ZT410™ RFID Printer

Silverline™ Media Printing Solution

User Guide

P1089083-001 Rev. A

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Part Number: P1089083-001 Rev. A

Declaration of Conformity

We have determined that the Zebra printers identified as the

ZT410™

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.

Note • 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.

Contents

Notes •

About This Document

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

Contents

Who Should Use This Document

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

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
Introduction on page 11	This section provides a high-level overview of the printer and its components.
Printer Setup and Operation on page 21	This section assists the technician with initial setup and operation of the printer.
Printer Configuration and Adjustment on page 75	This section assists you with configuration of and adjustments to the printer.
Routine Maintenance on page 133	This section provides routine cleaning and maintenance procedures.
Troubleshooting on page 139	This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.
Using the USB Host Port and NFC Capabilities on page 167	This section will help you to learn how to use the USB host port on your Zebra printer and how to use the printer's Near Field Communication (NFC) capability. The information is presented in the form of exercises with some SGD commands listed for advanced users.
Specifications on page 181	This section lists the general specifications for this printer and the ribbon and media that can be used with it.
Glossary on page 189	The glossary provides a list of common terms.

1

Introduction

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

Contents

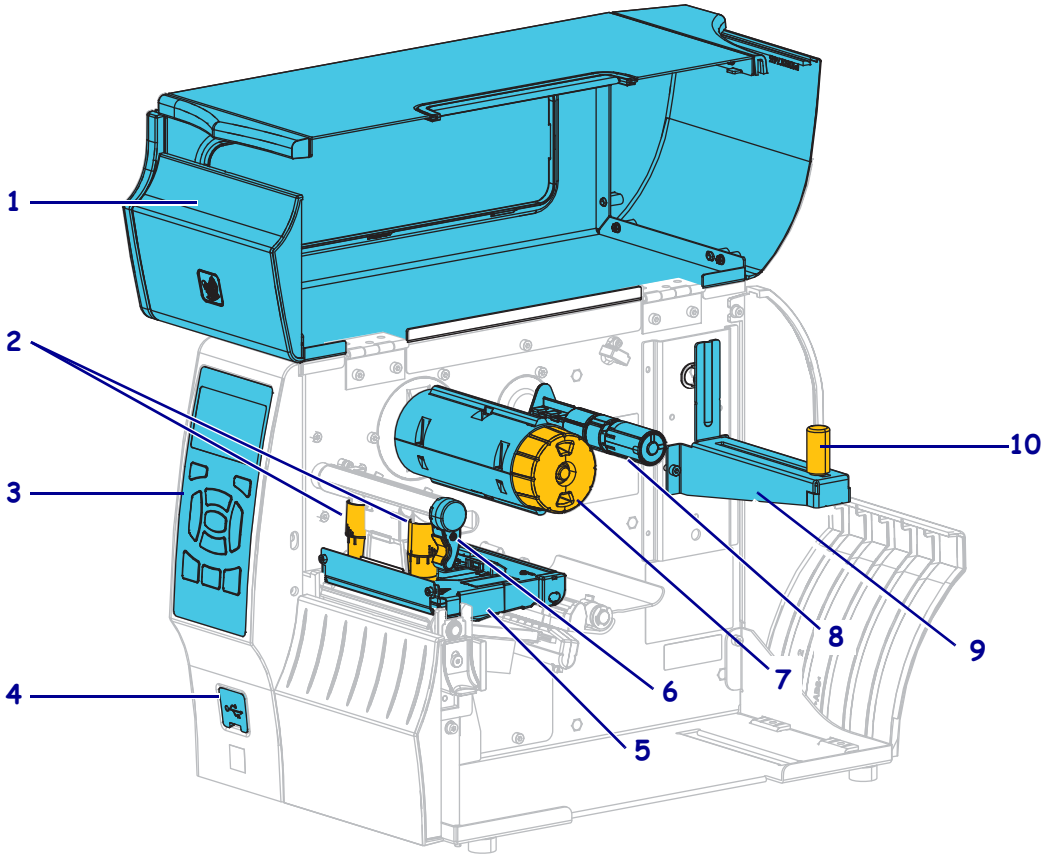
Printer Components

Note • The components inside your printer are color-coded.

- The touch points that you will need to handle are colored **gold** inside the printers and are highlighted in **gold** in the illustrations in this manual.
- The components associated with the ribbon system are made of **black** plastic, while the components associated with media are made of **gray** plastic. Those components and others are highlighted in **light blue** in the illustrations in this manual as needed.

Figure 1 shows the components inside the media compartment of a standard printer. Depending on the printer model and the installed options, your printer may look slightly different. The components that are labeled are mentioned in procedures throughout this manual.

Figure 1 • Printer Components



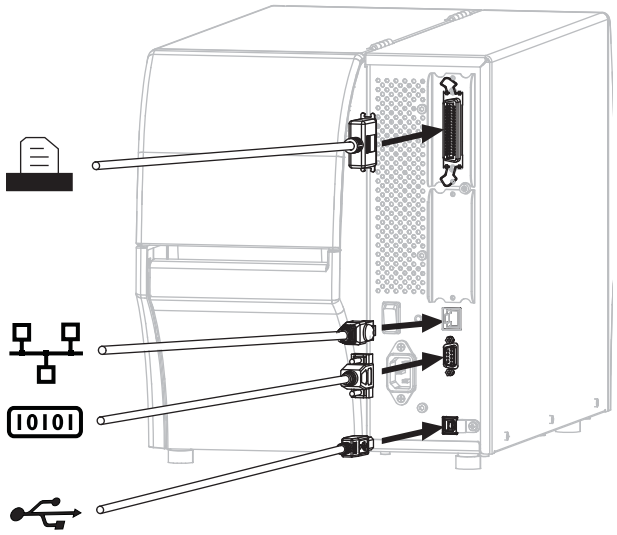
1	Media door	6	Printhead-open lever
2	Printhead pressure adjustment toggles	7	Ribbon take-up spindle
3	Control panel	8	Ribbon supply spindle
4	USB host port	9	Media supply hanger
5	Printhead assembly	10	Media supply guide

Communication Interfaces

The communication interface connectors are shown in Figure 2. A ZebraNet wireless print server option may also be present on your printer. You may send label formats to the printer through any communication interface that is available on your printer.

- For detailed information about the types of connections available, see *Communication Interface Specifications* on page 184.
- For instructions on when and how to connect your computer to one ore more of these communication interfaces, see *Install the Printer Driver and Connect the Printer to the Computer* on page 24.

Figure 2 • Location of Communication Interfaces



	Internal wired Ethernet print server
10101	Serial port
	USB port
	Parallel port (optional)

Data Cables

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.

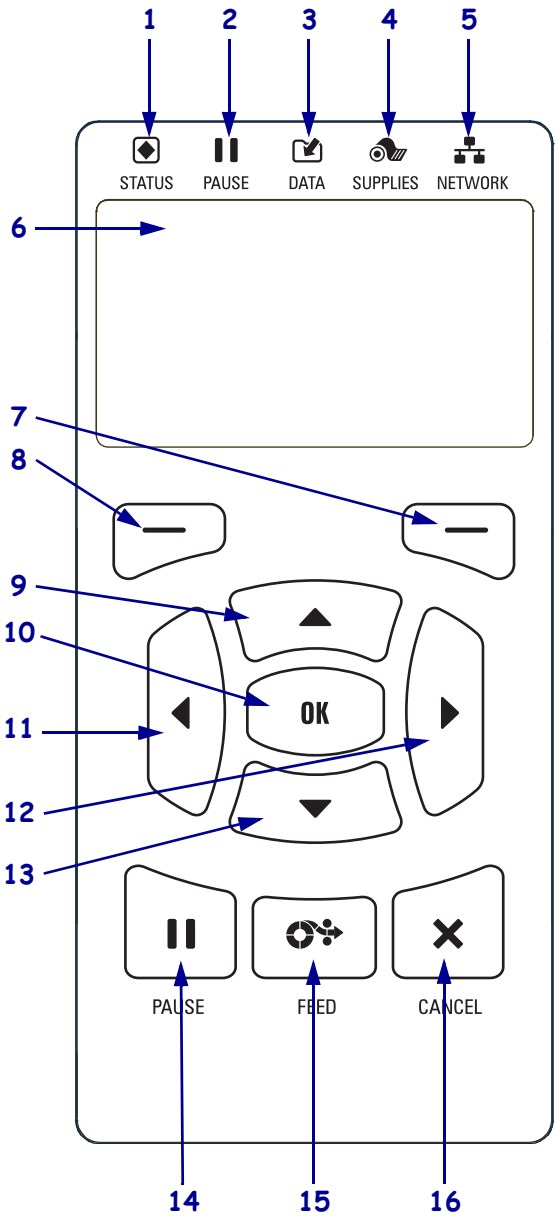
To minimize electrical noise pickup in the cable:

- 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.

Control Panel

The control panel indicates the printer's current status and allows the user to control basic printer operation.

Figure 3 • Control Panel



1	**STATUS light**	These **indicator lights** show the current status of the printer. For more information, see Table 14 on page 140.
2	**PAUSE light**	
3	**DATA light**	
4	**SUPPLIES light**	
5	**NETWORK light**	
6	The **display** shows the printer's current status and allows the user to navigate the menu system.	
7	**RIGHT SELECT button**	These buttons execute the commands shown directly above them in the display.
8	**LEFT SELECT button**	
9	The **UP ARROW button** changes the parameter values. Common uses are to increase a value or to scroll through choices.	
10	The **OK button** selects or confirms what is shown on the display.	
11	The **LEFT ARROW button**, which is active only in the menu system, navigates to the left.	
12	The **RIGHT ARROW button**, which is active only in the menu system, navigates to the right.	
13	The **DOWN ARROW button** changes the parameter values. Common uses are to decrease a value or to scroll through choices.	
14	The **PAUSE button** starts or stops printer operation when pressed.	
15	The **FEED button** forces the printer to feed one blank label each time the button is pressed.	
16	The **CANCEL button** cancels label formats when the printer is paused. • Press once to cancel the next label format. • Press and hold for 2 seconds to cancel all label formats.	

Navigating through Screens in the Display

Table 1 shows the following:

- the options available for navigating through the screens in the control panel display
- how to select or modify things shown on the display

Table 1 • Navigation

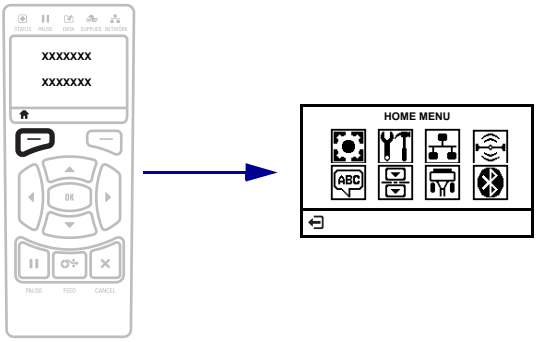
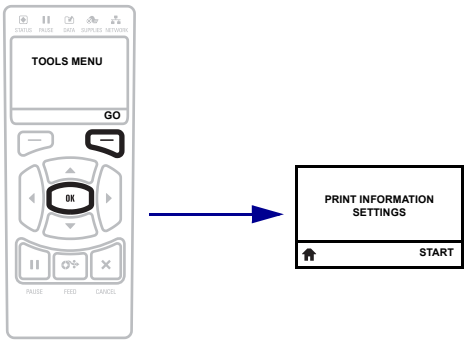
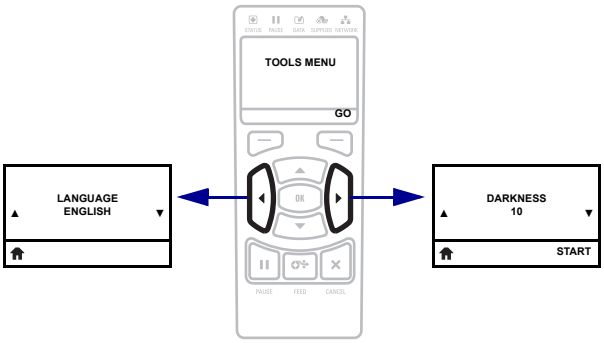
Idle Display		
		
At the Idle Display (Figure 4 on page 18), press LEFT SELECT to go to the printer's Home menu (Figure 5 on page 18).		
Home Menu		
		
To move from icon to icon in the Home menu, press any of the ARROW buttons. When an icon is selected, its colors are reversed to highlight it.  SETTINGS menu icon  SETTINGS menu icon highlighted	To select the highlighted menu icon and enter the menu, press OK.	Press LEFT SELECT to exit the Home menu and return to the Idle Display. The printer automatically returns to the Idle Display after 15 seconds of inactivity in the Home menu.

Table 1 • Navigation (Continued)

User Menus	
	
Press LEFT SELECT to return to the Home menu. The printer automatically returns to the Home menu after 15 seconds of inactivity in a user menu.	▲ and ▼ indicate that a value can be changed. Any changes that you make are saved immediately. Press the UP ARROW or DOWN ARROW to scroll through accepted values.
	
To scroll through the items in a user menu, press the LEFT ARROW or RIGHT ARROW.	A word in the bottom-right corner of the display indicates an available action. Press OK or press RIGHT SELECT to perform the action shown.
Menu Shortcuts	
	
To go to the next user menu from a menu shortcut, press OK or press RIGHT SELECT to select GO.	To continue to navigate in the same user menu, press the LEFT ARROW or RIGHT ARROW.

Idle Display, Home Menu, and User Menus

The printer's control panel includes a display, where you can view the printer's status or change its operating parameters. In this section, you will learn how to navigate through the printer's menu system and change values for menu items.

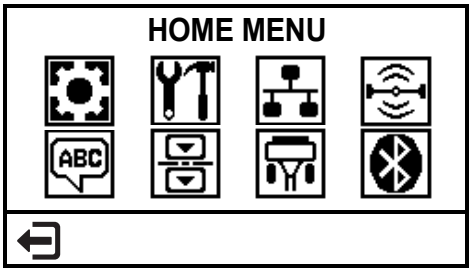
Idle Display After the printer completes the power-up sequence, it moves to the Idle Display (Figure 4). The printer cycles through its IP address and information configured by the user.

Figure 4 • Idle Display

1	The printer's current status
2	Information that is set through *IDLE DISPLAY* on page 86
	Home menu shortcut

Home Menu Use the Home menu (Figure 5) to access the printer's operating parameters through the eight user menus (Figure 6 on page 19).

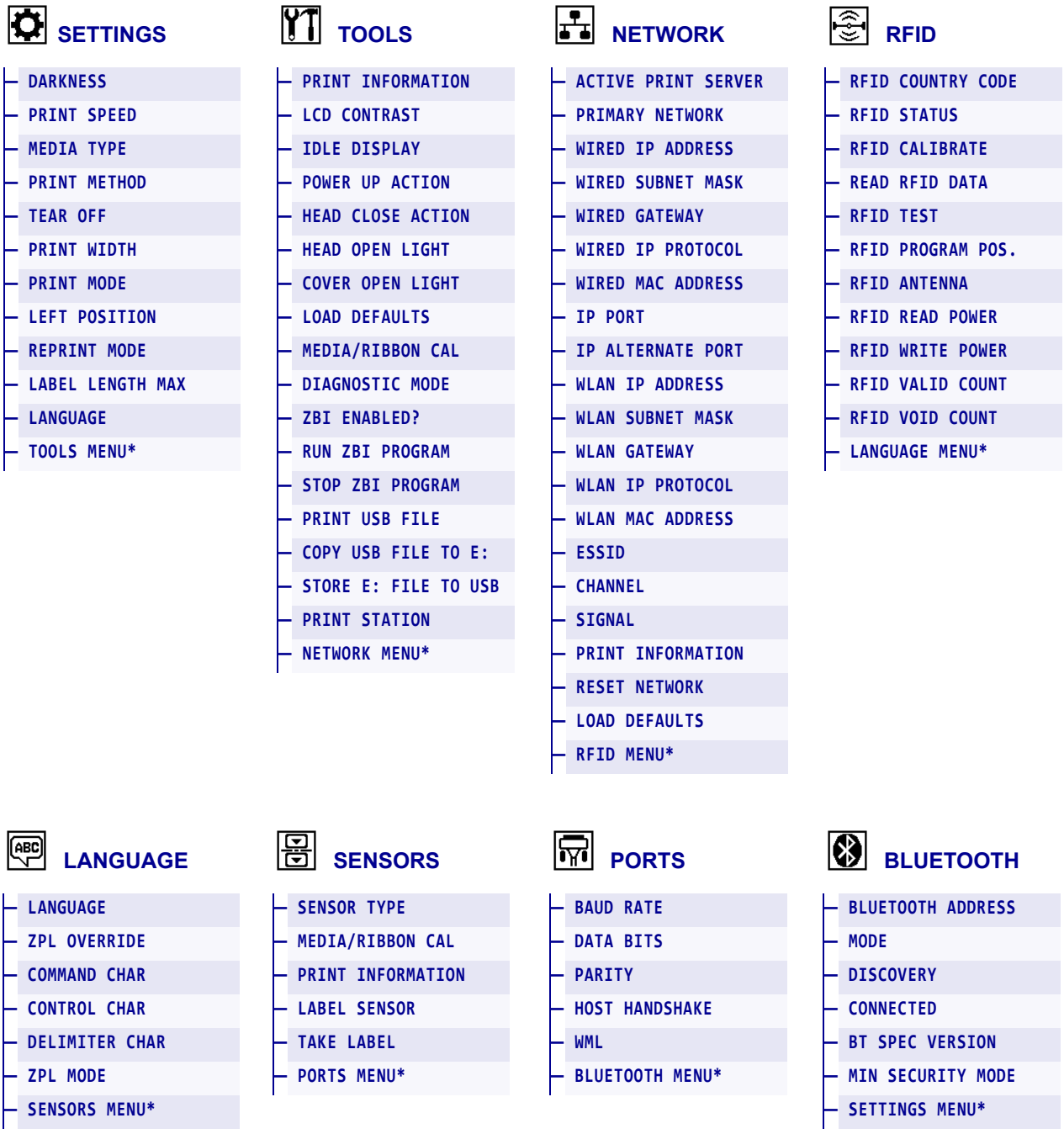
Figure 5 • Home Menu



	Exit and return to the Idle Display (Figure 4).

User Menus The following are the user menus and the items that appear in each. Click any of the menu items to go to their descriptions.

Figure 6 • User Menus



* Denotes a shortcut to the next user menu

Media Overview

The ZT410 Silverline Solution is ideal for on-demand RFID asset tagging for all surfaces, including metal and liquid-filled containers. The benefits of RFID are well known in industries from manufacturing and retail to transportation and healthcare. RFID systems—labels, printers/encoders, and readers—enable inventory and equipment tracking in real time, helping you make maximum use of virtually all of your assets.

There has, however, been one glaring RFID gap. RFID read performance deteriorates significantly when a traditional RFID label is applied on a metal surface or to a liquid-filled asset. This limits the use of RFID technology for tracking valuable assets like tools, automotive and machine parts, IT equipment, returnable containers, medical devices and equipment and liquid filled containers. To produce an effective read range, tags must be slightly thicker than traditional RFID labels, making them incompatible with standard thermal RFID printers.

Zebra and Confidex have worked together to develop a unique solution consisting of a redesigned ZT410 RFID printer, optimized Silverline labels, and high-quality Zebra ribbons. This combination provides for excellent print quality, encoding accuracy, and ease of solution deployment and use. Silverline labels, offered exclusively by Zebra, are available in three sizes to meet the needs of a wide variety of applications.

For more information about Silverline media, go to http://www.zebra.com/silverline.

2

Printer Setup and Operation

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

Contents

Handling the Printer

This section describes how to handle your printer.

Unpack and Inspect the Printer

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

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

If you discover shipping damage upon inspection:

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

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

Store the Printer

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

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

Ship the Printer

If you must ship the printer:

- Turn off (**O**) the printer, and disconnect all cables.
- Remove any media, ribbon, or loose objects from the printer interior.
- Close the printhead.
- Carefully pack the printer into the original container or a suitable alternate container to avoid damage during transit. A shipping container can be purchased from Zebra if the original packaging has been lost or destroyed.

Select a 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 Printer Specifications* on page 184.
- **Operating conditions:** Your printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. Table 2 shows the temperature and relative humidity requirements for the printer when it is operating.

Table 2 • Operating Temperature and Humidity

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

Install the Printer Driver and Connect the Printer to the 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 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.

Install Zebra Setup Utilities

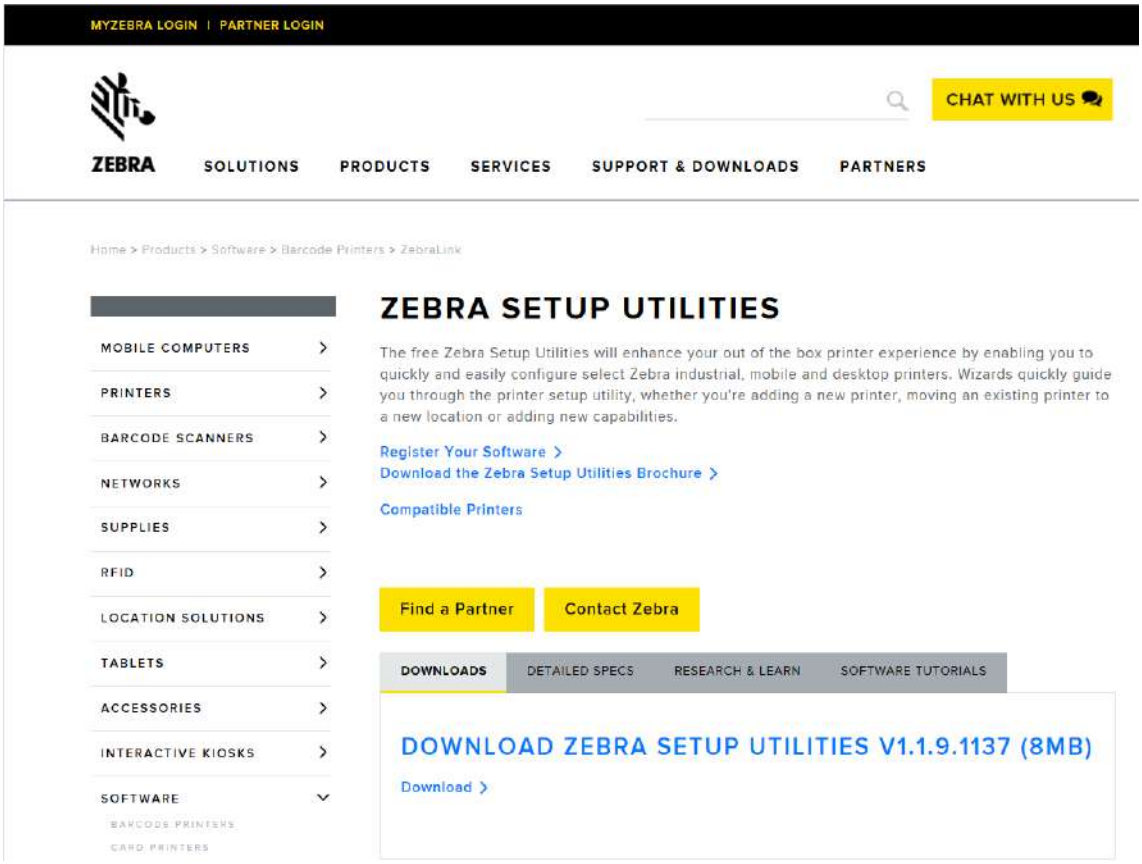
Follow the directions in this section if you do not have Zebra Setup Utilities installed on your computer or if you want to update an existing version of the program. You do not need to uninstall any older versions or any Zebra printer drivers to do so.

To install the Zebra Setup Utilities program, complete these steps:

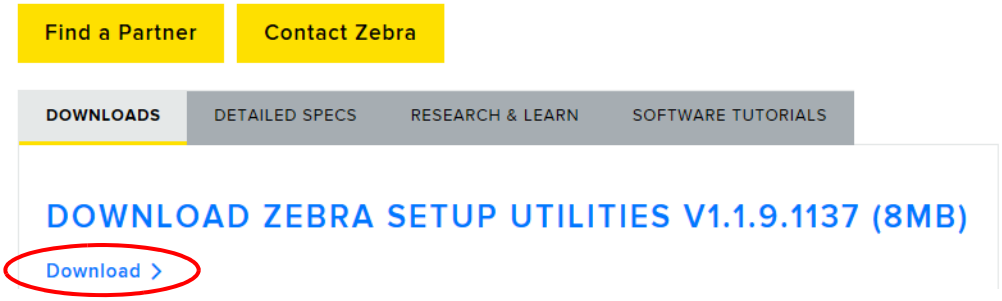
Download the Zebra Setup Utilities Installer

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

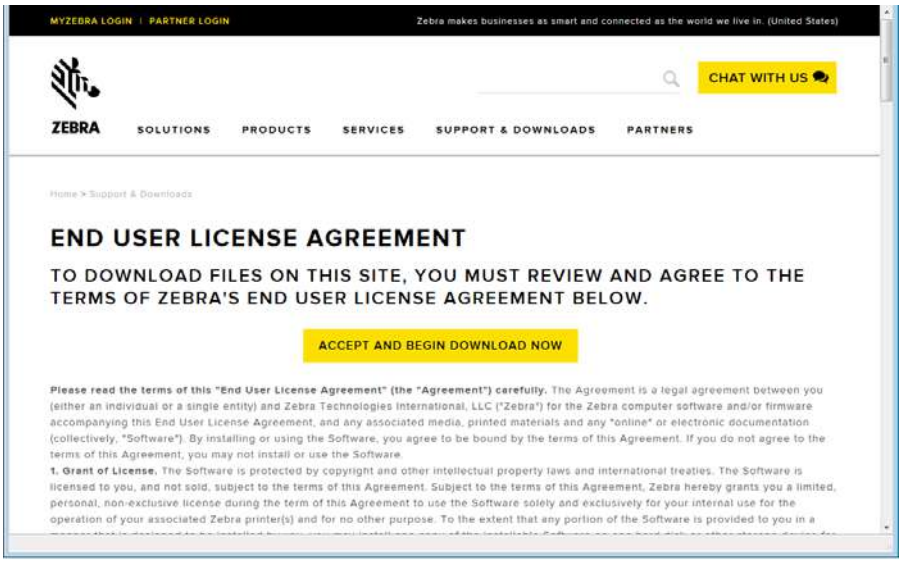
   The Zebra Setup Utilities page appears.



2. On the DOWNLOADS tab, click Download under the ZEBRA SETUP UTILITIES option.



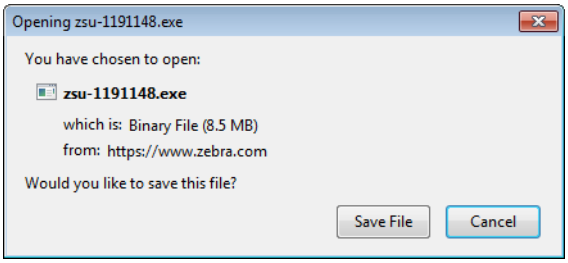
You are prompted to read and accept the End User License Agreement (EULA).



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.

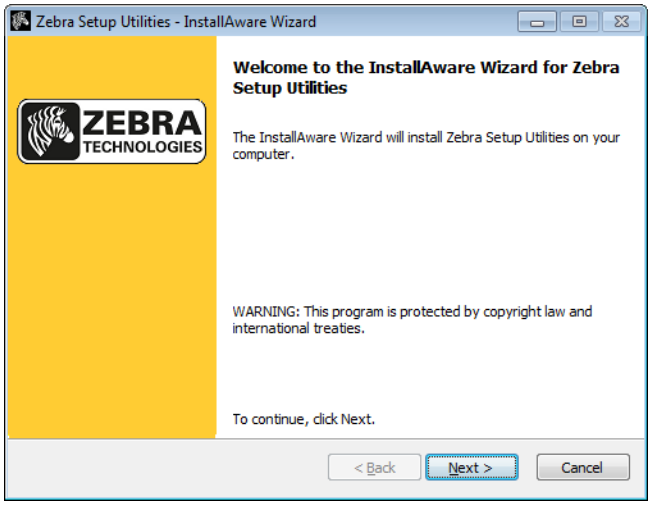
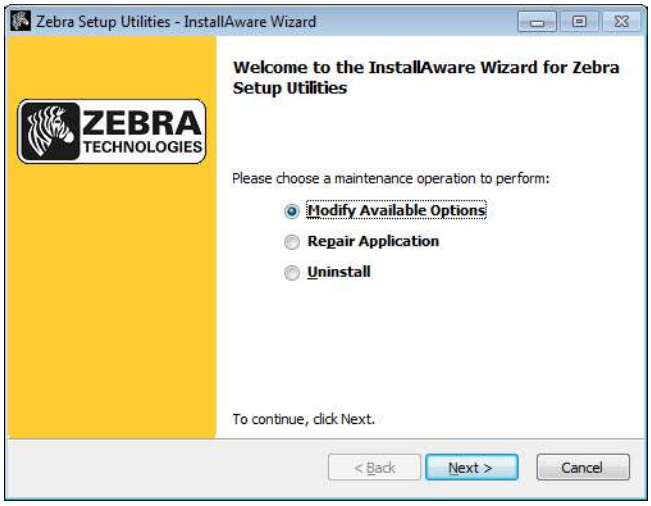


Run the Zebra Setup Utilities Installer

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.

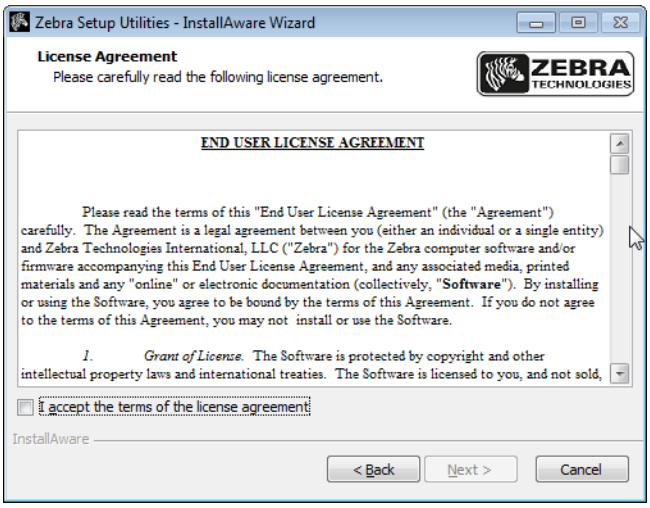
   What the computer displays next depends on whether Zebra Setup Utilities was already installed. Follow the instructions based on what your computer prompts you to do.

If your computer...	Then...
Did not previously have the Zebra Setup Utilities installed	**a.** The Zebra Setup Utilities - InstallAware Wizard displays the following.  **b.** Continue with *New Installations of Zebra Setup Utilities* on page 27.
Did previously have the Zebra Setup Utilities installed	**a.** The Zebra Setup Utilities - InstallAware Wizard displays the following.  **b.** Continue with *Updating Existing Installations of Zebra Setup Utilities* on page 29.

New Installations of Zebra Setup Utilities

6. Click Next.

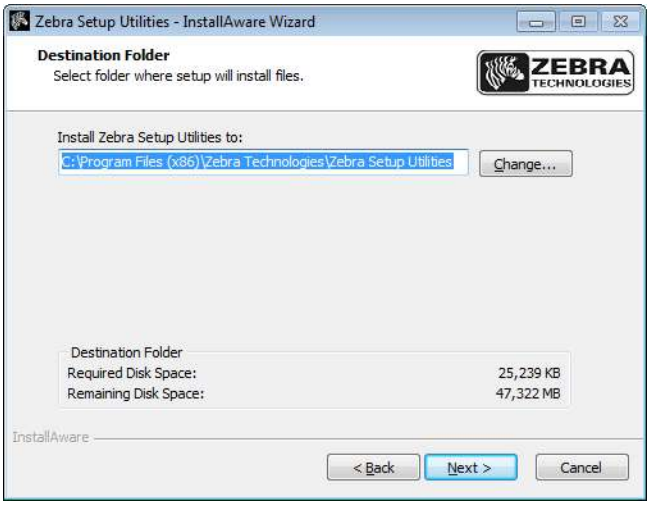
   You are prompted again to read and accept the End User License Agreement (EULA).



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

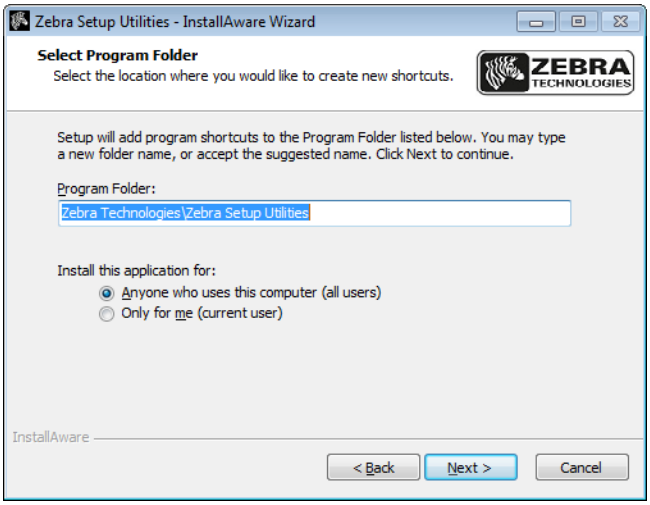
8. Click Next.

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



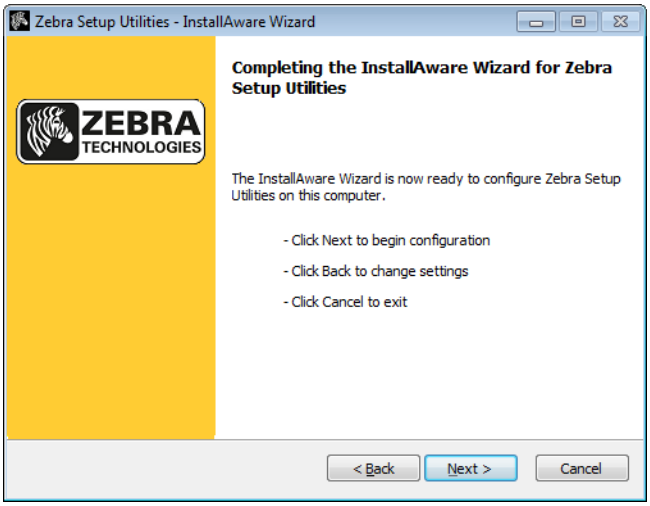
9. Change the destination folder, if necessary, and then click Next.

   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.

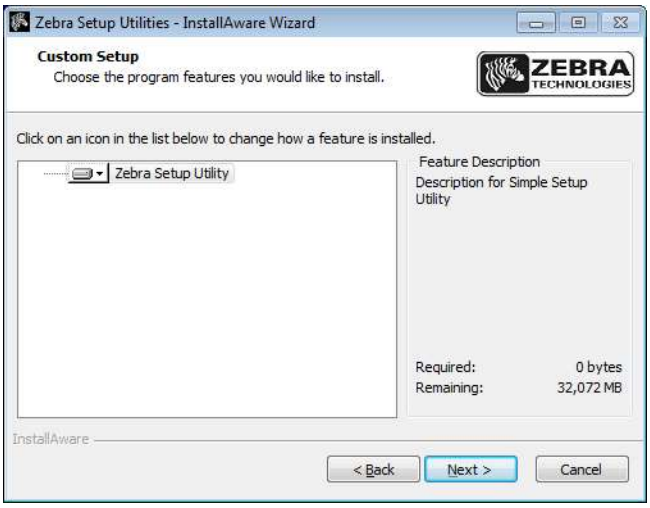


11. Skip to *Continuing with New or Updated Installations* on page 30.

Updating Existing Installations of Zebra Setup Utilities

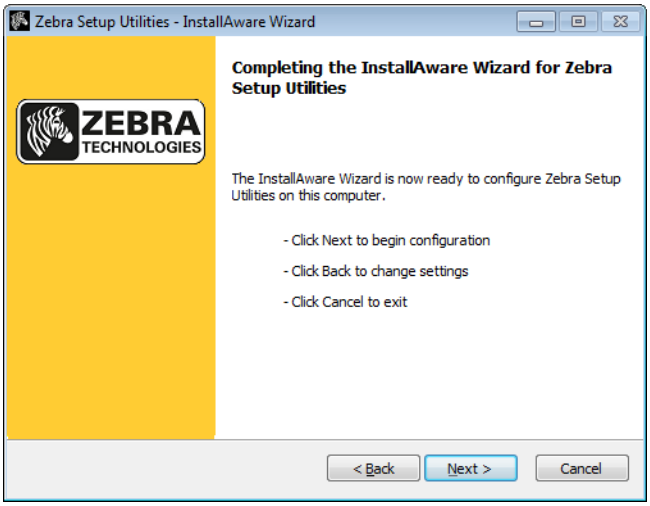
12. Click Next.

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



13. Click Next.

You are prompted to complete the InstallAware wizard.

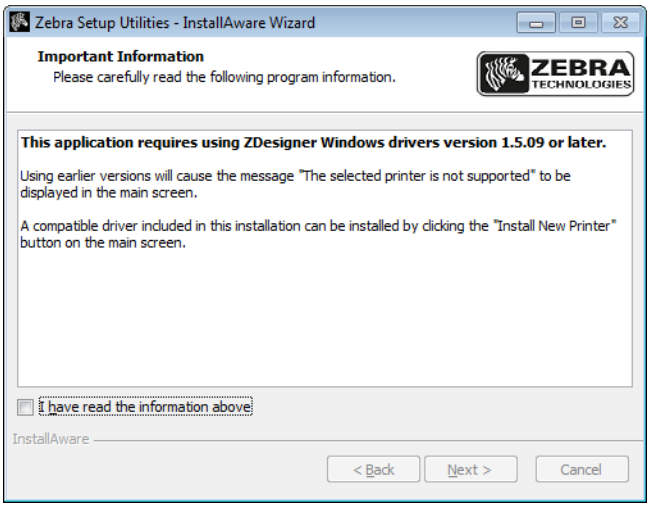


Continuing with New or Updated Installations

14. Click Next.

Installation begins.

During installation, you are presented with information about drivers.

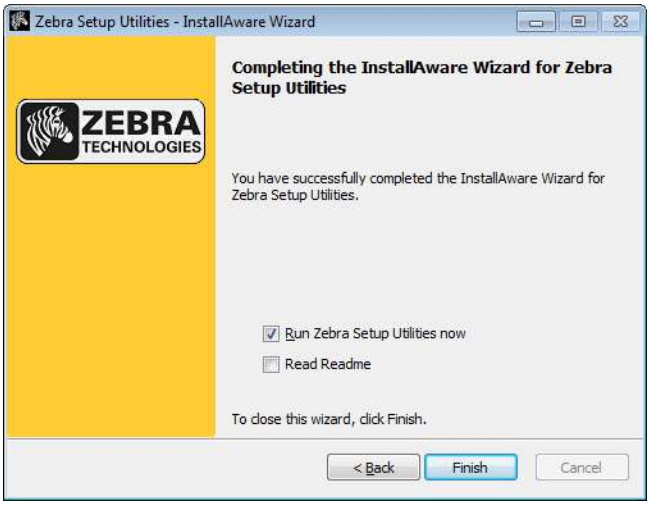


15. Read the information, and then check the box that says

I have read the information above

16. Click Next.

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



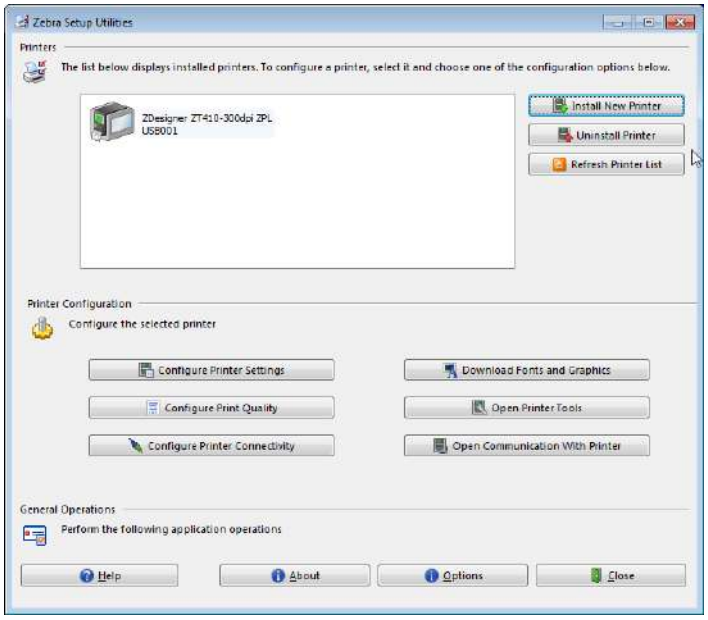
17. Check the box that says “Run Zebra Setup Utilities now.”

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.

<table>
<tr><th>If your computer...</th><th>Then...</th></tr>
<tr><td>Did not previously have any Zebra printer drivers installed</td><td>The System Prepare Wizard displays.


<table>
<tr><th>To connect by...</th><th>Then...</th></tr>
<tr><td>USB port</td><td>Continue with Connect a Computer to the Printer’s USB Port on page 33.</td></tr>
<tr><td>Serial or optional parallel port</td><td>Continue with Connect a Computer to the Printer’s Serial or Parallel Port on page 37.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>If your computer...</th><th>Then...</th></tr>
<tr><td>Did previously have any Zebra printer drivers installed</td><td>The Zebra Setup Utilities screen displays.
 

<table>
<tr><th>To connect by the...</th><th>Then...</th></tr>
<tr><td>USB port</td><td>Continue with Connecting the printer to a USB port on your computer on page 34.</td></tr>
<tr><td>Serial or optional parallel port</td><td>Continue with Adding a Printer from the Zebra Setup Utilities Screen on page 40.</td></tr>
</table></td></tr>
</table>

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

To connect the printer to your computer by USB, complete these steps:

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 34.

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

Figure 7 • System Prepare Wizard

1. Click Next.

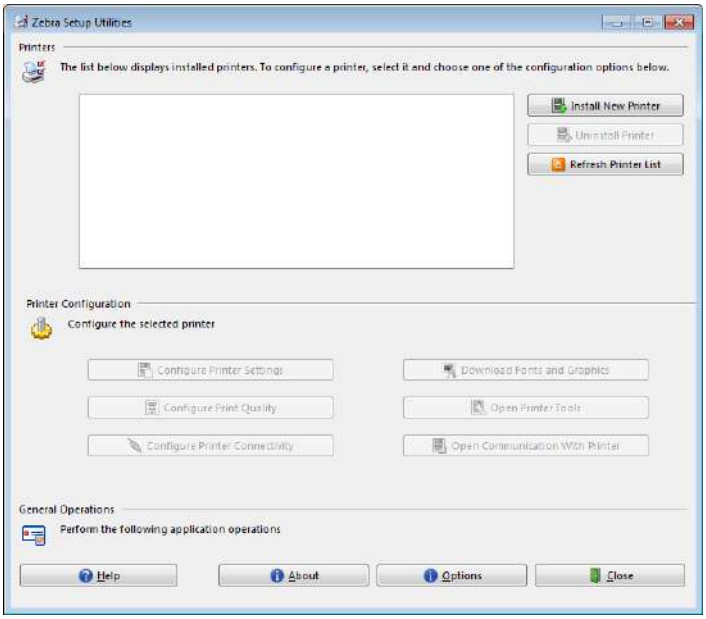
   The System Prepare Wizard prompts you to connect the printer to the USB port on your computer.

2. Click Finish.
   The Zebra Setup Utilities screen displays.

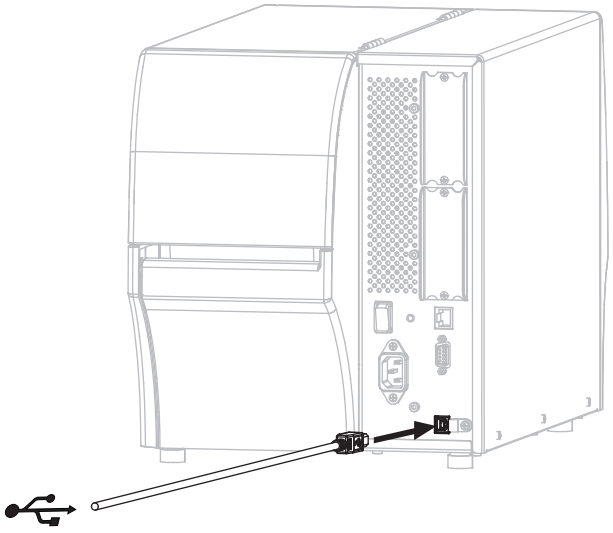
Connecting the printer to a USB port on your computer

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 24 before continuing.

Figure 8 • Zebra Setup Utilities Screen

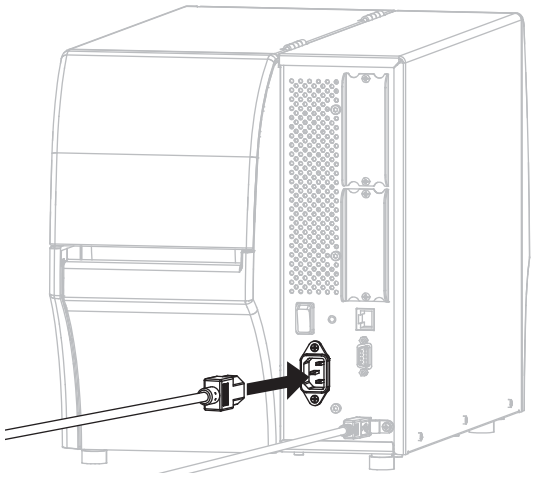


3. Connect the USB cord to the USB port on your printer.

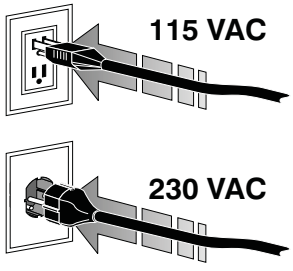


4. Connect the other end of the USB cord to your computer.

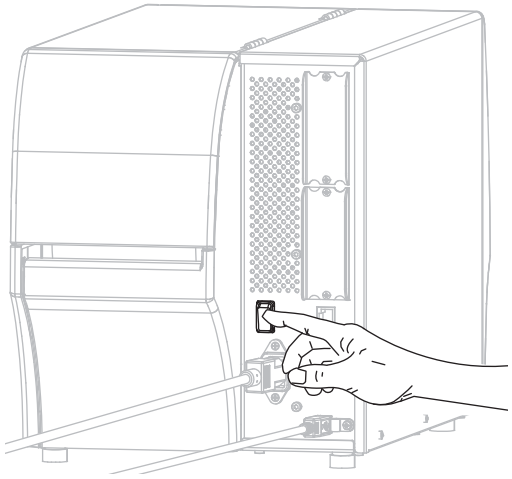
5. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



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



7. 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 24 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 • Ensure that the printer power is off (**O**) before connecting data communications cables. Connecting a data communications cable while the power is on (**I**) may damage the printer.

To connect the printer to your computer by USB, complete these steps:

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 40.

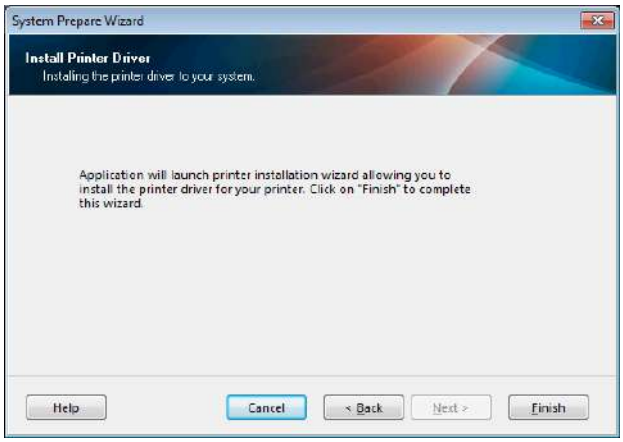
Running the System Prepare Wizard

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

Figure 9 • System Prepare Wizard

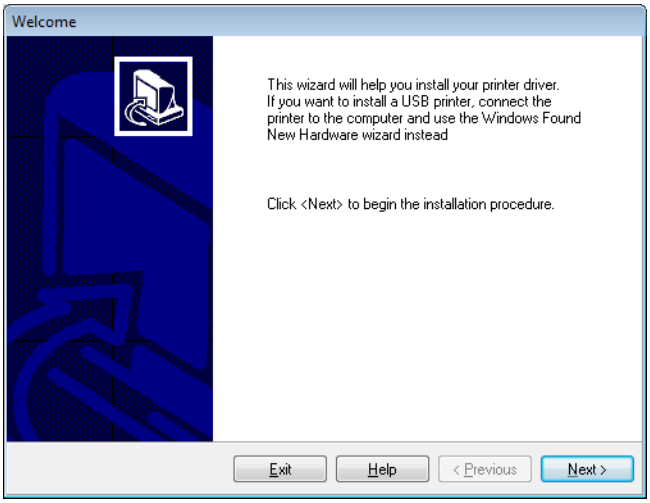
1. Select “Other computer ports (Parallel Port, Serial Port, TCP-IP Port, ...), and then click Next.

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



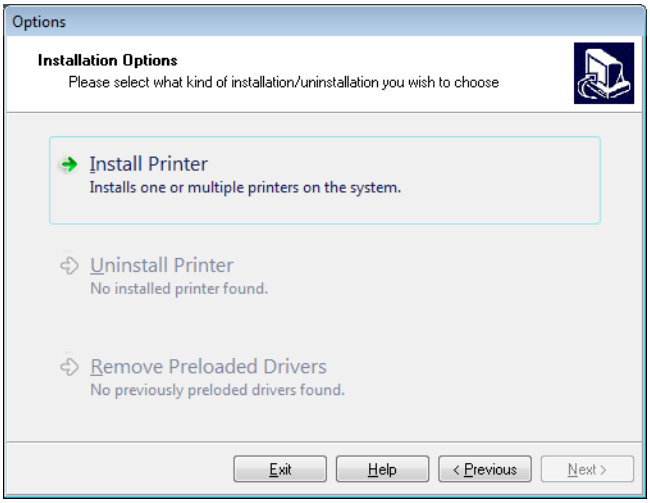
2. Click Finish.

   The printer driver wizard displays.



3. Click Next.

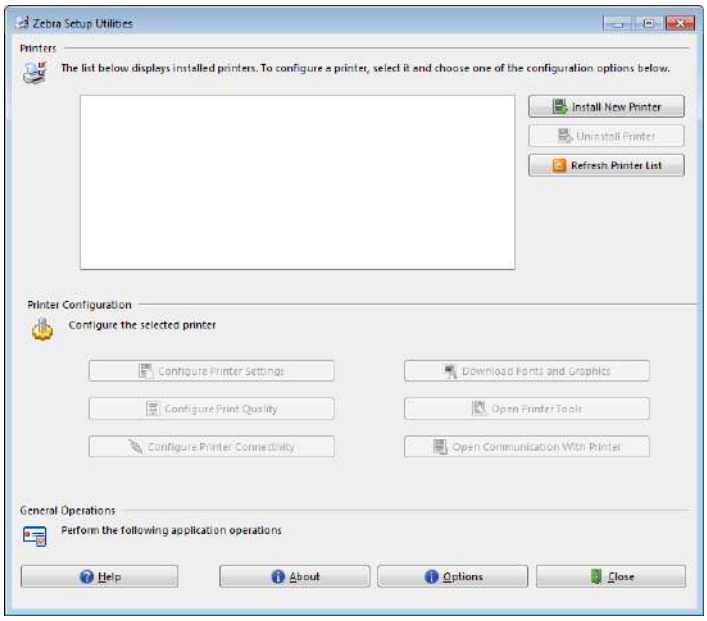
   You are prompted to select an installation option.



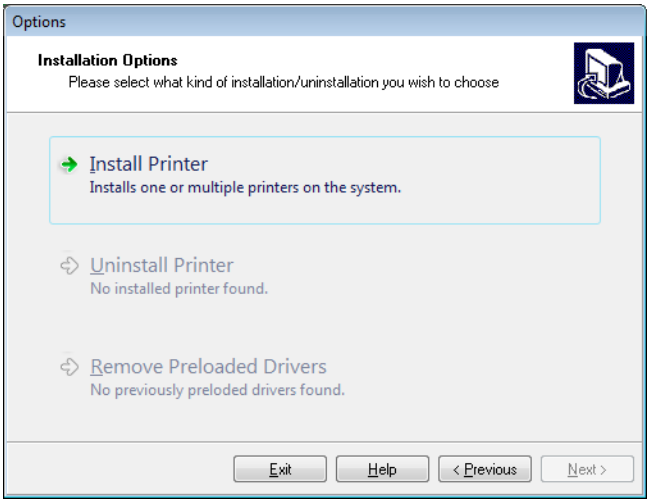
4. Continue with step 6 on page 41.

Adding a Printer from the Zebra Setup Utilities Screen

Figure 10 • Zebra Setup Utilities Screen

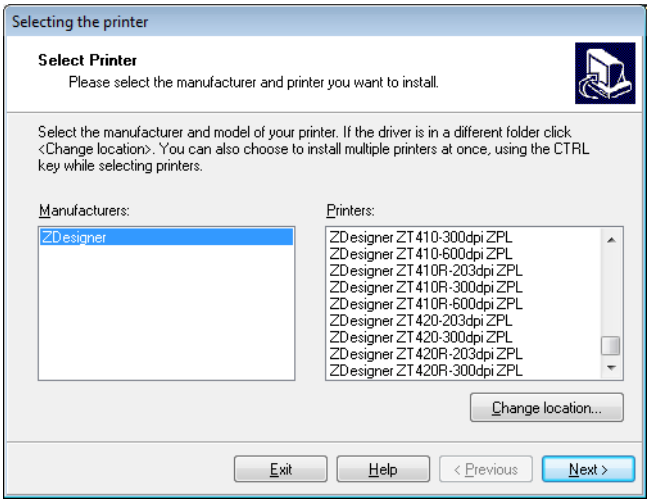


5. On the Zebra Setup Utilities screen, click Install New Printer.
   You are prompted to select an installation option.



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: XXXXXxY - xxxxxxxx`

   where

   XXXXX = the printer model

   Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi, 6 = 600 dpi)

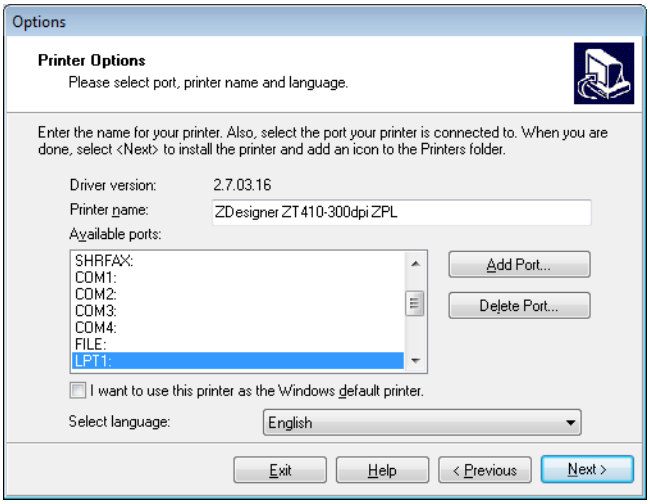
   For example, in the part number **ZT410**x**3** – xxxxxxxx

   ZT410 indicates that the printer is a ZT410 model

   3 indicates that the printhead resolution is 300 dpi

8. Click Next.

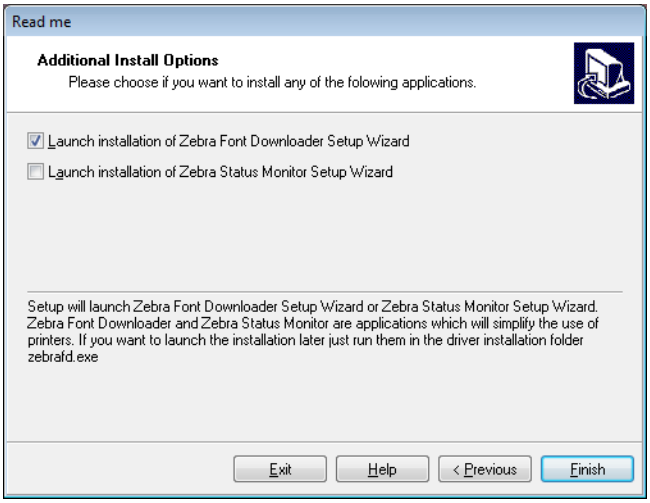
   You are prompted for a printer name, the port to which the printer will be connected, and the language for the program.



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.

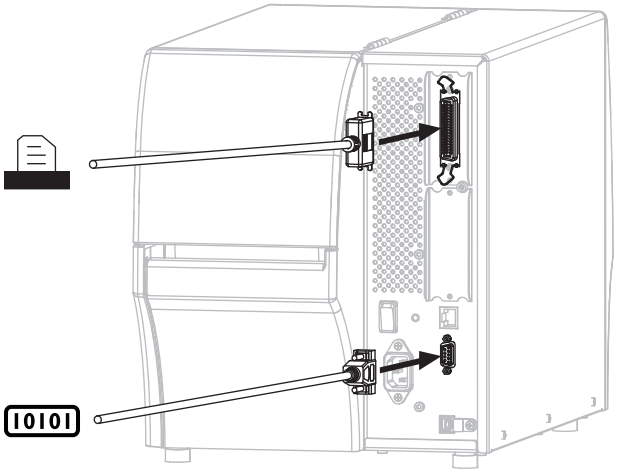


11. Check the desired options, and then click Finish.

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

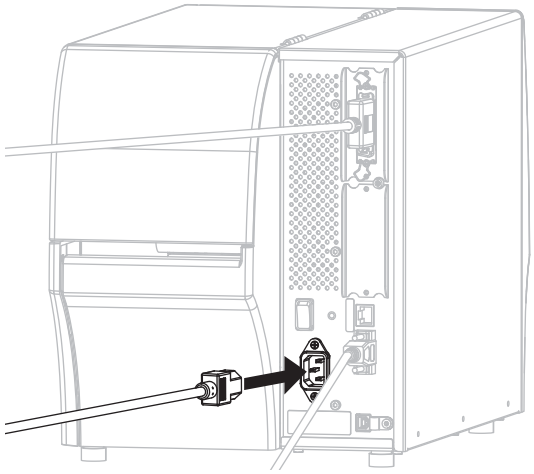
Connecting the printer to a serial or parallel port on your computer

12. Connect the desired cord to the appropriate port on your printer.

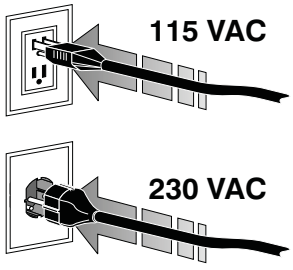


13. Connect the other end of the cord to the appropriate port on your computer.

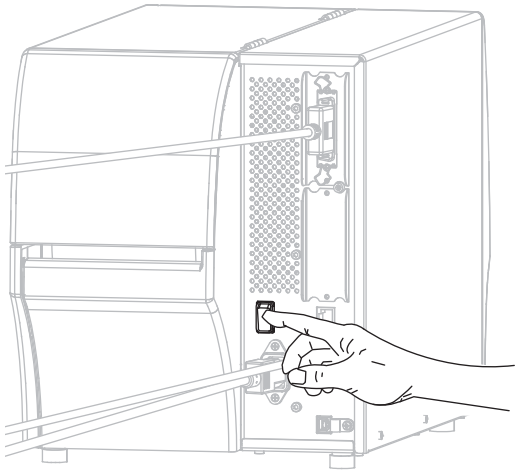
14. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.



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



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. For more information, see *Port Settings* on page 116.

The installation for serial or parallel connections is complete.

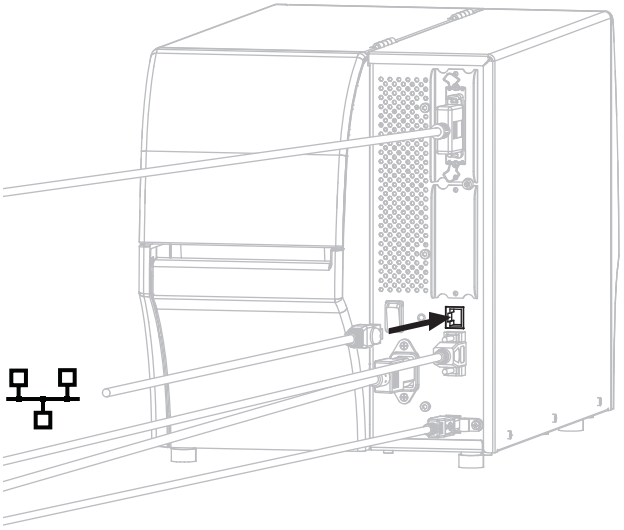
Connect to Your Network through the Printer's Ethernet Port

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.

To connect the printer to your computer by a wired print server, complete these steps:

1. Install Zebra Setup Utilities as instructed in *Install Zebra Setup Utilities* on page 24.
2. 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.

3. Check the display to see if an IP address was assigned to the printer. See *IP Address* on page 98 for additional ways to view the IP address.

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 46.
any other value	Continue with *Adding a Printer from the Zebra Setup Utilities Screen* on page 47.

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* on page 47.

4. 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 33 or *Connect a Computer to the Printer's Serial or Parallel Port* on page 37.

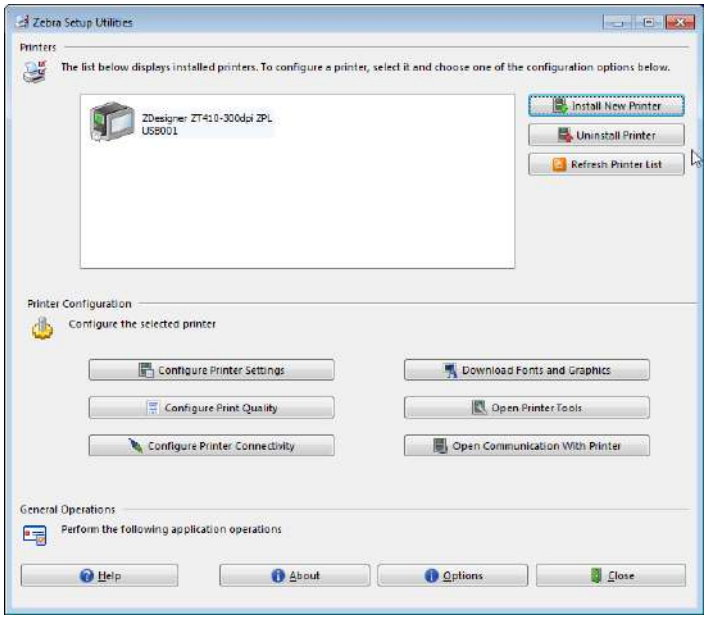
5. Configure the following printer settings. You can change the values through the Zebra Setup Utilities (click Configure Printer Connectivity on the Zebra Setup Utilities screen) or by the ways listed at the following links. Contact your network administrator for the proper values for your network.

   - *IP Protocol* on page 101 (change the value from ALL to PERMANENT)
   - *Gateway* on page 100 (match the gateway value of your LAN)
   - *Subnet Mask* on page 99 (match the subnet value of your LAN)
   - *IP Address* on page 98 (assign a unique IP address to the printer)

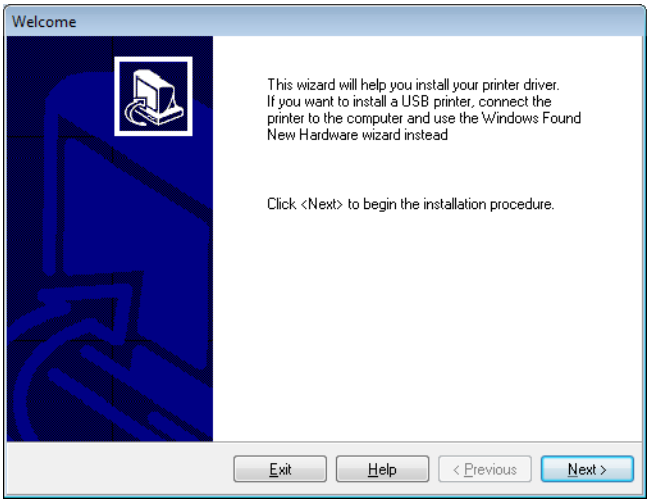
Adding a Printer from the Zebra Setup Utilities Screen

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

Figure 11 • Zebra Setup Utilities Screen

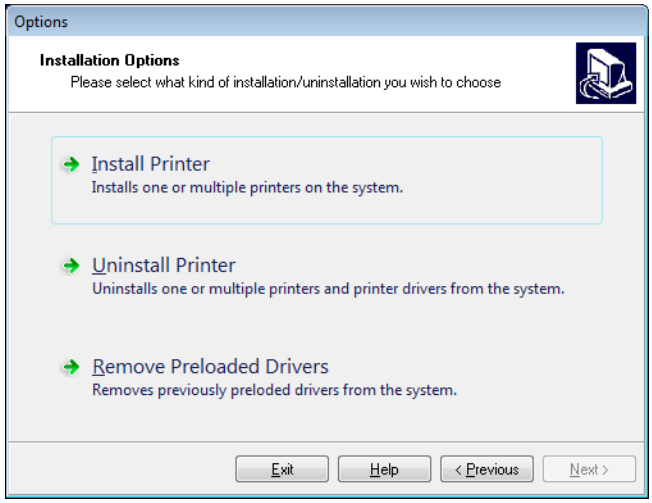


7. Click Install New Printer.
   The printer driver wizard displays.



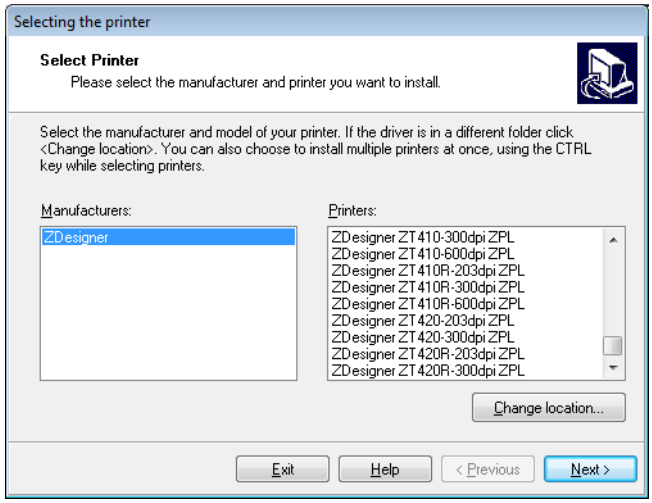
8. Click Next.

   You are prompted to select an installation option.



9. Click Install Printer.

   You are prompted to select a printer type.



10. 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: XXXXXxY – xxxxxxxx`

    where

    XXXXX = the printer model

    Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi, 6 = 600 dpi)

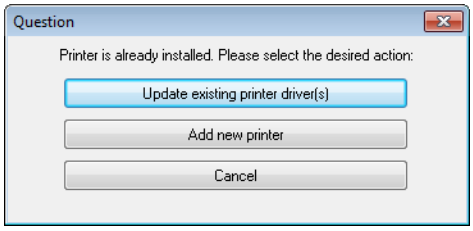
    For example, in the part number **ZT410**x**3** – xxxxxxxx

    ZT410 indicates that the printer is a ZT410 model

    3 indicates that the printhead resolution is 300 dpi

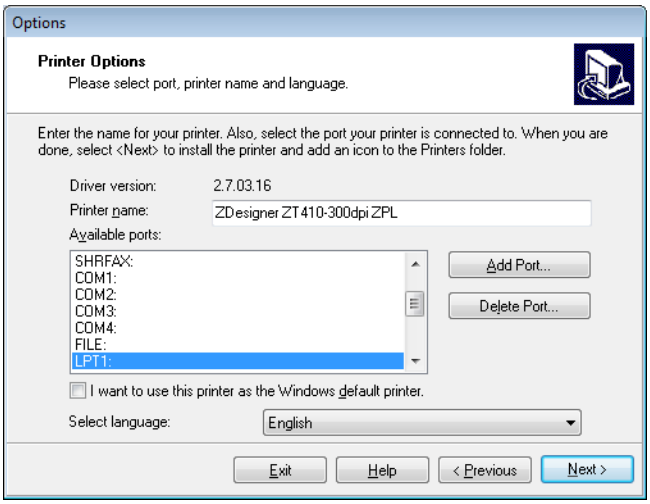
11. Click Next.

You are notified that the printer is already installed.



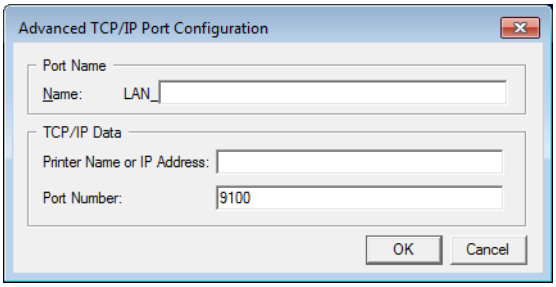
12. Click Add new printer.

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



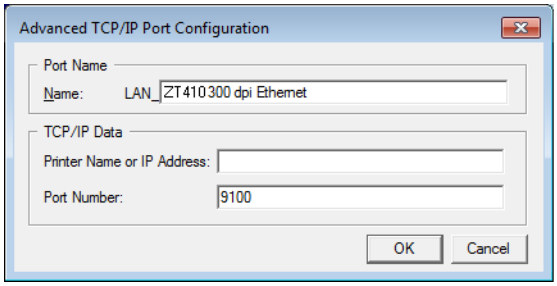
13. Click Add Port.

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.

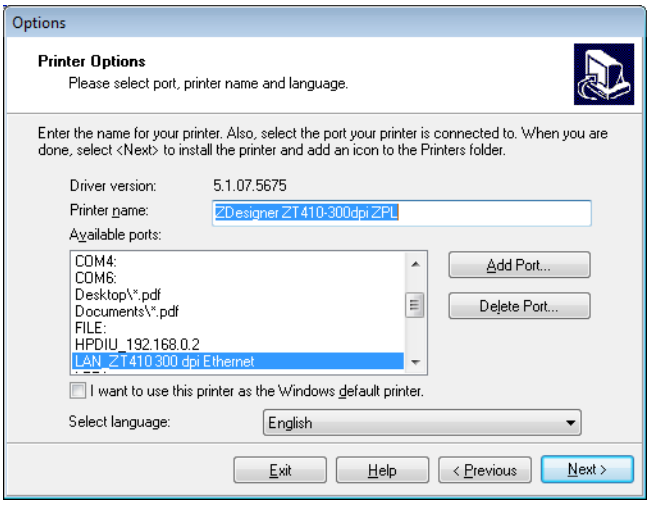
14. Give the port a name that you can recognize when it appears in the list of available ports.



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

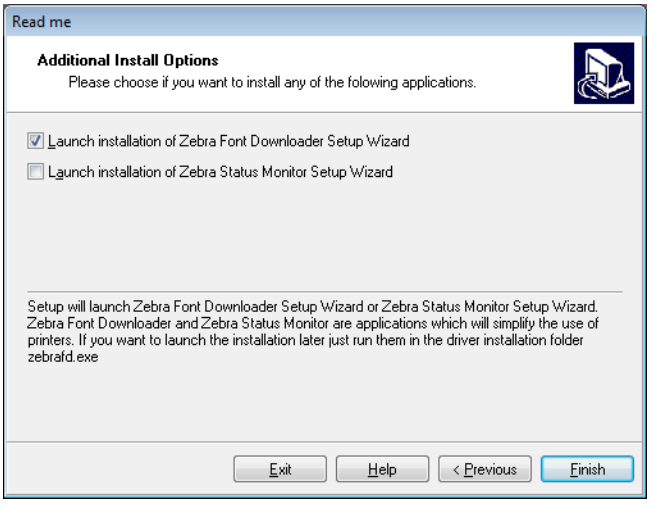
16. Click OK.

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



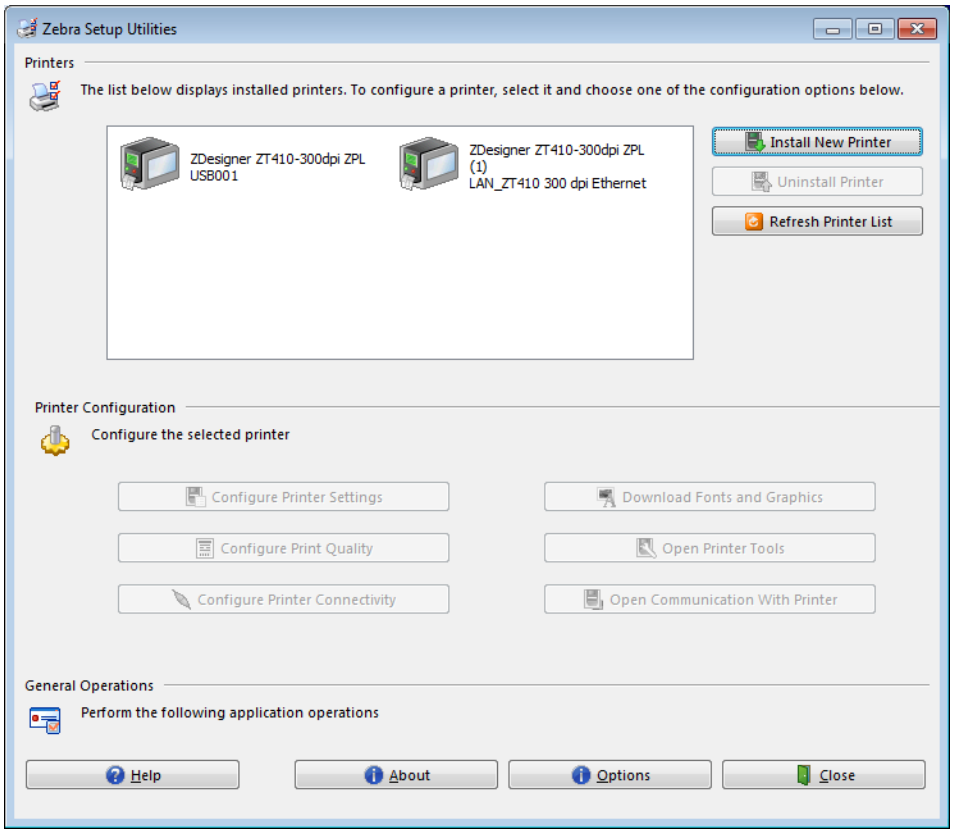
17. Click Next.

You are prompted to launch other setup wizards.



18. 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.

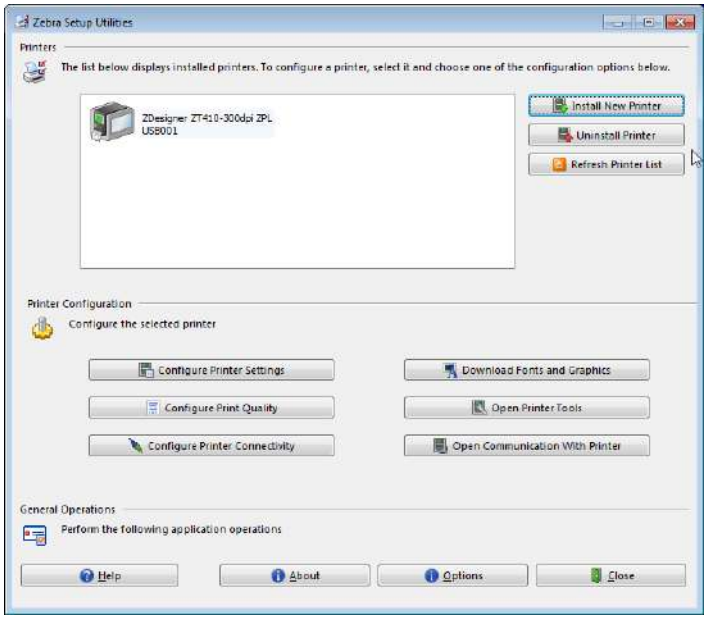
To connect the printer to your computer by an optional wireless print server, complete these steps:

1. Install Zebra Setup Utilities as instructed in *Install Zebra Setup Utilities* on page 24.
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 33 or *Connect a Computer to the Printer's Serial or Parallel Port* on page 37.
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.
   - *IP Protocol* on page 101 (change the value from ALL to PERMANENT)
   - *Gateway* on page 100 (match the gateway value of your WLAN)
   - *Subnet Mask* on page 99 (match the subnet value of your WLAN)
   - *IP Address* on page 98 (assign a unique IP address to the printer)

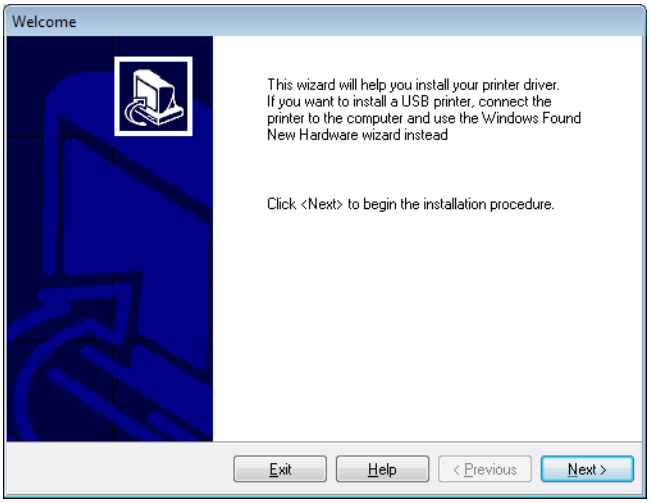
Adding a Printer from the Zebra Setup Utilities Screen

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

Figure 12 • Zebra Setup Utilities Screen

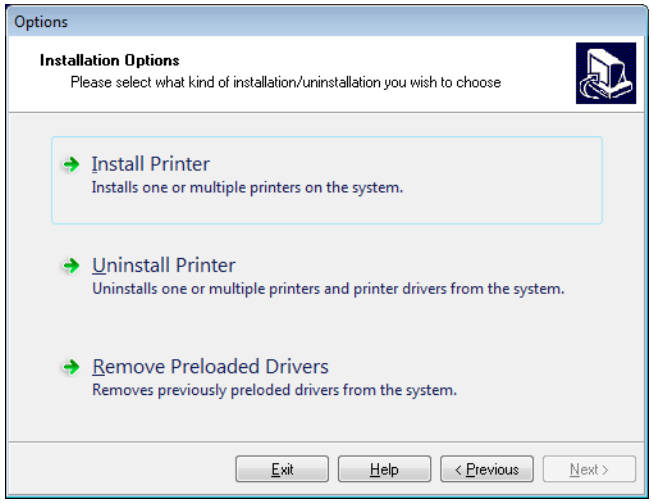


5. Click Install New Printer.
   The printer driver wizard displays.



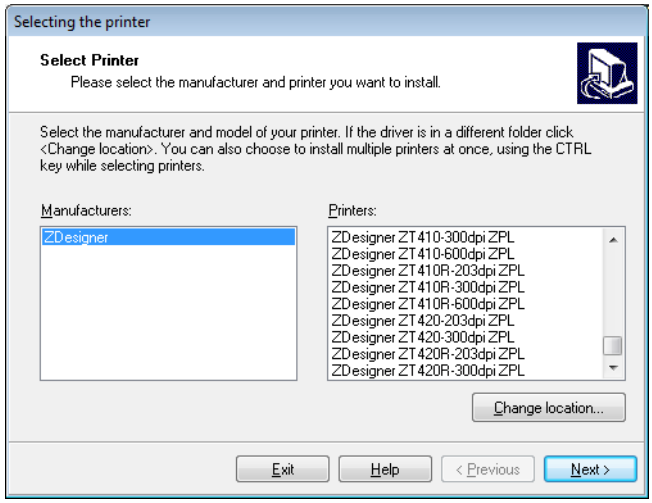
6. Click Next.

   You are prompted to select an installation option.



7. Click Install Printer.

   You are prompted to select a printer type.



8. 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: XXXXXxY – xxxxxxxx`

   where

   XXXXX = the printer model

   Y = the printer resolution (2 = 203 dpi, 3 = 300 dpi, 6 = 600 dpi)

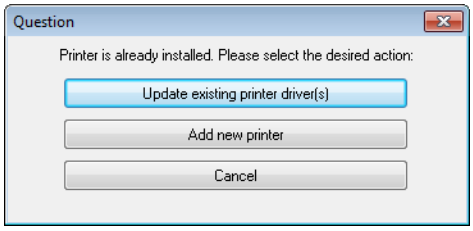
   For example, in the part number **ZT410**x**3** – xxxxxxxx

   ZT410 indicates that the printer is a ZT410 model

   3 indicates that the printhead resolution is 300 dpi

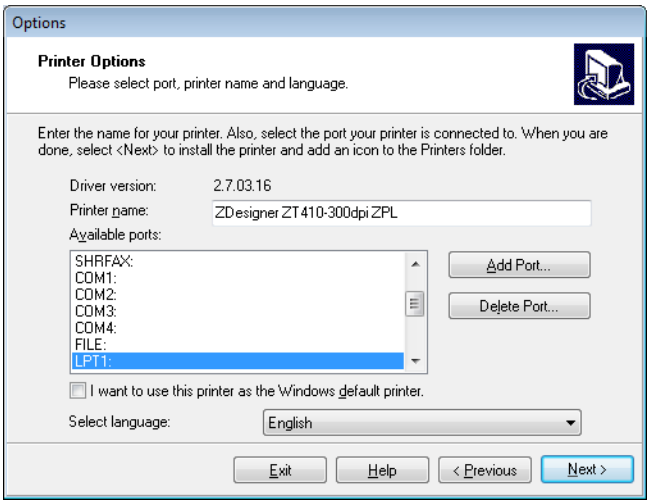
9. Click Next.

You are notified that the printer is already installed.



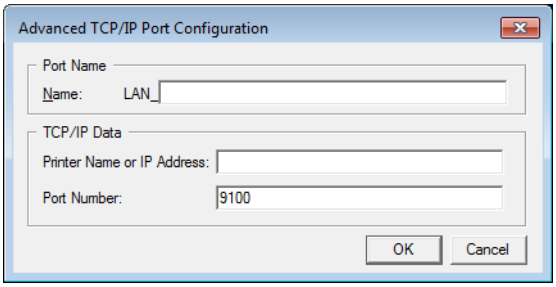
10. Click Add new printer.

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



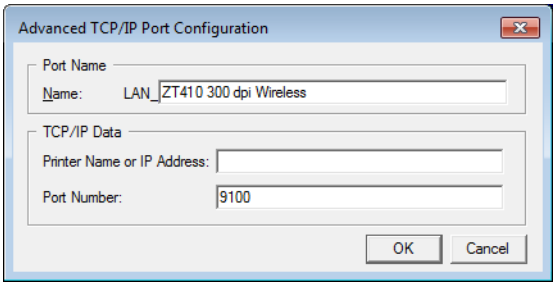
11. Click Add Port.

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.

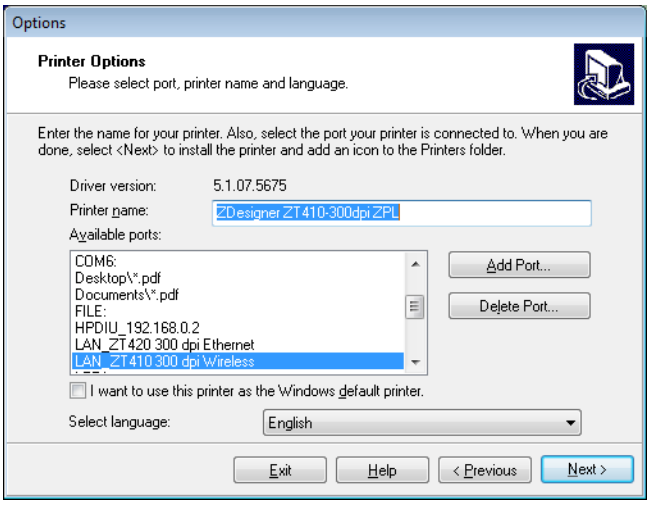
12. Give the port a name that you can recognize when it appears in the list of available ports.



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

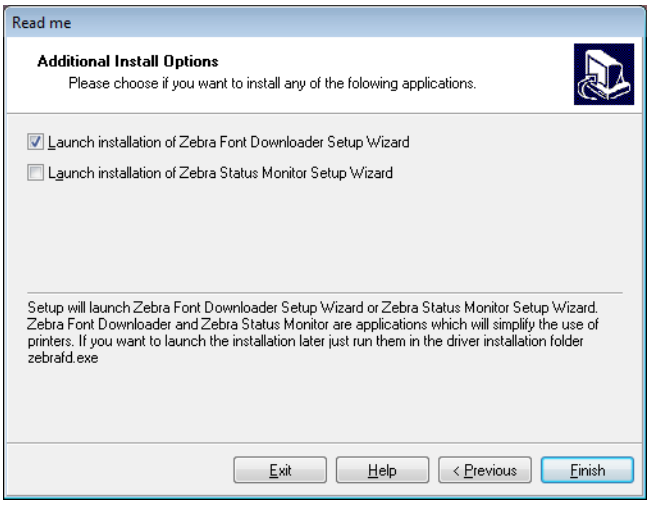
14. Click OK.

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



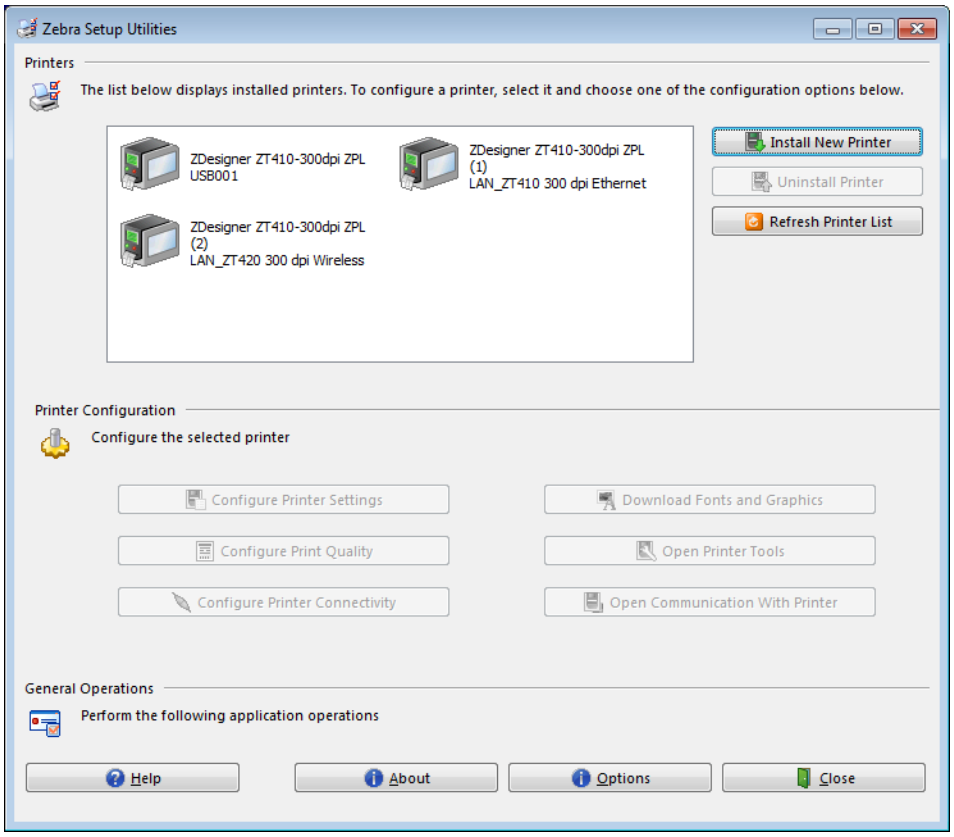
15. Click Next.

You are prompted to launch other setup wizards.



16. 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.

Lower the Media Sensor and Ribbon Strip Plate (if necessary)

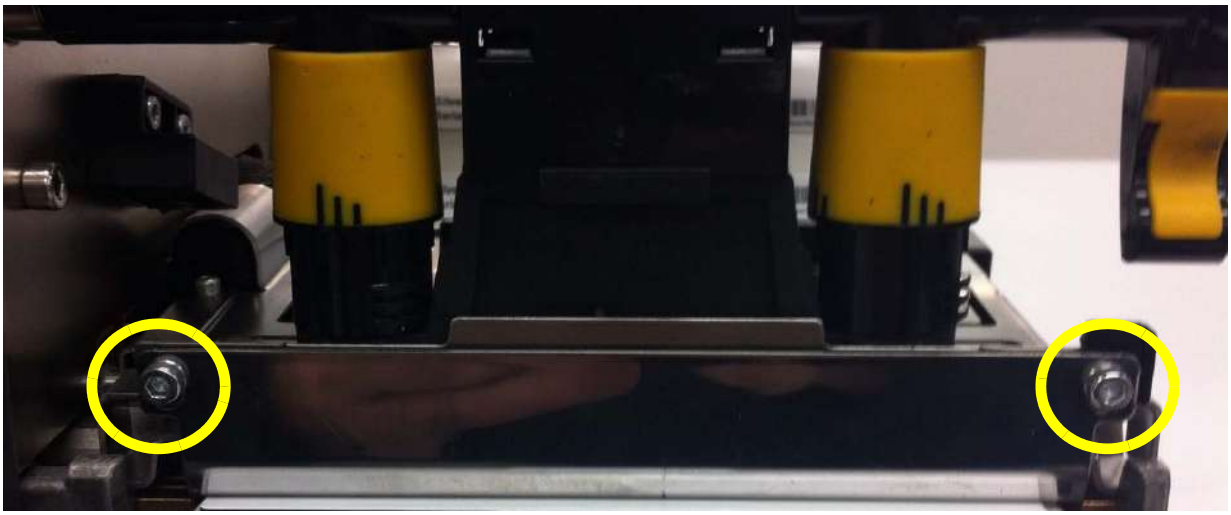
Note • Each ZT410 RFID printer with the Silverline Solution should leave the manufacturing plant with both the media sensor and the ribbon strip plate in the lowest position. If this is not the case, complete the instructions in this section.

1. Loosen the 3 mm Allen screw located directly underneath the adjustable transmissive media sensor.

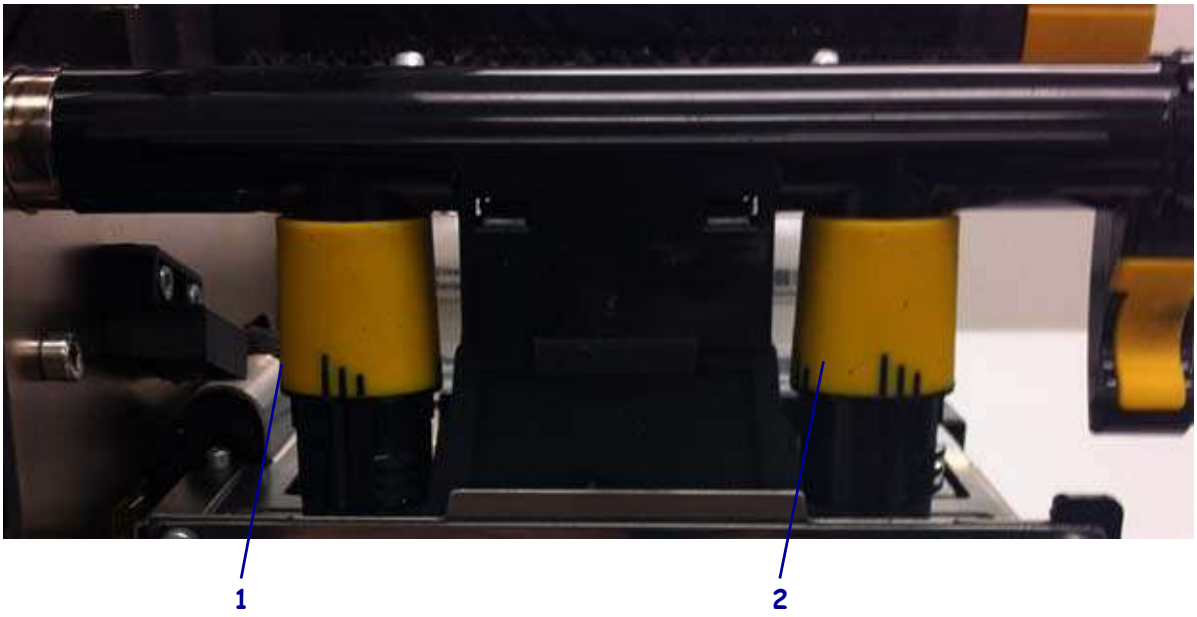
2. With your fingers, grab the lower half of the transmissive media sensor housing (near the mainframe) and pull it downward as far as it will go, and then re-tighten the screw. This sets the media sensor housing to accommodate the thickest media.

Adjust and Configure the Printer for Silverline Media

1. Loosen the two fasteners on the ribbon strip plate.



2. Lower the ribbon strip plate as far down as it will travel, and then re-tighten the screws.
3. Using the printhead pressure adjustment dials, set each barrel to the correct position for your media, as identified in Table 3.

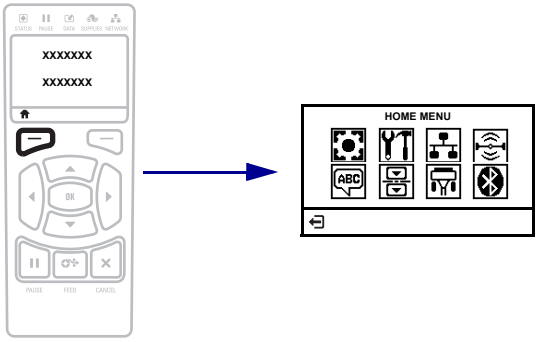


1	Inside dial
2	Outside dial

Table 3 • Toggle Pressure Settings

Tag	Inside Dial Setting	Outside Dial Setting
Micro	3	2
Classic	3	3
Slim	3	3
Blade	3	2

4. On the printer's control panel, press the LEFT SELECT button to go to the Home menu.



5. Press OK to enter the Settings menu.

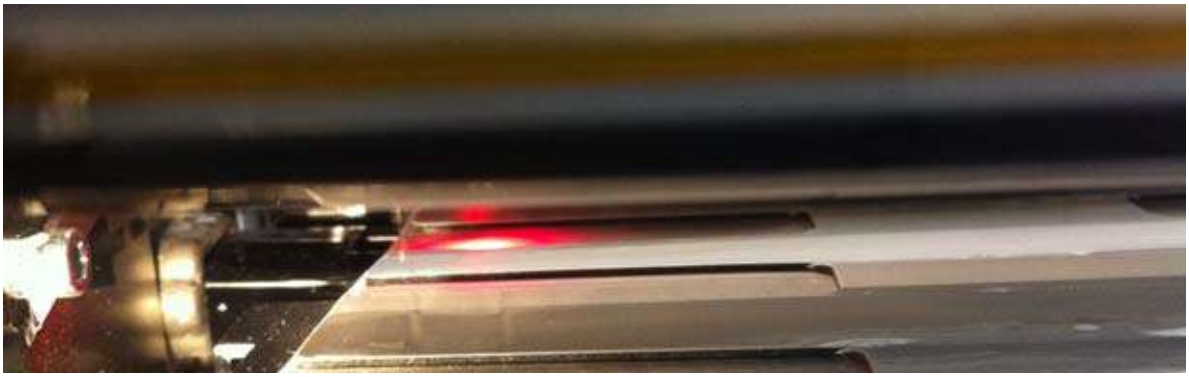
6. Use the arrow buttons to scroll to and adjust the following parameters in the Settings menu. For this application, Zebra recommends that you use the following settings:
   - DARKNESS = 25
   - LABEL LENGTH MAX = 5
   - PRINT SPEED = 2 ips (can be set through the control panel or through the ^PR ZPL command)
   - SLEW = 2 ips (must be set through the ^PR ZPL command)
   - BACKFEED = 2 ips (must be set through the ^PR ZPL command)

Load Silverline Media and Calibrate the Printer

1. Open the printhead, and then load the Silverline media and Zebra 5095 resin-based ribbon. For specific loading instructions, see *Instructions for Loading Media* on page 63 or *Instructions for Loading Ribbon* on page 68.

2. Position the adjustable transmissive media sensor, so that the visible red LED shines on the gap between the labels.

   (View: printhead open, looking down the throat of the printer.)



3. Close the printhead, and then press the PAUSE button to enable printing.

   The printer calibrates. If the calibration fails or if the printer displays a media error, perform a manual media and ribbon calibration. (For instructions, see the calibration video or *Calibrate the Ribbon and Media Sensors* on page 121.)

4. On the printer's control panel, press LEFT SELECT to go to the Home menu.

5. Press the RIGHT ARROW until you reach the RFID menu.

6. Press OK to enter the RFID menu.

7. Press the LEFT ARROW or RIGHT ARROW until you reach RFID CALIBRATE.

8. Press the RIGHT SELECT button to begin the RFID calibration process.

The printer determines the optimal read/write power and antenna location to use for your tags. For additional information about these settings, find the transponder information for your printer at http://www.zebra.com/transponders.

9. On the printer's control panel, press LEFT SELECT to go to the Home menu.
10. Press the RIGHT ARROW until you reach the TOOLS menu.

11. Press OK to enter the TOOLS menu.
12. Use the arrow buttons to scroll to and adjust the following parameters in the Settings menu. For this application, Zebra recommends that you use the following settings:
    - POWER UP ACTION = FEED
    - HEAD CLOSE ACTION = FEED

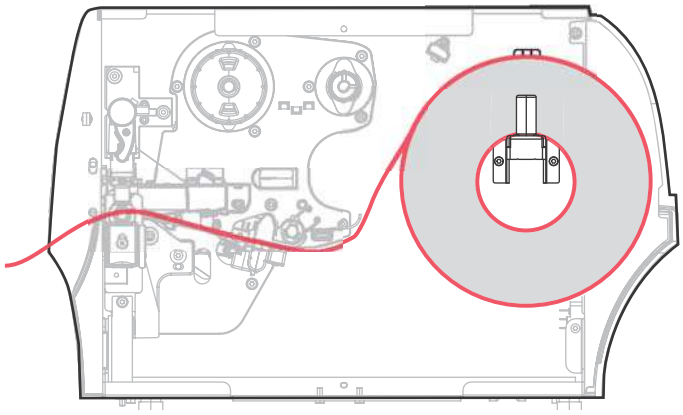
    Your printer is now ready to print.

Important • These settings cause a tag to be fed each time the printer is powered up or each time the printhead is closed.

Instructions for Loading Media

Use the instructions in this section for loading Silverline media.

Figure 13 • Silverline Media in Tear-Off Mode

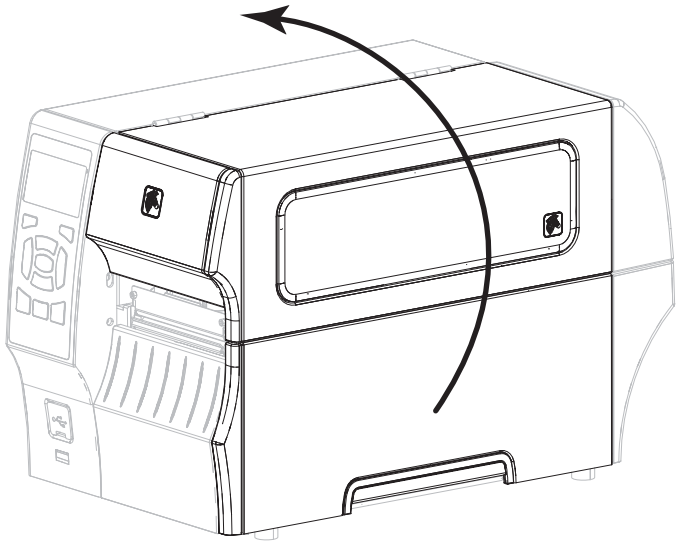


Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as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

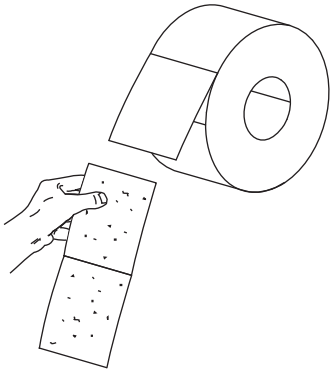
Note • In some of the drawings that follow, the printer is shown without a ribbon system to give you a better view of the components involved in media loading.

To load media, complete these steps:

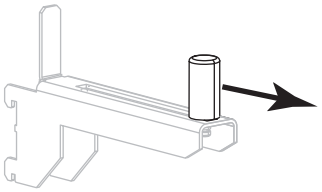
1. Raise the media door.



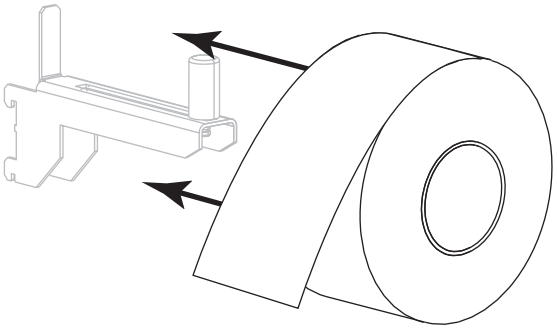
2. Remove and discard any tags or labels that are dirty or that are held by adhesives or tape.



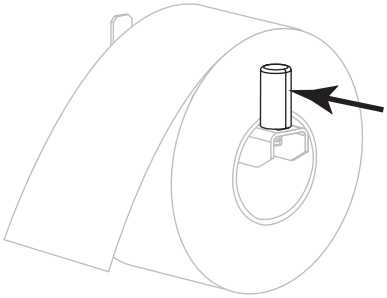
3. Pull out the media supply guide as far as it goes.



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

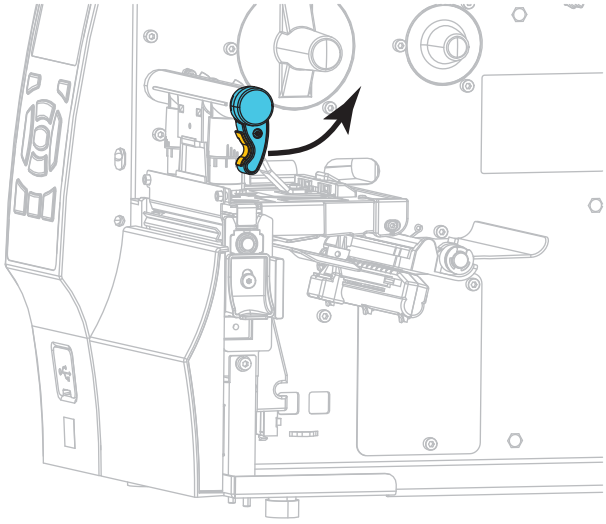


5. Slide in the media supply guide, until it touches the edge of the roll.

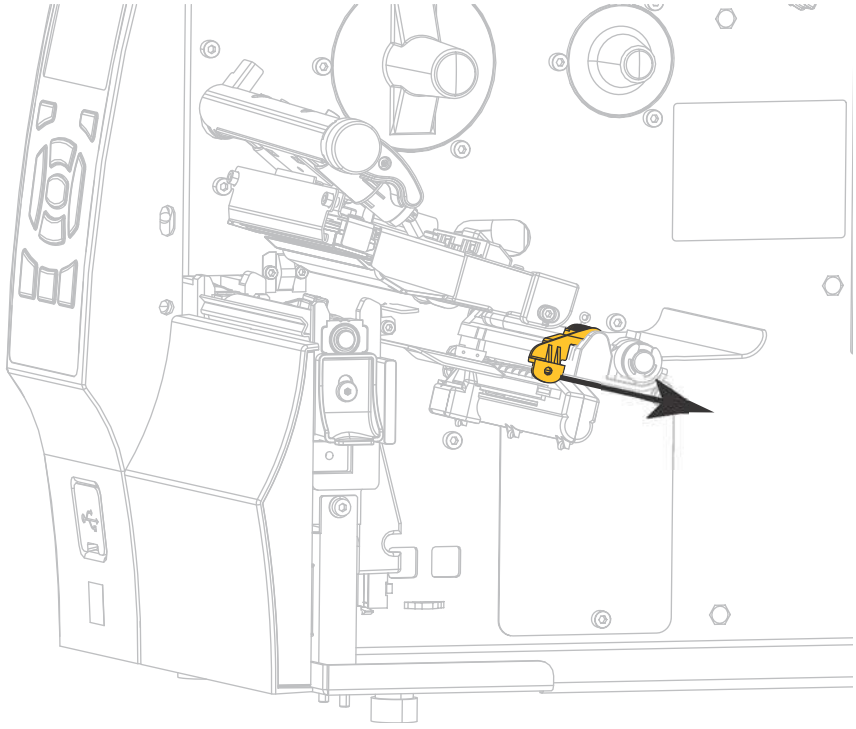


6. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

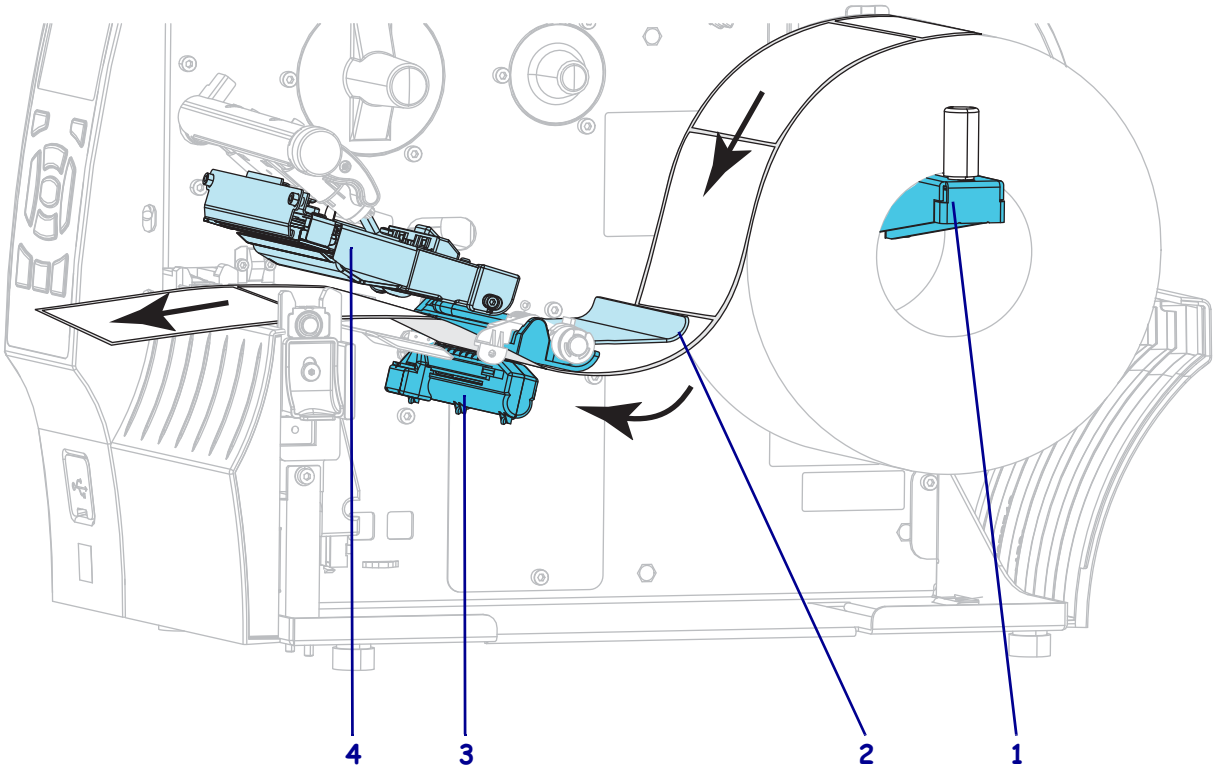
   Open the printhead assembly by rotating the printhead-open lever.



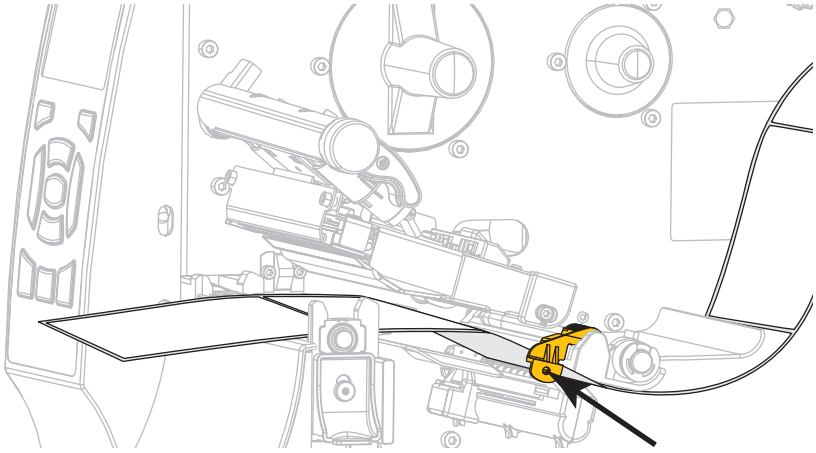
7. Slide the media guide all the way out.



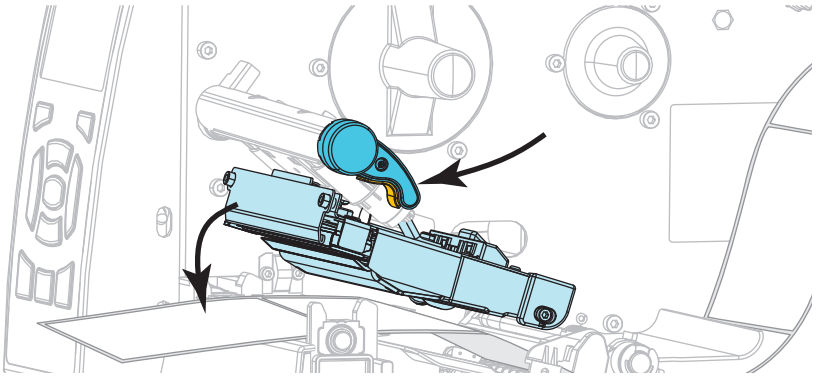
8. From the media hanger (**1**), feed the media under the dancer assembly (**2**), through the media sensor (**3**), and under the printhead assembly (**4**). Slide the media back until it touches the inside back wall of the media sensor.



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

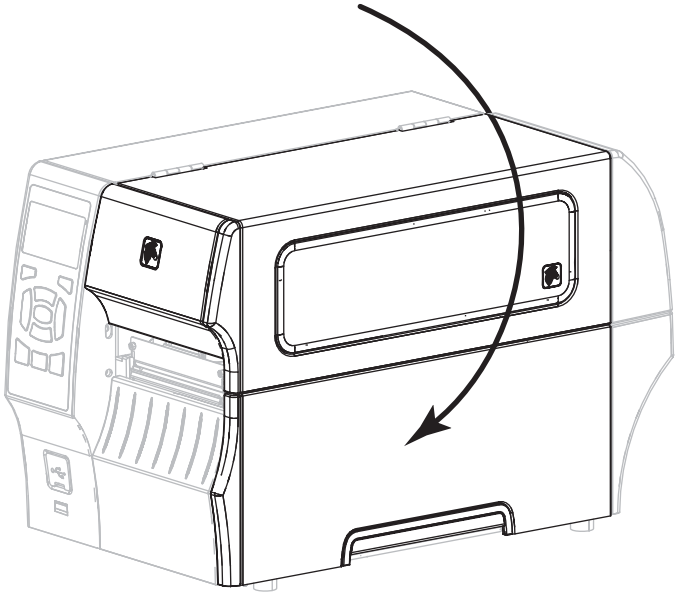


10. Rotate the printhead-open lever downward until it locks the printhead in place.



11. If you have not already done so, load ribbon in the printer. See *Instructions for Loading Ribbon* on page 68.

12. Close the media door.



13. Set the printer to Tear-Off mode (for more information, see *Print Mode* on page 81).

14. Press PAUSE to exit pause mode and enable printing.

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

15. For best results, calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 121.

16. If desired, perform the *CANCEL Self Test* on page 157 to verify that your printer is able to print.

    Media loading in Tear-Off mode is complete.

Instructions for Loading Ribbon

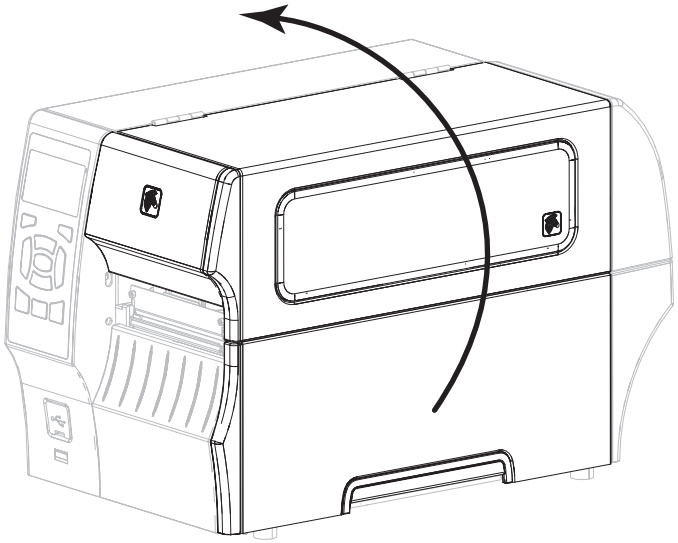
Ribbon is used only with thermal transfer labels. For direct thermal labels, do not load ribbon in the printer. To determine if ribbon must be used with a particular media, see *When to Use Ribbon* *on page 22*.

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

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

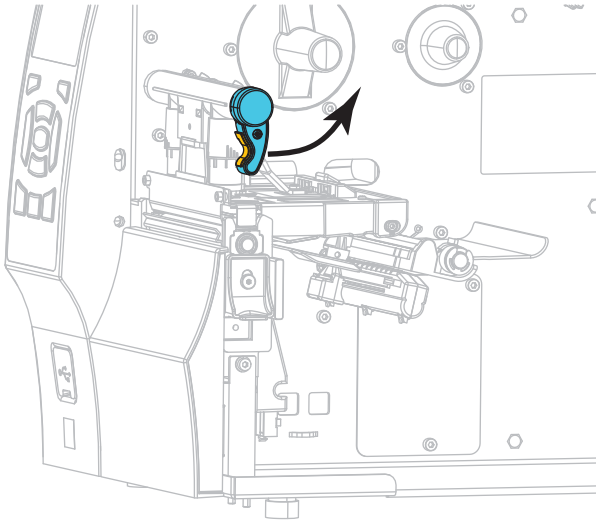
To load ribbon, complete these steps:

1. Raise the media door.

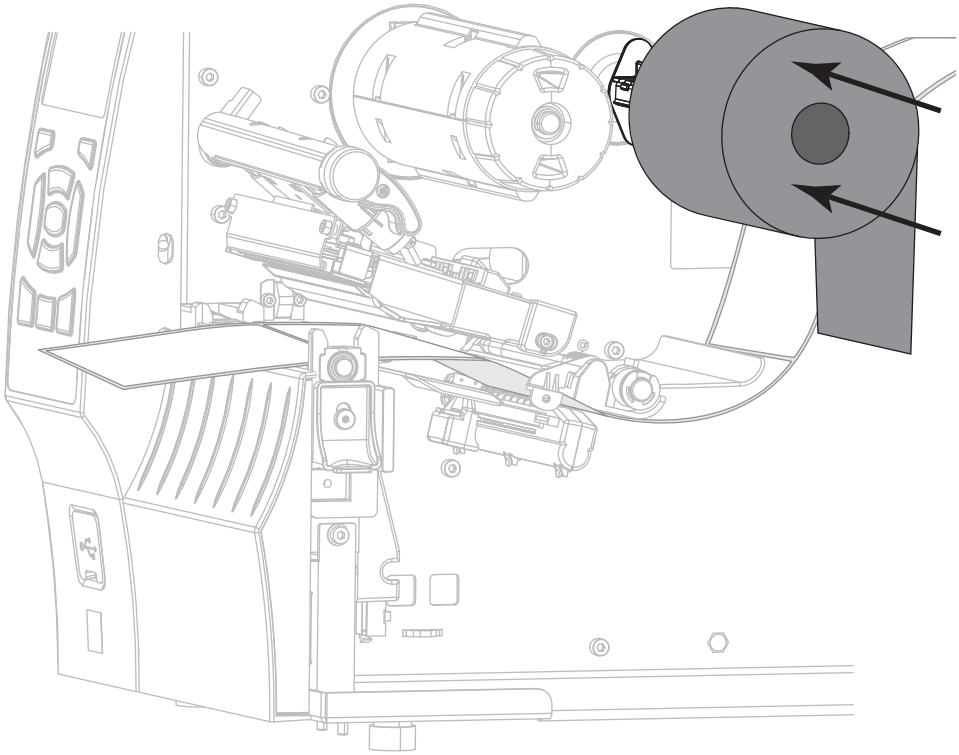


2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

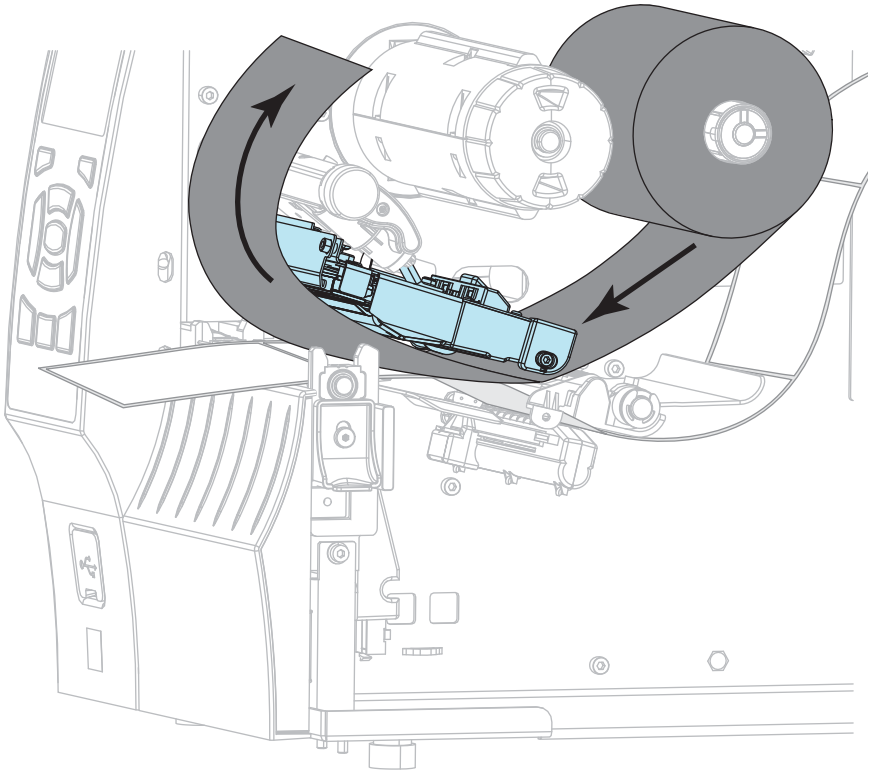
   Open the printhead assembly by rotating the printhead-open lever.



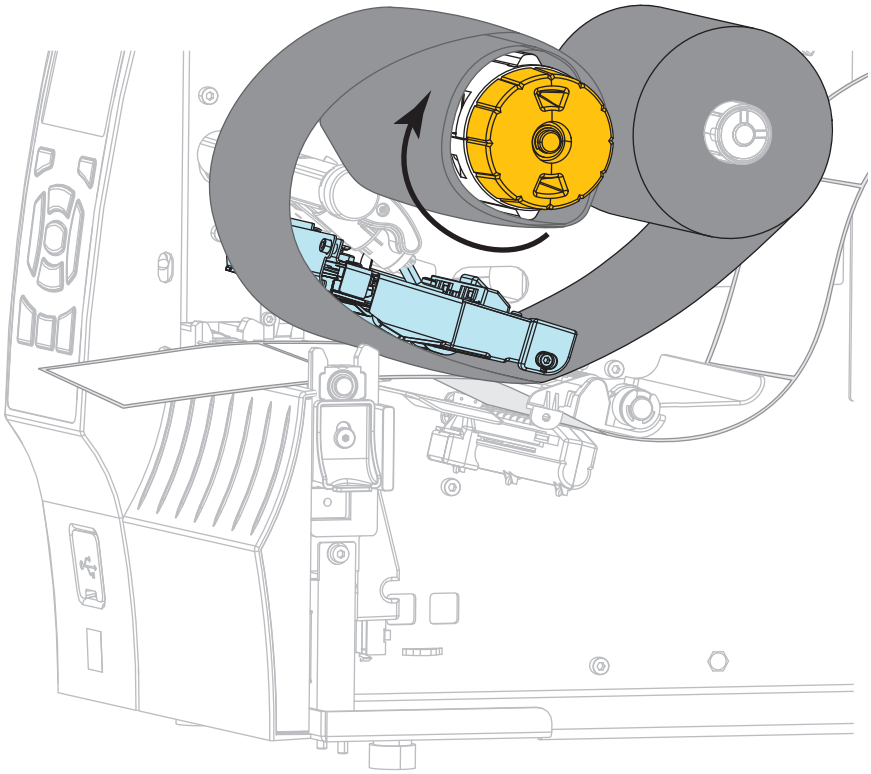
3. Place the roll of ribbon on the ribbon supply spindle with the loose end of the ribbon unrolling as shown. Push the roll back as far as it will go.



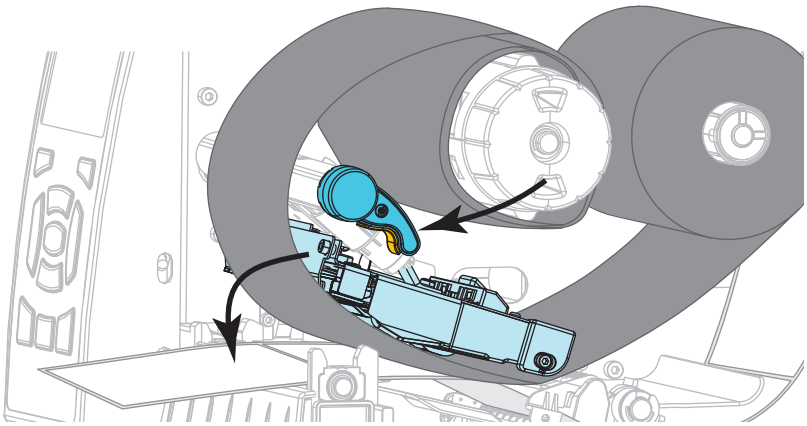
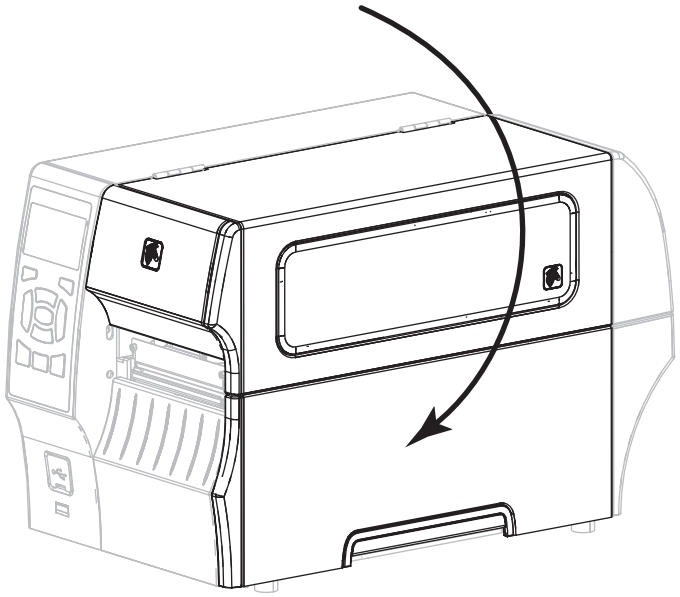
4. Bring the ribbon under the printhead assembly and around its left side, as shown.



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 *Instructions for Loading Media* on page 63 to load media in the printer.
Yes	**a.** Rotate the printhead-open lever downward until it locks the printhead in place.  **b.** Close the media door.  **c.** If necessary, press PAUSE to enable printing.

Sample Label Formats for Silverline Media

CLASSIC Sample Format


```
^XA
^RW27,27,A1
^RS8,B14
^FT140,110^A0N,30,30^FH\^FDZebra Silverline PN 10025340^FS
^FT140,150^A0N,30,30^FH\^FDFor use with Zebra's Custom ZT410 RFID Silverline^FS
^FT140,190^A0N,30,30^FDSerial Number:^FS^FT^A0N,30,30 ^FD678000002001^SF%%%%%%%%%ddd,1^FS
^FO140,260^BY2^B3N,N,60,n,N^FD678000002001^SF%%%%%%%%%ddd, 1^FS
^RFW,H^FD678000002001^SF%%%%%%%%%ddd,1^FS
^PQ3
^XZ
```

SLIM Sample Format


```
^XA
^RW30,30,A1
^RS8,B19
^FT20,130^A0N,28,28^FH\^FDSilverline Slim PN 10025341^FS
^FT20,162^A0N,28,28^FDSerial Number: ^FS^FT^A0N,26,26^FD678000003001^SF%%%%%%%%%ddd,1^FS
^FT490,172^A0N,21,21^FDFor use only on Zebra ZT410 Silverline^FS
^FO490,110^BY2^B3N,N,40,n,N^FD678000003001^SF%%%%%%%%%ddd, 1^FS
^RFW,H^FD678000003001^SF%%%%%%%%%ddd,1^FS
^PQ10
^XZ
```

MICRO Sample Format


```
^XA
^RW27,27,A1
^RS8,B18
^FT30,115^A0N,27,27^FDSilverline Micro PN 10025342^FS
^FT30,145^A0N,27,27^FDSerial Number: ^FS^FT^A0N,26,26 ^FD678000004001^SF%%%%%%%%%ddd,1^FS
^FT30,170^A0N,21,21^FDFor use only on Zebra ZT410 Silverline^FS
^RFW,H^FD678000004001^SF%%%%%%%%%ddd,1^FS
^PQ2
^XZ
```

Notes • _____

3

Printer Configuration and Adjustment

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

Contents

Adjust Printer Settings

This section presents the printer settings that you can change and identifies the tools for changing them. These tools include the following:

- ZPL and Set/Get/Do (SGD) commands (See the *Zebra® Programming Guide* for more information.)
- The printer's **user menus** (See *Idle Display, Home Menu, and User Menus* on page 18 for more information.)
- The printer's **web pages** when the printer has an active wired or wireless print server connection (See the *ZebraNet Wired and Wireless Print Servers User Guide* for more information.)

Copies of the referenced manuals are available at http://www.zebra.com/manuals.

This section contains the following subsections:

Print Settings

Table 4 • Print Settings

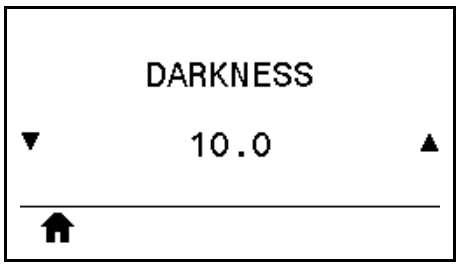
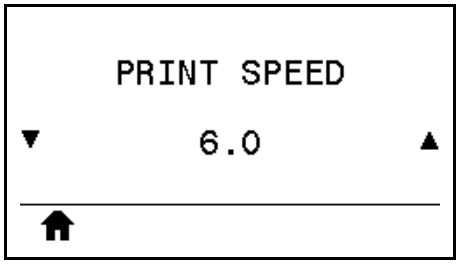
Print Darkness	Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. If desired, use the *FEED Self Test* on page 159 to determine the best darkness setting. **Note** • The recommended darkness setting for this printer is 5.0.	
	User menu item:	Main Menu > SETTINGS 
	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 Speed	Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality. **Note** • The recommended print speed for this printer is 2.0 ips.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	2, 3, 4, 5, 6
	Related ZPL command(s):	^PR
	SGD command used:	media.speed

Table 4 • Print Settings (Continued)

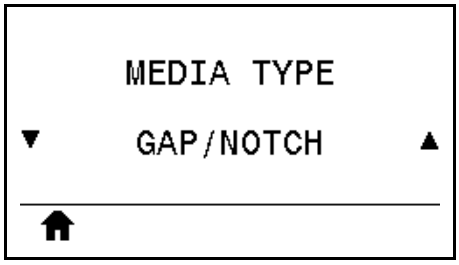
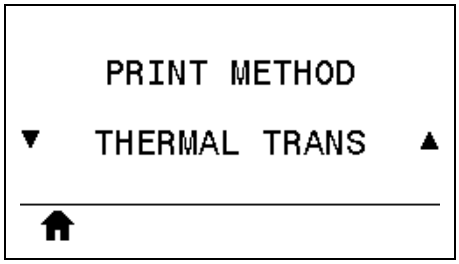
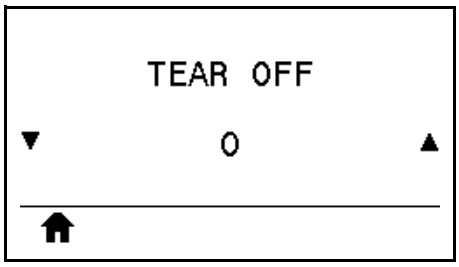
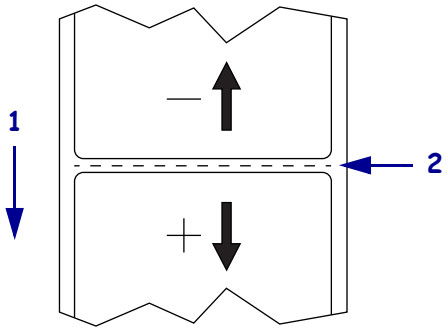
Media Type	Select the type of media that you are using.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	• CONTINUOUS • GAP/NOTCH • MARK If you select CONTINUOUS, you must include a label length in your label format (^LL if you are using ZPL). If you select GAP/NOTCH or MARK for various noncontinuous media, the printer feeds media to calculate the label length. See *Media Overview* on page 20 for more information about types of media.
	Related ZPL command(s):	^MN
	SGD command used:	ezpl.media_type
	Printer web page:	View and Modify Printer Settings > Media Setup > Media Type
Print Method	Specify if the printer needs to use ribbon for printing.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	• THERMAL TRANS—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

Table 4 • Print Settings (Continued)

<table>
<tr><td rowspan="5">Tear-Off Position</td><td colspan="2">If necessary, adjust the position of the media over the tear-off bar after printing.</td></tr>
<tr><td>User menu item:</td><td>Main Menu > SETTINGS
 
</td></tr>
<tr><td>Accepted values:</td><td>-120 to 120
• Higher numbers move the media out (the tear line moves closer to the leading edge of the next label).
• Lower numbers move the media in (the tear line moves closer to the edge of the label just printed).
 

<table>
<tr><td>1</td><td>Media direction</td></tr>
<tr><td>2</td><td>Factory-set tear line location at position 000</td></tr>
</table></td></tr>
<tr><td>Related ZPL command(s):</td><td>~TA</td></tr>
<tr><td>SGD command used:</td><td>ezpl.tear_off</td></tr>
<tr><td>Printer web page:</td><td>View and Modify Printer Settings > General Setup > Tear Off</td></tr>
</table>

Table 4 • Print Settings (Continued)

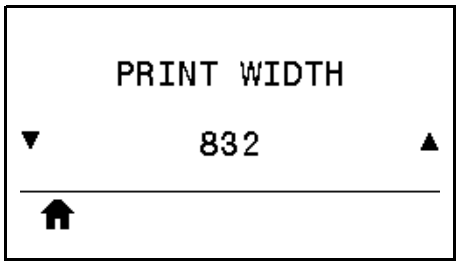
Print Width	Specify the width of the labels being used, in dots. The default value is the maximum width for the printer, based on the printhead's DPI value.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	**Note •** Setting the width too narrow can result in portions of a label format not being 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. ZT410 203 dpi = `0002` to `832`
	Related ZPL command(s):	`^PW`
	SGD command used:	`ezpl.print_width`
	Printer web page:	View and Modify Printer Settings > Media Setup > Print Width

Table 4 • Print Settings (Continued)

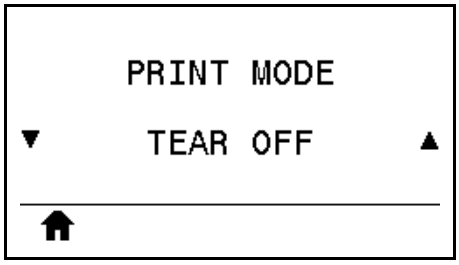
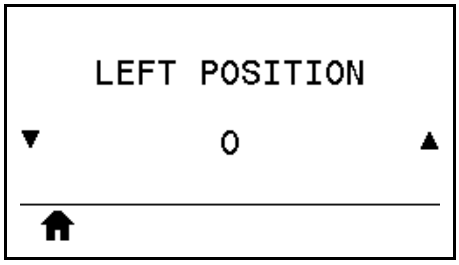
Print Mode	Select a print mode that is compatible with your printer options.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	• TEAR OFF • CUTTER * • PEEL * • REWIND * * Do not use with Silverline media.
	Related ZPL command(s):	^MM
	SGD command used:	media.printmode
	Printer web page:	View and Modify Printer Settings > General Setup > Print Mode
Label Left Position	If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.	
	User menu item:	Main Menu > SETTINGS 
	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

Table 4 • Print Settings (Continued)

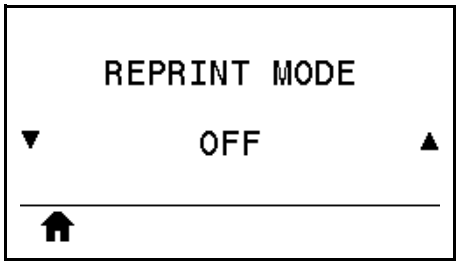
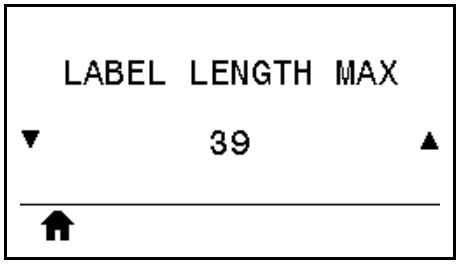
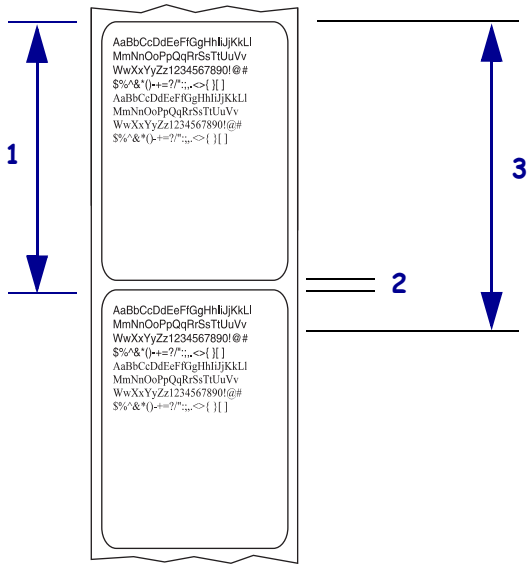
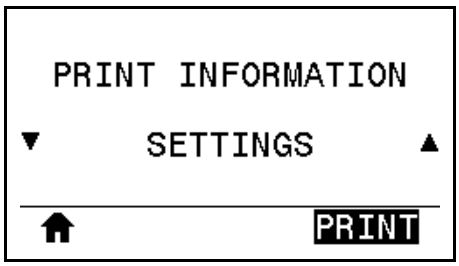
Reprint Mode	When reprint mode is enabled, you can reprint the last label printed by pressing and holding PAUSE + CANCEL or by pressing the DOWN ARROW when at the printer's Idle Display.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	• ON • OFF
	Related ZPL command(s):	^JZ
	SGD command used:	ezpl.reprint_mode

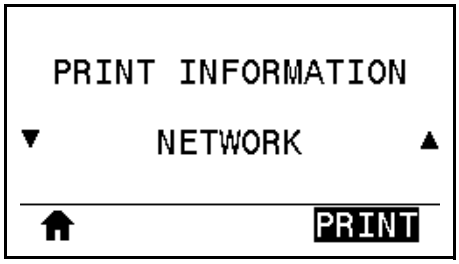
Table 4 • Print Settings (Continued)

Maximum Label Length	Set the maximum label length.	
	User menu item:	Main Menu > SETTINGS 
	Accepted values:	`0` to the maximum label length supported by the printer **Important •** Specify a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate. The maximum label length recommended for this printer is 5 in.  **1** Label length (including interlabel gap) **2** Interlabel gap **3** Set the maximum label length to approximately this value
	Related ZPL command(s):	`^ML`
	SGD command used:	`ezpl.label_length_max`
	Printer web page:	View and Modify Printer Settings > Media Setup > Maximum Length

Tool Settings

Table 5 • Tools

<table>
<tr><td rowspan="3">Print Information</td><td colspan="2">Print the specified information on one or more labels.
Important • Printing these labels will use several Silverline tags.</td></tr>
<tr><td>User menu item:</td><td>Main Menu > TOOLS
 

Main Menu > NETWORK
 

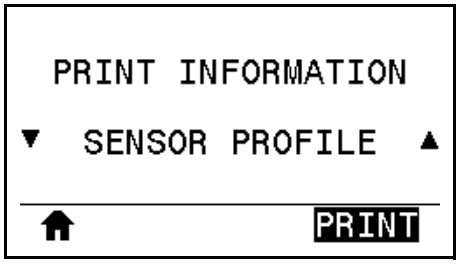
Main Menu > SENSORS
 
</td></tr>
<tr><td colspan="2">(Continued on next page.)</td></tr>
</table>

Table 5 • Tools (Continued)

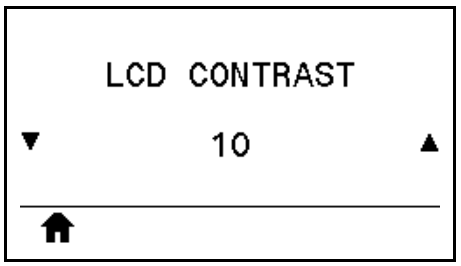
Print Information (continued)	*Accepted values:*	• SETTINGS—prints the printer configuration label. • NETWORK—prints the settings for any print server that is installed. • FORMATS—prints the available formats stored in the printer's RAM, Flash memory, or optional memory card. • IMAGES—prints the available 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 bar codes in the printer. Bar codes may be stored in RAM or Flash memory. • ALL—prints the previous six labels. • SENSOR PROFILE—shows the sensor settings compared to actual sensor readings. To interpret the results, see *Sensor Profile* on page 164.
	Related ZPL command(s):	SETTINGS: ^HH (return printer information to the host) ~WC (print on labels) NETWORK: ~WL SENSOR PROFILE: ~JG Others: ^WD
	Control panel key(s):	SETTINGS and NETWORK: Do one of the following: • Hold CANCEL during printer power-up. • Hold FEED + CANCEL for 2 seconds when the printer is in the Ready state. SENSOR PROFILE: Hold FEED + CANCEL during printer power-up.
	Printer web page:	View and Modify Printer Settings > Print Listings on Label
LCD Contrast	Change the contrast on the printer's display.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	3 to 15
	SGD command used:	display.contrast

Table 5 • Tools (Continued)

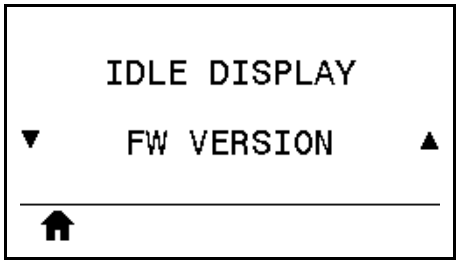
Idle Display	Select the information shown on the printer's display when the printer is idle.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• FW VERSION • IP ADDRESS • MM/DD/YY 24 HR • MM/DD/YY 12 HR • DD/MM/YY 24 HR • DD/MM/YY 12 HR
	SGD command used:	`device.idle_display_format`

Table 5 • Tools (Continued)

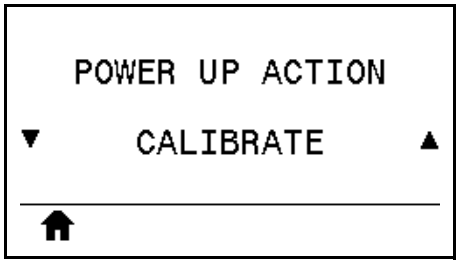
Power-Up Action	Set the action for the printer to take during the power-up sequence. **Important** • The FEED setting is recommended for this printer, but it causes a tag to be fed each time the printer is powered up.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• CALIBRATE—adjusts sensor levels 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

Table 5 • Tools (Continued)

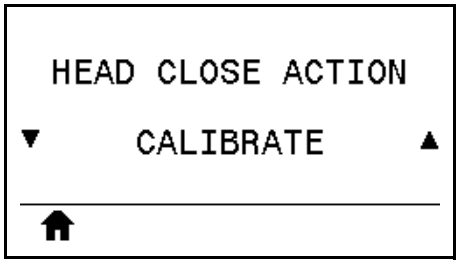
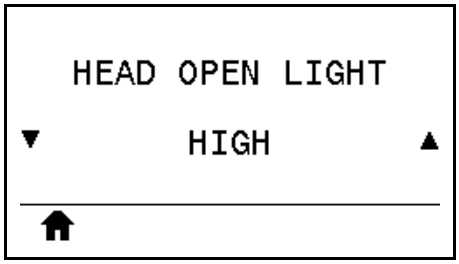
Head-Close Action	Set the action for the printer to take when you close the printhead. **Important** • The FEED setting is recommended for this printer, but it causes a tag to be fed each time the printhead is closed.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• CALIBRATE—adjusts sensor levels 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
Head-Open Light	Set the brightness of the light that turns on when the printhead is open.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• HIGH • MEDIUM • LOW • OFF
	SGD command used:	device.light.head_open_brightness

Table 5 • Tools (Continued)

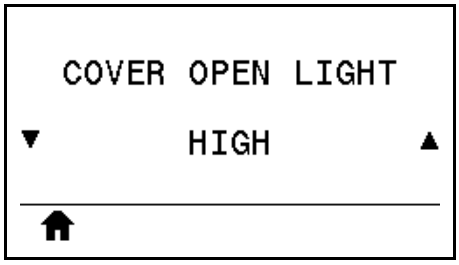
Cover-Open Light	Set the brightness of the light that turns on when the media door is open.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• HIGH • MEDIUM • LOW • OFF
	SGD command used:	`device.light.cover_open_brightness`

Table 5 • Tools (Continued)

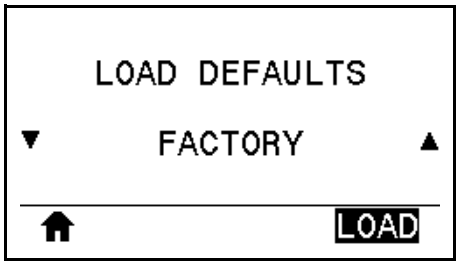
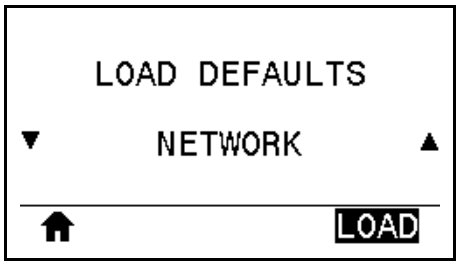
Load Defaults	Restore specific printer, print server, and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.	
	User menu item:	Main Menu > TOOLS  Main Menu > NETWORK 
	Accepted values:	• FACTORY—Restores 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):	FACTORY: ^JUF NETWORK: ^JUN LAST SAVED: ^JUR
	Control panel key(s):	FACTORY: 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:	FACTORY: 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

Table 5 • Tools (Continued)

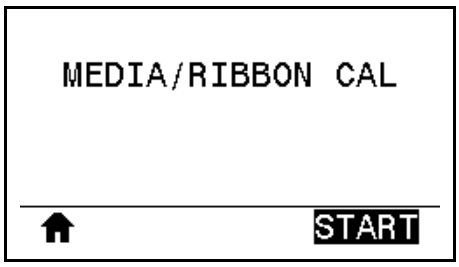
Media and Ribbon Sensor Calibration	Calibrate the printer to adjust the sensitivity of the media and ribbon sensors. For complete instructions on how to perform a calibration procedure, see *Calibrate the Ribbon and Media Sensors* on page 121.	
	User menu item:	Main Menu > TOOLS Main Menu > SENSORS 
	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.

Table 5 • Tools (Continued)

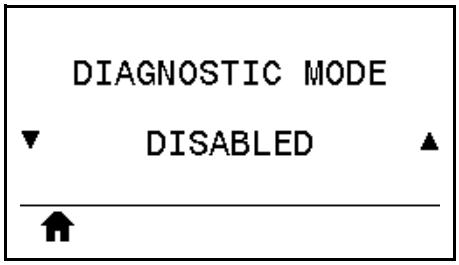
Communication Diagnostics Mode	Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer. For more information, see *Communication Diagnostics Test* on page 163.	
	User menu item:	Main Menu > TOOLS 
	Accepted values:	• DISABLED • ENABLED
	Related 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.

Table 5 • Tools (Continued)

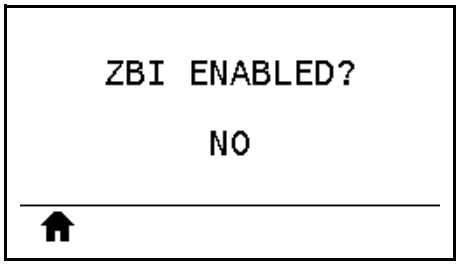
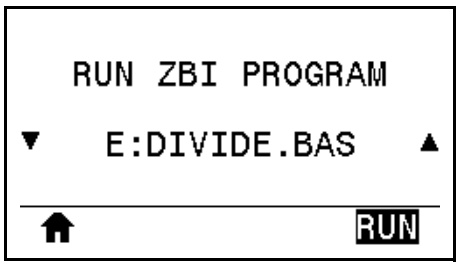
Enable ZBI	Zebra Basic Interpreter (ZBI 2.0™) is a programming option that may be purchased for your printer. If you would like to purchase this option, contact your Zebra reseller for more information.	
	User menu item:	Main Menu > TOOLS 
	SGD command used:	`zbi.key` (identifies if the ZBI 2.0 option is enabled or disabled on the printer)
Run a ZBI Program	If you have ZBI installed, you may choose to run a ZBI program that you have downloaded to your printer.	
	*User menu item: ** * *This menu item appears only if ZBI is enabled on your printer and no ZBI program is running.*	Main Menu > TOOLS  If ZBI programs exist on your printer, they are listed. If no program exists, NONE is listed. If you wish to run a ZBI program that you have downloaded to your printer: **1.** Use the UP ARROW or DOWN ARROW to select a file from this menu. **2.** Press RIGHT SELECT to select **RUN**. If no program exists, the RUN option does not perform an action.
	Related ZPL command(s):	`^JI`, `~JI`
	SGD command used:	`zbi.control.run`
	Printer web page:	Directory Listing

Table 5 • Tools (Continued)

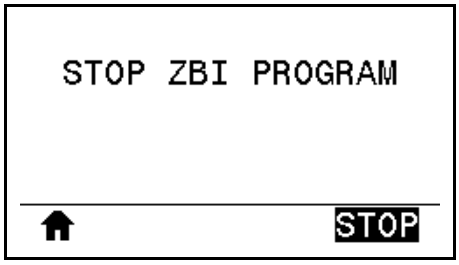
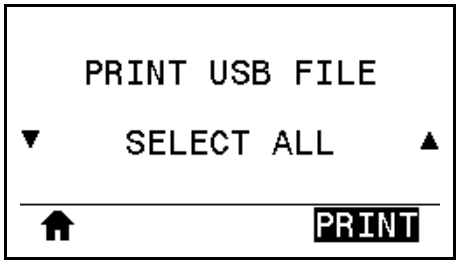
Stop a ZBI Program	If your printer is running a ZBI program, you may stop that program.	
	*User menu item: ** * *This menu item appears only if ZBI is enabled on your printer and no ZBI program is running.*	Main Menu > TOOLS  If ZBI programs are running, the printer lists them. If you wish to stop a program: **1.** Use the UP ARROW or DOWN ARROW to select the file from this menu. **2.** Press RIGHT SELECT to select **STOP**.
	Related ZPL command(s):	`~JQ`
	SGD command used:	`zbi.control.terminate`
	Printer web page:	Directory Listing
Print from a USB Flash Drive	Select files to print from a USB Flash drive.	
	*User menu item: ** * *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*	Main Menu > TOOLS  **1.** Insert a USB flash drive into the printer's USB host port. The printer lists available files. **SELECT ALL** is available to print all available files on the USB Flash drive. **2.** Use the UP ARROW or DOWN ARROW to select a file from this menu. **3.** Press RIGHT SELECT to select **PRINT**.
	SGD command used:	`usb.host.read_list`

Table 5 • Tools (Continued)

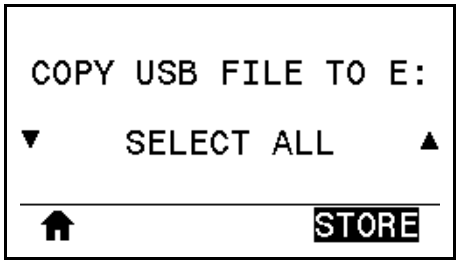
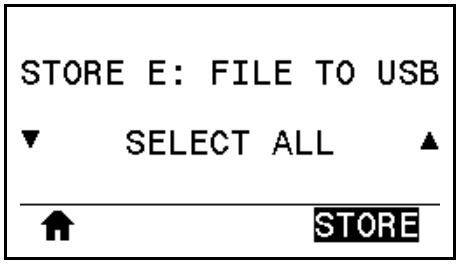
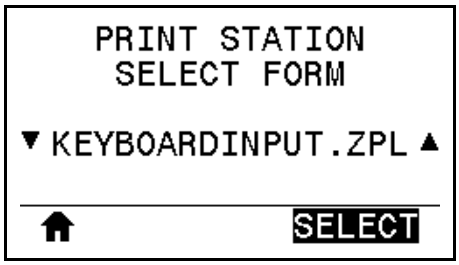
Copy Files from a USB Flash Drive	Select files to copy to the printer from a USB Flash drive.	
	User menu item: * * *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*	Main Menu > TOOLS  1. Insert a USB flash drive into the printer's USB host port. The printer lists available files. **SELECT ALL** is available to copy all available files from the USB Flash drive. 2. Use the UP ARROW or DOWN ARROW to select a file from this menu. 3. Press RIGHT SELECT to select **STORE**.
	SGD command used:	`usb.host.read_list`
Store Files on a USB Flash Drive	Select files from the printer to store on a USB Flash drive.	
	User menu item: * * *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*	Main Menu > TOOLS  1. Insert a USB flash drive into the printer's USB host port. The printer lists available files. **SELECT ALL** is available to store all files available files from the printer on the USB Flash drive. 2. Use the UP ARROW or DOWN ARROW to select a file from this menu. 3. Press RIGHT SELECT to select **STORE**.
	SGD command used:	`usb.host.write_list`

Table 5 • Tools (Continued)

Fill in a Form or Print a Label Format from the Display	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 or barcode scanner. A suitable label format must be stored on the E: drive of the printer to use this option. When the printer finds an HID plugged into the printer's USB host port, it uses this user menu to prompt you 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, refer to the *Zebra Programming Guide*. You can download a copy of the manual from http://www.zebra.com/manuals/.	
	*User menu item: ** * *This menu item appears only if a USB Flash drive is inserted into the USB host port on the printer.*	Main Menu > TOOLS  1. Insert a USB flash drive into the printer's USB host port. The printer lists available files. 2. Use the UP ARROW or DOWN ARROW to select a file from this menu. 3. Press RIGHT SELECT to select **SELECT**. The printer accesses the file and prompts for the information in the ^FN fields in the file. 4. Use your keyboard or barcode scanner to enter the requested information. When using a keyboard, press <ENTER> after entering the appropriate information in the field. When all ^FN fields have been filled, the printer prompts for the number of labels to print. 5. Specify the desired number of labels. The specified number of labels is printed with your data in the appropriate fields.
	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

Network Settings

Table 6 • Network Settings

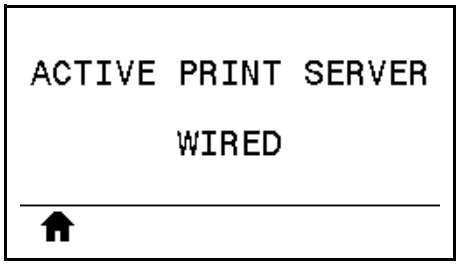
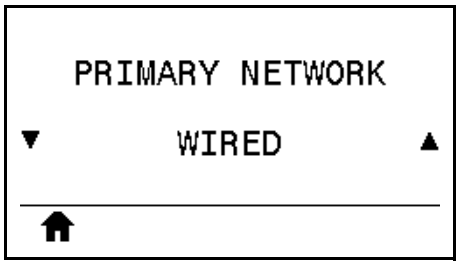
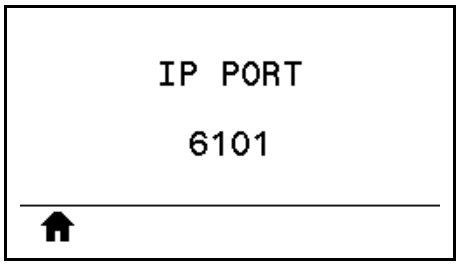
Active Print Server	Only one print server (wired or wireless) can be installed at a time. Therefore, the print server installed is the active print server.	
	*User menu item: ** * This menu item cannot be modified from the control panel.	Main Menu > NETWORK 
Primary Print Server	Only one print server (wired or wireless) can be installed at a time. Therefore, the print server installed is the primary print server.	
	*User menu item: ** * This menu item cannot be modified from the control panel.	Main Menu > NETWORK 
Primary TCP/IP Port	View the Ethernet TCP port number, over which labels and commands can be sent for processing.	
	*User menu item: ** * This menu item cannot be modified from the control panel.	Main Menu > NETWORK 

Table 6 • Network Settings (Continued)

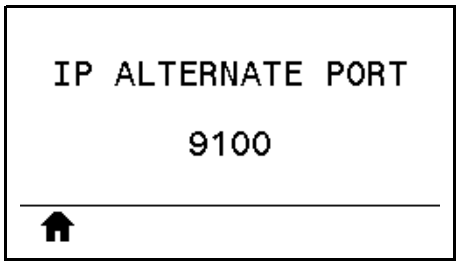
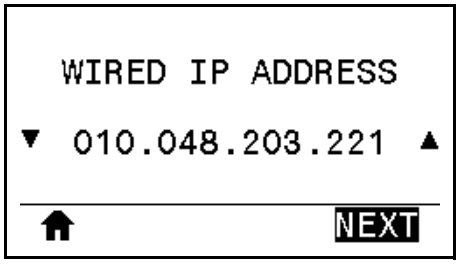
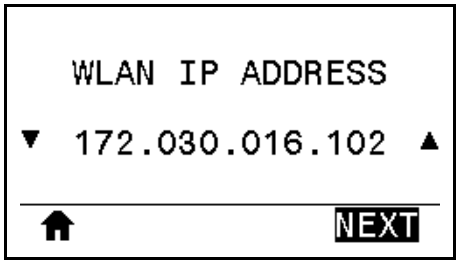
Alternate TCP/IP Port	View the alternate Ethernet TCP port number, over which labels and commands can be sent for processing.	
	User menu item: * * This menu item cannot be modified from the control panel.	Main Menu > NETWORK 
IP Address	View and, if necessary, change the printer's IP address. To save changes to this setting, set IP Protocol on page 101 to PERMANENT, and then reset the print server (see *Reset Network* on page 103).	
	User menu item:	Main Menu > NETWORK  
	Accepted values:	`000` to `255` for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.addr` Wireless: `ip.addr`, `wlan.ip.addr`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

Table 6 • Network Settings (Continued)

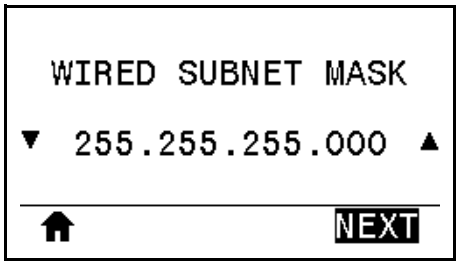
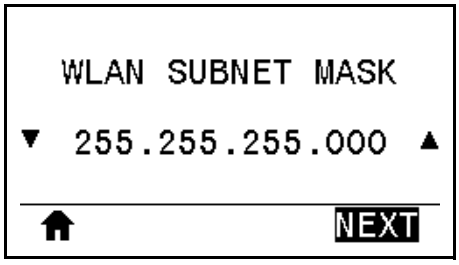
Subnet Mask	View and, if necessary, change the subnet mask. To save changes to this setting, set IP Protocol on page 101 to PERMANENT, and then reset the print server (see *Reset Network* on page 103).	
	User menu item:	Main Menu > NETWORK  
	Accepted values:	`000` to `255` for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.netmask` Wireless: `wlan.ip.netmask`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

Table 6 • Network Settings (Continued)

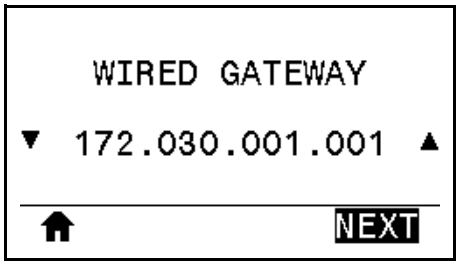
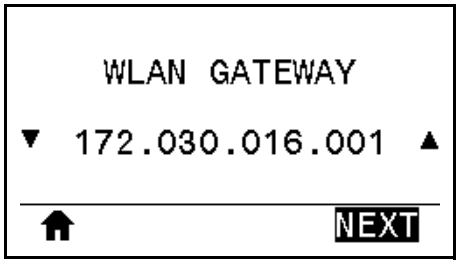
Gateway	View and, if necessary, change the default gateway. To save changes to this setting, set IP Protocol on page 101 to PERMANENT, and then reset the print server (see *Reset Network* on page 103).	
	User menu item:	Main Menu > NETWORK  
	Accepted values:	`000` to `255` for each field
	Related ZPL command(s):	`^ND`
	SGD command used:	Wired: `internal_wired.ip.gateway` Wireless: `wlan.ip.gateway`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

Table 6 • Network Settings (Continued)

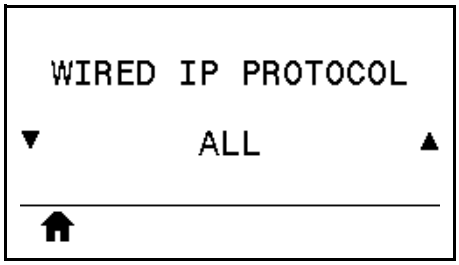
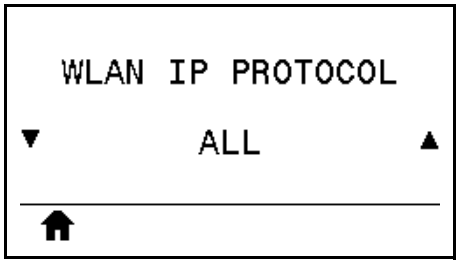
IP Protocol	This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. When a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.	
	User menu item:	Main Menu > NETWORK  
	Accepted values:	• ALL • GLEANING ONLY • RARP • BOOTP • DHCP • DHCP & BOOTP • PERMANENT
	Related ZPL command(s):	^ND
	SGD command used:	Wired: internal_wired.ip.protocol Wireless: wlan.ip.protocol
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > TCP/IP Settings

Table 6 • Network Settings (Continued)

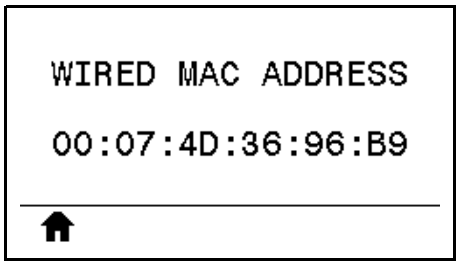
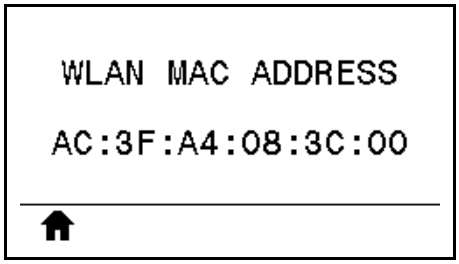
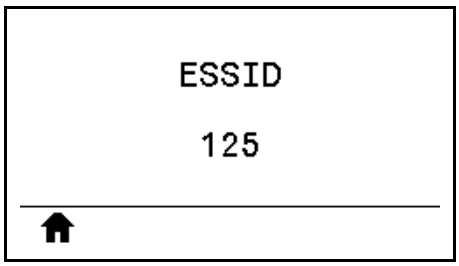
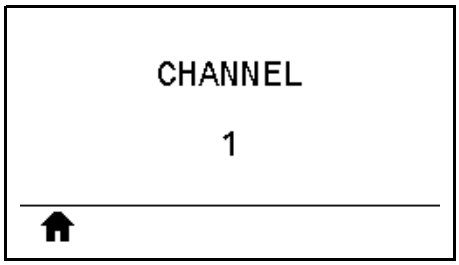
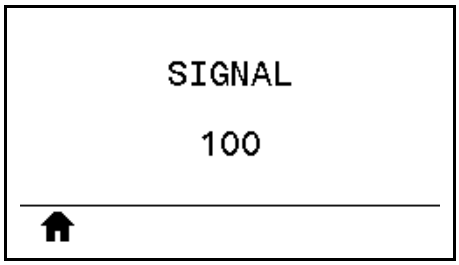
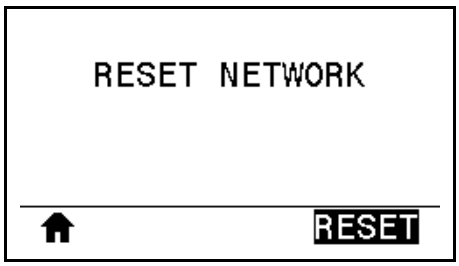
MAC Address	View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).	
	User menu item:	Main Menu > NETWORK  
	SGD command used:	Wired: `internal_wired.mac_addr` Wireless: `wlan.mac_addr`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
ESSID	The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.	
	User menu item:	Main Menu > NETWORK 
	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

Table 6 • Network Settings (Continued)

Channel	View the wireless channel being used when the wireless network is active and authenticated.	
	User menu item:	Main Menu > NETWORK 
	SGD command used:	`wlan.channel`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
Signal	View the wireless signal strength when the wireless network is active and authenticated.	
	User menu item:	Main Menu > NETWORK 
	SGD command used:	`wlan.signal_strength`
	Printer web page:	View and Modify Printer Settings > Network Communications Setup > Wireless Setup
Reset Network	This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.	
	User menu item:	Main Menu > NETWORK 
	Related ZPL command(s):	`~WR`
	SGD command used:	`device.reset`
	Printer web page:	Print Server Settings > Reset Print Server

RFID Settings

Table 7 • RFID Settings

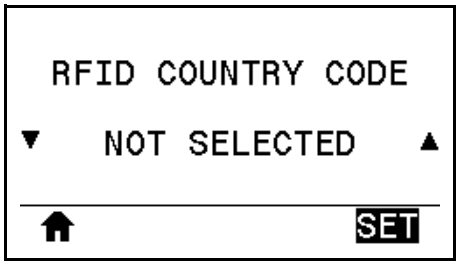
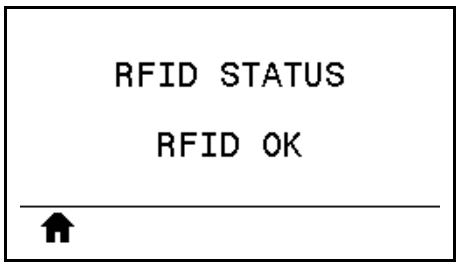
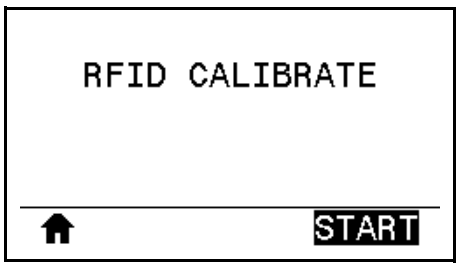
RFID Country Code	View the RFID country code. **Note •** A prompt for the country code appears only on some printers the first time that they are powered up, depending on the world region to which the printers were shipped. Select the appropriate country to access the printer's RFID features.	
	User menu item:	Main Menu > RFID 
	SGD command used:	`rfid.country_code`
RFID Status	Display the status of the RFID subsystem of the printer.	
	User menu item:	Main Menu > RFID 
	Related ZPL command(s):	^HL or ~HL
	SGD command used:	`rfid.error.response`
RFID Tag Calibration	Initiate tag calibration for RFID media. (Not the same as media and ribbon calibration.)	
	User menu item:	Main Menu > RFID 
	Related ZPL command(s):	^HR
	SGD command used:	`rfid.tag.calibrate`

Table 7 • RFID Settings (Continued)

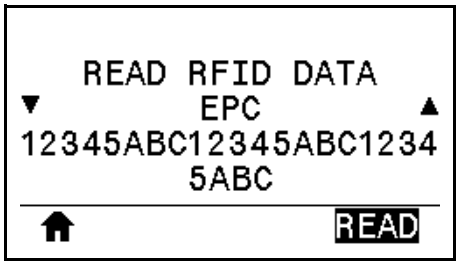
Read RFID Data	Read and return the specified tag data from the RFID tag located over the RFID antenna. No printer movement occurs while tag data is being read. The printhead can be open or closed.	
	User menu item:	Main Menu > RFID  To read and display the information stored on an RFID tag: **1.** Position the RFID label with its transponder over the RFID antenna. **2.** Use the UP ARROW or DOWN ARROW to select the type of information that you want read and displayed. **3.** Press RIGHT SELECT to select READ. The results of the test are shown on the display.
	Accepted values:	`epc`—reads the first 128 bits of EPC data `tid information`—reads the first 32 bits of the TID (Tag ID) `password status`—reads the tag's access and kill passwords `protocol bits`—reads the protocol bits from the EPC memory banks and converts that value to the EPC size `memory bank sizes`—reads the EPC, TID, and user memory banks sizes
	Related ZPL command(s):	`^RF`
	SGD command used:	`rfid.tag.read.content` and `rfid.tag.read.execute`

Table 7 • RFID Settings (Continued)

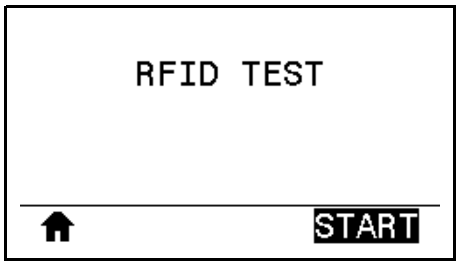
RFID Test	During the RFID test, the printer attempts to read and write to a transponder. No printer movement occurs with this test.	
	User menu item:	Main Menu > RFID  To test an RFID label: **1.** Position the RFID label with its transponder over the RFID antenna array. **2.** Press RIGHT SELECT to select START. The results of the test are shown on the display.
	Accepted values:	`quick`—performs a read EPC test and a write EPC test (using random data) `read`—performs a read EPC test `write`—performs a write EPC test (using random data)
	SGD command used:	`rfid.tag.test.content` and `rfid.tag.test.execute`

Table 7 • RFID Settings (Continued)

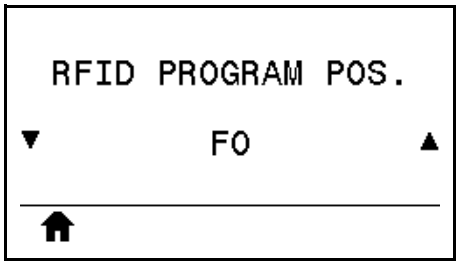
Programming Position	If the desired programming position (read/write position) is not achieved through RFID tag calibration, a value may be specified. See the *RFID Programming Guide 3* for more information.	
	User menu item:	Main Menu > RFID 
	Accepted values:	`F0` to `Fxxx` (where `xxx` is the label 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

Table 7 • RFID Settings (Continued)

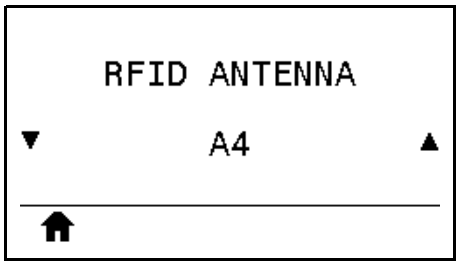
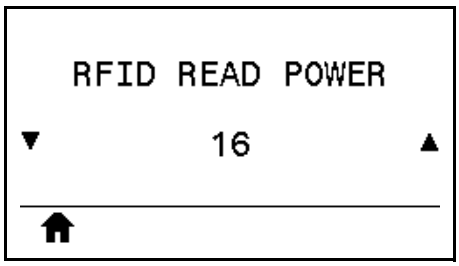
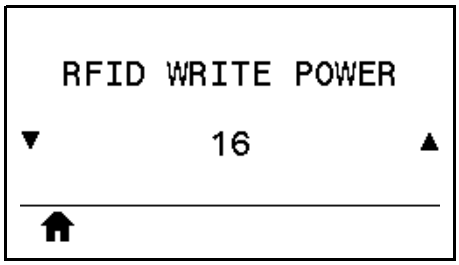
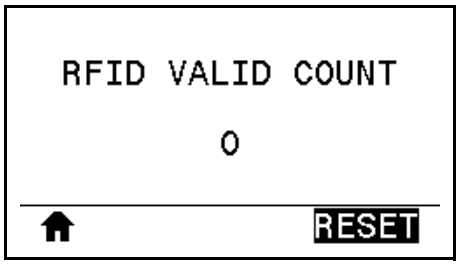
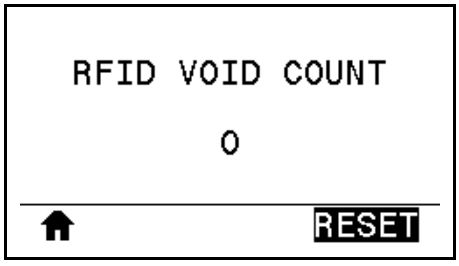
RFID Antenna Element	If the desired antenna is not achieved through RFID tag calibration, a value may be specified.	
	User menu item:	Main Menu > RFID 
	Accepted values:	A1, A2, A3, A4 B1, B2, B3, B4 C1, C2, C3, C4 D1, D2, D3, D4 E1, E2, E3, E4
	Related ZPL command(s):	^RW
	SGD command used:	rfid.reader_1.antenna_port
	Printer web page:	View and Modify Printer Settings > RFID Setup > RFID ANTENNA
RFID Read Power	If the desired read power is not achieved through RFID tag calibration, a value may be specified.	
	User menu item:	Main Menu > RFID 
	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

Table 7 • RFID Settings (Continued)

RFID Write Power	If the desired write power is not achieved through RFID tag calibration, a value may be specified.	
	User menu item:	Main Menu > RFID 
	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 Valid Counter	Resets the RFID valid label counter to zero.	
	User menu item:	Main Menu > RFID 
	Related ZPL command(s):	~RO
	SGD command used:	odometer.rfid.valid_resettable
RFID Void Counter	Resets the RFID void label counter to zero.	
	User menu item:	Main Menu > RFID 
	Related ZPL command(s):	~RO
	SGD command used:	odometer.rfid.void_resettable

Language Settings

Table 8 • Language Settings

Language	If necessary, change the language that the printer displays. This change affects the words shown on the following: • the Home menu • 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	
	User menu item:	Main Menu > SETTINGS Main Menu > LANGUAGE  **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.
	Accepted values:	ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, CZECH, JAPANESE, KOREAN, ROMANIAN, RUSSIAN, POLISH, SIMPLIFIED CHINESE, TRADITIONAL CHINESE
	Related ZPL command(s):	^KL
	SGD command used:	display.language
	Printer web page:	View and Modify Printer Settings > General Setup > Language

Table 8 • Language Settings (Continued)

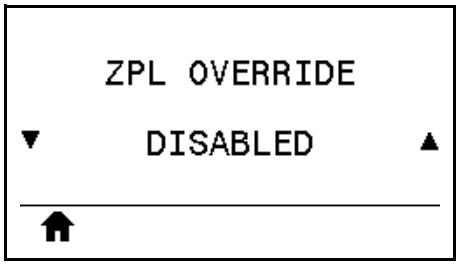
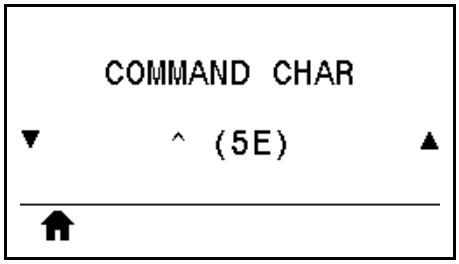
ZPL Override	Enable this menu item to prevent the following ZPL commands from changing the printer's current settings: • ^MM (print mode) • ^MT (Direct Thermal or Thermal Transfer print method) • ^MN (media type non-continuous or continuous) When this menu item is disabled, these commands override the printer's settings.	
	User menu item:	Main Menu > LANGUAGE 
	Accepted values:	• DISABLED • ENABLED
	SGD command used:	zpl.zpl_override
Command Character	The format command prefix is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this hex character to indicate the start of a ZPL/ZPL II format instruction. Set the format command character to match what is used in your label formats. **Important •** You cannot use the same hex value for the format command prefix, control character, and delimiter characters. The printer must see different characters to work properly. If you are setting the value through the control panel, the printer will skip any value that is already in use.	
	User menu item:	Main Menu > LANGUAGE 
	Accepted values:	00 to FF
	Related ZPL command(s):	^CC or ~CC
	SGD command used:	zpl.caret
	Printer web page:	View and Modify Printer Settings > ZPL Control

Table 8 • Language Settings (Continued)

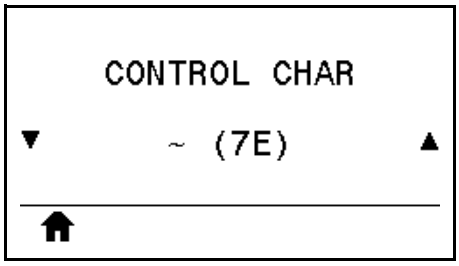
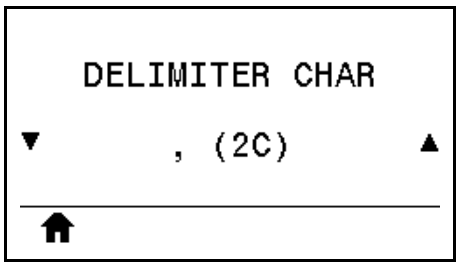
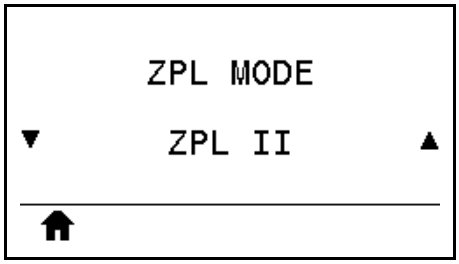
Control Character	The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction. Set the control prefix character to match what is used in your label formats.	
	User menu item:	Main Menu > LANGUAGE 
	Accepted values:	00 to FF
	Related ZPL command(s):	^CT or ~CT
	SGD command used:	zpl.control_character
	Printer web page:	View and Modify Printer Settings > ZPL Control
Delimiter Character	The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. Set the delimiter character to match what is used in your label formats.	
	User menu item:	Main Menu > LANGUAGE 
	Accepted values:	00 to FF
	Related ZPL command(s):	^CD or ~CD
	SGD command used:	zpl.delimiter
	Printer web page:	View and Modify Printer Settings > ZPL Control

Table 8 • Language Settings (Continued)

ZPL Mode	Select the mode that matches what is used in your label formats. This printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. The printer remains in the selected mode until it is changed in one of the ways listed here.	
	User menu item:	Main Menu > LANGUAGE 
	Accepted values:	• ZPL II • ZPL
	Related ZPL command(s):	^SZ
	SGD command used:	zpl.zpl_mode
	Printer web page:	View and Modify Printer Settings > ZPL Control

Sensor Settings

Table 9 • Sensor Settings

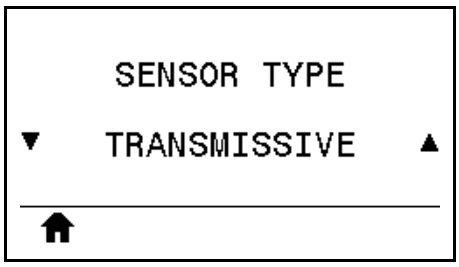
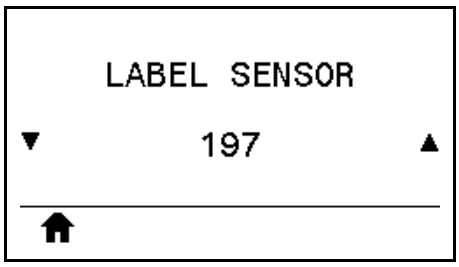
Sensor Type	Select the media sensor that is appropriate for the media that you are using. The reflective sensor typically is used only for black mark media. The transmissive sensor typically is used for other media types.	
	User menu item:	Main Menu > SENSORS 
	Accepted values:	• TRANSMISSIVE • REFLECTIVE
	Related ZPL command(s):	^JS
	SGD command used:	device.sensor_select
	Printer web page:	View and Modify Printer Settings > Media Setup
Label Sensor	Set the sensitivity of the label sensor. **Important** • This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.	
	User menu item:	Main Menu > SENSORS 
	Accepted values:	0 to 255
	SGD command used:	ezpl.label_sensor
	Printer web page:	View and Modify Printer Settings > Calibration

Table 9 • Sensor Settings (Continued)

Take Label Sensor	Set the intensity of the take label LED. **Important •** This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.	
	User menu item:	Main Menu > SENSORS 
	Accepted values:	`0` to `255`
	SGD command used:	`ezpl.take_label`
	Printer web page:	View and Modify Printer Settings > Calibration

Port Settings

Table 10 • Port Settings

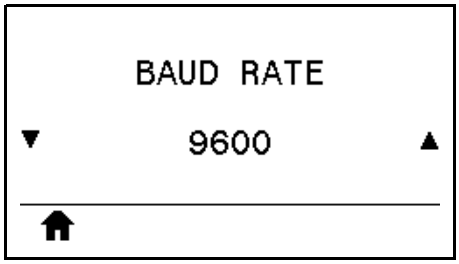
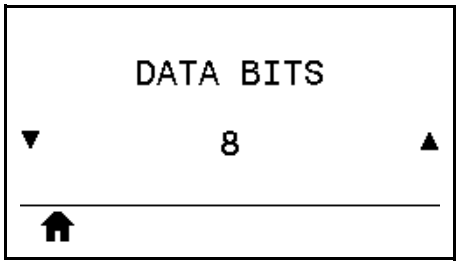
Baud Rate	Select the baud value that matches the one being used by the host computer.	
	User menu item:	Main Menu > PORTS 
	Accepted values:	• 115200 • 57600 • 38400 • 28800 • 19200 • 14400 • 9600 • 4800
	Related ZPL command(s):	^SC
	SGD command used:	comm.baud
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup
Data Bits	Select the data bits value that matches the one being used by the host computer.	
	User menu item:	Main Menu > PORTS 
	Accepted values:	7 or 8
	Related ZPL command(s):	^SC
	SGD command used:	comm.data_bits
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup

Table 10 • Port Settings (Continued)

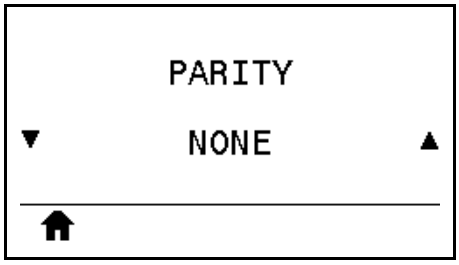
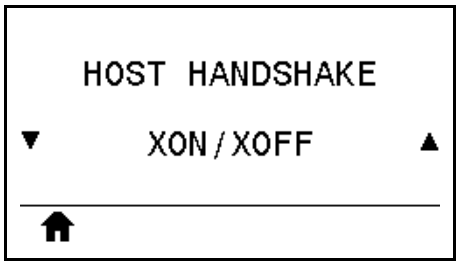
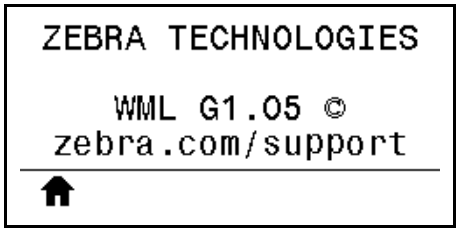
Parity	Select the parity value that matches the one being used by the host computer.	
	User menu item:	Main Menu > PORTS 
	Accepted values:	• NONE • EVEN • ODD
	Related ZPL command(s):	^SC
	SGD command used:	comm.parity
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup
Host Handshake	Select the handshake protocol that matches the one being used by the host computer.	
	User menu item:	Main Menu > PORTS 
	Accepted values:	• XON/XOFF • RTS/CTS • DSR/DTR
	Related ZPL command(s):	^SC
	SGD command used:	comm.handshake
	Printer web page:	View and Modify Printer Settings > Serial Communications Setup

Table 10 • Port Settings (Continued)

Wireless Markup Language (WML) Version	View the WML version. This value cannot be changed.	
	User menu item:	Main Menu > PORTS 

Bluetooth Settings

Table 11 • Bluetooth Settings

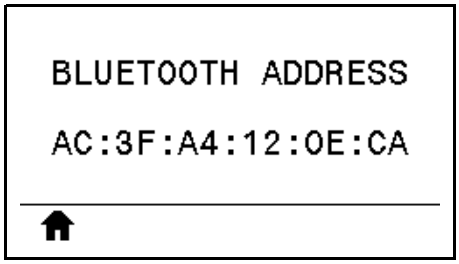
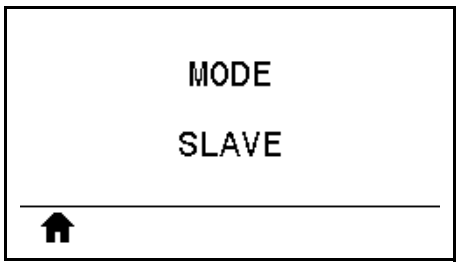
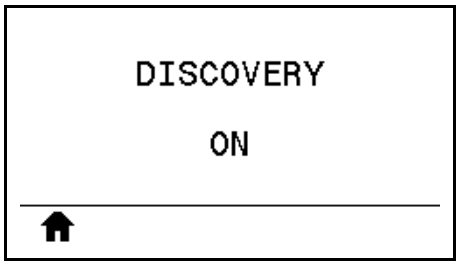
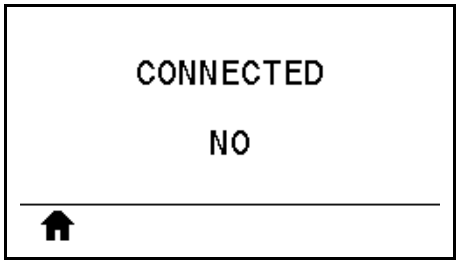
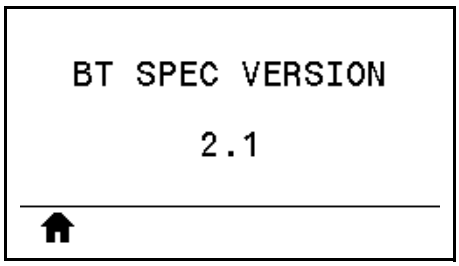
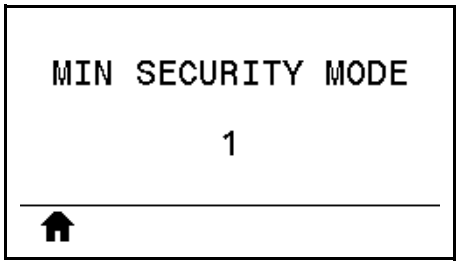
Bluetooth Address	Displays the printer's Bluetooth Device Address	
	User menu item:	Main Menu > BLUETOOTH 
	SGD command used:	`bluetooth.address`
Connection Device Type	Displays the Bluetooth connection pair printer's device type—Slave (typical) or Master.	
	User menu item:	Main Menu > BLUETOOTH 
Bluetooth Discovery	Select if the printer is "Discoverable" for Bluetooth device pairing.	
	User menu item:	Main Menu > BLUETOOTH 
	Accepted values:	• `ON`—enables Bluetooth discoverable mode • `OFF`—disables Bluetooth discoverable mode
	SGD command used:	`bluetooth.discoverable`

Table 11 • Bluetooth Settings

Connection Status to Paired Device	Displays the Bluetooth connection status to its paired device (Yes or No).	
	User menu item:	Main Menu > BLUETOOTH 
Bluetooth Specification Version	Displays the Bluetooth operational specification level.	
	User menu item:	Main Menu > BLUETOOTH 
	SGD command used:	`bluetooth.radio_version`
Minimum Security Level	Displays the printer's Bluetooth minimum level of applied security.	
	User menu item:	Main Menu > BLUETOOTH 

Calibrate the Ribbon and Media Sensors

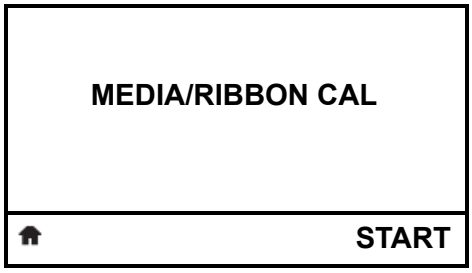
Use the procedure in this section to calibrate the printer, which adjusts the sensitivity of the media and ribbon sensors.

- For issues that may be resolved by sensor calibration, see *Printing Issues* on page 142.
- For a summary of the options for initiating calibration, see *Media and Ribbon Sensor Calibration* on page 91.

Important • Follow the calibration procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press and hold CANCEL at any step in this procedure to cancel the process.

To perform sensor calibration, complete these steps:

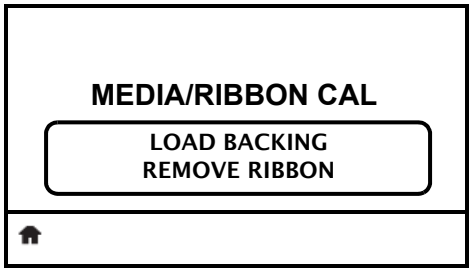
1. With the printer in the Ready state, initiate media and ribbon calibration in one of these ways:
   - Press and hold PAUSE + CANCEL for 2 seconds.
   - Send the `ezpl.manual_calibration` SGD command to the printer. See the *Zebra Programming Guide* for more information about this command.
   - Navigate to the following menu item on the control panel display. This item is located under the TOOLS menu and the SENSORS menu. See *Idle Display, Home Menu, and User Menus* on page 18 for information about using the control panel and accessing the menus.



   a. Press RIGHT SELECT to select START.

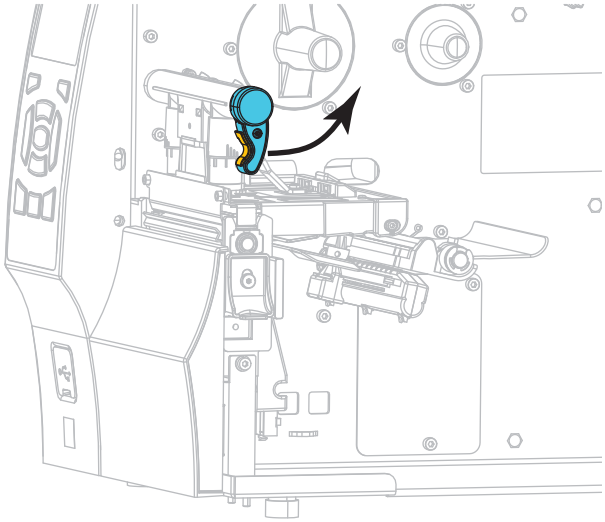
The printer does the following:

- The **STATUS light** and **SUPPLIES light** flash yellow once.
- The **PAUSE light** blinks yellow.
- The control panel displays:

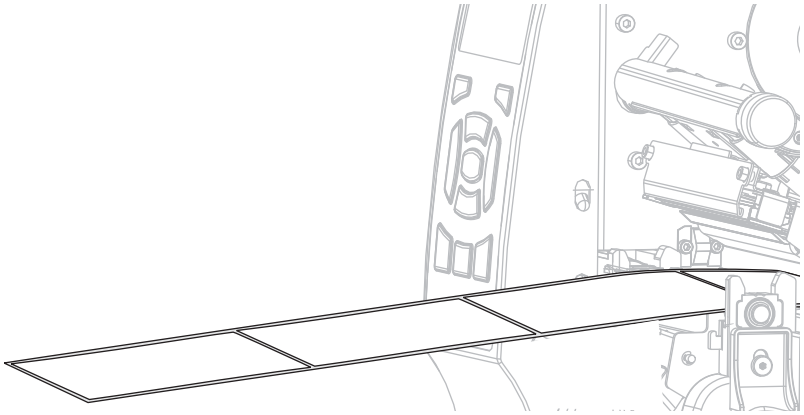


2. **Caution •** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

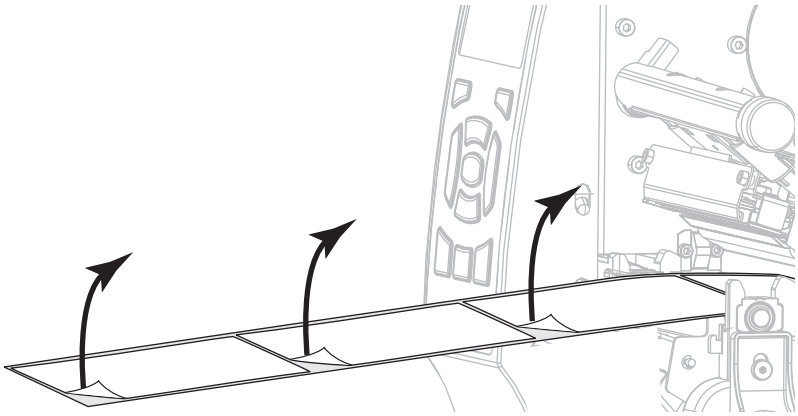
   Open the printhead assembly by rotating the printhead-open lever.



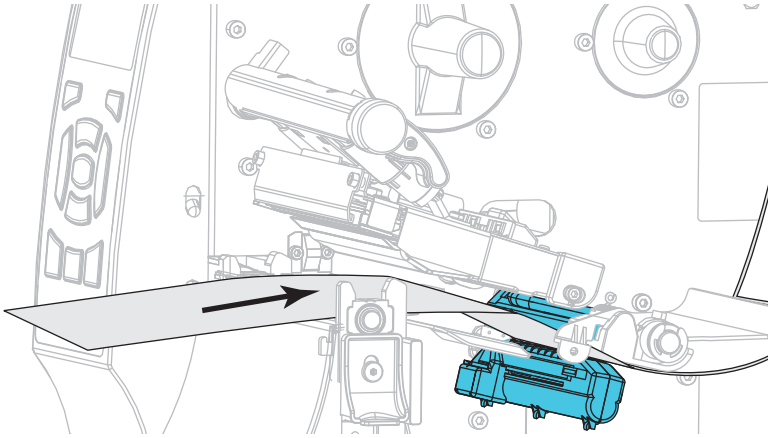
3. Extend the media approximately 8 in. (203 mm) out of the printer.



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

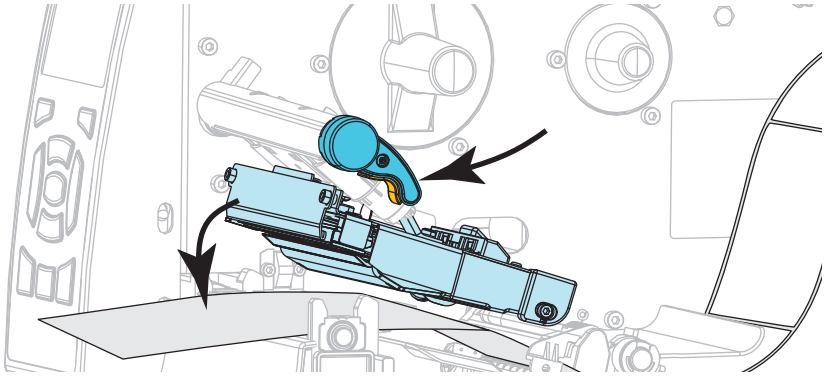


5. Pull the media into the printer so that only the backing is between the media sensors.

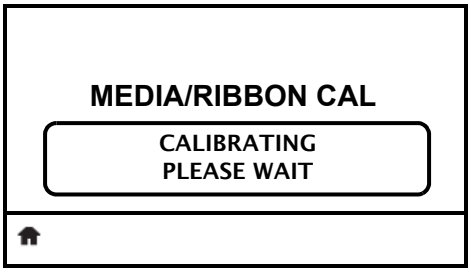


6. Remove the ribbon (if used).

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

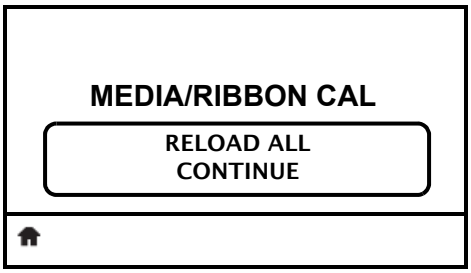


8. Press PAUSE to begin the media calibration process.
   - The **PAUSE light** turns off.
   - The **SUPPLIES light** flashes.
   - The control panel displays:

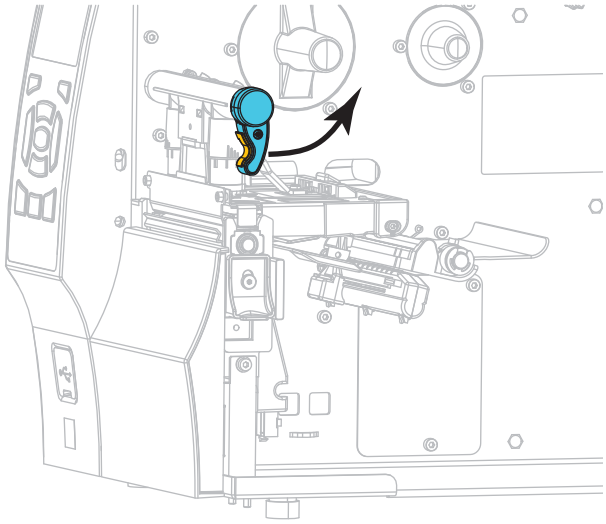


When the process is complete:

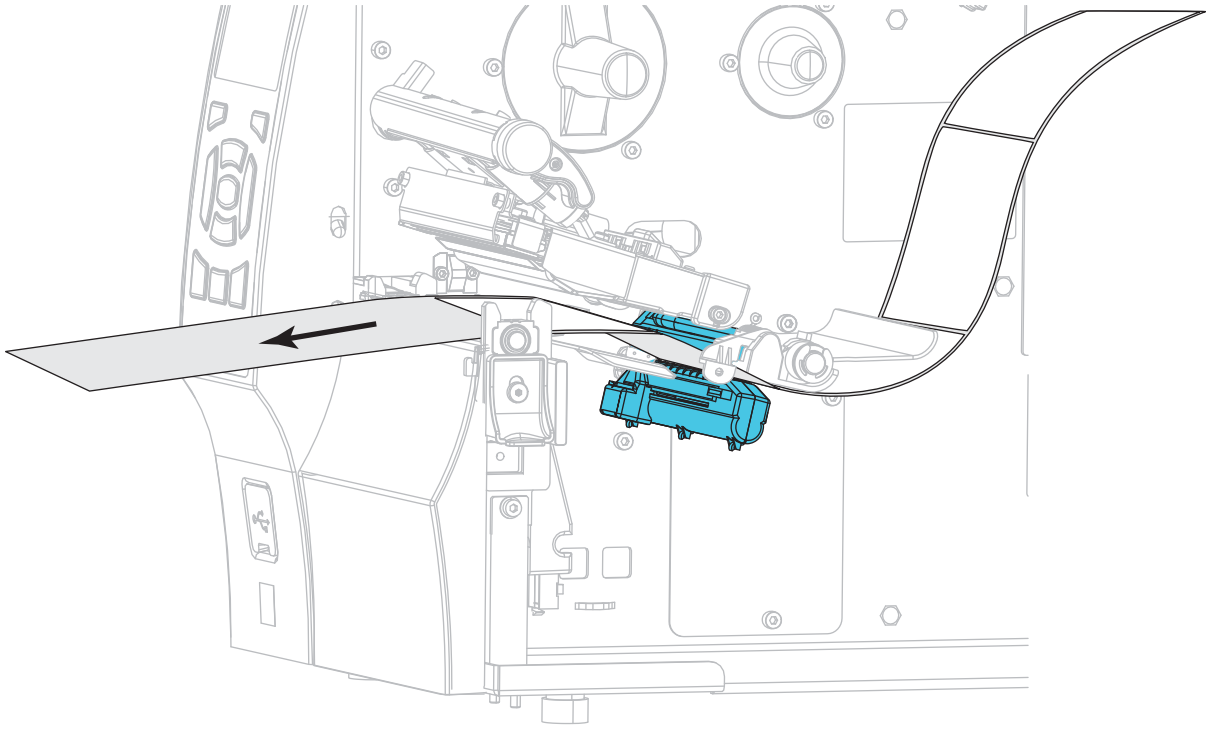
- The **SUPPLIES light** stops flashing.
- The **PAUSE light** flashes yellow.
- The control panel displays:



9. Open the printhead assembly by rotating the printhead-open lever.



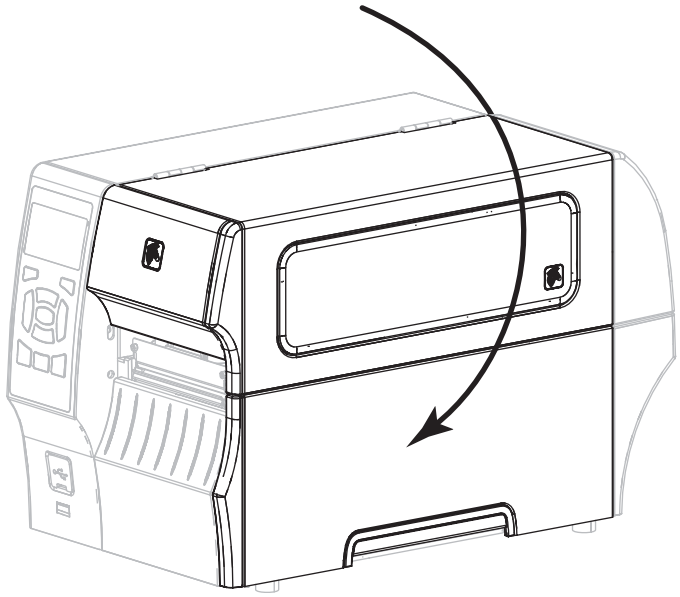
10. Pull the media forward until a label is positioned under the media sensors.



11. Reload the ribbon (if used).

12. Close the printhead.

13. Close the media door.



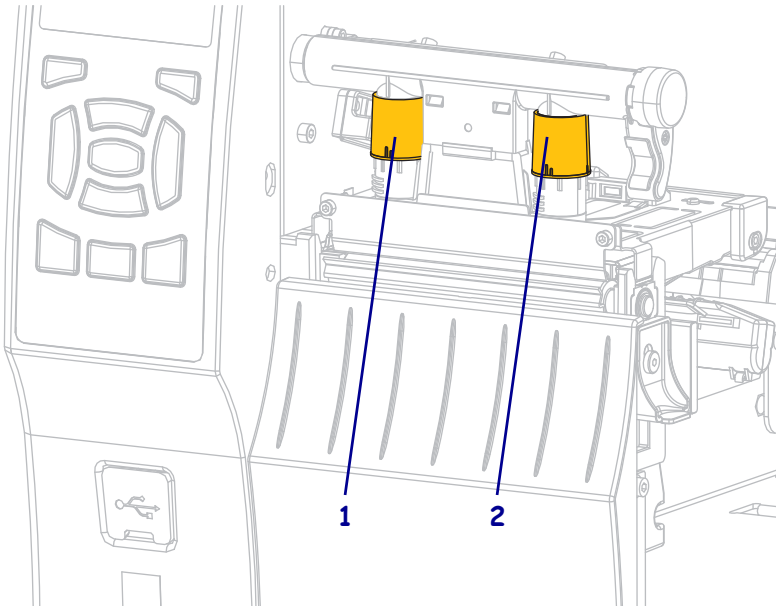
14. Press PAUSE to enable printing.

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 14. The printhead pressure adjustment dials have setting marks from 1 to 4.

Figure 14 • Printhead Pressure Adjustment Dials



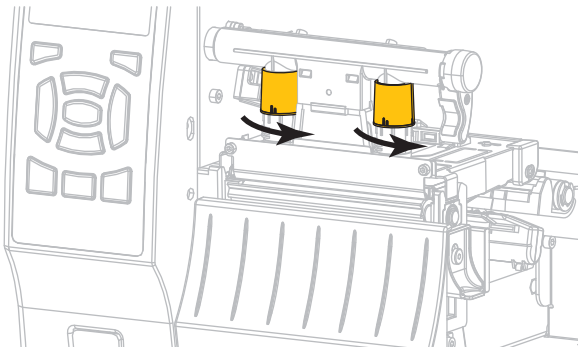
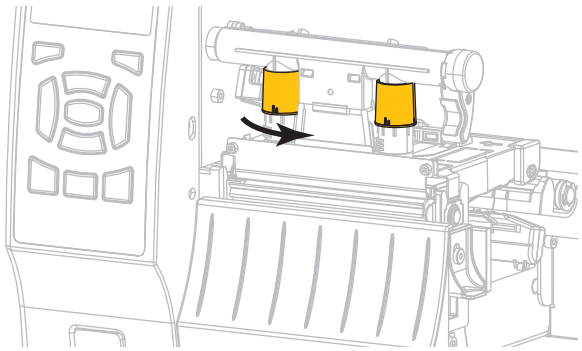
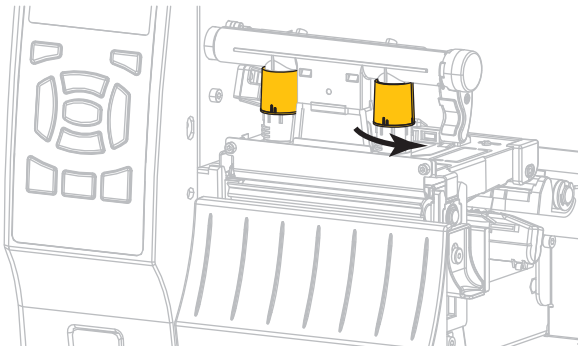
1	Inside dial
2	Outside dial

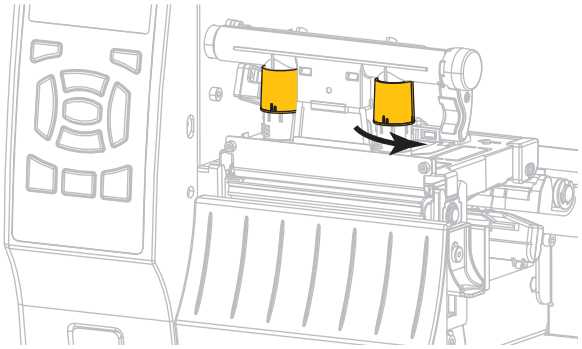
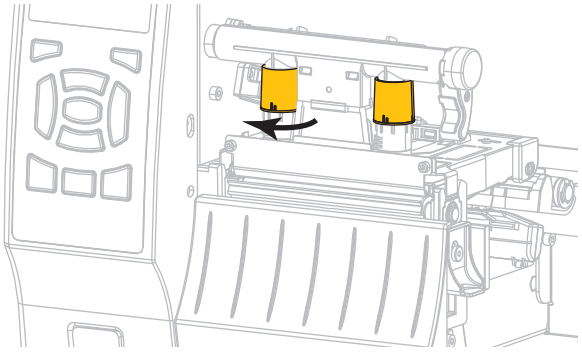
See Table 12. Begin with the following pressure settings, based on your printer and media width, and make adjustments as necessary.

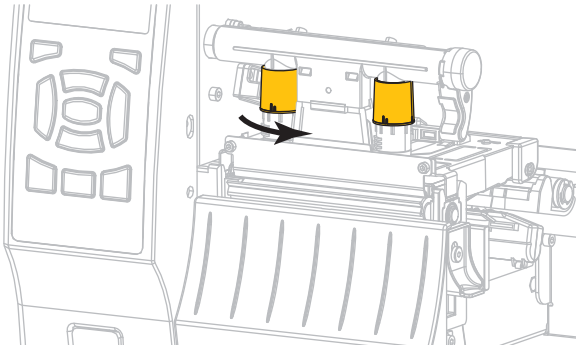
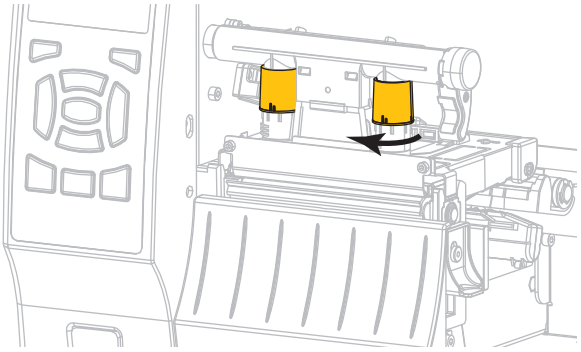
Table 12 • Toggle Pressure Settings

Tag	Inside Dial Setting	Outside Dial Setting
Micro	3	2
Classic	3	3
Slim	3	3
Blade	3	2

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

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

If the media...	Then...
Shifts left while printing	Increase the outside dial setting one position.  OR Decrease the inside dial setting one position. 

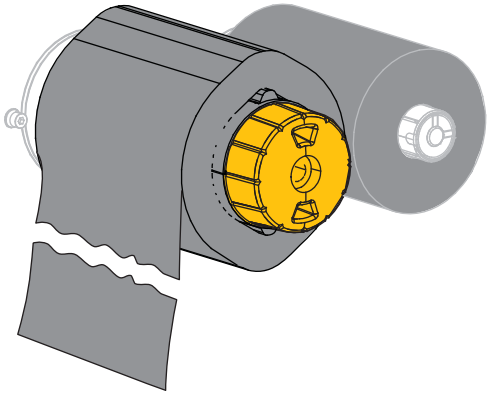
If the media...	Then...
Shifts right while printing	Increase the inside dial setting one position.  OR Decrease the outside dial setting one position. 

Remove Used Ribbon

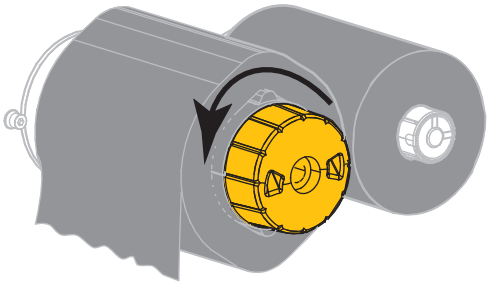
At minimum, remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon. With ribbon that is half or less the width of the printhead, remove used ribbon each time you load a new roll of media. This ensures that uneven pressure on the ribbon take-up spindle does not interfere 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	Cut or break the ribbon before the ribbon take-up spindle.  **Caution** • Do not cut the ribbon directly on the ribbon take-up spindle. Doing so may damage the spindle.

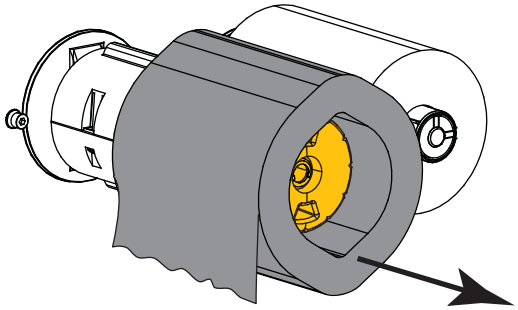
2. While holding the ribbon take-up spindle, turn the ribbon release knob to the left until it stops.



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.



Notes •

4

Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

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. For example, inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead.

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 • Do not use liquids to clean any part of this printer, especially the printhead. Zebra is not responsible for damage caused by the use of cleaning fluids on this printer.

Specific cleaning procedures are provided on the following pages. Table 13 shows the recommended cleaning schedule. These intervals are intended as guidelines only. You may have to clean more often, depending upon your application and media.

Table 13 • Recommended Cleaning Schedule

Area	Method	Interval
Printhead	Cleaning film*	**Direct Thermal Mode:** After every roll of media. **Thermal Transfer Mode:** After every roll of ribbon.
Platen roller	Cleaning film*	
Media sensors	Air blow	
Ribbon sensor	Air blow	

Use Zebra's 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.

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

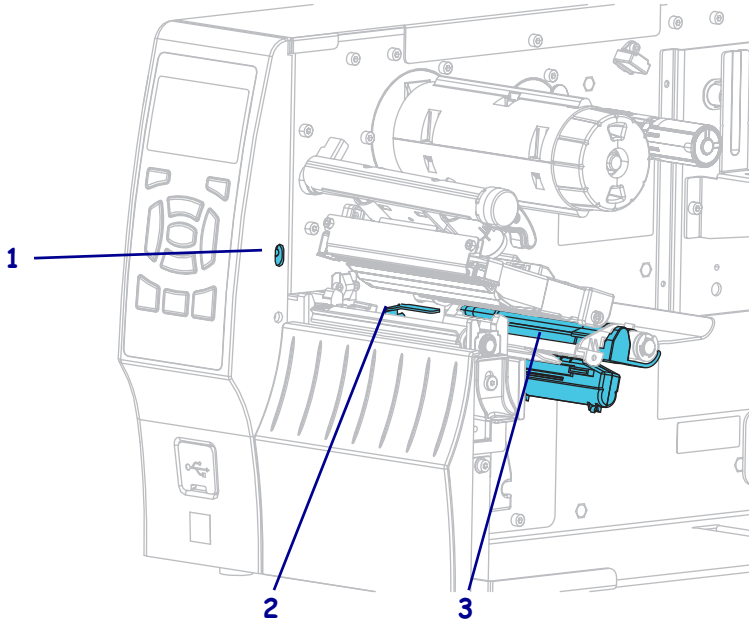
You may clean the exterior surfaces of the printer with a lint-free cloth and a small amount of a mild detergent, if necessary. Do not use harsh or abrasive cleaning agents or solvents.

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

Media Compartment and Sensors

To clean the sensors, complete these steps:

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 reflector
3	Media sensor

Clean the Printhead and Platen Roller

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For the recommended cleaning schedule, see Table 13 on page 134.

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

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

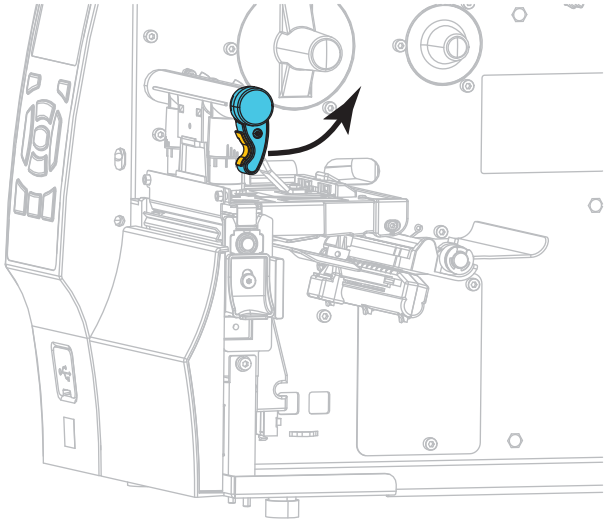
Caution • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an antistatic wriststrap and mat.

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

1. Raise the media door.
2. 

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

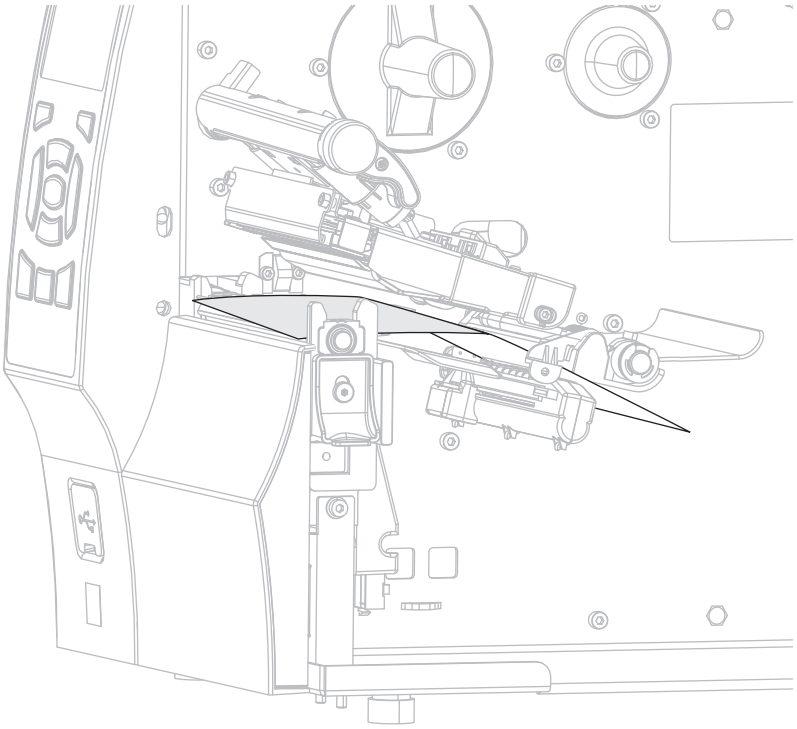
   Open the printhead assembly by rotating the printhead-open lever.



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

4. **Caution** • Do not use liquids to clean any part of this printer, especially the printhead. Zebra is not responsible for damage caused by the use of cleaning fluids on this printer.

   Position the Save-a-Printhead film in the print path. Place the film's glossy side down and away from the printhead. (Keep the film's matte side up.)



5. Rotate the printhead-open lever downward until it locks the printhead in place over the cleaning film.
6. Slowly pull the full length of the film through the print mechanism.

   If pulling the strip through once or twice does not clean the print mechanism adequately, you may gently rub the strip back and forth over the area to try to dislodge any residue. Discard the strip if residue buildup or other contamination is apparent.
7. Reload the ribbon (if used) and the media. For instructions, see *Instructions for Loading Ribbon* on page 68 or *Instructions for Loading Media* on page 63.
8. Rotate the printhead-open lever downward until it locks the printhead in place.
9. Close the media door.
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. Print labels and inspect for improved print quality. If quality has not improved, contact Technical Support at http://www.zebra.com/support.

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 Table 13 on page 134 for the recommended cleaning intervals.

Ordering Replacement Parts

Contact your authorized Zebra reseller for part ordering information.

The ZT410 RFID printer with the Silverline Solution requires a special printhead that is designed for this printer. The printhead is not the same as the printhead for standard ZT410 printers. Order kit number P1088805.

The installation instructions are included with the kit, or you may view a video of the printhead replacement procedure at http://www.zebra.com/silverline.

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.

Lubrication

No lubrication is needed for this printer.

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

5

Troubleshooting

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

For videos of some common procedures, go to http://www.zebra.com/silverline.

Contents

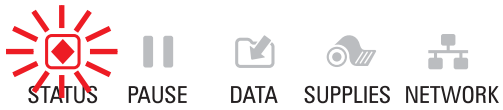
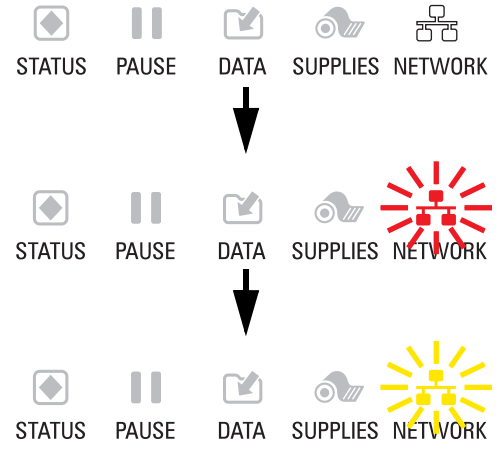
Meaning of Indicator Lights

The indicator lights on the control panel show the current status of the printer (Table 14).

Table 14 • Status of Printer As Shown by Indicator Lights

	*STATUS light steady green (other lights steady yellow for 2 seconds during printer power-up)* The printer is ready.
	*PAUSE light steady yellow.* The printer is paused.
	*STATUS light steady red* *SUPPLIES light steady red* The media supply is out. The printer needs attention and cannot continue without user intervention.
	*STATUS light steady red* *SUPPLIES light flashing red* The ribbon supply is out. The printer needs attention and cannot continue without user intervention.
	*STATUS light steady yellow* *SUPPLIES light flashing yellow* The printer is in Direct Thermal mode, which does not require ribbon; however, ribbon is installed in the printer.
	*STATUS light steady red* *PAUSE light steady yellow* The printhead is open. The printer needs attention and cannot continue without user intervention.
	*STATUS light steady yellow* The printhead is over temperature. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.
	*STATUS light flashing yellow* This indicator light flashing indicates one of the following: • The printhead is under temperature. • The power supply is over temperature. • The main logic board (MLB) is over temperature.
	*STATUS light steady red* *PAUSE light steady red* *DATA light steady red* The printhead was replaced with one that is not a genuine Zebra™ printhead. Install a genuine Zebra™ printhead to continue.

Table 14 • Status of Printer As Shown by Indicator Lights (Continued)

	*STATUS light flashing red* The printer is unable to read the dpi setting of the printhead.
Printers with a ZebraNet wired Ethernet option	
	*NETWORK light off* No Ethernet link is available.
	*NETWORK light steady green* A 100 Base link was found.
	*NETWORK light steady yellow* A 10 Base link was found.
	*NETWORK light steady red* An Ethernet error condition exists. The printer is not connected to your network.
Printers with a ZebraNet wireless option	
	*NETWORK light off* 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.
	*NETWORK light steady green* The radio is associated with your network and authenticated, and the WLAN signal is strong.
	*NETWORK light flashing green* WLAN—The radio is associated with your network and authenticated, but the WLAN signal is weak.
	*NETWORK light steady red* A WLAN error condition exists. The printer is not connected to your network.

Printing Issues

Table 15 identifies possible issues with printing or print quality, the possible causes, and the recommended solutions.

For videos of some common procedures, go to http://www.zebra.com/silverline.

Table 15 • Printing Issues

Issue	Possible Cause	Recommended Solution
General print quality issues	The printer is set at the incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. You may want to perform the *FEED Self Test* on page 159 to determine the optimal settings for your printer. See *Print Speed* on page 77 for how to change the print speed.
	You are using an incorrect combination of labels and ribbon for your application.	1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	The printer is set at an incorrect darkness level.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test* on page 159 to determine the ideal darkness setting. See *Print Darkness* on page 77 for how to change the darkness setting.
	The printhead is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 136.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 126.
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 136.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned. See *Instructions for Loading Media* on page 63.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 78.
	The media is loaded incorrectly.	Load media correctly. See *Instructions for Loading Media* on page 63.

Table 15 • Printing Issues (Continued)

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 Problems* on page 145.
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in *Ribbon Problems* on page 145.
Printing 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.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test* on page 159 to determine the ideal darkness setting. See *Print Darkness* on page 77 for how to change the darkness setting.
	You are using an incorrect combination of media and ribbon for your application.	1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.
	You are using ribbon with direct thermal media.	Direct thermal media does not require ribbon. To determine if you are using direct thermal media, perform the label scratch test in *When to Use Ribbon on page 22*.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 126.
Printing too light or too dark on one side of the label	Incorrect or uneven printhead pressure.	Adjust the printhead pressure as needed for good print quality. See *Adjust the Printhead Pressure* on page 126.
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.
Misregistration/skips labels	The printer is not calibrated.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 121.
	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 136.
	Media does not meet specifications.	Use only approved Silverline media. Go to http://www.zebra.com/silverline for more information about Silverline media.

Table 15 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
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 121.
	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 136.
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—see *Media Type* on page 78) and calibrate the printer, if necessary (see *Calibrate the Ribbon and Media Sensors* on page 121).
	The media sensor is calibrated improperly.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 121.
	The platen roller is dirty.	Clean the printhead and platen roller. See *Clean the Printhead and Platen Roller* on page 136.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality. See *Adjust the Printhead Pressure* on page 126.
	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See *Instructions for Loading Ribbon* on page 68 and *Instructions for Loading Media* on page 63.
	Incompatible media.	Use only approved Silverline media. Go to http://www.zebra.com/silverline for more information about Silverline media.
The bar code printed on a label does not scan.	The bar code is not within specifications because the print is too light or too dark.	Perform the *FEED Self Test* on page 159. Adjust the darkness or print speed settings as necessary.
	There is not enough blank space around the bar code.	Leave at least 1/8 in. (3.2 mm) between the bar code and other printed areas on the label and between the bar code and the edge of the label.
Auto Calibrate failed.	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See *Instructions for Loading Ribbon* on page 68 and *Instructions for Loading Media* on page 63.
	The sensors could not detect the media or ribbon.	Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 121.
	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). See *Media Type* on page 78.

Ribbon Problems

Table 16 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

For videos of some common procedures, go to http://www.zebra.com/silverline.

Table 16 • Ribbon Problems

Problem	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	1. Reduce the darkness setting. See *Print Darkness* on page 77 for how to change the darkness setting. 2. Clean the printhead thoroughly. See *Clean the Printhead and Platen Roller* on page 136.
	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 *Coated Side of Ribbon on page 22*.
Wrinkled ribbon	Ribbon was loaded incorrectly.	Load the ribbon correctly. See *Instructions for Loading Ribbon* on page 68.
	Incorrect burn temperature.	For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test* on page 159 to determine the ideal darkness setting. See *Print Darkness* on page 77 for how to change the darkness setting.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust the Printhead Pressure* on page 126.
	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.
The printer does not detect when the ribbon runs out. **In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.**	The printer may have been calibrated without ribbon or without the ribbon loaded properly.	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 *Instructions for Loading Ribbon* on page 68. 2. Calibrate the printer. See *Calibrate the Ribbon and Media Sensors* on page 121.
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 121.

RFID Problems

Table 17 identifies problems that may occur with RFID printers, the possible causes, and the recommended solutions. For more information about RFID, refer to the *RFID Programming Guide 3*. A copy of the manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.

Table 17 • RFID Problems

Problem	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 121).
	You are using an RFID label with a tag type that is not supported by your printer.	Use only approved Silverline media. Go to http://www.zebra.com/silverline for more information about Silverline media.
	The printer is unable to communicate with the RFID reader.	1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized Zebra RFID service technician for assistance.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers or other RF sources. • Make sure that the media door is closed at all times during RFID programming.
	The settings are incorrect in your label designer software.	The software settings override the printer settings. Make sure that the software and printer settings match.
	You are using an incorrect programming position, particularly if the tags being used are within printer specifications.	Do one or more of the following as necessary: • Check the 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*.
	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*.

Table 17 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
Low yields. Too many RFID tags per roll are voided.	The RFID labels are not within specifications for the printer.	Use only approved Silverline media. Go to http://www.zebra.com/silverline for more information about Silverline media.
	Incorrect read and write power levels for the RFID tag type.	Perform RFID tag calibration. Manually adjust the settings afterward, if necessary. See *RFID Settings* on page 104 or refer to the *RFID Programming Guide 3*.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers. • Make sure that the media door is closed at all times during RFID programming.
	The printer is using outdated printer firmware and reader firmware versions.	Go to http://www.zebra.com/firmware for updated firmware.
The printer stops at the RFID inlay.	The printer calibrated the label length only to the RFID inlay instead of to the interlabel gap.	1. Select `FEED` for the `MEDIA POWER UP` and `HEAD CLOSE` parameters (see *Power-Up Action* on page 87 or *HEAD CLOSE ACTION* on page 88). 2. Manually calibrate the printer (see *Calibrate the Ribbon and Media Sensors* on page 121).
The DATA light flashes indefinitely after you attempt to download printer or reader firmware.	The download was not successful. For best results, cycle power on the printer before downloading any firmware.	1. Turn off (**O**) the printer. 2. Wait 10 seconds. 3. Turn on (**I**) the printer. 4. Attempt to download the firmware again. 5. If the problem persists, contact Technical Support.

Table 17 • RFID Problems (Continued)

Problem	Possible Cause	Recommended Solution
RFID parameters do not appear in Setup mode, and RFID information does not appear on the printer configuration label. **The printer does not void RFID labels that are not programmed correctly.**	The printer was powered off (**O**) and then back on (**I**) too quickly for the RFID reader to initialize properly.	Wait at least 10 seconds after turning the printer power off before turning it back on. **1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** Check for the RFID parameters in Setup mode or for RFID information on a new configuration label.
	An incorrect version of printer or reader firmware was loaded on the printer.	**1.** Verify that the correct firmware version is loaded on your printer. 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.
	The printer is unable to communicate with the RFID subsystem.	**1.** Turn off (**O**) the printer. **2.** Wait 10 seconds. **3.** Turn on (**I**) the printer. **4.** If the problem persists, you may have a bad RFID reader or a loose connection between the RFID reader and the printer. Contact Technical Support or an authorized service technician for assistance.

Error Messages

The control panel displays messages when there is an error. See Table 18 for errors, the possible causes, and the recommended solutions.

QuickHelp Pages Most error messages will include the option to view a QuickHelp page. The lower right-hand corner of the message displays QR.

To access a QuickHelp page from an error message, do the following:

1. Press RIGHT SELECT to select QR.

   The printer displays a QuickHelp page specific to that error message. This page includes a QR code, such as this.

2. Scan the QR code with a smartphone.

   Your phone accesses either a video specific to that error message or the Zebra support page for your printer.

Table 18 • Error Messages

Display/ Indicator Lights	Possible Cause	Recommended Solution
HEAD OPEN CLOSE HEAD STATUS light steady red PAUSE light steady yellow	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.
MEDIA OUT LOAD MEDIA STATUS light steady red SUPPLIES light steady red	The media is not loaded or is loaded incorrectly.	Load media correctly. See *Instructions for Loading Media* on page 63.
	Misaligned media sensor.	Check the position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	1. Install the proper media type, or reset printer for the current media type. 2. Calibrate the printer. See *Media and Ribbon Sensor Calibration* on page 91.

Table 18 • Error Messages (Continued)

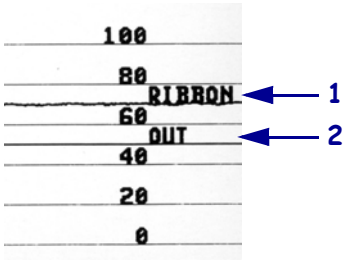
Display/ Indicator Lights	Possible Cause	Recommended Solution
WARNING RIBBON IN STATUS light steady yellow SUPPLIES light flashing yellow	Ribbon is loaded, but the printer is set for direct thermal mode.	Ribbon is not required with direct thermal media. If you are using direct thermal media, remove the ribbon. This error message will not affect printing.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See *Print Method* on page 78.
ALERT RIBBON OUT STATUS light steady yellow SUPPLIES light flashing yellow	In thermal transfer mode: • ribbon is not loaded • ribbon is loaded incorrectly • the ribbon sensor is not detecting ribbon • media is blocking the ribbon sensor	1. Load ribbon correctly. See *Instructions for Loading Ribbon* on page 68. 2. Calibrate the printer. See *Media and Ribbon Sensor Calibration* on page 91.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	1. Print a sensor profile (see *Print Information* on page 84). The ribbon out threshold (**2**) is likely too high, above the line that indicates where the ribbon is detected (**1**).  2. Calibrate the printer (see *Media and Ribbon Sensor Calibration* on page 91) or load printer defaults (see *Load Defaults* on page 90).
	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 Method* on page 78.

Table 18 • Error Messages (Continued)

Display/ Indicator Lights	Possible Cause	Recommended Solution
PH NOT AUTHENTICATED REPLACE PRINTHEAD STATUS light steady red PAUSE light steady red DATA light steady red	The printhead was replaced with one that is not a genuine Zebra™ printhead.	Install a genuine Zebra™ printhead.
PRINT HEAD OVERTEMP PRINTING HALTED STATUS light steady yellow	 **Caution** • The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature. If this error persists, consider changing where the printer is located or using a slower print speed.
HEAD COLD PRINTING HALTED THERMISTOR REPLACE PRINTHEAD STATUS light steady yellow The printer shows one of these messages or cycles between them.	 **Caution** • An improperly connected printhead data or power cable can cause these error messages. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead data cable is not properly connected.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.

Table 18 • Error Messages (Continued)

Display/ Indicator Lights	Possible Cause	Recommended Solution
HEAD COLD PRINTING HALTED STATUS light flashing yellow	**Caution •** An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead temperature is approaching its lower operating limit.	Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the printer to a warmer area.
	The printhead data cable is not properly connected.	Call a service technician to hook up the printhead properly.
	The printhead has a faulty thermistor.	Call a service technician to replace the printhead.
USE USB MEMORY DEVICE? YES NO	The USB host port is disabled, and a USB device was plugged into the port.	To use the USB device, select **YES**, or send the following SGD command to the printer: `! U1 setvar "usb.host.lock_out" "on"`
OUT OF MEMORY STORING GRAPHIC OUT OF MEMORY STORING FORMAT OUT OF MEMORY STORING BITMAP OUT OF MEMORY STORING FONT	There is not enough memory to perform the function specified on the second line of the error message.	Free up some of the printer's memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See *Print Width* on page 80.
		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.

Communications Problems

Table 19 identifies problems with communications, the possible causes, and the recommended solutions.

Table 19 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized. The DATA light does not flash.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable) for your connection. You may wish to reinstall the printer driver following the instructions in *Install the Printer Driver and Connect the Printer to the Computer* on page 24.
		If you are using serial communication, check the serial port settings. See *Port Settings* on page 116.
		If you are using serial communication, make sure that you are using a null modem cable or a null modem adaptor.
		Check the printer's handshake protocol setting. The setting used must match the one being used by the host computer. See *Host Handshake* on page 117.
A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.	The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See *Command Character* on page 111 and *Delimiter Character* on page 112.
	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.
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 *General Printer Specifications* on page 184 for requirements.
		Check the printer driver or software communications settings (if applicable).

Miscellaneous Issues

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

For videos of some common procedures, go to http://www.zebra.com/silverline.

Table 20 • Miscellaneous Printer Problems

Problem	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.	1. On the control panel display, scroll to LANGUAGE Menu. 2. Press OK to access the items in this menu. 3. Use the UP ARROW or DOWN ARROW to scroll through the language selections. 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. 4. Select the language that you want to display.
The display is missing characters or parts of characters	The display may need replacing.	Call a service technician.
Changes in parameter settings did not take effect	Some parameters are set incorrectly.	1. Check the parameters and change or reset if necessary. 2. Turn the printer off (**O**) and then on (**I**).
	A firmware command turned off the ability to change the parameter.	Refer to the *Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML* or call a service technician.
	A firmware command changed the parameter back to the previous setting.	
	If the problem persists, there may be a problem with the main logic board.	Call a service technician.
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 121.
	The printer is configured for continuous media.	Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 78.
All indicator lights are on, nothing is on the display (if the printer has a display), and the printer locks up.	Internal electronic or firmware failure.	Call a service technician.

Table 20 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
The printer locks up while running the Power-On Self Test.	Main logic board failure.	Call a service technician.
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 drive may require its own external power.	If your USB drive requires external power, make sure that it is plugged into a working power supply.

Printer Diagnostics

Self tests and other diagnostics provide specific information about the condition of the printer. The self tests produce sample printouts and provide specific information that helps determine the operating conditions for the printer.

Important • Performing some self tests will use a number of Silverline tags.

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

Note •

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

Power-On Self Test

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

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

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

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

CANCEL Self Test

The CANCEL self test prints a printer configuration label and a network configuration label. For other ways to print these labels, see *Print Information* on page 84.

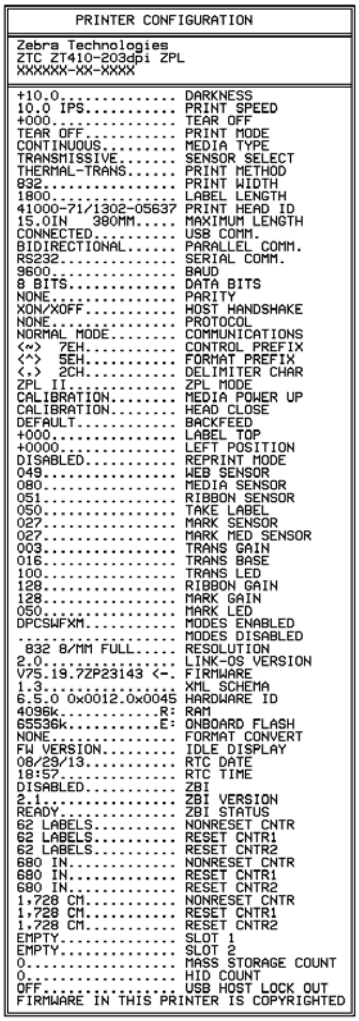
Important • Performing this self test will use a number of Silverline tags. To avoid printing, use send the ZPL string `^XA^HH^XZ` to return the configuration label information to the host.

To perform the CANCEL Self Test, complete these steps:

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

   The printer prints a printer configuration label (Figure 15) and then a network configuration label (Figure 16).

Figure 15 • Sample Printer Configuration Label



```
PRINTER CONFIGURATION

Zebra Technologies
ZTC ZT410-203dpi ZPL
XXXXXX-XX-XXXX

+10.0............. DARKNESS
10.0 IPS.......... PRINT SPEED
+000.............. TEAR OFF
TEAR OFF.......... PRINT MODE
CONTINUOUS........ MEDIA TYPE
TRANSMISSIVE...... SENSOR SELECT
THERMAL-TRANS..... PRINT METHOD
832............... PRINT WIDTH
1800.............. LABEL LENGTH
41000-71/1302-05637 PRINT HEAD ID
15.0IN   380MM.... MAXIMUM LENGTH
CONNECTED......... USB COMM.
BIDIRECTIONAL..... PARALLEL COMM.
RS232............. SERIAL COMM.
9600.............. BAUD
8 BITS............ DATA BITS
NONE.............. PARITY
XON/XOFF.......... HOST HANDSHAKE
NONE.............. PROTOCOL
NORMAL MODE....... COMMUNICATIONS
<~>  7EH.......... CONTROL PREFIX
<^>  5EH.......... FORMAT PREFIX
<,>  2CH.......... DELIMITER CHAR
ZPL II............ ZPL MODE
CALIBRATION....... MEDIA POWER UP
CALIBRATION....... HEAD CLOSE
DEFAULT........... BACKFEED
+000.............. LABEL TOP
+0000............. LEFT POSITION
DISABLED.......... REPRINT MODE
049............... WEB SENSOR
080............... MEDIA SENSOR
051............... RIBBON SENSOR
050............... TAKE LABEL
027............... MARK SENSOR
027............... MARK MED SENSOR
003............... TRANS GAIN
016............... TRANS BASE
100............... TRANS LED
128............... RIBBON GAIN
128............... MARK GAIN
050............... MARK LED
DPCSWFXM.......... MODES ENABLED
.................. MODES DISABLED
 832 8/MM FULL.... RESOLUTION
2.0............... LINK-OS VERSION
V75.19.7ZP23143 <-. FIRMWARE
1.3............... XML SCHEMA
6.5.0 0x0012.0x0045 HARDWARE ID
4096k.........R: RAM
65536k........E: ONBOARD FLASH
NONE.............. FORMAT CONVERT
FW VERSION........ IDLE DISPLAY
08/29/13.......... RTC DATE
18:57............. RTC TIME
DISABLED.......... ZBI
2.1............... ZBI VERSION
READY............. ZBI STATUS
62 LABELS......... NONRESET CNTR
62 LABELS......... RESET CNTR1
62 LABELS......... RESET CNTR2
680 IN............ NONRESET CNTR
680 IN............ RESET CNTR1
680 IN............ RESET CNTR2
1,728 CM.......... NONRESET CNTR
1,728 CM.......... RESET CNTR1
1,728 CM.......... RESET CNTR2
EMPTY............. SLOT 1
EMPTY............. SLOT 2
0................. MASS STORAGE COUNT
0................. HID COUNT
OFF............... USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Figure 16 • Sample Network Configuration Label

```
Network Configuration

Zebra Technologies
ZTC ZT410-203dpi ZPL
XXXXXX-XX-XXXX

PrintServer....... LOAD LAN FROM?
INTERNAL WIRED.... ACTIVE PRINTSRVR

Wired*
ALL............... IP PROTOCOL
010.003.004.072... IP ADDRESS
255.255.255.000... SUBNET
010.003.004.001... GATEWAY
010.003.001.098... WINS SERVER IP
YES............... TIMEOUT CHECKING
300............... TIMEOUT VALUE
000............... ARP INTERVAL
9100.............. BASE RAW PORT
9200.............. JSON CONFIG PORT

Wireless
ALL............... IP PROTOCOL
000.000.000.000... IP ADDRESS
255.255.255.000... SUBNET
000.000.000.000... GATEWAY
000.000.000.000... WINS SERVER IP
YES............... TIMEOUT CHECKING
300............... TIMEOUT VALUE
000............... ARP INTERVAL
9100.............. BASE RAW PORT
9200.............. JSON CONFIG PORT
NOT INSERTED...... CARD INSERTED
H................. CARD MFG ID
H................. CARD PRODUCT ID
00:00:00:00:00:00. MAC ADDRESS
YES............... DRIVER INSTALLED
INFRASTRUCTURE.... OPERATING MODE
125............... ESSID
100............... TX POWER
ALL............... CURRENT TX RATE
OPEN.............. WEP TYPE
NONE.............. WLAN SECURITY
1................. WEP INDEX
000............... POOR SIGNAL
LONG.............. PREAMBLE
NO................ ASSOCIATED
ON................ PULSE ENABLED
15................ PULSE RATE
OFF............... INTL MODE
not available..... REGION CODE
no region code.... COUNTRY CODE
0x3FFFFFFFFFF..... CHANNEL MASK

Bluetooth
4.2.0............. FIRMWARE
04/20/2012........ DATE
on................ DISCOVERABLE
2.1............... RADIO VERSION
on................ ENABLED
AC:3F:A4:12:0F:20. MAC ADDRESS
XXXXXX-XX-XXXX.... FRIENDLY NAME
No................ CONNECTED
1................. MIN SECURITY MODE
nc................ CONN SECURITY MODE

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

PAUSE Self Test

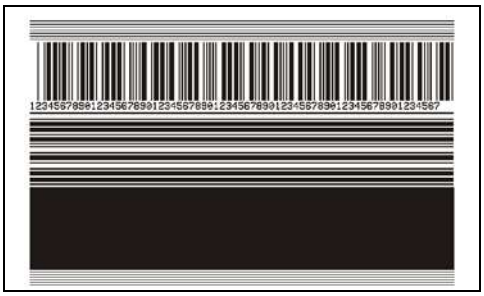
This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies or to determine if any printhead elements are not working. Figure 17 shows a sample printout.

Important • Performing this self test will use a number of Silverline tags.

To perform a PAUSE self test, complete these steps:

1. Turn off (**O**) the printer.
2. Press and hold PAUSE while turning on (**I**) the printer. Hold PAUSE until the first control panel light turns off.
   - The initial self test prints 15 labels at the printer's slowest speed, and then automatically pauses the printer. Each time PAUSE is pressed, an additional 15 labels print. Figure 17 shows a sample of the labels.

Figure 17 • 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.

FEED Self Test

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

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

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

Important • Performing this self test will use a number of Silverline tags.

To perform a FEED self test, complete these steps:

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

   The printer prints a series of labels (Figure 18) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 18 • FEED Test Label

4. See Figure 19 and Table 21. Inspect the test labels and determine which one has the best print quality for your application. If you have a bar code verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a bar code verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 19 • Bar Code Darkness Comparison

Table 21 • Judging Bar Code Quality

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not "in-spec." • The normal bar code bars increase in size. • The openings in small alphanumeric characters may fill in with ink. • Rotated bar code bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. • The normal bar code will be "in-spec." • Small character alpha numerics will be bold and could be slightly filled in. • The rotated bar code spaces are small when compared to the "in-spec" code, possibly making the code unreadable.

Table 21 • Judging Bar Code Quality (Continued)

Print Quality	Description
"In-spec"	The "in-spec" bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics. • The normal bar code will have complete, even bars and clear, distinct spaces. • The rotated bar code will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark bar code, the bar code will be "in-spec." • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferred to slightly dark ones for "in-spec" bar codes. • Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. • Both normal and rotated bar codes have incomplete bars and spaces. • Small alphanumeric characters are unreadable.

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

FEED + PAUSE Self Test

Performing this self test resets the printer configuration to the factory default values. Perform a sensor calibration after this self test. (See *Calibrate the Ribbon and Media Sensors* on page 121.)

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

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

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

CANCEL + PAUSE Self Test

Performing this self test resets the network configuration to the factory default values.

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

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

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

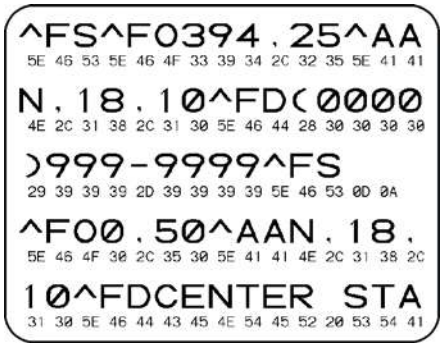
Communication Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the printer and the host computer. When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). Figure 20 shows a typical test label from this test.

Important • Performing this self test will use a number of Silverline tags.

Note • The test label prints upside-down.

Figure 20 • Communications Diagnostics Test Label



To use communications diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See *Print Width* on page 80 for more information.
2. Set the DIAGNOSTICS MODE option to ENABLED. For methods, see *Communication Diagnostics Mode* on page 92.

   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. Turn the printer off (**O**) and then back on (**I**) to exit this self test and return to normal operation.

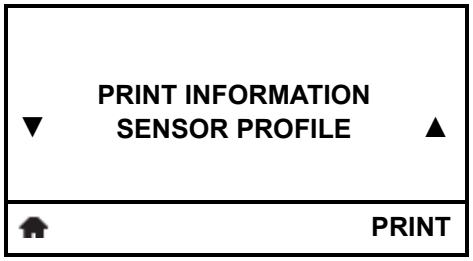
Sensor Profile

Important • Printing a sensor profile will use a number of Silverline tags.

Use the sensor profile image (which will extend across several actual labels or tags) 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.

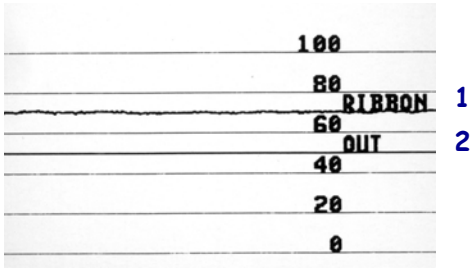
With the printer in the Ready state, print a sensor profile in one of these ways:

Using the buttons on the control panel	**a.** Turn off (**O**) the printer. **b.** Press and hold FEED + CANCEL while turning on (**I**) the printer. **c.** Hold FEED + CANCEL until the first control panel light turns off.
Using ZPL	**a.** Send the `~JG` command to the printer. See the *Zebra Programming Guide* for more information about this command.
Using the control panel display	**a.** Navigate to the following item under the SENSORS menu. See *Idle Display, Home Menu, and User Menus* on page 18 for information about using the control panel and accessing the menus.  **b.** Press RIGHT SELECT to select PRINT.

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 121).

Ribbon Sensor Profile (Figure 21) 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.

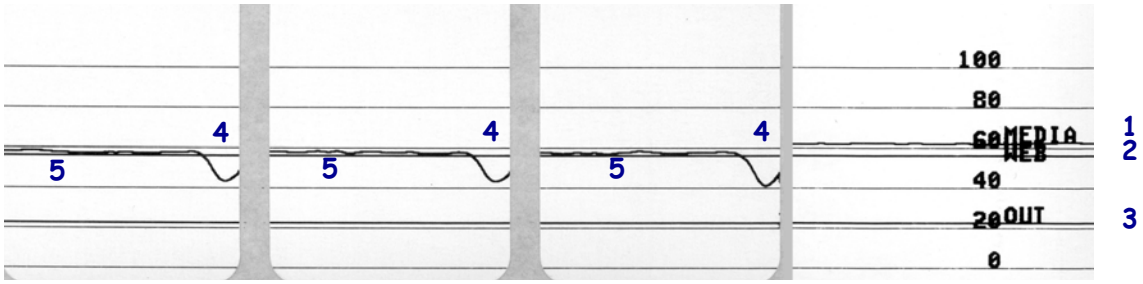
Figure 21 • Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 22) 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 downward spikes (4) indicate gaps between labels (the web), 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 22 • Sensor Profile (Media Section)



Notes •

6

Using the USB Host Port and NFC Capabilities

This section will help you to learn how to use the USB host port on your Zebra printer and how to use the printer's Near Field Communication (NFC) capability. The information is presented in the form of exercises with some SGD commands listed for advanced users.

Note • You are not required to complete these exercises, which may use several tags during printing. The information is included to teach you how the USB host port and NFC capabilities work.

Contents

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

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

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

File 3: LOGO.ZPL

File 4: USBSTOREDFILE.ZPL

```
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
```

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.

File 5: VLS_BONKGRF.ZPL

File 6: VLS_EIFFEL.ZPL

File 7: KEYBOARDINPUT.ZPL

```
^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
```

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

File 8: SMARTDEVINPUT.ZPL

```
^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
```

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

File 9: Firmware File

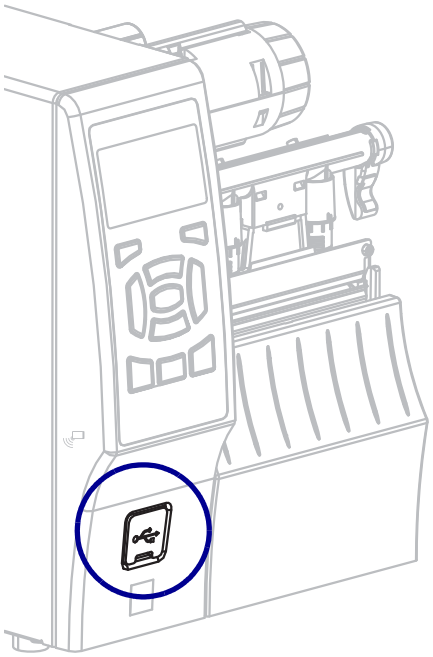
You may want to download a firmware file for your printer and copy it to your computer for use during the exercises. You may omit doing this if you wish.

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

USB Host

The USB host port allows you to connect a USB device—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.

Figure 23 • USB Host Port Location

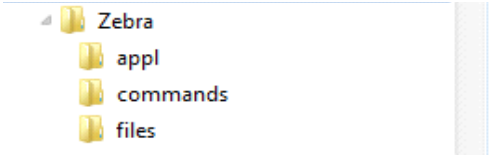


Important • When using the USB host port, files should be named only with 1 to 16 alphanumeric characters (A, a, B, b, C, c, ..., 0, 1, 2, 3, ...). Do not use Asian characters, Cyrillic characters, or accented characters in file names.

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.

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

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 the USB host port on the front of your printer.
6. Observe the control panel and wait.

   The following should happen:
   - 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.)
   - The printer downloads the files in the `/files` folder and briefly shows the names of the files that are downloading on the display.
   - The printer executes any files in the `/commands` folder.
   - The printer restarts and then displays the message `MIRROR PROCESSING FINISHED`.
7. Remove the USB Flash drive from the printer.

Exercise 1: 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:

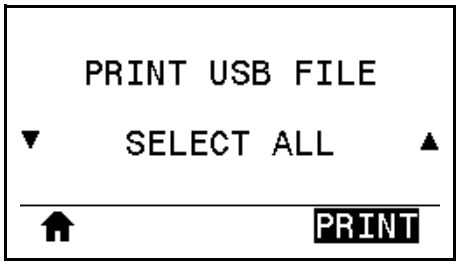
```
! U1 setvar "usb.host.lock_out" "value"
```

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 the USB host port on the front of your printer.
3. On the printer's control panel, press the LEFT SELECT button (below the home icon) to access the printer's Home Menu.
4. Use the ARROW buttons to scroll to the Tools menu. 
5. Press OK.
6. Use the ARROW buttons to scroll to **PRINT USB FILE**.



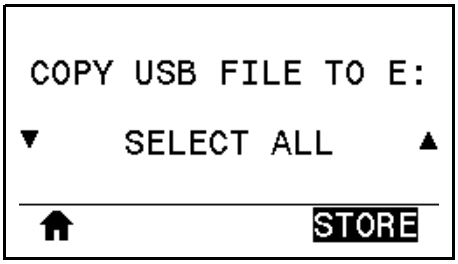
   The printer loads any executable files and processes them. The available files are listed. **SELECT ALL** is available to print all files on the USB Flash drive.
7. If necessary, use the up and down arrow to select `USBSTOREDFILE.zpl`.
8. Press the RIGHT SELECT button to select **PRINT**.

   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 the USB host port on the front of your printer.
3. On the printer's control panel, press the LEFT SELECT button to access the printer's Home Menu.
4. Use the ARROW buttons to scroll to the Tools menu. 
5. Press OK.
6. Use the ARROW buttons to scroll to **COPY USB FILE TO E:**.

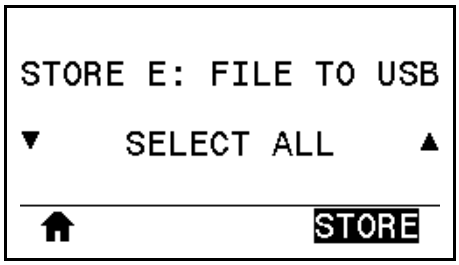
   The printer loads any executable files and processes them. The available files are listed. **SELECT ALL** is available to copy all of the available files from the USB Flash drive.
7. If necessary, use the UP or DOWN ARROW to select the file `STOREFMT.ZPL`.
8. Press the RIGHT SELECT button to select **STORE**.

   The printer stores the file in `E:` memory. All file names are converted to uppercase.
9. Repeat this process to select the file `STOREFMTM1.ZPL`.
10. Press the RIGHT SELECT button to select **STORE**.

    The printer stores the file in `E:` memory.

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

NOTE: You can now copy these files from the printer to a USB Flash drive using the user menu item **STORE E: FILE TO USB**.

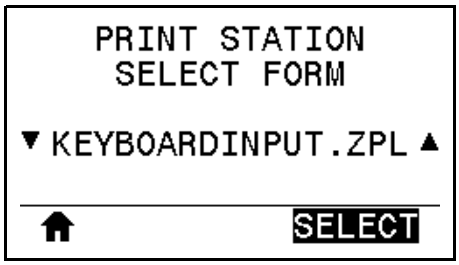


The option **SELECT ALL** is available to store all of the available files from the printer to the USB Flash drive. Any .ZPL file that is copied will be post-processed such that the contents of the file will be suitable to be sent to a printer for normal execution.

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 the USB host port.
2. Use the ARROW buttons to scroll to the Tools menu. 
3. Press OK.
4. Use the ARROW buttons to scroll to **PRINT STATION**.



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

5. If necessary, use the UP or DOWN ARROW to select the file KEYBOARDINPUT.ZPL.
6. Press the RIGHT SELECT button to select **PRINT**.

   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.

7. Type your name, and then press <ENTER>.

   The printer prompts for the number of labels to print.

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

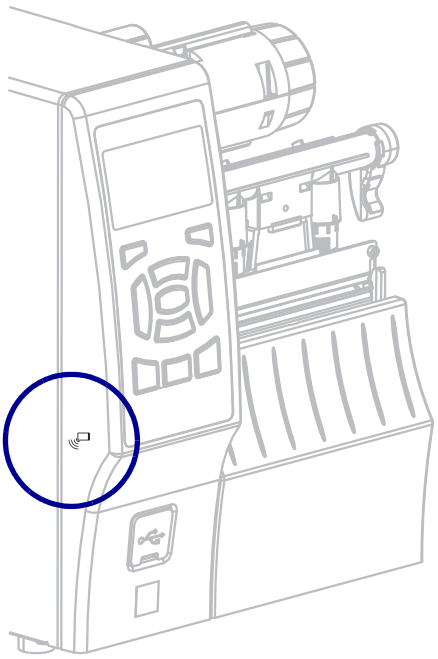
   The specified number of labels is printed, with your name in the appropriate fields.

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 24) 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 24 • NFC Logo Location



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

Note • 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.

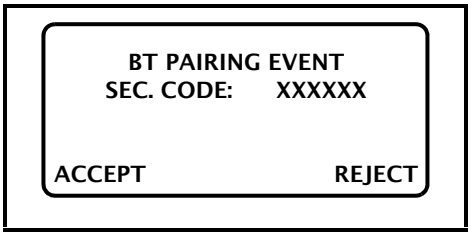
1. If you do not have the Zebra Utilities app installed on your device, go to the app store for your device, search for the Zebra Utilities app, and install it.

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, press the LEFT SELECT button on the printer to select **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.

7

Specifications

This section lists the general specifications for this printer and the ribbon and media that can be used with it.

For more information about the Silverline Solution, go to http://www.zebra.com/silverline or contact your local Zebra partner.

Contents

RFID Media Specifications

For detailed specifications about the supported Silverline media, go to http://www.zebra.com/silverline.

Media	Maximum roll size	8.0 in. (203 mm) O.D. on a 3 in. (76 mm) I.D. core
	Media thickness	Optimized to print Silverline labels up to 2.2 mm thick.
RFID	RFID protocol	UHF EPC Gen 2 V2/ISO 18000-6C
	Operational frequency	Available in either: • EU/Rest of World (ETSI): 865–869 MHz • USA (FCC): 902–928 MHz
	Memory configuration	Monza 4QT: EPC 128 bit; User 512 bit; TID 96 bit

Printing Specifications

Important • With the ZT410 RFID printer with the Silverline Solution, use only the Zebra printhead assembly that is specifically designed for use with Silverline labels. Order the printhead kit with Zebra part number P1088019.

Print resolution	203 dpi (dots/in.)/8 dots/mm
Dot size (nominal) (width x length)	0.0049 in. x 0.0049 in. (0.125 mm x 0.125 mm)
Maximum print width	4.09 in. (104 mm)
Bar code modulus (X) dimension	
Picket fence (nonrotated) orientation	4.9 mil to 49 mil
Ladder (rotated) orientation	4.9 mil to 49 mil
Programmable constant print speeds	2.4 in. to 14 in. (61 mm to 356 mm) per second in 1-in. (25.4 mm) increments

Ribbon Specifications

Recommended ribbon for use with Silverline labels is 5095 Performance Resin Ribbon.

Ribbon width*	Minimum	2 in.** (51 mm**)
	Maximum	4.33 in. (110 mm)
Maximum ribbon length		1476 ft (450 m)
Ribbon core inside diameter		1 in. (25 mm)
Ribbon roll outside diameter		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.

General Printer Specifications

Height		12.8 in.(325 mm)
Width		10.7 in. (272 mm)
Depth		19.7 in. (500 mm)
Weight		36 lb (16 kg)
Electrical		90–265 VAC, 48-62 Hz
Power consumption Printing PAUSE test at slowest speed		118.7 W
Power consumption Printer idle		<7 W
Fuses		5A
Temperature	Operating	Thermal Transfer: 41° to 104°F (5° to 40°C) Direct Thermal: 32° to 104°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
Communication Interface Specifications	Standard	**Bluetooth® version 2.1** Limitations and Requirements Many mobile devices can communicate with the printer within a 10-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.
		USB host port See *Using the USB Host Port and NFC Capabilities* on page 167 for more information. Limitations and Requirements Only one device can be plugged into the printer's USB host port. You cannot use a second device by plugging it into a USB port on the first device, nor can you use an adaptor to split the USB host port on the printer to accept more than one device. Connections and Configuration No additional configuration is necessary.
	(Continued on next page.)	

Communication Interfaces (continued)	Standard (continued)	**Zebra PrintTouch/Near Field Communication (NFC)** See *Using the USB Host Port and NFC Capabilities* on page 167 for more information. 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 • 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/CCITT V.24 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 • You must use a null-modem cable to connect to the printer or a null-modem adaptor 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.

Communication Interfaces (continued)	Optional	**Wireless print server** WLAN Radio Specification 802.11 b • 2.4GHz • DSSS (DBPSK, DQPSK and CCK) • RF power 63 mW (ZebraNet n Print Server) 802.11 g • .4GHz • OFDM (16-QAM and 64-QAM with BPSK and QPSK) • RF power 63 mW (ZebraNet n Print Server) 802.11 n • 2.4GHz • OFDM (16-QAM and 64-QAM with BPSK and QPSK) • RF power 63 mW (ZebraNet n Print Server) 802.11 a/n • 5.15-5.25 GHz, 5.25-5.35 GHz, 5.47-5.725 GHz, 5.725-5.825 GHz • OFDM (16-QAM and 64-QAM with BPSK and QPSK) • RF power 50 mW (ZebraNet n Print Server) 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.
		8-bit Parallel data interface nibble mode compliant 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. Connections and Configuration No additional configuration is necessary.

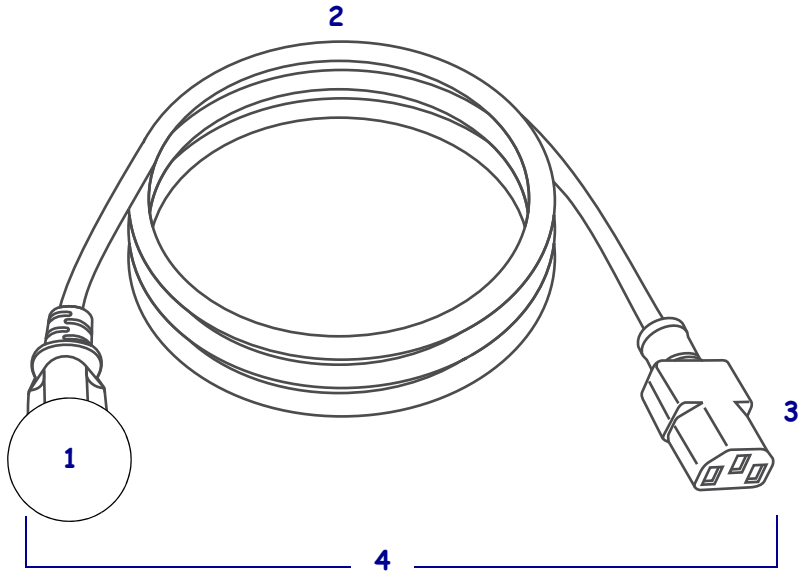
Power Cord Specifications

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

Depending on how your printer was ordered, a power cord may or may not be included. If one is not included or if the one included is not suitable for your requirements, see Figure 25 and refer to the following guidelines:

- The overall cord length must be less than 9.8 ft. (3 m).
- The cord must be rated for at least 10 A, 250 V.
- The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference.

Figure 25 • 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 26).
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 26).
4	Length ≤ 9.8 ft. (3 m). Rating 10 Amp, 250 VAC.

Figure 26 • International Safety Organization Certification Symbols

Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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. Examples are die-cut labels, notched tag-stock, and stock with black mark registration marks.

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

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

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

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

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

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

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

roll media Media that comes supplied rolled onto a core (usually cardboard).

supplies A general term for media and ribbon.

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

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

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

thermal transfer A printing method in which the printhead presses an ink or resin coated ribbon against the media. 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 bar code symbol to be read incorrectly or not at all.

Index

D

E

F

G

H

I

L

M

N

O

P

Q

R

S

T

U

V

W

Z

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