DESKTOP PRINTER

ZD411T

User Guide

Link-OS

P1128298-04EN Rev A

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About this Guide

This guide is for operators and integrators of Zebra ZD411T Link-OS desktop thermal printers. Use this guide to install, change the configuration, operate, and support these printers.

Finding ZD411T Printer References

Information, support, and additional resources are available online to support this printer:

- ZD411T Thermal Transfer printer — https//www.zebra.com/zd411t-info

Printer Resources

Zebra has a large suite of technical resources for your Zebra Link-OS printer, as well as free and fee-based software and apps (applications), including:

- How-To videos
- Printer accessory, supplies, parts, and software links
- Label Design software
- Printer Drivers (Windows, Apple, OPOS, etc.)
- Printer Firmware
- Printer Management tools
- Virtual Devices for legacy languages normally associated with other printer brands
- Various setup and configuration guides
- Cloud-based Enterprise printer management and printing
- XML and PDF format file printing
- Programmer's manuals
- Printer Fonts
- Utilities
- Knowledge base and support contacts
- Printer warranty and repair links

Zebra OneCare Printer Service and Support

For increased productivity, we can help your business ensure its Zebra printers are Online and ready for business. Refer to the descriptions of the Zebra OneCare service and support options available for the printer at zebra.com/zebraonecare.

Icon Conventions

The documentation set is designed to give the reader more visual clues. The following graphic icons are used throughout the documentation set. These icons and their associated meanings are described below.



NOTE: The text here indicates information that is supplemental for you to know and that is not required to complete a task.



IMPORTANT: The text here indicates information that is important for you to know.



CAUTION—EYE INJURY: Wear protective eyewear when performing certain tasks such as cleaning the inside of a printer.



CAUTION—EYE INJURY: Wear protective eyewear when performing certain tasks such as installing or removing E-rings, C-clips, snap rings, springs, and mounting buttons. These parts are under tension and could fly off.



CAUTION—PRODUCT DAMAGE: If the precaution is not taken, the product could be damaged.

CAUTION: If the precaution is not heeded, you could receive a minor or moderate injury.



CAUTION—HOT SURFACE: Touching this area could result in burns.



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



CAUTION—ELECTRIC SHOCK: Turn off (O) the device and disconnect it from the power source before performing this task or task step to avoid the risk of electric shock.



WARNING: If danger is not avoided, you CAN be seriously injured or killed.



DANGER: If danger is not avoided, you WILL be seriously injured or killed.

Introducing the ZD411T

This section introduces the Zebra ZD411T Link-OS 2-inch desktop thermal label printer. It has an overview of the Link-OS printer's features and options, and what ships with your new printer.

https://www.zebra.com/zd411t-info

Introduction to the Zebra ZD411T

This Zebra Link-OS 2-inch Desktop printer offerings include:

- Direct thermal and thermal transfer printing
- Standard Print Resolution – 8 dots per millimeter (203 dots per inch)
  - Prints at speeds up to 203 millimeters per second (8 inches per second)
  - Print width is 56 mm (2.20 in.)
- Higher Resolution Option – 12 dots per millimeter (300 dots per inch)
  - Prints at speeds up to 152.4 millimeters per second (6 inches per second)
  - Print width is 56 mm (2.20 in.)
- Thermal Transfer Printing – Includes a 74 m ribbon roll system
- Non-Zebra 300 m Ribbon Roll Adapters

NOTE: Maximum print speeds vary by model, print resolution, and the type of media in use.

Zebra Label Printing Solution

The large set of Zebra printer capabilities and resources provide the ability to print unconnected or as a part of a larger print system.

The printer is just one of three parts of a printing solution. To print; you need your Zebra printer, compatible labels (and ribbon if used with thermal transfer labels), and software (such as the driver, mobile apps, programming, and more) to tell the printer what to do and print.

Use Zebra's free label and form design software, ZebraDesigner, to make professionally looking label designs and print them.

Zebra provides a complete suite of free Link-OS software: mobile and personal computer applications, drivers, set up utilities, monitor and control printing, import graphics and fonts, send programming commands, update firmware, and download files. The Link-OS suite has emulation for a wide variety of

other printer control languages via Link-OS Virtual Devices and includes a free PDF Direct emulation app.

The Zebra website or your reseller will be able to help you identify media for your desired use case.

Modes of Operation

The printer has many operating configurations and hardware options. Here is a partial list of some of the operating modes that this versatile printer can do.

- Direct thermal printing (which uses heat-sensitive media to print).
- Standard Tear-Off mode allows you to tear off each label/receipt or batch print a strip of labels and tear them off after it is printed.
- Label Dispense Mode: If an optional dispenser is installed, the backing material can be peeled away from the label as it is printed. After this label is removed, the next one is printed.
- Media Cutting: If an optional media cutter is installed, the printer can cut the label liner between labels, receipt paper, or tag stock.
- Linerless media printing with Cut or Tear-Off label options for easy pick and place label applications.
- Internet of Things (IoT) data tools (Savanna)
- Stand-alone: The printer can print without being directly connected to a computer.
  - A printer with the Color Touch Display option can use menus to access and print a label format/form.
  - A Link-OS App connecting via Bluetooth (Wireless option).
  - An auto-running label format/form (programming based).
  - A data input device connected to the printer's USB Host port or serial port. This accommodates data input devices, such as scanners, weigh scales, keyboards, etc.
  - Use the printer with an Attached Battery option and wireless communication via mobile configuration apps or the desktop computer (apps, drivers, and programs).
- Shared network printing: Printers configured with Ethernet (LAN) and Wi-Fi interface options include an internal print server.

Common Link-OS Desktop Series Printer Features

Zebra Link-OS Desktop printers share a common feature set. Here are some common platform features:

- OpenAccess design for simplified media loading.
- Zebra's Link-OS Software, Apps, and SDK's—an open platform that connects operating systems for smart Link-OS Zebra devices with powerful software apps (applications), making the devices easy to integrate, manage, and maintain from any location.
  - The Link-OS suite has emulation for a wide variety of other printer control languages via Link-OS Virtual Devices and includes a free PDF Direct emulation app.
- Color-coded touchpoints for operator controls and media guides.
- Enhanced user interface featuring three buttons and five status indicators.
- Easy, field-installable media handling options.

- Media roll support:
  - Outer Diameter: Up to 127 mm (5 in.)
  - Inner Diameter: 12.7 mm (0.5 in.), 25.4 mm (1 in.), and additional core sizes with optional media core adapters.
- Moveable Sensor provides compatibility with the widest range of media types:
  - Outer Diameter: Up to 127 mm (5 in.)
  - Compatible with notched or slotted media.
  - Multi-center position transmissivity sensor for use with label gap/web media.
- USB Host Port that can be used for easy firmware updates.
- USB 2.0 interface
- Modular Connectivity Slot for field installable 10/100 Ethernet (802.3 RJ-45) and Serial (RS-232 DB-9) interface options.
- On-the-fly OpenType and TrueType font scaling and import, Unicode, resident scalable font (Swiss 721 Latin 1 font), and a selection of resident bitmap fonts.
- Backward compatibility focused technology eases printer replacement:
  - Drop-in replacement of legacy Zebra desktop printers. The printer accepts both EPL and ZPL programming languages.
  - Supports Link-OS virtual devices to interpret non-Zebra printer programming languages.
- XML-Enabled printing — allows XML communications for barcode label printing, eliminating license fees and print server hardware, and lowering customization and programming costs.
- Zebra Global Printing Solution supports:
  - Microsoft Windows keyboard encoding (and ANSI)
  - Unicode UTF-8 and UTF 16 (Unicode Transformation Formats)
  - XML
  - ASCII (7- and 8-bit used by legacy programs and systems)
  - Basic single and double-byte font encoding
  - JIS and Shift-JIS (Japanese International Standards)
  - Hexadecimal encoding
  - Custom character mapping (DAT table creation, font linking, and character remapping)
- The printer supports configuration via a setup utility running on mobile devices.
  - Use the printer's optional Bluetooth Low Energy (LE) feature for short-range communication to a variety of mobile devices. Bluetooth LE works with Zebra mobile setup utility applications to assist in the printer setup, perform media calibration, and maximize print quality.
  - Zebra's Print Touch (Near Field Communication - NFC) tap to pair devices, access printer information, and access mobile applications.
- An On-board Real-Time Clock (RTC).
- Printhead maintenance reporting is enabled and customizable by the user.
- Easy tool-less replacement of printhead and platen (driver) roller.
- A minimum of 64 MB of internal printer memory for storing forms, fonts, and graphics.

See Also

zebra.com/linkos

Link-OS Desktop Printer Options

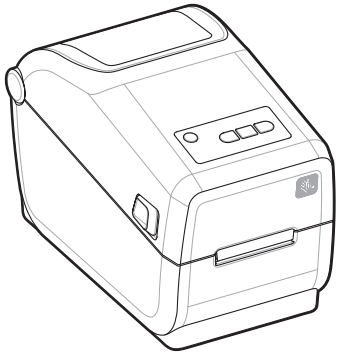
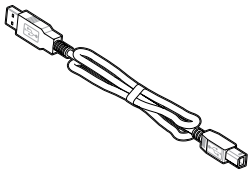
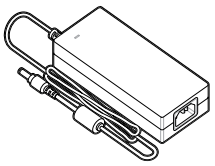
The printer can be ordered with a wide variety of factory-installed options. Other options are field upgrade kits.

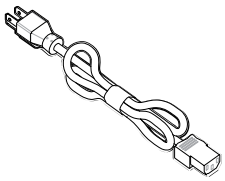
- Wired and Wireless options (factory installed or field upgrade-able):
  - Bluetooth Low Energy (LE) wireless connectivity.
  - Wi-Fi (802.11ac – includes a/b/g/n), Bluetooth 4.2 (4.1 compatible), and Bluetooth Low Energy (LE) 5.0 wireless connectivity.
  - Wi-Fi (802.11ax – includes a/b/g/n), Bluetooth 5.3, and Bluetooth Low Energy (LE) 5.3 wireless connectivity.
  - Internal Ethernet Print Server (LAN, RJ-45 connector) – supports 10Base-T, 100Base-TX, and fast Ethernet 10/100 auto-switching networks for wired connectivity.
- Modular Connectivity Slot for field installable 10/100 Ethernet (802.3 RJ-45) and Serial (RS-232 DB-9) interface options.
  - Internal Ethernet Print Server (LAN, RJ-45 connector) – supports 10Base-T, 100Base-TX, and fast Ethernet 10/100 auto-switching networks.
  - Serial (RS-232 DB-9) Port
- Media handling options (field-installable):
  - Label Dispenser (Peel-Off liner and present the label to the operator)
  - General-purpose media cutter
- Media Core Adapter kits include adapters for media rolls with outer diameters up to 127 mm (5 in.):
  - 38.1 mm (1.5 in.) inner diameter media cores
  - 50.8 mm (2.0 in.) inner diameter media cores
  - 76.2 (3.0 in.) inner diameter media cores
- Attached Battery Base with a removable battery
  - The Attached Battery Base and battery are sold separately
  - The battery is designed to provide constant regulated power for consistent print quality (darkness-contrast).
  - Includes a Shutdown Mode for shipping and storage
  - Includes battery charge and status indicators built into the battery
- USB Host Port that can be used for easy firmware updates.
- USB 2.0 interface
- Asian language support with printer configuration options for the large Simplified and Traditional Chinese, Japanese, or Korean character sets.
- Zebra ZBI 2.0 (Zebra BASIC Interpreter) programming language. ZBI allows you to create custom printer operations that can automate processes and use peripherals (for example, scanners, scales, keyboards, Zebra ZKDU, etc.) all without being attached to a PC or network.

What's in the Zebra ZD411T Box?

The printer typically ships with the following items.

Included

	
Printer	USB Cable
	
Printer Documentation	Power Supply

	
Power Cord	Ribbon Roll Core

Not Included

Desktop Media - Labels, Ribbons, etc.

Unpacking and Inspecting the Printer

Tips for inspecting and verifying the printer items.

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

- Save all packing materials.
- Check all exterior surfaces for damage.
- Open the printer and inspect the media compartment for damage to components.

If you discover shipping damage upon inspection:

- Immediately notify the shipping company and file a damage report. Zebra Technologies Corporation is not responsible for any damage to the printer incurred during shipment, and will not cover the repair of this damage under its warranty policy.
- Keep all packaging material for shipping company inspection.
- Notify your authorized Zebra reseller.

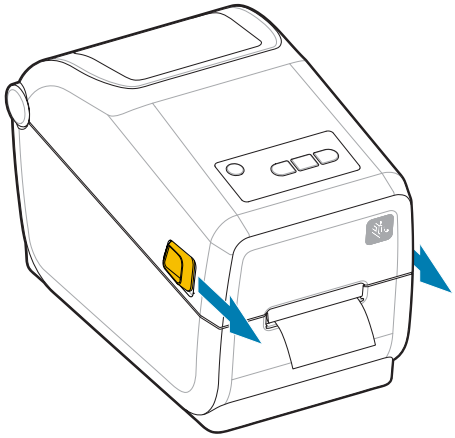
Opening the Printer

Accessing the printer's media compartment.

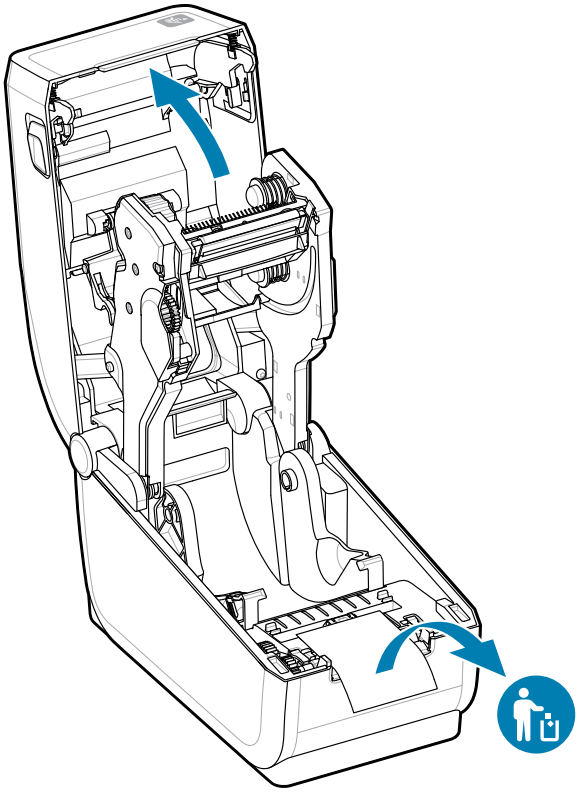
CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Open the printer to view and access the label compartment.

1. Open the printer by pulling the two printer release latches on both sides of the printer.



2. Lift up the cover when the latch releases. Remove any loose test labels in the label compartment.



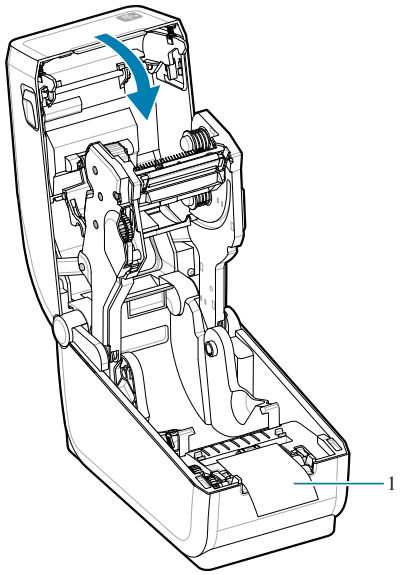
3. Inspect for any loose or damaged parts within the printer.

Closing the Printer

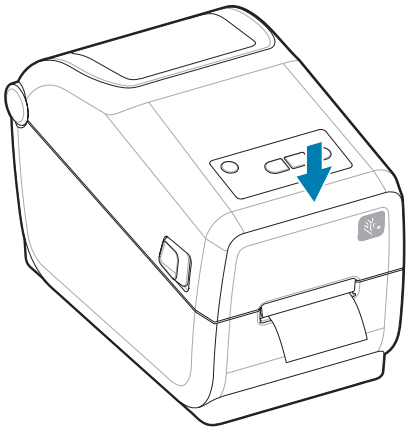
Close the printer after accessing the label compartment to protect the printer.

1. If labels are loaded in the printer, verify that the labels completely cover the platen roller at the front of the printer.

NOTE: If the printer is not in use, it is recommended that a label (1) be placed over the whole platen roller and closed to prevent the printhead from sticking to the platen roller. Do this for shipping and storage.



2. Gently lower the cover.
3. Push down on the front of the printer to close. Push the center or both corners of the printer firmly until both sides of the latches lock.



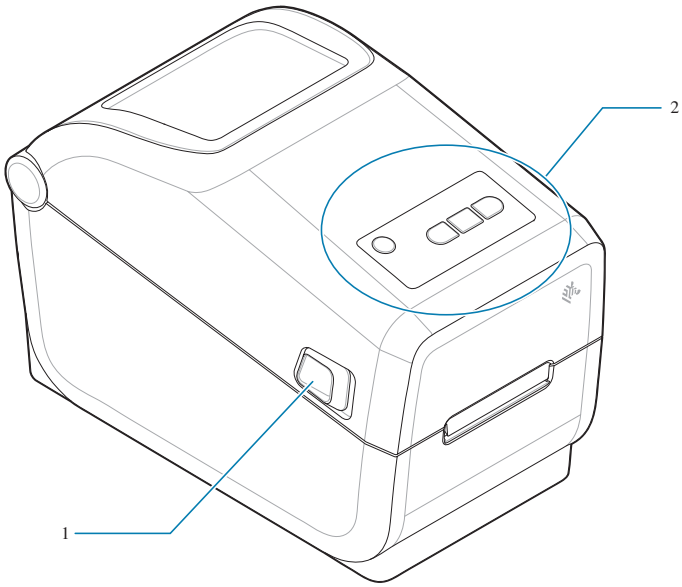
ZD411T Features

This section identifies features of the Zebra ZD411T Link-OS 2-inch desktop thermal label printer. There is also a How-To Features video on the Zebra Web site.

The printer Support page and videos are found here:

https://www.zebra.com/zd411t-info

Figure 1 External Features - Front View



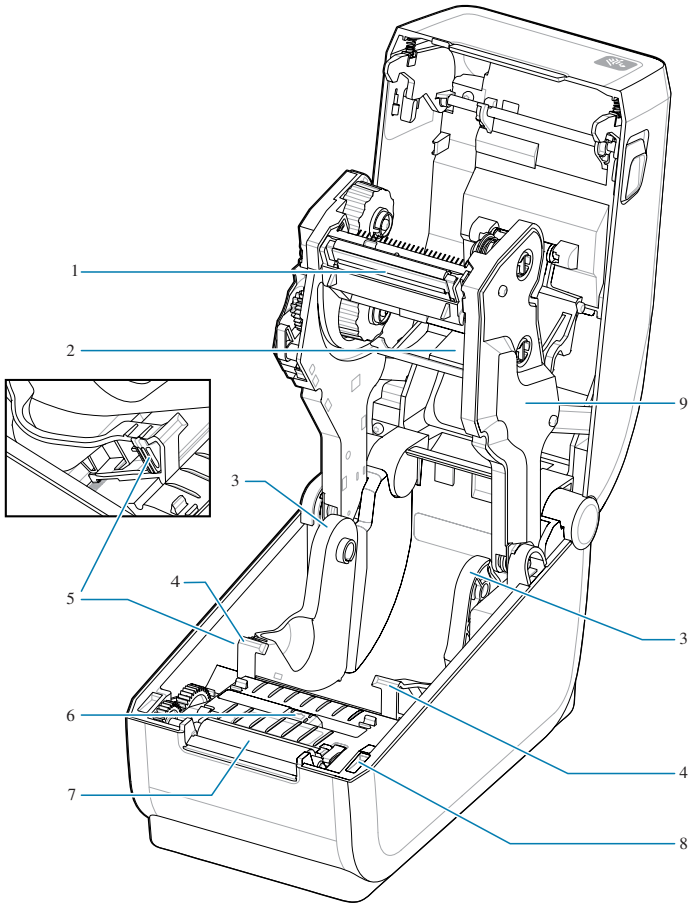
1	Release latch (one on each side)
2	User Interface

For more details on printer controls, see Controls and Indicators on page 30.

Figure 2 External Printer Features - Rear View

1	Release latch
2	DC power receptacle
3	Interface and connectivity module slot access
4	Fanfold media entry slot
5	Power button

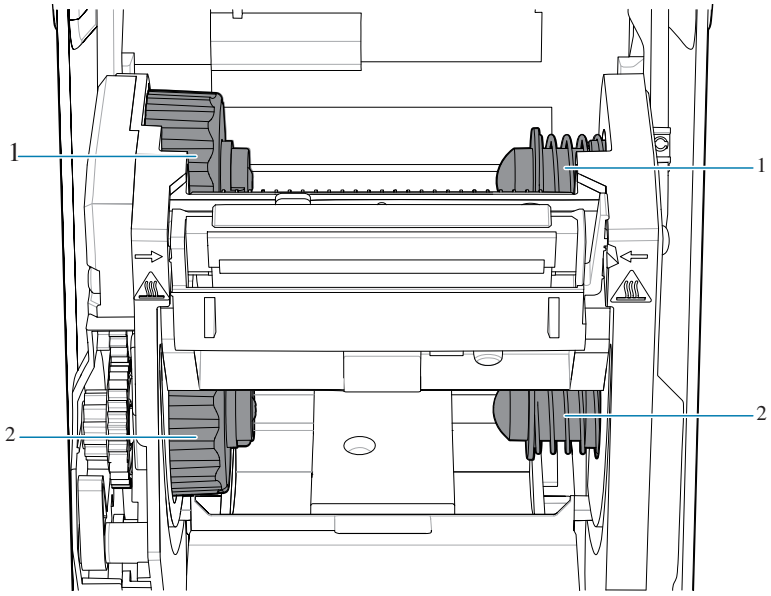
Figure 3 Features Inside the Printer



1	Printhead
2	Upper web (gap) array sensor (on the other side)
3	Roll holders
4	Media guides
5	Media guide/roll stop adjustment
6	Movable sensor (black mark and lower web/gap)

7	Platen Drive Roller
8	Head-Up Sensor (inside)
9	Ribbon Drive Carriage

Figure 4 Ribbon Chassis–Ribbon Roll Holders

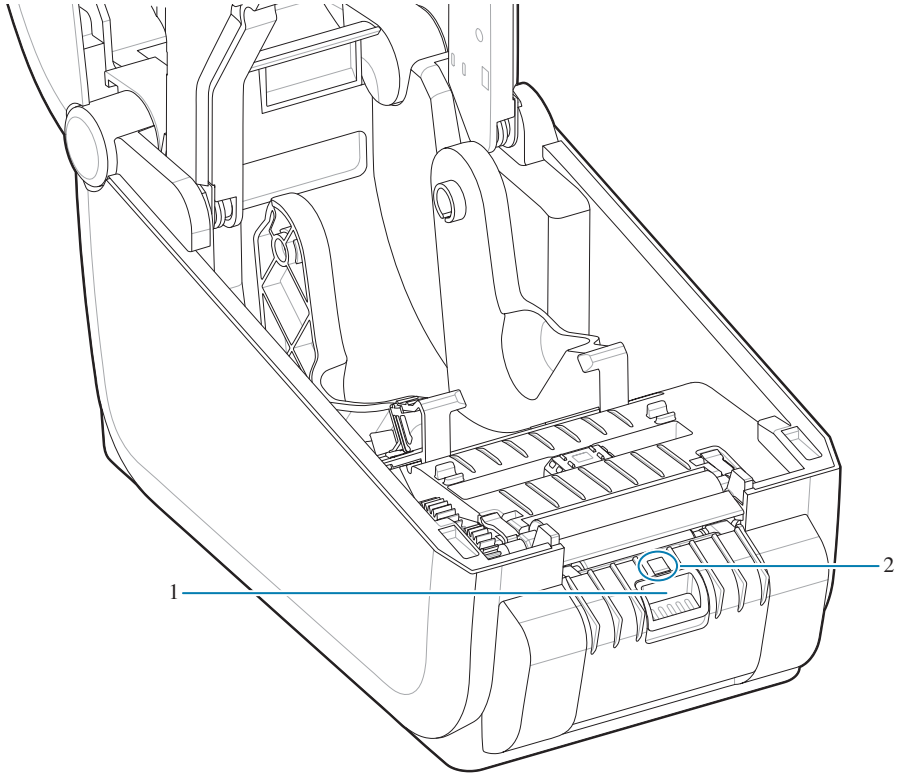


1	Take-up spindle (starts with empty roll)
2	Supply spindles (starts with full roll)

Label Dispenser Option

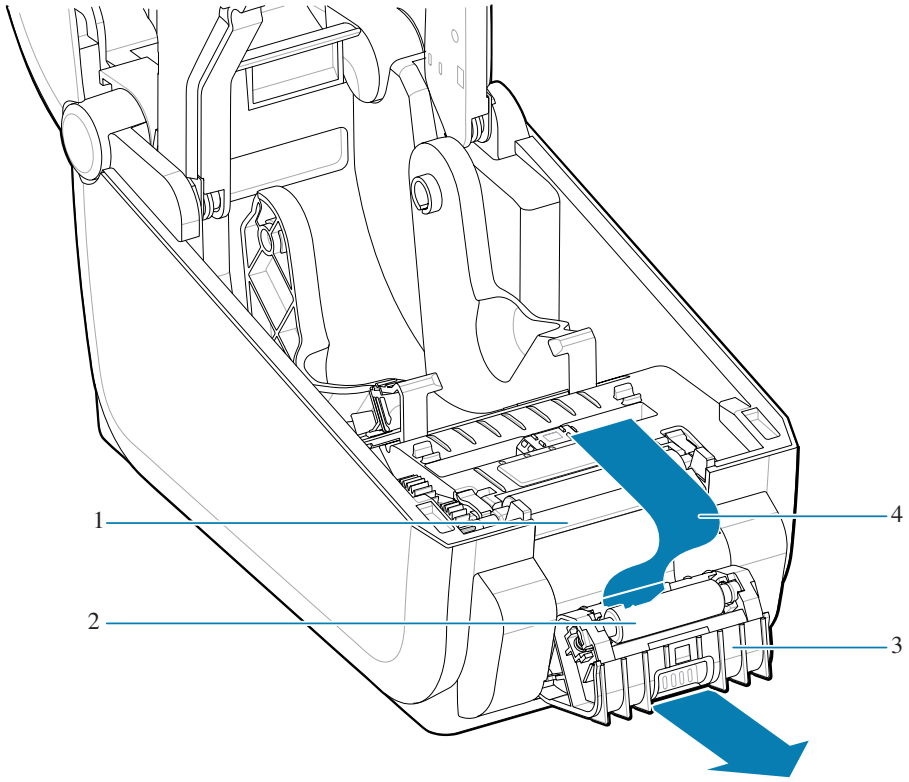
The Label Dispenser option is a common 2-inch Link-OS printer upgrade kit for the printer family.

Figure 5 Label Dispenser Closed



1	Door Latch
2	Label Taken Sensor

Figure 6 Label Dispenser Open



1	Label Peel Bar
2	Peel Roller
3	Dispenser Door
4	Label liner exit path

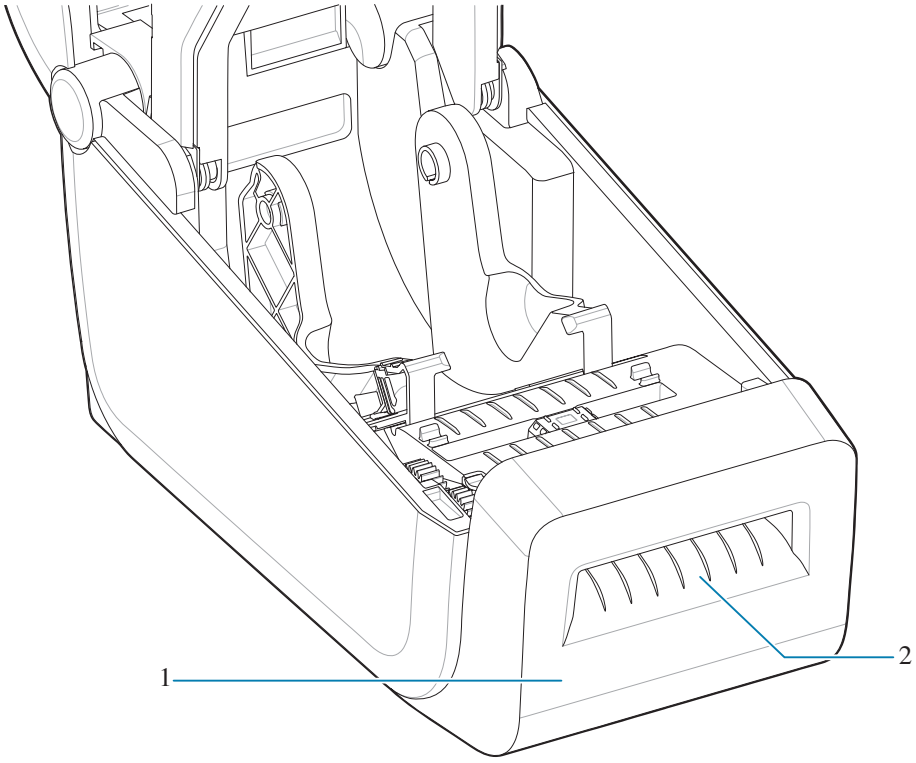
See Also

Installing Dispense, Cut, and Tear Media Handling Options

Cutter Option

The Cutter option is a common 2-inch Link-OS printer upgrade kit for the printer family.

Figure 7 Cutter



1	Media Exit Slot
2	Cutter Module

See Also

Installing Dispense, Cut, and Tear Media Handling Options

Attached Battery and Base Option

The Attached Battery and Base option is a common Link-OS printer upgrade kit for the printer family.

Table 1 Printer with Battery Base and Battery

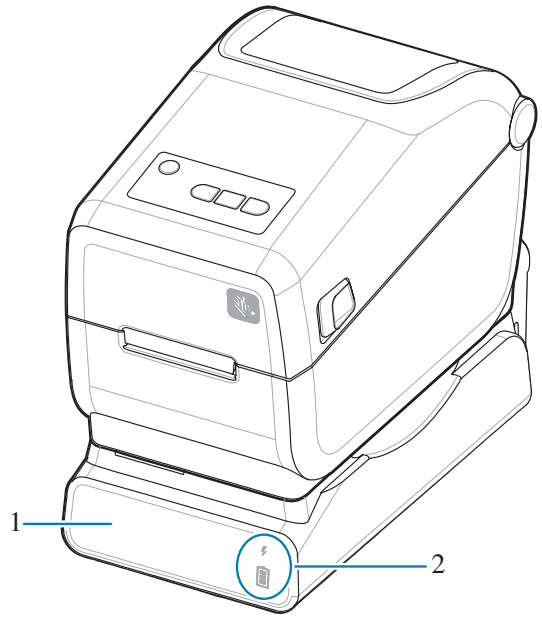
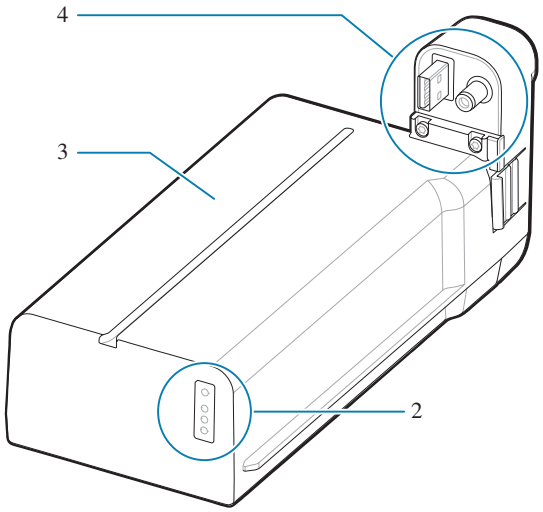
	
1 – Battery Power Base	3 – Battery
2 – Battery Status and Charge Indicators	4 – Power Interface

Table 2 Inserting the Battery

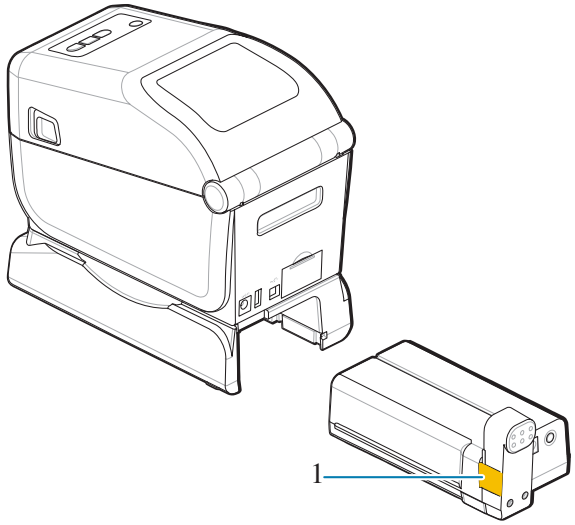
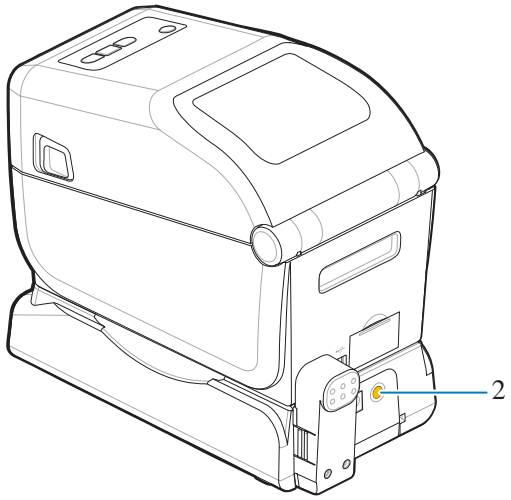
	

Table 2 Inserting the Battery (Continued)

1 – Battery Latch	2 – Battery Control Button

NOTE: The battery can be charged, checked, and configured for storage without the printer. A printer power supply or other approved Zebra power source is needed to charge the battery.

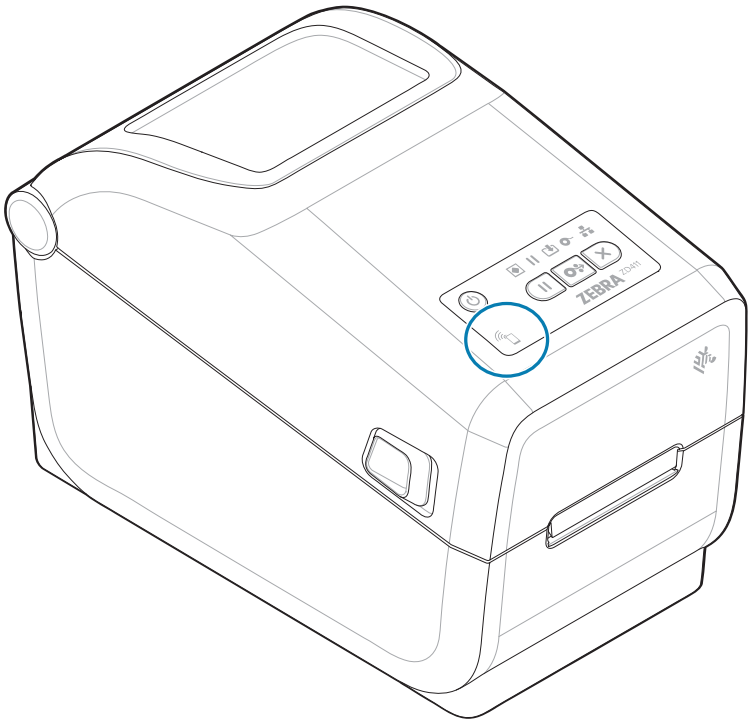
Zebra Print Touch

With the Zebra Print Touch feature, you can use a Near Field Communication (NFC)-enabled device such as a smartphone or tablet to scan the Print Touch logo and pair the device to the printer.

Print Touch is available on models with a factory-installed low-power Bluetooth. This capability enables you to use your device to provide information for which you are prompted and then print a label using that information.

NOTE: Some mobile devices may not support NFC communication with the printer until you configure the required NFC settings in your device. If you encounter difficulties, consult your service provider or your smart device manufacturer for more information.

Figure 8 Zebra Print Touch NFC Reader Activation Location



Data Included in the Encoded NFC Tag

- A URL for a Zebra QuickHelp style support web page
- The printer's Bluetooth Low Energy MAC address
- The printer's Bluetooth Classic MAC address (if present)
- The printer's Wi-Fi (WLAN) MAC address (if present)
- The printer's Ethernet (LAN) MAC address (if present)
- The printer SKU – example ZD42122-D01W01EZ

- The printer's serial number

Uses for the Print Touch feature (NFC tag)

- Facilitate Bluetooth pairing with a compatible mobile device
- Launch an application
- Launch a mobile browser to a web page

Controls and Indicators

This section discusses user controls and their functionality.

User Interface

The primary user controls are found on the front of the printer.

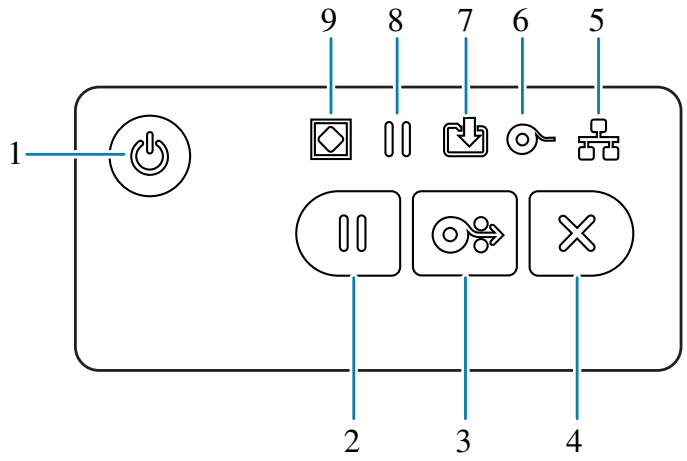
Standard User Interface

- This interface provides the basic control and status needed by an operator. The printer operating status is reported by five icon status indicator lights. The icons represent several functional areas of operation. The indicator lights, as a group, provide a wide range of printer status notifications when used in combination. They are visible from a greater distance than you can read on a printer with a display. See the Meaning of the Indicator Light Patterns on page 34.
  - This interface supports operator tasks of replacing printing supplies (labels, receipt paper, transfer ribbon, etc.) when prompted by two indicators.
  - Status indicator icons represent a functional area of printer operation.
  - Status indicator lights typically use color to show the operator the functional status of the printer. The status indicator lights may be off (not lit), red, green, or amber (orange/yellow). Red is Needs Attention or Not Ready. Green is for Ready or Functioning. Amber (orange/yellow) is for a busy or active process (data downloading, over-temperature cooling cycle, etc.). An off or un-lit status indicator does not require the operator's attention.
  - A status indicator can flash (blink), fade (bright to off), alternate between colors, or remain on in a variety of patterns that denote various printer activities, and operational status as a group.
  - Control buttons are used in various combinations to access internal utilities that calibrate the printer to your media and make limited print settings.

ZD411T Standard Interface Controls

The ZD411T printer interface provides the basic control and status of common printer operations.

Figure 9 Identifying Standard Interface Controls and Indicators



1	Power button
2	Pause button
3	Feed (Advance) button
4	Cancel button
5	Network indicator
6	Supplies indicator
7	Data indicator
8	Pause indicator

9	Status indicator

Power Button — Turns power ON and OFF in the printer. It is also used to initiate low-power sleep and wake states.

- **Initial Power ON** — Press **Power** until the printer's indicator lights flash on. The indicator lights will flash on and off in various combinations while the printer does self-diagnostics, configuration checks, and integrate optional components which will take several seconds to complete. The **Status** indicator will turn solid green indicating the printer is ready for normal print operations.
- **Energy Star (Low Power Mode)** — Press and release **Power** to enter Energy Star low power mode. The printer will minimize power use. All the indicators will be off except the Status Indicator will slowly change between On and Off to indicate Energy Star Mode.
- **Power OFF with Energy Star Delayed** — Press and hold **Power** for 4-9 seconds. The operator can start a batch print job and put the printer into the low power consumption state of Sleep mode — after the job has finished.
- **Power OFF / Shutdown** — Press and hold **Power** for 4-9 seconds. The printer turns OFF.
- **Power Failure Recovery Mode** — This printer feature is activated by a hardware jumper setting on one of the optional Printer Connectivity Modules installed in the printer. See Setting the Power Failure Recovery Mode Jumper on page 119.
- The printer will automatically Power ON when plugged into an active (ON) AC power source.
- Supports Sleep Mode and Power OFF with Sleep mode Delayed.
- A Power OFF/Shutdown resets the printer and then runs the Initial Power ON sequence.

NOTE: The Power Failure Recovery Mode is only available on printers with a Printer Connectivity Module installed in the printer.

Pause Button — Pauses print and media movement actions.

- Pressing **Pause** to stop print activities and place the printer into a pause state. The printer will complete printing a label that is printing before it pauses.
- The **Pause** indicator displays Amber (orange/yellow) to indicate the pause state.
- Pressing **Pause** while in the pause state to return the printer to normal operation. If printing a multi-label (form/format) job or another print job is waiting to print in the print queue, then the printer will resume printing.

Feed (Advance) Button — Advance a label (print form/format).

- **Feed One Label** — Press and release **Feed** when the printer is not printing to advance media one (1) blank form/format length (label, receipt, tag, ticket, etc.).
- **Advance Multiple Labels** — Press and hold **Feed** to advance labels until released. It finishes advancing to the beginning position of the next label.
- **Reprint Last Label** (activated via an SGD command: `ezpl.reprint_mode`) — The intended purpose of this feature is to allow reprint of a failed media print. If the printer runs out of media (paper, labels, transfer ribbon, etc.), then the printer can re-print the last label (print form/format). The print buffer that stores the print image available for reprint is cleared when the printer gets turned off or is reset.

 **Cancel** Button – Cancels print jobs.

- **Cancel** is only functional when the printer is in the Pause state.
- Press **Cancel** once to cancel printing the next format in the print buffer.
- Press and hold **Cancel** for two seconds to cancel the printing of ALL pending formats.

 **Status Indicator** – Primary status indicator for overall printer health and operational status. This indicator is also known as the power indicator.

- **Green**: Ready for print and data activity.
- **Green, Slowly Changing between ON and OFF**: The printer is in Sleep Mode.
- **Red**: Media out, media detection error, head (cover/printhead) open, cut error, printhead authentication failure.
- **Amber**: Printhead Over Temp (temperature), printhead element failure, out of memory while storing content (formats, graphics, fonts, etc.), and interface power fault for USB Host or Serial ports.
- **Blinking Amber**: Printhead Under Temp (temperature).
- **Blinking Red**: Printhead Over Temp (temperature) – this status is coupled with a blinking red **Pause** indicator. Requires cooling and printer restart.

 **Pause Indicator** – The printer is in pause mode when the **Pause** indicator light is on. A label (print form) or all labels (print forms) in the print buffer's queue can be canceled when the **Pause** indicator is on using the **Cancel** button.

- **Amber**: The printer is paused. Print, label feed (advance), and other label routines are suspended until the pause state is removed by pressing **Pause** .
- **Blinking Red**: Printhead Over Temp (temperature) – this status is coupled with a blinking red **Status** indicator. Requires cooling and printer restart.

 **Data Indicator** – Indicates the status of data transfer activity.

- **Off**: Data is not being transferred.
- **Green**: A data communication operation has not finished but is not actively being transferred.
- **Blinking Green:** Data communications are in process.
- **Blinking Amber**: Out of memory while storing content (formats, graphics, fonts, etc.).

 **Supplies Indicator** – Indicates media (label, receipt, tags, transfer ribbon, ribbon cartridge, etc.) status.

- **Red**: There is a media out condition.
- **Blinking Red**: Ribbon Out.

 **Network Indicator** – Indicates network activity and status.

- **Amber**: 10 base Ethernet (LAN) connection detected.
- **Green**: 10/100 Ethernet (LAN) connection detected or when Wi-Fi (WLAN) has a strong signal and is connected.
- **Red**: when an Ethernet (LAN) or Wi-Fi (WLAN) fault occurs.
- **Blinking Red**: during Wi-Fi (WLAN) association.

- **Blinking Amber**: during Wi-Fi (WLAN) authentication.
- **Blinking Green**: when Wi-Fi (WLAN) has completed but has a weak signal.

Meaning of the Indicator Light Patterns

All of the Link-OS Desktop printers have five common status indicators.

These five indicators help you identify issues. The individual indicators tell you the general area of interest. The indicators may be off or on in a variety of lighting patterns of red, green, or amber (orange/yellow). The status indicators can flash (blink), fade (bright to off), alternate between colors, or just remain on. The status information that these lighting patterns represent is detailed in this section.

Status - Typical Operating Conditions

Printer Ready



The printer is powered on and ready to print.

Pause



The printer is paused. The operator must press the **Pause** button to resume print operations.

Media Out



The media (labels, receipts, tags, tickets, etc.) supply is out. The printer needs attention and cannot continue without user intervention.

Transferring Data



Data communications are in process.

Data Transfers Paused



A data communication operation has not finished but is not actively being transferred.

Out of Memory



Out of memory while storing content (formats, graphics, fonts, etc.).

Cover Open/Printhead (PH) Open



The cover (printhead) is open. The printer needs attention and cannot continue without user intervention.

Cut Error (Binding)



The cutter blade is bound and is not moving properly.

Status - Printhead Operation

CAUTION: Hot Surface — The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.

Printhead Over Temp



Out of memory while storing content (formats, graphics, fonts, etc.).

Printhead Under Temp



The printhead is under temperature. Typically, the operating environment is below the printer's minimum operational temperature.

Printhead Shutdown



The printhead is over-temperature. Turn the printer OFF. After several minutes to allow the printer to completely cool, turn the printer ON.

Printhead Resolution Error



The printhead is unable to read the printhead resolution type (dpi). The printhead has been replaced incorrectly or is a non-Zebra printhead.

Unauthorized Printhead Error



The printhead was replaced with one that is not a genuine Zebra printhead. Install a genuine Zebra printhead to continue.

Status - Bluetooth Low Energy (BTLE) Option

Bluetooth LE Paired



Bluetooth Low Energy has paired.

Bluetooth LE Failed to Pair



Bluetooth Low Energy has failed to pair.

Status - Ethernet (LAN) Option

Ethernet (LAN) No Link



No Ethernet link is available. **NETWORK** status is light off

Ethernet (LAN) 100base Link



A 100 Base link was found.

Ethernet (LAN) 10base Link



A 10 Base link was found.

Ethernet (LAN) Link Error



An error condition exists. The printer is not connected to your network.

Status - Wi-Fi (WLAN) Option

Wi-Fi Connecting to WLAN



The light flashes red while the printer associates with the network.

The printer switches to authentication mode with a change to flashing amber.



The light then flashes yellow while the printer is authenticating with the network.

Wi-Fi (WLAN) 100base Strong Link



The printer is connected to your network and the Wi-Fi signal is strong.

Wi-Fi (WLAN) 100base Weak Link



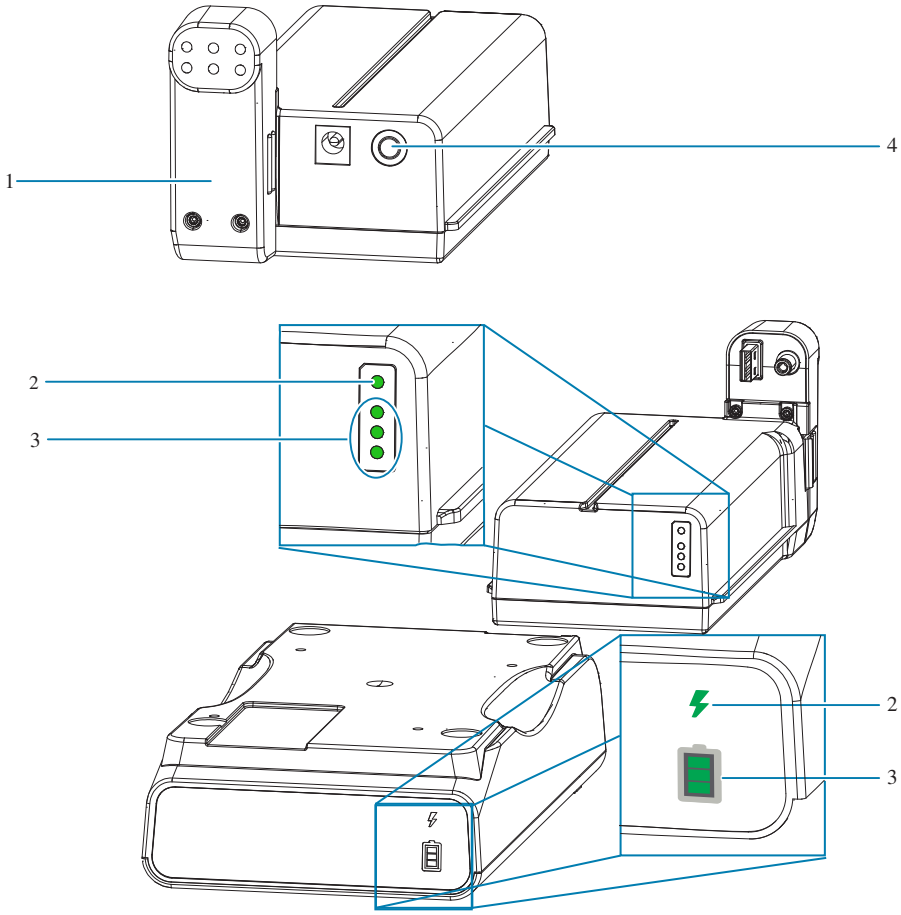
The printer is connected to your network and the Wi-Fi signal is weak.

Battery Indicators and Controls

The battery uses the printer's power supply and its single control button.

The optional printer battery accessory has a simple, one-button, four LED indicator light user interface to control and display battery status and health. The battery acts as a UPS (uninterruptible power supply) for the printer. For more information on using the battery with the printer and power-saving modes (such as sleep or shutdown), see Printing with the Attached Battery Base and Battery Option on page 116.

Figure 10 Battery Controls



1	Rear view of the battery
2	Battery Health indicator
3	Charge Level indicators
4	Battery Control button

Battery Control Button

The button helps you control the battery, both inside and outside of the printer.

- **Battery On** - Press and release.
  - **Wakes up (activates power) the battery from Sleep or Shutdown Modes**. The battery health and charge status are checked. The battery indicators all flash on and off together 3 times. The operator now has one minute to turn the printer on before the battery reverts back to the previous Sleep or Shutdown Mode.
  - **Battery displays the battery level charge during the first 10 seconds** after internal battery health checks are complete

- **Shutdown Mode** - Press and hold the button for 10–11 seconds and release. The battery begins shutdown and approximately 3 seconds later all of the battery LEDs will flash three times to let you know the battery has shut down.

Battery Health Indicator

Displays the battery's charging status and health of the battery.

- **Green** - Good health, charge complete, and ready to operate.
- **Amber** - Charging (printer is OFF).
- **Red** - Battery has an internal error. Remove the battery and see Troubleshooting on page 143.
- **Flashing Red** - Charging error, over or under temperature, internal monitoring error, etc.

Battery Charge Level Indicator

Displays the battery's charging status and health of the battery.

- **Three green bars** on, no flashing - Battery is fully charged. The battery stopped charging.
- **Two green bars** on with the top bar flashing. Less than a full charge.
- **One green bar** flash - Time to charge your battery.
- **No bars** illuminated - Battery needs charging, but the **Battery Health** indicator flashes when the **Battery Control** button is pressed. The printer can not be turned on.
- **Amber** - Charging.

Installing Hardware Options

This section assists you in installing common printer connectivity modules and media handling options.

IMPORTANT:

To simplify and speed up the setup process, install all connectivity modules and media handling options before setting up and using the printer for the first time.

It is strongly recommended that you update the printer's firmware after the printer has completed the setup process. Many of these options have internal firmware that requires an update to operate properly with the printer's Main Logic Board's installed firmware version.

Field Installable ZD411T Accessories and Options

The printer supports a wide variety of user upgrade kits for connectivity, media handling, and power options.

Printer Connectivity Modules

The connectivity module access door must be removed prior to installing the following options — Accessing the Connectivity Module Slot.

- Wireless Connectivity Module - Installing the Wireless Connectivity Module
  - Wi-Fi 802.11ac, Bluetooth 4.2, BTLE 5.0, and MFi 3.0
  - Wi-Fi 802.11ax, Bluetooth 5.3, BTLE 5.3, and MFi 3.0

Media Handling Options

The printer standard bezel must be removed prior to installing the following options — Removing the Standard Bezel.

- Label Dispenser (Peel-Off Liner and Present Label for Operator) - Installing the Label Dispenser
- General Purpose Media Cutter — Installing the Standard Media Cutter
- Media Roll Adapters for 38.1 mm (1.5 in.), 50.8 mm (2.0 in.), or 76.2 mm (3.0 in.) inner diameter media cores - Media Roll Core Size Adapters

Power Base Options

The printer supports a power base field upgrade kit for the printers.

- Battery Power Base (battery pack sold separately) — Installing the Attached Battery Base Options

- Battery Pack (battery power base sold separately) — Installing the Battery into the Attached Power Base

Printer Connectivity Modules

The connectivity modules can be easily installed without tools.



CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Power Failure Recovery Mode Jumper (OFF by Default)

All of the Printer Connectivity Modules have a Power Failure Recovery jumper. It is set to the OFF position by default. With the jumper set to ON, the printer will automatically Power ON when plugged into an active (ON) AC power source (and not powered off).

- See ZD411T Standard Interface Controls on page 31 — **Power** Button - Power Failure Recovery Mode for power ON/OFF behaviors.
- See Setting the Power Failure Recovery Mode Jumper on page 119 for instructions on activating the mode



NOTE: The Power Failure Recovery Mode is only available on printers with a Printer Connectivity Module installed in the printer.

Configuring Wired Connectivity Options and Power Failure Recovery Mode

Use this reference to assist in upgrading, reconfiguring, troubleshooting the printer; and setting the Power Failure Recovery Mode on the connectivity option cards.

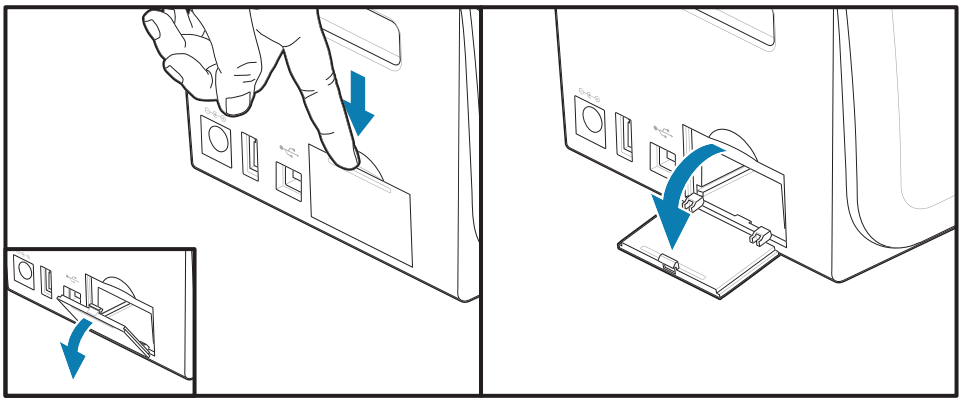
Accessing the Connectivity Module Card or Empty Slot

CAUTION—HOT SURFACE: The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.

Installation Preparation – No tools are needed for this procedure.

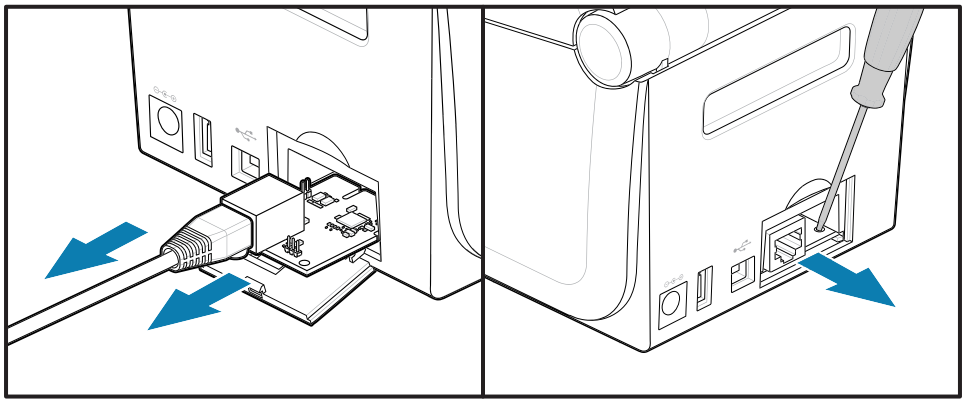
- Disconnect the DC power plug from the rear of the printer.
- Remove any interface cables and USB devices from the printer to protect you and the printer.
- This will help avoid accidents and damage to the printer and you.

Open the module access door by pushing down on the top of the door with your fingertip. This releases the latch. Pull the door down and away from the printer.

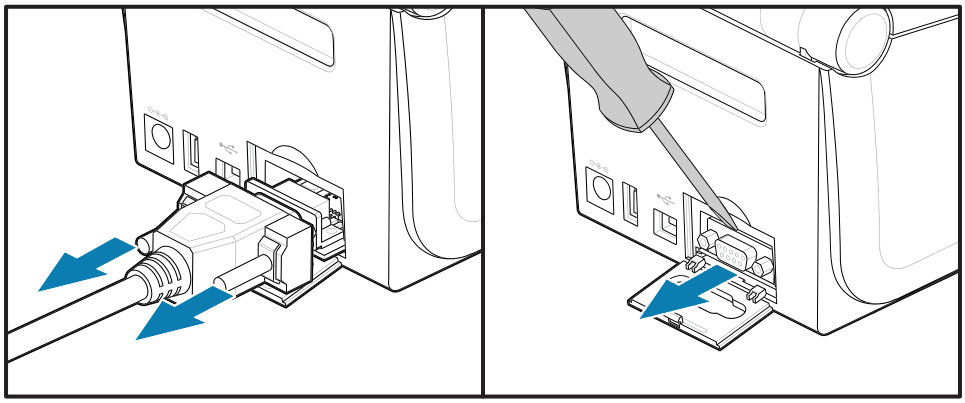


Removing a Connectivity Module Card

The module cards have a hole punched into the edge of the module card to pull the card out. Use your fingers, a connected cable connector body, or a pointy-tipped object to pry the card out.



The Serial Port Module requires the use of fingers, a scribe, or a small flat-bladed screwdriver to pry the card out.



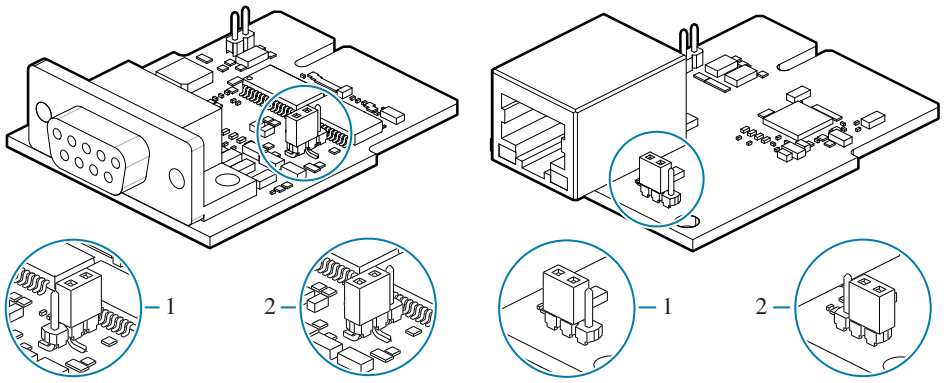
Setting the Power Failure Recovery Mode Jumper

NOTE:

The Power Failure Recovery Mode is only available on printers with a Printer Connectivity Module installed in the printer.

The Printer Connectivity Modules have a Power Failure Recovery jumper set to OFF. With the jumper set to ON, the printer will automatically Power ON when plugged into an active (ON) AC power source.

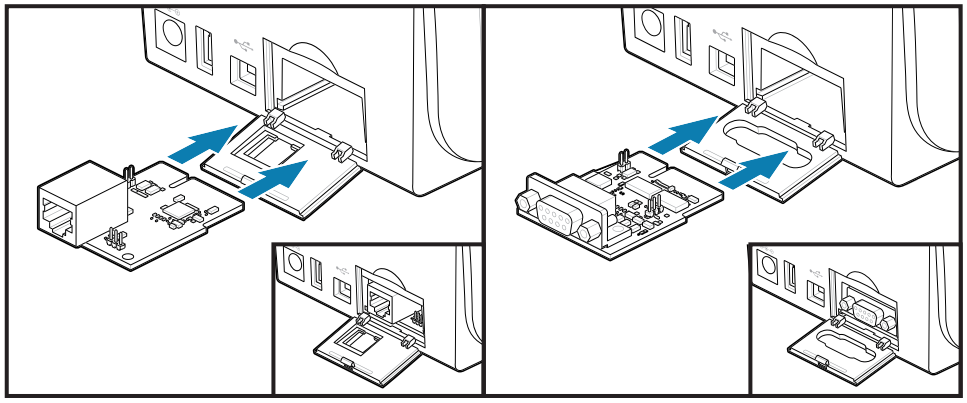
Move the AUTO (Power Failure Recovery Mode) jumper from the OFF position to the ON.



1 – Default: Power Failure Recovery Mode is OFF	2 – Power Failure Recovery Mode is ON

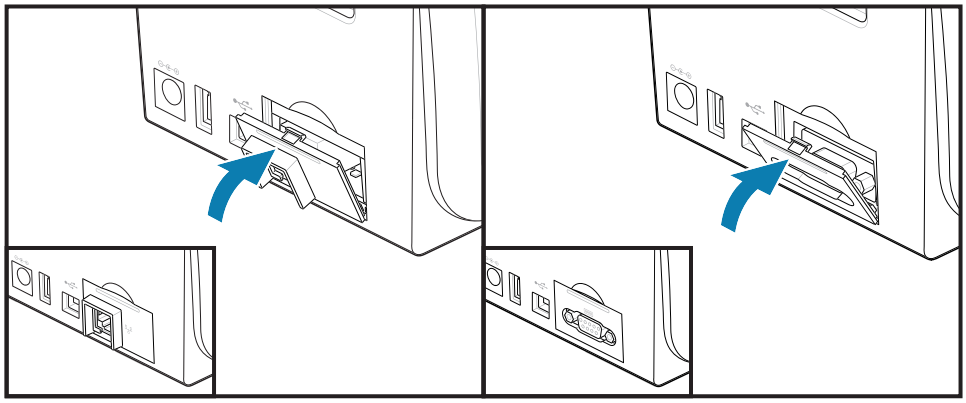
Installing a Connectivity Module Card

Push the circuit card in slowly but firmly until the card is just past the inside lip of the access door.



Installing a Connectivity Module Door

Align the bottom of the door to the bottom lip of the module access opening. Swing the door up and snap the cover closed. The locking tabs hook to the base under the inserted module card.



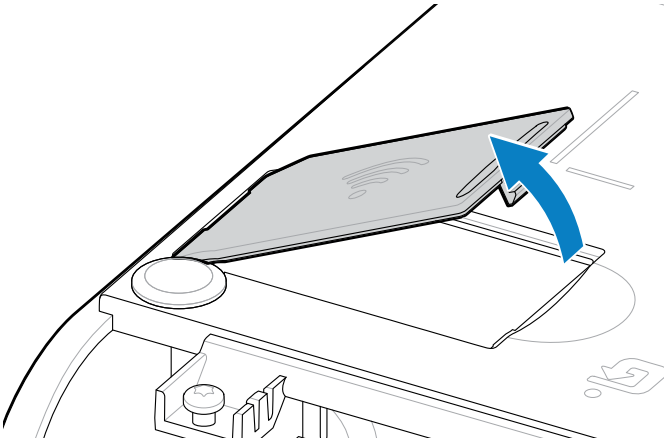
Installing the Wireless Connectivity Module

The wireless connectivity module provides Wi-Fi connectivity for the printer. Install it to allow your printer to connect to Wi-Fi networks.

CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

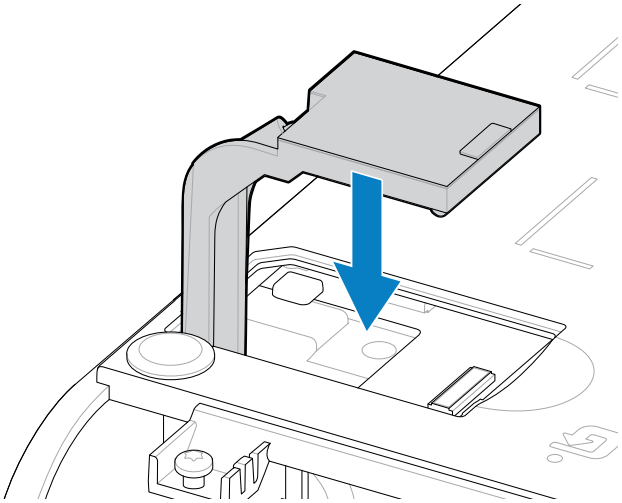
1. Remove the media roll from the Media Roll Holder.
2. Disconnect the DC power plug from the rear of the printer.
3. Remove any interface cables and USB devices.
4. Turn the printer over to access the wireless connectivity door located at the bottom of the printer.
5. Open the module access door by pushing the latch at the top of the door. The printer base has a recessed area for your fingertip.

   The latch releases.
6. Lift and swing the door up to remove it.

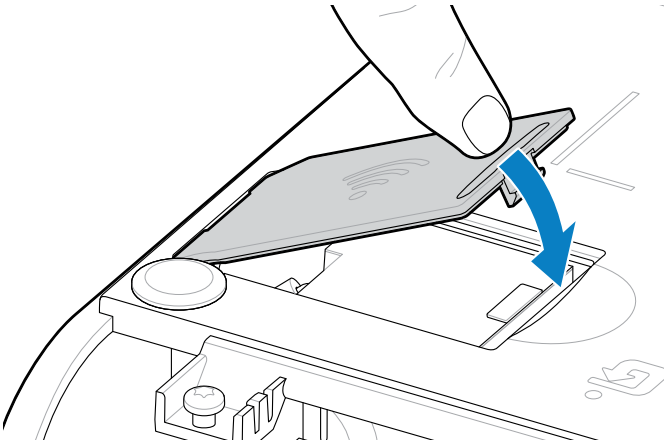


7. Align the antenna arm and lower the module into the printer body.

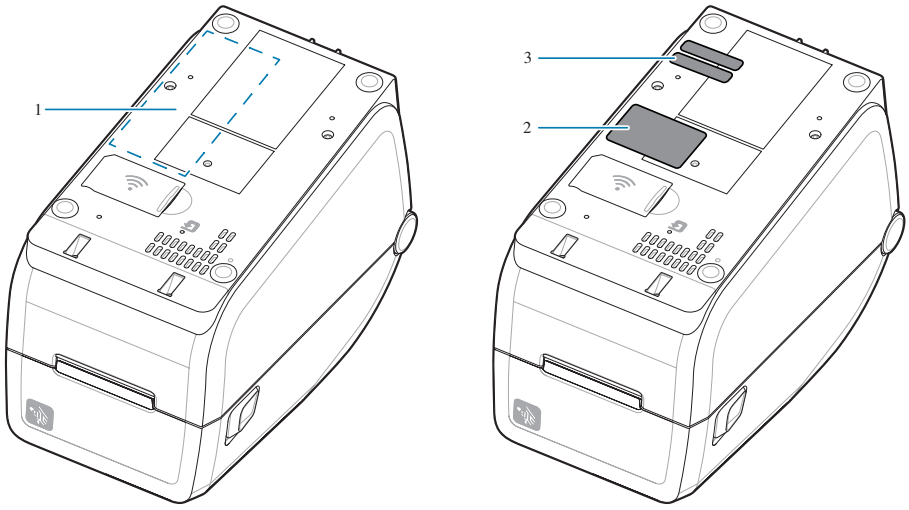
NOTE: Ensure the printer's Wi-Fi connector aligns with the module's connectors.



8. Align the shortest side of the wireless connectivity door to the shortest side of the opening.
9. Swing the door closed and push down to lock the latch.



10. Place the three labels included on the bottom of the printer (1). These labels (2 and 3) assist with the printer configuration (and later reconfiguration) of the printer. Mobile apps, use of scanners, and printer support are aided by these printer configuration labels.



Re-connect the printer's power and interface cables after all hardware upgrade kits have been added to the printer.

NOTE: It is recommended that you update the printer firmware to verify that the printer and wireless module are at the same and latest version. See Updating Printer Firmware on page 142.

IMPORTANT:

The Wireless Connectivity Module needs to have Wi-Fi and Bluetooth configured to communicate with the printer.

The network automatically provides a new IP address when the printer is turned on. The Windows printer driver uses a static IP address to connect to the printer, usually used in controlled networking environments. See Setting Up the Wi-Fi Print Server Option on page 101.

See the following manuals on the Zebra website at zebra.com/manuals.

- Wired and Wireless Print Server User Guide
- Bluetooth Wireless Guide

Media Handling Options

Use these easy-to-add media options to modify the printer to your media needs.

The printer will verify any hardware changes and configure the printer as needed during restart.

- The printer will not detect Media Roll Core Size Adapter addition or changes.
- These media options do not require removal for normal operation and cleaning.
- ZD Series Cutters are self-cleaning by design and do not require internal cleaning with the use of Zebra media and supplies.

NOTE: You should not remove and replace Media Handling Options as a general practice. Only remove for repairs.

CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Installing Dispense, Cut, and Tear Media Handling Options

The printer uses a common installation and mounting method for the label dispensers, cutter, and label tear-off printer option kits.

Removing Media Handling Options

To protect you and the printer, before installing, reconfiguring, or troubleshooting media handling options in your print please do the following.

- Remove the media roll from the Media Roll Holder.
- Disconnect the DC power plug from the rear of the printer.
- Remove any interface cables and USB devices.

Tools Required:

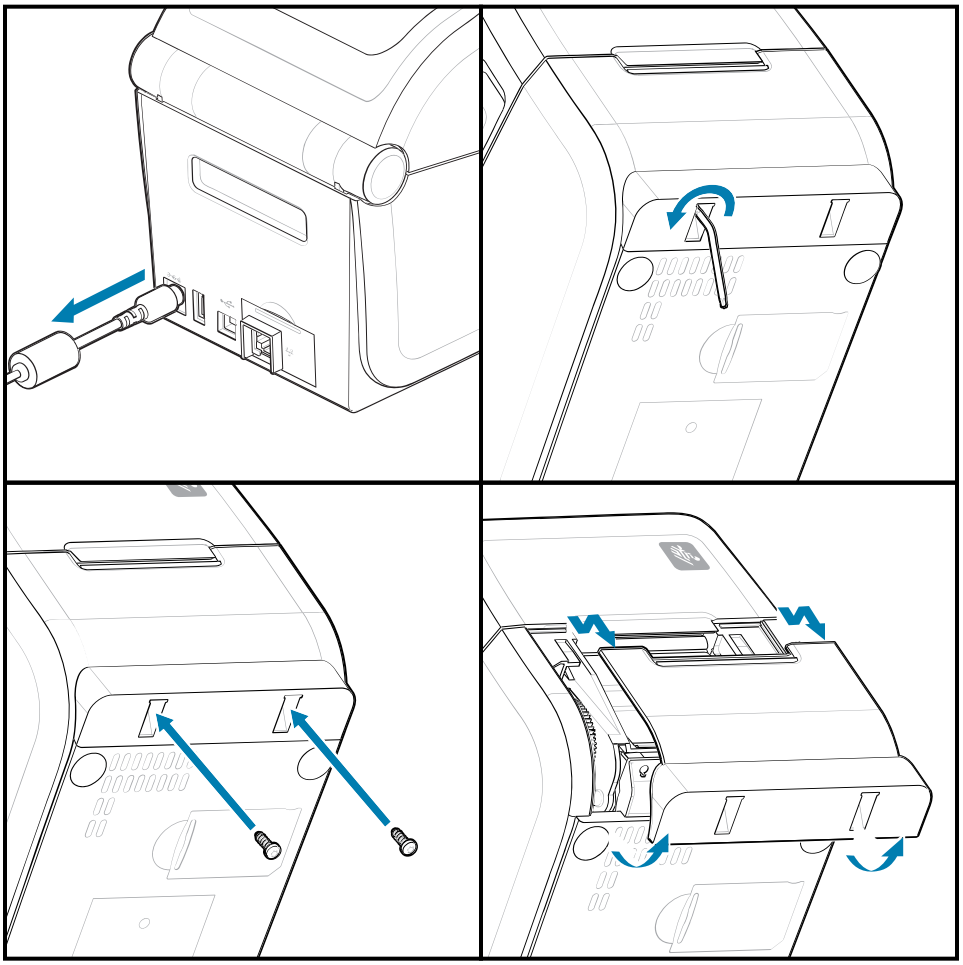
Upgrade kits come with a common T10 hexolobular Allen-style wrench.

IMPORTANT: You should not remove and replace connectivity modules as a general practice.

IMPORTANT: The printer will verify any hardware changes and configure the printer as needed during restart. For optimal printer performance, update the printer's firmware immediately after the printer's initial setup is done or after upgrading the printer is completed. See Updating Printer Firmware on page 142.

The standard Tear option bezel is removed the same as other media handling printer options.

1. Turn the printer upside down. Remove the two mounting screws.
2. Slide the bezel along the front of the printer about 12.5 mm (0.5 in.) towards the printer base. Pull the loose bezel straight out the front of the printer.

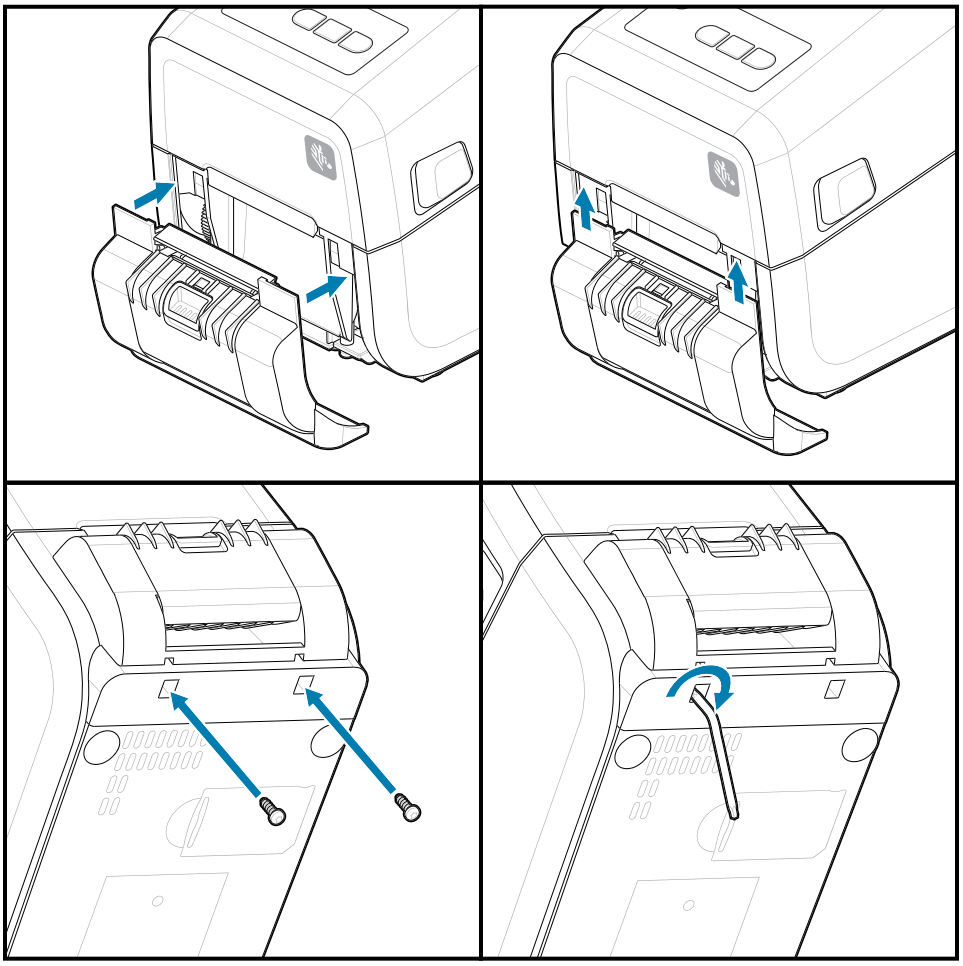


Installing Media Handling Options

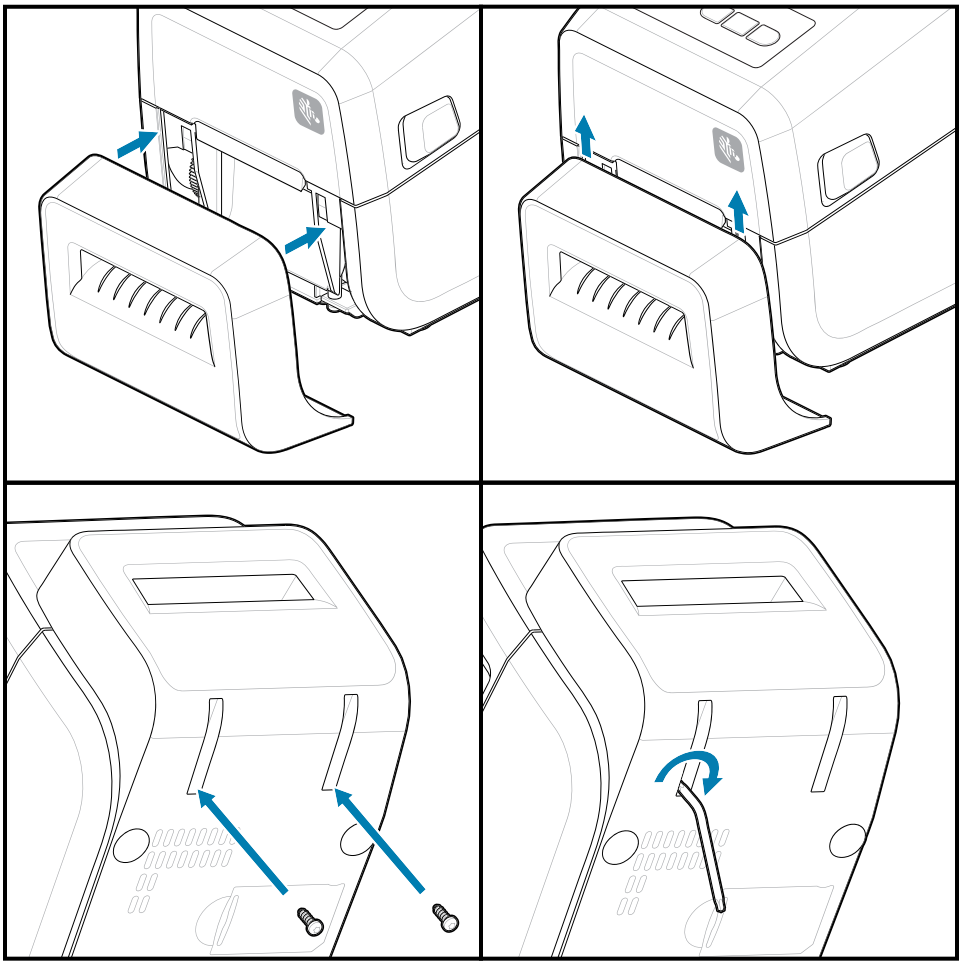
See the illustrations for attaching media option bezels to the printer.

1. Center and push the module onto the front of the printer and slide it into the front of the printer.
2. Attach the option module to the printer with the two screws.

Installing a Label Dispenser



Installing a Media Cutter



Media Roll Core Size Adapters

This option kit modifies the printer to use media rolls with larger inner roll core diameters.

The media roll adapters option kit includes the screws to attach them. The kits are for the following inner diameter media cores:

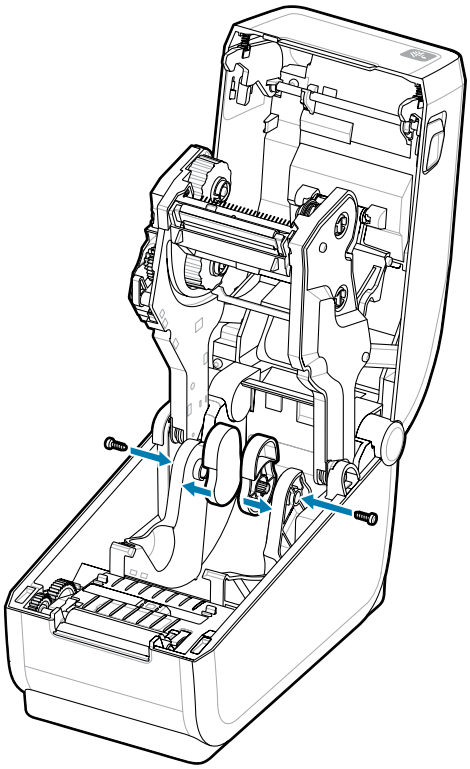
- 38.1 mm (1.5 in.)
- 50.8 mm (2.0 in.)
- 76.2 (3.0 in.)

Adapter Usage

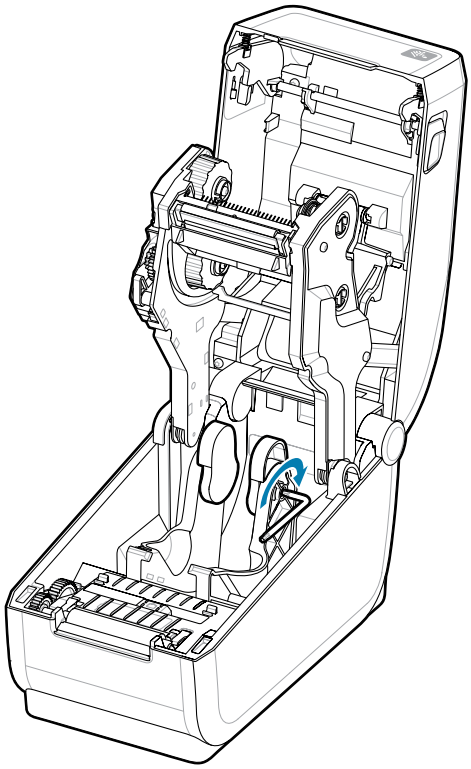
- The adapters are intended to be permanently installed in the printer.
- Adapters may be changed to support other media roll sizes.
- The adapters may loosen if they are changed too many times.
- Remove any debris from the media roll bay before placing a new media roll.

Installing Media Roll Adapters

1. Each roll holder gets one adapter.

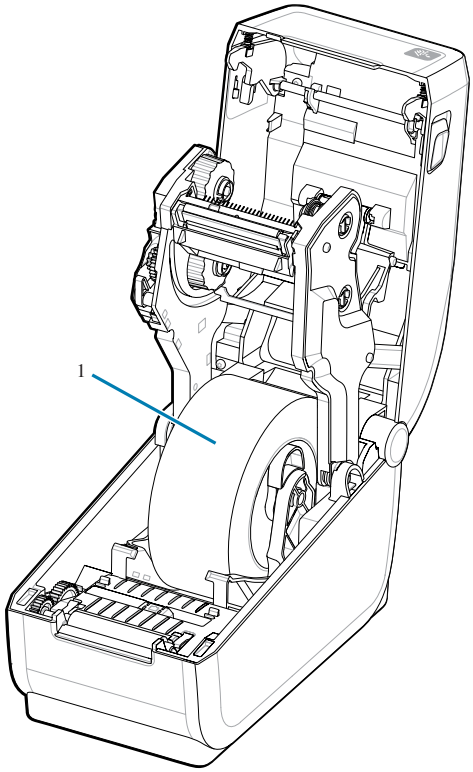


2. Place the adapter onto the roll holder.



3. Attach the adapter to the roll holder using a screw.
4. Tighten the screw until there is no gap between the adapter and the roll holder. Do not tighten beyond this point. Over-tightening will strip the thread.
5. Repeat for the other adapter and roll holder.

Example of a label roll (1) placed on the adapters.

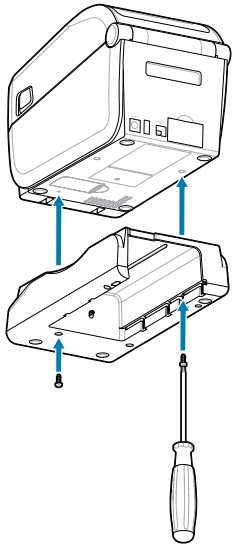


Installing the Attached Battery Base Options

Easily attach the printer battery base to the printer. The battery is sold separately.

- Remove any media rolls from the printer.
- Remove the DC power cable from the back of the printer.
- Remove any attached printer interface cables.

1. Turn the printer over and align the battery base to the bottom of the printer with the printer power plug oriented toward the rear of the printer. The printer's rubber feet align with recesses at the top of the battery base.



2. Use the two screws provided to attach the battery base to the printer. Tighten the screws using the T10 hexolobular wrench.

The battery is now ready to be installed in the printed battery base.

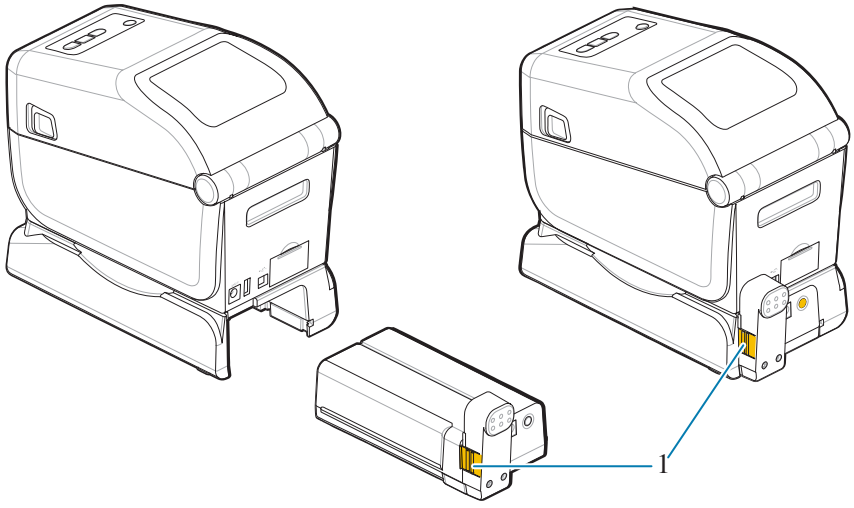
Installing the Battery into the Attached Power Base

Describes how to add the battery to the battery base attached to the printer.

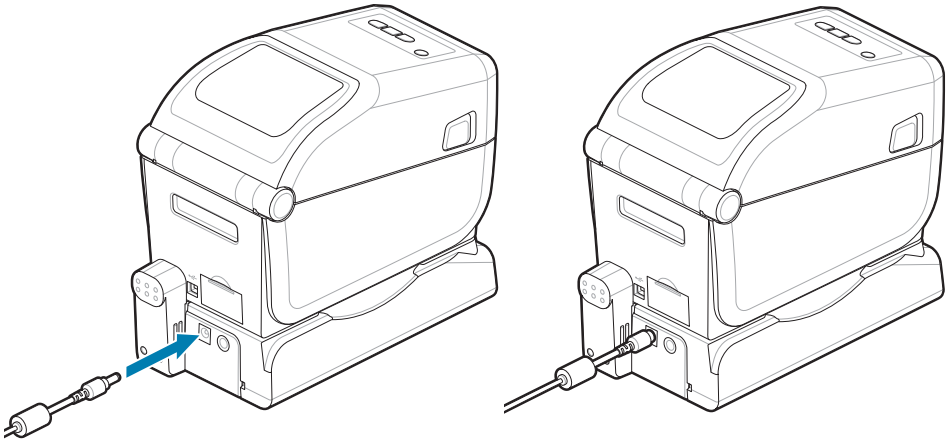
IMPORTANT: The printer must have an Attached Battery Base securely installed to the printer to keep it from damaging the printer or battery.

IMPORTANT: Batteries are shipped in Shutdown Mode for safety and to keep the battery from discharging during storage and shipping. The battery requires charging prior to initial use with the printer.

1. Disconnect the printer's external power supply from the DC Power Input located in the rear of the printer.
2. Slide the battery into the battery base's battery slot. Push the battery into the base until the battery pack is flush with the rear of the battery base, and the connectors on the battery pack are engaged with the ports on the back of the printer. The battery latch (1) locks the battery in place.



3. Attach the printer's power supply to the battery to wake up the battery from Shutdown Mode and begin its initial charge.



4. Charge the battery. The battery must be fully charged before its first use.

   See Battery Indicators and Controls on page 36 to learn how to:

   - Turn the battery on.
   - Discover battery charge-saving features and behaviors.
   - Check the battery's charge level and health.

5. The printer will take approximately two hours to reach a full charge. The battery status (health) indicator (lightning bolt) will go from Amber (Charging) to Green (Charged)

ZD411T Printer Setup

This section assists you in setting up and operating your ZD411T printer. The setup process is broken down into two phases: hardware setup and host system (software/driver) setup. This section covers the physical hardware setup needed to print your first label.

Modifying or Viewing Secured Features

Some features may be locked either by default or by choice, and you need to perform certain tasks before they can be modified.

EU RED

If you purchased your printer within Europe, Middle Eastern, or African (EMEA) countries on or after August 1, 2025, the printer comes with specific security features to meet the EU Radio Equipment Directive (RED) requirements. As part of the setup process, you must set a Protected Mode password and configure Protected Mode before you can modify certain settings.

For more information, go to zebra.com/asr or refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

Protected Mode

For printers that already have Protected Mode set up, you need to enter the Protected Mode (admin) password to change certain settings on the printer. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

ZD411T Printer Setup Overview

This list highlights important steps and warnings for the basic printer setup process.

Go to the Zebra Support page and look in the **Drivers** section to download the recommended **Windows Printer Driver v8**.

- ZD411T Thermal Transfer printer — https//www.zebra.com/zd411t-info

IMPORTANT: Do not connect your printer to a computer yet!

- If you connected your printer to a computer via USB before driver installation, the printer might appear as an unknown (unspecified) device in “Devices and Printers.”
- If necessary, follow these recovery steps before proceeding to Step 1.

NOTE: You will need a roll of media (labels, receipt paper, or tags) to set up your printer for the first test print. See the Zebra Web site or contact your reseller to help you select the right media for your use. Find media at http:www.zebra.com/supplies.

This is a simplified instruction list to assist you in planning a basic printer setup.

1. Run the downloaded **Windows Printer Driver v8** file from your Windows computer. The driver executable file (such as zd86423827-certified.exe) is added to your Download folder.

   See Pre-installing the Window's Driver.

2. Place the printer in a safe location with access to power and where you can connect with interface cables or wirelessly to the system.
   - See Select a Location for the Printer.
   - See Attaching the Printer Power.
   - See Interface Cable Requirements.
3. Remove the outside layer of your media roll to keep grit, adhesive, and other handling contaminants from damaging the printhead.
4. Load media. Typically this is a roll of labels, receipt paper, or tags. See How to Load Roll Media.
   - For label and receipt (continuous) media roll, see Adjusting the Movable Sensor for Web/Gap Sensing.
   - For label and receipt (continuous) media roll, see Adjusting the Movable Sensor for Black Marks or Notches .
5. Load ribbon if you are printing on thermal transfer media. See Using Thermal Transfer Ribbon in the Printer and Loading Zebra Transfer Ribbon.

   The media settings must match the actual media that you are using. See How to identify media type on the Zebra website.
6. Turn the printer ON. The USB cable should not be connected to the computer!
7. Calibrate media properties and label positioning. See Run a SmartCal Media Calibration.
8. Print a Configuration Report as a test print. See Print a Configuration Report to Test Printing. The information needed to identify and select the printer driver is at the top of the report. Use it to connect to printer communications ports.
9. Turn the printer OFF.
10. **For USB printer communication ports**, connect the supplied USB cable to the printer. The printer can connect to multiple uniquely named ports.

IMPORTANT: You must have the **Windows Printer Drivers v8** installed prior to powering the printer ON with the USB cable connected to the computer.

- See Pre-installing the Window's Driver to pre-load the drivers before continuing.
- If you connected your printer to a computer via USB before driver installation, the printer might appear as an unknown (unspecified) device in “Devices and Printers.”
- If necessary, follow these recovery steps before proceeding to Step 1.

11. **For non-USB printer communication ports**, run the **Windows Printer Driver v8** previously used to preload the drivers. The driver executable file (such as zd86423827-certified.exe) was added to your Download folder. See Running the Printer Installation Wizard on page 96.

12. Turn the printer ON when instructed.
    - Windows should automatically detect and configure your printer for USB port operations.
    - Network (Ethernet and Wi-Fi), Bluetooth, and Other (serial port) will require additional setup. Follow the on-screen instructions and prompts to complete the wizard.
    - The printer can connect to multiple uniquely named ports.

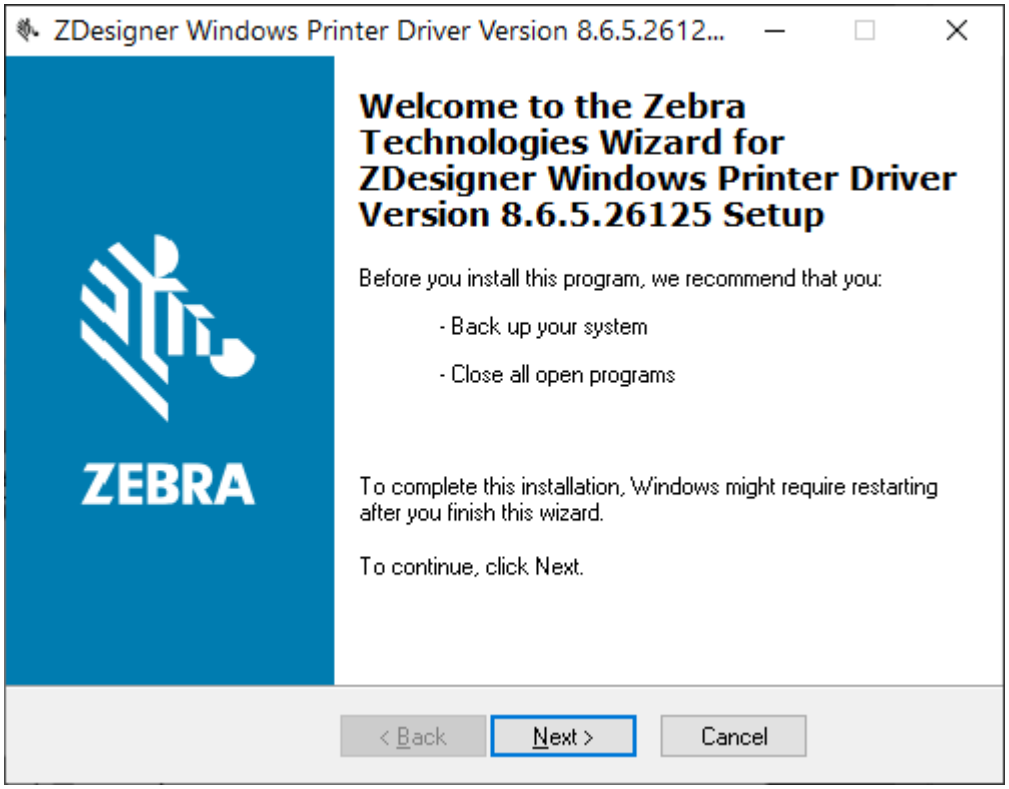
Pre-installing the Window's Driver

Pre-installing the printer driver is an important first step in setting up your printer.

The Windows Printer Driver v8 has been preloaded

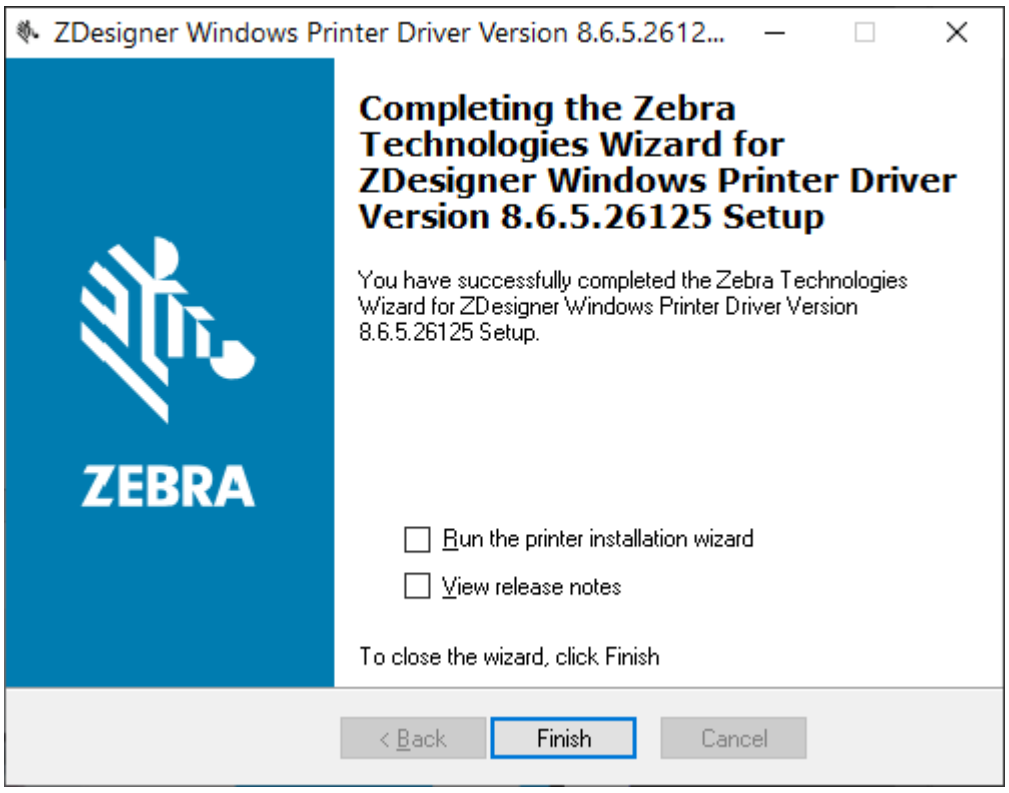
1. Navigate to www.zebra.com/drivers.
2. Click **Printers**.
3. Select your printer model.
4. On the printer product page, click **Drivers**.
5. Download the appropriate driver for Windows.

   The driver executable file (such as zd86423827-certified.exe) is added to your Download folder.
6. Run the executable file and follow the prompts.



7. Review the settings before continuing and the drivers will finish pre-loading after setting the checkboxes.
   a) **To pre-install the drivers only:** Unselect **Run the printer installation wizard** to disable running the print wizard until the printer is operating without a computer.

b) Click **Finish**.



8. The drivers will be pre-installed and the window will close automatically went finished.

Select a Location for the Printer

The printer and media need a clean safe area with moderate temperatures to have optimal print operations.

Select a location for the printer that meets these conditions:

- **Surface:** The surface where the printer will be located must be solid, level, and of sufficient size and strength to hold the printer with media.
- **Space:** The area where the printer will be located must include enough space for opening the printer (media access and cleaning), and for printer access to connectivity and power cords. To allow for proper ventilation and cooling, leave open space on all sides of the printer.

IMPORTANT: Do not place any padding or cushioning material under or around the base of the printer because this restricts airflow and could cause the printer to overheat.

- **Power:** Place the printer close to an easily accessible power outlet.
- **Data Communication Interfaces:** Ensure that cabling and Wi-Fi or Bluetooth radios do not exceed the maximum distance specified by the communication protocol standard or product data sheet for this printer. Radio signal strength can be reduced by physical barriers (objects, walls, etc.).
- **Data Cables:** Cables should not be routed with or near power cords or conduits, fluorescent lighting, transformers, microwave ovens, motors, or other sources of electrical noise and interference. These interference sources may cause problems with communications, host system operation, and printer functionality.

- **Operating Conditions:** The printer is designed to function in a wide range of environments.
  - **Operational Temperature:** 0–40°C (32–104°F)
  - **Operational Humidity:** 20–85% non-condensing
  - **Non-Operational Temperature:** -40–60°C (0–140°F)
  - **Non-Operational Humidity:** 5–85% non-condensing

Pre-Install Printer Options and Connectivity Modules

Pre-Install the following printer options before proceeding with the printer's setup. The printer auto-detects and updates the option hardware and the printer's hardware configuration. The media roll size adapters are not detected. These may be needed for your chosen media.

-
- Internal Wireless connectivity:
  - Wi-Fi (802.11 ac – includes a/b/g/n), Bluetooth 4.2 (4.1 compatible), and BLE 5.0.
  - Wi-Fi (802.11ax – includes a/b/g/n), Bluetooth 5.3, and BLE 5.3.
- Label Dispenser (Peel-Off Liner and Present Label for Operator) - Installing the Label Dispenser
- Cutter - Installing the Cutter
- Media Roll Core Size Adapters for 38.1 mm (1.5 in.), 50.8 mm (2.0 in.), or 76.2 (3.0 in.) inner diameter media cores

Attaching Printer Power

This procedure guides you through attaching the power supply to a grounded power source and the printer.

CAUTION: Never operate the printer and power supply in an area where they can get wet. Serious personal injury could result!

NOTE: Set up the printer so that you can handle the power cord easily if needed. Some processes for setup or troubleshooting issues may ask you to remove power. Separate the power cord from the power supply receptacle or AC electrical outlet to ensure that the printer cannot carry electrical current.

Connect power in this order.

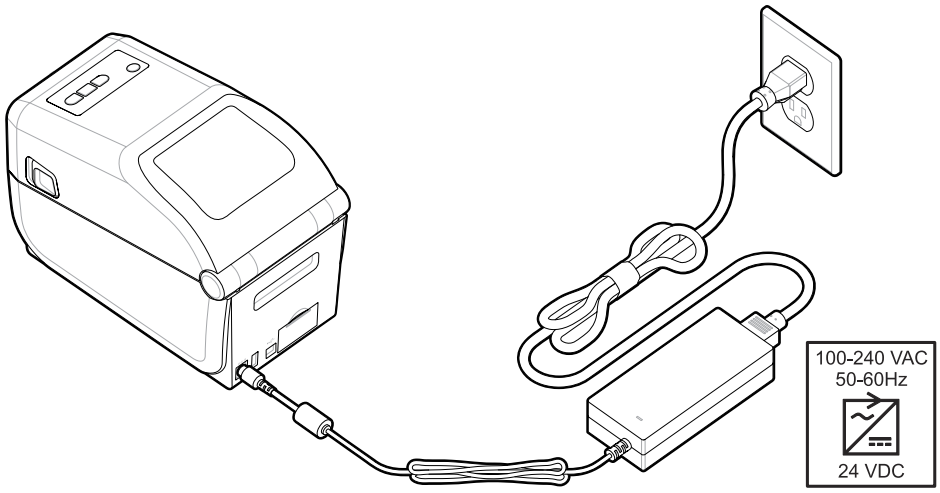
1. Plug the power supply into the printer's DC power receptacle.
2. Insert the AC power cord into the power supply.

IMPORTANT: Ensure the appropriate power cord with a three (3) prong plug and an IEC 60320-C13 connector are used at all times. These power cords must bear the country's relevant certification mark in which the product is being used.

3. Plug the other end of the AC power cord into an appropriate AC electrical outlet. the AC outlet end of the power cord's plug type can vary by region.

NOTE: The AC outlet end of the power cord's plug type can vary by region.

The active power light will turn on (green) if power is ON at the AC outlet.


100-240 VAC
50-60Hz
24 VDC

Getting Ready to Print

Get labels ready following a few easy practices and can help maximize print quality and printer life.

IMPORTANT: The printer does not come with labels or other media. The media may be labels, tags, tickets, receipt paper, fan-fold stacks, tamper-proof labels, etc. Ideally, choose the same labels or other media needed for your planned use of the printer. The printer setup cannot be completed without media.

The Zebra Web site or your reseller may be able to help you select the right media for your intended printing application. Find all your labels and other media type designed for use in your printer at zebra.com/supplies.

Preparing and Handling Labels and Media

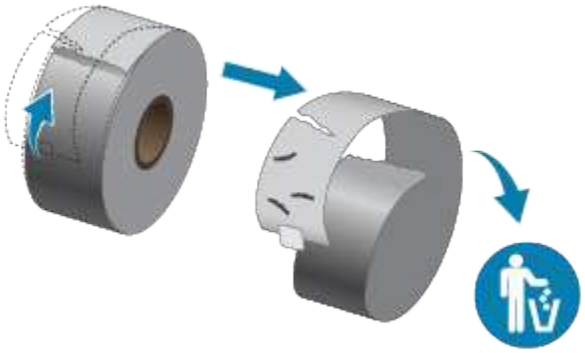
Careful handling and storage of your media are important in order to maximize print quality.

The media comes in protective packaging. Once the labels or other media have been removed from its packaging, it will typically pick up dust and particles from work and storage surfaces.

If the media becomes contaminated or dirty, it can damage the printer and cause defects in the printed image (voids, streaks, discoloration, compromise the adhesion of the adhesive, etc.).

IMPORTANT: During manufacturing, packaging, handling, and storage, the outside length of media may become dirty or contaminated. This will remove any contaminants which might be transferred onto the printhead during normal operation.

Remove the outside layer of the media roll or the top label of the stack.



Media Storage Tips

Storing media safely and managing your supplies will keep your media ready to use.

- Store media in a clean, dry, cool, dark area. Direct thermal media is chemically treated to be heat sensitive. Direct sunlight or heat sources may expose the media.
- Do not store media with chemicals or cleaning products.
- Leave media in its protective packaging until it is going to be put in the printer.
- Many media types and label adhesives have a shelf life or expiration date. Always use the oldest, viable (non-expired) media first.

Loading Roll Media in the ZD411T Printer

All of the Link-OS printers load print labels and media rolls the same.

- **Label media** uses the sensor to look through the media backing (liner) to see the beginning and end of labels on the roll
- **Marked media** (black lines, black marks, notches, or holes) to define the print length
- **Continuous** (receipt, etc.) with no marks to define the print length

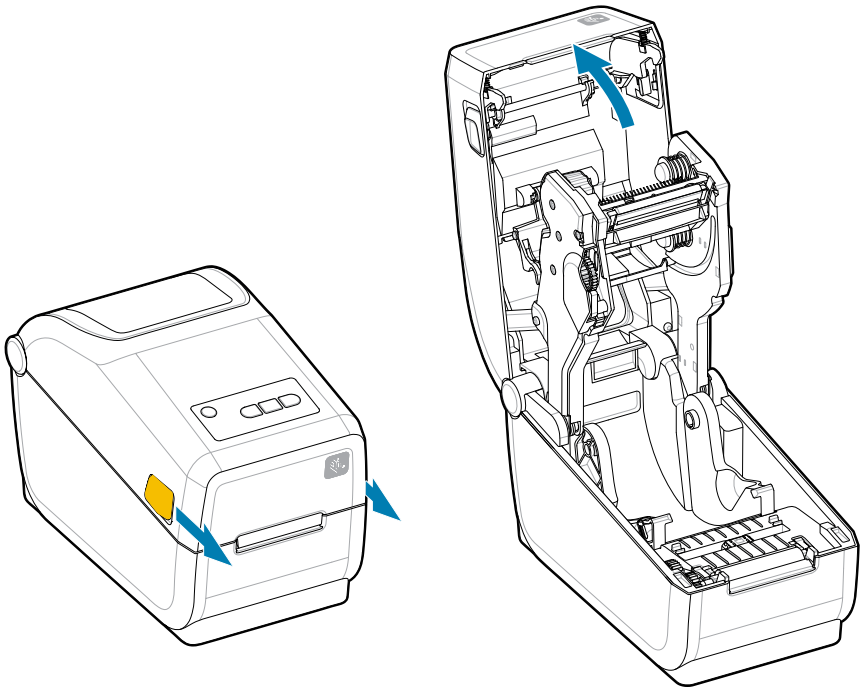
Setting Media Sensing by Media type

- **For web/gap label media**, the printer senses the differences between the label and the liner to determine the print format length.
- **For continuous roll media**, the printer only senses the media's characteristics. The print format's length is set by programming (driver or software) or the last stored form's length.
- **For black mark media**, the printer senses the beginning of the mark and the distance to the start of the next black mark to measure the print format length.
- **For other common media and setting variations**
  - Setup printing with the Label Dispenser Option after you have loaded media using this procedure.
  - For loading fan-fold media, see Printing on Fan-Fold Media. Those instructions replace steps 1-4 for loading roll media.

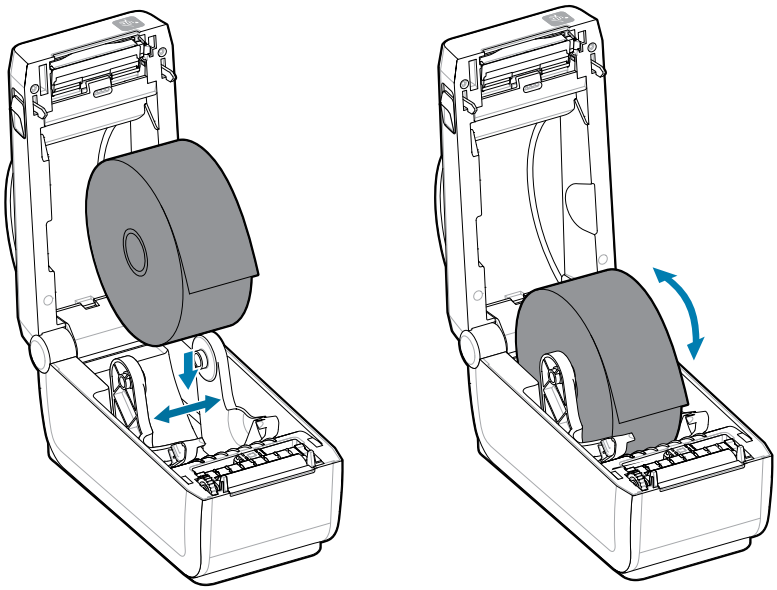
How to Load Roll Media – ZD411T

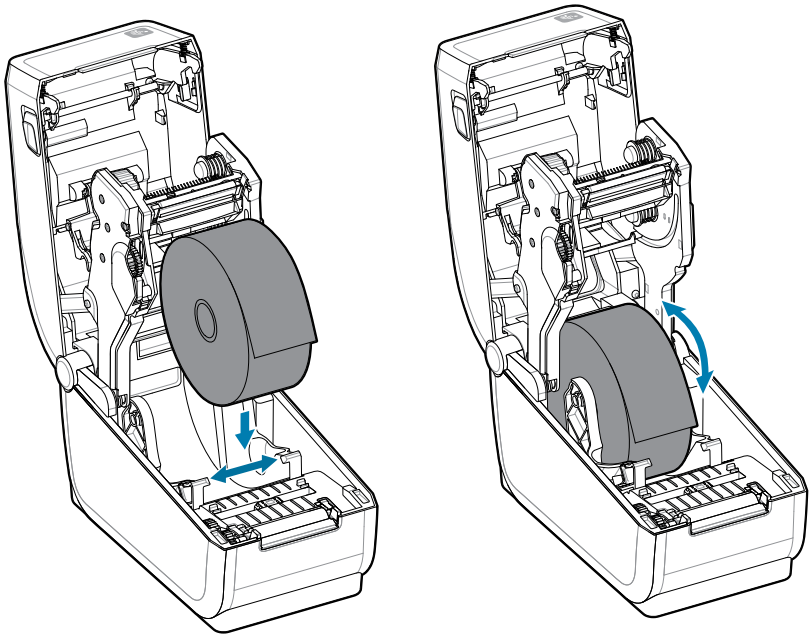
This procedure works for Tear-Off (standard bezel), Label Dispense, and Media Cutting printer options.

1. Slide the release latches to the front to unlock the cover.

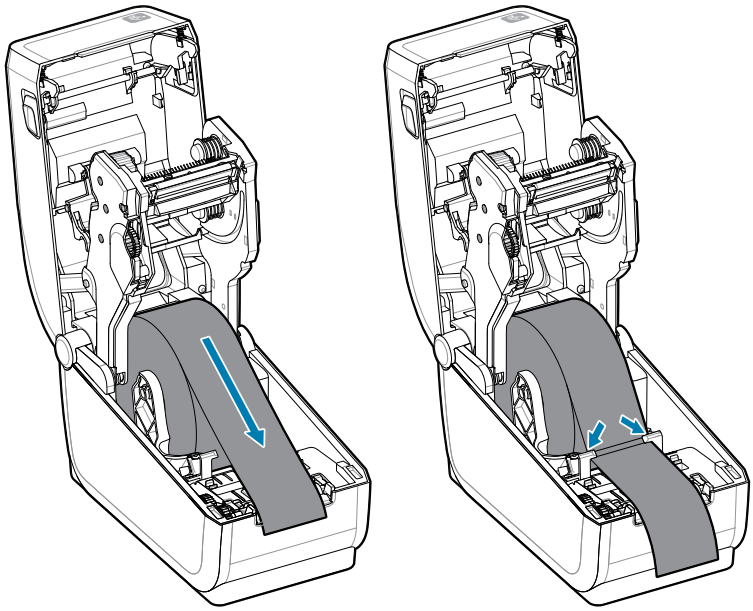


2. Spread the roll holders open and place the roll into the printer.

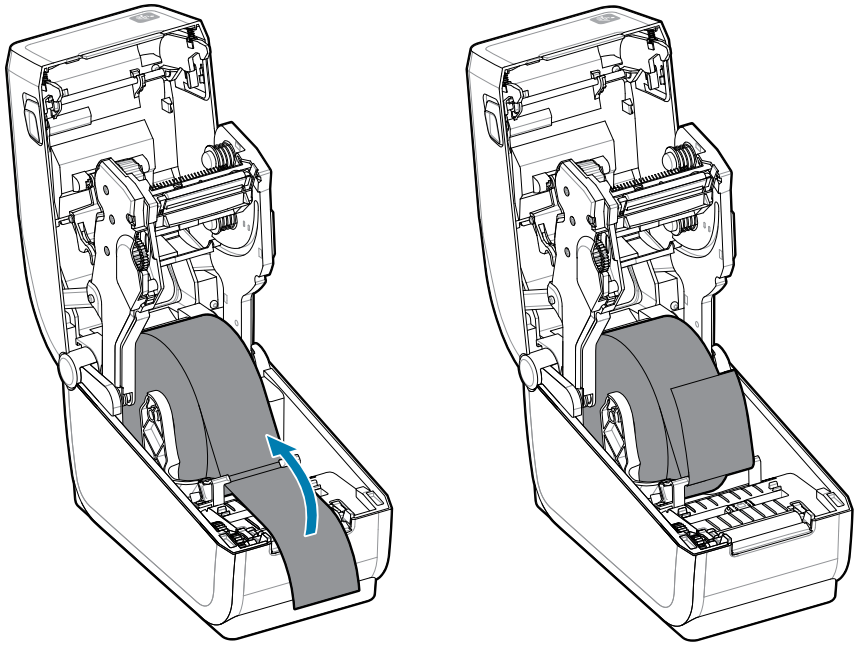




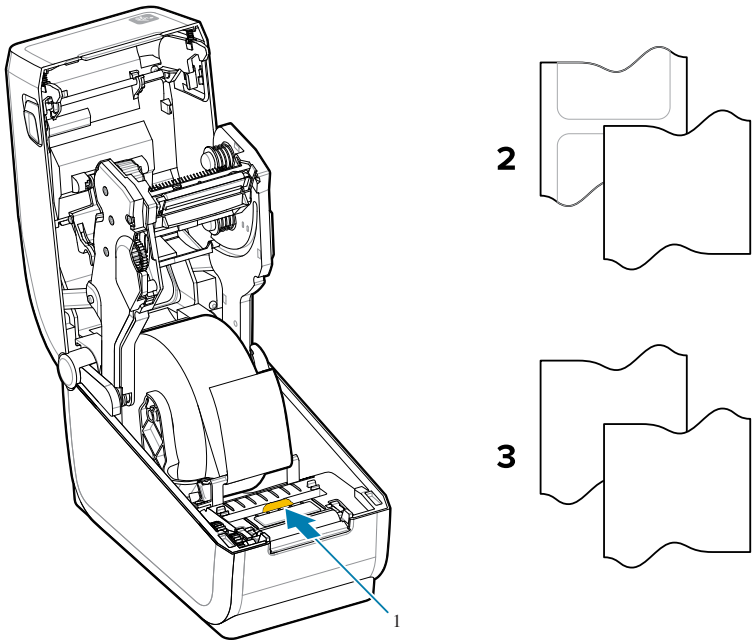
3. Verify the roll turns freely. The roll must not sit in the bottom of the media compartment.
4. Pull the end of the roll past the front edge of the printer.
5. Push the media under both of the media guides.



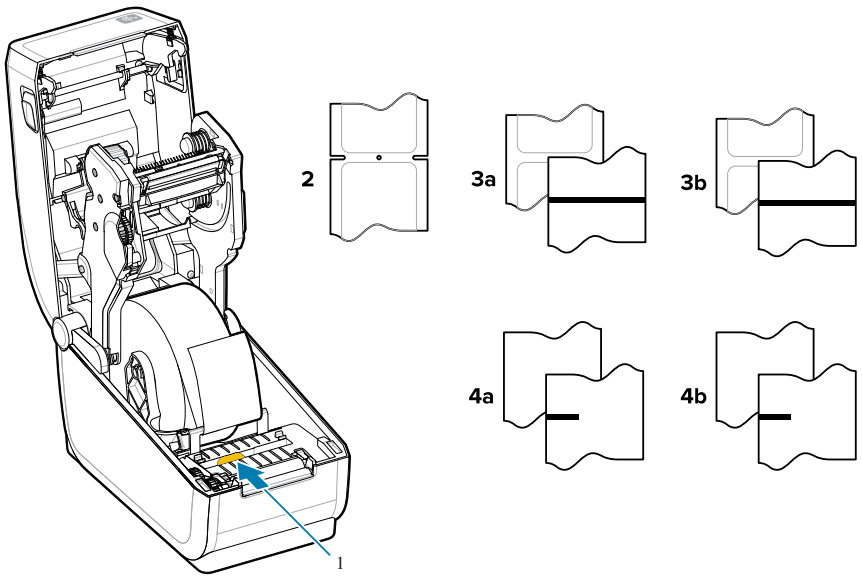
6. Flip the media up to access the sensor and the backside of the media.



7. Align the movable media sensor for your media type.



1 – Default Sensor Position (transmissive web/gap sensing)	2 – Standard Labels	3 – Standard Receipt (continuous roll shown in the printer)



1 – Off-Center Positions (Reflective)	3a – Blackline Label	4a – Black Mark Label (shown in the printer)
2 – Notched or Hole (label or tear-off)	3b – Blackline Tear-Off (continuous)4b – Black Mark Tear-Off (continuous)	4b – Black Mark Tear-Off (continuous)

Using the Movable Sensor

This adjustable sensor allows you to use a wide variety of media and media tracking/positioning methods.

The movable sensor is a dual function sensor. It provides transmissive (sees through media) and reflective media sensing. The printer can use either sensing method, but not both at the same time.

The movable sensor has a center array of sensors. This provides an adjustable transmissive web/gap sensing to positions that match legacy Zebra desktop printer sensor locations and positions in between. This also provides for use of some atypical media variations or irregularly shaped media.

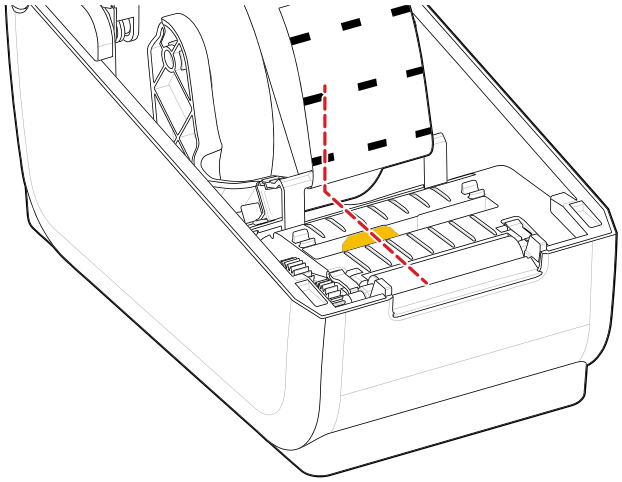
The movable sensor allows the printer to use media with black marks or notches (holes through the media) on the backside of the media (or media liner). Align the sensor to the middle of black marks or notches not in the center of the media roll to avoid web/gap sensing array.

Adjusting the Movable Sensor for Black Marks or Notches

The printer sensing for black marks and notches uses reflective sensing. Reflective (area) sensing does not work in the default sensing position.

The black mark sensing looks for non-reflective surfaces such as black marks, black lines, notches, or holes on the back of the media which do not reflect the sensor's near-infrared light beam back to the sensor's detector. The sensor light and its black mark detector are next to each other under the sensor cover.

- Position the sensor alignment arrow to the middle of the black mark or notch in the underside of the media.
- Sensor alignment should be set as far as possible from the edge of media but where 100% of the sensor window is covered by the mark.
- When printing, the media can move from side to side ±1mm (due to media variations and edge damage due to handling). Notches cut into the side of the media can also become damaged by handling.



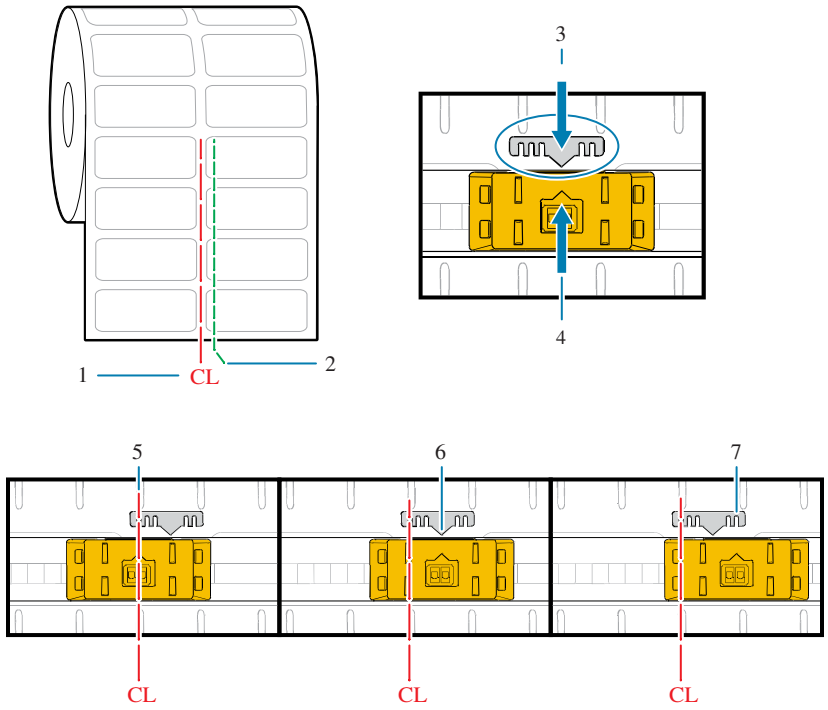
Adjusting the Movable Sensor for Web/Gap Sensing

The printer sensing for standard media uses transmissive (see-through) sensing. Transmissive (area) sensing does not work out of the default sensing position.

The movable sensor for web/gap sensing supports multiple positions.

- The movable sensor's Default position is ideal for most label types.
- The adjustment range is from the center to maximum right positions which are ideal for printing two labels side by side on a roll.
- The movable sensor adjustment range covers sensor positions used by legacy Zebra printers.
- Web/gap sensing with the movable sensor only functions when the movable sensor's alignment arrow points to any position on the alignment key.

Figure 11 Web/Gap Sensing Positions



1 – Center Line	2 – Default Gap Sensing Position	3 – Alignment Key
4 – Alignment Arrow (Default	5 – Center Aligned	6 – Default
7 – Maximum Right		

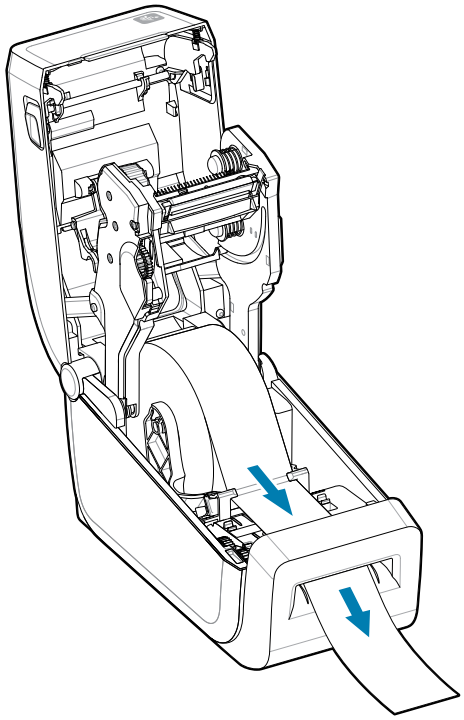
Zebra Printer Models Fixed Sensor Position Relative to a ZD-Series Printer

- **Default** – Zebra Models: G-Series fixed position sensors, LP/TLP 2842, LP/TLP 2844, LP/TLP 2042
- **Center Aligned** – Zebra Model: LP/TLP 2742

How to Load Roll Media - Continued

This procedure works for Tear-Off (standard bezel), Label Dispense, and Media Cutting printer options.

1. **Cutter Models** — For printers with the optional cutter module installed, thread the media through the cutter's media slot and pull it out the front of the printer.



2. Close the printer. Press down until the cover snaps closed.

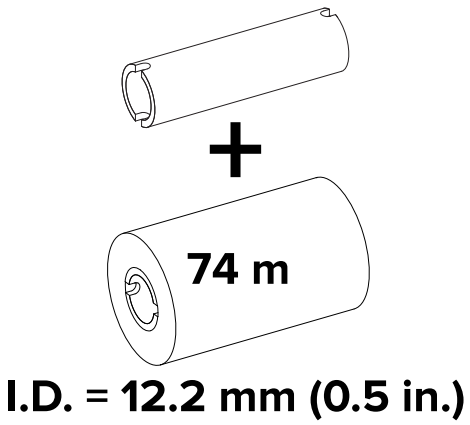
   Calibrate the printer for the new media. The printer's sensors need to adjust to sense the label, the liner, and the distance between labels to operate properly.

   When reloading the same media (size, vendor, and batch), you can just press the **FEED** (Advance) button once to prepare the media for printing.

Using Thermal Transfer Ribbon in the Printer

The printer has the ability to use a wide variety of Zebra and non-Zebra thermal transfer ribbons.

The printer supports a 74-meter thermal transfer ribbon.



Transfer ribbons come in several varieties and in some cases colors to match your application needs. Genuine Zebra transfer ribbons are specifically designed for the printer and Zebra brand media. Using non-Zebra media or ribbons not approved for use in your Zebra printer may damage the printer or printhead.

- The media and ribbon types should be matched to provide you with optimal print results.
- Always use a ribbon that is wider than the media to protect the printhead from wear.
- For direct thermal printing, do not load ribbon in the printer.
- Always use an empty ribbon core that matches your transfer ribbon roll's inner diameter. Ribbon wrinkling and other print problems can occur.

Genuine Zebra ribbons for this printer include:

- Performance Wax
- Premium Wax/Resin
- Performance Resin for synthetics (6 ips max. speed) and coated paper (4 ips max. speed)
- Premium Resin for synthetics (4 ips max. speed)

IMPORTANT: – Do not use early model desktop printer ribbon cores. The older style ribbon cores (and some Non-Zebra ribbons) can be identified by notches on only one side of the ribbon core. These older cores are too large.

IMPORTANT: Do not use ribbon cores with damaged notches that may be rounded, frayed, smashed, etc. The core notches should be square to lock the core on the spindle or the core may slip causing ribbon wrinkle, poor end of ribbon sensing, or other intermittent failures.

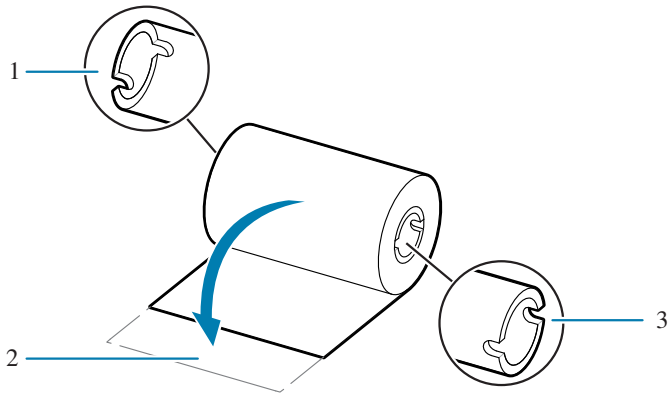
See Also

Go to the Zebra website for thermal transfer ribbons and other printing supplies.

Loading Zebra Transfer Ribbon – ZD411T

The printer has a 74-meter ribbon system.

Before following these steps, prepare the ribbon by removing its wrapping and pulling its adhesive strip free.



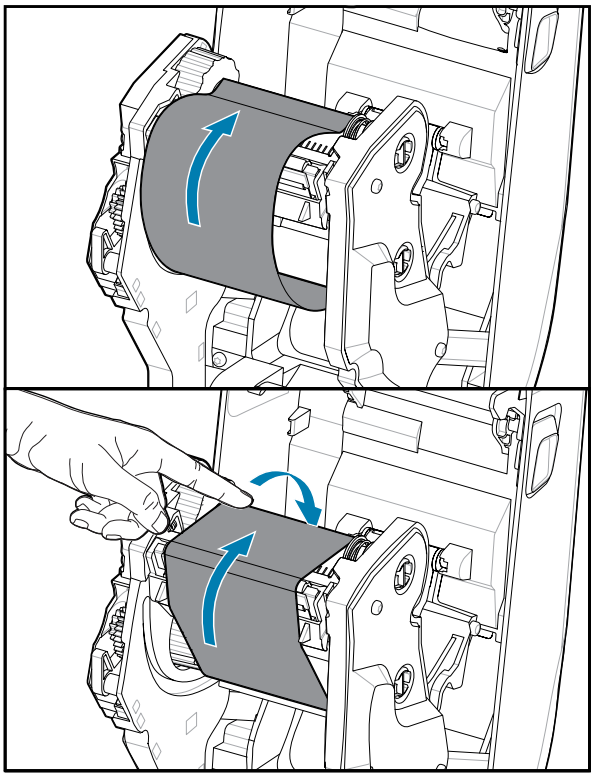
1 - Notch (Required on the left side of Zebra thermal transfer ribbon)	2 - Adhesive Strip	3 - Right Notch (not usable by ribbon drive system)

Verify that the ribbon and empty ribbon core have notches on the left side of the ribbon cores as shown above.

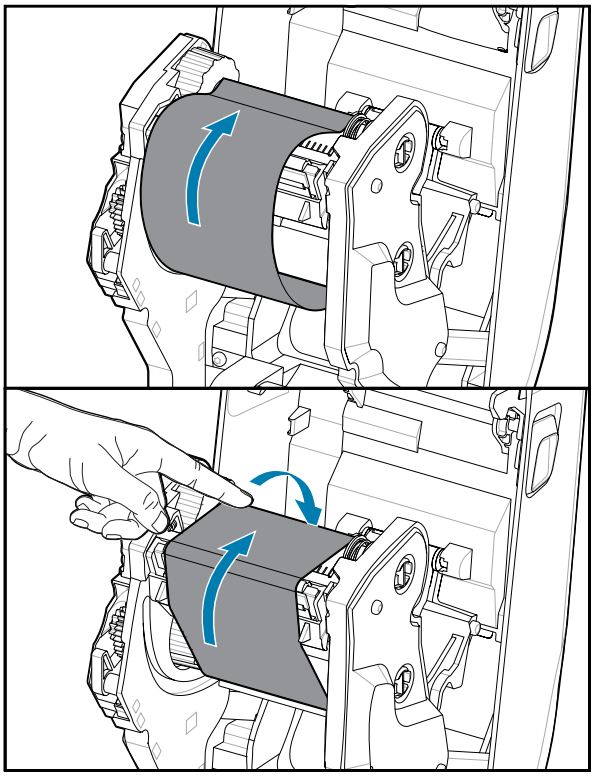
1. With the printer open, place an empty ribbon core on the printer's take-up spindles. Push the right side of the empty core onto the spring-loaded spindle (right side). Align the core with the center of the left side spindle's hub and rotate the core until the notches align and lock.

NOTE: You can find your first ribbon take-up core in the packing box. Subsequently, use the empty supply core from the supply spindle for the next roll of ribbon.

2. Place a new ribbon roll on the printer's lower ribbon supply spindle. Push it onto the right spindle and lock the left side the same as the take-up mounting the take-up core.



3. Attach the ribbon to the take-up core. Use the adhesive strip on new rolls; otherwise, use a thin strip of tape. Align the ribbon so that it will be taken straight onto the core.



4. Turn the ribbon take-up hub with the top moving toward the rear to remove slack from the ribbon. Rotating the hub helps to finish aligning the take-up ribbon position to the supply ribbon roll. The ribbon leader should be completely covered by the ribbon.
5. Verify that the media is loaded and ready to print and then close the printer cover.
6. If printer power is on, press the **FEED** button to have the printer advance a minimum of 20 cm (8 in.) of media to remove slack and ribbon wrinkle (straightens the ribbon), and to align the ribbon on the spindles. Otherwise, wait to turn on the printer and complete the printer instructions in this chapter.
7. Change the print mode setting from direct thermal printing to thermal transfer to set the printer's temperature profiles for thermal transfer media. This can be done with the printer driver, ZebraDesigner label design software, or printer programming commands.
   - When controlling printer operations with ZPL programming, refer to the Media Type (`^MT`) ZPL II command (follow the instructions in the ZPL Programming Guide).
   - When controlling printer operations with EPL Page Mode, refer to the `Options` (`O`) EPL command (follow the instructions in the EPL Page Mode Programmer's Guide).

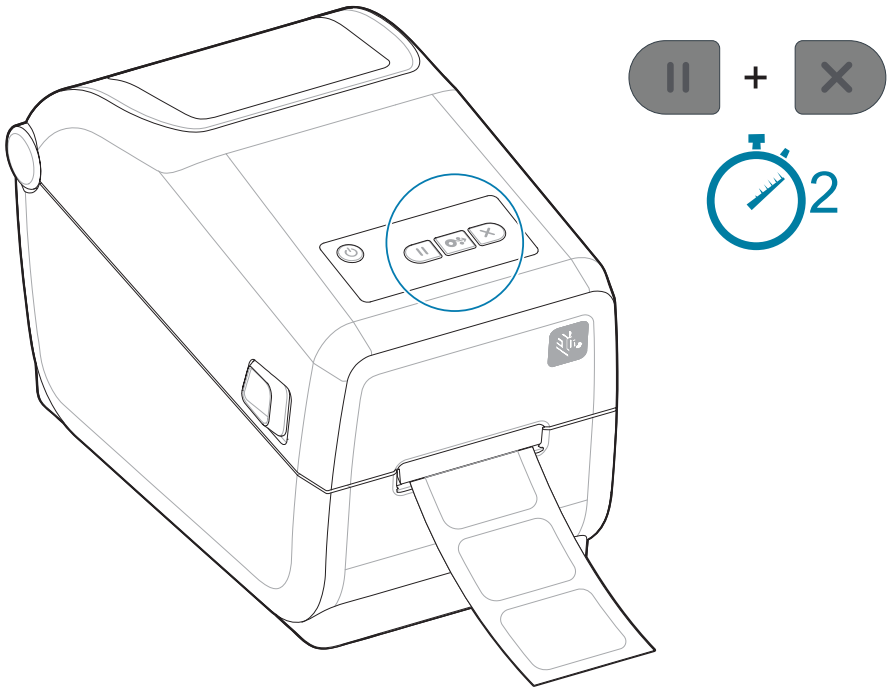
To verify the mode change from direct thermal printing to thermal transfer printing, use the Test Printing with the Configuration Report to print a configuration label. The `PRINT METHOD` should read *THERMAL-TRANS* on the printer configuration status label.

Run a SmartCal Media Calibration

The printer needs to set the media detection parameters prior to printing for optimal operation. After the printer has media correctly loaded for your selected media, then use SmartCal to automatically determine media type (web/gap, black mark/notch, or continuous) and measure media characteristics to calibrate the printer.

The printer needs the media loaded and the movable media sensor properly adjust for your media type chosen.

1. Make sure the media and ribbon cartridge (if you are thermal transfer printing) are loaded properly in the printer and the top cover of the printer is closed.
2. Press the **POWER** button to turn the printer ON.
3. Once the printer is in the ready state (Status indicator is solid green), press and hold the **PAUSE** and **CANCEL** button for two seconds and release.



The printer will measure a few labels and adjust media sensing levels.

When the printer stops, the **Status** indicator will turn solid green.

IMPORTANT:

After the initial calibration to a specific media is completed, it is not required to perform additional calibrations each time the media is replaced. The printer automatically measures the media to adjust for small changes in the media characteristics while printing.

Pressing the **FEED** (Advance) once or twice after a new roll of media (same batch) has been installed will synchronize the labels. It is then ready to continue printing.

See Also

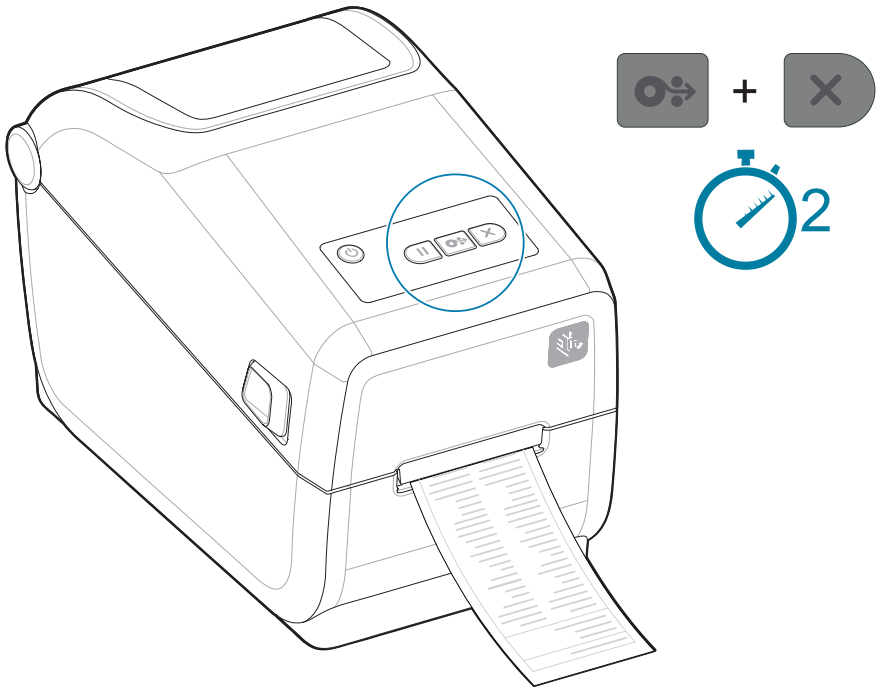
Loading Roll Media in the Printer
How to Load Roll Media
Adjusting the Movable Sensor for Web/Gap Sensing
Adjusting the Movable Sensor for Black Marks or Notches

Print a Configuration Report to Test Printing

Printing a Configuration Report is a great way to test and verify the printer's basic operation and settings.

Before you connect the printer to a computer, make sure that the printer is in proper working order. You can do this by printing a Configuration Report using this procedure. The information on the Configuration Report's printout may be helpful with printer installation and troubleshooting the printer.

1. Make sure the media and ribbon cartridge (if you are thermal transfer printing) are loaded properly in the printer and the top cover of the printer is closed.
2. Turn the printer ON.
3. Once the printer is in the ready state (Status indicator is solid green), press and hold the **FEED** and **CANCEL** buttons for two seconds and release.



If you cannot get these reports to print, then see Troubleshooting.

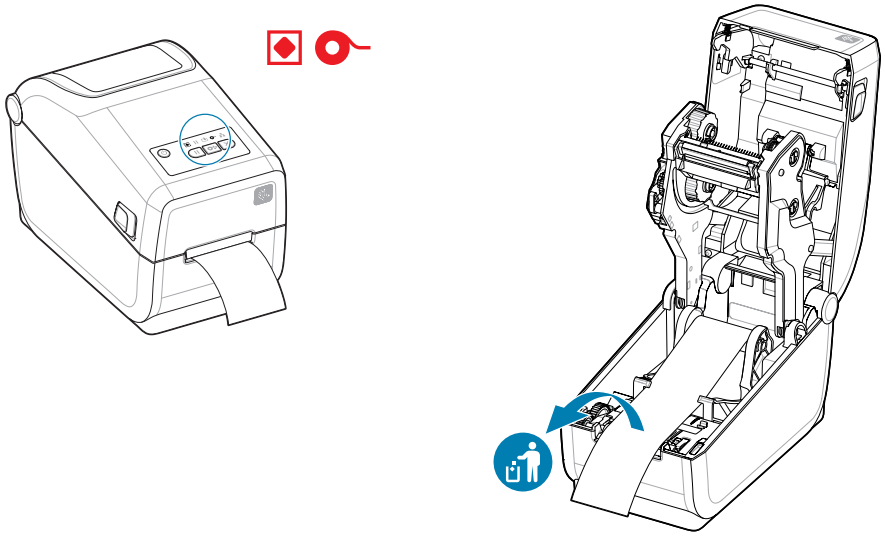
IMPORTANT:

Use the Configuration Report to find your printer's model, print resolution (for example XXX dpi), programming language (typically ZPL, CPCL, and EPL), and alpha-numeric serial number at the top of the printout. They are used to set and configure the printer for various printer communication options (USB, Wi-Fi, Ethernet, and Bluetooth) and supported operating systems (Windows, Android, Apple, and more).

Detecting a Media Out Condition

When you run out of media, the printer will report a Media Out condition with the **Status** and **Media** indicators both solid red. This is part of the normal media usage cycle.

Figure 12 Media Out Detected



Recovering from a Media Out condition

1. Open the printer.
2. Observe that the media is at the end or nearly at the end of the roll with a label missing from the liner.

IMPORTANT:

Sometimes a label may be missing somewhere in the middle of your roll of labels (not at the end of media). This will also cause a Media Out condition.

To recover, just pull the media past the missing label until the next label is over the platen roller. Close the printer. Press the **FEED** (Advance) button once. The printer will resynchronize the label position and will be ready to resume printing.

3. Remove the remaining media and roll core.
4. Insert a new roll of media.

See Loading Roll Media.

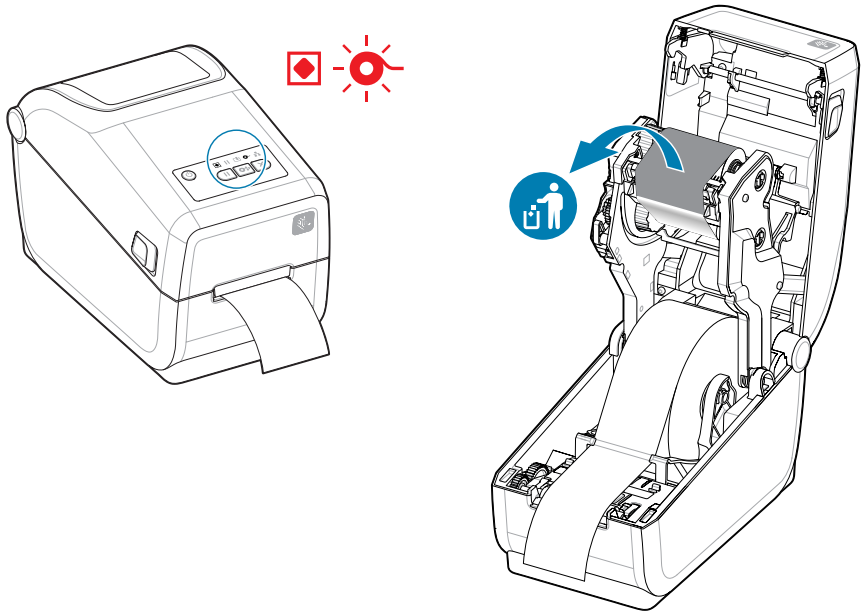
- If you are installing more of the same media, just load the new media and press the **FEED** (Advance) button once to resume printing.
- If you are loading different media (size, vendor, or even batch is different), then reloading media followed by a SmartCal is needed to ensure optimal operation.

NOTE: Changing media size (length or width) usually requires you to change the programmed media dimensions or the active label format in the printer.

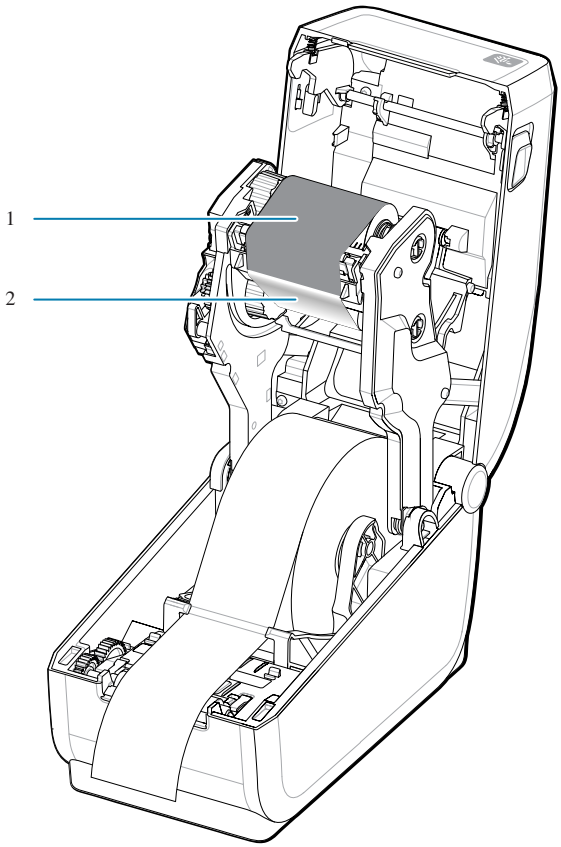
Detecting a Ribbon Out Condition

When you run out of printable ribbon, your printer will report a Ribbon Out condition with the **Status** and **Media** indicators. This is part of the normal media usage cycle.

The printer's **Status** indicator will turn solid red and the **Media** indicator will be flashing red when the printer detects the ribbon is out.



1. Open the printer. Do not turn the printer OFF.
2. Observe a reflective ribbon (used to detect the end of the ribbon) is exposed on the underside of the ribbon cartridge or ribbon roll. The front ribbon/top roll is also full.



1 – Take-Up Ribbon Roll is Full	2 – End of Ribbon at the Reflective Ribbon Trailer

3. Remove the used Take-Up roll of ribbon and dispose of it properly. Keep the now empty lower Supply Ribbon core located towards the bottom/back of the ribbon carriage.
4. Load a new ribbon roll.

   See Loading Thermal Transfer Roll Ribbon for more details.
5. Press the **FEED** (Advance) once to resume printing.

Connecting to the Printer

The printer supports a wide offering of communication options to use the printer.

The printer supports a variety of interface options and configurations. These include:

- Universal Serial Bus (USB 2.0) interface - Standard.
- RS232 Serial – Installed or as a Field Upgrade Option
- Ethernet (LAN) – Installed or as a Field Upgrade Option
- Factory Installed Option or as a Field Upgrade Wireless Connectivity with Wi-Fi:
  - 802.11ac and Bluetooth 4.2 (4.1 compatible).
  - 802.11ax and Bluetooth 5.3.
  - Wi-Fi models include Bluetooth Low Energy (low-speed connection) for printer configuration using software running on an Android or iOS device.

Pre-install Windows Printer Drivers

The Printer Setup Utility installs the driver on your computer to simplify the setup.

Install the Printer Setup Utility before applying power to the printer connected to the PC. The utility installs the Zebra Windows drivers first. The installation wizard will then prompt you to turn on the printer. Follow the instructions to complete the printer installation.

The Printer Setup Utility is designed to assist you in setting up printer operations in Windows. Make configuration setup choices prior to and immediately following applying power using the utility's wizards. The cabling and parameters for each of these physical printer communication interfaces are discussed in the following pages to assist you. The Printer Setup Utility configuration wizards will instruct you when to turn the printer's power on at the appropriate time to complete the installation of the printer.

For more details on configuring network (Ethernet or Wi-Fi) and Bluetooth communication, see the following guides:

- Wired and Wireless Print Server User Guide
- Bluetooth Wireless Guide

Interface Cable Requirements

Interface cabling needs to comply with requirements for shielding and routing to keep noise and interference from printer communications.

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

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible. 1.83 m (6 ft.) is the maximum recommended length)
- Do not tightly bundle the data cables with power cords.
- Do not tie the data cables to power wire conduits.
- To minimize electrical noise pickup in the cable:

IMPORTANT: This printer complies with FCC Rules and Regulations, Part 15, for Class B Equipment, using fully shielded data cables. The use of unshielded cables may increase radiated emissions above the Class B limits.

USB Interface (Device)

Connect to the printer with USB 2.0 cables.

IMPORTANT:

Turn the print power off. Keep the printer power OFF until instructed to turn it ON by the printer installation wizard. You must pre-load the **Windows Printer Driver v8** driver set before the printer can be turned ON! The Windows system will detect and load the wrong printer driver otherwise.

To recover from incorrect driver installation, see Troubleshooting, USB Printer Fails to Install after Connecting Printer.

Run the **Windows Printer Driver v8** and select run the Printer Installation Wizard.

USB (version 2.0 compliant) provides a fast interface that is compatible with your existing PC hardware. Multiple printers can share a single USB port/hub.

When using a USB cable, verify that the cable or cable packaging bears the Certified USB mark (see below) to guarantee USB 2.0 compliance.

Serial Interface

The printer supports Serial Port as a factory configuration or as a field upgrade kit.

IMPORTANT: Do not use RS-232 cable adapter dongles for data terminal equipment (DTE) and data communication equipment (DCE) with this printer. Some dongles can interfere with the operation of USB Host port devices at printer power-up.

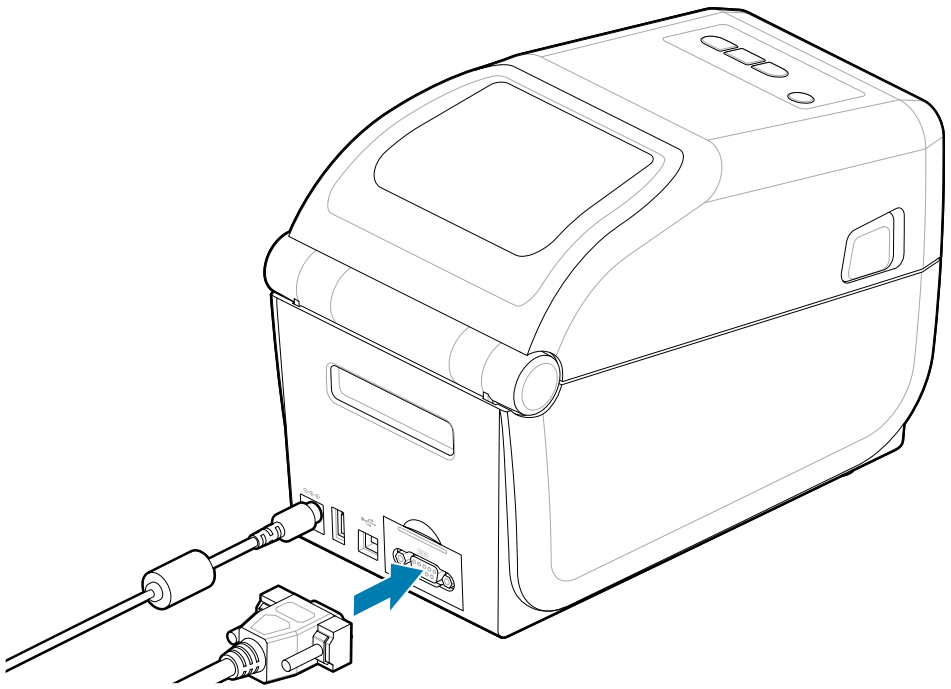
The printer uses a Null Modem (cross-over) cable for DTE communications. The required cable must have a nine-pin D-type (DB-9P) male connector on one end which plugs into the mating (DB-9S) serial port located on the back of the printer. The other end of this signal interface cable connects to a serial port on the host computer. For pin-out information, refer to Serial Port Interface.

The serial port communication settings between the printer and host (typically a PC) must match for reliable communication. The Bits per second (or Baud rate) and Flow control are the most common settings that get changed.

Serial communications between the printer and the host computer can be set by:

- ZPL programming `^SC` command.
- Resetting the printer to its default printer configuration.

Factory defaults for serial communication settings are `9600` baud, `8`-bit word length, `NO` parity, `1` stop bit, and `XON/XOFF` (Software data flow control in the Windows-based host system).



Ethernet (LAN, RJ-45)

Connect to the printer with a wired Ethernet cable.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

The printer requires a UTP RJ45 Ethernet cable (1) with a CAT 5 rating or higher.

The printer has a built-in network print server. For more information on configuring the printer to run on a compatible Ethernet-based network, see the Wired and Wireless Print Server users guide. The printer must be configured to run on your network. The print server onboard the printer can be accessed through the printer's print server Web pages.

Ethernet Status/Activity Indicators

The Ethernet connector on the printer has two status/activity indicators that are partially visible to provide interface status at the connector. The printer also has the user interface indicator lights for printer network operation status. See the Meaning of the Indicator Light Patterns on page 34 for more details.

LED Status	Description
Both OFF	No Ethernet link detected
Green	100 Mbps link detected
Green with the Amber flashing	100 Mbps link and Ethernet activity detected
Amber	10 Mbps link detected
Amber with the Green flashing	10 Mbps link and Ethernet activity detected

Assigning an IP Address for Network Access

All devices on an Ethernet network (LAN and WLAN) require a network IP (Internet Protocol) address. The printer's IP address is needed to access the printer for printing and printer configuration. The five different ways to assign an IP address are:

- DHCP (Dynamic Host Connection Protocol) - Default setting
- Zebra Setup Utilities (includes the ZebraDesigner Windows printer driver)
- Telnet
- Mobile Apps
- ZebraNet Bridge

DHCP for Personal Networks

The printer by default is set to operate on an Ethernet LAN or Wi-Fi network with DHCP. This setting is intended primarily for personal networks. The network automatically provides a new network IP address each time the printer is turned on. The Windows printer driver uses a Static IP address to connect to the printer. The IP address set in the printer driver will need to be changed to access the printer if its assigned IP address has changed after the printer's initial installation.

Managed Networks

Using the printer in a structured network (LAN or Wi-Fi) requires a network administrator to assign the printer a Static IP address and other settings needed to operate on the network properly.

- `User ID:` *admin*
- `Password:` *1234*

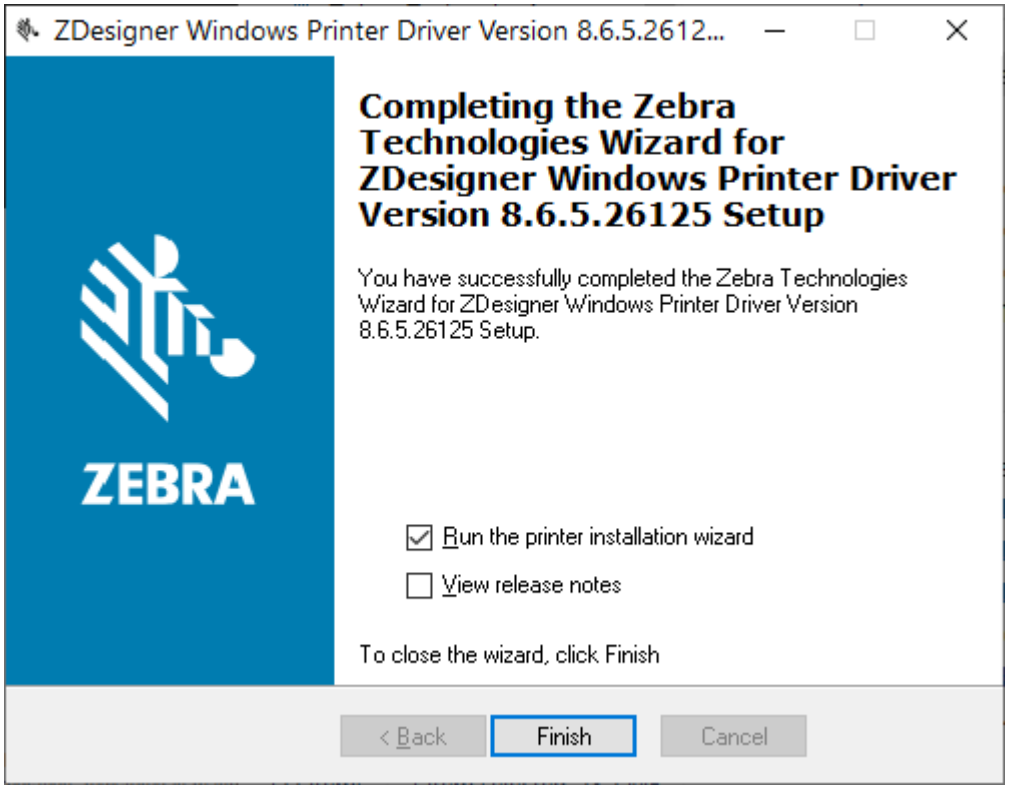
Running the Printer Installation Wizard

Running the printer installation wizard will complete the printer setup.

The **Windows Printer Drive v8** has been pre-installed.

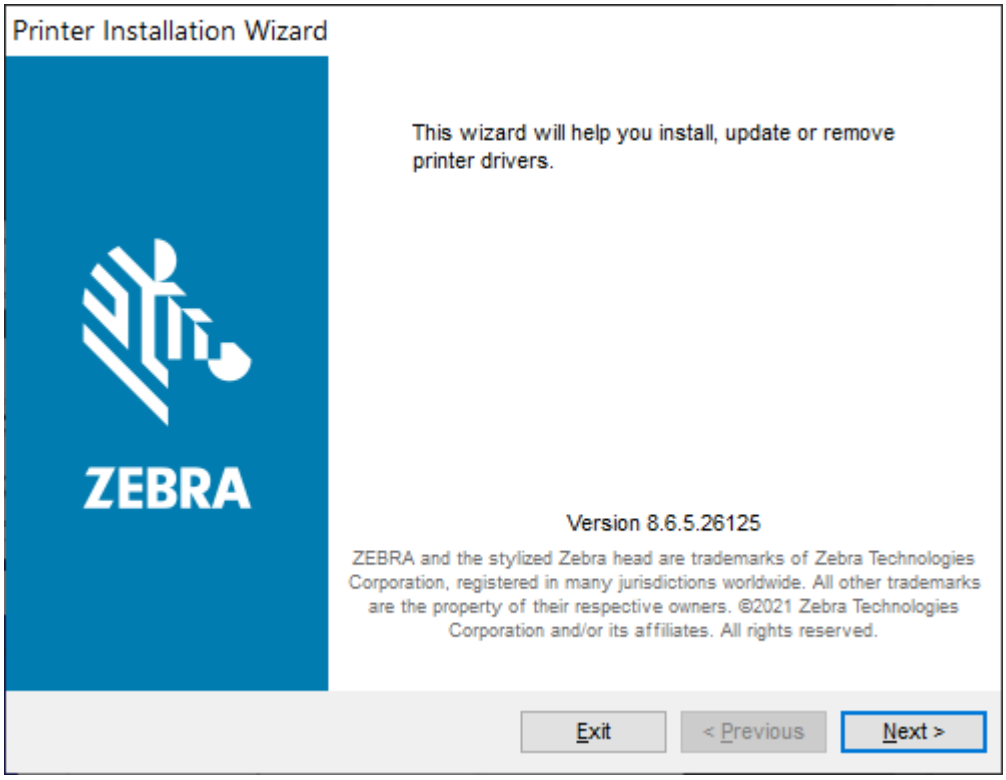
NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

1. Run the **Windows Printer Driver v8** previously used to preload the drivers. The driver executable file (such as zd86423827-certified.exe) was added to your Download folder.
   a) Follow the screens and answer the prompts. The drivers are ready to be preloaded after Finish is pressed.



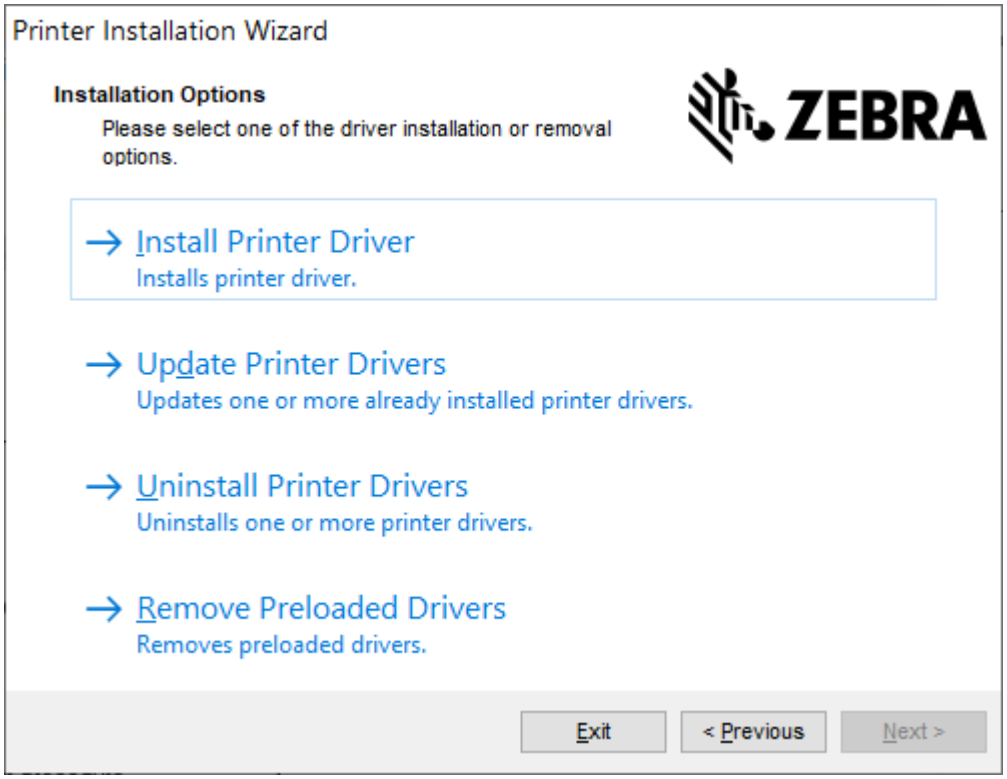
2. Review the checkbox settings before continuing.
   a) Verify that the checkbox for **Run the printer installation wizard** to Select and enable the wizard.
   b) Click **Finish** to close the window and run the wizard.

3. The Printer Installation Wizard displays after the preloaded drivers are loaded or have finished loading (if this is the first time using the **Windows Printer Driver v8** file).



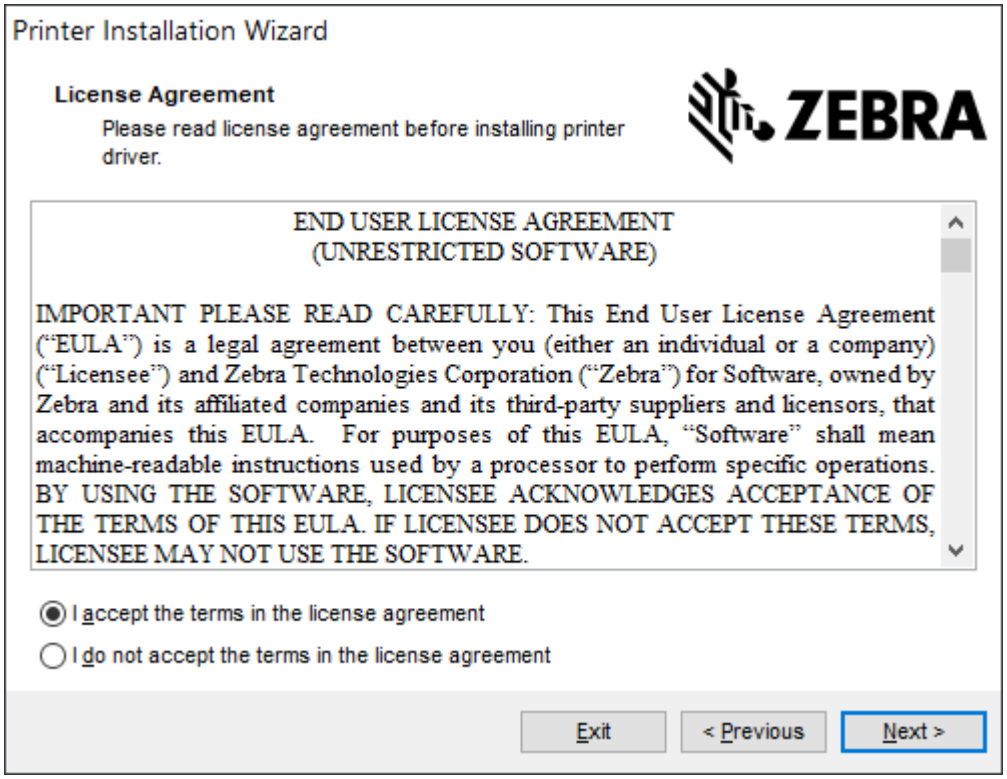
4. Click **Next**.

   You are prompted to select an installation option.

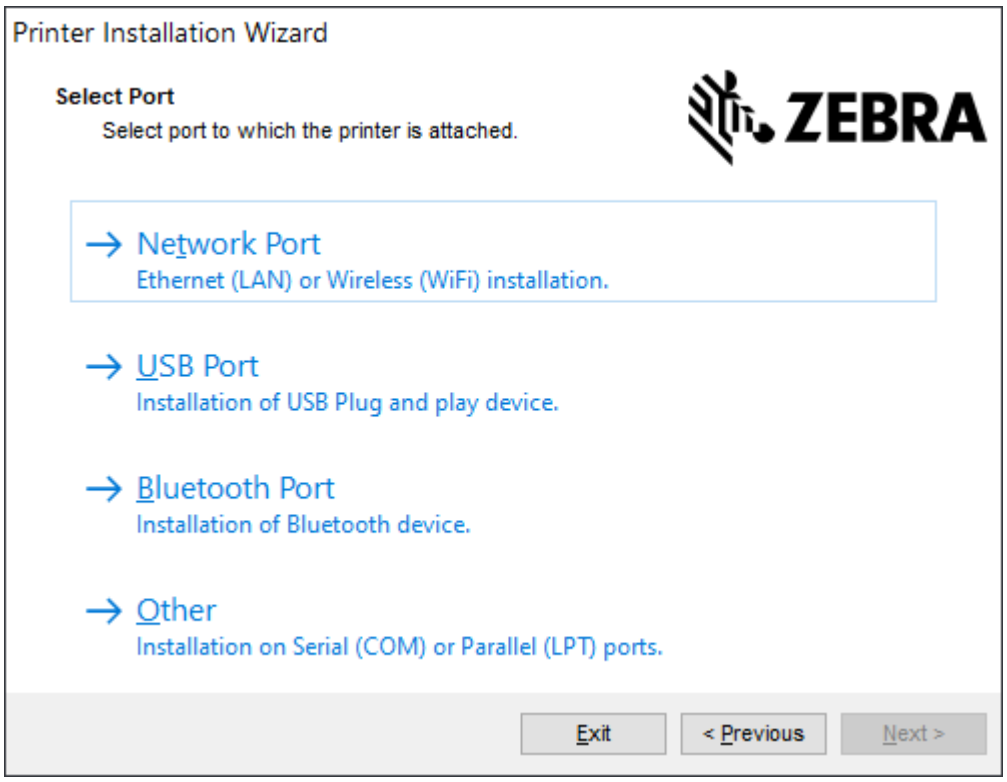


5. Click **Install Printer**.

The license agreement displays. Read the important information and agree to the terms by selecting the **I Accept the Terms in the License Agreement** button. Click **Next**.



6. You are prompted to select the printer port.



Complete the installation by following the instructions in the wizard.

The model of the printer is located on the top front of the printer. You can use a Configuration Report (see Print a Configuration Report to Test Printing on page 87) to identify the model number, print resolution (203 dpi, 300 dpi, and 600 dpi), primary printer programming language (ZPL, EPL, CPCL), and the printer serial number. Installing some of the communication port selections will use some of

NOTE:

Each port selection other than USB requires you to select, recognize, or use the information on the Configuration Report (see Print a Configuration Report to Test Printing on page 87). You can use a Configuration Report to identify the model number, print resolution (203 dpi, 300 dpi, and 600 dpi), primary printer programming language (ZPL, EPL, CPCL), and the printer serial number.

Installing Network ports require IT assistance or knowledge of your network and networking principles and equipment.

Bluetooth uses the printer's serial number to identify the printer for pairing.

See Serial Interface for information needed to configure the optional serial port communication for the printer.

The Parallel Port option is not available for this printer.

7. The wizard automatically closes the window when the installation process has been completed.

Setup for Windows

The section helps setting up communications between your printer and the Windows operating system environment.

Zebra Setup Utility: Pre-install Windows Printer Drivers

IMPORTANT:

Go to the Zebra Support page:

- ZD411T Thermal Transfer printer – https//www.zebra.com/zd411t-info

Look in the **Drivers** section to download the recommended **Windows Printer Driver v8**.

Do not connect your printer to a computer yet!

- If you connected your printer to a computer via USB before driver installation, the printer might appear as an unknown (unspecified) device in "Devices and Printers."
- If necessary, follow these recovery steps before proceeding to Step 1.

You will need a roll of media (labels, receipt paper, or tags) to set up your printer for the first test print. See the Zebra Web site or contact your reseller to help you select the right media for your use. Find media at http:www.zebra.com/supplies.

Install the Zebra Setup Utility before applying power to the printer connected to the PC (running a Zebra driver-supported Windows operating system). The utility installs the driver first. The installation wizard will then prompt you to apply the printer power. Continue to follow the instructions to complete the printer installation.

The setup utility is designed to assist you in setting up printer communication on a PC running the Windows operating system. The cabling and parameters for each of these physical printer communication interfaces are discussed in the following pages to assist you with making configuration setup choices prior to and immediately following applying power. The configuration wizard will instruct you to turn the printer's power on at the appropriate time to complete the installation of the printer.

For more details on installing Ethernet (network) and Bluetooth interfaces:

- Wired and Wireless Print Servers User Guide
- Bluetooth User Guide

Windows to Printer Communication Setup (Overview)

For supported Windows Operating systems (most common) with a Local (wired) connection:

1. Download the Zebra Setup Utilities from the Zebra Web site. See zebra.com/setup.
2. Run the Zebra Setup Utilities from your Download directory.
3. Select **Install New Printer** and run the install wizard.
4. Select **Install Printer**.
5. Select the printer's model number from the list of ZDesigner printers.
6. Select the USB port to connect to the PC. Use the interface to assist the Wizard-guided installation of networked or Bluetooth Classic.
7. Turn the printer ON and configure printer communications for your interface type.
8. Use the Windows driver to print a test page to verify operation with Windows. From the printer properties of the printer's driver, select the **General** window tab, and then click the **Print Test Page** button.

Setting Up the Wi-Fi Print Server Option

This section covers the basic configuration of your internal Wi-Fi Print Server option. For more detailed information, refer to the Wired and Wireless Print Servers User Guide. See zebra.com/manuals.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

You may configure the printer for wireless operation in the following ways. This basic guide covers only the first option, the Connectivity Wizard.

- **Through the Connectivity Wizard**, which writes a ZPL script for you. On the last screen of the utility, you may choose to send the command directly to the printer, or you may choose to save the ZPL script to a file. The saved ZPL file has several purposes:
  - The file can be sent to the printer through any available connection (USB, or wired print server).
  - The file can be resent to the printer after the network settings have been restored to factory defaults.
  - The file can be sent to multiple printers that will use the same network settings.
- **Through ZPL** a script that you write yourself. Use the `^WX` command to set the basic parameters for security type. You can send the command through any available connection (USB, or wired print server). Refer to the ZPL Programming Guide for more information on this option.
- **Through Set/Get/Do (SGD) commands** that you send to the printer. Begin with `WLAN.security` to set the wireless security type. Depending on which security type that you select, other SGD commands will be necessary to specify other parameters. You can send the commands through any available connection (USB, or wired print server). Refer to the ZPL Programming Guide for more information on this option.

Using a Configuration Script

Complete the setup by sending the ZPL script to the printer through the port selected at the beginning of this procedure.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

1. Verify that the printer is connected to the computer through the wired cable connection to USB port.
2. If you have not already done so, turn ON the printer.
3. On the **Review and Send ZPL for Wireless** window, click **Finish**.
4. The printer sends the ZPL script to the printer through the selected port. The **Wireless Setup Wizard** screen closes.
5. Turn the printer OFF and then back ON.

Saving a Configuration Script

Save the ZPL script to a file for use later or for use with other printers.

NOTE: You can send the ZPL script file to multiple printers that use the same configuration, or you can send the file to a printer that had the network settings restored to the factory defaults. This saves you from having to go through the **Wireless Setup Wizard** more than once.

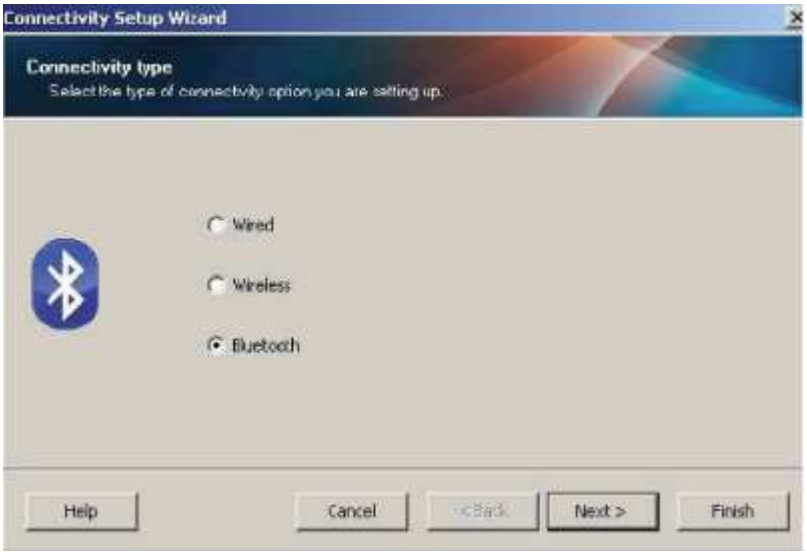
1. On the **Review and Send ZPL for Wireless** window, highlight the script, right-click, and select **Copy**.
2. Open a text editor, such as Notepad, and paste the script into the application.
3. Save the script.
4. In the **Connectivity Wizard**, click **Cancel** to exit without sending the script at this time.
5. If you have not already done so, turn ON the printer.
6. Send the ZPL file to the printer through the connection of your choice. If you have not already done so, turn ON the printer.
7. Observe the wireless status on the printer's indicator lights, and confirm you have set up the printer for wireless connectivity.

Bluetooth Option Configuration

The Zebra Setup Utilities provides a quick and easy way to configure a Bluetooth wireless connection with the printer.

NOTE: For printers with Protected Mode enabled, you need to provide the Protected Mode password to change certain settings. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.

1. Double-click the **Zebra Setup Utilities** icon on your desktop.
2. Connect a USB cable from your printer to the computer.
3. On the first ZSU screen, highlight the printer displayed in the window and click the **Configure Printer Connectivity** where shown.
4. Select **Bluetooth** on the **Connectivity Type** screen and click **Next**.



5. On the **Bluetooth Settings** screen, check **Enabled** to enable Bluetooth functionality.
6. In the **Friendly Name** text field, set the Bluetooth name of the device. This name appears during device discovery and the central device will label the printer with this name.
7. Set **Discoverable** to On or Off to set whether the device will appear when central devices are looking for new devices to pair with.
8. Set **Authentication** to On.

NOTE: This setting does not exist in Link-OS, but you need to turn it on if you want to enter a PIN in ZSU. The actual authentication setting on the printer is set in the **Security Mode** on the **Advanced Settings** menu.

9. The values set in the **Authentication** PIN field will vary depending on the Bluetooth version of the central device. If the central uses BT v2.0 or older, enter a numeric value in this field. You are prompted to enter this same value on the central device to verify the pairing. **Security Mode** 2 or 3 in **Advanced Settings** should also be selected for PIN paring. In Advanced Settings, select Security Mode 2 or 3 for PIN paring.



If the central device uses BT v2.1 or newer, this setting has no effect. BT v2.1 and newer uses Secure Simple Pairing (SSP) which does not require the use of a PIN.

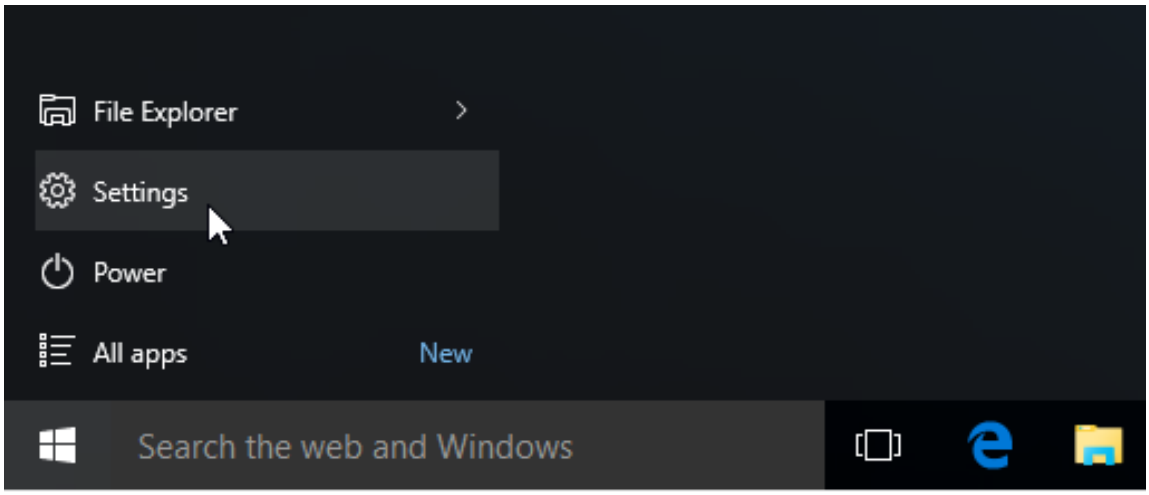
Clicking the **Advanced Settings** button will display the **Advanced Bluetooth Settings** window. For more information on **Advanced Settings**, refer to the Wired and Wireless Print Server Guide.

10. Click **Next** to continue configuring the printer.
11. The SGD commands to properly configure the printer are displayed. Click **Next** to continue to the **Send Data** screen.
12. On the **Send Data** screen, click the **Printer** icon that you want to send the commands to, or click the **File** button to save the commands to a file for reuse later.
13. To send the commands to the printer, click the **Finish** button. The printer will update and then reboot. You may disconnect the USB interface from the printer now.
14. To complete the Bluetooth pairing process, enable Bluetooth device discovery on your central device and follow the directions provided with the master device.

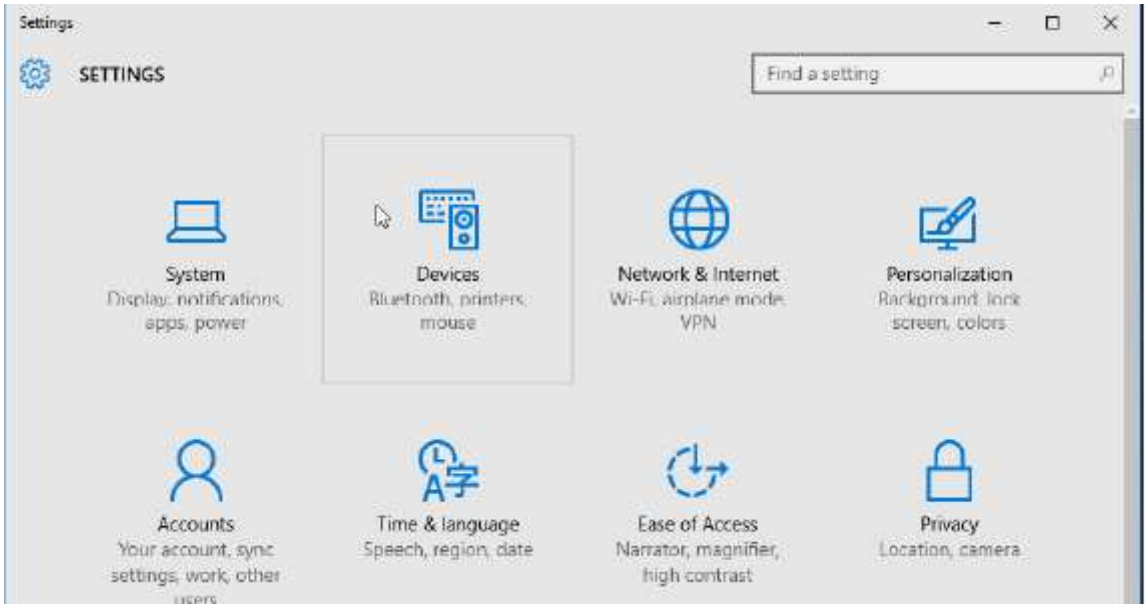
Windows 10 (PC version)

Before pairing or adding a Bluetooth-enabled device, make sure it is turned on and discoverable. Your Windows device may need a Bluetooth adapter to connect to Bluetooth devices. Check with your device manufacturer's User Manual for further information.

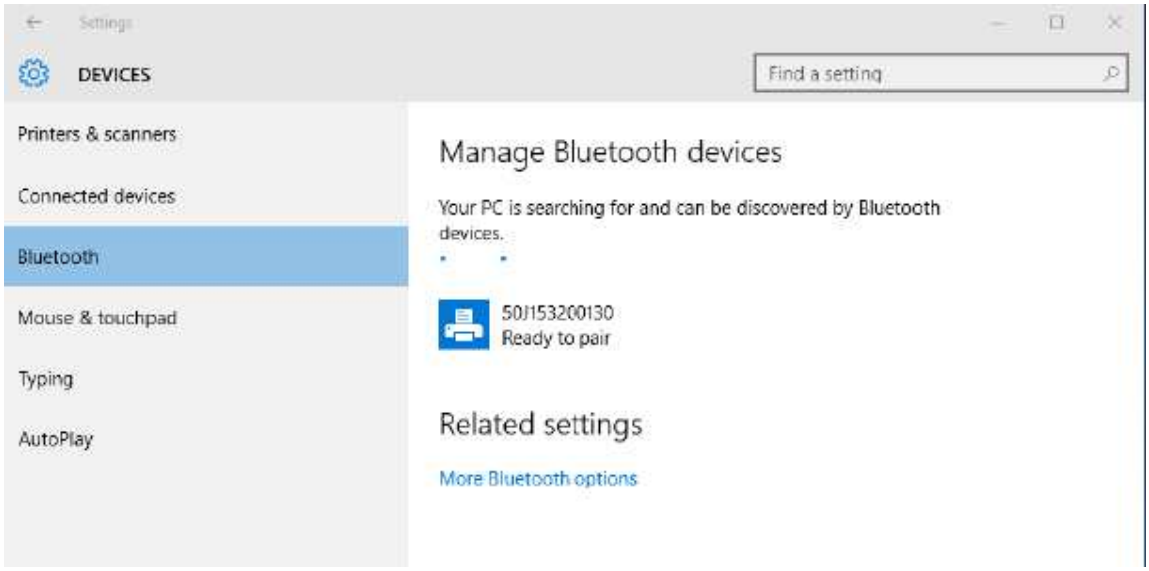
1. Open the Windows Start Menu by clicking on the Windows **Start** button and select **Settings**.



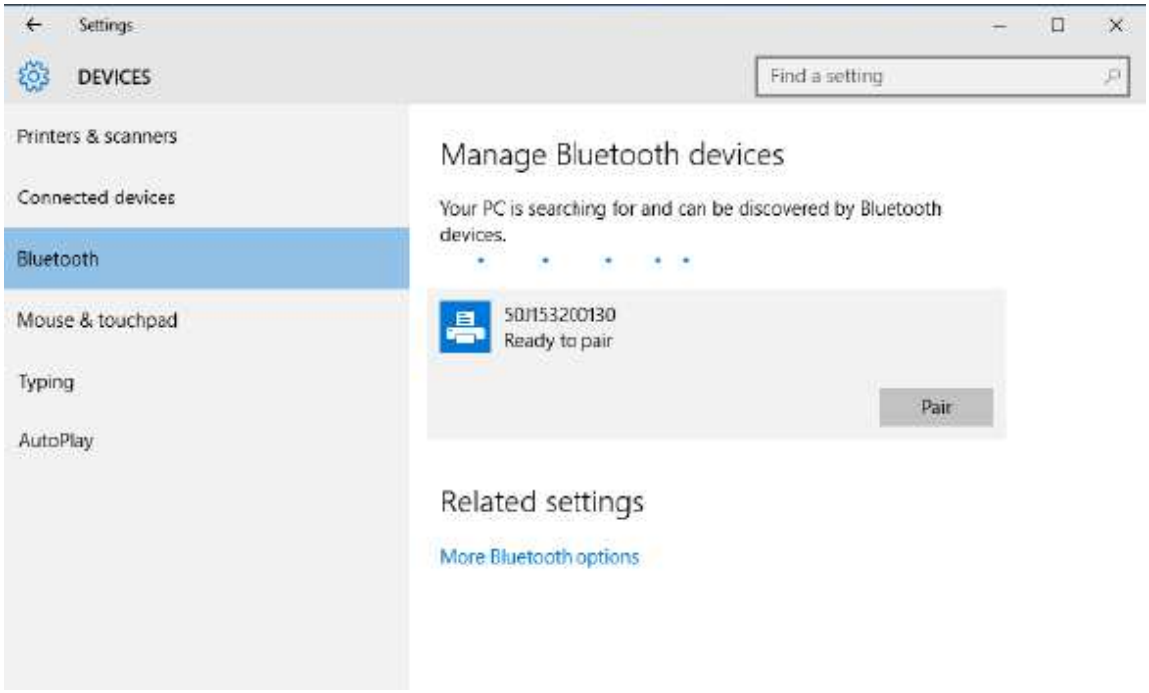
2. Click on the **Devices** category in the Settings window.



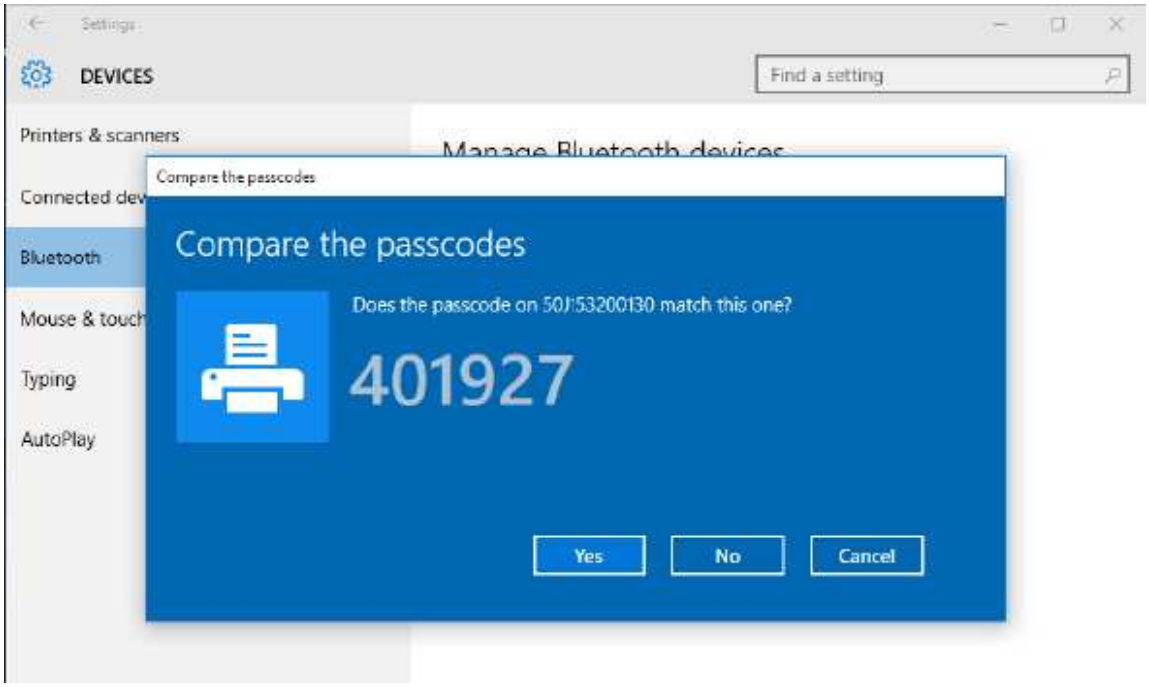
3. Click on **Bluetooth**. If your PC doesn't have Bluetooth installed, the Bluetooth category will not be displayed in the list of device categories. The printer is identified by the serial number.



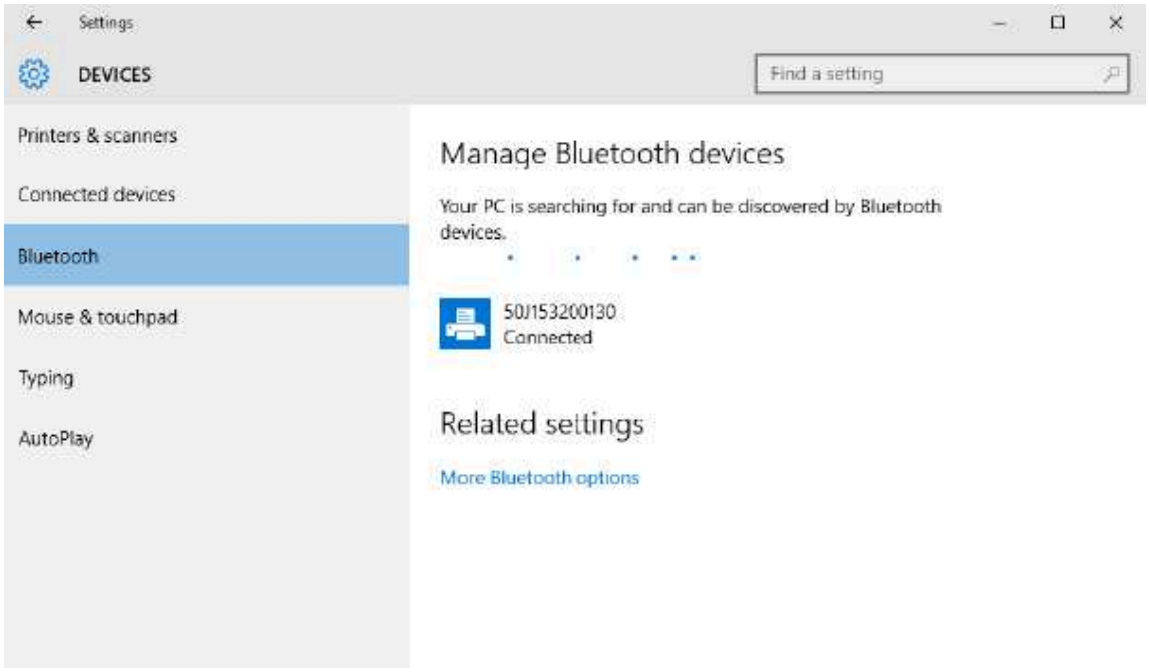
4. Click the **printer** icon and then click the **Pair** button for the printer.



5. The printer prints a passcode. Compare that with the passcode showing on the screen. Click **Yes** if they match.



6. The printer status changes to connected when the pairing is complete.



After the Printer is Connected

Now that you have basic communication to the printer, test printer communications, and then install other printer-related applications, drivers, or utilities.

Testing Communications by Printing

Verifying the print system's operation is a relatively simple process. For Windows operating systems, use the Zebra Setup Utility or the Windows **Printers and Faxes** or **Devices and Printers** to access and print a test label. For non-Windows operation systems, copy a basic ASCII text file with a single command (`~WC`) to print a configuration status label.

Test Printing with Zebra Setup Utility:

1. Open the Zebra Setup Utility.
2. Click on the newly installed printer's icon to select the printer and activate the printer configuration buttons below it in the window.
3. Click the **Open Printer Tools** button.
4. In the **Print** tab window, click the **Print configuration label** line.
5. Click the **Send** button. The printer should print a configuration report.

Test Printing with Windows Printer and Devices menu:

1. Click the Windows **Start** menu button, to access the **Printers and Faxes** or **Devices and Printers** menu. You may also use the **Control Panel** to access the menus. Open the menu.
2. Select the newly installed printer's icon to select the printer and right-click the mouse to access the printer **Properties** menu.
3. From the printer's **General** tab window, click the **Print Test Page** button. The printer should print a Windows test print page.

Test Print with an Ethernet printer connected to a network:

Test Print on an Ethernet printer connected to a network (LAN or WLAN) with an (MS-DOS) **Command Prompt** (or **Run** from the Windows XP Start menu):

1. Create a text file with the following ASCII three characters: `~WC`
2. Save the file as: TEST.ZPL (an arbitrary file name and extension name).
3. Read the IP address from the printer's configuration report's Network Status printout. On a system that is connected to the same LAN or WAN as the printer, type the following in the Web browser window's address bar and enter:

```
ftp (IP address)
(for IP address 123.45.67.01 it would be: ftp 123.45.67.01)
```

4. Type the word `put` followed by the file name and **Enter**. For this test print file, it would be:

```
put TEST.ZPL
```

The printer should print a new configuration report.

Print Operations

This section provides general information on media and print handling, font and language support, and the setup of less common printer configurations.

Thermal Printing Basic Setting and Operations

Extra care should be taken to avoid touching the printhead which gets hot and is sensitive to electrostatic discharges.



CAUTION—HOT SURFACE: The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.



CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

Determining the Printer's Configuration Settings

Use the printer's Configuration Report to verify option installation, media handling, and print settings.

The printer provides a configuration report of the settings and hardware configuration. Operational status (darkness, speed, media type, etc.), installed printer options (network, interface settings, cutter, etc.) and printer description information (serial number, model name, firmware version, etc.) are all included in the configuration report.

See Also

Test Printing with the Configuration Report to print this label

ZPL Configuration

Sending Files to the Printer

Use a wide variety of Zebra methods to transfer files for printing and updates for the printer.

Send graphics, fonts, and programming files to the printer from the Microsoft Windows operating systems using the Link-OS Profile Manager, Zebra Setup Utilities (and driver), ZebraNet Bridge, or Zebra ZDownloader found on the Zebra Web site: zebra.com/software.

Select a Print Mode for Media Handling

Use a print mode that matches the media being used and the printer options available.

Print Modes

- `TEAR OFF` — This mode (default) can be used with any printer options and most media types. The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.
- `PEEL` — Label Dispenser Option only. The printer peels the label from the liner during printing and then pauses until the label is removed.
- `CUTTER` — Cutter Option only. The printer cuts between labels after each one is printed.

Related ZPL command(s):
`^MM`

SGD command used:
`media.printmode`

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

Adjusting the Print Quality

Print quality is affected by the heat (density) setting of the printhead, the print speed, and the media in use.

The printer's default darkness and speed settings work for most applications that use Zebra labels and media. Set the printer to the maximum recommended speed of the media in use. Experiment with the darkness setting first, then lower the speed setting to find the optimal mix for your application. Print quality can be configured with the Zebra Setup Utility's **Configure Print Quality** routine.

NOTE: Media (labels, receipt paper, tags, etc.) have maximum speed settings for your chosen media. Start with these setting

The darkness (or density) setting can be controlled by:

- The `Set Darkness` (`~SD`) ZPL command (consult your ZPL Programming Guide).
- See the Adjusting the Darkness with Manual Print Darkness on page 164 routine.

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**

Adjusting the Print Width

Adjust the print width to place your image on the media.

Print width must be set:

- Before you use the printer for the first time.

- Any time you change the width of the media in use.

Print width may be set by:

- The Windows printer driver or application software such as ZebraDesigner™.
- Controlling printer operations with ZPL programming; refer to the Print Width (`^PW`) command (consult your ZPL Programming Guide).
- See Using the Manual Print Width Adjustment on page 163.

Related ZPL command(s):

`^PW`

SGD command used:

`ezpl.print_width`

Printer web page:

View and Modify Printer Settings > Media Setup > Print Width

Replacing Supplies while Using the Printer

If media (ribbon, labels, receipts, tags, tickets, etc.) run out while printing, leave the printer power on while reloading media. After you load a new roll of media or ribbon, press the **FEED** button to resync and restart printing.

NOTE: Do not turn the printer off to replace the printer media. Data loss results if you turn off the printer while printing. By maintaining printer power, print jobs in progress can resume and complete if a single printout or a batch print job.

Press the **FEED** button once after reloading media initiates a media resync to the beginning of label.

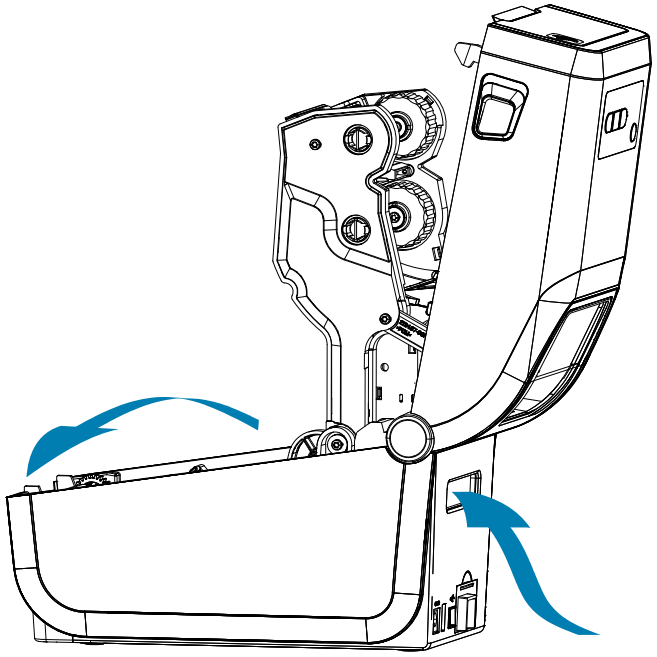
Pressing the **PAUSE** will resume the print job in most cases.

Press the **FEED** button after the media has been resynced or calibrated and the printer's default setting is to reprint the last label image in the printer.

Printing on Fan-Fold Media

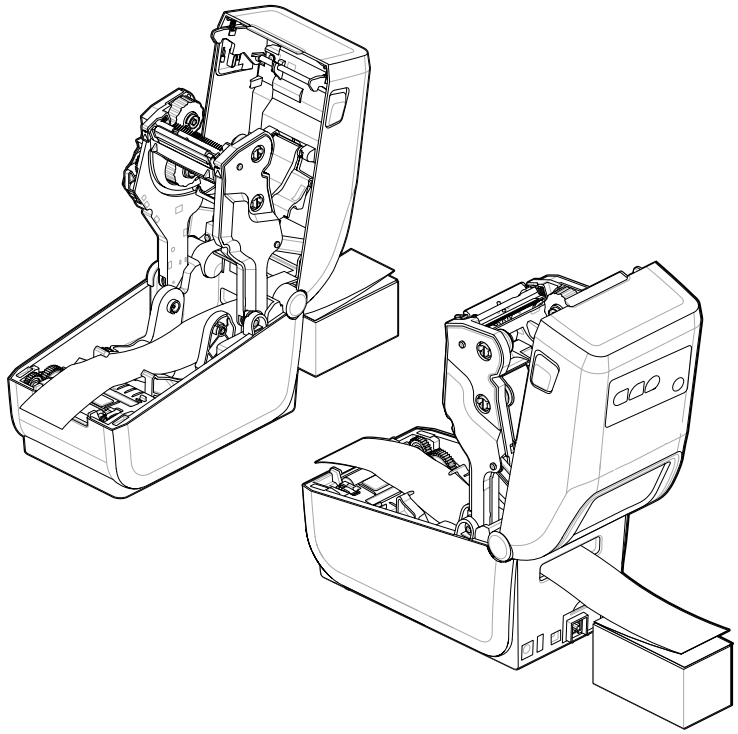
The printer can use fan-fold media via a media access slot in the rear of the printer.

1. Remove any roll media from the printer.
2. Open the top cover.



3. Adjust the media guide stop position with the gray slide-lock. It is located on the outside of the left media roll holder. Use a piece of your fan-fold media to set the stop position's width Push the gray slide-lock towards the rear of the print to lock its position.

4. Insert the media through the slot at the rear of the printer and place the media between the media guide and roll holders.



5. Close the top cover.

After printing or using the **FEED** button to advance several labels: If the media does not track down the center (moves the stack from side to side) or the sides of the media (liner, tag, paper, etc.) are frayed or damaged when exiting the printer, then the media guide stop position may need further adjustment.

If this does not correct the problem, then the media can be routed over the two roll-holding pins on the media guide depending upon your media.

An empty roll core of the same width as the stack of the fan-fold media can be placed between the roll holders to provide additional support for thin media.

Using the Label Dispenser Option

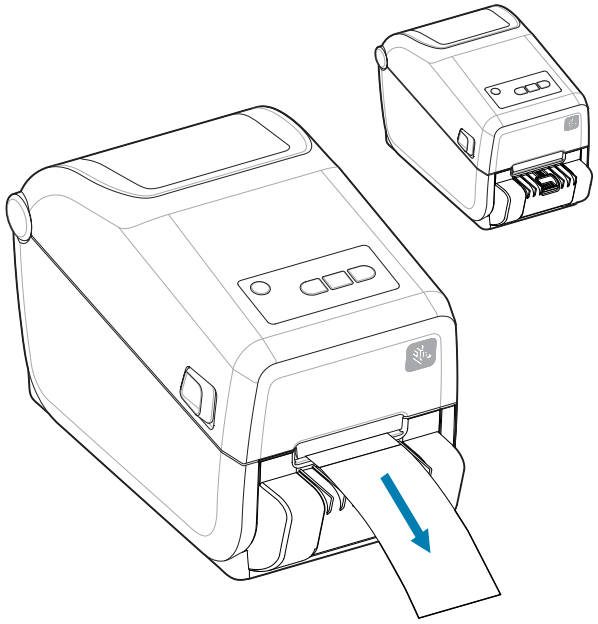
Use the label dispenser option to print a label and have the backing material (liner/web) automatically removed. When printing multiple labels, removing the dispensed (peeled) label can trigger the printer to print and dispense the next label.

- For printers with the display option, use the **Print** > **Label Position** > **Collection Method**
- Set Media Handling to Peel-Off in the printer driver
- Use the Zebra Setup Utility **Configure Printer Settings** wizard
- Send the ZPL programming commands to the printer.

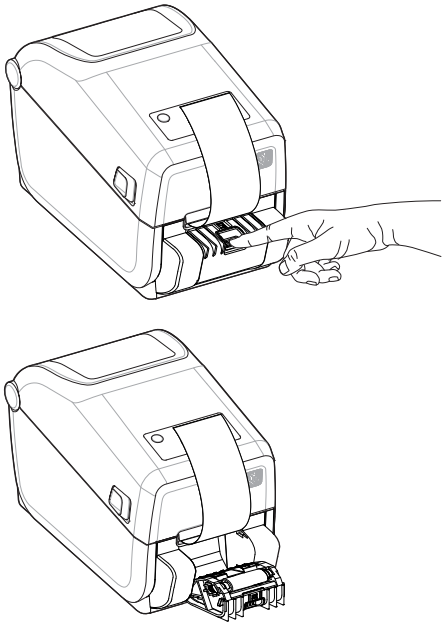
When programming in ZPL, you can use the command sequences shown below to configure the printer to use the dispenser option:

```
^XA ^MMP ^XZ
^XA ^JUS ^XZ
```

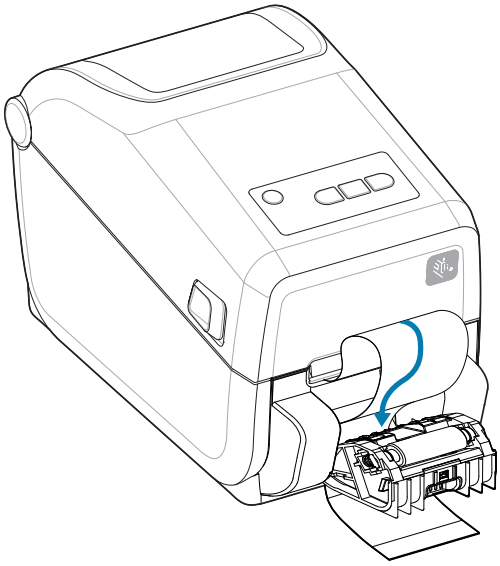
1. Load your labels into the printer. Close the printer and press the **FEED** button until a minimum of 100 millimeters or 4 inches of exposed labels exit the printer. You can leave the labels on the liner.



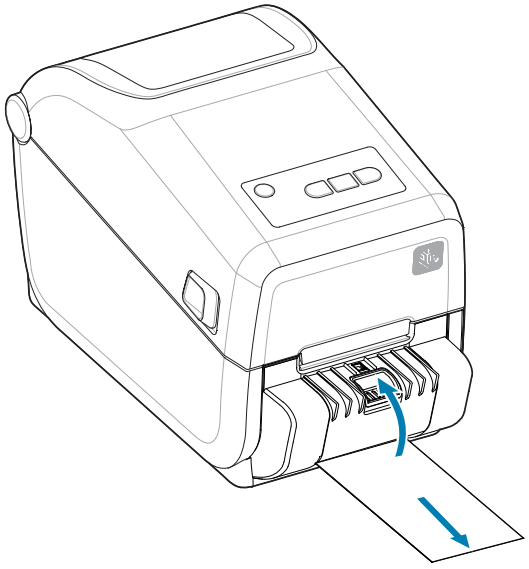
2. Lift the liner over the top of the printer. Pull the gold latch in the center of the dispenser door away from the printer and the door opens.



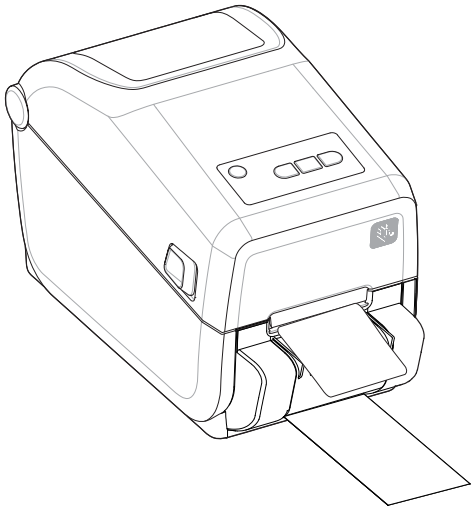
3. Insert the label liner between the dispenser door and the printer body.



4. Close the dispenser door while pulling the end of the label liner tight.



5. Press and release the **FEED** (Advance) button one or more times until a label gets presented for removal.



6. During the print job, the printer peels off the backing and presents a single label. Take the label from the printer to allow the printer to print the next label.

IMPORTANT: If you did not activate the label taken sensor to detect the removal of the dispensed (peeled and presented for removal) label with software commands, the printed labels will stack and may bind the mechanism.

Printing with Externally Mounted Roll Media

The printer accommodates externally mounted roll media similar to the printer's support of fan-fold media.

Externally Mounted Roll Media Considerations:

IMPORTANT: The printer requires the media roll and stand combination to have low initial inertia to pull the media off the roll.

- The media enters the printer directly behind the printer through the fan-fold media slot in the rear of the printer. See Printing on Fan-Fold Media on page 111.
- Lower the print speed to decrease the chance of motor stalls. The roll typically has the highest inertia when trying to start the roll moving. Larger media roll diameters require the printer to have more torque applied to get the roll moving.
- The media should move smoothly and freely. The media should not slip, skip, jerk, bind, and then move, etc. when mounted on your media stand.
- The printer should not touch the media roll.
- The printer should not slip or lift up off the operating surface.

Printing with the Attached Battery Base and Battery Option

Printer operating procedures change slightly when using the battery.

The battery is designed to maximize battery life, maintain print quality, and have a simple operation. Power connections and power loss scenarios necessitate the differences in operation.

- Connecting the printer's external power supply to the battery will wake up the battery. The battery determines if charging is needed.
- The battery will not start charging until the battery's charge level is below 90% charge. This extends your battery's life.
- Once charging has begun, the battery will charge to 100% capacity and then go into Sleep Mode.
- The printer is receiving the external power passed through by the battery circuitry into the printer. The battery does not charge while printing or moving media.
- The battery uses a very small amount of power during Sleep Mode to maximize the available charge stored in the battery.
- It takes about 2 hours to charge a fully discharged battery.

UPS Mode

The printer is receiving the external power passed through by the battery circuitry into the printer.

1. Press the **Battery Control** button to activate the battery and check the battery's charge level. After 60 seconds the battery goes to sleep.
2. The battery is in Sleep Mode awaiting the loss of external power to the battery (and attached printer).

The printer can be turned OFF and ON normally and does not require the battery to be ON to operate.

Battery Mode

The printer is powered by a battery only.

1. Press the **Battery Control** button to activate the battery and check the battery's charge level. After 60 seconds the battery goes to sleep if the printer has not been turned on yet.
2. Turn the printer ON.
3. Use the printer normally.
4. Check the battery charge status at any time by pressing the **Battery Control** button.
5. Change or charge your battery when the last battery charge level indicator is flashing. Your print operation may be interrupted if the battery charge is used up and the printer turns off.

Printer Fonts

The ZD-Series printer supports your language and font requirements.

The ZPL programming language provides advanced font mapping and scaling technology to support outline fonts (TrueType or OpenType) and Unicode character mapping as well as basic bitmapped fonts and character code pages.

The printer's font capabilities are programming language-dependent. The ZPL and the legacy EPL programming guides describe and document the fonts, code pages, character access, listing fonts, and limitations for their respective printer programming languages. See the printer programming guides for information on Text, Fonts, and Character support.

Zebra has a variety of utilities and application software that support font download to the printer for ZPL and EPL printer programming languages.

IMPORTANT: Some factory-installed ZPL fonts in the printer cannot be copied, cloned, or restored to the printer by reloading or updating firmware. If these licenses restricted ZPL fonts are removed by an explicit ZPL object delete command, they must be repurchased and reinstalled via a font activation and installation utility. EPL fonts do not have this restriction.

Identifying Fonts in the Printer

Fonts and memory are shared by the programming languages in the printer. Fonts can be loaded into various storage locations in the printer. ZPL programming can recognize EPL and ZPL fonts. EPL programming can only recognize EPL fonts. See the respective programmer guides for more information on fonts and printer memory.

- To manage and download fonts for ZPL print operation, use the Zebra Setup Utility or ZebraNet ™ Bridge.
- To display all of the fonts loaded in the printer, send the printer the ZPL command `^WD`. See the ZPL Programmers Guide for details.
  - Bitmap fonts in the various printer memory areas are identified by the .FNT file extension in ZPL.
  - Scalable fonts are identified with the .TTF, .TTE or .OTF file extensions in ZPL. EPL does not support these fonts.

Localizing the Printer with Code Pages

The printer supports two sets of language, region, and character sets for permanent fonts loaded into the printer for each printer programming language; ZPL and EPL. The printer supports localization with common international character map code pages.

For ZPL code page support, including Unicode, see the `^CI` command in the ZPL programmer's guide.

Asian fonts and Other Large Font Sets Asian

Asian language ideographic and pictographic fonts have large character sets with thousands of characters that support a single language code page. In order to support the large Asian character sets, the industry adopted a double-byte (67840 maximum) character system instead of the single-byte characters (256 maximum) used by Latin-based language characters to address large font sets. In order to address multiple languages with a single font set, Unicode was invented. A Unicode font supports one or more code points (relate these to code page character maps) and is accessed in a standard method that resolves character mapping conflicts. The ZPL programming language supports Unicode. Both of the printer's programming languages support the large pictographic double-byte character Asian font sets.

The number of fonts that can be downloaded is dependent upon the amount of available flash memory not already in use and the size of the font to be downloaded.

Some Unicode fonts are large, such as MS (Microsoft) Arial Unicode font (23 MB) available from Microsoft or the Andale font (22 MB) offered by Zebra. These large font sets typically support a large number of languages as well.

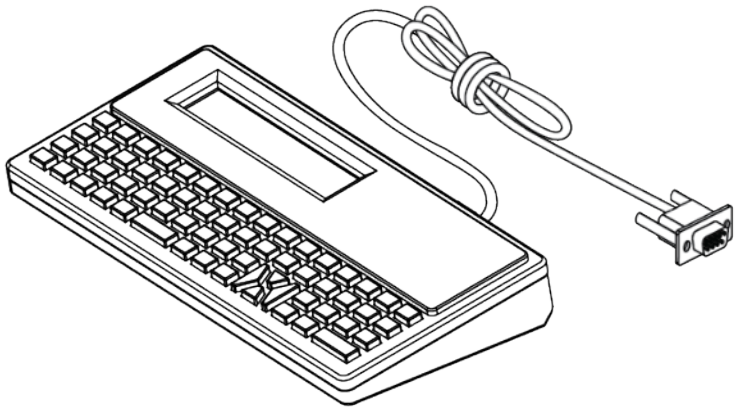
Getting Asian Fonts

Asian bitmap font sets are downloaded into the printer by the user or integrator. The ZPL fonts are purchased separately from the printer. EPL Asian Fonts are available for free to download from the Zebra Web site.

- Simplified and Traditional Chinese (The SimSun scalable font is pre-loaded onto printers sold with a Chinese power cord.)
- Japanese — JIS and Shift-JIS mappings
- Korean including Johab
- Thai

Zebra Keyboard Display Unit (ZKDU) – Printer Accessory

The ZKDU is a small terminal unit that interfaces with the printer to enable ease of access to EPL or ZPL label forms stored in the printer.



The ZKDU is used for the following functions:

- List label forms stored in the printer
- Retrieve label forms stored in the printer

- Input variable data
- Printing labels
- Switching between EPL and ZPL to support dual-format printer language format/form types. These forms can be stored and printed in late model Zebra label printers.

NOTE: The ZKDU is strictly a terminal unit. It does not store data and cannot be used to change printer or printing parameters.

Zebra Basic Interpreter (ZBI) 2.0

Use ZBI to create custom controls and interpret non-Zebra formatted data from other applications, systems, and data input devices (scanners, keyboards, scales, etc.).

Customize and enhance the printer using the ZBI 2.0 programming language. ZBI 2.0 allows Zebra printers to run applications and take input from scales, scanners, and other peripherals without a PC or network connection. ZBI 2.0 works with the ZPL printer command language so that printers can understand non-ZPL data streams and convert them into labels. That means the Zebra printer can create barcodes and text from input received, non-ZPL label formats, sensors, keyboards, and peripherals. Printers can also be programmed to interact with PC-based database applications to retrieve information to be used on printed labels.

- ZBI 2.0 can be activated by ordering a ZBI 2.0 Key Kit or activated by purchasing a key from Zebra.
- Use the ZBI Key Manager (also known as ZDownloader utility) to apply the key.
- An intuitive ZBI-Developer is used to create, test, and distribute ZBI 2.0 applications. The built-in virtual printer allows you to quickly create, test, and prepare programs for use.

Go to the Zebra Web site and search for Zebra Basic Interpreter 2.0. See zebra.com/software.

Setting the Power Failure Recovery Mode Jumper

The printer can be configured to restart itself after a power failure, unattended, with the Power Failure Recovery Mode set.

- Remove the power supply cable from the back of the printer.
- Remove any attached printer interface cables.

NOTE:

The Power Failure Recovery Mode is only available on printers with a Printer Connectivity Module installed in the printer.

The Printer Connectivity Modules have a Power Failure Recovery jumper set to OFF. With the jumper set to ON, the printer will automatically Power ON when plugged into an active (ON) AC power source.

1. Remove the module access door and connectivity module. See Configuring Wired Connectivity Options and Power Failure Recovery Mode on page 41 for 'Removing a Connectivity Module Card' instructions.
2. Move the AUTO (Power Failure Recovery Mode) jumper from the OFF position to the ON.
3. Reinstall the connectivity module and module access door. See Configuring Wired Connectivity Options and Power Failure Recovery Mode on page 41 for 'Installing a Connectivity Module Card' instructions.

Maintaining the Printer

This section covers how you can maintain the printer in an optimal operating condition.

The printer may require periodic maintenance to keep the printer functional and printing high-quality labels, receipts, tags, etc.

Cleaning Supplies

Use the recommended cleaning supplies to maintain printer function and prevent damage to the printer from unapproved cleaning materials.

The following printer cleaning supplies are recommended for use with the printer:

- Printhead Cleaning Pens for simple operator printhead cleaning
- Isopropyl alcohol (minimum 99.7% pure). Use a labeled alcohol dispenser. Never re-moisten cleaning materials used to clean the printer)
- Fiber-free Cleaning Swabs for media path, guides, and sensors.
- Cleaning Wipes for media path and interior (for example Kimberly-Clark Kimwipes).
- Can of Compressed Air.

IMPORTANT:

The cutter mechanism does not require maintenance cleaning. Do not clean the blade or mechanism. The blade has a special coating to resist adhesives and wear.

Using too much alcohol can result in contamination of the electronic components requiring a much longer drying time before the printer will function properly.

Do not use an air compressor in place of the can of compressed air. Air compressors have micro contaminants and particles that get into the air compressor system and damage the printer.

CAUTION—EYE INJURY: Use eye protection to protect your eyes from particles and objects when using compressed air.

See Also

Get Zebra Supplies and Accessories for cleaning the printer at zebra.com/accessories

Recommended Cleaning Schedule

Use the following guidelines to help you print high-quality labels and keep the printer running well.

Printhead

Interval:
Clean the printhead after every 5 rolls printed.

Procedure:
See .

Standard Platen (Drive) Roller

Interval:
As needed to improve print quality. Platen rollers can slip causing print image distortion and in worst-case scenarios not move the media (labels, receipts, tags, etc.).

Procedure:
See Platen Cleaning and Replacement on page 128.

Media Path

Interval:
Clean as needed.

Method:
Clean it thoroughly with fiber-free cleaning swabs and cloths moistened with isopropyl alcohol (minimum 99.7% pure). Let the alcohol evaporate completely.

Procedure:
See Media Path Cleaning on page 123.

Interior

Interval:
Clean the printer as needed.

Method:
Use a soft cloth, brush, or compressed air to wipe or blow dust and particles out of the printer. Use isopropyl alcohol (minimum 99.7% pure) and a fiber-free cleaning cloth to dissolve contaminants like oils and grime.

Procedure: See the following:
Media Path Cleaning on page 123

Sensor Cleaning on page 126

Platen Cleaning and Replacement on page 128

Exterior

Interval:
Clean as needed.

Method:

Use a soft cloth, brush, or compressed air to wipe or blow dust and particles out of the printer. Use isopropyl alcohol (minimum 99.7% pure) and a fiber-free cleaning cloth to dissolve contaminants like oils and grime

Label Dispenser Option

Interval:
As needed to improve label dispensing operations.

Procedure:
See Cleaning the Label Dispenser Option on page 125.

Cutter Option

Interval:
Not an operator serviceable component. Do not clean inside the cutter opening or blade mechanism. You may use exterior cleaning to clean the cutter bezel (housing).

Method:
Call a service technician.

Procedure:
Not applicable.

WARNING: There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers into the cutter mechanism.

IMPORTANT:

The blade has a special coating to resist adhesives and wear. Cleaning it may ruin the blade.

Using un-approved tools, cotton swabs, solvents (including alcohol), etc.; all may damage or shorten the cutter's usable life or cause the cutter to bind.

Cleaning the ZD411T Printhead

Clean the printer's printhead often to maximize print quality and printer life.

Always use a new cleaning pen on the printhead (an old pen carries contaminants from its previous use that may damage the printhead).

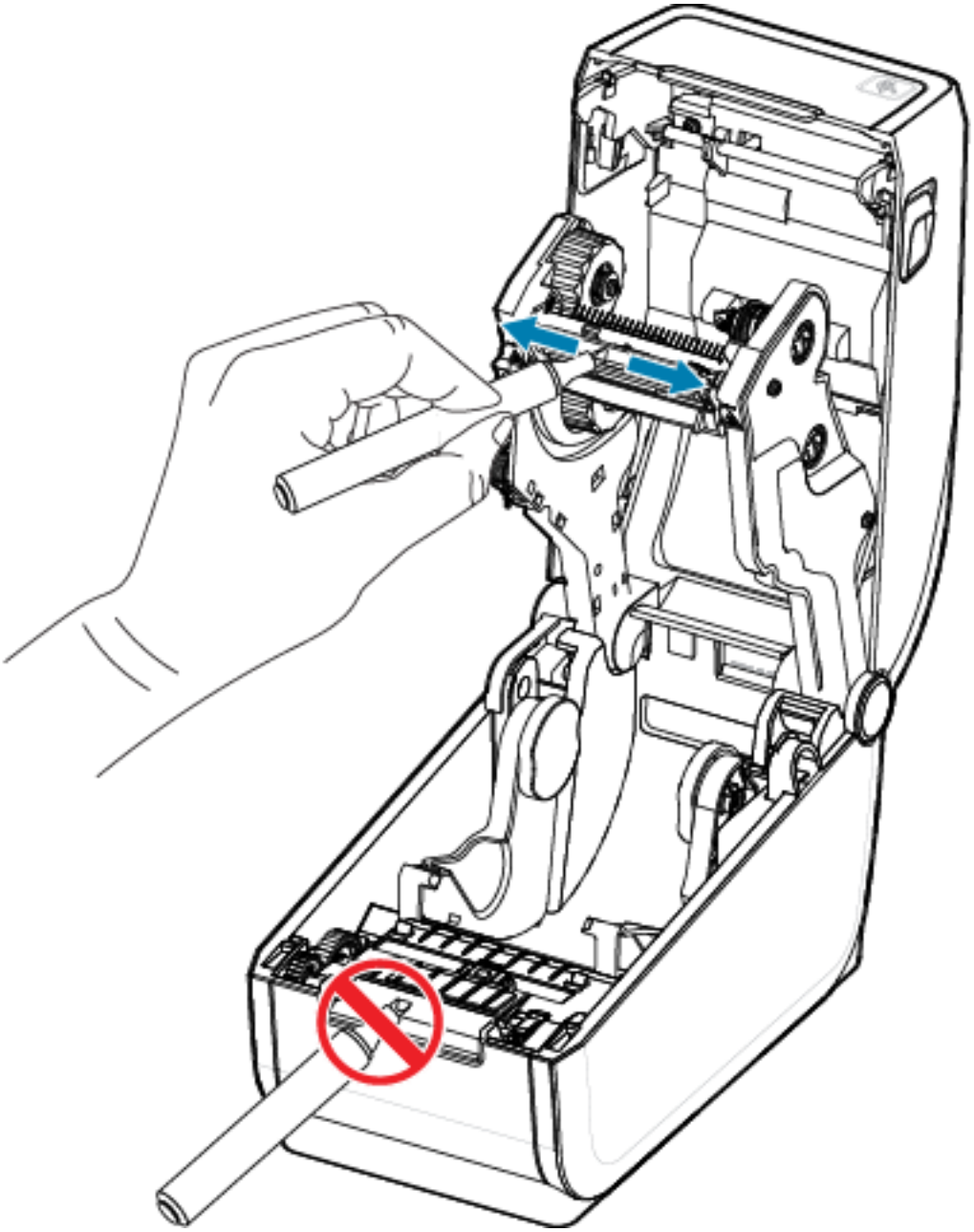
CAUTION—ESD: The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.

CAUTION—HOT SURFACE: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.

NOTE: When you load new media or ribbon, you can also clean the printhead.

The printer is open for replacing the media roll or performing printer service.

1. If the transfer ribbon is installed, remove it before proceeding.
2. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside. This will move adhesive transferred from the outer edges of media to the area outside of the media path. Do not use the cleaning pen on the platen roller.



3. Wait one minute before closing the printer.

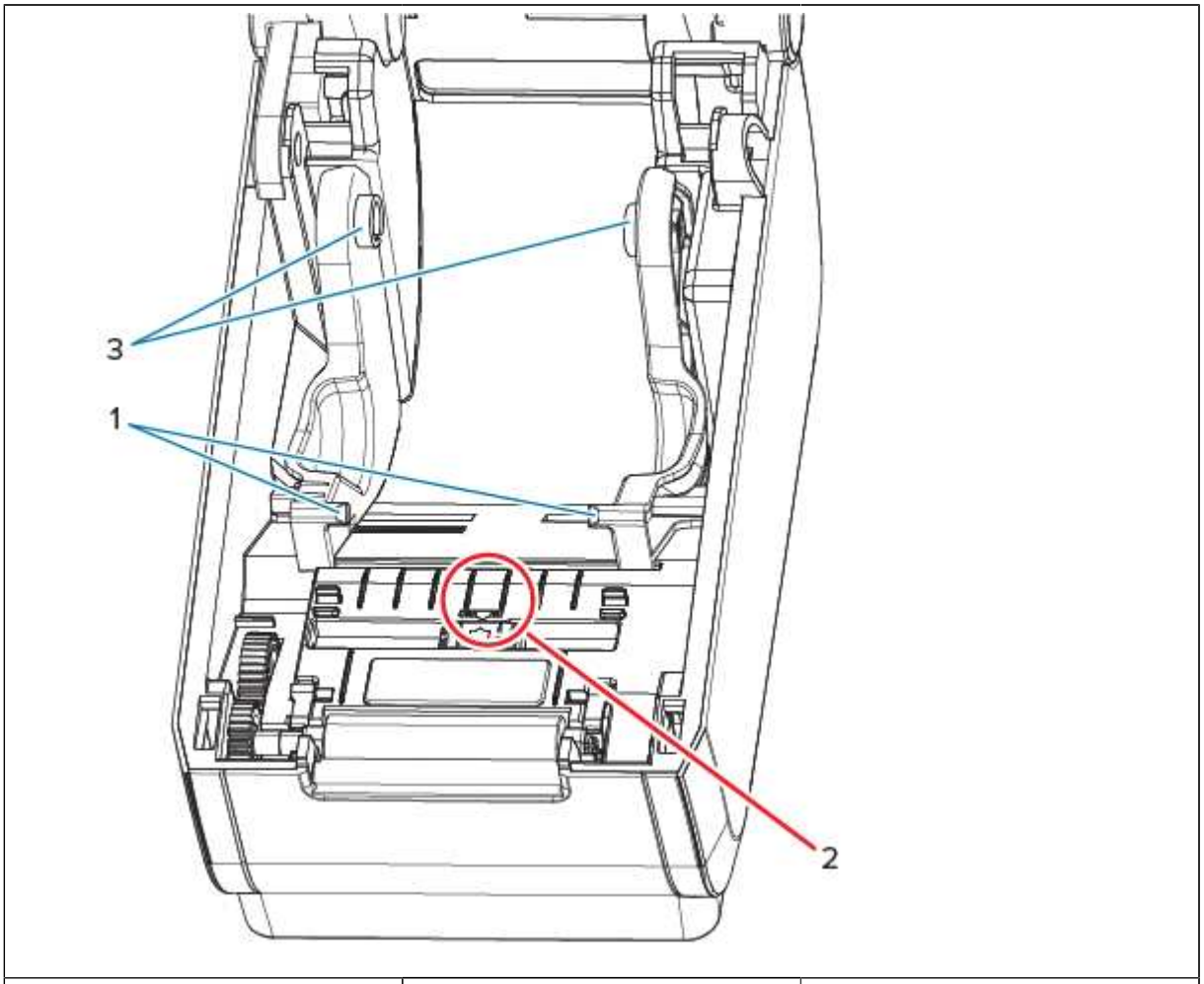
Media Path Cleaning

Use a cleaning swab and/or a lint-free cloth to remove debris, dust, or crust that has built up on the holders, guides, and media path surfaces.

Lightly moisten the swab or cloth with isopropyl alcohol (minimum 99.7% pure). For hard-to-clean areas, use extra alcohol on a cleaning swab to soak the debris to break up any adhesive that may have accumulated on surfaces in the media compartment.

Do not clean the printhead, sensors, or platen as part of this process.

1. Wipe the inside surfaces of the roll holders and the underside of the media guides with cleaning swabs and wipes.
2. Wipe the movable sensor slide channel (but not the sensor). Move the sensor to get to all areas.
3. Wait one minute before closing the printer. Discard used cleaning supplies.



1 — Media Guides	2 — Don't Clean Sensor	3 — Media Roll Holders

Cleaning the Cutter Option

This procedure is a continuation of cleaning the media path for printers with a cutter option installed.

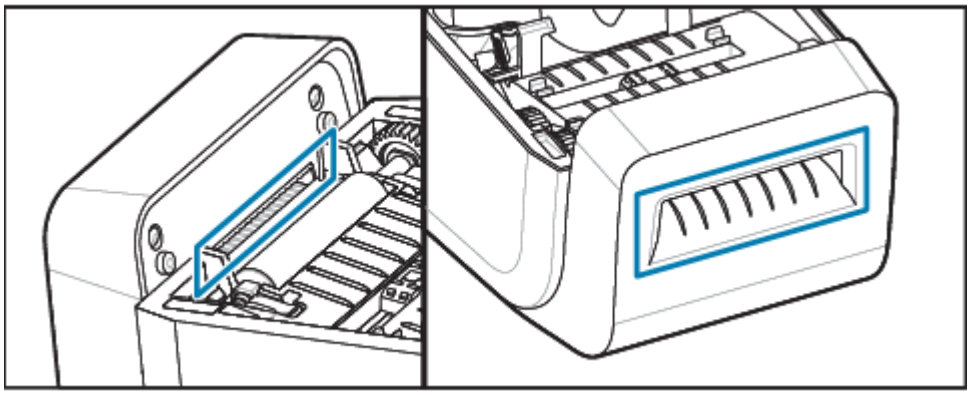
The plastic media path surfaces can be cleaned but not the internal cutter blades or mechanism.

IMPORTANT: The cutter blade mechanism does not require maintenance cleaning. DO NOT clean the blade. This blade has a special coating to resist adhesives and wear.

WARNING: There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers into the cutter mechanism.

ATTENTION: Using un-approved tools, cotton swabs, solvents (including alcohol), etc. all may damage or shorten the cutter's usable life or cause the cutter to jam.

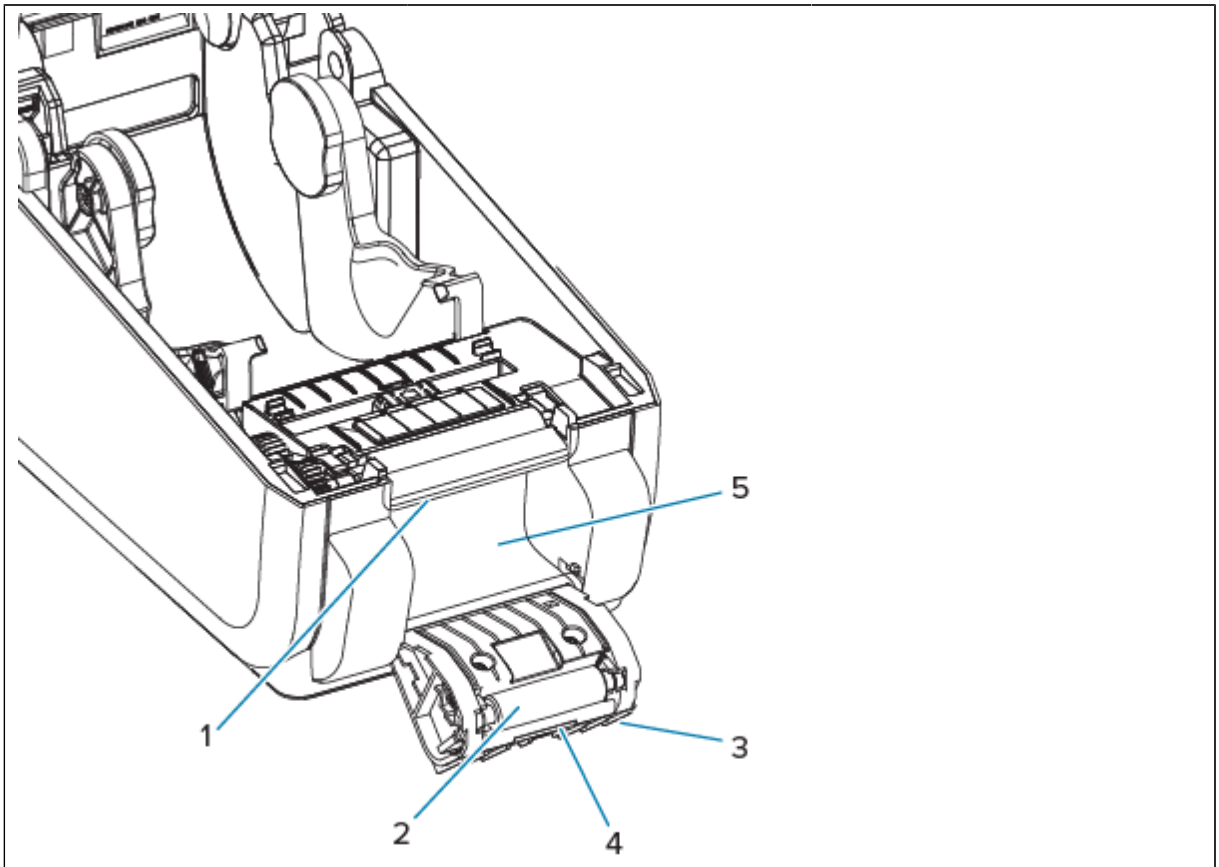
1. Wipe the ridges and the plastic surfaces of the media entry (inside) and exit slot (outside) of the cutter. Clean inside the areas outlined in blue.
2. Repeat as necessary to remove any adhesive or contaminant residue after it dries.



Cleaning the Label Dispenser Option

This procedure is a continuation of cleaning the media path for printers with a label dispenser option installed.

1. Open the door and clean the peel bar, inner surfaces, and ridges on the door.
2. Wipe the roller while rotating it. Discard the swab or cloth.
3. Clean the roller again with a new swab or cloth to remove diluted residue.
4. Clean the sensor window. The window should be clear of streaks and residue.



1 — Peel Bar	2 — Pinch Roller	3 — Ridges
4 — Label Taken Sensor	5 — Inside Wall	

Sensor Cleaning

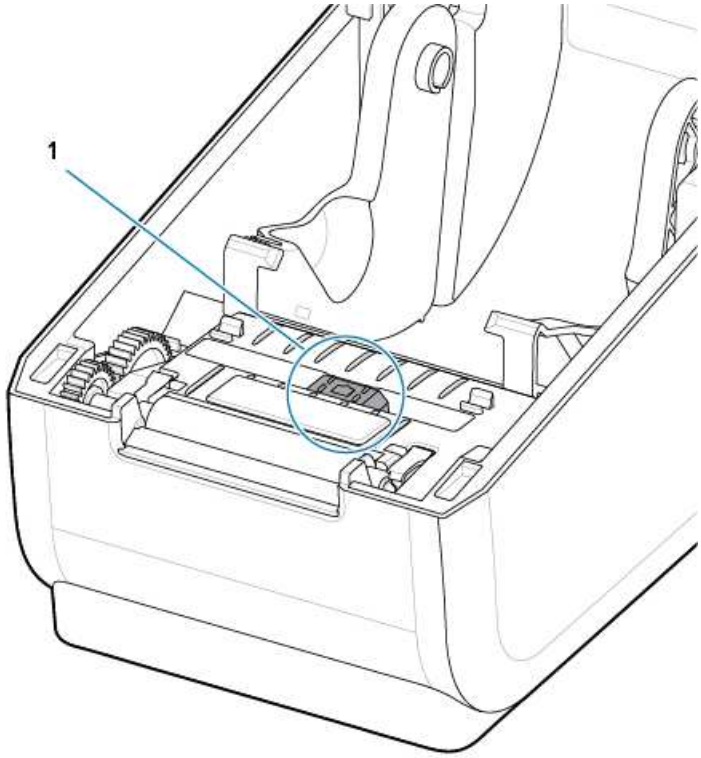
Removing dust (normally) cleans these sensors.

Dust can accumulate on the media sensors. Blow or gently brush dust away while a soft cloth.

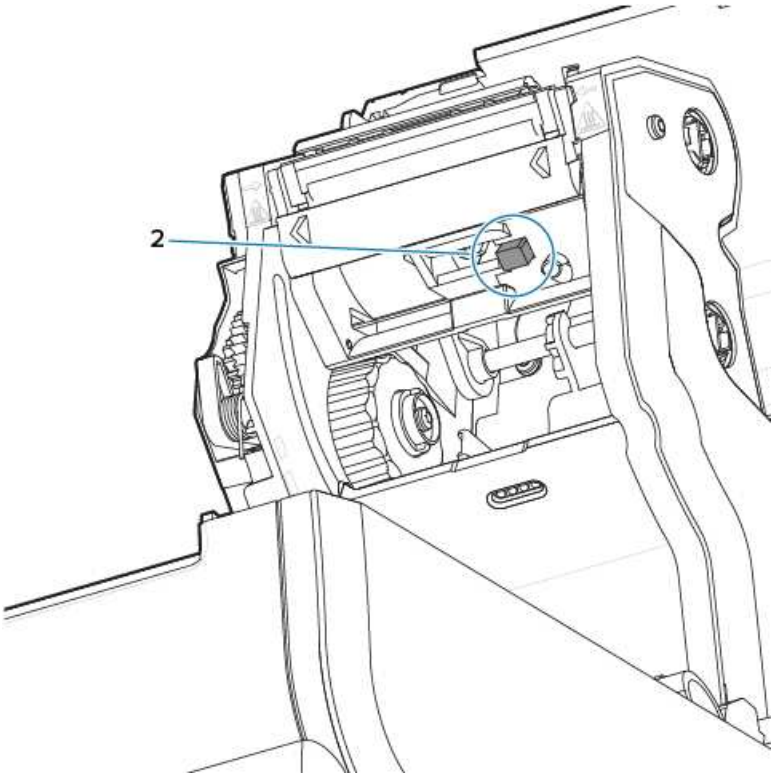
IMPORTANT: Do not use an air compressor to remove dust. Compressors add moisture, fine grit, and lubricant which can contaminate the printer.

Adhesive particles and airborne substances can cover or coat the optical components in non-typical use media and operating environments.

1. Clean the Movable Sensor's window (1). Gently brush away dust or use a can of compressed air; if necessary, use a dry swab to brush away dust. If adhesives or other contaminants remain, use an alcohol moistened swab to break them up.



2. Use a dry swab to remove any residue that may be left from the first cleaning.
3. Repeat steps 1 and 2 as required until all residue and streaks are removed from the sensor.
4. Spray the Upper Web (Gap) Array Sensor (1) below the printhead with a can of compressed air. If necessary, use an alcohol moistened swab to break up adhesive or other non-dust contaminants. Use a dry swab to remove any residue that may be left from the first cleaning.



Platen Cleaning and Replacement

The platen (drive roller) normally does not require cleaning. Normally, paper and liner dust can accumulate without affecting print operations.

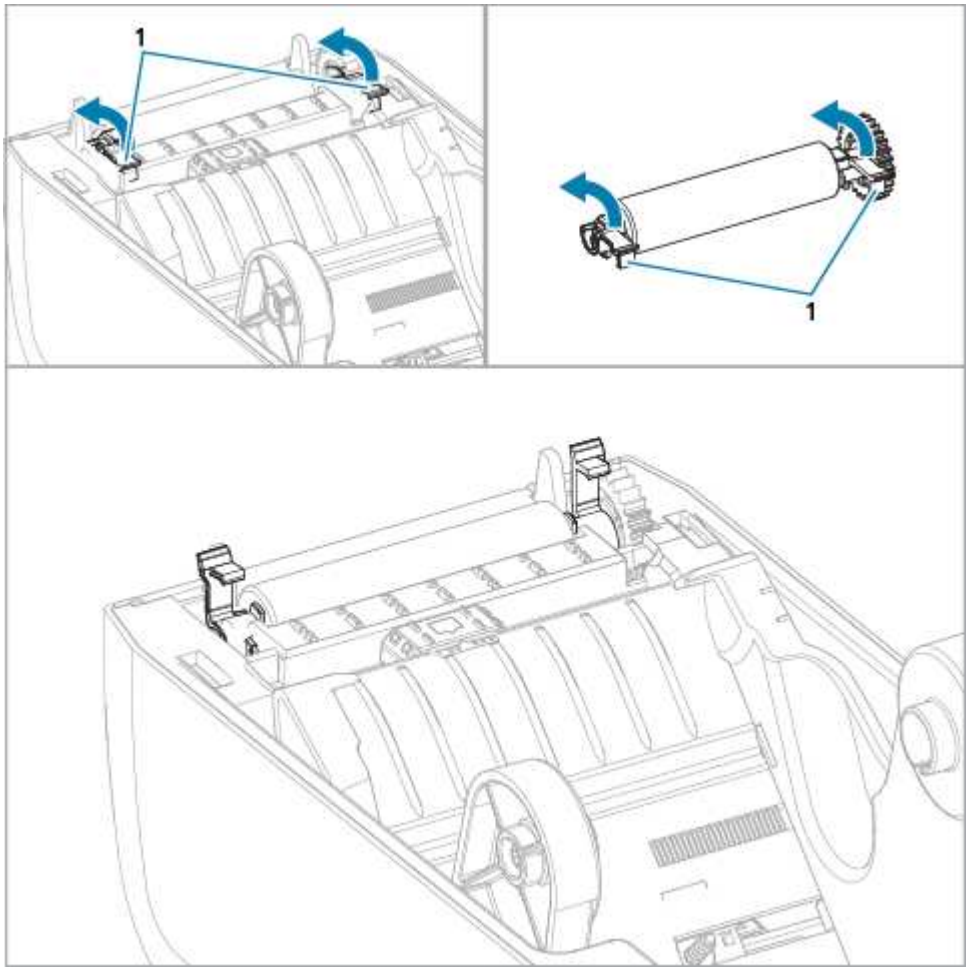
Clean the platen (and media path) whenever the printer has significantly poorer performance, print quality, or media handling. The platen is the print surface and drive-roller for your media. If sticking or jamming continues even after cleaning, you must replace the platen.

IMPORTANT: Contaminants on the platen roller can damage the printhead or cause the media to slip or stick when printing. Adhesive, dirt, general dust, oils, and other contaminants should be cleaned off the platen immediately.

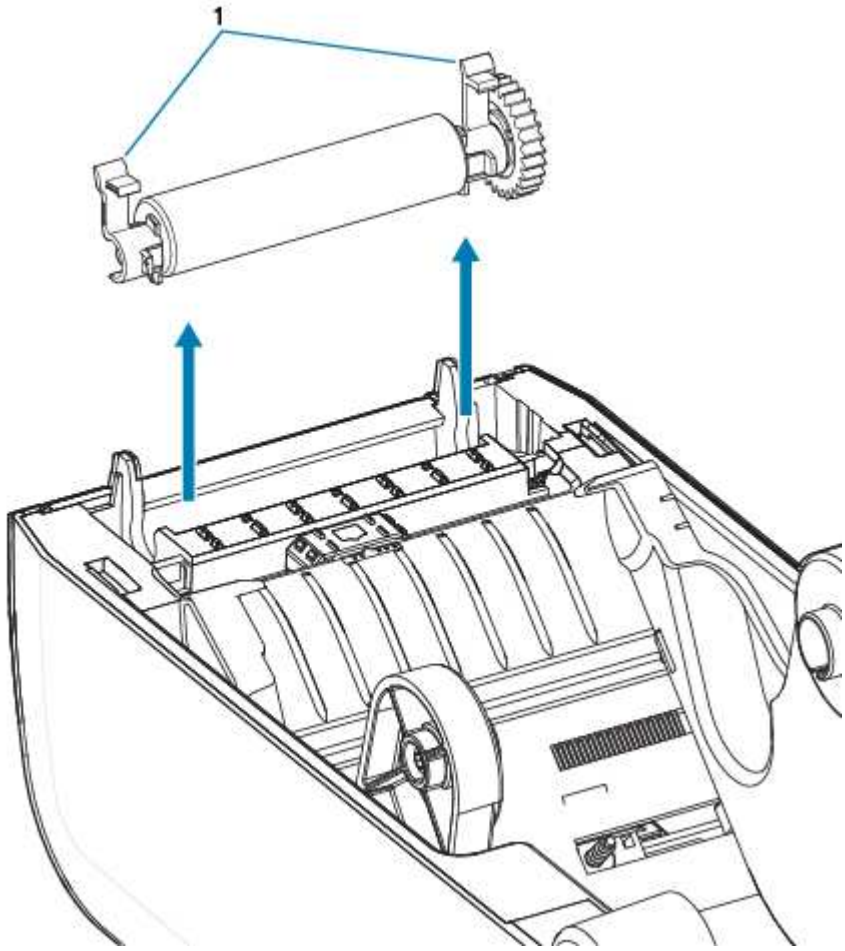
Clean the platen with a fiber-free swab (such as a Texpad swab) or a lint-free, clean, damp cloth very lightly moistened with isopropyl alcohol (minimum 99.7% pure).

Removing the Platen Roller

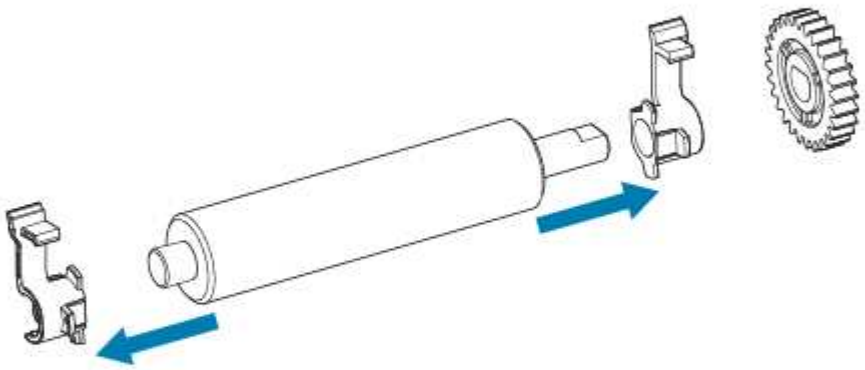
1. Open the cover (and dispenser door, if the dispenser is installed). Remove media from the platen area.
2. Pull the platen bearing latch release tabs (1) on the right and left sides towards the front of the printer and rotate them up.



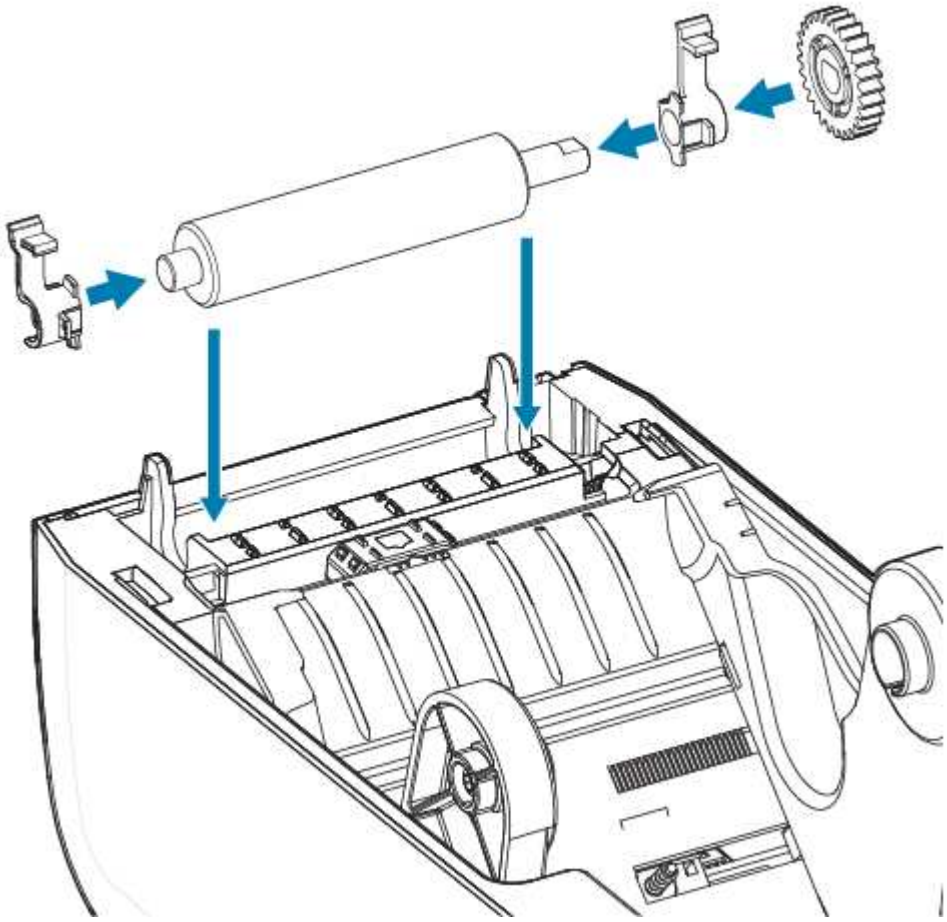
3. Lift the platen out of the printer's lower frame using the bearing arms (1).



4. Slide the gear and the two bearings off the shaft of the platen roller.



5. Cleaning Only — Clean the platen with the alcohol moistened swab. Clean from the center out. Repeat this process until all of the roller surfaces have been cleaned. If there has been heavy adhesive build-up or label jam, repeat with a new swab to remove residual contaminants, as the initial cleaning may thin but not completely remove adhesives and oils.
6. Discard the cleaning swabs after use - do not reuse them.
7. Make sure the bearings and drive gear are on the shaft of the platen roller.



8. Align the platen with the gear to the left and lower it into the printer's bottom frame.
9. Rotate the platen bearing latch release tabs down on the right and left sides towards the rear of the printer and snap them into place.
10. Allow the printer to dry for one minute before closing the dispenser door, media cover, or loading labels.

Replacing the ZD411T Printhead

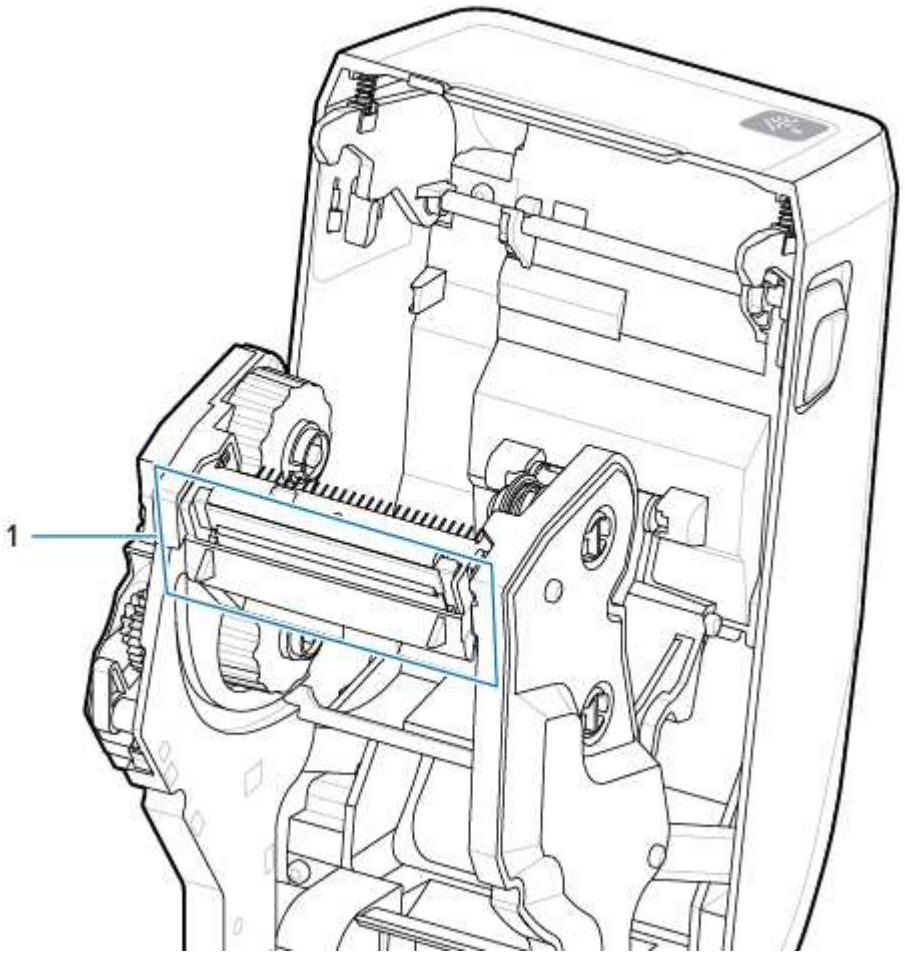
This procedure guides you through replacing the printhead.

Read this procedure first before you begin your repair.

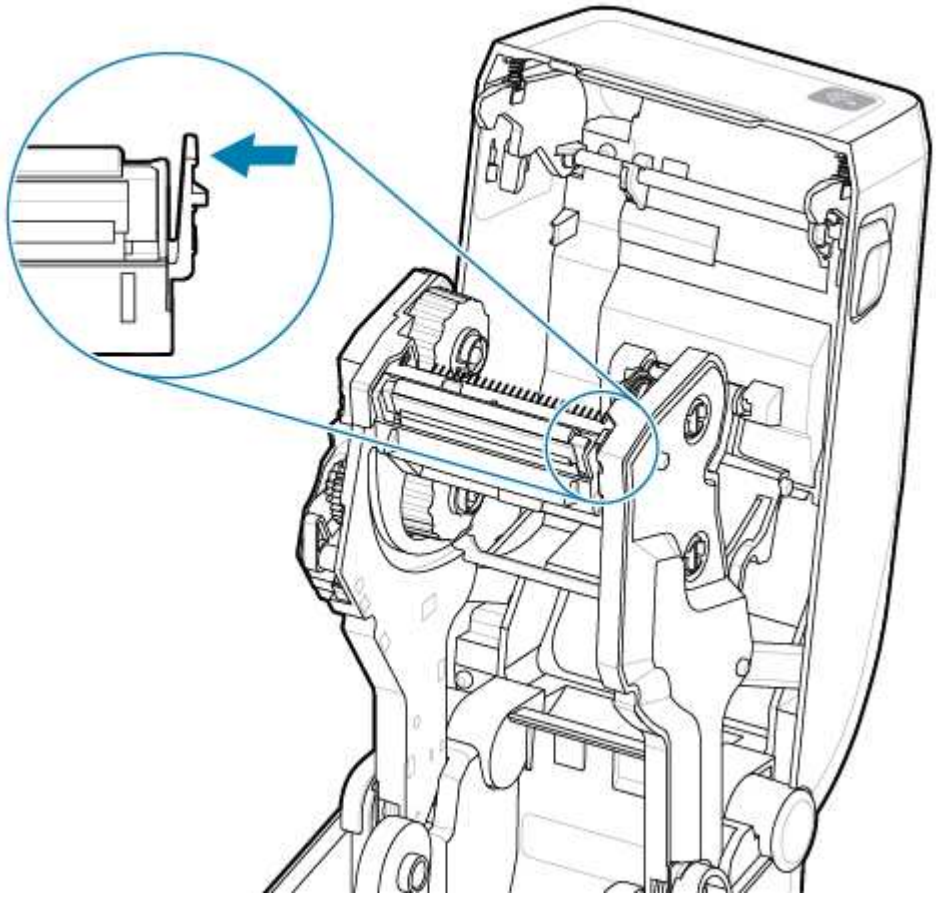
- Turn the printer OFF.
- Open the printer to gain access to the printhead (1).

CAUTION—HOT SURFACE: The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Only use the cleaning pen to perform printhead maintenance.

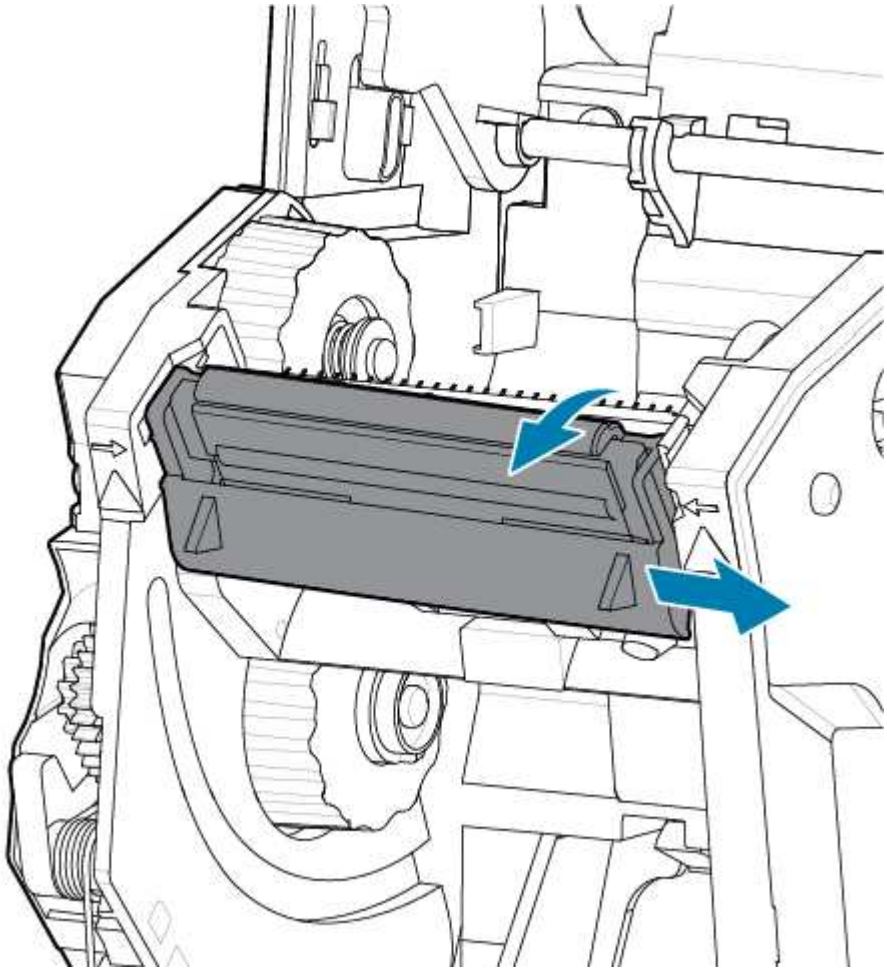
CAUTION—ESD: The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead and other electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components under the top cover.



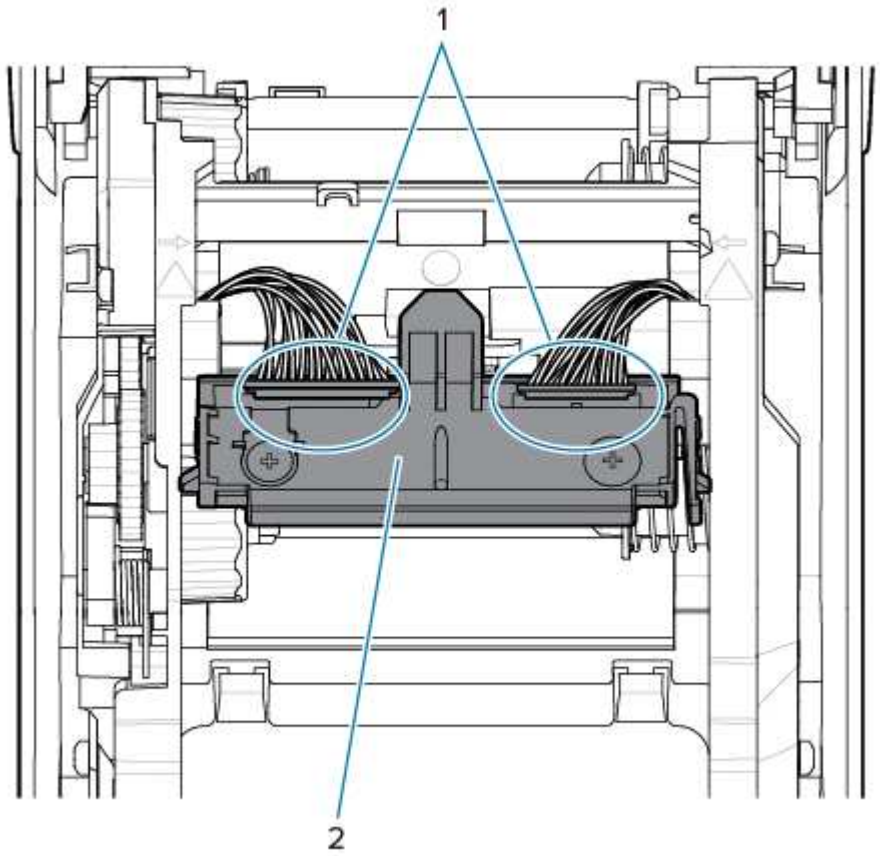
1. Push the printhead release latch toward the printhead (shown as green for visibility). The right side printhead releases down and away from the printhead lock arm.



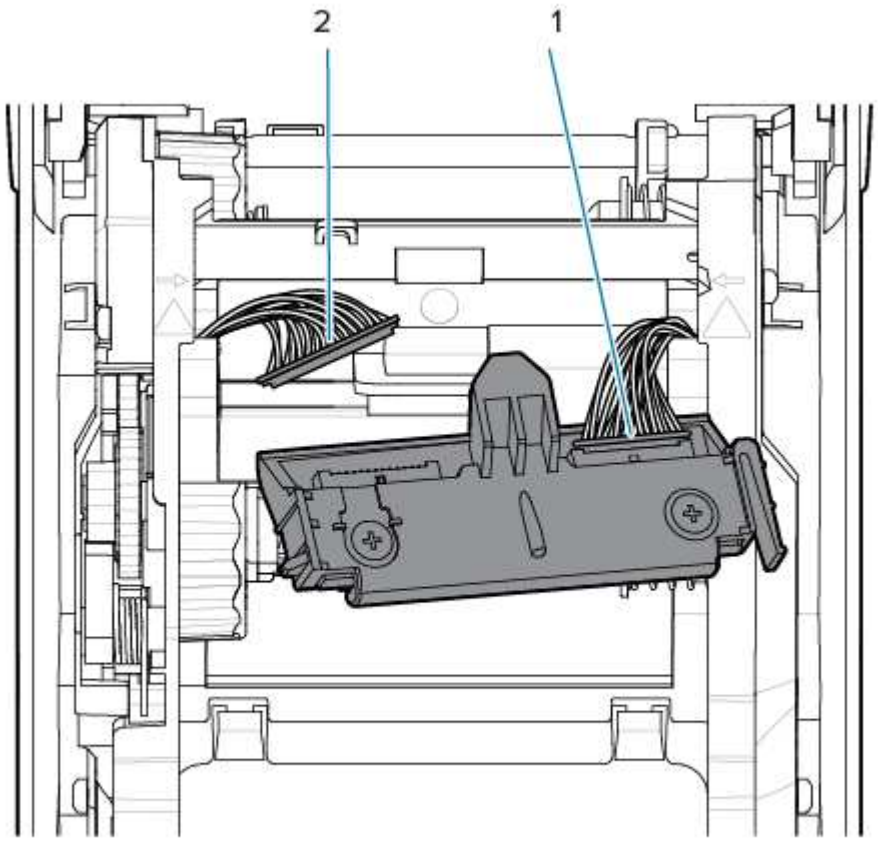
2. Swing the loose right side of the printhead out of the printer. Pull it to the right a little to get the left side of the printhead clear. Pull the printhead down and free of the ribbon carriage to gain access to its attached cables.



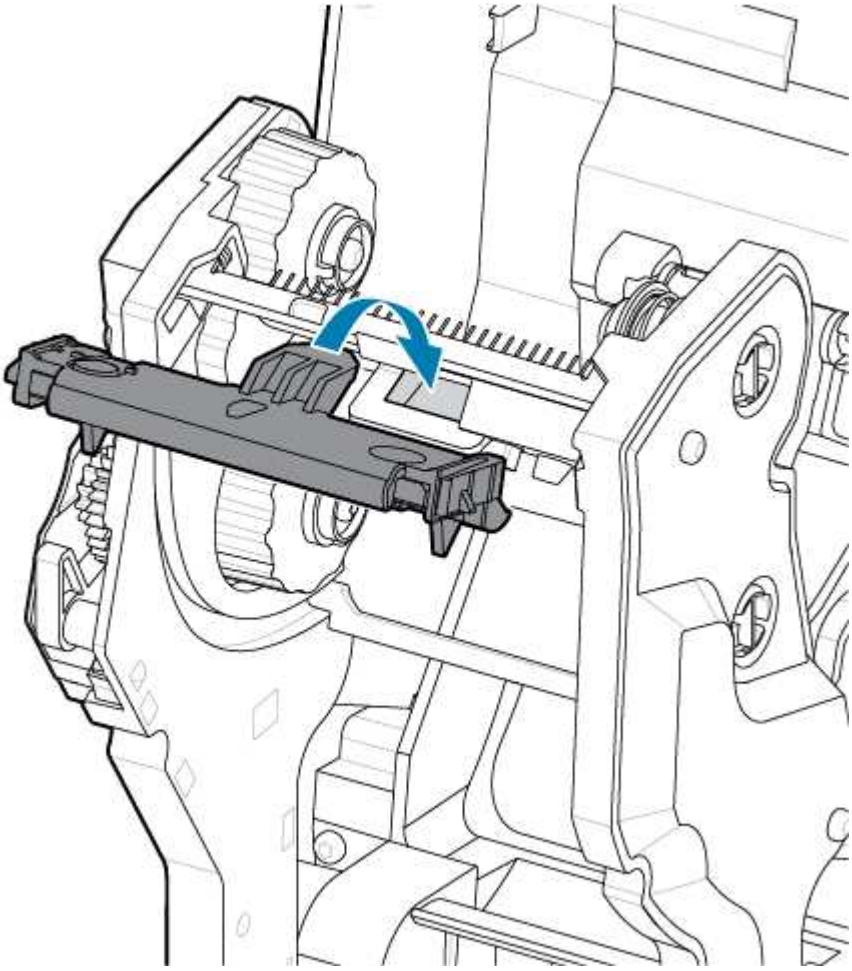
3. Gently but firmly pull the two printhead cable bundle connectors (1) off of the printhead (2).



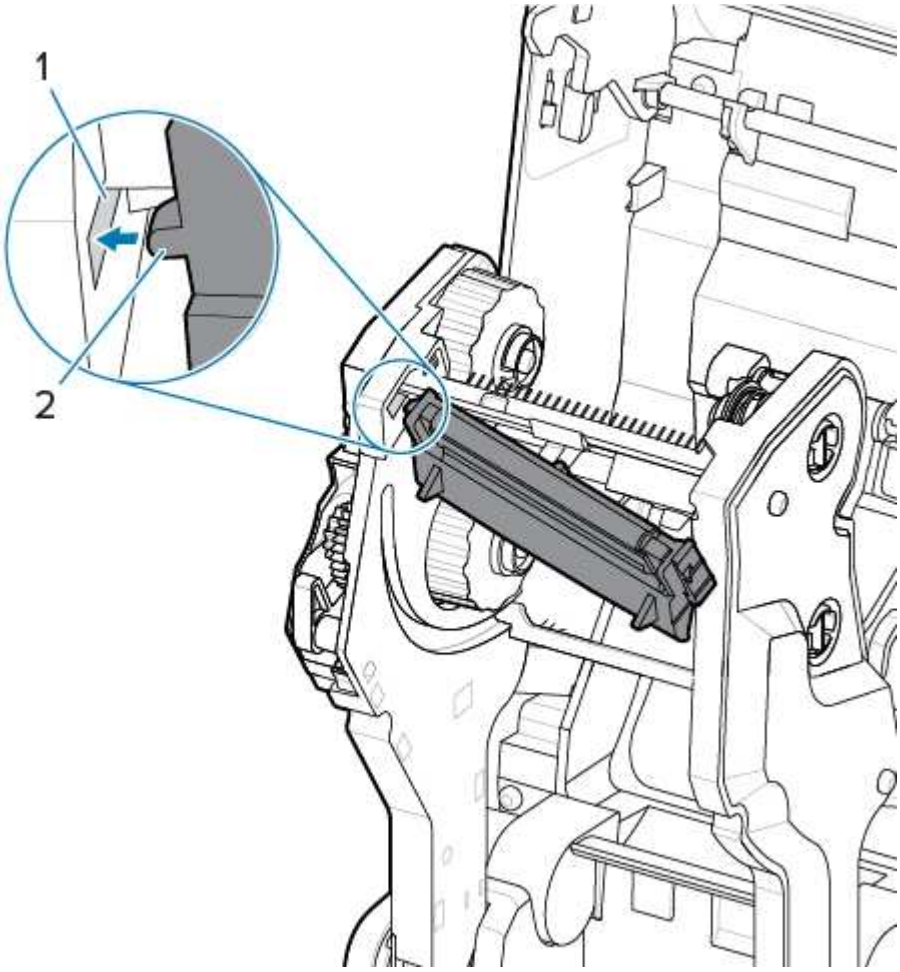
4. Align the new printhead up to the printer. Push the right printhead cable connector into the printhead. The connector is keyed to only insert one way.
5. Push the left printhead cable connector (2) onto the printhead (1).



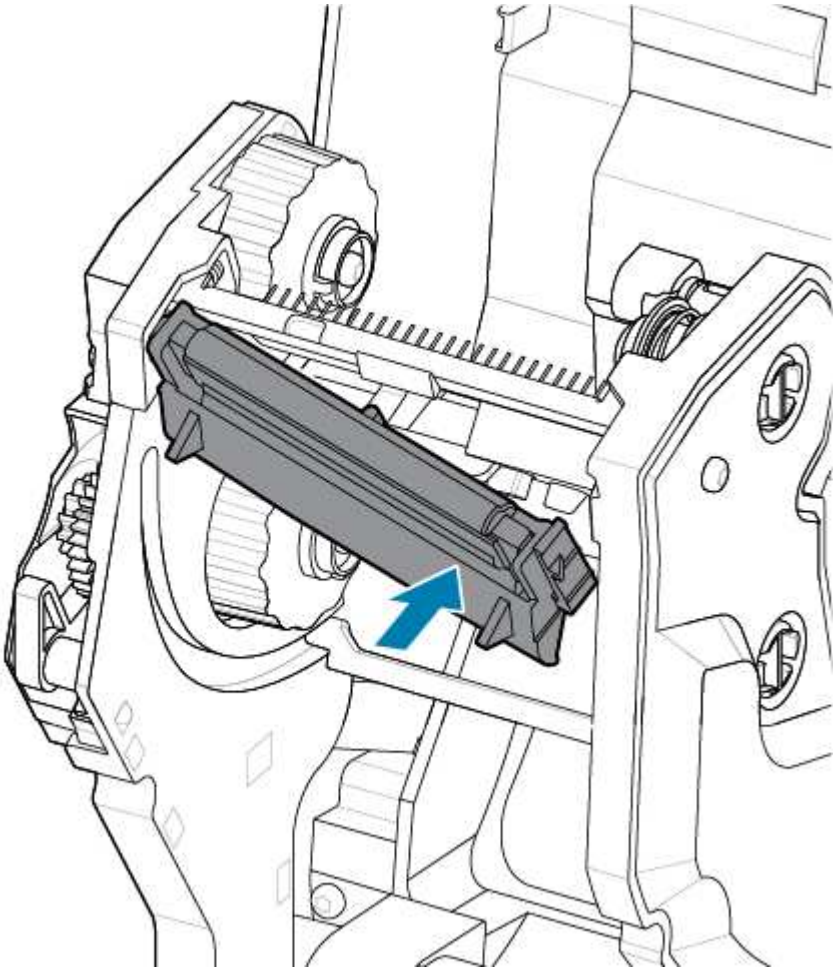
6. Insert the center tab on the printhead assembly into the center slot on the printhead mounting bracket in the ribbon carriage.



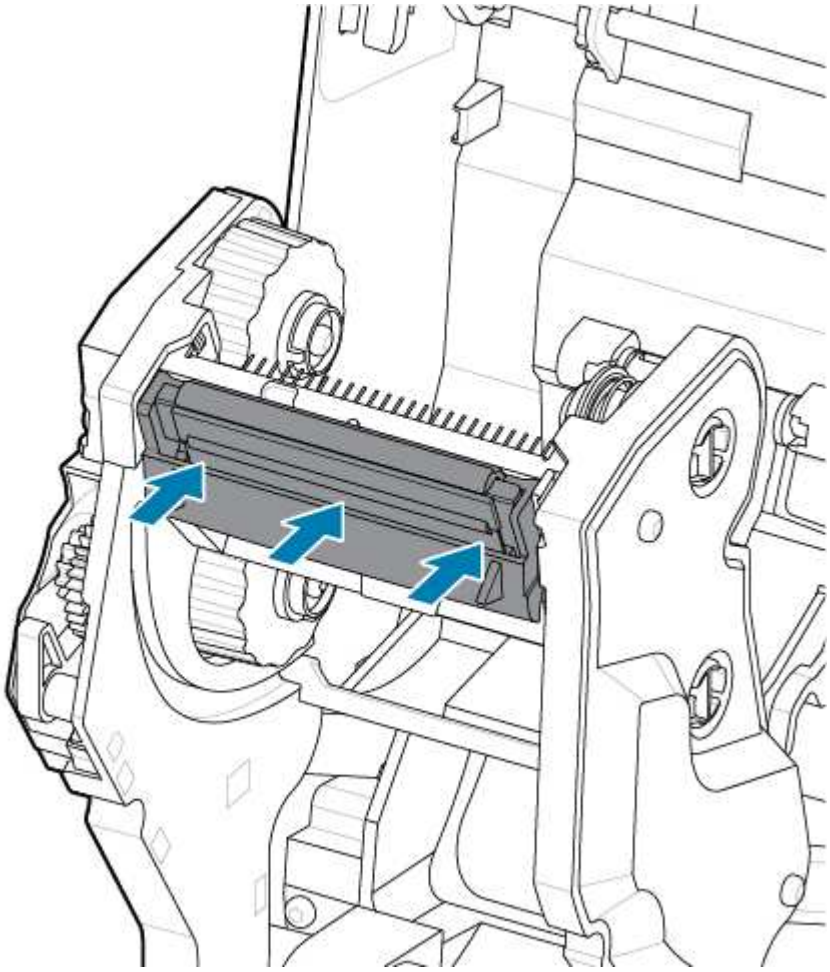
7. Insert the left side tab of the printhead assembly (2) into the recessed slot (1) on the left side of the ribbon carriage.



8. Push the right side of the printhead into the printer until the latch locks the right side of the printhead into the printer.



9. Verify that the printhead moves up and down freely when pressure is applied and remains locked when released.



After Installation

1. Clean the printhead. Use a new pen to wipe body oils (fingerprints) and debris off the printhead. Clean from the center of the printhead to the outside. See Cleaning the ZD411T Printhead on page 122.
2. Plugin the printer power is disconnected.
3. Load full-width label or receipt paper roll. Printing with a full-width roll verifies all elements of the printhead function.
4. Print a Configuration Report. See Print a Configuration Report to Test Printing on page 87.

Updating Printer Firmware

The printer's firmware may need to be updated periodically to get new features, improvements, and printer upgrades for media handling and communications.

Use Zebra Setup Utilities (ZSU) to load new firmware.

1. Open Zebra Setup Utilities.
2. Select your installed printer.
3. Click on the **Open Printer Tools** button and a **Tools** window opens.
4. Click on the **Action** tab.
5. Load the printer with media. See Loading Roll Media in the ZD411T Printer on page 68.
6. Observe the user interface and wait.

If the firmware version is different than the version installed on the printer, the firmware downloads to the printer.

The data indicator flashes green while the firmware is downloading. Then the printer restarts with all indicators flashing.

When the firmware update completes, the **STATUS** indicator displays solid green, as the firmware is validated and has finished installing.

A printer Configuration Report is automatically printed and the firmware update has been completed.

Other Printer Maintenance

There are no other user-level maintenance procedures beyond those detailed in the rest of this section. The Real-Time Clock (RTC) battery, printer fuses, or power supply fuses are not user-serviceable in this printer.

RTC Battery

A Real-Time Clock (RTC) is included with the printer. The clock's battery is rated to provide approximately ten (10) years of service and is not user-replaceable. See a Zebra authorized service technician to replace the circuit board.

You can discern a low battery if the printer provides a consistently delayed date stamp. Battery replacement must be performed by a qualified service technician. Only use a Zebra-approved replacement battery.

IMPORTANT:

Recycle batteries according to local guidelines and regulations. Wrap the battery when disposing (or storing) to avoid a short circuit.

Do not heat, disassemble or dispose of battery in fire.

Do not short circuit the battery. Short-circuiting the battery may result in heat generation, fire or bursting.

Fuses

There are no replaceable fuses in the printer or power supply.

Troubleshooting

This section provides troubleshooting procedures and information.

Resolving Alerts and Errors

The printer uses alerts to notify you that the printer needs attention.

Alert: Printhead/Cover Open

A print command or a **FEED** button has been pressed and the printer has detected that the printhead (cover) is not closed.



Cause: Cover Open

A print command has been issued or the **FEED** has been pressed and the printer reports the cover is open.

Remedy: Close the Cover

1. Close the cover/printhead.
2. Push down on the front top corners of the printer's cover. You should normally hear and feel the cover latches snap in place to lock the cover closed.

Remedy: Head-Open Switch

Call a service technician.

Alert: Media/Labels Out

A print command has been issued, the **FEED** has been pressed, or you are printing, and the printer can not detect media to print in the print path.



Cause: Out of Media/Labels

There are no labels or media on the roll in the printer. See Detecting a Media Out Condition on page 88.

Remedy: Install New Media

Operator Action

Load media in the printer. See Loading Roll Media in the ZD411T Printer on page 68.

Cause: Label(s) Missing on Roll

A label is missing in the middle of the roll or fan-fold stack.

NOTE: Some label vendors use a missing label at the end of a media roll to alert the printer that it is out of media. Do not use the remaining labels. They may transfer adhesives used to attach media to the roll.

Remedy: Advance the Roll

Operator Action

1. Open the printer and pull the roll to the next label at the front of the printer.
2. Close the printer. Press the **PAUSE** to let the printer resume printing.
3. If the printer is paused without advancing the labels, press **FEED** one to two times.

Cause: Misaligned Media Sensor

The movable media sensor is not set properly for your media type.

Remedy: Adjust the Media Sensor

Operator Action

See Using the Movable Sensor on page 76.

Cause: The printer is set for non-continuous media with continuous media installed

The printer is set for noncontinuous (web/gap or black mark) media, but continuous media is loaded.

Remedy: Load the correct label type.

Operator Action

Load media in the printer. See Loading Roll Media in the ZD411T Printer on page 68.

Remedy: Calibrate the printer for continuous roll media.

Operator Action

1. Set the media sensor for continuous media. See Using the Movable Sensor on page 76.
2. Finish loading your media roll.
3. Calibrate the media. See Run a SmartCal Media Calibration on page 85.

Cause: Dirty Media Sensor

Adhesive, dust, or other contaminants are blocking proper sensor operation.

Remedy: Clean the Movable Media Sensor

Operator action

Clean the Movable Media Sensor. See Sensor Cleaning on page 126.

The printer may need more media path cleaning. Inspect the media compartment of other dirty areas of the media path and roll holders. See Media Path Cleaning on page 123.

Cause: Media Sensor is not Working

Possible data corruption of memory or faulty components.

Remedy: Update Firmware

Internal Printer Support

See Updating Printer Firmware on page 142.

Remedy: Sensor Component Failure

Call a service technician.

Alert: Cut Error

Condition

The printer has detected that the cutter blade is bound and is not moving properly



IMPORTANT: Cutter Service — There are no operator serviceable parts in the cutter unit. Never remove the cutter cover (bezel). Never attempt to insert objects or fingers into the cutter mechanism.

IMPORTANT: Using unapproved tools, cotton swabs, solvents (including alcohol), etc. all may damage or shorten the cutter's usable life or cause the cutter to jam.

Cause

Adhesive and paper particles can bind the blade.

Remedy

Operator Action

1. Turn the printer off by holding the power using the **POWER** down for 5 seconds. Wait for the printer to shut down completely. Turn the printer ON.
2. If the printer does not recover from this error, call a service technician. This is not an operator serviceable item.

Alert: Printhead Over Temperature

Condition

The printhead is over-temperature and paused to allow the printhead to cool.



Cause: Large Dense Print Jobs

The printer is printing a large batch job, typically with large amounts of print.

Remedy: Printer Stops and Cools Before Resuming

Internal Printer Support - Operator Action

The print operation will resume after the printhead has cooled sufficiently to continue.

Cause: Operating Environment is Too Hot

The ambient temperature at the printer's location exceeds the specified operating range. Sometimes, ambient temperatures in the printer can be higher if it is in direct sunlight.

Remedy: Printer Stops and Cools Before Resuming

Internal Printer Support - Operator Action

Move the printer location or cool ambient temperature where the printer is operating.

Alert: Printhead Under Temperature

Condition



Cause: Operating Environment is Too Cold

The ambient temperature at the printer's location is below the specified operating range.

Remedy: Increase Operating Environment Temperature or Move the Printer Location

Internal Printer Support - Operator Action

Printhead has had a critical temperature (or power failure).

1. Turn the printer off. Move the printer location and wait for it to warm naturally. Moisture may condense in and on the printer if the temperature changes too quickly.
2. Set the printer up for operation and turn the power on to continue using the printer. See Select a Location for the Printer on page 64.

Cause: Printhead Failure

The printhead is below operating temperature for proper printing.

Remedy: Replace the Printhead

Internal Printer Support

Replace the printhead. See Replacing the ZD411T Printhead on page 133.

Alert: PRINTHEAD SHUTDOWN

Condition

The printhead has had a printhead circuit fault protection shutdown.



Cause

has shut down due to critically high temperatures to protect the printhead.

Remedy

1. Turn the printer off by holding the **POWER** button down for 5 seconds. Wait for the printer to shut down completely. Wait a few minutes for cooling and turn the printer ON.
2. Replace the printhead if restarting and cooling have not corrected this issue.
3. Call a service technician if the printer does not recover from this error. This is not an operator serviceable item.

Alert: Out Of Memory

Condition

The printer can not store data in the printer in the specified memory location. There are four types of storage memory: Graphic, Format, Bitmap, and Font. There is not enough memory to perform the function specified on the second line of the error message.



Cause: Not Enough Memory to Store a File

There is not enough memory to perform the function on the specified file type.

Remedy: Free Up Memory

Internal Printer Support

1. Free up some of the printer's memory by adjusting the label format or printer parameters to make the print area smaller.
2. Remove unused graphics, fonts, or formats.
3. Ensure that the data is not directed to a device that is not installed or is unavailable.

Resolving Print Issues

This section helps you identify issues with printing or print quality, the possible causes, and the recommended solutions.

Issue: General Print Quality Issues

Condition

The printed image does not look right.

Cause: Darkness and Speed Settings Need to be Adjusted

The printer is set at an incorrect darkness level and/or print speed for your media.

Remedy: Run Print Quality Report

Internal Printer Support

Perform the Print Quality Report (**FEED** self-test) to determine the ideal darkness and speed settings for your application. Do not set print speeds above the manufacturer's maximum rated speed for your

media (print material and ribbons both). See Generating a Print Quality Report (FEED self-test) on page 160 and Adjusting the Print Quality on page 110.

Cause: Dirty Printhead

The printhead is dirty and distorting the image or putting voids in the printout.

Remedy: Clean the Printhead

Operator Action

Clean the printhead. See Cleaning the ZD411T Printhead on page 122.

Cause: Dirty or Damaged Platen (Drive) Roller

The platen roller is dirty or damaged.

Remedy: Clean or Replace the Platen

Internal Printer Support - Operator Action

Clean or replace the platen. Platens can wear out or get damaged. See Platen Cleaning and Replacement on page 128.

Cause: Printhead is Worn Out

The printhead has worn out.

Remedy: Replace the Printhead

Internal Printer Support - Operator Action

Replace the printhead. The printhead can wear out and be damaged. See Replacing the ZD411T Printhead on page 133.

Cause: Thermal Transfer Printing Looks Distorted

Thermal Transfer printing - Printing looks fuzzy, has smudge marks, or has voids or holes in print with no particular pattern.

Remedy: Verify Media and Ribbon Types are Matched

Internal Printer Support - Operator Action

- The print material (wax, wax-resin, or resin) may not match the material (paper, media coating, or synthetics) in use. Set the printer for no higher than the maximum recommended print speed of the ribbon.
- Perform the Print Quality Report (**FEED** self-test) to determine the ideal darkness and speed settings for your application. Do not set print speeds above the manufacturer's maximum rated speed for your media (print material and ribbons both). See Generating a Print Quality Report (FEED self-test) on page 160 and Adjusting the Print Quality on page 110.

Cause: Using the Wrong Power Supply

The power supply has a lower voltage or power rating. Printing is a high-power process.

Remedy: Use the Proper Power Supply

Operator Action

- Find the power supply that goes with the printer.

Issue: No Print on the Label

Wrong Media Installed for Media Type Setting

No print on labels.

Cause: Using Thermal Media for Direct Thermal Printing

See the test procedure, Determining Thermal Media Types on page 174.

Remedy: Install Direct Thermal Media

Operator Action

- Load your chosen direct thermal media in the printer.

Cause: Media Loaded Incorrectly

Remedy: Reload your Media

- The media printable surface must face up towards the printhead. See Getting Ready to Print on page 67 followed by Loading Roll Media in the ZD411T Printer on page 68.

Issue: Print Image Moves or is Distorted

Condition

Print image distortion or print positioning issues.

Cause: Media Needs to be Reloaded

has not been loaded incorrectly, the movable media sensor is not set properly, or the media needs to be calibrated.

Remedy: Inspect Area and Reload the Media

Internal Printer Support - Operator Action

1. Leave printer power ON and remove the media.
2. Visually inspect the media path, roll holders, and media guides for paper dust and adhesive buildup. Visually inspect the platen (drive) roller for damage or paper dust and adhesive.

   See next **Cause: Printer Needs to be Cleaned** for this Issue.
3. Verify that the sensor is set and positioned correctly for your media type and sensing location. Check to see the Movable Sensors window is clean.

   See Using the Movable Sensor on page 76.
4. Reload the media.

   See Loading Roll Media in the ZD411T Printer on page 68.

Cause: Printer Needs to be Cleaned

Remedy: Clean the Interior of the Printer

Internal Printer Support - Operator Action

1. Clean the printer's media path, platen roller, and media sensors.

See Media Path Cleaning on page 123.

2. Clean the printer's sensors.

   See Sensor Cleaning on page 126.

3. Clean the platen (drive) roller

   See Platen Cleaning and Replacement on page 128.

4. Clean the printhead last.

   Clean the printhead. See .

5. Reload the printer media and run a SmartCal media calibration.

Platen Roller is Damaged or Worn Out

Over time the platen roller can wear out or become damaged. As the platen roller gets older, it smoother and grips the media less and becomes less soft and wears out.

Replace the Platen Roller

Internal Printer Support

Remove and replace the platen roller.

See Platen Cleaning and Replacement on page 128.

Printer Connectivity Issues

Issue	Possible Cause	Recommended Solution
My printer reassigns a new IP address to the print server after the printer has been off for a while.	The settings for your network are causing the network to reassign a new IP address.	If the changing IP addresses cause issues for you, follow these steps to assign a static IP address to the printer: 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.
My printer does not obtain an IP address while trying to connect via LAN/ Ethernet.	The cable is not plugged in correctly.	Check that both ends of the cable are connected properly.
	The printer is not configured correctly (usually for DHCP).	Check the Wired IP Protocol setting. It should match your network environment.
I cannot change the wired, wireless, or Bluetooth settings on my printer.	The printer is in Protected Mode, which prevents these settings from being updated without the Protected Mode password. You cannot change these settings through the front panel.	You will need the Protected Mode password to change the settings via JSON commands. For more information, refer to the Zebra Link-OS PrintSecure Printer Administration Guide.
	For printers purchased in the EMEA region after August 1, 2025, many connectivity options are disabled by default.	For additional information and a configuration wizard, go to zebra.com/asr.

Issue	Possible Cause	Recommended Solution
I manually entered a wireless IP address, subnet, and gateway on my printer, but it won't connect to my wireless network. Protected Mode is not enabled.	The printer's network must be reset after values are changed.	
	An ESSID value was not 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. **NOTE:** If the information has been changed from the default, check with your network administrator for the ESSID value to use.
	The ESSID or another value was incorrect.	1. Print a network configuration label and verify that your values are correct. 2. Make corrections as necessary.

Communication Issues

This section identifies problems with communications, the possible causes, and the recommended solutions.

Issue: USB Printer Fails to Install after Connecting Printer (Before Installing the Printer Driver)

USB printer driver fails to install

The printer is connected to the Windows computer via USB and is not properly recognized by the system. The incorrectly Windows-assigned printer can not do a Windows test print from the selected USB-attached printer.

The USB Cable was installed before the printer drivers were pre-installed.

Windows installed the Windows generic printer driver.

Remedy

Operator

1. Disconnect the printer USB cable from the Windows computer.
2. The Zebra printer is not shown in the printers section of the **Devices and Printers** window in the connected Windows computer. The printer incorrectly shows as **Unspecified**. You can use the Windows taskbar to search for **Control Panel** and open it. Select the **Devices and Printers** to open.



   Zebra printers display ZTC as a prefix to identify them easily.
3. Click on the**Unspecified Zebra printers** in the **Devices and Printers** window and delete.
4. If you have not previously loaded the **Windows Printer Driver v8** , then load the **Windows Printer Driver v8** now. See Pre-installing the Window's Driver to help you add the correct drivers to the system.
5. Plug the printer USB cable into the Windows computer. The Zebra printer should now be added into the **Printers** section of the **Devices and Printers** window.

Issue: Label Job Sent, No Data Transfer

Condition

A label format was sent to the printer but was not recognized. The **DATA** indicator does not flash.

Cause

The communication parameters are incorrect for typically serial interface communications.

Remedy

Internal Printer Support

- Check the printer driver or software communications settings (if applicable).
- Serial Port Only - Check the printer's handshake protocol and serial port settings. The setting used must match the one being used by the host computer.
- The serial cable you are trying to use may not be a standard DTE or DCE type cable, is damaged, or is too long per the RS-232 Serial ports specifications
- The interface cable may be too long, does not meet interface specifications, not properly shielded or routed by electronic noise sources (fluorescent lights, transformers, motors, etc.).
- See Serial Interface on page 94 (setup), Interface Cable Requirements on page 91, and **Serial Port Interface** (connector wiring).

Issue: Label Job Sent, Skips Labels or Prints Bad Content

Condition

A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.

Cause: Serial Communications Miss-Match

The serial communication settings are incorrect for the printer or the host computer system and operating system software.

Remedy: Set Serial Communications

Internal printer support

Check the printer driver or software communications settings (if applicable). Ensure that the flow control settings and other serial port handshake settings match the host system.

See Serial Interface on page 94 (setup).

Issue: Label Job Sent, Data Transfers, But No Print

Condition

A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.

Cause: Data Parsing Character Miss-match

The prefix and delimiter characters set in the printer do not match the ones in the label format.

Remedy: Set Data Parsing Characters.

- Verify the ZPL programmings prefix (`COMMAND CHAR`) and delimiter (`DELIM./CHAR`) characters. See Configuration Setting to Command Cross-Reference on page 187.

Cause: Incorrect Data

Incorrect data is being sent to the printer.

Remedy: Correct Label Format Programming

Internal Printer Support

- Check the communication settings on the computer. Ensure that they match the printer settings.
- Check the label format syntax.

  See the ZPL Programmers at zebra.com/manuals. for more information on printer and label programming.

Miscellaneous Issues

This section identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions for them.

Issue: Settings are Lost or Ignored

Condition

Some programming parameters are set incorrectly.

Cause: Unsaved Printer/Format Settings Lost

Printer settings were changed without saving them.

Remedy: Save Printer/Format Settings

Internal Printer Support

The ZPL ^JU command was not used to save your configuration before turning the printer off. Cycle the printer OFF and then back ON to verify settings have been saved.

Cause: Incorrect Label Syntax

The label format/form commands or commands sent directly to the printer have syntax errors or have been used incorrectly.

- An internal command or other action turned off the ability to change the parameter.
- An internal command or other action changed the parameter back to the default setting.

Remedy: Save Printer/Format Settings

Internal Printer Support

- Reset printer settings. Sometimes it is helpful to reset the printer to factory default.
- Update printer firmware in case of memory corruption.

  See Updating Printer Firmware on page 142.
- Check the label format syntax.

  See the ZPL Programmers at zebra.com/manuals. for more information on printer and label programming.

Issue: Non-continuous Labels act as Continuous Labels.

Condition

A non-continuous label format with matching label media loaded in the printer was sent to the printer but prints like it is continuous roll media.

Cause

The printer is configured for continuous media.

Remedy

Internal Printer Support

- Set the printer for the correct media type (gap/notch, continuous, or mark).

- Calibrate the printer using Run a SmartCal Media Calibration on page 85.
- If necessary use Manual Media Calibration Mode on page 163 for hard-to-calibrate media types.

Issue: Printer Locks-Up

Condition

The printer is not responding to operator actions and commands sent to the printer. The status may be all on or in unknown status patterns.

Cause: Memory Corruption or Failure

The printer memory has been corrupted by an unknown event.

Remedy: Reload Printer Firmware and Test

Internal Printer Support

1. Reset the printer to factory defaults.

   Use one of the following methods to reset factory defaults.

   - See Resetting Printer Factory Defaults (PAUSE + FEED Self Test) on page 160.
   - Use the Zebra Setup Utility and **Open Printer Tools** > **Action** > **Load printer defaults**.
2. Reload printer firmware. See Updating Printer Firmware on page 142.
3. If the printer does not recover from this error, call a service technician. This is not a user-serviceable item.

Issue: Battery has a Red Indicator

Condition

The battery has a detected fault condition.

Cause: Battery Failure

The battery has reached its usable life or has a general component failure.

Cause: Battery is too hot or too cold

Remedy: Test and Replace the Battery, if necessary.

Internal Printer Support - Operator Action

1. Remove the battery from the printer and check the charge status by charging the battery.
2. Let the battery cool down or warm up to ambient temperature and recheck the battery charge.
3. Insert a new fully-charged battery into the printer and safely dispose of the battery per locale requirements.

Onboard Printer Tools

This section provides a variety of tools and utilities built into the printer. They are designed to assist you with setup, configuration, and debugging (printer and command programming).

Printer Diagnostics

A variety of diagnostic tools and procedures are available to help you operate your printer and diagnose problems. These include printer configuration and network configuration reports, diagnostic reports, calibration procedures, and the ability to restore the printer settings to their factory defaults if needed.

Diagnostic Testing Tips

IMPORTANT: When performing self-tests, use full-width media. If the media is not wide enough, the test labels may print on the platen (drive) roller.

To initiate a printer self test, you will need to press a specific user interface button or a combination of buttons while turning printer power ON. Keep the button(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the normal power-up operation.

- When performing these self tests, do NOT send data to the printer from the central device.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- If canceling a self test before it completes, always reset the printer by turning printer power OFF and then ON.
- If the printer is dispensing the printer reports and liner is being taken up by the applicator, manually remove the reports as they become available.

SmartCal Media Calibration

SmartCal is used to quickly calibrate the printer to the media currently loaded.

During SmartCal, the printer automatically determines the media sensing type (gap, black line, or notch), and then measures the length of the media.

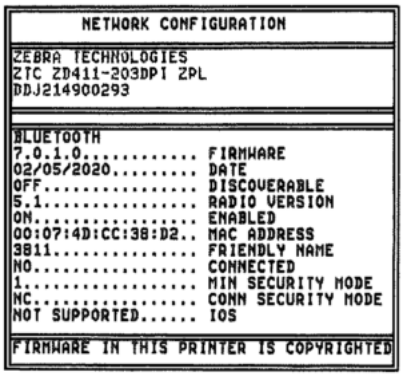
1. Make sure the media is properly loaded, the printer cover is closed, and printer power is ON.
2. Press and hold the **PAUSE** + **CANCEL** buttons for two seconds.
3. The printer will feed and measure several labels. When done, the printer will return to **READY** status.

If the printer should fail to recognize and correctly calibrate to the media, refer to the Manual Media Calibration Mode on page 163 procedure later in this section.

Printing a Configuration Report (CANCEL Self Test)

The Configuration Report diagnostic prints a set of printer and network configuration reports.

1. Make sure the media is loaded and the printer cover is closed.
2. There are two choices to print the report here.
   - If printer power is OFF, press and hold the **CANCEL** button while turning the printer power ON.
   - If printer power is ON, press **FEED** + **CANCEL** buttons for two seconds.
3. The Printer and Network Configuration Reports (below) is printed, and the printer returns to **READY** status.

Sample Printer Configuration	Sample Network Configuration (for versions with wired and wireless Ethernet installed)
	

```
PRINTER CONFIGURATION
ZEBRA TECHNOLOGIES
ZTC ZD411-203DPI ZPL
DDJ214900293

+10.0............. DARKNESS
LOW............... DARKNESS SWITCH
6.0 IPS........... PRINT SPEED
+000.............. TEAR OFF ADJUST
TEAR OFF.......... PRINT MODE
CONTINUOUS........ MEDIA TYPE
TRANSMISSIVE...... SENSOR SELECT
THERMAL-TRANS..... PRINT METHOD
448............... PRINT WIDTH
0818.............. LABEL LENGTH
15.01IN  380MM.... MAXIMUM LENGTH
MAINT. OFF........ EARLY WARNING
NOT CONNECTED..... USB COMM.
AUTO.............. SER COMM. MODE
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
NO MOTION......... MEDIA POWER UP
FEED.............. HEAD CLOSE
DEFAULT........... BACKFEED
+000.............. LABEL TOP
+0000............. LEFT POSITION
DISABLED.......... REPRINT MODE
013............... WEB SENSOR
096............... MEDIA SENSOR
067............... RIBBON SENSOR
000............... TAKE LABEL
036............... MARK SENSOR
004............... MARK MED SENSOR
040............... TRANS GAIN
028............... TRANS LED
000............... RIBBON GAIN
035............... MARK GAIN
034............... MARK LED
DPCSWFXM.......... MODES ENABLED
.................. MODES DISABLED
 448 8/MM FULL.... RESOLUTION
6.6............... LINK-OS VERSION
V93.21.11ZP60752 <- FIRMWARE
1.3............... XML SCHEMA
7.0.1............. HARDWARE ID
8176K.........R: RAM
65536K........E: ONBOARD FLASH
NONE.............. FORMAT CONVERT
FW VERSION........ IDLE DISPLAY
07/13/22.......... RTC DATE
19:37............. RTC TIME
DISABLED.......... ZBI
2.1............... ZBI VERSION
READY............. ZBI STATUS
79 LABELS......... NONRESET CNTR
79 LABELS......... RESET CNTR1
79 LABELS......... RESET CNTR2
401 IN............ NONRESET CNTR
401 IN............ RESET CNTR1
401 IN............ RESET CNTR2
1,019 CM.......... NONRESET CNTR
1,019 CM.......... RESET CNTR1
1,019 CM.......... RESET CNTR2
*** EMPTY......... SLOT 1
0................. MASS STORAGE COUNT
0................. HID COUNT
OFF............... USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

```
NETWORK CONFIGURATION
ZEBRA TECHNOLOGIES
ZTC ZD411-203DPI ZPL
DDJ214900293

BLUETOOTH
7.0.1.0........... FIRMWARE
02/05/2020........ DATE
OFF............... DISCOVERABLE
5.1............... RADIO VERSION
ON................ ENABLED
00:07:4D:CC:38:D2.. MAC ADDRESS
3811.............. FRIENDLY NAME
NO................ CONNECTED
1................. MIN SECURITY MODE
NC................ CONN SECURITY MODE
NOT SUPPORTED..... IOS

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Printer Network (and Bluetooth) Configuration Report

For printers installed with Wired or Wireless connectivity options, print an additional printer configuration report.

This information is needed to establish and troubleshoot Ethernet (LAN and WLAN), Bluetooth 4.2, and Bluetooth LE network printing. The following printout is printed with the ZPL `~WL` command.

iOS Bluetooth Support

- iOS devices have Bluetooth when the Wi-Fi and Bluetooth wireless connectivity option is installed in the printer and is noted as supported at the bottom of the Bluetooth Configuration report.
- The iOS setting is noted on the bottom of the Bluetooth Configuration report as not supported when the Wireless connectivity option is detected as not installed.
- See Printing a Configuration Report (CANCEL Self Test) on page 159 for a sample printout of the Network Configuration report.

Resetting Printer Factory Defaults (PAUSE + FEED Self Test)

This resets the printer configuration to the factory default values for the non-network printer settings.

NOTE: The printer has a reset button under the printer, See the Reset Button.

1. Turn OFF the printer.
2. Press and hold the **PAUSE** + **FEED** buttons while turning ON the printer.
3. Continue holding the **PAUSE** + **FEED** buttons until the **STATUS** indicator is the only indicator lit.
4. Calibrate the printer for the media in use. See SmartCal Media Calibration on page 158.

Resetting Network Factory Defaults (PAUSE + CANCEL Self Test)

This procedure resets the network configuration settings to the factory default values.

1. Turn OFF the printer.
2. Press and hold the **PAUSE** + **CANCEL** buttons while turning ON the printer.
3. Continue holding the **PAUSE** + **CANCEL** buttons until the **STATUS** indicator is the only indicator lit.

Generating a Print Quality Report (FEED self-test)

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

Load the printer with full-width media.

During the Print Quality Report (FEED self-test), a series of labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The barcodes on these labels may be ANSI-graded to check the print quality. The speed at which labels are printed during this print quality test depends on the dot density of the printhead.

During this test, one set of labels is printed at low speed, and another set is printed at the high speed. The darkness value starts at three settings lower than the printer's current darkness value (relative

darkness of –3) and increases until the darkness is three settings higher than the current darkness value (relative darkness of +3).

The speed at which labels are printed during this print quality test depends on the dot density of the printhead.

- 300 dpi printers: prints 7 labels at 51mm/sec (2 ips) and 102 mm/sec (4 ips) print speeds.
- 203 dpi printers: prints 7 labels at 51mm/sec (2 ips) and 152 mm/sec (6 ips) print speeds.

1. Print a configuration report to show the printer's current settings. Press and hold the **FEED** and **CANCEL** buttons for two (2) seconds to print the report.
2. Turn OFF the printer.
3. Press and hold **FEED** button while setting the printer power to ON. Continue to hold **FEED** button until the **Status** indicator is the only indicator lit.

   The printer prints a series of labels at various speeds and darkness settings higher and lower than the darkness value shown on the printer's configuration report.

Figure 13 Print Quality Sample Test Print



Table 3 Visual Darkness Descriptions

Print Quality	Description
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 appear filled in. • Rotated barcodes have bars and spaces run together.
Slightly dark	• Slightly dark labels are not as obvious. • The normal barcode will be In-Spec. • Small character alphanumerics 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.

Table 3 Visual Darkness Descriptions (Continued)

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

4. Inspect the test labels and determine which one has the preferred print quality for your application.
   - If you have a barcode verifier, use it to measure bars/spaces and calculate the print contrast.
   - If you do not have a barcode verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self-test.
5. Note the relative darkness value and the print speed printed on the preferred test label.
6. Add or subtract the relative darkness value from the darkness value specified on the configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.
7. If necessary, change the current darkness value to the darkness value on the preferred test label.
8. If necessary, change the current print speed to the speed value on the preferred test label.

Activating Advanced Mode

Advanced Mode is used to access several manual adjustment modes in the printer. Each manual adjustment mode is described in detail in the following sections.

1. Ensure media is loaded and printer power is ON.
2. Press the **PAUSE** button for two seconds, all indicators will flash yellow.
3. The **STATUS** indicator will show solid yellow, indicating the currently selected mode is: Manual Media Calibration.
   - Pressing the **FEED** button will sequentially cycle through all available modes.
   - Pressing the **PAUSE** button will activate the selected mode.

- Pressing the **CANCEL** button will exit Advanced Mode.

Manual Media Calibration Mode

The Manual Media Calibration performs an optimized series of focused sensor settings for hard-to-sense media.

While in Advanced Mode, press **PAUSE** while the **Status** indicator is illuminated yellow to start Manual Media Calibration.

1. The **media** indicator will flash yellow than the **pause** indicator will flash.
2. Open the printer and verify the media sensor is in the center position for label gap (transmissive) sensing.

NOTE:

If your media uses black mark or notch sensing, ensure the media sensor is in the proper location to see the mark or notch.

If your media is pre-printed, either on the front of the label or on the back of the liner, position the sensor so that it is in a position with minimal printing. You may need to perform Manual Media Calibration several times, moving the media sensor, until the printer completes the calibration process and returns to the READY state.

3. Remove 3 inches or 80mm of labels from the liner.
4. Place the label-less area of the liner over the platen (drive) roller with the leading edge of the first label under the media guides.
5. Close the printer and press **PAUSE** once.

   The **media** indicator will flash as the media liner is measured. When complete, the **pause** indicator will begin flashing.
6. Open the printer and reposition the media so that a label is located directly above the movable sensor. Close the printer.
7. Press **PAUSE** once.

   The printer will feed and measure several labels. If the printer is able to determine the correct media type (gap, black mark, or notch) and measure the media length, the printer will return to the READY state, the **status** indicator is solid green.

Using the Manual Print Width Adjustment

Use this procedure to set the maximum print width without programming.

NOTE: Do not set the print width wider than the media width. The printhead and platen (drive) roller can be damaged or degrade component life.

1. Press the **PAUSE** button while the **Pause indicator** is illuminated yellow.
2. The printer prints a 16 mm (0.63 in.) box and pauses momentarily.
3. The printer then prints a slightly larger box and pauses again.

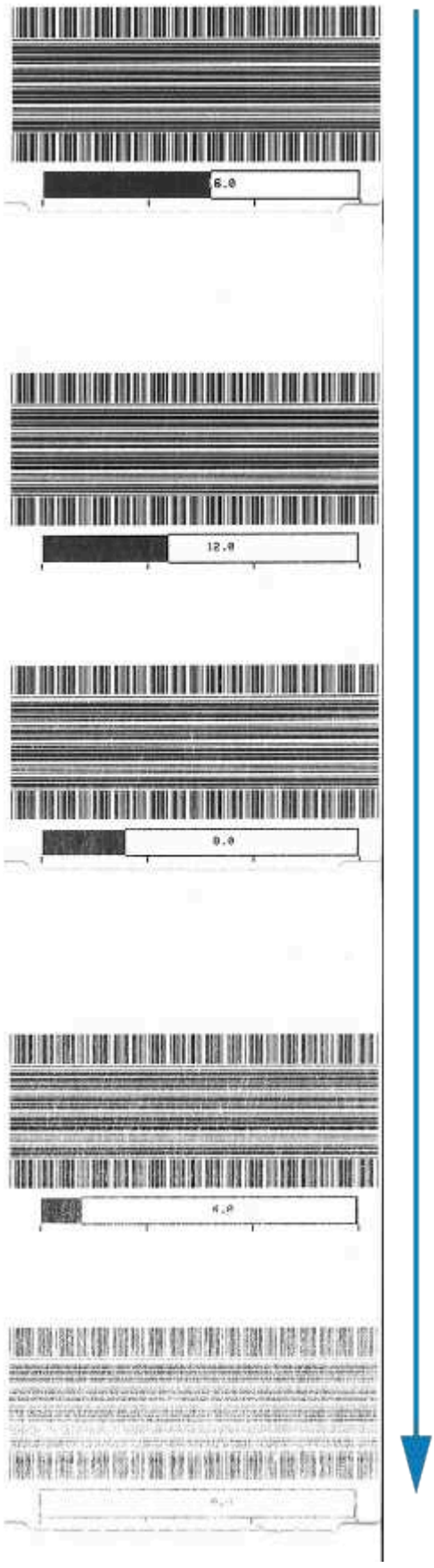
TIP: To return to the maximum print width setting, allow the printer to proceed without pressing the **FEED** button.

4. When you see the printer print a box that matches the width of your media, press the **FEED** button to set the print width and return to the READY state.

Adjusting the Darkness with Manual Print Darkness

Use this procedure to set the print darkness using pseudo barcodes without programming.

1. Press the **PAUSE** button while the **DATA indicator** is illuminated yellow
2. The printer prints a test pattern showing the current darkness number with several barcode patterns and then pauses momentarily.
3. The printer then repeats the pattern with the next darkness level.
4. When you see the printer print a pattern with solid even black lines, press the **FEED** button to set the darkness value and return the printer to a READY state.


6.0
12.0
0.0

Factory Test Modes

The printer includes print modes that are intended for factory test only.

Test mode 1

When activated, the printer will begin printing various test patterns used to evaluate printer performance.

NOTE: Both of these test modes will consume a considerable amount of media as the tests are performed.

Initiated by holding **PAUSE** button while turning ON printer power.

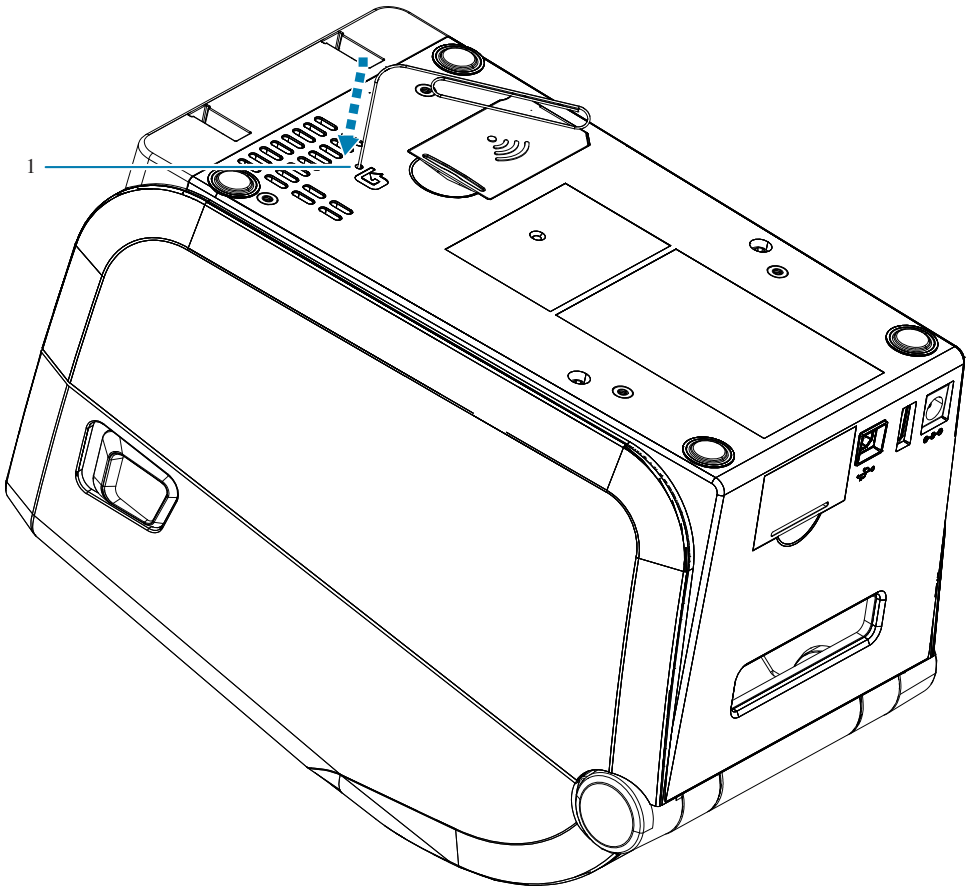
Test mode 2

Initiated by holding the **PAUSE** + **FEED** + **CANCEL** buttons for two seconds while the printer power is ON.

Using the Reset Button

The printer has a dedicated **Reset** button located on the bottom of the printer.

Press the printer's **Reset** button (1) with a paperclip or similar small object.



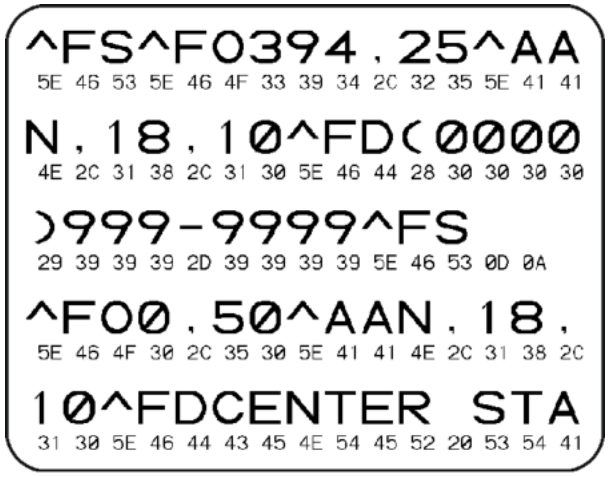
Pressing the button triggers the following results based on the length of the button press:

0-1 second	No action
1-5 seconds	**Printer reset** — Printer performs a factory reset and will automatically print a configuration label (and network label if present)
6-10 seconds	**Network reset** — Printer drops connection to the network, and a network factory default reset occurs. Upon completion of the reset, a configuration and network configuration label are automatically printed.
More than 10 seconds	**Exits the reset function** without resetting the printer or making changes

Running a Communication Diagnostics Test

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

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



1. Ensure media is loaded and printer power is ON.
2. Set the print width equal to or less than the label width being used for the test.
3. Press and hold **Pause** + **FEED** for two seconds. When active, the **STATUS** indicator will alternate between green and yellow.

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

   Errors show on the test label as follows:

   - FE indicates a framing error.
   - OE indicates an overrun error.
   - PE indicates a parity error.
   - NE indicates noise.

Press and hold **Pause** + **FEED** for two seconds or turn the printer power OFF (O) and then back ON to exit this self-test and return to normal operation.

Sensor Profile Report

Use this report to identify sensor location and sensing problems.

Identifying Sensor Profile Elements

Use the sensor profile image (which will extend across several labels or tags) to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).

Using the buttons on the user interface	1. Turn OFF the printer. 2. Press and hold **FEED** + **CANCEL** while turning ON the printer. 3. Hold **FEED** + **CANCEL** until the **STATUS** indicator is the only indicator lit.
Using ZPL	Send the `~JG` command to the printer. See the Zebra Programming Guide for more information about this command.

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see Manual Media Calibration Mode on page 163).

- The line labeled MEDIA (1) on the sensor profile indicates the media sensor readings.
- The media sensor threshold settings are indicated by WEB (2).
- The media out threshold is indicated by OUT (3).
- The upward spikes (4) indicate gaps between labels (the web/gap).
- The lines between the spikes (5) indicate where labels are located.
- The numbered line at the top (6) provides measurement in dots from the start of the printout.

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

Figure 14 Sensor Profile (Gap/Web Media)

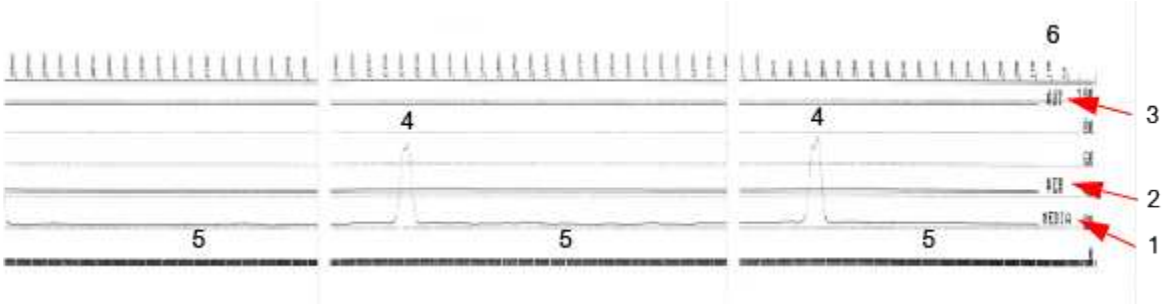
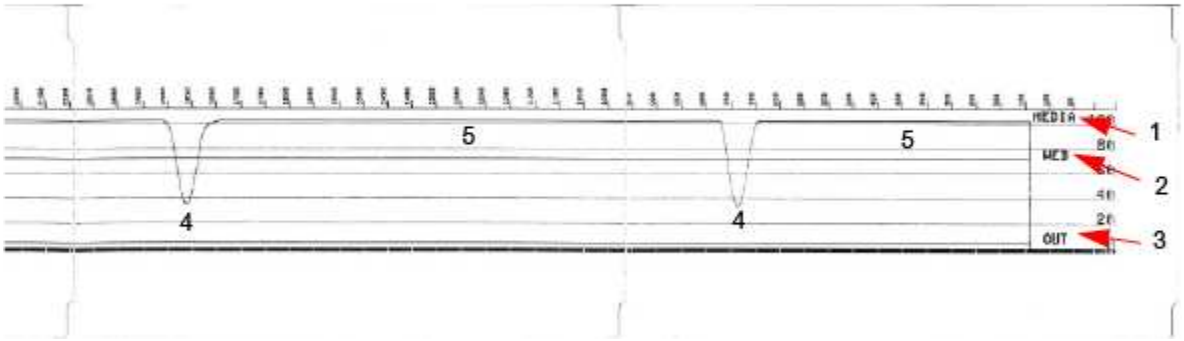


Figure 15 Sensor Profile (Black Mark, Tag Media)



Interface Information

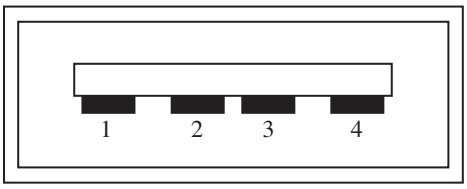
This section provides connector wiring and power information for the USB and serial port interfaces.

Universal Serial Bus (USB) Interface

This section explains the USB connector wiring for the USB A and B styles used by the printer.

IMPORTANT: When using third-party cables, the printer requires USB cables or the cable packaging that bears the Certified USB mark to guarantee USB 2.0 compliance.

Figure 16 USB - A



Wiring - USB Connector A Style for connecting to the printer or device

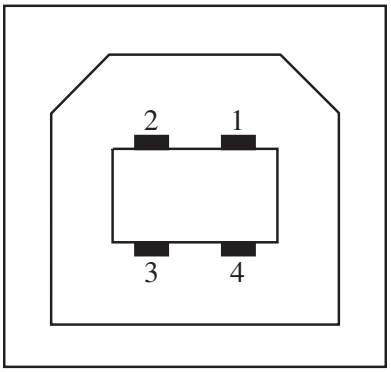
Pin 1 — Vbus (+5VDC).

Pin 2 — D- (Data Signal, Negative Side)

Pin 3 — D+ (Data Signal, Positive Side)

Pin 4 — Shell (Shield/Drain Wire)

Figure 17 USB -B



Wiring - USB Connector B Style for connecting to the printer or device

Pin 1 — Vbus (Not Connected)

Pin 2 — D- (Data Signal, Negative Side)

Pin 3 — D+ (Data Signal, Positive Side)

Pin 4 — Shell (Shield/Drain Wire) Shell

IMPORTANT: USB Host +5 VDC power source is shared with serial port phantom power. It is limited to 0.5mA per USB Specification and with onboard current limiting. The maximum current available through the serial port and USB port will not exceed a total of 0.75 Amps.

See Also

usb.org

Serial Port Interface

This section explains the connector wiring Zebra Auto-Detecting DTE and DCE for 9-Pin RS-232 Interface.

Table 4 9-Pin RS-232 Interface

Pin	DTE	DCE	Description (DTE)
1	—	5V	Not used
2	RDX	TXD	RXD (receive data) input to the printer
3	TXD	RXD	TXD (transmit data) output from the printer
4	DTR	DSR	DTR (data terminal ready) output from the printer -- controls when the host may send data
5	GND	GND	Circuit ground
6	DSR	DTR	DSR (data set ready) input to the printer

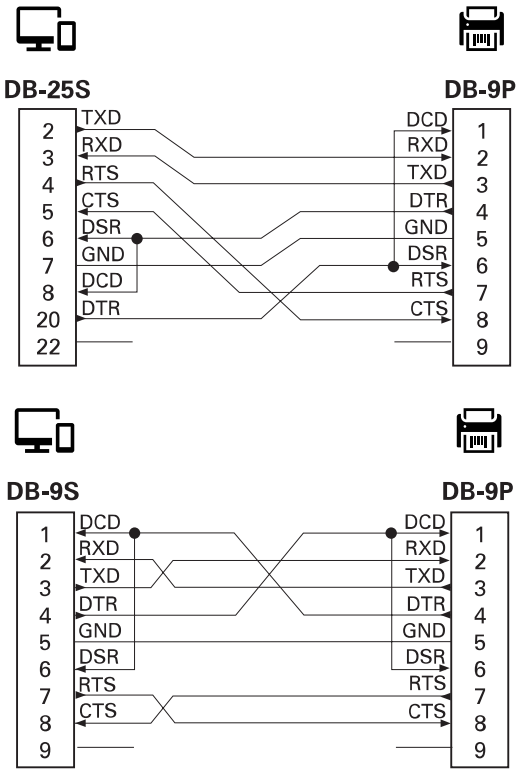
Table 4 9-Pin RS-232 Interface (Continued)

Pin	DTE	DCE	Description (DTE)
7	RTS	CTS	RTS (request to send) the output from the printer -- always in the ACTIVE condition when the printer is turned on
8	CTS	RTS	CTS (clear to send) - Not used by the printer
9	5V	—	+5 V @ 0.75 A - FET Circuit current limited

IMPORTANT: The maximum current available through the serial port, USB port, or both will not exceed a total of 0.75 Amps.

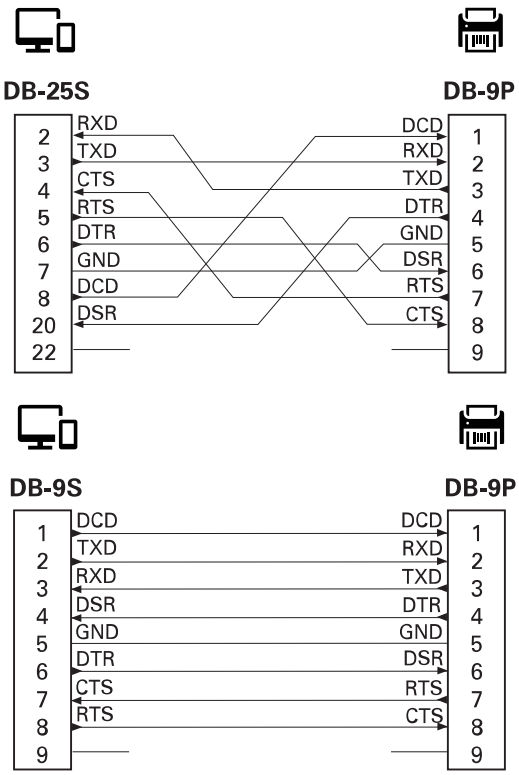
When XON/XOFF handshaking is selected in the printer driver, the data flow is controlled by the ASCII control codes DC1 (XON) and DC3 (XOFF). The DTR control lead will have no effect.

Figure 18 Connecting the Printer to a DTE Device



Interconnecting to DTE Devices – The printer is configured as data terminal equipment (DTE). To connect the printer to other DTE devices (such as the serial port of a personal computer), use an RS-232 null modem (crossover) cable.

Figure 19 Connecting the Printer to a DCE Device



Interconnecting to DCE Devices – When the printer is connected via its RS-232 interface to data communication equipment (DCE) such as a modem, a STANDARD RS-232 (straight-through) interface cable must be used.

Types of Thermal Media

The printer can use a wide variety of thermal print media outlined here.

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 your printer and prevent premature printhead wear. To purchase supplies, go to zebra.com/supplies.

ZD series printers use heat and pressure to expose direct thermal media or melt and transfer ink to the media.

The printer can use various types of media:

- Standard media—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- Continuous roll media—Most continuous roll media is direct thermal media (similar to fax paper) and is used for receipts or tickets.
- Tag stock—Tags are usually made from heavy paper up to 0.19 mm ([0.0075 in.) thick. Tag stock does not have adhesive or a liner. It is typically perforated between tags.
- Fanfold—Non-continuous media that comes folded in a rectangular stack. Fanfold media is either gap/notch or black mark media.

Determining Thermal Media Types

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

1. Scratch the print surface of the media with a fingernail or pen cap. Press firmly and quickly while dragging it across the media surface. Direct thermal media is chemically treated to print (expose) when the heat is applied. This test method uses friction heat to expose the media.
2. Did a black mark appear on the media?

Table 5 Media Scratch Test Results

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

General Media and Print Specifications

The printer has a wide variety of media and print handling variations. The range of basic media support is specified here.

- Direct Thermal ZD621, ZD621R, ZD421 — Max. Media width: 108 mm (4.25 in.)
- Direct Thermal ZD411, ZD611 — Max. Media width: 57mm (2.25 in.)
- Thermal Transfer ZD621, ZD621R, ZD421 Cartridge — Max. Media width: 118 mm (4.65 in.)
- Thermal Transfer ZD411, ZD611 — Max. Media width: 57mm (2.25 in.)
- Thermal Transfer ZD421, ZD421CN — Max. Media width: 112 mm (4.41 in.)
- All Printers — Min. Media width: 15 mm (0.585 in.)
- Media length:
  - 990 mm (39 in.) max.
  - 6.35 mm (0.25 in.) min. – Tear Off or Label
  - 12.7 mm (0.50 in.) min. – Peel
  - 25.4 mm (1.0 in.) min. – Cutter
- Media thickness:
  - 0.06 mm (0.0024 in.) min. – all requirements
  - 0.1905 mm (0.0075 in.) max. – all requirements
- Media Roll Outer Diameter (O.D.) max. – 127 mm (5.0 in.)
- Media Roll Core Inner Diameter (I.D.):
  - 12.7 mm (0.5 in.) I.D. – Standard roll configuration
  - 25.4 mm (1 in.) I.D. – Standard roll configuration
  - 38.1 mm (1.5 in.) I.D. – with optional media roll adapter
  - 50.8 mm (2.0 in.) I.D. – with optional media roll adapter
  - 76.2 mm (3.0 in.) I.D. – with optional media roll adapter
- Ribbon Rolls – 74 meter
  - Ribbon Length – 74 m (243 ft.)
  - Ribbon Width Max. – 110 mm (4.33 in.)
  - Ribbon Width Min. – 33 mm (1.3 in.)
  - Ribbon Core I.D. – 12.7 mm (0.5 in.)
  - Wax, Wax/Resin, and Resin transfer materials
- Dot pitch:
  - 203 dpi: 0.125mm (0.0049 in.)
  - 300 dpi: 0.085mm (0.0033 in.)
- Barcode modulus x-dim:
  - 203 dpi: 0.005 – 0.050 in.
  - 300 dpi: 0.00327 – 0.03267 in.

Label Dispenser (Peeler)

The printer supports a field-installed label dispense option with a label taken sensor for batch processing of labels.

- Paper Thickness:
  - Min. – 0.06 mm (0.0024 in.)
  - Max. – 0.1905 mm (0.0075 in.)
- Media Width:
  - Min. – 15 mm (0.585 in.)
  - Thermal Transfer ZD621, ZD621R, and ZD421 Cartridge Max. 118 mm (4.65 in.)
  - Thermal Transfer ZD421 and ZD421CN Max. 112 mm (4.41 in.)
  - Direct Thermal Printers Max. 108 mm (4.25 in.)
- Label Length:
  - All Printers Max. (theoretical) – 990 mm (39 in.)
  - Thermal Transfer Printers Max. (tested) – 279.4 mm (11 in.)
  - Direct Thermal Printers Max. (tested) – 330 mm (13 in.).
  - All Printers Min. – 12.7 mm (0.5 in.)

Standard (Media) Cutter

The printer supports a field-installed media cutter option for full-width cutting of label liner, tag or receipt media.

- A medium-duty cutter for cutting label liner and light tag media (LINER/TAG). Do not cut through labels, adhesive, or embedded circuitry.
- Paper Thickness:
  - Min. – 0.06 mm (0.0024 in.)
  - Max. – 0.1905 mm (0.0075 in.)
- Cut Width:
  - Min. – 15 mm (0.585 in.)
  - Thermal Transfer ZD621, ZD621R, and ZD421 Cartridge Max. 118 mm (4.65 in.)
  - Thermal Transfer ZD421 and ZD421CN Max. 118 mm (4.65 in.)
  - Direct Thermal Printers Max. 109 mm (4.29 in.)
- Min. distance between cuts (label length): 25.4 mm (1 in.).
  - Cutting shorter media lengths between the cuts may cause the cutter to jam or errors.

NOTE: By design, the cutter is self-cleaning and does not require preventive maintenance of the internal cutter mechanism.

Linerless (Media) Cutter - Direct Thermal only

The printer supports a field installed media cutter option for full width cutting of linerless media.

- A full width linerless media cutter (LINERLESS CUT).
- Paper Thickness:

- Cut Width:
- Minimum distance between cuts (label length): 25.4 mm (1 in.). Cutting shorter media lengths between the cuts may cause the cutter to jam or error.

NOTE: By design, the cutter is self cleaning and does not require preventive maintenance of the internal cutter mechanism. Go to Linerless Platen (Drive) Roller on page 242 cleaning and Media Path Cleaning on page 247 to maintain optimal linerless media cut operation.

Various Types of Roll and Fan-Fold Media

The following table helps to identify what type of media to use to print labels.

IMPORTANT: Zebra strongly recommends the use of Zebra-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and prevent premature printhead wear. To purchase supplies, go to zebra.com/supplies.

- Standard media—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- Continuous roll media—Most continuous roll media is direct thermal media (similar to FAX paper) and is used for receipt or ticket style printing.
- Tag stock—Tags are usually made from heavy paper (up to 0.0075in./0.19mm thick). Tag stock does not have adhesive or a liner, and it is typically perforated between tags.

For more information on basic media types, see the table below.

The printer typically uses roll media, but you can use fanfold or other continuous media too. Use the correct media for the type of printing you require. You must use direct thermal media.

Table 6 Types of Media Roll and Fanfold Media

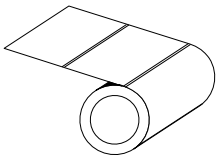
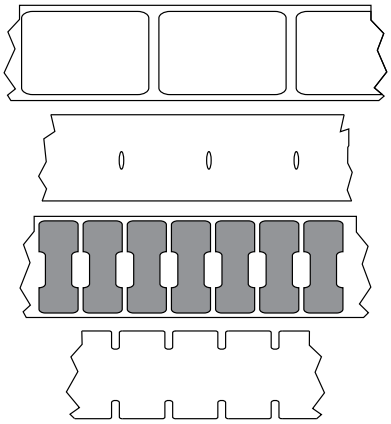
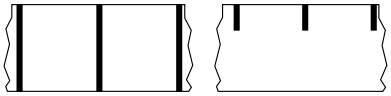
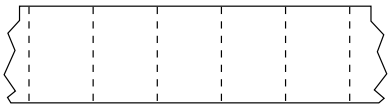
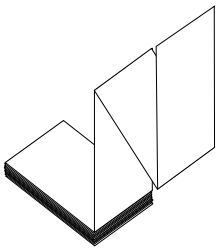
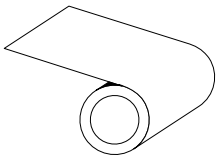
Media Type	How It Looks	Description
Non-Continuous Roll Media		Roll media is wound on a core that can be 0.5 to 1.5 in. (12.7 to 38.1 mm) in diameter. Labels have adhesive backing that sticks them to a liner, and they are separated by gaps, holes, notches, or black marks. Tags are separated by perforations. Individual labels are separated by one or more of the following methods: • Web media separates labels by gaps, holes, or notches.  • Black mark media uses pre-printed black marks on the backside of the media to indicate label separations. • Perforated media has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags.  • Perforated media has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags. 
Non-Continuous Fanfold Media		Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.

Table 6 Types of Media Roll and Fanfold Media (Continued)

Media Type	How It Looks	Description
Continuous Roll Media		Roll media is wound on a core that can be 0.5 to 1.5 in. (12.7 to 38.1 mm) in diameter. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. A cutter can be used to cut apart individual labels. With continuous media, use the transmissive (gap) sensor so the printer can detect when the media runs out.

ZD411T Printer Dimensions

This section provides external printer dimensions for the printer, and many of the accessories that are available for the ZD411T.

ZD411T Thermal Transfer Printer Dimensions

This section provides external dimensions for the printer, and the printer with common accessories or options installed.

Figure 20 ZD411T Standard Printer (dimensions in millimeters)

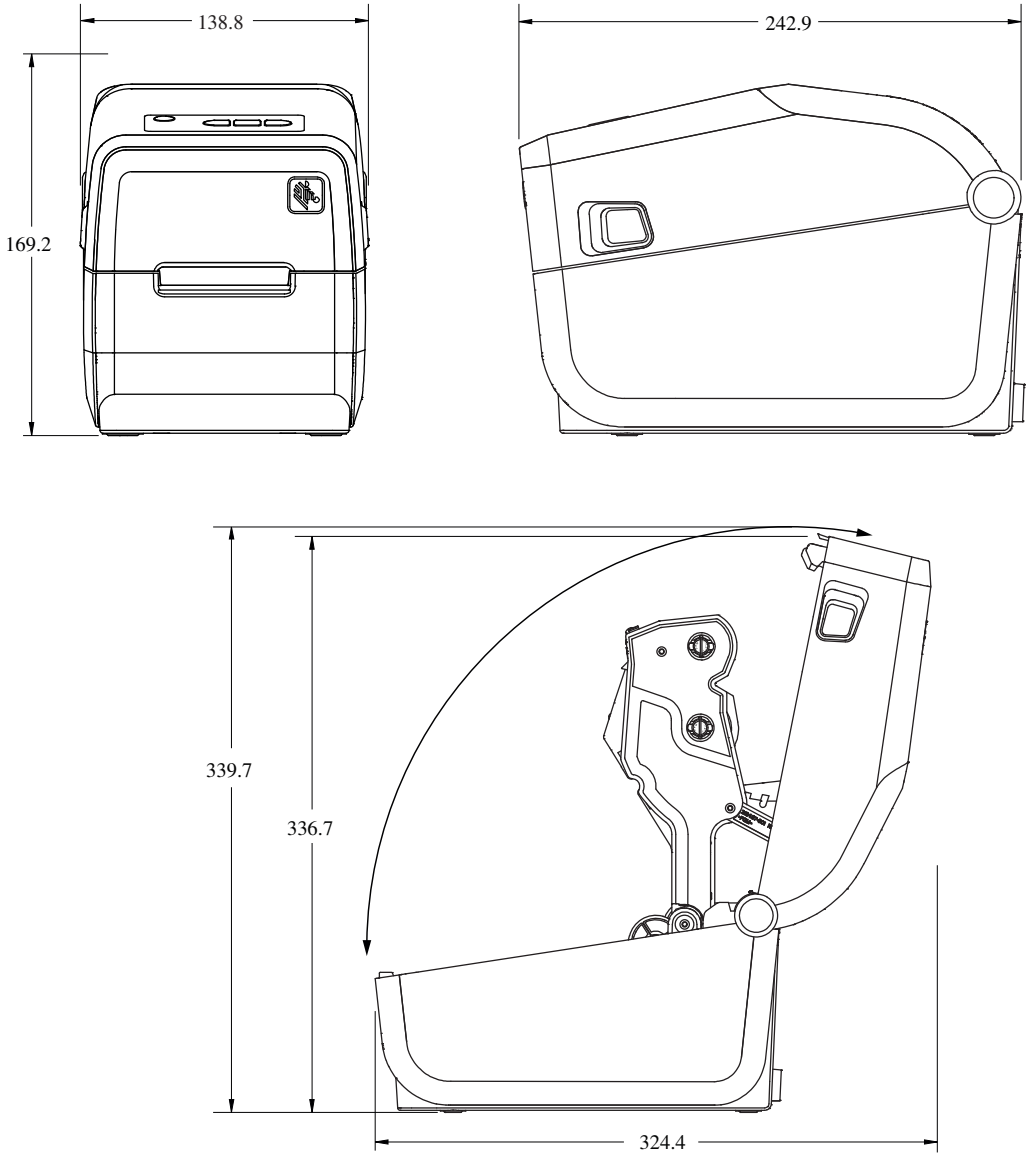


Figure 21 ZD411T Printer with Label Dispense Option (dimensions in millimeters)

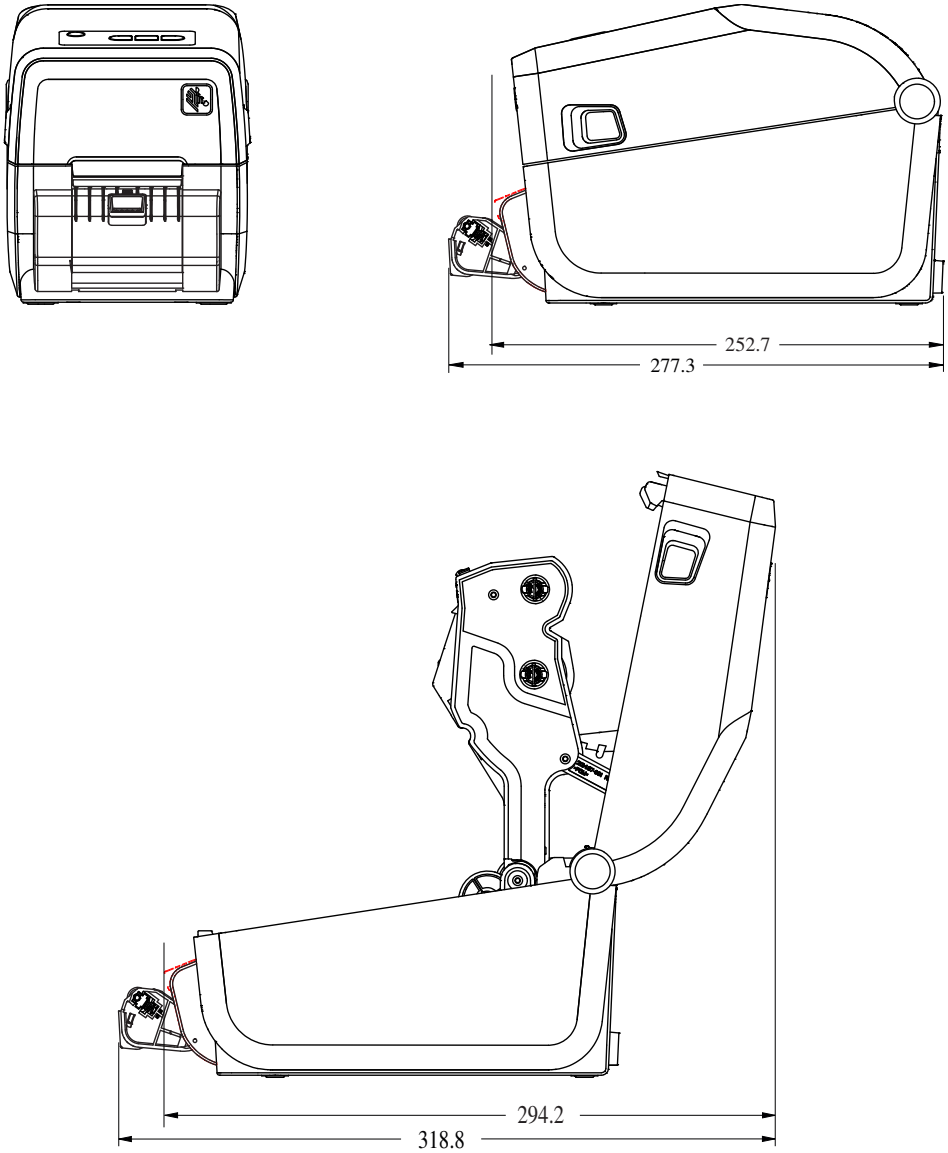


Figure 22 ZD411T Printer with the Media Cutter Option (dimensions in millimeters)

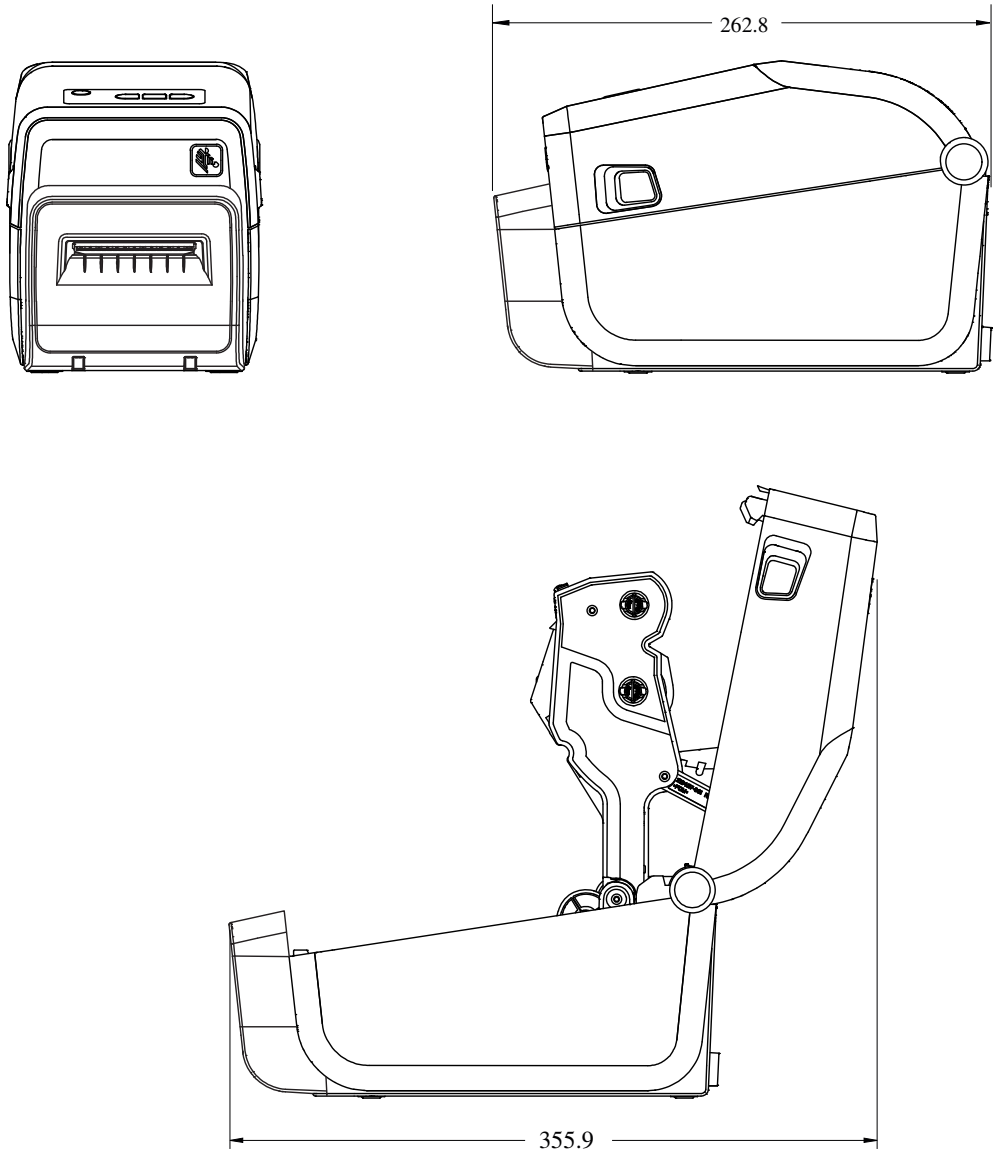


Figure 23 ZD411T Printer with Attached Battery Base Option (dimensions in millimeters)

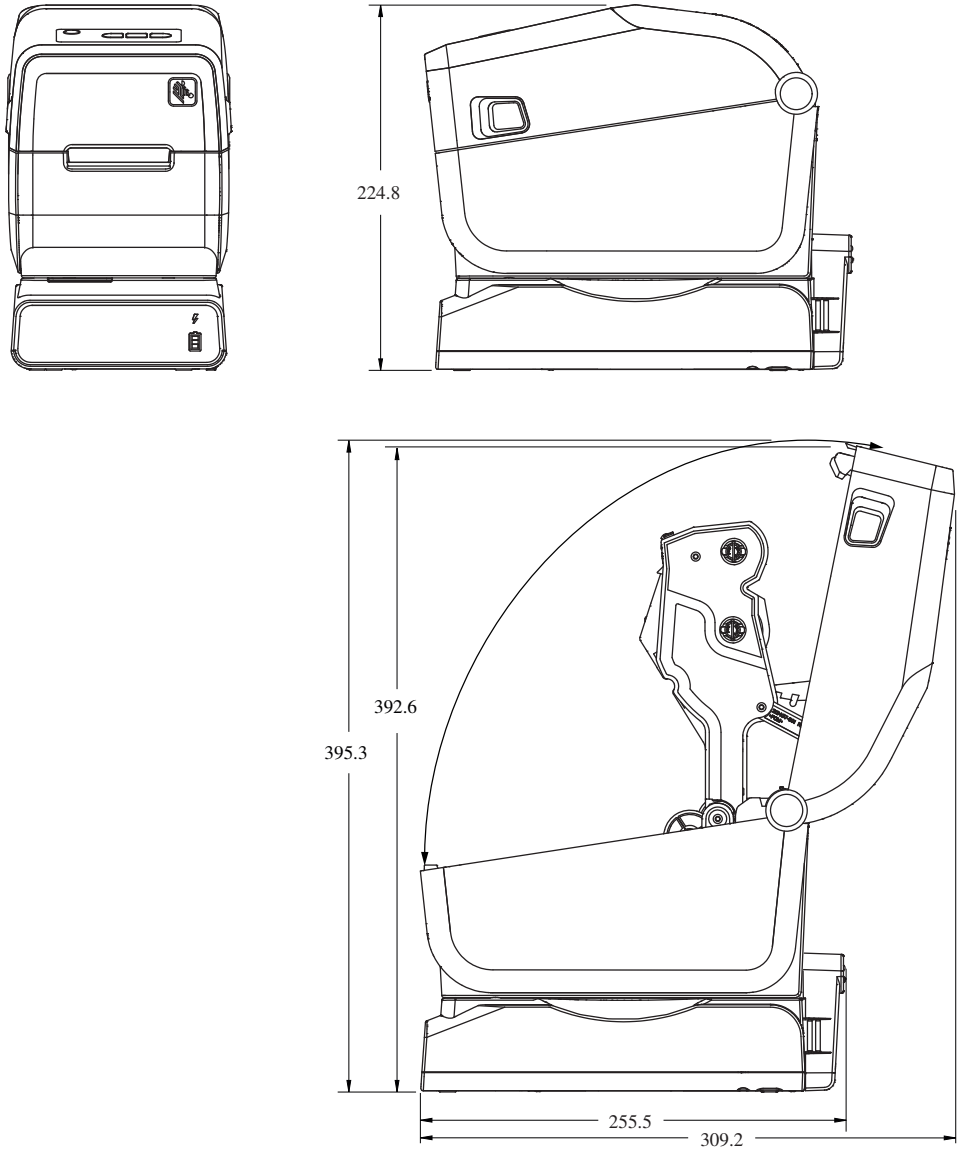
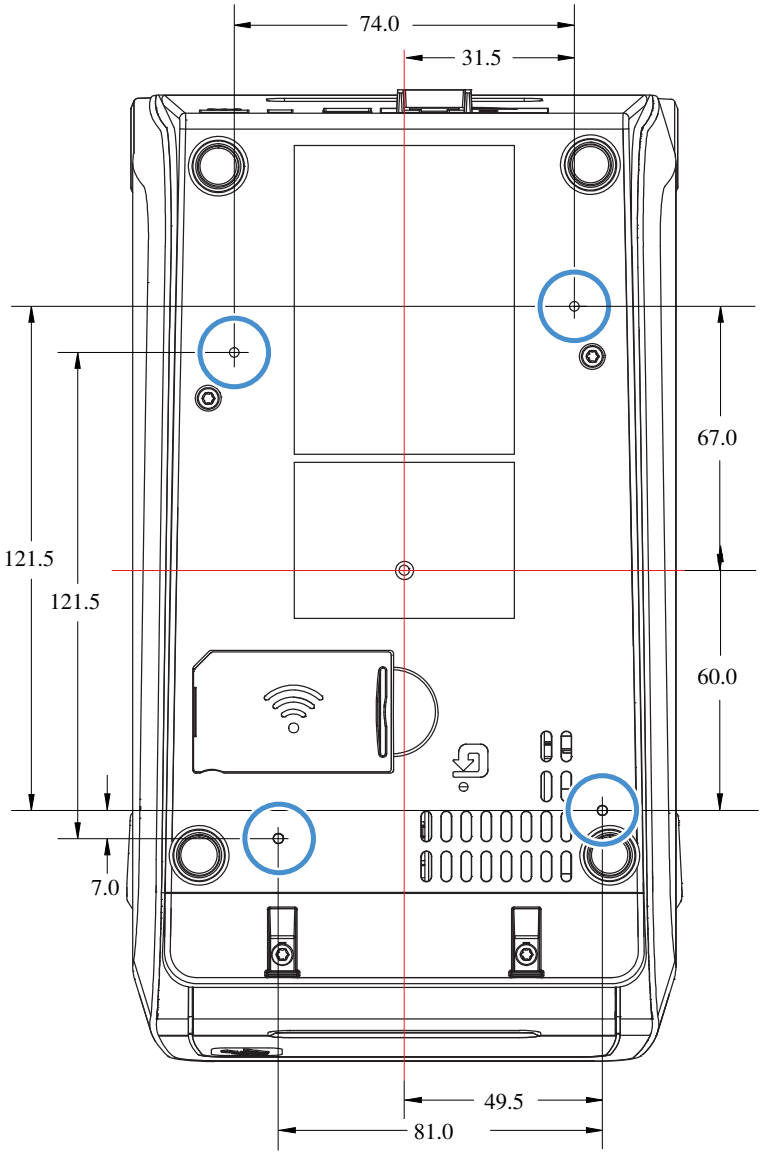


Figure 24 ZD411T Standard Mounting (dimensions in millimeters)



IMPORTANT: Use M3 thread-forming screws to mount the printer. The maximum hole depth is 8.5 mm.

ZPL Configuration

This section provides an overview of managing printer configuration, the Configuring Status Report, and Printer and Memory Printouts.

Managing the ZPL Printer Configuration

This describes how settings are saved and updated.

The ZPL printer is designed to allow you to change printer settings dynamically for a fast first label out of the printing. Printer parameters that are persistent will be retained for future format use. Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, power is cycled, or when you restore a parameter that has a factory default by resetting the printer to factory defaults. The ZPL Configuration Update command (`^JU`) saves and restores printer configurations to initialize (or re-initialize) the printer with pre-configured settings.

- To keep settings after a power cycle or printer reset, a `^JUS` can be sent to the printer to save all current persistent settings.
- The values are recalled with a `^JUR` command to restore the last saved values to the printer.

ZPL stores all parameters at once with a single command mentioned above. The legacy EPL programming language (supported by this printer) changes and saves individual commands immediately. Most printer settings are shared between ZPL and EPL. For example, changing the speed setting with EPL will also change the speed set for ZPL operations. The changed EPL setting will persist even after a power cycle or reset issued by either printer language.

You can print a printer configuration report to determine the printer parameters The configuration report lists operating parameters, sensor settings, and printer status. The Zebra Setup Utility and the ZebraDesigner Windows driver also print this report and other printer reports to help you manage the printer.

ZPL Print Configuration File Format

The printer is easily updated using a ZPL programming configuration file.

Managing multiple printers can be done by creating a printer configuration programming file. The configuration file is sent or auto-loaded from a prepared USB memory device. These can be used to clone a printer's setup. The figure shows the basic structure of a ZPL programming configuration file.

Table 7 Printer Management and Format Program Structure

Command	Description
^XA	Start Format Command
Place your commands here.	Format commands are ordered sensitive • General print and command settings • Media handling and behaviors • Media print size and position ^JUS command to save settings
^XZ	End Format Command

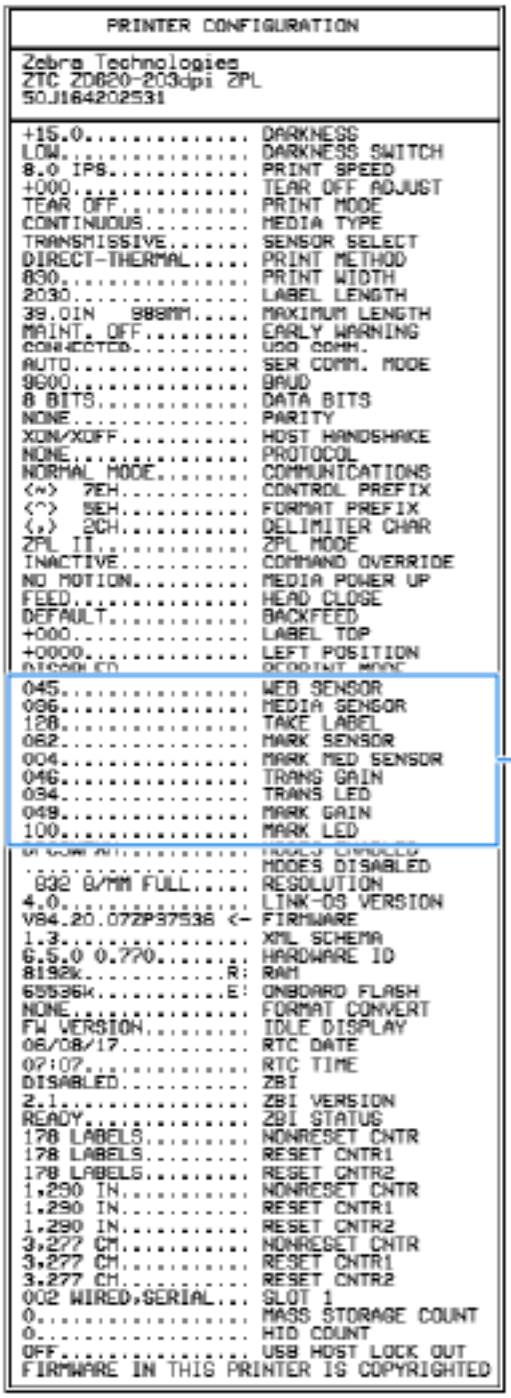
For information on creating a programming file, see the ZPL programmer's guide (available from zebra.com/manuals) and Configuration Setting to Command Cross-Reference on page 187.

You can use Windows Notepad (text editor) to create programming files and the Zebra Setup Utility (ZSU) to send programming files to the printer.

Configuration Setting to Command Cross-Reference

Use the printer configuration report to understand the settings that influence printer behaviors and the ZPL or SGD programming commands you can use to modify these behaviors.

The Printer Configuration Report provides a listing of a majority of the configuration settings that can be set by ZPL or SGD commands. Some sensor values in the middle of the report (1) are used primarily used for service purposes.



1	Sensor settings used for service purposes

Table 8 ZPL Commands and Configuration Report Callout Cross-Reference

Command	Listing Name	Description
~SD	DARKNESS	Default: 10.0

Table 8 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Description
—	DARKNESS SWITCH	LOW (Default), MEDIUM, or HIGH
^PR	PRINT SPEED	Default: 152.4 mm/s / 6 IPS (max.) - 203 dpi 101.6 mm/s / 4 IPS (max.) - 300 dpi
~TA	TEAR OFF	Default: +000
^MN	MEDIA TYPE	Default: GAP/NOTCH
	SENSOR SELECT	Default: AUTO (^MNA - Auto-Detect)
^MT	PRINT METHOD	THERMAL-TRANS or DIRECT-THERMAL
^PW	PRINT WIDTH	Default: 448 (dots for 203 dpi) or 640 (dots for 300 dpi)
^LL	LABEL LENGTH	Default: 1225 (dots) (dynamically updated while printing)
^ML	MAXIMUM LENGTH	Default: 989MM (39.0IN)
—	USB COMM.	Connection Status: Connected / Not Connected
^SCa	BAUD	Default: 9600
^SC,b	DATA BITS	Default: 8 BITS
^SC,,c	PARITY	Default: NONE
^SC,,,,e	HOST HANDSHAKE	Default: AUTO ^SC,,,,
^SC,,,,,f	PROTOCOL	Default: NONE
— SGD —	COMMUNICATIONS	Default: NORMAL MODE **NOTE:** Not supported with a ZPL command, uses the Set Get Do command in the ZPL manual. Refer to device.command_override.xxxxx in the ZPL Programmer's manual.
	SER COMM. MODE	Default: AUTO
^CT / ~CT	CONTROL CHAR	Default: <~> 7EH
^CC / ~CC	COMMAND CHAR	Default: ^> 5EH
^CD / ~CD	DELIM./CHAR	Default: <,> 2CH
^SZ	ZPL MODE	Default: ZPL II
— SGD —	COMMAND OVERRIDE	Default: INACTIVE **NOTE:** Not supported with a ZPL command, uses the Set Get Do command in the ZPL manual. Refer to device.command_override.xxxxx in the ZPL Programmer's manual.
^MFa	MEDIA POWER UP	Default: NO MOTION

Table 8 ZPL Commands and Configuration Report Callout Cross-Reference (Continued)

Command	Listing Name	Description
^MF,b	HEAD CLOSE	Default: FEED
~JS	BACKFEED	Default: DEFAULT
^LT	LABEL TOP	Default: +000
^LS	LEFT POSITION	Default: +0000
~JD / ~JE	HEXDUMP	Default: NO (~JE)
	Default: DISABLED	Default: DISABLED

From this point in the Configuration Receipt listing, the printout lists sensor settings and values which are used to troubleshoot sensor and media operations, typically by Zebra Tech Support. These listings contain printer features that are seldom modified from their default or that provide status information.

Table 9 ZPL Commands and Configuration Receipt Callout Cross-Reference

Command	Listing Name	Description
^MP	MODES ENABLED	Default: CWF (see ^MP command)
	MODES DISABLED	Default: (nothing set)
^JM	RESOLUTION	Default: 448 8/mm (203 dpi); 640 8/mm (300 dpi)
—	FIRMWARE	Lists ZPL Firmware Version
—	XML SCHEMA	1.3
—	HARDWARE ID	Lists Firmware Boot-Block Version
	LINK-OS VERSION	
—	CONFIGURATION	CUSTOMIZED (after first use)
—	RAM	2104k..... R:
—	ONBOARD FLASH	6144k.....E:
^MU	FORMAT CONVERT	NONE
	RTC DATE	Date Displayed
	RTC TIME	Time Displayed
^JI / ~JI	ZBI	DISABLED (Requires key to enable)
—	ZBI VERSION	2.1 (Displayed if installed)
—	ZBI STATUS	READY
^JH ^MA ~RO	LAST CLEANED	X,XXX IN
	HEAD USAGE	X,XXX IN
	TOTAL USAGE	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	NONRESET CNTR0 (1, 2)	X,XXX IN

Table 9 ZPL Commands and Configuration Receipt Callout Cross-Reference (Continued)

Command	Listing Name	Description
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	SLOT1	EMPTY / SERIAL / WIRED
	MASS STORAGE COUNT	0
	HID COUNT	0
	USB HOST LOCK OUT	OFF / ON
—	SERIAL NUMBER	XXXXXXXXXXX
^JH	EARLY WARNING	MAINT. OFF

The printer has the ability to set a command or a group of commands once for all receipts (or labels) that follow. Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, or you restore factory defaults.

Printer Memory Management and Related Status Reports

The printer has various memory resources and storage for building and printing.

To help you manage printer resources, the printer supports a variety of format commands. You can use these commands to manage memory, transfer objects (between memory areas and import / export files), name object nams, test printer functions, and generate printer operating status reports. They are very similar to the old DOS commands such as DIR (directory listing) and DEL (delete file). The most common reports are also part of the Zebra Setup Utility and ZebraDesigner Windows driver.

It is recommended that a single command be processed within this type of format (form). A single command is easily reused as a maintenance and development tool.

Table 10 Printer Management and Format Program Structure

Command	Description
^XA	Start Format Command
Put your commands here	Use a single command to manage the printer, test functions, and reports.
^XZ	End Format Command

Many of the commands that transfer objects, manage, and report on memory are Control (~) commands. They do not need the be within a format (form). They will be processed immediately upon receipt by the printer whether in a format (form) or not.

ZPL Programming for Memory Management

PL has various printer memory locations that are used to run the printer, assemble the print image, and store formats (forms), graphics, fonts, and configuration settings.

The printer file-naming requirements as as follows:

- ZPL treats formats (forms), fonts, and graphics like files; and memory locations like disk drives in the DOS operating system environment:
  - Memory Object Naming: Up to 16 alphanumeric characters followed by a three alphanumeric character file extension, for example, `123456789ABCDEF.TTF`.
  - Legacy ZPL printers with v60.13 firmware and earlier can only use the 8.3 filename format versus today's 16.3 filename format.
- Allows moving of objects between memory locations and deleting objects.
- Supports DOS-directory-style file list reports as printouts or status to the host.
- Allows use of wildcards (`*`) when accessing files.

Table 11 Object Management and Status Report Commands

Command	Name	Description
`^WD`	Print Directory Label	Prints a list of objects and resident barcodes and fonts in all addressable memory locations.
`~WC`	Print Configuration Report	Prints a configuration report report.
`^ID`	Object Delete	Deletes objects from printer memory.
`^TO`	Transfer Object	Used to copy an object or group of objects from one memory area to another.
`^CM`	Change Memory Letter Designation	Reassigns a letter designation to a printer memory area.
`^JB`	Initialize Flash memory	Similar to formatting a disk. Erases all objects from the specified memory locations B: or E:.
`~JB`	Reset Optional Memory	Similar to formatting a disk. Erases all objects from the B: memory (factory option).
`~DY`	Download Objects	Downloads and installs a variety of printer-usable programming objects: fonts (OpenType and TrueType), graphics, and other object data types. You can use ZebraNet Bridge to download graphics and fonts to the printer.
`~DG`	Download Graphic	Downloads an ASCII Hex representation of a graphic image. This is used by ZebraDesigner (label creation application) for graphics.
`^FL`	Font Linking	Appends secondary TrueType font or fonts to the primary TrueType font to add glyphs (characters).
`^LF`	List Font Links	Prints a list of the linked fonts.
`^CW`	Font Identifier	Assigns a single alphanumeric character as an alias to a font stored in memory.

IMPORTANT: Some ZPL fonts that are factory-installed in your printer cannot be copied, cloned, or restored to the printer by reloading or updating firmware. If these license-restricted ZPL fonts are removed using an explicit ZPL object delete command, they must be repurchased and reinstalled using a font activation and installation utility. EPL fonts do not have this restriction.