GK420d

Desktop Printer

User Guide

Terms of Use

Proprietary Statement

This manual contains proprietary information of Zebra Technologies Corporation and its subsidiaries ("Zebra Technologies"). It is intended solely for the information and use of parties operating and maintaining the equipment described herein. Such proprietary information may not be used, reproduced, or disclosed to any other parties for any other purpose without the express, written permission of Zebra Technologies.

Product Improvements

Continuous improvement of products is a policy of Zebra Technologies. All specifications and designs are subject to change without notice.

Liability Disclaimer

Zebra Technologies takes steps to ensure that its published Engineering specifications and manuals are correct; however, errors do occur. Zebra Technologies reserves the right to correct any such errors and disclaims liability resulting therefrom.

Limitation of Liability

In no event shall Zebra Technologies or anyone else involved in the creation, production, or delivery of the accompanying product (including hardware and software) be liable for any damages whatsoever (including, without limitation, consequential damages including loss of business profits, business interruption, or loss of business information) arising out of the use of, the results of use of, or inability to use such product, even if Zebra Technologies has been advised of the possibility of such damages. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Contents

Contents

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
    - Drop-down 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.

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.

NOTE: This is an icon for wired networking notes.

NOTE: This is an icon for wireless networking notes.

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

The Zebra GK420d printer provides 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.

The G-Series printer features:

- Automatic printer language detection and switching between ZPL and EPL programming and label formats.
- OpenAccess™ design for simplified media loading.
- 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: faster 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 are enabled and customizable by the user.
- The G-Series direct thermal printer models also include support for Line Mode printing to support EPL1 legacy programming-based printing applications.

The GK printers offer these basic printer options:

- 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.

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.

Your printer, when connected to a host computer, functions as a complete system for printing labels and tags.

NOTE: Many printer settings may also be controlled by your printer's driver or label design software. 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.
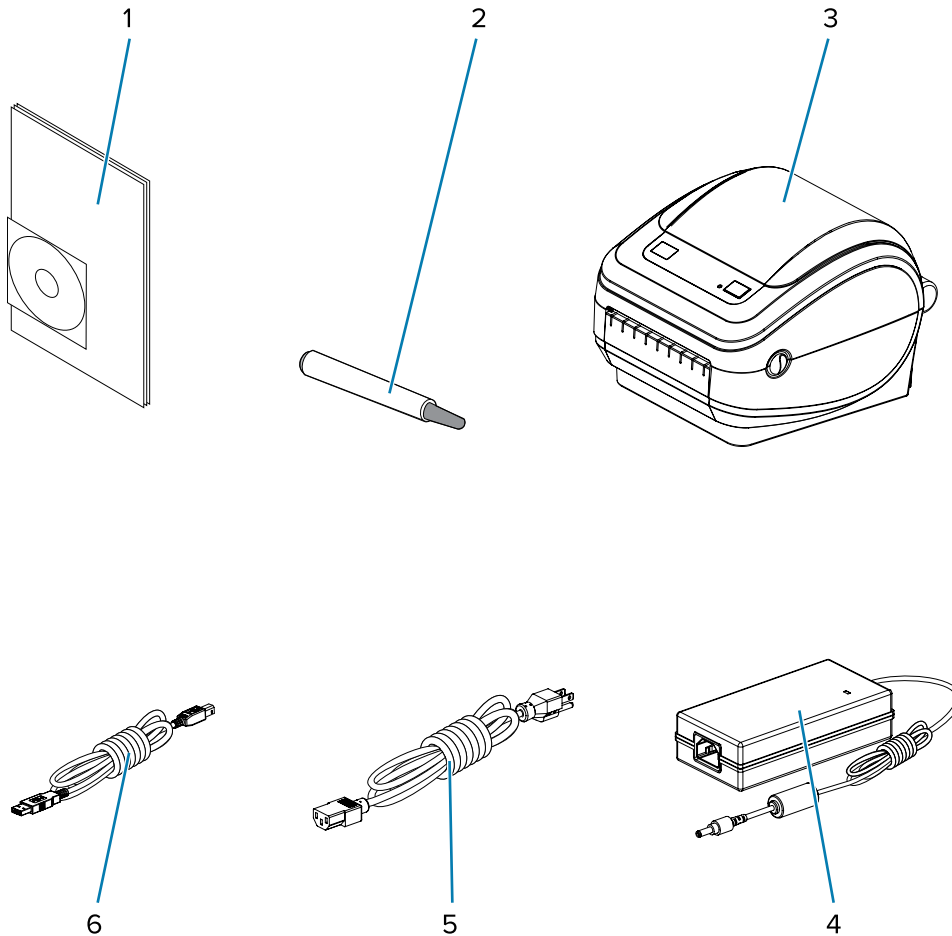
1	Documentation and software
2	Cleaning pen
3	Printer

4	USB cable
5	Power cord (varies by locale or region)
6	Power supply

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   Your Printer
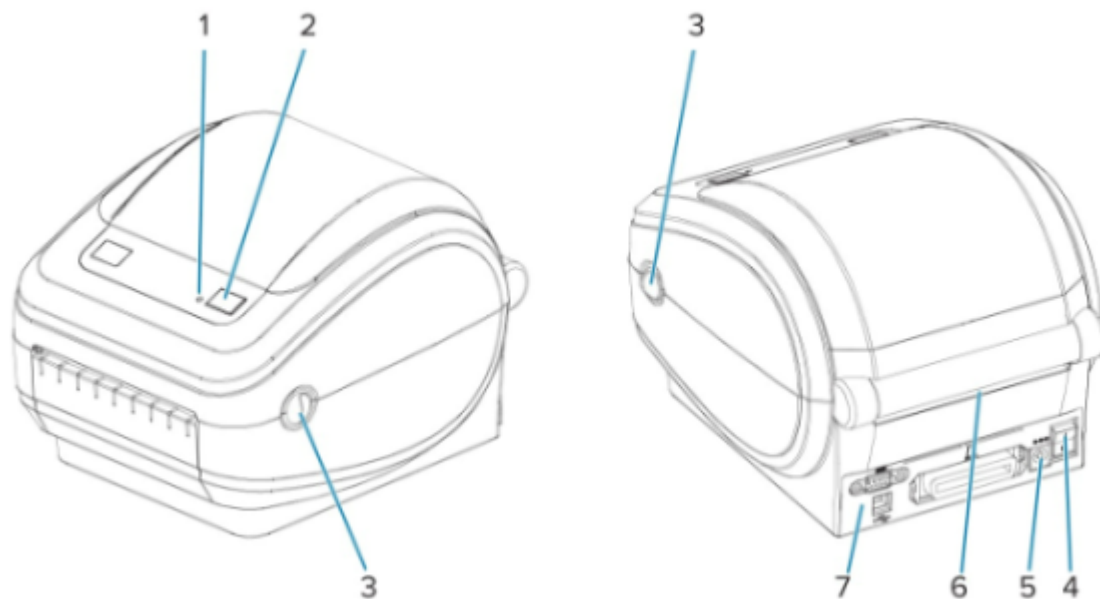
1	Status light
2	Feed button
3	Release latches
4	Power switch
5	DC power receptacle
6	Fanfold media entry slot
7	Interface connectors

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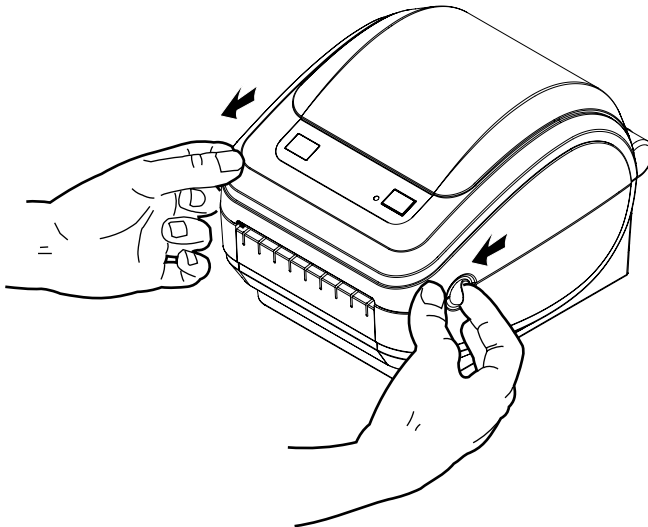
⚠️ **CAUTION:** The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the printhead or electronic components used in this device. You must observe static-safe procedures when working with the printhead or the electronic components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

Printer Features

Figure 2   GK420D Features
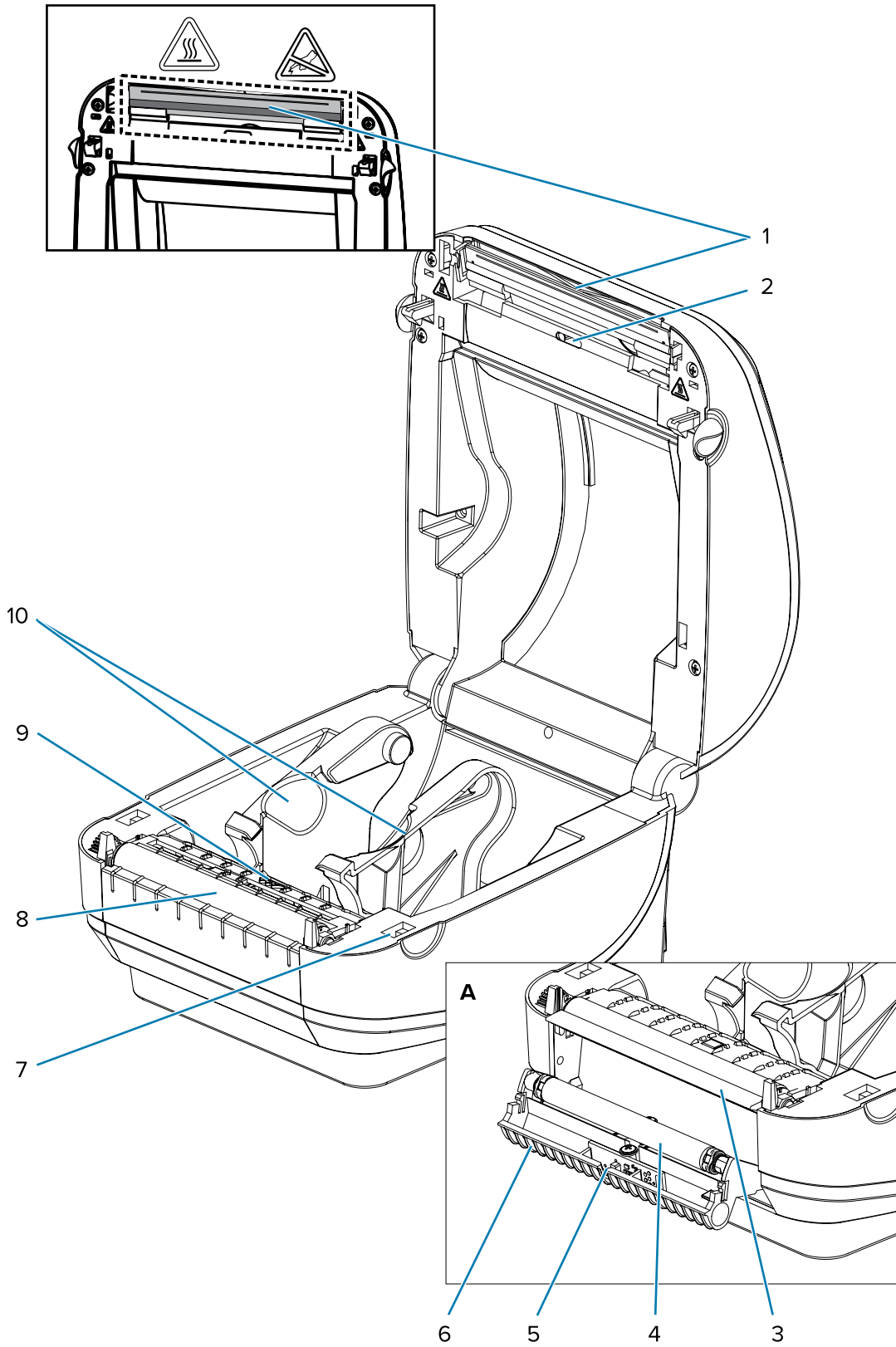
1	Printhead
2	Gap sensor
3	Peel bar
4	Pinch roller
5	Sensor
6	Dispenser door (open)
7	Head-up sensor (inside)
8	Platen roller
9	Blackline sensor
10	Roll holder and media guides
A	Dispenser option

Operator Controls

These sections describe the operator controls of the printer.

Power Switch

Press up to turn ON or down to turn OFF the printer.

⚠️ **CAUTION:** The printer power should be turned off before connecting or disconnecting the communications and power cables.
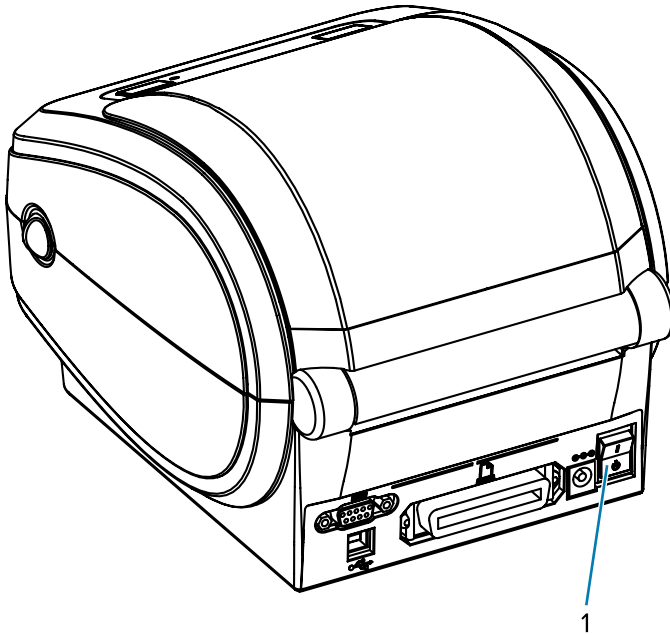
1	Power switch

Feed Button

The **Feed** Button is used to perform a variety of actions.

- Tap the **Feed** button once to force the printer to feed one blank label.

- Press the **Feed** button 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 on page 78 for details.

- Use the **Feed** button as described in Feed Button Modes on page 85 to set up the printer or obtain its status.

Status Light

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

See Status Light Descriptions on page 78 for more information on what the various indications convey.
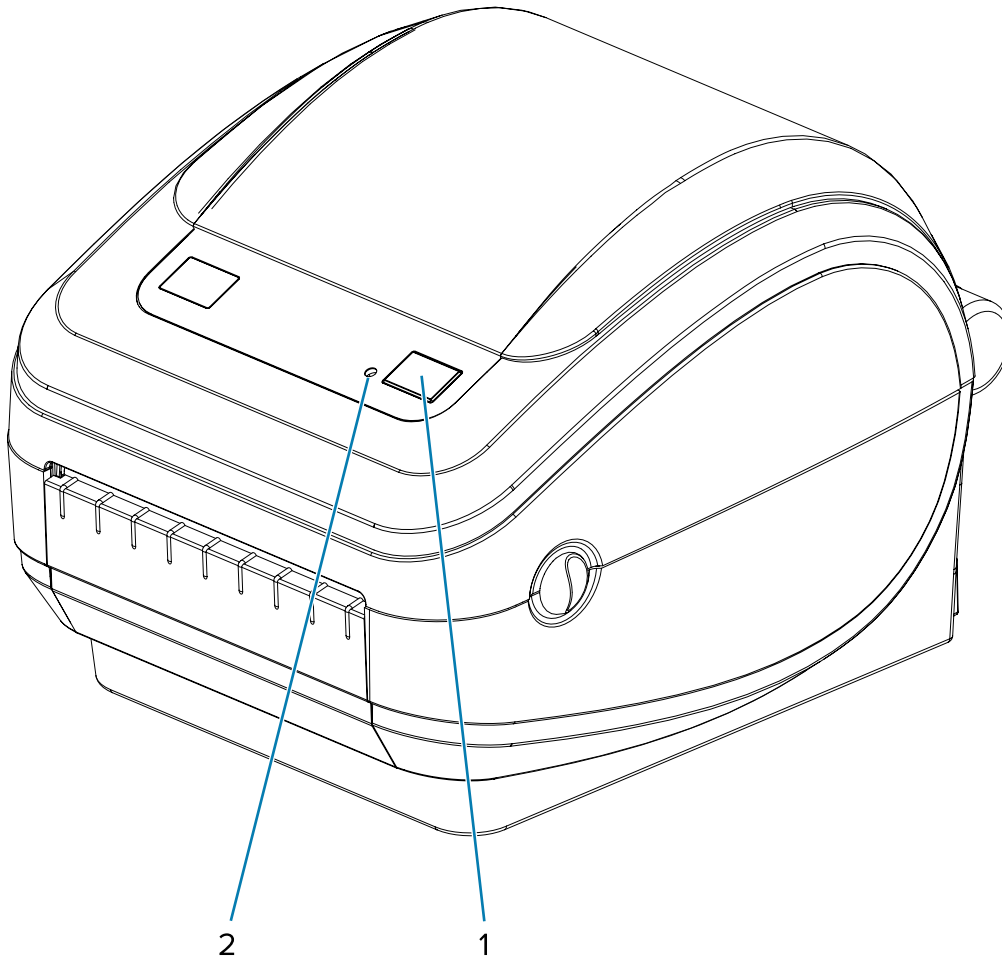
1	Feed button
2	Status light

Closing the Printer

After loading media, securely close the printer cover.

1. Lower the top cover.
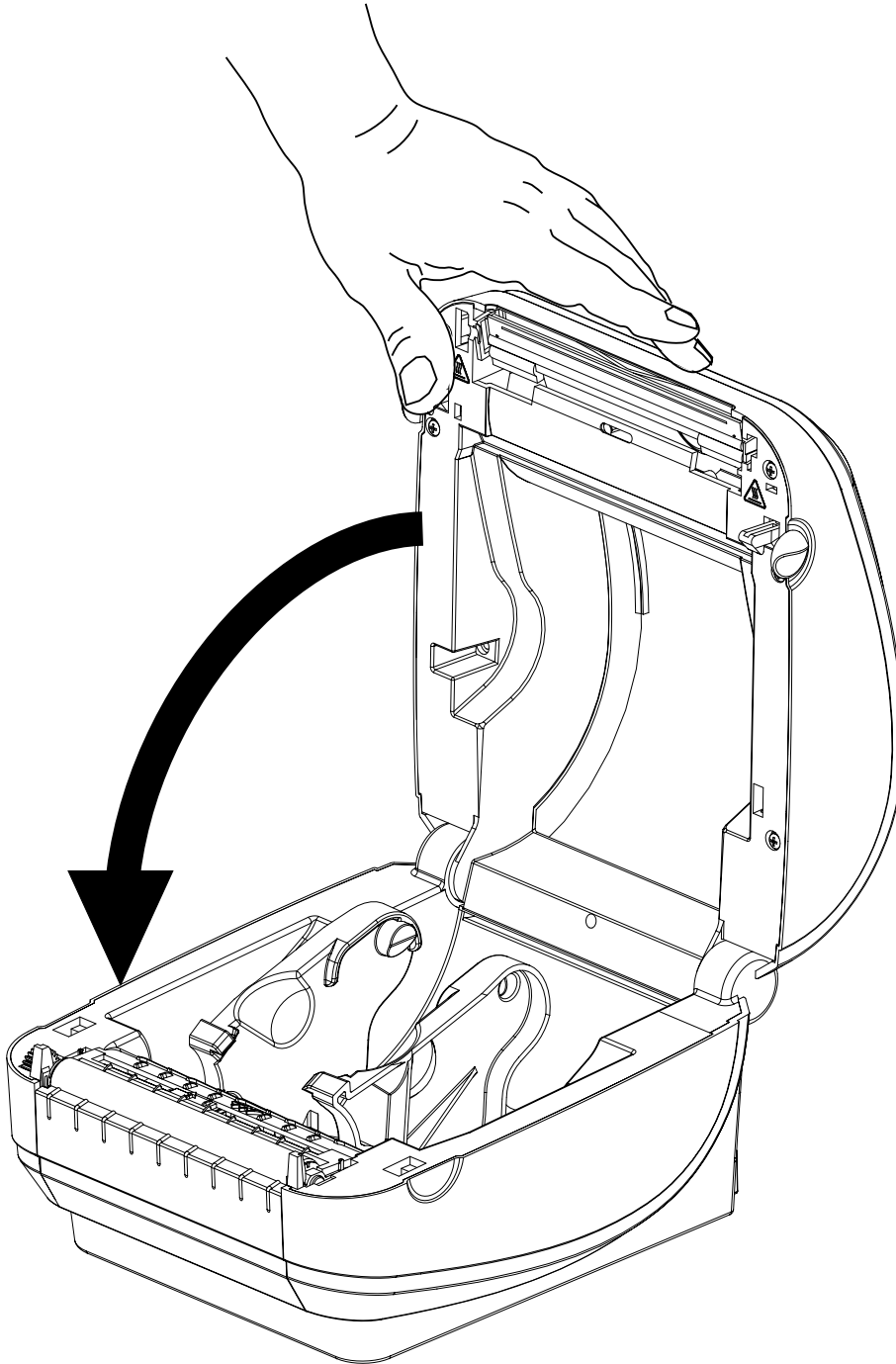
2. Press down until the cover snaps closed.
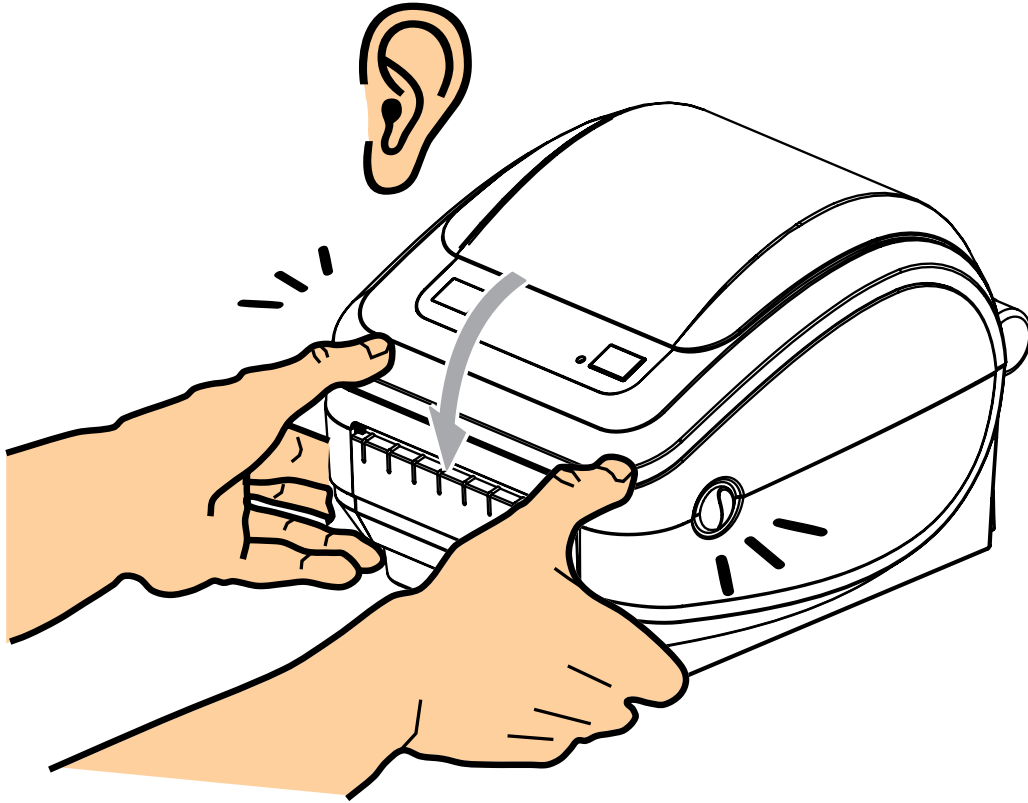
Getting Started

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 (1) the hardware setup and (2) 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 (see step 2 on page 18).

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 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 19.)

2. Access 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.

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 19).

4. Load the media (see Loading Roll Media on page 20).

   The printer auto-calibrates (see Media Sensing on page 52).

5. Print a Configuration Report to verify basic printer operation (see Printing a Test (Printer Configuration) Label on page 23).

6. Turn the printer OFF (**O**).

7. 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 connection.

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.

NOTE: 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.
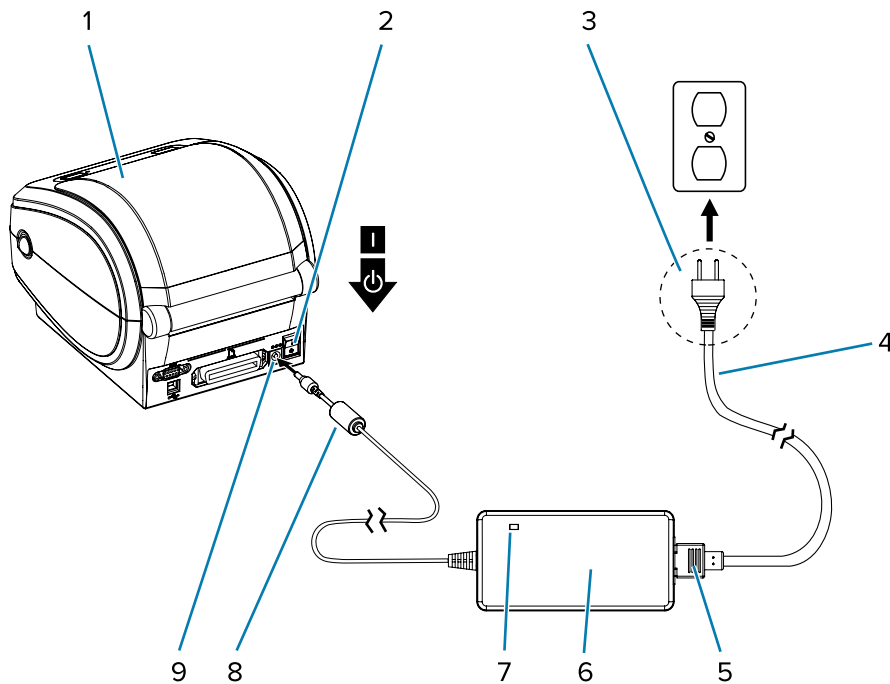
1	Printer
2	Power switch
3	Plug (varies by country)
4	AC power cord
5	IEC 60320 C-13

6	Power supply
7	Active power light
8	Power connector
9	Power receptacle

NOTE: Ensure the appropriate power cord with a three (3) prong plug and an IEC 60320-C13 connector are used at all times. These power cords must bear the 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

Whether your roll media is inside or outside wound, you load it into 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.
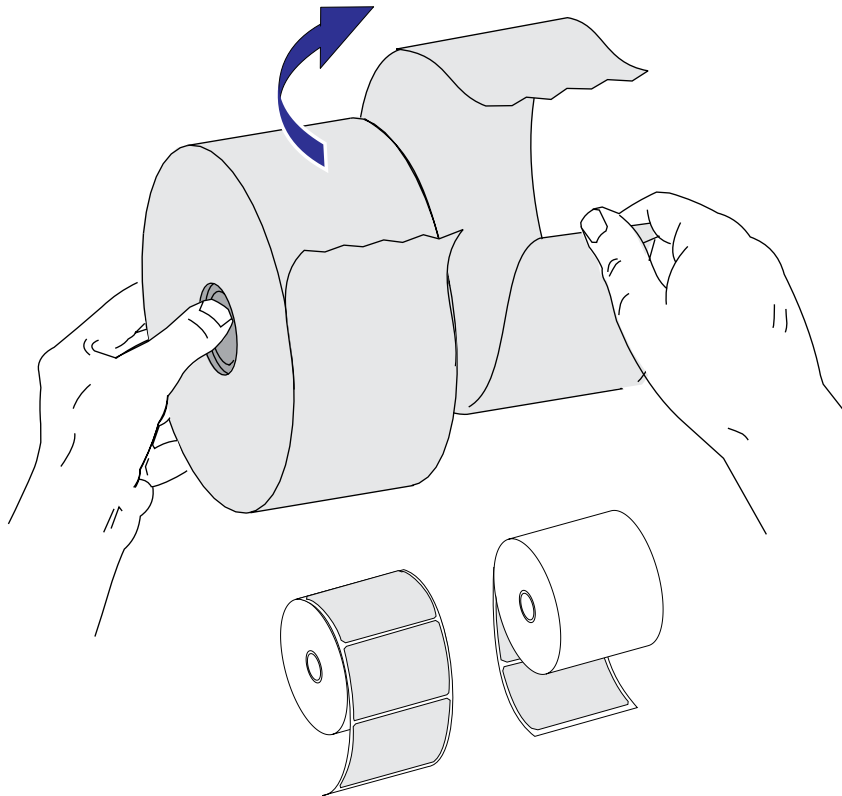
Placing the Roll in the Media Compartment

Before using the printer install the media roll into the printer.

1. Open the printer. Remember that you need to pull the release latch levers toward the front of the printer.

2. Open the media roll holders. Pull the media guides open with your free hand and place the media roll on the roll holders and release the guides. Orient the media roll so that its printing surface will face up as it passes over the platen (drive) roller.
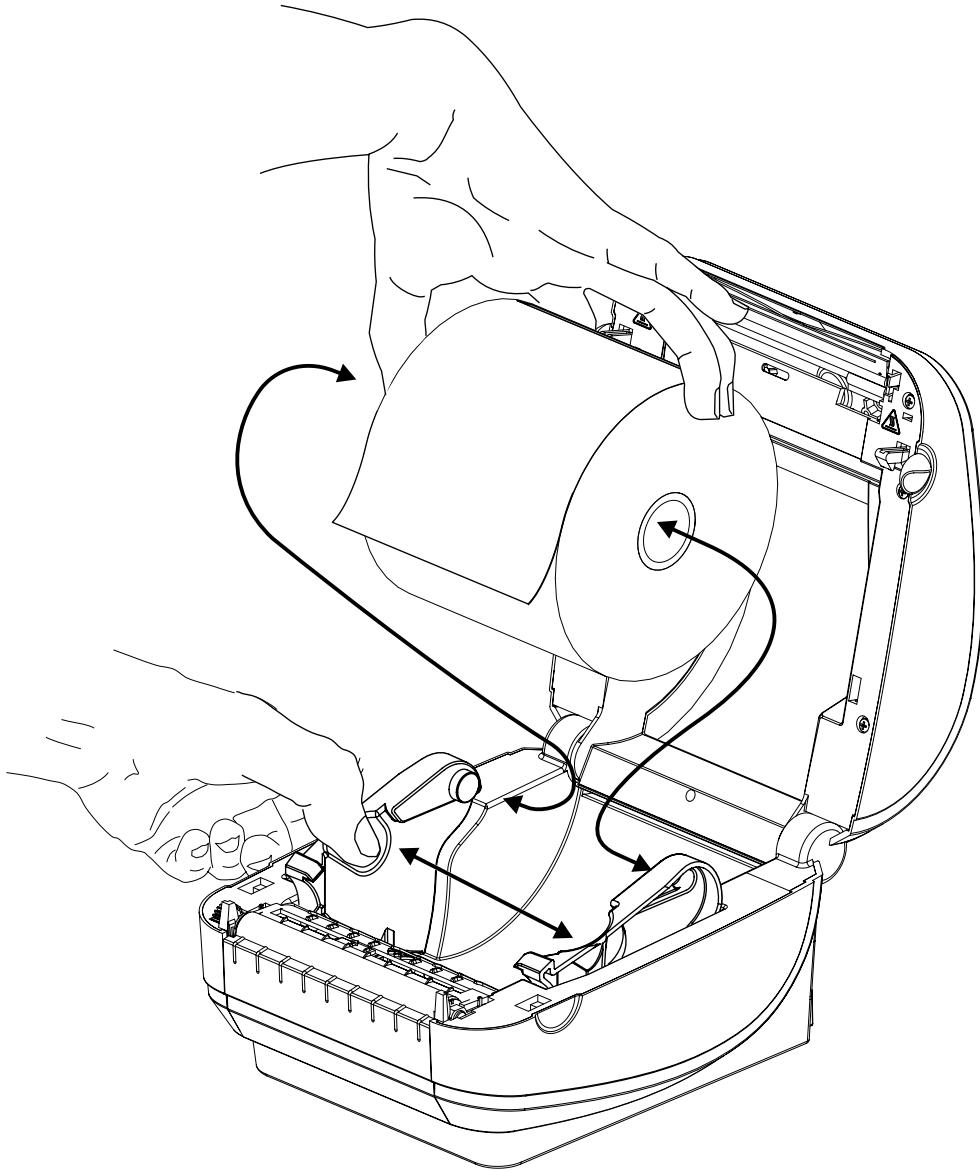
3. Pull the media so that it extends out of the front of the printer. Verify the roll turns freely. The roll must not sit in the bottom of the media compartment. Verify that the media's printing surface is facing up.
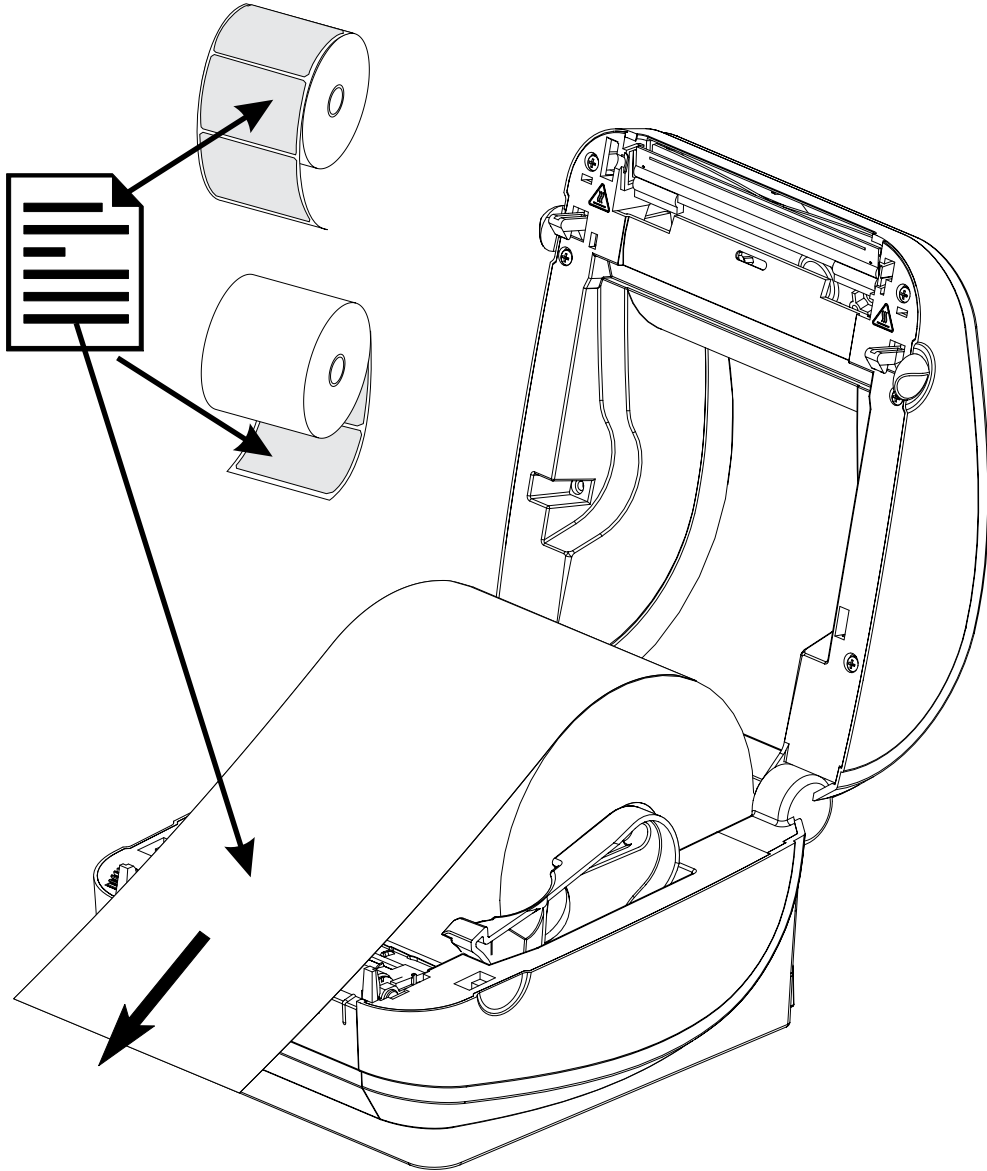
4. Push the media under both of the media guides.
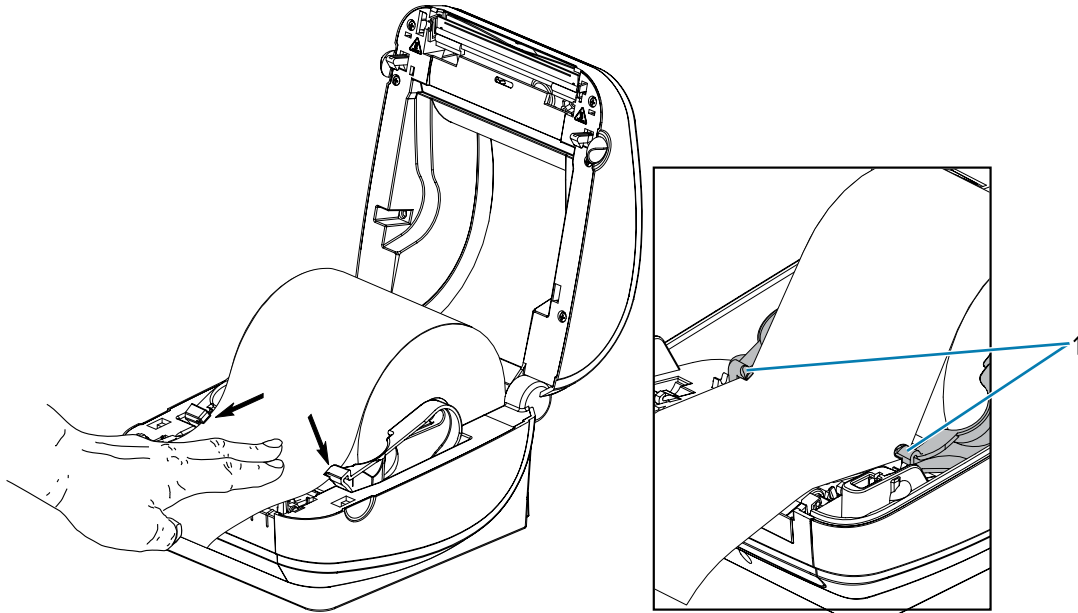
1	Media guides

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

The printer auto-calibrates (see Media Sensing on page 52).

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.

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

Option	Description
If the printer initializes with the status light blinking green (pause mode)...	Press the **Feed** button 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 Troubleshooting on page 78 section.

3. Press the **Feed** button two to three times to allow the printer to calibrate for the installed media.

The printer auto-calibrates (see Media Sensing on page 52) and may feed several labels during this process.

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

    A configuration label will print. If you cannot get this label to print, see

    Figure 3   `CFG-LBL-01_GK420d.tif`

5. Turn off the printer.

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 Utility is designed to assist you with installing these interfaces. Be sure to review the cabling and unique parameters for each physical printer communication interface in Interface Cable Requirements on page 34 and Interface Wiring on page 89. This will help you make configuration setup choices before and immediately after applying power to the printer.

⚠️ **CAUTION:** 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.

The Zebra Setup Utility configuration wizards will instruct you to turn the printer's 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.

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, do NOT connect any cables from your computer to the printer UNTIL you are instructed to do so by the installation wizards.

If you connect the cables at the wrong time, your printer will not install the correct printer drivers. To recover from incorrect driver installation, see What to Do If You Forget to Install Printer Drivers First on page 41.

Pre-install Windows® Printer Drivers

Zebra is changing the way you install and use your printer with your Windows-based PC systems.

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.

We recommend that, at minimum, you 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.

  Zebra Setup Utilities and Zebra Windows printer drivers are available on the CD provided with your printer. For later versions, go to the Zebra website at zebra.com.

- ZebraDesigner Driver and Zebra Setup Utilities—The driver supports 32-bit and 64-bit Windows OS and is Microsoft Certified. It can be installed on Windows 7, Windows Vista, Windows XP, Windows 2000, Windows Server 2008, and Windows Server 2003 OS.

  ZebraDesigner driver and Zebra Setup Utilities support the following G-Series 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, namely Windows 7, Windows Vista, Windows XP, Windows 2000, Windows Server 2008, and Windows Server 2003 OS.

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.

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 29.
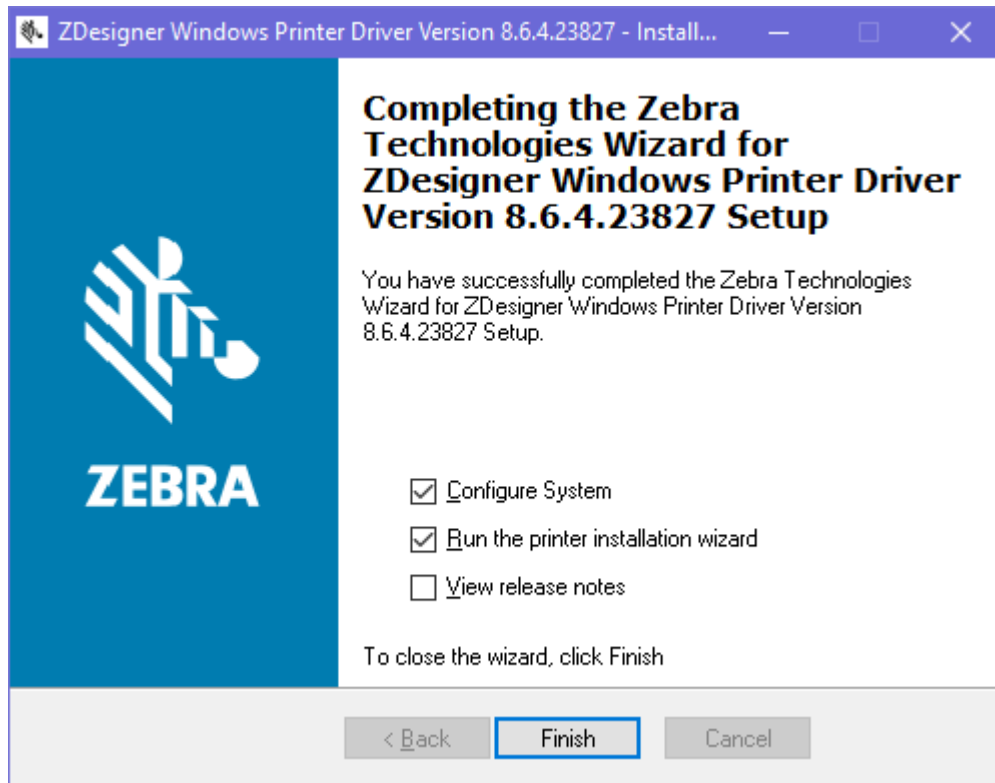
7. Select **Configure System**, then click **Finish**.

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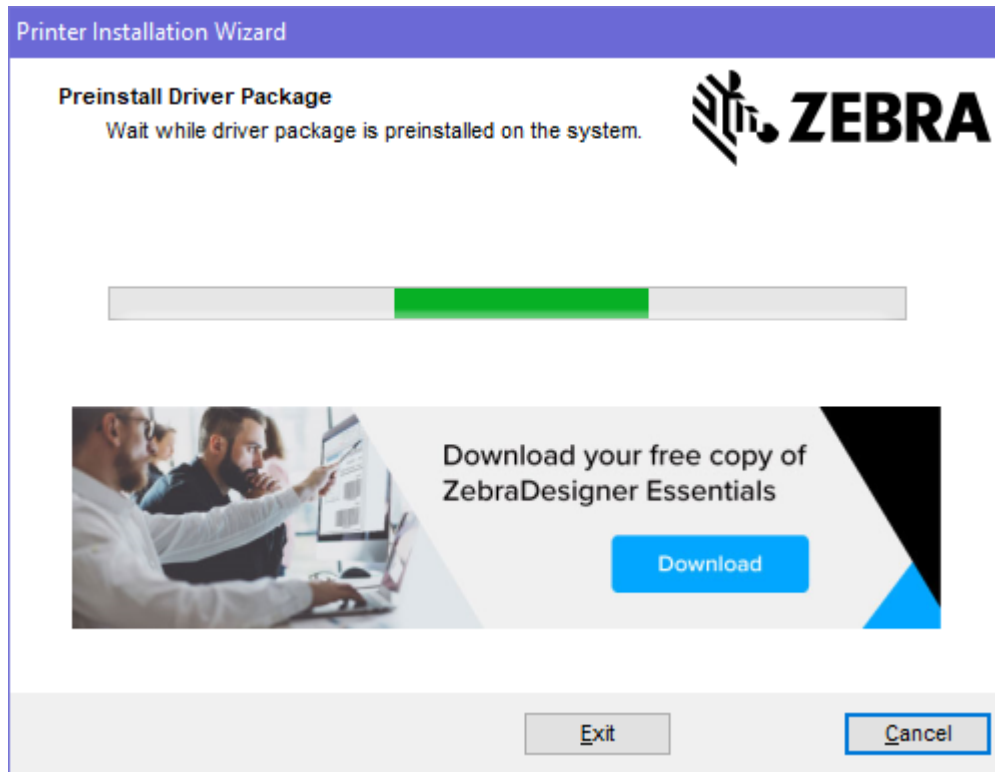
Running the Printer Installation Wizard

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**.

Printer Installation Wizard

Installation Options
Please select one of the driver installation or removal options.

→ **Install Printer Driver**
Installs printer driver.

→ **Update Printer Drivers**
Updates one or more already installed printer drivers.

→ **Uninstall Printer Drivers**
Uninstalls one or more printer drivers.

→ **Remove Preloaded Drivers**
Removes preloaded drivers.

Exit   < Previous   Next >

3. Click **Install Printer Driver**.

The license agreement displays.

4. Read and accept the terms of the license agreement, and then click **Next**.
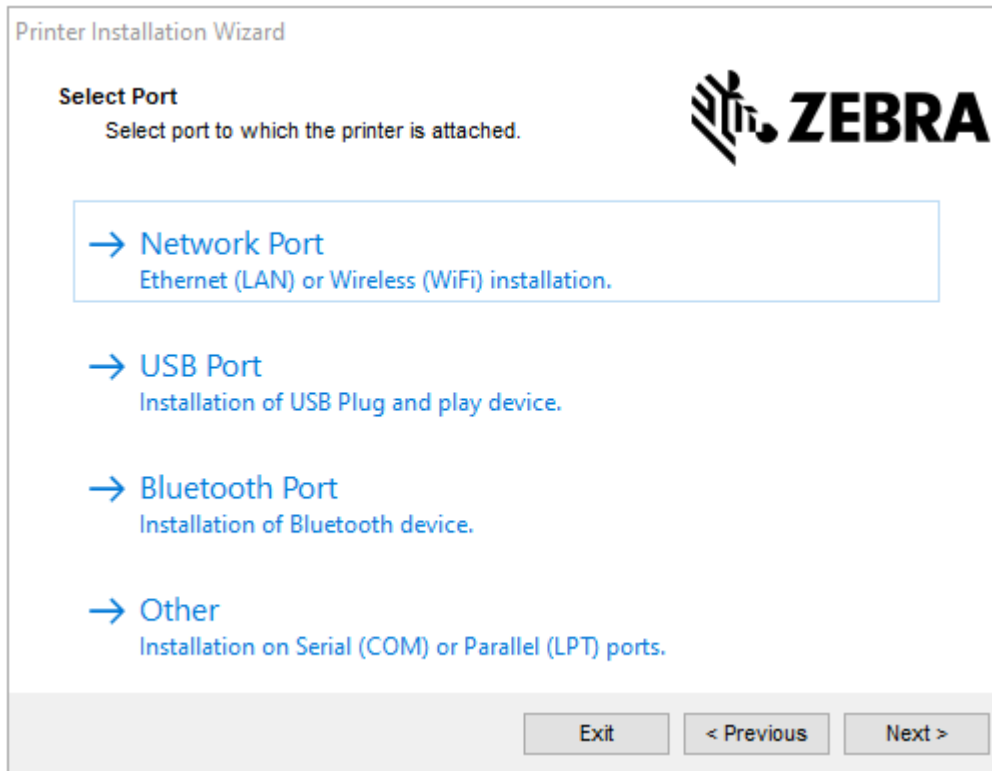
5. Select the communication option that you want to configure for your printer:

- Network Port: For installing printers with an Ethernet (LAN) or wireless (Wi-Fi) network connection. Wait for the driver to scan your local network for devices and follow the prompts.

- USB Port: For installing printers connected with the USB cable. Connect the printer 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: For installing printers with a Bluetooth connection.

- Other: For installation on 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.

The model and resolution are on the printer configuration label. See Printing a Test (Printer Configuration) Label on page 23 for instructions on printing a label.)

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 via 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 and have bidirectional communications.

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 the Zebra Setup Utility, 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 if:

- it is reconnected to the USB interface, or

- if printer power is turned on when the PC has finished rebooting the OS.

> **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 29

Ignore the "new device detected" warnings and close the Taskbar prompts. Wait several seconds for the operating system 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 29.

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. The G-Series printer requires data Flow Control set to Hardware.

> **NOTE:** At this time, G-Series printers do not support Windows Serial Port Plug and Play (PnP) device detection.

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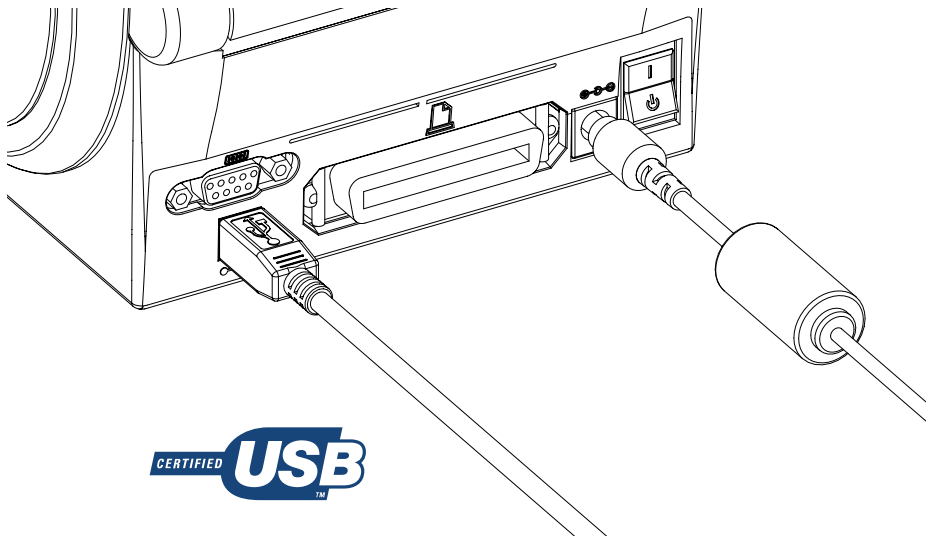
ⓘ **IMPORTANT:** Wait to apply power to the printer until after you have installed the drivers on the PC.

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.

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 by:

- Autobaud synchronization
- Programming using the ZPL ^SC Command on page 35
- Programming using the EPL Y Command on page 36
- Resetting the Default Serial Port Parameters on page 36

Autobaud

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

To autobaud:

1. Press and hold the **Feed** button until the green status LED flashes once, twice, and then three times.

2. While the status LED flashes, send the `^XA^XZ` command sequence to the printer.

3. When the printer and host are synchronized, the LED changes to 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 the **Feed** button 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 LED rapidly flashes amber and green, press the **Feed** button.

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.
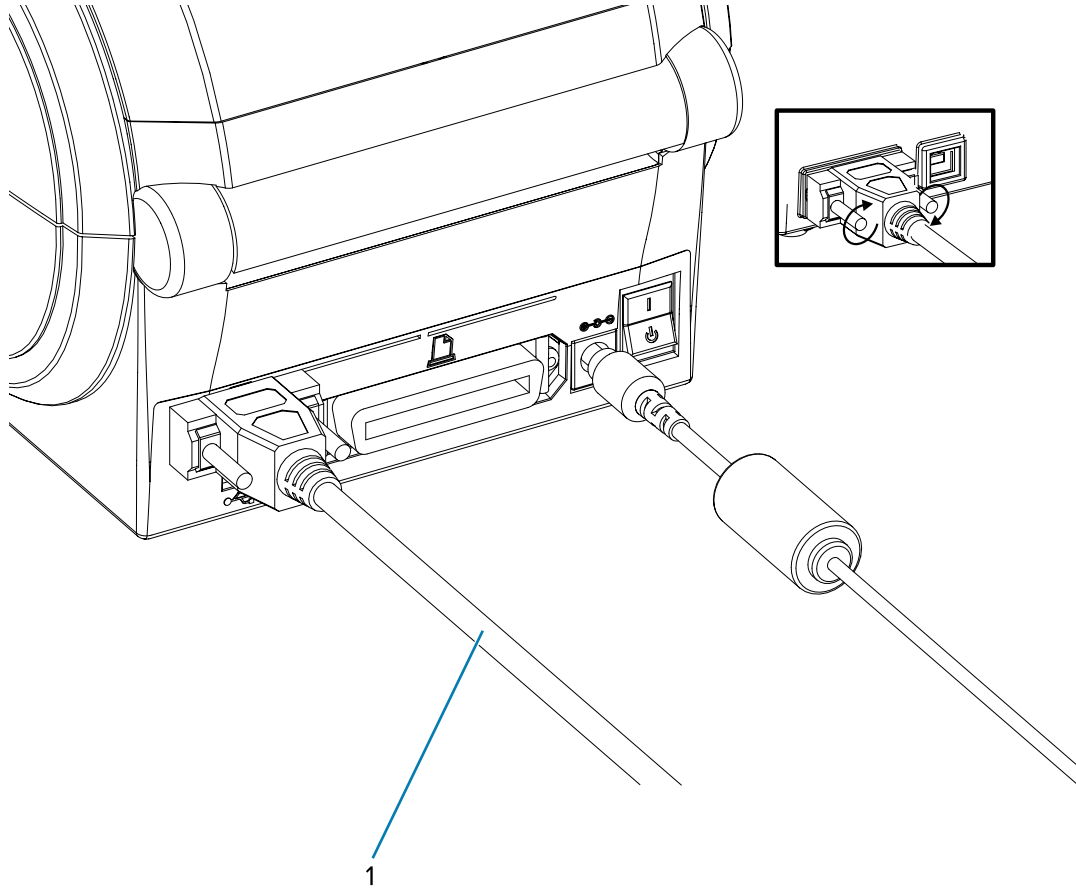
1	Serial cable (tighten the screws after plugging in the cable)

Parallel Port

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

Early models of 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).
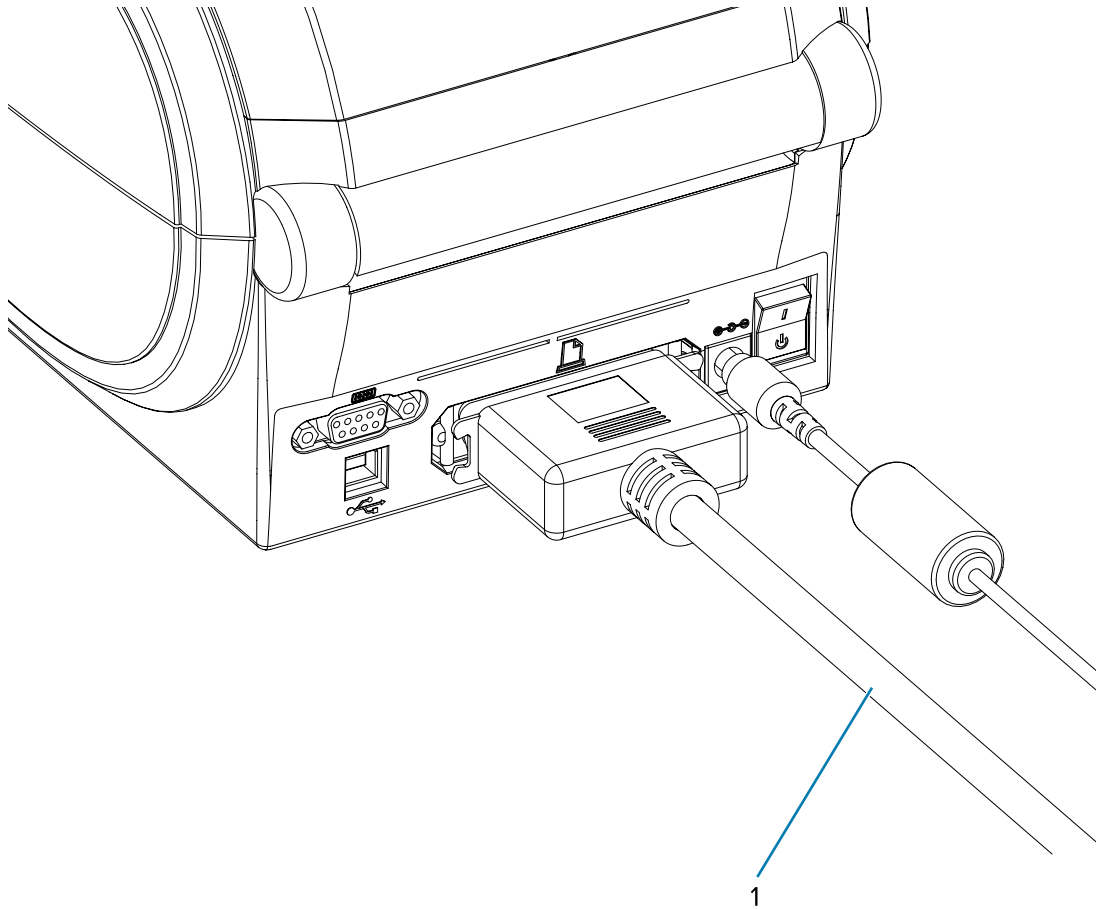
| 1 | Parallel Cable |

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). The print server onboard your printer can be accessed through the printer's Web pages.
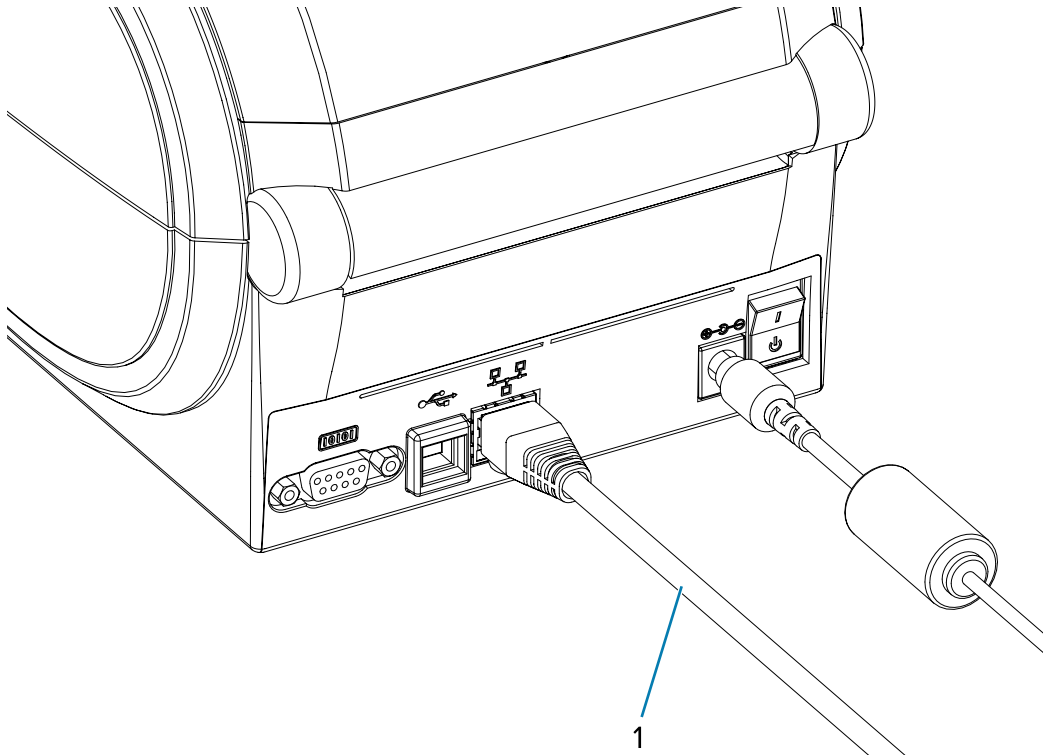
1	Ethernet Cable (RJ45 Connector)

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
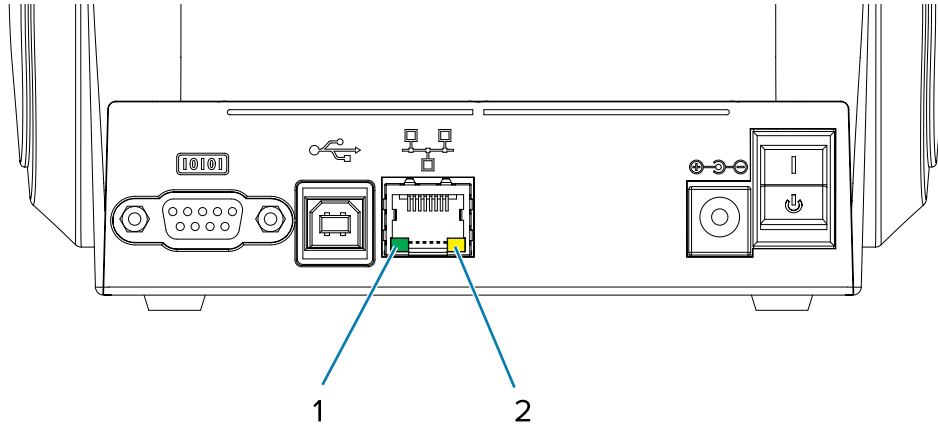
1	Green LED
2	Amber LED

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, coping a basic ASCII text file with a single command (~WC) to print a configuration status label.

Test Printing with Zebra Setup Utility

Test communications using the Zebra Setup Utility.

1. Open the Zebra Setup Utility.

2. Click on the newly installed printer's icon to select the printer and activate the printer configuration buttons below it in the window.

3. Click the **Open Printer Tools** button.

4. In the **Print** tab window, click on the **Print configuration label** line and click on the **Send** button. The printer should print a configuration status label.

Test Printing with Windows Printer and Faxes Menu

Print a test with 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.

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:

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

4. Type the word `put` followed by the file name and enter. For this test print file, it would be: `put TEST.ZPL` The printer should print a new Print Configuration Status label.

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.

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

The properties for the device display.
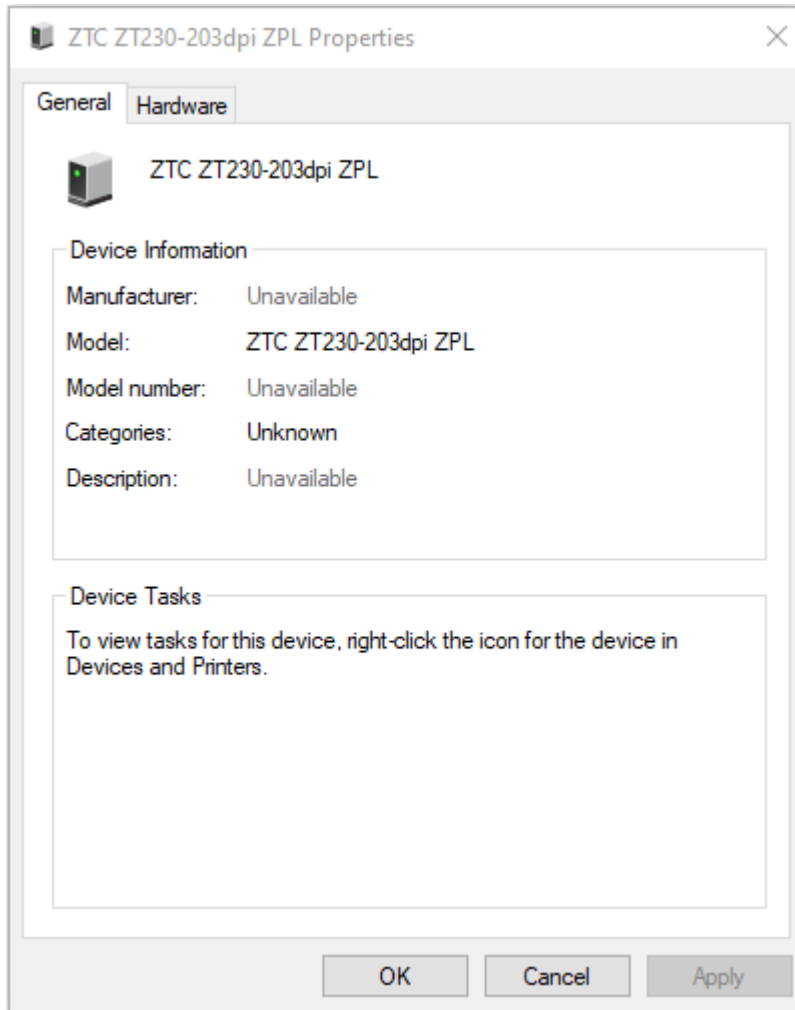
5. Click the **Hardware** tab.
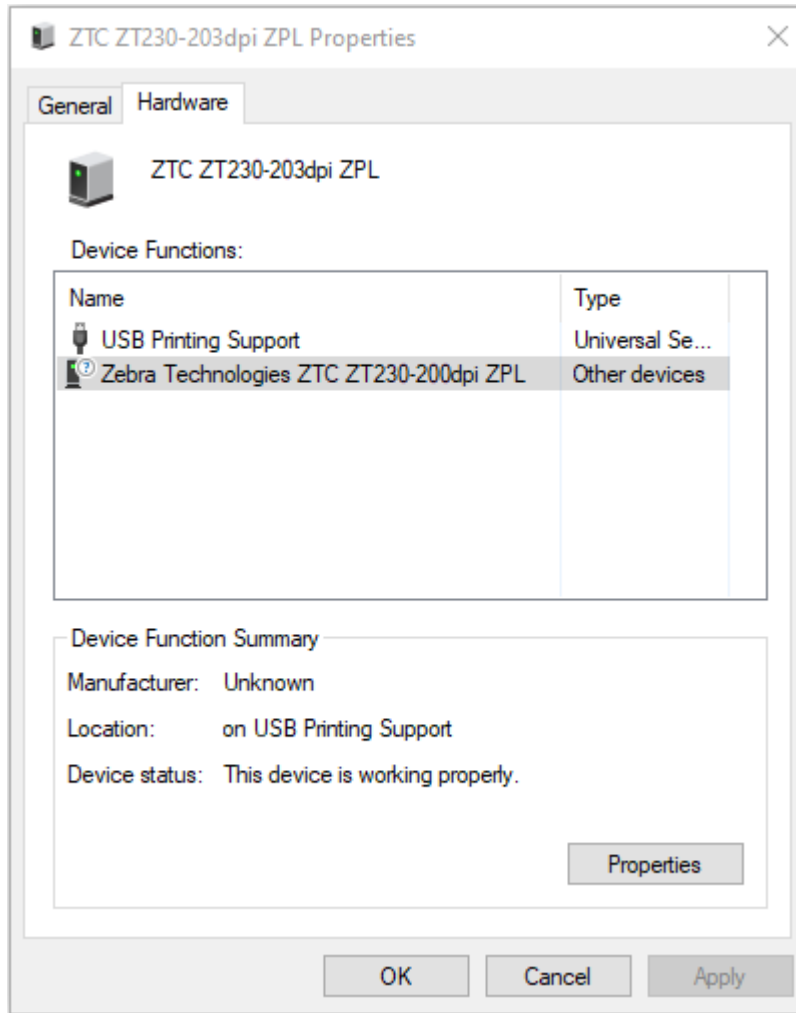
6.   Select the printer in the **Device Functions** list, and then click **Properties**.

The properties display.
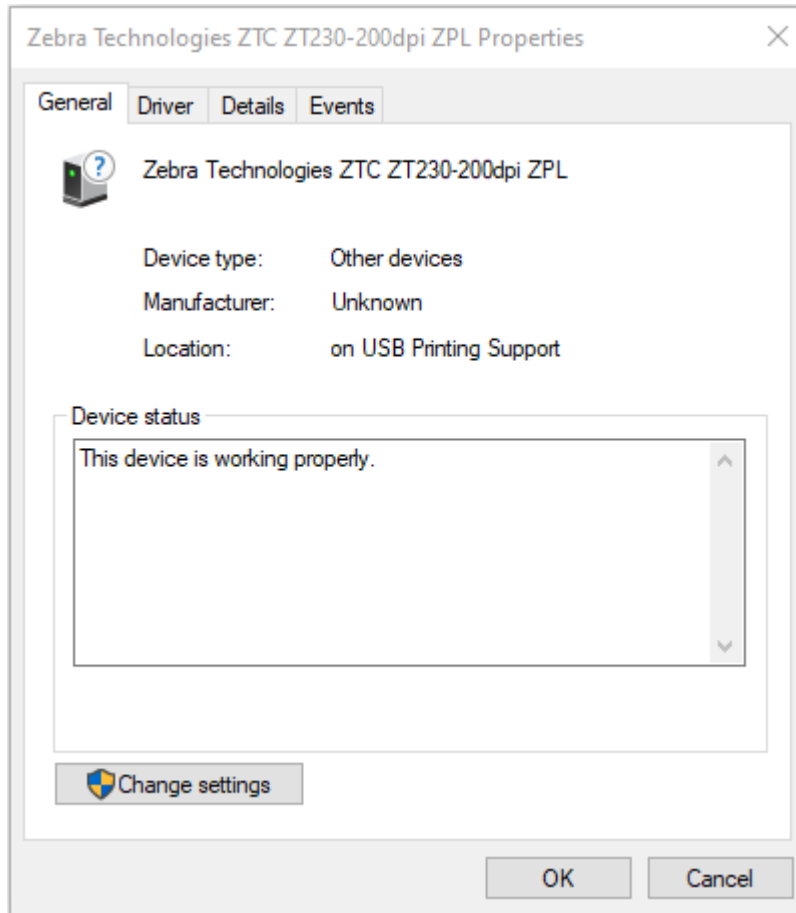
7. Click **Change settings** and then click the **Driver** tab.
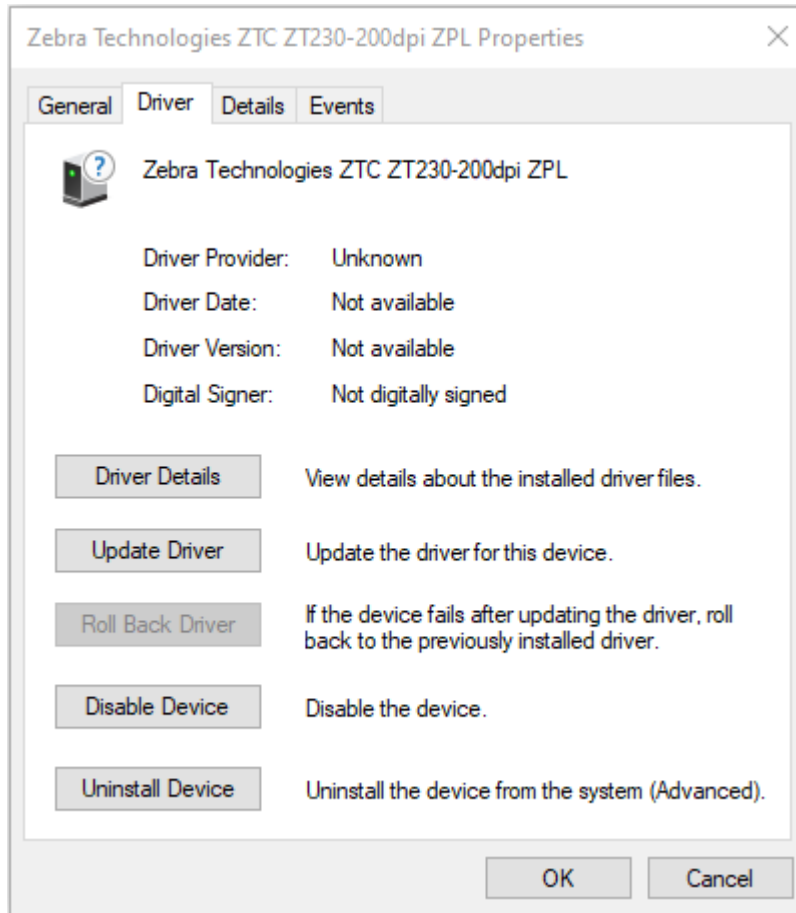
8. Click **Update Driver**.
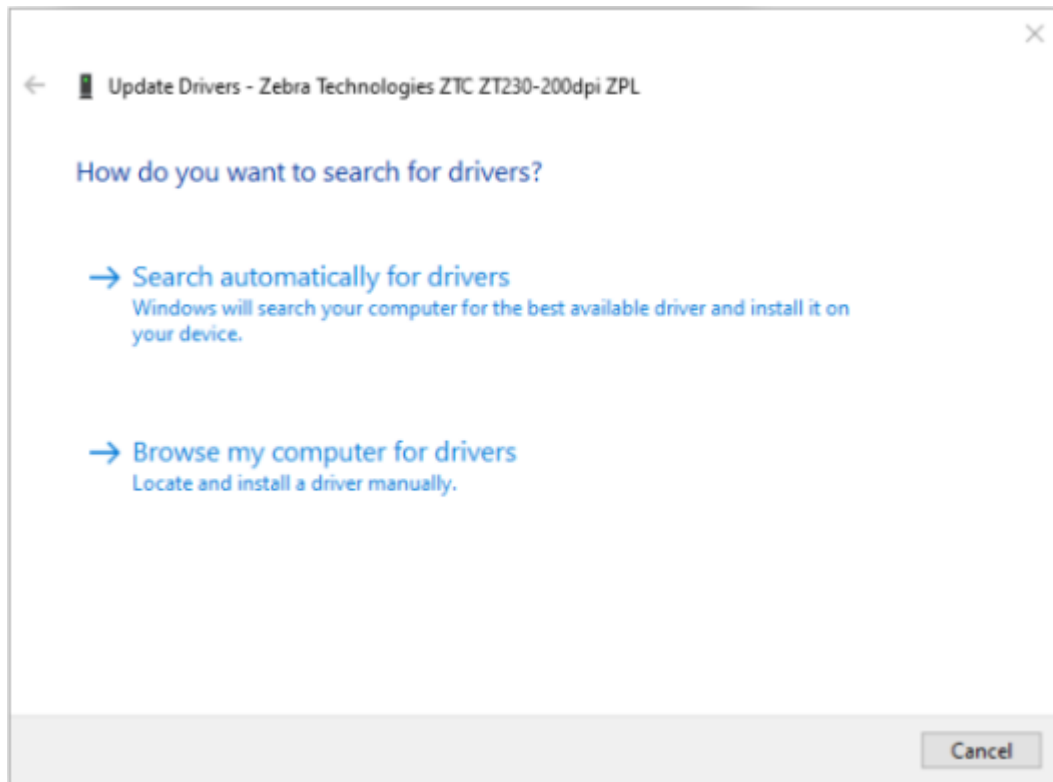
9. Click **Browse my computer for driver software**.

10. Click **Browse**... and navigate to the **Downloads** folder.

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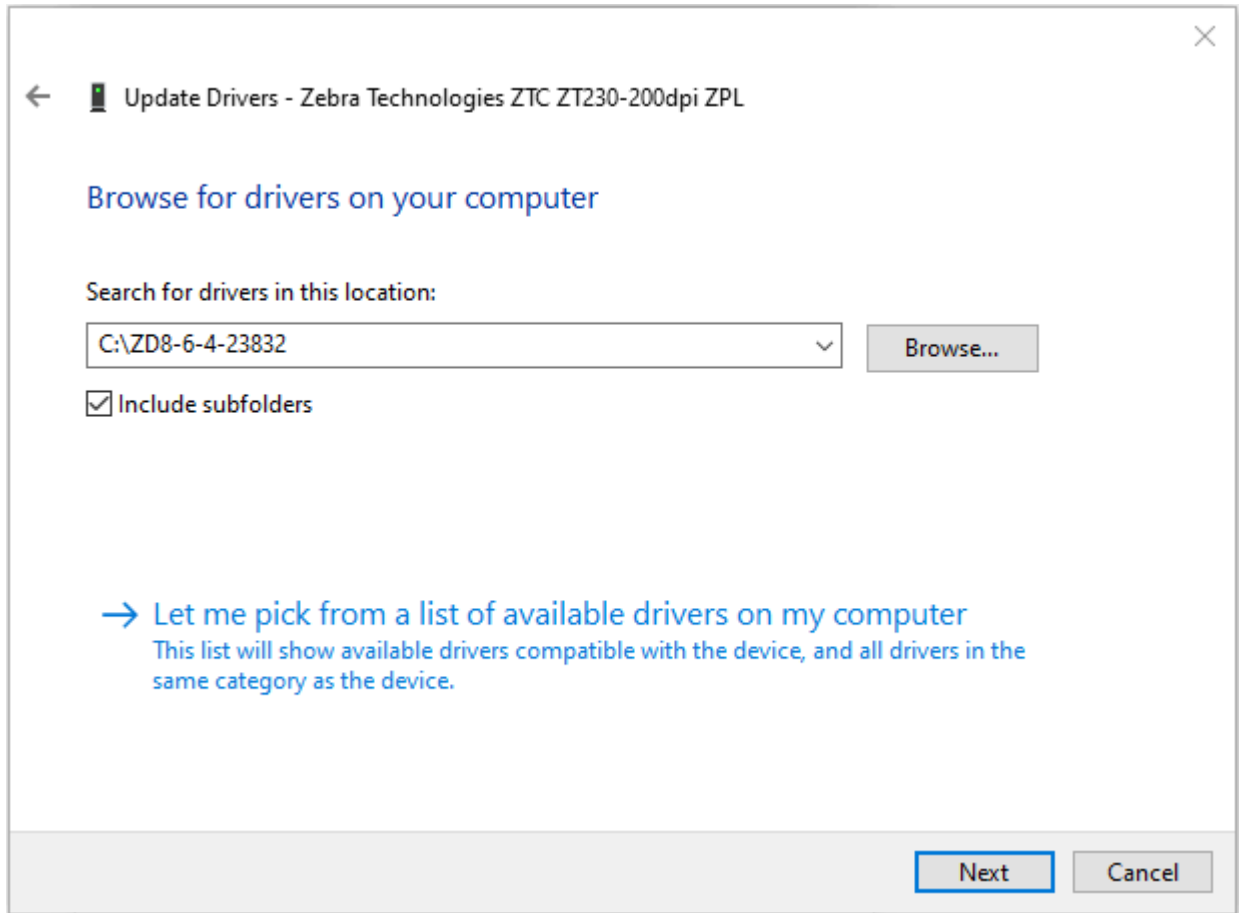
12. Click **Next**.

The 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

The G-Series 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 23 to print this label. See ZPL Printer Configuration Format on page 96 for details on printer configuration and the ZPL commands that control the printer settings listed on the Printer Configuration Status Label.

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

See the EPL programmer's 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 Status Configuration Label on page 48).

Localizing the Printer Status Configuration Label

The printer configuration status label can be localized for up to 16 languages. Use the ZPL programming command ^KD to modify the displayed language for most status items on this label.

See Printing a Test (Printer Configuration) Label or Feed Button Modes for information on accessing the printer configuration status label.

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.

IMPORTANT: Do not ship the printer with a roll of media installed or damage to the printer or media may result.

Thermal Printing

Ensure care when using the thermal printer.

⚠️ **CAUTION:** 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:** 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.

Modes of Printing

You can operate your GK420d printer in various modes and media configurations.

Mode	Description
Direct thermal printing	Uses heat-sensitive media to print.
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, the dispenser can peel away the backing material from the label as it is being printed, and then print the next label.
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, etc.
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 for managing and monitoring the status of Zebra printers on a network.

Print Media Types

Your printer can use various types of media.

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

- Standard media—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.

- Continuous roll media—Most continuous roll media is direct thermal media (similar to FAX paper) and is used for receipt or ticket style printing.

- Tag stock—Tags are usually made from heavy paper (up to 0.0075in./0.19mm thick). Tag stock does not have adhesive or a liner, and it is typically perforated between tags.

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

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

Table 2 Types of Media Roll and Fanfold Media
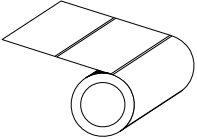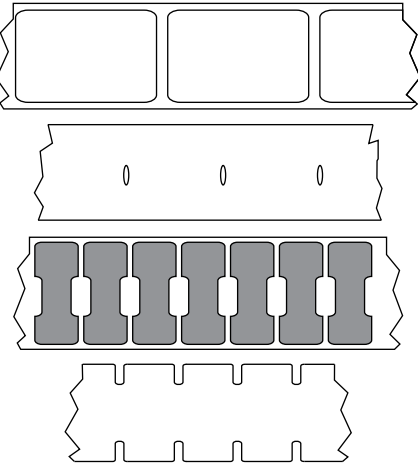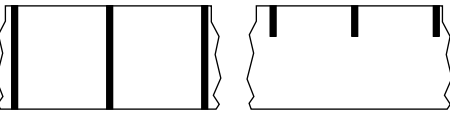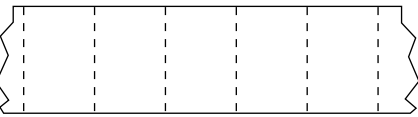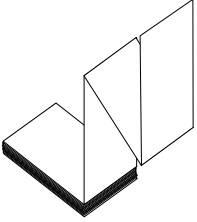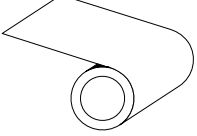
Media Type	How It Looks	Description
Non-Continuous Roll Media		Roll media is wound on a core that can be 0.5 to 1.5 in. (12.7 to 38.1 mm) in diameter. Labels have adhesive backing that sticks them to a liner, and they are separated by gaps, holes, notches, or black marks. Tags are separated by perforations. Individual labels are separated by one or more of the following methods: • Web media separates labels by gaps, holes, or notches. • Black mark media uses pre-printed black marks on the backside of the media to indicate label separations. • Perforated media has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags. • Perforated media has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags.

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

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

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.

Performing a Media Scratch Test

Use this method to perform the media scratch test.

1. Scratch the print surface of the media with a fingernail or pen cap. Press firmly and quickly while dragging it across the media surface. Direct thermal media is chemically treated to print (expose) when 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...	Then the media is...
Appears on the media	Direct thermal—No ribbon is required.
Does not appear on the media	Thermal transfer—A ribbon is required. Your printer does not support this media.

Replacing Supplies

If labels run out while printing, leave the printer power on while reloading (data loss results if you turn off the printer). After you re-load media, press the **Feed** button to restart.

Always use high-quality, approved labels and tags. If adhesive-backed labels are used that don't lay flat on the backing liner, the exposed edges may stick to the label guides and rollers inside the printer, causing the label to peel off from the liner and jam the printer.

Adjusting the Print Width

Print width must be set when:

- You are using the printer for the first time.
- There is a change in media width.

Print width may be set by:

- The Windows printer driver or application software such as ZebraDesigner.
- The five-flash sequence in
- Controlling printer operations with ZPL programming; refer to the Print Width (`^PW`) command (consult your ZPL Programming Guide).
- Controlling printer operations with EPL Page Mode programming, refer to the Set Label Width (`q`) command (consult your EPL Programmer's Guide).

Adjusting the Print Quality

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

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.

Experiment with these settings to find the optimal mix for your application. Print quality can be set with the Zebra Setup Utility's 'Configure Print Quality' routine.

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

- The six-flash sequence in This will overwrite any ZPL and EPL programmed darkness/density settings.
- The Set Darkness (`~SD`) ZPL command (consult your ZPL Programming Guide).
- The Density (`D`) EPL command (consult your EPL Programmer's 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 (consult your ZPL Programming Guide).
- The Speed Select (`S`) command (consult your EPL Programmer's Guide).

Media Sensing

The G-Series printer has automatic media sensing capability.

The printer is designed to continuously check and adjust media length sensing for minor variations. Once the printer is printing or feeding media, the printer continually checks and adjusts the media sensing to accommodate for minor changes in media parameters from label to label on a roll and from roll to roll of media. The printer will automatically initiate a media length calibration if the expected media length or the label to label gap distance has exceeded the acceptable variation range when starting a print job or feeding media. The automatic media sensing in the G-Series printers works the same for printer operations that use EPL and ZPL label formats and programming.

If the printer does not detect labels or black marks (or notches with blackline sensing) after feeding the media the default maximum label length distance of 39 inches (1 meter), the printer will switch to continuous (receipt) media mode. The printer will keep these settings until changed by software, programming, or a manual calibration with different media.

Optionally, the printer can be set to do a short media calibration after printer power-up or when closing the printer with power on. The printer will then feed several labels while calibrating.

The printer's media settings can be verified by printing a Printer Configuration label. See Printing a Test (Printer Configuration) Label on page 23 for more details.

The maximum distance that the automatic media type detection and sensing will check can be reduced by using the ZPL Maximum Label Length command (^ML). It is recommended that this distance be set to no less than two times the longest label being printed. If the largest label being printed was a 4 by 6 inch label, then the maximum label (media) length detection distance can be reduced from the default distance of 39 inches down to 12 inches.

If the printer has difficulty automatically detecting the media type and auto-calibrating, see Manual Calibration on page 81 to perform an extensive calibration. It includes a printed graph of sensor operation for your media. This method disables the printer's automatic media sensing capability until the printer's default parameters are reset to the factory defaults with the four flash Feed button mode. See Feed Button Modes on page 85 for more details.

The automatic media calibration can be modified, turned on, or turned off to meet your needs. Sometimes print job conditions require that the printer use all the media on a roll. The two automatic media conditions, power up with media loaded and closing the printer with power on, can be controlled individually with the ZPL Media Feed command, ^MF. The feed action discussed in the ZPL programmers guide for the ^MF command is primarily for automatic media sensing and calibration. The automatic media calibration that controls the dynamic media (label to label) calibration is the ^XS command. If multiple media types of different lengths, material or detection methods (web/gap, black mark, notches or continuous) are used, you should not change these settings.

The media calibration and detection process can also be refined to match the media type loaded into the printer. Use the ZPL Media Tracking command (^MN) to set the media type. Sometimes the printer can detect preprinted media as the gap between labels or the liner backing with print as a black marks. If the ^MN parameter for continuous media is set, then the printer does not perform the automatic calibration. The ^MN command also includes an automatic calibration parameter (^MNA) to return the printer to its default setting to automatically detect 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.
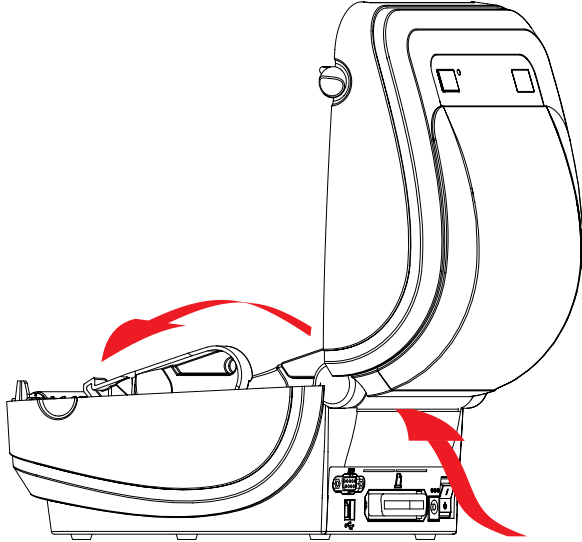
2. Adjust the media guide stop position with the green thumb wheel. Use a piece of the fanfold media to set the stop position. Rotate the wheel toward you to open the guides wider. Rotate the wheel away from you to make the media guide narrower.
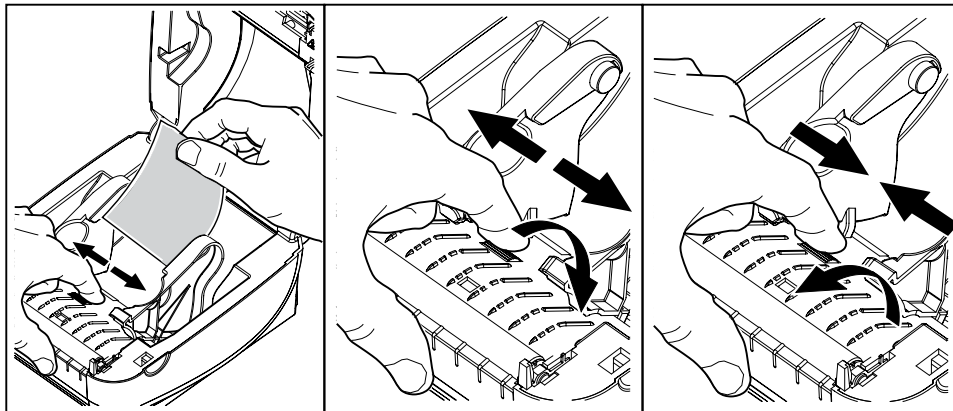
3. Insert the media through the slot at the rear of the printer.
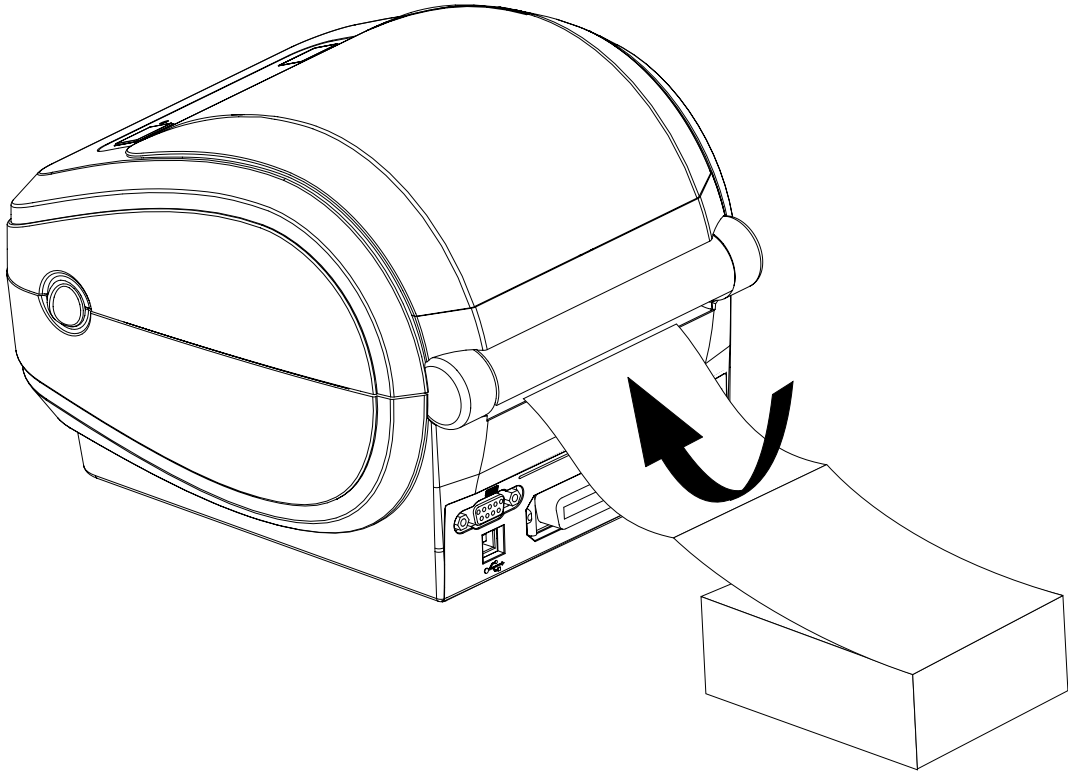
4. Run the media between the media guide and roll holders.
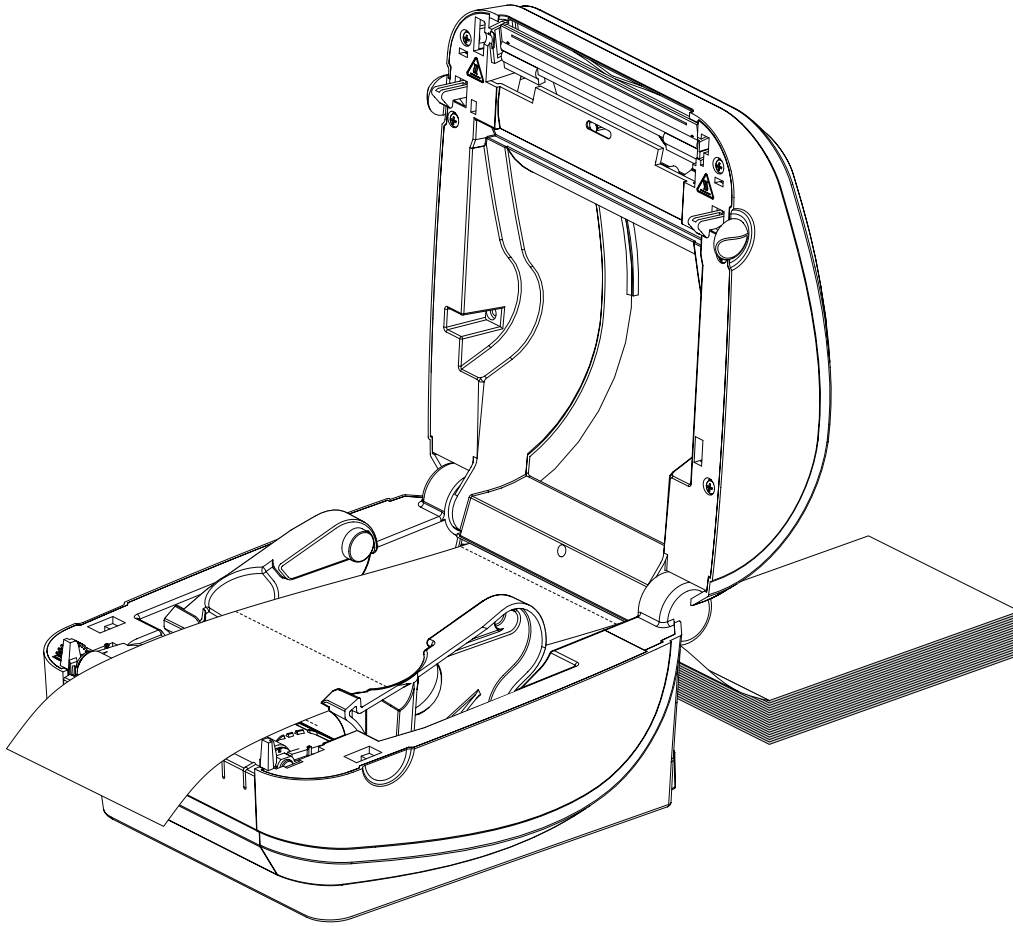
5. Close the top cover.

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

The G-Series printer accommodates externally mounted roll media similar to the printer's support of fanfold media.

The printer requires the media roll and stand combination to have low initial inertia to pull the media off the roll. The G-Series motor has 30% more torque than the Zebra 2800 Series desktop printers to provide improved media handling and speed.

Zebra at this time does not offer an external media option for the G-Series printer.

Externally Mounted Roll Media Considerations

Ensure that externally mounted roll media is properly configured.

- The media ideally should enter the printer directly behind the printer through the fanfold media slot in the rear of the printer. See for media loading.

- Lower the print speed to decrease the chance of motor stalls. The roll typically has the highest inertia when trying to start the roll moving. Larger media roll diameters require the printer to have more torque applied to get the roll moving.

- The media should move smoothly and freely. The media should not slip, skip, jerk, bind and then move, etc. when mounted on your media stand.

- The printer should not touch the media roll.

- The printer should not slip or lift up off the operating surface.

Fonts and Your Printer

The G-Series printer supports your 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.

The G-Series™ 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 printer programming guides for information on Text, Fonts, and Character support.

The G-Series printer includes utilities and application software that support font downloading into the printer for both printer programming languages.

Localizing the Printer with Code Pages

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

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

- For EPL code page support, see the `I` command in the EPL programmer's guide.

Identifying Fonts in Your Printer

Fonts and memory are shared by the programming languages in the printer.

Fonts can be loaded in many memory areas in the G-Series printer. ZPL programming can recognize EPL and ZPL fonts. EPL programming can only recognize EPL fonts. See the respective programmer guides for more information on fonts and printer memory.

ZPL Fonts

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

To display all of the fonts loaded in your G-Series printer, send the printer the ZPL command `^WD`. See the ZPL Programmers Guide for details.

- Bitmap fonts in the various printer memory areas are identified by the `.FNT` file extension in ZPL.

- Scalable fonts are identified with the `.TTF`, `.TTE` or `.OTF` file extensions in ZPL. EPL does not support these fonts.

EPL Fonts

To download fonts for EPL print operations, use the Zebra Setup Utility or ZebraNet Bridge to send files to the printer.

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

- Optional Asian Fonts in G-Series printers are displayed as Soft Fonts, but are still accessible as documented in the `A` command in the EPL programmer's 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 ZPL command `^WD` as described above in ZPL Fonts.

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

To remove EPL Asian fonts from the printer, use the ZPL `^ID` 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. One or more downloaded label forms can be accessed and run with a terminal or wedge device or a Zebra KDU (keyboard display unit) to call a label form. These methods allow the developer to incorporate 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 that have:

- No data entry required and print when the **Feed** button is pressed.

- No data entry required and print when a label is removed from the printer's optional label dispenser.

- One or more data variables to be 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 that are called by scanning bar codes containing programming to run a label form.

- Label forms 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 printer programming languages support special label forms that will automatically run after a power cycle or reset. The ZPL looks for a file named `AUTOEXEC.ZPL` and EPL looks for a label form named `AUTOFR`. If both files are loaded in the G-Series printer, then only the AUTOEXEC.ZPL will run. The EPL AUTOFR form runs until it is disabled. Both files must be deleted from the printer followed by a reset or a power cycle to completely remove the files.

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

The G-Series printer can source up to 750mA through the serial port's 5-volt line; see Interface Wiring on page 89 for more information on the printer's serial port interface.

Sending Files to the Printer

Graphics, fonts and programming files can be sent to the printer from the Microsoft Windows operating systems by using the Zebra Setup Utilities (and driver), ZebraNet Bridge or Zebra ZDownloader found on the user's CD or at zebra.com.

These methods are common for both programming languages and the G-Series printers.

Print Meter

The G-Series printer has the capability to report printhead maintenance alerts.

The printer can provide cleaning and early warning of end of calculated printhead life alerts. If the RTC (Real Time Clock) is installed in the printer, the printhead life and history reporting will also include the date. By default, print metering alerts are disabled.

Many of the print meter messages and reports are customizable. See the ZPL or EPL Programming Guides for more information on the Print Meter.

To activate Print Meter Alerts, send one of the following commands to the printer:

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

EPL Line Mode

Your direct thermal printer supports Line Mode printing.

EPL Line Mode printing is designed to be command compatible with the EPL1 programming language used in early model LP2022 and LP2042 printers. The Zebra 2800 series direct thermal printers also included Line Mode printer language support. The G-Series continues Zebra's support of Line Mode.

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

Line Mode printing only prints single lines the height of the largest element present in the line of text and data – bar code, text, a logo, or simple vertical lines. Line mode has many limitations due to the single line of print: no fine element placement, no overlapping elements, and no horizontal (ladder) bar codes.

- Line Mode printer operation is entered by sending the printer the EPL `OEPL1` command. See the EPL Programmers Guide (Page Mode) or the EPL Line Mode Programmers Guide.
- Line Mode printer operation is exited by sending the printer the `escOEPL2` Line Mode command. See the EPL Line Mode Programmers Guide.
- With Line Mode active, ZPL and EPL (EPL2) Page Mode programming will be processed as Line Mode programming and data.

- With 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.

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 notifies 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 ZPL or EPL programming commands to the printer.

When programming in ZPL, you can use the following command sequences shown below and refer to your 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. Other printer option parameters may also be included with the Options command string. Refer to your EPL Programmer's 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 the Feed button until a minimum of 4 inches or 100 millimeters of exposed labels exit the printer. Remove the exposed labels from the liner.
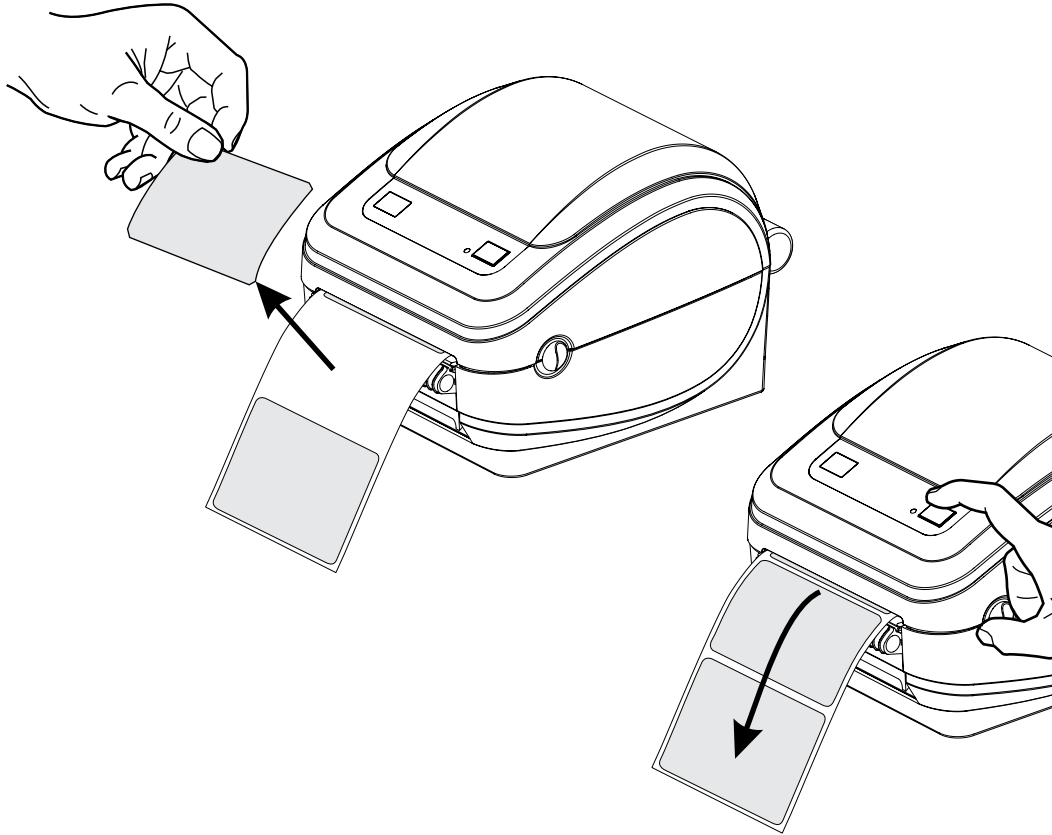
2. Lift the liner over the top of the printer and open the dispenser door.
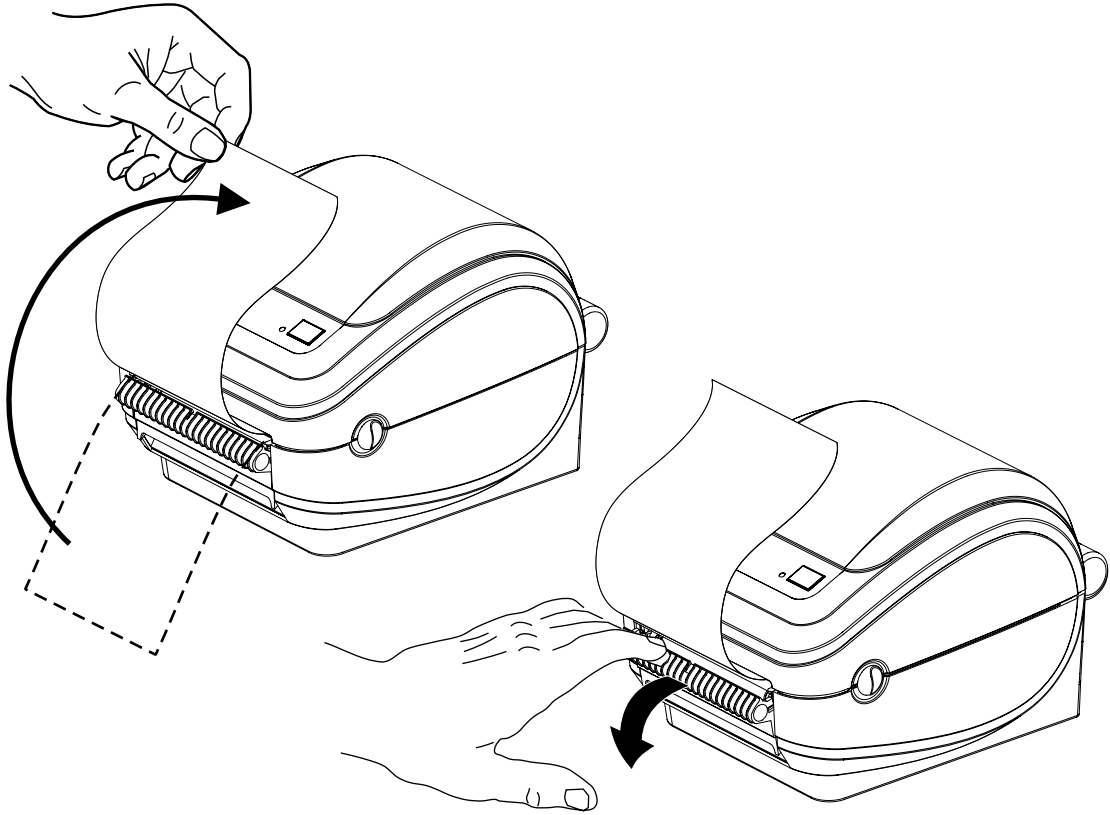
3. Insert the label liner between the dispenser door and the printer body.
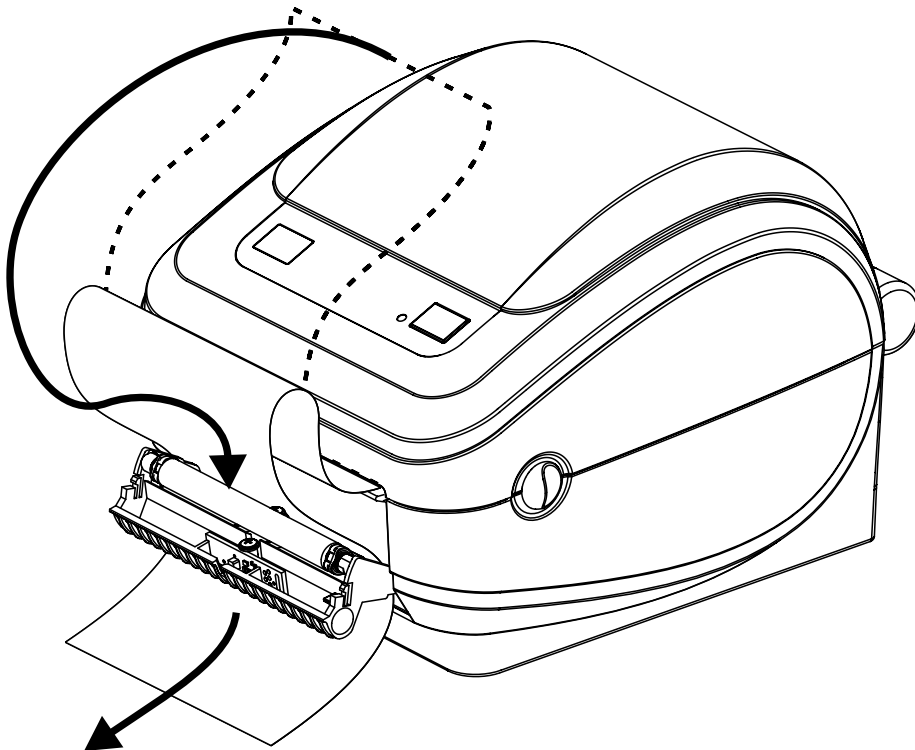
4. Close the dispenser door.
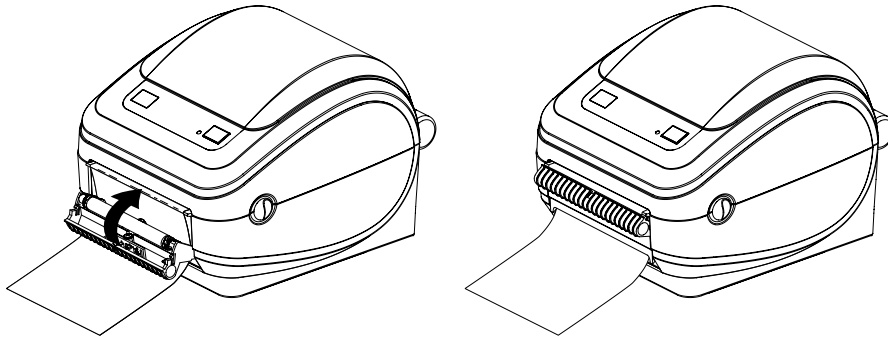
5. Press the Feed button to advance the media.
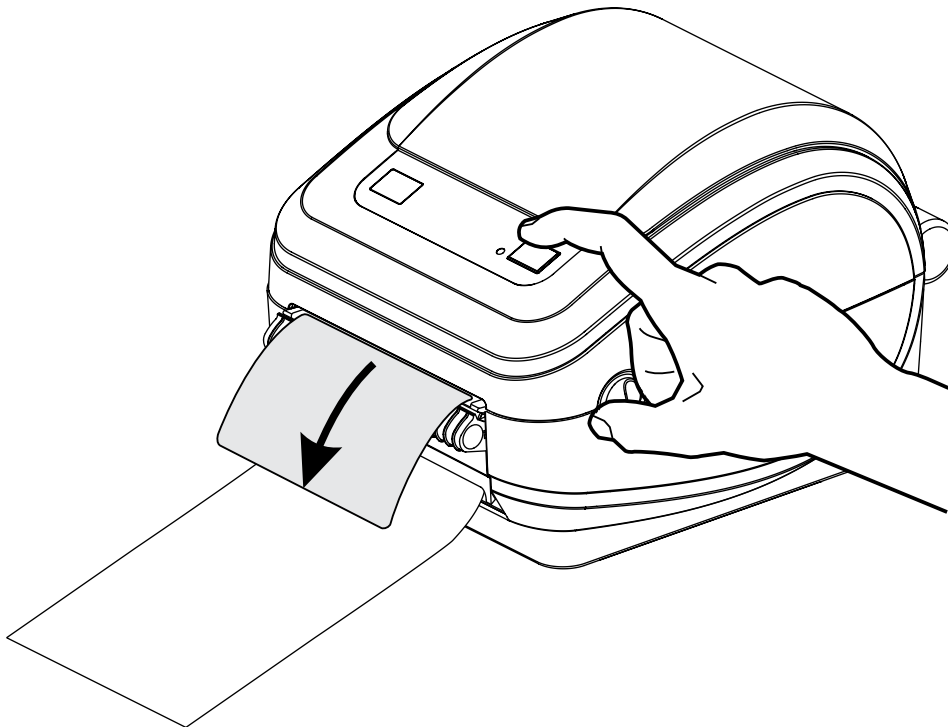
6. During the print job, the printer will peel off the backing and present a single label. Take the label from the printer to allow the printer to print the next label.

NOTE: If you did not activate the label taken sensor to detect the removal of the dispensed (peeled) label with software commands, the printer will stack and eject peeled labels.

ZebraNet 10/100 Internal (Wired) Print Server Option

The ZebraNet 10/100 Internal Print Server (PS) 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 the specialized features of a ZebraLink-enabled printer.

Printers with the 10/100 Internal PS provide the following features:

- Print server and printer setup using a browser

- Remote monitoring and configuration capability of the 10/100 Internal PS using a browser

- Alerts

- The ability for you to send unsolicited printer status messages via E-mail-enabled devices

ZebraNet Bridge—A software program that works with the 10/100 Internal PS and enhances the features of ZebraLink resident within ZPL-based printers. The features include the following:

- 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—virtual "golden printers"—with desired settings, objects, and alerts, and clone or broadcast them as if they were real printers, providing extensive savings in setup time. Printer profiles are also an excellent way to back up a printer's configuration for crisis recovery.

Printer Network Configuration Status Label

G-Series printers with the ZebraNet 10/100 Internal Print Server option onboard print an additional printer configuration status label for information needed to establish and troubleshoot network printing.

The following printout is printed with the ZPL ~WL command.

```
           Network Configuration

     Zebra Technologies
     ZTC GK420d
     ZBR2835016

     Internal Wired*
     ALL................. IP PROTOCOL
     000.000.000.000.... IP ADDRESS
     255.255.255.000.... SUBNET MASK
     000.000.000.000.... DEFAULT GATEWAY
     010.001.001.100.... WINS SERVER IP
     YES................ TIMEOUT CHECKING
     300................ TIMEOUT VALUE
     000................ ARP INTERVAL
     9100............... BASE RAW PORT
     00074d2b4248....... MAC ADDRESS

     FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

The regular printout of the configuration status label has some of the printer's network settings such as IP Address, on the lower half of the printout.

The printer's IP address is needed to identify and configure the printer for operations on your network. See the ZebraNet 10/100 Internal Print Server manual for more information.

Zebra KDU — Printer Accessory

The KDU (keyboard display unit) is a small terminal unit that interfaces with the printer for accessing EPL label forms stored in the printer.

The KDU is strictly a terminal and does not have the capability to store data or set up parameters. The KDU is used for the following functions:

- List label forms stored in the printer
- Retrieve label forms stored in the printer
- Input variable data
- Printing labels
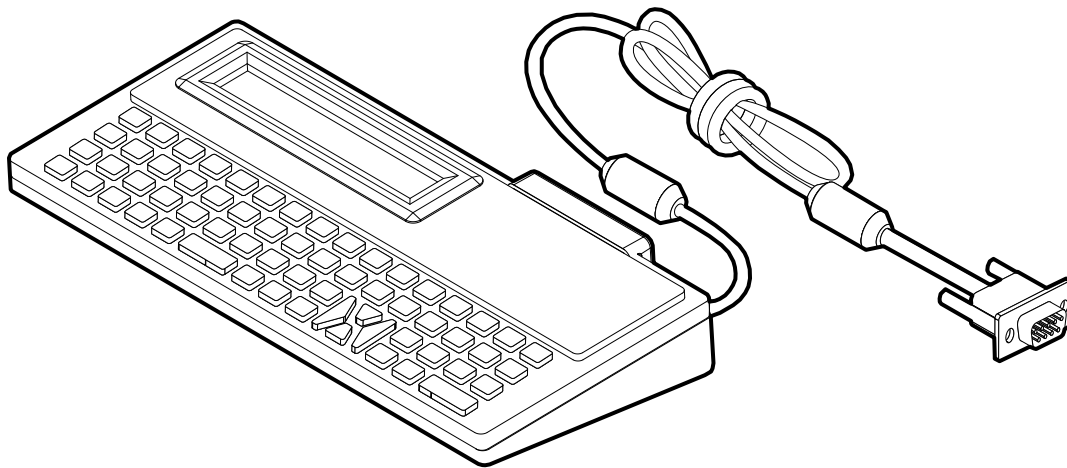
KDU Plus — Printer Accessory

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
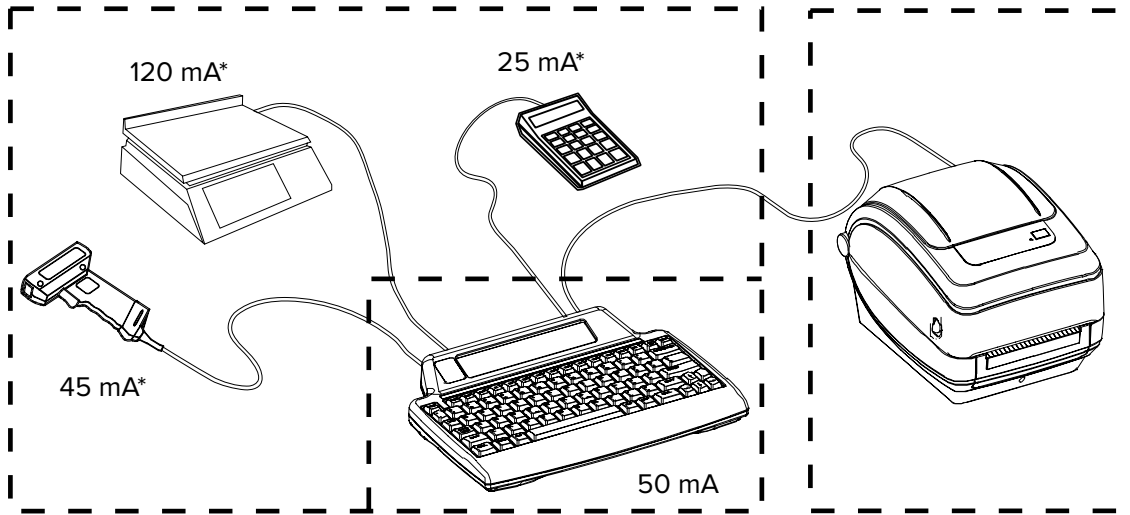
* Not real values
(45mA + 120mA + 25mA) + 50mA < Max. Current

CAUTION: 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.

Use the ZDownloader utility to apply the key. Zdownloader is available on the user's CD or at the Zebra web site at zebra.com.

An intuitive ZBI-Developer programming utility is used to create, test, and distribute ZBI 2.0 applications available on the user's CD or on the Zebra Web site: 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 3   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.

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

Table 4   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 Cleaning the Printhead on page 69.	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 Platen Cleaning and Replacement on page 72.	As needed.
Peel bar	Clean it thoroughly with 90% 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: 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. (An old pen carries contaminants from its previous uses that may damage the printhead.)

NOTE: 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.

When you load new media, you can also clean the printhead.

1. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside. This will move adhesive transferred from the edges of the media to the printhead outside of the media path.

2. Wait one minute before closing the printer.
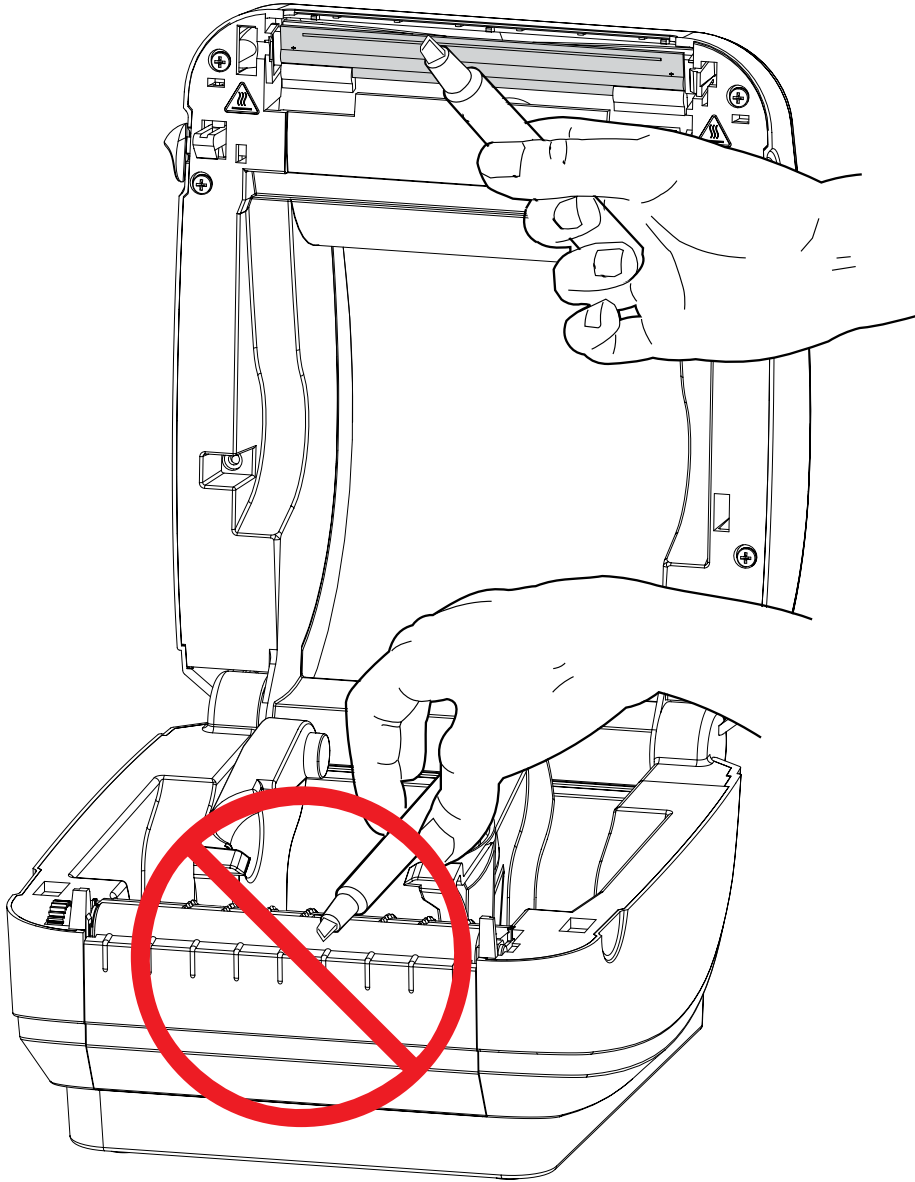
Media Path Considerations

Use a cleaning swab to remove debris, dust, or crust that has 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.
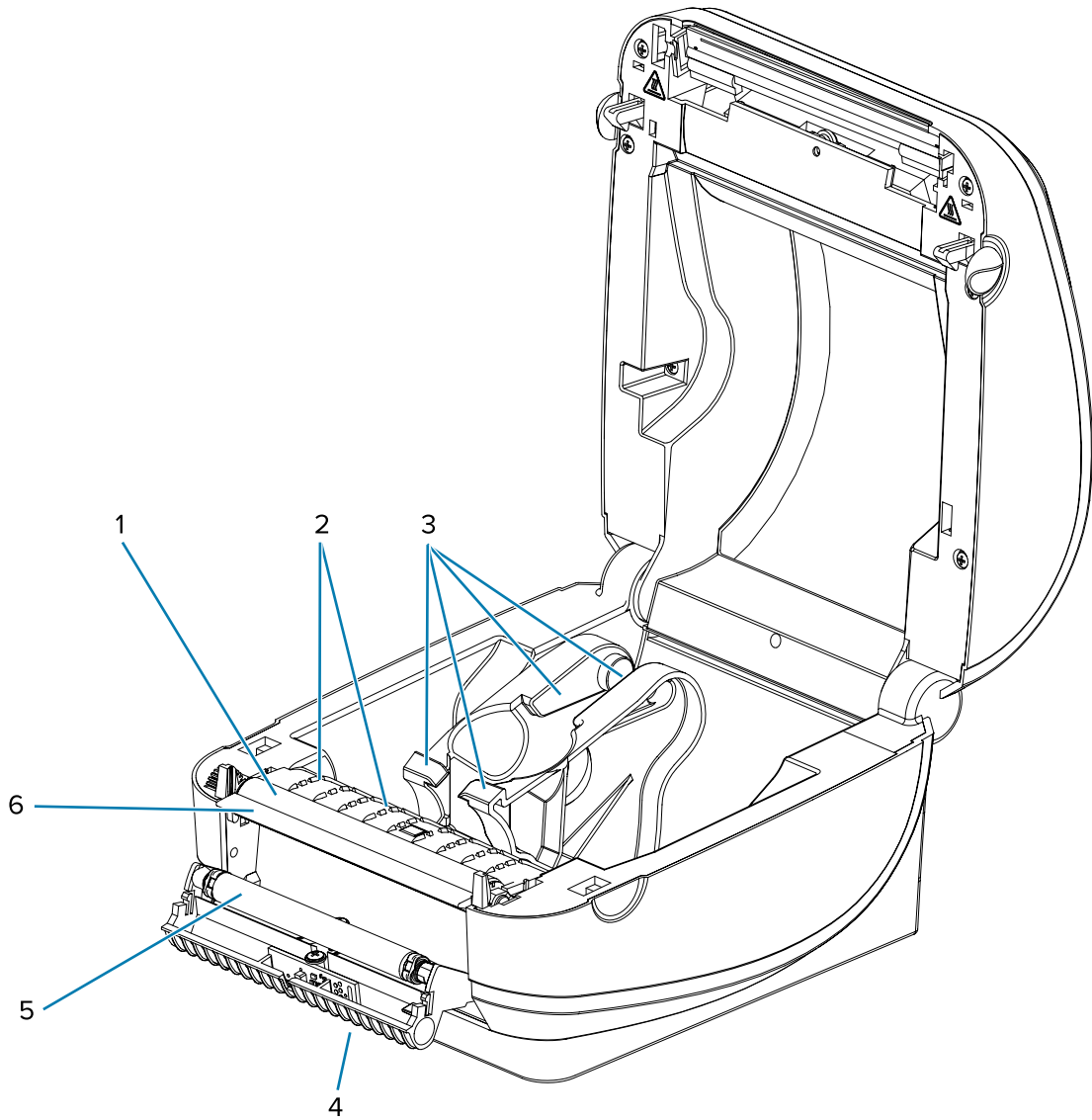
1	Platen
2	Ridges
3	Media guides
4	Ridges
5	Pinch roller
6	Peel bar

Sensor Cleaning

Dust can accumulate on the media sensors.

1. Gently brush away dust; if necessary, use a dry swab to brush away dust. If adhesives or other contaminants remain, use an alcohol moistened swab to break them up.

2. Use a dry swab to remove any residue that may be left from the first cleaning.

3. Repeat steps 1 and 2 as required until all residue and streaks are removed from the sensor.
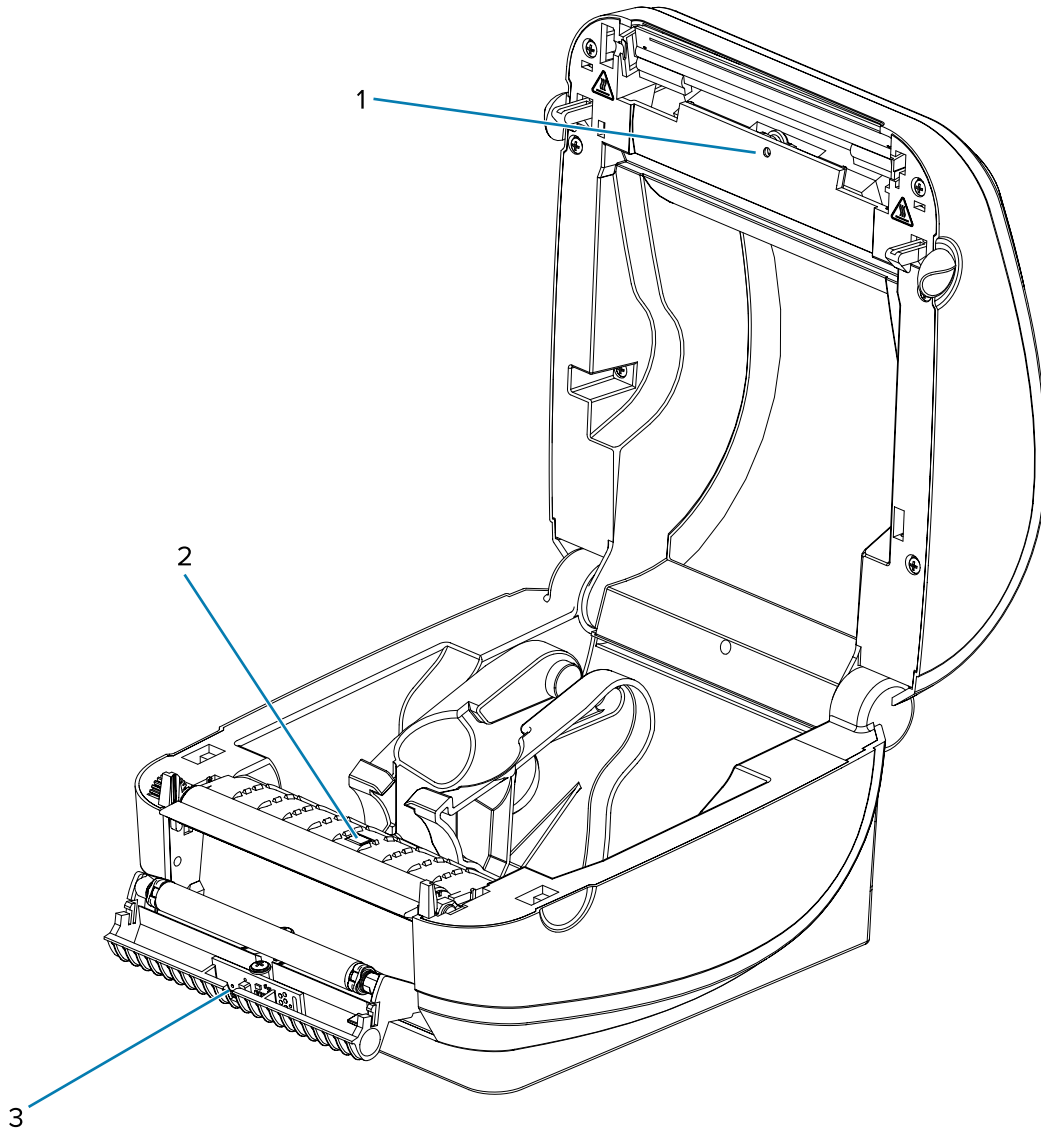
1	Gap sensor
2	Black-line sensor
3	Label taken sensor

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 (90% pure or better).

1. Open the cover (and dispenser door). Remove media from the platen area.

2. Press the tabs on the right and left sides out. Then rotate them up.
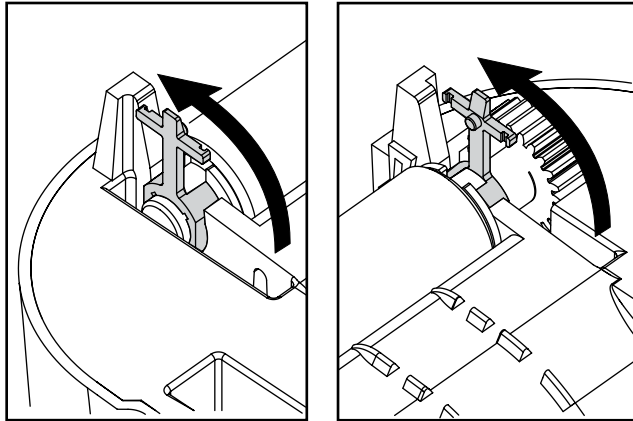
3. Lift the platen out of the printer's bottom frame.
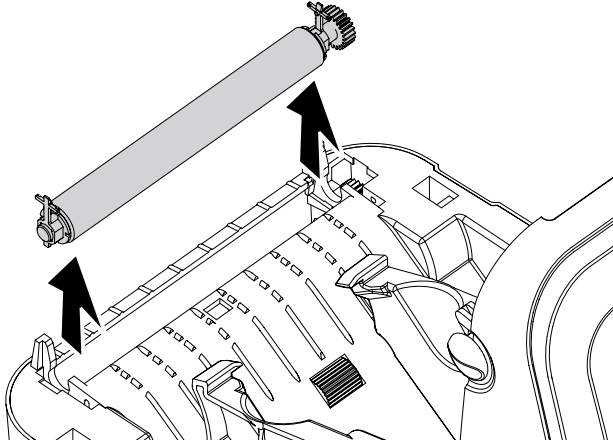
4. Clean the platen with the alcohol moistened swab. Clean from the center out. Repeat this process until all of the roller surfaces have been cleaned. If there has been heavy adhesive build-up or label jam, repeat with a new swab to remove residual contaminants. Adhesives and oils, for example, maybe thinned by the initial cleaning but not completely removed.

5. Install the platen in the printer. Discard the cleaning swabs after use – do not reuse them.

6. Make sure the bearings are on the shaft of the platen.
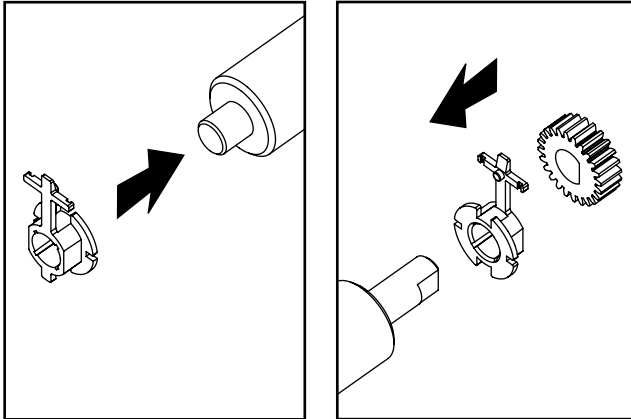
7. Align the platen with the gear to the left and lower it into the printer's bottom frame.
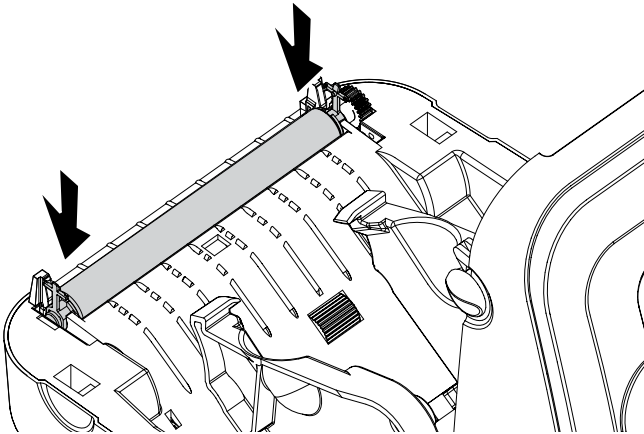
8. Rotate the tabs back and snap them into place.
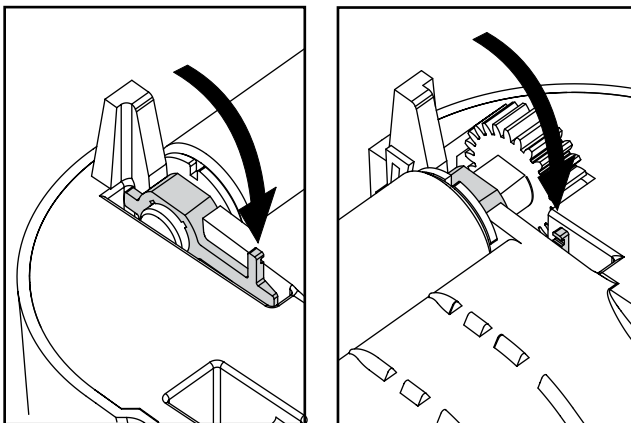
Allow the printer to dry for one minute before closing the dispenser door, media cover, or loading labels.

Other Printer Maintenance

There are no user level maintenance procedures beyond those detailed in this section. See
Troubleshooting on page 78 for more information on diagnosing printer and print problems.

Replacing the Printhead

If you need to replace the printhead, read the procedure and review the removal and installation steps
before actually replacing the printhead.

⚠️ **CAUTION:** 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 for yourself.

⚠️ **CAUTION:** Turn the printer power off and unplug the power cord before replacing the printhead.

Before following the steps in this procedure, open the printer by pulling the release latches forward and
then lifting the top cover.

To remove the printhead:

1. Push the printhead's right side catch to the right.
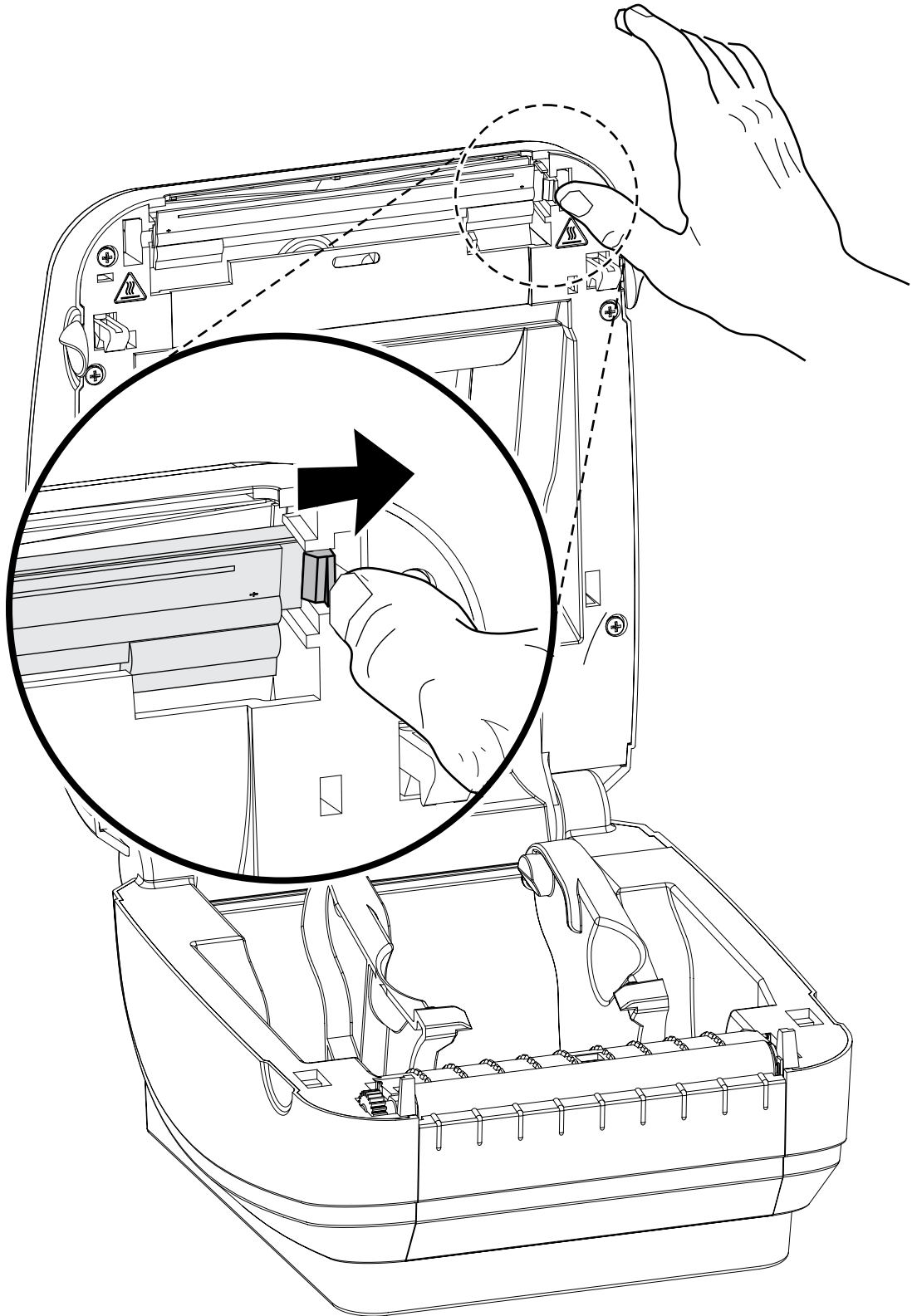
2. Pull the printhead forward and pull it free of the top case if necessary.
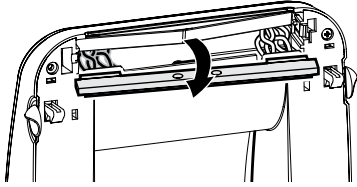
3. Unplug both bundles of printhead wires from their connectors.
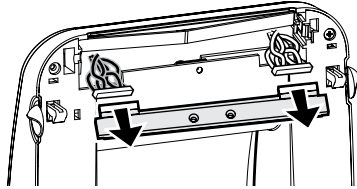
4. Align the printhead to plug the left and right connectors into the wire bundles.
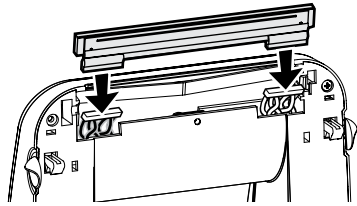
5. Slide the printhead into the left side and jog it into the right side catch.
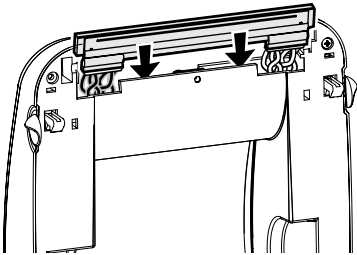
6. Clean the print head as described under Cleaning the Printhead on page 69.

7. Reload media. Plugin the power cord, turn on the printer, and print a status report to ensure proper function. See Printing a Test (Printer Configuration) Label on page 23.

Troubleshooting

This section provides information about printer error reporting that you might need for printer troubleshooting. Assorted diagnostic tests are included.

Status Light Descriptions

The status lights provide information on printer status and errors.

Table 5   Status Light Descriptions

LED Status and Color	Printer Status	For a Resolution, Refer to Number:
Off	Off	1
Solid green	On	2
Solid amber	Stopped	3
Flashing green	Normal operation	4
Flashing red	Stopped	5
Double flashing green	Paused	6
Flashing amber	Paused	7
Alternately flashing green and red	Needs service	8
Flashing red, red, green	Needs service	9
Flashing red, amber, green *	Memory defragmentation	10 *

> **NOTE:** * Do not reset or turn off the power.

Status Light Error Resolutions

The following Status Error Light Resolution numbers correspond to the descriptions listed in Each error number may have one or more resolutions to correct that error listed.

1. The printer is not receiving power.

- Have you turned on the printer power?

- Check power connections from the wall outlet to the power supply, and from the power supply to the printer. See Attaching Power on page 19.

- Disconnect the printer from the wall outlet for 30 seconds and reconnect the printer to the wall outlet.

2. The printer is on and in an idle state.

- No action is necessary.

3. The printer has failed its power-on self-test (POST).

There is a memory error.

The printhead needs to cool down.

- 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 be amber for about 10 seconds before turning green (solid or blinking).

- If this error occurs after you have been printing, turn the printer power off and on, and then resume printing.

- If this error continues, turn the printer power off for five minutes or more, and then turn it on. If the amber light persists, then the printer requires service.

4. The printer is receiving data.

- As soon as all of the data has been received, the status LED will turn green and the printer will automatically resume operation.

5. The media is out.

The printhead is open.

- Follow the instructions for Loading Roll Media on page 20 in the Getting Started section, and then press the **Feed** button to resume printing.

- Close the top cover and then press the **Feed** button to resume printing.

6. The printer is paused.

- Press the **Feed** button to resume printing.

7. The printhead is over-temperature.

- Printing will stop until the printhead cools to an acceptable printing temperature. When it does, the printer will automatically resume operation.

8. FLASH memory is not programmed.

- Return the printer to an authorized reseller.

9. The printhead or motor has had a critical failure.

- Return the printer to an authorized reseller.

10. The printer is defragmenting memory.

⚠️ **CAUTION:** Do NOT turn off the printer power during defragmentation. Doing so can damage the printer.

- Defragmentation is a normal operation of the printer—necessary to manage the memory space for optimal use. The printer will defragment its memory both after a factory default and when the printer detects that a defragment is required. When the printer is in this condition, allow it to finish defragmenting. If this warning occurs frequently, check the label formats. Formats that frequently and repeatedly write to and erase from memory may cause the printer to defragment often. Using formats that avoid frequent and repeated memory write/erase events will minimize the need for defragmentation.

- If this warning condition does not go away, the printer requires service. Contact Technical Support.

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 20. For printing using transfer ribbon, see Printing a Test (Printer Configuration) Label on page 23.

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.

  - Use the `D` (darkness/density) and `S` (speed) commands in the EPL Programmer's Guide.

  - Manually adjust print darkness with the six-flash sequence of Feed Button Modes on page 85.

  - 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.

The printing does not start at the top of the label or misprinting of one to three labels.

- The media may not be threaded correctly. Follow the instructions for Loading Roll Media on page 20.

- The printer needs to be calibrated. Refer to the two-flash sequence of Feed Button Modes on page 85.

- ZPL label formats—The correct media sensor may not be activated. Manual Calibration on page 81 selects the media sensing method for the labels being used (refer to the `^MN` command in the ZPL Programming Guide).

- ZPL label formats—Verify that the Label Top (`^LT`) command is correctly set for your application (consult the ZPL Programming Guide).

- 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 (refer to the `O` and `Q` commands in the EPL Programmer's Guide).

- EPL label formats—Verify that the Set Label Length (`Q`) command is correctly set for your application (consult 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 the **Feed** button.

- If the status LED is on or flashing, see Status Light Descriptions on page 78.

- 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 (^) character 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 85 to print this label.

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

- Is the printer in pause mode? If so, press the **Feed** button.

- 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 61.

- If the status LED is on or flashing, see Status Light Descriptions on page 78.

- Make sure the data cable is correctly installed.

- 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 or if the printer will not correctly auto-calibrate.

1. Make sure media is loaded.
2. Turn printer power on.

3. Press and hold the **Feed** button until the green status light flashes once, then twice, and then continuing until the flash groups reach the group of seven flashes. Release the **Feed** button.

4. The printer will set the media sensor for the label backing being used. After it is done making this adjustment, the 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. Upon completion, the printer will save the new settings in memory and the printer is ready for normal operation.

5. Press the **Feed** button. One entire blank label will feed. If this does not happen, try defaulting (refer to the four-flash sequence in Feed Button Modes on page 85) and recalibrating the printer.

> **NOTE:** Performing a manual calibration disables the auto-calibration function. To return to auto-calibration, default the printer (see the four-flash sequence in Feed Button Modes on page 85).
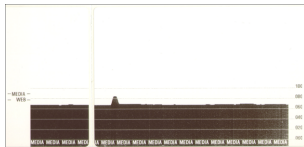
Troubleshooting Tests

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 the one-flash sequence in Feed Button Modes on page 85. See ZPL Configuration on page 96 to interpret the label.

```
                PRINTER CONFIGURATION

     Zebra Technologies
     ZTC GK420d

     10.0................. DARKNESS
     5 IPS................ PRINT SPEED
     +000................. TEAR OFF
     TEAR OFF............. PRINT MODE
     GAP/NOTCH............ MEDIA TYPE
     WEB.................. SENSOR TYPE
     AUTO................. SENSOR SELECT
     812.................. PRINT WIDTH
     1240................. LABEL LENGTH
     39.0IN    989MM...... MAXIMUM LENGTH
     NOT CONNECTED........ USB COMM.
     BIDIRECTIONAL........ PARALLEL COMM.
     9600................. BAUD
     8 BITS............... DATA BITS
     NONE................. PARITY
     DTR & XON/XOFF....... HOST HANDSHAKE
     NONE................. PROTOCOL
     AUTO................. SER COMM. MODE
     <~>  7EH............. CONTROL CHAR
     <^>  5EH............. COMMAND CHAR
     <,>  2CH............. DELIM. CHAR
     ZPL II............... ZPL MODE
     CALIBRATION.......... MEDIA POWER UP
     CALIBRATION.......... HEAD CLOSE
     DEFAULT.............. BACKFEED
     +000................. LABEL TOP
     +0000................ LEFT POSITION
     NO................... HEXDUMP
     038.................. WEB S.
     096.................. MEDIA S.
     021.................. WEB GAIN
     032.................. MARK S.
     032.................. MARK GAIN
     096.................. MARK MED S.
     090.................. MARK MEDIA GAIN
     096.................. CONT MEDIA S.
     031.................. CONT MEDIA GAIN
     066.................. TAKE LABEL
     CWF.................. MODES ENABLED
     ....................  MODES DISABLED
     832 8/MM FULL........ RESOLUTION
     V61.17.8ZP04A <-..... FIRMWARE
     1.3.................. XML SCHEMA
     V25.00.06............ HARDWARE ID
     CUSTOMIZED........... CONFIGURATION
     2104k............R: RAM
     1536k............E: ONBOARD FLASH
     NONE................. FORMAT CONVERT
     DISABLED............. ZBI
     2.1.................. ZBI VERSION
     2,147,356 IN........ LAST CLEANED
     2,147,356 IN........ HEAD USAGE
     2,147,356 IN........ TOTAL USAGE
     2,147,356 IN........ RESET CNTR1
     2,147,356 IN........ RESET CNTR2
     TOP-98............... SERIAL NUMBER
     MAINT. OFF........... EARLY WARNING
     2010-07-05 13:24:49 TIME STAMP
     FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Recalibration

Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels. See the two-flash sequence in Feed Button Modes on page 85.

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 85.

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. See sample included below.

To find out how.

There are multiple ways to enter hex data dump mode:

* The ~JD ZPL command

* The dump EPL command

* On power up with the **Feed** button pressed. See the power-off mode procedure in

The printer will print Now in DUMP (see below) and advance to the top of the next label.
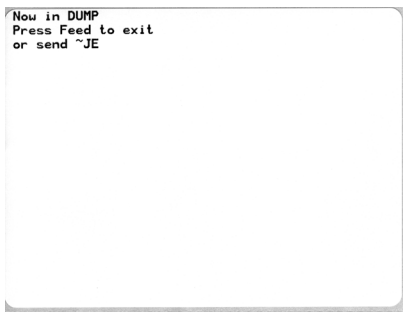
The following example of a communications DUMP mode printed out. The printout displays hexadecimal data 00h-FFh (0-255 decimal) with a unique character for each hexadecimal value displayed above the hexadecimal data.
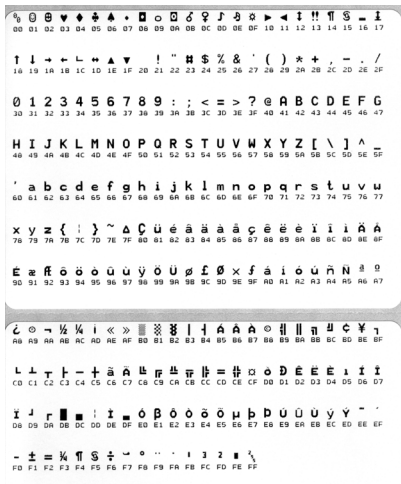
The blank lines between the lines of data are where the serial port and Bluetooth data handling errors get logged. The errors are:

* F = Frame Error

* P = Parity Error

* N = Noise Error

* O = Data Overrun Error

To exit the diagnostic mode and resume printing, turn off and then turn on the printer. An alternate method for exiting the diagnostic mode is to press the **Feed** button as many times as it takes to clear the printer's command buffer and print Out of DUMP on the label.

Out of DUMP

Feed Button Modes

Describes the functions of the **Feed** button.

Power Off Modes

With the printer power off, press and hold the **Feed** button while you turn on the power.

Table 6   Power Off Modes

Flash Sequence	Action
Amber - Red Flashing	Firmware Download Mode—The printer starts rapidly flashing red to denote entry into the Firmware Download mode. Releasing the **Feed** button here will start initializing the printer for download.
	The printer is ready to start downloading firmware when the status light begins to slowly flash between red and green.
	See Sending Files to the Printer on page 59 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 zebra.com
Amber	Normal Operations Mode—The printer continues into a normal printer initialization. Releasing the **Feed** button here will allow the printer to start normally without firmware download or operating in Communications Diagnostic mode.
Green	Communications Diagnostic (Dump) Mode—Release the **Feed** button immediately after the printer status light turns green.
	The printer will print `Now in DUMP` at the top of the label and then advance to the next label.
	After printing the first label, the printer automatically enters diagnostic mode and prints out a literal representation of all data subsequently received.
	To exit diagnostic mode and resume printing, turn off and then turn on the printer.
	Another way to exit diagnostic mode is to press the **Feed** button as many times as it takes to clear the printer's command buffer and print 'Out of DUMP' on the label.

Power On Modes

With the printer power on and the top cover closed, press and hold the **Feed** button for several seconds.

The green status LED will flash a number of times in sequence. The explanation at the right (Action column) shows what happens when you release the key after the start of the specific number of flashes and before the next flash sequence starts.

Table 7 Power On Modes

Flash Sequence	Action
*	Configuration Status—The printer prints a detailed printer configuration status label. You can use this label to: • verify proper print function • assist with configuring computer communications, maintenance, and troubleshooting • help our support team diagnose and address issues as needed
* **	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 (equivalent ZPL command ~JC). The printer will feed one to four labels while calibrating. **NOTE:** Users familiar with the Zebra EPL desktop printer can use this Feed mode to replace power-up AutoSensing calibration (equivalent EPL command XA).
* ** ***	Serial Port Configuration—Applies only to printers with serial interface ports. To reset serial port communication parameters, except for Flow Control, press and release the **Feed** button while the LED rapidly flashes amber and green. For autobaud synchronization, send the ^XA^XZ command sequence to the printer while the LED rapidly flashes amber and green. When the printer and host are synchronized, the LED changes to solid green. **NOTE:** No labels will print during autobaud synchronization.

Table 7 Power On Modes (Continued)

Flash Sequence	Action
* ** *** ****	Factory Defaults—Resets the printer to the factory default settings (equivalent to ZPL command `^JUN`). See ZPL Configuration on page 96 for a description of the primary configuration settings and their associated ZPL commands. Some configuration settings are not returned to their initial 'out of box' settings. Other settings are exclusively set, viewed, and controlled by programming and are also reset. This performs a standard media calibration and then a memory defragmentation routine. When the printer has entered Factory Default mode, the status light will turn amber for three (3) seconds. During that time you may do two things: • Do nothing and the printer will reset the factory defaults automatically as described above, OR • Press and hold the **Feed** button to enter Factory Default Reset mode for printers that have a network print option such as Ethernet, Wi-Fi, or Bluetooth (equivalent ZPL command `^JUF`.) Releasing the button after the first flash resets the network factory options only (equivalent ZPL command `^JUN`). Releasing the button after the second flash sequence (two flashes) resets the printer defaults only. Releasing the button after the third flash sequence (three flashes) will reset both printer and network settings (equivalent ZPL commands `^JUN` and `^JUF`)
* ** *** **** *****	Print Width Adjustment—Prints a succession of boxes starting at the minimum print width and ending in the printer's maximum print width in 4mm increments. Press the **Feed** button once when the printer has reached the desired maximum print width. **NOTE:** The printer driver and applications can override this setting.
* ** *** **** ***** ******	Print Darkness (Density) Adjustment—Prints a succession of bar code simulation patterns starting at the minimum darkness (print density/heat) and ending in the printer's maximum darkness in increments of four (4) using the ZPL darkness setting range values. Press the **Feed** button once the pattern is clear and legible. Do not continue to increase the darkness setting or bar code line widths may become distorted reducing readability. **NOTE:** The printer driver and applications can override this setting.

Table 7 Power On Modes (Continued)

Flash Sequence	Action
* ** *** **** ***** ****** *******	Manual Media Calibration—The printer runs extensive tests to detect and set media type and media length, and then it adjusts the media sensors for optimal performance with the installed media (equivalent ZPL command ~JG). Manual calibration is recommended whenever you are using pre-printed media, print on the liner or if the printer will not correctly auto-calibrate. A graphical profile of the media sensing will print. See Manual Calibration on page 81 for more details and considerations.
If the **Feed** button remains pressed after the 7th flash sequence cycle finishes, the printer exits configuration mode when the Feed button is released.	
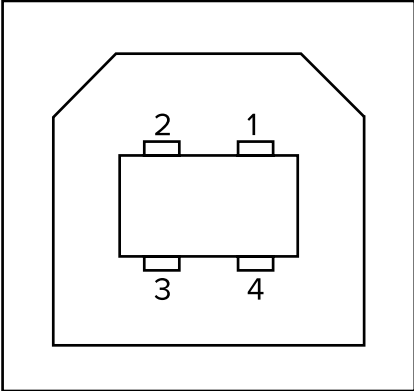
Interface Wiring

This section provides printer interface connection information.

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
2 1 3 4	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.

For information on the USB interface, go to the USB website at 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 4 DB-25 to Centronics (Cable)
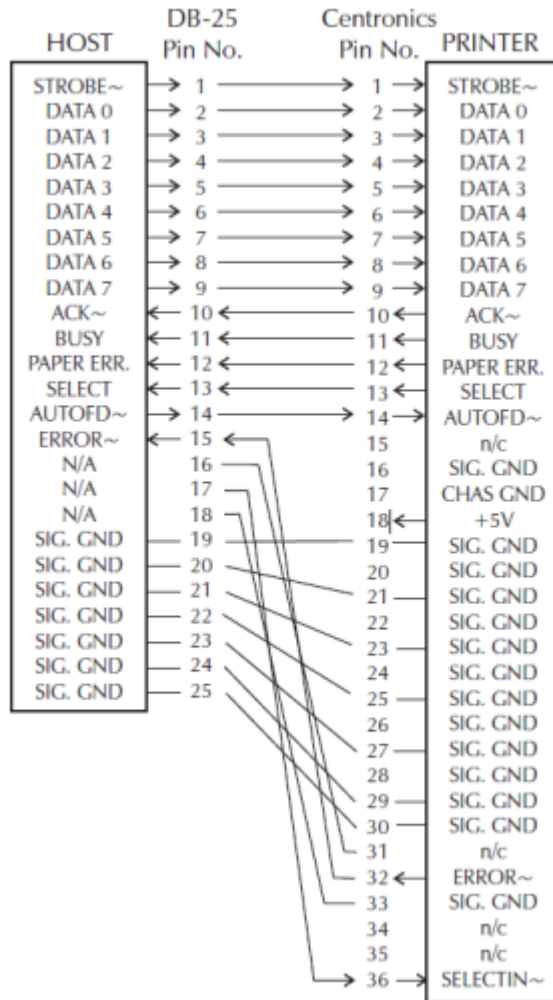
Ethernet Interface

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

The table below provides the cable's pinout assignments.

Table 8 Ethernet Pin-Outs

Signal	Pin	Pin	Signal
Tx+	1	1	Tx+
Tx-	2	2	Tx-
Rx+	3	3	Rx+
—	4	4	—
—	5	5	—

Table 8 Ethernet Pin-Outs (Continued)

Signal	Pin	Pin	Signal
Rx-	6	6	Rx-
—	7	7	—
—	8	8	—
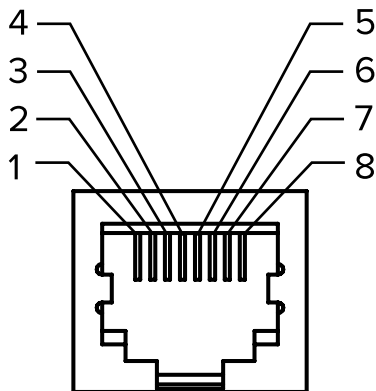
Serial Port Interface

Configurations for the Serial Port Interface are described here.

Table 9 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. Table 10   Connecting the Printer to a DTE Device on page 92 shows the required cable connections.

Table 10   Connecting the Printer to a DTE Device

DB-25S Connector to DTE Device (PC)		DB-9P Connector to Printer		DB-9S Connector to DTE Device (PC)		DB-9P Connector to Printer
2 TXD		DCD 1		1 DCD		DCD 1
3 RXD		RXD 2		2 RXD		RXD 2
4 RTS		TXD 3		3 TXD		TXD 3
5 CTS		DTR 4		4 DTR		DTR 4
6 DSR		GND 5		5 GND		GND 5
7 GND		DSR 6		6 DSR		DSR 6
8 DCD		RTS 7		7 RTS		RTS 7
20 DTR		CTS 8		8 CTS		CTS 8
22		9		9		9
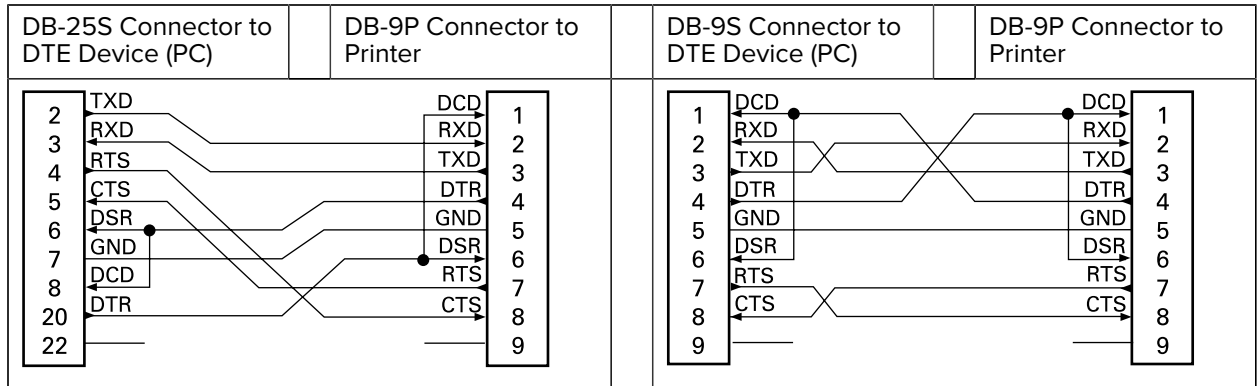
Interconnecting to DCE Devices—When the printer is connected via its RS-232 interface to data communication equipment (DCE) such as a modem, a STANDARD RS-232 (straight-through) interface cable must be used. Figure 32 shows the connections required for this cable.

Table 11   Connecting the Printer to a DCE Device

DB-25S Connector to DCE Device		DB-9P Connector to Printer		DB-9S Connector to DCE Device		DB-9P Connector to Printer
2 RXD		DCD 1		1 DCD		DCD 1
3 TXD		RXD 2		2 TXD		RXD 2
4 CTS		TXD 3		3 RXD		TXD 3
5 RTS		DTR 4		4 DSR		DTR 4
6 DTR		GND 5		5 GND		GND 5
7 GND		DSR 6		6 DTR		DSR 6
8 DCD		RTS 7		7 CTS		RTS 7
20 DSR		CTS 8		8 RTS		CTS 8
22		9		9		9
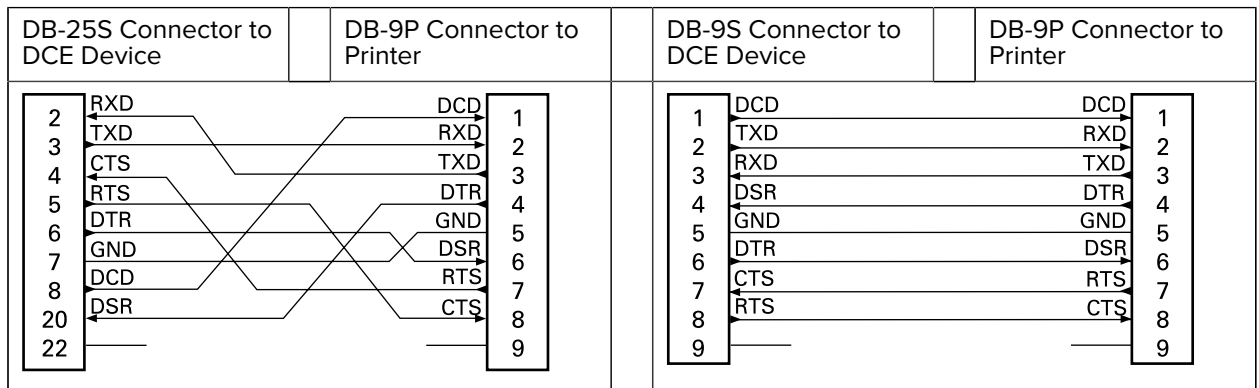
Connecting to the KDU (Keyboard Display Unit)—The KDU was designed for DCE printer connections and requires a Zebra custom serial port gender-changing adapter. The KDU now includes the KDU adapter and the Zebra kit part number for the KDU Adapter is 105934-088.

Dimensions

This section provides external printer dimensions.

GK Printer External Dimensions

NOTE: All dimensions are in inches.

Label Dispenser Dimensions

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.

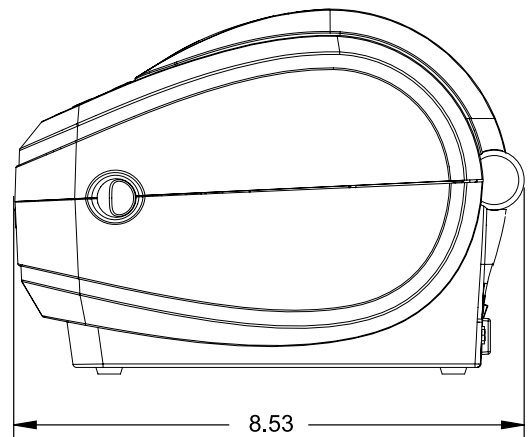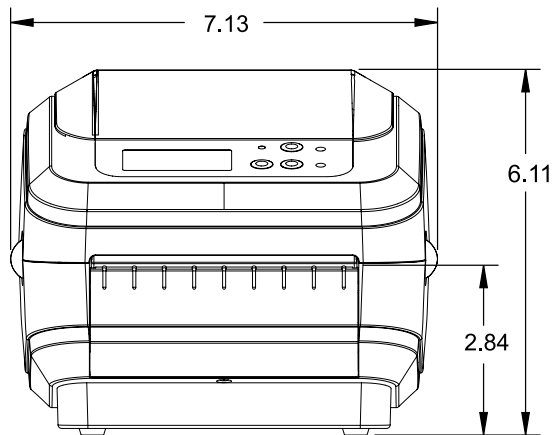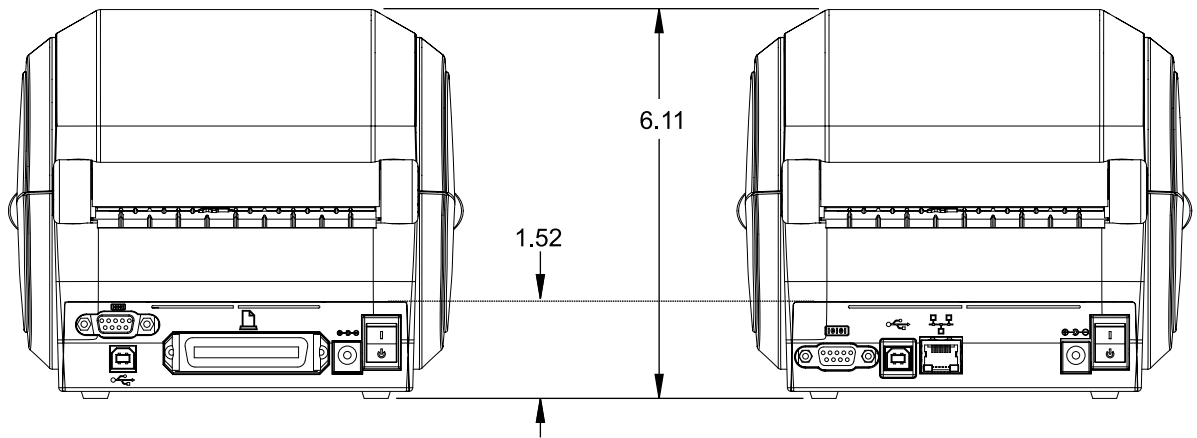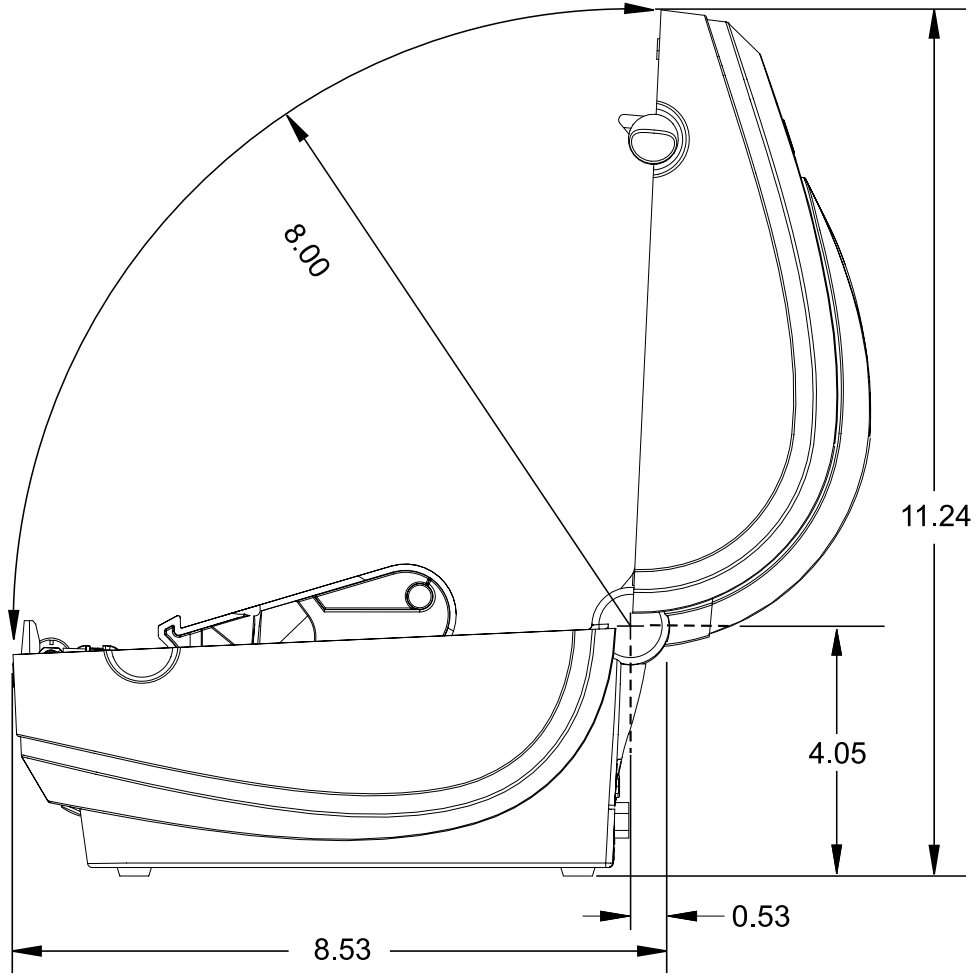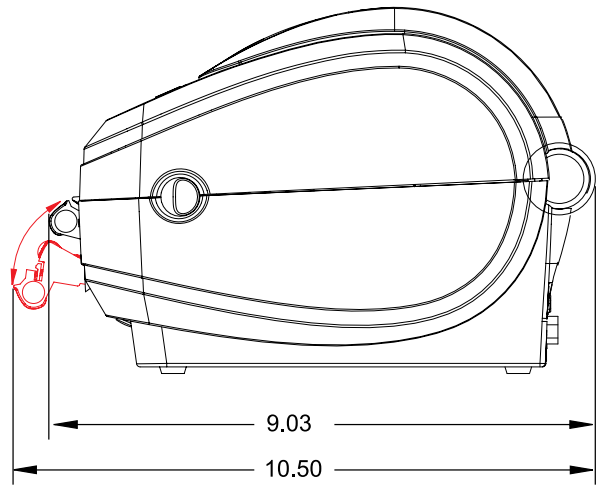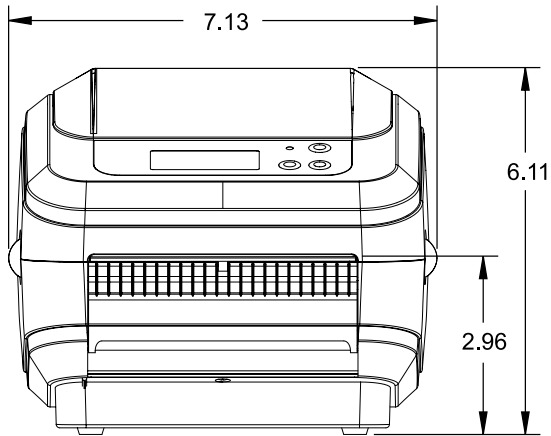Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, power is cycled, or when you restore a parameter that has a factory default by using the **Feed** Button Mode four (4) flash routine. The ZPL Configuration Update command (^JU) saves and restores 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.

To assist the developer, the printer has a listing of the operating parameters, a Printer Configuration Label. It can be accessed by using the printer's **Feed** button and the Printing a Test (Printer Configuration) Label on page 23. The Zebra Setup Utility and the ZebraDesigner Windows driver also print this label and other printer status labels to 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 98 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 5   Configuration Label Printout

```
              PRINTER CONFIGURATION

Zebra Technologies
ZTC GK420d

10.0................. DARKNESS
5 IPS............... PRINT SPEED
+000................ TEAR OFF
TEAR OFF........... PRINT MODE
GAP/NOTCH.......... MEDIA TYPE
WEB................. SENSOR TYPE
AUTO............... SENSOR SELECT
812................ PRINT WIDTH
1240............... LABEL LENGTH
39.0IN    989MM..... MAXIMUM LENGTH
NOT CONNECTED...... USB COMM.
BIDIRECTIONAL...... PARALLEL COMM.
9600............... BAUD
8 BITS............. DATA BITS
NONE............... PARITY
DTR & XON/XOFF..... HOST HANDSHAKE
NONE............... PROTOCOL
AUTO............... SER COMM. MODE
<~>   7EH.......... CONTROL CHAR
<^>   5EH.......... COMMAND CHAR
<,>   2CH.......... DELIM. CHAR
ZPL II............. ZPL MODE
CALIBRATION........ MEDIA POWER UP
CALIBRATION........ HEAD CLOSE
DEFAULT............ BACKFEED
+000............... LABEL TOP
+0000.............. LEFT POSITION
NO................. HEXDUMP
038................ WEB S.
096................ MEDIA S.
021................ WEB GAIN
032................ MARK S.
032................ MARK GAIN
096................ MARK MED S.
090................ MARK MEDIA GAIN
096................ CONT MEDIA S.
031................ CONT MEDIA GAIN
066................ TAKE LABEL
CWF................ MODES ENABLED
................... MODES DISABLED
832 8/MM FULL...... RESOLUTION
V61.17.8ZP04A <-... FIRMWARE
1.3................ XML SCHEMA
V25.00.06.......... HARDWARE ID
CUSTOMIZED......... CONFIGURATION
2104k.............R: RAM
1536k.............E: ONBOARD FLASH
NONE............... FORMAT CONVERT
DISABLED........... ZBI
2.1................ ZBI VERSION
2,147,356 IN....... LAST CLEANED
2,147,356 IN....... HEAD USAGE
2,147,356 IN....... TOTAL USAGE
2,147,356 IN....... RESET CNTR1
2,147,356 IN....... RESET CNTR2
TOP-98............. SERIAL NUMBER
MAINT. OFF......... EARLY WARNING
2010-07-05 13:24:49 TIME STAMP
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

1 —

99

1	Sensor Settings used for Service Purposes

Table 12 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 13   ZPL Commands and Configuration Receipt Callout Cross-Reference

Command	Listing Name	Description
^MP	MODES ENABLED	Default: CWF (See ^MP Command) (CWFM 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	LAST CLEANED	X,XXX IN
^MA	HEAD USAGE	X,XXX IN
~RO	TOTAL USAGE	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR1	X,XXX IN
—	SERIAL NUMBER	XXXXXXXXXXX
^JH	EARLY WARNING	MAINT. OFF

The printer has the ability to set a command or a group of commands once for all receipts (or labels) that follow. Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, or you restore factory defaults.

Printer Memory Management and Related Status Reports

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 recommended that a single command be processed within this type of format (form). A single command is easily reused as a maintenance and development tool.

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 sixteen (16) alphanumeric characters followed by a three (3) 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 14 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 Feed Button mode one flash routine.

Table 14   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. **NOTE:** 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.