

# GK420T

Desktop Thermal Printer



**ZEBRA**

## User Guide

2023/04/10

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# About This Guide

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

## Notational Conventions

The following conventions are used in this document:

- **Bold** text is used to highlight the following:
  - Dialog box, window, and screen names
  - Dropdown list and list box names
  - Checkbox and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen
- Bullets (•) indicate:
  - Action items
  - List of alternatives
  - Lists of required steps that are not necessarily sequential.
- Sequential lists (for example, those that describe step-by-step procedures) appear as numbered lists.

## 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 the user to know and that is not required to complete a task.



**IMPORTANT:** The text here indicates information that is important for the user to know.



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

## About This Guide



**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, the user 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, the user CAN be seriously injured or killed.



**DANGER:** If danger is not avoided, the user WILL be seriously injured or killed.

# Introduction

This section describes what you get in your shipping box and provides an overview of printer features. This includes procedures that describe how to open and close the printer and report any problems.

## GK Series Thermal Printers

Your printer provides thermal transfer and direct thermal printing at speeds up to 5 ips (inches per second) at a 203 dpi (dots per inch) print density. It supports both ZPL and EPL Zebra printer programming languages and a wide variety of interface and feature options.

Here are the features of your printer:

- Automatic printer language detection and switching between ZPL and EPL programming and label formats.
- OpenAccess design for simplified media loading.
- Easy ribbon-loading design.
- Color-coded operator controls and media guides.
- 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, and custom character maps (DAT table creation, font linking, and character remapping).
- On-the-fly OpenType and TrueType font scaling and import, Unicode, preloaded Swiss 721 Latin 1 font, one resident scalable font, and a selection of resident bitmap fonts.
- Improved printer performance over legacy printers—Fast print speeds and a 32-bit processor.
- Adaptive auto serial port cable sensing and configuration for plug-and-play integration.
- A complete suite of free software applications and drivers to configure printer settings, design, and print labels and receipts, get printer status, import graphics, and fonts, send programming commands, update firmware, and download files. Clone printer settings and send graphics, files, fonts, and firmware (updates) to one or more Zebra Ethernet and locally connected printers with ZebraNet Bridge.
- Printhead test and maintenance reporting can be enabled and customized.

The options available with your printer include:

- Label Dispense (Peel-Off).
- Internal 10/100 Print Server and Ethernet Interface.

- Zebra ZBI 2.0 (Zebra BASIC Interpreter) programming language—ZBI allows you to create custom printer operations that can automate processes, and use peripherals (i.e. scanners, scales, keyboards, Zebra KDU or KDU Plus, etc.) all without being attached to a PC or network.

When connected to a host computer, your printer functions as a complete, standalone system for printing labels and tags. It does not have to be connected to a network to print.

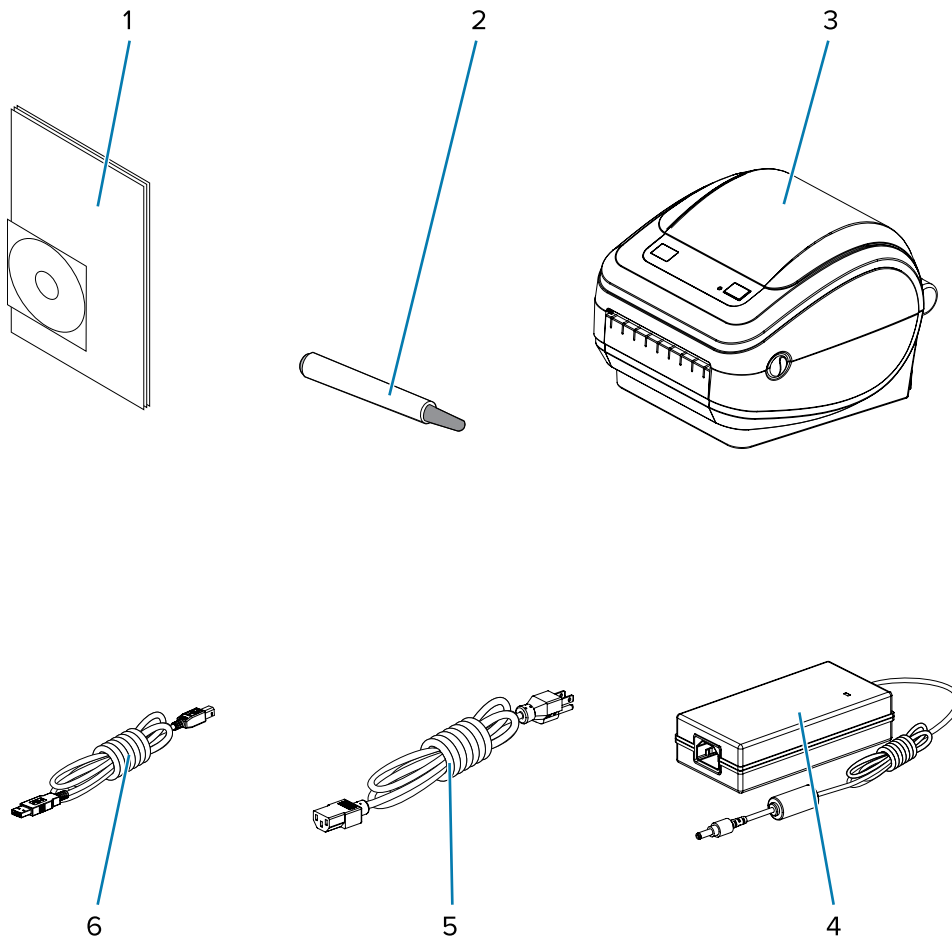
This user guide provides all the information you need to operate your printer on a daily basis. To create label formats, refer to your programming guides or label design applications such as ZebraDesigner.



**NOTE:** Many printer settings may be controlled by your printer’s driver or label design software such as ZebraDesigner. Refer to the driver or software documentation for more information.

## What is in the Box

Save the carton and all packing materials in case you need to ship or store the printer later. After unpacking, make sure you have all parts. Follow the procedures for inspecting the printer to familiarize yourself with printer parts so you can follow the instructions in this book.



1	Documentation and software	4	USB cable
2	Cleaning pen	5	Power cord (varies by locale or region)
3	Printer	6	Power supply

In addition, thermal transfer printers ship with a starter ribbon core.



## Unpack and Inspect the Printer

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

- Save all packing materials.
- Check all exterior surfaces for damage.
- 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.



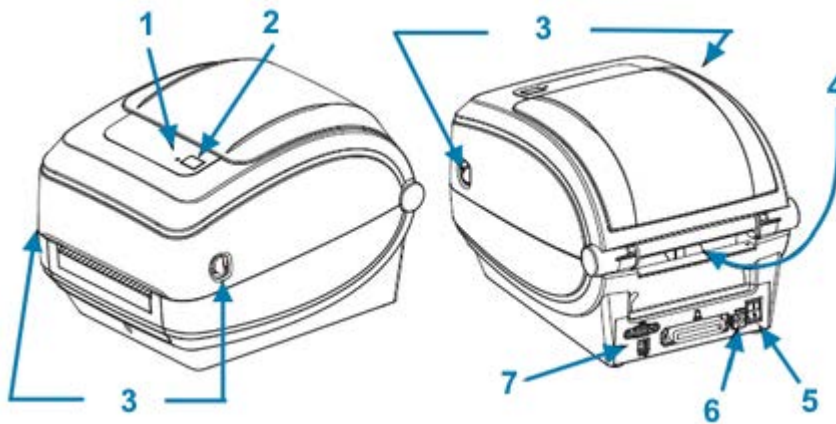
**IMPORTANT:** Zebra Technologies Corporation is not responsible for any damage to the printer incurred during shipment, and will not cover the repair of this damage under its warranty policy.

- Keep all packaging material for shipping company inspection.
- Notify your authorized Zebra reseller.

## Your Printer

Familiarize yourself with the controls, connectors and indicators of your printer.

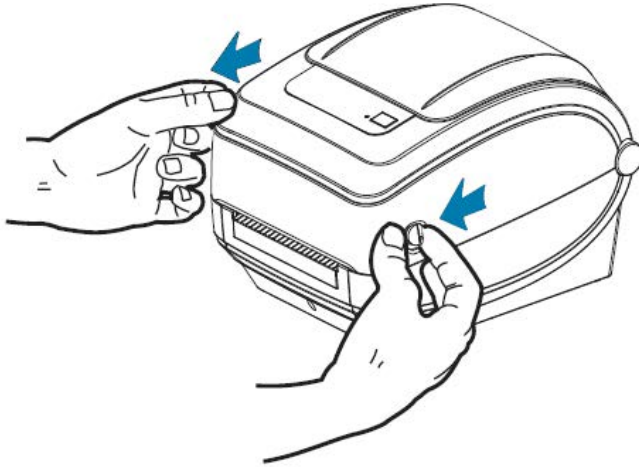
**Figure 1** Printer Controls, Connectors, and Indicators



1	Status light	5	DC power receptacle
2	<b>FEED</b> button	6	Fanfold media entry slot
3	Release latches (one on each side of the printer)	7	Interface connectors
4	Power switch		

## Opening the Printer

To access the media compartment, you must open the printer. Pull the release latches towards you and lift the cover. Check the media compartment for loose or damaged components.



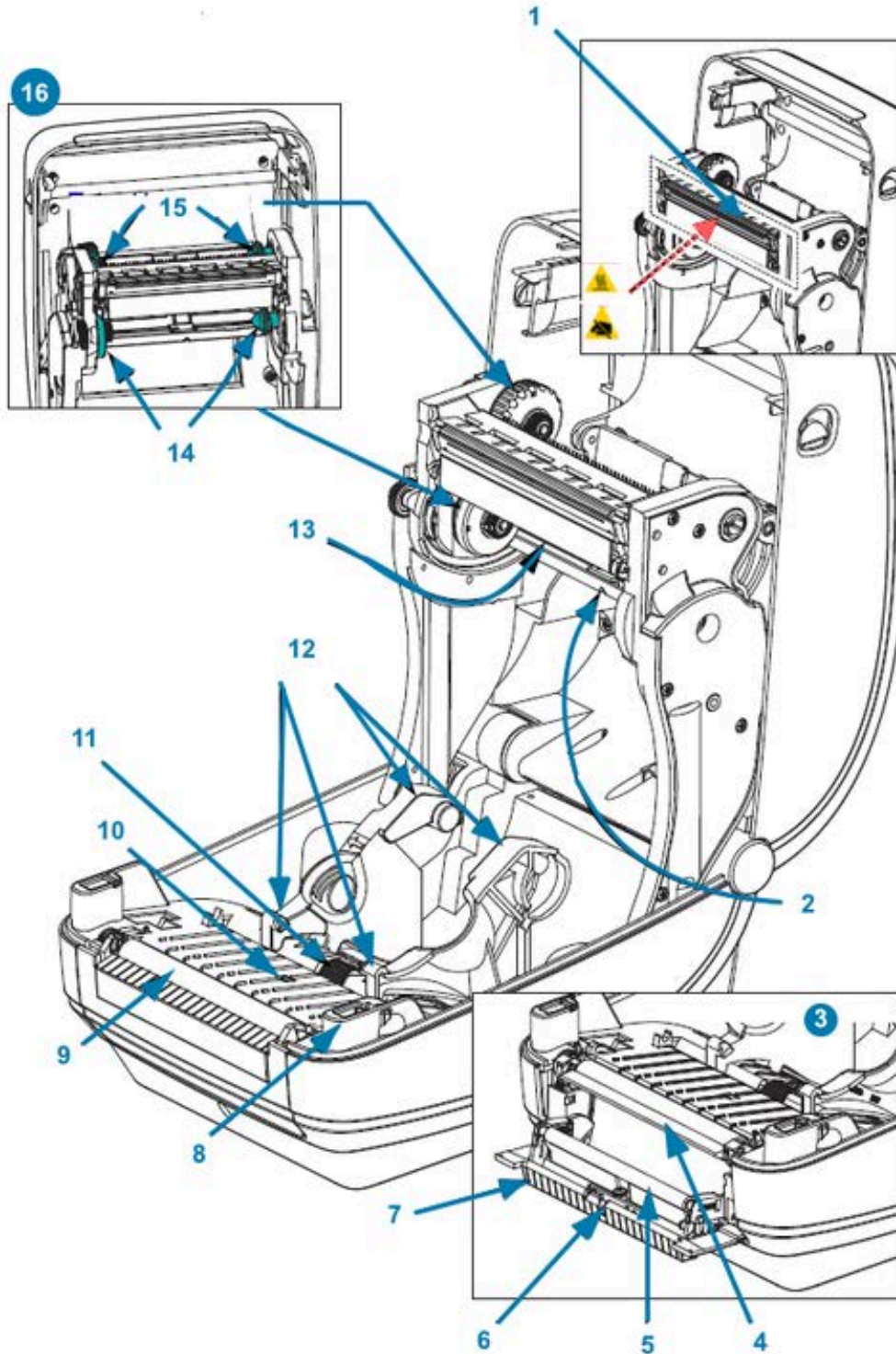
**CAUTION—ESD:** The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components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



## Printer Features

A knowledge of your printer's features is useful when operating and maintaining your printer.

**Figure 2** GK420 Thermal Transfer Printer Features



1	Printhead	9	Platen roller
2	Web (gap) sensor	10	Blackline sensor
3	DISPENSER OPTION	11	Media guide stop
4	Peel bar	12	Roll holders and media guides
5	Pinch roller	13	Ribbon trailer sensor (hidden from view)
6	Sensor	14	Supply spindles
7	Dispenser door (open)	15	Take-up spindles
8	Head-up sensor (inside)	16	Ribbon roll holders

## Operator Controls

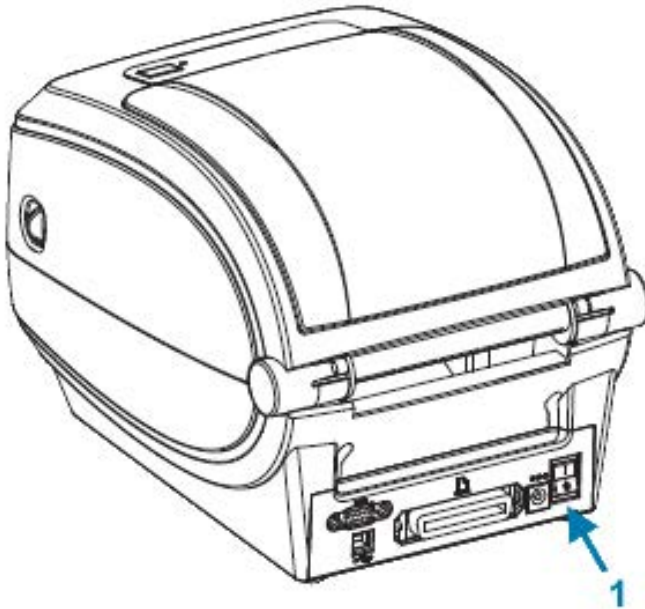
These sections describe the operator controls of the printer.

### Power Switch

Press the **POWER** switch on the back of the printer to turn printer power ON and OFF.



**IMPORTANT:** Turn printer power OFF before connecting or disconnecting the communications and power cables.



1	<b>POWER</b> switch
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## FEED Button

The **FEED** button is used to perform a variety of actions.

- Tap **FEED** once to force the printer to feed one blank label.
- Press **FEED** to exit the printer out of a pause condition.



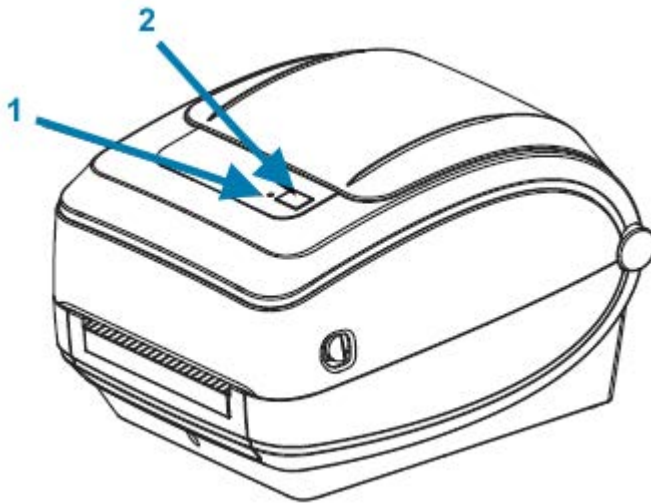
**NOTE:** The printer may be in a pause condition because of an error or it may be have been placed in that condition using a programming command. See [Status Light Descriptions and Error Resolutions](#) on page 83 for details.

- You can use the **FEED** button to set up the printer or obtain its status. See [FEED Button Modes](#) on page 92.

## Status Light

Located on the top, next to the **FEED** button, the status light is a printer operation indicator.

See [Status Light Descriptions and Error Resolutions](#) on page 83 for more information on what the various status indications convey.

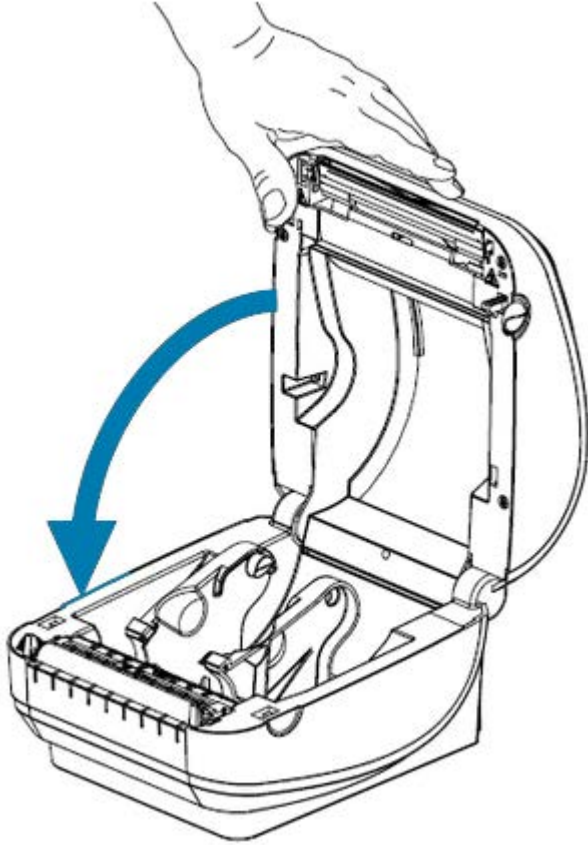


1	Status light	2	<b>FEED</b> button
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## Closing the Printer

After loading media, securely close the printer cover.

1. Lower the top cover.



2. Press down until the cover snaps closed.



# Getting Started

This section describes how to set up your printer for the first time, use the most common operating procedures for loading media, and print your first label.

## Printer Setup Overview

This section provides a high-level outline of how to set up your Zebra printer which includes the hardware setup and the host system or software/driver setup.



**IMPORTANT:** After finding an appropriate location for the printer but BEFORE plugging in the printer to a power source, download the printer drivers on the laptop or PC that you will use to set up and manage the printer.



**NOTE:** You will need a roll of media (labels, receipt paper, tags, etc.) to set up your first test print. Go to [zebra.com/supplies](https://zebra.com/supplies) or contact your reseller to help you select the right media for your use.

1. Place the printer in a safe location with access to a power source, and one where you can connect it to your PC, laptop, or mobile device using either interface cables or through wireless. See location considerations in [Attaching Power](#) on page 14.
2. Go to [zebra.com/setup](https://zebra.com/setup) to download and install the Zebra Setup Utilities (ZSU) for your Windows operating system (OS). The utility includes the latest drivers, installation wizards, and various tools to assist you in managing your printer. See [Installing Drivers and Connecting to a Windows-Based Computer](#) on page 24.



**NOTE:** Optionally download Android, iPhone, and iPad apps that will help you manage your Zebra printer.

3. Attach the printer and power supply to a grounded AC power source. See [Attaching Power](#) on page 14.
4. Load the media. See [Loading Roll Media](#) on page 15.  
The printer auto-calibrates. See [Media Sensing](#) on page 55.
5. Load transfer ribbon. See [Loading Transfer Ribbon](#) on page 19.
6. Print a Printer Configuration Report to verify basic printer operation. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.
7. Turn printer power OFF.
8. Choose a method to communicate with your printer using either a wired connection—USB port, optional serial port, or optional Ethernet—or a wireless connection such as Bluetooth or Wi-Fi, and

establish the physical connection if using a cable. See [Connecting your Printer to a Device](#) on page 24 and [Interface Cable Requirements](#) on page 33.

9. Run Zebra Setup Utilities. See [Running the Printer Installation Wizard](#) on page 28.
10. Verify printer connectivity. See [Testing Communications by Printing](#) on page 39

If you connected the printer to your host device and turned printer power on BEFORE installing the printer drivers on the host (using the Zebra Setup Utilities Installation Wizard), see [What to Do If You Forget to Install Printer Drivers First](#) on page 40.

## Attaching Power

Set up your printer so that you can handle the power cord easily if needed.



**IMPORTANT:** To make certain the printer cannot carry electrical current, you must separate the power cord from the power supply receptacle or AC electrical outlet.

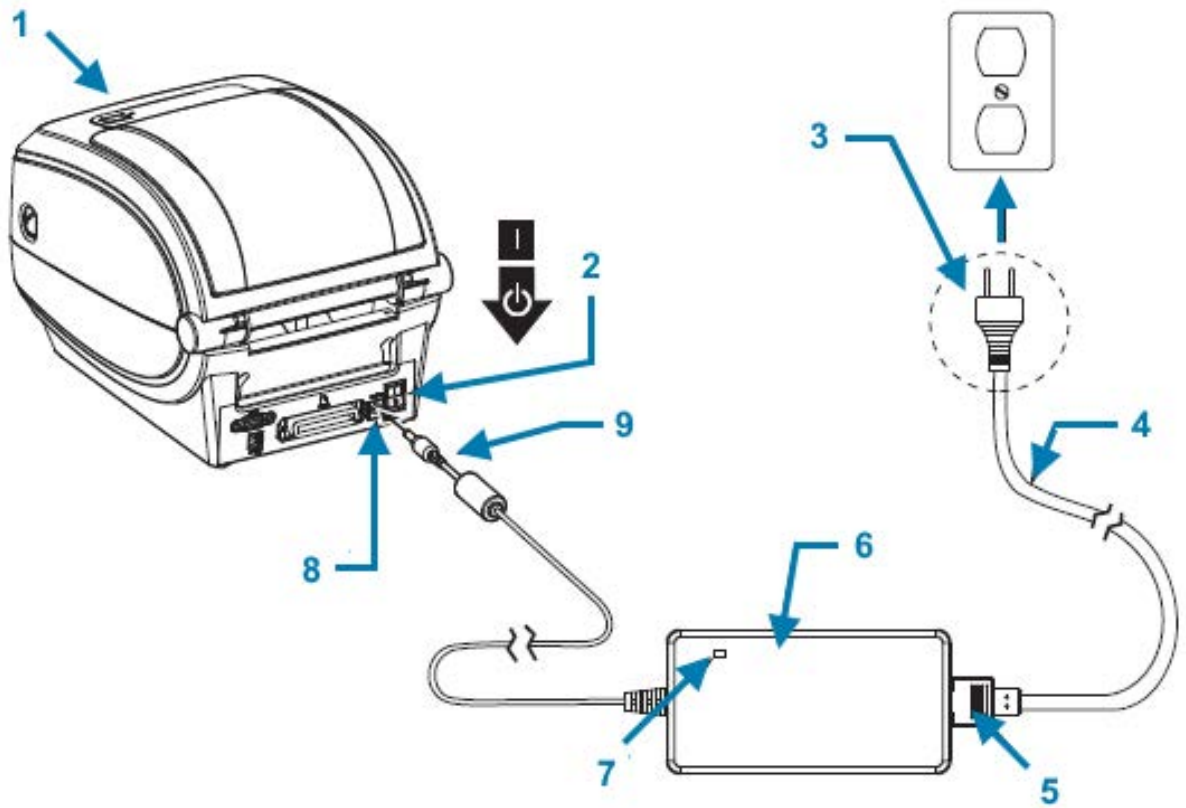


**CAUTION:** Never operate the printer and power supply in an area where they can get wet. Serious personal injury could result!

1. Make sure the printer's power switch is in the off position (down).
2. Insert the AC power cord into the power supply.
3. Plug the other end of the cord into an appropriate AC electrical outlet.

If power is on at the AC outlet, the active power light will light up.

4. Insert the power supply's power connector into the printer's power receptacle.



1	Printer
2	Power switch
3	Plug (varies by country)
4	AC power cord
5	IEC 60320 C-13 connector
6	Power supply
7	Active power light
8	Power connector
9	Power receptacle



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

## Loading Roll Media

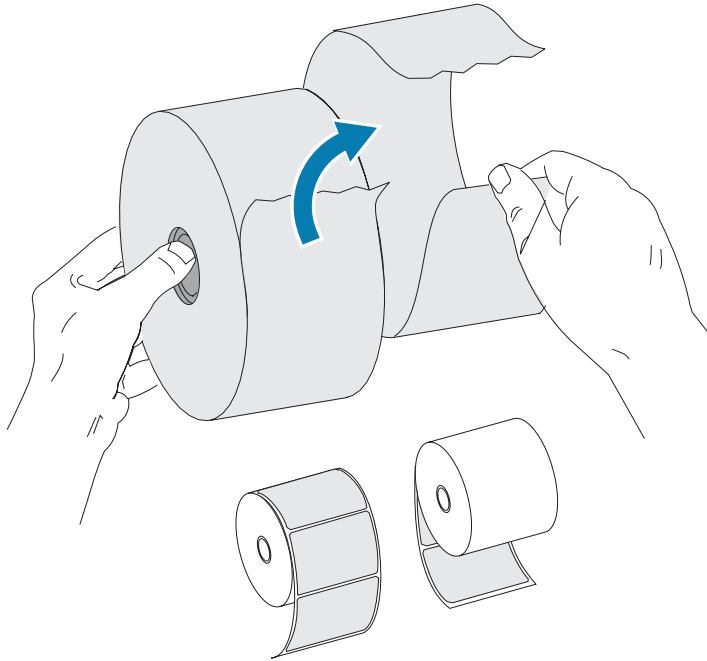
When you load media, you must place the roll onto the media hangers.

You must use the correct media for the type of printing you require.

### Preparing Media

You load both inside-wound and outside-wound roll media in the printer the same way.

Remove the outside length of the media. During shipment, handling, or storage, the roll may become dirty or dusty. Removing the outside length of media avoids dragging adhesive or dirty media between the printhead and platen.



### Placing the Roll in the Media Compartment

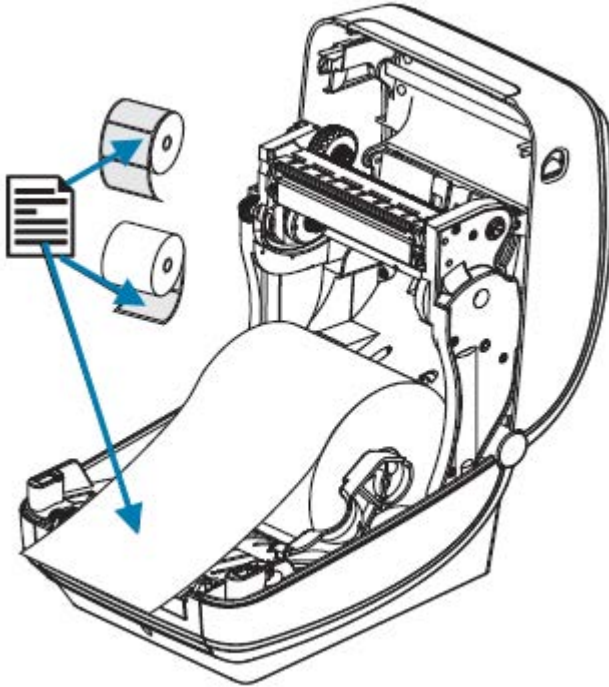
Use these steps to load the media in the printer.

1. Facing the front of the printer, open the printer cover by pulling the release latch levers towards you.

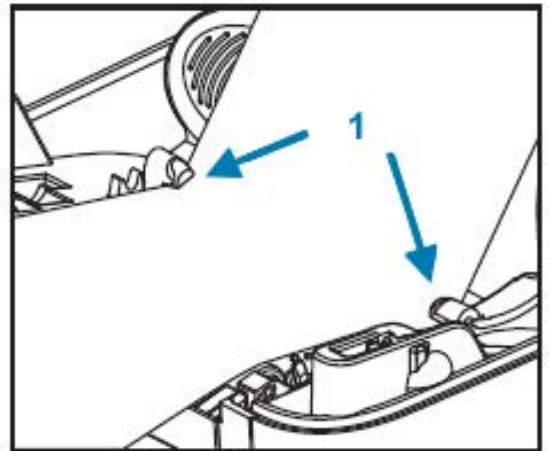
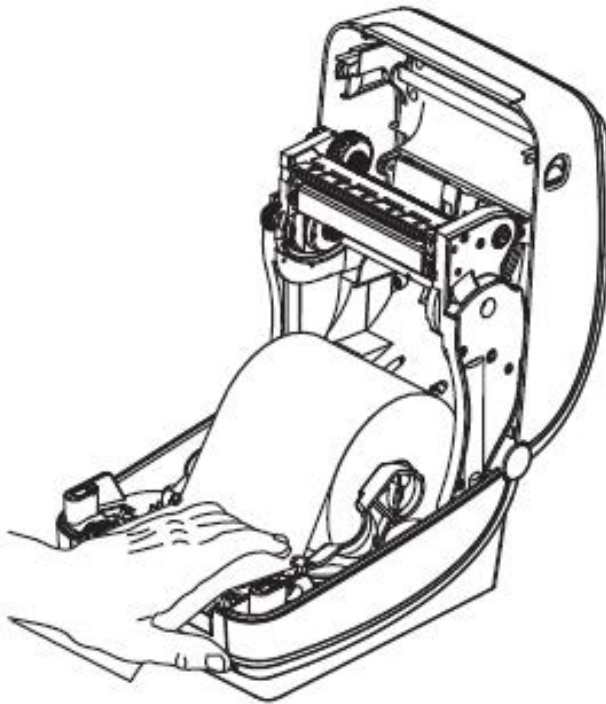




3. Pull the media so that it extends out of the front of the printer. Verify the roll turns freely. Make sure the roll does not sit in the bottom of the media compartment. Verify that the media's printing surface is facing up.



4. Push the media under both of the media guides.



1	Media guides
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5. Close the printer. Press down until the cover snaps closed.

The printer auto-calibrates (see [Media Sensing](#) on page 55).

## Loading Transfer Ribbon

Your printer uses ribbon to print. Transfer ribbons come in several varieties and in some cases colors to match your application needs. Use the information provided here to purchase compatible ribbon supplies and load ribbon in your printer.

Your printer requires certified Zebra ribbons for optimal printing performance and operation.

Transfer ribbons available from Zebra are:

- Specifically designed to work with your printer and with Zebra-brand media.
- Include a ribbon-out trailer (reflector). When the printer senses this trailer, it recognizes that the transfer ribbon roll has been used up and stops printing, to prevent damage to the printhead.
- Ribbons and ribbon cores manufactured by Zebra have notches which help maintain ribbon-roll engagement and drive (without slipping) while printing.



**NOTE:** Using non-Zebra media or ribbons—not approved for use in your Zebra printer—may damage your printer or its printhead.

To purchase ribbon and supplies that are compatible with your printer, go to [zebra.com/supplies](https://zebra.com/supplies). These color-coded ribbon types are available for your printer:

- Blue—Performance Wax
- Silver—Premium Wax/Resin
- Gold—Performance Resin for synthetics (6 ips max. speed) and coated paper (4 ips max. speed)
- Red—Premium Resin for synthetics (4 ips max. speed)

For more information on using ribbons with your printer, see [Ribbon Overview and Use](#) on page 52.

For optimal results and to prevent damage to the printer:

- Match the media and ribbon types you plan to use.
- Use ribbon that is wider than the media to protect the printhead from wear.



**CAUTION—PRODUCT DAMAGE:** If the ribbon used is not as wide as the media loaded, areas of the printhead that are NOT protected by ribbon may wear out prematurely and damage the printhead.

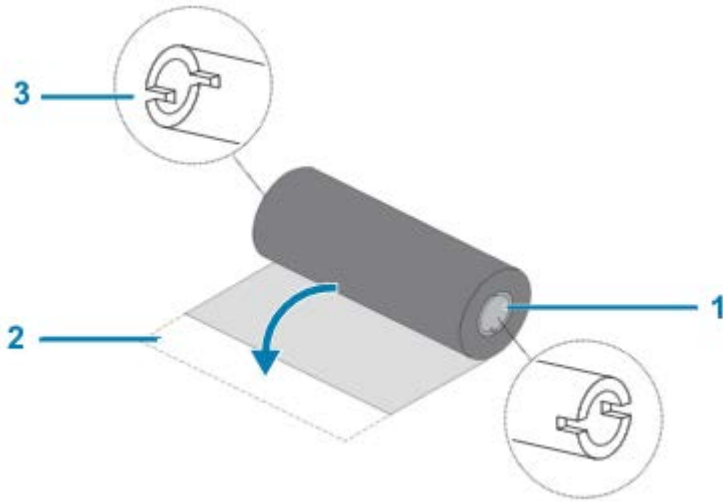
- Do NOT load ribbon in the printer if you are printing on direct thermal media. To determine the type of media you are using, see [Determining Thermal Media Types](#) on page 51.
- Make sure the notches on the ribbon core are square. The notches must be in good condition to lock on the spindle.



**CAUTION:** DO NOT use any ribbon cores with damaged notches (rounded, frayed, smashed, etc.). Cores with damaged notches may slip and cause ribbon wrinkle, poor end-of-ribbon sensing, or potentially other intermittent failures.

If the printer runs out of ribbon while printing and you need to replace ribbon without losing your print job, see [Ribbon Overview and Use](#) on page 52.

1. Prepare the ribbon by removing its wrapping and pulling its adhesive strip free.

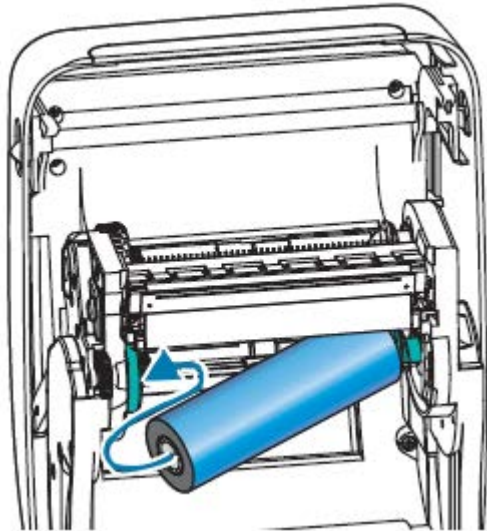


1	Right side (printer and roll)
2	Adhesive strip
d	Notch (required on left side of ribbon)



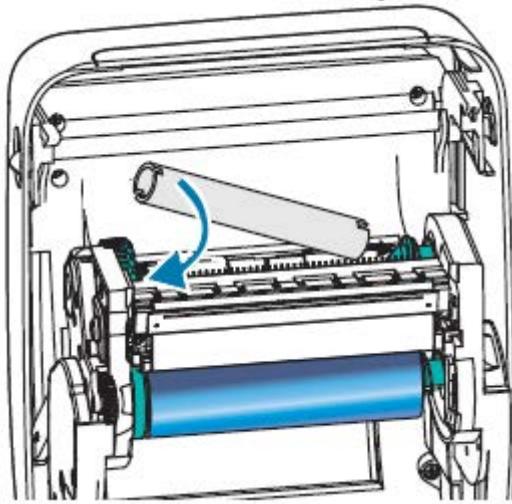
**IMPORTANT:** Do NOT use early model desktop printer ribbon cores! Older ribbon cores have notches on only one side of the ribbon core. They are too large and will cause take-up spool to bind.

2. Open the printer and place a new ribbon roll on printer's lower ribbon supply spindles.

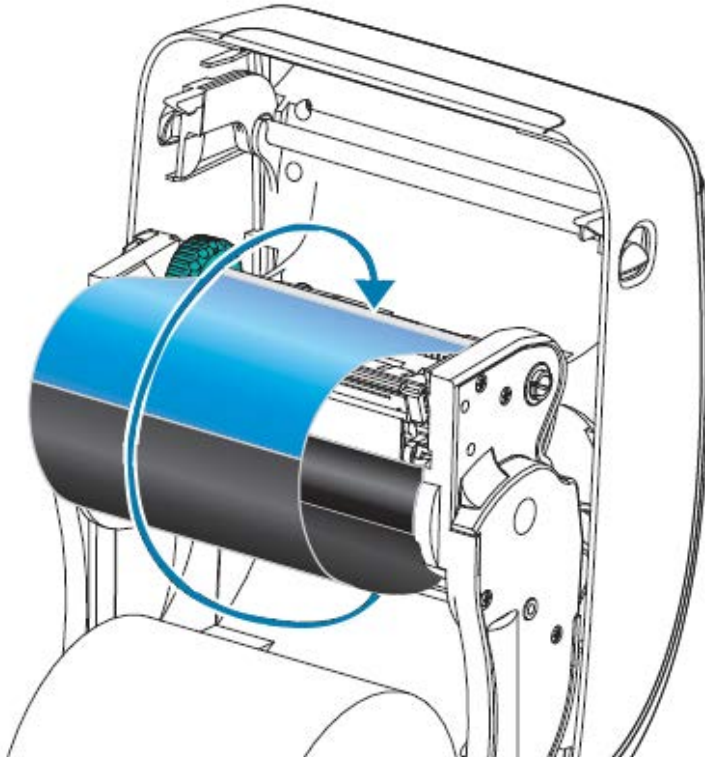


3. Rotate the roll until the notches align and lock into the left side of the supply hub.

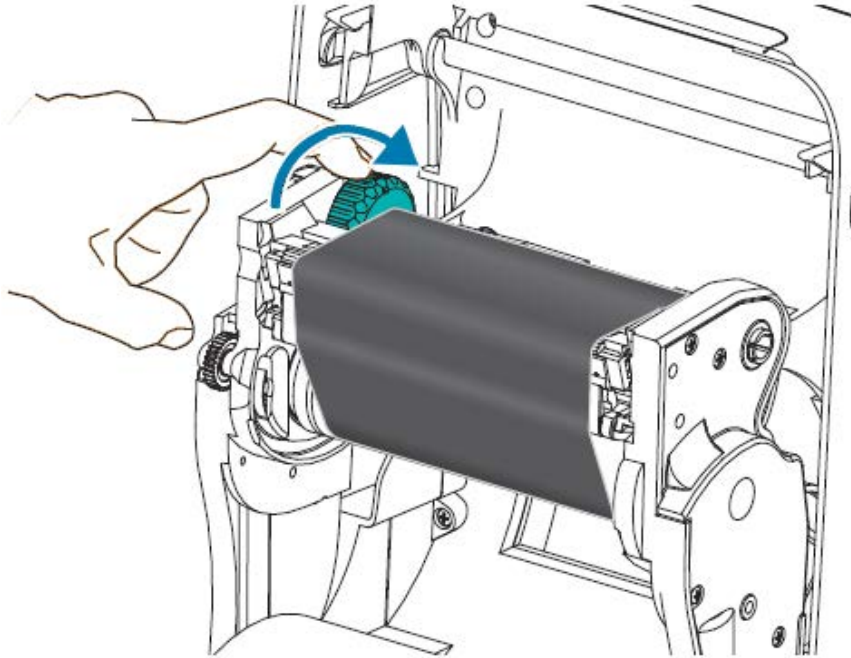
Your first ribbon take-up core shipped in the box with your printer. During subsequent ribbon replacements, you can use the empty supply core to take-up the next roll of ribbon.



4. Pull the transfer ribbon's leader off the roll and attach it with the adhesive strip on the leader to the empty ribbon core on the supply spindle. Center the ribbon on the ribbon core.



5. Rotate the thumb wheel on the left side of the supply spindle towards the rear of the printer, until the ribbon is pulled tight across the printhead.



6. Verify that media—matched for use with this ribbon—is loaded and the printer is ready to print, then close the printer cover.
7. Press **FEED** to make the printer feed a minimum of 10 cm (4 in.) of media to remove slack and ribbon wrinkle, and to align the ribbon on the spindles.
8. Use your printer driver, application software such as Zebra Setup Utilities, or printer programming commands to change the print mode setting from Direct Thermal printing to Thermal Transfer printing. This will set the printer's temperature profiles for thermal transfer media.

If using ZPL programming...	Send the printer the <code>^MT</code> (Media Type) ZPL II command. See the instructions for this command in the ZPL Programming Guide.
If using EPL programming in Page Mode (the default for your printer)...	Refer to the <code>^O</code> (Hardware Options) command. See the instructions for this command in the EPL Programming Guide.

9. Verify the mode change from Direct Thermal printing to Thermal Transfer printing by printing a Printer Configuration label. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.

The `PRINT METHOD` entry on the label should read `THERMAL-TRANS`.

## Printing a Test (Printer Configuration) Label

Before you connect the printer to your computer, make sure that the printer is in proper working order.

You can do this by printing a configuration status label.

1. Make sure the media is properly loaded and the top cover of the printer is closed.

- Turn the printer power on if you have not already done so.

If the printer initializes with the status light blinking green (pause mode)...	Press <b>FEED</b> once to set the printer in Ready (to print) mode.
If the printer's status light does not turn solid green (Ready)...	Refer to the <a href="#">Diagnostics and Troubleshooting</a> on page 83 section.

- Press **FEED** two to three times to allow the printer to calibrate for the installed media.

The printer auto-calibrates (see [Media Sensing](#) on page 55) and may feed several labels during this process.

- When the status light turns solid green, press and hold **FEED** button until the status light flashes once, then release.

A configuration label prints. If you cannot get this label to print, see [Getting Started](#) on page 13.

**Figure 3** Example of a Printer Configuration Label



- If you are printing this label as part of the printer setup, turn printer power OFF after you have printed the label. You must first complete the physical cable connections between the printer and the

computer, install the printer drivers on your computer, and then turn printer power ON when the Installation Wizard instructs you to do so. See [Printer Setup Overview](#) on page 13.

## Connecting your Printer to a Device

Zebra printers support a variety of interface options and configurations.

Printer interface options include:

- Universal Serial Bus (USB) interface
- RS-232 Serial
- Parallel (IEEE 1284.4)
- 10/100 Ethernet

The Zebra Setup Utilities application is designed to help you install these interfaces. Review the cabling and unique parameters for each physical printer communication interface in [Interface Cable Requirements](#) on page 33 and [Interface Wiring](#) on page 96. This will help you make your configuration setup choices before and immediately after applying power to the printer.



**IMPORTANT:** Keep the power switch in the OFF position when attaching the interface cable. The power cord must be inserted into the power supply and the power receptacle on the back of the printer before you connect or disconnect the communications cables.

Zebra Setup Utilities configuration wizards will instruct you to turn printer power ON at the appropriate time to complete the printer installation.

## Connecting to a Phone or Tablet

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

- [Android devices](#)
- [Apple devices](#)

The applications support the following types of connectivity:

- Bluetooth Classic
- Bluetooth Low Energy (Bluetooth LE)
- Wired/Ethernet
- Wireless
- USB On-The-Go

For the User Guides for these printer setup utilities, go to [zebra.com/setup](http://zebra.com/setup).

## Installing Drivers and Connecting to a Windows-Based Computer

To use your printer with a Microsoft Windows-Based computer, you must install the correct drivers first.



**NOTE:** You may connect your printer to your computer using any of the supported connections that are available to you to use. However, wait to connect any cables from your computer to the printer until you are instructed to do so by the Installation Wizard. If you connect the cables before the Wizard prompts you, the printer will not be installed correctly.



To recover from incorrect printer driver installation, see [What to Do If You Forget to Install Printer Drivers First](#) on page 40.

### Pre-install Windows Printer Drivers

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

At minimum, pre-install the ZebraDesigner Windows driver to avail of the ease-of-use and simplicity advancements in Windows operating systems (OS) higher than Windows XP OS version SP2.

Zebra provides the following:

- Zebra Setup Utilities (ZSU)—A suite of Zebra printer drivers, utilities, and communications and installation tools deployable on most Windows PC operating systems. ZSU and Zebra Windows printer drivers are available on the CD provided with your printer. For the latest versions, go to the Zebra website at [zebra.com](http://zebra.com).
- ZebraDesigner Driver and ZSU—The driver supports 32-bit and 64-bit Windows OS. It is Microsoft Certified. For a list of operating systems that the software supports, ZebraDesigner Driver and ZSU support the following printer communication interfaces:
  - USB port
  - Parallel port
  - Serial port
  - Wired and wireless Ethernet
  - Bluetooth (using a virtual Bluetooth printer port)



**IMPORTANT:** Wait to apply power to the printer until after you have installed the drivers on the PC.

To install the drivers:

1. Connect the printer to a PC that is running a Windows OS that the Zebra driver supports.
2. Install the Zebra Setup Utilities. The utility will prompt you to apply power to the printer.
3. Continue following the on-screen instructions to complete your printer installation.

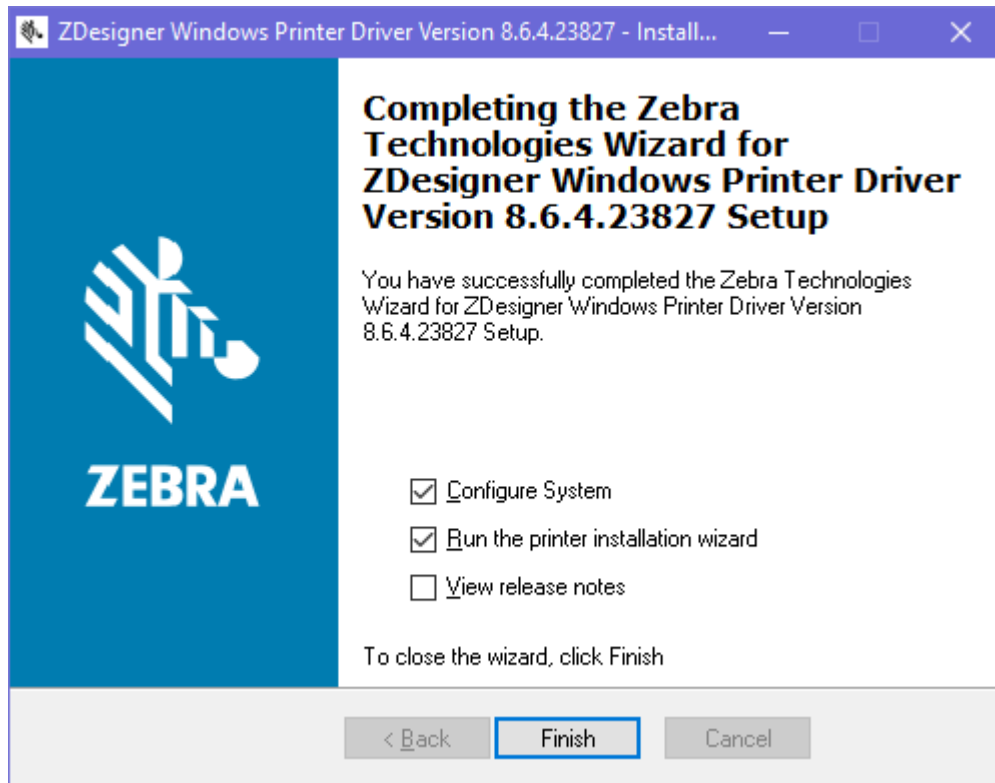
### Installing the Drivers

1. Navigate to [zebra.com/drivers](http://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.

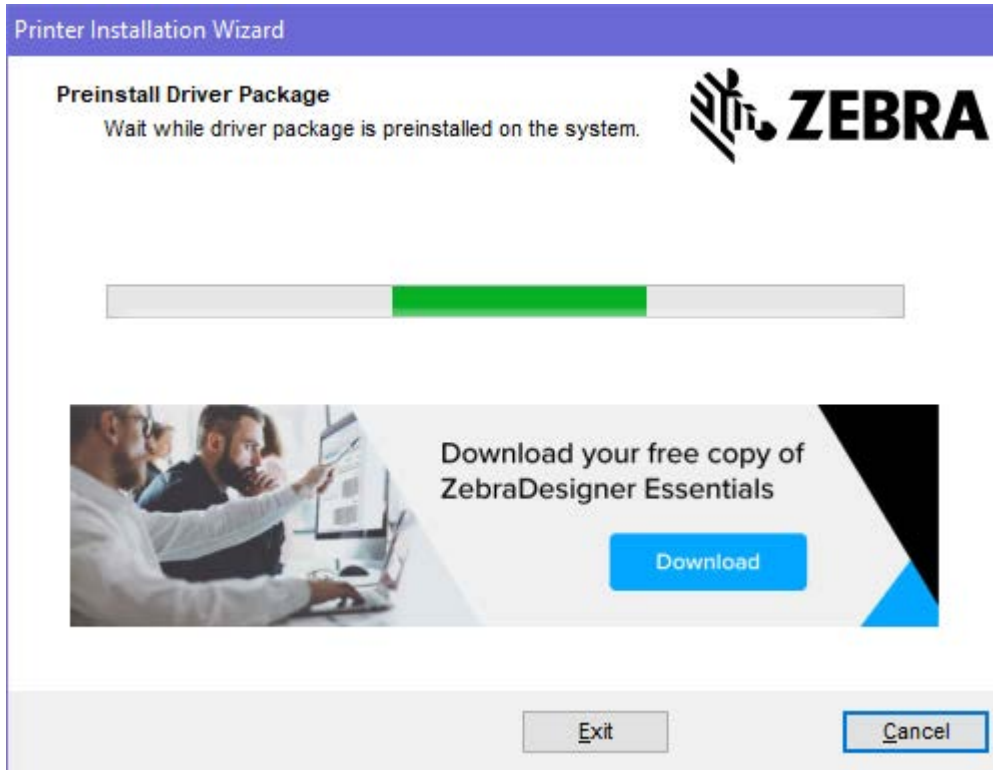
6. Run the executable file and follow the prompts.

When the setup is complete, you may select to add the drivers to your system (Configure System) or to add specific printers, see [Running the Printer Installation Wizard](#) on page 28.



7. Select **Configure System**, then click **Finish**.

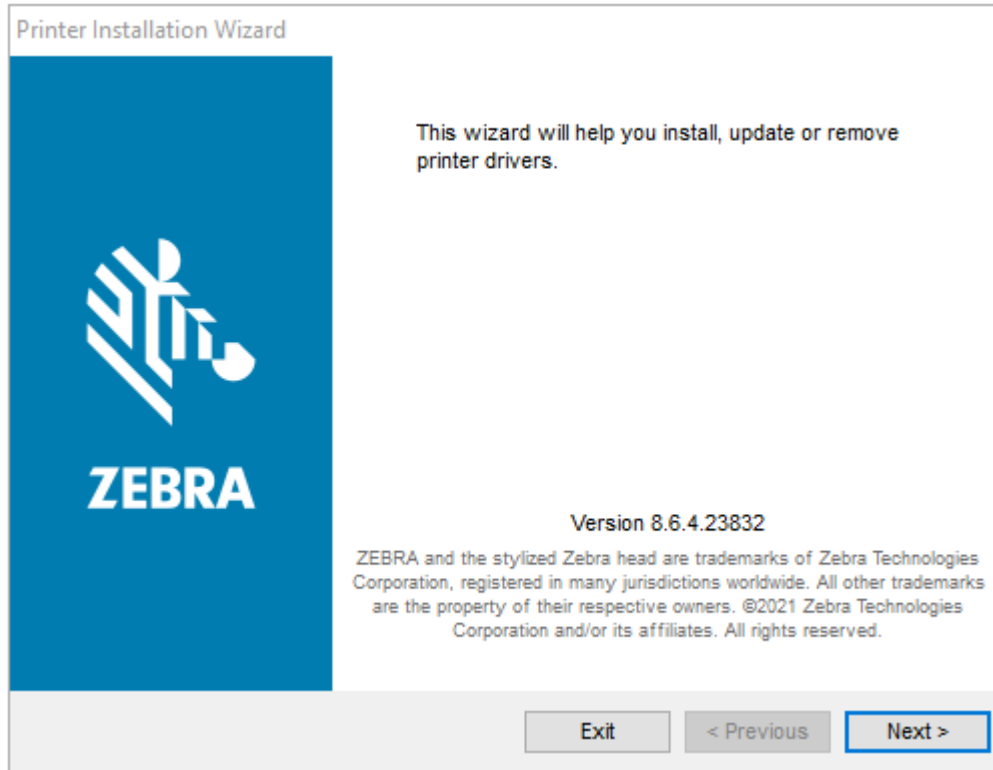
The **Printer Installation Wizard** installs the drivers.



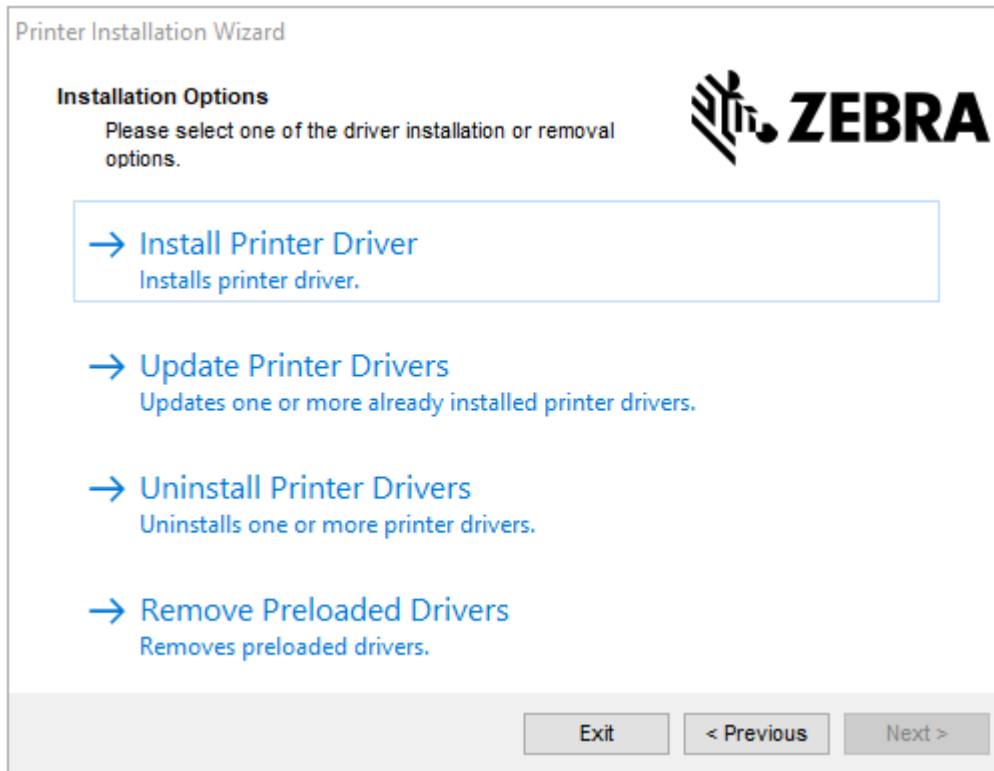
## Running the Printer Installation Wizard

1. On the last screen of the driver installer, leave **Run the Printer Installation Wizard** checked, and then click **Finish**.

The printer driver wizard displays.



2. Click **Next**.

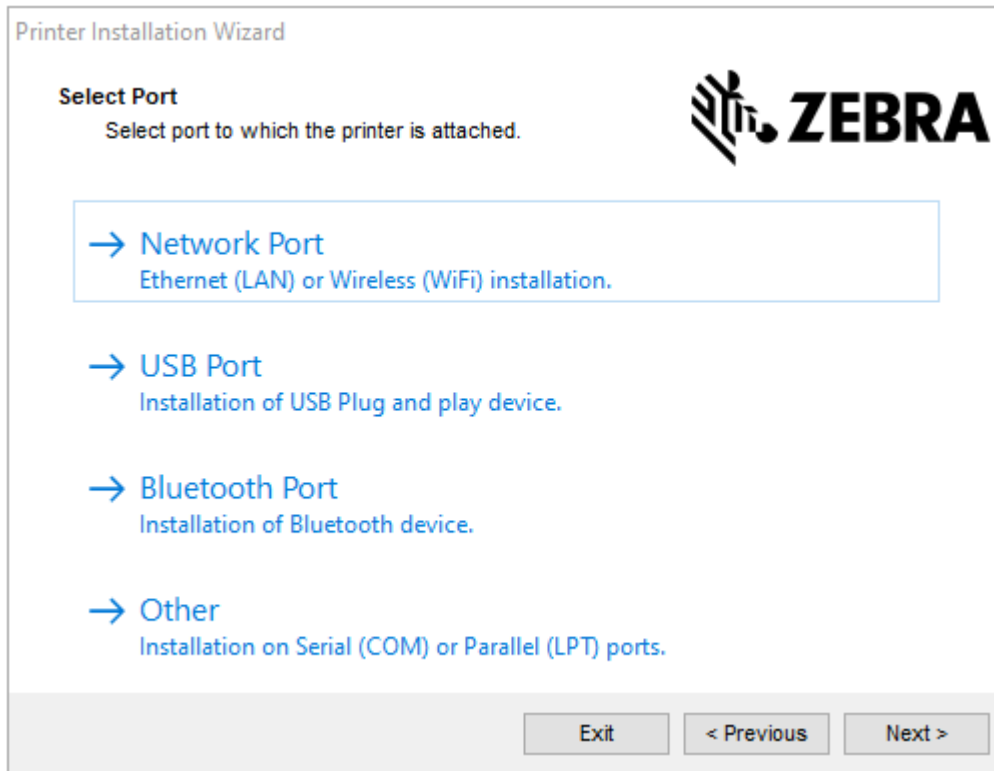


3. Click **Install Printer Driver**.

The license agreement displays.



4. Read and accept the terms of the license agreement, then click **Next**.



5. Select the communication option that you want to configure for your printer:

Connection type	When and how to use this option
Network Port	If you plan to use an Ethernet (LAN) or wireless (Wi-Fi) connection. Wait for the driver to scan your local network for devices and follow the prompts.
USB Port	If you will connect through a USB cable. Connect the cable to the printer and to the computer. If the printer is already connected and powered on, you may need to remove the USB cable and install it again. The driver will automatically search for the model of the connected printer.
Bluetooth Port	If you will be using a Bluetooth connection.
Other	You will use another type of cable such as Parallel (LPT) and Serial (COM). No additional configuration is necessary.

6. If prompted, select your printer model and resolution.  
This information is listed on the printer configuration label. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.
7. Follow the Installation Wizard prompts to complete the installation.

### Plug-n-Play (PnP) Printer Detection and Windows Operating Systems

Depending on the hardware configuration and the Windows version, your printer may be Plug-and-Play (PnP) detected when connecting to the USB, parallel, or serial port interfaces.

Recent Windows operating systems automatically detect the printer when it is connected through the USB interface.



**NOTE:** At this time, the printer drivers do not support serial port PnP installation.

For PnP operations, the printer's PC interface configuration for the parallel port must support bidirectional communications and be connected.

When connecting the printer for the first time to the PC, the operating system will automatically initiate an Add New Hardware wizard. If you have pre-loaded the driver suite using Zebra Setup Utilities, the printer driver will automatically install.

Access your Windows printer directory, then right-click the printer name and select **Properties**. Click the **Print test page** button to verify a successful installation.

The Windows operating system detects and re-links a previously-installed printer under the following conditions:

- The printer it is reconnected to the USB interface, or
- If printer power is turned on when the PC has finished rebooting the Windows OS.



**IMPORTANT:** Wait to apply power to the printer until after you have installed the printer drivers on your Windows PC. See [Running the Printer Installation Wizard](#) on page 28.

Ignore any New Device Detected warnings and close the taskbar prompts. Wait several seconds for the Windows OS to match the printer to the driver software. The warnings will disappear, and the printer should now be ready to begin printing.

### Ethernet

This printer option has a variety of methods and utilities to assist with printer connection and configuration of networked Zebra printers on a LAN (local area network) or WAN (wide area network).

Zebra Setup Utility configuration wizards allow you to connect to a printer on a shared network of Windows-based systems using the printer's IP address.

The printer's internal web pages provide easy access to printer and network configuration. You can access these pages via the printer's IP address using any web browser.

The free version of ZebraNet Bridge software allows you to centrally deploy, manage, and monitor your Zebra printers with automatic Zebra printer discovery of up to three printers from a single PC screen anywhere on your global network. ZebraNet Bridge Enterprise is available for purchase to manage larger numbers of Zebra printers.



**IMPORTANT:** Wait to apply power to the printer until after you have installed the drivers on the PC. See [Running the Printer Installation Wizard](#) on page 28.



### Serial Port and Windows Operating Systems

Windows OS default settings for serial port communication closely match the printer's default settings with one exception (data flow control). It must be changed.

The Windows default data flow control setting is `NONE`. Your printer requires Data Flow Control set to `Hardware`.



**NOTE:** Your printer does not support Windows Serial Port Plug-and-Play (PnP) device detection at this time.

### Interface Cable Requirements

Data cables must be of fully-shielded construction and fitted with metal or metalized connector shells.



**IMPORTANT:** 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 or 6 ft. recommended).
- Do not tightly bundle the data cables with power cords.
- Do not tie the data cables to power wire conduits.



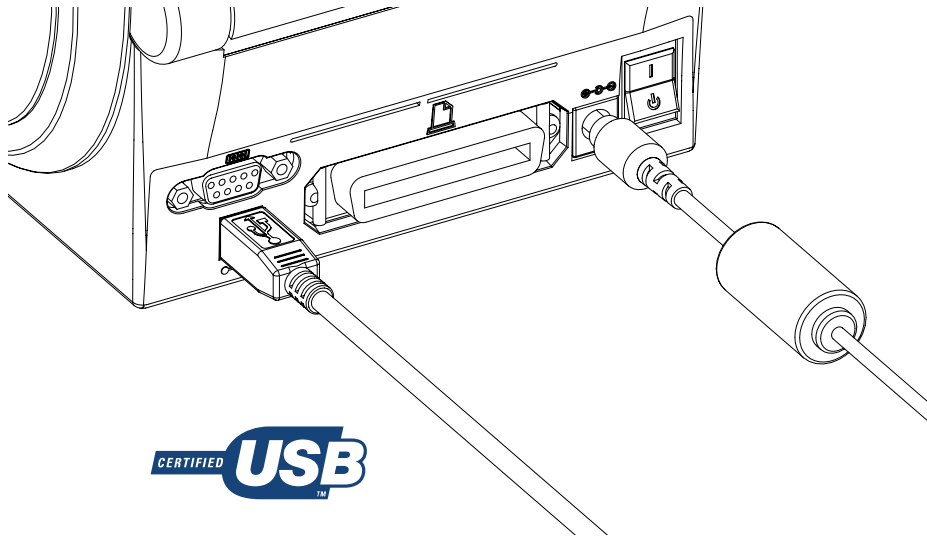
**IMPORTANT:** This printer complies with FCC Rules and Regulations, Part 15, for Class B Equipment, using fully-shielded data cables. Use of un-shielded cables may increase radiated emissions above the Class B limits.

### USB Interface Requirements

Universal Serial Bus (version 2.0 compliant) provides a fast interface that is compatible with your existing PC hardware.

The plug-and-play (PnP) design of USBs makes installation easy. Multiple printers can share a single USB port/hub.

When using a USB cable (not supplied with your printer), verify that the cable or cable packaging bears the Certified USB™ mark (see below) to guarantee USB 2.0 compliance.



**IMPORTANT:** Wait to turn printer power ON until after you have installed the drivers on the PC, when the Installation Wizard instructs you to do so.

## Serial Communications

The printer automatically detects and switches the serial port to match common serial port cabling and signal connection configurations for DTE and DCE communications.

You will need a signal interface cable with a nine-pin D type (DB-9P) male connector on one end that is capable of plugging into the mating (DB-9S) serial port on the back of the printer. The other end of the cable connects to a serial port on the host computer. This allows for the use of two common cable types and drop-in replacement for Zebra and other printer models.

Zebra printers use a Null Modem (crossover) cable. Early models of Zebra printers (DCE devices) which support EPL programming used a straight-through (no crossover) signal connections cable. For pinout information, see [Interface Wiring](#) on page 96.

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

The host (typically a Windows PC) must have the data Flow Control modified to match the printer's default communication method (Hardware); in legacy printers, it is noted by the Host Handshake setting DTR/Xon/Xoff. This combined hardware (DTR) and software (Xon/Xoff) mode may require changes based on any non-Zebra application software and the serial cable variation being used.

Serial communications between the printer and the host computer can be set using one of these methods:

- Autobaud synchronization. See [Autobaud](#) on page 35.
- Programming using the [ZPL ^SC Command](#) on page 35.
- Programming using the [EPL Y Command](#) on page 35.
- [Resetting the Default Serial Port Parameters](#) on page 35.

### Autobaud

Autobaud synchronization allows the printer to automatically match the communication parameters of the host computer.

Use these steps to perform autobaud synchronization:

1. Press and hold **FEED** until the green status indicator flashes once, twice, and then three times.
2. While the status indicator flashes, send the `^XA^XZ` command sequence to the printer.
3. When the printer and host are synchronized, the status indicator lights solid green.



**NOTE:** No labels will print during autobaud synchronization.

### ZPL ^SC Command

Use the Set Communications (^SC) command to change the communications settings on the printer.

1. With the host computer set at the same communications settings as the printer, send the ^SC command to change the printer to the desired settings.
2. Change the host computer settings to match the new printer settings.

Refer to the ZPL Programming Guide for more information about this command.

### EPL Y Command

Use the serial port setup (Y) command to change the communications settings on the printer.

1. With the host computer set at the same communications settings as the printer, send the Y command to change the printer to the desired settings.



**NOTE:** The Y command does not support setting data Flow Control. Use the `Xon/Xoff` setting instead.

2. Change the host computer settings to match the new printer settings.

Refer to the EPL Page Mode Programming Guide for more information about this command.

### Resetting the Default Serial Port Parameters

Do the following to reset the communications parameters on the printer to the factory defaults (serial communication settings are: 9600 baud, 8-bit word length, NO parity, 1 stop bit, and DTR/XON/XOFF data flow control).

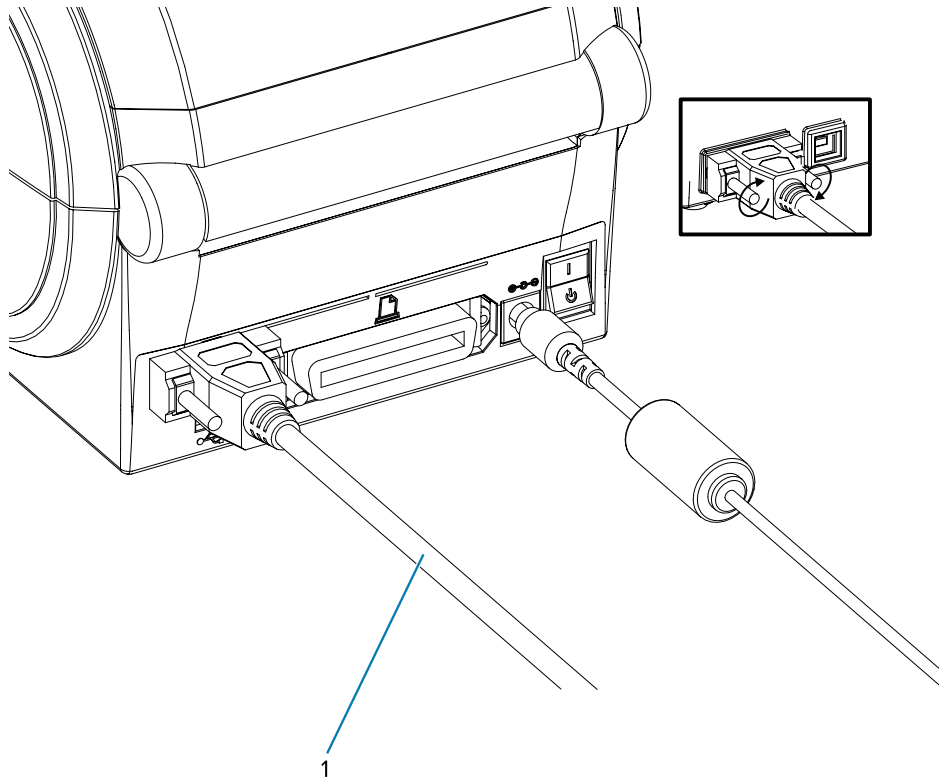
1. Press and hold **FEED** until the green status LED flashes once, after a moment flashes twice, and then waits again before flashing three times. Release immediately.
2. While the status indicators rapidly flashes amber and green, press **FEED**.



**NOTE:** Serial communications between the printer and the host computer can be set by the ZPL ^SC command or the EPL Y command.

Early models of Zebra printers running the EPL programming language had 9600 baud, NO parity, 8 data bits, 1 stop bit, and a hardware and software (merged) data control (essentially

DTR/Xon/Xoff) as the default serial port settings. The Windows operating system Flow Control setting was Hardware for most applications.

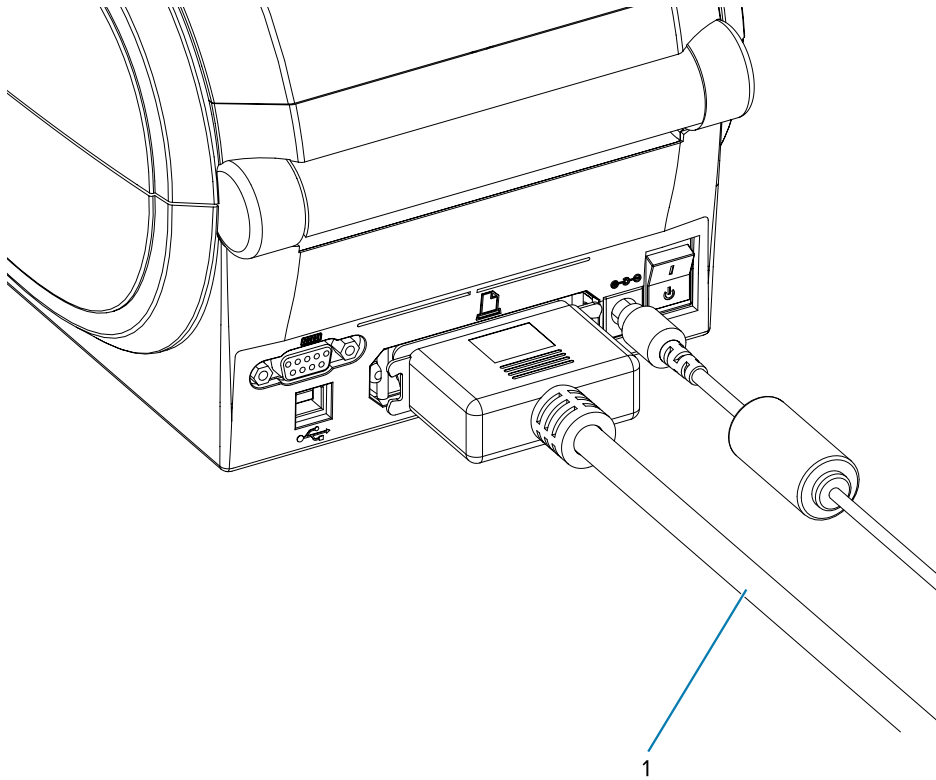


- |   |   |
|---|---|
| 1 | Serial cable (tighten the screws after plugging in the cable) |
|---|---|

### Parallel Port

The required cable must have a 25-pin D-type (DB-25P) male connector on one end and a Centronics on the end (IEEE 1284 A-B parallel interface specification).

Early models of the G-Series printers originally supported parallel cables with two 25-pin D-type (DB-25P) male connectors on both ends (IEEE 1284 A-A parallel interface specification).

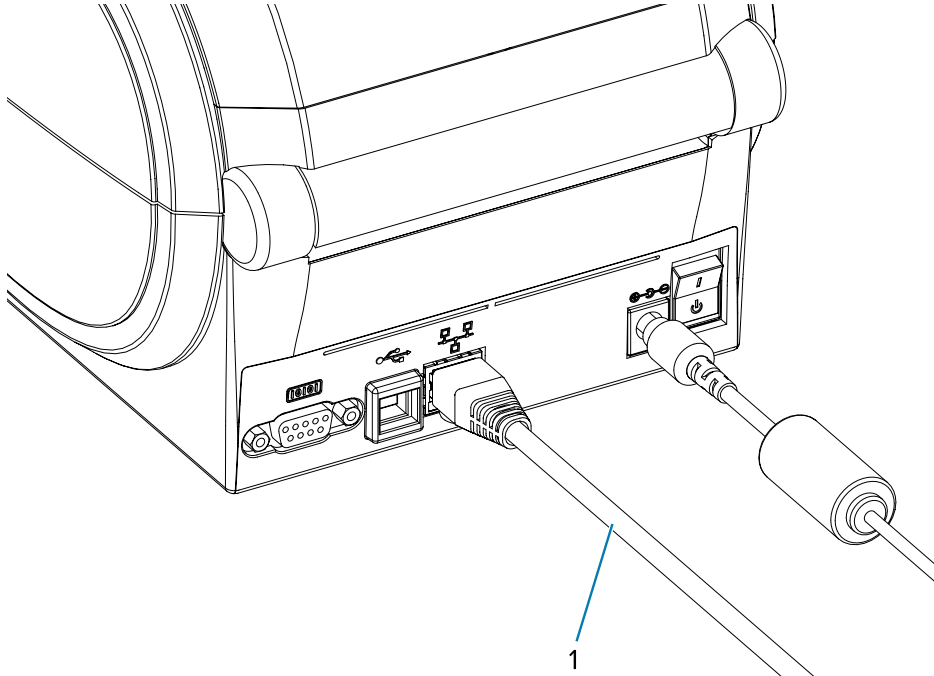


1	Parallel Cable
---	----------------

### **Ethernet Cable**

The printer requires a UTP RJ45 Ethernet cable rated CAT-5 or better.

For more information on configuring your printer to run on a compatible Ethernet-based network, see the ZebraNet 10/100 Internal Print Server manual. The printer must be configured to run on your LAN (local area network) or WAN (wide area network).



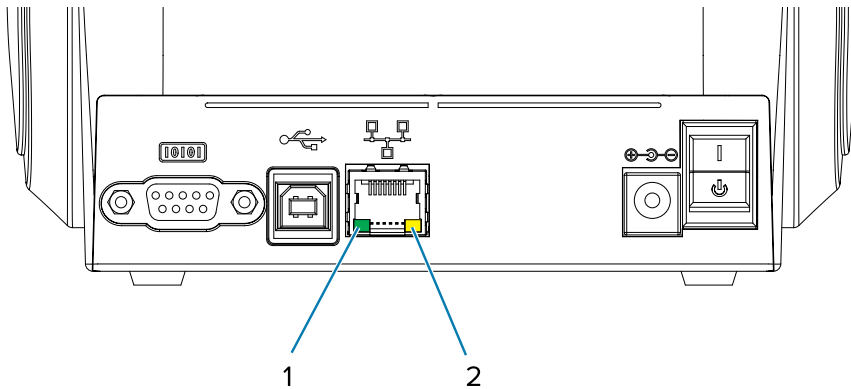
1	Ethernet Cable (RJ45 Connector)
---	---------------------------------

### Ethernet Status/Activity Indicators

The indicators on the connector indicate the status and activity.

**Table 1** Ethernet Status/Activity Indicators

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



1	Green LED
---	-----------

2	Amber LED
---	-----------

## After Your Printer is Connected

Now that you have basic communication with your printer, you may want to 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, the Zebra Setup Utility or the Windows **Printers and Faxes** Control Panel 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 using Zebra Setup Utilities

After installing the printer drivers on your Windows PC and successfully connecting your printer to the computer using the Installation Wizard, try a test print to make sure the printer is connected.

Use these steps to print a configuration a label using Zebra Setup Utilities (ZSU):

1. Open the Zebra Setup Utilities.
2. Click on the newly-installed printer's icon to select the printer and activate the printer configuration buttons located below it in the window.
3. Click **Open Printer Tools**.
4. In the **Print** tab window, click on the **Print configuration label** line, then click **Send**.

The printer should print a configuration status label. See [Diagnostics and Troubleshooting](#) on page 83 for tips on diagnosing and resolving print issues.

#### Test Printing with Windows Printer and Faxes Menu

Print a test label using the Windows Printers and Faxes menu.

1. Click on the Windows Start menu button, to access the **Printers and Faxes** menu or **Control Panel** to access the **Printers and Faxes** menu. Open the menu.
2. Select the newly install 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 on the **Print Test Page** button.

The printer should print a Windows test print page. See [Diagnostics and Troubleshooting](#) on page 83 for tips on diagnosing and resolving print issues.

#### Test Print on an Ethernet Printer

Test Print on an Ethernet printer connected to a network (LAN or WAN) 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 Status Label'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 press enter. For this test print file, it would be: `put TEST.ZPL`

The printer should print a new Print Configuration Status label. See [Diagnostics and Troubleshooting](#) on page 83 for tips on diagnosing and resolving print issues.

### Test Print with a Copied ZPL Command File

Test print with a copied ZPL command file for non-Windows operating systems.

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. Copy the file to the printer.

For DOS, a file sent to a printer connected to the system's parallel port would be as simple as:

```
COPY TEST.ZPL LPT1
```

Other interface connection types and operating systems will have different command strings. See your operating system documentation for detailed instructions on how to copy to the appropriate printer interface for this test.

## What to Do If You Forget to Install Printer Drivers First

If you plug your Zebra printer into a power source before installing the drivers, the printer displays as an Unspecified device.

1. Follow the instructions in [Pre-install Windows Printer Drivers](#) on page 25 to download and install the drivers on your laptop.
2. From the **Windows** menu, open the **Control Panel**.
3. Click **Devices and Printers**.

In this example, the ZTC ZT320-203dpi ZPL is an incorrectly installed Zebra printer.

▼ Unspecified (1) -

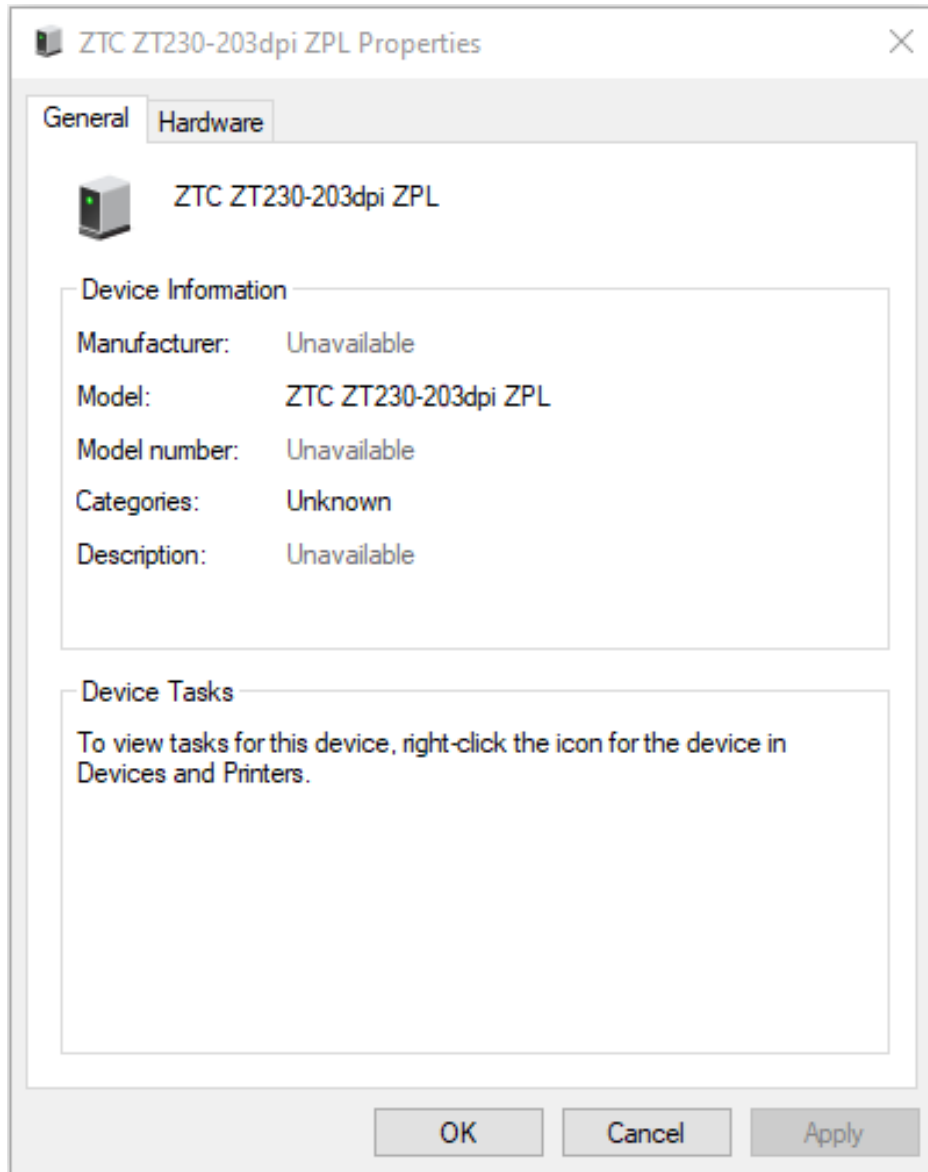


ZTC  
ZT320-203dpi  
ZPL

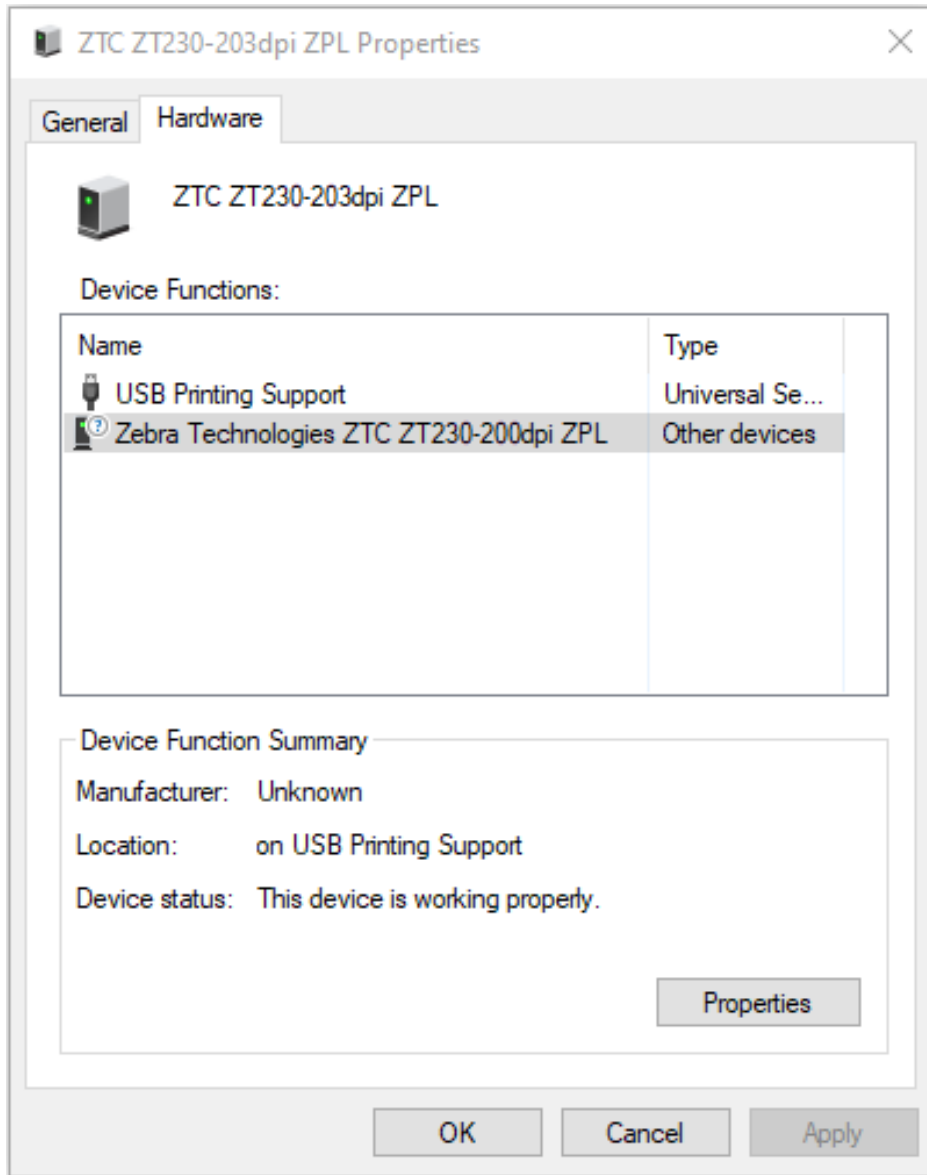


4. Right-click on the icon representing the device, then select **Properties**.

The properties for the device display.

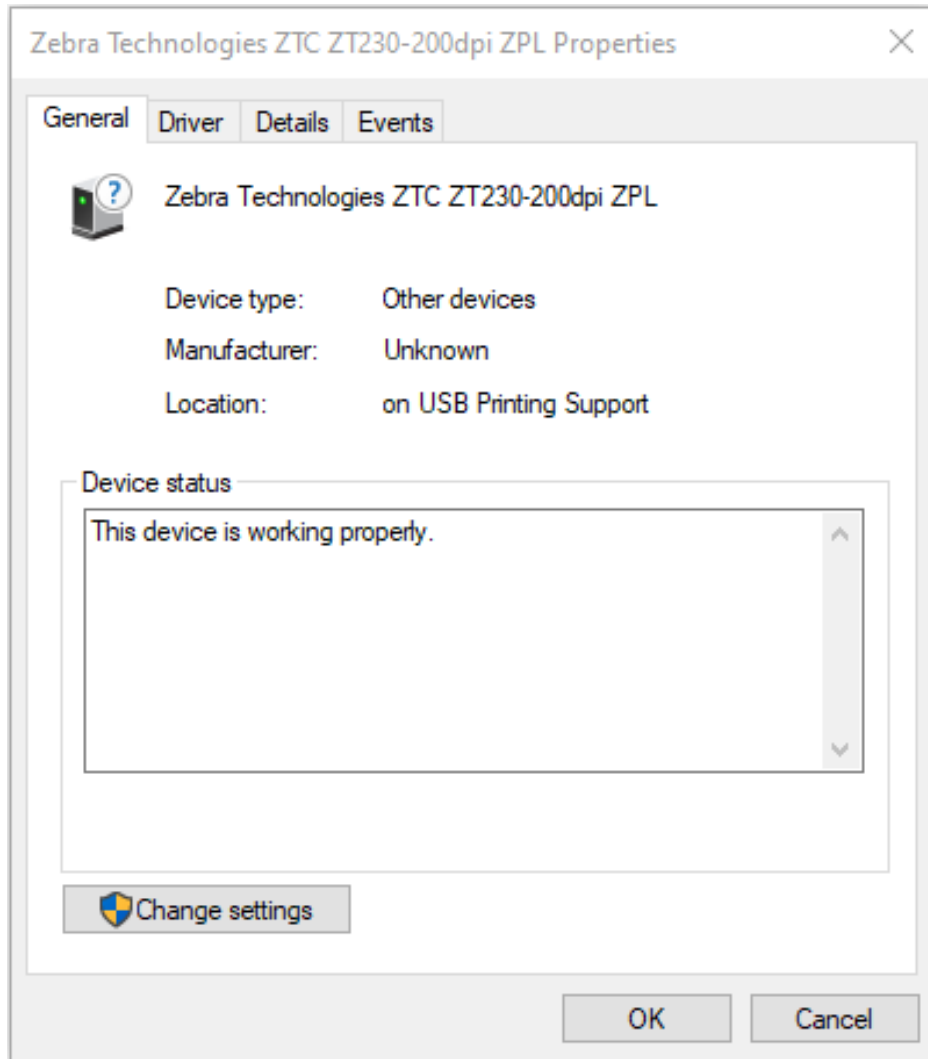


5. Click the **Hardware** tab.

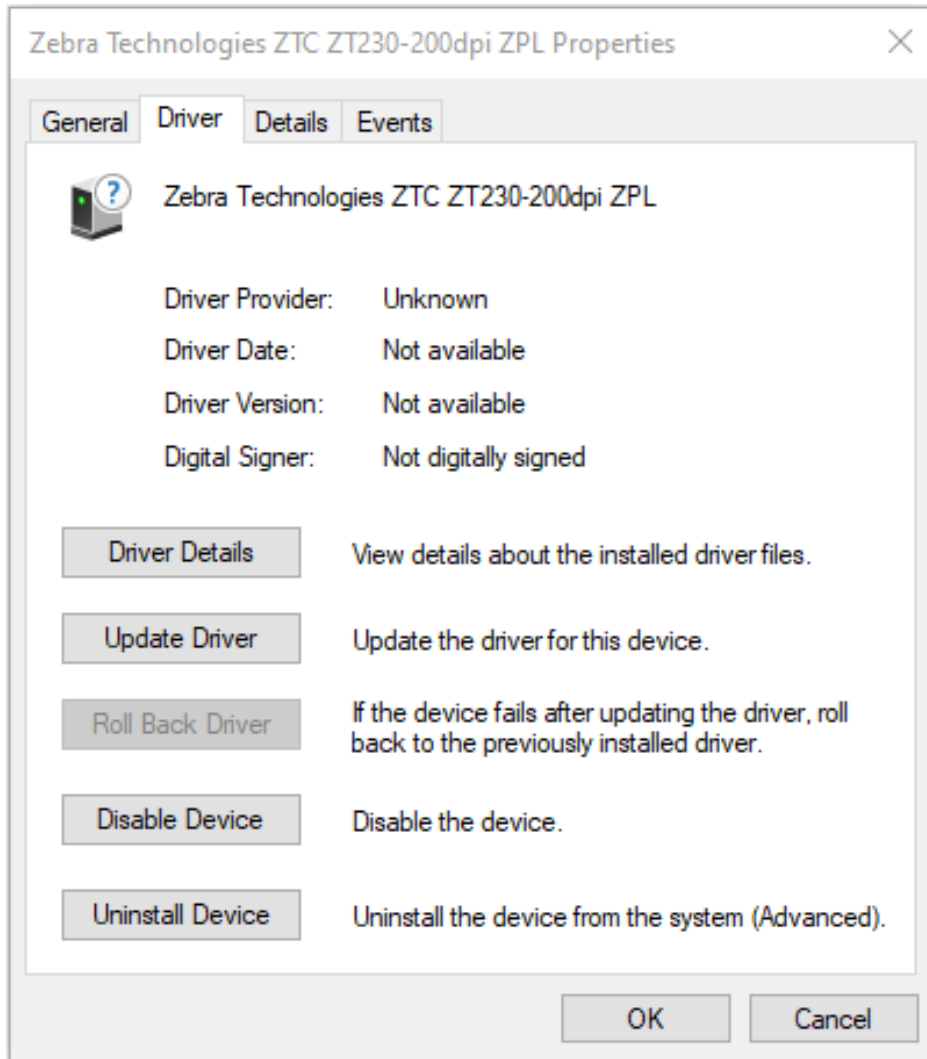


6. Select the printer in the **Device Functions** list, and then click **Properties**.

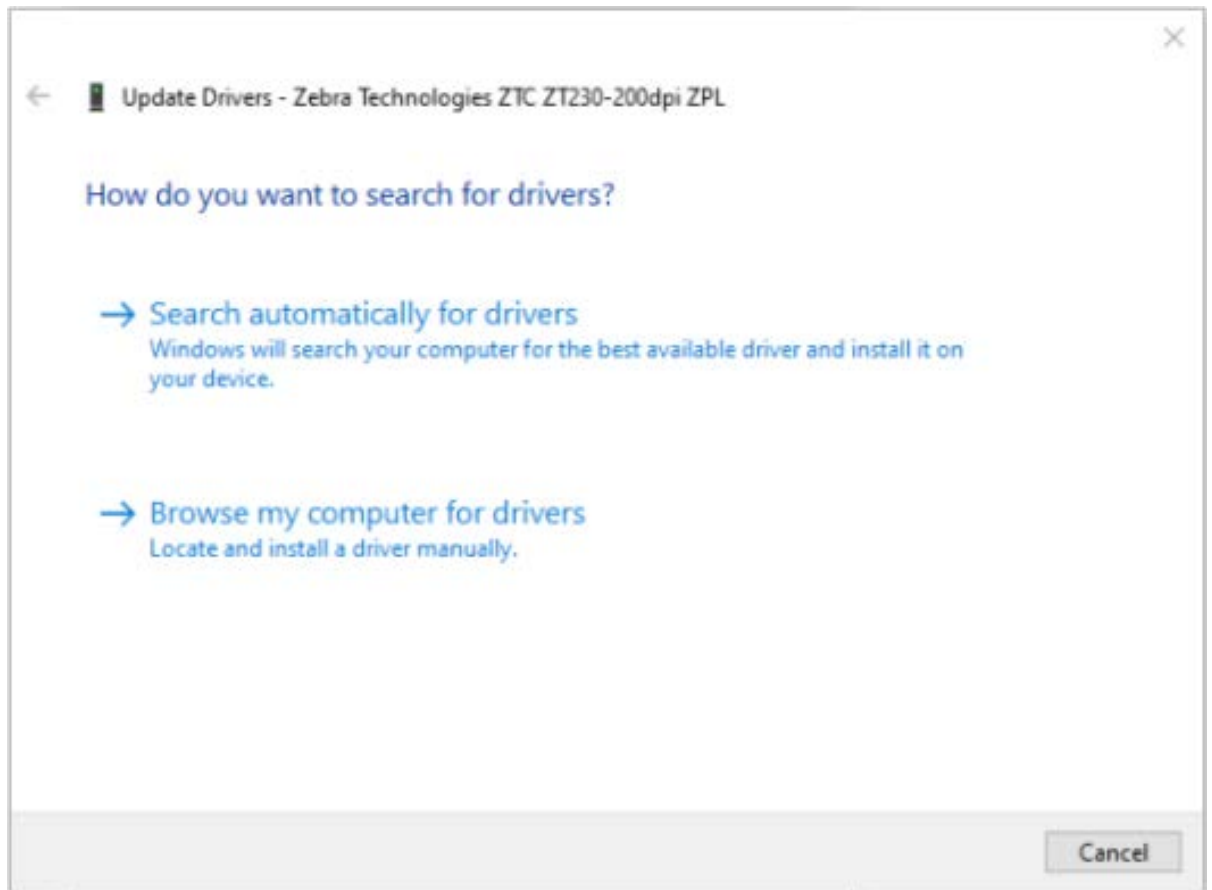
The properties display.



7. Click **Change settings** and then click the **Driver** tab.

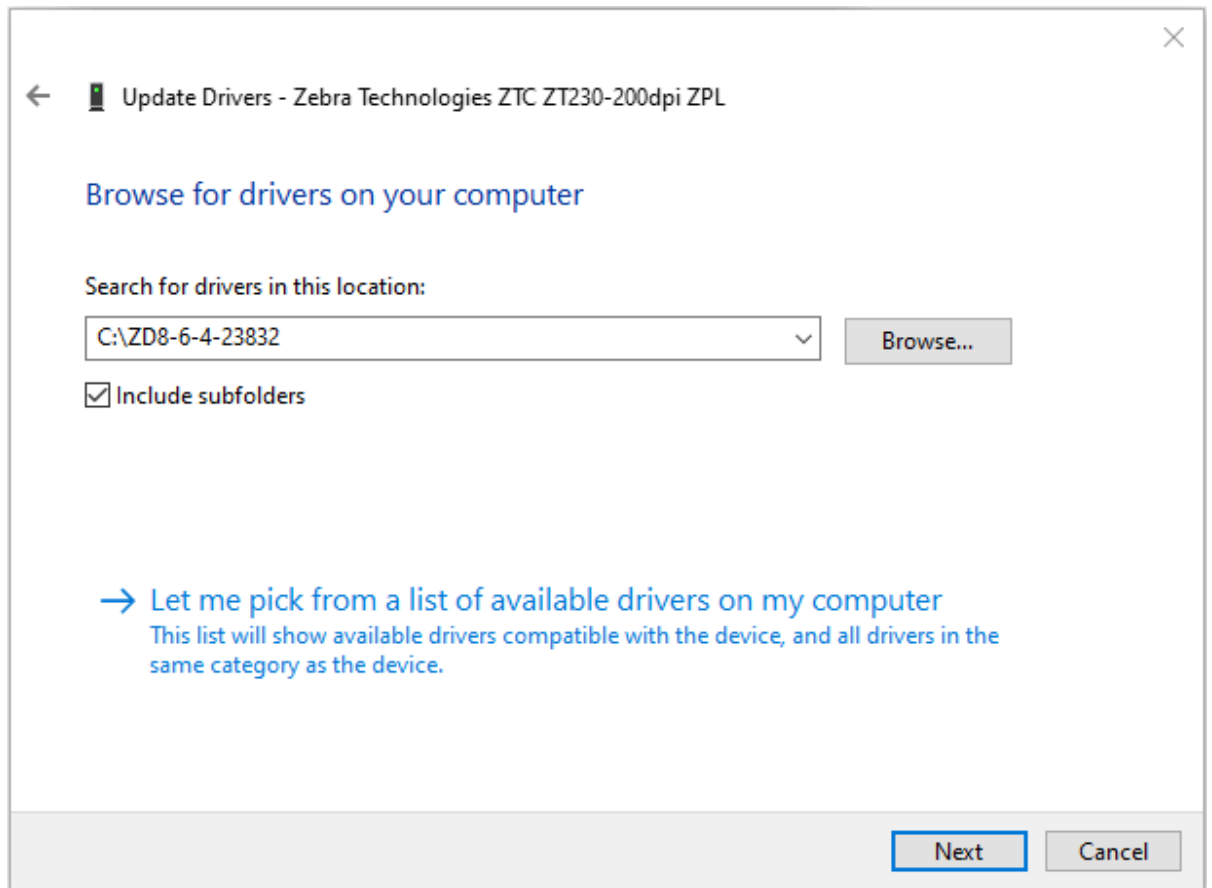


8. Click **Update Driver**.



9. Click **Browse my computer for driver software**.
10. Click **Browse...** and navigate to the **Downloads** folder.

11. Click **OK** to select the folder.



12. Click **Next**.

Your device is updated with the correct drivers.

# Print Operations

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

## Determining Printer Configuration

Your printer uses a ZPL printer configuration status label to report the printer's configuration status for both EPL and ZPL operations.

The ZPL style label provides a more intuitive and functionally descriptive naming convention than the EPL style printer status label. 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 status label. See [Printing a Test \(Printer Configuration\) Label](#) on page 22 to print this label. See [ZPL Printer Configuration Format](#) on page 103 for details on printer configuration and the ZPL commands that control the printer settings listed on the Printer Configuration Status Label.

To print an EPL style printer configuration status label, send the printer the EPL `U` command.

See the EPL Programming Guide for more information on the various EPL `U` commands and interpreting the settings displayed on these labels.



**NOTE:** You can localize the label in languages other than English. See [Localizing the Printer Configuration Label](#) on page 47.

## Localizing the Printer Configuration Label

The printer configuration label can be localized in one of 16 languages. Use the `^KD` ZPL programming command to modify the displayed language for most of the status items included in this label.

For information on printing the Printer Configuration label, see [Printing a Test \(Printer Configuration\) Label](#) or [FEED Button Modes](#) on page 92.

## Long-Term Printer Inactivity or Storage

Over time, the printhead may stick to the platen (drive) roller. To prevent this, always store the printer with a piece of media (a label or paper) between the printhead and the platen roller.



**CAUTION—PRODUCT DAMAGE:** To avoid damaging the printer, the media, or both, remove media rolls loaded in the printer (if any) before shipping the printer.

## Thermal Printing

It is important to follow certain precautions when using a thermal printer.



**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 or 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.

## Methods and Modes of Printing

You can use your printer in various modes and media configurations.

Mode	Description
Direct thermal printing	Uses heat-sensitive media to print on media that supports this print method. See <a href="#">Determining Thermal Media Types</a> on page 51.
Thermal transfer printing	Uses ribbon and heat transfer to print on thermal transfer media on media that supports this print method. See <a href="#">Determining Thermal Media Types</a> on page 51.
Standard tear-off mode	Allows you to tear off each label or to batch-print a strip of labels after the printer has printed.
Label dispense mode	If your printer has the optional label dispenser factory-installed and it is set to this mode, the dispenser peels away the backing material from the label as it is being printed before it prints the next label. See <a href="#">Label Dispenser Option</a> on page 63.
Standalone	The printer can print without being connected to a computer using the printer's auto-running label form feature (programming based) or by using a data input device connected to the printer's serial port. This mode accommodates data input devices, such as scanners, weigh scales, Zebra KDU (Keyboard Display Unit), or Zebra KDU Plus. See <a href="#">Zebra Keyboard Display Unit (KDU) Printer Accessory</a> on page 67.
Shared network printing	Printers configured with the Ethernet interface option include an internal print server with a ZebraLink printer configuration web page and ZebraNet Bridge software which enables you to manage and monitor the status of Zebra printers on a network. See <a href="#">ZebraNet 10/100 Internal (Wired) Print Server Option</a> on page 66.

## Print Media Types

Your printer can use various types of media.



**IMPORTANT:** Zebra strongly recommends that you use Zebra-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to work with your printer for optimal results and prevent premature printhead wear. To purchase supplies, go to [zebra.com/supplies](http://zebra.com/supplies).

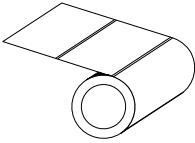
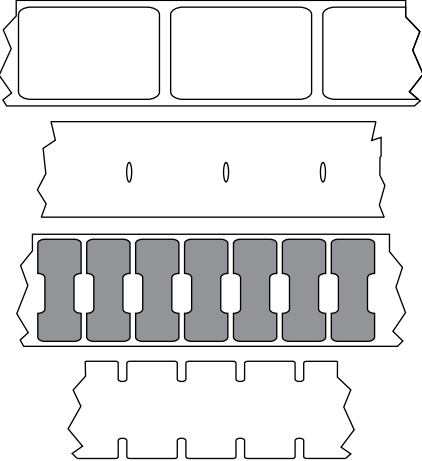
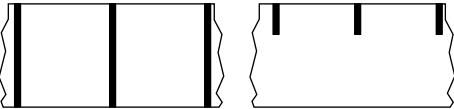
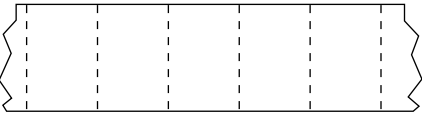
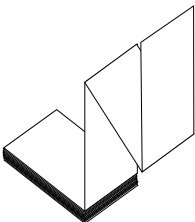


These types of media can be used with your printer:

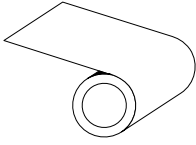
- Standard media—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- Continuous roll media—Most continuous roll media is direct thermal media (similar to fax paper) and is used for receipt or ticket style printing.
- 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.

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 2** Roll and Fanfold Media Types

Media Type	How It Looks	Description
<p>Non-continuous roll media</p>		<p>Roll media is wound on a core that can be 12.7 to 38.1 mm (0.5 to 1.5 in.) 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:</p> <ul style="list-style-type: none"> <li>Web media separates labels by gaps, holes, or notches.</li> </ul>  <ul style="list-style-type: none"> <li>Black mark media uses pre-printed black marks on the backside of the media to indicate label separations.</li> <li>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.</li> </ul>  <ul style="list-style-type: none"> <li>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.</li> </ul> 
<p>Non-continuous fanfold media</p>		<p>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.</p>

**Table 2** Roll and Fanfold Media Types (Continued)

Media Type	How It Looks	Description
Continuous roll media		Roll media is wound on a core that can be 12.7 to 38.1 mm (0.5 to 1.5 in.) 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.

## Determining Thermal Media Types

Thermal transfer media requires ribbons for printing while direct thermal media does not.

To determine if ribbon must be used with a particular media, [Performing a Media Scratch Test](#) on page 51.

Thermal transfer printers support the use of ribbon and thermal transfer media.

### Performing a Media Scratch Test

Use this method to perform the media scratch test and determine if a batch of media is suited for Direct Thermal or Thermal Transfer printing.

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 heat is applied. This test method uses friction heat to expose the media.
2. Did a black mark appear on the media?

If a black mark...	The media is...
Appears on the media	Direct thermal—No ribbon is required to print on this media. Direct thermal printers support this media.
Does not appear on the media	Thermal transfer—A ribbon is required to print on this media. Thermal transfer printers support this media.

## Replacing Printing Supplies

If the printer runs out of label or ribbon supplies while printing, leave printer power ON when reloading these supplies. Turning off the printer while printing results in the loss of the print job. After reloading supplies, press **FEED** to resume printing.



**CAUTION—PRODUCT DAMAGE:** Always use high-quality, approved labels and tags. If the adhesive-backed labels being used don't lay flat on the backing liner, its exposed edges may stick to the printer's internal label guides and rollers. This may cause the label to peel off from the liner and jam the printer.

Permanent damage to the printhead may result if a non-approved ribbon is used. Such ribbons may be wound incorrectly for your printer or contain chemicals that may corrode the printhead.

## Ribbon Overview and Use

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin. This wax or resin is transferred to the loaded media during thermal transfer printing.

The type of media you are using determines whether or not you need to ribbon to print. It also determines the width of ribbon you will need. Ribbon must be as wide as or wider than the media being used.



**CAUTION—PRODUCT DAMAGE:** If the ribbon used is not as wide as the media loaded, areas of the printhead that are NOT protected by ribbon may wear out prematurely and damage the printhead.

### When to Use Ribbon

Thermal transfer printers and thermal transfer media require ribbon for printing. Direct thermal printers and media do not require ribbon.

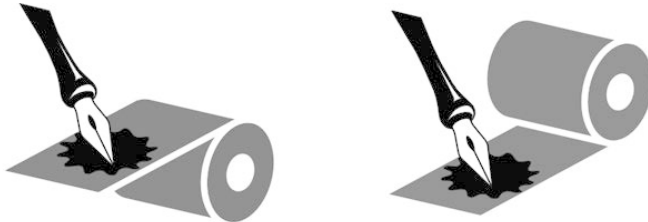


**IMPORTANT:** NEVER use direct thermal media with ribbon. This can distort bar codes and graphics.

To determine if ribbon must be used with a particular media, perform a media scratch test. See [Performing a Media Scratch Test](#) on page 51

### Coated Side of Ribbon

Ribbon supplies may be wound such that their coating is on the outside (shown on the left of this image) or on the inside (shown on the right).



**IMPORTANT:** This printer can use ONLY ribbon coated on the outside.

Perform either an adhesive test or a ribbon scratch test to find out which side of the ribbon is coated.

## Ribbon Test with Adhesive

If you have labels available, perform the adhesive test to determine which side of a ribbon is coated. This method works well for ribbon that is already installed.

To perform an adhesive test, complete these steps:

1. Peel a label from its liner.
2. Press a corner of the sticky side of the label to the outer surface of the roll of ribbon.
3. Peel the label off of the ribbon.
4. Observe the results. Did flakes or particles of ink from the ribbon adhere to the label?

If the ink from the ribbon...	The ribbon is...
Adhered to the label	Coated on the outside and can be used with this printer.

If the ink from the ribbon...	The ribbon is...
Did not adhere to the label	Coated on the inside and CANNOT be used with this printer.

## Ribbon Scratch Test

Perform the ribbon scratch test when labels are unavailable.

To perform a ribbon scratch test, complete these steps:

1. Unroll a short length of ribbon from the roll.
2. Place the unrolled section of ribbon on a piece of paper with the outer surface of the ribbon in contact with the paper.
3. Scratch the inner surface of the unrolled ribbon with your fingernail.
4. Lift the ribbon from the paper.
5. Observe the results. Did the ribbon leave a mark on the paper?

If the ribbon...	The ribbon is...
Left a mark on the paper	Coated on the outside and can be used with this printer.
Did not leave a mark on the paper	Coated on the inside and CANNOT be used with this printer.

## Replacing Transfer Ribbon

If ribbon runs out during a print job, the printer's indicator lights and stays red until you load fresh ribbon.



**NOTE:** Keep printer power ON when loading new ribbon or media. Turning printer power OFF in the middle of a print job will result in the job being lost.

1. Open the top cover
2. Cut the used ribbon to prepare to remove the cores.
3. Load an empty ribbon core and new ribbon roll. See [Loading Transfer Ribbon](#) on page 19.



**IMPORTANT:** Use ONLY ribbon cores that have intact notches. These notches should have square corners and should be in good condition. Ribbon cores with damaged notches may impact print output if used with your printer. For optimal results, purchase replacement ribbon cores from [zebra.com/supplies](http://zebra.com/supplies).

4. Close the top cover.
5. If the printer was in the middle of a print job when ribbon ran out, press **FEED** to resume the job.

## Replacing a Partially-Used Transfer Ribbon

You can remove transfer ribbon roll that is not fully used and resume printing with a new roll or another partially-used roll loaded.

1. Cut the ribbon from the take-up roll.
2. Remove the take-up roll and discard the used ribbon if you will not be saving it for later. If you will use it later, take the cut end to prevent it from unwrapping.

3. Remove the fresh ribbon roll and tape the leading end onto the empty-take-up roll to keep it from unwrapping. If reinstalling a partially-used ribbon roll, tape the cut end of the ribbon onto the empty take-up roll.
4. Close the printer cover.
5. If the printer was in the middle of a print job when ribbon ran out, press **FEED** to resume printing.

## Adjusting the Print Width

Print width must be set when you:

- Are using the printer for the first time.
- Plan to use a wider or a narrower roll of media than the one you used previously.

Set and adjust print width using one of these methods:

- The Windows printer driver or application software such as ZebraDesigner.
- The five-flash **FEED** button sequence in [FEED Button Modes](#) on page 92.
- Controlling printer operations with ZPL programming. Refer to the Print Width (^PW) ZPL command in the ZPL Programming Guide.
- Controlling printer operations with EPL Page Mode programming. Refer to the Set Label Width (g) command in the EPL Programming Guide.

## Adjusting the Print Quality

Three factors influence print quality: the printhead's heat (density) setting, the print speed setting for your printer, and the media in use. Experiment with these to find the optimal combination of settings for your print jobs.



**NOTE:** Media manufacturers may have specific recommendations for speed settings for your printer and the media. Some media types have lower maximum speeds than your printer's maximum speed.

Print quality can be set using the **Configure Print Quality** routine in Zebra Setup Utilities.

The relative darkness (or density) setting can be controlled using:

- The six-flash sequence in [FEED Button Modes](#) on page 92. This will overwrite any ZPL and EPL programmed darkness/density settings.
- The Set Darkness (~SD) ZPL command. See the ZPL Programming Guide.
- The Density (D) EPL command. See the EPL Programming Guide.

If you find that the print speed needs to be adjusted, use:

- The Windows printer driver or application software such as ZebraDesigner.
- The Print Rate (^PR) command. See your ZPL Programming Guide.
- The Speed Select (S) command. See your EPL Programming Guide.

## Media Sensing

Your printer supports automatic media sensing. It continuously checks and adjusts for the length of the loaded media, sensing for minor variations.

Here is some useful information on media sensing:

- When the printer is printing or feeding media, it looks for small, naturally-occurring variations in length, either from label to label on a roll or from roll to roll of loaded media.
- At the start of a print job or a media-feed action, if the printer senses that the expected media length or inter-label gap falls outside the acceptable range of variations, it auto-initiates a media-length calibration.
- Automatic media sensing methods are the same for EPL and ZPL label formats and programming.
- When feeding the media, if the printer does not detect label gaps or black marks (or notches with blackline sensing) for the default maximum label length distance of 1 meter (39 in.), it switches to continuous media mode (typically used for receipts).



**NOTE:** The printer retains these settings until you change them using software such as ZebraDesigner, using ZPL or EPL programming, or with manual calibration which is recommended if you have loaded media of a different batch, size, or date than that of the prior roll.

- You can reduce the automatic media type maximum-sensing distance using the `^ML` ZPL Maximum Label Length command.



**NOTE:** Set this distance to NO LESS THAN two times the longest label being printed. If the longest label being printed is 4 in. wide by 6 in. long, you can reduce this distance from the default 39 in. to 12 in. (2 x 6 in.).

- You can set the printer to run a short media calibration either after printer power-up or when the printer cover is closed with printer power ON. With this setting, the printer feeds several labels while calibrating.
- Use the printer configuration label to check and verify your printer's media settings. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.
- If the printer has difficulty auto-detecting the media type and auto-calibrating, run a longer calibration using [Manual Calibration](#) on page 87. During manual calibration, your printer prints a graph of sensor operation specific to the media that is loaded. This method disables the printer's automatic media sensing until its default parameters are reset to their factory defaults using the four-flash **FEED** button mode. See [FEED Button Modes](#) on page 92.
- You can turn automatic media calibration on or off and modify it as needed.
  - Some print jobs may need to use entire media rolls. To accommodate these scenarios, you can modify two conditions (power up with media loaded and closing the printer with power on)

individually using the `^MF` ZPL Media Feed command. This command is used primarily when what you need is automatic media sensing and calibration.

- For automatic media calibration in the context of dynamic media calibration (label to label), refer to the `^XS` command in the ZPL Programming Guide.



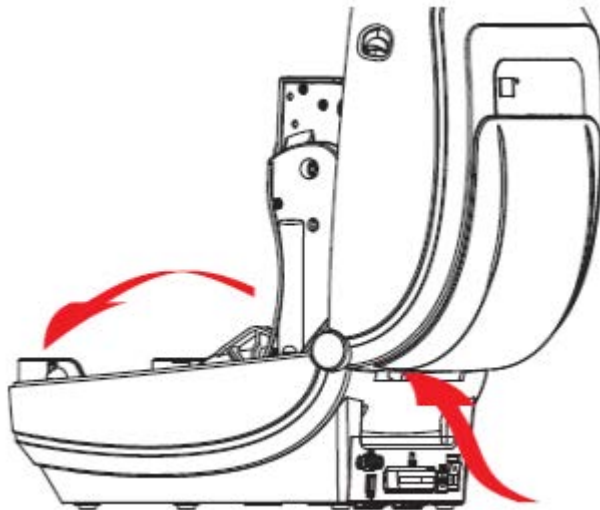
**NOTE:** Do NOT change these settings if multiple media types of different lengths, material or detection methods (web/gap, black mark, notches or continuous) are in use.

- You can refine the automatic media calibration and detection process to match the media type loaded into the printer. Use the `^MN` ZPL Media Tracking command to set the media type.
- At times, the printer may auto-sense preprinted media as gaps between labels. It may also interpret any print that is on the media liner backing as black marks.
- If you have set the `^MN` ZPL Programming parameter for continuous media, the printer does not perform auto-calibration. The `^MN` command supports the `^MNA` automatic calibration parameter. Use this parameter to return the printer to its defaults if you want it to resume auto-detection and sensing of all media types.

## Printing on Fanfold Media

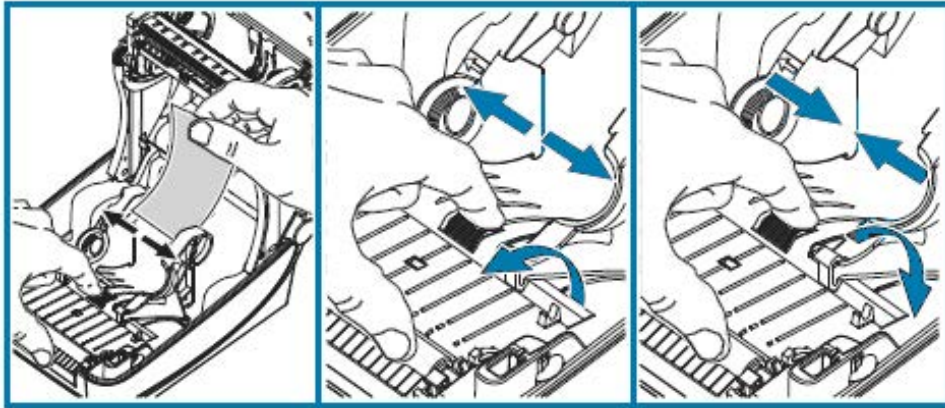
Printing on fanfold media requires you to adjust the media guide's stop position.

1. Open the top cover.

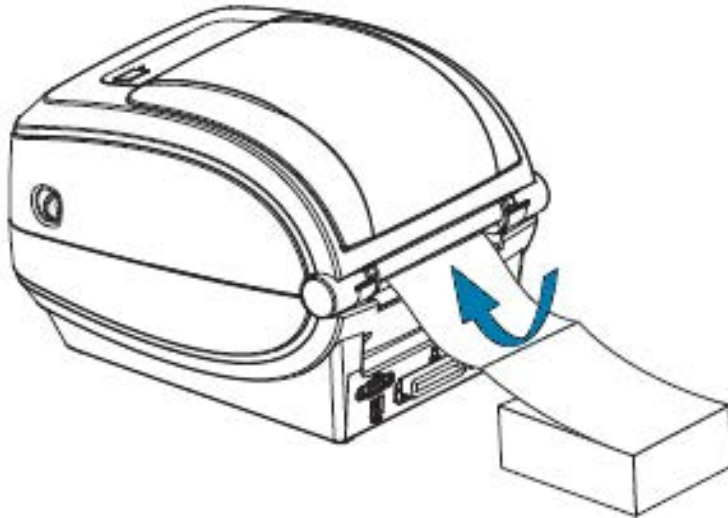




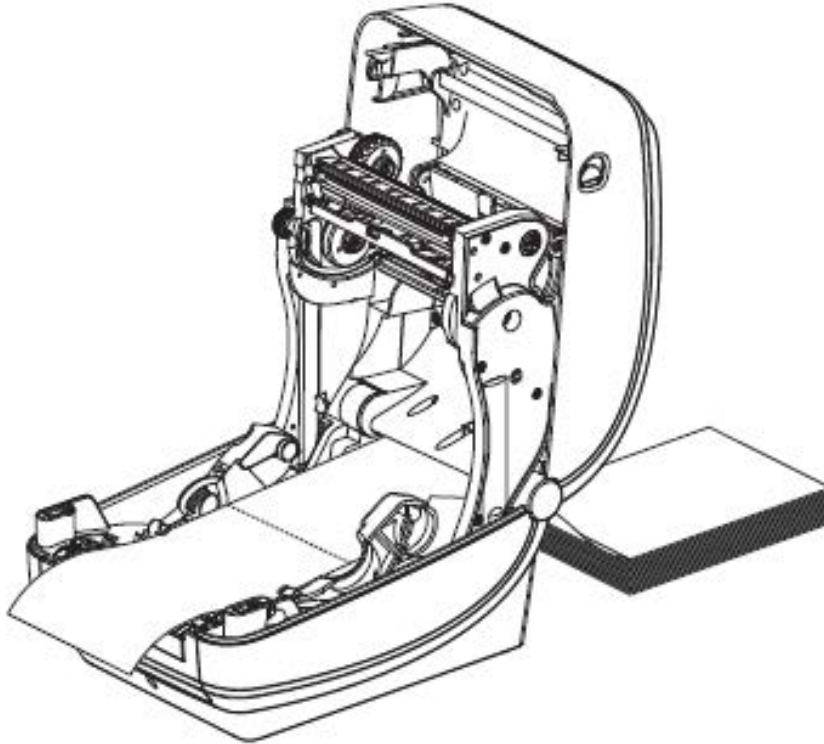
2. Adjust the media guide stop position with the green thumb wheel for the width of the media loaded. Use a piece of the fanfold media to set the stop position. To open the guides wider, rotate the wheel toward you. To narrow the gap between the guides, rotate the wheel away from you.



3. Insert the media through the slot at the rear of the printer.



4. Run the media between the media guide and roll holders.



5. Close the top cover.

After printing or feeding several labels: If the media does not track down the center (moves from side to side) or the sides of the media (liner, tag, paper, etc.) are frayed or damaged when exiting the printer, the media guides may need further adjustment.

If this does not correct the problem, the media can be routed over the two roll-holding pins on the media guide. An empty roll core of the same width as the stack of the fanfold media can be placed between the roll holders to provide additional support for thin media.

## Printing with Externally-Mounted Roll Media

Your printer accommodates externally-mounted roll media.

The printer requires the media roll-and-stand combination to make for low initial inertia as it pulls the media off the roll. To provide improved media handling and printing speed, your printer's motor has 30% more torque than the Zebra 2800 Series desktop printers.

Zebra at this time does not offer an external media option for your printer.

## Externally-Mounted Roll Media Considerations

Ensure that externally mounted roll media is properly configured.

- The media should ideally enter the printer through the fanfold media slot in the rear of the printer.

- Lower the print speed to decrease the chance of motor stalls. A loaded media roll typically has the highest inertia when the printer gets it moving. Larger media roll diameters require the printer to apply more torque to get the roll moving.
- When mounted on your media stand, the media should move smoothly and freely. It should not slip, skip, jerk, bind before moving or as it moves.
- The printer should NOT touch the media roll.
- The printer should NOT slip or lift up off the operating surface.

## Fonts and Your Printer

Your printer supports language and font requirements with a variety of internal fonts, on-board font scaling, international font sets, and character code page support, Unicode support, and font download.

Your printer's font capabilities are programming-language dependent.

- The EPL programming language provides basic bitmapped fonts and international code pages.
- 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.
- ZPL and EPL programming guides describe and document the fonts, code pages, character access, listing fonts, and limitations for their respective printer programming languages.

See the the ZPL Programming Guide and the EPL Programming Guide for information on text, fonts, and character support. These guides are available from [zebra.com/support](http://zebra.com/support).

Printer utilities and application software made available for your printer support font downloads to your printer for both ZPL and EPL printer programming languages.



**IMPORTANT:** Some ZPL fonts factory-installed in your printer cannot be copied, cloned, or restored to your printer by reloading or updating firmware. If these license-restricted ZPL fonts are removed by 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.

## Localizing the Printer with Code Pages

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

- For ZPL code page support, including Unicode, see the ^CI command in the ZPL Programming Guide.
- For EPL code page support, see the I command in the EPL Programming guide.

## Identifying Fonts in Your Printer

Fonts and programming languages share the available memory locations in your printer.

Fonts can be loaded in many memory areas.

ZPL programming can recognize EPL and ZPL fonts. EPL programming can only recognize EPL fonts. See the ZPL and ELP Programming Guides for more information on fonts and printer memory. These guides are available from [zebra.com/support](http://zebra.com/support).

## ZPL Fonts

To manage and download fonts for ZPL print operation, use the Zebra Setup Utilities or ZebraNet Bridge.

To display all of the fonts loaded in your printer, send the printer the `^WD ZPL` command to the printer. For details, see the ZPL Programming Guide.

- 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.



**NOTE:** EPL does not support these fonts.

## EPL Fonts

To download fonts for EPL print operations, use the Zebra Setup Utilities or ZebraNet Bridge.

To display soft fonts (ext.) available to EPL, send the `EI EPL` command to the printer.

- Optional Asian Fonts in your printer are displayed as soft fonts, but they are still accessible as documented in the `A` command in the EPL Programming Guide.
- All EPL fonts displayed are bitmap fonts. They do NOT include the `.FNT` file extension or the horizontal (H) or vertical (V) designators that are displayed with the `^WD ZPL` command (see [ZPL Fonts](#) on page 60).

To remove non-Asian EPL fonts with EPL programming, use the `EK EPL` command.

To remove EPL Asian fonts from the printer, use the `^ID ZPL` command.

## Standalone Printing

Your printer can be configured to work without being attached to a computer.

The printer has the ability to automatically run a single label form. You can access one or more downloaded label forms and run them using a terminal or wedge device or a Zebra Keyboard Display Unit (KDU) to call a label form. These methods allow you to use data input devices such as scanners or weight scales to the printer via the serial port.

Label formats can be developed and stored in the printer to support labels for which:

- No data entry required. The printer will print when **FEED** is pressed.
- No data entry required. The printer will print when a label is removed from the printer's optional label dispenser.
- One or more data variables is entered via the terminal or wedge device. The label will print after the last variable data field has been input.
- One or more label formats are called by scanning barcodes containing programming to run a label form.
- Label forms are designed to work as a process chain, with each label including a bar code containing the programming to run the next label in the process sequence.

Both ZPL and EPL printer programming languages support special label forms that will automatically run after a power cycle or reset. ZPL looks for a file named `AUTOEXEC.ZPL`. EPL looks for a label form named `AUTOFR` runs until it is disabled. If both files are loaded in your printer, only `AUTOEXEC.ZPL` will run.

To remove the files, you must delete both files from the printer and then reset or a power cycle the printer.



**NOTE:** For this printer model, the `AUTOFR` EPL command can be disabled only with a `NULL` character (00 hex or ASCII 0). This printer will ignore the the `XOFF` character (13 hex or ASCII 19) that normally disables the `AUTOFFR` form operation in most other EPL printers.

Your printer can source up to 750mA through the serial port's 5-volt line. See [Interface Wiring](#) on page 96 for more information on the printer's serial port interface.

## Sending Files to the Printer

You can send graphics, fonts and programming files to the printer from a computer running Microsoft Windows. Use Zebra Setup Utilities (and driver), ZebraNet Bridge, or Zebra ZDownloader. These utilities are available from [zebra.com/support](http://zebra.com/support).

ese methods are common for both ZPL and EPL programming languages.

## Print Meter

Your printer can report printhead maintenance alerts.

It can be set up to alert you of the need for cleaning or provide early warnings of the need to replace printheads when they approach their calculated working life span. If Real-Time Clock (RTC) is installed in the printer, printhead reporting will also include the date. These print metering alerts are disabled by default.

Many print meter messages and reports are customizable. For information on the print meter, see the ZPL Programming Guide or the EPL Programming Guide.

To activate print meter alerts, send one of these commands to the printer:

- `oLY` EPL command
- `^JH, , , , ,E` ZPL command

## EPL Line Mode

Your direct thermal printer supports EPL line mode printing.

EPL Line Mode printing mode was designed to be command-compatible with the the legacy EPL1 programming language. Your printer supports line mode printing.

This mode of printing is ideal for basic retail (point of sale), shipping, inventory, workflow control, and general labeling. EPL printers with Line Mode are versatile and capable of printing a wide range of media and barcodes.

Line Mode printing prints only single lines at the height of the largest element present in the line of text and data (barcode, text, a logo, or simple vertical lines). Being a limited mode of printing, it does not allow for fine element placement, overlapping elements, and horizontal (ladder) barcodes.

- Your printer's default mode of printing is Page Mode.
- Enter line mode by sending the printer the `oEPL1` EPL command to the printer. See the EPL Programming Guide.
- Exit Line Mode by sending the `escO EPL2` Line Mode command o the printer. See the EPL Programming Guide.
- When Line Mode is active, ZPL and EPL (EPL2) Page Mode programming will be processed as Line Mode programming and data.

- When the default ZPL and EPL (EPL2) Page Mode active, Line Mode programming will be processed as ZPL and/or EPL programming and data.
- Verify printer programming modes by printing out a printer configuration label. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.

# Printer Options

This section covers the common printer options and accessories with brief descriptions and how to get you started using or configuring your printer option or accessory.

## Label Dispenser Option

The factory-installed label dispenser option allows you to print a label with backing (liner/web) being removed from the label as it prints, ready for application. When printing multiple labels, removing the dispensed (peeled) label prompts the printer to print and dispense the next label.

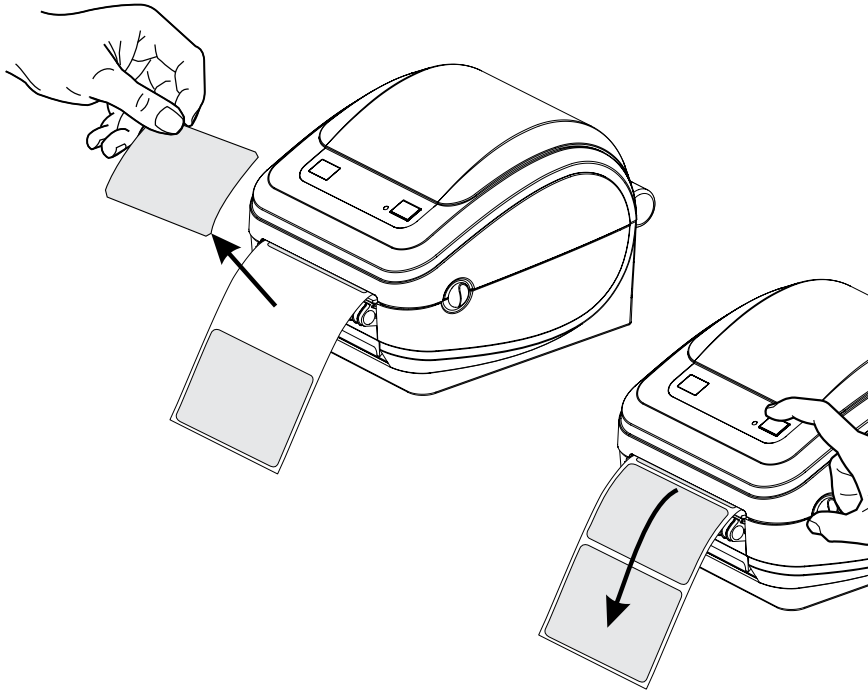
To use dispenser-mode correctly, use your printer driver to activate the label (taken) sensor along with these typical label settings which include but are not limited to length, non-continuous (gap), and web (liner). Otherwise, you must send the appropriate ZPL or EPL programming commands to the printer.

When programming in ZPL, you can use the command sequences below. See the ZPL Programming Guide for more information on ZPL programming.

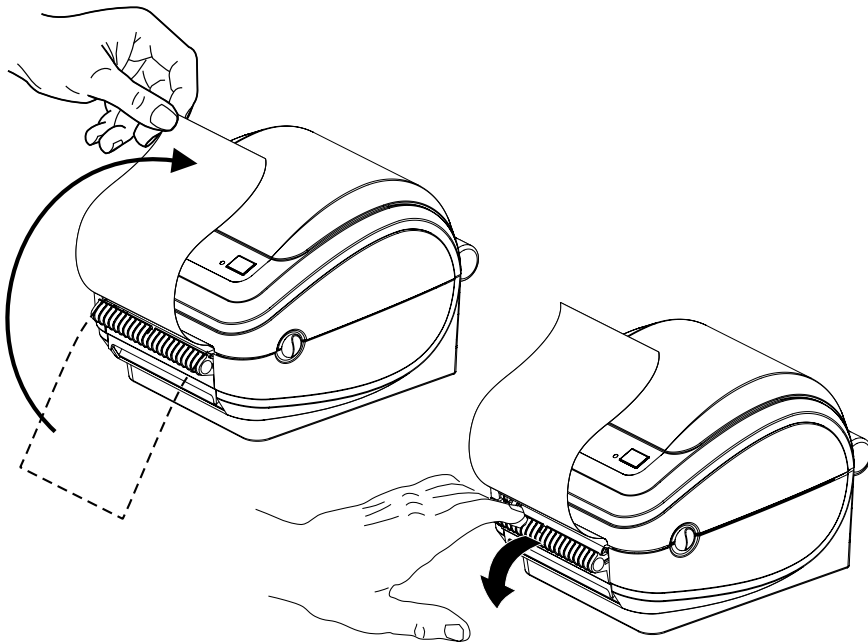
- `^XA ^MMP ^XZ`
- `^XA ^JUS ^XZ`

When programming in EPL, send the Options (O) command with the P command parameter (OP) to enable the label-taken sensor. You can include other printer option parameters with the Options command string. See the EPL Programming Guide for more information on programming with EPL and the Options (O) command behaviors.

1. Load your labels into the printer. Close the printer and press **FEED** until a minimum of 4 in. or 100 mm of exposed labels exit the printer. Remove the exposed labels from the liner.

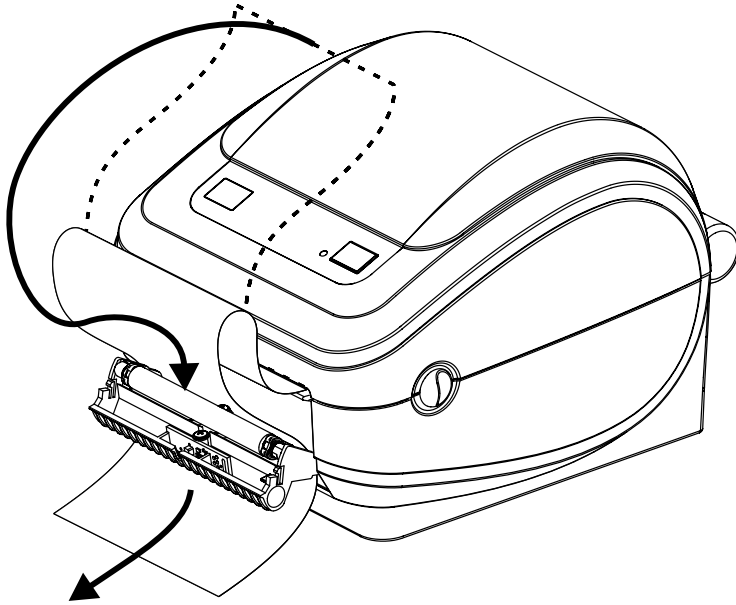


2. Lift the liner over the top of the printer and open the dispenser door.

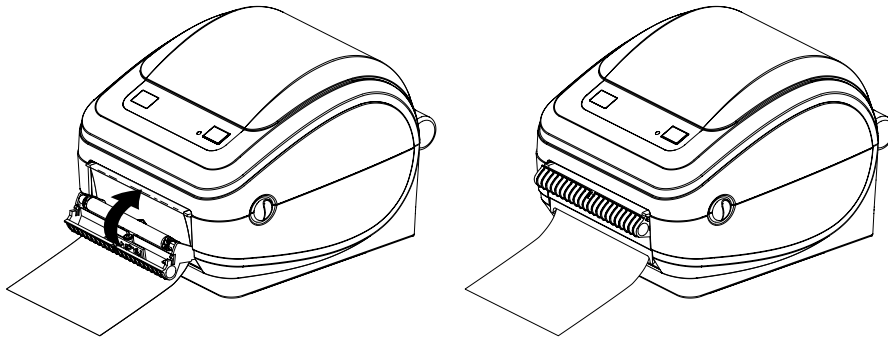




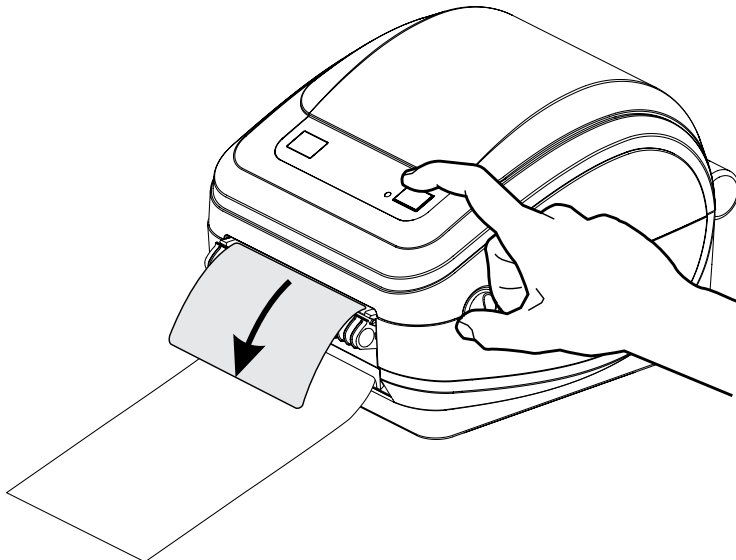
3. Insert the label liner between the dispenser door and the printer body.



4. Close the dispenser door.



5. Press **FEED** to advance the media.



6. During the print job, as the printer peels off the backing and present a single label, take the label to prompt the printer to print the next label.



**NOTE:** If you did not use ZPL or EPL software commands to activate the label-taken sensor, the printer will stack and eject the peeled labels.

## ZebraNet 10/100 Internal (Wired) Print Server Option

The ZebraNet 10/100 Internal Print Server is an optional factory-installed device that connects the network and your ZebraLink-enabled printer.

The print server provides you with a browser interface for printer and print server settings. If you use the ZebraNet Bridge Zebra network printer management software, you can easily access these specialized features of a ZebraLink-enabled printer.

- Print server and printer setup using a browser.
- Remote monitoring and configuration capability of the ZebraNet 10/100 Internal print server using a browser.
- Server alerts.
- Support for sending unsolicited printer-status messages using email-enabled devices.

ZebraNet Bridge is software that works with the ZebraNet 10/100 Internal print server. It supplements ZebraLink features built into ZPL-based printers

**Table 3** ZebraNet Bridge Features

Locate printers automatically	ZebraNet Bridge searches on parameters such as IP address, subnet, printer model, printer status, and many other user-defined characteristics.
Remote configuration	Manage all your Zebra label printers throughout the enterprise without having to travel to remote sites or physically handle any printers. Any Zebra printer connected to the enterprise network can be accessed from the ZebraNet Bridge interface and configured remotely through an easy-to-use graphical user interface.
Printer alerts, status, heartbeat monitoring, and event notification	ZebraNet Bridge lets you configure multiple event alerts per device with different alerts directed to different people. Receive alerts and notifications by e-mail, cell phone/pager, or through the ZebraNet Bridge Events tab. View alerts by printer or group, and filter by date/time, severity, or trigger.
Configure and copy printer profiles	Copy and paste settings from one printer to another or broadcast them to an entire group. ZebraNet Bridge allows you to copy printer settings, printer-resident files (formats, fonts, and graphics), and alerts with a click of the mouse. Create printer profiles with desired settings, objects, and alerts, and clone or broadcast them as if they were real printers, providing considerable savings in setup time. Printer profiles are an excellent way to back up a printer's configuration for crisis recovery.

## Printer Network Configuration Label

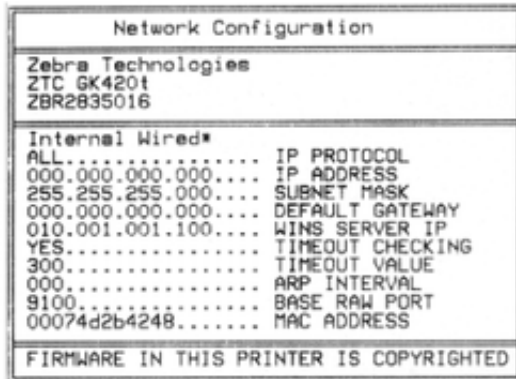
If your printer has an integrated ZebraNet 10/100 Internal Print Server option, you will need the printer's IP address and other networking information to identify and configure the printer for operations on

your network and to troubleshoot network connectivity if needed. You can find the printer's IP address by printing a Printer Network Configuration label.

See the ZebraNet 10/100 Internal Print Server manual for more information on establishing network connectivity using the printer's internal server.

To print a Network Configuration label, send the `~WL ZPL` command to the printer.

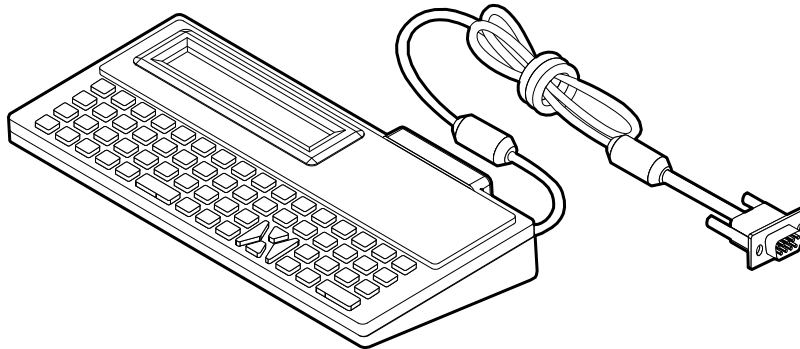
**Figure 4** Sample Network Configuration Label



The other label that prints configuration information, the Printer Configuration label, also lists some printer's network settings such as IP address, on the lower half of the printout. To print that label, follow the instructions in [Printing a Test \(Printer Configuration\) Label](#) on page 22.

## Zebra Keyboard Display Unit (KDU) Printer Accessory

The Zebra KDU is a small terminal that can interface with the printer to help you access any EPL label forms that may have been stored in the printer.



The KDU is strictly a data-input device. It does not store data and it cannot be used to configure the printer. The Zebra KDU Plus is a terminal with expanded capabilities including storage.

You can use the basic Zebra KDU to:

- List and retrieve label forms stored in the printer.
- Input variable data.
- Initiate the printing of labels with the information provided.

## KDU Plus — Printer Accessory

The KDU Plus is a terminal device with memory for storing files and maintaining one or more remote printers. The KDU Plus has a larger laptop-style keyboard than the Zebra's original KDU design.

The KDU Plus is designed for the following functions:

- List label forms stored in the printer
- Retrieve label forms stored in the printer
- Input variable data
- Printing labels
- File storage and transfer

The KDU Plus is designed to work with ZPL and EPL printers by dynamically detecting and switching the printer's communications configuration (DTE or DCE) to match your Zebra printer. By default, the KDU Plus will start-up forms mode. This is compatible with the operation of Zebra's original KDU. The KDU Plus is configurable to work in ZPL or terminal modes too.

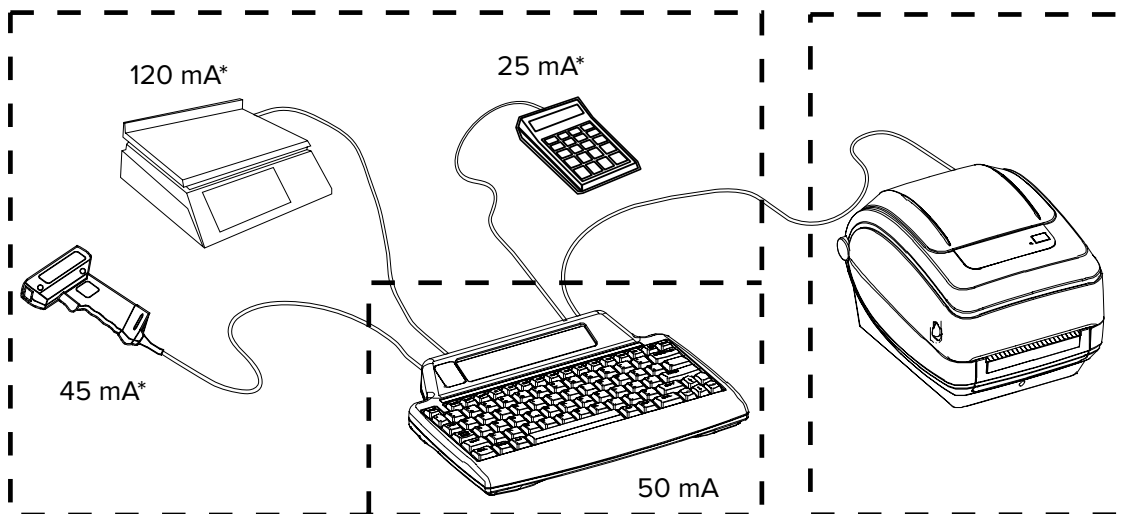
The KDU Plus has file transfer and storage capabilities. This is great for maintaining remote and stand-alone printers with label forms, logos, and smaller font sets.

The KDU Plus has two configurable serial ports and a PS/2 port to connect to other data input devices such as scanners, weigh scales, etc.

The +5 volts from the printer's serial (pin 9) provides power for the KDU Plus and any additional input devices attached to the KDU Plus.

Maximum total current draw for the G-Series printer's serial port: 750mA

The KDU Plus's current without external input devices attached is: 50mA



\* Not real values

$(45\text{mA} + 120\text{mA} + 25\text{mA}) + 50\text{mA} < \text{Max. Current}$



**CAUTION—PRODUCT DAMAGE:** The KDU Plus's input ports (AUX1, AUX2, and PS/2 style) are not fused. Exceeding the total current draw available could damage an input device, KDU Plus, or the printer.

## ZBI 2.0 Zebra Basic Interpreter

Customize and enhance your printer with ZBI 2.0 optional programming language, ZBI 2.0 allows Zebra printers to run applications and take input from scales, scanners, and other peripherals—all 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 bar codes 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 the ZBI 2.0 store at [zebrasoftware.com](http://zebrasoftware.com).

Use the ZDownloader utility to apply the key. Zdownloader is available on the Zebra web site at [zebra.com](http://zebra.com).

An intuitive ZBI-Developer programming utility is used to create, test, and distribute ZBI 2.0 applications available on the Zebra web site: [zebra.com](http://zebra.com).

# Maintenance

This section provides routine cleaning and maintenance procedures.

## Cleaning

When you clean the printer, use one of the following supplies that best suits your needs:

**Table 4** Cleaning Supplies

Cleaning Supplies	Order Quantity	Intended Purpose
Cleaning pens (105950-035)	Set of 12	Clean printhead
Cleaning swabs (105909-057)	Set of 25	Clean media path, guides, and sensors

You can obtain cleaning supplies at [zebra.com/supplies](http://zebra.com/supplies).

The cleaning process takes just a couple of minutes using the steps outlined below.

**Table 5** Cleaning Process

Printer Part	Method	Interval
Printhead	Allow the printhead to cool for a minute, then use a new cleaning pen to swab the dark line on the printhead cleaning from the center to the outside edges of the printhead. See <a href="#">Cleaning the Printhead</a> on page 71.	After every roll of media.
Platen roller	Remove the platen roller to clean. Clean the roller thoroughly with 90% medical-grade alcohol and a cleaning swab or lint-free cloth. See <a href="#">Platen Cleaning and Replacement</a> on page 74.	As needed.
Peel bar	Clean it thoroughly with 99% medical-grade alcohol and a fiber-free cleaning swab. Let alcohol dissipate and the printer dries completely.	
Media path		
Exterior	Use a water-dampened cloth.	
Interior	Gently brush out the printer.	



**CAUTION—PRODUCT DAMAGE:** Adhesives and media material can over time transfer onto the printer components along the media path including the platen and printhead. This build-up can accumulate dust and debris. Failure to clean the printhead, media path, and platen roller could result in inadvertent loss of labels, label jams, and possible damage to the printer.



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

### Cleaning the Printhead

Always use a new cleaning pen on the printhead.



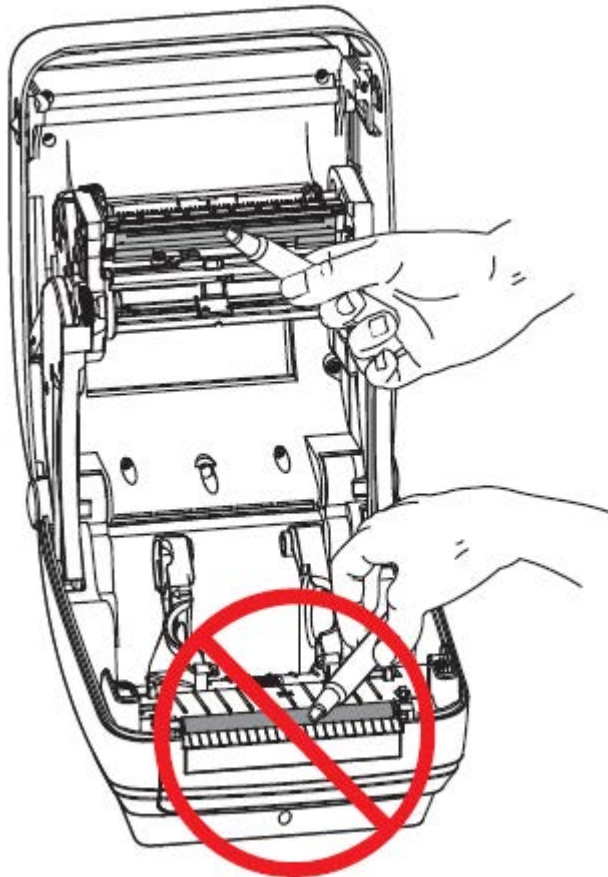
**CAUTION—PRODUCT DAMAGE:** Used cleaning pens carry contaminants from previous uses. These contaminants may damage the printhead.



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

Clean the printhead each time you load new media.

1. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside. This action helps move any adhesive—transferred from the edges of the media to the printhead—away and outside the media path.
2. Wait one minute for the printhead to dry before closing the printer.

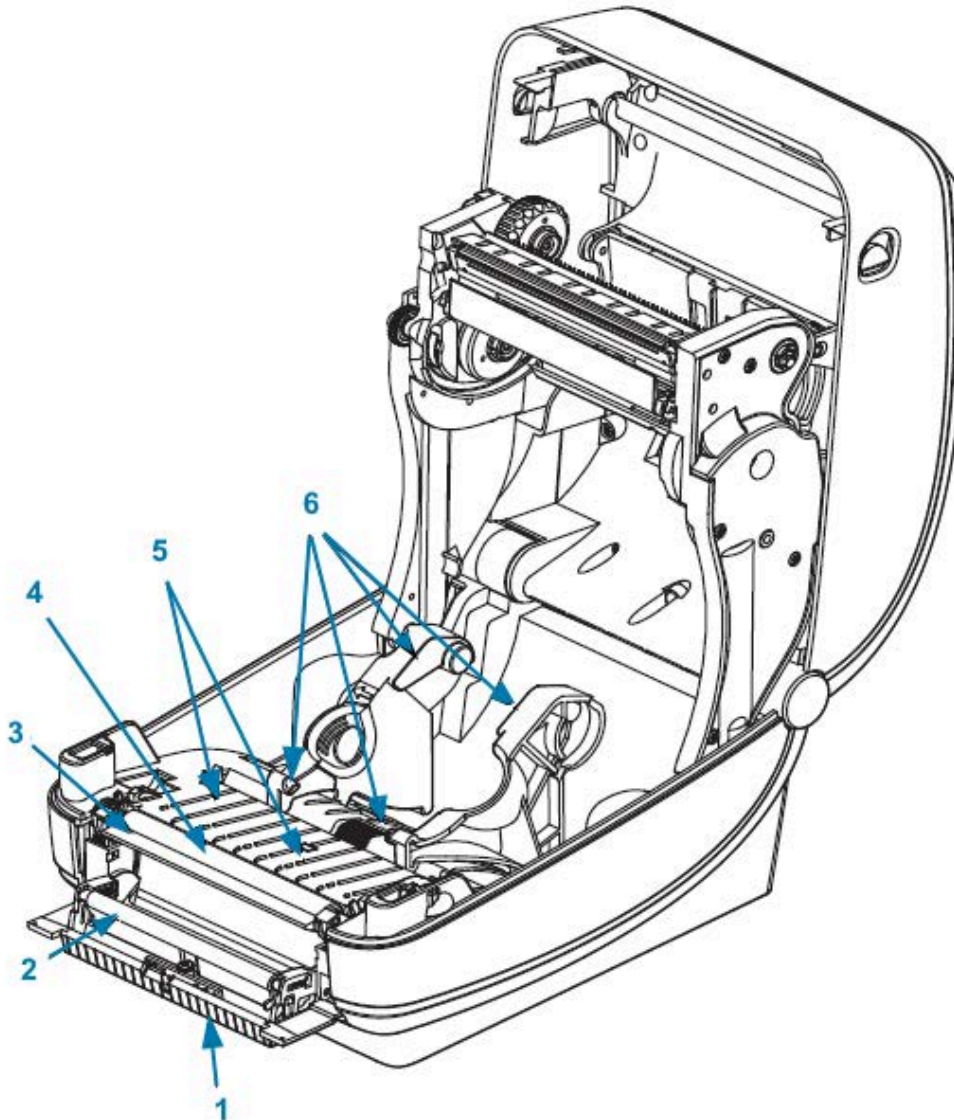


## Clean the Media Path

Use a cleaning swab to remove debris, dust, or crust that may have built up on the holders, guides, and media path surfaces.

- Use the alcohol in the cleaning swab to soak the debris to break up the adhesive.
- Wipe the ridges to remove accumulated debris.
- Wipe the inside edges of both edge guides to remove any built-up residue.
- Wait one minute before closing the printer.

Discard the cleaning swab after use.



1	Ridges	4	Platen
2	Pinch roller	5	Ridges
3	Peel bar	6	Media guides



## Cleaning the Sensor

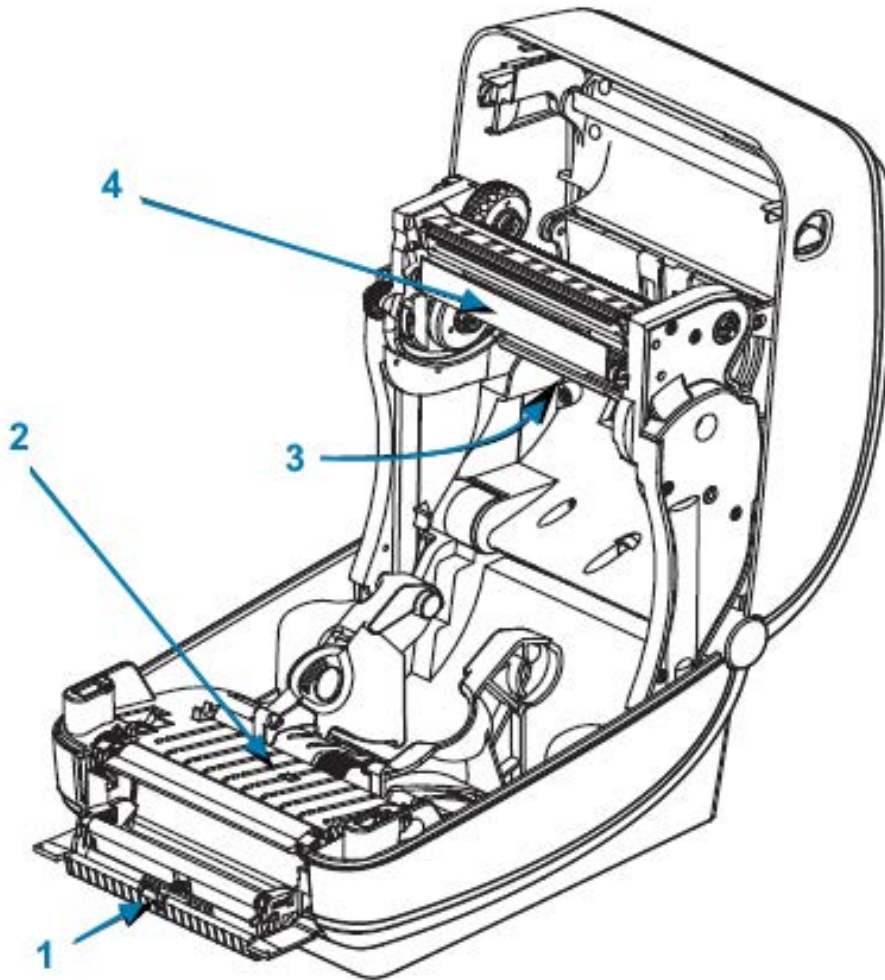
Dust can accumulate on the media sensors.

1. Gently brush away dust; if necessary, use a dry swab for the brushing. If adhesives or other contaminants remain, use an alcohol moistened swab to break them up. Gently brush the sensor surface or use a can of compressed air to blow dust off the sensor.



**IMPORTANT:** Do NOT use an air compressor to clean the sensor. Oil from the pump and dirty water will contaminate the printer and printhead.

2. Use a dry swab to remove any residue that may remain after the first cleaning.
3. Repeat steps 1 and 2 as required until all residue and streaks are removed from the sensor.



1	Gap sensor	3	Label-taken sensor
2	Black-line sensor	4	Ribbon-trailer sensor

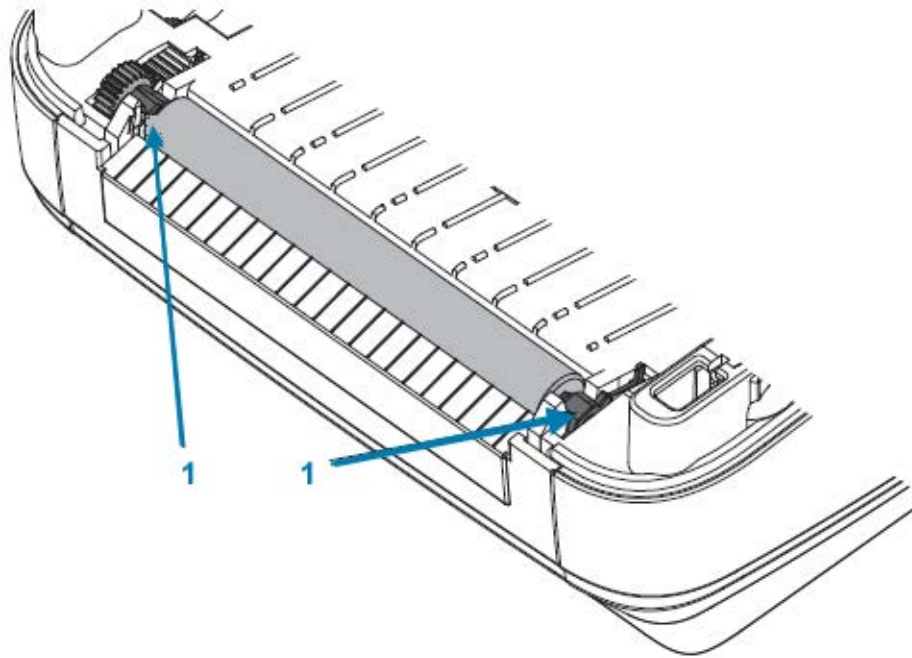
## Platen Cleaning and Replacement

The standard platen (drive roller) normally does not require cleaning. Paper and liner dust can accumulate without affecting print operations. Contaminates 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 immediately off the platen.

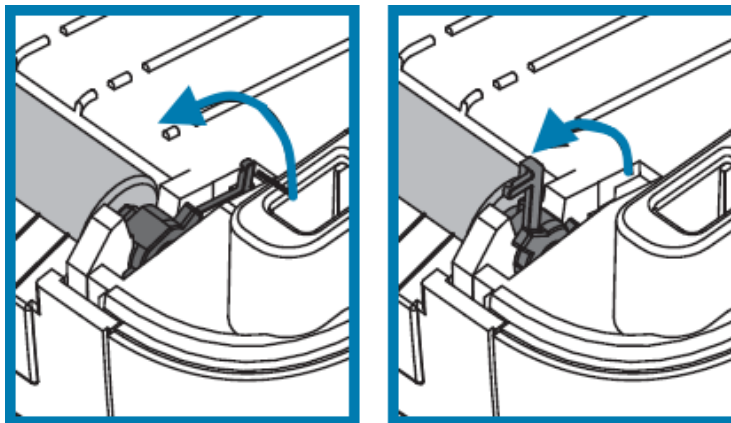
Clean the platen (and media path) whenever the printer has significantly poorer performance, print quality, or media handling. The platen is the print surface and drive roller for your media. If sticking or jamming continues even after cleaning, you must replace the platen.

The platen can be cleaned with a fiber-free swab (such as a Texpad swab) or a lint-free, clean, damp cloth very lightly moistened with medical-grade alcohol (99% pure medical grade).

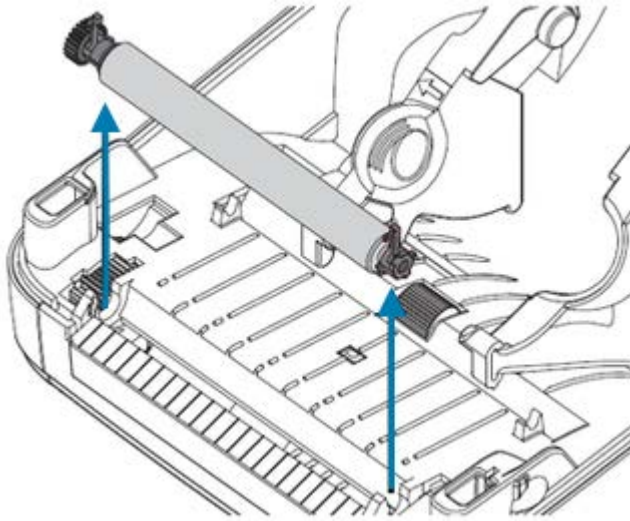
1. Open the cover (and dispenser door). Remove media from the platen area.
2. Press the platen-release tabs on the right and left sides out, then rotate them up.



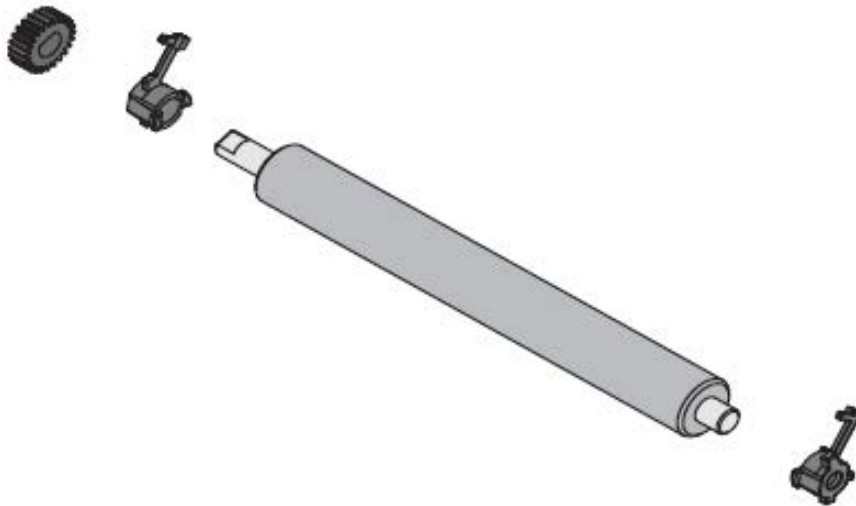
1	Platen bearings
---	-----------------



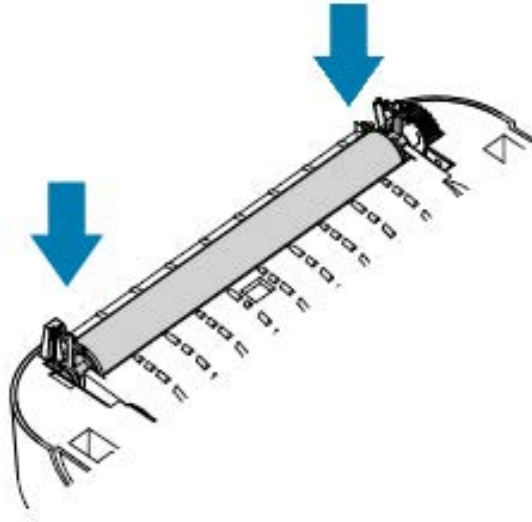
3. Lift the platen out of the printer's bottom frame.



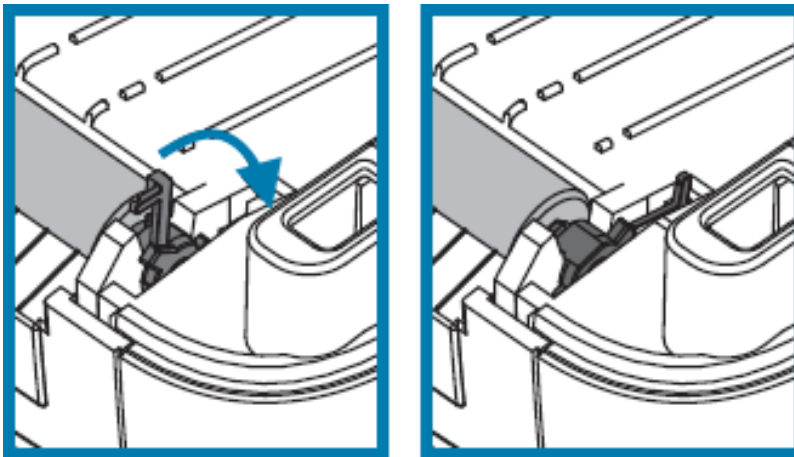
4. Clean the platen with a clean swab moistened with 99% pure medical-grade alcohol. Clean from the center out. Repeat this process until all of the roller surfaces have been cleaned. If there has been heavy adhesive build-up or a label jam, repeat with a new, similarly-moistened swab to remove residual contaminants. Adhesives and oils, for example, could be thinned by the initial cleaning but not completely removed.
5. Install the platen in the printer. Discard the cleaning swabs after use. Reusing them tends to contaminate previously-cleaned surfaces.
6. Make sure the bearings and drive gear are on the platen shaft.



7. Align the platen with the gear to the left and lower it into the printer's bottom frame.



8. Rotate the tabs back and snap them in place.



Allow the printer to dry for one minute before closing the dispenser door and the media cover and before loading labels.

## Other Printer Maintenance

There are no user level maintenance procedures beyond those detailed in this section.

See [Diagnostics and Troubleshooting](#) on page 83 for more information on diagnosing printer and print problems.

## Removing and Replacing the Printhead

If you must replace the printhead, review these printhead removal and installation steps before proceeding.



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

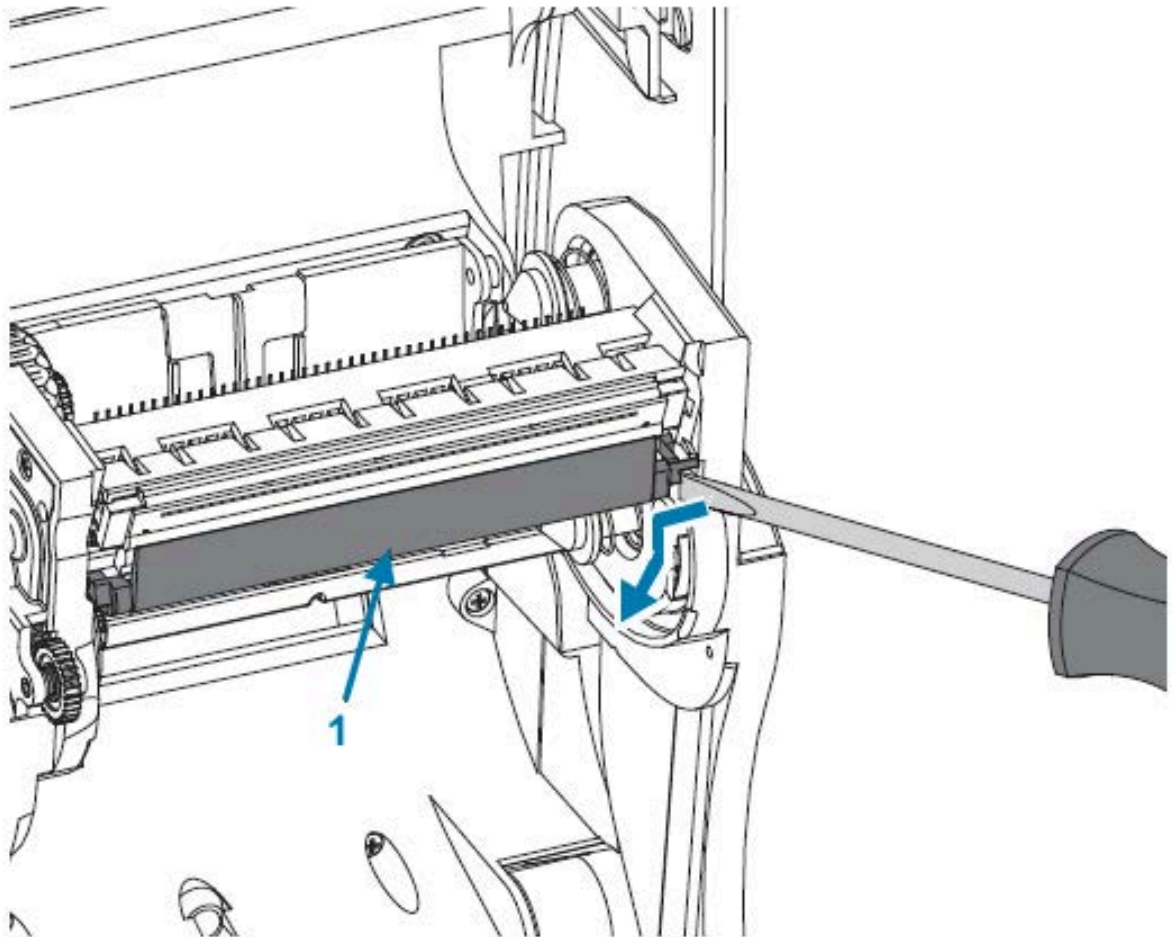


**CAUTION—ESD:** Prepare your work area by protecting against static discharge. Your work area must be static-safe and include a properly grounded, conductive, cushioned mat to hold the printer and a conductive wrist strap you can wear.

Start by opening the printer. Pull the release latches forward, then lift the top cover.

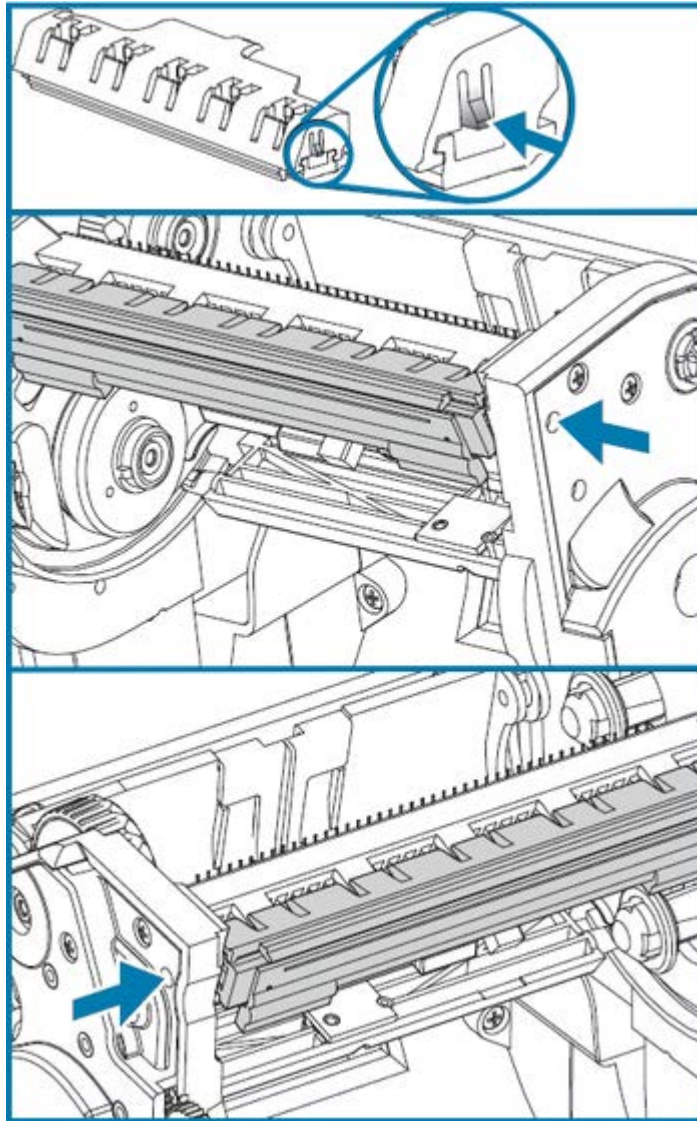
To remove and replace the printhead:

1. Turn printer power OFF and unplug the power cord from the printer.
2. If you have ribbon loaded, remove the ribbon.
3. Use a small flat-bladed screwdriver to remove the ribbon guide. Gently pry the guide's right-side tab from the ribbon frame. Pull the left side of the ribbon guide out.

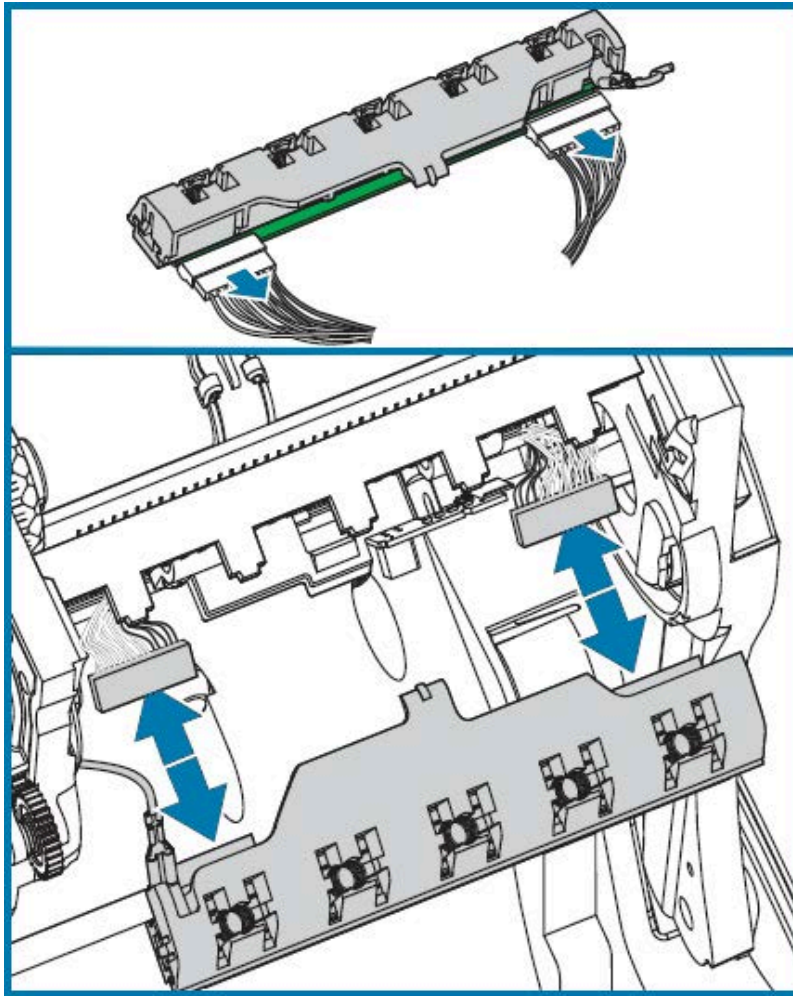


1	Ribbon guide and printhead cover
---	----------------------------------

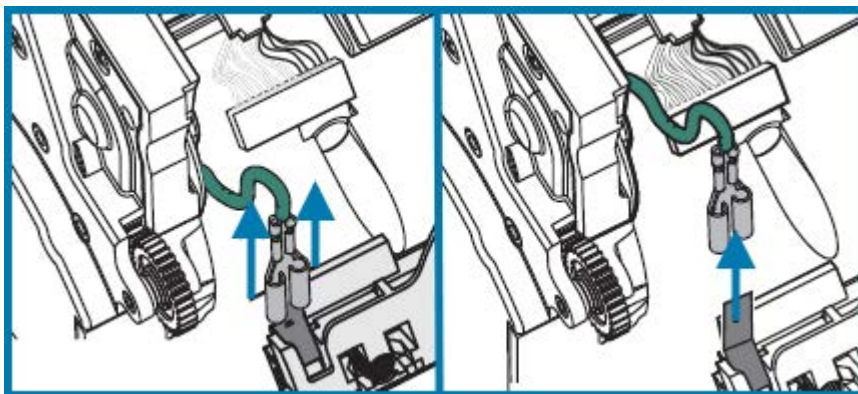
4. Use a blunt-tipped tool to press the release tab, first on the right side and then on the left side of the printhead. The tool diameter can be 2.5 mm – 3.8 mm (0.10 in. – 0.15 in.). Insert the tool into the ribbon frame's printhead release access opening. This is a round opening. Push the release tab and gently pull the printhead bracket down.



5. Gently but firmly pull the connectors of the two printhead cable bundles off the printhead.

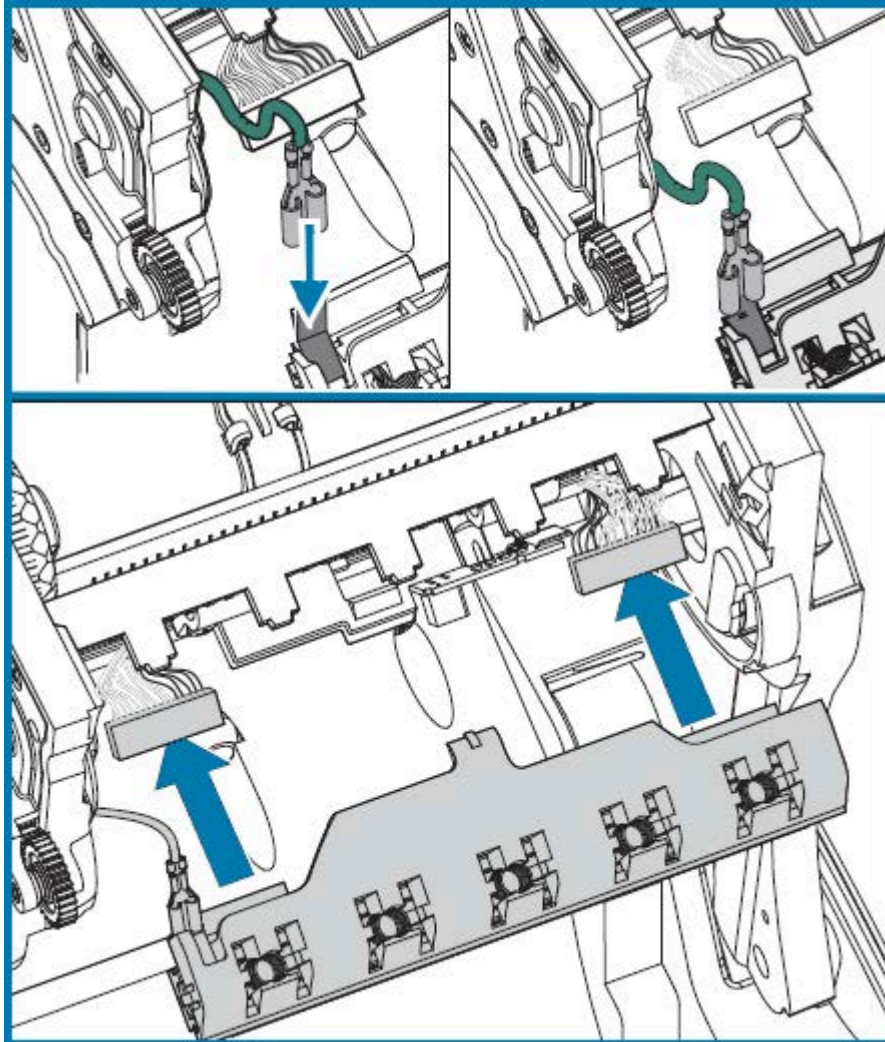


6. Gently but firmly pull the green ground wire off the printhead.



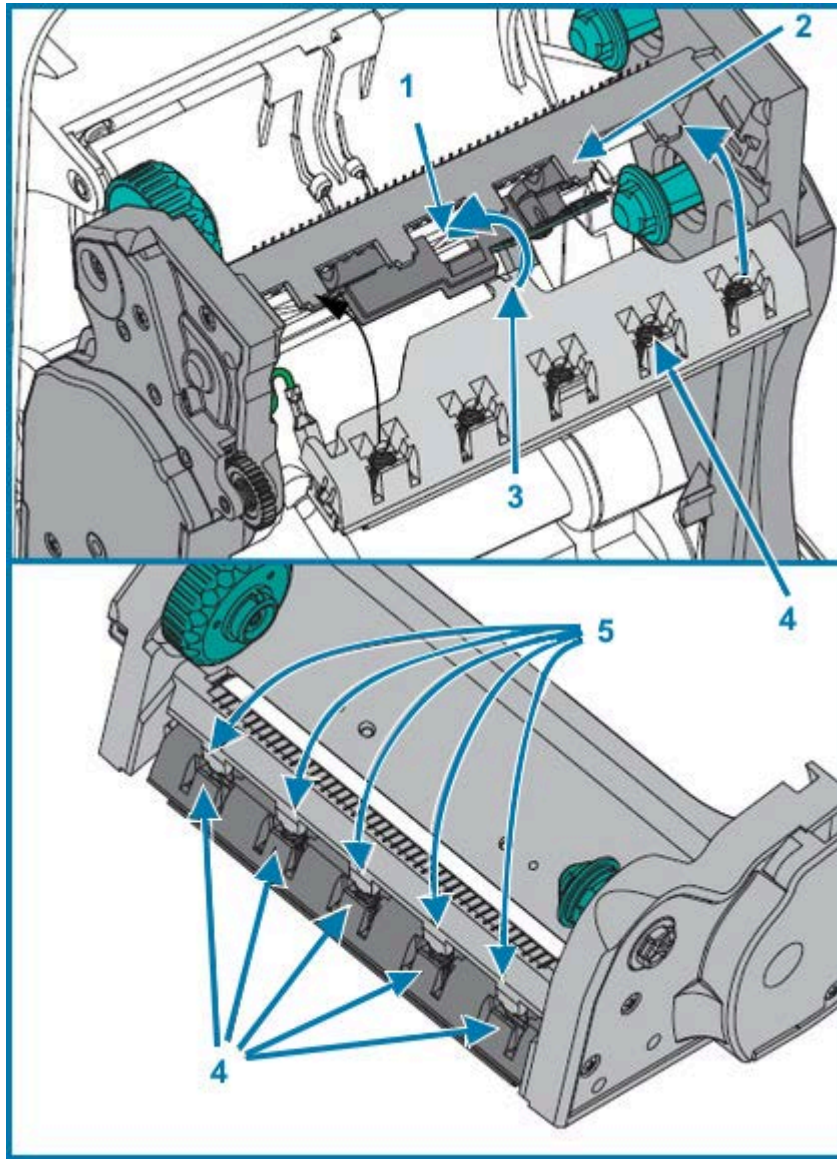
7. To replace the printhead, start by pushing the left-side printhead connector into the printhead. The connector is keyed to only insert one way.
8. Connect the green ground wire to the printhead.
9. Push the right-side printhead wire connector onto the printhead.

10. Check that the ground wire and wire bundles are still connected to the printhead.



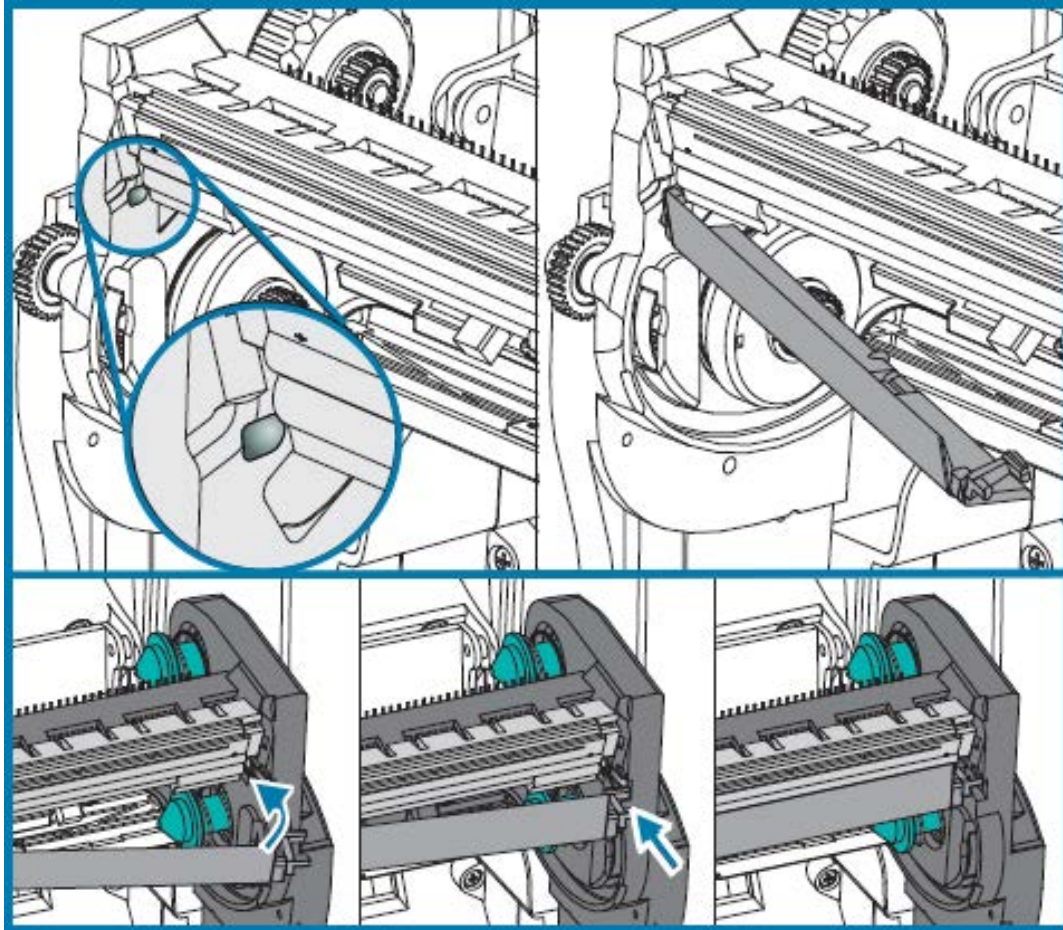


11. Insert the printhead bracket's the tab into slot in the ribbon frame assembly. Align the printhead spring slots to the five posts and snap the printhead into the ribbon frame.



1	Slot	4	Spring slots
2	Post	5	Spring posts
3	Tab		

12. Place the left-hand side of the ribbon guide into the ribbon frame. Swing the right side of the ribbon guide into the slot and snap it into position.



13. Verify that the printhead moves up and down freely when pressure is applied and remains locked when released.
14. Clean the printhead. Use a new pen to wipe body oils (finger prints) and debris of the printhead. Clean from the center of the printhead to the outside. See [Cleaning the Printhead](#) on page 71.
15. Reload media. Plug in the power cord, turn printer power ON, and print a status report to ensure proper function. See [Printing a Test \(Printer Configuration\) Label](#) on page 22.

# Diagnostics and Troubleshooting

This section provides information that will help you diagnose and troubleshoot issues with your printer and its operations. A variety of diagnostic tests are available.

## Status Light Descriptions and Error Resolutions

The status lights provide information on printer status and error conditions if any.


**Table 6** Status Light Descriptions and Error Resolutions

LED Status and Color	Printer Status		Description and Resolution(s)
Off	Off	The printer is not receiving power.	Verify that the printer power is turned ON. Check the power connections from the wall outlet to the power supply, and from the power supply to the printer. Try disconnecting the printer power cord from the wall outlet for 30 seconds and reconnecting the cord to the outlet. Try turning printer power OFF and then ON.
Solid green	On	The printer is on and in an idle state.	Idling is a normal printer state. No action is necessary.

**Table 6** Status Light Descriptions and Error Resolutions (Continued)

LED Status and Color	Printer Status		Description and Resolution(s)
Solid amber	Stopped	The printer has failed its power-on self test (POST), there is a memory error, or the printhead needs to cool down.	<p>If this error occurs right after turning on the printer, contact an authorized reseller for assistance. When the printer is operating normally, the printer status light will show amber for about 10 seconds before turning green (solid or blinking).</p> <p>If there is a possibility of a memory error and it occurs after you have been printing, turn printer power OFF and ON, then resume printing.</p> <p>If the error is because the printer may need to cool down, turn printer power OFF for five minutes or more, then turn it ON. If the amber light persists, the printer requires service</p>
Flashing green	Normal operation	The printer is receiving data.	When the printer has received all the data, the status indicator turns green and it resumes operations.
Flashing red	Stopped	The media is out or the printhead is open.	<p>If the printer has run out of media or ribbon, load media and ribbon. If the top cover is open, close it.</p> <p>Then press <b>FEED</b> to resume printing.</p>
Double flashing green	Paused	The printer is paused.	Press <b>FEED</b> to resume printing.
Flashing amber	Paused	The printhead is over temperature.	Printing will stop until the printhead cools to an acceptable printing temperature and resume when it has cooled sufficiently.
Alternately flashing green and red	Needs service	FLASH memory is not programmed.	Return the printer to an authorized reseller.
Flashing red, red, green	Needs service	The printhead or motor has had a critical failure.	Return the printer to an authorized reseller.

**Table 6** Status Light Descriptions and Error Resolutions (Continued)

LED Status and Color	Printer Status		Description and Resolution(s)
Flashing red, amber, green	Printer is defragmenting memory	The printer is defragmenting its memory locations.	 <p><b>CAUTION—PRODUCT DAMAGE:</b> Do NOT turn printer power OFF or reset the printer during defragmentation. Doing so can damage the printer.</p> <p>Defragmentation is part of normal printer operation. It is necessary to manage printer memory space for optimal use. The printer will defragment its memory both after a factory default and when it detects that a defragment is required.</p> <p>When the printer defragments, give it time to complete the action.</p> <p>If this warning occurs frequently, check the label formats. Formats which frequently (and repeatedly) write to memory and erase from memory may cause the printer to defragment often. To minimize frequent defragmentation, use formats that do not require frequent and repeated memory write/erase events.</p> <p>If this warning condition persists after you switch to formats that do not require frequent/repeated memory writes and erase events, the printer needs service. Contact Technical Support for assistance.</p>

## Print Quality Problems

If print quality problems occur, use these sections to resolve issues.

### No print on the label.

- The media may not be direct thermal media. See the test procedure [Determining Thermal Media Types](#) on page 51.
- Is the media loaded correctly? Follow the instructions for [Loading Roll Media](#) on page 15. For printing using transfer ribbon, see [Printing a Test \(Printer Configuration\) Label](#) on page 22.
- For thermal transfer printers, the media may not be outside-wound or it may not be approved for use with your printer. See [Ribbon Test with Adhesive](#) on page 52 and [Ribbon Scratch Test](#) on page 53 to test if you are using the correct ribbon supplies and loading them as needed for your printer.

### The printed image does not look right.

- The printhead is dirty. Clean the printhead.

- The printhead is under temperature.
- Adjust the print darkness and/or print speed.
  - Use the ^PR (speed) and ~SD (darkness) commands referenced in the ZPL Programming Guide available from [zebra.com/support](http://zebra.com/support).
  - Use the D (darkness/density) and S (speed) commands in the EPL Programmer's Guide available from [zebra.com/support](http://zebra.com/support).
  - Manually adjust print darkness with the six-flash sequence of [FEED Button Modes](#) on page 92.
  - The Windows printer driver or the application software may change these settings and may require a change to optimize print quality.
- The media being used is incompatible with the printer. Use the recommended media for your application, and always use Zebra-approved labels and tags.
- The printhead has worn out. The printhead is a consumable item and will wear out due to friction between the media and the printhead. Using unapproved media may shorten life or damage your printhead. Replace the printhead.
- The platen may need cleaning or replacement. The platen (driver) roller may be losing traction due to:
  - Foreign objects attached to its surface,
  - The rubbery smooth surface has become polished and slippery, or
  - There is damage to the usually smooth and flat print surface such as from box-knife cuts.

**There are long tracks of missing print (blank vertical lines) on several labels.**

- The printhead is dirty. Clean the printhead.
- The printhead elements are damaged.

**Print does not start at the top of the label or misprinting of one to three labels.**

- The media may NOT be threaded correctly. See [Loading Roll Media](#) on page 15.
- The printer may need to be calibrated for the media you loaded. Refer to details of the two-flash sequence of [FEED Button Modes](#) on page 92.
- For ZPL label formats:
  - The correct media sensor may not be activated. See [Manual Calibration](#) on page 87 to make sure the correct media-sensing method is being used for the labels you loaded. Also see the ^MN command in the ZPL Programming Guide available from [zebra.com/support](http://zebra.com/support).
  - Verify that the Label Top (^LT) command is correctly set for your application. See the ZPL Programming Guide.
- For EPL label formats:
  - The correct media sensor may not be activated for label dispensing, blackline or notch sensing, or Gap/Web sensing. Manual calibration selects the media sensing method for the labels being used. See the O and Q commands in the EPL Programmer's Guide available from [zebra.com/support](http://zebra.com/support).
  - EPL label formats—Verify that the Set Label Length (Q) command is correctly set for your application. See the EPL Programmer's Guide.

**A ZPL label format was sent to, but not recognized by the printer.**

- Is the printer in pause mode? If so, press **FEED**.
- If the status LED is on or flashing, see [Status Light Descriptions and Error Resolutions](#) on page 83.

- Make sure the data cable is correctly installed.
- A communications problem has occurred. First, make sure that the correct communications port on the computer is selected. Refer to [Connecting your Printer to a Device](#) on page 24.
- Verify the correct Format and Control Prefix on the printer match what you are using in your ZPL programmed label format. The default format (COMMAND CHAR) is caret (^) and the Control (CONTROL CHAR) is a tilde (~) character. Verify the characters with the Configuration Status label printout. Refer to the one-flash sequence of [FEED Button Modes](#) on page 92 for instructions on printing this label.

### **An EPL label format was sent to, but not recognized by the printer.**

- Is the printer in pause mode? If so, press **FEED**.
- If the printer has label dispensing enabled, the printer may be waiting for the label to be removed. The liner/web must be properly threaded through the label-dispenser mechanism (peeler) to correctly operate in label dispense mode, refer to [Label Dispenser Option](#) on page 63.
- If the status LED is on or flashing, see [Status Light Descriptions and Error Resolutions](#) on page 83.
- Make sure the data cable is connected properly.
- A communications problem has occurred. Make sure that the correct communications port (USB) on the computer is selected. See [Connecting your Printer to a Device](#) on page 24.

## Manual Calibration

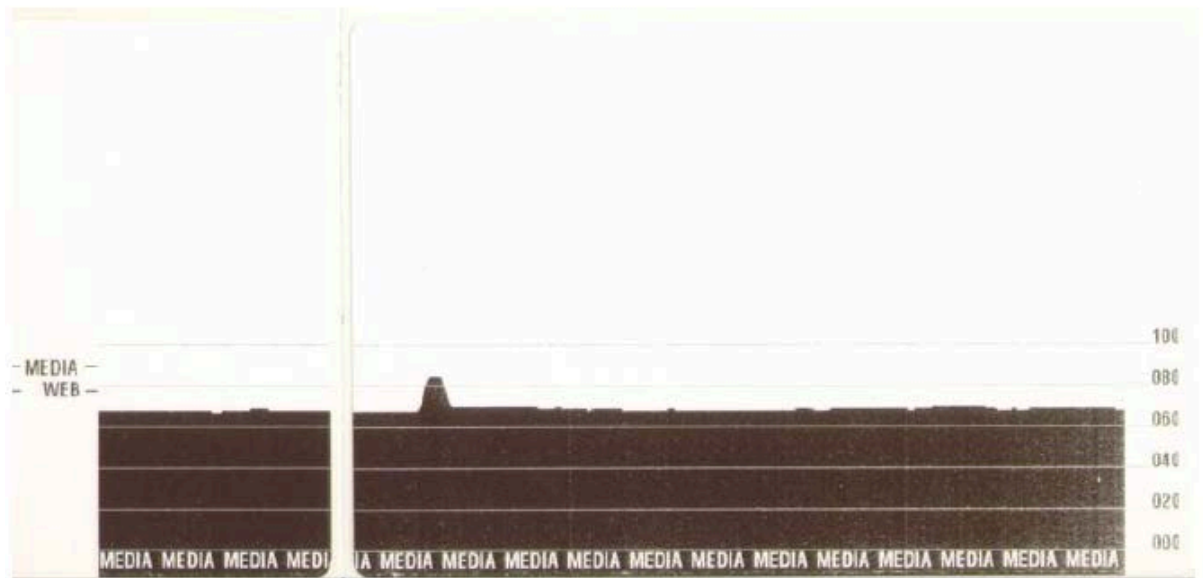
Manual calibration is recommended whenever you are using pre-printed media, you are changing media types (or batch or size), or if the printer will not correctly auto-calibrate.

1. Make sure media is loaded.
2. Turn printer power ON.
3. Press and hold **FEED** until the green status light flashes once, then twice, and then continuing until the flash groups reach the group of seven flashes. Release **FEED**.

The printer will set the media sensor for the label backing being used. When complete, the media roll will automatically feed until a label is positioned at the printhead. A profile of the media sensor settings

(similar to the example below) will print. The printer will then save the new settings in memory and return to normal operation.

**Figure 5** Media Sensor Settings Profile Printout



**4. Press FEED.**

One entire blank label will feed. If this does not happen, try defaulting (see four-flash sequence in [FEED Button Modes](#) on page 92) and recalibrating the printer.



**NOTE:** Performing a manual calibration disables the auto-calibration function. To revert the printer to auto-calibration, return the printer to its defaults (see four-flash sequence in [FEED Button Modes](#) on page 92).

## Troubleshooting Tests

Troubleshoot the printer by printing a configuration label and print issues.

### Printing a Configuration Label

To print out a listing of the printer's current configuration, refer to details on the one-flash sequence in [FEED Button Modes](#) on page 92. For information on interpreting the label, see [ZPL Configuration Status to Command Cross-reference](#) on page 104.



PRINTER CONFIGURATION	
Zebra Technologies	
ZTC GK420t	
ZBR2835016	
16.0.....	DARKNESS
5 IPS.....	PRINT SPEED
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
GAP/NOTCH.....	MEDIA TYPE
WEB.....	SENSOR TYPE
AUTO.....	SENSOR SELECT
THERMAL-TRANS.....	PRINT METHOD
832.....	PRINT WIDTH
1242.....	LABEL LENGTH
39.0IN 989MM.....	MAXIMUM LENGTH
NOT CONNECTED.....	USB COMM.
NONE.....	PROTOCOL
LINER/TAG FULL.....	CUTTER TYPE
<~> 7EH.....	CONTROL CHAR
<^> 5EH.....	COMMAND CHAR
<, > 2CH.....	DELIM. CHAR
ZPL II.....	ZPL MODE
NO MOTION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
NO.....	HEXDUMP
046.....	WEB S.
096.....	MEDIA S.
021.....	WEB GAIN
050.....	MARK S.
004.....	MARK GAIN
095.....	MARK MED S.
014.....	MARK MEDIA GAIN
095.....	CONT MEDIA S.
007.....	CONT MEDIA GAIN
075.....	RIBBON OUT
040.....	RIBBON GAIN
066.....	TAKE LABEL
CWF.....	MODES ENABLED
	MODES DISABLED
832 8/MM FULL.....	RESOLUTION
V61.17.8ZG05 <-.....	FIRMWARE
1.3.....	XML SCHEMA
V26.00.00.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
2104k.....	R: RAM
1536k.....	E: ONBOARD FLASH
NONE.....	FORMAT CONVERT
DISABLED.....	ZBI
2.1.....	ZBI VERSION
14.409 IN.....	LAST CLEANED
59.208 IN.....	HEAD USAGE
59.208 IN.....	TOTAL USAGE
59.208 IN.....	RESET CNTR1
59.208 IN.....	RESET CNTR2
TOP-09.....	SERIAL NUMBER
MAINT. OFF.....	EARLY WARNING
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

### Recalibration

Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels (refer to information on the two-flash sequence in [FEED Button Modes](#) on page 92).

## Resetting the Factory Default Values

Sometimes, resetting the printer to the factory defaults may solve some problems. See the four-flash sequence in [FEED Button Modes](#) on page 92.

## Communications Diagnostics

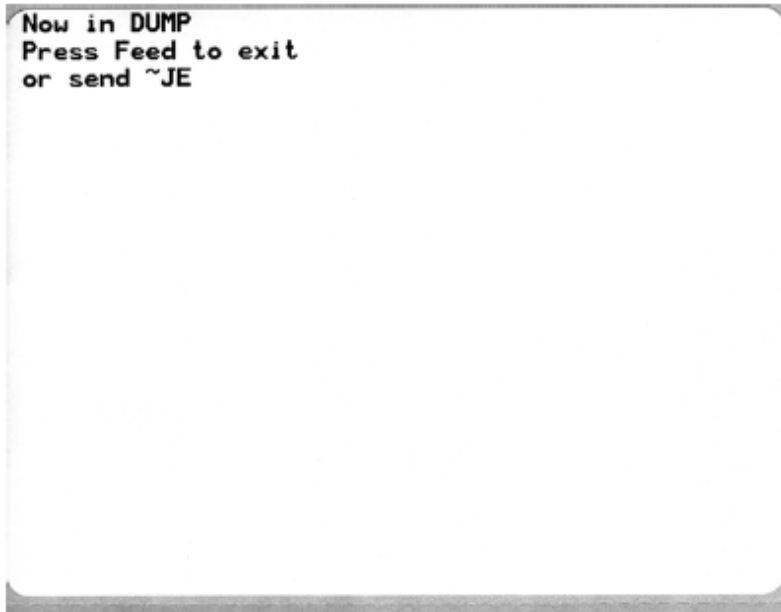
If there is a problem transferring data between the computer and printer, try putting the printer in the communications diagnostics mode.

The printer will print the ASCII characters and their respective hexadecimal values for any data received from the host computer.

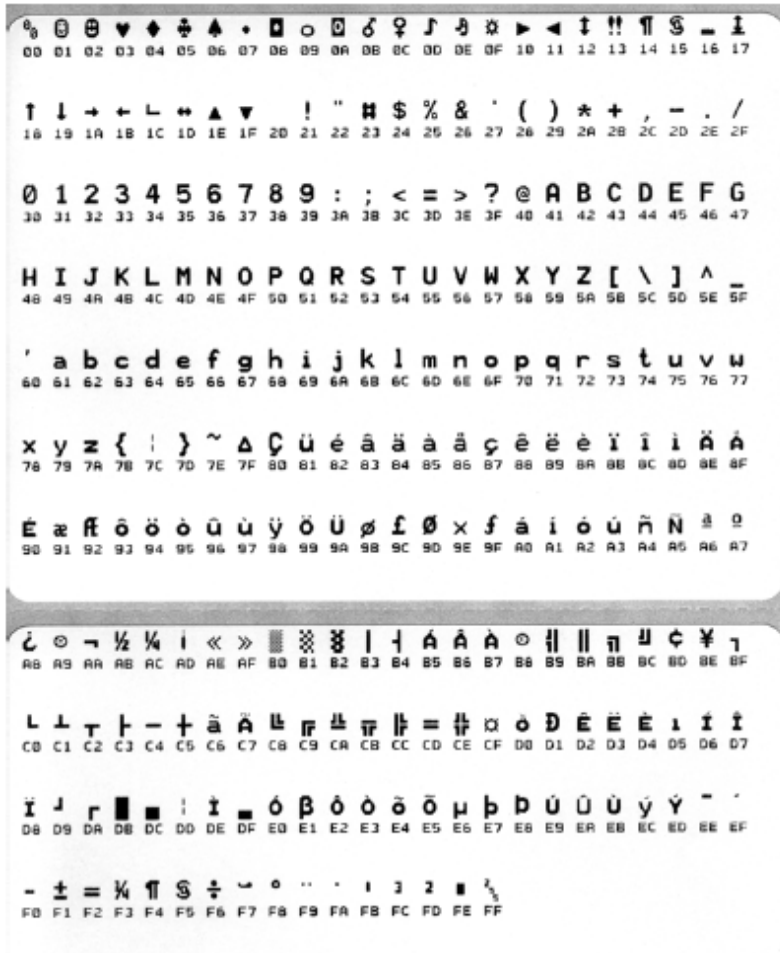
You can enter hex data dump mode using one of the following methods:

- Use the ZPL programming ~JD command
- Use the EPL Programming dump command
- Turn printer power ON while holding down **FEED**. For details, see [Power-Off FEED Button Modes](#) on page 92.

The printer prints `Now in DUMP` and advances to the top of the next label.



Here is a sample communications `DUMP` mode printout. It displays hexadecimal data `00h-FFh` (0–255 decimal) with a unique character for each hexadecimal value displayed above the hexadecimal data.



Serial port and Bluetooth data-handling errors are logged in the blank lines between the lines of data:

- F = frame error
- P = parity error
- N = noise error
- O = data overrun error

To exit diagnostic mode and resume printing, turn printer power OFF and then ON. Alternatively, press **FEED** as many times as necessary to clear the printer's command buffer and print Out of DUMP on the label. The printer prints Out of DUMP.



## FEED Button Modes

You can enter several printer modes by pressing the **FEED** button.

### Power-Off FEED Button Modes

With printer power OFF, press and hold **FEED** while turning printer power ON to access the power-off **FEED** button modes.



**Table 7** Power Off Modes

Flash Sequence	Action
Amber-Red flashing	<p>Firmware Download Mode—The printer starts rapidly flashing red to denote entry into the Firmware Download mode. Releasing the <b>FEED</b> at this point in the sequence will initialize the printer for download.</p> <p>The printer is ready to start downloading firmware when the status light begins to slowly flash between red and green.</p> <p>See <a href="#">Sending Files to the Printer</a> on page 61 for more information on using the Firmware (and File) Download utility available for use with this printer. Firmware updates for your printer, if any, are posted on the Zebra website at <a href="http://zebra.com">zebra.com</a>.</p>
Amber	<p>Normal Operations Mode—The printer continues into a normal printer initialization. Releasing <b>FEED</b> at this point allows the printer to start as normal without a firmware download or operating in Communications Diagnostic mode.</p>
Green	<p>Communications Diagnostic (DUMP) Mode—Release <b>FEED</b> immediately after the printer status light turns green.</p> <p>The printer prints <code>Now in DUMP</code> at the top of the label before advancing to the next label.</p> <p>After printing the first label, the printer automatically enters diagnostic mode and prints out a literal representation of all data subsequently received.</p> <p>To exit diagnostic mode and resume printing, turn printer power OFF, wait 30 seconds, and turn power back ON.</p> <p>Another way to exit diagnostic mode is to press <b>FEED</b> as many times as necessary, in sequence, to clear the printer's command buffer and print <code>Out of DUMP</code> on the label.</p>



### Power-On FEED Button Modes

With printer power ON and the top cover closed, press and hold **FEED** for several seconds. The green status LED flashes a number of times in sequence. Use the information in this table to release the key after a specific number of flashes and before the next flash sequence starts.

**Table 8** Power-On Modes

When you release the FEED button after...	This happens.
* (the first flash)	<p>Configuration Status—The printer prints a detailed printer configuration status label.</p> <p>Use this label to:</p> <ul style="list-style-type: none"> <li>• verify proper print function</li> <li>• assist with configuring computer communications, maintenance, and troubleshooting</li> <li>• help our support team diagnose and address issues as needed</li> </ul>
* ** (the second flash)	<p>Standard Auto Media Calibration—The printer detects and sets media type and media length and adjusts the media sensors for optimal performance with the installed media. This method of calibration is the equivalent of issuing the ~JC ZPL command.</p> <p>The printer feeds one to four labels while calibrating.</p> <p> <b>NOTE:</b> Users familiar with the Zebra EPL desktop printer can use this FEED mode to replace power-up auto-sensing calibration. This method of calibration is the equivalent of issuing the XA EPL command.</p>
* ** *** (the third flash)	<p>Serial Port Configuration—Applies only to printers with serial interface ports.</p> <p>To reset serial port communication parameters, except for Flow Control, press and release <b>FEED</b> while the LED rapidly flashes amber and green.</p> <p>For autobaud synchronization, send the ^XA^XZ command sequence to the printer when the LED is rapidly flashing amber and green.</p> <p>When the printer and host are synchronized, the indicator lights up a steady green.</p> <p> <b>NOTE:</b> Labels do not print during autobaud synchronization.</p>

**Table 8** Power-On Modes (Continued)

When you release the FEED button after...	This happens.
<p>* ** *** **** (the fourth flash)</p>	<p>Factory Defaults—Resets the printer to the factory default settings. This is the equivalent of issuing the ^JUN ZPL command. See <a href="#">ZPL Configuration</a> on page 103 for a description of the primary configuration settings and their associated ZPL commands.</p> <p>Some configuration settings are not returned to their initial out-of-box printer settings. Other settings are exclusively set, viewed, and controlled by programming and are also reset.</p> <p>This performs a standard media calibration and then a memory defragmentation routine.</p> <p>When the printer has entered Factory Default mode, the status light turns amber for three seconds. During that time you can:</p> <ul style="list-style-type: none"> <li>• Do nothing to let the printer reset the factory defaults automatically as described above, OR</li> <li>• For printers that have a network print option such as Ethernet, Wi-Fi, or Bluetooth, press and hold <b>FEED</b> to enter Factory Default Reset mode. This is the equivalent of issuing the ^JUF ZPL command.</li> </ul> <p>During this sequence, releasing the button after the first flash resets only the network factory options. This is the equivalent of issuing the ^JUN ZPL command.</p> <p>Releasing the button after the second flash sequence (two flashes) resets only the printer defaults.</p> <p>Releasing <b>FEED</b> after the third flash sequence (three flashes) resets both printer and network settings. This is the equivalent of issuing the ^JUN and ^JUF ZPL commands.</p>
<p>* ** *** **** ***** (the fifth flash)</p>	<p>Print Width Adjustment—Prints a succession of boxes starting at the minimum print width and ending in the printer’s maximum print width in 4-mm increments.</p> <p>Press <b>FEED</b> once after the printer has reached the desired maximum print width.</p> <p> <b>NOTE:</b> The printer driver and applications can override this setting.</p>
<p>* ** *** **** ***** ***** (the sixth flash)</p>	<p>Print Darkness (Density) Adjustment—Prints a succession of barcode simulation patterns starting at the minimum darkness (print density/heat) and ending in the printer’s maximum darkness in increments of four using the ZPL darkness setting range values.</p> <p>Press <b>FEED</b> one time when the pattern is clear and legible. Continuing to increase the darkness setting or barcode line widths may distort the print output, thereby reducing readability.</p> <p> <b>NOTE:</b> The printer driver and applications can override this setting.</p>

**Table 8** Power-On Modes (Continued)

When you release the FEED button after...	This happens.
* ** *** **** ***** ***** ***** (the seventh flash)	<p>Manual Media Calibration—The printer runs extensive tests to detect and set media type and media length. It then adjusts the media sensors for optimal performance with the installed media. This is the equivalent of issuing the ~JG ZPL command.</p> <p>Manual calibration is recommended whenever you are using pre-printed media, there is print on the liner, or if the printer will not correctly auto-calibrate. A graphical profile of the media sensing operation will print. See <a href="#">Manual Calibration</a> on page 87 for details and considerations.</p>
<p>To exit Configuration Mode, keep <b>FEED</b> pressed until after the seventh flash sequence cycle ends, then release <b>FEED</b>.</p>	

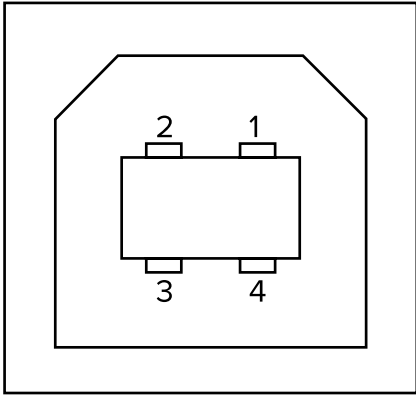
# Interface Wiring

It is important to follow the interface connection specifications for each type of connection you plan to use.

## Universal Serial Bus Interface

The figure below displays the cable wiring required to use the printer's USB interface.

The printer requires a cable or cable packaging that bears the "Certified USB™" mark to guarantee USB 2.0 compliance.

	Pin	Signal
	1	Vbus - N/C
	2	D-
	3	D+
	4	Ground
	Shell	Shield / Drain Wire

For printer supported operating systems and drivers, see the software and documentation CD or visit the Zebra website at [zebra.com](http://zebra.com).

For information on the USB interface, go to the USB website at [usb.org](http://usb.org).

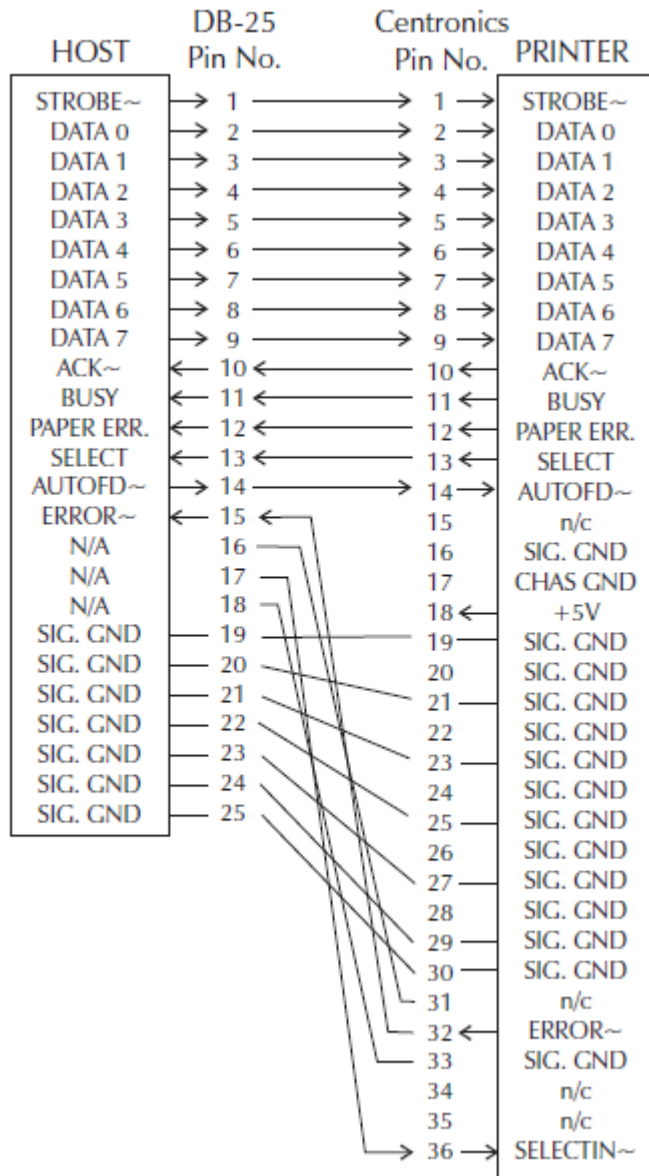
## Parallel Interface

The printer's parallel interface uses the IEEE 1284-A to 1284-B parallel interface cables.

The host connector has a DB-25 pin male connector. The printer connector is a Centronics-style connector. Early model G-Series printers had a DB-25 pin connector on the printer side, as well as on the host connection side (IEEE 1284-A to A parallel cable).



**Figure 6** DB-25 to Centronics (Cable)



## Ethernet Interface

This interface requires a UTP RJ45 Ethernet cable rated CAT-5 or better.

Ethernet interface cable pinouts are listed here.

**Table 9** Ethernet Pinouts

Pinout chart	Signal	Pin	Pin	Signal
	Tx+	1	1	Tx+
	Tx-	2	2	Tx-
	Rx+	3	3	Rx+
	—	4	4	—
	—	5	5	—
	Rx-	6	6	Rx-
	—	7	7	—
	—	8	8	—

## Serial Port Interface

Configurations for the Serial Port Interface are described here.

**Table 10** Serial Port Signal Description

Pin	Description
1	Not used
2	RXD (receive data) input to the printer
3	TXD (transmit data) output from the printer
4	DTR (data terminal ready) output from the printer -- controls when the host may send data
5	Chassis ground
6	DSR (data set ready) input to the printer
7	RTS (request to send) output from the printer -- always in the ACTIVE condition when the printer is turned on
8	CTS (clear to send) - Not used by the printer
9	+5 V @ 0.75 A fused

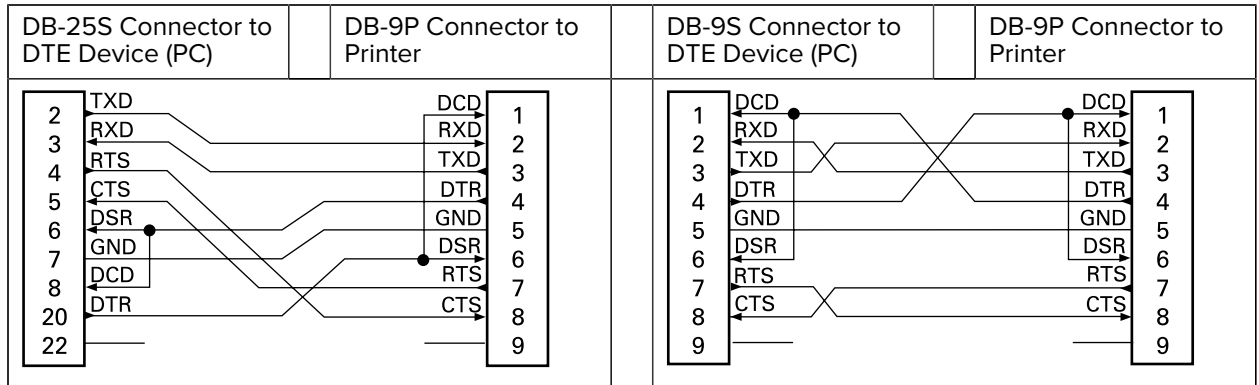


**IMPORTANT:** The maximum current available through the serial and/or parallel port should NOT exceed a total of 0.75 Amps.

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

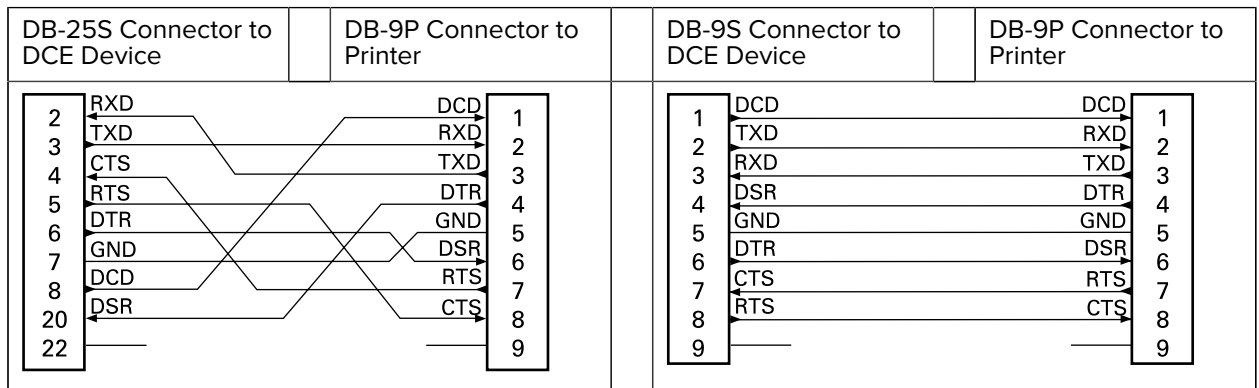
Interconnecting to DTE Devices—The printer is configured as data terminal equipment (DTE). To connect the printer to other DTE devices (such as the serial port of a personal computer), use an RS-232 null modem (crossover) cable. The required cable connections are shown here.

**Table 11** Connecting the Printer to a DTE 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. The connections required for this cable are shown here.

**Table 12** Connecting the Printer to a DCE Device



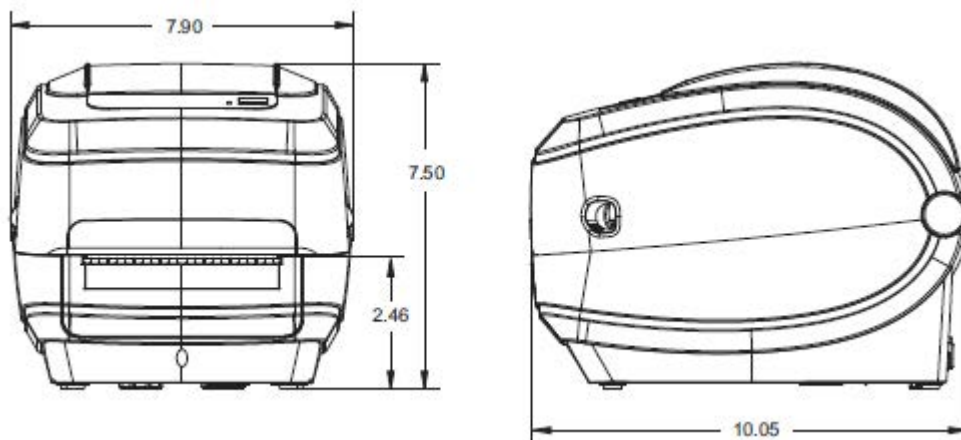
Connecting to the KDU (Keyboard Display Unit)—The KDU was designed for DCE printer connections and requires a Zebra custom serial port gender-changing adapter. The KDU now includes the KDU adapter. The Zebra kit part number for the KDU Adapter is 105934-088.

# Dimensions

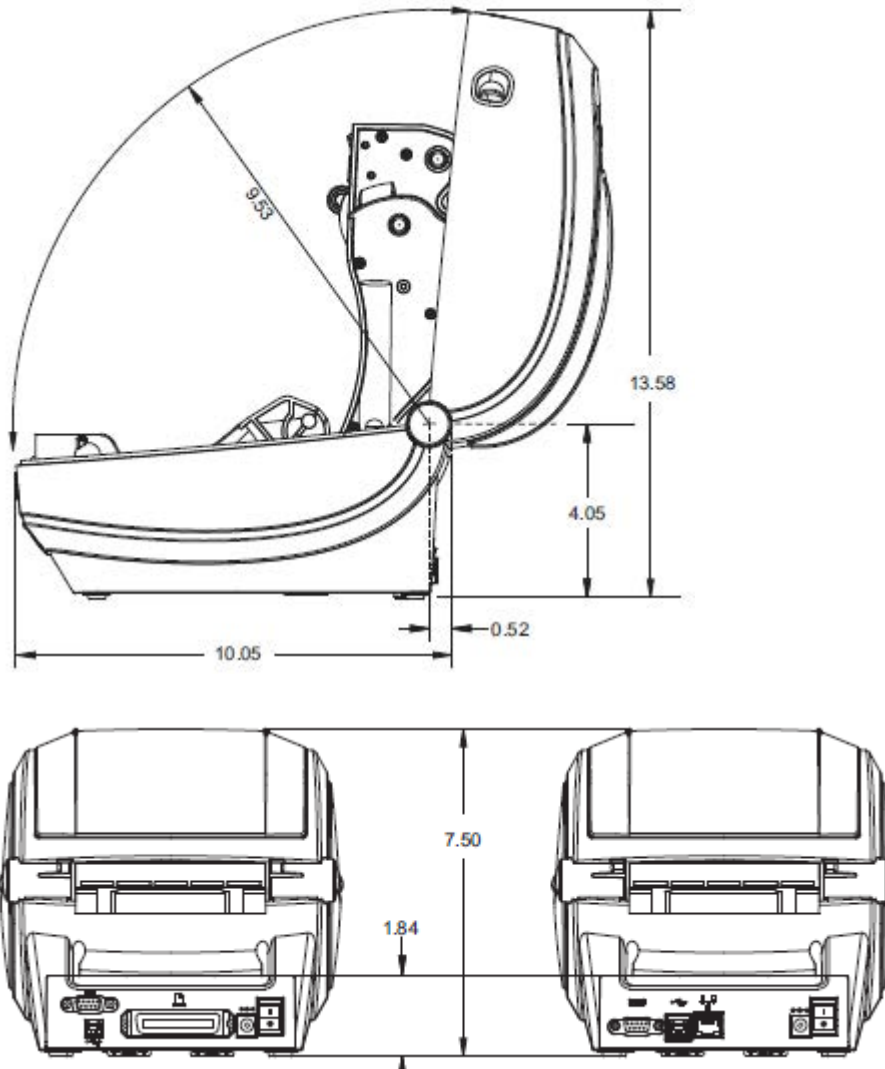
This section provides external printer dimensions.

## GK420 Desktop Thermal Printer – External Dimensions

Dimensions are shown in inches.



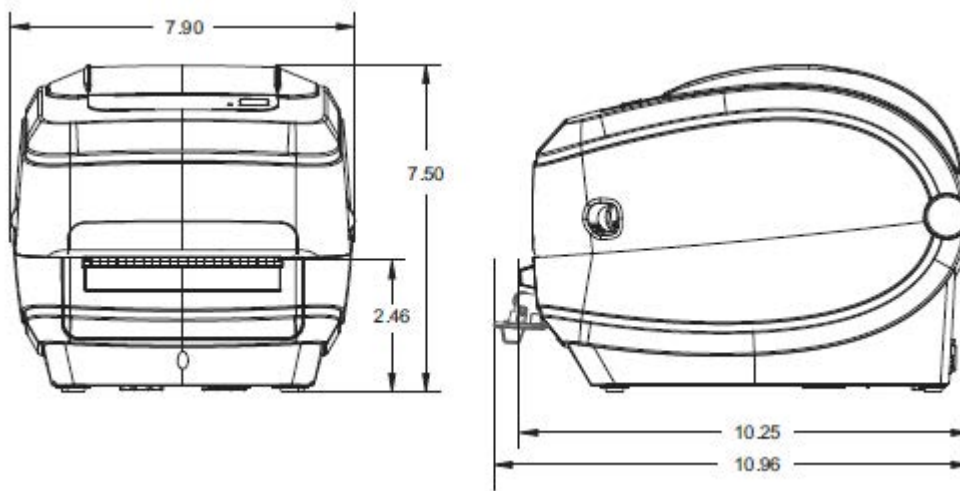
## Dimensions



Dimensions are shown in inches.

## Dimensions

### External Dimensions for GK420 Desktop Thermal Printer with Label Dispenser Installed



# ZPL Configuration

This section provides a basic overview of managing printer configuration, the Configuring Status Printout, and Printer Memory Printouts.

## Managing the ZPL Printer Configuration

The ZPL printer is designed to allow you to change printer settings dynamically for fast first label out printing. Printer parameters that are persistent, will be retained for the following formats to 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 using the **FEED** button mode four-flash routine. See [FEED Button Modes](#) on page 92. 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 your printer.

ZPL stores all parameters at once with a single command discussed above. The legacy EPL programming language (supported by this printer) changes and saves individual commands immediately. Most configurations and 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.

The printer can be made to output a Printer Configuration Label which lists operating parameters and settings. See [Printing a Test \(Printer Configuration\) Label](#) on page 22. You can also use Zebra Setup Utilities and ZebraDesigner Windows driver to print this label and other printer status labels that will help you manage your printer.

## ZPL Printer Configuration Format

Managing more than one printer can be done by creating a printer configuration programming file to send to one or more printers or ZebraNet Bridge can be used to clone a printer's setup.

The figure below shows the basic structure of a ZPL programming configuration file.

See the ZPL programmer's guide and the [ZPL Configuration Status to Command Cross-reference](#) on page 104 to create a programming file. The Zebra Setup Utility (ZSU) can be used to send programming files to the printer. Windows Notepad (text editor) can be used to create programming files.

The Configuration Parameter Format Structure is as show below:

^XA — Start Format Command

Format Commands are order sensitive

- a) General Print and command settings
- b) Media handling and behaviors
- c) Media print size

^ JUS Command to save

^XZ — End Format Command

## ZPL Configuration Status to Command Cross-reference

The Printer Configuration Label, shown below, provides a listing of a majority of the configuration settings that can be set by the ZPL command.

**Figure 7** Example of a Configuration Label Printout

PRINTER CONFIGURATION	
Zebra Technologies	
ZTC GK420t	
ZBR2835016	
16.0.....	DARKNESS
5 IPS.....	PRINT SPEED
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
GAP/NOTCH.....	MEDIA TYPE
WEB.....	SENSOR TYPE
AUTO.....	SENSOR SELECT
THERMAL-TRANS.....	PRINT METHOD
832.....	PRINT WIDTH
1242.....	LABEL LENGTH
39.0IN 989MM.....	MAXIMUM LENGTH
NOT CONNECTED.....	USB COMM.
NONE.....	PROTOCOL
LINER/TAG FULL.....	CUTTER TYPE
<~> 7EH.....	CONTROL CHAR
<^> 5EH.....	COMMAND CHAR
<.> 2CH.....	DELIM. CHAR
ZPL II.....	ZPL MODE
NO MOTION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
NO.....	HEXDUMP
046.....	WEB S.
096.....	MEDIA S.
021.....	WEB GAIN
050.....	MARK S.
004.....	MARK GAIN
095.....	MARK MED S.
014.....	MARK MEDIA GAIN
095.....	CONT MEDIA S.
007.....	CONT MEDIA GAIN
075.....	RIBBON OUT
040.....	RIBBON GAIN
066.....	TAKE LABEL
ON.....	MODES ENABLED
OFF.....	MODES DISABLED
832 B/MM FULL.....	RESOLUTION
V61.17.8ZG05 <~>.....	FIRMWARE
1.3.....	XML SCHEMA
V26.00.00.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
2104k.....R:	RAM
1536k.....E:	ONBOARD FLASH
NONE.....	FORMAT CONVERT
DISABLED.....	ZBI
2.1.....	ZBI VERSION
14.409 IN.....	LAST CLEANED
59.208 IN.....	HEAD USAGE
59.208 IN.....	TOTAL USAGE
59.208 IN.....	RESET CNTR1
59.208 IN.....	RESET CNTR2
TOP-09.....	SERIAL NUMBER
MAINT. OFF.....	EARLY WARNING
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	



1	Sensor settings used for service purposes
---	---

**Table 13** ZPL Commands and Configuration Receipt Callout Cross-Reference

Command	Listing Name	Description
~SD	DARKNESS	Default: 10.0
^PR	PRINT SPEED	Default: 6 IPS / 152.4 mm/s (max.)
~TA	TEAR OFF	Default: +000
^MN	MEDIA TYPE	Default: GAP/NOTCH
	SENSOR TYPE	Default: WEB
	SENSOR SELECT	Default: AUTO (^MNA - Auto-Detect)
^PW	PRINT WIDTH	Default: 832 (dots)
^LL	LABEL LENGTH	Default: 1225 (dots) (the value constantly recalibrates with automatic Web-Gap detection for label media)
^ML	MAXIMUM LENGTH	Default: 39.0IN 989MM
—	USB COMM.	Connection Status: Connected / Not Connected
—	PARALLEL COMM.	Connection Available: BIDIRECTIONAL
^SCa	BAUD	Default: 9600
^SC , b	DATA BITS	Default: 8 BITS
^SC , , c	PARITY	Default: NONE
^SC , , , e	HOST HANDSHAKE	Default: DTR & XON/XOFF
^SC , , , , f	PROTOCOL	Default: NONE
	SER COMM. MODE	Default: AUTO
	CUTTER TYPE	Option Present: LINER/TAG FULL (cut)
^CT / ~CT	CONTROL CHAR	Default: <~> 7EH
^CC / ~CC	COMMAND CHAR	Default: <^> 5EH
^CD / ~CD	DELIM./CHAR	Default: <,> 2CH
^SZ	ZPL MODE	Default: ZPL II
^MFa	MEDIA POWER UP	Default: NO MOTION
^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)

From this point in the Configuration Receipt listing, the printout has sensor settings and values are displayed to troubleshoot sensor and media operations. These are typically used by Zebra Tech Support to diagnose printer problems.

The configuration settings listed here resume after the TAKE LABEL sensor value. These listings contain printer features seldom changed from default or provide status information (e.g. Firmware Version).

**Table 14** ZPL Commands and Configuration Receipt Callout Cross-Reference

Command	Listing Name	Description
^MP	MODES ENABLED	Default: CWF (See ^MP Command) (CWF for wireless printers with display)
	MODES DISABLED	Default: (nothing set)
^JM	RESOLUTION	Default: 832 8/mm FULL (203 dpi) 1280 8/mm FULL (300 dpi)
—	FIRMWARE	Lists ZPL Firmware Version
—	XML SCHEMA	1.3
—	HARDWARE ID	Lists Firmware Boot-block Version
—	CONFIGURATION	CUSTOMIZED (after first use)
—	RAM	2104k..... R:
—	OPTION MEMORY	65536k.....B: (only displays this if installed)
—	ONBOARD FLASH	1536k.....E:
^MU	FORMAT CONVERT	NONE
^JI / ~JI	ZBI	DISABLED (Requires key to enable)
	ZBI VERSION	2.1
^JH ^MA ~RO	LAST CLEANED	X,XXX IN
	HEAD USAGE	X,XXX IN
	TOTAL USAGE	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR1	X,XXX IN
—	SERIAL NUMBER	XXXXXXXXXXXX
^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

To help you manage printer resources, the printer supports a variety of format commands to manage memory, transfer objects (between memory areas, import, and export), object naming, and provide various printer operating status reports.

They are very similar to the old DOS commands like `DIR` (directory listing) and `DEL` (delete file). The most common reports are also part of the Zebra Setup Utility and ZebraDesigner Windows driver.

^XA — Start Format Command	
	(A Single Format Command is recommended for purposes of reuse.)
^XZ — End Format Command	

It is preferable to use a single command be processed within this type of format (form). A single command is easily reused as a maintenance and development tool.

Many of the commands that transfer objects, manage, and report on memory are control (~) commands. They do not need be within a format (form). They will be processed immediately upon receipt by the printer whether in a format (form) or not.



**NOTE:** To maximize available printer memory, the printer includes an automatic memory defragmentation (defrag). Several factors can trigger a defrag operation. Changing memory by deleting or adding objects to memory can cause a defrag. The printer status light will begin flashing Red, Amber and Green when a memory defrag is in process. Do not turn off the printer's power while the status light is flashing. This operation may take several minutes if memory use and file fragmentation are high.

## ZPL Programming for Memory Management


ZPL has various printer memory locations that are used to run the printer, assemble the print image, store formats (forms), graphics, fonts, and configuration settings.

- 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: i.e. 123456789ABCDEF.TTF
  - Legacy ZPL printers with V60.13 firmware and earlier can only use the 8.3 file name format versus today's 16.3 file name format.
- Allows moving objects between memory locations and deleting objects.
- Supports DOS directory-style file list reports as printouts or status to the host.
- Allows use of wild cards (\*) in file access

**Table 15** Object Management and Status Report Commands

Command	Name	Description
^WD	Print Directory Label	Prints a list of objects and resident bar codes and fonts in all addressable memory locations.
~WC	Print Configuration Label	Prints a configuration Status Receipt (Label) Same as <b>FEED</b> button mode one-flash routine. See <a href="#">FEED Button Modes</a> on page 92.

**Table 15** Object Management and Status Report Commands (Continued)

Command	Name	Description
^ID	Object Delete	Deletes objects from the 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 wide variety of printer usable programming objects: fonts (OpenType and TrueType), graphics, and other object data types.   <b>NOTE:</b> It is recommended that you 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.

