ZE511/ZE521
Industrial Print Engine

User Guide

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Proprietary Statement
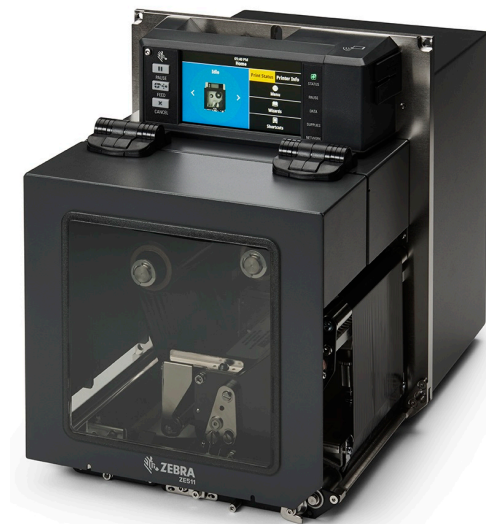
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Introduction

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

Print Engine Orientation

The ZE511 and ZE521 print engines are available in a left-hand configuration (the print mechanism is on the left) and a right-hand configuration (the print mechanism is on the right).

Left-hand (LH) print engine
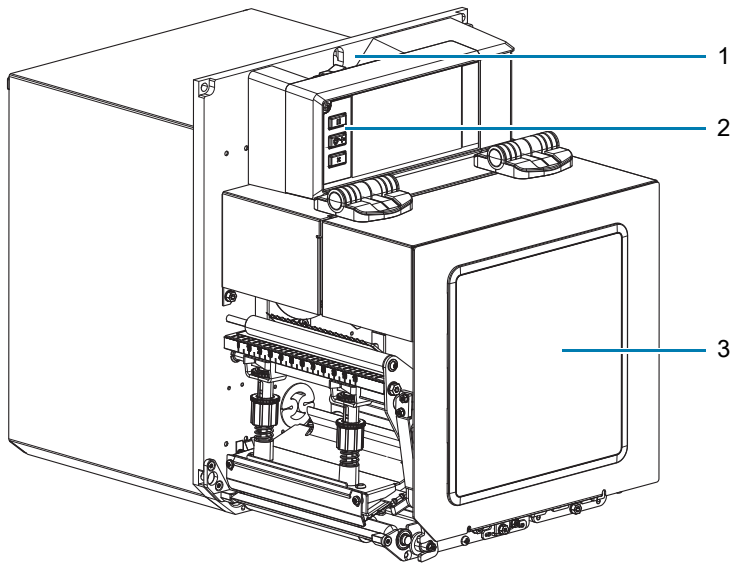
Right-hand (RH) print engine
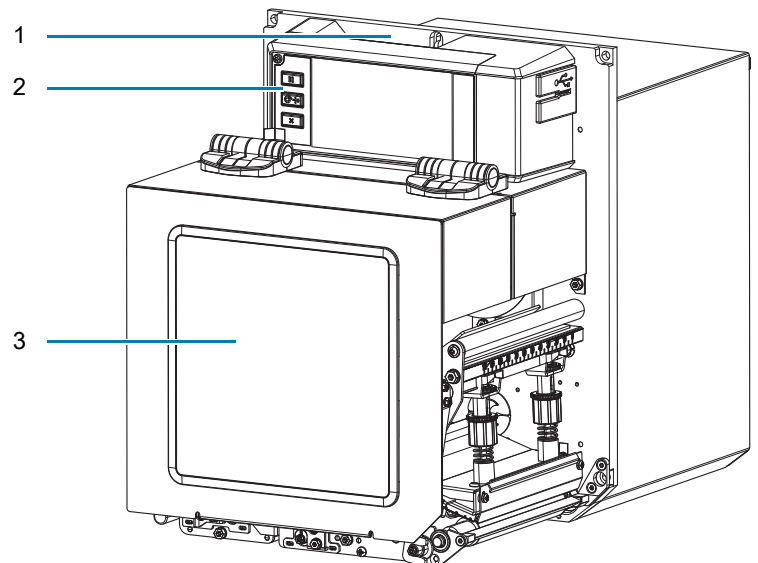
1	Power switch location
2	Control panel
3	Media cover

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Print Engine Components

The following shows the components inside the media compartment of a right-hand (RH) print engine. A left-hand (LH) unit contains a mirror image of these components. Familiarize yourself with these components before continuing.
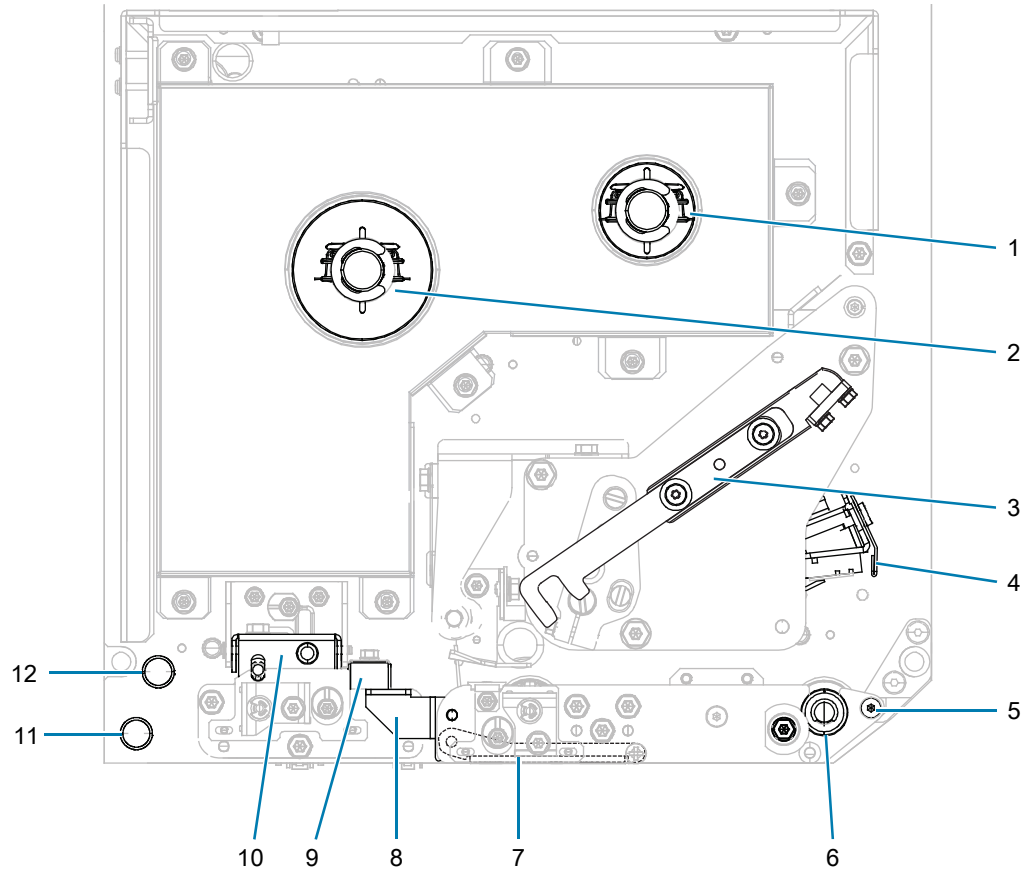
1	Ribbon take-up spindle		7	Peel roller assembly (hidden when closed)
2	Ribbon supply spindle		8	Peel roller latch
3	Printhead-release latch		9	Media guide
4	Printhead assembly (shown open)		10	Pinch roller assembly
5	Peel bar		11	Lower guide post
6	Platen roller		12	Upper guide post

Control Panel

All controls and indicators for the print engine are located on the control panel.
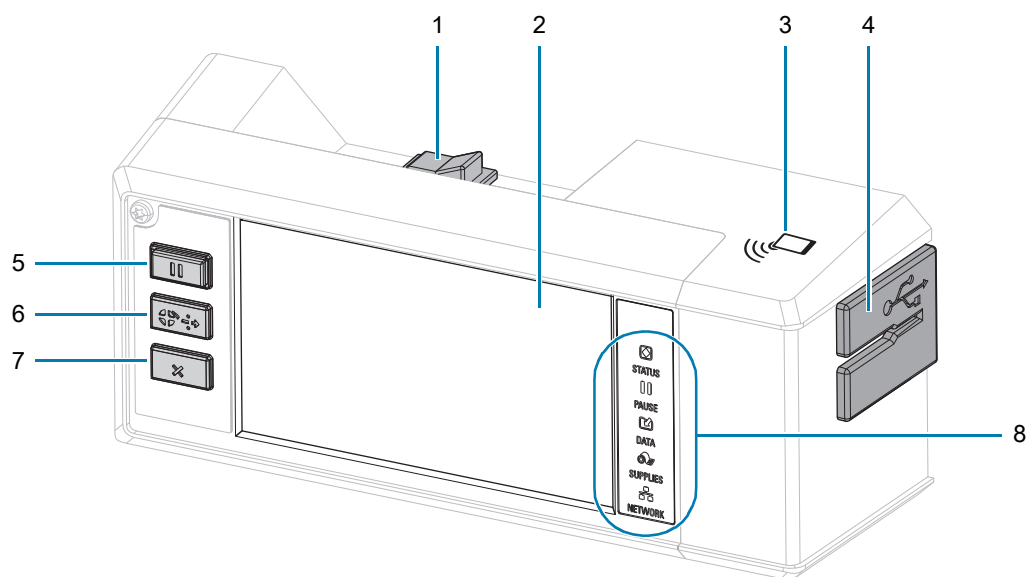
1	Power switch	Toggles the print engine on/off.
2	Display	Shows the print engine's operating status and allows the user to navigate the menu system. For more information, see Home Screen on page 11.
3	NFC logo	Used for the Print Touch feature. For more information, see Print Touch/Near Field Communication (NFC) on page 109.
4	USB host ports	Allows you to connect USB devices such as memory sticks, keyboards, or handheld scanners to the printer. For more information, see USB Host Ports on page 109.
5	PAUSE button	Starts or stops print engine operation when pressed.
6	FEED button	Forces the print engine to feed one blank label each time the button is pressed.
7	CANCEL button	Cancels print jobs when the print engine is paused.
8	Indicator lights	Communicate the printer's status. For more information, see Indicator Lights on page 93.

Home Screen

⚠ **IMPORTANT:** If the background color of the Home screen is yellow or red, the printer is in an alert or error state and may need user intervention. For more information, see Alert and Error States on page 88.

Print Status Tab

The Print Status tab on the Home screen provides the current status (such as Idle). On this screen, touching the left or right arrow rotates the image of the printer so that you can view it from any angle.
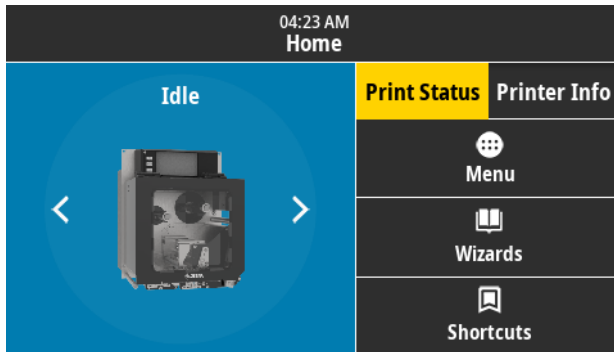
✎ **NOTE:** Depending on how your print engine is configured, the screens may display horizontally or vertically. See System > Settings > Display Orientation on page 35 for options.

Printer Info Tab

The Printer Info tab on the Home screen provides connectivity and firmware data. To scroll in a screen that does not display everything at one time, such as the horizontal Printer Info screen, touch the screen and drag upward.

NOTE: Depending on how your print engine is configured, the screens may display horizontally or vertically. See System > Settings > Display Orientation on page 35 for options.

Other Tabs

The following tabs are available on the Home screen:

Menu

Allows you to access the user menus, where you can view or change the printer settings. See Changing Printer Settings on page 30.

Wizards

Allows you to change printer settings by going through prompts. For more information about individual parameters that are set by any of the wizards, see Changing Printer Settings on page 30.

IMPORTANT: When using the Wizards, do not send data to the print engine from the host. For best results, use full-width media running the Print or Set All Wizards. If the media is shorter than an image to be printed, the image may be truncated or print across multiple labels.

Set All Wizard—runs all of the Wizards in sequence.

System—sets up non-print related operating system settings.

Connection—configures the printer's connectivity options.

Print—configures key printing parameters and features. See Running the Print Wizard and Printing a Test Label on page 27.

RFID—sets up the RFID subsystem operations.
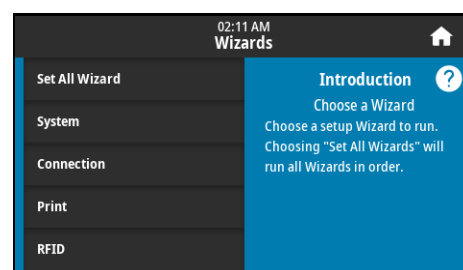
Shortcuts

Allows you to quickly access the most recent menu items and to save your favorites.The Print Station and Calibrate menu items also appear in the shortcuts.

1. Touch the dark heart icon next to a menu item to save it to your list of favorites.

   A red heart icon (1) indicates a saved item.
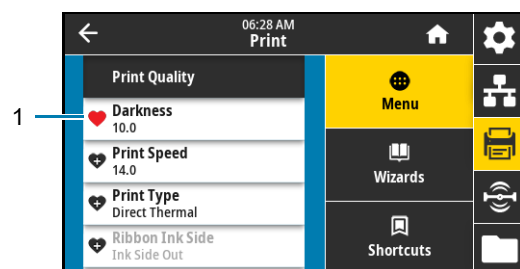
2. Access saved items by touching **Favorites** (1).
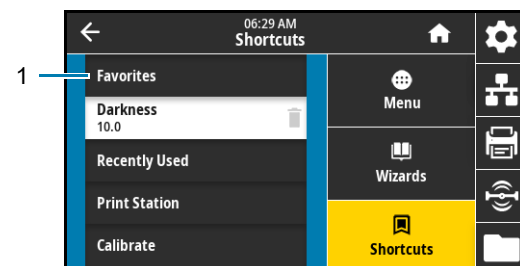
Preparing to Print

Ordering Supplies and Accessories

The following required items do NOT come with the printer:

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

Label Design Software

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

Cables

See Communication Interface Specifications on page 122 for more information.

Media

For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of Zebra Certified Supplies as part of the total solution. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the print engine and to prevent premature printhead wear. To purchase supplies, go to zebra.com/supplies.

The Glossary on page 174 includes terms associated with media, such as black mark media, gap/notch media, RFID media, fanfold media, and roll media. Use these terms to help determine which type of media is best for your needs.

Ribbon

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

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

What kind of ribbon can I use? Ribbon can be wound with the coated side on the inside or outside. This print engine can use either type. Contact your authorized Zebra reseller for ordering information.

Ink on the Outside   Ink on the Inside

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

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

Specifying the Media Handling Method

1. On the Home screen, touch **Menu > Print > Image Adjust > Media Handling**.
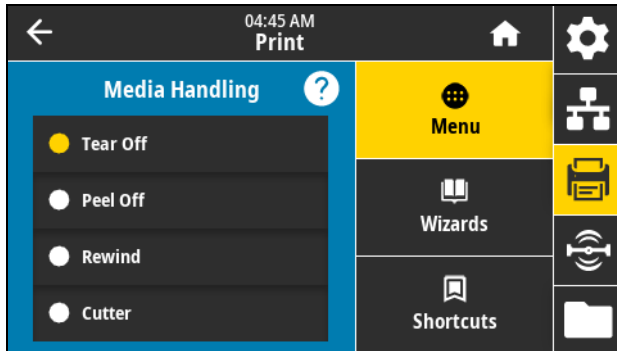
2. Select a media handling method that matches your media and setup.

Method	Description
Tear Off	The printer prints label formats as it receives them. The printer operator can tear off the printed labels when the printer stops.
Peel Off	The printer peels the label from the backing during printing and then pauses until the label is removed.
Rewind	The printer prints without pausing between labels. The media is wound onto a core after printing.
Cutter	The printer cuts between labels after each one is printed.
Delayed Cut	The printer waits for a delayed cut ZPL command (~JK) before it cuts the last printed label.
Linerless Peel	Not used. Reserved for future use.
Linerless Rewind	
Linerless Tear	
Applicator	The printer prints when it receives a signal from the applicator. Refer to the Advanced User Information section of the Maintenance Manual for additional information about the applicator interface.
Linerless Cut	Not used. Reserved for future use.
Linerless Delayed Cut	
Stream	The printer prints a batch of labels with backfeed occurring only at the start and end of the batch instead of between individual labels. This setting increases label throughput in batch printing.

3. Touch the home icon to return to the Home screen.

Ribbon and Media Loading

Use the instructions in this section to load ribbon (if used) and media in a ZE511/ZE521 print engine.

NOTE: The majority of the graphics in this section show a right-hand (RH) unit with ribbon that is coated with ink on the outside. Graphics for other options are included in some places for clarity.
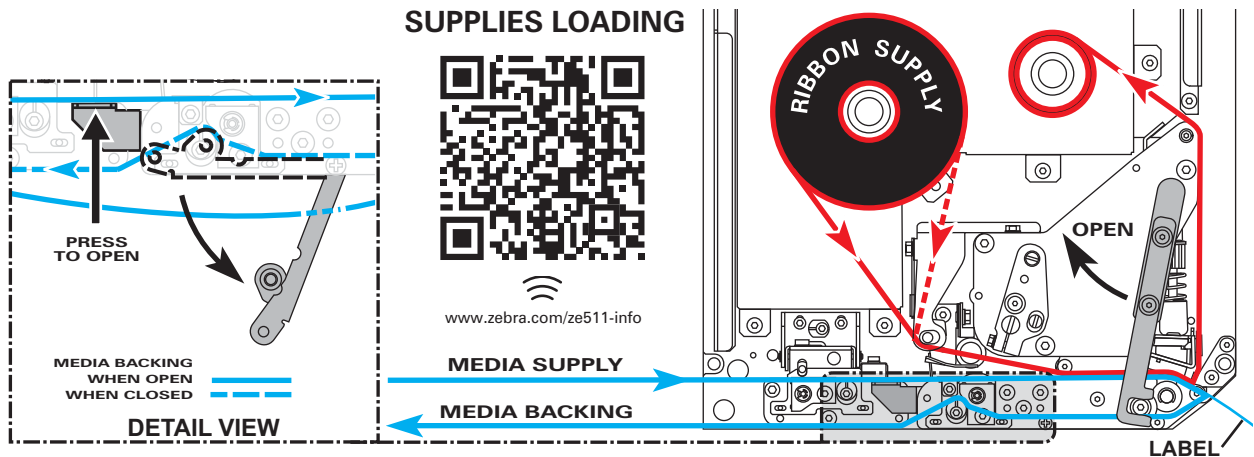
Loading Ribbon

Ribbon is used with thermal transfer labels. For direct thermal labels, do not load ribbon in the print engine. To determine if ribbon must be used with a particular media, see Do I need to use ribbon? on page 13. To order Zebra Certified ribbon or media, visit zebra.com/supplies.

1. Determine which side of the ribbon is coated with ink (see How can I tell which side of the ribbon is coated? on page 13), and then position the ribbon roll with the loose end unrolling in the direction shown.

LH (ink side **out**)
RH (ink side **in**)

RH (ink side **out**)
LH (ink side **in**)
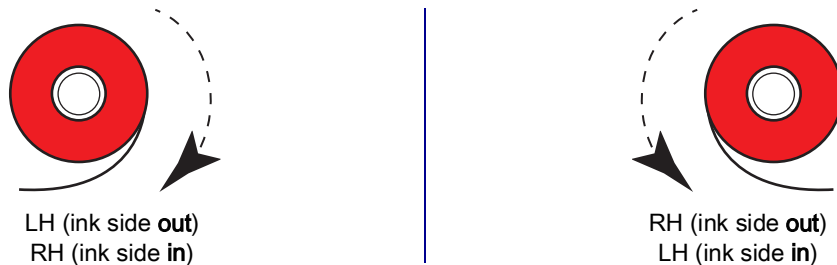
2. If necessary, update the ribbon ink side setting (see Print > Print Quality > Ribbon Tension on page 51).

3. Open the media cover.
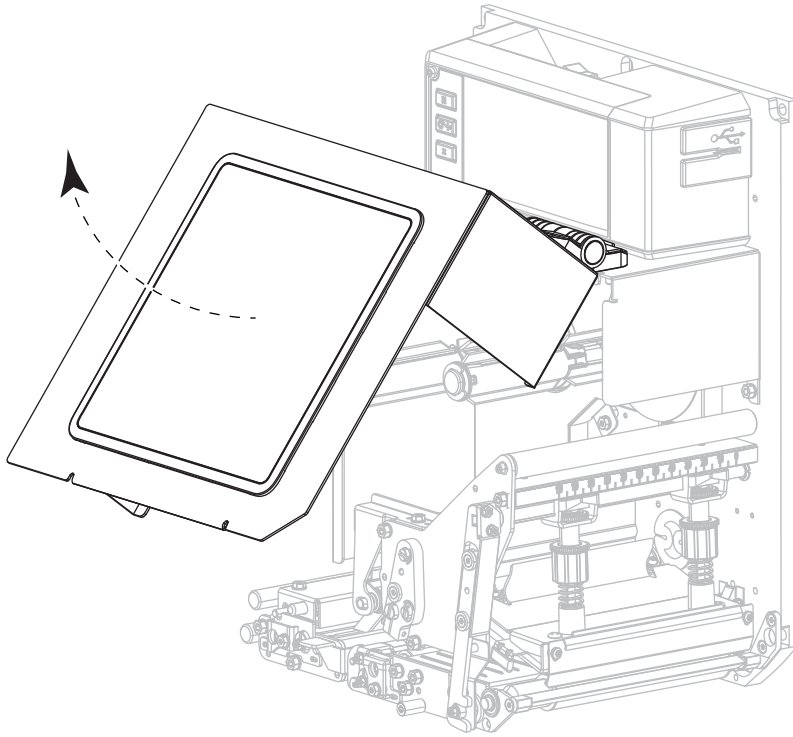
4. Release the printhead assembly.
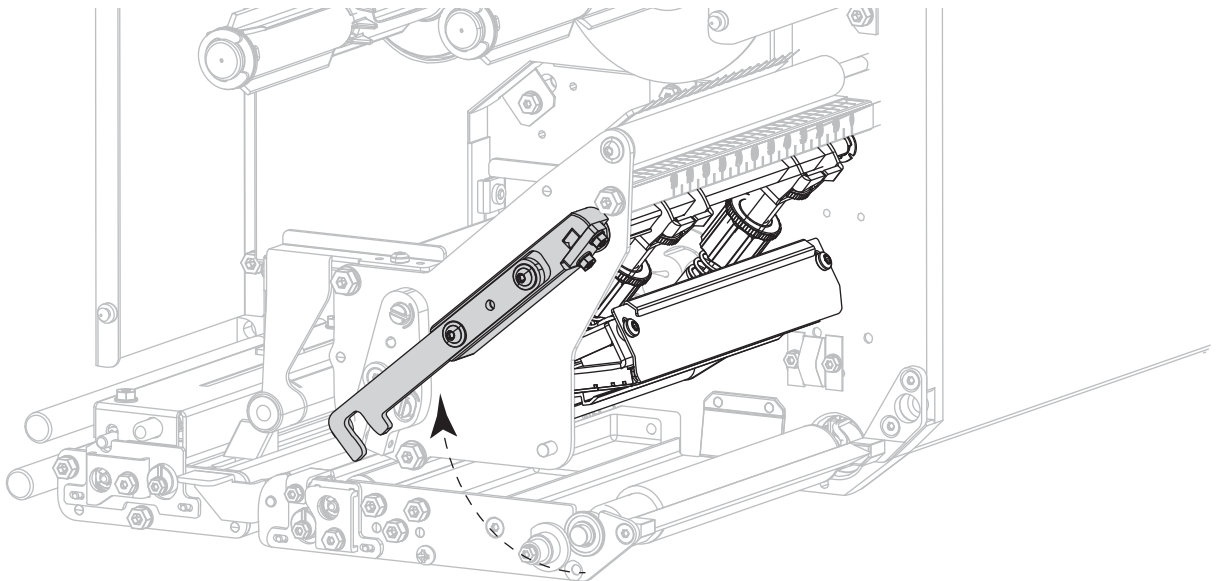
5. Place the roll of ribbon on the ribbon supply spindle. Push the roll back as far as it will go.
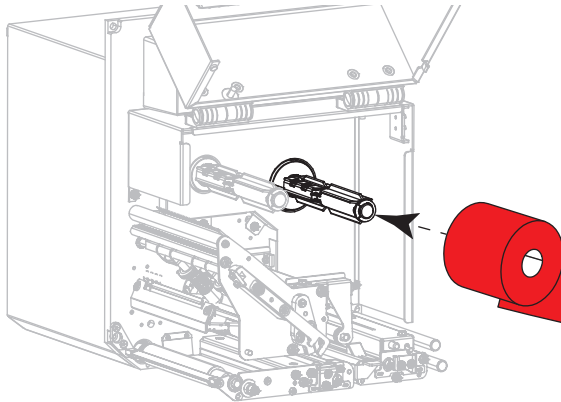
LH (ink side **out**)
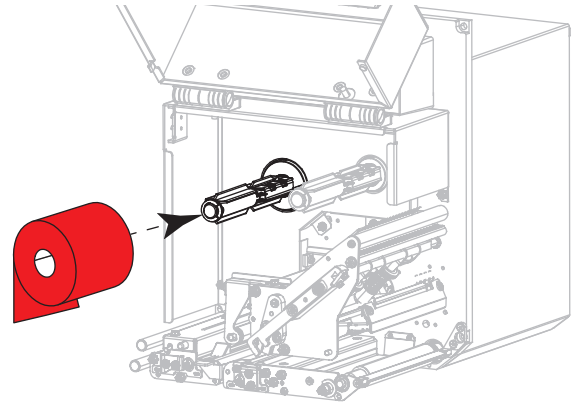
RH (ink side **out**)
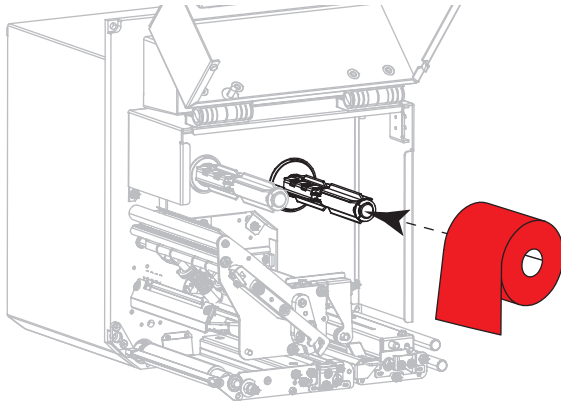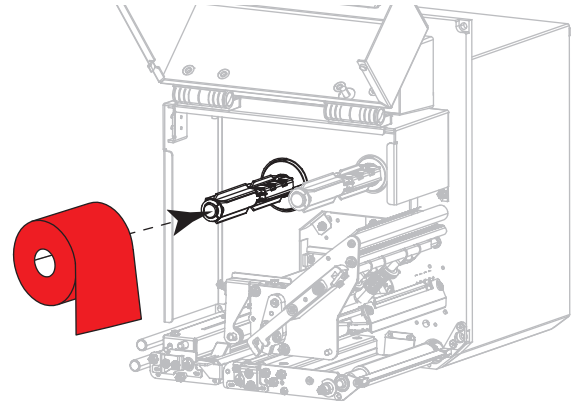
LH (ink side **in**)

RH (ink side **in**)

6. Place an empty ribbon core on the ribbon take-up spindle. Push the core back as far as it will go.
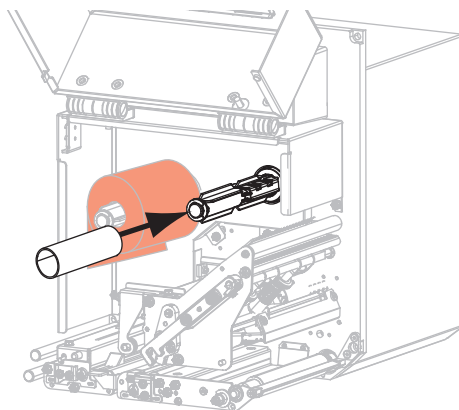
⚠️ **CAUTION—HOT SURFACE:** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

7. Thread the ribbon under the lower ribbon guide roller (1), under the printhead assembly (2), and then over the upper ribbon guide roller (3).
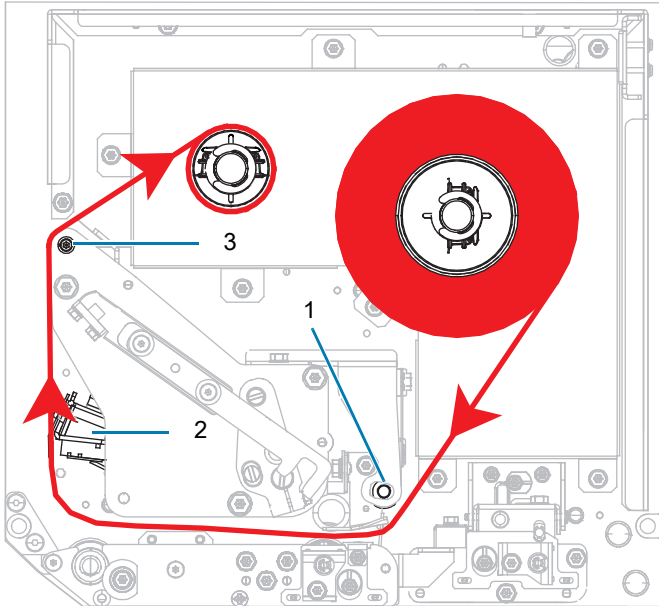
LH (ink side **out**)
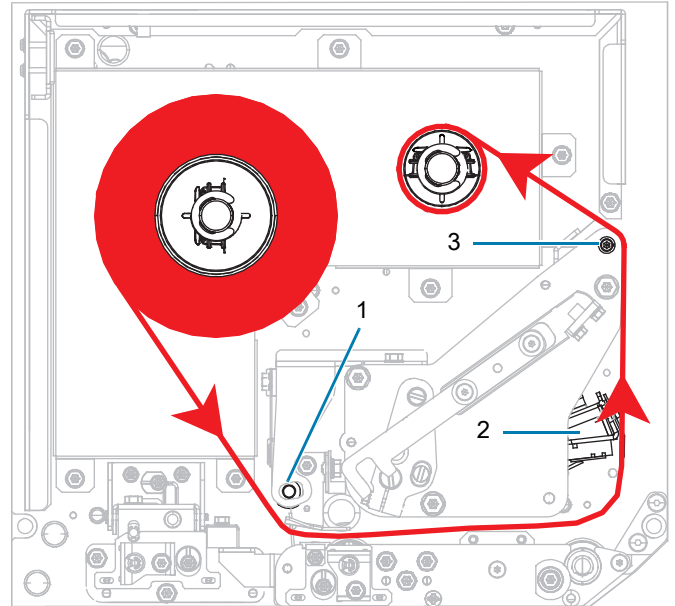
RH (ink side **out**)
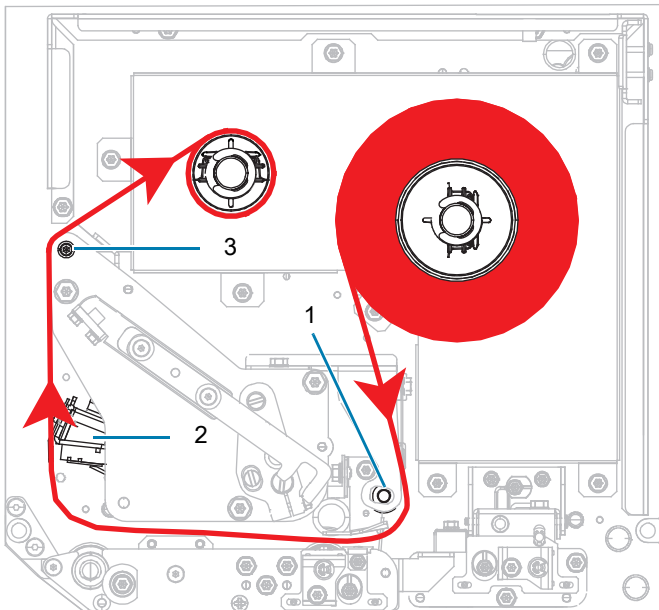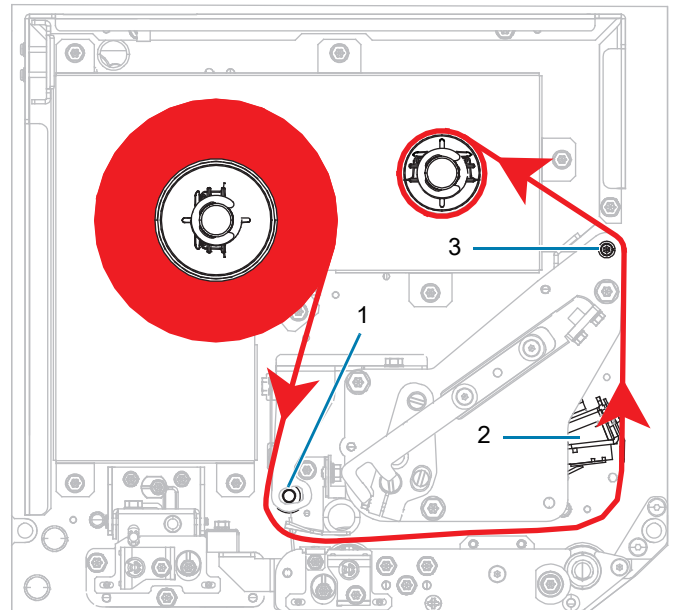
LH (ink side **in**)

RH (ink side **in**)

8. Wind the ribbon around the core on the ribbon take-up spindle in the direction shown.

| LH | RH |
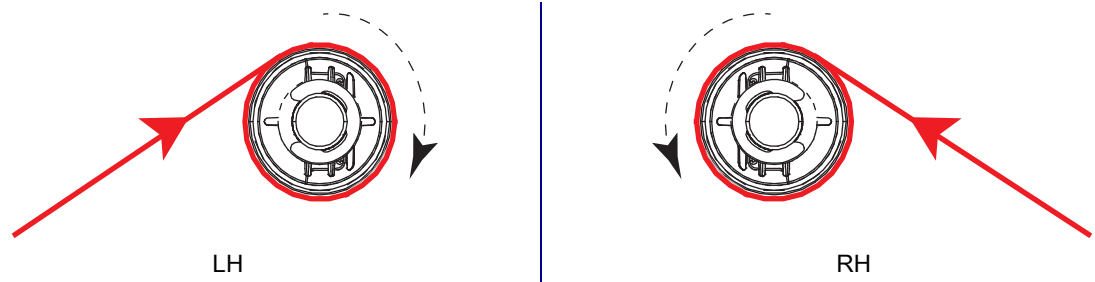
Loading Media

1. Load media on the media supply reel of the applicator (refer to the applicator's documentation for more information).

2. Press the release button on the pinch roller assembly. Allow the assembly to pivot upward.
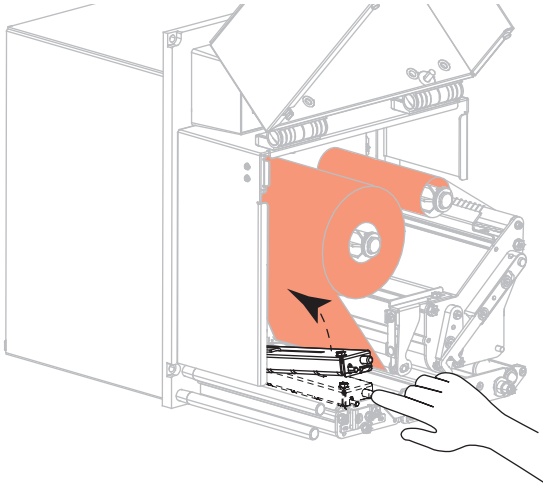
3. Slide the media guide all the way out.
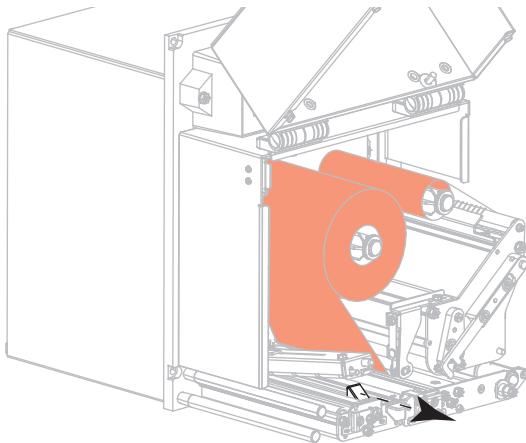
4. Thread the media under the upper guide post (1), below the pinch roller assembly (2), and under the printhead assembly (3).

LH   RH
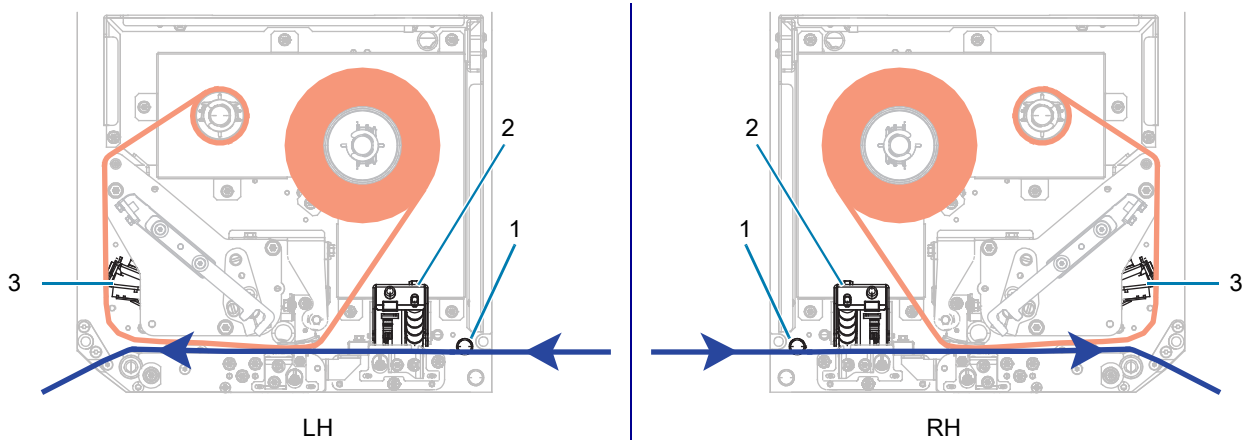
5. Extend approximately 30 in. (75 cm) of media past the peel bar. Remove and discard the labels from the liner on this exposed media.
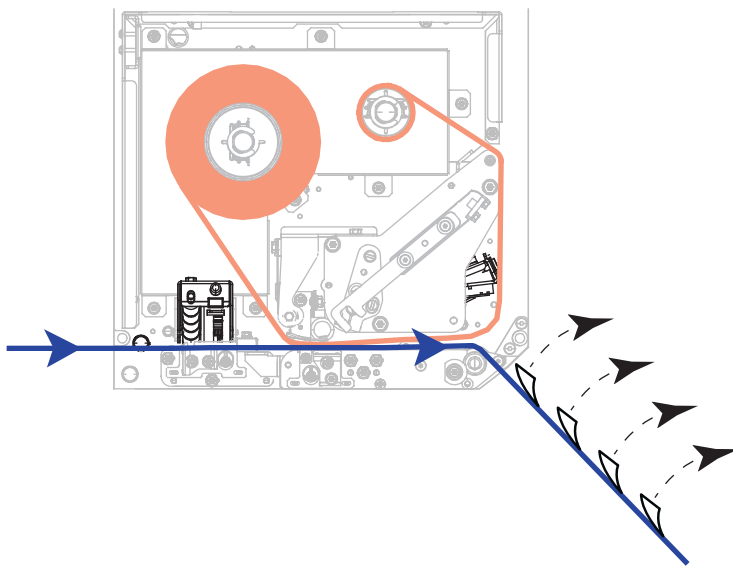
6. Slide in the media guide until it just touches the edge of the media.
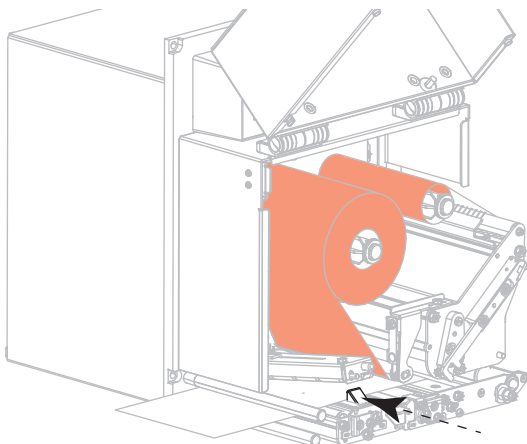
7. Press down on the pinch roller assembly until it locks closed.
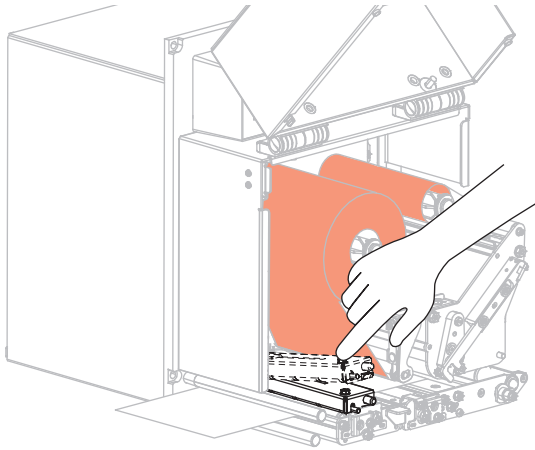
8. Raise the peel roller latch so that the peel roller assembly pivots downward.

LH   RH
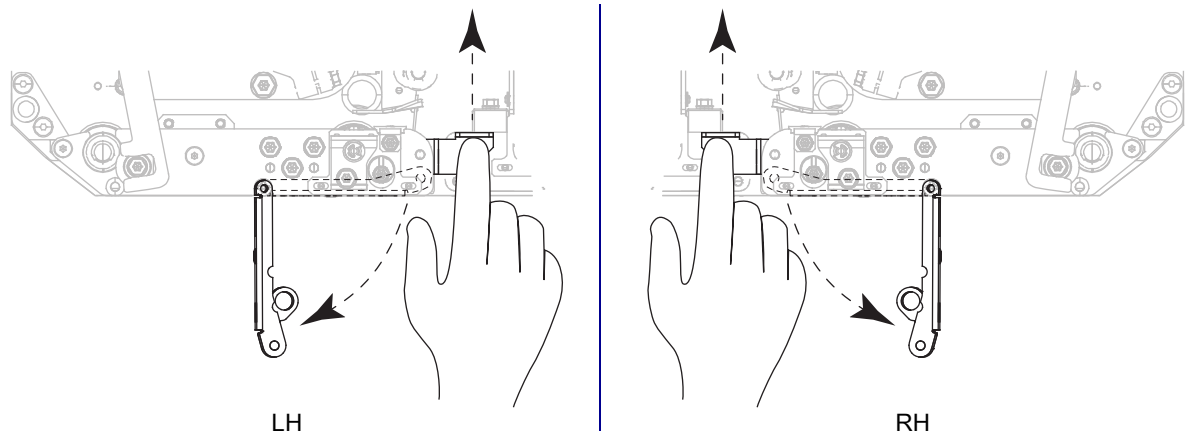
9. Thread the liner around the peel bar (1) and through the peel roller assembly (2).

IMPORTANT: If the applicator has an air tube, route the liner between the air tube and the peel bar. Do not thread the liner over the air tube.

1   2   LH   RH   2   1
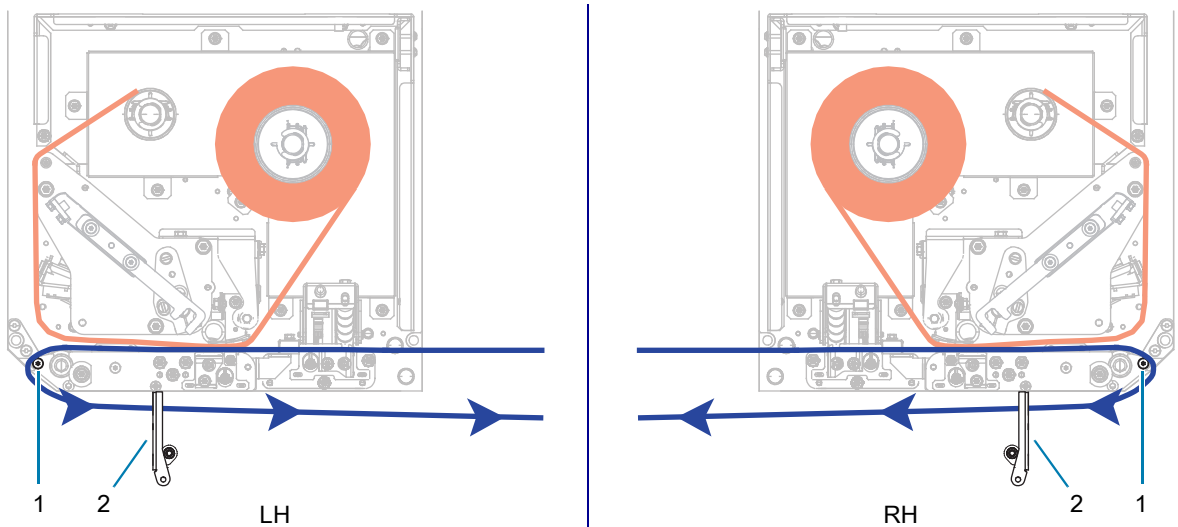
10. Lock the printhead assembly.
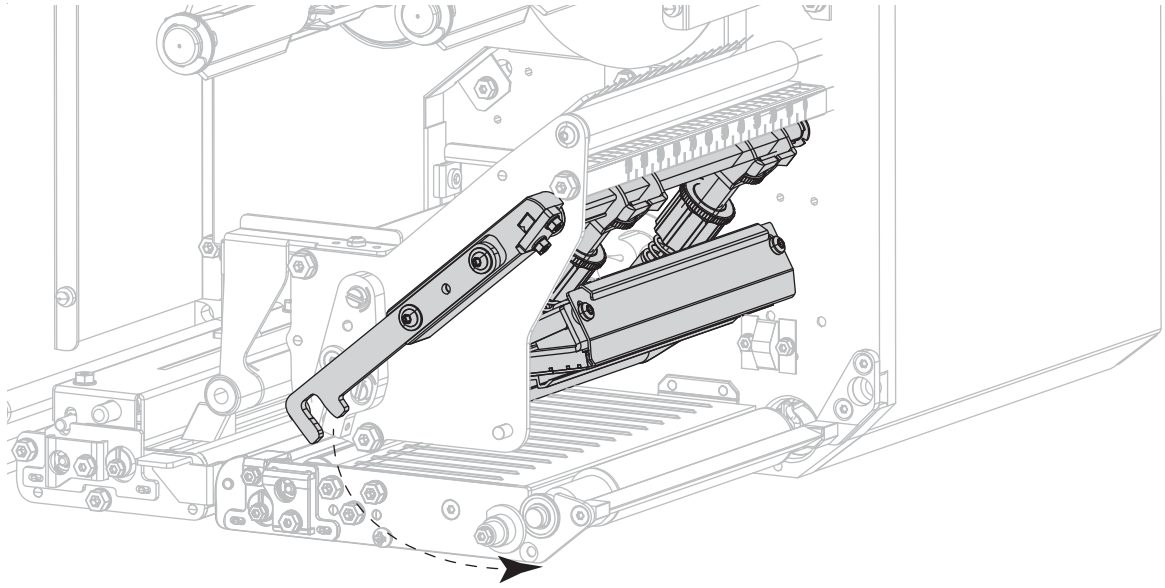
11. Rotate the peel roller assembly up until it locks into the closed position.

LH   RH
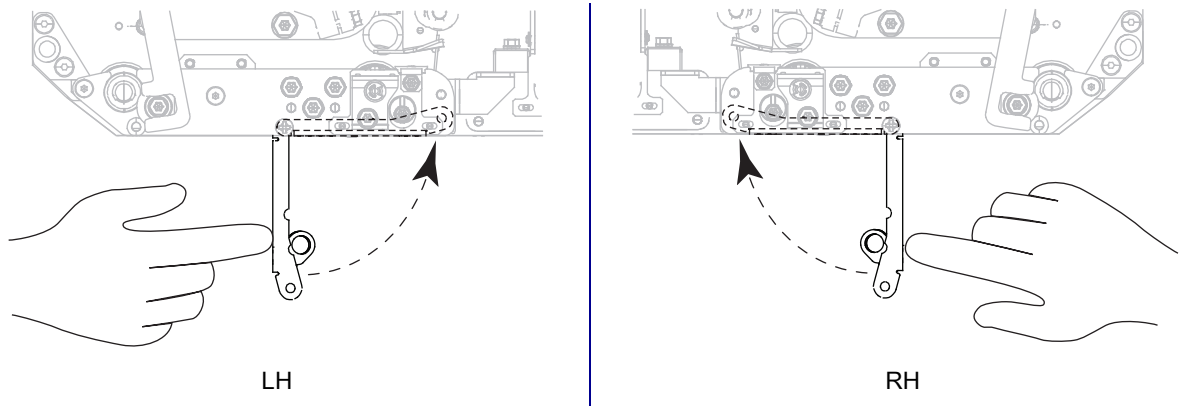
12. Thread the liner around the take-up spindle of the applicator (refer to the applicator's documentation for more information).

13. Close the media cover.
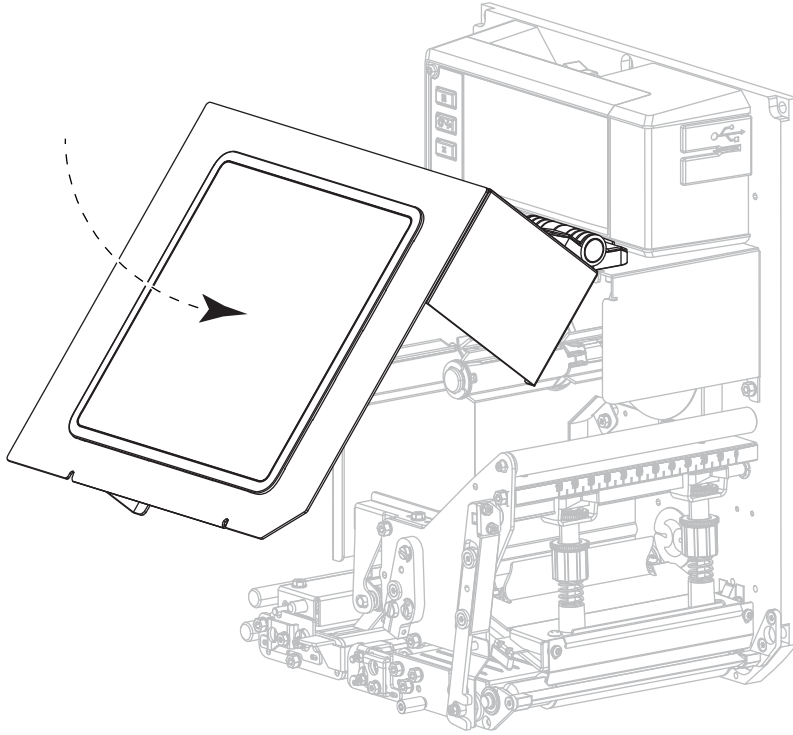
14. If desired, perform the PAUSE Self-Test on page 83 to verify that your printer is able to print.

Calibrating 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.

IMPORTANT: Follow the calibration procedure exactly as presented.

To cancel the calibration process, press and hold **CANCEL** at any step in the procedure.

1. Touch **Print > Sensors > Manual Calibration**.
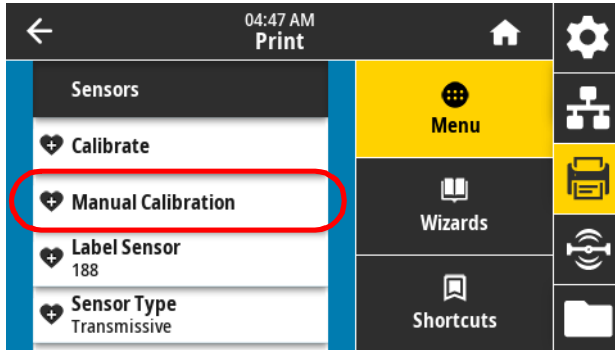
The printer prompts you to start calibration.
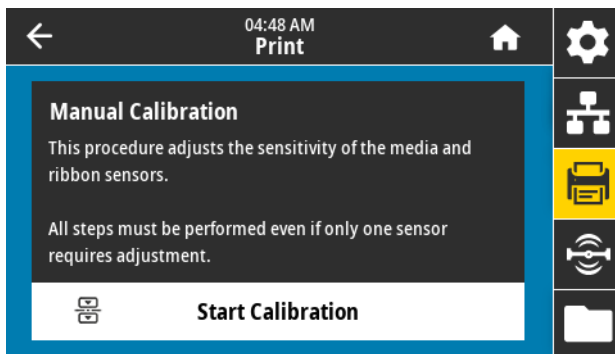
2. Touch **Start Calibration**.

3. Follow the steps in the calibration procedure.

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

Running the Print Wizard and Printing a Test Label

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

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

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

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

1. On the Home screen, touch **Wizards > Print > Start Print**.

2. Follow the prompts to specify the following information:

   - print type (Thermal Transfer or Direct Thermal)

   - media type (Continuous, Gap/Notch, or Mark)

   - label width

   - media handling method (tear off, peel-off, rewind, cutter, delayed cut, linerless peel, linerless rewind, linerless tear, or applicator)

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

3. If you have not already done so, load media, and then touch the check mark.

4. At the prompt, close the printhead, and then touch the next check mark.

   The printer calibrates and then asks if you would like to print a test label.

5. Follow the prompts until the printer completes auto calibration.

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

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

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

    • If the space between labels falls on the tear bar, continue with the next step.

    • If the space between labels does not fall directly on the tear bar, shift the position of the media over the tear bar after printing. Lower numbers move the media into the printer by the specified number of dots (the tear line moves closer to the edge of the label just printed). Higher numbers move the media out of the printer (the tear line moves closer to the leading edge of the next label).
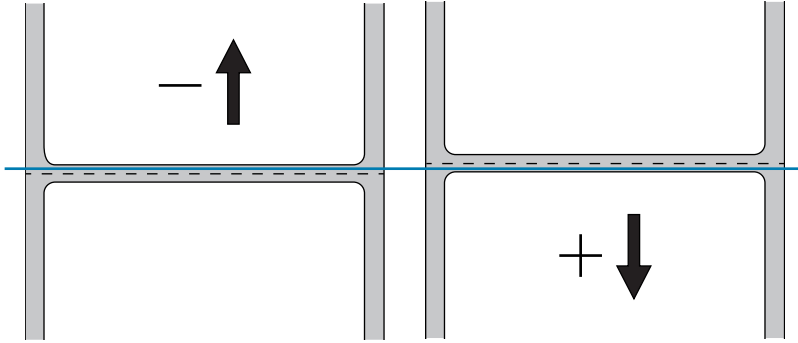
8. Examine the quality of the image on the test label. Is the quality of the barcode and text on the test label acceptable? See Judging Barcode Quality on page 80 for assistance.

    • If yes, touch the check mark, and then continue with step 13.

    • If no, adjust the print quality manually by changing darkness and speed settings through the printer's menu system, or continue with this procedure to run the Print Quality Assistance wizard.

Print Quality Assistance Wizard

9. Touch **Print Quality Assistance**.

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

10. Select a number of test labels to print.

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

11. Decide which test label is the best quality. See Judging Barcode Quality on page 80 for assistance. If none of the labels are acceptable, use the arrow to back up a screen in the wizard, and select a larger number of test labels.

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

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

13. If necessary, see Printing or Print Quality Issues on page 96 to see what other issues may be affecting your print quality.

The print setup procedure is complete.

Printer Configuration and Adjustment

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

Changing Printer Settings

You can view or change the printer settings in a number of ways. In this section, the user menus are shown, and when other options for changing the same setting exist, they are included.

- User menus—See the following sections:

  - System Menu on page 31

  - Connection Menu on page 38

  - Print Menu on page 49

  - RFID Menu on page 60

  - Storage Menu on page 64
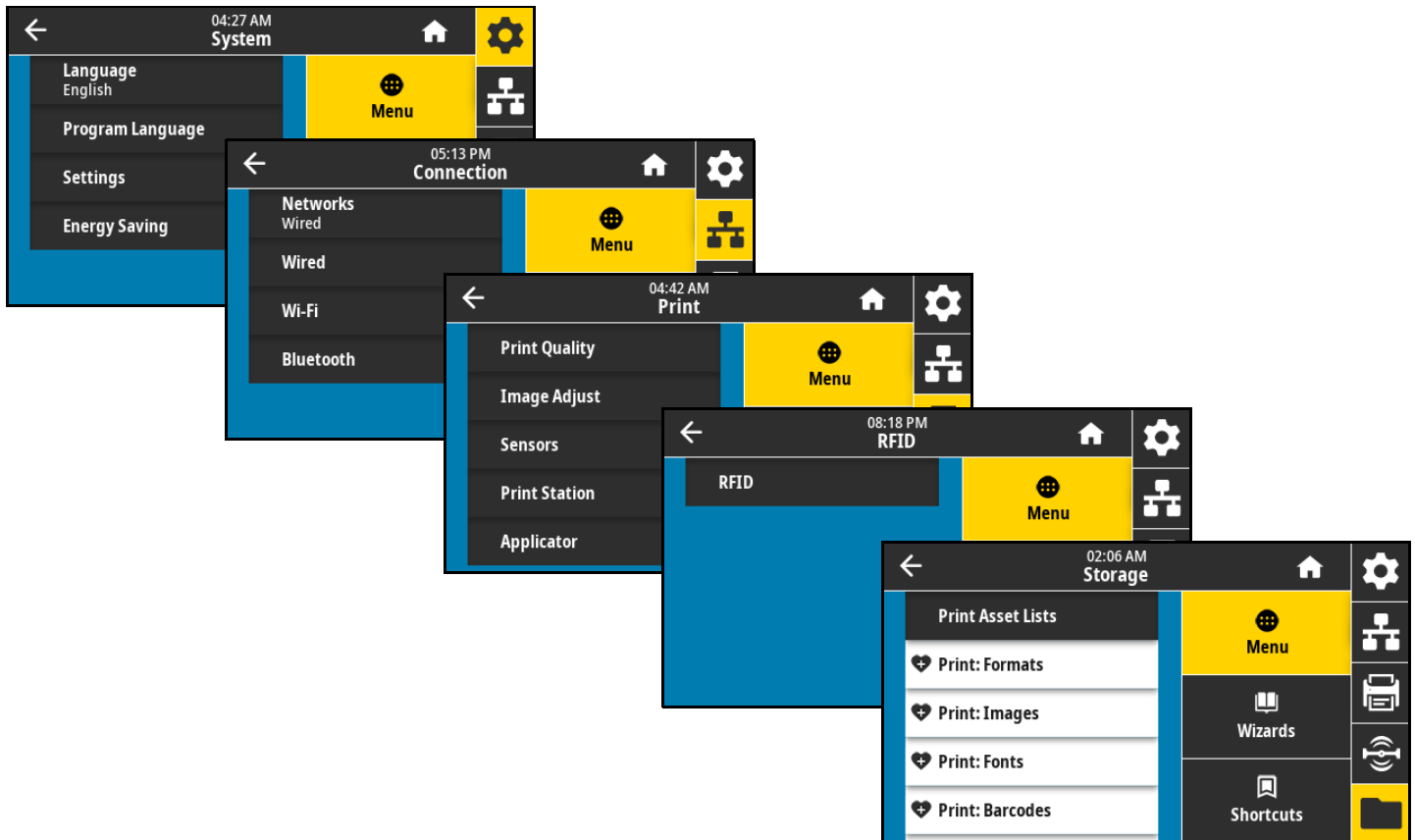
- Control panel key(s)—Some actions can be initiated through control panel key combinations.

- ZPL and Set/Get/Do (SGD) commands—Many parameters can be set through these commands. See the Zebra Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML at zebra.com/manuals for more information.

- Printer web pages—These are available when the printer has an active wired or wireless print server connection. See the ZebraNet Wired and Wireless Print Servers User Guide at zebra.com/manuals for more information.

System Menu

System > Language

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

- the Home screen
- the user menus
- error messages
- for some languages, the printer configuration label, the network configuration label, and other labels that you can select to print through the user menus
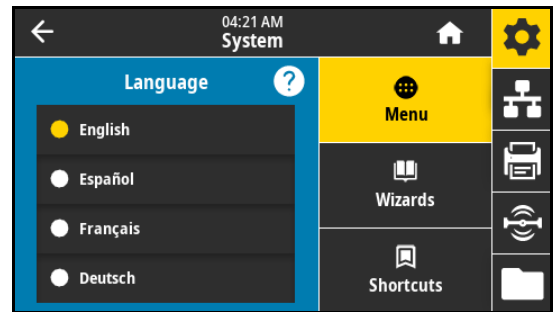
Accepted values:

English	English	Suomi	Finnish
Español	Spanish	日本語	Japanese
Français	French	한국어	Korean
Deutsch	German	简体中文	Simplified Chinese
Italiano	Italian	繁體中文	Traditional Chinese
Norsk	Norwegian	Русский	Russian
Português	Portuguese	Polski	Polish
Svenska	Swedish	Čeština	Czech
Dansk	Danish	Română	Romanian
Nederlands	Dutch		

Related ZPL command(s): ^KL

SGD command used: display.language

Printer web page:

   View and Modify Printer Settings > General Setup > Language

System > Program Language > Diagnostic Mode

Enabling this diagnostics tool causes the printer to output the hexadecimal values for all data received by the printer. The hexadecimal data is saved or printed based on the selection. For more information, see Using Communication Diagnostics Mode on page 86.

Accepted values:

- Print
- E: Drive
- USB Host
- Off
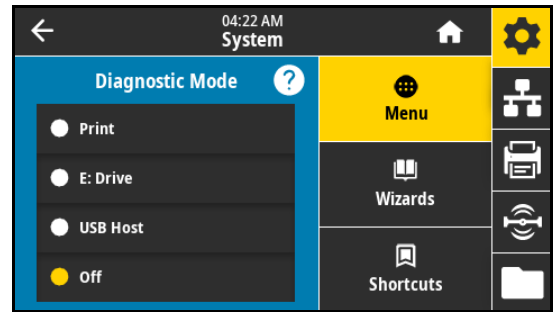
System > Program Language > Virtual Device

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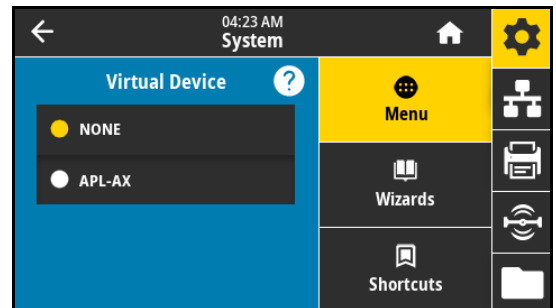
System > Program Language > ZBI

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

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

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

After a program is running, only that program is listed. Touch **Stop** (highlighted in white) to end the program.
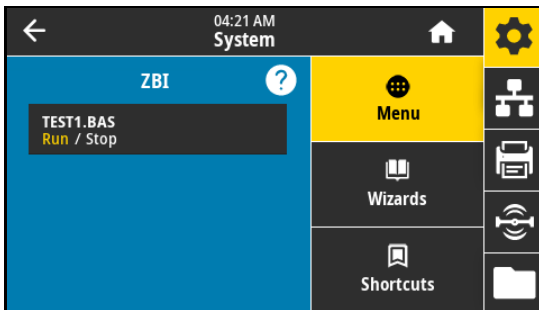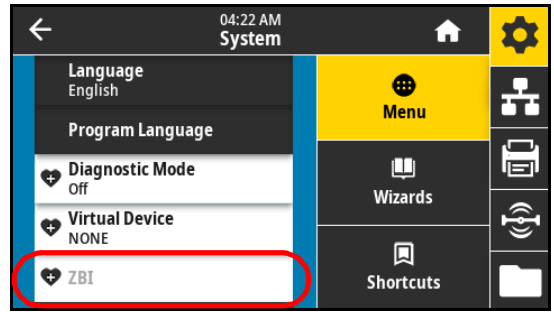
SGD command used: `zbi.key` (identifies if the ZBI 2.0 option is enabled or disabled on the printer)

System > Settings > Display Time Format

Select the time format used by the printer.

Accepted values:

- 12-Hour
- 24-Hour
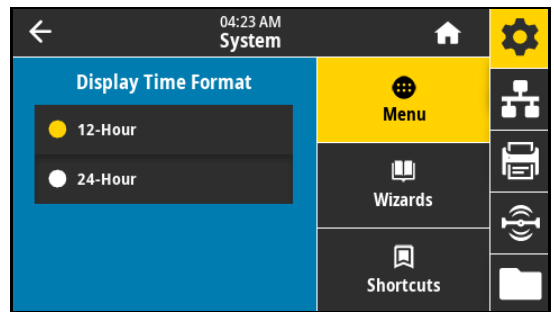
System > Settings > Password Level

Select the level of password protection for user menu items.
Accepted values:

- Selected
- All
- None

Related ZPL command(s): `^KP` (to change the printer password)
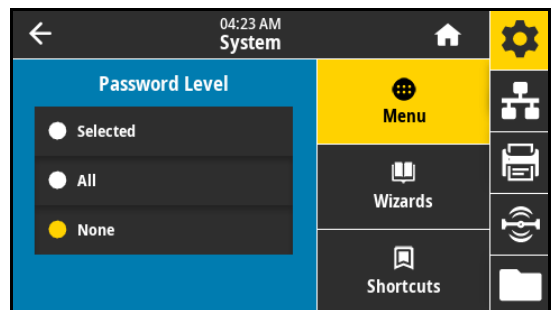
System > Settings > Set Password

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

Accepted values: Numerals 0–9

Related ZPL command(s): ^KP
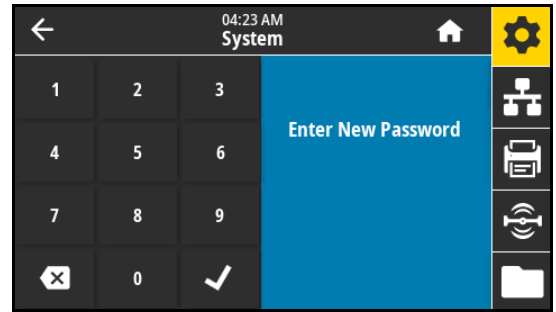
System > Settings > Power Up Action

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

Accepted values:

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

- FEED—Feeds the labels to the first registration point.

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

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

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

Related ZPL command(s): ^MF

SGD command used: ezpl.power_up_action

Printer web page:

   View and Modify Printer Settings > Calibration
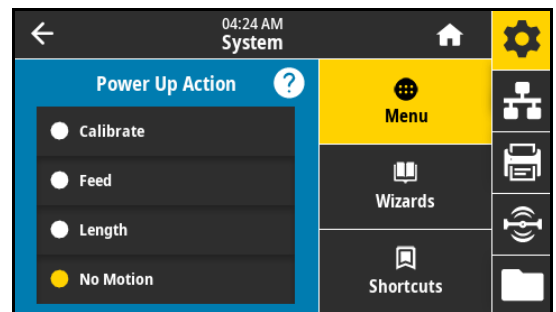
System > Settings > Head Close Action

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

Accepted values:

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

- FEED—Feeds the labels to the first registration point.

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

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

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

Related ZPL command(s): ^MF

SGD command used: ezpl.head_close_action

Printer web page:

View and Modify Printer Settings > Calibration
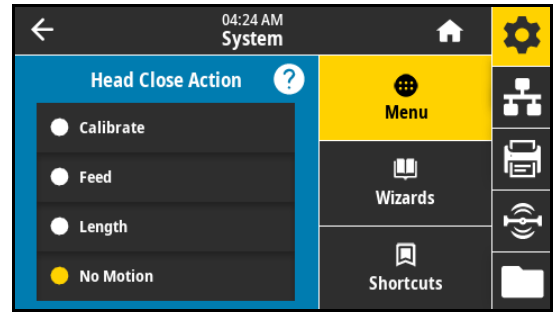
System > Settings > Display Orientation

Select the angle at which the control panel displays.

Accepted values:

- 0—Horizontal display (default)

- 90—Vertical display, rotated right

- 180—Horizontal display, upside-down

- 270—Vertical display, rotated left

SGD command used: display.orientation
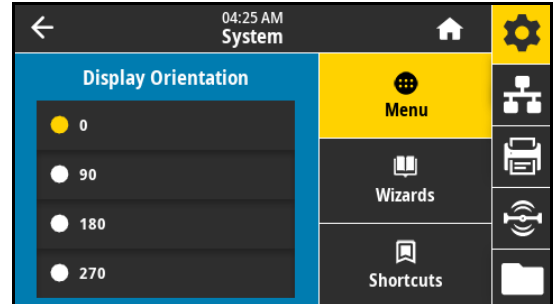
System > Settings > Screen Calibration

Touch each crosshair to calibrate the screen.
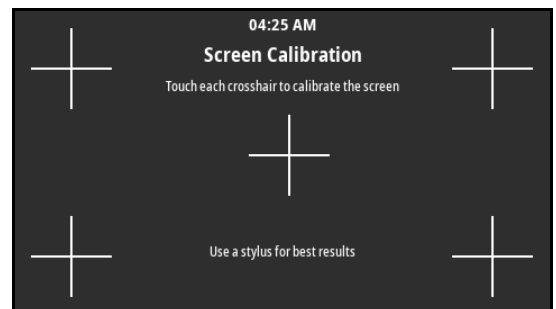
System > Settings > Restore Defaults

Restore specific printer, print server, and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.

Accepted values:

- PRINTER—Restores all printer settings other than the network settings back to the factory defaults.

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

- LAST SAVED—Loads settings from the last permanent save.

Related ZPL command(s):

- PRINTER— `^JUF`

- NETWORK— `^JUN`

- LAST SAVED— `^JUR`

Control panel key(s):

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

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

- LAST SAVED—N/A

Printer web page:

- PRINTER—View and Modify Printer Settings > Restore Default Configuration

- NETWORK—Print Server Settings > Reset Print Server

- LAST SAVED—View and Modify Printer Settings > Restore Saved Configuration
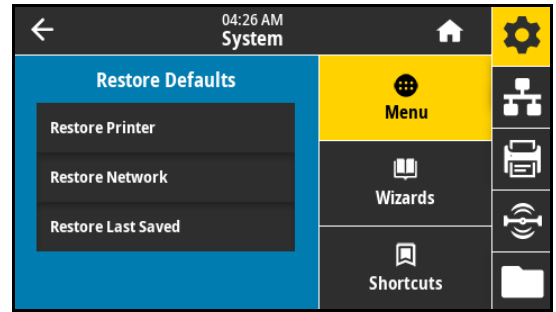
System > Settings > Print: System Settings

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

```
          PRINTER CONFIGURATION

Zebra Technologies
ZTC ZTXXX-XXXdpi ZPL
XXXXXXXXXXXX

+30.0.............. DARKNESS
6.0 IPS............ PRINT SPEED
-007............... TEAR OFF
TEAR OFF........... PRINT MODE
CONTINUOUS......... MEDIA TYPE
TRANSMISSIVE....... SENSOR SELECT
DIRECT-THERMAL..... PRINT METHOD
1344............... PRINT WIDTH
2000............... LABEL LENGTH
P1085892/00005 2... PRINT HEAD ID
15.0IN    380MM.... MAXIMUM LENGTH
MAINT. OFF......... EARLY WARNING
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
INACTIVE........... COMMAND OVERRIDE
FEED............... MEDIA POWER UP
LENGTH............. HEAD CLOSE
DEFAULT............ BACKFEED
+000............... LABEL TOP
+0000.............. LEFT POSITION
OFF................ APPLICATOR PORT
ENABLED............ ERROR ON PAUSE
PULSE MODE......... START PRINT SIG
DISABLED........... REPRINT MODE
080................ WEB SENSOR
090................ MEDIA SENSOR
255................ TAKE LABEL
027................ MARK SENSOR
027................ MARK MED SENSOR
000................ TRANS GAIN
005................ TRANS BASE
060................ TRANS LED
002................ MARK GAIN
100................ MARK LED
DPCSWFXM........... MODES ENABLED
................... MODES DISABLED
1344 8/MM FULL..... RESOLUTION
4.0................ LINK-OS VERSION
V80.20.03 <-....... FIRMWARE
1.3................ XML SCHEMA
6.6.0 22.89........ HARDWARE ID
32768k.........R: RAM
524288k.........E: ONBOARD FLASH
NONE............E: FORMAT CONVERT
MM/DD/YYYY 24HR.... IDLE DISPLAY
05/11/17........... RTC DATE
06:40.............. RTC TIME
ENABLED............ ZBI
2.1................ ZBI VERSION
READY.............. ZBI STATUS
TM:MBE MICRO....... RFID READER
20.00.00.01........ RFID HW VERSION
01.03.00.18........ RFID FW VERSION
USA/CANADA......... RFID REGION CODE
USA/CANADA......... RFID COUNTRY CODE
RFID OK............ RFID ERR STATUS
16................. RFID READ PWR
16................. RFID WRITE PWR
F0................. PROG. POSITION
0.................. RFID VALID CTR
0.................. RFID VOID CTR
NONE............... ADAPTIVE ANTENNA
A4................. RFID ANTENNA
570 LABELS......... NONRESET CNTR
570 LABELS......... RESET CNTR1
570 LABELS......... RESET CNTR2
2,798 IN........... NONRESET CNTR
2,798 IN........... RESET CNTR1
2,798 IN........... RESET CNTR2
7,107 CM........... NONRESET CNTR
7,107 CM........... RESET CNTR1
7,107 CM........... RESET CNTR2
001 WIRELESS....... SLOT 1
*** EMPTY.......... SLOT 2
0.................. MASS STORAGE COUNT
0.................. HID COUNT
OFF................ USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Related ZPL command(s): `~WC`

Control panel key(s):

Do one of the following:*

- Hold **CANCEL** during printer power-up. (Formerly called a CANCEL self-test.)

- Hold **FEED + CANCEL** for 2 seconds when the printer is in the Ready state.

Printer web page:

View and Modify Printer Settings > Print Listings on Label *

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

System > Energy Saving > Energy Star

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

Accepted values:

- ON
- OFF

SGD command used:

- power.energy_star.enable
- power.energy_star_timeout
  (to set the amount of idle time before Energy Star is invoked)
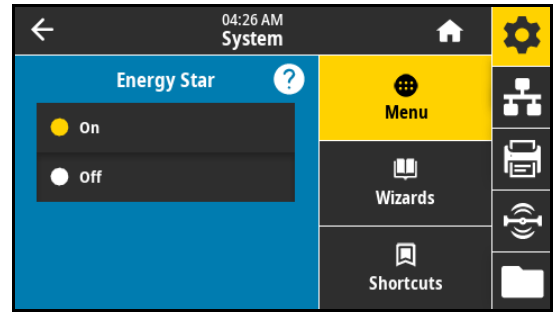
Connection Menu

Connection > Networks > Reset Network

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

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

Related ZPL command(s): ~WR

SGD command used: device.reset

Printer web page:

Print Server Settings > Reset Print Server
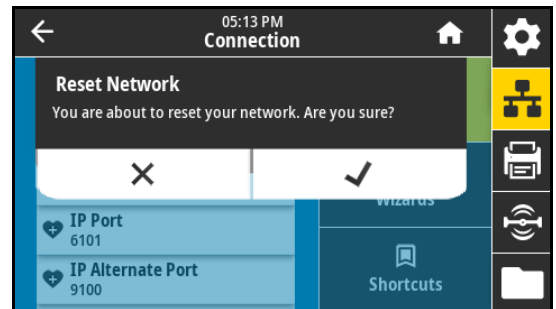
Connection > Networks > Primary Network

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

Accepted values:

- Wired
- Wi-Fi

Related ZPL command(s): ^NC

SGD command used: ip.primary_network
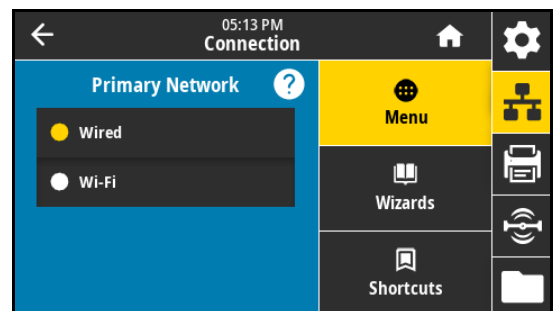
Connection > Networks > IP Port

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

SGD command used:

- `internal_wired.ip.port`
- `wlan.ip.port`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > TCP/IP Settings
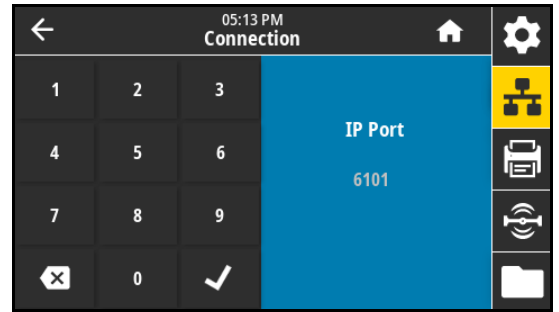
Connection > Networks > IP Alternate Port

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

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

SGD command used:

- `internal_wired.ip.port_alternate`
- `wlan.ip.port_alternate`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > TCP/IP Settings
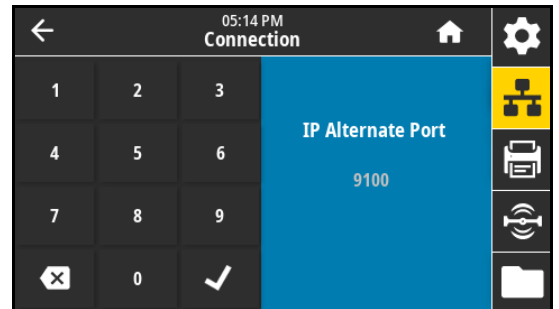
Connection > Networks > Print: Network Info

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

```
         Network Configuration

Zebra Technologies
ZTC ZTXXX-XXXdpi ZPL
XXXXXXXXXXXX

Wired.............. PRIMARY NETWORK
PrintServer........ LOAD LAN FROM?
INTERNAL WIRED..... ACTIVE PRINTSRVR

Wired*
ALL................ IP PROTOCOL
192.168.000.017.... IP ADDRESS
255.255.255.000.... SUBNET
192.168.000.254.... 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

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
INSERTED........... CARD INSERTED
02dfH.............. CARD MFG ID
9134H.............. CARD PRODUCT ID
ac:3f:a4:82:05:9c.. MAC ADDRESS
YES................ DRIVER INSTALLED
INFRASTRUCTURE..... OPERATING MODE
125................ ESSID
1.0................ CURRENT TX RATE
OPEN............... WEP TYPE
WPA PSK............ WLAN SECURITY
1.................. WEP INDEX
000................ POOR SIGNAL
LONG............... PREAMBLE
NO................. ASSOCIATED
ON................. PULSE ENABLED
15................. PULSE RATE
OFF................ INTL MODE
USA/CANADA......... REGION CODE
USA/CANADA......... COUNTRY CODE
0x7FF.............. CHANNEL MASK

Bluetooth
4.3.1p1............ FIRMWARE
02/13/2015......... DATE
on................. DISCOVERABLE
3.0/4.0............ RADIO VERSION
on................. ENABLED
AC:3F:A4:82:05:9D.. MAC ADDRESS
76J162700886....... FRIENDLY NAME
no................. CONNECTED
1.................. MIN SECURITY MODE
nc................. CONN SECURITY MODE
supported.......... iOS

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Related ZPL command(s): `~WL`

Control panel key(s):

Do one of the following:*

- Hold **CANCEL** during printer power-up. (Formerly called a CANCEL self-test.)

- Hold **FEED + CANCEL** for 2 seconds when the printer is in the Ready state.

Printer web page:

View and Modify Printer Settings > Print Listings on Label *

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

Connection > Networks > Visibility Agent

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

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

Accepted values:

- On
- Off

SGD command used: `weblink.zebra_connector.enable`

Printer web page:

> View and Modify Printer Settings > Network Configuration > Cloud Connect Settings
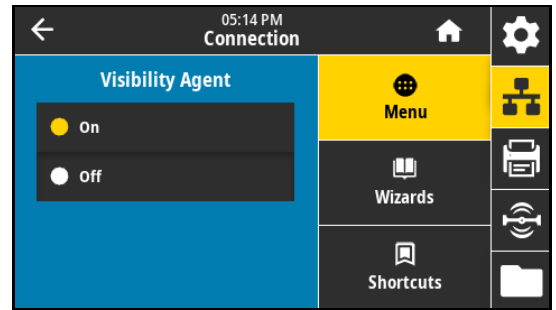
Connection > Wired > Wired IP Protocol

(!) **IMPORTANT:** You must reset the print server to allow changes to the network settings to take effect. See Connection > Networks > Reset Network on page 38.

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

Accepted values:

- ALL
- GLEANING ONLY
- RARP
- BOOTP
- DHCP
- DHCP & BOOTP
- PERMANENT

Related ZPL command(s): `^ND`

SGD command used: `internal_wired.ip.protocol`

Printer web page:

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

Connection > Wired > Wired IP Address

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

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

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.addr`

Printer web page:

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

Connection > Wired > Wired Subnet

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

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

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.netmask`

Printer web page:

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

Connection > Wired > Wired Gateway

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

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

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: `internal_wired.ip.gateway`

Printer web page:

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

Connection > Wired > Wired Mac Address

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

SGD command used: `internal_wired.mac_addr`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > TCP/IP Settings
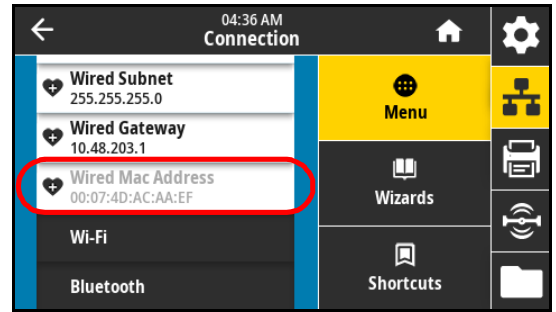
Connection > Wi-Fi > Wi-Fi IP Protocol

(!) IMPORTANT: You must reset the print server to allow changes to the network settings to take effect. See Connection > Networks > Reset Network on page 38.

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

Accepted values:

- ALL
- GLEANING ONLY
- RARP
- BOOTP
- DHCP
- DHCP & BOOTP
- PERMANENT

Related ZPL command(s): `^ND`
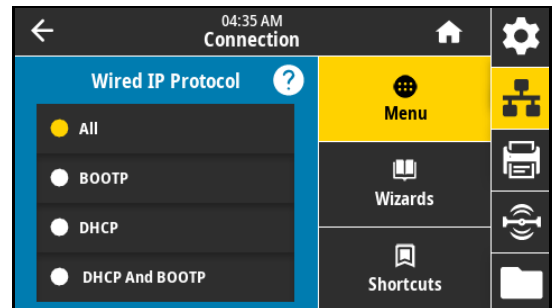
SGD command used: `wlan.ip.protocol`

Printer web page:

> View and Modify Printer Settings > Network Communications Setup > Wireless Setup
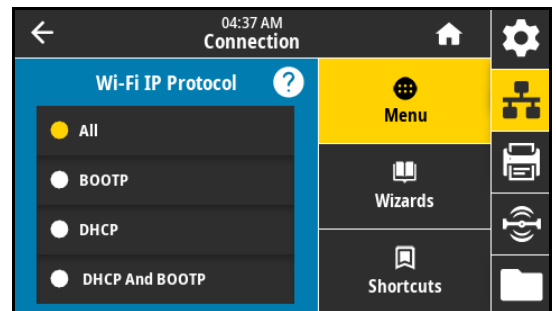
Connection > Wi-Fi > Wi-Fi IP Address

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

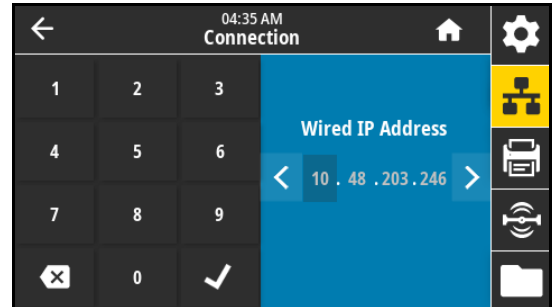View and, if necessary, change the printer's wireless IP address.

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used:

- ip.addr

- wlan.ip.addr

Printer web page:

> View and Modify Printer Settings > Network Communications Setup > Wireless Setup
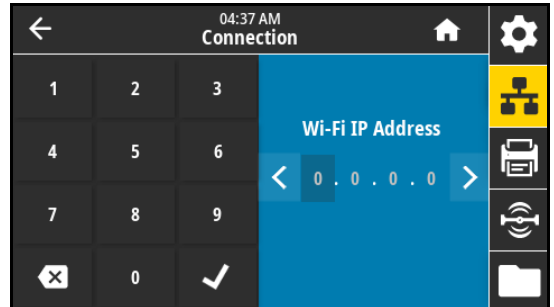
Connection > Wi-Fi > Wi-Fi Subnet

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

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

Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: wlan.ip.netmask

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > Wireless Setup
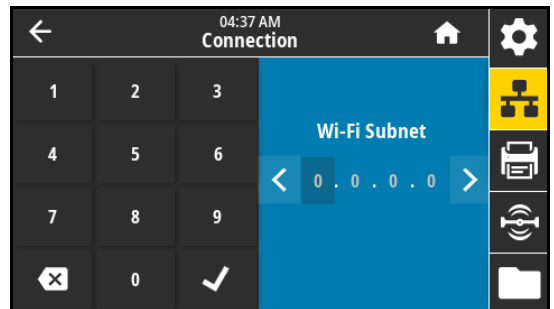
Connection > Wi-Fi > Wi-Fi Gateway

NOTE: To save changes to this setting, set Connection > Wired > Wired IP Protocol on page 41 to **PERMANENT**, and then reset the print server (see Connection > Networks > Reset Network on page 38).

View and, if necessary, change the default wireless gateway.
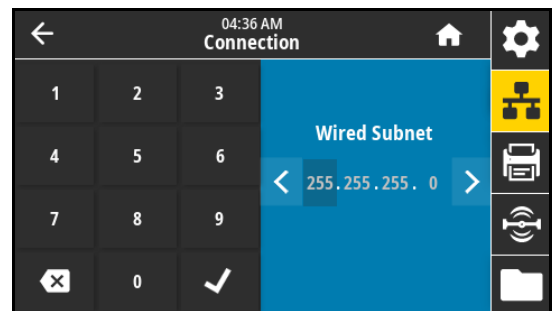
Accepted values: 000 to 255 for each field

Related ZPL command(s): ^ND

SGD command used: wlan.ip.gateway

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > Wireless Setup
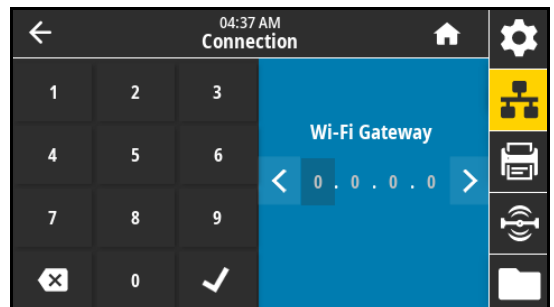
Connection > Wi-Fi > Wi-Fi Mac Address

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

SGD command used: `wlan.mac_addr`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > Wireless Setup
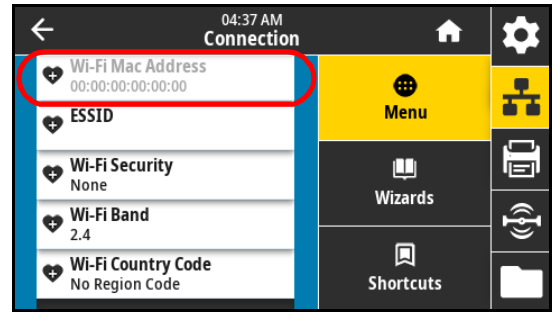
Connection > Wi-Fi > ESSID

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

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

SGD command used: `wlan.essid`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > Wireless Setup
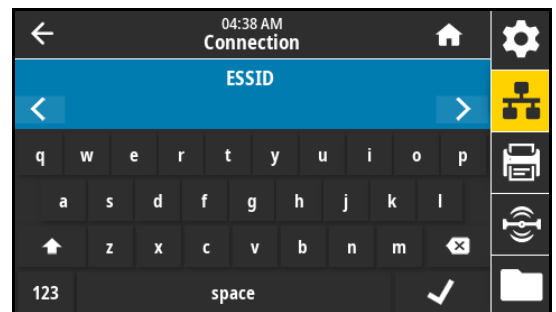
Connection > Wi-Fi > Wi-Fi Security

Select the security type being used on your wireless network.

Related ZPL command(s): `^WX`

SGD command used: `wlan.security`

Printer web page:

> View and Modify Printer Settings >
> Network Communications Setup > Wireless Encryption Setup
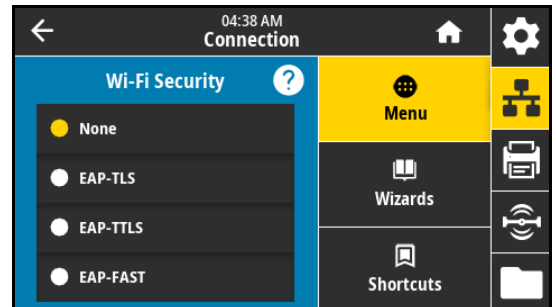
Connection > Wi-Fi > Wi-Fi Band

Set a preferred band to connect with via Wi-Fi.

Accepted values:

- 2.4
- 5
- All

SGD command used: `wlan.band_preference`

Printer web page:

> View and Modify Printer Settings > Network Communications Setup > Wireless Setup
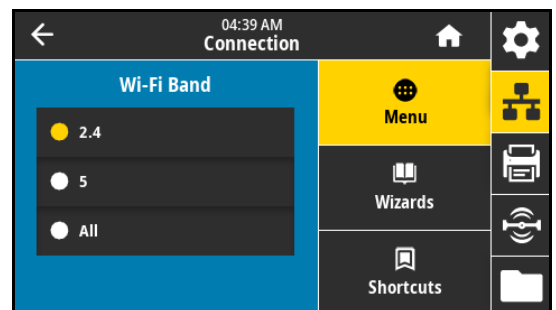
Connection > Wi-Fi > Wi-Fi Country Code

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

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

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

SGD command used: `wlan.country_code`
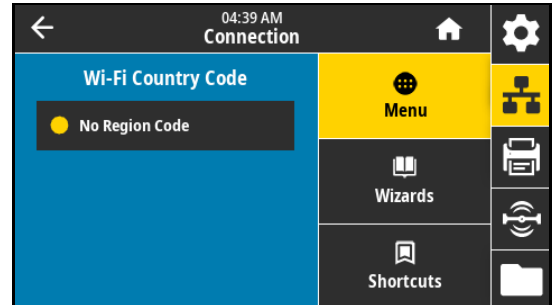
Connection > Bluetooth > Bluetooth

Select if Bluetooth is enabled.

Accepted values:

- On—Enables the Bluetooth radio.
- Off—Disables the Bluetooth radio.

SGD command used: `bluetooth.enable`
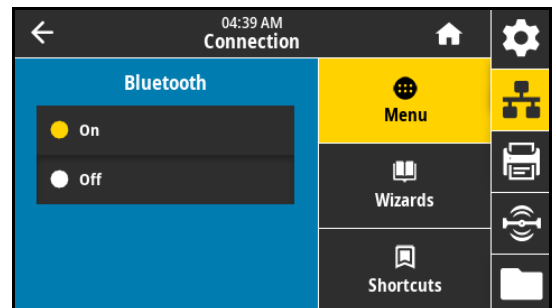
Connection > Bluetooth > Bluetooth Discovery

Select if the printer is "Discoverable" for Bluetooth device pairing.

Accepted values:

- On—Enables Bluetooth discoverable mode.
- Off—Disables Bluetooth discoverable mode.

SGD command used: `bluetooth.discoverable`
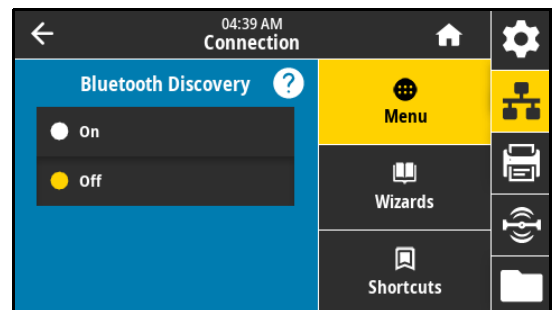
Connection > Bluetooth > Friendly Name

This command sets the friendly name, which is used during service discovery. For changes to take effect, you must power cycle the printer or issue the `device.reset` command (see Connection > Networks > Reset Network on page 38).

If you do not set a friendly name, this setting defaults to the printer serial number.

Accepted values: 17-character text string

SGD command used: `bluetooth.friendly_name`
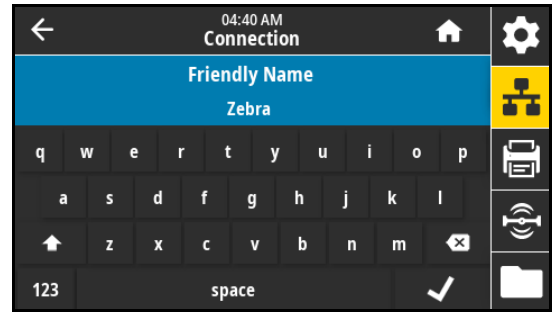
Connection > Bluetooth > Minimum Security Mode

This printer setting defines the minimum level of security that the printer requires for a Bluetooth connection. Connections attempting to use a lower level are refused.

Accepted values: 1–4

SGD command used: `bluetooth.minimum_security_mode`
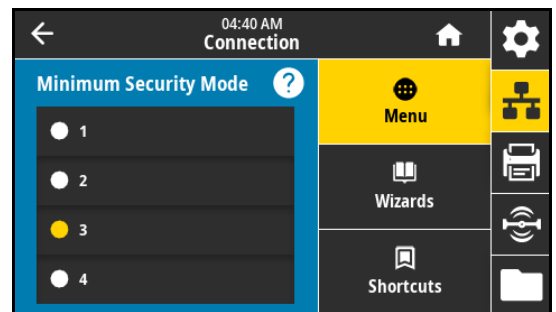
Connection > Bluetooth > Specification Version

This parameter displays the Bluetooth library version number.

SGD command used: `bluetooth.version`
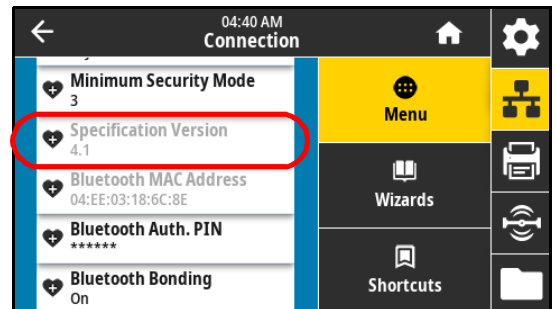
Connection > Bluetooth > MAC Address

This parameter displays the Bluetooth device address.

SGD command used: `bluetooth.address`
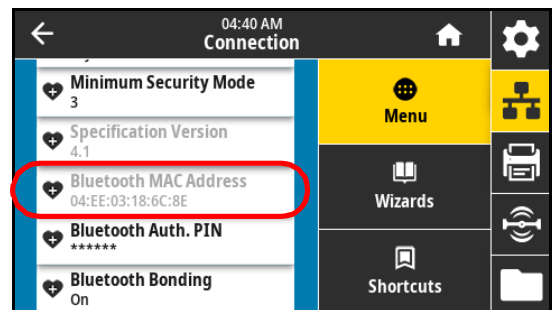
Connection > Bluetooth > Bluetooth Auth. PIN

Set the PIN used when Bluetooth authentication is enabled (Bluetooth 2.0 and earlier).

SGD command used:

- `bluetooth.bluetooth_pin` (to set the PIN)

- `bluetooth.authentication` (to enable authentication)
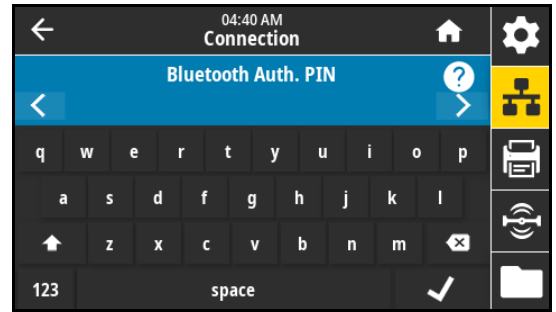
Connection > Bluetooth > Bluetooth Bonding

Select if the printer should retain details from previously completed Bluetooth pairings.

Accepted values:

- On—Enables Bluetooth bonding so that the information is retained.

- Off—Disables Bluetooth bonding.

SGD command used: `bluetooth.bonding`
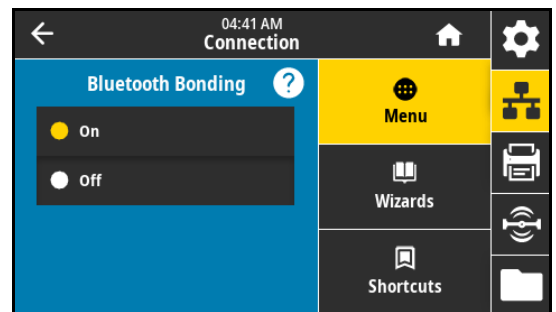
Print Menu

Print > Print Quality > Darkness

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

Accepted values: 0.0 to 30.0

Related ZPL command(s):

- `^MD`

- `~SD`

SGD command used: `print.tone`

Printer web page:

> View and Modify Printer Settings > General Setup > Darkness

Print > Print Quality > Print Speed

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

Accepted values:

- ZE511 203 dpi = 2 to 18

- ZE511 300 dpi = 2 to 14

- ZE511 600 dpi = 2 to 6

- ZE521 203 dpi = 2 to 14

- ZE521 300 dpi = 2 to 12

Related ZPL command(s): `^PR`

SGD command used: `media.speed`

Printer web page:

> View and Modify Printer Settings > General Setup > Print Speed
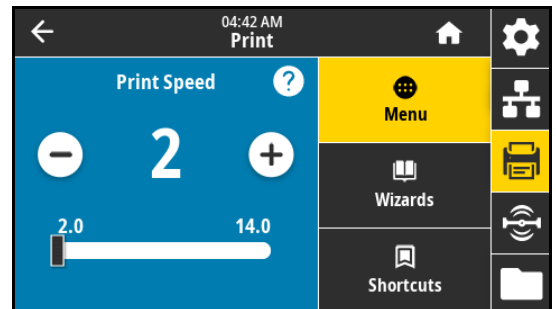
Print > Print Quality > Print Type

Specify if the printer needs to use ribbon for printing. If you need assistance, see Do I need to use ribbon? on page 13.

Accepted values:

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

Related ZPL command(s): ^MT

SGD command used: ezpl.print_method

Printer web page:

    View and Modify Printer Settings > Media Setup > Print Method
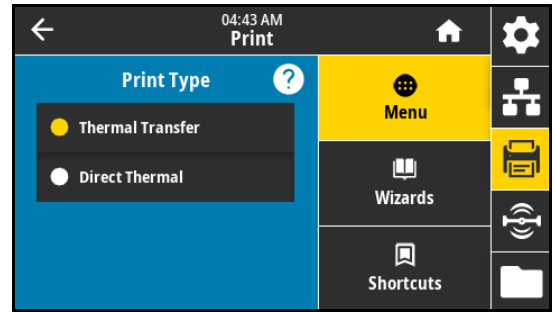
Print > Print Quality > Ribbon Ink Side

Select whether your ribbon is coated on the inside or the outside. To determine which side of the ribbon is coated, see How can I tell which side of the ribbon is coated? on page 13.

Accepted values:

- Ink Side Out
- Ink Side In

SGD command used: ribbon.coating
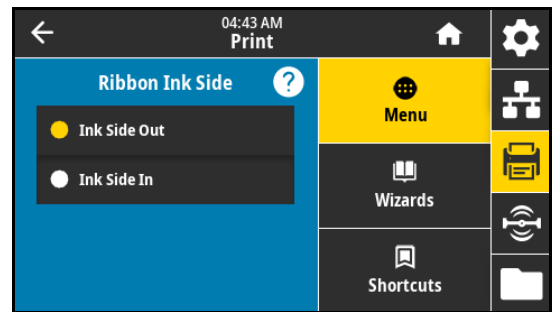
Print > Print Quality > Ribbon Tension

Select the ribbon tension setting that is appropriate for the width or type of media being printed. High can be used for most media. The correct setting is determined by a combination of the ribbon width and the ribbon length. If necessary, use a lower value for narrow media or for glossy media.

Ribbon Width	Ribbon Length		
	300 Meters	450 Meters	600 Meters
76 to 127 mm (3 to 5 in.)	Low	Low	Low
102 to 152 mm (4 to 6 in.)	Low	Low or Medium	Low or Medium
127 to 180 mm (5 to 7.1 in.)	Low or Medium	Medium	Medium or High

Accepted values:

- Low

- Medium

- High

Related ZPL command(s): `^JW`

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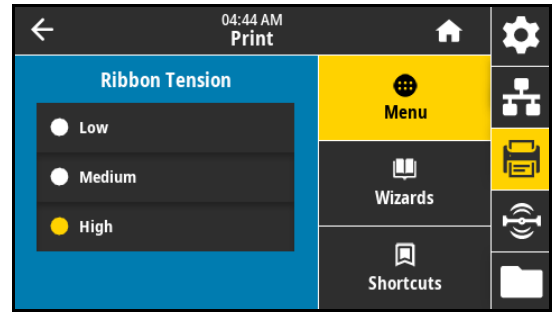
Print > Print Quality > Media Type

Select the type of media that you are using.

Accepted values:

- **Continuous**—With continuous media, you must include a label length in your label format (`^LL` if you are using ZPL).

- **Gap/Notch**—With gap/notch media, you may need to adjust the position of the transmissive media sensor, which finds "start of label" indicators, such as notches or holes in the media or interlabel gaps.

  On the pinch roller assembly (1), slide the sensor position indicator (2) to move the sensor.
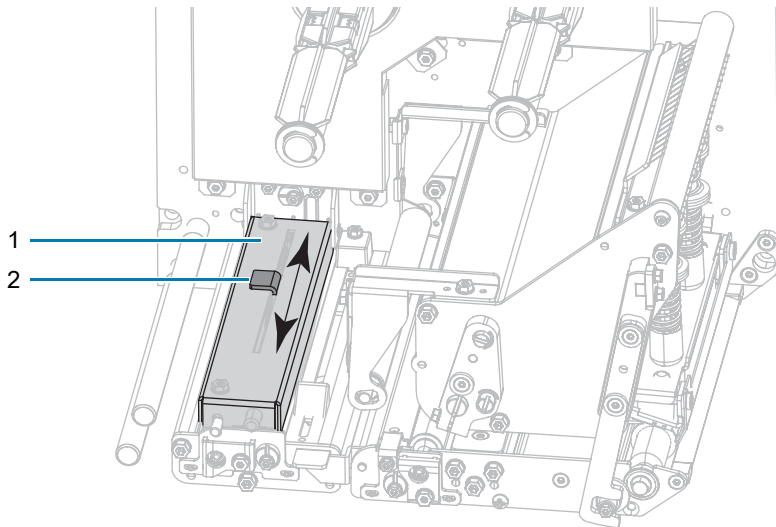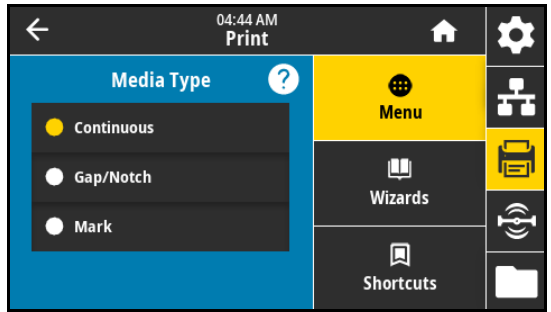
- If the media uses **interlabel gaps**, position the sensor approximately at the center of the media width.

  - If the media has **notches or holes** between labels, align the sensor with the notch or hole in the media.

- **Mark**—Some types of media have black marks printed on the underside of the media liner, which act as "start of label" indicators. The reflective media sensor senses these black marks. The position of this sensor is not adjustable. If you use this type of media, refer to Media Specifications on page 128 for information about black mark requirements.

Related ZPL command(s): `^MN`

SGD command used: `ezpl.media_type`

Printer web page:

View and Modify Printer Settings > Media Setup > Media Type

Print > Print Quality > Label Length (Dots)

For continuous media, specify the length of the labels being used, in dots. For non-continuous media, this value is determined during media calibration and cannot be modified.

Accepted values: 1 to 32000, (in dots) not to exceed the maximum label length

Related ZPL command(s): `^LL`

SGD command used: `zpl.label_length`
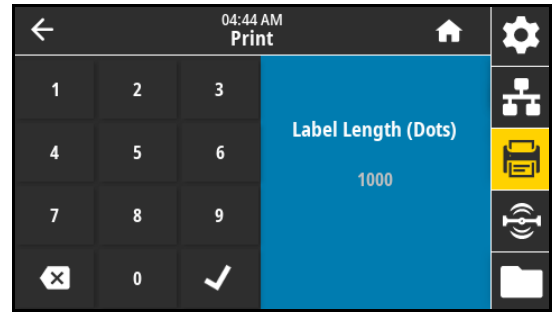
Print > Print Quality > Label Width (Dots)

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.

Specify the width of the labels being used, in dots. The default value is the maximum width for the printer, based on the printhead dpi (dots per inch) value.

Accepted values:

- ZE511 203 dpi = 0002 to 832
- ZE511 300 dpi = 0002 to 1228
- ZE511 600 dpi = 0002 to 2456
- ZE521 203 dpi = 0002 to 1344
- ZE521 300 dpi = 0002 to 1984

Related ZPL command(s): `^PW`

SGD command used: `ezpl.print_width`

Printer web page:

   View and Modify Printer Settings > Media Setup > Print Width
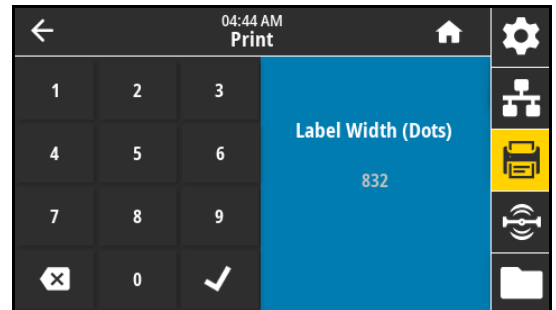
Print > Image Adjust > Media Handling

Select a media handling method that is compatible with the options available on your printer. See the Zebra Programming Guide at zebra.com/manuals for more information.

Accepted values:

> Tear Off, Peel Off, Rewind, Cutter, Delayed Cut, Linerless Peel, Linerless Rewind, Linerless Tear, Applicator, Linerless Cut, Linerless Delayed Cut, Stream
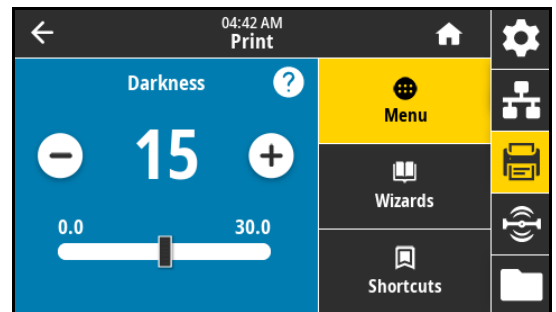
Related ZPL command(s): `^MM`

SGD command used: `ezpl.print_mode`

Printer web page:

> View and Modify Printer Settings > General Setup > Print Mode
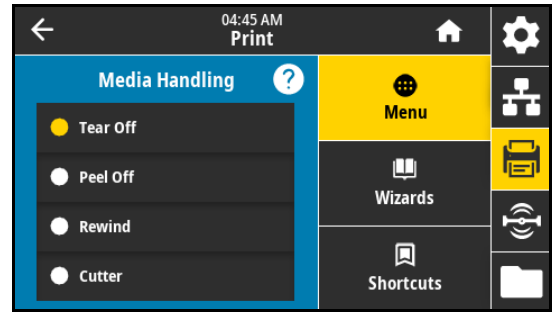
Print > Image Adjust > Tear Line Offset

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

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

- Higher numbers move the media out of the printer (the tear line moves closer to the leading edge of the next label).
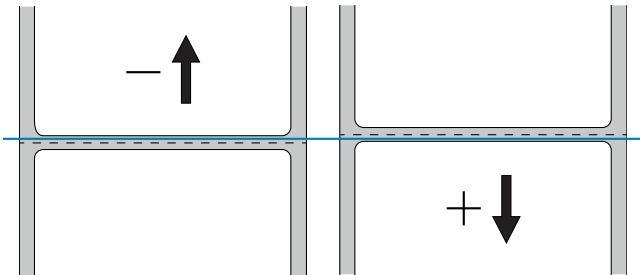
Accepted values: –120 to +120

Related ZPL command(s): `~TA`

SGD command used: `ezpl.tear_off`

Printer web page:

> View and Modify Printer Settings > General Setup > Tear Off

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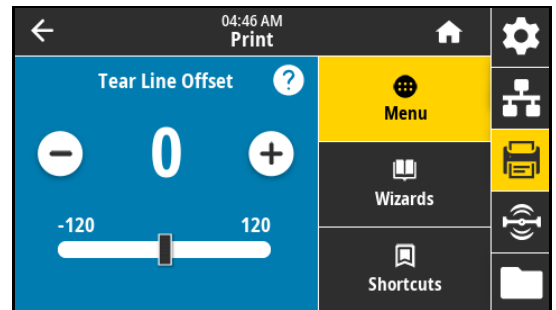
Print > Image Adjust > Horizontal Label Offset

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

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

- Positive numbers move the edge of the image toward the right edge of the label.
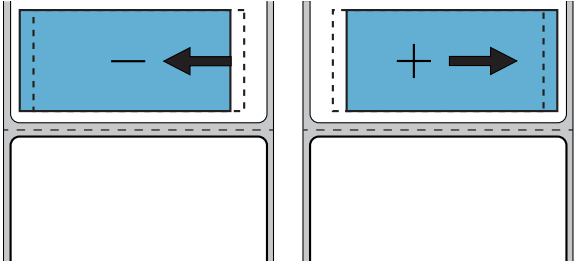
Accepted values: –9999 to 9999

Related ZPL command(s): ^LS

SGD command used: zpl.left_position

Printer web page:

> View and Modify Printer Settings > Advanced Setup > Left Position
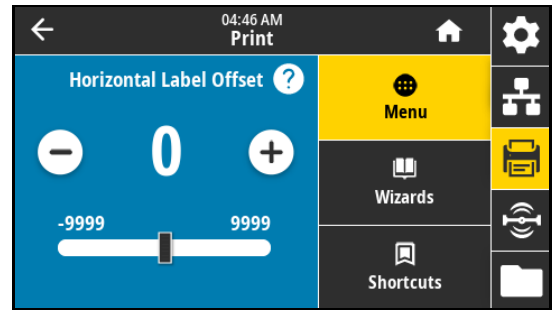
Print > Image Adjust > Vertical Label Offset

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

- Lower numbers move the image higher on the label (toward the printhead).

- Higher numbers move the image farther down on the label (away from the printhead) by the specified number of dots.
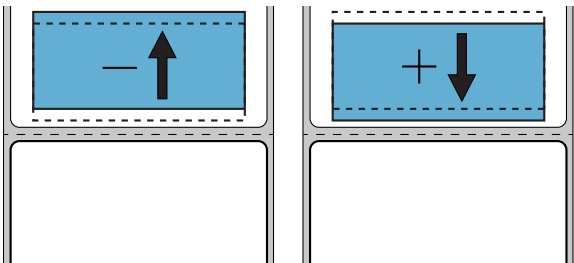
Accepted values: –120 to +120

Related ZPL command(s): ^LT

Printer web page:

> View and Modify Printer Settings > General Setup > Label Top
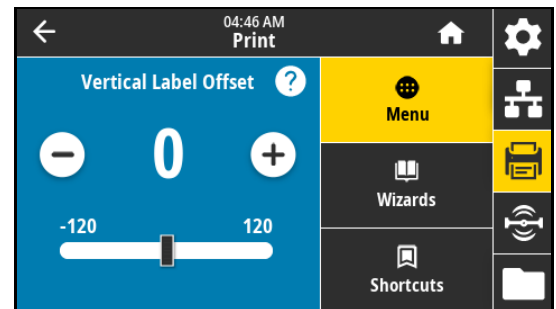
Print > Image Adjust > Invert Label

When this option is enabled, the image prints inverted on the media.

Accepted values:

- On
- Off

SGD command used: print.invert_label
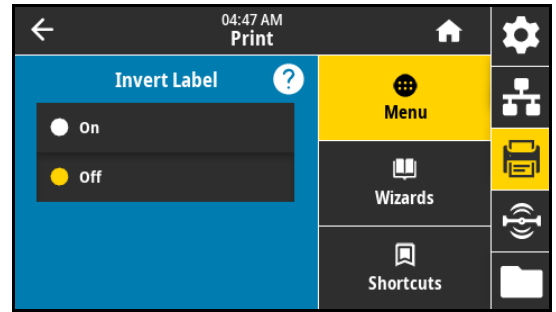
Print > Sensors > Calibrate

This option adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web. This option is disabled when Media Type is set to Continuous and Head Close Action is set to Calibrate.

Printer web page: Calibration 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
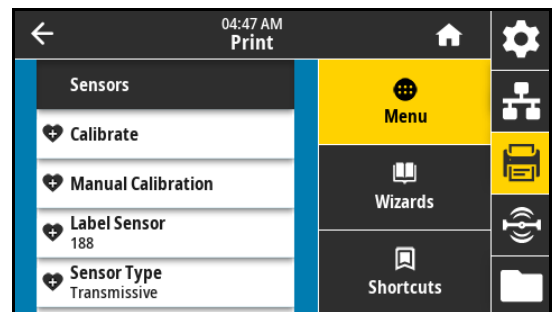
Print > Sensors > Manual Calibration

This option adjusts the sensitivity of the media and ribbon sensors, adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.

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: Calibration 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
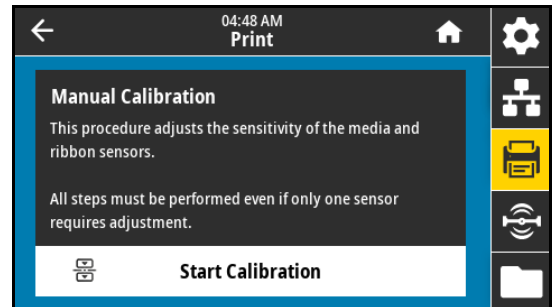
Print > Sensors > Label Sensor

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

Set the sensitivity of the label sensor.

Accepted values: 0 to 255

SGD command used: `ezpl.label_sensor`

Printer web page:

> View and Modify Printer Settings > Calibration
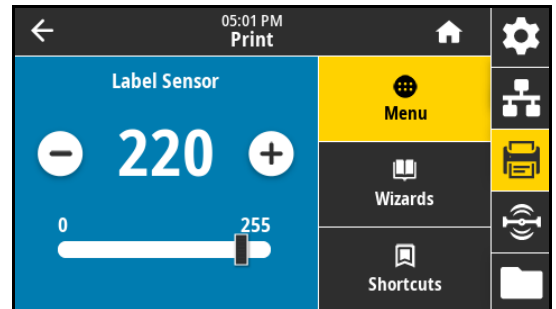
Print > Sensors > Sensor Type

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

Accepted values:

- Transmissive
- Reflective

Related ZPL command(s): `^JS`

SGD command used: `device.sensor_select`

Printer web page:

> View and Modify Printer Settings > Media Setup
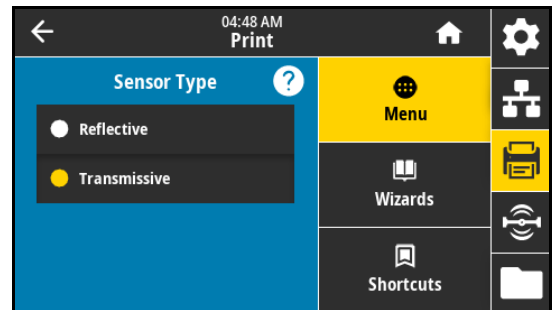
Print > Sensors > Print: Sensor Profile

Shows the sensor settings compared to actual sensor readings. To interpret the results, see Printing and Interpreting a Sensor Profile on page 84.

Related ZPL command(s): `~JG`

Control panel key(s):

> Hold **FEED + CANCEL** during printer power-up.

Printer web page:

> View and Modify Printer Settings > Print Listings on Label
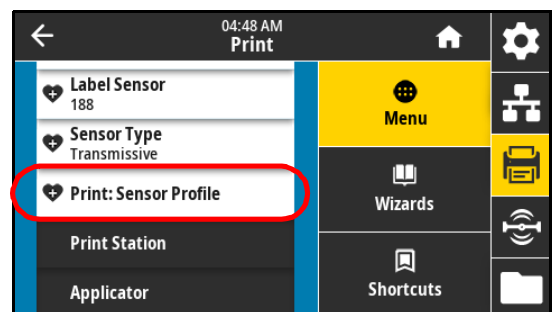
Print > Print Station

Use this menu item to fill in variable fields in a label format and print the label using a Human Input Device (HID), such as a USB keyboard, scale, or barcode scanner. A suitable label format must be stored on the E: drive of the printer to use this option. See the exercises in Using USB Host Ports and Print Touch/NFC on page 109 for an exercise using this capability.

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

For more information about using the ^FN command or the SGD commands related to this feature, see the Zebra Programming Guide at zebra.com/manuals.

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

SGD command used:

  - usb.host.keyboard_input (must be set to ON)

  - usb.host.template_list

  - usb.host.fn_field_list

  - usb.host.fn_field_data

  - usb.host.fn_last_field

  - usb.host.template_print_amount
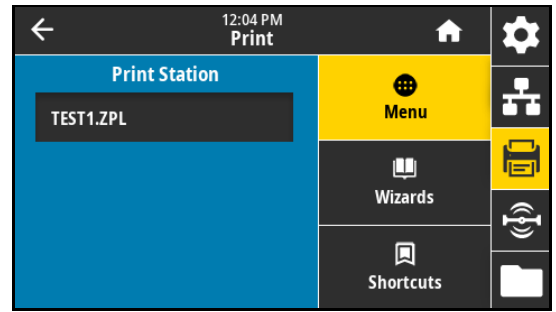
Print > Applicator > Applicator Port Mode

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

Accepted values:

  - Off

  - 1 = End Print signal normally high, and low only when the printer is moving the label forward.

  - 2 = End Print signal normally low, and high only when the printer is moving the label forward.

  - 3 = End Print signal normally high, and low for 20 ms when a label has been printed and positioned.

  - 4 = End Print signal normally low, and high for 20 ms when a label has been printed and positioned.

Related ZPL command(s): ^JJ

SGD command used: device.applicator.end_print
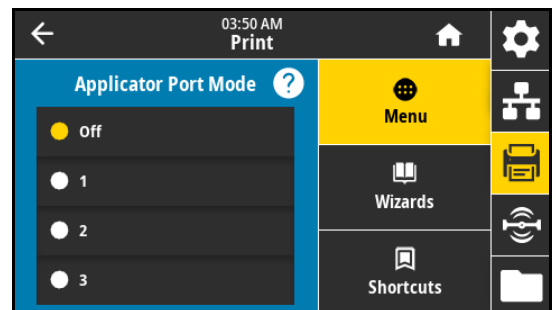
Print > Applicator > Start Print Mode

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

Accepted values:

- Pulse Mode—Start Print signal must be deasserted before it can be asserted for the next label.
- Level Mode—Start Print signal does not need to be deasserted to print the next label. As long as the Start Print signal is low and a label is formatted, a label prints.

Related ZPL command(s): `^JJ`

SGD command used: `device.applicator.start_print`
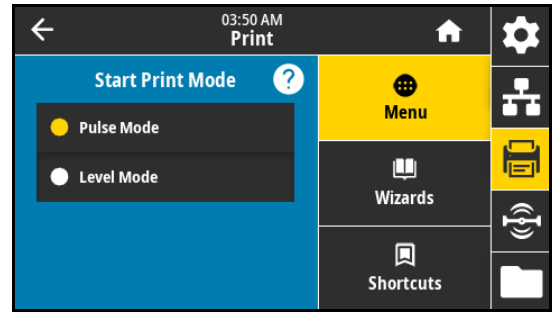
Print > Applicator > Error on Pause

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

Accepted values:

- Enabled
- Disabled

SGD command used: `device.applicator.error_on_pause`

Printer web page:

> View and Modify Printer Settings > Advanced Setup > Error on Pause
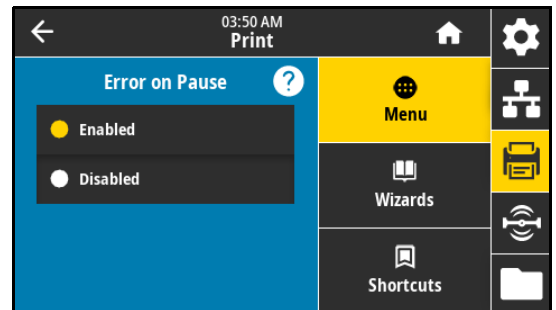
Print > Applicator > Applicator Reprint

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

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

Related ZPL command(s):

- `^JJ`
- `~PR`

SGD command used: `device.applicator.reprint`
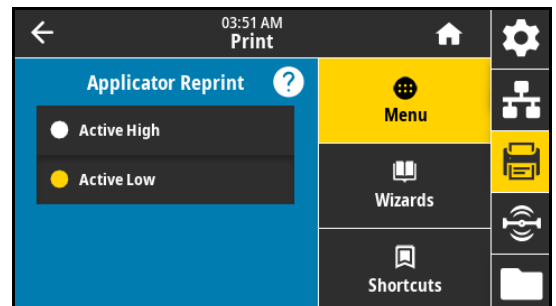
RFID Menu

RFID > RFID Status

Display the status of the RFID subsystem of the printer.

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

SGD command used: `rfid.error.response`
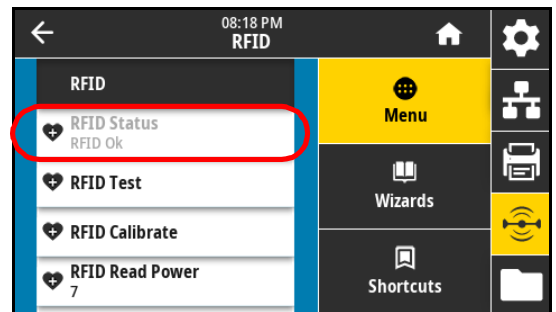
RFID > RFID Test

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

1. Position the RFID label with its transponder over the RFID antenna array.

2. Touch **Start**.

   The results of the test are shown below the Start button.

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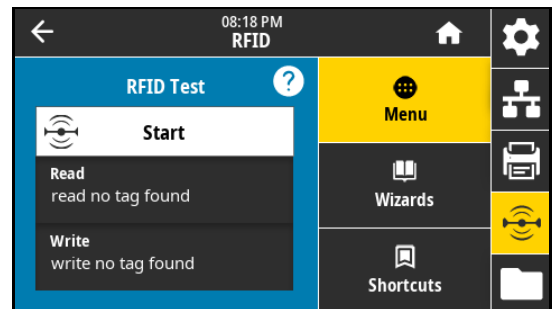
RFID > RFID Calibrate

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

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

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

Related ZPL command(s): ^HR

SGD command used: `rfid.tag.calibrate`
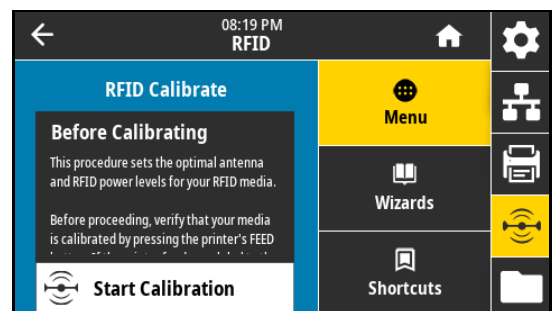
RFID > Read Power

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

Accepted values: 0 to 30

Related ZPL command(s): ^RW

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

Printer web page:

   View and Modify Printer Settings > RFID Setup > RFID READ PWR
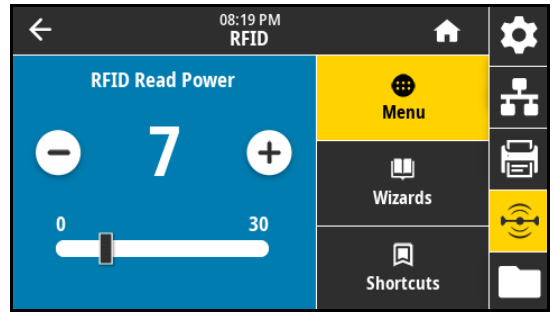
RFID > Write Power

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

Accepted values: 0 to 30

Related ZPL command(s): ^RW

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

Printer web page:

   View and Modify Printer Settings > RFID Setup > RFID WRITE PWR
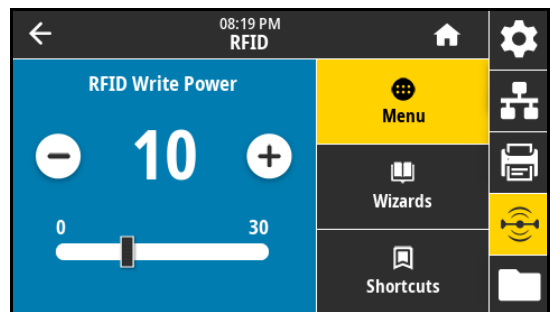
RFID > RFID Antenna

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

Accepted values:

   A1, A2, A3, A4, A5, A6, A7

   B1, B2, B3, B4, B5, B6, B7

Related ZPL command(s): ^RW

SGD command used: `rfid.reader_1.antenna_port`

Printer web page:

   View and Modify Printer Settings > RFID Setup > RFID ANTENNA
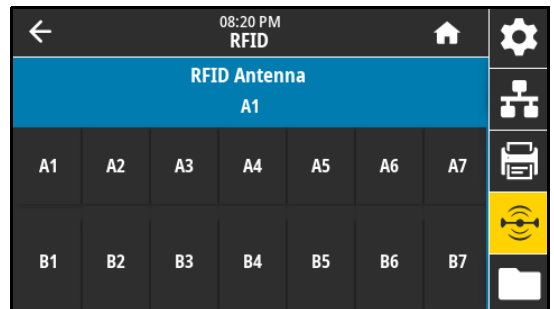
RFID > RFID Valid Count

Resets the RFID valid label counter to zero.

Related ZPL command(s): ~RO

SGD command used:

    odometer.rfid.valid_resettable
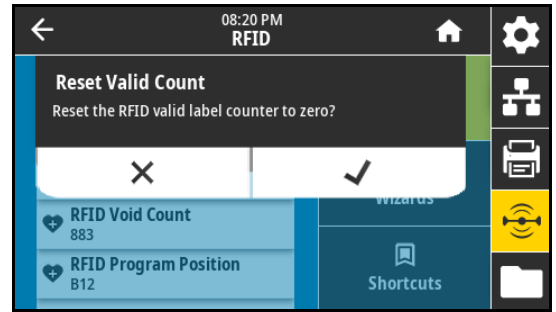
RFID > RFID Void Count

Resets the RFID void label counter to zero.

Related ZPL command(s): ~RO

SGD command used:

    odometer.rfid.void_resettable
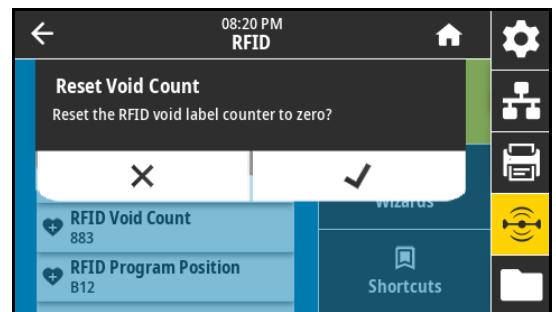
RFID > RFID Program Position

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

Accepted values:

- F0 to Fxxx (where xxx is the label length in millimeters or 999, whichever is less)—The printer feeds the label forward for the specified distance and then begins programming.

- B0 to B30—The printer backfeeds the label for the specified distance and then begins programming. To account for the backfeed, allow empty media liner to extend out of the front of the printer when using a backward programming position.

Related ZPL command(s): ^RS

SGD command used: rfid.position.program

Printer web page:

    View and Modify Printer Settings > RFID Setup > PROGRAM POSITION
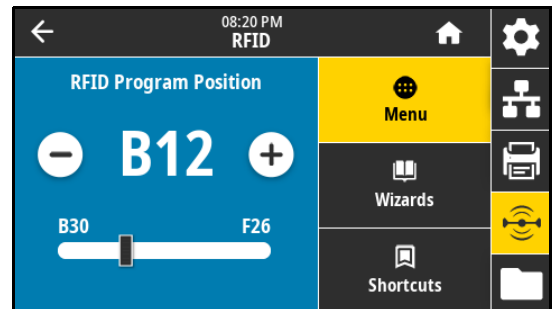
RFID > Read RFID Data

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

1. Position the RFID label with its transponder over the RFID antenna.

2. Touch **Read RFID Data**.

   The results of the test are shown on the display.
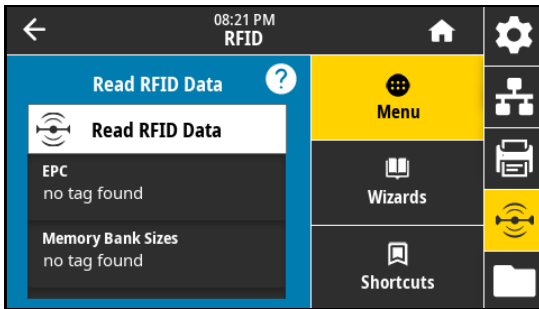
Related ZPL command(s): ^RF

SGD command used:

- `rfid.tag.read.content`

- `rfid.tag.read.execute`

RFID > RFID Country Code

sets the RFID reader country code. The country code is restricted based on the region code assigned to the reader and, in some instances, cannot be modified. Only the countries available for your region are listed.

SGD command used: `rfid.country_code`
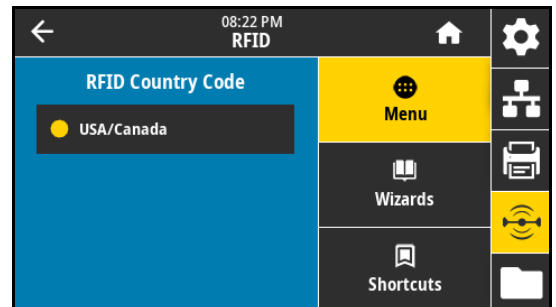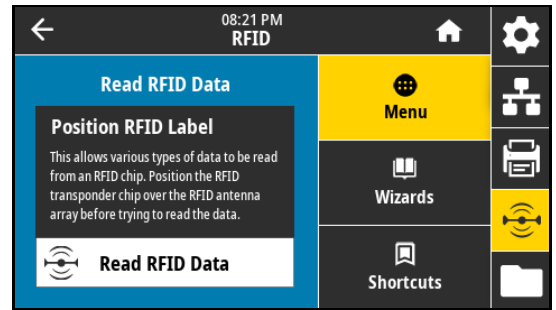
Storage Menu

Storage > USB > Copy: Files to USB

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

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

   The printer lists available files.

2. Touch the box next to the desired files. **Select All** is also available.

3. Touch the check mark to copy the selected files.

SGD command used: `usb.host.write_list`
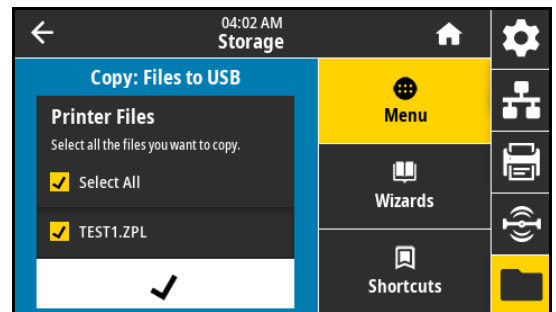
Storage > USB > Copy: Files to Printer

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

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

   The printer lists available files.

2. Touch the box next to the desired files. **Select All** is also available.

3. Touch the check mark to copy the selected files.

SGD command used: `usb.host.read_list`
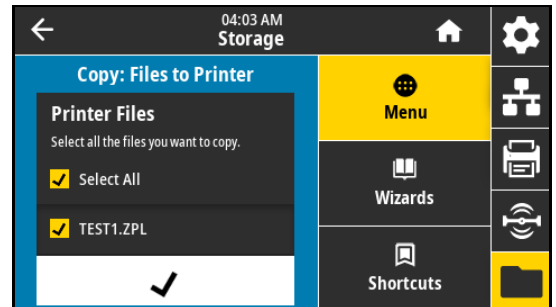
Storage > USB > Copy: Configuration to USB

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

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

Printer web page:

- Printer Home Page > View Printer Configuration
  (to view printer configuration information on your web browser)

- View and Modify Printer Settings > Print Listings on Label
  (to print the configuration information on labels)
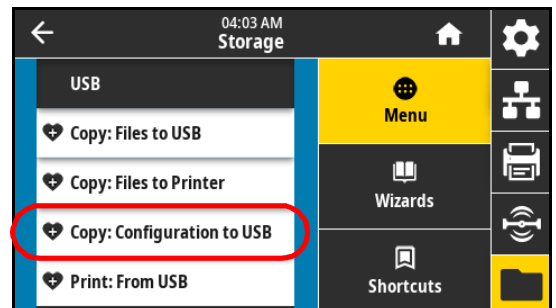
Storage > USB > Print: From USB

Select files to print from a USB Flash drive.

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

   The printer lists available files.

2. Touch the box next to the desired files. **Select All** is also available.

3. Touch the check mark to print the selected files.

SGD command used: `usb.host.read_list`
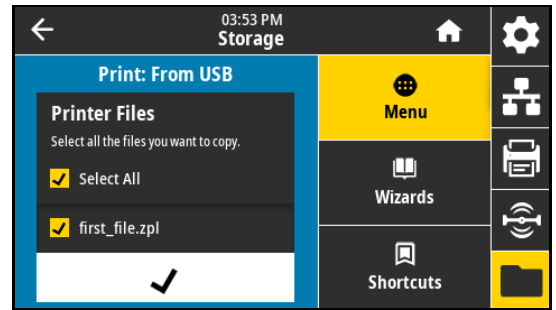
Storage > Print Asset Lists

Print the specified information on one or more labels.

Accepted values:

- Formats—Prints the available formats stored in the printer's RAM, Flash memory, or optional memory card.

- Images—Prints the available images stored in the print engine's RAM, Flash memory, or optional memory card.

- Fonts—Prints the available fonts in the print engine, including standard print engine fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.

- Barcodes—Prints the available barcodes in the print engine. Barcodes may be stored in RAM or Flash memory.

- All—Prints the previous labels plus the printer configuration label and the network configuration label.

Related ZPL command(s): `^WD`

Printer web page:

   View and Modify Printer Settings > Print Listings on Label
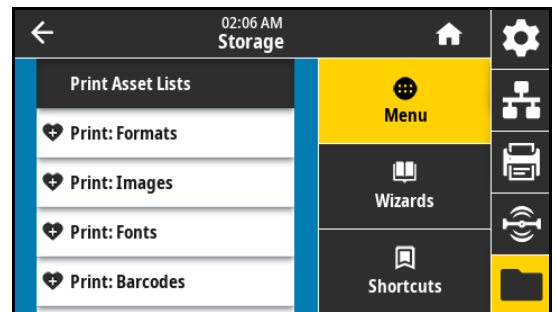
Storage > Print from E:

Select files to print from the printer's E: drive.

1. Touch **Print from E:**.

   The printer lists available files.

2. Touch the box next to the desired files. **Select All** is also available.

3. Touch the check mark to print the selected files.
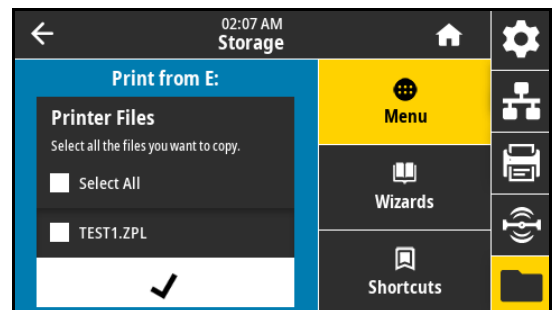
Toggle Positioning and Printhead Pressure Adjustment

The printhead pressure toggles can be adjusted to create more or less pressure, as needed. They can also be moved from side to side to adjust the pressure in certain areas.

If the toggles are not positioned correctly or adjusted to apply the correct pressure, the following types of issues may result:

* media and ribbon may slip

* ribbon may wrinkle

* media may move from side to side during printing

* printing may be too light or too dark on one side of the media

Use the lowest printhead pressure necessary to produce good print quality. Higher pressures may cause premature wear on the printhead elements.

Changing the Toggle Position

NOTE: The graphics shown in this section depict a right-hand (RH) model. The graphics for a left-hand (LH) model would be a mirror image.

1. Release the printhead assembly to lessen the pressure on the toggles.
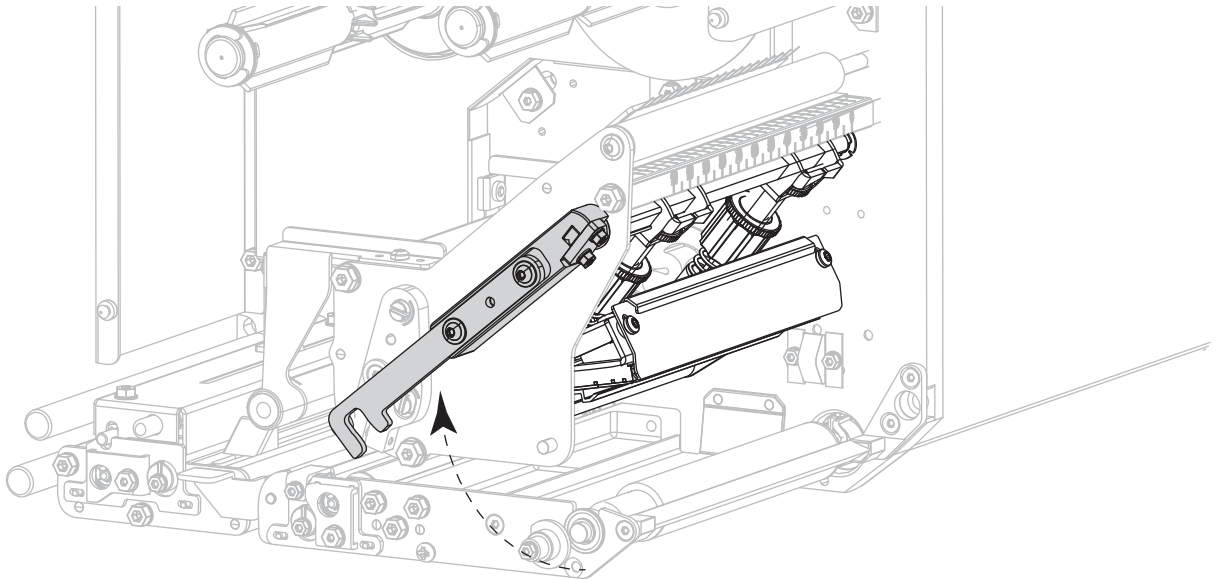
2. Loosen the locking nut at the top of the toggle to be moved.
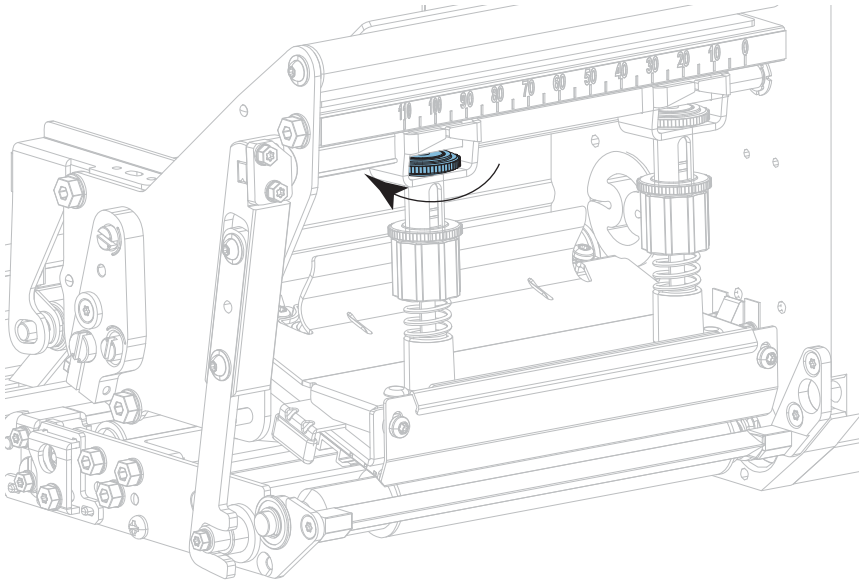
3. Reposition the toggle as necessary to provide even pressure on the media. For extremely narrow media, position the inner toggle over the center of the media, and decrease the pressure on the outer toggle.
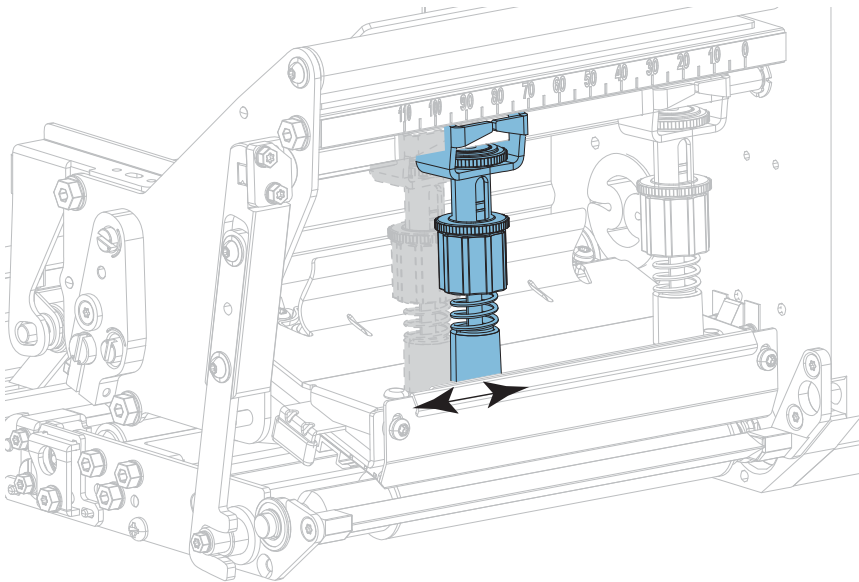
4. Tighten the locking nut.
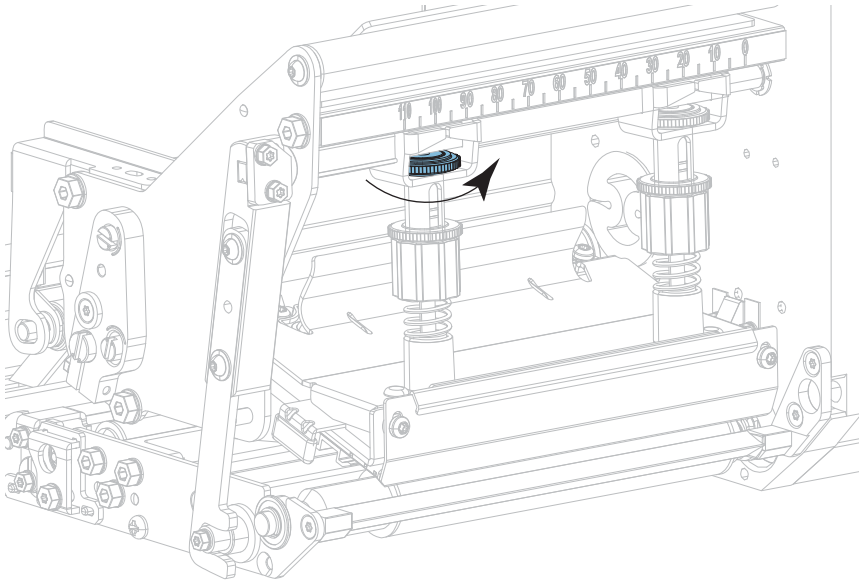
5. Lock the printhead assembly.
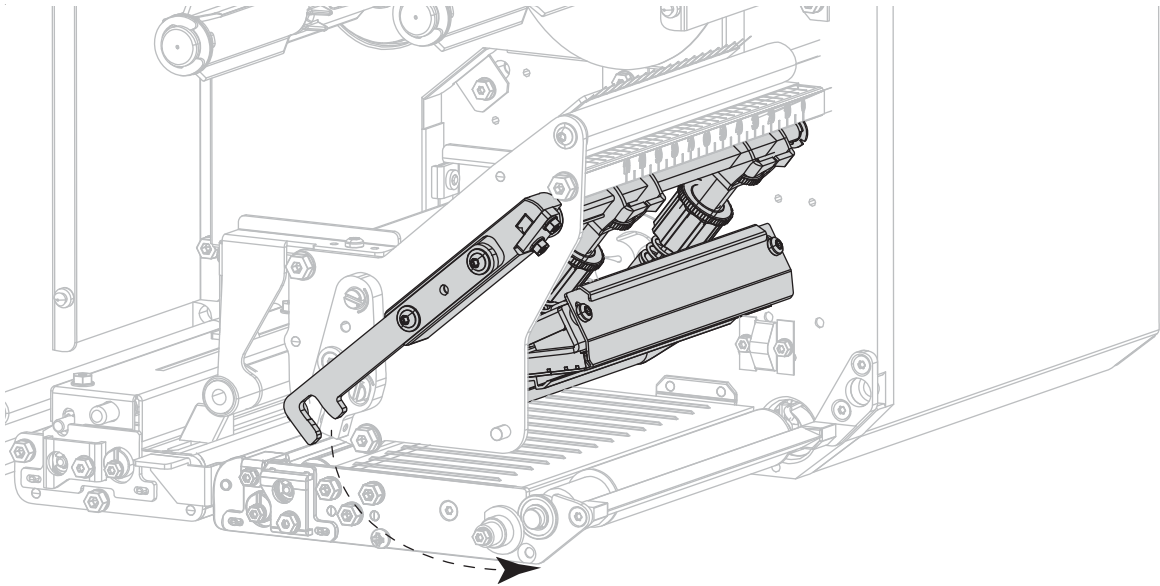
Adjusting the Printhead Pressure

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

NOTE: The graphics shown in this section depict a right-hand (RH) model. The graphics for a left-hand (LH) model would be a mirror image.

Inner toggle (closest to the body of the printer)

Outer toggle (farthest from the body of the printer)
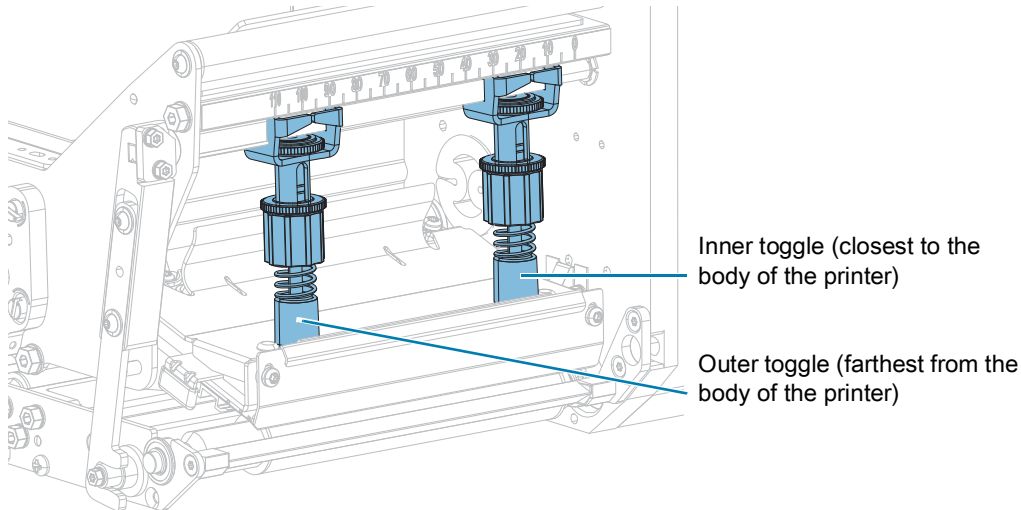
1. Are you experiencing either of the following issues?

If the media...	Then...
Requires higher pressure overall to print well	Increase the pressure on both toggles. Continue with step 5 on page 70.
Requires lower pressure overall to print well	Decrease the pressure on both toggles. Continue with step 5 on page 70.

2. If overall pressure is not an issue, initiate a PAUSE Self-Test on page 83.

3. While printing labels, use the control panel to lower the darkness setting until the labels are printing gray instead of black. (See Print > Print Quality > Darkness on page 49.)

4. Are you experiencing any of the following issues?

If the media...	Then for right-hand (RH) print engines...	Then for left-hand (LH) print engines...
Prints too lightly on the left side of the label.	Increase the pressure on the **inner** toggle.	Increase the pressure on the **outer** toggle.
Prints too lightly on the right side of the label.	Increase the pressure on the **outer** toggle.	Increase the pressure on the **inner** toggle.
Shifts left while printing	Increase the pressure on the **outer** toggle. OR Decrease the pressure on the **inner** toggle.	Increase the pressure on the **inner** toggle. OR Decrease the pressure on the **outer** toggle.
Shifts right while printing	Increase the pressure on the **inner** toggle. OR Decrease the pressure on the **outer** toggle.	Increase the pressure on the **outer** toggle. OR Decrease the pressure on the **inner** toggle.

5. To make adjustments to the printhead pressure:

a. Loosen the upper knurled nut on the toggle to be adjusted.
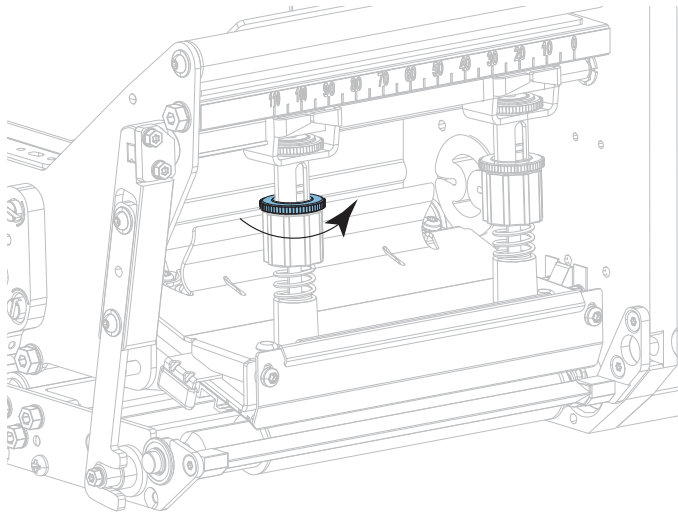
b. Increase or decrease the pressure by rotating the lower nut.
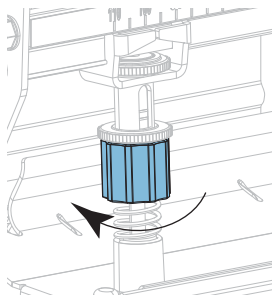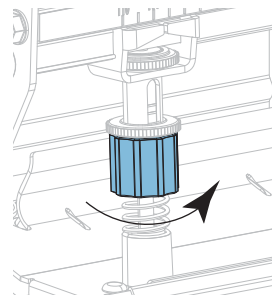
Increase pressure   Decrease pressure

c. Hold the lower nut in place and tighten the upper knurled nut.
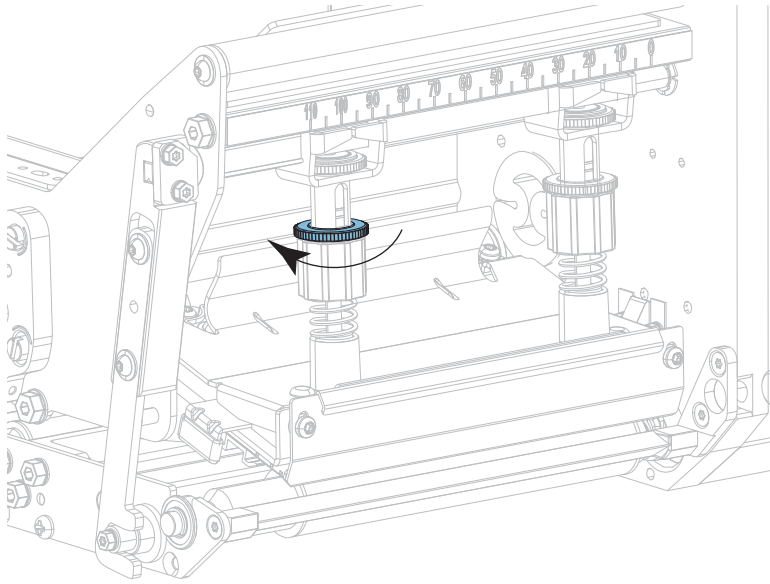
6. If necessary, reinitiate a PAUSE Self-Test on page 83.

7. While printing labels, use the control panel to raise the darkness setting until the labels are again printing black instead of gray. (See Print > Print Quality > Darkness on page 49.)

8. Check the print quality, and if necessary, repeat this procedure until the printhead pressure is adequate.

Routine Maintenance

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

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

• Clean the printhead frequently.

• Minimize printhead pressure and burn temperature (darkness) settings by optimizing the balance between the two.

• When using Thermal Transfer mode, ensure that the ribbon is as wide or wider than the media to prevent exposing the printhead elements to the more abrasive label material.

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

Cleaning Schedule and Procedures

Specific cleaning procedures are provided in this section. Table 1 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 1   Recommended Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*	**Direct Thermal Mode:** After every roll of media (or 500 feet of fanfold media). **Thermal Transfer Mode:** After every roll of ribbon.
Platen roller	Solvent*	
Pinch roller	Solvent*	
Peel roller	Solvent*	
Media sensors	Air blow	
Ribbon sensor	Air blow	
Media path	Solvent*	
Ribbon path	Solvent*	
Tear-off/peel-off bar	Solvent*	
*Zebra recommends using the Preventive Maintenance Kit (p/n 47362 or p/n 105950-035 - multipack). In place of this kit, you may use a clean swab dipped in 99.7% isopropyl alcohol.		

Cleaning 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 print engine 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 print engine.

Media Compartment and Sensors

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

Cleaning the Printhead and Rollers

Inconsistent print quality, such as voids in the barcode or graphics, may indicate a dirty printhead. For the recommended cleaning schedule, see Cleaning Schedule and Procedures on page 72.

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

1. Turn Off (**O**) the print engine.

2. Open the media cover.
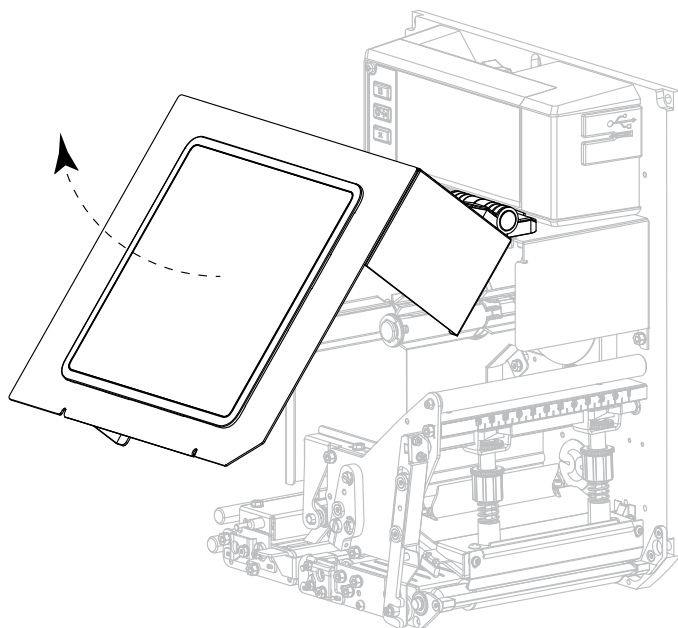
3. Remove the media and ribbon.

4. Release the printhead assembly.
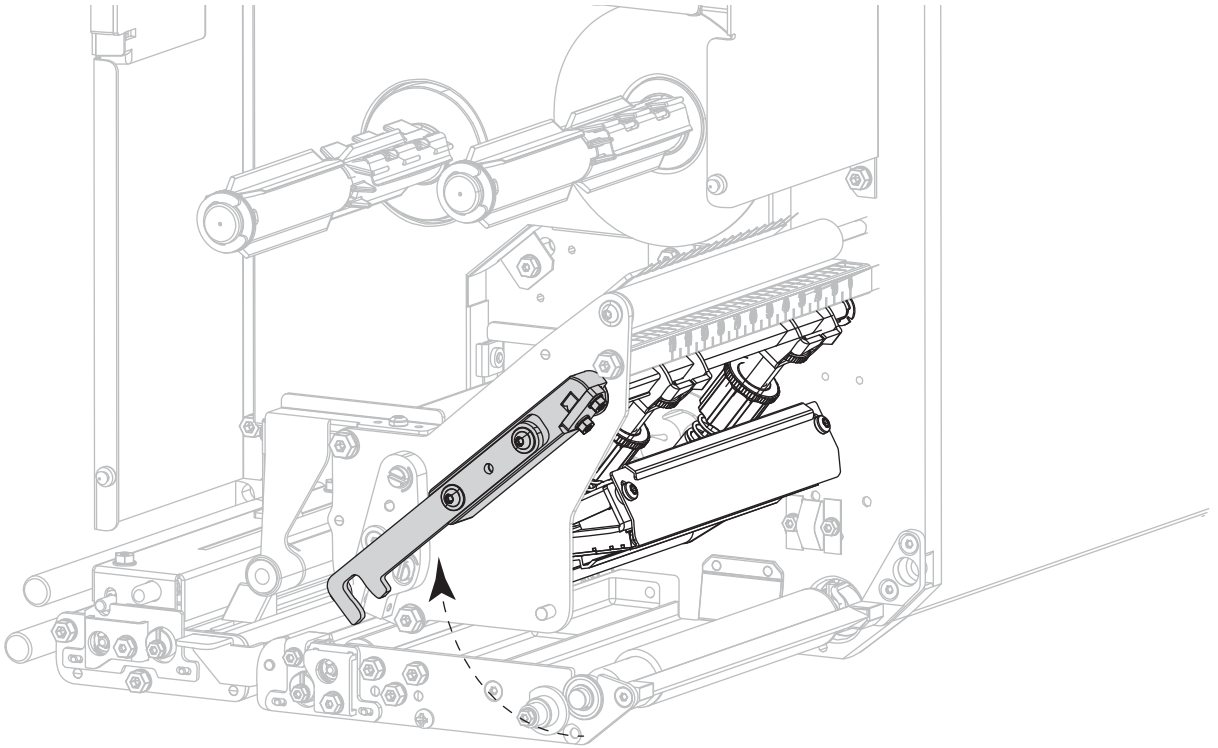
5. Press the release button on the upper pinch roller assembly, and allow the assembly to pivot upward.
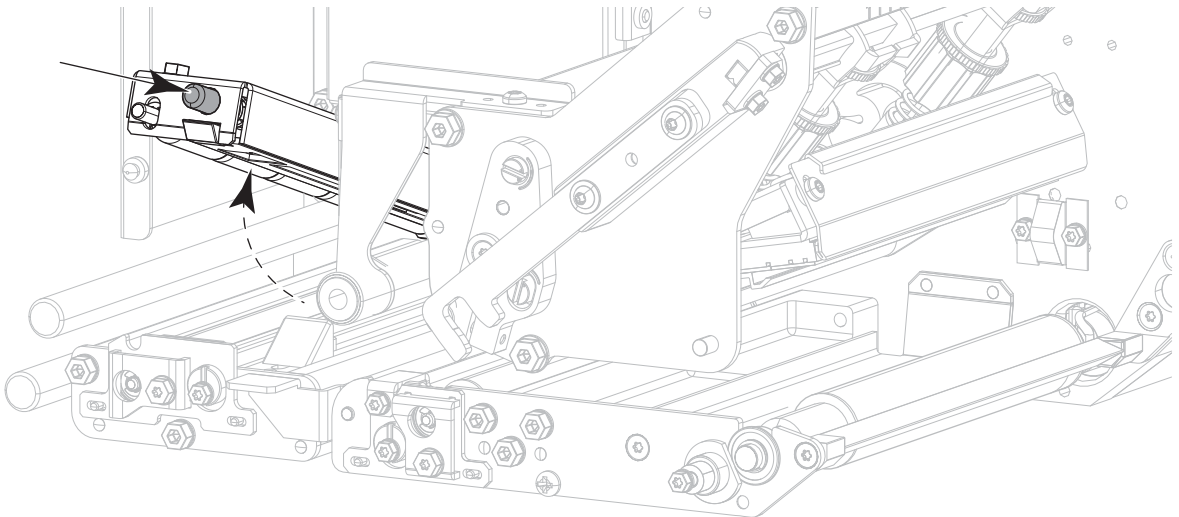
⚠️ **CAUTION—HOT SURFACE:** The printhead may be hot and could cause severe burns. Allow the printhead to cool.

6. Clean the printhead.

a. Using the swab from the Preventive Maintenance Kit (p/n 47362 or p/n 105950-035 for a multipack), wipe the print elements (gray strip) from end to end. In place of this kit, use a lint-free cloth dipped in 99.7% isopropyl alcohol.

b. Allow the solvent to evaporate.
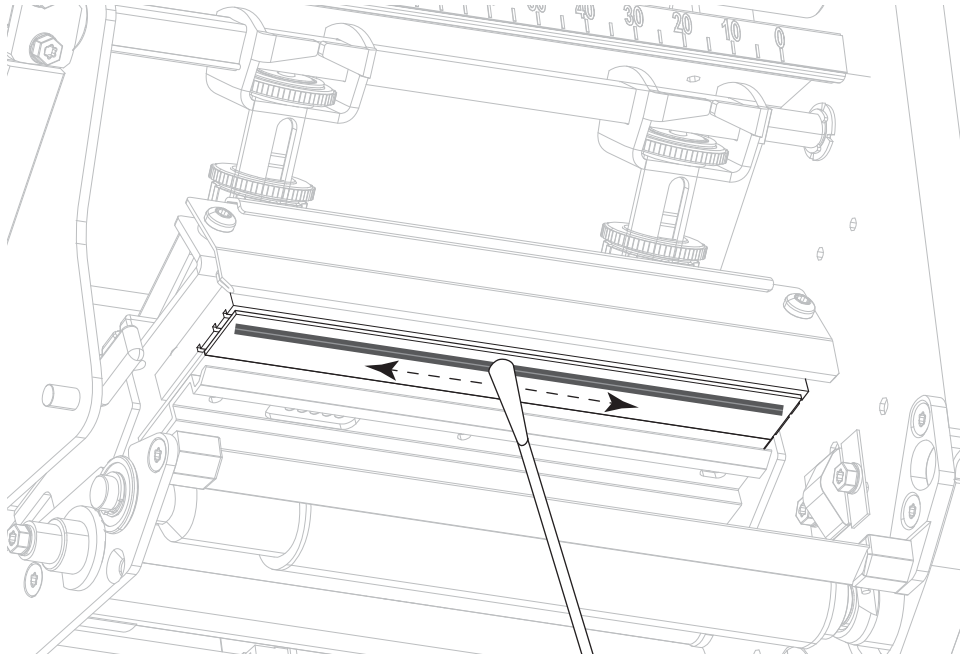
7. Clean the rollers.

a. Use the swab or the lint-free cloth to clean the pinch roller (1), peel roller (2), and platen roller (3). Rotate the rollers while cleaning them.

b. Allow the solvent to evaporate.
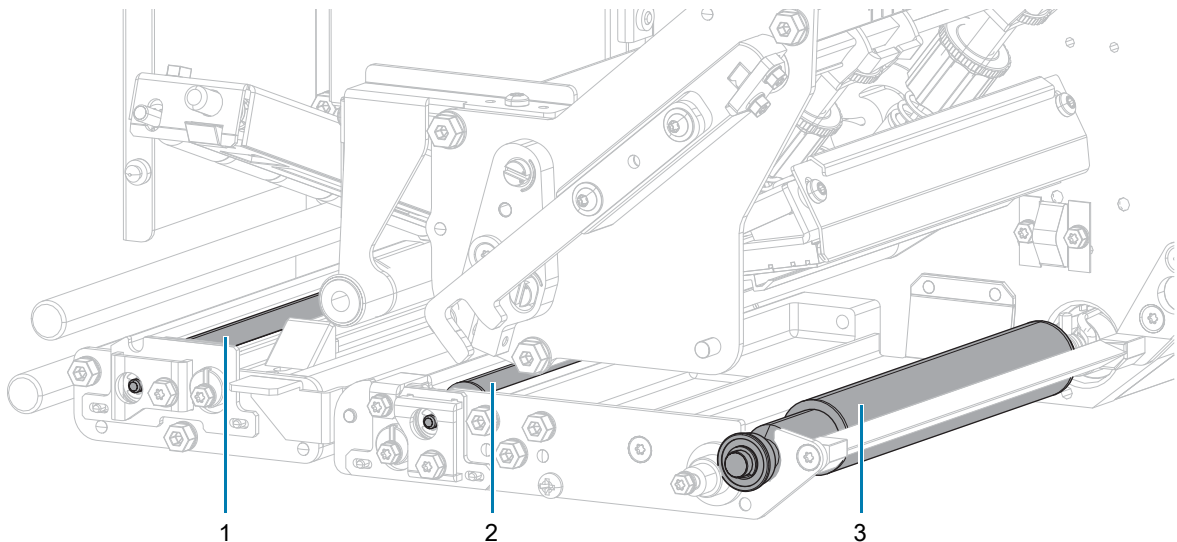
NOTE: If print quality does not improve after you perform this procedure, clean the printhead with Zebra's Save-a-Printhead cleaning film. Call your authorized Zebra distributor for more information.

8. Reload the ribbon and media (if used).

9. Close the upper pinch roller assembly.

10. Lock the printhead assembly.
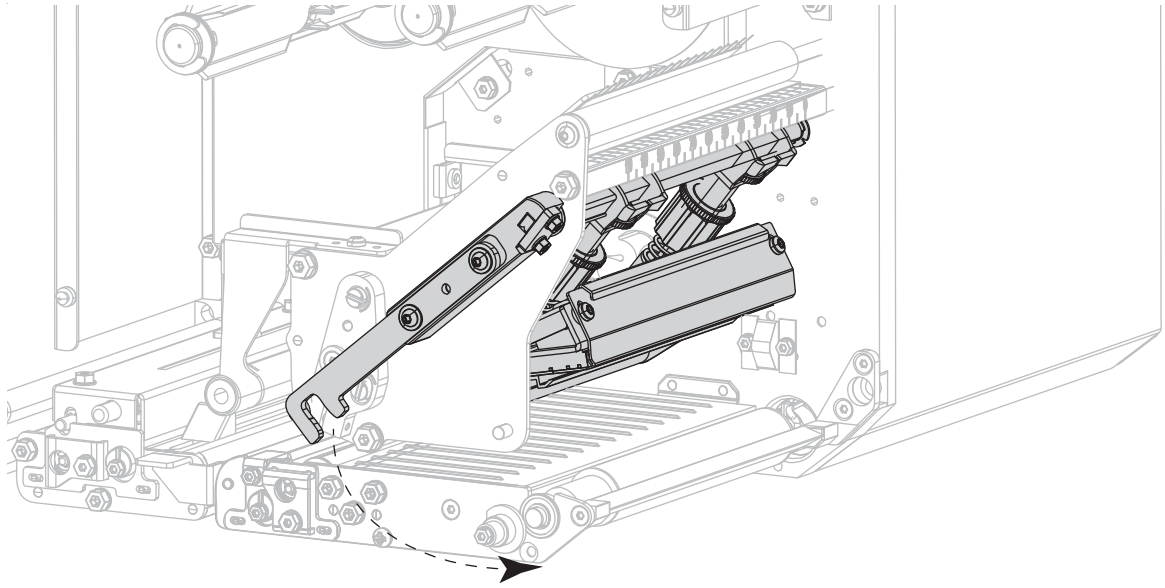
11. Close the media cover.
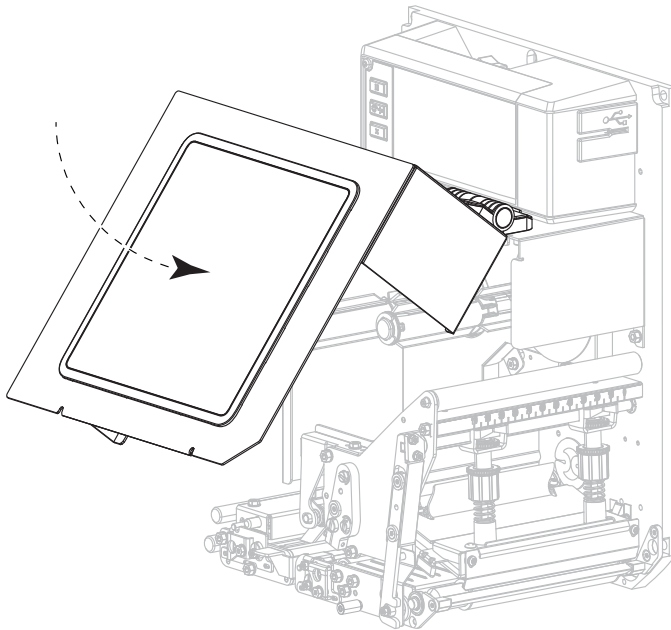
Removing Used Ribbon

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

1. Has the ribbon run out?

   • Yes—Continue with step 2.

   • No—Cut or break the ribbon before the ribbon take-up spindle.
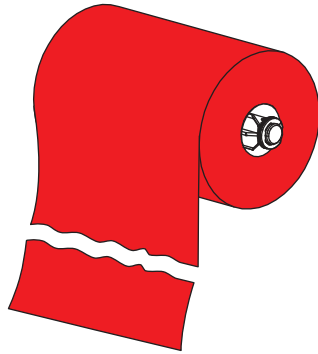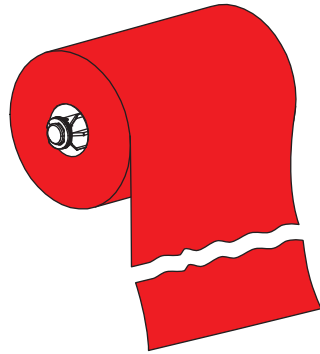
LH   RH

2. Slide the core with the used ribbon off of the ribbon take-up spindle.
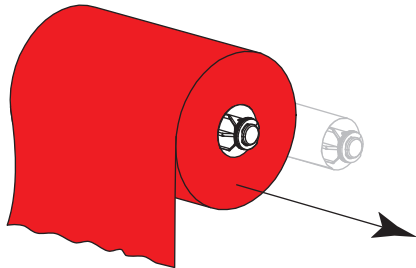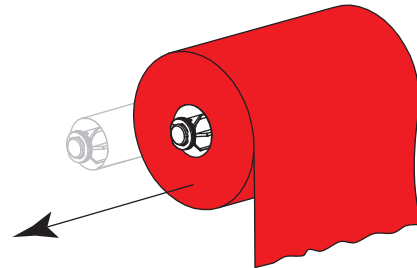
LH   RH

3. Discard the used ribbon. Reuse the empty core from the ribbon supply spindle by moving it to the ribbon take-up spindle.

Replacing Print Engine Components

Some print engine 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 1 on page 72 for the recommended cleaning intervals.

Ordering Replacement Parts

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

Recycling Print Engine Components

The majority of this print engine's components are recyclable. The print engine's main logic board may include a battery that you should dispose of properly.

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

Storing the Print Engine

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

• Temperature: –40°C to 60°C (–40° to 140°F)

• Relative humidity: 5% to 85% non-condensing

Lubrication

No lubrication is needed for this print engine.

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

Troubleshooting

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

Judging Barcode Quality

Figure 1 shows how printer settings such as darkness and print speed can affect the quality of barcodes. Set the print darkness to the lowest setting that provides good print quality. The Print Quality Assistant in Running the Print Wizard and Printing a Test Label on page 27 can help you determine the best settings.

Figure 1   Barcode Darkness Comparison
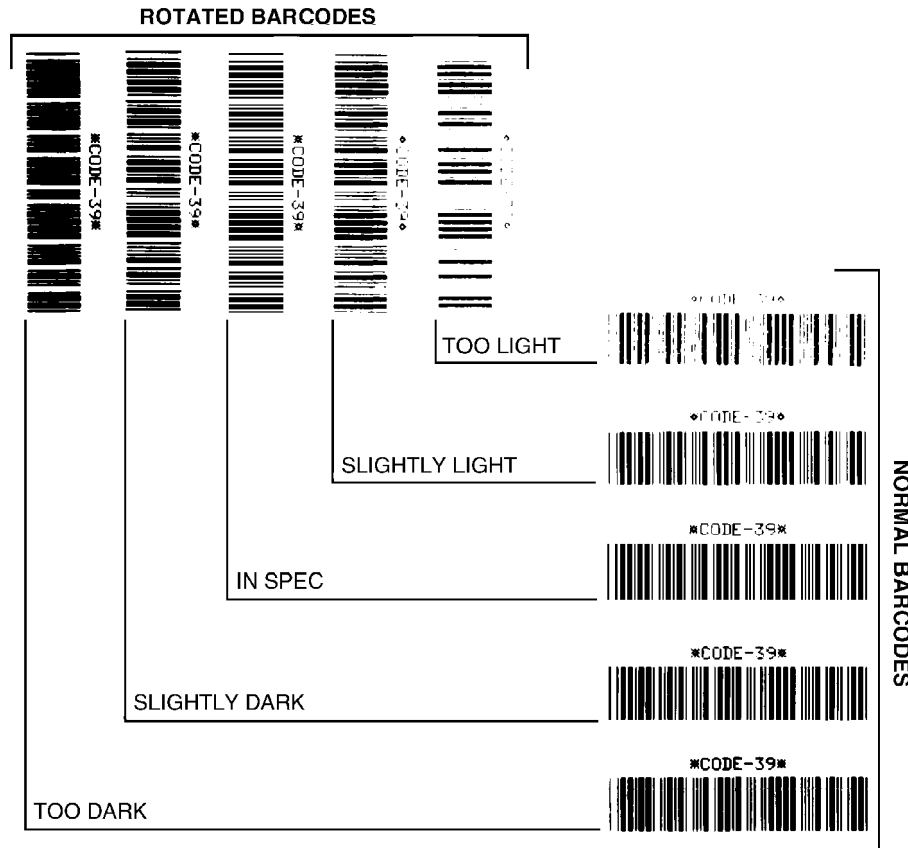
Too Dark

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

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

Slightly Dark

Slightly dark labels are not as obvious.

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

In-Spec

A barcode that is "in-spec" (within specifications) can only be confirmed by a verifier, but it should exhibit some visible characteristics.

- The normal barcode will have complete, even bars and clear, distinct spaces.

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

- 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 barcodes.

- Both normal and rotated barcodes will be in spec.

- Small alphanumeric characters may not be complete.

Too Light

Labels that are too light are obvious.

- Both normal and rotated barcodes have incomplete bars and spaces.

- Small alphanumeric characters are unreadable.

Configuration Labels

Some of the most commonly used diagnostic items are the printer configuration label and the network configuration label. Sample labels are shown in Figure 2. Analyzing the information on these labels can help you to troubleshoot potential issues.

To print a printer configuration label, touch **Menu > Settings > Print: System Settings**.

To print a network configuration label, touch **Menu > Connection > Networks > Print: Network Info**.

Figure 2   Sample Labels

Printer Configuration Label

Network Configuration Label

```
         PRINTER CONFIGURATION

Zebra Technologies
ZTC ZTXXX-XXXdpi ZPL
XXXXXXXXXXXX

+30.0............... DARKNESS
6.0 IPS............. PRINT SPEED
-007................ TEAR OFF
TEAR OFF............ PRINT MODE
CONTINUOUS.......... MEDIA TYPE
TRANSMISSIVE........ SENSOR SELECT
DIRECT-THERMAL...... PRINT METHOD
1344................ PRINT WIDTH
2000................ LABEL LENGTH
P1085892/00005 2... PRINT HEAD ID
15.0IN   380MM..... MAXIMUM LENGTH
MAINT. OFF.......... EARLY WARNING
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
INACTIVE............ COMMAND OVERRIDE
FEED................ MEDIA POWER UP
LENGTH.............. HEAD CLOSE
DEFAULT............. BACKFEED
+000................ LABEL TOP
+0000............... LEFT POSITION
OFF................. APPLICATOR PORT
ENABLED............. ERROR ON PAUSE
PULSE MODE.......... START PRINT SIG
DISABLED............ REPRINT MODE
080................. WEB SENSOR
090................. MEDIA SENSOR
255................. TAKE LABEL
027................. MARK SENSOR
027................. MARK MED SENSOR
000................. TRANS GAIN
005................. TRANS BASE
060................. TRANS LED
002................. MARK GAIN
100................. MARK LED
DPCSWFXM............ MODES ENABLED
.................... MODES DISABLED
1344 8/MM FULL..... RESOLUTION
4.0................. LINK-OS VERSION
V80.20.03 <-....... FIRMWARE
1.3................. XML SCHEMA
6.6.0 22.89........ HARDWARE ID
32768k.........R: RAM
524288k........E: ONBOARD FLASH
NONE................ FORMAT CONVERT
MM/DD/YYYY 24HR.... IDLE DISPLAY
05/11/17............ RTC DATE
06:40............... RTC TIME
ENABLED............. ZBI
2.1................. ZBI VERSION
READY............... ZBI STATUS
TM:MGE MICRO........ RFID READER
20.00.00.01......... RFID HW VERSION
01.03.00.18......... RFID FW VERSION
USA/CANADA.......... RFID REGION CODE
USA/CANADA.......... RFID COUNTRY CODE
RFID OK............. RFID ERR STATUS
16.................. RFID READ PWR
16.................. RFID WRITE PWR
F0.................. PROG. POSITION
0................... RFID VALID CTR
0................... RFID VOID CTR
NONE................ ADAPTIVE ANTENNA
A4.................. RFID ANTENNA
570 LABELS......... NONRESET CNTR
570 LABELS......... RESET CNTR1
570 LABELS......... RESET CNTR2
2,798 IN............ NONRESET CNTR
2,798 IN............ RESET CNTR1
2,798 IN............ RESET CNTR2
7,107 CM............ NONRESET CNTR
7,107 CM............ RESET CNTR1
7,107 CM............ RESET CNTR2
001 WIRELESS....... SLOT 1
*** EMPTY.......... SLOT 2
0................... MASS STORAGE COUNT
0................... HID COUNT
OFF................. USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

```
         Network Configuration

Zebra Technologies
ZTC ZTXXX-XXXdpi ZPL
XXXXXXXXXXXX

Wired.............. PRIMARY NETWORK
PrintServer........ LOAD LAN FROM?
INTERNAL WIRED..... ACTIVE PRINTSRVR

Wired*
ALL................ IP PROTOCOL
192.168.000.017.... IP ADDRESS
255.255.255.000.... SUBNET
192.168.000.254.... 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

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
INSERTED........... CARD INSERTED
02dfH.............. CARD MFG ID
9134H.............. CARD PRODUCT ID
ac:3f:a4:82:05:9c.. MAC ADDRESS
YES................ DRIVER INSTALLED
INFRASTRUCTURE..... OPERATING MODE
125................ ESSID
1.0................ CURRENT TX RATE
OPEN............... WEP TYPE
WPA PSK............ WLAN SECURITY
1.................. WEP INDEX
000................ POOR SIGNAL
LONG............... PREAMBLE
NO................. ASSOCIATED
ON................. PULSE ENABLED
15................. PULSE RATE
OFF................ INTL MODE
USA/CANADA......... REGION CODE
USA/CANADA......... COUNTRY CODE
0x7FF.............. CHANNEL MASK

Bluetooth
4.3.1p1............ FIRMWARE
02/13/2015......... DATE
on................. DISCOVERABLE
3.0/4.0............ RADIO VERSION
on................. ENABLED
AC:3F:A4:82:05:9D.. MAC ADDRESS
76J162700886....... FRIENDLY NAME
no................. CONNECTED
1.................. MIN SECURITY MODE
nc................. CONN SECURITY MODE
supported.......... iOS

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PAUSE Self-Test

Use this self-test to provide the test labels required when making adjustments to the print engine's mechanical assemblies or to determine if any printhead elements are not working. Figure 3 shows a sample printout.

Figure 3 PAUSE Self-Test Label

1. Turn off (**O**) the print engine.

2. Press and hold **PAUSE** while turning on (**I**) the print engine. Hold **PAUSE** until the first control panel light turns off.

   • The initial self-test prints 15 labels at the print engine's slowest speed, and then automatically pauses the print engine. Each time **PAUSE** is pressed, an additional 15 labels print.

   • While the print engine is paused, pressing **CANCEL** alters the self-test. Each time **PAUSE** is pressed, 15 labels print at 152 mm (6 in.) per second.

   • While the print engine is paused, pressing **CANCEL** again alters the self-test a second time. Each time **PAUSE** is pressed, 50 labels print at the print engine's slowest speed

   • While the print engine is paused, pressing **CANCEL** again alters the self-test a third time. Each time **PAUSE** is pressed, 50 labels print at 152 mm (6 in.) per second.

   • While the print engine is paused, pressing **CANCEL** again alters the self-test a fourth time. Each time **PAUSE** is pressed, 15 labels print at the print engine's maximum speed.

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

Printing and Interpreting a Sensor Profile

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

- The printer experiences difficulty in determining gaps (web) between labels.

- The printer incorrectly identifies preprinted areas on a label as gaps (web).

- The printer cannot detect ribbon.

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see Calibrating the Ribbon and Media Sensors on page 26).

Media Sensor Profile

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

If you compare the sensor profile printout to a length of your media, the spikes should be the same distance apart as the gaps on the media. If the distances are not the same, the print engine may be having difficulty determining where the gaps are located.

Figure 4   Media Sensor Profile (Gap/Notch Media)
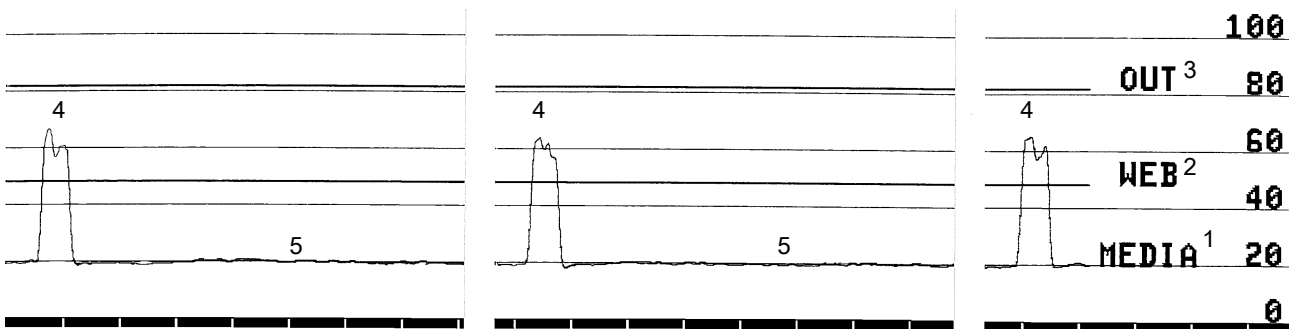
Figure 5   Media Sensor Profile (Black Mark Media)
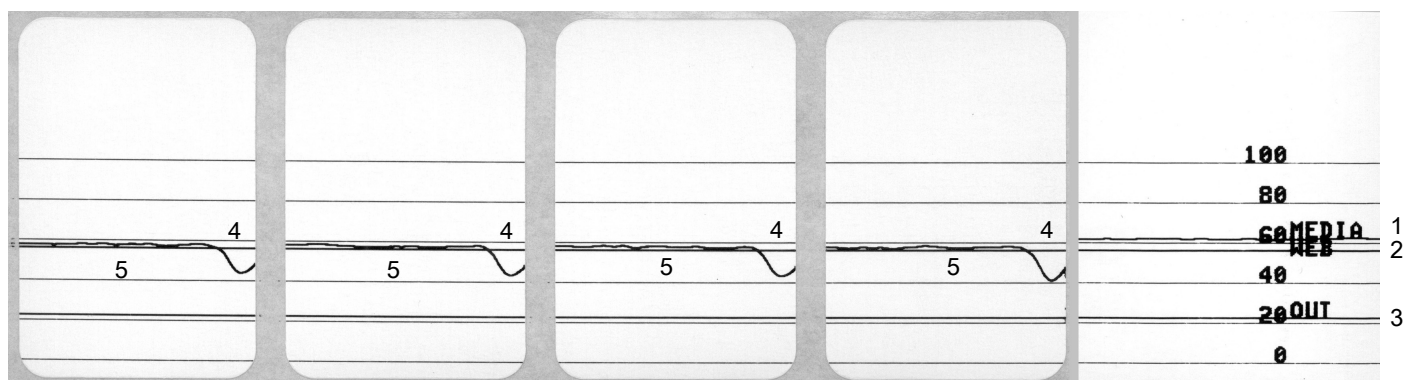
Ribbon Sensor Profile

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 print engine does not acknowledge that ribbon is loaded.
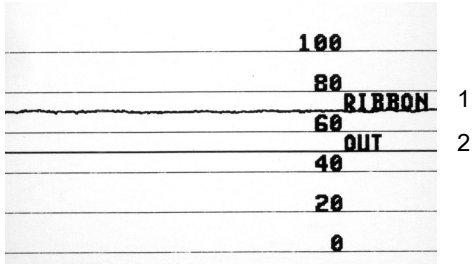
Using Communication Diagnostics Mode

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the print engine 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 print engine prints all characters received, including control codes such as CR (carriage return). Figure 6 shows a typical test label from this test.

Figure 6   Sample Communications Diagnostics Mode Label

```
^FS^FO394,25^AA
5E 46 53 5E 46 4F 33 39 34 2C 32 35 5E 41 41
N,18,10^FD(0000
4E 2C 31 38 2C 31 30 5E 46 44 28 30 30 30 30
)999-9999^FS
29 39 39 39 2D 39 39 39 39 5E 46 53 0D 0A
^FO0,50^AAN,18,
5E 46 4F 30 2C 35 30 5E 41 41 4E 2C 31 38 2C
10^FDCENTER STA
31 30 5E 46 44 43 45 4E 54 45 52 20 53 54 41
```
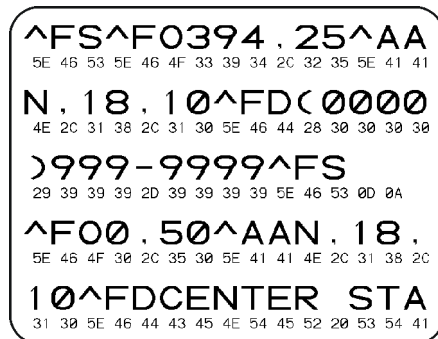
1. Set the label width equal to or less than the actual media width being used for the test.
   Touch **Settings > Media Settings** to access the label width setting.

2. Touch **Menu > System > Program Language > Diagnostic Mode**, and change the setting to **Print**.

   The printer enters diagnostics mode and prints any data received from the host computer on a test label

NOTE: Other options for this mode include **E:Drive** for saving the output to the print engine's hard drive and **USB Host** to save the output to a device that is connected to the USB host port.

3. Check the output for error codes. For any errors, check that your communication parameters are correct.

   Errors show on the test label as follows:

   • **FE** indicates a framing error.

   • **OE** indicates an overrun error.

   • **PE** indicates a parity error.

   • **NE** indicates noise.

4. To exit this self-test and return to normal operation, power cycle the printer or set the **Diagnostic Mode** option to **Off**.

Loading Defaults or Last Saved Values

Restoring the printer to default values or to the last saved values can help if things are not working as expected. Use care when loading defaults because you will need to reload all settings that you changed manually.

Touch **Menu > System > Settings > Restore Defaults** to see the available options.
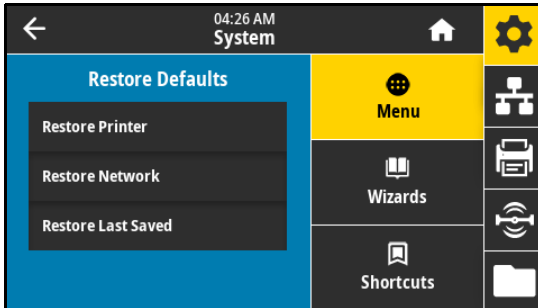
- **Restore Printer**—Restores all printer settings other than the network settings back to the factory defaults.

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

- **Restore Last Saved**—Loads settings from the last permanent save.

See for additional ways to restore these values.

Alert and Error States

If the background color of the Home screen changes, you may need to take an action to restore the printer to a Ready status. Red and yellow backgrounds typically halt printing until the issue is resolved. Informational messages with a green background usually disappear without user intervention, and printing continues as normal.
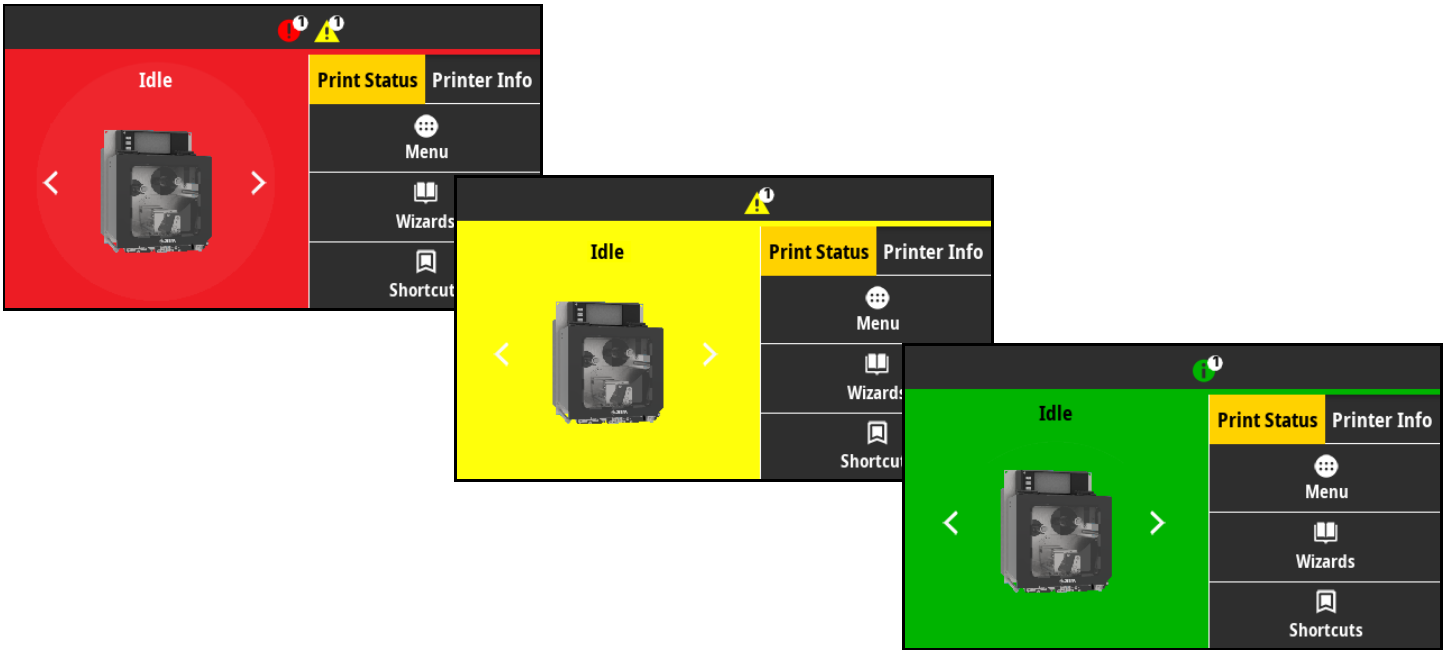
Touch the icons in the bar at the top of the Home screen to view the error, alert, or informational message. See Alerts and Error Messages on page 89 for recommended actions.
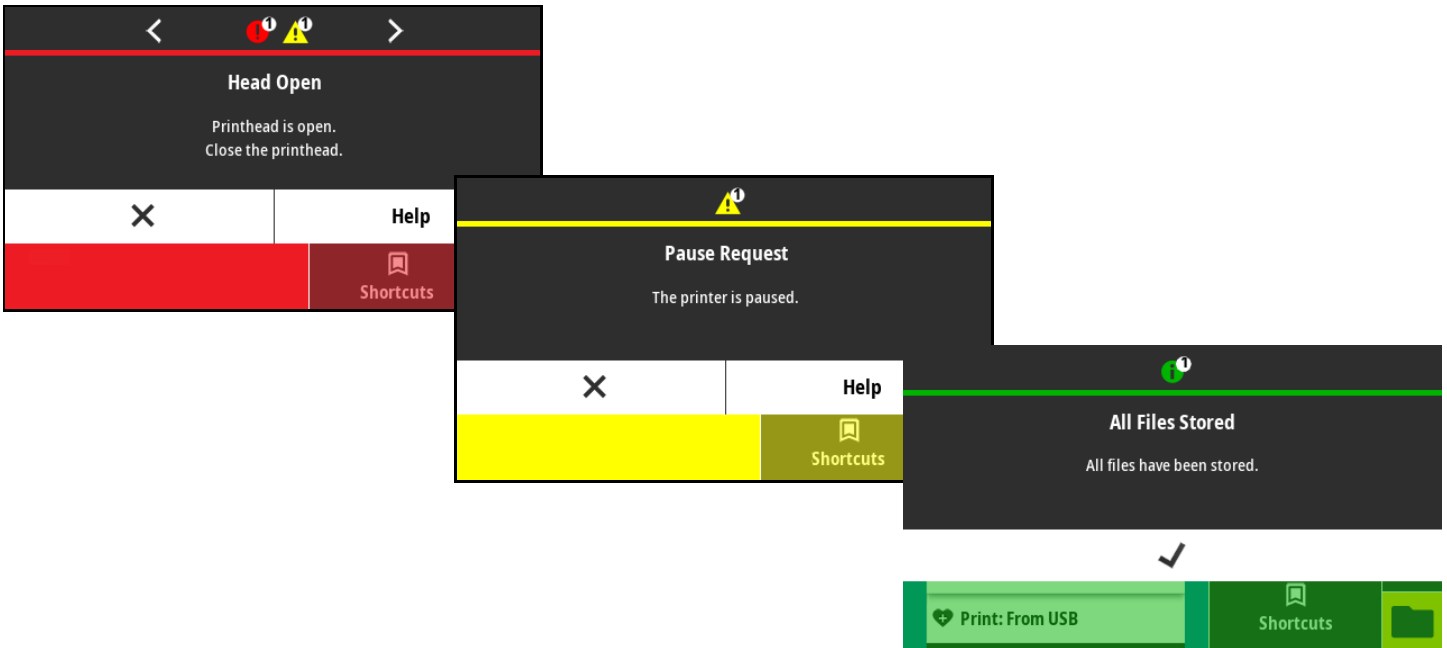
Alerts and Error Messages

Display/Indicator Lights	Possible Causes	Recommended Solutions
Head Open Printhead is open. Close the printhead.	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 Media is out. Load additional media.	The media is not loaded or is loaded incorrectly.	Load media correctly. See Ribbon and Media Loading on page 17.
	Misaligned media sensor.	Check the position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	1. Install the proper media type, or reset printer for the current media type. 2. Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
Paper Jam Media jammed. Check the media.	There is an issue with the media in the media path.	1. Check for media that is loaded incorrectly or stuck to components in the media path. 2. Check if media is wrapped around the platen roller. Carefully remove any labels. 3. If necessary, clean the platen roller to remove adhesive. See Cleaning the Printhead and Rollers on page 73.

Display/Indicator Lights	Possible Causes	Recommended Solutions
Ribbon Out Ribbon is out. Replace the ribbon.	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 Ribbon and Media Loading on page 17. 2. Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	1. See Print > Sensors > Print: Sensor Profile on page 57 to print a sensor profile image (which extends across several actual labels or tags).The ribbon out threshold (1) is likely too high, above the line that indicates where the ribbon is detected (2). 2. Calibrate the printer (see Calibrating the Ribbon and Media Sensors on page 26) or load printer defaults (see System > Settings > Restore Defaults on page 36).
	If you are using direct thermal media, the printer is waiting for ribbon to be loaded because it is incorrectly set for thermal transfer mode.	Set the printer for Direct Thermal mode. See Print > Print Quality > Print Type on page 50.
Ribbon In Ribbon was detected in Direct Thermal mode. Remove the ribbon.	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 the message persists with no ribbon in the printer, Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See Print > Print Quality > Print Type on page 50.

Display/Indicator Lights	Possible Causes	Recommended Solutions
Head Identification Failed Printhead is not a Zebra Certified Product Replace the Printhead	The printhead was replaced with one that is not a genuine Zebra printhead.	Install a genuine Zebra printhead.
Head Element Out A printhead element failed. The printhead may need to be replaced.	A printhead element is no longer working.	If the location of the failed element affects printing, replace the printhead.
Replace Printhead Replace the printhead.	The printhead is nearing the end of its life and should be replaced.	Replace the printhead.
Head Maintenance Needed Clean the printhead.	The printhead needs to be cleaned.	Follow the cleaning instructions in Cleaning the Printhead and Rollers on page 73.
Head Over Temp Printhead is too hot. All printing is halted.	⚠ **CAUTION—HOT SURFACE:** 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 Under Temp Printhead is too cold. All printing is halted. **Head Thermistor Fault** Faulty thermistor detected. Replace the printhead. The printer shows one of these messages or cycles between them.	⚠ **CAUTION—HOT SURFACE:** 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.	Make sure that the printhead is fully seated. If necessary, call a service technician to check the cable.
	The printhead has a faulty thermistor.	Replace the printhead.

Display/Indicator Lights	Possible Causes	Recommended Solutions
Head Under Temp Printhead is too cold. All printing is halted.	⚠ **CAUTION—HOT SURFACE:** 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.	Make sure that the printhead is fully seated. If necessary, call a service technician to check the cable.
	The printhead has a faulty thermistor.	Replace the printhead.
Out of Memory Storing XXX XXX not stored. Out of memory.	There is not enough memory to perform the function specified.	Free up some of the printer's memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default.
		Ensure that the data is not directed to a device that is not installed or is unavailable.
		If the problem persists, call a service technician.

Indicator Lights

The indicator lights communicate the printer's status.
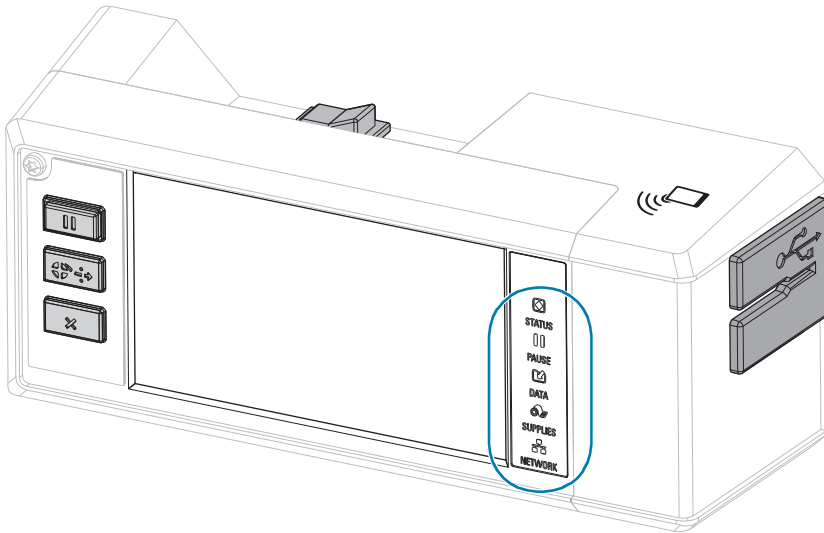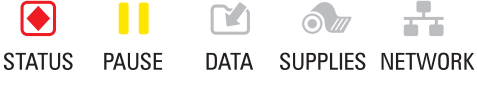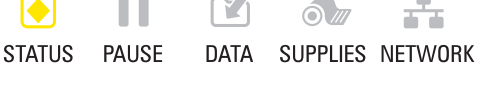
◈	STATUS light
‖	PAUSE light
☑	DATA light
⊚/	SUPPLIES light
⊞	NETWORK light
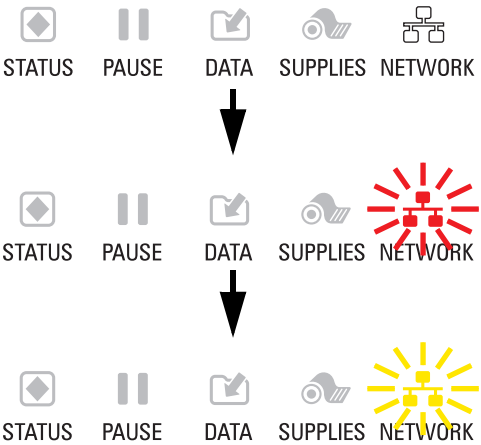
Table 2   Status of Printer As Shown by Indicator Lights

Indicator Lights	Description
◈ ‖ ☑ ⊚/ ⊞ STATUS PAUSE DATA SUPPLIES NETWORK	• **STATUS light steady green (other lights steady yellow for 2 seconds during printer power-up)** The printer is ready.
◈ ‖ ☑ ⊚/ ⊞ STATUS PAUSE DATA SUPPLIES NETWORK	• PAUSE light steady yellow. The printer is paused.
◈ ‖ ☑ ⊚/ ⊞ STATUS PAUSE DATA SUPPLIES NETWORK	• **STATUS light steady red** • **SUPPLIES light steady red** The media supply is out. The printer needs attention and cannot continue without user intervention.
◈ ‖ ☑ ⊚/ ⊞ STATUS PAUSE DATA SUPPLIES NETWORK	• **STATUS light steady red** • **SUPPLIES light flashing red** The ribbon supply is out. The printer needs attention and cannot continue without user intervention.

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Table 2   Status of Printer As Shown by Indicator Lights (Continued)

Indicator Lights	Description
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **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 · PAUSE · DATA · SUPPLIES · NETWORK	• **STATUS light steady red** • **PAUSE light steady yellow** The printhead is open. The printer needs attention and cannot continue without user intervention.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **STATUS light steady yellow** The printhead is over temperature. ⚠ **CAUTION—HOT SURFACE:** The printhead may be hot and could cause severe burns. Allow the printhead to cool.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **STATUS light flashing yellow** One of the following: • The printhead is under temperature. • The power supply is over temperature. • The main logic board (MLB) is over temperature.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **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.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **STATUS light flashing red** The printer is unable to read the dpi setting of the printhead.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **NETWORK light off** No Ethernet link is available.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **NETWORK light steady green** A 100 Base-T link was found.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **NETWORK light steady yellow** A 10 Base-T link was found.
STATUS · PAUSE · DATA · SUPPLIES · NETWORK	• **NETWORK light steady red** An Ethernet error condition exists. The printer is not connected to your network.

Table 2 Status of Printer As Shown by Indicator Lights (Continued)

STATUS PAUSE DATA SUPPLIES NETWORK	• **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.
STATUS PAUSE DATA SUPPLIES NETWORK	• **NETWORK light steady green** The radio is associated with your network and authenticated, and the WLAN signal is strong.
STATUS PAUSE DATA SUPPLIES NETWORK	• **NETWORK light flashing green** The radio is associated with your network and authenticated, but the WLAN signal is weak.
STATUS PAUSE DATA SUPPLIES NETWORK	• **NETWORK light steady red** A WLAN error condition exists. The printer is not connected to your network.

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Troubleshooting

Printing or Print Quality Issues

Barcode Does Not Scan	Possible Cause	Recommended Solution
The barcode printed on a label does not scan.	The barcode is not within specifications because the printer is set at an incorrect darkness level.	1. Perform the steps in Running the Print Wizard and Printing a Test Label on page 27. 2. If necessary, manually adjust the darkness or print speed settings. • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. Access the darkness and print speed settings from the Home screen by touching **Menu > Print > Print Quality**. 3. If the issue is not resolved, check the printhead pressure and toggle position. See Toggle Positioning and Printhead Pressure Adjustment on page 66
	There is not enough blank space around the barcode.	Leave at least 3.2 mm (1/8 in.) between the barcode and other printed areas on the label and between the barcode and the edge of the label.
Poor Print Quality	**Possible Cause**	**Recommended Solution**
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation. For more information, see zebra.com/supplies.
Poor results with thick labels	The print line is not at an optimal position for your media.	Refer to the Service Guide for instructions on how to adjust the print line for thick media.
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Issues on page 100.
Long tracks of missing print on several labels	Print element damaged.	Replace the printhead.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in Ribbon Issues on page 100.

Print Consistently Too Light or Too Dark	Possible Cause	Recommended Solution
Printing is too light or too dark over the entire label	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation. For more information, see 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. 1. Perform the steps in Running the Print Wizard and Printing a Test Label on page 27. 2. If necessary, manually adjust the darkness or print speed settings. • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. Access the darkness and print speed settings from the Home screen by touching **Menu > Print > Print Quality**.
	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.
	Incorrect printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Toggle Positioning and Printhead Pressure Adjustment on page 66.
Printing is too light or too dark on one side of the label	Uneven printhead pressure.	Adjust the printhead pressure as needed for good print quality. See Toggle Positioning and Printhead Pressure Adjustment on page 66.

General Print Quality Issues	Possible Cause	Recommended Solution

General print quality issues	The printer is set at an incorrect print speed or darkness level. Keep in mind that printer settings may be affected by the driver or software being used.	For optimal print quality, set the print speed and the darkness to the lowest possible settings for your application.
		
		1. Perform the steps in Running the Print Wizard and Printing a Test Label on page 27.
		
		2. If necessary, manually adjust the darkness or print speed settings.
		
		  • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.
		
		  • Slower print speeds typically yield better print quality.
		
		Access the darkness and print speed settings from the Home screen by touching **Menu > Print > Print Quality**.

	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 printhead is dirty.	Clean the printhead and platen roller. See Cleaning the Printhead and Rollers on page 73.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Toggle Positioning and Printhead Pressure Adjustment on page 66.
	The label format is scaling a font that is not scalable.	Check the label format for font issues.
Loss of Registration	**Possible Cause**	**Recommended Solution**
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the printhead and platen roller. See Cleaning the Printhead and Rollers on page 73.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned. See Ribbon and Media Loading on page 17.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark).
	The media is loaded incorrectly.	Load media correctly. See Ribbon and Media Loading on page 17.
Misregistration/skips labels	The printer is not calibrated.	Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
	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 Cleaning the Printhead and Rollers on page 73.
	Media does not meet specifications.	Use media that meets specifications. See Media Specifications on page 128.

Vertical drift in top-of-form position	The printer is out of calibration.	Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
	The platen roller is dirty.	Clean the printhead and platen roller. See Cleaning the Printhead and Rollers on page 73.
Horizontal movement in placement of the label image.	The previous labels were torn off incorrectly.	Pull down and to the left when tearing off labels so that the tear-off bar assists in tearing through the label backing. Pulling up or down and to the right can shift the media sideways.
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Set the printer for the correct media type (gap/notch, continuous, or mark) and calibrate the printer, if necessary (see Calibrating the Ribbon and Media Sensors on page 26).
	The media sensor is calibrated improperly.	Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
	The platen roller is dirty.	Clean the printhead and platen roller. See Cleaning the Printhead and Rollers on page 73.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality. See Toggle Positioning and Printhead Pressure Adjustment on page 66.
	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Ribbon and Media Loading on page 17.
	Incompatible media.	You must use media that meets the printer specifications. Ensure that the interlabel gaps or notches are 2 to 4 mm (0.08 to 0.16 in.) and consistently placed (see Media Specifications on page 128).

Ribbon Issues

For videos of some common procedures, go to zebra.com/ze511-info.

Broken Ribbon	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	1. Perform the steps in Running the Print Wizard and Printing a Test Label on page 27. 2. If necessary, manually adjust the darkness or print speed settings. • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. Access the darkness and print speed settings from the Home screen by touching **Menu > Print > Print Quality**. 3. Clean the printhead thoroughly. See Cleaning the Printhead and Rollers on page 73.
	The ribbon is coated on the opposite side than what the printer is set for.	Replace the ribbon with one coated on the correct side or change the setting. See Print > Print Quality > Ribbon Ink Side on page 50.
	The ribbon tension is too high.	Set the ribbon tension to a lower setting. See Print > Print Quality > Ribbon Tension on page 51.

Wrinkled Ribbon	Possible Cause	Recommended Solution
Ribbon wrinkles as it comes in contact with the printhead	Ribbon was loaded incorrectly.	Load the ribbon correctly. See Ribbon and Media Loading on page 17.
	Incorrect burn temperature.	1. Perform the steps in Running the Print Wizard and Printing a Test Label on page 27. 2. If necessary, manually adjust the darkness or print speed settings. • Set the print darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, barcodes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. • Slower print speeds typically yield better print quality. Access the darkness and print speed settings from the Home screen by touching **Menu > Print > Print Quality**.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See Toggle Positioning and Printhead Pressure Adjustment on page 66.
	Media not feeding properly; "walking" from side to side.	Make sure that media is snug by adjusting the media guide, or call a service technician.
	The printhead or platen roller may be installed incorrectly.	Call a service technician.
Ribbon Detection Issues	**Possible Cause**	**Recommended Solution**
The printer does not detect when the ribbon runs out.	The printer may have been calibrated without ribbon or without the ribbon loaded properly.	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 Ribbon and Media Loading on page 17. 2. Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.		
The printer indicates that ribbon is out, even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.

RFID Issues
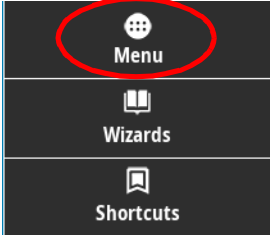
Printer Stops at RFID Inlay		
Issue	**Possible Cause**	**Recommended Solution**
The printer stops at the RFID inlay.	The printer calibrated the label length only to the RFID inlay instead of to the interlabel gap.	1. Select FEED for the Power Up and Head Close actions. See System > Settings > Power Up Action on page 34 and System > Settings > Head Close Action on page 35. 2. Manually calibrate the printer (see Calibrating the Ribbon and Media Sensors on page 26).
Voided Labels		
Issue	**Possible Cause**	**Recommended Solution**
The printer voids every label.	The printer is not calibrated for the media being used.	Manually calibrate the printer (see Calibrating the Ribbon and Media Sensors on page 26).
	You are using an RFID label with a tag type that is not supported by your printer.	These printers support only Gen 2 RFID labels. For more information, refer to the RFID Programming Guide 3, or contact an authorized Zebra RFID reseller.
	The printer is unable to communicate with the RFID reader.	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 cover 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. For transponder placement details, go to zebra.com/transponders.
	You are sending RFID ZPL or SGD commands that are incorrect.	Check your label formats. For more information, refer to the RFID Programming Guide 3.

Voided Labels (Continued)		
Issue	**Possible Cause**	**Recommended Solution**
Low yields. Too many RFID tags per roll are voided.	The RFID labels are not within specifications for the printer, which means that the transponder is not in an area that can be programmed consistently.	Make sure that the labels meet transponder placement specifications for your printer. See zebra.com/transponders for transponder placement information. For more information, refer to the RFID Programming Guide 3, or contact an authorized Zebra RFID reseller.
	Incorrect read and write power levels.	Change the RFID read and write power levels. For instructions, refer to the RFID Programming Guide 3.
	Radio frequency (RF) interference from another RF source.	Do one or more of the following as necessary: • Move the printer away from fixed RFID readers. • Make sure that the media cover is closed at all times during RFID programming.
	The printer is using outdated firmware.	Go to zebra.com/firmware for updated firmware.
Other RFID Issues		
Issue	**Possible Cause**	**Recommended Solution**
RFID parameters do not appear, 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.
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.

Communications Issues

Label Formats Not Recognized	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 Connecting the Printer to a Device on page 147.
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.	Change the prefix and delimiter settings. See the Zebra Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML at zebra.com/manuals for more information.
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.
		If the problem continues, check the label format.

Labels Stop Printing Correctly	Possible Cause	Recommended Solution
A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.	The serial communication settings are incorrect.	Ensure that the flow control settings match.
		Check the communication cable length. See Communication Interface Specifications on page 122 for requirements.
		Check the printer driver or software communications settings (if applicable).

Miscellaneous Issues

Issues with the Display	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 Home screen, touch **Menu**. 2. Touch the top selection on the screen. 3. Scroll through the language selections under this menu option. The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read. 4. Touch the language that you want to display to select it. 5. Touch the Home icon to return to the Home screen.
The display is missing characters or parts of characters	The display may need replacing.	Call a service technician.

USB Device Not Acknowledged	Possible Cause	Recommended Solution
The printer is not acknowledging a USB device or is not reading the files on a USB device that is plugged into the USB host port.	The printer currently supports USB drives only up to 1 TB in size.	Use a USB drive that is 1 TB or smaller.
	The USB device may require its own external power.	If your USB device requires external power, make sure that it is plugged into a working power supply.

Printer Parameters Are Not Set As Expected	Possible Cause	Recommended Solution
Changes in parameter settings did not take effect. OR Some parameters changed unexpectedly.	A firmware setting or command prevented the ability to change the parameter.	Check your label formats or the settings of the software that you use to send formats to the printer. If necessary, See the Zebra Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML at zebra.com/manuals for more information or call a service technician.
	A command in a label format changed the parameter back to the previous setting.	

IP Address Changing	Possible Cause	Recommended Solution
My printer reassigns a new IP address to the print server after the printer has been off for a while.	The settings for your network are causing the network to reassign a new IP address.	If the printer changing IP addresses causes issues for you, follow these steps to assign it a static IP address: 1. Find out what values need to be assigned to the IP address, subnet mask, and gateway for your print server (wired, wireless, or both). 2. Change the appropriate IP protocol value to PERMANENT. 3. Change the values for the IP address, subnet mask, and gateway for the appropriate print server to what you want them to remain. 4. Reset the network by touching **Menu > Connections > Networks > Reset Network** and then touching the check mark to save the changes.

Cannot Connect through Wired or Wireless Connections	Possible Cause	Recommended Solution
I manually entered a wireless IP address, subnet, and gateway on my printer, but it won't connect to my wired or wireless network.	The printer's network must be reset after values are changed.	Reset the network by touching **Menu > Connections > Networks > Reset Network** and then touching the check mark to save the changes.
	An ESSID value has not been specified.	1. For a wireless connection, specify the ESSID value that matches the value used by your wireless router using the following Set/Get/Do command: `! U1 setvar "wlan.essid" "value"` where `"value"` is the ESSID (sometimes called a network SSID) for your router. You can look on the back of your router for a sticker with the router's default information. If the information has been changed from the default, check with your network administrator for the ESSID value to use. 2. If the printer still does not connect, reset the network by touching **Menu > Connections > Networks > Reset Network** and then touching the check mark to save the changes, and then power cycle the printer.
	The ESSID or other value was not specified correctly.	1. Print a network configuration label and verify that your values are correct. 2. Make corrections as necessary. 3. Reset the network by touching **Menu > Connections > Networks > Reset Network** and then touching the check mark to save the changes.

Calibration Issues	Possible Cause	Recommended Solution
Auto Calibrate failed.	The media or ribbon is loaded incorrectly.	Ensure that the media and ribbon are loaded correctly. See Ribbon and Media Loading on page 17.
	The sensors could not detect the media or ribbon.	Calibrate the printer manually. See Calibrating the Ribbon and Media Sensors on page 26.
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark).
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Calibrate the printer. See Calibrating the Ribbon and Media Sensors on page 26.
	The printer is configured for continuous media.	Set the printer for the correct media type (gap/notch, continuous, or mark).

Printer Locks Up	Possible Cause	Recommended Solution
All indicator lights are on, nothing is on the display, and the printer locks up.	Internal electronic or firmware failure.	Power cycle the printer. If that does not solve the issue, call a service technician.
The printer locks up while booting up.	Main logic board failure.	

Servicing the Printer

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

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

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

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

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

Shipping the Printer

If you must ship the printer:

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

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

Using USB Host Ports and Print Touch/NFC

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

NOTE: The practice files that you need to complete the exercises are included as attachments to this PDF. Download these files from the PDF and copy them to your computer or device before you begin the exercises.

USB Host Ports

A USB host port allows you to connect USB devices—such as a keyboard, scanner, or USB Flash drive—to the printer. Your printer is equipped with two USB host ports on the right side of the control panel.

File Naming

File names for use with the USB host ports are restricted to a limited set of ASCII characters.

- Use: ASCII alphanumeric characters (A,a, B, b, C, ... 0, 1, ...), periods, and dashes.

- Do not use: underscores, accented characters, Cyrillic characters, or Asian (CJK) characters,

Print Touch/Near Field Communication (NFC)

The Zebra Print Touch feature allows you to touch an NFC-enabled device (such as a phone or tablet) to the printer's NFC logo 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 device manufacturer for more information.

Related SGD Commands for Advanced Users

See the See the Zebra Programming Guide at zebra.com/manuals 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 repeat 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"

Items Required for the Exercises

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

- the free Zebra Printer Setup Utility app for your device

  - Android devices: play.google.com/store/apps/details?id=com.zebra.printersetup

  - Apple devices: apps.apple.com/us/app/zebra-printer-setup-utility/id1454308745

- 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 latest printer firmware (optional)

  Download the latest firmware file from zebra.com/firmware.

- the practice files listed here

  Where possible, the contents of the files are shown in this section. The contents of files that contain coded content, which cannot be viewed as text or as an image, are not included.

NOTE: The practice files that you need to complete the exercises are included as attachments to this PDF. Download these files from the PDF and copy them to your computer or device before you begin the exercises.

- File 1: `SAMPLELABEL.TXT`

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

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

- File 2: `LOGO.ZPL`

- File 3: `ZEBRA.BMP`

- File 4: `VLS_BONKGRF.ZPL`

- File 5: `VLS_EIFFEL.ZPL`

- File 6: `USBSTOREDFILE.ZPL`

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

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

- File 7: `KEYBOARDINPUT.ZPL`

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

  - creates a barcode with the current date, based on your Real-Time Clock (RTC) setting

  - prints the Zebra logo graphic

  - prints fixed text

  - `^FN` prompts you to enter your name, and the printer prints what you entered

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

- File 8: `SMARTDEVINPUT.ZPL`

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

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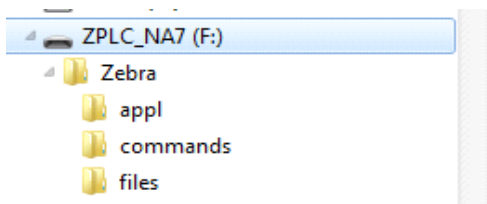
Exercises

> **NOTE:** The practice files that you need to complete the exercises are included as attachments to this PDF. Download these files from the PDF and copy them to your computer or device before you begin the exercises.

Exercise 1: Copying Files to a USB Flash Drive and Performing USB Mirror

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

    a. Create the following folder/subfolders:

    b. In the `Zebra/appl` folder, place a copy of the latest firmware for your printer. (This step is optional.)

    c. In the `Zebra/commands` folder, place the following files:

    NOTE: The practice files that you need to complete the exercises are included as attachments to this PDF. Download these files from the PDF and copy them to your computer or device before you begin the exercises.

    File 2: `LOGO.ZPL`

    d. In the `Zebra/files` folder, place the following file:

    File 3: `ZEBRA.BMP`

2. Insert the USB Flash drive into a USB host port on the front of your printer.

3. Observe the control panel and wait for the following to happen:

    a. If the firmware was included the USB Flash drive and that firmware is different than what is on the printer, the firmware downloads to the printer. The printer then restarts and prints a printer configuration label. (If there is no firmware on the USB Flash drive or if the firmware version is the same, the printer skips this action.)

    b. The printer downloads the files in the `/files` folder and briefly shows the names of the files that are downloading on the display.

    c. The printer executes any files in the `/commands` folder.

    d. The printer restarts and then displays the message:
    `MIRROR PROCESSING FINISHED.`

4. Remove the USB Flash drive from the printer.

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

The Print From USB 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 the root directory of your USB Flash drive. Do not put these files into a subfolder.

    • File 4: `VLS_BONKGRF.ZPL`

    • File 5: `VLS_EIFFEL.ZPL`

    • File 6: `USBSTOREDFILE.ZPL`

2. Insert the USB Flash drive into a USB host port on the front of your printer.

3. Touch **Menu > Storage > USB > Print: From USB**.
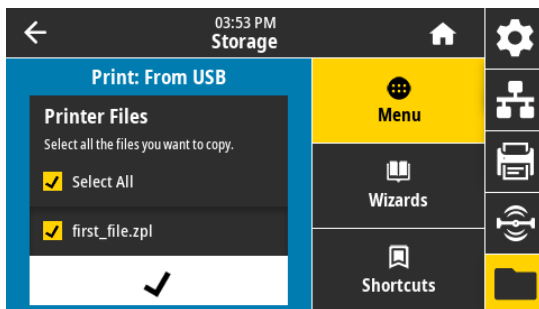
The printer loads any executable files and processes them. The available files are listed. **Select All** is available to print all files on the USB Flash drive.

4. Select File 6: `USBSTOREDFILE.ZPL`.

5. Touch the check mark to copy the files.

    The label prints.

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

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

1. Copy the following files to the root directory of your USB Flash drive. Do not put these files into a subfolder.

   - File 7: `KEYBOARDINPUT.ZPL`

   - File 8: `SMARTDEVINPUT.ZPL`

2. Insert the USB Flash drive into a USB host port on the front of your printer.

3. Touch **Menu > Storage > USB > Copy: Files to Printer**.
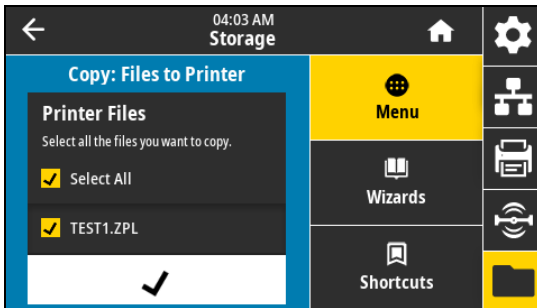
The printer loads any executable files and processes them. The available files are listed. **Select All** is available to copy all of the available files from the USB Flash drive.

4. Select the file `STOREFMT.ZPL`.

5. Select the file `STOREFMTM1.ZPL`.

6. Touch the check mark to copy the files.

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

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

   You can now copy these files from the printer to a USB Flash drive by touching **Menu > Storage > USB > Copy: Files to USB**.
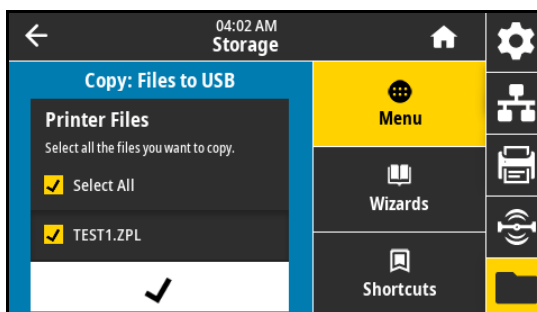
The option **Select All** is available to store all of the available files from the printer to the USB Flash drive. Any .ZPL file that is copied will be post-processed such that the contents of the file will be suitable to be sent to a printer for normal execution.

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Exercise 4: Entering Data for a Stored File with a USB Keyboard and Printing a Label

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

1. After performing the previous exercise, plug a USB keyboard into a USB host port.

2. Touch **Menu > Print > Print Station**.
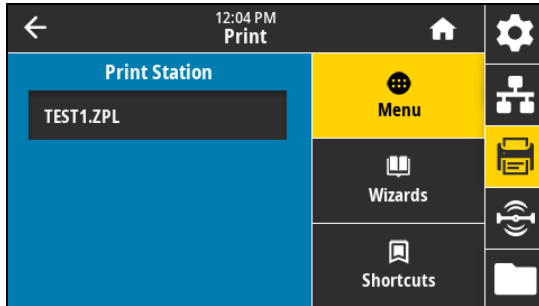
The printer loads any executable files and processes them. The available files are listed.

3. Select the file KEYBOARDINPUT.ZPL.

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

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

The printer prompts for the number of labels to print.

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

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

Exercise 5: Entering Data for a Stored File with a Phone or Tablet and Printing a Label

NOTE: The steps in this exercise may vary depending on your device and your service provider.

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 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 device with the printer by holding the device next to the NFC icon on the printer's control panel.

   a. If necessary, access the Bluetooth information about your printer using your 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 device has been detected by the printer, the printer may prompt you to accept or reject the pairing. If necessary, touch **ACCEPT**. Some 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.

Android
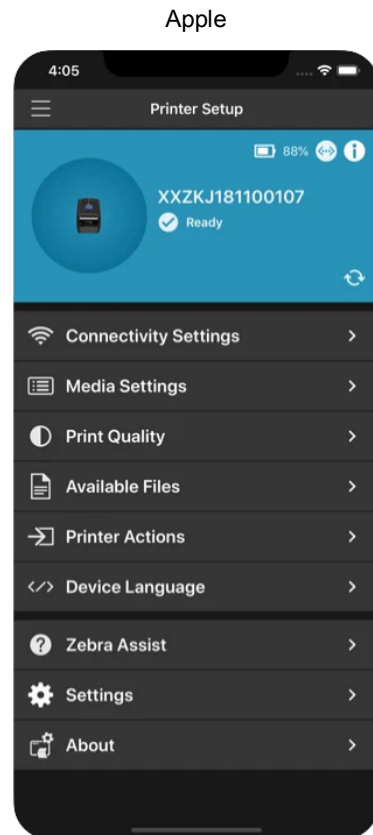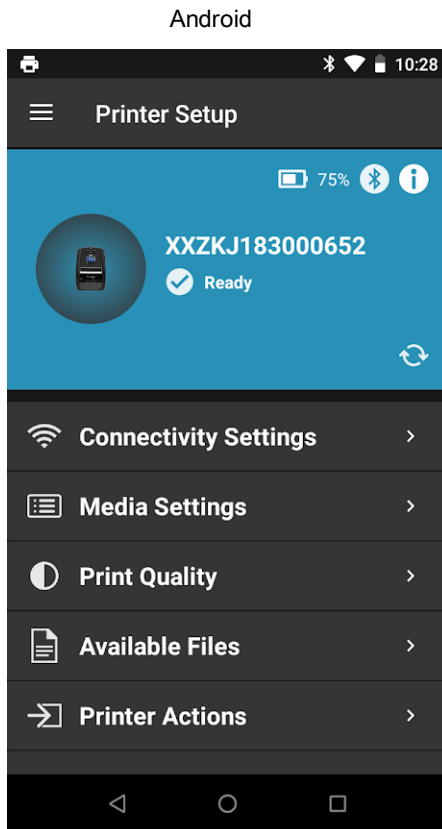
Apple

4. Perform this step if you have an Apple device:

   a. Touch the **Settings** icon.

   b. Change the setting for **Get Labels From Printer** to **ON**.

   c. Touch **Done**.

5. Touch **Available Files**.

   The 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 device prompts you for your name.

7. Enter your name at the prompt.

8. Change the quantity of labels to print, if desired.

9. Touch **Print** to print the label.

Specifications

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

General Specifications

		ZE511	ZE521
Height		300 mm (11.8 in.)	300 mm (11.8 in.)
Width		245 mm (9.6 in.)	245 mm (9.6 in.)
Depth		379 mm (14.9 in.)	438 mm (17.2 in.)
Weight		15.4 kg (34 lb)	17.3 kg (38 lb)
Temperature	Operating	Thermal Transfer: 5° to 40°C (40° to 104°F) Direct Thermal: 0° to 40°C (32° to 104°F)	
	Storage	–40° to 71°C (–40° to 160°F)	
Relative Humidity	Operating	20% to 85%, non-condensing	
	Storage	5% to 95%, non-condensing	
Memory		1 Gigabyte DRAM (32 MB user available) 2 Gigabyte Flash (512 MB user available on-board Flash)	

Power Specifications

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

|	ZE511	ZE521
Electrical	100–240 VAC, 50–60 Hz, 5A	
Power consumption	120 VAC, 60 Hz	
Inrush Current	< 35A peak 8A RMS (half cycle)	< 40A peak 8A RMS (half cycle)
Energy Star Off Power (W)	0.13	0.13
Energy Star Sleep Power (W)	3.79	3.79
Print Power* (W)	110	156
Print Power* (VA)	127	182
Power consumption	230 VAC, 50 Hz	
Inrush Current	< 80A peak 12A RMS (half cycle)	< 90A peak 15A RMS (half cycle)
Energy Star Off Power (W)	0.27	0.27
Energy Star Sleep Power (W)	4.00	4.00
Print Power* (W)	109	149
Print Power* (VA)	149	180
* Printing PAUSE self-test labels at 6 ips with 4x6-in. or 6.5x4 in. labels, darkness 10, and direct thermal media.		

Power Cord Specifications

Depending on how your print engine 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 7 for specifications.

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

Figure 7   Power Cord Specifications
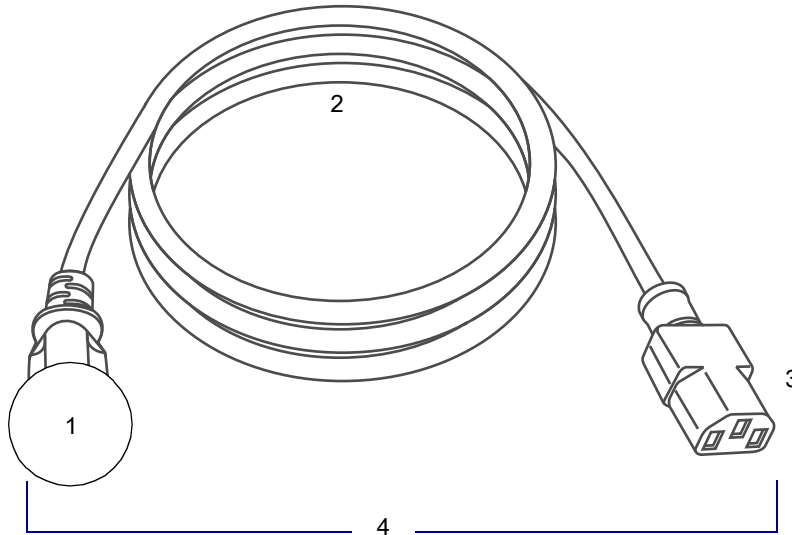
1	AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 8). The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference.
2	3-conductor HAR cable or other cable approved for your country.
3	IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 8).
4	Length ≤ 3 m (≤ 9.8 ft). Rating 10 Amp, 250 VAC.

Figure 8   International Safety Organization Certification Symbols

Communication Interface Specifications

NOTE: You must supply your own data cables. The use of the provided cable strain relief clamps is recommended.

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

To minimize electrical noise pickup in the cable:

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

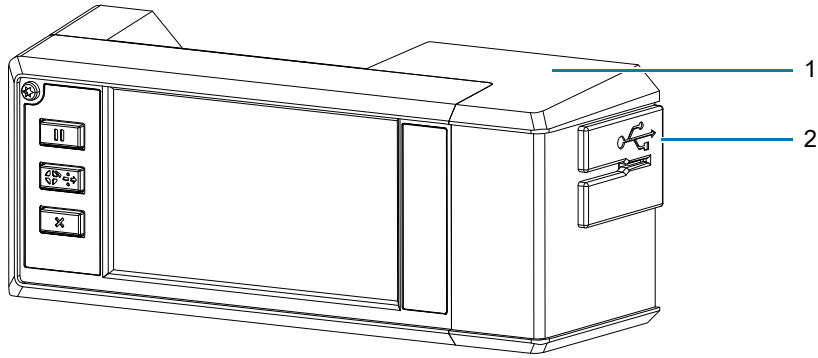## Standard Connections
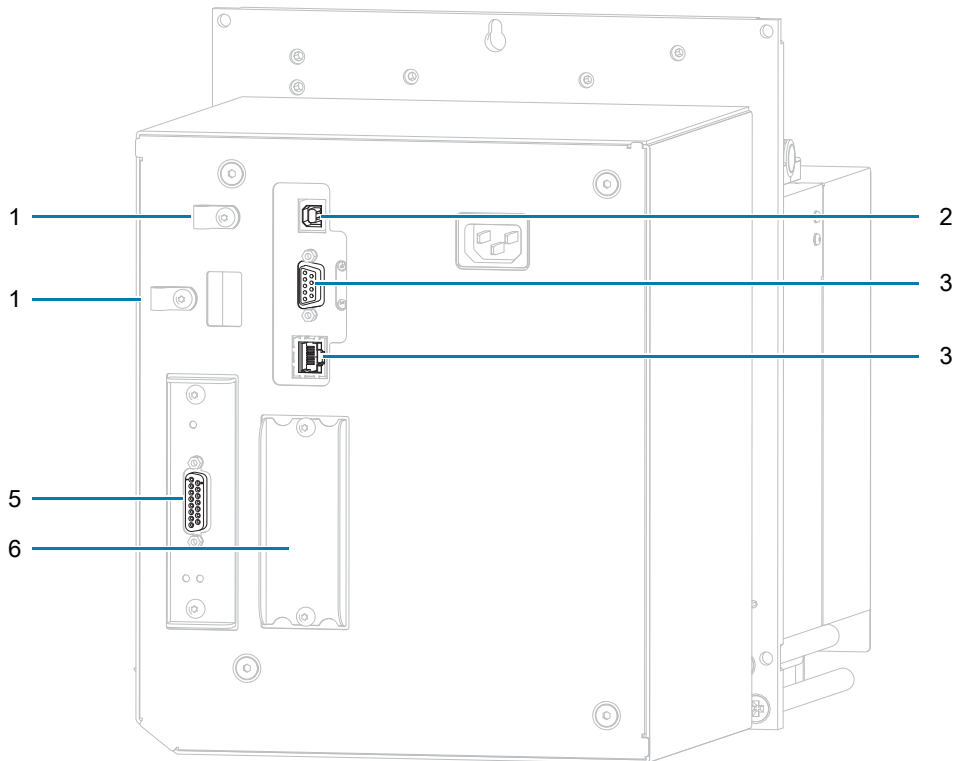
1	Cable strain relief clamps
2	**USB 2.0 data interface**
	Limitations and Requirements—Maximum cable length of 5 m (16.4 ft).
	Connections and Configuration—No additional configuration is necessary.

3	**RS-232/C serial data interface** • 2400 to 115000 baud • parity, bits/character • 7 or 8 data bit • XON-XOFF, RTS/CTS, or DTR/DSR handshake protocol required • 750mA at 5 V from pins 1 and 9
3	**RS-232/C serial data interface (continued)** Limitations and Requirements— • You must use a null-modem cable to connect to the print engine or a null-modem adapter if using a standard modem cable. • Maximum cable length of 15.24 m (50 ft). • You may need to change print engine 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.
4	**Internal 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 zebra.com/manuals.
5	**Applicator interface** with DB15F connector
6	Option slot

1	**Zebra PrintTouch/Near Field Communication (NFC)**
	Limitations and Requirements—NFC communication using Bluetooth 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.
—	**Bluetooth® Version 4.1**
	Limitations and Requirements—Many mobile devices can communicate with the printer within a 9.1-meter (30-ft) 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 zebra.com/manuals.
2	**Two USB host ports**
	Limitations and Requirements—You can only plug one device into each of the printer's two USB host ports. You cannot use a third device by plugging it into a USB port on one of the devices, nor can you use an adapter to split a USB host port on the printer to accept more than one device at a time.
	Connections and Configuration—No additional configuration is necessary.

Optional Connections

Wireless print server

See Wireless Specifications on page 126 for more details.

Limitations and Requirements

- Can print to the print engine from any computer on your Wireless Local Area Network (WLAN).

- Can communicate with the printer through the print engine's web pages.

- The print engine 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 zebra.com/manuals.

IEEE 1284 Bidirectional Parallel data interface

Limitations and Requirements

- Maximum cable length of 3 m (10 ft).

- Recommended cable length of 1.83 m (6 ft).

- No print engine parameter changes required to match the host computer.

- Can be installed in either the top or bottom option slot.

- An IEEE 1284 cable is required.

Connections and Configuration No additional configuration is necessary.

External ZebraNet 10/100 Print Server

Requires the parallel data interface option

Wireless Specifications

Antenna Information

- Type = chip antenna gain 1.69dBi

- Type = Omni directional antenna gain 3dBi @ 2.4GHz; 5dBi @ 5GHz

- Type = PCBA antenna gain = –30dBi @ 900MHz

WLAN Specifications

802.11 b

- 2.4 GHz

- DSSS (DBPSK, DQPSK, and CCK)

- RF power 17.77 dBm (EIRP)

802.11 g

- 2.4 GHz

- OFDM (16-QAM and 64-QAM with BPSK, and QPSK)

- RF power 18.61 dBm (EIRP)

802.11 n

- 2.4 GHz

- OFDM

(16-QAM and 64-QAM with BPSK, and QPSK)

- RF power 18.62 dBm (EIRP)

802.11 a/n

- 5.15–5.25 GHz, 5.25–5.35 GHz, 5.47–5.725 GHz

- OFDM (16-QAM and 64-QAM with BPSK and QPSK)

- RF power 17.89 dBm (EIRP)

802.11 ac

- 5.15–5.25 GHz, 5.25–5.35 GHz, 5.47–5.725 GHz

- OFDM (16-QAM and 64-QAM with BPSK and QPSK)

- RF power 13.39 dBm (EIRP)

Bluetooth 4.1 + Low Energy (LE)

- 2.4 GHz

- FHSS (BDR/EDR), GFSK (Bluetooth Low Energy)

- RF power 9.22 dBm (EIRP)

Bluetooth Classic + Low Energy (LE)

- 2.4 GHz

- FHSS (BDR/EDR), DSSS (Bluetooth LE)

- RF power 9.22 dBm (EIRP)

- FHSS (BDR/EDR), DSSS (Bluetooth LE)

- RF power 9.22 dBm (EIRP)

RFID M6e Radio Module

- 865–928 MHz

- FHSS

- RF power 27.893 dBm

Printing Specifications

		ZE511	ZE511
Maximum print width		104 mm (4.1 in.)	168 mm (6.6 in.)
Print resolution		203 dpi (dots per inch) (8 dots/mm)	
		300 dpi (12 dots/mm) (optional)	
		600 dpi (24 dots/mm) (optional)	N/A
Programmable constant print speeds (in 25.4 mm/1 in. increments)	203 dpi	51–457 mm/sec (2–18 ips)	51–356 mm/sec (2–14 ips)
	300 dpi	51–356 mm/sec (2–14 ips)	51–305 mm/sec (2–12 ips)
	600 dpi	51–152 mm/sec (2–6 ips)	N/A
Dot size (nominal) (width x length)	203 dpi	0.125 mm x 0.132 mm (0.0049 in. x 0.0052 in.)	
	300 dpi	0.084 mm x 0.110 mm (0.0033 in. x 0.0043 in.)	
	600 dpi	0.042 mm x 0.070 mm (0.0016 in. x 0.0027 in.)	N/A
Maximum continuous print length	203 dpi	3801 mm (150 in.)	
	300 dpi	2540 mm (100 in.)	
	600 dpi	1270 mm (50 in.)	N/A

Ribbon Specifications

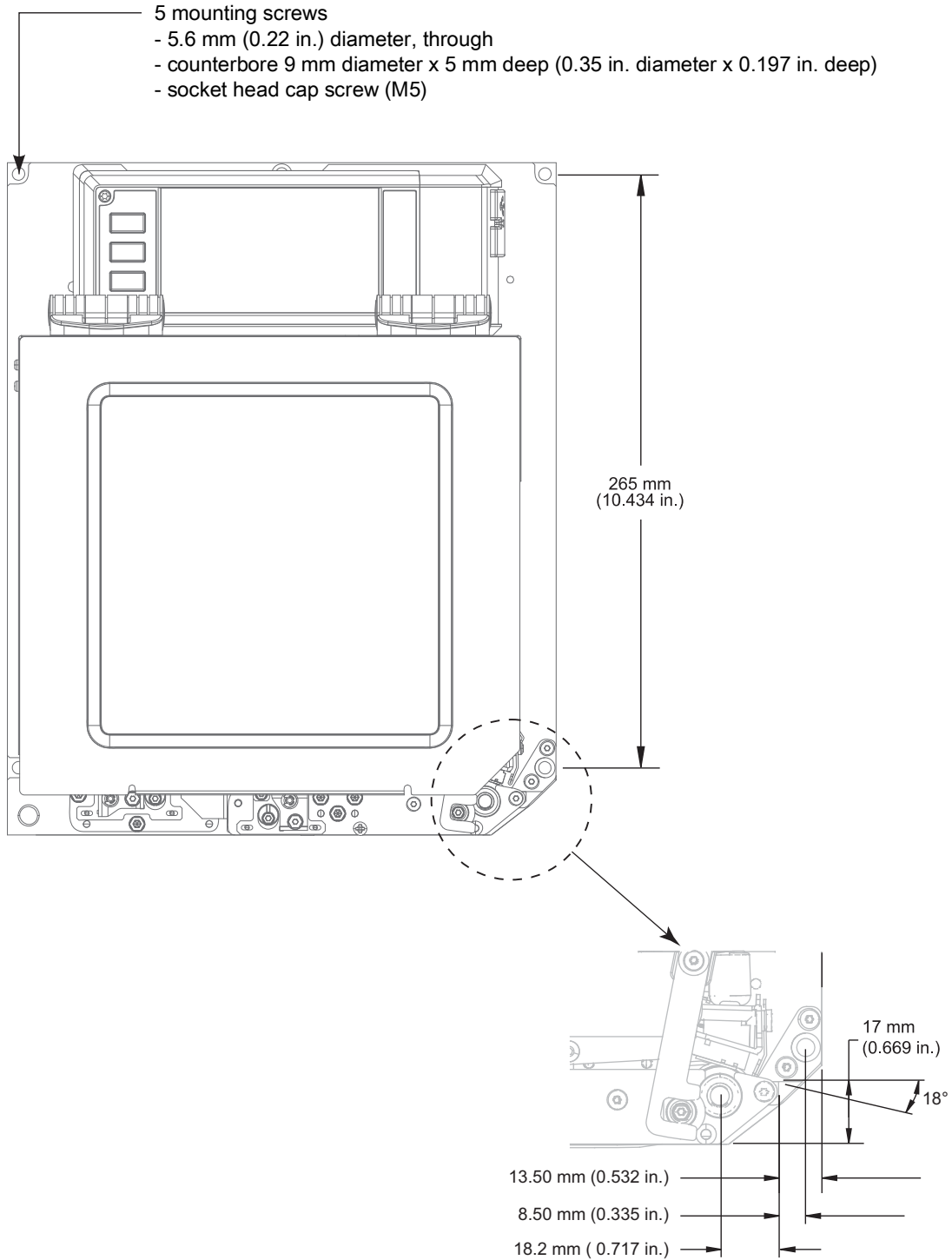|	ZE511	ZE521
Ribbon width MINIMUM*	25 mm (1 in.)	76 mm (3.0 in.)
Ribbon width MAXIMUM	107 mm (4.2 in.)	180 mm (7.1 in.)
Ribbon length MAXIUMUM	600 m (1970 ft)	
Ribbon core inside diameter	25 mm (1 in.)	
Ribbon roll outside diameter MAXIMUM	102 mm (4.0 in.)	
Ribbon wound coated side in or out		
* Zebra recommends using ribbon that is at least as wide as the media to protect the printhead from wear.		

Media Specifications

		ZE511	ZE521
Minimum label length	Applicator mode, backfeed on	12.7 mm* (0.50 in.*)	76.2 mm (3.0 in.)
	Applicator mode, backfeed off	6.4 mm* (0.25 in.*)	25.4 mm (1.0 in.)
	Stream mode	6.4 mm* (0.25 in.*)	N/A
	Rewind mode	6.4 mm* (0.25 in.*) "loose loop"	25.4 mm (1.0 in.) "loose loop"
	Tear-off mode, backfeed on	12.7 mm* (0.50 in.*)	76.2 mm (3.0 in.)
	Tear-off mode, backfeed off	6.4 mm* (0.25 in.*)	25.4 mm (1.0 in.)
	RFID mode	**	**
Media width (label and liner)	Minimum	16 mm* (0.625 in.*)	76.2 mm (3.0 in.)
	Maximum	114 mm* (4.5 in.*)	180 mm (7.1 in.)
	RFID labels	**	**
Media thickness (includes liner, if any)	Minimum	0.135 mm (0.0053 in.)	0.076 mm (0.003 in.)
	Maximum	0.254 mm (0.010 in.)	0.305 mm (0.012 in.)
Inter-label gap	Minimum	2 mm* (0.079 in.*)	2 mm (0.079 in.)
	Preferred	3 mm* (0.118 in.*)	3 mm (0.118 in.)
	Maximum	4 mm* (0.157 in.*)	4 mm (0.157 in.)
	RFID labels	**	**
Ticket/tag notch size (width x length)		6 x 3 mm (0.25 x 0.12 in.)	
Hole diameter		3 mm (0.125 in.)	
Black mark length (parallel to inside media edge)		3–11 mm (0.12–0.43 in.)	
Black mark width (perpendicular to inside media edge)		> 11 mm (> 0.43 in.)	
Black mark location		within 1 mm (0.040 in.) of inside media edge	
Density, in Optical Density Units (ODU) (black mark media)		> 1.0 ODU	
Maximum media density (black mark media)		0.5 ODU	

*Does not apply to RFID labels.
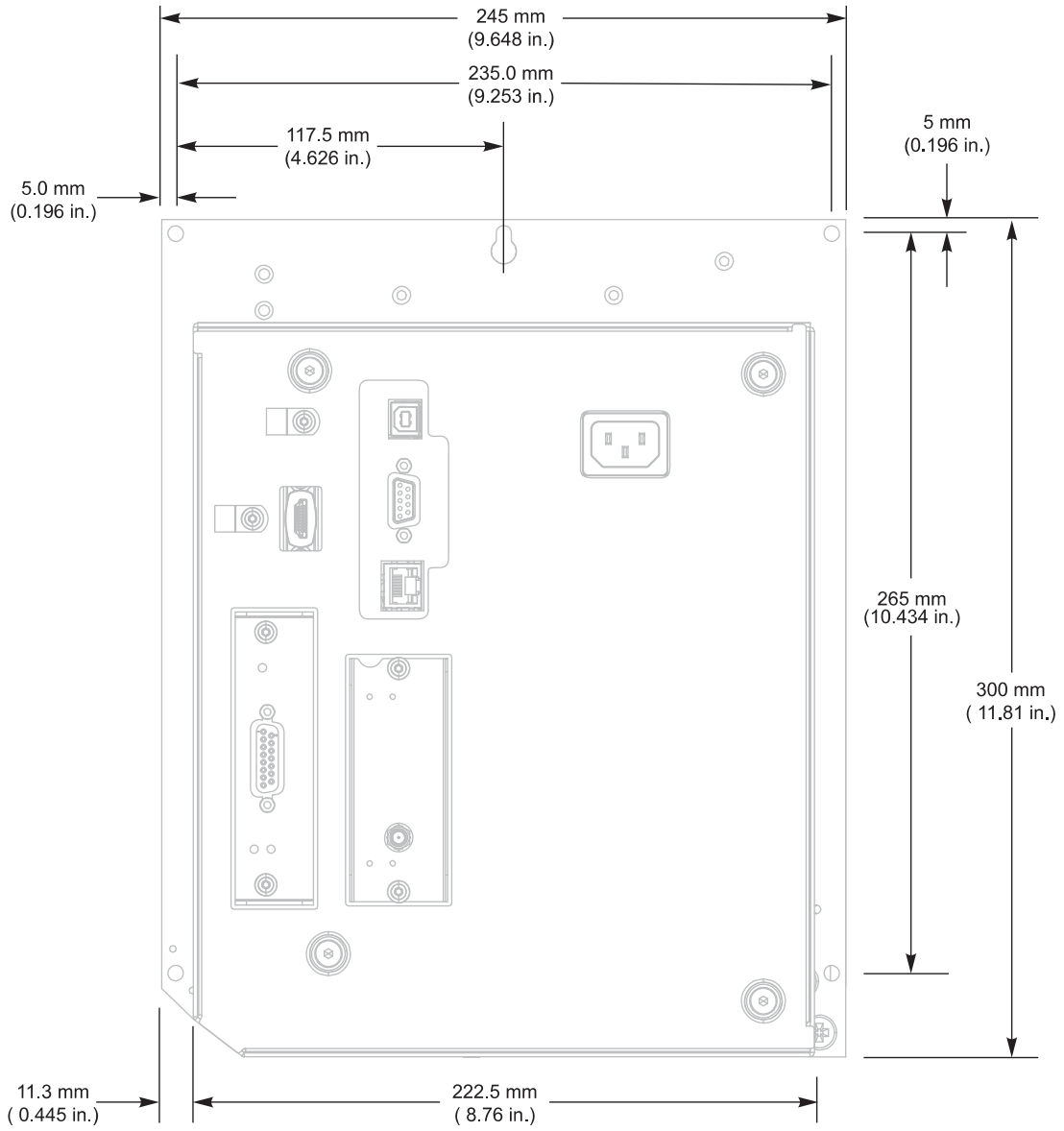**This parameter varies for each transponder type.

Dimensions and Clearance Needs

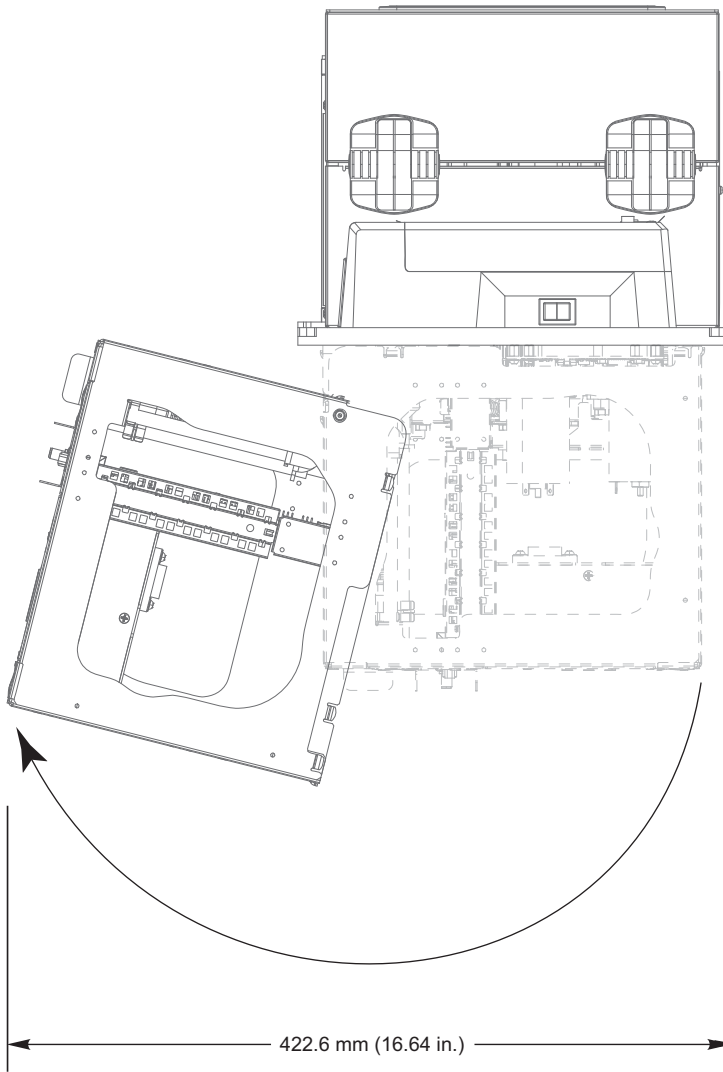This section shows measurements relevant when installing the print engine in an applicator.
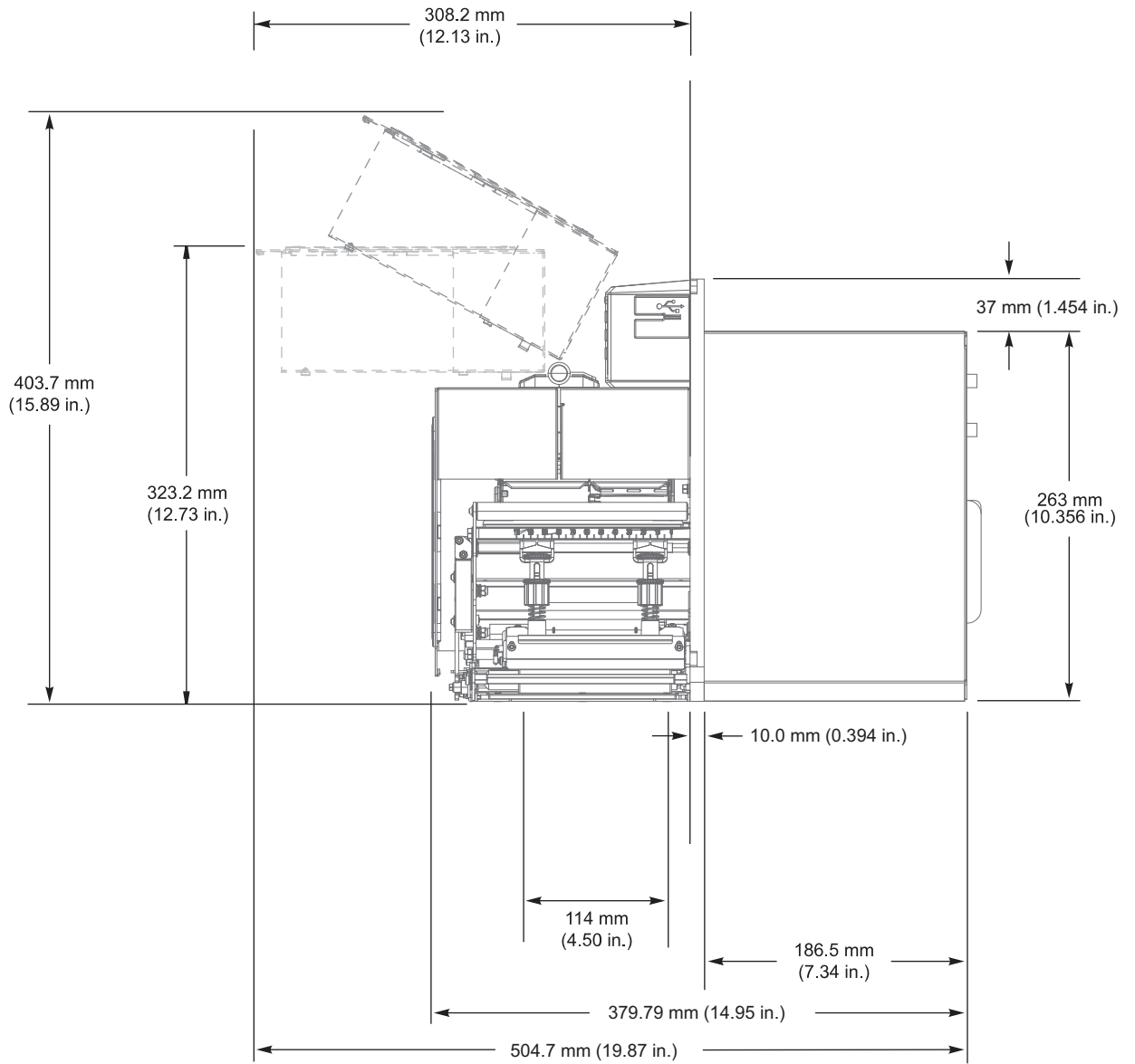
Front View (Right-Hand Print Engine Shown)

5 mounting screws
- 5.6 mm (0.22 in.) diameter, through
- counterbore 9 mm diameter x 5 mm deep (0.35 in. diameter x 0.197 in. deep)
- socket head cap screw (M5)

265 mm
(10.434 in.)

17 mm
(0.669 in.)

18°

13.50 mm (0.532 in.)

8.50 mm (0.335 in.)

18.2 mm (0.717 in.)

Rear View

245 mm
(9.648 in.)

235.0 mm
(9.253 in.)

117.5 mm
(4.626 in.)

5 mm
(0.196 in.)

5.0 mm
(0.196 in.)

265 mm
(10.434 in.)

300 mm
(11.81 in.)

11.3 mm
(0.445 in.)

222.5 mm
(8.76 in.)

Top View—Electronics Enclosure Clearance

422.6 mm (16.64 in.)

Side View—ZE511 Print Engine

308.2 mm
(12.13 in.)

403.7 mm
(15.89 in.)

323.2 mm
(12.73 in.)

37 mm (1.454 in.)

263 mm
(10.356 in.)

10.0 mm (0.394 in.)

114 mm
(4.50 in.)

186.5 mm
(7.34 in.)

379.79 mm (14.95 in.)

504.7 mm (19.87 in.)

Side View—ZE521 Print Engine

377 mm
(14.86 in.)

585.5 mm
(23.05 in.)

379 mm
(14.92 in.)

37 mm (1.454 in.)

263 mm
(10.356 in.)

10.0 mm (0.394 in.)

180 mm
(7.1 in.)

186.5 mm
(7.34 in.)

437.8 mm (17.23 in.)

573.2 mm (24.066 in.)
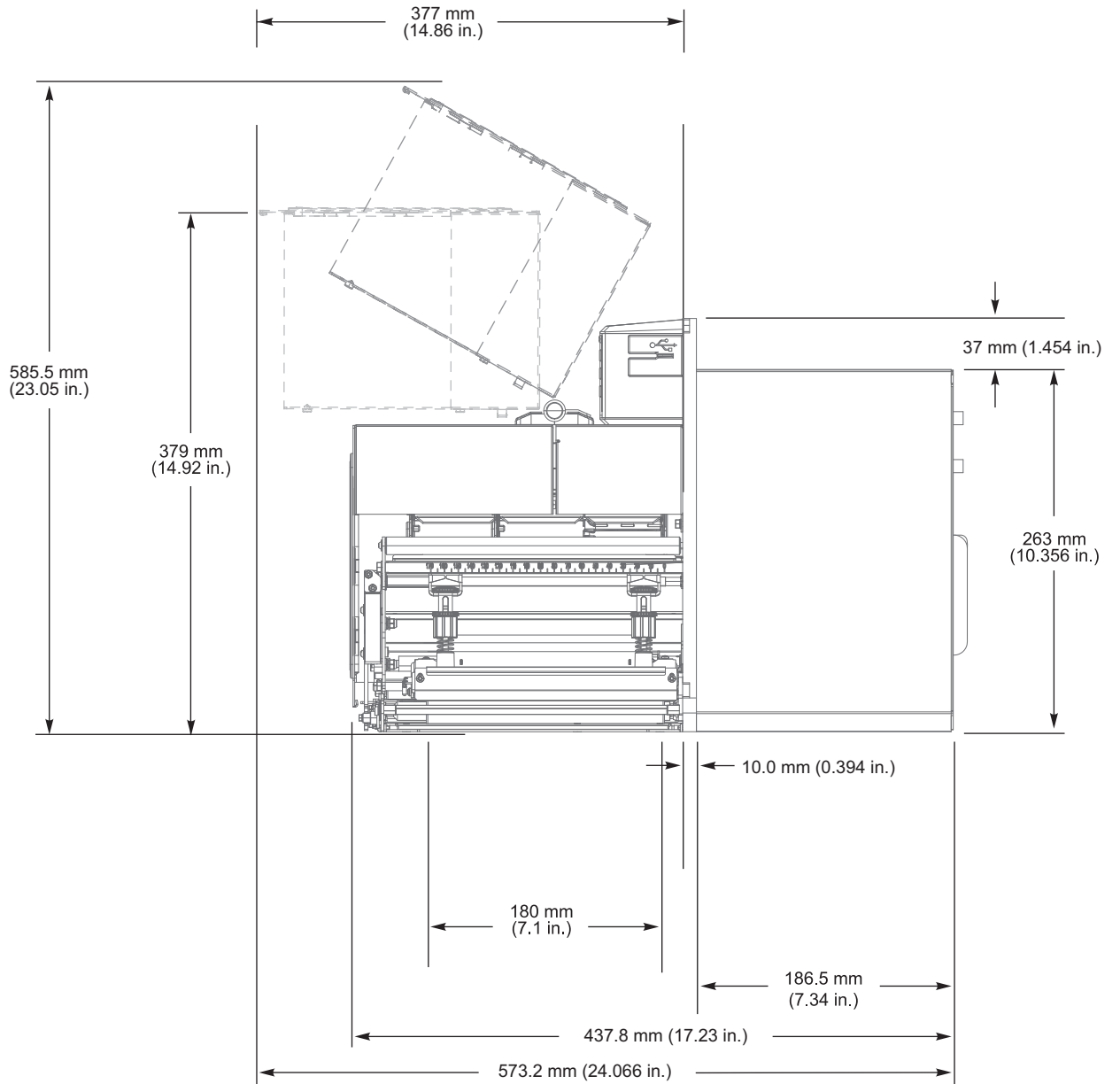
Print Engine Installation

This section provides basic information for mounting the print engine into an applicator.

Requirements

Stability When the print engine is mounted, the complete assembly must be physically stable. When the print engine is loaded with ribbon and media, the equipment must not become physically unstable.

Ventilation and Temperature Provide ventilation for the print engine mounting enclosure to remove heat and ensure uninterrupted, trouble-free operation of the print engine. Ambient air temperature surrounding the print engine must not exceed the following:

*   Temperature: 0° to 41°C (32° to 105°F)

*   Relative humidity: 20% to 95% non-condensing

Power Requirements Consider the current rating of the print engine during installation. When power is applied to the print engine and the enclosing equipment, an overload condition must not be created.

Grounding Requirements Maintain reliable grounding of the print engine. Pay particular attention to the AC power supply connections so that earth ground is maintained through the AC power input connector.

Clearance for Cables and Connectors Allow ample space at the rear of the print engine for electronic connectors and dressing of the following cables: power cord, serial and/or parallel host communication cable, host communication cable (Ethernet), and the discrete signal (applicator) interface cable. The use of cable strain relief clamps is recommended.

Power Cord Requirements The IEC power cord does not have a strain relief on the print engine. If the operating characteristics of the applicator include vibration or strain on the power cord, provide an appropriate clamping mechanism to avoid unintentional disconnection of the power cord from the print engine.

Inspect the Contents of the Box

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

When you receive the print engine, do the following:

1. Immediately unpack the print engine and inspect for shipping damage.

    • Save all packing materials.

    • Check all exterior surfaces for damage.

    • Raise the media cover, and inspect the media compartment for damage to components.

2. 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

3. The print engine shipped with several protective items for shipping, including a film of plastic over the transparent window on the media cover. Before operating the print engine, remove these protective items.

Install the Print Engine in an Applicator

This section provides the basic instructions for installing the print engine into an applicator.

⊘ **IMPORTANT:** A qualified service technician must perform this installation. If the print engine is installed improperly, it could fall out of the applicator and cause injury. The keyhole and the center mounting bolt are designed to support the print engine and assist in installing and removing the four mounting screws.

1. To install the print engine in an applicator:

   a. Install the center mounting bolt (1) into the center hole on the applicator.

   b. Carefully place the keyhole (2) on the center mounting bolt.

   c. Install the four corner mounting screws (4) to secure the print engine to the applicator.
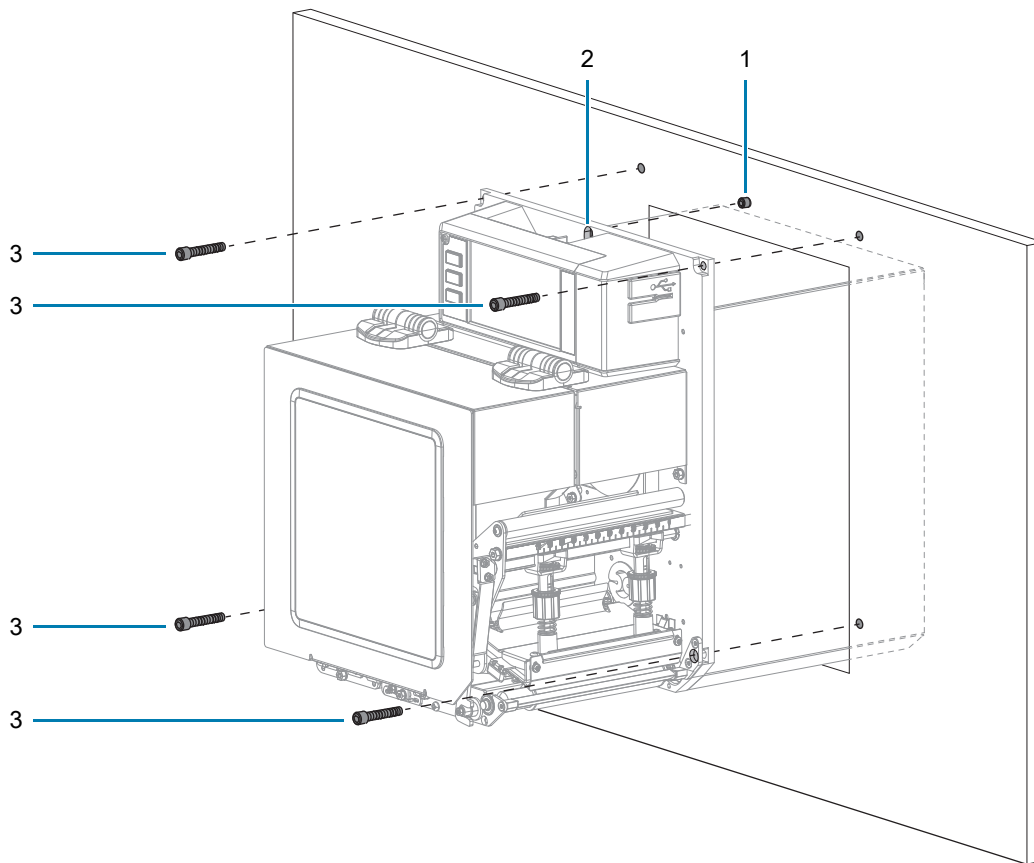
1	Center mounting bolt (shown inside hole on applicator)
2	Keyhole
3	Mounting screws (4)

2. If necessary, configure the applicator board. See for more information.

Applicator Interface Board Overview

The applicator interface board provides a robust electrical signal interface between the printer and the outside world via a standard DB15 connector. The applicator **input** signals allow an external device to control when the printer prints. The applicator **output** signals provide handshaking and status information to the external host.

The applicator output voltage can be set to three levels (0V, 5V, 24V) through the Set-Get-Do (SGD) command shown in Table 3. The applicator provides 5V or 24V power to run the I/O interface and to power small external loads. All output signals are open collector with a light pull-up resistor built in. All signals and power are galvanically isolated from the host printer. The applicator provides a jumper to connect printer and applicator grounds, if required, but the default setting is isolation (see Change the Applicator Interface Board Jumper Configuration on page 139).

IMPORTANT:

- The 0V setting must be used when an external voltage is provided.

- The applicator output power supply can sustain momentary short circuits but may be damaged with long-term shorts. There are no user-replaceable fuses on the applicator interface board.

Table 3 Applicator Interface Board Specifications

Output voltage selections	- 0V (required setting when voltage is supplied externally) - 5VDC (+/- 10%) <= 1.0 A - 24VDC (+/- 10%) <= 0.5 A Set by the following SGD command: `! U1 setvar "device.applicator.voltage" "X"` where X is 0, 5, or 24 to indicate the desired voltage. The printer must be power cycled before the setting takes effect. NOTE: A high-voltage lockout jumper installed on the applicator interface PCBA prevents the output from going above 5V, even if the SGD is sent for 24V output. This precaution prevents accidental damage to external equipment. The jumper must be repositioned to allow for 24V operation. The default setting is for 5V operation.
Pull-up resistor on output	10K +/- 5%
Pull-up resistor on input	4.7K +/- 5%
Output signal current sink	<= 7 mA
User-supplied voltage range when output voltage set to 0V	0–24 Volts

Energy Star Effect on the Applicator Interface Board

If the Energy Star feature is enabled and the printer goes to sleep, the applicator interface board shuts down. If the applicator interface board needs to remain on at all times, disable the Energy Star feature in one of the following ways:

- Set the Energy Star user menu item to OFF (on the Home screen, touch **Menu > System > Energy Saving > Energy Star**):
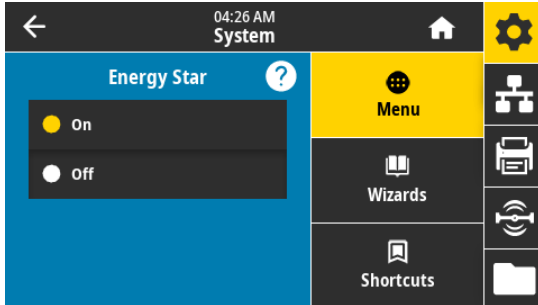
- Send the SGD command for disabling Energy Star:

```
! U1 setvar "power.energy_star.enable" "off"
```

To reenable Energy Star, send the SGD command with the value "on".

Change the Applicator Interface Board Jumper Configuration

The applicator provides a jumper to connect printer and applicator grounds, if required, but the default setting is isolation. Follow the instructions in this section if you need to change the default settings.

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

⚠️ **CAUTION—ESD:** Observe proper electrostatic safety precautions when handling static-sensitive components such as circuit boards and printheads.

🛈 **IMPORTANT:** A qualified service technician must perform this installation. If the print engine is installed improperly, it could fall out of the applicator and cause injury. The keyhole and the center mounting bolt are designed to support the print engine and assist in installing and removing the four mounting screws.

1. To access the applicator interface board:

   a. Remove the two mounting screws securing the applicator interface board.

   b. Slide out the applicator interface board.

   c. Disconnect the applicator cable from the applicator interface board, making sure to keep the end of the cable from falling inside the printer.
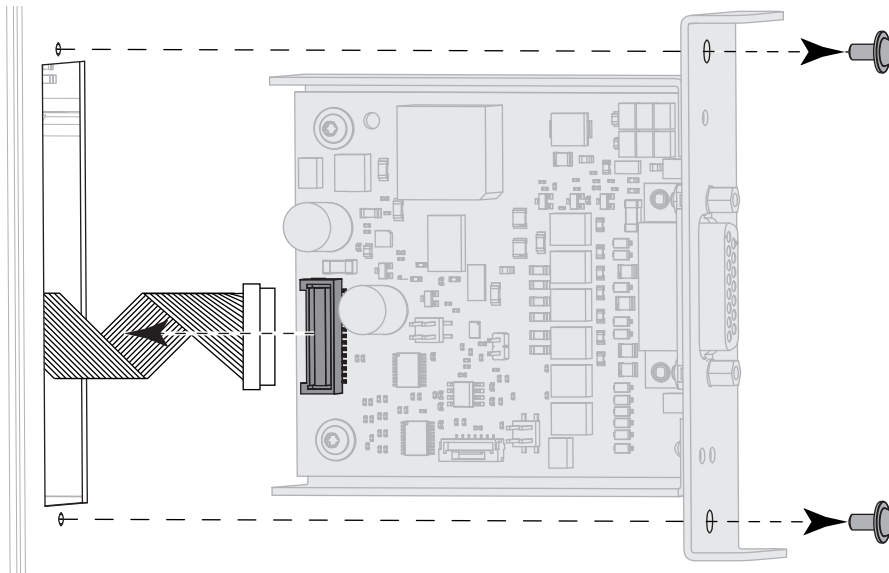
2. Configure the jumpers on the applicator board, as appropriate for your system.
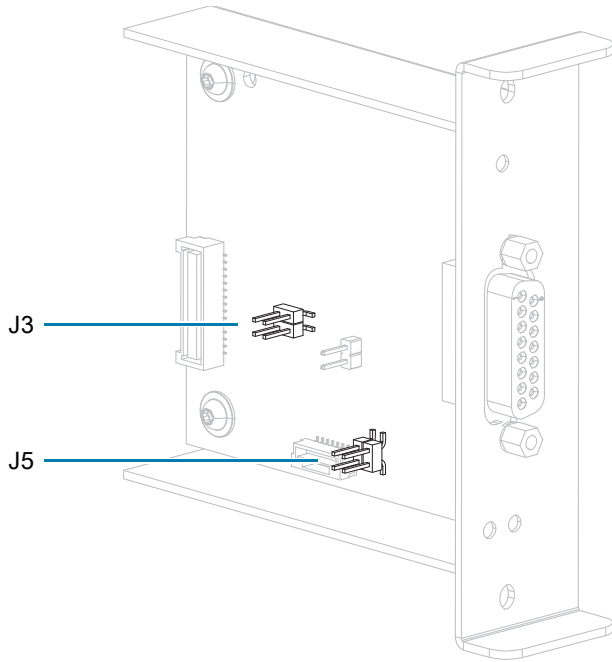
Jumper J3 — High-Voltage Lockout		Jumper J5 — Ground Isolation Jumper	
	J3 Pins 1 and 2 connected V out = 5V max (default)		**J5 Pins 1 and 2 connected** isolated (default)
	J3 Pins 3 and 4 connected V out = 0V, 5V, 24V		**J5 Pins 3 and 4 connected** not isolated

3. To reinstall the applicator interface board:

    a. Connect the applicator cable to the new applicator interface board.

    b. Insert the new applicator interface board, and secure it using the two new screws.
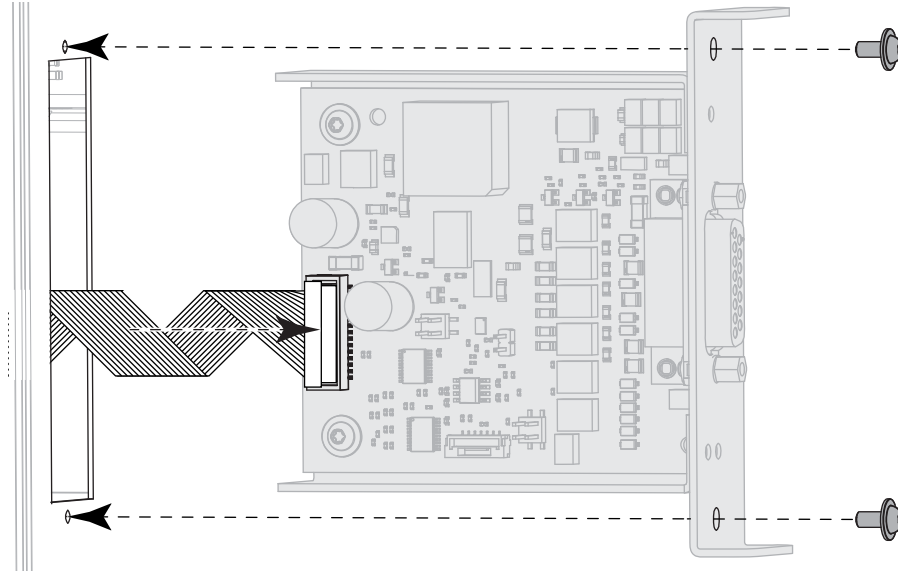
4. Reconnect the AC power cord and interface cables, and then turn on the printer power.

5. If necessary, change your Energy Star setting (see Energy Star Effect on the Applicator Interface Board on page 138).

6. If necessary, change the voltage using the `device.applicator.voltage` SGD command (see Table 3 on page 137). Then power cycle the printer.

Applicator Interface Pin Configuration

Figure 9   DB15 Connector
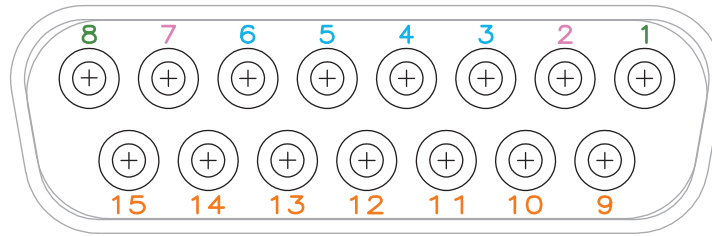
Figure 10   External Pinouts
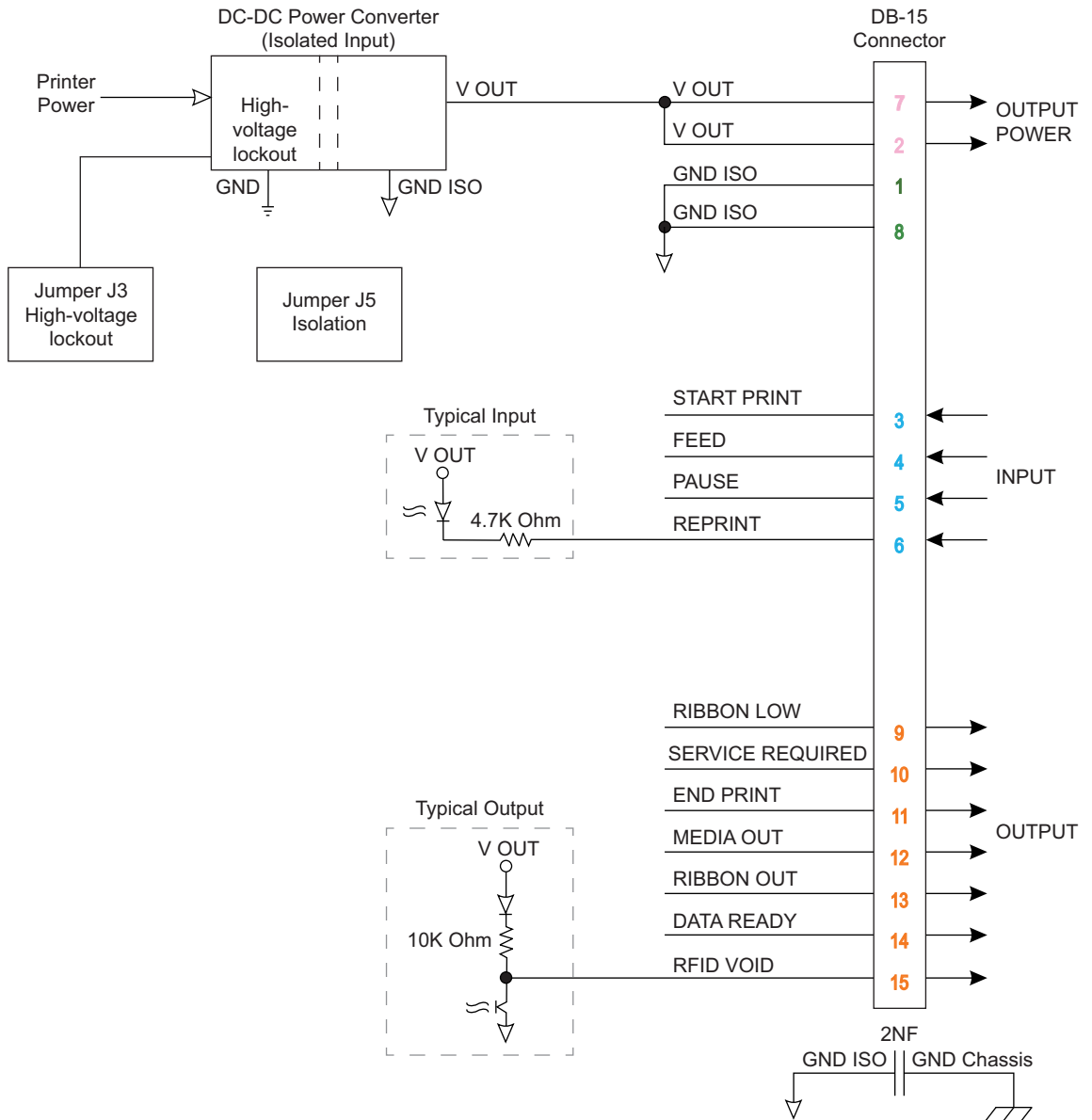
Table 4   Applicator Interface Connector Pin Configuration

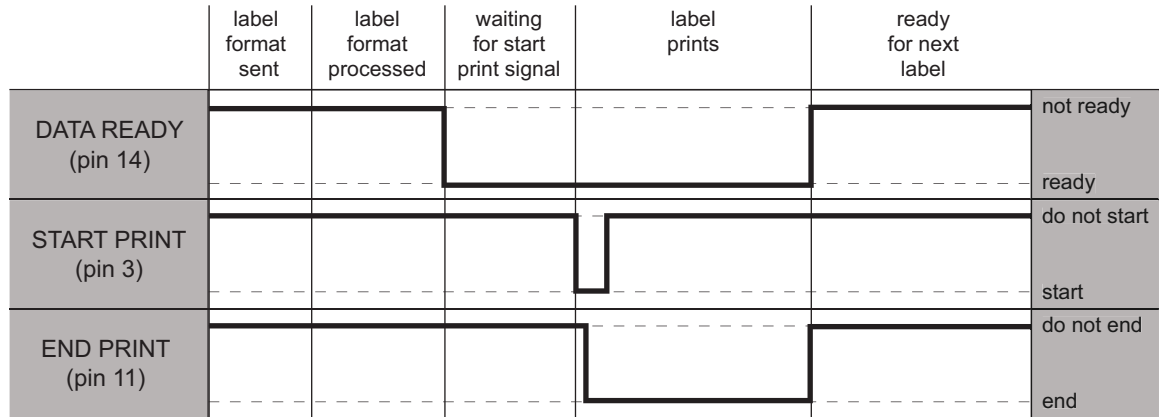| Pin No.	Signal Name	Signal Type	Description
1	GROUND ISOLATED	Ground	Using jumper J5, this pin can be configured as isolated or non-isolated from the printer circuit ground (see Change the Applicator Interface Board Jumper Configuration on page 139). Default position is set to isolation.
2	VOUT	Power	Programmable output voltage of 0V, 5VDC, 24VDC. Voltage selection done by SGD command. Depending on configuration, jumper J3 will lock out 24V operation (see Change the Applicator Interface Board Jumper Configuration on page 139). If set in 5V position, only 0V and 5V will be available. If set to 24V position, 0V, 5V and 24V will be available, depending on the SGD command. Default is 5V configuration.
3	START PRINT	Input	See Applicator Signals on page 145 for more information about the start and end print signals. • **Pulse Mode**—The label printing process begins on the HIGH to LOW transition of this signal if a format is ready. Deassert this signal HIGH to inhibit printing of a new label. • **Level Mode**—Assert LOW to enable the print engine to print if a label format is ready. When deasserted HIGH, the print engine completes the label that is printing then stops and waits for this input to be reasserted LOW.
4	FEED	Input	When the print engine is idle or has been paused, assert this input LOW to trigger repeated feeding of blank labels. Deassert HIGH to stop feeding blank labels and register to the top of the next label.
5	PAUSE	Input	To toggle the current Pause state, this input must be asserted LOW for 200 milliseconds, or until the SERVICE REQUIRED output (pin 10) changes state.
6	REPRINT	Input	• If the Reprint feature is enabled, this input must be asserted LOW to cause the print engine to reprint the last label. • If the Reprint feature is disabled, this input is ignored.
7	VOUT	Power	Programmable output voltage of 0V, 5VDC, 24VDC. Voltage selection done by SGD command. Depending on configuration, jumper J3 will lock out 24V operation (see Change the Applicator Interface Board Jumper Configuration on page 139). If set in 5V position, only 0V and 5V will be available. If set to 24V position, 0V, 5V and 24V will be available, depending on the SGD command. Default is 5V configuration.
8	GROUND ISOLATED	Ground	Using jumper J5, this pin can be configured as isolated or non-isolated from the printer circuit ground (see Change the Applicator Interface Board Jumper Configuration on page 139). Default position is set to isolation.
9	RIBBON LOW	Output	Asserted LOW if the Supplies Warning feature is enabled and the amount of ribbon remaining on the supply spindle is below the threshold level.

Table 4   Applicator Interface Connector Pin Configuration (Continued)

Pin No.	Signal Name	Signal Type	Description
10	SERVICE REQUIRED	Output	Asserted LOW in the following circumstances: • the printhead is open • the ribbon or media is out • the print engine is paused • an operational fault occurs • a Resynch error occurs while the applicator Resynch mode is set to Error mode
11	END PRINT	Output	See Applicator Signals on page 145 for more information about the start and end print signals. **NOTE:** A format (**^XA** ... **^XZ**) that does not print will signal that it is being processed. However, it will not trigger an End Print signal because no motion/printing is required. • **MODE 0**—The applicator port is OFF. • **MODE 1**—Asserted LOW only while the print engine is moving the label forward; otherwise deasserted HIGH. • **MODE 2**—Asserted HIGH only while the print engine is moving the label forward; otherwise deasserted LOW. • **MODE 3**—(Default) Asserted LOW for 20 milliseconds when a label is completed and positioned. Not asserted during continuous printing. • **MODE 4**—Asserted HIGH for 20 milliseconds when a label is completed and positioned. Not asserted during continuous printing.
12	MEDIA OUT	Output	Asserted LOW when there is no media in the print engine.
13	RIBBON OUT	Output	Asserted LOW when there is no ribbon in the print engine.
14	DATA READY	Output	See Applicator Signals on page 145 for more information about this signal. • Asserted LOW when sufficient data has been received to begin processing the next label format. • Deasserted HIGH when printing/processing stops after the current label format, either due to a pause condition or the absence of a label format.
15	RFID VOID	Output	• Asserted LOW when the RFID transponder over the antenna is "voided." • Deasserted HIGH when the end print signal is asserted.

Applicator Signals

The following timing diagrams show how applicator signals function in each applicator mode during the stages of printing a non-RFID label. For more information about applicator signals during RFID operation, see the RFID Programming Guide 3.

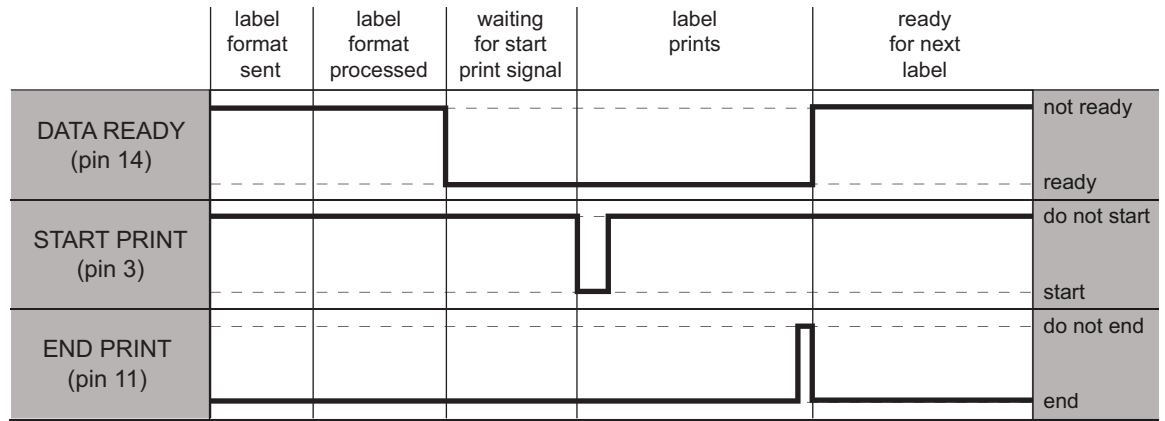**Figure 11**   Applicator Signals (Mode 1)

	label format sent	label format processed	waiting for start print signal	label prints	ready for next label	
DATA READY (pin 14)						not ready / ready
START PRINT (pin 3)						do not start / start
END PRINT (pin 11)						do not end / end

Figure 12   Applicator Signals (Mode 2)

	label format sent	label format processed	waiting for start print signal	label prints	ready for next label	
DATA READY (pin 14)						not ready / ready
START PRINT (pin 3)						do not start / start
END PRINT (pin 11)						do not end / end
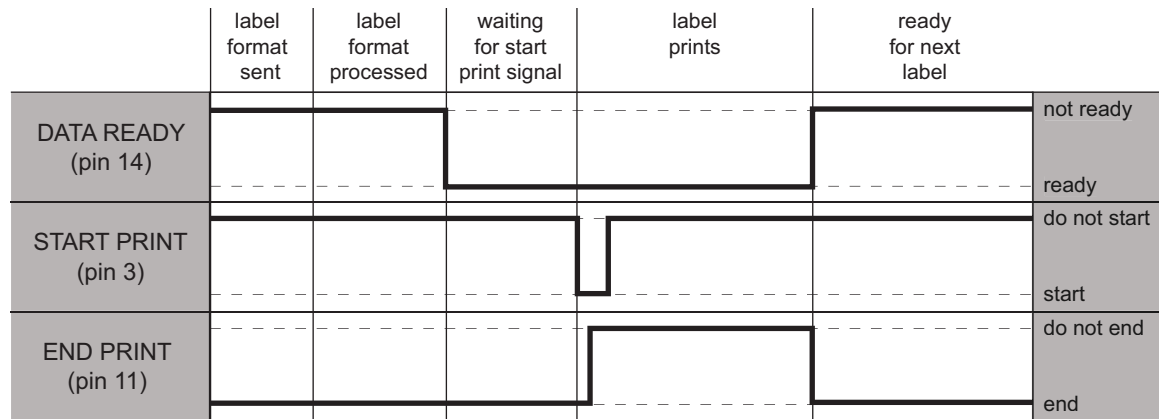
Figure 13   Applicator Signals (Mode 3)

	label format sent	label format processed	waiting for start print signal	label prints	ready for next label	
DATA READY (pin 14)						not ready / ready
START PRINT (pin 3)						do not start / start
END PRINT (pin 11)						do not end / end

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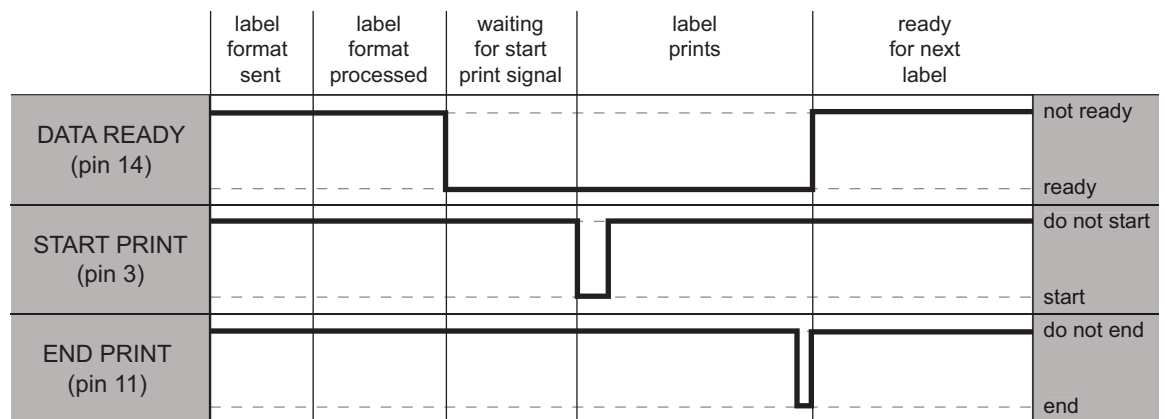
Figure 14 Applicator Signals (Mode 4)

	label format sent	label format processed	waiting for start print signal	label prints	ready for next label	
DATA READY (pin 14)						not ready / ready
START PRINT (pin 3)						do not start / start
END PRINT (pin 11)						do not end / end

Connecting the Printer to a Device

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

Connecting to a Phone or Tablet

Download the free Zebra Printer Setup Utility app for your device.

- Android devices: play.google.com/store/apps/details?id=com.zebra.printersetup
- Apple devices: apps.apple.com/us/app/zebra-printer-setup-utility/id1454308745

For the User Guides for these printer setup utilities, go to zebra.com/setup.

Connecting to a Windows-Based Computer

> **IMPORTANT:** You may connect your printer to your computer using any of the connections that you have available. However, do not connect any cables from your computer to the printer until you are instructed to do so. If you connect them at the wrong time, your printer will not install the correct printer drivers.

Run the Zebra Setup Utilities program. This utility will walk you through the process for connecting your printer to your computer.

Installing and Running Zebra Setup Utilities

Follow the directions in this section if you do not have Zebra Setup Utilities installed on your Microsoft Windows computer or if you want to update an existing version of the program.

1. Download the Zebra Setup Utilities installer from zebra.com/setup.

2. Run the Zebra Setup Utilities installer.

   a. Save the program to your computer. (Optional if your browser gave you the option to run the program without saving it.)

   b. 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 installation wizard displays next depends on whether Zebra Setup Utilities was already installed.

3. Follow the instructions based on what the installation wizard prompts you to do.

4. When you reach the installation wizard final screen, check the box that says "Run Zebra Setup Utilities now."
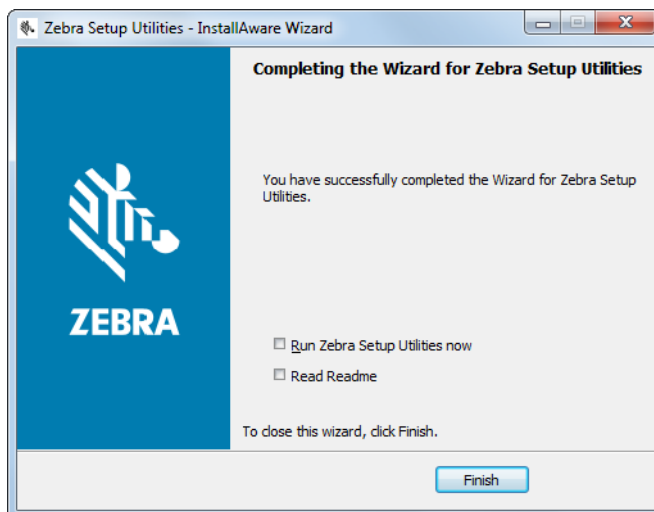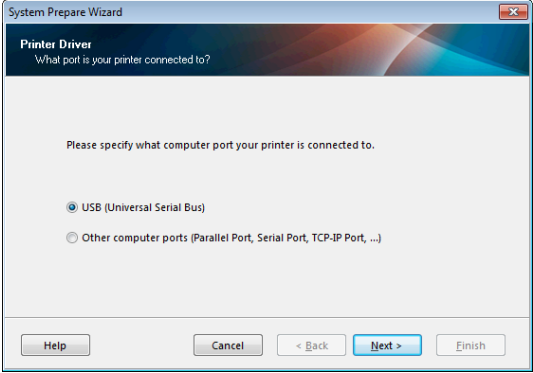
5. Click Finish.

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

If your computer...	Then...	
Did not previously have any Zebra printer drivers installed	The System Prepare Wizard displays.	
	To connect by...	**Then...**
	USB port	Continue with Connecting a Computer to the Printer's USB Port on page 150.
	Serial or optional parallel port	Continue with Connecting a Computer to the Printer's Serial or Parallel Port on page 153.
Did previously have any Zebra printer drivers installed	The Zebra Setup Utilities screen displays.	
	To connect by the...	**Then...**
	USB port	Continue with Connecting the printer to the USB port on your computer on page 151.
	Serial or optional parallel port	Continue with Adding a Printer from the Zebra Setup Utilities Screen on page 155.

Connecting 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 Installing and Running Zebra Setup Utilities on page 148 before continuing.

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

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

Running the System Prepare Wizard

If you are at the Zebra Setup Utilities screen, you do not need to complete this section. Continue with .

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

Figure 15   System Prepare Wizard
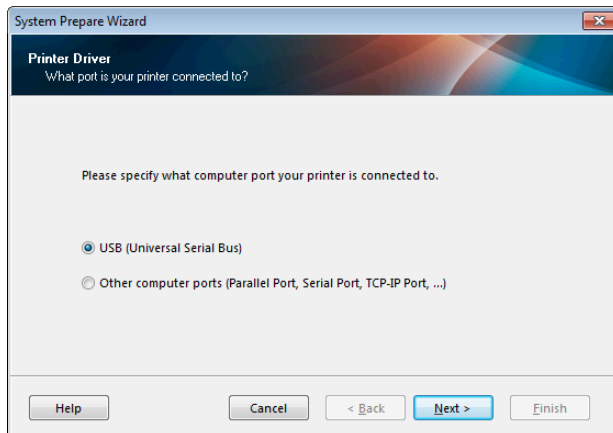
1. Click Next.

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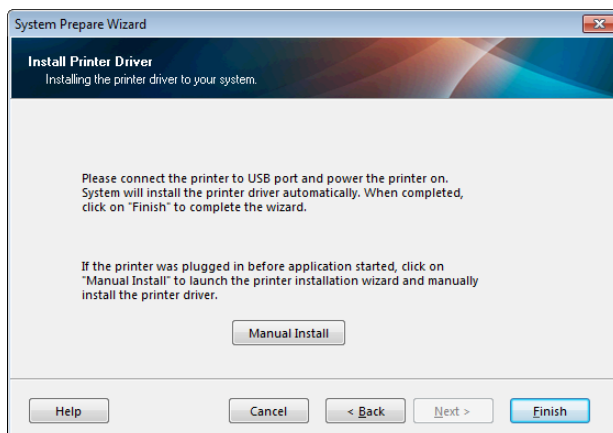
2. Click Finish.

   The Zebra Setup Utilities screen displays.

Connecting the printer to the 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 Installing and Running Zebra Setup Utilities on page 148 before continuing.

Figure 16   Zebra Setup Utilities Screen
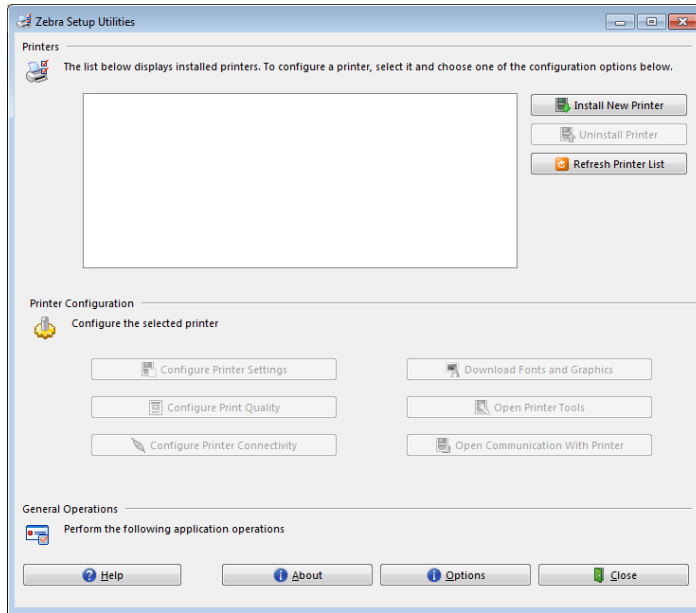
3. Connect one end of the USB cord to the USB port on your printer and the other end to your computer.
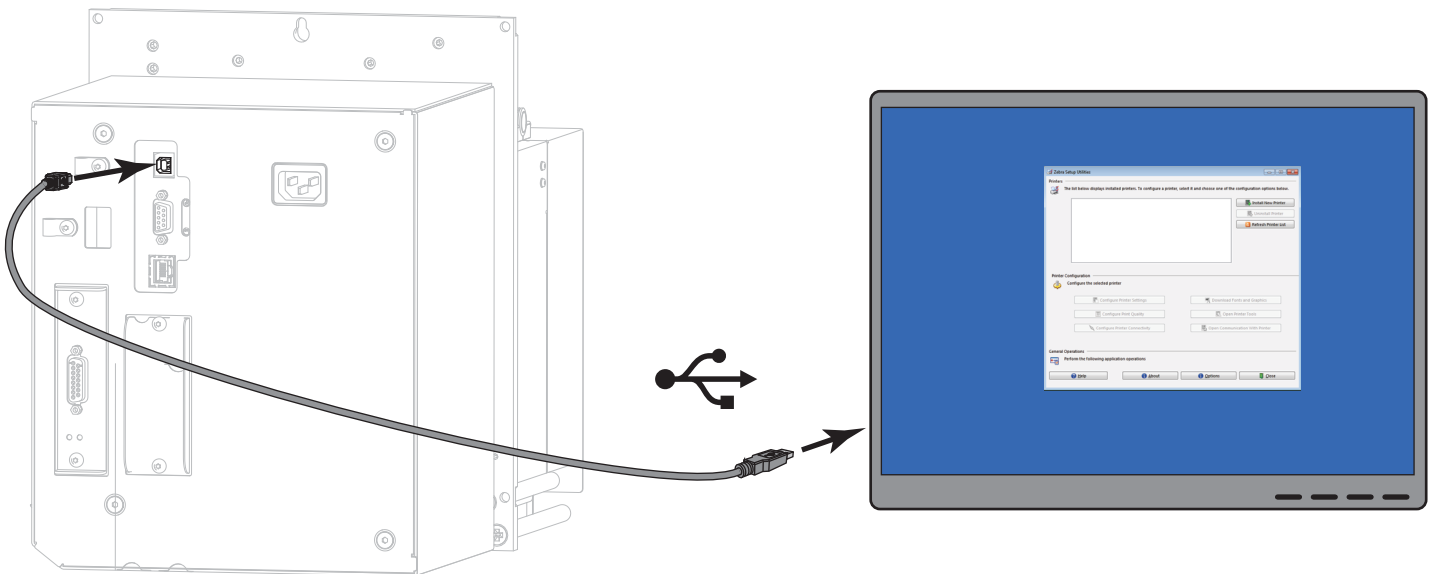
4. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.

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

100 − 240 VAC
50 − 60 Hz
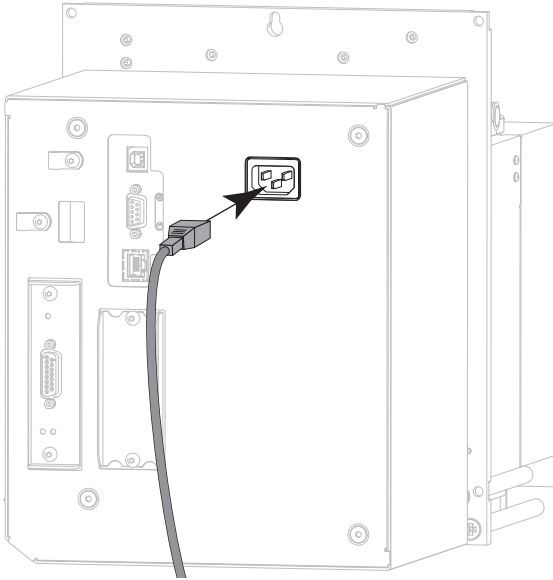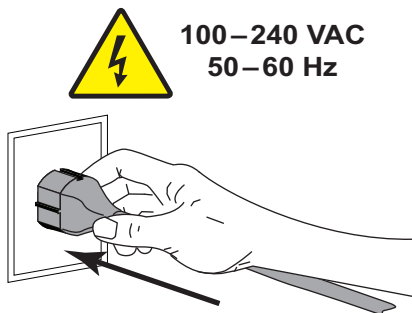
6. Turn on (**I**) the printer.
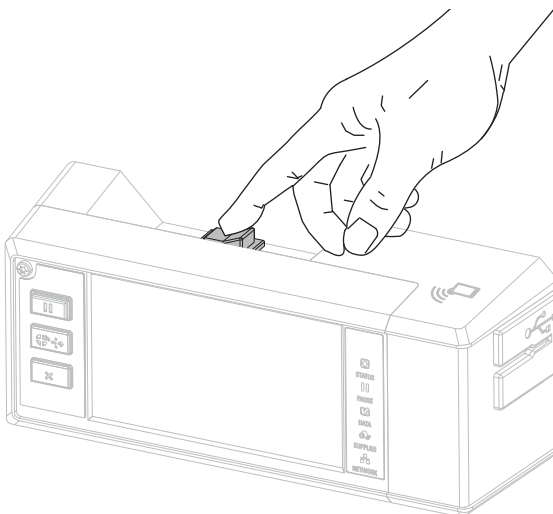
As the printer boots up, your computer completes the driver installation and recognizes your printer.

The installation for the USB connection is complete.

Connecting 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 Installing and Running Zebra Setup Utilities on page 148 before continuing.

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

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

Running the System Prepare Wizard

If you are at the Zebra Setup Utilities screen, continue with Adding a Printer from the Zebra Setup Utilities Screen on page 155.

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

Figure 17   System Prepare Wizard
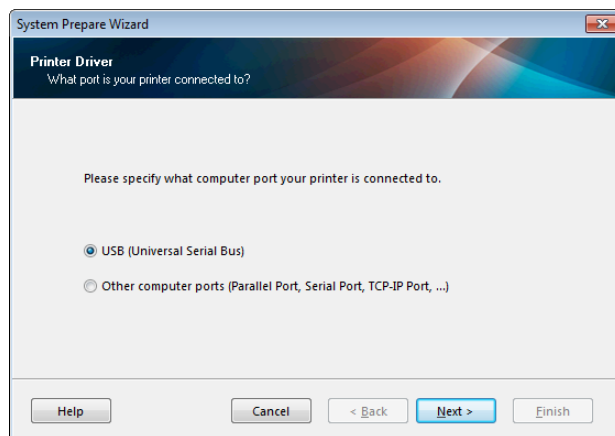
1. Select "Other computer ports (Parallel Port, Serial Port, TCP-IP Port, ...), and then click Next.

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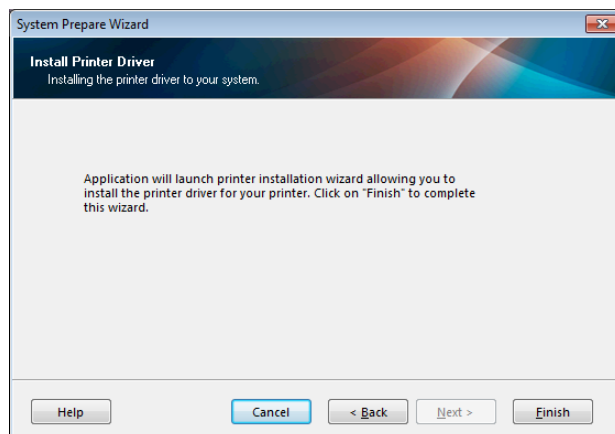
2. Click Finish.

The printer driver wizard displays.
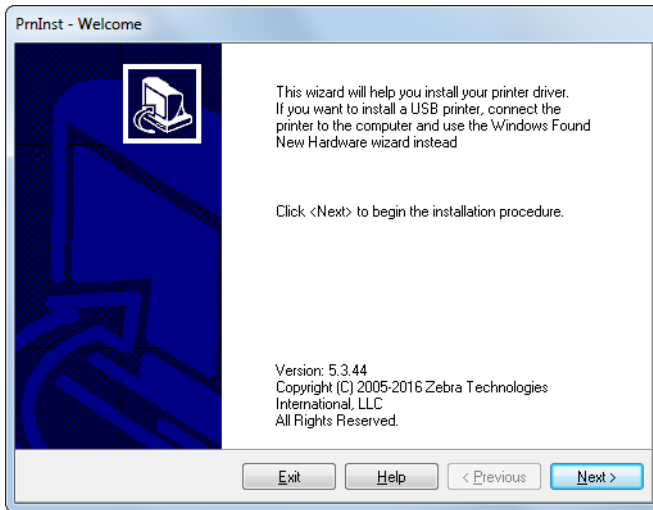
3. Click Next.

The Installation Options screen displays.
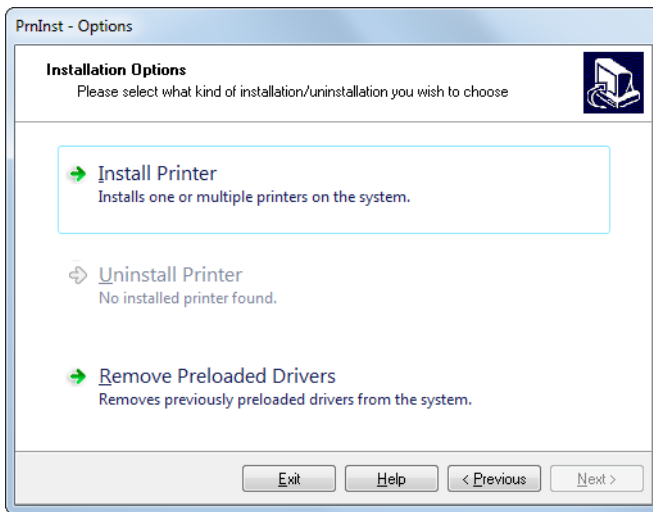
4. Continue with .

Adding a Printer from the Zebra Setup Utilities Screen

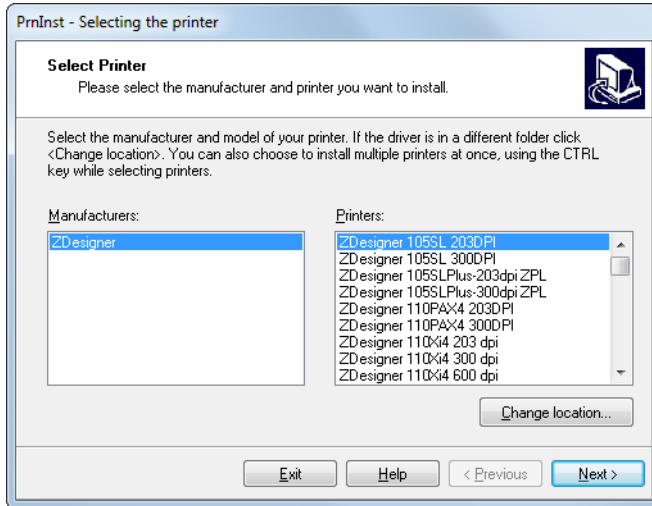**Figure 18**   Zebra Setup Utilities Screen
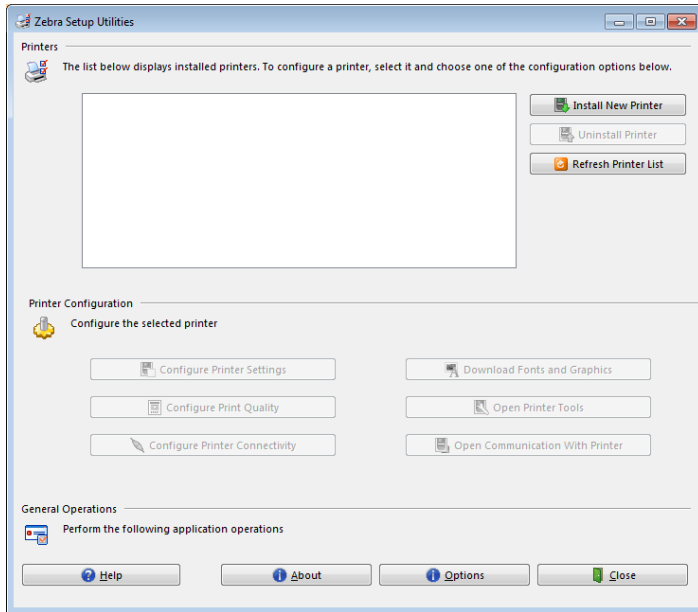
5. On the Zebra Setup Utilities screen, click Install New Printer.

The Installation Options screen displays.

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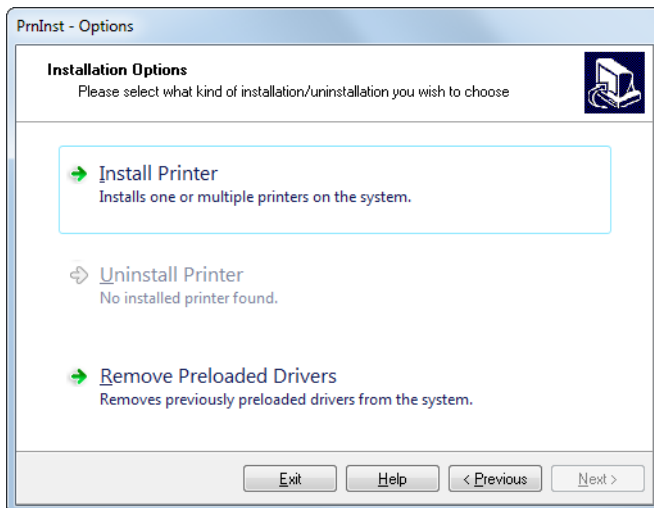
6. Click Install Printer.

The Select Printer screen displays.

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 spindle. The information will be in the following format:

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

where

XXXXX = the printer model

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

For example, in the part number **ZE511**x**3** – xxxxxxxx

ZE511 indicates that the printer is a ZE511 model

3 indicates that the printhead resolution is 300 dpi

8. Click Next.

The Printer Options screen displays.
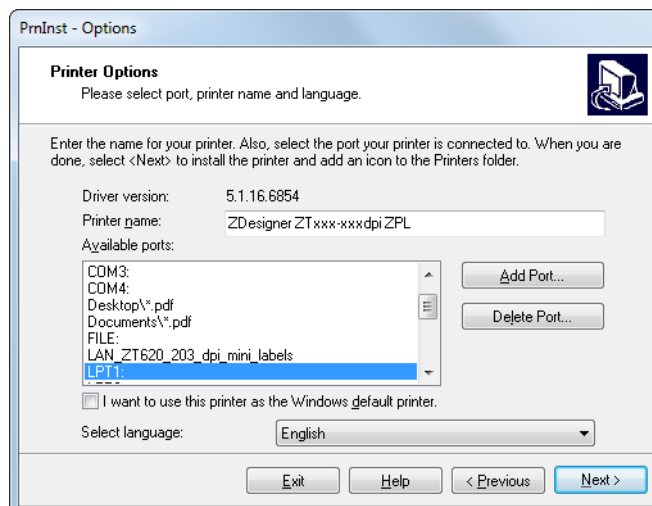
9. Change the printer name (if desired), and select the appropriate port and language.

10. Click Next.

The Additional Install Options screen displays.
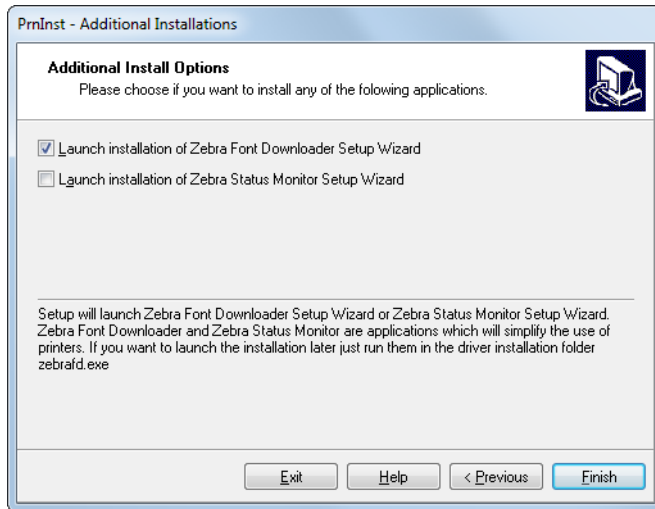
11. Check the desired options, and then click Finish.

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

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

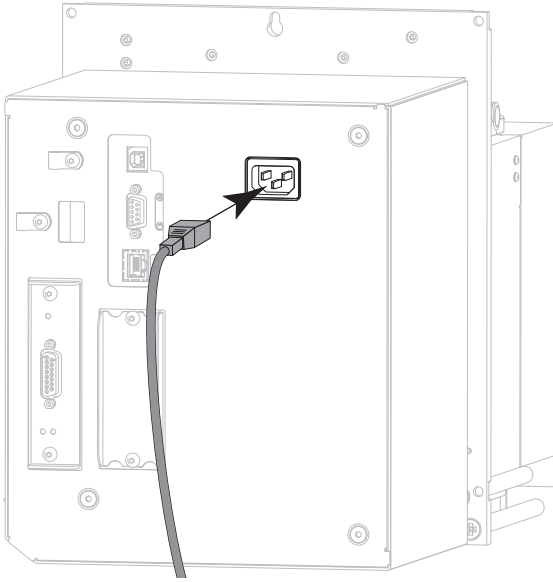12. Connect one or both cords to the appropriate ports on your printer.
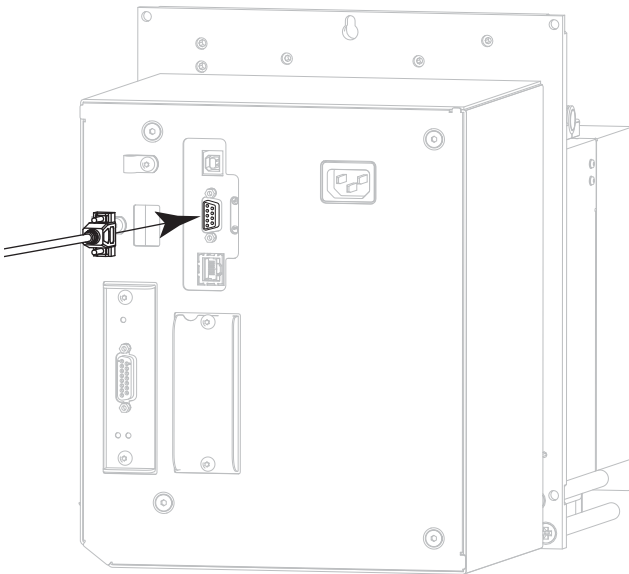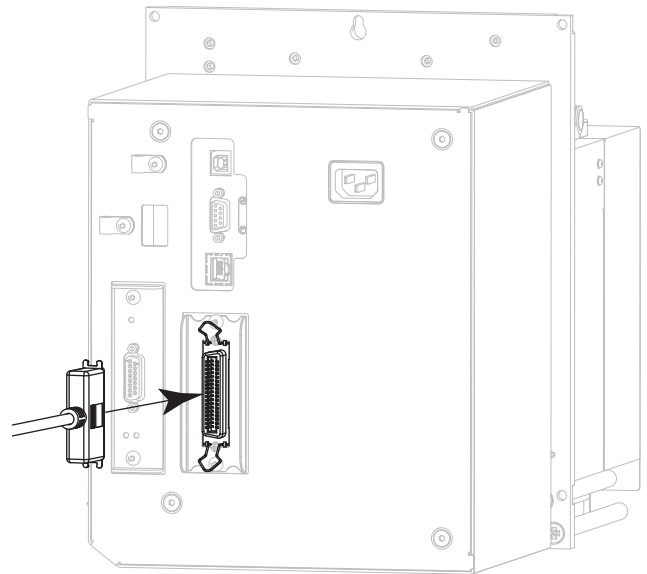
Serial connector   Parallel connector option

13. Connect the other end of the cord to the appropriate port on your computer.
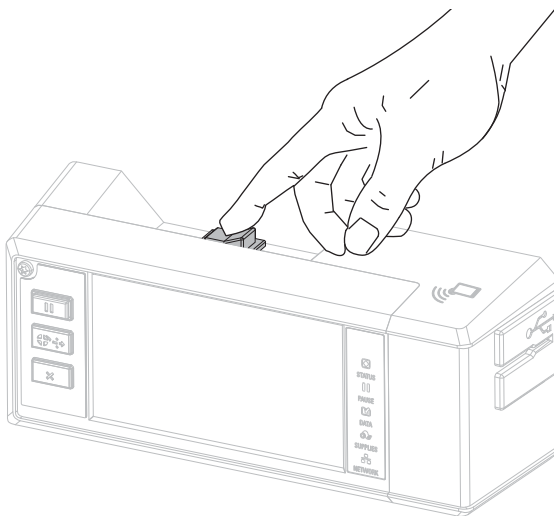
14. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.

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

100 – 240 VAC
50 – 60 Hz
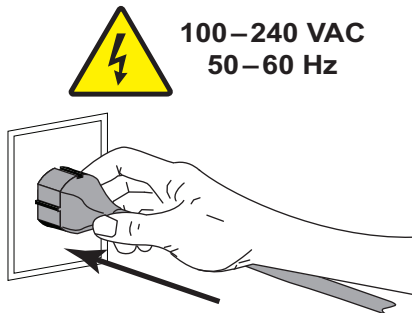
16. Turn on (**I**) the printer.

The printer boots up.

Configuring the printer (if necessary)

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

The installation for serial or parallel connections is complete.

Connecting 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 zebra.com/ze511-info.

1. Install Zebra Setup Utilities as instructed in Installing and Running Zebra Setup Utilities on page 148.

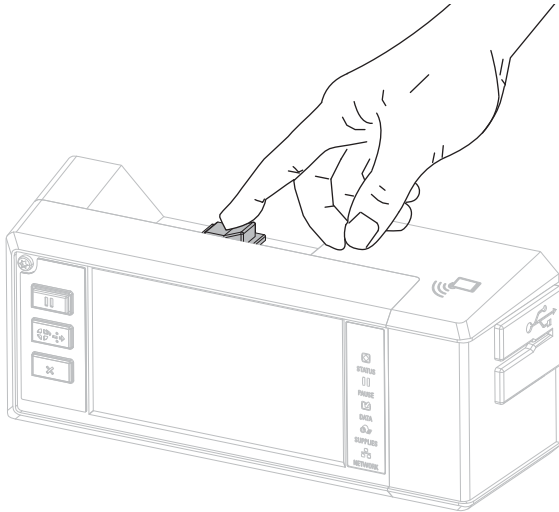2. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.
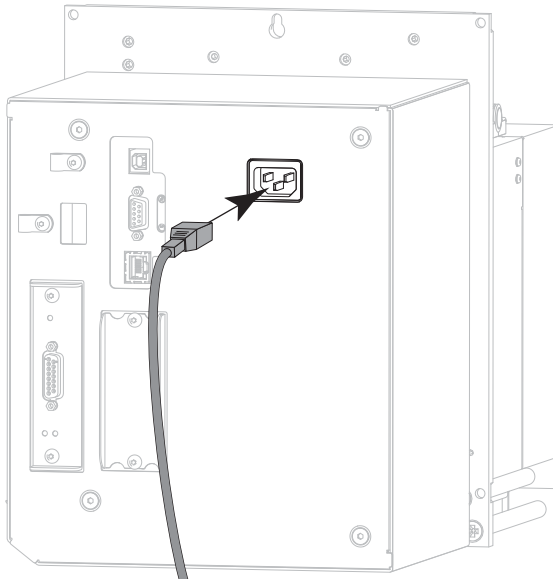
3. Plug the male end of the A/C power cord into an appropriate power outlet.
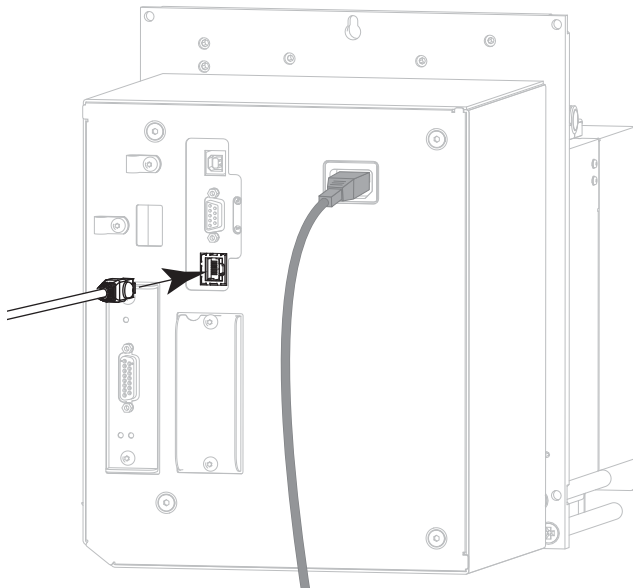
100 – 240 VAC
50 – 60 Hz
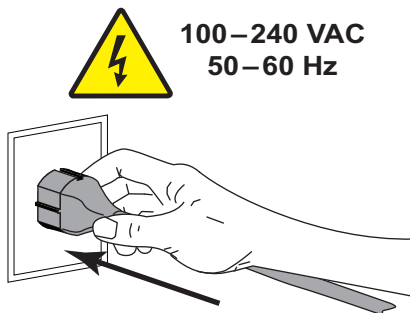
4. Turn on (**I**) the printer.

The printer boots up.

5. 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.

6. **Touch Menu > Connection > Wired**. Check the display to see if an IP address was assigned to the printer. See Connection > Wired > Wired IP Address on page 42.

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 162.
any other value	Continue with Adding a Printer from the Zebra Setup Utilities Screen on page 162.

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 162.

7. Connect the printer to your computer using a USB, serial, or optional parallel port as instructed in Connecting a Computer to the Printer's USB Port on page 150 or Connecting a Computer to the Printer's Serial or Parallel Port on page 153.

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

    • Connection > Wired > Wired IP Protocol on page 41 (change the value from ALL to PERMANENT)

    • Connection > Wired > Wired IP Address on page 42 (assign a unique IP address to the printer)

    • Connection > Wired > Wired Subnet on page 42 (match the subnet value of your LAN)

    • Connection > Wired > Wired Gateway on page 42 (match the gateway value of your LAN)

9. After the print server settings have been configured, reset the network to apply the changes. See Connection > Networks > Reset Network on page 38.

Adding a Printer from the Zebra Setup Utilities Screen
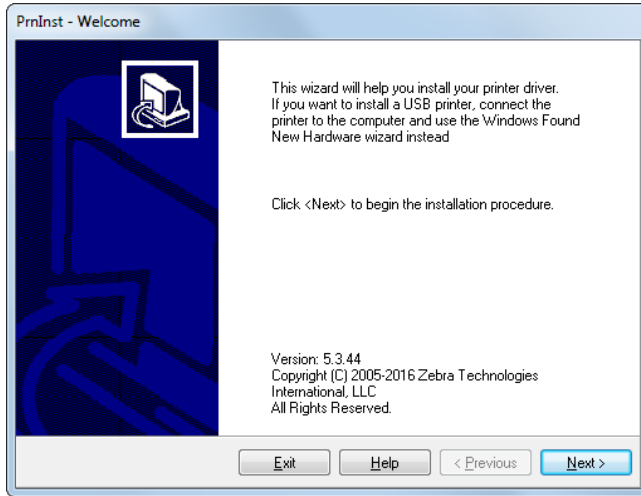
10. If necessary, open the Zebra Setup Utilities program.

The Zebra Setup Utilities screen displays.
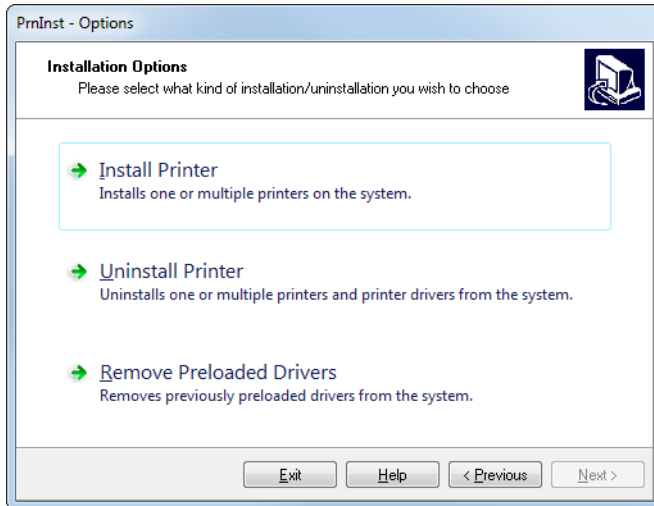
Figure 19   Zebra Setup Utilities Screen
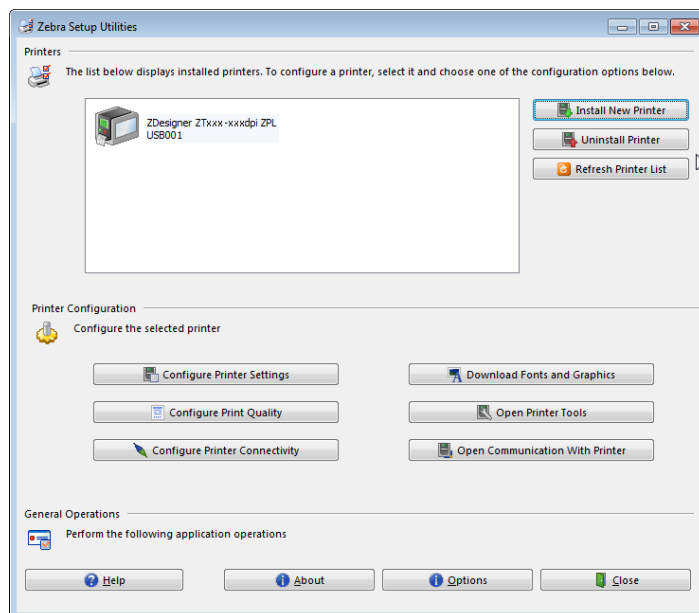
11. Click Install New Printer.

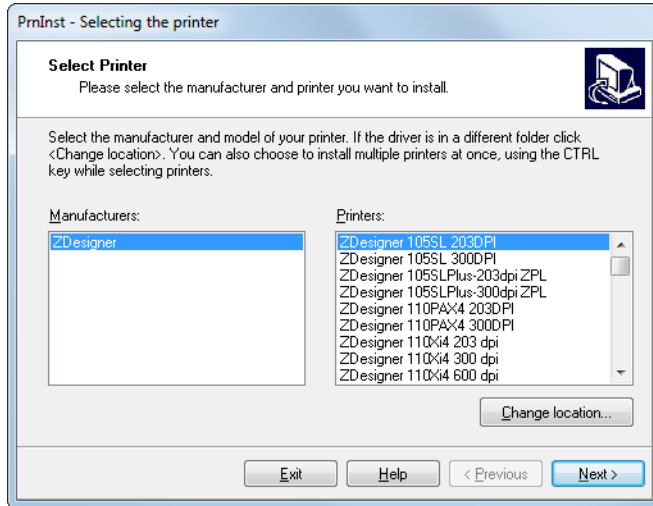The printer driver wizard displays.

12. Click Next.

The Installation Options screen displays.

13. Click Install Printer.

The Select Printer screen displays.

14. Select your printer model and resolution.

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

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

where

XXXXX = the printer model

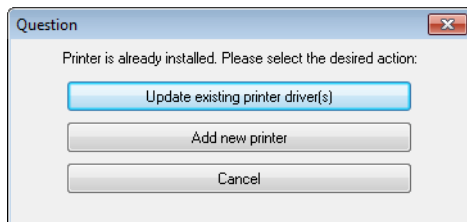**Y** = the printer resolution (2 = 203 dpi, 3 = 300 dpi, 6 = 600 dpi)

For example, in the part number **ZE511**x**3** – xxxxxxxx

ZE511 indicates that the printer is a ZE511 model

3 indicates that the printhead resolution is 300 dpi
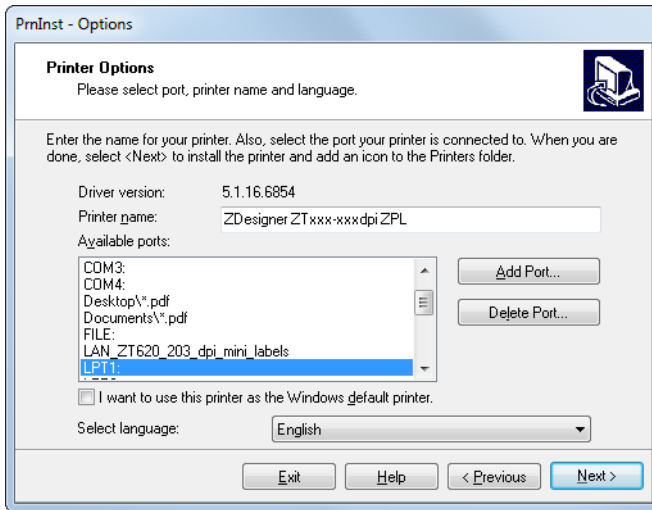
15. Click Next.
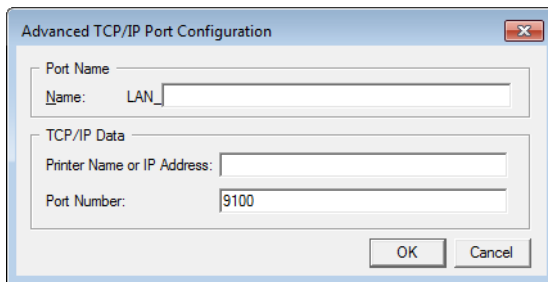
A question displays.

16. Click Add new printer.

The Printer Options screen displays.

17. Click Add Port.

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

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

18. Give the port a name that you can recognize when it appears in the list of available ports.
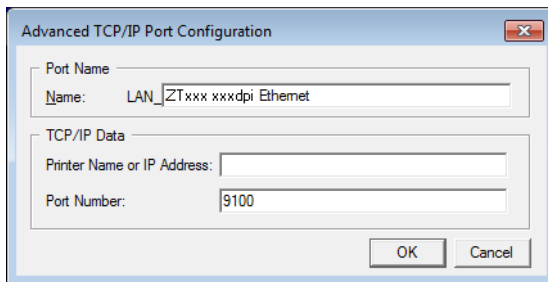
19. Enter the printer's IP address. This could be one that was assigned automatically or one that you specified manually in the previous section.
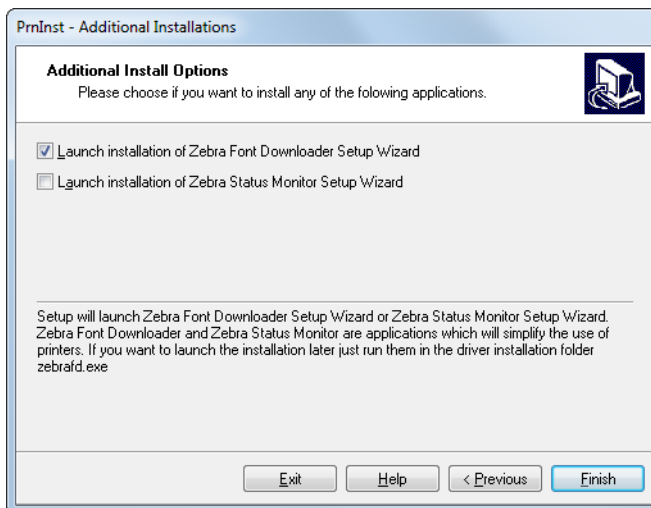
20. Click OK.

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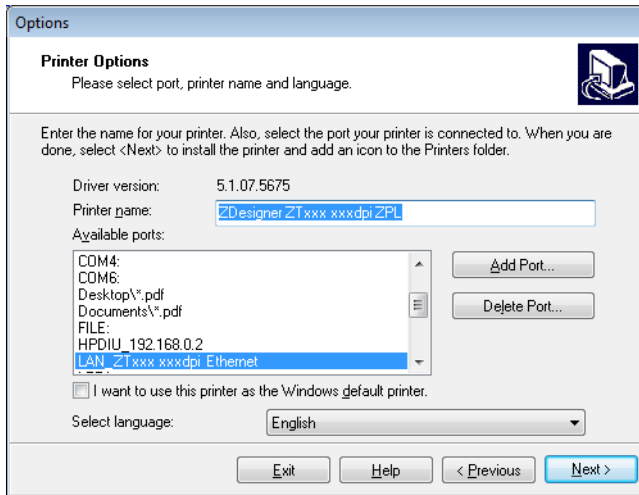
21. Click Next.

The Additional Install Options screen displays.

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

The printer driver is installed. If you are prompted that other programs might be affected, click the appropriate option to continue.
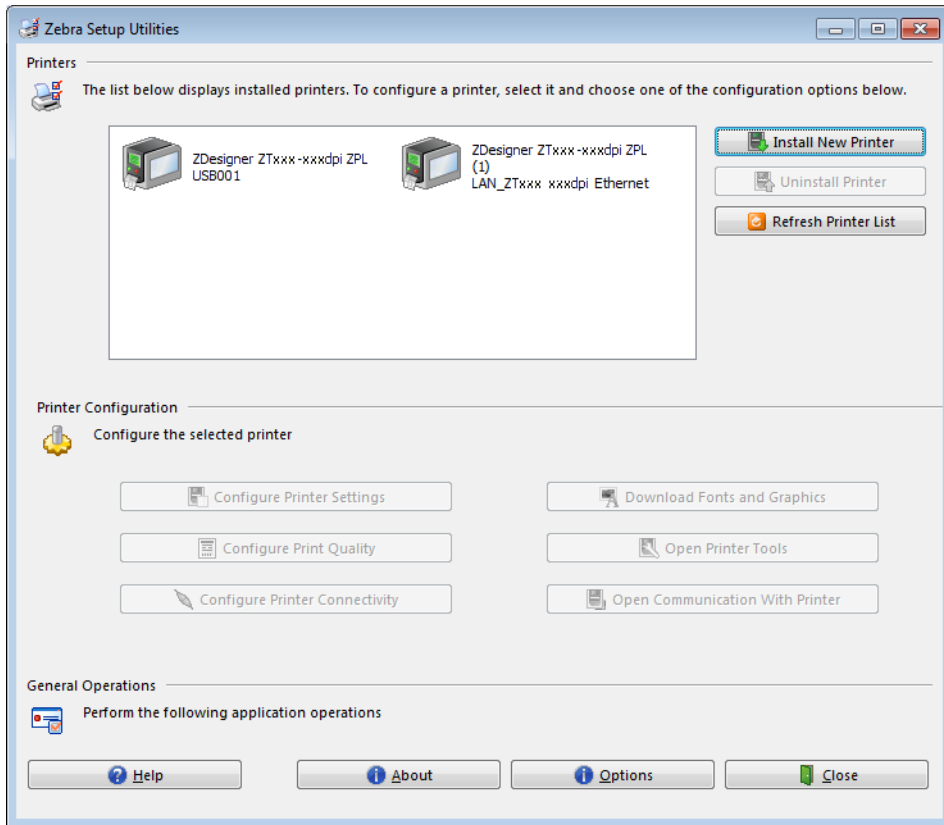
The installation for wired (Ethernet) connections is complete.

Connecting 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 zebra.com/ze511-info.

1. Install Zebra Setup Utilities as instructed in Installing and Running Zebra Setup Utilities on page 148.

2. Connect the printer to your computer using a USB, serial, or optional parallel port as instructed in Connecting a Computer to the Printer's USB Port on page 150 or Connecting a Computer to the Printer's Serial or Parallel Port on page 153.

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

    • Connection > Wi-Fi > Wi-Fi IP Protocol on page 43 (change the value from All to Permanent)

    • Connection > Wi-Fi > Wi-Fi IP Address on page 44 (assign a unique IP address to the printer)

    • Connection > Wi-Fi > Wi-Fi Subnet on page 44 (match the subnet value of your WLAN)

    • Connection > Wi-Fi > Wi-Fi Gateway on page 44 (match the gateway value of your WLAN)

4. After the print server settings have been configured, reset the network to apply the changes. See Connection > Networks > Reset Network on page 38.
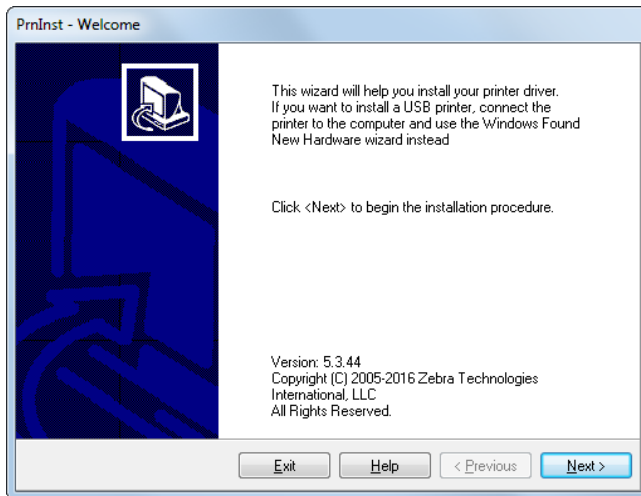
Adding a Printer from the Zebra Setup Utilities Screen

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

The Zebra Setup Utilities screen displays.
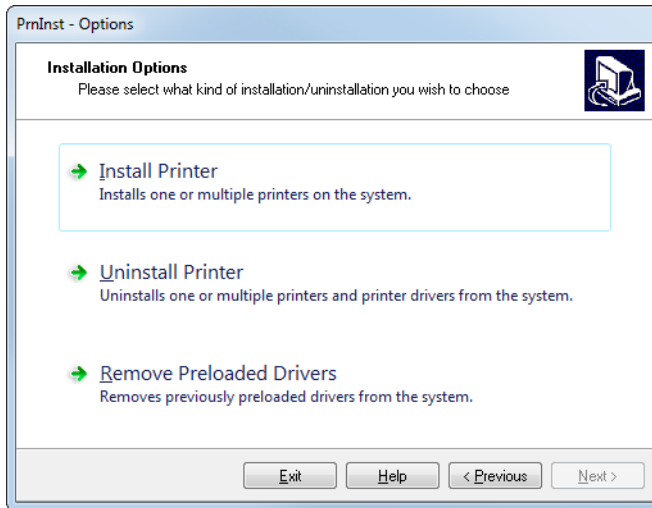
Figure 20   Zebra Setup Utilities Screen
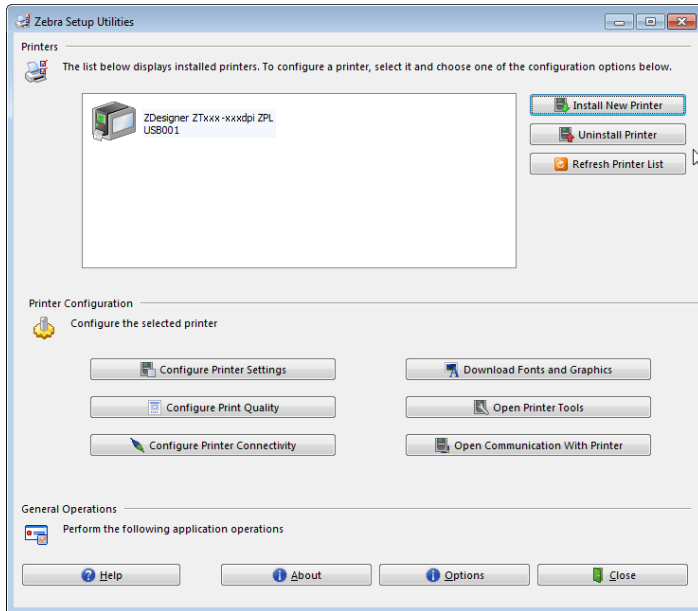
6. Click Install New Printer.
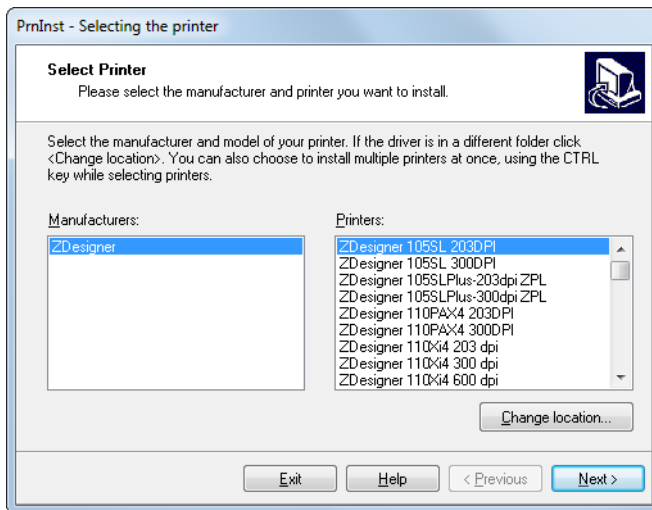
The printer driver wizard displays.

7. Click Next.

The Installation Options screen displays.

8. Click Install Printer.

The Select Printer screen displays.

9. Select your printer model and resolution.

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

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

where

XXXXX = the printer model

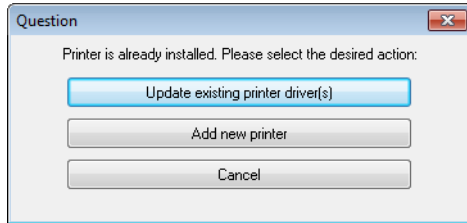**Y** = the printer resolution (2 = 203 dpi, 3 = 300 dpi)

For example, in the part number **ZE511**x**3** – xxxxxxxx

ZE511 indicates that the printer is a ZE511 model

3 indicates that the printhead resolution is 300 dpi

10. Click Next.

A question displays.

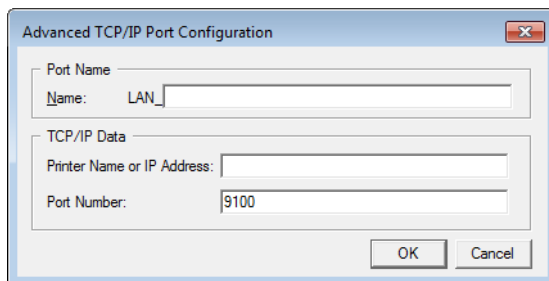**11.** Click Add new printer.
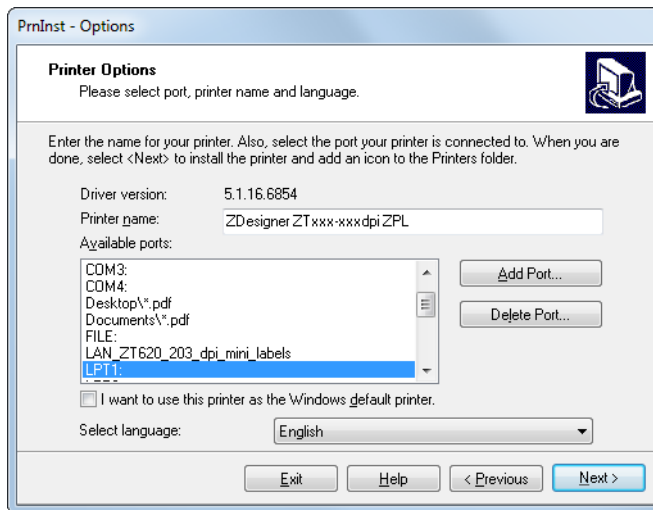
The Printer Options screen displays.

12. Click Add Port.

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

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

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13. Give the port a name that you can recognize when it appears in the list of available ports.
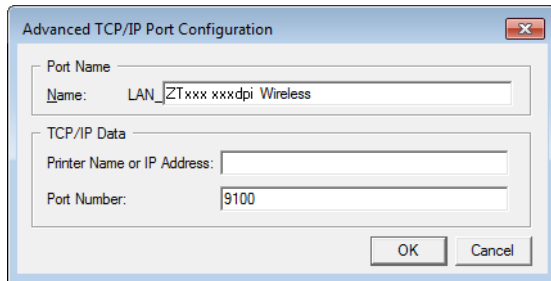
14. Enter the printer's IP address. This could be one that was assigned automatically or one that you specified manually in the previous section.

15. Click OK.

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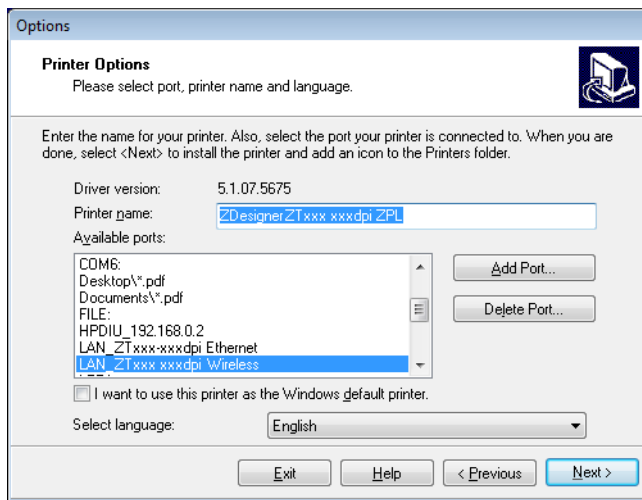
16. Click Next.

The Additional Install Options screen displays.
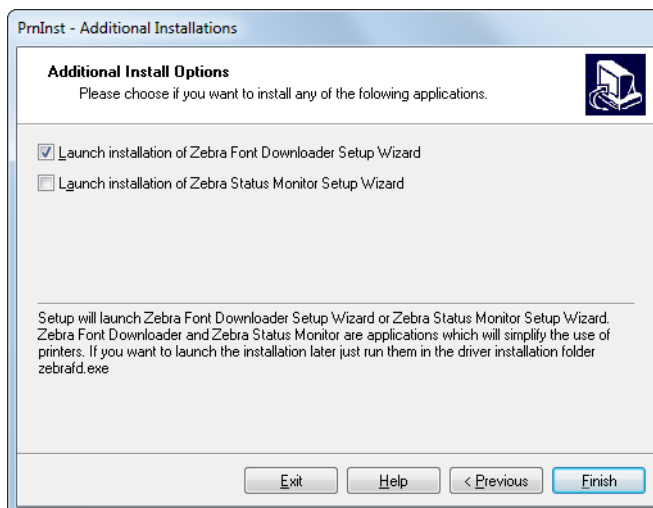
17. Check the desired options, and then click Finish.

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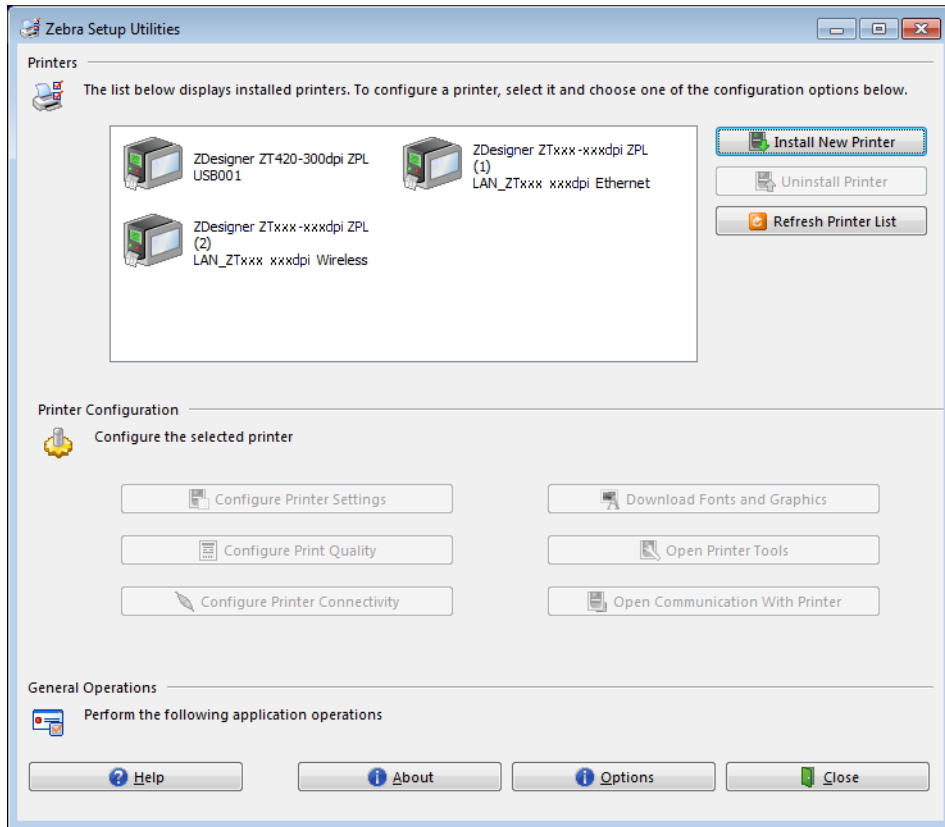
The installation for wireless communication is complete.

Glossary

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

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

barcode A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.
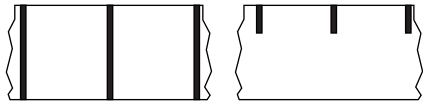
black mark media Media with registration marks found on the underside of the print media that act as start-of-label indications for the printer. The reflective media sensor is typically the best choice for use with black mark media.

Contrast this with continuous media or gap/notch media.

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

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

configuration The printer configuration is a group of operating parameters specific to the printer application. Some parameters are user selectable, while others are dependent on the installed options and mode of operation. Parameters may be switch selectable, control panel programmable, or downloaded as ZPL II commands. A configuration label listing all the current printer parameters may be printed for reference.
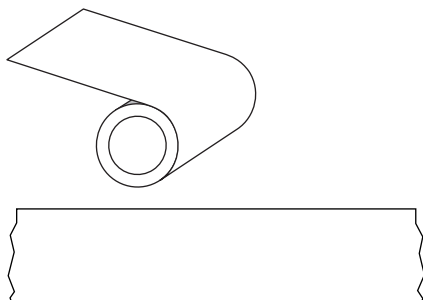
continuous media Label or tag-stock media that does not have gaps, holes, notches, or black marks to indicate label separations. The media is one long piece of material wound into a roll. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels or receipts.

Contrast this with black mark media or gap/notch media.

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

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

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

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

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

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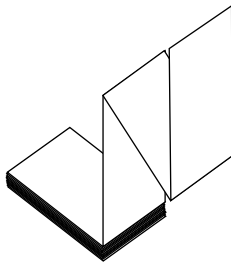

fanfold media Non-continuous media that comes folded in a rectangular stack. Fanfold media is either gap/notch or black mark media. Contrast this with roll media.

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

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

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

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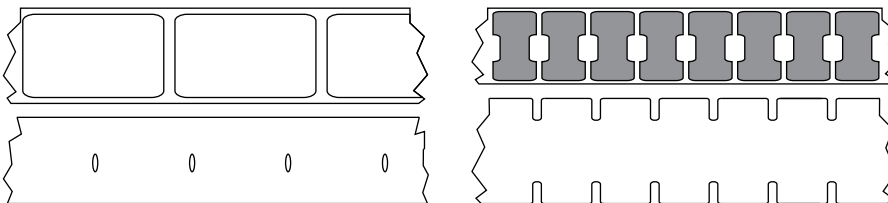
Contrast this with black mark media or continuous media.

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

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

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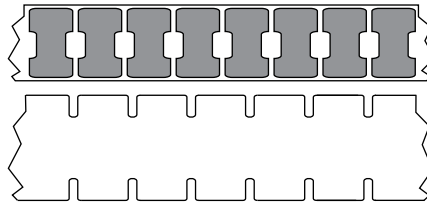
label type The printer recognizes the following label types.

Continuous
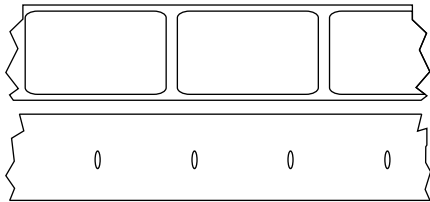
Gap/Notch

Mark

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

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

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

mark media See black mark media.

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

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

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

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

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

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

peel-off A mode of operation in which the printer peels a printed label away from the backing and allows the user to remove it before another label is printed. Printing pauses until the label is removed.
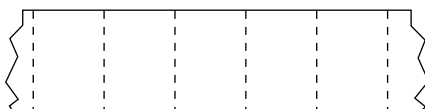
perforated media Media with perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags.

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

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

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

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

registration Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.
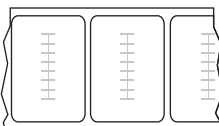
**Radio frequency identification (RFID) media**
Each RFID label has an RFID transponder (sometimes called an "inlay"), made of a chip and an antenna, embedded between the label and the liner. The shape of the transponder varies by manufacturer and is visible through the label. All RFID labels have memory that can be read, and many have memory that can be encoded.

RFID media can be used in a printer that is equipped with an RFID reader/encoder. RFID labels are made from the same materials and adhesives as non-RFID labels.

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

Ribbon is only used with the thermal transfer mode. Direct thermal media does not use ribbon. When ribbon is used, it must be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.
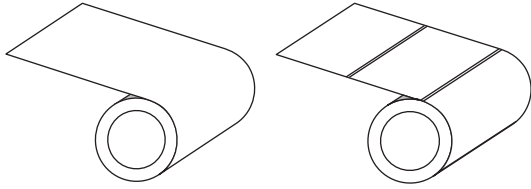
roll media Media that comes supplied rolled onto a core (usually cardboard). It can be continuous (no separations between labels) or non-continuous (some type of separation between labels).

Contrast this with fanfold media.

supplies A general term for media and ribbon.

symbology The term generally used when referring to a barcode.

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

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

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

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