You may wish to perform the *FEED Self Test* on page 104 to determine the ideal darkness setting.
	Incorrect or uneven printhead pressure.	Set the pressure to the minimum needed. See *Adjust Printhead Pressure* on page 51.
Smudge marks on labels	Media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
Misregistration/skips labels	The printer is not calibrated.	Recalibrate the printer.
	Improper label format.	Use correct label format.
Misregistration and misprint of one to three labels	The platen roller is dirty.	See *Clean the Printhead and Platen Roller* on page 81.
	Media does not meet specifications.	Use media that meets specifications.
Vertical drift in top-of-form position	Normal tolerances of mechanical parts and printer modes. **Note •** A vertical drift of ± 4 to 6 dot rows (approximately 0.5 mm) is within normal tolerances.	1. Calibrate the printer. 2. Adjust the label top position setting. See *Adjust Label Top Position* on page 63.
	The printer is out of calibration.	Recalibrate the printer.
	The platen roller is dirty.	See *Clean the Printhead and Platen Roller* on page 81.

Table 16 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Vertical image or label drift	The printer is using noncontinuous labels but is configured in continuous mode.	Configure the printer for non-continuous and run calibration routine, if necessary.
	Improperly calibrated media sensor.	See *Calibrate Media and Ribbon Sensors* on page 75.
	The platen roller is dirty.	Clean the platen roller. See *Clean the Printhead and Platen Roller* on page 81.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality.
	Improperly loaded ribbon or media.	Verify that the printer is loaded properly.
	Incompatible media.	Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed. Media must not exceed minimum specifications for mode of operation.
The bar code printed on a label does not scan.	The bar code is not within specifications because the print is too light or too dark.	Perform the *FEED Self Test* on page 104. Adjust the darkness or print speed settings as necessary.
	Not enough blank space around the bar code.	Leave at least 1/8 in. (3.2 mm) between the bar code and other printed areas on the label and between the bar code and the edge of the label.

Calibration Problems

Table 17 identifies problems with calibration, the possible causes, and the recommended solutions.

Table 17 • Calibration Problems

Problem	Possible Cause	Recommended Solution
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	Improperly positioned media guides.	Ensure that the media guides are properly positioned.
	Media type set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Set Media Type* on page 64.
	Incorrect sensor being used for the media type.	Manually select the correct sensor to use. See *Select the Media Sensor* on page 64.
	Dirty platen roller.	Clean the platen roller according to the instructions in *Clean the Printhead and Platen Roller* on page 81.
Auto Calibrate failed.	Improperly loaded media or ribbon.	Ensure that media and ribbon are loaded correctly.
	The sensors could not detect the media or ribbon.	Manually calibrate the printer (see *Calibrate Media and Ribbon Sensors* on page 75).
	Sensors dirty or media improperly positioned for the sensors to detect.	Ensure that the sensors are clean and that media is positioned properly.

Communications Problems

Table 18 identifies problems with communications, the possible causes, and the recommended solutions.

Table 18 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
		If you are using serial communication, make sure you are using the correct communication cable. See *RS-232 Serial* on page 20 for basic cabling information.
		If a driver is used, check the driver communication settings for your connection.
A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.	The serial communication settings are incorrect.	Ensure that the flow control settings match.
		Check the communication cable length. See *RS-232 Serial* on page 20 for requirements.
		Check the printer driver or software communications settings (if applicable).
A label format was sent to the printer but was not recognized. No printing occurs.	The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See *Set Command Character* on page 70 and *Set Delimiter Character* on page 71 for the requirements.
	Incorrect data is being sent to the printer.	Ensure that the label format being used matches the operating language of the printer. See *Printer Language Modes* on page 14.
		Check the communication settings on the computer. Ensure that they match the printer settings.
		If the problem continues, check the label format.

Ribbon Problems

Table 19 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

Note • This section applies only to printers that have the Thermal Transfer option installed.

Table 19 • Ribbon Problems

Problem	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	1. Reduce the darkness setting. 2. Clean the printhead thoroughly.
The printer does not detect when the ribbon runs out.	The printer was calibrated without ribbon. Later, ribbon was inserted without the user recalibrating the printer or loading printer defaults.	Calibrate the printer, this time using ribbon, or load printer defaults. See *Calibrate Media and Ribbon Sensors* on page 75 or *Load Factory Defaults* on page 72.
When the RIBBON parameter is set to AUTO, the printer remains in direct thermal mode (shown on the printer configuration label), even though ribbon is loaded correctly in the printer.		
The printer indicates that ribbon is out, even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensors* on page 75.

Miscellaneous Printer Problems

Table 20 identifies miscellaneous problems with the printer, the possible causes, and the recommended solutions.

Table 20 • Miscellaneous Printer Problems

Problem	Possible Cause	Recommended Solution
The LCD displays a language that I cannot read	The language parameter was changed through the control panel or a firmware command.	Perform the procedure in *Select a Display Language* on page 61.
The LCD is missing characters or parts of characters	The LCD may need replacing.	Call a service technician.
Changes in parameter settings did not take effect	Parameters are set incorrectly.	1. Set parameters and save permanently. 2. Turn the printer off (**O**) and then on (**I**).
	A command turned off the ability to change the parameter.	Refer to the *Programming Guide* for the printer language being used, or call a service technician.
	A command changed the parameter back to the previous setting.	Refer to the *Programming Guide* for the printer language being used, or call a service technician.
	If the problem continues, there may be a problem with the main logic board.	Call a service technician.
The printer stayed in Tear-Off mode when I switched to Peel-Off mode.	If you turn on the printer with the peel assembly open, the printer does not recognize the take-label sensor. The printer cannot operate in Peel-Off mode until it recognizes this sensor.	1. Close the peel assembly. 2. Make sure that no labels extend past the peel-off/tear-off bar. 3. Use the control panel to set the printer to Peel-Off mode, and save the changes. 4. Turn the printer off (**O**) and then on (**I**).
The printer fails to calibrate or detect the top of the label.	The printer was not calibrated for the label being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensors* on page 75.
	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 64.
	The driver or software configuration is not set correctly.	Driver or software settings produce commands that can overwrite the printer configuration. Check the driver or software media-related setting.
Non-continuous labels are being treated as continuous labels.	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 64.
	The printer was not calibrated for the media being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensors* on page 75.

Table 20 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
All lights are on, but nothing displays on the LCD, and the printer locks up.	Internal electronic or firmware failure.	Call a service technician.
The printer locks up while running the Power-On Self Test.	Main logic board failure.	Call a service technician.

Printer Diagnostics

Self tests and other diagnostics provide specific information about the condition of the printer. The self tests produce sample printouts and provide specific information that helps determine the operating conditions for the printer. The most commonly used are the Power-On and the CANCEL self tests.

Important • Use full-width media when performing self tests. If your media is not wide enough, the test labels may print on the platen roller.

Each self test is enabled by pressing a specific control panel key or combination of keys while turning on (**I**) the printer power. Keep the key(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the Power-On Self Test.

Note •

- When performing these self tests, do not send data to the printer from the host.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- When canceling a self test prior to its actual completion, always reset the printer by turning the printer power off (**O**) and then on (**I**).

Power-On Self Test

A Power-On Self Test (POST) is performed each time the printer is turned on (**I**). During this test, the control panel lights (LEDs) turn on and off to ensure proper operation. At the end of this self test, only the POWER LED remains lit. When the Power-On Self Test is complete, the media is advanced to the proper position.

To initiate the Power-On Self Test, complete these steps:

The POWER LED illuminates. The other control panel LEDs and the LCD monitor the progress and indicate the results of the individual tests. All messages during the POST display in English; however, if the test fails, the resulting messages cycle through the international languages as well.

CANCEL Self Test

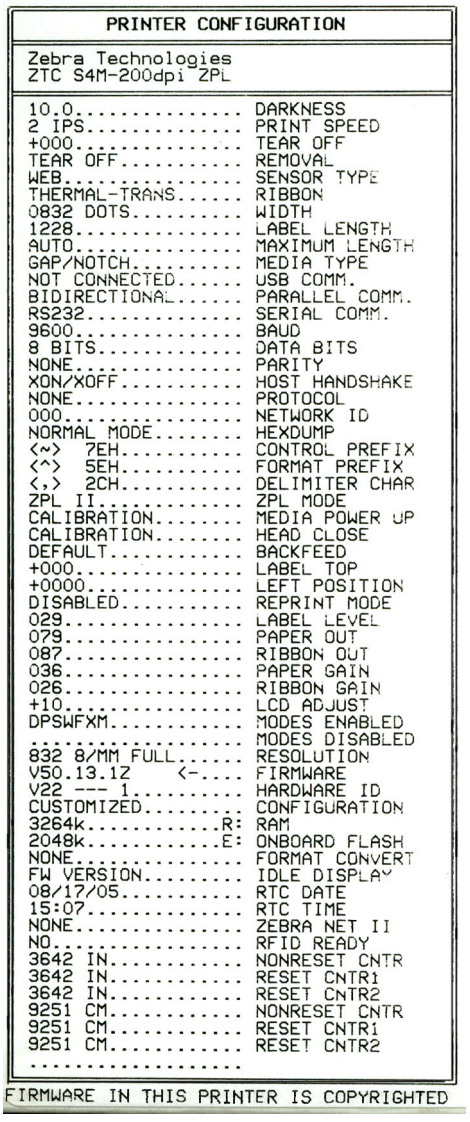
The CANCEL self test prints a configuration label (Figure 29).

To perform the CANCEL Self Test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold CANCEL while turning on (**I**) the printer. Hold CANCEL until the first control panel light turns off.

   A printer configuration label prints (Figure 29).

Figure 29 • Configuration Label



PAUSE Self Test

This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies or to determine if any printhead elements are not working. Figure 30 shows a sample printout.

To perform a PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold PAUSE while turning on (**I**) the printer. Hold PAUSE until the first control panel light turns off.
   - The initial self test prints 15 labels at the printer's slowest speed, and then automatically pauses the printer. Each time PAUSE is pressed, an additional 15 labels print. Figure 30 shows a sample of the labels.

Figure 30 • PAUSE Test Label

- While the printer is paused, pressing CANCEL alters the self test. Each time PAUSE is pressed, 15 labels print at 6 in. (152 mm) per second.
- While the printer is paused, pressing CANCEL again alters the self test a second time. Each time PAUSE is pressed, 50 labels print at the printer's slowest speed
- While the printer is paused, pressing CANCEL again alters the self test a third time. Each time PAUSE is pressed, 50 labels print at 6 in. (152 mm) per second.
- While the printer is paused, pressing CANCEL again alters the self test a fourth time. Each time PAUSE is pressed, 15 labels print at the printer's maximum speed.
- To exit this self test at any time, press and hold CANCEL.

FEED Self Test

Different types of media may require different darkness settings. This section contains a simple but effective method for determining the ideal darkness for printing bar codes that are within specifications.

During the FEED self test, labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The bar codes on these labels may be ANSI-graded to check print quality.

During this test, one set of labels is printed at 2 ips, and another set is printed at 6 ips. The darkness value starts at three settings lower than the printer's current darkness value (relative darkness of –3) and increase until the darkness is three settings higher than the current darkness value (relative darkness of +3).

To perform a FEED self test, complete these steps:

1. Print a configuration label to show the printer's current settings.
2. Turn off (**O**) the printer.
3. Press and hold FEED while turning on (**I**) the printer. Hold FEED until the first control panel light turns off.

   The printer prints a series of labels (Figure 31) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 31 • FEED Test Label

4. See Figure 32 and Table 21. Inspect the test labels and determine which one has the best print quality for your application. If you have a bar code verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a bar code verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 32 • Bar Code Darkness Comparison

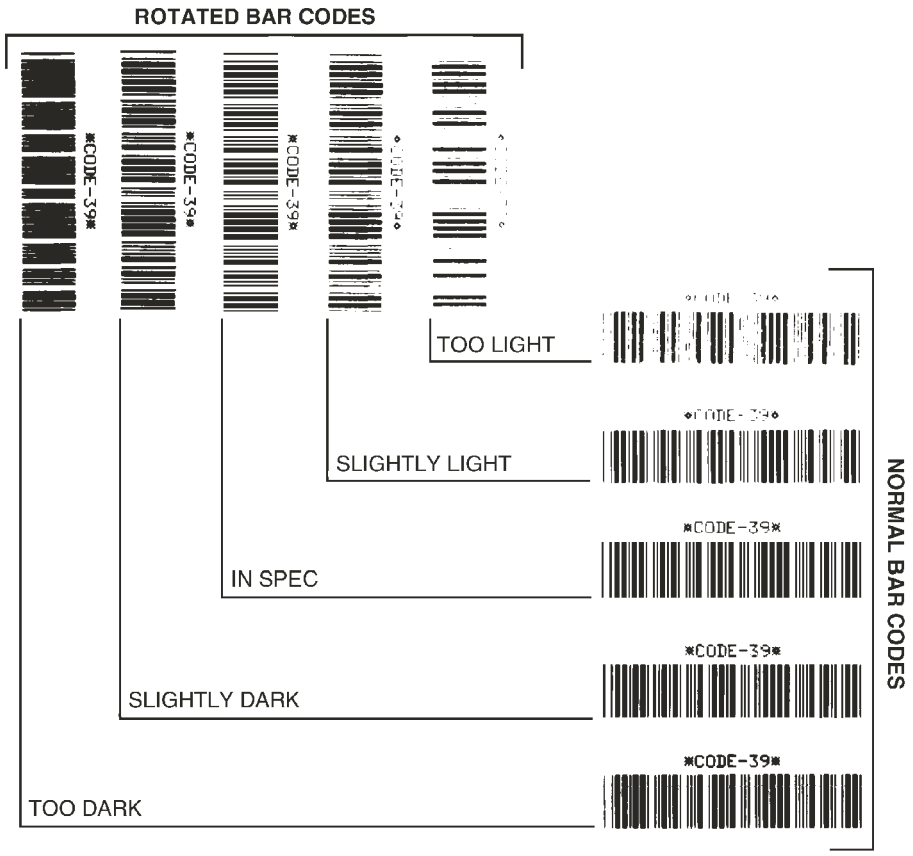


Table 21 • Judging Bar Code Quality

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not "in-spec." • The normal bar code bars increase in size. • The openings in small alphanumeric characters may fill in with ink. • Rotated bar code bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. • The normal bar code will be "in-spec." • Small character alpha numerics will be bold and could be slightly filled in. • The rotated bar code spaces are small when compared to the "in-spec" code, possibly making the code unreadable.
"In-spec"	The "in-spec" bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics. • The normal bar code will have complete, even bars and clear, distinct spaces. • The rotated bar code will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark bar code, the bar code will be "in-spec." • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferred to slightly dark ones for "in-spec" bar codes. • Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. • Both normal and rotated bar codes have incomplete bars and spaces. • Small alphanumeric characters are unreadable.

5. Note the relative darkness value and the print speed printed on the best test label.
6. Add or subtract the relative darkness value from the darkness value specified on the configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.
7. If necessary, change the darkness value to the darkness value on the best test label. See *Adjust Print Darkness* on page 62.
8. If necessary, change the print speed to the same speed as on the best test label. See *Adjust Print Speed* on page 65.

FEED and PAUSE Self Test

Performing this self test temporarily resets the printer configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory. If the factory default values are permanently saved, a media calibration procedure must be performed.

To perform a FEED and PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold FEED and PAUSE while turning on (**I**) the printer.
3. Hold FEED and PAUSE until the first control panel light turns off.

   The printer configuration is temporarily reset to the factory default values. No labels print at the end of this test.

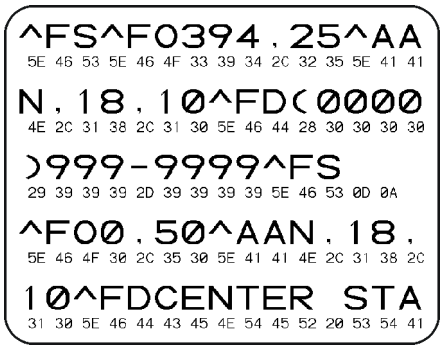
Communications Diagnostics Test

Do not perform the following test until all configuration and calibration parameters have been set. For configuration information, see *Control Panel LCD Display* on page 62.

This test is controlled from the control panel LCD display. See *Hex Dump* on page 71. Figure 33 shows a typical printout from this test. Turn the printer power off (**O**) and then back on (**I**) to exit this self test and return to normal operation.

Note • This test label prints upside-down.

Figure 33 • Communications Diagnostics Test Label



Notes •

7

Specifications

This section provides the features of and specifications for the printer.

Contents

General Specifications

General Specifications			
Height		11.6 in.	295 mm
Width		10.7 in.	272 mm
Depth		18.8 in.	477 mm
Weight (without options)		27.2 lbs.	12.4 kg
Electrical		90–264 VAC, 47–63 Hz, 3 Amps (100 W)	
Temperature	Operating	40° to 104°F	5° to 40°C
	Storage	–40° to 140°F	–40° to 60°C
Relative Humidity	Operating	20% to 85%, non-condensing	
	Storage	5% to 85%, non-condensing	

Communication Interface		• RS-232/CCITT V.24 serial data interface; 110 to 115000 baud, parity, bits/character, 7 or 8 data bit, and XON-XOFF, RTS/CTS or DTR/DSR handshake protocol required. 750mA at 5 V from pins 1 and 9.
		• USB 1.1 data interface
		• One of the following:
		  • 8-bit parallel data interface; supports IEEE 1284 bidirectional parallel; nibble mode compliant.
		  • 10/100 internal Ethernet
		  • 802.11b wireless card support	

Agency Approvals

Agency Approvals	• IEC60950-1 • EN55022: Class B • EN55024 • EN61000-3-2,-3-3
Product Markings	• cULus • CE Marking • FCC-B • ICES-003 • VCCI • C-Tick • NOM • CCC • GOST-R • S-Mark (Argentina) • MIC • BSMI

Printing Specifications

Printing Specifications			
Print resolution		203 dots/inch	8 dots/mm
		300 dots/inch	12 dots/mm
Dot size (width x length)	203 dpi	0.00492 in. x 0.00492 in.	0.125 mm x 0.125 mm
	300 dpi	0.0033 in. x 0.0039 in.	0.084 mm x 0.099 mm
Maximum print width	203 dpi	4.09 in.	104 mm
	300 dpi	4.1 in.	106 mm
Bar code modulus (X) dimension	203 dots/inch	5 mil to 50 mil	
	300 dots/inch	3.3 mil to 33 mil	
Programmable constant print speeds	203 dots/inch and 300 dots/inch	Per second: 2 in. 3 in. 4 in. 5 in. 6 in.	Per second: 51 mm 76 mm 102 mm 127 mm 152 mm

Media Specifications

Media Specifications			
Label length	Minimum (Tear-Off)	0.7 in.	17.8 mm
	Minimum (Peel-Off)	0.5 in.	12.7 mm
	Maximum	39 in.	991 mm
Label width	Minimum	0.75 in.	19 mm
	Maximum	4.5 in.	114 mm
Total thickness (includes liner, if any)	Minimum	0.003 in.	0.076 mm
	Maximum	0.010 in.	0.25 mm
Maximum roll outside diameter	3-in. (76 mm) core	8 in.	203 mm
	1-in. (25 mm) core	6 in.	152 mm
Inter-label gap	Minimum	0.079 in.	2 mm
	Preferred	0.118 in.	3 mm
	Maximum	0.157 in.	4 mm
Ticket/tag notch size (width x length)		0.25 in. × 0.12 in.	6 mm × 3 mm
Hole diameter		0.125 in.	3 mm
Notch or hole position (Centered from inner media edge)	Minimum	0.15 in.	3.8 mm
	Maximum	2.25 in.	57 mm
Density, in Optical Density Units (ODU) (black mark)		> 1.0 ODU	
Maximum media density		≤ 0.5 ODU	
Transmissive Sensor	Fixed	7/16 in. (11 mm) from inside edge	

Ribbon Specifications

Note • This section applies only to printers that have the Thermal Transfer option installed.

Ribbon must be wound with the coated side out.

Ribbon Specifications

Ribbon width (Zebra recommends using ribbon at least as wide as the media to protect the printhead from wear.)	Minimum	>2 in.*	51 mm*
	Maximum	4.3 in.	109 mm
Standard lengths	2:1 media to ribbon roll ratio	984 ft.	300 m
	3:1 media to ribbon roll ratio	1476 ft.	450 m
Ribbon core inside diameter		1 in.	25.4 mm

* Depending on your application, you may be able to use ribbon narrower than 2 in. (51 mm), as long as the ribbon is wider than the media being used. To use a narrower ribbon, test the ribbon's performance with your media to assure that you get the desired results.

A

ZPL II Commands

This section provides the ZPL II commands that were added or changed for the S4M.

Contents

^KP

Define Password

Description The ^KP command is used to define the password that must be entered to access the control panel switches and LCD Setup mode. For more information about the password structure in this printer, see *Password Protection of Parameters* on page 56.

Format ^KPa,b

This table identifies the parameters for this format:

Parameters	Details
a = mandatory four-digit password	A password of 0000 for any level disables password checking for that level and all levels below it. The printer web pages assume the Level 3 password. *Accepted Values:* Any four-digit number from 0000 to 9999 *Default Value:* • Level 4—9999 • Level 3—1234 • Level 2—0000 • Level 1—0000
b = password level	*Accepted Values:* 1, 2, 3, 4 *Default Value:* 3

Example • This example shows how to set a password of 5678 for level 3:

```
^XA
^KP5678,3
^XZ
```

Password-Protect All Parameters To password protect all parameters, send the ^KP ZPL II command with a password for each level.

Disable Passwords To disable the password-protection feature for a particular level and those below it, set the password to 0000 using the ^KP ZPL II command. To reenable the password-protection feature, send the ZPL II command with any non-zero number for a password.

Return to Default Passwords If you forget your passwords, the printer can be returned to the default factory settings, which makes the default passwords valid again. Use caution when returning the passwords to their default values because this also sets all other printer parameters back to their defaults.

To return the printer to the default factory settings using ZPL, send this command:

```
^XA
^JUF
^XZ
```

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14. Zebra Suppliers and Licensors. Any release, disclaimer or limitation of Zebra's liability or damages pursuant to this Agreement shall be construed, in addition to Zebra's benefit, also to the benefit of Zebra's suppliers, licensors, employees, and contractors and, without limiting any other defenses that such suppliers, licensors, employees and contractors may have, you agree to release such parties from liability or damages in accordance with such release, disclaimer, or limitation of liability or damages to the same extent that such provisions apply to Zebra.

15. Governing Law. To the maximum extent permitted by law, the laws of the State of Illinois, U.S.A., without reference to its conflict of laws provisions, will apply to this Agreement. You irrevocably agree to submit to the exclusive jurisdiction and venue of the state or federal courts in the State of Illinois in the event of any litigation involving this Agreement or the Software. You agree that you shall not assert any claim that you are not subject to the jurisdiction of such courts, that the venue is improper, that the forum is inconvenient or any similar objection, claim or argument. Zebra may, in its sole discretion, choose to resolve any controversy or dispute between you and Zebra concerning this Agreement, or the existence, validity, breach or termination thereof, whether during or after the term by binding arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association (“AAA”), as modified or supplemented under this Section 15, by providing notice to you. In the event that Zebra provides such notice, you hereby waive any right to institute a court or other dispute resolution proceeding with respect to such controversy or dispute and acknowledge arbitration in accordance with this Section 15 as the sole and exclusive means of resolving such controversy or dispute. The arbitration proceeding will take place in Chicago, Illinois and be conducted in the English language. The arbitration panel will consist of 3 arbitrators, one arbitrator appointed by each party and a third neutral arbitrator appointed by the two arbitrators designated by the parties. Any communication

between a party and any arbitrator will be directed to the AAA for transmittal to the arbitrator. The parties expressly agree that the arbitrators will be empowered to, at either party's request, grant injunctive relief. The arbitral award will be the exclusive remedy of the parties for all claims, counterclaims, issues or accountings presented or pleaded to the arbitrators. Judgment upon the arbitral award may be entered in any court that has jurisdiction thereof. Any additional costs, fees or expenses incurred in enforcing the arbitral award will be charged against the party that resists its enforcement. Nothing in this Section will prevent Zebra from seeking interim injunctive relief against you or filing an action against you to collect unpaid and past due amounts in any court of competent jurisdiction.

16. Injunctive Relief. You acknowledge that, in the event you breach any provision of this Agreement, Zebra will not have an adequate remedy in money or damages. Zebra shall therefore be entitled to obtain an injunction against such breach from any court of competent jurisdiction immediately upon request without posting bond. Zebra's right to obtain injunctive relief shall not limit its right to seek further remedies.

17. Entire Agreement. This Agreement constitutes the entire understanding and agreement of the parties and supersedes any and all prior or contemporaneous representations, understandings and agreements between the parties with respect to the subject matter of this Agreement. If any provision of this Agreement is held invalid, the remainder of this Agreement shall continue in full force and effect.

18. Assignment. You may not assign this Agreement or any of your rights or obligations hereunder (by operation of law or otherwise) without the prior written consent of Zebra. Zebra may assign this Agreement and its rights and obligations without your consent. Subject to the foregoing, this Agreement shall be binding upon and inure to the benefit of the parties to it and their respective legal representatives, successors and permitted assigns.

19. Modification. No modification of this Agreement shall be binding unless it is in writing and is signed by an authorized representative of the party against whom enforcement of the modification is sought.

20. Waiver. The failure by a party to exercise any right hereunder shall not operate as a waiver of such party's right to exercise such right or any other right in the future.

21. OUESTIONS. Should you have any questions, or if you desire to contact Zebra for any reason, please contact the Zebra subsidiary serving your country, or write:

Zebra Technologies International, LLC
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061

Effective February 2006.

Notes •

Glossary

alphanumeric Indicating letters, numerals, and characters such as punctuation marks.

backfeed When the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when operating the printer in Tear-Off and Applicator modes.

bar code A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

black mark A registration mark found on the underside of the print media that acts as a start-of-label indication for the printer. (See *continuous media*.)

calibration (of a printer) A process in which the printer determines some basic information needed to print accurately with a particular media and ribbon combination. To do this, the printer feeds some media and ribbon (if used) through the printer and senses whether to use the direct thermal or thermal transfer print method, and (if using non-continuous media) the length of individual labels or tags.

character set The set of all letters, numerals, punctuation marks, and other characters that can be expressed by a particular font or bar code.

check digit A character added to a bar code symbol that indicates to the scanner that it has read the symbol correctly.

configuration The printer configuration is a group of operating parameters specific to the printer application. Some parameters are user selectable, while others are dependent on the installed options and mode of operation. Parameters may be switch selectable, control panel programmable, or downloaded as ZPL II commands. A configuration label listing all the current printer parameters may be printed for reference.

continuous media Label or tag-stock media that has no notch, gap, or web (media liner only) to separate the labels or tags. The media is one long piece of material.

core diameter The inside diameter of the cardboard core at the center of a roll of media or ribbon.

diagnostics Information about which printer functions are not working that is used for troubleshooting printer problems.

die-cut media A type of label stock that has individual labels stuck to a media liner. The labels may be either lined up against each other or separated by a small distance. Typically the material surrounding the labels has been removed. (See *non-continuous media*.)

direct thermal A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method. Contrast this with *thermal transfer*.

direct thermal media Media that is coated with a substance that reacts to the application of direct heat from the printhead to produce an image.

dynamic RAM The memory devices used to store the label formats in electronic form while they are being printed. The amount of DRAM memory available in the printer determines the maximum size and number of label formats that can be printed. This is volatile memory that loses the stored information when power is turned off.

fanfold media Media that comes folded in a rectangular stack. Contrast this with *roll media*.

firmware This is the term used to specify the printer's operating program. This program is downloaded to the printer from a host computer and stored in FLASH memory. Each time the printer power is turned on, this operating program starts. This program controls when to feed the media forward or backward and when to print a dot on the label stock.

FLASH memory FLASH memory is non-volatile and maintains the stored information intact when power is off. This memory area is used to store the printer's operating program. In addition, this memory can be used to store optional printer fonts, graphic formats, and complete label formats.

Font A complete set of alphanumeric characters in one style of type. Examples include CG Times™, CG Triumvirate Bold Condensed™.

ips (inches-per-second) The speed at which the label or tag is printed. Zebra printers can print from 1 ips to 12 ips.

label An adhesive-backed piece of paper, plastic, or other material on which information is printed.

label backing (liner) The material on which labels are affixed during manufacture and which is discarded or recycled by the end-users.

liquid crystal display (LCD) The LCD is a back-lit display that provides the user with either operating status during normal operation or option menus when configuring the printer to a specific application.

light emitting diode (LED) Indicators of specific printer status conditions. Each LED is either off, on, or blinking depending on the feature being monitored.

lock-up This is the term generally used to describe a fault condition that, for no apparent reason, causes the printer to stop working.

media Material onto which data is printed by the printer. Types of media include: tag stock, die-cut labels, continuous labels (with and without media liner), non-continuous media, fanfold media, and roll media.

media sensor This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch used to indicate the start of each label.

non-continuous media Media that contains an indication of where one label/printed format ends and the next one begins. Examples are die-cut labels, notched tag-stock, and stock with black mark registration marks.

non-volatile memory Electronic memory that retains data even when the power to the printer is turned off.

notched media A type of tag stock containing a cutout area that can be sensed as a start-of-label indicator by the printer. This is typically a heavier, cardboard-like material that is either cut or torn away from the next tag. (See *non-continuous media*.)

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second). Zebra offers printers that can print from 1 ips to 12 ips.

printhead wear The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of the printhead, use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead pressure necessary to produce good print quality. In the thermal transfer printing method, use ribbon that is as wide or wider than the media to protect the printhead from the rough media surface.

registration Alignment of printing with respect to the top of a label or tag.

ribbon A band of material consisting of a base film coated with wax or resin “ink.” The inked side of the material is pressed by the printhead against the media. The ribbon transfers ink onto the media when heated by the small elements within the printhead. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

roll media Media that comes supplied rolled onto a core (usually cardboard). Contrast this with *fanfold media*.

supplies A general term for media and ribbon.

symbology The term generally used when referring to a bar code.

tag A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material.

tear-off A mode of operation in which the user tears the label or tag stock away from the remaining media by hand.

thermal transfer A printing method in which the printhead presses an ink or resin coated ribbon against the media. H eating the printhead elements causes the ink or resin to transfer onto the media. By selectively heating the printhead elements as the media and ribbon move past, an image is printed onto the media. Contrast this with *direct thermal*.

void A space on which printing should have occurred, but did not due to an error condition such as wrinkled ribbon or faulty print elements. A void can cause a printed bar code symbol to be read incorrectly or not at all.

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

W

Z

Notes •

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