

ZT411/ZT421

Industrial Printer



User Guide



ZEBRA

ULINE H-8908

1-800-295-5510

0621 IH-8908VND



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Declaration of Conformity



We have determined that the Zebra printers identified as the

ZT411 and ZT421

manufactured by:

Zebra Technologies Corporation

3 Overlook Point

Lincolnshire, Illinois 60069 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 of the FCC Rules. Operation is subject to the following two conditions:

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.

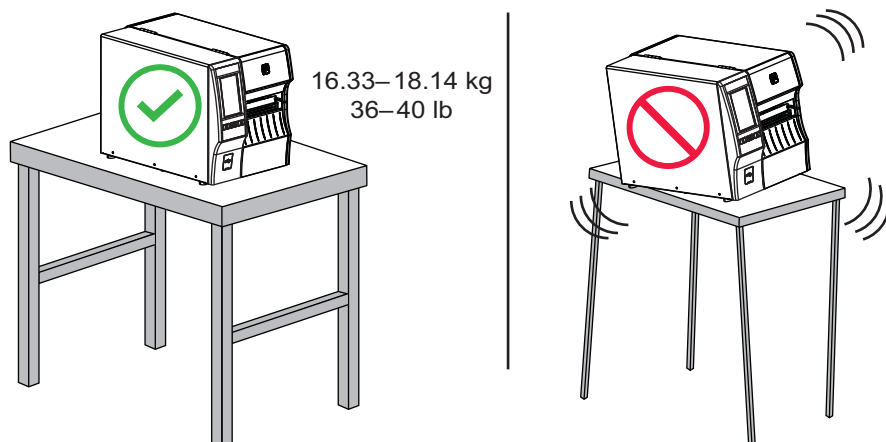
Printer Setup

This section assists a user with initial setup and operation of the printer.

Select a Location for the Printer

Select a location for the printer that meets these conditions:

- **Surface:** The surface where the printer will be located must be solid, level, and of sufficient size and strength to hold the printer.



- **Space:** The area where the printer will be located must include enough space for ventilation and for accessing the printer components and connectors. 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.

- **Power:** The printer should be within a short distance of an appropriate power outlet that is easily accessible.
- **Data communication interfaces:** The printer must be within range of your WLAN radio (if applicable) or within an acceptable range for other connectors to reach your data source (usually a computer). For more information on maximum cable lengths and configuration, see [General Specifications on page 183](#).
- **Operating conditions:** Your printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. [Table 1](#) shows the temperature and relative humidity requirements for the printer when it is operating.

Table 1 Operating Temperature and Humidity

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

Order Supplies and Accessories

The following things that you will need do NOT come with the printer:

- Communication/network cables (such as USB, serial, parallel, wired Ethernet)
- Media
- Ribbon (if your printer has a thermal transfer option)

Media

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

The [Glossary on page 194](#) includes terms associated with media, such as black mark media, gap/notch media, RFID media, fanfold media, and roll media. Use these terms to help determine which type of media will be best for your needs.

Ribbon

Do I need to use ribbon? The media itself determines if you will need to use ribbon. Thermal Transfer media requires ribbon while Direct Thermal media does not.

How can I tell if media is Direct Thermal or Thermal Transfer? The easiest way is to scratch the surface of the media rapidly with your fingernail. If a black mark appears where you scratched, the media is Direct Thermal, and you do not need to use ribbon.

What kind of ribbon can I use? Ribbon can be wound with the coated side on the inside or outside. This printer can only use ribbon that is coated on the **outside** unless you purchase and install the optional spindle that allows ribbon that is coated on the inside. Contact your authorized Zebra reseller for ordering information.



How can I tell which side of the ribbon is coated? Press a corner of the sticky side of a label to the outer surface of the roll of ribbon, and then peel the label off of the ribbon. If ink particles adhere to the label, the outer side of the roll is coated. Repeat this test with the inner surface if necessary to confirm the coated surface.

An alternate method is to unroll a short length of ribbon, place the outer surface against a piece of paper, and scratch the inner surface of the ribbon with your fingernail. Lift the ribbon and check for marks on the paper. If the ribbon left a mark, the outer side is coated.

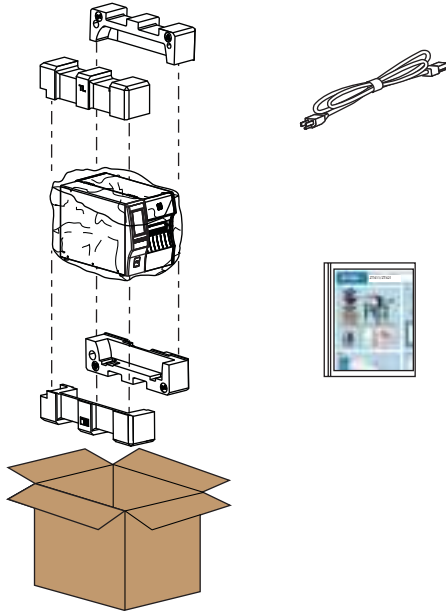
Inspect the Contents of the Box



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

When you receive the printer, do the following:

1. Verify that the following items are included in the box with the printer:



Additional items may be included, depending on the options ordered with the printer.

2. If anything is missing, notify your authorized Zebra reseller.
3. Immediately unwrap the printer 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.
4. 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
5. The printer shipped with several protective items for shipping, including a film of plastic over the transparent window on the media door. Before operating the printer, remove these protective items.

Install Label Software

Select and install the software that you will use to create label formats for your printer. One option is ZebraDesigner, which you can download from www.zebra.com.

Install Printer Drivers and Connect the Printer to Your Devices

After you have set up the printer, verified that it can print a test label, and made adjustments to the print quality, you are ready to connect the printer to your device (such as a computer, phone, or tablet).

Connect to a Computer

If you have not already done so, install the Zebra Setup Utilities program (www.zebra.com/setup) before connecting the printer to a computer. Your computer will not install the correct printer drivers if you connect the printer to it without the Zebra Setup Utilities program.

Run the Zebra Setup Utilities program. This utility will walk you through the process for connecting your printer to your computer. For step-by-step instructions, see [Install the Printer Driver and Connect to a Computer on page 138](#).

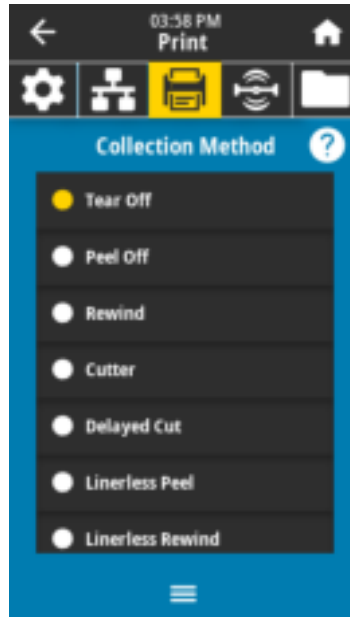
Connect to a Phone or Tablet

Use the Zebra Printer Setup Utility app for Android devices (available for free from Google Play™ at <http://play.google.com/store/apps/details?id=com.zebra.printersetup>).

Determine the Label Collection Method

Use a label collection method that matches the media being used and the printer options available (see [Table 2](#) and [Figure 1 on page 16](#)). The media path is the same for roll and fanfold media.

1. On the Home screen, touch **Menu > Print > Label Position > Collection Method**.



2. Select a collection method that is compatible with the options available on your printer. See [Table 2](#) and [Figure 1 on page 16](#).
3. Touch the home icon to return to the Home screen.

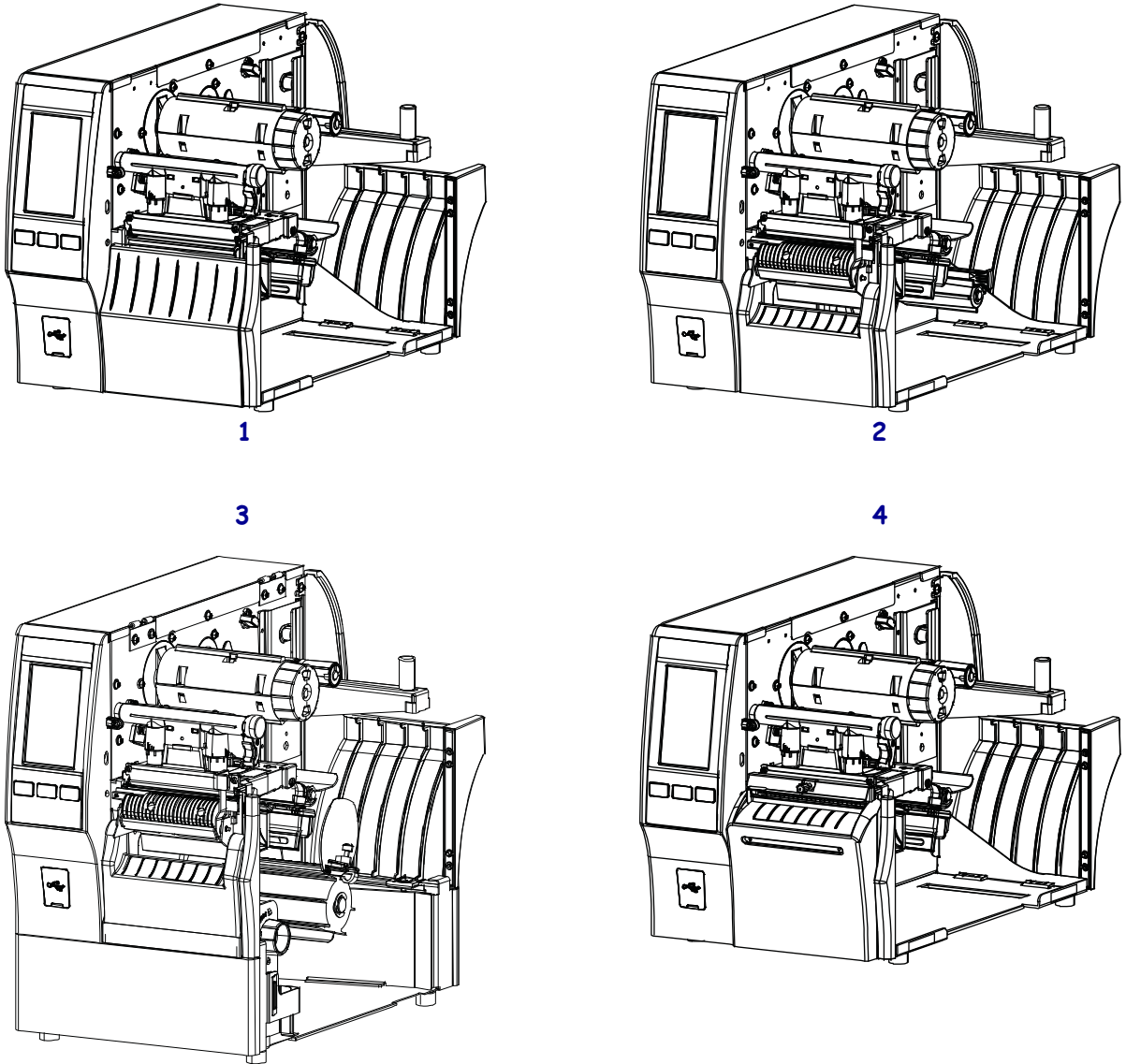
Table 2 Collection Methods and Printer Options

Collection Method	Required Printer Option	Description
Tear Off	Can be used with any printer option and most media types.	The printer prints label formats as it receives them. The printer operator can tear off the printed labels when the printer stops.
Peel Off	Liner Take-Up option or Rewind option	The printer peels the label from the backing during printing and then pauses until the label is removed. The empty backing may be allowed to exit the front of the printer, or it may be wound onto the liner take-up spindle or rewind spindle.
Rewind	Rewind option	The printer prints without pausing between labels. The media is wound onto a core after printing. The rewind plate is used to keep the labels from separating from the backing.
Cutter	Cutter option	The printer cuts between labels after each one is printed.
Delayed Cut	Cutter option	The printer waits for a delayed cut ZPL command (~JK) before it cuts the last printed label.

Table 2 Collection Methods and Printer Options (Continued)

Collection Method	Required Printer Option	Description
Applicator	This mode is for use with a machine that applies labels.	The printer prints when it receives a signal from the applicator. Refer to the Advanced User Information section of the Maintenance Manual for additional information about the applicator interface.
Linerless Peel*	* Reserved for future use.	
Linerless Rewind*		
Linerless Tear*		
Linerless Cut*		
Linerless Delayed Cut*		

Figure 1 Printer Options



1	Tear-Off (standard)
2	Peel with Liner Take-Up option
3	Rewind option
4	Cutter option

Load the Media

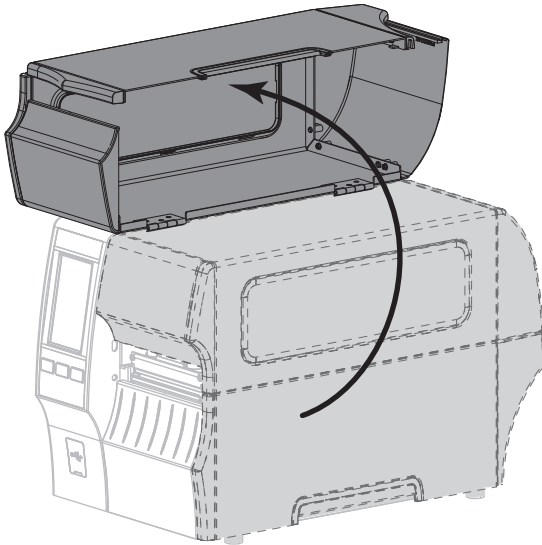
Use the instructions in this section for loading roll or fanfold media in the appropriate label collection method for your needs.



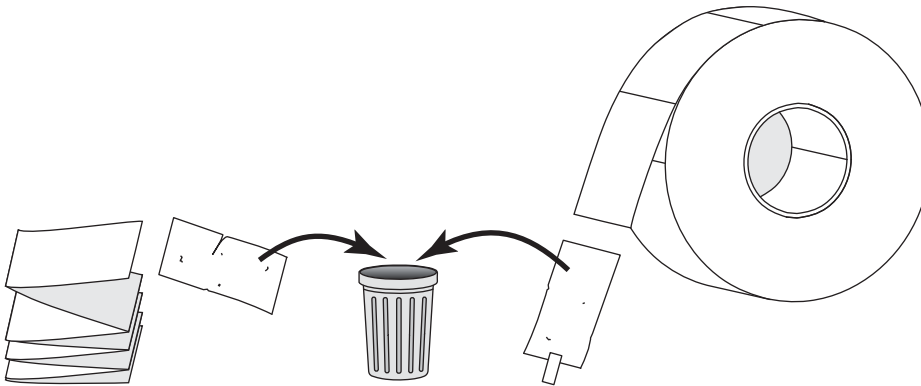
IMPORTANT: You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

Insert the Media into the Printer

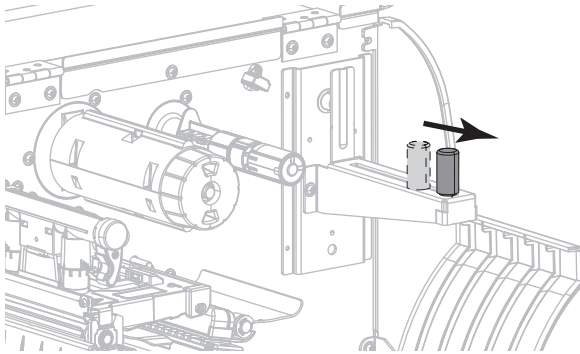
1. Raise the media door.



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



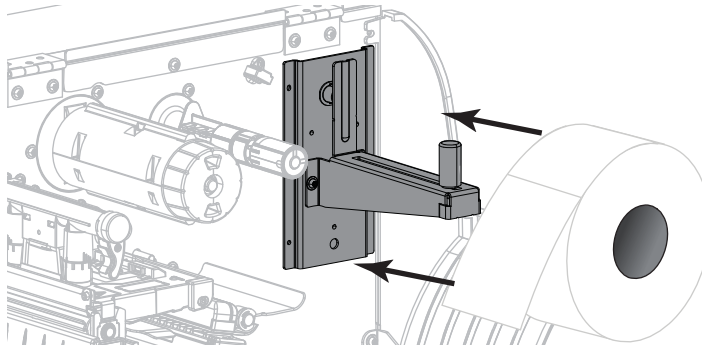
3. Pull out the media supply guide as far as it goes.



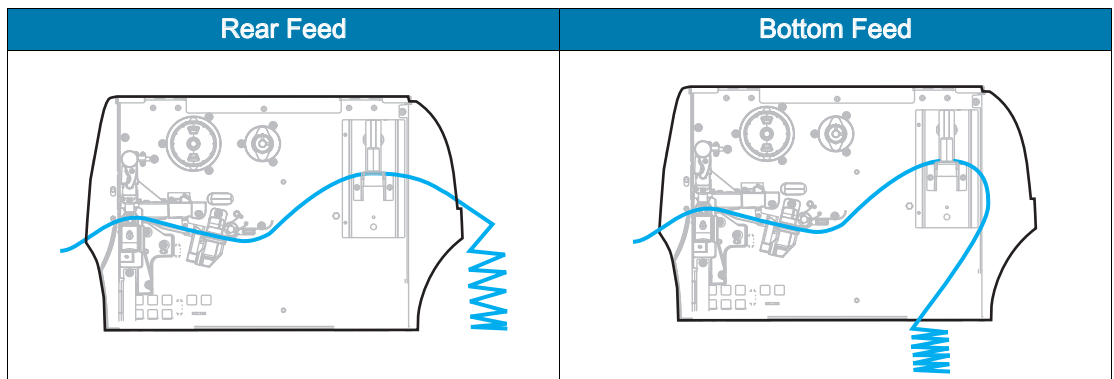
4. Insert roll or fanfold media into the printer. The media loading path is the same for both roll and fanfold media, so this is the only step that will be different.



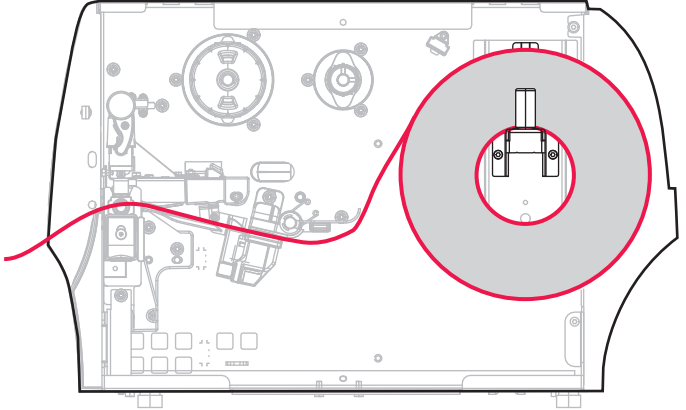
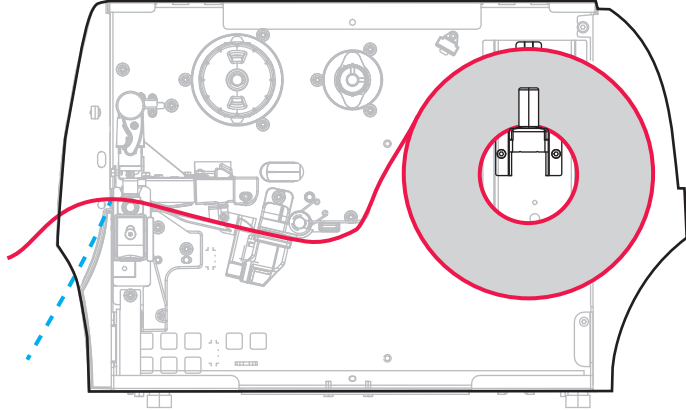
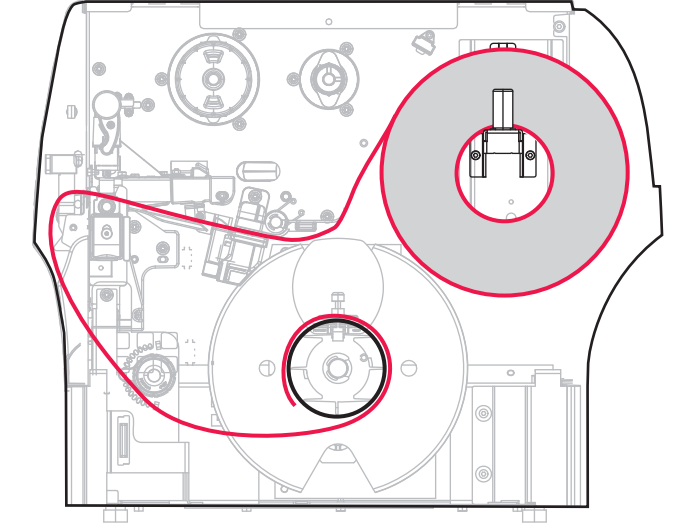
Roll Media—Place the roll of media on the media supply hanger. Push the roll as far back as it will go.

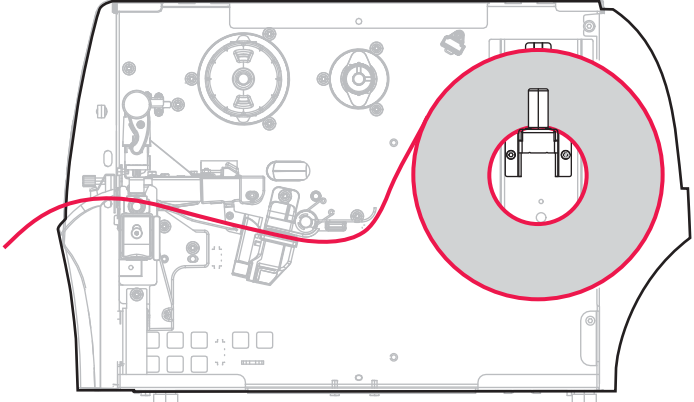


Fanfold Media—Fanfold media can be stored behind or under the printer. Depending on where the media is stored, feed the media from behind or through the bottom access slot and drape it over the media supply hanger.

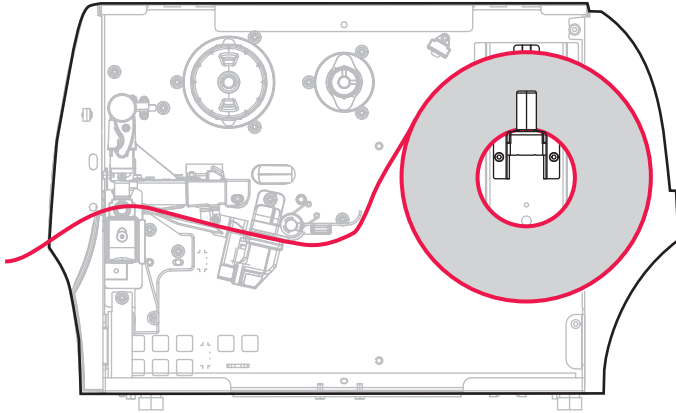


5. Which collection method are you using? (See [Determine the Label Collection Method on page 14.](#))

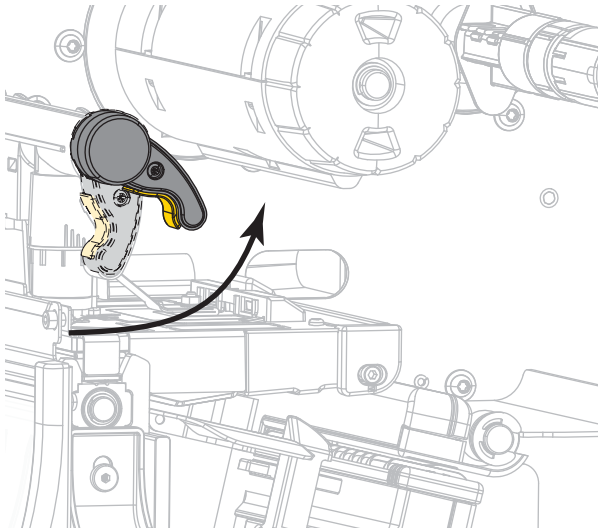
If using...	Then...
<p data-bbox="297 304 399 331">Tear Off</p> 	<p data-bbox="1011 304 1507 331">Continue with Tear-Off Mode on page 21.</p>
<p data-bbox="297 791 743 819">Peel Off (with or without liner take-up)</p> 	<p data-bbox="1011 791 1451 852">Continue with Peel-Off Mode (with or without Liner Take-Up) on page 25.</p>
<p data-bbox="297 1291 386 1318">Rewind</p> 	<p data-bbox="1011 1291 1495 1318">Continue with Rewind Mode on page 35.</p>

If using...	Then...
<p data-bbox="297 239 558 268">Cutter or Delayed Cut</p>  <p>The diagram shows the internal mechanism of a printer. A red line traces the path of a paper strip from the left side, through various rollers and gears, and finally into a circular cutter mechanism on the right. This cutter mechanism is highlighted with a red circle. The rest of the printer's internal structure, including other rollers and gears, is shown in a light gray outline.</p>	<p data-bbox="1011 239 1511 302">Continue with Cutter Mode or Delayed Cut Mode on page 43.</p>

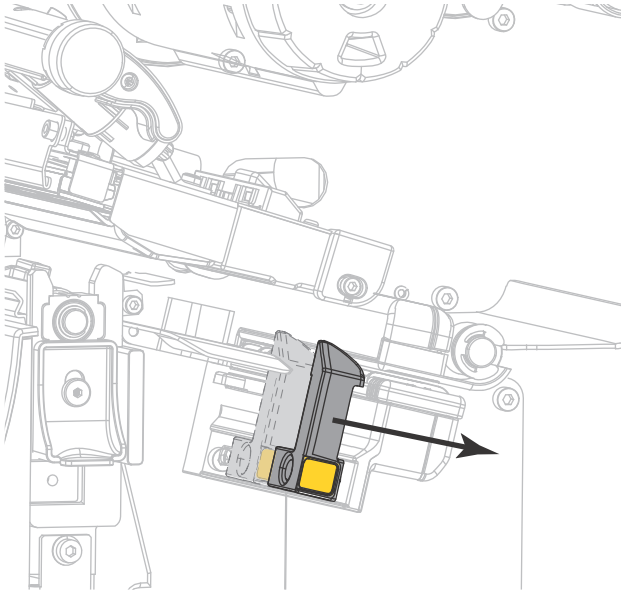
Tear-Off Mode



1. If you have not already done so, follow the instructions in the section [Insert the Media into the Printer on page 17](#).
2. Open the printhead assembly by rotating the printhead-open lever upward.

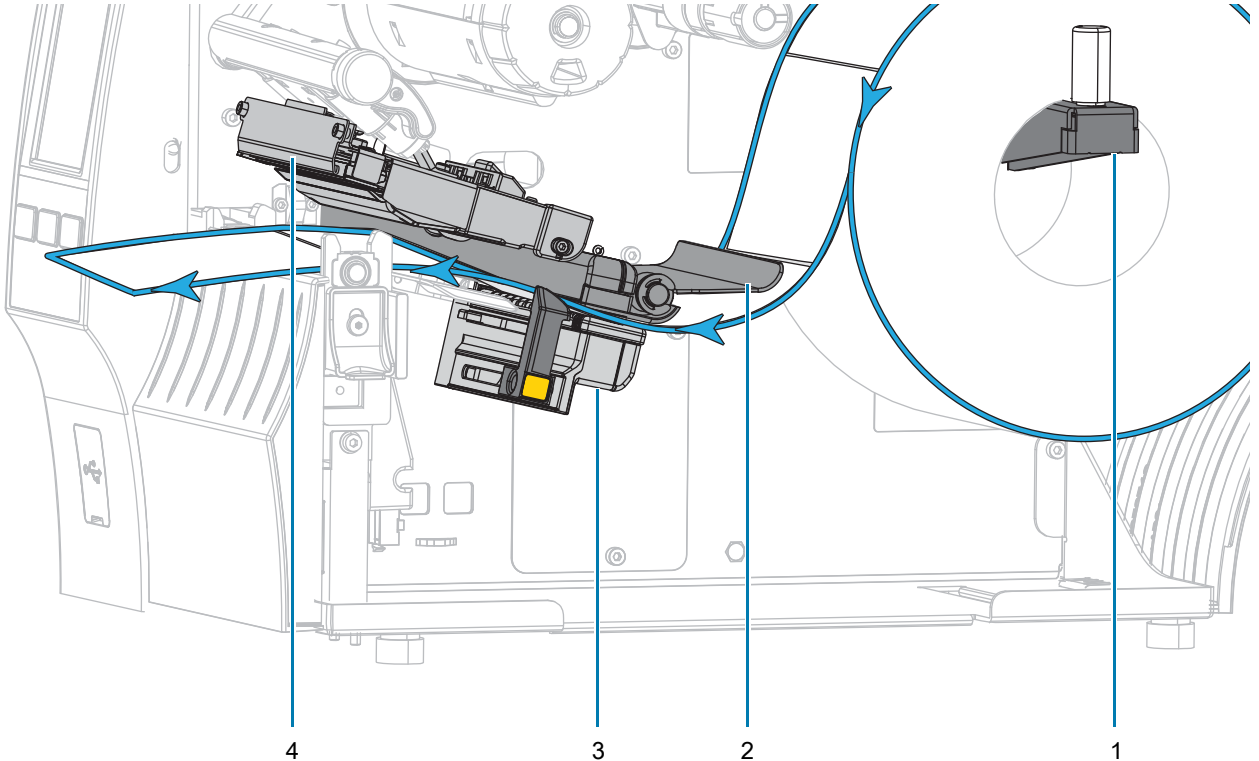


3. Slide the media guide all the way out.

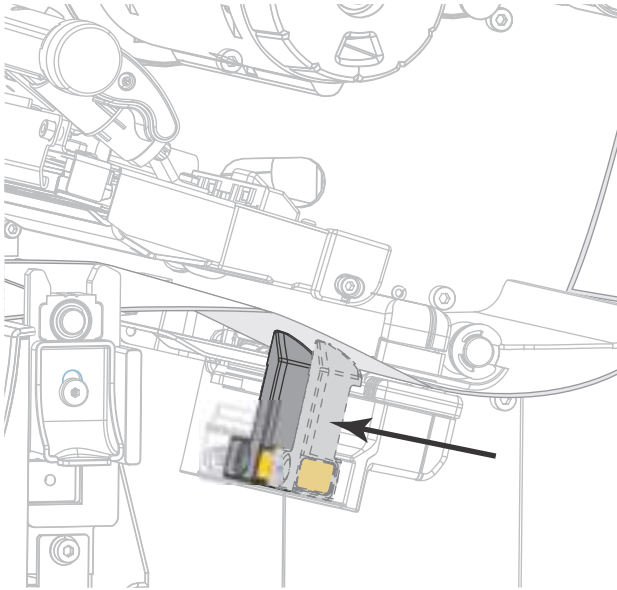


CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

4. From the media hanger (1), feed the media under the dancer assembly (2), through the media sensor (3), and under the printhead assembly (4). Slide the media back until it touches the inside back wall of the media sensor.



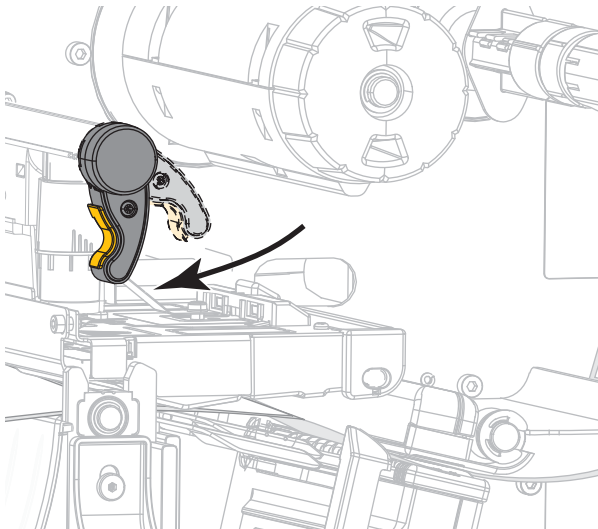
5. Slide in the media guide until it just touches the edge of the media.



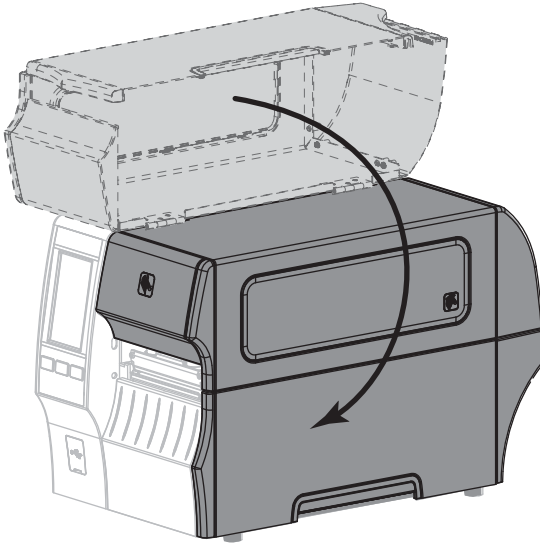
6. Does the media that you are using require ribbon for printing? If you are not sure, see [Ribbon on page 11](#).

If using...	Then...
Direct Thermal media (no ribbon needed)	Continue with step 7 .
Thermal Transfer media (ribbon needed)	<p>a. If you have not already done so, load ribbon in the printer. See Load the Ribbon on page 48.</p> <p>b. Continue with step 7.</p>

7. Rotate the printhead-open lever downward until it locks the printhead in place.



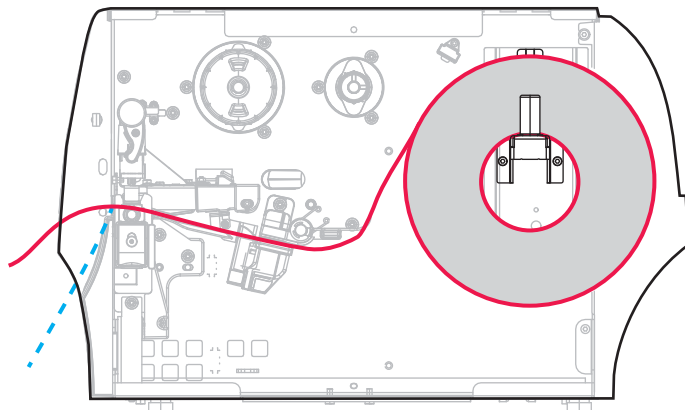
8. Close the media door.



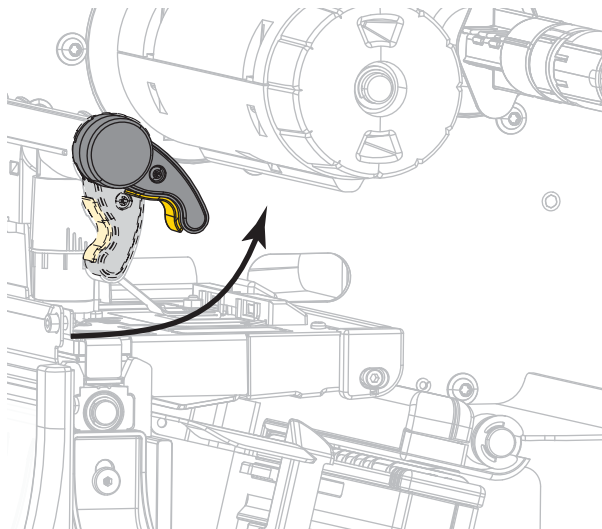
9. Set the printer to the appropriate collection method (see [Print > Label Position > Collection Method on page 77](#)).
10. Press **PAUSE** to exit pause mode and enable printing.
The printer may perform a label calibration or feed a label, depending on your settings.
11. For best results, calibrate the printer. See [Calibrate the Ribbon and Media Sensors on page 89](#).
12. If desired, print a configuration or other label to verify that your printer is able to print. (See [System > Settings > Print: System Settings on page 64](#).)

Media loading in Tear-Off mode is complete.

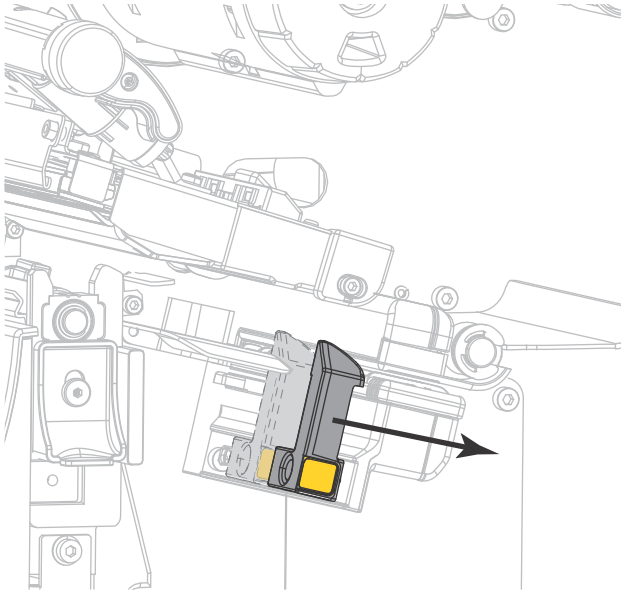
Peel-Off Mode (with or without Liner Take-Up)



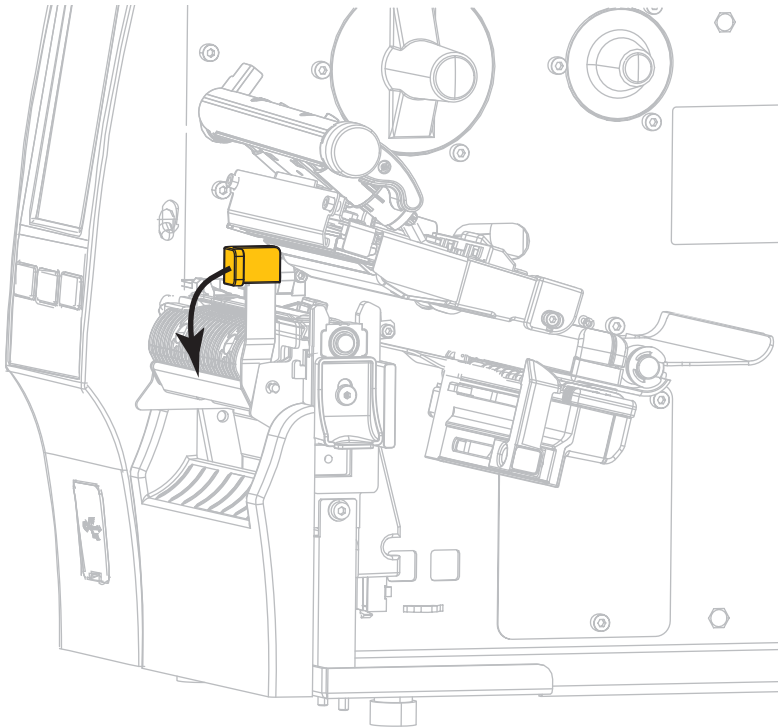
1. If you have not already done so, follow the instructions in the section [Insert the Media into the Printer on page 17](#).
2. Open the printhead assembly by rotating the printhead-open lever upward.



3. Slide the media guide all the way out.



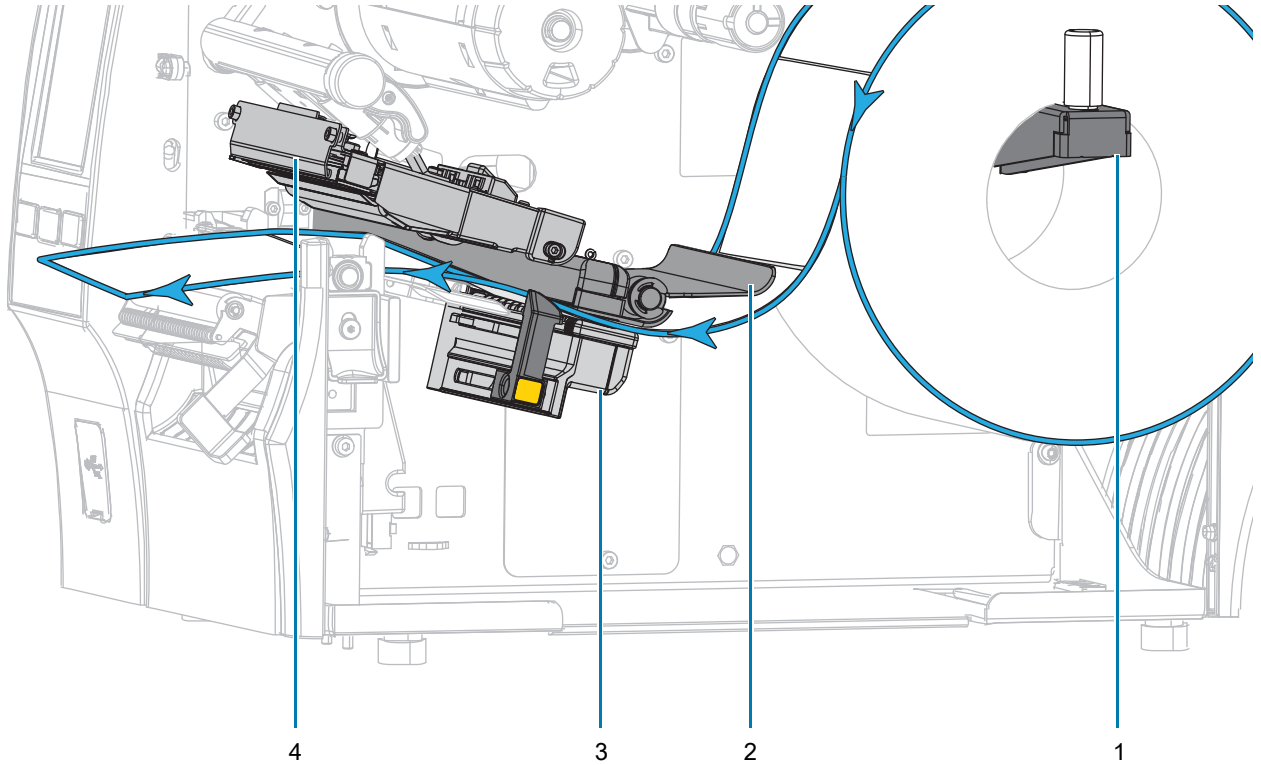
4. Push down the peel-off mechanism release lever to open the peel assembly.



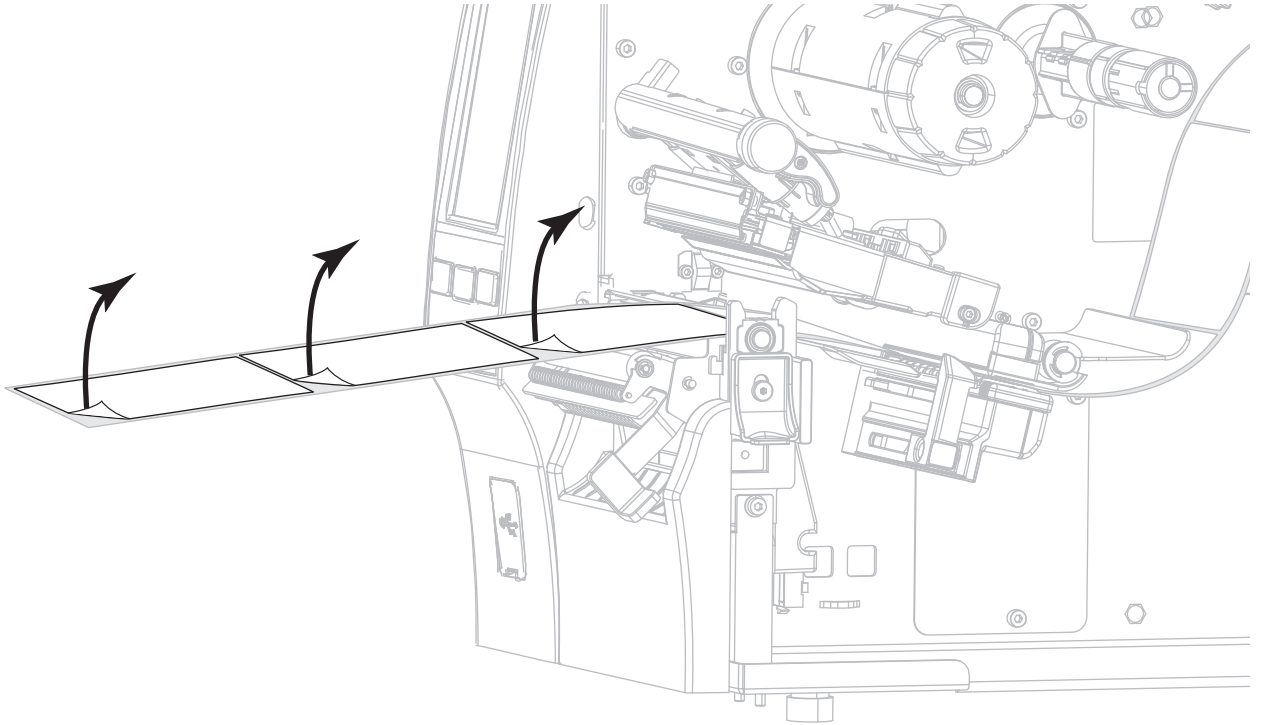


CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

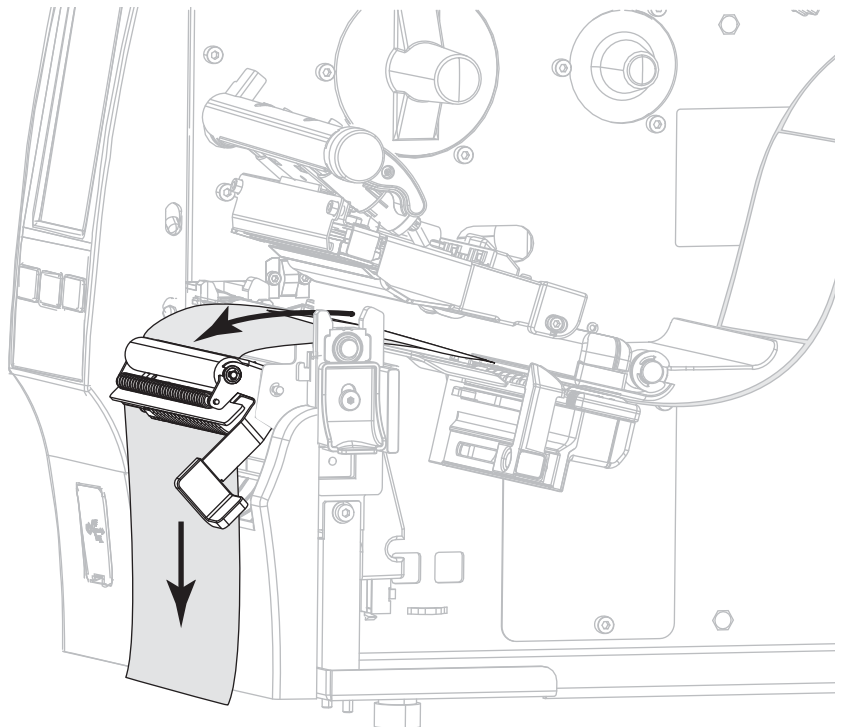
5. From the media hanger (1), feed the media under the dancer assembly (2), through the media sensor (3), and under the printhead assembly (4). Slide the media back until it touches the inside back wall of the media sensor.



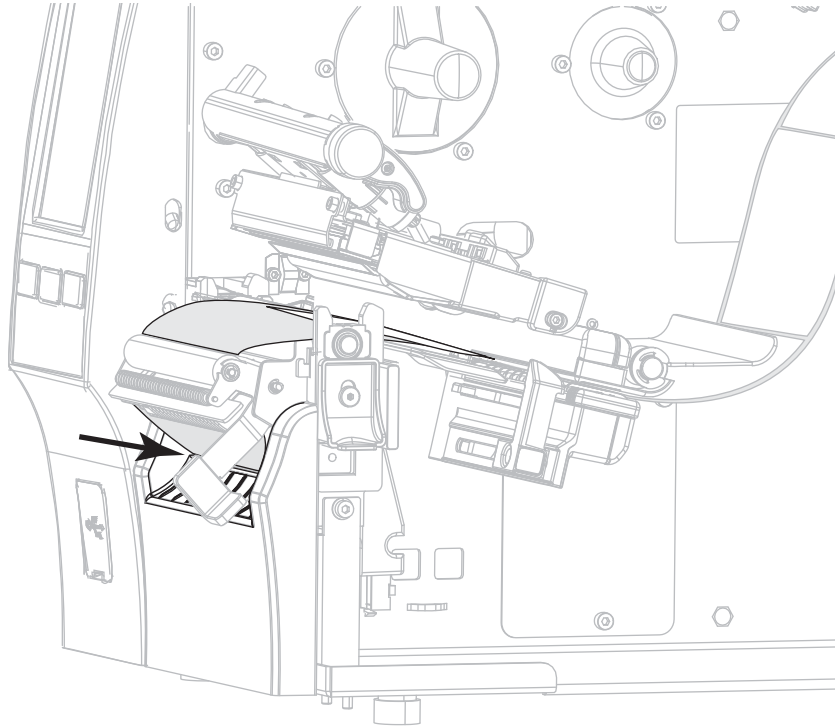
6. Extend approximately 18 in. (500 mm) of media out of the printer. Remove and discard the labels from this exposed media, leaving just the liner.



7. Feed the liner behind the peel assembly. Make sure that the end of the liner falls outside of the printer.

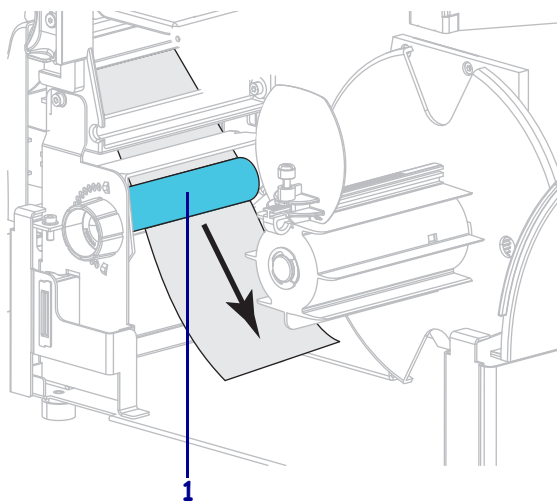


8. Complete this step only if you want to use Peel-Off mode with Liner Take-Up. Your printer must have the Liner Take-Up option or the Rewind option installed. Follow the instructions for your printer option. If you are not using Liner Take-Up, continue with [step 9 on page 33](#).
 - a. Thread the liner into the slot below the peel assembly.



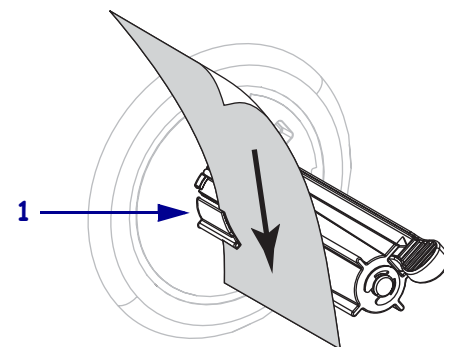
Rewind Option

- b. Feed the liner under the media alignment roller (1).



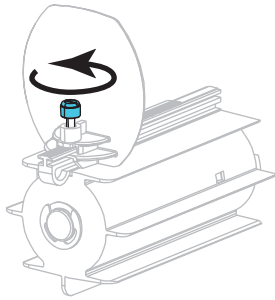
Liner Take-Up Option

- Slide the liner into the slot in the liner take-up spindle (1).

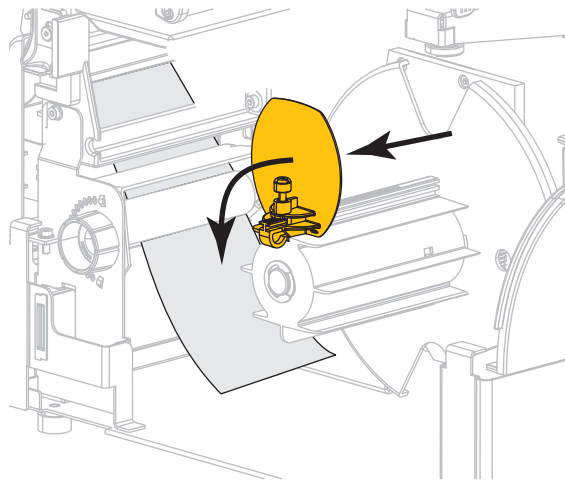


Rewind Option (Continued)

- c. Loosen the thumbscrew on the rewind media guide.

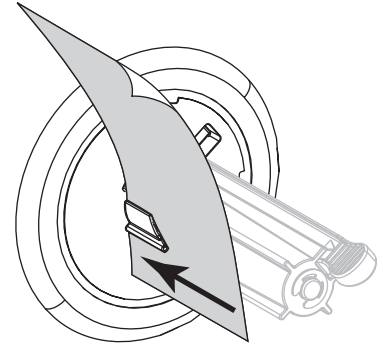


- d. Slide the rewind media guide all the way out, and then fold it down.

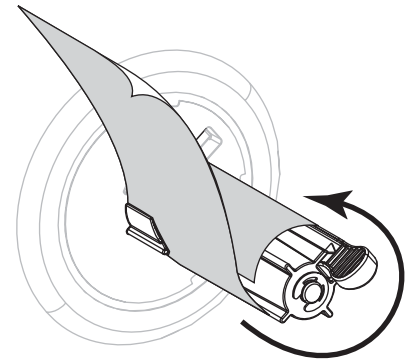


Liner Take-Up Option (Continued)

Push the liner back until it touches the back plate of the liner take-up spindle assembly.



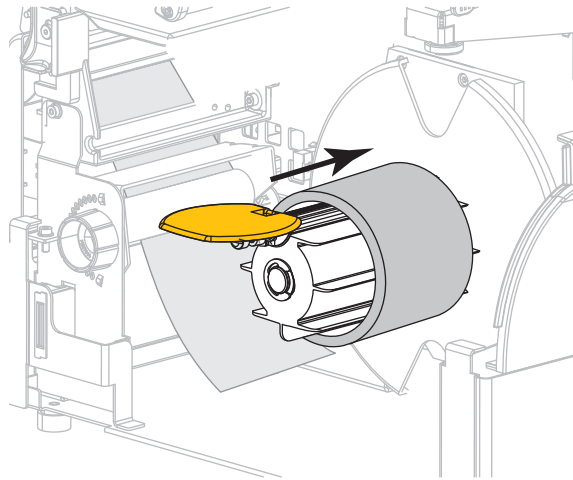
Wrap the liner around the liner take-up spindle and turn the spindle counterclockwise to tighten the liner.



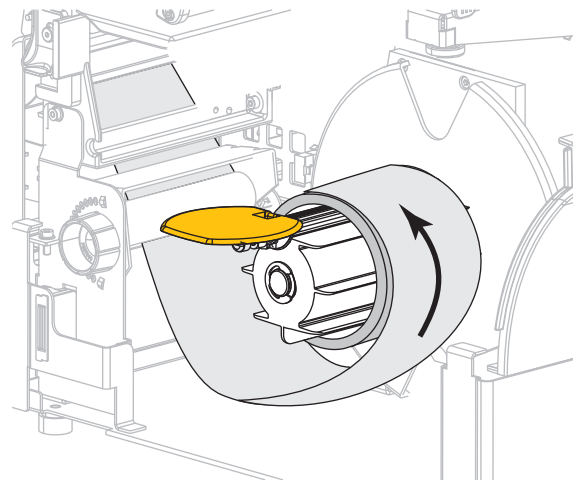
For the Liner Take-Up option, loading of the liner is complete. Continue with [step 9](#).

Rewind Option (Continued)

- e. Slide an empty core onto the rewind spindle.

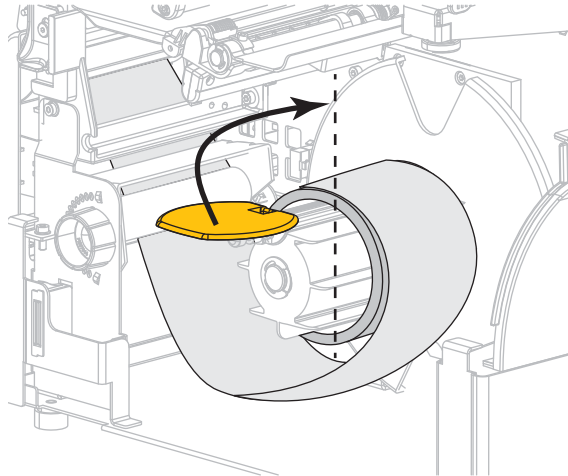


- f. Wrap the liner around the core as shown, and then turn the rewind spindle to tighten the media. Ensure that the edge of the media is flush against the backplate of the rewind spindle.

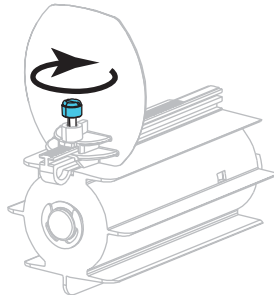


Rewind Option (Continued)

- g.** Fold up the rewind media guide, and then slide it in until it touches the liner.

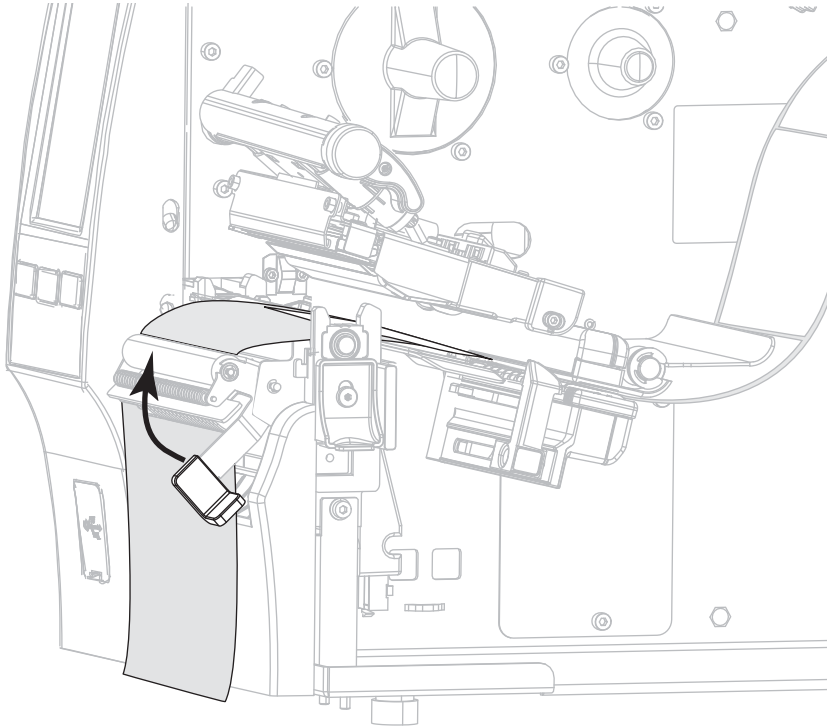


- h.** Tighten the thumbscrew on the rewind media guide.

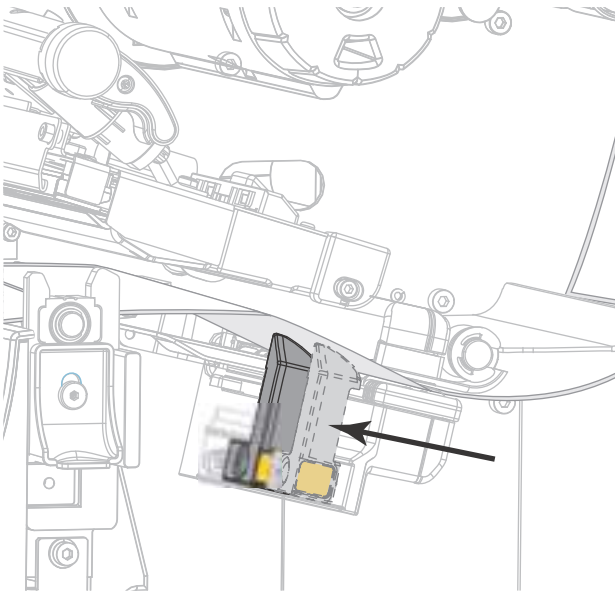


- i.** Loading of the liner is complete. Continue with [step 9](#).

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



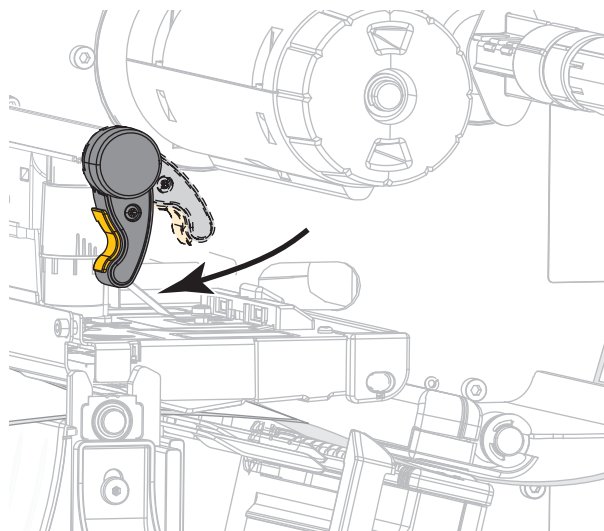
10. Slide in the media guide until it just touches the edge of the media.



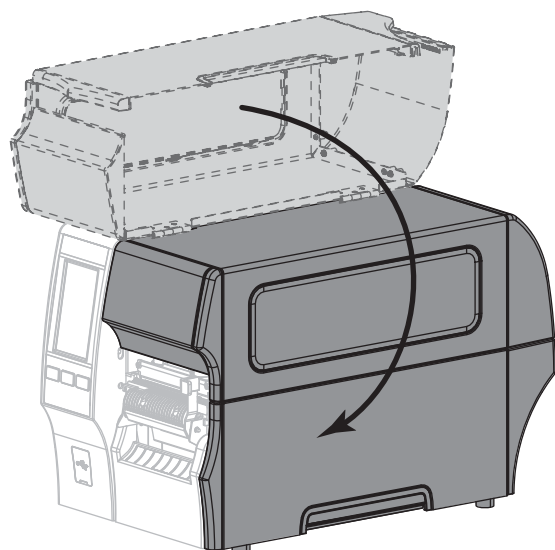
11. Does the media that you are using require ribbon for printing? If you are not sure, see [Ribbon on page 11](#).

If using...	Then...
Direct Thermal media (no ribbon needed)	Continue with step 12 .
Thermal Transfer media (ribbon needed)	<p>a. If you have not already done so, load ribbon in the printer. See Load the Ribbon on page 48.</p> <p>b. Continue with step 12.</p>

12. Rotate the printhead-open lever downward until it locks the printhead in place.



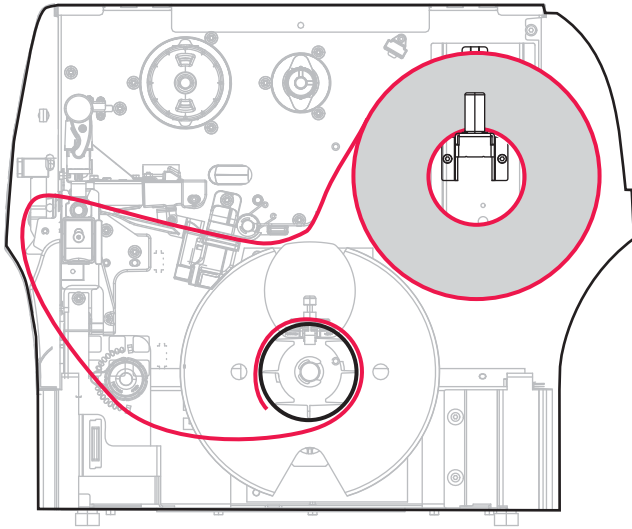
13. Close the media door.



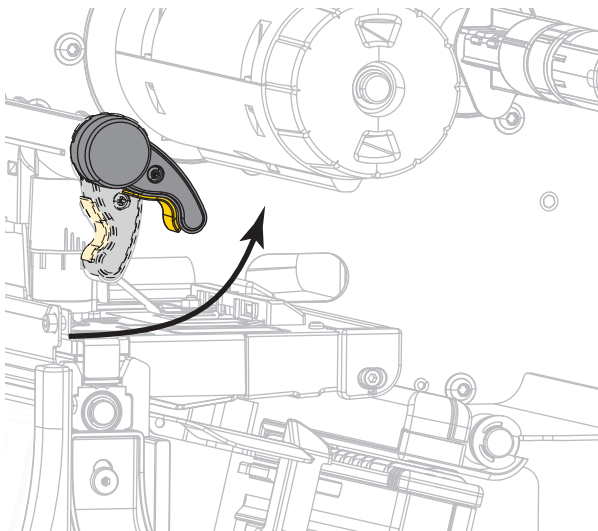
14. Set the printer to the appropriate collection method (for more information, see [Print > Label Position > Collection Method on page 77](#)).
15. Press **PAUSE** to exit pause mode and enable printing.
The printer may perform a label calibration or feed a label, depending on your settings.
16. For best results, calibrate the printer. See [Calibrate the Ribbon and Media Sensors on page 89](#).
17. If desired, print a configuration or other label to verify that your printer is able to print. (See [System > Settings > Print: System Settings on page 64](#).)

Media loading in Peel-Off mode is complete.

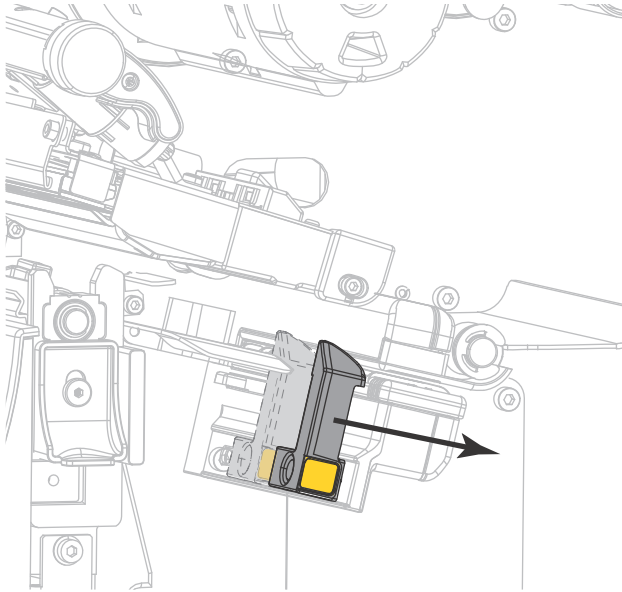
Rewind Mode



1. If you have not already done so, follow the instructions in the section [Insert the Media into the Printer on page 17](#).
2. Open the printhead assembly by rotating the printhead-open lever upward.

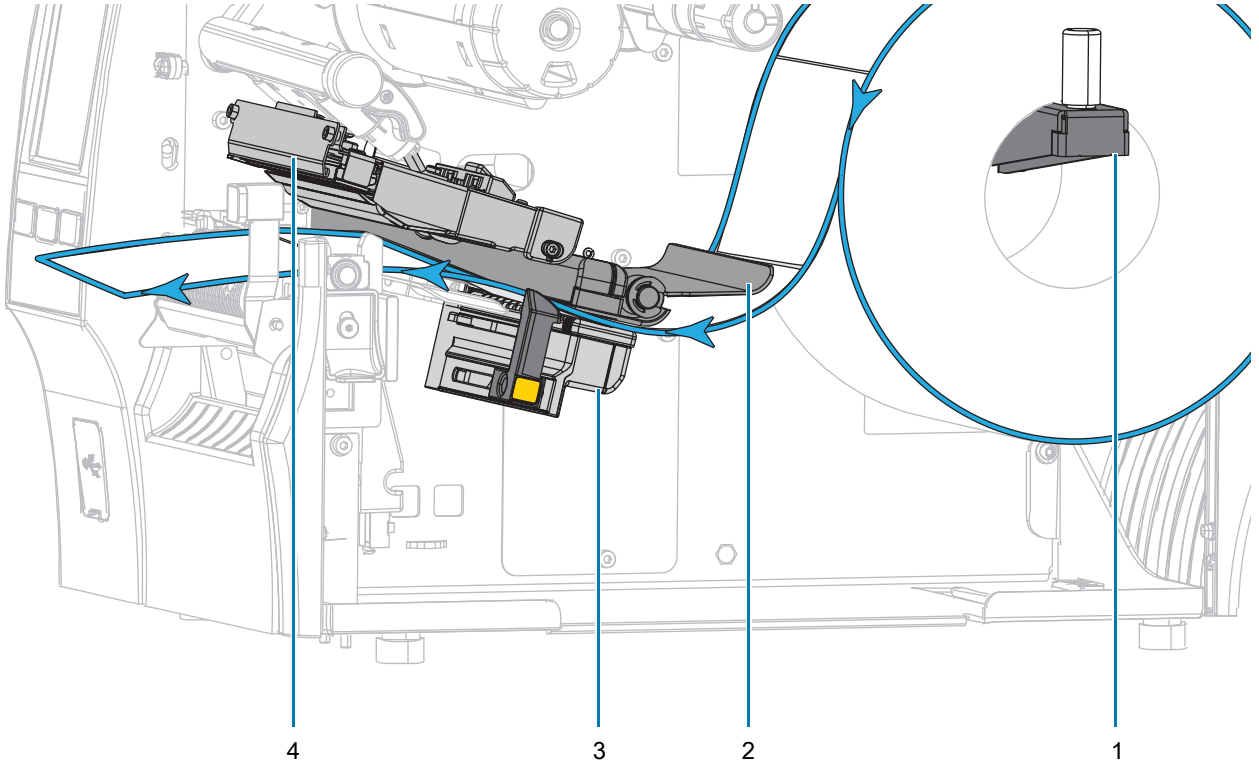


3. Slide the media guide all the way out.

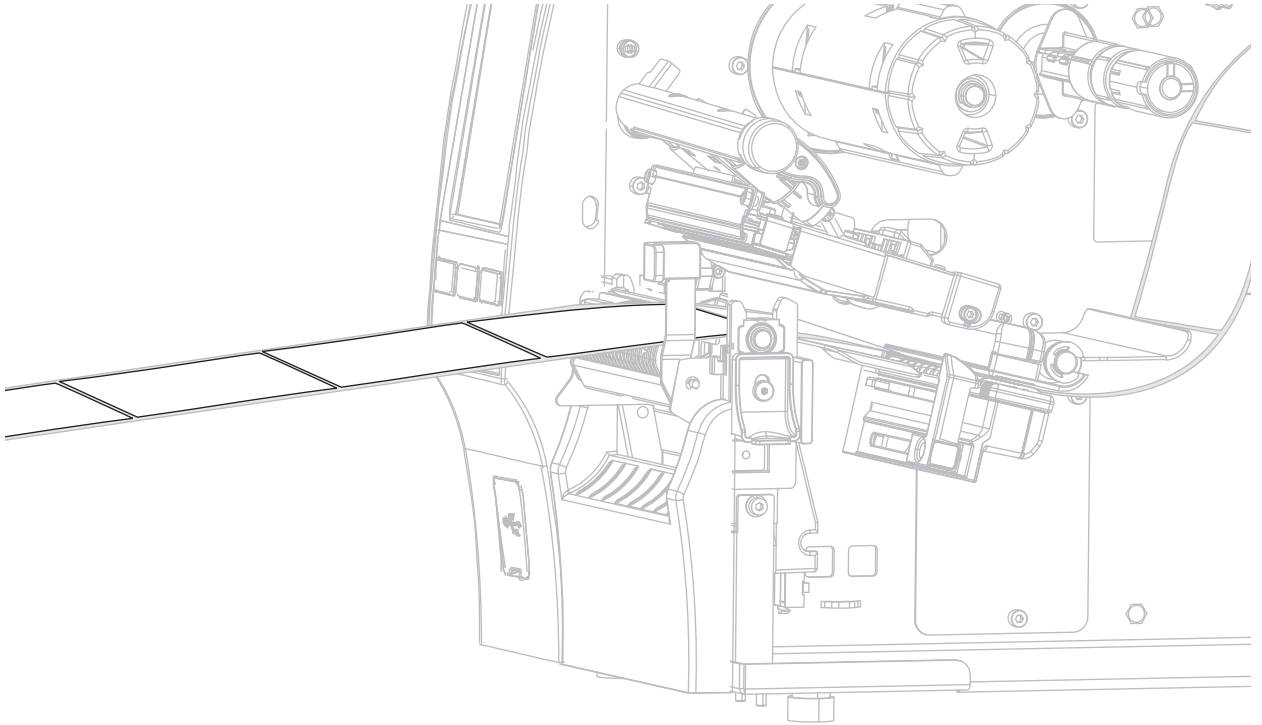


CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

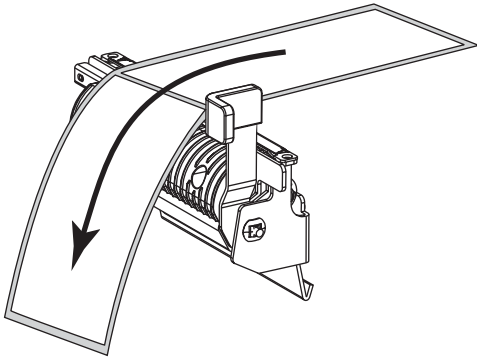
4. From the media hanger (1), feed the media under the dancer assembly (2), through the media sensor (3), and under the printhead assembly (4). Slide the media back until it touches the inside back wall of the media sensor.



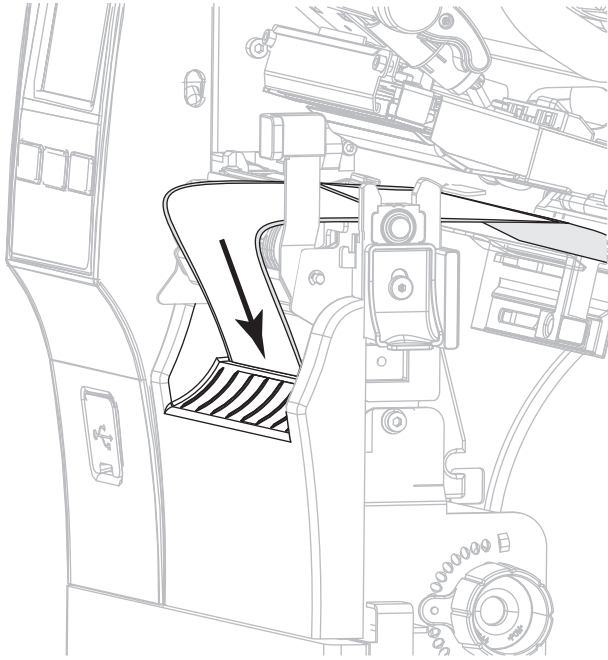
5. Extend approximately 18 in. (500 mm) of media out of the printer.



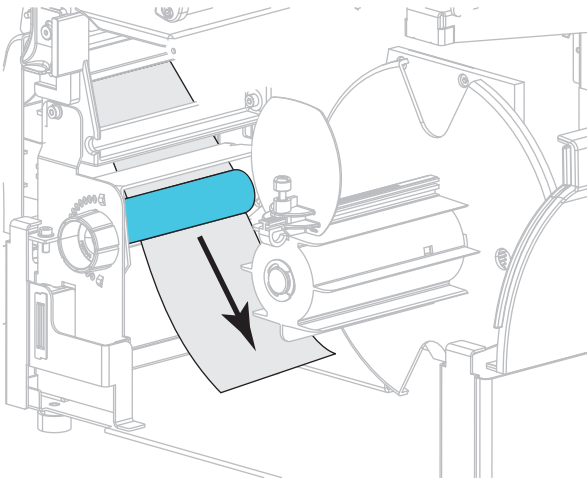
6. Feed the media over the peel assembly.



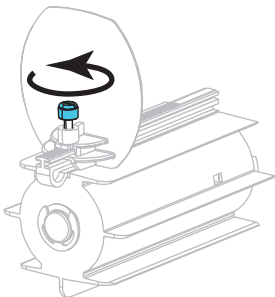
7. Thread the media into the slot below the peel assembly.



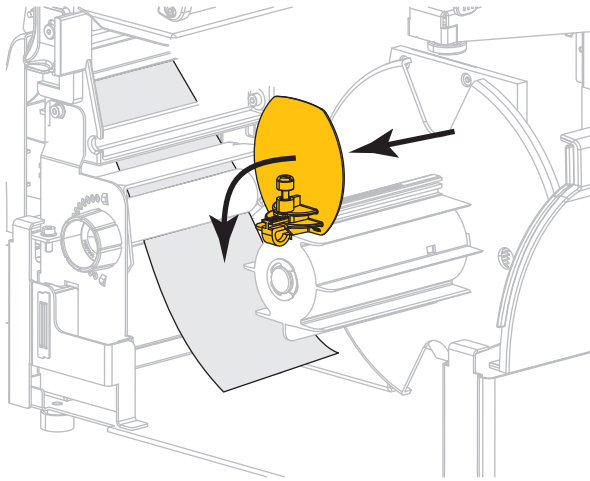
8. Feed the media under the media alignment roller.



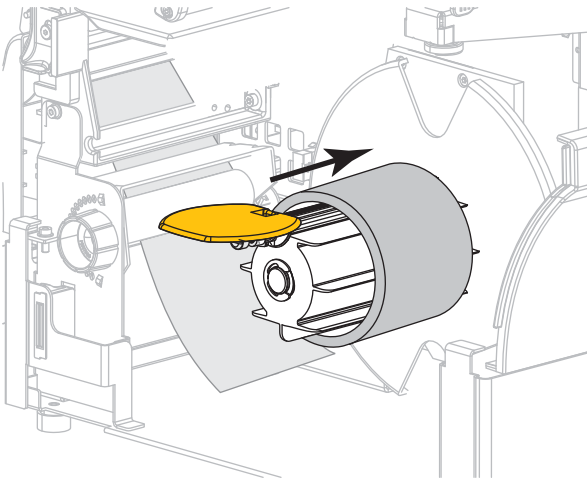
9. Loosen the thumbscrew on the rewind media guide.



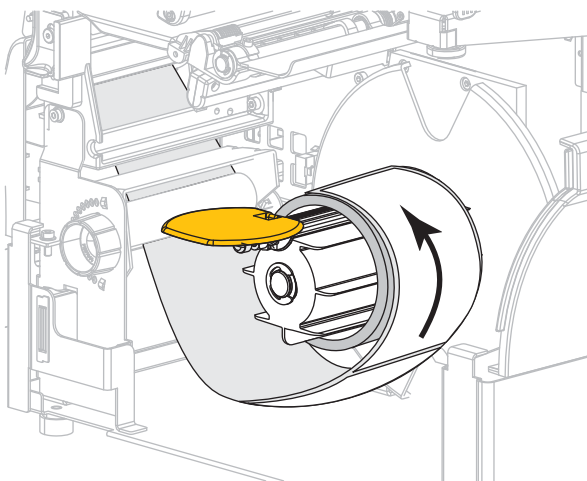
10. Slide the rewind media guide all the way out, and then fold it down.



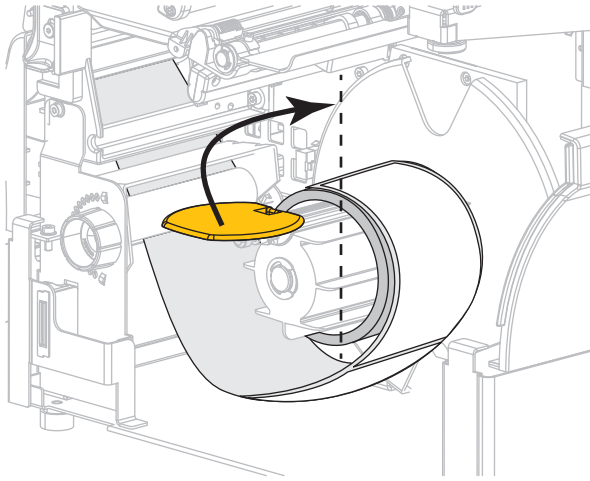
11. Slide an empty core onto the rewind spindle.



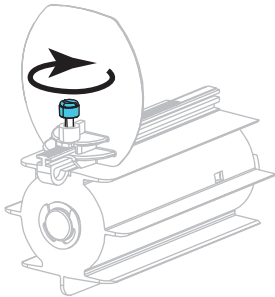
12. Wrap the media around the core as shown and turn the rewind spindle to tighten the media. Ensure that the edge of the media is flush against the backplate of the rewind spindle.



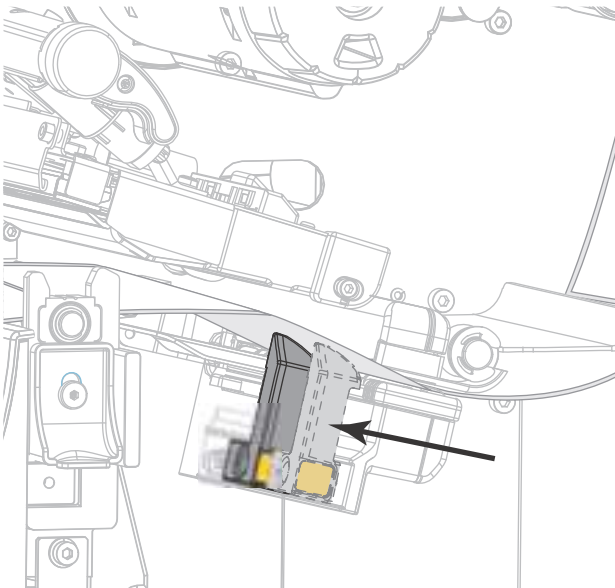
13. Fold up the rewind media guide, and then slide it in until it touches the media.



14. Tighten the thumbscrew on the rewind media guide.



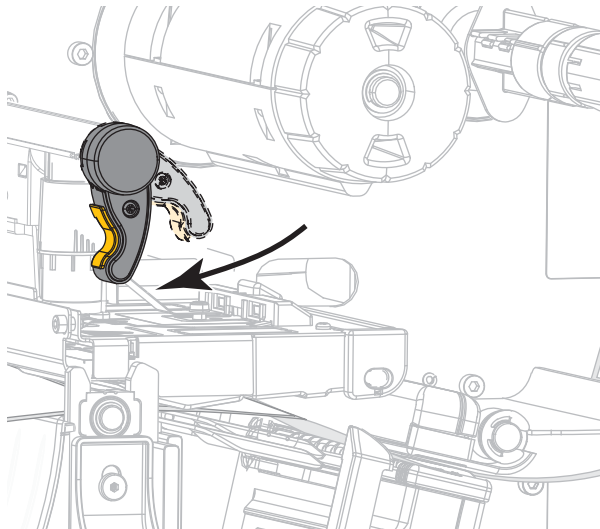
15. Slide in the media guide until it just touches the edge of the media.



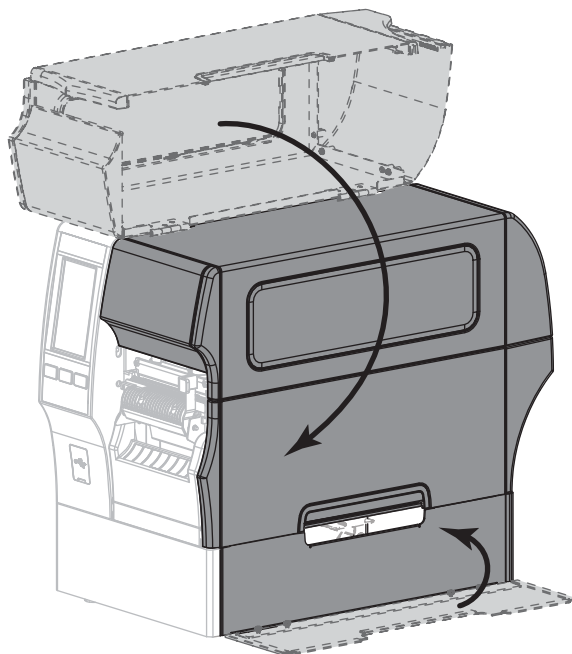
16. Does the media that you are using require ribbon for printing? If you are not sure, see [Ribbon on page 11](#).

If using...	Then...
Direct Thermal media (no ribbon needed)	Continue with step 17 .
Thermal Transfer media (ribbon needed)	<p>a. If you have not already done so, load ribbon in the printer. See Load the Ribbon on page 48.</p> <p>b. Continue with step 17.</p>

17. Rotate the printhead-open lever downward until it locks the printhead in place.



18. Close the media door and the rewind base door.



19. Set the printer to Rewind mode (for more information, see [Print > Label Position > Collection Method on page 77](#)).

20. Press **PAUSE** to exit pause mode and enable printing.

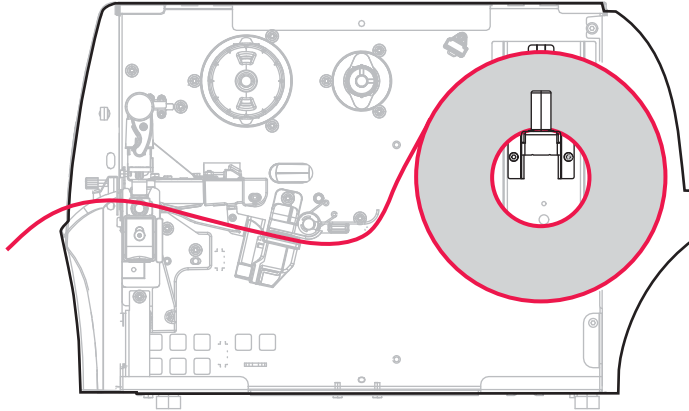
The printer may perform a label calibration or feed a label, depending on your settings.

21. For best results, calibrate the printer. See [Calibrate the Ribbon and Media Sensors on page 89](#).

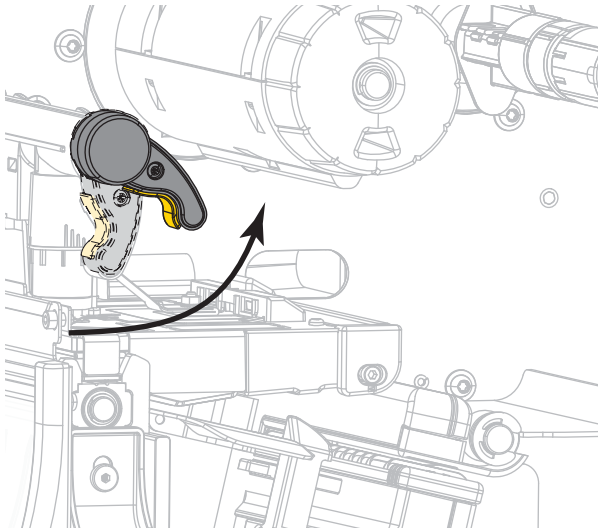
22. If desired, print a configuration or other label to verify that your printer is able to print. (See [System > Settings > Print: System Settings on page 64](#).)

Media loading in Rewind mode is complete.

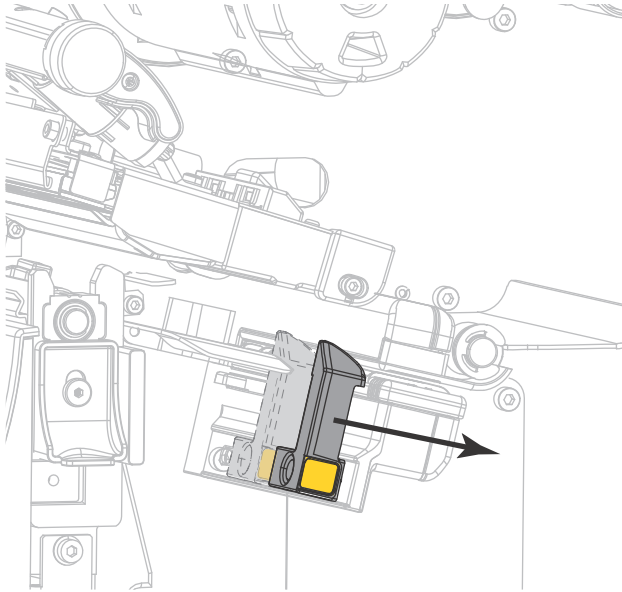
Cutter Mode or Delayed Cut Mode



1. If you have not already done so, follow the instructions in the section [Insert the Media into the Printer on page 17](#).
2. Open the printhead assembly by rotating the printhead-open lever upward.

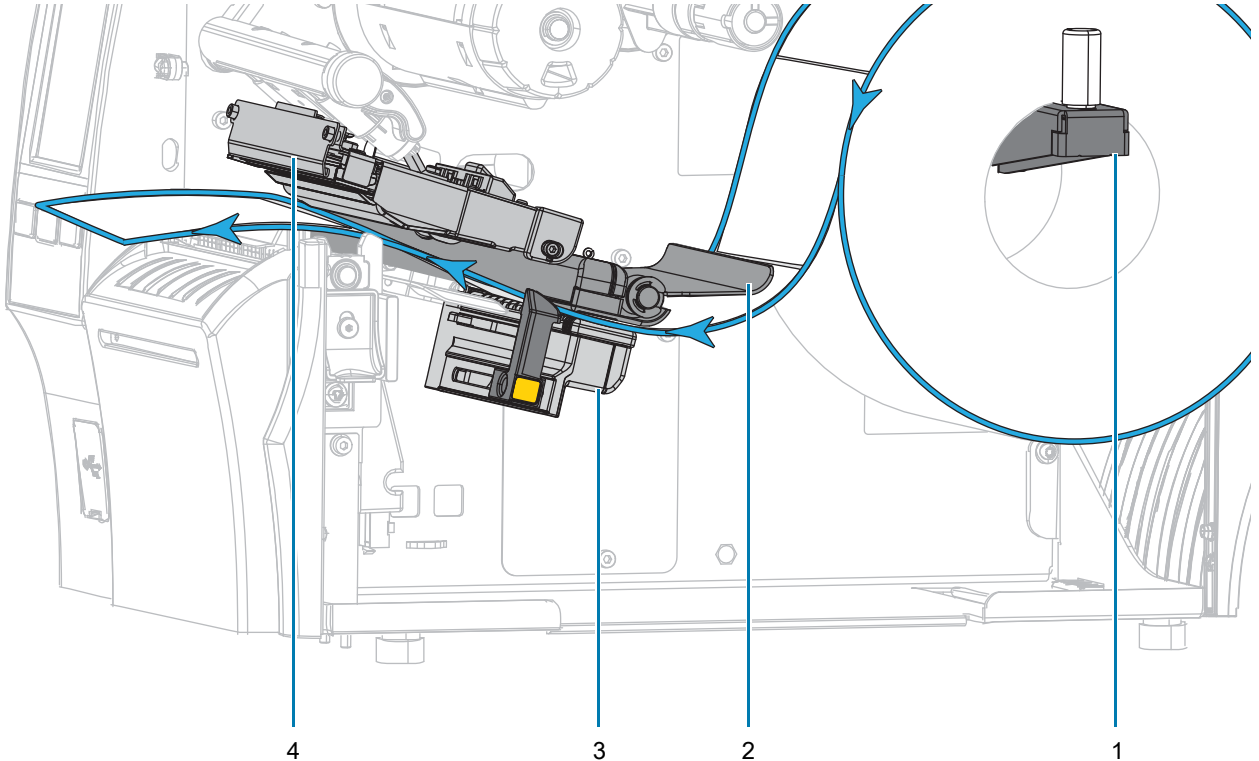


3. Slide the media guide all the way out.



CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

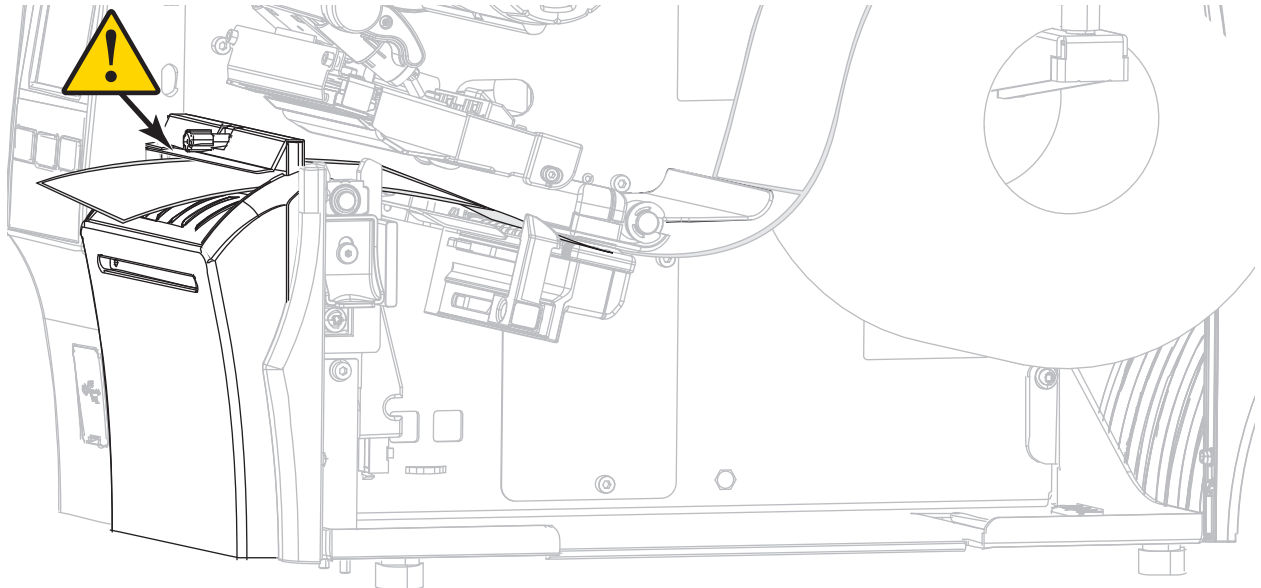
4. From the media hanger (1), feed the media under the dancer assembly (2), through the media sensor (3), and under the printhead assembly (4). Slide the media back until it touches the inside back wall of the media sensor.



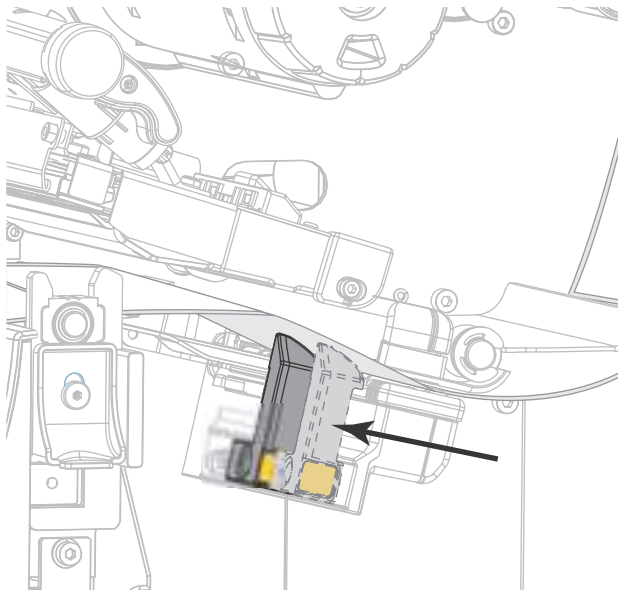


CAUTION: The cutter blade is sharp. Do not touch or rub the blade with your fingers.

5. Feed the media through the cutter.



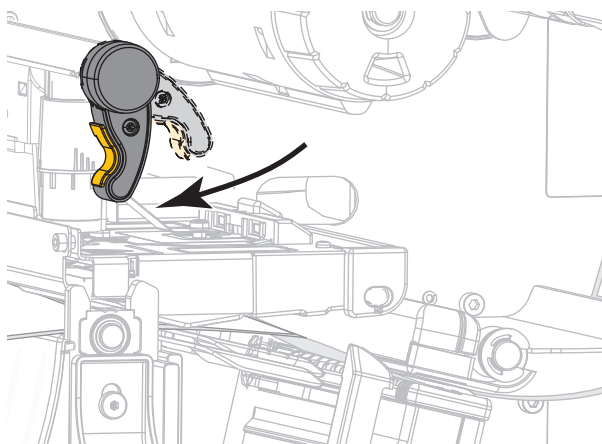
6. Slide in the media guide until it just touches the edge of the media.



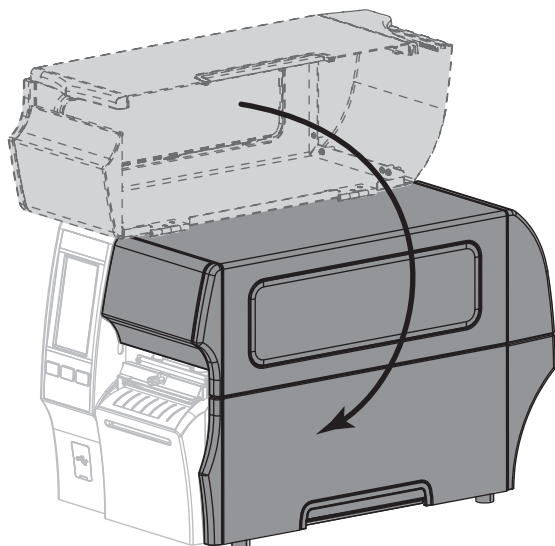
7. Does the media that you are using require ribbon for printing? If you are not sure, see [Ribbon on page 11](#).

If using...	Then...
Direct Thermal media (no ribbon needed)	Continue with step 8 .
Thermal Transfer media (ribbon needed)	<p>a. If you have not already done so, load ribbon in the printer. See Load the Ribbon on page 48.</p> <p>b. Continue with step 8.</p>

8. Rotate the printhead-open lever downward until it locks the printhead in place.



9. Close the media door.



10. Set the printer to the appropriate collection method (for more information, see [Print > Label Position > Collection Method on page 77](#)).
11. Press **PAUSE** to exit pause mode and enable printing.
The printer may perform a label calibration or feed a label, depending on your settings.
12. For best results, calibrate the printer. See [Calibrate the Ribbon and Media Sensors on page 89](#).
13. If desired, print a configuration or other label to verify that your printer is able to print. (See [System > Settings > Print: System Settings on page 64](#).)

Media loading in Cutter mode is complete.

Determine the Type of Ribbon to Use





NOTE: This section applies only to printers that have the Thermal Transfer option installed.

What kind of ribbon can I use? Rolls of ribbon are wound with the coated surface of ink on the inside of the roll or on the outside of the roll. This printer with a standard Thermal Transfer option uses ribbon that is coated on the outside. An optional ribbon spindle is available to use ribbon that is coated on the inside. Contact your authorized Zebra reseller for ordering information.

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.



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.

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 the standard printer. To verify this result, repeat the test on the other surface of the roll of ribbon.	

Ribbon Scratch Test Perform the ribbon scratch test when labels are unavailable.

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 outside and can be used in this printer.	
Did not leave a mark on the paper	The ribbon is coated on the inside and cannot be used in the standard printer. To verify this result, repeat the test on the other surface of the roll of ribbon.	

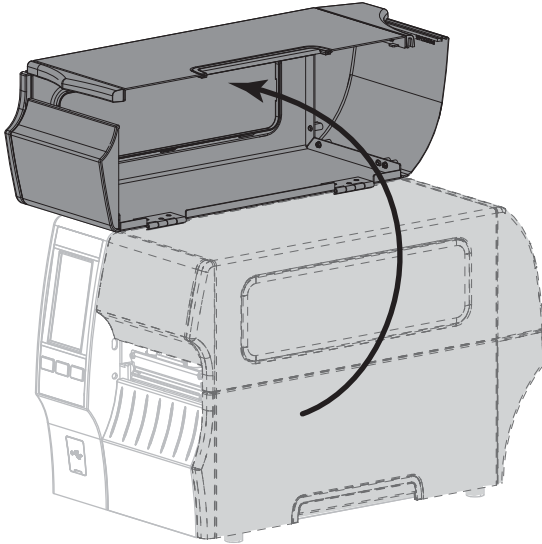
Load the Ribbon



IMPORTANT: 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.

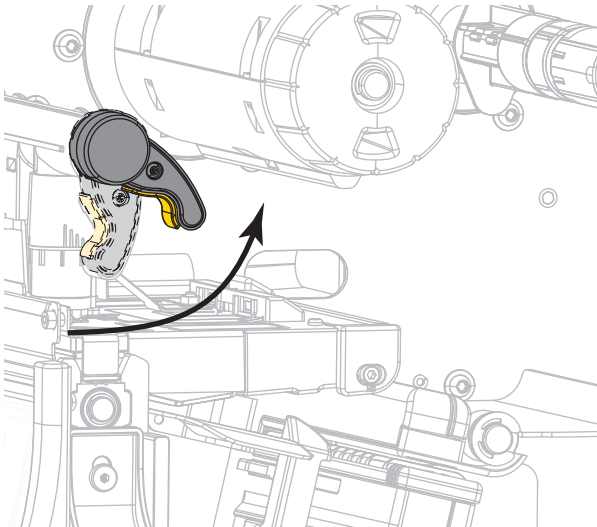
Use ribbon that is wider than the media to protect the printhead from wear. Ribbon must be coated on the outside for use in a standard printer. For more information, see [What kind of ribbon can I use? on page 47](#).

1. Raise the media door.

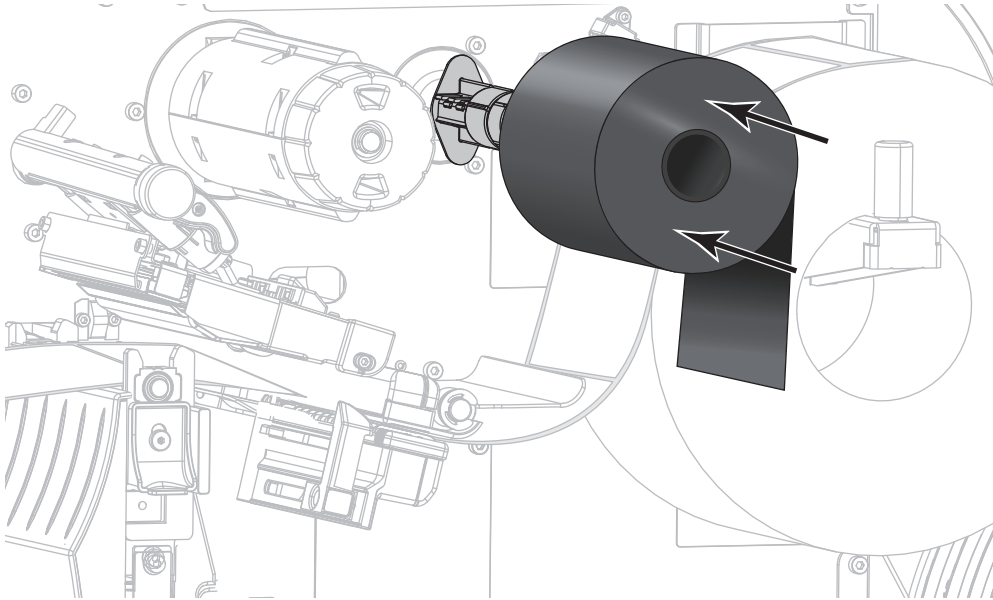


CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

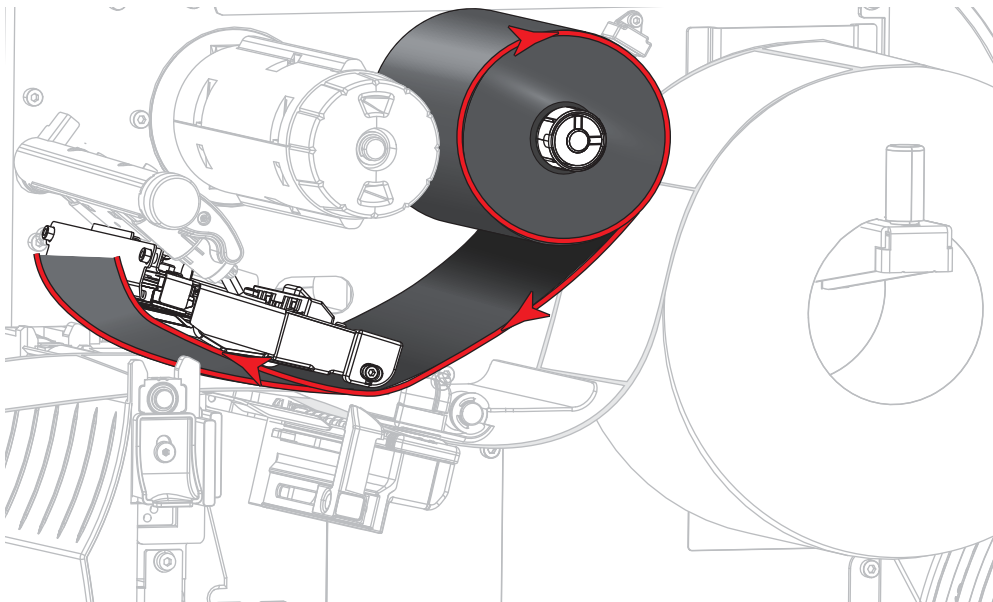
2. Open the printhead assembly by rotating the printhead-open lever upward.



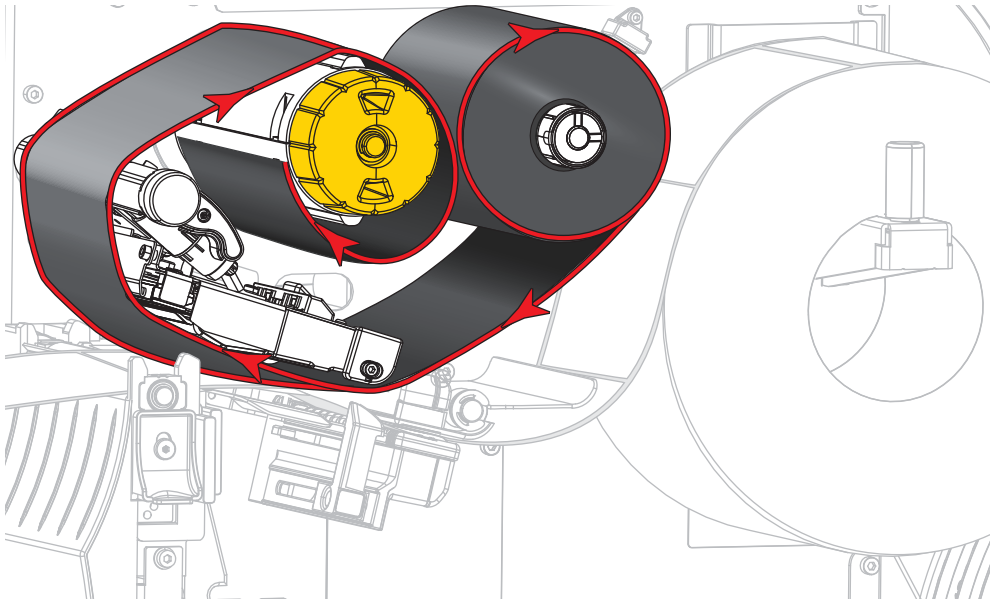
3. Place the roll of ribbon on the ribbon supply spindle with the loose end of the ribbon unrolling as shown. Push the roll back as far as it will go.



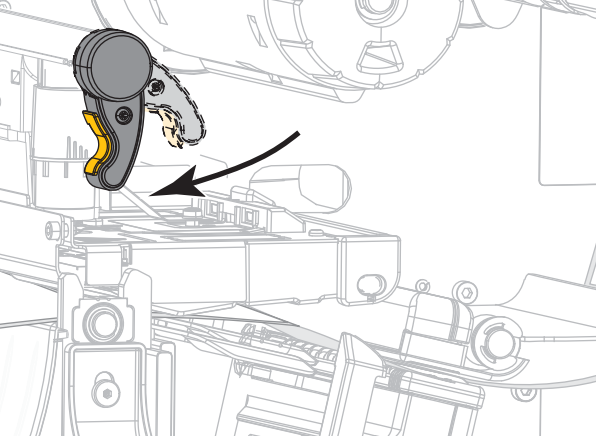
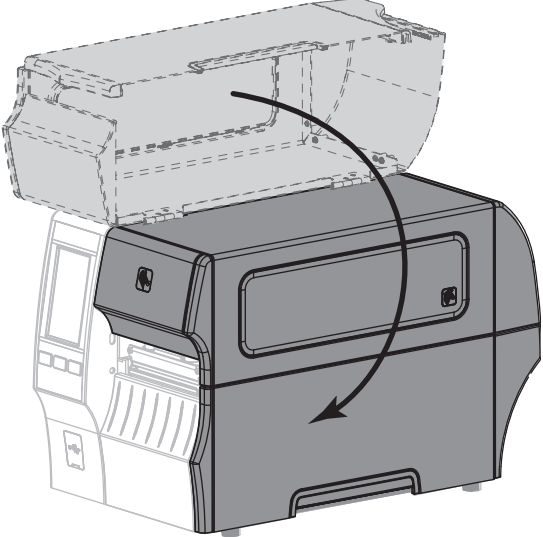
4. Bring the ribbon under the printhead assembly and around its left side, as shown.



5. With the ribbon tracking as far back as it can under the printhead assembly, wrap the ribbon around the ribbon take-up spindle. Rotate the spindle several turns in the direction shown to tighten and align the ribbon.



6. Is media already loaded in the printer?

If...	Then...
No	Continue with Load the Media on page 17 to load media in the printer.
Yes	<p data-bbox="488 348 1442 380">a. Rotate the printhead-open lever downward until it locks the printhead in place.</p>  <p data-bbox="488 873 786 905">b. Close the media door.</p>  <p data-bbox="488 1482 1162 1514">c. Press PAUSE to exit pause mode and enable printing.</p>

Run the Print Wizard and Print a Test Label

The Print Wizard configures the printer, prints test labels, and adjusts print quality based on the results of the test labels.



IMPORTANT: When using the Wizards, do not send data to the printer from the host.

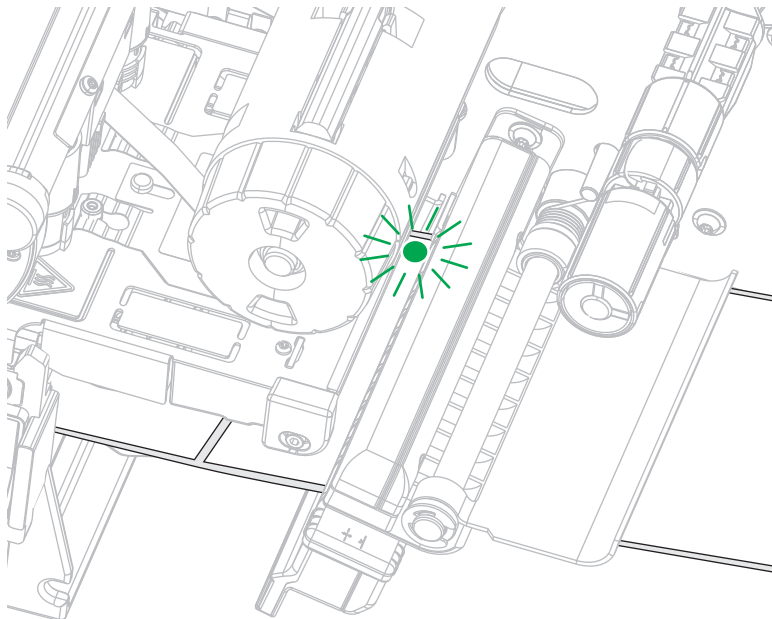
For best results, use full-width media running the **Print Wizard** or **Set All Wizard**. If the media is smaller than an image to be printed, the results may be truncated or print across multiple labels.

After you have completed the printer setup procedures and run the printer setup wizard, use this section to print a test label. Printing this label allows you to see if your connection is working and if you need to adjust any of the print settings.

1. On the Home screen, touch **Wizards > Print > Start Print**.
2. Follow the prompts to specify the following information:
 - print type (Thermal Transfer or Direct Thermal)
 - label type (Continuous, Gap/Notch, or Mark)
 - label width
 - collection method (tear off, peel-off, rewind, cutter, delayed cut, linerless peel, linerless rewind, linerless tear, or applicator)

After you have specified these, the wizard instructs you to load media and then to place a label over the media sensor.

3. Load media so that a label is over the green light from the media sensor, and then touch the check mark.



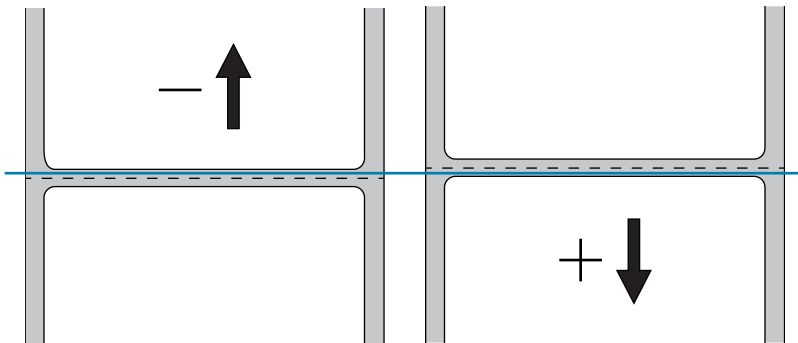
4. At the prompt, close the printhead, and then touch the next check mark.
The printer calibrates and then asks if you would like to print a test label.
5. Follow the prompts until the printer completes auto calibration.

6. When asked to print a test label, touch the check mark.

A test label similar to this one prints. If your labels are smaller than the image, only a portion of the test label will print.



7. Examine the position of the label over the tear bar. If necessary, shift the position of the media over the tear-off bar after printing.
- If the space between labels falls on the tear bar, continue with the next step.
 - If the space between labels does not fall directly on the tear bar, shift the position of the media over the tear bar after printing. Lower numbers move the media into the printer by the specified number of dots (the tear line moves closer to the edge of the label just printed). Higher numbers move the media out of the printer (the tear line moves closer to the leading edge of the next label).



8. Examine the quality of the image on the test label. Is the quality of the barcode and text on the test label acceptable? See [Judging Barcode Quality on page 110](#) for assistance.
- If yes, touch the check mark, and then continue with [step 13](#).
 - If no, adjust the print quality manually by changing darkness and speed settings through the printer's menu system, or continue with this procedure to run the Print Quality Assistance wizard.

Print Quality Assistance Wizard

9. Touch Print Quality Assistance.

The printer prompts for the number of test labels to print. The more labels you choose to print, the more choices that you will have available to decide on label quality. In general, if your test label from the previous wizard was acceptable, a lower number of test labels in this step will probably suffice.

10. Select a number of test labels to print.

The printer prints the specified number of test labels and prompts you for the best test label.

11. Decide which test label is the best quality. See [Judging Barcode Quality on page 110](#) for assistance. If none of the labels are acceptable, use the arrow to back up a screen in the wizard, and select a larger number of test labels.

12. In the list on the display, select the identifier for the test label with the best quality, and then touch the check mark.

The printer changes the darkness and speed to the levels used on the best test label.

13. If necessary, see [Printing or Print Quality Issues on page 124](#) to see what other issues may be affecting your print quality.

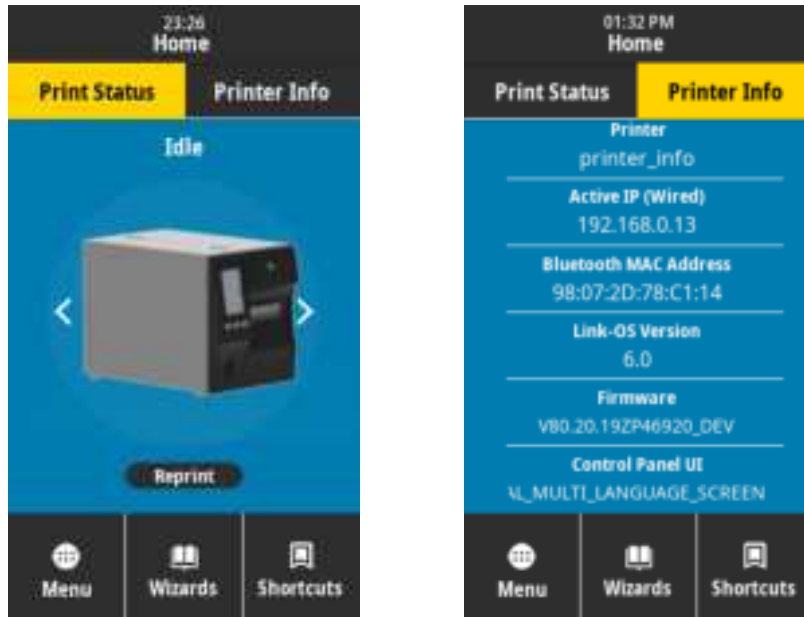
The print setup procedure is complete.

Printer Configuration and Adjustment

This section assists you with configuration of and adjustments to the printer.

Home Screen

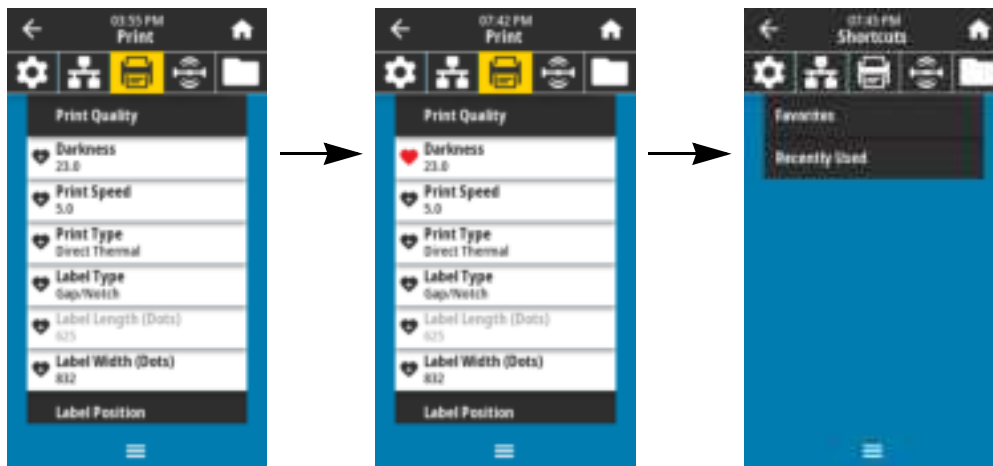
The printer's Home screen shows you the printer's current status and allows you to access the printer's menus. You can rotate the image of the printer 360 degrees to view it from all angles.



If the background color of the Home screen is yellow or red, the printer is in an alert or error state. For more information, see [Alert and Error States on page 118](#).

The following items are located on the Home screen Print Status tab:

- **Menu**—Allows you to change the printer settings. See [User Menus on page 58](#).
- **Wizards**—Allows you to change printer settings by going through prompts. See [Printer Wizards on page 57](#).
- **Shortcuts**—Allows you to quickly access the most recent menu items and to save your favorites. Touch the darkened heart icon next to a menu item to save it to your list of favorites. Items in the favorites are shown in the order in which they were saved.



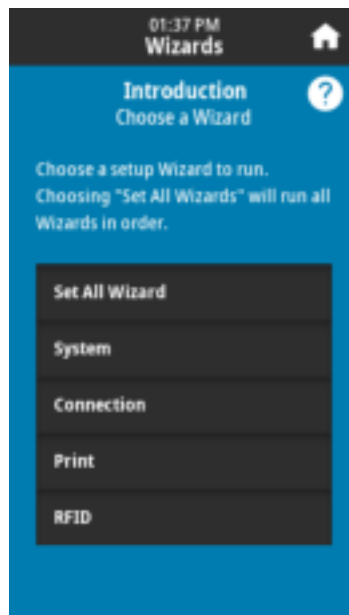
Printer Wizards

The printer Wizards can assist you by walking you through the setup process for various printer settings and features.

The following wizards are available:

- **Set All Wizard**—runs all the Wizards in sequence.
- **System Wizard**—sets up non-print related operating system settings.
- **Connection Wizard**—configures the printer's connectivity options.
- **Print Wizard**—configures key printing parameters and features. See [Run the Print Wizard and Print a Test Label on page 52](#).
- **RFID Wizard**—sets up the RFID subsystem's operations.

On the Home screen, touch **Wizards** to see the available options. For more information about individual settings set by any of the wizards, see [User Menus on page 58](#).



IMPORTANT: When using the Wizards, do not send data to the printer from the host.

For best results, use full-width media running the Print or Set All Wizards. If the media is shorter than an image to be printed, the image may be truncated or print across multiple labels.

User Menus

The printer's user menus can be used to configure the printer.



See the following sections:

- [System Menu on page 59](#)
- [Connection Menu on page 65](#)
- [Print Menu on page 75](#)
- [RFID Menu on page 83](#)
- [Storage Menu on page 87](#)

The user menu descriptions include the following other ways to change the same settings, when other options exist. You can also use the printer's wizards to change some of the settings. (See [Printer Wizards on page 57](#).)

- **ZPL** and **Set/Get/Do (SGD) commands**. See the *Zebra Programming Guide* at <http://www.zebra.com/manuals> for more information.
- The printer's **web pages**, for when the printer has an active wired or wireless print server connection. See the *ZebraNet Wired and Wireless Print Servers User Guide* at <http://www.zebra.com/manuals> for more information.

System Menu



System > Language

If necessary, change the language that the printer displays. This change affects the words shown on the following:

- the Home screen
- the user menus
- error messages
- the printer configuration label, the network configuration label, and other labels that you can select to print through the user menus

Accepted values:

ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, DUTCH, FINNISH, CZECH, JAPANESE, KOREAN, ROMANIAN, RUSSIAN, POLISH, SIMPLIFIED CHINESE, TRADITIONAL CHINESE

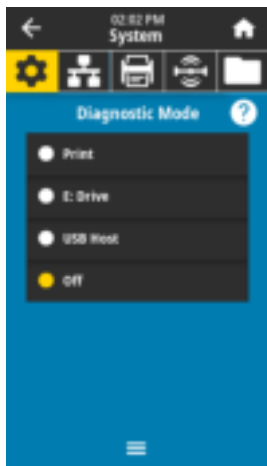


NOTE: The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.

Related ZPL command(s): `^KL`

SGD command used: `display.language`

Printer web page: View and Modify Printer Settings > General Setup > Language



System > Program Language > Diagnostic Mode

Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer. For more information, see [Communication Diagnostics Mode on page 116](#).

Accepted values: DISABLED, ENABLED

Related ZPL command(s): `~JD` to enable, `~JE` to disable

SGD command used: `device.diagnostic_print`

Control panel key(s): Hold **PAUSE + FEED** for 2 seconds when the printer is in the Ready state.

System > Program Language > Virtual Device

If any Virtual Device apps are installed on your printer, you may view or enable/disable them from this user menu. For more information about Virtual Devices, go to the User Guide for the appropriate Virtual Device, or contact your local reseller.



System > Program Language > ZBI

Zebra Basic Interpreter (ZBI 2.0™) is a programming option that may be purchased for your printer. If you would like to purchase this option, contact your Zebra reseller for more information.

If ZBI programs have been downloaded to your printer, you may select one to run using this menu item. If no program exists on your printer, **NONE** is listed.

When ZBI programs have been downloaded but none are running, the printer lists all available programs. To run one of them, touch **Run** (highlighted in white) under the program name.

After a program is running, only that program is listed. Touch **Stop** (highlighted in white) to end the program.



SGD command used:

`zbi.key` (identifies if the ZBI 2.0 option is enabled or disabled on the printer)



System > Settings > Display Time Format

Select the time format used by the printer.

Accepted values: 12-Hour, 24-Hour

SGD command used: `device.idle_display_value`

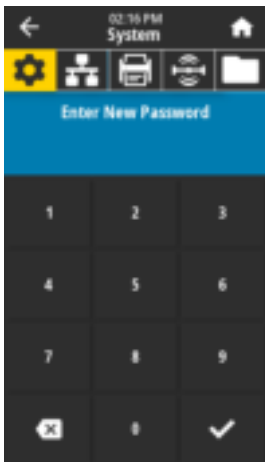


System > Settings > Password Level

Select the level of password protection for user menu items.

Accepted values: Selected, All, None

Related ZPL command(s): `^KP` (to change the printer password)

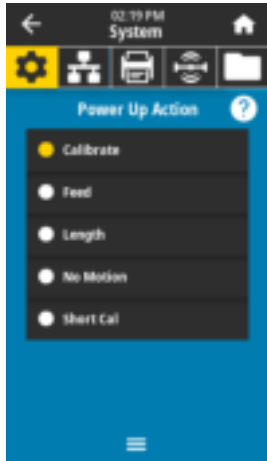


System > Settings > Set Password

Set a new printer password for menu items protected by the previous parameter. The default printer password is 1234.

Accepted values: Numerals 0-9

Related ZPL command(s): `^KP`



System > Settings > Power Up Action

Set the action for the printer to take during the power-up sequence.

Accepted values:

CALIBRATE—Adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.

FEED—Feeds the labels to the first registration point.

LENGTH—Determines the label length using current sensor values, and feeds the media to the next web.

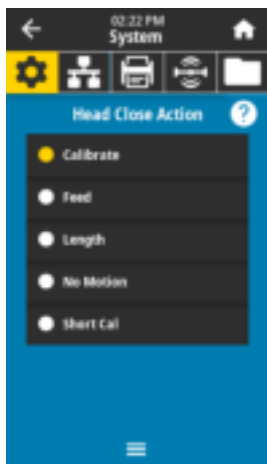
NO MOTION—Tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web.

SHORT CAL—Sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

Related ZPL command(s): **^MF**

SGD command used: **ezpl.power_up_action**

Printer web page: [View and Modify Printer Settings > Calibration](#)



System > Settings > Head Close Action

Set the action for the printer to take when you close the printhead.

Accepted values:

CALIBRATE—Adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.

FEED—Feeds the labels to the first registration point.

LENGTH—Determines the 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.

SHORT CAL—Sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

Related ZPL command(s): **^MF**

SGD command used: **ezpl.head_close_action**

Printer web page: [View and Modify Printer Settings > Calibration](#)



System > Settings > Screen Calibration

Touch each crosshair to calibrate the screen.



System > Settings > Restore Defaults

Restore specific printer, print server, and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually. This menu item is available through two user menus with different default values for each.

Accepted values:

PRINTER—Restores all printer settings 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.

NETWORK—Reinitializes the printer's wired or wireless print server. With a wireless print server, the printer also reassociates with your wireless network.

LAST SAVED—Loads settings from the last permanent save.

Related ZPL command(s):

PRINTER— **^JUF**

NETWORK— **^JUN**

LAST SAVED— **^JUR**

Control panel key(s):

PRINTER—Hold **FEED + PAUSE** during printer power-up to reset the printer parameters to factory values.

NETWORK—Hold **CANCEL + PAUSE** during printer power-up to reset the network parameters to factory values.

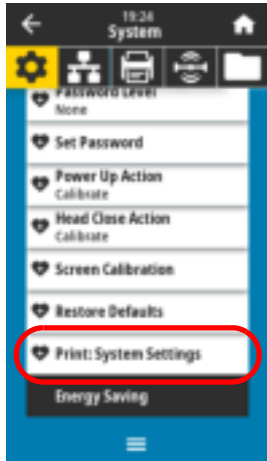
LAST SAVED—N/A

Printer web page:

PRINTER—View and Modify Printer Settings > Restore Default Configuration

NETWORK—Print Server Settings > Reset Print Server

LAST SAVED—View and Modify Printer Settings > Restore Saved Configuration



System > Settings > Print: System Settings

Prints a printer configuration label. The following is a sample label.



Related ZPL command(s): ~WC

Control panel key(s): Do one of the following*:

- Hold **CANCEL** during printer power-up. (Formerly called a CANCEL self test.
- Hold **FEED + CANCEL** for 2 seconds when the printer is in the Ready state.

Printer web page: View and Modify Printer Settings > Print Listings on Label *

* Prints a printer configuration label and a network configuration label.



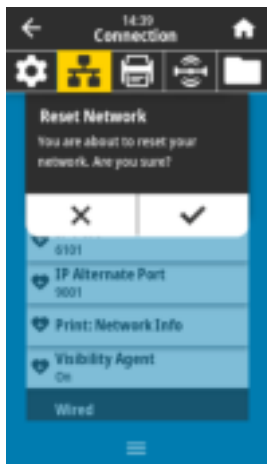
System > Energy Saving > Energy Star

When Energy Star mode is enabled, the printer goes into a “sleep” mode after a timeout period, thereby lowering power consumption. Press any button on the control panel to bring the printer back to an active state.

Accepted values: ON, OFF

SGD command used: `power.energy_star.enable`
`power.energy_star.timeout`
 (to set the amount of idle time before Energy Star is invoked)

Connection Menu



Connection > Networks > Reset Network

This option resets the wired or wireless print server and saves any changes that you made to any network settings.

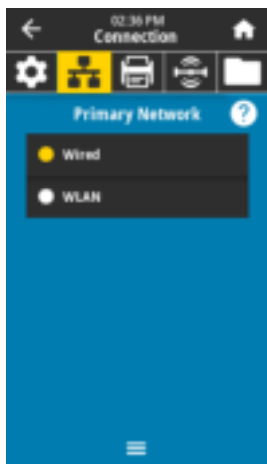


IMPORTANT: You must reset the print server to allow changes to the network settings to take effect.

Related ZPL command(s): `~WR`

SGD command used: `device.reset`

Printer web page: Print Server Settings > Reset Print Server



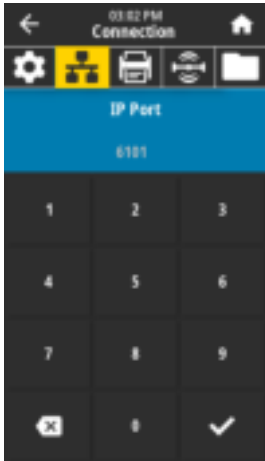
Connection > Networks > Primary Network

View or modify whether the wired or wireless print server is considered primary. You may select which one is primary.

Accepted values: Wired, WLAN

Related ZPL command(s): `^NC`

SGD command used: `ip.primary_network`

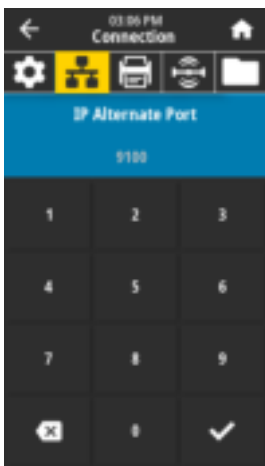


Connection > Networks > IP Port

This printer setting refers to the internal wired print servers port number that the TCP print service is listening on. Normal TCP communications from the host should be directed to this port.

SGD command used: **internal_wired.ip.port**
wlan.ip.port

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > Networks > IP Alternate Port

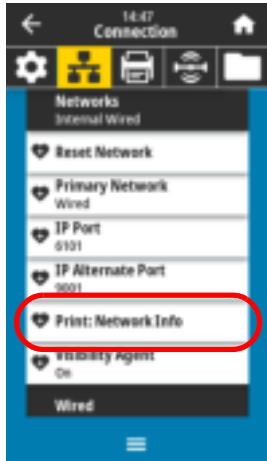
This command sets the port number of the alternate TCP port.



NOTE: Print servers supporting this command will monitor both the primary port and the alternate port for connections at the same time.

SGD command used: **internal_wired.ip.port_alternate**
wlan.ip.port_alternate

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > Networks > Print: Network Info

Prints the settings for any print server or Bluetooth device that is installed. The following is a sample label.



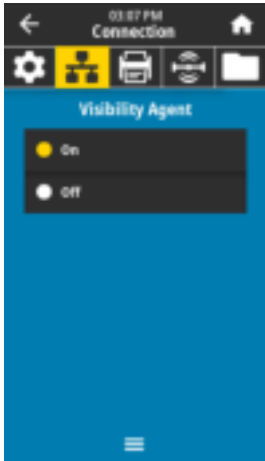
Related ZPL command(s): ~WL

Control panel key(s): Do one of the following:*

- Hold **CANCEL** during printer power-up. (Formerly called a CANCEL self test.
- Hold **FEED + CANCEL** for 2 seconds when the printer is in the Ready state.

Printer web page: View and Modify Printer Settings > Print Listings on Label *

* Prints a printer configuration label and a network configuration label.



Connection > Networks > Visibility Agent

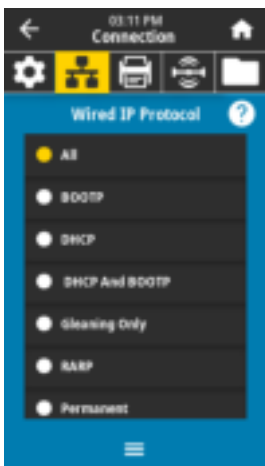
When the printer is connected to a wired or wireless network, it will attempt to connect to Zebra's Asset Visibility Service via the Cloud-based Zebra Printer Connector using an encrypted, certificate-authenticated web socket connection. The printer sends Discovery Data and Settings and Alerts Data. Data printed via any label formats is NOT transmitted.

To opt out of this feature, disable this setting. For more information, see the "Opting Out of the Asset Visibility Agent" application note at <http://www.zebra.com>.

Accepted values: ON, OFF

SGD command used: `weblink.zebra_connector.enable`

Printer web page: View and Modify Printer Settings > Network Configuration > Cloud Connect Settings



Connection > Wired > Wired IP Protocol

This parameter indicates if the user (permanent) or the server (dynamic) selects the wired print server's IP address. When a dynamic option is chosen, this parameter tells the method(s) by which this print server receives the IP address from the server.



IMPORTANT: You must reset the print server to allow changes to the network settings to take effect. See [Connection > Networks > Reset Network on page 65](#).

Accepted values: ALL, GLEANING ONLY, RARP, BOOTP, DHCP, DHCP & BOOTP, PERMANENT

Related ZPL command(s): `^ND`

SGD command used: `internal_wired.ip.protocol`

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > Wired > Wired IP Address

View and, if necessary, change the printer's wired IP address.

To save changes to this setting, set [Connection > Wired > Wired IP Protocol on page 68](#) to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network on page 65](#)).

Accepted values: 000 to 255 for each field

Related ZPL command(s): `^ND`

SGD command used: `internal_wired.ip.addr`

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > Wired > Wired Subnet

View and, if necessary, change the wired subnet mask.

To save changes to this setting, set [Connection > Wired > Wired IP Protocol on page 68](#) to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network on page 65](#)).

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.netmask`

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > Wired > Wired Gateway

View and, if necessary, change the default wired gateway.

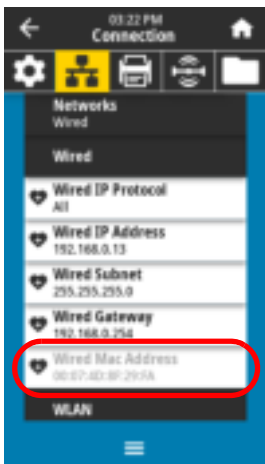
To save changes to this setting, set [Connection > Wired > Wired IP Protocol on page 68](#) to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network on page 65](#)).

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.gateway`

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

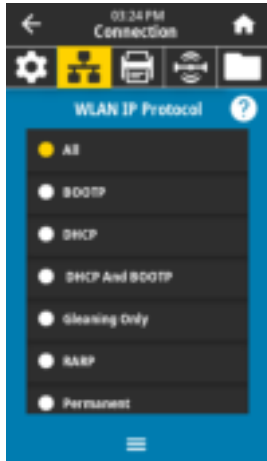


Connection > Wired > Wired Mac Address

View the Media Access Control (MAC) address of the wired print server. This value cannot be modified.

SGD command used: `internal_wired.mac_addr`

Printer web page: View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings



Connection > WLAN > WLAN IP Protocol

This parameter indicates if the user (permanent) or the server (dynamic) selects the wireless print server's IP address. When a dynamic option is chosen, this parameter tells the method(s) by which this print server receives the IP address from the server.



IMPORTANT: You must reset the print server to allow changes to the network settings to take effect. See [Connection > Networks > Reset Network on page 65](#).

Accepted values: ALL, GLEANING ONLY, RARP, BOOTP, DHCP, DHCP & BOOTP, PERMANENT

Related ZPL command(s): ^ND

SGD command used: wlan.ip.protocol

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup



Connection > WLAN > WLAN IP Address

View and, if necessary, change the printer's wireless IP address.

To save changes to this setting, set [Connection > WLAN > WLAN IP Protocol on page 70](#) to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network on page 65](#)).

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: ip.addr, wlan.ip.addr

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup



Connection > WLAN > WLAN Subnet

View and, if necessary, change the wireless subnet mask.

To save changes to this setting, set [Connection > WLAN > WLAN IP Protocol on page 70](#) to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network on page 65](#)).

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: wlan.ip.netmask

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup



Connection > WLAN > WLAN Gateway

View and, if necessary, change the default wireless gateway.

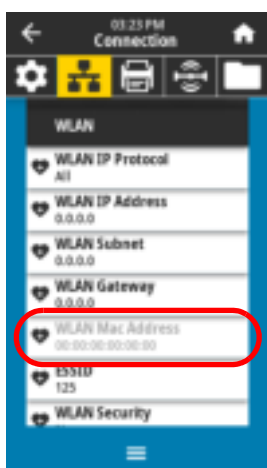
To save changes to this setting, set [Connection > WLAN > WLAN IP Protocol](#) on page 70 to **PERMANENT**, and then reset the print server (see [Connection > Networks > Reset Network](#) on page 65).

Accepted values: 000 to 255 for each field

Related ZPL command(s): `^ND`

SGD command used: `wlan.ip.gateway`

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup

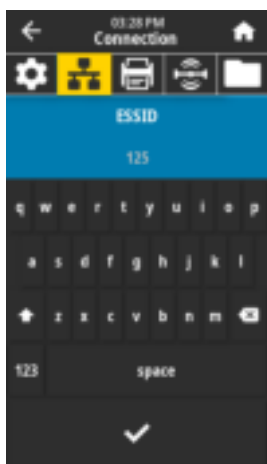


Connection > WLAN > WLAN Mac Address

View the Media Access Control (MAC) address of the wireless print server. This value cannot be modified.

SGD command used: `wlan.mac_addr`

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup



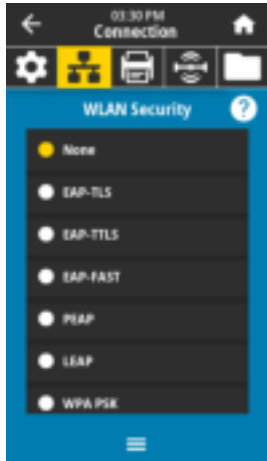
Connection > WLAN > ESSID

The Extended Service Set Identification (ESSID) is an identifier for your wireless network. Specify the ESSID for the current wireless configuration.

Accepted values: 32-character alphanumeric string (default 125)

SGD command used: `wlan.essid`

Printer web page: View and Modify Printer Settings > Network Communications Setup > Wireless Setup



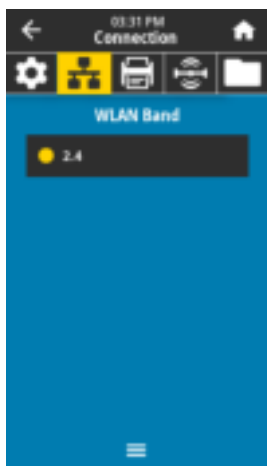
Connection > WLAN > WLAN Security

Select the security type being used on your WLAN.

Related ZPL command(s): `^WX`

SGD command used: `wlan.security`

Printer web page: [View and Modify Printer Settings > Network Communications Setup > Wireless Encryption Setup](#)



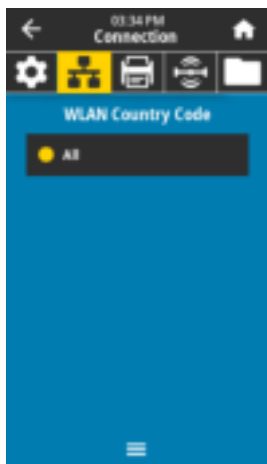
Connection > WLAN > WLAN Band

Set a preferred band to connect with via wifi.

Accepted values: 2.4, 5, None

SGD command used: `wlan.band_preference`

Printer web page: [View and Modify Printer Settings > Network Communications Setup > Wireless Setup](#)



Connection > WLAN > WLAN Country Code

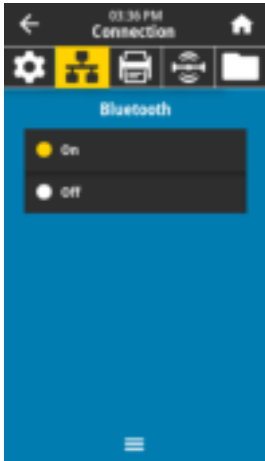
The country code defines the regulatory country for which the wireless radio is currently configured.



IMPORTANT: The list of country codes is specific to each printer and depends on the printer model and its wireless radio configuration. The list is subject to change, addition, or deletion with any firmware update, at any time, without notice.

To determine the country codes available on your printer, issue the `! U1 getvar "wlan"` command to return all commands related to WLAN settings. Locate the `wlan.country.code` command in the results and view the country codes available for your printer.

SGD command used: `wlan.country_code`

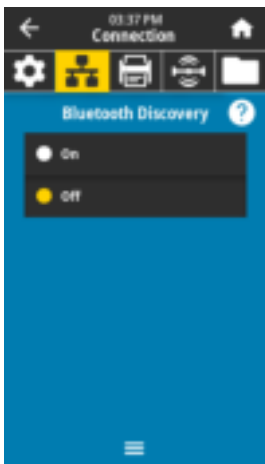


Connection > Bluetooth > Bluetooth

Select if the printer is “Discoverable” for Bluetooth device pairing.

Accepted values: ON—Enables the Bluetooth radio.
 OFF—Disables the Bluetooth radio.

SGD command used: **bluetooth.enable**

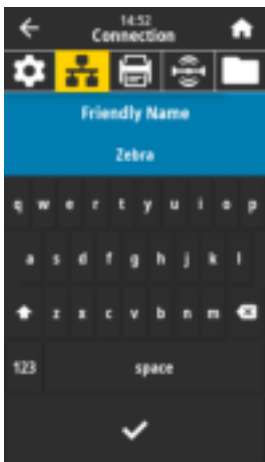


Connection > Bluetooth > Bluetooth Discovery

Select if the printer is “Discoverable” for Bluetooth device pairing.

Accepted values: ON—Enables Bluetooth discoverable mode.
 OFF—Disables Bluetooth discoverable mode.

SGD command used: **bluetooth.discoverable**



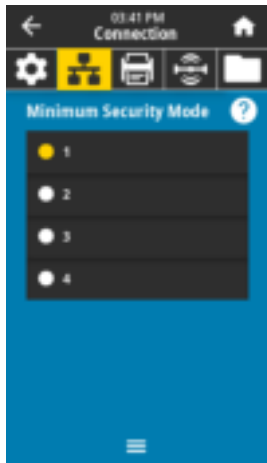
Connection > Bluetooth > Friendly Name

This command sets the friendly name, which is used during service discovery. For changes to take effect, you must power cycle the printer or issue the `device.reset` command (see [Connection > Networks > Reset Network on page 65](#)).

If you do not set a friendly name, it will default to the printer serial number.

Accepted values: 17-character text string

SGD command used: **bluetooth.friendly_name**

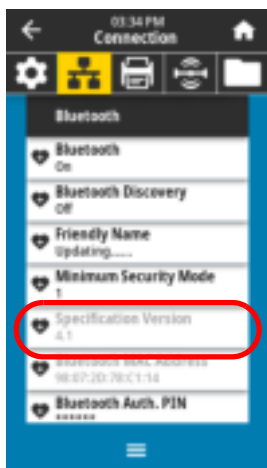


Connection > Bluetooth > Minimum Security Mode

This printer setting parameter sets the Bluetooth Minimum Security mode. Minimum Security Mode provides for different levels of security, depending on the printer radio version and printer firmware. See the *Zebra Programming Guide* at <http://www.zebra.com/manuals> for more information.

Accepted values: 1, 2, 3, 4

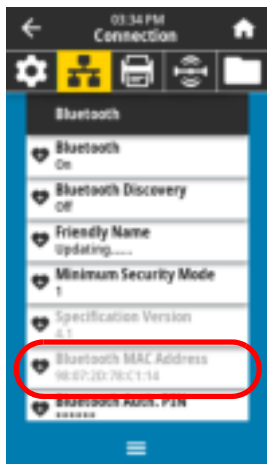
SGD command used: `bluetooth.minimum_security_mode`



Connection > Bluetooth > Specification Version

This parameter displays the Bluetooth library version number.

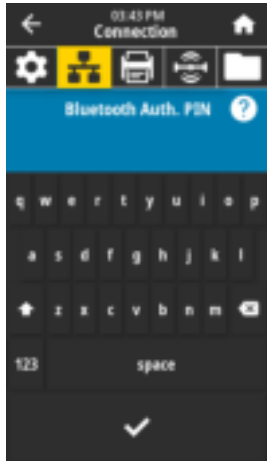
SGD command used: `bluetooth.version`



Connection > Bluetooth > MAC Address

This parameter displays the Bluetooth device address.

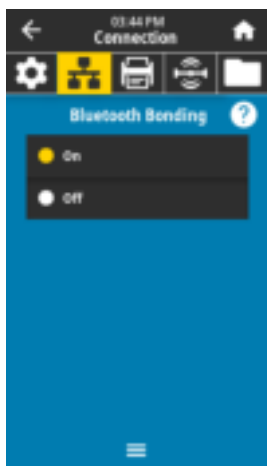
SGD command used: `bluetooth.address`



Connection > Bluetooth > Bluetooth Auth. PIN

Set the PIN used when Bluetooth authentication is enabled.

SGD command used: **bluetooth.bluetooth_pin** (to set the PIN)
 bluetooth.authentication (to enable authentication)



Connection > Bluetooth > Bluetooth Bonding

Controls whether the Bluetooth stack will “bond” or save link keys for devices that successfully connect to the printer.

Accepted values: ON—Enables Bluetooth bonding.
 OFF—Disables Bluetooth bonding.

SGD command used: **bluetooth.bonding**

Print Menu



Print > Print Quality > Darkness

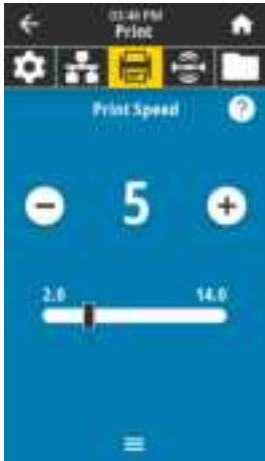
Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.

Accepted values: 0.0 to 30.0

Related ZPL command(s): **^MD, ~SD**

SGD command used: **print.tone**

Printer web page: View and Modify Printer Settings > General Setup > Darkness



Print > Print Quality > Print Speed

Select the speed, in inches per second (ips), for printing a label. Slower print speeds typically yield better print quality.

Accepted values: 2 to 6 ips

Related ZPL command(s): `^PR`

SGD command used: `media.speed`

Printer web page: View and Modify Printer Settings > General Setup > Print Speed



Print > Print Quality > Print Type

Specify if the printer needs to use ribbon for printing.

Accepted values:

- Thermal Transfer—Uses ribbon and thermal transfer media.
- Direct Thermal—Uses direct thermal media and no ribbon.

Related ZPL command(s): `^MT`

SGD command used: `ezpl.print_method`

Printer web page: View and Modify Printer Settings > Media Setup > Print Method



Print > Print Quality > Label Type

Select the type of media that you are using.

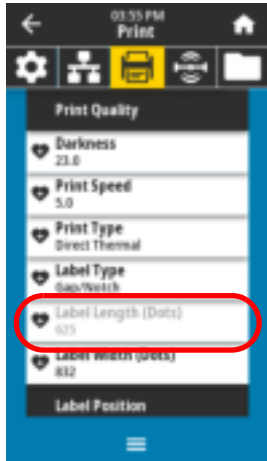
Accepted values: Continuous, Gap/Notch, Mark

If you select **Continuous**, you must include a label length in your label format (`^LL` if you are using ZPL). If you select **Gap/Notch** or **Mark** for various noncontinuous media, the printer feeds media to calculate the label length.

Related ZPL command(s): `^MN`

SGD command used: `ezpl.media_type`

Printer web page: View and Modify Printer Settings > Media Setup > Media Type



Print > Print Quality > Label Length

View the calibrated label length in dots. This value cannot be modified.



Print > Print Quality > Label Width (Dots)

Specify the width of the labels being used, in dots. The default value is the maximum width for the printer, based on the printhead's DPI value.

Accepted values:



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 the printer to print off of the label and onto 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.

ZT411 203 dpi = 0002 to 832

ZT411 300 dpi = 0002 to 1248

ZT411 600 dpi = 0002 to 2496

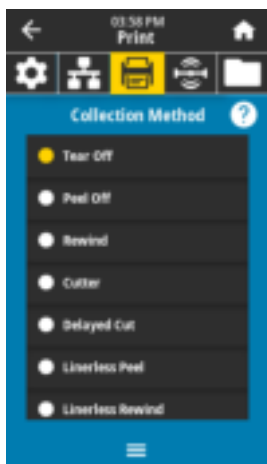
ZT421 203 dpi = 0002 to 1344

ZT421 300 dpi = 0002 to 1984

Related ZPL command(s): `^PW`

SGD command used: `ezpl.print_width`

Printer web page: [View and Modify Printer Settings > Media Setup > Print Width](#)



Print > Label Position > Collection Method

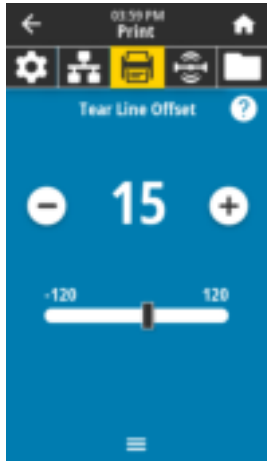
Select a collection method that is compatible with the options available on your printer.

Accepted values: Tear Off, Peel Off, Rewind, Cutter, Delayed Cut, Linerless Peel, Linerless Rewind, Linerless Tear, Applicator, Linerless Cut, Linerless Delayed Cut

Related ZPL command(s): `^MM`

SGD command used: `media.printmode`

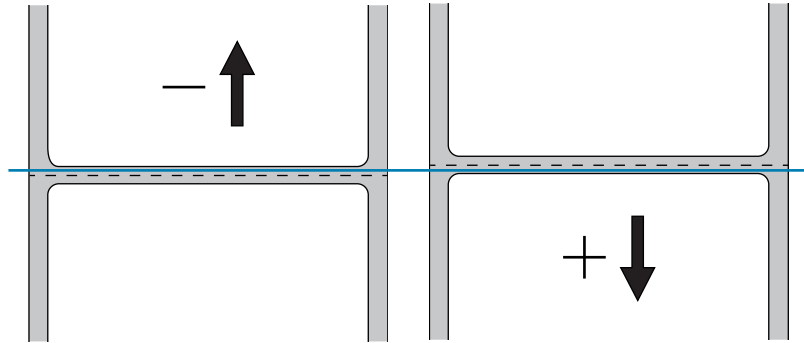
Printer web page: [View and Modify Printer Settings > General Setup > Print Mode](#)



Print > Label Position > Tear Line Offset

If necessary, shift the position of the media over the tear-off bar after printing.

- Lower numbers move the media into the printer by the specified number of dots (the tear line moves closer to the edge of the label just printed).
- Higher numbers move the media out of the printer (the tear line moves closer to the leading edge of the next label).

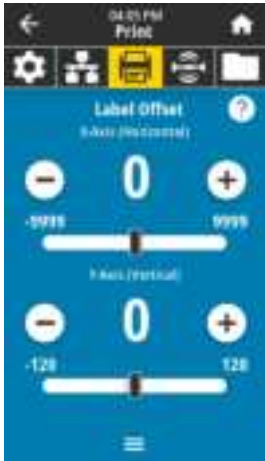


Accepted values: -120 to +120

Related ZPL command(s): `~TA`

SGD command used: `ezp1.tear_off`

Printer web page: [View and Modify Printer Settings > General Setup > Tear Off](#)

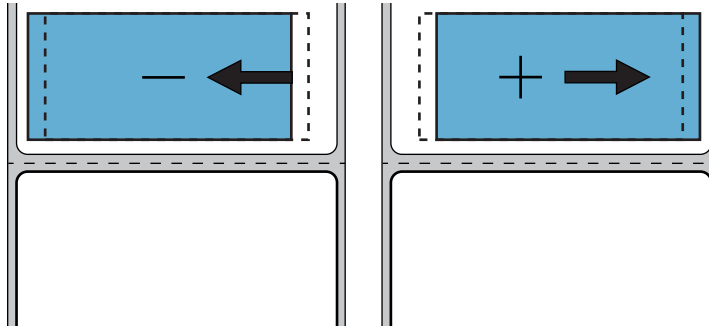


Print > Label Position > Label Offset

If necessary, shift the position of the image horizontally or vertically on the label.

Horizontal

- Negative numbers move the left edge of the image toward the left edge of the label by the number of dots selected.
- Positive numbers move the edge of the image toward the right edge of the label.



Accepted values: -9999 to 9999

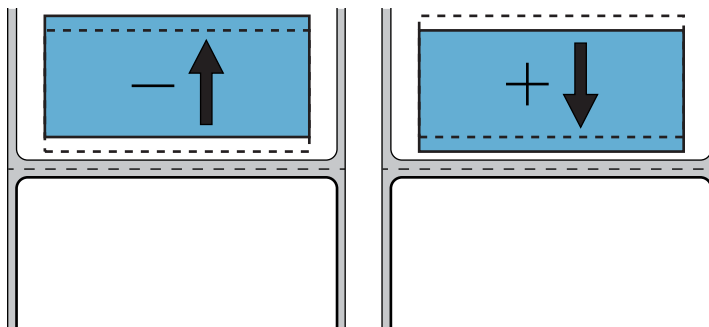
Related ZPL command(s): `^LS`

SGD command used: `zpl.left_position`

Printer web page: [View and Modify Printer Settings > Advanced Setup > Left Position](#)

Vertical

- Lower numbers move the image higher on the label (toward the printhead).
- Higher numbers move the image farther down on the label (away from the printhead) by the specified number of dots.



Accepted values: -120 to +120

Related ZPL command(s): `^LT`

Printer web page: [View and Modify Printer Settings > General Setup > Label Top](#)



Print > Sensors > Manual Calibration

Calibrate the printer to adjust the sensitivity of the media and ribbon sensors.

For complete instructions on how to perform a calibration procedure, see [Calibrate the Ribbon and Media Sensors on page 89](#).

Related ZPL command(s): `~JC`

SGD command used: `ezpl.manual_calibration`

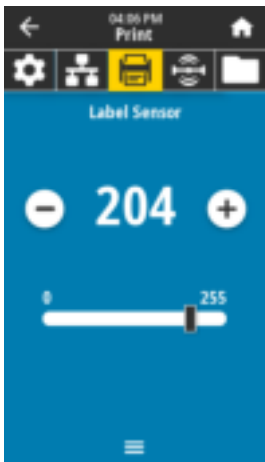
Control panel key(s): Hold **PAUSE + FEED + CANCEL** for 2 seconds to initiate calibration.

Printer web page: The calibration procedure cannot be initiated through the web pages. See the following web page for settings that are set during sensor calibration:

View and Modify Printer Settings > Calibration



IMPORTANT: Do not change these settings unless you are told to do so by Zebra Technical Support or by an authorized service technician.



Print > Sensors > Label Sensor

Set the sensitivity of the label sensor.



IMPORTANT: This value is set during sensor calibration. Do not change these settings unless you are told to do so by Zebra Technical Support or by an authorized service technician.

Accepted values: 0 to 255

SGD command used: `ezpl.label_sensor`

Printer web page: View and Modify Printer Settings > Calibration



Print > Sensors > Sensor Type

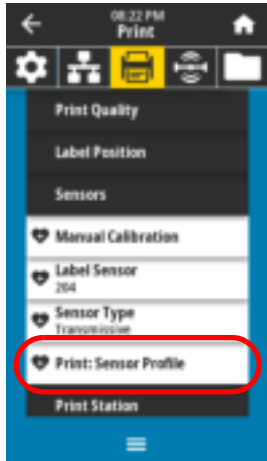
Select the media sensor that is appropriate for the media that you are using. The reflective sensor typically is used only for black mark media. The transmissive sensor typically is used for other media types.

Accepted values: TRANSMISSIVE, REFLECTIVE

Related ZPL command(s): `^JS`

SGD command used: `device.sensor_select`

Printer web page: View and Modify Printer Settings > Media Setup



Print > Sensors > Print: Sensor Profile

Shows the sensor settings compared to actual sensor readings. To interpret the results, see [Sensor Profile on page 114](#).

Related ZPL command(s): `~JG`

Control panel key(s): Hold **FEED + CANCEL** during printer power-up.

Printer web page: View and Modify Printer Settings > Print Listings on Label



Print > Print Station

Use this menu item to fill in variable fields in a label format and print the label using a Human Input Device (HID), such as a USB keyboard, scale, or barcode scanner. A suitable label format must be stored on the E: drive of the printer to use this option. See the exercises in [Using a USB Host Port and the Print Touch Feature on page 173](#) for an exercise using this capability.

When you plug an HID into one of the printer's USB host ports, use this user menu to select a form on the printer's E: drive. After you have been prompted to fill in each variable `^FN` field on the form, you can specify the desired quantity of labels to print.

For more information about using the `^FN` command or the SGD commands related to this feature, see the *Zebra Programming Guide* at <http://www.zebra.com/manuals> for more information.

* This menu item can be used only if a USB device is connected to a USB host port on the printer.

SGD command used:

- `usb.host.keyboard_input`
(must be set to ON)
- `usb.host.template_list`
- `usb.host.fn_field_list`
- `usb.host.fn_field_data`
- `usb.host.fn_last_field`
- `usb.host.template_print_amount`



Print > Applicator > Applicator Port Mode

Controls the way in which the applicator port's "End Print" signal functions.

Accepted values:

- Off
- 1 = End Print signal normally high, and low only when the printer is moving the label forward.
- 2 = End Print signal normally low, and high only when the printer is moving the label forward.
- 3 = End Print signal normally high, and low for 20 ms when a label has been printed and positioned.
- 4 = End Print signal normally low, and high for 20 ms when a label has been printed and positioned.

Related ZPL command(s): `^JJ`

SGD command used: `device.applicator.end_print`



Print > Applicator > Start Print Mode

Determines if the applicator port's "Start Print" signal is in level mode or pulse mode.

Accepted values:

Pulse—Start Print signal must be deasserted before it can be asserted for the next label.

Level—Start Print signal does not need to be deasserted to print the next label. As long as the Start Print signal is low and a label is formatted, a label prints.

Related ZPL command(s): `^JJ`

SGD command used: `device.applicator.start_print`



Print > Applicator > Error on Pause

Determines how applicator port errors are treated by the printer. Enabling this feature also causes the "Service Required" pin to be asserted.

Accepted values:

ENABLED, DISABLED

SGD command used:

`device.applicator.error_on_pause`

Printer web page:

View and Modify Printer Settings > Advanced Setup > Error on Pause



Print > Applicator > Applicator Reprint

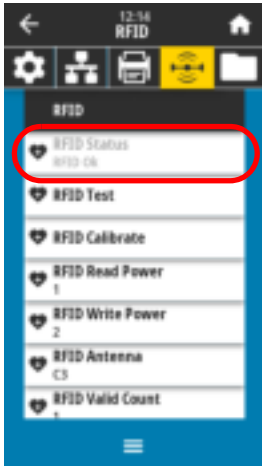
Specifies if a high or low value is required for an applicator to reprint a label.

Enables or disables the `~PR` command, which when enabled reprints the last printed label. It also enables the Reprint button on the Home screen.

Related ZPL command(s): `^JJ` and `~PR`

SGD command used: `device.applicator.reprint`

RFID Menu



RFID > RFID Status

Display the status of the RFID subsystem of the printer.

Related ZPL command(s): `^HL` or `~HL`

SGD command used: `rfid.error.response`



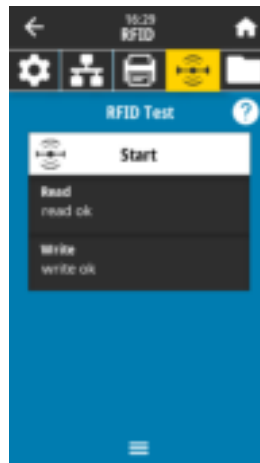
RFID > RFID Test

During the RFID test, the printer attempts to read and write to a transponder. No printer movement occurs with this test.

To test an RFID label:

1. Position the RFID label with its transponder over the RFID antenna array.
2. Touch **Start**.

The results of the test are shown on the display.



SGD command used: `rfid.tag.test.content` and `rfid.tag.test.execute`



RFID > RFID Calibrate

Initiate tag calibration for RFID media. (Not the same as media and ribbon calibration.) During the process, the printer moves the media, calibrates the RFID tag position, and determines the optimal settings for the RFID media being used. These settings include the programming position, the antenna element to use, and the read/write power level to use. See the *RFID Programming Guide 3* for more information.

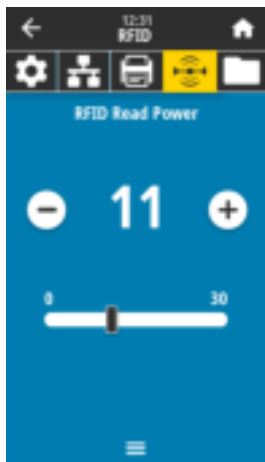


NOTE: Before running this command, load the printer with RFID media, calibrate your printer, close the printhead, and feed at least one label to make sure that tag calibration will begin from the correct position.

Leave all transponders before and after the tag that is being calibrated. This allows the printer to determine RFID settings which do not encode the adjacent tag. Allow a portion of media to extend out the front of the printer to allow for backfeed during the tag calibration procedure.

Related ZPL command(s): `^HR`

SGD command used: `rfid.tag.calibrate`



RFID > Read Power

If the desired read power is not achieved through RFID tag calibration, a value may be specified.

Accepted values: 0 to 30

Related ZPL command(s): `^RW`

SGD command used: `rfid.reader_1.power.read`

Printer web page: View and Modify Printer Settings > RFID Setup > RFID READ PWR



RFID > Write Power

If the desired write power is not achieved through RFID tag calibration, a value may be specified.

Accepted values: 0 to 30

Related ZPL command(s): `^RW`

SGD command used: `rfid.reader_1.power.write`

Printer web page: View and Modify Printer Settings > RFID Setup > RFID WRITE PWR



RFID > RFID Antenna

If the desired antenna is not achieved through RFID tag calibration, a value may be specified.

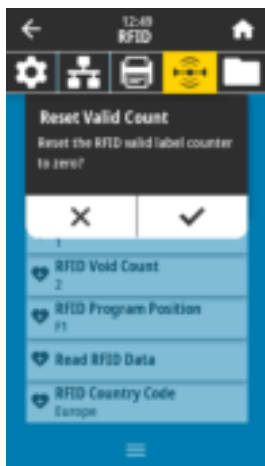
Accepted values:

- A1, A2, A3, A4
- B1, B2, B3, B4
- C1, C2, C3, C4
- D1, D2, D3, D4
- E1, E2, E3, E4

Related ZPL command(s): `^RW`

SGD command used: `rfid.reader_1.antenna_port`

Printer web page: [View and Modify Printer Settings > RFID Setup > RFID ANTENNA](#)

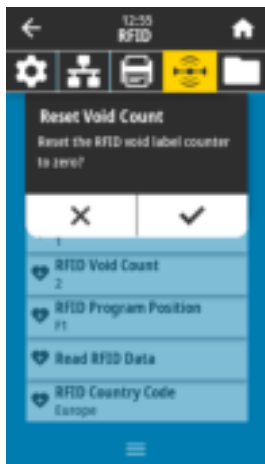


RFID > RFID Valid Count

Resets the RFID valid label counter to zero.

Related ZPL command(s): `~R0`

SGD command used: `odometer.rfid.valid_resetable`



RFID > RFID Void Count

Resets the RFID void label counter to zero.

Related ZPL command(s): `~R0`

SGD command used: `odometer.rfid.void_resetable`



RFID > RFID Program Position

If the desired programming position (read/write position) is not achieved through RFID tag calibration, a value may be specified.

Accepted values: F0 to Fxxx (where xxx is the label length in millimeters or 999, whichever is less)—The printer feeds the label forward for the specified distance and then begins programming.
B0 to B30—The printer backfeeds the label for the specified distance and then begins programming. To account for the backfeed, allow empty media liner to extend out of the front of the printer when using a backward programming position.

Related ZPL command(s): `^RS`

SGD command used: `rfid.position.program`

Printer web page: View and Modify Printer Settings > RFID Setup > PROGRAM POSITION



RFID > Read RFID Data

Read and return the specified tag data from the RFID tag located over the RFID antenna. No printer movement occurs while tag data is being read. The printhead can be open or closed.

To read and display the information stored on an RFID tag:

1. Position the RFID label with its transponder over the RFID antenna.
2. Touch **Read RFID Data**.

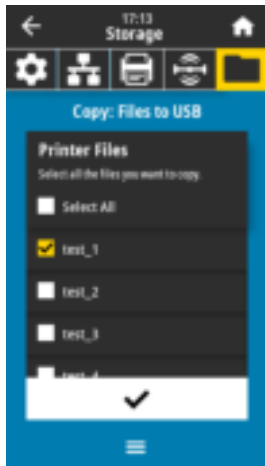
The results of the test are shown on the display.



Related ZPL command(s): `^RF`

SGD command used: `rfid.tag.read.content`
`rfid.tag.read.execute`

Storage Menu



Storage > USB > Copy: Files to USB

Select files from the printer to store on a USB Flash drive.

To copy files from the printer to a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port.

The printer lists available files.

1. Touch the box next to the desired files. **Select All** is also available.
2. Touch the check mark to copy the selected files.

SGD command used: `usb.host.write_list`



Storage > USB > Copy: Files to Printer

Select files to copy to the printer from a USB Flash drive.

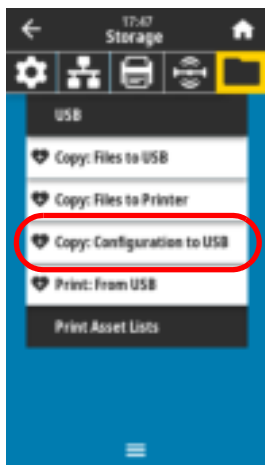
To copy files to the printer from a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port.

The printer lists available files.

1. Touch the box next to the desired files. **Select All** is also available.
2. Touch the check mark to copy the selected files.

SGD command used: `usb.host.read_list`



Storage > USB > Copy: Configuration to USB

Use this function to copy the printer's configuration information to a USB mass storage device, such as a USB Flash drive, that is plugged into one of the printer's USB host ports. This makes the information accessible without having to print physical labels.

Related ZPL command(s): `^HH`—Returns the printer configuration information returned to the host computer.

Printer web page:

Printer Home Page > View Printer Configuration
(to view printer configuration information on your web browser)
View and Modify Printer Settings > Print Listings on Label
(to print the configuration information on labels)



Storage > USB > Print: From USB

Select files to print from a USB Flash drive.

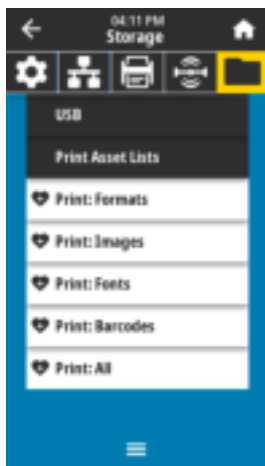
To print files from a USB Flash drive:

1. Insert a USB flash drive into the printer's USB host port.

The printer lists available files.

1. Touch the box next to the desired files. **Select All** is also available.
2. Touch the check mark to print the selected files.

SGD command used: `usb.host.read_list`



Storage > Print Asset Lists

Print the specified information on one or more labels.

Accepted values:

- Formats**—Prints the available formats stored in the printer's RAM, Flash memory, or optional memory card.
- Images**—Prints the available images stored in the printer's RAM, Flash memory, or optional memory card.
- Fonts**—Prints the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.
- Barcodes**—Prints the available barcodes in the printer. Barcodes may be stored in RAM or Flash memory.
- All**—Prints the previous labels plus the printer configuration label and the network configuration label.

Related ZPL command(s): `^WD`

Printer web page: [View and Modify Printer Settings > Print Listings on Label](#)

Calibrate the Ribbon and Media Sensors

Use the procedure in this section to calibrate the printer, which adjusts the sensitivity of the media and ribbon sensors.

1. Touch **Print > Sensors > Manual Calibration**.



2. Touch **Start Calibration**.
3. Follow the steps in the calibration procedure.



IMPORTANT: Follow the calibration procedure exactly as presented. You may press and hold **CANCEL** at any step in the procedure to cancel the calibration process.

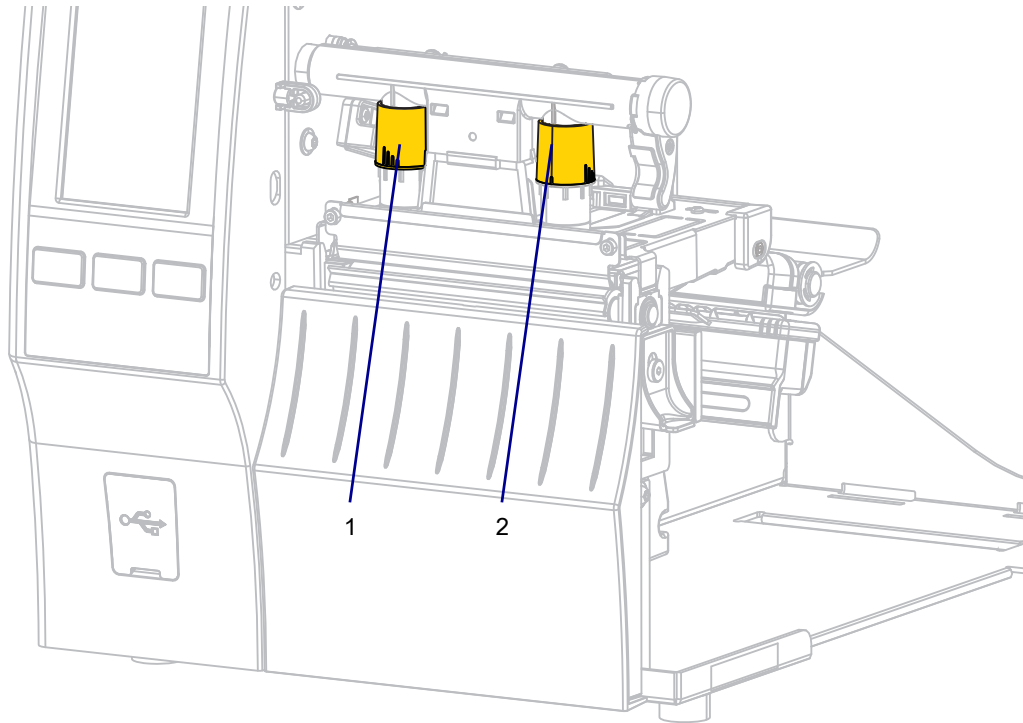
4. When calibration is complete, press **PAUSE** to exit pause mode and enable printing.

Adjust the Printhead Pressure

You may need to adjust printhead pressure if printing is too light on one side, if you use thick media, or if the media drifts from side to side during printing. Use the lowest printhead pressure necessary to produce good print quality.

See [Figure 2](#). The printhead pressure adjustment dials have setting marks from 1 to 4.

Figure 2 Printhead Pressure Adjustment Dials



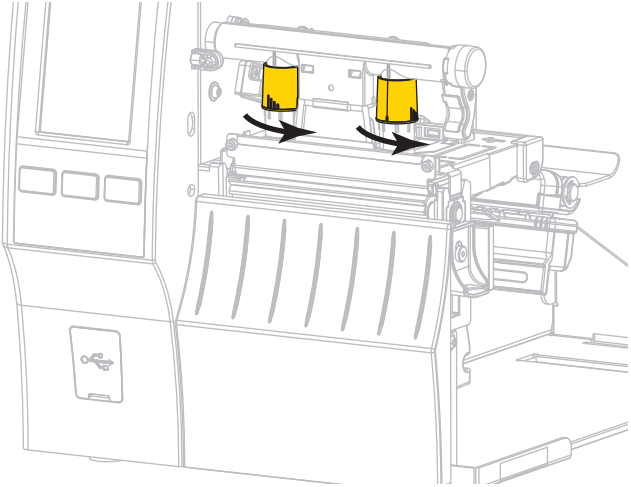
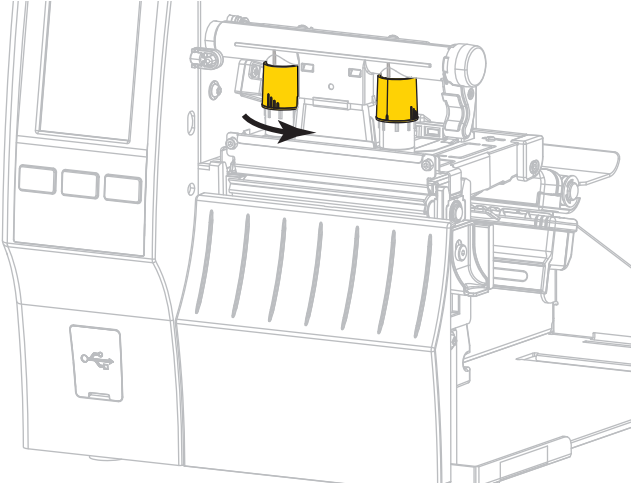
1	Inside dial
2	Outside dial

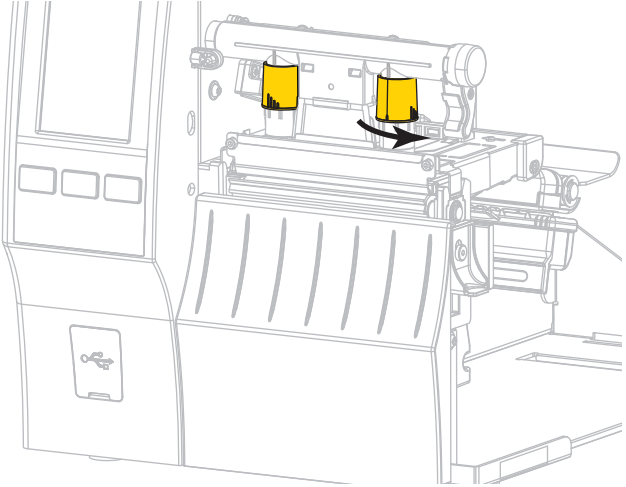
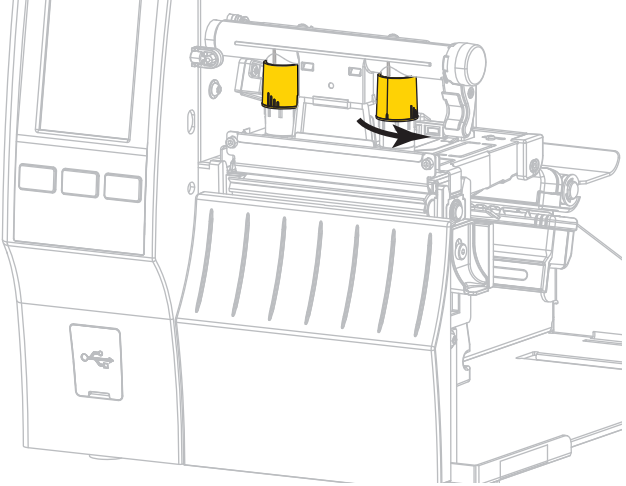
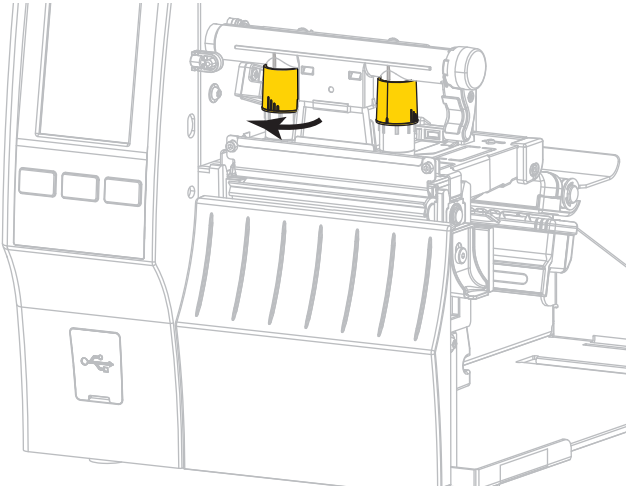
See [Table 3](#). Begin with the following pressure settings, based on your printer and media width, and make adjustments as necessary.

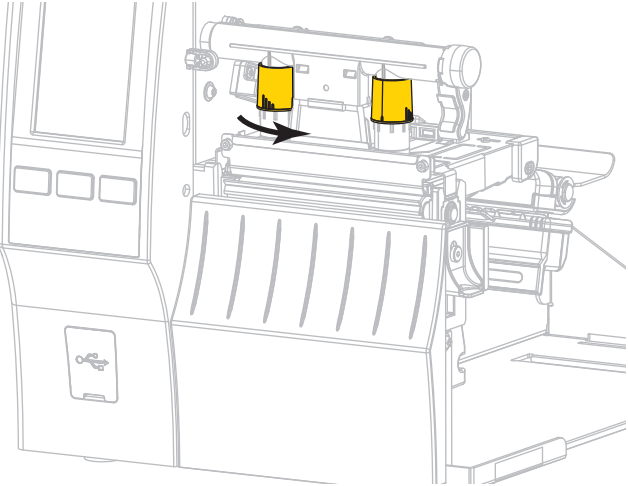
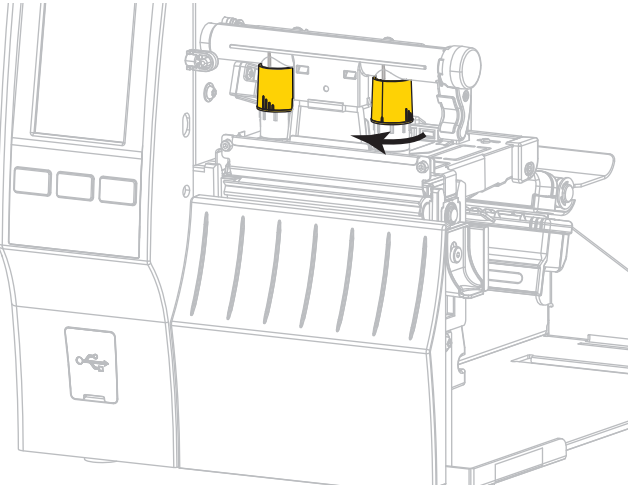
Table 3 Pressure Setting Starting Points

Printer	Media Width	Inside Dial Setting	Outside Dial Setting
ZT411	1 in. (25 mm)	4	1
	2 in. (51 mm)	3	1
	3 in. (76 mm)	2.5	1.5
	≥ 3.5 in. (89 mm)	2	2
ZT421	2 in. (51 mm)	4	1
	3 in. (76 mm)	3.5	1
	4 in. (102 mm)	3	2
	≥ 5 in. (127 mm)	2.5	2.5

If necessary, adjust the printhead pressure adjustment dials as follows:

If the media...	Then...
<p>Requires higher pressure to print well</p>	<p>Increase both dials one position.</p> 
<p>Prints too lightly on the left side of the label.</p>	<p>Increase the inside dial setting one position.</p> 

If the media...	Then...
<p>Prints too lightly on the right side of the label.</p>	<p>Increase the outside dial setting one position.</p> 
<p>Shifts left while printing</p>	<p>Increase the outside dial setting one position.</p>  <p>OR</p> <p>Decrease the inside dial setting one position.</p> 

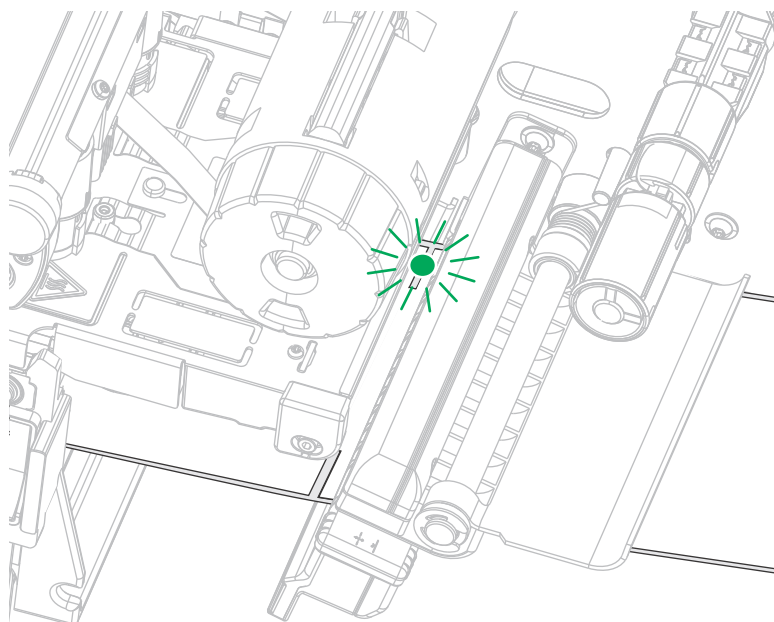
If the media...	Then...
Shifts right while printing	<p data-bbox="797 239 1312 268">Increase the inside dial setting one position.</p>  <p data-bbox="797 772 841 802">OR</p> <p data-bbox="797 814 1339 844">Decrease the outside dial setting one position.</p> 

Adjust the Sensor Position

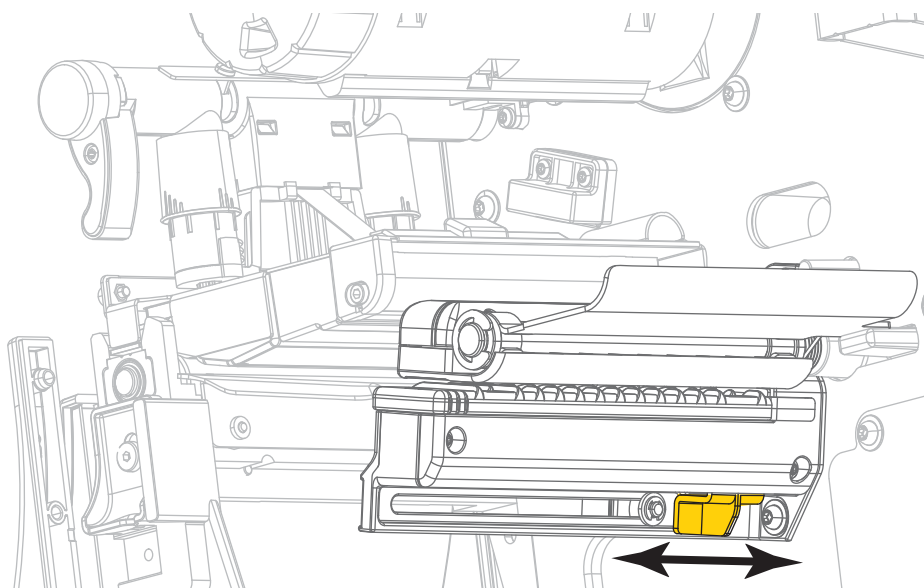
The transmissive media sensor assembly consists of two parts: a light source and a light sensor. The lower part of the media sensor is the light source, and the upper part of the media sensor is the light sensor. The media passes between the two parts.

Adjust the position of the sensor only if the printer cannot detect the top of the labels. In this situation, the display shows a media out error even though there is media loaded in the printer. For non-continuous media with a notch or hole, the sensor must be positioned directly at the notch or hole.

1. Remove the ribbon so you can clearly see the media path.
2. Load the media so that the green light from the media sensor is shining through a gap, notch, or hole.



3. If necessary, slide the media sensor horizontally using the media sensor adjustment.



Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Cleaning Schedule and Procedures

Routine preventive maintenance is a crucial part of normal printer operation. By taking good care of your printer, you can minimize the potential problems that you might have with it and help to achieve and to maintain your standards for print quality.

Over time, the movement of media or ribbon across the printhead wears through the protective ceramic coating, exposing and eventually damaging the print elements (dots). To avoid abrasion:

- Clean the printhead frequently.
- Minimize printhead pressure and burn temperature (darkness) settings by optimizing the balance between the two.
- When using Thermal Transfer mode, ensure that the ribbon is as wide or wider than the media to prevent exposing the printhead elements to the more abrasive label material.



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

Specific cleaning procedures are provided on the following pages. [Table 4](#) shows the recommended cleaning schedule. These intervals are intended as guidelines only. You may have to clean more often, depending upon your application and media.

Table 4 Recommended Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*	Direct Thermal Mode: After every roll of media (or 500 feet of fanfold media). Thermal Transfer Mode: After every roll of ribbon.
Platen roller	Solvent*	
Media sensors	Air blow	
Ribbon sensor	Air blow	
Media path	Solvent*	
Ribbon path	Solvent*	
Pinch roller (part of Peel-Off option)	Solvent*	

*Zebra recommends using the Preventive Maintenance Kit (p/n 47362 or p/n 105950-035 - multipack). In place of this kit, you may use a clean swab dipped in 99.7% isopropyl alcohol. For 600 dpi printers, use Save-a-Printhead cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized reseller or distributor for more information.

Table 4 Recommended Cleaning Schedule

Area		Method	Interval
Cutter module	If cutting continuous, pressure-sensitive media	Solvent*	After every roll of media (or more often, depending upon your application and media).
	If cutting tag stock or label liner material	Solvent* and air blow	After every two or three rolls of media.
Tear-off/peel-off bar		Solvent*	Once a month.
Take-label sensor		Air blow	Once every six months.
<p>*Zebra recommends using the Preventive Maintenance Kit (p/n 47362 or p/n 105950-035 - multipack). In place of this kit, you may use a clean swab dipped in 99.7% isopropyl alcohol. For 600 dpi printers, use Save-a-Printhead cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized reseller or distributor for more information.</p>			

Clean the Exterior, the Media Compartment, and the Sensors

Over time, dust, grime, and other debris may build up on the outside and inside of your printer, particularly in a harsh operating environment.

Printer Exterior

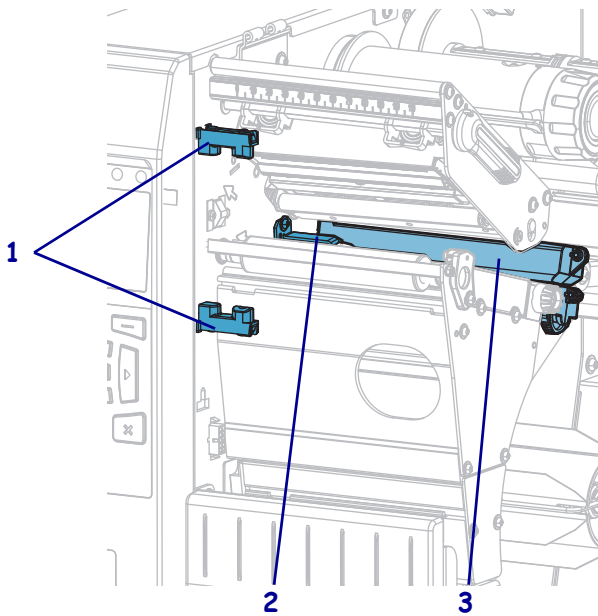
You may clean the exterior surfaces of the printer with a lint-free cloth and a small amount of a mild detergent, if necessary. Do not use harsh or abrasive cleaning agents or solvents.



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

Media Compartment and Sensors

1. Brush, air blow, or vacuum any accumulated paper lint and dust away from the media and ribbon paths.
2. Brush, air blow, or vacuum any accumulated paper lint and dust away from the sensors.



1	Take-label sensor
2	Ribbon sensor
3	Media sensor

Clean the Printhead and Platen Roller

Inconsistent print quality, such as voids in the barcode or graphics, may indicate a dirty printhead. For the recommended cleaning schedule, see [Cleaning Schedule and Procedures on page 95](#).

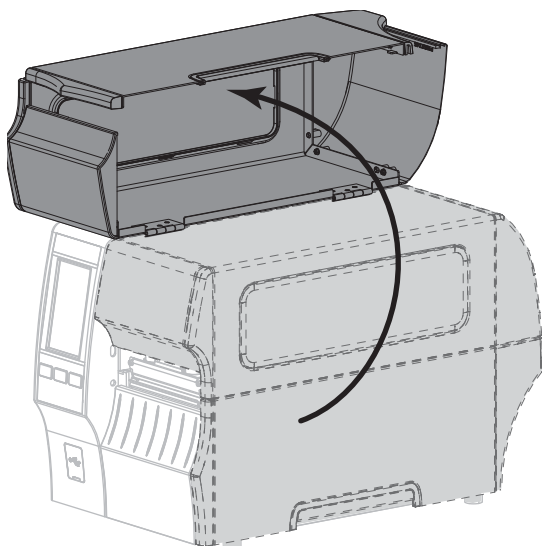


IMPORTANT: You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.



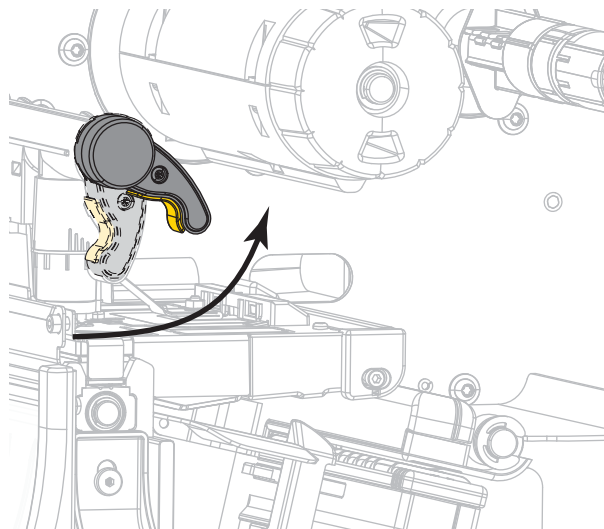
CAUTION—ESD: Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an anti-static wriststrap and mat.

1. Raise the media door.



CAUTION—HOT SURFACE: The printhead may be hot and could cause severe burns. Allow the printhead to cool.

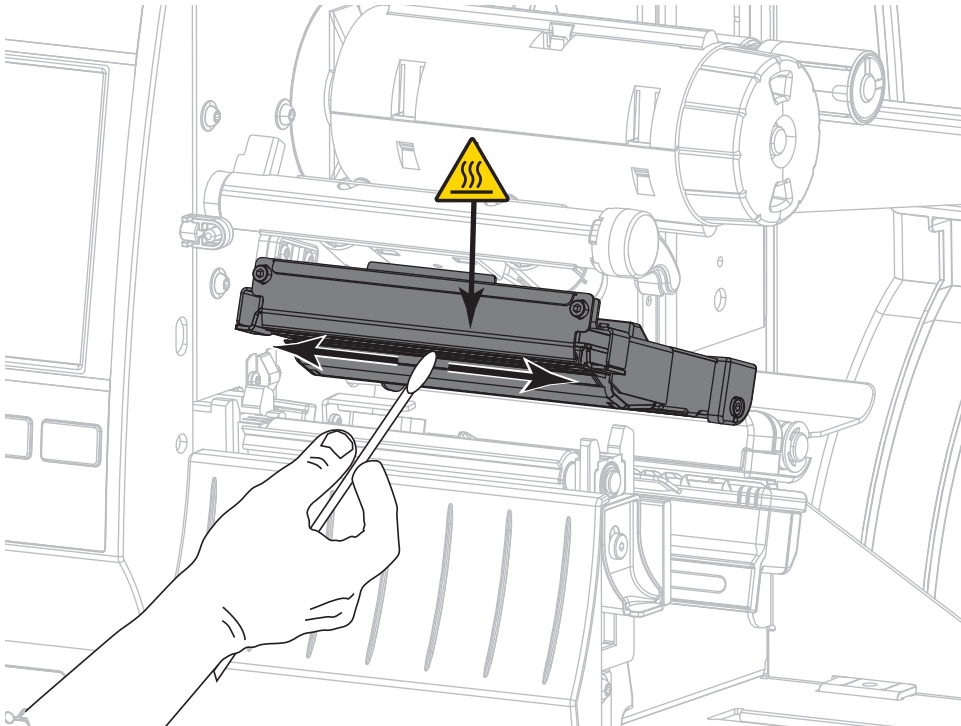
2. Open the printhead assembly by rotating the printhead-open lever upward.



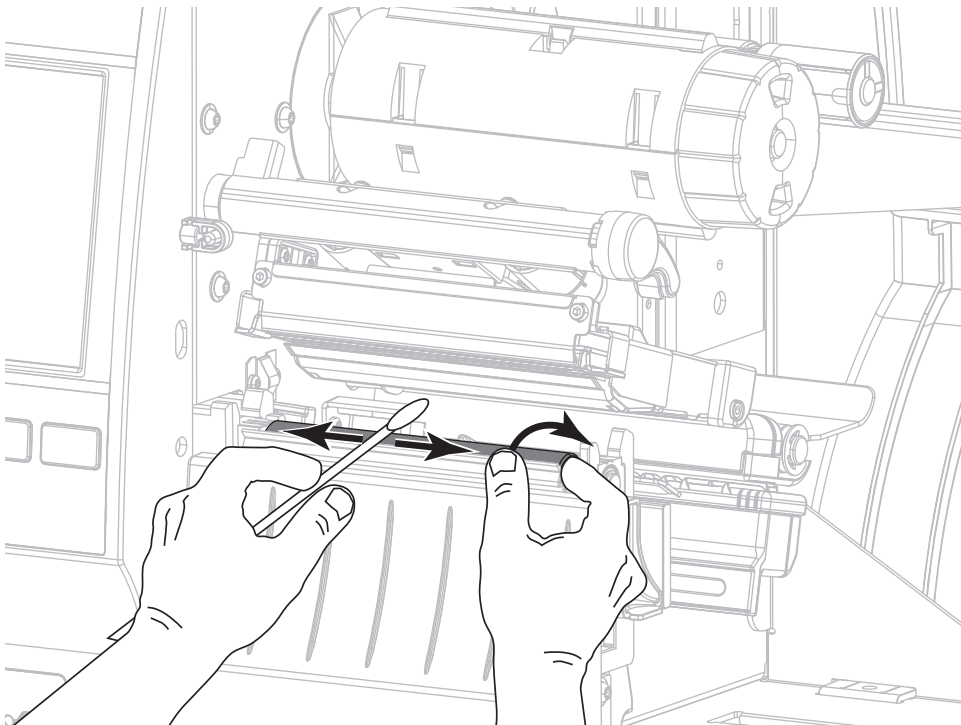
3. Remove the ribbon (if used) and the media.

Routine Maintenance

- Using the swab from a Zebra Preventive Maintenance Kit, 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 99.7% isopropyl alcohol. Allow the solvent to evaporate.

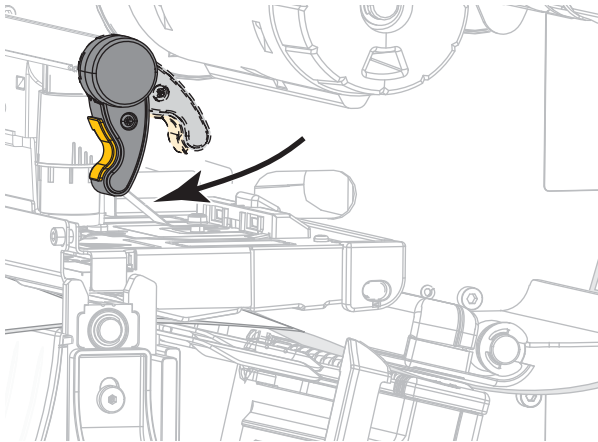


- While manually rotating the platen roller, clean it thoroughly with the swab. Allow the solvent to evaporate.

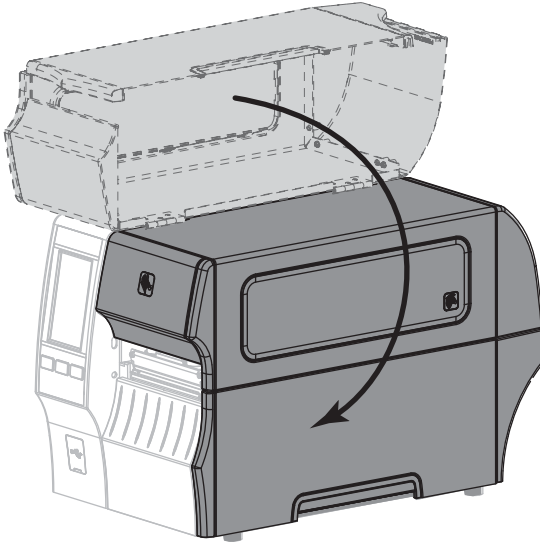


- Reload the ribbon (if used) and the media. For instructions, see [Load the Ribbon on page 48](#) or [Load the Media on page 17](#).

7. Rotate the printhead-open lever downward until it locks the printhead in place.



8. Close the media door.
The printer is ready to operate.



9. Press PAUSE to exit pause mode and enable printing.
The printer may perform a label calibration or feed a label, depending on your settings.



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

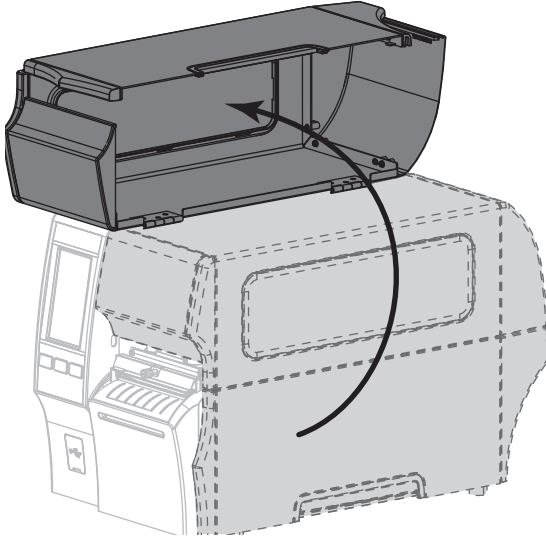
Clean and Lubricate the Cutter Module

If the cutter is not cutting the labels cleanly or if it jams with labels, clean the cutter blades. After cleaning the blades, apply lubrication to them to help extend the life of your cutter module.



CAUTION—ELECTRIC SHOCK: Turn off (O) the printer and disconnect it from the power source before performing the following procedure.

1. Turn off (O) the printer and disconnect the AC power cord.
2. Raise the media door.

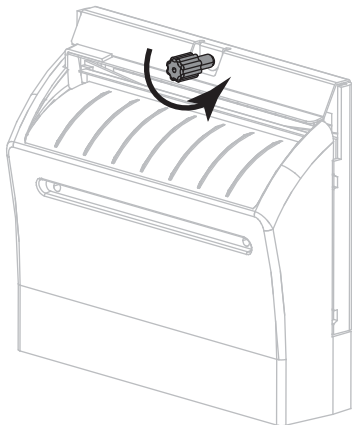


3. Remove media that is loaded through the cutter module.

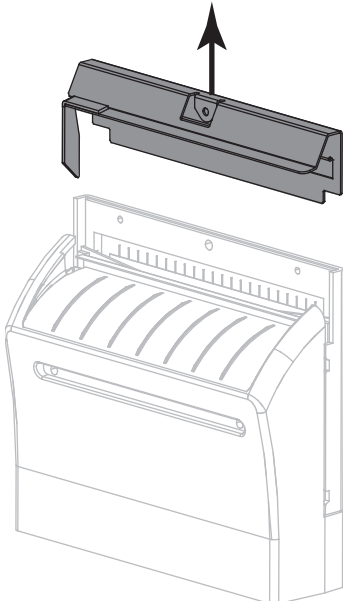


CAUTION: The cutter blade is sharp. Do not touch or rub the blade with your fingers.

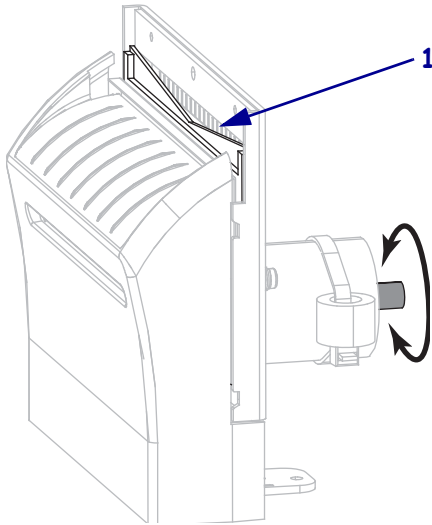
4. Loosen and remove the thumbscrew and lock washer on the cutter shield.



5. Remove the cutter shield.

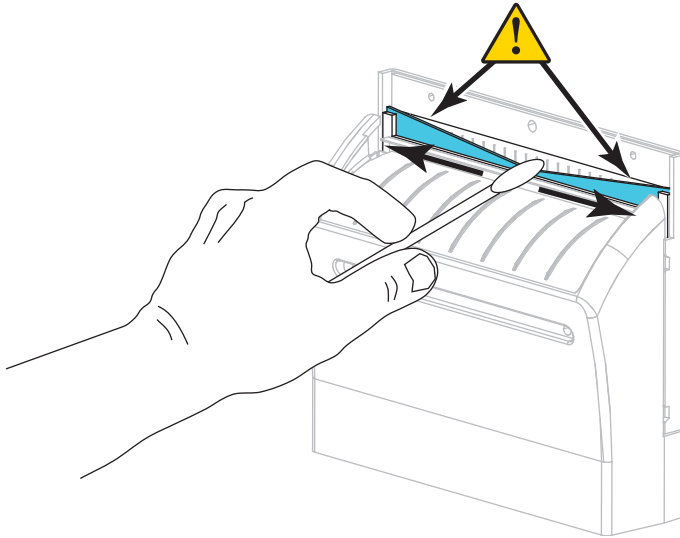


6. If necessary, rotate the cutter motor thumbscrew to fully expose the V-shaped cutter blade (1).

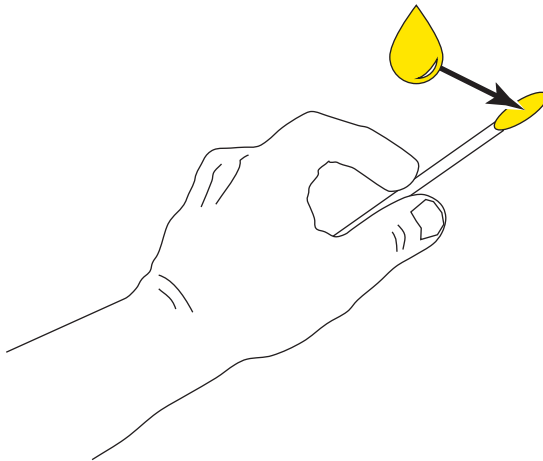


Routine Maintenance

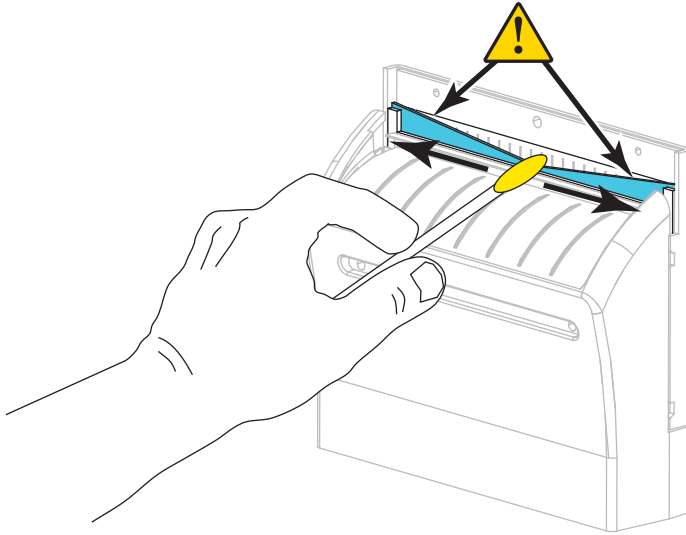
- Using the swab from the Preventive Maintenance Kit (part number 47362), wipe along the upper cutting surface and the cutter blade. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in 99.7% isopropyl alcohol. Allow the solvent to evaporate.



- When the solvent has evaporated, soak a clean swab in a general-purpose, higher-viscosity silicone or PTFE oil lubricant.

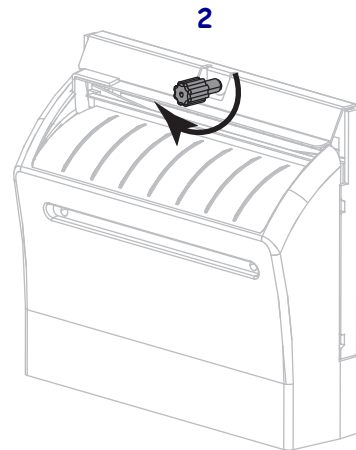
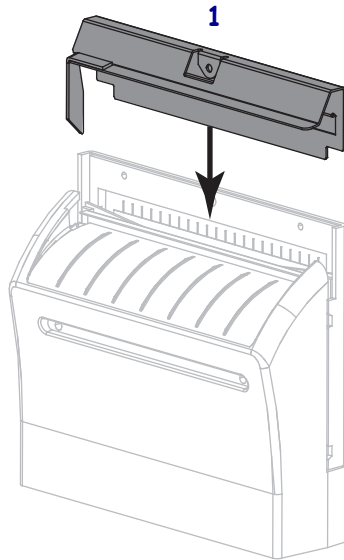


9. Apply an even layer along all exposed surfaces of both cutter blades. Remove any excess oil so that none of it comes in contact with the printhead or platen roller.

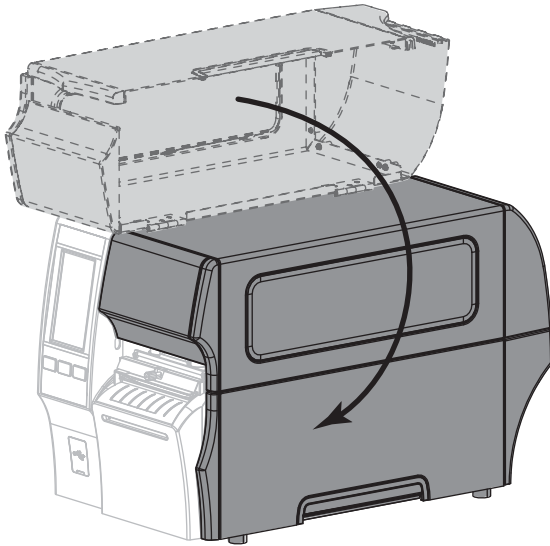


CAUTION: The cutter blade is sharp. For operator safety, replace the cutter shield.

10. Replace the cutter shield (1) and secure it with the thumbscrew and lock washer that you removed earlier (2).



11. Close the media door.



12. Plug the printer into its power source, and then turn on (I) the printer.

The cutter blade returns to its operating position.

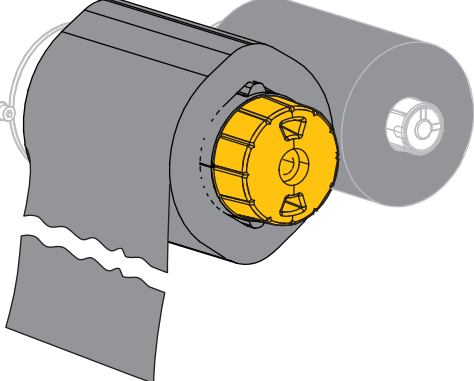
13. If the cutter continues to perform unsatisfactorily, contact an authorized service technician.

Remove Used Ribbon

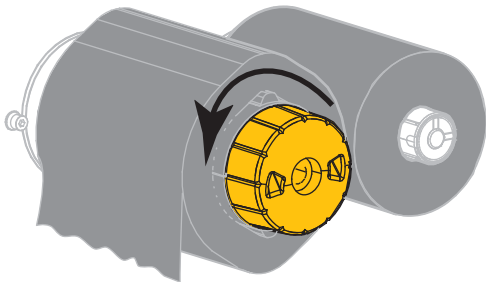
At minimum, remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon. With ribbon that is half or less the width of the printhead, remove used ribbon each time you load a new roll of media. This ensures that uneven pressure on the ribbon take-up spindle does not interfere with the ribbon release bars on the spindle.

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	<p>Cut or break the ribbon before the ribbon take-up spindle.</p>  <p>Do not cut the ribbon directly on the ribbon take-up spindle. Doing so may damage the spindle.</p>

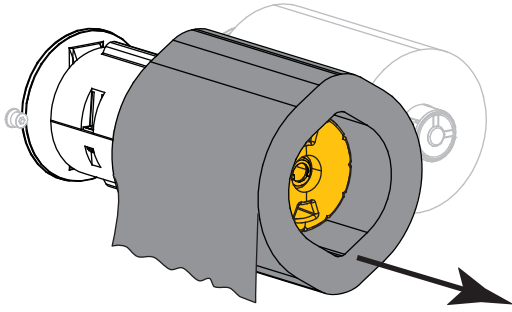
2. While holding the ribbon take-up spindle, turn the ribbon release knob to the left until it stops.



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

3. After the ribbon release bars have pivoted down, if possible, turn the ribbon take-up spindle one full to the right to help loosen the ribbon on the spindle.

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



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 95](#) for the recommended cleaning intervals.

Ordering Replacement Parts

Zebra™ printers are designed to work only with genuine Zebra printheads, thus maximizing safety and print quality. Contact your authorized Zebra reseller for part ordering information.

Recycling Printer Components



The majority of this printer's components are recyclable. The printer's main logic board may include 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>.

Storing the Printer

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

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

Lubrication

The only lubrication needed for this printer is for the cutter module. Follow the instructions in [Clean and Lubricate the Cutter Module on page 101](#). Do not lubricate any other parts of the printer.



CAUTION—PRODUCT DAMAGE: Some commercially available lubricants will damage the finish and the mechanical parts if used on this printer.

Diagnostics and Troubleshooting

This section provides diagnostic tests and other information that may help you to optimize printing or to troubleshoot issues with your printer.

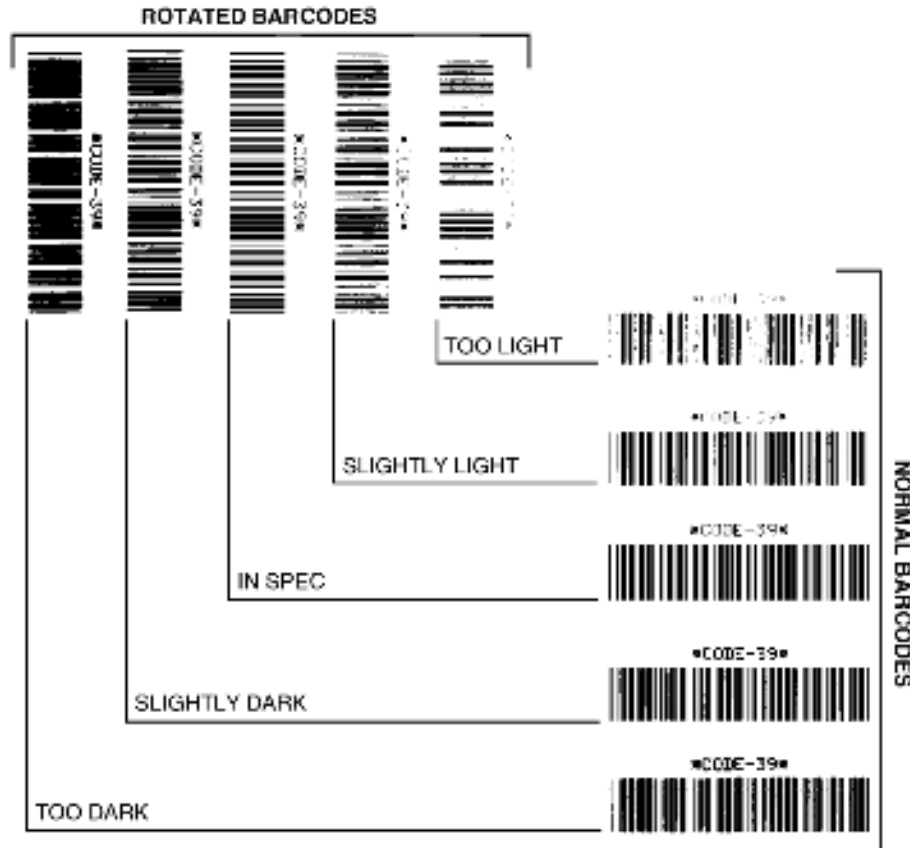
Go to www.zebra.com/zt400-info for access to videos and additional online information designed to assist you.



Judging Barcode Quality

Figure 3 shows how printer settings such as darkness and print speed can affect the quality of barcodes. Set the print darkness to the lowest setting that provides good print quality. The Print Quality Assistant in [Run the Print Wizard and Print a Test Label on page 52](#) can help you determine the best settings.

Figure 3 Barcode Darkness Comparison



Too Dark Labels that are too dark are fairly obvious. They may be readable but not “in-spec.”

- The normal barcode bars increase in size.
- The openings in small alphanumeric characters may fill in with ink.
- Rotated barcode bars and spaces run together.

Slightly Dark Slightly dark labels are not as obvious.

- The normal barcode will be “in-spec.”
- Small character alpha numerics will be bold and could be slightly filled in.
- The rotated barcode spaces are small when compared to the “in-spec” code, possibly making the code unreadable.

“In-Spec” The “in-spec” barcode can only be confirmed by a verifier, but it should exhibit some visible characteristics.

- The normal barcode will have complete, even bars and clear, distinct spaces.
- The rotated barcode will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark barcode, the barcode 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” barcodes.

- Both normal and rotated barcodes 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 barcodes have incomplete bars and spaces.
- Small alphanumeric characters are unreadable.

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 5](#) shows a sample printout.

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 5](#) shows a sample of the labels.

Figure 5 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.
3. To exit this self test at any time, press and hold **CANCEL**.

Sensor Profile

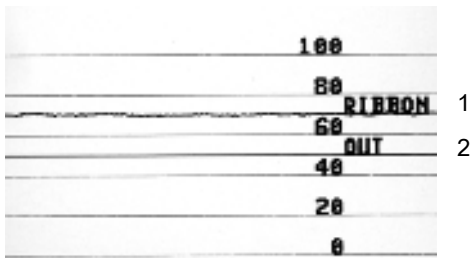
Tap **Menu > Print > Sensors > Print: Sensor Profile** to print a sensor profile image (which will extend across several actual labels or tags). Use the sensor profile image to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).
- The printer cannot detect ribbon.

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see [Calibrate the Ribbon and Media Sensors on page 89](#)).

Ribbon Sensor Profile (Figure 6) The line labeled **RIBBON (1)** on the sensor profile indicates the ribbon sensor readings. The ribbon sensor threshold setting is indicated by **OUT (2)**. If the ribbon readings are below the threshold value, the printer does not acknowledge that ribbon is loaded.

Figure 6 Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 7 and Figure 8) The line labeled **MEDIA (1)** on the sensor profile indicates the media sensor readings. The media sensor threshold settings is indicated by **WEB (2)**. The media out threshold is indicated by **OUT (3)**. The upward or downward spikes (**4**) indicate divisions between labels (the web, notch, or black mark), and the lines between the spikes (**5**) indicate where labels are located.

If you compare the sensor profile printout to a length of your media, the spikes 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.

Figure 7 Media Sensor Profile (Gap/Notch Media)

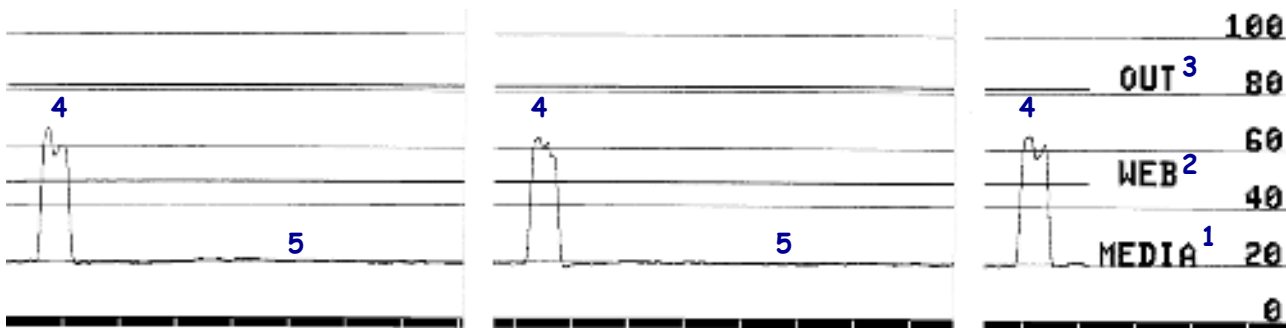
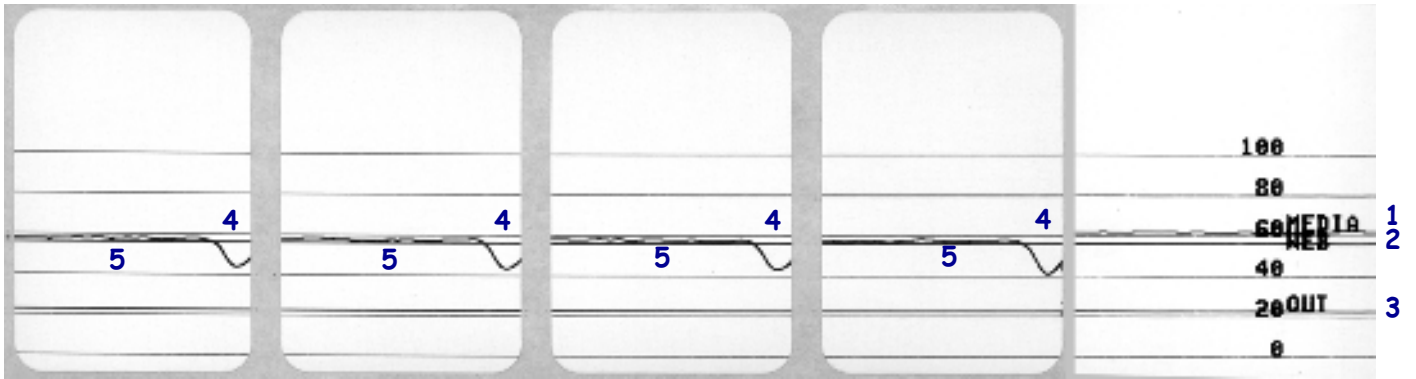


Figure 8 Media Sensor Profile (Black Mark Media)



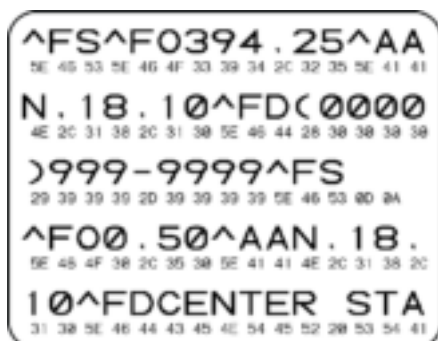
Communication Diagnostics Mode

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 9](#) shows a typical test label from this test.



NOTE: The test label prints upside-down.

Figure 9 Sample Communications Diagnostics Mode Label



1. Set the label width equal to or less than the actual media width being used for the test. Tap **Menu > Print > Print Quality > Label Width** to access the label width setting.
2. Tap **Menu > System > Program Language**, and set the **Diagnostic Mode** option to **ENABLED**.
The printer enters diagnostics mode and prints any data received from the host computer on a test label
3. 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.
4. To exit this self test and return to normal operation, power cycle the printer or set the **Diagnostic Mode** option to **DISABLED**.

Load Defaults or Last Saved Values

Restoring the printer to default values or to the last saved values can help if things are not working as expected.

Touch **Menu > System > Restore Defaults** to see the available options.



- **PRINTER**—Restores all printer settings 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.
- **NETWORK**—Reinitializes the printer's wired or wireless print server. With a wireless print server, the printer also reassociates with your wireless network.
- **LAST SAVED**—Loads settings from the last permanent save.

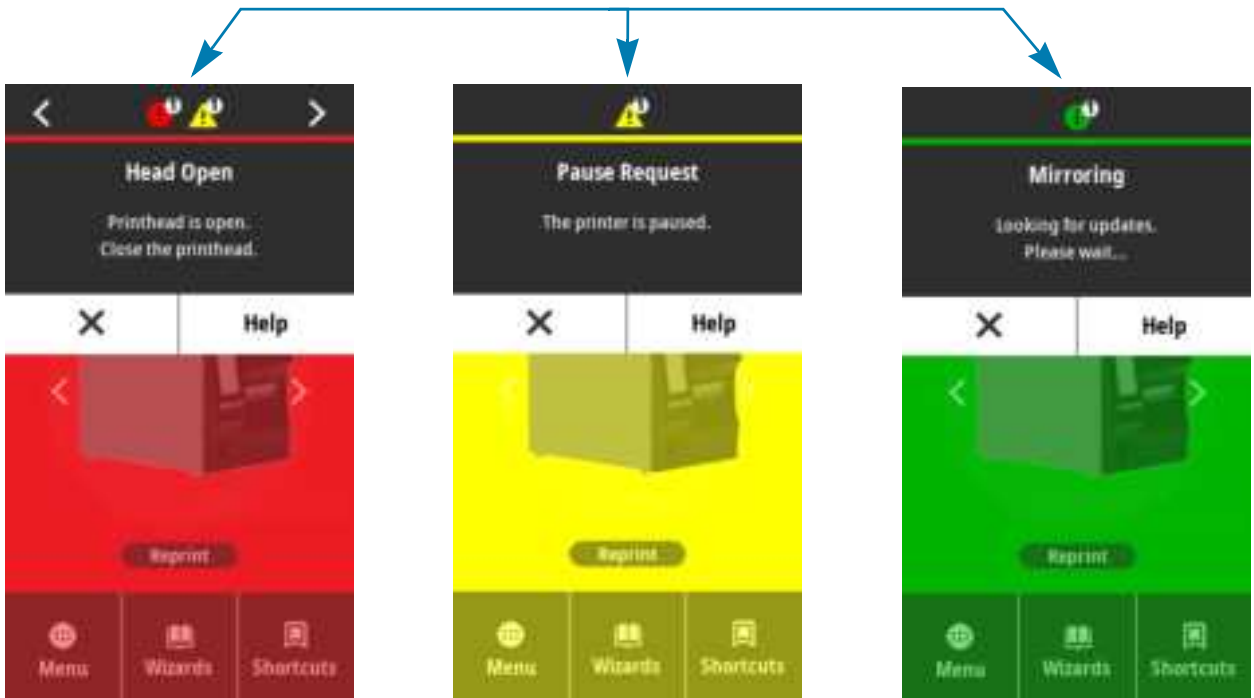
See [System > Settings > Restore Defaults](#) on page 63 for additional ways to restore these values.

Alert and Error States

If the background color of the Home screen changes, you may need to take an action to restore the printer to a Ready status. Red and yellow backgrounds typically halt printing until the issue is resolved. Informational messages with a green background usually disappear without user intervention, and printing continues as normal.







Touch the icons in the bar at the top of the Home screen to view the error, alert, or informational message. See [Alerts and Error Messages on page 119](#) for recommended actions.



Alerts and Error Messages

Display/Indicator Lights	Possible Causes	Recommended Solutions
<p>Head Open</p> <p>Printhead is open. Close the printhead.</p>	The printhead is not fully closed.	Close the printhead completely.
	The printhead open sensor is not working properly.	Call a service technician to replace the sensor.
<p>Media Out</p> <p>Media is out. Load additional media.</p>	The media is not loaded or is loaded incorrectly.	Load media correctly. See Load the Media on page 17 .
	Misaligned media sensor.	Check the position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	<ol style="list-style-type: none"> 1. Install the proper media type, or reset printer for the current media type. 2. Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89.
<p>Paper Jam</p> <p>Media jammed. Check the media.</p>	There is an issue with the media in the media path.	<ol style="list-style-type: none"> 1. Check for media that is loaded incorrectly or stuck to components in the media path. 2. Check if media is wrapped around the platen roller. Carefully remove any labels. If necessary, clean the platen roller to remove adhesive (see Clean the Printhead and Platen Roller on page 98).
<p>Ribbon Out</p> <p>Ribbon is out. Replace the ribbon.</p>	In thermal transfer mode: <ul style="list-style-type: none"> • ribbon is not loaded • ribbon is loaded incorrectly • the ribbon sensor is not detecting ribbon • media is blocking the ribbon sensor 	<ol style="list-style-type: none"> 1. Load ribbon correctly. See Load the Ribbon on page 48. 2. Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	Calibrate the printer (see Calibrate the Ribbon and Media Sensors on page 89) or load printer defaults by touching Menu > System > Settings > Restore Defaults > Restore Printer .
	If you are using direct thermal media, the printer is waiting for ribbon to be loaded because it is incorrectly set for thermal transfer mode.	Set the printer for Direct Thermal mode. See Print > Print Quality > Print Type on page 76 .

Display/Indicator Lights	Possible Causes	Recommended Solutions
<p>Ribbon In</p> <p>Ribbon was detected in Direct Thermal mode. Remove the ribbon.</p>	Ribbon is loaded, but the printer is set for direct thermal mode.	<p>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.</p> <p>If the message persists with no ribbon in the printer, Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89.</p> <p>If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See Determine the Label Collection Method on page 14.</p>
<p>Head Identification Failed</p> <p>Printhead is not a Zebra Certified Product Replace the Printhead</p>	The printhead was replaced with one that is not a genuine Zebra printhead.	Install a genuine Zebra printhead.
<p>Head Element Out</p> <p>A printhead element failed. The printhead may need to be replaced.</p>	A printhead element is no longer working.	If the location of the failed element affects printing, replace the printhead.
<p>Replace Printhead</p> <p>Replace the printhead.</p>	The printhead is nearing the end of its life and should be replaced.	Replace the printhead.
<p>Head Maintenance Needed</p> <p>Clean the printhead.</p>	The printhead needs to be cleaned.	Follow the cleaning instructions in Clean the Printhead and Platen Roller on page 98 .
<p>Head Over Temp</p> <p>Printhead is too hot. All printing is halted.</p>	 <p>The printhead may be hot enough to cause severe burns. Allow the printhead to cool.</p>	<p>Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.</p> <p>If this error persists, consider changing where the printer is located or using a slower print speed.</p>
	The printhead is over temperature.	

Display/Indicator Lights	Possible Causes	Recommended Solutions
<p>Head Under Temp Printhead is too cold. All printing is halted.</p> <p>Head Thermistor Fault Faulty thermistor detected. Replace the printhead.</p> <p>The printer shows one of these messages or cycles between them.</p>		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.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.
<p>Head Under Temp Printhead is too cold. All printing is halted.</p>		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.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.
<p>Cutter Error A cutter error occurred. Restart the printer.</p>		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 and Lubricate the Cutter Module on page 101 .
<p>Out of Memory Storing XXX XXX not stored. Out of memory.</p>	There is not enough memory to perform the function specified.	
	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.	
	Ensure that the data is not directed to a device that is not installed or is unavailable.	
		If the problem persists, call a service technician.

Indicator Lights

The indicator lights located above the printer's display also communicate the printer's status.

Table 5 Status of Printer As Shown by Indicator Lights















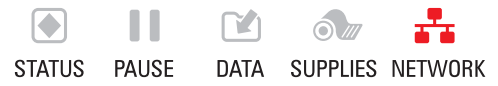
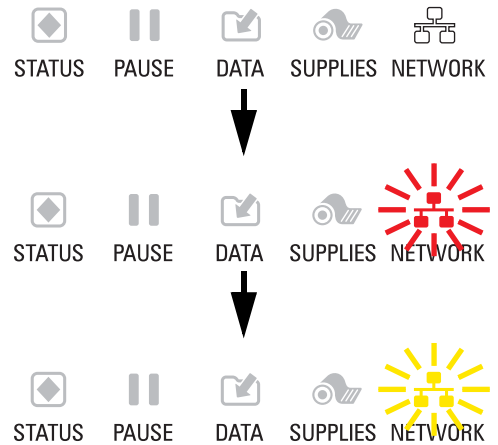
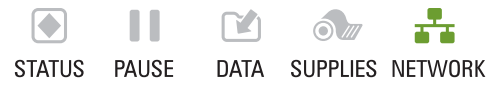


 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady green (other lights steady yellow for 2 seconds during printer power-up)</i> <p>The printer is ready.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • PAUSE light steady yellow. <p>The printer is paused.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady red</i> • <i>SUPPLIES light steady red</i> <p>The media supply is out. The printer needs attention and cannot continue without user intervention.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady red</i> • <i>SUPPLIES light flashing red</i> <p>The ribbon supply is out. The printer needs attention and cannot continue without user intervention.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady yellow</i> • <i>SUPPLIES light flashing yellow</i> <p>The printer is in Direct Thermal mode, which does not require ribbon; however, ribbon is installed in the printer.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady red</i> • <i>PAUSE light steady yellow</i> <p>The printhead is open. The printer needs attention and cannot continue without user intervention.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady yellow</i> <p>The printhead is over temperature.</p> <div style="display: flex; align-items: center;">  <p>The printhead may be hot and could cause severe burns. Allow the printhead to cool.</p> </div>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light flashing yellow</i> <p>This indicator light flashing indicates one of the following:</p> <ol style="list-style-type: none"> The printhead is under temperature. The power supply is over temperature. The main logic board (MLB) is over temperature.
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light steady red</i> • <i>PAUSE light steady red</i> • <i>DATA light steady red</i> <p>The printhead was replaced with one that is not a genuine Zebra™ printhead. Install a genuine Zebra™ printhead to continue.</p>

Table 5 Status of Printer As Shown by Indicator Lights (Continued)

 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>STATUS light flashing red</i> <p>The printer is unable to read the dpi setting of the printhead.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light off</i> <p>No Ethernet link is available.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light steady green</i> <p>A 100 Base link was found.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light steady yellow</i> <p>A 10 Base link was found.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light steady red</i> <p>An Ethernet error condition exists. The printer is not connected to your network.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p> <p>STATUS PAUSE DATA SUPPLIES NETWORK</p> <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light off</i> <p>A radio was found during power-up. The printer is attempting to associate with the network. The light flashes red while the printer associates with the network. The light then flashes yellow while the printer is authenticating with the network.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light steady green</i> <p>The radio is associated with your network and authenticated, and the WLAN signal is strong.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light flashing green</i> <p>The radio is associated with your network and authenticated, but the WLAN signal is weak.</p>
 <p>STATUS PAUSE DATA SUPPLIES NETWORK</p>	<ul style="list-style-type: none"> • <i>NETWORK light steady red</i> <p>A WLAN error condition exists. The printer is not connected to your network.</p>

Troubleshooting

Printing or Print Quality Issues

Barcode Does Not Scan		
Issue	Possible Cause	Recommended Solution
The barcode printed on a label does not scan.	The barcode is not within specifications because the printer is set at an incorrect darkness level.	<ol style="list-style-type: none"> 1. Perform the steps in Run the Print Wizard and Print a Test Label on page 52. 2. If necessary, manually adjust the darkness or print speed settings. <ul style="list-style-type: none"> • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. <p>Access the darkness and print speed settings from the Home screen by touching Menu > Print > Print Quality.</p> <ol style="list-style-type: none"> 1. If the issue is not resolved, check the printhead pressure and toggle position. See Adjust the Printhead Pressure on page 90
	There is not enough blank space around the barcode.	Leave at least 1/8 in. (3.2 mm) between the barcode and other printed areas on the label and between the barcode and the edge of the label.
Wrong Image Size		
Issue	Possible Cause	Recommended Solution
My label prints too small (or too large)	The wrong printer driver is being used, or other settings are not correct for your printing application.	Check the printer driver or software communications settings (if applicable) for your connection. You may wish to reinstall the printer driver following the instructions in Install the Printer Driver and Connect to a Computer on page 138 .
Poor Print Quality		
Issue	Possible Cause	Recommended Solution
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation. For more information, see http://www.zebra.com/supplies .
Poor results with thick labels	The print line is not at an optimal position for your media.	Refer to the <i>Maintenance Manual</i> for instructions on how to adjust the print line for thick media.

Print Consistently Too Light or Too Dark		
Issue	Possible Cause	Recommended Solution
Printing is too light or too dark over the entire label	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation. For more information, see http://www.zebra.com/supplies .
	The printer is set at an incorrect darkness level.	<p>For optimal print quality, set the darkness to the lowest possible setting for your application.</p> <ol style="list-style-type: none"> 1. Perform the steps in Run the Print Wizard and Print a Test Label on page 52. 2. If necessary, manually adjust the darkness or print speed settings. <ul style="list-style-type: none"> • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. <p>Access the darkness and print speed settings from the Home screen by touching Menu > Print > Print Quality.</p>
	You are using an incorrect combination of media and ribbon for your application.	<ol style="list-style-type: none"> 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.
	Incorrect printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Adjust the Printhead Pressure on page 90 .
Printing is too light or too dark on one side of the label	Uneven printhead pressure.	Adjust the printhead pressure as needed for good print quality. See Adjust the Printhead Pressure on page 90 .

Issue	Possible Cause	Recommended Solution
General print quality issues	The printer is set at an incorrect print speed or darkness level. Keep in mind that printer settings may be affected by the driver or software being used.	<p>For optimal print quality, set the print speed and the darkness to the lowest possible settings for your application.</p> <ol style="list-style-type: none"> 1. Perform the steps in Run the Print Wizard and Print a Test Label on page 52. 2. If necessary, manually adjust the darkness or print speed settings. <ul style="list-style-type: none"> • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. <p>Access the darkness and print speed settings from the Home screen by touching Menu > Print > Print Quality.</p>
	You are using an incorrect combination of labels and ribbon for your application.	<ol style="list-style-type: none"> 1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	The printhead is dirty.	Clean the printhead and platen roller. See Clean the Printhead and Platen Roller on page 98 .
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Adjust the Printhead Pressure on page 90 .
	The label format is scaling a font that is not scalable.	Check the label format for font issues.

Angled Gray Lines on Blank Labels

Issue	Possible Cause	Recommended Solution
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Issues on page 128 .

Missing Print

Issue	Possible Cause	Recommended Solution
Long tracks of missing print on several labels	Print element damaged.	Call a service technician.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Issues on page 128 .

Loss of Registration		
Issue	Possible Cause	Recommended Solution
Loss of printing registration on labels.	The platen roller is dirty.	Clean the printhead and platen roller. See Clean the Printhead and Platen Roller on page 98 .
Excessive vertical drift in top-of-form registration.	Media guides are positioned improperly.	Ensure that the media guides are properly positioned. See Load the Media on page 17 .
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark).
	The media is loaded incorrectly.	Load media correctly. See Load the Media on page 17 .
Misregistration/skips labels	The printer is not calibrated.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89 .
	Improper label format.	Check your label format, and correct it as necessary.
Misregistration and misprint of one to three labels	The platen roller is dirty.	Clean the printhead and platen roller. See Clean the Printhead and Platen Roller on page 98 .
	Media does not meet specifications.	Use media that meets specifications. See Media Specifications on page 192 .
Vertical drift in top-of-form position	The printer is out of calibration.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89 .
	The platen roller is dirty.	Clean the printhead and platen roller. See Clean the Printhead and Platen Roller on page 98 .
Horizontal movement in placement of the label image.	The previous labels were torn off incorrectly.	Pull down and to the left when tearing off labels so that the tear-off bar assists in tearing through the label backing. Pulling up or down and to the right can shift the media sideways.
<i>Issue</i>	<i>Possible Cause</i>	<i>Recommended Solution</i>
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Set the printer for the correct media type (gap/notch, continuous, or mark) and calibrate the printer, if necessary (see Calibrate the Ribbon and Media Sensors on page 89).
	The media sensor is calibrated improperly.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89 .
	The platen roller is dirty.	Clean the printhead and platen roller. See Clean the Printhead and Platen Roller on page 98 .
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality. See Adjust the Printhead Pressure on page 90 .
	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 48 and Load the Media on page 17 .
	Incompatible media.	You must use media that meets the printer specifications. Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed (see Media Specifications on page 192).

Ribbon Issues

For videos of some common procedures, go to <http://www.zebra.com/zt400-info>.



Broken Ribbon		
Issue	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	<ol style="list-style-type: none"> 1. Perform the steps in Run the Print Wizard and Print a Test Label on page 52. 2. If necessary, manually adjust the darkness or print speed settings. <ul style="list-style-type: none"> • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. <p>Access the darkness and print speed settings from the Home screen by touching Menu > Print > Print Quality.</p> <ol style="list-style-type: none"> 1. Clean the printhead thoroughly. See Clean the Printhead and Platen Roller on page 98.
	The ribbon is coated on the wrong side and cannot be used in this printer.	Replace the ribbon with one coated on the correct side. For more information, see Determine the Type of Ribbon to Use on page 47 .

Wrinkled Ribbon		
Issue	Possible Cause	Recommended Solution
Wrinkled ribbon	Ribbon was loaded incorrectly.	Load the ribbon correctly. See Load the Ribbon on page 48 .
	Incorrect burn temperature.	<ol style="list-style-type: none"> 1. Perform the steps in Run the Print Wizard and Print a Test Label on page 52. 2. If necessary, manually adjust the darkness or print speed settings. <ul style="list-style-type: none"> • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. <p>Access the darkness and print speed settings from the Home screen by touching Menu > Print > Print Quality.</p>
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Adjust the Printhead Pressure on page 90 .
	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 printhead or platen roller may be installed incorrectly.	Call a service technician.
Ribbon Detection Issues		
Issue	Possible Cause	Recommended Solution
The printer does not detect when the ribbon runs out.	The printer may have been calibrated without ribbon or without the ribbon loaded properly.	<ol style="list-style-type: none"> 1. Make sure that ribbon is loaded correctly so that it can be detected by the ribbon sensor. Under the printhead, the ribbon should track all the way back, near the printer’s firewall. See Load the Ribbon on page 48. 2. Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89.
In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.		
The printer indicates that ribbon is out, even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89 .

RFID Issues

Printer Stops at RFID Inlay		
Issue	Possible Cause	Recommended Solution
The printer stops at the RFID inlay.	The printer calibrated the label length only to the RFID inlay instead of to the interlabel gap.	<ol style="list-style-type: none"> 1. Tap Menu > System > Settings, and then select FEED for the Power Up and Head Close actions. 2. Manually calibrate the printer (see Calibrate the Ribbon and Media Sensors on page 89).
Voided Labels		
Issue	Possible Cause	Recommended Solution
The printer voids every label.	The printer is not calibrated for the media being used.	Manually calibrate the printer (see Calibrate the Ribbon and Media Sensors on page 89).
	You are using an RFID label with a tag type that is not supported by your printer.	These printers support only Gen 2 RFID labels. For more information, refer to the RFID Programming Guide 3 , or contact an authorized Zebra RFID reseller.
	The printer is unable to communicate with the RFID reader.	<ol style="list-style-type: none"> 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.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: <ul style="list-style-type: none"> • 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.
	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: <ul style="list-style-type: none"> • Check the RFID programming position or the program position setting in your label designer software. If the position is incorrect, change the setting. • Restore the RFID programming position back to the default value. For more information, refer to the RFID Programming Guide 3 . For transponder placement details, go to http://www.zebra.com/transponders .
	You are sending RFID ZPL or SGD commands that are incorrect.	Check your label formats. For more information, refer to the RFID Programming Guide 3 .

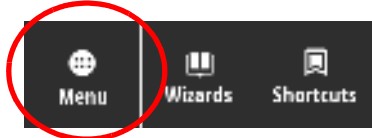
Voided Labels (Continued)		
Issue	Possible Cause	Recommended Solution
Low yields. Too many RFID tags per roll are voided.	The RFID labels are not within specifications for the printer, which means that the transponder is not in an area that can be programmed consistently.	Make sure that the labels meet transponder placement specifications for your printer. See http://www.zebra.com/transponders for transponder placement information. For more information, refer to the RFID Programming Guide 3 , or contact an authorized Zebra RFID reseller.
	Incorrect read and write power levels.	Change the RFID read and write power levels. For instructions, refer to the RFID Programming Guide 3 .
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: <ul style="list-style-type: none"> • 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.

Other RFID Issues		
Issue	Possible Cause	Recommended Solution
<p>RFID parameters do not appear in Setup mode, and RFID information does not appear on the printer configuration label.</p> <p>The printer does not void RFID labels that are not programmed correctly.</p>	<p>The printer was powered off (O) and then back on (I) too quickly for the RFID reader to initialize properly.</p>	<p>Wait at least 10 seconds after turning the printer power off before turning it back on.</p> <ol style="list-style-type: none"> 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.
	<p>An incorrect version of printer or reader firmware was loaded on the printer.</p>	<ol style="list-style-type: none"> 1. Verify that the correct firmware version is loaded on your printer. For more information, refer to the RFID Programming Guide 3. 2. Download the correct printer or reader firmware if necessary. 3. If the problem persists, contact Technical Support.
	<p>The printer is unable to communicate with the RFID subsystem.</p>	<ol style="list-style-type: none"> 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.
<p>The DATA light flashes indefinitely after you attempt to download printer or reader firmware.</p>	<p>The download was not successful. For best results, cycle power on the printer before downloading any firmware.</p>	<ol style="list-style-type: none"> 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.

Communications Issues

Label Formats Not Recognized		
Issue	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) for your connection. You may wish to reinstall the printer driver following the instructions in Install the Printer Driver and Connect to a Computer on page 138 .
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 using the following SGD commands. Modify the values if necessary. <ul style="list-style-type: none"> • ! U1 getvar "zpl.format_prefix" • ! U1 getvar "zpl.delimiter"
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings. If the problem continues, check the label format.
Labels Stop Printing Correctly		
Issue	Possible Cause	Recommended Solution
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 Communication Interface Specifications on page 186 for requirements.
		Check the printer driver or software communications settings (if applicable).

Miscellaneous Issues

Issues with the Display		
Issue	Possible Cause	Recommended Solution
The control panel display shows a language that I cannot read	The language parameter was changed through the control panel or a firmware command.	<ol style="list-style-type: none"> On the Home screen, touch Menu, which is the icon on the bottom-left.  <ol style="list-style-type: none"> Touch the top selection on the screen. Scroll through the language selections under this menu option. The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read. Touch the language that you want to display to select it. Touch the Home icon to return to the Home screen.
The display is missing characters or parts of characters	The display may need replacing.	Call a service technician.
The USB Host Port Is Not Acknowledging a USB Device		
Issue	Possible Cause	Recommended Solution
The printer is not acknowledging a USB device or is not reading the files on a USB device that is plugged into the USB host port.	The printer currently supports USB drives only up to 1 TB in size.	Use a USB drive that is 1 TB or smaller.
	The USB device may require its own external power.	If your USB device requires external power, make sure that it is plugged into a working power supply.
Printer Parameters Are Not Set As Expected		
Issue	Possible Cause	Recommended Solution
Changes in parameter settings did not take effect. OR Some parameters changed unexpectedly.	<p>A firmware setting or command prevented the ability to change the parameter.</p> <p>A command in a label format changed the parameter back to the previous setting.</p>	<p>Check your label formats or the settings of the software that you use to send formats to the printer.</p> <p>If necessary, refer to the <i>Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML</i> or call a service technician. A copy of the manual is available at http://www.zebra.com/manuals.</p>

IP Address Changing		
Issue	Possible Cause	Recommended Solution
My printer reassigns a new IP address to the print server after the printer has been off for a while.	The settings for your network are causing the network to reassign a new IP address.	<p>If the printer changing IP addresses causes issues for you, follow these steps to assign it a static IP address:</p> <ol style="list-style-type: none"> 6. Find out what values need to be assigned to the IP address, subnet mask, and gateway for your print server (wired, wireless, or both). 7. Change the appropriate IP protocol value to PERMANENT. 8. Change the values for the IP address, subnet mask, and gateway for the appropriate print server to what you want them to remain. 9. Reset the network by touching Menu > Connections > Networks > Reset Network and then touching the check mark to save the changes.

Cannot Connect through Wired or Wireless Connections		
Issue	Possible Cause	Recommended Solution
I manually entered a wireless IP address, subnet, and gateway on my printer, but it won't connect to my wired or wireless network.	The printer's network must be reset after values are changed.	Reset the network by touching Menu > Connections > Networks > Reset Network and then touching the check mark to save the changes.
	An ESSID value has not been specified.	<ol style="list-style-type: none"> 1. For a wireless connection, specify the ESSID value that matches the value used by your wireless router using the following Set/Get/Do command: <code>! U1 setvar "wlan.essid" "value"</code> <p>where "value" is the ESSID (sometimes called a network SSID) for your router. You can look on the back of your router for a sticker with the router's default information. If the information has been changed from the default, check with your network administrator for the ESSID value to use.</p> 1. If the printer still does not connect, reset the network by touching Menu > Connections > Networks > Reset Network and then touching the check mark to save the changes, and then power cycle the printer.
	The ESSID or other value was not specified correctly.	<ol style="list-style-type: none"> 1. Print a network configuration label and verify that your values are correct. 2. Make corrections as necessary. 3. Reset the network by touching Menu > Connections > Networks > Reset Network and then touching the check mark to save the changes.

Calibration Issues		
Issue	Possible Cause	Recommended Solution
Auto Calibrate failed.	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 48 and Load the Media on page 17 .
	The sensors could not detect the media or ribbon.	Calibrate the printer manually. See Calibrate the Ribbon and Media Sensors on page 89 .
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark).
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Calibrate the printer. See Calibrate the Ribbon and Media Sensors on page 89 .
	The printer is configured for continuous media.	Set the printer for the correct media type (gap/notch, continuous, or mark).
Printer Locks Up		
Issue	Possible Cause	Recommended Solution
All indicator lights are on, nothing is on the display, and the printer locks up.	Internal electronic or firmware failure.	Power cycle the printer. If that does not solve the issue, call a service technician.
The printer locks up while booting up.	Main logic board failure.	

Service the Printer

If you have a problem using the printer, contact your facility's technical or systems support. If there is a problem with the printer, they will contact the Zebra Global Customer Support Center at: <http://www.zebra.com/support>.

When contacting Zebra Global Customer Support, have the following information available:

- Serial number of the unit
- Model number or product name
- Firmware version number

Zebra responds to calls by e-mail, telephone, or fax within the time limits set forth in service agreements. If your problem cannot be solved by Zebra Global Customer Support, you may need to return your equipment for servicing and will be given specific directions.

If you purchased your product from a Zebra business partner, please contact that business partner for support.

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.

Zebra is not responsible for any damages incurred during shipment if an approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

Install the Printer Driver and Connect to a Computer

In this section, you are shown how to use the Zebra Setup Utilities program to prepare a computer running Microsoft Windows® for the printer driver before connecting the printer to any of the computer's data communication interfaces. Use this section for directions to install this program if you have not already done so. You may connect your printer to your computer using any of the connections that you have available.



IMPORTANT: You must use the Zebra Setup Utilities program or the Zebra Printer Setup Utility app for Android devices (available for free from Google Play™ at <https://play.google.com/store/apps/details?id=com.zebra.printersetup>) before connecting the printer to your computer. Your computer will not install the correct printer drivers if you connect the printer to it without the Zebra Setup Utilities program or the Zebra Printer Setup Utility app.

Install Zebra Setup Utilities

Follow the directions in this section if you do not have Zebra Setup Utilities installed on your computer or if you want to update an existing version of the program. You do not need to uninstall any older versions or any Zebra printer drivers to do so.

Download the Zebra Setup Utilities Installer

1. Go to <http://www.zebra.com/setup>.

The Zebra Setup Utilities page displays.

Install the Printer Driver and Connect to a Computer

2. On the DOWNLOADS tab, click Download under the ZEBRA SETUP UTILITIES option. You are prompted to read and accept the End User License Agreement (EULA).



3. If you agree with the terms of the EULA, click ACCEPT AND BEGIN DOWNLOAD NOW


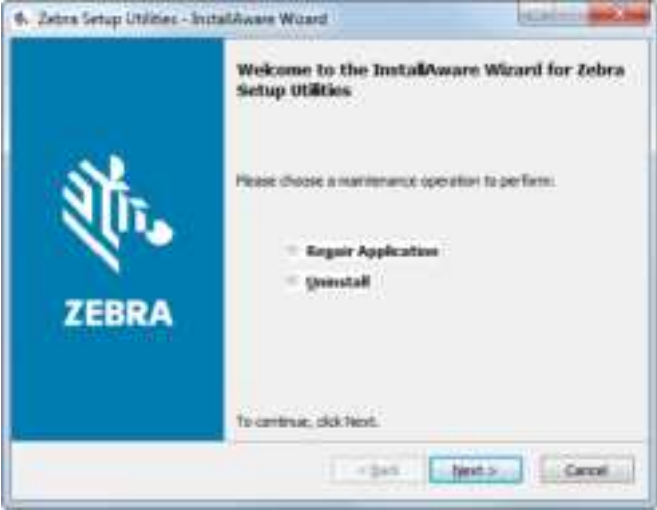
Depending on your browser, you are given options to run or save the executable file.



Run the Zebra Setup Utilities Installer

4. Save the program to your computer. (Optional if your browser gave you the option to run the program instead of saving it.)
5. Run the executable file. If your computer prompts you for permission to run the file, click the appropriate button to allow it to run.

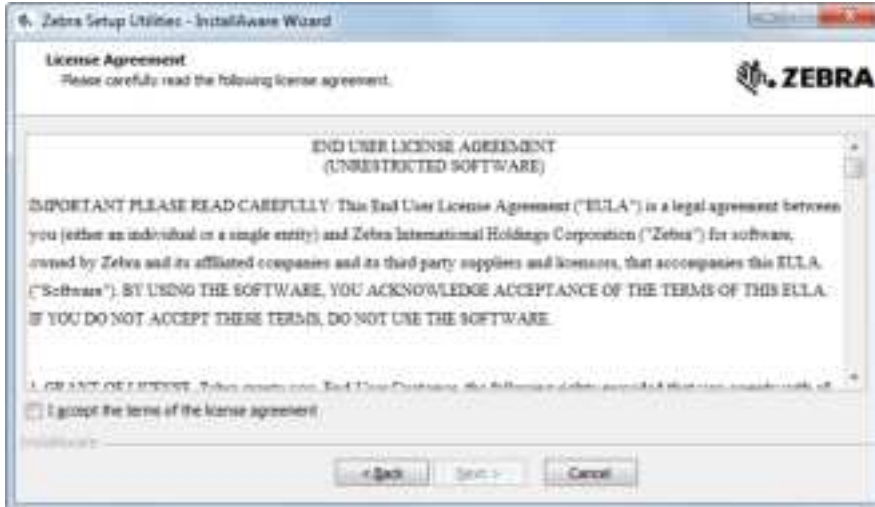
What the computer displays next depends on whether Zebra Setup Utilities was already installed. Follow the instructions based on what your computer prompts you to do.

If your computer...	Then...
<p>Did not previously have the Zebra Setup Utilities installed</p>	<p>a. The Zebra Setup Utilities - InstallAware Wizard displays the following.</p>  <p>b. Go to New Installations of Zebra Setup Utilities on page 141.</p>
<p>Did previously have the Zebra Setup Utilities installed</p>	<p>c. The Zebra Setup Utilities - InstallAware Wizard displays the following.</p>  <p>d. Go to Updating Existing Installations of Zebra Setup Utilities on page 143.</p>

New Installations of Zebra Setup Utilities

6. Click Next.

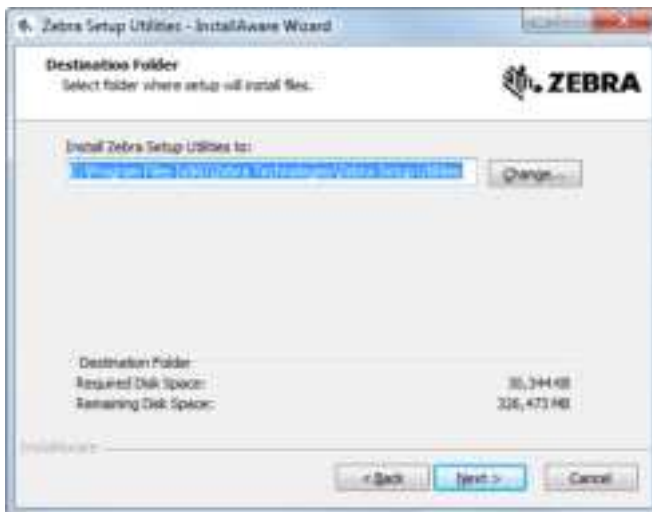
You are prompted again to read and accept the End User License Agreement (EULA).



7. If you agree with the terms of the EULA, check the box that says I accept the terms of the license agreement

8. Click Next.

You are prompted to select where the files will be installed.



9. Change the destination folder, if necessary, and then click Next.

You are prompted to select a location for program shortcuts.



10. Change the location, if desired, and then click Next.

You are prompted to complete the InstallAware wizard.



11. Skip to [Continuing with New or Updated Installations](#) on page 144.

Updating Existing Installations of Zebra Setup Utilities

12. Click Next.

You are prompted to choose the features that you would like to install.



13. Click Next.

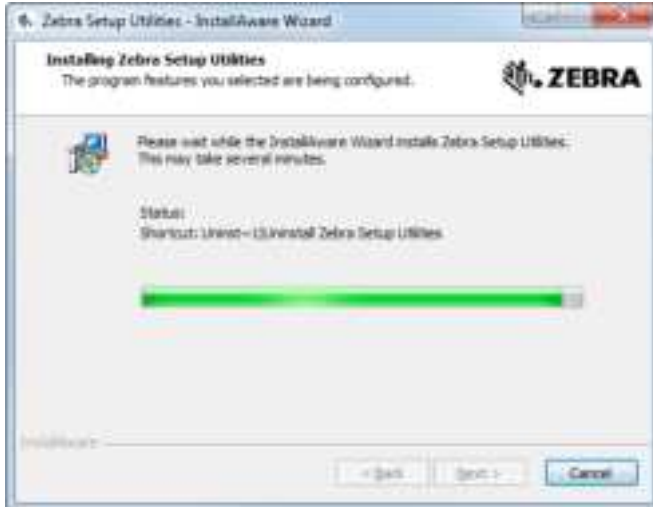
You are prompted to complete the InstallAware wizard.



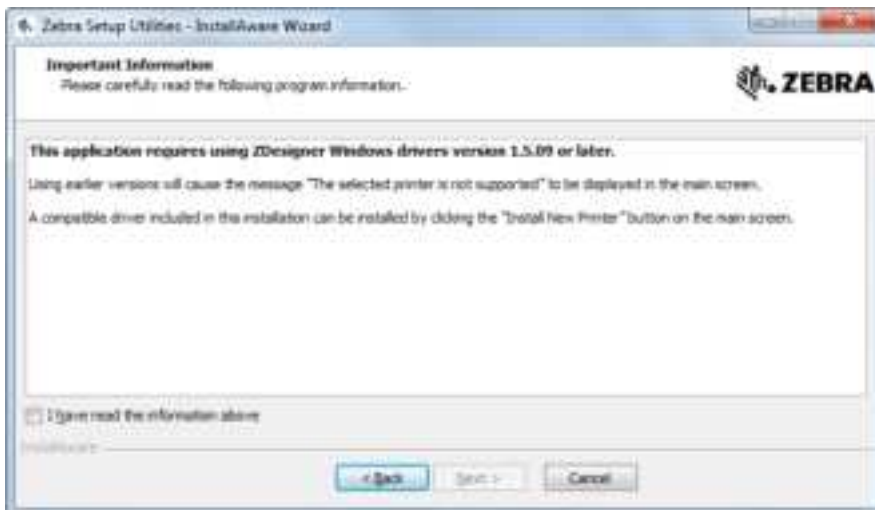
Continuing with New or Updated Installations

14. Click Next.

Installation begins.



During installation, you are presented with information about drivers.



15. Read the information, and then check the box that says

"I have read the information above".

16. Click Next.


You are shown options that can take place when the wizard exits the installation.




17. Check the box that says “Run Zebra Setup Utilities now.”

18. Click Finish.

What the computer displays next depends on whether any Zebra printer drivers are already installed on your computer. Follow the instructions based on what your computer displays.

If your computer...	Then...	
<p>Did not previously have any Zebra printer drivers installed</p>	<p>The System Prepare Wizard displays.</p> 	
	To connect by...	Then...
	USB port	Continue with Connect a Computer to the Printer's USB Port on page 147.
	Serial or optional parallel port	Continue with Connect a Computer to the Printer's Serial or Parallel Port on page 150.

Install the Printer Driver and Connect to a Computer

If your computer...	Then...	
<p>Did previously have any Zebra printer drivers installed</p>	<p>The Zebra Setup Utilities screen displays.</p> 	
	<p>To connect by the...</p>	<p>Then...</p>
	<p>USB port</p>	<p>Continue with Connecting the printer to a USB port on your computer on page 148.</p>
	<p>Serial or optional parallel port</p>	<p>Continue with Adding a Printer from the Zebra Setup Utilities Screen on page 152.</p>

Connect a Computer to the Printer's USB Port

Complete the steps in this section only after you have installed the Zebra Setup Utilities program. If necessary, complete the steps in [Install Zebra Setup Utilities on page 138](#) before continuing.



IMPORTANT: You must install the Zebra Setup Utilities program before connecting the printer to your computer. Your computer will not install the correct printer drivers if you connect the printer to it without the Zebra Setup Utilities program.



CAUTION—PRODUCT DAMAGE: Connecting a data communications cable while the power is on (I) may damage the printer. Turn the power off (O).

Running the System Prepare Wizard

If you are at the Zebra Setup Utilities screen, you do not need to complete this section. Continue with [Connecting the printer to a USB port on your computer on page 148](#).

The first time that you install the Zebra Setup Utilities program and printer drivers, you are prompted to follow the System Prepare Wizard.

Figure 10 System Prepare Wizard



1. Click Next.

The System Prepare Wizard prompts you to connect the printer to the USB port on your computer.



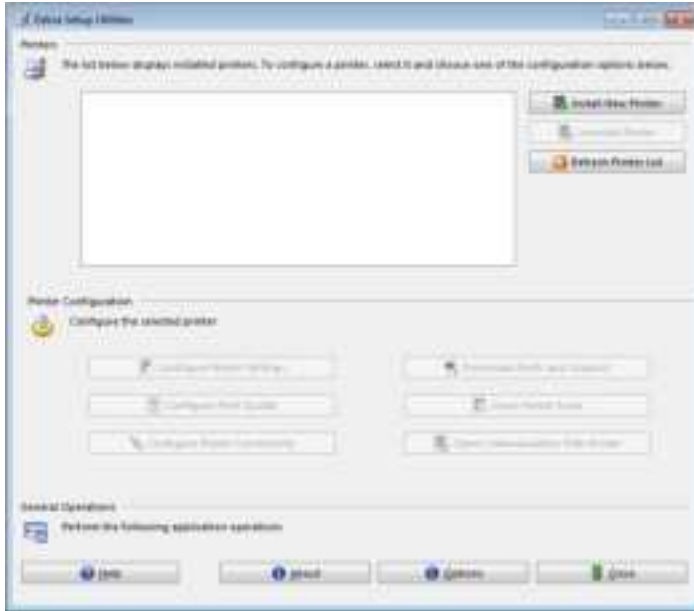
2. Click Finish.

The Zebra Setup Utilities screen displays.

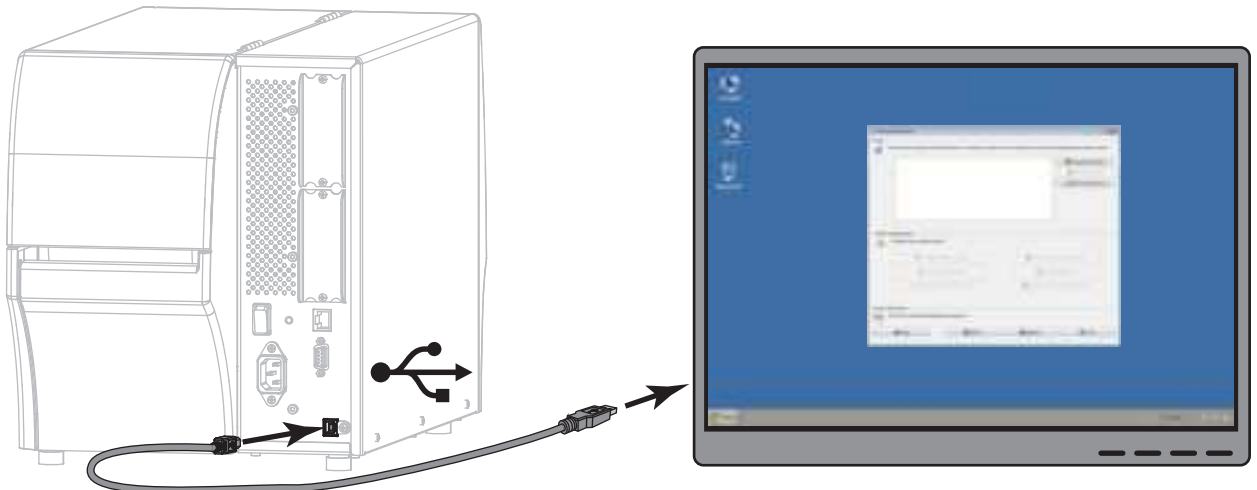
Connecting the printer to a USB port on your computer

Complete the steps in this section only after the System Prepare Wizard prompts you to do so or after you have opened the Zebra Setup Utilities program. If necessary, complete the steps in [Install Zebra Setup Utilities on page 138](#) before continuing.

Figure 11 Zebra Setup Utilities Screen

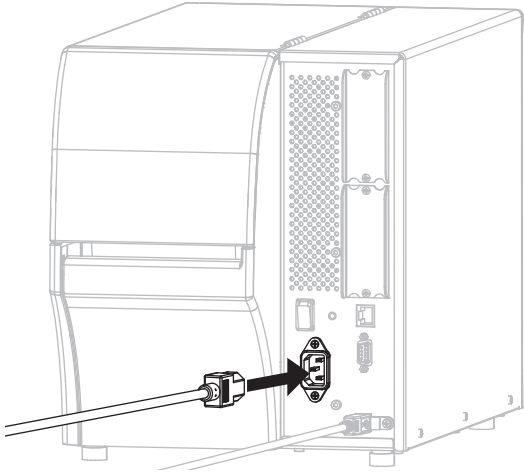


3. Connect one end of the USB cord to the USB port on your printer and the other end to your computer.



Install the Printer Driver and Connect to a Computer

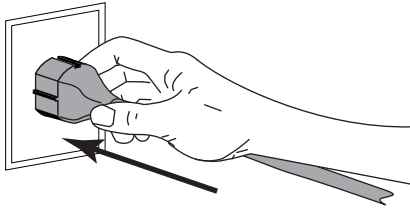
4. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



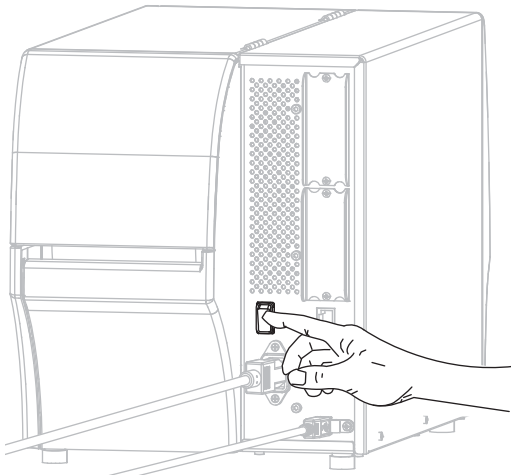
5. Plug the male end of the A/C power cord into an appropriate power outlet.



100–240 VAC
50–60 Hz



6. Turn on (I) the printer.



As the printer boots up, your computer completes the driver installation and recognizes your printer.

The installation for the USB connection is complete.

Connect a Computer to the Printer's Serial or Parallel Port

Complete the steps in this section only after you have installed the Zebra Setup Utilities program. If necessary, complete the steps in [Install Zebra Setup Utilities on page 138](#) before continuing.

If you are at the Zebra Setup Utilities screen, you do not need to complete this section. Continue with [Adding a Printer from the Zebra Setup Utilities Screen on page 152](#).



IMPORTANT: You must install the Zebra Setup Utilities program before connecting the printer to your computer. Your computer will not install the correct printer drivers if you connect the printer to it without the Zebra Setup Utilities program.



CAUTION—PRODUCT DAMAGE: Connecting a data communications cable while the power is on (I) may damage the printer. Turn the power off (O).

Running the System Prepare Wizard

The first time that you install the Zebra Setup Utilities program and printer drivers, you are prompted to follow the System Prepare Wizard.

Figure 12 System Prepare Wizard



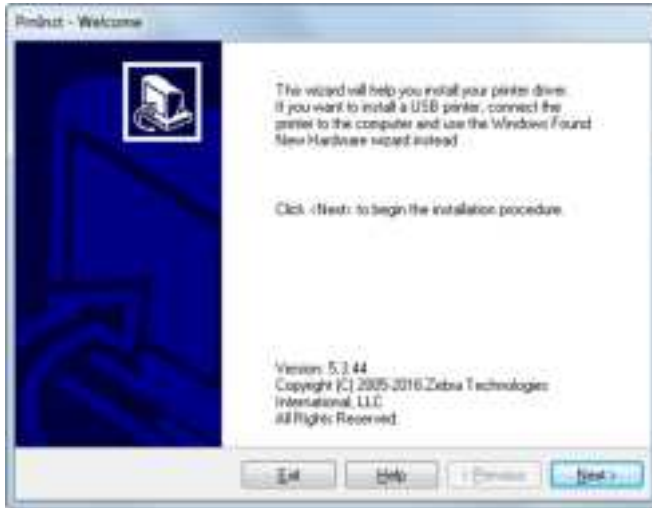
1. Select "Other computer ports (Parallel Port, Serial Port, TCP-IP Port, ...), and then click Next.

The new printer wizard prompts you to begin the installation procedure.



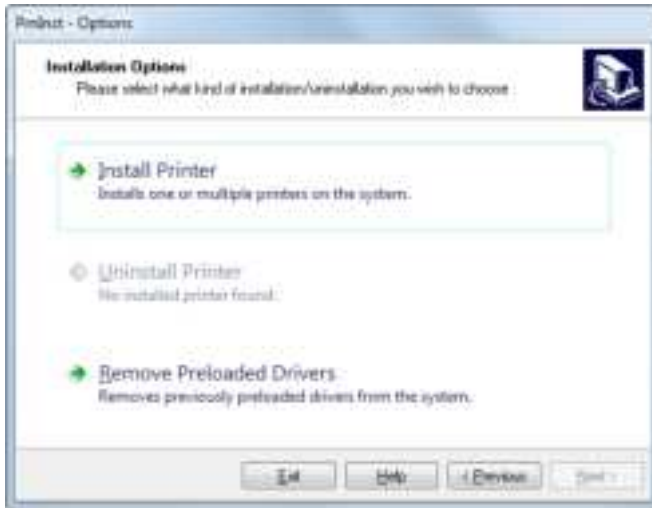
2. Click Finish.

The printer driver wizard displays.



3. Click Next.

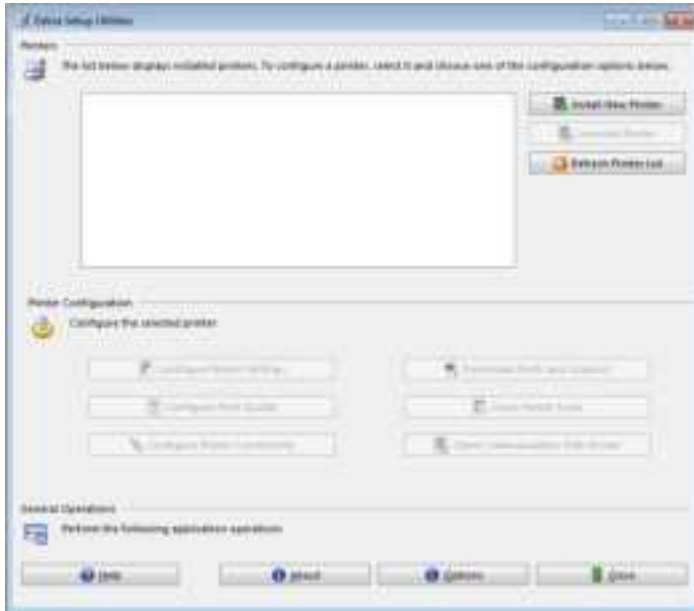
You are prompted to select an installation option.



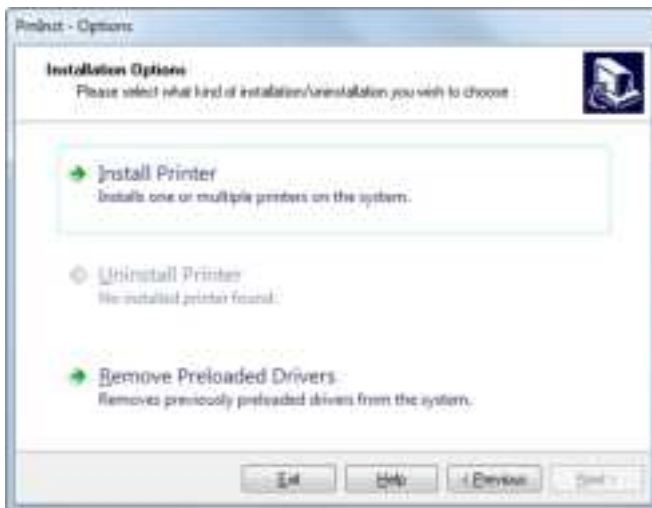
4. Continue with [step 6 on page 153](#).

Adding a Printer from the Zebra Setup Utilities Screen

Figure 13 Zebra Setup Utilities Screen



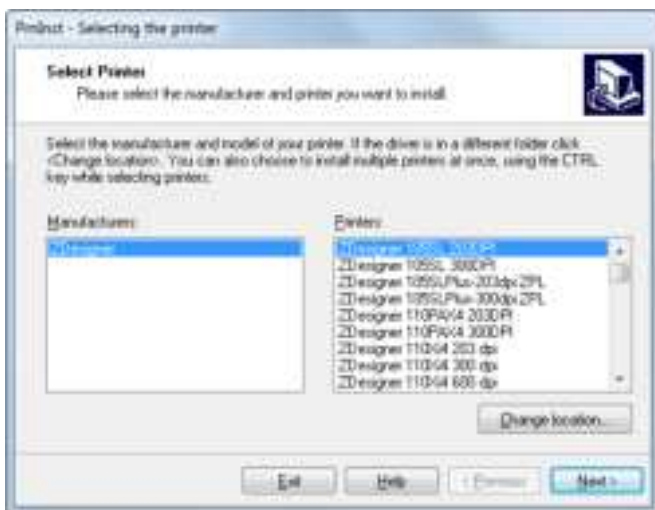
5. On the Zebra Setup Utilities screen, click Install New Printer.
You are prompted to select an installation option.



Install the Printer Driver and Connect to a Computer

6. Click Install Printer.

You are prompted to select a printer type.



7. Select your printer model and resolution.

The model and resolution are on a part number sticker on the printer, usually located below the media hanger. The information will be in the following format:

Part Number: **XXXXX**x**Y** – xxxxxxxx

where

XXXXX = the printer model

Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi)

For example, in the part number **ZT411x3** – xxxxxxxx

ZT411 indicates that the printer is a ZT411 model

3 indicates that the printhead resolution is 300 dpi

8. Click Next.

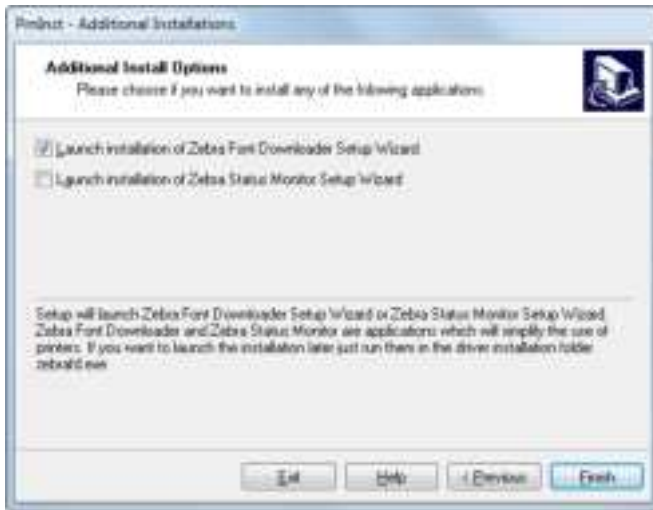
You are prompted for a printer name, the port to which the printer will be connected, and the language for the program.



9. Change the printer name (if desired), and select the appropriate port and language.

10. Click Next.

You are prompted to launch other setup wizards.

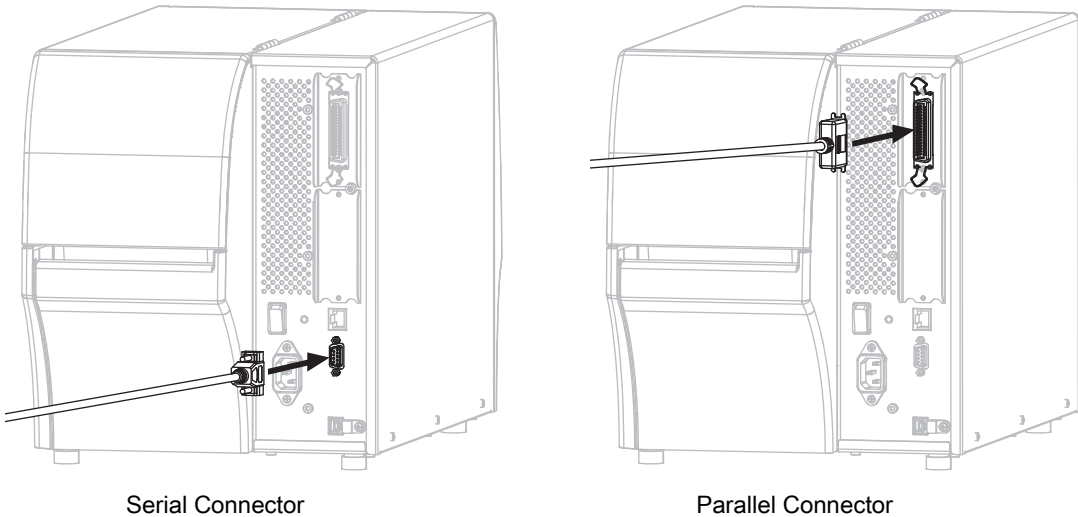


11. Check the desired options, and then click Finish.

The printer driver is installed. If you are prompted that other programs might be affected, click Next.

Connecting the printer to a serial or parallel port on your computer

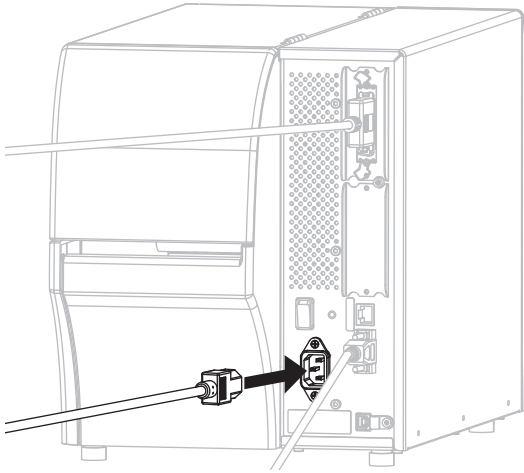
12. Connect one or both cords to the appropriate ports on your printer.



13. Connect the other end of the cord to the appropriate port on your computer.

Install the Printer Driver and Connect to a Computer

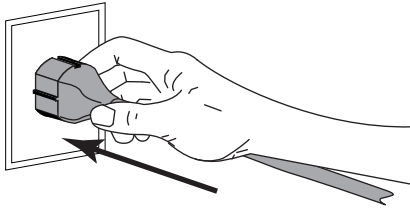
14. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



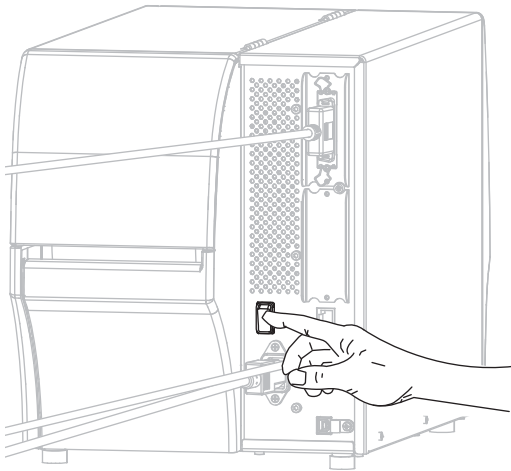
15. Plug the male end of the A/C power cord into an appropriate power outlet.



100–240 VAC
50–60 Hz



16. Turn on (I) the printer.



The printer boots up.

Configuring the printer (if necessary)

17. If necessary, adjust the printer's port settings to match those of your computer. See the **Zebra Programming Guide** at <http://www.zebra.com/manuals> for more information.

The installation for serial or parallel connections is complete.

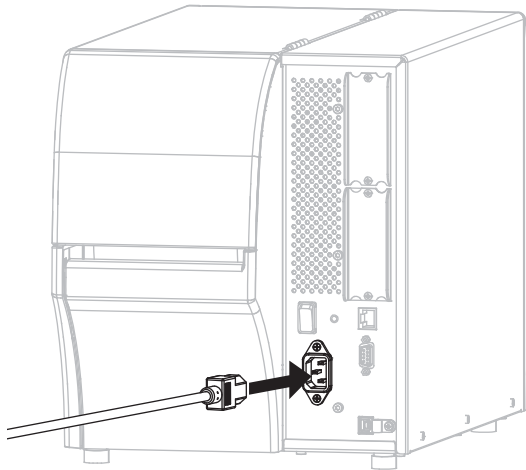
Connect to Your Network through the Printer's Ethernet Port

If you wish to use a wired print server (Ethernet) connection, you may need to connect the printer to your computer using one of the other available connections. While the printer is connected via one of those connections, you would configure the printer to communicate with your Local Area Network (LAN) through the printer's wired print server.

For additional information about Zebra print servers, refer to the **ZebraNet Wired and Wireless Print Server User Guide**. To download the latest version of this guide, go to <http://www.zebra.com/zt400-info>.



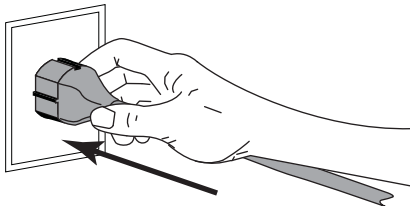
1. Install Zebra Setup Utilities as instructed in [Install Zebra Setup Utilities on page 138](#).
2. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



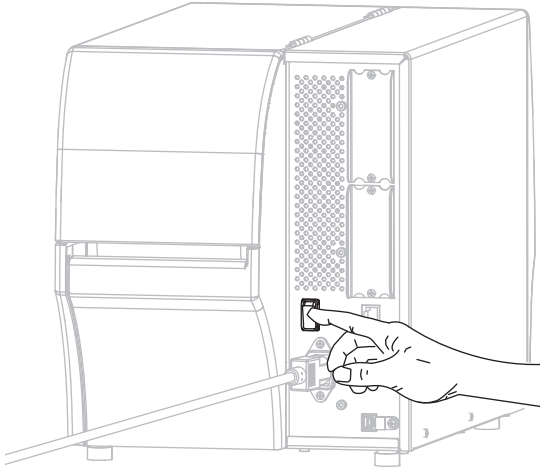
3. Plug the male end of the A/C power cord into an appropriate power outlet.



100–240 VAC
50–60 Hz

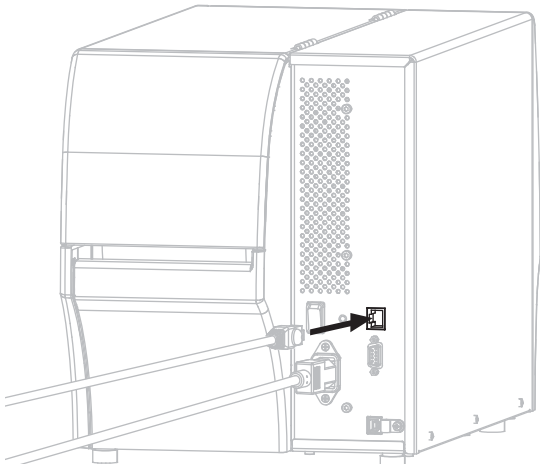


- Turn on (I) the printer.



The printer boots up.

- Connect the printer to an Ethernet cable that is connected to your network.



The printer attempts to communicate with your network. If it is successful, it fills in your LAN's gateway and subnet values and gets an IP address. The printer display will alternate between the printer's **firmware version and its IP address**.

- Tap **Menu > Connection > Wired > Wired IP Address**. Check the display to see if an IP address was assigned to the printer. See [Connection > Wired > Wired IP Address](#) on page 68.

If the printer's IP address is...	Then...
0.0.0.0 or 000.000.000.000	Continue with Configuring the printer with your LAN information (if necessary) on page 159.
any other value	Continue with Adding a Printer from the Zebra Setup Utilities Screen on page 159.

Configuring the printer with your LAN information (if necessary)

If your printer connected to your network automatically, you do not need to complete this section. Continue with [Adding a Printer from the Zebra Setup Utilities Screen](#).

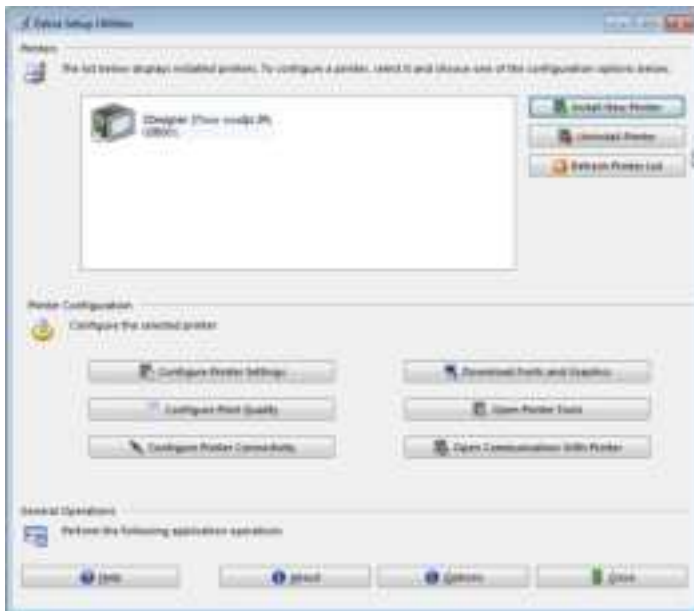
7. Connect the printer to your computer using a USB, serial, or optional parallel port as instructed in [Connect a Computer to the Printer's USB Port on page 147](#) or [Connect a Computer to the Printer's Serial or Parallel Port on page 150](#).
8. Configure the following printer settings. You can change the values through the Zebra Setup Utilities (click Configure Printer Connectivity on the Zebra Setup Utilities screen) or by the ways listed at the following links. Contact your network administrator for the proper values for your network.
 - [Connection > Wired > Wired IP Protocol on page 68](#) (change the value from ALL to PERMANENT)
 - [Connection > Wired > Wired IP Address on page 68](#) (assign a unique IP address to the printer)
 - [Connection > Wired > Wired Subnet on page 69](#) (match the subnet value of your LAN)
 - [Connection > Wired > Wired Gateway on page 69](#) (match the gateway value of your LAN)
9. After the print server settings have been configured, reset the network to apply the changes. See [Connection > Networks > Reset Network on page 65](#).

Adding a Printer from the Zebra Setup Utilities Screen

10. If necessary, open the Zebra Setup Utilities program.

The Zebra Setup Utilities screen displays.

Figure 14 Zebra Setup Utilities Screen



11. Click Install New Printer.

The printer driver wizard displays.



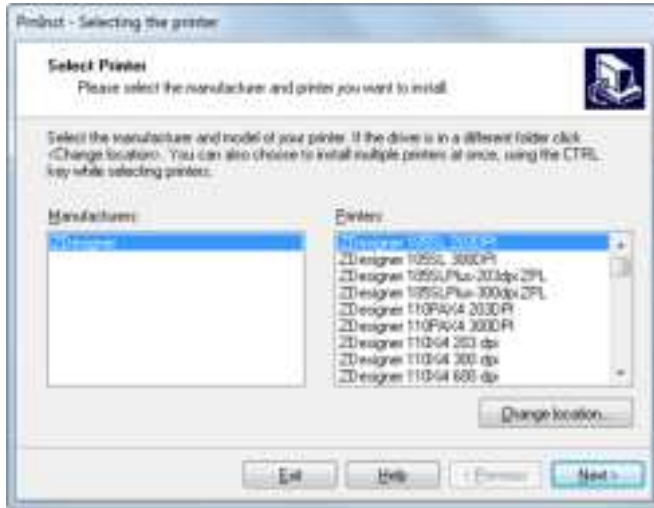
12. Click Next.

You are prompted to select an installation option.



13. Click Install Printer.

You are prompted to select a printer type.



14. Select your printer model and resolution.

The model and resolution are on a part number sticker on the printer, usually located below the media . The information will be in the following format:

Part Number: **XXXXXX**x**Y** – xxxxxxxx

where

XXXXXX = the printer model

Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi)

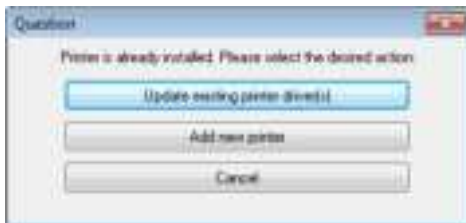
For example, in the part number **ZT411x3** – xxxxxxxx

ZT411 indicates that the printer is a ZT411 model

3 indicates that the printhead resolution is 300 dpi

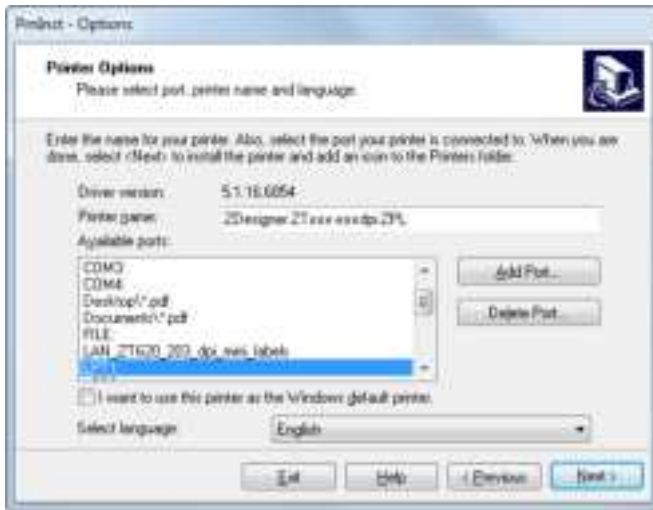
15. Click Next.

You are notified that the printer is already installed.



16. Click Add new printer.

You are prompted for a printer name, the port to which the printer will be connected, and the language for the printer display.



17. Click Add Port.

The wizard prompts you for a name for the port and the IP address of your printer.



NOTE: If you have other applications open, you may be prompted that the driver is locked by another process. You may click Next to continue or Exit to allow you to save your work before continuing with this installation.

18. Give the port a name that you can recognize when it appears in the list of available ports.



19. Enter the printer's IP address. This could be one that was assigned automatically or one that you specified manually in the previous section.

Install the Printer Driver and Connect to a Computer

20. Click OK.

A printer driver is created with the port name that you assigned. The new printer port appears in the list of available ports.



21. Click Next.

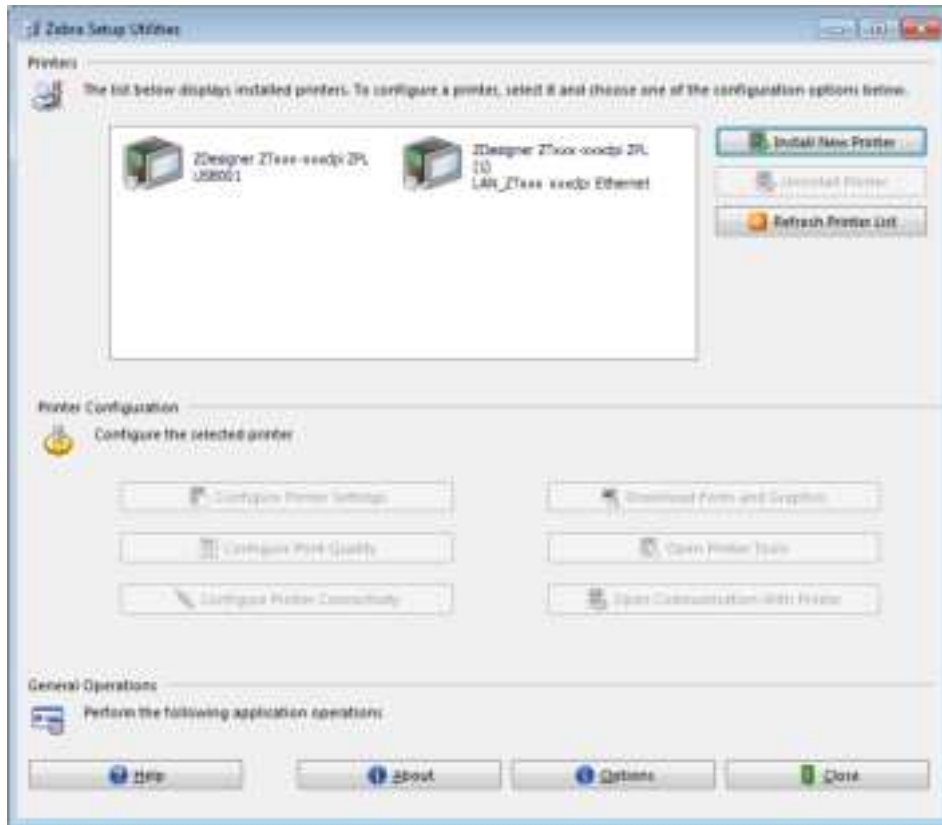
You are prompted to launch other setup wizards.



Install the Printer Driver and Connect to a Computer

22. Check the desired options, and then click Finish.

The printer driver is installed. If you are prompted that other programs might be affected, click the appropriate option to continue.



The installation for wired (Ethernet) connections is complete.

Connect the Printer to Your Wireless Network

If you wish to use the printer's optional wireless print server, you must first connect the printer to your computer using one of the other available connections. While the printer is connected via one of those connections, you configure the printer to communicate with your Wireless Local Area Network (WLAN) through the wireless print server.

For additional information about Zebra print servers, refer to the **ZebraNet Wired and Wireless Print Server User Guide**. To download the latest version of this guide, go to <http://www.zebra.com/zt400-info>.



1. Install Zebra Setup Utilities as instructed in [Install Zebra Setup Utilities on page 138](#).
2. Connect the printer to your computer using a USB, serial, or optional parallel port as instructed in [Connect a Computer to the Printer's USB Port on page 147](#) or [Connect a Computer to the Printer's Serial or Parallel Port on page 150](#).
3. Configure the following printer settings. You can change the values through the Zebra Setup Utilities (click Configure Printer Connectivity on the Zebra Setup Utilities screen) or by the ways listed at the following links. Contact your network administrator for the proper values for your network.
 - [Connection > WLAN > WLAN IP Protocol on page 70](#) (change the value from All to Permanent)
 - [Connection > WLAN > WLAN IP Address on page 70](#) (assign a unique IP address to the printer)
 - [Connection > WLAN > WLAN Subnet on page 70](#) (match the subnet value of your WLAN)
 - [Connection > WLAN > WLAN Gateway on page 71](#) (match the gateway value of your WLAN)
4. After the print server settings have been configured, reset the network to apply the changes. See [Connection > Networks > Reset Network on page 65](#).

Adding a Printer from the Zebra Setup Utilities Screen

5. If necessary, open the Zebra Setup Utilities program.
The Zebra Setup Utilities screen displays.



6. Click Install New Printer.

The printer driver wizard displays.



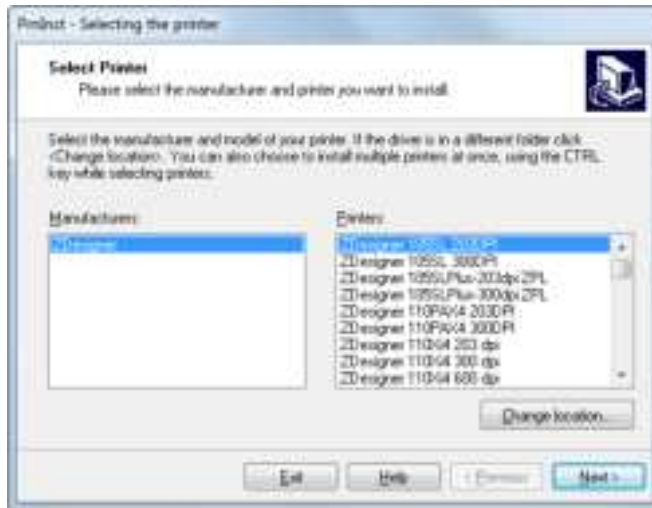
7. Click Next.

You are prompted to select an installation option.



8. Click Install Printer.

You are prompted to select a printer type.



9. Select your printer model and resolution.

The model and resolution are on a part number sticker on the printer, usually located below the media hanger. The information will be in the following format:

Part Number: **XXXXXX**x**Y** – xxxxxxxx

where

XXXXXX = the printer model

Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi)

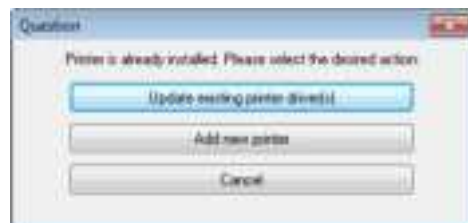
For example, in the part number **ZT411x3** – xxxxxxxx

ZT411 indicates that the printer is a ZT411 model

3 indicates that the printhead resolution is 300 dpi

10. Click Next.

You are notified that the printer is already installed.



11. Click Add new printer.

You are prompted for a printer name, the port to which the printer will be connected, and the language for the printer display.



12. Click Add Port.

The wizard prompts you for a name for the port and the IP address of your printer.



NOTE: If you have other applications open, you may be prompted that the driver is locked by another process. You may click Next to continue or Exit to allow you to save your work before continuing with this installation.

13. Give the port a name that you can recognize when it appears in the list of available ports.

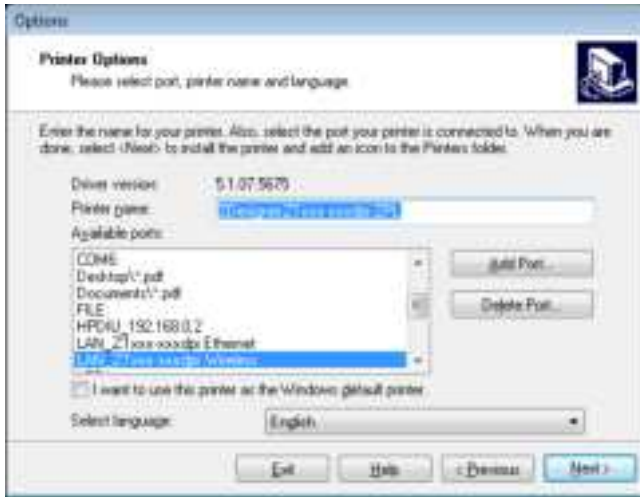


14. Enter the printer's IP address. This could be one that was assigned automatically or one that you specified manually in the previous section.

Install the Printer Driver and Connect to a Computer

15. Click OK.

A printer driver is created with the port name that you assigned. The new printer port appears in the list of available ports.



16. Click Next.

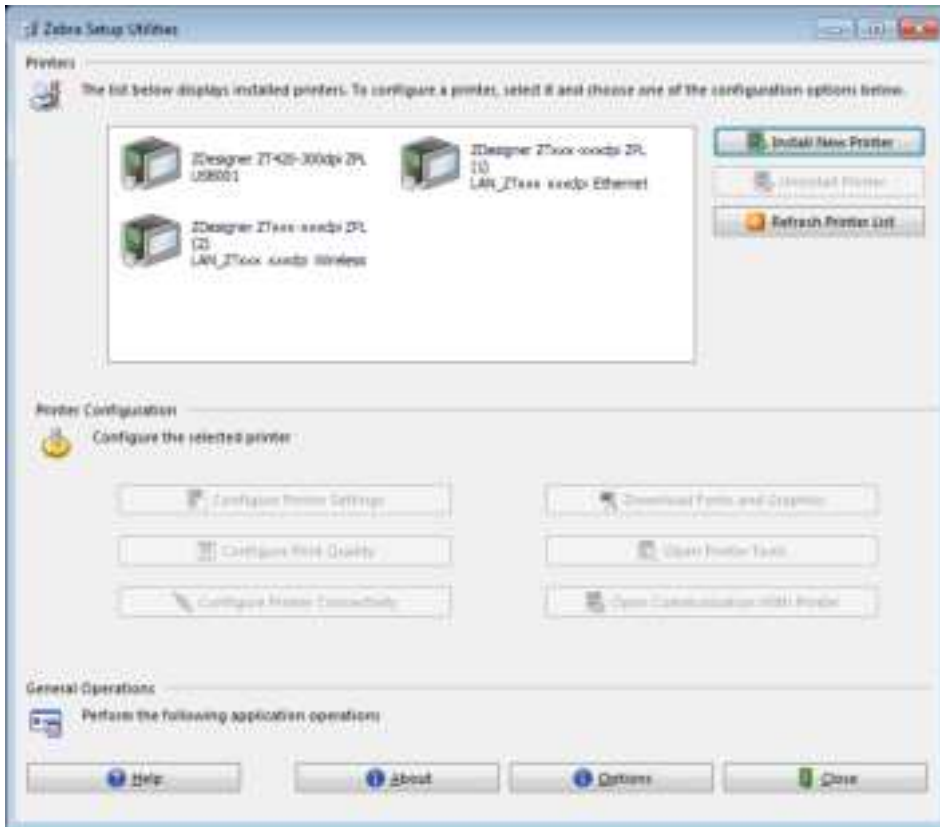
You are prompted to launch other setup wizards.



Install the Printer Driver and Connect to a Computer

17. Check the desired options, and then click Finish.

The printer driver is installed. If you are prompted that other programs might be affected, click the appropriate option to continue.



The installation for wireless communication is complete.

Using a USB Host Port and the Print Touch Feature

This section will teach you how to use a USB host port and how to use the printer's Print Touch feature with an Android™ -based, NFC-enabled device (such as a smart phone or tablet). The information is presented in the form of exercises with some SGD commands listed for advanced users.

Items Required for the Exercises

To perform the exercises in this document, you will need the following:

- a USB Flash drive (sometimes called a “thumb drive” or “memory stick”) that is up to 1 Terabyte (1 TB). The printer will not recognize drives larger than 1 TB.
- a USB keyboard
- the various files attached below
- the free Zebra Utilities app for your smart phone (search for Zebra Tech in the Google Play store)

Files for Completing the Exercises

Most of the actual files that you need to complete the exercises in these section are attached here. Copy these files to your computer before you begin the exercises. Where possible, the contents of the files are shown. The contents of files that contain coded content, which cannot be viewed as text or as an image, are not included.

File 1: ZEBRA.BMP



File 2: SAMPLELABEL.TXT

This simple label format prints the Zebra logo and a line of text at the end of the mirroring exercise.

```
^XA
^FO100,75^XGE:zebra.bmp^FS
^FO100,475^A0N,50,50^FDMirror from USB Completed^FS
^XZ
```

File 3: LOGO.ZPL

File 4: USBSTOREDFILE.ZPL

This label format prints an image and text. This file will be stored on the USB memory device at the root level so that it can be printed.

```

CT~~CD,~CC^~CT~
^XA~TA012~JSN^LT0^LH0,0^JMA^PR4,4~SD15^LRN^CI0^XZ
~DG000.GRF,07680,024,,[image data]
^XA
^LS0
^SL0
^BY3,3,91^FT35,250^BCN,,Y,N^FC%,{,#{^FD%d/%m/%Y^FS
^FT608,325^XG000.GRF,1,1^FS
^FT26,75^A0N,28,28^FH^FDThis label was printed from a format stored^FS
^FT26,125^A0N,28,28^FH^FDOn a USB Flash Memory drive. ^FS
^BY3,3,90^FT33,425^BCN,,Y,N
^FD>:Zebra Technologies^FS
^PQ1,0,1,Y^XZ
^XA^ID000.GRF^FS^XZ
    
```

File 5: VLS_BONKGRF.ZPL

File 6: VLS_EIFFEL.ZPL

File 7: KEYBOARDINPUT.ZPL

This label format, used for the USB keyboard input exercise, does the following:

- creates a barcode with the current date, based on your Real-Time Clock (RTC) setting
- prints the Zebra logo graphic
- prints fixed text
- **^FN** prompts you to enter your name, and the printer prints what you entered

```

^XA
^CI28
^BY2,3,91^FT38,184^BCN,,Y,N^FC%,{,#{^FD%d/%m/%Y^FS
^FO385,75^XGE:zebra.bmp^FS
^FT40,70^A0N,28,28^FH^FDThis label was printed using a keyboard input. ^FS
^FT35,260^A0N,28,28^FH^FDThis label was printed by:^FS
^FT33,319^A0N,28,28^FN1"Enter Name"^FS
^XZ
    
```

File 8: SMARTDEVINPUT.ZPL

This is the same label format as the previous label, only with different text printing. This format is used for the smart device input exercise.

```
^XA
^CI28
^BY2,3,91^FT38,184^BCN,,Y,N^FC%,{,#{^FD%d/%m/%Y^FS
^FO385,75^XGE:zebra.bmp^FS
^FT40,70^A0N,28,28^FH^FDThis label was printed using a smart device input. ^FS
^FT35,260^A0N,28,28^FH^FDThis label was printed by:^FS
^FT33,319^A0N,28,28^FN1"Enter Name"^FS
^XZ
```

File 9: Firmware File

You may want to download a firmware file for your printer and copy it to your computer for use during the exercises. You may omit doing this if you wish.

You can download the latest firmware file from <http://www.zebra.com/firmware>.

USB Host

Your printer may be equipped with one or two USB host ports on the front panel. A USB host port allows you to connect USB devices—such as a keyboard, scanner, or USB Flash drive—to the printer. The exercises in this section will teach you how to perform USB mirror, how to transfer files to and from the printer, and how to provide information for which you are prompted and then print a label using that information.



IMPORTANT: When using a USB host port, files should be named only with 1 to 16 alphanumeric characters (A, a, B, b, C, c, ..., 0, 1, 2, 3, ...). Do not use Asian characters, Cyrillic characters, or accented characters in file names.



NOTE: Some functions may not work properly if there are underscores in a file name. Use periods instead.

Exercise 1: Copy Files to a USB Flash Drive and Perform USB Mirror

1. On your USB Flash Drive, create the following:



- a folder called **Zebra**
 - in that folder, three subfolders:
 - **appl**
 - **commands**
 - **files**
2. In the **/appl** folder, place a copy of the latest firmware for your printer.
 3. In the **/files** folder, place the following file:
 - [File 1: ZEBRA.BMP](#)
 4. In the **/commands** folder, place the following files:
 - [File 2: SAMPLELABEL.TXT](#)
 - [File 3: LOGO.ZPL](#)
 5. Insert the USB Flash drive into a USB host port on the front of your printer.
 6. Observe the control panel and wait.

The following should happen:

- a. If the firmware on the USB Flash drive is different than what is on the printer, the firmware downloads to the printer. The printer then restarts and prints a printer configuration label. (If there is no firmware on the USB Flash drive or if the firmware version is the same, the printer skips this action.)
- b. The printer downloads the files in the **/files** folder and briefly shows the names of the files that are downloading on the display.
- c. The printer executes any files in the **/commands** folder.

- d. The printer restarts and then displays the message **MIRROR PROCESSING FINISHED**.
7. Remove the USB Flash drive from the printer.

Advanced User Information

See the **Zebra® Programming Guide** for more information about these commands.

Enable/disable mirroring:

```
! U1 setvar "usb.mirror.enable" "value"
```

Values: "on" or "off"

Enable/disable automatic mirroring that occurs when a USB Flash drive is inserted into the USB host port:

```
! U1 setvar "usb.mirror.auto" "value"
```

Values: "on" or "off"

Specify the number of times that the mirror operation will be repeated if it fails:

```
! U1 setvar "usb.mirror.error_retry" "value"
```

Values: 0 to 65535

Change the path to the location on the USB device from which mirror files are retrieved:

```
! U1 setvar "usb.mirror.appl_path" "new_path"
```

Default: "zebra/appl"

Change the path to the location on the printer from which mirror files are retrieved:

```
! U1 setvar "usb.mirror.path" "path"
```

Default: "zebra"

Enable/disable the ability to use the USB port:

```
! U1 setvar "usb.host.lock_out" "value"
```

Values: "on" or "off"

Exercise 2: Print a Label Format from a USB Flash Drive

The Print USB File option allows you to print files from a USB mass storage device, such as a USB Flash drive. Only printable files (.ZPL and .XML) may be printed from the USB mass storage device, and the files must be located at the root level, not in a directory.

1. Copy the following files to your USB Flash drive:
 - [File 4: USBSTOREDFILE.ZPL](#)
 - [File 5: VLS_BONKGRF.ZPL](#)
 - [File 6: VLS_EIFFEL.ZPL](#)
2. Insert the USB Flash drive into a USB host port on the front of your printer.
3. Tap **Menu > Storage > USB > Print: From USB**.



The printer loads any executable files and processes them. The available files are listed. **SELECT ALL** is available to print all files on the USB Flash drive.

4. Select **USBSTOREDFILE.zpl**.
5. Touch the check mark to copy the files.

The label prints.

Exercise 3: Copy Files to/from a USB Flash Drive

The Copy USB File option allows you to copy files from a USB mass storage device to the printer's Flash memory E: drive.

1. Copy the following files to the root directory of your USB Flash drive. Do not put these files into a subfolder.
 - [File 7: KEYBOARDINPUT.ZPL](#)
 - [File 8: SMARTDEVINPUT.ZPL](#)
2. Insert the USB Flash drive into a USB host port on the front of your printer.
3. Tap **Menu > Storage > USB > Copy: Files to Printer**.



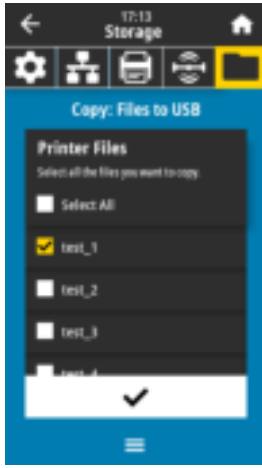
The printer loads any executable files and processes them. The available files are listed. **Select All** is available to copy all of the available files from the USB Flash drive.

4. Select the file **STOREFMT.ZPL**.
5. Select the file **STOREFMTM1.ZPL**.
6. Touch the check mark to copy the files.

The printer stores the files in E: memory.

7. Remove the USB Flash drive from the USB host port.

You can now copy these files from the printer to a USB Flash drive by tapping **Menu > Storage > USB > Copy: Files to USB**.



The option **SELECT ALL** is available to store all of the available files from the printer to the USB Flash drive. Any .ZPL file that is copied will be post-processed such that the contents of the file will be suitable to be sent to a printer for normal execution.

Exercise 4: Enter Data for a Stored File with a USB Keyboard and Print a Label

The Print Station feature allows you to use a USB Human Interface Device (HID), such as a keyboard or a barcode scanner, to enter ^FN field data into a *.ZPL template file.

1. After performing the previous exercise, plug a USB keyboard into a USB host port.
2. Tap **Menu > Print > Print Station**.



The printer loads any executable files and processes them. The available files are listed.

3. Select the file **KEYBOARDINPUT.ZPL**.

The printer accesses the file and prompts you for the information in the ^FN fields in the file. In this case, it prompts you for your name.

4. Type your name on the keyboard, and then press **<ENTER>**.

The printer prompts for the number of labels to print.

5. Specify the desired quantity of labels, and then press **<ENTER>** again.

The specified number of labels is printed, with your name in the appropriate fields.

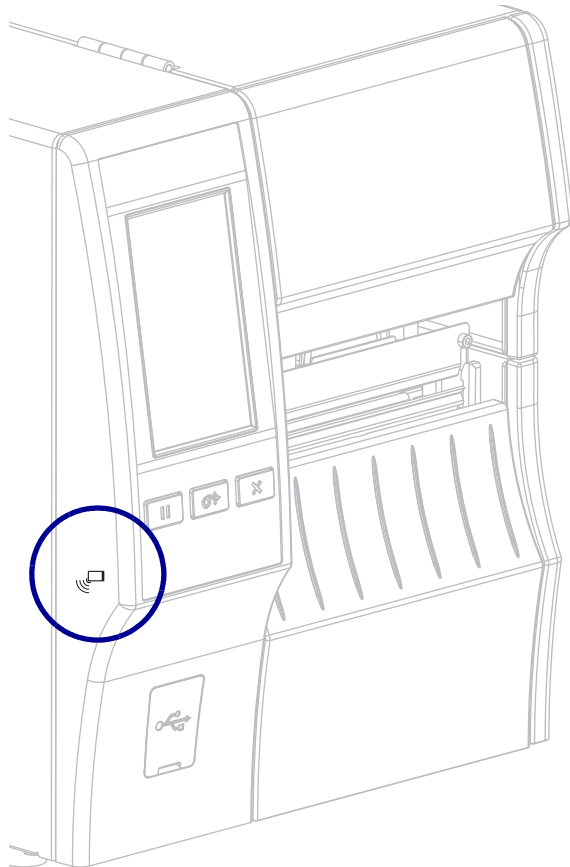
Print Touch/Near Field Communication (NFC)

The Zebra Print Touch feature allows you to touch an Android™ -based, NFC-enabled device (such as a smart phone or tablet) to the printer's NFC logo (Figure 15) to pair the device to the printer. This capability allows you to use your device to provide information for which you are prompted and then print a label using that information.



IMPORTANT: Some devices may not support NFC communication with the printer until you alter their settings. If you encounter difficulties, consult your service provider or your smart device manufacturer for more information.

Figure 15 NFC Logo Location



Exercise 5: Enter Data for a Stored File with a Smart Device and Print a Label

The steps in this exercise may vary somewhat based on your smart device, on your service provider, or on whether you already have the free Zebra Utilities app installed on your smart device.

Refer to the **Zebra Bluetooth User Guide** for specific instructions for configuring your printer to use a Bluetooth interface. A copy of this manual is available at <http://www.zebra.com/manuals>.

1. If you do not have the Zebra Utilities app installed on your device, go to the app store for your device, search for the Zebra Utilities app, and install it.
2. Pair your smart device with the printer by holding the smart device next to the NFC icon on the printer.
 - a. If necessary, access the Bluetooth information about your printer using your smart device. For instructions, refer to the manufacturer's documentation for your device.
 - b. If necessary, select the Zebra printer's serial number to pair it with the device.
 - c. After your smart device has been detected by the printer, the printer may prompt you to accept or reject the pairing. If necessary, tap **ACCEPT**. Some smart devices will pair with the printer without this prompt.



The printer and your device are paired.

3. Start the Zebra Utilities app on your device.

The Zebra Utilities main menu displays.



4. Perform these steps if you have an Apple device:
 - a. Tap the **Settings** icon in the lower-right corner.
 - b. Change the setting for **Get Labels From Printer** to **ON**.
 - c. Tap **Done**.
5. Tap **Files**.



The smart device gets data from the printer and displays it.



NOTE: This retrieval process may take a minute or more to complete.

6. Scroll through the formats shown and select **E : SMARTDEVINPUT . ZPL**.

Based on the ^FN field in the label format, the smart device prompts you for your name.

7. Enter your name at the prompt.
8. Change the quantity of labels to print, if desired.
9. Tap **PRINT** to print the label.

Specifications

This section lists general printer specifications, printing specifications, ribbon specifications, and media specifications.



NOTE: Some configurations of this printer do not include the features that are marked with this symbol (‡) in this chapter. The part number sticker inside the media compartment, usually located below the media hanger, indicates if your printer includes these features. The information will be in the following format:

Part Number: ZTxxxxx – **Xxxxxxxx**

If the last part (**Xxxxxxxx**) begins with the letter **P**, your printer DOES NOT include these features.

General Specifications

		ZT411	ZT421
Height		12.8 in.(325 mm)	12.8 in. (325 mm)
Width		10.7 in. (272 mm)	13.2 in. (335 mm)
Depth		19.7 in. (500 mm)	19.7 in. (500 mm)
Weight		36 lb (16 kg)	40 lb (18 kg)
Temperature	Operating	Thermal Transfer: 40° to 105°F (5° to 40°C) Direct Thermal: 32° to 105°F (0° to 40°C)	
	Storage	-40° to 140°F (-40° to 60°C)	
Relative Humidity	Operating	20% to 85%, non-condensing	
	Storage	5% to 85%, non-condensing	
Memory		1 Gigabyte DRAM (32 MB user available) 2 Gigabyte Flash (512 MB user available on-board Flash)	

Power Specifications

The following are typical values. Actual values vary from unit to unit and are affected by such things as the options installed and the printer settings.

	ZT411	ZT421
Electrical	100–240 VAC, 50-60 Hz	
Power consumption	120 VAC, 60 Hz	
Inrush Current	< 35A peak 8A RMS (half cycle)	< 40A peak 8A RMS (half cycle)
Energy Star Off Power (W)	0.08	0.08
Energy Star Sleep Power (W)	4.14	4.14
Print Power* (W)	98	215
Print Power* (VA)	108	261
Power consumption	230 VAC, 50 Hz	
Inrush Current	< 80A peak 12A RMS (half cycle)	< 90A peak 15A RMS (half cycle)
Energy Star Off Power (W)	0.18	0.18
Energy Star Sleep Power (W)	4.26	4.26
Print Power* (W)	97	209
Print Power* (VA)	127	261

* Printing Pause self test labels at 6 ips with 4x6-in. or 6.5x4 in. labels, darkness 10, and direct thermal media.

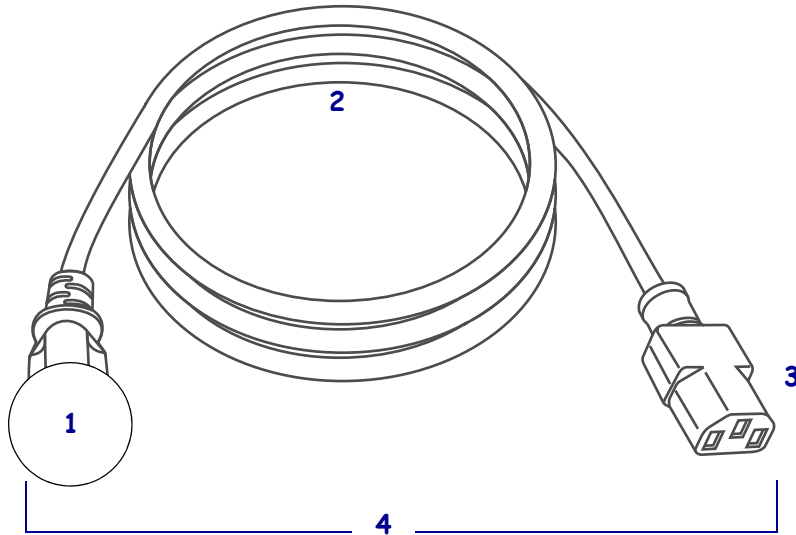
Power Cord Specifications

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 16](#) for specifications.



CAUTION—PRODUCT DAMAGE: 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.

Figure 16 Power Cord Specifications



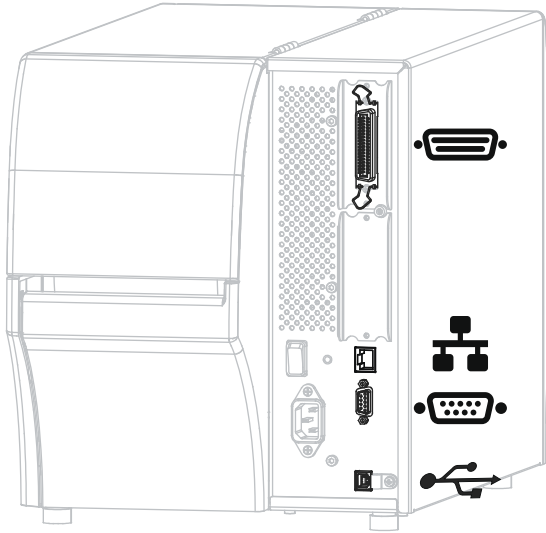
1	AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 17). The chassis ground (earth) must be connected to ensure safety and reduce electromagnetic interference.
2	3-conductor HAR cable or other cable approved for your country.
3	IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 17).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp, 250 VAC.





Figure 17 International Safety Organization Certification Symbols



Communication Interface Specifications

Figure 18 Location of Communication Interfaces



	Parallel port
	Internal wired Ethernet print server
	Serial port
	USB port



NOTE: You must supply all data cables for your application. The use of cable strain relief clamps is recommended.

Ethernet cables do not require shielding, but all other data cables must be fully shielded and fitted with metal or metalized 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.

Standard Connections

‡ Bluetooth® Version 4.1

Limitations and Requirements Many mobile devices can communicate with the printer within a 30-foot radius of the printer.

Connections and Configuration Refer to the *Zebra Bluetooth User Guide* for specific instructions for configuring your printer to use a Bluetooth interface. A copy of this manual is available at <http://www.zebra.com/manuals>.

‡ Two USB Host Ports

Limitations and Requirements You can only plug one device into each of the printer's two USB host ports. You cannot use a third device by plugging it into a USB port on one of the devices, nor can you use an adapter to split a USB host port on the printer to accept more than one device at a time.

Connections and Configuration No additional configuration is necessary.

‡ Zebra PrintTouch/Near Field Communication (NFC)

Limitations and Requirements NFC communication must be initiated by touching your device to the appropriate location on the printer.

Connections and Configuration Some devices may not support NFC communication with the printer until you alter their settings.

USB 2.0 Data Interface

Limitations and Requirements a. Maximum cable length of 16.4 ft (5 m).

Connections and Configuration No additional configuration is necessary.

Wired 10/100 Internal Ethernet Print Server

Limitations and Requirements

- The printer must be configured to use your LAN.
- A second wired print server can be installed in the bottom option slot.

Connections and Configuration Refer to the *ZebraNet Wired and Wireless Print Servers User Guide* for configuration instructions. A copy of this manual is available at <http://www.zebra.com/manuals>.

RS-232/C Serial Data Interface

- 2400 to 115000 baud
- parity, bits/character
- 7 or 8 data bit
- XON-XOFF, RTS/CTS, or DTR/DSR handshake protocol required
- 750mA at 5 V from pins 1 and 9

Limitations and Requirements a. You must use a null-modem cable to connect to the printer or a null-modem adapter if using a standard modem cable.

- Maximum cable length of 50 ft (15.24 m).
- You may need to change printer parameters to match the host computer.

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.

Optional Connections

Wireless print server

See [Wireless Specifications on page 190](#) for more details.

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.
- The printer must be configured to use your WLAN.
- Can be installed only in the top option slot.

Configuration Refer to the *ZebraNet Wired and Wireless Print Servers User Guide* for configuration instructions. A copy of this manual is available at <http://www.zebra.com/manuals>.

IEEE 1284 Bidirectional Parallel data interface

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.
- Can be installed in either the top or bottom option slot.
- An IEEE 1284 cable is required.

Connections and Configuration No additional configuration is necessary.

Applicator interface

with DB15F connector

External ZebraNet 10/100 Print Server

Requires the parallel data interface option

Wireless Specifications

Antenna Information

- Type = chip antenna gain 1.69dBi
- Type = Omni directional antenna gain 3dBi @ 2.4GHz; 5dBi @ 5GHz
- Type = PCBA antenna gain = -30dBi @ 900MHz

WLAN Specifications

802.11 b

- 2.4 GHz
- DSSS (DBPSK, DQPSK, and CCK)
- RF power 17.77 dBm (EIRP)

802.11 g

- 2.4 GHz
- OFDM
(16-QAM and 64-QAM with BPSK, and QPSK)
- RF power 18.61 dBm (EIRP)

802.11 n

- 2.4 GHz
- OFDM
(16-QAM and 64-QAM with BPSK, and QPSK)
- RF power 18.62 dBm (EIRP)

802.11 a/n

- 5.15-5.25 GHz, 5.25-5.35 GHz, 5.47-5.725 GHz
- OFDM (16-QAM and 64-QAM with BPSK and QPSK)
- RF power 17.89 dBm (EIRP)

802.11 ac

- 5.15-5.25 GHz, 5.25-5.35 GHz, 5.47-5.725 GHz
- OFDM (16-QAM and 64-QAM with BPSK and QPSK)
- RF power 13.39 dBm (EIRP)

Bluetooth 4.1 + Low Energy (LE)

- 2.4 GHz
- FHSS (BDR/EDR), GFSK (Bluetooth Low Energy)
- RF power 9.22 dBm (EIRP)

Bluetooth Classic + Low Energy (LE)

- 2.4 GHz
- FHSS (BDR/EDR), DSSS (Bluetooth LE)
- RF power 9.22 dBm (EIRP)
- FHSS (BDR/EDR), DSSS (Bluetooth LE)
- RF power 9.22 dBm (EIRP)

RFID M6e Radio Module

- 865-928 MHz
- FHSS
- RF power 27.893 dBm

Printing Specifications

		ZT411	ZT421
Print resolution		203 dpi (dots/in.)/8 dots/mm	203 dpi (dots/in.)/8 dots/mm
		300 dpi/12 dots/mm	300 dpi/12 dots/mm
		600 dpi/24 dots/mm	N/A
Maximum print width	203 dpi	4.09 in. (104 mm)	6.6 in. (168 mm)
	300 dpi	4.09 in. (104 mm)	6.6 in. (168 mm)
	600 dpi	4.09 in. (104 mm)	N/A
Programmable constant print speeds	203 dpi	2.4 in. to 14 in. (61 mm to 356 mm) per second in 1-in. (25.4 mm) increments	2.4 in. to 12 in. (61 mm to 305 mm) per second in 1-in. (25.4 mm) increments
	300 dpi	2.4 in. to 10 in. (61 mm to 254 mm) per second in 1-in. (25.4 mm) increments	2.4 in. to 10 in. (61 mm to 203 mm) per second in 1-in. (25.4 mm) increments
	600 dpi	1.5 in. to 4 in. (38 mm to 102 mm) per second in 1-in. (25.4 mm) increments	N/A
Dot size (nominal) (width x length)	203 dpi	0.0049 in. x 0.0049 in. (0.125 mm x 0.125 mm)	0.0049 in. x 0.0049 in. (0.125 mm x 0.125 mm)
	300 dpi	0.0033 in. x 0.0039 in. (0.084 mm x 0.099 mm)	0.0033 in. x 0.0039 in. (0.084 mm x 0.099 mm)
	600 dpi	0.0016 in. x 0.0016 in. (0.042 mm x 0.042 mm)	N/A
First dot location (measured from the inside edge of the media)	203 dpi	0.14 in. ±0.05 in. (3.5 mm ±1.25 mm)	0.10 in. ±0.035 in. (2.5 mm ±0.9mm)
	300 dpi	0.08 in. ±0.05 in. (2.1 mm ±1.25 mm)	0.10 in. ±0.035 in. (2.5 mm ±0.9mm)
	600 dpi	0.08 in. ±0.05 in. (2.1 mm ±1.25 mm)	N/A
Barcode modulus (X) dimension			
Picket fence (nonrotated) orientation	203 dpi	4.9 mil to 49 mil	5 mil to 50 mil
	300 dpi	3.3 mil to 33 mil	3.3 mil to 33 mil
	600 dpi	1.6 mil to 16 mil	N/A
Ladder (rotated) orientation	203 dpi	4.9 mil to 49 mil	5 mil to 50 mil
	300 dpi	3.9 mil to 39 mil	3.9 mil to 39 mil
	600 dpi	1.6 mil to 16 mil	N/A
Vertical registration	all print speeds and dpi	±1.0 mm	±1.0 mm

Media Specifications

			ZT411	ZT421
Label length	Minimum	Non-RFID		
		Tear-off	0.5 in. (12.7 mm)	0.5 in. (12.7 mm)
		Peel-off	0.5 in. (12.7 mm)	0.5 in. (12.7 mm)
		Rewind	0.5 in. (12.7 mm)	0.5 in. (12.7 mm)
		Cutter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
		RFID	Varies for each transponder type	
	Maximum	200 or 300 dpi	39 in. (991 mm)	39 in. (991 mm)
		600 dpi	20 in. (508 mm)	N/A
Maximum continuous media print length		200 dpi	157 in. (3988 mm)	102 in. (2590 mm)
		300 dpi	73 in. (1854 mm)	45 in. (1143 mm)
		600 dpi	39 in. (991 mm)	N/A
Label width	Minimum	Non-RFID	1.0 in. (25.4 mm)	2 in. (51 mm)
		RFID	Varies for each transponder type	
	Maximum	Tear/Cutter	4.5 in. (114 mm)	7.0 in. (178 mm)
		Peel/Rewind	4.25 in. (108 mm)	6.75 in. (171 mm)
Total thickness (includes liner, if any)		Minimum	0.0023 in. (0.058 mm)	0.0023 in. (0.058 mm)
		Maximum	0.010 in. (0.25 mm)	
Maximum roll outside diameter			8 in. (203 mm) on a 3-in. (76-mm) inside diameter core	
Inter-label gap		Minimum	0.079 in. (2 mm)	
		Preferred	0.118 in. (3 mm)	
		Maximum	0.157 in. (4 mm)	
Ticket/tag notch size (width x length)			0.25 in. x 0.12 in. (6 mm x 3 mm)	
Hole diameter			0.125 in. (3.18 mm)	
Notch or hole position (centered from inner media edge)		Minimum	0.15 in. (3.8 mm)	
		Maximum	2.25 in. (57 mm)	3.5 in. (90 mm)
Density, in Optical Density Units (ODU) (black mark)			> 1.0 ODU	
Maximum media density			≤ 0.5 ODU	
Transmissive media sensor (fixed position)			7/16 in. (11 mm) from inside edge	

Ribbon Specifications

Standard printers use ribbon that is coated on the outside. An optional ribbon spindle is available to use ribbon that is coated on the inside. Contact your authorized Zebra reseller for ordering information.

	ZT411	ZT421
Ribbon width MINIMUM*	2 in.** (51 mm**)	2 in.** (51 mm**)
Ribbon width MAXIMUM	4.33 in. (110 mm)	6.85 in. (174 mm)
Ribbon length MAXIMUM	1476 ft (450 m)	
Ribbon core inside diameter	1 in. (25 mm)	
Ribbon roll outside diameter MAXIMUM	3.2 in. (81.3 mm)	

* Zebra recommends using ribbon that is at least as wide as the media to protect the printhead from wear.

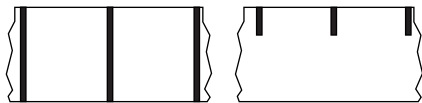
** Depending on your application, you may be able to use ribbon narrower than 2 in. (51 mm), as long as the ribbon is wider than the media being used. To use a narrower ribbon, test the ribbon's performance with your media to assure that you get the desired results.

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.

barcode 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.



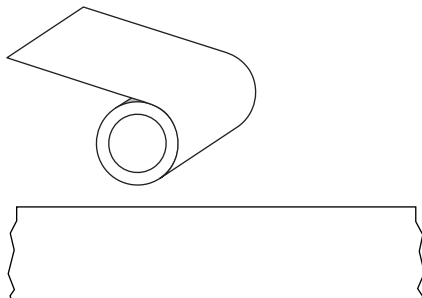
black mark media Media with registration marks found on the underside of the print media that act as start-of-label indications for the printer. The reflective media sensor is typically the best choice for use with black mark media.

Contrast this with [continuous media](#) or [gap/notch 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.

collection method Select a media collection method that is compatible with your printer options. Selections include tear-off, peel-off, cutter, and rewind. The basic media and ribbon loading instructions are the same for all collection methods with some additional steps necessary for using any media collection options.

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



continuous media Label or tag-stock media that does not have gaps, holes, notches, or black marks to indicate label separations. The media is one long piece of material wound into a roll. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels or receipts.

Contrast this with [black mark media](#) or [gap/notch media](#).

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

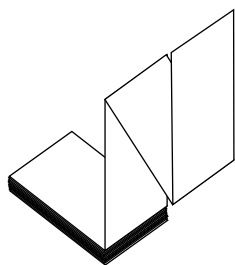
diagnostics Information about which printer functions are not working that is used for troubleshooting printer problems.

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

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

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

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



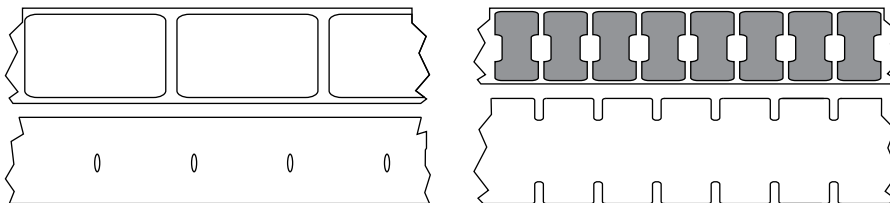
fanfold media Non-continuous media that comes folded in a rectangular stack. Fanfold media is either gap/notch or black mark media. Contrast this with [roll media](#).

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

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

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

gap/notch media Media that contains a separation, notch, or hole, indicating where one label/printed format ends and the next one begins.



Contrast this with [black mark media](#) or [continuous media](#).

ips (inches-per-second) The speed at which the label or tag is printed. Many Zebra printers can print from 1 ips to 14 ips.

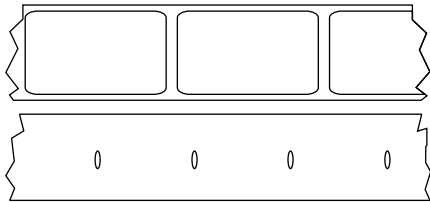
label An adhesive-backed piece of paper, plastic, or other material on which information is printed. A non-continuous label has a defined length, as opposed to a continuous label or a receipt, which can have a varying length.

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

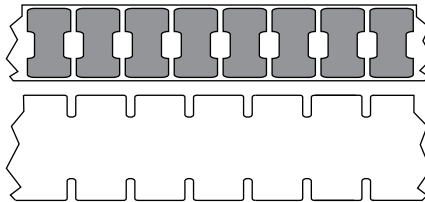
label type The printer recognizes the following label types.



Continuous



Gap/Notch



Mark

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

linerless media Linerless media does not use backing to keep the layers of labels on a roll from sticking to one another. It is wound like a roll of tape, with the sticky side of one layer in contact with the non-sticky surface of the one below it. Individual labels may be separated by perforations, or they can be cut apart. Because there is no liner, more labels can potentially fit on a roll, cutting down the need to change media as often. Linerless media is considered an environmentally friendly option because no backing is wasted, and the cost per label can be considerably less than that of standard labels.

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.

mark media See [black mark media](#).

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.

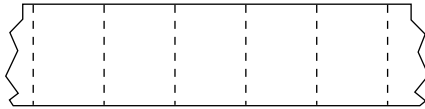
media supply hanger The stationary arm that supports the media roll.

non-continuous media Media that contains an indication of where one label/printed format ends and the next one begins. Gap/notch media and black mark media are types of non-continuous media. Contrast this with [continuous media](#).

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

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

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.



perforated media Media with 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.

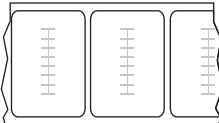
print type The print type specifies whether the type of media being used requires ribbon to print. Thermal Transfer media requires ribbon while Direct Thermal media does not.

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.

receipt A receipt is a variable length printout. One example of a receipt is in retail stores, where each purchased item occupies a separate line on the printout. Therefore, the more items purchased, the longer the receipt.

registration Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.



Radio frequency identification (RFID) “smart” media

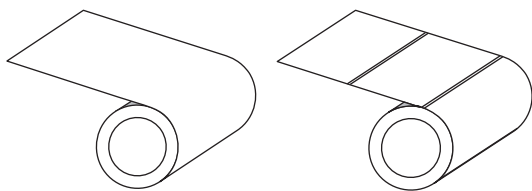
Each RFID label has an RFID transponder (sometimes called an “inlay”), made of a chip and an antenna, embedded between the label and the liner. The shape of the transponder varies by manufacturer and is visible through the label. All “smart” labels have memory that can be read, and many have memory that can be encoded.

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.

ribbon Ribbon is a thin film that is coated on one side with wax, resin, or wax resin (usually called “ink”), which is transferred to the media during the thermal transfer process. Ink is transferred onto the media when heated by the small elements within the printhead.

Ribbon is only used with the thermal transfer print method. Direct thermal media does not use ribbon. 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. Zebra ribbons have a coating on the back that protects the printhead from wear.

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



roll media Media that comes supplied rolled onto a core (usually cardboard). It can be continuous (no separations between labels) or non-continuous (some type of separation between labels).

Contrast this with [fanfold media](#).

supplies A general term for media and ribbon.

symbology The term generally used when referring to a barcode.

tag stock A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material and are typically perforated between tags. Tag stock can come on rolls or in a fanfold stack. See [gap/notch media](#).

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](#).

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

