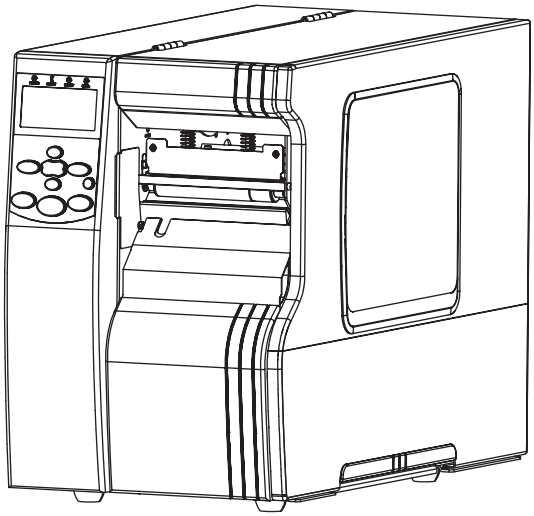


Zebra®

Xi4™/RXi4™

User Guide

P1009874-002

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Part Number: P1009874-002

Declaration of Conformity

We have determined that the Zebra printers identified as the

Xi4™ Series

110Xi4™, R110Xi4™, 140Xi4™, 170Xi4™, 220Xi4™

manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

Have been shown to comply with the applicable technical standards of the FCC

For Home, Office, Commercial, and Industrial use

If no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

Compliance Information

FCC Compliance Statement

This device complies with Part 15 rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

The user is cautioned that any changes or modifications not expressly approved by Zebra Technologies Corporation could void the user's authority to operate the equipment. To ensure compliance, this printer must be used with Shielded Communication Cables.

FCC Radiation Exposure Statement (for printers with RFID encoders)

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Canadian DOC Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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About This Document

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Who Should Use This Document

This User Guide is intended for use by any person who needs to perform routine maintenance, upgrade, or troubleshoot problems with the printer.

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
Introduction on page 15	This section provides a high-level overview of the printer and its components.
Printer Setup on page 19	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 35	This section provides the procedures for loading and calibrating the printer.
Configuration on page 85	This section describes the control panel parameters that are used to configure the printer for operation.
Routine Maintenance on page 115	This section provides routine cleaning and maintenance procedures.
Troubleshooting on page 133	This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.
Specifications on page 163	This section provides the features of and specifications for this printer.
Glossary on page 83	The glossary provides a list of common terms.

Contacts

Technical Support via the Internet is available 24 hours per day, 365 days per year.

Web Site: www.zebra.com
E-mail Back Technical Library:
E-mail address: emb@zebra.com
Subject line: Emaillist
Self Service Knowledge Base: www.zebra.com/knowledgebase
Online Case Registration: www.zebra.com/techrequest

Which Department Do You Need?	The Americas	Europe, Middle East, and Africa	Asia Pacific and India
Regional Headquarters	Zebra Technologies Corporation 475 Half Day Road, Suite 500 Lincolnshire, IL 60069 USA T: +1 847 634 6700 Toll-free +1 866 230 9494 F: +1 847 913 8766	Zebra Technologies Europe Limited Dukes Meadow Millboard Road Bourne End Buckinghamshire, SL8 5XF United Kingdom T: +44 (0) 1628 556000 F: +44 (0) 1628 556001	Zebra Technologies Asia Pacific Pte. Ltd. 120 Robinson Road #06-01 Parakou Building Singapore 068913 T: + 65 6858 0722 F: +65 6885 0838
Technical Support For questions on the operation of Zebra equipment and software, please call your distributor. For additional assistance, contact us. *Please have your model and serial numbers available.*	T: +1 877 ASK ZEBRA (275 9327) F: +1 847 913 2578 Hardware: ts1@zebra.com Software: ts3@zebra.com *Kiosk printers:* T: +1 866 322 5202 E: kiosksupport@zebra.com	T: +44 (0) 1628 556039 F: +44 (0) 1628 556003 E: Tseurope@zebra.com	T: +65 6858 0722 F: +65 6885 0838 E: *China:* tschina@zebra.com *All other areas:* tsasiapacific@zebra.com
Repair Service Department For back-to-base service and repair.	T: +1 877 ASK ZEBRA (275 9327) F: +1 847 821 1797 E: repair@zebra.com To request a repair in the U.S., go to www.zebra.com/repair.	T: +44 (0) 1772 693069 F: +44 (0) 1772 693046 New requests: ukrma@zebra.com Status updates: repairupdate@zebra.com	T: +65 6858 0722 F: +65 6885 0838 E: *China:* tschina@zebra.com *All other areas:* tsasiapacific@zebra.com
Technical Training Department For Zebra product training courses.	T: +1 847 793 6868 T: +1 847 793 6864 F: +1 847 913 2578 E: ttamerica@zebra.com	T: +44 (0) 1628 556000 F: +44 (0) 1628 556001 E: Eurtraining@zebra.com	T: + 65 6858 0722 F: +65 6885 0838 E: *China:* tschina@zebra.com *All other areas:* tsasiapacific@zebra.com
Inquiry Department For product literature and distributor and dealer information.	T: +1 877 ASK ZEBRA (275 9327) E: inquiry4@zebra.com	T: +44 (0) 1628 556037 F: +44 (0) 1628 556005 E: mseurope@zebra.com	E: *China:* GCmarketing@zebra.com *All other areas:* APACChannelmarketing@zebra.com
Customer Service Department (US) **Internal Sales Department (UK)** For printers, parts, media, and ribbon, please call your distributor or contact us.	T: +1 877 ASK ZEBRA (275 9327) E: clientcare@zebra.com	T: +44 (0) 1628 556032 F: +44 (0) 1628 556001 E: cseurope@zebra.com	T: +65 6858 0722 F: +65 6885 0836 E: *China*: order-csr@zebra.com *All other areas:* csasiapacific@zebra.com

Key: T: Telephone
F: Facsimile
E: E-mail

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



Identifies features that are available in printers with firmware version X60.15.x, X50.15.x, or later.



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.



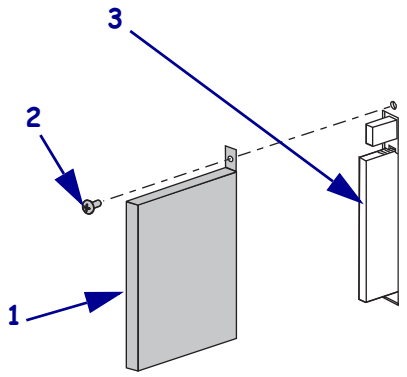
Note • Indicates neutral or positive information that emphasizes or supplements important points of the main text.



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

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	Clear plastic RF card cover (not used on all printers)
2	Screw
3	Wireless radio card



Notes •

1

Introduction

This section provides a high-level overview of the printer and its components.

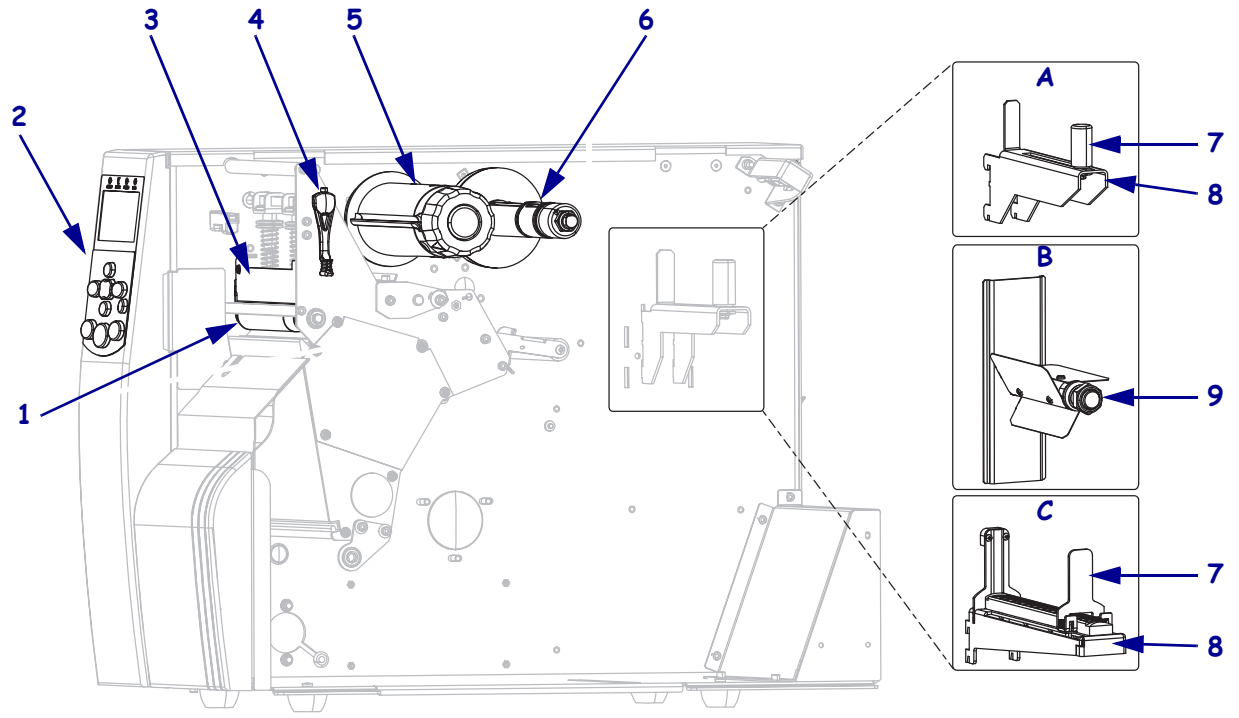
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Printer Components

Figure 2 shows the standard components inside the media compartment of your printer. Depending on the printer model and the installed options, your printer may look slightly different. Familiarize yourself with these components before continuing with the printer setup procedure.

Figure 2 • Printer Components



1	Platen roller
2	Control panel
3	Printhead assembly
4	Printhead-open lever
5	Ribbon take-up spindle
6	Ribbon supply spindle

7	Media supply guide*
8	Media supply hanger*
9	Media spindle*
A	Used in 110Xi4/R110Xi4 200 dpi and 300 dpi models.
B	Used in 110Xi4/R110Xi4 600 dpi models.
C	Used in all other Xi4 models.

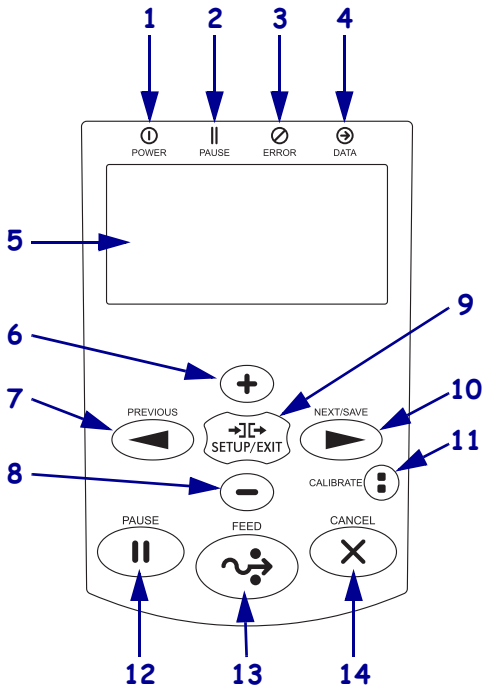
* Determined by printer model. See A, B, or C.

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	Power light	On when the printer is on.	
2	PAUSE light	On when the printer is paused.	
3	Error light	Off	Normal operation—no printer errors.
		Blinking	A printer error exists. Check the LCD for more information.
4	Data light	Off	Normal operation. No data being received or processed.
		On	The printer is processing data or is printing. No data is being received.
		Blinking quickly	The printer is receiving data from or sending status information to the host computer.

5	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. • 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 *Standard Control Panel Parameters* on page 91). • In **Error mode**, the LCD may display an alert or error message (see *LCD Error Messages* on page 135).
6	PLUS (+)	Changes the parameter values. Common uses are to increase a value, to answer "yes," to scroll through choices, or to change values while entering the printer password.
7	PREVIOUS	When in Setup mode, scrolls the LCD to the previous parameter. Press and hold to scroll quickly.
8	MINUS (-)	Changes the parameter values. Common uses are to decrease a value, to answer "no," to scroll through choices, or to change the cursor position while entering the printer password.
9	SETUP/EXIT	Enters and exits Setup mode.
10	NEXT/SAVE	• When in Setup mode, scrolls the LCD to the next parameter. Press and hold to scroll quickly. • When exiting Setup mode, saves any changes that you made in the configuration and calibration sequence.
11	CALIBRATE	Calibrates the printer for the following: • Media length • Media type (continuous or non-continuous) • Print method (direct thermal or thermal transfer) • Sensor values
12	PAUSE	Starts or stops printer operation, or removes error messages and clears the LCD. • If the printer is idle, it enters Pause mode immediately. • If the printer is printing, the label is completed before the printer pauses.
13	FEED	Forces the printer to feed one blank label each time the button is pressed. • If the printer is idle or paused, the label is fed immediately. • If the printer is printing, the label is fed after printing finishes.
14	CANCEL	Cancels print jobs when the printer is paused. 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. Pressing and holding CANCEL clears the printer's entire label format memory,. When the formats are cleared, the DATA light turns off.

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.

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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 21.
- ❑ **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 22.
- ❑ **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 Data Communication Interface* on page 23.
- ❑ **Attach a Power Cord** Do you have the correct power cord for your printer? If you are unsure, see *Power Cord Specifications* on page 29. To attach the power cord and connect the printer to a power source, see *Connect the Printer to a Power Source* on page 28.
- ❑ **Select Media** Do you have the correct media for your application? If you are unsure, see *Types of Media* on page 31.
- ❑ **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 33.

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 conditions shown in Table 1.

Table 1 • Storage Temperature and Humidity

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

Ship the Printer

If you must ship the printer:

- Turn off (**O**) the printer, and disconnect all cables.
- Remove any media, ribbon, or loose objects from the printer interior.
- Close the printhead.
- 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.

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. For the printer's weight and dimensions, see *General Specifications* on page 166.

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 166.

Table 2 shows the temperature and relative humidity requirements for the printer when it is operating.

Table 2 • Operating Temperature and Humidity

Mode	Temperature	Relative Humidity
Thermal Transfer	41° to 105°F (5° to 40°C)	20 to 85% non-condensing.
Direct Thermal	32° to 105°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 (such as a computer), the selected site must provide the appropriate connections to that data source. For more information on the types of communication interfaces and their limitations, see *Select a Data Communication Interface* on page 23.

Provide a Power Source

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

Select a Data Communication Interface

Table 3 provides basic information about data communication interfaces that you can use to connect your printer to a computer. You may send label formats to the printer through any data communication interface that is available. Select an interface that is supported by both your printer and your computer or your Local Area Network (LAN).

Table 3 also shows how to connect the different types of data cables to your printer and computer. The connectors on the back of your computer may be in different locations than on the sample computer shown in this section.

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

Table 3 • Data Communication Interfaces

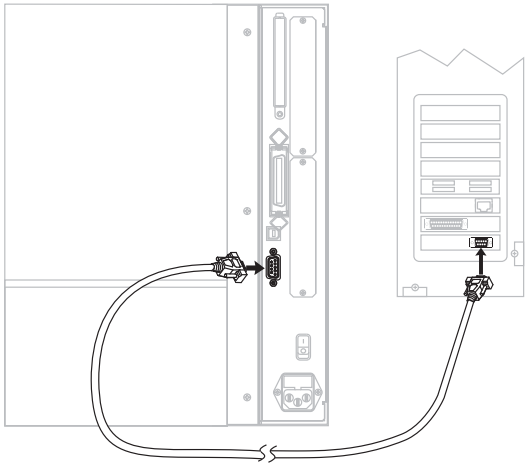
Interface	Standard or Optional	Description
RS-232 Serial	Standard	**Limitations and Requirements** • Maximum cable length of 50 ft (15.24 m). • You may need to change printer parameters to match the host computer. • You need to use a null-modem adaptor to connect to the printer if using a standard modem cable.
		Connections and Configuration The baud rate, number of data and stop bits, the parity, and the XON/XOFF or DTR control must match those of the host computer. See *Standard Control Panel Parameters* on page 91 to view or change these parameters. 

Table 3 • Data Communication Interfaces (Continued)

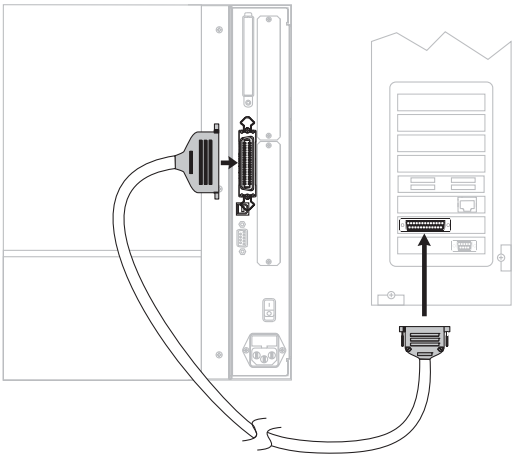
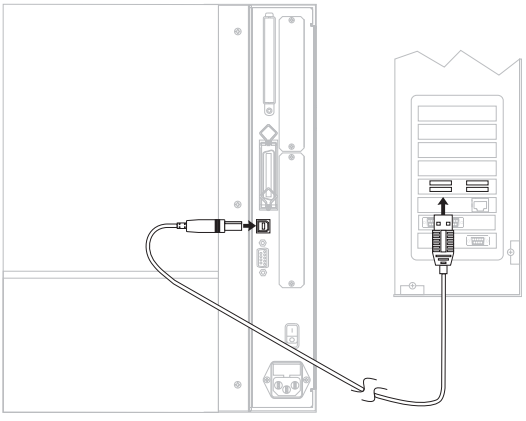
Interface	Standard or Optional	Description
IEEE 1284 Bidirectional Parallel	Standard	**Limitations and Requirements** • Maximum cable length of 10 ft (3 m). • Recommended cable length of 6 ft (1.83 m). • No printer parameter changes required to match the host computer. **Connections and Configuration** No additional configuration is necessary. An Ethernet print server (if installed) takes up or covers this port on the printer. 
USB	Standard	**Limitations and Requirements** • Maximum cable length of 16.4 ft (5 m). • No printer parameter changes required to match the host computer. **Connections and Configuration** No additional configuration is necessary. **Caution •** Be careful not to plug the USB cable into the wired Ethernet print server connector on the printer because doing so will damage the connector. 

Table 3 • Data Communication Interfaces (Continued)

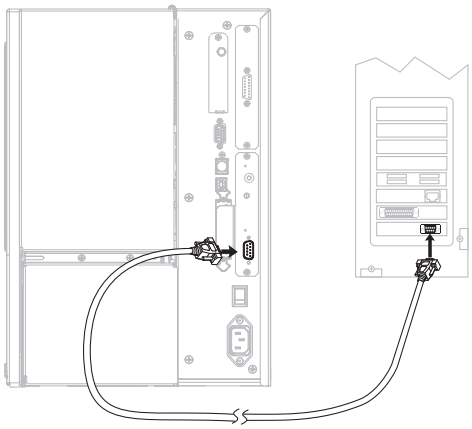
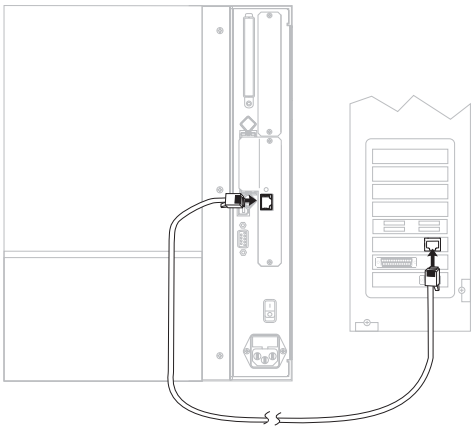
Interface	Standard or Optional	Description
Twinax/Coax	Optional	**Limitations and Requirements** • Acts as an EBCDIC to ASCII converter. • Allows for the ability to communicate with the printer in an IBM® AS/400® environment. **Connections and Configuration** No additional configuration is necessary. To purchase this option, contact your authorized Zebra reseller. 

Table 3 • Data Communication Interfaces (Continued)

Interface	Standard or Optional	Description
Internal wired Ethernet print server	Standard	**Limitations and Requirements** • Can print to the printer from any computer on your LAN. • Can communicate with the printer through the printer's web pages when in ZPL mode. • The printer must be configured to use your LAN. **Connections and Configuration** Refer to the *ZebraNet 10/100 Print Server User and Reference Guide* for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer. **Note** • To use this connection, you may need to remove a factory-installed plug that is designed to keep someone from accidentally plugging a USB connector into this port. 
Wireless Ethernet print server	Optional	**Limitations and Requirements** • Can print to the printer from any computer on your Wireless Local Area Network (WLAN). • Can communicate with the printer through the printer's web pages when in ZPL mode. • The printer must be configured to use your WLAN. **Configuration** Refer to the *ZebraNet Wireless User Guide* for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer. **Note** • This connection covers or takes up the parallel port.

Data Cables and Wireless Cards

You must supply all data cables or wireless cards for your application.

Data Cables Ethernet cables do not require shielding, but all other data cables must be fully shielded and fitted with metal or metallized connector shells. Unshielded data cables may increase radiated emissions above the regulated limits.

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.

Wireless Cards For supported wireless cards, refer to the *ZebraNet Wireless User Guide*. A copy of the manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.

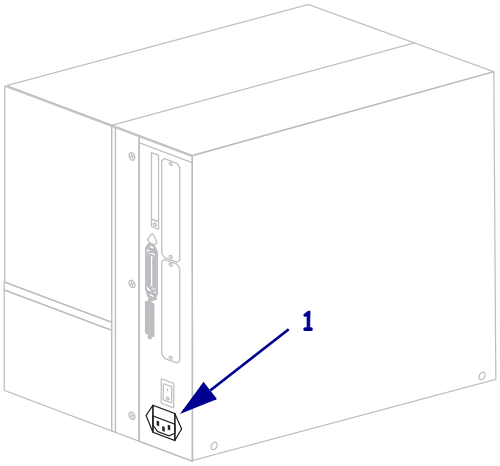
Connect the Printer to a Power Source

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 29.

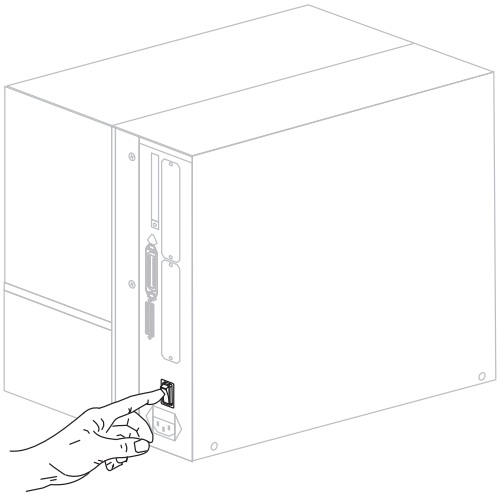
Caution • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific three-conductor grounded plug configuration.

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

1. Toggle the printer power switch to the off (**O**) position.
2. Plug the power cord into the AC power connector (**1**) 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.



The control panel LCD and lights activate, indicating that the printer is booting up.

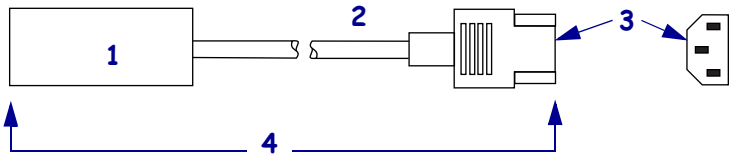
Power Cord Specifications

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, see Figure 4 and refer to the following guidelines:

- The overall cord length must be less than 9.8 ft. (3 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.

Figure 4 • 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 5).
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 5).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp, 250 VAC.

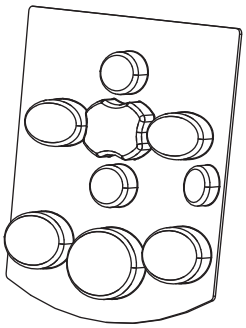
Figure 5 • International Safety Organization Certifications



Install the Control Panel Keypad Cover

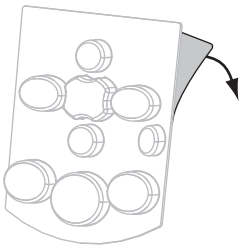
A protective cover for the control panel keypad is provided with your printer (Figure 6). Install this optional cover if your printer will operate in a moist or dirty environment. This will help to protect the keypad from damage.

Figure 6 • Control Panel Keypad Cover

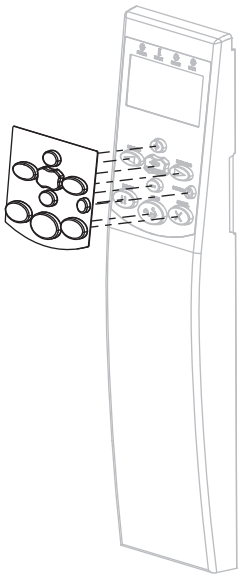


To install the control panel keypad cover, complete these steps:

1. Remove the paper backing from the control panel keypad cover to expose the adhesive.



2. Carefully align the cover over the keypad. Press to make the cover adhere to the printer.



Types of Media

Important • 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. To purchase supplies, go to http://www.zebra.com/howtobuy.

Your printer can use various types of media:

- *Standard media*—Most standard media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- *Tag stock*—Tags are usually made from a heavy paper. Tag stock does not have adhesive or a liner, and it is typically perforated between tags.
- *Radio frequency identification (RFID) "smart" media*—RFID media can be used in a printer that is equipped with an RFID reader/encoder. RFID labels are made from the same materials and adhesives as non-RFID labels. Each label has an RFID transponder (sometimes called an "inlay"), made of a chip and an antenna, embedded between the label and the liner. The shape of the transponder varies by manufacturer and is visible through the label. All "smart" labels have memory that can be read, and many have memory that can be encoded.

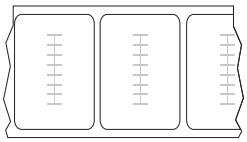
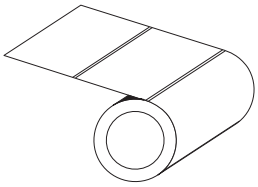
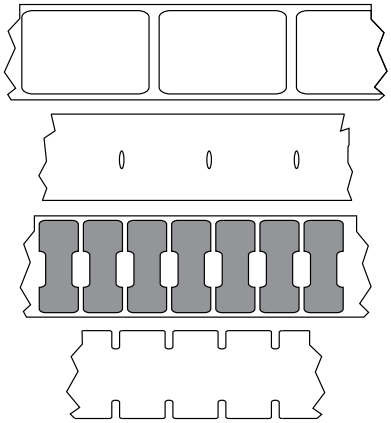
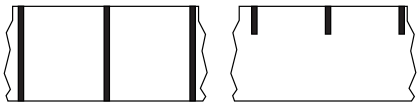
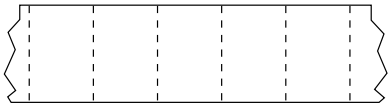
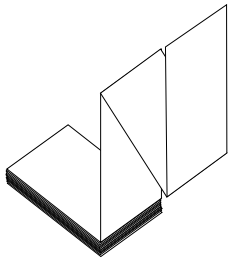
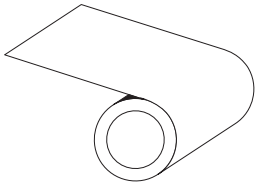


Table 4 describes roll and fanfold media. Roll media is loaded into the printer while fanfold media may be located inside or outside of the printer.

Table 4 • Roll and Fanfold Media

Media Type	How It Looks	Description
Non-Continuous Roll Media		Roll media is wound on a 3-in. (76-mm) core. Individual labels are separated by one or more of the following methods: • *Web media* separates labels by gaps, holes, or notches.  • *Black mark media* uses pre-printed black marks on the back side of the media to indicate label separations.  • *Perforated media* has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags. 
Non-Continuous Fanfold Media		Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.
Continuous Roll Media		Roll media is wound on a 3-in. (76-mm) core. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels.

Ribbon Overview

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 7). 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 7 • 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 outside and can be used in this printer.
Did not adhere to the label	The ribbon is coated on the **inside** 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.

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 19 before operating the printer.

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Print Mode Descriptions and Printer Requirements 36
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Print Modes and Printer Options

The printer can use different print modes and options for label removal (Table 5). Use a print mode that matches the media being used and the printer options available. For more information on the types of media, see *Types of Media* on page 31. To select a print mode, see *Select Print Mode* on page 92.

Print Mode Descriptions and Printer Requirements

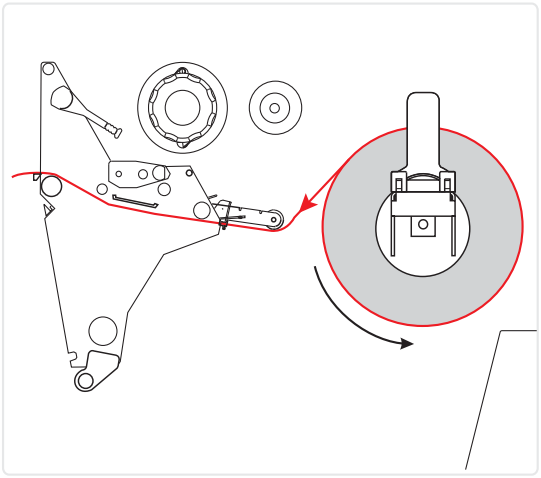
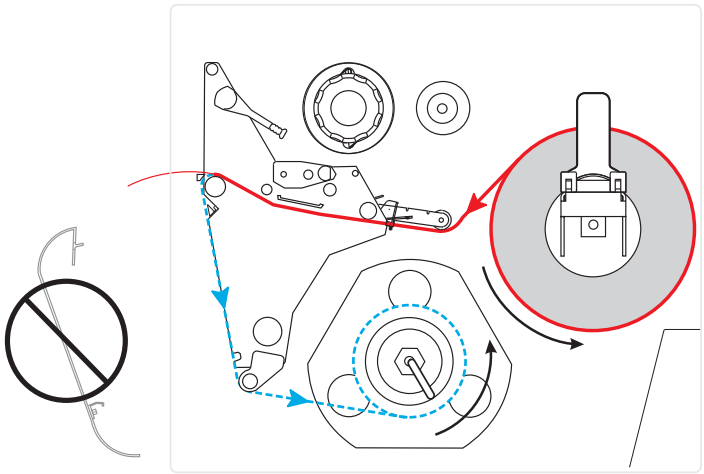
Table 5 • Print Modes and Printer Options

Print Mode	When to Use/Printer Options Required	Printer Actions
Tear-Off (default setting)	Use for most applications. This mode can be used with any printer options and most media types.	The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.
Peel-Off	Use only if the printer has the Peel-Off or Rewind option.	The printer peels the label from the liner during printing and then pauses until the label is removed. The backing is wound on the rewind spindle, but the rewind plate is not used.
Cutter	Use if the printer has a cutter option when you want the labels to be cut apart.	The printer prints a label and then cuts it free.
Delayed Cut	Use if the printer has a cutter option when you want the printer to cut the labels apart at a signal.	The printer prints a label, pauses, and cuts the label when it receives the ~JK (delayed cut) ZPL command.
Applicator	Use only if the printer is used with a machine that applies labels.	The printer prints a label when it receives a signal from the applicator.
Rewind	Use if the printer has the Rewind option and you want the labels to rewind onto a core.	The printer prints without pausing between labels. The media is wound onto a core after printing. The rewind plate is used. If your printer has a cutter, the media is threaded through the cutter, but the labels are not cut.
RFID	Use when printing multiple RFID labels in Tear-Off mode to improve throughput time.	The printer does not backfeed between labels. When the last label prints, the printer waits 1 second for another label format before feeding the last printed label to the tear-off position.

Media Paths

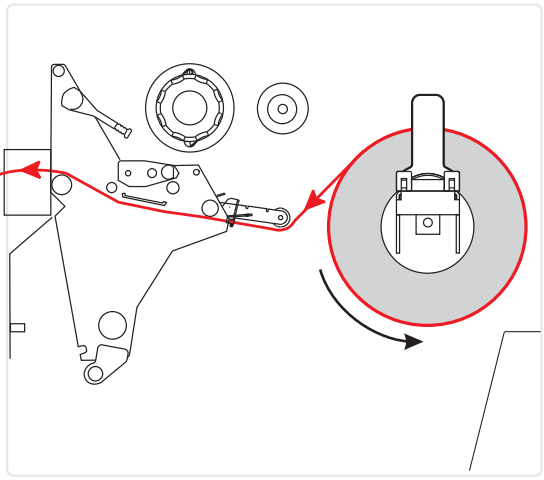
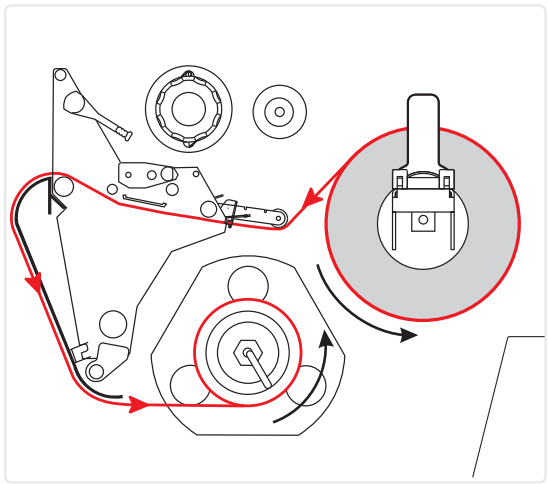
Table 6 shows the media paths for print mode and printer option combinations using roll media. Fanfold media uses the same print modes and printer options as roll media. RFID printers can use all of these printer options and have the same media paths.

Table 6 • Media Paths for Print Modes with Various Printer Options

Print Mode	Printer Option	Media Path
Tear-Off	Printers with any printer options can use Tear-Off mode	
Peel-Off or Applicator	Rewind (shown) or Peel (not shown)	

Red solid lines = media, Blue dotted lines = backing only

Table 6 • Media Paths for Print Modes with Various Printer Options (Continued)

Print Mode	Printer Option	Media Path
Cutter	Cutter	
Rewind	Rewind (without Cutter option)	

Red solid lines = media, Blue dotted lines = backing only

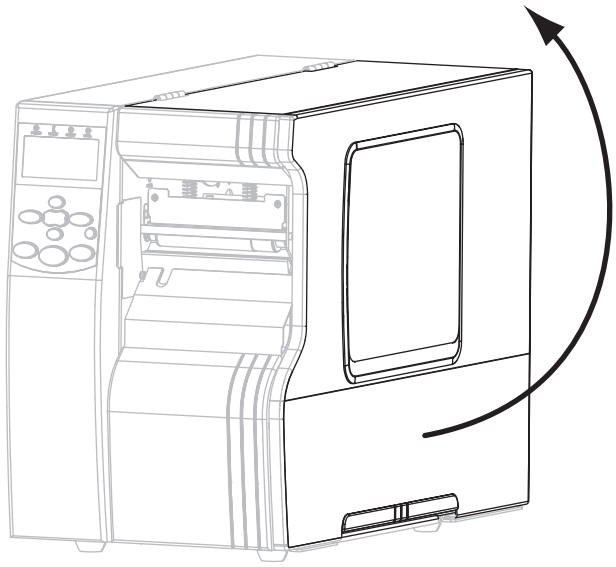
Prepare the Media for Loading

You can use roll media or fanfold media in your printer. Roll media hangs on and is loaded from the media supply hanger. Fanfold media is stored away from or in the bottom of the printer and can drape across the media supply hanger.

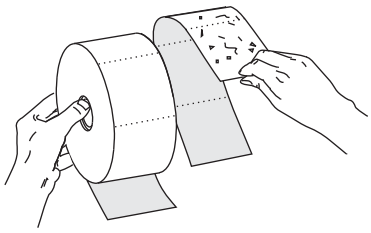
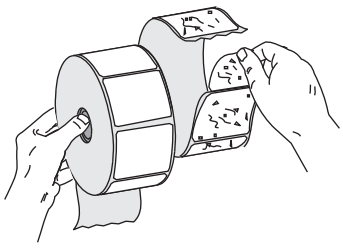
Roll Media

To place roll media on the media supply hanger, complete these steps:

1. Raise the media door.



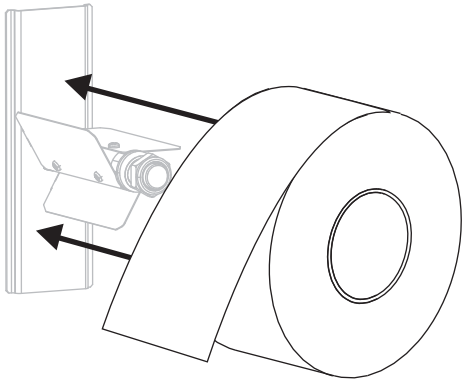
2. Remove and discard any tags or labels that are dirty or that are held by adhesives or tape.

Tag Stock	Labels
	

3. Follow the instructions for your printer model to insert media into the printer.

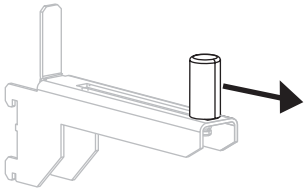
110Xi4/R110Xi4 600 dpi

a. Place the roll of media on the media supply spindle. Push the roll back as far as it will go.

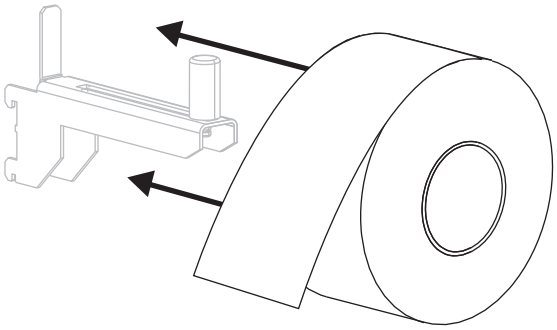


110Xi4/R110Xi4 200 dpi and 300 dpi

a. Pull out the media supply guide as far as it goes.

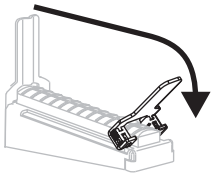


b. Place the roll of media on the media supply hanger. Push the roll as far back as it will go.

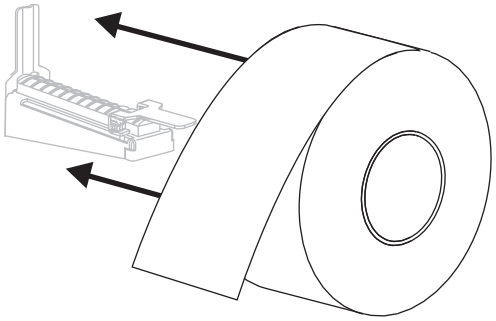


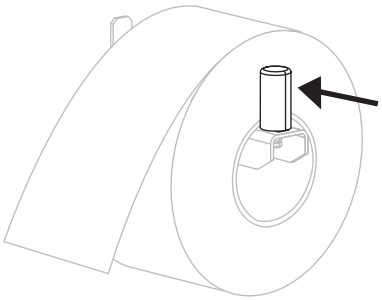
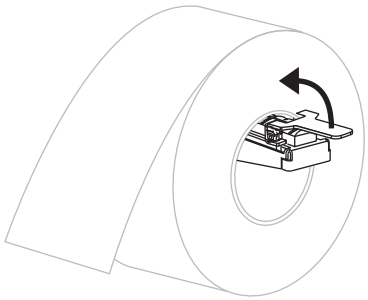
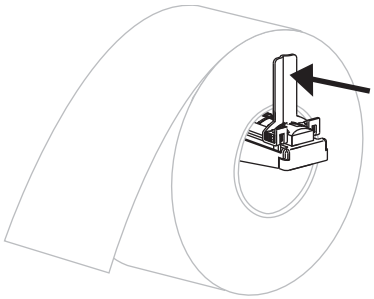
Other Xi4 Models

a. Slide out and flip down the media supply guide.



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



110Xi4/R110Xi4 200 dpi and 300 dpi	Other Xi4 Models
c. Slide in the media supply guide until it touches the edge of the roll. 	**c.** Flip up the media supply guide.  **d.** Slide in the media supply guide until it touches the edge of the roll. 

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

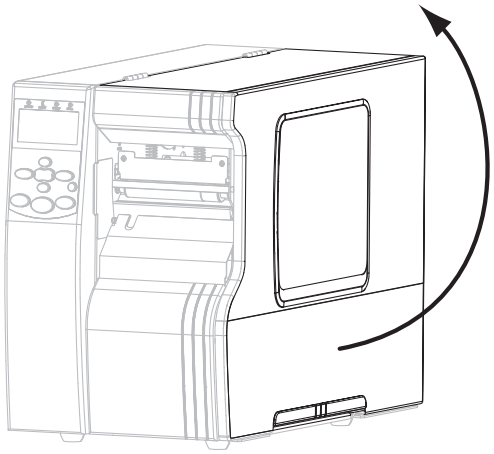
- *Load Media in Tear-Off Mode* on page 44
- *Load Media in Peel-Off Mode* on page 48
- *Load Media in Cutter Mode* on page 55
- *Load Media in Rewind Mode* on page 60

Fanfold Media

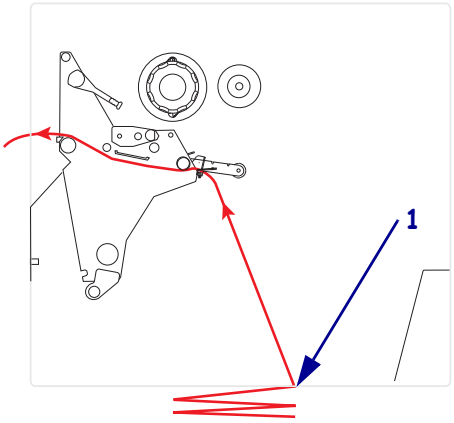
You can store fanfold media behind the printer (rear feed) or under the printer (bottom feed). Using the media supply hanger is optional.

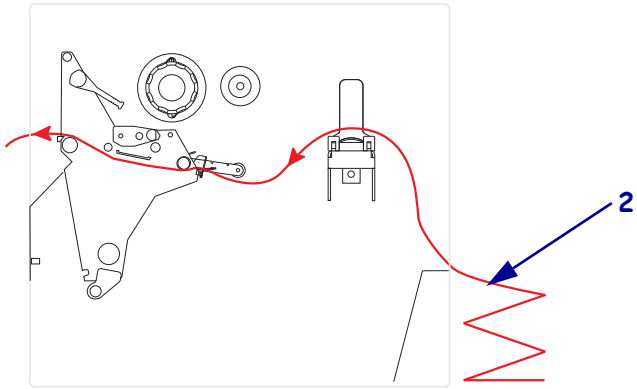
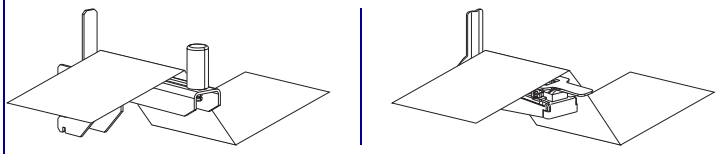
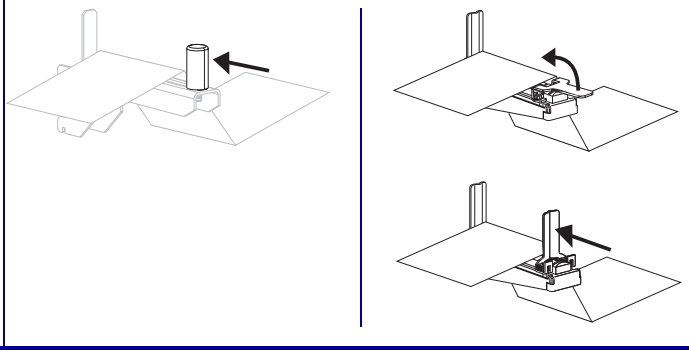
To load fanfold media, complete these steps:

1. Raise the media door.



2. Thread the fanfold media through the bottom access slot (**1**) or the rear access slot (**2**).

If using...	Then use this access slot...
Bottom feed	

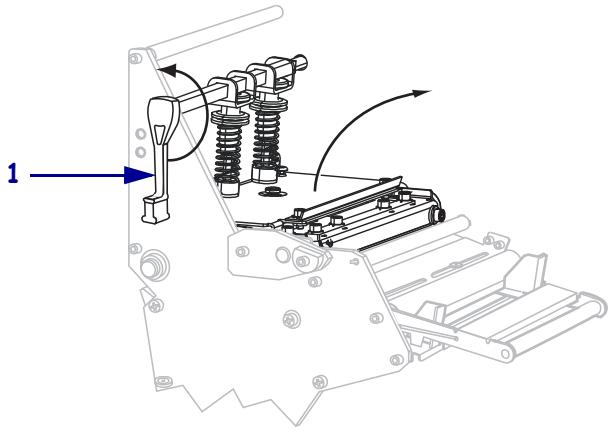
If using...	Then use this access slot...
Rear feed (shown using a media supply hanger)	 **a.** Slide out and, if applicable, flip down the media supply guide.  **b.** Drape the media over the media supply hanger or media spindle.  **3.** If applicable, flip up the media supply guide. Slide in the media supply guide until it touches the edge of the media. 

Load Media in Tear-Off Mode

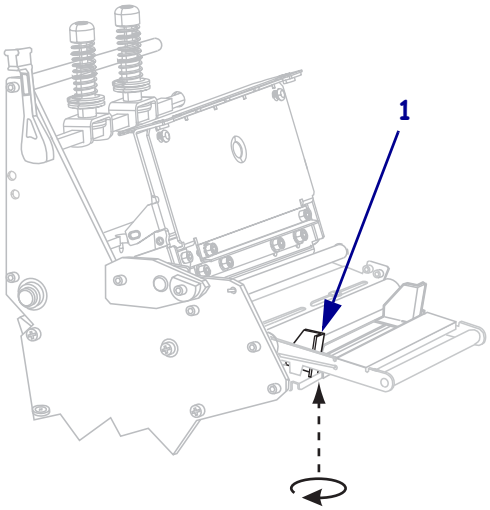
Follow these instructions to operate the printer in Tear-Off mode.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

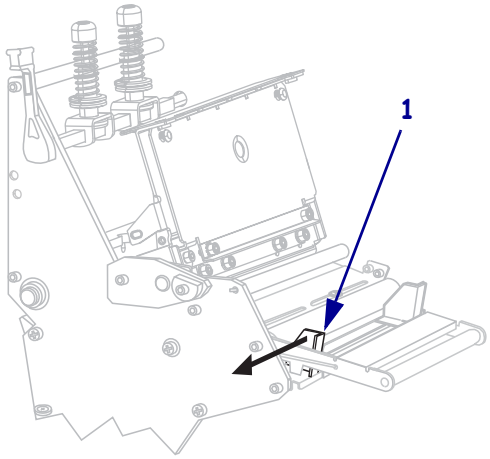
1. Set the printer to Tear-Off mode. See *Select Print Mode* on page 92 for instructions.
2. Insert media into the printer. See *Prepare the Media for Loading* on page 39 for instructions.
3. Open the printhead assembly by rotating the printhead-open lever (**1**) counter-clockwise.



4. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).

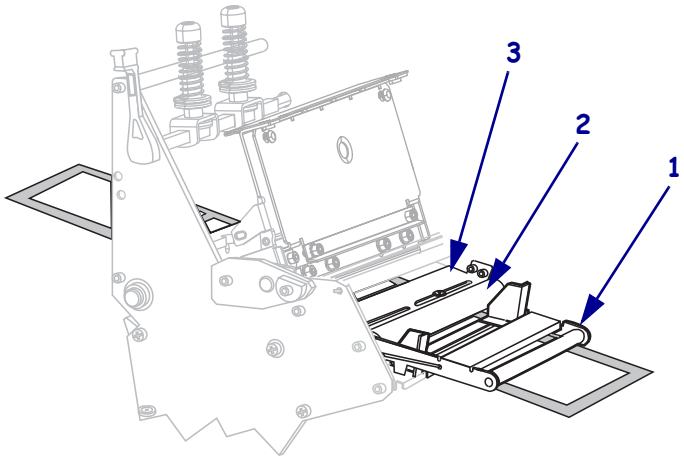


5. Slide the outer media guide (**1**) all the way out.

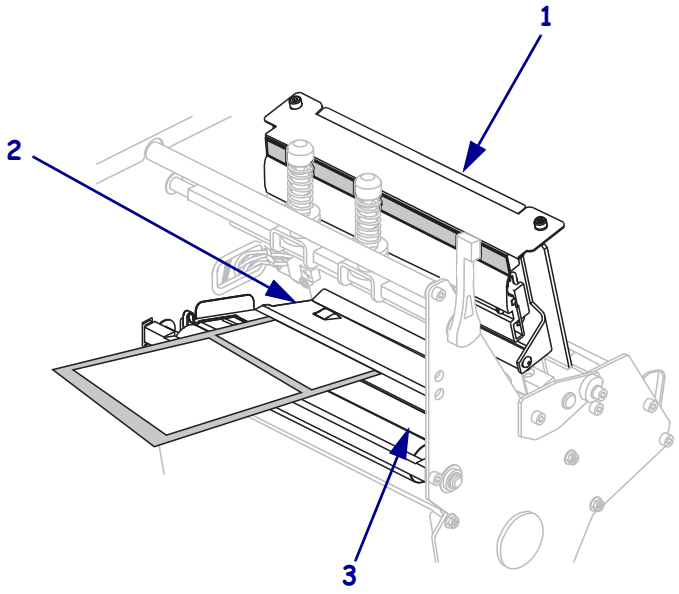


6. If your printer includes a media dancer assembly (**1**), thread the media under the media dancer assembly roller. For all printers, thread the media under the media guide roller (**2**) and then the upper media sensor (**3**).

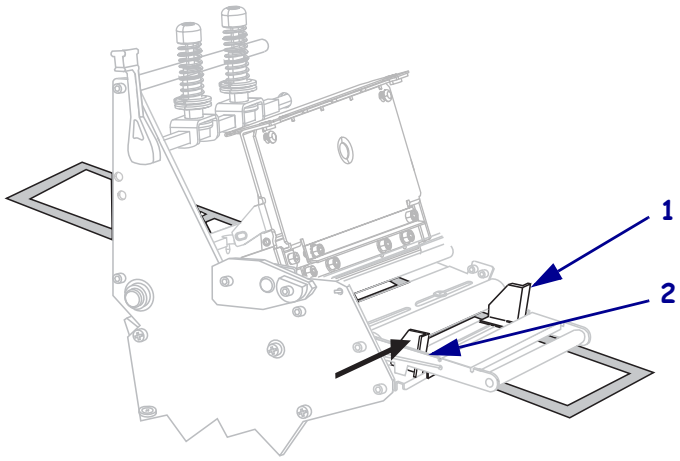
Important • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false `RIBBON OUT` error.



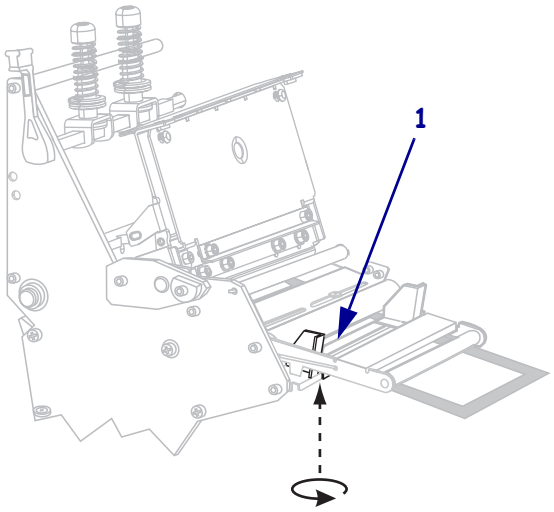
7. Push the media forward until it passes under the printhead assembly (**1**), under the snap plate (**2**), and then over the platen roller (**3**).



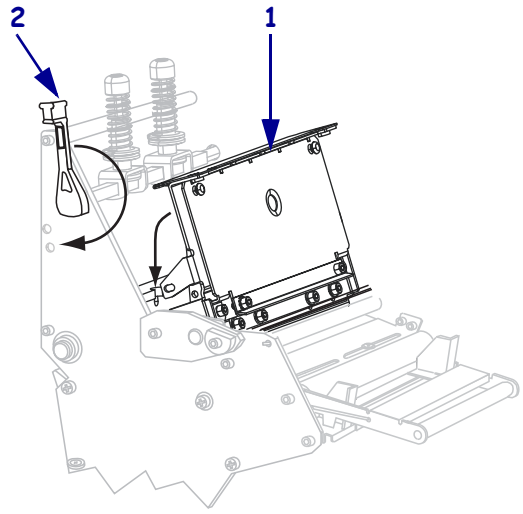
8. Align the media with the inner media guide (**1**). Slide in the outer media guide (**2**) until it just touches the edge of the media.



9. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).



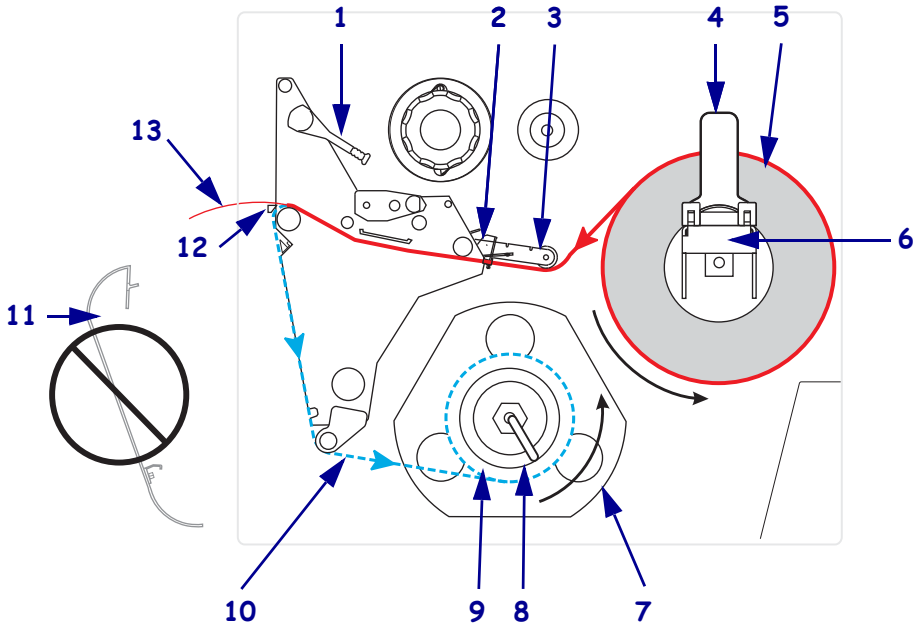
10. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) clockwise until it locks into place.



Load Media in Peel-Off Mode

Peel-Off mode (Figure 8) advances one label at a time. The printer does not print another label until the first label is removed. The TAKE LABEL light flashes until the label is removed. The backing is wound on the rewind spindle, but the rewind plate is not used.

Figure 8 • Media Loaded in Peel-Off Mode



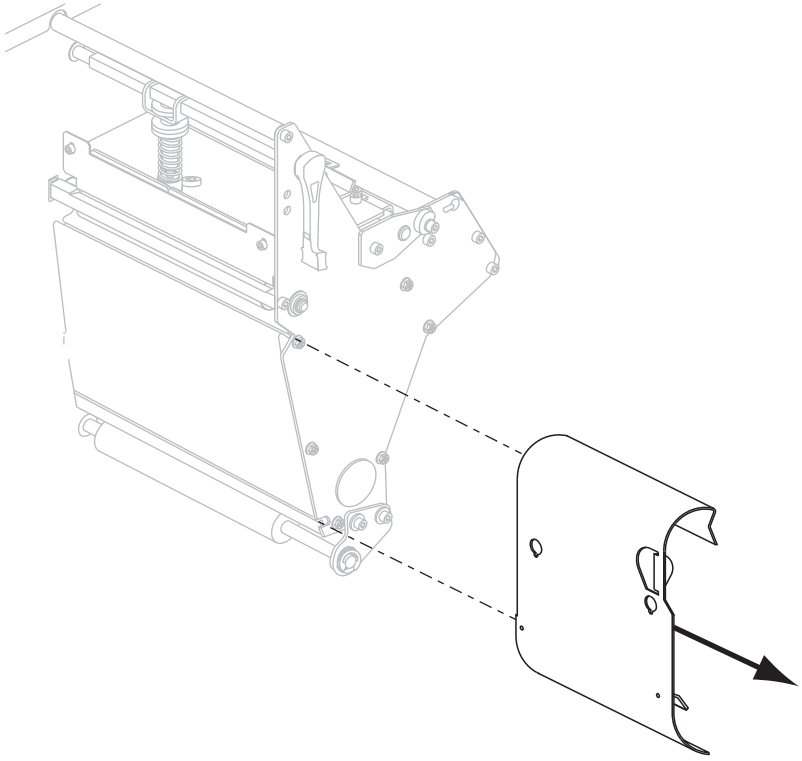
1	Printhead-open lever
2	Media guide
3	Media guide roller
4	Media supply guide
5	Media
6	Media supply hanger
7	Guide plate
8	Spindle hook
9	Rewind spindle
10	Label backing
11	Rewind plate (removed)*
12	Tear-off bar
13	Printed label

* In new printers, remove the protective plastic covering from the rewind plate before using.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

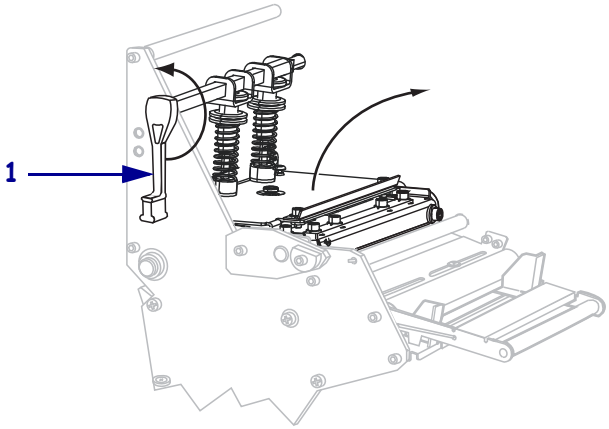
To set up the printer in Peel-Off mode, complete these steps:

1. Remove the rewind plate (if installed) from the front of the printer. Store it on the two mounting screws on the inside of the printer base.

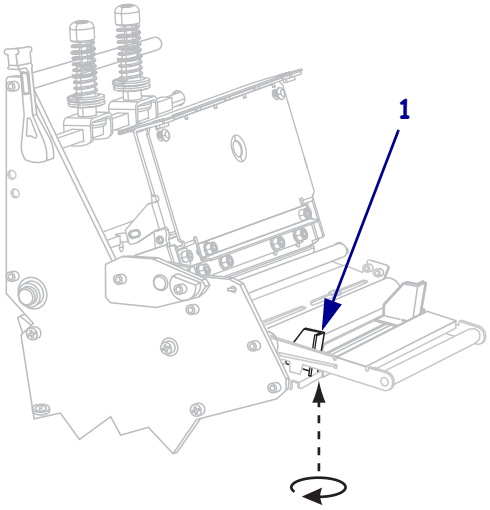


2. Set the printer to Peel-Off mode. See *Select Print Mode* on page 92 for instructions.
3. Insert media into the printer. See *Prepare the Media for Loading* on page 39 for instructions.

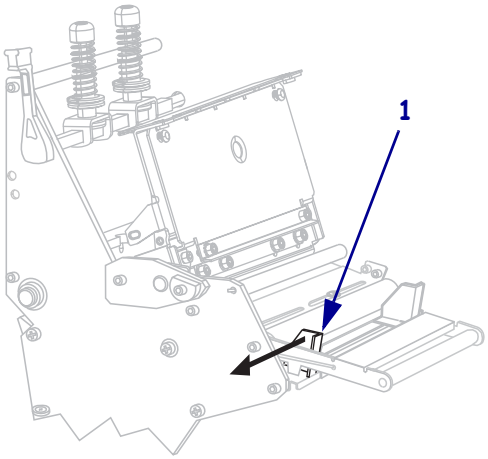
4. Open the printhead assembly by rotating the printhead-open lever (**1**) counter-clockwise.



5. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).

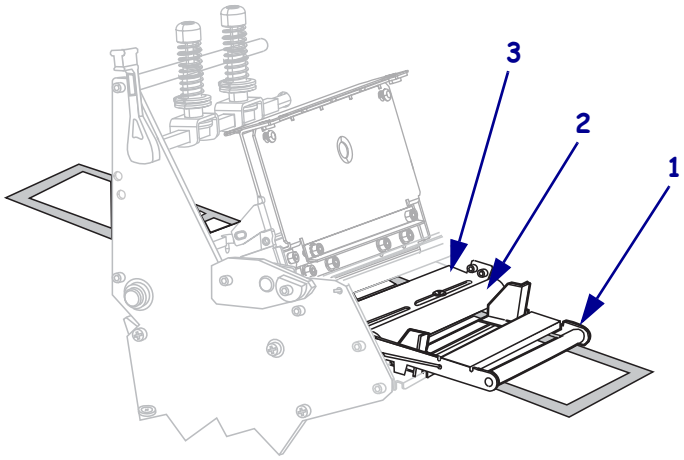


6. Slide the outer media guide (**1**) all the way out.

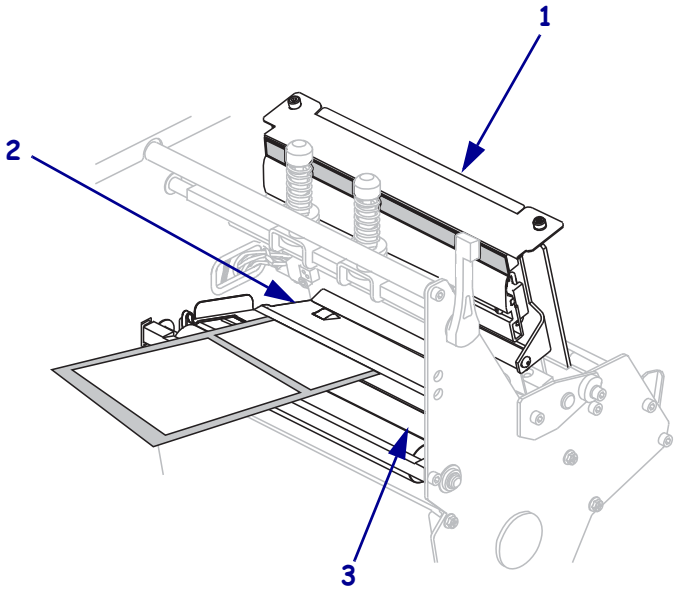


7. If your printer includes a media dancer assembly (**1**), thread the media under the media dancer assembly roller. For all printers, thread the media under the media guide roller (**2**) and then the upper media sensor (**3**).

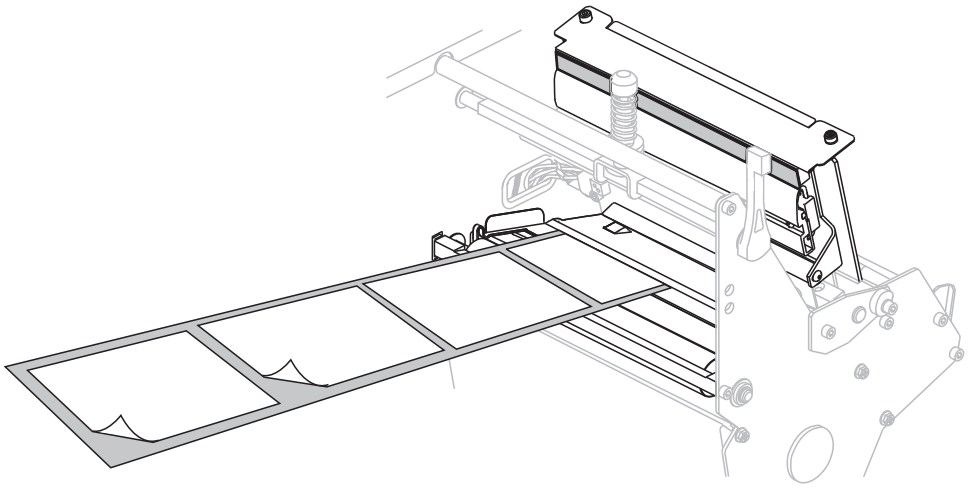
   Important • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false `RIBBON OUT` error.



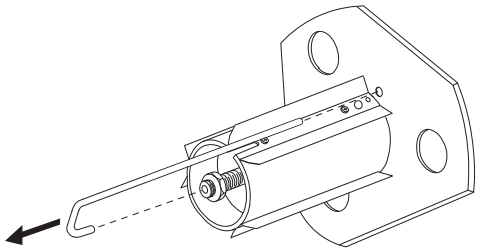
8. Push the media forward until it passes under the printhead assembly (**1**), under the snap plate (**2**), and then over the platen roller (**3**).



9. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.



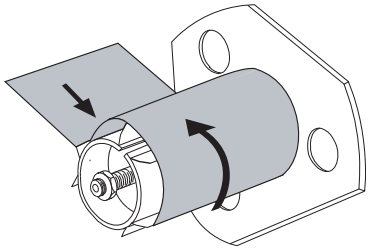
10. Remove the hook from the rewind spindle.



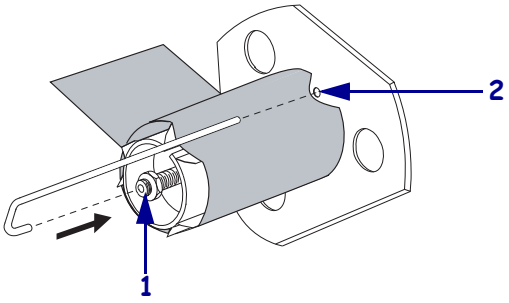
11. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

Note • A core is not required.

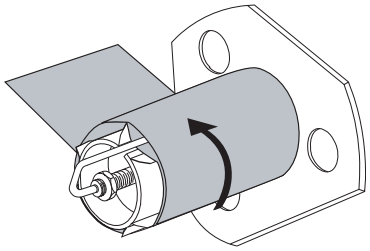
12. Wind the media liner counterclockwise around the rewind spindle.



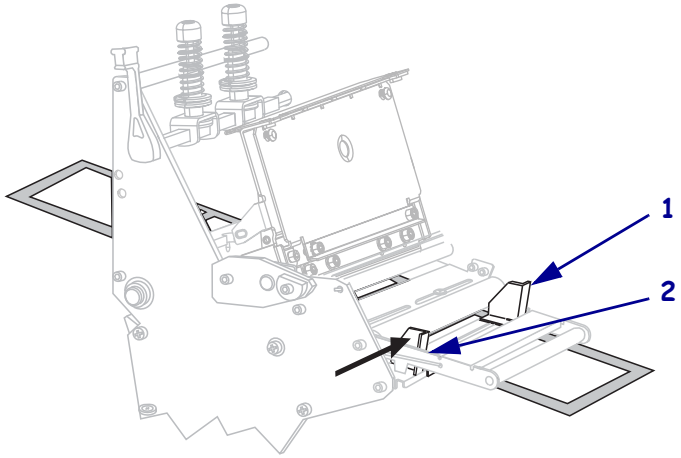
a. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (**1**). Insert the long end of the hook into the small hole on the guide plate (**2**).



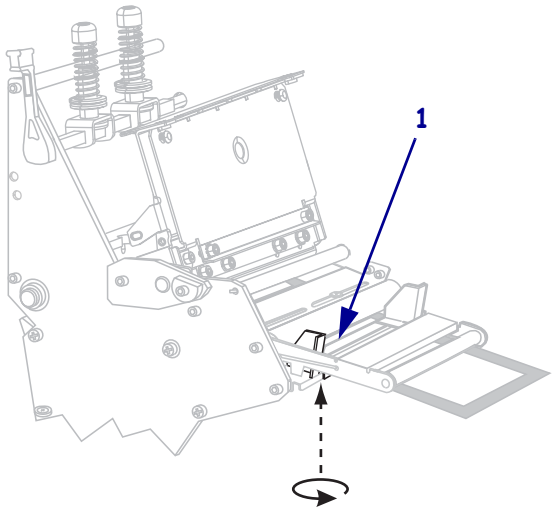
b. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.



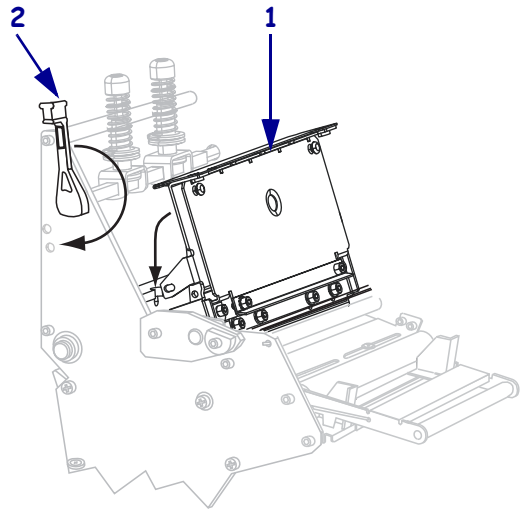
13. Align the media with the inner media guide (**1**). Slide in the outer media guide (**2**) until it just touches the edge of the media.



14. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).



15. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) clockwise until it locks into place.



The backing winds on the rewind spindle or core.

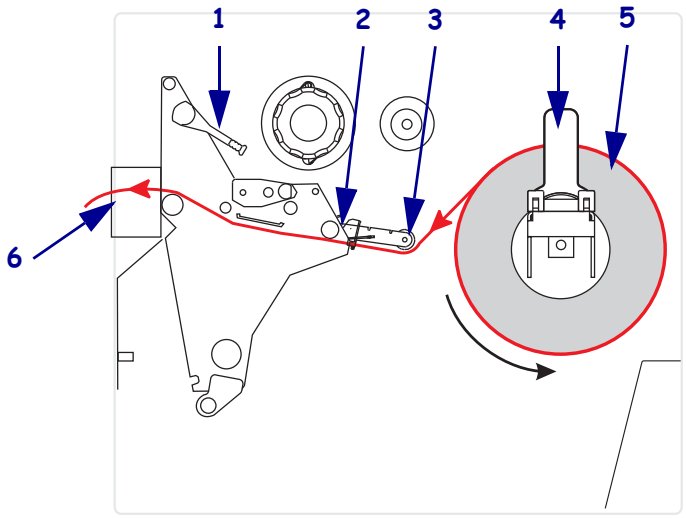
16. For instructions for removing the backing from the rewind spindle, see *Remove Media Liner from the Rewind Spindle* on page 67.

Load Media in Cutter Mode

A cutter is a rotating knife with a self-sharpening blade that is attached to the front of the printer. The cutter is used to cut individual labels as they are printed.

Figure 9 shows the printer loaded with labels in Cutter mode.

Figure 9 • Media Loaded in Cutter Mode



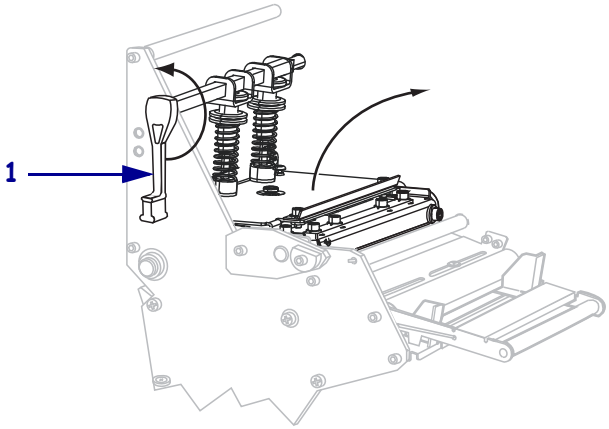
1	Printhead-open lever
2	Media guide
3	Media guide roller
4	Media supply guide
5	Media
6	Cutter

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

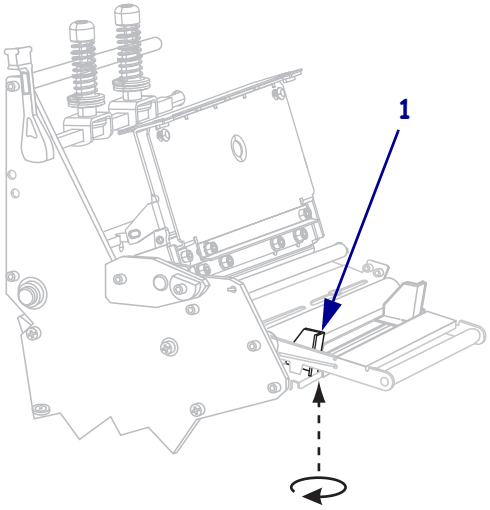
To set up the printer in Cutter mode, complete these steps:

1. Set the printer to Cutter mode. See *Select Print Mode* on page 92 for instructions.
2. Insert media into the printer. See *Prepare the Media for Loading* on page 39 for instructions.

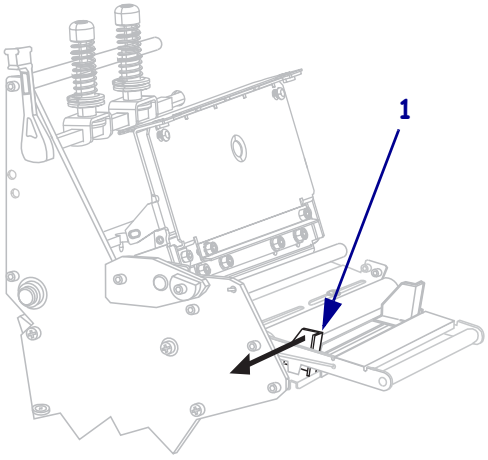
3. Open the printhead assembly by rotating the printhead-open lever (**1**) counter-clockwise.



4. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).

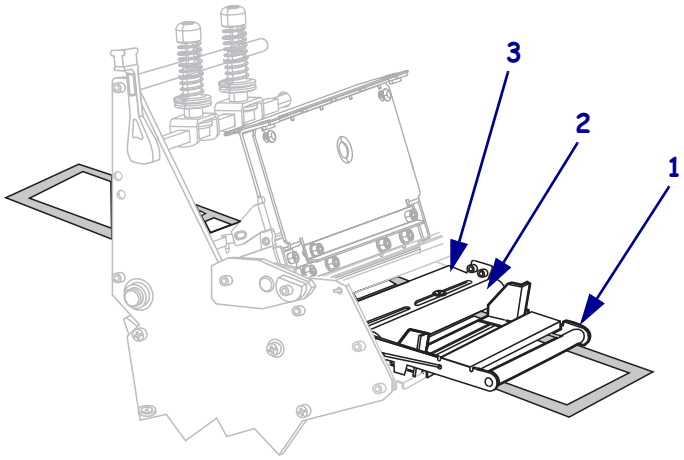


5. Slide the outer media guide (**1**) all the way out.



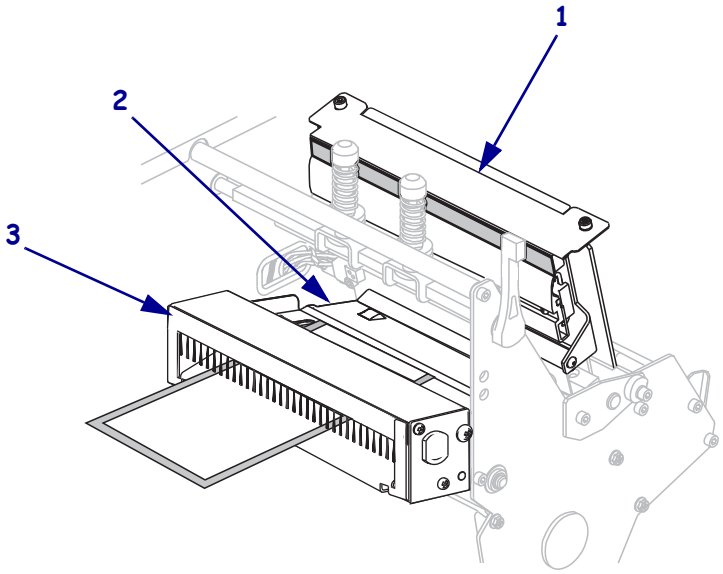
6. If your printer includes a media dancer assembly (**1**), thread the media under the media dancer assembly roller. For all printers, thread the media under the media guide roller (**2**) and then the upper media sensor (**3**).

Important • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false `RIBBON OUT` error.

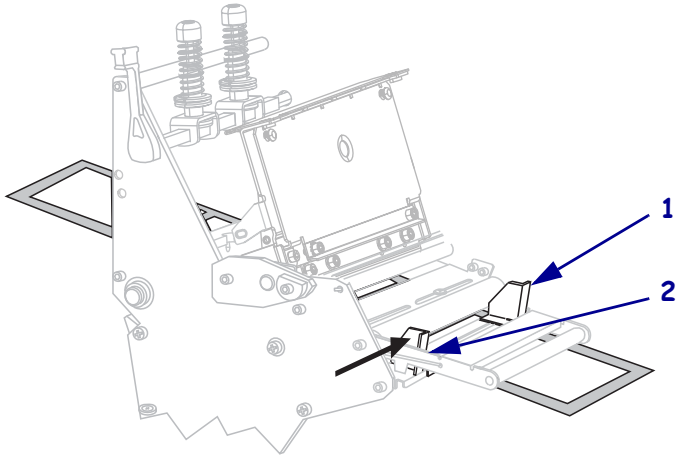


7. **Caution** • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

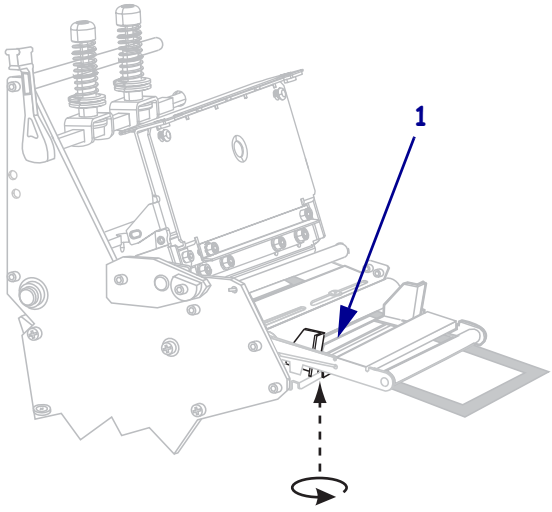
Thread the media forward until it passes under the printhead assembly (**1**), under the snap plate (**2**), and through the cutter assembly (**3**).



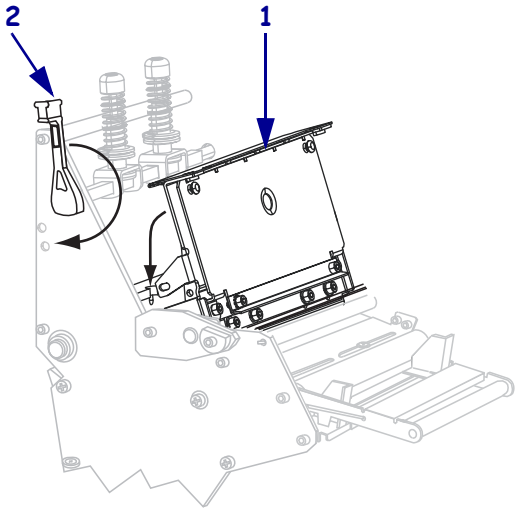
8. Align the media with the inner media guide (**1**). Slide in the outer media guide (**2**) until it just touches the edge of the media.



9. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).



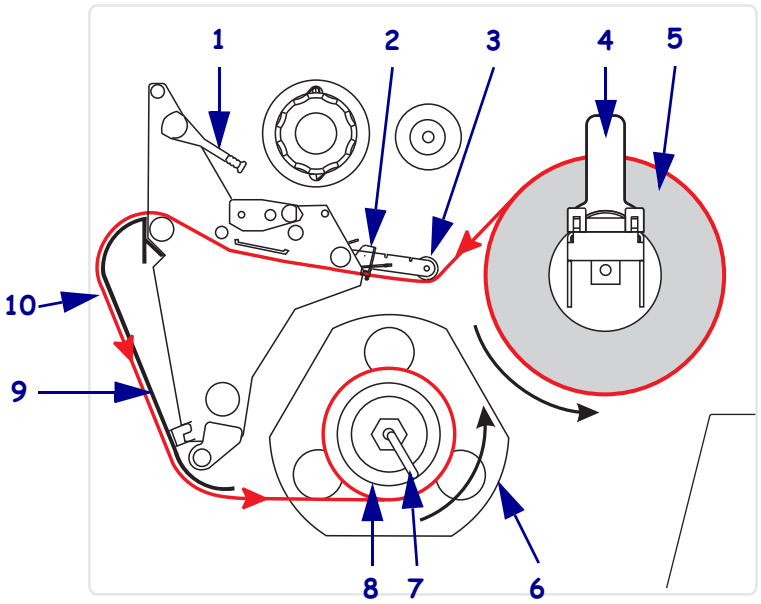
10. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) clockwise until it locks into place.



Load Media in Rewind Mode

Rewind mode (Figure 10) allows the media to be wound on a core after printing. This section shows how to load media for Rewind mode in printers that do not have a Cutter option.

Figure 10 • Media Loaded in Rewind Mode



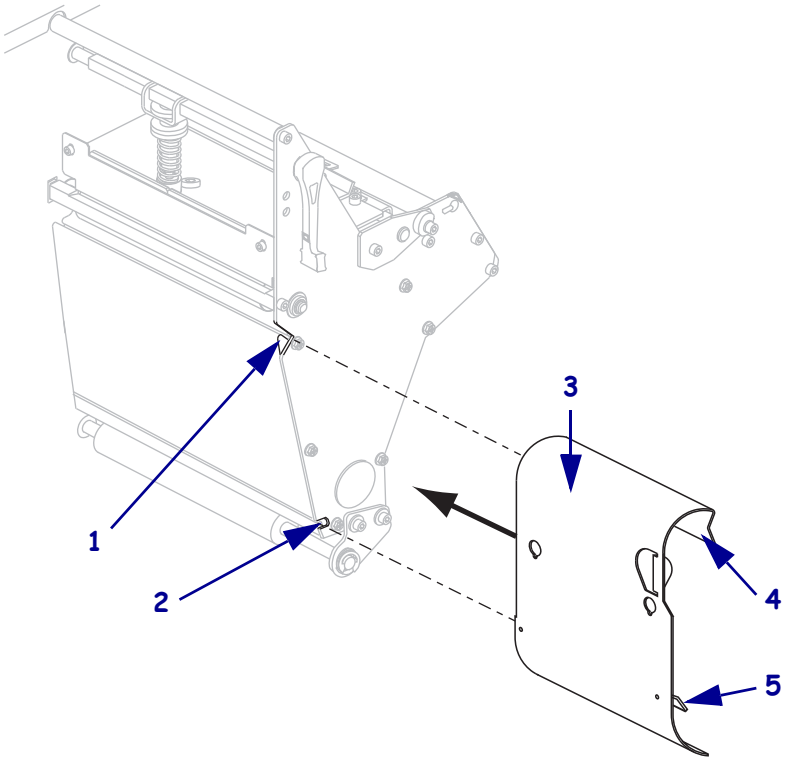
1	Printhead-open lever
2	Media guide
3	Media guide roller
4	Media supply guide
5	Labels
6	Guide plate
7	Spindle hook
8	Rewind spindle
9	Rewind plate (for Rewind mode only)*
10	Printed labels

* In new printers, remove the protective plastic covering from the rewind plate before using.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

To set up the printer in Rewind mode, complete these steps:

1. Remove the rewind plate from its storage location inside the printer.
2. Position the rewind plate so that the lip on the attached hook plate points down.

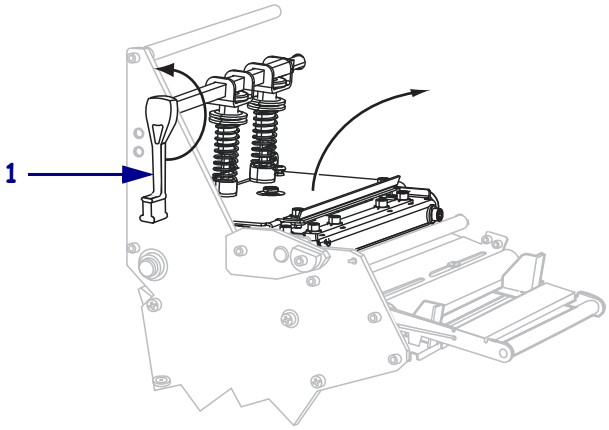


1	Upper slot
2	Lower slot
3	Rewind plate
4	Lip
5	Adjustable hook plate

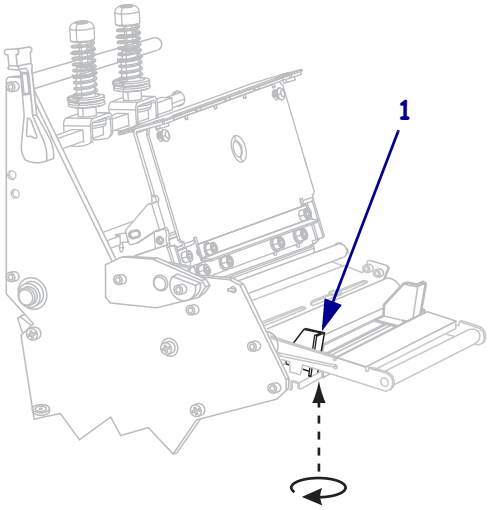
3. Insert the hook plate lip 1/2 in. (13 mm) into the lower slot in the side plate.
4. Align the upper end of the rewind plate with the matching upper slot in the side plate.
5. Slide in the rewind plate until it stops against the printer's main frame.
6. Set the printer to Rewind mode. See *Select Print Mode* on page 92 for instructions.

7. Insert media into the printer. See *Prepare the Media for Loading* on page 39 for instructions.

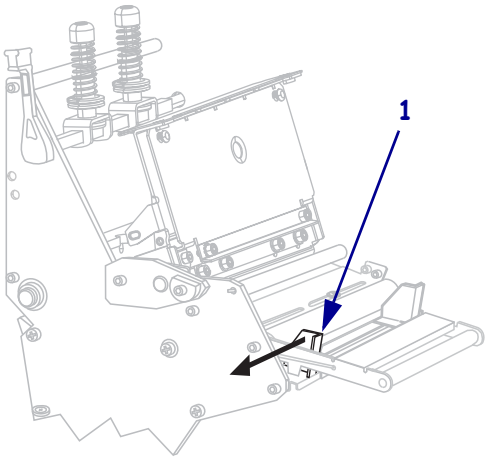
8. Open the printhead assembly by rotating the printhead-open lever (**1**) counter-clockwise.



9. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).

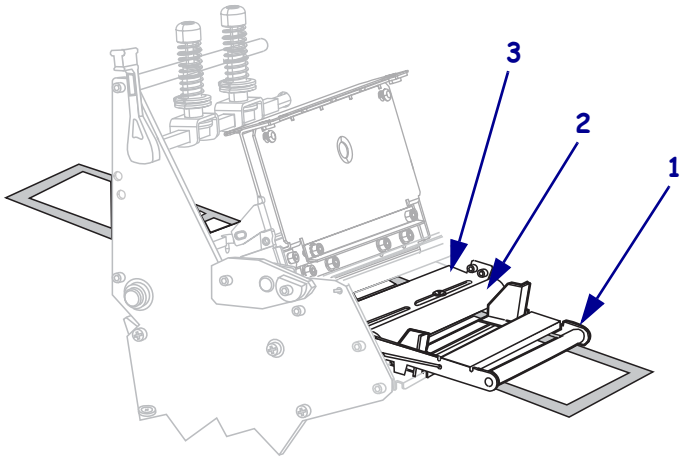


10. Slide the outer media guide (**1**) all the way out.

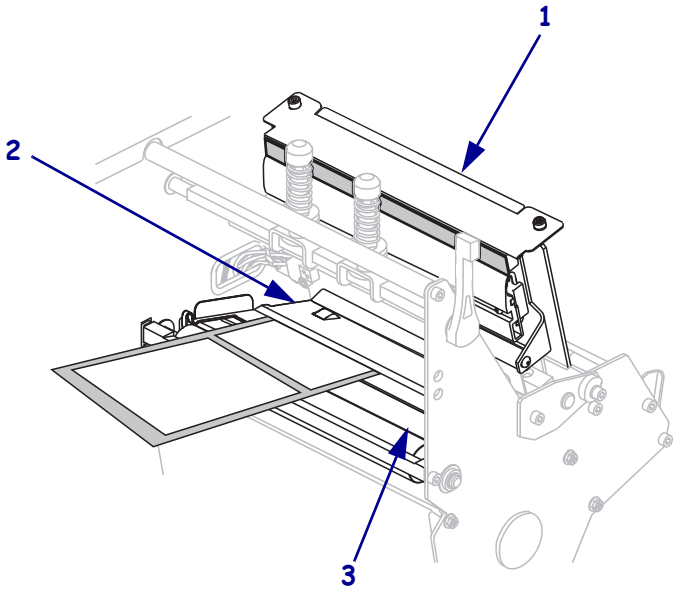


11. If your printer includes a media dancer assembly (**1**), thread the media under the media dancer assembly roller. For all printers, thread the media under the media guide roller (**2**) and then the upper media sensor (**3**).

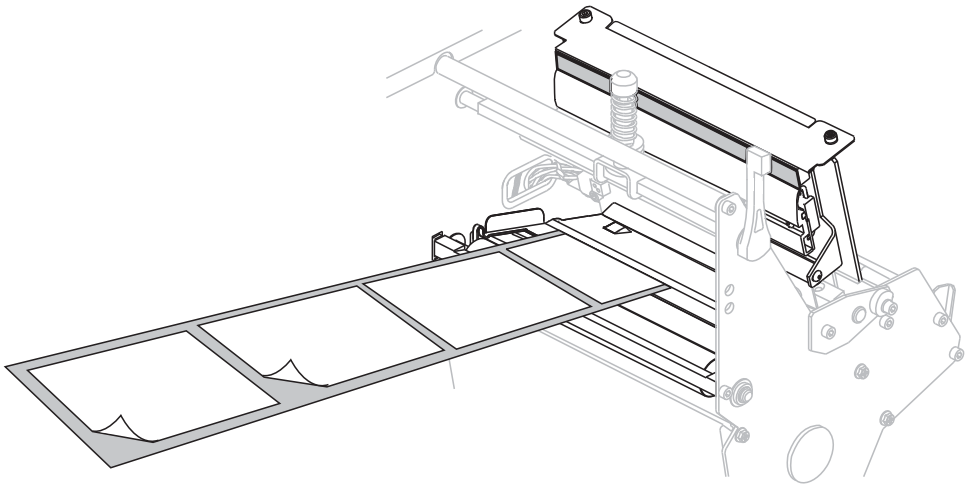
Important • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false `RIBBON OUT` error.



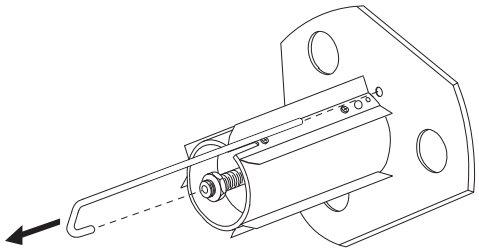
12. Push the media forward until it passes under the printhead assembly (**1**), under the snap plate (**2**), and then over the platen roller (**3**).



13. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.



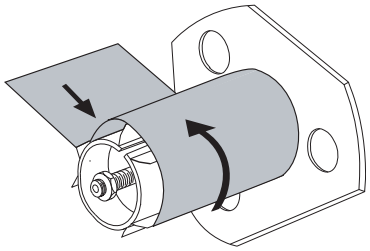
14. Remove the hook from the rewind spindle.



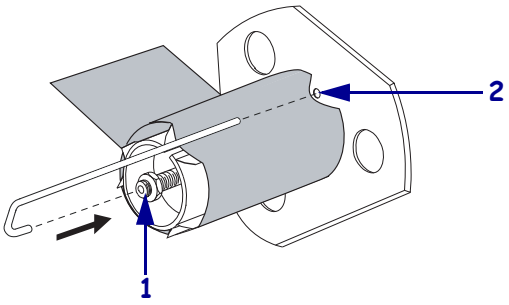
15. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

Note • A core is not required.

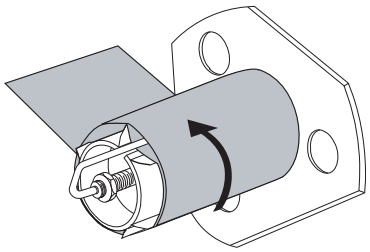
16. Wind the media liner counterclockwise around the rewind spindle.



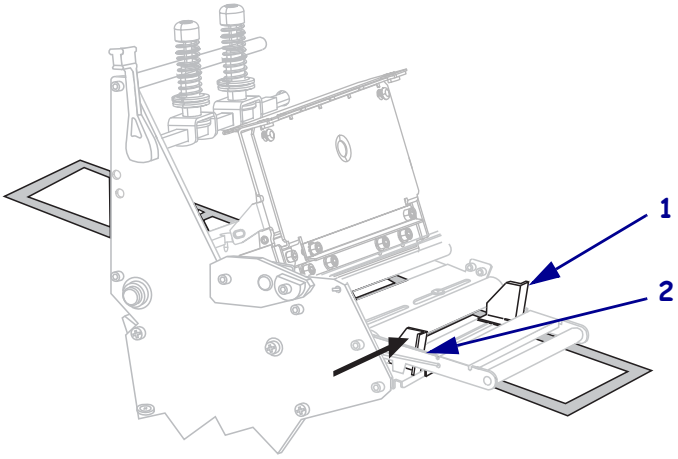
17. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (**1**). Insert the long end of the hook into the small hole on the guide plate (**2**).



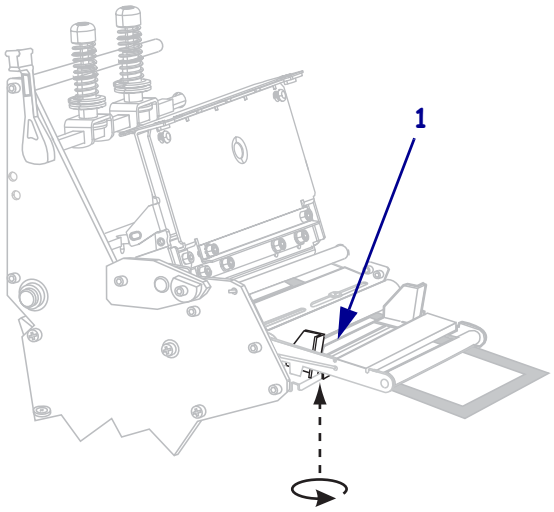
18. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.



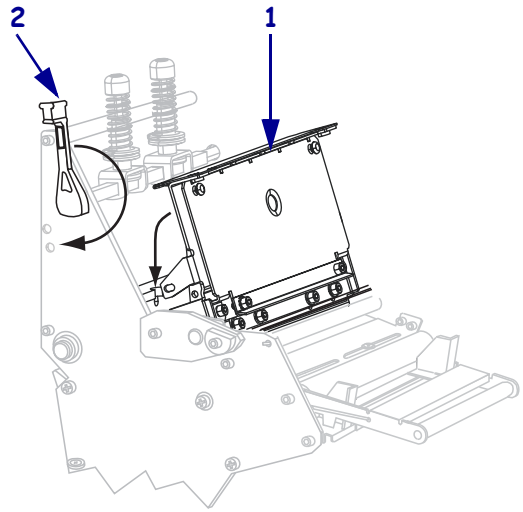
19. Align the media with the inner media guide (**1**). Slide in the outer media guide (**2**) until it just touches the edge of the media.



20. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (**1**).



21. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) clockwise until it locks into place.



The labels wind on the rewind spindle or core.

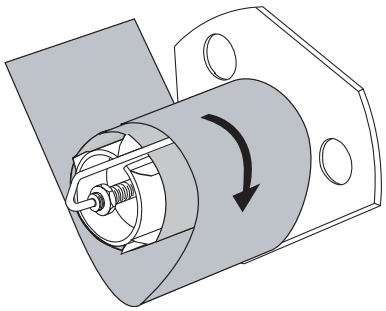
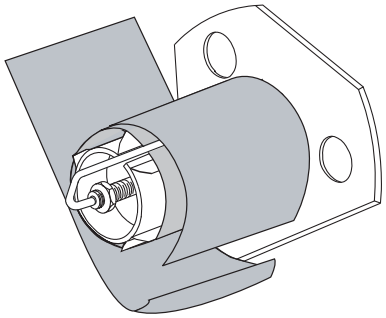
Remove Media Liner from the Rewind Spindle

Rewind mode uses the rewind spindle to wind media, while Peel-Off mode uses the rewind spindle to wind used liner. Remove the media or the liner from the rewind spindle each time that you change media.

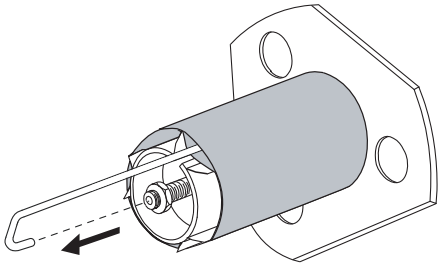
Important • It is **not** necessary to turn off the power to remove media or liner from the rewind spindle. If power is turned off, all label formats and images, as well as any temporarily saved parameter settings stored in the printer's internal memory, are lost. When power is turned back on, these items must be reloaded.

To remove media or liner from the rewind spindle, complete these steps:

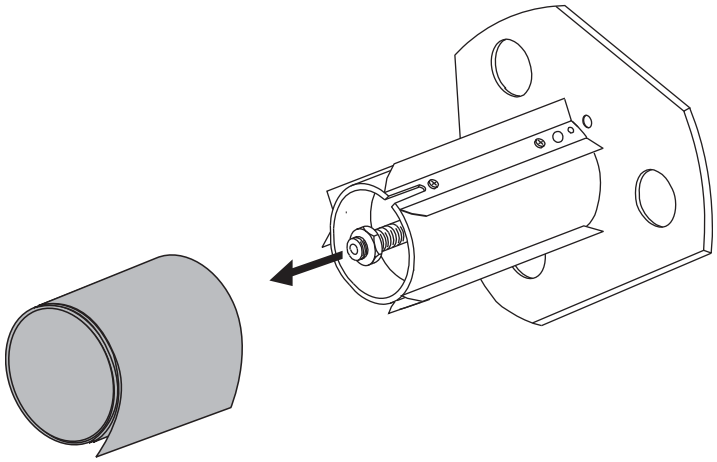
1. Has the media run out?

If...	Then...
No	**a.** Create slack in the media or liner by rotating the rewind spindle slightly clockwise.  **b.** Cut or tear the media or liner at the rewind spindle. 
Yes	Continue with the next step.

2. Pull out the spindle hook.



3. Slide the media or liner off of the rewind spindle.

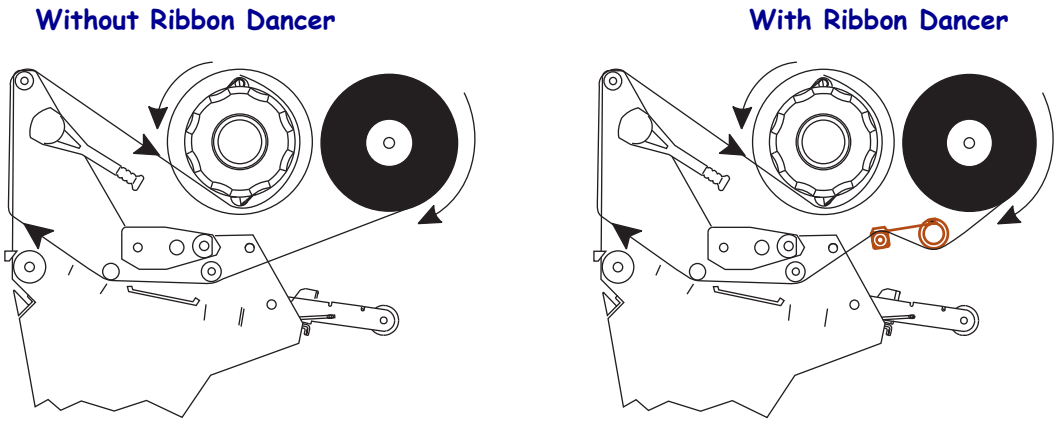


Load Ribbon

Use the instructions in this section to load ribbon for use with thermal transfer labels. For direct thermal labels, do not load ribbon in the printer. The ribbon path is slightly different for printers with ribbon dancers (Figure 11).

Important • Use ribbon that is wider than the media to protect the printhead from wear. Ribbon must be coated on the outside.

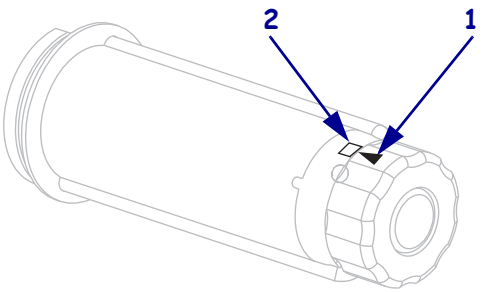
Figure 11 • Ribbon Path



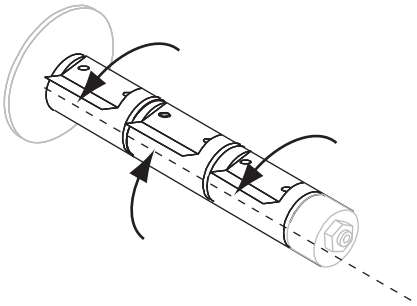
Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

To load ribbon, complete these steps:

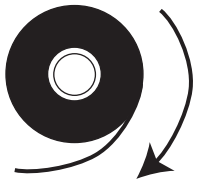
1. Align the arrow (**1**) on the ribbon take-up spindle knob with the notch (**2**) in the ribbon take-up spindle.



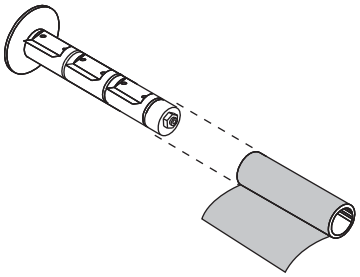
2. Align the segments of the ribbon supply spindle.



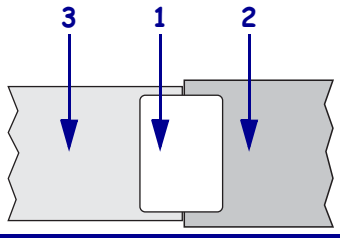
3. Orient the ribbon with the loose end unrolling clockwise.



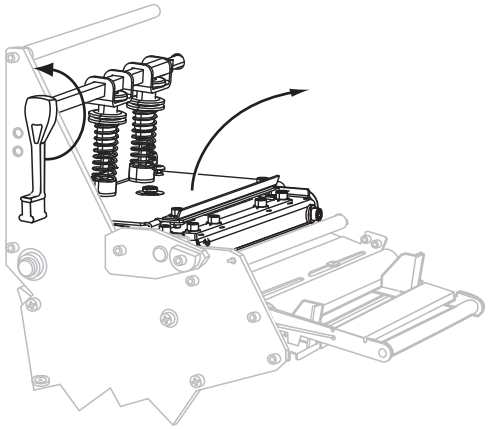
4. Place the roll of ribbon on the ribbon supply spindle. Push the roll back as far as it will go.



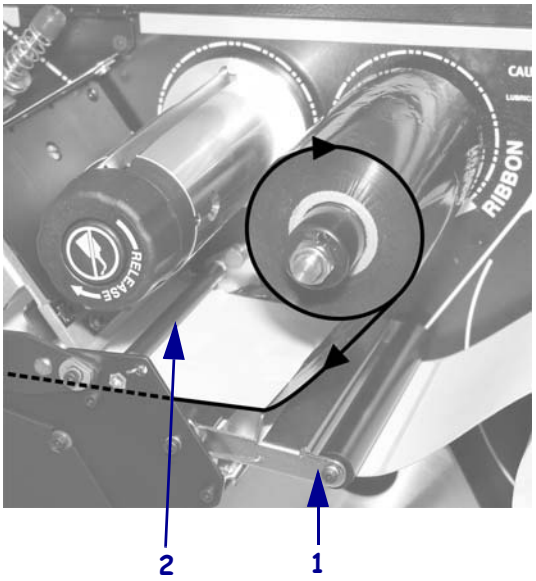
5. A ribbon leader makes ribbon loading and unloading easier. Does your roll of ribbon have paper or something else attached to the end to serve as a ribbon leader?

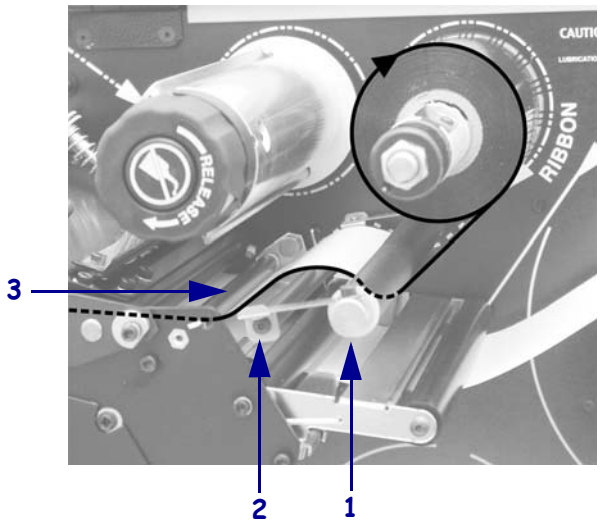
If…	Then…
Yes	Continue with the next step.
No	**a.** Tear off a strip of media (labels and liner) about 6–12 in. (150–305 mm) long from the roll. **b.** Peel a label from the media strip. **c.** Use this label (**1**) to attach the end of the ribbon (**2**) to the media strip (**3**). The media strip acts as a leader. 

6. Open the printhead assembly by rotating the printhead-open lever counter-clockwise.

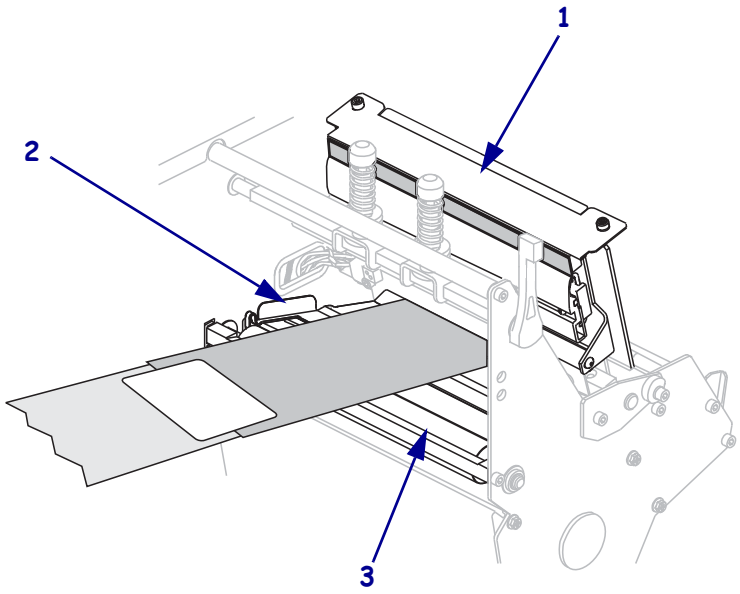


7. Does your printer contain a ribbon dancer assembly? (See Figure 11 on page 69 for the ribbon dancer location.)

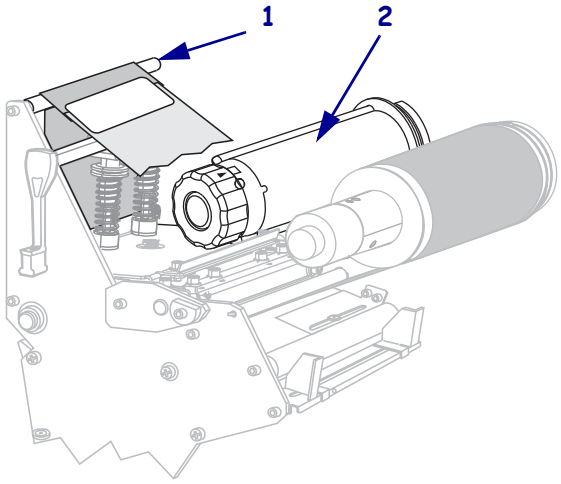
If...	Then...
No	Thread the ribbon over the media dancer assembly (**1**) and under the ribbon guide roller (**2**). 

If...	Then...
Yes	**a.** Thread the ribbon through the ribbon dancer. The ribbon must go under the upper roller (**1**) and then over the lower roller (**2**). **b.** Thread the ribbon under the ribbon guide roller (**3**). 

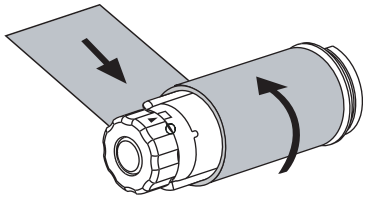
8. Push the ribbon leader forward until it passes under the printhead assembly (1), over the snap plate (2), and then over the platen roller (3).



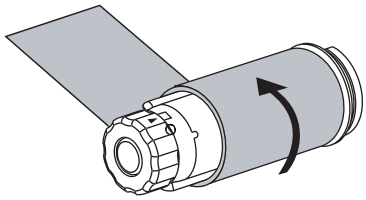
9. Bring the ribbon leader over the upper ribbon roller (**1**) and then toward the ribbon take-up spindle (**2**).



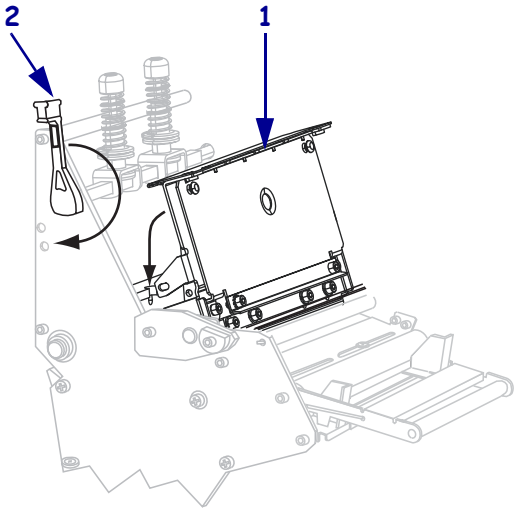
10. Wind the ribbon leader and attached ribbon counterclockwise around the ribbon take-up spindle.



11. Rotate the spindle counterclockwise several turns to wind the ribbon and remove any slack.



12. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) clockwise until it locks into place.

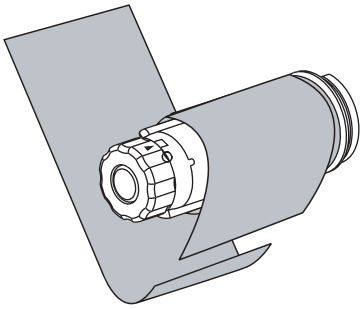


Remove Used Ribbon

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

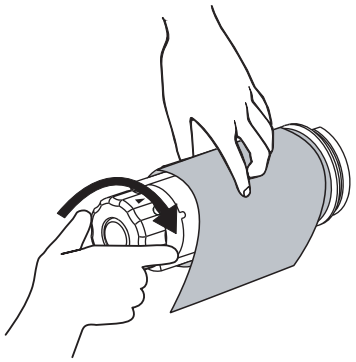
To remove used ribbon, complete these steps:

1. Has the ribbon run out?

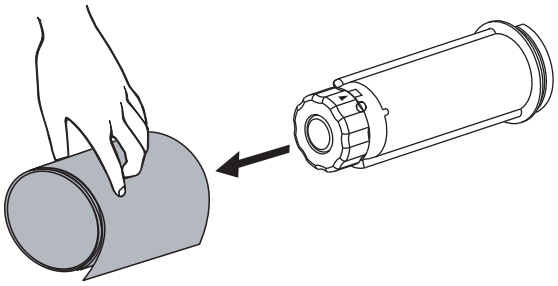
If the ribbon...	Then
Ran out	Continue with the next step.
Did not run out	Cut or break the ribbon before the ribbon take-up spindle. 

2. While holding the ribbon take-up spindle, turn the ribbon release knob clockwise until it stops.

   The ribbon release bars pivot down, easing the spindle's grip on the used ribbon.



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



Calibrate the Printer

Calibrate the printer when it is first put into service. Calibration allows the printer to establish the proper settings for the specific media and ribbon used in your application. You may calibrate the printer at other times as needed. Table 7 shows the different methods for calibration.

Important • To retain calibration settings in the printer's memory when the printer is power cycled, you must save the changes permanently. See *Exit Setup Mode* on page 87.

Table 7 • Types of Calibration

Type of Calibration	Description	When/How It Occurs
Auto-calibration	The printer automatically sets the value it detects for the spaces between labels.	Occurs at the following times: • When the printer is first turned on if CALIBRATION is selected for MEDIA POWER UP (see *Select Media Power-Up Option* on page 105). • When the printer feeds media after the printhead is closed if CALIBRATION is selected for HEAD CLOSE (see *Select Head Close Option* on page 106). • As part of both the sensor profile and media and ribbon sensor calibration procedures.
Long Calibration	The printer does the following: • feeds media and ribbon • sets the values it detects for media length, media type (continuous or non-continuous), and print mode (thermal transfer or direct thermal) • updates the sensor values	To perform a long calibration, do one of the following: • Press PAUSE on the control panel to pause the printer, and then press CALIBRATE. • Select CALIBRATION for the MEDIA POWER UP or HEAD CLOSE parameter (see *Select Media Power-Up Option* on page 105 or *Select Head Close Option* on page 106).
Short Calibration	The printer calibrates using the current sensor values rather than detecting the spaces between labels and resetting the sensors. This calibration sequence uses fewer labels than the long calibration sequence, but it is less reliable because the values that are stored in the sensors could be incorrect.	Select SHORT CAL for the MEDIA POWER UP or HEAD CLOSE parameter (see *Select Media Power-Up Option* on page 105 or *Select Head Close Option* on page 106.

Table 7 • Types of Calibration (Continued)

Type of Calibration	Description	When/How It Occurs
Sensor Profile Calibration	The printer auto-calibrates and prints a media sensor profile.	Select the `SENSOR PROFILE` option on the control panel. See *Print Sensor Profile* on page 100 for instructions.
Media and Ribbon Sensor Sensitivity Calibration	One of the most common adjustments to printer settings. The printer resets the sensitivity of the sensors to detect correctly the media and ribbon that you are using. If you change the type of ribbon and/or media, you might need to reset the sensitivity of the media and ribbon sensors. When the sensors are at their new sensitivity, the printer performs an auto-calibration.	Select the `MEDIA AND RIBBON CALIBRATE` option on the control panel. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101 for instructions.

Adjust Transmissive Media Sensors

The transmissive media sensor assembly consists of two parts: a light source and a light sensor. The lower media sensor is the light source, and the upper media sensor is the light sensor. The media passes between the two parts.

Adjust these sensors only when the printer cannot detect the top of the labels. In this situation, the control panel LCD displays **ERROR CONDITION PAPER OUT**, even though there are labels loaded in the printer. For non-continuous media with a notch or hole in the media, the sensor must be directly above the notch or hole.

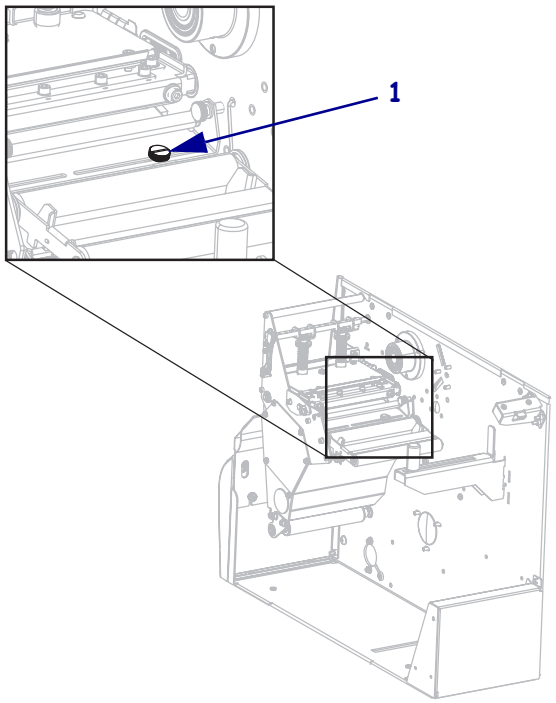
Upper Media Sensor

For the 220Xi4 The upper media sensor can be positioned along the inner portion of the media (the side closest to the back frame of the printer).

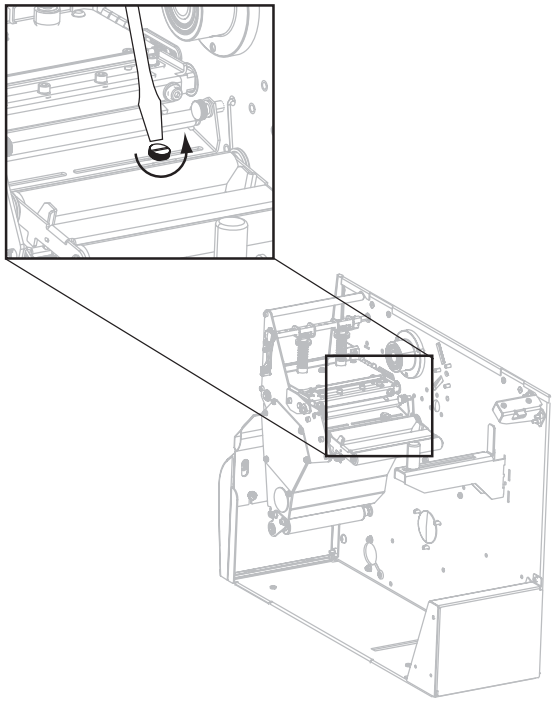
For all other Xi4 models The upper media sensor can be positioned along the inner portion of the media (the side closest to the back frame of the printer) or the outer portion of the media (the side farthest from the back frame of the printer). Moving the media sensor to the outer portion of the media should be performed only by a qualified service technician.

To reposition the upper media sensor along the inside portion of the media, complete these steps:

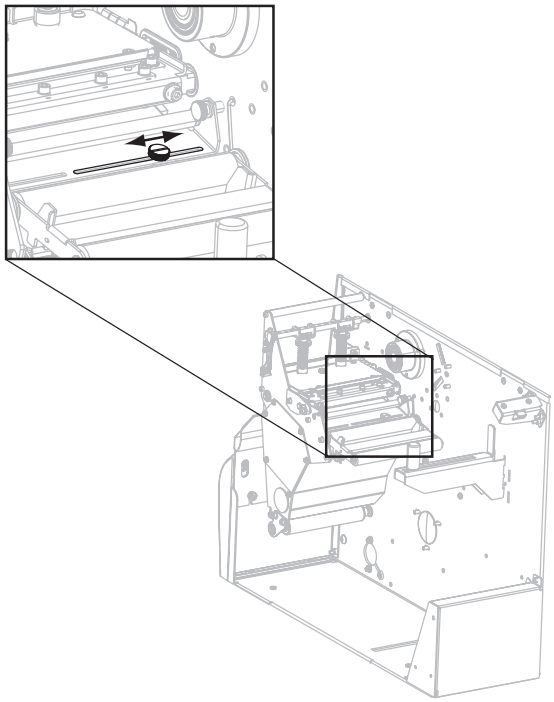
1. Remove the ribbon (if ribbon is used).
2. Locate the upper media sensor adjustment screw (**1**). The upper media sensor eye is directly below the adjustment screw head.



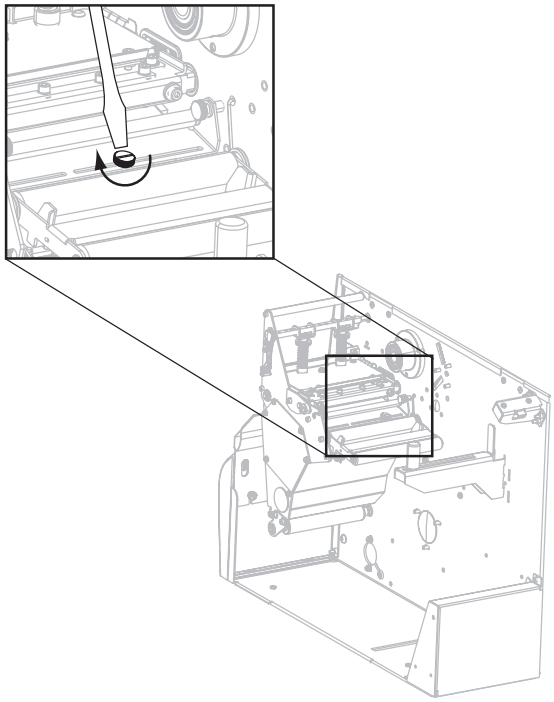
3. Using a thin, flat-blade screwdriver, loosen the upper media sensor adjustment screw.



4. Slide the upper media sensor along the slot to the desired position.



5. Tighten the adjustment screw to secure the upper media sensor in its new position.



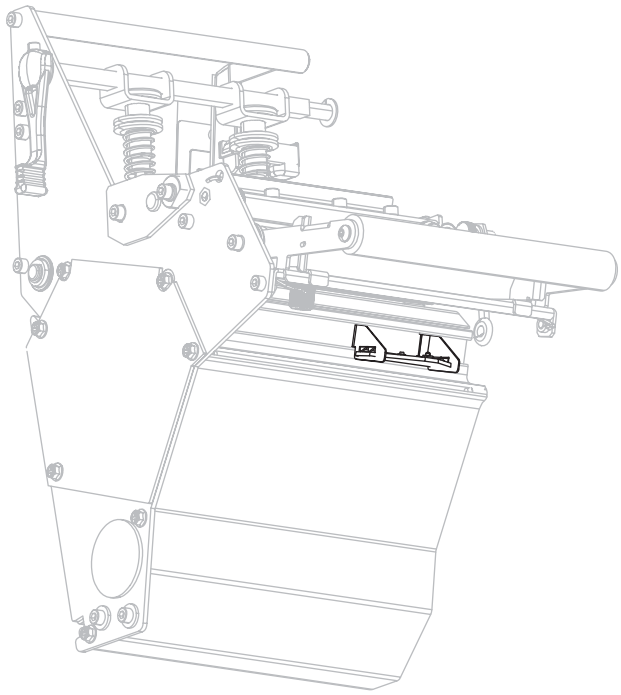
6. Adjust the lower media sensor to match the new position of the upper media sensor. See *Lower Media Sensor* on page 81.

Lower Media Sensor

After you adjust the upper media sensor, adjust the lower media sensor to match its new position.

To adjust the lower media sensor, complete these steps:

1. Locate the lower media sensor assembly under the rear roller. The sensor is a spring clip holding a circuit board.



2. Slide the lower sensor until it is under the upper media sensor. Use the light that shines from the lower sensor to help align it with the upper sensor. Gently pull the wires as needed (wires should have a little slack).

Adjust Printhead Pressure and Toggle Position

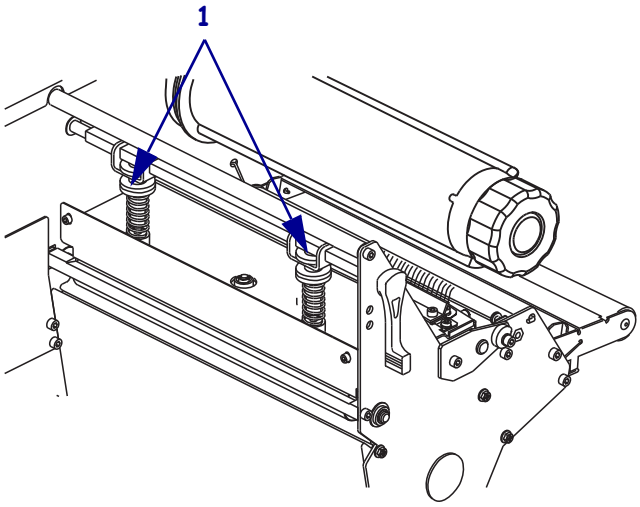
Print quality depends on the labels and ribbon used as well as the toggle pressure and position. Make sure that your labels and ribbon are acceptable for your application. If they are, check the toggle position and then the printhead pressure.

Toggle Position Adjustment

You may need to adjust the toggles if printing is too light on one side or if thick labels are used. If the toggle pressure is too light or uneven, the labels and ribbon may slip.

To position the toggles, complete these steps:

1. Loosen the locking nuts (**1**) at the top of the toggle assemblies.



2. Slide the toggles until they provide even pressure on the media. For extremely narrow media, position one toggle over the center of the labels, and decrease the pressure on the unused toggle.

3. Tighten the locking nuts.

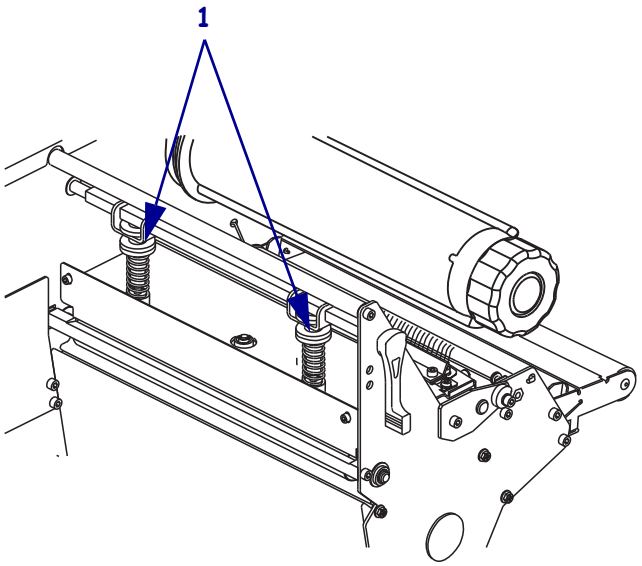
Printhead Pressure Adjustment

If positioning the toggles properly does not solve a print quality problem, try adjusting the printhead pressure. Maximize printhead life by using the lowest pressure that produces the desired print quality.

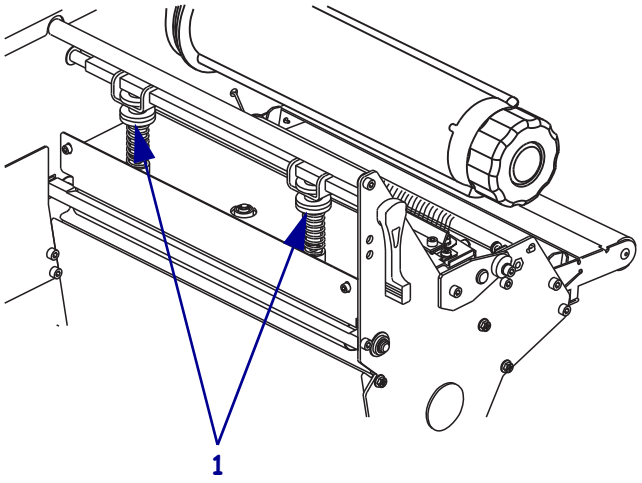
Caution • Observe proper electrostatic safety precautions when handling any static-sensitive components such as circuit boards and printheads.

To adjust printhead pressure, complete these steps:

1. Print some labels at 2.4 in. (61 mm) per second by running the *PAUSE Self Test* on page 155.
2. While printing labels, use the control panel controls to lower the darkness setting until the labels are printing gray instead of black.
3. Loosen the upper knurled nuts on the toggle assemblies (**1**).



4. Some media types require higher pressure to print well. For these media types, increase or decrease pressure using the lower knurled nuts (**1**) until the left and right edges of the printed area are equally dark.



5. Using the control panel, increase the darkness to the desired level.

6. Tighten the upper knurled nuts.

4

Configuration

This section describes the control panel parameters that are used to configure the printer for operation.

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Enter and Use Setup Mode 86
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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 display and the buttons directly below it. If it becomes necessary to restore the initial printer defaults, see *FEED and PAUSE Self Test* on page 159.

Important • Certain printing conditions may require that you adjust printing parameters, such as print speed, darkness, or print mode. 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.

Note • If the printer is operating on an IP network and you have a ZebraNet 10/100 Print Server or Wireless Plus Print Server, you can change the printer's parameters in these additional ways:

- with ZebraLink™ WebView. For information, see the appropriate print server user guide.
- with ZebraNet Bridge. For information, see the *ZebraNet Bridge Enterprise Printer Management User Guide*.

Enter and Use Setup Mode

Use the LCD on the control panel to view and adjust printer settings through Setup mode. When a parameter is changed, an asterisk (*) appears in the upper left corner of the display to indicate that the value is different from the one currently active in the printer.

Press this key...	To do the following...
SETUP/EXIT	enter or exit Setup mode.
SELECT	select or deselect a parameter.
PLUS (+)	continue to the next parameter.
MINUS (-)	return to the previous parameter in the cycle.

Exit Setup Mode

When you exit setup mode, you have several options for saving, changing, or not changing parameters.

To leave Setup mode, complete these steps:

1. While in Setup mode, press SETUP/EXIT.

   The LCD displays **SAVE CHANGES**.

2. Press PLUS (+) or MINUS (-) to display the save options:

LCD	Description
PERMANENT	Stores values in the printer even when power is turned off.
TEMPORARY	Saves the changes until power is turned off.
CANCEL	Cancels all changes made since you entered Setup mode, except for changes made to the darkness and tear-off settings, which go into effect as soon as they are made.
LOAD DEFAULTS	Restores all parameters other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually. **Note** • On non-RFID printers, loading factory defaults causes the printer to auto-calibrate.
LOAD LAST SAVE	Loads values from the last permanent save.
DEFAULT NET	Restores the wired and wireless network settings back to factory defaults.

3. Press NEXT/SAVE to select the displayed choice.

   When the configuration and calibration sequence is done, **PRINTER READY** displays.

Change Password-Protected Parameters

Certain parameters, including the communication parameters, are password-protected by factory default.

Caution • Do not change password-protected parameters unless you have a complete understanding of the parameters' functions. If the parameters are set incorrectly, the printer may function unpredictably.

The first time that you attempt to change a password-protected parameter, the printer displays ENTER PASSWORD. Before you can change the parameter, you must enter the four-digit numeric password. After you have entered the password correctly, you do not have to enter it again unless you leave Setup mode by pressing SETUP/EXIT or by turning off (**O**) the printer.

To enter a password for a password-protected parameter, complete these steps:

1. At the password prompt, use MINUS (-) to change the selected digit position.
2. When you have selected the digit that you wish to change, use PLUS (+) to increase the selected digit value. Repeat these two steps for each digit of the password.
3. After entering the password, press NEXT/SAVE.

   The parameter you selected to change is displayed. If the password was entered correctly, you can change the value.

Default Password Value

The default password value is **1234**. The password can be changed using the Zebra Programming Language (ZPL) command ^KP (Define Password) or using the printer's web pages (ZebraNet® 10/100 Print Server or Wireless Plus Print Server required).

Disable the Password Protection Feature

You can disable the password protection feature so that it no longer prompts you for a password by setting the password to **0000** via the ^KP ZPL command. To re-enable the password-protection feature, send the ZPL command ^KPx, where x can be any number from 1 to 9999.

Print a Configuration Label

A configuration label lists the printer settings that are stored in configuration memory. After you load the media and ribbon (if necessary), print a configuration label as a record of your printer's current settings. Keep the label to use when troubleshooting printing problems.

To print a configuration label, complete these steps:

1. On the control panel, press SETUP/EXIT.
2. Press NEXT/SAVE or PREVIOUS to scroll through the parameters until you reach **LIST SETUP**.
3. Press PLUS (+) to confirm printing.

   A configuration label prints (Figure 12).

Figure 12 • Sample Configuration Label

Xi4

```
PRINTER CONFIGURATION

Zebra Technologies
ZTC 140Xi4-200dpi
ZBR3099332

+0.0.............. DARKNESS
12 IPS............ PRINT SPEED
+000.............. TEAR OFF
TEAR OFF.......... PRINT MODE
CONTINUOUS........ MEDIA TYPE
WEB............... SENSOR TYPE
DIRECT-THERMAL.... PRINT METHOD
1024.............. PRINT WIDTH
2000.............. LABEL LENGTH
39.0IN   988MM.... MAXIMUM LENGTH
MAINT. OFF........ EARLY WARNING
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....... COMMUNICATIONS
<~>  7EH.......... CONTROL PREFIX
<^>  5EH.......... FORMAT PREFIX
<,>  2CH.......... DELIMITER CHAR
ZPL II............ ZPL MODE
CALIBRATION....... MEDIA POWER UP
CALIBRATION....... HEAD CLOSE
DEFAULT........... BACKFEED
+020.............. LABEL TOP
+0000............. LEFT POSITION
0000.............. HEAD TEST COUNT
0557.............. HEAD RESISTOR
OFF............... VERIFIER PORT
OFF............... APPLICATOR PORT
ENABLED........... ERROR ON PAUSE
PULSE MODE........ START PRINT SIG
FEED MODE......... RESYNCH MODE
DISABLED.......... REPRINT MODE
066............... WEB S.
066............... MEDIA S.
072............... RIBBON S.
100............... TAKE LABEL
050............... MARK S.
000............... MARK MED S.
004............... TRANS GAIN
034............... TRANS BASE
196............... TRANS BRIGHT
239............... RIBBON GAIN
014............... MARK GAIN
DPCSWFXM.......... MODES ENABLED
.................. MODES DISABLED
1024 8/MM FULL.... RESOLUTION
V53.17.12 <-...... FIRMWARE
1.2............... XML SCHEMA
V40 ---------- 12... HARDWARE ID
CUSTOMIZED....... CONFIGURATION
11008k..........R: RAM
59392k..........E: ONBOARD FLASH
NONE.............. FORMAT CONVERT
*** APPLICATOR.... P31 INTERFACE
007 POWER SUPPLY.. P32 INTERFACE
.................. TWINAX/COAX ID
FW VERSION........ IDLE DISPLAY
12/01/08.......... RTC DATE
17:06............. RTC TIME
DISABLED.......... ZBI
2.1............... ZBI VERSION
268.983 IN........ NONRESET CNTR
268.983 IN........ RESET CNTR1
268.983 IN........ RESET CNTR2
683.216 CM....... NONRESET CNTR
683.216 CM....... RESET CNTR1
683.216 CM....... RESET CNTR2
SELECTED ITEMS.... PASSWORD LEVEL
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

RXi4

```
PRINTER CONFIGURATION

Zebra Technologies
ZTC R110Xi4-203dpi ZPL
ZBR2293523

+11.0............. DARKNESS
2 IPS............. PRINT SPEED
+000.............. TEAR OFF
RFID MODE......... PRINT MODE
CONTINUOUS........ MEDIA TYPE
WEB............... SENSOR TYPE
THERMAL-TRANS..... PRINT METHOD
700............... PRINT WIDTH
2100.............. LABEL LENGTH
39.0IN   988MM.... MAXIMUM LENGTH
DISABLED.......... SUPPLIES WARNING
MAINT. OFF........ EARLY WARNING
NOT CONNECTED..... USB COMM.
READY............. EXTERNAL 5V
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....... COMMUNICATIONS
<~>  7EH.......... CONTROL PREFIX
<^>  5EH.......... FORMAT PREFIX
<,>  2CH.......... DELIMITER CHAR
ZPL II............ ZPL MODE
FEED.............. MEDIA POWER UP
FEED.............. HEAD CLOSE
DEFAULT........... BACKFEED
+000.............. LABEL TOP
+0000............. LEFT POSITION
OFF............... VERIFIER PORT
OFF............... APPLICATOR PORT
ENABLED........... ERROR ON PAUSE
PULSE MODE........ START PRINT SIG
FEED MODE......... RESYNCH MODE
DISABLED.......... REPRINT MODE
069............... WEB S.
069............... MEDIA S.
070............... RIBBON S.
100............... TAKE LABEL
050............... MARK S.
000............... MARK MED S.
002............... TRANS GAIN
034............... TRANS BASE
152............... TRANS BRIGHT
201............... RIBBON GAIN
015............... MARK GAIN
DPCSWFXM.......... MODES ENABLED
.................. MODES DISABLED
 832 8/MM FULL.... RESOLUTION
V53.17.3 <-....... FIRMWARE
1.9............... XML SCHEMA
V45 ---------- 19... HARDWARE ID
CUSTOMIZED....... CONFIGURATION
10944k..........R: RAM
59392k..........E: ONBOARD FLASH
NONE.............. FORMAT CONVERT
.................. TWINAX/COAX ID
FW VERSION........ IDLE DISPLAY
11/04/09.......... RTC DATE
01:03............. RTC TIME
ENABLED........... ZBI
2.1............... ZBI VERSION
READY............. ZBI STATUS
0................. RFID VALID CTR
0................. RFID VOID CTR
16................ RFID READ PWR
16................ RFID WRITE PWR
A4................ RFID ANTENNA
NO TAG FOUND...... RFID ERR STATUS
Gen2.............. RFID TAG TYPE
M5A00000003....... RFID HW VERSION
TM: 20080415...... RFID FW VERSION
FO MM............. PROG. POSITION
364 IN............ NONRESET CNTR
364 IN............ RESET CNTR1
364 IN............ RESET CNTR2
925 CM............ NONRESET CNTR
925 CM............ RESET CNTR1
925 CM............ RESET CNTR2
SELECTED ITEMS.... PASSWORD LEVEL
JJL000157.09Z128014.23630-002.I.CHIN
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Print a Network Configuration Label

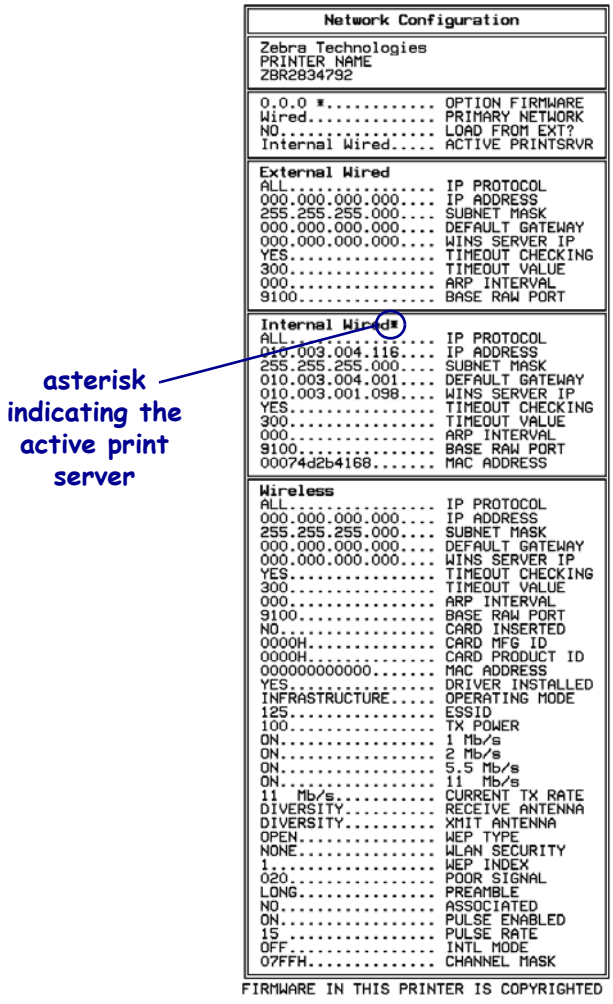
If you are using a print server, you can print a network configuration label after the printer is connected to the network.

To print a network configuration label, complete these steps:

1. On the control panel, press SETUP/EXIT.
2. Press NEXT/SAVE or PREVIOUS to scroll through the parameters until you reach LIST NETWORK.
3. Press PLUS (+) to confirm printing.

   A network configuration label prints (Figure 13). 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 13 • Network Configuration Label (with a Wireless Print Server installed)



Standard Control Panel Parameters

Table 8 shows parameters in the order in which they are displayed when you press NEXT/SAVE after entering Setup mode. For parameters that do not appear in this table, see *Additional Control Panel Parameters* on page 113.

Note • Your label preparation software or the printer driver may override adjustments made through the control panel. Refer to the software or driver documentation for more information.

Table 8 • Printer Parameters (Sheet 1 of 22)

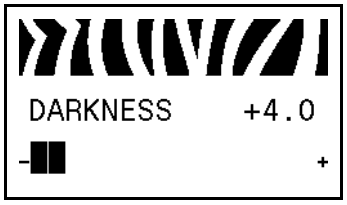
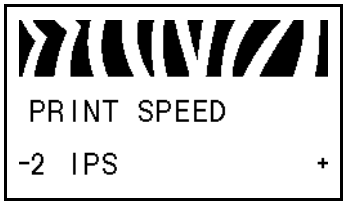
Language/Parameter	Action/Explanation
	**Adjust Print Darkness** Darkness (burn duration) settings depend on a variety of factors, including ribbon type, media type, and the condition of the printhead. You may adjust the darkness for consistent high-quality printing. **Important** • Set the darkness 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. If printing is too light or if there are voids in printed areas, increase the darkness. If printing is too dark or if there is spreading or bleeding of printed areas, decrease the darkness. The *FEED Self Test* on page 156 can be used to determine the best darkness setting. You may want to adjust darkness while performing the *PAUSE Self Test* on page 155. Because the darkness setting takes effect immediately, you can see the results on labels that are currently printing. Darkness settings also may be changed by the driver or software settings. *Default Value:* +4.0 *Range:* 0 to +30.0 **To change the value shown:** 1. Press PLUS (+) to increase darkness. 2. Press MINUS (-) to decrease darkness.
	**Adjust Print Speed** Adjusts the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality. Print speed changes take effect upon exiting Setup mode. *Default Value:* 2 IPS *Range:* Varies by printer type (see *Print Specifications by Model* on page 167 for values by model) **To change the value shown:** 1. Press PLUS (+) to increase the value. 2. Press MINUS (-) to decrease the value.

Table 8 • Printer Parameters (Sheet 2 of 22)

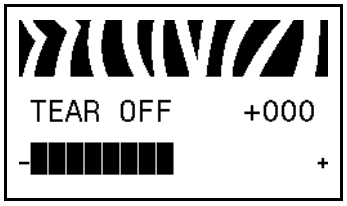
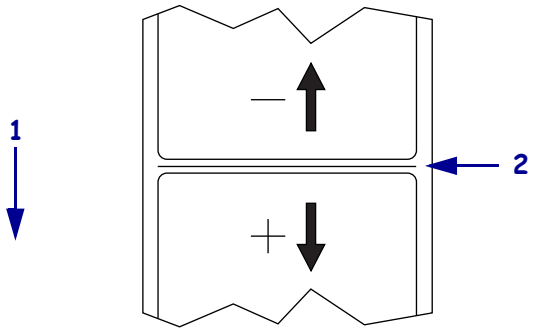
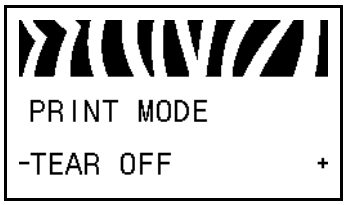
Language/Parameter	Action/Explanation
	**Adjust the Tear-Off Position** This parameter establishes the position of the media over the tear-off/peel-off bar after printing. See Figure 14. Higher numbers move the media out (the tear line moves closer to the leading edge of the next label), and lower numbers move the media in (the tear line moves closer to the edge of the label just printed). **Figure 14 • Tear-Off Position Adjustment**  **1** Media direction **2** Factory-set tear line location at position 00 *Default Value:* 0 *Range:* -120 to +120 **To change the value shown:** **1.** Press PLUS (+) to increase the value. Each press adjusts the tear-off position by four dot rows. **2.** Press MINUS (-) to decrease the value. Each press adjusts the tear-off position by four dot rows.
	**Select Print Mode** This parameter tells the printer how printed labels will be removed. Make sure that you select a print mode that is compatible with your printer and printer options. For information about how the print modes work with different printer options, see *Print Modes and Printer Options* on page 36. *Default Value (non-RFID printers):* TEAR-OFF *Default Value (RFID printers):* RFID MODE *Selections:* TEAR-OFF, PEEL-OFF, CUTTER, DELAYED CUT, RFID MODE, REWIND **Note** • RFID MODE should only be used with RFID media on RFID printers. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 3 of 22)

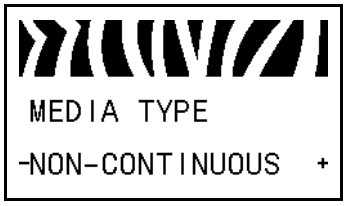
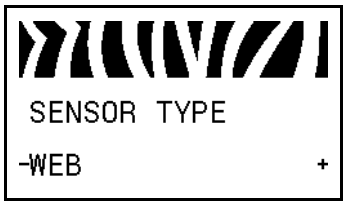
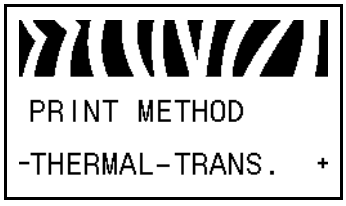
Language/Parameter	Action/Explanation
	**Set Media Type** This parameter tells the printer the type of media that you are using (see *Types of Media* on page 31 for more information). Selecting continuous media requires that you include a label length instruction in your label format (^LLxxxx if you are using ZPL or ZPL II). When non-continuous media is selected, the printer feeds media to calculate label length (the distance between two recognized registration points of the inter-label gap, webbing, or alignment notch or hole). *Default Value:* NON-CONTINUOUS *Selections:* NON-CONTINUOUS, CONTINUOUS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Sensor Type** This parameter tells the printer whether you are using media with a web (gap/space between labels, notch, or hole) to indicate the separations between labels or if you are using media with a black mark printed on the back. If your media does not have black marks for registration on the back, leave your printer at the default (WEB). *Default Value:* WEB *Selections:* WEB, MARK **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Print Method** The print method parameter tells the printer the method of printing that you want to use: direct thermal (no ribbon) or thermal transfer (using thermal transfer media and ribbon). *Default Value:* THERMAL-TRANS. *Selections:* THERMAL-TRANS., DIRECT THERMAL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 4 of 22)

Language/Parameter	Action/Explanation
	**Set Print Width** This parameter specifies the printable area across the width of the label. Table 9 shows the ranges and default values for print width, which are based on the printer model and the printhead resolution.

Table 9 • Print Width Ranges and Maximum Values

Printhead Resolution	Printer	
	110Xi4/R110Xi4	140Xi4, 170Xi4, 220Xi4
200 dpi	*Default Value:* 832 *Range:* 2 to 832 dots	*Default Value:* 1344 *Range:* 2 to 1344 dots
300 dpi	*Default Value:* 1248 *Range:* 2 to 1248 dots	*Default Value:* 1984 *Range:* 2 to 1984 dots
600 dpi	*Default Value:* 2496 *Range:* 2 to 2496 dots	N/A

Note • Setting the width too narrow can result in portions of a label format not being printed on the media. Setting the width too wide wastes formatting memory and can cause printing off of 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.

To change the value shown:

1. Press PLUS (+) or MINUS (-) to change the value shown.

Table 8 • Printer Parameters (Sheet 5 of 22)

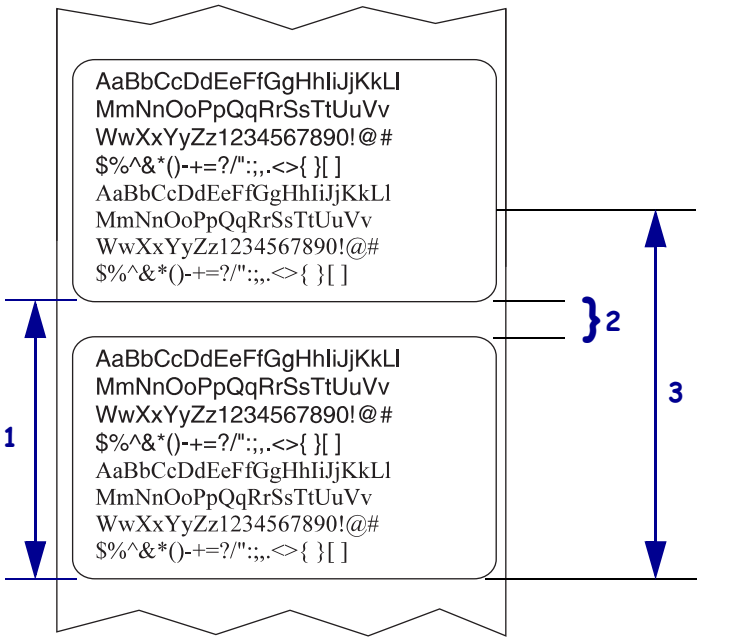
Language/Parameter	Action/Explanation
MAXIMUM LENGTH -39.0IN 988MM	**Set Maximum Label Length** This parameter is used during the media portion of the calibration process. Always set maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length (Figure 15). If the value is set to a smaller value than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate. For example, if the label length is 5.0 inches (126 mm) including the interlabel gap, set the parameter for 6.0 inches (152 mm). If the label length is 7.5 inches (190 mm), set the parameter for 9.0 inches (229 mm). **Figure 15 • Label Length**  | 1 | Label length (including interlabel gap) | | 2 | Interlabel gap | | 3 | Set maximum label length to approximately this value | *Default Value:* 39.0 inches (988 mm) *Selections:* Values are adjustable in one-inch (25.4 mm) increments **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to change the value shown.
*SUPPLIES WARNING -DISABLED +	**Set Supplies Low Warning** When this feature is enabled, the printer provides a warning when the media or ribbon level is low. *Default Value:* DISABLED *Selections:* ENABLED, DISABLED

Table 8 • Printer Parameters (Sheet 6 of 22)

Language/Parameter	Action/Explanation
	**Set Early Warning for Maintenance** When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned. *Default Value:* MAINT. OFF *Selections:* MAINT. OFF, MAINTENANCE ON **To change the Early Warning settings:** 1. When the LCD displays **EARLY WARNING MAINTENANCE**, press PLUS (+) or MINUS (-) to toggle between **OFF** and **ON**. (If you are prompted for a password, enter your password using the instructions in *Change Password-Protected Parameters* on page 88.) 2. Exit Setup mode and save changes to enable additional parameters related to the early warning system. 3. Enter Setup mode again and go to the following parameters to enter the printhead cleaning interval and the printhead life.
	**Set Printhead Cleaning Interval for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. This value should correspond to the length of the media or ribbon roll that you are using. *Default Value:* 450 M/1476 FT *Selections:* 0 M/0 FT to 450 M/1476 FT in 50 M increments **To change the value shown:** 1. Press PLUS (+) or MINUS (-) to set the printhead cleaning interval to the desired number of inches of media or ribbon. When the printhead reaches the set length, **WARNING CLEAN PRINTHEAD** appears on the LCD. If the alert function is enabled, the printer generates an alert.
	**Reset Printhead Cleaning Counter for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. **To reset the printhead cleaning counter:** 1. Did you clean the printhead? • If you cleaned the printhead, press PLUS (+) to select **YES**. • If you did not clean the printhead, press MINUS (-) to select **NO**.

Table 8 • Printer Parameters (Sheet 7 of 22)

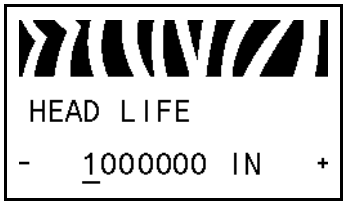
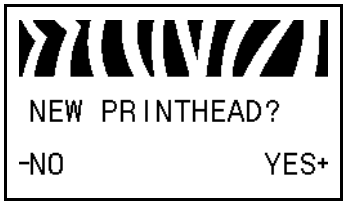
Language/Parameter	Action/Explanation
	**Set Printhead Life for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. Set this value to the number of inches of media that the printhead is expected to print. *Default Value:* 1,000,000 inches *Range:* 100 to 1,000,000 inches **To change the value shown:** 1. Press MINUS (-) to move the cursor. 2. Press PLUS (+) to increase the value of the digit. When the printhead reaches the set length, **WARNING REPLACE HEAD** appears on the LCD. If the alert function is enabled, the printer generates an alert.
	**Reset Printhead Life Counter for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. **To reset the printhead life counter:** 1. Did you replace the printhead? • If you replaced the printhead, press PLUS (+) to select **YES**. • If you did not replace the printhead, press MINUS (-) to select **NO**.
	**View Non-Resettable Counter** This parameter displays the total length of media that the printer has printed. You can use firmware commands to change the unit of measure and reset this counter. Refer to the *Programming Guide* for the printer language being used.
	**View User-Controlled Counter 1** This parameter displays the total length of media that the printer has printed since this parameter was last reset. You can use firmware commands to change the unit of measure and reset this counter. Refer to the *Programming Guide* for the printer language being used.
	**View User-Controlled Counter 2** This parameter displays the total length of media that the printer has printed since this parameter was last reset. You can use firmware commands to change the unit of measure and reset this counter. Refer to the *Programming Guide* for the printer language being used.

Table 8 • Printer Parameters (Sheet 8 of 22)

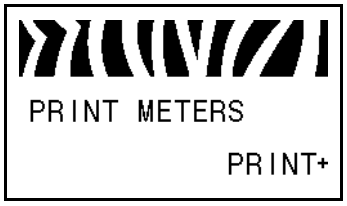
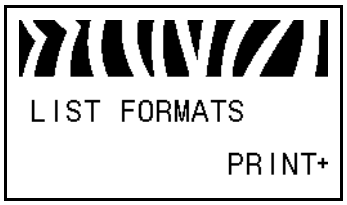
Language/Parameter	Action/Explanation
	**Print Counter Readings** Prints a label that lists the odometer readings for the following: • the non-resettable counter • the two user-controlled counters • the Early Warning for Maintenance counters, which indicate when the printhead was last cleaned and the printhead life If the Early Warning for Maintenance feature is disabled, the counters related to it do not print. **To print a list of the odometer readings:** 1. Press PLUS (+) to print the odometer readings.
	**List Fonts** This option 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 or Flash memory. **To print a list of the available fonts:** 1. Press PLUS (+) to select **PRINT**.
	**List Bar Codes** This option prints a label that lists the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory. **To print a list of the available bar codes:** 1. Press PLUS (+) to select **PRINT**.
	**List Images** This option prints a label that lists the available images stored in the printer's RAM, Flash memory, or optional memory card. **To print a list of the available images:** 1. Press PLUS (+) to select **PRINT**.
	**List Formats** This option prints a label that lists the available formats stored in the printer's RAM, Flash memory, or optional memory card. **To print a list of the available formats:** 1. Press PLUS (+) to select **PRINT**.
	**List Setup** This option prints a configuration label (see Figure 12 on page 89), which lists the current printer configuration. **To print a configuration label:** 1. Press PLUS (+) to select **PRINT**.

Table 8 • Printer Parameters (Sheet 9 of 22)

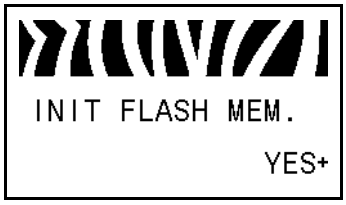
Language/Parameter	Action/Explanation
	**List Network Settings** This option prints a network configuration label (see Figure 13 on page 90), which lists the settings for any print server that is installed. **To print a network configuration label:** 1. Press PLUS (+) to select **PRINT**.
	**List All** This option prints labels that list the available fonts, bar codes, images, formats, and the current printer and network configurations. **To print labels for all settings:** 1. Press PLUS (+) to select **PRINT**.
	**Initialize Flash Memory** This option erases all previously stored information from Flash memory. **Caution** • This option completely erases the Flash memory. **To initialize Flash memory:** 1. If prompted for a password, enter the printer password. For instructions, see *Change Password-Protected Parameters* on page 88. The display shows **INITIALIZE FLASH?** 2. Press PLUS (+) to select **YES**. The display shows **ARE YOU SURE?**. 3. Do you want to continue? • Press MINUS (-) to select **NO** to cancel the request and return to the **INITIALIZE FLASH** prompt. • Press PLUS (+) to select **YES** and begin initialization. When initialization is complete, the control panel displays **INITIALIZING COMPLETED**. **Note** • Depending on the amount of free FLASH memory, initialization may take up to 1 minute to complete.

Table 8 • Printer Parameters (Sheet 10 of 22)

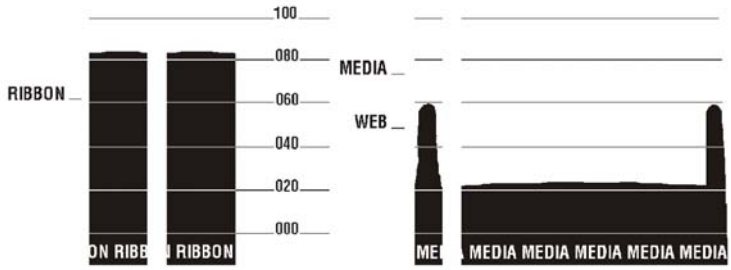
Language/Parameter	Action/Explanation
SENSOR PROFILE PRINT+	**Print Sensor Profile** A sensor profile shows sensor settings compared to actual sensor readings. This label (which will extend across several actual labels or tags) can be used to troubleshoot printing problems. To interpret the results of the sensor profile, see *Sensor Profile* on page 161.  **To print a sensor profile:** **1.** Press PLUS (+) to start this standard calibration procedure and print a media sensor profile. **2.** If the sensitivity of the sensors must be adjusted, perform *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.

Table 8 • Printer Parameters (Sheet 11 of 22)

Language/Parameter	Action/Explanation
MEDIA AND RIBBON CALIBRATE+	**Calibrate Media and Ribbon Sensor Sensitivity** Use this procedure to adjust sensitivity of media and ribbon sensors. **Important •** Follow this procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press MINUS (-) at any step in this procedure to cancel the process. **To perform a media and ribbon sensor calibration:** **1.** Press PLUS (+) to start the calibration procedure. The LOAD BACKING 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.** Leave the printhead open. **5.** Press PLUS (+) to continue. The REMOVE RIBBON prompt displays. **6.** Remove the ribbon (if used). **7.** Close the printhead. **8.** Press PLUS (+) 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 based on the specific media and ribbon combination being used. On the sensor profile, this essentially corresponds to moving the peak of the graph up or down to optimize the readings for your application. When calibration is complete, RELOAD ALL displays. **9.** Open the printhead and pull the media forward until a label is positioned under the media sensor. **10.** Reload the ribbon (if used). **11.** Close the printhead. **12.** Press PLUS (+) to continue. The printer performs an auto-calibration. During this process, the printer checks the readings for the media and ribbon based on the new scale established, determines the label length, and determines the print mode. To see the new readings on the new scale, print a sensor profile.
PARALLEL COMM. -BIDIRECTIONAL +	**Set Parallel Communications** Select the communications port that matches the one being used by the host computer. *Default Value:* BIDIRECTIONAL *Selections:* BIDIRECTIONAL, TWINAX/COAX, UNIDIRECTIONAL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 12 of 22)

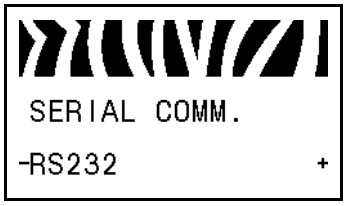
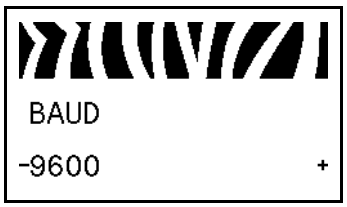
Language/Parameter	Action/Explanation
	**Set Serial Communications** Select the communications port that matches the one being used by the host computer. This setting applies only when the serial port is used. **Note •** Select RS232 if you are using an external adapter to enable RS422/485 operation. *Default Value:* RS232 *Selections:* RS232, RS422/485, RS485 MULTIDROP **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Baud** This setting applies only when the serial port is used. 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. *Default Value:* 9600 *Selections:* 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Data Bits** This setting applies only when the serial port is used. 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. *Default Value:* 8 BITS *Selections:* 7 BITS, 8 BITS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Set Parity** This setting applies only when the serial port is used. 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. *Default Value:* NONE *Selections:* EVEN, ODD, NONE **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 13 of 22)

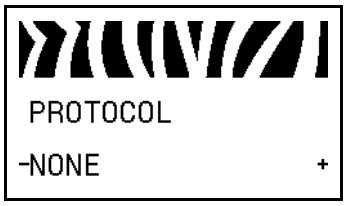
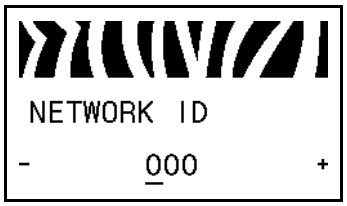
Language/Parameter	Action/Explanation
	**Set Host Handshake** This setting applies only when the serial port is used. The handshake protocol of the printer must match the handshake protocol of the host computer for communication to take place. Select the handshake protocol that matches the one being used by the host computer. *Default Value:* XON/XOFF *Selections:* XON/XOFF, DSR/DTR, RTS/CTS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Protocol** Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer. Further details on protocol can be found in the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML*. *Default Value:* NONE *Selections:* NONE, ZEBRA, ACK_NAK **Note •** ZEBRA is the same as ACK_NAK, except that ZEBRA response messages are sequenced. If ZEBRA is selected, the printer must use DSR/DTR for host handshake protocol. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Network ID** This parameter assigns a unique number to the printer when the printer is operating in an RS422/485 multi-drop network environment (an external RS422/485 adapter is required). This gives the host computer the means to address a specific printer. This does not affect TCP/IP or IPX networks. *Default Value:* 000 *Range:* 000 to 999 **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to increase the value of the digit.
	**Set Communications Mode** The communication diagnostics mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. For more information, see *Communications Diagnostics Test* on page 160. *Default Value:* NORMAL MODE *Selections:* NORMAL MODE, DIAGNOSTICS **To select communication diagnostics mode:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 8 • Printer Parameters (Sheet 14 of 22)

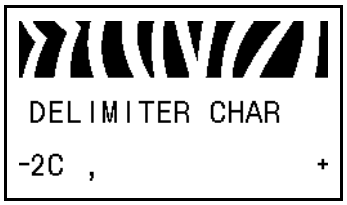
Language/Parameter	Action/Explanation
	**Set Control Prefix Character** The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 7E ~ *Range:* 00 to FF **To change the value shown:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to increase the value of the digit.
	**Set Format Prefix Character** The format prefix is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this hex character to indicate the start of a ZPL/ZPL II format instruction. See the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* for more information. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 5E ^ *Range:* 00 to FF **To change the value shown:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to increase the value of the digit.
	**Set Delimiter Character** The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. See the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* for more information. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 2C , *Range:* 00 to FF **To change the value shown:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to increase the value of the digit.

Table 8 • Printer Parameters (Sheet 15 of 22)

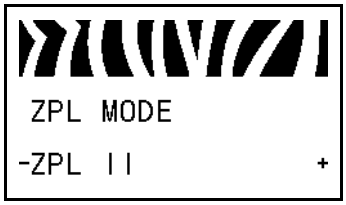
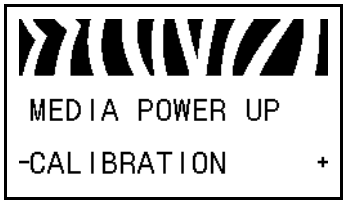
Language/Parameter	Action/Explanation
	**Select ZPL Mode** The printer remains in the selected mode until it is changed by this parameter or by using a ZPL/ZPL II command. The printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. See the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* for more information on the differences between ZPL and ZPL II. *Default Value:* ZPL II *Range:* ZPL II, ZPL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Media Power-Up Option** This parameter sets the action of the media when you turn on the printer. *Default Value (non-RFID printers):* CALIBRATION *Default Value (RFID printers):* FEED *Selections:* CALIBRATION, LENGTH, SHORT CAL, NO MOTION, FEED • **Calibration** adjusts sensor levels and thresholds, determines length, and feeds the media to the next web. • **Short Cal** sets media and web thresholds without adjusting sensor gain, determines length, and feeds the media to the next web. • **Length** determines label length using current sensor values, and feeds the media to the next web. • **No Motion** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • **Feed**—feeds the labels to the first registration point. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 16 of 22)

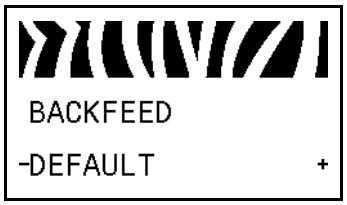
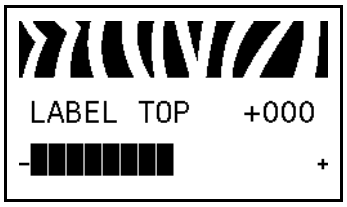
Language/Parameter	Action/Explanation
	**Select Head Close Option** This parameter sets the action of the media when you close the printhead. *Default Value (non-RFID printers):* CALIBRATION *Default Value (RFID printers):* FEED *Selections:* CALIBRATION, LENGTH, SHORT CAL, NO MOTION, FEED • **Calibration** adjusts sensor levels and thresholds, determines length, and feeds the media to the next web. • **Short Cal** sets media and web thresholds without adjusting sensor gain, determines length, and feeds the media to the next web. • **Length** determines label length using current sensor values, and feeds the media to the next web. • **No Motion** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web. • **Feed**—feeds the labels to the first registration point. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Select Backfeed Sequence** This parameter sets when label backfeed occurs after a label is removed in some print modes. It has no effect in Rewind mode. This setting is superseded by ~JS when received as part of a label format (see the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* for more information). *Default Value:* DEFAULT (90%) *Selections:* DEFAULT, AFTER, OFF, BEFORE, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80% **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Adjust Label Top Position** This parameter adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead) by the specified number of dots. Negative numbers adjust the position up the label (toward the printhead). *Default Value:* +000 *Range:* -120 to +120 **To change the value shown:** **1.** Press PLUS (+) to increase the value. **2.** Press MINUS (-) to decrease the value.

Table 8 • Printer Parameters (Sheet 17 of 22)

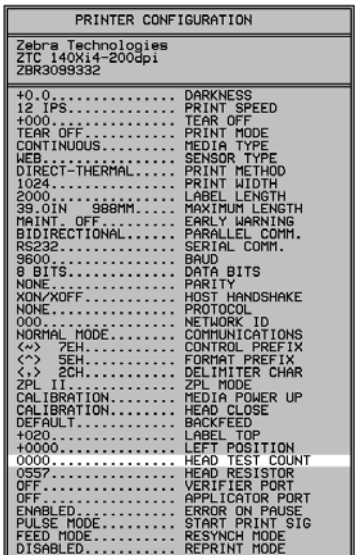
Language/Parameter	Action/Explanation
LEFT POSITION - +0000 +	**Adjust Left Position** This parameter adjusts the print position horizontally on the label. Positive numbers adjust printing to the left by the specified number of dots. Negative numbers shift printing to the right. *Default Value:* 0000 *Range:* –9999 to +9999 dots **To change the value shown:** 1. Press MINUS (-) to move the cursor. 2. Press PLUS (+) to change between +/- and to increase the value of the digit. For a negative value, enter the value before changing to the minus sign.
HEAD TEST COUNT - 0000 +	**Set the Head Test Count** The printer periodically performs a test of the printhead functionality, called a printhead test or head test. This parameter establishes how many labels are printed between these internal tests. **Note •** On the 110Xi4, this parameter appears only if the Head Test Count option is installed. Check the printer configuration label for the option.  PRINTER CONFIGURATION Zebra Technologies ZTC 140Xi4-200dpi ZBR3099332 +0.0..... DARKNESS 12 IPS..... PRINT SPEED +000..... TEAR OFF TEAR OFF..... PRINT MODE CONTINUOUS..... MEDIA TYPE WEB..... SENSOR TYPE DIRECT-THERMAL..... PRINT METHOD 1024..... PRINT WIDTH 2000..... LABEL LENGTH 39.0IN 988MM..... MAXIMUM LENGTH MAINT. OFF..... EARLY WARNING 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..... COMMUNICATIONS <~> 7EH..... CONTROL PREFIX <^> 5EH..... FORMAT PREFIX <,> 2CH..... DELIMITER CHAR ZPL II..... ZPL MODE CALIBRATION..... MEDIA POWER UP CALIBRATION..... HEAD CLOSE DEFAULT..... BACKFEED +020..... LABEL TOP +0000..... LEFT POSITION 0000..... HEAD TEST COUNT 0557..... HEAD RESISTOR OFF..... VERIFIER PORT OFF..... APPLICATOR PORT ENABLED..... ERROR ON PAUSE PULSE MODE..... START PRINT SIG FEED MODE..... RESYNCH MODE DISABLED..... REPRINT MODE **Default:** 0000 (disables the test) **Range:** 0000 to 9999 **To set the number of labels to print between head tests:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to increase the value of the digit.

Table 8 • Printer Parameters (Sheet 18 of 22)

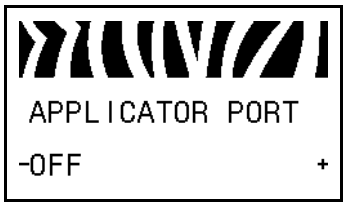
Language/Parameter	Action/Explanation
	**Set the Verifier Port** The auxiliary port is used to determine how the printer reacts to an online verifier. For more information on the operation of the optional verifier, refer to the documentation provided with that option. **Default:** OFF **Selections:** OFF, VER-RPRNT ERR, VER-THRUPUT • **OFF:** The verifier port is off. • **VER-RPRNT ERR:** Label reprinted if verifier detects an error. If a bar code is near the upper edge of the label, the label is fed out far enough to be verified and then backfed to allow the next label to be printed and verified. • **VER-THRUPUT:** Allows greatest throughput but may not indicate a verification error immediately upon detection. May print from one to three labels before an error is recognized and printing stops. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Applicator Port Mode** Determines the action of the applicator port. **Note •** Set this value as suggested by the applicator manufacturer. **Default:** OFF **Selections:** OFF, MODE 1, MODE 2, MODE 3, MODE 4 • **OFF:** The applicator port is off. • **MODE 1:** Asserts the ~END_PRINT signal low while the printer is moving the label forward. • **MODE 2:** Asserts the ~END_PRINT signal high while the printer is moving the label forward. • **MODE 3:** Asserts the ~END_PRINT signal low for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. • **MODE 4:** Asserts the ~END_PRINT signal high for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 8 • Printer Parameters (Sheet 19 of 22)

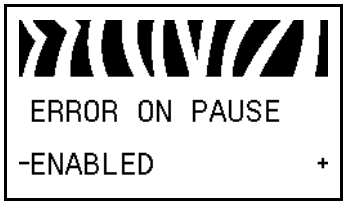
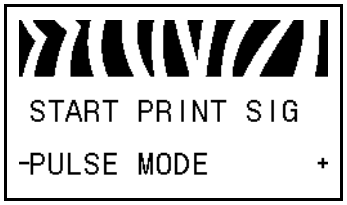
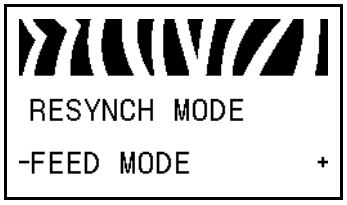
Language/Parameter	Action/Explanation
	**Set Applicator Error Signal When Printer Pauses** When this option is enabled and the printer is paused, the printer sets the applicator error state. **Default:** ENABLED **Selections:** ENABLED, DISABLED **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Start Print Signal** This parameter determines how the printer reacts to the Start Print Signal input on pin 3 of the applicator interface connector at the rear of the printer. **Caution •** Start Print Signal is set by the applicator manufacturer and should not be changed unless the factory defaults have been reloaded. Please make a note of it. While other choices are valid, the printer must be returned to its designated setting for it to work properly. **Default:** PULSE MODE **Selections:** PULSE MODE, LEVEL MODE • **PULSE MODE**—Labels print when the signal transitions from HIGH to LOW. • **LEVEL MODE**—Labels print as long as the signal is asserted LOW. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Resynch Mode** This parameter determines how the printer reacts if the label synchronization is lost and the label top is not where expected. **Default:** FEED MODE **Selections:** FEED MODE, ERROR MODE • **FEED MODE**—If the label top is not where expected, the printer feeds a blank label to find the label top position. • **ERROR MODE**—If the label top is not where expected, the printer stops, enters Pause mode, displays the message **Error Condition Feed Label**, flashes the ERROR light, and asserts the Service Required signal (pin 10 on the Applicator Interface Connector). To resynch the media to the top of the label in Error mode, press PAUSE to exit Pause mode. The ERROR light stops flashing, and the Service Required signal is deactivated. The action of the printer is determined by the **Head Close** configuration selection (see *Select Head Close Option* on page 106). **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 8 • Printer Parameters (Sheet 20 of 22)

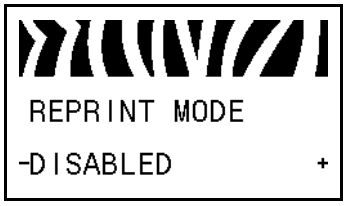
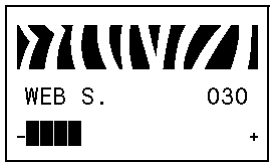
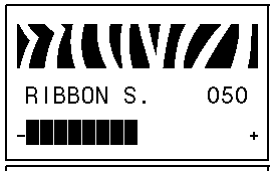
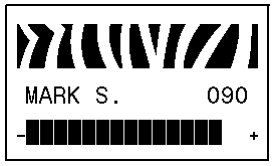
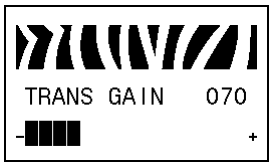
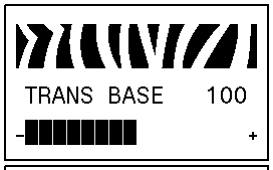
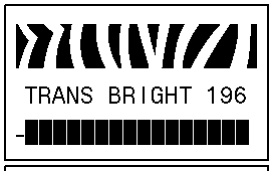
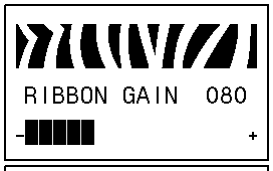
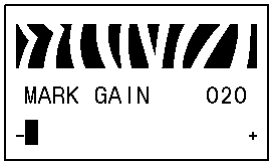
Language/Parameter	Action/Explanation
	**Set Reprint Mode** When reprint mode is enabled, you can reprint the last label printed either by issuing the ~PR ZPL command or by pressing MINUS (-) on the control panel. *Default Value:* DISABLED *Selections:* ENABLED, DISABLED **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
See next column	**View Sensor Settings** These parameters are automatically set during the calibration procedure and should be changed only by a qualified service technician. Refer to the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* for information on these parameters. **To skip these parameters:** **1.** Press NEXT/SAVE to skip each of the following parameters:           

Table 8 • Printer Parameters (Sheet 21 of 22)

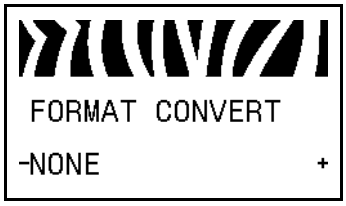
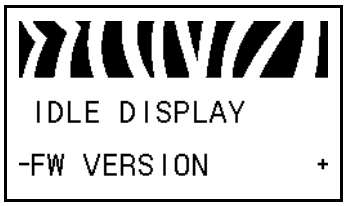
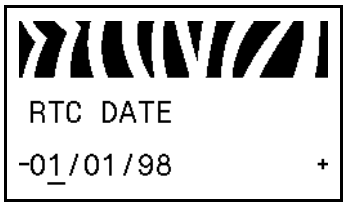
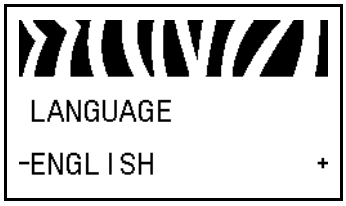
Language/Parameter	Action/Explanation
	**Select Format Convert** Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale. *Default Value:* NONE *Selections:* NONE, 150 → 300, 150 → 600, 200 → 600, 300 → 600 **To change the value shown:** 1. Press PLUS (+) or MINUS (-) to scroll through the options.
	**Select Idle Display** This parameter selects the LCD options for the real-time clock. **Note •** If the default value is not selected, pressing PLUS (+) or MINUS (-) briefly displays the firmware version of the printer. *Default Value:* FIRMWARE (FW) VERSION *Selections:* MM/DD/YY (24HR), MM/DD/YY (12HR), DD/MM/YY (24HR), DD/MM/YY (12HR), FW VERSION **To change the value shown:** 1. Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Real-Time Clock (RTC) Date** This parameter allows you to set the date following the convention selected in **IDLE DISPLAY**. **To change the value shown:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to change the value of the digit.
	**Set RTC Time** This parameter allows you to set the time following the convention selected in **IDLE DISPLAY**. **To change the value shown:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to change the value of the digit.
	**Specify Password Level** This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected. *Default Value:* SELECTED ITEMS *Selections:* SELECTED ITEMS, ALL ITEMS 1. Press PLUS (+) or MINUS (-) to toggle between the options.

Table 8 • Printer Parameters (Sheet 22 of 22)

Language/Parameter	Action/Explanation
	**Select the Display Language** This parameter changes the language displayed on the LCD. Each language selection is displayed in the language itself. *Default Value:* ENGLISH *Selections:* ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, JAPANESE, KOREAN, SIMPLIFIED CHINESE, TRADITIONAL CHINESE, RUSSIAN, POLISH  **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Additional Control Panel Parameters

Additional parameters appear in the following situations:

- When a Radio Frequency Identification (RFID) reader/encoder is installed.

  The R110Xi4 is equipped with an RFID reader/encoder. The 110Xi4 is RFID-ready, but it does not come with an RFID reader. For more information about purchasing the RFID option, contact your authorized Zebra reseller.

- When a wired print server is installed in the printer.

  For more information, refer to the *ZebraNet 10/100 Print Server User and Reference Guide*

- When a wireless print server is installed in the printer.

  Refer to the *ZebraNet Wireless User Guide*.

Copies of the print server manuals and the *RFID Programming Guide* are available at http://www.zebra.com/manuals or on the user CD that came with your printer.

Notes •

5

Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

Replacing Printer Components 116
Ordering Replacement Parts 116
Recycling Printer Components 116
Lubrication 116
Cleaning Schedule and Procedures. 117
Clean the Exterior 117
Clean the Media Compartment 118
Clean the Printhead and Platen Roller. 118
Clean the Sensors 121
Clean the Snap Plate 124
Clean the Cutter. 130
Replace the Fuse. 131

Replacing Printer Components

Some printer components, such as the printhead and platen roller, may wear out over time and can be replaced easily. Regular cleaning may extend the life of some of these components. See *Cleaning Schedule and Procedures* on page 117 for the recommended cleaning intervals.

Ordering Replacement Parts

For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra™ supplies as part of the total solution.

Contact your authorized Zebra reseller for part ordering information, or see *Contacts* on page 7 for contact addresses and telephone numbers.

Recycling Printer Components



The majority of this printer's components are recyclable. The printer's main logic board includes a battery that you should dispose of properly.

Do not dispose of any printer components in unsorted municipal waste. Please dispose of the battery according to your local regulations, and recycle the other printer components according to your local standards. For more information, see http://www.zebra.com/environment.

Lubrication

Other than lubricating the cutter blade after approximately 60,000 cuts, no lubrication is needed for this printer.



Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

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

Cleaning Schedule and Procedures

Cleaning your printer regularly maintains print quality and may extend the life of the printer. The recommended cleaning schedule is shown in Table 10. See the following pages for specific procedures.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

Caution • Use only the cleaning agents indicated. Zebra is not responsible for damage caused by any other fluids being used on this printer.

Table 10 • Recommended Printer Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*	Perform these procedures at the following times: • When CLEAN HEAD NOW appears. • **Direct Thermal Print Mode:** After every roll of labels or 500 ft (150 m) of fanfold labels. • **Thermal Transfer Print Mode:** After every roll (1500 ft or 450 m) of ribbon.
Platen roller	Solvent*	
Transmissive (media) sensor	Air blow†	
Black mark sensor	Air blow†	
Media path	Solvent*	
Ribbon sensor	Air blow	
Label-available sensors	Air blow	Every 6 months, or as needed
Tear-off/peel-off bar	Solvent*	
Snap plate	Solvent*	As needed
Cutter	Solvent*	

* 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%).

† If using canned air, it is recommended that you turn off the printer before cleaning.

Clean the Exterior

Clean the outside surfaces of the printer with a lint-free cloth. Use a mild detergent solution or desktop cleaner sparingly, as needed.

Caution • Do not use harsh or abrasive cleaning agents or solvents.

Clean the Media Compartment

After every four rolls of media, inspect the media compartment. Use a soft bristle brush or a vacuum cleaner to remove any dirt and lint from the interior of the printer.

Clean the Printhead and Platen Roller

If print quality does not improve after you perform this procedure, clean the printhead with *Save-a-Printhead* cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller or distributor for more information.

Cleaning intervals are as follows, based on the printhead resolution:

For 203 and 300 dpi printers Clean the printhead after every roll (1500 feet or 450 m) of thermal transfer ribbon or after every roll (500 feet or 150 m) of direct thermal labels or when CLEAN HEAD NOW appears on the LCD. Clean the printhead more often if you see inconsistent print quality, such as voids in the bar code or graphics.

For 600 dpi printers Clean the printhead after each roll (500 feet or 150 m) of labels or when CLEAN HEAD NOW appears on the LCD. Clean the printhead more often if you see inconsistent print quality, such as voids in the bar code or graphics.



If power is removed from a 600 dpi printer when cleaning the printhead, the CLEAN HEAD NOW warning shown on the LCD will not disappear.

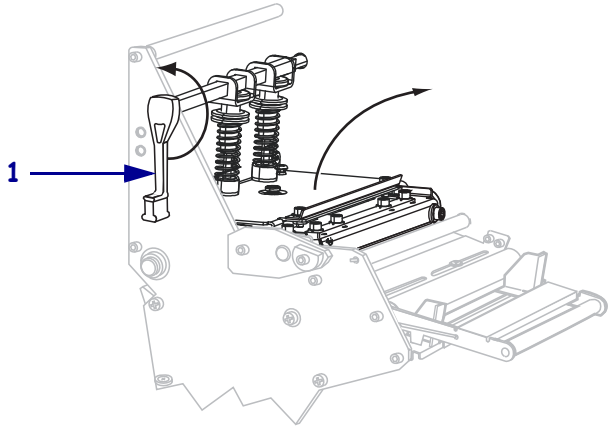
Caution • The printhead may be hot and can cause severe burns. Allow the printhead to cool.

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.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

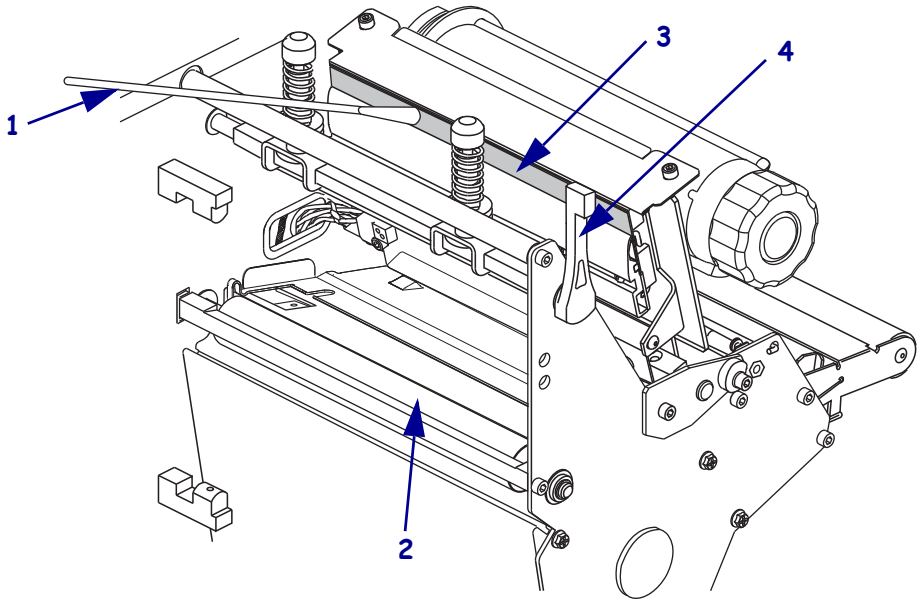
To clean the printhead and platen roller, complete these steps:

1. Open the printhead assembly by rotating the printhead-open lever (**1**) counter-clockwise.



2. Remove the media and ribbon (if loaded).

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.

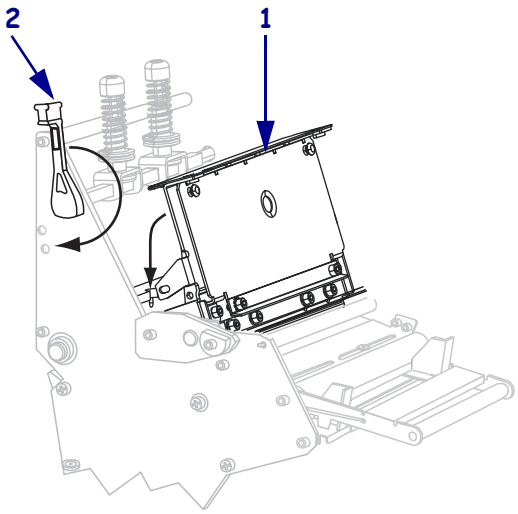


1	Swab
2	Platen roller
3	Printhead print elements
4	Printhead-open lever

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

5. Reload the media and the ribbon (if required).

6. Push down the printhead assembly (**1**), and then rotate the printhead-open lever (**2**) clockwise until it locks into place.



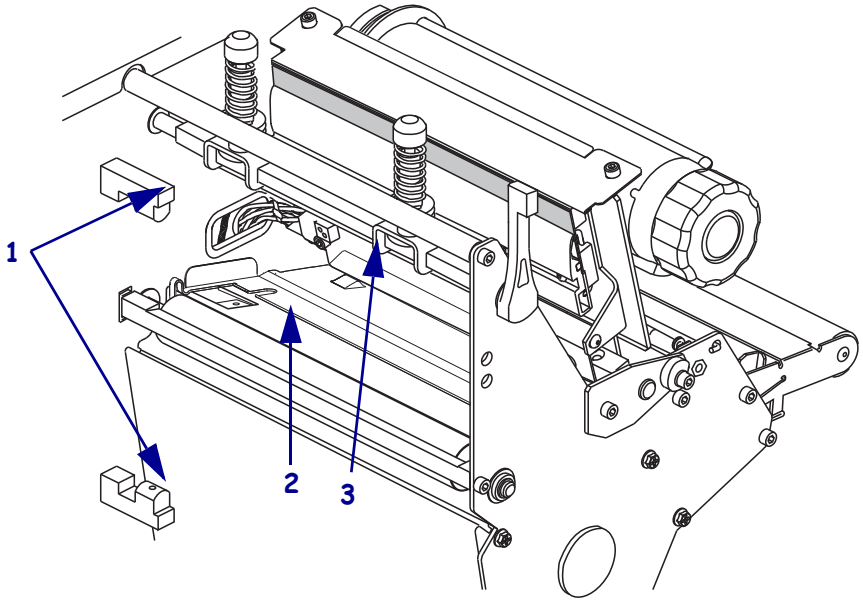
Clean the Sensors

Brush or vacuum any accumulated paper lint and dust off the sensors. Clean the sensors according to the recommendations in *Cleaning Schedule and Procedures* on page 117.

Ribbon and Label-Available Sensor Locations

The ribbon sensor and optional label-available sensor are shown in Figure 16.

Figure 16 • Sensor Locations

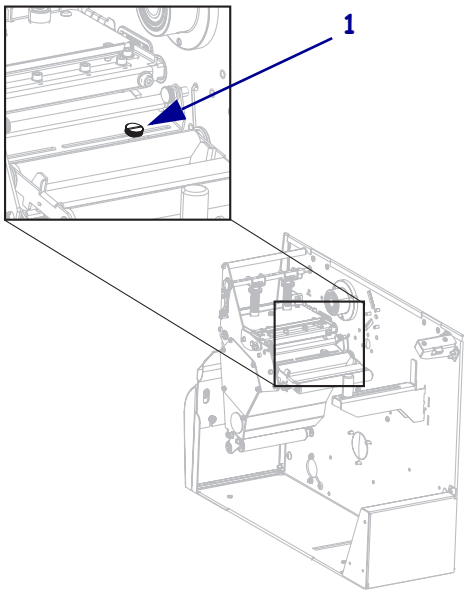


1	Label-available sensors
2	Black mark sensor
3	Ribbon sensor

Transmissive Media Sensor

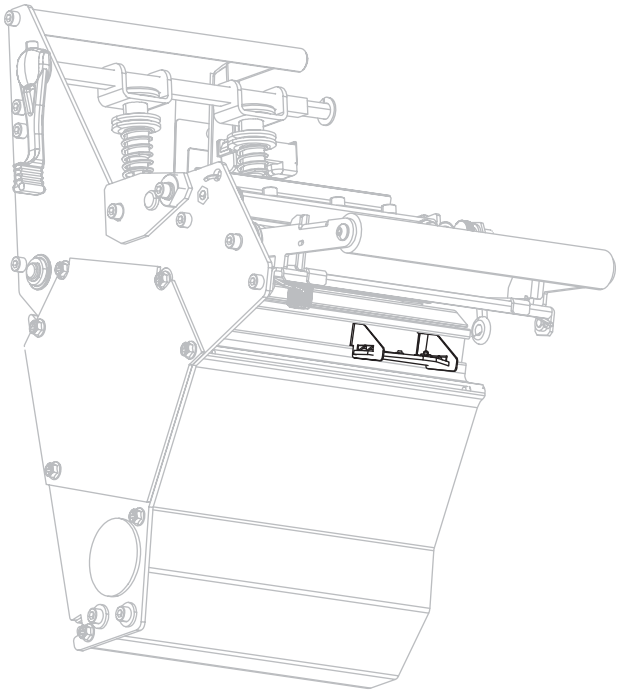
The upper and lower transmissive media sensors are show in Figure 17 and Figure 18.

Figure 17 • Upper Media Sensor



1	Upper media sensor adjustment screw

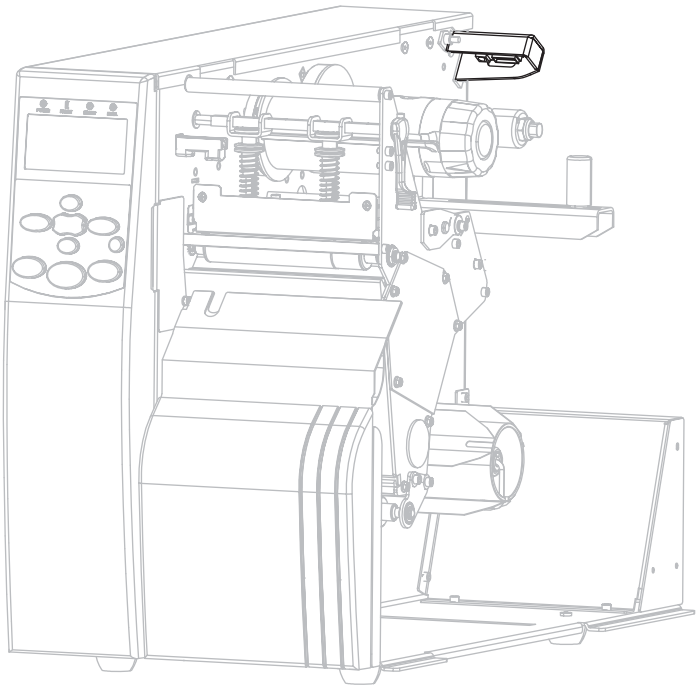
Figure 18 • Lower Media Sensor



Media Out Sensor Location

The location of the media out sensor is shown in Figure 19.

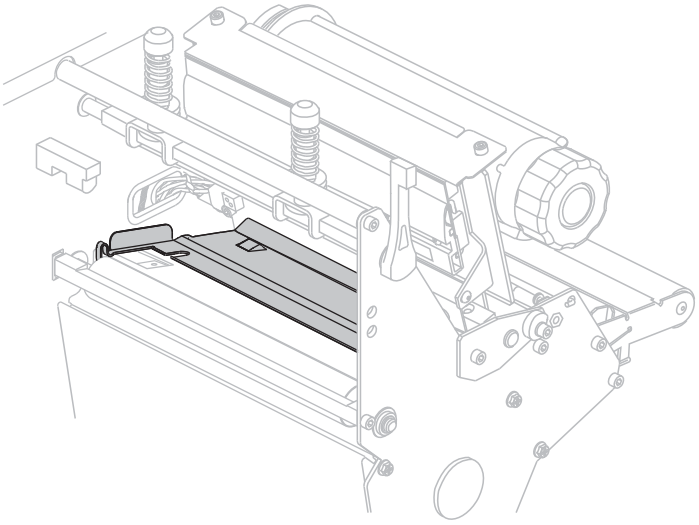
Figure 19 • Media Out Sensor



Clean the Snap Plate

Clean the snap plate when label adhesive or a label is stuck to the underside. Figure 20 shows the location of the snap plate. The snap plate is made of plastic in RFID printers and of metal in non-RFID printers.

Figure 20 • Snap Plate Location



Non-RFID Printers

Important • Be careful not to bend or twist the metal snap plate as you remove it from or insert it into the printer.

To clean a metal snap plate in a non-RFID printer, complete these steps:

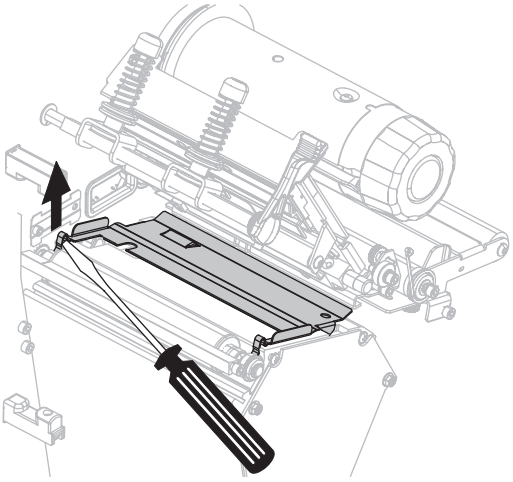
1. **Caution •** Turn off (**O**) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (**O**) the printer, and disconnect the AC power cord and all data cables.

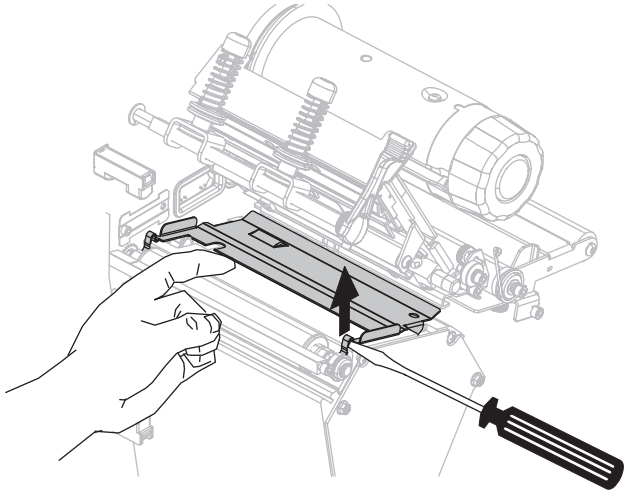
2. **Caution •** While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead.

   Open the printhead and remove the media and ribbon (if used).

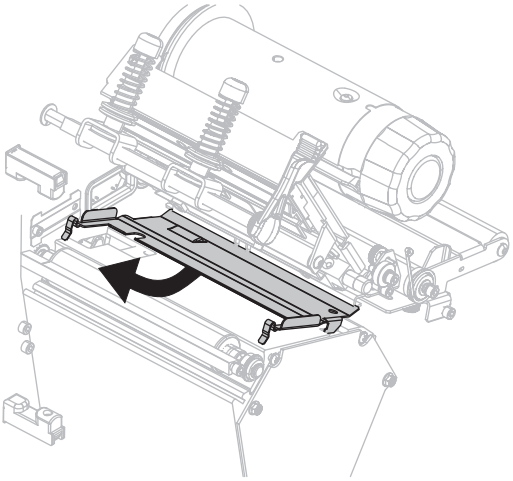
3. Insert a small-blade screwdriver or similar tool into the loop on the left side of the snap plate. Gently lift the left side of the snap plate slightly and, if necessary, support it with your left hand.



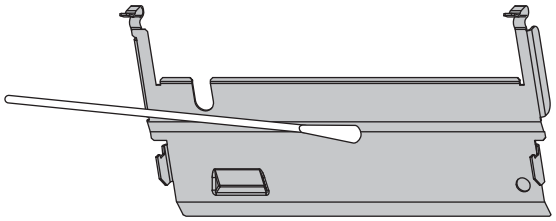
4. Insert the small-blade screwdriver or similar tool into the loop on the right side of the snap plate. Gently lift the right side of the snap plate.



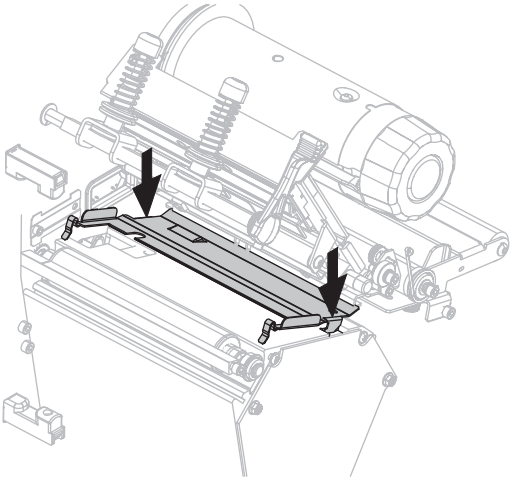
5. Remove the snap plate from the printer.



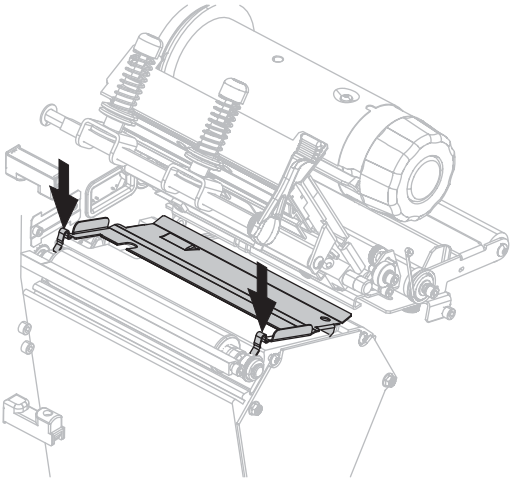
6. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the back of the snap plate. In place of the Preventive Maintenance Kit, you may use a clean swab or soft cloth dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



7. To reinstall the snap plate, insert the two tabs on the bottom of the snap plate into the two slots of the media path.



8. Press down on the loops to lock the snap plate into place.



9. Reinstall the media and ribbon (if used).

10. Reconnect the data cables and AC power cord, and turn on (**I**) the printer.

RFID Printers

Important • Do not use a screwdriver or other metal objects when removing the plastic snap plate from an RFID printer. Doing so could damage the snap plate.

To clean a plastic snap plate in an RFID printer, complete these steps:

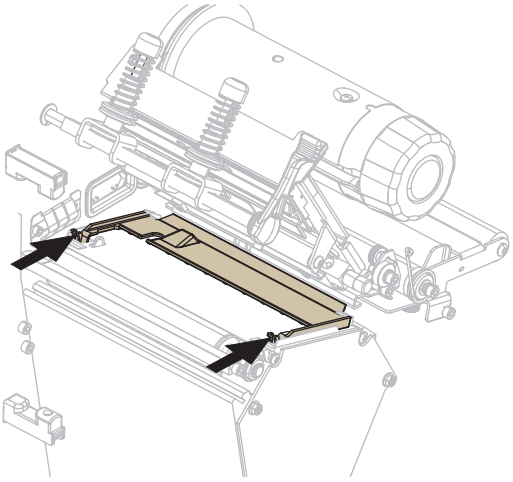
1. **Caution •** Turn off (**O**) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (**O**) the printer and disconnect the AC power cord and all data cables.

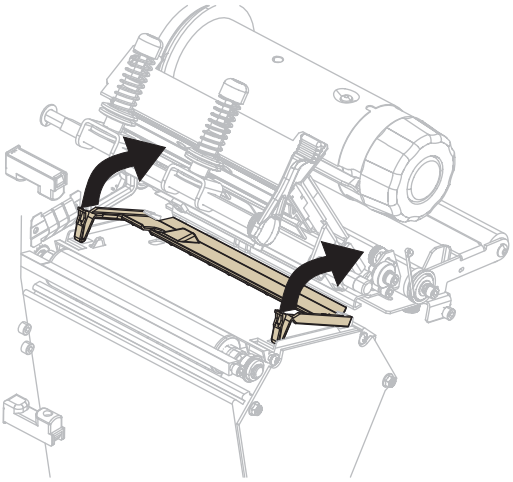
2. **Caution •** While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead.

   Open the printhead and remove the media and ribbon (if used).

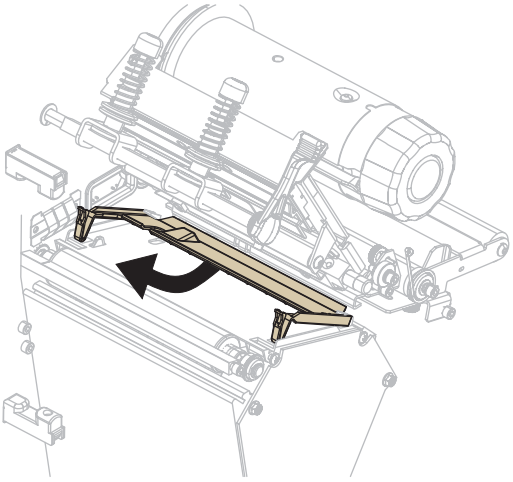
3. Press in the tabs on the sides of the snap plate.



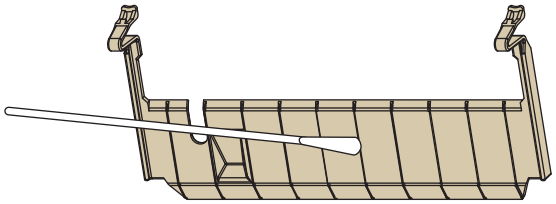
4. Rotate the front of the snap plate upward.



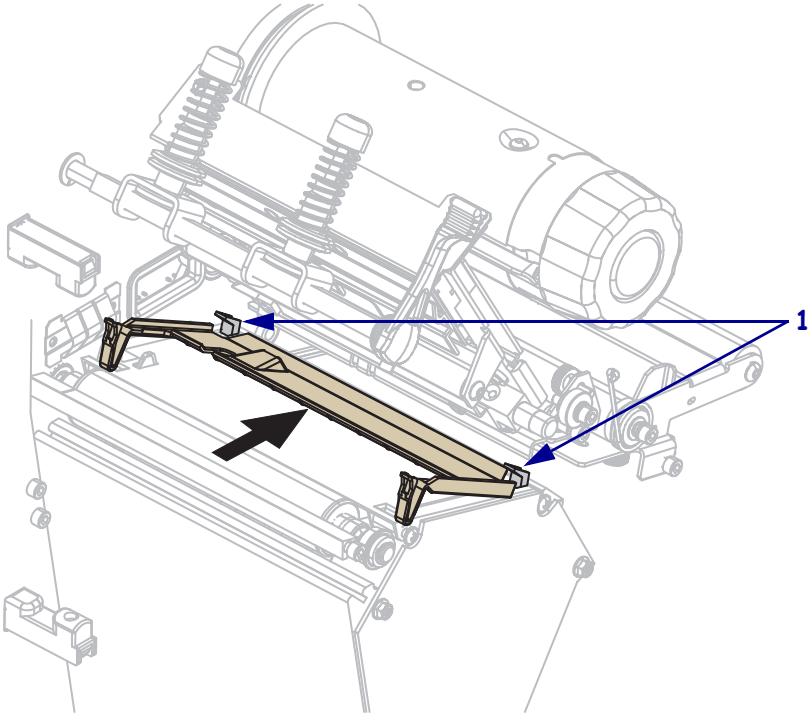
5. Remove the snap plate from the printer.



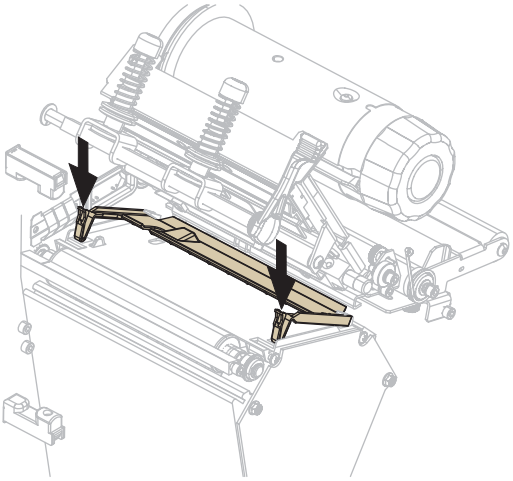
6. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the back of the snap plate. In place of the Preventive Maintenance Kit, you may use a clean swab or soft cloth dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.



7. To reinstall the snap plate, insert the snap plate into the printer until it hits the stops (**1**) on the back of the encoder plate.



8. Press down on the tabs to lock the snap plate into place.



9. Reinstall the media and ribbon (if used).
10. Reconnect the data cables and AC power cord, and turn on (**I**) the printer.

Clean the Cutter

If the cutter is not cutting the labels cleanly or if it jams with labels, clean the cutter.

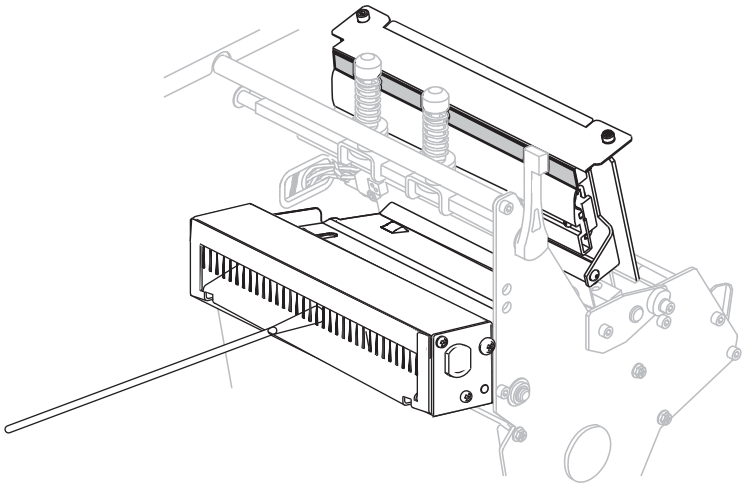
Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

To clean the cutter, complete these steps:

1. **Caution •** Turn off (**O**) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (**O**) the printer, and disconnect the AC power cord and all data cables.

2. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the stationary cutter blade. 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.



3. If cleaning does not remove label fragments and adhesive, contact an authorized service technician.

4. Reconnect the data cables and AC power cord, and turn on (**I**) the printer.

Replace the Fuse

The instructions that follow are for the 140Xi4, 170Xi4, and 220Xi4 printers only. Fuses are not user-replaceable in the 110Xi4.

Caution • Turn the AC power switch off (**O**) and remove the power cord before performing this procedure.

The printer uses a metric-style fuse (5 × 20 mm IEC) rated at F5A, 250 V. The AC power entry module comes with two approved fuses in the fuse holder: one is in-circuit, and the second is provided as a spare. The end caps of the fuse must bear the certification mark of a known international safety organization (see Figure 5 on page 29).

To replace a faulty fuse, complete these steps:

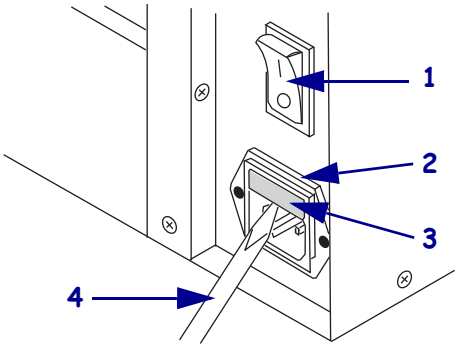
1. **Caution •** Turn off (**O**) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (**O**) the printer, and disconnect the AC power cord and all data cables.

2. Use a small-blade screwdriver or similar tool to remove the fuse holder.

   The fuse holder is part of the AC power entry module at the rear of the printer (Figure 21).

Figure 21 • AC Power Entry Module

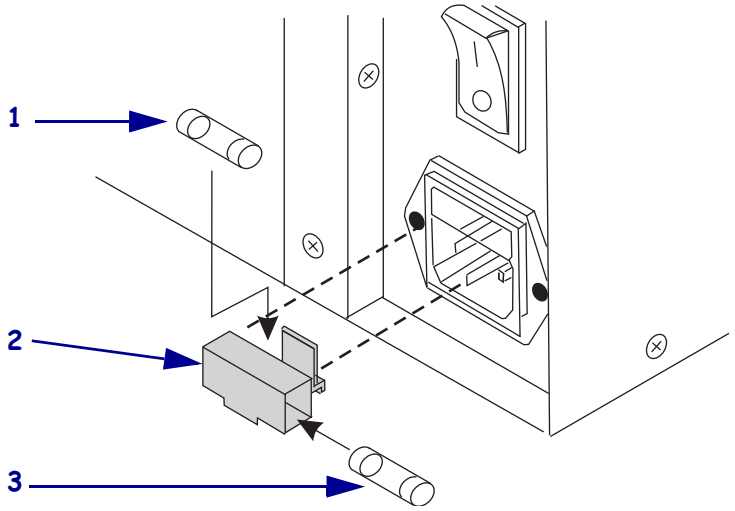


1	Power switch
2	Fuse holder
3	AC power entry module
4	Small-blade screwdriver

3. Remove the faulty fuse and install a new fuse in the in-circuit position (Figure 22).

   Important • If you use the spare fuse, be sure to order a replacement fuse from an authorized Zebra distributor. The spare fuse should be the exact type and rating as the original in-circuit fuse.

Figure 22 • Fuse Locations



1	In-circuit fuse
2	Fuse holder
3	Spare fuse

4. Snap the fuse holder back into the AC power entry module.
5. Reconnect the data cables and AC power cord, and turn on (**I**) the printer.

Note • If the printer does not power on, an internal component failure may have occurred, and the printer requires servicing by an authorized service technician.

6 Troubleshooting

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

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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 135.
- ❑ Are noncontinuous labels being treated as continuous labels? If yes, see *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
- ❑ Is the CHECK RIBBON light on when ribbon is loaded properly? If yes, see *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
- ❑ Are you experiencing problems with print quality? If yes, see *Print Quality Problems* on page 141.
- ❑ Are you experiencing communications problems? If yes, see *Communications Problems* on page 146.

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 31.
- ❑ Are you using a label that is narrower than the maximum print width? See *Set Print Width* on page 94.
- ❑ Review the label- and ribbon-loading illustrations in *Print Modes and Printer Options* on page 36 and *Load Ribbon* on page 69.
- ❑ Does the printhead need to be adjusted? See *Adjust Printhead Pressure and Toggle Position* on page 82 for more information.
- ❑ Do the sensors need to be calibrated? See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101 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 153. Use the results to help identify the problem.
- ❑ If you are still having problems, see *Contacts* on page 7 for customer support information.

LCD Error Messages

The LCD displays messages when there is an error. See Table 11 for LCD errors, the possible causes, and the recommended solutions.

Table 11 • LCD Error Messages

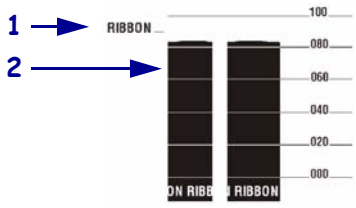
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
ERROR CONDITION INVALID HEAD The ERROR light flashes.	The printhead was replaced with one that is not a genuine Zebra™ printhead.	Install a genuine Zebra™ printhead.
ERROR CONDITION RIBBON OUT The printer stops; the RIBBON light is on; the ERROR light flashes.	In thermal transfer mode, ribbon is not loaded or incorrectly loaded.	Load ribbon correctly. See *Load Ribbon* on page 69.
	In thermal transfer mode, the ribbon sensor is not detecting ribbon.	**1.** Load ribbon correctly. See *Load Ribbon* on page 69. **2.** Calibrate the sensors. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	In thermal transfer mode, media is blocking the ribbon sensor.	**1.** Load media correctly. See *Print Modes and Printer Options* on page 36. **2.** Calibrate the sensors. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	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 100. The ribbon out threshold (**1**) is likely too high, above the black area that indicates where the ribbon is detected (**2**).  **2.** Calibrate the sensors or load printer defaults. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101 or *LOAD DEFAULTS* on page 87.

Table 11 • LCD Error Messages (Continued)

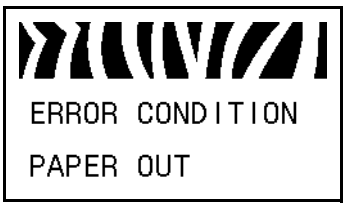
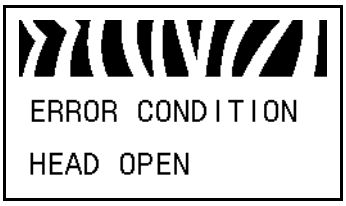
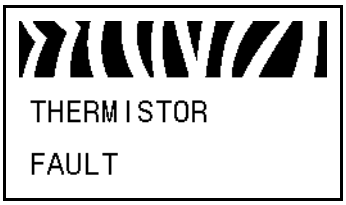
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
 The RIBBON light is on; the ERROR light flashes.	Ribbon is loaded, but the printer is set for direct thermal mode.	Ribbon is not required with direct thermal media. If you are using direct thermal media, remove the ribbon. This error message will not affect printing.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See *Select Print Method* on page 93.
 The printer stops; the MEDIA light is on; the ERROR light flashes.	The media is not loaded or is loaded incorrectly.	Load media correctly. See *Print Modes and Printer Options* on page 36.
	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.
 The printer stops; the ERROR light flashes.	The printhead is not fully closed.	Close printhead completely.
	The head open sensor is not working properly.	Call a service technician.
 The ERROR light flashes.	The printhead has a faulty thermistor.	Call a service technician.

Table 11 • LCD Error Messages (Continued)

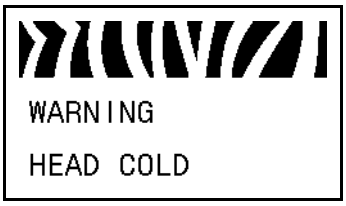
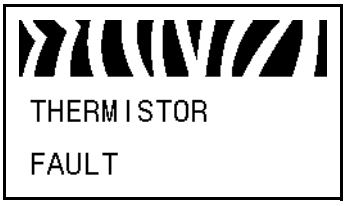
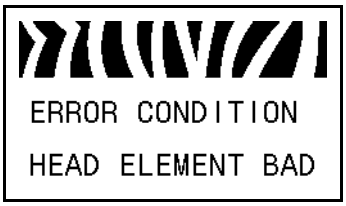
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
   The printer stops; the ERROR light is on; the printer cycles through these three messages.	 **Caution •** An improperly connected printhead data or power cable can cause these error messages. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	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.
	The printhead has a faulty thermistor.	Call a service technician.

Table 11 • LCD Error Messages (Continued)

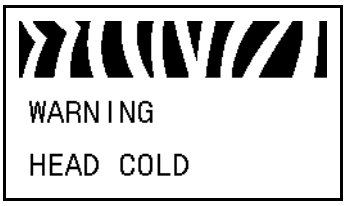
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
 The printer prints while the ERROR light flashes.	**Caution** • An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead temperature is approaching its lower operating limit.	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.
	The printhead has a faulty thermistor.	Call a service technician.
 The printer stops; the ERROR 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 11 • LCD Error Messages (Continued)

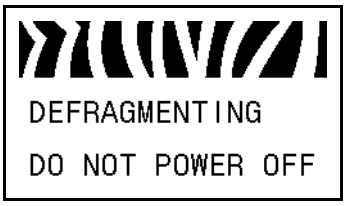
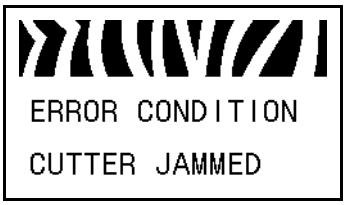
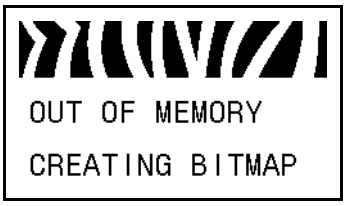
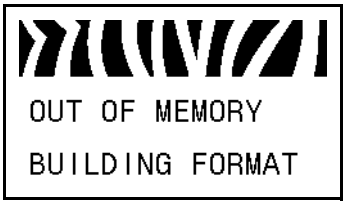
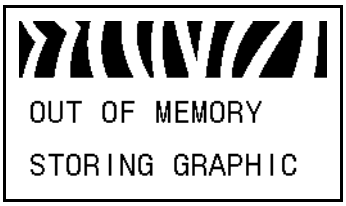
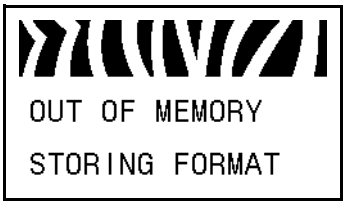
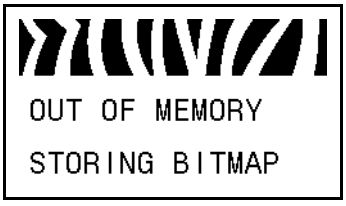
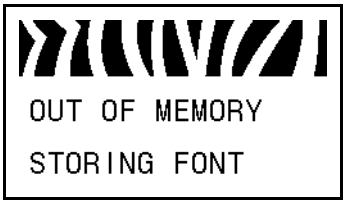
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
 The printer stops.	The printer is defragmenting memory.	**Caution •** Do NOT turn off the printer power during defragmenting. Doing so can damage the printer. Allow the printer to finish defragmenting. If you get this error message frequently, check your label formats. Formats that write to and erase memory frequently may cause the printer to defragment often. Using properly coded label formats usually minimizes the need for defragmenting. If this error message does not go away, contact Technical Support. The printer requires service.
 The printer stops; the ERROR light flashes.	 **Caution •** The cutter blade is sharp. Do not touch or rub the blade with your fingers.	
	The cutter blade is in the media path.	Turn off the printer power and unplug the printer. Inspect the cutter module for debris and clean as needed following the cleaning instructions in *Clean the Cutter* on page 130.

Table 11 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
     	There is not enough memory to perform the function specified on the second line of the error message.	Free up some of the printer's memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See *Set Print Width* on page 94.
		Ensure that the device, such as FLASH memory or PCMCIA card, is installed and not write protected or full.
		Ensure that the data is not directed to a device that is not installed or is unavailable.
		Refer to the *Maintenance Manual* for more information about the specified function.

Print Quality Problems

Table 12 identifies problems with print quality, the possible causes, and the recommended solutions.

Table 12 • 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 91. You may want to perform the *FEED Self Test* on page 156.
	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 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 Speed* on page 91. You may want to perform the *FEED Self Test* on page 156 to determine the ideal darkness setting.
	The printhead is dirty.	Clean the printhead. See *Clean the Printhead and Platen Roller* on page 118.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust Printhead Pressure and Toggle Position* on page 82.
	The printhead is improperly balanced.	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.

Table 12 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Wrinkled ribbon	Ribbon was fed through the ribbon system incorrectly.	Load the ribbon correctly. See *Load Ribbon* on page 69.
	Incorrect burn temperature.	Set the darkness to the lowest possible setting for good print quality. See *Adjust Print Darkness* on page 91.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust Printhead Pressure and Toggle Position* on page 82.
	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.
	The strip plate needs adjusting.	Call a service technician.
	The printhead needs vertical adjustment.	Call a service technician.
	The printhead is improperly balanced.	Call a service technician.
	The printhead and platen roller need to be realigned.	Call a service technician.
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in this table.
Printing too light or too dark over the entire label	The media is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
	You are using an incorrect combination of media 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 33.
	Incorrect or uneven printhead pressure.	Set the pressure to the minimum needed. See *Adjust Printhead Pressure and Toggle Position* on page 82.
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.

Table 12 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Misregistration/skips labels	The printer is not calibrated.	Recalibrate the printer.
	The media sensor is not positioned correctly.	Place the media sensor in the proper position. See *Adjust Transmissive Media Sensors* on page 78.
	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 118.
	The media sensor is not positioned correctly.	Place the media sensor in the proper position. See *Adjust Transmissive Media Sensors* on page 78.
	Media does not meet specifications.	Use media that meets specifications.
Vertical drift in top-of-form position	The printer is out of calibration.	Calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	Vertical drift occurs during normal printer operation. **Note •** A vertical drift of ± 4 to 6 dot rows (approximately 0.5 mm) is within normal tolerances.	Calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	The platen roller is dirty.	Clean the platen roller. See *Clean the Printhead and Platen Roller* on page 118.
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Configure the printer for non-continuous and run calibration routine, if necessary.
	The media sensor is positioned incorrectly.	Ensure that the media sensor is properly positioned to read a single/consistent interlabel gap. See *Adjust Transmissive Media Sensors* on page 78.
	The media sensor is calibrated improperly.	See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	The platen roller is dirty.	Clean the platen roller. See *Clean the Printhead and Platen Roller* on page 118.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality.
	Improperly loaded 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.

Table 12 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
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 156. 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 13 identifies problems with calibration, the possible causes, and the recommended solutions.

Table 13 • Calibration Problems

Problem	Possible Cause	Recommended Solution
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the platen roller according to the instructions in *Clean the Printhead and Platen Roller* on page 118.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (non-continuous or continuous). See *Set Media Type* on page 93.
Auto Calibrate failed.	Media or ribbon is loaded incorrectly.	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 Sensor Sensitivity* on page 101.
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.

Communications Problems

Table 14 identifies problems with communications, the possible causes, and the recommended solutions.

Table 14 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized. The DATA light does not flash.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
		If you are using serial communication, check the serial port setting in the control panel menu. See *Set Serial Communications* on page 102.
		If you are using serial communication, make sure that you are using a null modem cable or a null modem adapter.
		Using the control panel menu, check the protocol setting. It should be set to NONE. See *Set Protocol* on page 103.
		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 Table 3 on page 23 for requirements.
		Check the printer driver or software communications settings (if applicable).
A label format was sent to the printer but was not recognized. The DATA light flashes but 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 Format Prefix Character* on page 104 and *Set Delimiter Character* on page 104 for the requirements.
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.
		Ensure that ZPL II is being used.
		If the problem continues, check the ZPL II format for changes to ^CC, ^CT, and ^CD.

Ribbon Problems

Table 15 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

Table 15 • 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 Sensor Sensitivity* on page 101.
In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.		
The ribbon light is on 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 Sensor Sensitivity* on page 101.

RFID Problems

Table 16 identifies problems that may occur with RFID printers, the possible causes, and the recommended solutions. For more information about RFID, refer to the *RFID Programming Guide*. A copy of the manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.

Table 16 • RFID Problems

Problem	Possible Cause	Recommended Solution
The RFID-enabled printer voids every label.	The printer is not calibrated for the RFID label being used.	Manually calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	The printer is set for the wrong tag type.	Set the correct tag type. Refer to the *RFID Programming Guide* for instructions.
	The printer is unable to communicate with the RFID reader.	1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized Zebra RFID service technician for assistance.
	The settings are incorrect in your label designer software.	The software settings override the printer settings. Make sure that the software and printer settings match.
	You are using an incorrect programming position, particularly if the tags being used are within printer specifications.	Do one or more of the following as necessary: • Check the programming position being used with the ^RS command, or the program position setting in your label designer software. If the position is incorrect, change the setting. Refer to the *RFID Programming Guide* for more information. • Select RESTORE for the **RFID TAG CALIB** parameter (refer to the *RFID Programming Guide* for instructions).
	You are sending RFID ZPL or SGD commands that are incorrect.	Refer to the *RFID Programming Guide* for more information about the ZPL and SGD commands for RFID.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers or other RF sources. • Make sure that the media door is closed at all times during RFID programming.

Table 16 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
Low yields. Too many RFID tags per roll are voided.	The RFID labels are not within specifications for the printer, which means that the transponder is not in an area that can be programmed consistently.	Make sure that the labels meet transponder placement specifications for your printer. See http://www.zebra.com/transponders for transponder placement information. Refer to the *RFID Programming Guide* or contact an authorized Zebra RFID reseller for more information.
	Some RFID tags are more sensitive than others and may require special printer settings.	1. Verify that the printer is set for the correct write power. Refer to the *RFID Programming Guide* for instructions. 2. If necessary, run the ^HR command to manually calibrate the transponder position. 3. If the problem persists, consider using a different tag type. Refer to the *RFID Programming Guide* or contact an authorized Zebra RFID reseller for more information.
	Incorrect read and write power levels for the RFID tag type.	Change the RFID read and write power levels. Refer to the *RFID Programming Guide* for instructions.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers. • Make sure that the media door is closed at all times during RFID programming.
	The printer is using outdated printer firmware and reader firmware versions.	Go to http://www.zebra.com/firmware for updated firmware.
The printer stops at the RFID inlay.	The printer calibrated the label length only to the RFID inlay instead of to the interlabel gap.	1. Select FEED for the **MEDIA POWER UP** and **HEAD CLOSE** parameters (see *Select Media Power-Up Option* on page 105 or *Select Head Close Option* on page 106). 2. Manually calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
The DATA light flashes indefinitely after you attempt to download printer or reader firmware.	The download was not successful. For best results, cycle power on the printer before downloading any firmware.	1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. Attempt to download the firmware again. 5. If the problem persists, contact Technical Support.

Table 16 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
RFID parameters do not appear in Setup mode, and RFID information does not appear on the printer configuration label. **The printer does not void RFID labels that are not programmed correctly.**	The printer was powered off (**O**) and then back on (**I**) too quickly for the RFID reader to initialize properly.	Wait at least 10 seconds after turning the printer power off before turning it back on. 1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. Check for the RFID parameters in Setup mode or for RFID information on a new configuration label.
	An incorrect version of printer or reader firmware was loaded on the printer.	1. Verify that the correct firmware version is loaded on your printer. Refer to the *RFID Programming Guide* for more information. 2. Download the correct printer or reader firmware if necessary. 3. If the problem persists, contact Technical Support.
	The printer is unable to communicate with the RFID subsystem.	1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized service technician for assistance.
	The printer is RFID-ready, but no reader is installed.	Contact an authorized Zebra RFID reseller to acquire a reader for your printer.

Miscellaneous Printer Problems

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

Table 17 • 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.	**1.** Press SETUP/EXIT to enter configuration mode. **2.** Press MINUS (-). The printer displays the LANGUAGE parameter in the current language. Even if you cannot recognize the characters displayed, you can still scroll to another language. **3.** Press PLUS (+) or MINUS (-) to scroll through the choices until you find a language that you can read. **4.** Press SETUP/EXIT. The LCD displays SAVE CHANGES in the original language. **5.** Press NEXT/SAVE to exit configuration mode and save the changes (if the language does not change, you may need to scroll to a different save option by pressing PLUS (+) or MINUS (-) in the previous step). **6.** Repeat this process, if necessary, until you reach the desired language.
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 firmware 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 firmware 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.

Table 17 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
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 Sensor Sensitivity* on page 101.
	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 93.
	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 was not calibrated for the media being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.
	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 93.
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. To prevent this from happening, check the print width using *Set Print Width* on page 94, and ensure that the width is correct for the media that you are using.

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 it off (**O**) and then on (**I**).
- If printer is in applicator mode and the liner is being taken up by the applicator, the operator must manually remove the labels as they become available.

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:

1. Turn on (**I**) the printer.

   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 23).

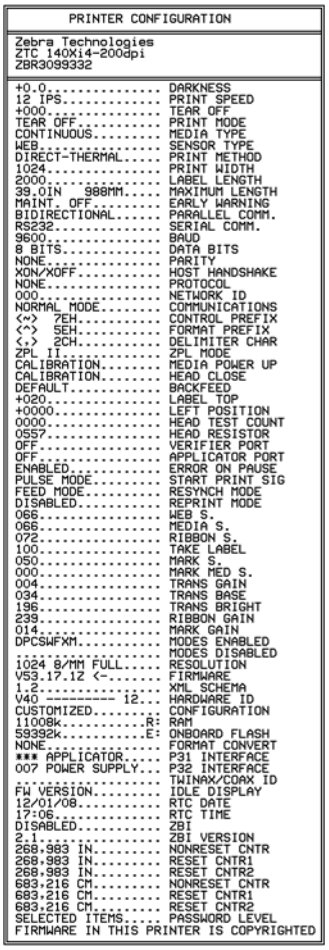
To perform the CANCEL Self Test, complete these steps:

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 23).

Figure 23 • Sample Configuration Label

Xi4



RXi4



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 24 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 24 shows a sample of the labels.

Figure 24 • 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.

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).

Depending on the dot density of the printhead, seven labels are printed at each of the following speeds:

- 203 dpi printers: 2 ips, 6 ips, and 10 ips
- 300 dpi printers: 2 ips, 6 ips, 8 ips
- 600 dpi printers: 2 ips, 4 ips

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 25) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 25 • FEED Test Label



4. See Figure 26 and Table 18. 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 26 • Bar Code Darkness Comparison

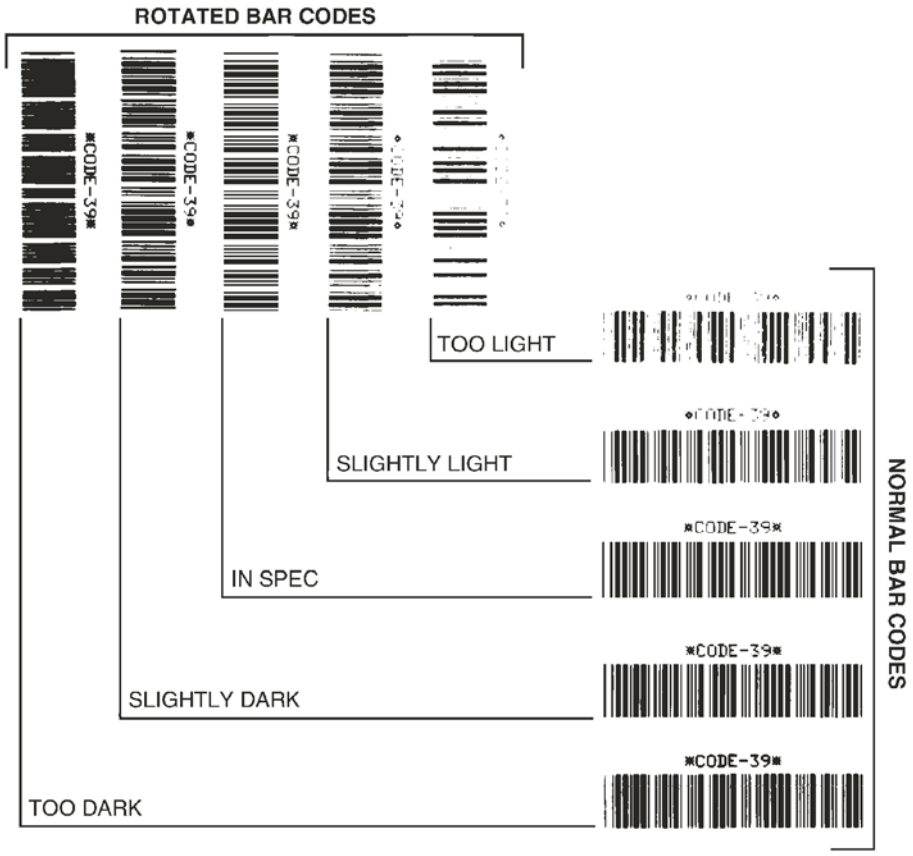


Table 18 • Judging Bar Code Quality

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 91.
8. If necessary, change the print speed to the same speed as on the best test label. See *Adjust Print Speed* on page 91.

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.

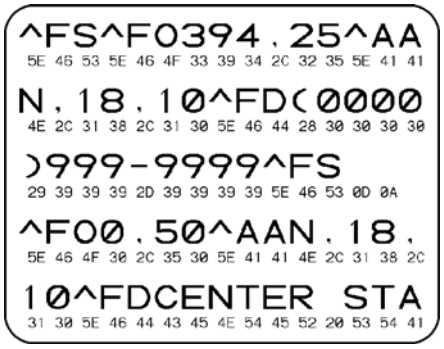
Communications Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the printer and the host computer.

When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). Figure 27 shows a typical test label from this test.

Note • The test label prints upside-down.

Figure 27 • Communications Diagnostics Test Label



To use communications diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See *Set Print Width* on page 94 for more information.
2. Set the printer to **DIAGNOSTICS**. For instructions, see *Set Communications Mode* on page 103.
3. Set the print width equal to or less than the label width being used for the test. See *Set Print Width* on page 94 for more information.

   The printer enters diagnostics mode and prints any data received from the host computer on a test label
4. Check the test label for error codes. For any errors, check that your communication parameters are correct.

   Errors show on the test label as follows:

   - FE indicates a framing error.
   - OE indicates an overrun error.
   - PE indicates a parity error.
   - NE indicates noise.
5. Turn the printer off (**O**) and then back on (**I**) to exit this self test and return to normal operation.

Sensor Profile

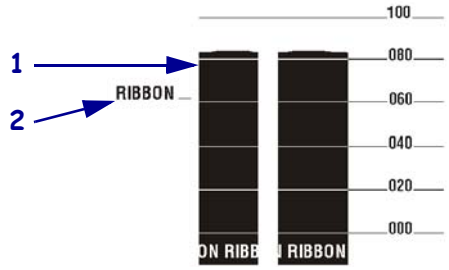
Use the sensor profile label to troubleshoot the following types of problems:

- If the media sensor experiences difficulty in determining gaps (web) between labels.
- If the media sensor incorrectly identifies preprinted areas on a label as gaps (web).
- If the ribbon sensor cannot detect ribbon.

For instructions on printing a sensor profile, see *Print Sensor Profile* on page 100. If the sensitivity of the sensors must be adjusted, perform *Calibrate Media and Ribbon Sensor Sensitivity* on page 101.

Ribbon Sensor Profile (Figure 28) The bars (**1**) on the sensor profile indicate the ribbon sensor readings. The ribbon sensor threshold setting is indicated by the word RIBBON (**2**). If the ribbon readings are below the threshold value, the printer does not acknowledge that ribbon is loaded.

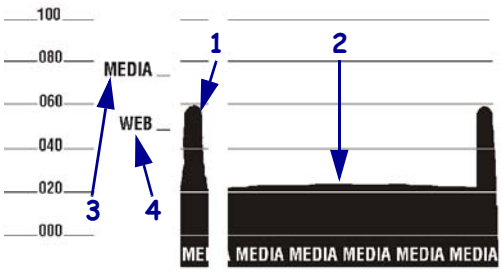
Figure 28 • Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 29) The media sensor readings are shown as bars and flat areas on the sensor profile. The bars (**1**) indicate gaps between labels (the web), and the low areas (**2**) indicate where labels are located. If you compare the sensor profile printout to a blank length of your media, the bars should be the same distance apart as the gaps on the media. If the distances are not the same, the printer may be having difficulty determining where the gaps are located.

The media sensor threshold settings are shown by the words MEDIA (**3**) for the media threshold and WEB (**4**) for the web threshold. Use the numbers to the left of the sensor readings to compare the numeric readings to the sensor settings.

Figure 29 • Sensor Profile (Media Section)





Notes •

7 Specifications

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

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Features

This section lists the standard and optional features for the printer.

Standard Features

Note • Printer specifications are subject to change without notice.

- Thermal transfer and direct thermal printing
- 16 MB SDRAM (12 MB user-available)
- ZebraNet 10/100 Print Server (internal)
- USB 2.0 Port
- RS-232 serial port
- Bidirectional parallel port
- Real-Time Clock
- Advanced Counter
- XML-enabled printing

Optional Features

- ZebraNet Internal Wireless Plus Print Server
- RFID reader/encoder (110Xi4 models only, standard for R110Xi4 models)
- IBM twinax/coax interfaces (internal)
- Applicator port
- Full-width rotary knife cutter and catch tray
- 3 in. Media supply spindle (standard for 110Xi4 and R110Xi4 600 dpi printers)
- Media rewind spindle
- Bi-fold media door
- Factory-installed 64 MB (61 MB user available) Flash memory option
- Additional fonts

Zebra Programming Language (ZPL)

ZPL II features include:

- Downloadable graphics, scalable and bitmap fonts, and label formats
- Object copying between memory areas
- (RAM, memory card, and internal Flash)
- Code page 850 character set
- Data compression
- Automatic virtual input buffer management
- Format inversion
- Mirror image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Slew command
- Controlled via mainframe, mini-computer, PC, portable data terminal
- Programmable quantity with print, pause, and cut control
- Communicates in printable ASCII characters
- Error-checking protocol
- Status message to host upon request
- Serialized fields
- In-spec OCR-A and OCR-B
- UPC/EAN
- User-programmable password

Bar Codes

Types of bar codes include:

- Bar code ratios—2:1, 7:3, 5:2, 3:1
- Codabar (supports ratios of 2:1 up to 3:1)
- CODABLOCK
- Code 11
- Code 39 (supports ratios of 2:1 up to 3:1)
- Code 49 (two-dimensional bar code)
- Code 93
- Code 128 (with subsets A, B, and C and UCC case codes)
- Check digit calculation where applicable
- Data Matrix
- EAN-8, EAN-13, EAN extensions
- ISBT-128
- Industrial 2 of 5
- Interleaved 2 of 5 (supports ratios of 2:1 up to 3:1, Modulus 10 Check Digit)
- LOGMARS
- MaxiCode
- Micro PDF
- MSI
- PDF-417 (2-dimensional bar code)
- PLANET code
- Plessey
- POSTNET
- QR-Code
- RSS code
- Standard 2 of 5
- TLC 39
- UPC-A, UPC-E, UPC extensions

General Specifications

Physical Specifications

Dimensions	110Xi4/R110Xi4	140Xi4	170Xi4	220Xi4
Height	15.5 in (393.7 mm)	15.5 in. (393.7 mm)	15.5 in. (393.7 mm)	15.5 in (393.7 mm)
Width	10.31 in. (261.9 mm)	11.31 in. (287.3 mm)	13.31 in. (338.1 mm)	15.81 in. (401.6 mm)
Depth	20.38 in. (517.5 mm)	20.38 in. (517.5 mm)	20.38 in. (517.5 mm)	20.38 in. (517.5 mm)
Weight without options	50 lb. (22.7 kg)	55 lb. (25 kg)	67 lb. (30.5 kg)	72 lb. (32.7 kg)

Electrical Specifications

Power	110Xi4/R110Xi4	140Xi4	170Xi4	220Xi4
General	90 to 264 VAC; 48 to 62 Hz	90 to 264 VAC; 48 to 62 Hz	90 to 264 VAC; 48 to 62 Hz	90 to 264 VAC; 48 to 62 Hz
Power consumption printing PAUSE test at slowest speed	121 W	180 W	220 W	269 W
Printer idle	20 W	20 W	20 W	20 W

Environmental Conditions for Operation and Storage

Environment	Mode	Temperature	Relative Humidity
Operation	Thermal Transfer	40° to 105°F (5° to 40° C)	20 to 85% non-condensing
	Direct Thermal	32° to 105°F (0° to 40° C)	
Storage	Thermal Transfer or Direct Thermal	–40° to 140°F (–40° to 60° C)	5 to 85% non-condensing

Print Specifications by Model

Refer to the tables that follow for printer specifications.

110Xi4 and R110Xi4

Print Specifications	200 dpi	300 dpi	600 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	600 dots/inch (24 dots/mm)
Dot size (width×length)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)	0.0016×0.0016 in. (0.042×0.042 mm)
First dot location (measured from inside media edge)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.023 ± 0.035 in. (0.6 ± 0.9 mm)	0.023 ± 0.035 in. (0.6 ± 0.9 mm)
Maximum print width	4.0 in. (102 mm)	4.0 in. (102 mm)	4.0 in. (102 mm)
Maximum print length (non-continuous)	39 in. (991 mm)	39 in. (991 mm)	39 in. (991 mm)
Maximum print length (continuous)	150 in. (3810 mm)	100 in. (3810 mm)	39 in. (991 mm)
Selectable print speeds (inches per second)	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	1.5, 2, 3, 4, 5, 6
Bar code modulus (X) dimension:			
• Ladder (rotated) orientation	• 4.9 mil to 49 mil	• 3.9 mil to 39 mil	• 1.6 mil to 16 mil
• Picket fence (nonrotated) orientation	• 4.9 mil to 49 mil	• 3.33 mil to 33 mil	• 1.6 mil to 16 mil
Thin film printhead with Element Energy Equalizer (E^3)®	Yes	Yes	Yes

140Xi4, 170Xi4, and 220Xi4

Print Specifications	140Xi4	170Xi4 200 dpi	170Xi4 300 dpi	220Xi4 200 dpi	220Xi4 300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Dot size (width×length)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)
First dot location (measured from inside media edge)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)
Maximum print width	5.04 in. (128 mm)	6.6 in. (168 mm)	6.6 in. (168 mm)	8.5 in. (216 mm)	8.5 in. (216 mm)
Maximum print length (non-continuous)	39 in. (99 cm)	39 in. (99 cm)	39 in. (99 cm)	39 in. (99 cm)	39 in. (99 cm)
Maximum print length (continuous)	150 in. (381 cm)	100 in. (254 cm)	100 in. (254 cm)	150 in. (381 cm)	150 in. (381 cm)
Selectable Print Speeds (inches per second)	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	2.4, 3, 4, 5, 6, 7, 8	2.4, 3, 4, 5, 6, 7, 8, 9, 10	2.4, 3, 4, 5, 6
Bar code modulus (X) dimension:					
• Ladder (rotated) orientation	• 4.9 mil to 49 mil	• 3.9 mil to 39 mil	• 3.9 mil to 39 mil	• 4.9 mil to 49 mil	• 4.9 mil to 49 mil
• Picket fence (nonrotated) orientation	• 4.9 mil to 49 mil	• 3.33 mil to 33 mil	• 3.33 mil to 33 mil	• 4.9 mil to 49 mil	• 4.9 mil to 49 mil
Thin film printhead with Element Energy Equalizer (E3)	Yes	Yes	Yes	Yes	Yes

Ribbon Specifications

Refer to the following tables for ribbon specifications.

Note • Consider the following when using ribbon:

- Match the ribbon to the label width and printhead width that you are using. The ribbon should be at least as wide as the labels to protect the printhead from excessive wear.
- Ribbon must be wound with the coated side out.

110Xi4 and R110Xi4

Ribbon Specifications	200 dpi	300 dpi	600 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	600 dots/inch (24 dots/mm)
Ribbon width Minimum	0.79 in. (20 mm)*	0.79 in. (20 mm)*	0.79 in. (20 mm)*
Ribbon width Maximum	4.33 in. (110 mm)	4.33 in. (110 mm)	4.33 in. (110 mm)
Standard length with 2:1 label to ribbon ratio	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)
Standard length with 3:1 label to ribbon ratio	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Maximum ribbon roll outside diameter	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)

* For RFID labels, the minimum ribbon width is determined by the minimum label width for the transponder being used.

140Xi4, 170Xi4, and 220Xi4

Ribbon Specifications	140Xi4	170Xi4 200 dpi	170Xi4 300 dpi	220Xi4 200 dpi	220Xi4 300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Ribbon width Minimum	1.57 in. (40 mm)	2.0 in. (51 mm)	2.0 in. (51 mm)	4.25 in. (108 mm)	4.25 in. (108 mm)
Ribbon width Maximum	5.10 in. (130 mm)	6.7 in. (170 mm)	6.7 in. (170 mm)	8.60 in. (220 mm)	8.60 in. (220 mm)
Standard length with 2:1 label to ribbon ratio	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)
Standard length with 3:1 label to ribbon ratio	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Maximum ribbon roll outside diameter	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)

Media Specifications

Use the correct size and type of labels for best performance. Refer to the tables that follow for specifications.

Important • Media registration and minimum label length are affected by label type and width, ribbon type, print speed, and printer mode of operation. Performance improves as these factors are optimized. Zebra recommends qualifying any application with thorough testing.

110Xi4 and R110Xi4

Media Specifications		200 dpi	300 dpi	600 dpi
Minimum label length	Tear-Off	0.7 in.* (18 mm*)	0.7 in.* (18 mm*)	0.7 in. (18 mm)
	Peel-Off	0.5 in.* (13 mm*)	0.5 in.* (13 mm*)	0.5 in. (13 mm)
	Cutter	1.5 in.* (38 mm*)	1.5 in.* (38 mm*)	1.5 in. (38 mm)
	Rewind	0.25 in.* (6 mm*)	0.25 in.* (6 mm*)	0.25 in. (6 mm)
	RFID labels	**	**	**
Total media width (label + backing, if any)	Minimum	0.79 in.* (20 mm*)	0.79 in.* (20 mm*)	0.79 in. (20 mm)
	Maximum	4.5 in.* (114 mm*)	4.5 in.* (114 mm*)	4.5 in. (114 mm)
	RFID labels	**	**	**
Total thickness (includes backing, if any)		0.003 in. (0.076 mm)	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)
		0.012 in. (0.305 mm)	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)
Cutter maximum full-width media thickness		0.009 in. (0.23 mm)	0.009 in. (0.23 mm)	0.009 in. (0.23 mm)
Roll media core inside diameter		3 in. (76 mm)	3 in. (76 mm)	3 in. (76 mm)
Maximum roll diameter on 3 in. (76 mm) core		8.0 in. (203 mm)	8.0 in. (203 mm)	8.0 in. (203 mm)
Interlabel gap	Minimum	0.079 in.* (2 mm*)	0.079 in.* (2 mm*)	0.079 in. (2 mm)
	Preferred	0.118 in.* (3 mm*)	0.118 in.* (3 mm*)	0.118 in. (3 mm)
	Maximum	No more than the calibrated length of the label.	No more than the calibrated length of the label.	No more than the calibrated length of the label.
	RFID labels	**	**	**
Maximum internal fanfold media pack size (label + backing): L × W×H		8.0×4.5×4.5 in. (203×114×114 mm)	8.0×4.5×4.5 in. (203×114×114 mm)	8.0×4.5×4.5 in. (203×114×114 mm)
Ticket/tag sensing notch: L × W		0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)
Ticket/tag sensing hole diameter		0.125 in. (3 mm)	0.125 in. (3 mm)	0.125 in. (3 mm)
Label registration tolerance (vertical)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)
Label registration tolerance (horizontal)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)

* Does not apply to RFID labels.

** This parameter varies for each transponder type.

110Xi4 and R110Xi4 Black Mark Sensing

Media Specifications		200 dpi	300 dpi	600 dpi
Mark length (measuring parallel to label/tag edge)	Minimum	0.12 in. (3 mm)	0.12 in. (3 mm)	0.12 in. (3 mm)
	Maximum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
Mark width (measuring to perpendicular label/tag edge)	Minimum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
	Maximum	Full media width	Full media width	Full media width
Mark location		within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge
Mark density in Optical Density Unit (ODU)		>1.0	>1.0	>1.0

140Xi4, 170Xi4, and 220Xi4 Printers

Media Specifications		140Xi4	170Xi4	220Xi4
Minimum label length	Tear-Off	0.7 in. (18 mm)	0.7 in. (18 mm)	0.7 in. (18 mm)
	Peel-Off	0.5 in. (13 mm)	0.5 in. (13 mm)	0.5 in. (13 mm)
	Cutter	1.5 in. (38 mm)	1.5 in. (38 mm)	1.5 in. (38 mm)
	Rewind	0.25 in. (6 mm)	0.25 in. (6 mm)	0.25 in. (6 mm)
Total media width (label + backing, if any)	Minimum	1.57 in. (40 mm)	2.00 in. (51 mm)	4.25 in. (108 mm)
	Maximum	5.51 in. (140 mm)	7.1 in. (180 mm)	8.80 in. (224 mm)
Total thickness (includes backing, if any)	Minimum	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)
	Maximum	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)
Cutter maximum full-width media thickness		0.009 in. (0.23 mm)	0.007 in. (0.18 mm)	0.005 in. (0.14 mm)
Roll media core inside diameter		3 in. (76 mm)	3 in. (76 mm)	3 in. (76 mm)
Maximum roll diameter on 3 in. (76 mm) core		8.0 in. (203 mm)	8.0 in. (203 mm)	8.0 in. (203 mm)
Interlabel gap	Minimum	0.079 in. (2 mm)	0.079 in. (2 mm)	0.079 in. (2 mm)
	Preferred	0.118 in. (3 mm)	0.118 in. (3 mm)	0.118 in. (3 mm)
	Maximum	No more than the calibrated length of the label.	No more than the calibrated length of the label.*	No more than the calibrated length of the label.
Maximum internal fanfold media pack size (label + backing): L×W×H		8.0×5.5×4.5 in. (203×140×114 mm)	8.0×7.1×4.5 in. (203×180×114 mm)	8.0×8.8×4.5 in. (203×224×114 mm)
Ticket/tag sensing notch: L×W		0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)
Ticket/tag sensing hole diameter		0.125 in. (3 mm)	0.125 in. (3 mm)	0.125 in. (3 mm)
Effective leading edge registration accuracy (vertical)		± 0.070 in. (± 1.8 mm)	± 0.070 in. (± 1.8 mm)	± 0.060 in. (± 1.5 mm)
Effective leading edge registration accuracy (horizontal)		± 0.070 in. (± 1.8 mm)	± 0.070 in. (± 1.8 mm)	± 0.060 in. (± 1.5 mm)

140Xi4, 170Xi4, and 220Xi4 Black Mark Sensing

Media Specifications		140Xi4	170Xi4	220Xi4
Mark length (measuring parallel to label or tag edge)	Minimum	0.12 in. (3 mm)	0.12 in. (3 mm)	0.12 in. (3 mm)
	Maximum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
Mark width (measuring to perpendicular label or tag edge)	Minimum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
	Maximum	Full media width	Full media width	Full media width
Mark location		within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge
Mark density in Optical Density Unit (ODU)		>1.0	>1.0	>1.0

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

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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 *non-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.

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.

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

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*.

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.

Extensible Authentication Protocol over Flexible Authentication via Secure Tunneling (EAP-FAST) Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST) is a publicly accessible IEEE 802.1X EAP type developed by Cisco Systems. It is available as an IETF informational draft. Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST) is a publicly accessible IEEE 802.1X EAP type developed by Cisco Systems. It is available as an IETF informational draft. Cisco developed EAP-FAST to support customers who cannot enforce a strong password policy and wish to deploy an 802.1X EAP type that does not require digital certificates, supports a variety of user and password database types, supports password expiration and change, and is flexible, easy to deploy, and easy to manage. For example, a customer using Cisco LEAP who cannot enforce a strong password policy and does not want to use certificates can migrate to EAP-FAST for protection from dictionary attacks.

Extensible Authentication Protocol over Transport Layer Security (EAP-TLS) Second generation Wi-Fi security. Current Wi-Fi security standards (802.1x) define the use of the TLS protocol encapsulated within the Extensible Authentication Protocol (EAP) as one of the strongest security mechanisms for Wi-Fi. Using EAP-TLS provides well-regarded, standards-based security between an access point and a Wi-Fi client. This is a Microsoft standard.

- A form of 802.1X (EAP) authentication
- Uses client and server certificates for mutual authentication (PKI)
- TLS 1.0 (Transport Layer Security) is based on Secure Socket Layer (SSL) 3.0

Extensible Authentication Protocol over Tunneled Transport Layer Security (EAP-TTLS) EAP-TTLS is an extension of EAP-TLS which provides for certificate-based, mutual authentication of the client and network. Unlike EAP-TLS, however, EAP-TTLS requires only server-side certificates, eliminating the need to configure certificates for each WLAN client. In addition, it supports legacy password protocols, so you can deploy it against your existing authentication system (such as tokens or Active Directories.) It securely tunnels client authentication within TLS records, ensuring that the user remains anonymous to eavesdroppers on the wireless link and the entire network to the RADIUS server.

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.

Kerberos Network authentication protocol that uses the concept of a time-limited “ticket” for access to network resources. Kerberos uses key distribution and client/server authentication.

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

Lightweight Extensible Authentication Protocol (LEAP or Lightweight EAP) A non-standard Wireless Security protocol from Cisco. LEAP uses mutual authentication, meaning that both the user and the access point must be authenticated before access to the LAN is allowed. Mutual authentication can help protect wireless networks from rogue access points, man-in-the-middle attacks, sniffing attacks, and active attacks. Based on 802.1X EAP protocol.

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.

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.

Protected Extensible Authentication Protocol (PEAP) A draft standard for a common approach to wireless-network user authentication.

- A form of 802.1X authentication
- Currently an IETF draft (still subject to change)
- Performs mutual client/server authentication using transport layer security (TLS), but only requires a server certificate
- With no client certificate, configuration is easier than EAP-TLS

peel-off A mode of operation in which the printer peels a printed label away from the backing and allows the user to remove it before another label is printed. Printing pauses until the label is removed.

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second).

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 (vertical) or sides (horizontal) of a label or tag.

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

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. Heating 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*.

Wi-Fi Protected Access (WPA) WPA is a security protocol for wireless local area networks (WLANs) that includes encryption and user authentication.

Wireless Encryption Protocol (WEP) WEP is a security protocol for wireless local area networks (WLANs) that secures data transmissions using 64-bit or 128-bit encryption.

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